

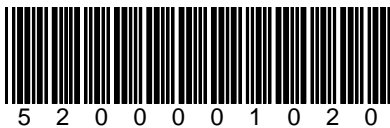
Operator's Manual

Ride-On Trowel

CRT 36-25 **CRT 36-26A**



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notice**

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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.

Machines covered by this manual

Machine	Item Number	Machine	Item Number
CRT 36-26A	0620999	CRT 36-25	0620115
CRT 36-26A	0621000	CRT 36-25	0620295
CRT 36-26A	0621001	CRT 36-25	0620803
CRT 36-26A	0621002	CRT 36-25	0620804

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.
- 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.
- The illustrations, parts, and procedures in this manual refer to Wacker Neuson factory-installed components. Your machine may vary depending on the requirements of your specific region.

**CALIFORNIA
Proposition
65 Warning**

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

**Laws
pertaining to
spark
arresters**

NOTICE: State Health Safety Codes and Public Resources Codes specify that in certain locations spark arresters be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose. In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

**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.



EC Declaration of Conformity

Manufacturer

Wacker Neuson Production Americas LLC, N92W15000 Anthony Avenue,
Menomonee Falls, Wisconsin 53051 USA

Product

Product	CRT V36-26A, CRT 36-24A, CRT 36-25, CRT 48-35V, CRT 48-35L, CRT 48-33K DF
Product category	Trowel
Product function	To smooth and finish semi-cured concrete
Item number	5200008546, 5000620803, 5000620804, 5000620806, 5000620807, 5000621001, 5000621002, 5200002354, 5200007687

Directives and Standards

We hereby declare that this product meets and complies with the relevant regulations and requirements of the following directives and standards:
2006/42/EC, 2004/108/EC, EN12649

Authorized Person for Technical Documents

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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 ride-on concrete finishing trowel. The Wacker Neuson Ride-On Trowel consists of a frame onto which are mounted a gasoline or diesel engine, a fuel tank, a water tank, two gearboxes joined by a drive shaft, and an operator's platform with controls and a seat. A set of metal blades is connected to each gearbox. A ring guard surrounds the blades. The engine rotates the blades via the gearboxes and a clutch mechanism. The rotating blades ride on the surface of curing concrete, creating a smooth finish. The operator, who sits on the operator's platform, uses the controls and the throttle pedal to control speed and direction of the machine.

This machine is intended to be used for floating and burnishing curing concrete.

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 to finish inappropriate materials such as slurries, sealers, or epoxy finishes
 - Operating the machine outside of factory specifications
 - Operating the 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
- Chemical burns from the curing concrete
- Fire hazards from improper refueling techniques
- Fuel and its fumes, fuel spillage from improper lifting technique
- Personal injury from improper lifting techniques
- Cutting hazards from sharp or worn blades

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 Operating Safety



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

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

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

-
- Never operate this machine in applications for which it is not intended.
 - 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.
 - 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.
 - Do not operate the machine with unapproved accessories or attachments.
 - Do not operate the machine with the beltguard missing. Exposed drive belt and pulleys create potentially dangerous hazards that can cause serious injuries.
 - Do not leave the machine running unattended.
 - Do not run the machine indoors or in an enclosed area such as a deep trench unless adequate ventilation, through such items as exhaust fans or hoses, is provided. Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell. Exposure to carbon monoxide can cause loss of consciousness and CAN KILL YOU IN MINUTES.
 - ALWAYS remain aware of moving parts and keep hands, feet, and loose clothing away from the moving parts of the machine.
 - Always wear protective clothing appropriate to the job site when operating the machine.
 - Read, understand, and follow procedures in the Operator's Manual before attempting to operate the machine.
 - Be sure operator is familiar with proper safety precautions and operation techniques before using machine.
 - Close fuel valve on engines equipped with one when machine is not being operated.

- 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.
- Always operate the machine with all safety devices and guards in place and in working order.

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.
- Reinstall 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.
- Use suitable tools for refueling (for example, a fuel hose or funnel).
- 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



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.

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.

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:

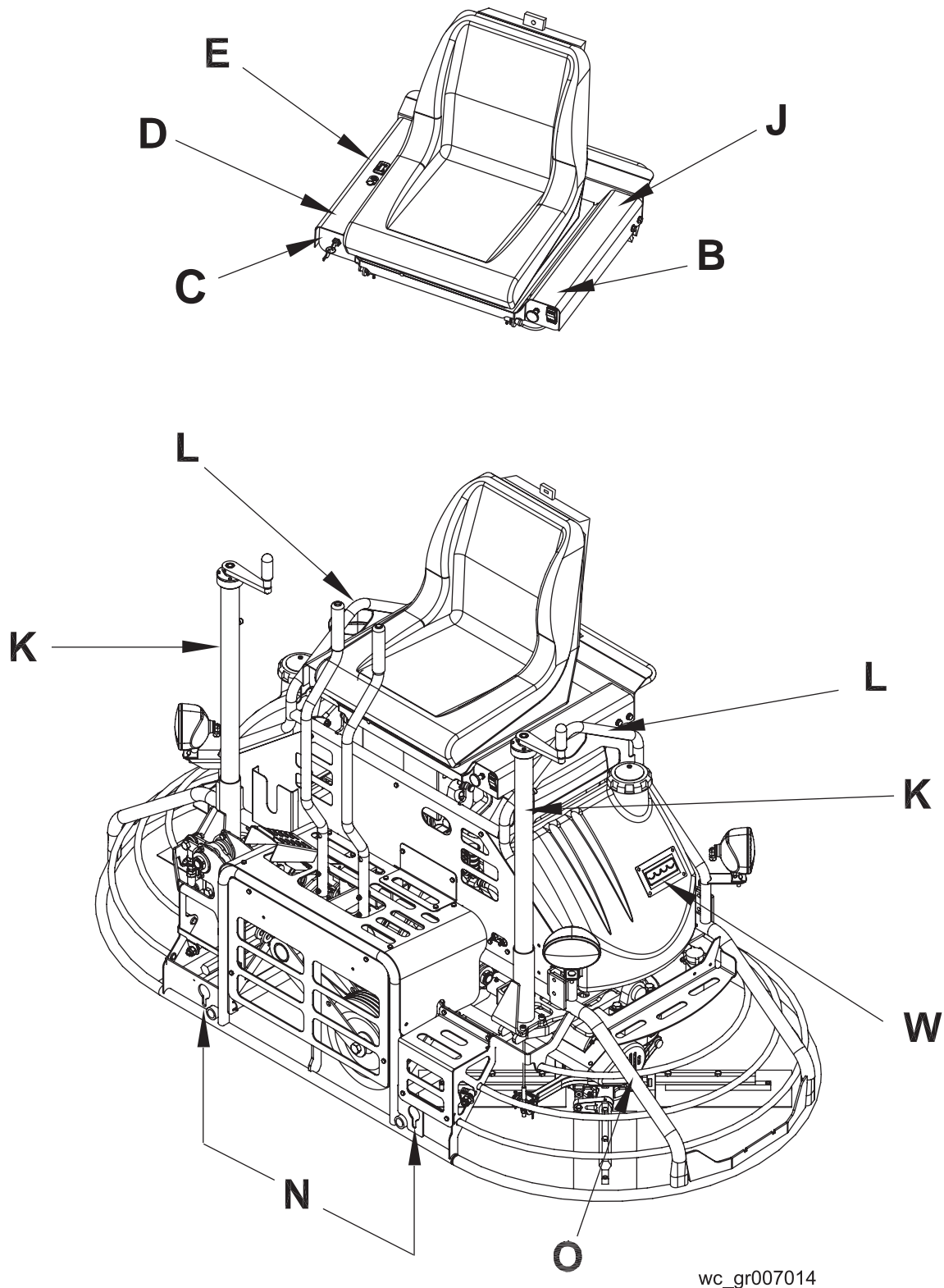
- Tie back long hair.
- Remove all jewelry (including rings).

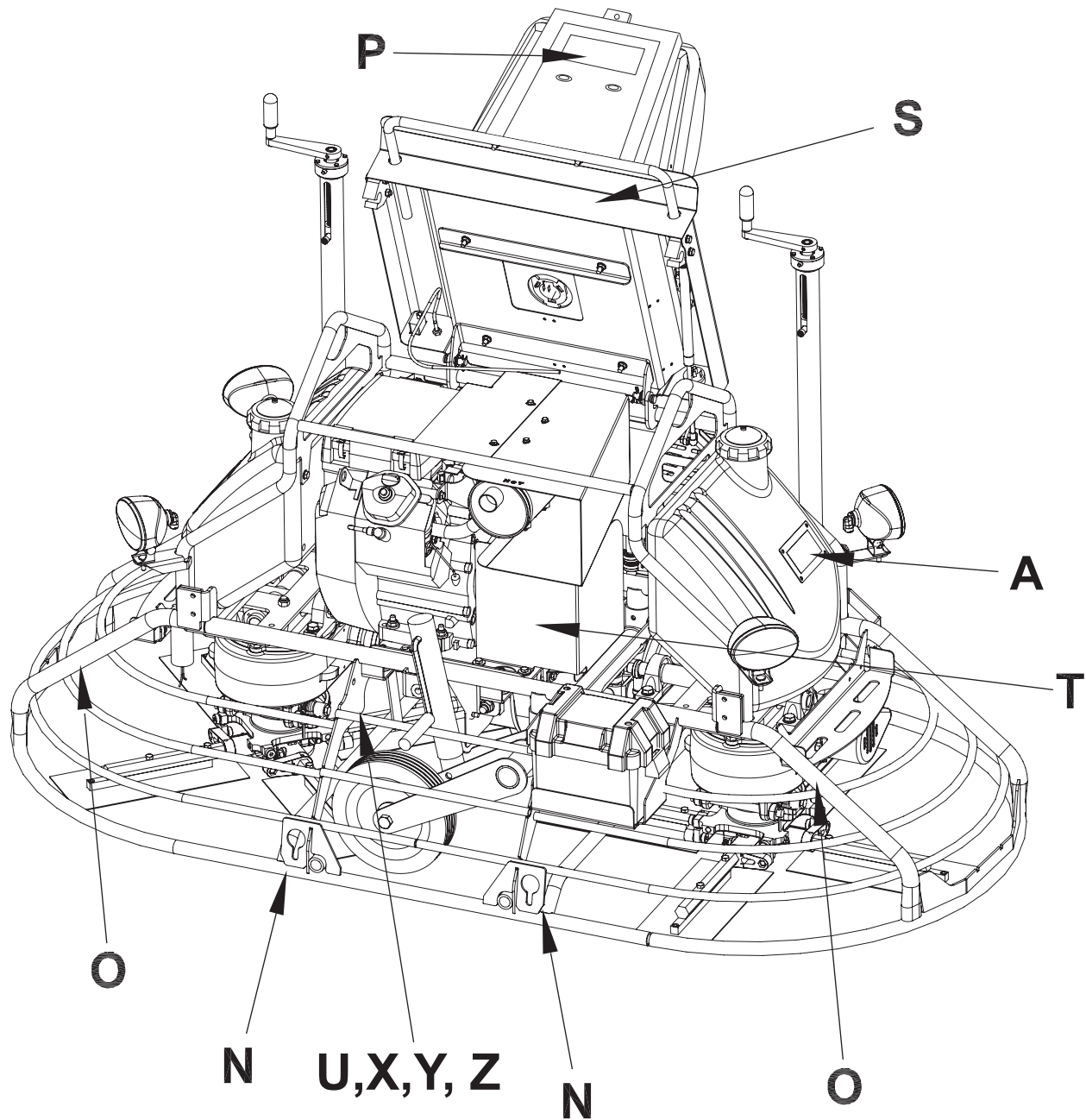
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- Do not attempt to clean or service the machine while it is running. Rotating parts can cause severe injury.
 - Do not crank a flooded engine with the spark plug removed on gasoline-powered engines. Fuel trapped in the cylinder will squirt out the spark plug opening.
 - 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.
 - 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.
 - ALWAYS turn engine off and remove key from machine before performing maintenance or making repairs.
 - Handle blades carefully. The blades can develop sharp edges which can cause serious cuts.
 - 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.

