

OPERATION & MAINTENANCE INSTRUCTIONS

Model No. *SY3861012 & SY3861013*

GP50-75 MINIVAC DIESEL DRIVEN (2-wheel site trailer)

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STATUS SHEET

AMENDMENTS

ISSUE	DATE	TEXT AFFECTED
First	7 November 1997	First issue
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2 FOREWORD

This manual covers the Andrews Sykes GP50-75 Minivac 2 wheel site pump. It is written for operators and maintenance personnel and provides the information needed for safe and efficient siting, use, testing, routine maintenance and repairs.

Manuals provided are an essential part of the relevant equipment. They should be kept for the life of the equipment and passed on to any subsequent purchaser. Any amendment issued by Andrews Sykes Hire Limited should be promptly incorporated into this manual.

Information contained in this manual is correct at the date of publication. As improvements are continually being made, Andrews Sykes Limited reserve the right to make alterations without giving prior notice.

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Product names referenced in this manual are registered trade marks of the original equipment manufacturers.

HEALTH & SAFETY STATEMENT

DO TAKE TIME TO ENSURE THAT YOUR SAFETY AND THAT OF OTHERS IS NOT PUT AT RISK. FAILURE TO OBSERVE PRECAUTIONS, BOTH ELEMENTARY AND THOSE EXPLICIT IN THIS MANUAL, MAY RESULT IN PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT. THE SAFETY INFORMATION ON PAGE 6 IS INTENDED TO MAKE YOU AWARE OF HAZARDS AND PRECAUTIONS AND TO ENCOURAGE A SAFETY-CONSCIOUS APPROACH TO OPERATING AND CARRYING OUT MAINTENANCE WORK ON THIS EQUIPMENT.

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3 SERVICING AND REPAIR INFORMATION

3.1 Contacting your local Sykes depot

For any enquiry regarding the use, servicing or repair of your Andrews Sykes pump, please contact your local Andrews Sykes Hire Ltd depot on (freefone) 0800-211-611.

Please provide the following information:

- (1) Machine model and chassis type
- (2) Model-Serial number of the machine
- (2) Approximate date of purchase
- (3) Details of enquiry, apparent fault(s), etc.

Section 5.3, *Product identification*, page 13 describes how to identify models and where to locate the Model-Serial number.

3.2 Ordering spares

Section 8. *Spare parts*, page 30, explains how to order spare parts.

4 SAFETY PRECAUTIONS

4.1 Warnings and Cautions

For the purpose of definition in this manual, a **WARNING** gives information which, if ignored, could engender serious injury to personnel. A **CAUTION** gives information which if ignored could cause serious damage to the machine or associated equipment.

WARNING

Warning notices are boxed and highlighted in the style of this paragraph.

CAUTION

Cautionary notices are boxed and highlighted in the style of this paragraph.

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4.2 Training

It is strongly recommended that all operators, other personnel working on or near the pump, and any site visitors, are made fully aware of the potential dangers of this rotating equipment. If in ANY doubt please contact Andrews Sykes Hire Limited for advice.

WARNINGS

FOR YOUR OWN PERSONAL SAFETY READ AND TAKE NOTE OF THE FOLLOWING:

- Hazardous areas**
 - All moving parts, including drive belts, are dangerous.
 - Pump intake and discharge ports are also dangerous when open. Do not insert hands or other objects into the ports when the pump is operating.
- Lifting and transport**
 - Read and follow the instructions on page 14. In particular, always lift using the lifting points provided and ensure that any lifting equipment is of adequate load-carrying capacity and possesses a valid test certificate.
- Operating the pump**
 - Note the general precautions on page 16 and ensure that you are familiar with the controls before operating the pump. Read and follow the instructions on safe siting and operation on pages 14 to 19.
- Fault finding and pump maintenance**
 - Follow a regular maintenance schedule as defined on page 22.

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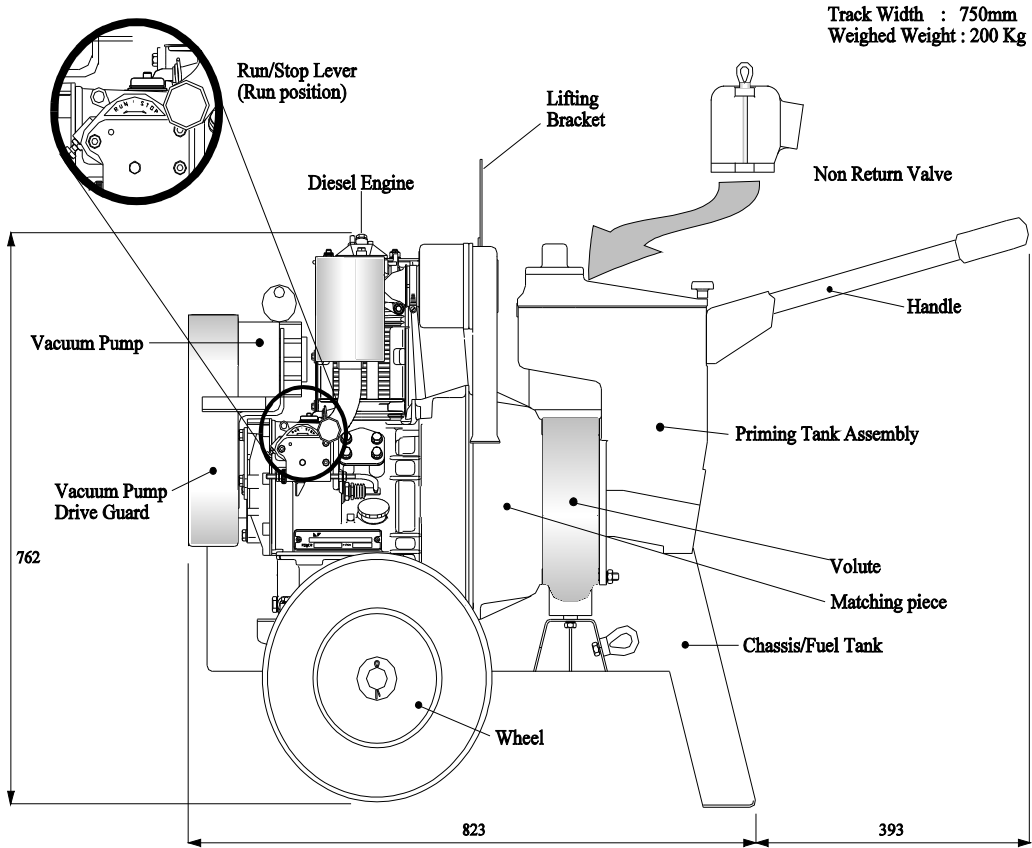


Figure 1 Main Components

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5 DESCRIPTION OF EQUIPMENT

5.1 General description

MINIVAC is a general purpose, self priming, free standing site pump set.

The pump is capable of passing solids up to the specified maximum diameter for the size of machine (see **Table 1**, page 11), provided the solids are in suspension; a typical example being ditch water containing soil and rock particles. Slurries may also be pumped, if concentration of solid matter is not too high. The pumps can also handle abrasive materials at the expense of higher wear rate. (For advice on the suitability of your pump for specific applications contact your local Sykes depot; see Section 3.1, page 6.)

The Minivac pump is normally powered by a diesel engine with electric or hand start.

5.2 Technical description

5.2.1 Overview

This section identifies the main components of the standard pump and provides general technical and performance data. It does not cover any special options or modifications made to suit customer requirements.


 **NOTE:** Tolerances are given in Maintenance, Section 7 page 22.

Figure 1, page 8, shows the general arrangement and the overall dimensions of the pump set.

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Figure 2 illustrates, schematically, the pumpset's principle of operation.

