### AMENDMENT RECORD

Model: Prima, single and twin pressure models

<table>
<thead>
<tr>
<th>Mod No.</th>
<th>Date</th>
<th>Page/s</th>
<th>Amendment</th>
<th>New Issue No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>June 2011</td>
<td>All</td>
<td>New publication</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>March 2012</td>
<td>44</td>
<td>Gearbox oil capacity revised to 1.2 litres</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>March 2012</td>
<td>48</td>
<td>Water ring primer – 3mm lift-off gap</td>
<td>2</td>
</tr>
</tbody>
</table>
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right to amend specifications without notice or obligation.
Page intentionally left blank.
SAFETY

Please read this manual before operating the machinery.

Safety notices -

= non-compliance could affect safety

= in case of damage to pump

In operation

 Rotating parts must be guarded against accidental contact.
 Do not insert items into the suction tube when pump is running.
 Discharge hoses must not be disconnected when the unit is running.
 No components must be unfastened when the unit is running.
 When installing or removing the pump, suitable lifting equipment must be used.
 Suitable ear protection must be worn when pump is running – if necessary.

Training
Godiva pumps must only be operated by trained personnel.

Maintenance
The user must maintain the equipment in an operational condition, as per regulation 5 in the Provision and Use of Work Equipment Regulations 1998.

Environmental Protection
Used oil from the pump must be disposed of in accordance with your local regulations.

Risk Assessment
It is the duty of the pump installer to make a risk assessment of their operations when installing the pump, please contact Godiva Ltd. if assistance is required.

Transportation and Storage
The pump is supplied mounted on a wooden pallet and covered with a tri-walled cardboard box. This protection is suitable for standard methods of freight handling using forklift trucks. No more than one pump should be stacked on top of another. The tri-walled cardboard box is not suitable for storage when open to the elements. The pump is sprayed internally with a moisture inhibitor when leaving the factory, this treatment may be required if the pump is in long term storage (6 months or more) before use. On receipt of
the pump a full inspection must be carried out, if any damage has occurred
please contact Godiva Ltd.

Warranty
For all issues relating to warranty claims please contact Godiva Ltd. Please
be prepared to quote the six figure pump serial number located on the pump
volute.

Gauges (if fitted)
Do not clean the glass surfaces of the gauges with abrasive or solvent
cleaners. These will cloud the glass surface. Use a mild detergent and water.

Associated Publications

<table>
<thead>
<tr>
<th>Publication</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation and Operation Manual</td>
<td>GP/287</td>
</tr>
<tr>
<td>P1 Spare Parts Manual</td>
<td>GP/281</td>
</tr>
<tr>
<td>P2 Spare Parts Manual</td>
<td>GP/258</td>
</tr>
</tbody>
</table>

PUMP SPECIFICATION NUMBERING

P C 1 A 20 10 601123 = typical six figure serial number
Stamped on volute body (boss at top left)

- Nominal pressure in bars
- Nominal flow in litres / minute x 100
- A = Aluminium  B = Bronze
- 1 = Single pressure, 2 = Twin pressure
- C = Compressed air foam system fitted (option)
- P = Prima series
ENVIRONMENTAL PROTECTION

It is prohibited to pour oil and other contaminants onto the ground, down sewers, drains, or into water courses. Dispose of lubricants through authorised waste disposal contractors, licensed waste disposal sites, or to the waste reclamation trade. If in doubt, contact your Local Environmental Agency for advice regarding disposal policies.
OPERATOR MAINTENANCE LOG

Pump serial number . . . . . . . . . . . . . . . . . . . . .

Use this log to record faults, part replacements and major overhauls. Please contact Customer Services at Godiva Ltd. prior to any proposed return of either a single part, or a complete assembly.

<table>
<thead>
<tr>
<th>Date Run</th>
<th>Hours Run</th>
<th>Inspection / Fault</th>
<th>Parts Used</th>
<th>Reason For Renewal</th>
<th>Initial</th>
</tr>
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<tbody>
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</tr>
</tbody>
</table>
## MAINTENANCE SCHEDULE

Maintenance intervals and action required

<table>
<thead>
<tr>
<th>Interval</th>
<th>Action required</th>
<th>Items Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>After each use –</td>
<td>Flush pump through with clean water</td>
<td>Supply of clean water</td>
</tr>
<tr>
<td>Every 3 months -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check oil level in bearing housing</td>
<td>Remove filler/dipstick on bearing housing to check level</td>
<td>10w/40 or 15w/40 multigrade engine oil</td>
</tr>
<tr>
<td>Vacuum test</td>
<td>See separate instructions on page 48</td>
<td></td>
</tr>
<tr>
<td>Pressure test – for tracing location of vacuum leak</td>
<td>See separate instructions on page 48</td>
<td>Access to pressurised water source</td>
</tr>
<tr>
<td>P2 only - High pressure filter</td>
<td>Remove the filter from the housing and flush with clean water</td>
<td></td>
</tr>
<tr>
<td>Every 12 months -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change oil in bearing housing</td>
<td>Drain oil from bearing housing and refill with new oil</td>
<td>1 litre SAE10w/40 or 15w/40 multigrade engine oil</td>
</tr>
<tr>
<td>Change oil in gearbox - if fitted</td>
<td>Drain oil from gearbox and refill with new oil</td>
<td>1.2 litres BP Energol GR XP 68 or similar</td>
</tr>
<tr>
<td>Every 2 years -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change piston primer seals in cover and body</td>
<td>Maintenance manual procedures page 24</td>
<td>Repair kits Special tools (contact Godiva)</td>
</tr>
<tr>
<td>Thermal Relief Valve Test</td>
<td>See separate instructions on page 49</td>
<td></td>
</tr>
</tbody>
</table>
REMOVAL & INSTALLATION

Introduction
Instructions particular to the repair of Godiva Prima Fire Pump series are detailed in the following sections. These instructions describe the complete strip-down of the pump. To reduce unnecessary work and avoid the introduction of other issues, only dismantle those parts necessary to effect inspection and or repair.

P1 and P2 Models – for both pumps the majority of parts are common. Where parts are unique to the P1 or P2 pump, this is indicated in the text.

Precautions
Before carrying out repair work, take the following precautions:

- Drain the volute of water.

Post Repair and Assembly
On completion of work:

- Carry out vacuum test.
- Complete the maintenance log.
1. Suction tube and front wearing ring

**Removal**

1. Undo the 12 x hexagon head bolts (shown).
   If necessary remove the tank to pump line, collecting head and RTP unit.
   Disconnect the vacuum gauge tubing from the top of the suction tube.

