Operator’s Manual

Trench Roller

RTD-SC4

Machine Type	**RTD-SC4**
Material Number	**5100077244 / 3300035169**
Version	**04**
Date	**01/2026**
Language	**[en-US]**

Imprint

Publisher and copyright holder:

Wacker Neuson America Corporation

N92W15000 Anthony Ave

Menomonee Falls, WI 53051, USA

www.wackerneuson.us

Original instructions

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.

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Table of Contents

1 Foreword

1.1 Machine Identification

Save these instructions

This manual contains important instructions for the machine models below. These instructions have been written expressly by Wacker Neuson America Corporation and must be followed during installation, operation, and maintenance of the machines.

The following machines and variants/options are described:

Machine	Item Number
RTD-SC4	5100079567, 5100079568, 5100079569, 5100079570, 5100079571, 5100079575

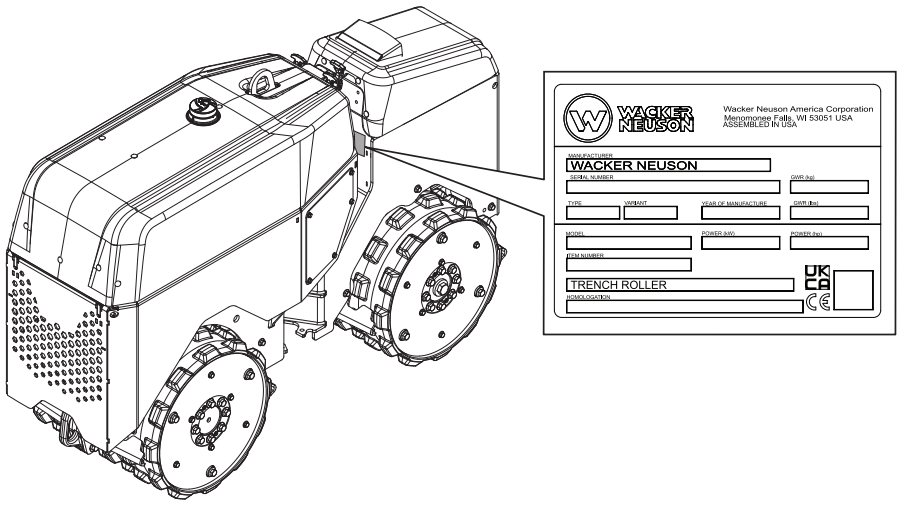


Fig. 1: Nameplate location

Serial number (S/N)

For future reference, record the serial number in the space provided below. You will need the serial number when requesting parts or service for this machine.

Serial number:

1.2 Machine Documentation

Keep a copy of the operator's manual with the machine at all times. Replace the manual immediately if it is lost, damaged, or unreadable.

From this point forward in this documentation, Wacker Neuson America Corporation will be referred to as Wacker Neuson or the manufacturer.

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, and serial number.

1.3 Expectations for Information in This Manual

This manual provides information and procedures to safely operate and maintain this machine. For your own safety and to reduce the risk of injury, carefully read, understand, and observe all instructions described in this manual.

The manufacturer 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. The manufacturer reserves the right to change any portion of this information without notice.

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

1.4 Laws Pertaining to Spark Arresters

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.

1.5 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 the manufacturer.
- Approved modifications are those performed by an authorized service center according to written instructions published by the manufacturer.
- 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 dealer immediately if you have questions about approved or unapproved parts, attachments, or modifications.

1.6 Abbreviations

Acronym	Definition	Acronym	Definition
API	American Petroleum Institute	CARB	California Air Resource Board
DTC	Diagnostic trouble code	E-stop	Emergency stop
EPA	Environmental Protection Agency	FMI	Fault mode indicator
IR	Infrared	LDF	Limited defect warranty
LLC	Long-life coolant	MCU	Machine control unit
NiMH	Nickel-metal hydride	OAT	Organic acid technology
PIN	Personal identification number	PPE	Personal protective equipment
S/N	Serial number	SPN	Suspect parameter number
UWB	Ultra-wideband	—	—

1.7 Maintenance Items

Item	Part Number		Item	Part Number
Oil filter	5200015526		Fan belt	5200002703
Air filter, primary	5000160171		Battery	5000177257
Air filter, secondary	5000162184		Coolant	1000367466
Fuel filter	5000082116		Fuel cap	5100046509
Hydraulic oil filter, primary	1000459723		Hydraulic tank cap	1000340157
Hydraulic oil filter, secondary	5100040787		Grease	
Hydraulic tank screen	1000340159		—	—

1.8 Approved Attachments

Attachment	Part Number	Use
Standard (narrow) drums	5100069699	Compacting soft materials such as mud and dense clay
Smooth drums	5100066586	Compacting granular materials, such as sand, gravel, or asphalt.
Wide drums	5100071777	Compacting soft materials such as mud and dense clay
Standard scrapers	5100066601	Cleaning standard drums
Smooth scrapers	5100071776	Cleaning smooth drums
Wide scrapers	5100071775	Cleaning wide drums
Drum covers	5100080980	Keeping debris from entering the drum
Drum cover inserts	5100080700	Keeping debris from enter the drum while using extensions

2 Usage

2.1 Intended Use

This machine is intended to be used for compacting sub-bases, backfill, and cohesive type soils.

2.2 Unintended Use

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
- 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

2.3 Residual Risks

This machine has been designed and built in accordance with the latest global safety standards. It has been carefully engineered to eliminate hazards as far as practicable and to increase operator safety through protective guards and labeling.

However, some risks may remain even after protective measures have been taken. They are called residual risks. On this machine, they may include exposure to:

- Heat, noise, exhaust, and carbon monoxide from the engine
- Fire hazards from improper refueling techniques
- Fuel and its fumes
- Electric shock and arc flash
- Personal injury from improper lifting techniques
- Typical hazards related to towing a trailer on roads and highways

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

3 Safety

3.1 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.

⚠ 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

NOTICE identifies a situation that causes damage if it is not observed.

► To avoid possible damage from this type of hazard, obey all safety messages that follow this signal word.

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

3.2 Safety Guidelines for Operating the Machine

Operator and service training, knowledge, and qualifications

Before operating, maintaining, or servicing the machine:

- Familiarize yourself with the location and proper use of all controls and safety devices.
- Know the rules for the jobsite.
- Have appropriate fire fighting equipment readily available.
- Contact Wacker Neuson for additional training if necessary.

When operating this machine:

- Do not allow improperly trained people to operate the machine.
- Be alert for malfunctions.
- People operating the machine must be familiar with the potential risks and hazards associated with it.
- Follow legal and other mandatory regulations relevant to accident prevention and environmental protection. These may include handling hazardous substances, issuing and/or wearing personal protective equipment (PPE), or obeying traffic regulations.

The machine must not be accessed or operated by:

- Children
- People impaired by alcohol, drugs, or prescription drugs

Application area

Be aware of the application area.

- Keep unauthorized personnel, children, and pets away from the machine.
- Keep the area around the machine clear.
- Remain aware of changing positions and the movement of other equipment and personnel in the application area/job site.
- Use caution when operating the machine near the edges of pits, trenches, or platforms. Check to be sure that the ground surface is stable enough to support the weight of the machine and that there is no danger of the roller sliding, falling, or tipping.
- Do not operate the machine in areas that contain flammable objects, fuels, or products that produce flammable vapors.
- 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.
- Always remain in visual contact with the machine at all times while operating the controls.

Safety devices, controls, and attachments

Only operate the machine when:

- All safety devices and guards are in place and in working order.
- The beacon is functional.
- The horn is functional.
- All controls operate correctly.
- The machine is set up correctly according to the instructions in the operator’s manual.
- The machine is clean.
- The machine’s labels are legible.

To ensure safe operation of the machine:

- Do not operate the machine if any safety devices or guards are missing or inoperative.
- Do not modify or defeat the safety devices.
- Only use accessories or attachments that are approved by the manufacturer.

Safe operating practices

- Position yourself safely when operating the machine, using extra caution while operating in reverse or on hills. Leave enough space between yourself and the machine so you will not be placed in a hazardous position should the machine slide or tip.
- Do not use a cellphone or send text messages while operating this machine.
- Stay clear of the articulation steering joint and the area between the front and rear frames.
- Remain aware of the machine's moving parts. Keep hands, feet, and loose clothing away from the machine's moving parts.
- Do not consume the operating fluids used in this machine. Depending on your machine model, these operating fluids may include water, wetting agents, fuel (gasoline, diesel, kerosene, propane, or natural gas), oil, coolant, hydraulic oil, heat transfer fluid (propylene glycol with additives), battery acid, or grease.

Personal protective equipment (PPE)

Wear the following PPE while operating, 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).

After use

- Stop the engine.
- Close the fuel valve on engines equipped with one.
- Turn the battery disconnect switch to OFF on machines equipped with one.
- Ensure that the machine will not tip over, roll, slide, or fall.
- Store the machine properly. The machine should be stored in a clean location out of the reach of children.

3.3 Safety Guidelines for Maintenance

Service training

Before servicing or maintaining the machine, see Safety Guidelines for Operating the Machine on page 13 and follow all guidelines for operating the machine.

Precautions

- Read and understand the service procedures before performing any service to the machine.
- All adjustments and repairs must be completed before operating the machine. Do not operate the machine with a known problem or deficiency.
- All repairs and adjustments shall be completed by a qualified technician.
- Turn off the machine before performing maintenance or making repairs.
- Remain aware of the machine's moving parts. Keep hands, feet, and loose clothing away from the machine's moving parts.
- Install the safety devices and guards after repair and maintenance procedures are complete.
- Always secure the articulated steering joint using the locking bar before lifting, jacking, and servicing the machine. The machine halves could swing together unexpectedly and cause a serious injury.
- Do not remove the radiator cap when the engine is running or hot. The radiator fluid is hot and under pressure and may cause severe burns.
- Do not remove air cleaner cover, paper element, or precleaner while engine is running.
- Do not leave the wireless controller unattended while servicing the machine.

Machine modifications

- Use only accessories/attachments that are approved by the manufacturer.
- Do not disable safety devices.
- Do not modify the machine without the express written approval of the manufacturer.

Replacing parts and labels

- Replace worn or damaged components with spare parts designed and approved by the manufacturer.
- Replace all missing and hard-to-read labels.
- When replacing electrical components, use components that are identical in rating and performance to the original components.
- When replacement parts are required for this machine, use only replacement parts from the manufacturer or those parts equivalent to the original in all types of specifications, such as physical dimensions, type, strength, and material.

Cleaning the machine

- Keep the machine clean and free of debris such as leaves, paper, cartons, etc.
- Keep labels legible.
- Do not clean the machine while it is running. Rotating parts can cause severe injury.
- Clean with soapy water only.
- Never use gasoline or other types of fuels or flammable solvents to clean the machine. Fumes from fuels and solvents can become explosive.
- Do not use high pressure water jets to clean inside the machine or around the articulation joint.

3.4 Hydraulic Oil Safety

⚠ WARNING

Injury hazard

Hydraulic oil is under high pressure and becomes very hot during operation.

► To avoid injury, obey the safety instructions listed below.

Safety instructions

- Inspect the hydraulic system thoroughly before operating the machine.
- Do not touch hydraulic oil or hydraulic components while the machine is operating. Wait until the machine is cool.
- Before disconnecting hydraulic fittings or hoses, ensure that all pressure has been bled from the circuit. Set all controls to the neutral position, turn the engine off, and allow the fluids to cool before loosening hydraulic fittings or attaching test gauges.
- Hydraulic oil escaping under high pressure may penetrate the skin, causing burns, blindness, or other serious injuries or infections. Contact a physician immediately for treatment if your skin has been penetrated by hydraulic oil, even if the wound seems minor.
- Fluid leaks from small holes are often practically invisible. Do not use your bare hands to check for leaks. Check for leaks using a piece of cardboard or wood.
- Stop the engine immediately if a hydraulic leak is detected.
- After servicing the hydraulics, make sure all components are reconnected to the proper fittings. Failure to do so may result in damage to the machine and/or injury to a person on or near the machine.

3.5 Safety Guidelines for Lifting the Machine

When lifting the machine:

- Make sure slings, chains, hooks, ramps, jacks, forklifts, cranes, hoists, and any other type of lifting device used is attached securely and has enough weightbearing capacity to lift or hold the machine safely. For machine weight, see Technical Data on page 116.
- Remain aware of the location of other people when lifting the machine.
- Only use the lifting points described in the operator's manual.

To reduce the possibility of injury:

- Do not stand under the machine while it is being lifted or moved.
- Do not get onto the machine while it is being lifted or moved.

3.6 Battery Safety

General battery safety

- Remove the battery from the wireless controller if it will not be used for an extended period (longer than one week).
- Only use original batteries and battery chargers made by the wireless controller manufacturer.
- Do not use or charge damaged, faulty, leaking, swollen, or corroded batteries.
- Avoid using batteries in temperatures other than specified.
- Avoid exposing the batteries to direct sunlight.
- Keep the batteries out of reach of children.
- Do not store or transport batteries in such a way that the battery terminals touch conductive materials such as keys, coins, or hand tools.
- In the interests of environmental protection, dispose of used batteries properly. Do not dispose in trash or incinerate.

Battery charger safety

Note: Some of the following applies mainly to a stand-alone charger, which is available for purchase.

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

- Charge only the batteries intended for this system.
- Do not use a damaged or faulty battery charger.
- Do not short circuit battery charger terminals.
- Avoid using the battery charger in temperatures other than specified.
- Do not use the battery charger if the connection cable is damaged or faulty.
- Do not use the battery charger in hazardous locations or near explosive substances.

4 Description of the Machine

4.1 Machine Description

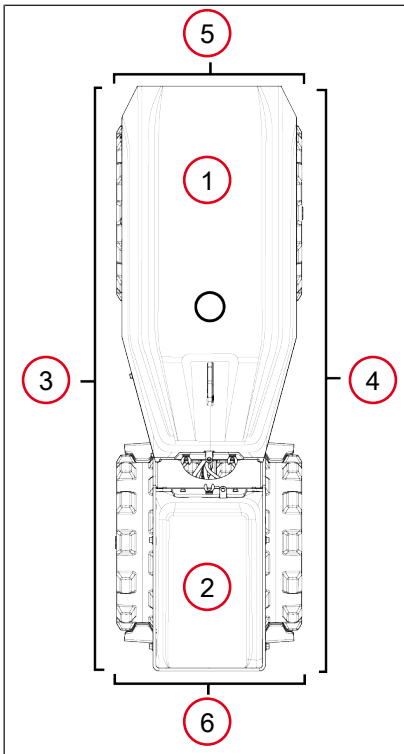


Fig. 2: Halves and sides of the machine, top view

This remote-controlled trench roller consists of two distinct machine halves. The larger of the two is the front **(1)**, and the smaller is the rear **(2)**. The machine halves are joined by an articulation joint, and each half includes an exciter assembly and two drums. The front half includes a diesel engine, the hydraulic oil reservoir, and pumps for the hydraulic system. The rear half includes the fuel tank, battery, battery disconnect switch, and storage for the wireless controller. The diesel engine powers the hydraulic systems that provide machine movement and drum vibration. The operator controls all machine functions (steering, vibration, and engine start/stop) using a radio frequency control system. A two-way, 2.4 GHz signal is used for machine control and status. A 6.5 GHz ultra-wideband (UWB) signal is used for distance/proximity detection.

Right/left/front/rear

The following depict the sides of the machine:

3: Left

4: Right

5: Front

6: Rear

4.2 Features and Controls

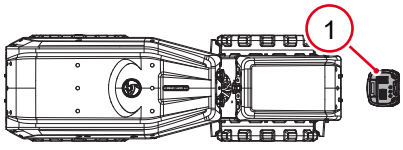


Fig. 3: Wireless controller

This machine is designed specifically for remote control operation. This feature protects the operator by allowing him or her to stand at a distance from the machine, and the work area, during operation. When used in excavations, it allows the operator to stand safely above the trench, rather than in it.

The wireless controller **(1)** is designed for radio remote-controlled operations. The radio system includes the wireless controller and transceiver. This system provides wireless operation up to 30 meters (98 feet). It uses a handheld wireless controller to transmit signals to the transceiver on the machine to control machine operation.

Each wireless controller and transceiver are paired to each other. It is not possible for other wireless controllers to operate the machine unless they are specifically paired.

4.3 Control and Component Locations

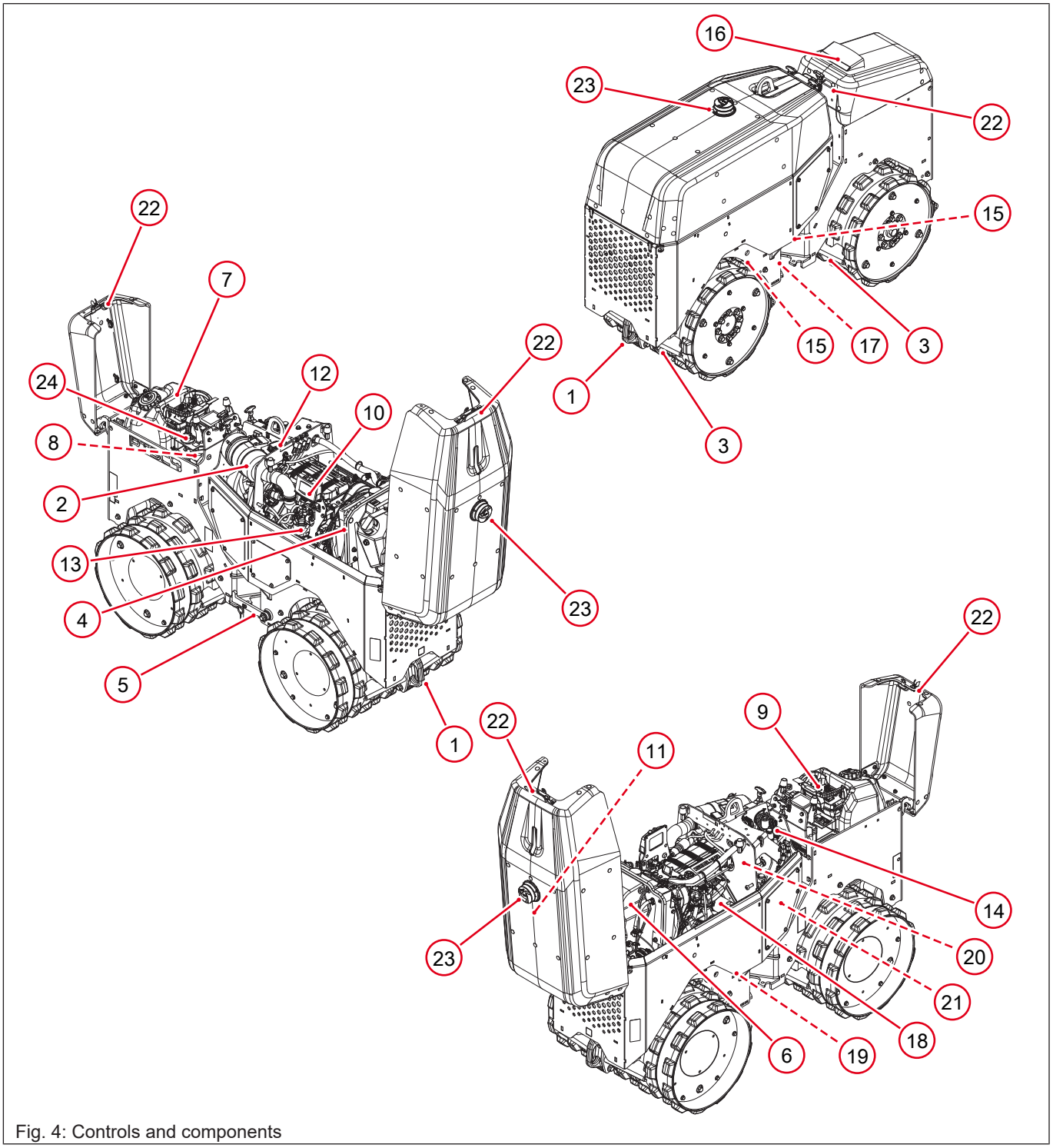


Fig. 4: Controls and components

Ref	Description	Ref	Description
1	Tie-downs/towing points	2	Air cleaner
3	Scraper bar	4	Radiator/hydraulic oil cooler
5	Articulation joint locking bar	6	Hydraulic tank

Ref	Description	Ref	Description
7	Fuel tank	8	Battery
9	Wireless controller	10	Transceiver
11	Manual holder	12	Fuse box
13	Fuel filter	14	Hydraulic manifold
15	Steering cylinder grease fittings	16	Compatec display (if equipped)
17	Articulation joint grease fitting	18	Oil filter
19	Oil drain	20	Primary hydraulic filter
21	Secondary hydraulic filter	22	Hood handle
23	Beacon	24	Battery disconnect switch

