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0806	

**Pump**

**PG 2**

**PG 2A**

**PG 3**

**PG 3A**

**REPAIR MANUAL**



0 1 6 3 1 7 2 E N



This manual covers machines with Item Number:  
**0007658, 0007659, 0009054, 0009055, 0009496, 0009498**

### **Operating / Parts Information**

You must be familiar with the operation of this machine before you attempt to troubleshoot or repair it. Basic operating and maintenance procedures are described in the Operator's Manual supplied with the machine. Keep a copy of the Operator's Manual with the machine at all times. Use the separate Parts Book supplied with the machine to order replacement parts. If you are missing either of the documents, please contact Wacker Corporation to order a replacement.

Damage caused by misuse or neglect of the unit should be brought to the attention of the operator to prevent similar occurrences from happening in the future.

This manual provides information and procedures to safely repair and maintain the above Wacker model(s). For your own safety and protection from injury, carefully read, understand, and observe all instructions described in this manual. THE INFORMATION CONTAINED IN THIS MANUAL IS BASED ON MACHINES MANUFACTURED UP TO THE TIME OF PUBLICATION. WACKER CORPORATION RESERVES THE RIGHT TO CHANGE ANY PORTION OF THIS INFORMATION WITHOUT NOTICE.

**CALIFORNIA****Proposition 65 Warning:****WARNING**

Engine exhaust, some of its constituents, and certain vehicle components, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

**Laws Pertaining to Spark Arresters**

**Notice:** State Health Safety Codes and Public Resources Codes specify that in certain locations spark arresters be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose.

In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

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## 1. Safety Information

This manual contains DANGER, WARNING, CAUTION, *NOTICE* and NOTE callouts which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



**DANGER**

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE:** Used without the safety alert symbol, **NOTICE** indicates a hazardous situation which, if not avoided, could result in property damage

**Note:** *Contains additional information important to a procedure.*

## 1.1 Operating Safety

**WARNING**

Familiarity and proper training are required for the safe operation of equipment. Equipment operated improperly or by untrained personnel can be dangerous. Read the operating instructions contained in both this manual and the engine manual and familiarize yourself with the location and proper use of all controls. Inexperienced operators should receive instruction from someone familiar with the equipment before being allowed to operate the machine.

- 1.1.1 NEVER allow anyone to operate this equipment without proper training. People operating this equipment must be familiar with the risks and hazards associated with it.
- 1.1.2 NEVER touch the engine or muffler while the engine is on or immediately after it has been turned off. These areas get hot and may cause burns.
- 1.1.3 NEVER use accessories or attachments that are not recommended by Wacker. Damage to equipment and injury to the user may result.
- 1.1.4 NEVER pump volatile, flammable or low flash point fluids. These fluids could ignite or explode.
- 1.1.5 NEVER pump corrosive chemicals or water containing toxic substances. These fluids could create serious health and environmental hazards. Contact local authorities for assistance.
- 1.1.6 NEVER open the priming plug when the pump is hot. Never loosen or remove inlet or discharge hose fittings when the pump is hot. Hot water inside could be pressurized much like the radiator on an automobile. Allow the pump to cool to the touch before loosening the plug and before loosening or removing the inlet or discharge hose fittings.
- 1.1.7 NEVER open pump housing cover while pump is operating, or start pump with the cover off. The rotating impeller inside the pump can cut or sever objects caught in it.
- 1.1.8 NEVER block or restrict flow from inlet line or discharge line. Remove kinks from discharge line before starting pump. Operation with a blocked inlet line or discharge line can cause water inside pump to overheat.
- 1.1.9 NEVER stand on the machine.
- 1.1.10 DO NOT stand under the machine while it is being hoisted or moved.
- 1.1.11 DO NOT attach equipment to the machine when it is suspended.
- 1.1.12 ALWAYS read, understand, and follow procedures in the Operator's Manual before attempting to operate the equipment.
- 1.1.13 ALWAYS be sure operator is familiar with proper safety precautions and operation techniques before using machine.



- 1.1.14 ALWAYS be sure the machine is on a firm, level surface and will not tip, roll, slide, or fall while operating.
- 1.1.15 ALWAYS close fuel valve on engines equipped with one when machine is not being operated.
- 1.1.16 ALWAYS store the equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children.

## **1.2 Operator Safety while using Internal Combustion Engines**



**DANGER**

Internal combustion engines present special hazards during operation and fueling. Read and follow the warning instructions in the engine owner's manual and the safety guidelines below. Failure to follow the warnings and safety guidelines could result in severe injury or death.

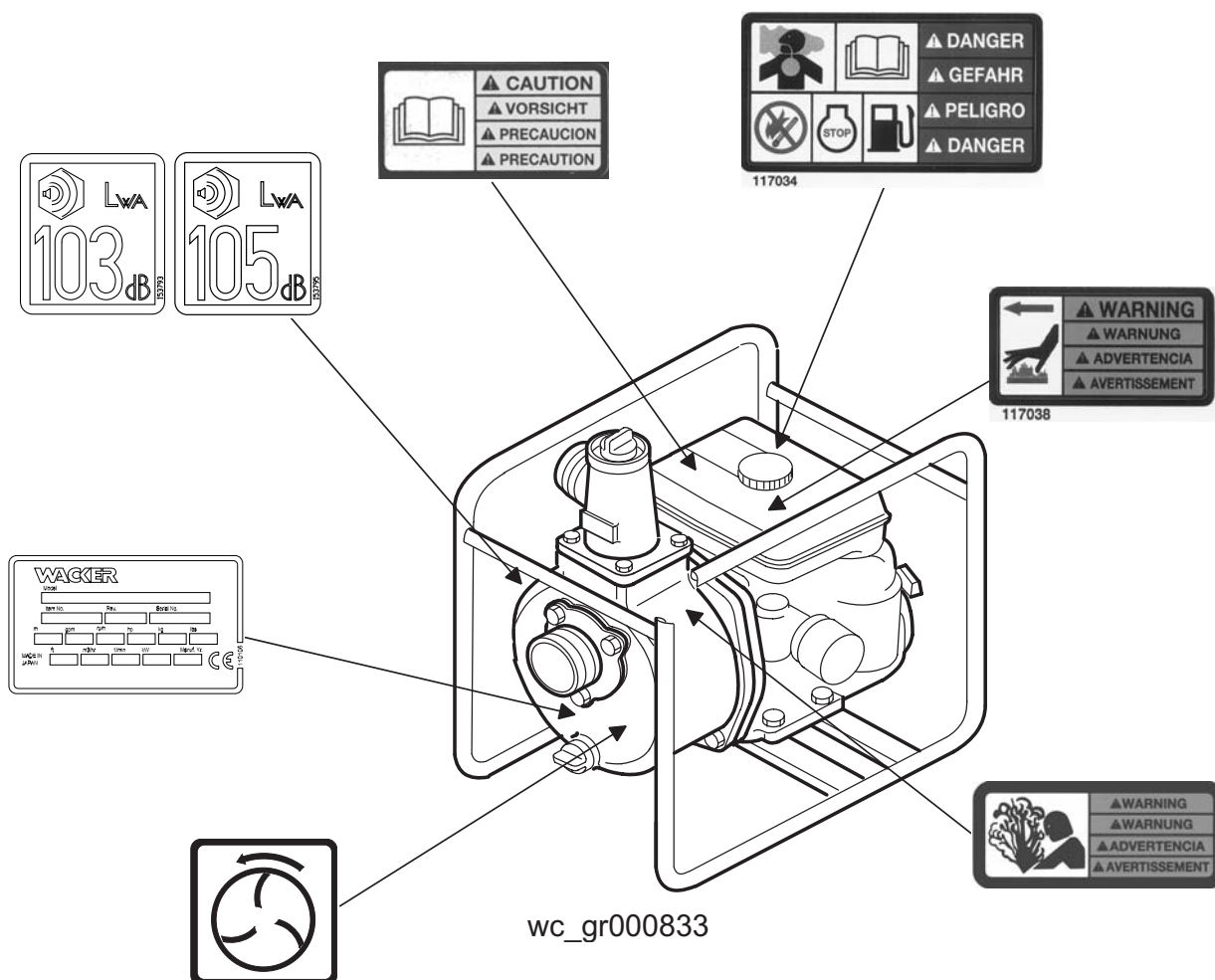
- 1.2.1 DO NOT smoke while operating the machine.
- 1.2.2 DO NOT smoke when refueling the engine.
- 1.2.3 DO NOT refuel a hot or running engine.
- 1.2.4 DO NOT refuel the engine near an open flame.
- 1.2.5 DO NOT spill fuel when refueling the engine.
- 1.2.6 DO NOT run the engine near open flames.
- 1.2.7 ALWAYS refill the fuel tank in a well-ventilated area.
- 1.2.8 ALWAYS replace the fuel tank cap after refueling.

**1.3 Service Safety****WARNING**

Poorly maintained equipment can become a safety hazard! In order for the equipment to operate safely and properly over a long period of time, periodic maintenance and occasional repairs are necessary.



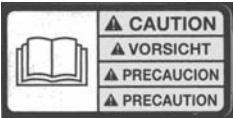


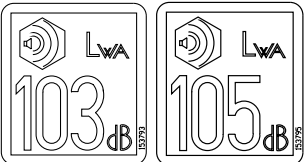
- 1.3.1 DO NOT attempt to clean or service the machine while it is running. Rotating parts can cause severe injury.
- 1.3.2 DO NOT crank a flooded engine with the spark plug removed on gasoline-powered engines. Fuel trapped in the cylinder will squirt out the spark plug opening.
- 1.3.3 DO NOT test for spark on gasoline-powered engines if the engine is flooded or the smell of gasoline is present. A stray spark could ignite the fumes.
- 1.3.4 DO NOT use gasoline or other types of fuels or flammable solvents to clean parts, especially in enclosed areas. Fumes from fuels and solvents can become explosive.
- 1.3.5 ALWAYS keep the area around the muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could ignite the debris and start a fire.
- 1.3.6 ALWAYS replace worn or damaged components with spare parts designed and recommended by Wacker Corporation.
- 1.3.7 ALWAYS disconnect the spark plug on machines equipped with gasoline engines, before servicing, to avoid accidental start-up.

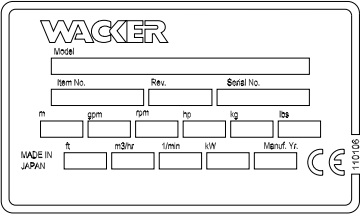

## 1.4 Label Locations



## 1.5 Safety Labels

Wacker machines use international pictorial labels where needed. These labels are described below:

Label	Meaning
 <p>117034</p>	<p><b>DANGER!</b> Engines emit carbon monoxide; operate only in well-ventilated area. Read the Operator's Manual. No sparks, flames, or burning objects near the machine. Shut off the engine before refueling.</p>
 <p>117038</p>	<p><b>WARNING!</b> Hot surface!</p>
	<p><b>CAUTION!</b> Read and understand the supplied Operator's Manuals before operating this machine. Failure to do so increases the risk of injury to yourself or others.</p>
	<p><b>WARNING!</b> Pressurized contents. Do not open when hot!</p>
	<p>Impeller rotation.</p>
	<p>Guaranteed sound power level in dB(A)</p>

Label	Meaning
	A nameplate listing the model number, item number, revision number, and serial number is attached to each unit. Please record the information found on this plate so it will be available should the nameplate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model number, item number, revision number, and serial number of the unit.
	This machine may be covered by one or more patents.

