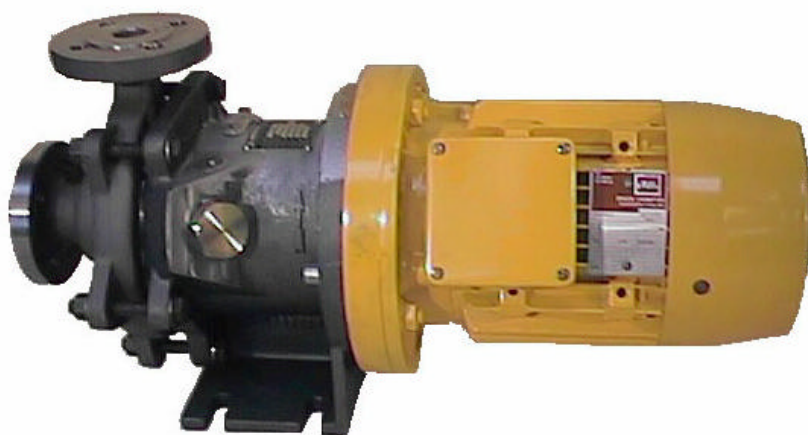


INDEX

MAINTENANCE INSTRUCTIONS

FOR PUMP RANGE GT



Standard Models

Quality Assured to ISO 9001 and BS 5750
since 1985 for the Design, Manufacture
and Repair of Sealless Pumps and Drives



European Union Machinery Directive (CE Mark System)

(where applicable)

This document incorporates information relevant to the Machinery Directive 89/392/EEC. 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 magnet drive pumps to exacting International Quality Management System Standards (ISO 9001 - 1994) 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.

Extreme caution should be taken by wearers of these implants 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 switch gear 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 inner and outer magnet ring due to the axial pull of the components. Where supplied jacking bolts should be used to prevent fingers from becoming trapped in the assembly.



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 GT Pumps, as detailed below:-

The GT range is a magnetically driven centrifugal pump family with end suction and top discharge nozzles. The GT range is available in, but not limited to the following standards (where applicable) :-

GTA	HMD Standard
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GTI	HMD Standard
-----	--------------

The GTA and GTI pumps are close coupled designs

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

For further assistance call your nearest HMD/Kontro representative stating the pump serial number, or contact HMD or Kontro direct on :

HMD SEALLESS PUMPS Customers

Sundstrand Fluid Handling

Telephone: 01323 452000 (UK) +44 (1323) 452000 (Int)

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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 DISASSEMBLY

	GT (Metric)	GT (Imperial)
Spanner x2	19mm	3/4"
Hexagonal wrench	10mm	3/8"
	5mm	3/16"
	3mm	1/8"
Torque Wrench	0 - 70 ft lbs	0 - 100 Nm
Soft Mallet	Yes	Yes
Bearing Press	Yes	Yes
Oven Suitable for 350°C (662°F)	Yes	Yes
Metal Blocks (75mm [3"] diameter x 25mm [1"] thick [Fig 17 & 19])		
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

Used in this Manual	Also Known as
Gasket	Joint
Shroud	Containment Shell
Bush	Radial Bearing or Journal Bearing
Neck Ring	Wear Ring
Close Coupled	Frame Mounted
Support Gasket	Alignment Pad
Spanner	Wrench

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 and 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 & Endfloats

GT Pumps:-

COMPONENT	DIAMETRAL CLEARANCE MAX / MIN (mm) (inch)		WEAR LIMITS Recommended for Replacement (mm) (inch)	
Front Neck Ring (1 x 1 x 5)[25-25-125]	2.21/2.06	0.087/0.081	2.7	0.11
Front Neck Ring (1 x 1 x 6)[25-25-160]	2.17/2.05	0.085/0.080	2.7	0.11
Front Neck Ring (2 x 1.5 x 5)[50-32-125]	2.21/2.06	0.087/0.081	2.7	0.11
Bump Ring/OMR	0.84/0.67	0.033/0.026	1.16	0.046
OMR/Shroud	2.06/1.35	0.081/0.053		
IMR/Shroud	1.83/1.57	0.072/0.062		
Sleeve/Bush	0.17/0.13	0.007/0.005	0.20	0.008
End Float	0.57/0.22	0.022/0.008	2.5	0.098