4.4 Labels Overview—ANSI

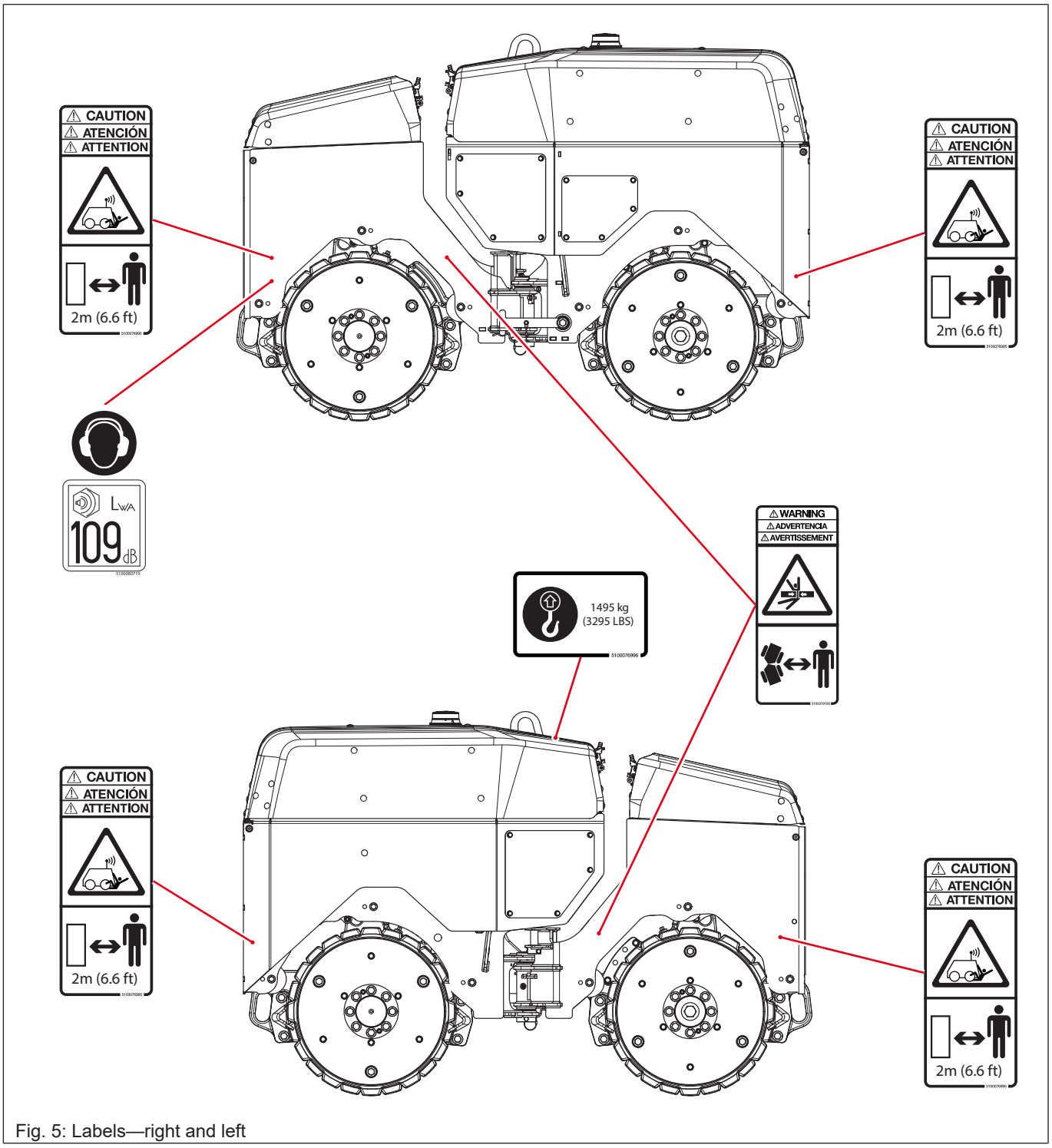


Fig. 5: Labels—right and left

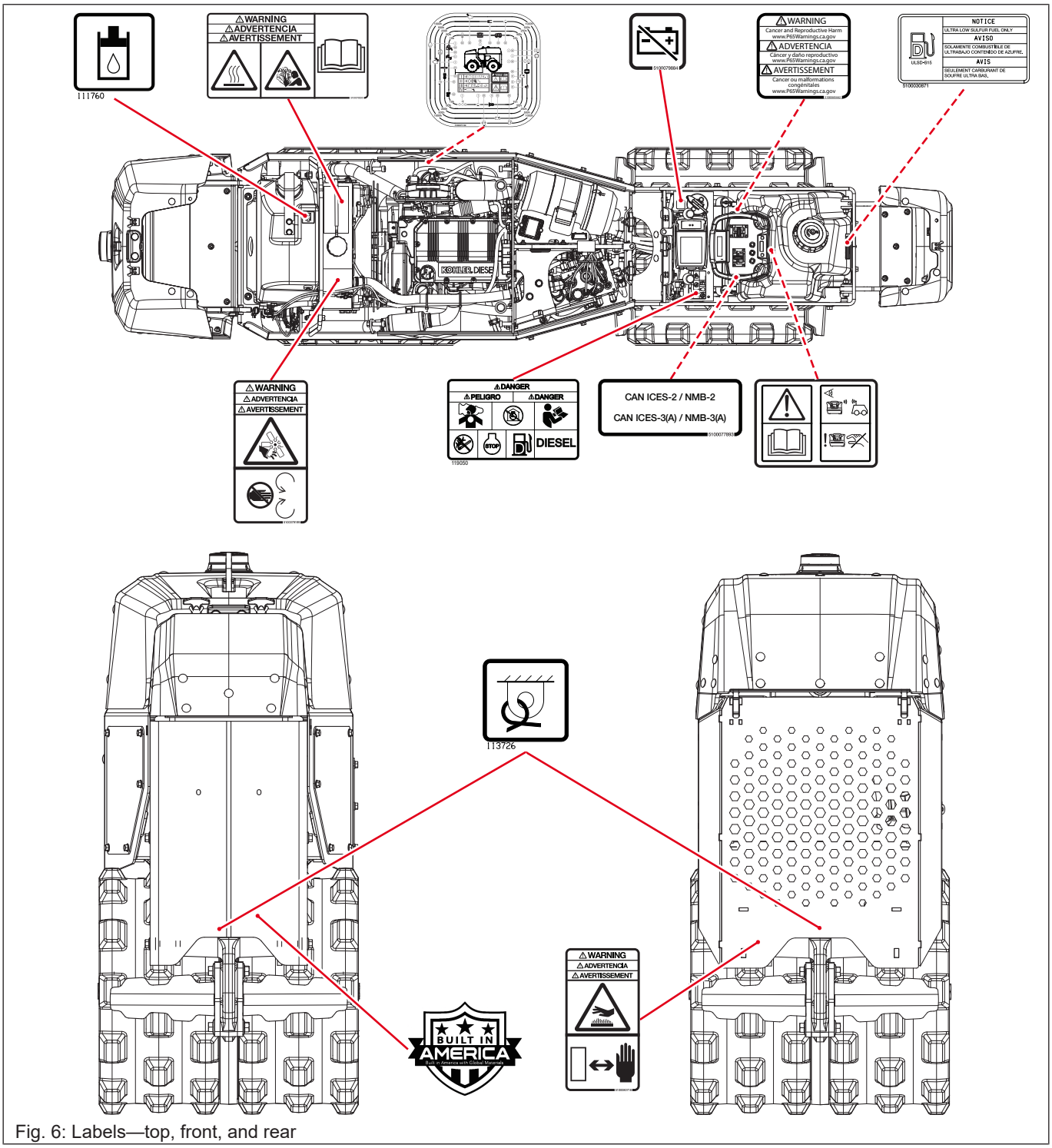


Fig. 6: Labels—top, front, and rear

4.5 Labels Overview—ISO

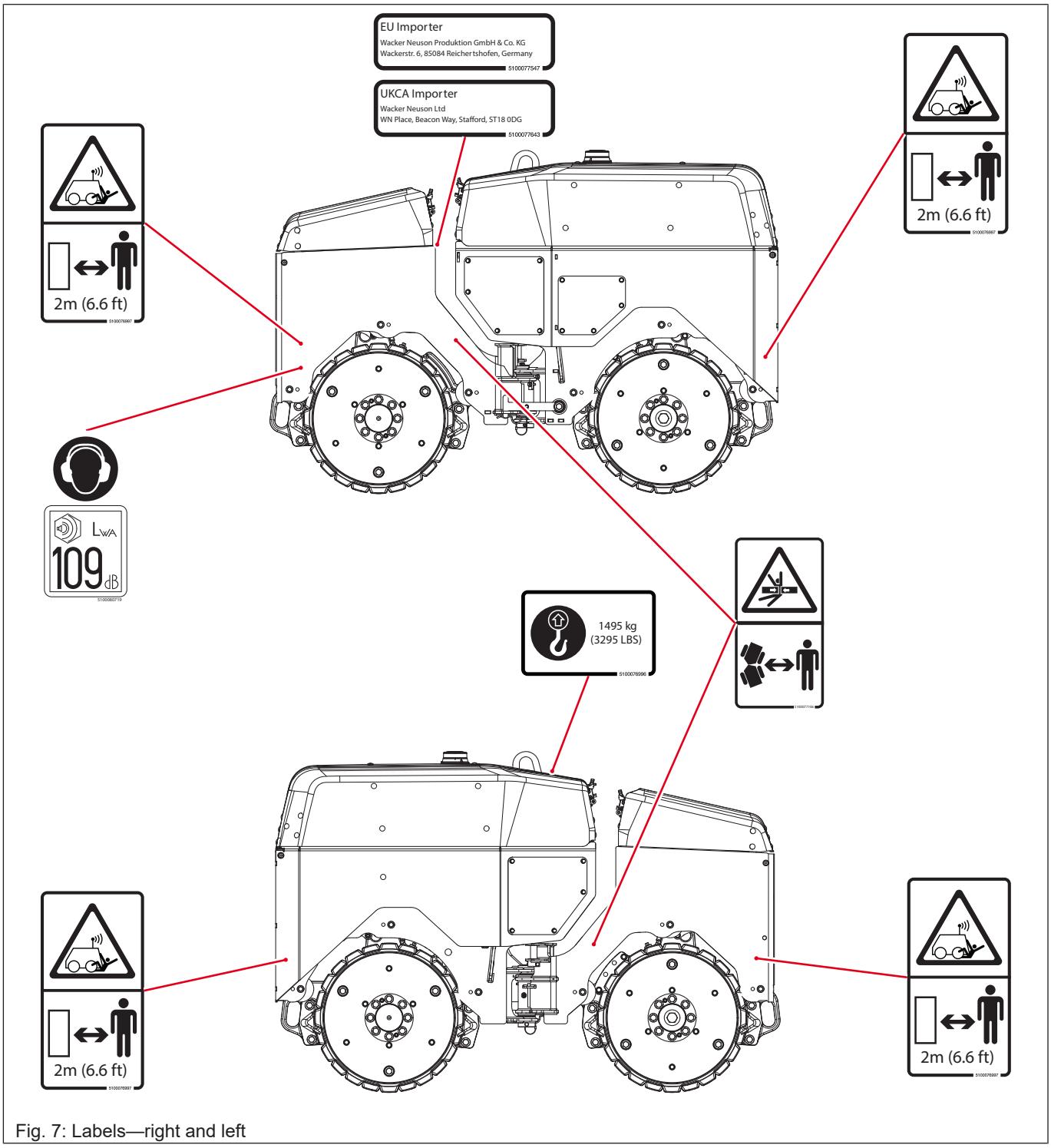


Fig. 7: Labels—right and left

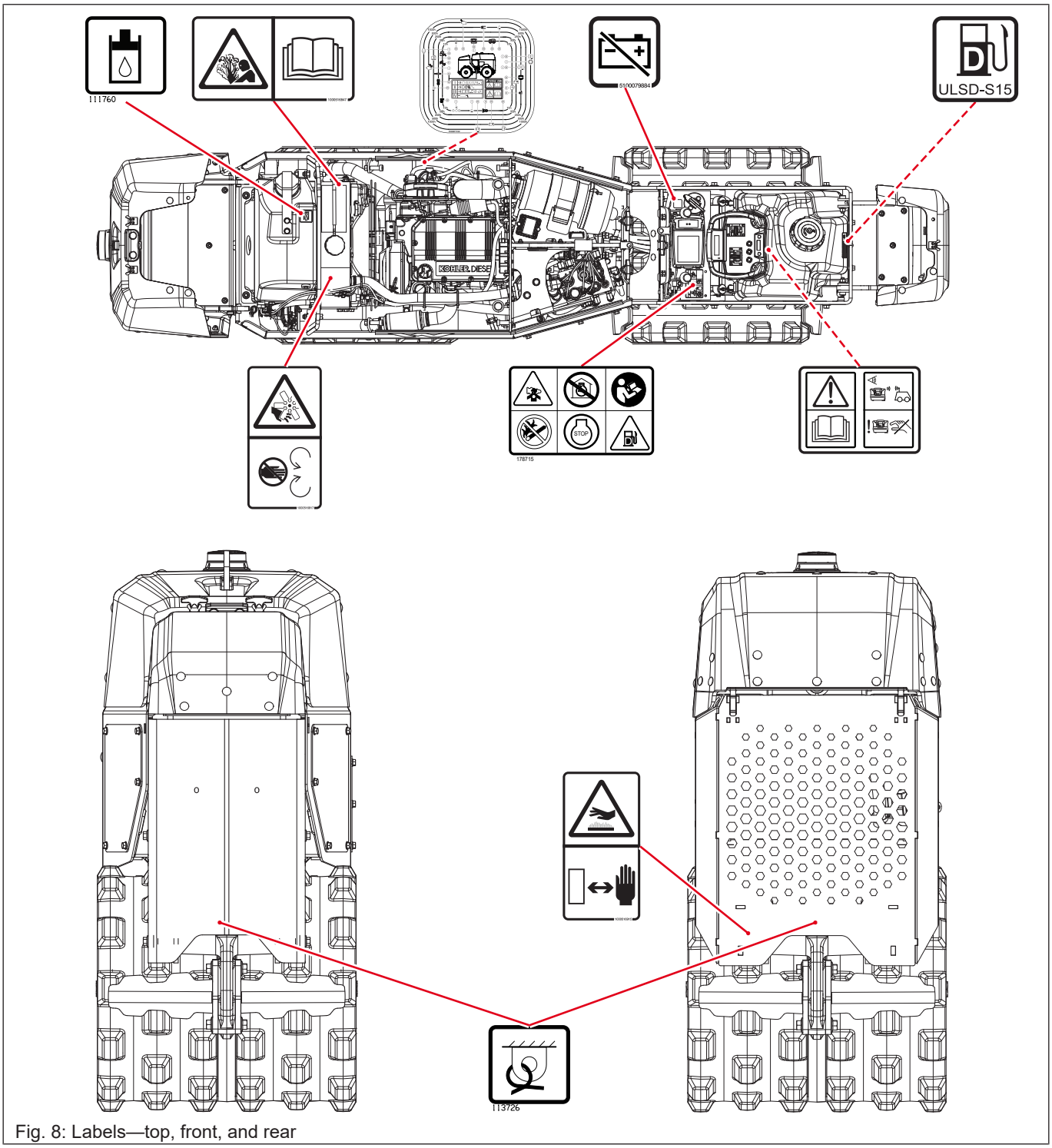
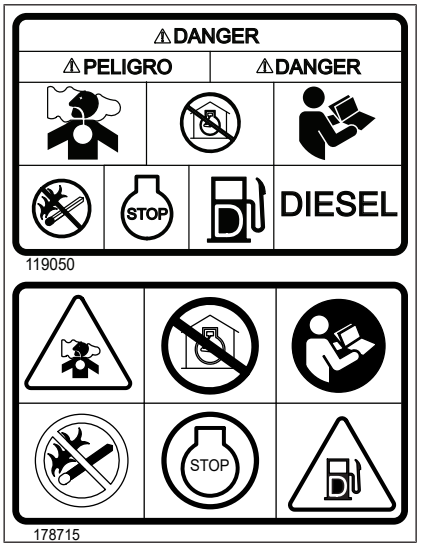


Fig. 8: Labels—top, front, and rear

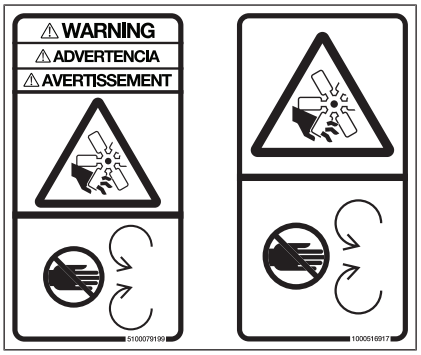
4.6 Safety Labels



DANGER

Asphyxiation hazard

- 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.



WARNING

Entanglement hazard

Avoid all moving parts while the engine is running.

WARNING

Hot surface hazard

Explosion hazard

Read the operator's manual

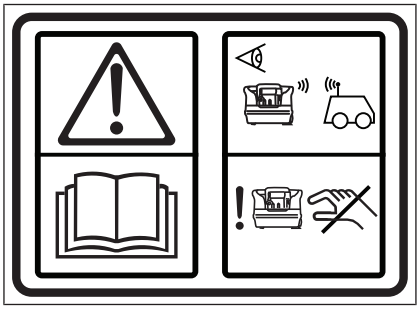
WARNING

Pinching hazard

WARNING

Hot surface hazard

Keep safe distance



(On the wireless controller)

WARNING

Read and fully understand operator's manual before using this machine.

Failure to follow operating instructions could result in death or serious injury.

Check the operational functionality of the remote control system prior to use.

Do not operate the machine if the remote control displays any faults.

WARNING

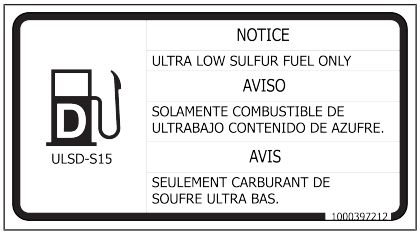
California Proposition 65 Warning

Cancer and Reproductive Harm

www.P65Warnings.ca.gov

CAUTION

Do not stand within 2 m (6.6 ft) of the machine while it is running.

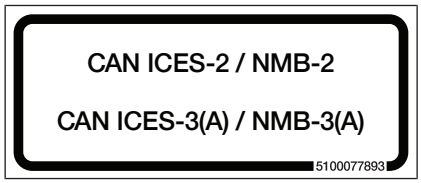


NOTICE

Ultra low sulfur fuel only

4.7 Information Labels

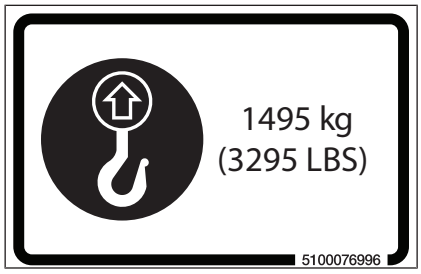
Ultra low sulfur fuel only



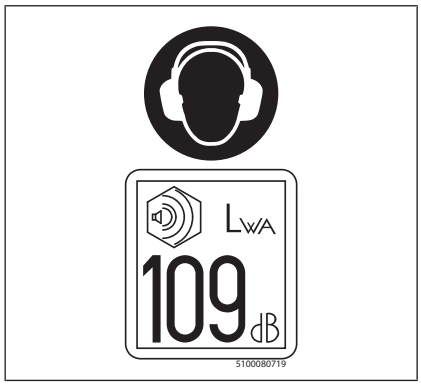
Industry Canada ICES-002 Compliance Label:

CAN ICES-2/NMB-2

CAN ICES-3(A)/NMB-3(A)

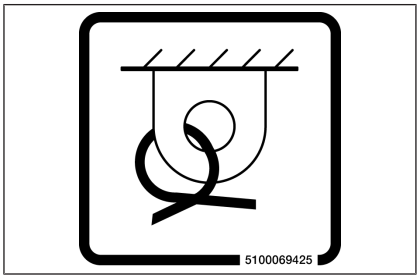


Lifting point

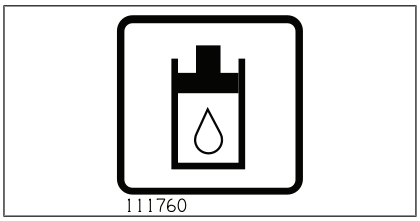


To reduce the risk of hearing loss, always wear hearing protection when operating this machine.

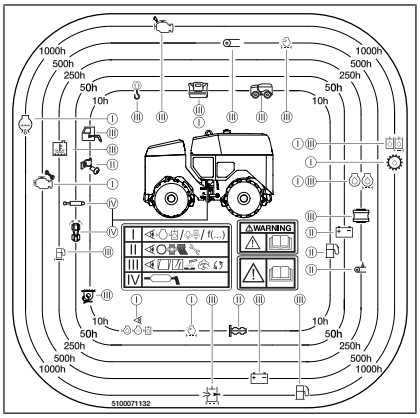
Guaranteed sound power level in dB(A)



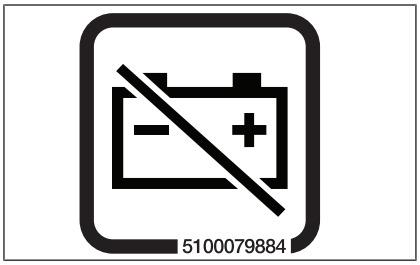
Tie-down point



Hydraulic oil reservoir fill



Maintenance schedule



Battery disconnect switch

Importer

Built in America with global materials

5 Transportation

5.1 Articulation Joint Locking Bar

A bar is provided to lock the articulation joint, and prevent the two machine halves from swinging together.

When lifting or jacking up the machine, secure the articulation joint with the bar as shown. Hold the bar in position using the cotter pin **(1)** provided.

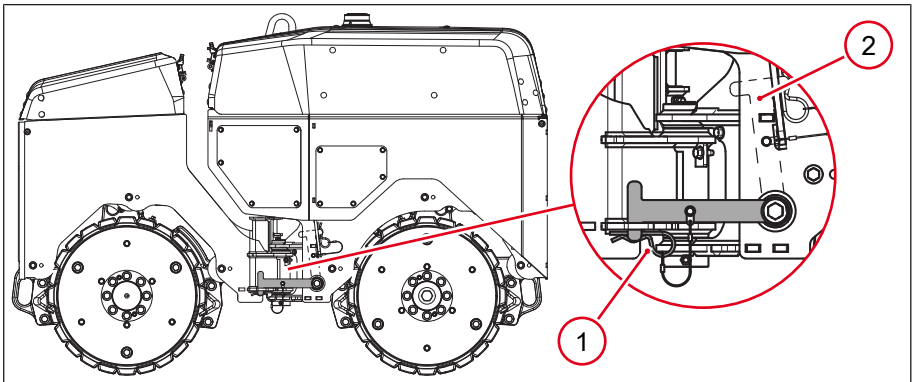


Fig. 9: Cotter pin and storage position

When operating the machine, place the bar in the storage position **(2)** as shown. Hold the bar in position using the cotter pin.

5.2 Lifting the Machine

⚠ WARNING

Crushing hazard

You may be crushed if the lifting devices fail.

► Do not stand under, or get onto, the machine while it is being lifted or moved.

⚠ WARNING

Crushing hazard

The machine can drop if it is lifted by any part of the frame. These components are not designed to support the weight of the machine.

► Use only the designated lifting points to lift the machine.

Overview

The following procedure is specific to this machine. For general safety requirements, see Safety Guidelines for Lifting the Machine on page 17.

Requirements

- Lifting equipment (crane or hoist) capable of supporting the machine's weight
- Lifting hooks and chains capable of supporting the machine's weight
- Engine stopped

Procedure

A lifting eye is used for lifting the machine.

1. Lock the front and rear halves of the machine using the articulation joint locking bar **(1)**.

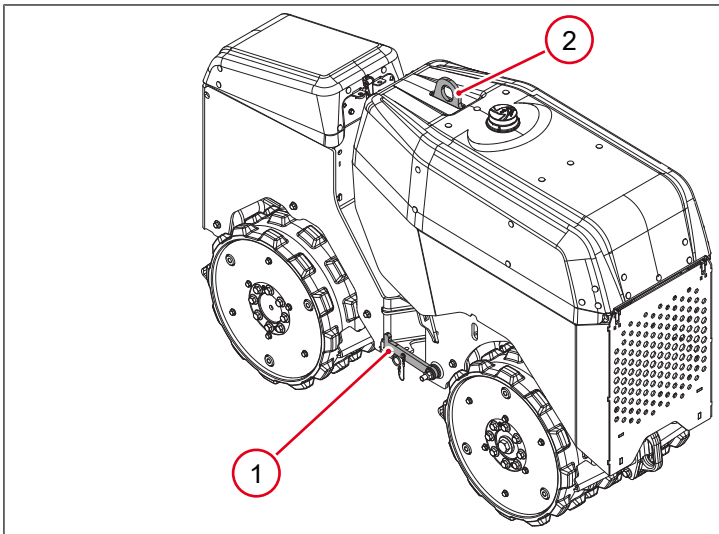


Fig. 10: Locking bar and lifting eye

2. Attach the lifting devices and equipment to the lifting eye **(2)**. Do not attach lifting devices to any other part of the machine.
3. Lift the machine a small distance.
4. Check for stability. If the machine is not stable, lower it, center the machine under the lifting device, and lift the machine a small distance again.
5. Continue lifting the machine as necessary.

5.3 Tying Down and Transporting the Machine

⚠ WARNING

Accident hazard

Tie-down points that are cracked or otherwise damaged may fail when tying down or towing the machine, thereby potentially causing injury to personnel or machine damage.

► Inspect the tie-down points before attaching any tie-down or towing equipment.

NOTICE

Damage may occur from not securing the machine properly.

► Do not position ropes or chains across the machine frame or the articulated steering joint.

► Do not completely compress the shock mounts.

► Do not leave the machine tied down for extended periods of time (except when transporting).

NOTICE

Using parts of the roller other than those specified to tie down the machine may cause severe damage.

► Only use the specified tie downs to secure the machine.

Requirements

- Machine shut down
- Chocks in place
- Properly rated nylon straps

Overview

Observe the following when tying down the machine.

- Always tie down the machine at the front and the rear.
- The specified angles must be observed.
- The fastening equipment must be designed for the specified forces.
- Apply the specified forces to tighten the fastening equipment.

Procedure

1. Make sure that the transport vehicle is capable of handling the weight and size of the machine. For dimensions and operating weight, see Technical Data on page 116.
2. Lock the front and rear halves of the machine using the articulation joint locking bar **(1)**.

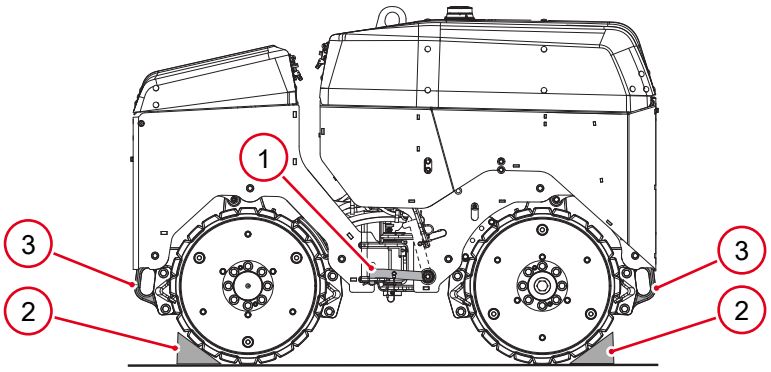


Fig. 11: Locking bar, chocks, and tie-down points

3. Place chocks **(2)** in front of or behind each drum as shown.
4. Attach properly rated nylon straps to the front and rear tie downs **(3)**.
5. Attach the other end of the nylon straps to the transport vehicle.
6. Make note of the following specifications as they pertain to the graphic below:

Angle	Minimum	Maximum	Maximum Tie-down Force
α	20°	45°	13,347 (3,000) N (lb-ft)
ß	20°	45°	13,347 (3,000) N (lb-ft)

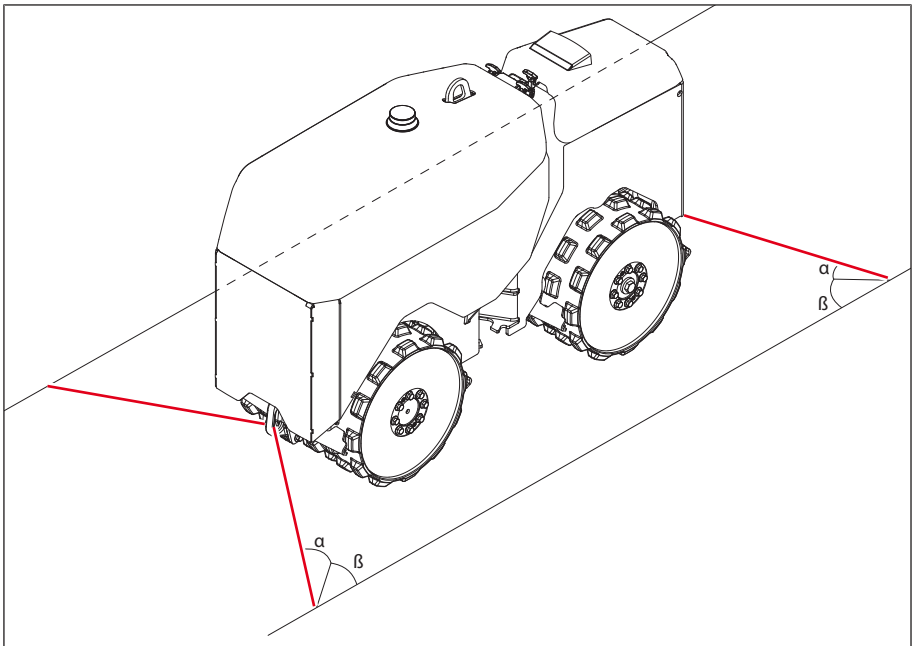


Fig. 12: Front and rear tie-down points and angles

5.4 Towing the Machine

NOTICE

Machine damage can occur during towing.

- ► The machine may only be towed out of the immediate risk zone. Then, load it on to a truck or trailer.
- ► The manufacturer's warranty shall not apply to accidents or damage caused by towing.

Requirements

- Machine of appropriate size and towing capacity
- Shielding for all machines being used

Note: The strength of the towing line should be at least 150 percent of the gross weight of the towing machine.

Limitations

- Limit towing to emergency situations only
- Limit towing to short distances
- Limit towing speed to 2 km/h (1.2 mph)
- Limit tow line angle to 30° from center

Procedure

1. Attach shielding to the machines to protect the operators if the towing equipment breaks.
2. Attach the tow line to the machine at the tow point. The tow point is the tie down closest to the towing vehicle. For information on tie downs, see Tying Down and Transporting the Machine on page 33.
3. Attach the tow line to the towing vehicle(s).
4. Using the wireless controller, disengage the parking brake. The parking brake override subpage is found under the settings page. For further information, see Display Pages on page 39.
5. Tow the disabled machine at a slow rate of speed to the desired location.
6. Remove the tow lines.

6 Operation

6.1 Preparing the Machine for First Use

Requirement

Machine on level surface

Procedure

1. Remove all loose packaging materials from the machine.
2. Check the machine and its components for damage. If there is visible damage, do not operate the machine. Contact the 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. Connect component parts not already attached.
5. Add fluids as needed and applicable, such as fuel, engine oil, engine coolant, and hydraulic oil.
6. Move the machine to its operating location.

6.2 Accessing the Machine Compartments

For information on what components are in the front and rear compartments, see Machine Description on page 19.

To access the compartments:

1. Remove the lock if present.

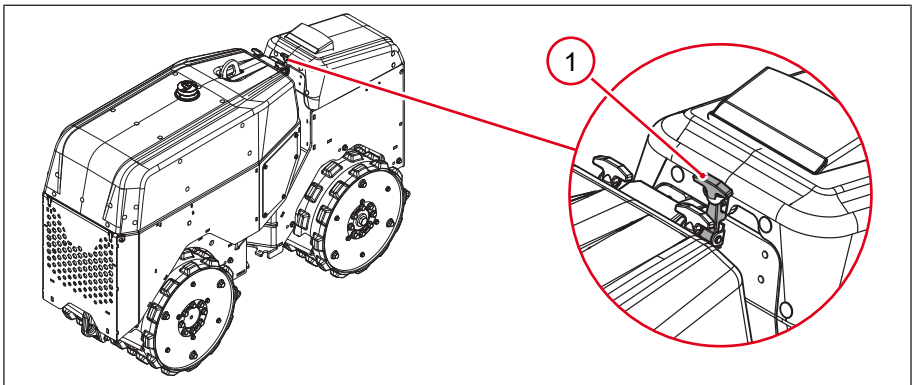


Fig. 13: Rear compartment latch

2. Pull the latch(es) **(1)** up and out from the retainer(s).
3. Raise the hood and place it in the open position. Use the provided handhold when opening the front hood. Use the provided cutout when opening the rear hood.
   Note: Gas struts assist in opening the hoods. Make sure the hood will not close by itself before working in the compartment.
4. To close, lower the hood over the compartment.
5. Pull the latch(es) up and seat it (them) over the retainer(s).

6.3 Wireless Controller Description

- Wireless, radio frequency operation
- 64 x 120 monochrome screen
- Control channels: Infinite (paired with machine)
- Minimum range: 2 m (6.6 ft)
- Maximum range:
  - Control: 30 m (98 ft)
  - Communication: 500 m (1,640 ft)
- Transmitting time (full charge): 8 to 10 hours
- Recharge time (full charge): 2 hours
- Battery: Nickel-metal hydride (NiMH) battery pack

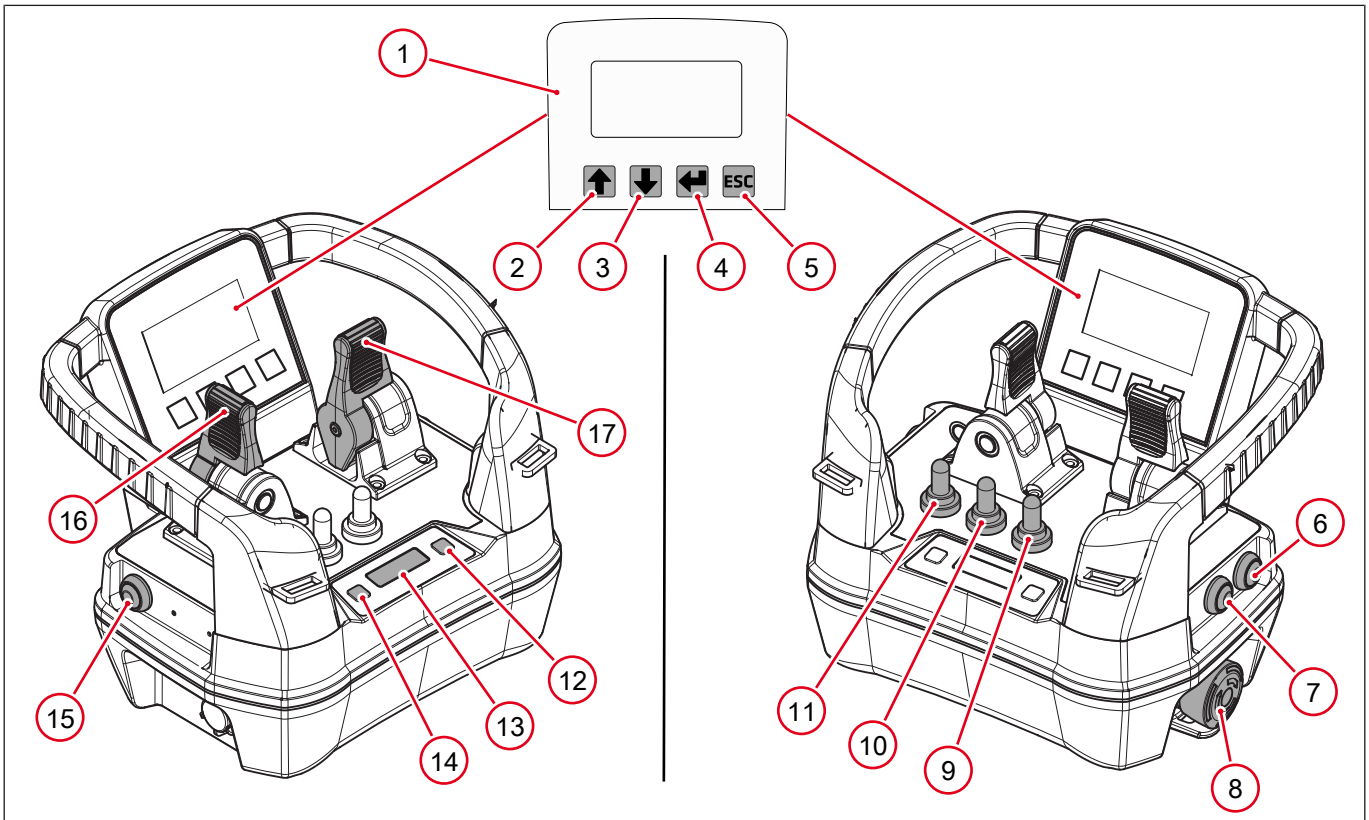


Fig. 14: Wireless controller components

Ref	Component	Description
1	Monochrome display	This provides detailed information about the operating status of the machine.
2	Next button	This navigates the user to the next display page or subpage.
3	Previous button	This navigates the user to the previous display pages or subpage.
4	Enter/select/confirm button	This takes the user from a page to the subpages. This also confirms entries, such as PINs, into the controller.
5	Escape/back/cancel button	This takes the user back to the main page from any subpage. It also cancels an active selection, such as on one of the settings subpages.
6	Horn button	This sounds the machine's horn.

