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INSTRUCTION MANUAL

(original instructions)

Pump model

TWO-WAY



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CONTENTS

- A** General
- B** Transport & Storage
- C** Description of Pump
- D** Installation & Assembly
- E** Operation
- F** Maintenance & Servicing
- G** Faults - causes & remedies
- H** Documentation

Introduction

Thank you for purchasing a stainless steel pump from MDM PUMPS LTD.

This instruction manual describes how to transport, install, assemble, operate, maintain, adjust, repair and dismantle your pump.

Please retain it safely for future reference.

Application

The pump should only be used for the conditions as specified in the data sheet(s), ie pump duty, ambient conditions, liquid, motor specification, extras specification, and if applicable suction pipework details. In addition it has been designed for use with industry recognised cleaning solutions.

Unless otherwise stated in the data sheet, the maximum allowable working pressure is:

Maximum Allowable Working Pressure (bar) ¹

Model	D121	(C)H141	(C)H161	(C)H191	(C)H221	(C)H241	(C)H261	CR / CF
Pressure (bar)	3.1	4.1	5.6	7.8	10.2	12.7	14.3	1.5 x outlet pressure

Model	Two-Way	D1X	GP D2	(C)H140	(C)H160	(C)H190 D3	(C)H220 D4/D4V	(C)H240	(C)H260 D6/D6V	D5/D5V
Pressure (bar)	2.0	0.9	2.0	2.6	3.6	6.8	6.8	8.7	11.4	17.0

Note: 1) The pump cover is hydrostatically pressure tested to 1.5 times these values.

The maximum speed of rotation is 3600 rpm unless otherwise stated in the data sheet. Please refer to the manufacturer if higher speeds are required.

The minimum speed of rotation is determined by the motor, since at low speeds motor cooling is reduced and bearing lubrication is affected. Please refer to the motor manufacturer's instructions for further information.

Utility Requirements

Power supply - see the data sheet.

Safety

Safety instructions given in this manual noncompliance with which would affect safety are identified by the following symbol:



or where electrical safety is involved, with:



Safety instructions which shall be considered for reasons of safe operation of the pump or pump unit and/or protection of the pump or pump unit itself are marked by the sign:

ATTENTION

Transport

Pumps are usually transported securely fitted into plywood cases, with the inlet and outlet connections blanked off to prevent ingress of foreign bodies into the pump cover.

The pump should be lifted as follows:



The motor lifting lug or eye bolt should **not** be used to lift the pump as it has only been designed to support the weight of the motor.

- a) When the pump is securely fitted to a pallet, use a fork lift truck.
- b) When the pump is free standing, use a sling arrangement. Before lifting the pump, ensure that the pump cover is fitted (to protect the pump internals), the cowl is removed (cowed pumps only) and that the pump can not slip from the slings. The sling should not be located around the pump cover, and care should be taken to avoid damaging the flexible conduit (where fitted) and the motor fan cover.

Storage

- The pump should be kept fixed within the packing case and stored in a vibration-free, dry, ventilated room at a uniform temperature whenever possible. The cases should not be stacked.
- To prevent the mechanical seal faces ringing (sticking) together, rotate the shaft by hand monthly and immediately before commissioning the pump.

Long-term Storage

If the pump is to be stored for a prolonged period of time (over 1 year) it is recommended:

- a) The mechanical seal is removed and stored separately, seal installation should then only be carried out shortly before the actual start-up of the pump.
- b) The cable entry to the motor is plugged to prevent ingress of moisture and foreign bodies.
- c) The shaft is rotated by hand periodically to prevent grease migration in the motor.
- d) Before commissioning the pump, electrical motors should be checked for insulation resistance, and if necessary the insulation should be cleaned and dried (please refer to the motor manufacturers instructions).



Design & Function

Six pump ranges are available:

- H & CH The Hygienic ranges, which are new generation, high quality stainless steel centrifugal pumps, utilising advanced design concepts and manufactured from solid bar. The CH (Cleanability assessed Hygienic range) is the ultimate in hygiene. It is similar to the 'H' range but is fitted with a John Crane 515H metal bellows seal and has been independently assessed to the EHEDG (European Hygienic Equipment Design Group) in-place cleanability protocol.
- D Our long-standing range of hygienic pumps, which are manufactured from solid bar and have an excellent track record.
- GP The General Purpose range, which offers hygiene at good value and with a simple design.
- Two-Way These pumps have been designed to pump in either direction and are used typically in the brewing industry as a fermentation vessel sample pump.
- CR A range of liquid ring pumps with investment cast covers and impellers.
- CF A range of flooded suction pumps with investment cast covers and impellers.

In the H, CH & D ranges, there are two types of pumps available:

- Flooded suction pump, which is used for applications where the pump is flooded with liquid, eg a delivery pump.
- Air Separator ('AS') pump, which is designed to handle a mixture of air and liquid, eg for emptying product from road tankers, or for scavenging of vessels and pipelines in a CIP (Cleaning In Place) system. For applications where the liquid level is below the inlet of the pump, a liquid reservoir can be supplied to make the 'AS' pump self-priming.

