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Operator's Manual

Ride-On Trowel

CRT 36-25
CRT 36-26A



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CALIFORNIA Proposition 65 Warning



WARNING

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



WARNING

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.



WARNING

Cancer and Reproductive Harm -
www.P65Warnings.ca.gov.



WARNING

Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

NOTICE! CALIFORNIA AIR RESOURCES BOARD (CARB): This machine is considered a preempt Off-Road Applicatoin as relating to CARB standards. The U.S. EPA has sole authority to establish emission standards for preempt construction equipment. For more information see www.arb.ca.gov/msprog/offroad/preempt.htm

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

Masin	Osa nr	Masin	Osa nr
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.
- For spare parts information, please see your Wacker Neuson Dealer, or visit the Wacker Neuson website at <http://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.

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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



WARNING 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.
- Dust precaution

Dust created by construction activities may cause silicosis or respiratory harm. To reduce the risk of exposure:

- Work in a well ventilated area.
- Use a dust control system.
- Wear an approved dust/particle respirator.

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



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

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:

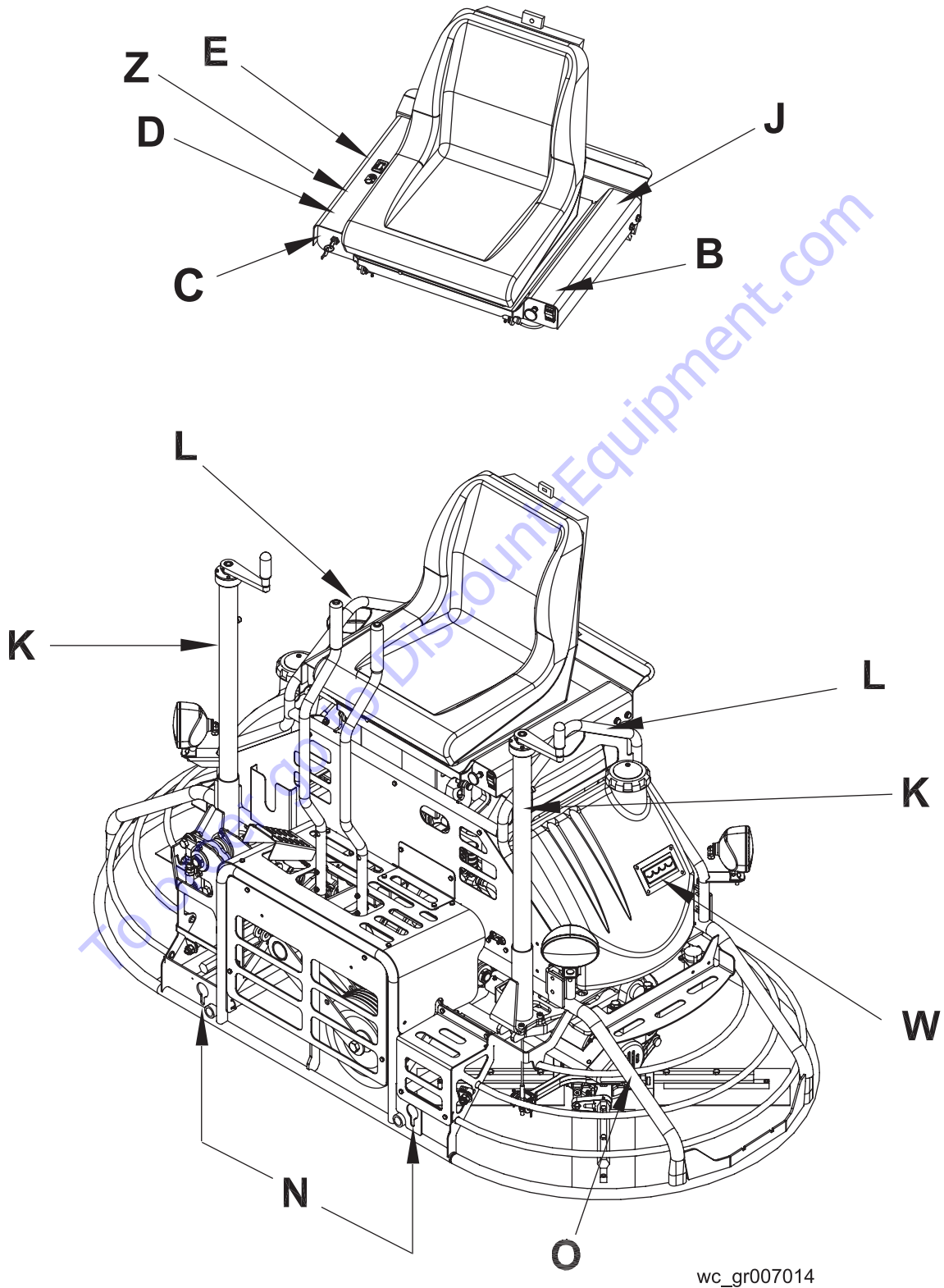
- Tie back long hair.
- Remove all jewelry (including rings).
- Do not attempt to clean or service the machine while it is running. Rotating parts can cause severe injury.
- Do not crank a flooded engine with the spark plug removed on gasoline-powered engines. Fuel trapped in the cylinder will squirt 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.

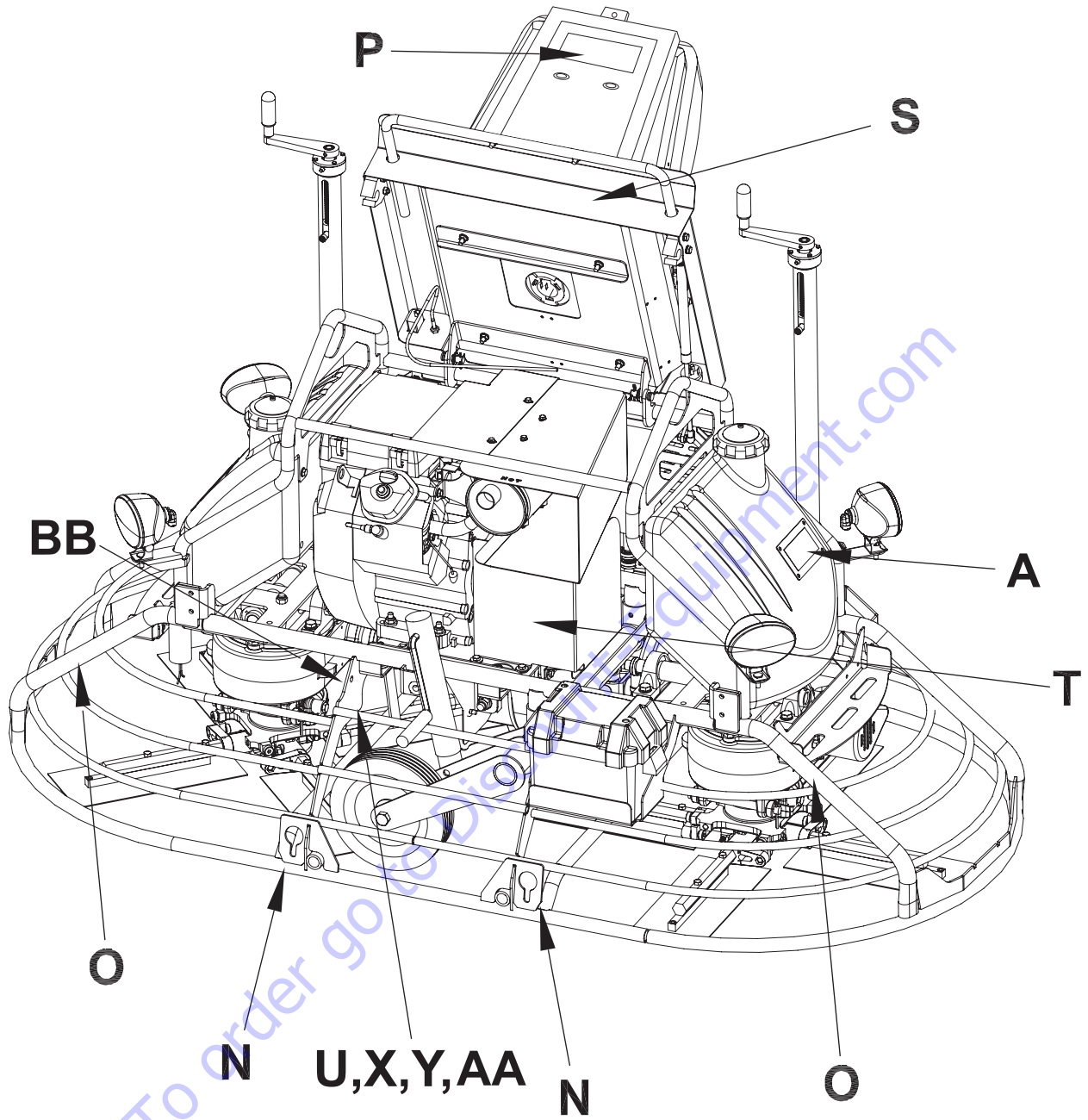
- ALWAYS turn engine off and remove key from machine before performing maintenance or making repairs.
- Handle blades carefully. The blades can develop sharp edges which can cause serious cuts.
- Keep the area around the muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could 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.

