

**AUTOPRIME
HH100 and HH150
DIESEL DRIVEN
PUMP UNITS**



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We **SPP Pumps Limited**

Of Theale Cross
Reading
Berkshire
England
RG31 7SP

Declare that:

Equipment: **DIESEL DRIVEN CENTRIFUGAL PUMPS**
Model/Type: **HH100 & HH150**
Serial Number: As shown on the Pump Nameplate

in accordance with the following Directives:

73/23/EEC	The Low Voltage Directive and its amending directives
89/336/EEC	The Electromagnetic Compatibility Directive and its amending directives
98/37/EC	The Machinery Directive and its amending directives
2000/14/EC	The Noise Emissions Directive and its amending directives

have been designed and manufactured to the following specifications:

EN 809
EN 12162
EN 292
EN 50081
EN 50082

We hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The units comply with all essential requirements of the Directives.

Signed:

Name: John Toseland

Position: Engineering Manager - Authorised to sign on behalf of SPP Pumps Limited

Date: 1st Jan 2007

A handwritten signature in black ink, appearing to read 'John Toseland', written over a light blue horizontal line.

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1 INTRODUCTION

The purpose of this handbook is to provide operating guidelines and routine maintenance instructions for the **SPP AUTOPRIME HH100 & HH150** diesel engine driven pump units, featuring the electric priming system (*SMARTprime*).

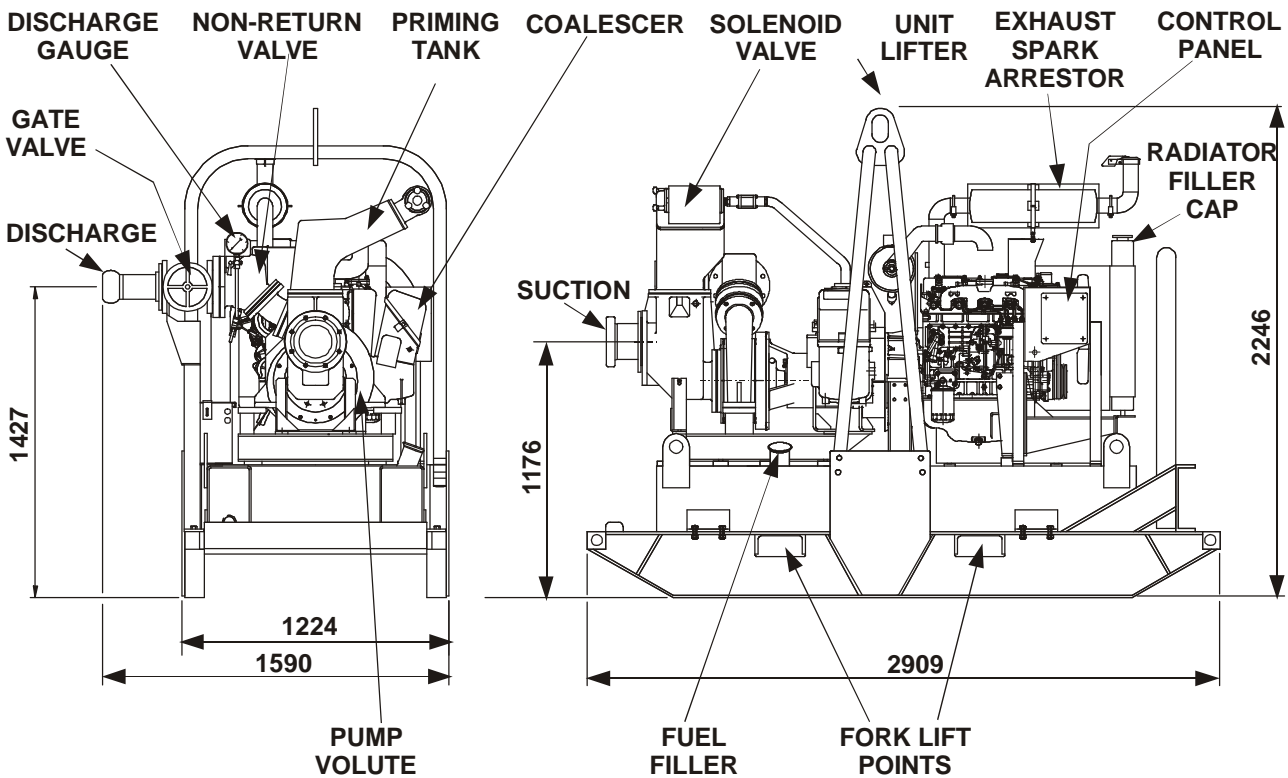
Instructions and statements contained within this handbook are given with our best intentions and are correct at the time of compilation. They are subject to alteration at any time.