Safety Protection Devices

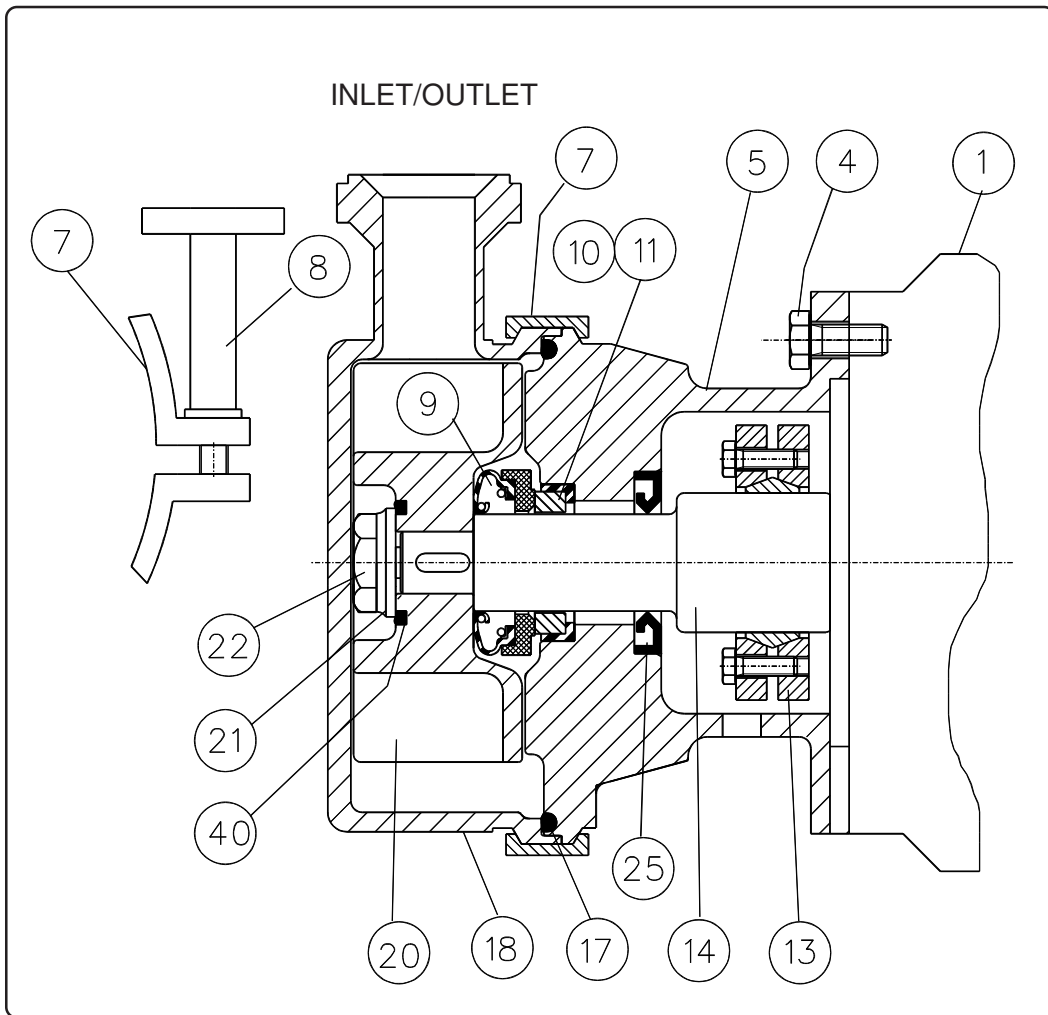
There are no special safety protection devices provided with the pump as standard. However it is recommended that an overload protection device be used with electric motors.

Dimensions

Please refer to the dimension sheets for approximate dimensions. The pump weight (when empty) is shown on the pump information sheet included with the instruction manual, and the pump duty (flow and pressure) is shown on the data sheet.

Accessories

When accessories are supplied with the pump, they are shown on the data sheet and where appropriate additional instructions are included with this manual.



Item	Description
1	Motor
4	Flanged adaptor screws
5	Flanged adaptor
7	Clamp ring
8	Clamp ring handle and washer
9	Mechanical seal
10	Seal seat ring
11	Seal seat
13	Shaft clamp

Item	Description
14	Stub shaft
17	Cover joint ring
18	Cover
20	Impeller
21	Impeller key
22	Impeller lock nut
25	Rotary seal (where fitted)
40	Impeller joint ring

Introduction

Before installation check that the pump is in good condition and that there are no signs of damage or deterioration. The pump is fully assembled and is simple to install.



The pump can be heavy, see section B for how to transport the pump.

Installation

- The suction line should be as short as possible.
- *Flooded suction and air separator pumps:* The level of the liquid must be above the centre line of the pump inlet (if this is not the case, an air separator pump must be used with an additional liquid reservoir to make it self-priming).
- *Air separator pump only:* A non-return valve should not be fitted in the outlet pipeline as it prevents air from escaping and the pump from priming. Where one is fitted the pipeline should be vented with a vent valve. Alternatively the return valve could be replaced with an automatic valve set to open when the pump starts.

Site requirements

The pump should be installed on a firm, level surface. Ensure that there is sufficient space around the pump for maintenance (eg replacing seals), and for cowl pumps allow enough room for the cowl to be removed.

