

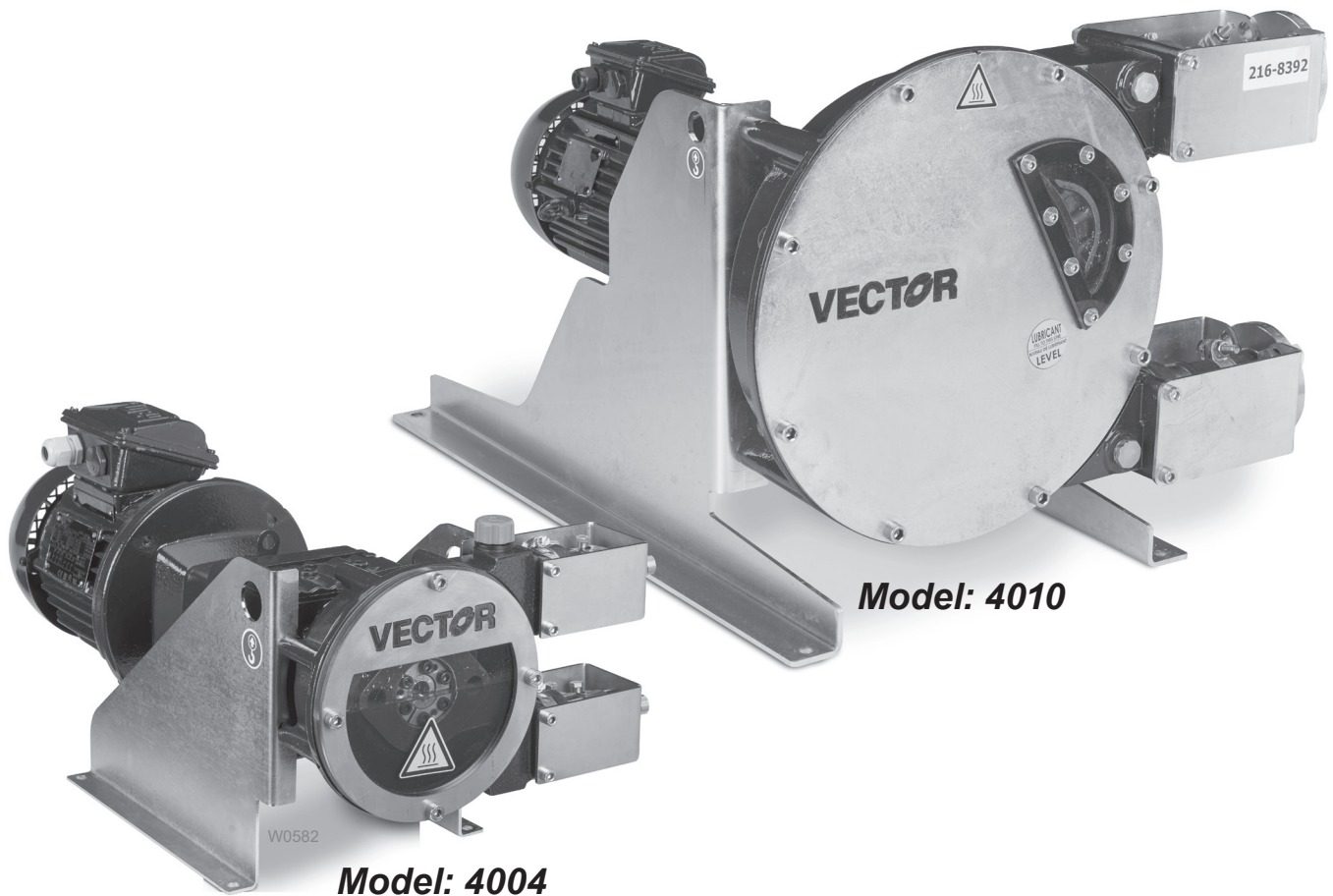
VECTOR

*Installation, Operation
and Maintenance Manual*
VEC-991-4000B

Peristaltic Pumps

Vector 4000 Series

*Models: 4003, 4004, 4006, 4007, 4009, 4010,
& 4014*



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Vector 4000 Important Precautions



CAUTION

Important Precautions

- To avoid personal injury or pump damage, follow all instructions and safety precautions carefully.
- Don't exceed the manufacturer's recommended RPM or pressure limits.
- Follow all codes and hydraulic recommendations on installation and operation of the pumping system.
- To prevent vibration, mount the pump and motor securely to a rigid, level base.
- For safety and easier servicing, provide adequate work space around the pump. Allow space to remove the front cover, hose clamps, hose, and drive unit.

W0387

Safety Precautions

General remarks

These safety and installation instructions contain important information and precautionary notes and must be available to those operating the pump. Please read them thoroughly prior to installation, electrical connection and use of the pump. Operating instructions for components of pumps must be followed.

These safety and installation instructions do not cover local regulations. Installers and operators must also observe local regulations during installation and operation.

Each pump must be labeled by the end user to warn of any hazards that the system process may produce; e.g. corrosive chemicals or hot process etc.

All personnel involved in the operation, maintenance, inspection and installation of the pump must be fully qualified to perform the work. The personnel's responsibilities, competence, and supervision must be clearly defined by the operator. To the extent that if the personnel in question is not already in possession of the requisite know how, appropriate training and instruction must be provided. In addition, the operator is responsible for ensuring that the contents of the operating instructions are fully understood by all the responsible personnel.

When installing a Vector pump in conjunction with a motor, or motor and frequency controller, the relevant manuals must be referred to for electromagnetic compatibility.

All safety instructions in this manual and all relevant local health and safety regulations must be followed.

Pay attention to the weight of the pump before attempting to lift either manually or when selecting appropriate lift equipment.

Safety Measures

1. Mechanical risk:

Ensure that all protections (cover, sight glass, ventilator hood, coupling protection) are in place before operating the pump.

Disconnect the electrical supply before any mechanical work, except during hose replacement.

Hose replacement must be done with the pump cover closed.

While replacing a hose, wear protective gloves and clothes. Keep hands away from the brackets, suction and discharge flanges.

During pump maintenance, check that lifting points are correctly used.

The frame of the pump must be firmly fastened to the ground.

2. Electrical risk:

Ensure that the electrical installation conforms to the local standards required; especially regarding ground and thermal protection.

3. Operational risk:

Check that the materials to be pumped are compatible with the following:

- Peristaltic pump operation.
- Hose material.
- Lubricant.
- Inserts material.
- Shoe material.

Wanner cannot guaranty the hose lifetime or the material loss due to a hose burst. It is the operator's responsibility to prevent pumped liquid loss with additional hose rupture detectors and or automatic shut down valves. Check guarantee for further information.

Ensure that the pump is compatible with the process.

Ensure that the pump suction side pressure is correct.

To avoid hose rupture, make sure that:

- The pump casing is not filled with the pumped material.
- That the suction line is not on load. Otherwise the material may empty into the pump casing and leak out of the pump.
- That the discharge line is not under pressure. Otherwise the pumped material may be forced back into the pump casing and leak out of the pump.

A leakage detector as well as automatic shut down valves are recommended in order to prevent hose rupture.

When draining the pump following a hose rupture, make sure the lubricant and pumped material are disposed of properly.

Complete or partial blockage of the positive displacement pump discharge line can lead to a dangerous high pressure condition. Before operating the pump, make sure there is no complete or partial hose blockage.

Before each use, check the direction of rotation of the pump. While placing the pump under vacuum, mount window screw using an airtight glue to avoid air leakage.



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Vector 4000 Introduction

2. HOW TO USE THIS MAINTENANCE MANUAL

This technical manual covers the Vector 4000 Series pumps. The manual provides instructions on how to install, start, and maintain the pumps. All persons, installers, and users must read the manual in its entirety prior to installation and use.

Your local Wanner distributor is also available for additional information .

For a reply, please include the following information:

- Type of pump
- Pump

Also visit our website www.vectorpump.com for further information.

2.1 USE OF THE PUMP

The pump was defined for specific application. Any other use which does not comply with this use invalidates the warranty. Wanner cannot be held responsible for damage or possible injury incurred during the use of the pump. The pump was designed in accordance with applicable norms and directives. Use the pump only for applications represented above. If you want to change your application, first contact your Wanner distributor.

2.2 RESPONSIBILITY

Wanner will be under no circumstances responsible for damage or wounds caused by non respect of security directives and maintenance instructions contained in this manual, or by negligence during the installation, use, service or repair of Wanner hose pumps. Moreover, additional directives of security can be necessary according to working conditions or according process. Contact your Wanner distributor if you notice a potential danger during the use of the pump.

2.3 USER TRAINING AND INSTRUCTION

Every person who installs, uses, or performs any operations or maintenance on the pump must be qualified. The person must also read and be familiar with this technical manual.

Any temporary personnel must be supervised by skilled users.

The order of operational steps defined in this manual must be followed. Store this manual next to the pump so that it can be consulted at any time.

2.4 Limited Warranty

Wanner Engineering, Inc. ("Wanner") extends to the original purchaser of equipment supplied or manufactured by Wanner and bearing its name, a limited one-year warranty from the date of purchase against defects in material or workmanship, under normal use and service, and provided the equipment is installed, operated and maintained in accordance with instructions supplied by Wanner. Wanner will repair or replace, at its option, defective parts without charge if: (a) you provide written notice of any defect within thirty (30) days from the discovery of the defect; (b) the claim is received by Wanner before the expiration of the warranty period; and (c) such parts are returned with transportation charges prepaid to Wanner Engineering, Inc., 1204 Chestnut Avenue, Minneapolis, Minnesota 55403. A return goods authorization must be received prior to the return of the defective part. No allowance will be made for repairs undertaken without WEI's written consent or approval.



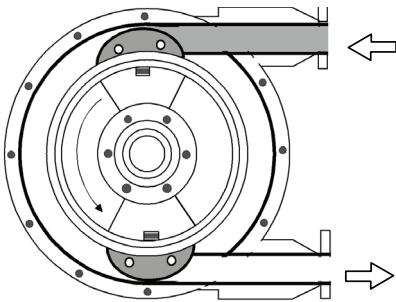
Vector 4000 Description

3 DESCRIPTION

3.1 Identification

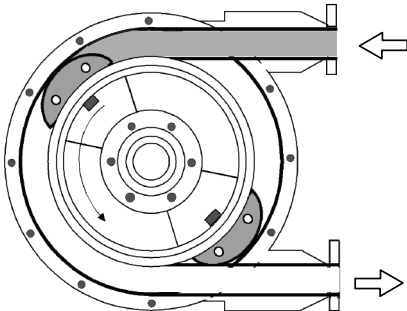
Vector pumps are identified by the nameplate located on the upper bracket. It includes the type and model number of the pump. This model number indicates information regarding pump materials, type of the hose, characteristics of the gearbox, and characteristics of the motor. The gearbox as well as the motor have their own nameplates on which include the reduction ratio, power, and electrical voltage.

3.2 Description of Pump Operation



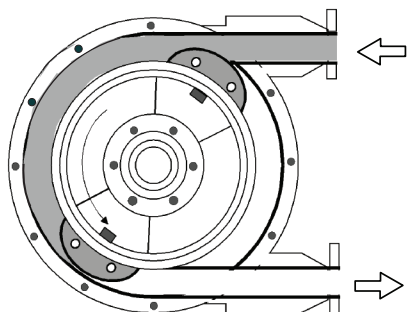
PHASE 1

The pump hose is compressed successively by two pressing shoes assembled on a rotating wheel. The first shoe, by pressing the walls of the hose, will create a vacuum and suck the pumped liquid into the hose.



PHASE 2

The pumped liquid has now entered the hose. The second shoe will compress the hose and push the liquid towards the pump outlet.