These pumps are normally supplied mounted on skids, but alternatives forms such as enclosures or trailers are available by special request.

This Handbook covers the following pumps:

HH100 – 4” automatic priming pump driven by an Isuzu 4BG1 diesel engine mounted on site skid with twin fuel tanks and central lifting point.

HH 150 – 6” automatic priming pump driven by an Isuzu 6BG1T diesel engine mounted on site skid with twin fuel tanks and central lifting point.



HH100 & 150 Pump Components

2 SAFETY PRECAUTIONS

2.1 Safety Symbols

Safety instructions within this manual are marked with the following symbols:



This symbol refers to general mechanical aspects of safety.



This symbol refers to electrical safety.

ATTENTION

This symbol gives warning of a hazard to the pump itself, which in turn could cause a risk to personal safety.

2.2 Pump Safety Precautions



ATTENTION apply to all the following:-

1. These pumps are designed for use in sites with controlled access and by staff that are trained in the safe use of the equipment.
2. Guards that have been removed for maintenance must be replaced before starting the pump.
3. Never insert anything into the pump casing whilst the pump is running and the suction and delivery hoses are disconnected.
4. Never use collapsible hoses on the suction side of the pump and use all pump flange holes to fit suction and delivery hose connections.
5. Always lift pump sets vertically by the lifting eye. Any side force will damage the lifter. Never lift with suction or delivery hoses attached. The increased weight of these items may cause lifting gear failure.
6. Check the type of liquid being pumped before working on pump ends. Residues could be hazardous to your health. If in doubt flush out with clean water before work commences.
7. Personnel working on the pump unit must always wear clean correctly fitting clothing and safety footwear. Clothing impregnated with oil or fuel can constitute a health hazard through prolonged contact with the skin and may also constitute a fire hazard.
8. Always allow adequate ventilation for diesel engines. Be aware of fire risks from items such as exhaust pipes and silencers. Never place flammable items around the unit.

3 HANDLING & TRANSPORT

3.1 Lifting

The central lifting point is suitable only for vertical lifting and must not be used to pull the unit sideways.

Before lifting ensure that the lifting point is not bent or damaged.

Do NOT lift the pump with the hoses attached.

3.2 Trailer or Wagon Carriage

Transportation on a trailer or wagon will require the unit to be strapped down. Straps are to be fitted directly across the skid frame, not over the engine or pump.

4 SERIAL NUMBER

The serial number plate is fitted on the coalescer mounting bracket.

This serial number must be quoted in any enquiry for spares or service.

	SPP Pumps Limited Reading RG31 7SP ENGLAND		Ty
			kg
Tel: ++44(0)1189 323123 Fax: ++44(0)1189 323302		Serial No.	

5 OPERATING INSTRUCTIONS




5.1 Before Starting

1. Read this the safety and operating instructions on the pump and in this handbook carefully.
2. Position the pump set on level ground and chock in place to prevent movement.
3. Connect suction and delivery hoses making sure that there are no sharp bends in the lines. Where the hoses pass over sharp edges or abrasive surfaces ensure that they are protected by suitable means to prevent chafing. Ensure that the suction hose end is fully submerged.

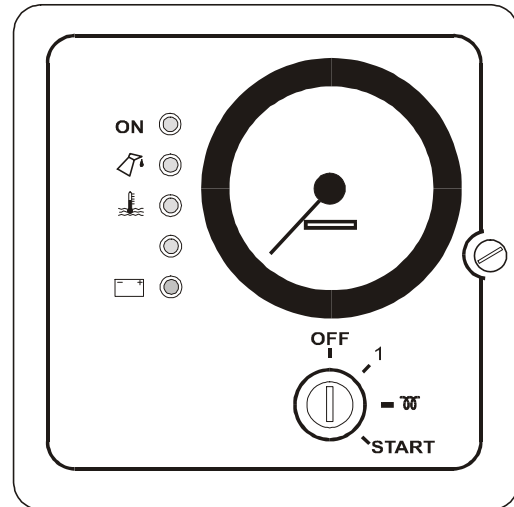
ATTENTION

7. Select and fit a strainer to the suction hose end with holes smaller than:


HH100	32mm Diameter
HH150	45mm Diameter

8. Ensure that the strainer and suction hose end is fully submerged.
10. Check for sufficient fuel using the fuel tank gauge.
11. Check for sufficient engine lubricating oil – dipstick.
12. Check for sufficient engine coolant – Ensure the engine is cold and remove the radiator filler cap. The correct level is when coolant is just visible at the base of the filler neck.