Ref	Component	Description
7	Steering style button	If equipped, this switches the machine steering style between normal mode and return-to-center mode. In normal mode, the arrows on the display point out, and the machine remains at its current angle while traveling. In return-to-center mode, the arrows on the display point in, and the machine returns to a straight angle while traveling.
8	Emergency stop (E-stop) button	Pressing this removes switched power from the machine in an emergency situation where the machine needs to be stopped immediately. Pressing this also turns off the wireless controller after the engine is stopped under normal operation. Releasing this turns on the wireless controller.
9	Vibration/high travel speed switch	When toggled rearward, this allows the machine to automatically switch to high travel speed depending on joystick position. The machine cannot perform vibration functions with the switch in this position. When toggled forward, this allows vibration. The machine cannot switch to high travel speed with the switch in this position.
10	Vibration intensity switch	When toggled rearward, the vibration intensity is low. When toggled forward, the vibration intensity is high. With vibration engaged, there is a delay when switching between intensities.
11	Engine throttle switch	When toggled rearward, the engine remains in low idle. When toggled forward, the engine automatically throttles up when the operator engages high travel speed or vibration.
12	Confirm button	This confirms the selection on the information center.
13	Information center	This is a small display that gives the operator essential information about the wireless controller's operating status. It shows the following: • Wireless controller switched on • Battery level • Pairing options • Radio signal strength • Error codes • Self-test mode
14	Next button	This scrolls through the screens on the information center.
15	Engine start/stop button	Pressing this turns on the wireless controller only if the controller was not turned off using the E-stop button. Holding this for 1/2 second starts the engine. An override prevents the engine from cranking if it is already running. When the engine is running, holding this for 1 second stops the engine. Under hard-to-start conditions such as cold weather, the operator can continuously hold this button to crank the engine for up to 15 seconds.

Ref	Component	Description
16	Steering (left/right) joystick	This controls left/right motion.
17	Drive (forward/reverse) joystick	This controls forward/reverse travel. From 0 to 95 percent of joystick travel, the machine moves in low travel speed. This speed is proportional to the joystick position, meaning the machine travels slower at 25 percent of joystick movement versus 75 percent. From 96 to 100 percent of joystick travel, the machine moves in high travel speed. The machine only switches to high travel speed if vibration is off and the throttle is set to automatic.

6.4 Starting and Stopping the Wireless Controller

Fig. 15: Boot page

Starting

1. Turn the emergency stop (E-stop) button clockwise to release it. The button pops out when it releases, and the boot page appears on the display for about 3 seconds before transitioning to the home page.
   Note: If the E-stop button is already released, press the engine start/stop button to turn on the wireless controller.
2. To start the machine, see Starting, Operating, and Shutting Down the Machine on page 54.

Stopping

1. If the machine is running, press and hold the engine start/stop button to turn off the machine.
2. Press the E-stop button to turn off the wireless controller.

The wireless controller shuts off automatically if one of the following is detected:

- Battery voltage is too low
- Five minutes of idle time if the machine shuts down due to inactivity
- Ten minutes of idle time if the connection between the controller and machine is lost

6.5 Display Pages

NOTICE

Starting the machine immediately after tipping it up after a rollover can cause machine damage.

► Deactivating the rollover PIN also deactivates the rollover starter lockout. When resetting the rollover PIN, do not leave it set at 000000.

► To avoid inadvertent starting and engine damage after a rollover, always operate the machine with a rollover PIN set.

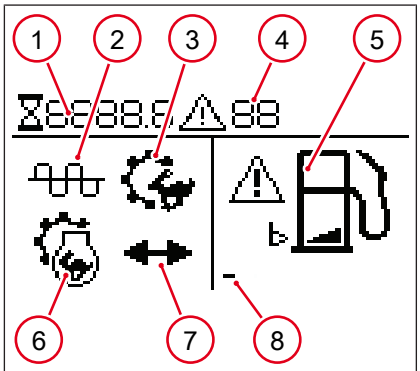


Fig. 16: Home page

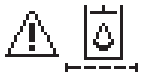
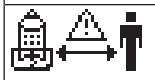
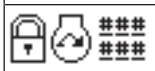
Home page

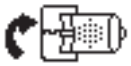
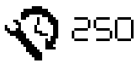
The home page appears after the boot page. Information shown is as follows:

- Machine hours **(1)**
- Vibration intensity (off/auto vibration/low/high) **(2)**
- Travel speed (low/auto high/high) **(3)**
- Active faults **(4)**
- Indications and warnings **(5)** (low fuel alert shown)
- Engine speed (slow/auto fast/fast) **(6)**
- Steering style (optional) **(7)**
- Parking brake status **(8)**

The following table explains the possible home page icons and their respective meanings. The position numbers correspond to the callouts from the previous graphic.

Icon	Name	Description
Position 1—Machine hours		
This shows the total hours on the machine.		
Position 2—Vibration intensity		
	Off	Vibration is off.
	Low	Vibration is operating at low intensity.
	High	Vibration is operating at high intensity.
	Auto	Vibration is on but not currently active. Vibration turns on automatically when the machine starts moving.
Position 3—Travel speed		
	Low	The machine travels at low speed only.
	Auto	The machine is in low travel speed. The speed automatically changes from low to high if the operator moves the drive joystick forward to at least 95 percent and vibration is off.
		The machine is in high travel speed. The speed automatically changes from high to low if the operator moves the drive joystick below 95 percent or turns on vibration.
Position 4—Active faults		
This shows the number of active faults.		
Position 5—Indications and warnings		
	Air filter restriction	There is a restriction somewhere in the air filter.
	Battery presence	There is no wireless controller battery in the charger.
	Cold weather restriction	Below 10°C (50°F), this icon is displayed. The engine is limited to low idle, low travel speed, and no vibration until the hydraulic fluid has warmed up sufficiently.

Icon	Name	Description
	Engine crank	The engine is attempting to start.
	Engine stopped	This appears when the engine stops. This can be voluntary (pressing the engine stop button) or involuntary (after a rollover or malfunction).
	Glow plugs	The glow plugs are active.
	High coolant temperature	The engine coolant temperature is too high.
	High hydraulic temperature	The hydraulic oil temperature is too high.
	Hydraulic filter restriction	There is a restriction somewhere in the hydraulic filter.
	Joysticks not in neutral	One or both of the joysticks are not in the neutral position.
	Low fuel	The machine is low on fuel.
	Low hydraulic oil	The machine is low on hydraulic oil.
	Low oil pressure	The engine oil pressure is too low.
	Operating range	The operator is either too close or too far away from the machine.
	Overcrank	The starter has exceeded its maximum crank time, or the engine has otherwise failed to start.
	Parking brake fault	The parking brake is not operating correctly.
	Push start button	Push the engine start/stop button to start the machine.
	Start locked	The operator cannot start the engine without entering the PIN.
	12V power low	The machine battery's voltage is low.
	Malfunction indicator lamp	This is a general indicator that there are one or more active faults. Any system icons related to the fault blink when this icon is displayed.
	Active moving fault	The machine cannot drive or steer due to a fault.
	High engine speed restricted	The engine is restricted from going into high speed.
	Machine angle warning	The machine is nearing the angle at which it shuts down due to a rollover condition.

Icon	Name	Description
	Machine angle shutdown	The machine shut down due to a rollover condition.
	Machine angle lock	The machine is locked due to a rollover condition.
	Wireless controller lock	The wireless controller is locked due to being rotated too far from its normal orientation.
	Maintenance reminder	This flashes if the depicted maintenance interval (250 hours here) is past due.
Position 6—Engine speed		
	Slow	The engine runs at low idle.
	Auto	The engine automatically switches between low and high idle depending on whether vibration is on or off. It is currently in low idle.
		The engine automatically switches between low and high idle depending on whether vibration is on or off. It is currently in high idle.
Position 7—Steering style		
	Return to center	The machine automatically straightens itself to continue on a straight path.
	Standard	The machine remains at the turning angle it was at when the operator let go of the joystick.
Position 8—Parking brake status		
P	Engaged	The parking brake is engaged.
-	Disengaged	The parking brake is disengaged under normal operation.
X	Disengaged manually	The operator has disengaged the parking brake manually with the override option.

Faults

If a machine function is disabled due to a fault, the respective icon flashes. For example, if the wireless controller is rotated beyond its functional limit, drive functionality is disabled. This causes the travel speed icon to blink. This applies to vibration intensity, travel speed, engine speed, and steering style.

Pages and subpages

The following graphic shows the flow of pages and subpages for the display. From left to right, at the top, are the following pages:

- Home
- Machine parameters
- Active fault codes
- Maintenance
- Settings
- PIN entry

When navigating the screens, remember that the button with the up arrow is the next button, and the button with the down arrow is the previous button. Press enter to go into the subpages, and then press next (↑) to navigate down through the subpages. Press previous (↓) to navigate up through the subpages.

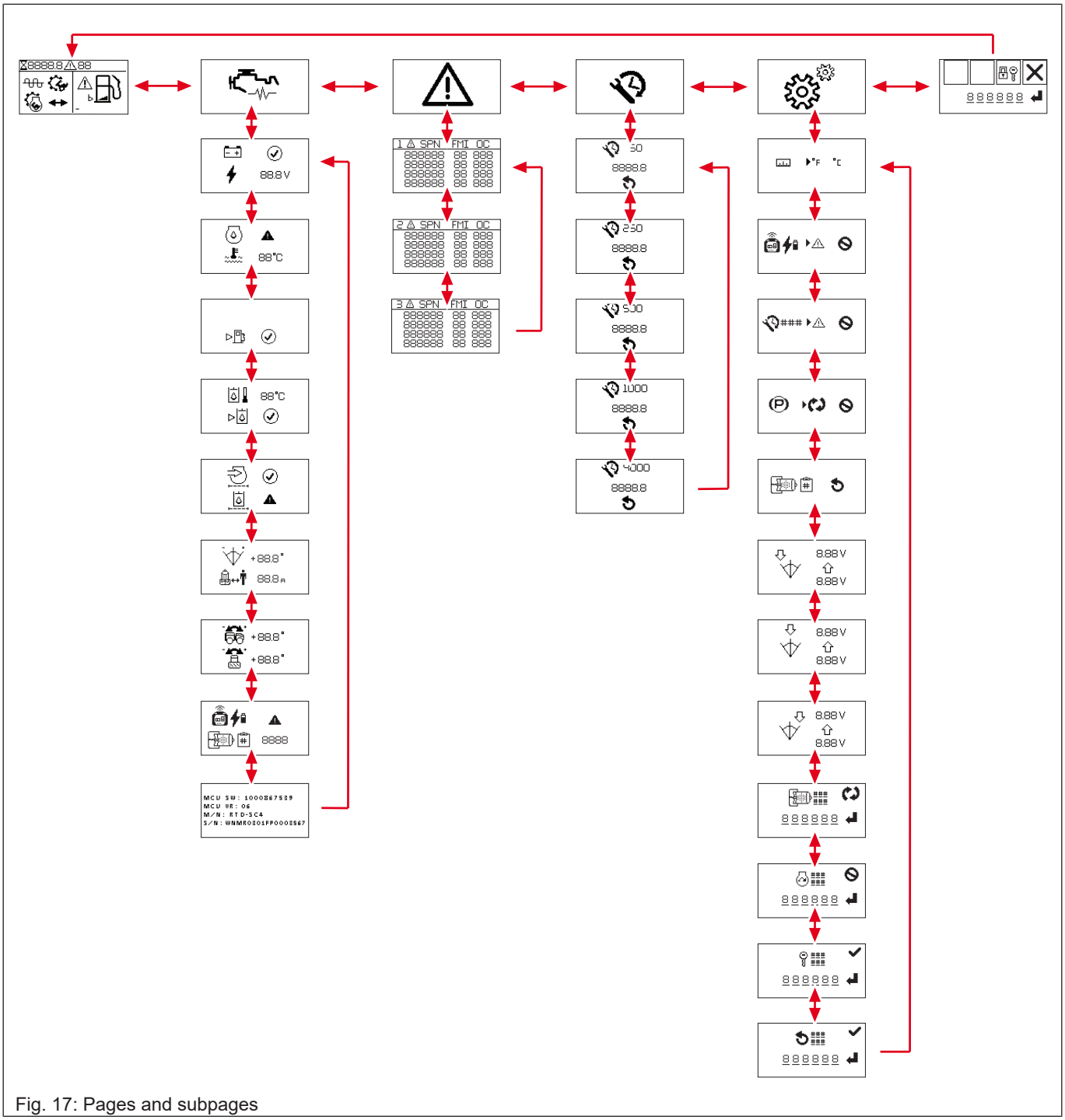


Fig. 17: Pages and subpages

Machine parameter subpages

Press enter on the machine parameter page to enter the machine parameter subpages. For most of the machine parameters subpages, the icons on the left denote the parameter. The icons on the right display the current value. Binary statuses (such as on/off or good/bad) are represented with an icon. The machine parameter subpages are as follows:

- Alternator charging and machine battery voltage
- Oil pressure and coolant temperature
- Low fuel
- Hydraulic oil temperature and level
- Engine air filter restriction switch and hydraulic oil filter switch
- Machine angle sensor and operating distance from the wireless controller to the transceiver
- Machine pitch and roll
- Wireless controller battery status and tip over count
- MCU software version, machine model, and serial number

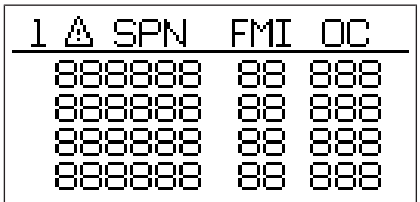


Fig. 18: Active faults subpage

Active fault codes subpages

Press enter on the active faults page to enter the active faults subpages. Up to three subpages are displayed, depending on the number of active faults. Each subpage displays a suspect parameter number (SPN), fault mode indicator (FMI), and an occurrence count (OC).

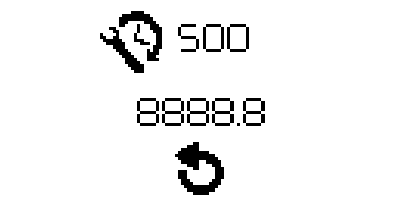


Fig. 19: 500 hour maintenance subpage

Maintenance subpages

Press enter on the maintenance page to enter the maintenance subpages.

All maintenance subpages perform the same function in that they count down from a specified number of hours to alert the operator that service is due. After reaching 0, the numbers then go negative to show how far the machine is past the maintenance interval. The hour intervals are:

- 50
- 250
- 500
- 1,000
- 4,000

On any of these subpages, press the enter button to make the reset icon flash. Press enter again to reset the timer. Press cancel to exit and leave the timer as is.

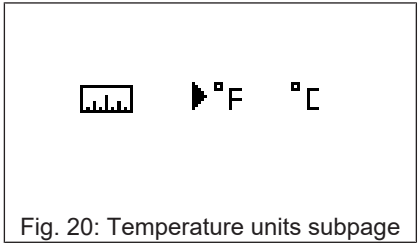


Fig. 20: Temperature units subpage

Settings subpages

Press enter on the settings page to enter the settings subpages.

Change the temperature units between Fahrenheit and Celsius on the temperature units subpage.

Fig. 21: Battery presence subpage

Use this screen to toggle notifications for battery presence warnings. Press enter to make the arrow flash, and press next or previous to toggle back and forth. Press enter again to confirm the selection. Press escape to maintain the current selection.

Fig. 22: Maintenance subpage

Use this screen to toggle notifications for maintenance alarm warnings. Press enter to make the arrow flash, and press next or previous to toggle back and forth. Press enter again to confirm the selection. Press escape to maintain the current selection.

Fig. 23: Parking brake override subpage

Use this screen to toggle the parking brake override function. Press enter to make the arrow flash, and press next or previous to toggle back and forth. Press enter again to confirm the selection. Press escape to maintain the current selection.

The icon on the left denotes normal operation, meaning the parking brake engages and disengages automatically. The icon on the right denotes the parking brake is disabled (overridden).

Note: The engine needs to be running to disengage the parking brake.

Fig. 24: Tip count reset subpage

Use this screen to reset the tip count. Press enter to make the reset button flash. Press enter again to confirm. Press escape to exit the reset mode and leave the current value as is. This feature is available as long as the machine is not locked due to being tipped over.

Note: If the owner's PIN is set and locked, the tip count cannot be reset. Enter the owner's PIN first.

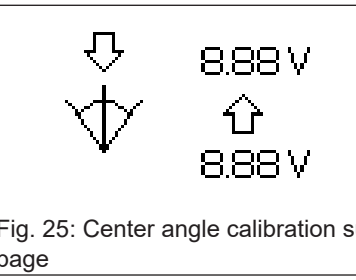


Fig. 25: Center angle calibration subpage

On each angle calibration subpage, the current stored value for the voltage read by the wireless controller from the angle sensor is displayed on top. There are three angle sensors, as follows:

Angle Sensor	Description
Left	Reads the angle at the machine's farthest left articulation
Center	Reads the angle sensor at the machine's centered position
Right	Reads the angle at the machine's farthest right articulation

On the bottom of each subpage is the present value of the angle sensor. If this is locked, the current value is shown in both the top and bottom positions. To unlock and edit this value, perform the following:

- Press and hold the steering style button for 10 seconds. The current (top) value shows the actual value, and editing is enabled.
- Articulate the machine to the appropriate position (left/center/right) to set that position as the new value.
- Press cancel to abort this action and maintain the present value.

Adjustments will not take effect until the user cycles power on the machine.

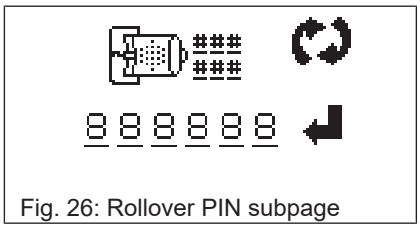


Fig. 26: Rollover PIN subpage

Use this screen to change or reset the rollover PIN. Press enter. Each digit flashes one at a time. Use the next or previous buttons to change the digit. Press enter to select a digit and move to the next one. Press escape to go back to the previous digit. Press enter when done to confirm the PIN.

Notes:

- Enter “000000” to deactivate the PIN. This also deactivates the rollover starter lockout. Always operate the machine with a rollover PIN set to enable rollover starter lockout protection.
- If the owner’s PIN is set, the operator cannot change this PIN until the owner’s PIN is entered.
- The icon at the top right indicates if editing is unlocked (), locked (⦸), or if the change is confirmed (√).
- It may take the system a few minutes to save the new value. To save the value immediately, follow the procedure to turn off the wireless controller. For further information, see Starting and Stopping the Wireless Controller on page 39.

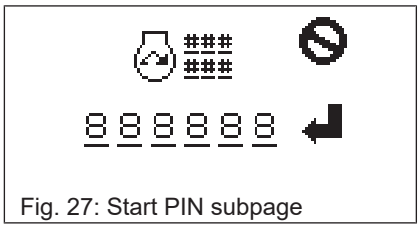


Fig. 27: Start PIN subpage

Use this screen to change or reset the start PIN. Press enter. Each digit flashes one at a time. Use the next or previous buttons to change the digit. Press enter to select a digit and move to the next one. Press escape to go back to the previous digit. Press enter when done to confirm the PIN.

Notes:

- Enter “000000” to deactivate the PIN.
- If the owner’s PIN is set, the operator cannot change this PIN until the owner’s PIN is entered.
- The icon at the top right indicates if editing is unlocked (), locked (⦸), or if the change is confirmed (√).

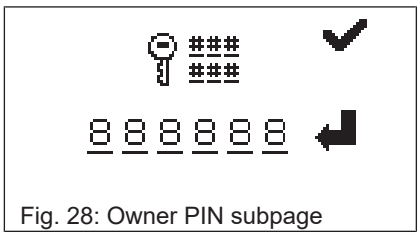


Fig. 28: Owner PIN subpage

Use this screen to change or reset the owner’s PIN. Press enter. Each digit flashes one at a time. Use the next or previous buttons to change the digit. Press enter to select a digit and move to the next one. Press escape to go back to the previous digit. Press enter when done to confirm the PIN.

Notes:

- Enter “000000” to deactivate the PIN.
- If the owner’s PIN is set, the operator cannot change this PIN until the owner’s PIN is entered.
- The icon at the top right indicates if editing is unlocked (), locked (⦸), or if the change is confirmed (√).

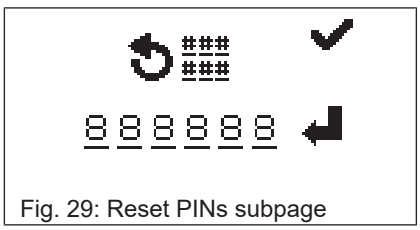


Fig. 29: Reset PINs subpage

Use this screen to reset all PINs. Contact Wacker Neuson Service to obtain the master PIN. Press enter. Each digit flashes one at a time. Use the next or previous buttons to change the digit. Press enter to select a digit and move to the next one. Press escape to go back to the previous digit. Press enter when done to confirm the PIN.

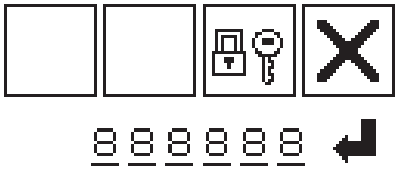


Fig. 30: PIN entry page locked

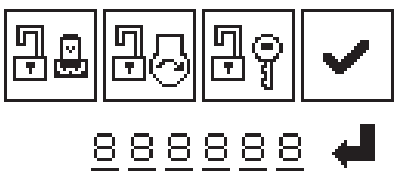


Fig. 31: PIN entry page unlocked

PIN entry page

Use this screen to enter PINs. Press enter. Each digit flashes one at a time. Use the next or previous buttons to change the digit. Press enter to select a digit and move to the next one. Press escape to go back to the previous digit. Press enter when done to confirm the PIN. When a PIN is not configured for a given function, the space for that function is blank.

The graphic to the left shows examples of all icons from left to right, as follows:

- Rollover lockout status: This icon is either upright and unlocked, or tipped and locked. Entering the valid PIN moves it from tipped to unlocked.
- Starter interlock status: The starter icon changes from locked to unlocked, and indicates if the engine start command is ignored or respected.
- Status of the owner lock/unlock: The owner icon indicates whether or not the owner's PIN has been entered, which unlocks changing of the PINs in the respective screens.
- Feedback on the entered PIN: This shows for 3 to 5 seconds when a PIN is entered. It shows whether the PIN is valid (✓) (seen at the left) or not valid (X) (shown in the first PIN entry graphic).

6.6 Pairing the Wireless Controller

Fig. 32: Next and confirm buttons

Note: A special pairing magnet is needed to pair the wireless controller with the machine. This magnet is located in the operator's manual holder under the front hood.

In most cases, the wireless controller is already paired with the machine. If it is properly paired, there are signal bars shown in the LCD display, and there is a green flashing light on the transceiver.

If the wireless controller needs to be paired with the machine, perform the following:

1. Simultaneously press and release the next **(1)** and confirm **(2)** buttons.
2. Navigate to option 2 (2.) and press the confirm button.
   Note: The option to cancel pairing ( ) is available on this screen. To cancel the pairing process, press the next button. Otherwise, continue with the following steps to complete the pairing process.
3. Press and hold the next and confirm buttons for 3 seconds. The wireless controller searches for transceivers ( ).

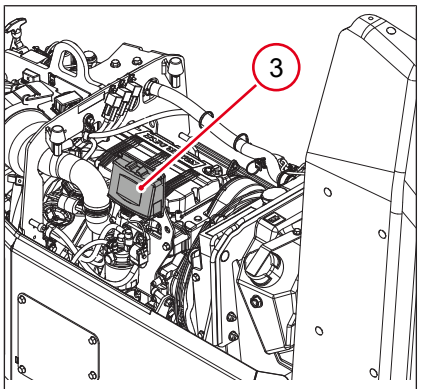


Fig. 33: Transceiver

4. Start the pairing mode on the transceiver **(3)** by switching the battery disconnect to OFF. This turns off the transceiver.
5. Switch the battery disconnect to ON to turn on the transceiver.
6. Within 5 seconds after turning the transceiver on, place the pairing magnet on the magnet symbol ( ) on the bottom of the transceiver.
   Notes:
   - ⇨ The LED on the transceiver flashes orange with fast pulses, indicating that pairing is pending.
   - ⇨ If the pairing magnet that came with the system is not available, you can use any magnet with a force greater than 1 kg.
7. Immediately remove the magnet after the LED starts flashing. The transceiver's serial number (SN 24678943) shows on the information center.
8. Make sure the serial number (found on the product label) matches the intended transceiver's serial number.
9. If the serial numbers do not match, find the transceiver with the non-matching serial number, switch it off, and follow these steps:
   - ⇨ Switch off the wireless controller and switch it on again.
   - ⇨ Restart the pairing process.
10. If the serial numbers match, press the confirm button.
    - ⇨ The pairing confirmation symbol ( ) shows for 2 seconds.
    - ⇨ The off symbol shows.
11. Turn off the wireless controller and the transceiver.
12. Turn on the transceiver and the wireless controller.

6.7 Function of the Compatec Compaction System (if equipped)

The function of the Compatec compaction system is to indicate:

- Compaction progress
- When the machine has achieved the maximum soil density it can achieve
- If the machine is operating on too hard of a substrate and runs the risk of being damaged

The Compatec compaction system is suitable for all mixed (well-graded) soils.
Note: The Compatec compaction system only serves to assist in soil compaction and does not replace professional measurement of soil density.

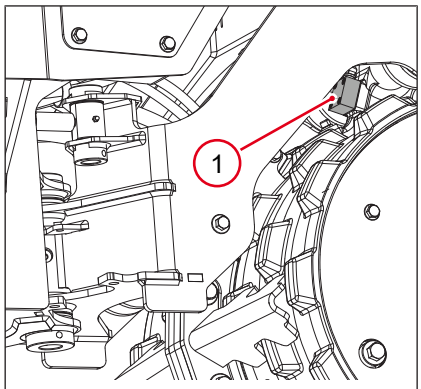


Fig. 34: Sensor

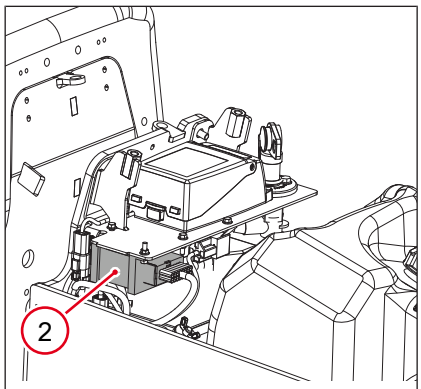


Fig. 35: Module

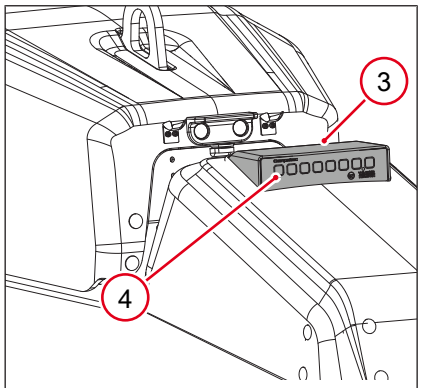


Fig. 36: Display and LEDs

System components

The major Compatec system components are as follows:

- Sensor: The sensor **(1)** is mounted on the rear drum support. It signals to the processing module the level of soil compaction.
- Processing module: The processing module **(2)** is mounted in the rear half of the machine, under the battery charger bracket. It receives signals from the sensor. It processes the signals and communicates with the LED display unit.
- LED display unit: The LED display unit **(3)** is mounted on the hood. The LED display unit consists of eight LEDs **(4)**. The LEDs illuminate to communicate the information received from the processing module.

LED operation

The number of LEDs illuminated is proportional to the density of the soil, the more illuminated LEDs, the greater the density of the soil.

When the number of illuminated LEDs stops increasing, no more compaction is obtainable. The maximum number of illuminated LEDs varies greatly depending on the type of soil being compacted. For example, a soft clay material may only reach a maximum of three lit LEDs.

When all LEDs flash rapidly, there is a hazard of over compaction or the machine is on a substrate that is too hard.
Note: Non-compactible material or flaws in the substrate are detectable by the system if they are more than one meter in length. With sudden changes from high to low compacted soil (or vice versa), there is a slow rise or fall in the LEDs.

Testing

Test the Compatec compaction system upon machine startup.

