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CRESTPUMPS
CHEMICAL PUMPING SOLUTIONS

PPS Range

Vertical Sealless Thermoplastic Centrifugal Pumps

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

INDEX

1. GENERAL

1.1 INTRODUCTION

This manual is supplied to acquaint you with the easiest and most practical way to **INSTALL, OPERATE** and **MAINTAIN** this pump.

We suggest that all personnel responsible for this pump read this manual carefully and keep it handy for future reference. Additional information may be obtained direct from **CREST PUMPS LIMITED**.

Equipment can not operate well without proper care. To keep this unit at top efficiency, correct procedures for installing and maintaining must be followed. The **CREST PUMPS LIMITED** organisation can give helpful advice when installing this unit so that maximum machine life can be attained with the minimum downtime.

NOTE: The description and instructions in this book include the standard design of the equipment and common deviations, when possible. This manual does not cover all design details and variation nor does it provide for every possible contingency which may be encountered. When information cannot be found in this book contact **CREST PUMPS LIMITED** direct.

1.2 GUARANTEE

All pumps are tested prior to despatch so that a trouble free operation of the pump is warranted.

The resistance of material can be guaranteed only if the specific operating conditions were known by **CREST PUMPS LIMITED** before commencement of the order.

The guarantee period is specified in our General Terms and Conditions of Sale.

1.3 CONTACT ADDRESS

Crest Pumps Limited
7 Queensway
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New Milton
Hampshire
BH25 5NN

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Email:- info@crestpumps.co.uk

1.4 NOISE

Depending upon the motor size fitted to this pump, the likely noise level can be found in the chart below. Please note that at certain installations and operation points on the pump curve, the noise level 70dB can be exceeded. Hearing protecting devices should be used in case of long exposure to noise.

Motor Power (kW)	Noise level at 1m dB(A)
0.55	58
0.75	58
1.1	61

1.5	61
2.2	66
3	66
4	69
5.5	69
7.5	70
9.2	70
11	70
15	70
18.5	72
22	72
30	72
37	76
45	76
55	77

1.5 WARNINGS AGAINST MISUSE

Safety instructions given in this Manual non-compliance 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:-

