

*Thank You for Selecting  
The Powerful QL Series Truck Loader Vacuum*

## Operator Owner's Manual

### QL2300KO

#### Specifications

##### QL2300KO

ENGINE HP(kW)	23 HP (17.14kW) KOHLER COMMANDER
ENG. WEIGHT	90# (40.8 kg)
ENG. TYPE	TWIN OHV KOHLER ELECTRIC START
MODEL NO.	PA-76559
FUEL CAPACITY	8 qt (7.57L) Remote Tank, Oil Pump
OIL CAPACITY	2.0 qt. (1.9L)
UNIT WEIGHT	266# (120.1 kg)
ELBOW WEIGHT	40# (18.1 kg)
HOSE (w/ nozzle) WEIGHT	59# (26.8 kg)
TOTAL WEIGHT	399 lb (181.3 kg)
SHIPPING WT.	483 lb (219.5 kg)

**BATTERY NOT INCLUDED:** REQUIRES 12 V BATTERY, 40 AH, 240 CCA MIN.  
U1 SERIES GROUP BATTERY FOR PROPER FIT

UNIT SIZE (ASSEMBLED W/EXHAUST, NO HOSE):  
OVERALL WIDTH: 32" (0.81m)

OVERALL LENGTH: 58" (1.47m)  
OVERALL HEIGHT: 74" (1.82m)

#### Optional Accessories

##### INTAKE

**HOSE REPLACEMENT KIT P/N 790211**  
Standard on QL units. [12" (305mm) x 10' (3.0m)]

##### EXHAUST

**EXHAUST HOSE KIT P/N 790114**  
[8" (203mm) x 5' (1.5m)] Quick release coupler and  
flexible steel hose increases exhaust distance.

##### TRAILER

**TRAILER QL P/N 790112**  
Heavy duty spring axle trailer designed for towing your QL.  
Allows unit to be mounted for pickup from rear and both sides.

# IN THE INTEREST OF SAFETY



**BEFORE STARTING ENGINE, READ AND UNDERSTAND THE "ENTIRE OPERATOR'S MANUAL & ENGINE MANUAL."**



**THIS SYMBOL MEANS WARNING OR CAUTION. DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE MAY OCCUR UNLESS INSTRUCTIONS ARE FOLLOWED CAREFULLY.**



## WARNING!

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

## WARNING: DO NOT

- DO NOT** run engine in an enclosed area. Exhaust gases contain carbon monoxide, an odorless and deadly poison.
- DO NOT** place hands or feet near moving or rotating parts.
- DO NOT** store, spill or use gasoline near an open flame, or devices such as a stove, furnace, or water heater which use a pilot light or devices which can create a spark.
- DO NOT** refuel indoors where area is not well ventilated. Outdoor refueling is recommended.
- DO NOT** fill fuel tank while engine is running. Allow engine to cool for 2 minutes before refueling. Store fuel in approved safety containers.
- DO NOT** remove fuel tank cap while engine is running.
- DO NOT** operate engine when smell of gasoline is present or other explosive conditions exist.
- DO NOT** operate engine if gasoline is spilled. Move machine away from the spill and avoid creating any ignition until the gasoline has evaporated.
- DO NOT** transport unit with fuel in tank.
- DO NOT** smoke when filling fuel tank.
- DO NOT** choke carburetor to stop engine. Whenever possible, gradually reduce engine speed before stopping.
- DO NOT** run engine at excessive speeds. This may result in injury & /or damage to unit.

- DO NOT** tamper with governor springs, governor links or other parts which may change the governed engine speed.
- DO NOT** tamper with the engine speed selected by the engine manufacturer.
- DO NOT** check for spark with spark plug or spark plug wire removed. Use an approved tester.
- DO NOT** crank engine with spark plug removed. If engine is flooded, place throttle in "FAST" position and crank until engine starts.
- DO NOT** strike flywheel with a hard object or metal tool as this may cause flywheel to shatter in operation. Use proper tools to service engine.
- DO NOT** operate engine without a muffler. Inspect periodically and replace, if necessary. If engine is equipped with muffler deflector, inspect periodically and replace, if necessary, with correct deflector.
- DO NOT** operate engine with an accumulation of grass, leaves, dirt or other combustible material in the muffler area.
- DO NOT** use this engine on any forest covered, brush covered, or grass covered unimproved land unless a spark arrester is installed on the muffler. The arrester must be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.

**DO NOT** touch hot muffler, cylinder, or fins because contact may cause burns.

**DO NOT** run engine without air cleaner or air cleaner cover.

**DO NOT** operate during excessive vibration!

**DO NOT** leave machine unattended while in operation.

**DO NOT** park machine on a steep grade or slope.

## WARNING: DO



**ALWAYS DO** remove the wire from the spark plug when servicing the engine or equipment TO PREVENT ACCIDENTAL STARTING.

**DO** keep cylinder fins and governor parts free of grass and other debris which can affect engine speed.

**DO** pull starter cord slowly until resistance is felt. Then pull cord rapidly to avoid kickback and prevent hand or arm injury.

**DO** examine muffler periodically to be sure it is functioning effectively. A worn or leaking muffler should be repaired or replaced as necessary.

**DO** use fresh gasoline. Stale fuel can gum carburetor and cause leakage.

**DO** check fuel lines and fittings frequently for cracks or leaks. Replace if necessary

**Follow** engine manufacturer operating and maintenance instructions.

**Inspect** machine and work area before starting unit.

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### SOUND

Sound tests conducted were in accordance with 2000/14/EEC and were performed on 2/14/2002 under the conditions listed:

**NOTE:** Sound power level listed is the highest value for any model in this manual. Please refer to serial plate on the unit for the sound power level for your model.

