GODIVA Prima

Workshop Manual

P1 Single Pressure Model
P2 Twin Pressure Model

Prima P1

Prima P2

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GP/290
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AMENDMENT RECORD

Model: Prima, single and twin pressure models

Mod No.	Date	Page/s	Amendment	New Issue No.
1	June 2011	All	New publication	
2	March 2012	44	Gearbox oil capacity revised to 1.2 litres	2
3	March 2012	48	Water ring primer – 3mm lift-off gap	2
4	May 2013	60	Adhesives and solvents list added	3
5	March 2014	19	Modify information on seal assembly installation	4
6	November 2015	55-57	More detail on valve maintenance	5
7	July 2016	14	Improved impeller nut tightening process	6
8	July 2016	54	SPRV maintenance detail	6
9	May 2019	43	Specify a tightening torque of 3.0Nm when fitting the 60015/001 sender to the bearing housing.	7
10	July 2019	9, 60-61	Delivery valve maintenance - more detail	7
11	Jan 2023	11,15,16 67,68	Lowering the Recommended Torque for the front and rear wear ring to 8Nm	8

CONTENTS

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SAFETY

Please read this manual before operating the machinery.
Safety notices -

= non-compliance could affect safety

IMPORTANT = 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

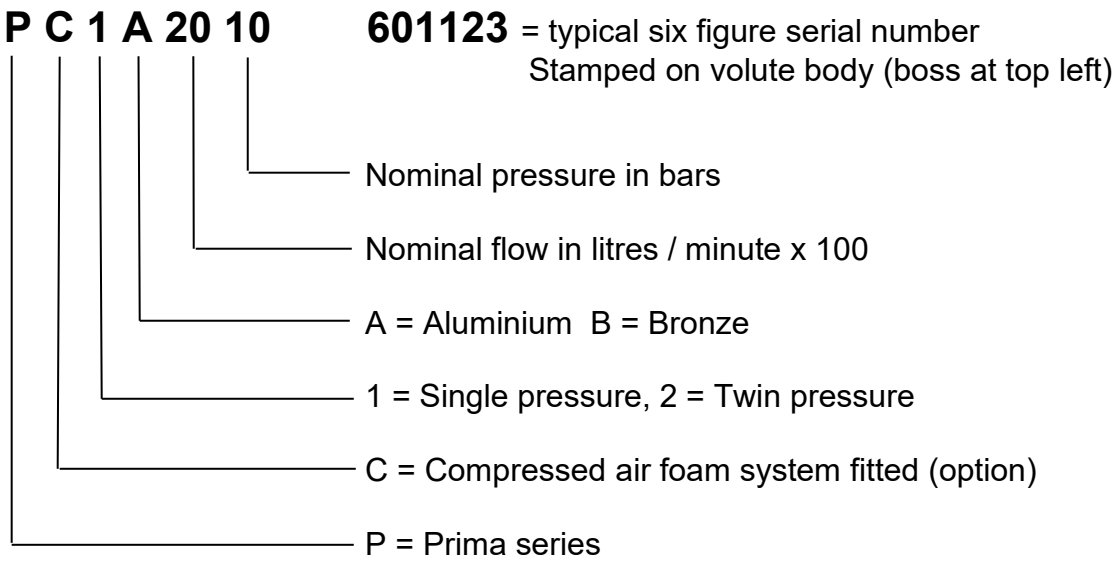
For all issues relating to warranty claims please contact Godiva Ltd.. Please be prepared to quote the six figure pump serial number located on the pump volute.

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

Publication	Part No
Installation and Operation Manual	GP/287
P1 Spare Parts Manual	GP/281
P2 Spare Parts Manual	GP/258

PUMP SPECIFICATION NUMBERING



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.

Date	Hours Run	Inspection / Fault	Parts Used	Reason For Renewal	Initial

MAINTENANCE SCHEDULE

Maintenance intervals and action required

Interval	Action required	Items Required
After each use –	Flush pump through with clean water	Supply of clean water
Delivery valves (applies primarily to UK screw down type)	Check the valves open and close freely. Do not overtighten in either direction.	If the valve is stiff, report to workshop for repair.
Delivery valve	Check for leaks around the spindle	If valve is leaking, report to workshop for repair.
Delivery valve	Check the twist release mechanism operates freely and the seal inside the outlet is in place	If the twist release mechanism is stiff, report to workshop for repair.
Delivery valve	Check visually for any damage	Report to workshop for repair
Every 3 months -		
Check oil level in bearing housing	Remove filler/dipstick on bearing housing to check level	10w/40 or 15w/40 multigrade engine oil
Vacuum test	See separate instructions on page 32	
Pressure test – for tracing location of vacuum leak	See separate instructions on page 32	Access to pressurised water source
P2 - High pressure filter	Remove the filter from the housing and flush with clean water	
Delivery valve	Examine non-return flap rubber and pivot pin, spindle	Report to workshop for repair
Every 12 months -		
Change oil in bearing housing	Drain oil from bearing housing and refill with new oil	1 litre SAE10w/40 or 15w/40 multigrade engine oil
Change oil in gearbox -if fitted	Drain oil from gearbox and refill with new oil	1.2 litres BP Energol GR XP 68 or similar
Every 2 years -		
Piston primer seals in cover and body	See Maintenance Manual procedures	Repair kits Special tools (contact Godiva)
Thermal Relief Valve Test	See separate instructions on page 33	
Delivery valve	Examine valve spindle, re-grease or replace. Examine twist release mechanism	Report to workshop for repair

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

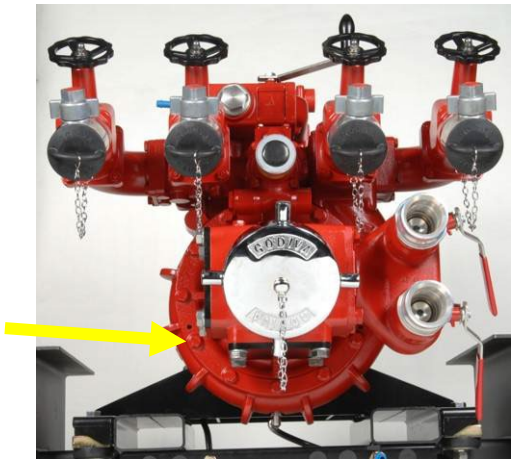
On completion of work:

- Carry out vacuum test.
- Complete the maintenance log.

1. Suction tube and front wearing ring

Removal

1.1 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.

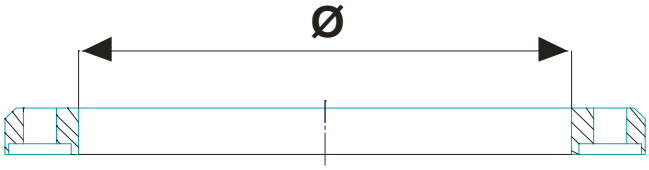


To remove and replace the front wearing ring in the locating bore in the suction cover plate, undo the 4 x cap screws and washers

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.

Pump	Internal Ø Limit - mm
P1_2010 / P2_3010	140.16 / 140.10
P1_4010	170.685 / 170.632
P1_6010	187.07 / 187.00

Pump	Internal Ø Limit - mm
P2_2010 / P2_3010	140.16 / 140.10
P2_4010	170.685 / 170.632
P2_6010	187.07 / 187.00

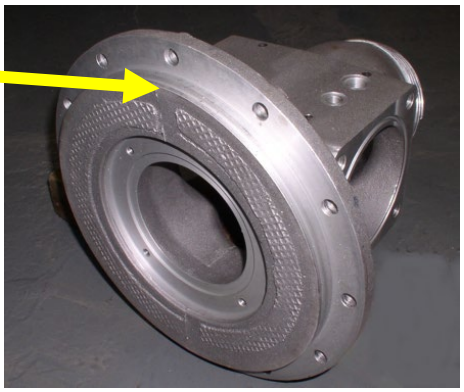


Installation

Installation is the reverse of removal noting:
When replacing the front wear ring apply Loctite 243 to screw threads and torque to 8 Nm.

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

O ring here



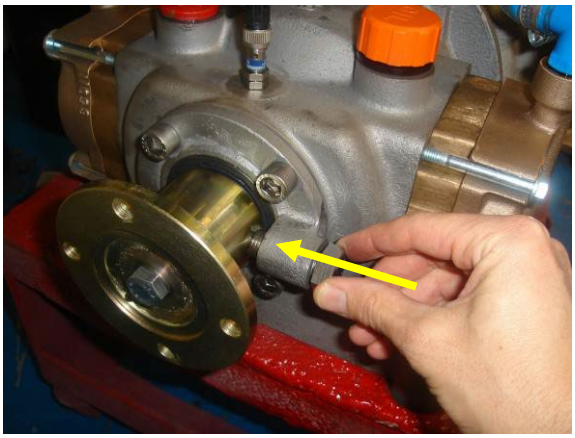
Re-connect the collecting head, vacuum gauge tubing and tank to pump line (or blanking plates for tank to pump apertures if fitted).

2. Low Pressure Impeller

Removal

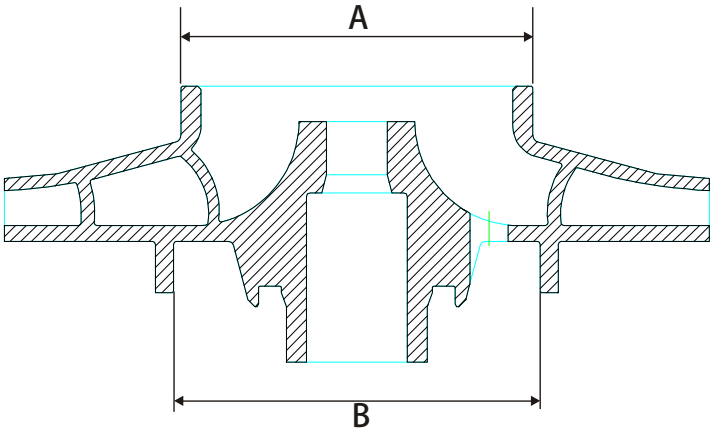
To remove and inspect the low pressure impeller, remove the suction tube and associated parts as described in section 1. This gives direct access to the low pressure impeller leaving the volute body in-situ.

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.



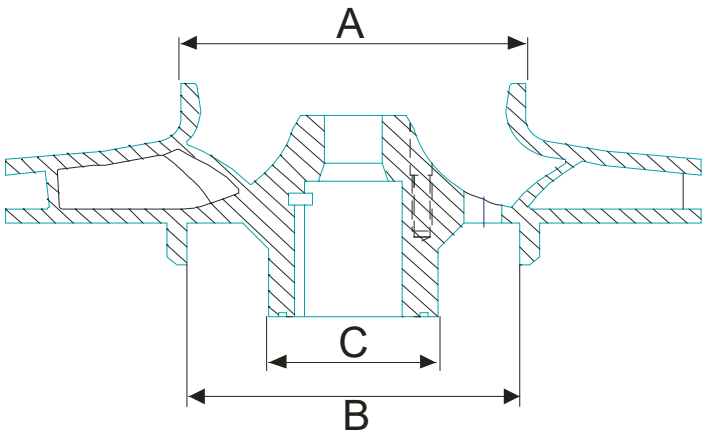
Check the wearing diameter on the impeller in several places. If the diameter is less than stated in the table below, a new impeller should be fitted.

