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Operating the machine

Perform the procedure below to operate the rammer.

1. Move the throttle to the full position **(c3)**. The choke will open automatically.
2. Guide the rammer's direction of travel. Allow the rammer to pull itself forward. Do not try to overpower the rammer.

CAUTION

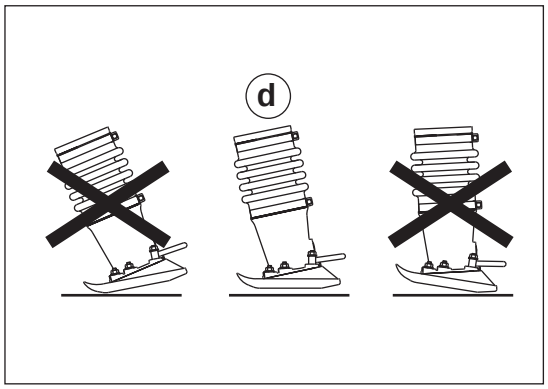
Do not lift or move the rammer to another location while it is operating. You may lose control of it.

► Stop the engine before lifting or moving the rammer to another location.

► Restart the engine only after the rammer is in place.

Safe operating practices

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



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- Guide the rammer in such a way that you are not squeezed between the rammer and solid objects.
- Make sure you have solid footing when operating the rammer on uneven ground or when compacting coarse material.

Stopping the machine

1. Place the throttle in the idle position **(c2)**.
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.

4.9 Emergency Shutdown Procedure

Procedure

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

1. Reduce engine speed to idle.
2. Stop the engine.
3. Close the fuel valve.
4. Contact the rental yard or machine owner for further instructions.

4.10 Selecting and Adjusting the Ramming Stroke—BS 65-V

Overview

The length of the ramming stroke directly affects the impact force delivered by the rammer. Selecting the appropriate stroke depends on job requirements and soil conditions.

The ramming stroke is adjusted by rotating a locking lever inside the housing.

WARNING
Personal injury hazards.

► Observe the safety requirements described below when adjusting the ramming stroke.

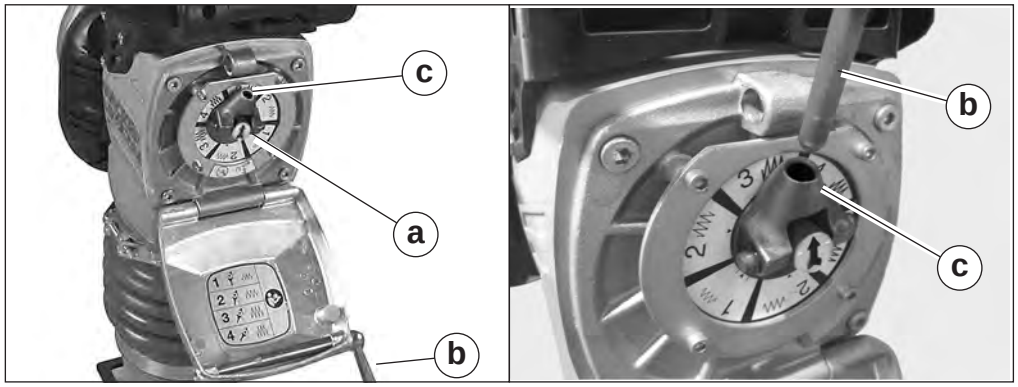
Safety requirements

To avoid injuring yourself and others:

- Always stop the engine before adjusting the ramming stroke. The clutch could engage, causing the rammer to jump unexpectedly.
- Adjust the ramming stroke with machine standing upright and resting on a firm, level surface.
- Do not adjust the ramming stroke if the machine is in an unstable position where it can easily tip or slide.
- Adjustment should be performed by one person and with no one else near the machine. The tool used to make the adjustment could slip out of your hands and strike someone standing nearby.
- Do not operate the rammer with the stroke adjusting cover open. The locking lever rotates rapidly and could catch on skin or clothing.

Location

The locking lever **(a)** is located inside the housing. The removable adjusting tool **(b)** fits into the bore **(c)** on the locking lever.



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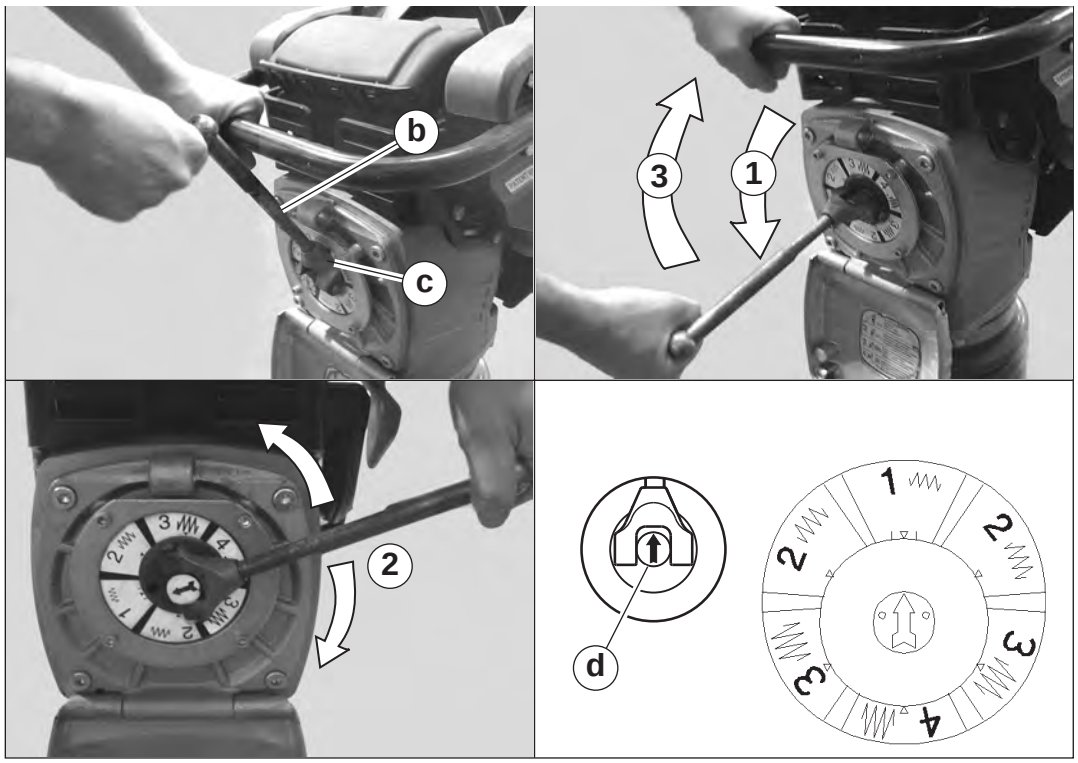
Adjusting the ramming stroke

Perform the procedure below to adjust the ramming stroke.

1. Remove the adjusting tool **(b)** from the housing cover. Open the housing cover.



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2. Verify that the arrow **(d)** at the center of the locking lever is pointing up.

WARNING
Crushing hazard. If the arrow is pointing down, the spring system is not balanced. The top half of the rammer could drop unexpectedly while making the stroke adjustment.

► If the arrow is pointing down, balance the spring system as described below.

To balance the spring system, stand behind the rammer and use the guide handle to rock the machine back and forth until you feel the spring system relax. The arrow should now be facing up.