Table 1

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

Bolt Torques

Ref.	Component	Torque	
		Nm	ftlbs
62.S41	Outer Magnet Ring Retention Screws	25	18
45.S42	Motor Adaptor Retention Screws	36	27
02.03	Impeller Lock Nut	36	27
20.S41	Bush Holder Retention Screws	12	9
41.N11	Casing Retention Nuts	55	41
41.50	Casing Drain Plug (if fitted)	20	15

Table 2

SECTION 5

DISASSEMBLY OF THE GT PUMP

The disassembly of the GT Pump can be accomplished with simple tools. Before working on the pump ensure that it is drained and decontaminated.

5.01 The work should be carried out on a clean level work bench in a workshop where possible. - **Fig. 1**

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



Fig. 1

Note 1 Removal of Instrumentation

If a shroud temperature probe is fitted, ensure that it is removed prior to disassembly to avoid damage when the shroud is withdrawn.

If INsight or thermal ribbon RTD sensors are fitted, refer to the INsight or RTD instruction manuals before removing the shroud. This is to reduce the risk of possible damage to the sensors or sensor tails. The lock nut on the outside of the INsight or RTD adaptor must be removed to enable the socket connector to be pushed through as the shroud is withdrawn. Failure to do this will risk breaking the sensor tail.

5.02 Remove the Casing Retention Bolts (41.B11, 41.N11, 41.W11). - **Fig. 2**

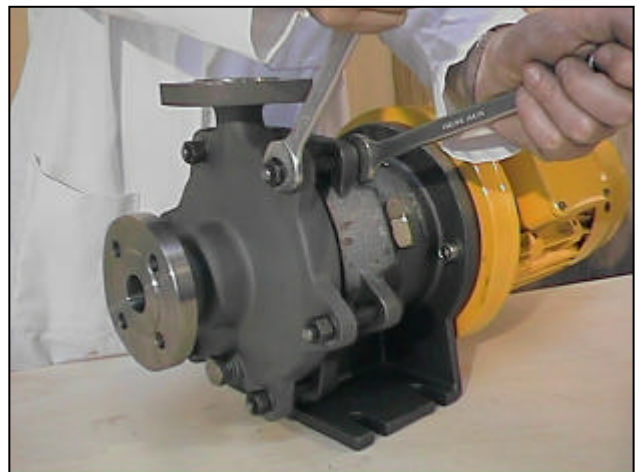


Fig. 2

5.03 Remove Casing Assembly (41.41) and Joint (20.17). - **Fig. 3**

Caution: The Cartridge may withdraw from the Coupling Housing (43.43) when the Casing (41.41) is removed.

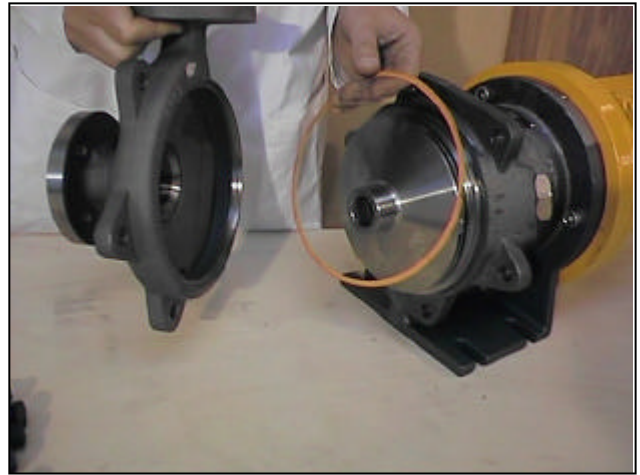


Fig. 3

5.04 Remove the Cartridge Assembly from the Coupling Housing (43.43) or casing (41.41). The groove on the outside diameter of the Shroud (20.20) can be used to prise it from the Coupling Housing (43.43). Care should be taken as there will be resistance from the magnetic coupling. - **Figs. 4 & 5**