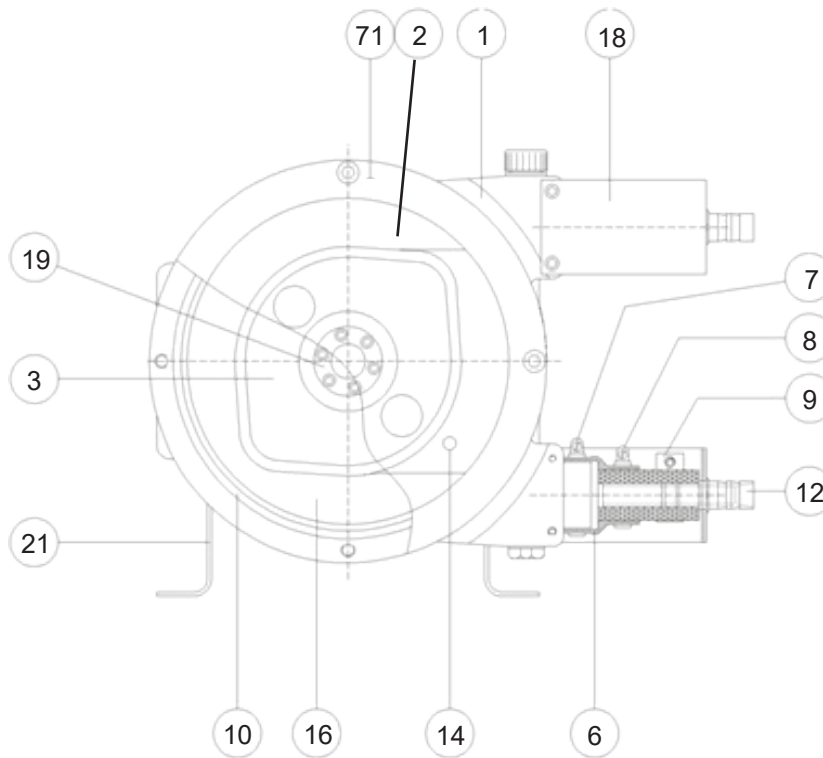
PHASE 3

As soon as, at the discharge side, the shoe is detached from the hose, the other shoe diametrically opposite is already in compression thus avoiding an internal material leakage. The material is then successively sucked and pushed due to the wheel rotation.



Vector 4000 Description

3.3 PUMP PARTS

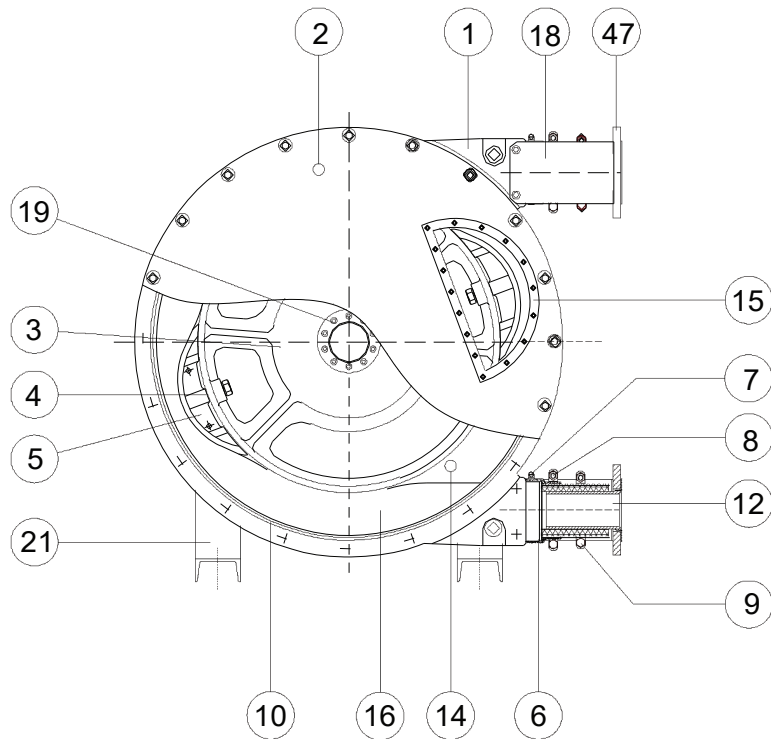


VECTOR 4003, 4004

PART NO	DESIGNATION	4003, 4004 MATERIAL
1	CASING	CAST IRON
2	COVER, TRANSPARENT	LEXAN
3	WHEEL	CAST IRON
6	SLEEVE	EPDM
7	CLAMP ON CASING	STAINLESS STEEL
8	CLAMP SLEEVE / HOSE	STEEL
9	CLAMP ON HOSE	STEEL
10	SEAL COVER	NITRILE
12	INSERT	STAINLESS STEEL
14	LUBRICANT	GLYCERIN BLEND
16	HOSE	NR/NBR/EPDM
18	BRACKET	ELECTROPLATED STEEL
19	HUB	STEEL
21	FRAME	ELECTROPLATED STEEL
71	COVER PLATE	ELECTROPLATED STEEL

Vector 4000 Description

3.3 PUMP PARTS



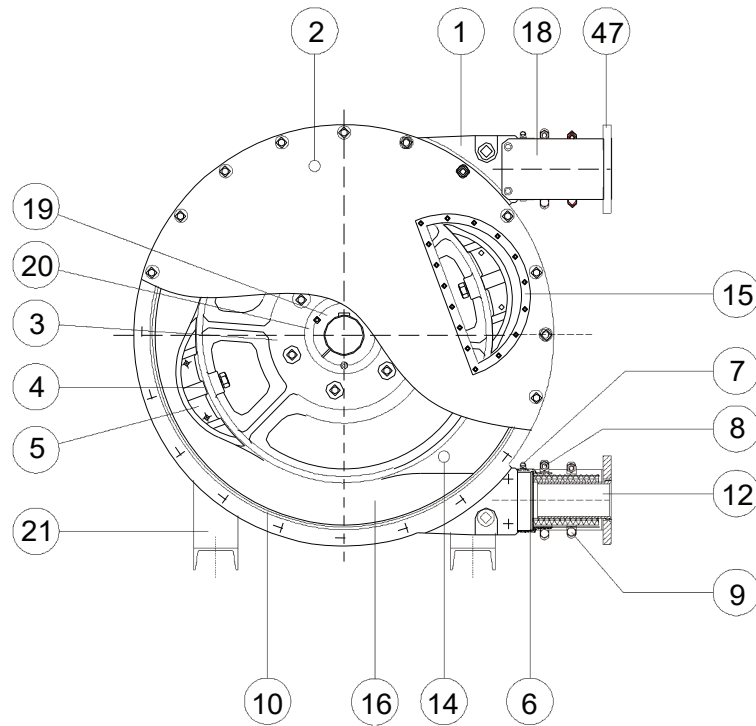
VECTOR 4006, 4007, 4009, 4010

PART NO	DESIGNATION	4006, 4007 MATERIAL	4009, 4010 MATERIAL
1	CASING	CAST IRON	CAST IRON
2	COVER	ELECTROPLATED STEEL	STEEL
3	WHEEL	CAST IRON	CAST IRON
4	SHIM	GALVANIZED STEEL	GALVANIZED STEEL
5	SHOE	ALUMINIUM	ALUMINIUM (4009) / CAST IRON (4010)
6	SLEEVE	EPDM	EPDM
7	CLAMP ON CASING	STAINLESS STEEL	CK STEEL
8	CLAMP SLEEVE / HOSE	STAINLESS STEEL	STAINLESS STEEL
9	CLAMP ON HOSE	STAINLESS STEEL	STEEL
10	SEAL COVER	NITRILE	NITRILE
12	INSERT	STAINLESS STEEL	STAINLESS STEEL
14	LUBRICANT	GLYCERIN BLEND	GLYCERIN BLEND
15	SIGHTGLASS	LEXAN	LEXAN
16	HOSE	NR/NBR/EPDM	NR/NBR/EPDM
18	BRACKET	ELECTROPLATED STEEL	ELECTROPLATED STEEL
19	HUB	STEEL	STEEL
21	FRAME	STEEL	STEEL
46	SIGHT GLASS SEAL	NITRILE	NITRILE
47	INLET/OUTLET FLANGE	STAINLESS STEEL	STAINLESS STEEL



Vector 4000 Description

3.3 PUMP PARTS



VECTOR 4014

PART NO	DESIGNATION	4014 MATERIAL
1	CASING	CAST IRON
2	COVER	STEEL
3	WHEEL	CAST IRON
4	SHIM	GALVANIZED STEEL
5	SHOE	CAST IRON
6	SLEEVE	EPDM
7	CLAMP ON CASING	STAINLESS STEEL
8	CLAMP SLEEVE / HOSE	STAINLESS STEEL
9	CLAMP ON HOSE	STEEL
10	SEAL COVER	NITRILE
12	INSERT	STAINLESS STEEL
14	LUBRICANT	GLYCERIN BLEND
15	SIGHT GLASS	LEXAN
16	HOSE	NR/NBR/EPDM
18	BRACKET	ELECTROPLATED STEEL
19	HUB	STEEL
20	BOLT ON PLATE	CAST IRON
21	FRAME	STEEL
46	SIGHTGLASS SEAL	NITRILE
47	INLET/OUTLET FLANGE	STAINLESS STEEL



Vector 4000 Description

3.4 PUMP HOSE

Wanner hoses are manufactured according to strict specifications for the best performance of the pump and to assure optimum hose life. Hoses are available in four materials: Natural Rubber (NR), perbunan (NBR), EPDM, and Hypalon. The hose material must be compatible with the liquid pumped. Consult your Wanner distributor to obtain the correct hose for your use.

Vector 4000 pumps operate in temperatures between + 14°F and +176°F. Pumps are painted with a 150µ Polyurethane paint to resist corrosive environments. Pumps are designed for indoor and outdoor use.

HOSE DIMENSIONS (dimensions in mm)

PUMP	INNER ø	THICKNESS	LENGTH
4003	10	11	570
4004	15	11	830
4006	25	14.5	1090
4007	32	15.5	1300
4009	40	13.5	1500
4010	51	15	1820
4014	80	21.5	2910

3.5 GEARBOX

Gearboxes are sized according to the pump's radial loads. Consult the gearbox maintenance manual for the type, quantity, and frequency of oil changes.

3.6 ELECTRICAL MOTORS

The standard motors provided on pumps are TEFC motors and require a 230/460 VAC, 60Hz, 3Ø voltage source. If the pump is to be used in an explosive environment, please contact the factory.

3.7 AVAILABLE OPTIONS

The following Vector Pump options are available:

- Hose rupture detector.
- Pulsation dampener.

Please contact your Wanner distributor for additional information about these options



Vector 4000 Installation

4 INSTALLATION

4.1 INSPECTION

The pump must be checked upon receipt for any possible damage or incomplete shipment. Notify Wanner Engineering of any discrepancies immediately.

Check all boxes or packages containing spare parts or accessories packed with the pump.

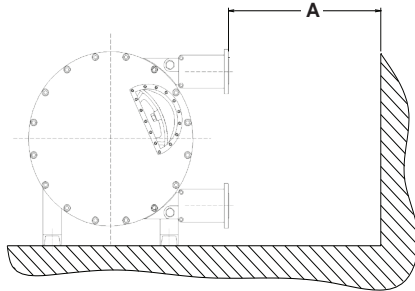
4.2 INSTALLATION PLANNING

Location

1. Locate the pump near the liquid source, so that the suction line is short and direct.
2. When practical, locate the pump above the level of the liquid; if the hose fails, the pumpage drains back into the tank.
3. **Allow space to remove the front cover, hose, and drive unit. See Inlet Hose Length Chart (A).**

Inlet Hose Length Chart (A)

PUMP	DISTANCE (A)
4003	1.3 ft
4004	1.6 ft
4006	2.6 ft
4007	3.3 ft
4009	3.9 ft
4010	4.6 ft
4014	6.5 ft



Foundation

The foundation should be sufficiently rigid and substantial to absorb any vibration, and to permanently support the base plate at all points. A concrete foundation, poured on a solid footing of adequate thickness to support the pumping unit provides the most satisfactory foundation.

The base plate should be installed in a level position. The size and location of the base mounting holes are shown on the pump specification sheets. Use the dimensions provided in the pump specification data sheets for general piping.

Note: For a detailed description of proper procedures for grouting base plates, refer to the Hydraulic Institute Standards.

4.3 PIPING

Inlet piping:

1. Size the inlet line 1.5 or two sizes larger than the pump suction opening.
2. Suction lines should be as short and direct as possible.
3. See Site Plumbing Figure below. Install 6 to 8 feet of reinforced flexible hose between pump and rigid piping to absorb vibration, expansion and contraction, and to make maintenance easier.

