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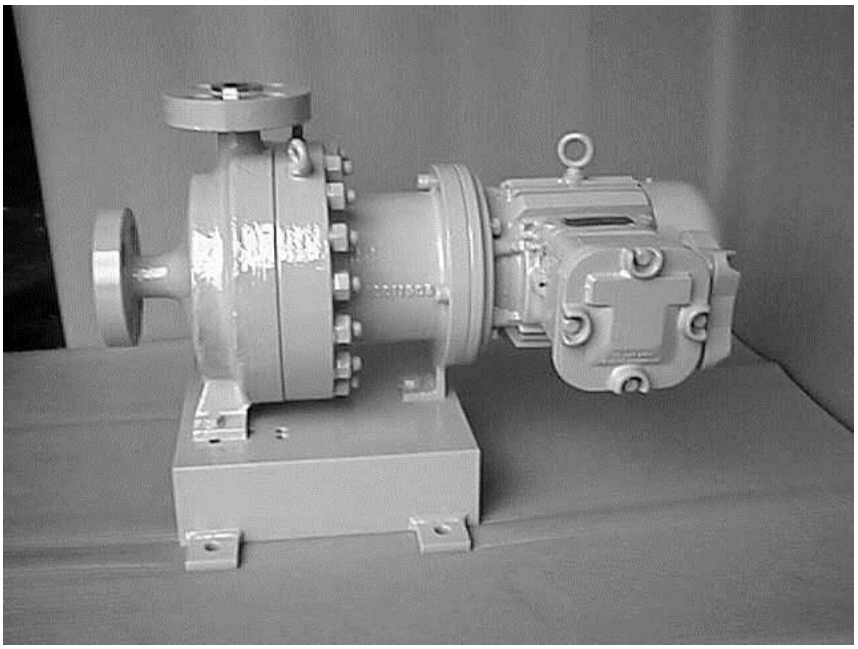
Sundyne

Sundyne **HMD Kontro**
Sealless Pumps

HMD Kontro

MAINTENANCE INSTRUCTIONS FOR PUMP RANGE HPGS FRAME 0



Standard Models

Quality Assured to ISO 9001 and BS5750 since 1985 for the Design, Manufacture and Repair of SEALLESS Pumps and Drives

LLOYD'S REGISTER QUALITY ASSURANCE
ISO9001 • ISO14001
OHSAS 18001

Ref. HPGS0MI503 Issue 1.6

European Union Machinery Directive
(CE Mark System)

(where applicable)

This document incorporates information relevant to the Machinery Directive 98/37/EC. It should be read prior to the use of any of our equipment. Individual maintenance manuals which also conform to the EU Directive should be read when dealing with specific models.

Disclaimer

HMD / Kontro SEALLESS Pumps manufactures sealless pumps to exacting International Quality Management System Standards (ISO 9001) as certified and audited by Lloyd's Register Quality Assurance Limited. Genuine parts and accessories have been specifically designed and tested for use with these products to ensure continued product quality and performance. As HMD / Kontro SEALLESS Pumps can not test all parts and accessories sourced from other vendors, incorrect design and/or fabrication of such parts and accessories may adversely affect the performance and safety features of these products. Failure to properly select, install or use authorised HMD / Kontro parts and accessories is considered misuse and damage or failure caused by misuse is not covered by HMD / Kontro's warranty. Additionally, modification of HMD / Kontro products or removal of original components may impair the safety of these products and their effective operation.

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Safety

The following safety precautions are to be taken in addition to safety procedures laid down by your company and do not supersede, change or absolve you from your statutory duties under government legislation. Our recommendations are based on our proven experience.

A pump that is not installed, operated or maintained in accordance with HMD/Kontro's recommendations may present a hazard.

Attention must be given to the safe handling of all items. This applies to both installation and maintenance. Safe lifting practices must be observed to ensure that personal injury or damage to pump components does not occur. Note that lifting eyes fitted to individual pieces such as pump and motor are designed to lift only this part and not the complete assembly.

HMD / Kontro pumps contain high power magnets which may, in some circumstances, affect the operation of certain types of medical implants such as pacemakers. Wearers of these implants should take extreme caution when in proximity to an HMD / Kontro Sealless Pump. The assembled pump presents no known problems, however certain internal components need to be treated with caution.

Before disassembling a pump all relevant and appropriate safety precautions must be taken.
SEEK ADVICE FROM YOUR SAFETY REPRESENTATIVE OR THE MANUFACTURER IF YOU HAVE ANY DOUBTS.

Should the pumps have been used to pump toxic or hazardous products ensure compliance with COSHH and/or applicable Health and Safety legislation.

Always isolate the pump electrically before dismantling. Ensure that the electrical switchgear cannot be operated during any work being carried out on the pump.

After the pump has come to a complete stop, isolate the pump by shutting off all valves controlling flow to and from the pump, and any other measures required.

All pumps returned to HMD / Kontro for factory servicing must have a decontamination certificate and the appropriate Health and Safety data sheets.

Care should be taken in assembling magnetic components due to their attraction with ferrous materials. Particular care should be exercised in assembling the pump shaft due to the axial pull of the components. Where supplied, use forcing bolts (or special tool No.JF2210 should be purchased) to ease disassembly of the pump.

Always wear adequate protective clothing and eye protection when dismantling pumps, during all process involving the use of power tools such as cleaning, grinding etc. and at all times during the assembly and disassembly of bearing components.

Introduction

This document details the maintenance procedures to be followed in servicing HPGS Frame 0 pumps, as detailed below:-

The HPGS range is a magnetically driven centrifugal pump family with end suction and top discharge nozzles.

For HMD / Kontro guidance and recommendations covering pump foundation and commissioning, refer to the separate Installation & Operating Instructions.

If in doubt or you need to know our latest recommendations, or for further assistance, call your nearest HMD/Kontro representative stating the pump serial number, or contact HMD/Kontro direct on:

Telephone: 01323 452000 (UK) +44 (1323) 452000 (Int)
Facsimile: 01323 503369 (UK) +44 (1323) 503369 (Int)
Customer Service 24 Hour 07966 525269
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Web: www.hmdkontro.com

Contents

This document must be read in conjunction with the Sectional Arrangement drawing, Parts List, Installation Drawing and the Installation and Operating manual all contained in the Data Package supplied.

This symbol within the following sections signifies a helpful hint that will assist the user in maintaining the HMD/Kontro pump.

Section 1: Tools Required For Maintenance

Spanners / Wrenches	10mm A/F 13mm A/F 3/4" A/F
Socket Spanner / Wrench	9/16” A/F 1 1/16” A/F 38mm A/F
Hexagonal Key	3mm 3/16” 1/4" 7/32” 5/16” 3/8”
Torque Wrench	0 – 120 Nm Range
Soft Mallet	Yes
Bearing Press	Yes
Oven Suitable for 350°C (662°F)	Yes
Metal Blocks (75mm [3”] diameter x 25mm [1”] thick [Fig 48])	
Puller or Pry Bar	
Levers	
Extension Arm	
Dial Test Indicator	

Note: A/F means across flats

Section 2: Equivalent Terms

To assist in global understanding the following equivalent terminology is used:

Common Terminology	Also known as	Common Terminology	Also known as
Bearing Assembly	Power Frame	Separate Mounted	Long Coupled
Gasket	Joint	Support Gasket	Alignment Pad
Shroud	Containment Shell	Shroud Temperature Probe	Thermometer/RTD
Bush	Radial Bearing or Journal Bearing	Spanner	Wrench
Neck Ring	Wear Ring		