To remove and replace the front wearing ring in the locating bore in the suction cover plate, undo the 4 x cap screws and washers

Check the large internal diameter of the wearing ring in several places. If dimension A exceeds the limit given in the table the wearing ring must be replaced.

<table>
<thead>
<tr>
<th>Pump</th>
<th>Internal Ø Limit - mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1_2010 / P2_3010</td>
<td>140.16 / 140.10</td>
</tr>
<tr>
<td>P1_4010</td>
<td>170.685 / 170.632</td>
</tr>
<tr>
<td>P1_6010</td>
<td>187.07 / 187.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pump</th>
<th>Internal Ø Limit - mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2_2010 / P2_3010</td>
<td>140.16 / 140.10</td>
</tr>
<tr>
<td>P2_4010</td>
<td>170.685 / 170.632</td>
</tr>
<tr>
<td>P2_6010</td>
<td>187.07 / 187.00</td>
</tr>
</tbody>
</table>

**Installation**

Installation is the reverse of removal noting:
When replacing the front wear ring apply Loctite 243 to screw threads and torque to 12 Nm.

Insert the O ring (65097) in the O ring groove on the locating diameter on the suction tube cover plate (shown).

Re-connect the collecting head, vacuum gauge tubing and tank to pump line (or blanking plates for tank to pump apertures if fitted).
2. Low Pressure Impeller

Removal
To remove and inspect the low pressure impeller, remove the suction tube and associated parts as described in section 1. This gives direct access to the low pressure impeller leaving the volute body in-situ.

To remove the impeller it may be necessary to fit a shaft locking screw in the aperture provided at the rear of the bearing housing. Remove the impeller nut and the pair of lock washers, withdraw the impeller from the keyed pump shaft.

Check the wearing diameter on the impeller in several places. If the diameter is less than stated in the table below, a new impeller should be fitted.

P1 Model

<table>
<thead>
<tr>
<th>Pump</th>
<th>Front Diameter A mm</th>
<th>Rear Diameter B mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1_2010 / 3010</td>
<td>139.3 mm</td>
<td>146.1</td>
</tr>
<tr>
<td>P1_4010</td>
<td>169.5 mm</td>
<td>170.8</td>
</tr>
<tr>
<td>P1_6010</td>
<td>188.6 mm</td>
<td>184.2</td>
</tr>
</tbody>
</table>
P2 Model

<table>
<thead>
<tr>
<th>Pump</th>
<th>Front Diameter A mm</th>
<th>Rear Diameter B mm</th>
<th>Hub Diameter C mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2_2010 / 3010</td>
<td>139.70 / 139.65</td>
<td>134.93 / 134.88</td>
<td>68.05 / 68.00</td>
</tr>
<tr>
<td>P2_4010</td>
<td>170.06 / 170.00</td>
<td>170.47 / 170.40</td>
<td>68.05 / 68.00</td>
</tr>
<tr>
<td>P2_6010</td>
<td>186.25 / 186.20</td>
<td>188.07 / 188.00</td>
<td>68.05 / 68.00</td>
</tr>
</tbody>
</table>

**Installation**

Apply a small amount of tallow to the bore of the low pressure impeller. Place a new O ring into the end face groove of the impeller. Place the impeller on the shaft and retain using a new set of locking washers. Tighten the locking nut to a torque of 300 Newton meters.

3. Rear Wear Ring

**P1 Model**

**Removal**

The rear wear ring is accessible when the low pressure impeller is removed. To remove the wear ring undo the four screws and washers retaining the ring against the pump head. The wear ring can be eased away from the pump head by means of two screws inserted into the adjacent tappings.

Check the wearing diameters as follows –

![Diagram](image-url)
Installation

When relocating the rear wear ring into the pump head, ensure the priming port in the ring is located at the top. Secure the wear ring with the washers and screws. Tighten to 10Nm.

P2 Model

Removal

The rear wear ring is accessible when the low pressure impeller is removed. To remove the wear ring undo the four screws and washers retaining the ring against the high pressure cover plate. The wear ring can be eased away from the cover plate by means of two screws inserted into the adjacent tappings.

Check the wearing diameters as follows –

<table>
<thead>
<tr>
<th>Pump</th>
<th>Ø X</th>
<th>Ø Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2_2010/3010</td>
<td>134.440 / 134.400</td>
<td>68.500 / 68.450</td>
</tr>
<tr>
<td>P2_4010</td>
<td>170.000 / 169.937</td>
<td>68.500 / 68.450</td>
</tr>
<tr>
<td>P2_6010</td>
<td>187.45 / 187.40</td>
<td>68.500 / 68.450</td>
</tr>
</tbody>
</table>

Installation

When relocating the rear wear ring into the cover plate, ensure the priming port in the ring is located at the top. Secure the wear ring with the washers and screws. Tighten to 10Nm.
4. P2 Only - High Pressure Impeller

**Removal**
To access the high pressure impeller the suction tube and low pressure impeller must be removed as per sections 1 and 2.

Remove the high pressure cover plate by undoing the 12 off cap screws. Insert 3 off M8 bolts into the extractor holes around the edge of the plate. Screw the bolts in evenly until the plate moves forward.

Remove the cover plate and high pressure impeller. Clean the cover plate and pump body jointing faces.

5. P2 Only - High Pressure Impeller - Maintenance
Check the high pressure impeller, pump body, mechanical seal assembly for wear. Replace any worn parts.

**Installation**
Replacing the high pressure impeller requires precise setting to achieve the rated output. If no new parts are fitted, the original shims as fitted to the pump may be refitted and a check on clearances carried out as detailed below.

If new parts are fitted then follow this checking procedure –
Measure the depth of the high pressure counter bore in the pump body (Dimension A). Measure the thickness of the impeller (Dimension B). Required clearance C = (A-B)/2.

![Diagram of impeller clearance](image)

Place a 1.1mm shim pack made up of 60095 series shims onto the pump shaft and then fit the high pressure impeller. Place a clamping spacer over the pump shaft and securely tighten the impeller using the shaft retaining nut.
Measure the depth between the face of the impeller and the shoulder within the pump body (Dimension X). Adjust the previously fitted shim pack until Dimension X = C.

Remove the impeller to re-fit the mechanical seal and main key on the pump shaft – if they have been removed.

