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HMI is a division of HM Plant Ltd



Isuzu Marine Engines

Supplementary operators handbook

Canal Boat Engine Range

ISUZU
MARINE

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Introduction

The **ISUZU** marine diesel engines are a product of Isuzu's long years of experience and advanced technology. Isuzu takes great pride in the superior durability and operating economy of these engines.

To get the fullest use and benefit from your marine engine, it is important that you install, operate and maintain it correctly. This manual, along with the engine and gearbox operators' handbook, is designed to help you do this.

Please read this supplementary manual carefully and follow its operating maintenance recommendations, along with the installation guidelines. This will ensure many years of trouble-free and economical engine operation. Sections in this manual such as starting/stopping, wiring diagrams, etc override the sections within the engine operators handbook.

Should you require further advice, technical assistance or an engine service, please contact your nearest Isuzu marine engine outlet, a list of dealers are enclosed. He knows your engine best and is ready to meet your requirements.

On completion of the warranty registration card, you will receive an engine spares voucher, entitling you to your spares pack, please present this to your local Isuzu Marine dealer.

All information, illustrations, and specifications contained in this Manual are based on the latest product information available at the time of publication.

HMI are the UK and Eire distributor for Isuzu industrial and marine diesel engines, producing the finished product in the UK. HMI produces this manual for use on the Isuzu Marine engines that HMI manufactures.

HMI reserves the right to make changes in this manual at any time without prior notice.

The information given is subject to the company's current conditions of Tender and Sale, is for the assistance of users, and is based upon results obtained from tests carried out at the place of manufacture and in vessels used for development purposes. We do not guarantee the same results will be obtained elsewhere under different conditions.

Engine Identification

NOTE: In all communications with the distributor or HMI the engine number and engine type must be quoted.

The engine serial number is stamped on the top of the water-cooled manifold, on a designated number plate. On the Isuzu 70 this number plate is placed on the side.

As part of your engine warranty please return your registration card, which is supplied loose, as soon as possible.

Engine Information

Fill in your engine information below, so you have it to hand when contacting your local dealer.

Engine Type	
Engine Number	
Gearbox Type	
Gearbox Number	
Date of Installation	

Safety Precautions

Keep the engine, gearbox and surrounding area clean, including the area immediately below the engine.

Drives – Power Take Off Areas

Gearbox Output Flange

The purpose of the marine diesel propulsion engine is to provide motive power to propel a vessel. Accordingly the gearbox output shaft rotates at between 133 and 2400rev/min. This flange is designed to be coupled to a propeller shaft by the installer and steps must be taken to ensure adequate guarding.

Forward End Drive

Engines are supplied with unguarded vee and poly vee belt drives to power the fresh water pump and battery-charging alternator. The installer must ensure that it is not possible for injury to occur by allowing accessibility to this area of the engine. The pulleys run at high speed and can cause injury if personnel or clothing come in contact with the belts or pulleys, when the engine is running.

Exhaust

Exhaust Outlet

Diesel marine propulsion engines emit exhaust gases at very high temperatures – around 400 - 500°C. Engines are supplied with either wet exhaust outlet (water injection bend) or dry outlet (dry exhaust stub) – see engine price list. At the outlet next to the heat exchange header tank, the exhaust outlet can become very hot and if touched, can injure. This must be lagged or avoided by ensuring adequate guarding. It is the responsibility of the installer to lag the exhaust system if a dry system is used. Exhaust gases are harmful if ingested, the installer must therefore ensure that exhaust lines are lead overboard and that leakage in the vessel does not occur.

Fuel

Fuel Lines

Diesel engines are equipped with high pressure fuel injection pumps, if leakage should occur, or if pipes fracture, fuel at high pressure can harm personnel. Skin must be thoroughly cleaned in the event of contact with diesel fuel.

Fuel Supply Connections

Engines are supplied with 8mm compression fittings. The installer must ensure that when connections are made, they are clean and free of leaks.

Oil

The Isuzu marine propulsion package is supplied with 2 dipsticks, one for the engine and one for the gearbox. Ensure dipsticks are returned and secure after checking, if not oil leaks can cause infection when touched. Do not remove dipsticks whilst engine is running, as this can cause oil to blow out. All oil must be removed from the skin to prevent infection.

Scalding

An engine running under load will have a closed circuit fresh water temperature of 85° to 95°C. The pressure cap on the top of the header tank must not be removed when the engine is running. It can only be removed when the engine is stopped and has cooled down.

Transportation/Lifting

Engines are supplied on transportable pallets. Lifting eyes on engines are used for lifting engine and gearbox assembly only, not the pallet and associated kit.

GENERAL DECLARATION

This machinery is not intended to be put into service until it has been incorporated into or with other machinery. It is the responsibility of the purchaser/installer/owner, to ensure that the machinery is properly guarded and that all necessary health and safety requirements, in accordance with the laws of the relevant country, are met before it is put into service.

Note: Recreational Craft

Where applicable, the purchaser/installer/owner and operator must be responsible for making sure that the Recreational Craft Directive 94/25/EC is complied with.

Canal Boat Engine – Technical Data

Model	Cyl	Bore	Stroke	CC	Combustion	Cooling	Max Output		Oil Levels (Litres)		Dry Weight	Alternator	Gearbox
		mm	mm	cm³			BHP	r/min	Total	Between Marks	Kg		
Isuzu 25	3	77.4	79.7	1124	Indirect Injection	Keel Cooled	25	3000	4.5	1.4	180	Twin 80 Amp	PRM 80
Isuzu 35	4	77.4	79.7	1499	Indirect Injection	Keel Cooled	35	3000	6.6	2.7	206	Twin 80 Amp	PRM 120
Isuzu 42	4	77.4	92	1732	Indirect Injection	Keel Cooled	42	3000	6.6	2.7	206	Twin 80 Amp	PRM 150
Isuzu 55	4	85	96	2179	Indirect Injection	Keel Cooled	55	3000	8	2.7	241	Twin 80 Amp	PRM 150
Isuzu 70	4	95.4	107	3059	Direct Injection	Keel Cooled	65	2600	9.2	2.0	321	80 & 110 Amp	PRM 260

Note

Alternators and gearboxes may vary, check with your supplier.

Starting and Stopping

Initial Start up

Important checks prior to use

Your engine has been filled with new oil for both engine and gearbox when it leaves the factory. However, please check, see section on engine maintenance.

Ensure the engine is free to turn without obstructions.

Ensure battery is fully charged and connected (the isolator is in the 'ON' position).

Ensure Morse speed and gearbox cables are fitted correctly and that cable travel lengths are correct.

Ensure engine is out of gear with 1/3 throttle – see single lever control instruction manual

CAUTION: for safety's sake conduct inspection before start up with engine stopped.

Engine starting

First Start of the day, from cold or initial installation

Turn the Key to the "1" position.
Leave for approximately 60 seconds, this allows the fuel to be pumped through the engine.
Turn the Key to the Pre-Heat position and hold ***for no longer than 10 – 15 seconds***.
Turn the Key to the Start/Crank position and release when the engine fires.