Section 3: Units

Both Metric and equivalent US units are shown in this manual where appropriate.
Conversion factors between units are:

°C	to	°F	=	multiply by 1.8 & add 32
mm	to	inches	=	divide by 25.4
Nm	to	ftlbs	=	divide by 1.356
mls	to	US. floz	=	divide by 29.6

Section 4: Clearances & End-float

HPGS Frame 0 Pump:-

Component	Diametral Clearance Max/Min		Wear Limits Recommended for Replacement	
	(mm)	(Inch)	(mm)	(Inch)
Impeller / Front Neck Ring (1", 25mm Suction)	2.21 / 2.05	0.087 / 0.080	2.50	0.098
Bump Ring / OMR	0.84 / 0.67	0.033 / 0.026	1.16	0.046
OMR / Shroud	2.10 / 1.43	0.083 / 0.056		
IMR / Shroud	1.83 / 1.57	0.072 / 0.062		
Sleeve / Bush	0.17 / 0.003	0.006 / 0.001	0.20	0.008
End Float	1.28 / 0.48	0.050 / 0.019	2.5	0.098

Table 1

The above table is for guidance only. Contact HMD/Kontro if different

Section 4a: Quick Reference Torque Settings

(Torque settings also contained in main manual)

REF (Reference Number)	Description	Torque Setting	
		Nm	lbf-ft
61.S47	Screw (Bearing Housing Retention) **Separate Mounted Pump only**	50	37
61.S43	Screw (Back Cap Retention) **Separate Mounted Pump only**	12	9
61.S42	Screw (Front Cap Retention) **Separate Mounted Pump only**	12	9
45.S41	Screw (Motor Adaptor Retention) **Close Coupled Pump only**	50	37
45.S11	Screw (Motor Retention) **Close Coupled Pump only**	3/8” UNC: 30Nm / 22lbf-ft	
		1/2” UNC: 50Nm / 37lbf-ft	
45.N11	Nut (Motor Retention) **Close Coupled Pump only**	M10: 30Nm / 22lbf-ft	
		M12: 50Nm / 37lbf-ft	
		M16: 110Nm / 81lbf-ft	
43.S44	Screw (Foot Retention)	30	22
41.N11	Nut (Casing Retention)	120	89
20.S41	Screw (Bush Holder Retention)	16	12
02.03	Screw (Impeller Retention)	50	37

Note that Outer Magnet Ring (51.51) Retention Screws 51.S51 and 51.S61 do not have a torque setting due to deep recesses Screws are located in, and are therefore fully tightened by hand using long series hexagon key sockets. See Section 8.16 for details.

It is not normally required that Motor Adaptor and Motor are separated; but if this is the case the above torque settings are given for both (45.S11 or 45.N11).

SECTION 5
DISASSEMBLY OF THE HPGS Frame 0 PUMP

Refer to the Sectional/Parts List Drawing supplied with the separate data package. Component references indicated on sectional and parts list are contained in parentheses ( ) in this document.

5.01 The disassembly of the HPGS Frame 0 Pump can be accomplished with simple tools. Before working on the pump ensure that it is drained and decontaminated. The work should be carried out on a clean level workbench in a workshop. - **Fig. 1**

Refer to the Sectional/Parts List Drawing supplied with this manual.

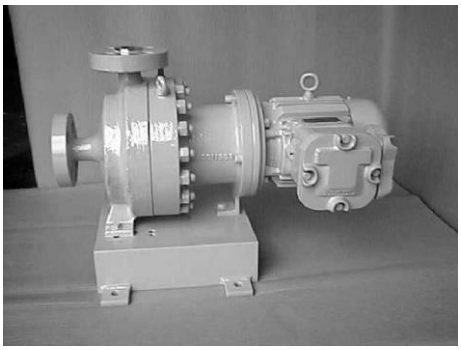

Fig. 1

If a shroud temperature probe is installed, ensure that it is removed prior to disassembly to avoid damage when the shroud is withdrawn. - **Fig. 2**

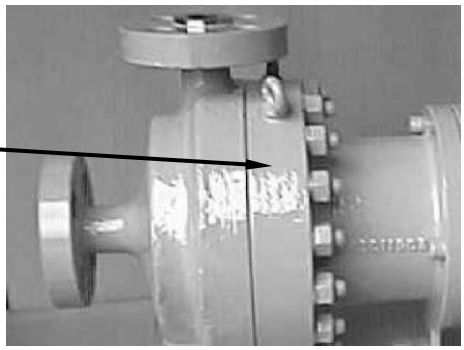

Fig. 2

5.02 Remove the Casing Retention Nuts (41.N11) and the Casing Retention Washers (41.W11). - **Fig. 3**

And then remove the Casing Foot to Baseplate bolts.

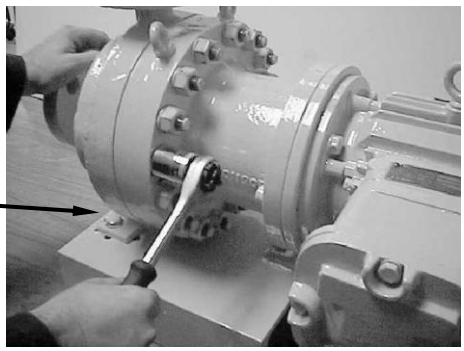

Fig. 3

5.03 If required use the Casing forcing screws (43.S12) to initially separate the Casing and Coupling Housing. - **Fig. 4**

Fig. 4

5.04 Remove Casing Assembly (41.41). - **Fig. 5**

Note: If refurbishment is required remove the Neck Ring (41.01) from the Casing (41.41). Refer to section 7.

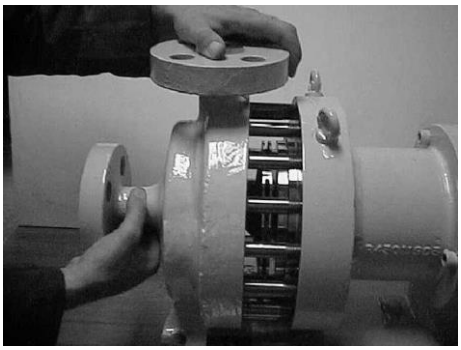

Fig. 5

5.05 Remove and discard the Gasket (20.17). - **Fig. 6**

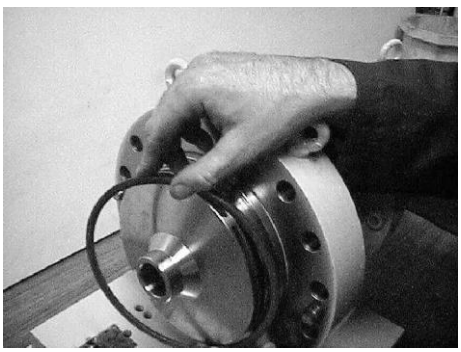

Fig. 6

5.06 5.06 Remove the Impeller fastener (02.03). - **Fig. 7**

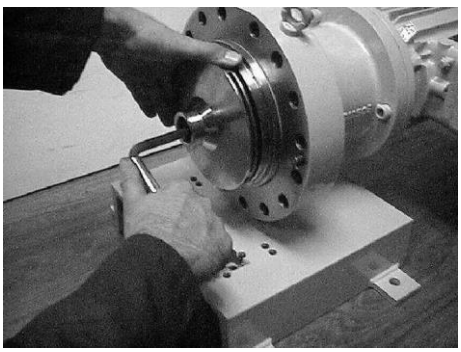

Fig. 7

5.07 Ensure the recirculation hole drilled through the centre of the Impeller Fastener is totally clear. - **Fig. 8**

Fig. 8

5.08 Remove Impeller (06.06), taking care to ensure that the Thrust Washer (07.07) does not drop out.

5.09 Remove the Thrust Washer (07.07) and check location for damage - **Fig. 9**

Note:- To remove the Front Thrust Washer (07.07) it may be necessary to break it into small pieces with a hammer and punch. Always wear an eye protection when handling Silicon Carbide Components.