13. Check that oil is present in the pump seal reservoir alongside the non-return valve housing.

14. Ensure that the batteries are charged and ready for use.

15. Where fitted, ensure that the battery isolation switch is in the ON position.
16. Check the air filter monitor (LH below engine air cleaner). If reading is greater than 12" remove filter and clean.
17. Check coalescer oil level on the dipstick and ensure dipstick is fully tightened.
18. Ensure drain cocks in the discharge line and volute are closed.

5.2 Starting



The panel comprises:

- a) Four position key-switch (Off, 1, Heat, Start)
 - c) Tachometer that incorporates an hours run meter.
 - d) Five warning indicator lamps
 - On / off indicator
 - Engine oil pressure
 - High engine temperature
 - Not Used
 - No Charge
3. Turn the ignition switch to the '1' position. The 'ON' indicator will show green and all three red warning lights will flash, indicating that all circuits are healthy.

 4. Switch **OFF**.
 5. Turn the key-switch directly to the 'Heat' position and hold for 6 to 10 seconds.
 6. Turn the key-switch on to the 'START' position for a maximum of 20 seconds. Release the key switch once the engine has fired and is running.
 7. If the engine fails to start, wait 20 seconds and repeat steps 5 and 6.

5.3 After Starting

The pump will prime automatically once the suction hose is submerged.

5.4 Engine Speed Adjustment

1. The throttle control fitted to the engines is designed to provide for fine adjustment of engine speed and must be operated with care.
2. The control consists of a black screw knob and a red press button.
3. The black screw knob provides for fine adjustment for increasing and decreasing speed. Turn the black knob clockwise to increase and anticlockwise to decrease speed.
4. The red push button is for quick reduction in speed ONLY. Press the red button and push the red button and black knob fully in to reduce engine speed to the minimum or idle speed.

ATTENTION

DO NOT USE THE RED BUTTON TO INCREASE ENGINE SPEED AS THIS MAY RESULT IN BREAKAGE OF THE THROTTLE CONTROL LINKAGE.

5.5 Setting Pump Delivery**ATTENTION**

Do not run the pump with the delivery valve closed.

1. For the engine speed selected, use the gate valve to set the delivery pressure to a value between the limits stated on the pump label.

5.6 Stopping

2. Turn the key-switch to the 'OFF' position. The unit will stop and the key can be removed.
3. Open the discharge cock to drain the discharge line. Close after draining is complete.
4. Open the volute cock to drain the volute. Close after draining is complete.
5. Remove the key to prevent unauthorised use.

5.7 Emergency Stop (Where fitted)

1. While the pump is running, if the pump has to be stopped quickly, an emergency stop button is provided. When pressed the engine and pump will stop.

2. To reset the emergency stop, turn off the key-switch and turn the emergency stop button to release it. The pump is now ready for starting again.

5.8 Battery Isolation Switch (Where fitted)

1. A battery isolation switch may be specified for additional security and for ease of maintenance. This is located adjacent to the control panel.
2. When the unit is to be stored or is not required for immediate use, turn the isolating switch to the OFF position.
3. When the pump is required for use turn the battery isolation switch to the ON position.

6 Problem Solving by Operator

In all the cases below, **STOP** the pump before attempting to correct the problem.

6.1 Engine running but not pumping:

Check suction pipe for leaks, ensure all hose fittings are air tight.

Check for blockage of the strainer, and clear any debris.

Check for damage to the suction hose both externally and internally, replace damaged hose.

6.2 Pumping reduced with surging:

Check that the impeller is clear of debris and remove debris, if present.

Check the non-return valve is clear.

6.3 Pump fails to prime after starting:

Check suction hoses for leaks and ensure all hose fittings are air tight.

Check that volute drain cock is closed.

Check that the non-return valve is free of debris and can seal when closed.

6.4 Engine stops:

Check engine fuel level, and refuel if necessary.

Check warning indicator lamps and correct any faults indicated.

7 PUMP MAINTENANCE CHART

Highlighted tasks in italics below are to be done by the pump operator, other tasks by the pump service engineer. For engine maintenance periods refer to the engine operators handbook included within the pump documentation pack.

