Warranty

The Company warrants each new Hamilton product to be free from defects in materials and workmanship under normal use and service, its obligations under this Warranty being limited to make good at its factory or at the factory of any subsidiary or branch of the Company the product or any part or parts thereof which shall be returned to it with transportation charges pre-paid and which its examination shall disclose to its satisfaction to have been defective provided that the product or such part or parts thereof shall be so returned to it not later than 12 months from the date of the original purchase from the Company or its authorised agents. No allowance shall be granted for any repairs or alterations made by the purchaser or his or its agent without the written consent of the Company. This Warranty is expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, including any liability under the Sale of Goods Act, 1908, and no other person or agent or dealer is authorised to give any other condition or warranty or to assume for the Company any other liability in connection with the sale of its products whether new or second-hand. Any obligation on the part of the Company under this Warranty does not apply to any Hamilton product which may have been repaired or altered in any way outside the factory of the Company or to damages caused in the opinion of the Company by overloading, misuse, mis-application, improper storage, abnormal wear and tear due to exposure to the elements, negligence, accident, or whilst being operated in any way other than in accordance with the operating and maintenance instructions of the Company nor does it apply to repairs made necessary by the use of parts or accessories not recommended by the Company. There is no liability on the part of the Company with respect to any items incorporated in any Hamilton product when such items have been manufactured by others and are warranted by their respective manufacturers in favour of the purchaser or when they are supplied by the Company on special order. The Company shall not be liable for any consequential loss or damage resulting directly or indirectly from any defect in the product the subject of this agreement. No liability on the part of the Company with respect to this Warranty shall extend to second-hand and reconditioned goods and the Warranty does not cover the cost of labour involved in the replacement of defective parts. No liability on the part of the Company with respect to this Warranty shall exist unless the registration card supplied by the Company is completed in every detail and returned to the Company.

C.W.F. HAMILTON & CO. LTD.

N.B. For Warranty conditions to apply, negative earth bonding instructions (Pages 5–8 & 5–9) must be followed.

THIS PORTION MUST BE COMPLETED IN EVERY DETAIL AND RETURNED IMMEDIATELY TO:

C.W.F. Hamilton & Co. Ltd.
P.O. Box 709
Christchurch, New Zealand

Purchaser .....

Address .....

Model ..... Serial No. .....

Signed ..... Date .....

Dealer .....

Delivery Date .....

Dealer's Signature .....

Hamilton Jet

HAMILTON MARINE JET UNITS

1300 SERIES
(FOR DIESEL ENGINES)

MODEL 134

INDEX	SECTION

Due to our policy of continuous development, specifications in this manual are subject to change without notice.

Part No. 98803

September 1982

The Hamilton Jet Unit propels boats by harnessing the reaction force generated by expelling a column of water rearwards. This is achieved by drawing water in from under the hull, and pumping it at high pressure via a nozzle from the transom. It is immaterial whether the water jetstream goes into the air or the water—the reaction force is the same.

A prime mover, such as a conventional marine diesel engine, or gas turbine drives the unit through a short connecting shaft.

Efficiency is dependent on balancing the water flow and velocity against the required boat displacement and speed. Hamilton jet units have comparable efficiency to propeller drive if applied as recommended—the first time this has been achieved in the history of marine propulsion

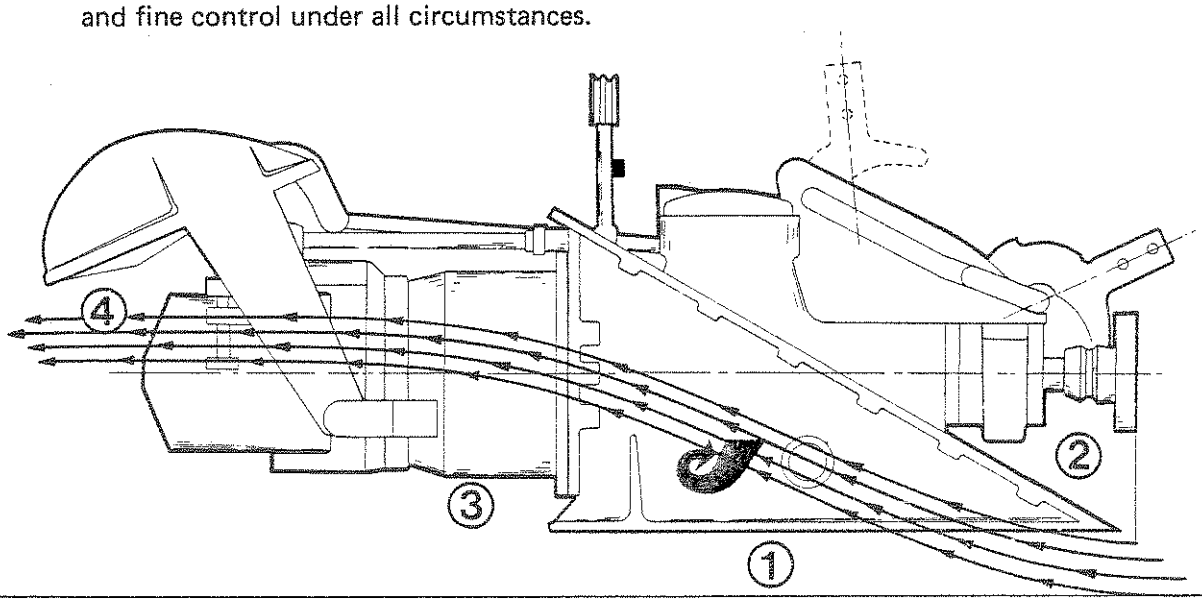
1341 series units consist for four main parts:—

1. **An Intake Duct**— to convey water from the bottom of the boat to the pumping unit. This is made from corrosion resisting Silicon-Aluminium alloy and contains a thrust bearing mounting and an inspection hatch. A screen or grill is mounted across the intake opening to deflect debris from the interior of the unit.

2. **The Thrust Bearing**— is mounted on the front face of the intake duct and carries a heavy duty duplex ball bearing with appropriate seals. The stainless steel mainshaft finishes with a flanged drive coupling at the front end, which is connected to the engine flywheel through a flexible connecting shaft. **The bearing is cooled by the water passing through the jet unit.**

3. **The Main Pumping Unit**— is a single stage axial flow design mounted at the outlet end of the intake, and easily detachable for servicing. Axial-flow design is chosen since it ensures the highest possible flow rate to give the most efficient propulsion. The pump consists of an impeller, with an associated set of guide vanes, all mounted in a stainless steel casing. The water is expelled from a large diameter nozzle, which handles up to 30 tonnes of water per minute. This high flow capability is essential for efficient jet propulsion.

4. **The Control Gear**— consists of a pair of ganged deflectors for steering the jetstream left or right for quick and sensitive steering. Behind this again is a large directional control deflector operated by a rod and lever system from inside the boat which can be lowered to slow, stop or reverse the craft as desired. Full steering is always available no matter what manoeuvre is undertaken. Hamilton Jet Control Systems give complete and fine control under all circumstances.



The Hamilton 1341 jet unit is designed for the efficient propulsion of planing or displacement launches and barges with DIESEL DRIVE.

SIMPLE MOUNTING

This unit is designed for complete outboard mounting against a single angled surface easily arranged on the hull. (Prov. N.Z. Patent Application No. 166824). Through one hole in the hull pass all the necessary shafts, controls and other inboard items. The whole unit can be mounted in the prepared boat in minutes. It can also be detached completely for inspection, maintenance or overhaul.

SHALLOW DRAUGHT

With no appendages protruding beneath the hull, the clean bottomed jet craft can operate in extremely shallow water without risk of damage to propulsion equipment.

MANOEUVRABILITY

A high degree of control is achieved at all speeds from the powerful directed-jet steering and reverse thrust deflector. Full steering response is felt at all speeds and in all directions of travel, **including the stationary position.**

Manual or hydraulic operation of the counter-balanced reverse deflector is available.

LOW MAINTENANCE

The 1341 jet unit is manufactured from corrosion-resisting materials throughout. The main pumping unit, mounted outboard of the transom, is of stainless steel. The impeller is stainless steel and the intake housing is cast silicon-aluminium alloy (LM6).

An oil lubricated, anti-friction thrust bearing and water lubricated fluted rear bearing offer maximum reliability. The main pumping unit has been conveniently designed to allow dismantling without disturbing the watertight seal between the intake housing and the hull.

An inspection cover on the intake housing enables access to the interior of the unit if necessary for weed clearance or impeller inspection.

NO GEARBOX NECESSARY

The 1341 unit offers an r.p.m. range suitable for many popular diesel engines, driven directly off the flywheel. See pages 3–2 and 3–3 for table of suitable matching engines. Three impeller pitches are available for different engine characteristics. A flange drive coupling is supplied to suit the 1600 series Hardy Spicer universal drive-shaft.

HIGH PROPULSIVE EFFICIENCY

High efficiency Hamilton axial flow design gives the optimum combination of jet velocity and mass flow. Hamilton Jets have the highest mass flow for best performance.

Impeller diameter	330mm (13")
No. of stages	1
Approx. comparable propeller	400–500mm (16"-20")
Impeller options (one supplied)	150, 250, 420
Nozzle diameter options (one supplied)	200, 210, 220, 230
Recommended Max. power input	150 h.p. continuous – non planing applications 200 h.p. continuous – planing applications 350 h.p. intermittent – planing applications
Weight of unit	318 kg (700 lb)
Rotation	L.H. (clockwise looking at jet drive coupling)
Mounting	Complete outboard mounting against a single 30° angled surface
Screen cleaning method	Inspection hatch
Reverse operation	Manual lever or Hydraulic (optional extra)
Steering	Tiller arm, inboard (manual operation)
Intake screen	Fixed bar

SUITABLE BOATS

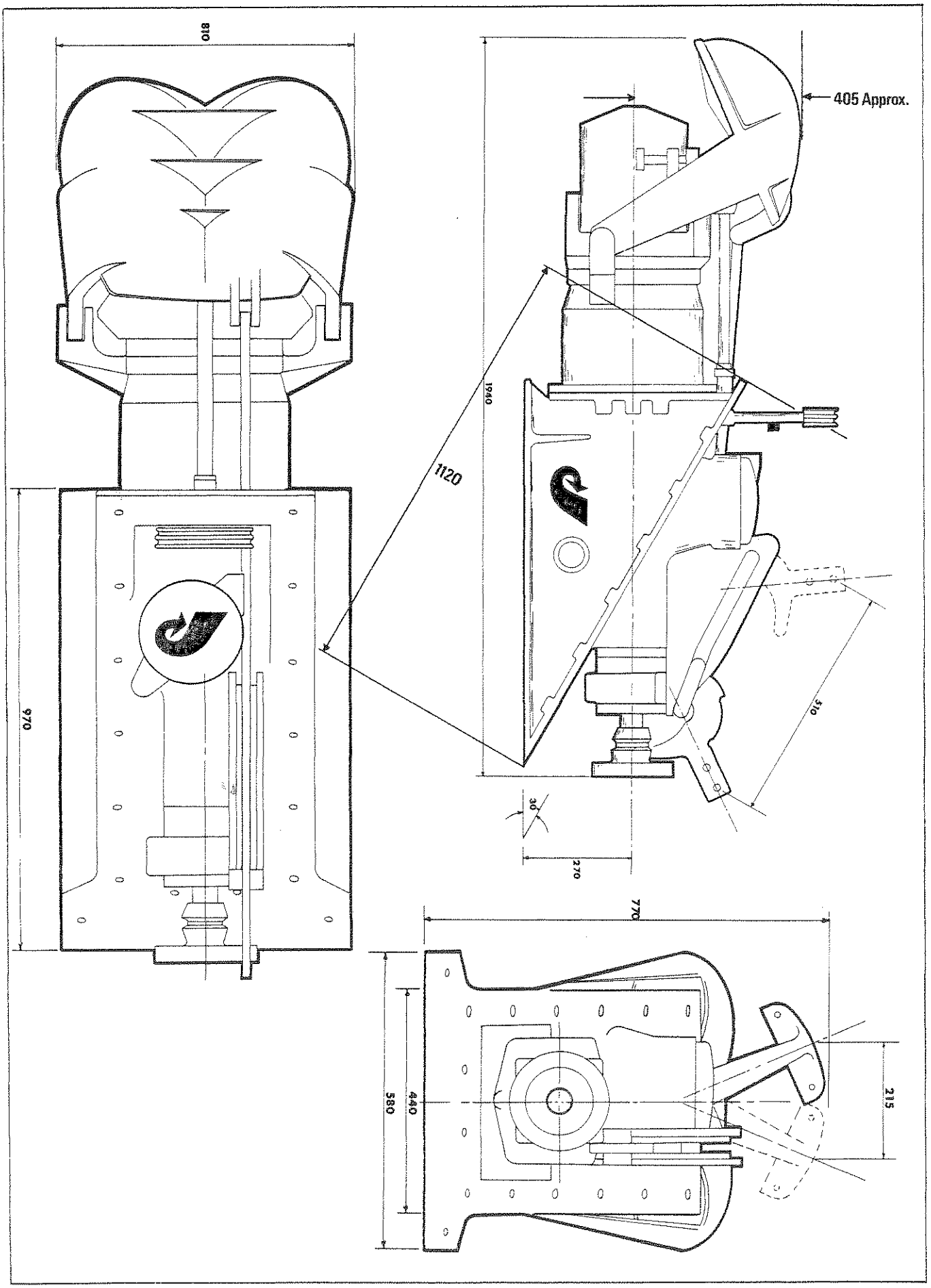
	SINGLE UNIT	TWIN UNIT
A. PLANING HULLS		
Hull shape	Constant deadrise	Constant deadrise
Boat length	8m - 10m (26 - 33 ft)	10m - 12m (33 - 39 ft)
Max. laden displacement	up to 5 tonnes	up to 10 tonnes
Power to weight ratio (Minimum recommended)	60 h.p. per tonne	60 h.p. per tonne

B. DISPLACEMENT HULLS		
Hull shape	Conventional displacement hulls including barges	
Boat length	9m - 15m (30 - 50 ft)	12m - 20m (39 - 65 ft)
Max. laden displacement	10 tonnes	20 tonnes

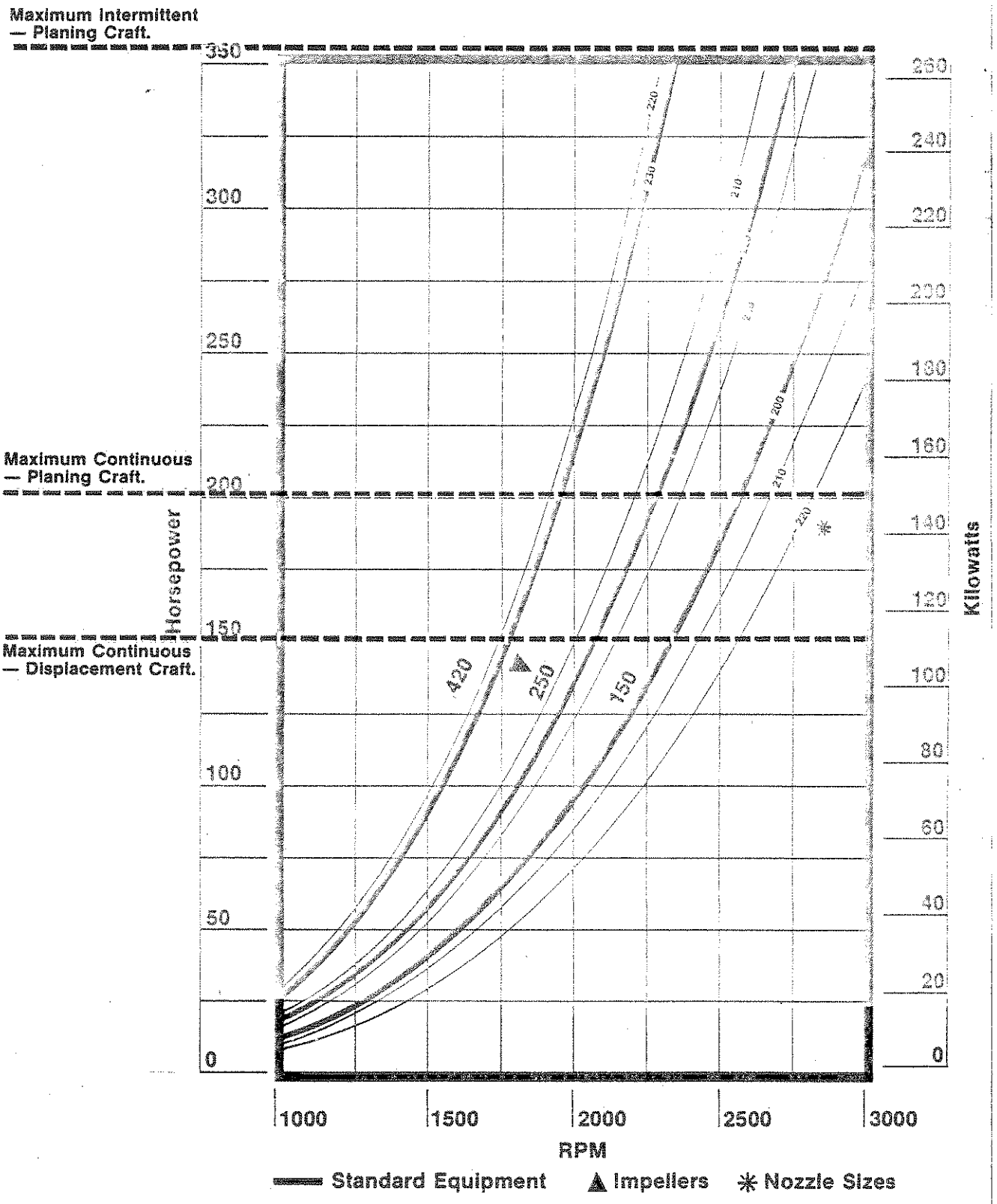
NOTE: For long, narrow displacement speed boats and barges, which are easily propelled, the above weights may be doubled.