- 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.
- Disconnect the spark plug on machines equipped with gasoline engines, before servicing, to avoid accidental start-up.
- ALWAYS switch off the power supply at the battery disconnect before adjusting or maintaining the electrical equipment.
- 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.

2 Labels




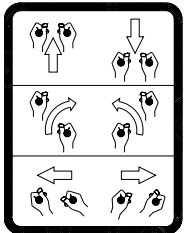
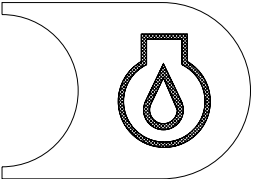
2.1 Label Locations


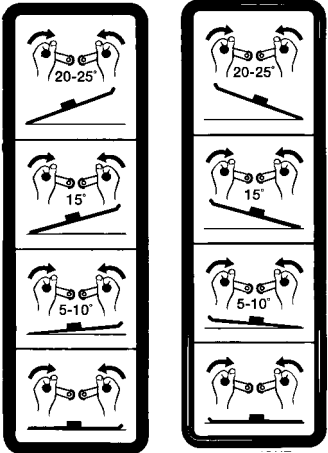








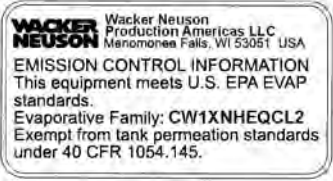
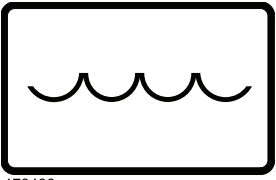


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2.2 Label Meanings

A		<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. Read the Operator's Manual. No sparks, flames, or burning objects near the machine. Stop the engine before refueling.
B		<p>WARNING</p> <p>To reduce the risk of hearing loss and eye injury, always wear hearing protection and eye protection when operating this machine.</p>
C		<p>Positions of the key switch:</p> <ul style="list-style-type: none"> ON OFF Engine crank
D		<p>Steering control:</p> <ul style="list-style-type: none"> Push both levers forward to move forward Pull both levers backward to move rearward Push the left lever forward and pull the right lever backward to rotate clockwise Pull the left lever backward and push the right lever forward to rotate counterclockwise Move both levers to the left to move left Move both levers to the right to move right
E		<p>Check engine oil level.</p>

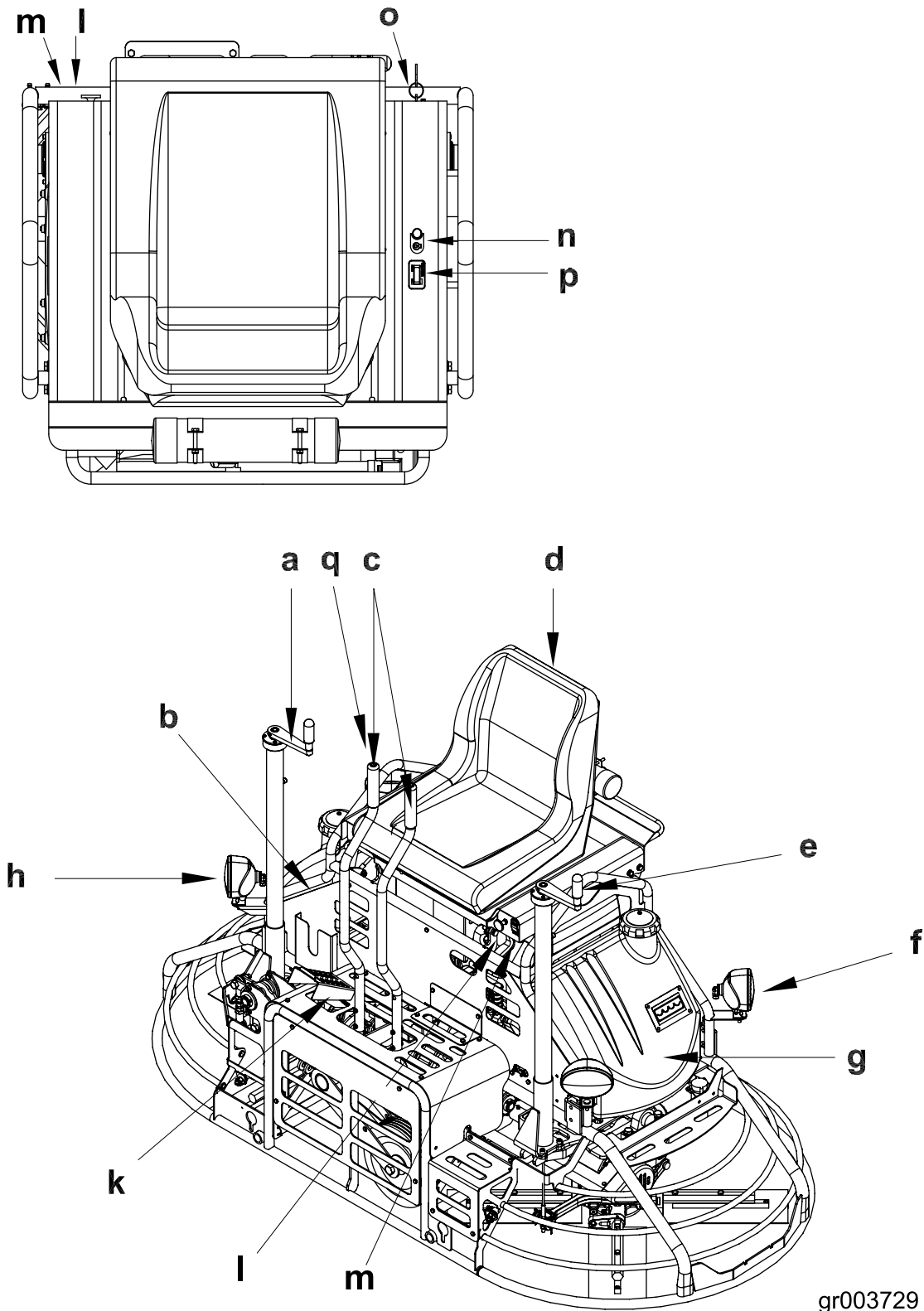
J		<p>Read and understand the supplied Operator's Manual before operating the machine. Failure to do so increases the risk of injury to yourself and others.</p>
K		<p>Pitch control:</p> <p>To increase pitch: Rotate the left pitch control clockwise, rotate the right pitch control counterclockwise.</p> <p>To decrease pitch: Rotate the left pitch control counterclockwise, rotate the right pitch control clockwise</p>
L		<p>NOTICE Lifting point</p>
N		<p>Tie-down point</p>
O		<p>WARNING</p> <p>Cutting hazard. Keep hands and feet away from moving blade.</p>

<p>P</p>	 <p>180562</p>	<p>Operator's Manual must be stored on machine. Replacement Operator's Manual can be ordered through your local Wacker Neuson distributor.</p>
<p>S</p>	 <p>178713</p>	<p>WARNING Hot surface</p>
<p>T</p>	 <p>178712</p>	<p>WARNING! Entanglement hazard. Keep hands away from spinning belt and pulley.</p>
<p>U</p>		<p>Emission Control Information This equipment meets U.S. EPA EVAP standards. Evaporative Family: CW1XNHEQCL2 Exempt from tank permeation standards under 40 CFR 1054.145.</p>
<p>W</p>	 <p>173438</p>	<p>Water tank fill. Use only clean water or water-based retardants.</p>

--		<p>WARNING</p> <p>Remove pan from trowel before lifting machine overhead. Pans can fall and cause death or serious injury if a person is hit. (Label is located on top side of float pan.)</p>
--		<p>Use only Glygoyle 460 gear oil in gearbox.</p>
--		<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>
--		<p>This machine may be covered by one or more patents.</p>

3 Operation

3.1 Features and Controls



Control locations and functions:

Ref.	Description	Ref.	Description
a	Right pitch control	k	Foot pedal (throttle control)
b	Fuel tank	l	Engine choke control
c	Control arms	m	Work light switch
d	Operator's seat with "operator presence" switch	n	Oil pressure indicator light
e	Left pitch control	o	Engine keyswitch
f	Rear work light (one each side)	p	Hour meter
g	Water tank	q	Water spray control
h	Work light (one each side)	—	—

The Ride-On Trowel features a seat with an integrated "operator presence" system, which works in conjunction with a throttle mounted switch. This system allows the engine to remain running (idling) with no operator seated in the seat, as long as the throttle is not depressed. This system meets all safety requirements and eliminates the need for a foot-operated "kill switch".

To familiarize a new operator with the Ride-On Trowel the following steps should be taken:

1. With the operator in the seat, show him or her the functions of the control arms **(c)** and how to start the machine.
2. Have the operator practice steering the trowel. A hard concrete slab slightly wetted with water is an ideal place for an operator to practice with the machine. For this practice, pitch the blades up approximately ¼" on the leading edge. Start by making the machine hover in one spot, and then practice driving the machine in a straight line and making 180° turns. The **best control** is achieved at full rpm.

3.2 Position of the Operator

Safe and efficient use of this machine is the operator's responsibility. Full control of the machine is not possible unless the operator maintains the proper working position at all times.

While operating this machine the operator must:

- be seated in the operator's seat facing forward
- have both feet on the control deck
- have both hands on the controls

3.3 Preparing the Machine for First Use

1. Make sure all loose packaging materials have been removed from the machine.
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.
3. Take inventory of all items included with the machine and verify that all loose components and fasteners are accounted for.
4. Attach component parts not already attached.
5. Add fluids as needed and applicable, including fuel, engine oil, and battery acid.
6. Move the machine to its operating location.

3.4 Recommended Fuel

Use of oxygenated fuels

The engine requires regular grade unleaded gasoline. Use only fresh, clean gasoline. Gasoline containing water or dirt will damage the fuel system. Consult the engine owner's manual for complete fuel specifications.

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 and provinces require this information to be posted on the fuel pump.