Replace the high pressure impeller on the pump shaft.

Available shims for setting the high pressure impeller -

<table>
<thead>
<tr>
<th>Pack Thickness mm</th>
<th>Pack Thickness inches</th>
<th>Part No. 60095/01</th>
<th>Part No. 60095/02</th>
<th>Part No. 60095/03</th>
<th>Part No. 60095/04</th>
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<td>0.030</td>
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<td></td>
<td></td>
<td>Qty 2</td>
</tr>
</tbody>
</table>
Before replacing the high pressure cover plate, ensure the auto drain ball bearing is moving freely in the high pressure drain valve. If the retaining plate does have to be removed ensure the two cap screws are secured with Loctite 243 to the threads.

Replace the high pressure cover plate against the pump body. Retain with 12 off cap screws and torque to 44 Nm. Apply Molykote P37 or similar under the head of the cap screws to prevent galling.

Place the O ring (57044) into the groove on the end of the pump shaft, and two O rings into the grooves in the transfer tube openings in the pump body ready to receive the low pressure manifold and high/low pressure filter housing.
6. Mechanical Seal Maintenance

With the high pressure impeller (P2) or low pressure impeller (P1) removed, the carbon seal can be examined for wear. If there has been excessive leakage past the carbon seal and through the drain hole in the pump head, examine the carbon seal.

If the face of the carbon seal is scored, this will have to be replaced along with the mating part, the silicon carbide ring located in the rear side of the HP impeller (P2) or low pressure impeller (P1).

**Removal**

The carbon seal can be removed from the carrier assembly by undoing the two screws securing the assembly to the pump body. Carefully remove the carbon seal.

The silicon carbide ring fitted in the high pressure impeller (P2) or low pressure impeller (P1) can be levered out by means of a small instrument screwdriver.

**Installation**

Ensure that the lapped faces are clean. Soiled faces must be cleaned with the appropriate degreasing cleaner and soft tissue.

Ensure that the pump body and high pressure impeller (P2) are clean and free from burrs and sharp edges.

Apply a suitable lubricant, e.g. soft soap solution (washing up liquid) to the O ring and carefully insert the seal head assembly into the pump body, lining up the cutouts in the seal head assembly with the threaded studs.

Fit a washer to each of the studs followed by the lock nuts. Tighten the locknutes half a turn at a time so the seal assembly is pulled squarely into the pump body. Ensure the lock nuts are fully secured.
Ensure the carbon face is clean and free from grease, if not use a degreasing cleaner and soft tissue. Apply clean water to the carbon face.

Fit the opposite seal mating ring assembly into the high pressure impeller bore using fitting tool 60275/08. Ensure the face of the mating ring is fitted squarely in the impeller housing within 0.1mm. Use a soft soap solution on seal cup to ease fitting.

Carefully fit the high pressure impeller onto the shaft and continue with pump build.
7. Volute Body
It is unlikely that the volute body will need to be removed during normal service. But if removal is required -

**Removal**
Remove the suction tube as in section 1.

The volute is mounted to the pump body by 12 off capscrews. The volute may be mounted on either standard rotation or reverse rotation pumps, and must be fitted the correct way for the rotation of the pump. The arrow cast on the volute will point in the direction of rotation.

**Installation**
Installation is a reversal of the removal process.

8. Low Pressure Manifold and High/Low Pressure Filter Housing (P2)
The low pressure manifold and the high/low pressure filter housing are attached to the top of the volute.

**Removal – High/Low pressure Filter Housing**
**P2 only** – first disconnect the high pressure pump discharge connections together with gauge, thermal relief valve and foam connections.

The high/low pressure filter housing is removed by undoing the six bolts securing the housing to the manifold below.
Below the high/low pressure filter housing, the low pressure manifold is secured to the volute by five bolts.

The filter in the high/low pressure housing is designed to prevent large particles from entering the high pressure stage. During pump operation in low pressure mode and at any time the pressure relief valve is open, a flow of water is directed across the filter helping to flush the exterior of the filter.

The change over valve is clamped between the filter housing and the bypass connector housing and is retained by four off bolts. Also constrained between the two housings is the cylindrical pressure relief valve and sealed on its outside diameter by two O rings. This valve contains a strong internal spring and must not be stripped down. It is reinstalled with its open end towards the filter housing. It is retained by an external circlip.

**Removal – Low pressure manifold**

**P1 only** The low pressure manifold, with filter housing, is attached to the top of the volute.

**Removal**

To remove this entire assembly disconnect the pressure gauge connections together with any foam connection options that may be fitted.
The low pressure manifold is secured to the volute by five bolts.

The filter on the low pressure manifold is designed to filter water that can be used for ancillary devices, e.g. gearbox cooling. The filter can be unscrewed and removed for cleaning in running water.

9. Priming Valve

Removal
The Prima pump uses a single priming valve attached to the rear of the pump body and connected to the piston primers by two short hose lengths.
1. Disconnect the priming pipes (A) from the priming valve.
2. The priming valve can be removed from the pump as a complete assembly by undoing the nuts on the two studs (B).
3. To dismantle the priming valve undo the two bolts (D) Remove the priming valve cover and discard the diaphragm (C).
4. Remove the screw (F) from the piston and separate the piston parts. Discard the seal (G).
5. Discard the ‘O’ ring (E).
6. Inspect all parts for signs of wear or damage, check that they are in good condition. Replace damaged parts if necessary.
7. Assemble parts in reverse order, making sure that a new ‘O’ ring (E), seal (G) and diaphragm (C) are installed. Tighten bolts (D) to complete the unit.
8. Install the priming valve assembly to the pump and secure with the nuts (B) and washers.
9. Connect the priming pipes (A) to the priming valve.

10. Primer System – Reciprocating Piston Primer

   **Removal / Maintenance**

   The reciprocating piston primer system features two identical pistons located each side of the pump shaft in the bearing housing. Both primers are connected by a flexible hose to the priming valve and through this to the suction tube.
End Cover

1. Disconnect the hose (A).
2. Remove four bolts (B) and washers. Remove the cover (C).
3. The rubber inlet (D p/n 65009) and outlet (E p/n 65008/002) valves must be changed.
4. To replace the valves, remove the screw (F). Remove the valves from the cover.
5. Clean the inside of the cover.
6. Install new valves in the cover. Apply Loctite 380e to the threads of the screw (F). Avoid placing Loctite on the underside of the screw head.
7. Secure the valves with the screw.
Primer Piston and Cylinder
These assemblies contain a number of seals that should be replaced.

