

VECTOR

*Installation and
Operation Manual
VEC-991-2400C*

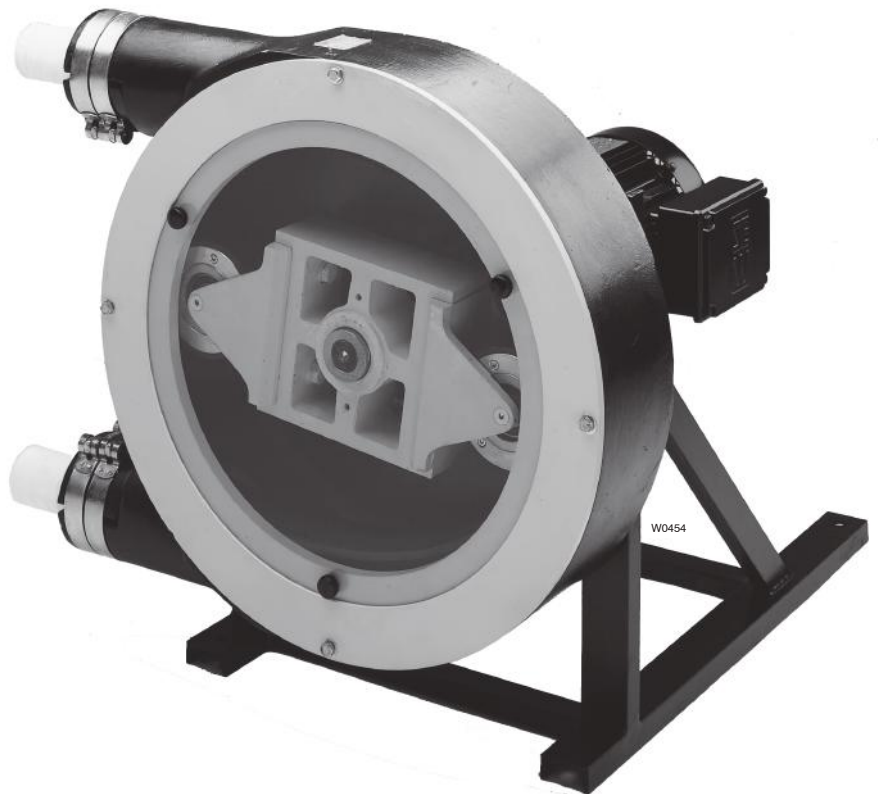
Peristaltic Pumps

Vector 2000 Series

Models: 2002, 2003, 2004, 2005, 2006, 2007



Models: 2002, 2003, 2004



Models: 2005, 2006, 2007



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Vector Series Installation

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Limited Warranty

Wanner Engineering, Inc. extends to the original purchaser of equipment manufactured by it and bearing its name, a limited one-year warranty from the date of purchase against defects in material or workmanship, provided that the equipment is installed and operated in accordance with the recommendations and instructions of Wanner Engineering, Inc. Wanner Engineering, Inc. will repair or replace, at its option, defective parts without charge if such parts are returned with transportation charges prepaid to Wanner Engineering, Inc., 1204 Chestnut Avenue, Minneapolis, Minnesota 55403.

This warranty does not cover:

1. The electric motors (if any), which are covered by the separate warranties of the manufacturers of these components.
2. Normal wear and/or damage caused by or related to abrasion, corrosion, abuse, negligence, accident, faulty installation or tampering in a manner which impairs normal operation.
3. Transportation costs.

This limited warranty is exclusive, and is in lieu of any other warranties (express or implied) including warranty of merchantability or warranty of fitness for a particular purpose and of any noncontractual liabilities including product liabilities based on negligence or strict liability. Every form of liability for direct, special, incidental or consequential damages or loss is expressly excluded and denied.