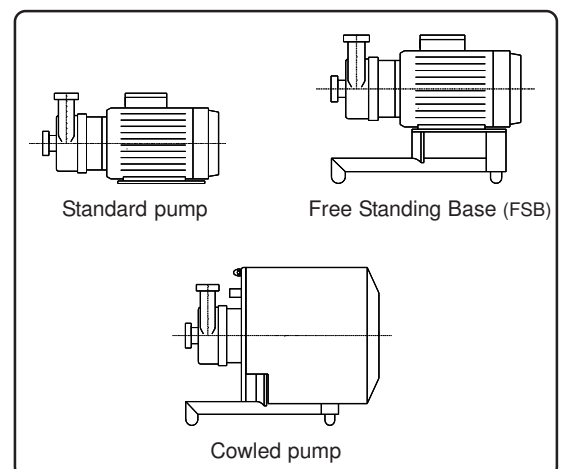
To ensure adequate cooling of the motor:

- a) The ambient temperature should not exceed 40°C (for higher temperatures, the motor will generally have to be derated).
- b) Allow one clear motor length between the rear of the motor air intake and the nearest obstruction, eg a wall.

Installation

Site: The pump is available with 3 types of base:

- a) Standard - which has slots in the motor feet.
- b) Free Standing Base (FSB) - which is mounted onto a stainless steel frame and has adjustable feet.
- c) Cowled - which consists of a FSB and a stainless steel shroud.



Tools required: To adjust the feet on the cowls and free standing bases:

- Tommy bar or similar tool.

To remove and fit the cowl (where fitted):

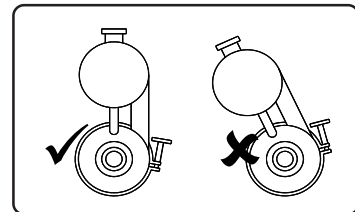
- Open ended spanner, 13 mm and 16 mm across flats.

1. There is no need to fix down the pump, as the pump runs smoothly. However for the standard pump, there are slots in the motor feet for bolting down, should it be required.

Pipework connection:

2. Connect the inlet and outlet pipelines, ensuring that they are adequately supported and aligned with brackets - the pumps are **not** designed to support or take the weight of pipework. The outlet is indicated by a label on the pump cover.

When installing an 'AS' pump ensure that the outlet fitting on top of the cover is vertical. (Note: to reduce the size of the packing case, the 'AS' cover may be packed tilted).



3. For pumps fitted with a seal flush:

Connect the seal flush connections, and ensure that the flush liquid is flowing through the clamp plate/stuffing box before start-up. A valve will be required on the outlet flush pipe to maintain the pressure in the clamp plate/stuffing box as shown below:

Flush pressures:

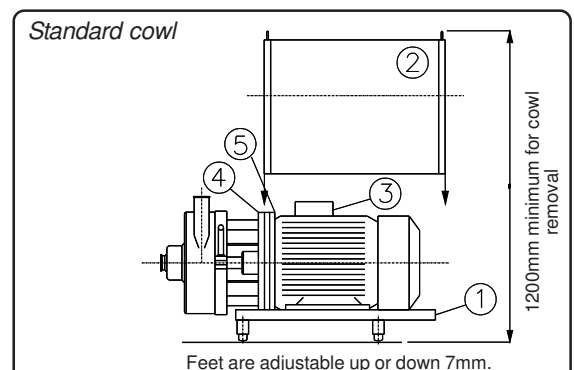
- Low pressure flush = 0.20 - 0.27 bar gauge pressure.
- High pressure flush (double back to back) = 1 bar above pump discharge pressure.
- Approximate flush flow rate = 50 - 100 litres/hr.

Electrical connection:

4. For cowlled pumps, the cowl needs to be removed first, before connecting the motor:

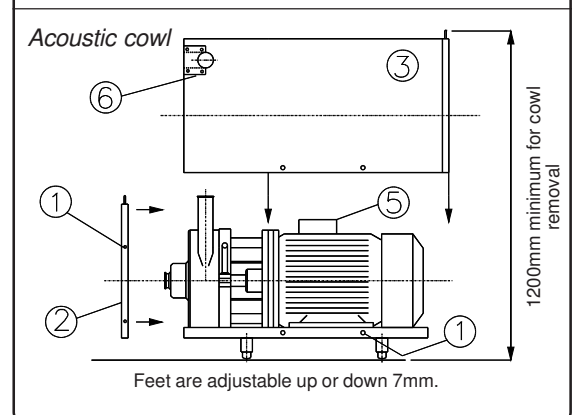
Standard cowl

- 1) Loosen and remove (where appropriate) the cowl fixing bolts and washers (where fitted) (1).
- 2) Lift cowl (2) up and off the motor.
- 3) The motor is now ready for wiring into the motor terminal box (3).



Acoustic cowl

- 1) Loosen and remove (where appropriate) the cowl fixing bolts and washers (where fitted) (1).
- 2) Lift off the front of the cowl (2).
- 3) Where fitted, remove the infill plate (6).
- 4) Lift the cowl (3) up and off the pump unit.
- 5) The motor is now ready for wiring into the motor terminal box (5).



5. The motor should be connected according to the motor manufacturer's instructions (the connection diagram is located in the terminal box). For centrifugal pumps, the direction of rotation is **clockwise** looking at the fan end, as indicated by a label on the motor fan cowl. The Two-Way pump, however, can be run in either direction.



Safety: The motor must be installed, tested and approved by a qualified person. There should be a means of isolating the energy supply to the motor; such means shall allow for switching-off during normal operation and/or in an emergency. The cables used should be capable of carrying the full load current of the motor (see motor nameplate) without overheating or undue voltage drop under starting conditions. Ensure that the terminal screws are tight, and gaskets are fitted correctly to ensure water does not enter the motor through the terminal box. A motor overload protection device is recommended.

