

Operator's Manual

Rammer BS 50-4s



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Original instructions

This Operator's Manual presents the original instructions. The original language of this Operator's Manual is American English.

Foreword

SAVE THESE INSTRUCTIONS—This manual contains important instructions for the machine models below. These instructions have been written expressly by Wacker Neuson Production Americas LLC and must be followed during installation, operation, and maintenance of the machines.

Machine	Item Number	Rev
BS 50-4s	5000620071	209 and above
	5000620811	208 and above
	5000620322	100 and above
	5000620818	100 and above

Machine documentation

- From this point forward in this documentation, Wacker Neuson Production Americas LLC will be referred to as Wacker Neuson.
- 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.
- Refer to the separate Repair Manual for detailed instructions on servicing and repairing the machine.
- If you are missing any of these documents, please contact Wacker Neuson to order a replacement or visit www.wackerneuson.com.
- When ordering parts or requesting service information, be prepared to provide the machine model number, item number, revision number, and serial number.

Expectations for information in this manual

- This manual provides information and procedures to safely operate and maintain the above Wacker Neuson model(s). For your own safety and to reduce the risk of injury, carefully read, understand, and observe all instructions described in this manual.
- Wacker Neuson expressly reserves the right to make technical modifications, even without notice, which improve the performance or safety standards of its machines.
- The information contained in this manual is based on machines manufactured up until the time of publication. Wacker Neuson reserves the right to change any portion of this information without notice.

CALIFORNIA Proposition 65 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

Foreword

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

Manufacturer's approval

This manual contains references to *approved* parts, attachments, and modifications. The following definitions apply:

- **Approved parts or attachments** are those either manufactured or provided by Wacker Neuson.
- **Approved modifications** are those performed by an authorized Wacker Neuson service center according to written instructions published by Wacker Neuson.
- **Unapproved parts, attachments, and modifications** are those that do not meet the approved criteria.

Unapproved parts, attachments, or modifications may have the following consequences:

- Serious injury hazards to the operator and persons in the work area
- Permanent damage to the machine which will not be covered under warranty

Contact your Wacker Neuson dealer immediately if you have questions about approved or unapproved parts, attachments, or modifications.



WACKER NEUSON

EC DECLARATION OF CONFORMITY

**WACKER NEUSON PRODUCTION AMERICAS LLC, N92W15000 ANTHONY AVENUE,
MENOMONEE FALLS, WISCONSIN USA**

AUTHORIZED PERSON FOR TECHNICAL DOCUMENTS	Axel Häret WACKER NEUSON SE Preußenstraße 41 80809 München
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hereby certifies that the construction equipment specified hereunder:

- Category:
Vibratory Rammer
- Machine function:
This machine is intended to be used for compacting cohesive, mixed, and granular soils in confined areas.
- Type / Model
Rammer BS 50-4, BS 50-4s, BS 60-4, BS 60-4s
- Item number of equipment:
0620074, 0620388, 0620483, 0620811, 0620812, 0620813, 0620816, 0620818, 0620819, 0620820
- Net installed power:
2,1 kW

has been sound tested per Directive 2000/14/EC:

Conformity Assessment Procedure	Name and address of notified body	Measured sound power level	Guaranteed sound power level
ANNEX VIII	Lloyds Register Quality Assurance Limited (Notified Body No 0088) 71 Fenchurch Street London EC3M 4BS United Kingdom	107 dB(A)	108dB(A)

- This machinery fulfills the relevant provisions of Machinery Directive 2006/42/EC and is also produced in accordance with these standards:
**2000/14/EC
2004/26/EC
2004/108/EC
EN 500-1
EN 500-4**

03.01.11

Date

William Lahner
Vice President of Engineering

Paul Sina
Manager, Product Engineering

WACKER NEUSON PRODUCTION AMERICAS LLC

The original language of this EC Declaration of Conformity is American English.

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1 Safety Information

1.1 Signal Words Used in this Manual

This manual contains **DANGER**, **WARNING**, **CAUTION**, **NOTICE**, and **NOTE** signal words 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 hazards.

- ▶ Obey all safety messages that follow this symbol.



DANGER

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

- ▶ To avoid death or serious injury from this type of hazard, obey all safety messages that follow this signal word.
-



WARNING

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

- ▶ To avoid possible death or serious injury from this type of hazard, obey all safety messages that follow this signal word.
-



CAUTION

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

- ▶ To avoid possible minor or moderate injury from this type of hazard, obey all safety messages that follow this signal word.
-

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

Note: A *Note* contains additional information important to a procedure.

1.2 Machine Description and Intended Use

This machine is a vibratory rammer. The Wacker Neuson Rammer consists of a gasoline or diesel engine, a clutch, a fuel tank, a spring-loaded ramming system, a ramming shoe, and a handle. The engine transmits power through the ramming system and ramming shoe, generating percussive impact force to compact soil. The operator guides and controls the machine from behind using the handle.

This machine is intended to be used for compacting cohesive, mixed, and granular soils in confined areas.

This machine has been designed and built strictly for the intended use described above. Using the machine for any other purpose could permanently damage the machine or seriously injure the operator or other persons in the area. Machine damage caused by misuse is not covered under warranty.

The following are some examples of misuse:

- Using the machine as a ladder, support, or work surface
- Using the machine to carry or transport passengers or equipment
- Using the machine as a hammer or for other demolition work
- Attaching the machine to any other machine
- Operating the machine outside of factory specifications
- Operating machine in a manner inconsistent with all warnings found on the machine and in the Operator's Manual

This machine has been designed and built in accordance with the latest global safety standards. It has been carefully engineered to eliminate hazards as far as practicable and to increase operator safety through protective guards and labeling. However, some risks may remain even after protective measures have been taken. They are called residual risks. On this machine, they may include exposure to:

- Heat, noise, exhaust, and carbon monoxide from the engine
- Fire hazards from improper refueling techniques
- Fuel and its fumes
- Personal injury from improper lifting techniques or operating techniques

To protect yourself and others, make sure you thoroughly read and understand the safety information presented in this manual before operating the machine.

1.3 Safety Guidelines for Operating the Machine

Operator qualifications

Only trained personnel are permitted to start, operate, and shut down the machine. They also must meet the following qualifications:

- have received instruction on how to properly use the machine
- are familiar with required safety devices

The machine must not be accessed or operated by:

- children
- people impaired by alcohol or drugs

Operator training

Before operating the machine:

- Read and understand the operating instructions contained in all manuals delivered with the machine.
- Familiarize yourself with the location and proper use of all controls and safety devices.
- Contact Wacker Neuson for additional training if necessary.

When operating this machine:

- Do not allow improperly trained people to operate the machine. People operating the machine must be familiar with the potential risks and hazards associated with it.

Personal Protective Equipment (PPE)

Wear the following Personal Protective Equipment (PPE) while operating this machine:

- Close-fitting work clothes that do not hinder movement
- Safety glasses with side shields
- Hearing protection
- Safety-toed footwear

- 1.3.1 Never operate this machine in applications for which it is not intended.
- 1.3.2 Do not allow anyone to operate this equipment without proper training. People operating this equipment must be familiar with the risks and hazards associated with it.
- 1.3.3 Do not 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.
- 1.3.4 Do not operate the machine with unapproved accessories or attachments.
- 1.3.5 Never leave the machine running unattended.