**2. Technical Data**
**2.1 Technical Data—PG 2 Machines with Honda Engines**

Item Number:	PG 2A 0009054 Rev. 102 and lower, 0007658		PG 2A 0009054 Rev. 103 and higher	
Engine				
Engine Make	Honda			
Engine Model	GX120K1WKT2		GX120K1WKT4	
Rated Power	kW (Hp)	3.0 (4.0)		
Spark Plug	type	NGK BPR 6ES		
Electrode Gap	mm (in.)	0.7–0.8 (0.028–0.031)		
Air Cleaner	type	Single element		
Engine Lubrication oil	grade class	SAE 10W30 SG or SF		
Engine Oil Capacity	ml (oz.)	600 (20)		
Fuel	type	Regular unleaded gasoline		
Fuel Tank Capacity	l (qts.)	2.5 (2.6)		
Valve Clearance (cold)	mm (in.)	Inlet: 0.15 ( 0.006) Outlet: 0.20 (0.008)		

<b>Pump</b>		
Weight	kg (lbs.)	24 (53)
*Max. Suction Lift	m (ft.)	7.5 (25)
Max. Total Head	m (ft.)	30 (98)
Suction / Discharge Dia.	mm (in.)	50 (2)
Maximum Solid Size	mm (in.)	6.5 (0.25)
Max. Discharge	l/min (gpm)	600 (159)

\* Based on pump operating at sea level. Maximum suction lift will be less at higher altitudes.

## 2.2 Sound Specifications—PG 2 Machines with Honda Engines

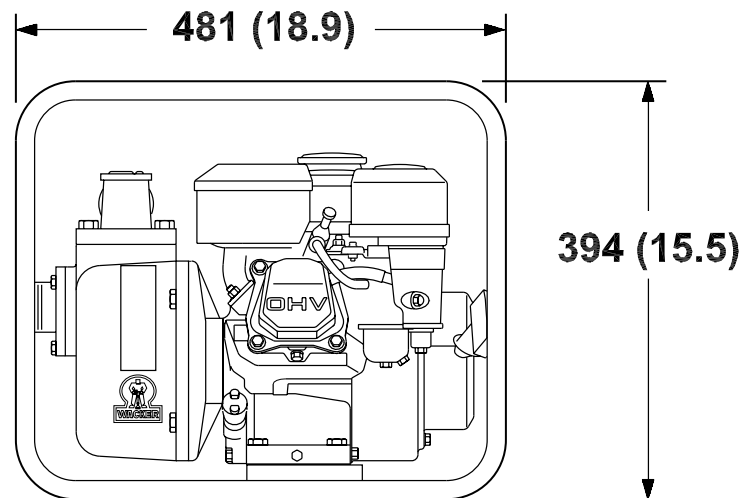
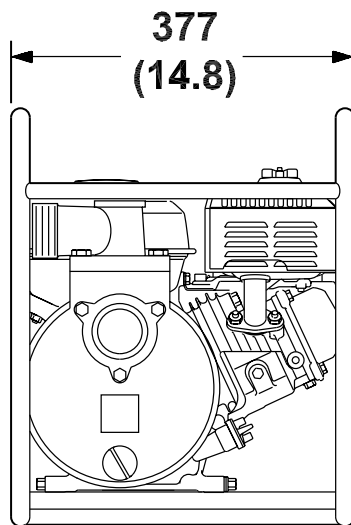
The required sound specification, Paragraph 1.7.4.f of 89/392/EEC Machinery Directive, is:

- the sound pressure level at operator's location ( $L_{pA}$ ) = 84 dB(A)
- the guaranteed sound power level ( $L_{WA}$ ) = 103 dB(A)

These sound values were determined according to ISO 3744 for the sound power level ( $L_{WA}$ ) and ISO 6081 for the sound pressure level ( $L_{pA}$ ) at the operator's location.

## 2.3 Dimensions—PG 2 Machines with Honda Engines

mm (in.)



wc\_gr000834

**2.4 Technical Data—PG 3 Machines with Honda Engines**

Item Number:	<b>PG 3A</b> 0009055 Rev. 102 and lower, 0007659		<b>PG 3A</b> 0009055 Rev. 103 and higher
Engine			
Engine Make	Honda		
Engine Model	GX160K1WKT2	GX160K1WKT4	
Rated Power	kW (Hp)	4.1 (5.5)	
Spark Plug	type	NGK BPR 6ES	
Electrode Gap	mm (in.)	0.7–0.8 (0.028–0.031)	
Air Cleaner	type	Single element	
Engine Lubrication	oil grade class	SAE 10W30 SG or SF	
Engine Oil Capacity	ml (oz.)	600 (20)	
Fuel	type	Regular unleaded gasoline	
Fuel Tank Capacity	l (qts.)	3.6 (3.8)	
Valve Clearance (cold)	mm (in.)	Inlet:0.15 ( 0.006) Outlet: 0.20 (0.008)	

<b>Pump</b>		
Weight	kg (lbs.)	31 (69)
*Max. Suction Lift	m (ft.)	7.5 (25)
Max. Total Head	m (ft.)	30 (98)
Suction / Discharge Dia.	mm (in.)	75 (3)
Maximum Solid Size	mm (in.)	6.5 (0.25)
Max. Discharge	l/min (gpm)	1000 (264)

\* Based on pump operating at sea level. Maximum suction lift will be less at higher altitudes.



## 2.5 Sound Specifications—PG 3 Machines with Honda Engines

The required sound specification, Paragraph 1.7.4.f of 89/392/EEC Machinery Directive, is:

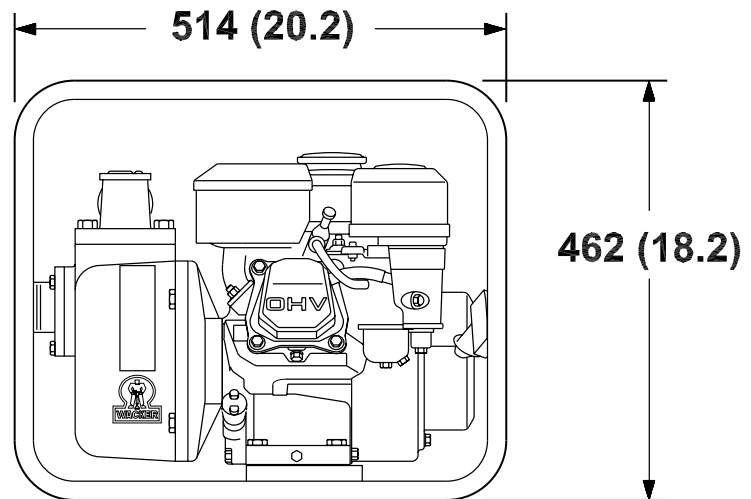
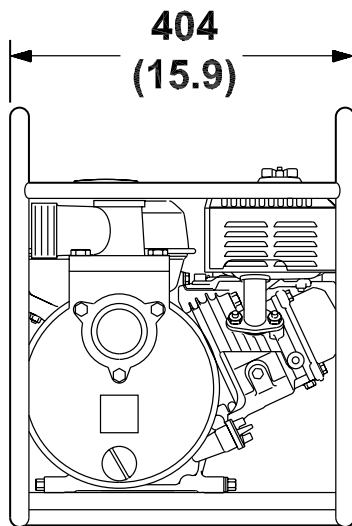
- the sound pressure level at operator's location ( $L_{pA}$ ) = 87 dB(A)
- the sound power level ( $L_{WA}$ ) = 108 dB(A)

These sound values were determined according to ISO 3744 for the sound power level ( $L_{WA}$ ) and ISO 6081 for the sound pressure level ( $L_{pA}$ ) at the operator's location.

The sound and vibration specifications were obtained with the unit operating on pavement at nominal engine speed.

## 2.6 Dimensions—PG 3 Machines with Honda Engines

mm (in.)



wc\_gr000841

**2.7 Technical Data—Machines with Wacker Engines**

Item Number:	PG 2 0009496, 0009497		PG 3 0009498, 0009499	
Engine				
Engine Make	Wacker			
Engine Model	WM 130		WM 170	
Displacement	cm <sup>3</sup> (in <sup>3</sup> )	126 (7.7)		169 (10.3)
Engine Speed	rpm	3600 ± 100		
Max. Operating Power	kW (Hp)	3.2 (4.3)		4.2 (5.7)
Rated Power	kW (Hp)	2.2 (3.0)		3.0 (4.0)
Spark Plug	type	NGK BR6HS (Champion RL86C)		
Electrode Gap	mm (in.)	0.6–0.7 (0.024–0.028)		
Air Cleaner	type	Dual Element		
Engine Lubrication oil	grade class	SAE10W30, SE or higher		
Engine Oil Capacity	ml (oz.)	600 (20)		
Valve Clearance (cold)	mm (in.)	0.12-0.15 (0.005-0.006)		
Fuel	type	Regular unleaded gasoline		
Fuel Tank Capacity	l (qts.)	2.7 (2.8)		3.6 (3.8)
Fuel Consumption	l (qts.)/hr.	1.3 (1.4)		1.8 (1.9)
Running Time	hr.	2.0		2.1

## 2.8 Pump—Machines with Wacker Engines

Item Number:		PG 2 0009496, 0009497	PG 3 0009498, 0009499
Pump			
Dimensions (L x W x H)	mm (in.)	480 x 375 x 395 (19 x 15 x 15.5)	515 x 405 x 460 (20 x 16 x 18)
Operating Weight	kg (lbs.)	24 (53)	31 (69)
*Max. Suction Lift	m (ft.)	8 (26)	
Max. Discharge Head	m (ft.)	30 (98)	
Suction / Discharge Dia.	mm (in.)	50 (2)	75 (3)
Maximum Solid Size	mm (in.)	6.5 (0.25)	
Max. Flow Rate	l/m (gpm)	600 (158)	970 (256)

\* Based on pump operating at sea level. Maximum suction lift will be less at higher altitudes.

## 2.9 Sound Specifications—Machines with Wacker Engines

The required sound specification, Paragraph 1.7.4.f of 89/392/EEC Machinery Directive, is:

- the sound pressure level at operator's location ( $L_{pA}$ ):  
PG 2 = 84 dB(A), PG 3 = 87 dB(A).
- the guaranteed sound power level ( $L_{WA}$ ):  
PG 2 = 103 dB(A), PG 3 = 105 dB(A).

These sound values were determined according to ISO 3744 for the sound power level ( $L_{WA}$ ) and ISO 6081 for the sound pressure level ( $L_{pA}$ ) at the operator's location.

### **3. Operation**

#### **3.1 Application**

This pump is intended for removing clean water and water containing some debris and solids. Refer to “Technical Data” for maximum solid size.

#### **3.2 Recommended Fuel**

The engine requires regular grade unleaded gasoline. Use only fresh, clean gasoline. Gasoline containing water or dirt will damage fuel system. Consult engine Owner’s Manual for complete fuel specifications.

### 3.3 Before Starting

See Graphic: wc\_gr000835

- 3.3.1 Read safety instructions at the beginning of manual.
- 3.3.2 Place pump as near to water as possible, on a firm, flat, level surface.
- 3.3.3 To prime pump, remove prime plug **(a)** and fill pump case with water. If the pump case is not filled with water before starting, it will not begin pumping.