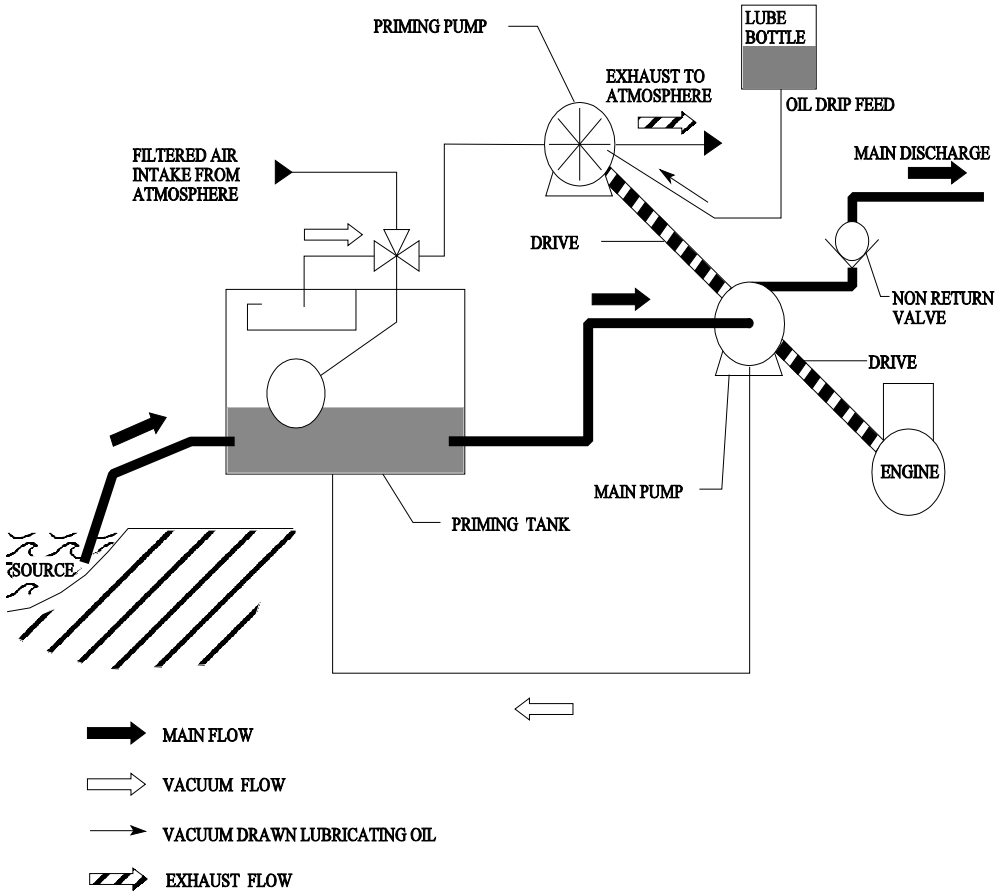


Figure 2 Schematic drawing of the pumpset system

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5.2.2 Main pump

Figure 9 shows the main pump in detail.

Table 1 Main pump technical data

PARAMETER	GP50-75
Standard pump body (volute) material	Cast iron
Volute size	50-75mm
Intake and discharge ports	Intake: 3" BSP Female requires 3" BSP Male Coupling Discharge: 2" BSP Female requires 2" BSP Male Coupling
Solids handling capability (maximum diameter)	28mm
Maximum lift (theoretical)	9.75m
Maximum discharge head	40m
Maximum flow	70m ³ /hr
Nominal speed	2500 rpm

5.2.3 Vacuum Pump

Figure 8 on page 34 shows a sectioned view of the vacuum pump. **Figure 9** shows it assembled onto the pump set.

Table 2 Vacuum system technical data

COMPONENT/PARAMETER	MINIVAC / GP50-75
Vacuum pump	Utile Eng vacuum pump
Vacuum pump displacement	7 cfm
Vacuum level	10m
Lubricating oil	30 SAE viscosity below 30°C 10W30 SAE above 30°C
Nominal speed	1900 rpm

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5.2.4 Engine, drives and fuel system

Table 3 Engine and fuel system technical data

COMPONENT/PARAMETER	SPECIFICATION	COMMENTS
Engine	Lister Petter - air cooled AD-1 diesel engine	Drives main and vacuum pumps
Main pump coupling	D/C stub shaft	
Vacuum pump transmission	Fenner wedged belt and pulleys	
Battery	037 × 35 Ah	
Fuel tank	14 litres	
Approximate running time on full tank, at max load	10 hours	
Nominal speed	2500 rpm	

5.2.5 Weights

Table 4 provides approximate component weights for the pumpset and its major components. The weights given are typical and may vary by $\pm 20\%$ for individual machines. Therefore, ensure that all lifting and towing equipment used have a safe working load of at least 120% of the relevant indicated weight.

Table 4 Approximate component and combined weights

COMPONENT	WEIGHT (kg)
Engine	56
Main pump	80
Main pump, priming tank, engine and coupling	150
Priming tank	10
Gross weight including chassis and full tank of fuel	200

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5.2.6 Chassis

Table 5 Chassis technical data

COMPONENT/PARAMETER	DETAIL/VALUE
General specification	Two wheel + stationary outrigger
Total carrying capacity	200 kg
Tyre type	Cushioned Tyre
Wheel Retention	Split Pin
Recommended lifting methods	Crane, using the single lifting point.

5.3 Product identification

For your own security and to enable Andrews Sykes Hire Ltd to answer any enquiries and requests for service and spares, where not stated, record details of your pumpset in the table below.

DETAIL	CORRESPONDING INFORMATION
Model:	GP50-75 Minivac
'Model-Serial number' Located on Handle Bracket	Model number: Serial number:
Engine serial number. (See Associated Publications, page 4, 42.):	
Date of purchase:	

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6 HANDLING AND OPERATION

6.1 Lifting

All pumpset variants are equipped with the single point lifting eye by which they may be lifted using suitable lifting equipment.

WARNINGS

DO NOT attempt to lift pump with suction and discharge hoses in place.

ALWAYS ensure that lifting gear is adequate for the weight being lifted (See **Table 4**).

6.2 Care and storage

To maintain the body parts in good condition, it is strongly recommended that the trailer is steam or spray cleaned regularly to remove dirt, mud and grit. See Section 6.6.4 for shutting down procedures.

When not in use store the trailer under cover in a dry environment, where practicable. Care should be taken to ensuring the pump end is drained dry if being stored through cold weather conditions.

6.3 Trailer routine checks

Routine checks are essential for personal safety and maintenance of equipment condition. (Consult **Table 5** for all chassis related technical data.)

6.4 Siting and preparation for pumping


If you wish to test pump operation before use, refer to *Testing*, page 19.

1. Place the pumpset on a firm, level area of ground, as close as practical to the source of liquid.

CAUTION

DO NOT place the unit on soft ground into which it could sink.

2. Immobilise the trailer.
3. Connect the hoses to the intake and discharge flanges (see **Figure 14**, **Figure 15** & **Figure 16** page 42).

 **NOTE:** USE all the bolt holes provided on the flanges. **DO NOT** use a collapsible hose on the suction side, and make sure the strainer is in place on the suction side.

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4. Submerge the end of the suction hose.
5. Place the end of the discharge hose in a suitable outlet.

WARNING

ENSURE that any discharge into rivers or watercourses, or to soak away onto land, is environmentally acceptable.

CAUTION

DO NOT put any stress on hoses. Lay them so as to avoid forming sharp kinks and protect them where they come in contact with abrasive surfaces.

6.5 Controls and connection points

6.5.1 Main Ignition Key

Refer to Section 6.6.2, 6.6.3 on page 16, 17, for the pumps start up procedure.

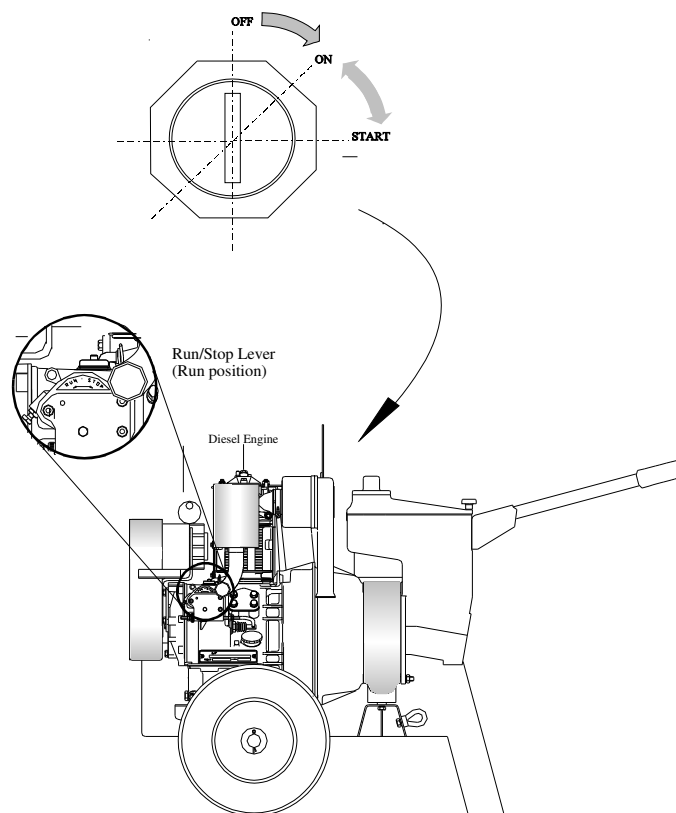


Figure 3 Position of the Run/Stop Lever

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6.6 Operating Instructions

6.6.1

General precautions

WARNINGS

DO NOT attempt to insert anything into the pump intake and discharge ports while the engine is running.