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

Principle of Operation

Two rollers, mounted on a rotor, alternately compress a thick-walled hose in a patented concentric guide. As they rotate, they push the liquid in the hose from the suction to the discharge side. The subsequent opening of the hose, after a roller passes, creates a vacuum on the suction side — resulting in continuous pumping.

Installation Planning

Inlet Piping

- Size the inlet line one or two sizes larger than pump suction opening.
- Suction lines should be as short and direct as possible.
- Size the suction line so that the velocity will not exceed 1 – 3 ft/sec.

$$\text{Velocity} = \frac{0.408 \times \text{GPM}}{\text{Pipe I.D.}}$$

- Install a 3 ft. to 4 ft. flexible hose between pump and hard piping to absorb vibrations, expansions, or contractions.
- Install an inlet pressure/vacuum gauge on the inlet side of the pump.
- 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.
- Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.
- In extreme cases, a pulsation dampener may be required to decrease acceleration head.

Discharge Piping

- Size the discharge line to at least one size larger than the pump inlet connection.
- Between the pump and hard piping, install flexible a hose long enough to reduce pulsations (typically 3 ft. to 4 ft.).
- Install a pressure gauge in the discharge piping.
- In extreme cases, a pulsation dampener may be required to absorb excessive pulsation (caused by high pump speed and long discharge lines).



Vector Series Installation

Pump Test and Installation

Before you install the pump in the system, set the direction of pump rotation and the position of the pressure rollers:

1. Remove front cover from pump (four screws).
2. See Figure 1. For easier adjustment, check that pressure rollers are in position shown (one roller compressing middle of hose, and one roller free).

Note: Model 2006 and 2007 pumps use a different rotor assembly than the one shown.

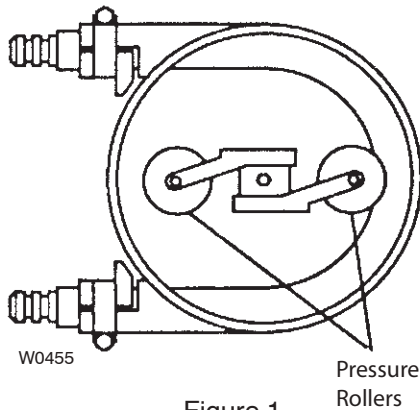


Figure 1

3. Connect incoming power supply to motor (refer to motor manufacturer's instructions).
4. See Figure 2. Run pump and check direction of rotation, "A" or "B" as shown. All pumps must rotate in direction "A" (counterclockwise). To reverse rotation, exchange two of three wires that connect incoming power to motor.

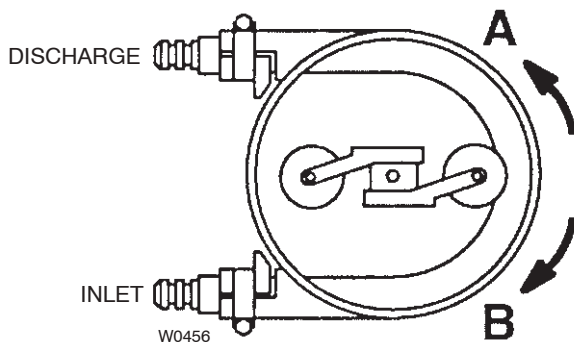


Figure 2

5. Set pressure rollers (see "Service: Setting the Roller Pressure"). Roller pressure is not set at factory, because it must be adjusted to compensate for size of inlet and discharge lines and specific gravity of fluid being pumped.
6. Verify all fasteners are properly tightened.
7. Reattach front cover.
8. Install pump in system.

Before Initial Start-Up

Before you pump fluid through the system, be sure that:

1. All shutoff valves are open.
2. All connections are tightly secured.
3. See Hose Identification Table. Hose material is compatible with fluid being pumped, and hose design matches duty cycle and discharge pressures.