- 1.3.6 Never tamper with or disable the function of operating controls.
- 1.3.7 Never use the choke to stop the engine.
- 1.3.8 Never operate the machine in areas where explosions may occur.
- 1.3.9 Read, understand, and follow procedures in the Operator's Manual before attempting to operate the machine.
- 1.3.10 Make sure that all other persons are at a safe distance from the machine. Stop the machine if people step into the working area of the machine.
- 1.3.11 Be sure operator is familiar with proper safety precautions and operation techniques before using machine.
- 1.3.12 Always keep hands, feet, and loose clothing away from moving parts of the machine.
- 1.3.13 Always use common sense and caution when operating the machine.
- 1.3.14 Always be sure the rammer will not tip over, roll, slide, or fall when not being operated.
- 1.3.15 Always turn the engine OFF when the rammer is not being operated.
- 1.3.16 Always guide the rammer in such a way that the operator is not squeezed between the rammer and solid objects. Special care is required when working on uneven ground or when compacting coarse material. Make sure to stand firmly when operating the machine under such conditions.
- 1.3.17 When working near the edges of breaks, pits, slopes, trenches and platforms, always operate the rammer in such a way that there is no danger of it tipping over or falling in.
- 1.3.18 Store the machine properly when it is not being used. The machine should be stored in a clean, dry location out of the reach of children.
- 1.3.19 Always operate machine with all safety devices and guards in place and in working order. Do not modify or defeat safety devices. Do not operate machine if any safety devices or guards are missing or inoperative.
- 1.3.20 Do not transport the machine while it is running.
- 1.3.21 Do not tip the machine for cleaning or for any other reason.

1.4 Operator Safety while Using Internal Combustion Engines

**WARNING**

Internal combustion engines present special hazards during operation and fueling. Failure to follow the warnings and safety standards could result in severe injury or death.

- ▶ Read and follow the warning instructions in the engine owner's manual and the safety guidelines below.

**DANGER**

Exhaust gas from the engine contains carbon monoxide, a deadly poison. Exposure to carbon monoxide can kill you in minutes.

- ▶ NEVER operate the machine inside an enclosed area, such as a tunnel, unless adequate ventilation is provided through such items as exhaust fans or hoses.

Operating safety

When running the engine:

- Keep the area around exhaust pipe free of flammable materials.
- Check the fuel lines and the fuel tank for leaks and cracks before starting the engine. Do not run the machine if fuel leaks are present or the fuel lines are loose.

When running the engine:

- Do not smoke while operating the machine.
- Do not run the engine near sparks or open flames.
- Do not touch the engine or muffler while the engine is running or immediately after it has been turned off.
- Do not operate a machine when its fuel cap is loose or missing.
- Do not start the engine if fuel has spilled or a fuel odor is present. Move the machine away from the spill and wipe the machine dry before starting.

Refueling safety

When refueling the engine:

- Clean up any spilled fuel immediately.
- Refill the fuel tank in a well-ventilated area.
- Replace the fuel tank cap after refueling.
- Do not smoke.
- Do not refuel a hot or running engine.
- Do not refuel the engine near sparks or open flames.
- Do not refuel if the machine is positioned in a truck fitted with a plastic bed liner. Static electricity can ignite the fuel or fuel vapors.

1.5 Service Safety



WARNING

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

Personal Protective Equipment (PPE)

Wear the following Personal Protective Equipment (PPE) while servicing or maintaining this machine:

- Close-fitting work clothes that do not hinder movement
- Safety glasses with side shields
- Hearing protection
- Safety-toed footwear

In addition, before servicing or maintaining the machine:

- Tie back long hair.
- Remove all jewelry (including rings).

Service training

Before servicing or maintaining the machine:

- Read and understand the instructions contained in all manuals delivered with the machine.
- Familiarize yourself with the location and proper use of all controls and safety devices.
- Only trained personnel shall troubleshoot or repair problems occurring with the machine.
- Contact Wacker Neuson for additional training if necessary.

When servicing or maintaining this machine:

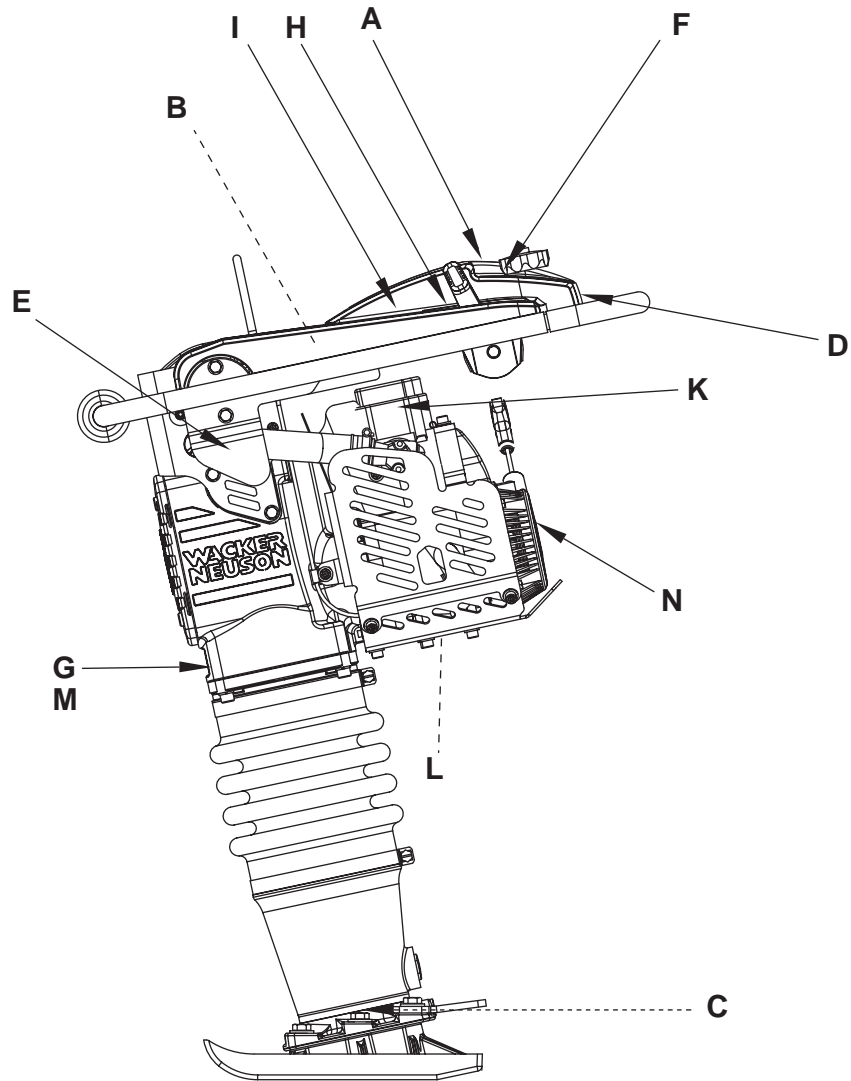
- Do not allow improperly trained people to service or maintain the machine. Personnel servicing or maintaining the machine must be familiar with the associated potential risks and hazards.

- 1.5.1 Do not attempt to clean or service the machine while it is running. Rotating parts can cause severe injury.
- 1.5.2 DO NOT operate the machine without an air cleaner.
- 1.5.3 DO NOT remove air cleaner cover, paper element, or precleaner while engine is running.
- 1.5.4 DO NOT alter engine speeds. Run the engine only at speeds specified in the Technical Data Section.

- 1.5.5 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.
- 1.5.6 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.
- 1.5.7 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.
- 1.5.8 ALWAYS replace the safety devices and guards after repairs and maintenance.
- 1.5.9 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.
- 1.5.10 ALWAYS do periodic maintenance as recommended in the Operator's Manual.
- 1.5.11 ALWAYS clean debris from engine cooling fins.
- 1.5.12 When replacement parts are required for this machine, use only Wacker Neuson replacement parts or those parts equivalent to the original in all types of specifications, such as physical dimensions, type, strength, and material.
- 1.5.13 Disconnect the spark plug on machines equipped with gasoline engines, before servicing, to avoid accidental start-up.
- 1.5.14 Keep the machine clean and labels legible. Replace all missing and hard-to-read labels. Labels provide important operating instructions and warn of dangers and hazards.
- 1.5.15 Do not operate the machine with unapproved accessories or attachments.