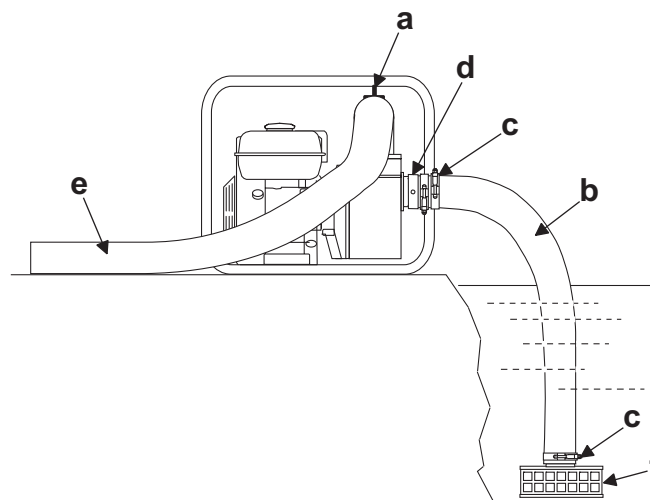
**WARNING**

DO NOT open priming plug, discharge plug, or loosen hose fittings if pump is hot! Water or vapor inside pump may be under pressure.

- 3.3.4 Check for leaks between pump and engine. If water is leaking, the seal inside pump is worn or damaged. Continued operation may cause water damage to engine.
- 3.3.5 Check that hoses are securely attached to pump. Suction hose **(b)** must not have any air leaks. Tighten hose clamps **(c)** and couplings **(d)**. Check that discharge hose **(e)** is not restricted. Lay hose out as straight as possible. Remove any twists or sharp bends from hose which may block the flow of water.
- 3.3.6 Make sure suction strainer **(f)** is clean and securely attached to end of hose. The strainer is designed to protect the pump by preventing large objects from being pulled into the pump.

**NOTICE:** Strainer should be positioned so it will remain completely under water. Running the pump with the strainer above water for long periods can damage the pump.

- 3.3.7 Check fuel level, engine oil level, and condition of air cleaner.



wc\_gr000835

### 3.4 To Start—Machines with Honda Engines

See Graphic: wc\_gr000014

- 3.4.1 Open fuel valve by moving lever to the right (**a1**).

**Note:** If engine is cold, move choke lever to close position (**b1**). If engine is hot, set choke to open position (**b2**).

- 3.4.2 Turn engine switch to “ON” (**e1**).

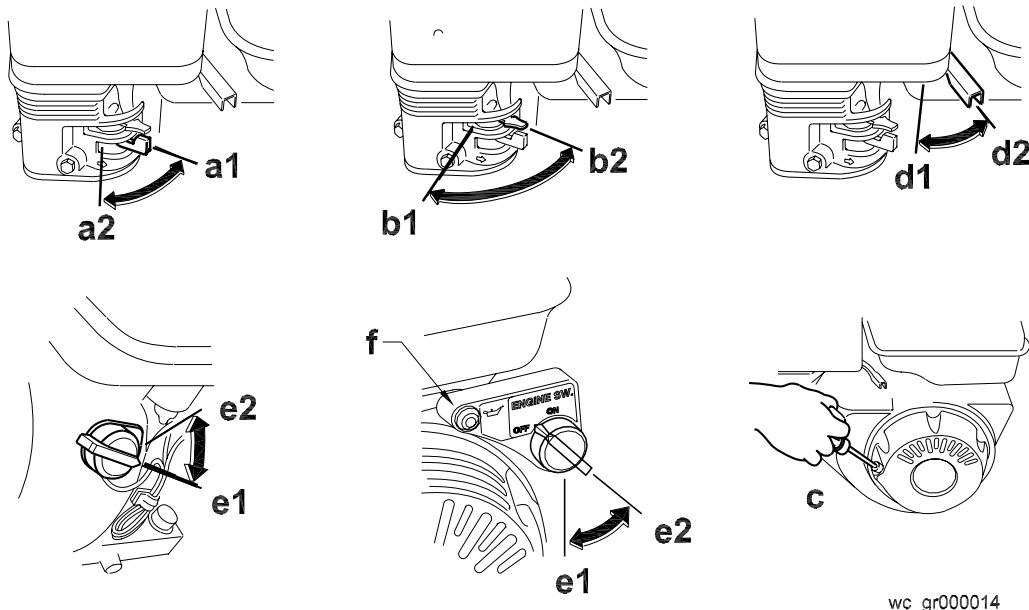
- 3.4.3 Open throttle by moving it slightly to left (**d1**).

- 3.4.4 Pull starter rope (**c**).

**Note:** If the oil level in the engine is low, the engine will not start. If this happens, add oil to engine. Some engines are equipped with an oil alert light (**f**) that will come on while pulling the starter rope.

- 3.4.5 Open choke as engine warms (**b2**).

- 3.4.6 Open throttle fully to operate.



wc\_gr000014

### 3.5 To Stop—Machines with Honda Engines

See Graphic: wc\_gr000014

- 3.5.1 Reduce engine RPM to idle by moving throttle completely to right (**d2**).

- 3.5.2 Turn engine switch to “OFF” (**e2**).

- 3.5.3 Close fuel valve by moving lever to the left (**a2**).

### 3.6 To Start—Machines with Wacker Engines

See Graphic: wc\_gr000655

- 3.6.1 Open fuel valve by moving lever down (**a1**).

**Note:** If engine is cold, move choke lever to close position (**d2**). If engine is hot, set choke to open position (**d1**).

- 3.6.2 Turn engine switch to “ON” (**b2**).

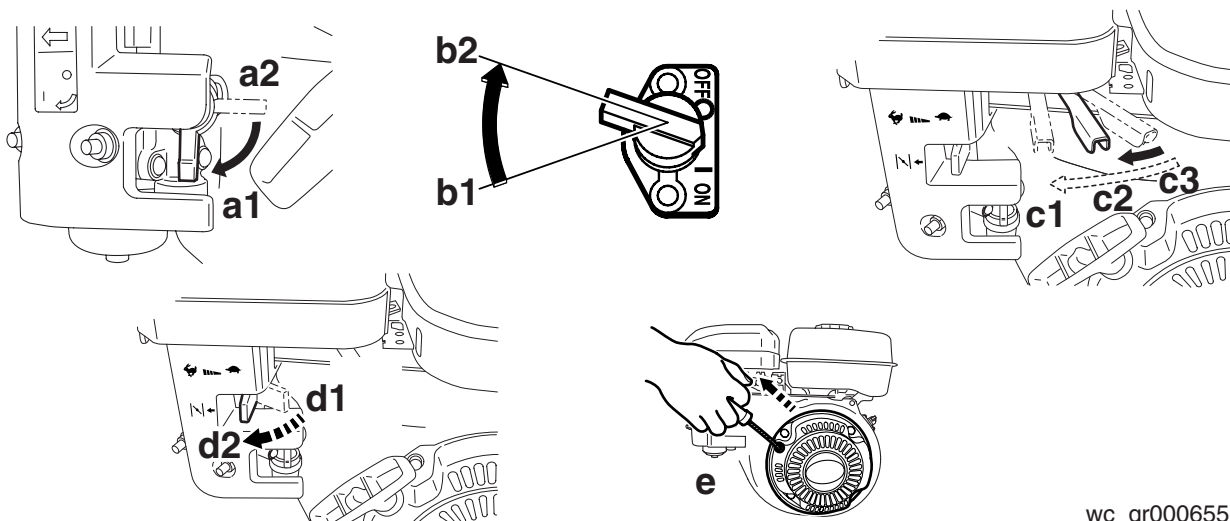
- 3.6.3 Open throttle by moving it slightly to left (**c2**).

- 3.6.4 Pull starter rope (**e**).

**Note:** If the oil level in the engine is low, the engine will not start. If this happens, add oil to engine.

- 3.6.5 Open choke as engine warms (**d1**).

- 3.6.6 Open throttle fully to operate (**c1**).



wc\_gr000655

### 3.7 To Stop—Machines with Wacker Engines

See Graphic: wc\_gr000655

- 3.7.1 Reduce engine RPM to idle by moving throttle completely to right (**c3**).

- 3.7.2 Turn engine switch to “OFF” (**b1**).

- 3.7.3 Close fuel valve (**a2**).

### 3.8 Operation

Pump should begin pumping water within a minute depending on length of suction hose and height of pump above water. Longer hoses will require more time.

If pump does not prime, check for loose fittings or air leak in suction hose. Make sure strainer in water is not blocked.

Run engine at full speed while operating pump.



NEVER pump corrosive chemicals or water containing toxic substances. These fluids could create serious health and environmental hazards. Contact local authorities for assistance.

### 3.9 Hoses and Clamps

See Graphic: wc\_gr000836

Suction hoses **(a)** must be rigid enough not to collapse when pump is operating.

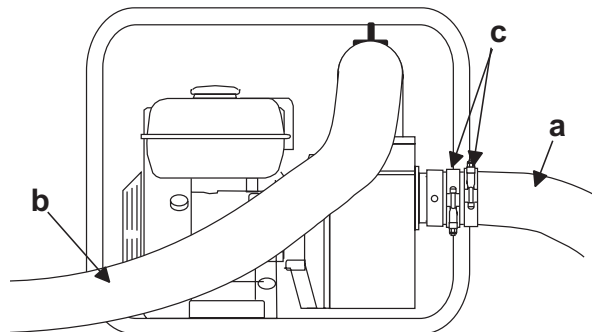
Discharge hoses **(b)** are usually thin-walled collapsible hoses. Rigid hoses similar to those used as suction hoses may also be used as discharge hoses.

**Note:** Suction and discharge hoses are available from Wacker. Contact your nearest dealer for more information.

Two clamps **(c)** are recommended for connection of suction hoses to inlet coupling.

**Note:** This connection is important. Even a small air leak on the suction side of pump will prevent the pump from priming.

For other hose connections, one T-bolt or worm-gear type clamp is usually sufficient to hold hoses in place. In some cases, slight variances in hose diameters may make it necessary to add more clamps in order to maintain tight connections.



wc\_gr000836



## 4. Maintenance

### 4.1 Periodic Maintenance Schedule

	Daily before starting	After first 20 hrs.	Every 50 hrs.	Every 100 hrs.	Every 300 hrs.
Check fuel level.	■				
Check engine oil level.	■				
Inspect air filter. Replace as needed.	■				
Check external hardware.	■				
Inspect hoses and housing for leaks.	■				
Clean air cleaner element.			■		
Change engine oil.		■		■	
Clean cooling system.				■	
Check and clean spark plug.				■	
Clean sediment cup.				■	
Check and adjust valve clearance.					■
Check and adjust impeller clearance.					■

## 4.2 Cleaning Pump

See Graphic: *wc\_gr000837*

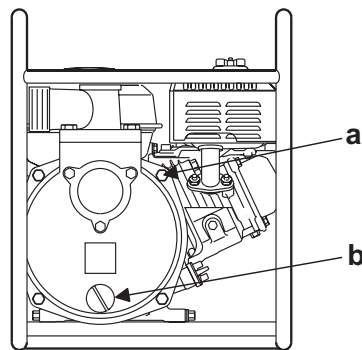
After pumping water containing a large amount of dirt or debris, clean out inside of pump housing.