Hose Identification		
Extruded	Code	Description
Hypalon	HE	Black color, shiny smooth surface
Neoprene	PE	Flat black color, rough surface, rubber smell
Varprene	VE	Cream color, smooth surface
Silicone	SE	Rust color, smooth surface
Pharmed®	FE	Cream color, Pharmed® name on hose
Fiber Braided		
Hypalon	HF	Black color, yellow stripe, double braided
EPDM	EF	Black color, white stripe, double braided
Natural Rubber	NF	Black color, green stripe, double braided (standard duty)
Natural Rubber	MF	Black color, no stripes, thick double braids (heavy duty)
Nitrile Rubber	BF	Black color, white inner hose
Nitrile Rubber - Oil Rated	OF	Black color, HBRF-HY-K stamped on hose

4. See Material Operating Temperatures Table. Temperature of fluid pumped is within operating temperature range of hose material installed in pump. Hose material can be identified by 5th and 6th digit of pump model number. E.g. 2007-NF-BB-D2, where 'NF' designates natural rubber.

CAUTION: Contact factory when pumping a fluid that is within 15° F of the maximum hose temperature. Take safety precautions to insure hot pumpage does not harm operators if a hose leaks.

Material Operating Temperatures	
Material	Operating Temperatures
EPDM	32 to 185° F
Hypalon	32 to 180° F
Neoprene	50 to 130° F
Silicone	14 to 185° F
Varprene	14 to 185° F
Natural Rubber	14 to 185° F
Nitrile Rubber	23 to 160° F
Pharmed®	32 to 180° F



Vector Series Installation

Routine Maintenance

Periodically inspect hose for signs of failure caused by chemical attack, material fatigue, etc.

Check non-petroleum silicone lubricant on hose, and reapply if worn off.

Inspect roller bearings for damage, and replace if necessary (See Parts List, item 11).

Check that all fasteners are properly tightened.

Troubleshooting

If the hose fails prematurely, check for:

- Chemical attack. If the hose becomes soft, spongy, or harder than when originally supplied, chemical attack may be the problem.
 - Improper hose selection for the fluid being pumped.
 - Improper roller setting. If flow fluctuates back and forth or up and down in the discharge line, the rollers may not be adjusted with equal pressure on the hose.
 - See Figure 3. If the hose fails in area A, this may occur from operating the pump at a discharge pressure higher than the hose is rated for, or with a closed discharge line. If the hose fails in area B, this may occur from operating the pump under a higher vacuum or higher inlet pressure than the hose is rated for, or with a closed suction line.
- Line system problems — debris, closed valves, or a clogged or packed line.
 - Fluid temperature too high.
 - Abrasive material being pumped, or solid size too large.
 - Hose connector becomes loose:
 - Wrong size connector.
 - Suction pressure too high

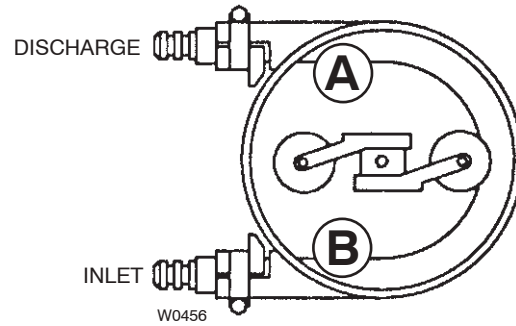


Figure 3

Service (Models 2002, 2003, 2004, 2005)

Replacing Worn Hose

Remove Old Hose

1. Turn off and lock out all power to pump motor.
2. Remove front cover from pump (four screws).
3. See Figure 4. Position pressure rollers as shown.
4. Loosen screw(s) that secure mounting bracket of pressure roller which is compressing hose. To maintain correct hose compression adjustment, **DO NOT** loosen opposite roller's mounting bracket.
5. See Figure 5. Loosen hose clamp bolts. Remove hose supports and clamps that secure both ends of hose.
6. Remove hose from pump casing.
7. Pull (cut hose if needed) hose connectors from worn hose. Clean if reusable.
8. Carefully clean pump casing and front cover.