3. Steady the rammer by holding the guide handle. Insert the adjusting tool **(b)** into the bore **(c)**. Make sure it is fully seated and will not slip out. Using the adjusting tool for leverage, push the locking lever straight down until it is completely disengaged. (Refer to Operation 1 in the illustration.)
4. Using the adjusting tool, rotate the locking lever until the center arrow points to the desired stroke setting (Operation 2).

Note: *There are two positions for stroke settings 2 and 3. Either position can be selected—the result will be the same.*

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Note: *Choosing a stroke setting applies tension to the spring system. This tension will release as the locking lever is returned back to its locked position. When this happens, the rammer will settle, causing the handle and crankcase to drop down. The movement is slight but happens quickly. Be aware of this when moving the locking lever.*

5. Push or pull the adjusting tool to move the locking lever back to its locked position (Operation 3). When the locking lever is halfway between the locked and unlocked position, the spring system will settle and move as described in the warning above.
6. Remove the adjusting tool. Close the housing cover and lock it in place with the adjusting tool.

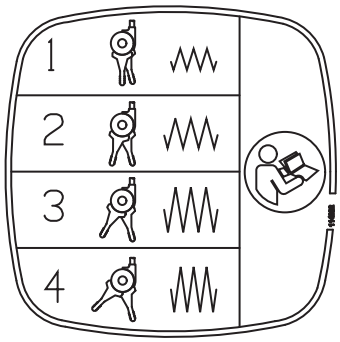
Result

The ramming stroke has now been selected. Operate the machine at the corresponding throttle setting as shown on the chart below.

Selecting the ramming stroke

The label located inside the housing cover indicates the general compaction application, together with approximate throttle settings and impact levels for each stroke level. It should be used as a general guide when selecting the appropriate ramming stroke.

Summary of Stroke and Throttle Settings				
Stroke Setting	**Throttle Position**	**Percussion Blows/Min.**	**Stroke at Ramming Shoe mm (in.)**	**Applications**
1	1/4–1/2	750	up to 25 (1)	smoothing
2	1/2–3/4	650	up to 65 (2.6)	normal compaction
3	3/4–full load	650	up to 75 (3)	heavy compaction
4	full load	600	up to 80 (3.2)	wet and cohesive soils; not for hard soils which are difficult to compact



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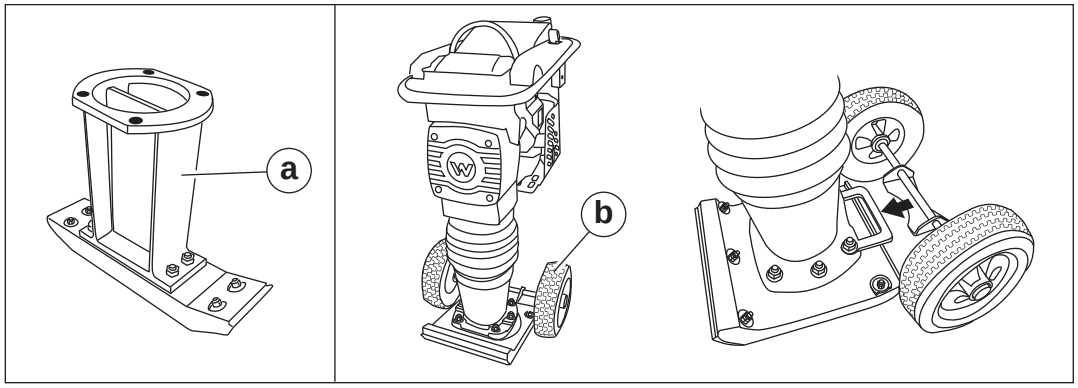
4.11 Optional Equipment

The following optional equipment is available:

- Foot extensions **(a)**—a narrow rammer foot for use in compacting trenches and in areas of limited clearance. Available sizes are 102 mm x 102 mm (4 in. x 4 in.) and 102 mm x 309 mm (4 in. x 12 in.).
- Wheel kit **(b)**—solid rubber tires joined to a steel axle, attached to the lifting handle by means of a slip-on retaining plate.



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Contact your Wacker Neuson dealer for ordering information.

5 Maintenance

WARNING
A poorly maintained machine can malfunction, causing injuries or permanent damage to the machine.

► Keep the machine in safe operating condition by performing periodic maintenance and making repairs as needed.

5.1 Maintaining the Emission Control System

For machines sold in North America:

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 3 months or 300 hours	Every 5 months or 500 hours	Every year
Check air filter. Replace air filter as needed.	✓					
Check ramming system oil level in sightglass.	✓					
Check fuel line and fittings for cracks or leaks. Replace as needed.	■					
Tighten ramming shoe hardware.		■	■			
Inspect the machine.		✓	✓			
Clean engine cooling fins.			✓			
Clean and check spark plug gap.			■			
Change ramming system oil.[1]				■		
Inspect central lifting cable for wear, damage, or abuse.				✓		
Replace in-line fuel filter assembly.					■	
Replace spark plug.						■
Inspect and clean in-tank fuel filter.						✓

[1]Change ramming system oil after first 50 hours of operation.

5.3 Servicing the Air Cleaner

When

Inspect the air filter daily. Replace filter elements as needed.

Requirements

- Engine stopped and cool to the touch
- Replacement filter elements (as needed)
- Mild detergent
- Warm water
- Compressed air

NOTICE: Do not run the engine without the main paper air filter **(b)**. Severe engine damage will occur.

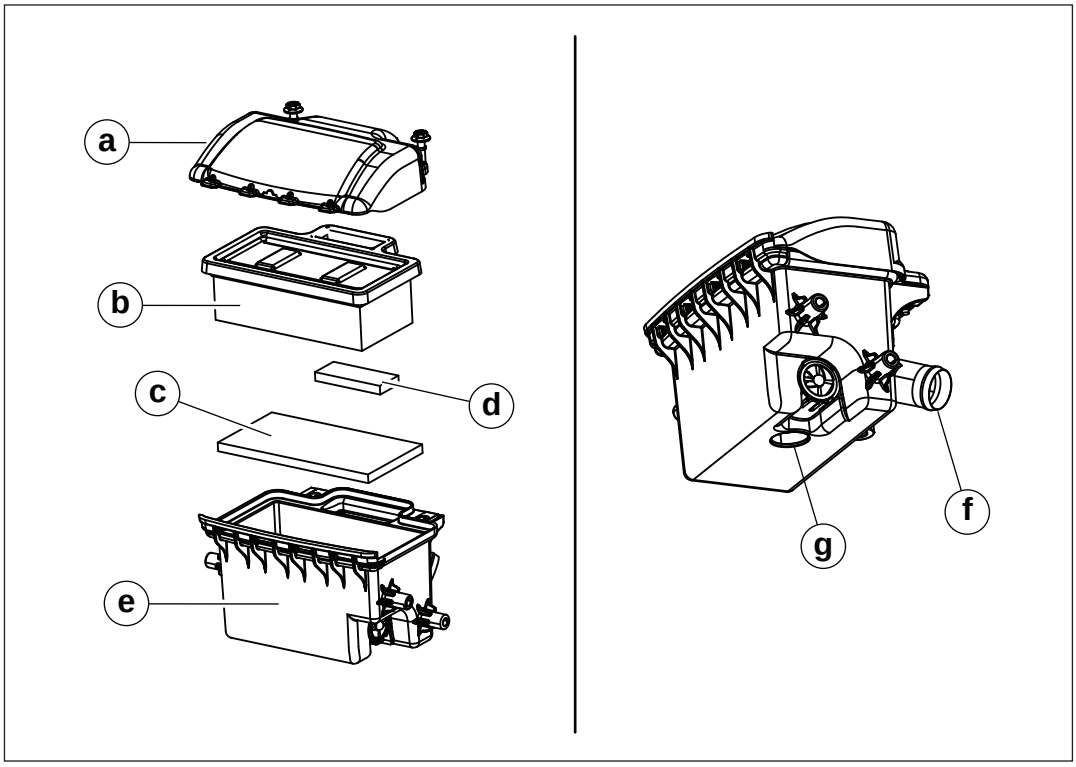
WARNING
Explosion and fire hazards.