- 4.2.1 Remove drain plug **(b)** from pump housing and drain any water left in pump.
- 4.2.2 Loosen the four knobs holding the pump cover **(a)** and remove cover.
- 4.2.3 Clean out dirt and debris. Inspect impeller and volute insert for wear.



**WARNING**

The impeller may develop sharp edges. Use care when cleaning around impeller to avoid getting cut.



*wc\_gr000837*

### 4.3 Adjusting Impeller Clearance

See Graphic: *wc\_gr000838*

If it is necessary to replace impeller or volute, be sure clearance between impeller and volute is adjusted correctly. The impeller **(a)** should be as close to the volute **(b)** as possible without rubbing against it. Clearance is adjusted by adding or removing shims **(c)** from behind impeller. To adjust the clearance do the following:

4.3.1 Remove pump housing but do not remove impeller.

4.3.2 Measure the distance **(d)** of volute.

4.3.3 Measure the distance **(e)** of impeller.

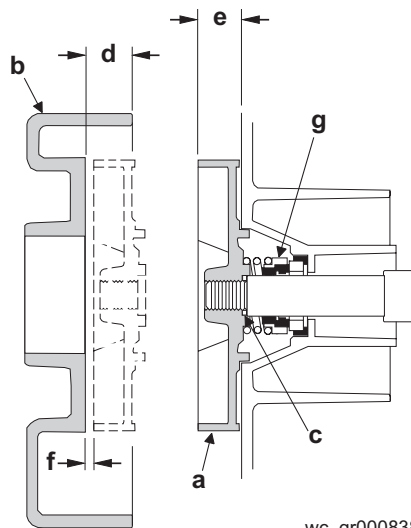
4.3.4 Subtract the distance **(e)** from **(d)**.

**(d) - (e) = (f)** clearance.

4.3.5 The clearance between the volute and the impeller should be 0.3 mm (0.012 in.) to 0.7 mm (0.028 in.). Adjust the distance by removing the impeller and adding shims as needed.

Each shim measures 0.3 mm (0.012 in.).

As the impeller wears down, additional shims may be required to maintain the clearance between the impeller and the volute. Check the clearance whenever the mechanical seal **(g)**, impeller, volute, or rear flange plate are replaced.



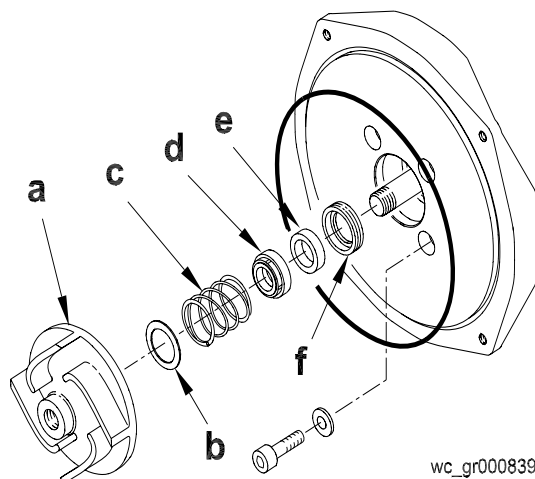
wc\_gr000838

## 4.4 Mechanical Seal Replacement

See Graphic: wc\_gr000839

To service the mechanical seal do the following:

- 4.4.1 Remove the impeller **(a)** from the engine shaft by turning it counterclockwise.  
**Note:** If the impeller is hard to remove, tap it with a plastic mallet. Do not lose any adjusting shims **(b)**.
- 4.4.2 Remove mechanical seal spring **(c)** and carbon face **(d)** from crankshaft.
- 4.4.3 Remove mechanical seal ceramic face **(e)** and L-ring **(f)**.
- 4.4.4 Clean engine shaft, remove any rust. Also clean contact surface of ceramic and carbon faces with a clean cloth. Do not lubricate seal faces.
- 4.4.5 Place ceramic face in L-ring and install in pump flange. Carefully place carbon face and seal spring on engine shaft.
- 4.4.6 Mount impeller to engine shaft. Turn impeller shaft clockwise to tighten. See Section *Adjusting Impeller Clearance*.



## 4.5 Spark Plug

See Graphic: wc\_gr000028



**WARNING**

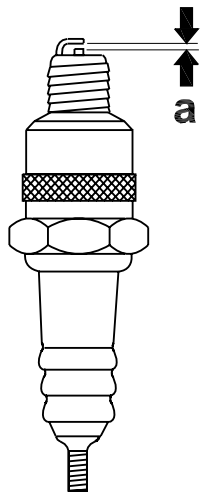
Clean or replace spark plug as needed to ensure proper operation.

The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Do not touch the muffler while it is hot.

**Note:** Refer to the Technical Data for the recommended spark plug type and the electrode gap setting.

- 4.5.1 Remove spark plug and inspect it.
- 4.5.2 Replace plug if the insulator is cracked or chipped.
- 4.5.3 Clean spark plug electrodes with a wire brush.
- 4.5.4 Set the electrode gap (**a**).
- 4.5.5 Tighten spark plug securely.

**NOTICE:** A loose spark plug can become very hot and may cause engine damage.



wc\_gr000028

## 4.6 Air Cleaner—Machines with Honda Engines

See Graphic: wc\_gr000840

Service air cleaner frequently to prevent carburetor malfunction.

**NOTICE:** **NEVER** run engine without air cleaner. Severe engine damage will occur.

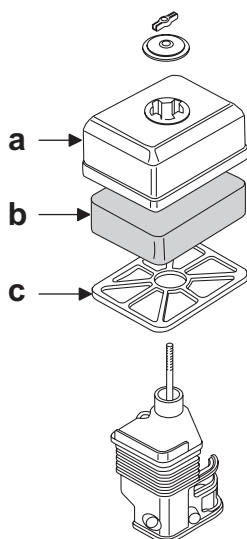


**WARNING**

**NEVER** use gasoline or other types of low flash point solvents for cleaning the air cleaner. A fire or explosion could result.

To service:

- 4.6.1 Remove air cleaner cover **(a)**. Inspect element **(b)** for holes or tears. Replace element if damaged.
- 4.6.2 Wash element in solution of mild detergent and warm water. Rinse thoroughly in clean water. Allow element to dry thoroughly.  
Soak element in clean engine oil and squeeze out excess oil.
- 4.6.3 Install element, grid plate **(c)**, and air cleaner cover.



wc\_gr000840

## 4.7 Air Cleaner—Machines with Wacker Engines

See Graphic: *wc\_gr000656*



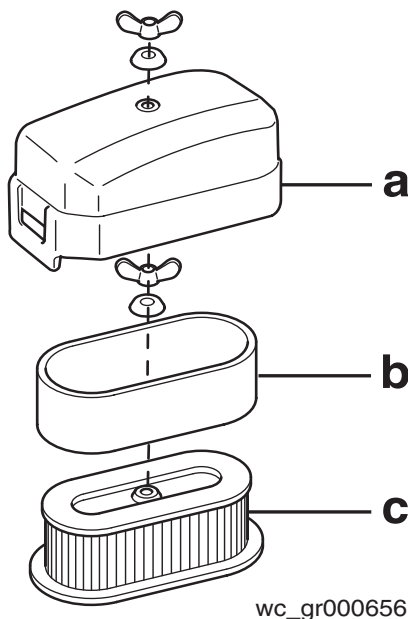
**WARNING**

NEVER use gasoline or other types of low flash point solvents for cleaning the air cleaner. A fire or explosion could result.

**NOTICE:** NEVER run engine without air cleaner. Severe engine damage will occur.

The engine is equipped with a dual element air cleaner. Under normal operating conditions, elements should be cleaned once every week. Under severe, dry and dusty conditions, the elements should be maintained daily. Replace an element when saturated with dirt that cannot be removed.

- 4.7.1 Remove the air cleaner cover **(a)**. Remove the filter assembly by pulling it straight up. Inspect both elements for holes or tears. Replace damaged elements.
- 4.7.2 Wash the foam element **(b)** in a solution of mild detergent and warm water. Rinse it thoroughly in clean water. Allow the element to dry thoroughly.
- 4.7.3 Tap the paper element **(c)** lightly to remove excess dirt or blow compressed air through the filter from the inside out. Replace the paper element if it appears heavily soiled.



*wc\_gr000656*

## 4.8 Engine Oil—Machines with Honda Engines

See Graphic: wc\_gr000022

4.8.1 Drain the oil while the engine is still warm.

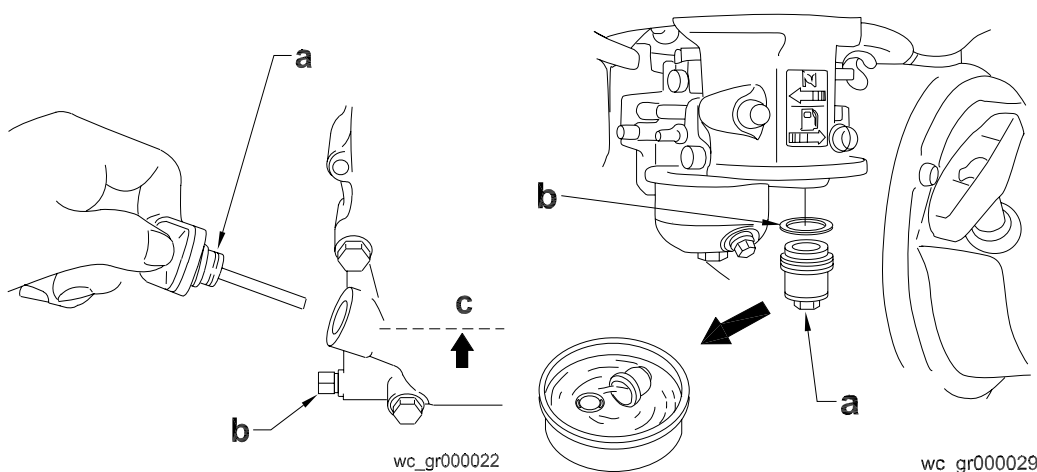
4.8.2 Remove the oil filler plug (a) and the drain plug (b) to drain the oil.

**Note:** In the interests of environmental protection, place a plastic sheet and a container under the machine to collect any liquid that drains off. Dispose of this liquid in accordance with environmental protection legislation.

4.8.3 Install the drain plug.

4.8.4 Fill the engine crankcase with the recommended oil up to the level of the plug opening (c). See *Technical Data* for oil quantity and type.

4.8.5 Install the oil filler plug.



## 4.9 Cleaning Sediment Cup—Machines with Honda Engines

See Graphic: wc\_gr000029

4.9.1 Turn the fuel valve off.

4.9.2 Remove the sediment cup (a) and the O-ring (b).

4.9.3 Wash both thoroughly in a nonflammable solvent. Dry and reinstall them.

4.9.4 Turn the fuel valve on and check for leaks.



## 4.10 Changing Engine Oil—Machines with Wacker Engines

See Graphic: wc\_gr000087

4.10.1 Drain oil while engine is still warm.

**Note:** In the interests of environmental protection, place a plastic sheet and a container under the machine to collect any liquid which drains off. Dispose of this liquid in accordance with environmental protection legislation.