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2 Labels

2.1 Label Locations

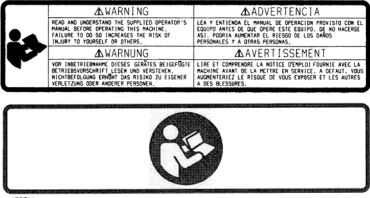
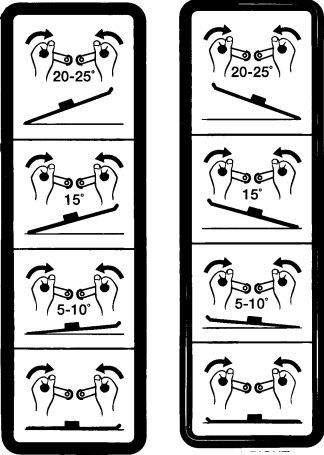
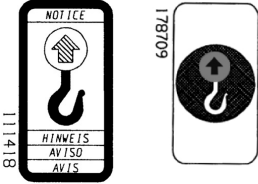

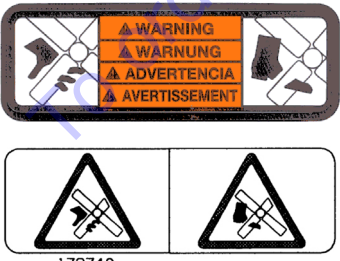


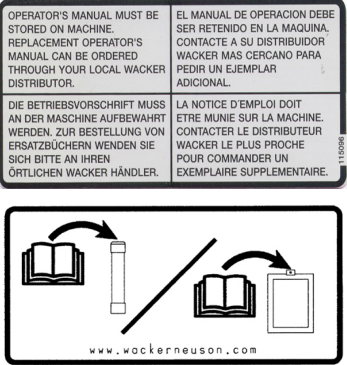


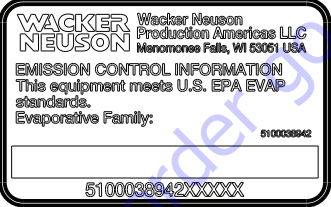
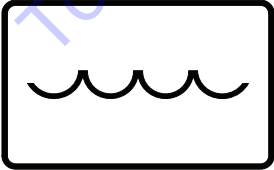
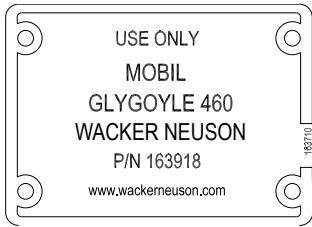


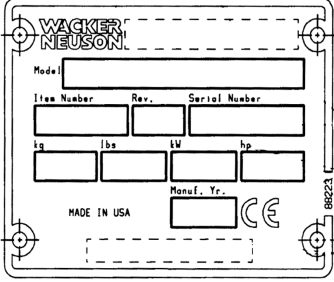

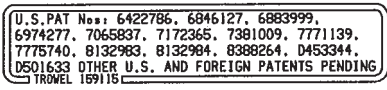


wc_gr007015

2.2 Label Meanings

<p>A</p>		<p>DANGER</p> <p>Asphyxiation hazard.</p> <ul style="list-style-type: none"> Engines emit carbon monoxide. Do not run the machine indoors or in an enclosed area unless adequate ventilation, through such items as exhaust fans or hoses, is provided. Read the Operator's Manual. No sparks, flames, or burning objects near the machine. Stop the engine before refueling.
<p>B</p>		<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>
<p>C</p>		<p>Positions of the key switch:</p> <ul style="list-style-type: none"> ON OFF Engine crank
<p>D</p>		<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
<p>E</p>		<p>Check engine oil level.</p>

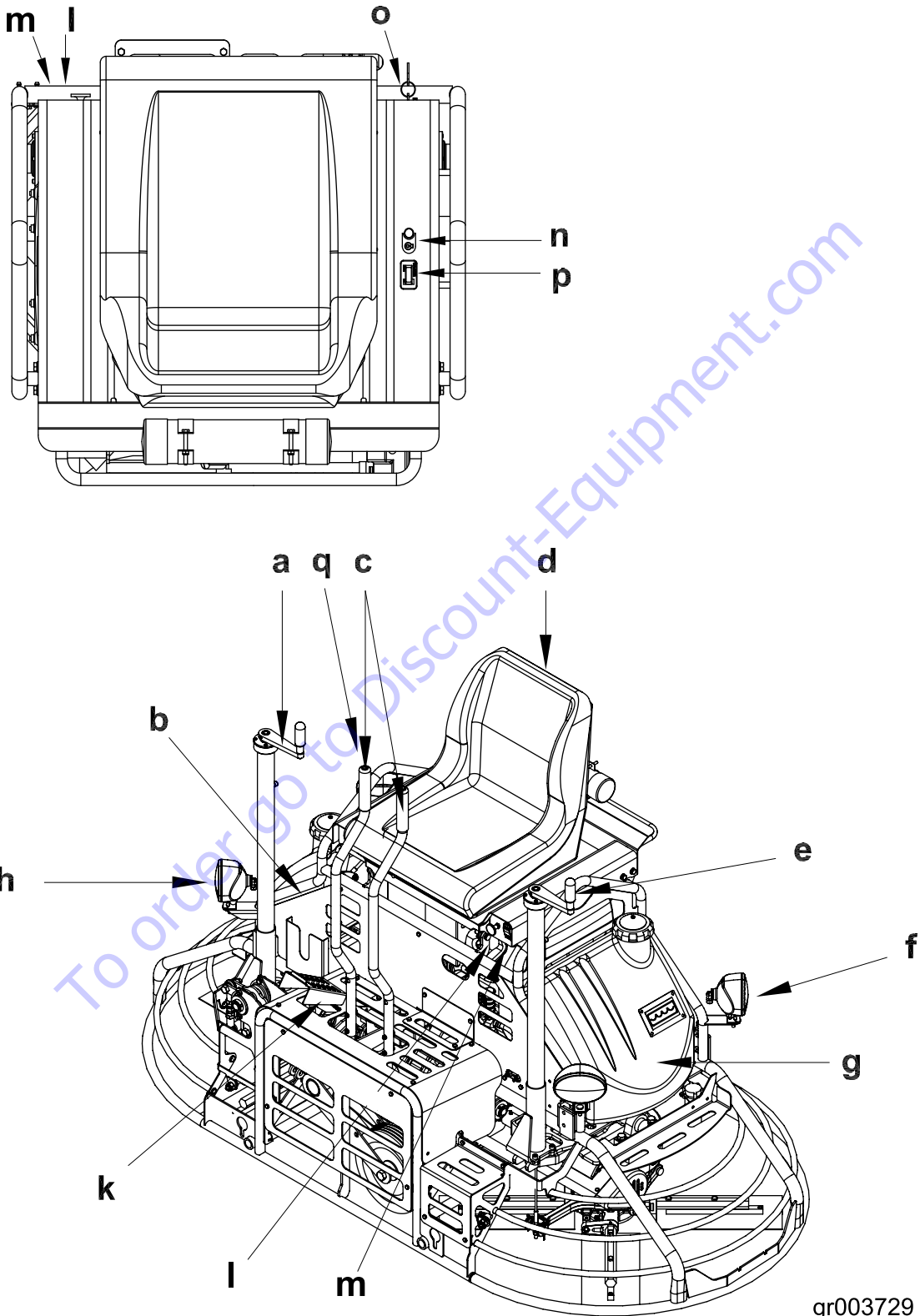
<p>J</p>	 <p>178714</p>	<p>Read and understand the supplied Operator's Manual before operating the machine. Failure to do so increases the risk of injury to yourself and others.</p>
<p>K</p>		<p>Pitch control:</p> <p>To increase pitch: Rotate the left pitch control clockwise, rotate the right pitch control counterclockwise.</p> <p>To decrease pitch: Rotate the left pitch control counterclockwise, rotate the right pitch control clockwise</p>
<p>L</p>	 <p>111418</p>	<p>NOTICE Lifting point</p>
<p>N</p>		<p>Tie-down point</p>
<p>O</p>	 <p>178740</p>	<p>WARNING Cutting hazard. Keep hands and feet away from moving blade.</p>

<p>P</p>	 <p>OPERATOR'S MANUAL MUST BE STORED ON MACHINE. REPLACEMENT OPERATOR'S MANUAL CAN BE ORDERED THROUGH YOUR LOCAL WACKER DISTRIBUTOR.</p> <p>EL MANUAL DE OPERACION DEBE SER RETENIDO EN LA MAQUINA. CONTACTE A SU DISTRIBUIDOR WACKER MAS CERCAÑO PARA PEDIR UN EJEMPLAR ADICIONAL.</p> <p>DIE BETRIEBSVORSCHRIFT MUSS AN DER MASCHINE AUFBEWAHRT WERDEN. ZUR BESTELLUNG VON ERSATZBÜCHERN WENDEN SIE SICH BITTE AN IHREN ÖRTLICHEN WACKER HÄNDLER.</p> <p>LA NOTICE D'EMPLOI DOIT ETRE MUNIE SUR LA MACHINE. CONTACTER LE DISTRIBUTEUR WACKER LE PLUS PROCHE POUR COMMANDER UN EXEMPLAIRE SUPPLEMENTAIRE.</p> <p>www.wackerneuson.com</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>▲ WARNING ▲ WARNUNG ▲ ADVERTENCIA ▲ AVERTISSEMENT</p> <p>178713</p>	<p>WARNING Hot surface</p>
<p>T</p>	 <p>▲ WARNING ▲ WARNUNG ▲ ADVERTENCIA ▲ AVERTISSEMENT</p> <p>178712</p>	<p>WARNING! Entanglement hazard. Keep hands away from spinning belt and pulley.</p>
<p>U</p>	 <p>WACKER NEUSON Wacker Neuson Production Americas LLC Menomonee Falls, WI 53051 USA</p> <p>EMISSION CONTROL INFORMATION This equipment meets U.S. EPA EVAP standards. Evaporative Family: 6100038942</p> <p>5100038942XXXX</p>	<p>Emission Control Information This equipment meets U.S. EPA EVAP standards.</p>
<p>W</p>	 <p>173438</p>	<p>Water tank fill. Use only clean water or water-based retardants.</p>
<p>X</p>	 <p>USE ONLY MOBIL GLYGOYLE 460 WACKER NEUSON P/N 163918 www.wackerneuson.com</p> <p>163710</p>	<p>Use only Glygoyle 460 gear oil in gearbox.</p>

<p>Y</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>Z</p>		<p>California Proposition 65 Warning Cancer and Reproductive Harm - www.P65Warnings.ca.gov.</p>
<p>AA</p>		<p>This machine may be covered by one or more patents.</p>
<p>BB</p>		<p>Industry Canada ICES-002 Compliance Label: CAN ICES-2/NMB-2</p>
<p>—</p>		<p>WARNING 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>

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 1/4" 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

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.