The following is the Wacker Neuson approved percentage 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.

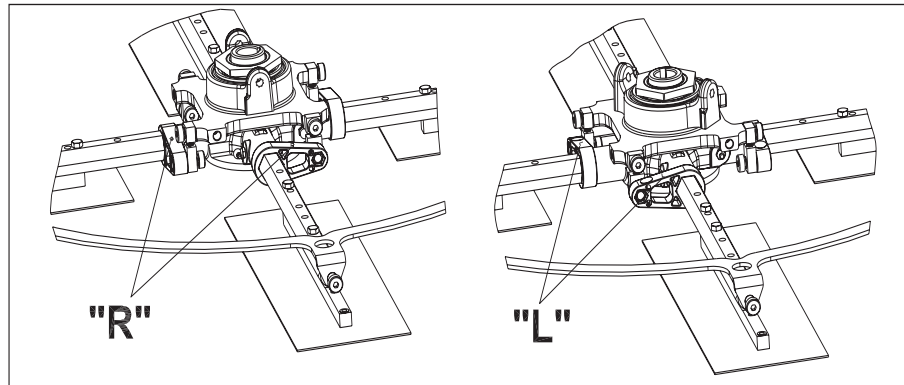
Fuel system damage or performance problems resulting from the use of an oxygenated fuel containing more than the percentages of oxygenates mentioned above are not covered under warranty.

3.5 Break-in Period

1. To break in the gearboxes, run the engine at 50% of full throttle for the first 2–4 hours. This will prevent premature wear and extend gear life.

NOTICE: Running the engine at full throttle during the break-in period could result in premature gear failure.

2. Verify that the horizontal blade pitch links are properly assembled. When seated on the machine, the right rotor should have an “R” designation located towards the upper portion of the pitch link and the left rotor should have an “L”.



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3.6 Before Starting

Before starting the trowel, check the following:

- fuel level
- oil level in the engine
- condition of the air filter
- condition of trowel arms and blades

Grease the trowel arms daily.

3.7 Starting

Before starting the operator must know the location and function of all controls.

1. Push down on the throttle foot pedal, turn the engine keyswitch **(o)**, and hold it until the engine starts.

Note: *If the engine is cold, pull out the choke control knob fully. The choke may need to be opened even when starting a warm engine.*

NOTICE: Cranking the engine for more than 5 seconds can cause starter damage. If the engine fails to start, release the keyswitch and wait 10 seconds before operating the starter again.

Note: *The engine has an oil alert light to notify operator if the oil pressure is low. If engine will not start, or stops during operation, check engine oil level.*

2. Allow the engine to warm up before operating the trowel.

3.8 Stopping

To stop trowel movement, return control levers to their neutral position and release pressure on the throttle foot pedal.

To stop the engine, turn the keyswitch to “O” (off).

3.9 Operation

To utilize your Wacker Neuson Ride-On Trowel to its fullest capacity, the machine should be driven in the direction that the operator is facing. This will finish the widest possible area, while giving the operator an excellent view of the slab surface about to be troweled. When the machine reaches the end of the slab, make a 180° U-turn, and repeat the straight line of direction to the other end of the slab.

Note: *During the break-in period, run the engine at 50% of full throttle. Refer to Section New Machines.*

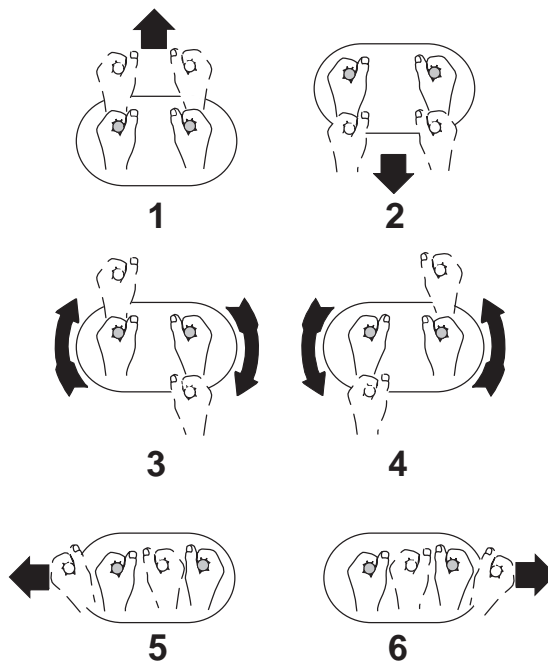
NOTICE: DO NOT use excessive pressure on the control levers. Excessive pressure does not improve the reaction time of the machine and can damage the steering controls.

NOTICE: Attempting to use the trowel too early in the curing stage of the concrete may result in an undesirable finish. Only experienced concrete finishers should operate the trowel.

3.10 Steering

Refer to the illustration for the necessary hand motions to move the trowel in the desired direction, described below.

- 1 - forward
- 2 - reverse
- 3 - rotate clockwise
- 4 - rotate counter-clockwise
- 5 - left sideways
- 6 - right sideways



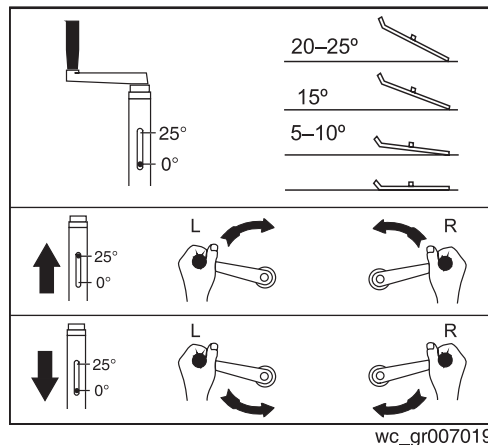
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3.11 Pitch Adjustment

When changing or setting the pitch (angle) of the trowel blades, slow the machine, set the desired pitch on the left side of the machine, then adjust the right side to match.

To increase pitch: Rotate the left pitch control **(L)** clockwise, rotate the right pitch control **(R)** counterclockwise.

To decrease pitch: Rotate the left pitch control **(L)** counterclockwise, rotate the right pitch control **(R)** clockwise.



Working Conditions of Concrete	Suggested Working Pitch
1. Wet surface working stage	Flat (No Pitch)
2. Wet to plastic working stage	Slight Pitch
3. Semi-hard working stage	Additional Pitch
4. Hard finishing stage (burnishing)	Maximum Pitch

3.12 Emergency Shutdown Procedure

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

1. Stop the engine.
2. Close the fuel valve.
3. Remove the machine from the job site using the wheel kit.
4. Clean concrete from the blades and the machine.
5. Contact the rental yard or machine owner for further instructions.

4 Maintenance

4.1 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.



4.2 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.

Refer to the engine operator's manual for information on engine maintenance.

	Daily	Every 20 hrs.	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 300 hrs.
Grease trowel arms.	■					
Check fuel level.	✓					
Check engine oil level. ¹	✓					
Inspect air filter. Replace as needed.	✓					
Check external hardware.	✓					
Pressure wash all surfaces until free of concrete. ²	■					
Check oil level in gearboxes.		✓				
Grease gearbox, drive system and pitch posts fittings.		■				
Grease control linkage.		■				
Check drive belt for wear.			✓			
Change engine oil. ³				■		
Check fuel filter.				✓		
Clean and check spark plug.					■	
Replace oil filter.					■	
Replace spark plug.						■
Replace fuel filter.						■
Replace oil in gearboxes.						■

¹ Check engine oil twice daily (every 4 hours).

² Pressure wash immediately after use.

³ Change engine oil after first 20 hours of operation.

4.3 Trowel Gearboxes

Check the gearboxes for the correct oil level after every 20 hours of operation. Change the gearbox oil every 300 hours.

To check the oil level:

Each CRT gearbox is equipped with two oil fill plugs. Remove one gearbox oil fill plug **(b)**. If the level is below the threads of the oil fill plug hole, add synthetic gear oil through the opening. DO NOT overfill. Wipe the threads dry on both the gearbox and the oil fill plug, apply Loctite 545 or equivalent to the oil fill plug threads, replace the oil fill plug and torque to 16–20 Nm (12–15 ft.lbs.).

NOTICE: DO NOT mix types of gear oil. **DO NOT** overfill the gearbox with oil. Damage to the gearbox may occur if oils are mixed, or if the gearbox is overfilled. See *Technical Data* for oil quantity and type.

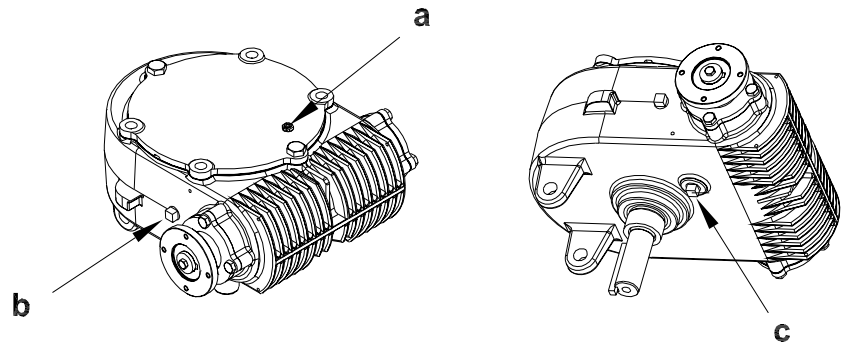
To change gearbox oil:

1. Place a container of sufficient capacity (approximately 3.8 l [1 gallon]) under each gearbox.
2. Remove the gearbox oil drain plug **(c)** and allow the oil to drain out. It may be necessary to remove the gearbox oil fill plug(s) to facilitate draining. After most of the oil has drained out, tip the back of the trowel upwards to allow the remaining oil to drain out.
3. After all the oil has drained out, wipe the threads dry on both the gearbox and the oil drain plug, apply Loctite 545 or equivalent to the oil drain plug threads, and replace the gearbox oil drain plug.

Note: *Dispose of used gear oil in accordance with environmental protection legislation.*

4. With the trowel level, fill the gearbox with approximately 1.83 l (62 oz.) synthetic gear oil through the oil fill plug as described above.
5. Wipe the threads dry on both the gearbox and the oil fill plug, apply Loctite 545 or equivalent to the oil fill plug threads, replace the oil fill plug(s), and torque all plugs to 16-20 Nm (12–15 ft.lbs.).

Each gearbox has a pressure relief valve **(a)** which can become clogged over time. Check or replace as needed. Failure to replace the valve can result in oil leakage from the gearbox shaft seals.