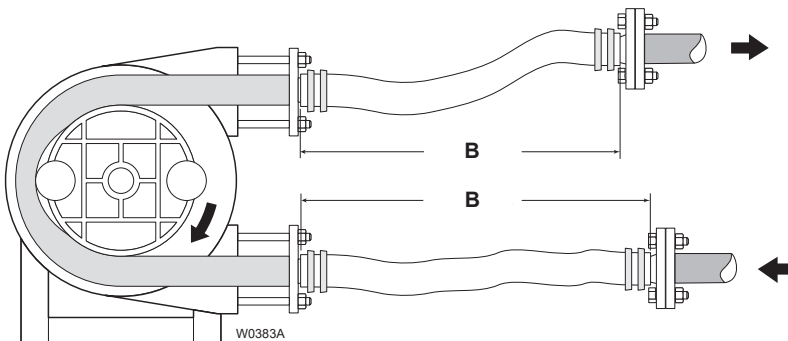
Note: The inlet hose must be capable of withstanding a vacuum. This avoids hose collapse which will restrict flow.

4. Install an inlet pressure/vacuum gauge on the inlet side of the pump.
5. To reduce turbulence and resistance, do not use 90° elbows. If turns are necessary in the suction line use 45° elbows or long sweeping elbows when required.
6. Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.
7. In some cases, a pulsation dampener may be required to decrease acceleration head and pulsations. Mount dampener within ten pipe diameters of the pump suction connection. The closer the better.

Discharge piping:

1. See Site Plumbing Figure below. Install a length, B, of reinforced flexible hose (one size larger than pump connection) between pump and rigid piping. This will absorb vibration, provide for expansion and contraction. It also creates a reservoir and eases the replacement of the hose.
2. Size the rigid discharge line to be at least the size of the pump inlet connection.
3. Install piping supports where necessary to relieve strain on discharge piping and to minimize vibration.
4. Install a pressure gauge in the discharge piping.
5. In some cases, a pulsation dampener may be required to decrease pulsations. Mount dampener within ten pipe diameters of the pump discharge connection. The closer the better.
6. Install a pressure relief valve to protect the pump and piping.

Site Plumbing Figure



PUMP	DISTANCE (B)
4003	2 ft
4004	2 ft
4006	2.5 ft
4007	3 ft
4009	4 ft
4010	5 ft
4014	8 ft

Vector 4000 Installation and Maintenance

4.4 LIFTING THE PUMP

Pumps are provided with two lift rings fitted on the upper part of the frame. While lifting the pump, do the following:

1. Lift the complete hose pump using the lifting rings plus additional support on the gearbox and the motor using suitably rated straps or slings.
2. Never exceed a lift's upper weight limit. Refer to the Pump Weight table below to determine the size of lift required.
3. The motorized pump, given its centre of gravity, will tend to overbalance on the pump head side. Make sure that the persons are at a security distance of the pump to avoid any risk of wound.
4. Never raise the pump otherwise than by the pump's lifting rings.
5. Never raise the pump by its orifices nor by its brackets.

Pump Weight							
Pump	4003	4004	4006	4007	4009	4010	4014
Lb.	55	77	176	287	463	694	2050

5. PUMP STARTUP

5.1 PREPARATIONS

1. Connect the electrical motor in accordance with the local rules and regulations. Perform this work by qualified personnel.
2. Make sure that the lubricant level arrives at the level of the sight glass. Add lubricant if required by the breather or by the sight glass. See 6.1.
3. Make sure the shimming of the pump is according to the pump process. See 6.5.
4. Check the direction of rotation of the pump. It is recommended to install a rotation inverter on the motor for the hose change.

5.2 STARTUP

1. Install piping at the inlet and outlet of the pump.
2. Make sure that valves at the inlet and outlet are opened.
3. Start the pump by checking its direction of rotation by the sight glass.

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

6. MAINTENANCE

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

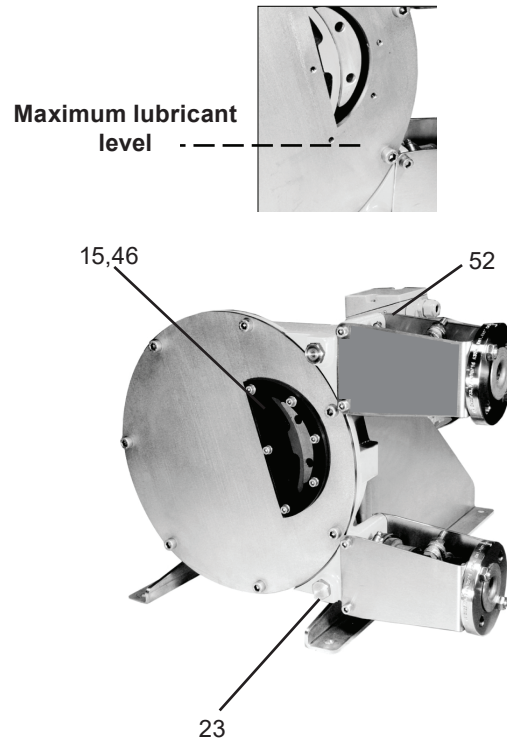
6.1 CHANGING LUBRICANT.

Check lubricant level every 1000 hours. Change as follows:

1. Stop the pump
2. Place a tray underneath the drain plug (23)
3. If necessary, install a tap and a drain circuit instead of the drain plug
4. Make sure tray will hold the quantity of lubricant during the drainage process. See 9.3 Lubrication Table for quantity.
5. Unscrew the drain plug and drain lubricant
6. Position and tighten drain plug by applying Teflon® band or waterproof paste of close drain tap.
7. Remove sight glass (15) as well as seal (46) and fill the casing with Wannan lubricant. See 9.3 Lubrication Table for quantity. Fill with lubricant to the level of the sight glass or underneath the shaft line. See illustration below.

Note: You can also fill the casing by removing the breather cap (52) at the back of the pump casing.

8. Check the condition of the seal (replace if necessary). Reassemble sight glass (or tighten the breather cap).



Note: If the pump is mounted with the inlet/outlet positioned upwards, lubricant drainage is obtained by unscrewing some cover bolts in the lower part.

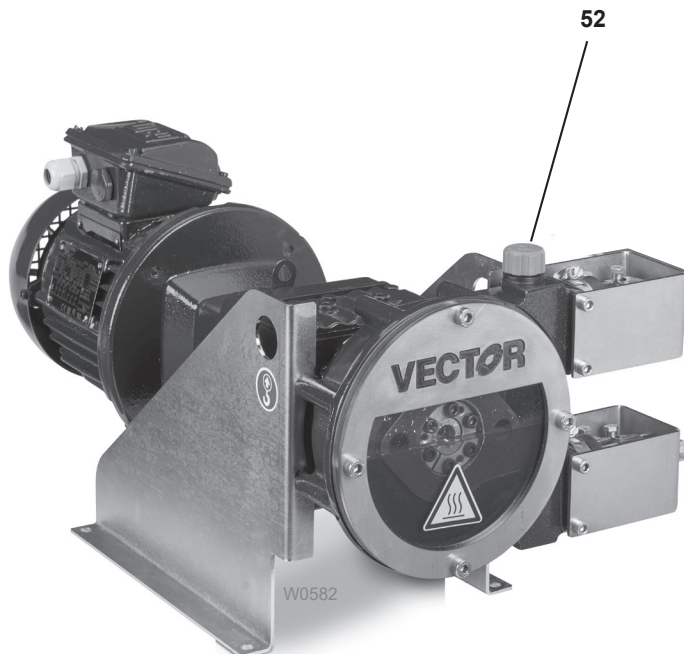


Vector 4000 Maintenance

6.1 CHANGING LUBRICANT. (Cont'd)

FOR MODELS 4003, 4004:

Unscrew breather plug (52). Place a funnel inside the breather plug hole and fill the casing with the Wanner lubricant. See 9.3 Lubrication Table for quantity. Fill lubricant to just underneath the shaft.



Vector 4000 Maintenance

6.2 HOSE CLEANING

The hose can be cleaned without removing. Use water or cleaning liquid (check compatibility with hose material). With Some pumped material requires cleaning after each use to avoid material hardening in the hose.



CAUTION: Make sure that the cleaning liquid temperature is the same as the hose material.

6.3 HOSE REPLACEMENT

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.



CAUTION: Before any hose change, check the following points:

1. Skilled personnel are to perform this service and have read and understand this manual.
2. Close inlet and outlet valves to minimize material loss.
3. Wear clothes that provide protection when using the pumped material.
4. Observe all safety and environmental rules governing the use of the pumped material.

6.3.1 HOSE REMOVAL

1. Disconnect and remove suction and discharge piping.
2. Drain lubricant as outlined in Section 6.1.
3. Loosen clamps (8) and (9) at the suction inlet. Remove insert (12) and flange (47) See Figure 1.

FOR MODELS 4003, 4004:

3. Loosen clamps (8) and (9) at suction inlet. Remove circlips (24) and remove bracket (18) and insert (12). See Figure 2.

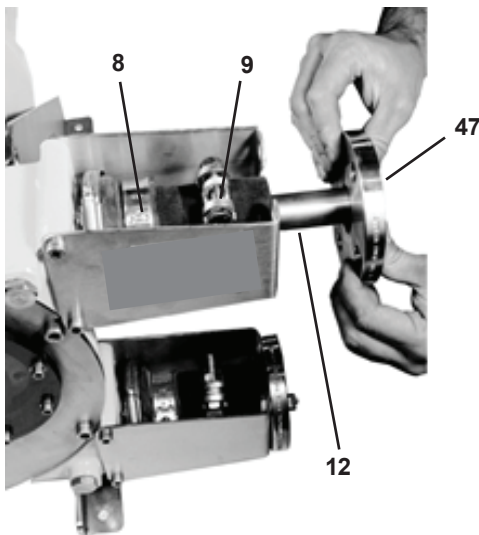


Figure 1

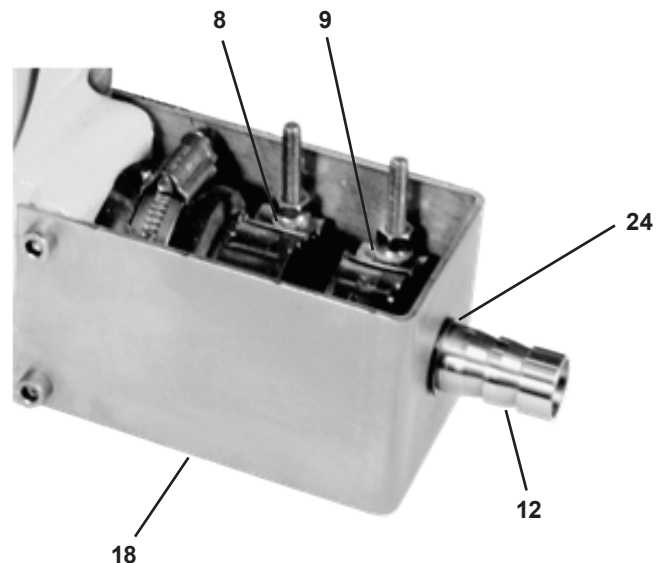


Figure 2



Vector 4000 Maintenance

6.3.1 HOSE REMOVAL (Cont'd)

4. -At the discharge outlet, loosen clamps (8) and (9).
-Remove the insert (12) and remove the flange (47) as well as the brackets (18). See Figure 3.
5. Remove clamps.

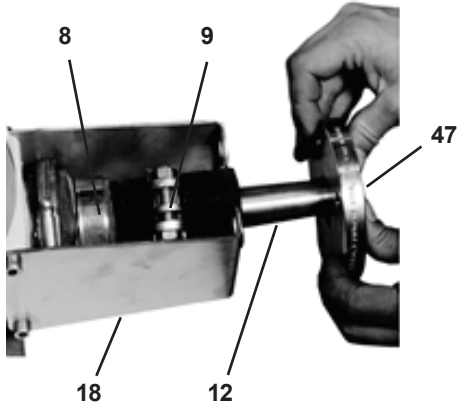


Figure 3

FOR MODELS 4003, 4004:

At the pump outlet, loosen clamps (8) and (9). Remove circlips (24) and dismantle bracket (18). Remove insert (12) and clamps. See Figure 5.