Use of oxygenated fuels

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

Before using an oxygenated fuel, confirm the fuel's contents. Some states 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.

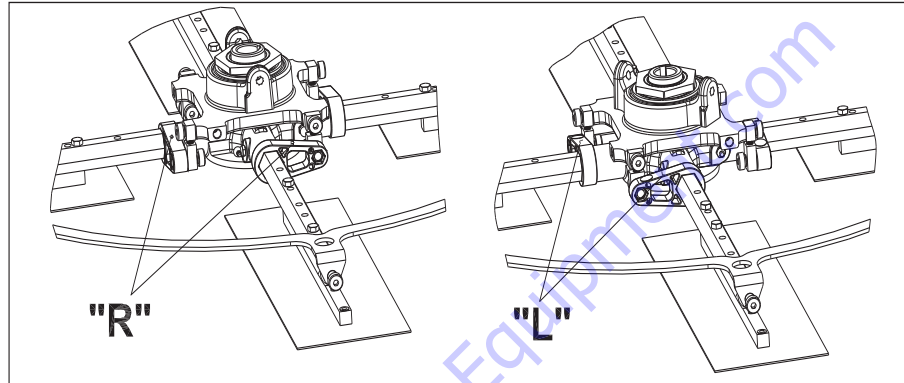
Fuel system damage or performance problems resulting from the use of an oxygenated fuel containing more than the percentages of oxygenates mentioned above are not covered under warranty.

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.*

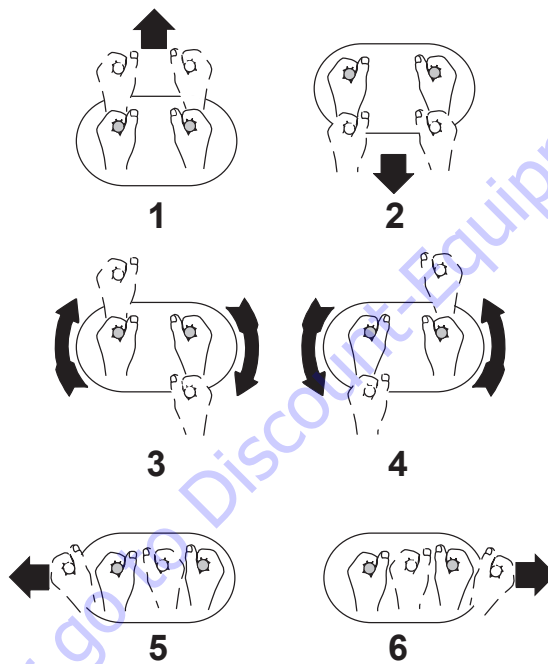
NOTICE: DO NOT use excessive pressure on the control levers. Excessive pressure does not improve the reaction time of the machine and can damage the steering controls.

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



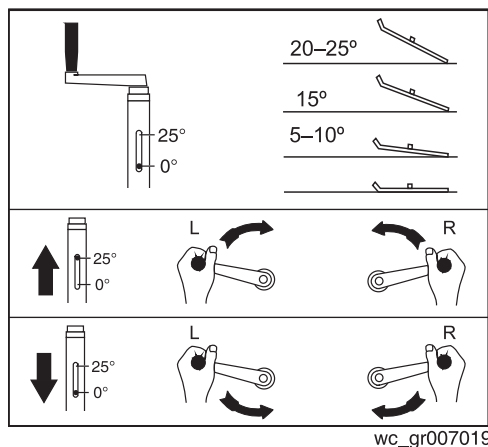
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3.11 Pitch Adjustment

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.

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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.

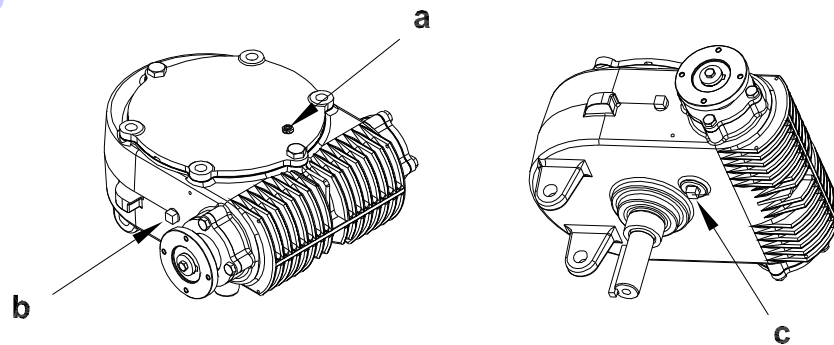
To change gearbox oil:

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.

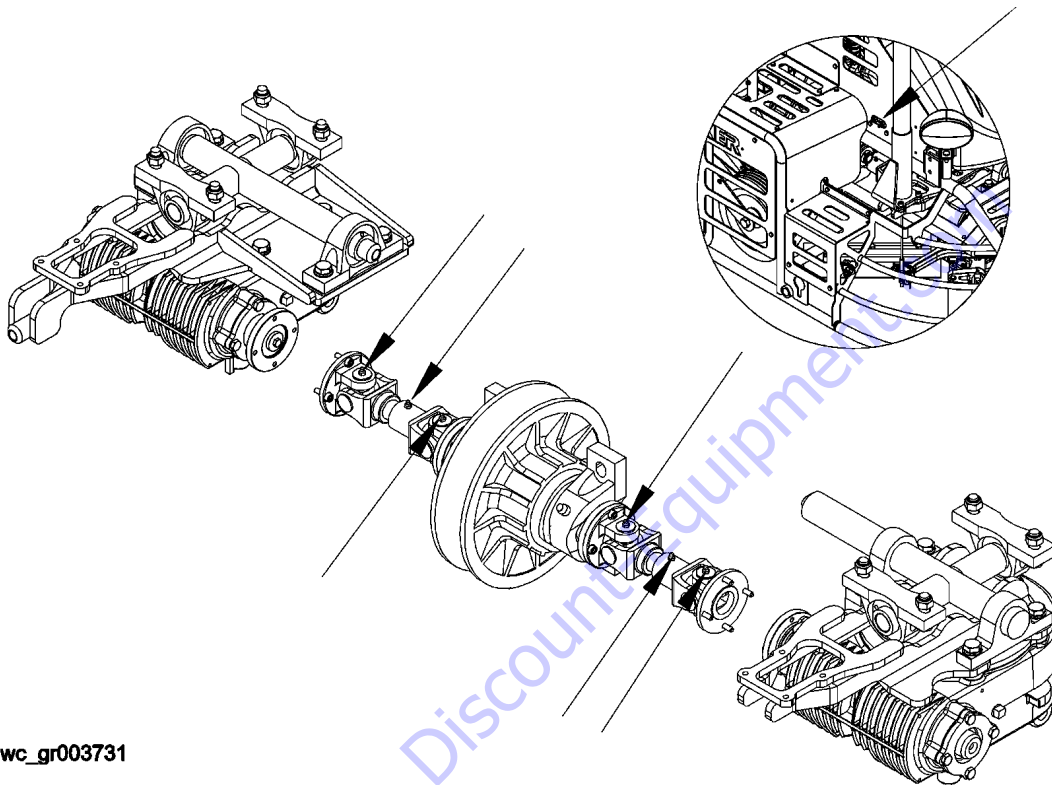


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4.4 Control Linkage Lubrication

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.