Sound level of 93 dBA at operator position



113 dB

GENERAL CONDITION: Sunny

TEMPERATURE: 50° F (10° C)

WIND SPEED: 15 MPH (24.1 kmh)

WIND DIRECTION: North

HUMIDITY: 32 %

BAROMETRIC PRESSURE: 30.06" Hg (764mm Hg)

### VIBRATION

VIBRATION LEVEL 0.02g

Vibration levels at the operators handles were measured in the vertical, lateral, and longitudinal directions using calibrated vibration test equipment. Tests were performed on 05/07/98 under the conditions listed:

GENERAL CONDITION: Partly Cloudy

TEMPERATURE: 69° F (20.6° C)

WIND SPEED: 8 MPH (12.8 kmh)

WIND DIRECTION: N

HUMIDITY: 76 %

BAROMETRIC PRESSURE: 29.71" Hg (755mm Hg)

# GENERAL SAFETY

*For your safety and the safety of others, these directions should be followed:*



**Do not operate this machine without first reading owner's manual and engine manufacturer's manual.**



**Use of Ear Protection is recommended while operating this machine.**



**Use of Eye and Breathing protection is recommended when using this machine, especially in dry and dusty conditions.**

**DO NOT** place hands or feet inside nozzle intake opening, near debris outlet or near any moving parts.

**DO NOT** start engine without hose and exhaust elbow connected firmly in place to housing and exhaust outlet.

**DO NOT** allow children to operate this equipment.

**DO NOT** transport unit without elbow retension cable (item 87) assembled.

**DO NOT** operate without discharging exhaust into enclosed container.

**DO NOT** operate during excessive vibration.

**DO NOT** remove hose until engine has been turned off and has come to a complete stop.

**DO NOT** operate machine with hose or exhaust elbow removed.

**DO NOT** use this machine for vacuuming **exclusively** sand, dust, fine dirt, rock, glass, string like material, grain, rags, cans, metal, bark or water.

**DO NOT** operate this machine on slopes greater than 45%(25°).

**DO NOT** pick up any hot or burning debris, or any toxic or explosive material.

**DO NOT** operate this unit freestanding. Unit must be secured in place during any operation.

## ASSEMBLY



**Read all safety and operating instructions before assembling or starting this unit.**



**PUT OIL IN ENGINE BEFORE STARTING.**

**BATTERY NOT INCLUDED WITH UNIT.**

Your Billy Goat is shipped from the factory in one carton and is completely assembled except for the exhaust elbow, nozzle, handle loop for nozzle, hose boom, hose band, hose coupler, hose clamps and related hardware.

1. **SECURELY ATTACH** unit to the bed of a truck or to a trailer, so that the exhaust discharges into an enclosed container. **NOTE:** This unit must be securely mounted to the bed of a truck or to a trailer before operating.

2. **ATTACH** hose to hose coupler, using hose clamp (item 26) **NOTE:** This unit is equipped with a unidirectional hose. Assemble hose so that interior hose material seams face toward unit. Refer to flow direction arrow printed on outside of hose. When installed arrow should point toward vac housing.

3. **ATTACH** hose coupler w/hose to housing intake, that is preassembled to housing front plate, and rotate to lock it in place.

4. **ASSEMBLE** handle loop nozzle (item 45), to nozzle handle (item 44) using capscrew (item 53), and lock nut (item 60). Adjust handle loop to desired height and angle and securely tighten in place.

5. **ASSEMBLE** nozzle handle (item 44), to nozzle (item 25), using screws (item 52), washers (item 66), washers (item 68) and lock nuts (item 60).

8. **ATTACH** assembled nozzle to hose using hose clamp (item 26). Before tightening hose clamp, position nozzle handle upward when hose is stretched to prevent twisting load on hose assembly during operation.

9. **ATTACH** preassembled hose boom on top of housing using a hitch pin (item 10).

10. **ASSEMBLE** hose band (item 29) around hose and secure chain between flanges of the hose band using capscrew (item 53) and lock nut (item 60) Repeat same steps on the other chain. (see ADJUSTING HOSE BOOM on page 6).

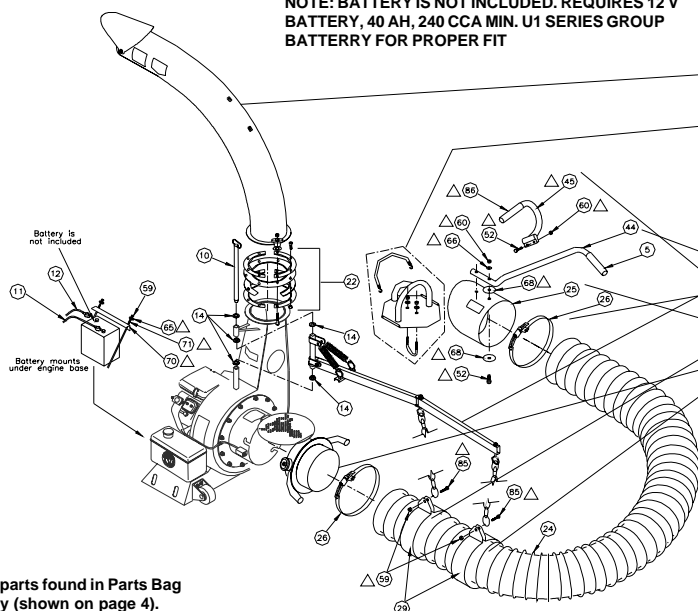
11. **SECURELY ATTACH** exhaust elbow (item 21) capturing both flanges inside the clamp, then firmly tighten the clamp, securing the elbow to the housing (see MOUNTING on page 5).

12. **ASSEMBLE** battery (**not included**) by using battery bracket QL (item no. 70, hold down rods (item 71), washers (item 70), and lock nuts (item 59).

13. **ATTACH** red battery cable to + terminal and black battery cable to - terminal.

## PACKING CHECKLIST

**NOTE: BATTERY IS NOT INCLUDED. REQUIRES 12 V BATTERY, 40 AH, 240 CCA MIN. U1 SERIES GROUP BATTERY FOR PROPER FIT**



△ Denotes parts found in Parts Bag Assembly (shown on page 4).

These items should be included in your carton. If any of these parts are missing, contact your dealer.

Check

### Boxing Checklist

- |                          |  |
|--------------------------|--|
| <input type="checkbox"/> | Exhaust Elbow Assembly                   |
| <input type="checkbox"/> | Nozzle Tray Assembly                     |
| <input type="checkbox"/> | Hose Boom Assembly                       |
| <input type="checkbox"/> | Band Hose Boom 12" (305mm) 790153 Qty. 2 |
| <input type="checkbox"/> | Hose Clamps 12" (305mm) 790150 Qty. 2    |
| <input type="checkbox"/> | Hose Coupler Assy                        |
| <input type="checkbox"/> | Handle Nozzle 811020                     |
| <input type="checkbox"/> | Nozzle QL 790149                         |
| <input type="checkbox"/> | Hose 12"x 10" QL 790148                  |
| <input type="checkbox"/> | Handle Loop Nozzle 811019                |
| <input type="checkbox"/> | Parts Bag & Literature Assy 790297       |
| <input type="checkbox"/> | KOHLER COMMAND PRO 23 HP                 |