Starting an engine already at running temperature.

Turn the Key to Pre-Heat for 1 or 2 seconds.
Turn the Key to the Start/Crank position and release when the engine fires.

Ensure alarm buzzer is not sounding and red warning lights are off.

Note:

If the alternator warning light is still on then increase the engine speed to excite the alternator, then return to idle. The light should then go out.

The Isuzu Marine L Series engines are fitted with "*Quick Heat*" Glow Plugs and the Pre-Heat time tends to be shorter than on other Indirect Injection engines. These Glow Plugs can reach tip temperature s of 800 to 900°C within 5 seconds and therefore prolonging the Pre-Heat cycle can lead to premature plug failure.

Continuous engagement of the starter to the flywheel ring gear without giving them a break will result in the damaged starter pinion gear and flywheel ring gear. Crank for no longer than 20 seconds, with a 20 second break between attempts.

The oil pressure gauge on the deluxe engine control panel will read high on start

up and whilst the engine is cold. This is normal it will then decrease.

The temperature light on the basic and intermediate engine control panel will not light up during the start up procedure, this is normal.

STOPPING

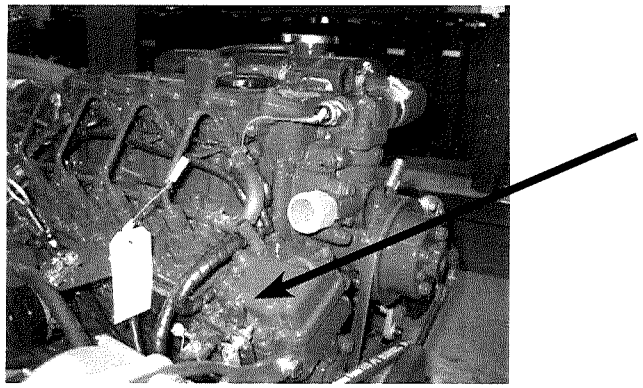
Every propulsion engine is fitted with a stop solenoid which is energised to stop. To stop engine simply press stop push button, hold in until engine stops, then turn key from '1' to 'OFF' position.

When leaving the boat for an extended period, turn off battery isolator

Do not turn the key to the off position when the engine is running. This will not allow the alternator to charge, and cause damage to the alternator.

EMERGENCY STOPPING

If for some reason the stop does not work then the engine can be stopped by moving the stop lever over by hand. See photograph.



Emergency stop lever – push towards back of the engine until engine stops, turn off at key afterwards

Fuel and Oil Specifications

Fuel

Important

- It as advisable to fit a fuel/water separator in the fuel supply system. Water in the fuel can damage the injection system. However if the engine is being fitted into an existing boat (re-installation), it is compulsory to fit a fuel/ water separator
- If a fuel supply shutoff valve is fitted do not use taper tap, only use a ball valve tap. The valve type are more reliable and less likely to let air into the fuel system.
- Do not use kerosene, which is very low in cetane rating, and adversely affects the engine.
- Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.

Fuel selection

The following criteria is required for the diesel fuel

1. Must be free from minute dust particles
2. Must have adequate viscosity
3. Must have high cetane value
4. Must have high fluidity at low temperature
5. Must have low sulphur content
6. Must have little residual carbon

Diesel fuels

Applicable standard	Recommendation
JIS (Japanese Industrial Standard)	NO. 2
DIN (Deutsche Industrie Normen)	DIN 51601
SAE (Society of Automotive Engineers)	NO.2-D
Based on SAE-J-313C	Class A-1
BS (British Standard)	
Based on BS/2869-1970	

If fuel other than the specified one is used, engine function will be lowered.

Fuel Requirements

NOTICE: The fuel injection pump, injector or other parts of the fuel system and engine can be damaged if you use any fuel or fuel additive other than those specifically recommended by Isuzu.

Such damage is not Isuzu's responsibility and is not covered by the warranty. To help avoid fuel system or engine damage, please read the following:

- Some service stations mix used engine oil with diesel fuel. Some manufacturers

of large diesel engines allow this; however for your diesel engine, do not use diesel fuel, which has been contaminated with engine oil.
- Do not use any fuel additive (other than as recommended under "Biocide" in this section). At the time this manual was printed, no other fuel additive was recommended. (See your authorisation dealer to find out if this has changed).

Fuel system air bleeding

The entry of air into the fuel system will cause difficult engine starting or engine malfunction. When servicing such as emptying the fuel tank, draining the water sedimentor, and the fuel filter element change is done, be sure to bleed air. Because of the "automatic air-bleeding system" being employed, turn the starter switch to the "1" position and activate the "electromagnetic pump" to bleed the air.

Air Bleeding Procedure:

1. When the "starter switch" is set to "1" (ON) position to activate the electromagnetic pump, fuel is forcibly sent to the fuel valve of each injection pump and further to the leak-off pipe of each nozzle holder, where air in the fuel leaks off automatically to the fuel tank.
2. Start the engine and check the fuel system for fuel leak.

CAUTION: the water/diesel fuel mixture is flammable and could be hot. To help avoid personal injury and/or property damage do not touch the fuel coming from the drain valve and do not expose the fuel to open flames or sparks. Be sure you do not overfill the container. Heat (such as from the engine) can cause the fuel to expand. If the container is too full, fuel could be forced out of the container. This could lead to a fire and the risk of personal injury and/or vehicle or equipment damage.

Biocides

In warm or humid weather, fungus and/or bacteria may form in diesel fuel if there is water in the fuel.

NOTICE: fungus or bacteria can cause fuel systems damage by plugging the fuel lines, fuel filters or injector. They can also cause fuel system corrosion.

If fungus or bacteria has caused problems, you should have your authorised dealer correct these problems. Then, use a diesel fuel biocide to sterilise the fuel system (follow the biocide manufacturers instructions). Biocides are available from your dealer, service stations, parts stores and other automotive places. See your authorised dealer for advice on using biocides in your area and for recommendations on which biocides you should use.

Smoke suppressants

Because of extensive testing of treated fuel versus untreated fuel, the use of a smoke suppressant additive is not recommended because of the greater possibility of stuck rings and valve failure, resulting from extensive ash deposits.

Lubricant

The quality of engine oil may largely affect engine performance, startibility and engine life.

Use of unsuitable oil may result in piston ring stick, piston and cylinder seizure and accelerate the sliding surface wear causing increased oil consumption, lowered output and finally engine failure. To avoid this, use the specified engine oil.

Engine Oil Selection

Isuzu recommend that an API CC grade oil is used in all of its Isuzu marine engines. Alternatively an API CD grade can be used if an API CC grade is unavailable.

The correct grade oil is available from your local Isuzu marine dealer.