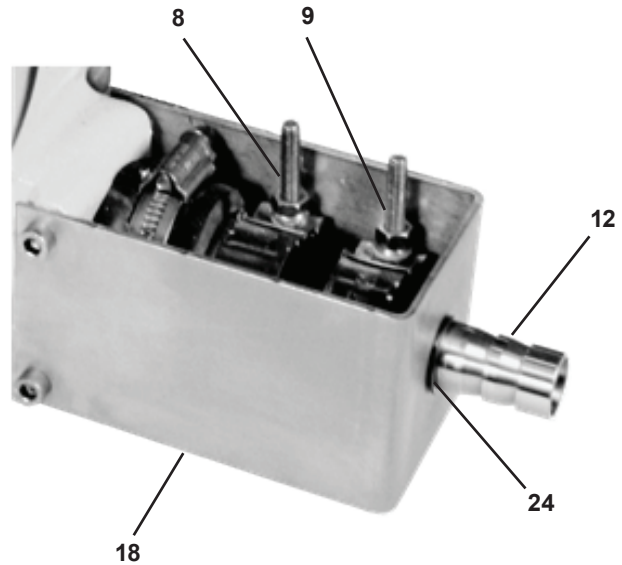


Figure 5



WARNING!

The hose can come out of the pump casing very fast and cause harm. Ensure that no one is in front of the pump's outlets when removing the hose.



WARNING!

Use care when you jog/run the motor to avoid injury.

6. Carefully jog/run motor to expel hose from pump casing outlet side. See Figure 4.

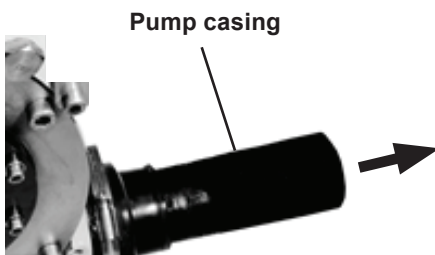


Figure 4



Vector 4000 Maintenance

6.3.2 PUMP CASING CLEANING

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

This operation is necessary when a hose burst has caused material contamination inside the pump casing.

1. Unscrew cover bolts (33) by leaving two cover bolts partly fastened to the casing. Partially remove the cover (2) from the casing and fix a shackle in one of the cover's highest bolt holes (4014 is equipped with a lifting ring). Unfasten the remaining cover bolts and remove the cover. See Figure 6.
2. Check the state of the cover seal (10) and replace if necessary.
3. Check the state of wear of the pressing shoes (5) and replace them if necessary. See 6.4.



CAUTION: A wear of shoes can cause problems to the pump and provoke abnormal hose lifetime.

4. In the case of a hose burst, it is possible that the shaft seal (26) and seal ring (27) have been damaged when pumping an abrasive liquid. See 6.4 and Parts List to replace.
5. Wash the casing with clear water and remove any residue.
6. Dry the pump casing entirely.
7. Replace the cover seal in its groove.
8. Reassemble the pump cover.

6.3.3 REASSEMBLY OF THE HOSE



WARNING! You should never assemble a new hose without a mounted cover.

1. Pre-assemble the flange (47) at the inlet port with two bracket bolts See Figure 7.

FOR MODELS 4003, 4004:

Temporarily mount the bracket 18 at the inlet port.

2. Clean the new Wanner hose carefully. Slightly coat it with Wanner lubricant. Slightly lubricate the inside of the sleeve (6).

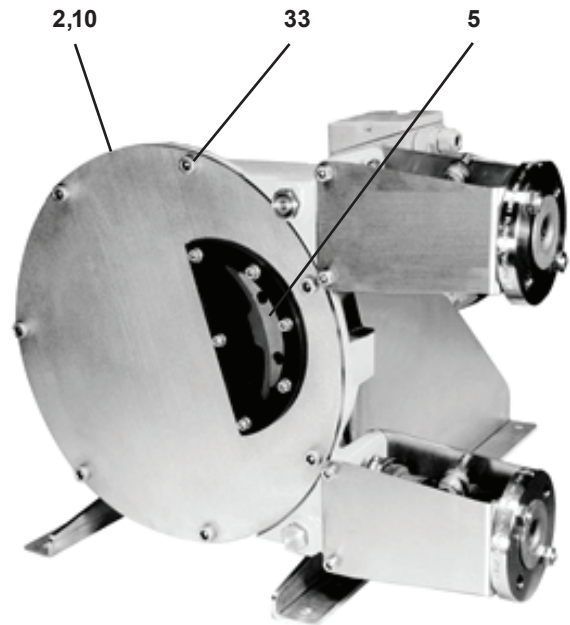


Figure 6

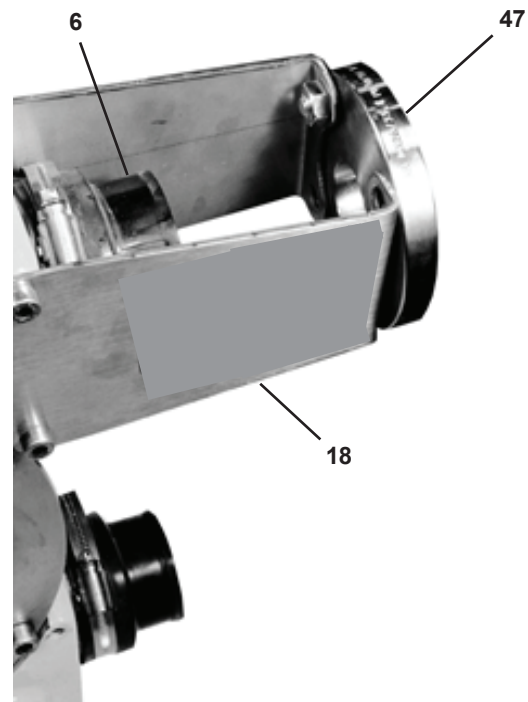


Figure 7



Vector 4000 Maintenance

6.3.3 REASSEMBLY OF THE HOSE (Cont'd)

3. Insert hose at the outlet port. See Figure 8.



WARNING!

Use care when you jog/run the motor to avoid injury.

4. Reverse the direction of rotation of the motor.
5. While pushing on the hose, jog/run the motor and check the direction of rotation.
6. The shoes mounted on the wheel are going to “swallow” the hose and push it out of the inlet port. Jog the motor to bring the hose against the flange (47). See Figure 9.
7. Assemble the clamps (8) and (9) on the inlet side. Mount the insert (12) into the hose. Tighten clamps.

FOR MODELS 4003, 4004

Dismantle the bracket 18. Mount clamps on the hose. Mount the insert into the hose. Fix bracket (18) and block the insert with circlips (24). Tighten clamps.

Note: If you have difficulty assembling inserts into the pump hose, coat them slightly with Wanner lubricant. Never use another lubricant.

8. Assemble the brackets (18) and pre-assemble flange (47) on the outlet side with two temporary bolts.

FOR MODELS 4003, 4004

Assemble the brackets at the outlet side.

9. Reverse the direction of rotation of the motor.



WARNING!

Use care when you jog/run the motor to avoid injury.

10. Jog/run the motor to bring the hose against the discharge flange.
11. Perform step 7 at discharge side.
12. Fill the pump with the necessary quantity of Wanner lubricant. See 6.1. and 9.3.
13. Take away the temporary flange bolts and fix the piping on both suction and discharge sides.
14. Open the valves at the suction and discharge sides.
15. Check the direction of rotation of the pump. Check for any possible lubricant leakage by the inserts, sleeves or cover.

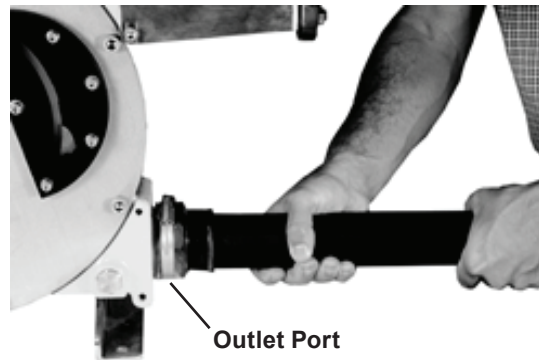


Figure 8

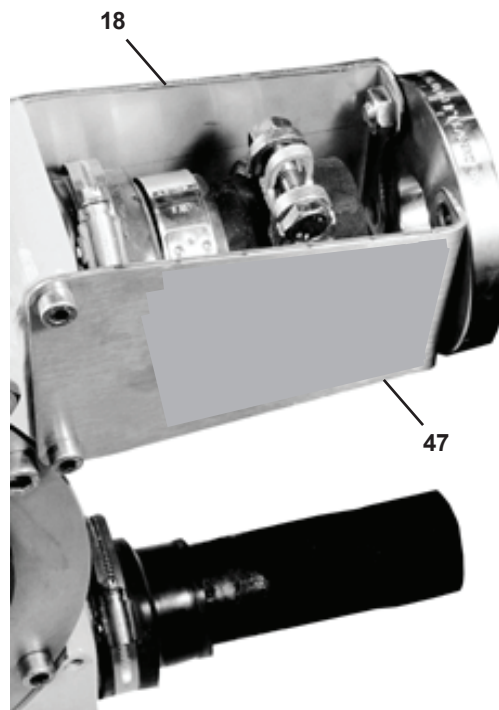


Figure 9

Vector 4000 Maintenance

6.4 REPLACEMENT OF SPARE PARTS

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

6.4.1 REPLACEMENT OF PUMP SHOES (except 4003 and 4004)



WARNING!

Use care when you jog/run the motor to avoid injury.

1. Jog/run the motor and position one of the shoes in front of the sight glass.
2. Cut the power supply.
3. Drain the lubricant. See 6.1.
4. Remove the pump cover (2) as well as the cover seal (10). See Figure 10 and Figure 11.
5. Disassemble the shoe which is not in contact with the hose and put aside the shims if any. Check that the pin (30) is still on the wheel (4006, 4007, 4009, 4010).
6. Mount a new shoe on the wheel with shoe bolt (28) and shoe bolt washer (29). Slide the shims (4) between the shoe and the wheel before tightening.



CAUTION: Be careful of the position of the shoe with centering pin 30 (4006, 4007, 4009, 4010).

7. Tighten the shoe onto the wheel.
8. Temporarily reassemble the cover with three cover bolts (33) positioned 120° from each other.



WARNING!

Use care when you jog/run the motor to avoid injury.

9. Jog the motor 180° to bring the second shoe in front of the sight glass.
10. Remove the cover once again and perform steps 5 thru 7.
11. Reposition the cover and tighten all cover bolts.

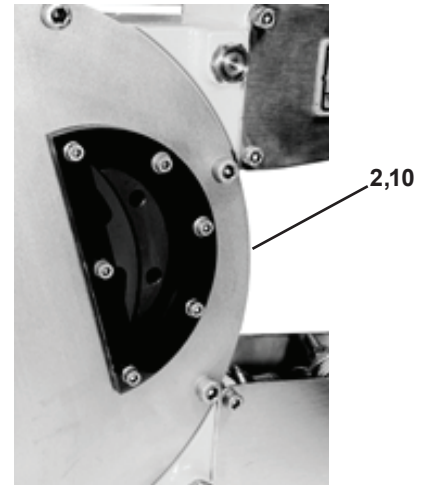


Figure 10

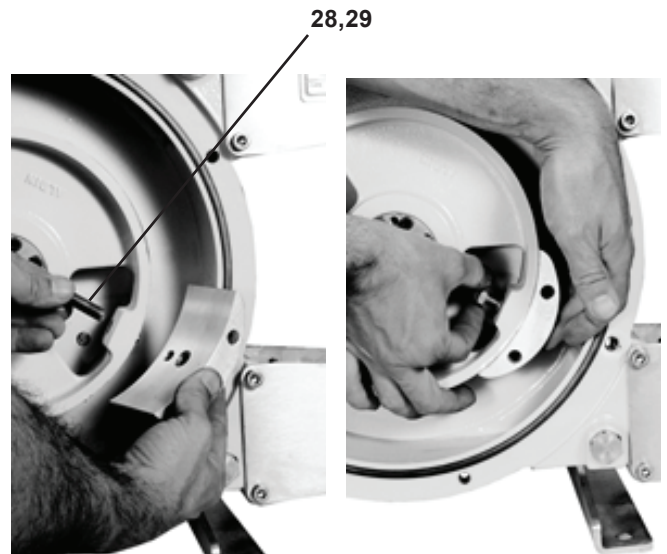


Figure 11



Vector 4000 Maintenance

6.4.2 REPLACEMENT OF THE SEAL RING (27) AND THE SHAFT SEAL (26)

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

Wanner hose pumps are equipped with a leakage channel to observe wear of the seal ring or the shaft seal. This channel is at the back of the pump casing underneath the gearbox flange. It also protects the gearbox seals by leaving the lubricant or the material to pass freely at the back of the pump casing. See Figure 12, Figure 13, and Figure 14.