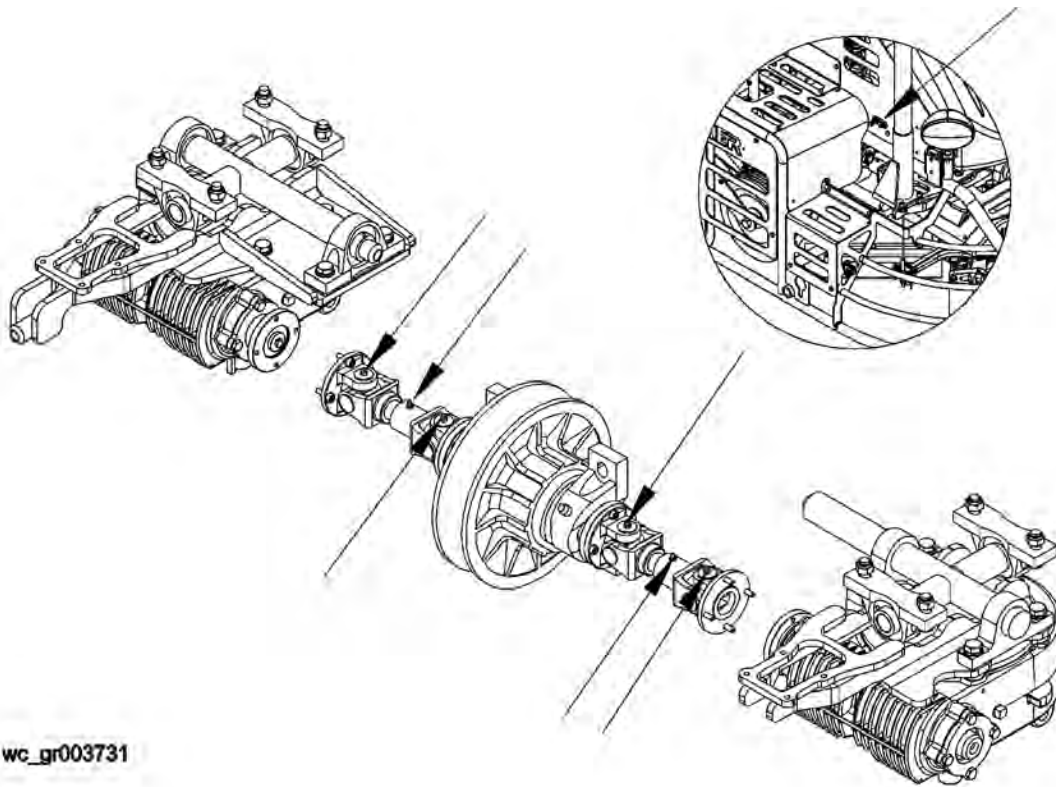


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4.4 Control Linkage Lubrication

The drive system, gearbox and pitch posts are equipped with several grease fittings. Grease these fittings once a week, or every 20 hours, to prevent wear.

Use a general purpose grease and add one to two shots of grease at each fitting.

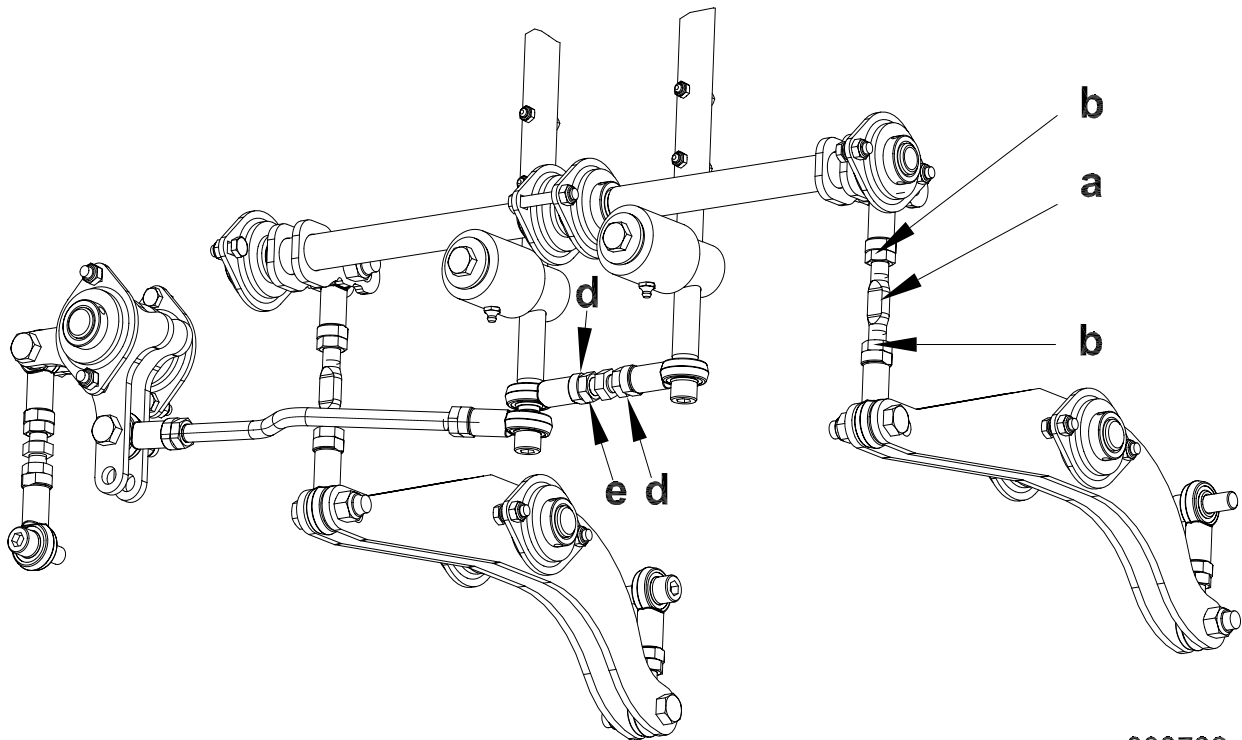


4.5 Control Arm Adjustment (Forward or Backward)

The control arms should line up evenly. If arms appear out of adjustment, they can be re-adjusted forward or backward as follows:

1. Loosen jam nuts **(b)**.
2. Turn the vertical linkage **(a)** as follows:
 - Extend the linkage to adjust control levers forward. See section 4.5 before extending linkage.
 - Shorten the linkage to adjust control levers backward.
3. After the arms have been adjusted to the desired position, tighten jam nuts **(b)**.

NOTICE: Control arms are adjusted as part of the steering assist system. Changing orientation of the control arms may affect steering effort.



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4.6 Right-hand Control Arm Adjustment (Right or Left)

The arms should be set to be perfectly vertical. Should the arms come out of adjustment, adjust as follows:

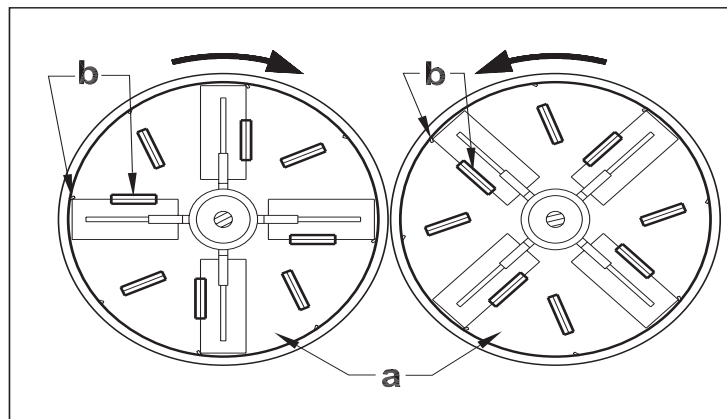
1. Loosen the jam nuts **(d)**.
2. Drop the horizontal linkage **(e)** down to clear the bracket.
3. Shorten the linkage to move the control arms to the left.
4. Extend the linkage to move the control arms to the right.
5. After the control lever has been adjusted to the desired position, reassemble the nut and the bolt **(c)** and tighten the jam nuts **(d)**.

4.7 Mounting Float Pans

Certain applications may require the use of float pans. Optional float pans **(a)** are available, and are used with the machines in the non-overlapping configuration only.

To mount float pans:

Lift trowel off the ground **with the engine off** and position the pan against the blades. Turn pan either to the right or left to engage clip angles **(b)** as shown. Remember, the right-hand trowel blades turn counterclockwise; the left-hand blades turn clockwise.



4.8 Transporting the Machine



WARNING

ALWAYS turn the engine off and remove the key from the machine before moving or transporting machine.

To hoist the trowel:

Attach a sling or chains through the lifting bars **(a)** on each side of the seat pedestal.

NOTICE: Make sure the lifting device has enough weight-bearing capacity to lift machine safely. Refer to section *Technical Data*.

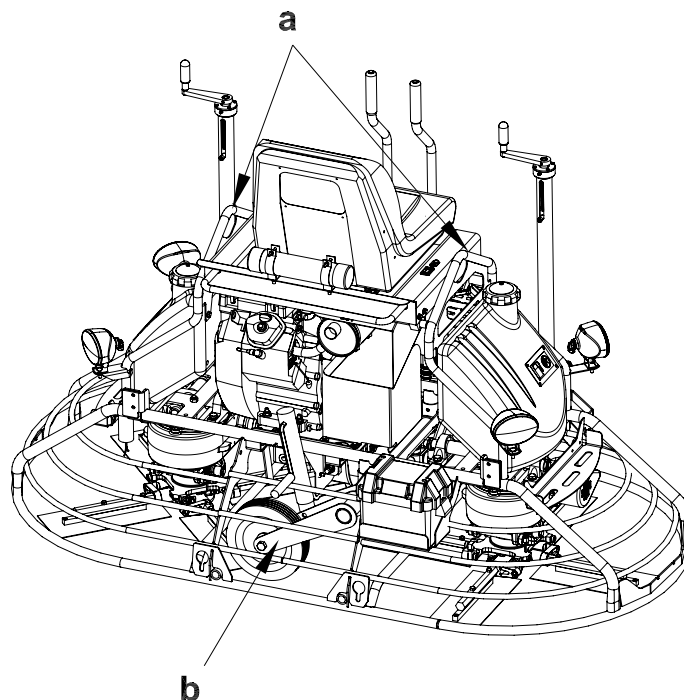


WARNING

DO NOT lift the trowel by the guard rings or any part of the trowel other than the lifting fixture, as the component may fail, causing the trowel to fall, possibly injuring bystanders.

If equipped with the optional integrated wheel kit **(b)**:

From the rear of machine, use the jack handle to raise the blades off the ground 76-102 mm (3-4 in.). Push the machine using the upper frame.