P1 Model



Pump	Front Diameter A mm	Rear Diameter B mm
P1_2010 / 3010	139.3 mm	146.1
P1_4010	169.5 mm	170.8
P1_6010	188.6mm	184.2

P2 Model



Pump	Front Diameter A mm	Rear Diameter B mm	Hub Diameter C mm
P2_2010 / 3010	139.70 / 139.65	134.93 / 134.88	68.05 / 68.00
P2_4010	170.06 / 170.00	170.47 / 170.40	68.05 / 68.00
P2_6010	186.25 / 186.20	188.07 / 188.00	68.05 / 68.00

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.
Place a new set of Nord-Lock washer on to the shaft and up against the impeller.
Note: the Nord-Lock washer comprises of two mating parts, ensure the two parts are not separated and kept together as one washer.
Apply Anti-Seize grease to the threaded section of the shaft and to the face of the nut bearing against the Nord-Lock washer.
Suitable Anti-Seize grease products are -
Loctite Anti-Seize 8023 (Loctite catalogue no. 37625)
Copaslip Anti-Seize (made by Molyslip Atlantic Ltd.) or a similar product.

Tighten the locking nut to a torque of 300Nm.
Next check the fitting is correct - undo the nut slowly, you should hear a sharp click sound, as the nut becomes loose.
If you hear a click this indicates that the nut and Nord-Lock washer are functioning correctly. Re-tighten the nut to 300 Nm.

3. Rear Wear Ring

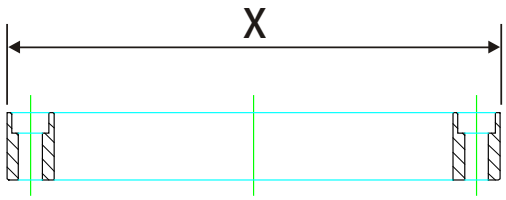
P1 Model

Removal

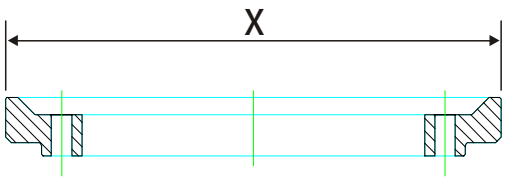
The rear wear ring is accessible when the low pressure impeller is removed.

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 –



P1_2010/3010



P1_4010/6010

Pump	Ø X
P1_2010/3010	144.9mm
P1_4010	169.5mm
P1_6010	183mm

Installation

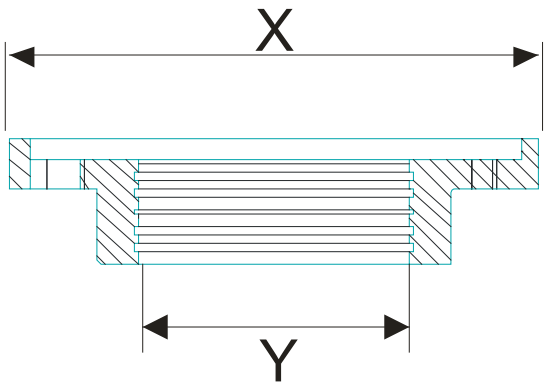
When relocating the rear wear ring into the pump head, ensure the priming port in the ring is located at the top. When replacing the rear wear ring apply Loctite 243 to screw threads and torque to 8 Nm.

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 –



Pump	Ø X	Ø Y
P2_2010/3010	134.440 / 134.400	68.500 / 68.450
P2_4010	170.000 / 169.937	68.500 / 68.450
P2_6010	187.45 / 187.40	68.500 / 68.450

Installation

When relocating the rear wear ring into the cover plate, ensure the priming port in the ring is located at the top. When replacing the rear wear ring apply Loctite 243 to screw threads and torque to 8 Nm.

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.

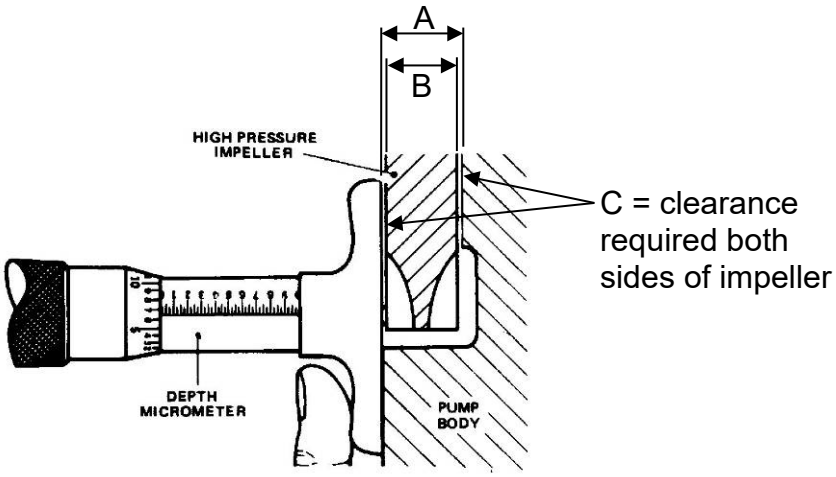
5. P2 Only - High Pressure Impeller - Maintenance

Check the high pressure impeller, pump body, mechanical seal assembly for wear. Replace any worn parts.

Installation

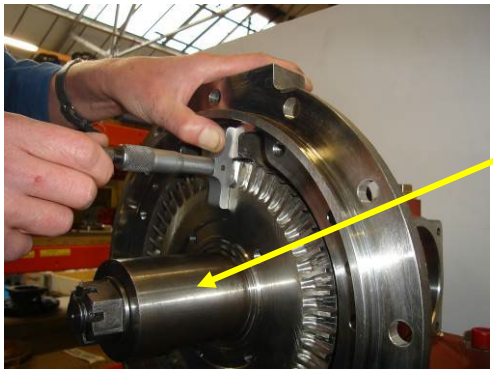
Replacing the high pressure impeller requires precise setting to achieve the rated output. If no new parts are fitted, the original shims as fitted to the pump may be refitted and a check on clearances carried out as detailed below.

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.



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.

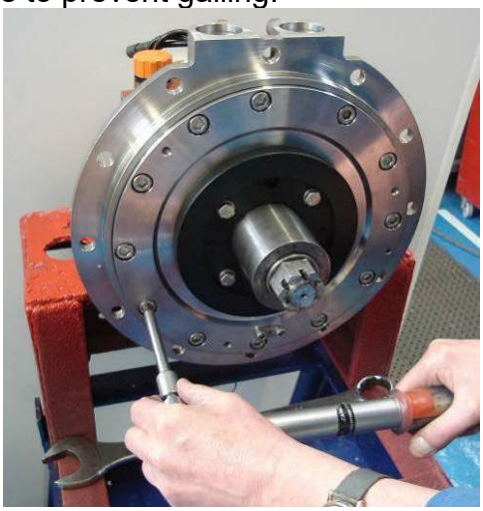
Replace the high pressure impeller on the pump shaft.

Available shims for setting the high pressure impeller -

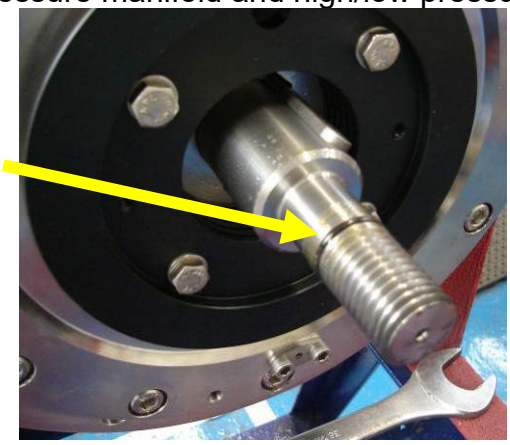
		0.0508mm /0.002”	0.127mm /0.005”	0.254mm /0.010”	0.3810mm /0.015”
Pack Thickness mm	Pack Thickness inches	Part No. 60095/01	Part No. 60095/02	Part No. 60095/03	Part No. 60095/04
0.0508	0.002	Qty 1			
0.1016	0.004	Qty 2			
0.127	0.005		Qty 1		
0.1524	0.006	Qty 3			
0.1778	0.007	Qty 1	Qty 1		
0.2032	0.008	Qty 4			
0.2286	0.009	Qty 2	Qty 1		
0.254	0.010			Qty 1	
0.2794	0.011	Qty 3	Qty 1		
0.3048	0.012	Qty 1			
0.3302	0.013	Qty 4	Qty 1		
0.355	0.014	Qty 2		Qty 1	
0.3810	0.015				Qty 1
0.4064	0.016	Qty 3		Qty 1	
0.4318	0.017	Qty 1	Qty 1	Qty 1	
0.4572	0.018	Qty 4		Qty 1	
0.4826	0.019	Qty 2			Qty 1
0.508	0.020			Qty 2	
0.5334	0.021	Qty 3			Qty 1
0.5588	0.022	Qty 1		Qty 2	
0.5842	0.023	Qty 4			Qty 1
0.6096	0.024	Qty 2		Qty 2	
0.635	0.025			Qty 1	Qty 1
0.6604	0.026	Qty 3		Qty 2	
0.6858	0.027	Qty 1	Qty 1	Qty 2	
0.7112	0.028	Qty 4		Qty 2	
0.7366	0.029	Qty 2		Qty 1	Qty 1
0.7620	0.030				Qty 2

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.



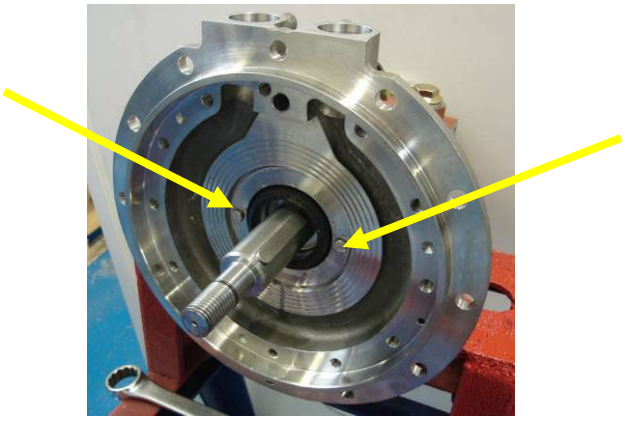
6. Mechanical Seal Maintenance

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.



P2 pump body shown

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 assembly into the pump body, lining up the screw holes in the seal assembly with the screw holes in the pump body.

Replace the two screws and seals retaining the seal. Tighten the screws half a turn at a time so the seal assembly is pulled squarely into the pump body. Ensure the screws 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.