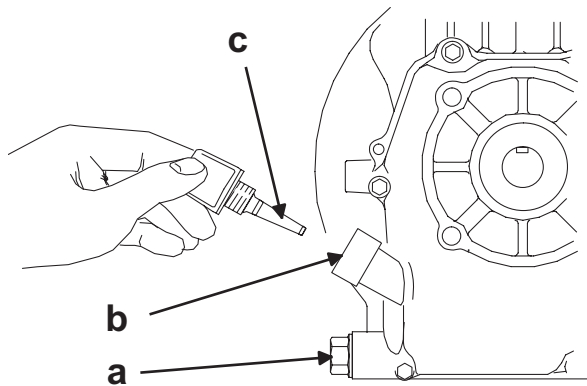
4.10.2 Remove the oil drain plug (a).

4.10.3 Allow the oil to drain.

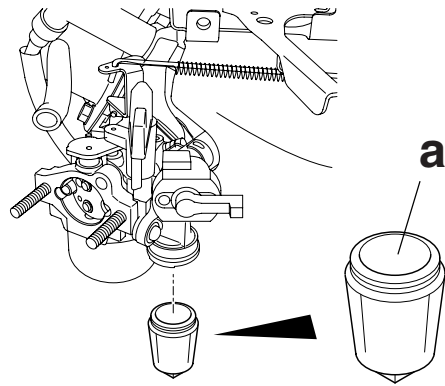
4.10.4 Install the drain plug.

4.10.5 Fill the engine crankcase through the oil filler opening (b), to the upper mark on the dipstick (c). Do not thread in the dipstick to check the level. See Technical Data for oil quantity and type.

4.10.6 When the crankcase is full, reinstall the dipstick.



wc\_gr000087



wc\_gr001093

## 4.11 Cleaning Fuel Strainer—Machines with Wacker Engines

See Graphic: wc\_gr001093

4.11.1 To remove water and dirt, close the fuel lever and remove the fuel strainer.

4.11.2 Inspect the fuel strainer (a) for water and dirt.

4.11.3 After removing any dirt and water, wash the fuel cup with a nonflammable solvent.

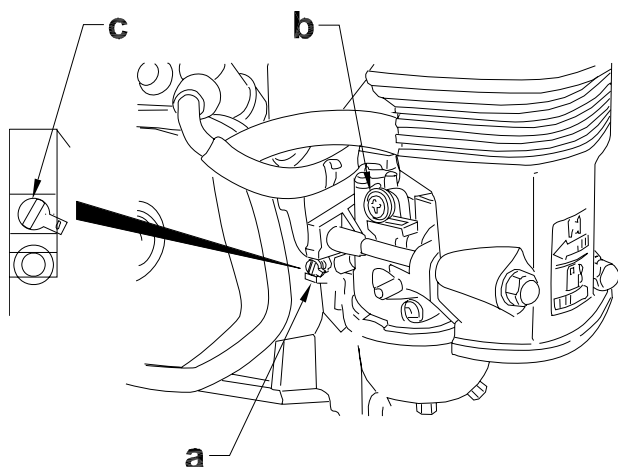
4.11.4 Reinstall securely to prevent leakage.

## 4.12 Carburetor Adjustment—Machines with Honda Engines

See Graphic: wc\_gr000032

- 4.12.1 Start the engine and allow it to warm up to operating temperature.
- 4.12.2 Set the pilot screw **(a)** two turns out. See *Note*.
- 4.12.3 With the engine idling, turn the pilot screw **(a)** in or out to the setting that produces the highest rpm.
- 4.12.4 After the pilot screw is adjusted, turn the throttle stop screw **(b)** to obtain the standard idle speed. See *Technical Data*.

**Note:** On some engines the pilot screw is fitted with a limiter cap **(c)** to prevent excessive enrichment of the air-fuel mixture in order to comply with emission regulations. The mixture is set at the factory and no adjustment should be necessary. Do not attempt to remove the limiter cap. The limiter cap cannot be removed without breaking the pilot screw.



wc\_gr000032

## 4.13 Adjusting Idle Speed—Machines with Honda Engines

See Graphic: wc\_gr000032

To adjust idle speed:

- 4.13.1 Start engine and allow it to warm up to normal operating temperature.
- 4.13.2 Turn throttle stop screw **(b)** in to increase speed, out to decrease speed.

## 4.14 Storage

If pump is being stored for more than 30 days:



**WARNING**

NEVER open priming plug, discharge plug, or cover when pump is hot.

- 4.14.1 Remove discharge plug from pump casing and drain out any water left in the housing after pump has cooled.
- 4.14.2 Remove pump cover and clean inside of pump housing. Coat inside of pump with a light film of oil to reduce corrosion. A spray can of oil works well for this.
- 4.14.3 Tape up suction and discharge ports to prevent anything from falling into pump.
- 4.14.4 Change engine oil and follow procedures described in engine manual for engine storage.
- 4.14.5 Cover pump and engine and store in a clean, dry area.

## 4.15 Troubleshooting

Problem / Symptom	Reason / Remedy
Pump does not take in water.	<ul style="list-style-type: none"> <li>• Not enough priming water in housing.</li> <li>• Engine speed too low. Adjust speed.</li> <li>• Strainer plugged. Clean strainer.</li> <li>• Suction hose damaged. Replace or repair hose.</li> <li>• Air leak at suction port. Check that fittings are tight and sealing properly.</li> <li>• Pump too high above water.</li> <li>• Debris collecting in pump housing. Clean pump housing.</li> <li>• Too much clearance between impeller and insert.</li> </ul>
Pump takes in water, little or no discharge.	<ul style="list-style-type: none"> <li>• Engine speed too low. Adjust speed.</li> <li>• Suction strainer partially plugged. Clean strainer.</li> <li>• Impeller worn. Adjust clearance by adding shims or replace impeller.</li> <li>• Volute insert worn or damaged. Adjust clearance or replace insert.</li> </ul>
Suction hose leaks at inlet.	<ul style="list-style-type: none"> <li>• Clamps are not sealing properly. Tighten, replace, or add clamp.</li> <li>• Hose diameter is too large.</li> <li>• Hose is damaged.</li> </ul>
Discharge hose does not stay on coupling.	<ul style="list-style-type: none"> <li>• Pressure may be too high for clamps being used. Add another clamp.</li> <li>• Hose kinked or end blocked. Check hose.</li> </ul>
Impeller does not turn; pump is hard to start.	<ul style="list-style-type: none"> <li>• Impeller jammed or blocked. Open pump cover and clean dirt and debris from inside of pump housing.</li> <li>• Impeller and insert binding. Adjust clearance by removing shim from behind insert.</li> </ul>

## **5. Disassembly/Assembly Procedures**

### **5.1 Tools**

Because all possible problems encountered while repairing the machine cannot be anticipated, it is up to the mechanic to use common sense and good judgement in tool selection.

The use of any special tools is recommended only for those operations where the use of conventional tools proves inadequate.

Before substituting another tool or procedure, you should be satisfied that neither personal injury nor damage to the component will result.

### **5.2 Ordering Parts**

The repair procedures contained in this manual do not include part numbers. For parts replacement information, refer to the Parts Book originally supplied with the machine.

If the original Parts Book has been lost, a replacement may be ordered from Wacker Corporation. When ordering a replacement Parts Book, please list the model number, item number, revision level, and serial number of the machine. Parts Books are also available on the Wacker Corporation Web site. See [www.wackergroup.com](http://www.wackergroup.com). Enter the site as a visitor.

### **5.3 Reference Numbers ( )**

Repair procedures contain reference numbers enclosed in parentheses ( ). These numbers refer to the item numbers shown on the assembly drawings and other detailed drawings. They are included to aid the mechanic in identifying parts and assembling components.

## 5.4 Description and Operation

*See Graphic: wc\_gr003495*

PG Series Pumps use an impeller (1) and volute (2) to create the suction and discharge pressures required for pump operation.

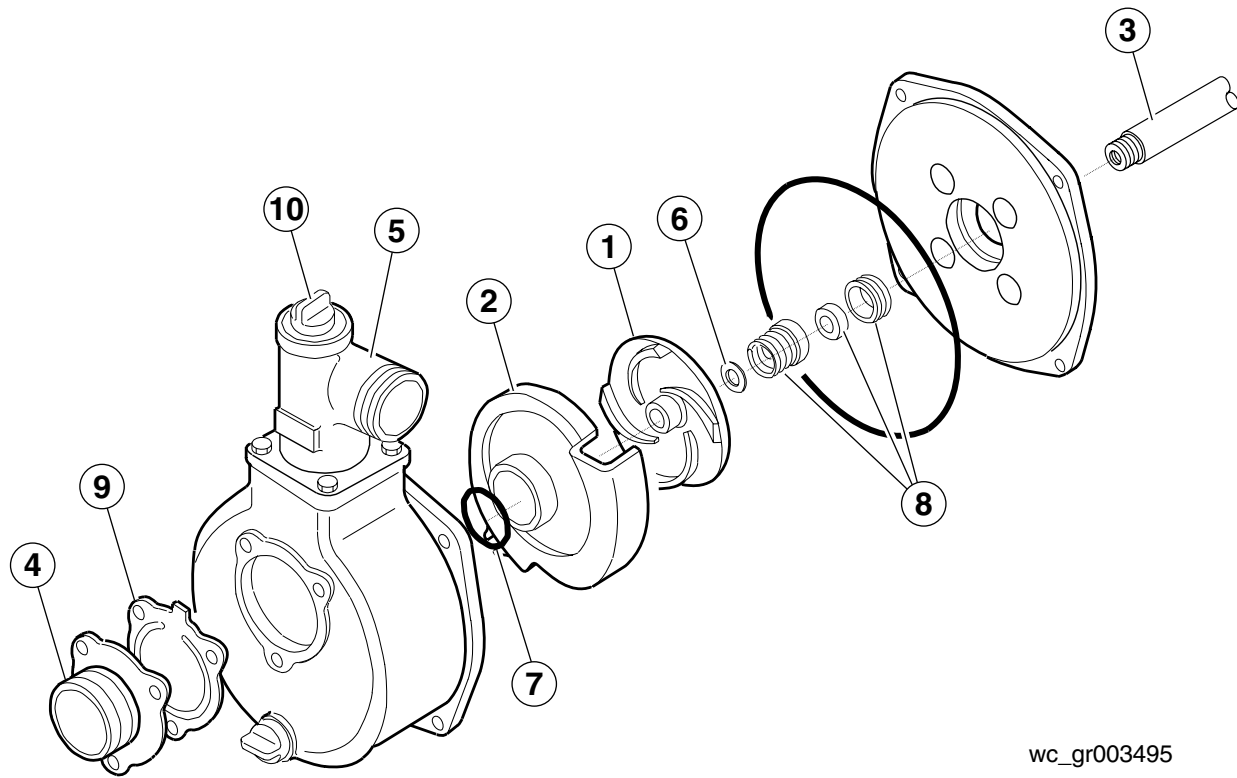
The impeller is threaded directly to the engine drive shaft (3) and rotates inside the volute casing. Water is drawn into the pump inlet (4) by the low pressure area created at the eye of the impeller. Vanes on the impeller move the liquid into the volute where it is gathered and directed to the discharge port (5).

Clearance between the impeller and the volute is maintained by the addition of shim washers (6) behind the impeller.

A mechanical seal (8), mounted behind the impeller, prevents water from running along the engine drive shaft and seals the rear of the pump housing to prevent leakage.

The flapper valve (9) at the pump inlet closes when the pump stops. This valve seals the inlet port and prevents the prime water in the suction hose from being lost.

The pump case is easily filled with water by removing the priming plug (10).



wc\_gr003495

## **5.5 Inspection**

Before disassembling the pump, check for conditions both outside and inside the pump which could affect performance.