- 5 litres API CC 15W/40 – HMI part no - 700008-ALS
- 20 litres API CC 15W/40 – HMI part no - 700009-ALS

Maintenance Schedule

Daily or every 8 hours running

- Check engine oil level
- Check gearbox oil level, see gearbox manual
- Check coolant level
- Check drive belt tension, adjust if necessary
- Ensure raw water inlet strainer is clear (heat exchanger cooled engines only).
- Check stern gland lubrication

After first 50 hours

- Change gearbox lubricant (see separate gearbox manual)
- Change engine lubricating oil
- Change oil filter
- Change fuel filter
- Check fuel contamination and drain off water trap/agglomerator if fitted
- Check all water pipes are not chaffing and for any leaks, and adjust if necessary
- Check all fuel pipes are not chaffing and for any leaks, and adjust if necessary
- Check exhaust system for any leaks, etc, and adjust if necessary
- Check wiring looms and cables are not chaffing, and adjust if necessary
- Check coupling alignment and ensure all bolts are tight
- Check bolts/nuts on the anti vibration mounts are tight and secure

Every 250 hours or every year

- As 50 hours and the following -
- Check air cleaner element
- Change oil filter

Every 500 hours

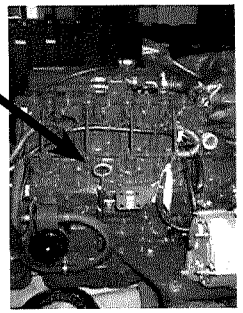
- As 50 & 250 hours and the following -
- Change air cleaner element
- Change fuel filter
- Change anti-freeze
- Check electrical equipment, condition of hoses and belts, replace as necessary

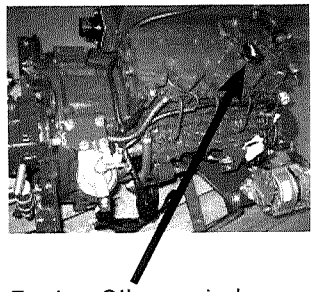
Checking engine oil level

For quantities of oil please refer to the engine operators manual. When checking the engine oil level, do so before starting or more than five minutes after stopping.

1. To check the oil level, draw out the dipstick, wipe clean, re-insert it and draw it out again. Check to see that the oil level lies between the two marks.
2. If the level is too low add new oil via the oil filler port, to the specified level – do not overfill.

Engine Dip stick





Engine Oil goes in here

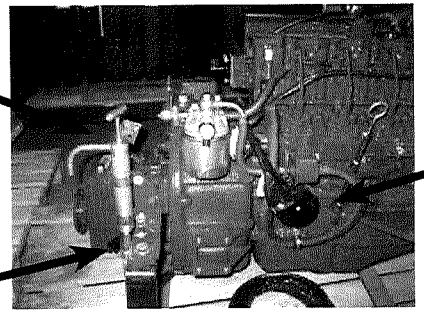
Important

When using oil of different make or viscosity from the previous one, drain old oil. Never mix two different types of oil. Engine oil and filter should be changed after the first 50 hours running time and then every 250 hours or every year. Oil filter is a cartridge type mounted on the side of the engine.

Changing Engine Oil

1. Run the engine for 10 minutes to warm up the oil.
2. Your engine is provided with a sump drain pump. Turn the tap to "on". Use the hand pump as shown to pump out the oil into a bucket. Turn the tap to off position and replace end cap.
3. Unscrew the oil filter and replace with a new one. See diagram below

Sump drain Pump



Oil Filter

Sump drain Pump - tap

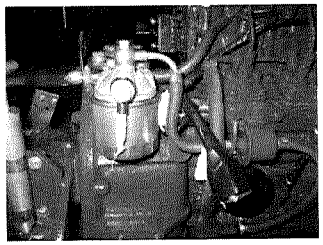
Note: it is best to have a plastic bag wrapped around the filter to catch any oil left in the system. (Always keep your bilges clean!) Before screwing in the new filter spread a thin film of oil round the rubber gasket to ensure a good seal and screw in – hand tight.

4. Fill the engine with new oil, refer to page 11 for specification, as described above.

Note: once you have re-filled the engine will oil, run the engine for about 5 minutes, so the oil can be pumped around the engine and into the new filter. Stop the engine, and let it settle for about 10 minutes, and re-check the oil level, fill if required.

Changing the fuel filter

1. The fuel filter is a spin type. Remove by turning anti-clockwise when viewed from below, see picture
2. Replace the fuel filter cartridge every 500 hours.
3. Apply fuel oil thinly over the gasket and tighten into position – hand tight
4. Turn key to position 'RUN' and allow electric fuel lift pump to pump fuel into filter.
5. Check for leaks



Note: Do not get fuel on the flexible mounts.

Checking Gearbox Oil Level – please refer to gearbox manual

Freshwater system

New engines are supplied with the freshwater drained off. The following instructions must be followed to fill the system.

(a) Mix up in a clean bucket the correct strength of anti-freeze solution.
(b) Check that the drain tap or plug is turned off.
(c) Fill engine with freshwater/anti freeze solution through the top of the header tank with the filler cap removed.
(d) Fill the header tank to the top of the filler neck and replace cap. Press down firmly on filler cap and hand tighten in a clockwise direction.

Note: for keeled cooled engines a much larger quantity of freshwater/anti freeze solution is required depending on the size of the keel cooling tank – refer to the builder.

(e) run the engine for 5 minutes on no load (out of gear) and check coolant level. Top up if necessary.
(f) Check systems for leaks, including calorifier circuit if fitted.

Note: for keel cooled engines it is very important to bleed all the air out of the system before the engine is run on load (check with builders instructions).

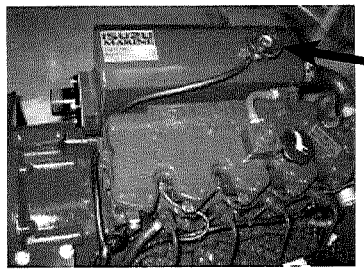
(g) If a calorifier is fitted care must be taken to see that this is also full of coolant and all the air is expelled. (see calorifier fitting notes under installation section)

(h) Run the engine on one third speed for 15 minutes, preferably with the boat tied up. As the system warms up coolant may be expelled from the overflow pipe into the bilge. Stop the engine and allow the engine to cool down before removing the pressure cap and top up the coolant to 25mm below the filler neck.

Important

Removal of the pressure cap when the engine is hot can cause severe injury from scalding hot water under pressure. Always allow the engine to cool and then use a large cloth when turning the cap anti-clockwise to the stop. This allows the pressure to be released. Press firmly down on the cap and continue to turn anticlockwise to release the cap.

(i) Repeat (h) if coolant level is more than 25mm below the base of the filler neck when the engine has cooled down.
(j) Run engine on $^{2}/_{3}$ speed for 20 minutes, check for leaks and repeat (i)
(k) Anti-freeze solutions should be drained off every 500 hours or 2 years which ever is sooner, and replaced with a new solution.



Engine water filler cap, integrated into the header tank.

WARRANTY TERMS AND CONDITIONS

INTRODUCTION

Your new Isuzu Marine Engine is covered by the HMI Warranty according to the conditions and instructions contained below.

OWNER'S OBLIGATIONS

The operation, maintenance and care of your Isuzu Marine engine, in accordance with the instructions and requirements listed in your Owner's Manual and the Isuzu Marine supplementary booklet, is your responsibility. Records should be kept of all maintenance services performed, including engine oil and filter changes. This record of correct maintenance is required for the purpose of determining warranty coverage on repairs and should be transferred to each subsequent owner.