Parts Bag & Literature Assy

Engine Manual Per Model

# PARTS BAG & LITERATURE ASSY

## △ PARTS BAG ASSEMBLY CHECKLIST P/N 790229

- |  |   |   |
|--|---|---|
| <b>59</b> Nut Lock 1/4-20<br>8160001 Qty. 4      | <b>68</b> Washer 5/16<br>Fender<br>8172020 Qty. 4 | <b>52</b> Screw Cap 5/16-18 x 1 1/2<br>8041030 Qty. 4 |
| <b>60</b> Nut Lock 5/16-18<br>8160002 Qty. 4     |   |   |
| <b>65</b> Washer Lock 1/4" SAE<br>8172007 Qty. 2 | <b>45</b> Handle Adj. W/<br>Grip 811019<br>Qty. 1 | <b>85</b> Screw Cap 1/4-20 x 1 1/2<br>8041008 Qty. 2  |
| <b>66</b> Washer 5/16 SAE<br>8172008 Qty. 2      |   |   |
| <b>71</b> Rod Battery Hold Down 790231 Qty. 2    | <b>70</b> Bracket Battery QL 790230 Qty. 1        |   |

For  
Mounting  
to a trailer

Screw Cap 3/8-16 x 2 3/4  
8041057 Qty. 4

Nut Lock 3/8-16  
8160003 Qty. 4

Washer 3/8 FC  
8171004 Qty. 8

## Literature Checklist

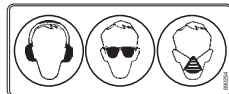
- |   |                                |  |
|---|--------------------------------|--|
| <b>Owner's Manual</b>   | <input type="checkbox"/> Check | <b>Owner's Manual 790294</b>   |
| <b>Literature Parts Bag</b>                                   | <input type="checkbox"/> Check | <b>Literature Parts Bag 790297</b>                                   |
| <b>Warranty Card</b>  | <input type="checkbox"/> Check | <b>Warranty Card 400972</b>  |
| <b>EU Declaration of Conformity &amp; EU Distributor List</b> | <input type="checkbox"/> Check | <b>EU Declaration of Conformity &amp; EU Distributor List 790162</b> |

## INSTRUCTION LABELS

These labels should be included on your Quiet Loader. If any of these labels are damaged, replace them before putting this equipment into operation. Item and part numbers are given to help in ordering replacement labels.



Label Danger Keep Hands and Feet Away  
Item 3  
Part No. 400424



Label Ear Eye Breathing  
Item No. 49 Part No. 890254



Label Danger Flying Material  
Item No. 43 Part No. 810736



Label Warning Secure  
Item No. 72 Part No. 790232



Label QL Instruct/Warn  
Item 18 Part No. 790142



Label Read Owner's Manual  
Item No. 50  
Part No. 890301



Label Secure Nozzle  
Item No. 42 Part No. 790301



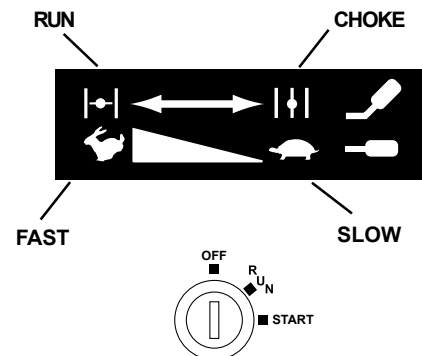
Label On Off  
Item 77  
Part No. 830276



Label Do Not Fill While Engine Is Hot  
Item 1 Part No. 400268

## CONTROLS

### Control Panel



## ENGINE LABELS

**IMPORTANT ENGINE INFORMATION**  
THIS ENGINE MEETS U.S. EPA 2004 AND CALIFORNIA 2006 AND LATER EMISSION CONTROL REGULATIONS FOR S1 SOR2  
FAMILY 1KHXS.7252GC  
DISPLAY (CC) 674  
MODEL NO. CH23S  
SPEC NO. 76559  
SERIAL NO. 3133205181

**EMISSION COMPLIANCE PERIOD:**  
EPA CATEGORY A CARB: EXTENDED  
THIS ENGINE IS CERTIFIED TO OPERATE ON UNLEADED GASOLINE  
REFER TO OWNER'S MANUAL FOR SAFETY, MAINTENANCE SPECS AND ADJUSTMENTS  
FOR SALES/SERVICE IN US/CANADA, CALL:

1-800-544-2444  
www.kohlerengines.com

**KOHLER engines**  
KOHLER CO. KOHLER WISCONSIN USA

**OIL COOLER MAINTENANCE**  
Oil cooler must be kept free of debris.  
Inspect and clean every 25 hours, more frequently under severe conditions.



# OPERATION

**INTENDED USE:** This machine is designed for vacuuming leaves, grass clippings and other types of organic litter. Debris mixed with cans, bottles and small amounts of sand can be vacuumed; however, it is not this machine's primary purpose. Vacuuming cans, bottles and sand will affect the longevity of your machine.

Do not operate if excessive vibration occurs. If excessive vibration occurs, shut engine off immediately and check for damaged or worn impeller, loose impeller bolt, loose impeller key, loose engine or lodged foreign objects. Note: See parts list for proper impeller bolt torque specifications. (See trouble shooting section on page 12).



Like all mechanical tools, reasonable care must

be used when operating machine.

## MOUNTING

Main unit



**GENERAL:** Unit must be securely mounted to a trailer, truck bed, or other similar surface before use. Do not use this unit in a freestanding position. Unit is not stable until it has been secured in place.

Secure unit by bolting through the base of the unit and through the mounting surface using 3/8" dia. bolts, with washers and locking nuts (see fig. 1)

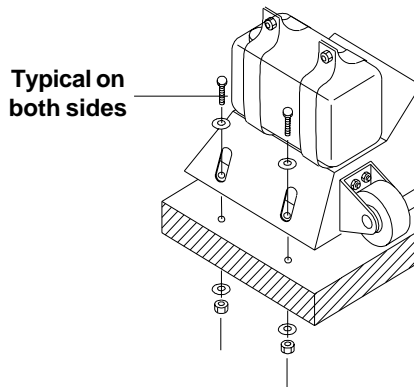


Fig. 1

**MOUNTING:** Unit can be mounted in various positions. Figure 2 illustrates the mounting options available when using the optional trailer (Billy Goat Part no. 790112) available from your Billy Goat dealer. The unit can be mounted to allow vacuuming from either sides as well as from the rear.