ATTENTION

Before checking correct rotation and whenever starting up, ensure the pump is flooded with liquid to avoid any risk of dry running and overheating which would damage the sealing surfaces.



Risk of moving parts. Before starting the pump, ensure that the pump is fully assembled, and in particular that the pump cover is fitted.

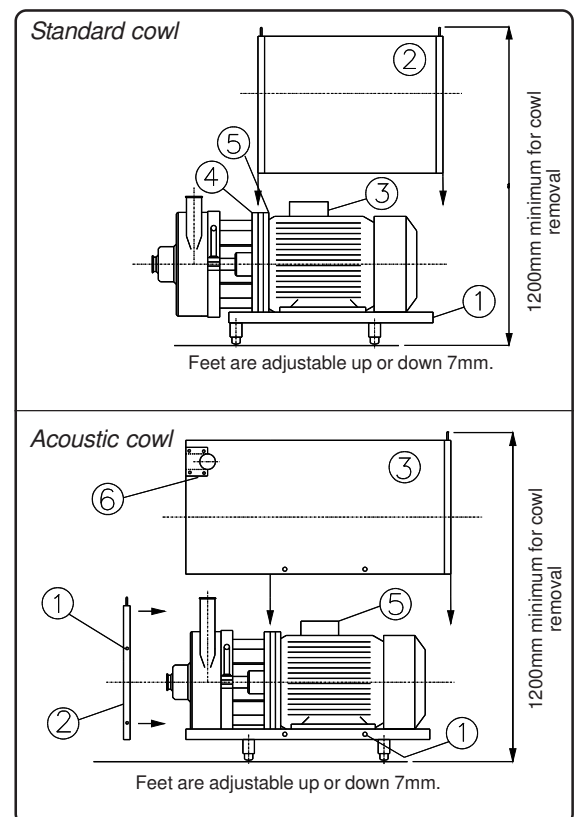
6. For cowed pumps, the cowl needs to be refitted:

Standard cowl

- 1) Lower the cowl onto the motor, ensuring that the front plate slides down between the flanged adaptor (4) and adaptor plate (5).
- 2) Refit and tighten cowl fixing bolts and washers (where fitted) (1).

Acoustic cowl

- 1) Lower the cowl (3) onto the pump unit.
- 2) Refit the front of the cowl (2) and (where fitted) the infill plate (6).
- 3) Refit and tighten cowl fixing bolts and washers (where fitted) (1).



Minimising noise & vibration

To minimise the noise and vibration ensure that:

- a) All pipes are adequately supported,
- b) The pump is mounted on a stable base,
- c) If applicable, the acoustic cowl is fitted,
- d) The pump is operated at the duty point,
- e) An inverter is used where applicable, to run the pump at reduced speeds,
- f) Pump cavitation is minimised by careful design of the system.

Preparing the Pump for Operation

1) Ensure that the pump is fully installed, and in particular that the pump cover is fitted, the clamp ring and the inlet/outlet connections are tight, and any drains (where fitted) are closed.

ATTENTION

2) For pumps fitted with a seal flush, ensure that the flush liquid is flowing through the clamp plate/stuffing box at the correct pressure.

ATTENTION

3) Ensure that the pump is flooded with liquid to avoid any risk of dry running and overheating which could damage the sealing surfaces. Where a vent is fitted, vent off any trapped air. Close vent after use.

ATTENTION

4) For liquid ring pumps (CR), fill the pump with liquid. During subsequent starting sufficient liquid should remain in the pump to ensure self-priming.

ATTENTION

5) For pumps fitted with a self-priming reservoir, ensure that the reservoir and pump are filled with liquid.



Safety Devices

- For pumps with open flanged adaptors ensure that the pump shaft guard has been fitted.
- Ensure that the acoustic cowl (where applicable) has been fitted.
- Where special protection devices have been fitted, ensure that they are in place and are fully functioning.

Commissioning

- Check that the pump is achieving the duty as stated on the pump data sheet.
- With the pump operating at the required duty, ensure that the motor current does not exceed the full load amps stated on the motor rating plate.
- Ensure that there are no leaks from the mechanical seal, pump cover and the flush (where fitted).

For commissioning the pump, we recommend carrying a complete set of first line spares (see section F).

Operation



- Warnings:
- Ensure that the pump is correctly installed before operation.
 - If the pump cover and the inlet/outlet connections are not correctly fitted, there are risks of contact with the fluid and of the fluid being ejected.
 - Do not exceed the maximum allowable working pressure of the pump.
 - Do not exceed the full load amps of the motor.
 - Avoid violent pressure surges.
 - In applications where the pump is pumping hot fluid and the surface temperature is greater than 80°C, steps should be taken to minimise contact with or to warn operators of such surfaces.
 - Wear the appropriate personal protection equipment.
 - **With liquid ring pumps (CR), never completely close the outlet valve whilst the pump is running.**

Cleaning

The pump should be regularly cleaned. The type of cleaning chemicals to be used, their concentration, temperature and period of contact will be determined by:

- a) The product being pumped.
- b) The level of contamination.
- c) The method of cleaning.
- d) Compatibility with the materials inside the pump:
 - SS316 or SS316L
 - Mechanical seal materials (see the data sheet)
 - Cover joint ring materials (see the data sheet).

The pump generally forms part of a system which is cleaned in place (CIP). Where this is not possible, the wetted parts of the pump can be dismantled (see section F), soaked in a detergent/disinfectant bath, rinsed in clean water and reassembled.