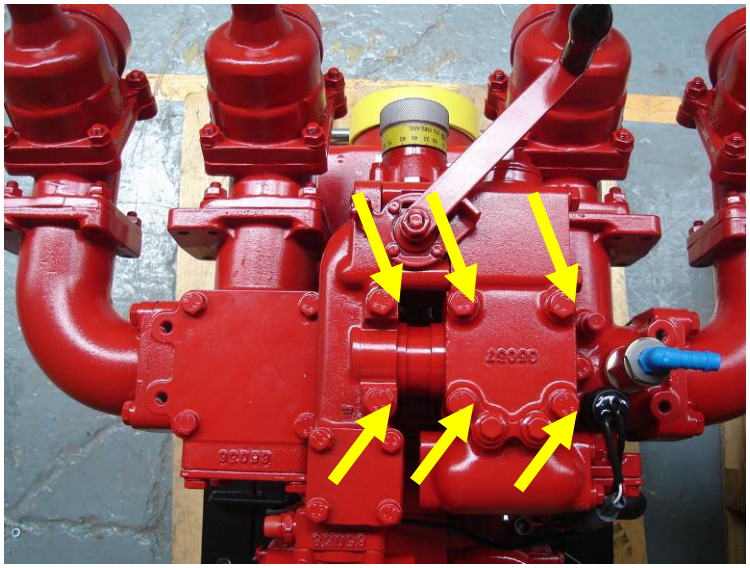
8. Low Pressure Manifold and High/Low Pressure Filter Housing (P2)

The low pressure manifold and the high/low pressure filter housing are attached to the top of the volute.

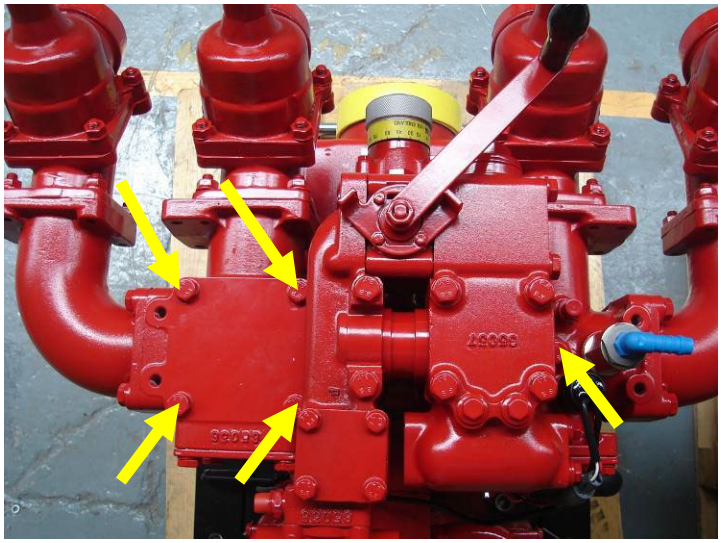
Removal – High/Low pressure Filter Housing

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.

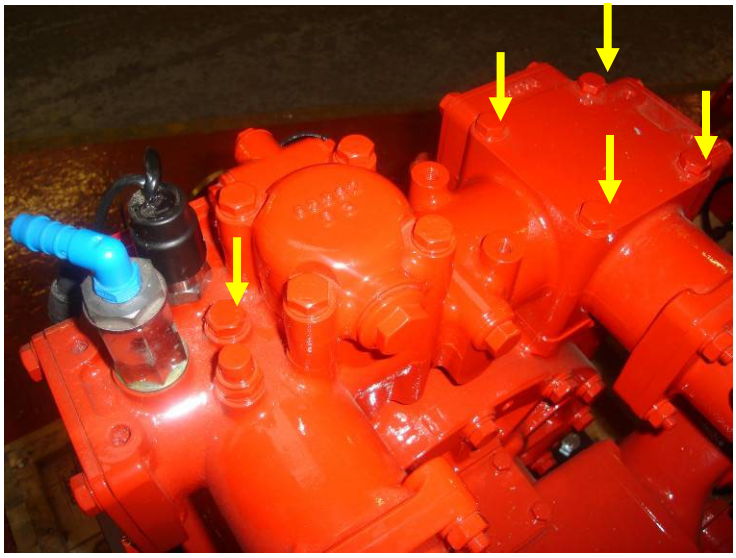
Removal – Low pressure manifold

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.

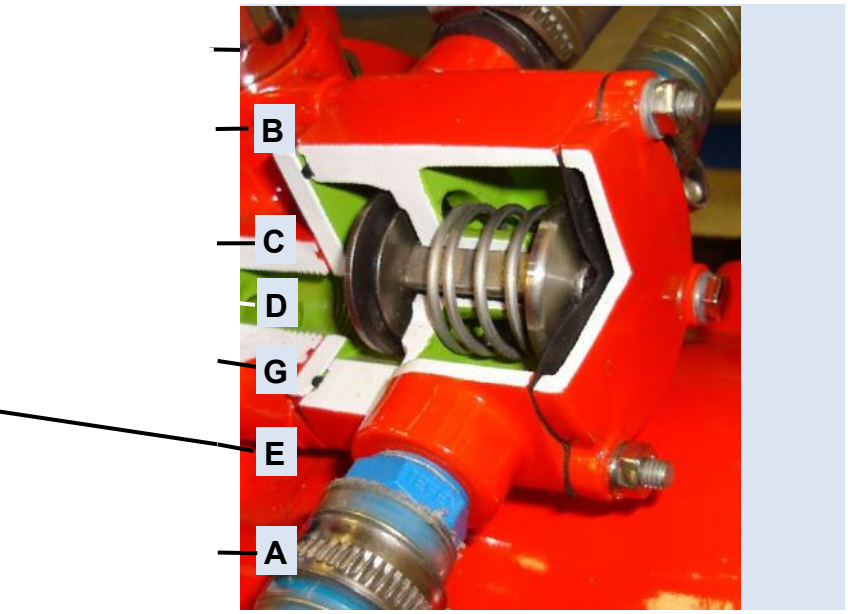


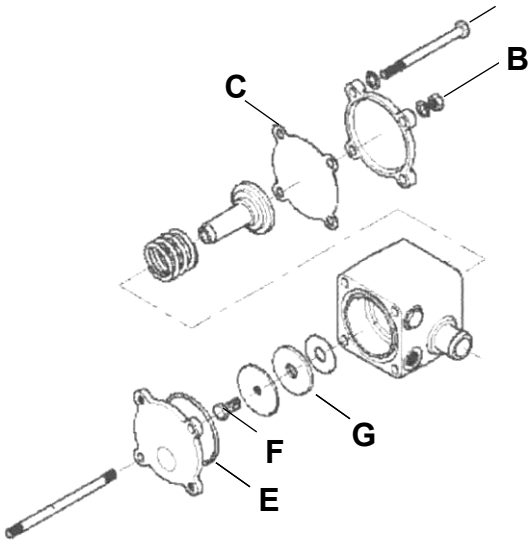
The filter on the low pressure manifold is designed to filter water that can be used for ancillary devices, e.g. gearbox cooling. The filter can be unscrewed and removed for cleaning in running water.

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.



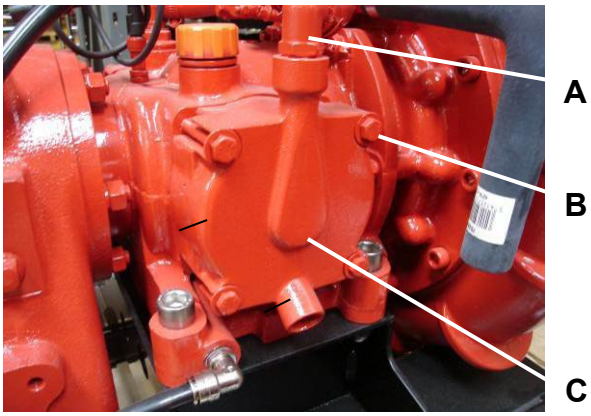


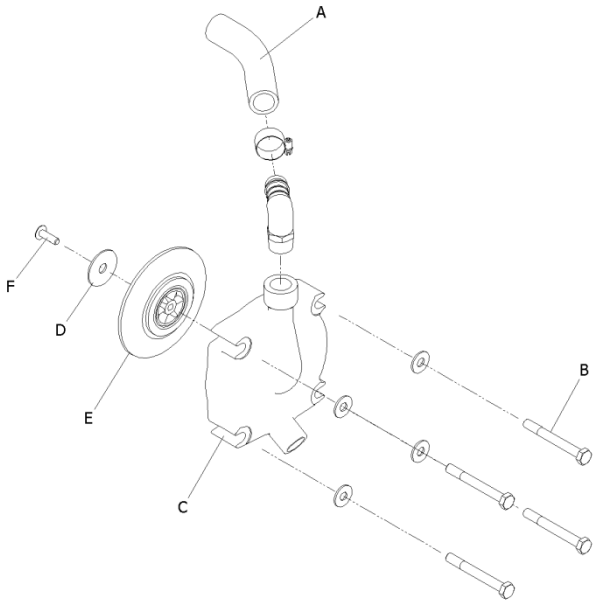
1. Disconnect the priming pipes (A) from the priming valve.
2. The priming valve can be removed from the pump as a complete assembly by undoing the nuts on the two studs (B).
3. To dismantle the priming valve undo the two bolts (D) Remove the priming valve cover and discard the diaphragm (C).
4. Remove 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.