Fig 9

5.10 Remove the three Bush Holder retention screws (20.S41). Forcing holes are provided to assist in separating the Bush Holder from the Shroud. - **Fig. 10**

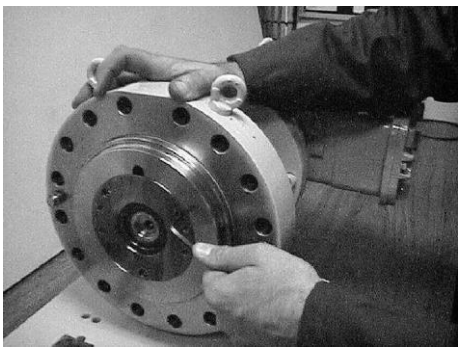

Fig. 10

5.11 The Impeller Fastener (02.03) can be used to assist in fully removing the Bush Holder (09.09). - **Fig. 11**

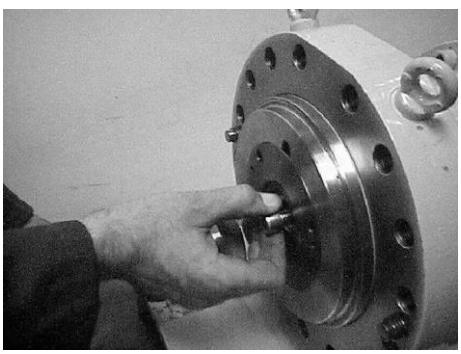

Fig. 11

5.12 Fully remove the Bush Holder (09.09) and the Shaft/IMR assembly (02.02) from the Shroud (20.20). - **Fig. 12**

Note:- Care should be taken as there will be resistance from the magnetic coupling.

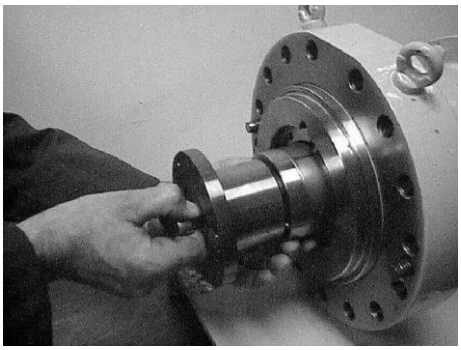

Fig. 12

5.13 Lift the Bush Holder (09.09) from the Shaft/IMR assembly (02.02). - **Fig. 13**

Fig 13

5.14 Slide the Silicon Carbide sleeve (02.86) from the Shaft (02.02) and remove the two 'O' rings (02.OR1) from their grooves in the shaft (02.02). - **Fig. 14 & 15**

Fig 14

Fig 15

5.15 Remove Pump Shaft Sleeve Spacer (02.69). - **Fig. 16**

Fig 16

5.16 Slide the Silicon Carbide Sleeve (02.86) from the Shaft (02.02) and remove the two 'O' rings (02.OR1) from their grooves in the shaft (02.02).

5.17 Remove the Back Thrust Washer (08.08) and the support gasket (08.39) from the shaft (02.02). – **Fig. 17 & 18**

Fig. 17

Fig. 18

5.18 Remove the Shroud Retention Screws 20.S42 and remove the shroud (20.20) from the Coupling Housing (43.43). **- Fig. 19**
If required forcing screws are located adjacent to the Shroud Retention Screws to assist in this operation.

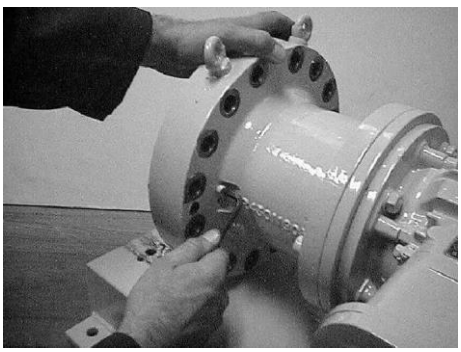

Fig. 19

5.19 Gently remove the Shroud (20.20) from the Coupling Housing (43.43). Take care not to damage the outside of the tube. – **Fig. 20**

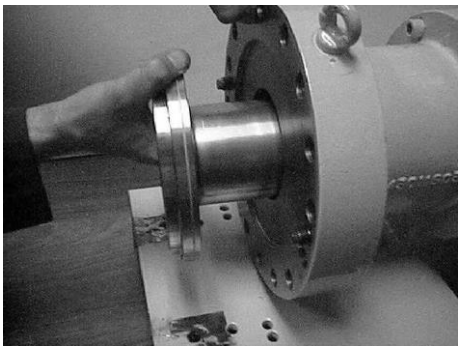

Fig. 20

5.20 This photograph shows the pump cartridge fully dismantled. – **Fig. 21**

Fig. 21

5.21 Unscrew the fasteners locating the Bearing Housing (61.61) or the Electric Motor to the Coupling Housing (43.43), and remove (ensure the Electric Motor is adequately supported during this operation). – **Fig. 22**

For Close Coupled pumps refer to paragraph 5.33

Fig. 22

DISASSEMBLY OF THE HPGS Frame 0 PUMP
Oil Lubricated Power Frame

5.22 Before Staring to disassemble, the Bearing Housing must be drained of all oil by removing the Drain Plug (61.50) situated at the bottom. – **Fig. 23**

Fig. 23

5.23 Place the Bearing Housing / OMR assembly on a clean surface. – **Fig. 24**

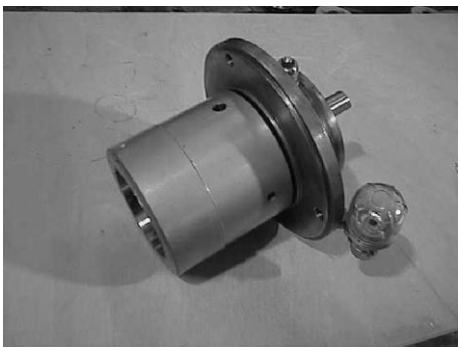

Fig. 24

5.24 The OMR (51.51) is locked on to the drive shaft (62.62) with two Retention Screws (51S.51, 51S.62), these need to be loosened. – **Fig. 25 & 26**

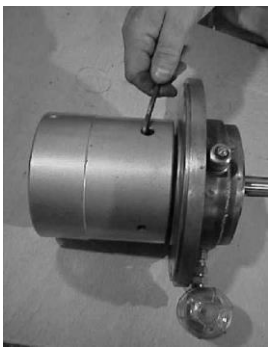

Fig. 25

Fig. 26

5.25 Remove the OMR (51.51) from the Drive Shaft (62.62) using two suitable levers as shown in **Fig. 27**

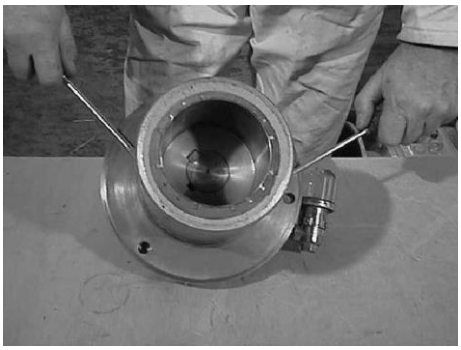

Fig. 27

Fig. 28 shows the two component parts.