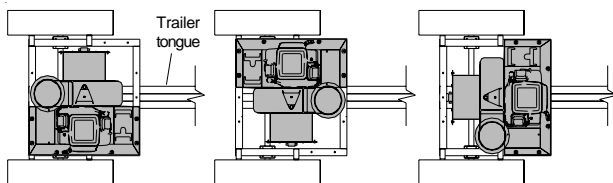


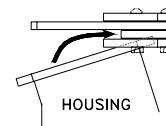
Fig. 2

## MOUNTING

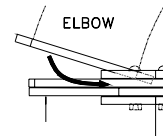
Exhaust elbow

### INSTRUCTIONS:

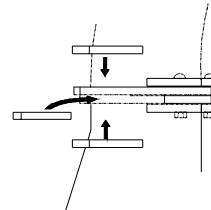
- 1) Remove the loose hardware from the clamp assembly so that there are 4 separate pieces (remaining clamp assembly, two half plates, and a plate split).
- 2) Slide the assembled plates over the housing flange. The flange should rest between the bottom plate and the plate split.



- 3) Slide the elbow over the plate spacer and center it in the clamp. The elbow flange should now be resting on the housing flange between the plate split and the top plate.

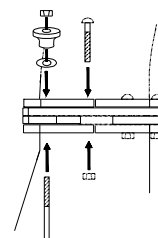


- 4) Insert the other plate split beneath the plate spacer so the holes align and the plate overlaps the flange on the elbow.



- 5) Secure the assembly with a plate half on top of the elbow flange and a plate half on bottom of the housing flange using 3, 1" carriage bolts and 3 lock nuts (removed hardware in step 1).

- 6) Tighten down the clamp with 2, 1 3/4" carriage bolts, 2 knobs, and 2 lock nuts (removed hardware in step 1).





## OPERATION continued

### STARTING



**PUT OIL IN ENGINE BEFORE STARTING.**

**Inspect machine work area and machine before operating. Make sure that all operators of this equipment are trained in general machine use and safety.**



**ENGINE:** See engine manufacturer's instructions for type and amount of oil and gasoline used. Engine must be level when checking and filling oil and gasoline.

**ENGINE SPEED:** Controlled by throttle lever on the vac housing. Under normal conditions, operate at minimum throttle to accomplish your current cleaning task.

**INTAKE HOSE:** Hose mounting assembly must be properly attached to vac housing and safety switch must be engaged before engine will start. Note: Any damage to the switch or wiring harness will prevent engine from starting.

**CHOKE:** Located on the vac housing as part of the engine control panel.

**THROTTLE:** Move throttle control to fast position.

**KEY SWITCH:** Turn to start position until engine begins to fire, immediately release the key to the run position.

**Note:** Do not hold key in start position more than 10 seconds per attempt.

#### **IF YOUR UNIT FAILS TO START:**

See Troubleshooting on page 12. Also see engine owner's manual.

### OPERATION



**DO NOT OPERATE UNLESS  
DEBRIS IS DISCHARGING  
INTO AN ENCLOSED  
CONTAINER**



**KEEP ENGINE CLEAN OF DEBRIS**

**EXHAUST DIRECTION & DISTANCE:** Exhaust direction and distance are controlled by the angle of the exhaust deflector and by rotation of the exhaust elbow. Adjust the angle of the exhaust deflector to control the distance that debris is discharged. Typically debris is aimed to discharge to the rear of the container. The direction of discharge is adjusted by loosening the knobs on the exhaust elbow clamp and rotating the elbow to the desired direction.

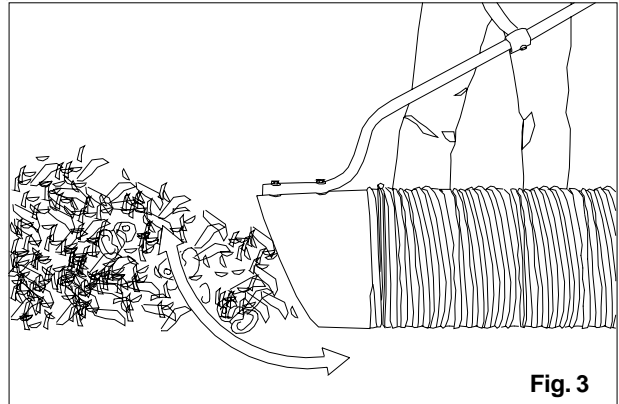
**NOTE:** Elbow is heavy. Use caution when adjusting. Never stand directly under the elbow while adjusting direction of exhaust.

**⚠ Never adjust exhaust deflector angle or direction of discharge while unit is running.**

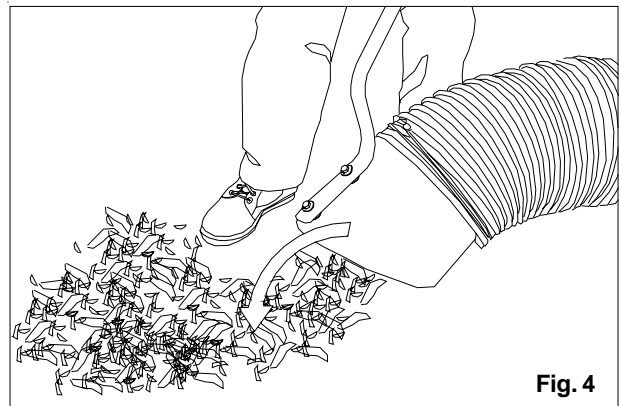
**⚠ Never direct exhaust into an area where bystanders may cross the path of the debris.**

**INTAKE OPERATION:** With machine running and fully assembled, move the nozzle in sweeping motions over debris. Always allow air to flow into the nozzle along with the debris. Do not completely block the nozzle when vacuuming, it will reduce performance, and increase clogging (See figure 3).

For removal of heavier debris, or debris that is stuck to the ground, rock nozzle forward to concentrate suction power around the debris (See figure 4).



**Fig. 3**



**Fig. 4**

### HOSE CARE & USE TIPS

**THE HOSE IS A REPLACEABLE WEAR ITEM.**

**FOR BEST HOSE OPERATION RESULTS, FOLLOW THESE RECOMMENDATIONS.**

Be sure the hose is correctly installed by checking that the arrow printed on the hose indicating flow direction is pointing toward the vac housing.

Keep hose as straight as possible and avoid sharp bends during operation for best pick-up and to avoid clogs.

Never drag hose. Always remove and store hose before transporting unit.

Store hose straight and flat to maintain flexibility for next use.