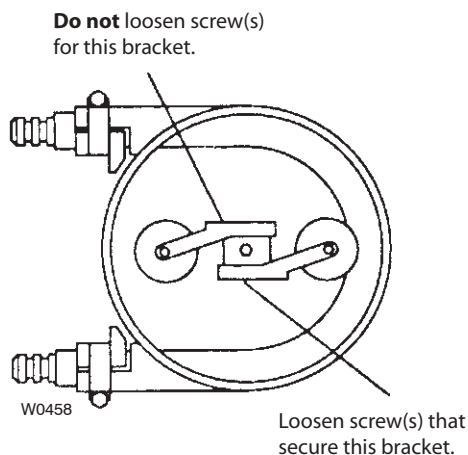


Figure 4

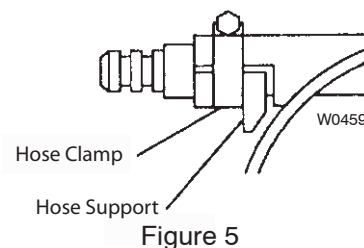


Figure 5

9. Spin each roller to determine integrity of the bearings. Replace roller and bearing assembly if either roller does not spin or either roller runs rough.



Service (Models 2002, 2003, 2004, 2005)

Install New Hose

1. Check for correct length of hose:
 Model 2002: 13 in. (330 mm)
 Model 2003: 15 3/8 in. (390 mm)
 Model 2004: 23 1/4 in. (590 mm)
 Model 2005: 33 7/8 in. (860 mm)
2. Install connectors in new hose.
3. Make sure that pressure rollers are in same position as before. See Remove Old Hose, Step 3.
4. Position bent hose inside pump casing.
5. Push upper connector against end of pump casing. Install top hose clamp and secure its bolt.
6. Repeat Step 5 on lower connection.
Important: On models 2002 through 2005, make sure the hose lays completely against the inside of the pump casing.
7. Smear non-petroleum silicone grease on inner surface of hose (where rollers contact hose).
8. Set roller pressure according to procedure following (steps 2 thru 6).

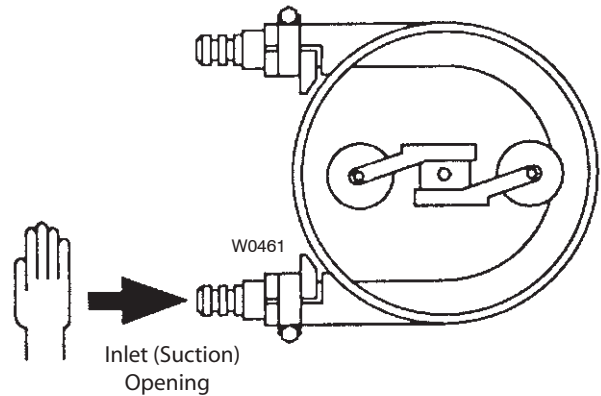


Figure 7

- a. If there is vacuum on first attempt, rollers are set.
- b. See Figure 8. If not enough vacuum, gradually move rollers forward in 1/32 to 1/8 in. (0.8 to 3.0 mm) increments and repeat test until suction seems to be correct. (Make sure compression is same for both rollers by measuring roller bracket in relation to rectangular rotor block).

Setting Roller Pressure

Note: This pressure setting must be checked when a new hose is installed, because of variations in hose thickness.

1. Remove front cover from pump.
2. See Figure 6. Loosen all roller bracket screws and slide both rollers away from the hose to reduce compression on the hose. Retighten all roller bracket screws.