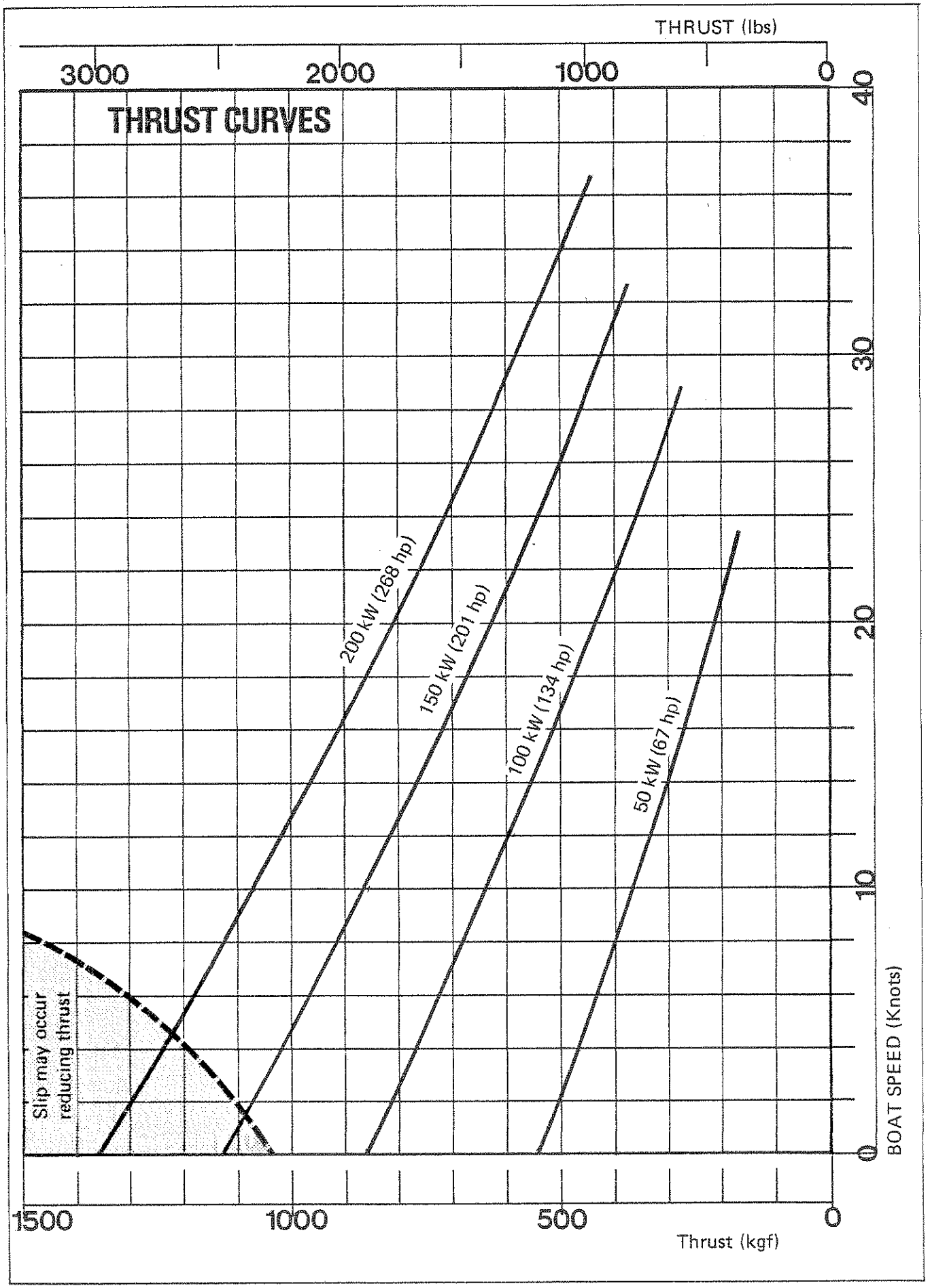
OPTIONAL AT EXTRA COST

Coupling Shaft	Hardy Spicer 1600 series short shaft assembly
Hydraulic Reverse Control	(See Page 5–5)


810
405 Approx.
1940
1120
970
510
30°
270
770
580
440
215

POWER CURVES

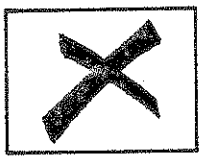


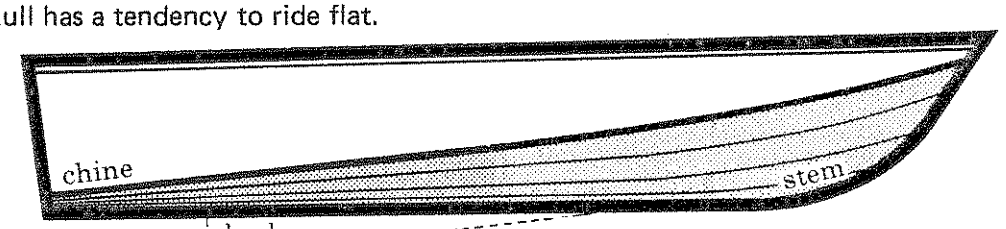

THRUST (lbs)
3000
2000
1000
0
THRUST CURVES
200 kW (268 hp)
150 kW (201 hp)
100 kW (134 hp)
50 kW (67 hp)
Slip may occur reducing thrust
40
30
20
10
0
BOAT SPEED (Knots)
1500
1000
500
0
Thrust (kgf)

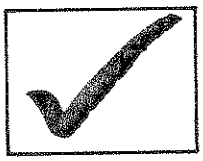
1. HULL SHAPES

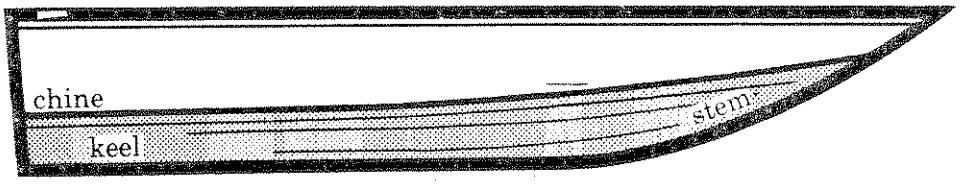
A. PLANING SPEED CRAFT

Some deadrise angle in planing hulls is desirable. This is primarily to ensure that the static water level of the craft is sufficient to prime the jet unit. At rest, water must come at least up to main-shaft level.
Monohedron hull lines are recommended i.e. chine and keel parallel, at least over the planing area. The stem should be easy rising as a deep fine fore-foot can cause steering problems if the hull has a tendency to ride flat.









There must be no keel, rudder, planing strakes or any other underwater appendages for at least 2m (7 ft) in front of the jet intake. Such protrusions from the hull can interrupt water flow and divide water away from the intake. Strakes and/or keels outside the intake area are acceptable.

B. DISPLACEMENT SPEED CRAFT

Performance of displacement boats and barges is less susceptible to variation in hull design. Use hulls with easily driven fine lines. The preferred length/beam ratio is 5:1 or more.
Most conventional displacement craft suit Hamilton Jet propulsion. Two factors are important, however:

(a) the unit must be mounted so that it will prime as described in "A. Planing Speed Craft" above
(b) the area immediately in front of the jet intake is clear of under-water appendages, as described in "A. Planing Speed Craft" above. However, keeling well forward of the intake (at least 2m) and/or twin keels abeam of the intake is acceptable.

2. WEIGHT

For a successful planing boat, all-up weight is the most critical factor. Every effort to reduce all-up weight below the recommended maximum limits (below) will result in a more efficient boat. In any event, power to weight ratio should exceed:—

A. 45kW (60hp) per tonne (planing speed craft)

B. 7-22kW (10-30hp) per tonne (displacement speed craft)

MAXIMUM LADEN DISPLACEMENT	SINGLE UNIT	TWIN UNIT
Planing hulls	up to 5 tonnes	up to 10 tonnes
Displacement speed hulls	up to 10 tonnes	up to 20 tonnes
Barges and long narrow hulls	up to 20 tonnes	up to 40 tonnes

3. GEARBOXES

Although not normally necessary, the use of a gearbox may be employed. In this case, the manufacturer should be consulted for appropriate engine matching.

Step-up gearboxes are not recommended. However, reduction or 1:1 gearboxes are suitable, particularly for displacement speed craft where it is an advantage to be able to run the engine without also running the jet unit. With a gearbox, running the jet unit in reverse is also a useful way of cleaning debris from the intake screen.

COMMON MARINE DIESELS MATCHED TO 1341 JET UNIT FOR PLANING SPEED APPLICATIONS — DIRECT DRIVE (NO GEARBOX)

MAKE	MODEL	LISTED MAX HP/RPM	IMPELLER & NOZZLE	DRIVING JET UNIT MAX HP/RPM	DRIVING JET UNIT CRUISE HP/RPM
Baudouin	*6F11 SRM	306/3000	150-210	306/3000	230/2800
	*DF12M	306/3000	150-210	306/3000	230/2800
	DF12SM	420/3000	250-230	420/3000	300/2700
Deutz	(V10)F10L/413	285/2650	250-230	283/2625	227/2450
	(V12)F12L/413	340/2650	250-210	375/2565	272/2400
	BF10L/413	375/2650	250-210	375/2650	315/2550
Caterpillar	*3208 NA	210/2800	150-210	200/2700	160/2480
	*3208 T	260/2800	150-200	260/2800	208/2600
Cummins	V903M	286/2600	250-220	297/2600	235/2400
	VT903M	372/2600	420-230	377/2400	290/2200
DAF	DKA1160M	212/2200	250-210	212/2200	185/2100
	DU825	220/2400	250-220	218/2350	190/2250
Detroit	*6V-53N	197/2800	150-220	197/2800	160/2600
	*6V-53T	260/2800	150-200	260/2800	207/2600
	6-71	240/2300	250-210	250/2320	185/2100
	6-71LP	257/2300	420-230	263/2200	215/2000
	6-71M	257/2300	420-230	263/2200	215/2000
	6-71TI	325/2300	420-230	325/2280	250/2100
	8V-71	325/2300	420-230	338/2310	250/2100
Fiat	821M	240/2200	420-230	235/2050	195/1930
	8361SRM	272/2600	250-230	272/2600	210/2400
	828M	330/2400	420-230	325/2290	255/2100
Ford	*2704ET/IC	250/2450	250-220	250/2470	195/2270
Isotta Fraschini	ID 32	320/3000	150-200	320/3000	260/2800
	ID32 SS6L	356/2900	250-230	352/2850	285/2650
Isuzu	E120	214/2200	250-210	214/2220	165/2050
	8MA1	285/2400	420-230	275/2150	215/2000
Mercedes	OM 346	200/2200	250/210	198/2150	160/2000
	OM 355	240/2200	420-230	235/2050	175/1850
	OM402	240/2200	420-230	235/2050	188/1900
	OM 403	300/2500	250-210	300/2500	240/2300
Nissan	PD 6T06	210/2100	420-230	205/1950	145/1750
	PD6TA06	247/2100	420-230	247/2100	190/1900
	UD 626	220/2000	420-230	215/2000	170/1850
	UDV 816	311/2200	420-210	311/2700	230/1950
Perkins	T6-3543GTM	225/2600	250-230	230/2450	165/2200
	TV8-510M	235/2600	250-230	240/2500	185/2300
Renault	RC210DT	210/2450	250-230	190/2300	140/2100
	RC215DV	215/2500	250-230	200/2350	153/2150
	RC260DV	260/2500	250-220	260/2500	202/2300
	RC285DV	285/2500	250-210	270/2400	210/2200
	RC320DV	320/2500	250-210	320/2520	250/2320
	RC355DV	355/2500	420-230	335/2300	255/2100
Sabre (Ford)	275	275/2500	250-210	275/2450	210/2250
Scania	D11	203/2000	420-230	200/1950	146/1750
Thornycroft (Leyland)	760	190/2000	420-230	185/1900	160/1800
Volvo	TAMD70C	270/2500	250-220	270/2520	205/2300
	THAMD70C	270/2500	250-220	270/2520	205/2300
	TMD120A	307/2200	420-210	320/2200	250/2000
Yanmar	TV8-510M	225/2600	250-230	225/2450	185/2300

* These engines also match 1031 model jet unit.

COMMON MARINE DIESELS MATCHED TO 1341 JET UNIT FOR DISPLACEMENT SPEED APPLICATIONS

NOTE: With planing applications the weight and cost of a gearbox are usually avoided by direct driving jet from engine. In most displacement speed applications weight is not critical and reduction gearboxes can be used to match engine and jet.

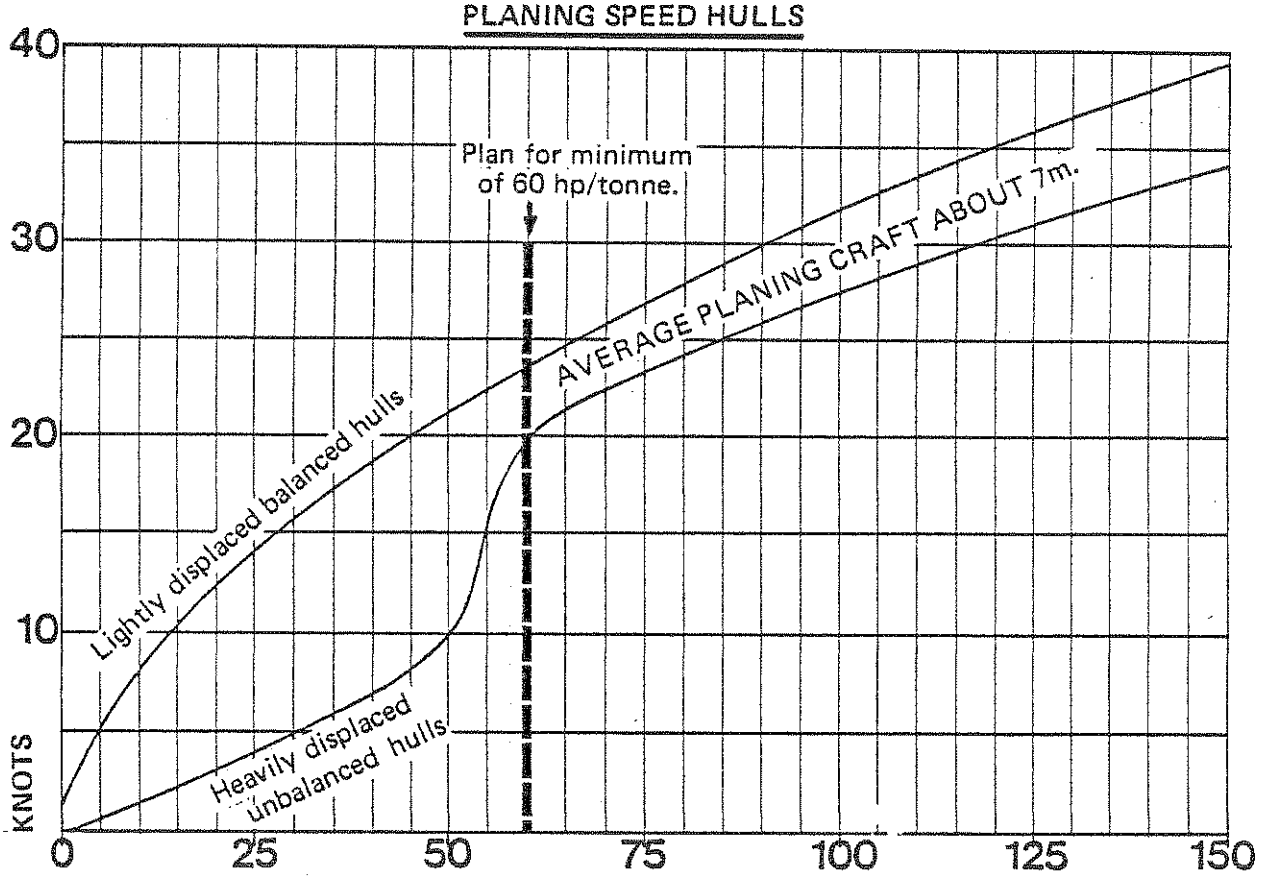
If the gearbox has a reverse this is useful for running the jet unit backwards as a good way of clearing the intake screen of debris.

In the table below for those matchings listed with a reduction ration of 1:1 it is not necessary to fit a gearbox — that is the jet can be direct driven from the engine.