To increase hose life, periodically rotate hose and reposition nozzle and coupler on front plate of unit. This increases hose life by keeping hose from wearing only on one side.

### ADJUSTING HOSE BOOM:

Properly adjusting the boom will prevent most hose clogs from occurring and will maximize vacuum performance by keeping the hose straight and perpendicular to the housing (see fig. 5).

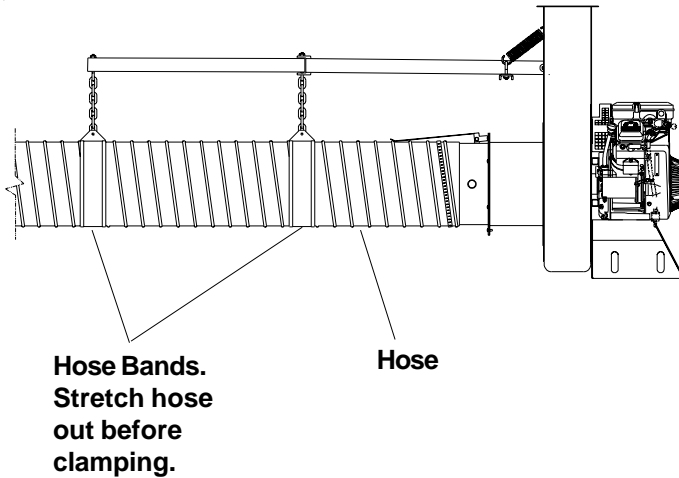


Fig. 5

### UNCLOGGING A CLOGGED HOSE:



With engine running and unit secured to a trailer, truck bed, or other similar surface, fully stretch hose in a straight line to dislodge the clog. If the clog will not clear, turn unit off, and allow engine to come to a complete stop. Remove hose and manually clear hose clog.

**NOTE:** The clogged debris may be sharp. Always wear durable gloves when removing clog.

### UNCLOGGING A CLOGGED HOUSING OR EXHAUST ELBOW:



Turn engine off and wait for impeller to come to a complete stop. Disconnect spark plug wires and battery cables. Remove the hose coupler from the housing and determine where the clog is located. If possible clear the clog through the intake opening. It may require removal of the intake adaptor (item 33) to allow access to clear the housing. If clog is in the elbow, carefully remove the elbow. Remove elbow by removing the knobs on the elbow clamp. Then remove 3 bolts so that the split plate can be taken out. Finally, the elbow can be removed by sliding it past the remaining attached clamp.

**NOTE:** Elbow is very heavy. Do not stand directly under elbow during removal.

**Danger,** the clog may contain sharp materials. Wearing durable gloves, clear the clog. Reconnect spark plug wire.

## HANDLING & TRANSPORTING

The unit is equipped with small front wheels to allow for easier transportation to storage. With unit removed from its mounting, tilt unit forward toward the ground and use wheels to maneuver it into storage area.



**ALWAYS ATTACH NOZZLE TO THE TRAY BEFORE TRANSPORTING UNIT**



## STORAGE

Drain all fuel prior to storage.



Never store engine indoors or in enclosed poorly ventilated areas with fuel in tank, where fuel fumes may reach an open flame, spark or pilot light, as on a furnace, water heater, clothes dryer or other gas appliance.

**If engine is to be unused for 30 days or more, prepare as follows:**



Be sure engine is cool. Do not smoke. Remove all gasoline from carburetor and fuel tank to prevent gum deposits from forming on these parts and causing possible malfunction of engine. Drain fuel outdoors, into an approved container, away from open flame. Run engine until fuel tank is empty and engine runs out of gasoline.

**NOTE:** Fuel stabilizer (such as Sta-Bil) is an acceptable alternative in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow mix ratio found on stabilizer container. Run engine at least 10 min. after adding stabilizer to allow it to reach the carburetor.



**HOSE STORAGE:** Store hose as straight and flat as possible. Storing hose in a covered area, out of sunlight and heat will prolong hose life. Do not store hose where it could be stepped on or where other objects could crush or damage hose.

## MAINTENANCE



**USE ONLY A QUALIFIED MECHANIC FOR ANY ADJUSTMENTS, DISASSEMBLY OR ANY KIND OF REPAIR.**



**WARNING: TO AVOID PERSONAL INJURY, ALWAYS TURN MACHINE OFF, MAKE SURE ALL MOVING PARTS COME TO A COMPLETE STOP.**



**DISCONNECT SPARK PLUG WIRES & BATTERY CABLES BEFORE SERVICING UNIT.**



**ENGINE: SEE ENGINE MANUFACTURER OPERATOR'S INSTRUCTIONS.**



**RECONNECT ALL GUARDS GUARDS AND HOSE BEFORE STARTING ENGINE.**



**USE ONLY BILLY GOAT ORIGINAL EQUIPMENT PARTS FOR REPLACEMENT AND REPAIR**

### GENERAL

Replace any worn or damaged parts as required.

**DO NOT** operate if excessive vibration occurs. If excessive vibration occurs, shut engine off immediately. Remove spark plug wire and check for damaged impeller, loose impeller bolt, loose impeller key or lodged foreign objects. Refer to parts list (item 16) on page 11 for proper torque specifications.

### ENGINE

Remove and Service foam air cleaner and inner air filter every 25 hours of use or every 10 hours or less for extremely dusty conditions (see engine manual).

Keep engine and engine cooling fins clean from dust and debris build-up.

When servicing engine refer to specific manufacturers engine owner's manual. All engine warranty is covered by the specific engine manufacturer. If your engine requires warranty or other repair work contact your local servicing engine dealer. When contacting a dealer for service it is a good idea to have your engine model number available for reference(See table page 1). If you can not locate a servicing dealer in your area you can contact the manufacturers national service organization.