When hazardous chemicals are handled, the appropriate personal protection equipment should be worn.

ATTENTION The pump must be stationary during SIP (steam in place).

Shutdown

ATTENTION The pump can be damaged by back flow through it.



Spare Parts

The following parts may need replacing during the lifetime of the pump:

Line	Part	Average Expected life*	Signs of failure
1 st	Mechanical seal	2 years	Leaking from the rear of the housing plate (single seal), leaking into the flushing liquid (low pressure flush) or flush liquid leaking into the pumped liquid (high pressure flush).
	Cover joint ring	2 years	Leaking from around the pump cover.
	Impeller joint ring	2 years	Leaking past joint ring.
	Locknut O ring	2 years	Leaking past the O ring.
	Pump bearing (CF & CR only)	2 years	1) Noisy motor, 2) Excessive heat from the motor bearing, 3) Excessive vibration.
2 nd	Stub shaft, stub shaft fixing	5 years	1) Leaking from the mechanical seal, 2) Excessive vibration and noise.
	Motor or motor bearings	Refer to motor manufacturer's instructions.	1) Noisy motor, 2) Excessive heat from the motor bearing, 3) Excessive vibration, 4) Leaking from the mechanical seal.
<i>Additional parts for a pump with a low pressure flush:</i>			
1 st	Rotary lip seal / outboard mechanical seal (as appropriate)	1 year / 2 years	Leaking from flush clamp plate (along shaft).
	Flush joint ring (where fitted)	2 years	Leaking from flush clamp plate (via joint ring).
<i>Additional parts for a pump with a high pressure flush:</i>			
1 st	Outboard mechanical seal	2 years	Leaking from stuffing box cover (along shaft).
	Stuffing box washer	3 years	Leaking from stuffing box cover (via washer).

- Notes: *
- * The average expected lives are subject to the full service conditions being disclosed, the seals being appropriately selected and approved parts being used.
 - For stock codes of the above items, please refer to the parts list.
 - When ordering spare parts, please quote the pump serial number, which is stamped on top of the flanged adaptor and on the pump nameplate.

Monitoring

Monthly: Check the overall condition of the pump, and in particular check for leaks from the mechanical seal and pump cover.

Preventative Action

Motor: At regular intervals depending on the environment, clean the cooling surfaces and air passages of the motor so as to maintain efficient cooling.

For information on lubricating the motor please refer to the motor manufacturer's instructions.

Dismantling the Pump

The correct sequence of dismantling the pump to any required stage is listed below, however do not dismantle the pump unless absolutely necessary.



Pumps which convey hazardous liquids must be decontaminated before dismantling the pump. The appropriate personal protection equipment should be used.

Tools required: Open ended spanner - 13 mm across flats, Engineers pliers, Hide mallet, Torque wrench with socket - 22 mm across flats, Screwdriver - medium flat blade, Loctite activator 7649, Loctite retainer 242.



1) Isolate the motor (1) from the power supply.



2) Disconnect the inlet, outlet and flush (where fitted) connections.
Risk of contact with liquid being pumped.

3) Unscrew the clamp ring handle (8) by several turns and lift the clamp ring (7) over the flanged adaptor (5).

4) Remove the cover (18).

5) Unscrew the impeller locknut (22) with the socket (right hand thread). The impeller joint ring (40) is now exposed and can be inspected.

6) Slide the impeller (20) forward off the shaft (14) by maintaining an even pressure. Hitting the impeller can cause serious damage.

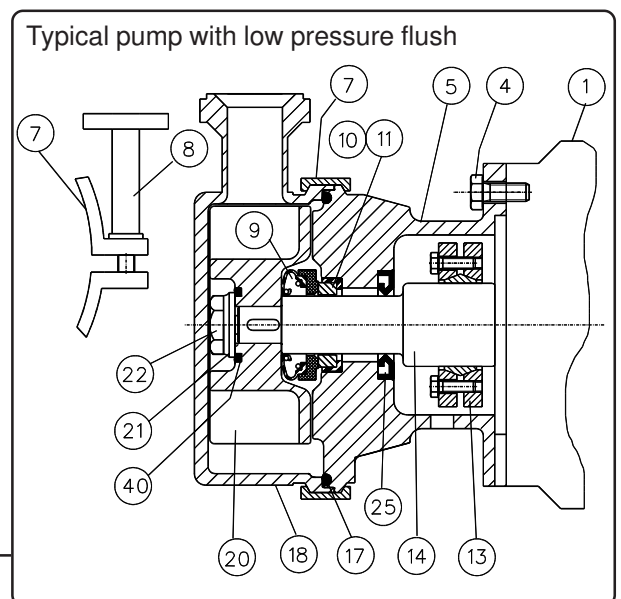
7) Remove the key (21) from the pump stub shaft (14).

8) The mechanical seal (9) is now accessible. Clean the shaft and slide the seal forwards off the shaft.

9) The face of the seal is now exposed and can be inspected.

10) To remove the seal seat assembly (10,11), unscrew the flush connectors (where fitted). Remove the flanged adaptor (5).

11) The seal seat (11), seat ring (10), and rotary seal (25) (where fitted) can be inspected.



Reassembling the Pump

1) Locate the seal seat assembly (10,11) and the rotary seal (25) in the flanged adaptor (5).

2) Fit the flanged adaptor (5) onto the motor (1) and tighten the flanged adaptor screws (4). Take care during assembly that the seal seat (11) does not contact the shaft (14) and become chipped.