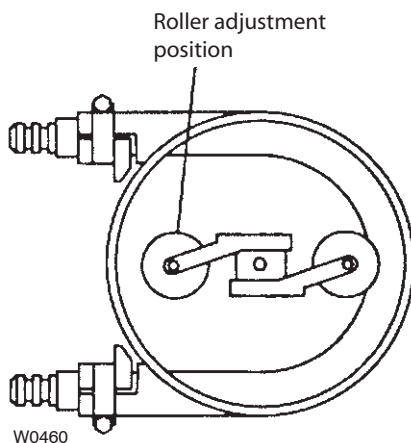


Figure 6

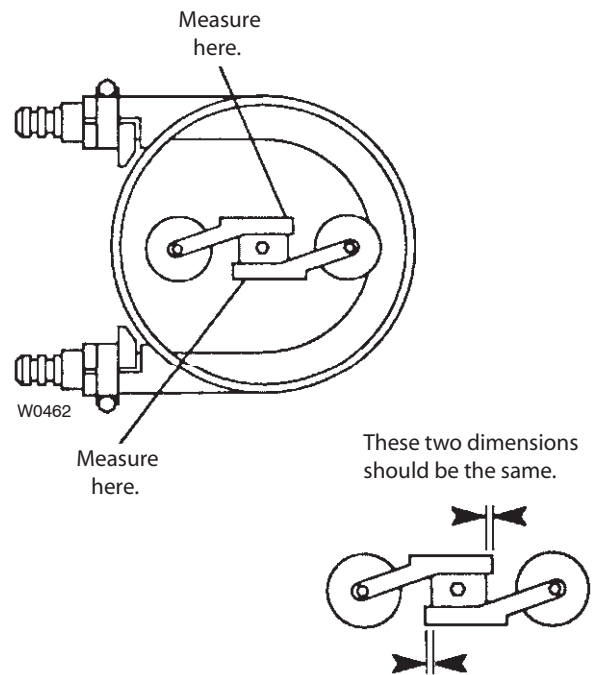


Figure 8

3. See Figure 7. Start pump. Place palm of hand over suction opening and check for vacuum.
4. Test pump in full operation, and readjust as necessary.
5. Reattach front cover.

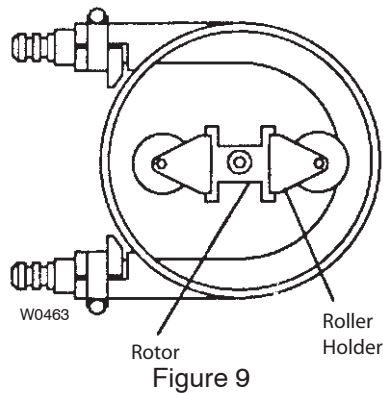


Service (Models 2006, 2007)

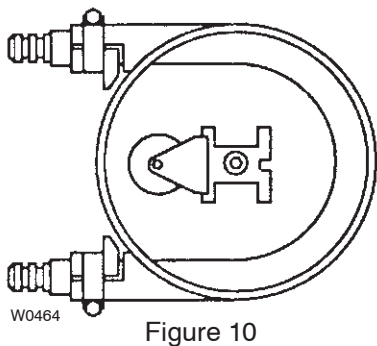
Replacing a Worn Hose

Remove Old Hose

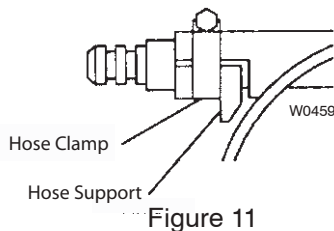
1. Turn off and lock out all power to pump motor.
2. Remove front cover from pump (four screws).
3. See Figure 9. Position rotor as shown.



4. Remove roller holder (two screws) not compressing hose. Also remove any shims under it.
5. See Figure 10. Turn rotor 180° as shown.



5. See Figure 11. Loosen clamp bolts. Remove hose supports and clamps that secure both ends of hose.

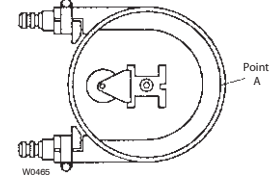


6. Remove hose from pump casing.
7. Pull (cut hose if needed) hose connectors from worn hose. Clean if reusable.
8. Carefully clean pump casing and front cover.
9. Spin each roller to determine integrity of the bearings. Replace roller and bearing assembly if either roller does not spin or either roller runs rough.

