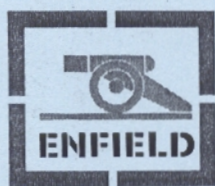
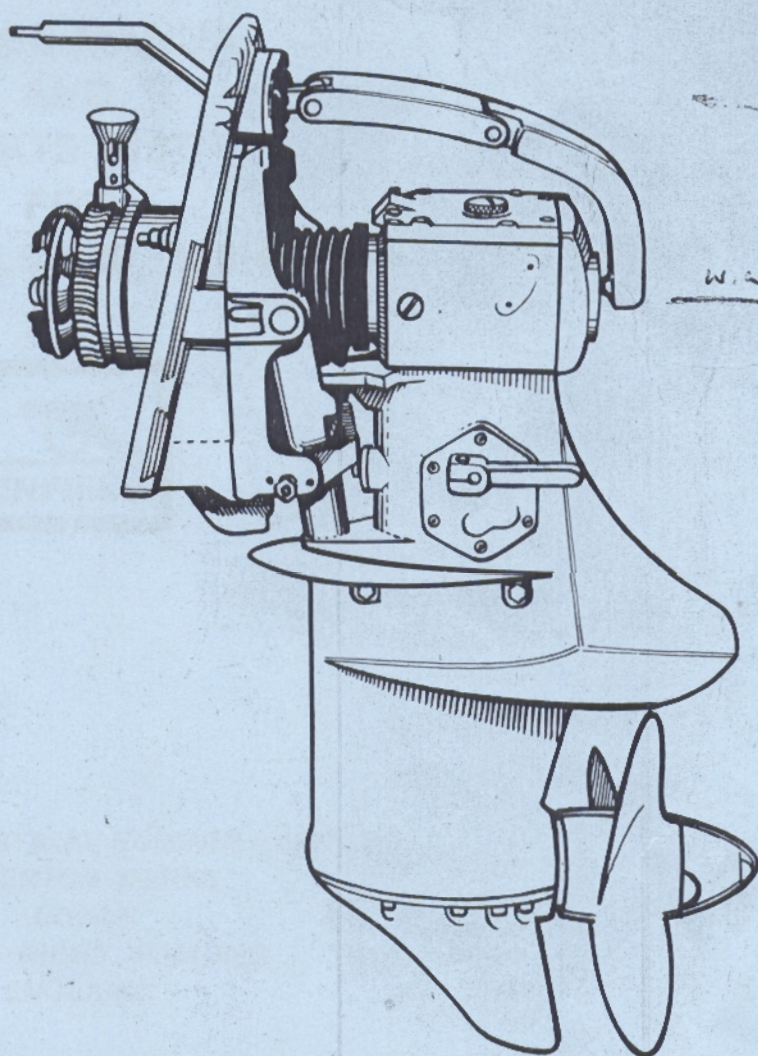


ENFIELD

Z-DRIVE TRANSOM UNITS SERVICE MANUAL AND PARTS LIST



COWES ENGLAND

ENFIELD

Z-DRIVE
TRANSOM UNITS

SERVICE MANUAL
AND
PARTS LIST
FOR
MODELS 130, 130H



ENFIELD INDUSTRIAL ENGINES LIMITED
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This booklet is published by ENFIELD INDUSTRIAL ENGINES LIMITED and every endeavour is made to ensure that the information contained in this manual is correct at the date of publication, but due to continuous development, the manufacturers reserve the right to make alterations without notice.

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29 -
ROBIN STAW

DESCRIPTION

The ENFIELD "Z-DRIVE" transom unit is a transom mounted drive unit incorporating a reverse and reduction gear. It is suitable for adaption to either petrol or diesel engines within its power capacity.

Installation is easily accomplished, the standard mounting plate being arranged to suit a transom raked aft at 12° to the vertical. Where the transom is at a different angle an adaptor block is used.

DRIVE

Power from the engine is supplied through a flexible rubber-metal coupling to the drive unit input shaft. Two constant-velocity universal joints transmit the power to the top bevel gears and thence via the floating mainshaft to the gearshift bevels on the propeller shaft.

PROPELLER ROTATION

The standard propeller rotation is left hand, i.e. anti-clockwise looking forward when in forward gear. Rotation can be in the opposite direction so that contra-rotating twin units may be used.

ENGINE ROTATION

The "Z-DRIVE" transom unit is only to be

used on engines which rotate anti-clockwise when viewed from aft.

GEAR CHANGE

An external lever, on the port side of the unit, controls the gear change by an internal linkage to the sliding dog clutch on the propeller shaft. A lock comes into operation automatically in the astern gear position to prevent the unit kicking up under reverse propeller thrust. The external gear change lever is arranged to suit a single lever control cable and quick release cable fittings are embodied. Gear positions are forward, neutral and reverse.

LUBRICATION

The unit must be filled with oil, up to the centre line of the input shaft. The filler plug is situated on the upper housing top cover, and the level plug is on the port side of the upper housing.

STEERING

Steering is by a tiller arm which is adaptable to either wire rope and pulleys or a proprietary push pull system.

TECHNICAL DATA

The unit serial number, consisting of 6 digits commencing with 2ZE, is found stamped on the port side of the Drive Housing. This

number should be quoted on all spares and service queries. The Power Trim Model carries its own serial number and the suffix "H".

| | 130 | 130H |
|---|--|---|
| * Torque Capacity | 140 lb. ft. torque at speeds up to 5500 r.p.m. | |
| Weight | 90 lb. 41 kg. | 95 lb. |
| Lubricating Oil Capacity | 8.5 pt. 4.8 L | 8.5 pt. 4.8 L |
| Type of Lubricant | E.P. 90 | E.P. 90 |
| Oil for Power Trim | — | — |
| Reduction Ratio | 1.65:1 or 2.0:1 | 1.65:1 or 2.0:1 |
| Articulation: Lift Rearward (total) Trim Angle Forward Steering Athwartships Rotation | 55° 6° 34° (30° at steering arm) 135° | 55° 6° 34° (30° at steering arm) — |
| Transom Angle | 12° | 12° |
| Propellers (for further details see Page 32) | Small Spline 12½ in. dia. to 14 in. dia. | |

For a recommendation of propeller sizes, consult either a naval architect, the distributor or Enfield Industrial Engines Ltd.

*Torque is given by Horse Power multiplied by 5250
divided by RPM at Horse Power Rating.

Central Engine Installations in Catamarans and Vessels having otherwise normal installations but exceeding 20,000 lb. displacement must have the 'H' Model.

OPERATING, LUBRICATION AND MAINTENANCE INSTRUCTIONS

The Z-DRIVES are a transmission system for boats allowing a direct coupling to an engine without a gearbox being required. Also incorporated are steering and either a kick-up system or power trim.

STEERING

This is done usually with a proprietary push-pull system and the patented exterior linkage will require little maintenance.

GEARSHIFT

There are ahead, neutral and astern positions of gear movement and the angle of movement and length of the Z-DRIVE operating lever are designed to suit one recommended stroke of a cable system. These systems have alternative strokes available by selecting a different anchoring hole on the control head. **THEY WILL NOT BE SUITABLE FOR THE Z-DRIVE.**

Operation is simple. Select neutral once the engine is started and is idling at its operating temperature, the control head lever can be moved to engage the desired gear. Further movement of the control head lever will give an increase in engine speed but no further gear engagement.

The engine may be stopped when a gear is engaged but starting should always be when in neutral and no gear shifting should be attempted when the engine is NOT idling.

LUBRICATION

Before entering service and at regular intervals (20 hours or monthly, whichever is the shorter period) the oil level in the unit must be checked. The level plug is on the outside near the top of the Z-DRIVE body. The Power Trim Models have a dipstick in the transom plate. Should the colour of the lubricant become grey or creamy, contamination by water has occurred and the cause should be ascertained. The lubricant should be changed at least once per season and preferably at 100 hour intervals, if this period is exceeded in one season.

ELECTROLYTIC CORROSION

As protection against galvanic action, the Z-DRIVE has a zinc block (5) fitted to the underside of the transom plate and a zinc ring

(218) just forward of the propeller. These should be inspected and replaced as they become eaten away.

A craft must be fitted with sufficient anodes to protect its own hull and fittings otherwise the whole sterndrive may act as such. Consultation with an expert on such anodes may be a wise precaution if in doubt.

NEVER use any paint on the hull or Z-DRIVE that contains copper.

PARKING MODEL 130 Z-DRIVE

SEE P. 11

If it is wished to leave the boat with the Z-DRIVE(S) parked, adopt the following procedure:—

Just before stopping the engine, engage astern. (This ensures that the drive will not slip off the reverse catch bar because the astern lock pin is under the catch). Pull on the plunger release cable to withdraw the locating plunger. The winding handle, when turned in the socket of the Z-DRIVE, will cause the body to swing sideways and upwards. (This will be possible in one direction only because of a stop plate on the swivel plate). Continue winding until the plunger re-engages. The Drive is then parked. For trailing support the Z-DRIVE body with ropes or blocks, etc.

POWER TRIM

Operation

If the system is correctly assembled, when the switch is pressed down the body will be trimmed inwards. This trimming will be finished when the rams are completely closed. There is no indication of this on the gauge but a change of note on the pump may be heard. Trimming out is achieved by pressing the switch upwards. If underway, a reading will be shown on the gauge (up to 600 p.s.i.) and when the needle swings quickly up to 1000 p.s.i. end of travel is reached. Continued operation under this condition will result in overheated wiring and damage.

Parking

It is recommended that the Power Trim Model Z-DRIVES are left parked with the bodies down. The rams are fully closed and there is no chance of marine growth on the piston rods.

INSTALLATION DETAILS

INSTALLATION OF DRIVE UNIT

The assembly is bolted through the transom which should be prepared as shown in *Figs. 1, 2 and 3*. It will also be noted that suitable reinforcing must be introduced to the transom. The drive unit is arranged to suit a standard transom angle of 12° although it is possible to accommodate other angles by making up a suitable adaptor block.

Generally speaking, it is recommended that the cavitation plate should be located within 0- $\frac{3}{4}$ inches (0 to 19 mm) below the keel (see *Fig. 2*).

On the 130 Z-DRIVE the out-drive unit should be installed initially with the locating tilt catch rod in the centre hole and the propeller shaft horizontal. A small angular adjustment of the propeller shaft with the rod in the other two holes is possible if it is found necessary to alter the trim. With fast single engine craft, where speeds over 30 mph (48 kph) are anticipated, it may be advisable to locate the engine and drive about $1\frac{1}{4}$ inches (31.75 mm) off centre towards the port side to minimise torque reaction.

ENGINE DRIVE SHAFT

Depending upon the mounting distance between the engine and "Z-DRIVE" transom unit, a balanced tubular drive shaft, (see page 30 and refer) conforming to the following dimensions, may be used.

3 inches diameter
Minimum Length ... 1 ft. 6 ins. ... (457.2 mm)
Maximum Length ... 4 ft. 10 ins. ... (1473.2 mm)

STEERING GEAR

The tiller arm is adaptable to either a wire rope and pulley system or a proprietary push pull cable system, with 9 ins. (228 mm) travel. The special steering linkage does not have to be disconnected from the drive before swivelling to the parked position or when the unit is tilted.

REMOTE CONTROL

Remote control of both engine throttle and gear change is by means of a "single lever" control which is available as an optional extra with cable lengths up to 30 feet (9.14 metres) and all necessary fittings. For details of remote control cable kits available refer to Accessories Section.