PERIOD	TASK
After first 50 hours running with new drive belts	Due to the initial stretch of new vacuum pump drive belts, it is necessary to check and re-tension the drive belts after the first 50 hours running time on all new pumps and following the fitting new drive belts. (See section 7.9)
After first 500 hours of operation	IMPORTANT (Also required 500 hours after fitting a new vacuum pump) Replace the four coalescer filter elements. Replace the coalescer oil and oil filter.
Daily	<i>Check and top up the coalescer oil.</i> <i>Check and top up the engine oil.</i> <i>Check and top up the diesel fuel.</i> <i>Check the fuel filter and drain off any water.</i> <i>Check and top up the mechanical seal oil reservoir level.</i> <i>Check for bearing temperature rise or increased noise.</i> <i>Check and top up the engine cooling water.</i>
Weekly or 100 hours	<i>Check security of all fasteners & fittings.</i> <i>Check battery electrolyte level.</i> <i>Check condition of battery connections.</i> <i>Check security of battery mountings.</i> <i>Drain any water from coalescer.</i> <i>Check visually for leaks.</i>
Two Weekly or 250 hours	Refer to the engine operator's handbook and ensure that the engine is maintained as required by the engine manufacturer's maintenance schedule.
Monthly or 500 hours	Check priming tank air filter, clean if dirty. Check fuel filler filter. Check vacuum pump belt tension. Check for contamination of coalescer oil Check the condition of the vacuum pump belts and renew if necessary. Grease the drive end pump bearings with 15grams of grease.
6 monthly or 3000 hours	Check and clean the level sensing probe. Check electrical connections. Check condition of non-return valve. Replace the four coalescer air filters. Change mechanical seal coolant/lubricant. Change coalescer oil and oil filter. Check the vacuum pump drive belts and renew if necessary. Clear and clean or replace the small air filter on the solenoid valve. Grease the pump end pump bearings with 15grams of grease.
Annually or 6000 hours	Check condition of impeller and wear plate. Check and replace the coalescer & priming tank knitmesh filters.
Bi - annually or 12000 hrs.	Repack pump bearings with grease.

The maintenance schedule is given for guidance only. Site operating conditions may override the suggested maintenance intervals. Adjustments to time scales will also have to be made if the pump is idle for long periods.

8 MAINTENANCE & SERVICE INSTRUCTIONS



These instructions are for trained pump service engineers.

8.1 Preparation for Maintenance



Electric Shock & Accidental Starting Hazard ISOLATE the equipment from any mains supply connected before any maintenance work is done.

Disconnect the negative battery lead to prevent inadvertent starting.

To avoid the possibility of maintenance personnel inhaling dangerous fumes or vapours. It is recommended that

maintenance work be carried out away from the pump location by removal of the pump unit to a suitable maintenance area.

No special tools are required for dismantling and re-assembling, however, it is important to ensure the suitable lifting equipment is available and that the work is carried out in a clean area.

8.2 Pump Bearings

The pump shaft runs on three bearings: a roller bearing on the impeller end of the shaft and a pair of angular contact bearings on the drive end of the shaft. These bearings are grease lubricated.

Grease is applied through two grease nipples, one for the roller bearing and one for the pair of angular contact bearings located on the left side of the bearing bracket. Do not over grease. 15 grams from a hand held grease gun at the specified intervals are sufficient.

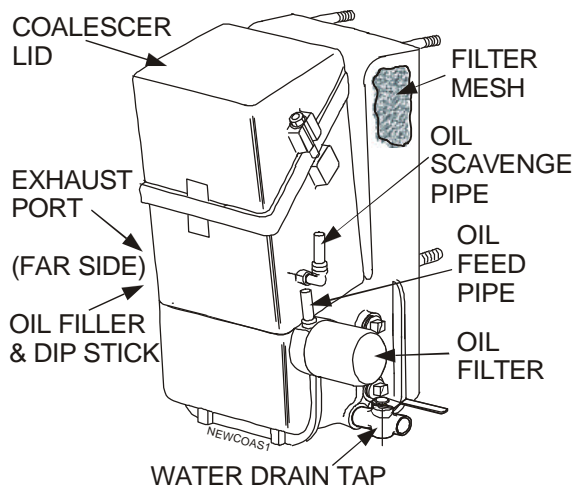
8.3 Mechanical Seals

The mechanical seals are cooled and lubricated by oil. The oil reservoir is mounted on top of the non-return valve cover. The system oil capacity is approximately two litres. The bottle should be filled to the MAX mark when the unit is cold.

ATTENTION Only use oil of the correct grade (see Technical Data section).

8.4 Coalescer Maintenance

Daily, check the oil level in the coalescer sump. If the level has risen, check for water contamination, drain off any water present and top-up the oil to the level between the marks on the dipstick. Water is removed by means of the drain tap fitted to the side of the coalescer sump.