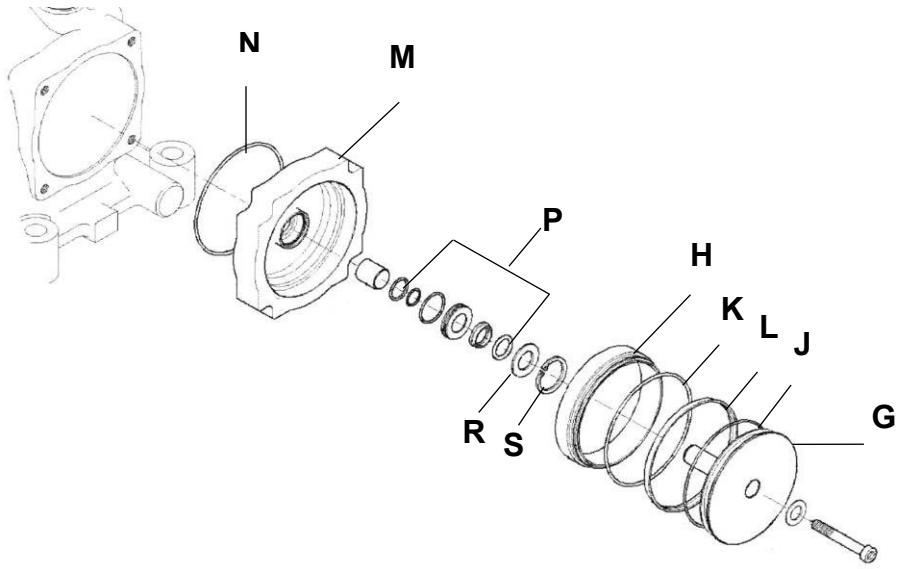




End Cover

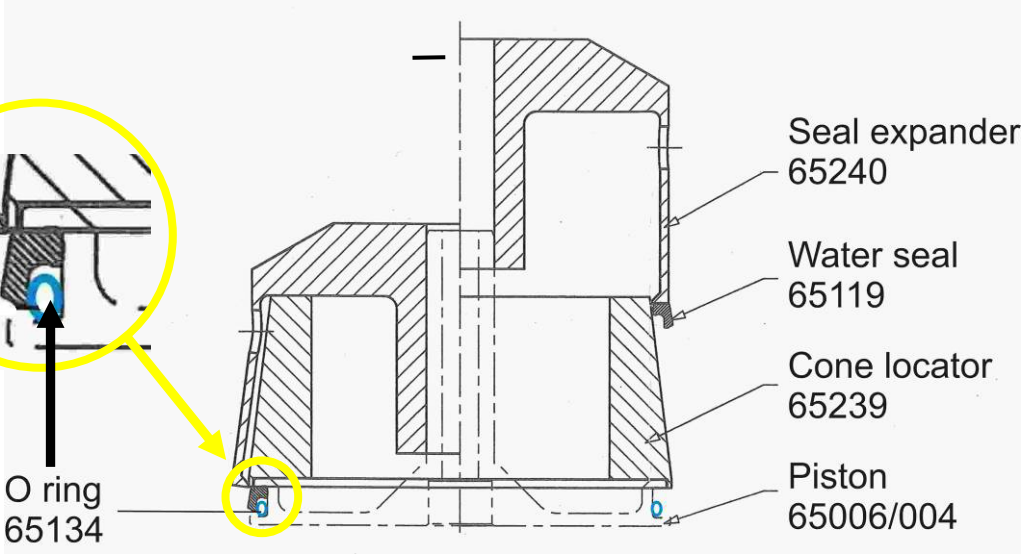
1. Disconnect the hose (A).
2. Remove four bolts (B) and washers. Remove the cover (C).
3. The rubber inlet (D p/n 65009) and outlet (E p/n 65008/002) valves must be changed.
4. To replace the valves, remove the screw (F). Remove the valves from the cover.
5. Clean the inside of the cover.
6. Install 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.

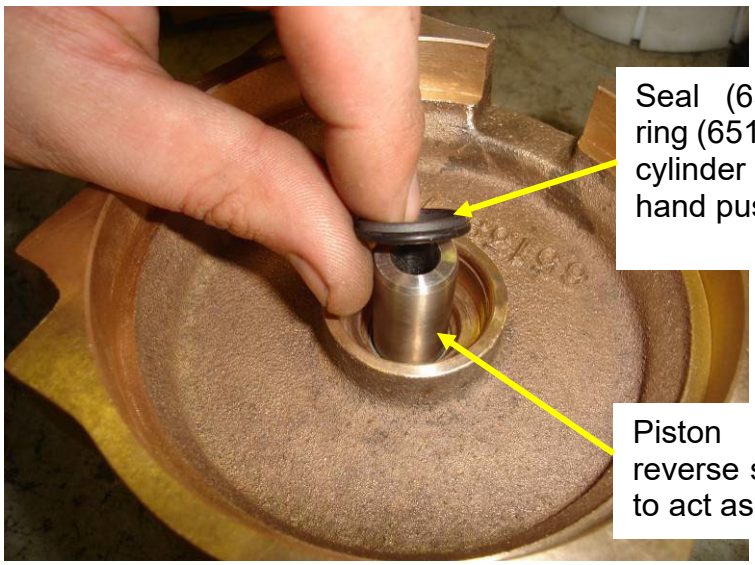


The piston (G) and cylinder liner (H) assembly comprise two ‘O’ rings (J p/n 65134) and K p/n 61097) and a water seal (L p/n 65119).

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.

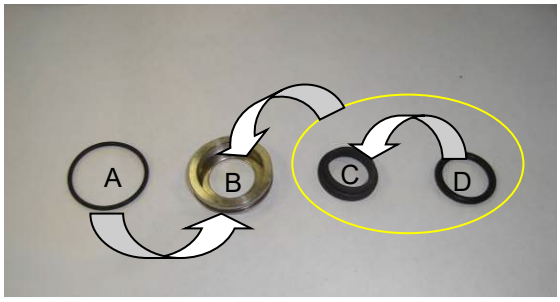


9. The cylinder body (M) assembly has an outer ‘O’ ring (N) and an inner seal arrangement (P) that comprises three ‘o’ rings, two shaft seals and a wiper carrier. These items are secured in the cylinder bore with a retaining disc (R) and circlip (S).
10. Replace O ring N (p/n 61097) on the cylinder M 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.



A = O ring p/n 52816
B = Wiper carrier p/n 65158/001
C = seal p/n 65161
D = O ring p/n 65162

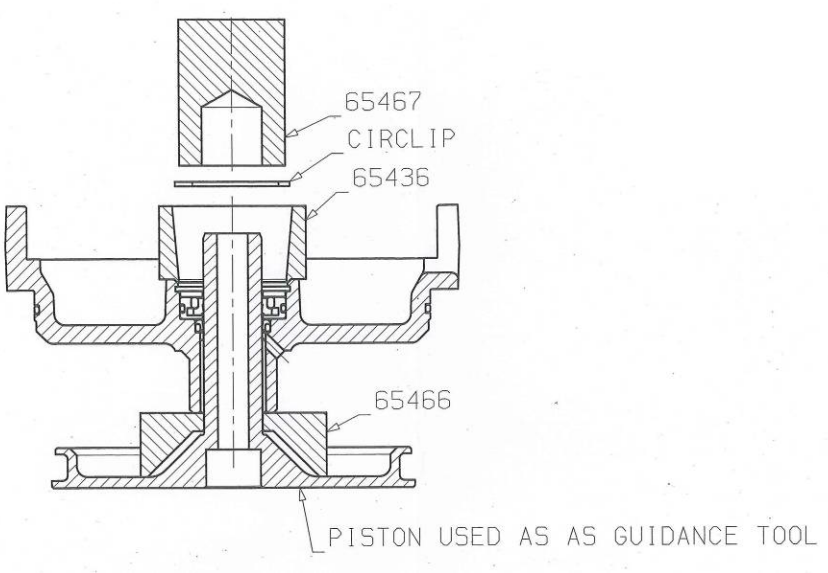
The complete assembly is placed in the cylinder using the piston shaft as a location guide.

    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 -

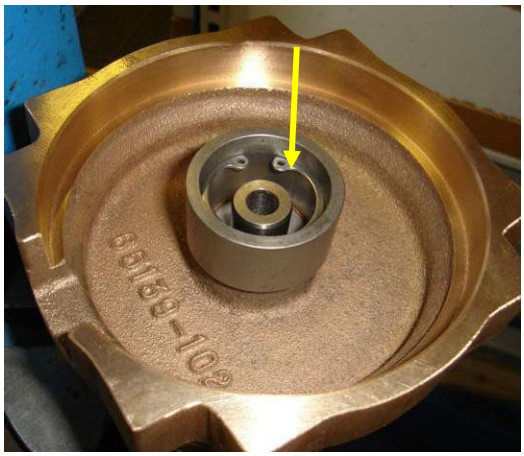


16. Cylinder support tool (p/n 65466) is used to raise the cylinder a short height.

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.

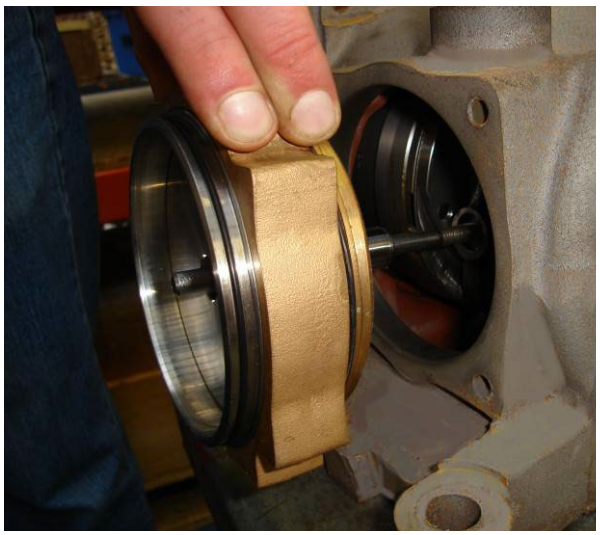


19. Place the Circlip Drift tool inside the fitting tool to rest on the circlip. By applying pressure to the fitting tool, using a suitable manual press, the circlip will be pushed down until it fits into the groove inside the cylinder liner. This secures and retains the seal assemblies, as below.

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.

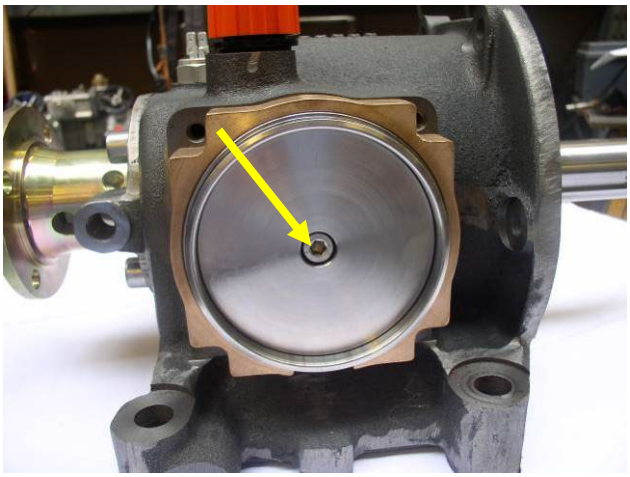
The complete assembly can now be placed back onto the bearing housing with the piston shaft placed to connect with the pump shaft yoke inside.

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.

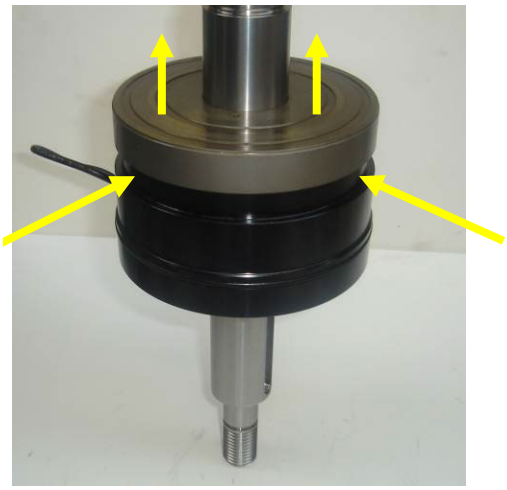
The shaft assembly can be dissembled by reversing the assembly process described below.

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 separartion.
To remove the clutch rotor from the stator it may be necessary to lever it away from the stator with a suitable tool.

Lever here to remove clutch rotor



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

.

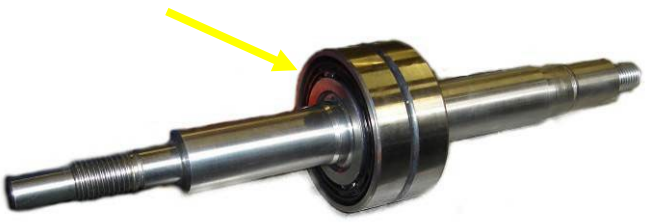
Support bearings under here in tool stand to allow shaft to be forced through

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.