► Never use gasoline or other types of low flash point solvents for cleaning the air filter. Use only compressed air, mild detergent, and warm water.

Procedure

Perform the procedure below to clean the filter elements.

1. Remove the air cleaner cover **(a)**.



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2. Remove the main paper filter element **(b)**, foam prefilter **(c),** and foam discharge filter **(d)** and inspect them for holes or tears. Replace the element and filters if they are damaged.
3. Replace the main paper filter element **(b)** if it appears heavily soiled.
4. Clean the foam prefilter and foam discharge filter **(c, d)** with low-pressure compressed air. If the filters are extremely soiled, wash them in a solution of mild detergent and warm water. Rinse the filters thoroughly in clean water. Allow them to dry thoroughly before re-installing.

Note: *Do not oil the foam prefilter or the foam discharge filter.*

5. Wipe out the filter housing **(e)** with a clean cloth. Do not use compressed air.

NOTICE: Do not allow dirt to get into the engine intake port **(f)** while cleaning. Damage to engine will result.

6. Check that the precleaner debris ejector port **(g)** is clear.

Result The air cleaner has now been serviced.

5.4 Checking and Changing the Ramming System Oil

Background

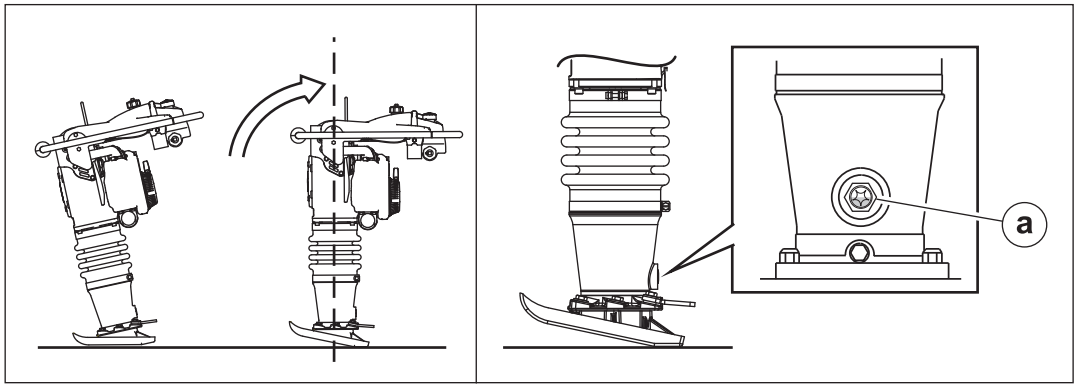
Lubricating oil is distributed throughout the ramming system by the vibrating action of the rammer. Holes drilled in the piston carry oil from the bottom of the rammer to the crankcase as the rammer operates. Oil in the ramming system must be maintained at the correct level to ensure that the ramming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

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



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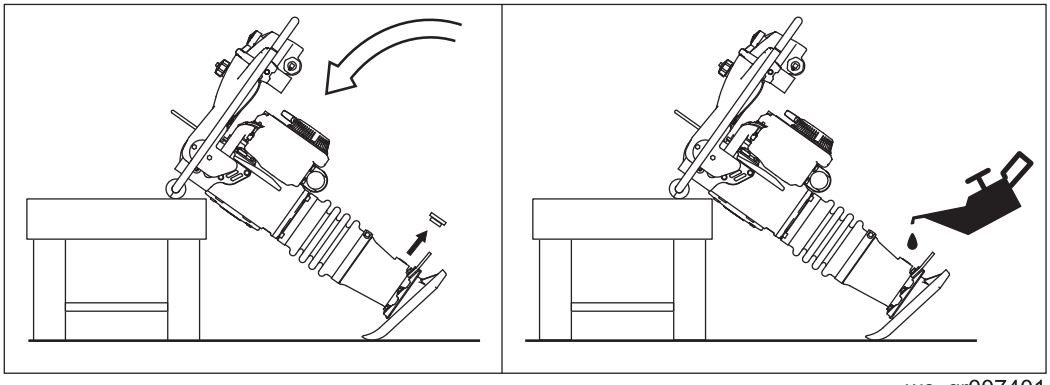
2. Check the oil through the sightglass **(a)**.
   The correct oil level will fill 1/2 to 3/4 of the sightglass. Add more oil if necessary.

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.

1. Tip the rammer forward to allow access to the sightglass. Secure the rammer in this position.



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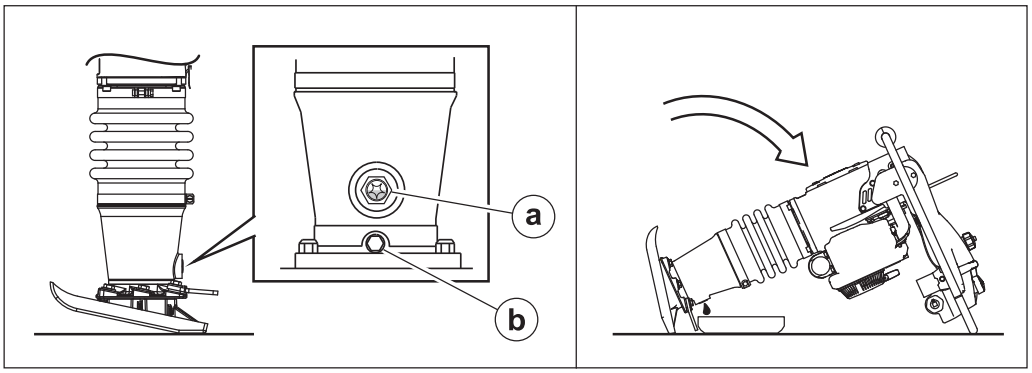
2. Remove the sightglass. Clean the threads of the sightglass, then wrap the threads with Teflon tape.
3. Add oil to the machine through the sightglass opening in the housing.
4. Re-install the sightglass, but do not torque it at this time.
5. Stand the machine upright and check the oil level.
6. Add oil as needed so that it fills 1/2 to 3/4 of the sightglass.
7. 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.*

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



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2. 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.*

3. Re-install the drain plug. Torque it to 54 Nm (40 ft.lbs.).
4. Add oil as stated above.

Result

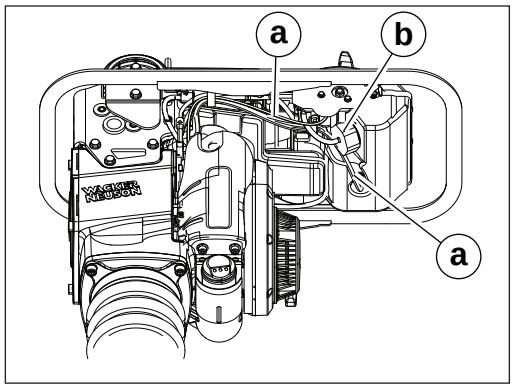
The ramming system oil has now been changed.