Fig. 4



Fig. 5

5.05 Remove Impeller Fastener (02.03).
- **Fig. 6**



Fig. 6

5.06 Remove Impeller (06.06), care should be taken to ensure that the Thrust Washer (07.07) located behind the impeller (06.06) does not drop out. - **Figs. 7 & 8**

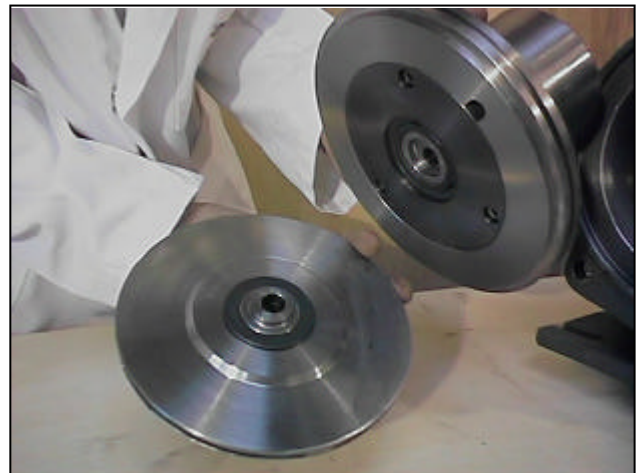


Fig. 7



Fig. 8

5.07 Remove Bush Holder Retention Screws (20.S41). - **Fig. 9**

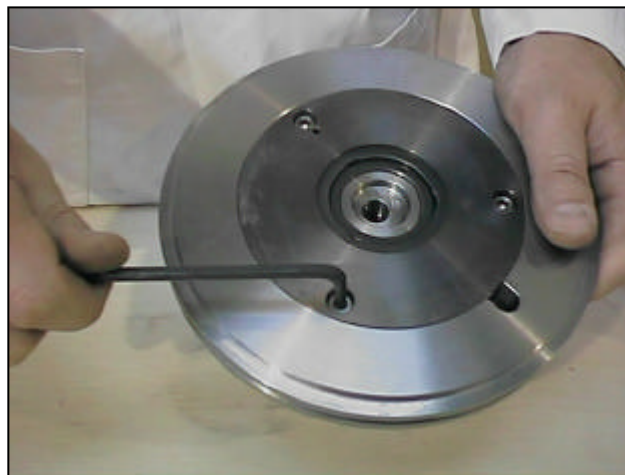


Fig. 9

5.08 Remove bush holder assembly (09.09) using jack screws if required. Please note, some earlier models may not be fitted with jack screw holes. - **Fig. 10**



Fig. 10

5.09 Remove Pump Shaft/IMR (02.02)
from Shroud (20.20). - **Fig. 11**



Fig. 11

Disassembly of the liquid end is now
complete. - **Fig. 12**



Fig. 12

5.10 Remove Coupling Housing Retention Screws (45.S41) and remove Motor (99.99) together with Motor Adaptor (45.45) from Coupling Housing (43.43).
- **Figs. 13 & 14**