MAKE	MODEL	LISTED MAX HP/RPM	IMPELLER & NOZZLE	GEARBOX REDUCTION RATIO	ENGINE RPM DRIVING JET UNIT MAX HP/RPM	ENGINE RPM DRIVING JET UNIT CRUISE HP/RPM
Bedford	*330	98/2600	250-210	1.5:1	98/2600	77/2400
	*381	120/2800	250-210	1.5:1	120/2800	95/2600
	*500	162/2800	420-230	1.5:1	160/2550	105/2350
Deutz	*F5L 912	100/2800	250-230	1.5:1	100/2800	80/2600
	*F6L 912	120/2800	250-210	1.5:1	120/2800	95/2600
Caterpillar	3304T	165/2200	250-230	1:1	165/2200	125/2000
	*3208NA	210/2800	150-210	1:1	200/2700	150/2400
Cummins	*V504	190/3300	250-220	1.47:1	190/3300	150/3000
DAF	DK1160M	195/2200	250-210	1:1	193/2130	150/2000
Detroit	*4-53N	128/2800	250-210	1.5:1	128/2800	97/2600
	*6V-53N	197/2800	150-220	1:1	197/2800	150/2550
	4-71	160/2300	250-230	1:1	162/2200	125/2000
Ford	*2715E	108/2500 (Cont)	150-220	1.1:1	108/2500	80/2250
	*2704ET	135/2400 (Cont)	150-210	1:1	133/2330	105/2150
Isuzu	*DA640	90/2300	420-220	1.59:1	90/2300	65/2100
	DH100	140/2000	250-210	1:1	137/1950	110/1800
Mercedes	*OM352A	125/2600	250-230	1.3:1	125/2600	85/2300
(Wiseman 180)	OM401	180/2200	250-220	1:1	180/2200	135/2000
Mitsubishi	6DB10M	110/1800	250-210	1:1	108/1760	76/1560
	6DB10MT	150/1800	420-230	1:1	148/1750	100/1550
Nissan	PD 606	160/2100	250-220	1:1	160/2100	115/1900
(Chrysler M4-75)	UD 426	148/2000	250-210	1:1	145/1950	115/1800
Perkins	*6-354M	115/2800	250-210	1.5:1	113/2730	87/2500
	T6-354M	175/2400	250-230	1:1	178/2270	140/2100
Renault	*RC120D	120/2500	420-230	1.5:1	120/2500	85/2200
	*RC160DS	160/3000	250-210	1.5:1	160/3075	120/2800
	*RC195DV	195/2500	250-220	1.1:1	195/2500	150/2280
Ruston (India)	6YDAM	112/2200	150-210	1:1	112/2200	96/2100
Scania	D8	145/2000	250-210	1:1	143/1940	105/1750
	DS8	186/2000	420-230	1:1	182/1880	135/1700
Thornycroft	*345	113/2500	420-230	1.5:1	116/2400	85/2200
(Leyland)	760	190/2000	420-230	1:1	185/1900	150/1770
Volvo	*MD70B	139/2500	150-220	1:1	139/2500	110/2300
	TMD70B	192/2500	250-230	1:1	195/2350	150/2130
	MD100B	155/2000	420-230	1:1	155/2800	135/1700
Watermota	*LION	120/2500	420-230	1.5:1	118/2460	85/2200
Yanmar	*T6.354	135/2400	150-210	1:1	133/2330	105/2150

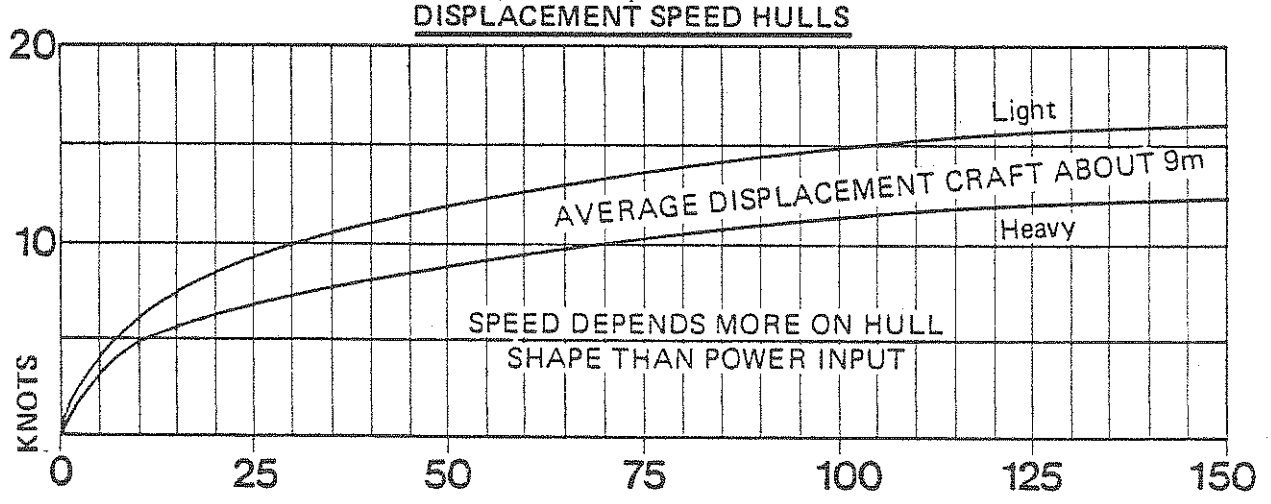
* These engines also match 1031 model jet unit.