2 Labels

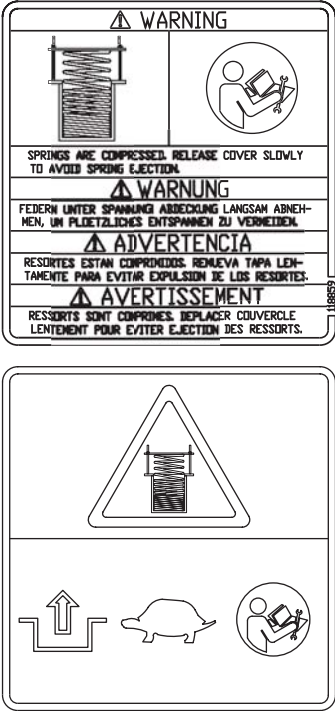
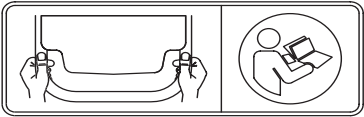

2.1 Label Locations


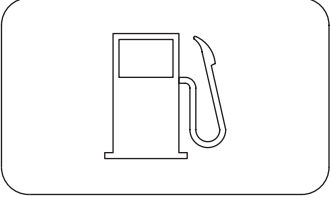
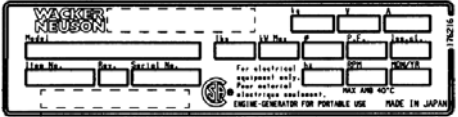

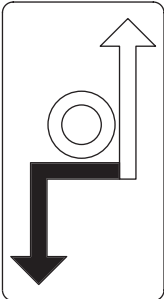


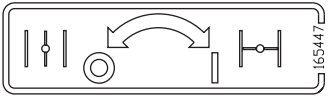
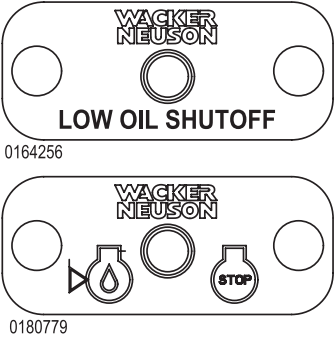
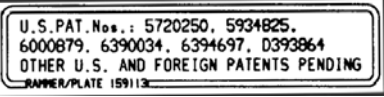

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2.2 Label Meanings

	Label	Meaning
A	<p>181636</p> <p>181637</p>	<p>To start the machine:</p> <ol style="list-style-type: none"> 1. Move the throttle to the IDLE position. 2. Push the purge bulb 10 times. 3. Close the choke. 4. Pull the starter rope until engine starts. 5. Open the choke as the engine warms. 6. Move the throttle to the FAST position. <p>To stop the machine:</p> <ol style="list-style-type: none"> 1. Move the throttle past the SLOW position. <p>Warning! To reduce the risk of hearing loss, always wear hearing protection when operating this machine.</p> <p>Read the Operator's Manual.</p> <p>Danger!</p> <p>Asphyxiation hazard.</p> <ul style="list-style-type: none"> ■ Engines emit carbon monoxide. ■ Do not run the machine indoors or in an enclosed area unless adequate ventilation, through such items as exhaust fans or hoses, is provided. ■ No sparks, flames, or burning objects near the machine. ■ Stop the engine before refueling. <p>This label is molded into the cover. If the label becomes illegible, the cover must be replaced. Refer to the Parts Book for ordering information.</p>
B		<p>WARNING! Hot surface!</p>

	Label	Meaning
C	 <p>178792</p>	<p>Warning!</p> <p>Springs are compressed. Release cover slowly to avoid spring ejection.</p> <p>See the Repair Manual for proper disassembly instructions.</p>
D	 <p>162853</p>	<p>For optimal control, performance, and minimal hand/arm vibration, grasp handle as shown.</p> <p>Read the Operator's Manual.</p> <p>This label is molded into the cover. If the label becomes illegible, the cover must be replaced. Refer to the Parts Book for ordering information.</p>
E		<p>Guaranteed sound power level in dB(A).</p>

	Label	Meaning
F	 <p>0150194</p>  <p>182307</p>	<p>Use only clean, filtered fuel.</p> <p>This label is molded into the cover. If the label becomes illegible, the cover must be replaced. Refer to the Parts Book for ordering information.</p>
G		<p>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 nameplate 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.</p>
H		<p>Turtle = Idle/slow engine speed Rabbit = Full/fast engine speed</p> <p>This label is molded into the cover. If the label becomes illegible, the cover must be replaced. Refer to the Parts Book for ordering information.</p>
I	 <p>115416</p>	<p>Move lever forward to stop machine. Move lever backward to run machine.</p> <p>This label is molded into the cover. If the label becomes illegible, the cover must be replaced. Refer to the Parts Book for ordering information.</p>

	Label	Meaning
K		<p>Choke: 0 = Open I = Closed</p>
L		<p>This rammer is equipped with a low oil shutoff switch, it will not allow the engine to operate unless a sufficient amount of oil is present. See section <i>Low Oil Shutoff Switch</i>.</p>
M		<p>This machine may be covered by one or more patents.</p>
N		<p>WM 100 4-Cycle 4000–4200 rpm Low oil shutoff</p>

3 Lifting and Transporting

3.1 Lifting and Transporting

See Graphic: wc_gr001457

3.1.1 Always shut off engine and close fuel valve when transporting machine.

3.1.2 Make sure lifting device has enough capacity to hold machine (see identification plate on machine for weight).

3.1.3 Use central lifting point **(a)** when lifting machine.



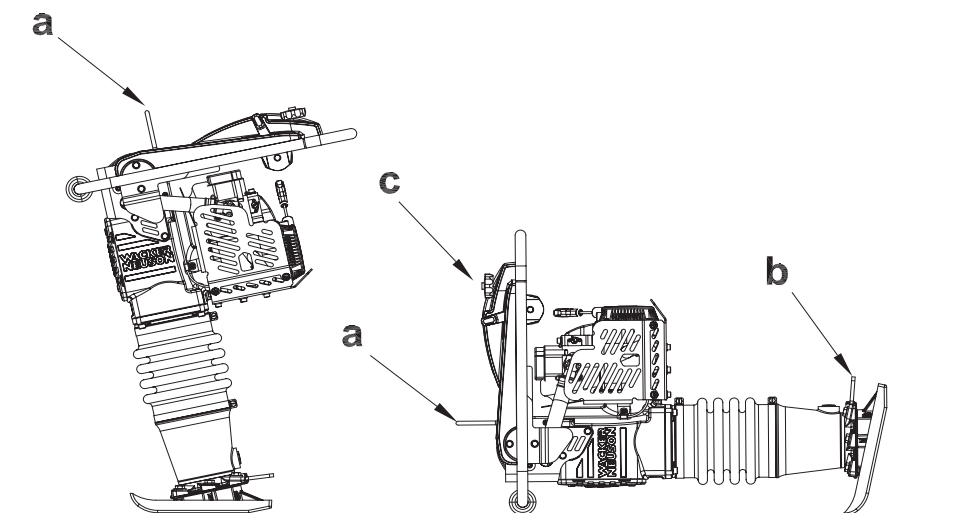
Always inspect the lifting cable **(a)** for wear, damage, or abuse. Protect cable from any sharp edges. Do not use if there are any signs of cut wires, excessive wear, or other defects. Replace damaged cable immediately to avoid injury or death.

3.1.4 Wacker Neuson recommends transporting rammers upright whenever possible; however, a rammer should not be allowed to fall over.

If the rammer cannot be secured in the upright position, tie down the rammer to the transport vehicle to prevent it from tipping, falling, or rolling. Lay the rammer down only as shown below and tie it to the vehicle at points **(a)** and **(b)**.

NOTICE: Drain the fuel tank as required to prevent fuel leaking from the cap **(c)**.