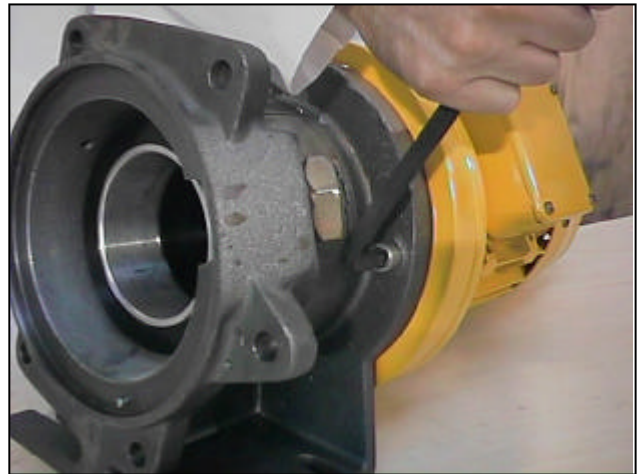


Fig. 13



Fig. 14

5.11 Remove Outer Magnet Ring Retention Screws (51.S51 and 51.S61) and the Outer Magnet Ring (51.51) from the motor.

- **Fig. 15**



Fig. 15

5.12 The Motor Adaptor (45.45) need only be removed if it or the motor requires replacement. - **Fig. 16**

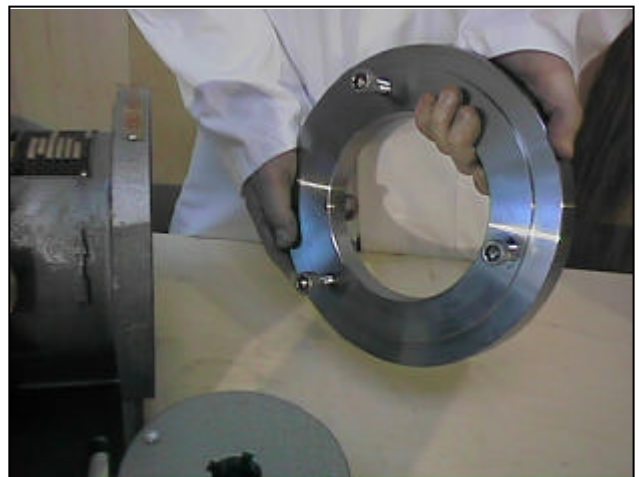


Fig. 16

SECTION 6

Recommended Procedure for Replacement of Bushes and Thrust Washers

Note Examine all Components for wear or damage and particular attention should be paid to the Bearing surfaces and related parts. Replace damaged bearing parts as follows:-

6.01 Whilst Silicon Carbide has excellent wear resistance it is brittle and care must be taken in handling this material. Always wear eye protection when handling Silicon Carbide.

6.02 Support Bush Holder (09.09) on two metal packings either side of the protruding Silicon Carbide Bush. Heat the Bush Holder (09.09) 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. - **Fig. 17**

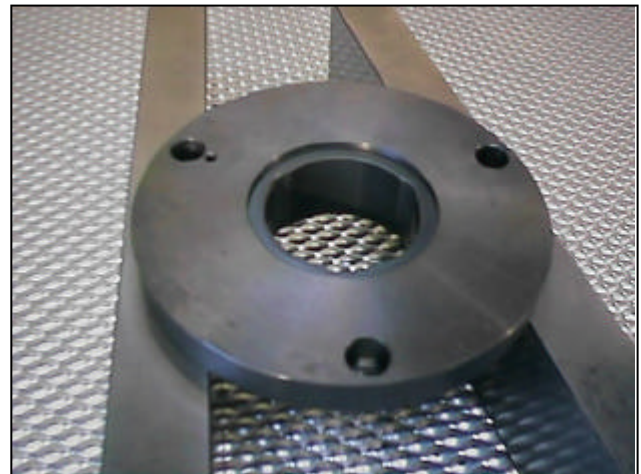


Fig. 17

6.03 Put the replacement Silicon Carbide Bush (09.10) in an oven and heat slowly to 100°C, maintain at this temperature until required. - **Fig. 18**



Fig. 18

6.04 Turn over the Bush Holder (09.09) and support on metal packings. Heat the Bush Holder (09.09) up to 250°C remove the Bush (09.10) from the oven and insert it into the Bush Holder (09.09) . Ensure that the Silicon Carbide Bush (09.10) is in contact with the Internal Shoulder in the Bush Holder. It is important to ensure that none of the lubrication grooves are positioned at the bottom (6 o'clock position) of the bush holder when refitting. - **Figs. 19 & 19A**