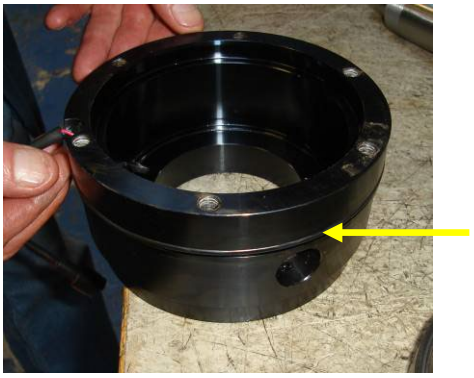


Place the clutch stator on a suitable support and lower the shaft and bearing assembly into it.

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 20Nm.

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.

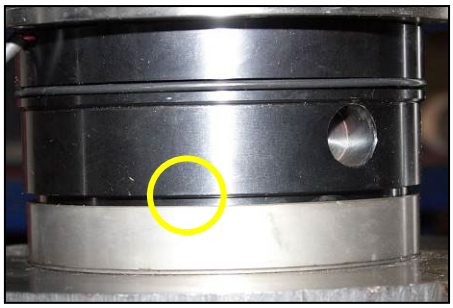
Also apply Loctite 638 sparingly to the inner surface of the rotor.

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.

DU bearing slightly below rear face of eccentric drive

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 28Nm.

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.

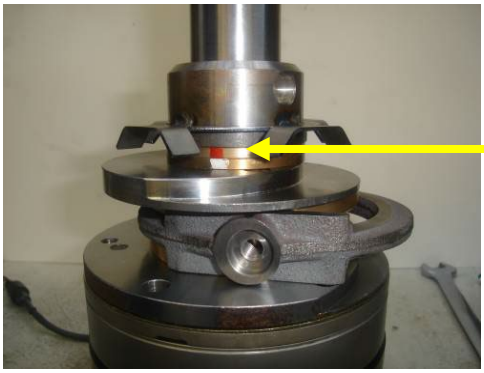
Place the yoke over the slider bush with the straight sides in line.

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 20Nm.

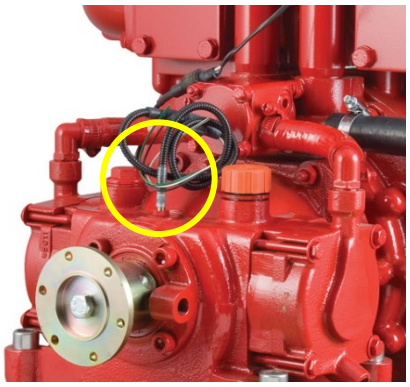
Fit the 53384/01 ‘O-ring onto the shaft underneath the rear oil seal wearing 60008.

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.

Tachometer Sender
If the Tachometer Sender 60015/001 located on the bearing housing needs to be replaced, please note the following -



It requires a tightening torque of 3.0Nm when fitting the sender to the bearing housing.

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.

SHIM SPACER COMBINATION

	4.0	4.1	4.2	4.3	4.4	4.5	5.1
PACK THICKNESS	PART No 65166	PART No 65166/001	PART No 65166/002	PART No 65166/003	PART No 65166/004	PART No 65166/005	PART No 65166/006
COLOUR	BLACK	WHITE	RED	BLUE	GREEN	YELLOW	ORANGE
8.0	QTY 2						
8.1	QTY 1	QTY 1					
8.2	QTY 1		QTY 1				
8.3	QTY 1			QTY 1			
8.4	QTY 1				QTY 1		
8.5	QTY 1					QTY 1	
8.6				QTY 2			
8.7				QTY 1	QTY 1		
8.8				QTY 1		QTY 1	
8.9					QTY 1	QTY 1	
9.0						QTY 2	
9.1	QTY 1						QTY 1
9.2		QTY 1					QTY 1
9.3			QTY 1				QTY 1
9.4				QTY 1			QTY 1
9.5					QTY 1		QTY 1
9.6						QTY 1	QTY 1

ALTERNATIVE COMBINATION

	4.1	4.2	4.3	4.4	4.5
PACK THICKNESS	PART No 65166/001	PART No 65166/002	PART No 65166/003	PART No 65166/004	PART No 65166/005
COLOUR	WHITE	RED	BLUE	GREEN	YELLOW
8.2	QTY 2				
8.3	QTY 1	QTY 1			
8.4	QTY 1		QTY 1		
8.5	QTY 1			QTY 1	
8.6	QTY 1				QTY 1
8.7		QTY 1			QTY 1
8.8				QTY 2	

ALTERNATIVE COMBINATION

	4.2	4.3
PACK THICKNESS	PART No 65166/002	PART No 65166/003
COLOUR	RED	BLUE
8.4	QTY 2	
8.5	QTY 1	QTY 1

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.

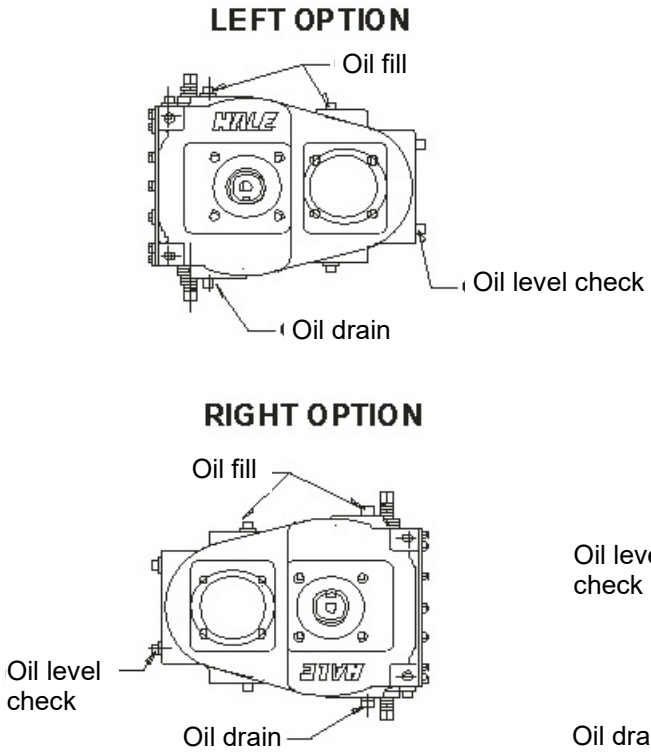
The oil capacity of the gearbox is approximately 1.2 litres. The photograph below shows the left side of the gearbox as viewed from the PTO end.

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

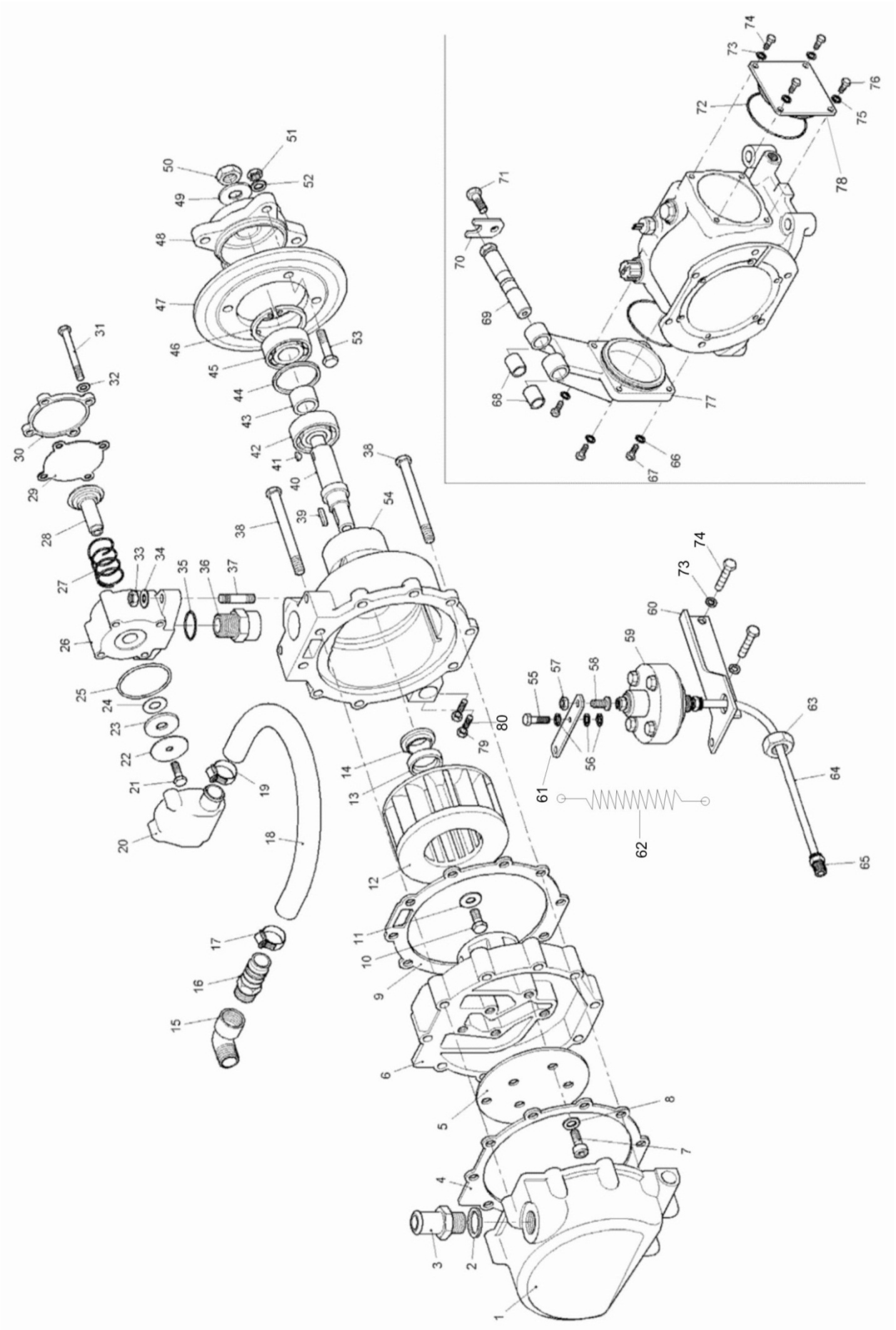
To remove the entire Water Ring Primer unit, slacken the hose clip (19) retaining the 3/4inch hose to the top of the primer. Disconnect the hose and secure the hose end away from the primer. Disconnect and remove the primer return spring (62) from the lower part of the primer. If connected, remove the 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.



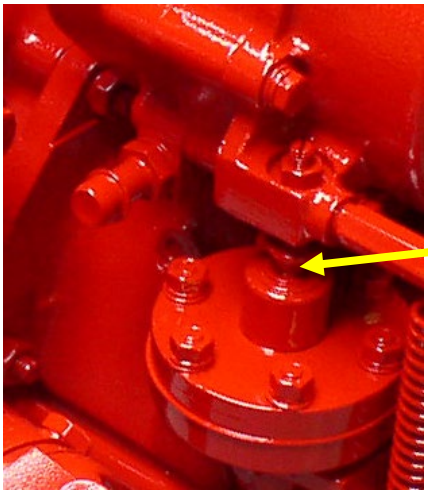
When fitting a new seal ensure that the lip on the backing washer and the open end of the seal face is towards the impeller.