Canal Boat Engine Range: It is also your responsibility to ensure that the warranty card is filled in by yourself (self certification) and returned to HM Isuzu, as this information forms part of the validation of your engine warranty.

The warranty card must be returned completed to ensure the warranty on your engine is valid, this is the responsibility of the owner.

REPORT OF A DEFECT

It is the responsibility of the owner of any Isuzu product referred to herein to report any defect to HMI, Boatbuilder, Distributor, Dealer, Workshop or Boatbuilder. Such a report must be made as soon as possible and no later than fourteen (14) days from the date when the user first observed the defect.

WARRANTY TERMS AND CONDITIONS

1.0 In the event that Goods supplied are defective in that they have a defect that existed at the time of delivery, HMI shall (at its option) meet the cost of replacing or repairing such defective Goods or part thereof subject to the following:-

1.1 Labour costs will be paid in accordance with HMI's standard repair times and standard rates, which are agreed upon before work is carried out.

1.2 HMI has the sole discretion to determine whether the Goods shall be returned to HMI's premises or repaired at any other location, which HMI may nominate.

1.3 HMI will pay for lubricating oil, coolant concentrate, filter elements, belts, hoses, gaskets and other maintenance items that are not reusable due to such defect. (at its discretion)

1.4 Only distributors, dealers or workshops authorized by HMI may carry out warranty repairs.

1.5 No incidental, consequential or related costs such as costs for travelling, transport, extra costs due to the installation in making the products accessible, docking or cranes, loss of use, loss of income, loss of time, loss of profits or damages of any other parts or goods shall be payable under this condition 1.0 by HMI.

2.0 The warranty in condition 1.0 above does not cover Goods which in HMI's opinion have been damaged during transportation, installation or repair or through abnormal use, overload, carelessness, insufficient lubrication, normal wear, use of spare parts other than genuine parts approved by HMI or through any type of incorrect installation, abuse, misuse, accident or through neglect or failure to follow instructions in the applicable owners manual, maintenance instructions or installation instructions.

3.0 The warranty in condition 1.0 above will be void if You or your representative, employees or contractors have taken abnormal risks or if modifications have been performed, which in the judgement of HMI have caused or enhanced the damage, or if the security seals have been broken, or settings altered, or if the Goods or any part thereof have been used in violation of the law, or for an unintended purpose.

4.0 The warranty does not cover expendable parts, such as all kinds of filters, belts, gaskets, rubber hoses, fuses, brushes, etc and lubricants.

5.0 The operation, maintenance and care of the Goods in accordance with the instructions and requirements listed in the owners manual and the warranty and service booklet provided by HMI is your responsibility. Records must be kept of all maintenance services performed, including engine oil and filter changes. This record of proper maintenance is required for the purpose of determining warranty coverage on repairs and should be transferred to each subsequent owner of the Goods.

6.0 All warranty claims must be advised to HMI prior to work being carried out, and an authorisation number being allocated, to the distributors, dealer

or by a HMI authorized workshop. No claims for warranty will be accepted unless previously authorised by H M Isuzu.

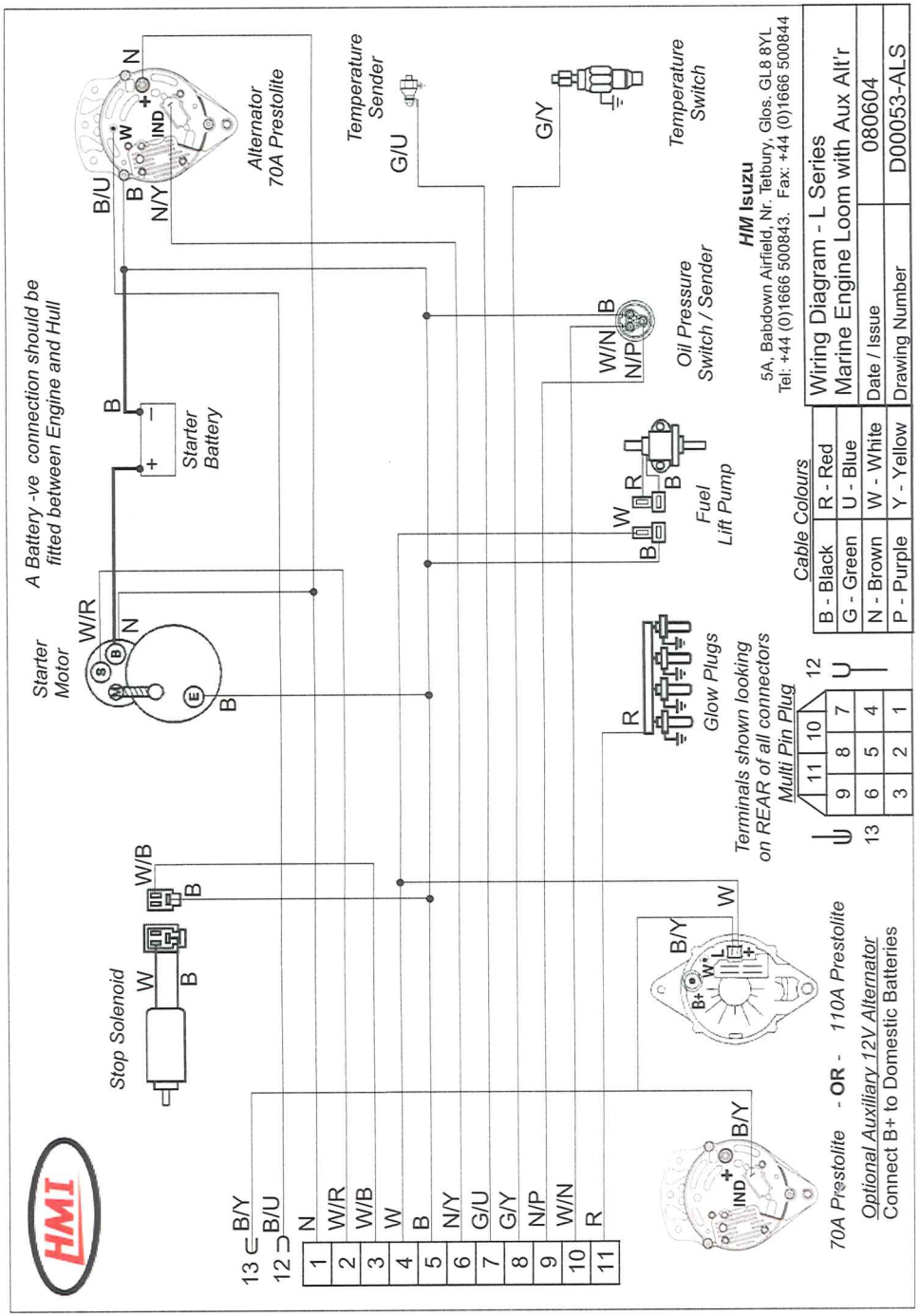
The period of cover relating to the warranty in condition 1.0 above is as follows:

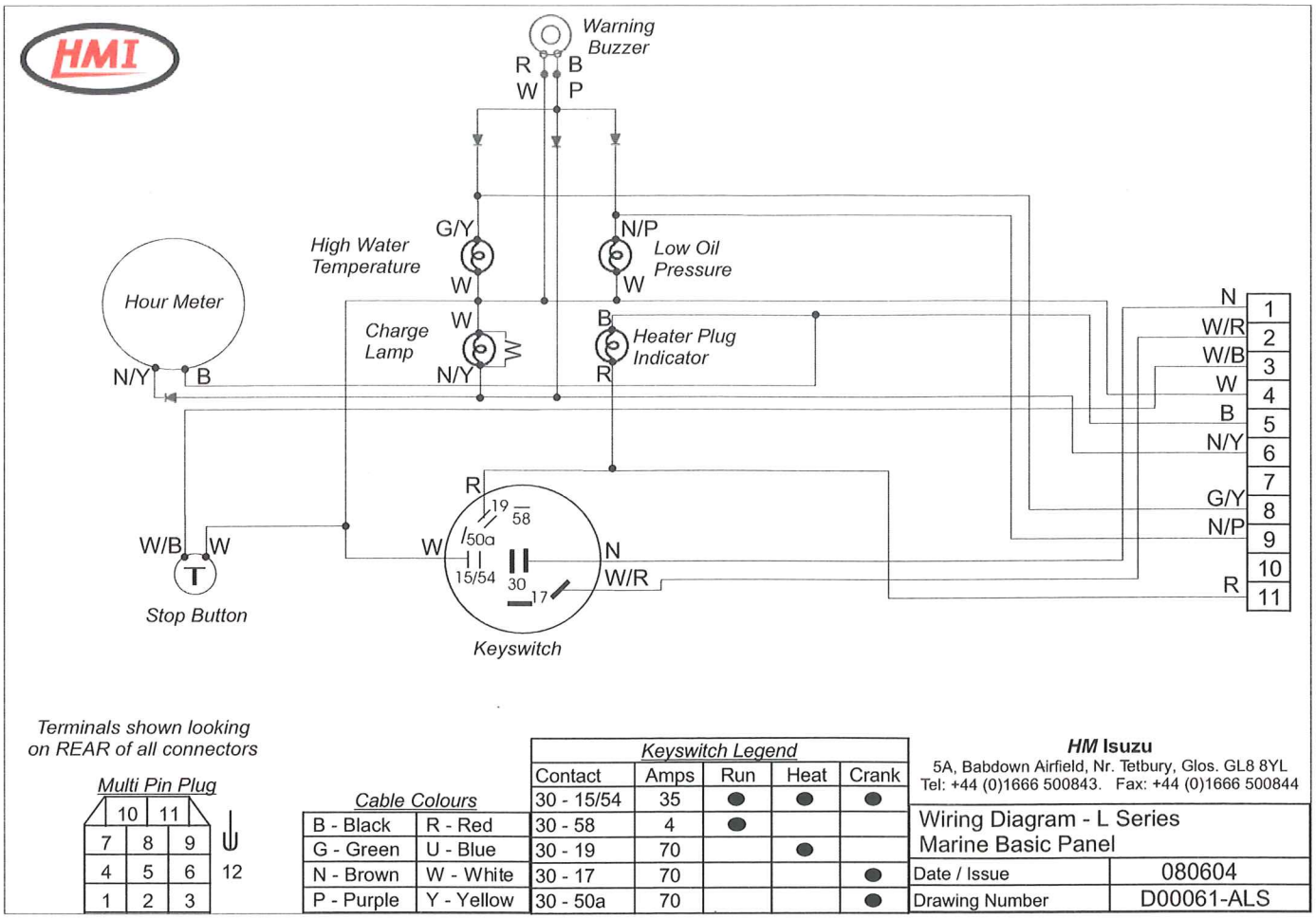
7.0 Marine Engine Applications

	MULTIUSER or HIRE USE	PRIVATE USE
Pleasure boats	The earlier of either 18 months from the date of despatch from HMI's factory or 12 months or 2,000 hours from engine installation	The earlier of either 30 months from the date of despatch from HMI's factory or 24 months or 1,500 hours from engine installation
Pleasure boats Electrical equipment and turbocharger	As above	12 months or 1,500 hours
Work boat engines and associated products	The earlier of either 18 months from the date of despatch from HMI's factory or 12 months or 2,000 hours	The earlier of either 18 months from the date of despatch from HMI's factory or 12 months or 2,000 hours

8.0 Save where the Goods are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977) all warranties conditions or other terms implied by law or custom are excluded to the fullest extent permitted by law.

9.0 HMI shall under no circumstances be liable for any indirect or consequential loss, loss of profits, loss of savings, loss of business or loss of contract. HMI's liability whether in contract, tort (including negligence), breach of statutory duty or otherwise shall not exceed the price of the Goods in respect of which any claim arises PROVIDED THAT nothing in these Conditions shall restrict or exclude HMI's liability for death or personal injury caused by its negligence.