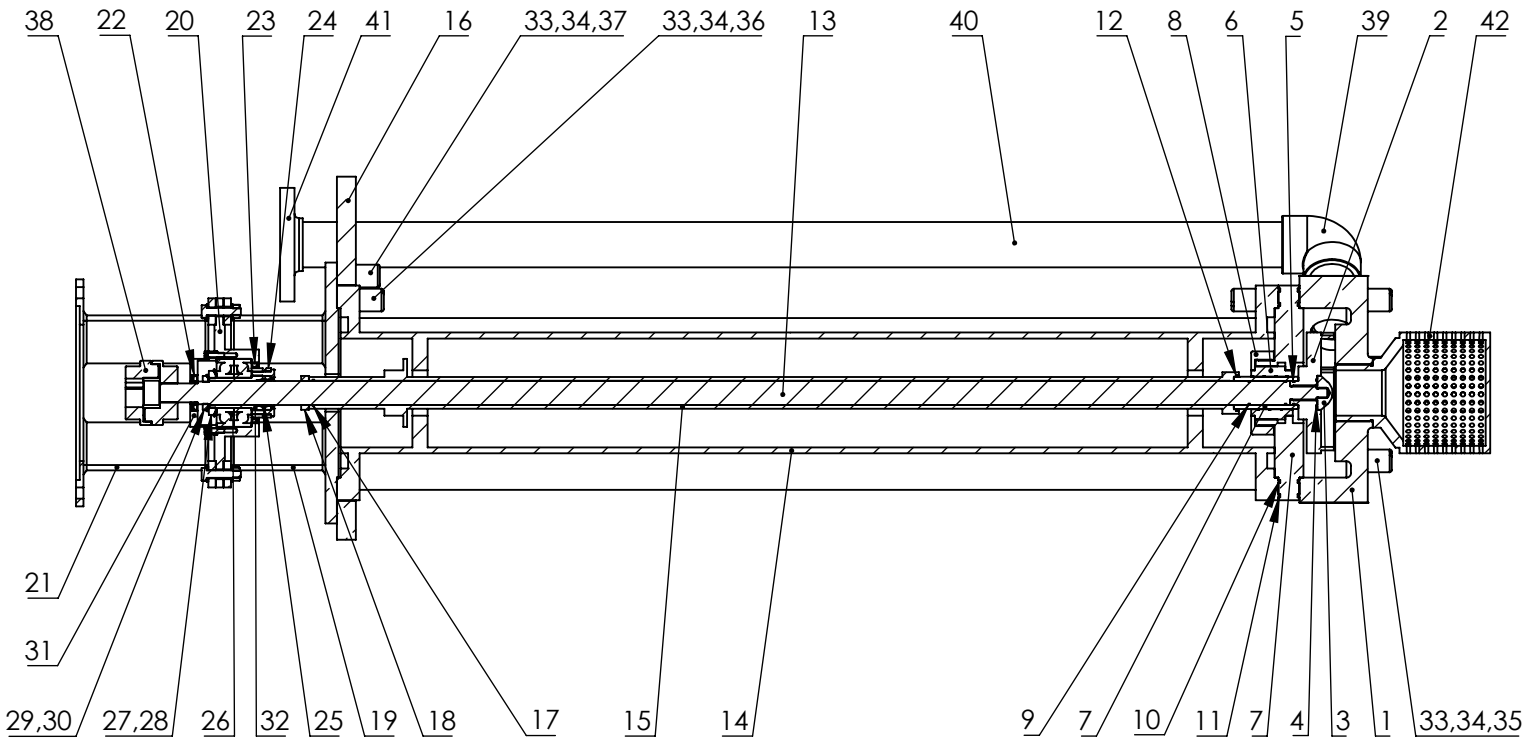
ATTENTION

1.6 SUPPLEMENTARY INSTRUCTIONS

Supplementary components such as the motor for example, have to be used in accordance with the relevant instructions supplied with the pump's documents.

DRG NO: 7323

IF IN DOUBT ASK!



1. CASING
2. IMPELLER
3. LOCKNUT
4. O RING
5. O RING
6. BEARING
7. SLEEVE
8. RETAINING CAP
9. O RING
10. O RING
11. O RING
12. O RING
13. SHAFT
14. SUSPENSION TUBE
15. SHAFT SLEEVE
16. MOUNTING PLATE
17. O RING
18. COLLAR
19. ADAPTOR
20. BEARING HOUSING
21. ADAPTOR
22. OIL SEAL
23. OIL SEAL
24. FLANGE
25. INSERT
26. BEARINGS
27. NUT
28. WASHER
29. NUT
30. WASHER
31. BEARING CAP
32. BEARING CARRIER
33. NUT
34. O RING
35. STUD
36. STUD
37. STUD
38. COUPLING
39. ELBOW
40. DISCHARGE PIPE
41. DISCHARGE FLANGE
42. SUCTION STRAINER

ALL UNTOLERANCED DIMENSIONS TO BE WITHIN +/-.25mm

CRESTPUMPS
CHEMICAL PUMPING SOLUTIONS

DRAWN BY: J.HOBBY
DATE: 10/02/2022
CHECKED BY:

REVISION 1 | REVISION 2 | TITLE: PPS RANGE
SINGLE STAGE
REVISION 3 | REVISION 4 | CUTTING LIST:

ITEM	DESCRIPTION	MATERIAL	PART NUMBER

DRG NO: 7323

3 DESCRIPTION

Pumps of the PPS series are vertical, immersible, pumps designed to handle corrosive liquids and built to the highest possible standards of design, workmanship and materials.

The materials of construction have been selected for the temperature and liquid specified in your order. Before the pump is operated with other liquids or at other temperatures, it is essential that the manufacturer be consulted.