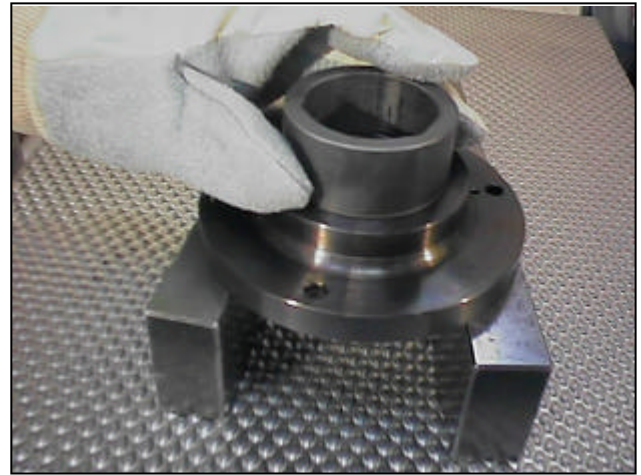


Fig. 19

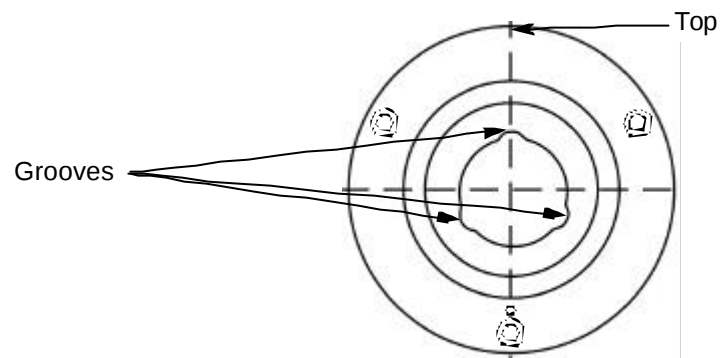


Fig. 19A

6.05 Allow the Bush Holder (09.09) to cool to ambient temperature in the vertical position with a warm (not less than 20°C) weight on top. - **Fig. 20**



Fig. 20

6.06 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. A new Thrust Washer (07.07) can now be inserted into the Impeller (06.06). - **Figs. 21 & 22**



Fig. 21



Fig. 22

6.07 Remove the Rear Thrust Washer.
- **Fig. 23**



Fig. 23

6.08 Remove the Pump Shaft Sleeve (02.86) from the Pump Shaft (02.02). It may be necessary to break this into pieces to remove. Always wear eye protection when handling Silicon Carbide components. - **Figs. 24, 25 & 26**



Fig. 24



Fig. 25



Fig. 26

6.09 Remove and discard the Support Gasket (08.39) from its recess. - **Fig. 27**



Fig. 27

6.10 Remove and renew 'O' Rings (02.OR1) into the two grooves and push on the new Shaft Sleeve (02.86). - **Figs. 28 & 29**



Fig. 28

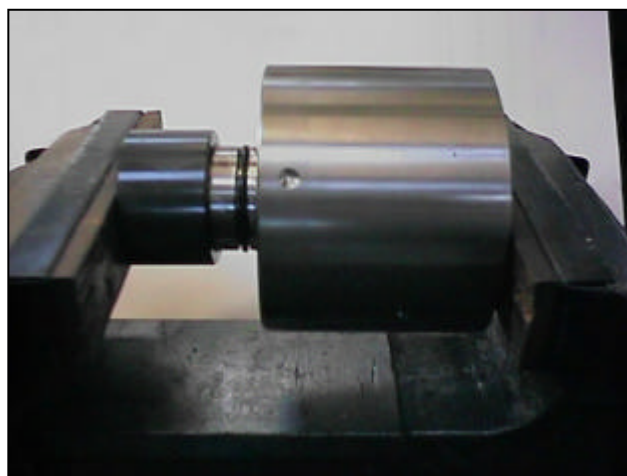


Fig. 29

6.11 Fit new Support Gasket (08.39) and Rear Thrust Washer (08.08) ensuring the grooves are uppermost and that they are correctly located on the Thrust Washer Pin (02.49C). - **Fig. 30**



Fig. 30

SECTION 7

Neck Ring Replacement

Removal

7.01 Neck Rings (41.01) are retained by an interference fit and can be removed from their locations by using a suitable puller or pry bar. - **Fig. 31**

Note that if Neck Rings are pinned, the pins should be removed first, prior to removing the Neck Rings.