APPROXIMATE SPEED GUIDE FOR AVERAGE WELL DESIGNED
PLANING SPEED HULLS

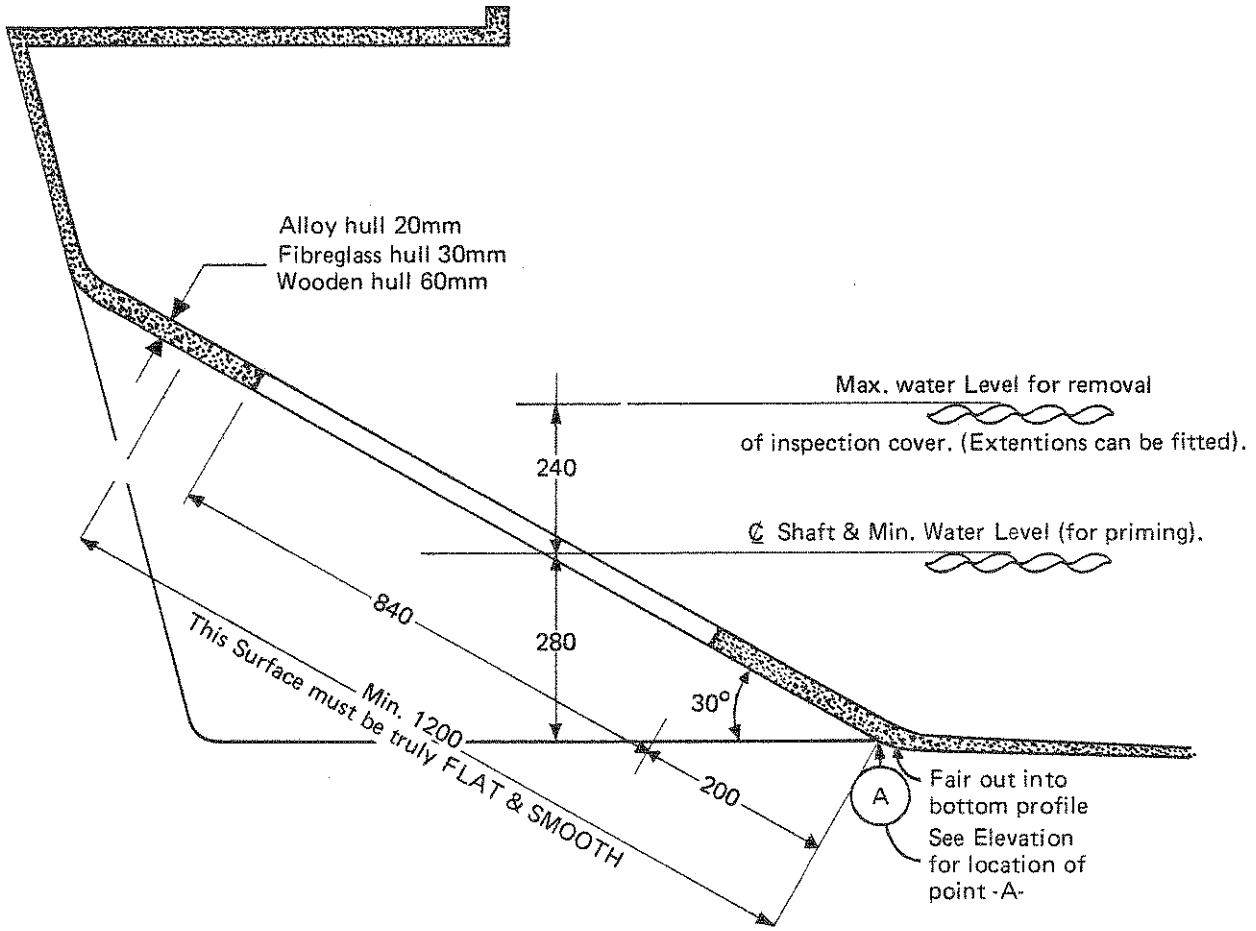


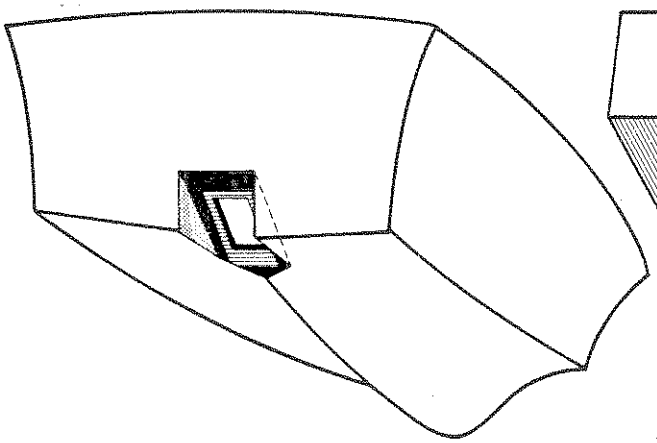
SHP/TONNE for planing craft

APPROXIMATE SPEED GUIDE FOR AVERAGE WELL DESIGNED
DISPLACEMENT SPEED HULLS

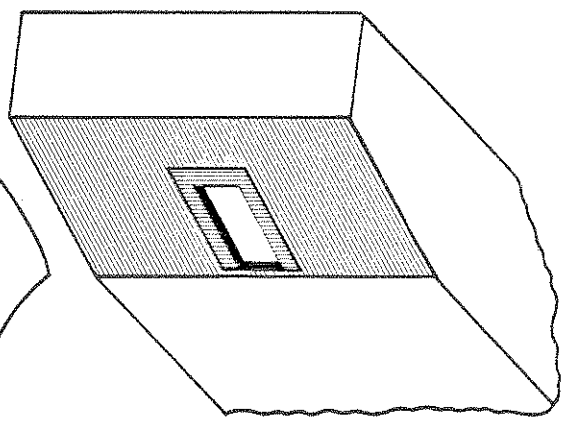


SHP for displacement craft

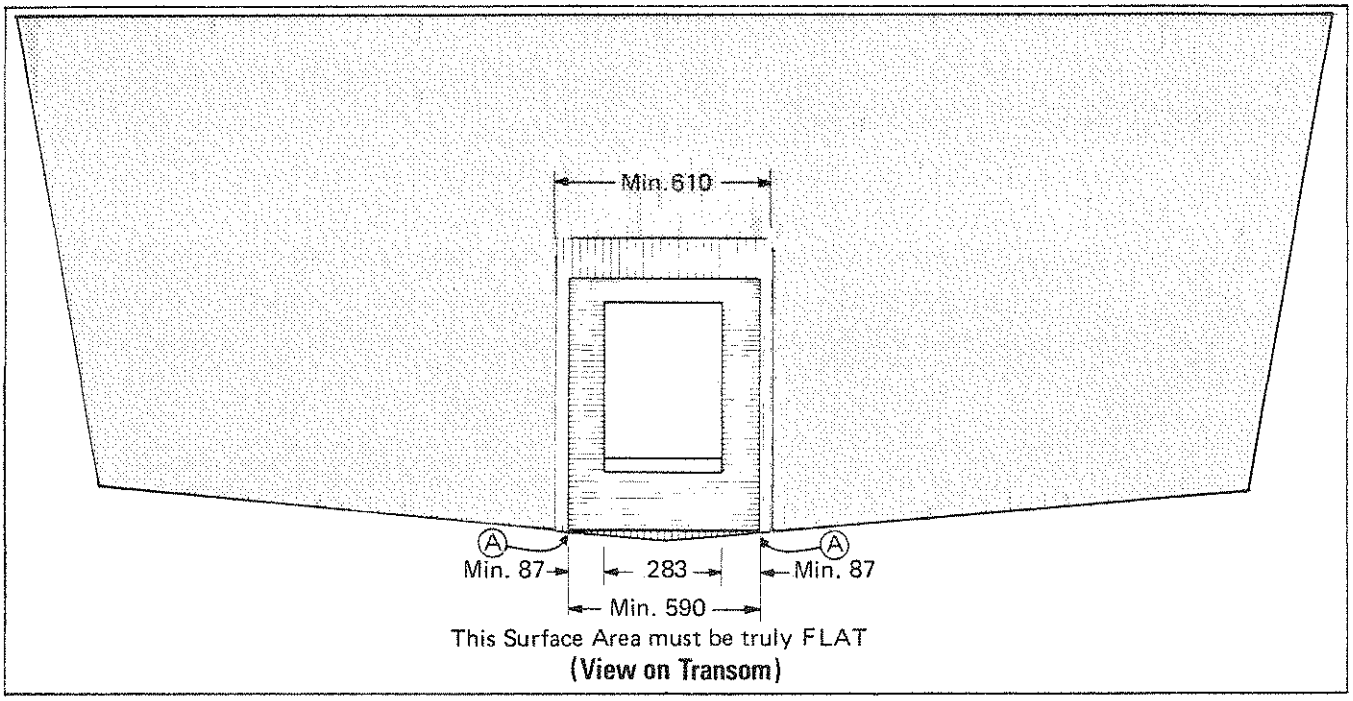




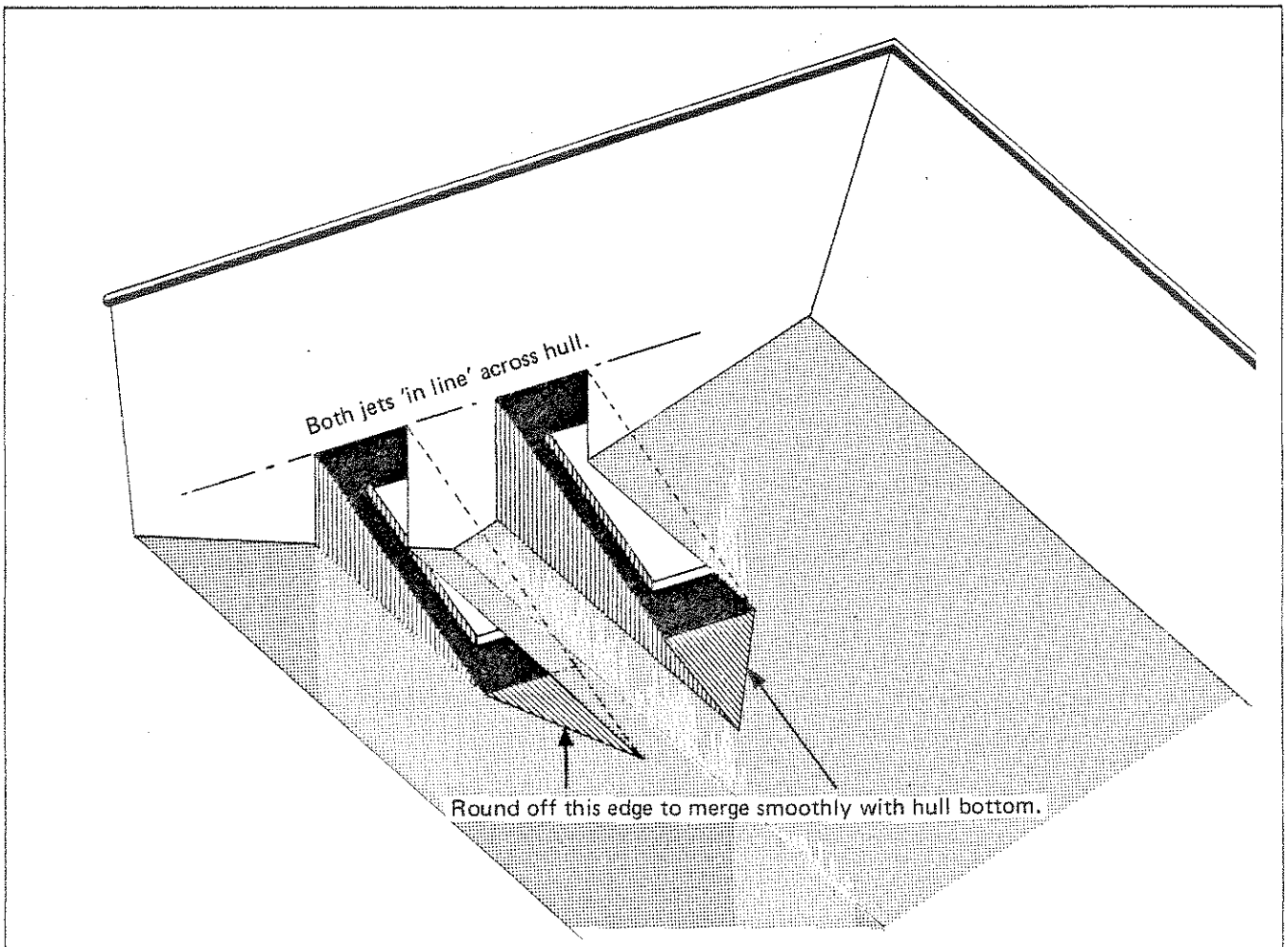
PLANING SPEED CRAFT



"SWIM END" BARGE



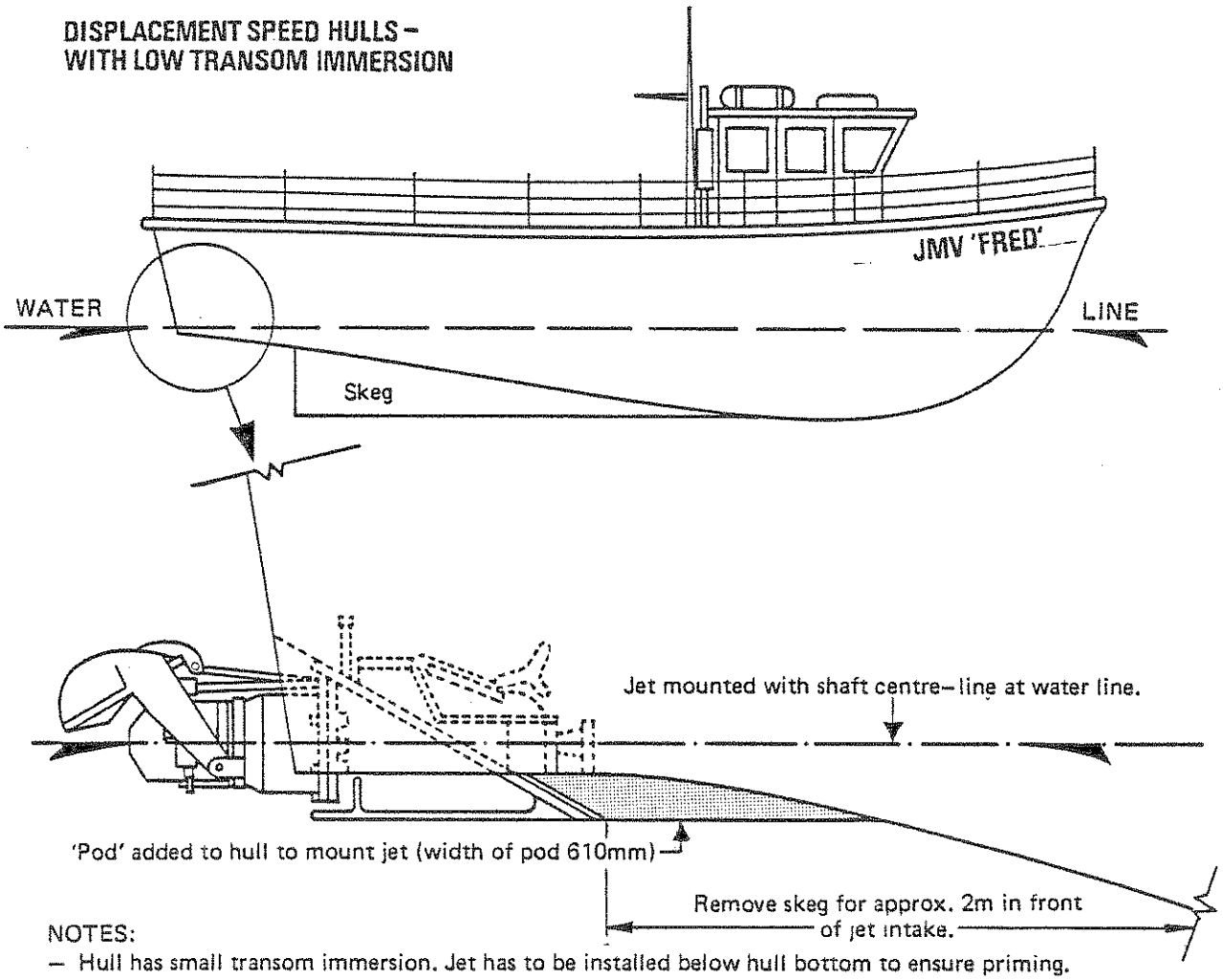
This Surface Area must be truly FLAT
(View on Transom)



HULL PREPARATION FOR TWIN 1341 JETS

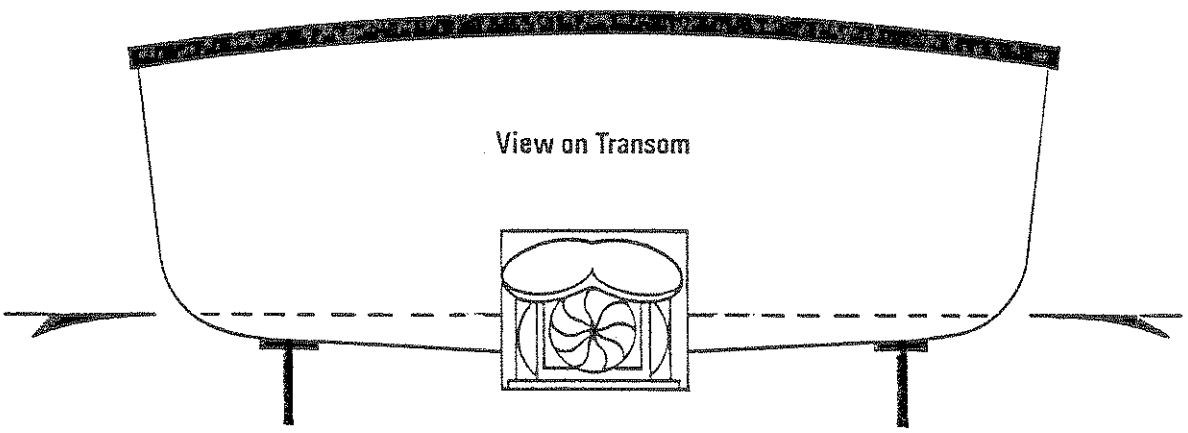
(View from outside boat)

DISPLACEMENT SPEED HULLS – WITH LOW TRANSOM IMMERSION



NOTES:

- Hull has small transom immersion. Jet has to be installed below hull bottom to ensure priming.
- Engine should be installed in same position as it would be for a propeller installation or slightly aft of that position, which will improve priming of the jet.
- If more keeling is desired twin keels abeam of the intake is acceptable. (See sketch below).



TWIN ABEAM KEELS (Optional)

1. Prepare hull to drawing, taking care to maintain position of angle face at 30° and in correct relation to craft waterline.

2. Cut rectangular hole through hull, carefully positioned from the bottom edge of the 30° angle face.

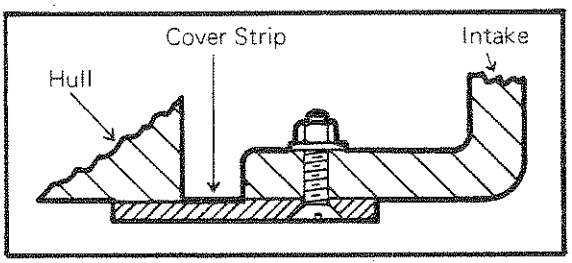
3. This angle face should be strong, rigid and sufficiently strong to transmit the thrust of the unit to the hull.

4. Drill mounting holes to the pattern, and trial fit the unit to the hull.

5. When satisfied with the fit, smear sealing cement on both faces of the gasket, and offer up the unit to the hull. (Lift unit by two inspection hatch studs if desired with suitable crossbar, and a crane over the mounting hole.)

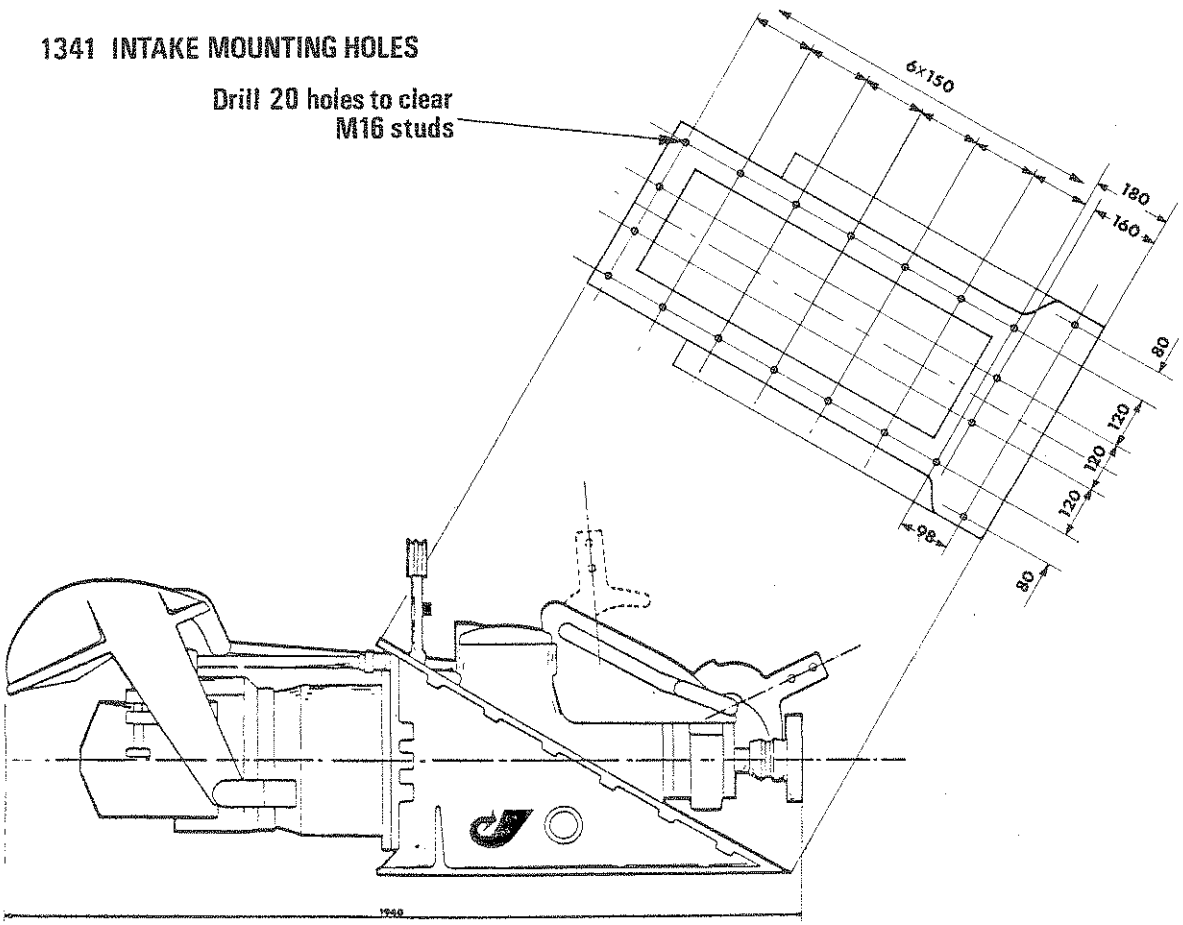
6. Make sure that the unit comes up neatly all round and tighten all nuts. Make sure the bottom sharp edge is flush with or above the bottom surface, and does not protrude below it.

7. To avoid surplus water leakage on fast boats, bridge the gap along the sides of the intake cavitation plate with a cover strip. (See diagram).



N.B. There must be an air tight seal between hull and cover strip for all planing craft.

1341 INTAKE MOUNTING HOLES

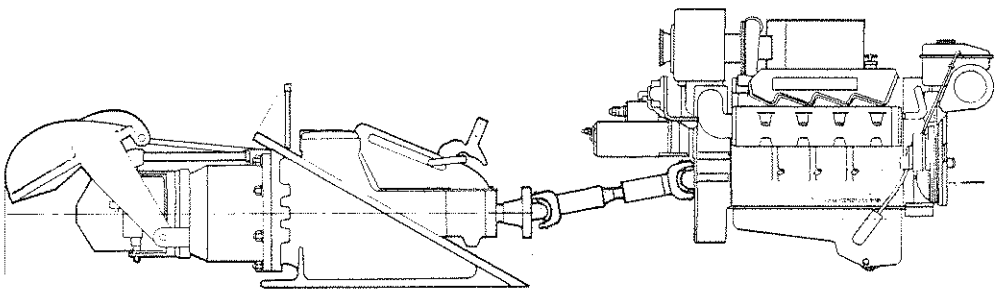


POSITION

The engine should be mounted where recommended by the hull designer. Because of differences between propellers and jets in line of thrust action to hull (and jet priming requirements), best engine position is unlikely to be the same for jet and propeller boats. If in doubt consult C.W.F. Hamilton & Co.

LEVEL

Mount the engine on longitudinal bearers so that the crankshaft line is preferably level and with a small clearance only under the oil sump. In the event, follow the instructions in the next section on "Drive Shaft".

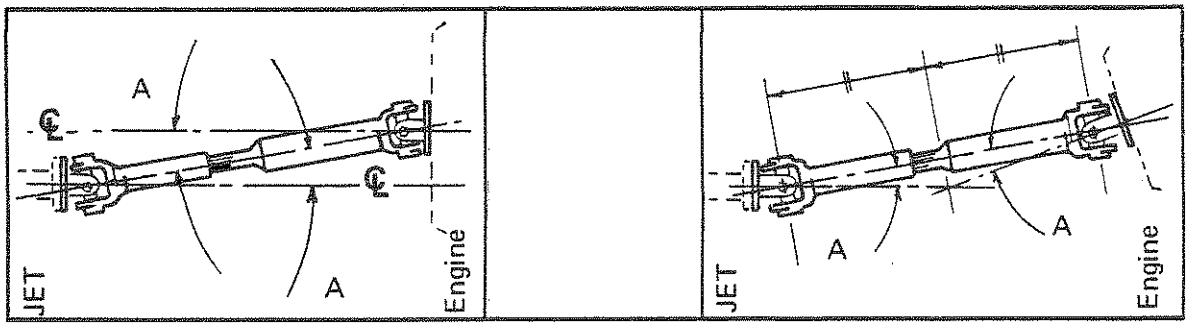


DRIVE SHAFT

The drive coupling is made to match a Hardy Spicer 1600 series universal joint. A double universal joint shaft should be used with a sliding spline of a length to suit the chosen engine position. An adaptor plate is required so that the universal joint can be coupled to the engine flywheel.

The universals should be run at a slight angle, to avoid vibration, but not too great an angle which would cause wear.

Make sure the two centre yokes are in the same plane to avoid torsional vibrations. No special care is required in lining up the engine, the universal taking up small differences.



Parallel Shafts Parallel Flanges
A = 1° - 5°

Angled Shafts Angled Flanges
A = 1° - 5°

N.B. Limit universal angles to a maximum of 5° on each joint, which is about 25mm (1") offset on the usual short shaft. ENSURE ANGLE "A" SAME AT EACH END whatever the angle used.

GENERAL

In all other respects, e.g. cooling, the engine should be installed as for any conventional (i.e. propeller) drive marine engine installation. Follow the engine manufacturer's installation instructions where applicable. The majority of engines have an integral raw water cooling pump. The suction side of this pump should be connected to a conventional skin fitting in the hull bottom.

The exhaust system is led through a transom skin fitting in the normal way, either with or without high riser and silencer as necessary and the waste water fed into this line.

There are no special requirements for fitting the engine and jet drive and the engine manufacturer's instructions should be followed. Wiring to the instrument panel, battery link-up and throttle connections are entirely conventional.

Steering is by means of a pair of coupled deflectors arranged either side of the jet nozzle. Turning the steering wheel turns the deflectors which deflect the jetstream to port or starboard giving powerful and accurate steering.

Good quality steering is of paramount importance in a jet boat. Use a 400 mm (16in) diameter steering wheel with the following specified number of turns from hard to port to hard to starboard. Planing Speed Boats: One turn full lock to full lock. Displacement Speed Craft: Two turns full lock to full lock. A greater number of turns reduce the sensitivity of the steering during slow speed manoeuvring.

There are two control options:

A. WIRE ROPE AND PULLEYS (see schematic diagram below)

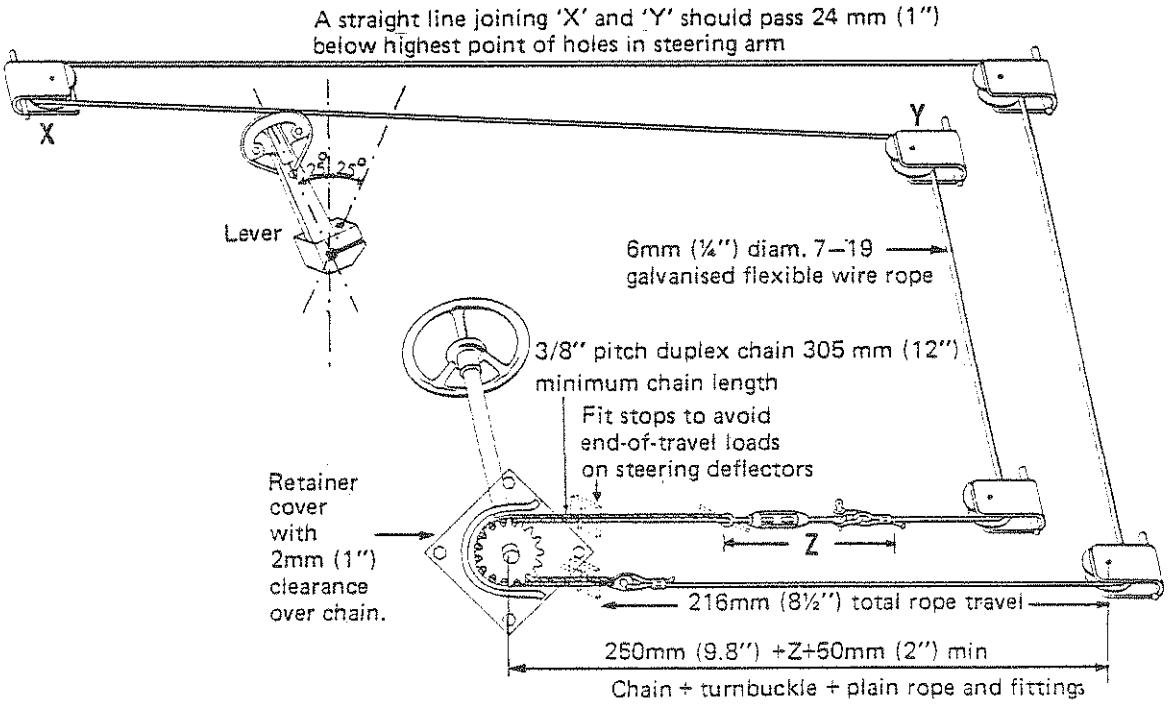
This system is easy to inspect and maintain and is recommended in areas where the more sophisticated steering systems are difficult to obtain.

Important design points are:—

(I) the wire rope should be a true flexible type capable of forming easily to the pulley diameter.

(II) the pulleys should be at least 130mm (5in) effective diameter so that the flexible wire is not severely bent at the pulley. Pulleys must have good quality small diameter bearings.