Ensure the pumpset is stable and immobilised **BEFORE** starting the pump.

BEWARE of fire risks. **DO NOT** place any flammable material near or around the engine or exhaust. Allow adequate ventilation.

The engine and exhaust become **HOT** during operation.

ENSURE that any discharge into rivers or watercourses, or to soak away onto land, is environmentally acceptable.

The pump body retains liquid which could be hazardous to health. Flush the pump with clean water **BEFORE** disconnecting the hoses or working on the pump.

 **NOTE:** In the event of an emergency, **STOP** the engine **IMMEDIATELY** using the engine key on the start panel, and activate the engine stop lever.

CAUTIONS

NEVER use the pump without a strainer.

DO NOT pump, either liquids that may damage the pump, or dry material. If in doubt contact your local Andrews Sykes depot for advice (see Section 3.1, page 6).

6.6.2 Starting up, Electric Start Engine

Follow this procedure before each engine start-up. Refer to Section 6.5, page 15, for details of controls and access.

WARNINGS

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Make sure you are familiar with the engine manufacturer's safety instructions **BEFORE** running the engine.

CAUTION

ALWAYS check and top up using oil of correct specification. See the manufacturer's handbook for details of engine oil, and **Table 2**, page 11, for details of vacuum pump oil.

1. Check and top up, if necessary;
 - i the engine fuel oil;
 - ii the oil level in the vacuum pump lube bottle.
2. Ensure that all drain taps are closed.
3. Submerge the intake hose in the source.
4. Turn the ignition key to **ON** position, ensuring engine stop lever is in the run position.
5. Turn the key clockwise to the **START** position and release as soon as the engine starts. If the engine fails to start within 30 seconds, release the key and attempt to restart after allowing time for all moving parts to come to rest.

(The pump should prime automatically. In case of start-up failure, consult *Fault diagnosis* on page20.)

6.6.3 Starting up, Hand Start Engine

Follow this procedure before each engine start-up. Refer to Section 6.5, page 15, for details of controls and access.

WARNINGS

Make sure you are familiar with the engine manufacturer's safety instructions **BEFORE** running the engine.

CAUTION

ALWAYS top up using oil of correct specification. See the manufacturer's handbook for details of engine oil, and **Table 2**, page 11, for details of vacuum pump oil.


1. Check and top up, if necessary;
 - i the engine fuel, oil;
 - ii the oil level in the vacuum pump lube bottle.
2. Ensure that all drain taps are closed.
3. Submerge the intake hose in the source.
4. Always use the correct type and direction of starting handle.
5. Test the Grip, Pawl and Spring are sound and clean.

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6. Examine the engine shaft and the inner boss of the starting handle, lightly oil.
7. Hold the Starting Grip correctly (Thumb on top of the grip - **Not around it**)
8. Make sure the Handle is fully home in the shaft or in the mechanism.
9. Turn the handle against the direction of rotation to ensure that the handle will disengage when engine has started.
10. Ensure engine stop lever is in the run position.
11. Perform the Engine Manufacturers instructions relating to priming, fuel control levers to start the engine.
12. If the engine fails to start within 30 seconds, attempt to restart after allowing time for all moving parts to come to rest.
13. After starting the Engine do not drop the handle into the mud or onto a hard surface.

(The pump should prime automatically. In case of start-up failure, consult *Fault diagnosis* on page 20.)

6.6.4 Shutting down

 **NOTE: *TO STOP-*** Stop the engine and push down fully the plunge pin on top of the priming tank to release the vacuum and empty the system.

CAUTION

ALWAYS drain the pump; before removing it, or if it is being left unused for a while -especially in cold weather.

The procedure is as stated below.

1. Flush the pump with clean water.
2. Drain the following the main pump through the drain taps or plugs provided (See **Figure 9**, page 36)
3. Push down fully the plunge pin on top of the priming tank to release the vacuum and empty the system.
4. Follow the engine manufacturer's instructions relating to engine being left unused for a period of time.

If the pump is to be moved to a new site, disconnect the hoses and follow the instructions in Section 6.1, *Lifting*, page 14.

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CAUTION

NEVER leave water in the pumps or hoses if there is any risk of it freezing.

6.7 Testing

To test correct operation of the pumpset before its first service, or whenever required, follow the procedure described below.

1. Immobilise and secure the pumpset, at the test site.
2. Start the engine as described in Section 6.6.2, 6.6.3, page 16, 17.
3. Place a 'cone tester' (or an alternative test gauge) in the inlet and check that the vacuum reading is sufficient for the intended lift plus the pipework losses. If the vacuum reading is unsatisfactory or the pump fails to prime consult *fault diagnosis*, Section 6.8, page 20.
4. Stop the engine.

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6.8 Fault diagnosis

6.8.1 Pump performance fault diagnosis

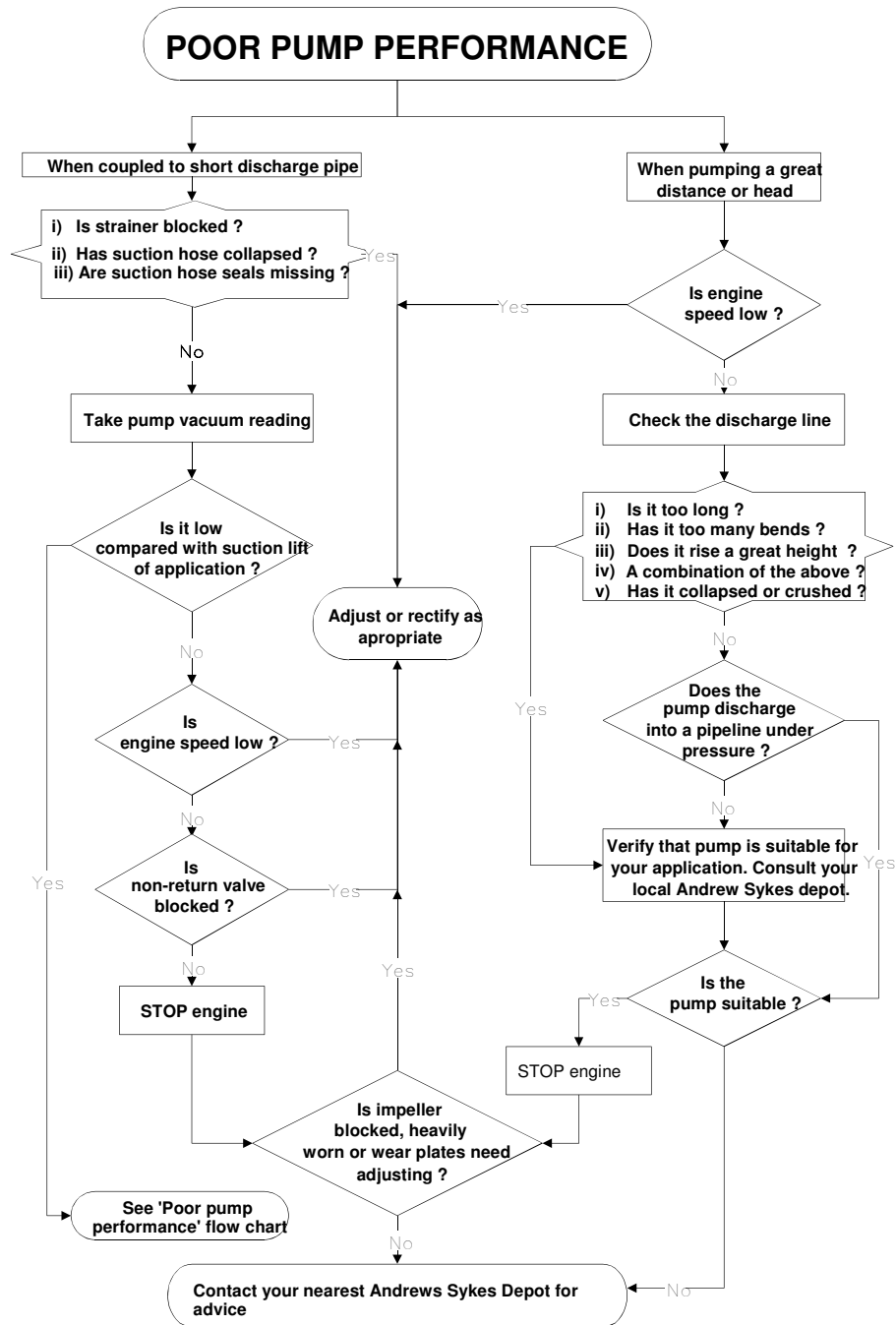


Figure 4 Pump fault diagnosis flowchart

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6.8.2 Priming system fault diagnosis