The piston (G) and cylinder liner (H) assembly comprise two ‘O’ rings (J p/n 65134) and K p/n 61097) and a water seal (L p/n 65119).

1. Replace the two ‘O’ rings and water seal.
2. The water seal and O ring are best replaced using the Godiva special tool P/n 65239/65240 Piston Seal Assembly Tool. This helps to slide the water seal over the edge of the piston.
3. O ring 65134 is placed in the groove of the piston, this is a loose fit. Cone locator 65239 sits on top of the piston, using the piston ring edge as a location guide.
4. Water seal 65119 is placed over the locator at the narrow end. The water seal is placed with the O ring groove facing downwards, so the already fitted O ring can be accommodated. A small amount of water can be used as lubrication around the seal and locator surfaces.
5. Place the seal expander 65240 over the cone with the outer edge pressing down on the water seal.
6. Press down on the seal expander to force the water seal down towards the piston groove. A final push will force the water seal into the piston groove resting on top of the O ring already in the groove.
7. The seal expander and cone locator are now removed.
8. O ring K (p/n 61097) rests in a groove on the outside of the cylinder liner H (p/n 65006/002) and can hand fitted.
9. The cylinder body (M) assembly has an outer ‘O’ ring (N) and an inner seal arrangement (P) that comprises three ‘o’ rings, two shaft seals and a wiper carrier. These items are secured in the cylinder bore with a retaining disc (R) and circlip (S).

10. Replace O ring N (p/n 61097) on the cylinder M by pressing the O ring into the groove.

11. To replace the inner seal arrangement P a set of special tools are available to assist correct fitting.

12. First insert the seal (p/n 65159) with its O ring (p/n 65160). It is useful to use the piston shaft as a guidance tool inserted into the cylinder at the reverse side to the working position. Note how the O ring is pointing downwards when inserting in the cylinder.
13. Next - the second group of seals (p/n 52816, 65161, 65162) can be prepared for fitting. These three parts locate onto the wiper carrier (p/n 65158/001), a component that should not need replacing.

This picture shows how the seals assemble on the carrier.

Apply a smear of general purpose grease to the O ring A, to assist inserting the assembly into the cylinder.

14. When inserting the seal assembly into the cylinder a suitable press can be used to push the seal to the bottom of the cylinder, using the special tools and retaining disc (p/n 65157) described in section 16 – but without inserting the circlip

15. The seal assembly is retained in the cylinder body by a retaining disc and circlip.

16. To fully insert the seals and O rings use the special tools as indicated in this diagram -
16. Cylinder support tool (p/n 65466) is used to raise the cylinder a short height.

17. Insert the retaining disc (p/n 65167) to rest on top of the previously inserted seals and O ring assemblies.

17. Place the circlip fitting tool (p/n 65436) over the end of piston shaft and resting on the cylinder casting.

18. Insert the circlip (p/n 60914) into the circlip fitting tool.

19. Place the Circlip Drift tool inside the fitting tool to rest on the circlip. By applying pressure to the fitting tool, using a suitable manual press, the circlip will be pushed down until it fits into the groove inside the cylinder liner. This secures and retains the seal assemblies, as below.
20. The piston can now be removed from the cylinder and re-assembled to the cylinder in the correct orientation. The manual press can also be used to force the piston through the seal arrangement until the piston rests in the bottom of the cylinder.

The complete assembly can now be placed back onto the bearing housing with the piston shaft placed to connect with the pump shaft yoke inside.

If only one cylinder assembly is removed for repair, the cylinder in place will maintain the position of the yoke. If both cylinders are removed, use a guide rod inserted into the yoke to help connect the yoke and the piston shaft.

The cylinder/piston assembly will then slide over the guide rod and connect with the yoke.
The screw (p/n 65169) and bonded seal (p/n MS133/8) are inserted to secure the piston to the yoke. If the seal is being used again, apply Loctite 243 around the screw head to secure the bolt. Tighten to a torque of 20Nm.

21. Install the priming valve cover (C) and secure with the four screws (B) and washers.

22. Connect the hose (A) to the priming valve.

11. Pump Head
The main reason for removing the pump head is to gain access to the bearing housing. But the front oil seal mounted on the bearing housing can be accessed without removing the pump head.

   Removal
Remove the low pressure manifold, volute body, impellers, cover plate and mechanical seal assembly, as detailed in the previous sections.

   Unscrew the six nuts and washers retaining the pump head to the bearing housing. Using a hide faced hammer, tap around the pump head until it is separated from the bearing housing.

   Installation
Installation is a reversal of the removal process.
12. Front End Oil Seal

**Removal**
To access the front end oil seal, remove the low pressure impeller, cover plate, high pressure impeller and mechanical seal and other relevant sections. Remove the seal housing by undoing the four cap screws.

**Installation**
When re-fitting, insert a new oil seal into the seal housing. Secure the seal housing with the four cap screws.

12. Rear Oil Seal

**Removal**
For access to the rear end shaft and oil seal it is necessary to disconnect the drive shaft from the pump drive flange and drain oil from the bearing housing.

**Installation**
When re-fitting, insert a new oil seal into the seal housing. Secure the seal housing with the four cap screws.

13. Bearing Housing

The following section will only be necessary if worn or damaged bearings or a faulty clutch are suspected.

**Removal**
Remove from the bearing housing all the assemblies mentioned in previous sections, leaving the bearing housing as a separate module. Drain the bearing housing of all oil.

Remove the front and rear oil seal housings. Lightly tap the shaft assembly with a hammer, forwards from the rear (drive flange end), the entire assembly will move forward and free of the bearing housing.

The shaft assembly can be disassembled by reversing the assembly process described below.

To remove the components on the shaft it is necessary to remove the bearing inner race (at the drive flange end). This can be removed by using a special extractor tool that grips the flinger assembly behind the bearing inner race.
The shaft assembly is set upright on a work bench. By turning the extractor tool the flinger assembly is moved up the shaft and the bearing inner race is pulled away from the shaft.

Note: the majority of the components will slide off the shaft (flinger assembly, shims, balance weight/sliders/yoke/eccentric assembly) but the clutch rotor/stator and two shaft bearings require careful separation. To remove the clutch rotor from the stator it may be necessary to lever it away from the stator with a suitable tool.

The clutch stator can now be forced off the shaft using a suitable press tool or tapping with a soft headed hammer around the outer edge.
The two bearings left on the shaft will require a press tool to force the shaft away from the bearings. Support the bearings underneath and force the shaft down and away from the bearings.