5.5 Checking the Fuel Lines and Fittings

When Daily before starting the machine

Procedure

1. Check the fuel lines **(a)** and fittings **(b)** for cracks and leaks.



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2. Repair or replace components as needed.

Result The fuel lines and fittings have now been checked.

5.6 Maintaining the Shoe Hardware

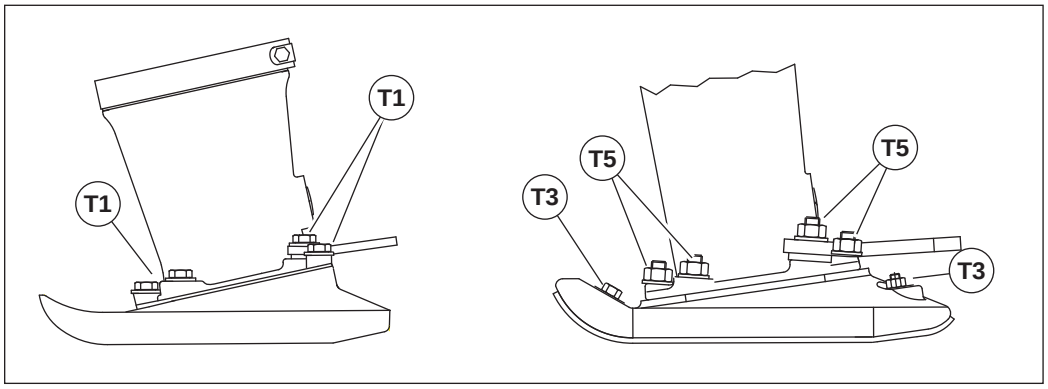
When

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

Procedure

Torque hardware as specified.

Cast Iron Shoe **Plastic Shoe**



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Torque	Nm	ft.lbs.
T1	86	63
T3	19	14
T5	79	58

5.7 Inspecting the Machine

When

After the first five hours, and every week or every 25 hours thereafter (whichever comes first)

Requirements

- Engine stopped
- Machine cool to the touch
- Replacement parts as needed (refer to the Parts Book)

Procedure

1. Perform a walk-around inspection of the machine. Check for:

☐ Loose or missing fasteners

☐ Cracked, corroded, or missing parts

☐ Damaged controls

CAUTION

Injury hazard.

► Do not operate the machine if any safety devices, guards, controls, or fasteners are loose, missing, or inoperative.

2. Tighten loose fasteners. Replace missing fasteners as needed.
3. Replace damaged or missing parts. 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.

Result

The machine has now been inspected.

5.8 Cleaning the Engine Cooling Fins

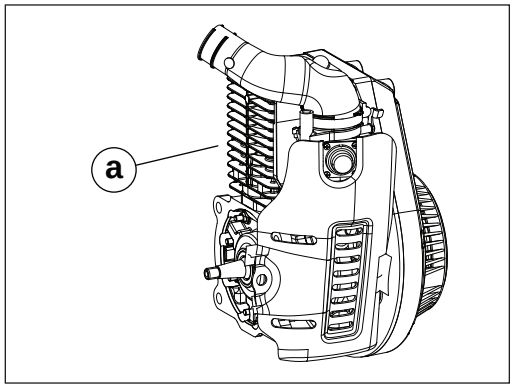
When Every week, or every 25 hours (whichever comes first)

Background Clean engine cooling fins allow fresh air to freely circulate around the combustion chamber. Free air circulation is necessary to prevent the engine from overheating.

Requirements
- Engine stopped and cool to the touch
- Compressed air

Procedure Perform the procedure below to clean the engine cooling fins.

1. Locate the engine cooling fins **(a)**.



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2. Use compressed air to blow dirt and debris off the engine cooling fins.

Result The engine cooling fins have been cleaned.

5.9 Cleaning and Checking the Spark Plug

When Every week, or every 25 hours (whichever comes first)

Requirements

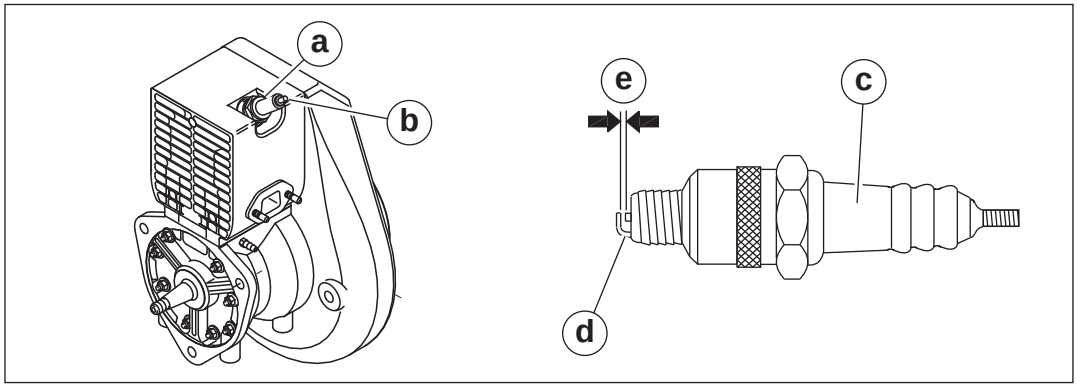
- Engine stopped and cool to the touch
- Spark plug wrench
- Spark plug gap tool
- Wire brush
- Replacement spark plug as needed (see *Technical Data*)

WARNING
Burn hazard. The engine and muffler become very hot during operation and require cool-down time after the engine is stopped.

► Do not touch the engine, muffler, or spark plug until the machine is cool.

Procedure Perform the procedure below to clean and check the spark plug.

1. Disconnect the spark plug wire **(b)** and remove the spark plug **(a)**.



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2. Inspect the spark plug. Replace the spark plug if the insulator **(c)** is cracked or chipped.
3. Clean spark plug electrodes **(d)** with a wire brush to remove carbon deposits.
4. Check the electrode gap **(e)** and adjust as needed. See *Technical Data* for the recommended gap setting.
5. Reinstall the spark plug and torque it to 35–41 Nm (25.8–30.2 ft.lbs.).

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

Result The spark plug has now been cleaned and checked.

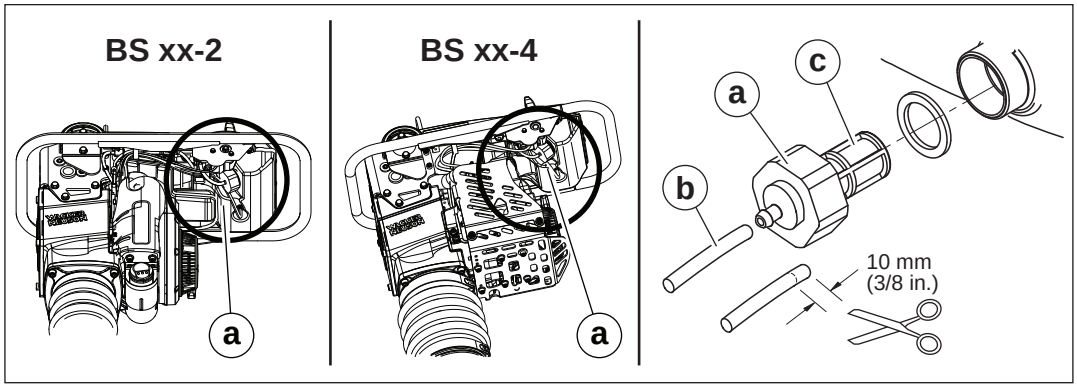
5.10 Inspecting and Cleaning the Fuel Filter

When Every year or every 1200 hours (whichever comes first)

Requirements
- Engine stopped
- Fuel tank empty
- Clean, dry, lint-free cloth
- Replacement fuel filter (as needed)

Procedure Perform the procedure below to clean the fuel filter.