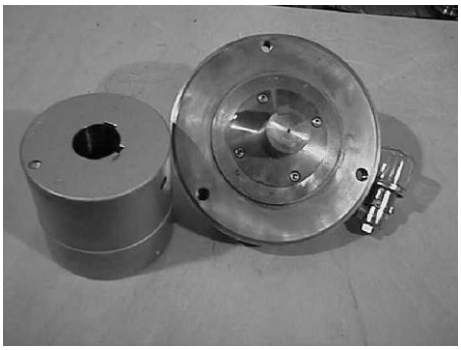

Fig. 28

5.26 Remove both the keys (62K.31, 62K.11) from the Drive Shaft (62.62). – **Fig. 29 & 30**

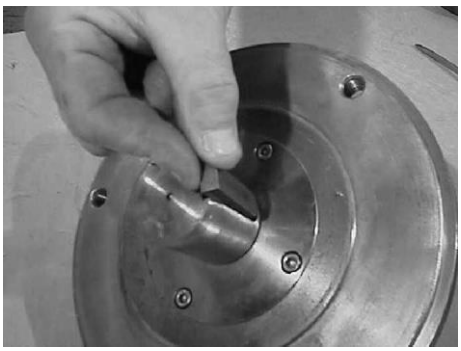

Fig. 29

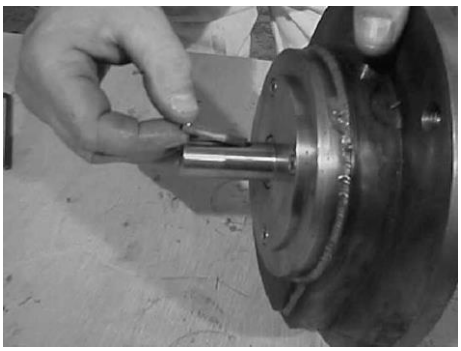

Fig. 30

5.27 Remove the Constant Level Oiler (61.CL1) by undoing the union securing it to the Bearing Housing. – **Fig. 31**

Fig. 31

5.28 Remove the four Back Cap Retention Screws (61.S43). – **Fig. 32**

Fig. 32

5.29 Remove the Back Cap (61.68) and inspect the Oil Seal (61.SS1) for damage. Discard if worn or damaged. – **Fig. 33**

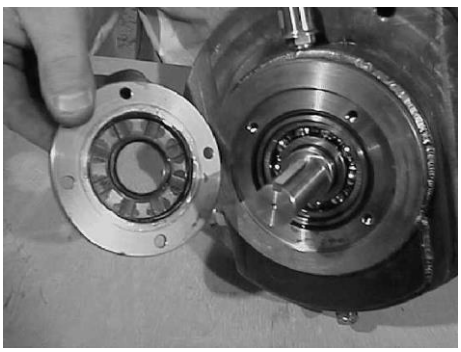

Fig. 33

5.30 Remove the 'O' Ring (61.OR1) and discard. – **Fig. 34**

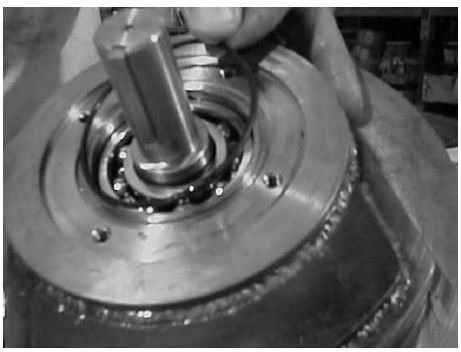

Fig. 34

5.31 Undo the four Front Cap Retention Screws (61S.42) and remove the Front Cap (61.67). – **Fig. 35**

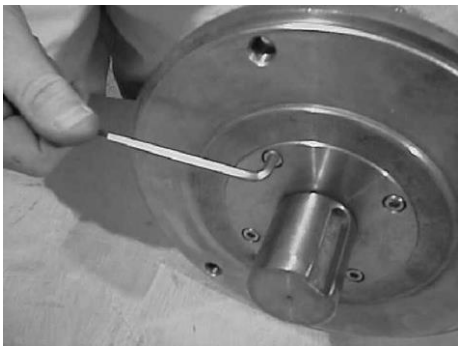

Fig. 35

5.32 Using a suitable press remove the Drive Shaft (62.62) from the Bearing Housing (61.61). – **Fig. 36**

Fig. 36

5.33 Press the Drive Shaft (62.62) from the Front Race (62.BB1). – **Fig. 37**

Fig. 37

Fig. 38 shows the Bearing Housing component parts fully disassembled.

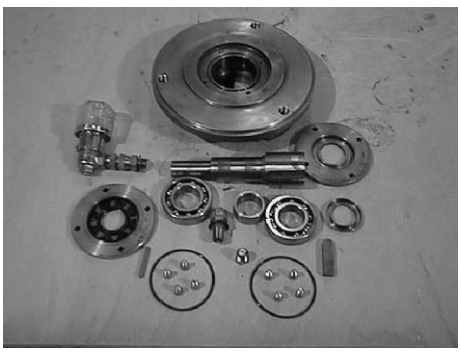

Fig. 38

DISASSEMBLY OF THE HPGS Frame 0 PUMP
Close Coupled Pumps

5.34 Remove the three Motor Adaptor to Coupling Housing Retention Screws (45.S41). – **Fig 39**

Care must be taken as this can be heavy, ensure the Electric Motor is adequately supported during this operation.

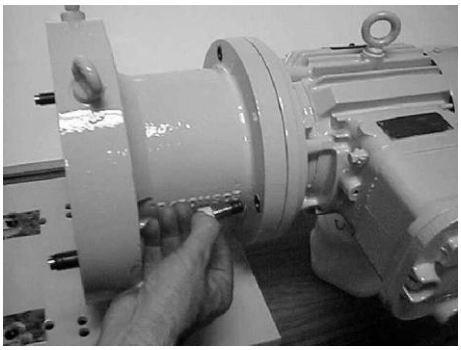

Fig. 39

5.35 Carefully ease the motor complete with OMR (51.51) from the Coupling Housing (43.43). – **Fig. 40**

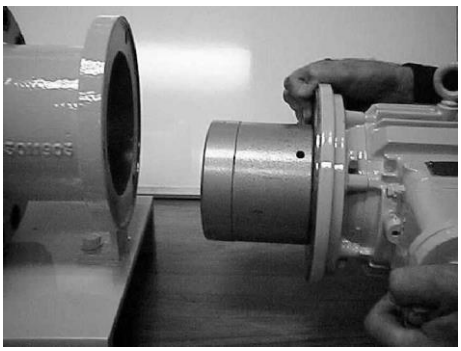

Fig. 40

5.36 Remove the OMR (51.51) from the Motor Shaft. Refer to **Fig. 25, 26 & 27**

SECTION 6
Recommended Procedure for Replacement of Bushes

⚠ Guard against the combustion of product residue on the component. Wear eye protection to guard against the fracturing of Carbon and Silicon Carbide Bushes and Thrust Pads. Wear Suitable protective clothing and gloves while handling hot components.

6.01 It is strongly recommended that all Bushes and Thrust Pads are replaced before the pump is reassembled, if damaged or beyond wear limits given on page 2.

Removal

6.02 Support Bush Holder (09.09) on two metal packings either side of the protruding Silicon Carbide Bush (09.10). Heat the Bush Holder to 350°C and the Silicon Carbide Bush (09.10) will fall out. After cooling check that components are clean and free from damage to location diameter.

Fitting

Clean mating bores and faces thoroughly prior to fitting of replacement parts. Use a non-mechanical cleaning method. Note: Metal blocks will be required, refer to section 1, Tool Requirements.