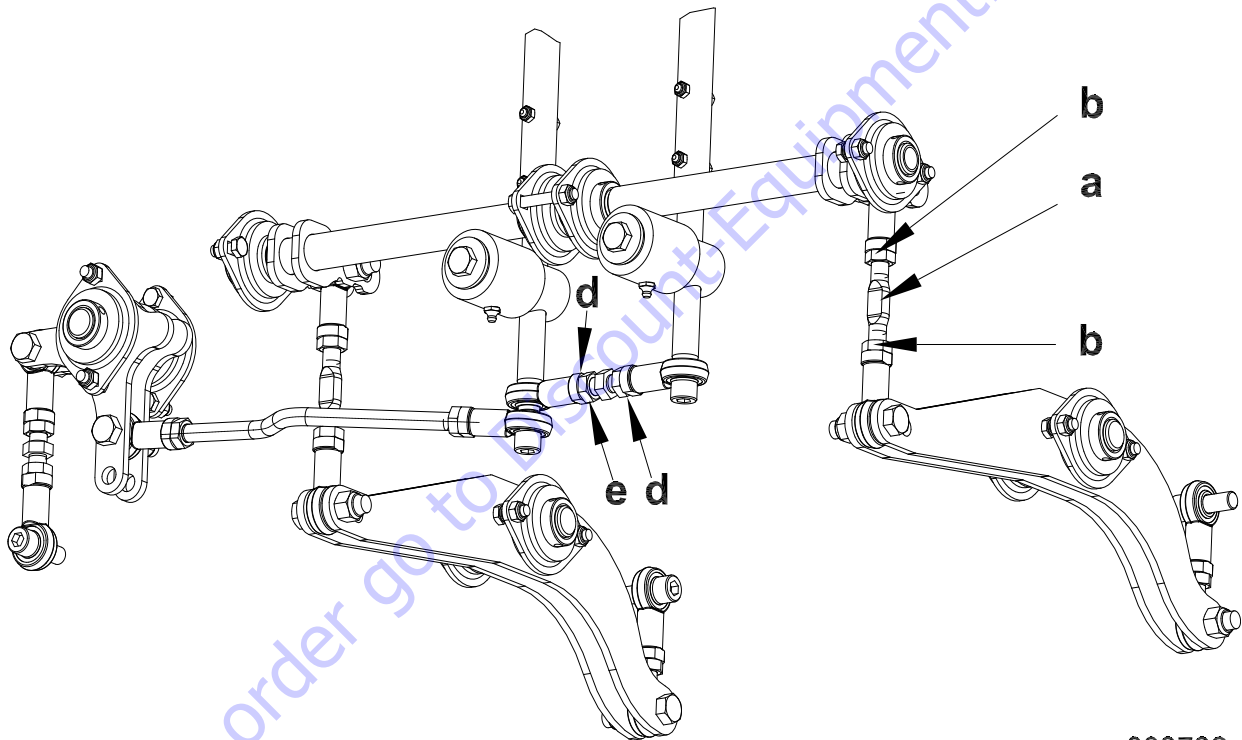
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4.5 Control Arm Adjustment (Forward or Backward)

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:

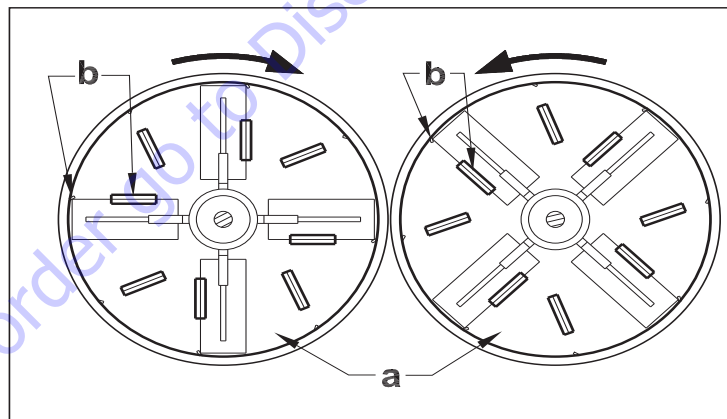
1. Loosen the jam nuts **(d)**.
2. Drop the horizontal linkage **(e)** down to clear the bracket.
3. Shorten the linkage to move the control arms to the left.
4. Extend the linkage to move the control arms to the right.
5. After the control lever has been adjusted to the desired position, reassemble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



wc_gr000151

4.8 Transporting the Machine



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.

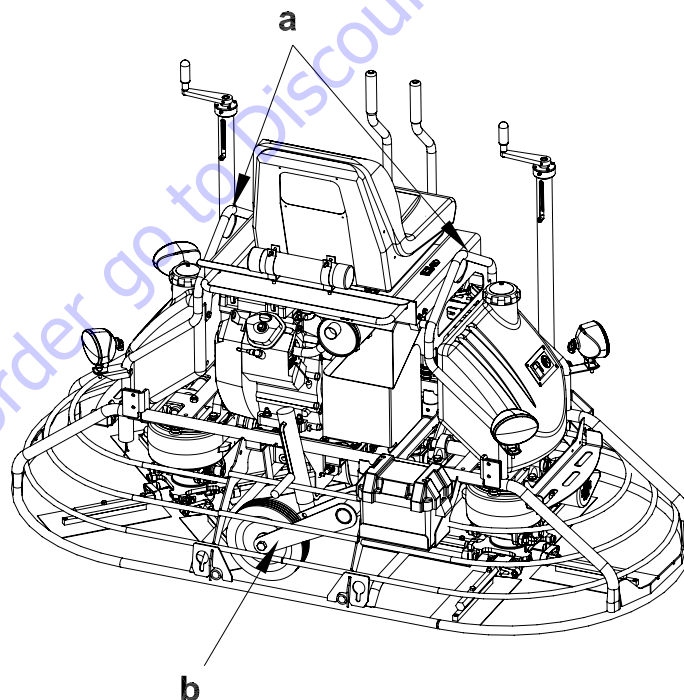
NOTICE: Make sure the lifting device has enough weight-bearing capacity to lift machine safely. Refer to section *Technical Data*.



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.

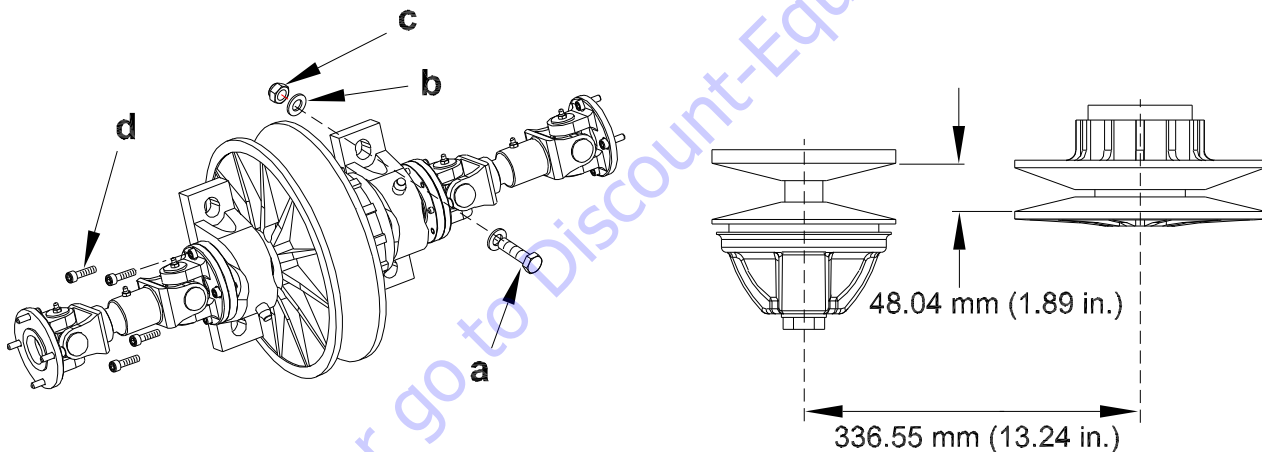


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4.9 Drive Belt

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.

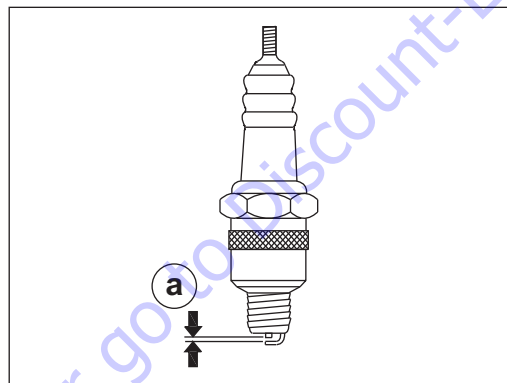
Note: Refer to the Technical Data for the recommended spark plug type and the electrode gap setting.



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.

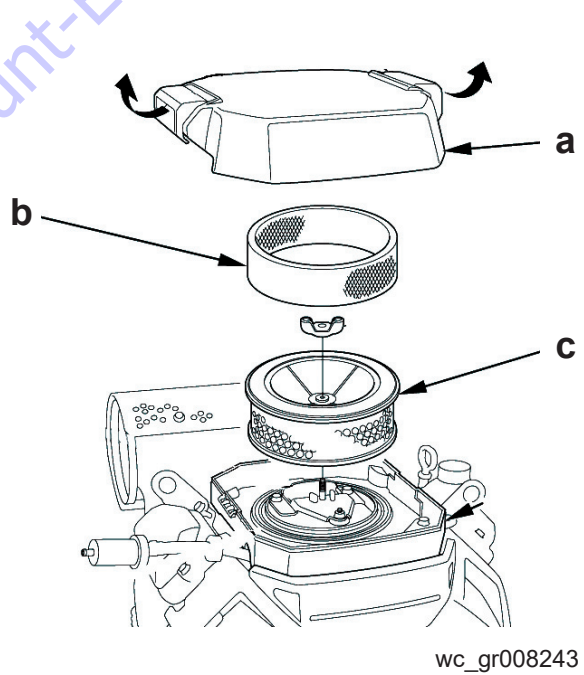
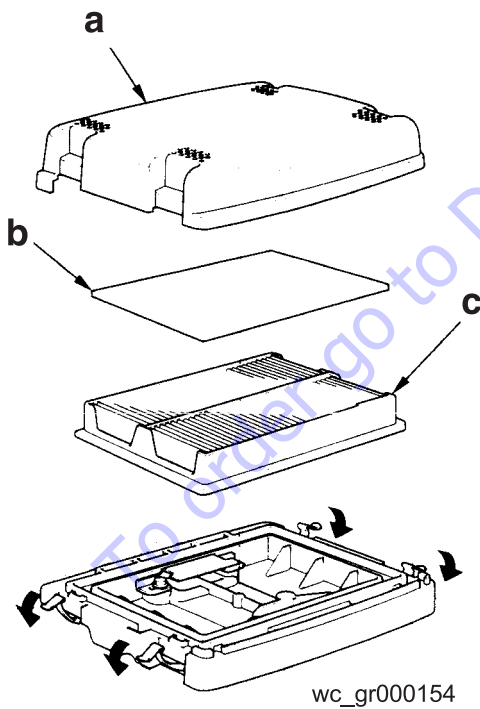
NOTICE: NEVER run engine without air cleaner. Severe engine damage will occur.