1. Clamp, then disconnect the fuel hose **(b)** from the fuel filter **(a)**.



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2. Unscrew and remove the fuel filter.
3. Wipe visible sediment or debris from the exterior of the fuel filter screen **(c)** using a clean, dry, lint-free cloth.
4. Inspect the fuel filter screen for cracks or damage. Replace the fuel filter if it is damaged.
5. Re-install the fuel filter.
6. To ensure a proper connection, cut approximately 10 mm (3/8 in.) from the end of the fuel hose, then connect it to the fuel filter.
7. Check for fuel leaks before restarting the machine.

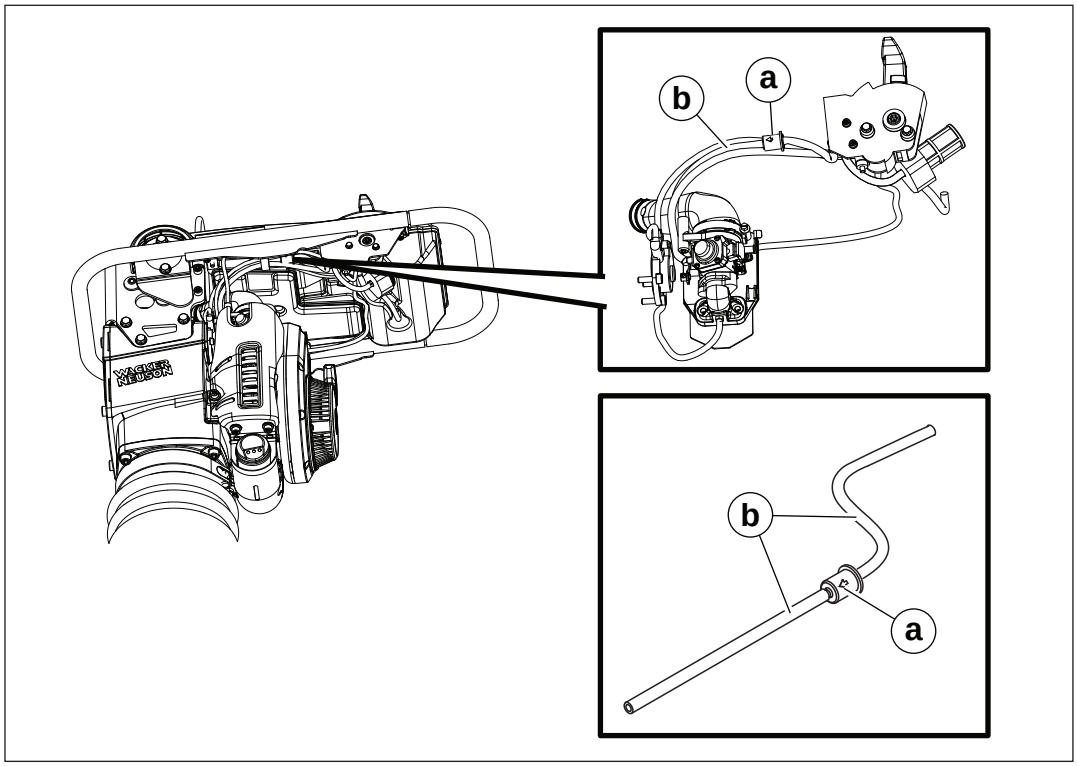
Result The fuel filter has now been inspected and cleaned.

5.11 Replacing the In-Line Fuel Filter Assembly

When Every 5 months or every 500 hours (whichever comes first)

Requirements
- Engine stopped
- Replacement in-line fuel filter assembly

Procedure Perform the procedure below to replace the in-line fuel filter assembly**.** The in-line fuel filter assembly consists of the fuel filter **(a)** and two hoses **(b)**.



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1. Set the throttle to the OFF position. This will close the fuel valve.
2. Remove the existing in-line fuel filter assembly and discard it in accordance with local environmental protection regulations.
3. Connect the new in-line fuel filter assembly, making sure to orient the fuel filter as shown in the illustration.
4. Set the throttle to the IDLE position. This will open the fuel valve.
5. Check for fuel leaks before restarting the machine.

Result The in-line fuel filter assembly has now been replaced.

5.12 Adjusting the Idle Speed

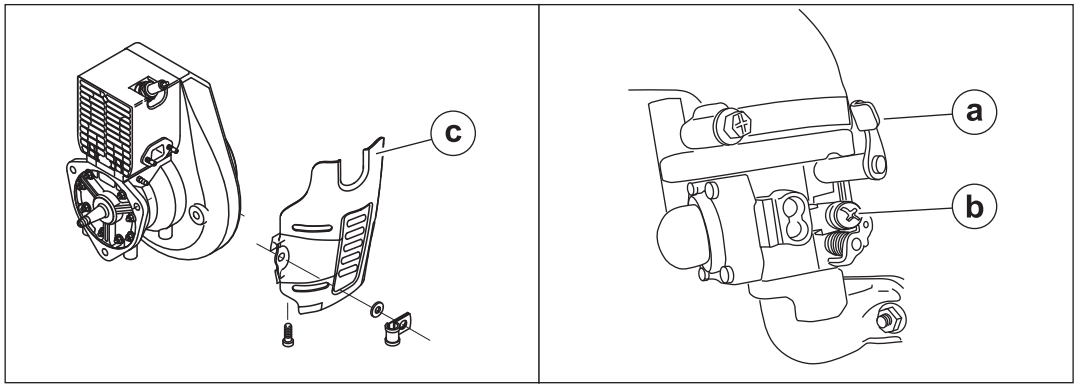
Requirements

- Tachometer
- Phillips screwdriver

Procedure

Perform the procedure below to adjust the idle speed.

1. Remove the guard **(c)**.



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2. Start the engine and allow it to warm up to operating temperature.
3. Using the tachometer, set the engine idle speed with engine running at idle and choke **(a)** fully open.
4. Adjust idle speed screw **(b)** in or out to obtain correct idle speed. Refer to *Technical Data* for correct idle and operating rpm.

NOTICE: Do not over-tighten the idle speed screw. Damage to the carburetor may occur.

5. Re-install the guard.

Result

The idle speed has now been adjusted.

5.13 Long-Term Storage

Introduction

This machine requires preventive maintenance before long-term storage. Performing preventive maintenance helps to preserve machine components and ensures that the machine will be ready for future use.

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.

1. Complete any needed repairs.
2. Replenish or change oils (engine, ramming system, etc.) per the intervals specified in the Periodic Maintenance table.
3. 4-cycle machines only: 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).
- Add the correct amount of stabilizer per the manufacturer's recommendations.

Storing the machine

Perform these remaining steps to store your machine.

1. Wash the machine and allow it to dry.
2. Move the machine to a clean, dry, secure storage location.
3. Secure the machine in an upright position.
4. Cover the machine.

5.14 Machine Disposal / Decommissioning

Introduction

This machine must be properly decommissioned at the end of its service life. Responsible disposal of recyclable components, such as plastic and metal, ensures that these materials can be reused—conserving landfill space and valuable natural resources.