This action will complete the stripping down of the shaft assembly.

**Rebuild / Installation**

A new shaft assembly is constructed by following these procedures –

Press two bearings (p/n 60002) onto the shaft. Apply tallow to shaft to ease assembly. The bearings should be fitted with the large inner race facing outwards from the bearing pair.

Place the clutch stator on a suitable support and lower the shaft and bearing assembly into it.
Fit the lip seal (p/n 60012) into the seal housing (p/n 65019/001). Place the O ring (p/n 65171) on the seal housing.

Secure the seal housing to the clutch stator with 6 off MS164/20 screws. Apply Loctite 243 to the threads and torque to 20kN.

Fit the 53526 ‘O’ ring onto the outside of 65017/004 clutch stator.
Place a 51355 ‘O’ ring into the 60141 seal wear ring. Smear grease between the lips of the lip seal and insert the wear ring onto the shaft and into the lip seal.

Place the shaft assembly in a locking device so that the drive end of the shaft is uppermost.

Place the MS79/44 key into the shaft.

Place the clutch stator over the shaft, locating on the previously fitted key.

Place the clutch rotor onto the shaft to rest on top of the previously installed stator.
There are two types of clutch rotor fixing onto the shaft –
1. Early models - with Loctite 638
2. Later models - press fit (no Loctite)

1. Using Loctite 638
Apply Loctite 638 sparingly to the outer surface of the shaft, keep the Loctite away from the bearing below.

Also apply Loctite 638 sparingly to the inner surface of the rotor.

Place the rotor onto the shaft, aligning correctly with the shaft key, and press it down until it rests firmly on the stator below. Allow Loctite to set.

2. Later model clutch units are held in position by pressing onto the shaft. Loctite is not required.
Turn the assembly over 180° and into a suitable press plate hole.

Press down on the shaft (low force of 20kN) until the stator is fully home.

Using a suitable press tool insert the 56949/008 DU bush into the 65021/005 eccentric drive. The bush should be pushed through the balance weight so it is slightly below or flush with the rear face.
Secure the clutch friction plate (part of 65017/004) to the eccentric drive using the (3) screws and washers supplied by clutch manufacturer. Apply Loctite 243 to the threads, Tighten to a torque of 28 Nm.

Then measure the distance between the surface of the friction plate and the lower surface of the eccentric drive. The measurement will be approximately 4.0 – 4.1mm. Note this measurement.

A gap of 0.24/0.40mm is required between the clutch rotor and friction plate. Selection of an appropriate shim from the table at the end of this section will give the required gap. E.g. gap is 4.1mm, add .3mm for the gap, therefore a shim of 4.4mm is required. A shim of 4.4mm is green coded. See table on page 42.

The previously assembled eccentric drive and friction plate can now be lowered over the shaft onto the clutch rotor face. Check the gap between the friction plate and rotor, it should be 0.3mm.

Next proceed to add the slider bush, yoke and balance weight components.
Place the first slider bush onto the shaft with the flat surface downwards.

Place the yoke over the slider bush with the straight sides in line.

Place the second slider bush over the yoke with the straight sides in line.

Place the balance weight over the second slider bush and secure it to the eccentric drive below using two socket head screws.
Now measure the distance between the top surface of the balance weight and the shoulder on the shaft just above. Record this measurement. Deduct 0.1mm from this measurement to give the shim pack size required. E.g Measurement is 8.4mm, minus 0.1mm, equals a shim pack of 8.3mm. See table on page 42.

Place shims on the shaft equivalent to 8.3mm. The table on page 42 provides the shim options. Place the flinger assembly onto the shims and check the gap between the top shim and the flinger, gap required is 0.05-0.15mm.

Using a suitable power supply (12V or 24V DC as appropriate), power up the electromagnetic clutch to confirm activation, and ensure that the clutch assembly can’t be rotated on the shaft. This confirms the presence of the MS79/44 key and clutch operation.
The shaft assembly is now ready to be loaded into the bearing housing.

Ensure that the yoke is positioned on the pump shaft assembly at mid stroke position. This eases assembly of the shaft assembly into the bearing housing.

Load the shaft assembly into the bearing housing ensuring that the wire for the electromagnetic clutch aligns with the slot in the face of the bearing housing.

Place the 60007 rear bearing outer race into the back end of the bearing housing to help support the shaft.

Secure the 65019/001 seal housing to the 65000/300 bearing housing using (6) MS164/20 cap screws, apply Loctite 243 to the threads torque to 20 Nm.

Fit the 53384/01 ‘O-ring onto the shaft underneath the rear oil seal wearing 60008.

Fit the 50682/02 oil seal into the 65094 seal housing.

Put the previously assembled 65094 seal housing on to the rear of the bearing housing and loosely locate with (4) MS166/25 screws.

Fit the 60008 rear oil sealing wearing to centralise the rear seal housing and tighten the (4) MS166/25 screws.
Bearing Housing - Shim Details
Two sections on the shaft require shims.

1. Select shim spacer to give 0.24 / 0.40mm air gap on clutch – between friction plate and clutch rotor.

2. Select shim spacer/s to give 0.05/0.15mm gap between balance weight and flinger assembly to give minimum clearance for free rotation.

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14. Gearbox (Optional)

The gearbox incorporates a cooling system, which utilises cold water diverted from the main pump body to flow around the gearbox outer housing and then return to the pump. The water is always flowing around the gearbox whenever the pump is operating and pumping water. This section describes the gearbox when it is in a vertical position in relation to the pump body, other positions are possible.

The gearbox incorporates an oil filling point, an oil level check point and an oil drain point for the routine maintenance of the unit. These points are duplicated on both sides of the gearbox to allow for different installation arrangements. There is also an oil drain point at the front of the mounting platform, if a platform is fitted.

The oil capacity of the gearbox is approximately 1.2 litres. The photograph below shows the left side of the gearbox as viewed from the PTO end.

The gearbox must be filled with approximately 1.2 litres of the recommended oil before any operation commences. The recommended oil is BP Energol GR XP 68. If this is not available, the following may be used – Elf Reductelf SP 68, Shell Omala 68 or equivalent.

Undo the oil filling and level check plugs with a suitable spanner. Ensure no dust or debris enters the gearbox when the plug is removed. Using a funnel, pour the oil into the gearbox housing until it overflows from the check level plug. Before replacing the plugs, apply Loctite 572 to the plug threads to ensure a good seal, replace and hand tighten with a suitable spanner.