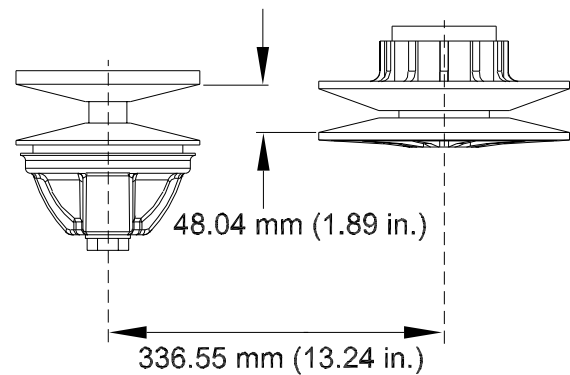
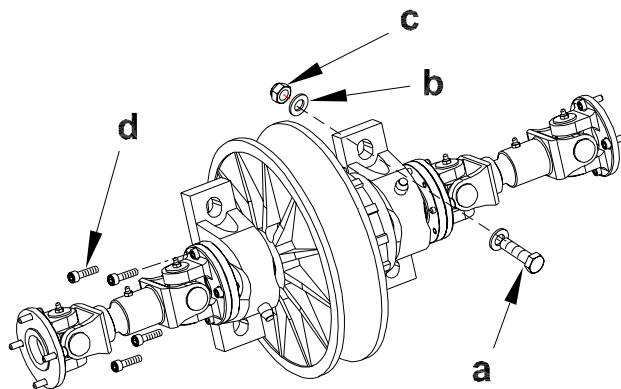


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4.9 Drive Belt

To replace the drive belt:

1. Place the trowel on a flat, level surface with the blades pitched flat.
2. Turn engine off and disconnect battery.
3. Remove the beltguard.
4. Remove 2 bolts **(a)**, washers **(b)** and nuts **(c)** from each bearing flange.
5. Remove the 4 bolts **(d)** holding each inside universal joint to the shaft fitting. Remove universal joints and shims (if included) from ends of drive shaft.
6. Lift the drive pulley up far enough to slide belt past.
7. Remove the old belt and install a new one.
8. Reverse the procedure for assembly. Align the bearings and shaft as straight as possible. Adjust pulley offset and center distance to values as shown.
9. Torque the bearing bolts **(a)** to 99±10 ft.lbs. Torque the universal joint bolts **(d)** to 10±1 ft.lbs.



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4.10 Battery Jump Start Procedure

Occasionally, it may be necessary to jump start a weak battery. If jump starting is necessary, the following procedure is recommended to prevent starter damage, battery damage, and personal injuries.



DANGER

Jump starting a battery incorrectly can cause battery to explode, resulting in severe personal injury or death. Do not smoke or allow ignition sources near the battery, and do not jump start a frozen battery.



WARNING

Electrical arcing can cause severe personal injury. Do not allow positive and negative cable ends to touch.

1. Disconnect engine load.
2. Use a battery of the same voltage (12V) as is used with your engine.
3. Attach one end of the positive booster cable (red) to the positive (+) terminal of the booster battery. Attach the other end to the positive terminal of your engine battery.
4. Attach one end of the negative booster cable (black) to the negative (–) terminal of the booster battery. Attach other end of negative cable to a solid chassis ground on your engine.

NOTICE: Jump starting in any other manner may result in damage to the battery or the electrical system.

5. Push down on the throttle foot pedal, turn the engine keyswitch and hold it until the engine starts.

NOTICE: Cranking the engine for more than 5 seconds can cause starter damage. If the engine fails to start, release the keyswitch and wait 10 seconds before operating the starter again.

NOTICE: When using lights or high amperage draw accessories, idle the engine for a period of 20 minutes to bring the battery to charge state.

4.11 Spark Plug

Clean or replace spark plug as needed to ensure proper operation. Refer to the engine Owner's Manual.

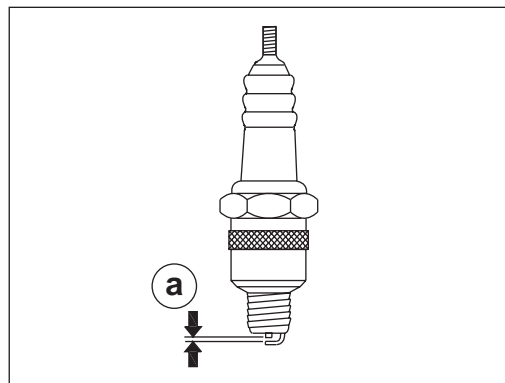
Note: Refer to the *Technical Data* for the recommended spark plug type and the electrode gap setting.



The muffler and engine cylinder become very hot during operation and remain hot for a while after stopping the engine. Allow engine to cool before removing spark plug.

1. Remove spark plug and inspect it.
2. Replace plug if the insulator is cracked or chipped. Clean spark plug electrodes with a wire brush.
3. Set the electrode gap **(a)**
4. Tighten spark plug securely.

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



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4.12 Air Cleaner—CRT 36

The engine is equipped with a dual element air cleaner. Service air cleaner frequently to prevent carburetor malfunction.

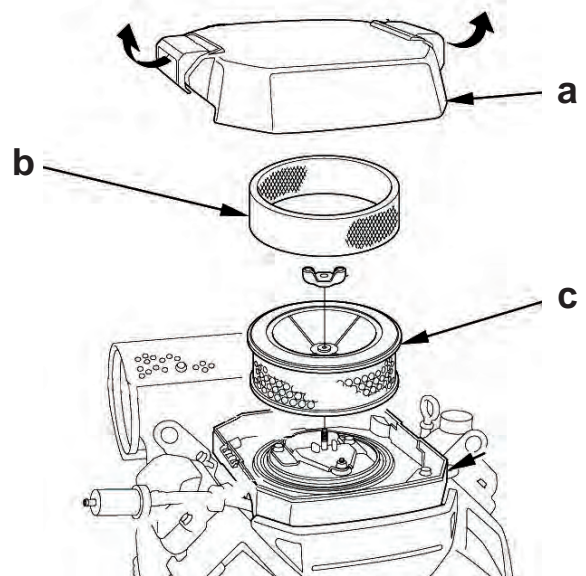
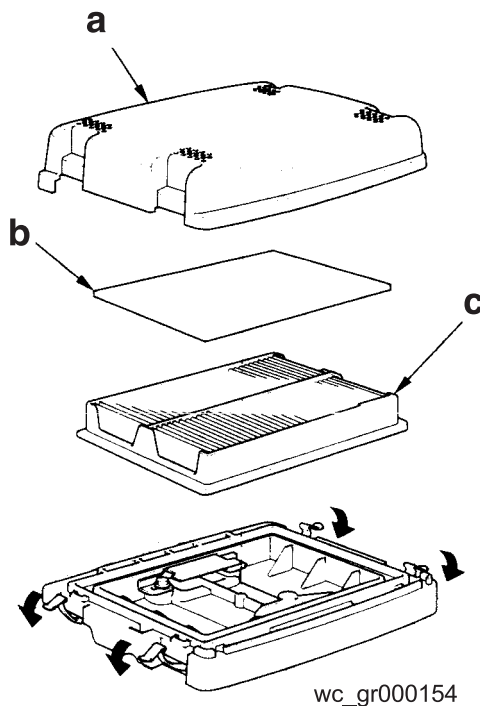
NOTICE: NEVER run engine without air cleaner. Severe engine damage will occur.



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

To service:

1. Remove air cleaner cover **(a)**. Remove both elements **(b, c)** and inspect them for holes or tears. Replace damaged elements.
2. Wash foam element **(b)** in solution of mild detergent and warm water. Rinse thoroughly in clean water. Allow element to dry thoroughly. Do not put oil on the foam element.
3. Tap paper element **(c)** lightly to remove excess dirt. Replace paper element if it appears heavily soiled.



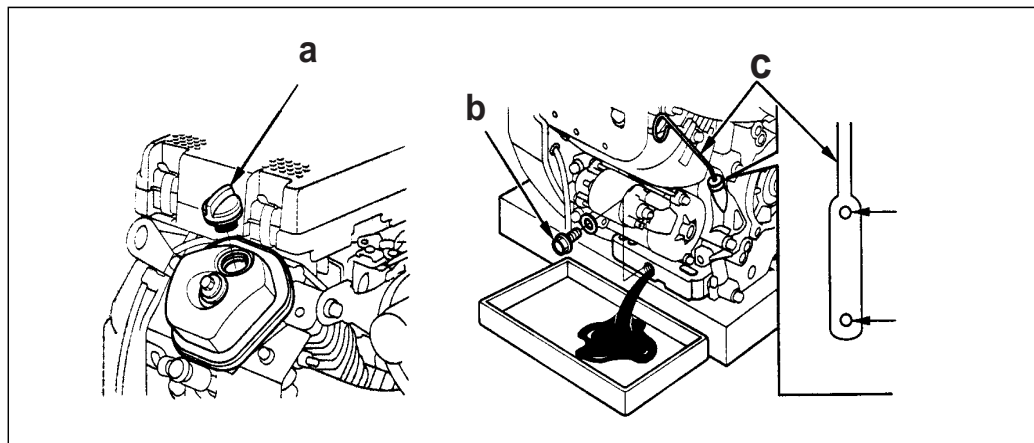
4.13 Engine Oil and Filter (Honda engine)

Drain oil while engine is still warm.

1. Remove oil fill cap **(a)** and drain plug **(b)** to drain oil.

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.*

2. Install drain plug and tighten.
3. Fill engine crankcase with recommended oil to the upper limit mark on the dipstick **(c)**.
4. Install oil fill cap and dipstick securely.
5. Remove front pedestal panel to access oil filter. To replace the oil filter, remove the installed oil filter after oil has been drained. Apply a thin coat of oil to the rubber gasket of the replacement oil filter. Screw the filter on until it just contacts the filter adapter, then turn it an additional 22.24 mm (7/8 in.) turn. Refill with oil as described above.



wc_gr000155



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.

4.14 Engine Oil and Filter (Wacker Neuson engine)

Drain the oil while the engine is still warm. To drain oil:

1. Remove the filler cap **(a)** and drain cap **(d)**. Drain oil into a suitable container.

Note: *In the interests of environmental protection, place plastic sheeting and a container under the machine to collect the liquid which drains off. Dispose of this liquid properly.*

2. Re-insert the drain cap and tighten.

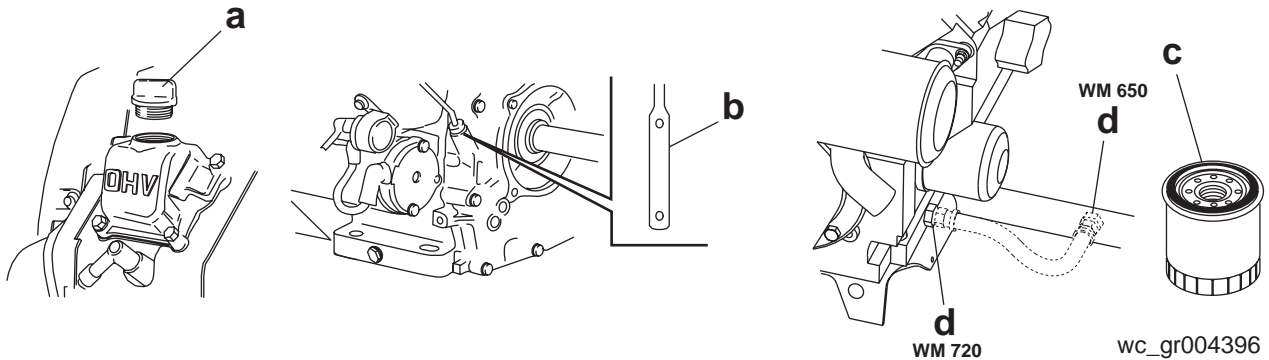
3. Fill the engine with the recommended oil to the upper limit mark on the dipstick **(b)**. See section *Technical Data* for the oil quantity and type.