6.03 For new Bushes (09.10) place them into an oven and hold within 50°C (122°F) of the bush holder temperature and maintain for approximately 30 minutes, prior to fitting into the Bush Holder. Metal blocks should also be preheated to prevent cracking of the Bush.

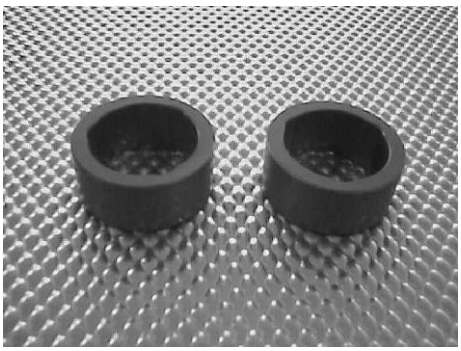

Fig. 41

6.04 Stand the Bush Holder (09.09) vertical with the flange uppermost in an oven and heat to 250°C for 316 SS and 360°C for Alloy 255.

6.05 Take the first Silicon Carbide Bush (09.10) and insert into the Bush Holder (09.09). Ensure that the flow grooves are correctly positioned. – **Fig 42**

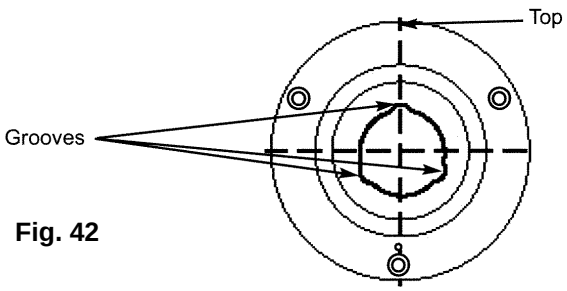

Fig. 42

6.06 Allow the Bush Holder (09.09) to cool to approximately 100°C (212°F). Replace the Bush Holder (09.09) in oven with the flange downwards. To ensure that the front Bush does not fall out, it should be held in place by resting on a metal block as shown. – **Fig. 43**

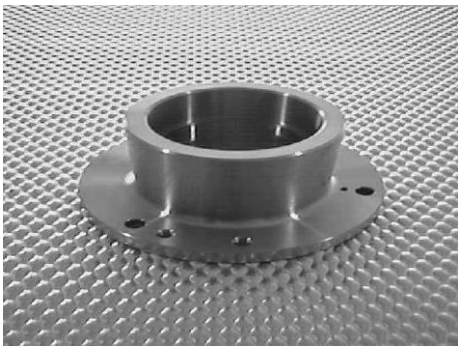

Fig. 43

6.07 Heat the Bush Holder (09.09) to 250°C for 316 SS and 360°C for Alloy 255. Remove from oven with the block holding in the Front Bush, now insert the Back Bush (09.10A) ensuring that it is fully seated and the flow grooves are aligned with the Front Bush flow grooves.

6.08 Allow the Bush Holder to cool in the vertical position as shown in **Fig. 44**. Do not attempt to accelerate the cooling process. Metal block on top must be approx. 1kg (2.2lbs). When cool, visually inspect the Bush for any signs of damage.

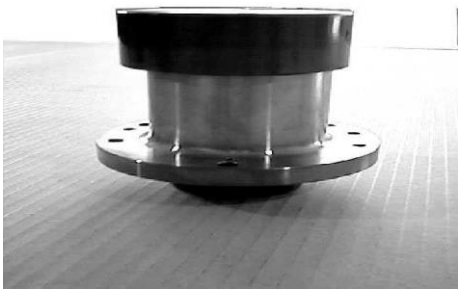

Fig. 44

6.09 When cool the Bush Holder (09.10) is ready to be assembled in the pump.

SECTION 7
Neck Ring Replacement

7.01 Neck Ring (41.01) are retained by an interference fit and can be removed from their locations by using a suitable puller or pry bar. – **Fig. 45**
Note that if Neck Rings are pinned, the pins should be removed first, prior to removing the Neck Rings.

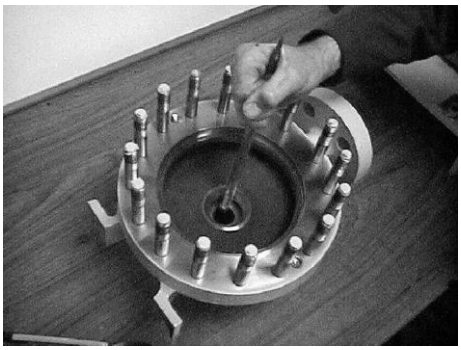

Fig. 45

Before fitting a new Neck Ring (41.01) check that the location is within the limits shown below.

Neck Ring Location Bore

Pump Size	**Casing**	
	Inch	**mm**
1 x 1 x 5	2.678	2.677
	68.030	68.000
1 x 1 x 6	2.759	2.758
	70.080	70.050

Fitting

7.02 Neck Ring (41.01) should be fitted using either a press or a soft mallet and suitable soft drift until it seats against its shoulder. – **Fig. 46**
Note that the leading edge of the Neck Ring has a chamfer.

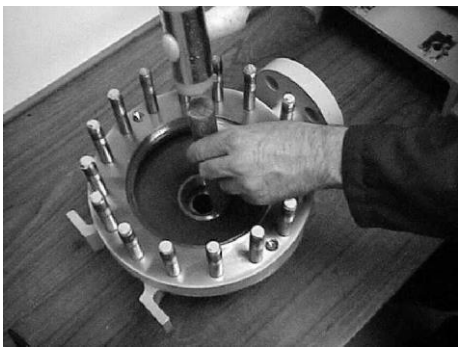

Fig. 46

SECTION 8
ASSEMBLY INSTRUCTIONS

Oil Lubricated Power Frame

8.01 Ensure all the Pump Components are clean and in "as new" condition. The assembly should be carried out in a clean dry area. – **Fig. 47**

Fig. 47

8.02 Position the Front Cap (61.67) on to the Drive Shaft (62.62). – **Fig. 48**

Fig. 48

8.03 Place the Front Thrower (61.75) on the Drive Shaft (62.62) with the recess against the Front Cap (61.67). – **Fig. 49**

Fig. 49

8.04 Press the Front Ball Race (61.BB1) on to the Drive Shaft (62.62). – **Fig. 50**

Fig. 50

8.05 Position the Spacer (62.69) on the Drive Shaft (62.62) up to the Front Ball Race (62.BB1). – **Fig. 51**

Fig. 51

8.06 Place the Drive Shaft (62.62), Race (62.BB1), O-Ring (61.OR1) and Front Cap (61.67) into the Bearing Housing (61.61). – **Fig. 52**

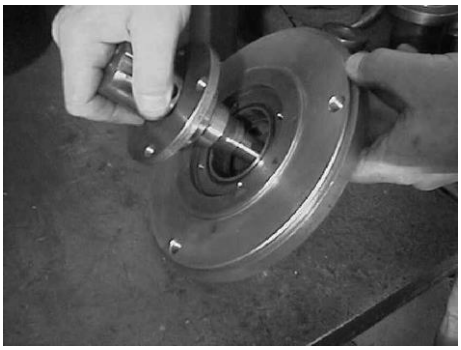

Fig. 52

8.07 Using a suitable press position the Drive Shaft (62.62), Race (62.BB1) and Front Cap (61.67) correctly into the Bearing Housing (61.61). – **Fig. 53**