The oil level can be checked by removing one of the oil level check point plugs, located on both sides of the gearbox, see the photograph above. The oil should be just up to the lower rim of the hole, which indicates the capacity is approximately 1.2 litres. This is the only accurate method of checking the oil level as it allows for different size gear ratios.
Before replacing the plug, apply Loctite 572 to the plug thread to ensure a good seal, replace and hand tighten with a suitable spanner.

The gearbox oil should be changed completely every 250 running hours or annually, whichever is sooner.

These diagrams show the oil fill points, oil level check points and oil drain points for the gearbox in the three different positions available – down, left or right.

The gearbox cooling system requires no regular maintenance. If the pump needs to be drained for any reason, there is a drain located at the lowest point in the cooling system. To drain the system, either remove the plug, or, if connected to a remote drain, open the remote drain cock. Allow all water to completely drain away before replacing the plug or closing the remote drain cock.

Before replacing the drain plug, apply Loctite 572 to the plug thread to ensure a good seal, replace and hand tighten with a suitable spanner.
15. Water Ring Primer (Optional)

The Water Ring Primer is available as an alternative to the Piston Primer system. It is mounted above the bearing housing and driven by a fibre wheel (47) in contact with a pulley at the end of the main pump shaft. Operation of the Water Ring Primer is fully automatic, when the pump is started the primer is driven by the pulley wheel turning the fibre wheel, air is evacuated from the pump allowing water to enter and build water pressure inside the volute. The water pressure inside the pump is then used, via the redundant piston primer housing, to act on a lever which pivots, and through a second lever (61), lifts the Water Ring Primer clear of the drive pulley on the pump shaft. When the primer disengages from the pulley it stops operating, if the pump pressure falls e.g. when the pump is turned off, the primer fibre wheel will re-engage with the pulley ready for priming operation when the pump is started again.

To Remove

To remove the entire Water Ring Primer unit, slacken the hose clip (19) retaining the 3/4inch hose to the top of the primer. Disconnect the hose and secure the hose end away from the primer. Disconnect and remove the primer return spring (62) from the lower part of the primer. If connected, remove the air outlet connection from the top and the water inlet connection from the bottom of the primer. Slacken the two screws (79, 80) securing the primer to the hinge pin (69). Carefully ease the primer unit off the primer hinge pin.

Maintenance

To dismantle the primer for internal inspection, remove the 10 bolts (38) securing the primer bearing housing (54) to the primer body (1). Remove the primer bearing housing complete with shaft, bearings, impeller and pulley. Examine the inner diameter of the impeller (12) and the corresponding surface of the suction and delivery cover (6) for excessive scoring, renewing these parts if necessary.

To fit a new suction and delivery cover (6), remove the self-locking screws (7) which secure the cover plate (5) to the suction and delivery cover (6). Fit this cover plate to the new part, noting that no gasket is used but jointing compound should be used on the contacting faces.

To fit a new impeller (12), undo the impeller retaining screw (10) and pull off the impeller.

Note: if the impeller binds on the shaft it will be necessary to remove the primer shaft as follows -

At the pulley end of the shaft, knock back the tabwasher (49) and remove the nut (50) securing the pulley to the shaft. Remove the pulley and extract the woodruff key (41) and the circlip (46). Tap out the shaft (40) from the impeller end. The shaft will bring the bearings (42, 45) with it and these can now be replaced if necessary. The shaft seal (13) will remain in position and if this requires renewing it should be drifted out, together with its backing washer (14), towards the impeller end.
Our policy is one of continuous development. We therefore reserve the right to amend specifications without notice or obligation.
When fitting a new seal ensure that the lip on the backing washer and the open end of the seal face is towards the impeller.

To fit a new friction drive pulley (47), remove the pulley from the shaft as detailed above, undo the four nuts, bolts and washers (51, 52, 53) securing the pulley to the centre piece. Fit the new pulley. Refitting of the pulley assembly is a reversal of the dismantling instructions. Ensure that a new tab washer (49) is always used on re-assembly.

To examine the non-return valve on top of the primer, undo the four bolts and washers retaining the priming valve inlet (20) to the valve body (26) and cover (30). Examine the seals (23, 25), spring (27) and diaphragm (30) for wear, if necessary replace these parts.

To Refit

When refitting the water ring primer, rotate the primer hinge pin from its original position so that the two screws (80) will bear on a different part of the shaft. Move the whole primer forwards or backwards until both sides of the primer fibre wheel bear equally on the sides of the driving pulley on the pump shaft. Tighten the screws and the associated locknuts. Reconnect the hoses to the relevant points and refit the primer return spring.

When the primer is in position it is important to set a 3mm gap between the bottom of the lift-off pad (58) attached to the primer and the lift-off rod which is used to lift the primer away from the drive pulley. The gap is to make allowances for a new fibre drive wheel to “bed-in” through initial wear, but still maintain sufficient distance to allow the lift-off mechanism to work correctly. The lift-off pad can be turned to move it up or down as required.

When water ring primer is in engaged position (fibre pulley is resting in drive flange) there must be 3mm gap between lift-off pad on primer and cylinder piston below.
16. Pump Tests

**Vacuum Test**
Place the blanking cap(s) in position on the inlet(s) of the pump and close the delivery valves. Run the pump at 1300-1500 rpm and observe the vacuum/compound needle. When a vacuum of 0.81 bar is obtained, stop the pump. This vacuum should be maintained for at least 15 seconds or drop no more than 0.07 bar in a minute.

If the pump will not hold the vacuum with the blanking caps in position, a leak is present in the pump, and the pressure test detailed below must be carried out to trace it.

Should the pump not reach a vacuum of 0.81 bar but will hold a lower pressure, a fault in the priming system is indicated.

**Pressure Test**
This test is to be carried out if the pump will not hold a vacuum with blanking cap(s) in position, and is intended to trace the leaks responsible for the loss of vacuum.
Apply a water pressure of 3.5 - 7.0 bar to the pump and check for leaks. The area causing the leak should be visible, and can be dismantled and rectified.
Check each primer drain hole for water leakage. If leakage is found, replace the primer seals and O rings as described in the Maintenance Manual Procedures.
If the pump will not achieve 0.81 bar vacuum, and will not hold what it does achieve, there is a leak, and possibly also a fault, in the priming system.