ELECTROLYTIC CORROSION

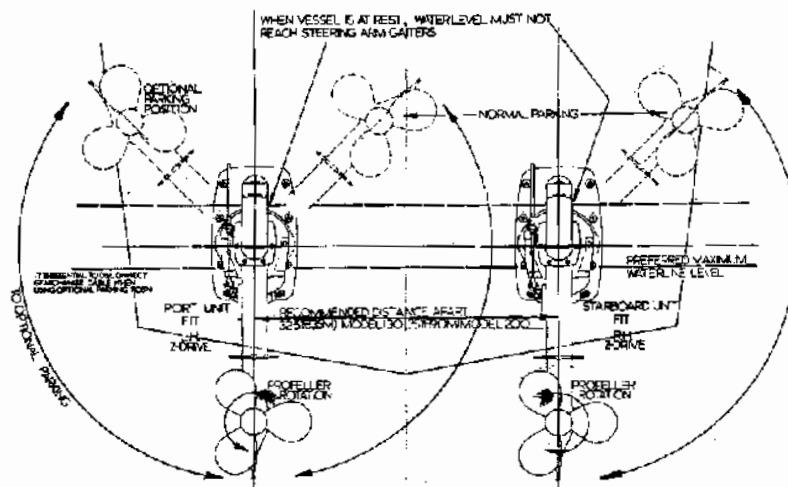
As the unit is of aluminium alloy construction, and copper alloys are commonly used in wooden boat construction, some trouble due to galvanic action should be anticipated unless precautions are taken.

It is recommended that an anti-fouling paint, as used with aluminium hulls and specifically free from copper, be applied to the bottom of the boat. This can also be used on the underwater part of the "Z-DRIVE" transom unit. Paints based on red lead should not be used.

A zinc sacrificial block is provided on the underside of the transom plate. The purpose of this block is to attract electrolytic erosion which would otherwise attack other "Z-DRIVE" components. This sacrificial block should never be painted. As it is the normal function of the sacrificial block to erode, it should be replaced periodically, as necessary. A zinc ring is also fitted forward of the propeller.

A master switch should be fitted in the earthed lead between the battery and starter motor to isolate the engine when the boat is out of use. Care should be taken to avoid earthing the unit to the engine or other metal work with the mounting bolts, controls, steering gear, etc.

When connecting radio, echo sounding equipment, etc., check polarity of engine earth.



INSTALLATION INSTRUCTIONS

When assembling the "Z-DRIVE" transom unit to the craft for the first time, it may be an advantage to use the "Z-DRIVE" transom plate for marking off purposes.

Removal of Transom Plate from "Z-DRIVE" Unit

When new, there will be no oil left in the unit, but on all other occasions, before removing the transom plate from the "Z-DRIVE", the oil must be drained.

The oil drain plug should be removed from the skeg, and the oil allowed to drain into a suitable clean container.

STANDARD MODELS

1. Loosen the jubilee clip around the gaiter over the universal joints (transom plate end only).
2. Remove the screws holding the steering arm assembly via the nylon cap to the transom plate. Withdraw the steering arm through the hole in the plate and allow the steering linkage to swivel away to one side.
3. Remove the two grub screws at the top of each leg of the swivel fork.
4. Tap outwards the two swivel pins connecting the fork to the swivel plate until the fork can swing away.
5. Move the gear lever so that the reverse stop pin is not protruding from its bush. The reverse catch can be pressed down and the body lifted away from the swivel plate. Remove the input shaft worm-wheel and worm-wheel housing from the transom plate as described below.
6. The transom can be marked off according to the *Figs. 2 & 3*, and after some preliminary cutting of holes, the plate may be offered up for drilling.
7. When all the necessary holes have been cut in the transom, the plate can be attached together with the gasket using the "Z-DRIVE" bolting kit 8093.

POWER TRIM MODELS

1. Loosen the clip around the gaiter over the universal joints (transom plate end only).
2. Remove the screws holding the steering arm assembly via the nylon cap and cup to the transom plate. Withdraw the steering arm through the hole in the plate, and allow the steering linkage to swivel away to one side.
3. Remove circlips off the end of the shaft on which the hydraulic cylinders are mounted, withdraw the shaft to one side, retaining the nylon and stainless steel washers as this is done. Note the order in which they are assembled. It is most important that the hydraulic cylinders are not rotated when at the innermost extreme of travel.
4. Loosen the allen screws found on the top of each leg of the swivel fork.
5. Tap outwards the two swivel pins connecting the fork to the transom plate, until the latter is free. The transom plate can now be handled separately from the "Z-DRIVE" body, which can be put to one side until required.

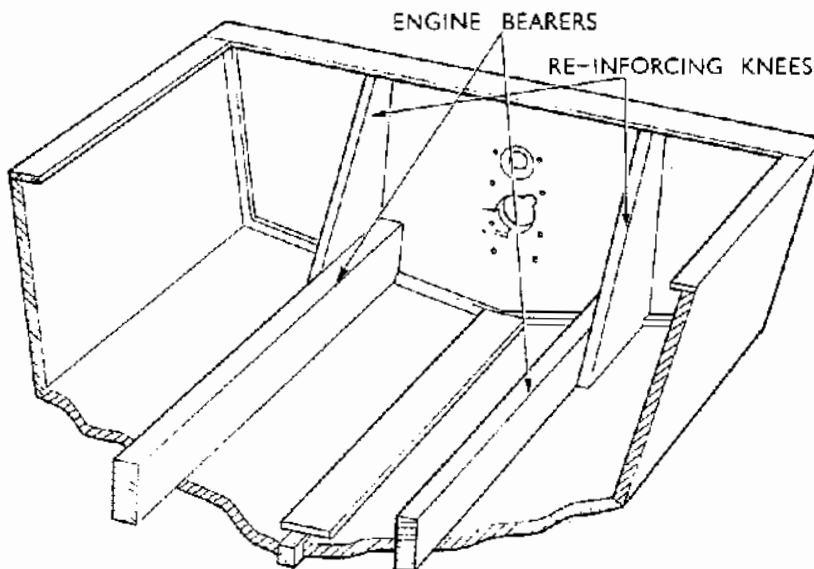


Figure 1

THE DISTANCE BETWEEN A PAIR OF "Z-DRIVES" WILL DEPEND ON THE ENGINES AND THEIR SIZE. IN THE CASE OF 130H "Z-DRIVE" THE MINIMUM DISTANCE IS MORE CRITICAL THAN WITH THE 130 BECAUSE WHEN CRANKING UP TO THE PARKED POSITION (NORMAL) THE PORT UNIT MUST NOT FOUL THE OTHER.

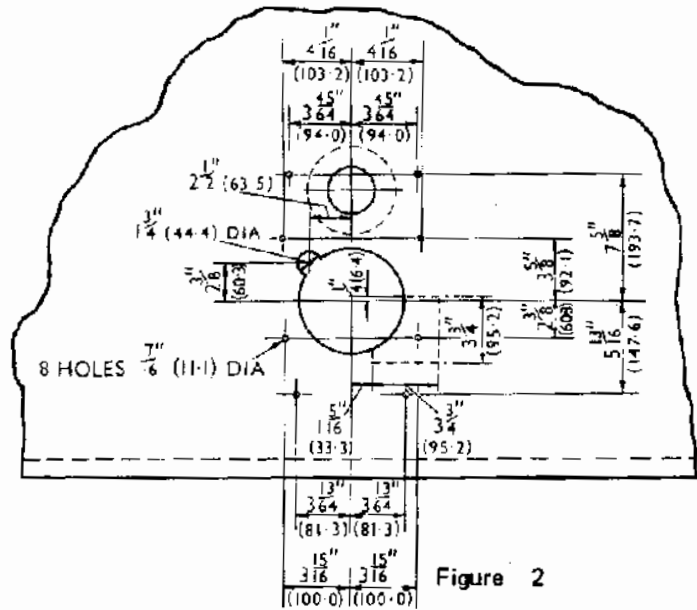
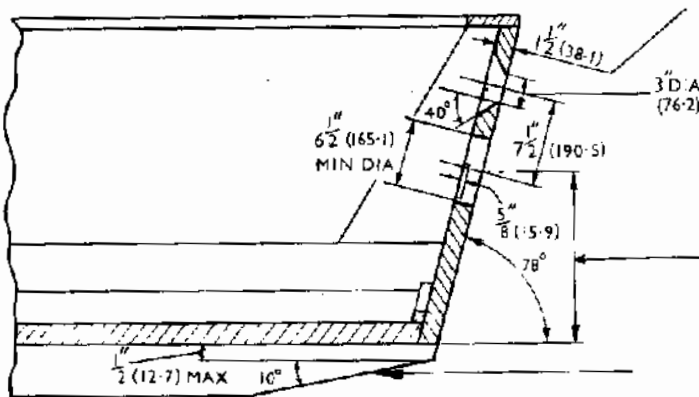


Figure 2

TRANSOM TO BE BUILT UP TO THIS DIMENSION BETWEEN RE-INFORCING KNEES



THIS DIMENSION TO BE—
MAX. 13.06" (332) FOR PLANING CRAFT
MIN. 11.31" (313) FOR DISPLACEMENT
CRAFT (NORMAL). FOR VESSELS
OPERATING FREQUENTLY IN SHALLOW
WATER A DIMENSION OF 15" (380) IS
SUGGESTED. DISPLACEMENT AND
HULL SHAPE MUST BE CONSIDERED
WITH CARE TO ENSURE GOOD ENTRY
FOR WATER INTO PROPELLER.