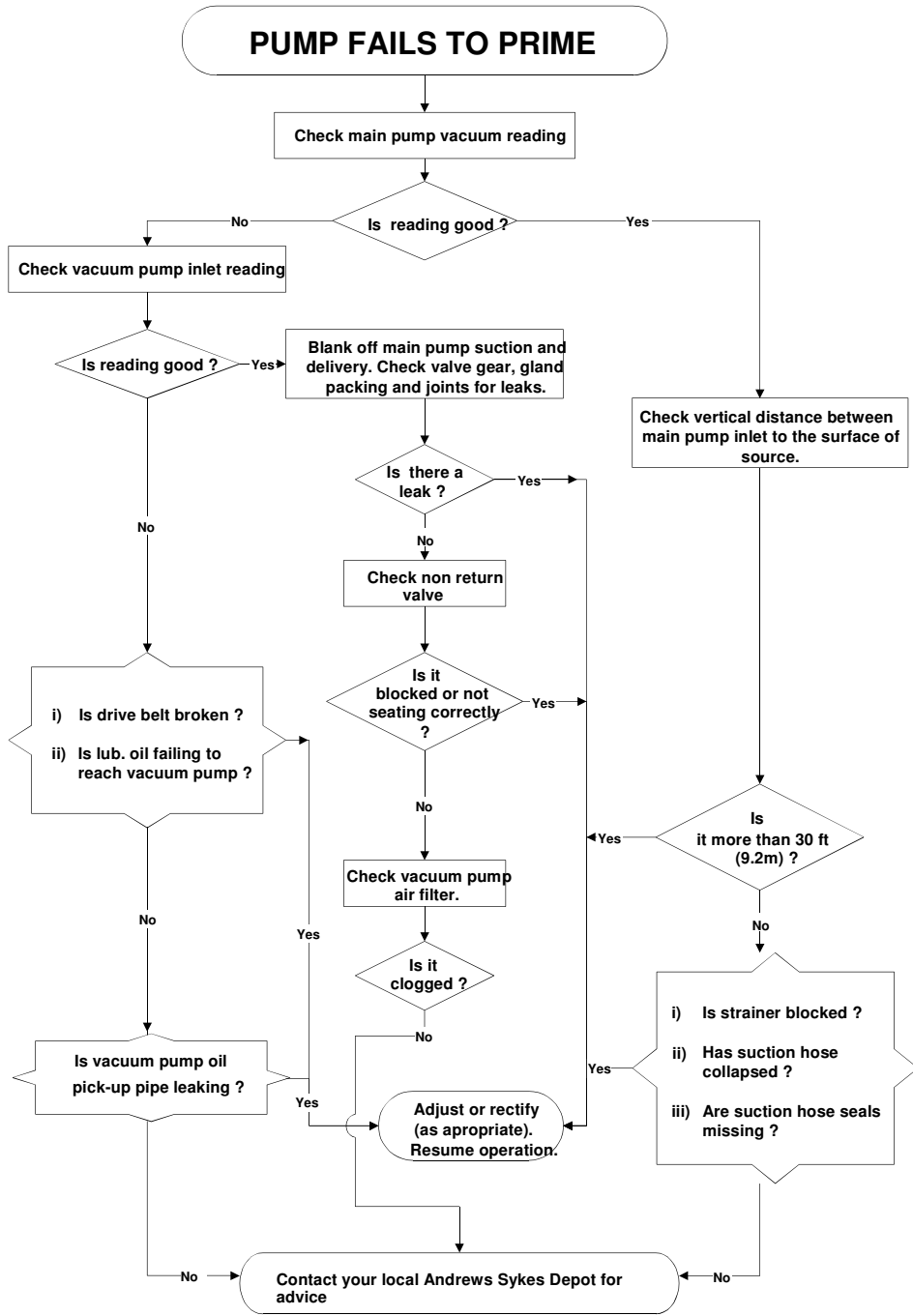


Figure 5 Priming fault diagnosis flowchart

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7 MAINTENANCE

7.1 Tools required

1. A standard fitters-toolkit.

7.2 Maintenance schedule

The following schedule provides a guide for maintaining the pump and the engine, together. The actual hours of operation between maintenance will depend on the operating conditions. For full details of engine maintenance, refer to the manufacturer's handbook.

Maintenance description	Refer to Section	Running hours					
		Daily	125	250	500	2000	6000
Vacuum pump and priming system:							
Check tension and condition of vacuum pump drive belt	7.5			×			
Check level of vacuum pump oil	5.2.3	×					
Check priming tank valves	Figure 10				×		
Renew vacuum pump drive belt	7.5					×	
Check non-return valve ball is sealing on seat	7.7					×	
Dismantle and clean priming tank, valves and pipes	Figure 10					×	
Check performance of vacuum pump and overhaul as necessary	7.6					×	
Main pump:							
Check impeller and wear plates for wear and renew or adjust as required.	7.8					×	
Renew pump pressure seal gland packing	7.10				×		
Check engine oil level		×					

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7.3 General instructions and precautions

7.3.1 Removal of engine and pump for major service

WARNINGS

Chock and stabilise the chassis **BEFORE** commencing work.

CAUTIONS

Drain main pump volute and priming tank.

ALWAYS remove major component to clean workshop conditions for overhaul.

1. Disconnect the wiring loom from the start panel.
2. Disconnect and remove the battery.
3. Disconnect the fuel hoses and from the engine.
4. Remove all guarding.
5. Remove handle assembly from the priming tank.
6. Remove engine and pump securing bolt.
7. Using suitable lifting straps, remove pump and engine assembly.

7.4 Engine and fuel system

7.4.1 General

Consult original manufacturer's handbook for engine maintenance instructions.

7.4.2 Cleaning the fuel tank

1. Drain the fuel tank.
2. Remove all traces of dirt, debris and fuel by steam cleaning.
3. Drain the tank of all water and ensure that its inside is dry.



NOTE: Section 7.5, 7.6, 7.7 and 7.8 can be done with pump and engine on chassis.

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7.5 Vacuum pump drive belt

The vacuum pump pulley arrangement is illustrated below in **Figure 6** on page 24.

7.5.1 Adjusting Belt Tension

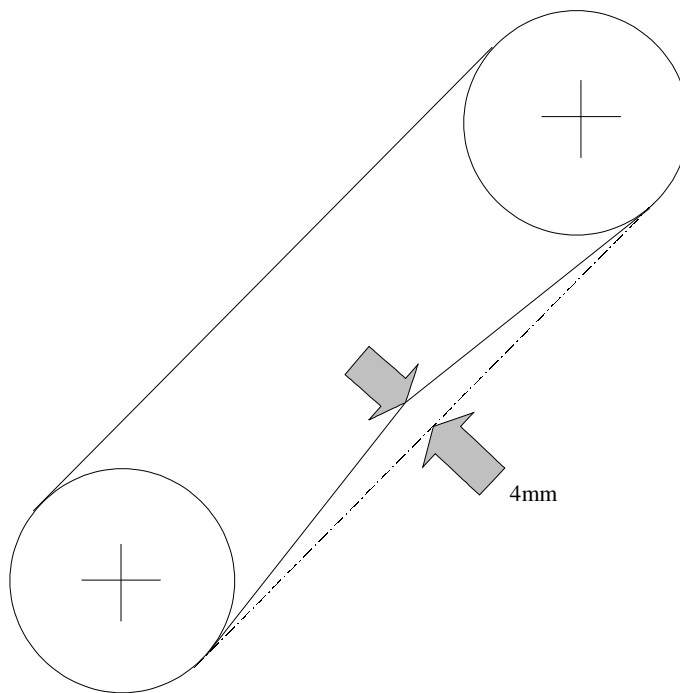


Figure 6 Drive Belt Tension

1. Remove guarding.
2. Loosen the vacuum pump adjusting bolts.
3. Reposition the vacuum pump to adjust the tension of the belt (D03). (At the correct tension a force of 2.5kg is needed to deflect the belt 4mm at the midpoint between the pulleys.)
4. When the vacuum pump is in the correct position, tighten the vacuum pump adjusting bolts.