Install New Hose

1. Check for correct length of hose:
Model 2006: 45 1/4 in. (1150 mm)
Model 2007: 57 1/4 in. (1455 mm)
2. Install connectors in new hose.
3. Position bent hose inside pump casing.
4. Push upper connector against end of pump casing. Install top clamp and secure clamp bolt.
5. Repeat Step 4 on the lower connection.

Important: On models 2006 and 2007, allow a 1-1.5 mm gap between the hose and the inside of the pump casing at Point A as shown in the illustration at right.



6. Smear non-petroleum silicone grease on inner surface of hose (where rollers contact hose).
7. Turn the rotor 180°. Reinstall the roller holder without shims.
8. Set roller pressure according to procedure following (steps 3 thru 7).

Setting Roller Pressure

Note: The pressure setting must be checked when a new hose is installed, because of variations in hose thickness.

1. Remove front cover from pump (four screws).
2. Remove any shims under two roller holders.
3. Be sure bolts securing roller holders are tight.
4. See Figure 12. Start pump. Place palm of hand over suction opening and check for vacuum.
 - a. If there is vacuum on first attempt, rollers are set.
 - b. If not enough vacuum, gradually add 0.5 mm (.02 in.) shims under one of rollers and repeat test until suction seems to be correct. **Contact factory before installing more than four shims under each roller.**

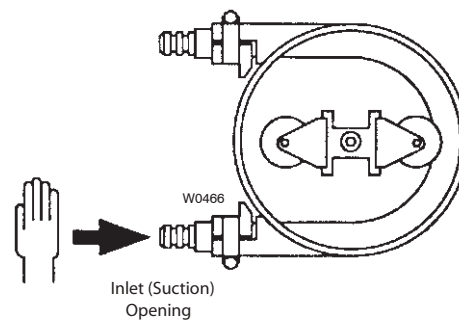
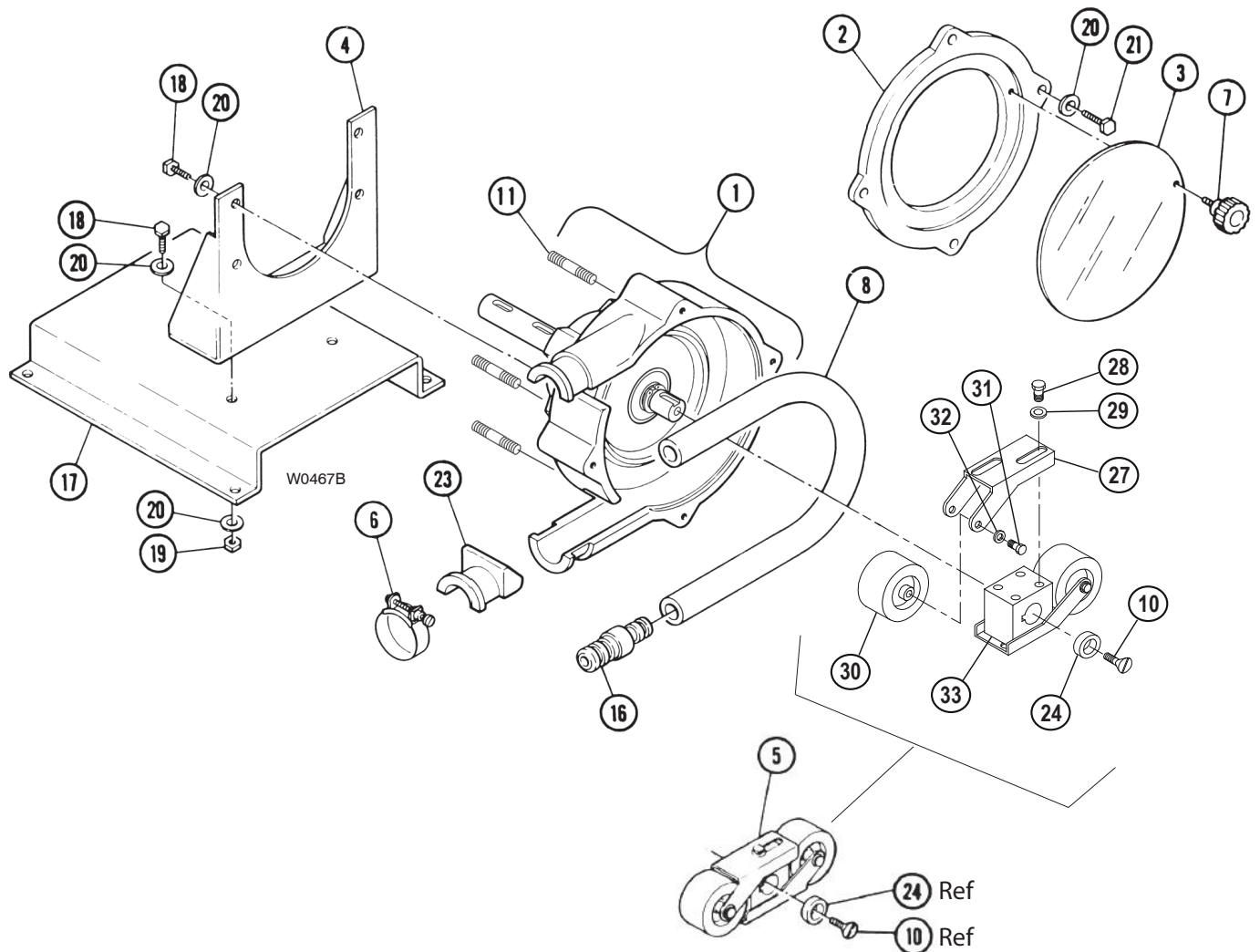