Burn hazard. Care must be taken when draining hot engine oil. Hot oil can burn!



To change the filter:

1. Drain the engine oil. Remove used filter.
2. Before installing the new filter, lightly oil the filter gasket **(c)** with fresh, clean engine oil. Screw the filter on by hand until the gasket makes contact, then tighten an additional 7/8 turn.
3. Fill the engine with the recommended oil. See section *Technical Data* for oil quantity and type.
4. Start and run the engine to check for leaks. Stop the engine. Recheck the oil level and add oil if required. Refer to the engine owner's manual.



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.

4.15 Storage

When Follow the procedures below if the machine is to be stored for more than 30 days.

Maintaining the machine

To prepare the machine for long-term storage:

1. Drain the fuel tank and the water tank.
2. Change the engine oil.
3. Maintain the engine (see below).
4. Clean the entire trowel and engine compartment.
5. Remove dirt from the cooling fins on the engine cylinders and on the blower housing.
6. Remove the battery from the machine and charge it periodically.
7. Cover the entire machine and place it in a dry protected area.

Maintaining the engine

- If your machine has a diesel engine, consult your engine owner's manual for maintenance instructions.
- If your machine has a gasoline engine:
 1. Disconnect the ignition wires from the spark plugs. Remove the spark plugs.
 2. Pour approximately 30 ml (1 ounce) of SAE 30W oil into each engine cylinder through the spark plug opening.
 3. Reinstall the spark plugs, but leave the ignition wires disconnected to prevent the engine from starting.
 4. Crank the engine for one or two seconds to distribute the oil inside the engine cylinders.
 5. Reconnect the ignition wires.

4.16 Troubleshooting

Problem	Reason	Remedy
Engine does not start.	Engine problem.	Consult engine manufacturer's service manual.
Machine out of balance; wobbling excessively.	Operator is over-steering.	The movement of each gearbox is controlled by "stops" to provide the correct relationship of the control arm movement to machine movement. Excessive pressure on control arms in any direction will not improve reaction time and can damage steering controls causing machine to wobble.
	Trowel arm(s) bent.	Replace trowel arm(s).
	Trowel blade(s) bent.	Replace trowel blade(s).
	Main shaft(s) bent due to machine being dropped.	Replace main shafts(s).
Poor handling; excessive range in control lever movement.	Worn bushings due to lack of lubrication.	Replace bushings and lubricate at least every 20 hours.
	Control arm lever adjustment has moved or control arm has been bent.	Reset control arm lever.
	Lower control arm(s) bent. This can be caused by dropping machine.	Replace lower control arm(s). Use lifting brackets and/or forklift pockets provided on machine for lifting.

Problem	Reason	Remedy
Machine does not move.	Drive belt broken.	Replace drive belt.
	Vacuum between bottom of blades and surface of concrete.	Change pitch on blades to break suction.
	Key sheared in the main shaft.	Replace damaged key.
Trowel noisy.	Trowel blades have become misaligned and are contacting each other during rotation.	Replace damaged blades. Align blades so that one set represents a (+) and the other an (x) when viewed from above.
	Sheared key.	Check all keys in drive system.
	Loose clutch.	Tighten clutch.

5 Technical Data

5.1 Engine

Engine Power Rating

Net power rating per SAE J1349. Actual power output may vary due to conditions of specific use.

Part No.		CRT 36-26A	CRT 36-25
Engine			
Engine make		Honda	Wacker Neuson
Engine model		GX690	WM720
Max. rated power @ rated speed	kW (Hp)	16.6 (22.2) @ 3600 rpm	18.6 (25) @ 3600 rpm
Displacement	cm ³ (in ³)	690 (42)	720 (44)
Spark plug		NGK ZFR5F DENSO KJ16CR	NGK BPR4EY
Electrode gap	mm (in.)	0.70 (0.028)	
Engine speed - operating	rpm	3850	
Engine speed - idle	rpm	1400	
Battery	V / size	12 / 340CCA	
Fuel	type	Regular unleaded gasoline	
Fuel tank capacity	l (gal.)	24.6 (6.5)	
Fuel consumption	l (qt.)/hr.	9 (9.5)	
Running time	hrs.	3.3	
Clutch	type	Variable speed	
Engine oil capacity	l (qt.)	2 (2.1)	1.9 (1.8)
Engine lubrication	oil grade	SAE 10W30 API CF-4, CF, SJ	

5.2 Trowel

Part No.		CRT 36-26A	CRT 36-25
Trowel			
Operating Weight without wheel kit with wheel kit	kg (lbs.)	373 (830) 392 (865)	376 (835) 395 (870)
Dimensions (L x W x H)	mm (in.)	2042 x 1041 x 1372 (80 x 41 x 54)	
Rotor Speed (range)	rpm	25–165	
Blade Pitch (range)	degrees	0-25	
Gearbox	type	heavy duty	
Gearbox Lubrication	type	Mobil Glygoyle 460	
	l (oz.)	1.83 (62) each	
Driveshaft	type	splined universal joint	

Operation		
Troweling Width with pans (non-overlapping) without pans (non-overlapping)	mm (in.)	1975 (78) 1905 (75)
Troweling Area with pans (non-overlapping) without pans (non-overlapping)	m ² (ft ²)	1.8 (19) 1.6 (18)

5.3 Sound and Vibration Specifications

The required sound specifications, per Annex I, Directive 2006/42/EC of the EC-Machine Regulations, are:

- the sound pressure level at operator's location (L_{pA}): 91.2 dB(A) (CRT 36-26A), and 91.7 dB(A) (CRT 36-25).
- the guaranteed sound power level (L_{WA}): 104.7 dB(A) (CRT 36-26A) and 108.6 dB(A) (CRT 36-25)

These sound values were determined according to ISO 3744 for the sound power level (L_{WA}) and ISO 11204 for the sound pressure level (L_{pA}) at the operator's location.

The weighted effective acceleration value, determined according to ISO 5349-1 and ISO 2631, is:

- for whole body: 0.215 m/s² (CRT 36-26A) and 0.316 m/s² (CRT 36-25).
- or hand/arm: 1.81 m/s² (CRT 36-26A) and 1.72 m/s² (CRT 36-25).

The sound and vibration specifications were obtained with the unit operating on fully cured, water wetted concrete at nominal engine speed.

Vibration Uncertainties

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

Whole body vibration was measured per ISO 2631-1. This measurement includes an uncertainty of 0.3 m/sec².

6 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.

6.1 Emission Control System Background Information

Introduction

Wacker Neuson spark-ignited engines/equipment must conform with applicable Environmental Protection Agency (EPA) and the State of California 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 and California 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—Gasoline

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.

6.2 Limited Defect Warranty for Exhaust Emission Control System

See the supplied engine owner's manual for the applicable emission warranty statement.

6.3 Limited Defect Warranty for Wacker Neuson Evaporative 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 evaporative emission control system, have been designed, built, and equipped to conform at the time of initial sale to all applicable evaporative 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 Evaporative 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

Emission Control Systems Information and Warranty—Gasoline

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

System Covered	Components
Evaporative emissions	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.



Emission Control Systems Information and Warranty—Gasoline

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.

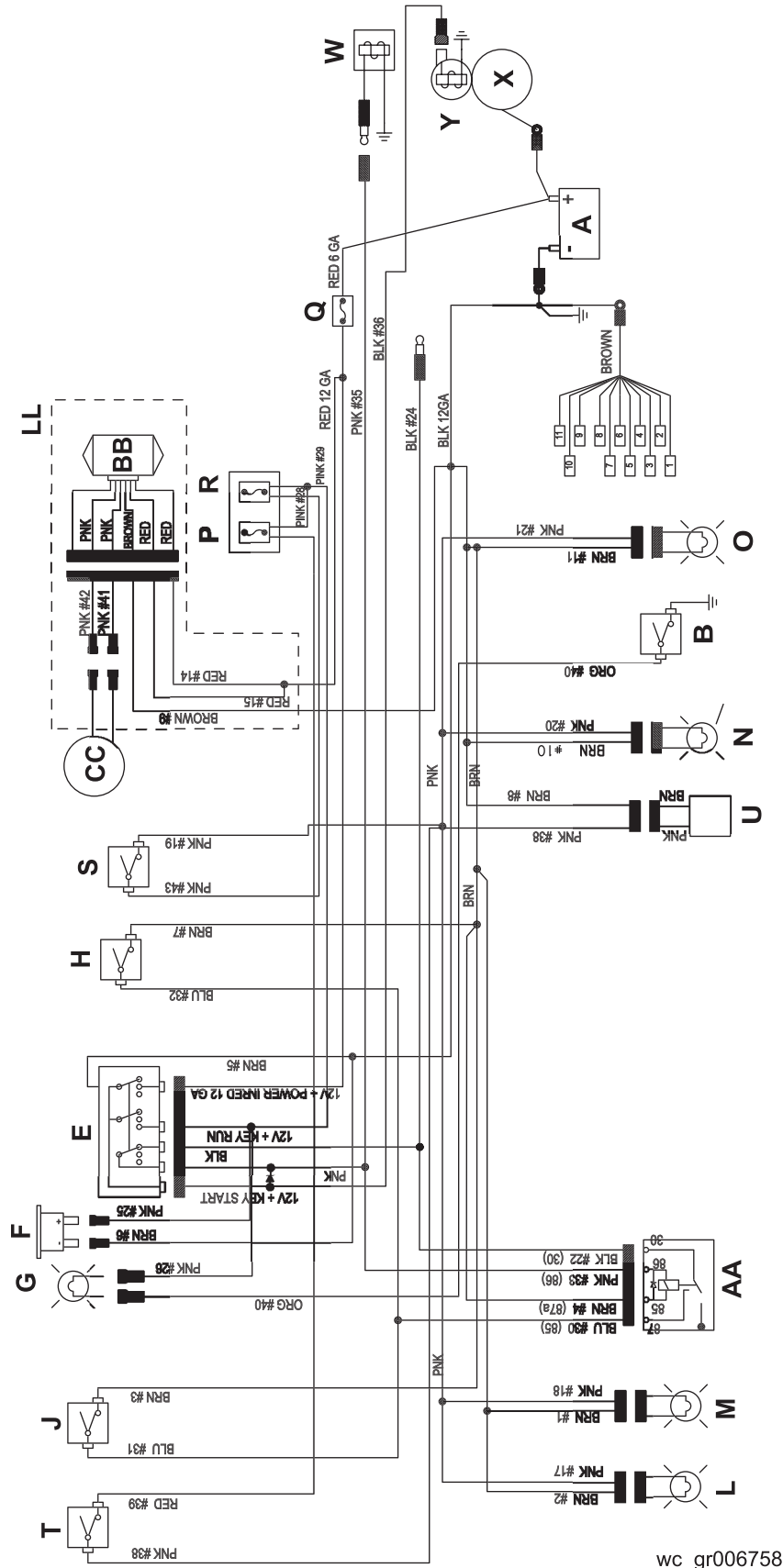
You must take your Wacker Neuson engine/equipment along with proof of original purchase date, at your expense, to the authorized Wacker Neuson dealer/service center during their normal business hours.