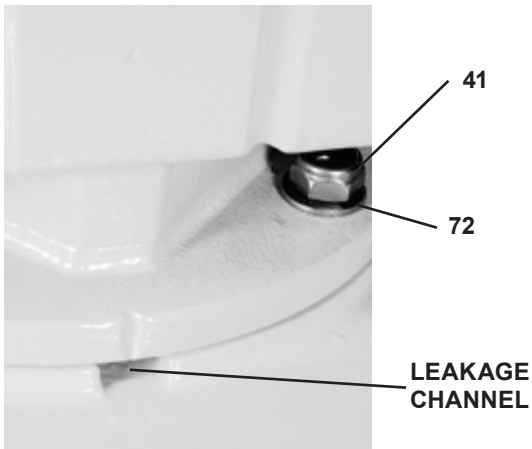


Figure 12

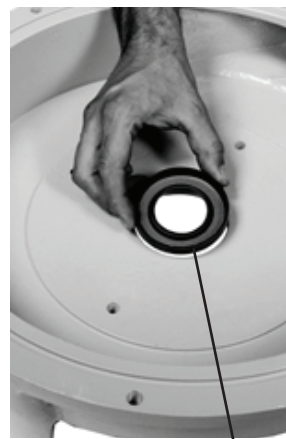


PUMPS 4006, 4007, 4009, 4010

1. Isolate the pump from the power supply.
2. Empty the lubricant and clean out the pump. See 6.1.
3. Remove the pump hose. See 6.3.1.
4. Disassemble the pump cover and remove the cover seal (10).
5. Disassemble the wheel by unscrewing the hub (19).
6. Remove the wheel of the pump shaft with a suitable lifting equipment.
7. Support the gear motor with a suitable lifting equipment.
8. Unscrew nuts (41), washers (72) and remove gearbox from pump casing.
9. Cut out and remove seal sleeve (27) if damaged.
10. Slip on spacer ring (73) if used and glue to the shaft.

Note: *Contact Factory before performing step 11!*

11. Position new seal ring (27) against spacer ring or the gearbox shaft's shoulder. Fill the key groove with silicone mastic to ensure correct sealing.
12. Remove the shaft seal (26) with a drift punch.
13. Replace with new shaft seal using a suitable tool (wooden or plastic cylinder). Check the mounting position of the seal (opened side turned to the cover).



26



Cylinder Tool

Figure 13

Vector 4000 Maintenance

14. Mount the gear motor on the casing being careful not to damage the shaft seal. Tighten nuts (41) and washers (72).
15. Mount the wheel on the pump shaft. Position and space wheel as indicated by the illustration in Figure 15. Refer to the Positioning Distances (L) table, depending on the pump used.



Figure 14

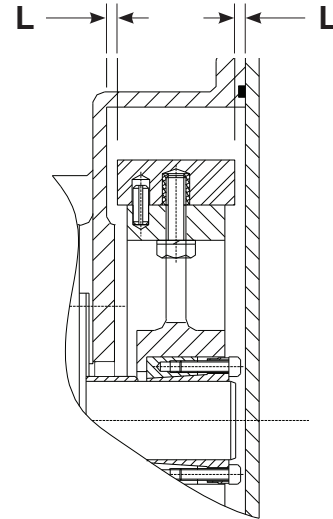


Figure 15

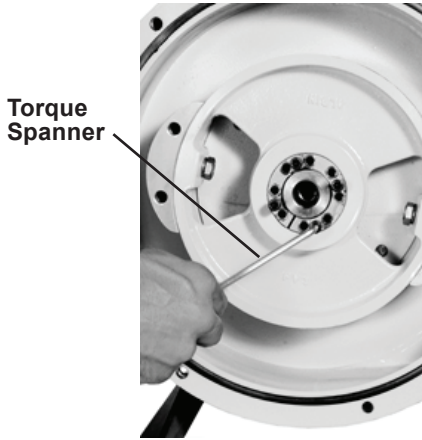
Positioning Distances (L)

Model:	4003	4004	4006	4007	4009	4010	4014
Distance:	4	2.75	5.5	6	5	3	8
Distance (L) in mm (plus or minus 0.5 mm)							



Vector 4000 Maintenance

16. Cross tighten the expandible hub (19) with a dynamometric spanner to the torque figure specified in the Hub Torque table. Check the wheel position once again. See Figure 16.



Hub Torque TABLE

PUMP TYPE	TORQUE Nm
4003, 4004	12
4006, 4007	13
4009	27
4010	35
4014	110

Figure 16

17. Mount the cover seal (10) in its groove and mount the cover.
 18. Mount the pump hose as stated in 6.3.3.

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

1. Steps 1 thru 10. for Vector pumps 4003 and 4010.
2. Disassemble the seal flange (25) and remove the shaft seal with a screwdriver or a similar tool.
3. Take the new shaft seal (26) between the thumb and index fingers and form a "figure 8". Insert seal into its groove. See Figure 17.



Figure 17

4. Mount gear motor on pump casing. See 6.4.2., step 13.
5. Replace the O-ring (67) if necessary and reassemble the seal flange.
6. For pump 4014, perform steps 14 thru 17 as above.



Vector 4000 Maintenance

6.5 SHOE SHIMMING (except 4003 and 4004)

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

Note: This paragraph does not apply to pumps 4003, 4004.



CAUTION: The shimming of shoes is an operation which consists in adding shims under the shoe to stop any internal leakage. An internal leakage considerably reduces the life time of the hose as well as the flow. As a result, it is essential to adjust the shoe's shimming according to the rotation speed of the pump, the desired discharge pressure and the liquid viscosity.



WARNING! Never run the pump without the sight glass.

The shoe shimming can be made without disassembling the hose or the cover. Shims are inserted or removed thru the sight glass opening as described in the following steps. See Figure 18 illustrations.



WARNING! Use care when you jog/run the motor to avoid injury.

1. Jog/run the motor and bring a shoe in front of the sight glass.
2. Cut the power supply of the pump.
3. Unscrew the sight glass bolts (37) and remove taking care in not damaging the seal.
4. Slightly unscrew the shoe's fastening bolt(s) and lift the shoe (5) off the wheel with a screwdriver or a similar tool.
5. You can now either slide in or remove the necessary number of shims under the shoe.

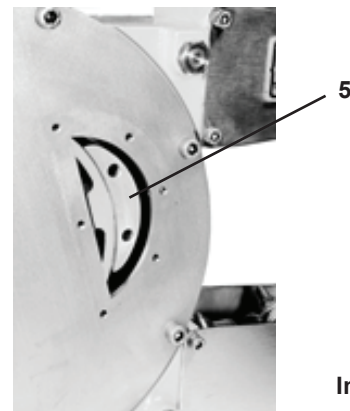
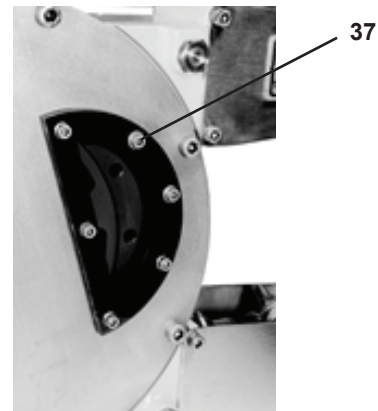
Note: Consult the shimming table 9.6 to determine the precise number of shims according to your application.

6. Tighten the shoe bolts (28).
7. Reassemble the sight glass with its seal.
8. Re-connect and jog/run the motor to bring the second shoe



WARNING! Use care when you jog/run the motor to avoid injury.

- in front of the sight glass.
9. Cut the power supply of the pump.
10. Repeat steps 3 thru 7.
Replace the sight glass seal (46) if necessary.



Inserting Shims

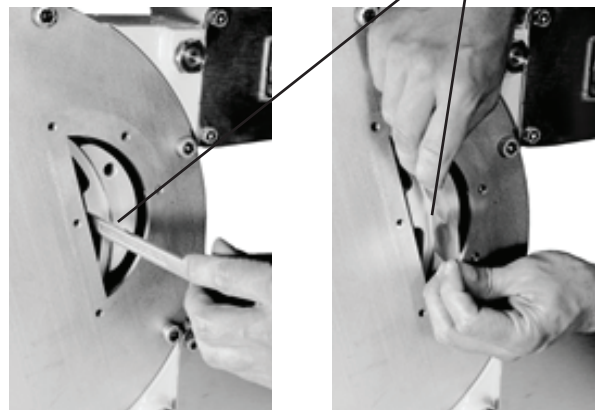


Figure 18



Vector 4000 Maintenance

6.6 ADDITIONAL INFORMATION

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

6.6.1 MAINTENANCE AND PERIODIC INSPECTIONS TABLE (4003, 4004, 4006, 4007, 4010, and 4014).

1	Pump hose replacement	In prevention, change the pump hose after 90 % of the life time of the first hose.	See 6.3.
2	Lubricant replacement.	At the end of two hose changes or 5000 hours of use. Otherwise, in every hose break	See 6.1. and 9.3.
3	Gearbox oil replacement.	Refer to the gearbox maintenance manual provided with the pump.	
4	Replacement of the seal ring (27).	In case of presence of lubricant in the leak channel.	See 6.4.2.
5	Replacement of the shaft seal (26).	In case of presence of lubricant in the leak channel.	See 6.4.2.
6	Replacement of the shaft seal (105) and (106)	In case of presence of oil in the leak channel or at the lip seals.	See 6.4.2. and 6.6.
7	Replacement of the shoes.	If these are worn on the contact surface.	See 6.4.1.
8	Replacement of the cover seal (10).	In the case of a leak around the pump cover.	See 6.3.2.
8	Replacement of the sleeves (6).	If damaged.	Refer to 6.3. Perform steps 1 thru 4 of 6.3.1 and change sleeves. Use care.
9	Replacement of the bearings (103) and (104)	If there are abnormal noises coming from the bearing case.	See 6.4. and 6.6.
9	Check the lubricant level.	Before starting the pump and periodically during the pump service.	See 6.1.
10	Check for lubricant leakage at the leakage channel.	Before starting the pump and periodically during the pump service.	See 6.4.
11	Check the pump casing to discern possible leakages around the cover, the sight glass, the flanges and the sleeves.	Before starting the pump and periodically during the pump service.	
12	Check for wear on the shoe's pressing surface.	At every hose change.	See 6.4.
13	Check the presence of a gearbox oil leakage.	Before starting the pump and periodically during the pump service.	See 3.5.
14	Check for strange noises coming from the pump, gearbox and bearing case or abnormal pump casing temperature.	Periodically during the pump service.	



Vector 4000 Maintenance and Storage

6.6.2 SETUP

Note: The numbers in parentheses are Reference Numbers located in the Parts List exploded views of this manual.

Before the setting up the pump, check the following:

1. The pump with its drive and frame must be fixed to a solid base with a slope which does not exceed 5mm for 1m and must be firmly fastened to this one.
2. The alignment of pump and drive shafts must be made in accordance with instructions given by the manufacturer of the coupling. Refer to the specific notice of such material. To achieve alignment and coupling, use a perfectly straight ruler to control the misalignment, and a feeler gauge for angular misalignment. Control four points (top, bottom, left, right) at each stage of the installation (after setting on foundations, after fixing pipes and after a first start).
3. Make sure there is enough room around the pump to carry out maintenance. If that was not the case, envisage the moving of the pump in a space provided for this purpose.
4. Make sure the room is adequately ventilated to relieve the heat generated by the pump. Leave a space behind the motor ventilator hood so as not to obstruct the air intake.