8.5 Coalescer Filter Element Replacement

Coalescer filter elements must be replaced after the first 500 hours or one month of operation of a new vacuum pump, after which they need to be replaced only when the inside surface becomes heavily discoloured i.e. black or dark brown. These elements cannot be cleaned, new elements must be fitted when required.

Ensure that the seals at the top and bottom of each filter element are fitted correctly.

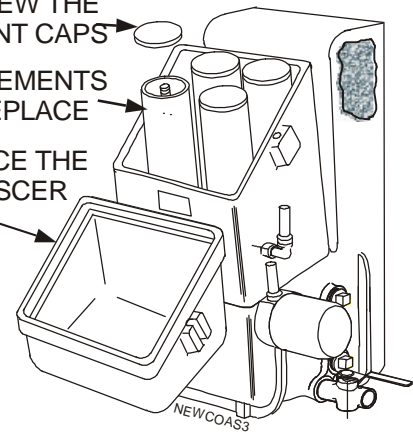
ATTENTION Do not over tighten the retaining knob as this will distort and crush the filter element.

REMOVE THE COALESCER LID

UNSCREW THE ELEMENT CAPS

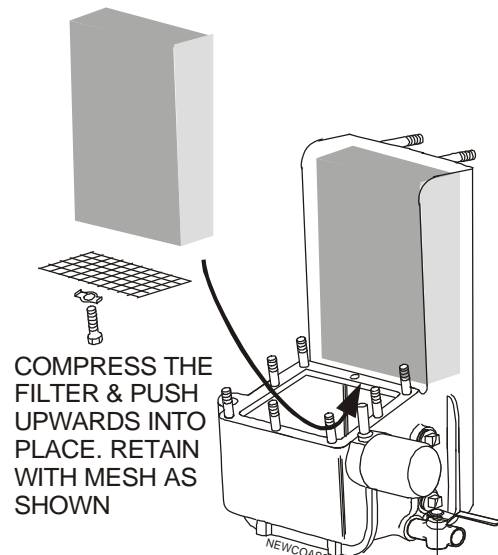
LIFT ELEMENTS AND REPLACE

REPLACE THE COALESCER LID



8.6 Coalescer Filter Mesh

Every year or more frequently if the pump has been operating in a dusty atmosphere or when the coalescer oil has become dirty, it is recommended that the priming tank filter mesh is replaced.



Drain the coalescer oil, disconnect the oil feed pipes and remove the coalescer lid and the coalescer element housing complete with the filter elements. Remove the mesh retaining the filter to give access for removal of the knitmesh filter.

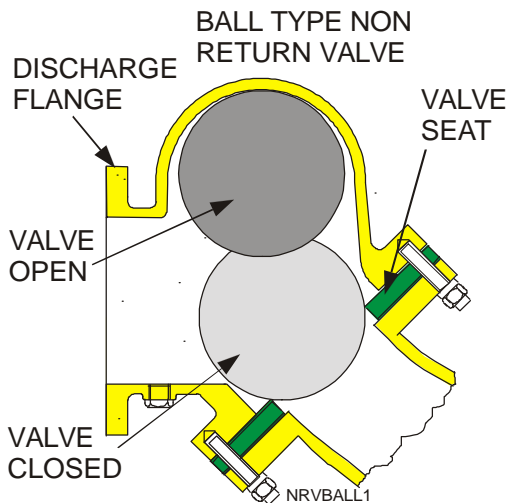
It is recommended that a new gasket is fitted before re-fitting the coalescer element housing.

The oil feed pipes should be cleaned in a similar manner and blown through with an air line.

8.7 Non-Return Valve

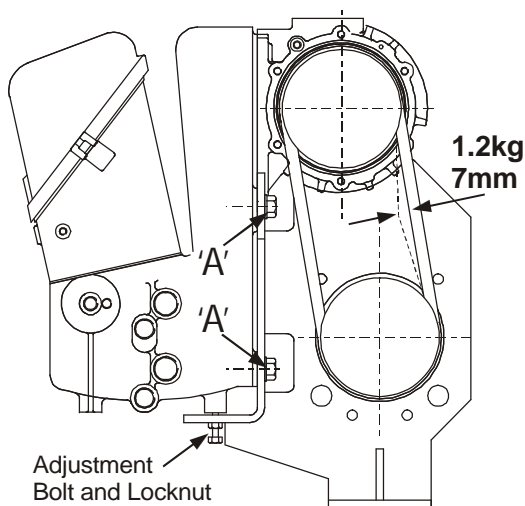
The non-return valve should be checked regularly for freedom of movement, absence

of debris and good seating. The valve seat should also be checked for damage or wear.