Each pump is tailored to the customers exact requirements in terms of generated head at the specific capacity and both the mechanical and hydraulic performance of the pump is checked before despatch.

ATTENTION

This pump must not be run against a closed head

ATTENTION

As per BS EN 13463-1:2009, item 6.7.5 c., for Atex Zone 1 Exd and Zone 2 Exn installations, the surface area of non-conductive parts has been minimised as best possible. But due to the corrosive nature of the liquid pumped and the requirement for this corrosion resistant material to be used, it is not possible to totally eliminate the danger of ignition by electrostatic discharges. This pump must be earthed at the earthing boss.

4 INSTALLATION OF THE PUMP

4.1 RECEIVING THE PUMP

On receipt of the pump please note the following:

a) Check pump for shortages and damage immediately after delivery. Prompt reporting to the Carriers Agent, with notations made on the Bill of Freight, will help expedite satisfactory adjustment by the Carrier.

b) Unload and handle with care. On models fitted with a baseplate, unload with a forklift truck under the baseplate or, use a hoist and sling round the motor and adaptor part of the pump. On **all** pumps it is important that no strain is put on the plastic parts of the pump especially the suction and discharge branches if fitted.

c) Temporary Storage If the pump is not to be installed and operated immediately, store in a clean dry place which has a slow to moderate change in ambient temperature and ensure all openings are protected to stop the ingress of foreign matter. Rotate the pump shaft weekly to stop damage to the bearings.

Storage requirements vary depending on the length of storage and the climate conditions. For storage periods longer than 3 months or storage in special conditions please contact **CREST PUMPS LIMITED.**

4.2 INSTALLATION & OPERATING INSTRUCTIONS

ATTENTION

The CREST PPS range is designed to handle a wide range of chemicals with the minimum of maintenance or operating procedures. The units are simple to install but to obtain maximum results **PLEASE READ THE INSTRUCTIONS CAREFULLY.**

The unit must be installed vertically and the mounting point should be firm and level. To avoid mechanical damage to the pump, care must be taken not to distort the mounting plate . The discharge pipework should be at least as large in diameter as the delivery pipe on the pump in order to reduce friction losses.

4.3 WIRING

The electrical installation must be carried out by a competent person. All relevant practices and regulations should be adhered to. The motor wiring should be carried out to the manufacturers instructions which can usually be found in the motor terminal box or supplied with the motor. A wiring diagram can be found in the terminal box or on the motor nameplate. Thermal overload protection should be used but is not supplied with the motor. Ensure that rotation is in the correct direction as shown by arrows on either the motor or pump. (See 5.1) If required, earthing bosses are supplied and should be used.

4.4 ROTATION

Before flooding the pump with liquid it is essential to establish that the direction of rotation is correct - i.e. clockwise looking from above the motor. This may be done by running the pump for not more than 2 seconds then instantly stopping.

If this is not done and the pump is run in reverse whilst full of liquid, the impeller may unscrew and cause the pump to seize.

4.5 FLOAT SWITCHES

If your pump is supplied with float switches they should be wired up in accordance with the manufacturers instructions.

5 OPERATION

After installation of the pump ensure that any valves fitted into the delivery lines are open. If this is not done the pump will run satisfactorily after it has been started but, under certain circumstances, prolonged running against a closed valve will cause the temperature of the liquid to rise above the level the pumps are designed to meet and therefore will damage the pump.

Ensure the liquid level is above the pump impeller.

After these points have been checked and passed as correct, the pump can be put into operation by either starting by hand or automatic control. Adjust the discharge valve to give the desired flow. On automatic control check cut-in and cut-out levels to see they meet with your requirements.

DO NOT RUN THE PUMP DRY - damage to the bearing bushes and pump components will occur causing the pump to seize.

The service temperature must not exceed that specified. In certain circumstances this may be exceeded but **ALWAYS** consult **CREST PUMPS LIMITED** for advice.

5.1 PRE-START CHECKS

Before initial start up of the pump, make the following inspection:

(a) Check all connections to motor and starting device for correct installation. Also voltage, phase and frequency are as motor nameplate for the circuit being used.