1. Start the wireless controller. For further information, see Starting and Stopping the Wireless Controller on page 39.

2. Observe the LED display. During the first few seconds after starting the controller, the eight LEDs illuminate from left to right.
   - ⇨ If all LEDs illuminate, the system is fault free and the LEDs switch off in succession. Then, all eight LEDs flash briefly with reduced brightness.
   - ⇨ If all LEDs illuminate and remain illuminated after initialization, the sensor is not functioning properly.

6.8 Position of the Operator

Although the transceiver on the machine can receive signals from any direction, the switches on the wireless controller are positioned so that they correspond to the movements of the machine with the operator standing behind it.

As the operator changes positions in the work area, it is important that he or she understands the changes that occur in the control of the machine. If the operator stands in front of the machine, it responds in a direction opposite in relation to the operator. That is, pushing forward causes the machine to move toward the operator; pushing left results in the machine turning to the operator's right. Operating the machine while standing in the direction of travel is not recommended.

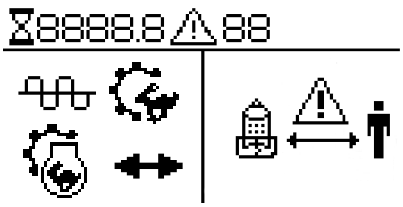


Fig. 37: Operator too close icon on home screen

If the operator is standing too close to the machine, the wireless controller does not respond to most input until the operator moves a safe distance away.

See the following graphic for acceptable operator positions.

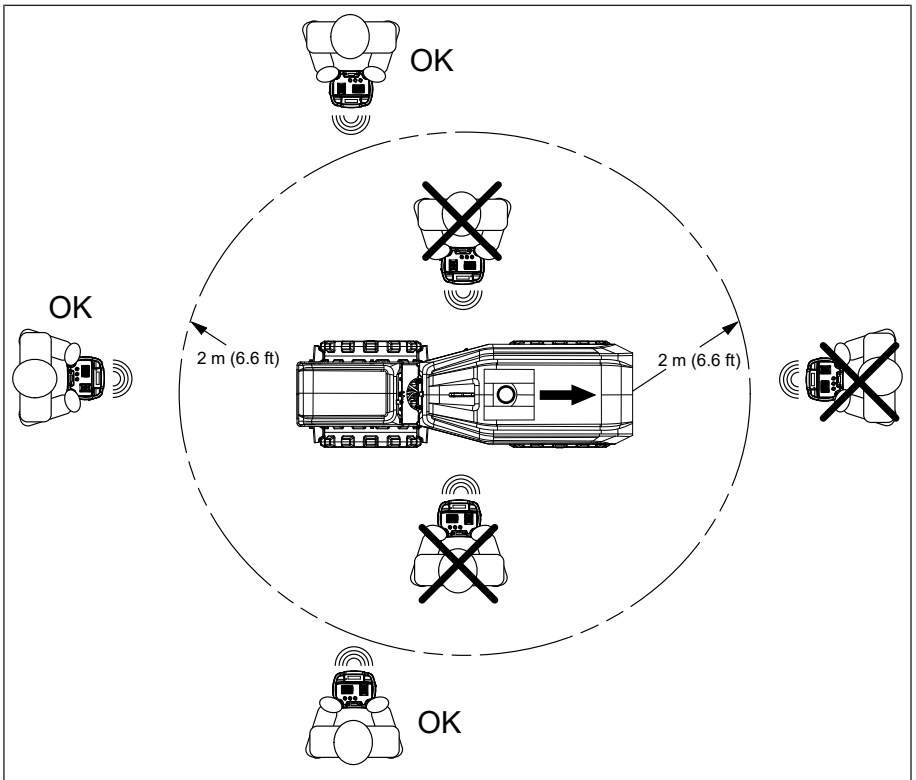


Fig. 38: Operator positions

6.9 Range Limits

⚠ WARNING

Injury hazard

Personnel may be injured if they are within 2 m (6.6 ft) of the machine while it is in operation.

- ► When operating the machine, always maintain a distance of at least 2 m (6.6 ft).
- ► Do not let others within 2 m (6.6 ft) of the machine.
- ► Stop the machine immediately if someone enters the work area of the machine.

The wireless controller signal remains in contact with the machine at distances up to 30 m (98 ft). Navigate to the machine angle sensor and operating distance subpage under the machine parameters page to view the distance from the machine. On the same subpage, an icon pops up to show a disconnected signal if the machine moves too far away from the operator or if the signal is severely obstructed. For further information on pages and subpages, see Display Pages on page 39.

As the distance between the wireless controller and machine increases, the intensity of the signal diminishes. If the machine moves out of range, it immediately stops moving. Vibration stops after 20 seconds. There is an indication on the wireless controller that the machine is out of range. This indication is the same as if the operator is too close. For further information, see Position of the Operator on page 50. The operator must then move closer to the machine to reestablish contact. If contact is not made within 1 minute, the engine shuts off.

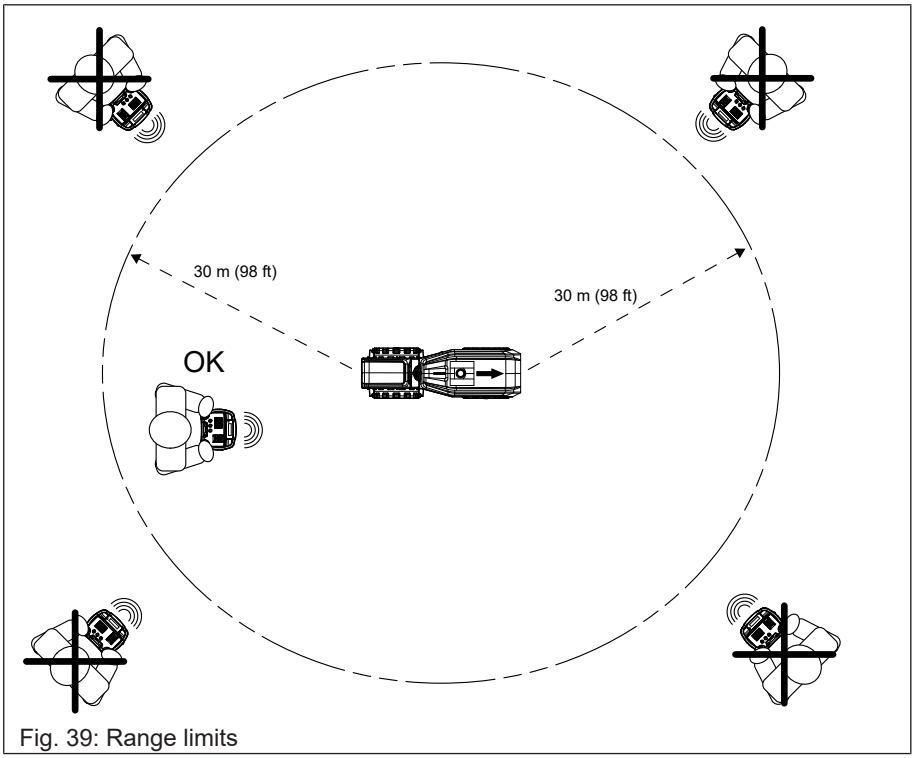


Fig. 39: Range limits

The radio signal strength is indicated on the information center with radio signal bars. The different radio signal states are indicated, also, as seen below:

Radio Signal States	Symbol
No radio link	
Radio signal strength 1 to 25 percent	
Radio signal strength 26 to 50 percent	
Radio signal strength 51 to 75 percent	
Radio signal strength 76 to 100 percent	
Radio standby	

Note: The standby symbol indicates something is preventing the wireless controller from operating. Make sure joysticks, levers, and switches are in the zero position during wireless controller startup and the engine start/stop button is not activated.

6.10 Communication Faults

Description

The machine has built-in diagnostics that continuously check for a faulty signal. If a faulty signal is detected, the machine stops moving and shuts down.

Fault correction

One common communication fault involves no connection with the machine. If the operator turns on the wireless controller but does not turn on the machine (by rotating the battery disconnect switch to the ON position), the controller shows COMMUNICATION ERROR. To remedy this, simply turn on the machine, or pair the controller with a different machine.

Other communication faults are rare, and they vary in frequency and duration. When a normal signal is restored, the user can restart the machine.

If communication faults occur regularly, there may be faulty or damaged components. Replace components as needed.

For a list of error codes and their meanings, see Wireless Controller Error Codes on page 107.

6.11 Preliminary Checks

⚠ WARNING

Injury hazard

When the beacon on the hood of the machine is rotating, the machine is capable of receiving a signal from the wireless controller that could cause the machine to start or move. This can potentially cause injury to the operator and any bystanders.

► All personnel should maintain a distance of 2 m (6 ft) from the machine whenever the beacon is rotating.

NOTICE

Contaminated oil can cause machine damage.

► When topping off the lubricating and hydraulic oil levels, use clean containers, funnels, etc., to avoid contamination.

Requirement

Machine on level surface

Overview

All items listed below must be performed on a daily basis before starting and operating the machine.

Before starting

Perform all daily maintenance tasks. For further information, refer to the Periodic Maintenance Schedule topic in the Maintenance chapter of this manual.

Perform the following:

- Check the fuel level.
- Check the condition of oil cooler and radiator cooling fins.
- Clean the scraper bars.
- Clean the wireless controller.
- Make sure the articulation joint locking bar is in the storage position.
- Turn the battery disconnect switch to the ON position and make sure the beacon rotates.
- Make sure the wireless controller and transceiver are paired. There should be signal bars on the wireless controller and a green flashing light on the transceiver. For further information on pairing the components, see Pairing the Wireless Controller on page 47.
- Check the work area for obstructions. Remove all obstructions.

After starting but before operating

- Check the machine for fluid leaks.
- Allow the engine to warm up according to the following schedule:

Ambient Temperature	Time (Minutes)
Above 0°C (32°F)	5
Below 0°C (32°F)	15[1)]

1) More time may be required if hydraulic controls are sluggish

Note: Below 0°C (32°F), the machine is limited to low idle, low travel speed, and no vibration. A snowflake icon appears on the display until the hydraulic fluid has warmed up enough for full machine use.

6.12 Operating in Extreme Temperatures

Do not operate the machine in temperatures below -30°C (-22°F) or above 50°C (122°F). Damage to electronics and other systems may occur.

6.13 Starting, Operating, and Shutting Down the Machine

⚠ WARNING

Explosion hazard

Evaporative starting fluids can cause unexpected explosions.

► Do not use evaporative starting fluids, such as ether, on this engine.

⚠ WARNING

Injury hazard

Personnel may be injured if they are within 2 m (6.6 ft) of the machine while it is in operation.

► When operating the machine, always maintain a distance of at least 2 m (6.6 ft).

► Do not let others within 2 m (6.6 ft) of the machine.

► Stop the machine immediately if someone enters the work area of the machine.

⚠ WARNING

Injury, damage, and accident hazard

Due to the nature of the connectivity between the machine and the wireless controller, it is possible to operate the machine while simultaneously not being able to see it. The machine can inadvertently run into or over bystanders or other equipment.

► Maintain line of sight with the machine at all times while operating.

Requirements

Machine is in operable condition and has been properly maintained

Starting the machine

To review the controls before starting, see Wireless Controller Description on page 37.

1. Open the rear hood.
2. Turn the battery disconnect switch to the ON position, and make sure the beacon rotates.
3. Remove the wireless controller, and close and latch the hood.
4. Turn the emergency stop (E-stop) button clockwise to release the button and turn on the controller.
   Note: If the E-stop is already released, press the engine start/stop button to turn on the controller.
5. Check the radio signal bars to make sure there is a connection between the controller and the transceiver.
6. Make sure there is no one within 2 m (6 ft) of the machine.
7. Press and hold the engine start/stop button for ½ second to start the engine.
   ⇨ Under hard-to-start conditions such as cold weather, the operator can continuously hold this button to crank the engine for up to 15 seconds. If the operator lets go in between the 1/2 second and the 15 seconds, the machine follows the normal starting procedure as if the button was only pressed for 1/2 second.

Operating the machine

- Always wear the neck strap provided by the manufacturer while operating the machine.
- When standing behind the machine, push forward on the drive joystick to move the machine away from the operator, push left on the steering joystick to turn the machine left, etc. It is not recommended that the operator stand to the front of the machine while operating. For further information, see Position of the Operator on page 50.

The wireless controller maintains power, but the machine overrides control if the controller experiences one of the following:

- A hard impact
- Rotation of about 45 degrees or more either front to back or left to right

In these instances, machine operations stop, but the engine continues to run. An icon () appears telling the operator the wireless controller is locked. Reset the controller by returning it to an upright position. Another icon () may also appear. This icon tells the operator to return the joysticks to neutral.

Shutting down the machine

Note: If the wireless controller is within range (30 m (98 ft)) of the machine, the machine shuts off after 5 minutes with no input from the operator. If the wireless controller is out of range, the machine shuts down after 1 minute.

1. Toggle the vibration/high travel speed switch rearward.

2. Place the throttle switch in the low (turtle) position.
3. Press and hold the engine start/stop button for at least 3 seconds to shut down the machine.

6.14 Engine Speeds

With the engine throttle switch toggled rearward (low idle), the engine is held in low idle. The operator cannot turn on vibration with the engine throttle switch in this position.

With the engine throttle switch toggled forward (auto idle), engine RPMs increase automatically when vibration is turned on or when the operator moves the drive joystick forward or backward. For further information, see Travel Speeds on page 56.

Also in auto idle, the engine throttles down when there is no travel input from the operator, as follows:

- If vibration is off, the engine throttles down after 5 seconds.
- If vibration is on, the engine throttles down after 20 seconds. Vibration also turns off at this time.

6.15 Travel Speeds

The machine has two travel speeds that are automatically selected based on operator input. The machine selects the travel speed according to the following table:

Speed	Criteria
Low—requires any of the criteria	Engine in low idle
	Vibration is on
	Drive joystick is pressed partially forward or backward
High—requires all of the criteria	Engine in auto idle
	Vibration is off
	Drive joystick is pressed most or all of the way forward or backward

6.16 Parking Brake

The parking brake is located in the rear drum. The brake is connected to the hydraulic system through the brake valve of the control manifold. The brake assembly is a spring-activated, pressure release system.

The parking brake automatically engages and disengages. When the engine is not running or the parking brake valve is closed, a spring automatically engages the parking brake. Once there is input from the operator that requests machine movement, the parking brake disengages by allowing hydraulic oil to flow to the brake.

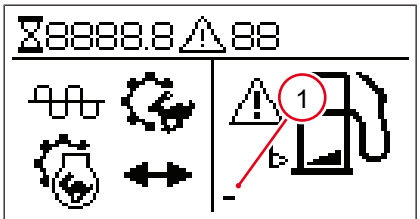


Fig. 40: Parking brake status (disengaged shown)

The parking brake status **(1)** is shown on the home screen with the following three icons:

- P = Engaged
- — = Disengaged
- X = Disengaged manually (with the override option)

If vibration is off, engine speed is in low idle, and there is no input from the operator for 10 seconds, the parking brake engages.

If vibration is on and there is no input from the operator, engine speed drops to low idle, and vibration stops after 20 seconds. The parking brake engages 10 seconds later as described above.

6.17 Activating the Parking Brake Engage Override Feature

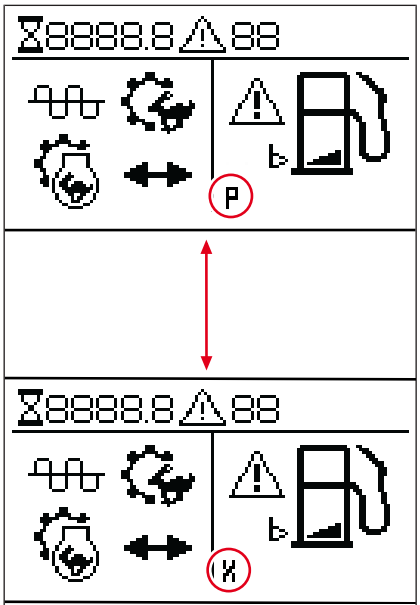


Fig. 41: Symbol alternating between P (top) and X (bottom)

Overview

This allows the operator to manually engage the parking brake to make sure it is functional.

When the parking brake engage override is active, the brake is engaged but drive and steer functionality are also active. The P symbol on the wireless controller display alternates between P and X every 1 second.

Requirements

- Wireless controller and transceiver paired and connected
- Parking brake override mode activated
- Drive joystick in neutral at the start and throughout the 10-second time period
- Steering joystick in neutral at the start and throughout the 10-second time period
- Engine throttle switch in low idle (not auto)

Notes:

- With the engine in low idle, the exciters and two-speed travel are disabled.
- The vibration intensity switch can be in low or high.
- The vibration/high travel speed switch can be in auto or two-speed.

Procedure

1. On the wireless controller, navigate to the parking brake override function subpage under the settings page. For further information, see Display Pages on page 39.
2. Toggle the selection to override the parking brake.
3. Press and hold the horn button for 10 seconds. The horn stops after 500 milliseconds as normal. It beeps for 200 milliseconds at the end of 10 seconds to confirm the parking brake engage override is active.
4. When desired, release the horn button to disengage the override.

5. If desired, return to the parking brake override function subpage and exit the override mode. The override mode resets on its own after power is cycled via the battery disconnect switch.

Note: The following also disengage the override:

- Exiting parking brake engage override mode
- Moving the engine throttle switch from low to auto
- Cycling the wireless controller power
- Cycling the transceiver or machine control unit (MCU) power
- Loss of pairing

6.18 Machine Stability

⚠ WARNING

Crushing hazard

Certain job site conditions or operating practices may adversely affect machine stability.

► Follow the instructions below to reduce the risk of tipping or falling incidents.

Surface conditions

Pay attention to changing surface conditions while operating the machine. Adjust speed and travel direction as necessary to maintain safe operation.

- Machine stability and traction may be severely reduced when operating on uneven or rough terrain, rocky soils, or wet or loosely packed surface material.
- The machine may suddenly tip, sink, or fall when moved onto surfaces that have been newly filled with earth.

Steering angle

An articulated roller is more likely to tip when moving off an elevated surface if the machine is turned away from the edge.

Turn the machine toward the edge when moving off an elevated surface, as shown in the following illustration.

Fig. 42: Traveling safely

Travel speed

Reduce travel speed before turning the machine. A fast moving machine is more likely to tip or fall over while making turns or changing direction.

Drum overhang

The machine can tip suddenly if more than half of the drum width extends beyond the edge of the elevated surface.

- Reduce travel speed and watch the drum position carefully when operating along the edge of an elevated surface.
- Keep as much of the drum on the elevated surface as possible.

Vibrating on a compacted surface

Activating the vibration system on a fully compacted surface may cause the drums to rebound and momentarily lose contact with the ground. If this occurs while the machine is on an incline, the machine may slide.

6.19 Operating on Slopes

⚠ WARNING

Crushing hazard

Do not operate the machine sideways on slopes. The machine may tip or roll over even on stable ground.

► Operate the machine straight up and down on slopes.

Overview

When operating on slopes or hills, special care must be taken to reduce the risk of personal injury or damage to the machine.

Procedure

Operate the machine up and down slopes rather than from side to side. Note the following:

- The maximum recommended operating angles are as follows:

	Pitch (degrees)	Roll (degrees)
Narrow drums (no extensions)	35	30
Narrow drums (with extensions)		35
Wide drums		

- The machine is equipped with safety switches which shut down the engine should the front-to-back (pitch) or side-to-side (roll) angles exceed the following:
  - For pitch, a pre-alarm appears on the display at 40 degrees. An alarm occurs at 50 degrees and shuts down the engine.

– For roll, a pre-alarm appears on the display at 30 degrees. An alarm occurs at 45 degrees and shuts down the engine.

- These angles decrease significantly when considering other factors, such as traveling (including acceleration, deceleration, and steering), vibration, and loose soil. Avoid travel across slopes unless absolutely necessary.

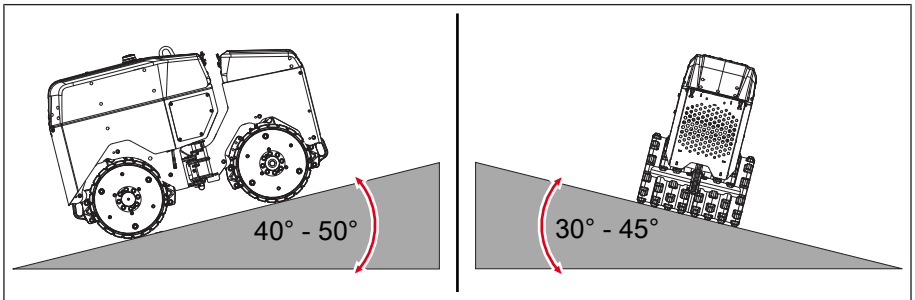


Fig. 43: Alarm ranges, pitch (left) and roll (right)

6.20 Rollovers

NOTICE

After a rollover, engine damage may occur if it is not serviced appropriately before being started.

► Do NOT start the machine after a rollover.

► Service the engine to remove any oil that may have been trapped in the combustion chambers.

► Contact your local dealer for instructions or servicing.

Proper operation of the machine on slopes will prevent rollovers. Read and follow the safety instructions. For further information, see Operating on Slopes on page 59. If a machine rollover does occur, press the emergency stop button immediately. Care must be taken to prevent damage to the engine. If the machine has rolled over, oil from the engine crankcase can flow into the combustion chamber, which can severely damage the engine the next time it is started. If the machine has rolled on its side, immediate steps should be taken to safely position the machine upright.

Inspect the entire machine for damage after a rollover. Some of the most commonly damaged components are as follows:

- Hoods (and beacon)
- Lifting eye
- Chassis
- Hydraulic cooler and radiator
- Hydraulic tank
- Hydraulic manifold
- Fuel tank
- Air filter
- Transceiver

A rollover is indicated on the home page on the wireless controller. An indication of whether the machine is locked out also appears. If the machine is locked out, navigate to the PIN entry page to unlock the machine. For further information, see Display Pages on page 39.

6.21 Refueling the Machine

⚠ WARNING

Fire hazard

Fuel and its vapors are extremely flammable. Burning fuel can cause severe burns.

- ► Keep all sources of ignition away from the machine while refueling.
- ► 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.
- ► Refuel only when the machine is outdoors.
- ► Clean up spilled fuel immediately paying particular attention to rubber and plastic components.

Requirements

- Machine shut down
- Machine and fuel tank level with the ground
- Fresh, clean fuel supply (For the fuel specification, see Technical Data on page 116.)

Procedure

1. Open the rear machine compartment.
2. Remove the fuel cap.
3. Fill the fuel tank up to the base of the neck.
4. Install the fuel cap.

6.22 Emergency Shutdown Procedure

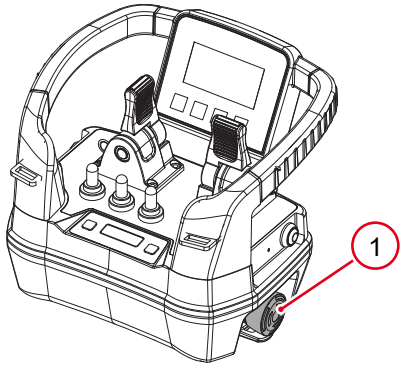


Fig. 44: Stop button

There may be an instance when the operator needs to shut down the machine immediately, such as interference from an uncontrollable outside force, unintended operation, a breakdown, or an accident. If a situation like this occurs while the machine is operating:

1. Press the E-stop button **(1)** on the side of the wireless controller to stop the engine and close the fuel valve.
2. Return the machine to an upright position if tipped over. Do not try to start the machine in this case. For further information on rollovers, see Rollovers on page 60.
3. If the machine has tipped over or has been damaged in some way, contact the machine owner for further instructions.

6.23 Nickel-metal Hydride Battery

The battery used to power the wireless controller is a high capacity nickel-metal hydride (NiMH) cell rated at 2,000 mAh and is capable of accepting hundreds of charging cycles. If the machine fails to operate for the full operating period, even after the battery has been fully discharged and recharged, the battery pack may need to be replaced.

Charging characteristics:

- Time to fully charge: 2 hours
- Full-charge operating time: 6 to 23 hours*
- Operating time after 1 hour charge: 10 hours*
- Battery charging temperature range is between 10°C (50°F) and 45°C (113°F)
- 70 percent nominal capacity after 500 charge cycles

* Operating time decreases at severely cold temperatures.

6.24 Replacing the Battery Pack

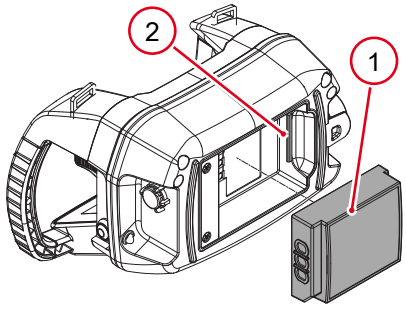


Fig. 45: Battery pack and retaining lip

Switch out the wireless controller battery pack **(1)** with a fully charged battery pack when it is low on charge. Replace the battery pack once a year or when it no longer holds a full charge.

To switch out the battery pack, grasp the pack and slide it to the left of the wireless controller, making sure the edge of the pack clears the retaining lip **(2)**, and then tilt the pack out. Installation is the reverse of removal.

Notes

- A new battery may not be fully charged. After replacing the battery, charge it for approximately one hour to ensure it is at full capacity.
- In the interests of environmental protection, dispose of used batteries properly. Do not dispose in trash, or incinerate.

6.25 Charging the Battery Pack

NOTICE

The battery charger has the potential to overheat if there are many power cycles when the battery is already fully charged.

► Turn off the machine and wait for the battery to cool.

► Do not cycle the battery disconnect switch.

Background

The battery charger is mounted to a bracket inside the machine's rear compartment. The battery pack has enough capacity to provide 10 hours (depending on configuration and number of options) of continuous operation. A second battery is provided with the machine. To avoid uninterrupted productivity during long hours of operation, make sure to keep the second battery on the charger while the first one is being used.

Notes:

- There is no need to run the battery completely down before recharging. The battery can be recharged from any state of discharge with no loss in performance or life.
- The battery charger in the machine has power only when the machine's battery disconnect switch is on.
- A stand-alone charger is available for purchase.

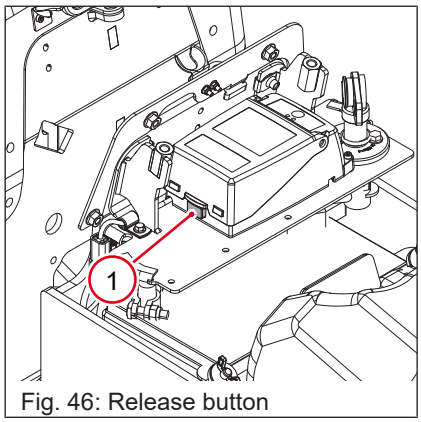


Fig. 46: Release button

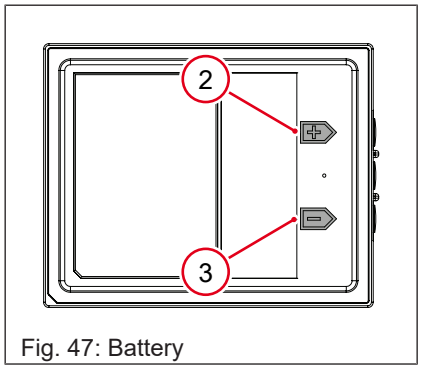


Fig. 47: Battery

Procedure

To charge the battery:

1. Open the rear hood.
2. Press the button **(1)** on the battery charger and flip open the cover.
3. Orient the battery to the charger by making sure the battery connection points are down and facing the right side of the machine.
   ⇨ When correctly oriented, the positive marking **(2)** should be toward the front of the machine, and the negative marking **(3)** should be toward the rear of the machine.
4. With the battery correctly oriented, insert the battery directly down into the charger. The status LED flashes green when the battery is charging.
   Note: There is not a lip to retain the battery in the charger like there is in the wireless controller.
5. Close the cover.

Charging time

Approximately two hours is required to bring the wireless controller battery up to full charge. This is the most efficient way to use the battery. The wireless controller will operate with a partially charged battery; however, its operating time will be reduced accordingly.

Charging status

Two LEDs on the battery charger indicate the status of the battery's charge. The power LED is red, and the status LED is green. Refer to the following table:

Power LED	Status LED	Meaning
Red	Off	The charger has power. No battery is present.
Red	Green	The charger has power. The battery is fully charged.

Power LED	Status LED	Meaning
Red	Green flashing	The charger has power. The battery is charging.
Red flashing	Off	There is an error on the battery or charger, or the temperature is out of the charging span.

Battery status indicators

Symbols are visible on the information center that indicate the status of the batteries' charge and condition. Refer to the following table:

Status	Symbol
Battery 0%	
Battery 25%	
Battery 50%	
Battery 75%	
Battery 100%	
Battery faulty	

6.26 Drum Extensions

The overall width of the drums on this machine is 600 mm (23 5/8 in.). By installing drum extensions, the user can increase the overall width of the drums to 820 mm (32 in.) as needed to accommodate specific job requirements.