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.



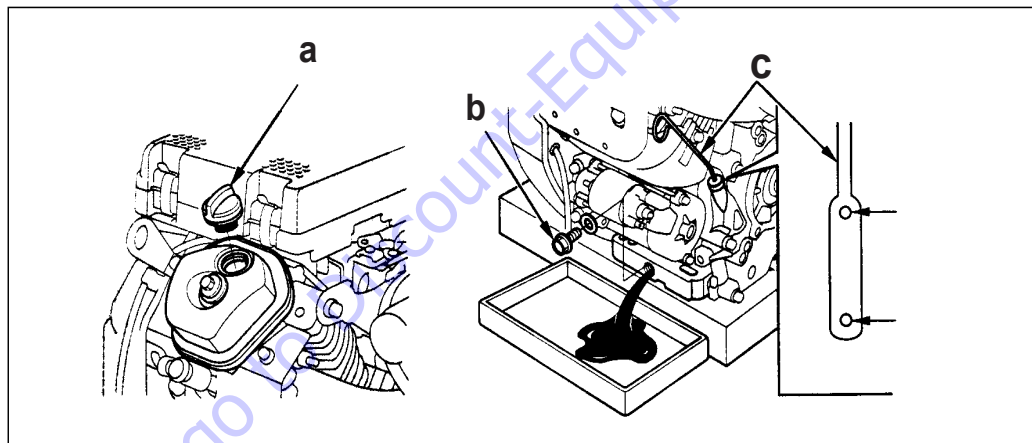
4.13 Engine Oil and Filter (Honda engine)

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!



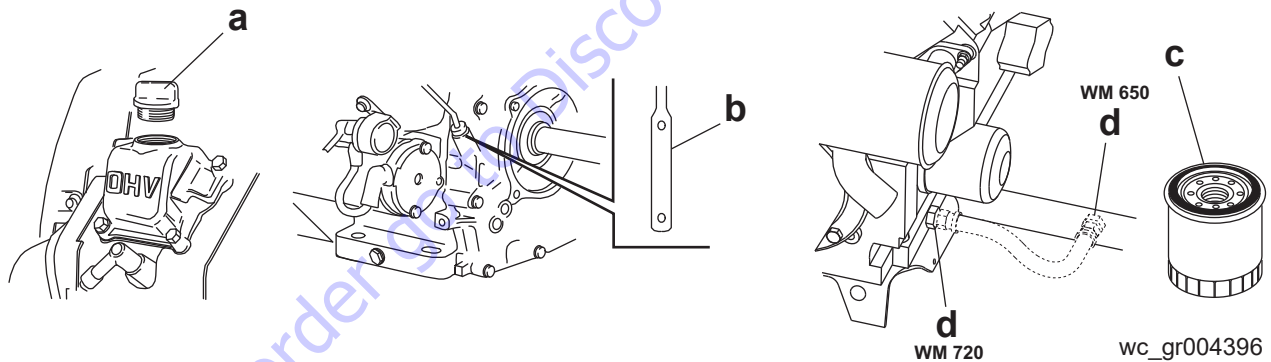
To change the filter:

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).
Poor handling; excessive range in control lever movement.	Main shaft(s) bent due to machine being dropped.	Replace main shafts.
	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.

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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.

Emission Control Systems Information and Warranty—Gasoline

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. Wacker Neuson recommends that all receipts covering maintenance on the engine/equipment be retained, but Wacker Neuson cannot deny warranty

Emission Control Systems Information and Warranty—Gasoline

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.

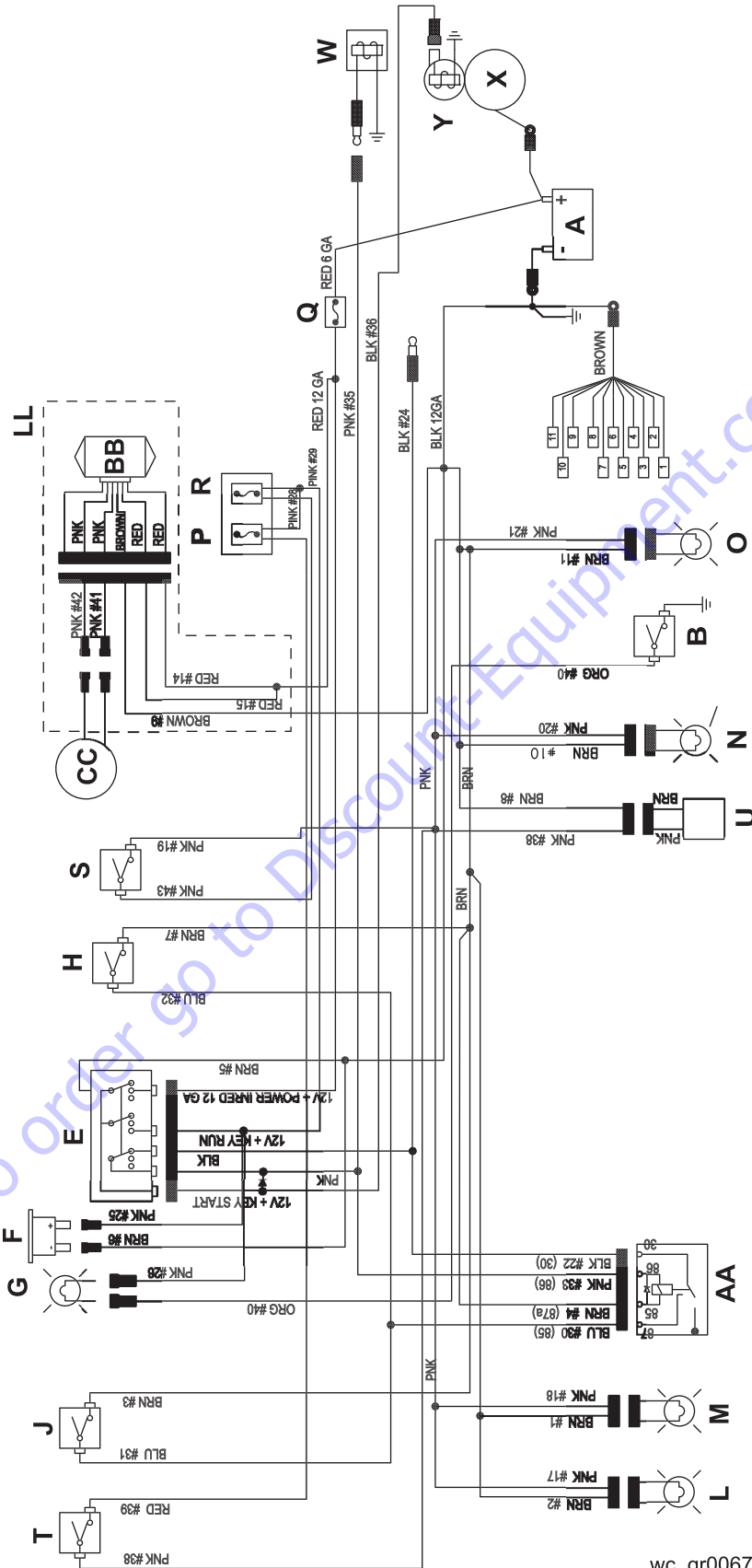
For owners located more than 100 miles from an authorized dealer/service center (excluding the states with high-altitude areas as identified in 40 CFR Part 1068, Appendix III), Wacker Neuson will pay for pre-approved shipping costs to and from an authorized Wacker Neuson dealer/service center.

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	—	—

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SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL

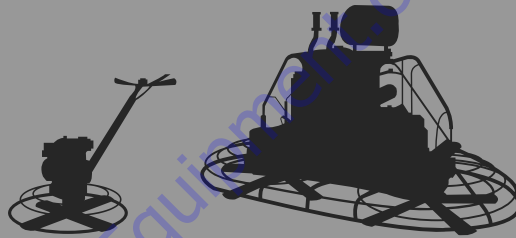


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To Order: Go to Discount-Equipment.com

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Acknowledgment

We wish to thank the members of the Association of Equipment Manufacturers for their invaluable contributions in preparing this Safety Manual.

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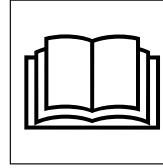
Foreword

This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your trowel and to instruct you in safety practices for dealing with these conditions. This manual is **NOT** a substitute for the manufacturer's operating manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the job site or in the service area. The manufacturer has no direct control over equipment application, operation, inspection, or maintenance. Therefore, it is **YOUR** responsibility to use good safety practices in these areas.

The information provided in this manual supplements the specific information about your trowel that is contained in the manufacturer's operating manual(s). Other information that may affect the safe operation of your machine may be contained in the following:

- Safety signs
- Insurance requirements
- Employer safety and training programs
- Safety codes
- Local, state/provincial, and federal laws, rules, and regulations



Read and understand manuals before operating

IMPORTANT! Before you operate this machine, make sure you have the manufacturer's manual(s) for this trowel and all attachments. If the manufacturer's manual(s) are missing, obtain replacements from your employer, equipment dealer, or directly from the manufacturer. Keep this safety manual and the manufacturer's manual(s) with the machine at all times. Read and understand all manuals.