NOTE: After transporting the rammer horizontally, upright the rammer and allow the oil to drain back through the engine. It may take up to 2 minutes for the oil level to recover.



wc_gr001457



4 Operation

4.1 Preparing the Machine for First Use

Preparing for first use

To prepare your machine for first use:

- 4.1.1 Make sure all loose packaging materials have been removed from the machine.
- 4.1.2 Check the machine and its components for damage. If there is visible damage, do not operate the machine! Contact your Wacker Neuson dealer immediately for assistance.
- 4.1.3 Take inventory of all items included with the machine and verify that all loose components and fasteners are accounted for.
- 4.1.4 Attach component parts not already attached.
- 4.1.5 Add fluids as needed and applicable, including fuel, engine oil, and battery acid.
- 4.1.6 Move the machine to its operating location.

4.2 Recommended Fuel

This engine is certified to operate on automotive unleaded gasoline. Use only fresh, clean gasoline. Gasoline containing water or dirt will damage fuel system.

Use of oxygenated fuels

Some conventional gasolines are blended with alcohol. These gasolines are collectively referred to as oxygenated fuels. If you use an oxygenated fuel, be sure it is unleaded and meets the minimum octane rating requirement.

Before using an oxygenated fuel, confirm the fuel's contents. Some states / Provinces require this information to be posted on the fuel pump.

The following are Wacker Neuson approved percentages of oxygenates:

ETHANOL - (ethyl or grain alcohol) 10% by volume. You may use gasoline containing up to 10% ethanol by volume (commonly referred to as E10). Gasoline containing more than 10% ethanol (such as E15, E20, or E85) may not be used because it could damage the engine.

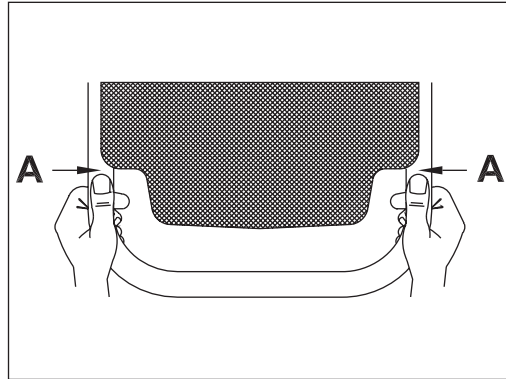
If you notice any undesirable operating symptoms, try another service station, or switch to another brand of gasoline.

Fuel system damage or performance problems resulting from the use of an oxygenated fuel containing more than the percentages of oxygenates mentioned above are not covered under warranty.

4.3 Position of the Operator

For optimal control, performance, and minimal hand/arm vibration follow the guidelines below when using the machine.

- Grasp the handle with both hands as shown.

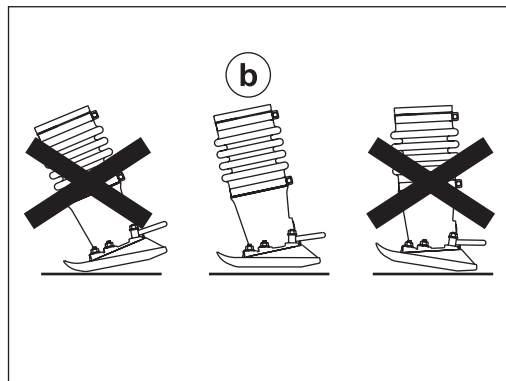


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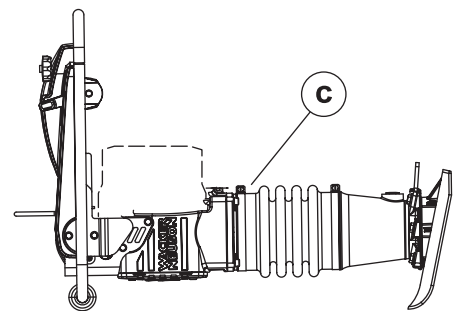
Hand/Arm Vibration (HAV) has been optimized for the hand position shown. Reported HAV levels are measured at position **A** in conformance with EN 1033 and ISO 5349.

- Run the rammer at full throttle.
- Walk behind the rammer.
- Use the handle to guide the rammer's direction of travel. Allow the rammer to pull itself forward. Do not try to overpower the rammer.
- If you need to lift the rammer while operating, position the throttle in the SLOW position. Position the rammer as needed then, continue operation with the throttle in the FAST position.

For best compaction and shoe wear, the shoe must hit the ground flat (**b**), not on its toe or heel.



wc_gr007109



wc_gr007110

If the rammer should tip on its side during operation, place the rammer in the position shown (**c**) and shut off the engine.

4.4 Before Starting

- 4.4.1 Read safety instructions at the beginning of this manual.
- 4.4.2 Make sure that the gas tank is full.
- 4.4.3 Check engine oil level.
- 4.4.4 Place rammer on loose soil or gravel. DO NOT start rammer on hard surfaces such as asphalt or concrete.

4.5 Starting

See Graphic: wc_gr007426

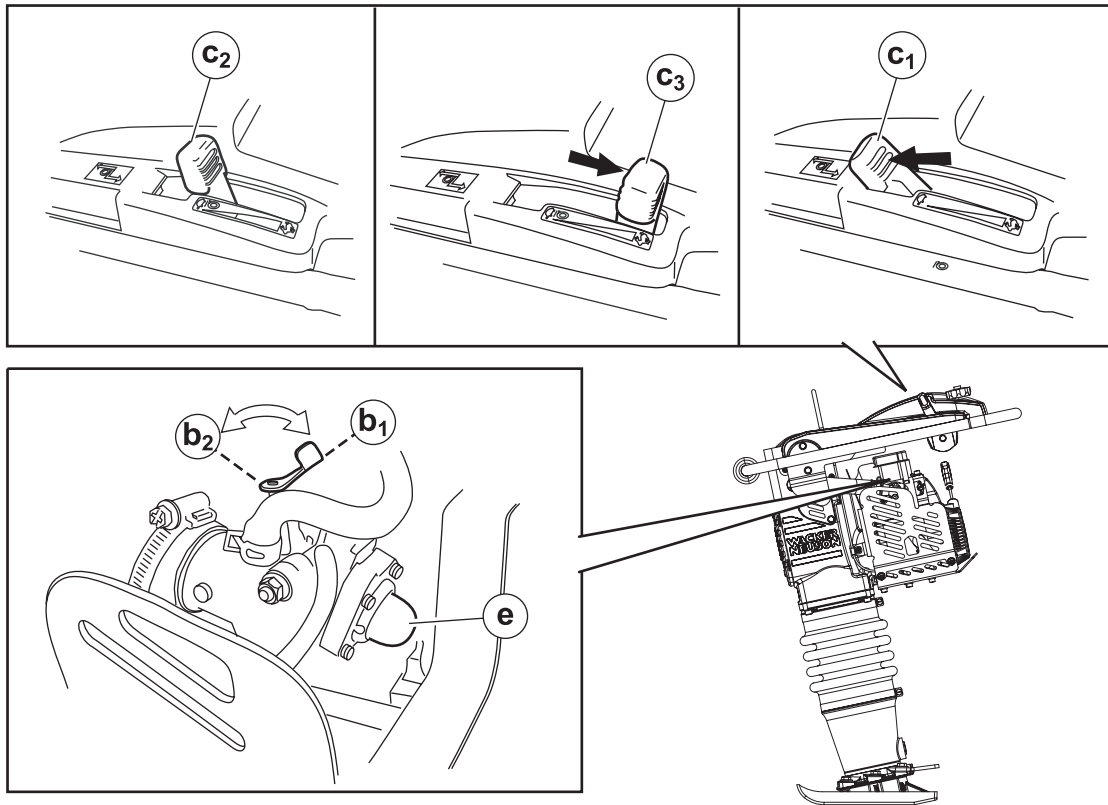
Note: After transporting the rammer horizontally, upright the rammer and allow the oil to drain back through the engine. It may take up to 2 minutes for the oil level to recover.

- 4.5.1 Set the throttle to the idle position **(c2)**. This will automatically turn on the flow of fuel.
- 4.5.2 Close the choke **(b1)**.
- 4.5.3 Push (pump) the purge bulb **(e)** 6 to 10 times or until you see fuel in the bulb.