Inspecting conditions outside the pump:

- Check that the pump is operating within specifications

Remember that as suction lift and discharge head increases, pump output is reduced.

- Check the type of fluid being pumped.

The pump will perform poorly if it is used to pump heavy sludges or mud.

- Check the suction hose for leaks or damage.

A puncture or tear above the water line will make the pump difficult or impossible to prime.

- Check that the suction hose is the correct type.

The suction hose must have strong rigid walls. Thin-walled collapsible hoses like those used on the discharge side cannot be used.

- Check that the strainer hose lines are not blocked or restricted.

Remove any dirt, debris or vegetation which might interfere with the fluid flow. If possible, flush the hoses with clear water at the end of each operation and suspend the strainer in water, rather than resting it in sand or mud. Check that the discharge hose is not kinked.

- Check that all the fittings and hose clamps on the suction line are tight and sealed properly.

The fittings and clamps may loosen during operation. Add additional clamps where necessary to ensure a good seal.

- Check that the pump case is filled with water and the prime plug is sealed tightly before start up.

Inspecting conditions inside the pump:

- Check for debris and dirt inside the pump casing.

If allowed to accumulate, debris may restrict fluid flow through the pump or impede the movement of the impeller.

- Check the engine operating speed— 3600  $\pm$ 100 rpm.

As engine operating rpm falls, the pump capacity and discharge head are reduced.



- Check the flapper valve and inlet port for leaks or damage.

If the flapper valve is worn or distorted, it may not seal tightly. Inspect the threads on the inlet port nipple for deep scratches which could allow air leaks.

- Check the clearance between the impeller and the volute insert.

Additional shims are required to maintain the clearance as the impeller wears.

- Check the pump housing O-ring and rear pump flange.

Replace the O-ring if it is torn or crushed. Make sure the cover is tightened evenly. Check that the rear plate is not warped.

- Check for water leaks between the pump housing and the engine. Inspect the mechanical seal lubricant and engine oil.

The presence of water indicates a loose impeller bolt or damage to the mechanical seal.

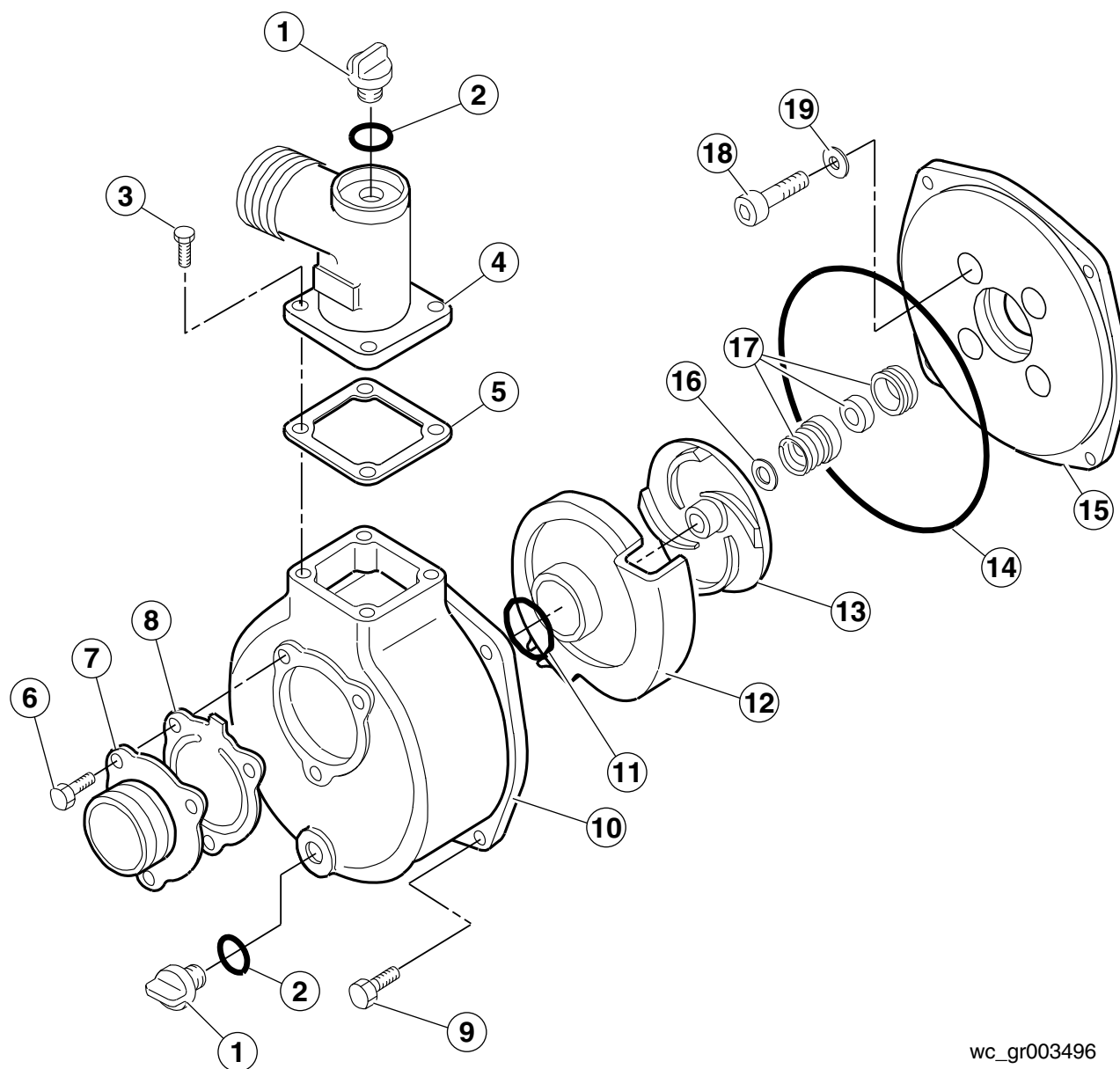
- Check for oil leaks between the pump housing and the engine.

An oil leak indicates a failed shaft seal.

- Check the pump suction with a vacuum gauge.

If the gauge reading is above 16 in. Hg (55 KPa), the problem is probably outside the pump, in the hose line or fittings.

## 5.6 Pump Exploded View



wc\_gr003496

## 5.7 Pump Components

Ref.	Description	Ref.	Description
1	Plug	11	Ring
2	O-ring	12	Volute
3	Screw	13	Impeller
4	Discharge port	14	O-ring
5	Discharge gasket	15	Mounting flange
6	Screw	16	Washer
7	Suction port	17	Mechanical seal
8	Flapper valve gasket	18	Screw
9	Screw	19	Washer
10	Pump case housing	-	---

## 5.8 Replacing the Flapper Valve

See Graphic: wc\_gr003497

The flapper valve (1) is located at the pump inlet (2). During operation, this valve is open allowing a free path for water to flow into the pump case. When the pump is stopped, it closes and prevents water in the suction line from being lost.

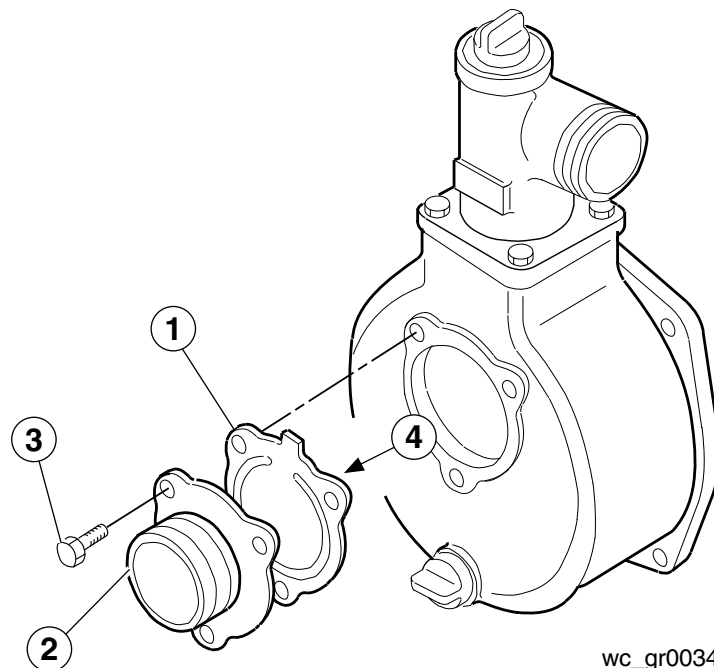
A leak around the flapper gasket will cause the suction line to lose its prime and make the pump difficult or impossible to operate.

Removal:

- 5.8.1 Remove the three screws (3) that secure the suction (inlet) port (2) to the pump.
- 5.8.2 Remove the inlet port and flapper valve assembly (1).

Installation:

- 5.8.3 Install the new flapper valve assembly (1) with the large washer (4) facing the suction port. This washer acts as a counterweight and helps seal the flapper gasket against the pump inlet when the pump stops.
- 5.8.4 Mount the suction (inlet) port (2) to the pump. Tighten the screws (3) evenly until the flapper gasket begins to compress. Use Loctite 243 or an equivalent medium-strength threadlocker on the screws.  
**NOTICE:** DO NOT overtighten the screws. Overtightening may distort the flapper gasket causing an air leak at the suction (inlet) port.



wc\_gr003497

## 5.9 Frame Assembly

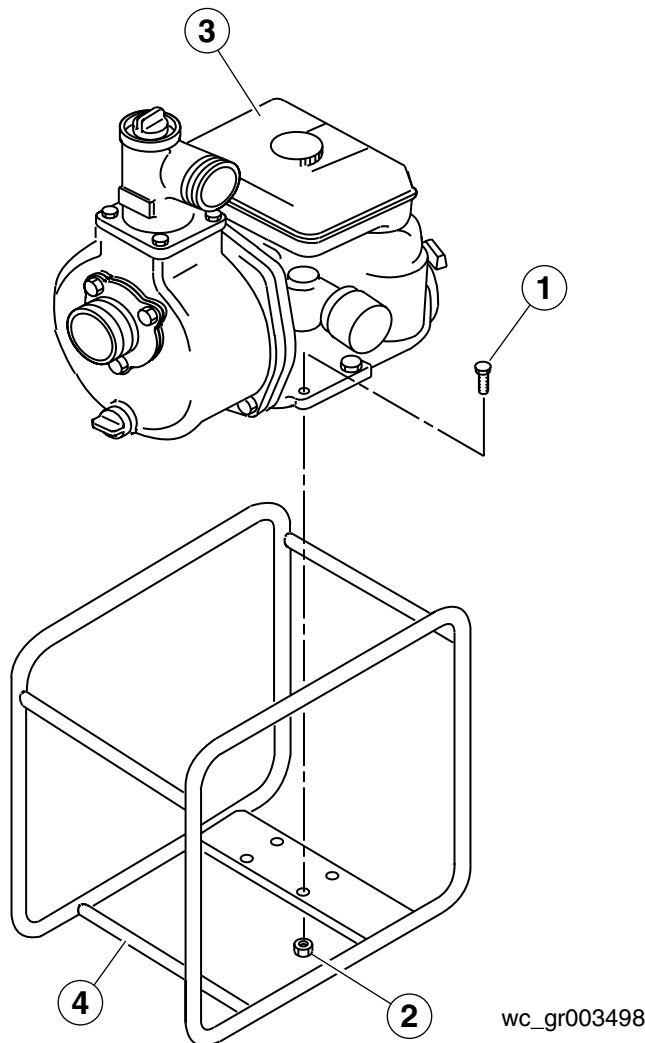
See Graphic: *wc\_gr003498*

Removal:

- 5.9.1 Remove the four screws (1) and nuts (2) that secure the pump/engine (3) to the frame (4).