Figure 12

5. Add same number of shims under other roller.
6. Test pump in full operation, and readjust as necessary.
7. Reattach front cover.

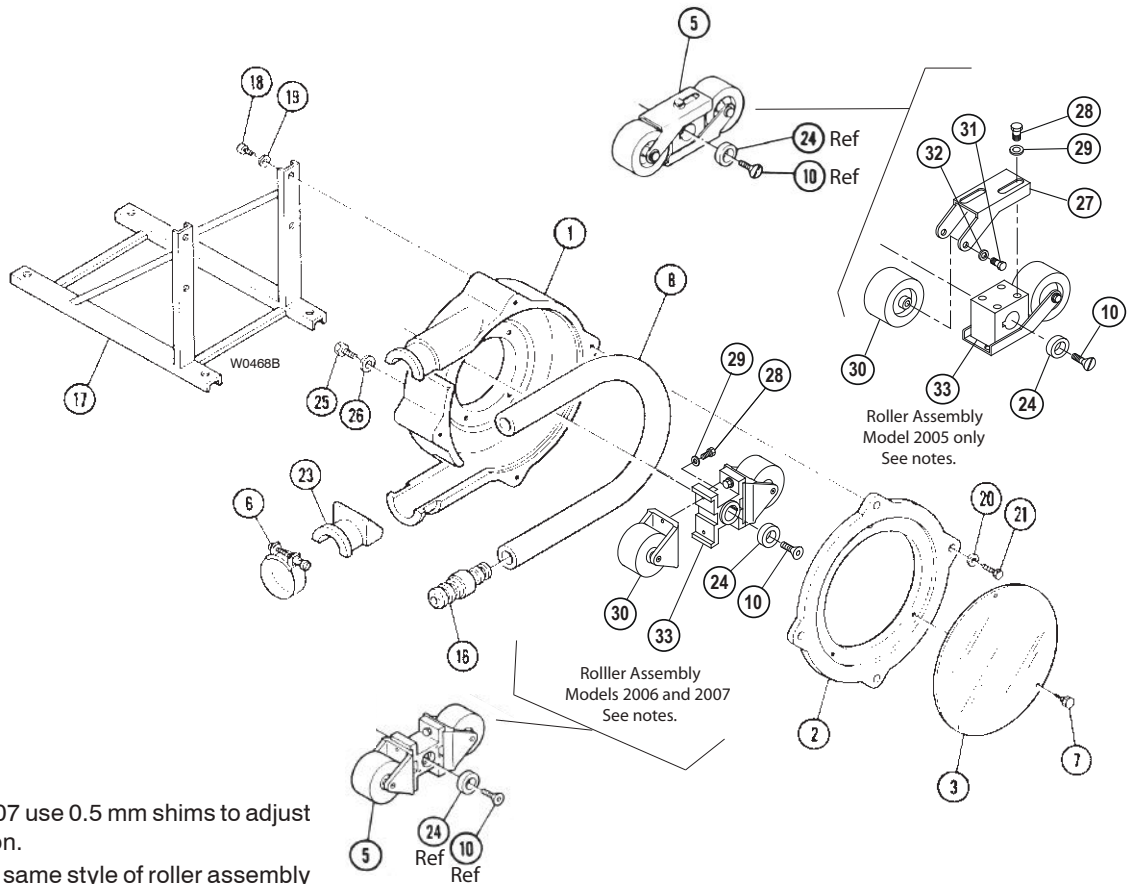
Parts List (Models 2002, 2003, 2004)