Safety videos and other training resources are available from some manufacturers and dealers. Operators are encouraged to periodically review these resources.

3

Safety Alerts

Safety Alert Symbol

This Safety Alert Symbol means:
"Attention! Stay alert! Your safety is involved!"



The Safety Alert Symbol identifies important safety messages on equipment, safety signs, in manuals, or elsewhere. When you see this symbol, be alert to the possibility of death or personal injury. Carefully read the message that follows and inform other operators. Follow instructions in the safety message.

Signal Words

Signal words are distinctive words that are typically found on safety signs on the concrete power trowels and other job site equipment. These words may also be found in this manual and the manufacturer's manual(s). These words are intended to alert the operator to a hazard and the degree of severity of the hazard.



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



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



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



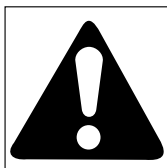
NOTICE is used to address practices not related to physical injury.

A Word to the User/Operator

It is **YOUR** responsibility to read and understand this safety manual and the manufacturer's manual(s) before operating this equipment. This safety manual takes you step by step through the working day.

Graphics have been provided to help you understand the text.

Hazard recognition and accident prevention depend upon you being alert, careful, and properly trained in the inspection, operation, transport, maintenance, and storage of this equipment.



Read and understand all safety signs – replace damaged signs

Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. Study this manual and the manufacturer's operating manual(s) for the specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written only for concrete power trowels.

After studying the manufacturer's operating manual(s) and this safety manual, please contact the equipment manufacturer with any remaining questions.

Practice all usual and customary safe working precautions and remember:

Safe operation is up to you!

You can prevent death or serious injury caused by unsafe work practices!

5

Follow a Safety Program

For Safe Operation

You must be a qualified and authorized operator for safe operation of this trowel. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation—and know the safety rules and regulations for the job site. It is a good safety practice to point out and explain safety signs and practices to others, and to make sure they understand the importance of following these instructions.



Never operate while impaired by alcohol or drugs

⚠ WARNING! Death or serious injury could result from operating machinery while impaired by drugs or alcohol. Drugs and alcohol affect operator alertness, coordination, and the ability to safely operate the equipment. **Never operate the trowel while impaired by use of alcohol or drugs. Never knowingly allow anyone to operate the machine when their alertness or coordination is impaired.**

An operator taking prescriptions or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to safely operate this equipment.

Be Alert!

Know where to get assistance. Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone. Know how to use a first aid kit and fire extinguisher/fire suppression system; know their location and practice getting to them. Ensure they have been properly tested and maintained.

Let others know where you will be working, and what time you will be returning. In case of an emergency, you want others to know where to find you.

Be Aware!

Take advantage of training programs offered.

Know the proper response to a fire or chemical spill on your trowel.

Follow a Safety Program

Be Careful!

Human error is the result of many factors: carelessness, fatigue, sensory overload, preoccupation, unfamiliarity with the machine or attachments, or drugs and alcohol, to name a few. You can avoid death or serious injury caused by these and other unsafe work practices. Be careful; never assume accidents cannot happen to you.

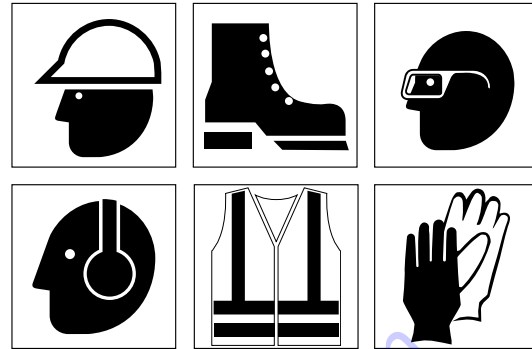
For your safety and the safety of others, act safely and encourage your fellow workers to act safely as well.

Protect Yourself

Wear all the personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:

- Hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask



Wear whatever is needed to protect yourself—don't take chances.

⚠ WARNING! Avoid death or serious injury from entanglement. **Do not wear loose or frayed clothing or accessories that could catch on moving parts.** Examples of items to avoid include flopping cuffs, dangling neckties and scarves, wallets attached to chains, jewelry and wrist watches.

7

Follow a Safety Program

Know the Rules

Most job sites have rules governing equipment use and maintenance. Before you start work at a new location, check with the supervisor or safety coordinator. Ask about the rules you will be expected to obey.

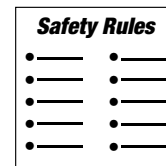
OSHA enforces federal laws within the United States that apply to the safe operation, application, and maintenance of equipment on some job sites. It is the employer's responsibility to comply with these laws. A federal representative may periodically inspect a job site to see that these laws are being followed.

There may be other local, state/provincial, federal laws or international organizations that regulate the use of this equipment, along with specific job site or employer rules. It is important that you know and comply with all applicable laws and rules, **including those requiring operator training and certification.**

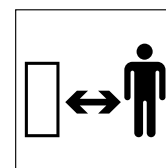
These are some of the rules you must work by:

- Only qualified and authorized individuals may operate this equipment.
- Inspect your machine and attachments before each use as specified by the manufacturer and your employer.

- Know the operating characteristics of your equipment. Do not misuse it.
- Wear proper clothing and PPE. Check that others are also wearing appropriate clothing.
- All shields, guards, air filters, access panels, and doors must be properly installed before each use.
- Know the rules regarding traffic at your job site. Know what all signs, flags, and markings mean. Know hand, flag, horn, whistle, siren, or bell signals, if used.
- Never modify or remove any part of the machine (except for qualified service personnel; then make sure the part is re-installed or replaced if defective or worn out).



Know and understand rules of operation



Keep bystanders away

8

Follow a Safety Program

- **Never allow children to play near, ride on or operate the equipment.**
- Keep bystanders away from the machine during operation.
- Know the work area before you use the equipment. Be aware of possible hazards.
- Only use attachments and parts that are approved by the manufacturer.
- Follow all safe shutdown instructions (See page 21, **Shut Down Safely**).

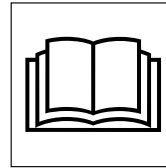
Know the Equipment

Read and understand the DANGER, WARNING, CAUTION, and NOTICE safety labels and other informational signs on the machine, the attachments, and in the manufacturer's operating manual(s). Ask your supervisor or dealer to explain any information you do not understand. Failure to obey safety instructions could result in death or serious injury.

Know the following about your equipment:

- Function, purpose, and use of all controls
- Correct operation speeds
- How to quickly stop equipment in an emergency
- Rated operating capacity

- Know the meaning of all identification symbols on the controls and gauges
- 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



Read and understand manuals before operating

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.

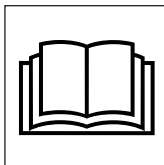
9

Prepare for Safe Operation

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 lift 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 the machine's operator's manual for the best and proper lifting, loading, and unloading methods.



Read and understand manuals before loading and unloading

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.

Prepare for Safe Operation

Check and Use All Available Safety Devices

To protect you and others around you, your machine may be equipped with the safety equipment listed below. Additional equipment may be required or some items may not apply, depending on attachments used, job site conditions, or applicable job site rules. Check that each required item is securely in place and in operating condition:

- Emergency stop switch or other “Shut-Down” devices
- Guards, Shields & Panels
- Alarms or Warning Lamps
- Drain Covers, Plugs, and Caps
- Pressure Relief Devices
- Lights
- Special enclosures or accessories required for specific applications or job site conditions
- Safety Signs

Use them! Never remove or disconnect any safety device.

Check the Machine

Before beginning your work day, inspect the machine and have all systems in good operational condition.

- Perform daily and periodic service procedures as instructed by the equipment manufacturer.
- Check for broken, missing, loose, or damaged parts. Make necessary repairs.



Inspect the machine before each work day

- Keep handholds clean and free of grease, oil, dirt, snow or ice.
- Ensure shielding is properly installed and in good condition. Repair or replace if damaged or missing.
- Ensure all tools or loose objects are removed or securely fastened before operating the machine.

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Prepare for Safe Operation

Hydraulic Fluid Injection Hazard

⚠ WARNING! Accidental injection of pressurized fluid into the hands or body is dangerous and could result in death or serious injury. **Use caution when checking hydraulic leaks as pressurized hydraulic fluid has enough force to penetrate skin, causing serious personal injury.**

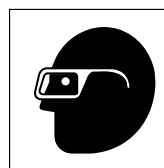
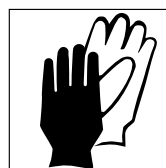
If a leak is discovered:

- Ensure engine is turned off; relieve pressure in hydraulic circuit.
- Wear proper hand and eye protection.
- Visually examine the hydraulic hose or fluid lines in the vicinity of the leak for breaks or cracks. **Do not** use your hand to check for leaks.
- Repair or replace hydraulic lines per manufacturer's recommendation.

Fluid injection injuries are not always obvious. Victims have reported such injuries feel like a bee sting or splinter under the skin. If you suspect you have a fluid injection injury, do not take chances. Seek proper medical care immediately. If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury.



Pressurized fluid can inject into the body



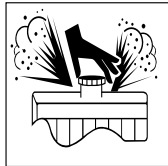
Wear proper hand and eye protection

Prepare for Safe Operation

Check the Cooling System

When checking the cooling system, make sure the engine is turned off and is cool. Remove the key to prevent fans from unexpectedly starting. Ensure the coolers and engine compartment are clean and free from debris, which could ignite and cause a fire.

If the machine is air-cooled, be sure the cooling unit has an unobstructed air flow. If it is liquid-cooled, check coolant level (at overflow tank, if provided).