IF TRANSOM DOES NOT FORM AN ANGLE OF BETWEEN 74° AND 78° A WEDGE SHAPED BLOCK MUST BE FITTED

Figure 3

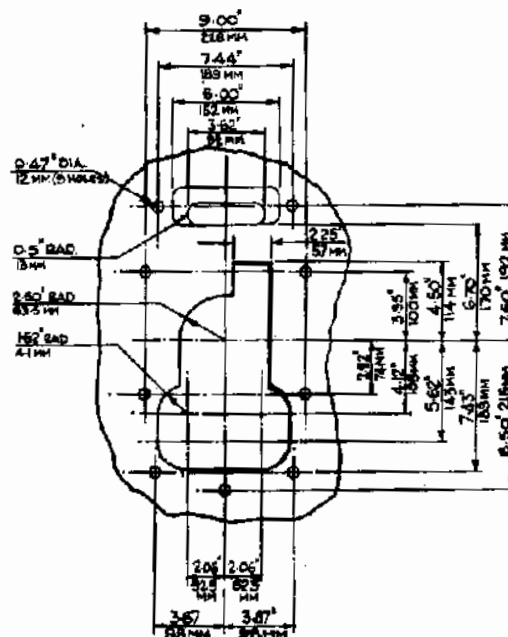
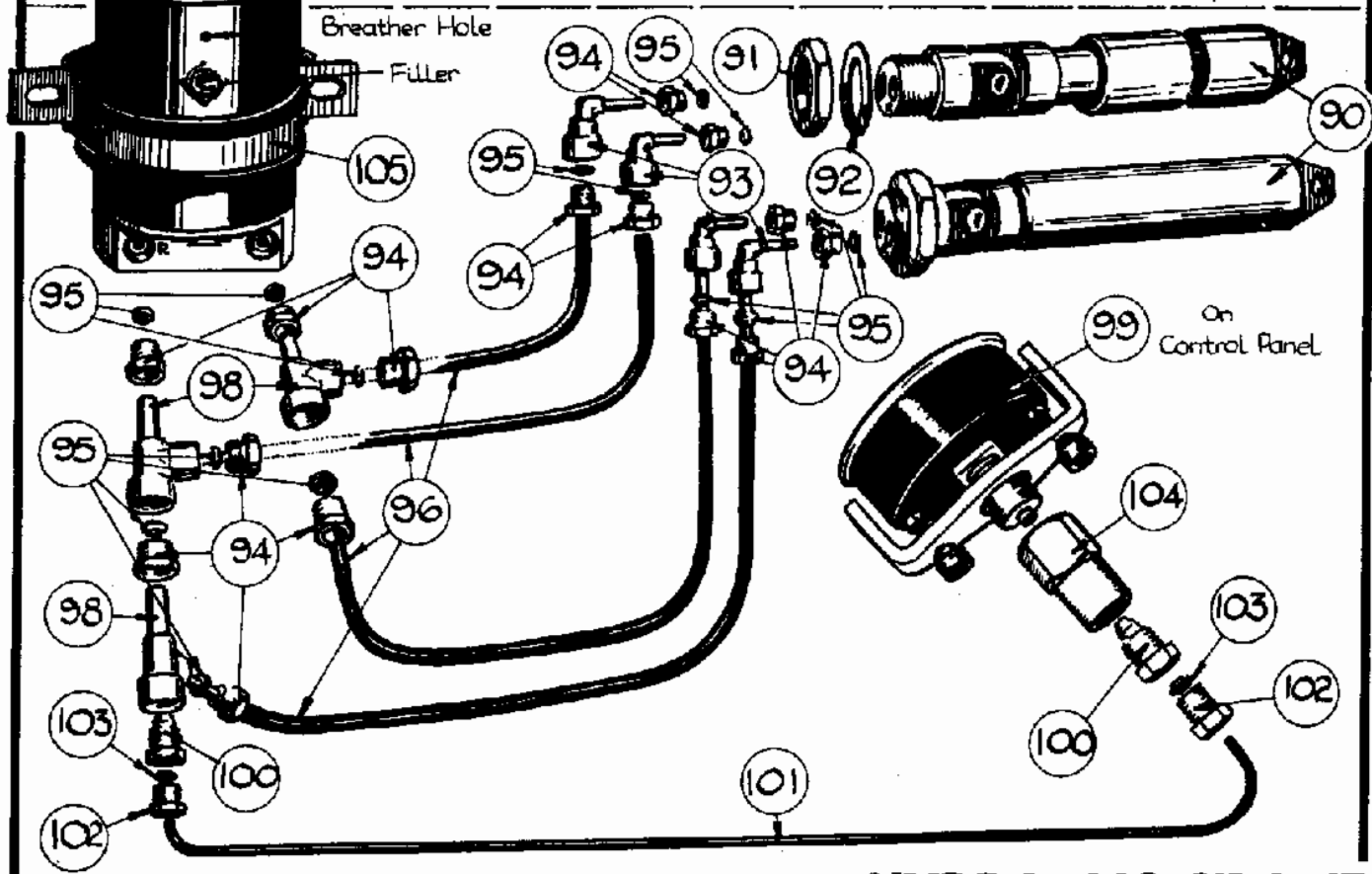
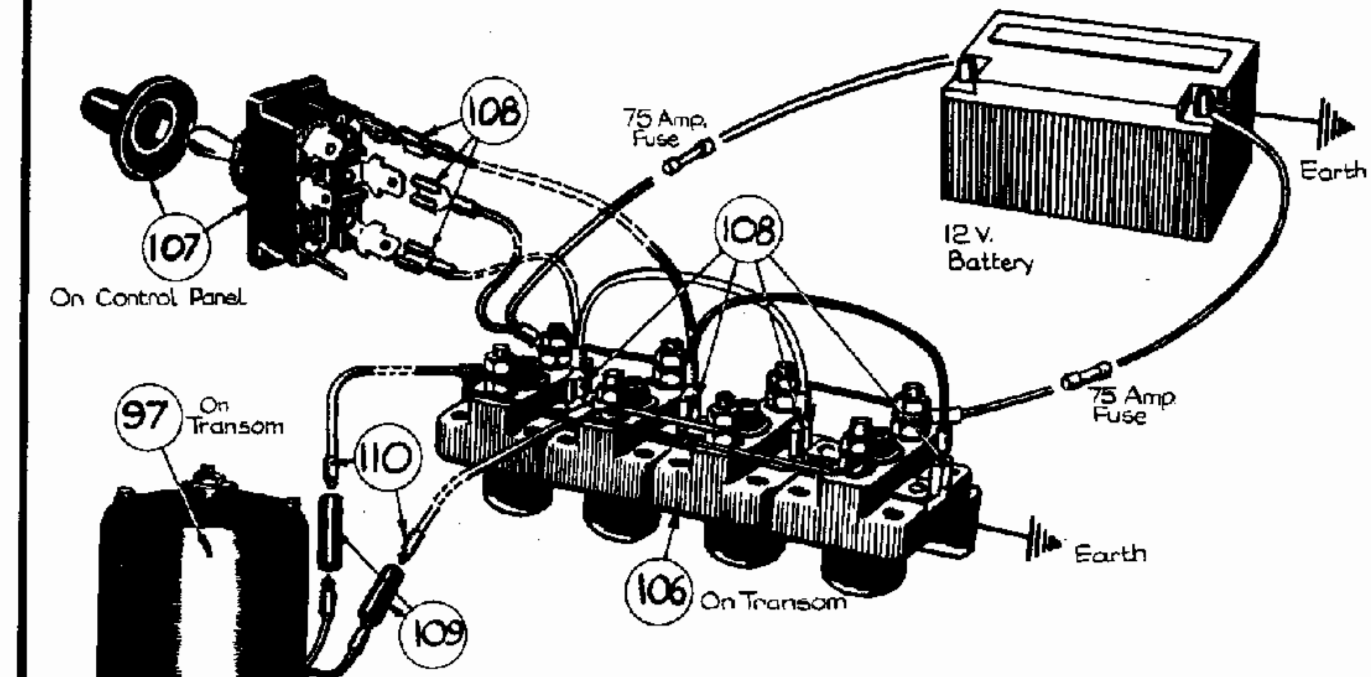


Figure 4

ELECTRICAL CIRCUIT



HYDRAULIC CIRCUIT

OVERHAUL SECTION

1. Transom Plate Assembly - 130
2. Transom Plate Assembly - 130H
3. Swivel Fork
4. Hydraulic Trim Tilt Equipment
5. 130 "Z-DRIVE" Housing, Lower
6. 130 "Z-DRIVE" Housing, Upper
7. Checking for Backlash

INTRODUCTION

Disassembly of the "Z-DRIVE" transom unit for inspection may be accomplished by following the procedures outlined below:-

1. Transom Plate Assembly:
2. Drive Housing
 - (a) Lower
 - (b) Upper

1. TRANSOM PLATE ASSEMBLY

When the disassembly procedure for any given section has been completed, any further disassembly indicated by inspection may then be carried out by following in detail the necessary additional procedures.

When removing or refitting ball and roller bearings, it is recommended that the housings, etc., should be heated in water to maintain manufacturing tolerances, and so avoid possible loosening of the bearings in the housings.

When re-assembling the unit, all gaskets and 'O' rings must be removed. Dirt is a major cause of wear and failure; therefore, conduct all maintenance operations in an area which is as clear and clean as possible. Place the disassembled parts on a clean surface and if they are to remain for an extended period of time, cover exposed surfaces, which can be contaminated by salt air, etc. For parts identification numbers refer to the illustrations contained in the Parts List section.

The following instructions assume that the unit has been removed from the craft. For ease of dismantling the unit can be split into two parts. These are (1) the Transom Plate and (2) Drive Housing. To accomplish this the following procedure should be adopted:-

Drain off the oil into a clean container.

TRANSOM PLATE ASSEMBLY 130

To Disassemble the Transom Plate Assembly

If the transom plate assembly has been removed from the craft with the close coupling components still connected, remove these first.

Knock back the tabwashers (61) locking the set screws (60) that hold the flexible couplings (59) to the input shaft (55). Unscrew the bolts (60) and remove the flexible coupling (59).

Undo the nut (57) on the universal coupling input shaft (55) and remove with the washer (58). The input shaft (55) can now, without the aid of special tools, be pulled out of the transom plate. It will bring with it the inner race to the roller bearing (21). Using a suitable drift, the universal coupling shaft (56) can be tapped through its ball bearing (22) in the opposite direction to which the input shaft was removed.

The oil seal (24) and bearings (21) in the swivel hub (20) can be inspected and if necessary changed.

Removal of Swivel Hub from Transom Plate

Remove from the hub the six socket screws (42), (retaining the wormwheel).(41)

Remove the seven socket screws (40) that retain the wormdrive housing (33) to the transom plate (1)

Rotate the swivel plate (44) and hub (20) so that the lug clears the hook in the transom.

Undo the six nuts (51) or the countersunk screws (54) and withdraw the swivel plate from the hub.

Using a suitable drift on the inboard end of the swivel hub (20) tap the swivel hub through the transom plate (1) in a rearwards direction. When the hub is clear, the sealing 'O' rings (29, 30) and nylon thrust washer (32) and bearing strips (31) will be evident and can be removed.

It is not necessary to remove the swivel hub (20) to replace the front oil seal (24) as this can be done after the input shaft (55) has been removed.

If the bearings roller (21) and ball (22) require renewal, the swivel hub (20) must be heated such as in boiling water and the bearings tapped clear with a drift or extractor.

The ball bearing (21) is retained by circlip (23) which should be removed before the bearing (21) is withdrawn.

The new bearings are pressed home hard against their locating shoulders with the bearings (22 & 21) cold and the hub (20) hot as before. If the oil seal (24) has been removed a new one may be fitted at this stage but after the hub (20) has cooled.

The 'O' rings (29 & 30) should be inspected and renewed if necessary. The washer (32) is located in its correct position and the nylon strips (31) fitted into their respective grooves. An application of a suitable water resistant graphite containing grease should be applied to the outer diameters.

The swivel hub is replaced within the transom plate, taking care that the nylon strips remain within their grooves as this is done.

THE SWIVEL PLATE ASSEMBLY

The only items on the swivel plate that may require replacing from time to time are the buffer (46), the two bushes (45), the rod (47) and nuts (48) left. In addition to these there is the swivel plate stop (49) with its screws (50) which may be moved to the opposite side of the swivel plate to allow for swivelling for parking in the opposite direction to that normally used.

NOTE: If this parking procedure is adopted, it is necessary to disconnect the gear change cable before parking to avoid damage to the cable.

To remove the buffer (46) merely unscrew as if it were a small bolt. Re-fit a new one, making sure that it is screwed up tight.

To renew the swivel bushes (45), place the swivel plate somewhere where the part of the plate that contains the bush can be adequately supported.

While using a suitable drift the bush is pushed through with a press or gently tapped through using a hammer.

The reverse is the procedure for fitting the new bushes but ensure that they do not protrude either side of the lugs.

The reverse catch rod (47) is normally positioned in the middle of the three holes but can be removed and used in either of the other two, whichever appears to give the best boat performance.

The removal of this bar can be done at any time and does not necessitate the dismantling of the "Z-DRIVE". If one of the nuts (48) is undone, the bar can be slid out sideways and re-fitted into whichever of the holes is thought to be the best position.

To re-fit the swivel plate assembly to the transom plate, the plate has to be slid over the spigot on the swivel hub and at the same time the lug at the bottom of the swivel plate engaged within the hook of the transom plate. The swivel hub is then rotated to align the holes within its flange with those on the swivel plate. The nuts (51) or countersunk screws (54) are re-fitted.

RE-FITTING THE WORMDRIVE HOUSING

The seven socket head screws (40) are fitted through the worm drive housing (33) and into the forward face of the transom plate (1). This is done with the cone pointing vertically upwards. The wormwheel is then attached to the swivel hub by six socket head screws (42). The constant velocity joint is tapped, from the rear, through the ball bearing (22) until fully home.

The input shaft (55) is fitted from the front of the transom, engaging with the splines of the constant velocity joint (56) and care should be taken when it is passing through the oil seal (24).

If the roller bearing (21) has been replaced within the swivel hub, the inner race previously fitted must be removed and the inner race to the new bearing fitted. Races and bearings are not interchangeable.