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.

7 Schematics



wc_gr006758

7.1 Schematic Components

Ref.	Description	Ref.	Description
A	Battery	U	Spray pump motor
B	Oil pressure switch (dual circuit)	V	Engine connector
C	Fuel pump	W	Fuel cut-off solenoid
D	Fuel pump relay	X	Starter motor
E	Key switch	Y	Engine crank solenoid
F	Hour meter	Z	Glow plug fuse
G	Oil pressure indicator light	AA	Relay—safety system
H	Operator presence switch (normally open)	BB	Voltage regulator
J	Throttle sense switch (normally closed)	CC	Alternator
K	Neutral relay	DD	Glow plug temperature sensors
L	Right front light	EE	Glow plugs
M	Right rear light	FF	Keyed power fuse
N	Left rear light	GG	Temperature sensor
O	Left front light	HH	Coils—ignition
P	Fuse—spray system	JJ	Ignition module
Q	Fuse—main	KK	Engine speed sensor
R	Fuse—light circuit	LL	External voltage regulator (Honda engines only)
S	Light switch	MM	Glow plug relay
T	Spray pump switch	—	—

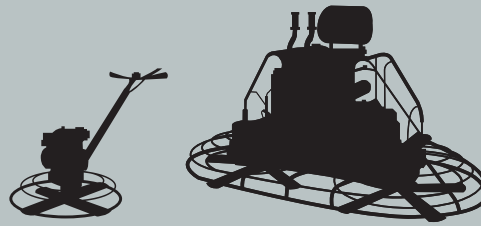
**CONCRETE
POWER TROWELS**

www.aem.org



SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL



SAFETY ALERT SYMBOL



**This Safety Alert Symbol means
ATTENTION is required!**

The Safety Alert Symbol identifies important safety messages on machines, safety signs, in manuals or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to YOU?

3 BIG REASONS

- **Accidents KILL or DISABLE**
- **Accidents COST**
- **Accidents CAN BE AVOIDED**

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WORD OF EXPLANATION

The following is a partial list of reference material on safe operating practices:

U.S. Department of Labor publishes Safety and Health Regulations and Standards under the authority of the Occupational Safety and Health Act for the General Construction and Mining Industries. Its address is: U.S. Department of Labor, Washington, DC 20210 (www.OSHA.gov and www.MSHA.gov).

ANSI – American National Standards Institute, c/o The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017 (www.ANSI.org).

ISO – International Standards Organization, 1, rue de Varembé Case postale 56, CH-1211 Geneva 20, Switzerland (www.ISO.ch).

SAE – Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096, publishes a list, "Operator Precautions" SAE J153 MAY 87 (www.SAE.org).

AEM – Association of Equipment Manufacturers, 111 East Wisconsin Avenue, Milwaukee, WI 53202 (www.AEM.org).

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FOREWORD

This safety manual is intended to point out some of the basic situations which may be encountered during the normal operation and maintenance of your walk-behind or ride-on concrete power trowel and to suggest possible ways of dealing with these conditions.

Additional precautions may be necessary, depending on application and attachments used and conditions at the work site or in the maintenance area.

The trowel manufacturer has no direct control over machine application, operation, inspection, lubrication, or maintenance. Therefore, it is your responsibility to use good safety practices in these areas.

Do not use the trowel for any purpose other than its intended purposes or applications.

The information provided in this manual supplements the specific information about your machine and its application that is contained in the manufacturer's manual(s).

Other information which may affect the safe operation of your machine may be displayed on safety signs, or in insurance requirements, employer's safety programs, safety codes, local, state/provincial, and federal laws, rules, and regulations.

If you do not understand any of this information, or if errors or contradictions seem to exist, consult with your supervisor before operating your trowel!

IMPORTANT: If you do not have the manufacturer's manual(s) for your particular machine, get a replacement manual from your employer, equipment dealer, or manufacturer of your machine. Keep this safety manual and the manufacturer's manual(s) accessible to the operator and maintenance personnel.

Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. It is your responsibility to study this manual and the manufacturer's manual(s) for your specific machine before operating your machine. Make them a working part of your safety program. Keep in mind that this safety manual is written for concrete power trowels only. Practice all other usual and customary safe working precautions, and above all –

**REMEMBER – SAFETY IS UP TO YOU
YOU CAN PREVENT SERIOUS
INJURY OR DEATH**



5

FOLLOW A SAFETY PROGRAM

EQUIPMENT/CLOTHING

Consult your supervisor for specific instructions on a job, and the personal safety equipment required. For instance, you may need:

- Hard Hat
- Heavy Gloves
- Eye Protection
- Ear Protectors
- Safety Shoes
- Dust Mask or Respirator

Do not wear loose clothing or any accessory – flopping cuffs, dangling neckties and scarves, or jewelry – that can catch in moving parts.

DUST PRECAUTION

Some dust created by construction activities may cause silicosis or respiratory harm.

Your risk of exposure varies depending on how often you do this type of work. To reduce your risk, work in a well ventilated area, use a dust control system, and wear approved personal safety equipment such as a dust/particle respirator designed to filter out microscopic particles.



PREPARE FOR SAFE OPERATION

LEARN TO BE SAFE

- Read the operator's manual. If one has not been provided, get one and study it before operating the equipment.
- Learn the location and understand the functions of all controls before attempting to operate the equipment.
- Know the meaning of all identification symbols on the controls and gauges.
- Check to determine that the manufacturer's furnished safety warning labels are securely attached to the trowel and all warnings can clearly read. Replace labels and decals if they are missing or become worn or unreadable.
- Know the location and type of emergency shut-down control the trowel is equipped with.
- Never start or operate the trowel without protective guards and panels in place.
- Know the capabilities and limitations of the trowel.



SAFETY DEVICES

Know what safety devices your trowel is equipped with ... and see that each item is securely in place and in operating condition.

For example:

- Emergency stop switch or other "Shut-Down" devices
- Guards, Shields & Panels
- Alarms or Warning Lamps
- Drain Covers, Plugs, and Caps
- Pressure Relief Devices
- Lights



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PREPARE FOR SAFE OPERATION

PRE-OPERATIONAL CHECKS

Walk around the trowel. Carefully inspect for evidence of physical damage, such as cracks, bends, or deformation of plates and welds. Check for loose, broken or missing parts on the trowel, including brackets, vibration isolators, nuts and bolts. Hardware should be replaced with original equipment manufacturer's (OEM) parts, and should be properly tightened to the manufacturer's recommendations.

Remove all trash and debris from the trowel. Make sure oily rags, leaves, or other flammable material are removed and not stored on the trowel. Avoid potential fire hazards!

Clean all oil or grease from operator areas such as control handles, foot pedals, or platforms to prevent slipping.

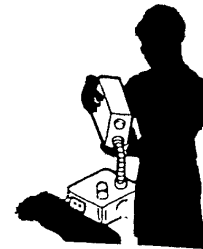
Check for fuel, oil, and hydraulic fluid leaks. All leaks must be corrected before the trowel is operated.



Inspect all hydraulic hoses for cracks or signs of wear and replace if necessary. Secure all caps and filler plugs for all systems.

Always use a flashlight or shielded trouble light when checking for leaks – never use an open flame. Never check for hydraulic leaks with your hand. Hydraulic systems are under high pressure and leaks in these systems can penetrate the skin which can result in serious injury or even death. Always use a piece of cardboard or wood when looking for hydraulic leaks.

Be sure the trowel is properly lubricated. See that the fuel, lubricating oil, coolant and hydraulic reservoirs are filled to the proper levels with the correct fluids according to the manufacturer's instructions and recommendations.



PREPARE FOR SAFE OPERATION

FIRE PREVENTION

Always stop the engine and allow it to cool before refueling.

Never refuel –

- When engine is running
- Near open flame or sparks
- While smoking
- In poorly ventilated areas



Never overfill fuel tanks or fluid reservoirs. In the event of a fuel spill, do not attempt to start the engine until the fuel residue has been completely wiped up, and the area surrounding the engine is dry. Replace fuel cap securely after refueling.



Inspect electrical wiring for damage or wear.

Batteries produce explosive gas. Keep open flame or sparks away.

In case of accident or fire, be ready to act quickly, yet calmly. Do not panic. Knowing ahead of time where to locate a first aid kit, fire extinguisher, or to get assistance will help should an emergency situation come up.

CHECK THE WORK AREA

Learn – beforehand – as much about your working area as possible.

Be observant of other workers, bystanders and other machinery in the area. Keep all unauthorized, untrained people and children out of the area while the trowel is in operation.



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PREPARE FOR SAFE OPERATION

CHECK THE AREA

Thoroughly check the area for unusual or dangerous conditions, such as tools, or items that may damage the trowel or be propelled by the trowels rotating blades. Note where pipes and forms are located. Locate and mark protrusions (rebar, anchor bolts, floor drains, etc.) in the concrete.

GETTING ON AND OFF A RIDE-ON TROWEL

If operating a ride-on trowel, mount and dismount carefully. Use the steps and hand holds provided. Do not use control levers as hand holds and never use guard rings as steps. Watch for surfaces that may be slippery. Never jump off a ride-on trowel.

OPERATING ON AN ELEVATED DECK (MULTI-STORY OPERATION)

Consult local/state regulations before you operate equipment on an elevated deck. If operating on an elevated deck, ensure perimeter safety cabling of proper size and strength is in place. Do not operate the trowel close to the edge of the deck.

TRANSPORTING THE TROWEL

Never transport the trowel with float pans attached unless safety catches are used and are specifically cleared for such transport by the manufacturer. Under no circumstances hoist the trowel more than three feet off the ground with float pans attached. Always consult the manufacturer's operation manual for specific information on transporting the trowel.

START CORRECTLY – START SAFELY

Before starting, check for proper functioning of all operation and shutdown controls. Check all controls to be sure they are in the correct startup position. Know the proper starting procedure for your trowel. Follow the manufacturer's operational instructions.

WALK-BEHIND TROWELS

- Ensure that the operator is familiar with the trowel and is trained on its operation.
- Ensure the operator is well rested, not fatigued, is alert, and not impaired in any way (medications, drugs, alcohol, etc.).
- Do not start or operate the trowel if the drive train will not disengage. Centrifugal force between the trowel and surface when starting can cause uncontrolled handle movement that can cause serious injury. The handle must not move while pulling the engine recoil starter.
- Visually check to be sure that the blades are free of obstructions and the area is clear for operation.
- For trowels that use this feature, ensure that the emergency stop switch is in the ON position.
- Move the throttle to the idle position.
- Switch the engine ON/OFF switch to the ON position.
- Never place your foot on the ring guard when starting the engine or severe injury can occur if your foot slips through the ring guard as the blades start to spin.
- While firmly holding the handle with one hand, start the engine following the guidelines in the engine manufacturer's instruction manual.
- Hold the handle bar firmly with both hands while the trowel is "throttled-up".
- If control of the trowel is lost, stay clear and do not attempt to regain control until the trowel has stopped moving. Depending on the engine speed, the trowel handle can swing around before it stops completely.
- You are ready to operate the trowel!