6.26.1 Installing Drum Extensions

⚠ WARNING

Injury and damage hazard

When the machine is placed on jack stands, there is an increased risk of it tipping and causing injury and damage to the machine.

- ► Make sure the machine is stabilized before installing or removing drum extensions.
- ► Do not allow untrained personnel to install or remove drum extensions.

NOTICE

Unapproved attachments may cause damage to the machine.

► Only use Wacker Neuson–approved attachments.

Requirements

- Engine stopped; machine cool to the touch
- Hand tools (sockets, wrenches, etc.)
- Torque wrench
- Drum extensions and mounting hardware
- Two sets of jack stands
- Wide scrapers (optional)

Installing the drum extensions

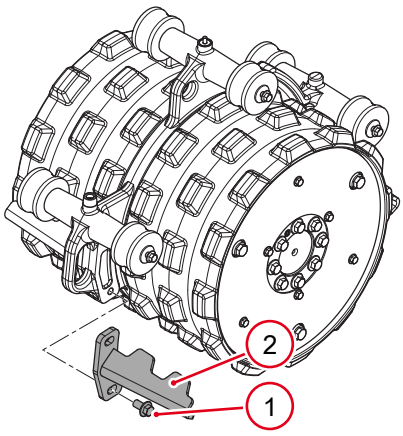


Fig. 48: Bolt and scraper

1. Lock the articulation joint. For further information, see Articulation Joint Locking Bar on page 31.
2. Remove the bolts **(1)** securing the narrow scrapers **(2)** to the front drum, front and rear.
3. Place the scrapers in storage for future use, but keep the bolts to reuse when installing the wide scrapers.
4. Lift the front of the machine 25 mm (1 in.) to 50 mm (2 in.).
5. Place jack stands **(3)** in the notches at the locations shown on the left in the following graphic.
   Note: When lifting the rear of the machine, place jack stands **(4)** at the locations shown on the right in the graphic.

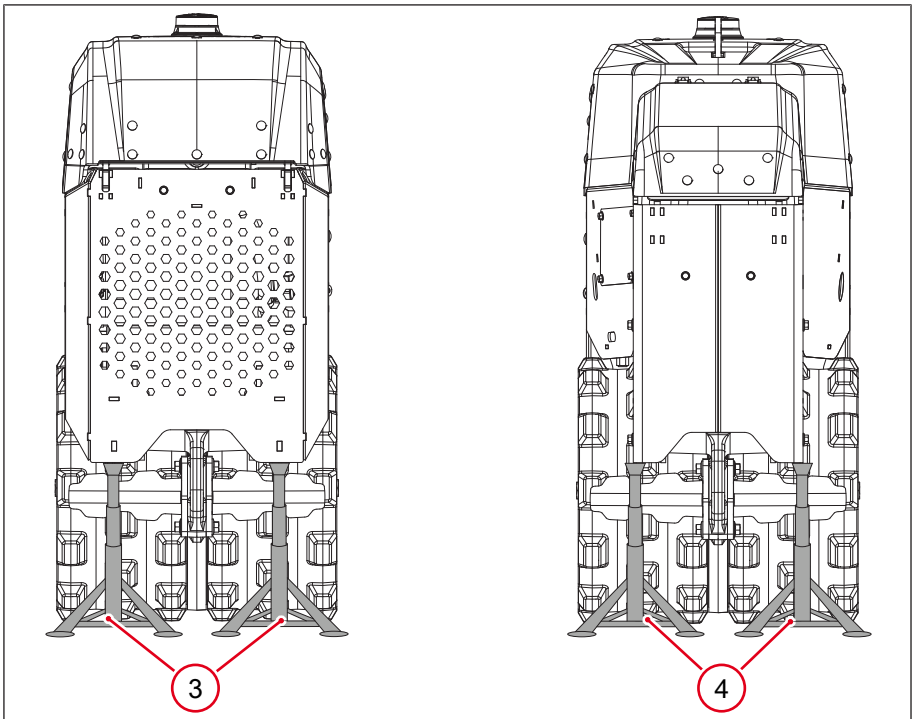


Fig. 49: Jack stands at front (left) and rear (right) of machine

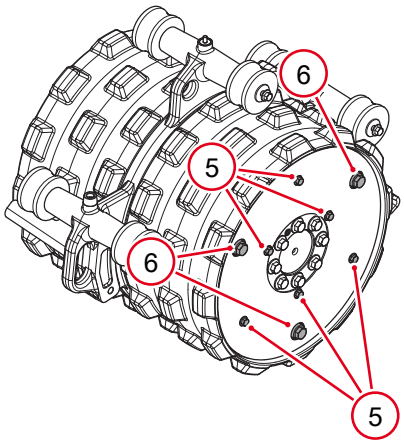


Fig. 50: Drum cover bolts

6. Remove the six bolts **(5)** securing the drum cover to the machine, and set the bolts aside.
7. Remove the drum cover.
8. Remove the three outside bolts **(6)** and keep them with the drum cover.

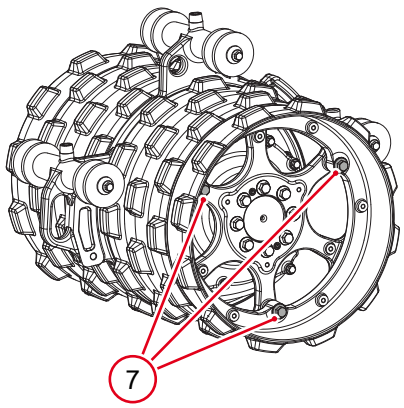


Fig. 51: Extension mounting bolts

9. Lift a drum extension into place and align the mounting holes.
10. Secure the drum extension using three M16 x 60 bolts **(7)**.
11. Tighten the bolts to 195 Nm (144 lb-ft).

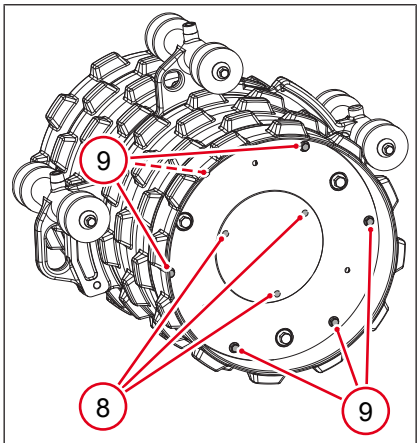


Fig. 52: Drum cover bolts

12. Install the drum cover and center plate, if not already attached, as follows:
    - ⇨ Install the center plate to the drum cover using three M8 x 25 bolts **(8)** and nuts.
    - ⇨ Using the six bolts **(9)** removed earlier, install the drum cover.
    - ⇨ Tighten the bolts to 46 Nm (34 lb-ft).
13. Repeat steps 6 through 12 for the other side of the machine.

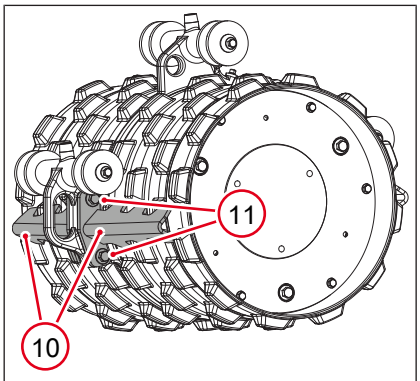


Fig. 53: Scraper and bolts

14. Using Loctite® 243 or equivalent on the bolts, install wide scrapers **(10)**, front and rear, using the bolts **(11)** from step 2.
15. Tighten the bolts to 195 Nm (144 lb-ft).
16. Raise the machine and remove the jack stands.
17. Lower the machine to the ground.
18. Repeat the installation procedure for the rear drum extensions, beginning with step 2.

6.26.2 Removing the Drum Extensions

⚠ WARNING

Injury and damage hazard

When the machine is placed on jack stands, there is an increased risk of it tipping and causing injury and damage to the machine.

► Make sure the machine is stabilized before installing or removing drum extensions.

► Do not allow untrained personnel to install or remove drum extensions.

Requirements

- Engine stopped; machine cool to the touch
- Hand tools (sockets, wrenches, etc.)
- Torque wrench
- Narrow scrapers

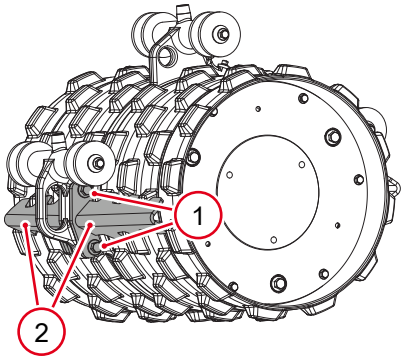


Fig. 54: Bolts and scrapers

Procedure

1. Lock the articulation joint. For further information, see Articulation Joint Locking Bar on page 31.
2. Remove the bolts **(1)** securing the wide scrapers **(2)** to the front drum, front and rear.
3. Place the scrapers in storage for future use, but keep the bolts to reuse when installing the narrow scrapers.
4. Lift the front of the machine 25 mm (1 in.) to 50 mm (2 in.).
5. Place jack stands **(3)** in the notches at the locations shown on the left in the following graphic.
   Note: When lifting the rear of the machine, place jack stands **(4)** at the locations shown on the right in the graphic.

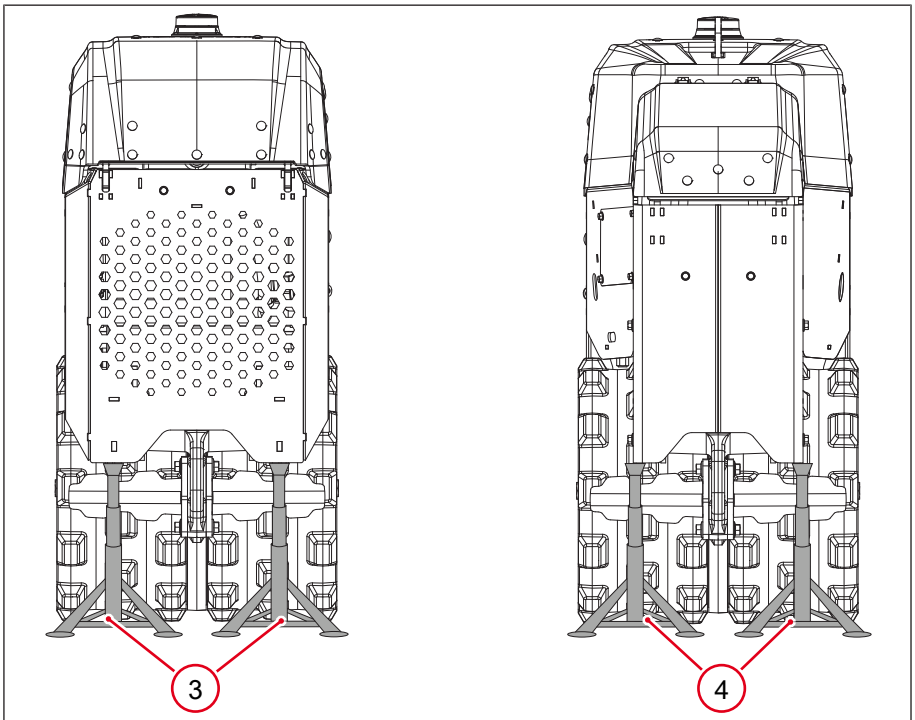


Fig. 55: Jack stands at front (left) and rear (right) of machine

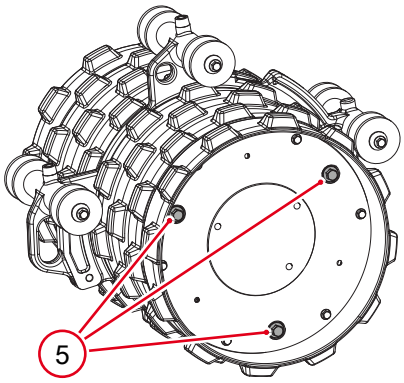


Fig. 56: Extension mounting bolts

6. On one side of the machine, while supporting the drum extension, remove the three bolts **(5)**, and remove the extension with the drum cover.

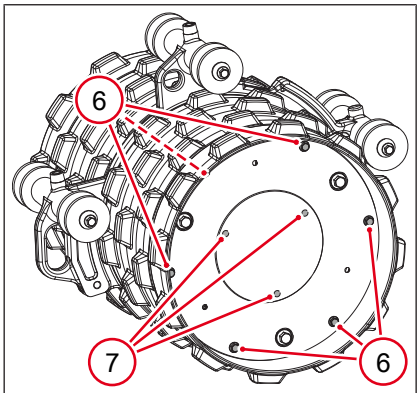


Fig. 57: Cover and center plate bolts

7. If reusing the drum cover for the standard drums:
   - ⇨ Remove the six bolts **(6)** securing the cover to the extension.
   - ⇨ Remove the three nuts and bolts **(7)** securing the center plate to the cover.

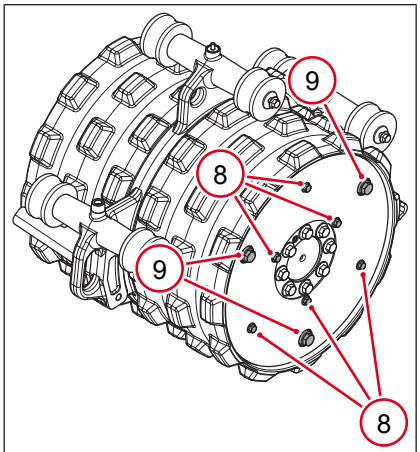


Fig. 58: Bolts

8. Install the drum cover using the same bolts **(8)** that held the cover to the extension.
9. Tighten the bolts to 46 Nm (34 lb-ft).
10. Install the bolts **(9)** in the drum extension mounting holes.
11. Repeat steps 6 through 10 for the other side of the machine.

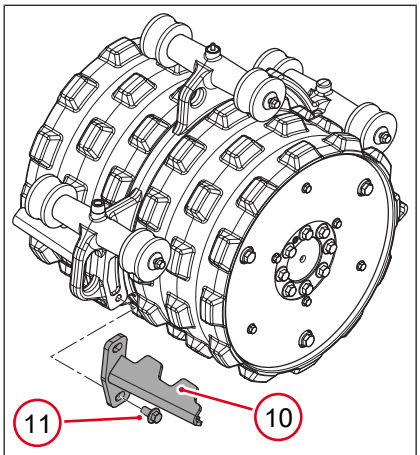


Fig. 59: Scraper and bolt

12. Install the narrow scrapers **(10)** with Loctite 243 or equivalent on the bolts **(11)** from step 1.
13. Tighten the bolts to 195 Nm (144 lb-ft).
14. Raise the machine and remove the jack stands.
15. Lower the machine to the ground.
16. Repeat the removal procedure for the rear drum extensions, beginning with step 1.
17. Place the drum extensions in storage for future use.

7 Maintenance

7.1 General Maintenance

⚠ WARNING

Injury and machine damage hazard

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

- ► Keep the machine in safe operating condition by performing periodic maintenance and making repairs as needed.
- ► Do not make unauthorized modifications to the machines. This includes structural, hydraulic, engine, and electrical systems.
- ► Before returning the machine to service, make sure all covers and parts are installed, check for any fluid leaks, check all fluid levels, operate all controls, and test the loader interlock system functionality.

NOTICE

Deviating from or altering the maintenance schedule provided by the manufacturer may cause machine damage, which may void the warranty.

- ► Follow the maintenance schedule provided.

Environment

Machine fluids may be harmful to the environment.

- ► 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.

Preparing for maintenance

Do not perform even routine service (oil/filter changes, cleaning, etc.) unless all electrical components are shut down. Use the checklist below to prepare this machine for maintenance:

- Press the start/stop button to shut the engine off.
- Engage the Emergency Stop button (push in).
- Turn the battery disconnect switch to OFF and remove the key.
- Attach a “DO NOT START” sign to the wireless controller.

- Do not open the wireless controller or transceiver to try to repair or replace internal parts. This must be done by authorized service workshops. Opening the wireless controller or transceiver voids any warranty and product liability.
- Always perform maintenance with the machine on a solid, level, clean surface.
- Service the equipment periodically.
- Clean the wireless controller and transceiver regularly with a damp cloth.
- Never use steam cleaners for cleaning.
- Do not use sharp or pointed objects to clean.
- Do not use solvents or flammable/corrosive materials for cleaning.
- Check the rubber bellows and rubber seals of the switches, buttons, levers, and joysticks for damage. Immediately replace any broken rubber bellows and/or rubber seals.
- Only use tested and approved original parts.
- Do not allow materials such as concrete, sand, grease, dirt, or dust to collect on the transceiver, wireless controller, or battery charger because it can impair the functions or damage the components.
- When welding on the machine, switch off the radio control system and disconnect the transceiver AMPSEAL connector.
- Make sure the machine is stable when removing the drums. If in doubt, use additional stabilization tools/techniques to make sure the machine does not tip over.

7.2 Periodic Maintenance Schedule

Maintenance cycle	Personnel	For further information	
Daily	Operating personnel	[▶ 73]	Cleaning the Wireless Controller
		[▶ 74]	Checking the Hydraulic Oil Level
		[▶ 75]	Checking the Engine Oil Level
		[▶ 76]	Checking and Replacing the Air Filter
		[▶ 77]	Inspecting the Machine for Damage
		[▶ 78]	Checking the Engine Coolant Level
		[▶ 79]	Checking the Fuel Lines
		[▶ 80]	Checking the Hoods
		[▶ 80]	Adjusting the Scraper Bars
		[▶ 81]	Checking for Loose or Missing Fasteners
		[▶ 81]	Cleaning the Machine
First 50 hours	Operating personnel	[▶ 84]	Tightening the Drum Bolts and Axle Bolts
		[▶ 86]	Changing the Engine Oil and Filter
50 hours	Operating personnel	[▶ 85]	Lubricating the Articulation Joint and Steering Cylinder
		[▶ 86]	Checking the Battery Cables
250 hours	Operating personnel	[▶ 86]	Changing the Engine Oil and Filter
		[▶ 88]	Checking the Fan Belt Tension

Maintenance cycle	Personnel	For further information	
		[▶ 89]	Replacing the Fuel Filter
		[▶ 90]	Checking the Coolant Hoses
		[▶ 90]	Checking the Drum Shock Mounts
		[▶ 91]	Checking and Cleaning Oil Cooler and Radiator Fins
500 hours	Operating personnel	[▶ 76]	Checking and Replacing the Air Filter
		[▶ 92]	Replacing the Engine Fan Belt
		[▶ 94]	Maintaining the Battery
	Service personnel	[▶ 95]	Checking Engine Valve Clearance
1,000 hours	Operating personnel	[▶ 82]	Changing the Hydraulic Oil and Filters
		[▶ 96]	Replacing the Hydraulic Oil Cap
		[▶ 96]	Changing the Drum Gear Oil
		[▶ 97]	Changing the Engine Coolant
	Service personnel	[▶ 98]	Replacing Fuel Hoses
		[▶ 98]	Cleaning and Adjusting Fuel Injectors
4,000 hours	Service personnel	[▶ 99]	Replacing the Engine Timing Belt
As needed	Operating personnel	[▶ 76]	Checking and Replacing the Air Filter
		[▶ 82]	Changing the Hydraulic Oil and Filters
		[▶ 89]	Replacing the Fuel Filter
		[▶ 91]	Priming the Fuel System
	Service personnel	[▶ 115]	Machine Disposal and Decommissioning

7.3 Engine Maintenance

⚠ WARNING

Health hazard

Most liquids from this machine contain 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 these liquids.
- ► Wash skin thoroughly after exposure to any of these liquids.

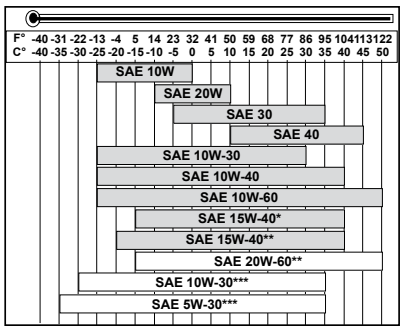


Fig. 60: Engine oil viscosities

The viscosity of the engine oil is an important factor when determining the correct engine oil to use in your machine. Use an engine oil of appropriate viscosity based on the expected outside air temperature. See the table on the left.

Note:

- * = Mineral base
- ** = Semi-synthetic base
- *** = Synthetic base

For additional information, see the engine owner's manual.

7.4 Hydraulic Oil Requirements

The use of a good petroleum-based, anti-wear hydraulic oil in the hydraulic system of this equipment is recommended. Good anti-wear hydraulic oils contain special additives to reduce oxidation, prevent foaming, and provide for good water separation.

When selecting hydraulic oil for your machine, be sure to specify anti-wear properties. Most hydraulic oil suppliers can provide assistance in finding the correct hydraulic oil for your machine.

Avoid mixing different brands and grades of hydraulic oils.

Most hydraulic oils are available in different viscosities.

The SAE number for an oil is used strictly to identify viscosity—it **does not** indicate the type of oil (engine, hydraulic, gear, etc.).

When selecting a hydraulic oil be sure it matches the specified SAE viscosity rating and is intended to be used as a hydraulic oil. For further information, see Lubrication on page 116.

7.5 Cleaning the Wireless Controller

When

Every 10 hours or daily

Requirements

- Can of compressed air
- Damp cloth

Procedure

1. Before beginning any cleaning procedures, see General Maintenance on page 70.
2. Use a can of compressed air to remove dirt and dust trapped around the switches.
3. Wipe the controller with a clean, damp cloth.
4. Allow the controller to air dry.

7.6 Checking the Hydraulic Oil Level

NOTICE

Low levels of hydraulic oil may cause damage to hydraulic components.

- ► If hydraulic oil continually needs to be added, inspect the hoses and connections for possible leaks. Repair any leaks immediately.
- ► Do not attempt to remove the vent cover from the hydraulic reservoir.

When

Every 10 hours or daily

Requirements

To prepare for maintenance, see General Maintenance on page 70.

For specific information on hydraulic oil requirements, see Hydraulic Oil Requirements on page 73.

Overview

A hydraulic oil level sight glass **(1)** is located on the side of the hydraulic fluid reservoir inside the front section of the machine. There is also a warning icon ( ) on the wireless controller that illuminates if the hydraulic oil level is low.

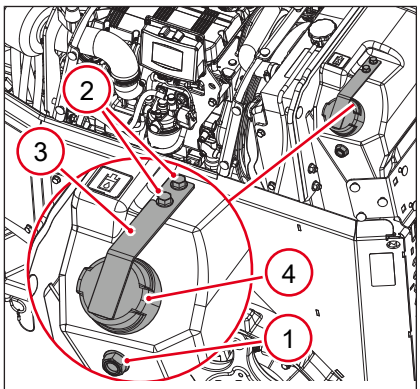


Fig. 61: Sight glass, cap, bolts, and retaining bar

Procedure

1. Open the front hood.
2. Observe the hydraulic oil level through the sight glass. The level should be half full in the sight glass.
3. If needed, add hydraulic oil as follows:
   - ⇨ Loosen the two bolts **(2)** securing the hydraulic oil cap retaining bar **(3)**.
   - ⇨ Rotate the retaining bar out of the way.
   - ⇨ Thoroughly clean the top of the filler cap **(4)**. Take care to prevent small dirt particles from entering the system.
   - ⇨ Remove the hydraulic oil cap.
   - ⇨ Fill the hydraulic oil until the level is between the minimum and the maximum levels in the sight glass.
   - ⇨ Install the hydraulic oil cap.
   - ⇨ Rotate the retaining bar so it is centered over the oil cap and tighten the bolts to 7 Nm (5 lb-ft).
4. Close the hood.

7.7 Checking the Engine Oil Level

⚠ WARNING

Health hazard

Most liquids from this machine, such as oil, gasoline, grease, etc., contain 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 these liquids.
- ► Wash skin thoroughly after exposure to these liquids.

NOTICE

Engine damage can occur if the oil level is too low, too high, or if the incorrect oil is used.

- ► Oil must be added to the engine if the oil level is below the minimum mark on the dipstick.
- ► Oil must be removed from the engine if the oil level is above the maximum mark on the dipstick.
- ► Use only the recommended oil.

NOTICE

Damage can occur from using contaminated oil or the wrong oil type.

- ► Prevent dirt and debris from contaminating the engine oil. Carefully clean the oil cap, dipstick, and the surrounding area before removing the cap.
- ► Do not mix different types of engine oil. This can adversely affect the lubricating properties of the engine oil.

Environment

Machine fluids and lubricants can be harmful to the environment.

- ► Use a suitable container to collect, store, and dispose of drained fluids and lubricants in accordance with current environmental protection regulations.

When

Every 10 hours or daily

Requirements

- Machine parked on a level surface
- Machine shut down and cool to the touch
- Recommended oil (for oil specifications, see Lubrication on page 116)
- A clean, soft cloth

Overview

Maintaining the appropriate engine oil level prevents excessive engine wear.

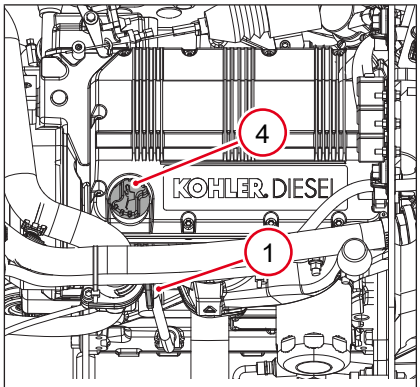


Fig. 62: Dipstick

Procedure

1. Open the front hood.
2. Clean the area around the engine oil dipstick **(1)**.
3. Carefully remove the dipstick and wipe it clean.
4. Fully insert the dipstick into the dipstick tube and remove it again to check the engine oil level.

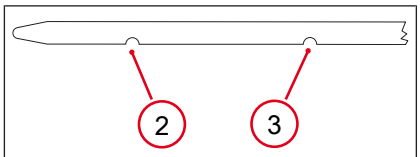


Fig. 63: Minimum and maximum marks

5. If the engine oil level is between the minimum **(2)** and maximum **(3)** marks, the level is acceptable. Do not add or remove engine oil.
6. If the oil level is below the minimum mark, remove the engine oil cap **(4)** and add enough oil to raise the level within the acceptable range. If it is above the maximum mark, drain a little oil from the engine. For further information on draining oil, see Changing the Engine Oil and Filter on page 86.
   - ⇨ Repeat steps 2 and 3 to check the engine oil level.
   - ⇨ Install the engine oil cap when the engine oil level is sufficient.
7. Install the dipstick and close the hood.

7.8 Checking and Replacing the Air Filter

NOTICE

Foreign material entering the engine may damage it.

► Do not operate the engine with the air cleaner elements removed.

When

- Every 10 hours or daily—check
- Every 500 hours—replace
- When indicated on the wireless controller

Requirements

- Machine parked on a level surface
- Machine shut down and cool to the touch
- Damp cloth

Overview

The air filter is located under the front hood on the right side of the machine.

An icon (⚠) appears on the wireless controller display if the air filter becomes clogged. Replace the filter immediately when this icon appears.

If the outer air filter element is excessively dirty, replace it. Replace the inner air filter element every third time the outer air filter element is replaced. Check for any signs of leaks or damaged components throughout this process.

Procedure

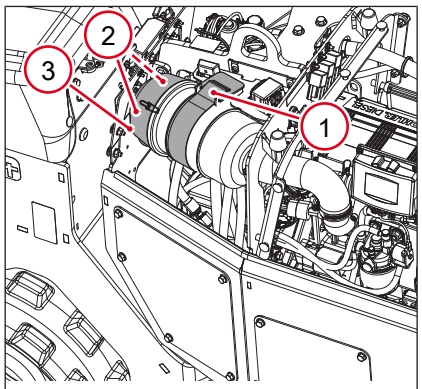


Fig. 64: Latch, clips, and cap

1. Pull up on the air cleaner housing retaining latch **(1)** to release the air cleaner strap.
2. Release the clips **(2)** that secure the air cleaner cap **(3)**, and remove the cap.

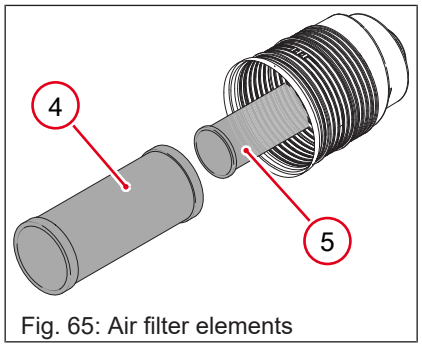


Fig. 65: Air filter elements

3. Remove the outer air filter element **(4)** from the air cleaner housing. If necessary, also remove the inner air filter element **(5)**.
4. Clean the inside of the air cleaner housing components with a damp cloth.
5. Install the air filter elements, using new ones if necessary per the maintenance interval.
6. Install the air cleaner cap, making sure it is oriented the correct way and that nothing is pinching, binding, or rubbing in a way that will cause damage.
7. Secure the clips that hold the cap to the air cleaner.
8. Making sure not to kink the hose, push down on the air cleaner housing retaining latch to secure the air cleaner strap.