The ball type non-return valve is located next to the discharge flange. It consists of a ball that floats when water is present and forms a seal when dry. The valve seat can be examined through the discharge flange once the quick release hose connection is removed. Check that the ball sits cleanly onto the seat and that nothing is trapped between the ball and the seat. Check that the ball is not worn and that the seat is not excessively pitted.

8.8 Vacuum Pump Belt Tension



Slaken Coalescer Screws 'A', adjust belt tension and retighten.

Remove the vacuum pump drive guard and loosen the coalescer mounting screws 'A'. Release the locking nut and tighten the adjusting screw to increase the belt tension to the require amount. When the correct belt tension is obtained re-tighten the locking nut, the coalescer mounting screws 'A' and refit the vacuum pump drive guard.

ATTENTION

Do not under-tension belts under any circumstances.

8.9 Vacuum Pump Belt Replacement

Remove the vacuum pump drive guard.

Slacken the coalescer mounting screws 'A'. Release the locking nut and loosen the adjusting screw to remove the tension from the drive belt.

From the main pump drive coupling, remove the three screwed pins from the rubber coupling to give a gap between the engine drive plate and the rubber coupling.

Remove the old belt, if still present.

Check both pulleys for any signs of wear or contamination with oil or grease, clean or replace if necessary.

ATTENTION

Fitting new belts to worn or damaged pulleys will lead to premature belt failure.

Carefully fit the new belts. These will be a tight fit and care must be taken not to damage them by using excessive force.

Replace the three screwed pins to connect the rubber coupling to the engine drive plate.

Re-tension the belt as in paragraph 8.8.

Replace the drive belt guard.

Run the pump for 30 minutes and recheck the belt tension as in Section 8.8.

For new belts, check and re-tension the belt after the first 50 hours of operation.

ATTENTION

Under tensioning of the belts will lead to premature belt failure.

Over-tensioning of the belts may lead to premature failure of belts, or the vacuum pump clutch or bearings.

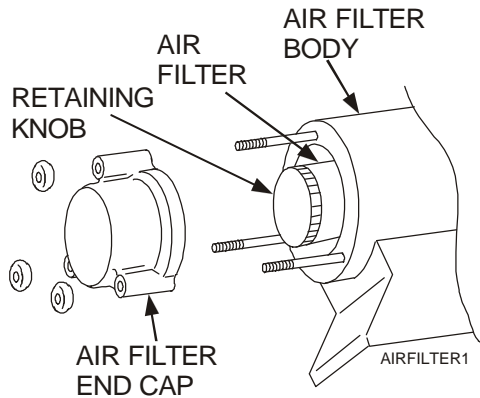
8.10 Priming Tank Air Filter Maintenance

The priming air filter is mounted in the filter housing on top of the priming tank. Access is from left hand side of pump.

With the pump stopped, open the volute drain valve to ensure that priming tank pressure is dissipated. Unscrew the three knobs holding the end cap and remove the end cap. Ensure that the sealing O-ring is not lost. Undo the knurled knob retaining the filter and carefully withdraw the filter element. Inspect for mechanical damage or

blockage. Ensure that the central stud holding the filter has not been loosened or bent.

Washing in water and drying before re-use should clean stainless steel filters. If white fibrous filter is fitted, this must be replaced.



Replace filter with care and do not over tighten the retaining knob as this can damage the filter.

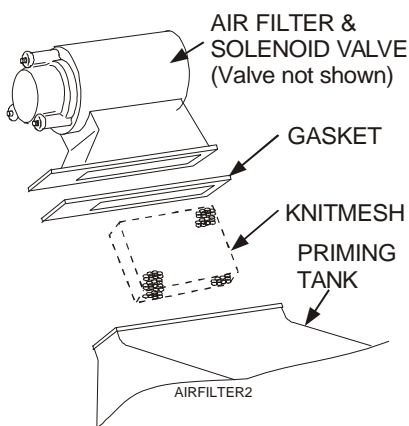
Ensure that the O-ring is in position in the end cap and replace the end cap. Replace the three knobs and tighten.

8.11 Priming Tank Knitmesh Replacement

Drain the volute. Disconnect suction and delivery hoses. Remove the suction quick release connection if required for easier access or handling purposes. Disconnect the battery negative lead.



Loosen the clamps that hold the vacuum pipe to the solenoid valve and the top of the vacuum pump. Disconnect the vacuum pipe.



Remove the terminal box cover from the solenoid valve and disconnect the wiring inside. Note the positions of the terminations for reconnection.

Separate the filter housing from the priming tank by removing eight nuts and the rubber

gasket. The knitmesh can now be removed from the priming tank.