Note: The engine will not become flooded by pushing (pumping) the purge bulb more than 10 times. Pumping the purge bulb removes air from the fuel system. It does not pump fuel into the carburetor.
- 4.5.4 Pull starter rope **(a)**. Repeat until engine starts. Multiple pulls (typically less than 5 pulls) may be required to start an engine:
 - that has not been run before
 - that has not been run for a long period of time (a week or more)
 - that has been run completely out of fuel
 - in cold weather conditions
- 4.5.5 Open the choke **(b2)**.

NOTICE: Only open choke **(b2)** with throttle in idle position **(c2)**. Opening choke with throttle not in idle position **(c2)** may result in rammer motion.
- 4.5.6 Open the throttle to the full position **(c3)**.

Note: The engine is equipped with a low oil level shutoff switch. If the engine stops running after 15-30 seconds, check the engine oil level.



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4.6 Stopping

See Graphic: wc_gr007426

- 4.6.1 Place throttle in the idle position (**c2**).
- 4.6.2 Shut off the engine by moving the throttle through the detent to the off position (**c1**). The engine will stop and the fuel valve will close.

4.7 Emergency Shutdown Procedure

Procedure

If a breakdown or accident occurs while the machine is operating, follow the procedure below:

- 4.7.1 Reduce engine speed to idle.
- 4.7.2 Stop the engine.
- 4.7.3 Close the fuel valve.
- 4.7.4 Contact the rental yard or machine owner for further instructions.

4.8 Low Oil Shutoff Switch

The low oil shutoff switch is designed to prevent engine damage caused by an insufficient amount of oil.

When starting the machine:

- if the warning light flashes quickly once, this indicates the engine oil level is acceptable.
- if the warning light flashes slowly, the engine will start but shut off after 10-12 seconds, this indicates that the engine oil level is low. Add oil to the engine. See *Technical Data* for oil quantity and type.
- if the warning light stays on continuously, the engine will start and continue to run but the low oil shutoff switch is not functioning properly. Check the switch for proper wire connections. If the light continues to stay on, replace the switch.
- if the warning light does not flash quickly once, and the engine starts and continues to run, the low oil shutoff switch is not functioning properly. Check the switch for proper wire connections and grounding. If the light still does not flash when starting the machine, replace the switch.

Notes

5 Maintenance**5.1 Maintaining the Emission Control System**

Normal maintenance, replacement or repair of emission control devices and systems may be performed by any repair establishment or individual; however, warranty repairs must be performed by a dealer/service center authorized by WACKER NEUSON. The use of service parts that are not equivalent in performance and durability to authorized parts may impair the effectiveness of the emission control system and may have a bearing on the outcome of a warranty claim.

5.2 Periodic Maintenance Schedule

The table below lists basic machine maintenance. Tasks designated with check marks may be performed by the operator. Tasks designated with square bullet points require special training and equipment.

	Daily before starting	After first 5 hours	Every week or 25 hours	Every month or 100 hours	Every 3 months or 300 hours	Every Year
Check fuel level. Check engine oil level.	✓					
Inspect air filter. Replace as needed.	✓					
Check oil level in sightglass.	✓					
Check fuel line and fittings for cracks or leaks. Replace as needed.	■					
Tighten ramming shoe hardware.		■	■			
Check external hardware.		✓	✓			
Clean engine cooling fins.			✓			
Clean and check spark plug gap.			■			
Change engine oil.				■		
Replace spark plug.				■		
Clean recoil starter.					✓	
Change ramming system oil.*					■	
Inspect lifting cable on rammer for wear, damage, or abuse.					✓	
Inspect fuel filter.						✓
* Change ramming system oil after first 50 hours of operation. Note: If engine performance is poor, check, clean, and replace air filter elements as needed.						

5.3 Servicing the Air Cleaner

See Graphic: wc_gr001306



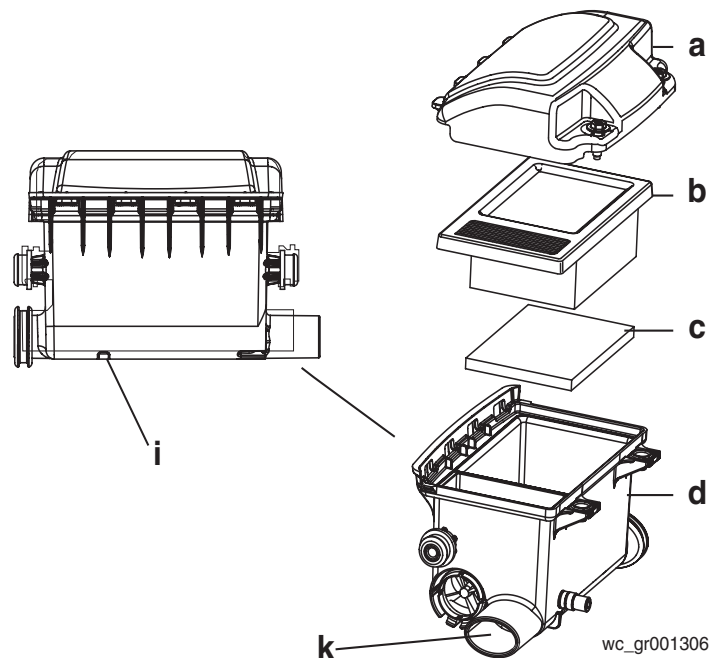
WARNING

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

NOTICE: NEVER run the engine without the main paper air filter **(b)**. Severe engine damage will occur.

Clean elements using the following procedure:

- 5.3.1 Remove the air cleaner cover **(a)**. Remove the main paper filter element **(b)** and secondary prefilter **(c)** and inspect them for holes or tears. Replace the elements if they are damaged.
- 5.3.2 Main paper filter element **(b)**: Replace the main paper filter element if it appears heavily soiled.
- 5.3.3 Prefilter **(c)**: Clean the prefilter with low-pressure compressed air. When very soiled, wash the prefilter in a solution of mild detergent and warm water. Rinse it thoroughly in clean water. Allow the prefilter to dry thoroughly before reinstalling.
Note: Do not oil the prefilter.
- 5.3.4 Wipe out the filter housing **(d)** with a clean cloth. Do not use compressed air.
NOTICE: Do not allow dirt to get into the engine intake port **(k)** while cleaning. Damage to engine will result.
- 5.3.5 Check that the precleaner debris ejector slot **(i)** is clear.



5.4 Engine Oil

See Graphic: wc_gr002431

5.4.1 Drain the oil while the 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.

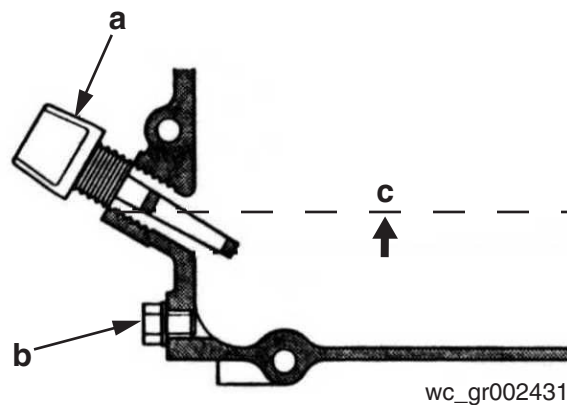
5.4.2 Place the rammer so that the engine is level.

5.4.3 Remove the oil fill plug (a) and the drain plug (b) to drain the oil.

5.4.4 Install the drain plug (b).

5.4.5 Fill the engine crankcase with the recommended oil up to the level of the plug opening (c). Do not thread in the dipstick to check the oil level. See section *Technical Data* for oil quantity and type.

5.4.6 Install the oil filler plug (a).



WARNING

Most used oil contains small amounts of materials that can cause cancer and other health problems if inhaled, ingested, or left in contact with skin for prolonged periods of time.