7.5.2 Renewing the belt

1. Remove guarding.

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2. Loosen the vacuum pump adjusting bolts to slacken the belt.
3. Remove the old belt.
4. Fit a new belt and re-adjust the vacuum pump on its slots to retension the belt as described in Section 7.5.1.
5. Refit the guarding.

7.6 Vacuum pump

7.6.1 Removing the vacuum pump

1. Remove all restricting guarding.
2. Disconnect hoses from the vacuum pump.
3. Loosen the vacuum pump adjusting bolts.
4. Remove the belt.
5. Remove the vacuum pump and pulley.

7.6.2 Service Instructions for Model L5/R Rotary Vacuum Pump

CAUTION

Dismantling the pump should be done in clean workshop conditions.

Consult **Figure 8** on page 34 to identify components.

1. Installation
When the machine is not required for immediate use the inlet and outlet must be kept covered, otherwise entry of foreign matter through the ports could cause serious damage. Connecting pipework on the intake side of the machine must be thoroughly cleaned to remove internal rust and scale. Use PTFE tape for making joints since surplus from jointing compounds will damage the blades if drawn into the machine. It is essential to fit a filter on the intake of vacuum pumps to prevent pipe scale, oil, water, dust and other harmful matter from being drawn in.
2. Checks before use
Before running the machine for the first time after installation or maintenance, make the following checks:

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1. Check that the machine is free by turning the shaft by hand through a few revolutions.
 2. Check that the direction of rotation is anti-clockwise when viewed from the drive shaft.
 3. The pump speed must not exceed 2200 rpm.
 4. Ensure that there is an adequate supply of oil available in the oil tank or bottle. Use the following oil or equivalent - Shell Rimula X Oil 20/20W.
3. Operation Instructions
- Regularly inspect any filters fitted in the intake pipeline. Clean the elements and renew when necessary. Failure to carry out this procedure will result in loss of performance and overheating. Check the blades for wear every 5000 running hours or if loss of performance occurs. The bearings are sealed for life and no maintenance is required.
4. To inspect and change blades
- Starting at the shaft end, take off end cap (U05) and remove thrust washer (U11). Undo coverplate retaining screws (U13 and U14) and using 2 x M6x25mm screws in tapped holes, jack off coverplate (U04) with bearing (U09). (Two long screws for this purpose are fitting as retaining screws, in the top position - see parts list). Renew blades if depth has worn to 25mm or less.
5. To change bearings
- Use a pulley to remove the coverplate from the rotor/shaft assembly. Remove bearing cap and take care not to lose shim, if fitted, before tapping out bearing. Seal bushes (U10) can now be pressed out of the coverplates if worn. **DO NOT ATTEMPT TO REMOVE SEAL SLEEVES (U07 and U08) OR SHAFT FROM ROTOR.** Check cylinder bore and replace if it is badly worn or ribbed. Do not rebores as this will cause loss of performance.
6. To reassemble
- Reassemble in reverse order. If any bearing shims (U16) are fitted, ensure that these are assembled in position before fitting the end cap B.E. (U05). These shims are essential to give the correct running clearances. Before fitting the end cap D.E. (U05) and thrust washer (U11) push the rotor/shaft assembly (U06) firmly towards the blind end. **IT IS ESSENTIAL THAT ALL PARTS ARE PERFECTLY CLEAN BEFORE ASSEMBLY.**

Failure to follow the above instructions can cause loss of performance or seizure.

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WHEN ORDERING SPARE PARTS ALWAYS QUOTE THE MACHINE SERIAL NUMBER.

7.7 Non-return valve

1. Regularly check the non-return valve, **Figure 13** page 41, for blockage and wear.
2. For a thorough inspection;
 - i disconnect the non-return valve from the volute and remove it;
 - ii detach the valve seat, remove the ball and inspect both for wear and damage;
 - iii re-fit or renew as appropriate.

7.8 Main pump impeller

To check the condition of the impeller and wear plates without removing the main pump:

1. Drain the volute.
2. Disconnect the intake hose and fittings.
3. Disconnect the volute from the priming tank.
4. Remove priming tank and sump tee by removing nuts and washers.
5. Consult **Figure 9** on page 36.
6. Remove the impeller assembly by unscrewing in an anti-clockwise direction, looking at the impeller end and extract it from the volute casing. Check for wear.
7. If the impeller blades are damaged, replace the entire impeller assembly. If only the wear ring is worn, remove it and bond on a replacement using a suitable retainer.
8. Check the packing for wear and renew if necessary, as detailed in section 7.10.1 page 28 .
9. Refit the impeller and subsequently sump tee and priming tank assembly in reverse of previous instructions.

7.9 Removing and refitting pump pressure seal

Reference **Figure 9**, page 36.

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1. After removal of the impeller as described in Section 7.10 (optional NRV), withdrawing item through front of volute.
2. Remove the set screw and washers from underside of volute. (Items W15,W24,W25)
3. Remove 3/8" nut and washers from their studs and extract pump end assembly off engine and accompanying stub shaft. (items W22,W23,W26)
4. Remove end cap by removing set screws and washers. (Items W09 & W10)
5. Remove packing holder, spring and gaitor respectively. Replace any worn components as required.

7.10 Main pump pressure seal

The main pump pressure seal is shown in **Figure 9** on page 36.

Renewal of the pump pressure seal packing can be undertaken during regular inspection of the impeller as explained in Section 7.8, and replaced as explained in Section 1.

7.10.1 Renewing the pump pressure seal packing

1. Cut a 205mm length of 3/8" square packing material.
2. Place the packing in the holder, butting the two ends first and then pressing the rest of the packing into the holder. The total length of packing is greater than the circumference of the holder and must be forced into place. The packing will protrude slightly from the face of the holder on completion.

7.10.2 Refitting pump pressure seal

1. Replace spring and gaitor onto packing holder.
2. Replace end cap (with newly fitted o-ring if required) and tighten all set screws evenly to position the pressure seal assembly in the matching piece.
3. Replace pump volute and matching piece assembly back onto the engine bell housing using the studs, nuts and washers previously removed and tighten evenly, as reverse of the steps in section 7.8 parts 1, 2, 3 & 4. For impeller refitting refer to Section 7.11.

7.11 Fitting the impeller

1. Clean the threaded portion of the shaft and impeller using solvent. Grease threads. Fit impeller shims (W08) and screw the impeller into place, making sure it is fully locked.

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2. Prior to final assembly, coat the outer edges of the wear plates heavily with water pump grease to facilitate removal at a later date.

7.12 Replacing the Priming tank, Sump Tee and Wear Plate

1. Fit priming tank wear plates etc. with no shims only pinch bolts.
2. Measure gap between volute and priming tank faces.
3. Remove tank and refit with appropriate number of shims (ie. gap measured + 0.5mm).
4. Check the shaft turns freely.
5. Ensure all nuts and screws are tight before restarting.

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8 SPARE PARTS

8.1 Introduction

If you require spare parts for your Andrews Sykes pump please contact your local Andrew Sykes Hire Ltd depot, telephone (freefone) 0800-211-611.

CAUTION

The use of any spares other than those supplied by Andrews Sykes Hire Ltd for the machine in question may cause **DAMAGE** to the machine and may **INVALIDATE** any EC Declaration given in respect of the equipment.

8.2 Ordering Spares

When ordering spare parts, please provide the following details:

Please provide the following information:

- (1) Machine model and chassis type
- (2) Model-Serial number of the machine
- (3) Part number
- (4) Description of part
- (5) Quantity required

See *Product identification*, page 13 for details of model naming and serial numbers.