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 0.81bar is obtained, stop the pump. This vacuum should be maintained for at least 15 seconds or drop no more than 0.07bar 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 0.81bar 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 2300rpm to achieve a vacuum.
Should the pump not reach a vacuum of 0.78bar 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.

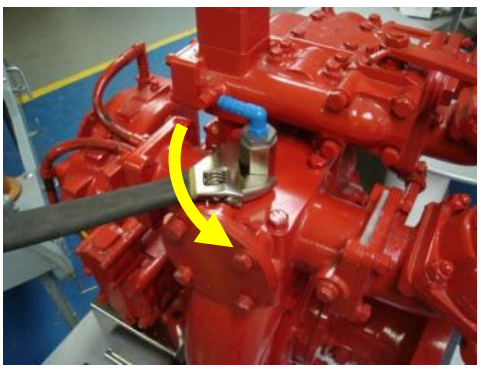
Continue running the pump, to permit it to heat up. The TRV should open and discharge water when the pump temperature is about 48°C (for a Standard 42°C TRV, for a 74°C it will open about 80°) . Observe the discharge, if it open to atmosphere, or feel the discharge pipe become warm if it returns to the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

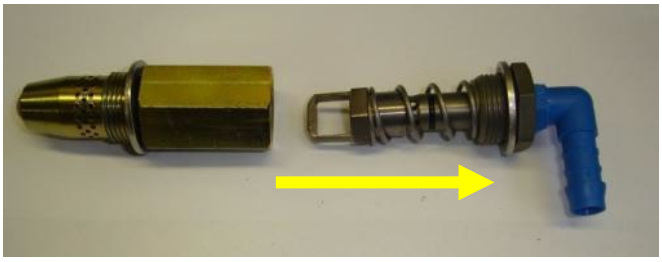
1. Location. The TRV is located on the top surface of the discharge manifold –

2. Remove the TRV with a suitable adjustable spanner to grip the main TRV body.



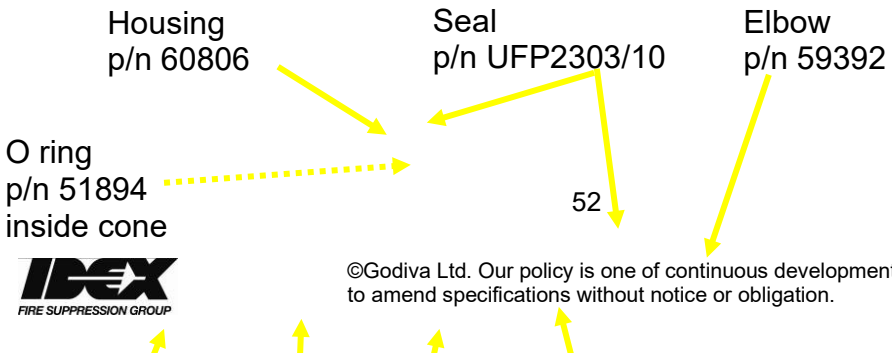
3. Remove the internal parts from the outer housing. Secure the TRV vertically in a vice. With an adjustable spanner undo the top part of the TRV.

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.



Build-up of deposit, usually due to high concentration of mineral deposits in water

thermal actuator p/n 57053 | sleeve p/n 60808 | spring p/n 670715 | O ring p/n 58107 | outlet adaptor p/n 60807

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.

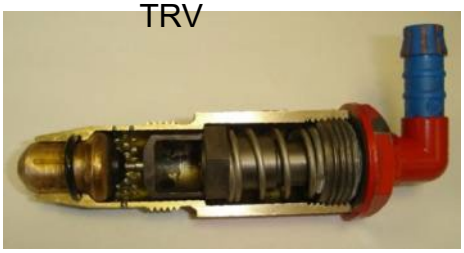
7. Re-assembly is a reversal of the dismantling process. If new O rings (p/n 58107) are to be fitted, roll the first O ring into the lower groove on the outlet adaptor, then roll the second O ring over the first O ring in to the second groove higher up the adaptor. Apply water resistant grease to the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

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

Fit this O ring first

Fit this O ring second

Cross section of assembled TRV



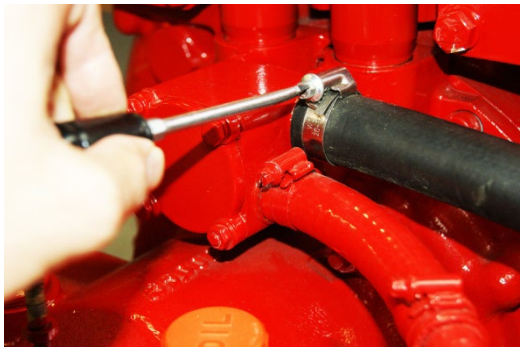
Suction Pressure Relief Valve Maintenance

The Suction Pressure Relief Valve (SPRV, p/n 60388) is fitted to the Prima multi-pressure pump. We recommend that the SPRV is checked for correct operation every 12 months, regardless of the amount of pump use.

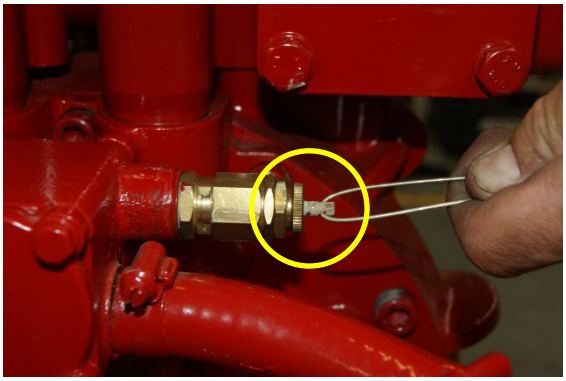
The valve is designed to protect the main parts of the pump from a sudden build-up of internal pressure from the closing of HP discharge hoses at the nozzle end. The valve will open at 13 Bar to allow the discharge of a small amount of pressurised water and close when the pressure drops below this point. The valve is pre-set at the factory to open at 13 Bar and we recommend that valves failing to meet this specification are replaced as a unit.

Follow this procedure for checking the valve, especially the valve spring - IMPORTANT: Ensure the pump PTO is disengaged and the pump is drained before proceeding.

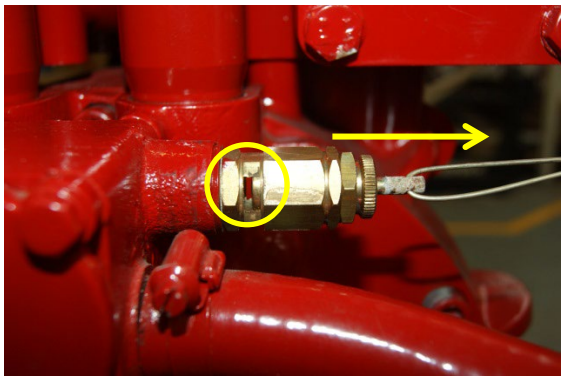
1. Remove the rubber discharge pipe by undoing the hose clip.



2. Insert a wire through the hole on the end of the valve. The wire must be sufficiently strong to pull against the internal spring of the valve.



3. If the valve is functioning correctly and free of corrosion, the valve can be pulled outward against the spring - by approximately 3mm and will re-seat when released.
Notice the aperture opening on the left of the valve in this picture. This is where the pressurised water will discharge through if it reaches 13 bar or more.



4. If the valve spring is not corroded and functioning correctly it will look like this photograph. There is a small hole in the side of the valve to observe the condition of the spring.

5. A corroded valve spring will look similar to this photograph. If the valve is sticking or the spring corroded, it is necessary to replace the valve completely. Unscrew the valve from the pump and insert a new one - part number 60388.

Replace the rubber discharge elbow over the valve and secure with the hose clip.

Run the pump and check for leaks. One method of doing this is to feed water from a hydrant at 10 Bar pressure.

Then run a vacuum test, see the relevant Godiva pump manual for details.
If the SPRV passes these tests the pump can be returned to operation.
If there is any uncertainty about the operation of the SPRV, please call Godiva, or our agent.

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*

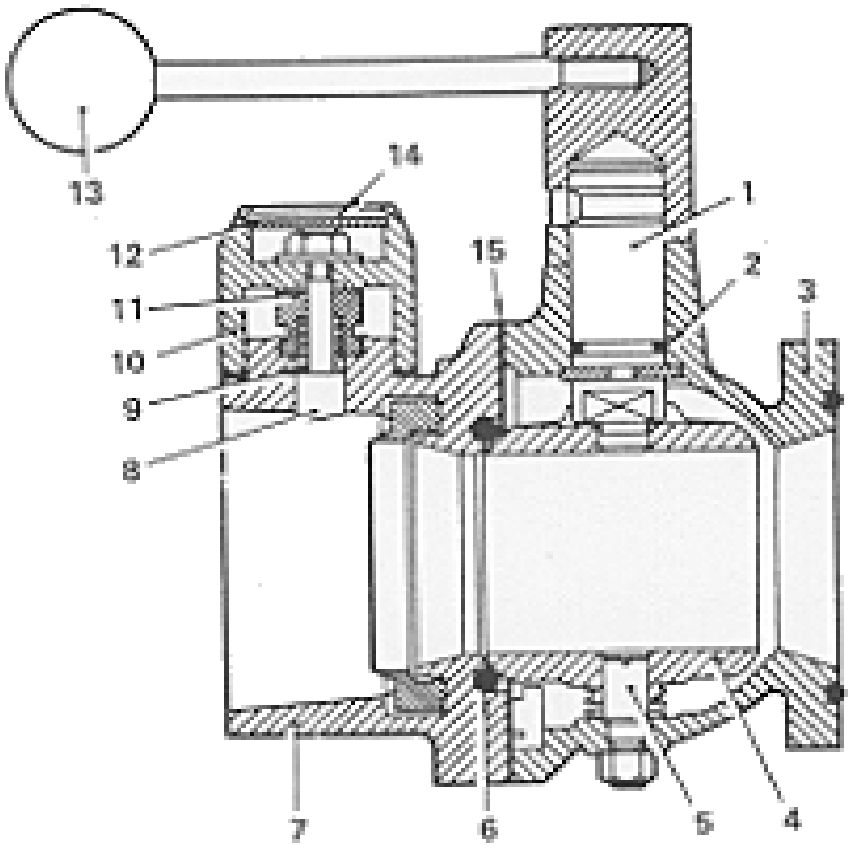
This is due to the O Ring not pressing tightly enough against the ball. Remove the bolts and spring washers and separate the coupling end tube from the ball valve housing. Turn the O Ring over so that it presents a new face to the Ball Valve, or fit a new O Ring. Rub a little Molybdenum Disulphide Powder 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.