(b) Check rotation by giving the motor a 2 second burst maximum. If incorrect, change wiring to give correct rotation.

Pump must operate in the direction indicated by the arrows on motor and pump adaptor. Serious damage can result if the pump is operated with the incorrect rotation. Always check rotation each time the motor or starter have been disconnected.

Pump must be completely filled with liquid before starting. Never allow pump to run dry in the hope it will prime itself. Serious damage to the pump will take place if this is allowed to happen.

(c) Check discharge piping and any other connections (eg. pressure gauge, temperature and flow control instruments) for correct operation.

5.2 STARTING

(a) Close any drain valves in discharge line.

(b) Open fully all valves in suction line.

(c) Prime Pump. If the pump does not prime properly or loses prime during start up, it should be shut down and condition corrected before the procedure is repeated.

Repeated trial start ups can overheat the motor. Starting currents are several time full load current - heating varies as the SQUARE of the current. Allow winding time to cool between starts.

(d) For pumps moving high temperature liquids it is advisable to warm the pump prior to starting to avoid thermal shock on the materials used in the construction of the pump head eg., impeller, casing and backplate.

(e) Start pump prime mover.

The discharge line valve should always be set to achieve the pump's minimum flow requirement usually achieved with a cracked discharge valve open slightly when pump is started. The excessive current required by the motor to start under full load will, in time, cause motor trouble.

(f) When pump is operating at full speed open the discharge valve slowly.

ATTENTION

5.3 OPERATING CHECKS

a) Check the pump and piping for leaks.

b) Check and record pressure readings for future reference.

c) Check and record voltage, amperage per phase and kW.

d) Check temperature of pump bearings - the maximum temperature should be no more than 35 Deg C above ambient or the temperature of the pumped medium, whichever is the greater.

(e) When the pump is operated with a Variable Speed Drive, the operating speed range must be no lower than 50% of the rated speed and no higher than the rated speed.

CAUTION Make all pump output adjustments with the discharge valve. **DO NOT** throttle suction line to adjust pump output.

5.4 LUBRICATION SCHEDULE

Use 'Shell' Alvania - R2 grease or approved equivalent to charge bearings.

NORMAL RUNNING CONDITIONS

1) 6cc grease per 700 hours running time or per month. Change grease every 25000 running hours or 3 years.

HARSH ENVIRONMENTAL CONDITIONS (Fuming Liquids)

2) Recommended 5cc per 24 hours running time or daily. Change grease every 9000 hour or annually.

3) With unknown environmental conditions the frequency will have to be established by customer.

5.5 SHUTDOWN

(a) When stopping the pump always close the discharge valve first. Pump should never run dry for any length of time with this valve shut or the suction valve closed or both closed, due to the damage of overheating and causing a meltdown of plastic parts of the pump.

(b) In severe climate conditions the pump should be protected from freezing conditions when shut down by one of the following methods:

i. Drain pump and remove all liquid from casing if this liquid is liable to freeze solid.

ii. Keep fluid moving in the pump and pipework to insulate to prevent freezing.

iii. Heat pump and pipework to prevent freezing.

If heat is used to keep pump from freezing do not let temperature rise above 60 degrees centigrade unless permission to do so has been obtained from CREST PUMPS LIMITED.

ATTENTION

In freezing conditions it is important to keep pipework from freezing. A blockage in the pipe can result in overheating the pump.

6 MAINTENANCE

6.1 PREVENTIVE MAINTENANCE

A pump properly installed and operated will require a minimum of maintenance. For the best overall performance be sure to adhere to the instructions in this manual.

Operating conditions vary so widely that to recommend one schedule of preventative maintenance for all duties covered by our pumps is not possible. Keep a permanent record of the periodic inspection and maintenance performed on the pump.

The recognition of maintenance procedure will keep the pump in good working condition and prevent costly breakdowns.