To reach:

**KOHLER ENGINES:** 800-544-2444  
[www.kohlerengines.com](http://www.kohlerengines.com)

## IMPELLER REMOVAL

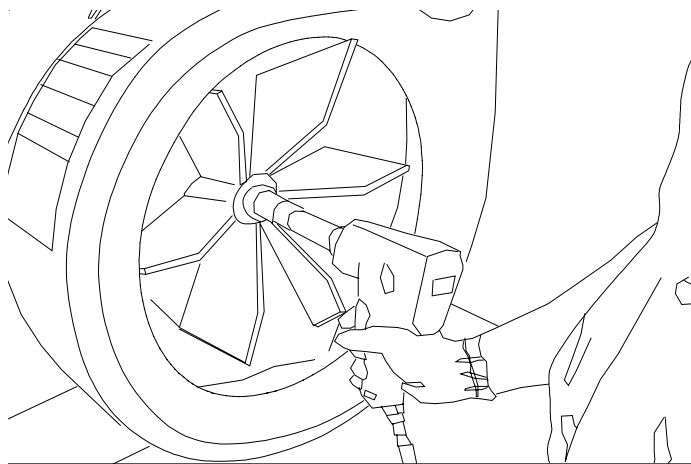
1. Wait for engine to cool and disconnect spark plugs from the both sides of the engine.
2. Disconnect the negative battery cable (black) (item 12) from the battery.
3. Remove the hose coupler assy from the unit (item 36).
4. Remove the hose boom assembly.
5. Remove the intake housing assembly (item 33) using 1/2" socket and socket wrench to remove (12) locknuts and washers (item 60 & 63). Be careful to place intake assembly to the side without putting excess strain on safety switch wire harness
6. Remove impeller bolt and lock washer using 5/8" socket and impact wrench (see fig. 6).
7. Once bolt is removed impeller should slide out freely. If impeller will not slide free on crankshaft, obtain a 3/4"-10 x 3" bolt and thread it into the nut that is welded onto the center of the impeller and tighten slowly to push the impeller off the crankshaft.

**Note:** 3/4"-10 x 3" bolt is included in each impeller replacement kit or the bolt can be ordered from your local Billy Goat Dealer (part no. 790214).

8. When impeller is free of the engine shaft, align impeller with the opening and pull it straight out of the housing.
9. Using a new impeller bolt, washer, and lockwasher, reinstall new or repaired impeller in reverse order.

**Note:** Be sure spacer is in place behind impeller before tightening.

10. Tighten impeller bolt. Torque impeller bolt to [ 60 Ft. Lbs. (81.4 N-m)].
11. Repeat steps 2 through 5 in reverse order.
12. Reinstall spark plug wires.



**Fig. 6**



## MAINTENANCE continued

### ***Maintenance Schedule***

Follow these hourly maintenance intervals.

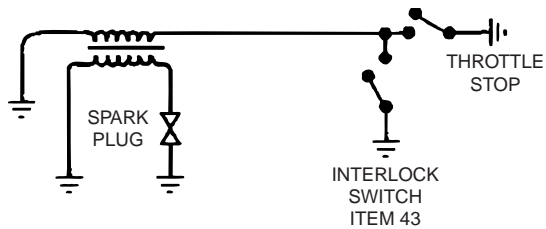
<b><i>Maintenance Operation</i></b>	<b>Every Use</b>	<b>Every 5 hrs or (Daily)</b>	<b>Every 10 hrs</b>	<b>Every 25 hrs</b>
Engine (See Engine Manual)				
Inspect battery for damage or leak			●	
Check battery terminal for corrosion				●
Check for excessive vibration		●		
Clean Hose	●			
Keep engine free of debris	●			
Inspect for loose parts		●		
Inspect for worn or damaged parts		●		

## MAINTENANCE HISTORY

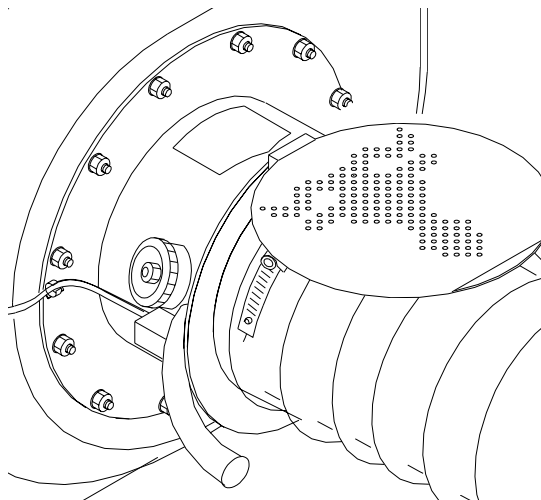
[illegible]

## INTERLOCK SYSTEM

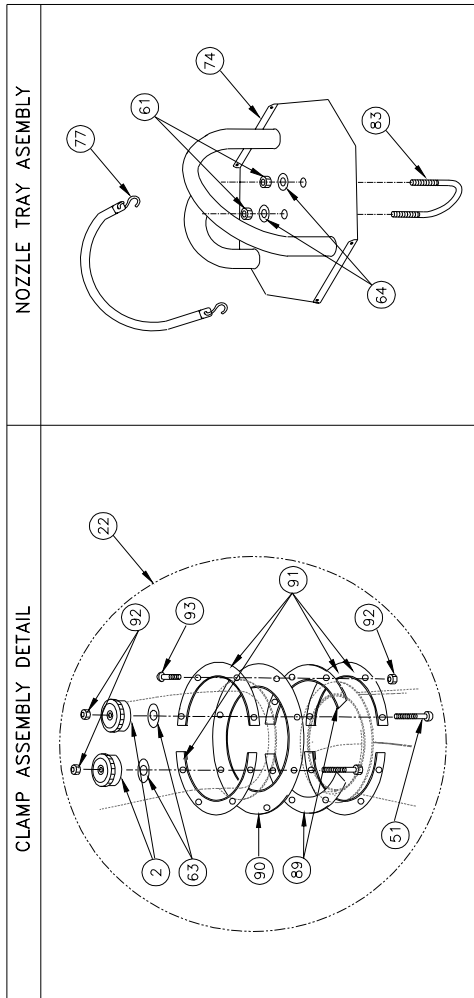
With hose coupler installed (as shown in Fig. 4) the switch is open & engine is not grounded out, allowing engine to run.