7.9 Inspecting the Machine for Damage

When

Every 10 hours or daily

Overview

Inspect the machine before each use. A thorough inspection helps to identify mechanical faults or potentially unsafe operating conditions. Correct these problems before operating the machine.

Procedure

External inspection

Perform an external inspection of the machine. Check for:

- External damage (dents, cracks, broken latches, etc.)
- Loose or missing fasteners
- Loose or missing parts
- Cut or worn insulation on wires and the harness across the articulation joint and under the machine
- Damaged light fixtures or lamps
- Fluid leaks
- Worn hoses above the articulation joint
- Restricted air flow at the engine exhaust

Internal inspection

Open the hoods. Check for:

- Loose or missing fasteners
- Loose or missing parts
- Loose or damaged hoses
- Loose or damaged wires
- Fluid leaks
- Rags, containers, or other debris inside either machine half

7.10 Checking the Engine Coolant Level

⚠ WARNING

Burn hazard

Engine coolant is hot and under pressure at operating temperature. It can cause severe personal injury.

- ► Check the engine coolant level only after the engine has been shut down and is cool.
- ► Do not add engine coolant directly to the radiator when hot.
- ► Check the coolant level at the radiator and add coolant as needed.
- ► Wear eye protection when handling the engine coolant.
- ► Tighten the radiator cap securely after checking the radiator. Steam can escape during engine operation if the cap is loose.

⚠ WARNING

Burn hazard

Engine coolant can contain alkali.

- ► Avoid engine coolant contact with skin and eyes.

NOTICE

Using coolant additives or improper coolants can damage the cooling system.

- ► Use organic acid technology (OAT) coolant.
- ► Never use automotive-type coolants. These coolants do not contain the correct additives to protect heavy duty diesel engines.

When

Every 10 hours or daily

Requirements

- Machine parked on a level surface
- Machine shut down and cool to the touch
- If needed, an equal mix (50/50) of distilled water and OAT coolant concentrate (see Lubrication on page 116)

Overview

The radiator is located in the front half of the machine. Open the front hood to access the radiator cap.

Because there is no overflow tank, there is a hose attached to the top of the radiator that runs down to about the top of the front right drum. Excess coolant flows out this hose, and there may be some residual coolant seen during inspection.

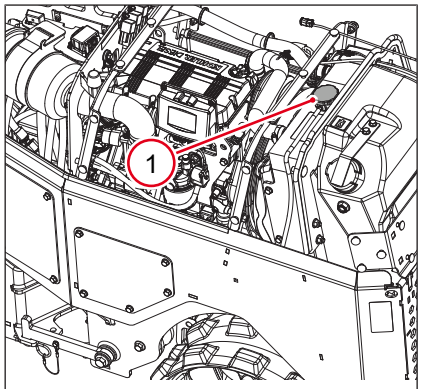


Fig. 66: Radiator cap

Procedure

1. Clean any dirt and debris off the radiator cap **(1)** and in the area around the cap.
2. Slowly rotate the cap counterclockwise to release any remaining system pressure.
3. Unscrew and remove the radiator cap after the pressure is released.
4. If needed, fill the radiator with fresh coolant until the pipes inside the radiator are covered by about 5 mm (0.25 in.).
5. Install the radiator cap.

7.11 Checking the Fuel Lines

⚠ WARNING

Fire hazard

Leaking fuel can ignite and cause a fire and/or explosion.

- ► Check all fuel lines and connections daily.
- ► Make any necessary repairs before operating the machine.

When

Every 10 hours or daily

Overview

Damaged or otherwise faulty fuel lines are a major safety hazard. Check all fuel lines daily.

Procedure

Check for the following in or on the fuel lines:

- Leaks
- Cracks
- Corrosion
- Loose fittings or clamps

7.12 Checking the Hoods

When

Every 10 hours or daily

Requirements

To prepare for maintenance, see General Maintenance on page 70.

Overview

Check both hoods—front and rear—on a daily basis for any signs of damage or failure. Replace any items that are damaged.

Procedure

1. Inspect the hoods for any cracks.
2. Inspect the latches for any damage such as cracked rubber or bent retainers.
3. Inspect the support brackets, hinges, and gas springs under the hoods for any signs of damage such as bending or tearing.
4. Inspect the shoulder bolts supporting the hoods for failure.

7.13 Adjusting the Scraper Bars

When

Every 10 hours or daily

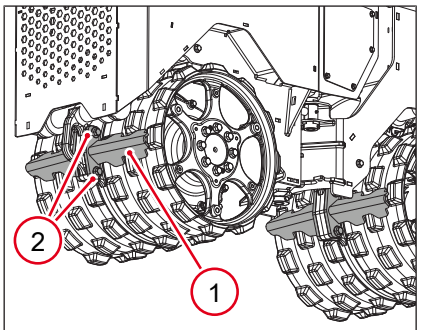


Fig. 67: Scraper bars and bolts

Overview

Scraper bars **(1)** are provided on all four drums to prevent dirt from building up on the drum surfaces. These scrapers should be inspected and adjusted as required to remove as much dirt from the drums as possible.

Procedure

1. Loosen the two bolts **(2)** holding the scraper to the drum casting.
2. Position the scraper 3 to 6 mm (1/8 to 1/4 in.) from the drum.
3. Tighten the bolts to 195 Nm (144 lb-ft).
4. Repeat this procedure for all of the scrapers.
5. Run the machine to check that the scraper does not rub against the drum surface.

7.14 Checking for Loose or Missing Fasteners

When

Every 10 hours or daily

Procedure

Check for loose or missing fasteners daily. Replace as needed. For further information on daily checks, see Preliminary Checks on page 53.

7.15 Cleaning the Machine

⚠ CAUTION

Injury hazard

Using compressed air or high-pressure water may cause eye injuries due to flying debris, dust, and steam.

► Wear eye protection when using compressed air or high-pressure water.

NOTICE

Direct, high water pressure at close range will damage certain components on the machine. The following components should be wiped clean by hand using a damp, clean cloth. Do not apply high pressure spray to these components:

► Hydraulic manifold
► Fuse boxes
► Electronic parts (controller, connectors, etc.)
► Wires and hoses around the articulation joint
► Labels

When

Every 10 hours or daily

Requirements

- Machine shut down and cool to the touch
- Clean water supply
- Pressure washer or water hose
- Clean, soft cloths

Overview

Regular cleaning is essential for keeping the machine in serviceable condition. It is important to remove dust and dirt from the machine as soon as possible after work has been completed.

Procedure

1. Use a pressure washer or water hose to remove dirt and debris from the machine's exterior.
2. To wash areas with labels, direct the water stream at a 90° angle to the machine surface with the spray nozzle at least 1/3 m (1 ft) away.
3. Keeping a minimum distance of 1 m (3 ft) away, use the pressure washer to rinse the machine.
4. Clean interior and electronic machine components using a damp, clean cloth.

7.16 Changing the Hydraulic Oil and Filters

NOTICE

Machine damage can occur if foreign materials are dropped into the reservoir housing.

► Be extremely careful to avoid dropping anything into the reservoir housing while the filler cap is off.

Environment

Machine fluids may be harmful to the environment.

► 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.

When

- After the first 50 hours
- Every 1,000 hours
- As indicated by the display

Requirements

- Engine and fluids cool
- Container of suitable size to collect oil
- Fresh hydraulic oil and new filter elements
- To prepare for maintenance, see General Maintenance on page 70.

Overview

All oils eventually shear or thin out with use, reducing their lubricating ability. In addition, heat, oxidation, and contamination may cause the formation of sludge, gum, or varnish in the system. For these reasons, it is important to change the hydraulic oil at specified intervals. For further information, see Maintenance on page 70.

If the hydraulic oil filter restriction icon ( ) appears on the display, the filter needs to be changed. The machine operates as normal for a short period of time. Eventually, however, if the filter is not changed, the machine derates and does not allow compaction.

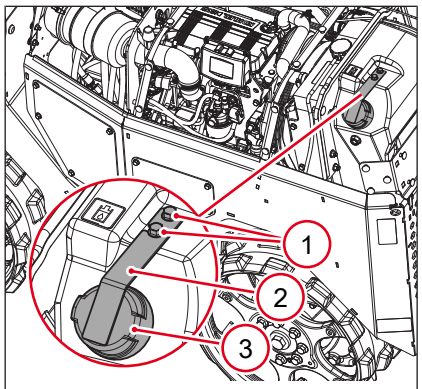


Fig. 68: Bolts, bar, and cap

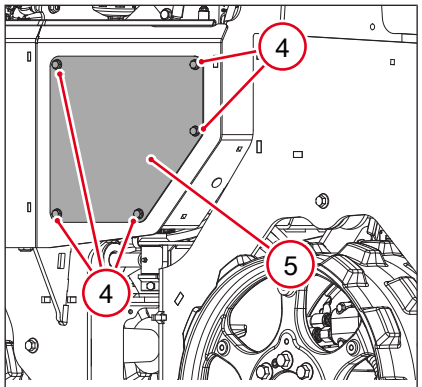


Fig. 69: Bolts and panel

Procedure

1. Open the front hood.
2. Thoroughly clean the top of the filler cap. Take care to prevent small dirt particles from entering the system.
3. Loosen the two bolts **(1)** securing the hydraulic oil cap retaining bar **(2)**.
4. Rotate the retaining bar out of the way and remove the hydraulic oil cap **(3)**.
5. Set the cap on the tank opening to prevent contaminants from entering the system.
6. Remove the bolts **(4)** securing the access panel **(5)** on the left side of the machine and remove the panel.

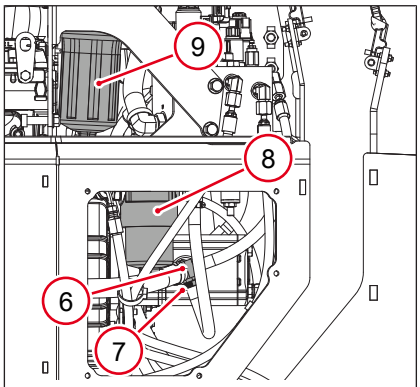


Fig. 70: Fitting, clamp, and filters

7. Place a container and rags under the hydraulic pump inlet port fitting **(6)** and both hydraulic oil filters.
8. Loosen the hose clamp **(7)** securing the hydraulic inlet hose to the fitting.
9. Remove the hose and allow the oil to drain into the container.
   Note: Removing the hydraulic oil cap from the tank opening may allow the oil to drain faster.
10. Remove the case drain filter **(8)**.
    Note: As you remove the filter elements, take care to note the proper location of all sealing O-rings.
11. Remove the primary hydraulic oil filter **(9)**.
12. Install a new primary hydraulic oil filter.
13. Install a new case drain filter.
14. Install the hydraulic inlet hose to the inlet port fitting and tighten the clamp.
15. Fill the hydraulic oil until the level is between the minimum and the maximum levels in the sight glass.
16. Install the hydraulic oil cap.
17. Rotate the retaining bar so it is centered over the oil cap, and tighten the bolts to 7 Nm (5 lb-ft).

7.17 Tightening the Drum Bolts and Axle Bolts

When

- After the first 50 hours
- After 50 hours when drums (drum bolts) or axles (axle bolts) are installed

Requirements

- Machine parked on a flat, level surface
- Machine shut down

Overview

Fasteners that secure wheels to machines can work loose after being retightened. It is important to check the tightness of these fasteners within 50 hours of installing them to make sure they are holding to the specified torque specification.

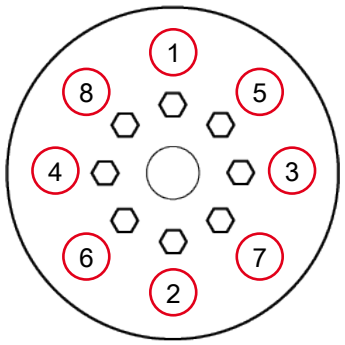


Fig. 71: Drum bolt tightening sequence

Procedure

Drum bolts

While following the sequence shown, tighten the drum bolts to 195 Nm (144 lb-ft).

Note: It may be necessary to remove the drum cover to access the drum bolts. For further information, see Removing the Drum Extensions on page 67.

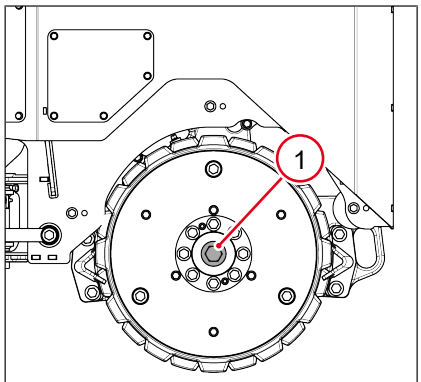


Fig. 72: Axle bolt

Axle bolts

Tighten the axle bolt(s) **(1)** to 904 Nm (667 lb-ft).

Note: It may be necessary to remove the drum cover to access the axle bolt. For further information, see Removing the Drum Extensions on page 67.

7.18 Lubricating the Articulation Joint and Steering Cylinder

When

Every 50 hours

Requirements

- Engine shut down
- Chocks in place
- Handheld grease gun
- Mobil® SHC 220 or an equivalent No. 2 general-purpose grease

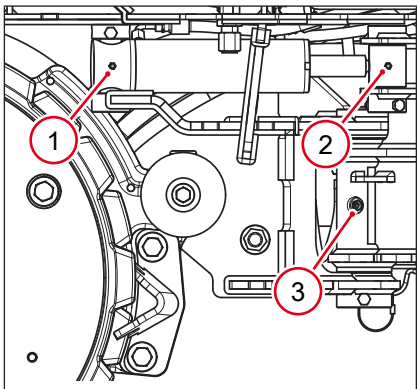


Fig. 73: Grease fittings

Procedure

1. Place chocks in front of and behind each drum.
2. On the left side of the machine, use a grease gun to lubricate the grease fittings at the front **(1)** and rear **(2)** of the steering cylinder.
3. Lubricate the grease fitting **(3)** at the main articulation joint.

7.19 Checking the Battery Cables

When

Every 50 hours

Overview

Faulty battery cables can cause hard starting and/or battery charging issues.

Procedure

1. Check the battery cables for the following:
   - ⇨ Tight connections
   - ⇨ Corrosion at the terminals
   - ⇨ Cracking on the cable sheathing
   - ⇨ Worn protective sleeves above the articulation joint
2. Make any necessary repairs based on the inspection.

7.20 Changing the Engine Oil and Filter

⚠ WARNING

Health hazard

Most liquids from this machine contain 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 these liquids.
- ► Wash skin thoroughly after exposure to any of these liquids.

NOTICE

Engine damage can occur if the oil level is too high or if the incorrect oil is used.

- ► Oil must be removed from the engine if the oil level is above the max line.
- ► Use only the recommended oil.

NOTICE

Damage can occur from using contaminated oil or the wrong oil type.

- ► Prevent dirt and debris from contaminating the engine oil. Carefully clean the oil cap, dipstick, and the surrounding area before removing the cap.
- ► Do not mix different types of engine oil. This can adversely affect the lubricating properties of the engine oil.

Environment

Machine fluids and lubricants can be harmful to the environment.

- ► Use a suitable container to collect, store, and dispose of drained fluids and lubricants in accordance with current environmental protection regulations.

7

When

- After the first 50 hours
- Every 250 hours

Requirements

- Machine parked on a flat, level surface
- Machine shut down
- Replacement oil filter
- Container of sufficient volume to collect drained fluid
- Recommended oil (for oil specifications, see Engine Oil Viscosity on page 90 and see Fluids on page 127 on page 116)
- Filter wrench

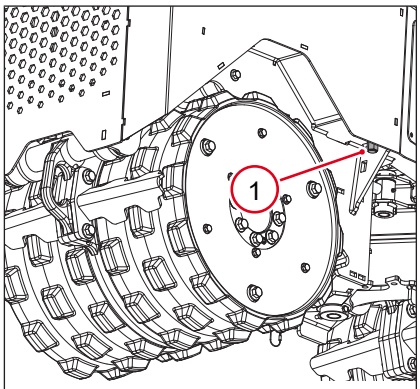


Fig. 74: Drain hose cap

Procedure

1. Locate the drain hose cap **(1)** on the left side of the machine.
2. Place a suitable container under the drain hose.
3. Drain the oil into a suitable container by removing the cap from the oil drain hose.

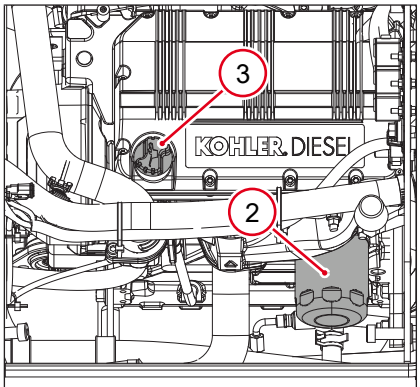


Fig. 75: Oil filter and fill cap

4. Place a suitable container under the oil filter **(2)** to catch used oil.
5. Clean the area where the filter mounts to the adapter.
6. Remove the oil filter.
7. Install a new oil filter.
8. Install the cap on the oil drain hose.
9. Remove the oil fill cap **(3)** from the engine.
10. Fill the engine with the required amount of oil.
11. Install the oil fill cap.
12. Start the engine and check for leaks.
13. Stop the engine.
14. Check the oil level and top off if needed.

7.21 Checking the Fan Belt Tension

When

Every 250 hours

Requirements

Machine shut down and cool to the touch

Procedure

1. Apply a force of approximately 10 kg (22 lb) on either side of the belt halfway between the pulleys.

   ⇨ The belt should not move more than 10 mm (0.4 in.).

2. If the tension is not within specification, tighten or replace the belt. For further information, see Replacing the Engine Fan Belt on page 92.

7.22 Replacing the Fuel Filter

⚠ WARNING

Explosion and fire hazard when handling fuel!

Can cause serious burns or death.

- ► Bleed the fuel system only if the engine is cold.
- ► Wear protective equipment.
- ► Never perform work on the fuel system near open flames or sparks.
- ► Do not smoke.
- ► Keep the maintenance area clean.

Environment

Machine fluids and lubricants can be harmful to the environment.

- ► Use a suitable container to collect, store, and dispose of drained fluids and lubricants in accordance with current environmental protection regulations.

When

Every 250 hours

Requirements

- Machine parked on a level surface
- Engine shut down and cool to the touch
- Container of sufficient volume to collect drained fluid
- Replacement fuel filter

Overview

The fuel filter is located on the right side of the engine.

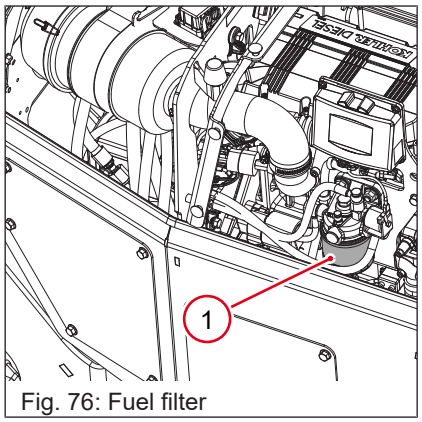


Fig. 76: Fuel filter

Procedure

1. Open the front hood.
2. Place a container under the fuel filter **(1)**.
3. Clean the area where the fuel filter mounts to the adapter.
4. Loosen and remove the filter.
5. Lubricate the gasket on the new filter.
6. Fill the new filter with fuel.
7. Install the filter to the fuel filter adapter.

7.23 Checking the Coolant Hoses

When

Every 250 hours

Procedure

Inspect the coolant hoses for signs of wear. Observe the following:

- Look for leakage or seepage along the entire length of the hose, especially at the ends.
- Check hose clamps for damage.
- Hoses should be firm and springy. Hoses that are cracked, soft, covered in oil, or otherwise obviously damaged should be replaced.

Note: Because there is no overflow tank, there is a hose attached to the top of the radiator that runs down to about the top of the front right drum. Excess coolant flows out this hose, and there may be some residual coolant seen during inspection.

7.24 Checking the Drum Shock Mounts

NOTICE

Other machine parts can be damaged if the machine is operated with damaged shock mounts.

► Do not operate the machine with damaged shock mounts for an extended period of time.

When

Every 250 hours

Requirements

- Machine parked on a level surface
- Machine shut down and cool to the touch

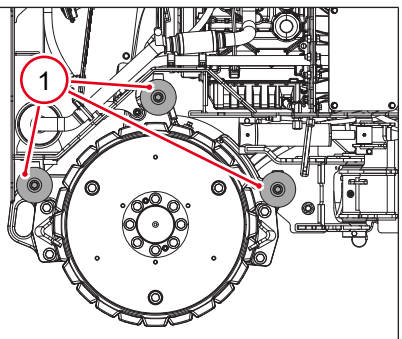


Fig. 77: Shock mounts (some components removed for clarity)

Procedure

1. Inspect the drum shock mounts **(1)** for cracking, splitting, or tearing. Make sure to check both sides of the machine, front and rear.
2. Have an authorized dealer or service center replace the shock mounts as needed.

7.25 Checking and Cleaning Oil Cooler and Radiator Fins

⚠ CAUTION

Injury hazard

Using compressed air or high-pressure water may cause eye injuries due to flying debris, dust, and steam.

► Wear eye protection when using compressed air or high-pressure water.

NOTICE

Cleaning the radiator improperly will damage the radiator fins.

► Do not use high-pressure water or compressed air at a pressure greater than 28 psi (193 kPa).

► Do not use a wire brush.

When

Every 250 hours

Procedure

1. Stop the engine.
2. Open the front hood.
3. Use compressed air to clean loose dirt and debris from the oil cooler and radiator fins.
4. Use a low pressure water stream to clean dirt from the surface of the cooler and radiator.

7.26 Priming the Fuel System

When

As needed

Requirements

- Engine and fluids cool
- Rags or towels to wipe up fuel

Overview

If the fuel tank has been run completely dry, or drained for service, it may be necessary to manually prime the fuel system.

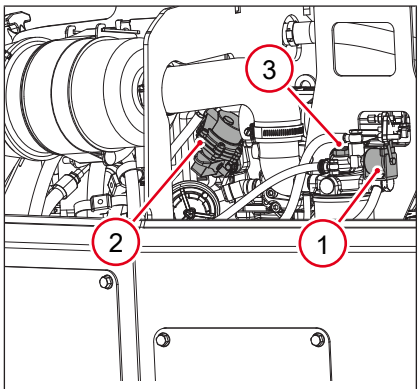


Fig. 78: Fuel pump and bleed screw

Procedure

1. Remove the fuel filter.
2. Fill the filter with fuel.
3. Install the fuel filter.
4. Fill the fuel tank.
5. Apply 12 volts of power to the fuel solenoid **(1)** to open the fuel valve.
6. Loosen one of the banjo bolts on the fuel filter and pump the lever on the fuel pump **(2)** until fuel flows freely from the opening in the banjo bolt. Tighten the banjo bolt.
7. Wipe up any leaked fuel.
8. Repeat this procedure for the fuel line bleed screw **(3)**.
9. Wipe up any leaked fuel.

7.27 Replacing the Engine Fan Belt

When

Every 500 hours

Requirements

- Machine shut down and cool to the touch
- Containers of sufficient volume to catch drained fluids

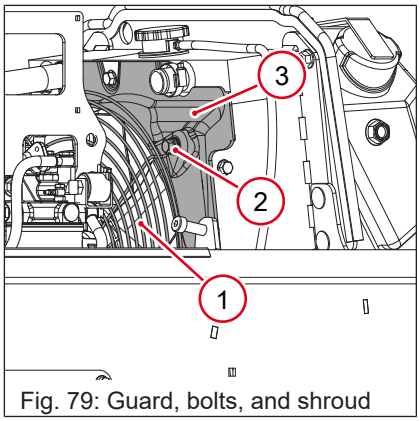


Fig. 79: Guard, bolts, and shroud

Procedure

1. While supporting the fan guard **(1)**, remove the four bolts **(2)** securing the fan guard to the fan shroud **(3)**.
2. Carefully remove the fan guard from the engine bay.

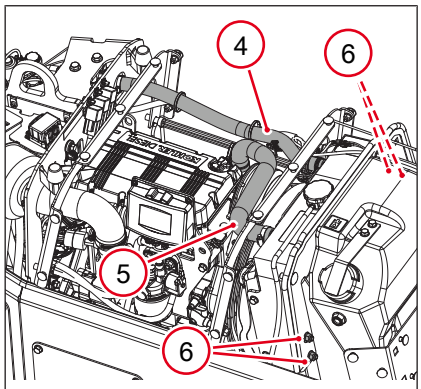


Fig. 80: Hydraulic and coolant hoses

3. Place a container under the top hydraulic oil hose **(4)**.
4. Loosen the clamp and remove the hose.
5. Place a container under the top coolant hose **(5)**.
6. Loosen the clamp and remove the hose.
7. Remove or disconnect any remaining components attached to the top of the oil cooler and radiator assembly.

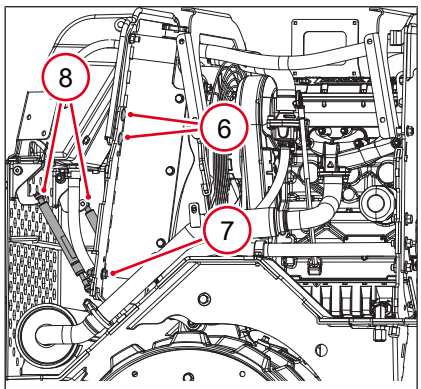


Fig. 81: Bolts (some components removed for clarity)

8. Remove the bolts **(6)** securing the hydraulic oil tank bracket to the chassis.
9. Remove the bolts **(7)** securing the oil cooler and radiator assembly to the chassis.
10. Carefully tilt the oil cooler and radiator assembly and the hydraulic tank toward the front of the machine in order to access the front of the fan.
11. If extra clearance is needed, remove the hood, as follows:
    - ⇨ Disconnect the pneumatic struts **(8)** at the hood hinges.

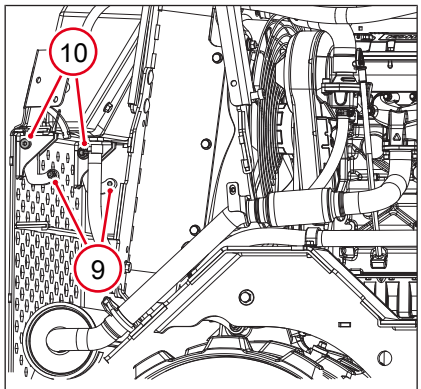


Fig. 82: Studs and bolts (some components removed for clarity)

    - ⇨ Remove the pneumatic strut ball studs **(9)**.
    - ⇨ Remove the bolts **(10)** securing the hood hinges to the chassis.
    - ⇨ Disconnect the beacon connector on the side of the hydraulic tank.
    - ⇨ Carefully remove the hood.
12. Remove the bolts securing the fan assembly to the front of the engine.
13. Remove the front half of the fan belt pulley and any shims between the halves of the pulley.
14. Remove the fan belt.
15. Install the new fan belt.
16. Along with all shims that were removed, hold the front half of the fan pulley in place and check the belt tension.
17. Install or remove shims to adjust belt tension as follows:
    - ⇨ Install shims to decrease tension.
    - ⇨ Remove shims to increase tension.
18. Assemble the machine to its original state by reversing this procedure starting at step 12.
    - ⇨ Tighten the fan guard bolts to 22 Nm (16 lb-ft).
19. Top off the hydraulic oil and engine coolant. For further information, see Checking the Hydraulic Oil Level on page 74 and see Checking the Engine Coolant Level on page 78.

7.28 Maintaining the Battery

⚠ DANGER

Explosion hazard

Batteries can emit explosive hydrogen gas.

- ► Keep all sparks, flames, and other ignition sources away from the battery.
- ► Do not short circuit battery posts.
- ► If the electrolyte is frozen, slowly warm the battery before recharging.

⚠ WARNING

Poisoning hazard

Battery fluid is poisonous and corrosive.

- ► In the event of ingestion or contact with skin or eyes, wash skin or eyes with water and seek medical attention immediately.

When

Every 500 hours

Overview

To prevent serious damage to the electrical system:

- Do not disconnect the battery while the machine is running.
- Do not reverse the positive (+) and negative (-) ends of the battery cable.
- Do not attempt to run the machine without a battery.
- Wear gloves and eye protection when working with batteries.
- When handling the battery, follow the battery manufacturer's safety instructions. Batteries contain caustic acids.
- A potentially combustible oxygen-hydrogen mixture forms in batteries during normal operation and especially when charging. Keep flames and sparks away from the battery.
- In the event that the machine has a discharged battery, either replace the battery with a fully charged battery or charge the battery using an appropriate battery charger.
- Dispose of discharged batteries in accordance with local environmental regulations.
- Agricultural or other chemicals, especially those with a high sulfur content, can adhere to the IC regulator. This has the potential to corrode the conductor and result in battery over-charging (boiling) and charging malfunctions.

Procedure

Maintaining

- Keep battery terminals clean and connections tight.
- When necessary, tighten the cables and grease the cable clamps with battery terminal grease or petroleum jelly.
- Maintain the battery at full charge to improve cold weather starting.