Installation:

- 5.9.2 Secure the pump/engine (3) to the frame (4) using screws (1) and nuts (2). Apply Loctite 243 or an equivalent medium-strength threadlocker to the screws and torque them to 35 Nm (26 ft.lbs.).



## 5.10 Pump Housing

*See Graphic: wc\_gr003499*

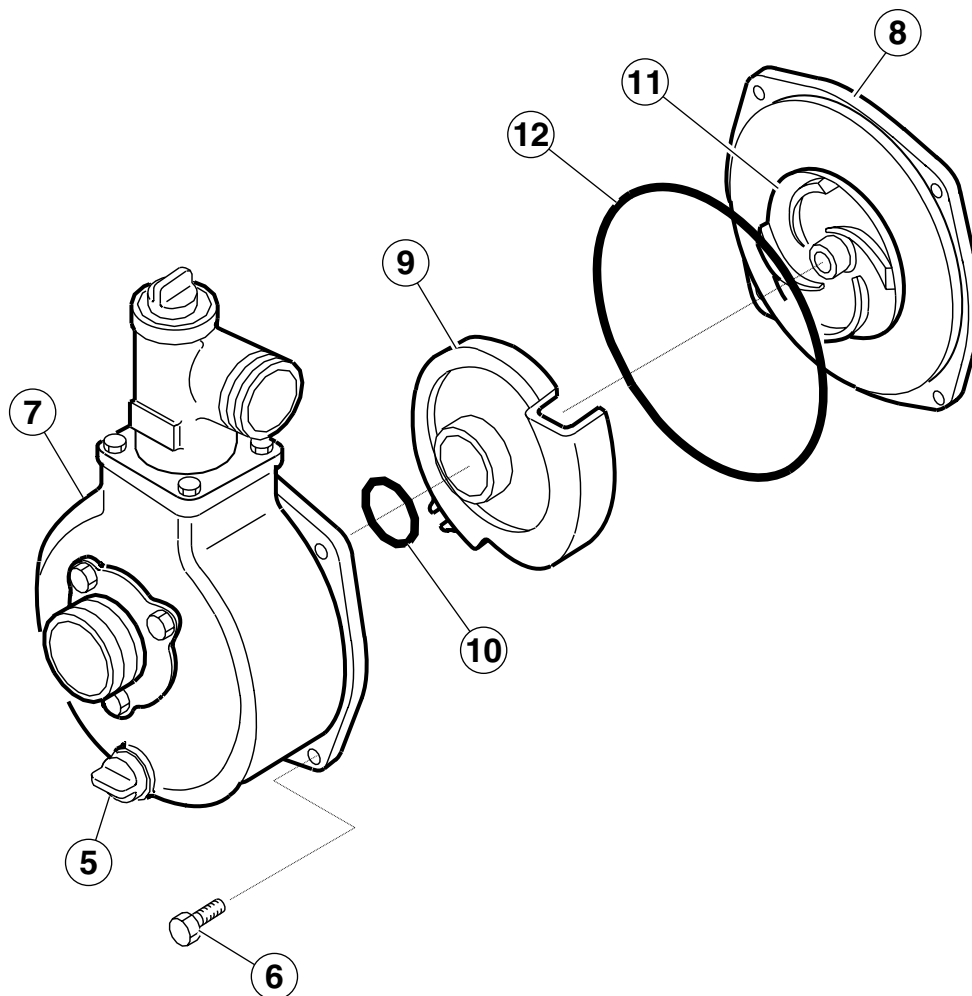
### Removal:

- 5.10.1 Remove the drain plug (5) from the bottom of the pump housing and drain the water from the pump housing.
- 5.10.2 Remove the four screws (6) securing the pump housing (7) to the back pump flange (8).
- 5.10.3 Lightly tap the pump housing with a plastic mallet to break the seal, and remove the pump housing.
- 5.10.4 Thoroughly clean any debris from the pump housing (7), volute (9), and flange (8).
- 5.10.5 Remove the volute (9) and the clean O-ring (10) and the intake port.

### Installation:

- 5.10.6 Check the clearance between the impeller (11) and the volute (9). Add shims as required. See section *Adjusting Impeller Clearance*.
- 5.10.7 Inspect the O-rings (12 and 10). Grease the O-rings lightly before assembly. Make sure the areas where the O-rings seat are clean.
- 5.10.8 Mount the pump housing (7) to the flange (8). Secure evenly with the screws (6). Torque the screws to 37 Nm (26 ft.lbs.).

**Note:** *The pump housing MUST seal flush around the rear flange. Replace the pump flange if it appears warped or bent.*



wc\_gr003499

## 5.11 Impeller

See Graphic: *wc\_gr003500*

**CAUTION:** When replacing either the impeller (1) or the rear pump flange (2), make note of the I.D. numbers found on back of each component casting (3). **MAKE SURE THE REPLACEMENT PARTS HAVE THE SAME NUMBER MARKINGS—THE PARTS ARE NOT INTERCHANGEABLE.**

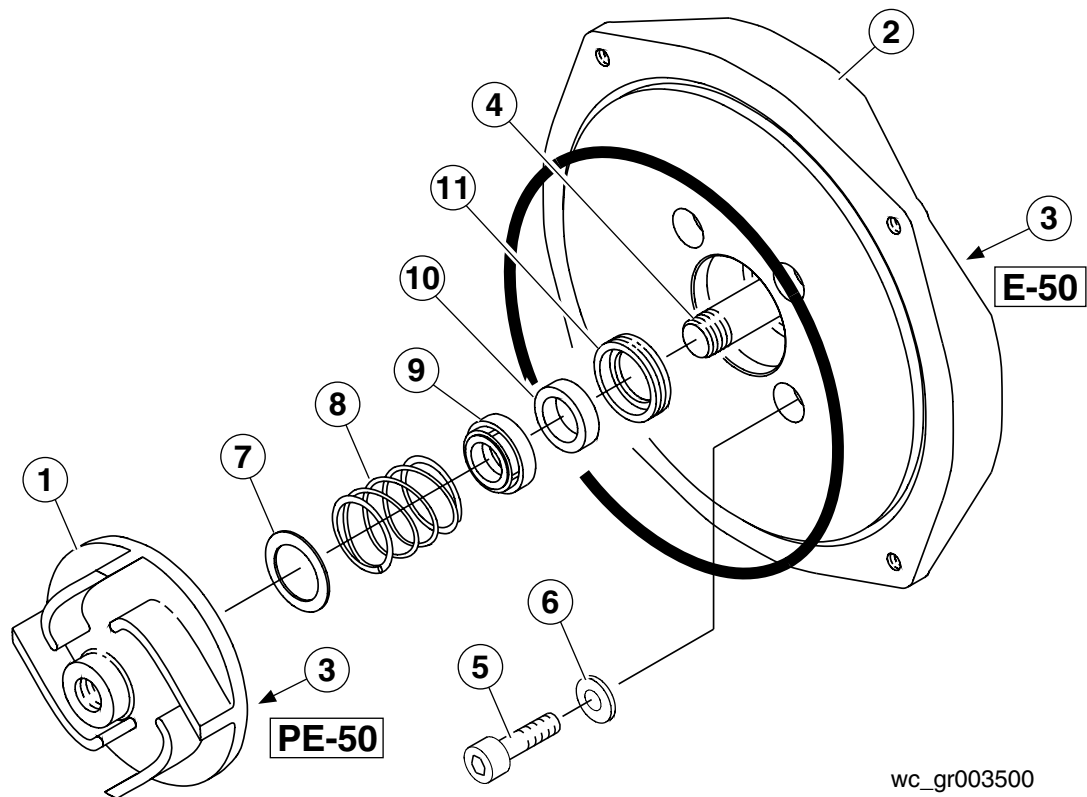
### Removal:

- 5.11.1 Remove the pump housing. See section *Pump Housing*.
- 5.11.2 Unscrew the impeller (1) counterclockwise from the engine shaft (4).
- 5.11.3 **Note:** *If the impeller is hard to remove, tap it with a plastic mallet. Do not lose any adjusting shims when removing the impeller.*
- 5.11.4 Remove the four screws (5) and washers (6) securing the rear pump flange (2) to the engine.

### Installation:

- 5.11.5 Secure the rear pump flange (2) to the engine with the screws (5) and washers (6). Apply Loctite 271 or an equivalent high-strength threadlocker to the screws and torque them to 22 Nm (16 ft.lbs.)  
**Note:** *Install rear pump flange with the drain channel facing down.*
- 5.11.6 Install the mechanical seal. See section *Replacing the Mechanical Seal*.
- 5.11.7 Screw the impeller (1) clockwise onto the engine shaft. **DO NOT** apply any threadlocker to threads of the impeller or the engine shaft.





wc\_gr003500

## 5.12 Replacing the Mechanical Seal

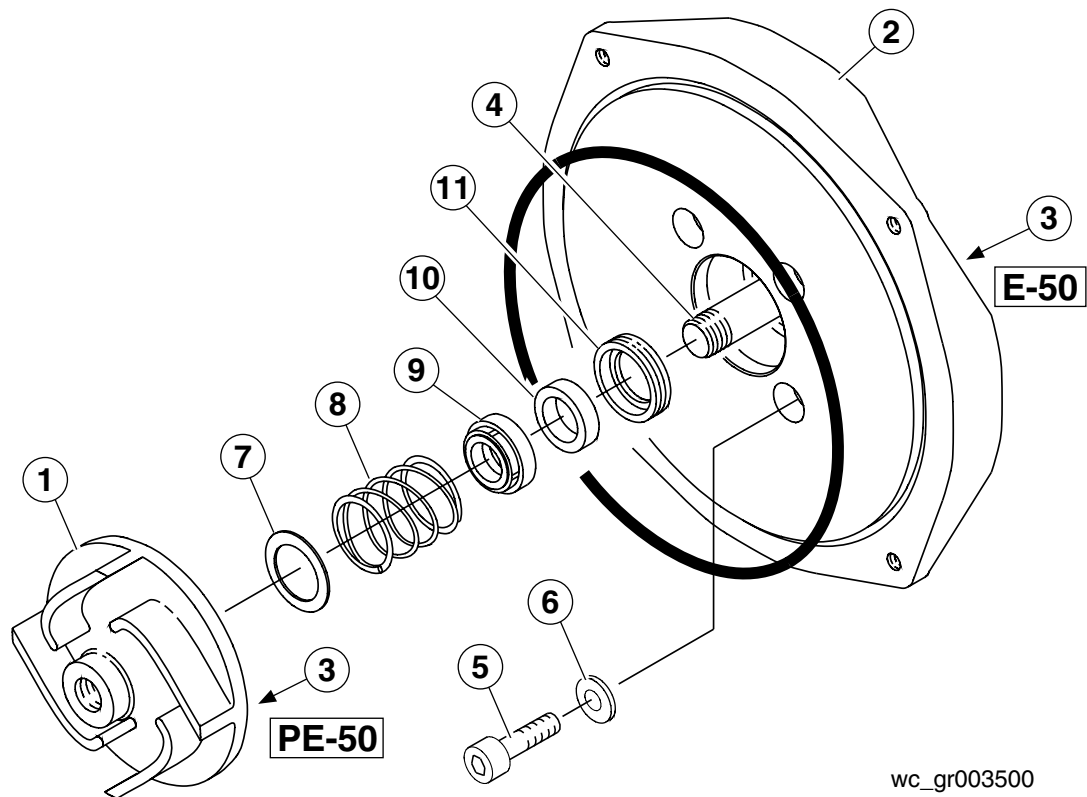
See Graphic: *wc\_gr003500*

Removal:

- 5.12.1 Remove the impeller (1). See section *Impeller*.  
**Note:** *Do not lose any adjusting shims (7).*
- 5.12.2 Remove the mechanical seal spring (8) and the carbon face (9) from the engine shaft.
- 5.12.3 Remove the mechanical seal ceramic face (10) and L-ring (11) from the rear pump flange.