Allow radiator to cool before removing cap slowly

⚠ WARNING! Allow the radiator to cool before checking the level. Hot radiator fluids could escape as steam and burn you. (See page 27, **Engine Coolant Hazards.**)

Use Caution When Fueling

⚠ WARNING! Avoid injury from fire or explosion. **Never fill the fuel tank with the engine running, while smoking or when near an open flame.**

Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately.

Be sure to use the correct type and grade of fuel.

Ground the fuel funnel or nozzle against the filler neck to prevent sparks that could ignite fuel vapors. Be sure to replace the fuel fill cap (if equipped) when you are done.



No smoking and no open flames in flammable/explosive atmospheres

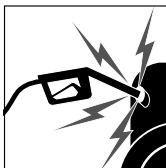
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Prepare for Safe Operation

Ultra-Low Sulfur Diesel (ULSD) Fuel Hazard

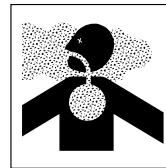
Avoid Static Electricity Risk When Fueling

⚠ WARNING! Ultra-Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations. Avoid death or serious injury from fire or explosion; **consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.**



Static discharge during fueling can cause explosion

⚠ WARNING! Exhaust fumes from diesel, gasoline or LP gas engines can kill. **Do not breath exhaust fumes from any kind of engine.**



Ventilate work area

Operating in Flammable/Explosive Atmospheres

⚠ WARNING! A trowel must not be operated in flammable or explosive atmospheres. Use in explosive atmospheres can result in fires and/or explosions which could cause serious injury or death.



Do not operate in explosive/flammable atmosphere

Follow Safe Operating Practices

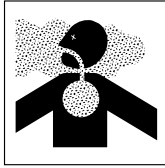
Exhaust Fumes in a Closed Space Can Kill

Vent exhaust and assure a flow of fresh air when an internal combustion engine is used in a closed space.

Prepare for Safe Operation

Avoid Crystalline Silica (quartz) Dust

⚠ WARNING! Avoid exposure to dust containing crystalline silica particles. This dust can cause serious injury to the lungs (silicosis).



Avoid silica dust

Because crystalline silica is a basic component of sand and granite, many activities at construction sites produce dust containing crystalline silica. Trenching, sawing and boring of material containing crystalline silica can produce dust containing crystalline silica.

If dust which contains crystalline silica is present there are guidelines which should be followed.

1. Be aware of the health effects of crystalline silica and that smoking adds to the damage.
2. Be aware of and follow OSHA (or other) guidelines for exposure to airborne crystalline silica.
3. Know the work operations where exposure to crystalline silica may occur.
4. Participate in air monitoring or training programs offered by the employer.
5. Be aware of and use optional equipment controls such as water sprays, local exhaust ventilation, and enclosed cabs with positive pressure air conditioning.
6. Where respirators are required, wear a respirator approved for protection against crystalline silica-containing dust. Do not alter the respirator in any way. Workers who use tight-fitting respirators cannot have beards/mustaches which interfere with the respirator seal to the face.
7. If possible, change into disposable or washable work clothes at the worksite; shower and change into clean clothing before leaving the worksite.
8. Do not eat, drink, use tobacco products, or apply cosmetics in areas where there is dust containing crystalline silica.
9. Store food, drink and personal belongings away from the work area.
10. Wash hands and face before eating, drinking, smoking, or applying cosmetics after leaving the exposure area.

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Prepare for Safe Operation

Know the Working Area

Learn as much about your working area as possible.

Check at Ground or Floor Level

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.

Plan Your Work

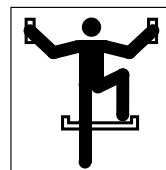
Know in advance the conditions likely to be encountered, and plan for any likely emergency.

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.



Use three points of contact when mounting and dismounting

Start Safely

Warn Personnel Before Starting

Before starting, walk completely around the machine. **Make sure no one is on it or close to it.** Let others know you are starting up and don't start until everyone is completely clear of the machine. As the equipment operator, you are responsible for the safe use of the machine, so always make sure you have communicated your work plans to others on the site.



Before starting,
walk completely
around trowel

Check the trowel thoroughly at delivery for any shipping damage.

Locate the trowel in an accessible location, as close to the work site as possible.

Secure the trowel after it is placed in its intended operating position so it does not tip, roll, slide or fall.

Starting the Engine

⚠ WARNING! Never attempt to start the engine by shorting across starter terminals. Serious injury or death may result.

Know the exact starting procedure for your machine. See the manufacturer's operating manual(s) for starting.

- Familiarize yourself with warning devices, gauges and operating controls.
- Make sure controls are in the neutral/locked position.
- Clear the area of all persons.
- Start the engine following the instructions in the manufacturer's operating manual(s).
- If necessary to run the engine or operate the machine in an enclosed area, ensure there is adequate ventilation.

⚠ WARNING! Never operate the machine without adequate ventilation. Exhaust fumes can kill. Do not breathe exhaust fumes!

For a walk-behind (pedestrian operated) trowel machine, make sure that a circular area with a minimum radius equal to the length of the machine is clear. This will ensure safety of personnel around the machine.

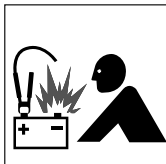
17

Start Safely

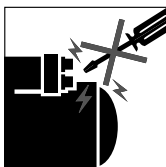
Starting Aids

If you have trouble starting the engine and need to use jumper cables, follow the instructions in manufacturer's operating manual(s). **Jump-starting is a two-person operation.** The operator must be in the operator's seat when jump-starting so the machine will be under control when the engine starts.

⚠ WARNING! Improper jump-starting procedures may cause serious injury or death from a battery explosion or a run-away machine. **Always use proper jump-starting procedure.** (See page 29, **Battery Hazards.**)



To avoid explosion,
follow proper jump-
starting procedures



Never start engine
by shorting across
starter terminals

Ether/cold start fluid is HIGHLY FLAMMABLE. Before using it, always read the instructions on the ether/cold start fluid container and the instructions in the manufacturer's operating manual(s).

⚠ WARNING! Avoid injury from explosion or fire. If the engine is equipped with a glow plug pre-heater or other intake manifold type pre-heater, follow manufacturer's instructions before using ether/cold start fluid.

After Starting Engine

Observe gauges, instruments, and warning lights to assure that they are functioning and their readings are within the operating range.

Run an Operating Check

Do not use a machine that is not in proper operating condition. It is your responsibility to check the condition of all systems and to run the check in a safe area.

Operate Safely

Walk-Behind Trowels

- Ensure that the operator is familiar with the trowel and is trained on its operation.
- 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.

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.

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Operate 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.
- Use an electrically powered trowel that has been built in accordance with the requirements of the National Electrical Code (NFPA-70) and has been approved by a Nationally Recognized Test Lab.



- Keep all electrical cords away from rotating components, 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

Storage

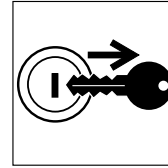
Always store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of reach of children.

⚠ WARNING! Avoid death or serious injury. **Never leave a machine unattended with the engine running.**

Safe Shutdown

The detailed shutdown procedure is given in your manufacturer's manual(s). In general, this includes:

- Stop machine.
- Position controls in neutral or locked position.
- Idle engine for short cool-down period.
- Stop engine and remove ignition key (if equipped).
- Cycle hydraulic controls to eliminate pressure.
- Lock covers and enclosures.
- Shut off master electric switch (if equipped).



Shut engine off,
remove key

Perform Maintenance Safely

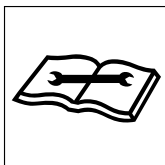
Know What You're Doing

Maintenance on this type of machine is not for inexperienced or untrained personnel. It can be hazardous unless performed properly. Be sure you have the necessary skill, information, correct tools, and proper equipment to do the job safely.

Be sure to maintain the equipment according to the manufacturer's instructions. Regularly check the operation of the protective and safety devices.

Do not perform any work on a machine unless you are authorized and qualified to do so.

If you have been authorized to perform maintenance, **read the manufacturer's operating and service manual(s)**. Study the instructions: check the lubrication charts, examine all the instruction messages on the machine.



Maintain equipment

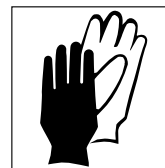
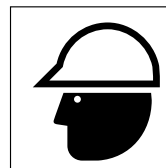
Protect Yourself

Wear all the personal protective clothing and PPE issued to you or called for by job conditions.

You may need:

- Hard hat
- Safety shoes
- Safety glasses, goggles or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed to protect yourself. Do not take chances.



Perform Maintenance Safely

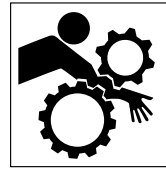
⚠ WARNING! Avoid death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

Wear a rubber apron and rubber gloves when working with corrosives. Wear gloves and safety shoes when handling wooden blocks or sharp-edged metal.

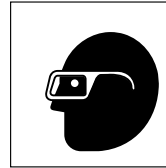
Always use safety glasses, goggles or a face shield. They provide eye protection from fluids under pressure, during grinding and while servicing batteries. Protection is also needed from flying debris, liquids and loose material produced by equipment, tools and pressurized air/water.

Wear a face shield and follow manufacturer's instructions when you disassemble spring-loaded components or work with battery acids. Keep pockets free of all objects that could fall out and drop into machinery.

Handle tools and heavy parts sensibly, with regard for the safety of yourself and others. Lower items; don't drop them.