Disconnecting and removing

1. Stop the machine and shut down the engine.
2. Place all electrical switches in the OFF position.
3. Place the battery disconnect switch in the OFF position.
4. Remove the four bolts **(1)** securing the battery charger bracket **(2)** to the chassis.
   Note: There are many components connected to the bottom of the bracket.
5. Carefully move the battery charger bracket up and away from the battery.
6. Securely support the battery charger bracket.
7. Remove the battery holddown bracket.
8. Disconnect the negative battery cable from the battery.
9. Disconnect the positive battery cable from the battery.
10. Remove the battery.

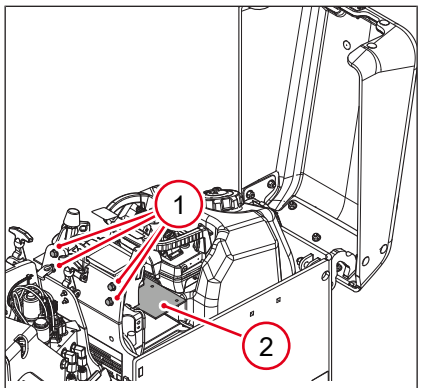


Fig. 83: Bolts and bracket

Installing and connecting

The following procedure assumes the battery charger bracket is already removed. If it is not, follow the previous procedure to remove the bracket.

1. Place the battery in the machine in the appropriate location making sure to note the orientation.
2. Install the battery holddown bracket.
3. Connect the positive battery cable to the battery.
4. Connect the negative battery cable to the battery.
5. Being careful not to bridge the battery terminals, install the battery charger bracket using the four bolts.

7.29 Checking Engine Valve Clearance

When

Every 500 hours

Overview

This maintenance task should be performed by a qualified technician. Contact an authorized dealer or service center for assistance.

7.30 Replacing the Hydraulic Oil Cap

When

Every 1,000 hours

Requirements

- Machine parked on a flat, level surface
- Machine shut down
- Replacement hydraulic tank filler cap

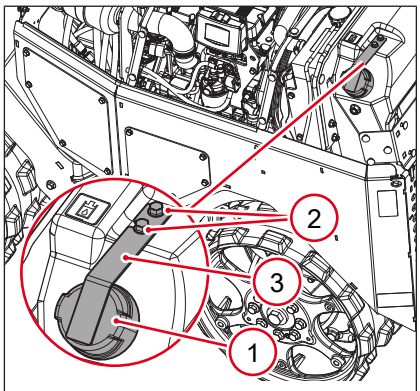


Fig. 84: Cap, bolts, and bar

Procedure

1. Open the front hood.
2. Thoroughly clean the top of the hydraulic oil cap **(1)**. Take care to prevent small dirt particles from entering the system.
3. Loosen the two bolts **(2)** securing the hydraulic oil cap retaining bar **(3)**.
4. Rotate the retaining bar out of the way and remove the hydraulic oil cap.
5. Install the new hydraulic oil cap.
6. Rotate the access plate back into place, and tighten the bolts to 7 Nm (5 lb-ft).

7.31 Changing the Drum Gear Oil

⚠ WARNING

Injury hazard

Hydraulic oil is under high pressure and becomes very hot during operation.

► To avoid injury, obey the safety instructions listed below.

Environment

Machine fluids and lubricants can be harmful to the environment.

► Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

When

Every 1,000 hours

Requirements

- Machine parked on a flat, level surface
- Machine shut down and cool to the touch
- Container of sufficient volume to collect drained fluid
- Replacement SAE 75W-90 GL-4 full synthetic gear oil

Overview

To change the gear oil on the front drum transmission, remove the front right drum. To change the oil on the rear drum transmission, remove the rear left drum.

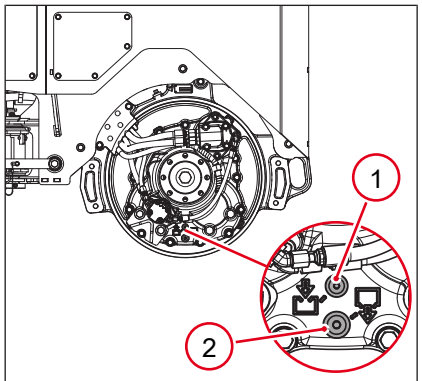


Fig. 85: Filler and drain plugs

Procedure

1. Jack up the machine and place it on jack stands.
2. Remove the appropriate drum to change the oil in the desired drum transmission. For further information on removing drums, see Drum Extensions on page 64.
3. Place a suitable container under the drum transmission.
4. Clean the areas around the plugs.
5. Crack open the filler plug **(1)** and allow the pressure inside to equalize.
6. Remove the drain plug **(2)**.
7. Remove the filler plug.
8. When the oil has stopped flowing, install the drain plug and tighten it to 29 Nm (22 ft-lb).
9. Fill the transmission with 75W-90 GL-4 gear oil up to the bottom of the fill port.
10. Install the filler plug and tighten it to 17 Nm (13 ft-lb).
11. Install the drum. For further information, see Drum Extensions on page 64.
12. If necessary, repeat this procedure for the other transmission.
13. Lower the machine to the ground, and run the exciter(s) for about 5 minutes.
14. Skipping the draining process, repeat steps 1 through 9.

7.32 Changing the Engine Coolant

When

Every 1,000 hours

Requirements

- Machine parked on a flat, level surface
- Machine shut down and cool to the touch
- Containers of sufficient volume to collect drained fluid
- Plastic sheeting
- Replacement coolant

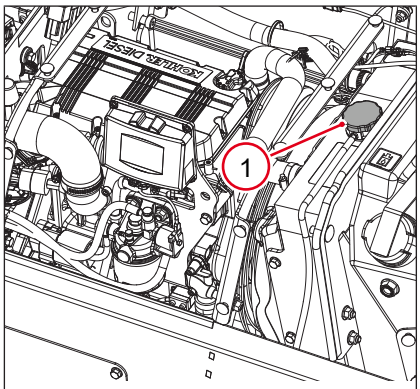


Fig. 86: Radiator cap

Procedure

1. Jack up the machine and place it on jack stands.
2. Slowly remove the radiator cap **(1)** to relieve any remaining pressure.
3. Place plastic sheeting under the machine to catch any coolant that may miss the containers.
4. Place suitable containers along the underside of the front of the machine.

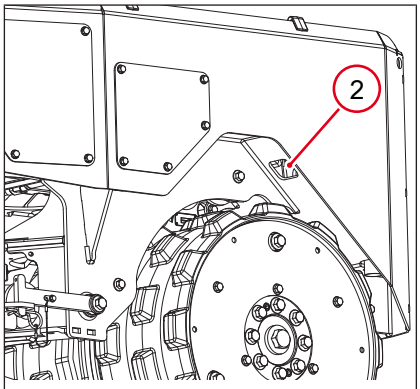


Fig. 87: Access hole

5. Using the access hole **(2)**, loosen the hose clamp at the bottom of the lower radiator hose.
6. Remove the hose from the radiator.
7. Once all the coolant has drained, install the hose and secure it with the clamp.
8. Add replacement coolant to the radiator until it is near full.
9. Run the engine until the coolant level drops.
10. Add coolant until the pipes inside the radiator are covered by about 5 mm (0.25 in.).
11. Install the radiator cap.
12. Shut down the machine.
13. Remove the machine from the jack stands.

7.33 Replacing Fuel Hoses

When

Every 1,000 hours

Overview

This maintenance task should be performed by a qualified technician. Contact an authorized dealer or service center for assistance.

7.34 Cleaning and Adjusting Fuel Injectors

When

Every 1,000 hours

Overview

This maintenance task should be performed by a qualified technician. Contact an authorized dealer or service center for assistance.

7.35 Replacing the Engine Timing Belt

When

Every 4,000 hours

Overview

This maintenance task should be performed by a qualified technician. Contact an authorized dealer or service center for assistance.

8 Troubleshooting

8.1 Troubleshooting

Problem / Symptom	Reason	Remedy
Engine does not start	Fuel tank empty	Fill with No. 2 diesel fuel and prime fuel lines.
	Wrong type of fuel	Drain tank, change fuel filter, and fill with fresh fuel.
	Water in fuel	Drain water from fuel filter.
	Old fuel	Drain tank, change fuel filter, and fill with fresh fuel.
	Fuel system not primed	Prime fuel system.
	Fuel filter restricted or clogged	Replace fuel filter.
	Battery disconnect switch is off	Turn battery disconnect switch to the ON position.
	Battery connections loose or corroded	Check connections. Tighten or clean as needed.
	Discharged battery	Charge or replace battery.
	Engine oil level too low	Add engine oil.
	Air cleaner element clogged	Maintain air cleaner.
	Faulty starter motor	Repair or replace.
	Faulty starter button on control box or wireless controller	Repair or replace.
	Inoperative fuel valve solenoids on engine	Repair or replace.
	Inoperative starter relay	Repair or replace.
	Electrical connections loose or broken	Check connections; repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Wireless controller and transceiver are not paired.	Pair the wireless controller and transceiver. See topic *Pairing the Wireless Controller*. [▷ 47]
	Communication fault	See topic *Communication Faults*. [▷ 52]
	One or both joysticks are not in the neutral position	Make sure nothing is restricting the joysticks from springing back to neutral.
	Starter interlock PIN is confirgured but not entered.	Enter the starter interlock PIN.
	Machine is in lockout due to a tilt occurrence	Make sure the machine is upright on a flat surface. Enter the unlock PIN if necessary.
Engine starts, then stops	Fuel tank empty	Fill with No. 2 diesel fuel and prime fuel lines.
	Fuel filter restricted or clogged	Replace fuel filter.
	Fuel lines broken or loose	Check fuel lines; tighten, repair or replace as needed
	Machine out of radio signal range	Move wireless controller closer to machine.
	Wireless controller automatically powered off due to inactivity	Turn on wireless controller.

Problem / Symptom	Reason	Remedy
No vibration	Machine in high speed travel mode	Reduce machine speed. Make sure the vibration/high travel speed switch is in vibration, and make sure the engine throttle switch is in auto idle.
	Faulty vibration switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on vibration valve	Repair or replace.
	Damaged exciter assembly	Repair or replace.
	Damaged exciter motor coupling	Repair or replace.
	Damaged exciter motor	Repair or replace.
	Damaged exciter pump	Repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Communication fault	See topic *Communication Faults*. [▷ 52]
No travel, or travel only in one direction	Debris buildup inside drum(s)	Remove drum covers and check for debris buildup insides the drums. Clean as necessary.
	Faulty forward/reverse switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on travel valve	Repair or replace.
	Damaged drive gearcase assembly	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged drive motor	Repair or replace.
	Damaged drive pump	Repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Parking brake pin may not be disengaging	Check parking brake functionality and circuit pressure.
	Communication fault	See topic *Communication Faults*. [▷ 52]
No high speed travel	Faulty forward/reverse switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on manifold	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged exciter pump	Repair or replace.
	Vibration is turned on	Turn off vibration.
	Engine throttle is in low idle	Move engine throttle switch to auto idle.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Communication fault	See topic *Communication Faults*. [▷ 52]

Problem / Symptom	Reason	Remedy
No steering	Faulty steering joystick switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on steering valve	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged steering cylinder	Repair or replace.
	Locking bar engaged	Disengage locking bar.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	See topic *Communication Faults*. [▷ 52]
Compatec compaction system LEDs permanently flashing (if equipped)	Sensor failure	Repair or replace. Contact your authorized dealer/service center.

Problem / Symptom	Reason	Remedy
Engine does not start	Fuel tank empty	Fill with No. 2 diesel fuel and prime fuel lines.
	Wrong type of fuel	Drain tank, change fuel filter, and fill with fresh fuel.
	Water in fuel	Drain water from fuel filter.
	Old fuel	Drain tank, change fuel filter, and fill with fresh fuel.
	Fuel system not primed	Prime fuel system.
	Fuel filter restricted or clogged	Replace fuel filter.
	Battery disconnect switch is off	Turn battery disconnect switch to the ON position.
	Battery connections loose or corroded	Check connections. Tighten or clean as needed.
	Discharged battery	Charge or replace battery.
	Engine oil level too low	Add engine oil.
	Air cleaner element clogged	Maintain air cleaner.
	Faulty starter motor	Repair or replace.
	Faulty starter button on control box or wireless controller	Repair or replace.
	Inoperative fuel valve solenoids on engine	Repair or replace.
	Inoperative starter relay	Repair or replace.
	Electrical connections loose or broken	Check connections; repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Wireless controller and transceiver are not paired.	Pair the wireless controller and transceiver. See topic *Pairing the Wireless Controller*. [▷ 47]
	Communication fault	See topic *Communication Faults*. [▷ 52]
	One or both joysticks are not in the neutral position	Make sure nothing is restricting the joysticks from springing back to neutral.
	Starter interlock PIN is confirgured but not entered.	Enter the starter interlock PIN.
	Machine is in lockout due to a tilt occurrence	Make sure the machine is upright on a flat surface. Enter the unlock PIN if necessary.
Engine starts, then stops	Fuel tank empty	Fill with No. 2 diesel fuel and prime fuel lines.
	Fuel filter restricted or clogged	Replace fuel filter.
	Fuel lines broken or loose	Check fuel lines; tighten, repair or replace as needed
	Machine out of radio signal range	Move wireless controller closer to machine.
	Wireless controller automatically powered off due to inactivity	Turn on wireless controller.

Problem / Symptom	Reason	Remedy
No vibration	Machine in high speed travel mode	Reduce machine speed. Make sure the vibration/high travel speed switch is in vibration, and make sure the engine throttle switch is in auto idle.
	Faulty vibration switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on vibration valve	Repair or replace.
	Damaged exciter assembly	Repair or replace.
	Damaged exciter motor coupling	Repair or replace.
	Damaged exciter motor	Repair or replace.
	Damaged exciter pump	Repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Communication fault	See topic *Communication Faults*. [▷ 52]
No travel, or travel only in one direction	Debris buildup inside drum(s)	Remove drum covers and check for debris buildup insides the drums. Clean as necessary.
	Faulty forward/reverse switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on travel valve	Repair or replace.
	Damaged drive gearcase assembly	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged drive motor	Repair or replace.
	Damaged drive pump	Repair or replace.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Parking brake pin may not be disengaging	Check parking brake functionality and circuit pressure.
	No valid IR signal	Maintain line of sight with the machine. Check the infrared eye status subpage under the machine parameters page. [▷ 39]
	Communication fault	See topic *Communication Faults*. [▷ 52]
No high speed travel	Faulty forward/reverse switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on manifold	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged exciter pump	Repair or replace.
	Vibration is turned on	Turn off vibration.
	Engine throttle is in low idle	Move engine throttle switch to auto idle.
	Machine out of radio signal range	Move wireless controller closer to machine.
	Operator too close to machine	Move away from machine.
	Communication fault	See topic *Communication Faults*. [▷ 52]

Problem / Symptom	Reason	Remedy
No steering	Faulty steering joystick switch or poor connection inside wireless controller	Check connection; repair or replace as needed.
	Inoperative solenoid on steering valve	Repair or replace.
	Loose, broken or corroded wire connections inside control panel or wireless controller	Repair or replace.
	Damaged steering cylinder	Repair or replace.
	Locking bar engaged	Disengage locking bar.
	Machine out of radio signal range	Move wireless controller closer to machine.
	No valid IR signal	Maintain line of sight with the machine. Check the infrared eye status subpage under the machine parameters page. [▷ 39]
	Operator too close to machine	See topic *Communication Faults*. [▷ 52]
Compatec compaction system LEDs permanently flashing (if equipped)	Sensor failure	Repair or replace. Contact your authorized dealer/service center.

8.2 Troubleshooting the Wireless Controller

Problem/Symptom	Reason	Remedy
The wireless controller does not start.	The battery is discharged.	Replace with fully charged battery.
	The emergency stop (E-stop) button is pressed.	Release the E-stop on the side of the wireless controller.
	The wireless controller is damaged.	Contact an authorized service center to inspect the wireless controller.
The wireless controller is switched on, but no commands function.	The transceiver is powered off. (The wireless controller shows COMMUNICATION ERROR.)	Make sure the transceiver is powered on.
	The wireless controller and transceiver are not paired.	Pair the units.
	The wireless controller is out of range.	Take the wireless controller back into the range of the transceiver.
	Radio communication between the units is intermittent due to radio interference.	Turn off all other radio equipment that may cause interference.

Problem/Symptom	Reason	Remedy
Some commands do not function.	The actuators were not in neutral (zero) position during startup.	Restart the wireless controller: • Push the emergency stop (E-stop) button. • Set the actuator(s) in neutral position. • Rotate the E-stop to release it.
	The actuators are faulty or not correctly connected.	Activate the self-test mode to check if the actuators are working. If any actuator does not appear in the information center when activated in this mode, contact the point of purchase.
	System logic does not allow the operation due to safety reasons.	Check the manual from the system installer or machine producer.
	There are damaged or loose cables that connect the transceiver to the machine	Check the transceiver connector and cables.
The information center lights up in red.	The system performed a safety shut down due to error.	See topic *Wireless Controller Error Codes*. [▷ 107]

8.3 Troubleshooting the Transceiver

Problem / Symptom	Reason	Remedy
No functionality from the wireless controller	The wireless controller is off.	Turn on the wireless controller.
	The emergency stop (E-stop) button is pressed.	Turn the E-stop button clockwise to unlock it.
	There is no power to the transceiver.	Turn the power supply on in the machine.
	The battery in the wireless controller is discharged, faulty, or old.	Replace the battery with a fully charged unit.
	There are faulty radio circuit boards in the wireless controller or the transceiver.	Contact the point of purchase.
	The transceiver is not paired with the correct wireless controller.	Pair the transceiver with the correct wireless controller.

8.4 Transceiver LED Meanings

There is an LED on the transceiver that indicates the status of errors, pairing, and connection. Refer to the following table for the different meanings:

LED	Meaning
Off	No power supply
Red continuous	Major error
Red fast flashing	Minor error
Red slow flashing	Power supplied, no application
Orange continuous	Refuse link with wireless controller
Orange fast flashing	Pairing pending
Orange slow flashing	Pairing
Green continuous	Power supplied, no link to wireless controller and no CAN communication
Green fast flashing	Linked with wireless controller

LED	Meaning
Green slow flashing	Power supplied, No link to wireless controller CAN in operational mode
Alternating green and orange	Technical error; contact your dealer

8.5 Wireless Controller Error Codes

The information center lights up in red when a system error occurs. A four-digit error code is visible on the display. If there are multiple errors, the error codes are shown cyclical. Only troubleshoot error codes that start with “11” or “81” and follow the guide below.

If the troubleshooting steps do not work, or if the error codes start with numbers other than “11” or “81”, write down the error code and contact the point of purchase or an authorized service workshop.

Error Code	Reason	Remedy
11xx	One or both joysticks are not in zero-position.	Make sure that joysticks are in zero-position during startup of the wireless controller.
81xx	An external CAN bus communication error between the transceiver and the machine has occurred.	Troubleshoot the machine before sending the radio remote control system for repair.

8.6 Wireless Controller Self-test Mode

Use self-test mode to diagnose errors in actuators on the wireless controller. Self-test mode is started from the information center. The purpose is to either identify a broken actuator or rule out errors in actuators. If no errors are found, further troubleshooting is required.

When starting the self-test mode, all digital and analog data are visible on the information center. The display allows users to monitor data in real-time during testing. There are also several screens that display different kinds of data. To switch between them, press the confirm button.

1. Press the two buttons next to the information center, next (left side) and confirm (right side), at the same time.
2. Press the next button to navigate between options in the information center menu.
3. Navigate to option 1, self-test mode, indicated by this symbol: ˅ 1.
4. Press the confirm button to enter self-test mode.
   ⇨ When self-test mode is entered, all communication is stopped, preventing link-up with the transceiver.
5. The information center displays the following three different self-tests to choose from:
   ⇨ Analog actuators (˅ 1.1)
   ⇨ Digital actuators (˅ 1.2)
   ⇨ Pitch and roll angle of the wireless controller (˅ 1.4)

8

6. Navigate to the test that you want to do.
   ⇨ Press the confirm button to start the test.
   ⇨ Manually test the actuators one by one.
   ⇨ Press the next button to exit the test and return to the menu.
7. Repeat steps 6 through 7 to select and start another test.
8. Switch off the wireless controller to exit self-test mode.
9. Switch on the wireless controller to resume normal operation.

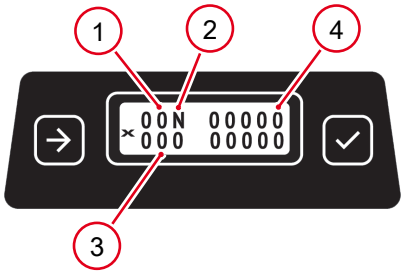


Fig. 88: Analog actuator self-test

Testing the analog actuators

The analog actuators are joysticks, levers, and potentiometers. A set of numbers shows on the display when the analog actuator self-test is started. The numbers shown refer to the following:

- **(1)** The analog actuator that is being moved. If multiple actuators are moved at the same time, the actuator with the lowest number is displayed.
- **(2)** The type of analog actuator that is being moved.
  - N = Non-safety classified actuator
  - S = Safety classified actuator
- **(3)** The direction the analog actuator is being moved in. When moved in an opposite direction the colors of the numbers shown are inverted (white text on a black background). Values range between 0 and 127. These numbers **(4)** are not detailed here since they are only used for advanced factory troubleshooting.

Note: If the numbers shown on the display do not change and remain zero when moving the actuator, one of the following has occurred:

- The analog actuator has broken.
- The analog actuator has not been implemented or activated in the software setting.

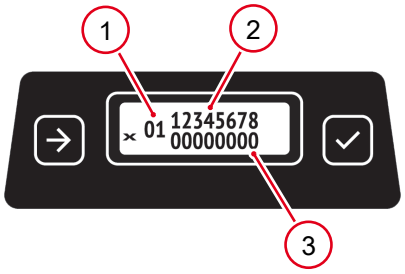


Fig. 89: Digital actuator self-test

Testing the digital actuators

The digital actuators are push buttons, toggle switches, and rotary switches. A set of numbers shows on the display when the digital actuator self-test is started. The numbers shown refer to the following:

- **(1)** The last activated (moved or pushed) digital actuator. If another digital actuator is activated during the test, the numbers change.
- **(2)** The number of safety classified digital actuators. The numbers one through eight always show on the display. This is because eight is the maximum number of safety classified digital actuators that can be configured.
- **(3)** The status of the safety classified digital actuator, as follows:
  - 0 = Not present or inactive
  - 1 = Activated
  - 2 = Invalid
  - 3 = Faulty

Note: If the numbers shown on the display do not change when activating a digital actuator during the self-test, one of the following has occurred:

- The digital actuator has broken.
- The digital actuator has not been implemented or activated in the software setting.

Depending on the configuration of the wireless controller, the number of safety classified digital actuators can vary. To find out how many safety classified digital actuators the wireless controller has, see the technical specification for your configuration.

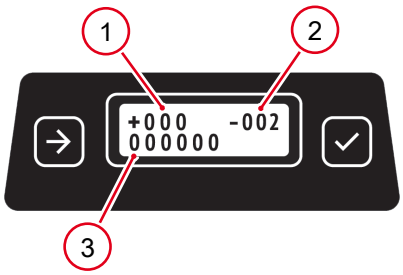


Fig. 90: Pitch and roll angle self-test

Testing the pitch and roll angle of the wireless controller

The wireless controller can be configured with a tilt-sensor that measure the tilt of the wireless controller in the x- and y-directions. A set of numbers shows on the display when the pitch and roll angle self-test is started. The numbers show the output from the tilt-sensor.

The numbers shown on the display refer to the following:

- **(1)** The roll angle of the wireless controller.
  - A minus sign shows the left roll angle.
  - A plus sign shows the right roll angle.
- **(2)** The pitch angle of the wireless controller.
  - A minus sign shows the left pitch angle.
  - A plus sign shows the right pitch angle.
- **(3)** The events that are triggered. Triggered events are indicated by the number one, and no triggered events by the number zero. The triggered events are counted from left to right, as follows:
  - Roll event
  - Pitch event
  - Freefall event (momentary)
  - Impact event (momentary)
  - Freefall event (static)
  - Impact event (static)

Notes:

- The tilt-sensor is broken if the numbers shown on the display do not change when tilting the wireless controller during the self-test.
- Depending on the configuration, the wireless controller can be switched off automatically if it is tilted too much in a certain direction. To find out if the wireless controller is configured with this feature, see separate technical specification.
- The wireless controller pitch and roll functionality is optional to implement. The values from the sensor are presented as raw data via the CAN bus protocol.

8.7 Diagnostic Trouble Codes

SPN	FMI	Function	Description	Priority
519388	03	High speed enable	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519392	03	Park brake release	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519354	03	Drive forward	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519353	03	Drive reverse	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519526	03	Steer right	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519527	03	Steer left	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519382	03	Exciter high F	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519383	03	Exciter low R	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
517930	—	CAN lo	Heartbeat error	1
	—	CAN hi	Heartbeat error	1
519350	03	Electric fuel check valve	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519912	03	Throttle hold (solenoid)	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
519940	03	Throttle pull (relay)	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
521006	03	Starter crank (relay)	Short to power	1
	04		Short to ground	1
	05		Open circuit	1

SPN	FMI	Function	Description	Priority
519754	03	Glow plugs relay	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
517001	03	Horn	Short to power	3
	04		Short to ground	3
	05		Open circuit	3
517006	03	Hydraulic oil temperature sensor	Short to power	2
	04		Short to ground	2
	05		Open circuit	2
N/A	03	Scanreco charger battery status	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
517550	03	Alternator charging switch	Short to power	2
	04		Short to ground	2
	05		Open circuit	2
N/A	03	Analog ground	Short to power	1
N/A	03	Sensor supply output +5 V, 100 mA	Short to power	1
518954	03	Hydraulic oil filter switch	Short to power	2
	04		Short to ground	2
	05		Open circuit	2
518956	03	Hydraulic oil level switch	Short to power	3
	04		Short to ground	3
	05		Open circuit	3
518953	03	Air filter restriction switch	Short to power	2
	04		Short to ground	2
	05		Open circuit	2
517000	03	Low fuel level switch	Short to power	3
	04		Short to ground	3
	05		Open circuit	3
516800	03	Receiver STOP_OUT switch	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
516801	03	Receiver ACT_MOVE switch	Short to power	1
	04		Short to ground	1
	05		Open circuit	1
517005	03	Engine coolant temperature sensor	Short to power	2
	04		Short to ground	2
	05		Open circuit	2
518951	03	Engine oil pressure switch	Short to power	2
	04		Short to ground	2
	05		Open circuit	2

SPN	FMI	Function	Description	Priority
517191	03	Switched power ignition	Short to power	—
517191	03	Machine angle sensor primary	Short to power	2
	04		Short to ground	2
	05		Open circuit	2

9 Storage

9.1 Daily Storage

- Do not allow the roller to sit overnight in a ditch, trench or other low-lying area which might fill with water during a heavy rain.
- Park the roller on a flat level surface, out of the way of traffic patterns and congestion.
- Chock the drums if the roller must be parked on an incline.
- Turn the battery disconnect switch to the OFF position.
- Lock the front and rear hoods.

9.2 Long-Term Storage

NOTICE

Allowing the battery to freeze or completely discharge is likely to cause permanent damage.

► Periodically charge the battery while the machine is not in use.

► In cold climates, store and charge the battery indoors or in a warm location.

When

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

Overview

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

Preparing for storage

Perform the procedures below to prepare your machine for storage.

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

Stabilizing the fuel

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

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

Storing the machine

Perform these remaining steps to store your machine.

- Wash the machine and allow it to dry.
- Move the machine to a clean, dry, secure storage location. Block or chock the wheels to prevent machine movement.
- Use touch-up paint as needed to protect exposed metal against rust.
- If the machine has a battery, either remove or disconnect it.
- Place the machine in the storage position. For further information, Machine Positions.
- Cover the machine. Exposed rubber items should be protected from the weather. Either cover them or use a protectant.
- Store the machine in a location where the temperature is between -40°C (-40°F) and 85°C (185°F). Damage to electronics and other system components may occur outside this range.
- Remove the wireless controller batteries from the controller and the charger, and store the batteries in a location where the temperature is between -20°C (-4°F) and 35°C (95°F).

10 Decommissioning

10.1 Machine Disposal and Decommissioning

Introduction

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

Responsible disposal prevents toxic chemicals and materials from harming the environment. This machine contains several components that may be considered hazardous waste in many areas:

- Operating fluids, including fuel, engine oil, grease, and hydraulic oil
- Batteries
- Electronic components, such as circuit boards, control panels, LEDs, and joysticks

Before decommissioning this machine, read and follow local safety and environmental regulations pertaining to the disposal of construction equipment.