Ref. No.	Description	Qty, per Pump	Ref. No.	Description	Qty, per Pump
1	Casing.....	1	18	Bolt, mounting	6
2	Cover, front.....	1	19	Nut	6
3	Window, cover	1	20	Washer	16
4	Bracket, mounting	1	21	Bolt, cover.....	4
5	Roller assembly.....	1	22	Key, roller assembly (not shown)	1
6	Clamp, hose.....	2	23	Support, hose	2
7	Screw, cover	1 or 2	24	Washer, roller mounting	1
8	Hose	1	27	Bracket, roller	2
9	Key, motor (non shown).....	2	28	Screw, roller bracket.....	4
10	Screw, roller.....	1	29	Washer, roller bracket	4
11	Stud (2004 only)	4	30	Roller, shaft and bearing assembly.....	2
	Bolt, mounting (2002, 2003) (not shown).....	4	31	Screw, roller shaft.....	4
16	Connector, hose	1	32	Washer, roller shaft	4
17	Base.....	1	33	Rotor.....	1



Parts List (Models 2005, 2006, 2007)



Notes:

- Models 2006 and 2007 use 0.5 mm shims to adjust the hose compression.
- Model 2005 uses the same style of roller assembly as Models 2002 – 2004 (see previous page.)

Ref. No.	Description	Qty, per Pump	Ref. No.	Description	Qty, per Pump
1	Casing.....	1	16	Connector, hose	1
2	Cover, front.....	1	17	Base.....	1
3	Window, cover	1	18	Bolt, mounting	4
5	Roller assembly.....	1	19	Washer	4
6	Clamp, hose.....	4	20	Washer	4
7	Screw, cover	2 or 3	21	Bolt, cover.....	4
8	Hose	1	23	Support, hose	2
10	Screw, roller.....	1	24	Washer, roller mounting	1
			25	Bolt.....	4
			26	Washer	4
			—	Shim, 0.5 mm (.02 in.) (not shown).....	8 max
			27	Bracket, roller	2
			28	Screw, roller bracket.....	4
			29	Washer, roller bracket	4
			30	Roller, shaft and bearing assembly.....	2
			31	Screw, roller shaft.....	4
			32	Washer, roller shaft	4
			33	Rotor.....	1



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