Avoid rotating parts



Wear eye protection



Do not loosen radiator cap until cool

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Perform Maintenance Safely

Prepare the Work Area

- Position the machine in a level area out of the way of other working equipment.
- Make sure there is adequate light, ventilation and clearance.
- Remove oil, grease or water to eliminate any slippery surfaces.
- Clean around the area to be serviced to minimize contamination.



Avoid falls, clean slippery surfaces

Prepare the Machine

Stored energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.) must be controlled or reduced to a practical minimum before performing any maintenance, repair, or service procedures.

⚠ CAUTION! Load and unload machinery using proper procedures. (See page 10, **Load and Unload Safely.**)

Safety practices to prevent potential injuries from energy-releasing sources include:

- Place controls in NEUTRAL or LOCKED position before shutting off engine.
- Allow all moving parts to stop.
- Shut off engine.
- Follow your manufacturer's recommendation for relieving hydraulic system pressure.
- Lock ignition, remove key (if equipped) and take it with you.
- Look and listen for evidence of moving parts before dismounting.
- Shut off master electrical switch (if equipped).
- Securely support or block up machine before working underneath machine or other lifted components.
- Securely support, block up, or lock up other components with approved locking devices before working near or underneath them.
- Relieve pressure before disconnecting or disassembling any pressurized system.
- Block or relieve spring pressure before disassembling any spring-loaded mechanism.
- Avoid flames, sparks, or smoking near any fuel, hydraulic fluid or other flammable material such as spraying debris.

Perform Maintenance Safely

Attach a “DO NOT OPERATE” warning tag to the control levers. Lockout/tagout the unit according to the manufacturer’s operating manual(s). If there is a key, remove it and take it with you.

Install approved support device(s) when working under or near raised equipment.

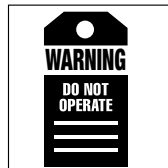
Remove only guards or covers that provide access to the area being serviced. Replace all guards and covers when work is complete.

Do not operate the machine with gaurds removed.

⚠ WARNING! Avoid injury or death. **Never work on machinery with the engine running unless instructed by the manufacturer’s manual(s) for specific service.**

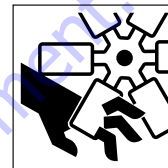
Trowel Maintenance and Repair

MAKE SURE the trowel is disconnected from the power source or the appropriate circuits are dead and OSHA Lockout/Tagout is applied before doing any maintenance or repair work on the trowel.



Trowel Blades, Pans and Attachments

- Do not attempt to clean, service or perform adjustments on the trowel while it is running.
- Do not remove blades or pans 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.
- Only use approved polishing and brush attachments.



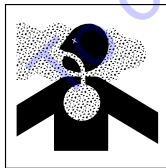
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Perform Maintenance Safely

Common Maintenance Safety Practices

Use Proper Ventilation

Never run an engine in an enclosed area without an approved ventilation system.



Ventilate work area

⚠ WARNING! Exhaust fumes contain carbon monoxide which could be deadly if inhaled. **Never operate any type of engine without proper ventilation. EXHAUST FUMES CAN KILL.**

A feeling of tiredness, or nausea, is an indication of being overcome by exhaust. Shut the engine off immediately if this occurs.

Fuel Hazards

⚠ WARNING! Avoid serious injury or death. **Always use approved fuel containers and/or fuel dispensing equipment to reduce the risk of explosion or fire.**

Always observe these practices to reduce the possibility of a serious accident:

- Shut off engine and ignition during refueling.
- Turn off all electrical switches.
- Ground the fuel nozzle against the filler neck.
- Keep sparks and open flames away from fuel. Do not smoke while refueling or when handling fuel containers.
- Do not cut or weld on or near fuel lines, tanks or containers.
- Do not overfill the tank or spill fuel. Clean up spilled fuel immediately. Clean spills immediately.



No smoking and no open flames

Perform Maintenance Safely

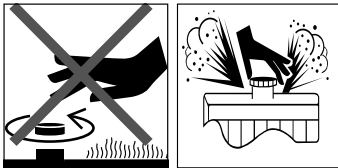
Ultra-Low Sulfur Diesel (ULSD) Hazard

⚠ WARNING! Ultra-Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion; **consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.**

Engine Coolant Hazards

⚠ WARNING! Avoid serious injury or death. Liquid cooling systems build up pressure as the engine gets hot, so **use extreme caution before removing the radiator cap.**

- Stop the engine and wait for the system to cool.
- Wear protective clothing and safety glasses.
- Turn the radiator cap slowly to the first stop to allow the pressure to escape before removing completely.



Allow radiator to cool before removing cap slowly

Engine Coolant Hazards (cont.)

⚠ CAUTION! Before replacing engine coolant, refer to the manufacturer's operating manual(s) for direction. Using incorrect coolant type may cause overheating and increase safety risks.

Hydraulic System Hazards

Be sure to follow manufacturer's instructions for relieving fluid pressure before performing any maintenance. The hydraulic system is pressurized whenever the engine is on and may hold pressure even after the engine is shut off. Cycle hydraulic controls, including auxiliary hydraulic control (if equipped), after the engine is shut off.



Check for leaks and inspect hoses

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Perform Maintenance Safely

Hydraulic System Hazards (cont.)

During inspection of the hydraulic system:

- Wait for fluid to cool before disconnecting the lines. Hot hydraulic fluid can cause **severe burns**.
- Wear appropriate eye protection. Hydraulic fluid can cause permanent eye injury.
- When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually.
- **Never** reset any relief valve in the hydraulic system to a pressure higher than recommended by the manufacturer.

Hydraulic Fluid Injection Hazard

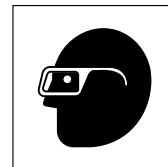
⚠ WARNING! Accidental injection of pressurized fluid into the hands or body is dangerous and could result in death or serious injury. **Use caution when checking hydraulic leaks as pressurized hydraulic fluid has enough force to penetrate skin, causing serious personal injury.**

If a leak is discovered:

- Ensure engine is turned off; relieve pressure in hydraulic circuit.
- Wear proper hand and eye protection.

- Visually examine the hydraulic hoses or fluid lines in the vicinity of the leak for breaks or cracks. **Do not** use your hand to check for leaks.
- Repair or replace hydraulic lines according to the manufacturer's recommendations.

Fluid injection injuries are not always obvious. Victims have reported such injuries feel like a bee sting or splinter under the skin. If you suspect you have a fluid injection injury, do not take chances. Seek proper medical care immediately. If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury.



Wear eye protection



Pressurized fluid can inject into the body

Perform Maintenance Safely

Battery Hazards

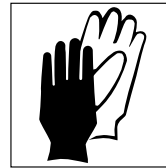
The liquid in batteries contains acid, which is a POISON and could cause SEVERE CHEMICAL BURNS.

Avoid injury:

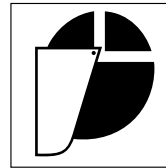
- Wear a face shield to prevent contact with your eyes.
- Wear chemical-resistant gloves and clothing to keep electrolyte off your skin and regular clothing.

⚠ WARNING! Electrolyte will damage eyes or skin on contact. **Always wear a face shield to avoid electrolyte in eyes.**

If liquid from the battery contacts your eyes, flush immediately with clean water and get medical attention. Wear chemical-resistant gloves and protective clothing to keep liquid off your skin. If liquid contacts exposed skin or clothing, wash off immediately with clean water. If liquid is ingested, drink large quantities of water or milk. DO NOT induce vomiting. Seek medical attention immediately.



Wear hand protection



Wear face protection

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Perform Maintenance Safely

Avoid Explosion

⚠ WARNING! Avoid serious injury from explosion. Lead-acid batteries produce extremely explosive gases especially when being charged. **Keep arcs, sparks, flames and lighted tobacco away.**

- **Do not** smoke near batteries.
- Keep them away from arcs, sparks and open flames.
- Provide adequate ventilation.

Never check the battery by placing a metal object across the battery posts. The resulting spark could cause an explosion.

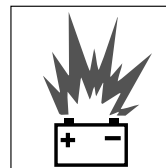
⚠ WARNING! Avoid serious injury from battery explosion. **Do not charge a battery or jump-start the engine if the battery is frozen.**

Warm to 60°F (15.6°C) or the battery may explode and could cause serious injury.

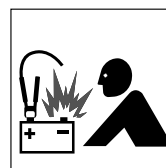
Safety rules during battery jump-starting:

- Follow the instructions for proper battery jump-starting, as specified in the manufacturer's manual(s).
- Be sure the machines are not touching.
- Adhere to the polarity of the batteries and connections.

- Make the final cable connection to the engine or the farthest ground point away from the battery. Never make the final connection at the starter or dead battery. Sparks may ignite the explosive gases present at the battery.
- When disconnecting cables, remove the cables in reverse order of connection (e.g., final connection first).



Avoid sparks and open flames near batteries



When jump-starting, observe polarity and make final connection at ground point

Perform Maintenance Safely

Complete Service and Repairs Before Machine is Released

Tighten all bolts, fittings, and connections to torques specified by the manufacturer.

Inspect for leftover components such as cotter pins, washers, locknuts, etc. after completing service. Replace any missing parts.



Pressurized fluid
can inject into
the body

Start the engine and check for leaks. (See page 27, **Hydraulic System Hazards**.) Operate all controls to make sure the machine is functioning properly. Test the machine if necessary. After testing, shut down and check the work you performed.

Recheck all fluid levels before releasing the equipment for operation.

All parts should be inspected during repair and replaced if worn, cracked or damaged. Excessively worn or damaged parts could fail and cause injury or death.

Install all guards, covers, and shields after servicing. Refill and recharge pressure systems only with manufacturer-approved or recommended fluids.



Verify service work
when completed

Notes



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