3) Fit the mechanical seal (9) (see page F3).

4) Replace the key (21) in the pump stub shaft (14).

5) Slide the impeller (20) onto the shaft, ensuring that the impeller joint ring (40) is fitted.

6) Follow the Loctite instructions, and spray the Loctite activator 7649 onto the threads of the impeller locknut (22) and then apply the Loctite retainer 242.

Screw on the impeller locknut (22) (right hand thread) and tighten with the socket to a torque of 25 Nm.

7) Refit the cover (18).

8) Fit the clamp ring (7) into position and tighten the clamp ring handle (8), ensuring that the clamp ring is correctly located.

9) Connect the inlet, outlet and flush (where fitted) connections.

Replacing the Seal - type 6D or 2100

ATTENTION Mechanical seals are precision products. Installation should be carried out to the laid down procedure. Seals should be installed in a clean environment with particular care given to the lapped and polished seal faces.

Notes: - For information on the seal fitted in your pump, please refer to the data sheet.

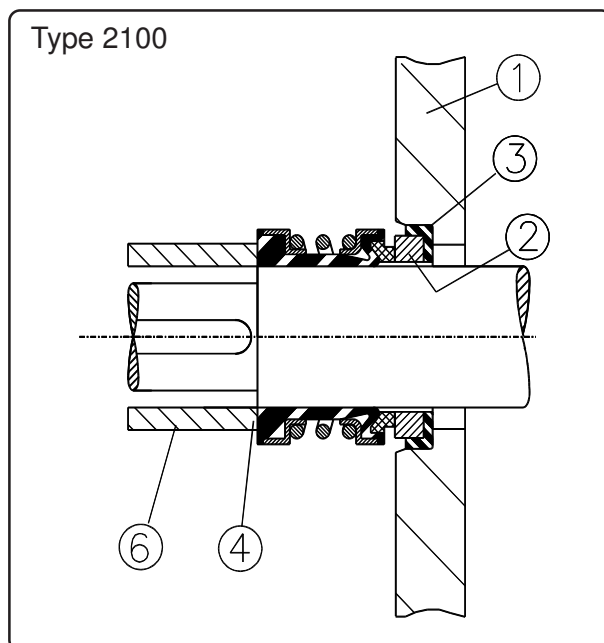
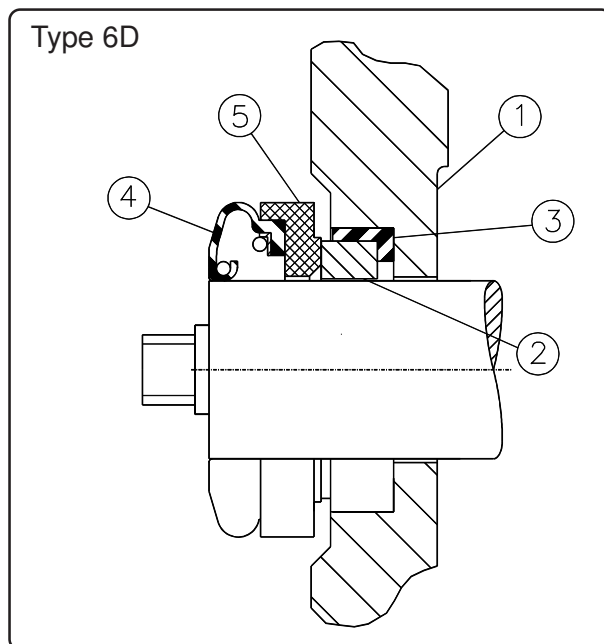
Tools required: Diluted soft soap solution, Seal fitting tube & sleeve (recommended for 2100 seal).

Removing the old seal:

Dismantle the pump and seal as described on page F2.

Fitting the new seal:

- 1) Ensure all components are clean.
- 2) Fit the seat (2) into the seat ring (3) to form the seat assembly.
- 3) Press the seat assembly fully down into the recess in the flanged adaptor (1). Ensure that it is at right angles to the axis of the shaft and that the lapped sealing surface will face **towards** the mechanical seal assembly.
- 4) Fit the flanged adaptor (1) onto the motor and tighten the flanged adaptor screws. Take care during assembly that the seal seat does not contact the shaft and become chipped.
- 5) Ensure that the rubber bellows (4) are not cut or damaged during assembly. Any sharp edges on the shaft shoulder or keyway should be removed.
- 6) Lubricate the inside sleeve of the bellows with a very slight smear of diluted soft soap solution. **Never use mineral oil, grease, vaseline**, etc, as it is **not** hygienic and may degrade the rubber.
- 7) For Type 6D seals, ensure that the bellows (4) is fully inserted into the seal face (5).
- 8) Slide the seal unit onto the shaft until it makes contact with the seat (2), making sure that the bellows (4) is fully compressed - for type 2100 seals a fitting tube (6) is recommended for this operation.
- 9) Reassemble the pump as described on page F2.
- 10) Before start-up, the pump should be flooded with liquid at the seal faces as dry running will cause overheating and may damage the mating surfaces.



Replacing the Pump Stub Shaft

Tools required: Torque wrench, Dial test indicator, Open ended spanner - across flats 13 mm.

- 1) Dismantle the pump as described on page F2, then remove the flanged adaptor (1).
- 2) To remove the pump stub shaft (3), the shaft clamp screws (4) should be unscrewed in a clockwise sequence, evenly and in several stages, to avoid tilting the thrust rings (5).