7.02 Before fitting the new Neck Ring (41.01) ensure the location is within the dimensional limits shown in the table below.

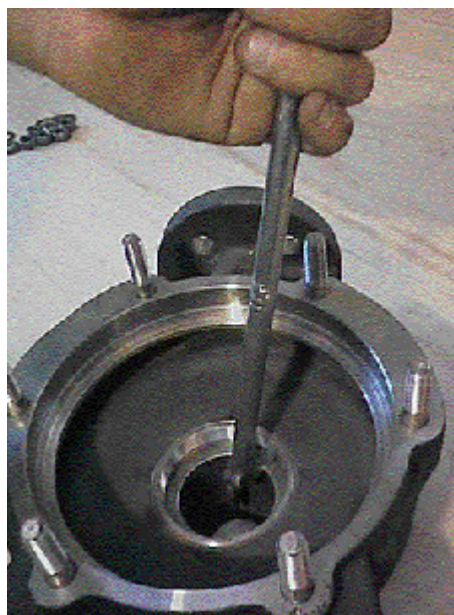


Fig. 31

Neck Ring Location Bore

Pump Size	Casing	Inch mm
1 x 1 x 5 25x25x125	2.678 / 2.677 68.030 / 68.000	
1 x 1 x 6 25x25x160	2.759 / 2.758 70.080 / 70.050	
2 x 1.5 x 5 50x32x125	3.546 / 3.544 90.060 / 90.030	

Fitting

7.03 Neck Rings (41.01) should be fitted using a soft drift until it seats against its shoulder. - **Fig. 32**

Note that the leading edge of the Neck Ring has a chamfer.



Fig. 32

SECTION 8

ASSEMBLY INSTRUCTIONS

8.01 Ensure all the Pump Components are clean and in "as new" condition. Ensure feed hole in Impeller fastener (02.03) and drain hole in Bush Holder (09.09) are not blocked or restricted. The pump is now ready for assembly and should be carried out in a clean dry area.

- **Figs. 33 & 34**



Fig. 33



Fig. 34

8.02 Before fitting any components to the Electric Motor the Motor must be checked to ensure that its shaft is running concentrically to the Motor Flange. - **Fig. 35 & 35A**

8.03 Stand the Electric Motor on its end with the Drive Shaft uppermost and vertical. Fix the magnetic base of a Dial Test Indicator to the Motor Shaft. Check the Motor Flange face run-out does not exceed 0.004" and check that the spigot run-out does not exceed 0.004".

- **Fig. 35 & 35A**

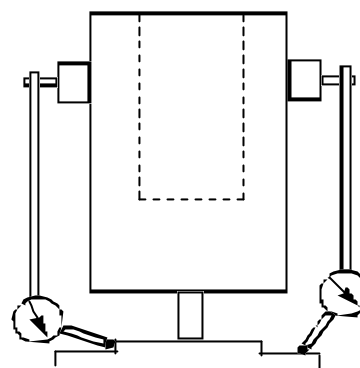


Fig. 35

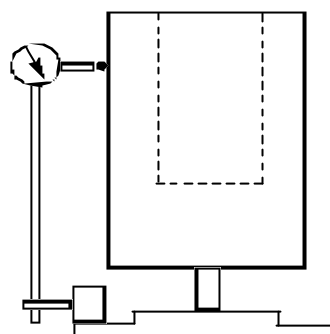


Fig. 35A

8.04 Fit Outer Magnet Ring (51.51) to Motor Shaft using OMR Screws (51.S51 and 51.S61).

Torque to 25Nm, (18 ftlbs). - **Fig. 36**



Fig. 36

8.05 Fit Motor to Coupling Housing (43.43) with Coupling Housing Retention Screws (45.S41). Torque to 36 Nm, (27 ftlbs). - **Fig. 37**