- ▶ Take steps to avoid inhaling or ingesting used engine oil.
- ▶ Wash skin thoroughly after exposure to used engine oil.

5.5 Checking and Changing the Ramming System Oil

Background

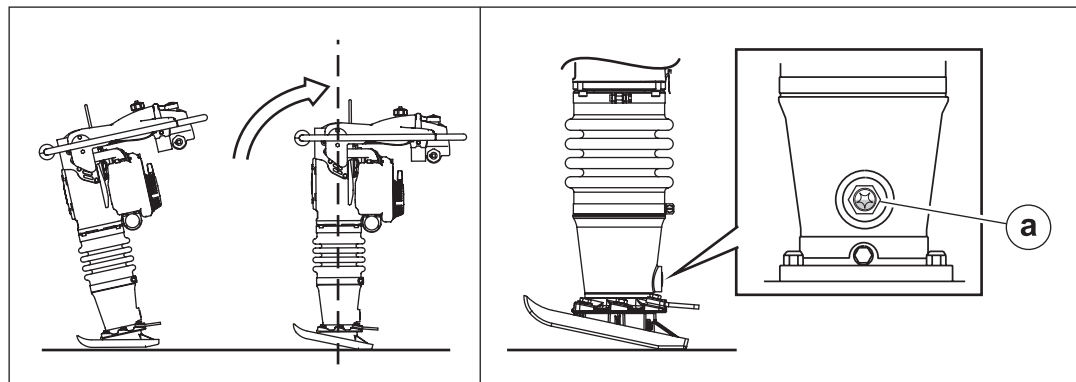
Lubricating oil is distributed throughout the ramming system by the action of the rammer. Holes drilled in the piston carry oil from the bottom of the rammer to the crankcase as the rammer operates. Oil in the ramming system must be maintained at the correct level to ensure the ramming system operates efficiently.

Checking the oil level

Perform the following procedure to check the ramming system oil level.

Note: *If the Rammer has been transported in the horizontal position or has recently been used, upright it and allow it to stand in the upright position for 15 minutes before checking the oil level. This will allow the oil to settle and provide a more accurate reading.*

5.5.1 Tip the rammer so that it is perpendicular with the ground.



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5.5.2 Check the oil through the sightglass (a).

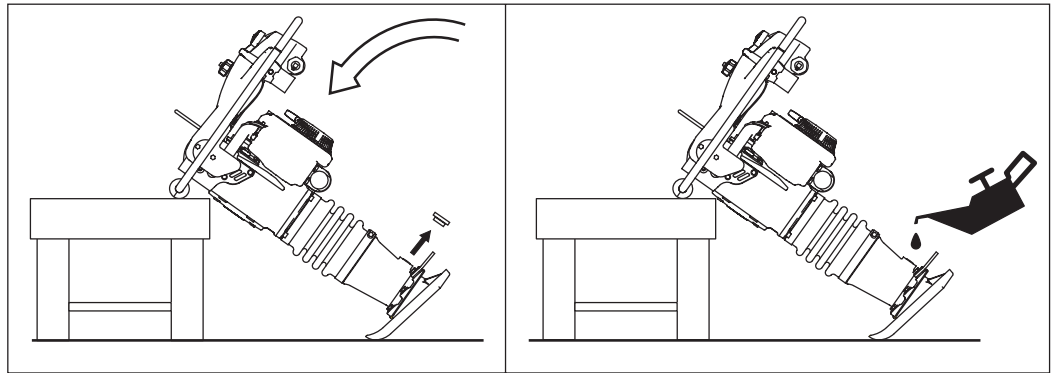
The correct oil level will fill 1/2 to 3/4 of the sightglass. Add more oil if necessary.

Adding oil

Perform the following procedure to add oil to the ramming system.

NOTICE: Do not overfill the ramming system with oil. Excessively high levels of oil can create a hydraulic lock in the ramming system. This can result in erratic operation and cause damage to the engine clutch, the ramming system, and the shoe.

5.5.3 Tip the Rammer forward to allow access to the sightglass. Secure the Rammer in this position.



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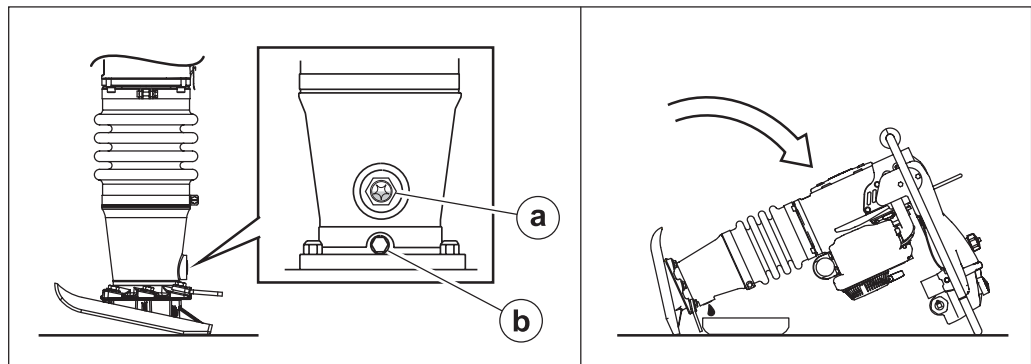
- 5.5.4 Remove the sightglass. Clean the threads of the sightglass, then wrap the threads with Teflon tape.
- 5.5.5 Add oil to the machine through the sightglass opening in the housing.
- 5.5.6 Stand the machine upright to check the oil level. Add enough oil so that when the machine is upright, oil will fill 1/2 to 3/4 of the sightglass. At that point, install the sightglass. Torque the sightglass to 9 Nm (6 ft.lbs.).

Changing oil

Perform the following procedure to change the ramming system oil.

Note: Dispose of used oil in accordance with local environmental regulations.

- 5.5.7 Remove the drain plug (b). (On BS 50 machines, remove the sightglass (a).)



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- 5.5.8 Tilt the rammer backward until it is resting on the handle and drain the oil into a suitable container.

Note: It may take up to 10 minutes for the oil to drain.
- 5.5.9 Reinstall the drain plug. Torque it to 54 Nm (40 ft.lbs.).
- 5.5.10 Add oil as stated above.

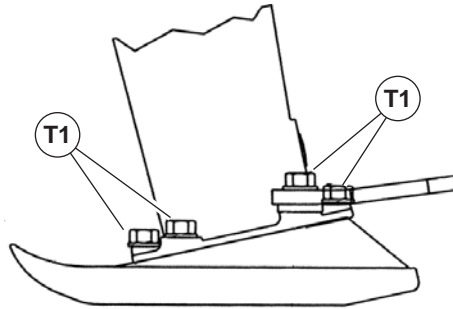
5.6 Shoe Hardware

See Graphic: *wc_gr005385*

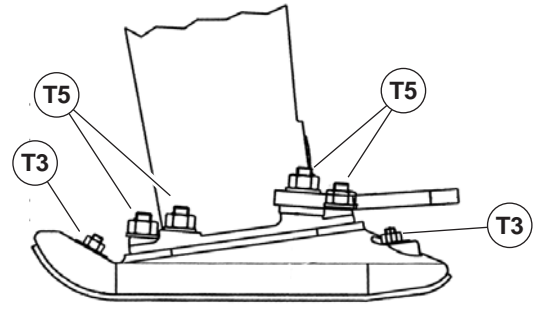
On new machines, or after replacing shoe, check and tighten shoe hardware after the first 5 hours of operation. Inspect hardware every week thereafter.

Torque hardware as specified.

Cast Iron Shoe



Plastic Shoe



wc_gr005385

Torque	Nm	Ft.lbs.
T1	86	63
T3	19	14
T5	78.7	58

5.7 Long-Term Storage

Introduction

Extended storage of equipment requires preventative maintenance. Performing these steps helps to preserve machine components and ensures the machine will be ready for future use. While not all of these steps necessarily apply to this machine, the basic procedures remain the same.