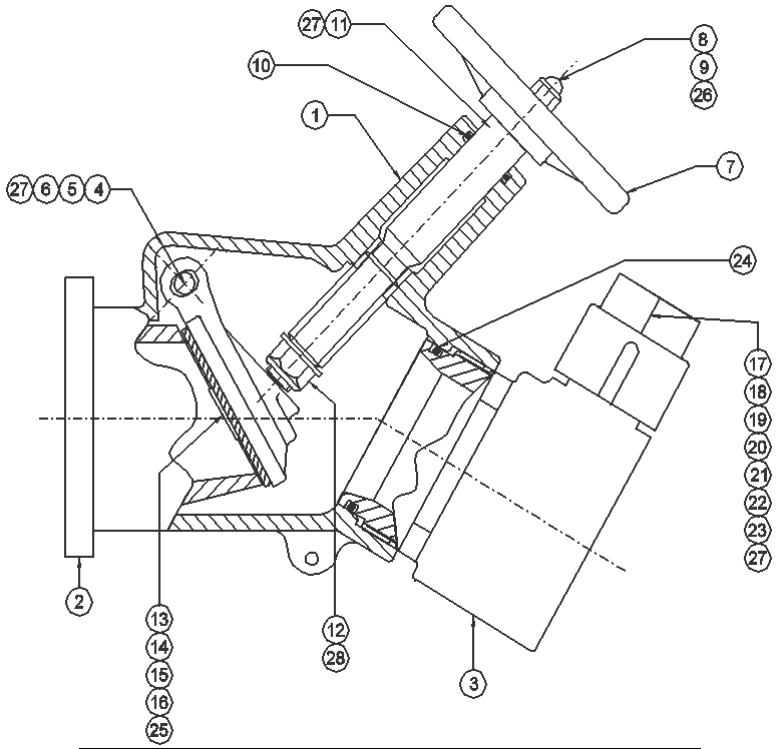


1	Valve Stem	9	Spring
2	Valve Stem Seal	10	Coupling Release Cap
3	Valve Housing	11	Release Cam
4	Ball Valve	12	Closure Disc
5	Ball pivot and Spring	13	Operating Handle
6	O Ring	14	Circlip
7	Coupling End Tube	15	Joint Washers
8	Coupling Release Bolt		

Part Nos	**Light Alloy I/C**	**Gunmetal I/C**
LH	TH137	TH153/100
RH	TH138	TH154/100

Screw-down Type

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



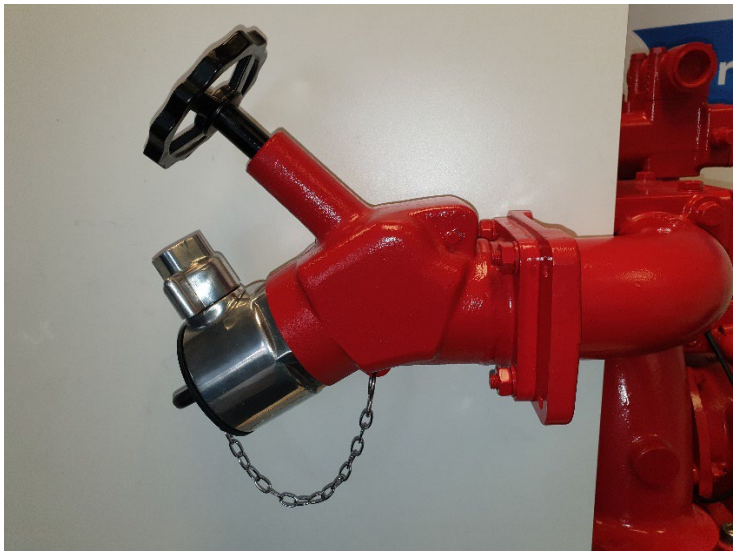
ITEM	DESCRIPTION	QTY.
1	Main Body	N/A
2	Inlet	N/A
3	Outlet	1
4	Pivot Pin	1
5	'O' Ring	2
6	Circlip	2
7	Screw Down Handle	1
8	Domed Nut	1
9	Spring Washer	1
10	'O' Ring	1
11	Screw Down Spindle	1
12	M12 Stainless Steel Washer	1
13	Non Return Flap	1
14	Non Return Flap Washer	1
15	Retaining Washer	1
16	Washer Insert	2
17	Instantaneous Washer	1
18	Twist Release Knob	1
19	Release Cam	1
20	Release Spring	1
21	Release Plunger	1
22	Knob Closure Bung	1
23	Nyloc Nut	1
24	'O' Ring	1
25	'C' Sunk Screw	2
26	Plain Washer	1
27	Moly Grease	1
28	M12 Stainless Steel Nyloc Nut	1

Inspection and Maintenance

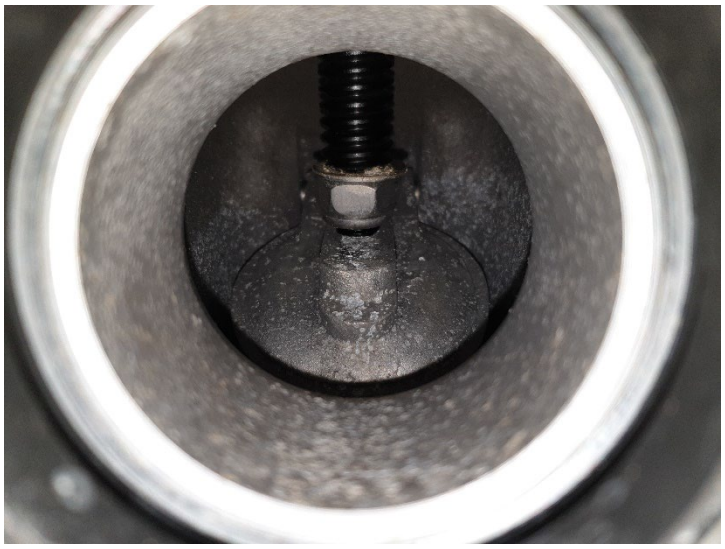
1. After each use -
Check that the valve opens and closes freely without the need to exert excessive torque to the handwheel. Do not overtighten in either direction. If stiff, dismantle the spindle and investigate.
Check that there are no leaks around the spindle. If leaking, change O ring (9).
Check that the twist release mechanism operates freely and that the female instantaneous seal is in place.
Check visually for any damage.

2. Every three months -
Fully open the valve and, using a torch, examine the non return flap rubber sealing washer (14)
If damaged or worn, replace the rubber sealing washer. To do this it is first necessary to remove the outlet adaptor, (2) see page 3, section 1, for instructions. Then remove one of the circlips (5) and withdraw the pivot pin (3). The flap (13) can then be extracted from the valve. Replace the rubber sealing washer (14) and plastic inserts (16). Apply Loctite 222 to the screw threads before hand tightening.
Reassemble by reversing the above instructions.
Fully close the valve, and using a small brush, apply Lithium EP21 plus Moly Grease to the exposed spindle threads.
If the spindle stop is the old roll pin type replace with the latest Nyloc nut type.
If the spindle is of the latest Nyloc nut type check that the nut is still tight, and that the spindle protrudes through the nut. DO NOT ATTEMPT TO UNSCREW IT (ANTI-CLOCKWISE) UNLESS THE NUT IS TO BE CHANGED. If the spindle end has worn flush with the nut it should be replaced immediately.
Check there is no leakage from the flap pivot pin O rings (4) and change if necessary.
Grease pivot pin (3) and check that the non return flap is free to articulate.
Check that circlips (5) are firmly in place.

3. Every two years -
Remove the spindle (see instructions page 3), regrease it, fit a new Nyloc nut (12) and O ring (9) and refit.
Inspect the twist release mechanism components and instantaneous seal for damage or corrosion and replace as necessary.



Screw down valve



Screw down valve, view through the connector showing the spindle with the Nyloc nut and washer fitted to the end of the spindle.

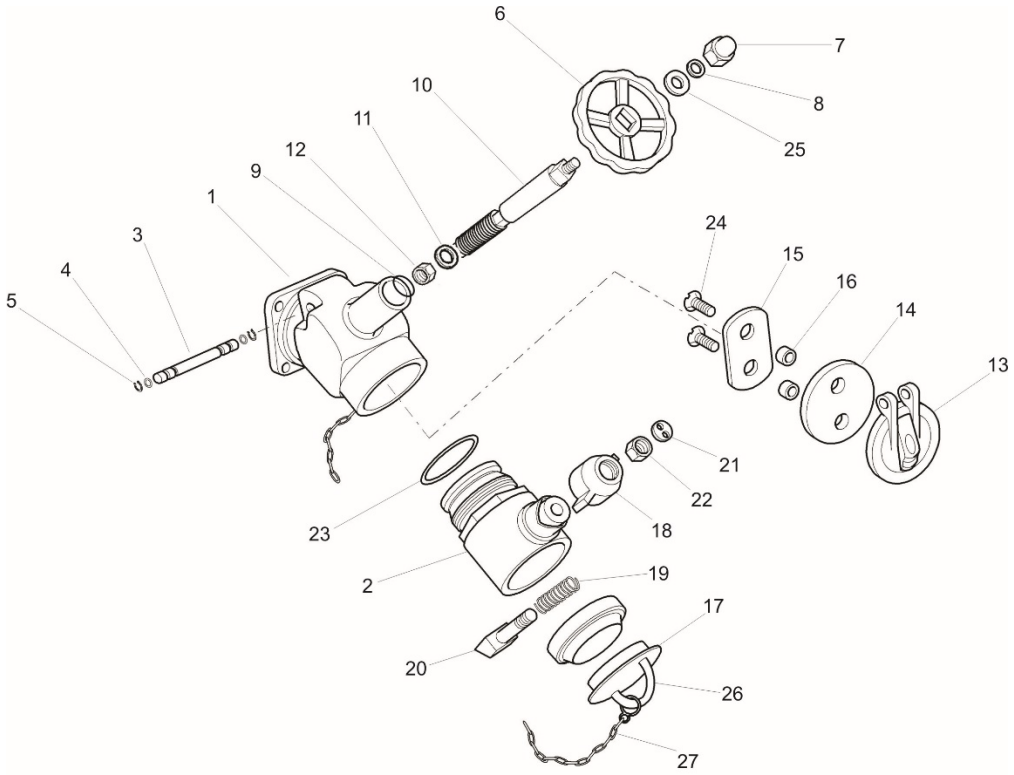
Instructions for Removing / Changing Spindles

The spindle retaining nut may be removed and replaced by accessing through the instantaneous coupling. Access is much easier if the coupling is removed, but this will take longer.

1. With the valve still bolted to the pump, remove the outlet adaptor. To do this dismantle the twist release mechanism, taking care to retain all components. Using a soft mallet strike the cam boss so that the adaptor turns anti-clockwise. Note: Alternatively special spanners are available to enable the adaptor to be removed without dismantling the twist release mechanism, see photograph below.