Fig. 37

8.06 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. 38**



Fig. 38

8.07 Insert Pump Shaft/IMR (02.02) into Shroud (20.20). - **Fig. 39**



Fig. 39

8.08 Fit Bush Holder (09.09) to Shroud (20.20) using Bush Holder Retention Screws (20.S41). Torque to 12 Nm, (9ftlbs).
Note: To ensure correct positioning the screw holes are not symmetrically drilled, fit all three screws.
- **Fig. 40**



Fig. 40

8.09 Fit Impeller (06.06) to the Pump Shaft Assembly, screw in Impeller Fastener (02.03). Torque to 36Nm, (27 ftlbs). Ensure the flow hole in the centre of the Impeller Fastener (02.03) is unblocked.

- **Fig. 41**



Fig. 41

Refitting of Instrumentation

If a shroud temperature probe is fitted, ensure that it is refitted with the tip in contact with the outside of the shroud.

If INsight or thermal ribbon RTD sensors are fitted, refer to the INsight or RTD instruction manuals before assembling the shroud. Whenever possible, assemble the shroud and sensor assembly on its own into the coupling housing. This will ensure that the assembly can be aligned and assembled into the housing without the added complication of both halves of the magnet coupling being present. In the latter case, when the magnets in the inner and outer magnet rings engage, there is a very strong axial force which pulls the two halves of the pump towards each other. In this situation, failure to carefully align both halves of the pump will risk damaging the sensors.

8.10 Fit the Cartridge to the Coupling Housing (43.43) ensuring that the dowel pin on the face of the Coupling Housing locates in the hole in the rear of the Shroud flange (20.20). - **Fig. 42**



Fig. 42

8.11 Fit Casing Assembly (41.41) to the Coupling Housing (43.43) using Casing Bolts (41.B11, 41.N11, 41.W11). Tighten bolts diagonally. Torque to 55 Nm, (41 ftlbs). - **Fig. 43**

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.
- 3 Following the patterns shown tighten the Casing Nuts thus:-
 - 1st pass 30% of recommended torque
 - 2nd pass 60% of recommended torque
 - 3rd pass Full recommended torque

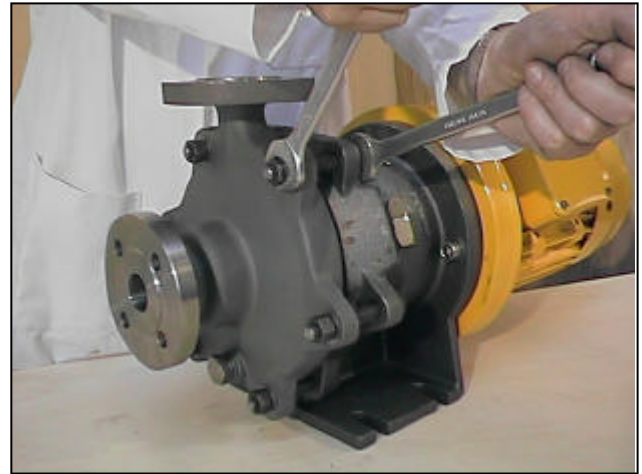
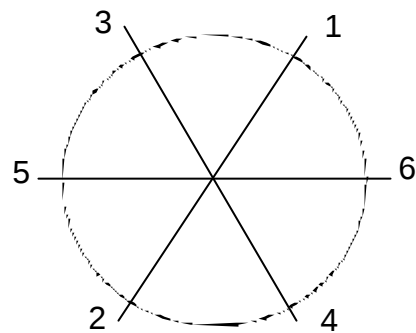


Fig. 43



8.12 The Pump is now ready for hydrostatic and performance testing. - **Fig. 44**



Fig. 44

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Design, Manufacture and Repair of
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Sealless Pumps



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