WARNING: Small diameter pulleys rapidly damage the wire and have high friction.



B. PROPRIETARY PUSH-PULL CABLE

The appropriate Teleflex-Morse system is the Command 401 Steering System. This kit is available from your nearest Teleflex-Morse stockist or from C.W.F. Hamilton & Company.

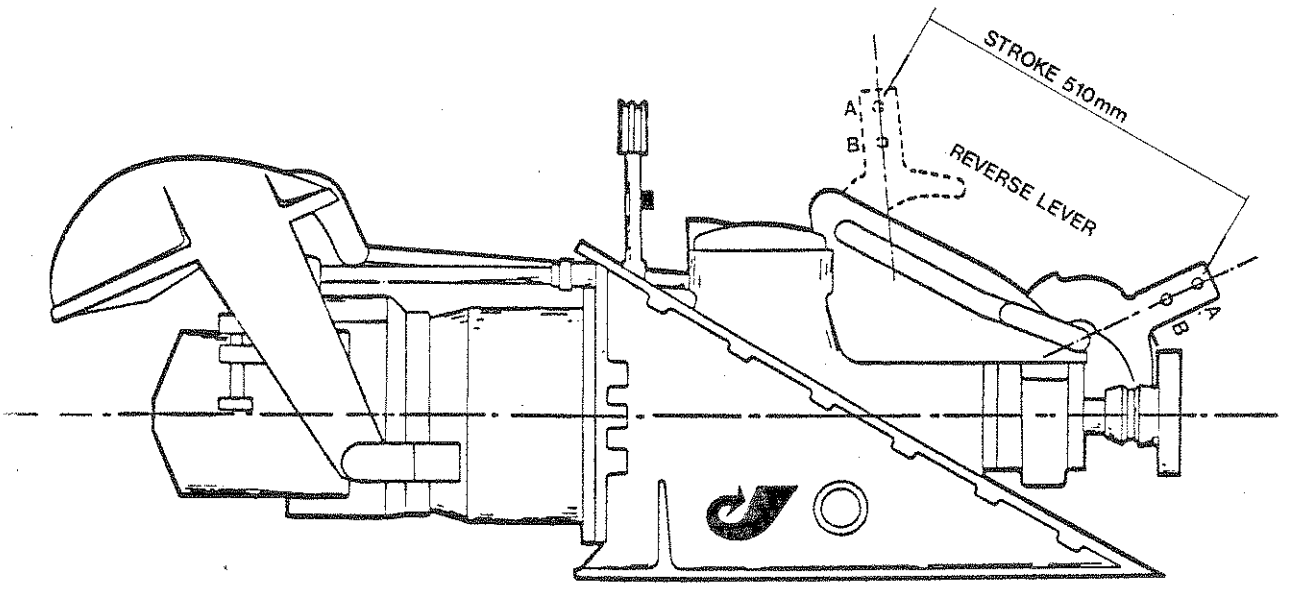
A complete kit will include:

1. A helm assembly, consisting of a steering wheel and control box.
2. A cable assembly. Specify the length required i.e. Measure along the actual cable path from the centre of the steering wheel to the attachment point of the steering arm on the jet unit, with the steering arm vertical. Keep the number of bends to a minimum and ensure that the bend radius is as large as possible to minimise friction loads.
3. A ball joint attachment on the jet end of the cable.
4. A main bracket to hold the cable end to the transom near the jet unit.
5. Sufficient brackets to hold the cable in position along its length.

N.B. Dual station steering is also available with the Command 401 Steering System.

REVERSE
Operation of the reverse deflector may be either manual or hydraulic.

MANUAL REVERSE
Manual operation requires the fitting of any suitable fore and aft linkage attachment to the inboard reverse lever supplied on the unit.



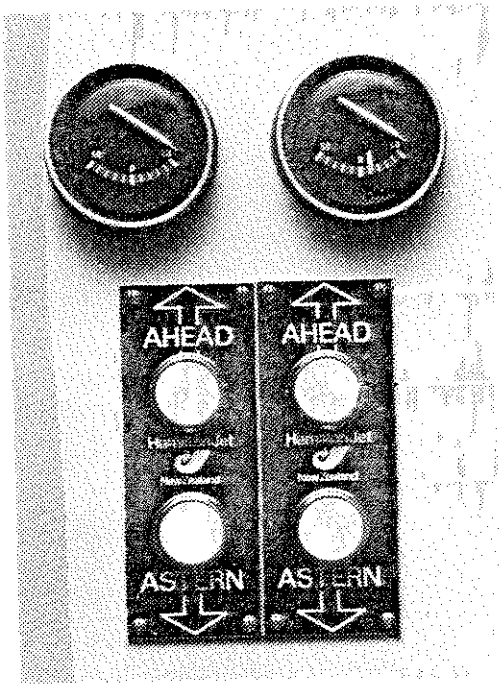
Holes A and B are 16.5mm diameter and at 80mm centres. The lever is 12.7mm thick.

POWER STEERING CONTROL

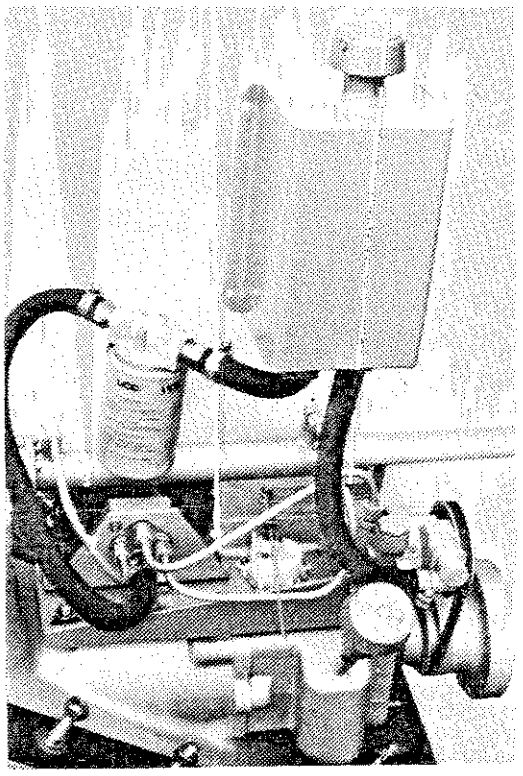
Power steering is recommended for twin or triple jet installations. A Hydraulic Power Steering Kit is available as an optional extra. Apply C.W.F. Hamiltons for details.

DUAL STATION CONTROL

This is available with Power Steering and Electro-Hydraulic Reverse systems. Apply C.W.F. Hamiltons for details.



Push button controls and position indicators for twin jets mounted at helm.



Hydraulic Power Pack at jet unit.

The hydraulic power pack comes complete as shown above. The boat builder has to mount the control button panel(s) and indicator gauge(s) near the helm plus provide the 24V electricl connections

(a) between control buttons and solenoid valve on the jet; and

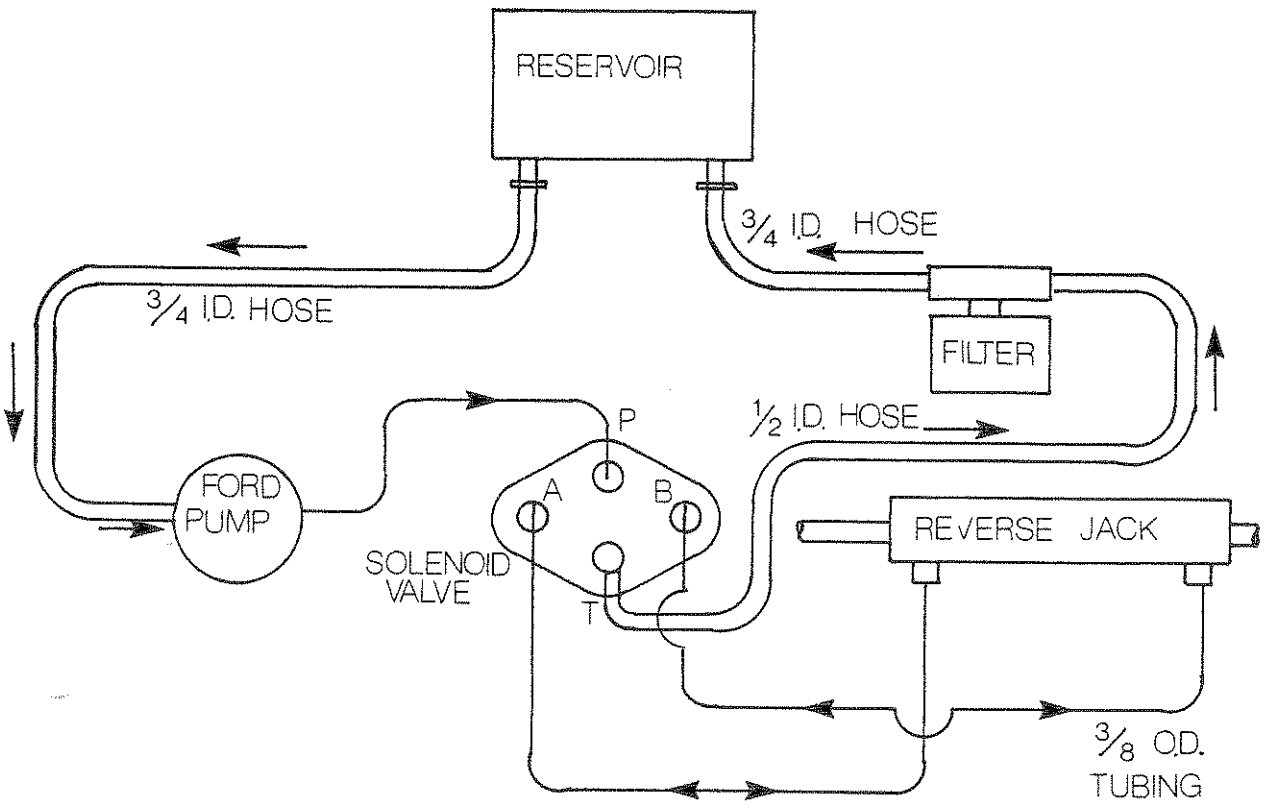
(b) between the position sender on the jet and the indicator gauge at the helm.

Fill the oil reservoir and circuit with "Shell Tellus 29" hydraulic oil (or equivalent) and bleed air out.

Adjust the indicator sender so that from reverse bucket "up" to reverse bucket "down" gives full swing on the gauge at the helm. "Neutral" position of the reverse bucket (when boat does not move ahead or astern) will not be half way on the gauge indicator travel. Find the "neutral" position by experiment when the boat is on trials and then mark the position of the gauge indicator for future reference.

EMERGENCY MANUAL HYDRAULIC REVERSE - can be provided at extra cost for use in case of electrical failure. Apply C.W.F. Hamiltons for details.

SCHEMATIC LAYOUT - 24v DC ELECTRO-HYDRAULIC REVERSE



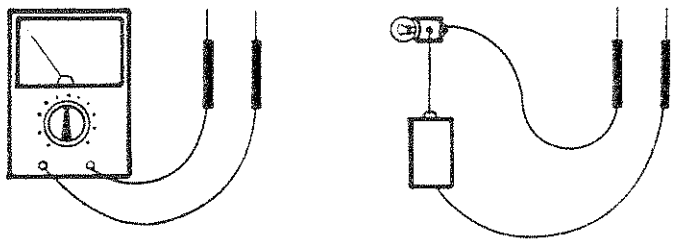
ELECTRICAL INSULATION

Apart from the need to check the jet unit insulation, normal marine practice should be followed when installing the electrical system in a jet boat.

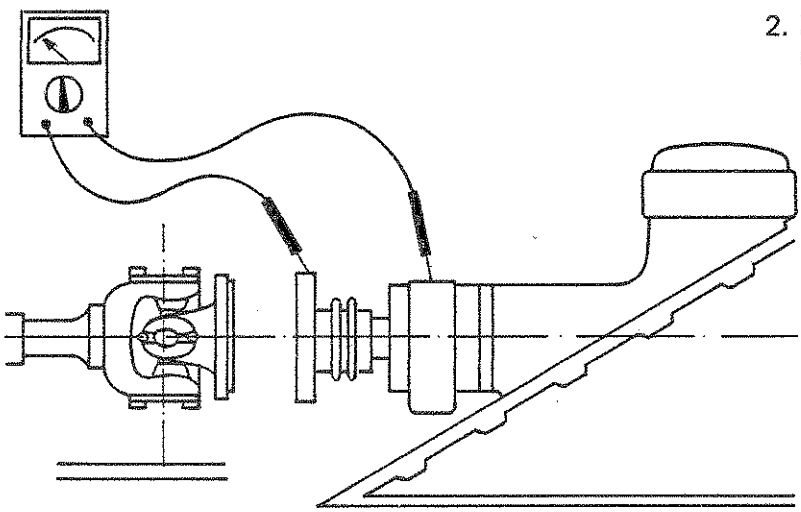
INSULATION

The rotating parts of the jet unit are electrically insulated from the aluminium casing to prevent electrolytic corrosion in sea water. Insulation is by tufnol washers and rubber in the rear bearing,

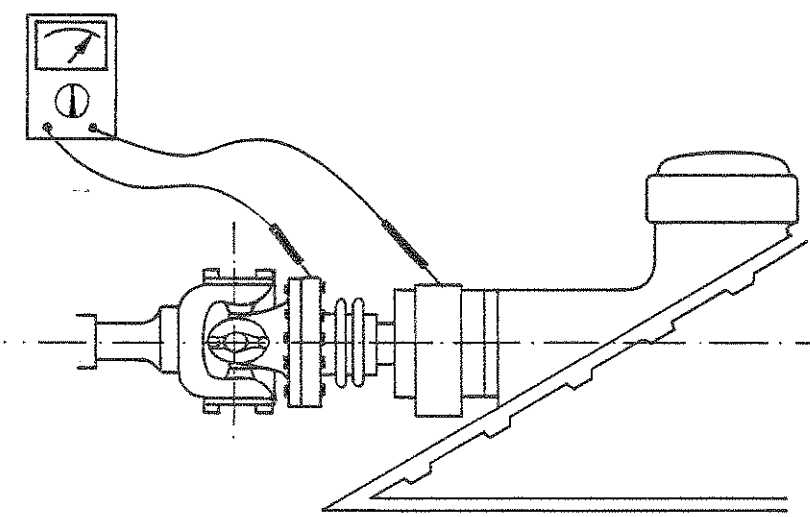
When a well insulated jet unit is immersed in sea water, a small electrolytic voltage is generated between the shaft and the housing. However, no corroding current flows as there is no external metallic circuit.



1. To check the insulation use an ohm-meter or bulb and battery (3 – 12 volt).



2. Remove the coupling shaft and, revolving the shaft slowly by hand, (with the engine stationary and jet unit out of water), check the insulation between the casing and shaft. The resistance should not be less than 1000 ohms. (If you are using a bulb it should not light).
A rear bearing, damp with sea water, may give a slightly lower resistance, but a metallic short circuit, which is dangerous, usually shows a very low resistance (under 10 ohms) and a test light will glow.



3. With coupling shaft connected resistance should be almost zero (bulb should light).
(This because of Negative Earth Bonding System – see page 5–8)

PRECAUTIONS AGAINST CORROSION

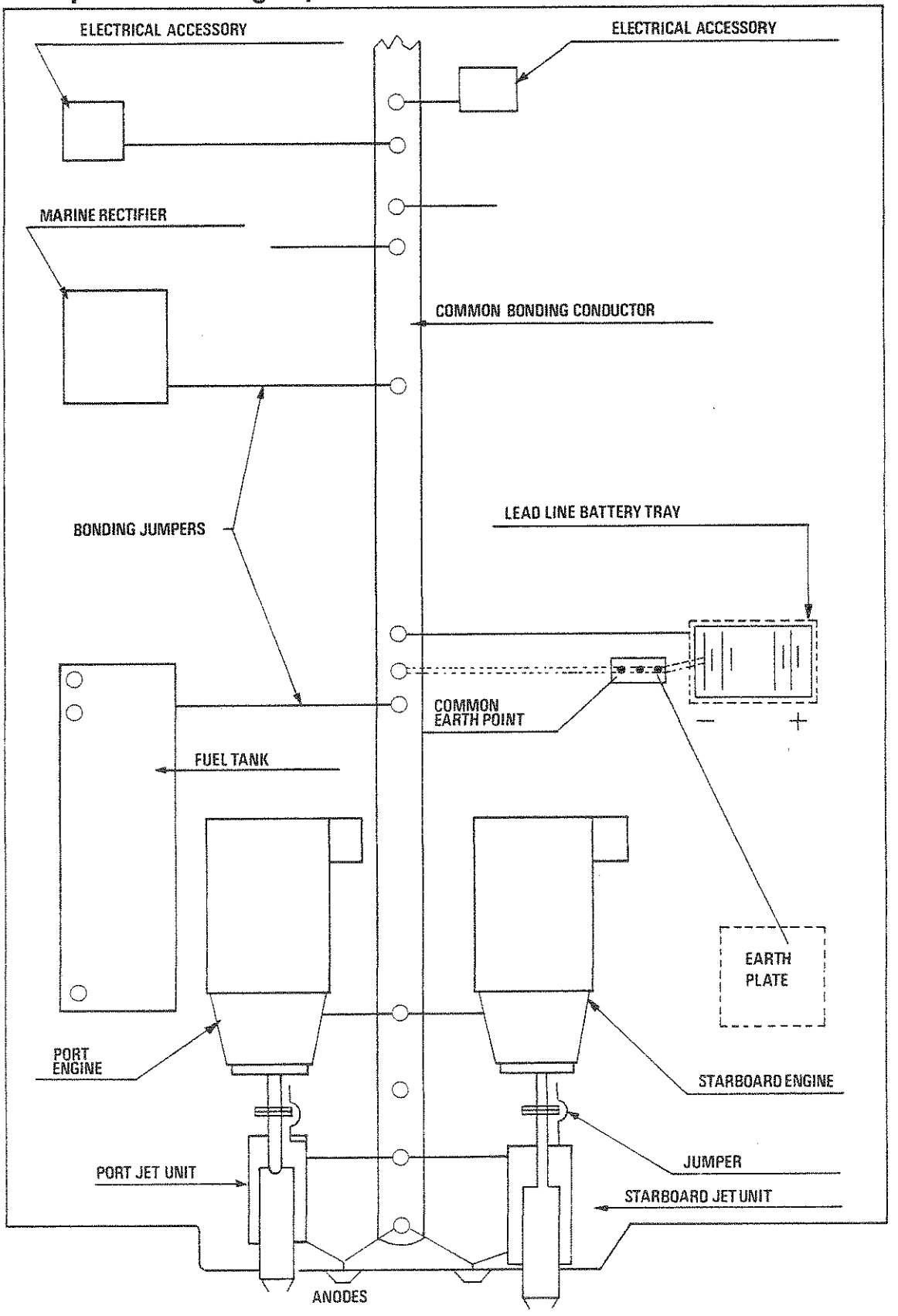
C.W.F. Hamilton and Co. have taken all possible precautions during manufacture and assembly of the jet unit, by using materials that are resistant to salt water corrosion and by placing anodes in the most effective places on the jet. The unit however is still vulnerable to the actions of the person who fits the entire power pack into the hull and to the actions of his electrician.