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START SAFELY

RIDE-ON TROWELS

- Ensure that the operator is familiar with the trowel and is trained on its operation.
- Ensure the operator is well rested and not fatigued, is alert, and not impaired in any way (medications, drugs, alcohol, etc.).
- Adjust the seating if necessary and get into a comfortable position where all controls are accessible.
- Visually check to be sure that the blades are free of obstructions and the area is clear for operation.
- Start the trowel following the instructions in the engine manufacturer's operation manual. For diesel powered trowels, follow the instructions for glow plug and cold start operation.
- Observe any gauges and warning lights to ensure they are functioning and their readings are within the manufacturer's normal operating range.
- Check operation of controls. Make certain they operate properly.
- You are ready to operate the trowel!



SAFE WORKING PROCEDURES

DANGER – CARBON MONOXIDE

Exhaust from the engine contains poisonous carbon monoxide gas that is not easily detected as it is colorless and odorless. Exposure to carbon monoxide can cause loss of consciousness and may lead to death! Do not operate your trowel indoors or in an enclosed area unless adequate ventilation is provided. Ensure that permissible carbon monoxide levels are monitored and not exceeded.



OTHER PRECAUTIONS

- Never leave the trowel unattended while it is running.
- Always keep clear of rotating or moving parts.
- Never use additional weights other than the weights recommended by the manufacturer. The use of unauthorized weights could lead to personal injury or damage to the trowel.

- Never fill the fuel tank while the engine is running. Turn the engine off and allow it to cool before refueling.

- The muffler, exhaust pipes and other engine parts will become hot during operation and will remain hot for a while after shutdown. Do not touch until allowed to sufficiently cool. Do not allow debris, rags, paper, or leaves to accumulate around these areas.



- Do not keep tools, buckets, loose materials on the trowel while it is running and never allow anyone other than the operator on or near the trowel while it is in operation.
- Do not use the trowel for any purpose other than its intended purposes or applications.

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WORK SAFELY

ELECTRICAL EQUIPMENT

Some walk-behind trowels are powered by electric motors. Electric motors and components present special hazards during operation. Read the operator's manual.

- Never operate a trowel with a damaged or worn electrical cord. When using an extension cord, be sure to use one heavy enough to carry the current load. When trowel is used outdoors, use only extension cords that are marked for outdoor use.
- Use only appropriate extension cords that have grounding-type plugs and receptacles that accept the machine's plug.



- Keep all electrical cords away from rotating elements, heat, oil, and sharp edges to avoid damaging them.
- Avoid body contact with grounded surfaces such as pipes, metal railings, radiators and metal ductwork.
- Always check the power supply before running the trowel. Using the wrong voltage supply will damage the motor.
- Always make sure the motor switch is OFF or in the stop position before plugging the trowel into the power supply.
- Do not operate an electric powered trowel in the rain or snow. Keep the motor, switch, and electrical cords dry.
- Never operate the trowel in areas exposed to flammable or explosive liquids or gases. Sparks could ignite fumes.

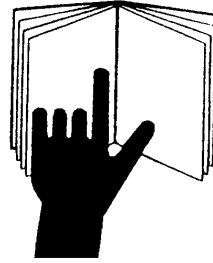
SHUT DOWN SAFELY

SHUT DOWN PROCEDURES

Never disable or disconnect the safety devices!

Always close fuel valves when the machine is not being used.

Refer to the manufacturer's manuals for specific shut down procedures.



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LOAD AND UNLOAD SAFELY

PRECAUTIONS

- Power trowels are heavy and awkward to move around.
- Do not attempt to lift the ride-on trowel by the guard rings.
- Use proper heavy lifting procedures.
- Keep all non-essential personnel clear of the area.
- Never hoist the trowel over areas where people are standing or working.
- Remove tools and loose items before lifting.
- Make sure the crossbars on the safety catches are in good condition if so equipped.
- Always consult your operator's manual for the best and proper lifting, loading, and unloading methods.

WALK-BEHIND TROWELS

Some walk-behind trowels can be lifted or moved by two people utilizing lifting tubes or other special attachments. Generally however, they must be

lifted using lifting bales (special lifting brackets), or other specific lifting points provided by the manufacturer, and cranes, hoists, or forklifts. Be certain any lifting devices used have adequate capacity.

RIDE-ON TROWELS

Ride-on trowels are very heavy. They require heavy-duty lifting devices such as cranes or heavy-duty hoists to lift them on and off the concrete slab.

Be certain any lifting devices used have adequate capacity. Some ride-on trowels are equipped with lifting bosses that are used with specialized apparatus to assist in moving the trowels around. Use extreme care when lifting or moving a ride-on trowel.

STORAGE

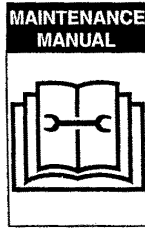
Always store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of reach of children.

PERFORM MAINTENANCE SAFELY

SERVICE AND MAINTENANCE SAFETY

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

Do not attempt to clean, service, or perform adjustments on the trowel while it is running.



GOOD HOUSEKEEPING

Keep area clean and dry if possible. Oily and wet surfaces are slippery; greasy rags are a fire hazard; wet spots are dangerous around electrical equipment.



GENERAL PROCEDURES

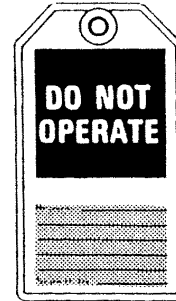
Do not perform any work on the trowel unless you are authorized to do so.

Standard maintenance procedures should always be observed. Read the manufacturer's manual or find assistance if you do not understand what you are doing.

Maintenance can be dangerous unless performed properly. Be certain that you have the necessary skill and information, correct tools and equipment to do the job correctly.

Attach a Do Not Operate tag or similar warning tag to the control panel (or handle on walk-behind trowels), and disconnect the battery (disconnect the spark plug wire on walk-behind trowels), before performing maintenance on the machine.

Disconnect the electric cord on electrical machines.



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PERFORM MAINTENANCE SAFELY

FORM GOOD DRESS HABITS

Loose clothing and jewelry can catch in moving parts and cause serious injury.

Keep hands – and clothing – away from moving parts.

GUARDS AND SAFETY DEVICES

After performing maintenance make certain all guards and panels have been reinstalled and all safety devices are functional.

BATTERY MAINTENANCE

Always wear eye and face protection.

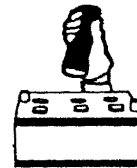
Batteries produce explosive gases. Keep open flame or sparks away. See the manufacturer's instructions when servicing the batteries, when using jumper cables, or when using a battery charger.



Use a flashlight to check battery electrolyte level. Always check with engine stopped.

Battery electrolyte is poisonous. It is strong enough to burn your skin, eat holes in clothing, and can cause blindness if splashed into eyes. Always wear eye and face protection.

Flush any contacted area with water immediately.



PERFORM MAINTENANCE SAFELY

FIRE PREVENTION

Avoid fire hazards.

Always stop the engine and allow it to cool before you refuel the trowel. Do not refuel while smoking or near open flame or sparks. Never overfill fuel tanks or fluid reservoirs.

Remove all trash or debris. Make sure oily rags or other flammable materials are not stored on or in the trowel.

Check for fuel, oil, or hydraulic fluid leaks. Repair the leaks and clean the machine before you operate it.

Inspect electrical wiring or worn or frayed insulation. Install new wiring if wires are damaged.

Do not weld or flame cut on pipes, tubes, or tanks that contain flammable fluids or gases.

Ether and starting fluid is flammable. Do not smoke when using. Always follow the instructions on the can and in the manufacturer's manual for your trowel.

Always use a safe, nonflammable solvent when you clean parts. Do not use flammable fluids or fluids that give off harmful vapors.

Store all flammable fluids and materials away from your work area.

Whenever the sparkplug is removed, do not test for spark on gasoline powered engines if engine is flooded or the smell of gasoline is present. A stray spark could ignite fumes.

Know where fire extinguishers are kept – how they operate – and for what type of fire they are intended!

Check readiness of fire suppression systems and fire detectors (if so equipped).



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PERFORM MAINTENANCE SAFELY

EXHAUST FUMES

Engine exhaust fumes can cause sickness or death.

When performing maintenance, if it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area when an exhaust pipe extension. If you do not have an exhaust pipe extension, make sure you open the doors and get outside air into the area.

Ensure that permissible carbon monoxide levels are monitored and not exceeded.



FLUID SIPHONING

Never siphon gasoline or hydraulic fluid using a hose and suction by mouth. Ingestion of these fluids even in small amounts will require immediate medical attention and can cause death.

COOLING SYSTEM

Maintain the cooling system according to the manufacturer's instructions.

Hot coolant can spray out and you can be burned if you improperly maintain or service the cooling system.

Remove filler cap only when cool.



PERFORM MAINTENANCE SAFELY

TROWEL BLADES AND PANS

- Do not attempt to clean, service or perform adjustments on the trowel while it is running.
- Do not remove while the trowel is hanging overhead. Always support the trowel securely on a flat, level surface before changing blades or pans.
- Always handle blades and pans carefully. Worn blades or pans may develop sharp edges that can cause serious cuts.
- Always replace worn or damaged parts with service parts designated by the manufacturer.
- Replace blades and pans as a complete set – even if only one blade or pan is showing wear or damage. They can wear differently depending on different jobs, and a difference in blade size will damage the finish of the slab surface.

HYDRAULIC SYSTEMS

Hydraulic fluid systems operate under high pressure. Even a small leak can have enough force to penetrate the eyes or skin. If injury occurs, seek immediate medical treatment by a physician familiar with injuries that are caused by hydraulic oil escaping under pressure.

Use a piece of wood or cardboard to find hydraulic oil leaks. Do not use your bare hands.

Wear safety glasses to prevent injuries to the eyes.

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TEST YOUR KNOWLEDGE

Do you understand this AEM manual and items such as –

- Your safety program?
- Your trowel manufacturer's manual(s)?
- Proper clothing and personal safety equipment?
- Your trowel's controls, warning signs and devices, and safety equipment?
- Proper trowel lifting and moving procedures?
- How to inspect and start your trowel?

- How to check your trowel for proper operation?
- Proper working procedures?
- Proper shut down procedures?
- Your work area and any special hazards that may exist?
- Under what conditions you should not operate your trowel?

If you do not understand any of these items, consult with your supervisor before operating your trowel.

A FINAL WORD TO THE USER

Remember that **YOU** are the key to safety. Good safety practices not only protect you but protect the people around you.

You have read this safety manual and the manufacturer's manual(s) for your specific trowel. Make them a working part of your safety program. Keep in mind that this safety manual is written for only this type of machine.

Practice all other usual and customary safe working precautions, and above all –

REMEMBER – SAFETY IS UP TO YOU

**YOU CAN PREVENT SERIOUS
INJURY OR DEATH**

This manual is another in a series on the safe operation of machinery published by AEM.
For additional publications visit our web site at www.aem.org.



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