If no leaks are apparent, the leakage must lie between the priming valve and the primer. Points to be checked are:
The inlet seal in the primer end cap
The priming valve diaphragm

**Water Ring Primer (optional priming system)**
If a water ring primer is fitted carry out the same vacuum test as described above but run the pump at 2300 rpm to achieve a vacuum.
Should the pump not reach a vacuum of 0.78 bar but will hold a lower pressure, a fault in the priming system is indicated. Check as follows –

See that the primer drive (fibre pulley) is engaged with the pump pulley and runs without slipping
Check that the primer is filled with water
Check the primer seal drain hole for leakage. If leakage is found, fit a new seal to the primer.

If the pump will not hold a vacuum apply the pressure test (as above) and check for leaks. Defective joints and seals must be replaced. If no leaks are apparent, the leakage must be in the line from form the priming valve to the
water ring primer, points to be checked are the priming valve sealing washer, the water ring primer non-return valve and the rubber hose and clip.

**Pressure Relief Valve (PRV) and Thermal Relief Valve (TRV) Test**

With the pump primed, and HP operation selected, close all discharges. Run the pump at approximately 2800rpm. The HP stage pressure should not exceed 50bar if the PRV is working satisfactorily.

Continue running the pump, to permit it to heat up. The TRV should open and discharge water when the pump temperature is about 48°C (for a Standard 42°C TRV, for a 74°C it will open about 80°) . Observe the discharge, if it open to atmosphere, or feel the discharge pipe become warm if it returns to the vehicle tank. Open a pump discharge valve to permit cool water to enter the pump. The flow from the TRV should now cease.

If the TRV is not operating as it should follow this procedure –

**Thermal Relief Valve Maintenance**

The Thermal Relief Valve (TRV) fitted usually requires minimum maintenance attention, but should the valve be failing to open at the specified temperature or remaining open after the water temperature has lowered, follow these instructions to clean the valve.

1. Location. The TRV is located on the top surface of the discharge manifold –

2. Remove the TRV with a suitable adjustable spanner to grip the main TRV body.
3. Remove the internal parts from the outer housing. Secure the TRV vertically in a vice. With an adjustable spanner undo the top part of the TRV.

4. The TRV internal parts will now slide out of the housing.

5. The thermal actuator (p/n 57053) can now be pushed out of the main housing from the cone end for inspection.
6. All the main internal parts can now be inspected for wear and/or the build-up of mineral deposits. If there is significant deposit build-up, this can be removed by cleaning the outer housing and internal parts in a proprietary lime scale remover.

Faulty operation could be due to the sleeve (p/n 60808) sticking in a closed or open position on the outlet adaptor (p/n 60807). Also, if the O rings (p/n 58107) are worn or damaged there will be an inadequate seal allowing water to discharge unnecessarily.

7. Re-assembly is a reversal of the dismantling process. If new O rings (p/n 58107) are to be fitted, roll the first O ring into the lower groove on the outlet adaptor, then roll the second O ring over the first O ring in to the second groove higher up the adaptor. Apply water resistant grease to the new O rings and the grooves to facilitate fitting.

NB: Service Parts Required – Seal, UFP2303/10, 1 off. O ring, 58107, 2 off.
17. Delivery Valves

**Ball Valve Type**

The ball valve should not be dismantled unless it is functioning unsatisfactorily. There are two possible faults and the method of correcting them is as follows:

1. *Water leaking round the ball*
   This is due to the O Ring not pressing tightly enough against the ball. Remove the bolts and spring washers and separate the coupling end tube from the ball valve housing. Turn the O Ring over so that it presents a new face to the Ball Valve, or fit a new O Ring. Rub a little Molybdenum Disulphide Powder into the surface of the ball where it contacts the O Ring. Leave the original washers or the same thickness of new washers, between the faces of the coupling end tube and the valve housing.

   In the case of old valves which have seen extremely arduous service, it may be necessary to fit a new ball, pivot or valve stem. To do this, remove the screw securing the valve stem cap to the ball valve housing and lift off the handle assembly.

   Remove the nut on the underside of the valve housing and push the ball pivot pin towards the centre of the ball. Remove the spring and take out the two half-rings securing the valve stem. Push out the valve stem and withdraw the ball. Fit the new part required and reassemble, reversing the above procedure. Use a right angled screwdriver to hold the pivot pin when tightening the pivot pin nut. Ensure that the handle is fitted in the correct position. Fit the stem O Ring and ensure that the two half rings are correctly positioned.

2. *Water leaking up the valve stem*
   If this occurs, remove the handle and stem as in "1" above and fit a new valve stem O Ring, rubbing a little molybdenum Disulphide Powder into the bore of the valve stem cap.
© Godiva Ltd. Our policy is one of continuous development. We therefore reserve the right to amend specifications without notice or obligation.
Screw-down Type

Godiva Part Number 56544/01 Light Alloy and 56544/05 Gunmetal (Instantaneous Connector Versions)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Body</td>
</tr>
<tr>
<td>2</td>
<td>Inlet</td>
</tr>
<tr>
<td>3</td>
<td>Outlet</td>
</tr>
<tr>
<td>4</td>
<td>Pivot Pin</td>
</tr>
<tr>
<td>5</td>
<td>O Ring</td>
</tr>
<tr>
<td>6</td>
<td>Circlip</td>
</tr>
<tr>
<td>7</td>
<td>Screw Down Handle</td>
</tr>
<tr>
<td>8</td>
<td>Domed Nut</td>
</tr>
<tr>
<td>9</td>
<td>Spring Washer</td>
</tr>
<tr>
<td>10</td>
<td>O Ring</td>
</tr>
<tr>
<td>11</td>
<td>Screw Down Spindle</td>
</tr>
<tr>
<td>12</td>
<td>Roll Pin</td>
</tr>
<tr>
<td>13</td>
<td>Non Return Flap</td>
</tr>
<tr>
<td>14</td>
<td>Non Return Flap Washer</td>
</tr>
<tr>
<td>15</td>
<td>Retaining Washer</td>
</tr>
<tr>
<td>16</td>
<td>Washer Insert</td>
</tr>
<tr>
<td>17</td>
<td>Instantaneous washer</td>
</tr>
<tr>
<td>18</td>
<td>Twist Release Knob</td>
</tr>
<tr>
<td>19</td>
<td>Release Cam</td>
</tr>
<tr>
<td>20</td>
<td>Release Spring</td>
</tr>
<tr>
<td>21</td>
<td>Release Plunger</td>
</tr>
<tr>
<td>22</td>
<td>Knob Closure Disc</td>
</tr>
<tr>
<td>23</td>
<td>Nyloc Nut</td>
</tr>
<tr>
<td>24</td>
<td>O Ring</td>
</tr>
<tr>
<td>25</td>
<td>Countersunk Screw</td>
</tr>
<tr>
<td>26</td>
<td>Plain Washer</td>
</tr>
<tr>
<td>27</td>
<td>Moly Grease</td>
</tr>
</tbody>
</table>