Clean the knitmesh filter in water and dry it. Inspect the filter and the rubber gasket and replace any damaged items.

8.12 Level Sensing Probe & Priming Control Box

The level sensing probe should be withdrawn and cleaned periodically to keep it in workable condition. Wipe any deposit from the stainless steel tip.

The control box and cable to the level sensing probe are sealed units for which no customer maintenance is required. If these items fail they may be replaced and/or returned to SPP Pumps Limited for examination.

8.13 Pump Impeller and Front Wear Plate

The impeller can be inspected for wear and corrosion after the suction quick release connection has been removed. Check the inlet duct for signs of damage or blockage.

The impeller to wear plate clearance should be between 0.25 and 0.38mm when the pump is new. When wear is excessive and pump performance falls below an acceptable level the wear plate may be replaced.

A more thorough examination can be conducted after the front cover plate and front wear plate have been removed.



Disconnect the battery negative lead to prevent accidental starting of the pump.

Remove the priming tank. Remove the front section of the tank shroud. Remove the nuts retaining the inlet duct and remove the duct. Remove the front cover plate by screwing two M16 bolts into the jacking holes on the wear plate.

Inspect the impeller and wear plate for damage and corrosion.

Before re-assembly ensure all 'O' rings are in good condition, clean and well greased. Impeller to front wear plate clearance can be altered by shimming. Measure the clearance with a feeler gauge inserted through the suction. When measuring the clearance temporarily fit the nuts and clamp the front wear plate to the volute to ensure that the wear plate is fully home.

Refit the inlet duct, priming tank, front

shroud, front panel and quick release connection.

9 PUMP FAULT FINDING

Refer to the operator's problem solving routines in section 5.5 and ensure that these faults are not present.

These checks to be done by trained service engineers:

9.2 **Checking the operation of the priming system**

Disconnect the suction hose. Place a flat board over the suction fitting to check that the priming system and vacuum pump is working.

If a vacuum gauge is fitted to the suction the vacuum pump should produce a vacuum of 9 metres water.

9.3 **Check the vacuum pump drive belts**

The vacuum pump drive belts run between the pump shaft and the electric clutch on the vacuum pump. See the maintenance instructions in section 8.8 for the belt tensioning method.

9.4 **Check the vacuum pump clutch**

The vacuum pump clutch is electrically operated. If the clutch is disengaged the belts still turn but the centre of the clutch will be stationary.

The clutch requires 12 volts to actuate it. This voltage controlled by a timer and supplied via a relay from the wiring loom. If the wiring is disturbed during investigations ensure that it is replaced correctly.

The priming system electrical circuit is protected by a circuit breaker mounted on the control panel. If this trips out, push the central button to reset. If the breaker will not reset or is constantly tripped then there is an electrical fault.

The electrical supply to the clutch is controlled by the level sensing probe, via a timer. If there is no electrical supply to the clutch, check that the power light is illuminated on the priming control box. If this is on then disconnect the clutch and check if there is 12 Volts across the wires. If there is then the clutch has failed and should be replaced.

If the 12 Volt supply is not provided to the clutch, check the continuity of the cables and rectify any bad connections.

If the control box does not provide the 12 Volt supply for the clutch the control box is faulty and must be replaced.

9.5 **Check the solenoid valve**

The electrically operated solenoid valve is connected to the top of the priming tank. The valve is reliable but if a fault is suspected it is most likely to be a problem with the wiring.

9.6 **Priming filter blockage.**

The priming tank air filter is mounted in the top of the priming tank. To remove and check the filter condition, follow the instruction given in the maintenance section of this manual.

9.7 **Priming tank knitmesh filter blocked**

It is extremely unlikely that the priming tank knitmesh filter will ever become sufficiently blocked to prevent priming. Instructions for dismantling the unit and removing and cleaning the knitmesh filter are given in the maintenance section of this manual.

9.8 **Volute non return valve not sealing**

The non-return valve needs to seal if the priming system is to function. The non-return valve can be examined by removing the discharge quick release coupling - see the relevant section of the maintenance instructions. Ensure that there is nothing jammed under the ball to prevent it seating properly.

9.9 **Air leak in priming system**

It is extremely unlikely that there will be air leaks at any of the priming system sealing faces. Leaks may occur if the suction quick release fitting has been moved or the priming tank has recently been dismantled. If the vacuum pump is working but not achieving full vacuum, fit a quick release connection cap and gauge to the suction pipe. Run the unit to achieve a vacuum, as indicated by the gauge, then turn the unit off. Note how long the vacuum takes to decay. A pump in full working order will achieve a vacuum of 9 metres water and hold it for in excess of five minutes.