The input shaft is tapped along the shaft of the constant velocity joint until itself is hard against the bearing.

The washer (58) and nut (57) are then fitted on to the exposed thread of the constant velocity joint, the nut is tightened to 140 lb. ft. torque. The flexible coupling (59) screws (60) tabwashers (61) may now be re-fitted to the input shaft.

2. TRANSOM PLATE ASSEMBLY 130H

Disassembly of the Transom Plate

Dismantle the input coupling (59) from the input shaft (55) by removing the set-screws (60), plain washers (62) and tab washers (61, 68).

Remove the input shaft nut (57) and washer (58) from the internal bore of the input shaft. Using a soft drift, carefully drive out the constant velocity joint (56) from the input shaft. Using a suitable press, remove the input shaft from its bearings (21). After removal of the circlip (23) press out the bearings (21) and (22) and seal (24) from the transom plate.

If renewal of the swivel fork bushes (45) is intended, press out in the normal manner. Thoroughly clean and inspect all components for wear, pitting and cracks, etc. Renew worn or defective parts.

To Reassemble the Transom Plate

If the swivel fork bushes (45) were removed from the transom plate (69) during disassembly, new bushes should be fitted.

Assemble the transom plate (69) by carefully pressing the ball bearing (22) into the rear end of the plate, and secure with the circlip (23). Carefully press the roller bearing (21) into the front end of the plate and fit the input shaft seal (24) with the lip of the seal facing inwards.

Carefully press the input shaft (55) into the bearings (21) and (22). Engage the splines of the universal joint (56) with the internal splines of the input shaft (55) and secure them together with the input shaft nut (57) and washer (58).

Fit the input shaft coupling (59) to the input shaft (55) and secure with the set-screws (60), plain washers (62) and tab washers (61).

3. SWIVEL FORK

If the Swivel Fork (76) assembly has to be removed from the "Z-DRIVE" body, follow this procedure:—

Remove circlip (196) from shaft (192). Pull shaft (192) forwards out of "Z-DRIVE" body (156). Undo socket screws (89) keeping gaiter (181) out of the way, using a suitable tool, tap centre pin (86) upwards until clear of the "Z-DRIVE" body. The swivel fork can be slid forwards, exposing also the thrust-washers (87). Refit using procedure in reverse.

To replace the reverse catch (78) it should not be necessary for complete removal of the swivel fork. Undo the retaining socket screws (79). Unhook the spring (80). Withdraw the pins (77) outwards. The reverse catch is free of the fork assembly.

For the Power trim versions, apart from complete removal of the fork from the "Z-DRIVE" body only replacement of the shaft (82) or washers (83, 84) can be undertaken. Remove circlip (85) and tap the shaft (82) right through the fork (81). Retain the washers (83, 84) as this is done. Remember to keep the hydraulic cylinders (90) from bending outwards as the shaft passes through.

4. HYDRAULIC TRIM TILT EQUIPMENT

Installation of Electro-Hydraulic Motor Unit

Inboard, near to or in the transom, as close as possible to the "Z-DRIVE" unit, provide two drilled holes for the motor unit clamp, so that the pump will be in a dry position with its pipe connections approximately 6" higher than those in the cylinders.

The motor unit must be vertical, with the pump downwards. Suitable ¼" diameter cadmium plated screws or bolts should be used to mount the motor unit in the motor clamp. The relay unit should be mounted in a dry position close to the motor unit and held also by cadmium plated screws or bolts.

In accordance with diagram (*Fig. 5*)

- (a) Complete the electrical wiring, using the correctly rated wire, and 75 amp fuses;
- (b) Assemble the hoses so that the holes stamped 'R' on the rams are connected to the fitting in the hole stamped 'R' on the pump. (The connections must be made oil-tight but care must be taken not to overtighten the tube nuts). Keep pipes away from hot areas.
- (c) The pressure gauge is fitted so that the pipe from the instrument panel runs to a tee connection on the pressure pipes marked 'R'.

General

Fill with suitable oil, using a pressure type oil can until oil runs from filler hole.

Any brand of automatic gear box oil is suitable.

Operate unit several times to both extremities to remove air inclusions, and finally check oil level and replace filler cap.

To Disassemble the Hydraulic Trim and Tilt Gear

From time to time, it may be necessary to remove the hydraulic cylinder unit from the transom plate to inspect the knuckle joint seals, or it may be necessary to renew the internal 'O' ring seals, etc.

Do not attempt to replace internal components of the water pump or hydraulic rams.

To remove the hydraulic cylinder units (90) first remove the circlip (85) plain washer (84) nylon washers (83) and press out the swivel shaft (82) from the swivel fork (81).

This will enable the main body of the "Z-DRIVE" to be lifted clear of the hydraulic cylinders. Now, from inside the hull, unscrew the two tubing nuts (94) which hold the oil supply and return pipes to each cylinder, and remove the pipes.

Now undo the large nut (91) with nylon washer (92) and remove.

It will be necessary to keep the main body of the "Z-DRIVE" lifted out of the way whilst the hydraulic cylinders are removed.

Checking the Hydraulic Cylinder Units for Leakage

A simple method of checking the hydraulic cylinder and pumps for leakage and to observe that the cylinders and pumps function correctly is to re-connect the pipes (96) to the hydraulic cylinder.

The hydraulic units can now be suitably clamped and operated several times to both extremities to remove air inclusions, checking that the pump reservoir is correctly filled to the level of the oil filler hole.

It will be observed whether leakage occurs at the knuckle joint seals, piston rod seals, or any of the pipe connections.

If new rings are fitted into the grooves in the hinge tongue, the hinge fork must be very carefully fed over the tongue.

The parts should be well lubricated with oil before starting to re-assemble, making sure that absolute cleanliness is maintained.

Re-fit the pivot pin.

5. MODEL 130/130H

To Disassemble the Drive Body (Lower)

Knock back the tabs on the locking washer and turning anti-clockwise remove the propeller shaft spinner nut. Withdraw the propeller and distance piece from the propeller shaft (204).

Remove the clutch operating lever pivot pin (155) and sealing washer (156) from the skeg. Remove the two socket screws (219) and withdraw the zinc ring (218) from within the boss surrounding the propeller shaft.

Release and remove the ten socket screws (163) and sealing washers (129) which secure the skeg (162) to the body (161) and remove the skeg.

Remove the split pin (144) from this gear change operating rod (150, 151). In the case of R.H. rotation units — drawing section F — F refers to Plate A. Remove clutch operating lever (153) together with the dog clutch operating fork (154).

Lift the propeller shaft (204) complete with bearings, bevel gears, thrust washers, seal and dog clutch from the housing.

Withdraw the seal circlip (217) and seal (213) complete with housing (214) from the rear end of the propeller shaft. Using a suitable extractor remove the ball bearing (166) from the rear end of the propeller shaft. It will now be possible to remove the rear thrust washer (211), rear bevel gear (210), rear bevel gear bush (205), dog clutch (212), front bevel gear (205) and front thrust washer (211) from the propeller shaft. Remove the front bearing circlip (209) and bearing spacer (207). Press off the front bearing (206) and remove the second spacer (208), circlip (209) and front bevel gear bush (205) from the propeller shaft.

Loosen clamp screw (136) and remove the gear change operating lever (135) and key (132) — See Section C — C Plate A illustrated.

Remove the plug (139), washer (140), spring (138) and gear change locking plunger (137) from the gear change lever shaft bearing (126) or in the case of R.H. rotation units (126A). Remove circlip (85) and thrust washer (134) from the gear change lever shaft.

Release and remove the six screws (40), sealing washers (128) and plain washers (129) securing the gear change lever shaft bearing (126) to the housing. Remove the bearing and joint (127) from its location.

Withdraw the pin (141) which connects the operating lever (133) to the astern lock operating fork (142). See section D D Plate A, not present on 130H.

Disconnect the gear change operating rod (150) or (151) on R.H. rotation units from the gear change lever (133) by removing the securing pin (149) and withdraw the operating rod and lever from the unit.

Remove the 'O' ring (131) and circlip (85) from the gear change lever shaft (130). The shaft can now be pressed out of the gear change lever and the woodruff key (132) removed.

Note: Position of lever reversed on R.H. rotation units.

Withdraw the astern lockpin (145) and fork (142) from the lockpin bush (175). Remove the split pin (144), washer (143) and fork (142) from the astern lockpin.

Release and remove the two setscrews (196), washers (197) and vertical drive shaft retainer (195) from the housing. Using a suitable extractor remove the bottom bevel gear (193) from the vertical drive shaft and bearings.

The vertical drive shaft (194) can now be removed, care being taken to prevent the removable collar (198) from falling and becoming lodged in the housing.

With a suitable extractor remove the roller bearing (165) and ball bearing (166) from the bottom of the housing. Disassembly of the drive housing (lower) comprising the skeg bottom bevel gears and the lower housing, is now complete.

Before inspection and reassembly, all parts should be thoroughly washed in clean paraffin. Carefully inspect all components for wear, pitting and cracks, etc. Renew all parts considered unserviceable

To Reassemble the Drive Body (Lower)

Using a suitable press, fit the bottom bevel drive gear ball bearing (166) and roller bearing (165) to the body (161) ensuring that each bearing is fitted in to the full extent of its recess.

Refit the vertical drive shaft (194) with collar (198) into the drive housing and using a press, fit the bottom bevel drive gear (193) into the roller bearing (165) and ball bearing (166).

Fit the vertical drive shaft retainer (195) to the housing and secure with the two setscrews (196) and washers (197).

Fit the 'O' ring (176) into the astern lock pin bush (175) and refit the bush and sealing washer (169) into the body (161). Refit the fork (142) and washer (143) to the astern lock pin (145) and secure with split pin (144). Assemble the lock pin into the bush.

Fit the woodruff key (132) to the inner end of the gear change shaft (130) and using a suitable press, assemble the gear change lever (133) to the shaft and secure with the circlip (85).

Place the gear change operating rod (151) (151 R.H. rotation unit), in position in the housing and connect the gear change lever (133) to the rod with the pin (149).

N.B. As the assembly of this item varies according to direction of rotation, it should be noted that the above instructions refer to the L.H. rotation unit and is illustrated in the main drawing whilst the assembly of the R.H. rotation unit is illustrated in Section F – F – Plate A.

Connect the gear change lever to the astern lock operating fork (142) with the pin (141). (Not on 130H).

Fit the 'O' ring (131) to the gear change lever shaft and using a new joint (127) fit the gear change shaft bearing (126) (126A for R.H. rotation) to the housing and secure with the six screws (40), sealing washers (128) and plain washers (129).

N.B. Refer to illustration for correct method of

fitment of the gear change shaft bearing (126) and (126A) as this varies with left or right hand rotation units.

Assemble the thrust washer (134), circlip (85) and woodruff key (132) to the gear change shaft.

Fit the locking plunger (137), spring (138), washer (140) and plug (139) to the rear change shaft bearing (126) or 126A on R.H. rotation units.

Fit the key (132) and the gear change operating lever (135) to the shaft (130) and secure with the clamp screw (136).

N.B. It should be noted that on L.H. rotation unit the lever will point aft, whereas on a R.H. one it will point forward; two key-ways are provided on the shaft for this purpose.

Onto the front end of the propeller shaft (204) assemble the front bevel gear bush (205), the rearmost of the two circlips (209) and bearing spacer (208) then press on the front bearing (206), fit the foremost spacer (207) and secure with the second circlip (209).

Onto the rear end of the shaft assemble the front bevel gear (210), the dog clutch (212), the rear bevel gear (210) and the rear thrust washer (211), press on the rear bearing (166) and fit the propeller shaft seal (213), complete with housing (214) and 'O' ring (215).