One of the major causes of corrosion to metal parts in salt water, particularly impellers, is stray currents emanating from the boat's electrics. These currents can be very small, and defy detection, but acting over a considerable period they can cause heavy corrosion.

The solution to this problem, is to formally bond all major metallic parts to a negative earth. Therefore, boats using Hamilton jet units at sea should be bonded and wired as follows:—

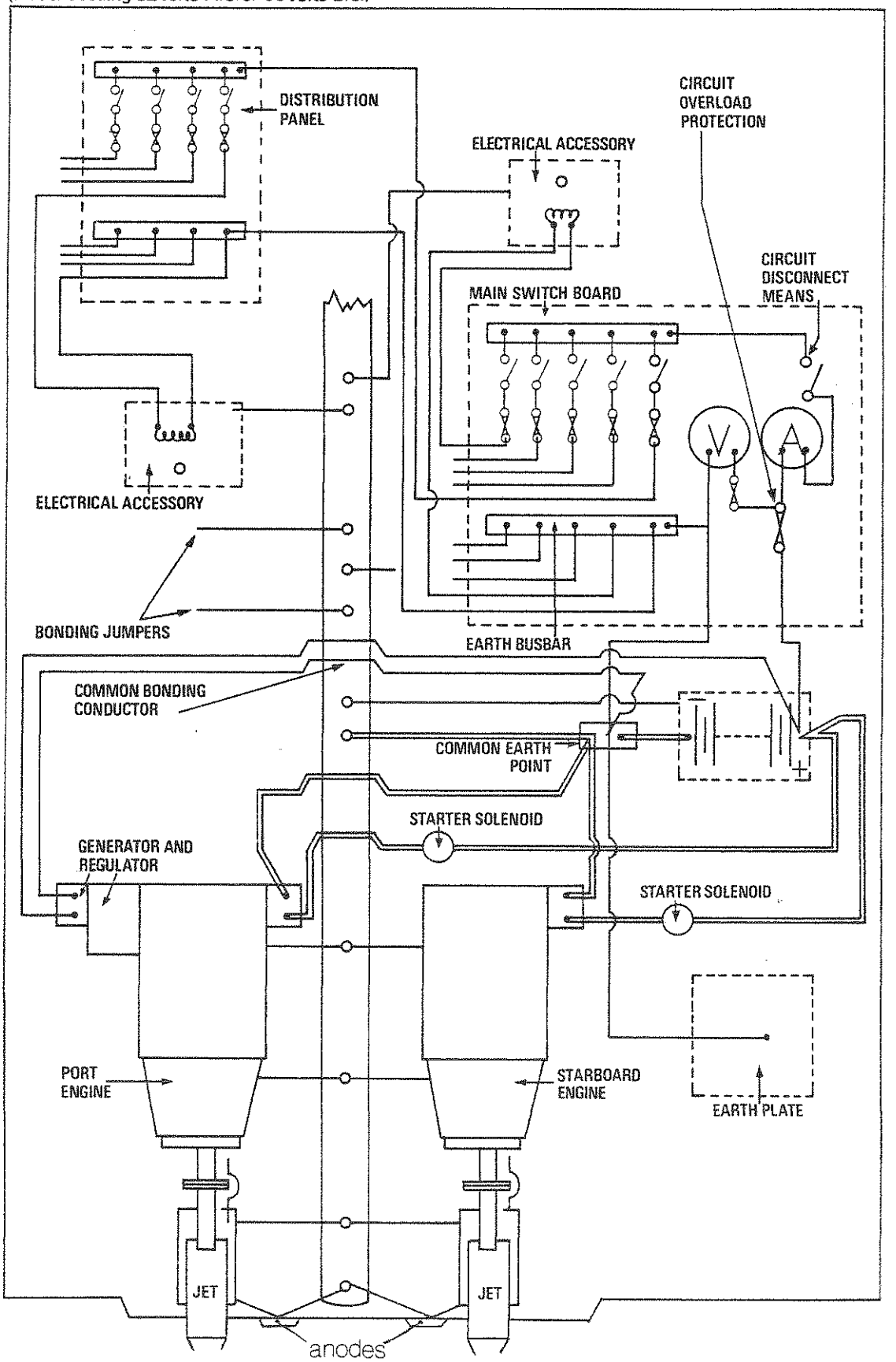
1. **Nevative Earth Bonding** (See page 5—9)
   The bond strip and connecting wires shall be copper of at least 14.5 sq. mm. cross section area to give very low electrical resistance. All junctions should preferably be welded, but if bolted, should be clean, a good contact, and regularly inspected. The bond wire or strip runs fore and aft down the hull and is connected to:
   (a) The negative pole of the battery. (b) The engine frame. (The engine must have a negative earth). (c) The jet unit casing. (d) All anodes whether in the jet, or attached to the hull (e) The fuel tanks and any other major metal item.
   (f) Casings of all major items of electrical equipment.
   (g) In the case of a wood or fibreglass hull, to an external earth plate in an area of the hull bottom which is always under water.
   (h) In the case of an aluminium hull, to a connection welded to the hull in an area where the hull is always touching water.
2. **Electrical Wiring System** (See Page 5—10)
   Every part of the electrical system should use two wires, positive and negative; i.e. the negative must not run through the frame of any major unit, through the hull of the boat, **or through the bonding system.**
   For example, the negative to the starter motor should be a seperate large section wire from the negative pole of the battery, to the holding bolt of the starter motor, and NOT to an engine bolt somewhere near the starter.
3. **Radio Transceivers, Depth Sounders and other Electrical Auxiliaries**
   Batteries, radio transmitter or other electrical equipment should NOT be earthed to the jet unit.
   Be guided by your radio technician, but in general these systems should either be entirely insulated, i.e. seperate insulated alternator, seperate batteries etc., or, the system should be incorporated in the bonding system, but with a seperate earth plate well removed from the bonding earth plate and from the jet.
4. **In Service Checks**
   In service, two items should be inspected regularly:
   (a) The bonding system for loose or corroded connections and test to ensure that electrical resistance is still low.
   (b) All anodes, if half eaten away, replace with a new anode.
5. **Zinc Anodes**
   Regular maintenance of the sacrificial zinc anode is recommended. The anode, which is a zinc block is fixed to the outside of the jet intake below the water line, and electrically connected to the casing of the jet unit. If corrosion is taking place the zinc anode will be eaten away in preference to the aluminium jet unit casing, so the anode should be inspected and replaced when badly corroded. Further anodes may be fitted on the hull if desired. A wire must be run from the anode to the aluminium casing of the jet unit.
6. **Anti Foul Paint**
   Keep stainless steel clean. Use chlorinated rubber, or non metallic based anti-fouling on the hull. (Do not use zinc, or particularly copper paints as these would cause rapid corrosion of the jet unit.)
7. **Impressed Current Protection**
   Impressed current protection e.g. Mercathode is also recommended.

Example of a Bonding Layout



A Typical Extra Low Voltage Negative Earth System

(Not exceeding 32 volts A.C. or 50 volts D.C.)



STEERING

The deflectors deflect the water jet to port or starboard causing the boat to steer to port or starboard respectively.

The following points should be remembered when operating a jet craft:—

(a) **If the engine is stopped** there is no water jet for the deflectors to deflect and thus **the craft cannot be steered.**

Never stop the engine when approaching a mooring or at any time when steering will be required.

(b) The wider the throttle is opened the greater the steering effect — i.e. the sharper the turn.

(c) Steering is available in neutral and reverse as well as in forward control — a feature which gives the Hamilton Jet unrivalled manoeuvrability.

Remember though that whether going forwards, in neutral, or in reverse **the bow of the boat will always turn the way the steering wheel is turned,** i.e. turn wheel to port, bow of boat will move to port and vice versa.

This means that in **reverse** the boat has the **opposite steering** to a motor car, a feature which can be used to advantage when manoeuvring.

FORWARD/NEUTRAL/REVERSE CONTROL

CAUTION

If in lightweight planing craft the **reverse** or **neutral** positions are selected with the throttle left open and the boat moving forward at speed, the resultant **"braking effect"** is **very severe** — even more so than full braking with a motor car.

The above procedure should therefore be used only in emergency.

For normal operation to "brake" the boat's forward motion:—

(i) Close the throttle

(ii) Select reverse or neutral

(iii) Open the throttle, gently at first.

MANOEUVRING & DOCKING

It has been found that the boat is best manoeuvred as follows:—

(i) Move the lever control to the 'neutral' position.

(ii) Set the throttle up to 1/3 open (say approx. 1,200 r.p.m. with direct drive engines.) In strong tide or wind conditions increase the throttle opening to obtain greater response as necessary.

(iii) A slight movement either way from the 'neutral' position will be sufficient to move the boat forwards or backwards until the manoeuvre is complete.

(iv) Steering will be excellent also at this throttle opening.

TO SUMMARISE

Manoeuvre at fixed throttle opening, one hand on the steering wheel and the other on the reverse lever. Move the reverse lever a little either side of the neutral position.

SHALLOW WATER OPERATION

Avoid using large throttle openings at slow speeds in shallow water as stones, sand, etc. will be sucked through the jet unit. Thus, when starting off and stopping, pick a deep water area and only travel over shallow water with small throttle opening.

DEBRIS, ETC. IN UNIT

Any debris such as wood, water weed, etc, caught in the intake screen, impeller or tailpipe stator vanes will affect the jet unit's performance. The 1341 jet is provided with an inspection cover which readily gives access to the above blockages.

On most installations the static level of water inside the jet unit will be below the intake inspection cover lip and the cover can be removed provided the engine is stopped and the craft is stationary.

If the static water line is too high then often by moving the load to the bow of the boat or placing a heavy load on the bow end the stern is raised enough to allow the cover to be removed.

To remove the cover:—

Remove the two nuts and washers and draw the cover off.

Blockages of the unit are usually noticed by (a) the engine 'racing' and/or (b) lack of jet thrust or boat speed.

Great care should be taken to avoid ropes or vines as these, if caught around the impeller shaft, will be wound into the jet unit.

Recommended practice is to close the throttle or even stop the engine and coast over such bad debris if the boat cannot steer round it.

Smaller pieces of debris, water weed, etc, will not normally foul the unit. If debris is sucked up on the intake screen, switch the engine off momentarily to allow the debris to fall away. If a gearbox is fitted, reversing the direction of rotation will have the same effect.

NOTE
This unit has been designed to require the absolute minimum of maintenance. However, it is recommended that the unit be dismantled and inspected for wear on bearings, seals etc. and corrosion annually as a minimum requirement.

Day to day maintenance should be negligible, but the following points and checks should be noted:—

THRUST BEARING
Use a good quality SAE 20 (SAE 30 in tropics.) Fill to dipstick. Capacity approx. 1.13 litres.

REAR BEARING
This is a water lubricated, cutless rubber bearing and requires no attention.

DO NOT RUN THE UNIT OUT OF WATER as this will damage the bearing. Application of a hose to the small hole at the back cone fairing of the tailpipe will wet the bearing sufficiently to allow the unit to run for a short time, but **remember** the engine will have no water circulation and prolonged running will cause damage.

GLAND SEAL
This is a carbon face seal with bronze counterface and should require no attention. If this seal is faulty, water will appear from under the bearing housing.

DRIVE SHAFT UNIVERSALS
Every thirty hours sparingly grease the universal joints and sliding splines. Do not over-grease.

SACRIFICIAL ANODES
The unit is fitted with anodes on the intake casting which will waste away in sea or contaminated water. Regularly inspect these anodes, and replace immediately they are reduced in size to a serious degree. If allowed to disappear, corrosion will start on the Aluminium parts which could eventually damage the unit.

TORQUE SETTINGS

Impeller nut (43)	:	22-25 kgm (160-180 lb ft)
Coupling nut (6)	:	34.5-41.5 kgm (280-300 lb ft)
Bearing housing nut (45)	:	12.7-13 kgm (92-96 lb ft)
Tailpipe nuts (84)	:	12.6-13 kgm)92-96 lb ft)

IMPELLER TIP CLEARANCE
Outside diameter of **new** 1341 impeller : 330.2-330.454mm (13.000-13.010 in).

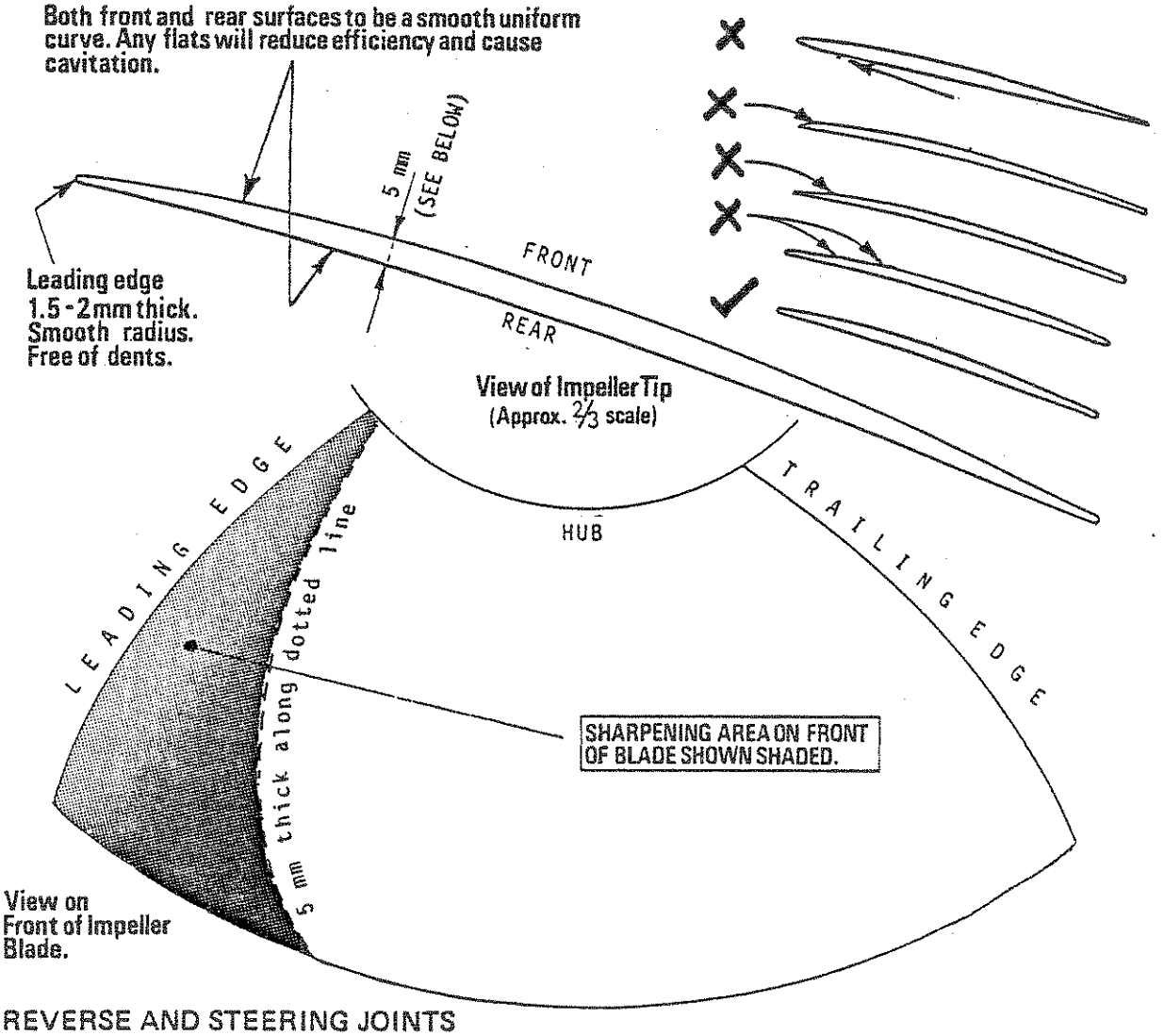
Worn impeller tip clearance i.e. the gap between the impeller tip and tailpipe, measured one side with the impeller hard against the tailpipe on the opposite side, is greater than:
2.540-3.048mm (or 1.270-1.524mm per side)
.100—.120 in (or .050 - .060 in per side)

Renew impeller tip clearance to:
.762-1.016mm (or .381-.508mm per side)
.03 - .04 in (or .015-.020 in per side)

IMPELLER SHARPENING

The leading edges of the impeller may tend to become blunt after a period of time with the action of small solid particles in the water. The performance of the impeller will drop with the blades blunt.