Terminals shown looking on REAR of all connectors

Multi Pin Plug

10	11		
7	8	9	
4	5	6	12
1	2	3	

Cable Colours

B - Black	R - Red
G - Green	U - Blue
N - Brown	W - White
P - Purple	Y - Yellow

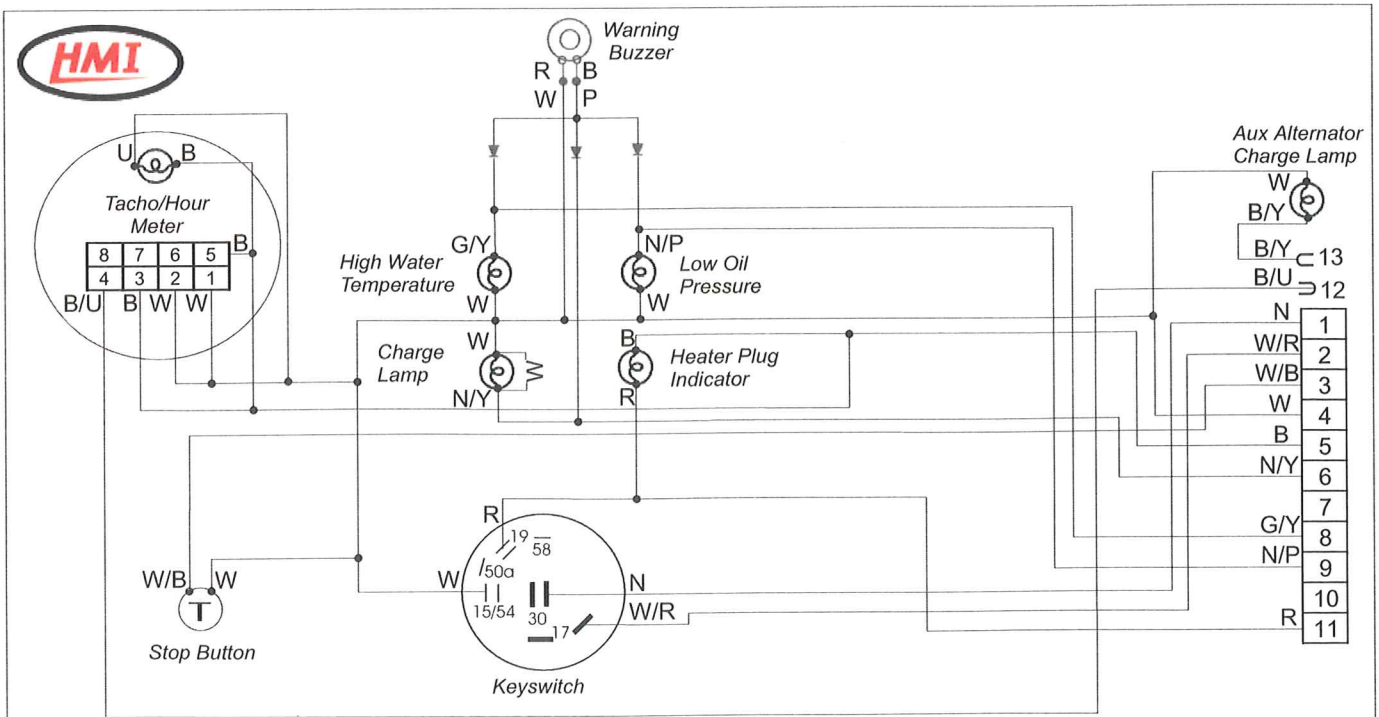
Keyswitch Legend

Contact	Amps	Run	Heat	Crank
30 - 15/54	35	●	●	●
30 - 58	4	●		
30 - 19	70		●	
30 - 17	70			●
30 - 50a	70			●

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Tel: +44 (0)1666 500843. Fax: +44 (0)1666 500844

Wiring Diagram - L Series
Marine Basic Panel

Date / Issue	080604
Drawing Number	D00061-ALS



Terminals shown looking on REAR of all connectors

Multi Pin Plug

13	10	11	
	7	8	9
	4	5	6	12
	1	2	3	

Illumination Lamp

Warning Lamp

Cable Colours

B - Black	R - Red
G - Green	U - Blue
N - Brown	W - White
P - Purple	Y - Yellow

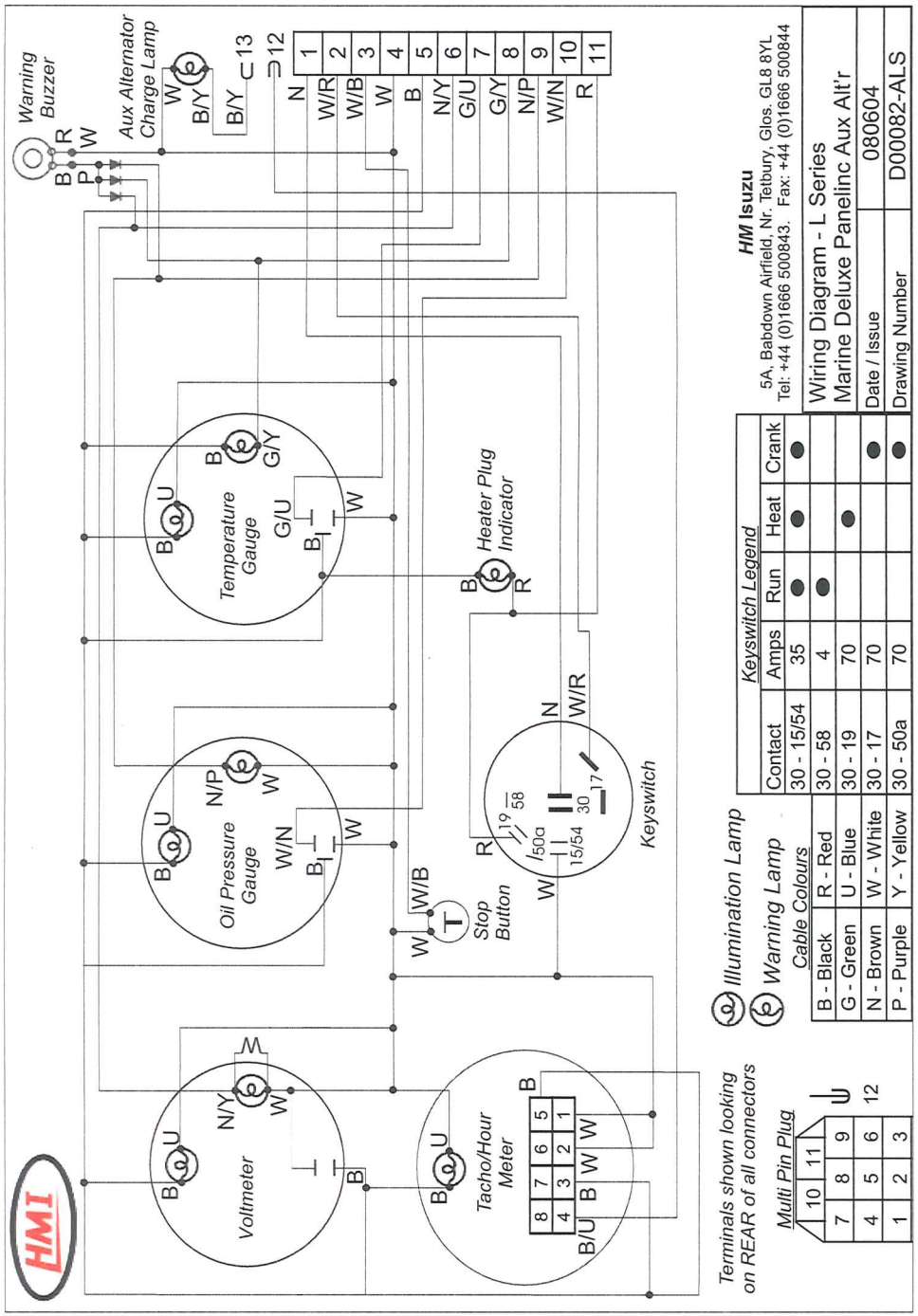
Keyswitch Legend

Contact	Amps	Run	Heat	Crank
30 - 15/54	35	●	●	●
30 - 58	4	●		
30 - 19	70		●	
30 - 17	70			●
30 - 50a	70			●

***HM* Isuzu**
5A, Babdown Airfield, Nr. Tetbury, Glos. GL8 8YL
Tel: +44 (0)1666 500843. Fax: +44 (0)1666 500844

Wiring Diagram - L Series
Marine Intermediate Panel inc Aux Alt'r

Date / Issue	080604
Drawing Number	D00072-ALS

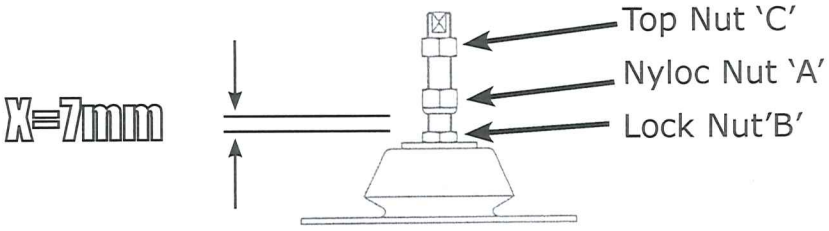


Marine Engine Installation Information

Anti vibration Mount Installation

These mounts are supplied for use where accurate alignment is required, e.g. between the gearbox output shaft and propeller shaft on marine installations. They also provide isolation of the power unit, to minimise the transmission of vibration into the hull.