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8.3Spare Parts Listing

Miscellaneous parts		
Ref.	Description	Part No.
M01	Vacuum Pump Silencer	SK1835/2
M02	Nut M10	SY9509653
M03	Nut Bow M10	SY9529273
M04	Chassis/Fuel Tank	SY3864029
M05	Wheel	SY3864036
M06	Cotter Pin 3/16" x 2" Steel	SY9519027
M07	Hose Assembly Fuel Supply	SY3864043
M08	1/4" BSPT- 1/4" BSP Cone Seat	SY9209253
M09	Set Screw M10 x 20	SY9519117
M10	Washer 1" Bright Steel	SY9019359
M11	Set Screw M10 x 35	SY9519121
M12	Washer Spring M10	SY9509807
M13	Engine/Pump Mounting Spacer	SY3864062
M14	Battery Box	SY3864063
M15	Battery 12V	SY7004404
M16	Battery Cable (Negative)	SY3864065
M17	Battery Cable (Positive)	SY3872001
M18	Lug Ring 25mm Sq- 6mm Hole	SY3864066
M19	Lug Ring 25mm Sq- 10mm Hole	SY3864067
M20	Battery Terminal (Positive)	SY3864068
M21	Battery Terminal (Negative)	SY3864069

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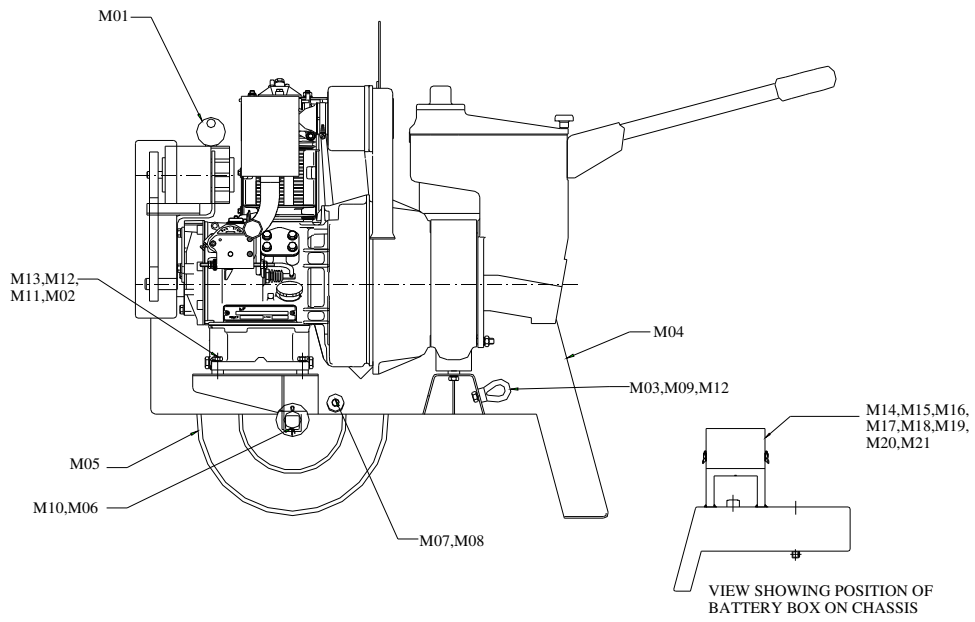


Figure 7 Miscelaneous parts

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Vacuum pump assembly -7cfm (U00)		
Part No. SY7951002		
Ref.	Description	Part No.
U01	Blade	S8326
U02	Cylinder	S8035
U03	Coverplate - B.E.	S8087/1ZP
U04	Coverplate - D.E.	S8087/2ZP
U05	End Cap	S8088
U06	Rotor and Shaft Assembly	S8407ZP
U07	Seal Sleeve - D.E.	S8090/3
U08	Seal Sleeve - B.E.	S8090/4
U09	Sealed Bearing	H1022
U10	Seal Bush	F1032
U11	Thrust Washer	B1037
U12	Dowel	E1000
U13	Socket Head Cap Screw	G1121
U14	Socket Head Cap Screw	G1090
U15	C'sunk Head Screw	G1155
U16	Shim	K1008
U17	Thrower Ring	S8260
U18	Elbow	M1007
U19	Exhaust Silencer	SK1375/2

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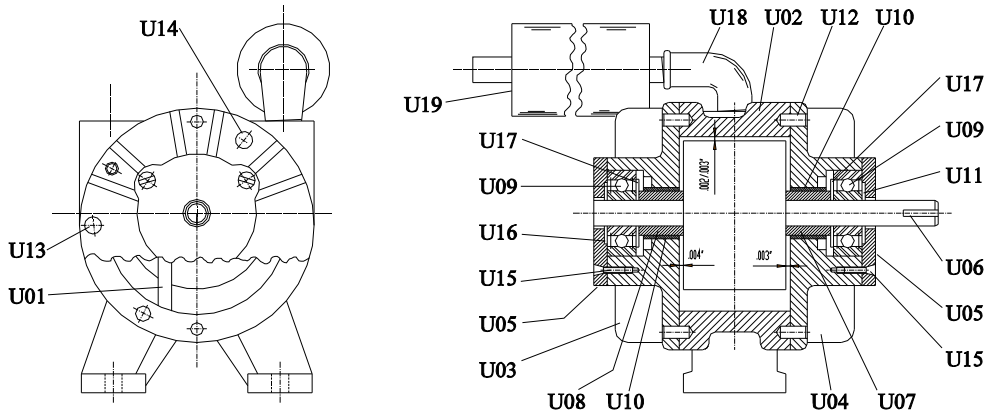


Figure 8 Vacuum pump

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Main pump assembly					
Ref.	Description	Part Number	Ref.	Description	Part Number
W00	Matching Piece	SY3864110	W16	Nut M10 H/T	SY9509653
W01	Stub Shaft	SY3864009	W17	Volute	SY3864001
W02	End Cap	SY3874017	W18	Gasket - Volute	SY5004425
W03	Packing Holder	SY3864109	W19	Lifter Bracket	SY3864030
W04	Shaft Sleeve	SY3864011	W20	Guard Flywheel	SY3864035
W05	'O' Ring	SY3804166	W21	Cock Drain 1/4" BSP	SY9209431
W06	Compression Spring	SY3804160	W22	Nut 3/8" UNC	SY9019425
W07	Gasket End Cap	SY5004410	W23	Washer Spring 3/8"	SY9019373
W08	Shim Pack	SY3864013	W24	Set Screw M10 x 20 H/T	SY9519117
W09	Set Screw M8 x 20 H/T	SY9519097	W25	Washer Spring M10	SY9509807
W10	Washer Spring M8	SY9509806	W26	Stud 3/8" UNC x 1-3/4"	SY9509218
W11	Set Screw M8 x 45	SY9519103	W27	Gasket	SY5004432
W12	Gland Packing 3/8" Sq	SY6384001A	W28	Support Bracket - Lifter	SY3864099
W13	Impeller Std. 2 Vane	SY3864044-M	W29	Spring Gator	SY3804412
W14	Stud M10 x 25	SY9509087	W30	Wear Ring	SY3864014
W15	Washer M10 Steel	SY9509679			

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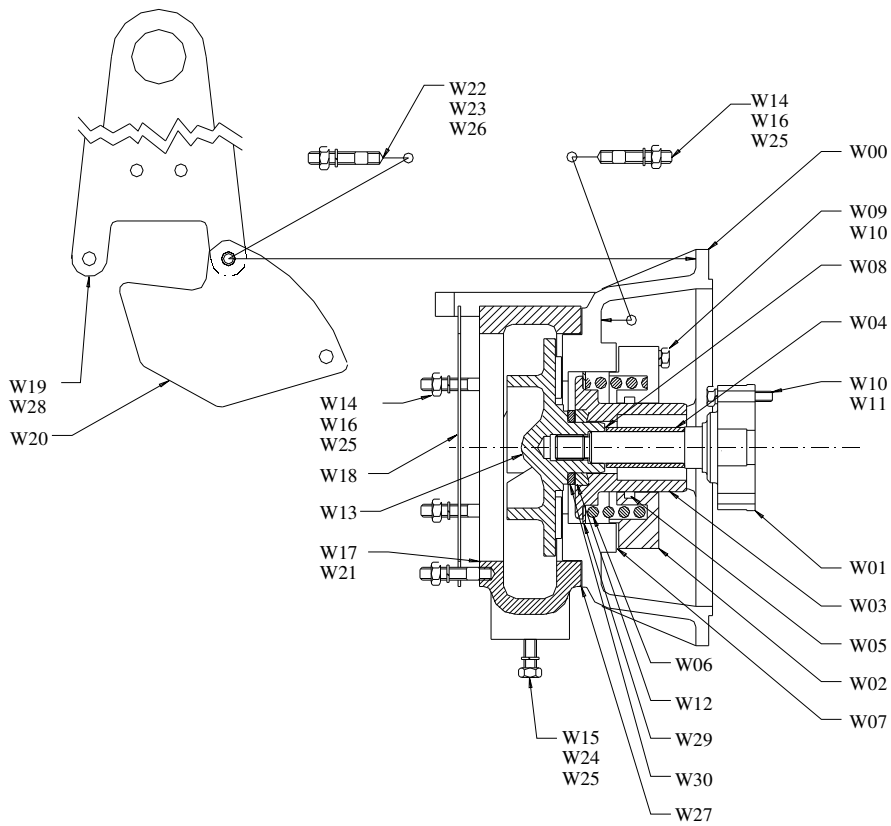