When

Prepare your machine for extended storage if it will not be operated for 30 days or more.

Preparing for storage

Follow the procedures below to prepare your machine for storage.

- Complete any needed repairs.
- Replenish or change oils (engine, exciter, hydraulic & gear-case) per the intervals specified in the Scheduled Maintenance table.
- Grease all fittings and, if applicable, repack bearings.
- Inspect engine coolant. Replace coolant if it appears cloudy, is more than two seasons old, or does not meet the average lowest temperature for your area.
- If your machine has an engine equipped with a fuel valve, start the engine, close the fuel valve, and run the engine until it stops.
- Consult the engine owner's manual for instructions on preparing the engine for storage.

Stabilizing the fuel

After completing the procedures listed above, fill the fuel tank completely and add a high-quality stabilizer to the fuel.

- Choose a stabilizer that includes cleaning agents and additives designed to coat/protect the cylinder walls.
- Make sure the stabilizer you use is compatible with the fuel in your area, fuel type, grade and temperature range. Do not add extra alcohol to fuels which already contain it (for example, E10).
- For engines with diesel fuel, use a stabilizer with a biocide to restrict or prevent bacteria and fungus growth.
- Add the correct amount of stabilizer per the manufacturer's recommendations.

Storing the machine

Perform these remaining steps to store your machine.

- Wash the machine and allow it to dry.
- Move the machine to a clean, dry, secure storage location. Block or chock wheels to prevent machine movement.
- Use touch-up paint as needed to protect exposed metal against rust.
- If the machine has a battery, either remove or disconnect it.

NOTICE: Allowing the battery to freeze or completely discharge is likely to cause permanent damage. Periodically charge the battery while the machine is not in use. In cold climates, store and charge the battery indoors or in a warm location.

- Cover the machine. Tires and other exposed rubber items should be protected from the weather. Either cover them or use a readily available protectant.

6 Basic Troubleshooting

Problem / Symptom	Reason / Remedy
Engine does not start, or stalls.	<ul style="list-style-type: none"> • No fuel in tank. • Check engine oil level. • Spark plug fouled. • Engine switch is in the "OFF" position.
Engine does not accelerate, is hard to start, or runs erratically.	<ul style="list-style-type: none"> • Spark plug fouled. • Crankshaft seals are leaking. • Check air cleaner. • Check engine oil level.
Engine overheats.	<ul style="list-style-type: none"> • Clean cooling fins and fan blades.
Engine runs, rammer does not tamp.	<ul style="list-style-type: none"> • Inspect clutch for damage. Replace if necessary. • Broken connecting rod or crankgear. • Low engine performance. Compression loss.
Engine runs, rammer operation is erratic.	<ul style="list-style-type: none"> • Oil/grease on clutch. • Broken/worn springs. • Soil buildup on ramming shoe. • Broken parts in ramming system or crankcase. • Engine operating speed is too high.
On machines equipped with the low oil shutoff switch, the warning light flashes slowly, the engine starts but shuts off after 10-12 seconds.	<ul style="list-style-type: none"> • Engine oil level is low. Add oil to the engine. See <i>Technical Data</i> for oil quantity and type.

Problem / Symptom	Reason / Remedy
On machines equipped with the low oil shutoff switch, the engine starts and continues to run but the low oil warning light stays on continuously.	<ul style="list-style-type: none">• Check the switch for proper wire connections.• Switch is not functioning properly. Replace the switch.
On machines equipped with the low oil shutoff switch, the engine starts and continues to run, but the low oil warning light did not flash quickly once.	<ul style="list-style-type: none">• Check the switch for proper wire connections and grounding.• Switch is not functioning properly. Replace the switch.

7 Technical Data

7.1 Rammer

Engine power rating

Gross power rating per SAE J1995. Actual power output may vary due to conditions of specific use.

	Item Number	Rev.	Item Number	Rev.
	5000620071	100+	5000620322	208+
	5000620811	100+	5000620818	100+
	5000620322	100–207		
Engine Model	type	WM 100	WM 100	
Operating weight	kg (lbs.)	63 (139)	63 (139)	
Engine Speed - operating	rpm	4200 ± 100	4000 ± 100	
Engine Speed - idle	rpm	2000 ± 100	2000 ± 100	
Clutch Engagement	rpm	2500 ± 100	2500 ± 100	
Max. rated power @ rated speed	kW(HP)	2.4 (3.2) @ 4200 rpm	2.4 (3.2) @ 4200 rpm	
Spark Plug	type	NGK BM4A or BMR4A	NGK BM4A or BMR4A	
Electrode Gap	mm (in)	0.6–0.7 (0.023–0.028)	0.6–0.7 (0.023–0.028)	
Cylinder Head Compression (cold)	bar/cm ³ (psi)	8.0–9.7 (120–140)	8.0–9.7 (120–140)	
Air Cleaner	type	Three stage with cyclonic precleaner		
Engine Lubrication	oil grade	SAE 10W30 SE, SF or higher		
Engine Oil Capacity	ml (oz.)	300 (10)	300 (10)	
Fuel Tank Capacity	l (qts.)	3.0 (3.2)	3.0 (3.2)	
Fuel	type	Regular unleaded gasoline		
Fuel Consumption	l(qt.)/hr	1.2 (1.3)	1.2 (1.3)	
Running Time	hour	2.5	2.5	
Ramming System Lubrication	oil grade	SAE 10W30	SAE 10W30	
Ramming System Capacity	ml (oz.)	710 (24)	710 (24)	

7.2 Sound Measurements

Products are tested for sound pressure level in accordance with EN ISO 11204. Sound power level is tested in accordance with European Directive 2000/14/EC - Noise Emission in the Environment by Equipment for use outdoors.

- the sound pressure level at operator's location (L_{pA}) = 90 dB(A).
- the guaranteed sound power level (L_{WA}) = 108 dB(A).

7.3 Vibration Measurements

Products are tested for hand/arm vibration (HAV) level in accordance with ISO 5349, EN1033, and EN500-4 where applicable.

- HAV 8.6 m/s²

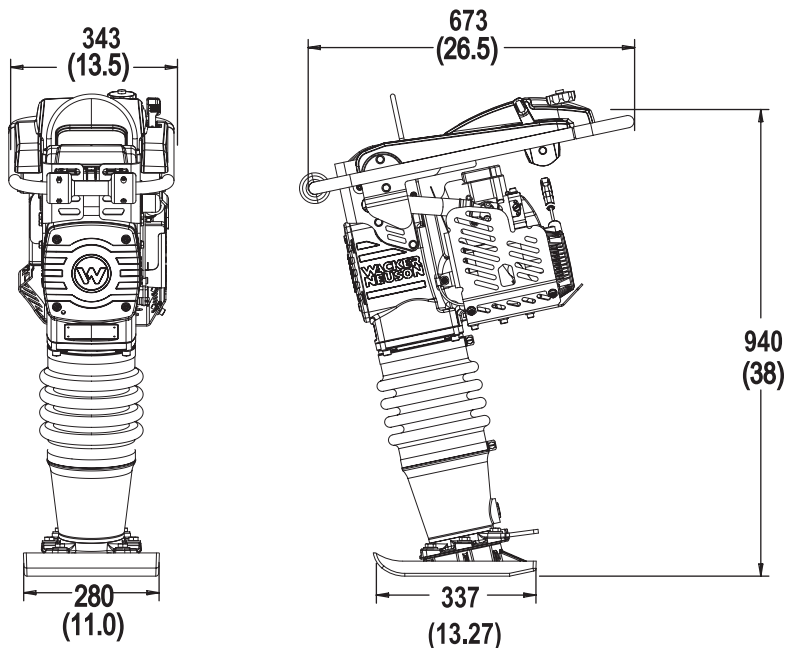
Refer to topic *Proper Operation* for further details.