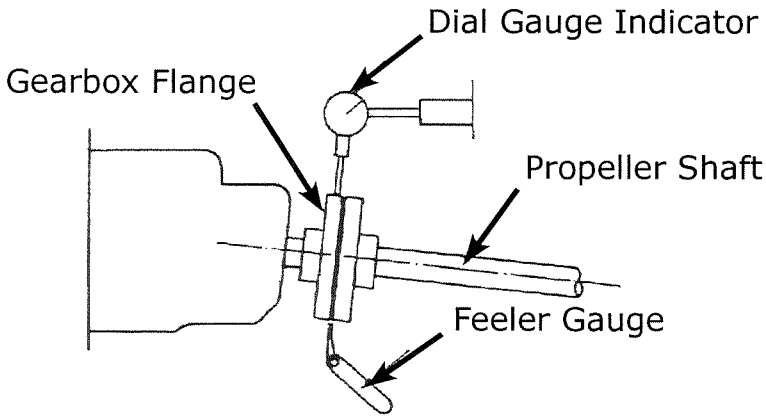
Assembly and adjustment is as below:



Set the gap 'X' between the lower face of the Nyloc Nut 'A' and the upper face of Locknut 'B' to 7mm.

1. Attach each mount to the engine bearers and secure by tightening Top Nut 'C'
2. Lower the propulsion unit, complete with mounts onto the beds or support structure, ensuring that the base of each mounts is fully seated. If any clearance between the underside of the mounts and beds is found, proceed as below:
3. (i) If the gap is less than 2mm, re-adjust Nyloc Nut 'A', until the base of the mount contacts the bed face.
   (ii) If the gap exceeds 2mm, a separate packing piece / shim should be fitted.
4. Fit and tighten the bolts fixing the mounts to the bed. Tighten Top Nut 'C'. Alignment between the Gearbox and Propeller Shaft Flanges should now be checked., preferably using a dial indicator for concentricity and feeler gauges for angular misalignment (see sketch).

Adjust alignment by raising or lowering the Nyloc Nut 'A', to achieve alignment within the limits of the Gearbox to Propeller Shaft Coupling, as specified by the manufacturer. If a rigid coupling is used, then it is suggested that eccentricity should not exceed 0.25mm (0.010") total indicator reading and, angular misalignment should be within 0.025mm (0.001") per 25mm of flange diameter.



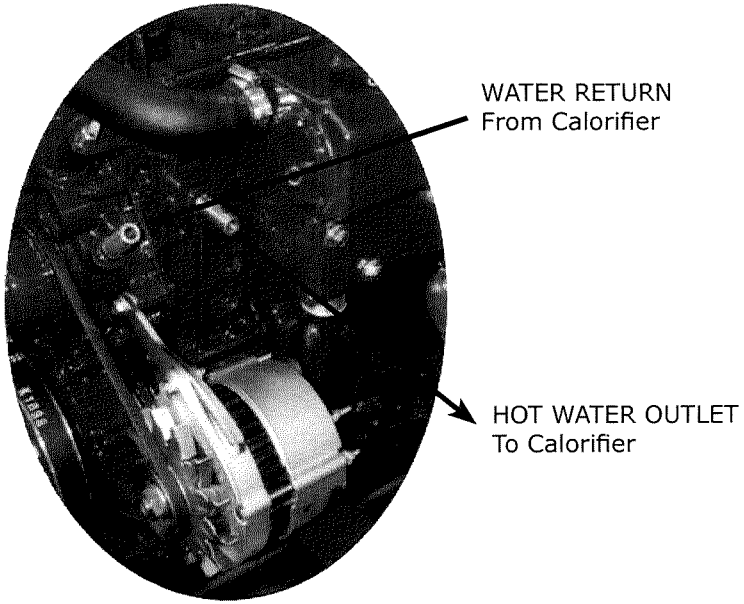
Coupling alignment procedures should be re-checked after 10/15 hours of operation, during which time any "settling" of the system should have taken place. If this is not possible, the power unit should be raised approximately 1mm on each mount after completing the alignment procedure.

5. If the distance between the underside of Nyloc Nut 'A' and the top of Locknut 'B' exceeds 15mm, then a 5mm Packing Piece should be inserted between the base of the mount and top face of the beds. Nyloc Nut 'A' should then be adjusted to compensate.
6. Following any height adjustment on the mountings, alignment of the Coupling Flanges should be re-checked after tightening the Top Nut 'C' and Mount to Bed Bolts securely.

NOTE.....LOCKNUT 'B' SHOULD NOT BE LOOSENED OR ADJUSTED AT ANY TIME.

Calorifier Connection Points

Calorifier connection points are as shown below. Connection stubs are provided and are suitable to accept 15mm (5/8") dia bore flexible hose. The hose must be secured with suitable hose clips to give a watertight connection capable of withstanding a water pressure of 15 psi. Hoses are not supplied by HMI.



If no calorifier is fitted, the connections must be blanked off, They **MUST NOT BE CONNECTED DIRECTLY TOGETHER**, Blanking plugs are available on request.

Calorifier Position

The ISUZU Marine range has been developed to operate with approximately 3m of piping between the engine and Calorifier, with a minimum number of bends and restrictions in this pipework. We recommend the Calorifier Inlet and Outlet connections be no more than 300 to 450mm either above the top of the engine or below the bottom of the engine sump.

Provided these criteria are applied and the system is fully bled of air, then satisfactory performance should result.

Both Feed and Return connections are situated on the engine side of the Thermostat and water is therefore allowed to circulate around the Calorifier Circuit at all times. It should be noted that during long periods of engine operation, when no hot water is drawn from the Calorifier, that the hot water temperature within could approach 80 deg C. Under these circumstances, extreme care should be taken when using the hot water circuit.