9.10 **Vacuum pump**

If the vacuum pump is considered to be at fault no attempt should be made to dismantle it. Obtain a replacement unit.

To check the operation of the vacuum pump, disconnect the pipe running between the priming tank and the vacuum pump.



Warning:- The pipe is stiff and very difficult to remove. Do not disconnect the pipe while the unit is running. If any solid objects, grit or mud are drawn up the pipe they will cause serious damage to the internals of the vacuum pump. Disconnection of this pipe should only be considered as a last resort. Conduct other investigations before resorting to this course of action.

Once the pipe between the vacuum pump and the coalescer has been disconnected start up the unit and place a small clean board over the inlet to the vacuum pump. The board should be held in place by the action of the vacuum pump. Turn the unit off before refitting the pipe.

The oil in the coalescer is used to both lubricate the vacuum pump and create an effective seal. If the vacuum pump performance is poor check the coalescer oil level, after having drained any excess water.

9.11 **Fault Finding Guide**

Unit does not start

- Fuel consumed.
- Trip switches need resetting.
- Warning lights on & shutdown circuit activated.
- Battery with low charge level.
- Refer to engine supplier's manual for engine checks.

Unit does not prime

- Volute drain tap open.
- Air leak in priming system.
- Air leak in suction hoses or fittings
- Blockage in suction hoses or strainer.
- Non return valve not sealing.
- Internal damage to pipe from solenoid valve to vacuum pump.
- Solenoid valve not operating.
- Solenoid valve blocked.
- Priming tank air filter blocked.
- Priming tank knitmesh blocked.
- Vacuum pump belts loose or broken.
- Vacuum pump electric clutch not engaged.
- Vacuum pump failure.
- Suction head too great.

Unit does not pump

- Blockage in delivery hoses.
- Blockage in impeller.
- Excessive impeller clearances.
- Broken Impeller.
- Pump drive coupling disengaged.
- Delivery head too great.

10 TECHNICAL DATA

PUMP TYPE		HH 100	HH150
SUCTION HOSE CONNECTION		150mm (6")	200mm (8")
DISCHARGE HOSE CONNECTION		100mm (4")	150mm (6")
VACUUM PUMP		65 cfm 110 m ³ /h	
SOLIDS PASSAGE CAPABILITY		32mm Diameter	45mm Diameter.
ENGINE TYPE		Isuzu 4BG1	Isuzu 6BG1T
FUEL TANK CAPACITY		450 litres	
APPROX. RUNNING TIME (at full load)		29 hours	14.75 hours
MECHANICAL SEAL COOLANT/LUBRICANT Capacity:- 2 litres		Mobil Velocite Oil No. 6 or Texaco Rando HD10	
BEARING LUBRICANT		Grease: Texaco Multifak All Purpose EP2 or equivalent conforming to DIN 51825:KP2K-30	
VACUUM PUMP OIL Capacity 5 litres	Above 30° C	Texaco Regular Motor Oil 30 or equivalent conforming to API CC 5F, CCMC G2 D1, MIL-L-2104B or MIL-L-46152B	
	Below 30° C	Texaco Ursatex 10W-30 or equivalent conforming to API CC 5F, CCMC G2 D1, MIL-L-2104B or MIL-L-46152B	
COALESCER FILTER		Bosch 0451-103-093 or Crossland CF367	
BATTERY		12V (345A cold cranking current)	
APPROX WEIGHT - DRY		2000 kg	2200kg
APPROX WEIGHT – WITH FUEL		2250 kg	2450kg



11 SPARES & SERVICE

SPP Pumps operate a comprehensive Spares and Service support network throughout the world, and can be contacted as follows:

SPARES & SERVICE	Telephone:	+44 (0)1189 323 123
<i>For spare parts, supply only.</i>	ask for -	Spares Dept.
<i>For breakdowns, spare parts and on-site fitting, pump installation and commissioning, and service contracts.</i>	ask for -	Service Dept.
<i>For breakdowns outside office hours.</i>	Telephone :	+44 (0)1491 201 613
Spares & Service Office SPP Pumps Limited Theale Cross Reading, Berkshire RG31 7SP ENGLAND	General Fax line:	+44 (0)1189 323 302
	Direct Fax line:	+44 (0)1189 303 259

Copies of this manual are available from the SPP Pumps Limited Spares & Service Department by quoting reference number and the relevant revision number.

12 ENGINE OPERATORS HANDBOOK

The specific engine operator's handbook from the manufacturer is included within the pump documentation pack.