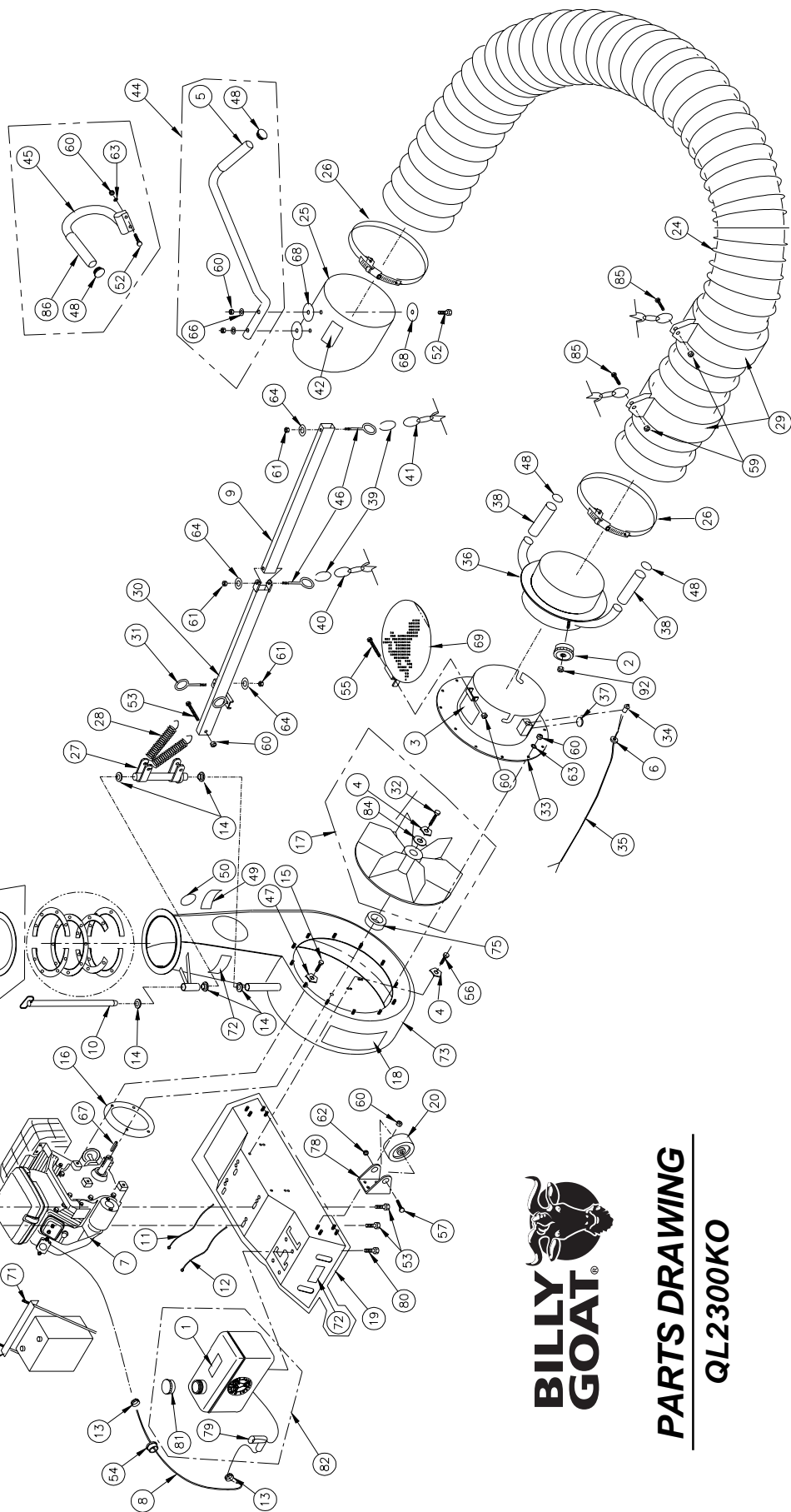
Hose must be installed and switch lever must engage switch for engine to start.



**Fig. 8**



NOTE:  
 1. BATTERY IS NOT INCLUDED.  
 REQUIRES 12V BATTERY, 40 AH,  
 240 CCA MIN. U1 SERIES GROUP  
 BATTERY FOR PROPER FIT  
 2. BATTERY MOUNTS UNDER  
 ENGINE BASE.



## PARTS DRAWING

### QL2300KO

## Parts List

\* Denotes standard hardware item that may be purchased locally.

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	400268	LABEL HOT ENGINE	1
2	400339	KNOB	3
3	400424	LABEL OPEI WARNING	3
4	850132	WASHER TWISTED LOCK 7/16"	5
5	500267	GRIP HANDLE	1
6	500282	STRAIN RELIEF HEYCO 1244	1
7	790275	ENGINE 23 HP HORIZ. KOHLER COMMAND PRO	1
8	790129	LINE FUEL QL	1
9	790263	TUBE BOOM ARM QL	1
10	790271	PTN 5/8 X 15.5 QL	1
11	790132	CABLE BATTERY RED 26"	1
12	790133	CABLE BATTERY BLACK 10"	1
13	790134	CLAMP FUEL LINE	2
14	510185	BUSHING NYLON 0.625	5
15	790307	SCREWCAP 7/16-14 x 2" GR. 5	4
16	790293	PLATE RING SPACER QL KOHLER	1
17	790103-S	IMPELLER 16" x 1.12" ASSY QL (INCL. 4, 32, 84)	1
18	790142	LABEL QL INSTRUCT/WARN	1
19	790143-S	BASE ENGINE ASSY QL (INCLUDES 72)	1
20	790144	WHEEL 4" DIA. X 2" W/SPANNER	2
21	790145-S	ELBOW 8" ASSY QL (INCLUDES 2, 3, 43)	1
22	790255-S	CLAMP ASSEMBLY	1
23	790147	DEFLECTOR EXHAUST QL	1
24	790211	HOSE 12" x 10' INTAKE W/WEARSTRIP	1
25	790149	NOZZLE INTAKE 12" FORMED	1
26	790150	CLAMP HOSE 12"	2
27	790270	BOOM HINGE WA QL	1
28	790152	SPRING BOOM QL	2
29	790153	BAND HOSE BOOM 12" FORMED	1
30	790267	ARM BOOM WA QL	2
31	790291	BOLT EYE 3/8" x 2.5"	1
32	500188	SCREWCAP 7/16-20X2" GR. 8 [TORQUE 60 ft. lb. (81.4Nm)]	1
33	790288	INTAKE HOUSING ASSY (INCL. 3, 6, 34, 35, 37, 55, 60, 63, 69)	1
34	890440	PLUNGE SWITCH	1
35	790305	HARNES WIRE ASSY QL23 KO	1
36	790289	HOSE INTAKE ASSY QL (INCL. 2, 38, 48, 92)	1
37	811123	PLUG 3/4"	1
38	790179	GRIP 1" ID x 4" LG	2
39	811160	LINKAGE 1/4" CHAIN	2
40	790306	CHAIN 5 LINKS	1
41	790189	CHAIN HANG HOSE QL	1
42	790301	LABEL WARNING NOZZLE	1
43	810736	LABEL FLYING DEBRIS	1
44	811020	HANDLE NOZZLE W/ GRIP	1
45	811019	HANDLE ADJ. NOZZLE W/ GRIP	1
46	790290	BOLT EYE 3/8" X 5"	2
47	850132	WASHER LOCK 7/16 TWIST	4
48	890132	PLUG RD 1"	4
49	890254	LABEL EAR EYE BREATHE	1
50	890301	LABEL READ	1