Responsible disposal also prevents toxic chemicals and materials from harming the environment. The operating fluids in this machine, including fuel, engine oil, ramming system oil, and grease, may be considered hazardous waste in many areas. Before decommissioning this machine, read and follow local safety and environmental regulations pertaining to the disposal of construction equipment.

Preparation

Perform the following tasks to prepare the machine for disposal.

- ☐ Move the machine to a protected location where it will not pose any safety hazards and cannot be accessed by unauthorized individuals.
- ☐ Ensure that the machine cannot be operated from the time of final shutdown to disposal.
- ☐ Drain all fluids, including fuel, engine oil, and ramming system oil.
- ☐ Seal any fluid leaks.

Disposal

Perform the following tasks to dispose of the machine.

- ☐ Disassemble the machine and separate all parts by material type.
- ☐ Dispose of recyclable parts as specified by local regulations.
- ☐ Dispose of all non-hazardous components that cannot be recycled.
- ☐ Dispose of waste fuel, oil, and grease in accordance with local environmental protection regulations.

6 Troubleshooting

Problem	Cause	Remedy
Engine does not start, or stalls.	No fuel in tank	Add fuel.
	Spark plug fouled	Clean or replace spark plug.
Engine does not accelerate, is hard to start, or runs erratically.	Spark plug fouled	Clean or replace spark plug.
	Obstructed muffler and/or exhaust port	Clear obstructions.
	Dirty or clogged air cleaner	Service air cleaner.
Engine overheats.	Dirty cooling fins	Clean the cooling fins.
Engine runs, but rammer does not tamp.	Obstructed exhaust port	Clear obstructions.
Engine runs, but rammer operation is erratic.	Oil or grease on clutch	Remove oil/grease from clutch.
	Soil buildup on ramming shoe	Clean soil from ramming shoe.
	Engine operating speed too high	Adjust engine operating speed.
Oil injection models only: Engine starts and runs for a short time—approximately 30 seconds—then stops.	Low oil level	Add oil to oil tank.

7 Technical Data

7.1 BS 50-2i

Machine		BS 50-2i
Engine model	—	WM80
Engine speed - operating	rpm	4400 ± 100
Engine speed - idle	rpm	2000 ± 100
Maximum rated power @ rated speed[1]	kW (hp)	1.7 (2.2) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four-stage with cyclonic precleaner
Fuel specification	type	Regular unleaded gasoline (minimum 85 octane)
Oil specification, 2-cycle	type	Wacker Neuson 2-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification.
Oil tank capacity	L (qt)	1.3 (1.4)
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.0 (1.1)
Running time	hr	2.9
Ramming system lubrication	type	SAE 10W30
Ramming system oil capacity	ml (oz.)	710 (24)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.2 BS 50-2i Operating Weight

Machine Item Number		**BS 50-2i** 5200000642 5200000660 5200000687 5200000678 5200025428	**BS 50-2i** 5200000643 5200000658 5200000659 5200000687 5200025429	**BS 50-2i** 5200000661	**BS 50-2i** 5200000657 5200011099
Operating weight	kg (lb)	59 (131)	58 (129)	57 (126)	56 (124)

7.3 BS 60-2i

Machine		BS 60-2i
Engine model	—	WM80
Engine speed - operating	rpm	4400 ± 100
Engine speed - idle	rpm	2000 ± 100
Max. rated power @ rated speed[1]	kW (hp)	1.8 (2.4) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four stage with cyclonic precleaner
Fuel specification	type	Regular unleaded gasoline
Oil specification, 2-cycle	type	Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification
Oil tank capacity	L (qt)	1.3 (1.4)
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.2 (1.3)
Running time	hr	2.5
Ramming system lubrication	type	SAE 10W30
Ramming system capacity	ml (oz.)	890 (30)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.4 BS 60-2i Operating Weight

Machine **Item Number**		**BS 60-2i** 5200000645 5200000664 5200000682 5200000689 5200000690	**BS 60-2i** 5200000646 5200000665
Operating weight	kg (lb)	66 (145)	64 (141)

7.5 BS 70-2i

Machine		BS 70-2i
Engine model	—	WM80
Engine speed - operating	rpm	4400 ± 100
Engine speed - idle	rpm	2000 ± 100
Max. rated power @ rated speed[1]	kW (hp)	2.0 (2.7) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four stage with cyclonic precleaner
Fuel specification	type	Regular unleaded gasoline
Oil specification, 2-cycle	type	Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification
Oil tank capacity	L (qt)	1.3 (1.4)
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.3 (1.4)
Running time	hr	2.3
Ramming system lubrication	type	SAE 10W30
Ramming system capacity	ml (oz.)	890 (30)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.6 BS 70-2i Operating Weight

Machine **Item Number**		**BS 70-2i** 5200000649, 5200000650, 5200000672, 5200000673
Operating weight	kg (lb)	74 (164)

7.7 BS 50-2

Machine		BS 50-2
Engine model	—	WM80
Engine speed - operating	rpm	4400
Engine speed - idle	rpm	2000 ± 100
Max. rated power @ rated speed[1]	kW (hp)	1.7 (2.2) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four-stage with cyclonic precleaner
Fuel specification	—	Gasoline-oil mixture
Gasoline/2-cycle oil mixing ratio	—	50:1 – 100:1
Oil specification, 2-cycle	—	Use only Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification. A gasoline/oil ratio in a range from 50:1 to 100:1 can be used. For optimum engine performance and durability, a 100:1 ratio with a fully synthetic oil meeting the specification described above is preferred.
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.2 (1.3)
Running time	hr	2.9
Ramming system lubrication	type	SAE 10W30
Ramming system oil capacity	ml (oz.)	710 (24)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.8 BS 50-2 Operating Weight

Machine Item Number		BS 50-2 5200000641	BS 50-2 5200000655	BS 50-2 5200000653 5200000652	BS 50-2 5200000654 5200000685 5200000686	BS 50-2 5200000656
Operating weight	kg (lb)	59 (129)	59 (131)	56 (124)	58 (129)	57 (126)

7.9 BS 60-2

Machine		BS 60-2
Engine model	—	WM80
Engine speed - operating	rpm	4400
Engine speed - idle	rpm	2000 ± 100
Max. rated power @ rated speed[1]	kW (hp)	1.8 (2.4) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL95YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four-stage with cyclonic precleaner
Fuel specification	—	Gasoline-oil mixture
Gasoline/2-cycle oil mixing ratio	—	50:1 – 100:1
Gasoline specification	—	Regular unleaded gasoline (minimum 85 octane)
Oil specification, 2-cycle	—	Use only Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification. A gasoline/oil ratio in a range from 50:1 to 100:1 can be used. For optimum engine performance and durability, a 100:1 ratio with a fully synthetic oil meeting the specification described above is preferred.
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.2 (1.3)
Running time	hr	2.5
Ramming system lubrication	type	SAE 10W30
Ramming system oil capacity	ml (oz.)	890 (30)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.10 BS 60-2 Operating Weight

Machine Item Number		BS 60-2 5200000663, 5200000688, 5200019205
Operating weight	kg (lb)	66 (143)

7.11 BS 70-2

Machine		BS 70-2
Engine model	—	WM80
Engine speed - operating	rpm	4400
Engine speed - idle	rpm	2000 ± 100
Max. rated power @ rated speed[1]	kW (hp)	2.0 (2.7) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0,76
Cylinder head compression (cold)	bar/cm^2 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four-stage with cyclonic precleaner
Fuel specification	—	Gasoline-oil mixture
Gasoline/2-cycle oil mixing ratio	—	50:1 – 100:1
Oil specification, 2-cycle	—	Use only Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification. A gasoline/oil ratio in a range from 50:1 to 100:1 can be used. For optimum engine performance and durability, a 100:1 ratio with a fully synthetic oil meeting the specification described above is preferred.
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.3 (1.4)
Running time	hr	2.3
Ramming system lubrication	type	SAE 10W30
Ramming system oil capacity	ml (oz.)	890 (30)

[1]Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.