To ensure that the bearing (166) is correctly positioned, place the assembled propeller shaft in its location in the housing, ensuring that the seal housing locating pin (216) engages with the locating hole in the seal housing (214). Check that clearance exists between the front face of the bearing and the rear face of the rear bevel gear thrust washer (211), and also between the rear face of the bearing and the front face of the seal housing (214).

With the propeller shaft assembly correctly positioned, check the backlash between the bottom bevel drive gear (193) and both propeller shaft bevel gears (210). Clearance between these gears should be within the limit of 0.008 in to 0.012 in. (0.20/0.30 mm). Should the backlash require adjustment, thrust washers (211) of the required thickness should be fitted to bring the backlash within the above limits.

When the dog clutch operating fork (154) is in the groove of the dog clutch, place the clutch operating lever (153) in position. Connect it to the gear change operating rod (150), (151 for R.H. rotation units) and secure with the split-pin (152).

The faces of the skeg and housing are

machined flat. On these units when re-fitting the skag a suitable jointing compound should be used. Place the skag (162) in position on the housing, ensuring that the tabs on the thrust washers (211) locate in their respective slots in the skag. Secure the skag with the ten socket screws (163) and sealing washers (129). Fit the rear seal housing retaining circlip (217).

Fit the clutch operating lever pivot pin (155) and washer (156) to the skag, ensuring that it is correctly located in the clutch operating lever (153).

Replace the zinc ring (218) in the boss surrounding the propeller shaft and secure with two socket screws (219).

Refit the distance piece, propeller, lock washer and spinner nut. With the spinner effectively tightened, secure with the locking washer tabs.

Refill the unit to the correct level with oil. Oil capacity of the unit is 8½ pints (4.8 litres). E.P. 90 gear oil should be used.

6. To Disassemble the Drive Body (Upper)

Remove the eight screws (171) securing the top cover (167) to the housing and remove the top cover and joint (170).

Remove the six socket screws (140) and spring washers (179) which retain the bevel gear bearing housing (177) to the body. Withdraw the bearing housing and joint (178) from the body.

Using a suitable extractor, carefully remove the bevel gear (192), roller bearing (165) and ball bearing (166) from the bevel gear bearing housing (177).

Remove the circlip (203) from the universal joint and input shaft assembly (199). Using a suitable press, remove the universal joint from its bearing (22).

Remove the two circlips (23) from the housing and press the universal joint shaft bearing (22) from the housing.

Withdraw the vertical drive shaft bevel gear (192). Before the bearings (165 and 166) can be removed, the vertical drive shaft (194) and collar (198) must be withdrawn. This can be accomplished by dismantling the lower housing as described in the earlier section. The vertical drive shaft can be withdrawn and using a suitable extractor, remove the vertical drive shaft bevel gear (192), roller bearing (165), ball bearing (166) and collar (198) from the housing.

If renewal of the centre swivel pin bushes (45) is intended, press out in the normal manner.

Thoroughly clean and inspect all components for wear, pitting and cracks, etc. Renew worn or defective parts.

To Reassemble the Drive Housing (Upper)

If the centre swivel bushes (45) have been removed for renewal, fit new bushes.

Fit the ball bearing (166) roller bearing (165) to the housing, ensuring that the bearings are fitted to the full extent of their recesses. Replace the vertical drive shaft (194) and ensure that collar (198) is correctly positioned and reassemble the lower housings, as described in the earlier section. Re-fit the vertical drive shaft bevel gear (192).

Fit the inner bearing circlip (23) to the housing and fit in the universal joint shaft bearing (22). Fit the second of the circlips (23).

Press the universal joint and input shaft assembly (199) into its bearing (23) and secure with the circlip (203).

Fit the ball bearing (166), roller bearing (165) and bevel gear (192) to the bevel gear housing (177) ensuring that the races fit in to the full extent of their recesses.

Fit the bevel gear bearing housing (177) to the body (161) using a new joint (178) and secure with the six socket screws (40) and spring washers (179). With the aid of a feeler gauge, check the backlash between the top bevel gear and the vertical drive shaft bevel gear. Clearance between these two gears should be within the limit of 0.008 in to 0.012 in. (0.20/0.30 mm). Adjustments to the clearances is obtained by the addition of extra joints (178) to the bevel gear housing (177).

Assemble the top cover (167), using a new joint (170) to the housing and secure with the eight screws (171).

7. CHECKING FOR BACKLASH

Re-fit into bearings in bearing housing top bevel gear (220). Slip gear (221) into bearings at the top of the housing. With two joints (178) offer the bevel gear housing with the gear up to the body. Check as follows:—

- (a) When looking at the inner faces of the gear, not the teeth, ensuring that the edges of the teeth are in line with the edges of the teeth of the mating gear.
- (b) When a clock gauge is mounted with its stylus on the pitch circle diameter, the other gear being held, the reading given should be 0.008 in. — 0.012 in. (min. to use).

To correct for (a) :—

It is unlikely with minimum shimming to start with that either gear will be too high, so the first step is to observe which gear has teeth whose faces are behind those of mating gear. The gear that has such teeth requires additional shimming.

To correct for (b) :—

However, when faces are in line, backlash may not be correct. If it is too much, additional shimming will be necessary on both gears.

If it is too little, shimming has to be taken away from both gears. On vertical gear (221) shim is put between gear and ball bearing. For top input gear (220)

shimming is done by using extra joints (78).

On ahead and astern gears (238) on propeller shaft assembly, adjustment is made by fitting different thickness of thrust washer (236).

When backlash is correct, the assembly may continue:—

Slip vertical bevel gear (221) on vertical driveshaft (223). Re-fit washer (225) and setscrew (226).

Holding hose clip (189) loosely over gaiter (190) put gaiter over spigot provided on the body (180) and tighten clip to seal.

Using soft-faced mallet, tap constant velocity joint (227) through ball bearing (22) until shoulder of joint is hard against bearing. Fit retaining circlip (203) into groove on shaft. The assembly of parts in bearing housing may be re-fitted and held in place with six screws (40) and washers (179). Top cover (167) with gasket (170) is fitted back into place and fixed with screws (171).

PARTS LIST

METHOD OF IDENTIFYING AND ORDERING SPARE PARTS

The Parts List contains the numbers and descriptions of all parts comprising the Model 130 & 130H "Z-DRIVE" Transom Units, together with a Supplementary Section giving those of the recommended propellers and other principal accessories. (For further details of Accessories, see separate leaflet).

IDENTIFICATION

Each part contained in the Unit is located in its section in columns headed as follows:—

Ref. No.

Relates the item concerned to its position on the drawing.

S or N.S.

'S' indicates that the item in question is available as a spare part.

'N.S.' indicates that the item is not available as a spare part by itself.

(For various reasons, some sub-assemblies or component parts can ONLY be supplied in the complete assembly. It is therefore necessary, before ordering, to determine whether or not the part required is, in fact, available separately).

Qty. Req.

Indicates the total quantity of the particular item in the assembly, or group, in which it is contained.

Part No. & Description

Is self-explanatory.

Remarks

Contains supplementary notes and information.

As a guide for use of the Parts List, the following examples are given:—

1. Locate the item required and its Ref. No. on the drawing.
2. Locate the Ref. No. in the list, so as to check whether 'S' or 'N.S.' determine quantity, and ascertain part number and description.
 - (a) If the part is indicated 'S', then it can be ordered separately, e.g. Ref. No. 7 in the Transom Plate and

Swivel Section on Page 20 is read as:

33432309 Sleeve, Swivel Plate Locking Plunger

This is indicated 'S' and, therefore, is available as a spare part.

- (b) If the part is indicated 'N.S.' then it can only be supplied inside its containing assembly, e.g. Ref. No. 112 in the Transom Plate and Swivel Section on Page 22 is read as:

37378581 Link, Steering Upper

This is indicated 'N.S.' and can ONLY be supplied inside the assembly of which it is part. This assembly is covered by the first number in the next left hand column reading upwards which is:

41425716 Assembly Link

and is the one that should be ordered.

ORDERING

When ordering parts, it is imperative to quote the serial number of the Unit and to specify the part number, description and quantity of the items required. If in doubt, then the reference numbers should also be given to facilitate identification by your Dealer.

The Unit serial number will be found stamped on the port side of the Drive Housing; it consists of six digits, commencing 2ZE, and we would again stress the importance of always quoting the number and giving complete information if parts orders are to be promptly expedited.

All enquiries relating to parts and accessories should be addressed to:—

**ENFIELD INDUSTRIAL ENGINES LIMITED
SOMERTON WORKS
COWES
ISLE OF WIGHT, ENGLAND**

**PHONE: COWES 4711
CABLES: 'DIESELS' COWES**

| Ref. No. | S or NS | Qty. Req. | For NS Model | Part No. | Description | Remarks |
|---|---|---|--------------|---|---|---------|
| — 1 2 3 4 5 6 | S NS S S S S | 1 1 10 1 1 1 | 130 only | 37814125 37527182 32815117 32114126 7055 36131314 2224568 | TRANSOM & SWIVEL PLATE ASSEMBLIES Assembly, transom plate comprising:— Transom Plate Pin, swivel plate stop. Plug Nipple, oiling Block, zinc Screw, zinc block to transom plate | |
| 7 8 9 10 11 12 | S S NS S S S | 1 1 1 1 1 1 | | 33432309 2725499 32723109 32815117 31744128 2415702 | Sleeve, swivel plate locking plunger Circlip, sleeve locating Plunger Pin Spring 'O' ring | |
| 13 14 15 16 17 | S S S S S | 1 1 1 1 1 | | 36285105 32713113 2221281 2131037 2117269 | Fork end, plunger release Pin, shackle, cable Grub screw Washer Split pin | |
| 19 | S | 1 | | 36863113 | Gasket "Z-DRIVE" to transom | |
| — 20 21 22 23 24 25 | S S S S S S | 1 1 1 1 1 6 | 130 only | 710947 33426381 2546106 0040020 2721790 2415507 2131041 | Swivel hub assembly, comprising:— Hub, swivel plate Bearing, roller, input shaft Bearing, ball, input shaft Circlip locating bearing Seal input shaft Stud-swivel plate to hub | |
| 29 30 31 32 | S S S S | 1 1 2 1 | | 2415821 33824117 36841412 33822406 | 'O' Ring — rear (Swivel hub to transom plate) 'O' Ring — front (Swivel hub to transom plate) Strip (Swivel hub to transom plate) Thrustwasher (Swivel hub to transom plate) | |
| — 33 34 35 36 37 38 39 40 41 42 43 | S S S S S S — — S S S | 1 1 1 2 1 1 2 2 1 7 1 6 1 | | 710914 710951 37522441 2513089 32456408 31173109 2513970 2115261 37442415 2222255 31173201 2222712 31774124 | Assembly, housing worm drive and assembly worm and shaft comprising:— Assembly worm drive housing Housing, worm drive Bush, worm drive housing Shaft, worm drive Worm Thrust washer, worm drive Pin, worm to shaft and tube assembly to shaft. Tube assembly Socket screw, worm drive housing to transom plate. Wormwheel Socket screw Handle, cranking | |
| — 44 45 46 47 48 49 50 51 52 | S NS S S S S S S S | 1 1 2 1 1 2 1 2 6 6 | 130 only | 710938 38167553 2513911 2634018 32524137 2211284 36113133 2224281 0576064 2131041 | Assembly, swivel plate comprising:— Plate swivel Bush top pins/swivel fork to plate Buffer, swivel plate Rod, locating catch — swivel fork Nut, retaining rod Plate, stop — swivel plate Screw — plate to swivel plate Nut — swivel plate Washer — to swivel hub | |