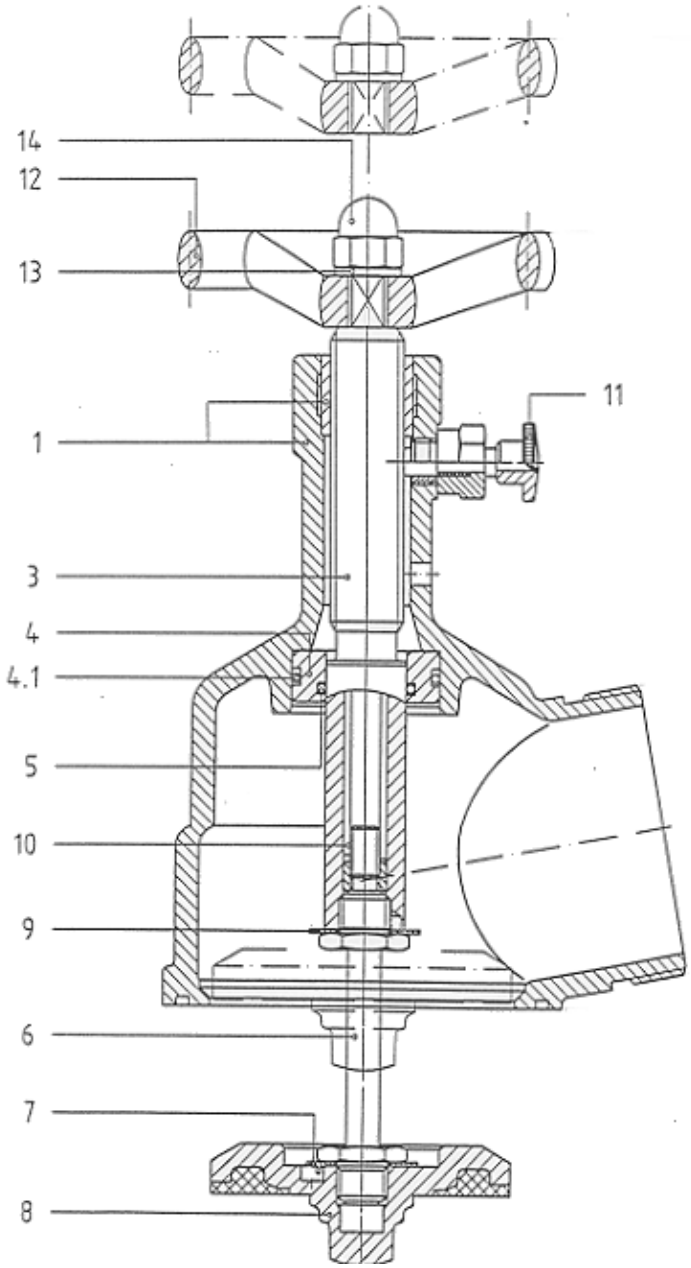
If a storz connector is fitted this may also need a special spanner to remove from the valve body.

2. Remove the handwheel from the spindle using a 13mm spanner. Retain the nut, plain washer and spring washer.
3. To remove the spindle half open the valve and grip the Nyloc nut using a 19mm open spanner. Using a special 14.5mm square “spanner” or 17mm socket spanner to grip the square on top of the spindle, turn the spindle anti-clockwise to disengage from the Nyloc nut.
4. To remove an old style spindle half open the valve so that the pin is accessible through the valve outlet. Using a 1/8” pin punch, gently hammer the punch to knock the pin, taking care not to jam the punch in the hole.
5. Unscrew the spindle from the valve. Any excessive stiffness indicates damage to the thread in the valve body which should be returned for inspection and repair. Remove any residual Loctite from the 12mm thread using a fine wire brush (applies to spindle with Nyloc nut).
6. Generously apply Lithium EP21 plus Moly Grease to the large diameter only of the reused or replacement spindle. Screw the spindle into the valve body until four large diameter threads are showing inside the body.
7. Apply Loctite 2701 to the thread of a new Nyloc nut. Place a new washer (11) over the small thread at the lower end of the spindle and screw on the Nyloc nut (12). Grip the nut using a 19mm open spanner and turn the spindle clockwise using the handwheel square until fully tight when approximately 4mm of spindle will protrude through the nut.
It should be noted that Nyloc nuts lose effectiveness if refitted after removal. Used nuts should always be discarded and a new nut fitted.
8. Use a 13mm spanner to replace the handwheel ensuring that both the plain washer and spring washer are fitted under the 8mm dome nut.
9. Replace the O ring (23) and refit the outlet adaptor and twist release mechanism.



Item	Description	Quantity	Aluminium	Gunmetal	Notes
	Complete assembly	-	56544/01	56545/01	
1	Main Body	1	N/A	N/A	Valve body and connector
2	2.5" I/C Body	1	N/A	N/A	are not available separately
3	Pivot Pin	1	56979/03	56979/03	If required, order complete valve – see top of list
4	'O' Ring	2	56979/02	56979/02	
5	Circlip	2	56979/01	56979/01	
6	Screw Down Handle	1	56979/22	56979/22	Crank handle - order 56132/03
7	Domed Nut	1	56979/09	56979/09	
8	Spring Washer	1	56979/08	56979/08	
9	'O' Ring	1	56979/10	56979/10	
10	Screw Down Spindle	1	56979/16	56979/16	
11	Washer	1	56979/30	56979/30	
12	Nyloc nut	1	MS141/7	MS141/7	
13	Non Return Flap	1	56979/18	56979/19	
14	Non Return Flap Washer	1	56979/07	56979/07	
15	Retaining Washer	1	56979/06	56979/20	
16	Washer Insert	2	56979/05	56979/05	
17	Instantaneous Seal	1	FWP1003/A	FWP1003/A	
18	Twist Release Knob	1	56979/26	56979/27	
19	Release Spring	1	56979/14	56979/14	
20	Release Plunger	1	56979/13	56979/21	
21	Knob Closure bung	1	56979/31	56979/25	
22	Nyloc Nut	1	56979/32	MS141/5	
23	'O' Ring	1	56979/15	56979/15	
24	Countersunk Screw	2	56979/04	56979/04	
25	Plain Washer	1	MS125/9	MS125/9	
26	Blank cap	1	2415	2415	
27	Chain	1	TH4749	TH4749	

Continental Delivery Valves



1	Body, incl. Nipple
3	Spindle
4	Guide Sleeve
4.1	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

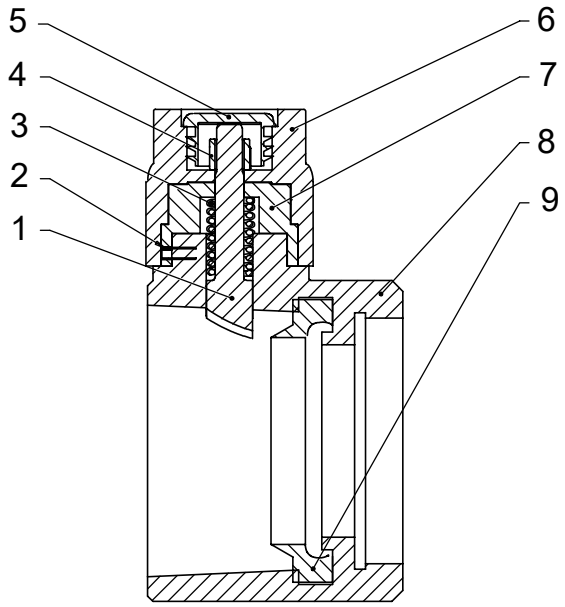
The spindle should be greased (lubricated) on a quarterly basis, using a proprietary waterproof grease such as Shell Retinex A or equivalent.

Caution

When opening the valve do not force the handwheel against its stop. NB. Max. working pressure is 16bar.

Instantaneous Connector Servicing Procedure:

Item	Description
1	Twist release bolt
2	Self-lock pin
3	Spring, twist release
4	Nyloc nut
5	Closure disc / red plug
6	Twist release knob
7	Twist release cam
8	2½" FM Twist release body
9	2½" Instantaneous seal



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 5. 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 4 using a socket spanner and Knob 6 can then be removed.
3. Withdraw Bolt 1 and Spring 3 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 4 the tension on the spring is correct when the leading edge of the curved face of Bolt 1 is level with the bolt hole edge as shown in diagram above.
7. Check Seal 9 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

Part	Description	Torque	
		Nm	Lbs ft
MS164/20	65019/001 Seal Housing to Clutch Stator	20	15
NPN	65017/004 Friction plate to eccentric drive. (Clutch manufacturers supply)	28	21
MS166/25	65094 Seal housing to bearing housing	20	15
MS165/35	65040 Cover plate to pump head	44	32
65405	65004 Rear wear ring to cover plate	8	6
MS164/25	65078 Front wear ring to suction tube	8	6
65181	Impeller retaining nut	300	225
MS07/35	Drive flange retaining screw	103	76
65169	Screw retaining piston primer to yoke in bearing housing	20	15
60015/001	Tachometer sender, tightening into bearing housing	3	2.2

18. Special Tools

Part	**For Piston Primer Equipped Pumps** Description
60275/03	Clamping spacer
65486	Mechanical seal extraction tool
65239	Piston seal assembly tool – cone locator
65240	Piston seal assembly tool – seal expander
65436	Circlip fitting tool – piston primer seal replacement
65466	Cylinder support tool – piston primer seal replacement
65467	Circlip drift - piston primer seal replacement

Part	**For Water Ring Primer Pumps** Description
60275/03	Clamping spacer
65486	Mechanical seal extraction tool

19. Adhesives, Solvents and Greases List

The following is a summary of the adhesives, solvents and greases required and the area of application.

Page reference	Location	Adhesive
12	Front wear ring, securing to suction tube	Loctite 243. Tighten to 8Nm.
14	Inside bore of low pressure impeller	Tallow
15	Rear wear ring, securing to pump head or cover plate	Loctite 243. Tighten to 8Nm.
18	HP cover plate, auto drain ball plate, 2 off screws	Loctite 243
18	HP cover plate to pump body, under head of capscrews	Molykote 37. Tighten to 44Nm
19	Mechanical seal assembly, inserting into pump head or impeller	Soft soap solution
25	Piston primer – screw retaining inlet and outlet valves	Loctite 380e
28	Piston primer – o ring (52816) on piston shaft	General purpose grease
31	Piston to yoke, 2 off screws	Loctite 243. Tighten to 20Nm
34	Bearing housing. Fitting bearings to shaft, 2 off.	Tallow
35	Seal housing to clutch stator	Loctite 243. Tighten to 20Nm.
37	Clutch rotor to shaft, inner surface. Early type of assembly only.	Loctite 638
39	Clutch friction plate to eccentric drive, 3 off screws	Loctite 243. Tighten to 28Nm
42	Seal housing to bearing housing, 6 off cap screws	Loctite 243. Tighten to 20Nm
44, 45	Gearbox – drain plugs, oil level check plugs	Loctite 572
52	TRV – o rings on actuator	Water resistant grease
53	Delivery valve, ball type. Valve ball and stem.	Molybdenum disulphide powder
57	Delivery valve, continental type. Spindle	Shell Retinax A or equivalent
58	Instantaneous connector bolt and spring	Molybdenum Disulphide grease (Lithium grease)