Fig. 53

8.08 Replace the 'O' Ring (61.OR1). – **Fig 54**

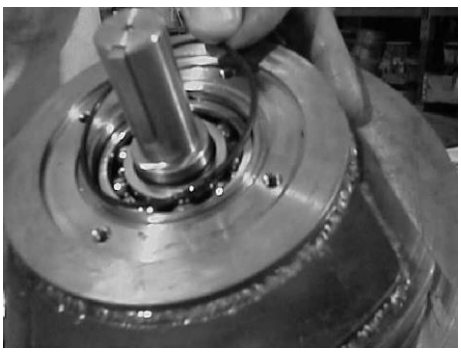

Fig. 54

8.09 Fit a new Oil Seal (61.SS1) (if required). – **Fig. 55**

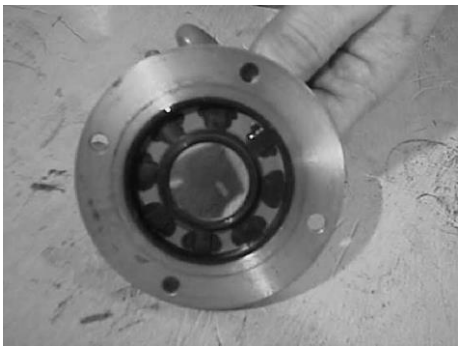

Fig. 55

8.10 Align the Front Cap (61.67) and tighten Retention Screws (61.S42) to 12Nm (9lbf-ft). – **Fig. 56**

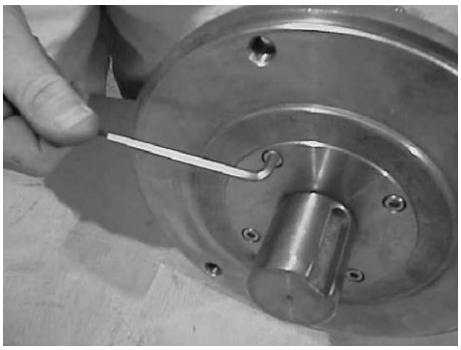

Fig. 56

8.11 Replace the Back Cap (61.68) and tighten Retention Screws (61.S43) to 12Nm (9lbf-ft). – **Fig 57**

Fig. 57

8.12 Replace the Constant Level Oiler (61.CL1), ensuring the union is tightened securely. – **Fig. 58**

Fig. 58

8.13 Replace the Breather (61.VP1). – **Fig. 59**

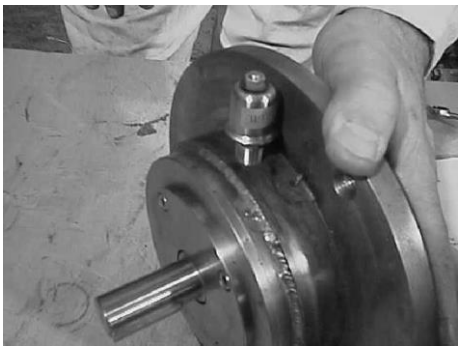

Fig. 59

8.14 Replace both keys (62.K31, 62.K11) in to the Drive Shaft (62.62). – **Fig. 60 & 61**

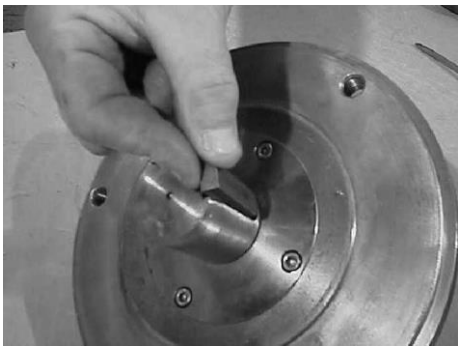

Fig. 60

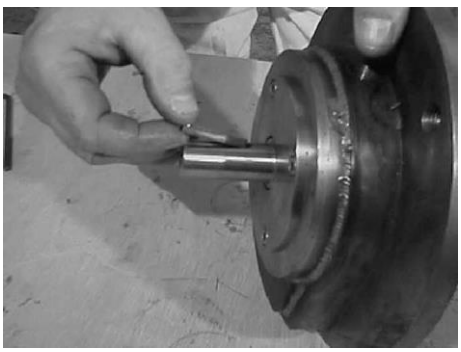

Fig. 61

8.15 Wrap PTFE tape around thread; refit the Drain Plug (61.50) into the bottom of the Bearing Housing (61.61) and fully hand tighten. – **Fig. 62**

Fig. 62

8.16 Position the OMR (51.51) on to the Drive Shaft (62.62) aligning end of Shaft with inner face of OMR, and then fully tightened the securing screws (51.S51, 51.S61) by hand using long series hexagon key sockets. – **Fig. 63**

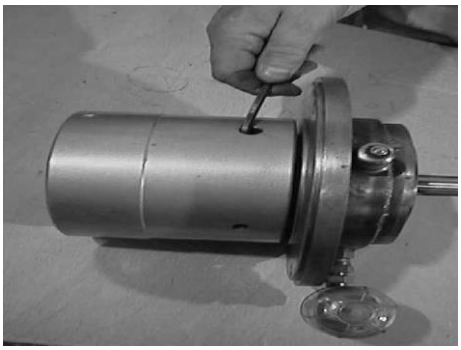

Fig. 63

8.17 This assembly is now ready to be put back into the Coupling Housing. – **Fig. 64**

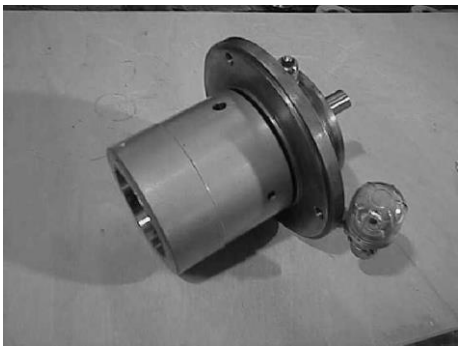

Fig. 64

Check Concentricity and squareness of OMR to the face of the Motor or Bearing Housing prior to fitting Coupling Housing. **Fig. 65a & 65b**

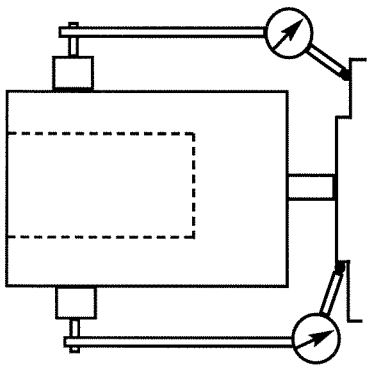

Fig. 65a

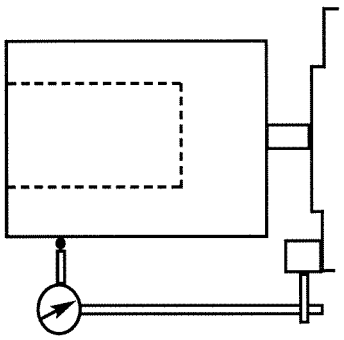

Fig. 65b

8.18 Fit the Bearing Housing (61.61) to the Coupling Housing (43.43) using the retention screws (61.S47). Torque to 50Nm (37lbf-ft). – **Fig. 66**

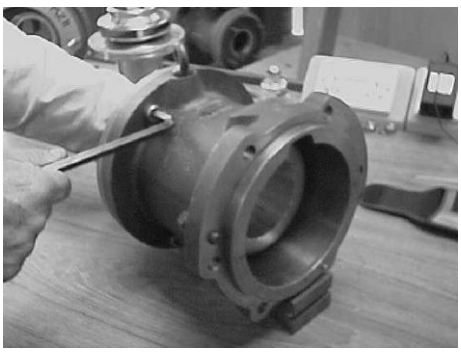

Fig. 66

8.19 Check that the Outer Magnet Ring(51.51) is rotating concentric within the Coupling Housing (43.43). Maximum face run-out is 0.25mm (0.010”) and maximum run-out is 0.50mm (0.020”) diametral, measured in the Shroud location bore. – **Fig. 67**

Fig. 67

ASSEMBLY INSTRUCTIONS
Close Coupled Pumps

8.20 Slide the Outer Magnet Ring (51.51) on to the Motor Shaft aligning end of Shaft with inner face of OMR and tighten the retention screws (51.S51, 51.S61). Note: The two screws are different sizes. Refer to 8.16.