Anytime the inspection cover is removed the leading edge of the blades should be inspected for wear. If badly worn, remove impeller and sharpen as shown below.



REVERSE AND STEERING JOINTS

The reverse bucket and steering joints which are outside the hull may tend to seize if the boat is laid up or stationary for some time.

These joints should be oiled after such periods and checked to see they are operating freely. Once in the water these joints will be water lubricated and will not normally require attention.

CARE OF STAINLESS STEEL

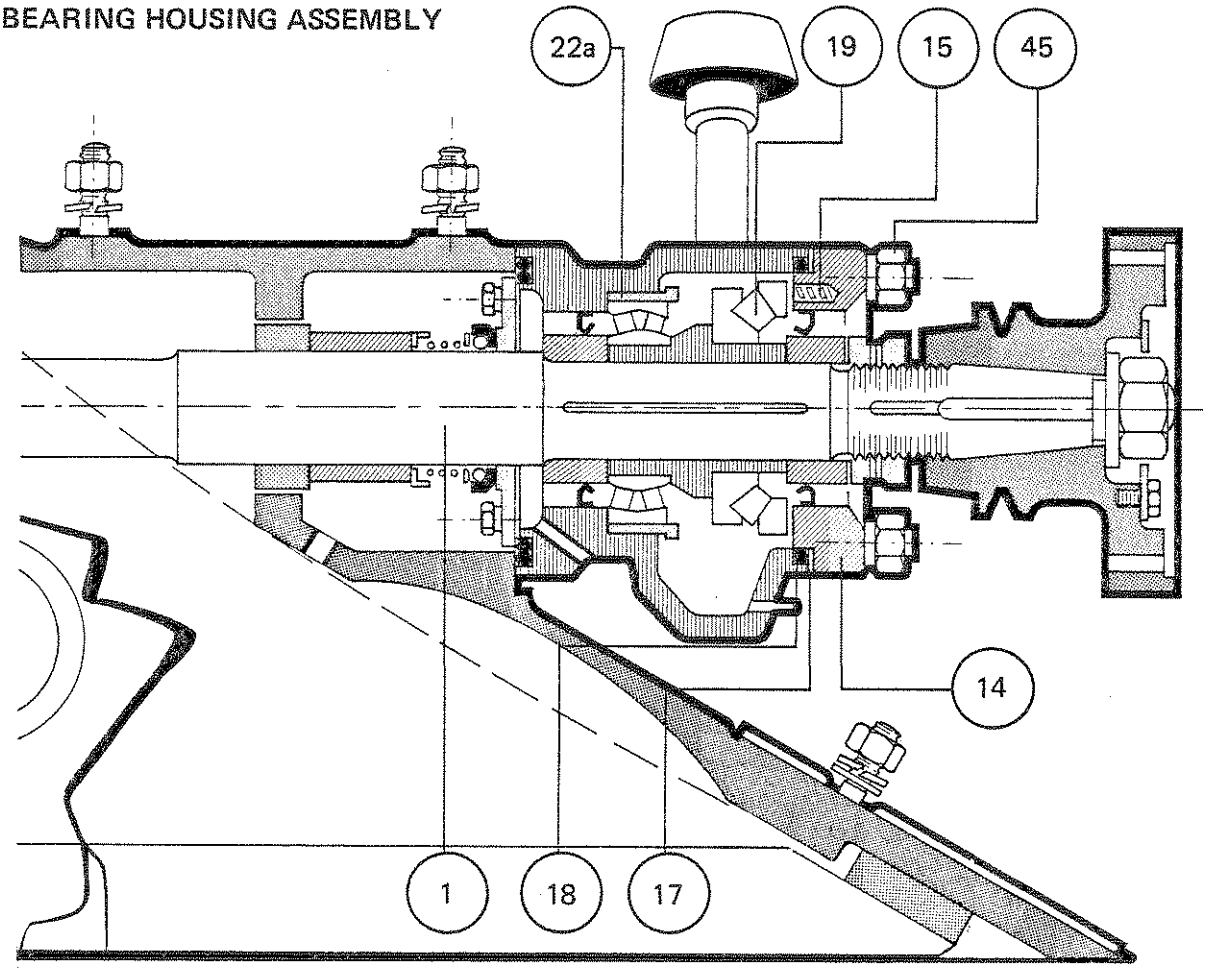
Stainless steel should not be painted, coated with anti-fouling or any similar treatment normally associated with mild steels. Stainless steel best resists rust and corrosion when the surface is clean and highly polished. The surfaces of the stainless steel components should be regularly inspected for signs of corrosion. Any areas of corrosion should be polished out with a fine emery cloth and the stainless steel brought back to a shiny surface finish.

In general, clean off oil slicks, chemical deposits, etc, daily, as stainless steel may corrode under such a deposit.

Periodically when the craft is on the slip, or at least an annual survey, the complete unit should be removed from the boat, and inspected internally and externally for faults, corrosions, or breakages. Clean down and repaint the intake castings. (Do not use copper-based paints.

See "Electrical Insulation" Page 5–8

BEARING HOUSING ASSEMBLY



Sufficient shims (17) are assembled to permit .13 - .18 mm (.005 - .007 in) shaft end float. The springs (15) in the end cap take up this end float when the jet is stopped and maintain a small end load on the thrust bearing (19) so that the taper rollers remain correctly loaded.

N.B. When the bearing housing is stripped, check that the bearing ring (Item No. 22a) (Part No. 102479-2) slides freely right home in its bore. See "Modifications" Page 7—4

ASSEMBLY

Assemble the bearing housing complete with say 3 shims (17) but **without** the springs, and tighten the four bearing housing nuts (45) to 13kgm (94 lbs ft) torque. Turn the main-shaft (1) by hand; if it feels tight, add another shim. Repeat until the shaft turns freely. Remove the cover plate (14) install the springs (15) and then re-assemble the unit.

BEARING CHECK

The thrust bearing (19) sheds a noticeable quantity of bronze from its cage during its first few hours of operation.

It is recommended that the bearing housing be drained, flushed out and re-filled with oil at the first engine oil change.

BEARING HOUSING OIL LEAK

An oil leak between the bearing housing and its cap can be caused by a misplaced 'O' ring seal (18).

If this occurs, replace the existing 137 x 143 x 3mm (5 3/8 x 5 5/8 x 1/8 in) O ring with a 140 x 146 x 3mm (5 1/2 x 5 3/4 x 1/8 in) O ring. When re-assembling make sure that the O ring is located and held by the groove in the bearing housing.

MODIFICATIONS FOR UNITS PRIOR TO SERIAL NO. 970

All units from Serial No. 970 onwards have had the following modifications carried out.

1. **OIL SEALS**

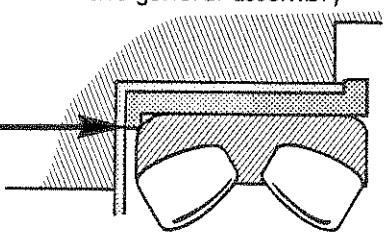
Early model 1341 units (prior to Serial No. 970) were fitted with two pairs of bearing oil seals (13). The outer seals being dry tended to make the mainshaft run too hot to touch after about 10 minutes running which could eventually affect the two inner seals causing an oil leak.

The remedy is to remove the two outer seals. The remaining inner seals will operate perfectly satisfactorily by themselves.

Units after No. 970 have only one seal each side as shown in the general assembly diagram at the rear of this manual.

2. **BEARING RING**

Bearing ring (Part No. 102479-2) may have a small shoulder in the bore which prevents the bearing seating home on the insulating washer (Part 102479-4)



As a result, units may have been assembled with up to 20 shims. Between 3 and 5 shims is desirable.(more is often necessary).

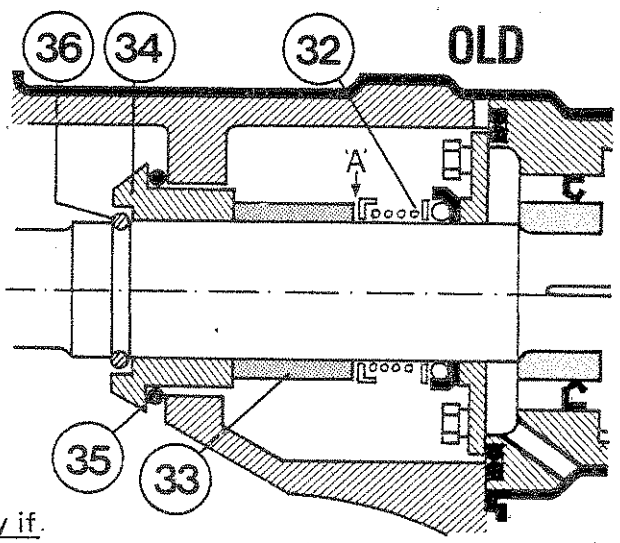
REMEDY — Use a scraper and remove the shoulder until the bearing can slide freely up the insulating washer. Ensure that the insulating washer (Part No. 102479-4) is not damaged.

MODIFICATION TO GLAND SEAL (Item 32)

- Units up to and including serial No: 969 were fitted as shown in sketch opposite.
- On units from serial No: 970 up to and including 1533 a modified version of item 34 was fitted and the "O" ring (35) deleted.

All these units utilised the circlip (36) to maintain the gland seal spring compression.

- Units from and including serial No: 1534 are fitted as shown in "new" sketch below. Item 34 is now a "shrink fit" sleeve part No: 103724 and the circlip (36) is deleted.

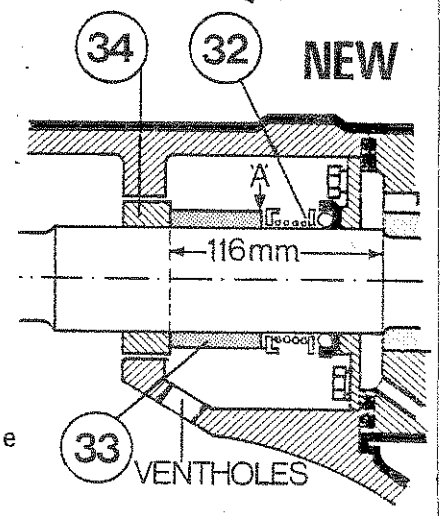


IMPORTANT (1) We recommend all units are fitted with the new shrink fit sleeve during an annual inspection or any other suitable time — especially if the gland seal (32) is being replaced. The new system provides better protection for the gland seal (32) from ropes or weed that might wind up on the mainshaft (1)

To fit the new sleeve pre-heat it to 350—450° C and slide onto shaft 116mm from shoulder as shown. If there are no vent holes as indicated drill 2 x 32mm dia. holes. 40mm each side of centre line.

(2) The gland seal (32) effectiveness is improved by replacing the old type (61358) with the new current seal (61405 - fitted from Serial No.1639 on). A 6mm wide spacer (103814) was fitted at "A" (on sketch) with 61358 - this spacer is NOT used with 61405 .

If the seal is not leaking take no action until normal servicing time such as annual inspection.



Shaft and Bearing Assembly

ITEM	PART NO	DESCRIPTION	QTY
1	103728	Mainshaft Assy.	1
	102480	Mainshaft with Item 34 fitted. (See page 7—4)	1
2	102499	Coupling	1
3	102481	Coupling key	1
4	102484	Washer	1
5	102485	Lockwasher	1
6	JP1308	Hex. Nut M30 S.S.	1
7	JP1342	Lock Washer 8mm S.S.	1
8	JP1020	Hex. Bolt M8 x 15 S.S.	1
9	102487	Seal Sleeve	2
10	JP475	Nut SKF KM10	2
11	JP421	Tab Washer SKF MB10	1
12	102482	Key	1
13	61357	Oil Seal	2
14	102490	Cover Plate	1
15	80682-94	Spring	6
16	102510	Washer	1
17	102527	Shim	5+
18	JP574	"O" Ring 140 x 146 x 3mm (5.5" x 5.75" x .13")	1
19	JP853	Bearing SKF 29412	1
20	102488	Spacer	1
21	JP852	Bearing SKF 22212	1
22	102479	Bearing Housing Assy	1
23	102513	Oil Filler tube	1
24	97887	Filler Cap & Dipstick Assy	1
25	JP574	"O" Ring 140 x 146 x 3mm (5.5" x 5.75" x .13")	1
26	JP572	"O" Ring 130 x 137 x 3mm (5.12" x 5.37" x .13")	1
27	102516	Gasket	1
28	102491	Seal Counter face	1
29	JP1025	Hex. Bolt M8 x 40 SS	6
30	JE262	Bush	6
31	JP1332	Flat Washer 8mm SS	6
32	61405	(Replaces 61358 & 103814)	1(See notes
33	102492	Spacer	1 opp.)
34	103724	Sleeve	1
	102493	Sleeve -- Obsolete (See page 7—4)	
35	JP599	"O" Ring — Obsolete (See page 7—4)	
36	102817	Circlip — Obsolete (See page 7—4)	
37	102483	Key	1
38	102498	420 Impeller	(optional)
39	102497	250 Impeller	(optional)
40	102496	150 Impeller	(optional)
42	102489	Sleeve	1
43	102517	Nut	1
44	JP528	Split pin .18" x 2.5" S.S.	1
45	JP1305	Hex Nut M16 S.S.	4
46	JP1345	Lock Washer 16mm S.S.	4
47	JP671	Drain Plug .25 BSP Galv.	1
48	JP680	Plug .5 BSP plastic	1

Tailpipe and Deflectors

ITEM	PART NO	DESCRIPTION	QTY
53	102464	Tailpipe	1
54	80682-446	Bearing	1
55	102470	200mm Nozzle	(optional)
56	102471	210mm Nozzle	(optional)
57	102472	220mm Nozzle	(optional)
58	102473	230mm Nozzle	(optional)
60	102462	Deflector Support	1
61	JP1346	Lockwasher 20mm SS	4
62	JP1074	Hex. Bolt M16 x 60 SS	4
63	102469	Hinge Pin	2
64	102594	Deflector Pivot Bearing	4
65	102467	Steering Deflector L.H.	1
66	102468	Steering Deflector R.H.	1
67	102463	Steering Shaft Bush	1
68	JP1161	Hex Screw M10 x 20 SS	2
69	JP1343	Lock Washer 10mm SS	2
70	102523	Tie Bar Pivot	2
71	JP1345	Lock Washer 16mm SS	6
72	JP1305	Hex. Nut M16 SS	2

Steering Controls

162	102494	Steering shaft	1
163	102524	Steering Arm	1
164	JP1487	Hex Bolt M16 x 75 Cad. Pl.	1
165	JP1345	Lock Washer 16mm SS	1
166	JP1305	Hex Nut M16 SS	1
167	102500	Steering Crank	1
168	JP1077	Hex Bolt M16 x 75 SS	1
169	102520	Steering Link	1
170	102525	Pivot Pin	1
171	102153	Washer	2
172	JP527	Split Pin .18" Dia. x 2" SS	2
173	102526	Pivot Pin	1
174	102477	Tie Bar	1
176	102723	Steering Arm Insulator	1

Reverse Bucket

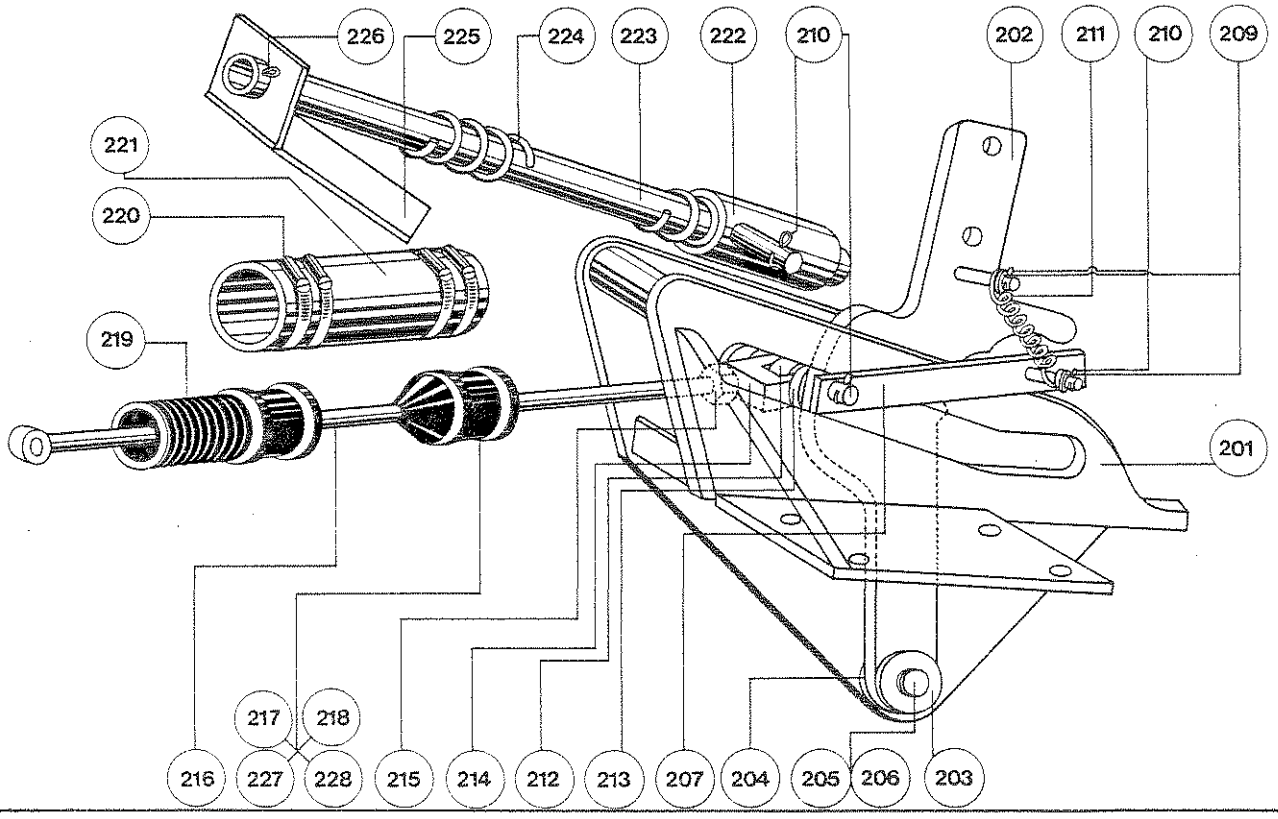
147	102465	Reverse Bucket	1
148	102466	Pivot Pin	2
149	102515	Washer	4
150	JP1033	Hex Bolt M8 x 80 SS	2
151	JP1342	Lock Washer 8mm SS	2
152	JP1302	Hex Nut M8 SS	2
153	102634	Hinge Pin	1
154	JP1161	Hex Screw M10 x 20 SS	1
155	JP1343	Lock Washer 10mm SS	1