ITEM NO.	PART NO.	DESCRIPTION	QTY
51	*8024044	BOLT CARRIAGE 5/16-18 x 2	2
52	*8041030	SCREWCAP 5/16-18 x 1 1/2	4
53	*8041031	SCREWCAP 5/16-18 x 1 3/4	4
54	790310	GROMMET 1" x 3/4" I.D.	1
55	*8024050	BOLT CARR. 5/16 - 18 x 3 1/2	1
56	*8041051	SCREW CAP 3/8 - 16x 1 1/4	4
57	*8041104	SCREWCAP 1/2-13 x 3 1/2"	2
58			
59	*8160001	NUT LOCK 1/4"-20 HEX Z/P	3
60	*8160002	NUT LOCK 5/16-18	31
61	*8160003	NUT LOCK 3/8	5
62	*8161044	NUT LOCK 1/2-13 THIN	2
63	*8171003	WASHER 5/16 FLAT CUT	22
64	*8171004	WASHER FLAT 3/8	2
65	8172007	WASHER 1/4"SAE 9/32"x5/8"x1/16"	2
66	*8172008	WASHER 5/16 SAE	2
67	*9201125	KEY 1/4 x 2 3/4	1
68	*8172020	WASHER 5/16 FENDER	4
69	790298	DOOR FLAPPER INTAKE QL23	1
70	790230	BRACKET BATTERY QL	1
71	790231	ROD BATTERY HOLD DOWN	2
72	790232	LABEL WARNING SECURE	3
73	790105	HOUSING ASSY QL	1
74	790285	TRAY NOZZLE WA QL23KO	1
75	790311	SPACER - IMPELLER QL 23	1
76			
77	790303	BUNGEE CORD BLACK 14"	1
78	790228	BRACKET WHEEL QL	2
79	790240	90 DEGREE ELBOW 1/8" NPT MALE X 1/4"	1
80	*8041026	SCREWCAP 5/16-18 X 3/4 HCS ZP	4
81	790258	CAP TANK FUEL 3 GAL	1
82	790257	TANK FUEL 3 GAL ASSY	1
83	790204	U-BOLT 3/8" -16 - X 3	1
84	850443	WASHER PLATE IMPELLER	1
85	8041008	SCREWCAP 1/4-20 x 1 1/2	1
86	500267	GRIP HANDLE 1" x 7.5"	1
87			
88			
89	790254	PLATE CLAMP SPLIT	2
90	790253	PLATE CLAMP SPACER	1
91	790252	PLATE CLAMP HALF	4
92	8161041	LOCK NUT 5/16-18 THIN ZP	8
93	8024041	BOLT CARRIAGE 5/16-1 1/4" ZP	6

# TROUBLESHOOTING

*Before Requesting Service Review These Suggestions*


Problem	Possible Cause	Solution
Engine will not start. (starter does not turn)	<ul style="list-style-type: none"> <li>- Battery is low or dead.</li> <li>- Battery cable is disconnected or battery terminal is corroded.</li> <li>- Hose coupler is not installed, allowing interlock switch to operate.</li> <li>- Harness wire is bad or disconnected from interlock switch.</li> </ul>	<ul style="list-style-type: none"> <li>- Charge battery or replace if the battery does not hold charge.</li> <li>- Clean battery terminal and cable then reconnect.</li> <li>- Install hose coupler securely to the unit and check whether interlock switch is engaged by lever.</li> <li>- Check harness wire connection and replace if necessary.</li> </ul>
Engine will not start. (starter turns)	<ul style="list-style-type: none"> <li>- Throttle stop switch in idle position.</li> <li>- Out of gasoline. Bad or old gasoline.</li> <li>- Spark Plug wire disconnected.</li> <li>- Dirty air cleaner.</li> </ul>	<ul style="list-style-type: none"> <li>- Check throttle.</li> <li>- Check gasoline, Replace if gasoline is old.</li> <li>- Connect spark plug wire.</li> <li>- Clean or replace air cleaner. Or contact a qualified service person.</li> </ul>
Will not vacuum or has poor vacuum performance.	Nozzle height too high or too low. Clogged hose or exhaust. Excessive quantity of debris.	Adjust nozzle position. Unclog hose or exhaust (see page 6). Allow air to feed with debris.
Abnormal vibration.	Loose or out of balance impeller or loose engine.	Check impeller and replace if required. Check Engine.
Engine is locked, will not turn over.	Debris locked inside impeller. Engine problem.	See page 6, Clearing a clogged impeller housing. Contact an engine servicing dealer for engine problems.

## Engine Service and Warranty


Contact your nearest engine manufacturer's authorized servicing dealer.

### Serial Plate

Record your machine model, serial number and date-of-purchase and where purchased



1803 S. Jefferson  
P.O. Box 308  
Lee's Summit,  
MO 64063 / USA  
Tel (816) 524-9666  
Fax (816) 524-6983



**113 dB**

Model

Serial No.

Unit(Weight)

lbs.
  kg

Engine Power

kW
  rpm

Purchase  
Date \_\_\_\_\_

Purchased  
from \_\_\_\_\_

## WARRANTY PROCEDURE

Please fill in the WARRANTY CARD and send the upper part to Billy Goat. The WARRANTY terms are stated on the lower part which remains with the user. Whenever a Billy Goat Machine is faulty due to a defect in material and / or workmanship, the owner should make a warranty claim as follows:

The Machine should be taken to the dealer from whom it was purchased or to an authorized Billy Goat dealer.

The owner should present the remaining half of the Warranty Registration Card, or, if this is not available, the invoice or receipt.

The Warranty Claim will be filled in by the authorized Billy Goat Dealer, who will send it with the faulty part to Billy Goat headquarters.

The Quality / Service department at Billy Goat headquarters will study the claim and parts and will notify their conclusions.

The decision by the Quality / Service department at Billy Goat headquarters to approve or reject a Warranty claim is final and binding.

**Note:** To process a Warranty Claim, it is necessary to quote the Model & Serial number who are printed on the Billy Goat Serial Plate.



**BILLY GOAT INDUSTRIES INC.**  
1803 S.W. JEFFERSON STREET / LEE'S SUMMIT, MO 64082-2312 / USA  
PHONE: 816-524-9666 FAX: 816-524-6983 [www.billygoat.com](http://www.billygoat.com)