6.6.3 PUMP STARTING

Perform the procedures outlined in the **PUMP STARTUP** section 5, before pump operation.

6.6.4 BEARING CASE DISMANTLING AND LIP SEAL REPLACEMENT

Perform steps in 6.4.2. Disassemble the bearing case in the same way as for the gearbox.

1. Remove lip seals (105) and (106) from the bearing case.
2. Remove circlips (107).
3. Remove shaft with bearings.
4. Disassemble bearings and replace them together with shaft (102) as needed.

6.7 PERIODIC CHECK

Regularly check the absence of grease coming from the leakage channel or from lip seal (106).

7 STORAGE

7.1 PUMP STORAGE

Store the pump in a sheltered and dry place and ensure that the storage room temperature is between 68°F and 113°F.

Protect the pump if necessary and block the inlet and outlet orifices:

1. If the pump stays without working more than 1 month, with draw the hose from the pump or remove one of the shoes as well as its centering pin and position the wheel so that the second shoe can be seen through the sight glass.

For models 4003,4004, position the wheel so that one of the cam lobes remains submerged in the lubricant.

2. If you can neither remove the hose or one of the shoes, run the pump 5 minutes a week.

7.2 HOSE STORAGE

Hoses must be stored sheltered from light in a cool place.

CAUTION: Hose performance is reduced after two years, due to material aging.



Vector 4000 Troubleshooting

8 TROUBLESHOOTING

PROBLEM	POSSIBLE REASON	RESOLUTION
The pump does not work	No power supply.	Check that the pump power switch is in the "ON" position.
		Check the motor connection.
	The pump wheel stalls.	Check the hose.
		Check that the discharge pressure is not too high.
		Check that the material hasn't blocked the hose.
	The lubricant level detector has been activated.	Check lubricant level. Check if the pump hose has burst. Replace.
Low capacity or pressure	Not enough Shims under shoes.	Add the sufficient number of shims.
	Air leak at the inlet of the pump.	Check and tighten pump clamps (if necessary). Check inlet piping seals.
	Valve closed or partly closed at inlet.	Open valve.
	Worn hose.	Replace hose.
	Material too viscous or excessive pump speed in comparison with the material viscosity.	Check with your Wanner distributor.
	Piping blocked or partly blocked at inlet.	Unblock piping and ensure good material flow.



Vector 4000 Troubleshooting

8 TROUBLESHOOTING

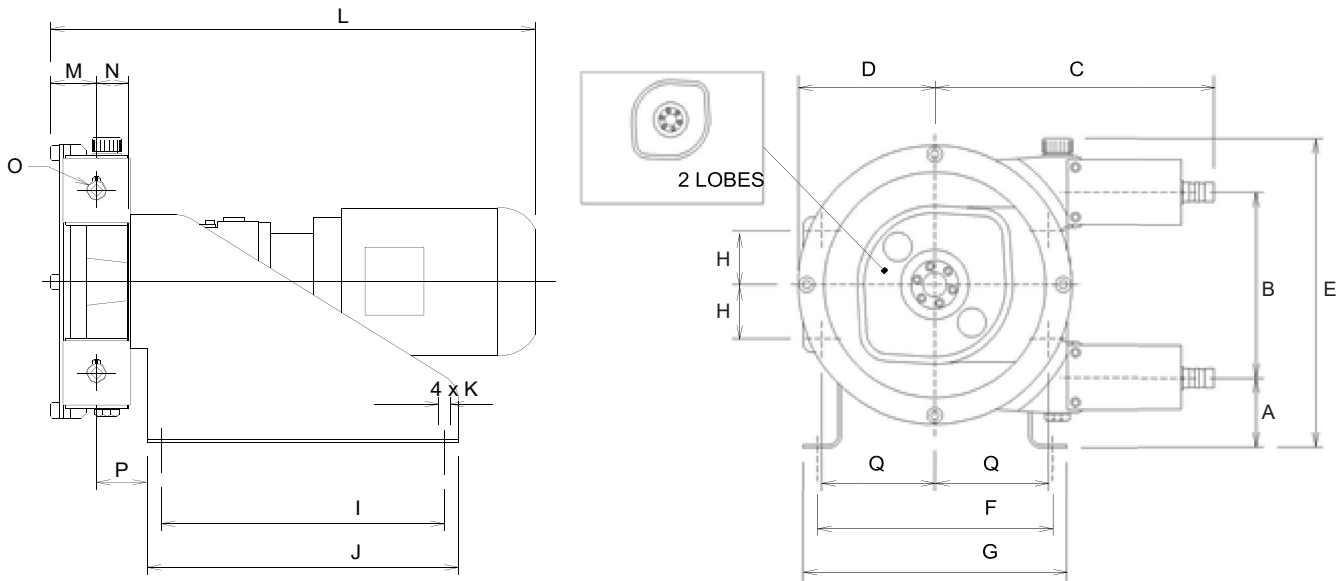
PROBLEM	POSSIBLE REASON	CORRECTION
Hose life is too short.	Incompatibility of the hose with the pumped material.	Make sure the compatibility of the hose with your material and contact your Wanner distributor.
	Discharge pressure too high.	Check that the discharge pressure of the pump does not exceed 15 bars (or 8 bars for 4003, 4004). Check that the outlet piping is not blocked up and that all valves are opened. Make sure that the security valve works correctly. Make sure that the piping friction losses do not exceed the value requested for an appropriate functioning of the pump.
	Pump speed too high.	Reduce pump speed.
	Wrong shimming.	Check shimming.
	Pumped material temperature too high.	Contact your Wanner distributor.
Lubricant leakage around the cover	Loose cover bolts. Cover seal wear.	Tighten cover bolts. Replace cover seal.
Lubricant leakage in the leakage channel (underneath the gearbox flange)	Shaft seal or seal ring wear.	Replace.
Lubricant leakage at the sleeves	Loose clamps or damaged sleeve(s).	Tighten clamps. Replace sleeves.
Pipe pulsations.	Piping not connected correctly.	Fix piping connections.
	Process creating abnormal pulsations due to the pumped material, the speed of pump, discharge pressure, or the pipe sizing.	Contact your Wanner distributor.



Vector 4000 Dimensions

9 CHARACTERISTICS AND TECHNICAL SPECIFICATIONS

9.1 VECTOR 4000 PUMP DIMENSIONS: 4003, 4004, 4006, 4007, 4010, 4014 FLANGED GEAR MOTOR and FPSHS series PUMPS 4003, 4004



Model	A	B	C	D	E	F	G	H	I	J
4003	103.5	115	226	95	256	220	240	33.5	260	280
4004	73	193	296	145	322	250	280	51.75	300	330

Model	K	L	M	N	O	P	Q
4003	4x ϕ 9	-	46.5	34.5	ϕ 16 *	56	81.25
4004	4x ϕ 13	-	49	35.5	ϕ 20 *	68.8	124.75

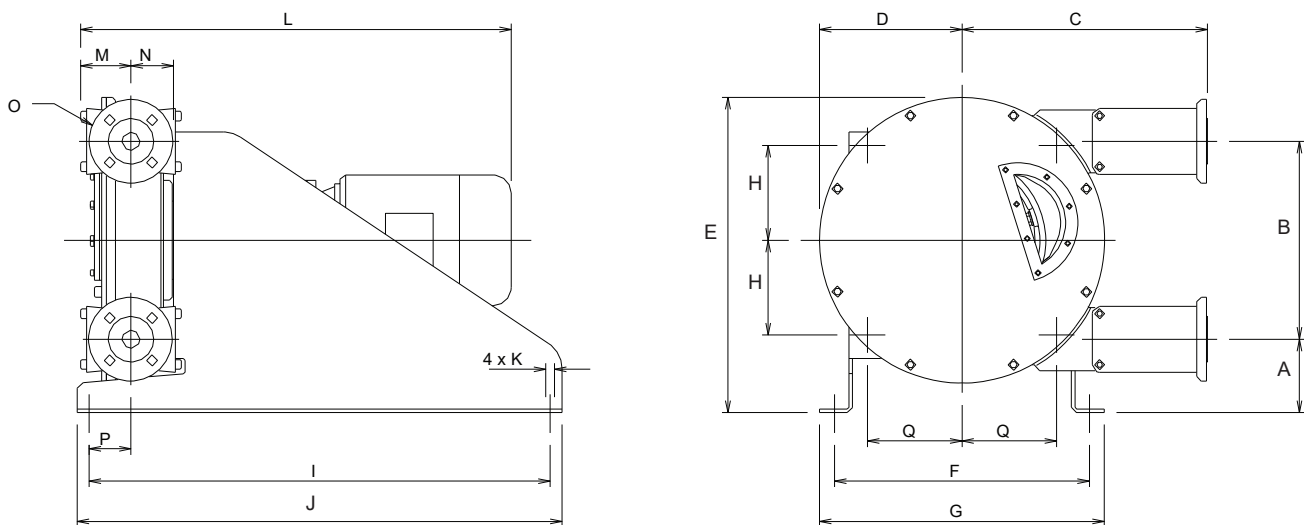
Note: all units in mm.

ALL DIMENSIONS AND TECHNICAL DATA IS SUBJECT TO CHANGE WITHOUT NOTICE



Vector 4000 Dimensions

9.1 VECTOR 4000 PUMP DIMENSIONS: 4006, 4007



Model	A	B	C	D	E	F	G	H	I	J
4006	95	262	355.5	190	416	311	351	110	560	600
4007	122.5	330	435.5	238	525.5	426	476	157.75	770	810

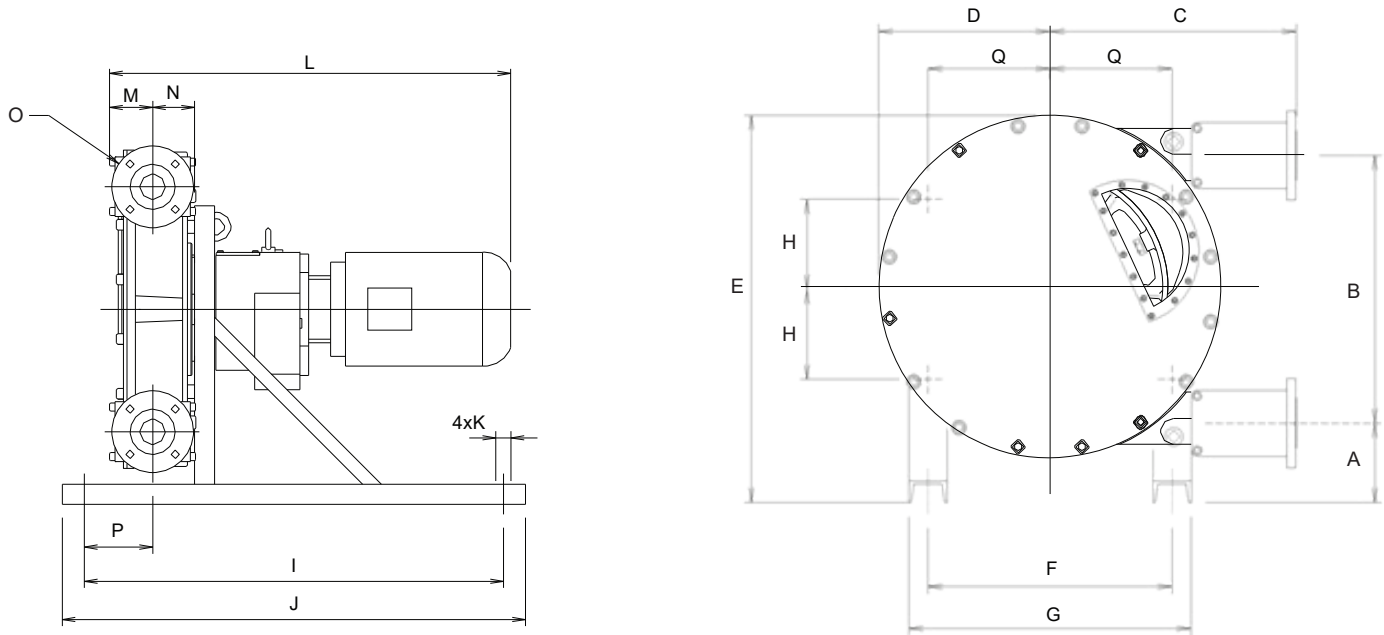
Model	K	L	M	N	O (ANSI FLANGE)	P	Q
4006	4xø13	-	65	69	1in. 150 lb	61	110
4007	4xø13	-	83	89	1.5 in. 150 lb	109	157.75

Note: all units in mm.