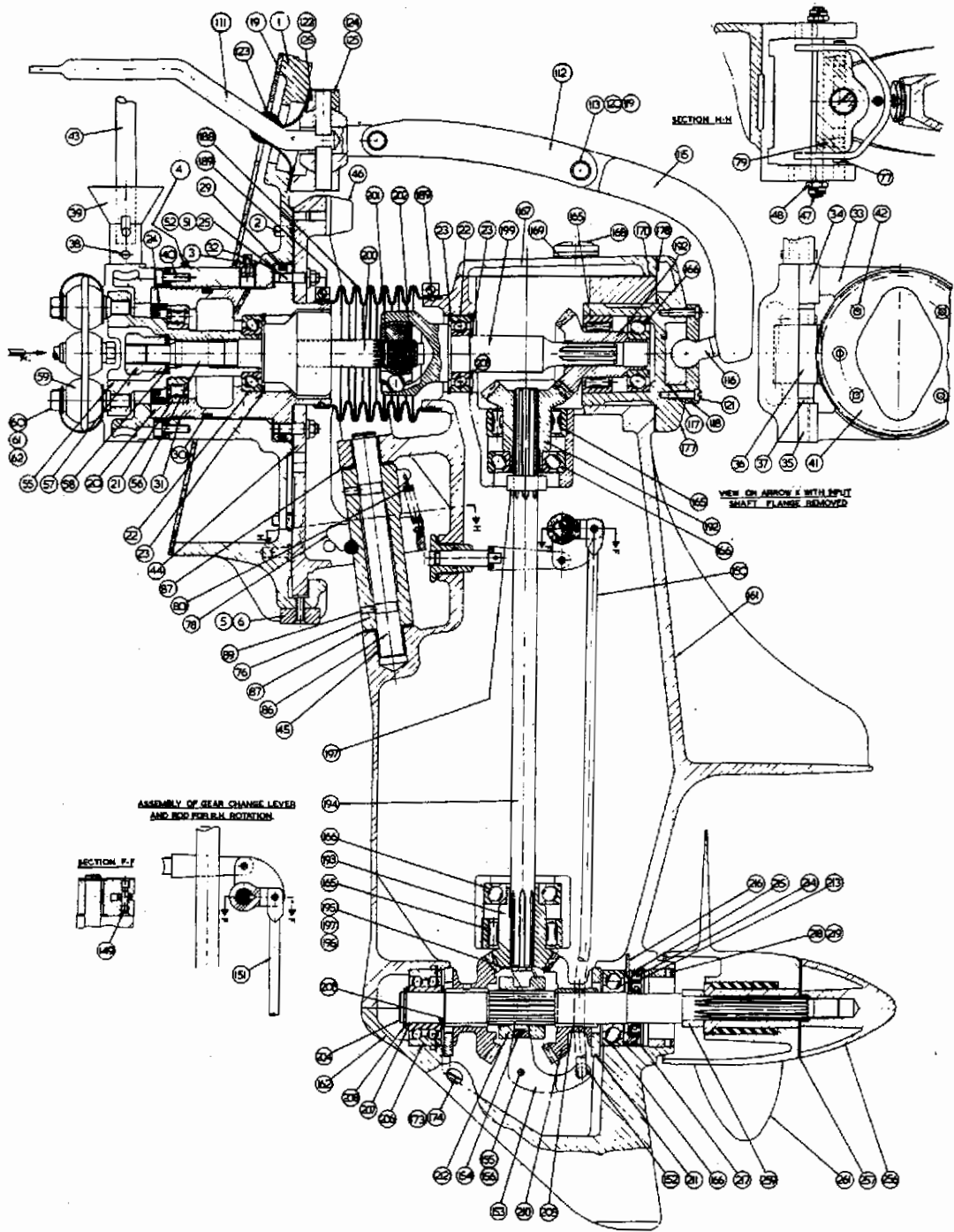
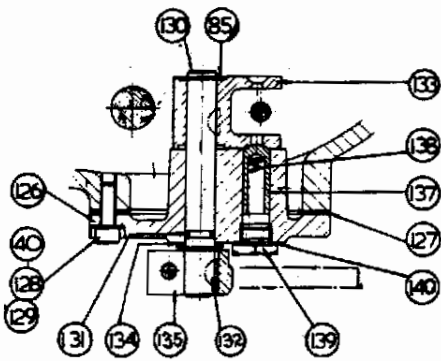
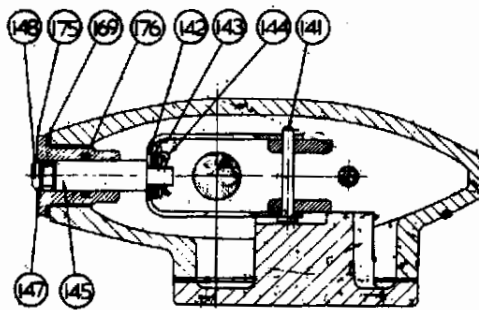


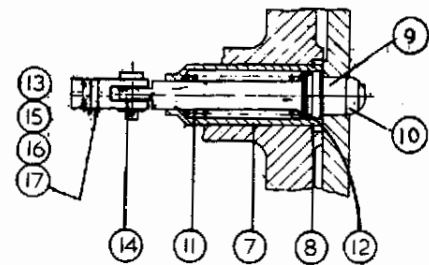
Plate A Model 130 Assy.



Section C-C



Section D-D



Section E-E

| Ref. No. | S or NS | Qty. Req. | For NS Model | Part No. | Description | Remarks |
|----------|---------|-----------|--------------|-------------------------------------|---|---------|
| 55 | S | 1 | 130/130H | 37466511 | TRANSOM & SWIVEL PLATE ASSEMBLIES (contd) | |
| 56 | S | 1 | | 2584601 | Shaft input | |
| 57 | S | 1 | | 33531116 | C.V. Joint - input | |
| 58 | S | 1 | | 33121412 | Nut. C.V. Joint to input shaft | |
| 59 | S | 1 | | 2581215 | Washer. C.V. Joint to input shaft | |
| 60 | S | 2 | | 0096635 | Coupling, flexible | |
| 61 | S | 2 | | 36478311 | Setscrew - Coupling to input shaft | |
| 62 | S | 2 | 2131043 | Tabwasher - Coupling to input shaft | | |
| 69 | S | 1 | 130H only | 7285 | Assembly Transom Plate, with 5, 6, 45, 21, 22, 23, comprising:- | |
| 70 | S | 1 | | 7003 | Transom plate | |
| 71 | S | 1 | | 7074 | Oil filler neck extension | |
| 72 | S | 1 | | W18275 | Oil filler neck extension | |
| 73 | S | 2 | | DE2010 | Oil filler cap | |
| | | | | 7076 | Pin, locating hydraulic cylinders | |
| | | | | 7286 | Assembly Transom Plate, with 5, 6, 22, 28, 23, 27, 45, 69, 70, 71, 72, comprising:- | |
| | | | | | Transom Plate | |
| 75 | S | 1 | 130H | 7008 | Gasket, "Z-DRIVE" to transom | |
| 76 | S | 1 | 130 | 37378571 | SWIVEL FORK ASSEMBLY Fork, swivel | |
| 77 | S | 2 | | 32716123 | Pin, pivot - locating catch | |
| 78 | S | 1 | | 36671134 | Catch, swivel fork locating | |
| 79 | S | 2 | | 2221281 | Socket screw, retaining pin to fork | |
| 80 | S | 1 | | 31751111 | Spring, swivel fork to catch | |
| 81 | S | 1 | 130H | 7005 | Fork, swivel | |
| 83 | S | 4 | | 7010 | Washer, nylon, cylinder to shaft | |
| 84 | S | 2 | | 33117417 | Washer, plain, cylinder to shaft | |
| 85 | S | 2 | | 2727177 | Circlip, cylinder to shaft | |
| 86 | S | 1 | All Models | 32716121 | Pin, centre-fork to body | |
| 87 | S | 2 | | 33813312 | Washer, thrust - to body | |
| 88 | S | 2 | | 32716119 | Pin, fork upper | |
| 89 | S | 4 | 130 | 2221285 | Socket screw retaining pins | |
| 89 | S | 3 | 130H | 2221285 | Socket screw retaining pins | |
| - | - | 1 | 130H | 9003 | HYDRAULIC TRIM/TILT Assembly, comprising:- | |
| 91 | S | 2 | | 7100 | Nut | |
| 92 | S | 2 | | 7099 | Washer | |
| 93 | S | 4 | | 7103 | Elbow stem | |
| 94 | S | 8 + | | 7104 | Nut - tubing | |
| 95 | S | 8 + | | 7105 | Sleeve - tubing | |
| 96 | S | To suit | | 7217 | Hose | |
| 97 | S | 1 | | 7219 | Motor pump | |
| 98 | S | 3 | | 7216 | Tee | |
| | | 1 | | 9008 | Gauge kit with items 92, 93, 96 | |
| 99 | S | 1 | | 7218 | Gauge | |
| 100 | S | 1 | | 7166 | Reducer | |
| 101 | S | To suit | | 7163 | Hose | |
| 102 | S | 2 | | 7165 | Nut | |
| 103 | S | 2 | | 7164 | Sleeve | |
| 104 | S | 1 | | 7162 | Adaptor | |
| 105 | S | 1 | | 7214 | Clamp motor pump | |
| 106 | S | 1 | 7213 | Relay bank | | |
| 107 | S | 1 | 7215 | Switch - and shroud | | |

| Ref. No. | S or NS | Qty. Req. | For NS Model | Part No. | Description | Remarks |
|----------|---------|-----------|---------------|----------------------|--|--|
| 108 | S | 7 | | 7167 | HYDRAULIC TRIM/TILT (contd) Terminal | |
| 109 | S | 2 | | 7161 | Connector — bullet | |
| 110 | S | 2 | | 7291 | Terminal — bullet | |
| 111 | S | 1 | 130/ 130H | 38636111 41425716 | STEERING LINKAGE Assembly steering arm | Ref. Page 19, and for later units Plate F. on page 25. |
| 112 | NS | 1 | | 37378581 | Assembly link and bushes comprising:- | |
| 113 | S | 4 | | 2513906 | Link steering, upper Bush steering, upper | |
| 115 | S | 1 | | 37374601 | Link steering — lower | |
| 116 | S | 1 | | 32732115 | Ball, lower steering link | |
| 117 | S | 1 | | 32813107 | Cup, inner — steering ball joint | |
| 118 | S | 1 | | 33825111 | Cup, outer — steering ball joint | |
| 119 | S | 2 | | 32716125 | Pin — upper link to steering arm & lower link | |
| 84 | S | 4 | | 33117417 | Washer — upper link to steering arm & lower link | |
| 120 | S | 2 | | 2221511 | Socket screw — upper link to steering arm & lower link | |
| 121 | S | 4 | | 2224282 | Screw, linkage to bevel gear housing | |
| 122 | S | 1 | | 41476002 | Cup, steering arm to transom | |
| 123 | S | 1 | | 33825426 | Geiter, steering arm to transom | |
| 124 | S | 1 | | 33823113 | Cap, steering arm to cup | |
| 125 | S | 8 | | 2224933 | Screw cup to transom & cup to cap | |
| 126 | S | 1 | | 37421511 | Gear Change Linkage | |
| 126A | S | 1 | | or 37421512 | Bearing, gear change, L.H. | |
| 127 | S | 1 | | 36822517 | Bearing, lever shaft, R.H. | |
| 40 | S | 6 | | 2222255 | Gasket, bearing to body | |
| 128 | S | 6 | | 2415924 | Socket screw bearing to body | |
| 129 | S | 6 | | 2131040 | Washer, sealing — bearing to body | |
| 130 | S | 1 | | 32732113 | Washer, plain — bearing to body | |
| 131 | S | 1 | | 0730135 | Shaft, gear change lever | |
| 132 | S | 2 | | 0500003 | 'O' Ring, sealing shaft | |
| 85 | S | 2 | | 2727177 | Key, gear change shaft | |
| 133 | S | 1 | | 37376481 | Circlip, retaining | |
| 134 | S | 1 | | 33812114 | Lever, operating gear change & astern lock | |
| 135 | S | 1 | | 37366641 | Washer, thrust | |
| 136 | S | 1 | | 2222712 | Lever, operating | |
| 137 | S | 1 | | 32455506 | Socket screw, clamping | |
| 138 | S | 1 | | 31742126 | Plunger, locking gear change | |
| 139 | S | 1 | | 32161212 | Spring, locking gear change | |
| 140 | S | 1 | | 33812113 | Plug retaining spring gear change Washer plug | |
| 141 | S | 1 | 130 | 32711408 | Pin, astern lock fork to lever | |
| 143 | S | 1 | | 33114411 | Washer, astern lock pin operating | |
| 144 | S | 1 | | 0610016 | Split pin, astern lock pin to fork | |
| 145 | S | 1 | 130 only | 32724105 | Pin astern lock | |
| 147 | S | 2 | | 33111411 | Washer | |
| 148 | S | 1 | | 32148311 | Screw adjusting | |
| 149 | S | 1 | 130/ 130H. | 32114125 | Pin — gear change rod to lever | |
| 150 | S | 1 | | 34161109 | Rod, gear change operating — L.H. Rotation | |
| 151 | S | 1 | | or 34161111 | Rod, gear change operating — R.H. Rotation | |
| 152 | S | 1 | | 0610002 | Split pin rod to lever | |
| 153 | S | 1 | | 37376119 | Lever, bell crank clutch operating | |
| 154 | S | 1 | | 37378551 | Fork, operating dog clutch | |
| 155 | S | 1 | | 32182112 | Pin, pivot — bell crank lever | |
| 156 | S | 1 | | 33811111 | Washer, sealing — pin to body | |