Check Concentricity and squareness of OMR to the face of the Motor or Bearing Housing prior to fitting Coupling Housing. **See Fig. 65a & 65b**

8.21 Carefully position the OMR and Motor into the Coupling Housing. – **Fig. 68**
Ensure the Motor is supported, preferably with a crane, during this operation.

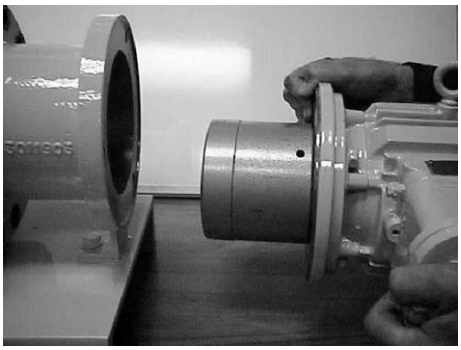

Fig. 68

8.22 Refit the three Retaining Screws (45.S41) through the Coupling Housing flange into the Motor Adaptor and tighten to 50Nm (37lbf-ft). **– Fig. 69**

8.23 Check Outer Magnet Ring (51.51) concentricity. Refer to 8.19.

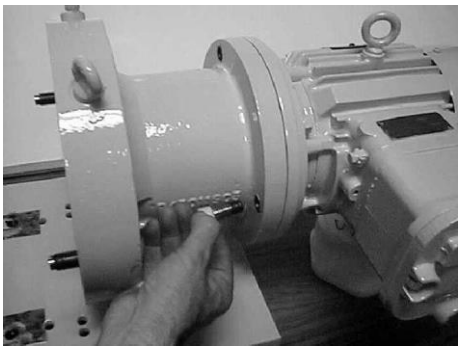

Fig. 69

ASSEMBLY INSTRUCTIONS
Pump End

8.24 Fit a new Back Thrust Washer (08.08) and Support Gasket (08.39) into the Pump Shaft/IMR (02.02). Ensure that the Thrust Washer (08.08) is located on the Thrust Washer Pin (02.49C). – **Fig 70 & 71**

Note: The Thrust Washer grooves must be uppermost. – Fig. 70

Fig. 70

Fig. 71

8.25 Fit two new 'O' Rings (02.OR1) into the grooves in the Pump Shaft/IMR (02.02).

8.26 Fit the Pump Shaft Sleeve (02.86) onto the Pump Shaft/IMR (02.02) and slide up to the Back Thrust Washer (08.08).

8.27 Fit the Pump Shaft Spacer Sleeve (02.69) on to the Pump Shaft/IMR (02.02) and push into contact with the Shaft Sleeve (08.86). – **Fig. 72**

Fig. 72

8.28 Fit two new 'O' Rings (02.OR1) into the grooves in the Pump Shaft/IMR (02.02). – **Fig. 73**

8.30 Ensure inside of Shroud (20.20) and outside diameter of Pump Shaft/IMR (02.02) are clean.

Fig. 73

8.31 Fit the Bush Holder (09.09) over the Pump Shaft/IMR (02.02). – **Fig. 74**

Fig. 74

8.32 Install the Shroud (20.20) within the Coupling Housing (43.43). – **Fig. 75**

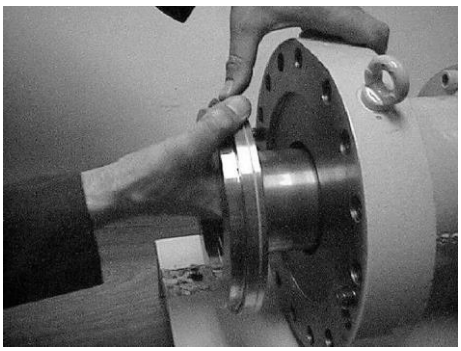

Fig. 75

8.33 Replace the Shroud Retention Screws (20.S42) and carefully hand-tighten. – **Fig. 76**

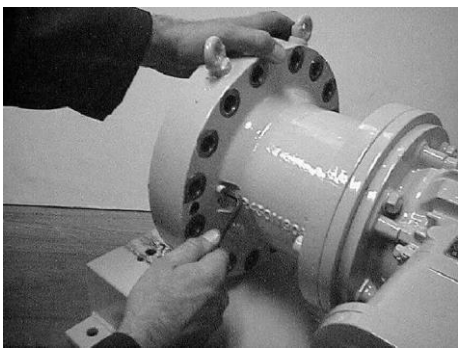

Fig. 76

8.34 Insert the Pump Shaft/Bush Holder Assembly into the Shroud (20.20). The Impeller Fastener setscrew (02.03) can be screwed into the Pump Shaft (02.02) to assist in this careful installation.

Note: Care should be taken as there will be some magnetic pull from the Magnetic Coupling. – **Fig. 77**

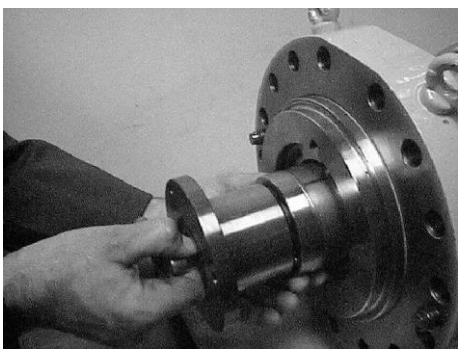

Fig. 77

8.35 Screw in the three Bush Holder Retaining Screws (20.S41). Torque to 16Nm (12lbf-ft).

Note: To ensure correct positioning the screw holes are not symmetrically drilled. – **Fig. 78**

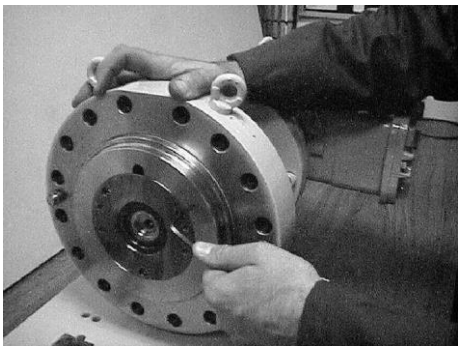

Fig. 78

8.36 Fit a new Front Thrust Washer (07.07) into the Impeller (06.06) ensuring surfaces and locations are free from dirt and damage. – **Fig. 79**

Fig. 79

8.37 Fit Impeller (06.06) to the Pump Shaft/IMR (02.02) and screw in the Impeller Fastener (02.03). Torque to 50Nm (37lbf-ft). – **Fig. 80**

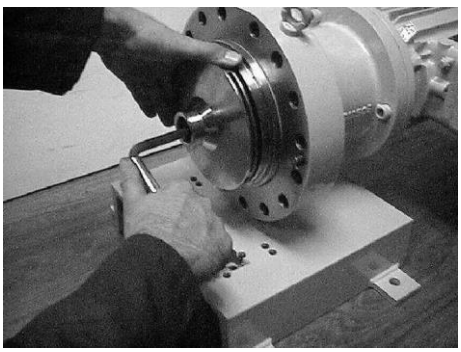

Fig. 80

8.38 Check the Axial movement of the Impeller (06.06) using a dial test indicator, it should be between 0.48mm (0.019”) and 1.28mm (0.050”). – **Fig. 81**