Vector 4000 Dimensions

9.1 VECTOR 4000 PUMP DIMENSIONS: 4009, 4010, 4014



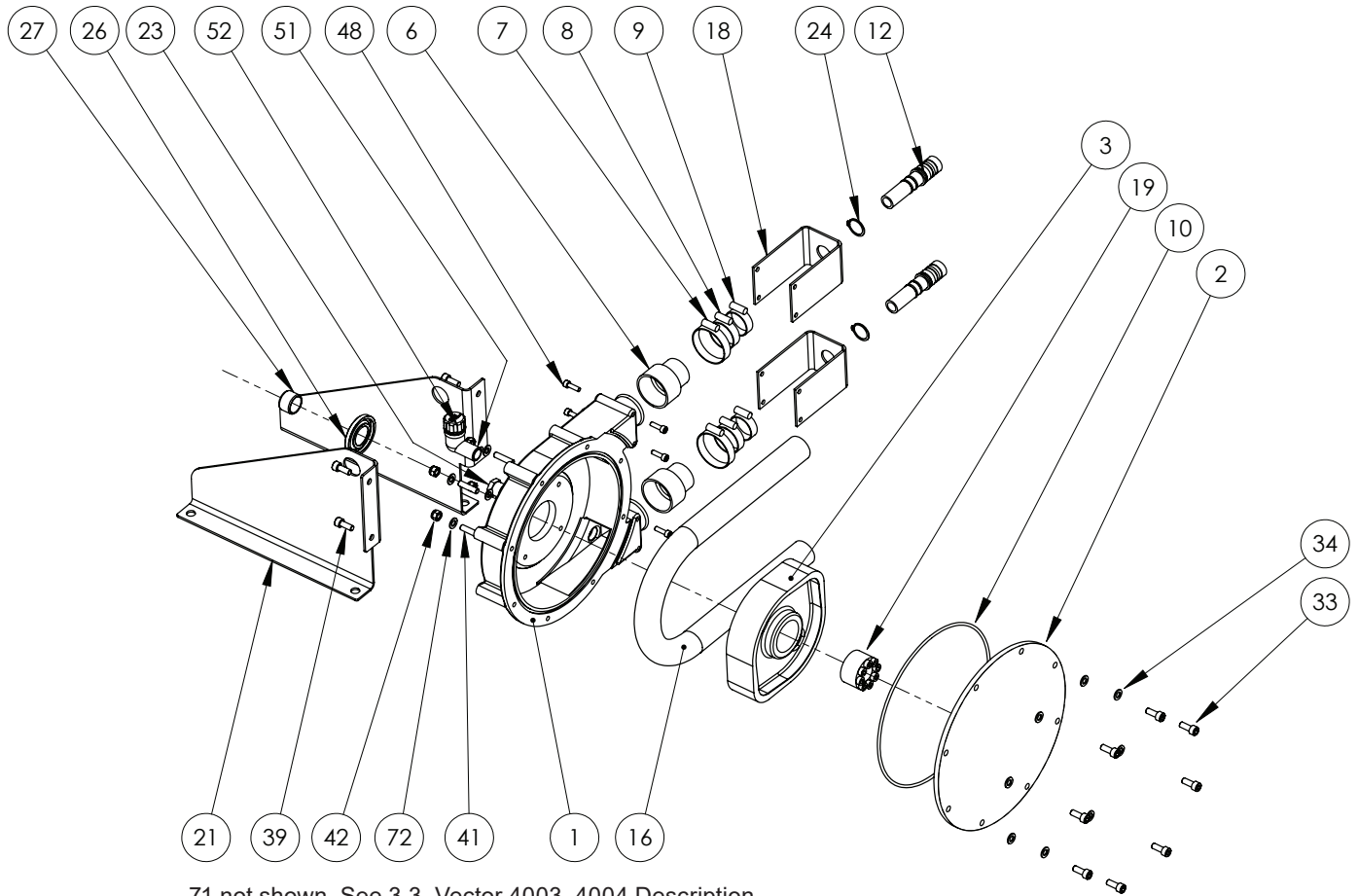
MODEL	A	B	C	D	E	F	G	H	I	J
4009	110	430	400	291	616	340	420	170	850	950
4010	164.5	554	517.5	360	801.5	513	593	186.5	950	1050
4014	262	876	803	555	1320	690	830	345	1300	1400

MODEL	K	M	N	O (ANSI FLANGE)	P	Q
4009	4xø19	75	86	1.5 in. 150 lb	87	170
4010	4xø19	94.5	102	2.0 in. 150 lb	152	256.5
4014	4xø27	140.5	142	3.0 in. 150 lb	210	345

Note: all units in mm.