ATTENTION

The locking screws must not be completely unscrewed, as the shaft clamp (2) is pretensioned and could jump apart.

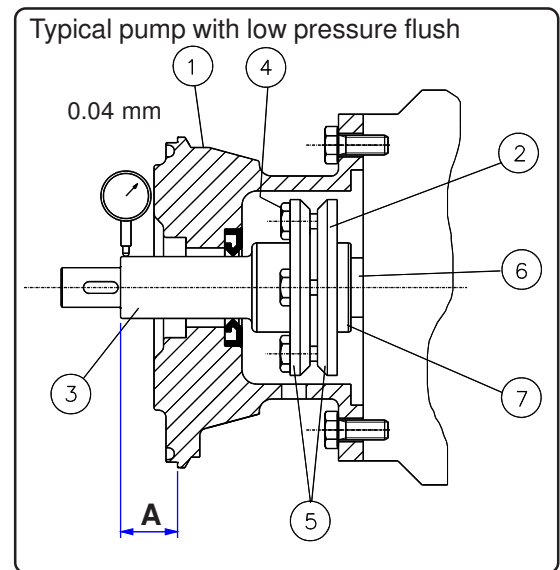
- 3) Remove the pump stub shaft (3) from the motor shaft.
- 4) The shaft clamp can now be removed from the pump stub shaft (3).

- 5) If the shaft clamp is going to be reused, it should be dismantled and cleaned. Check that the tapered working surfaces are not damaged, and re-lubricate them and the screws (threads and contact areas for the heads) with Molykote BR 2.

Do not tighten the screws (4) until the shaft clamp is positioned on the pump stub shaft (3).

- 6) Ensure that the surface of the motor shaft (6) is clean and free from oil or grease.
- 7) Slide the pump stub shaft onto the motor shaft.
- 8) Position the shaft clamp between the two witness lines (7) on the pump stub shaft .
- 9) Ensure that the pump stub shaft is pushed fully home on to the motor shaft **before** tightening the screws (4) otherwise deformation may occur (check dimension "A", see table).
- 10) Tighten the locking screws (4) finger tight to squarely position the thrust rings (5).
- 11) Tighten the locking screws (4) in a clockwise sequence (**not** diametrically opposite) in two stages: up to half full torque, and then up to full torque (see table below).

Motor shaft diameter (mm)	Stub shaft boss diameter (mm)	Full torque (Nm)
19	30	3.0
24 - 38	36 - 50	6.5



Pump model:	TWO-WAY		
Dim "A" (mm)	23		

Finally, repeat the tightening of the locking screws in a clockwise sequence until all screws are tightened to the full torque.

- 12) Clock the shaft for true running (Total Indicator Reading 0.04mm) and finally re-check dimension "A".
- 13) Reassemble the pump as described on page F2.



This section lists the common hydrodynamic, mechanical and electrical faults. For further advice please contact MDM PUMPS LTD or your supplier. Note: the pump has been checked for leaks and performance tested with water, meeting the duty as specified on the data sheet.

HYDRODYNAMIC FAULTS

PROBLEM	CAUSE	REMEDY
1) No pressure.	<p>Impeller is not rotating.</p> <p>Pump is air-locked.</p>	<p>Check that the motor is rotating - see Electrical Faults.</p> <p><i>Flooded suction pump:</i> Ensure that the pump is flooded with liquid, and that the cover is rotated so that air does not become trapped in the pump (ie for centrifugal pumps, the outlet should be vertical pointing upwards, or horizontal on top of the cover; for Two-Way pumps, both connections should be vertical). If air is becoming trapped in the pipes consider fitting a vent valve.</p> <p><i>Air Separator Pump:</i> Air must pass freely inside the discharge pipe and escape to atmosphere without any restriction (eg non-return valve) since the pump can only develop a small pressure when handling air. For applications which have non-return valves installed in the system, there are two alternatives:</p> <p>a) If a control of flow direction is required, replace the non-return valve with an actuated valve, programmed to open when starting the scavenge pump.</p> <p>b) Fit an air vent valve before the non-return valve at the highest point in the discharge pipe (where any air will collect). It is essential to start/stop the pump at the beginning/end of each cycle, otherwise the vent valve will be shut by the pressure in the discharge pipe and will not allow air to escape.</p>
2) Insufficient flow/pressure.	<p>Motor incorrectly connected.</p> <p>Incorrect direction of rotation.</p> <p>Motor is running slow.</p> <p>Valve in the system not fully open.</p> <p>Blockage in the pipe, pump or strainer.</p> <p>Pump is cavitating.</p>	<p>Check the motor connections (ie star or delta) and rewire if necessary.</p> <p>Check the direction of rotation of the motor - for centrifugal pumps it should be clockwise looking at the fan end, as indicated by the label on the motor fan cowl. The Two-Way pump, however, can be run in either direction. If necessary rewire the motor or starter (see the motor manufacturer's instructions).</p> <p>a) Check that the motor is running at the correct speed, particularly if it is controlled by an inverter, and</p> <p>b) Check that there is power to all 3 phases.</p> <p>Ensure that all the valves are fully open.</p> <p>Check for any blockage in the pipework, pump or strainer (if fitted) and remove as necessary.</p> <p>See below.</p>
3) Pump cavitates or is noisy.	<p>Insufficient NPSH available (Net Positive Suction Head).</p> <p>Air in the system.</p> <p>Restriction in the suction pipework.</p> <p>Foreign body trapped in the pump.</p>	<p>Either increase the NPSH available in the system by:</p> <p>a) increasing the inlet pressure to the pump, or</p> <p>b) reducing the pump suction line pressure drop, or</p> <p>c) reducing the fluid temperature and therefore reducing the liquid vapour pressure.</p> <p>Or reduce the NPSH required by the pump - contact MDM PUMPS LTD for advice.</p> <p>Vent off any trapped air.</p> <p>Check for any restriction in the suction pipework and remove as necessary.</p> <p>Take off the cover, remove any obstruction and check for damage to the pump.</p>