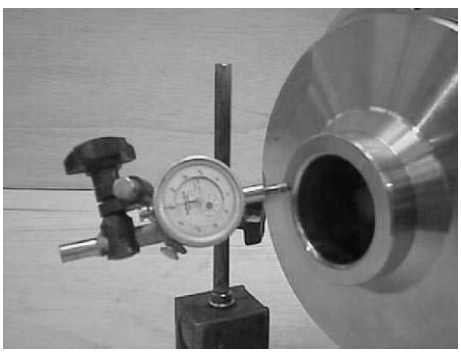

Fig. 81

8.39 Fit new Casing Gasket (20.17) ensuring that all faces are clean. – **Fig. 82**

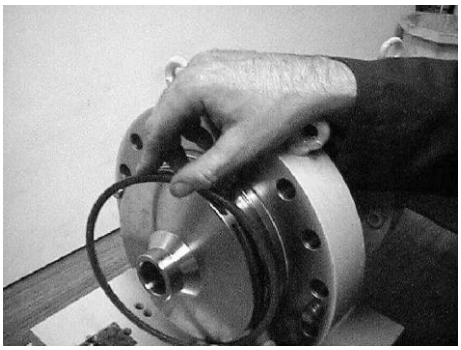

Fig. 82

8.40 Fit the Casing (41.41) to the Coupling Housing (43.43) and fit the Washers (41.W11) and Casing Retention Nuts (41.N11). Torque to 120Nm (89lbf-ft). – **Fig. 83**

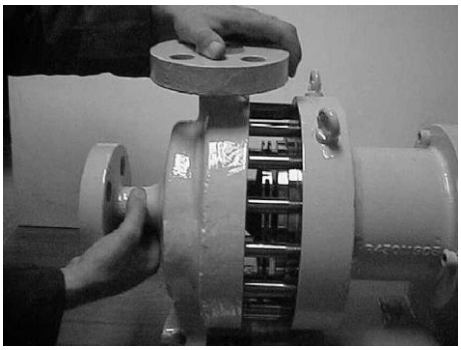

Fig. 83

In order to ensure that the Casing Gasket is evenly compressed, and to ensure the Coupling Housing is bolted squarely with the Casing, the following procedure must be followed:

1) After assembly, and before replacing the Nuts, ensure the Casing Studs are lightly lubricated.
2) Ensure the Casing Nuts are clean and lightly lubricated on the mating faces with the washers.
3) Following the pattern shown in **Fig. 84**, tighten the Casing Nuts thus:-

1st pass	30% of recommended torque
2nd pass	60% of recommended torque
3rd pass	Full recommended torque

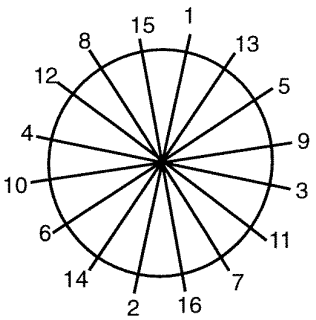

Fig. 84

8.41 Secure the Casing Foot to the Baseplate using existing Bolts and Washers

8.42 The pump is now ready for hydrostatic and performance testing. – **Fig. 85**

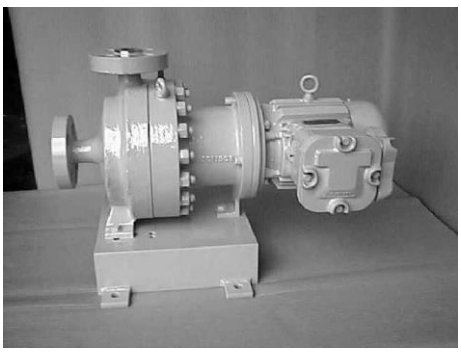

Fig. 85

SECTION 9
OIL LUBRICATED BEARING ASSEMBLIES
Separate Mounted Only

9.01 Filling Procedure

This details the filling procedure for oil lubricated bearing assemblies

Do not fill using the coupling housing vent plug shown in **Fig. 86**, as this will place oil in the coupling housing and may lead to pump failure.

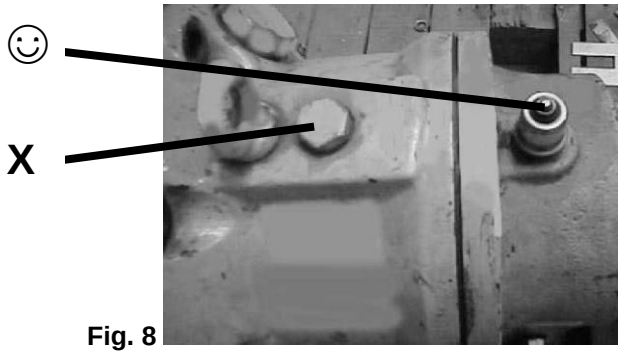

Fig. 8

Fill the oil lubricated bearing assembly using a recommended grade of oil, stated in section 9.02, by removing the filter/breather (61.VP1), and pouring approximately three quarters of the volume of oil, stated in section 9.03, into the housing. The remaining volume, to ensure the correct oil level, should be filled using the oil bottle as follows:

Fill the oil bottle and place in the constant level oiler (61.CL1) and allow the bottle to empty which may take 15 minutes or so. Then re-fill and repeat the procedure. If the oil bottle does not empty or stops at the same level for 30 minutes or so, the correct oil level in the bearing housing has been reached.

Do not try to take short cuts by topping up via the breather or constant level oiler without the bottle fitted as this may result in overfilling, resulting in oil entering the coupling housing, or hot running bearings.

9.02 Recommended Oil Grades

Typical Physical Characteristics	Value / Type	Acceptance Method
ISO Oil Type	HM	-
ISO Viscosity grade	68	-
Viscosity, kinematic		
at 0°C	1040 (max)	ASTM D445
at 40°C	64 – 68	or IP71
at 100°C	8.6 (max)	
Viscosity Index	98 - 102	ASTM D2270 or IP226
Density at 15°C, Kg/m³	878 - 888	ASTM D4052 or IP365
Flash Point °C (Pensky-Martens Closed Cup/coc)	220 - 255	ASTM D92 or IP36
Pour Point °C	-5 to -30	ASTM D97 or IP15
Foaming Characteristics ml, after 10 minutes		
Sequence 1 @ 24°C Tendency / Stability	 Trace / Nil	ASTM D892 or IP146
Sequence 2 @ 93.5°C Tendency / Stability	 20 / Nil	
Sequence 3 @ 24°C (after sequence 2) Tendency / Stability	 Trace / Nil	

For equipment operating in ambient temperatures below -40°C (-40°F) consult HMD / Kontro for advise. For pumps operating in process temperatures above 260°C (500°F) a synthetic oil is recommended, consult HMD / Kontro for advice.

9.03 Oil Capacities (Power Frame Housing)

Quantities are in ml and US fl.ozs and are approximate.

To determine how much oil is required for your particular pump, refer to the model number on either the order acknowledgement or the nameplate fitted to the pump. With that information refer to the table below for the correct amount of oil needed.

If you have any doubts or questions please do not hesitate to contact HMD / Kontro or your local representative.

Capacity:	**GSA** 100mls	3.3 Usfl.oz
	GSI 380mls	12.8 Usfl.oz

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