Figure 9 Main pump assembly

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Priming tank assembly		
Ref.	Description	Part No.
P01	Set Screw M8 x 20 H/T	SY9519097
P02	Washer M8	SY9509806
P03	Valve 3/8" Mini Ball	SY9209725
P04	Priming Tank	SY3864004
P05	Top Cover	SY3864075
P06	Filter Cover	SY3864076
P07	Gasket -F/Cover-T/Cover	SY5004423
P08	Gasket -T/Cover-P/Tank	SY5004424
P09	Stud M8 x 20	SY9509045
P10	Nut M8 H/T	SY9509652
P11	Washer M8 Steel	SY9509678
P12	Filter	SY3614044
P13	Valve Module	SY3864098
P14	Valve Seat	SY3864104
P15	Connecting Boss Inlet	SY3864022
P16	Valve Pin	SY3864023
P17	Fulcrum Pin	SY3864024
P18	Fulcrum Arm	SY3864025
P19	Float-Primary	SY3454417
P20	Float Rod	SY3864027
P21	Washer Starlock	SY9519256
P22	Handle Assembly	SY3864033
P23	Hand Grip	SY3304071
P24	Plastic Hand Wheel	SY9529274
P25	Float Weight	SY3864072
P26	Bush - Filter Cover	SY9059400

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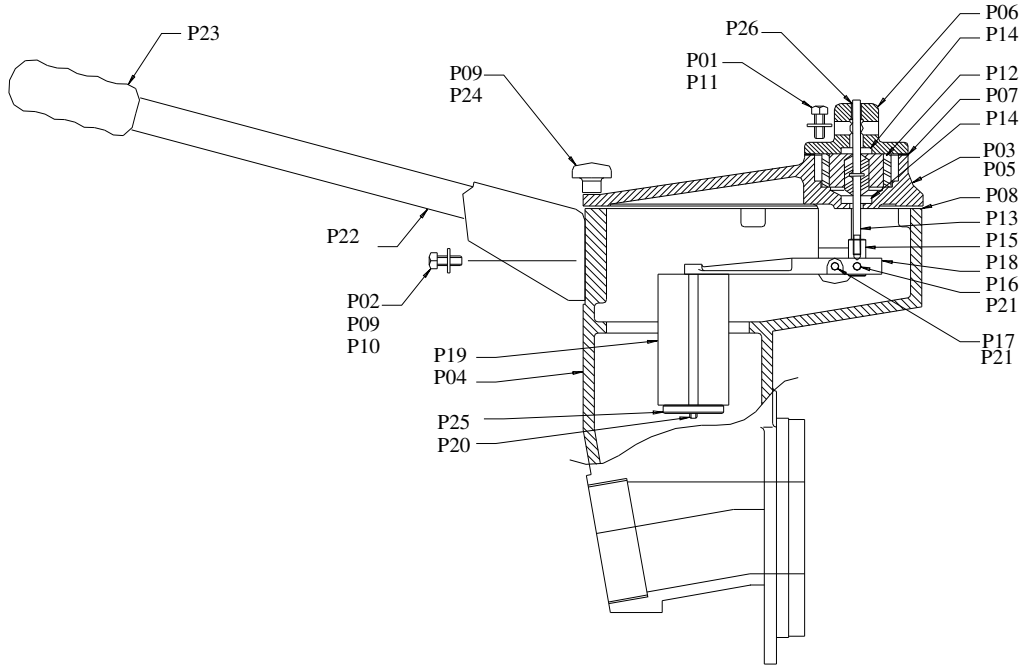


Figure 10 Priming tank and its main components

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Vacuum Pump, Belt Drive Assembly (Figure 11)			Vacuum Pump Bracket & Guard on Earlier Models (Figure 11)		
Ref.	Description	Part No.	Ref.	Description	Part No.
V00	Vacuum Pump 7 cfm	SY7951002	V22	Bracket-Vacuum Pump	SY3864100
V01	Lubricating Bottle	U-S9146	V23	Guard-Vac Pump	SY3864032
V02	Bracket-Vacuum	SY3864100	V24	Screw Set M8 x 12	SY9519093
V03	Guard-Vac Pump	SY3864017	V25	Screw Set M8 x 20	SY9519097
V04	Pulley- 90 Dia- Std	SY3864040	V26	Washer/ Spring	SY9509806
V04	Pulley-100 Dia-	SY3864051	V27	Nut M8 H/T	SY9509652
V05	Pulley- 75 Dia- Std	SY3864041	V28	Washer M8 Steel	SY9509678
V05	Pulley- 67 Dia-	SY3864052			
V06	Wedge Belt - SPZ	SY3864042			
V07	Bush/Taper 1108 x	SY9059340			
V08	Bush/Taper 1210 x	SY9059119			
V09	Vacuum Hose -	SY3864101			
V10	Vacuum Hose -	SY3864102			
V11	Tee Mal. - 1/4"	SY9209463			
V12	Joint	SY5004022			
V13	Washer M12 Steel	SY9509580			
V14	Nut M6 H/T	SY9509651			
V15	Key 3/16" sq. x 1	SY3864078			
V16	Washer M6 Steel	SY9509676			
V17	Set Screw	SY9019640			
V18	Stud M6 x 25	SY9509007			
V19	Washer/ Spring M6	SY9509805			
V20	Washer Plain	SY9019351			
V21	Screw Set M6 x 20	SY9519077			

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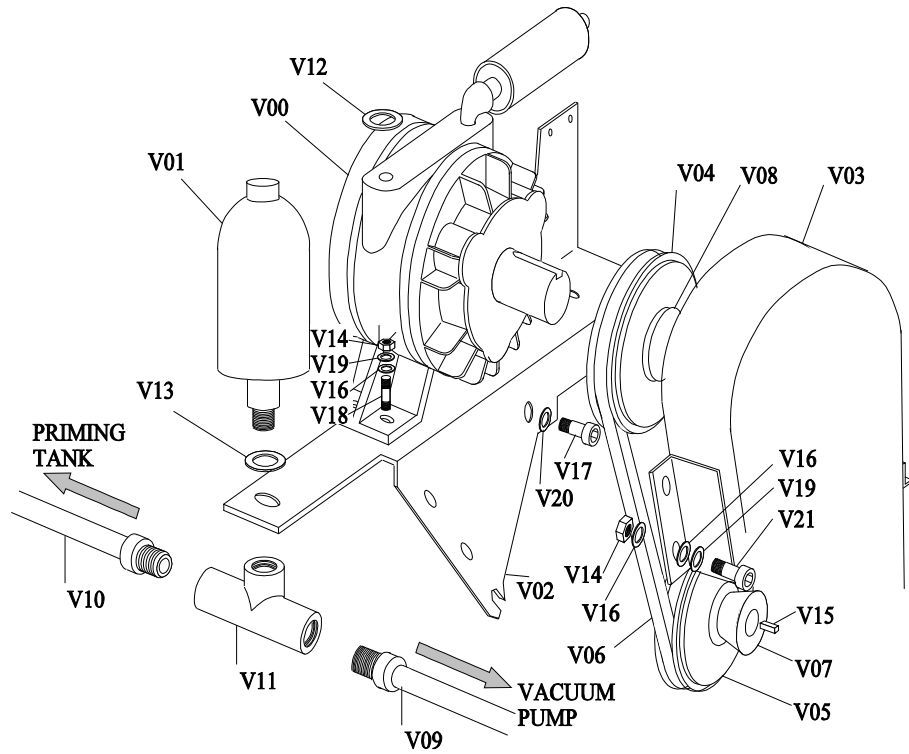