Engine Type : Isuzu designation	Isuzu 25 3LB1 PW-02 3LB1 PW-13	Isuzu 35 4LB1-PA04 4LB1-PA06/PW01	Isuzu 42 4LC1 PW-01 or 04 4LC1 PW-06	Isuzu 55 4LE1 PW-03 4LE1 PW-15	Isuzu 70 4JB1-PAW01
Oil Filter Element	894456-7412				587310-4890
Fuel Filter Element	897172-5491				587310-3350
Air Filter Element	100066-4LS				100020-4LS
Thermostat	897211-2090				894214-9620
Fan Belt - A section	800882-SPA	800975-SPA - 4LB1-PA04 800882-SPA - 4LB1-PA06/PW01	800882-SPA		892256-8000
Injector Nozzle	894130-5320		897116-1360	894130-5320	897134-5250
Injector Assy - complete	897079-9761		897116-0990	897079-9761	897134524O
Starter Motor	897048-9650	897048-9672	897048-9672	897135-3431	897084-8770
70 Amp Alternator	900021-ALS				
110 Amp Auxiliary alternator	N/A	900062-ALS			581410-0235
Glow plugs	897106-5491				
Oil Pressure switch	982720-0690				N/A
Oil Pressure Switch / Sender	900039-ALS				
Engine Temperature switch	897125-6000				
Engine Temperature Sender	900041-ALS				
Fuel Control Solenoid	897209-1140				300008-4JB
Top hose	400048-ALS				400039-4JB
Aux Alternator drive belt (70 Amp) - A Section	N/A	800975-SPA			801410-SPB
Aux Alternator drive belt (110 Amp) - 6PK	N/A	801065-6PK			N/A
Aux Alternator drive belt (Travel Power) -.6PK	N/A	801100-6PK			
Engine Oil - 5 Litre containers	700008-ALS				
Engine Oil - 20 Litre containers	700009-ALS				

April 25, 2005

Marine Dealer Network – Canal Boat Engines

Each dealer has specific dealer codes, which indicate their spacialized area.
P = Parts, E = Engines, S = Service, M = Mastervolt / Isuzu Specialist

Bath

Bath Narrowboats
Sydney Wharf, Bathwick Hill,
Bath. BA2 4EL.
Tel: 01225 447276
Fax: 01225 336029
Dealer Code: P:E:S

Alvechurch Boat Centres
Wessex Wharf, The slipway,
Hiperton Marina, Trowbridge. BA14 8RS.
Tel: 01225 769847
Fax: 01225 769849
Dealer Code: P:E:S
Bedfordshire

Grebe Canal Cruises
Pitstone Wharf, Pitstone,
Nr Leighton Buzzard,
Bedfordshire. RG4 6LQ
Tel: 0118 947 0944
Fax: 0118 946 1541
Dealer Code: P:E:S

Berkshire

Thames & Kennet Marina Ltd
Caversham Lakes, Henley Road
Reading, Berkshire. LU7 9AD
Tel: 01296 661920
Fax: 01296 662626
Dealer Code: P

Cambridgeshire

Buckden Marina Ltd
Mill Road Buckden, Cambs. PE18 9RY
Tel: 01480 810355
Fax: 01480 812137
Dealer Code: P:E:S

Cheshire

Alvechurch Boat Centres
Wrenbury Mill, Wrenbury,
Nr Nantwich, CW5 8HG.
Tel: 01270 780544
Dealer Code: P:E:S

Northamptonshire

Braunston Chandlers
Braunston Boat Haven, Bottom Lock,
Little Braunston, Northants. NN11 7HL
Tel: 01788 899041
Fax: 01788 891535
Dealer Code: P:E:S

New Mills Marina
Hibbert Street, New Mills, High Peak
Cheshire. SK22 3JJ
Tel: 01663 741310
Fax: 01663 749710
Dealer Code: P:E:S

Derbyshire

Riverview Narrowboats
The Boatyard, 120 Station Road,
Bridgefields, Kegworth. DE74 2FR
Tel: 01509 672084
Fax: 01509 672084
Dealer Code:P:E:S

Gloucestershire

Cotswold Diesel Services Ltd
Taits Hill Industrial Estate,
Dursley, Glos. GL11 6BL.
Tel: 01453 545261
Fax: 01453 545261
Dealer Code: P:E

Leicestershire

Kilworth Wharf Leisure
Kilworth Wharf, Station Road,
North Kilworth, Leics. LE17 6JB.
Tel: 01858 880484
Fax: 01858 880484
Dealer Code: P:E:S

Bob Knowles Plant Services
9 Vulcan Road, Leicester, LE5 3EF.
Tel: 0116 253 8685
Fax: 0116 251 4977
Dealer Code: P:E:S

Volt-master
6 Aston Lane, Aston Flamville
Hinckley, Leics. LE10 3AA
Tel: 01455 250601
Mobile: 07740 200775
Dealer Code: S:M

Alvechurch Boat Centres
Anderton Marina, Uplands Road,
Anderton, Cheshire. CW9 6AQ.
Tel: 01606 79642
Fax: 01606 784540
Dealer Code: P:E:S

Middlesex

Marine Engine Services Ltd
Unit 3, 549 Eskdale Road,
Uxbridge, Middlesex. UB8 2RT.
Tel: 01895 236246
Fax: 01895 813322
Dealer Code: P:E

Aquatravel Ltd
Mill Lane, Great Haywood
Stafford. ST16 ORJ
Tel: 01889 881711
Fax: 01889 882563
Dealer Code: P:E:S

Surrey

4All Marine
Harris Estate, Laleham Reach,
Chertsey, Surrey. KT16 8RP
Tel: 01932 567744
Fax: 01932 571050
Dealer Code: P:E:S

Alvechurch Boat Centres
Gayton Marina, Blisworth Arm,
Northamptonshire. NN7 3ER
Tel: 01604 858685
Fax: 01604 859644
Dealer Code: P:E:S

North Yorkshire

Selby Boat Centre Ltd
Bawtry Road, Selby
North Yorkshire, YO8 8NB
Tel: 0870 749 0061
Fax: 0870 749 0064
Dealer Code: P:E:S
Oxfordshire

Heyford Wharf Ltd
Canal Wharf, Station Road,
Lower Heyford Oxon, OX25 5PD
Tel: 01869 340348
Fax: 01869 347934
Dealer Code: P:E:S

Staffordshire

Wombourne Canal Services
Giggety Wharf, 130 Planks Lane,
Wombourne, Staffs. WV5 8EA.
Tel: 01902 892242
Dealer Code: P:E:S

Aquatravel Ltd
The Wharf, Norbury Junction,
Stafford. ST20 OPN.
Tel: 01785 284292
Fax: 01785 284251.
Dealer Code: P:E:S

Warwickshire

Ashby Canal Centre
Willow Park, Station Road, Stoke Golding,
Nuneaton, Warwickshire. CV13 6EU
Tel: 01455 212636
Fax: 01455 212636
Dealer Code: P:E:S

West Yorkshire

Heron Boatbuilders Ltd
Junction 25 Business Park,
Huddersfield Road, Mirfield,
West Yorkshire. WF10 9DA.
Tel: 01924 499200
Fax: 01924 497540
Dealer Code: P:E

Calder Valley Marine
Apperley Bridge Marina,
Waterfront Mews, Apperley Bridge,
West Yorkshire. BD10 0UR
Tel: 01274 616961
Fax: 01274 616993
Dealer Code: P:E:S:M

Worcestershire

Alvechurch Boat Centres
Scarfield Wharf, Alvechurch,
Birmingham, Worcs. B48 7SQ.
Tel: 0121 445 1133
Fax: 0121 447 7120.
Dealer Code: P:E:S