7.12 BS 70-2 Operating Weight

Machine Item Number		BS 70-2 5200000670, 5200000671
Operating weight	kg (lb)	74 (164)

7.13 BS 65-V

Machine		BS 65-V
Engine model	—	WM80
Engine speed - operating	rpm	4400 ± 100
Engine speed - idle	rpm	1800 ± 100
Max. rated power @ rated speed[1]	kW/hp	2.0 (2.7) @ 4400 rpm
Clutch engagement	rpm	2500 ± 100
Spark plug	type	Champion QL87YC
Electrode gap	mm (in.)	0.76 (0.030)
Cylinder head compression (cold)	bar/cm^3 (psi)	8.0–9.7 (120–140)
Air cleaner	type	Four-stage with cyclonic precleaner
Fuel specification	—	Gasoline-oil mixture
Gasoline/2-cycle oil mixing ratio	—	50:1 – 100:1
Oil specification, 2-cycle	—	Use only Wacker Neuson two-cycle or other fully synthetic oil meeting the NMMA TC-W3, JASO FD, or ISO-L-EGD specification. A gasoline/oil ratio in a range from 50:1 to 100:1 can be used. For optimum engine performance and durability, a 100:1 ratio with a fully synthetic oil meeting the specification described above is preferred.
Fuel tank capacity	L (qt)	3.0 (3.2)
Fuel consumption	L (qt)/hr	1.2 (1.3)
Running time	hr	2.5
Ramming system lubrication	oil grade	SAE 10W30, service class SJ or higher
Ramming system oil capacity	ml (oz.)	890 (30)

[1] *Net engine power rating per 80/1269/EEC and ISO 3046-1. Actual power output may vary due to conditions of specific use.*

7.14 BS 65-V Operating Weight

Machine Item Number		BS 65-V 5200000669
Operating weight	kg (lb)	68 (150)

7.15 Sound Measurements

Products are tested for sound pressure level in accordance with EN 500-4:2011.

Sound power level is tested in accordance with European Directive 2000/14/EC - Noise Emission in the Environment by Equipment for use outdoors.

Machine	Sound Pressure at Operator's Location dB(A)	Guaranteed Sound Power dB(A)
BS 50-2i	92	108
BS 60-2i	92	
BS 70-2i	93	
BS 50-2	92	108
BS 60-2	92	
BS 70-2	93	
BS 65-V	92	108

7.16 Vibration Measurements

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

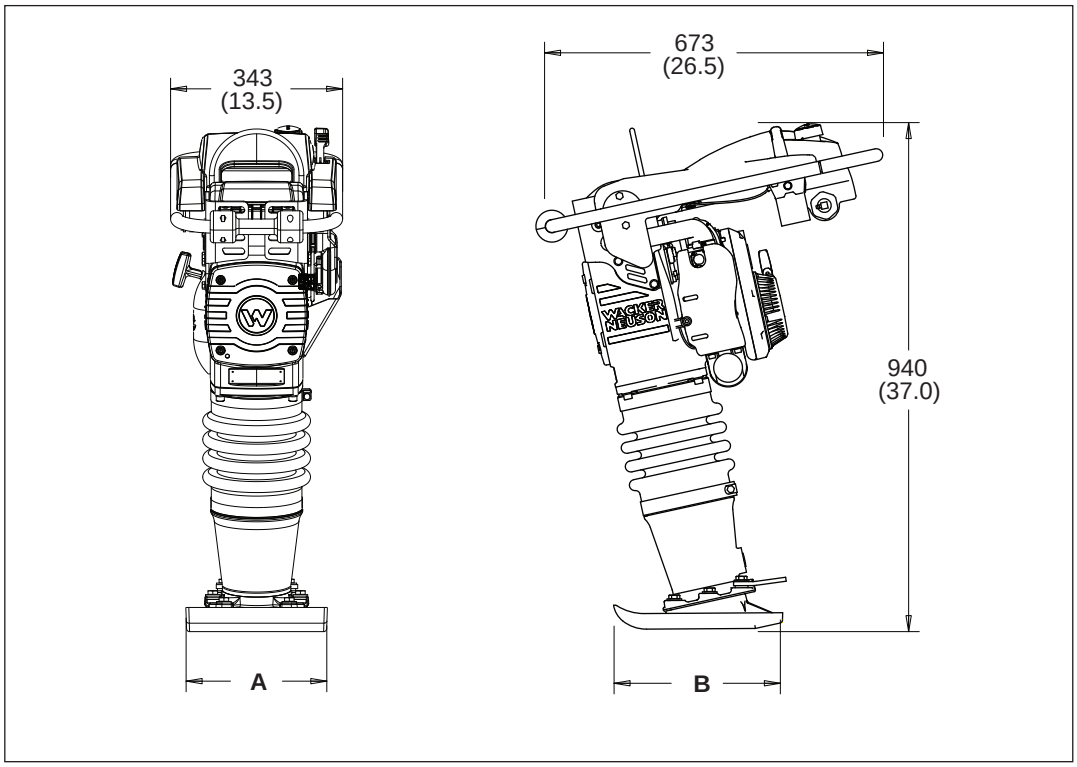
Machine	Item number	HAV m/sec^2	HAV ft/sec^2
BS 50-2i	5200000642, 5200000643, 5200000659, 5200000660, 5200000658, 5200000678, 5200025428, 5200025429	9.8	32.1
	5200000661, 5200000657, 5200011099, 5200000687	5.4	17.7
BS 60-2i	5200000645, 5200000646, 5200000664, 5200000665, 5200000689, 5200000690, 5200000682	7.6	24.9
BS 70-2i	5200000649, 5200000650, 5200000673, 5200000672	6.8	22.3
BS 50-2	5200000655, 5200000654, 5200000685	9.8	32.1
	5200000641, 5200000652, 5200000656, 5200000653, 5200000686	5.4	17.7
BS 60-2	5200000663, 5200000688, 5200019205	7.6	24.9
BS 70-2	5200000670, 5200000671	6.8	22.3
BS 65-V	5200000663	8.6	28.2

HAV Uncertainties

Hand-transmitted vibration was measured per ISO 5349-1. This measurement includes an uncertainty of 1.5 m/s^2.

7.17 Dimensions—BS 50-2i, BS 50-2

mm (in.)