Figure 11 Vacuum Pump, Drive Belt Assembly

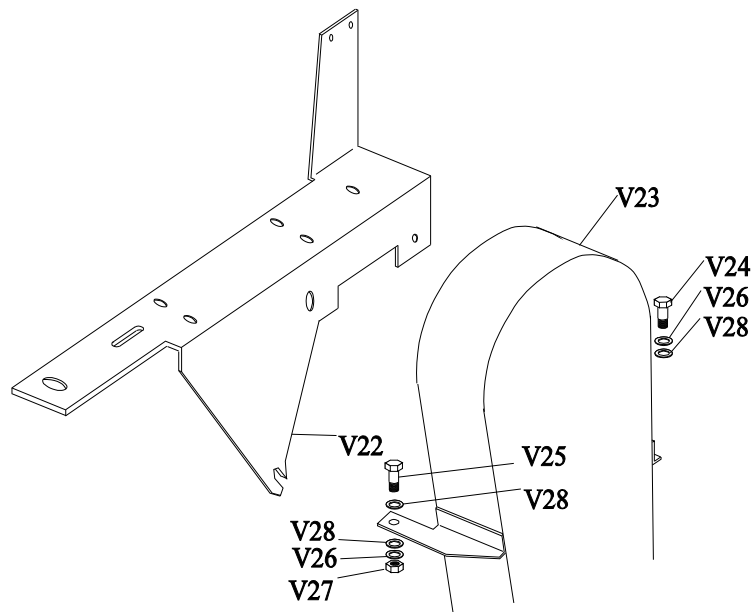


Figure 12 Vacuum Pump Bracket & Guard on Earlier Models

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Non-return valve assembly (N00)		
Ref.	Description	Part Number
N01	Reflux Box	SY3864002
N02	Seat Reflux Box	SY3864045
N03	Ball Valve Reflux 69mm	SY3344276
N04	Stud M10 x 150 NOM	SY9509113
N05	Nut Hex Full M10	SY9509653

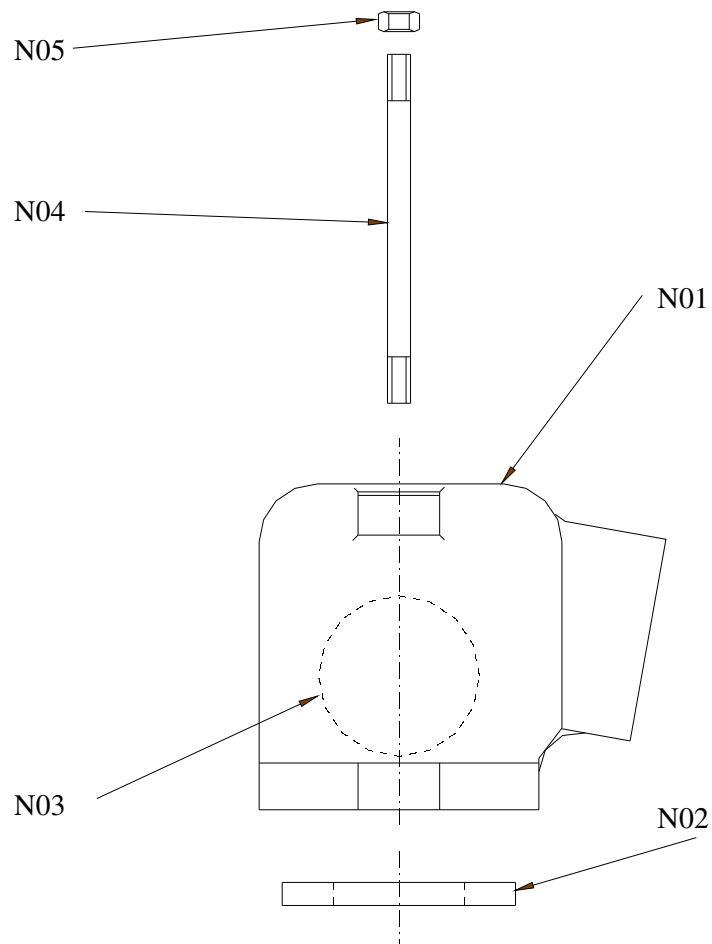


Figure 13 Non-return valve

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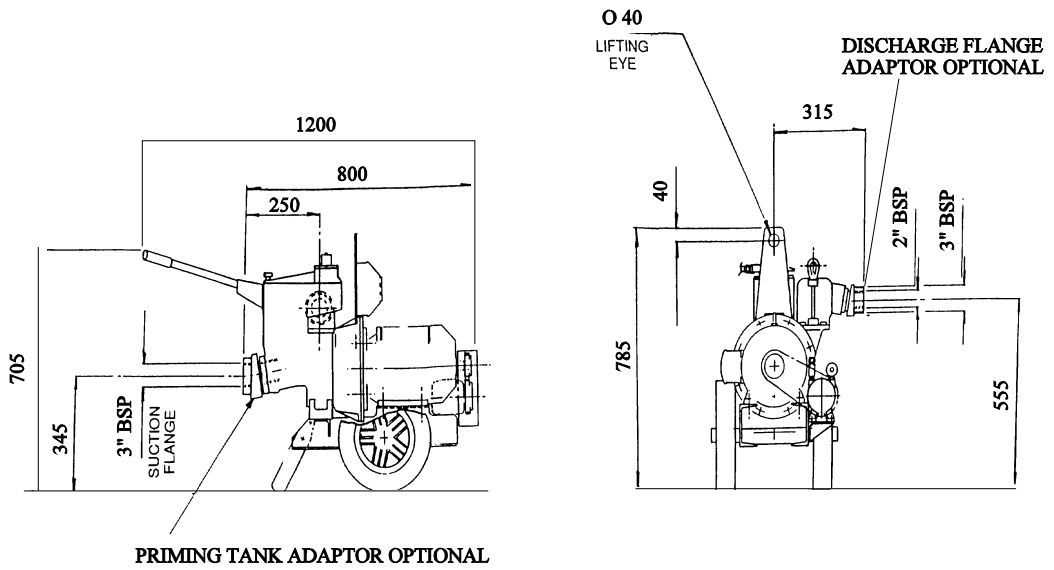


Figure 14 Overall Dimensions For Electric Pumpset

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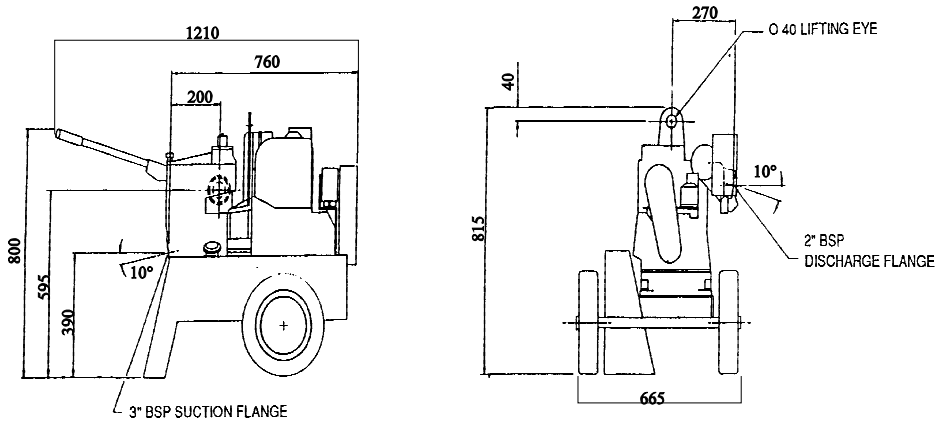


Figure 15 Overall Dimensions For Diesel Pumpset

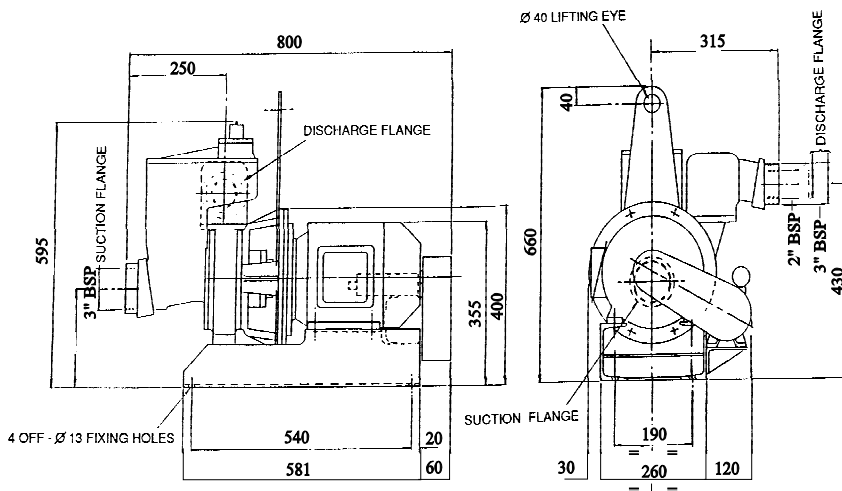


Figure 16 Overall Dimensions For Electric, Bed Plate Mounted Pumpset

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9APPENDICES

9.1Associated Publications

Documents listed under this section are for reference and relate only to the equipment bearing the model and serial numbers indicated in this manual.

Ref.	Title	Originator
027-08183	A series engines O&M manual	Lister Petter
	EC Declaration of Conformity	