| Ref. No. | S or NS | Qty. Req. | For NS Model | Part No. | Description | Remarks | |
|----------|---------|-----------------|---------------|----------|--|-----------------------|--|
| 161 | S | 1 | 130/ 130H | 710954 | ASSEMBLY BOOY, SKEG & GEARS, etc. Assembly body and bearings, comprising:— Assembly body comprising:— Body, drive Skeg Socket screw, skeg to body Washer, sealing socket screw Bush, centre pin swivel fork Bearing, roller-gear, vertical shaft Bearing, ball-gear, vertical shaft Bearing, ball — C.V. joint — rear Circlip, locating ball bearing | | |
| 162 | NS | 1 | | 0999999 | | | |
| 163 | S | 10 | | 37522491 | | | |
| 129 | S | 10 | | 37171751 | | | |
| 45 | S | 2 | | 2222256 | | | |
| 165 | S | 2 | | 2415924 | | | |
| 166 | S | 2 | | 2513911 | | | |
| 22 | S | 1 | | 7222 | | | |
| 23 | S | 2 | | 0040005 | | | |
| | | | | 00040020 | | | |
| | | | 2721790 | | | | |
| 167 | S | 1 | All Models | 37532891 | Cover top | | |
| 168 | S | 1 | | 32168105 | Plug, oil filler — top cover | | |
| 169 | S | 1 | | 0920351 | Washer, plug oil filler to cover | | |
| 170 | S | 1 | | 36857407 | Gasket, top cover to body | | |
| 171 | S | 8 | | 2224283 | Screw top cover to body | | |
| 172 | S | 1 | | 32168104 | Plug, oil level | | |
| 140 | S | 1 | | 33812113 | Washer, plug (oil level) to body | | |
| 173 | S | 1 | | 32158105 | Plug, oil drain (skeg) | | |
| 174 | S | 1 | | 33812112 | Washer, plug oil drain to skeg | | |
| 175 | S | 1 | | 130 only | 33533114 | Bush, astern lock pin | |
| 169 | S | 1 | | 0920351 | Washer, sealing bush to body | | |
| 176 | S | 1 | | 2415710 | 'O' ring, sealing astern lock pin | | |
| 168 | S | 1 | 130H/ | 32168105 | Plug — blanking | | |
| 177 | S | 1 | 130/ 130H | 710948 | Assembly housing top bevel gear comprising:— Housing, top bevel gear Bearing, roller Bearing, ball Gasket Housing top bevel gear to body Socket screw Housing top bevel gear to body Washer spring Housing top bevel gear to body | | |
| 165 | S | 1 | | 37446221 | | | |
| 166 | S | 1 | | 7222 | | | |
| 178 | S | 2 or to suit | | 0040005 | | | |
| 40 | S | 8 | | 36861724 | | | |
| 179 | S | 6 | | 2222255 | | | |
| | | | | 2134155 | | | |
| 183 | S | 1 | 130/ 130H | 37584125 | Splash plate | | |
| 185 | S | 2 | All models | 33134428 | Distance piece, splash plate to body | | |
| 186 | S | 2 | | 2227285 | Setscrew (rear) splash plate to body | | |
| 187 | S | 2 | | 2227283 | Setscrew (front) splash plate to body | | |

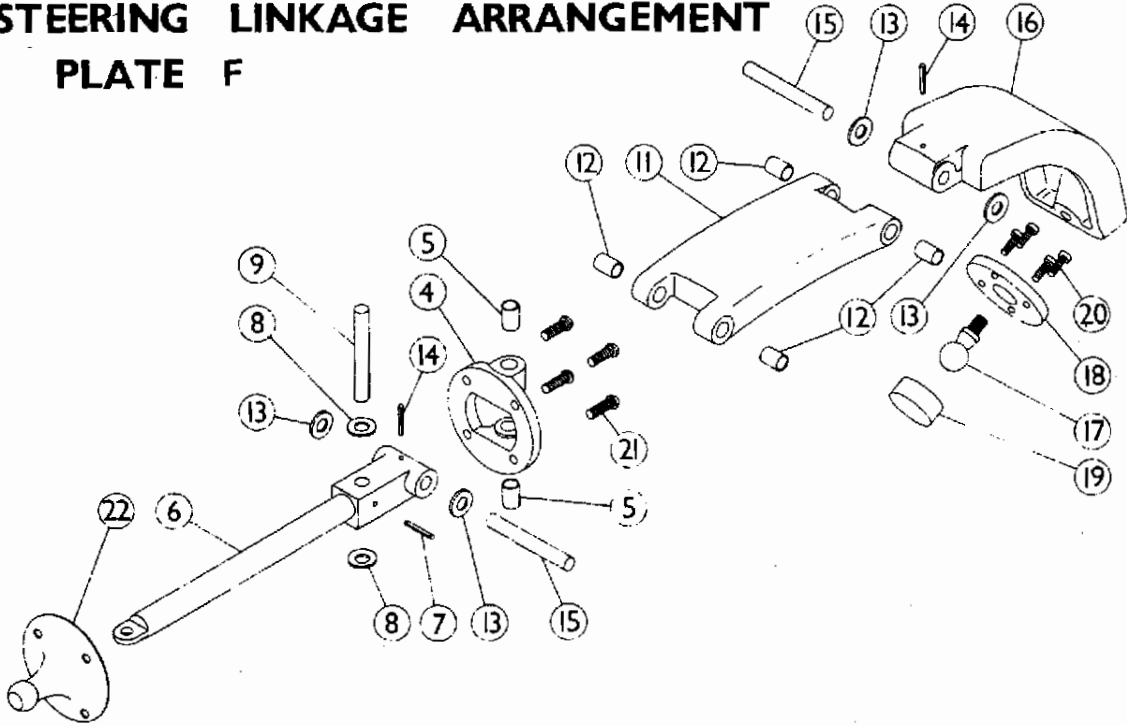
| Ref. No. | S or NS | Qty. Req. | For NS Model | Part No. | Description | Remarks |
|---|--|---|--------------|--|---|---------|
| 188 189 | S S | 1 2 | 130/ 130H | 33884112 7002 | ASSEMBLY BODY, SKEG & GEARS, etc. (contd) Gaiter - C.V. Joint cover Clip, sealing gaiter | |
| 192 193 194 195 196 197 198 | S S S S S S S | 2 1 1 1 2 2 1 | 130/ 130H | 31174141 31174132 32462114 36612118 0748352 0920052 33177512 | GEARS AND SHAFTS -- BODY Bevel gear top (1 in body and 1 in top bevel gear housing) Bevel gear - lower Shaft - vertical drive Retainer - vertical drive Screw - Retainer to body Washer - Retainer to body Collar - locating vertical shaft | |
| 199 200 201 202 203 | S S S S S | 1 1 1 1 1 | | 710911 2584602 33451522 2724459 2725191 2724410 | Assembly C.V. joint (rear) and intermediate shaft, comprising:- C.V. joint (rear) Shaft intermediate Circlip retaining, shaft to C.V. joint Circlip retaining, shaft to C.V. joint Circlip - C.V. joint to bearing | |
| 204 205 206 207 208 209 210 211 212 166 213 214 215 216 217 218 219 | S S S S S S S S S S S S S S S S | 1 2 1 1 1 2 2 As Reqd. As Reqd. As Reqd. 1 1 1 1 1 1 1 1 2 | | 32767422 33431405 7147 33123118 7146 2724322 31174152 31138101 31138102 31138103 33571122 0040005 2415520 33411503 2415817 2116024 31736114 33151507 2171711 | Assembly propeller shaft Shaft propeller Bush, propeller shaft Bearing, double row ball Spacer bearing to shaft Spacer bearing to shaft Circlip bearing to shaft Bevel gear - propeller shaft Thrust washer (0.0279/0.282) bevel gear Thrust washer (0.292/0.295) bevel gear Thrust washer () bevel gear Dog clutch, propeller shaft Bearing, ball propeller shaft Oil seal propeller shaft Housing, oil seal propeller shaft 'O' ring sealing housing propeller shaft Pin, locating housing Circlip, retaining oil seal housing Ring (zinc) Socket | |

ENFIELD Z-DRIVE TRANSOM UNITS

Note that the hole for the Roll Pin (Ref. Nos. G7 & G14 Part No. 7296) is drilled through the Pin (Ref. Nos. G9 & G15 Part No. 7233) after

assembly. The hole is 0.125/0.120 in diameter. (3.05/3.17 mm dia.). Care must be taken to ensure that the Roll Pin is a tight fit.