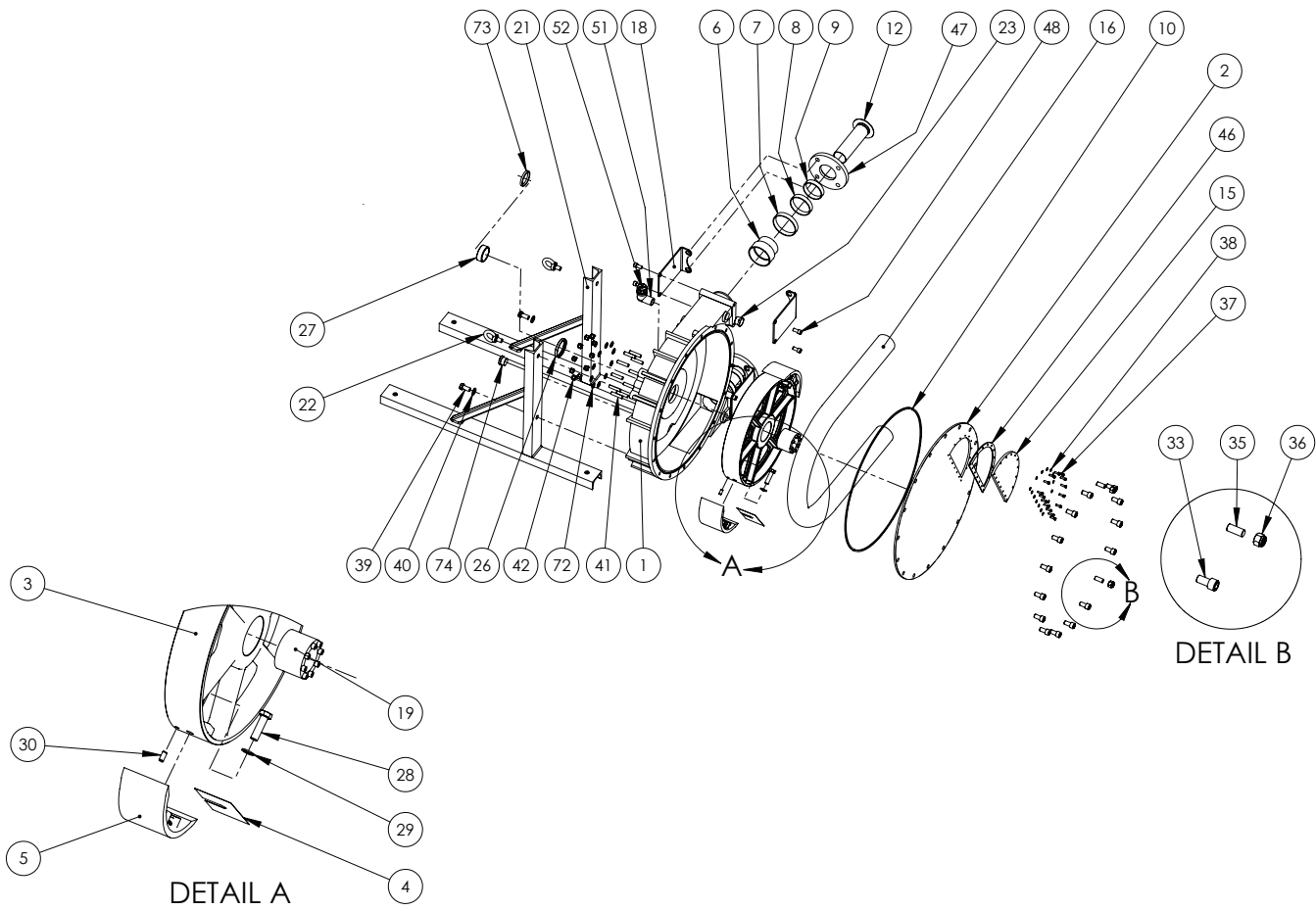
Vector 4000 Parts



Vector 4003, 4004



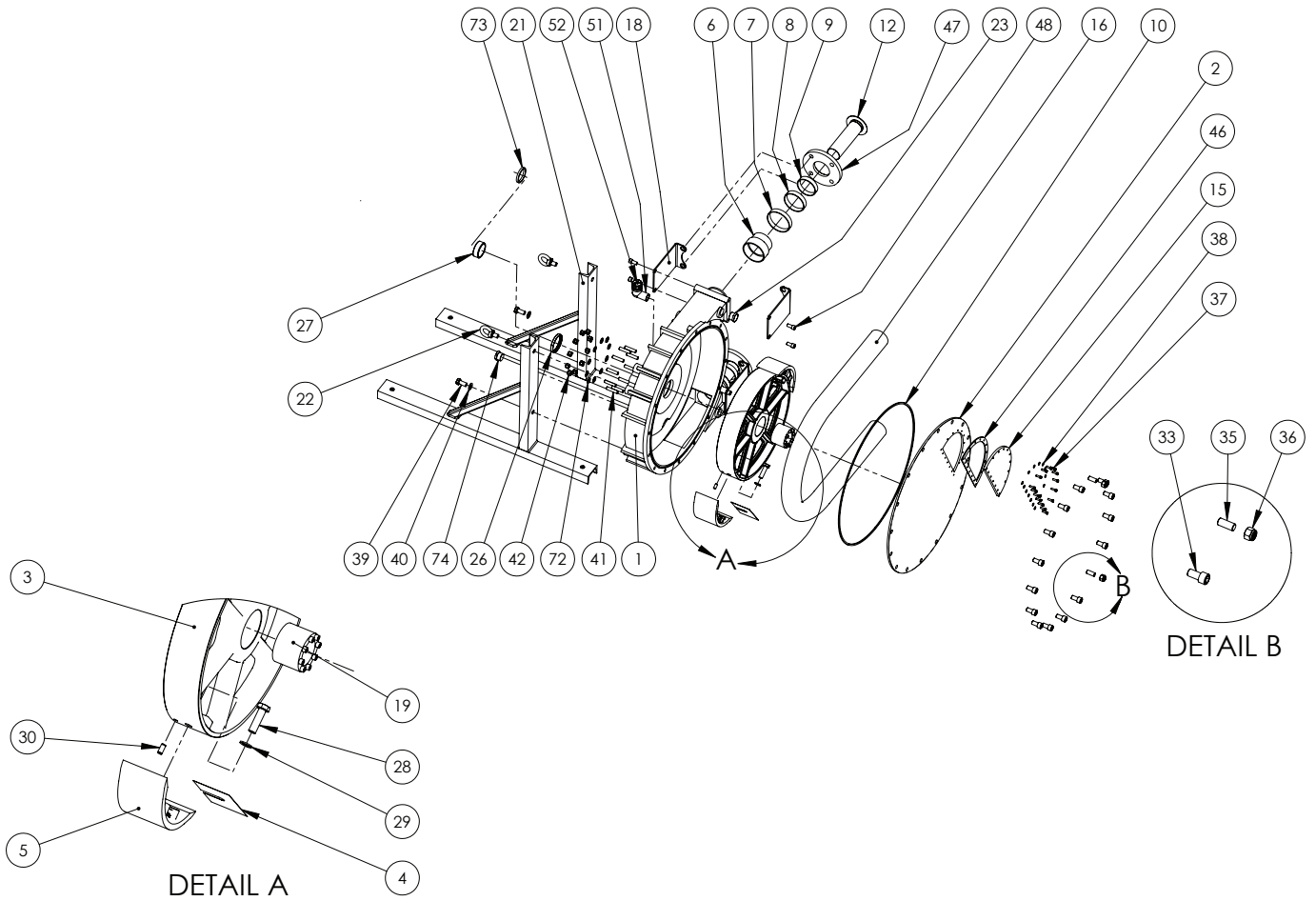
Vector 4000 Parts



Vector 4006, 4007



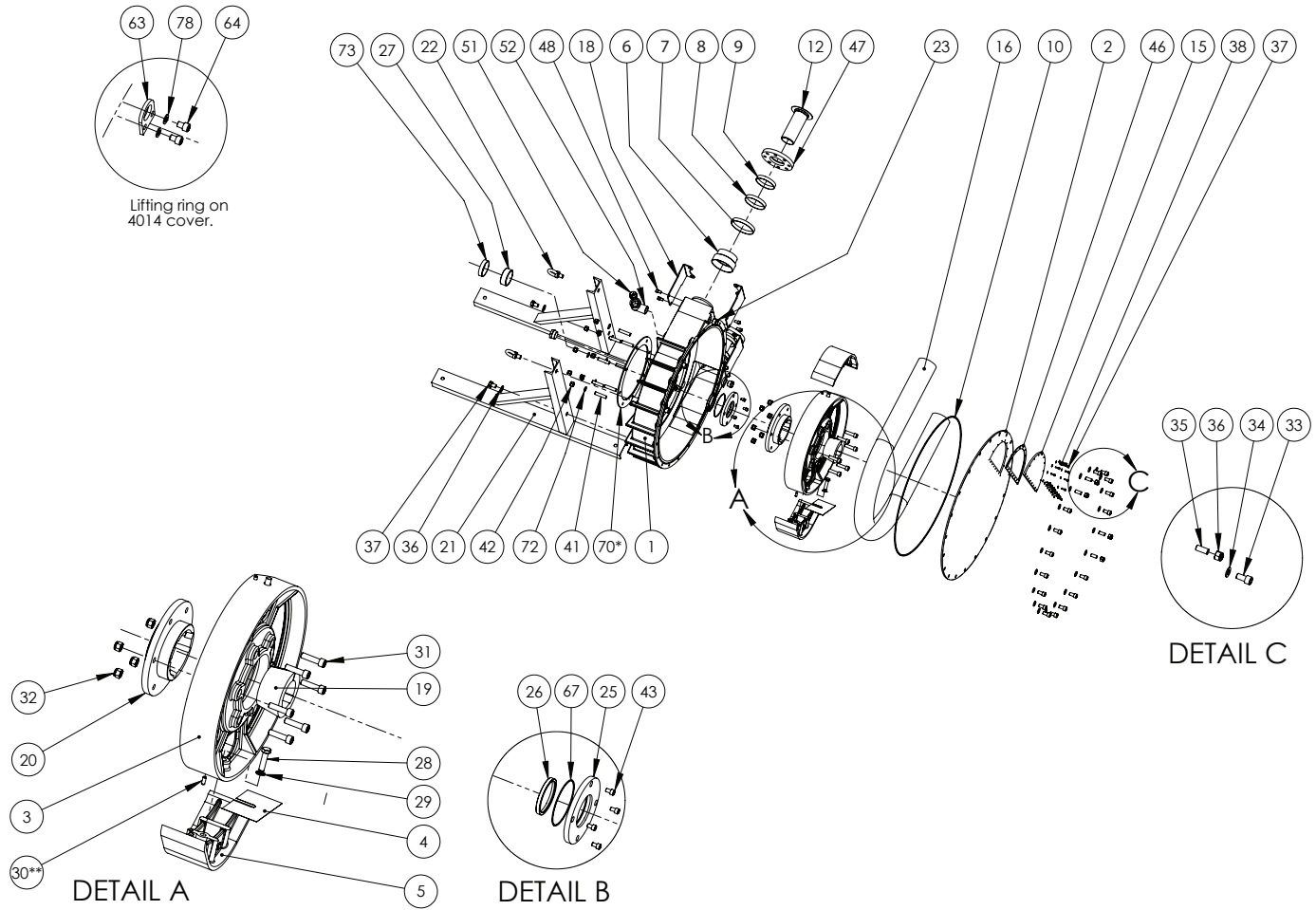
Vector 4000 Parts



Vector 4009, 4010



Vector 4000 Parts



Vector 4014



Vector 4000 Parts List

9.2 VECTOR 4000 Parts List

Ref #	DESCRIPTION	4003	4004	4006 to 4007	4009 to 4010	4014
1	CASING	X	X	X	X	X
2	COVER, TRANSPARENT	X	X	X	X	X
3	WHEEL	X	X	X	X	X
4	SHIM			X	X	X
5	SHOE			X	X	X
6	SLEEVE	X	X	X	X	X
7	CLAMP SLEEVE	X	X	X	X	X
8	CLAMP ON SLEEVE / HOSE		X	X	X	X
9	CLAMP ON HOSE	X	X	X	X	X
10	COVER SEAL	X	X	X	X	X
12	INSERT	X	X	X	X	X
14	LUBRICANT	X	X	X	X	X
15	SIGHT GLASS			X	X	X
16	HOSE	X	X	X	X	X
18	BRACKET	X	X	X	X	X
19	HUB	X	X	X	X	X
20	BOLT ON PLATE					X
21	FRAME	X	X	X	X	X
22	LIFT RING					X
23	OIL PLUG	X	X	X	X	X
24	CIRCLIPS	X	X			
25	SEAL FLANGE					X
26	SHAFT SEAL	X	X	X	X	X
27	SEAL SLEEVE	X	X	X	X	X
28	SHOE BOLT			X	X	X
29	SHOE BOLT WASHER			X	X	X
30	SHOE CENTERING PIN			X	X	
31	BOLT ON PLATE SCREW					X
32	NUT FOR 31					X
33	COVER BOLT	X	X	X	X	X
34	COVER BOLT WASHER				X	X
35	COVER STUD				X	X
36	NUT FOR 35				X	X
37	SIGHT GLASS BOLT			X	X	X
38	WASHER FOR 37			X	X	X
39	FRAME BOLT	X	X	X	X	X
40	WASHER FOR 39	X	X	X	X	X
41	GEARBOX STUD	X	X	X	X	X
42	NUT FOR 41	X		X	X	X
43	SEAL FLANGE BOLT					X
46	SIGHT GLASS SEAL			X	X	X
47	INLET & OULET FLANGE			X	X	X



Vector 4000 Parts List (Cont'd)

9.2 VECTOR 4000 Parts List (Cont'd)

Ref #	DESCRIPTION	4003	4004	4006 to 4007	4009 to 4010	4014
48	BRACKET BOLT	X	X	X	X	X
49	BRACKET BOLT WASHER					
51	90° BEND		X	X	X	X
52	BREATHER PLUG	X	X	X	X	X
63	LIFT RING ON COVER					X
64	BOLT FOR 63					X
67	O RING FOR SEAL FLANGE					X
70	GEARBOX CENTRING FLANGE					X
71	COVER PLATE	X	X			
72	WASHER for 41	X	X	X	X	X
73	SPACER RING			X	X	X
74	PLUG		X	X	X	X
101	BEARING CASE	X	X	X	X	X
102	SHAFT	X	X	X	X	X
103	ROLLAR BEARING	X	X	X	X	X
104	BALL BEARING	X	X	X	X	X
105	LIP SEAL	X	X	X	X	X
106	LIP SEAL	X	X	X	X	X
107	CIRCLIPS	X	X	X	X	X
108	GREASER	X	X	X	X	X
109	SHAFT KEY	X	X	X	X	X
110	SHAFT KEY					X



Vector 4000 Lubrication and Shoe Shimming

9.3 LUBRICATION TABLE

The table indicates the quantity of lubricant necessary for every pump size. The table indicates the quantity of lubricant necessary for every pump size. Employ only Vector lubricant for Vector hose pumps. Refer to 6.2 for lubricant emptying and filling.

PUMPS	4003	4004	4006	4007	4009	4010
QUANTITY OF LUBRICANT (LITRES) (QUARTS)	0.4 .42	0.8 .85	1.4 1.5	2.3 2.4	6 6.3	9 9.5
PUMPS	4014					
QUANTITY OF LUBRICANT (LITRES) (QUARTS)	40 42					

9.4 SHOE SHIMMING TABLE

Refer to 6.5 to remove or add shims. The table below points out the necessary number of shims under every shoe according to the speed, pressure and the temperature of the product. Respect these indications scrupulously to optimize the hose life and to avoid a possible deterioration of the internal parts.

For temperatures over 140°F, withdraw one shim in comparison with the table below.

For viscosities over 3000cP or concentrations exceeding 300g / l, withdraw one shim in comparison with the table below.

For a suction lift higher than 4 metres, add one shim to the following figures.



CAUTION: Every shoe must include the same number of shims (0.5mm).

PUMP TYPE 4006		
Pressure bar (psi)	Speed - Rpm	Number of shims
$\Delta P \leq 5$ (72.5)	0 to 40	0
	40 to 160	0
5 (72.5) $\leq \Delta P \leq 7.5$ (108.75)	0 to 40	2
	40 to 125	1
7.5 (108.75) $\leq \Delta P \leq 10$ (145)	0 to 40	3
	40 to 105	2
10 (145) $\leq \Delta P \leq 15$ (217.5)	0 to 40	4
	40 to 90	3

PUMP TYPE 4007		
Pressure bar (psi)	Speed - Rpm	Number of shims
$\Delta P \leq 5$ (72.5)	0 to 40	0
	40 to 140	0
5 (72.5) $\leq \Delta P \leq 7.5$ (108.75)	0 to 45	2
	45 to 140	1
7.5 (108.75) $\leq \Delta P \leq 10$ (145)	0 to 45	3
	45 to 110	2
10 (145) $\leq \Delta P \leq 15$ (217.5)	0 to 45	4
	45 to 80	3

PUMP TYPE 4009		
Pressure bar (psi)	Speed - Rpm	Number of shims
$\Delta P \leq 5$ (72.5)	0 to 55	0
	55 to 120	0
5 (72.5) $\leq \Delta P \leq 7.5$ (108.75)	0 to 55	2
	55 to 95	1
7.5 (108.75) $\leq \Delta P \leq 10$ (145)	0 to 55	3
	55 to 75	2
10 (145) $\leq \Delta P \leq 15$ (217.5)	0 to 55	4
	55 to 60	3



Vector 4000 Shoe Shimming

9.4 SHOE SHIMMING TABLE

PUMP TYPE 4010		
Pressure bar (psi)	Speed - Rpm	Number of shims
$\Delta P \leq 5$ (72.5)	0 to 30	0
	30 to 100	0
5 (72.5) $\leq \Delta P \leq 7.5$ (108.75)	0 to 30	2
	30 to 65	1
7.5 (108.75) $\leq \Delta P \leq 10$ (145)	0 to 30	3
	30 to 50	2
10 (145) $\leq \Delta P \leq 15$ (217.5)	0 to 30	4
	30 to 42	3

PUMP TYPE 4014		
Pressure bar (psi)	Speed - Rpm	Number of shims
$\Delta P \leq 5$ (72.5)	0 to 20	0
	20 to 60	0
5 (72.5) $\leq \Delta P \leq 7.5$ (108.75)	0 to 20	2
	20 to 47	1
7.5 (108.75) $\leq \Delta P \leq 10$ (145)	0 to 20	3
	20 to 37	2
10 (145) $\leq \Delta P \leq 15$ (217.5)	0 to 20	4
	20 to 31	3

9.5 GENERATED NOISE AND TEMPERATURE

NOISE

The Wanner Pumps do not generate more than 60dB during their operation.

TEMPERATURE

The cover and the pump casing can become very hot due to the friction on the hose and liquid temperature. If you need to limit the pump temperature, please contact your Wanner distributor.



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