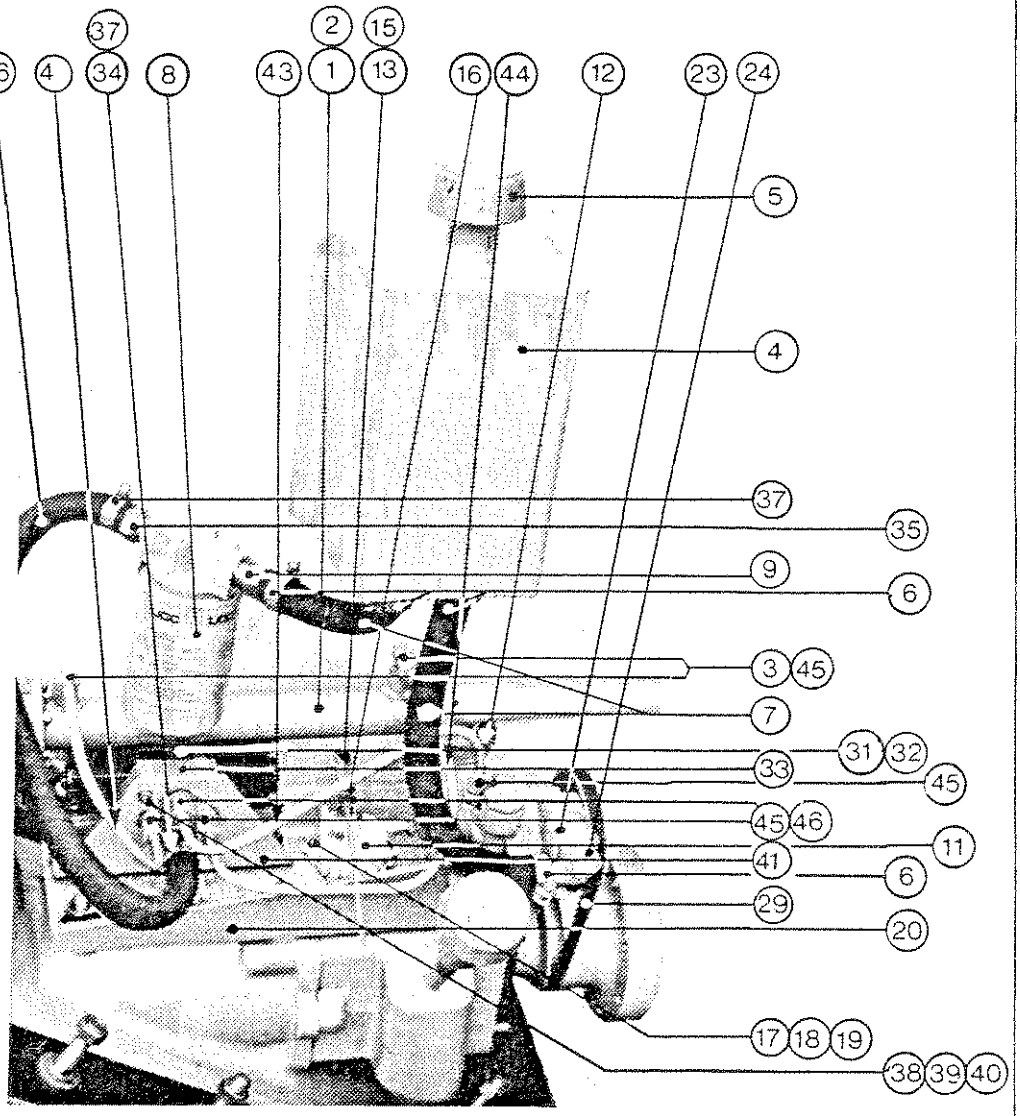
Intake Assembly

ITEM	PART NO	DESCRIPTION	QTY
79	102818	Intake	1
80	102170	Seal	1
81	102512	Inspection Cover	1
82	102455	Stud	2
83	JP1345	Lock Washer 16mm SS	36
84	JP1305	Hex Nut M16 SS	36
85	102178	Stud	4
86	102518	Gasket	1
87	102454	Stud	20
88	102153	Washer	28
89	102530	Stud	4
90	JP1074	Hex Bolt M16 x 60 SS	2
91	102455	Stud	8
92	102158	Gasket	1
93	102154	Washer	8
94	102169	Dowel	2
95	102461	Dowel	2
96	102300	Insulating Strip	2
97	102306	Insulating Disc	2
98	63135	Patent Plate	1
99	63097	Name Plate	1
100	102185 SY	Anodes (External-Internal)	2
101	102501	Bush	1
102	61372	Insulating Strip	2
103	61360	Seal	1
104	JP705	Grease Nipple 3/8" BSP x 62½°	1
105	61367	Scraper Seal	1
106	102622	Seal Housing	1
107	103072Y	Screen	1

Manual Reverse Control Assembly (102606SY)

ITEM	PART NO	DESCRIPTION	QTY
201	102607	Guide	1
202	102608	Reverse Lever	1
203	102309	Reverse Lever Bush	1
204	102310	Reverse Lever Spacer	1
205	JP 1184	Hex Screw M.16 x 35 SS	1
206	JP 1345	Lock Washer 16mm SS	1
207	102720Y	Reverse Linkage W.A.	1
209	JP 1334	Washer 12mm SS	8
210	JP 522	Split pin 1/8" x 1" SS	9
211	60197	Spring	1
212	102165	Roller	1
213	102182	Roller	2
214	102164	Clevis	1
215	JP 1305	Hex Nut M.16. SS	1
216	102514	Push/Pull Rod	1
217	102610	Seal Bush	1
218	61349	Oil Seal	2
219	102612	Bush	1
220	JP 763	Hose Clip Rex No. 3 SS	1
221	63330	Hose	1
222	102718	Roller Shaft	1
223	102613	Guide Tube	1
224	102609	Spring	1
225	102717 Y	Spring Bracket	1
226	JP 535	Split Pin ¼" Dia x 2½"	2
227	102611	Seal Retainer	1
228	JP 1143	M6 x 20 Hex Screw SS	4

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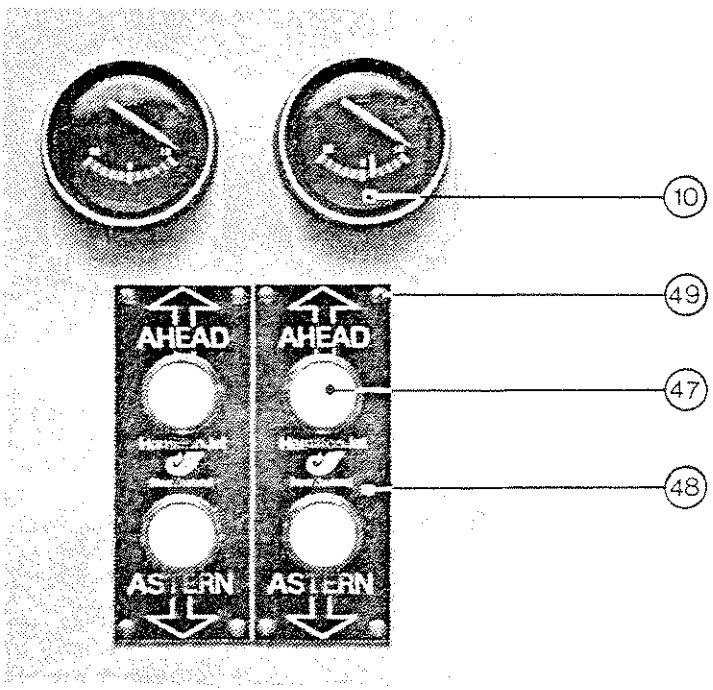
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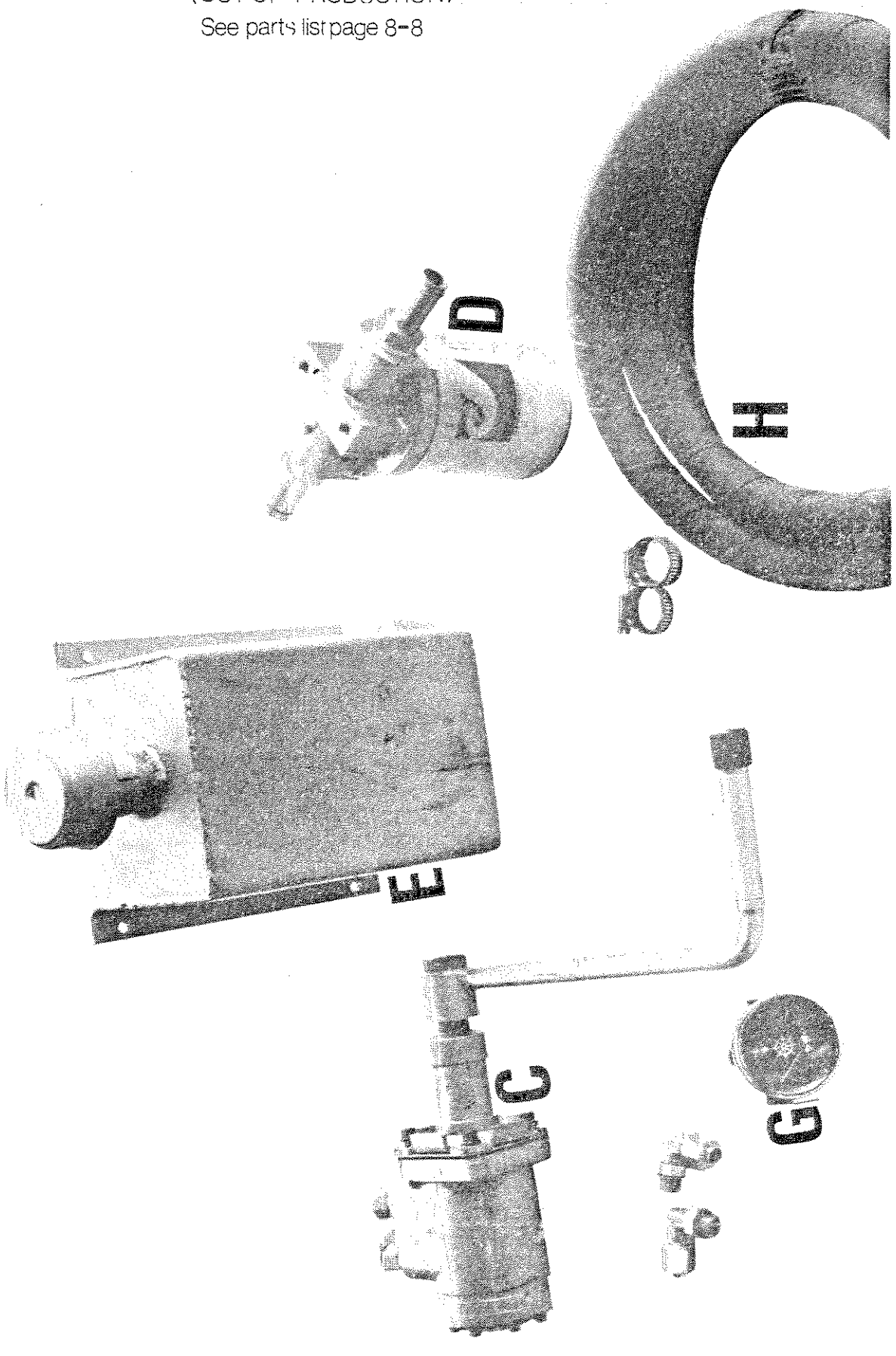
Optional electro-hydraulic reverse control assembly

ITEM	PART NO	DESCRIPTION	QTY
1	102806SY	Reverse Jack Assembly	1
2		1½ BSP Galvanised Back Nut	1
3	Enzed CE-A0909	9/16 UN - 9/16 JIC Elbow	2
4	80682-422	Oil Reservoir	1
5	97841	Filler Cap & Dipstick	1
6		Hose Clip - ASS20 - St.St.	4
7		3/4 Oil & Grease Hose (Hamspec 12) x 1.9m (6 ft) or (Enzed 100 RG-12 Push On)	1
8	UCC-MX-1518-102	10 Micron Filter 60 l/min	1
9	Enzed 515-1212	3/4 BSP - 3/4 Hose Tail	1
10		Position Indicator VDO 24V.	1
11		Position Sender. State 1 or 2 station controls.	1
12	103018Y	Link Arm Assembly	1
13	103022	Link Pin	1
14	103021	Bracket	1
15		3/32 Split Pin x ½ St.St.	1
16	103019	"U" Guide	1
17		3/16 BSW x ½ Rd.Hd. Machine Screw St.St.	3
18		3/16 Diameter Spring Washer St.St.	3
19		3/16 Diameter Flat Washer St.St.	3
20	103025Y	Reverse Kit Mounting Bracket Assembly	1
21		M8 x 20 Screw St.St.	2
22		M8 Nut St.St.	2
23		Ford/Eaton Pump 2710E 3A696D 600 psi Relief Valve	1
24	103060	Adaptor	1
25	103020	Spacer	3
26		3/8 UNC x 1¼ Bolt St.St.	3
27		3/8 Diameter Spring Washer St.St.	3
28		3/8 Diameter Flat Washer St.St.	3
29		"V" Belt -A-25 Troj n (1 spare)	2
30	104053SY	The following parts are required for conversion kit Part No.104053SY :-(For converting Manual Hydraulic Control to Electro-Hydraulic).	
31	63446	Solenoid Valve 24V Wandfluh AM4D63-24V DC	1
32		M5 x 50 Socket Hd. Cap Screw Cad Plated	4
33	104007	Sub Plate	1
34	Enzed 215-0608	Hosetail	2
35	Enzed AQ12-6	Reducing Bush	1
36		½ Oil & Grease Hose (Hamspec 12) x 1.3m (4 ft)	1
37		Hose Clip Ass 12 St.St.	2
38		¼ UNC x 1 3/4 Hex Bolt St.St.	2
39		¼ UNC Nut St.St.	2
40		¼ diameter spring washer St.St.	2
41	104006	Mounting Bracket	1
42	11087	3/8 O.D. Hamspec 19 Tube x 370mm	1
43	11088	3/8 O.D. Hamspec 19 Tube x 430mm	1
44	11089	3/8 O.D. Hamspec 19 Tube x 545mm	1
45	BA 9-6	Tube Nut and Sleeve	6
46	F-6-9	Nipple 9/16 JIC - 3/8 BSP	3
47	63445	Push Button Switch	2
		Assemble into :-	
48	98831	Switch Panel	1
49		½ + 4g Rd.Hd. Self Tapping Screw St.St.	4

MANUAL HYDRAULIC REVERSE-CONTROL ASSEMBLY

(OUT OF PRODUCTION)

See parts list page 8-8



MANUAL Hydraulic Reverse Control Assembly

(Refer illustration page 8–7)

ITEM	PART NO.	DESCRIPTION	QTY
A	102806 SY	Double ended double acting jack	1
	D 53/99	9/16" UN–9/16" JIC elbow	2
	D 14/9	Tube nut and sleeve	2
B	2710E3A 696D	Hydraulic pump (Ford/Eaton) (600psi relief)	1
	—	¾" hosetail (supplied with pump)	1
	103060	Adaptor	1
	D 14/9	Nut and sleeve	1
	Rex 1A	Hose clip St.St.	1
	103025Y	Reverse kit mounting bracket assembly	1
	—	M8 x 20 screw St.St.	2
	—	M8 Nuts St. St.	2
	103020	Spacer	3
	—	¾" UNC x 1¼" Bolt, lock washer and flat washer St. St.	3
C	211–1007	Charlynn Orbitrol control valve (with 204–1001–005 column)	1
	80682–416	Handle	1
		5/8 Plastic chair tip	1
		¾" St. St. Locknut	1
	80682–423	Connector	1
	DR 112	O Ring	1
	D 52/129	UN O Ring x 9/16" JIC adaptor	3
	D 14/9	Nut and sleeve	3
	Rex 1A	Hose clip St. St.	1
D	UCC–MS–1518–102	Filter (10 micron, 2 gpm)	1
	D 100/1212	¾" BSP – ¾" hosetail	2
	Rex 1A	Hose clips St. St.	2
E	80682–422	Oil reservoir (4.5 litre–1 gal)	1
	97841	Filler cap and dipstick	1
	Rex 1A	Hose clips St. St.	2
G	N420. 100/001/001	Rudder angle indicator (24v. VDO)	1
	103018Y	Sender link arm assembly	1
	103022	Link pin	1
	103021	Bracket	1
	—	3/32" Split pin x ½" St.St.	1
	103019	"U" Guide	1
	—	3/16" BSW x ½" Rd. hd. M/c screw with spring and flat washer St.St.	3
H	—	3/4" bore oil and grease hose	10ft
I	A25	Vee belt (Trojan)	1

HAMILTON JET
1341 MODEL