STEERING LINKAGE ARRANGEMENT PLATE F



| Ref. No. | S or NS | Qty. Reqd. | Part No. | Description | Remarks |
|----------|---------|------------|----------|---------------------------------------|--|
| G1 | S | 1 | 7299 | Steering Arm & Links Assy. | Comprising Ref. Nos. G2, G10, G13, G14, G15, G16, G17 & G18 Comprising Ref. Nos. G3, G6, G7, G8 & G9 Comprising Ref. Nos. G4 & G5 See Item G3 Comprising Ref. Nos. G11 & G12 See Item G10 |
| G2 | S | 1 | 7282 | Steering Arm Pivot Assy. | |
| G3 | S | 1 | 7301 | Housing & Bushes Assy. | |
| G4 | NS | 1 | 7238 | Housing, Steering Arm Pin | |
| G5 | S | 2 | 2513906 | Bush, Housing Steering Arm | |
| G6 | S | 1 | 7242 | Link & Arm Assy. | |
| G7 | S | 1 | 7296 | Roll Pin - Steering Arm | |
| G8 | S | 2 | 7010 | Washer - Steering Arm | |
| G9 | S | 1 | 7233 | Pin - Steering Arm | |
| G10 | S | 1 | 7225 | Link & Bushes Assy. | |
| G11 | NS | 1 | 7067 | Link Steering, Upper | |
| G12 | S | 4 | 2513906 | Bush Steering, Upper Link | |
| G13 | S | 4 | 7010 | Washer - Upper Link | |
| G14 | S | 2 | 7296 | Roll Pin - Steering Arm & Lower Link | |
| G15 | S | 2 | 7233 | Pin - Upper Steering Arm & Lower Link | |
| G16 | S | 1 | 37374601 | Link Steering, Lower | |
| G17 | S | 1 | 32762115 | Ball, Lower Steering | |
| G18 | S | 1 | 33825111 | Cup - Outer Steering Ball | |
| G19 | S | 1 | 32813107 | Cup - Inner Steering Ball | |
| G20 | S | 4 | 2224282 | Screw - Cup to Bearing Housing | |
| G21 | S | 4 | 2224933 | Screw - Housing to Transom | |
| G22 | S | 1 | 33B25426 | Gaiter, Steering Arm to Transom | |

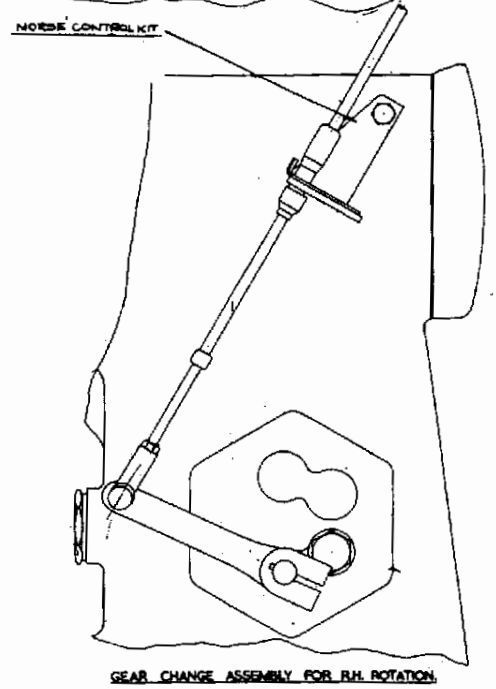
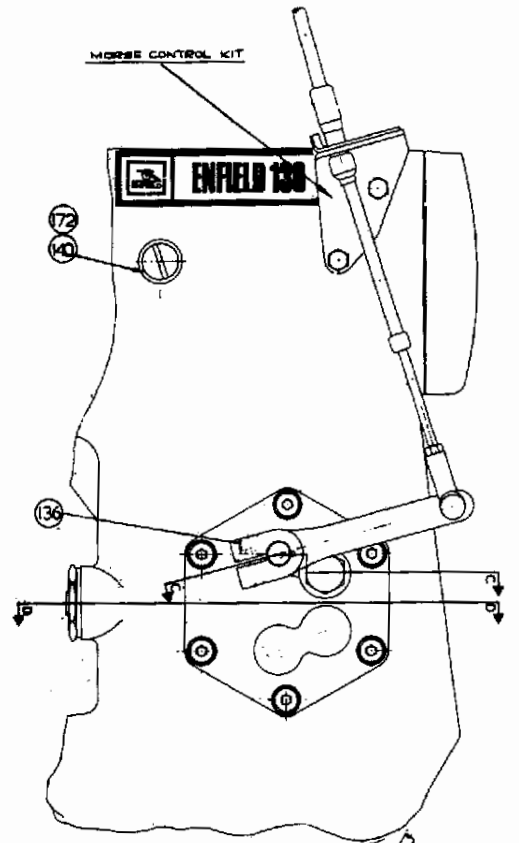
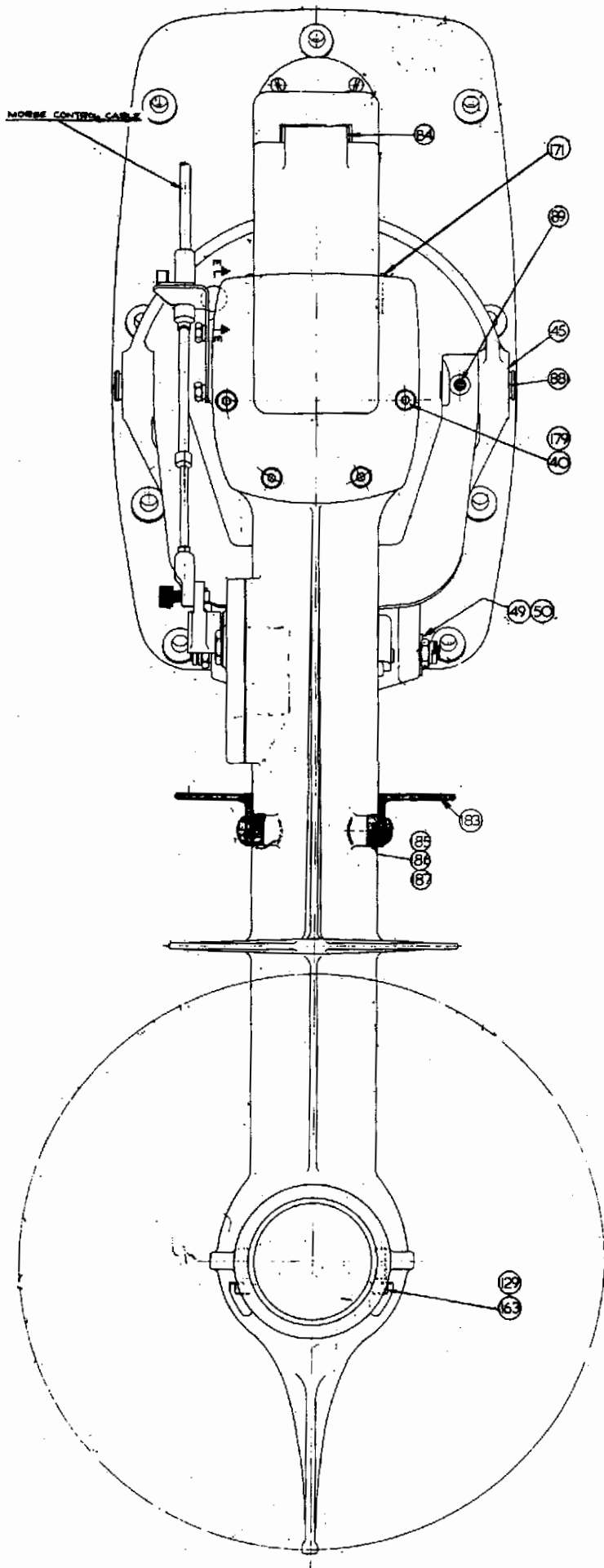


Plate E. MODEL 130 EXTERIOR

| Ref. No. | S or NS | Qty. Req | For NS Model | Part No. | Description | Remarks |
|----------|---------|----------|--------------|----------|-----------------------------------|---------|
| 245 | S | 1 | 130 | 7114 | Instruction - Transfer (top link) | |
| 246 | S | 1 | | 7125 | Motif - Port (Body) | |
| 247 | S | 1 | | 7126 | Motif - Starboard (Body) | |
| 248 | S | 1 | 130H | 7114 | Instruction - Transfer (Top link) | |
| 249 | S | 1 | | 7115 | Motif - Port (Body) | |
| 250 | S | 1 | | 7116 | Motif - Starboard (Body) | |

"Z-DRIVE" TRANSOM UNIT ACCESSORIES AND SERVICE PARTS

1. Attachment of "Z-DRIVE" Transom Unit to Boat Transom.

GASKET SETS

2. Coupling "Z-DRIVE" Transom Unit to engine. To suit various installation requirements, close and distance coupling arrangements are available as follows:-

All models

8089

SEAL SET

130 and 130H recommended engine coupling components:-

130

8101 Stub shaft (short) Part machined
7130 Stub shaft (long) undrilled. Customer
(130H) to finish to suit
engine.

8090 Seal Set comprising:-

37463734 Coupling, half
2581215 Coupling, flexible
0096637 Bolt, flexible coupling to half coupling - 2 off
0576101 Nut, flexible coupling to half coupling - 2 off

245821 'O' Ring
33824117 'O' Ring
2415507 Oil seal input
2415520 Oil seal propeller shaft
2415817 'O' Ring, housing oil seal propeller shaft
0730135 'O' Ring sealing shaft gear change
2415710 'O' Ring sealing astern lock pin
2415943 Washer, sealing housing astern lock
2415702 'O' Ring, sealing plunger swivel plate stop

Close Coupling:-

8009 Close coupling kit comprising:-

130H Comprising:-

36133118 Distance piece
0096642 Bolt Flexible coupling, distance piece to
0576101 Nut "Z-DRIVE" coupling, 2 off

2415507

2415520

2415817

0730135

Distance Coupling:-

Balance tubular shaft with flexible couplings

LOCKING ARRANGEMENT - SWIVELLING GEAR

(2581215) are available only from:-

BRD Company Limited,
Aldridge,
Staffordshire.

Telephone: 0922-53371

Telex: 338129

The plunger release cable, fitted within the craft, allows for remote operation of the swivel plate locking plunger when cranking the unit into or out of its Port and Starboard parking positions.

8096 Plunger release cable assembly 8 ft. (2.4m) comprises:-

41718422 Cable assembly, swivel plate locking plunger release

36562118 Bracket, plunger release cable support

Measured along the shaft from the centre of one coupling to the centre of the other, the assemblies are available in lengths from 18 in. (457mm) to 58 in. (1.473mm). The coupling 2581215 on the "Z-DRIVE" will have to be removed when a tubular shaft assembly is fitted.

PROPELLERS

With all propellers supplied by ENFIELD INDUSTRIAL ENGINES LTD.,
details as follows:-

| Ref. No. | Part Number | Description | Model |
|----------|-------------|----------------|----------|
| 256 | 7112 | Spinner Nut | 130/130H |
| 257 | 33177511 | Tabwasher | 130/130H |
| 259 | 33144114 | Distance Piece | 130/130H |

Reference 261

| Part Number | Description | | Part Number |
|-----------------------|----------------------|---|------------------------|
| Left Hand Rotation | | | Right Hand Rotation |
| 8005 | Propeller Assembly - | 11¼" (292mm) dia. X 11" (279mm) pitch X 3 blede | 8004 |
| 8003 | " | 11¼" (292mm) dia. X 12" (305mm) pitch X 3 " | 8002 |
| 8006 | " | 12¼" (318mm) dia. X 11" (279mm) pitch X 3 " | * 8005 |
| 8056 | " | 12¼" (318mm) dia. X 12" (305mm) pitch X 3 " | 8057 |
| 8058 | " | 12¼" (318mm) dia. X 13" (330mm) pitch X 3 " | 8059 |
| 8060 | " | 12¼" (318mm) dia. X 14" (356mm) pitch X 3 " | 8061 |
| * 8062 | " | 12¼" (318mm) dia. X 15" (381mm) pitch X 3 " | * 8063 |
| * 8064 | " | 13" (330mm) dia. X 8" (203mm) pitch X 3 " | * 8065 |
| 8100 | " | 13" (330mm) dia. X 9" (229mm) Pitch X 3 " | 8066 |
| * 8067 | " | 13" (330mm) dia. X 10" (254mm) pitch X 3 " | * 8068 |
| 8073 | " | 14" (356mm) dia. X 9" (229mm) pitch X 3 " | 8074 |
| 8075 | " | 14" (356mm) dia. X 10" (245mm) pitch X 3 " | 8076 |
| 8077 | " | 14" (356mm) dia. X 11" (279mm) pitch X 3 " | 8078 |
| 8079 | " | 14" (356mm) dia. X 12" (305mm) pitch X 3 " | 8080 |
| 8081 | " | 14" (356mm) dia. X 13" (330mm) pitch X 3 " | 8082 |
| 8083 | " | 14" (356mm) dia. X 14" (356mm) pitch X 3 " | 8084 |
| 8085 | " | 14" (356mm) dia. X 16" (406mm) pitch X 3 " | 8086 |