MECHANICAL FAULTS

PROBLEM	CAUSE	REMEDY
1) Leaking mechanical seal.	<p>Seal has been run dry, causing it to overheat and crack.</p> <p>Damaged, old or non-approved seal.</p> <p>Incorrectly fitted seal.</p>	<p>Replace the seal, and always ensure that the seal is in contact with liquid before starting the pump. Problems often arise when the direction of rotation is checked with the pump dry.</p> <p>Replace the seal (see section F) and ensure that only approved spares are fitted.</p> <p>Check that the seal is fitted correctly according to the seal fitting instructions in section F, particularly if the seal has recently been removed.</p>
2) Short mechanical seal life.	<p>Incorrect seal for the application.</p> <p>Worn motor bearings.</p> <p>Pump stub shaft not running true.</p>	<p>Ensure that a) only approved spares are fitted, and b) if the application changes that the seals are suitable.</p> <p>Check the motor bearings and replace if necessary.</p> <p>Check that the pump stub shaft is running true (see section F). See also problem 4) below, 'Damaged pump stub shaft'.</p>
3) Leaking cover joint ring.	<p>Clamp ring not located correctly.</p> <p>Incorrectly fitted seal.</p> <p>Damaged seal.</p>	<p>Ensure that the clamp ring is correctly located and is tight.</p> <p>Check that the seal is correctly fitted and is clean.</p> <p>Replace the seal (see section F).</p>
4) Pump vibrating or Impeller contacting the cover.	<p>Impeller lock nut loose.</p> <p>Worn motor bearings.</p> <p>Damaged pump stub shaft.</p>	<p>Tighten the impeller lock nut.</p> <p>Replace the motor bearings or pump bearing (where fitted).</p> <p>Replace the pump stub shaft and if necessary the motor bearings. This could be caused by either a) a foreign body entering the pump, b) impact whilst the cover was removed, or c) violent pressure surges.</p>

ELECTRICAL FAULTS

PROBLEM	CAUSE	REMEDY
1) Motor will not start.	<p>No power to the motor.</p> <p>Faulty electrical connections.</p> <p>Motor has burnt out.</p>	<p>Check that there is power to the motor.</p> <p>Check the electrical connections (refer to the motor manufacturer's instructions).</p> <p>Replace the motor, having found the cause for the failure.</p>
2) Motor rotates in the wrong direction.	<p>Motor is incorrectly connected.</p>	<p>Reconnect the starter or the motor (refer to the motor manufacturer's instructions).</p>
3) Motor overloads, overheats, or is noisy.	<p>Pump is operating at a duty that it was not designed for.</p> <p>Worn motor bearings.</p> <p>One of the supply phases has failed.</p>	<p>Check the motor current and ensure that it does not exceed the motor full load current as stated on the motor nameplate. The pump has been designed to meet the duty as specified in the data sheet. If the pump is run at a different duty (eg higher flow for centrifugal pumps or lower flow for liquid ring pumps), the motor may overload.</p> <p>Check the motor bearings and replace if necessary.</p> <p>Check that there is power to all 3 phases.</p>



EC DECLARATION OF CONFORMITY for complete pumps

We hereby declare that the following machinery complies with the relevant essential health and safety requirements of the EU Machinery Directive 2006/42/EC.

<i>Machine description</i>	STAINLESS STEEL PUMPS.	
<i>Make</i>	MDM PUMPS LTD	
<i>Type</i>	H, CH, D, GP, Two-Way, CF & CR.	
<i>Serial number</i>	Supplied from 01/01/10 onwards.	
<i>Manufactured by</i>	MDM PUMPS LTD	
	Spring Lane	
	Malvern	<i>Tel:</i> +44 (0)1684 892678
	Worcs. WR14 1BP	<i>Fax:</i> +44 (0)1684 892841
	England.	

Mr D N Petersen, Managing Director (based at the above address) has been authorised to compile the technical file.

This machinery has been designed and manufactured in accordance with the following transposed harmonised European standards:

Type A standards:

BS EN ISO 12100, Safety of machinery - Basic concepts, general principles for design,
Part 1: 2003+A1:2009, Basic terminology, methodology.

(Including amendment 14974, January 2004).

Part 2: 2003+A1:2009, Technical principles.

(Including amendment 14975, January 2004).

Type B standards:

BS EN ISO 13857:2008, Safety of machinery - Safety distances to prevent hazard zones
being reached by upper and lower limbs.

BS EN 349: 1993+A1:2008, Safety of machinery - Minimum gaps to avoid crushing of parts
of the human body.

Signed:  *Place:* Malvern, England. *Date:* 06/01/10

Name: Mr D N Petersen *Position:* Managing Director



Manufacturers of Stainless Steel Pumps,
Vent Valves & Strainers for hygienic applications

Founded in 1922, MDM PUMPS LTD is registered to ISO 9001

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