HAV Uncertainties

Hand-transmitted vibration was measured per ISO 5349-1. This measurement includes an uncertainty of 1.5 m/sec².

7.4 Dimensions

mm (in.)



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8 Emission Control Systems Information and Warranty

The Emission Control Warranty and associated information is valid only for the U.S.A., its territories, and Canada.

8.1 Emission Control System Background Information

Introduction

Wacker Neuson spark-ignited engines/equipment must conform with applicable Environmental Protection Agency (EPA) emissions regulations. There are two types of emissions that fall under these regulations: 1) exhaust, and 2) evaporative. These regulations require that manufacturers warrant the emission control systems for defects in materials and workmanship.

Furthermore, EPA regulations require all manufacturers to furnish written instructions describing how to operate and maintain the engines/equipment including the emission control systems. This information is provided with all Wacker Neuson engines/equipment at the time of purchase.

Exhaust Emissions

The combustion process produces carbon monoxide, oxides of nitrogen, and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Wacker Neuson utilizes lean carburetor settings and other systems to reduce the emissions of carbon monoxide, oxides of nitrogen, and hydrocarbons.

Evaporative Emissions

Evaporative emissions are fuel emissions and generally include emissions that result from permeation of fuel through the fuel-system materials or from ventilation of the fuel system.

Wacker Neuson utilizes low-permeation fuel lines and fuel tanks where applicable to reduce evaporative emissions.

Problems that may affect Emissions

If any of the following symptoms arise, have the engine/equipment inspected and repaired by a Wacker Neuson dealer/service center.

- Hard starting or stalling after starting
 - Rough idling
 - Misfiring or backfiring under load
 - Afterburning (backfiring)
 - Presence of black exhaust smoke during operation
 - High fuel consumption
-

Emission Control Systems Information and Warranty

Tampering and Altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. If evidence of tampering is found, Wacker Neuson may deny a warranty claim. Among those acts that constitute tampering are:

- Removing or altering of any part of the air intake, fuel, or exhaust systems.
- Altering or defeating the speed-adjusting mechanism causing the engine to operate outside its design parameters.

8.2 Limited Defect Warranty for Wacker Neuson Emission Control Systems

The Emission Control Warranty is valid only for the U.S.A., its territories, and Canada.

Wacker Neuson Sales Americas, LLC, N92 W15000 Anthony Avenue, Menomonee Falls, WI 53051, (hereinafter “Wacker Neuson”) warrants to the initial retail purchaser, and each subsequent owner, that this engine/equipment, including all parts of its emission control systems, have been designed, built, and equipped to conform at the time of initial sale to all applicable emission regulations of the U.S. Environmental Protection Agency (EPA), and that the engine/equipment is free of defects in materials and workmanship which would cause this engine/equipment to fail to conform to EPA regulations during its warranty period.

Wacker Neuson is also liable for damages to other engine/equipment components caused by a failure of any warranted parts during the warranty period.

Limited Defect Warranty Period for Wacker Neuson Emission Control Systems

The warranty period for this engine/equipment begins on the date of sale to the initial purchaser and continues for a minimum of two (2) years. For the warranty terms for your specific engine/equipment, visit wackerneuson.com.

Any implied warranties are limited to the duration of this written warranty.

What is covered

Wacker Neuson recommends the use of genuine Wacker Neuson parts, or the equivalent, whenever maintenance is performed. The use of replacement parts not equivalent to the original parts may impair the effectiveness of the engine/equipment emission controls systems. If such a replacement part is used in the repair or maintenance of the engine/equipment, assure yourself that such part is warranted by its manufacturer to be equivalent to the parts offered by Wacker Neuson in performance and durability. Furthermore, if such a replacement part is used in the repair or maintenance of the engine/equipment, and an authorized Wacker Neuson dealer/service center determines it is defective or causes a failure of a warranted part, the claim for repair of the engine/equipment may be denied. If the part in question is not related to the reason the engine/equipment requires repair, the claim will not be denied.

For the components listed in the following table, an authorized Wacker Neuson dealer/service center will, at no cost to you, make the necessary diagnosis, repair, or replacement necessary to ensure that the engine/equipment complies with the

Emission Control Systems Information and Warranty

applicable EPA regulations. All defective parts replaced under this warranty become property of Wacker Neuson.

Exhaust Emissions

Systems Covered	Components
Fuel metering system	Carburetor and internal parts
	Air/fuel ratio feedback system (if applicable)
	Cold start enrichment system (if applicable)
	Regulator assembly (if applicable)
Exhaust system	Catalytic muffler (if applicable)
	Exhaust manifold (if applicable)
Air induction system	Air filter housing
	Air filter element*
	Intake manifold (if applicable)
Ignition system	Flywheel magneto
	Ignition module
	Electronic controls (if applicable)
	Spark advance/retard system (if applicable)
	Spark plug cap
	Spark plug*
Miscellaneous parts associated with the exhaust emission control system	Tubing
	Fittings
	Seals
	Gaskets
	Clamps

* Indicates expendable maintenance items. Warranted only to first scheduled replacement point.

Evaporative Emissions

Systems Covered	Components
Evaporative control system	Fuel tank (if applicable)
	Fuel tank cap (if applicable)
	Fuel line (if applicable)
	Fuel line fittings (if applicable)
	Clamps (if applicable)
	Carbon canister (if applicable)
	Purge port connector (if applicable)
Miscellaneous parts associated with the evaporative emission control system	Clamps
	Gaskets
	Mounting brackets

Emission Control Systems Information and Warranty

What is not covered

- Failures other than those resulting from defects in material or workmanship.
 - Any systems or parts which are affected or damaged by owner abuse, tampering, neglect, improper maintenance, misuse, improper fueling, improper storage, accident and/or collision; the incorporation of, or any use of, add-on or modified parts, or unsuitable attachments, or the alteration of any part.
 - Replacement of expendable maintenance items made in connection with required maintenance services after the item's first scheduled replacement as listed in the maintenance section of the engine/equipment operator's manual, such as spark plugs and filters.
 - Incidental or consequential damages such as loss of time or the use of the engine/equipment, or any commercial loss due to the failure of the engine/equipment.
 - Diagnosis and inspection charges that do not result in warranty-eligible service being performed.
 - Any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.
-

Owner's Warranty Responsibility

The engine/equipment owner is responsible for the performance of the required maintenance listed in the Wacker Neuson engine/equipment operator's manual. Wacker Neuson recommends that all receipts covering maintenance on the engine/equipment be retained, but Wacker Neuson cannot deny warranty coverage solely for the lack of receipts or for the failure to ensure the performance of all scheduled maintenance.

Normal maintenance, replacement, or repair of emission control devices and systems may be performed by any repair establishment or individual; however, warranty repairs must be performed by an authorized Wacker Neuson dealer/service center.

The engine/equipment must be presented to an authorized Wacker Neuson dealer/service center as soon as a problem exists. Contact Wacker Neuson Product Support Department (1-800-770-0957) or visit wackerneuson.com to find a dealer/service center in your area, or to answer questions regarding warranty rights and responsibilities.

How to Make a Claim

In the event that any emission-related part is found to be defective during the warranty period, you shall notify Wacker Neuson Product Support Department (1-800-770-0957), and you will be advised of the appropriate dealer/service center where warranty repair can be performed. All repairs qualifying under this limited warranty must be performed by an authorized Wacker Neuson dealer/service center.

You must take your Wacker Neuson engine/equipment along with proof of original purchase date, at your expense, to the authorized Wacker Neuson dealer/service center during their normal business hours.

Emission Control Systems Information and Warranty

For owners located more than 100 miles from an authorized dealer/service center (excluding the states with high-altitude areas as identified in 40 CFR Part 1068, Appendix III), Wacker Neuson will pay for pre-approved shipping costs to and from an authorized Wacker Neuson dealer/service center.

Claims for repair or adjustment found to be caused solely by defects in material or workmanship will not be denied because the engine/equipment was not properly maintained and used.

The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.



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