Installation:

- 5.12.4 Clean the engine shaft and remove any rust. Clean the contact surface of the mechanical seal ceramic and carbon faces with a clean cloth. DO NOT lubricate the seal faces.
- 5.12.5 Place the ceramic face (10) in the L-ring (11) and install it in the pump flange.
- 5.12.6 Carefully place the carbon face (9) and the seal spring (8) on the engine shaft.
- 5.12.7 Install the impeller to the engine shaft.



### 5.13 Testing

See Graphic: wc\_gr003501

This procedure requires a vacuum gauge (P/N 28755) and a tachometer.

5.13.1 Fill the pump housing with cold water until it flows out from the discharge port.

5.13.2 Tighten the pump cover and the prime plug.

5.13.3 Bring the engine up to operating speed. Check the engine rpm with the tachometer. See chapter *Technical Data* for engine speeds.

**Note:** *Keep the pump housing filled with water at all times while the pump is running. If too much water is lost during the test procedure, stop the engine and prime the pump. It may be necessary to tilt the pump or partially cover the discharge port, to prevent the water in the pump housing from being lost while still allowing air to be vented.*

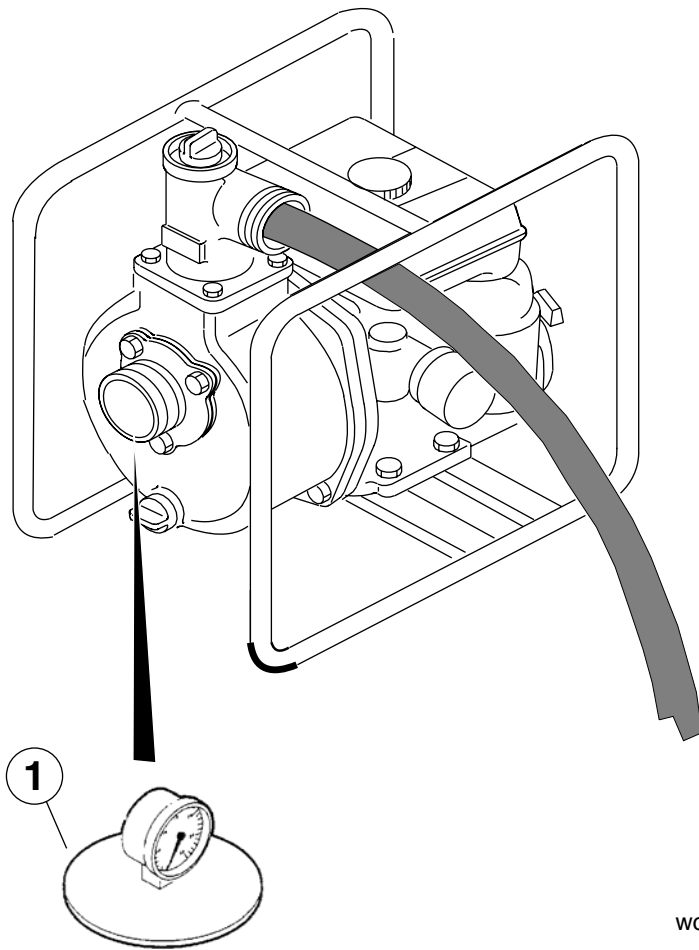
5.13.4 Grease the mounting face of the vacuum gauge (1) to ensure a good seal. Press the gauge over the inlet port.

5.13.5 The gauge reading should slowly climb and then hold steady.

With the gauge still against the inlet port, turn off the engine. The gauge reading should not change.

**Note:** *See the vacuum chart for appropriate gauge readings.*

This test **MUST** be completed within a few minutes of starting the pump to prevent the water in the pump housing from getting hot, which will result in lower readings. If possible, allow cold water to run into the discharge port while testing the pump.



wc\_gr003501



## Threadlockers and Sealants

Threadlocking adhesives and sealants are specified throughout this manual by a notation of “S” plus a number (S#) and should be used where indicated. Threadlocking compounds normally break down at temperatures above 175°C (350°F). If a screw or bolt is hard to remove, heat it using a small propane torch to break down the sealant. When applying sealants, follow instructions on container. The sealants listed are recommended for use on Wacker equipment.

<b>TYPE ( ) = Europe</b>	<b>COLOR</b>	<b>USAGE</b>	<b>PART NO. – SIZE</b>
Loctite 222 Hernon 420 Omnifit 1150 (50M)	Purple	Low strength, for locking threads smaller than 6 mm (1/4”). Hand tool removable. Temp. range: -54 to 149°C (-65 to 300°F)	73287 - 10 ml
Loctite 243 Hernon 423 Omnifit 1350 (100M)	Blue	Medium strength, for locking threads larger than 6 mm (1/4”). Hand tool removable. Temp. range: -54 to 149°C (-65 to 300°F)	29311 - .5 ml 17380 - 50 ml
Loctite 271/277 Hernon 427 Omnifit 1550 (220M)	Red	High strength, for all threads up to 25 mm (1”). Heat parts before disassembly. Temp. range: -54 to 149°C (-65 to 300°F)	29312 - .5 ml 26685 - 10 ml 73285 - 50 ml
Loctite 290 Hernon 431 Omnifit 1710 (230LL)	Green	Medium to high strength, for locking preassembled threads and for sealing weld porosity (wicking). Gaps up to 0.13 mm (0.005”) Temp. range: -54 to 149°C (-65 to 300°F)	28824 - .5 ml 25316 - 10 ml
Loctite 609 Hernon 822 Omnifit 1730 (230L)	Green	Medium strength retaining compound for slip or press fit of shafts, bearings, gears, pulleys, etc. Gaps up to 0.13 mm (0.005”) Temp. range: -54 to 149°C (-65 to 300°F)	29314 - .5 ml
Loctite 545 Hernon 947 Omnifit 1150 (50M)	Brown	Hydraulic sealant Temp. range: -54 to 149°C (-65 to 300°F)	79356 - 50 ml
Loctite 592 Hernon 920 Omnifit 790	White	Pipe sealant with Teflon for moderate pressures. Temp. range: -54 to 149°C (-65 to 300°F)	26695 - 6 ml 73289 - 50 ml
Loctite 515 Hernon 910 Omnifit 10	Purple	Form-in-place gasket for flexible joints. Fills gaps up to 1.3 mm (0.05”) Temp. range: -54 to 149°C (-65 to 300°F)	70735 - 50 ml

## Threadlockers and Sealants

### Threadlockers and Sealants (continued)

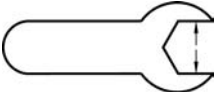

Threadlocking adhesives and sealants are specified throughout this manual by a notation of “S” plus a number (S#) and should be used where indicated. Threadlocking compounds normally break down at temperatures above 175°C (350°F). If a screw or bolt is hard to remove, heat it using a small propane torch to break down the sealant. When applying sealants, follow instructions on container. The sealants listed are recommended for use on Wacker equipment.

<b>TYPE</b> <b>( ) = Europe</b>	<b>COLOR</b>	<b>USAGE</b>	<b>PART NO. –</b> <b>SIZE</b>
Loctite 496 Hernon 110 Omnifit Sicomet 7000	Clear	Instant adhesive for bonding rubber, metal and plastics; general purpose. For gaps up to 0.15 mm (0.006”) Read caution instructions before using. Temp. range: -54 to 82°C (-65 to 180°F)	52676 - 1 oz.
Loctite Primer T Hernon Primer 10 Omnifit VC Activator	Aerosol Spray	Fast curing primer for threadlocking, retaining and sealing compounds. Must be used with stainless steel hardware. Recommended for use with gasket sealants.	2006124-6 oz.



## Torque Values

### Metric Fasteners (DIN)

	TORQUE VALUES (Based on Bolt Size and Hardness)						WRENCH SIZE			
	8.8		10.9		12.9					
Size	Nm	ft.lb.	Nm	ft.lb.	Nm	ft.lb.	Metric	Inch	Metric	Inch
M3	1.2	*11	1.6	*14	2.1	*19	5.5	7/32	2.5	–
M4	2.9	*26	4.1	*36	4.9	*43	7	9/32	3	–
M5	6.0	*53	8.5	6	10	7	8	5/16	4	–
M6	10	7	14	10	17	13	10	–	5	–
M8	25	18	35	26	41	30	13	1/2	6	–
M10	49	36	69	51	83	61	17	11/16	8	–
M12	86	63	120	88	145	107	19	3/4	10	–
M14	135	99	190	140	230	169	22	7/8	12	–
M16	210	155	295	217	355	262	24	15/16	14	–
M18	290	214	405	298	485	357	27	1-1/16	14	–
M20	410	302	580	427	690	508	30	1-1/4	17	–

1 ft.lb. = 1.357 Nm

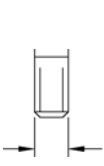
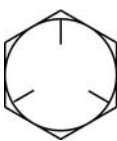
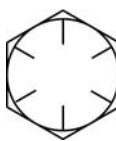
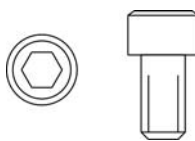
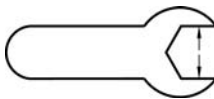

\* = in.lb.

1 inch = 25.4 mm

# Torque Values

## Torque Values (continued)

### Inch Fasteners (SAE)

	 SAE 5		 SAE 8							
Size	Nm	ft.lb.	Nm	ft.lb.	Nm	ft.lb.	Metric	Inch	Metric	Inch
No.4	0.7	*6	1.0	*14	1.4	*12	5.5	1/4	—	3/32
No.6	1.4	*12	1.9	*17	2.4	*21	8	5/16	—	7/64
No.8	2.5	*22	3.5	*31	4.7	*42	9	11/32	—	9/64
No.10	3.6	*32	5.1	*45	6.8	*60	—	3/8	—	5/32
1/4	8.1	6	12	9	16	12	—	7/16	—	3/32
5/16	18	13	26	19	33	24	13	1/2	—	1/4
3/8	31	23	45	33	58	43	—	9/16	—	5/16
7/16	50	37	71	52	94	69	16	5/8	—	3/8
1/2	77	57	109	80	142	105	19	3/4	—	3/8
9/16	111	82	156	115	214	158	—	13/16	—	—
5/8	152	112	216	159	265	195	24	15/16	—	1/2
3/4	271	200	383	282	479	353	—	1-1/8	—	5/8

1 ft.lb. = 1.357 Nm

\* = in.lb.

1 inch = 25.4 mm