One of the best rules to follow in proper maintenance is to keep a record of actual operation data and hours of operation. The length of this operation period will vary with different applications and can only be determined from experience. The next inspection can be scheduled based on the condition of the components at the first inspection. This system can be followed until a maximum period of operation is reached, which should be considered the operating schedule between inspections. A guide for performing periodic inspections on the pump follows:

PERIOD	INSPECTION
Monthly	Check bearing in motor and bearing pedestal when fitted for temperature and wear. A bearing that has become noisy is obviously showing signs of wear.
3 Monthly	Monthly checks plus check for leaks from pump and pipework and repair as required.
6 Monthly	Monthly and 3 monthly checks. Inspect operation of all valves and instrumentation for correct operation. Special attention to be paid to non-return and foot valves, if fitted, as poor operation of these valves can result in poor performance of the pump.
Yearly	All previous checks, also remove rotating element and inspect for damage and wear, ordering replacement parts if necessary. Remove any deposit or scaling with particular attention to the mechanical seal area. Measure total dynamic suction and discharge head as a test of pipe connections. Record figures and compare them with the figures of the next test. This is important especially where the fluid being pumped tends to form a deposit on internal surfaces.

Recommended 2 Year Spares

Please refer to the Parts List (2:1) for the exact part numbers for your pump. It is recommended to the following parts are replaced every two years: all bearings, o-rings and oil seals.

6.2 DISMANTLING INSTRUCTIONS

Never attempt to dismantle the pump unit until it has been disconnected from the mains electricity supply and, when it has been disconnected from the suction, discharge and seal flushing pipework, ensure that the pump is thoroughly de-contaminated of the fluid it has been pumping before dismantling.

These instructions are a general guide to dismantling the **CREST PUMPS LIMITED** range of end suction pumps and you
should only follow the relevant parts of these instructions appertaining to the pump you have purchased.

1. Remove the pump to a safe and clean working area.

2. Remove strainer basket or suction flare whichever is fitted.

3. Disconnect discharge flange on multistage versions and disconnect bearing feed pipes.

4. Unscrew discharge pipe and discharge elbow. Unscrew encapsulated nuts and remove casing.

5. Lock pump shaft at coupling end, remove impeller locknut (if fitted) left hand thread and unscrew impeller right hand thread.

6. Remove bolts and washers from backplate.

7. Remove backplate assembly.

8. Remove suspension tube.

9. Remove shaft sleeve.

10. Unscrew encapsulated nuts and remove mounting plate.

11. Remove the four nuts and bolts retaining motor and remove motor. Unscrew the grub screws retaining coupling halves and remove both halves of coupling.

12. Remove the four nuts and bolts holding adaptor to bearing housing and remove adaptor.

13. Unscrew the four M6 cap head bolts, remove bearing retaining plate. Bend back lock-tab and, with use of a C spanner, remove nut.

14. Remove six coupling bolts from underside of bearing carrier. Pull bearing housing from shaft and press out bearings from bearing housing.

15. Remove bearing retaining cap from backplate and press out ceramic bush from backplate.

16. Remove PTFE bush from impeller stem. Remove O ring from PTFE bush. Remove O rings from either end of shaft sleeve.

6.3 ASSEMBLY INSTRUCTIONS

Assembly is carried out in the reverse order taking care to maintain 1.5mm impeller gap. This impeller gap has to be re-set by slackening the shaft nut and locknut and adjust accordingly.

6.4 REPLACEMENT PARTS

Pumps are designed and built with all wearing parts being replaceable. A recommended inventory of spare parts is dependent upon installation and the importance of continued operation.

Parts should be ordered as far in advance as possible since circumstances beyond the control of the Company may reduce existing stock. Not all parts are stocked as some must be manufactured for each order.

When ordering spare parts always include the following information:

Pump Serial Number and/or Pump Type
Part number obtained from drawing/parts list
Name of part and quantity of part required
Material desired (if different from original material)
Full Company details including delivery/invoice address
Order Number.

NOTE Parts will be supplied in the original materials unless specified as a material change. All material substitutions should be discussed with **CREST PUMPS LIMITED.**

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