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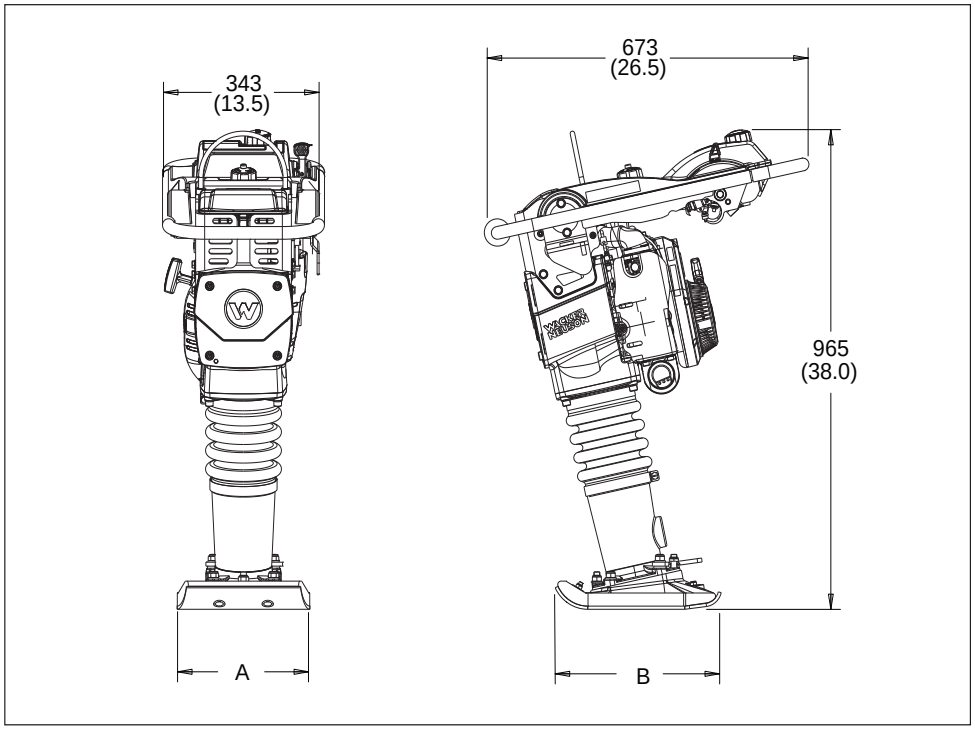
BS 50-2i	BS 50-2	A mm (in.)	B mm (in.)
5200000642 5200000660 5200000687 5200000678 5200025428	5200000656 5200000686	280 (11.03)	337 (13.27)
5200000643 5200000658 5200000659 5200025429	5200000641 5200000654 5200000685	250 (9.84)	337 (13.25)
5200000661 5200000687	5200000655	280 (11.03)	344 (13.55)
5200000657	5200000652	165 (6.50)	337 (13.25)
5200011099	5200000653	190 (7.50)	344 (13.55)

7.18 Dimensions—BS 60-2i, BS 60-2, BS 70-2i, BS 70-2, BS 65-V

mm (in.)



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BS 60-2i	BS 60-2	A mm (in.)	B mm (in.)
5200000645 5200000664 5200000689 5200000682	5200000663 5200000688 5200019205	280 (11.02)	336 (13.25)
5200000646 5200000665 5200000690	—	280 (11.02)	342 (13.45)

BS 70-2i	BS 70-2	A mm (in.)	B mm (in.)
5200000649 5200000673	5200000671	330 (12.99)	342 (13.45)
5200000650 5200000672	5200000670	280 (11.02)	336 (13.25)

BS 65-V	A mm (in.)	B mm (in.)
5200000669	280 (11.02)	336 (13.25)

8 Emission Control Systems Information and Warranty—Gasoline

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

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.

Emission Control Systems Information and Warranty—Gasoline

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 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

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, or technical.support@wackerneuson.com, or wackerneuson.com), 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.

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.

Notes

Important: For spare parts information, please see your Wacker Neuson Dealer, or visit the Wacker Neuson website at http://www.wackerneuson.com/.

Wichtig! Informationen über Ersatzteile erhalten Sie von Ihrem Wacker Neuson Händler oder besuchen Sie die Wacker Neuson Website unter http://www.wackerneuson.com/.

Important : Pour des informations sur les pièces détachées, merci de consulter votre distributeur Wacker Neuson, ou de visiter le site Internet de Wacker Neuson sur http://www.wackerneuson.com/.

Importante : Para saber más sobre las piezas de repuesto, póngase en contacto con su distribuidor de Wacker Neuson o acceda al sitio web de Wacker Neuson en http://www.wackerneuson.com/.

Importante : Per informazioni sui pezzi di ricambio, contattare il rivenditore Wacker Neuson o visitare il sito di Wacker Neuson all'indirizzo www.wackerneuson.com.

Viktigt : För information om reservdelar, kontakta din Wacker Neuson-leverantör eller besök Wacker Neusons webbplats på http://www.wackerneuson.com/.

Tärkeää : Pyydä varaosatietoja Wacker Neusonin jälleenmyyjältä tai vieraile Wacker Neusonin web-sivustolla osoitteessa http://www.wackerneuson.com/

Viktig : For informasjon om reservedeler, vennligst kontakt din Wacker Neuson-forhandler, eller besøk Wacker Neusons nettside på http://www.wackerneuson.com/.

Vigtigt : Hvis du ønsker oplysninger om reservedele, bedes du kontakte din Wacker Neuson forhandler eller besøg Wacker Neuson websiden på http://www.wackerneuson.com/.

Belangrijk! Neem contact op met uw Wacker Neuson dealer of bezoek de website van Wacker Neuson op http://www.wackerneuson.com/ voor meer informatie over reserveonderdelen.

Importante : Para obter informações sobre as peças sobresselentes, consulte o seu fornecedor da Wacker Neuson ou aceda ao site Web da Wacker Neuson em http://www.wackerneuson.com

Ważne : W celu uzyskania informacji na temat części zamiennych skontaktuj się z przedstawicielem firmy Wacker Neuson lub skorzystaj z witryny internetowej http://wackerneuson.com/.

Důležité upozornění! Pro informace o náhradních dílech, prosím, kontaktujte svého Wacker Neuson dealera, nebo navštivte webové stránky http://www.wackerneuson.com/.

FONTOS: A pótalkatrészekre vonatkozó információkért kérjük, forduljon Wacker Neuson kereskedőjéhez vagy látogasson el a Wacker Neuson weboldalára a következő címen: http://www.wackerneuson.com/.

Важно! Для ознакомления с информацией о запасных частях, пожалуйста, обратитесь к местному торговому представителю компании Wacker Neuson или посетите веб-сайт http://www.wackerneuson.com/.

Σημαντικό : Για πληροφορίες σχετικά με τα ανταλλακτικά, μιλήστε με τον αντιπρόσωπό σας της Wacker Neuson, ή επισκεφθείτε τον ιστότοπο http://www.wackerneuson.com/.

Važno : Za rezervne dijelove obratite se svom Wacker Neuson prodavaču ili posjetite mrežne stranice tvrtke Wacker Neuson: http://www.wackerneuson.com/.

Önemli : Yedek parça bilgileri için Wacker Neuson Bayinize bakın veya Wacker Neuson web sitesini ziyaret edin. http://www.wackerneuson.com/

重要 交換部品の情報については、ワッカーノイソンディーラーにお問い合わせ頂くか、ワッカーノイソンウェブサイト http://www.wackerneuson.com/ をご覧ください。

重要 有关备件信息，请咨询您的威克诺森经销商或访问威克诺森网站：http://www.wackerneuson.com/。

Important : Pentru informaţii referitoare la piesele de schimb, vă rugăm să vă adresaţi distribuitorului Wacker Neuson sau să vizitaţi site-ul web Wacker Neuson la adresa http://www.wackerneuson.com/.

Важно : За информация относно резервни части, моля, обърнете се към местния дилър на Wacker Neuson или посетете уебсайта на Wacker Neuson на адрес http://www.wackerneuson.com/.

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