Twice Yearly Servicing Procedure, Full Assembly:
A. Check that Screw Down Spindle "11" rotates freely. Regrease with B.F.L. Moly Grease.
B. Check that Non-Return Flap "13" is free to articulate and that Washer "14" is undamaged. Regrease Pivot Pin "4".
C. Check O Rings "10", "5" and "24". Replace where necessary.
Continental Delivery Valves

1. Body, incl. Nipple
2. Spindle
3. Guide Sleeve
4. O-Ring
5. X-Ring
6. Guide Axle Complete
7. Tap Washer
8. Valve Plate Complete
9. Tap Washer
10. Compression Spring
11. Release Knob Assembly
12. Handwheel
13. Washer
14. Cap Nut
Function

The valve opens and closes by turning the handwheel anti-clockwise and clockwise respectively and has an integrated, automatic non-return device. The handwheel should be opened until the spindle travels against the stop and then twisted half a turn in the opposite direction.

When the pump is temporarily stopped, the non-return valve keeps the delivery hose filled and prevents the water in the hoses from draining via the pump inlet.

To drain filled delivery hoses, especially when hoses are connected to a dry riser at buildings, pull Release Knob (11). The handwheel may now be turned further in the opening direction and water is allowed to drain via the pump.

Maintenance

The spindle should be greased (lubricated) on a quarterly basis, using a proprietary waterproof grease such as Shell Retinex A or equivalent.

Caution

When opening the valve do not force the handwheel against its stop. NB. Max. working pressure is 16bar.
**Instantaneous Connector Servicing Procedure:**

<table>
<thead>
<tr>
<th>Number</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knob Closure Disc</td>
</tr>
<tr>
<td>2</td>
<td>Twist Release Knob</td>
</tr>
<tr>
<td>3</td>
<td>Twist Release Cam</td>
</tr>
<tr>
<td>4</td>
<td>Twist Release Bolt</td>
</tr>
<tr>
<td>5</td>
<td>2 1/2&quot; Inst Seal</td>
</tr>
<tr>
<td>6</td>
<td>2 1/2&quot; Twist Release Body</td>
</tr>
<tr>
<td>7</td>
<td>Nut</td>
</tr>
<tr>
<td>8</td>
<td>Coil Spring</td>
</tr>
<tr>
<td>9</td>
<td>Self-Lock Pin</td>
</tr>
</tbody>
</table>

**Inspection**
A. Flush out equipment with clean water after use
B. Inspect equipment monthly and follow maintenance procedures at least once every year
C. Inspect release mechanism for free movement
D. Inspect the rubber seal

**Maintenance**
If signs of wear or breakdown of the mechanism occur, strip down and replace parts as follows:
1. Remove Knob Closure Disc "1". If the disc is of plastic type, insert pointed tool into hole in disc and prise out. If the disc is metal, use an Ajax ladder key locating in the 2 holes in the disc and unscrew anti-clockwise.
2. Unscrew nut "7" using a socket spanner and Knob "2" can then be removed.
3. Withdraw Bolt "4" and Spring "8" from the inside of the female instantaneous body.
4. Check for signs of dirt, wear or corrosion of the Spring, clean the parts and reassemble. If wear has occurred replace the affected parts with spares.
5. Reassemble the mechanism by reversing the foregoing instructions using a lubricating grease on the Spring and the Bolt.
6. When tightening Nut "7" the tension on the spring is correct when the leading edge of the curved face of Bolt "4" is level with the bolt hole edge as shown in Dia. B above.
7. Check Seal "5" for dirt, cuts or damage to seal lip after cleaning. If damaged, replace with spare seal.

**Special Notes**
- The recommended lubricant for the bolt and spring is Molybdenum Disulphide Grease (Lithium Grease)
- Always use a new locknut when reassembling the mechanism.
17. Tightening Torques

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS164/20</td>
<td>65019/001 Seal Housing to Clutch Stator</td>
<td>20 15</td>
</tr>
<tr>
<td>NPN</td>
<td>65017/004 Friction plate to eccentric drive. (Clutch manufacturers supply)</td>
<td>28 21</td>
</tr>
<tr>
<td>MS166/25</td>
<td>65094 Seal housing to bearing housing</td>
<td>20 15</td>
</tr>
<tr>
<td>MS165/35</td>
<td>65040 Cover plate to pump head</td>
<td>44 32</td>
</tr>
<tr>
<td>65405</td>
<td>65004 Rear wear ring to cover plate</td>
<td>10  7.5</td>
</tr>
<tr>
<td>MS164/25</td>
<td>65078 Front wear ring to suction tube</td>
<td>12  9</td>
</tr>
<tr>
<td>65181</td>
<td>Impeller retaining nut</td>
<td>300 225</td>
</tr>
<tr>
<td>MS07/35</td>
<td>Drive flange retaining screw</td>
<td>103 76</td>
</tr>
<tr>
<td>65169</td>
<td>Screw retaining piston primer to yoke in bearing housing</td>
<td>20  15</td>
</tr>
</tbody>
</table>

18. Special Tools

For Piston Primer Equipped Pumps

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>60275/03</td>
<td>Clamping spacer</td>
</tr>
<tr>
<td>65486</td>
<td>Mechanical seal extraction tool</td>
</tr>
<tr>
<td>65239</td>
<td>Piston seal assembly tool – cone locator</td>
</tr>
<tr>
<td>65240</td>
<td>Piston seal assembly tool – seal expander</td>
</tr>
<tr>
<td>65436</td>
<td>Circlip fitting tool – piston primer seal replacement</td>
</tr>
<tr>
<td>65466</td>
<td>Cylinder support tool – piston primer seal replacement</td>
</tr>
<tr>
<td>65467</td>
<td>Circlip drift - piston primer seal replacement</td>
</tr>
</tbody>
</table>

For Water Ring Primer Pumps

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
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<tbody>
<tr>
<td>60275/03</td>
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