Preparation

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

Disposal

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

11 Technical Data

11.1 Engine

Item	Unit	Specification
Engine type	—	3-cylinder, 4-cycle, liquid-cooled, diesel engine
Engine make	—	Kohler
Engine model	—	KDW 1003
Rated power[1)]	kW (hp)	14.8 (19.8) @ 3,000 rpm
Emission standard category	—	US Tier 4F/EU Stage V
CO_2 emissions[2)]	g/kWh	933.3
Engine speed – high idle	rpm	2,700
Engine speed – low idle	rpm	1,450
Air cleaner	type	Dry pleated paper elements
Battery	V / ccA	12V - Sealed / 650
Fuel	type	No. 2 Diesel, ultra-low sulfur fuel only
Fuel tank capacity (useable)	L (gal)	35.87 (9.47)
Fuel consumption	L (gal) / hr	2.7 (0.7)
Radiator capacity	L (gal)	4.8 (1.3)

1) Net power rating per ISO 3046/1. Actual power output may vary due to conditions of specific use.
2) Determined value of the CO2 emission during engine certification without consideration of the applications on the machine.

11.2 Roller

Component	Unit	Specification
Operating weight (with all options)	kg (lb)	1,456 (3,210)
Area capacity	m² (ft²) / hr	986.4 (10,617.5)
Inside turning radius	m (in.)	1.55 (61)
Travel speed (forward and reverse)	m (ft) / min	44.8 (147)
Vibration frequency	Hz	42
Gradeability with vibration	%	45
Gradeability without vibration	%	50

11.3 Lubrication

Item	Unit	Specification
Engine crankcase	type / L (qt)	SAE 10W30 Class CK-4 rated or synthetic oil / 2.6 (2.75)
Hydraulic system	type / L (gal)	Premium grade, anti-wear hydraulic fluid SAE 10W30 ISO 4406 class 19/17/13 or better / 10.7 (2.83)
Articulation joint	type (qty)	NLGI #2 grease (as required)
Steering cylinder	type (qty)	NLGI #2 grease (as required)
Radiator	type / qty %	OAT coolant and deionized water / 50/50
Exciter / drive bearings	type	75W-90 API GL-4 full synthetic gear oil
Drive gear / seals	type	75W-90 API GL-4 full synthetic gear oil

11.4 Sound and Vibration Specifications

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

Note: In some specific operating conditions of the machine, the actual noise emission may be different from the values determined using the noise test code.

The sound pressure level at operator's location (LpA) = 75 dB(A).

The guaranteed sound power level (LWA) = 109 dB(A).

Because this machine is operated using remote control, the operator is not exposed to vibration.

These measurements were carried out in accordance with the requirements of EN 474 and the Directive 2000/14 EC, as amended by Directive 2005/88 EC!

11.5 Dimensions

mm (in.)

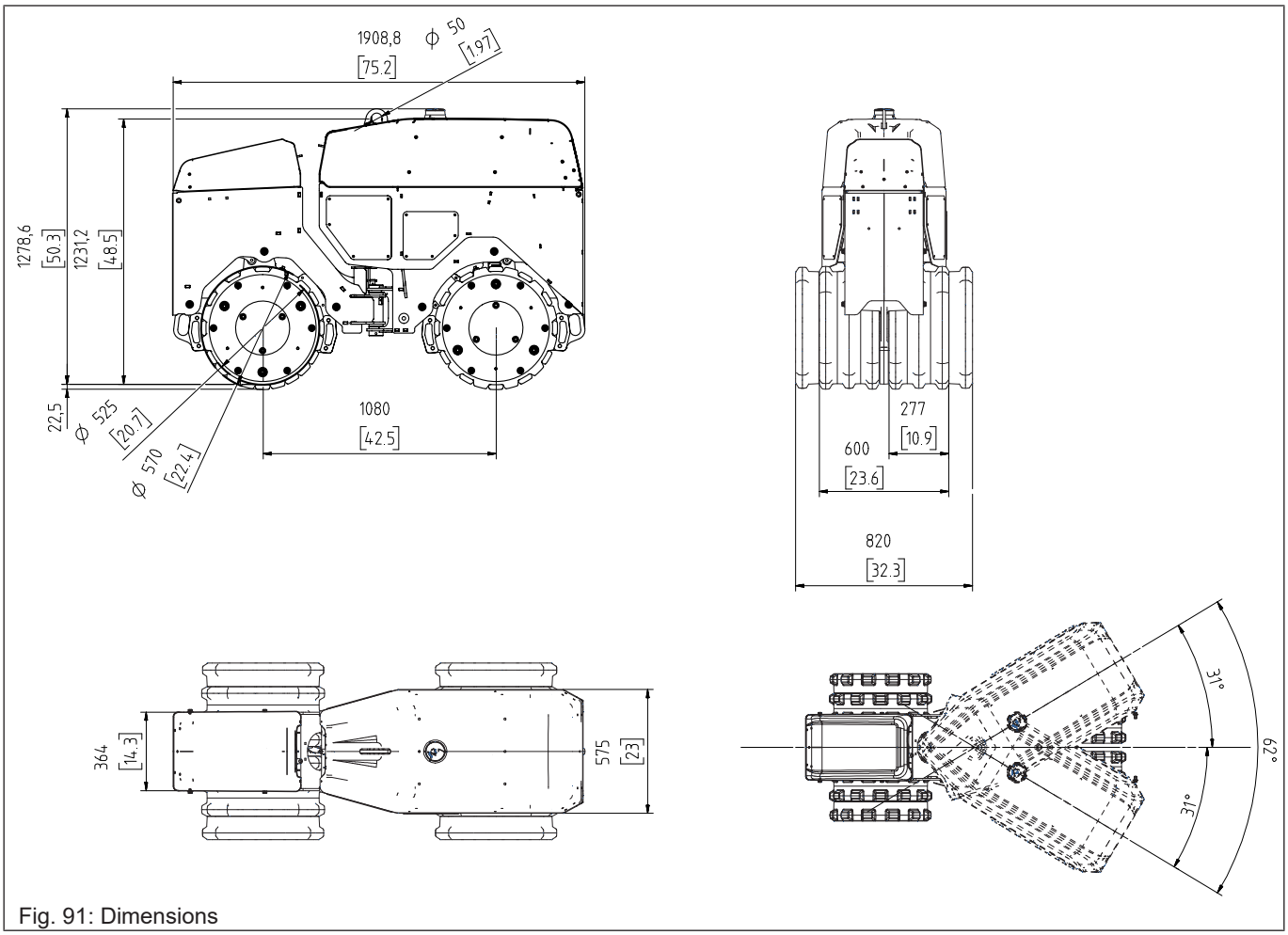


Fig. 91: Dimensions

11.6 Radiation Compliance

This machine meets the following radio interference radiated emission requirements:

- EN ISO 13766-1
- RED 2014/53/EU
- ICES/NMB-002
- ICES/NMB-003(A)
- ICES/NMB-005(A)

12 Emission Control Systems Information and Warranty—Diesel

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

12.1 Emission Control System Background Information

Introduction

The engines/equipment must conform with applicable Environmental Protection Agency (EPA) and California Air Resource Board (CARB) emissions regulations. These regulations require that manufacturers warrant the emission control systems for defects in materials and workmanship.

Furthermore, EPA and CARB 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 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.

Problems that may affect emissions

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

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

Tampering and altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. If evidence of tampering is found, the manufacturer 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.

12.2 Limited Defect Warranty for Emission Control Systems

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

Wacker Neuson America Corporation, N92 W15000 Anthony Avenue, Menomonee Falls, WI 53051, (hereinafter “Wacker Neuson”) warrants to the initial retail purchaser and each subsequent owner, that this engine/equipment, including all parts of its emission control 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.

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

What is covered

The manufacturer recommends the use of genuine parts from the manufacturer, 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 the manufacturer in performance and durability. Furthermore, if such a replacement part is used in the repair or maintenance of the engine/equipment, and an authorized 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 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 the manufacturer.

System Covered	Components
Air filter system and associated plumbing (before engine intake)	Air filter
	Air filter plumbing
Exhaust system connected after the exhaust manifold	Exhaust gas piping and muffler connected to the exhaust manifold

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 engine/equipment operator's manual. The manufacturer recommends that all receipts covering maintenance on the engine/equipment be retained, but the manufacturer cannot deny warranty coverage solely for the lack of receipts or for the failure to ensure the performance of all scheduled maintenance.

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

The engine/equipment must be presented to an authorized 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 engine/equipment along with proof of original purchase date, at your expense, to the authorized 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), the manufacturer will pay for pre-approved shipping costs to and from an authorized 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.

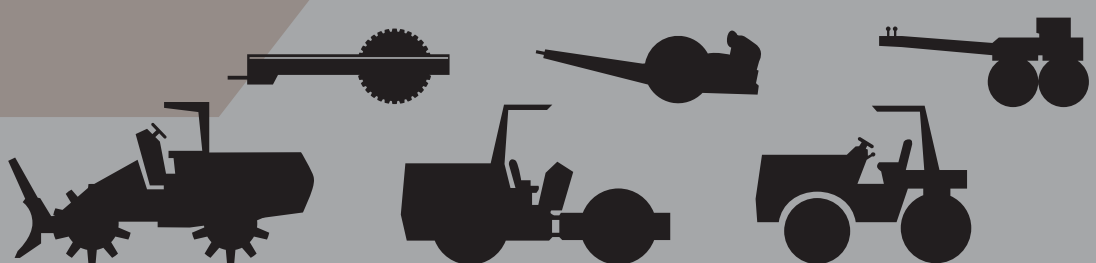
The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

ROLLER COMPACTOR

www.aem.org

SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL



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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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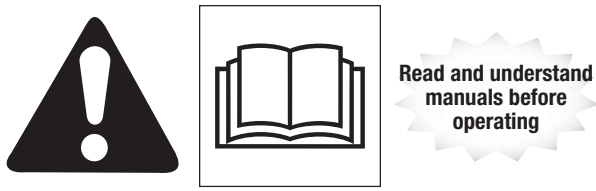
Foreword

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 machine and to instruct you in safety practices for dealing with these conditions. This manual is **NOT** a substitute for the manufacturer's operator's manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the jobsite 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 machine that is contained in the manufacturer's operator's manual(s). Other information that may affect the safe operation of your machine may be contained on safety signs or in insurance requirements, employer's safety and training programs, safety codes, local, state/provincial and federal laws, rules and regulations.



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

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 will typically be found on safety signs on the roller compactor and other jobsite equipment. These words may also be found in this manual and the manufacturer's manuals. 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, could result in minor or moderate injury.

NOTICE indicates a property damage message.

A Word to the User/Operator

It is **YOUR** responsibility to read and understand this safety manual and the manufacturer's manuals 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 manuals for the specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written only for the types of roller compactors covered.

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

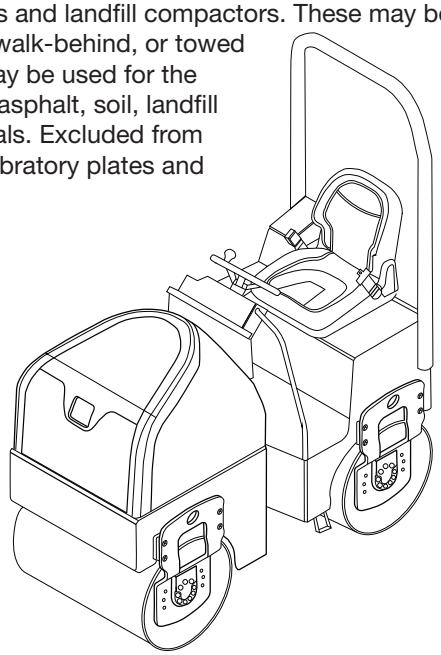
Practice all usual and customary safe working precautions and remember:

SAFE OPERATION IS UP TO YOU!

YOU CAN PREVENT DEATH OR SERIOUS INJURY CAUSED BY UNSAFE WORK PRACTICES!

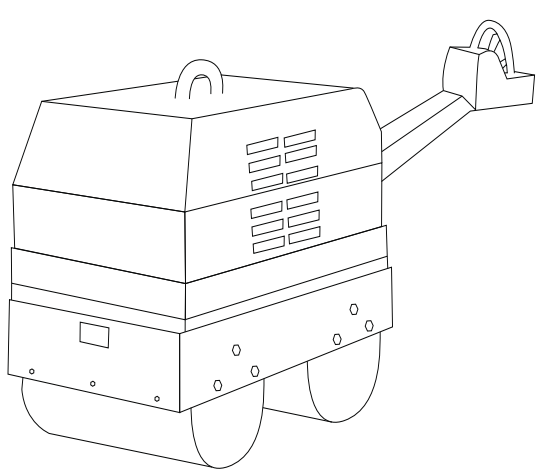
Types of Roller Compactors

This safety manual covers many different types of roller compactors including: steel wheel rollers, vibratory rollers, rubber-tired rollers, segmented pad/sheepsfoot soil compactors and landfill compactors. These may be either ride-on, walk-behind, or towed rollers. They may be used for the compaction of asphalt, soil, landfill or other materials. Excluded from coverage are vibratory plates and hand rammers.



Ride-on

Regardless of which machine you operate, it is your responsibility to study and understand this safety manual, and to see that a copy remains with your machine. Manufacturers produce machines with many built-in safety features. Employers provide accident prevention programs. Yet, the ultimate responsibility to operate and maintain your machine with the skill, care and knowledge essential for safety is yours.



Walk-behind

Follow a Safety Program

For Safe Operation

You must be a qualified and authorized operator for safe operation of this machine. 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 jobsite. 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.

⚠ **WARNING!** Drugs and alcohol affect operator alertness and coordination, and the ability to safely operate the equipment. **Never operate the machine 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 prescription 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 machine.

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 clothing or accessories that could catch on moving parts or controls.** Examples of items to avoid include flopping cuffs, dangling neckties and scarves, wallets attached to chains, jewelry and wrist watches.

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 jobsites. It is the employer's responsibility to comply with these laws. A federal representative may periodically inspect a jobsite 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 jobsite 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 capacity and 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 jobsite. 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 service; then make sure the part is re-installed or replaced if defective or worn out).

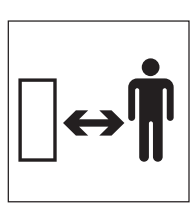
Know and understand rules of operation

Understand jobsite signals

Follow a Safety Program

- **Never allow children to play near, ride on, or operate the equipment.**
- Keep bystanders well clear of the operation.
- Know the work area before you use the equipment. Be aware of possible hazards, including those overhead and underground.
- Only use attachments and parts that are approved by the manufacturer.
- Do not allow riders.
- Fasten seat belt or operator restraint before starting.
- Drive forward whenever possible.
- Always look in the direction of travel.
- Check correct mirror settings, if available.
- Look before backing up.
- Never leave the operator's seat without stopping the engine and removing the ignition key, if equipped. (See page 30, **Safe Shutdown**.)
- Use three-point contact (handholds and steps) and face the equipment when mounting or dismounting. (See page 17, **Mount and Dismount Properly**.)

Fasten seat belt or operator restraint



Keep bystanders away

Follow a Safety Program

Know the Equipment

Read and understand the DANGER, WARNING, CAUTION and NOTICE safety labels and other informational signs on the machine and the attachments, and in the manufacturer's operating manuals. 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.
- Slope and uneven terrain capabilities and proper operation under all conditions.
- Braking and steering characteristics.
- Turning radius and clearances.
- How to quickly stop equipment in an emergency.
- Rated operating capacity.

Keep in mind that rain, snow, ice, loose gravel, soft ground, slopes, and other site conditions can affect your machine's operating capabilities. Make sure you are thoroughly familiar with your machine's stability, braking, traction, and other handling characteristics under any conditions you are likely to encounter.

Know machine capacity and operating characteristics

Read and understand manuals before operating

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, jobsite conditions or applicable jobsite rules. Check that each required item is securely in place and in operating condition:

- Falling Object Protective Structure (FOPS).
- Rollover Protective Structure (ROPS).
- Safety Guards.
- Seat Belt.
- Operator seat/restraint bar(s)/interlock control system.
- Cab side-screens or windows.
- Special enclosures or accessories required for specific applications or jobsite conditions.
- Alternate exit (window).
- Grab handles.
- Guard Rails.
- Articulated joint locks
- Lights.
- Mirrors.
- Anti-skid tread/steps.
- Safety signs.
- Horn.
- Guards.
- Back-up alarm.
- Emergency stop control.
- Fire extinguisher.
- First aid kit.
- Rotating beacon.
- Windshield wiper/defroster.

Use them! Never remove or disconnect any safety device. Replace any damaged, missing, or non-functional safety devices before resuming machine operation.

⚠ **WARNING! Never remove or modify a ROPS or FOPS.** Serious injury or death could result.

Fasten your seat belt

Prepare for Safe Operation

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.
- Check that all drum mounting bushes are pliable and free from damage.
- Check the water sprinkler system. Open the valve and make sure water flows through every hole in each spray bar.
- Check the tires for cuts, missing lugs, bulges, and correct pressure.
- Keep the steps and handholds clean and free of grease, oil, dirt, snow or ice.
- Check the parking brake for proper operation.
- Check condition and operation of any attachments.
- Ensure shielding is properly installed and in good condition. Repair or replace if damaged or missing.
- Ensure work lights (if equipped) are kept clean. Check that all lights work properly.
- Ensure the horn and back-up alarm (if equipped) are operating correctly. Repair or replace if damaged.
- Ensure any Slow Moving Vehicle (SMV) signs, reflectors and warning lights are in good condition and can be clearly seen. Repair or replace if damaged.
- Ensure all tools or loose objects are removed or securely fastened while operating the machine.
- Check for damaged or leaky hydraulic systems. Repair or adjust as needed.

Inspect the machine before each work shift

Hydraulic Fluid Injection Hazard

⚠ **WARNING!** Accidental injection of high-pressure oil 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.**

Prepare for Safe Operation

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.

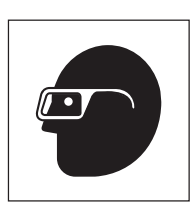
Fluid injection injuries are not always obvious. Victims have reported such injuries feel like a bee sting or splinter under the skin. If you suspect you have a fluid injection injury, do not take chances. Seek proper medical care immediately. If any fluid is injected into the skin, it must be surgically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

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).

⚠ **WARNING! Allow the radiator to cool before checking the level**. Hot radiator fluids could escape as steam and burn you. (See page 36, **Engine Coolant Hazards.**)



Wear eye protection

High pressure fluid can inject into the body

Prepare for Safe Operation

Clean Up

Clean windows, lights, mirrors, and safety signs.

Make sure the operator's area, steering levers, pedals, joysticks, steps, and grab handles are clean. Oil, grease, snow, ice, mud, or debris in these areas could cause you to slip and fall, or lose control of the machine. Clean your boots of excess mud before entering the machine.

Remove all personal items or other objects from the operator's area. Secure these items in a toolbox or remove them from the machine.

Use Caution When Fueling

⚠ **WARNING!** Avoid injury from fire or explosion. **Never fill the fuel tank in poorly ventilated areas, 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.

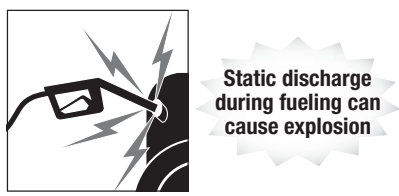
Be sure to use the correct type and grade of fuel.

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.

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 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.**



Prepare for Safe Operation

Know the Working Area

Learn as much about your working area as possible.

Check at Ground or Floor Level

Inspect the surface over which you will travel. Look for holes, drop-offs and obstacles. Look for rough spots or hidden obstacles on surfaces which could cause a collision or loss of control. Look for weak spots on docks, ramps or floors. Look for oil spills, wet spots, and slippery surfaces. Look for soft soil, deep mud or standing water. Watch for anything that might make you lose control or cause the machine to roll over.

When operating inside a building, make certain you are within weight limitations of floors and ramps. Be aware of overhead clearances, doorways, aisles, etc. Plan travel routes ahead of time, in order to make sure you can see and protect bystanders. Pick up debris that can puncture tires.

Be observant of other workers, bystanders, and other machines in the area.

Remember, the danger of sliding and/or tipping on steep slopes is always present, regardless of how heavy or stable your machine may appear to be. Always use seat belts if a ROPS is equipped.

Check Overhead

Check the clearances of doorways, canopies, and overheads. Know exactly how much clearance you have under power and telephone cables.

⚠ **DANGER!** Contact with energized power lines will cause serious injury or death. **Never approach overhead power lines with any part of your machine unless all local, state/provincial and national (OSHA) required safety precautions have been taken**. Always use extreme caution around power lines.

Know your margin of safety. If possible, have power to lines disconnected. If not possible, request a signal person for guidance.

⚠ **DANGER!** Electrocution will result from touching or being near a machine that is in contact with, or near, an electrical source. **Stay away from any machine in contact with electrical wires until you are told it is safe to approach.**

Start Safely

Mount and Dismount Properly

Always use three-point contact when mounting or dismounting the machine. Three-point contact means one hand and two feet, or two hands and one foot, in contact with the machine at all times.

Never mount or dismount while carrying tools or objects that prevent three-point contact. Put parts or tools down. Maintain proper contact, climb or dismount, and then pick up the object.

Face the machine when you enter or leave the machine.

Clean shoes and wipe hands. Clean steps and handholds of chemical residue, snow, ice, mud or oil.

During mounting and dismounting:
- Use handholds and step plates.
- Never use steering wheels, joysticks or controls as handholds.
- Never jump on or off the machine.
- Never mount or dismount from a moving machine.

Warn Personnel Before Starting

Before starting, walk completely around the machine. **Make sure no one is under the machine, 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.

Use three points of contact when mounting or dismounting

Avoid falls, clean up slippery areas

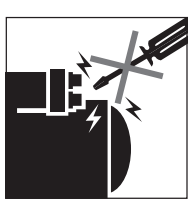
Start Safely

Starting the Engine

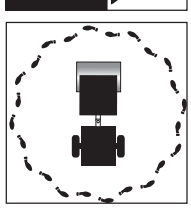
⚠ **WARNING!** Start the engine from the operator's seat only. **Never attempt to start the engine by shorting across starter terminals.** The machine may move unexpectedly, which could cause serious injury or death to anyone in its path.

Before starting, walk completely around compactor. Know the exact starting procedure for your machine. See the manufacturer's operating manual(s) for starting.
- Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
- Fasten the seat belt/operator restraint.
- 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 within an enclosed area, be sure there is adequate ventilation.

⚠ **WARNING!** Exhaust fumes can kill. **Do not breathe exhaust fumes!**



Never start engine by shorting across starter terminals



Before starting, walk completely around compactor

Starting Aids

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.

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. Wear appropriate PPE before attempting to jump-start your machine.

⚠ **WARNING!** A battery explosion or a run-away machine could result from improper jump-starting procedures. (See page 38, **Battery Hazards**.)

To avoid explosion, follow proper jump-starting procedures

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.

Test Controls

Roller compactors come equipped with various control configurations, patterns and operating modes, each with their own handling characteristics. Some have selectable or configurable controls, to suit personal preferences or specific applications. Make sure that you know which control pattern you have selected and that you understand how the machine will handle when using that control pattern.

Make sure the machine is operating properly by doing the following:

- With the control levers or joysticks in neutral, test engine speed control.
- Operate each pedal, lever or joystick to make sure all functions are correct.
- Operate the travel control lever(s) or joysticks to ensure correct operation in forward and reverse. Test steering to the right and to the left, while moving slowly in a clear, safe area.

⚠ **WARNING!** Before operating the machine under working conditions, **be certain you can control both the speed and direction of the machine.** Any loss of control could result in death or serious injury.

Masked Visibility Areas

Machines have areas where the operator's visibility of the job site can be affected by the machine itself. ROPS posts, attachments, a drum, even items in the cab, could limit your view of the surrounding area and possibly mask hazards or people around you. These masked visibility areas vary from machine to machine, and it is very important you be aware of these areas before operating your machine.

Follow these safety precautions to reduce the hazards posed by masked visibility areas:

- Look around the machine before operating. Objects near the machine and close to the ground can be difficult to see from the cab.
- Always look in the direction of travel, including reverse. A back-up alarm is no substitute for looking behind you when operating the machine in reverse.
- Keep bystanders away, even if your machine is equipped with a back-up alarm.

Remember These Rules

Never allow untrained, unqualified, or unauthorized personnel to operate your machine.

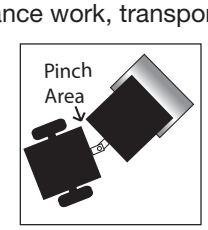
Never allow other personnel to ride on your machine unless appropriate seating is provided, and then, only if authorized to do so.

Never abuse your machine. Misuse or abuse can cause an accident.

Articulated Machines

Never enter or place any part of your body in the "hitch area" or "pinch areas" of an articulated machine while the engine is running, or when there is any chance another person could start the machine.

If available, use the articulated joint lock during maintenance work, transportation, etc.



Keep body parts away from pinch area

Work on Slopes Safely

When working on slopes, avoid side-hill travel whenever possible. It is generally safer to operate up and down the slope. Remember the danger of sliding and/or tipping on steep slopes is always present, regardless of how heavy or stable your machine may appear to be.

Always use seat belts if your machine is equipped with a ROPS. If equipped, make sure foldable ROPS is upright. Keep your hands and feet inside the cab at all times.

When climbing or descending steep grades, select the proper gear before starting on the slope, to assure adequate power or engine breaking.

If your machine has a gear shift, select a low gear. If your machine has a hydrostatic drive, the speed control should be in the slow travel position, close to neutral, not in the fully displaced position.

On machines that have a gear shift and a hydrostatic control, both controls must be in their slow travel position.

Always be sure that manually operated gear type transmissions are fully engaged before starting onto a grade. Do not attempt to change the gear selection while traveling on a grade. See the manufacturer's manual for specific instructions.

Watch Out for Hazardous Working Conditions

Be alert for hazards. Know where you are at all times. Watch for overhead obstacles. Look up as well as down.

Avoid operating your machine too close to an overhang, deep ditch or hole. If your machine inadvertently gets close to a tipping condition or drop-off, STOP and get off the machine after applying the parking brake. Plan your moves carefully before proceeding. Reversal is often the best move.

⚠ **WARNING! Never operate the machine close to the edge of an overhang or gully.** The edges could collapse or a slide could occur causing serious injury or death.

Stay Alert! Rough Terrain Can be Hazardous!

Be alert to obstacles and excessively rough terrain. Back away from them and go around.

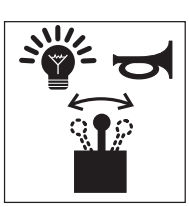
Always travel slowly over rough terrain and hillsides. Maintain a speed consistent with the working conditions.

Operate Safely

Follow Safe Operating Practices

Make these safe practices part of your daily routine:

- Keep your seat belt/operator restraint fastened.
- Never leave the operator's seat without having the unit come to a complete stop and applying the breaks.
- Operate the controls smoothly — don't jerk the steering levers or joysticks.
- Avoid sudden stops, starts or turns.
- Use care and good judgment.
- Never attempt to operate the controls unless properly seated in the cab.
- To shut down the machine, stop the engine and remove the ignition key, if equipped. (See page 30, **Safe Shutdown**.)



⚠ **WARNING!** Avoid Serious injury or death! **Keep your entire body inside the operator's cab while operating the machine.** Never work with your head, arms, feet or legs beyond the operator's compartment.

Traveling on Jobsite

Take it slow and easy when traveling through congested areas. Traffic courtesy pays off.

Give the right-of-way to loaded machines. Maintain a safe distance from other machines. Pass cautiously.

Don't obstruct your vision when traveling or working. (See page 20, **Masked Visibility Areas**.) Operate at speeds slow enough so you have complete control at all times. If possible, avoid travel over rough, slippery or uneven terrain, and on hillsides.

Travel Safely

When roading the machine, know your approximate stopping distance at any given speed.

Travel at controlled speeds, especially around corners.

Look in all directions before reversing your direction of travel.

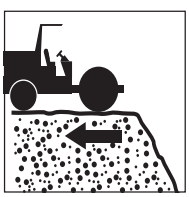
Never coast in neutral.

Operate Safely

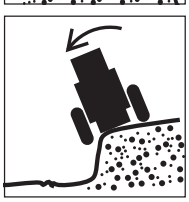
Avoid steep slopes or unstable surfaces. If you must drive on a slope, travel at an appropriate speed and with extreme caution. Do not drive across an excessively steep slope under any circumstances. Travel straight up and down the slope. Before operating on slopes, check the surface conditions for adequate traction. Loss of traction can cause the machine to slide and tip.

⚠ **WARNING!** Avoid death or serious injury. **Travel up and down slopes with the heavy end of the machine pointed uphill.**

Check machine manufacturer's recommendations.



Operate perpendicular to banks – stay back from the edge



Use caution – stay safely away from bank or excavation edge

Rules of the Road

When traveling on public roads or streets, obey all traffic regulations applicable to machine use and classification.

Make sure lights and warning signs are in place and visible. Make sure a SMV emblem is installed and visible to any vehicle approaching from the rear.

Find out if you must use an escort vehicle. Approach intersections with caution; observe speed and traffic control signs. Avoid panic stops and sharp turns.

Like any responsible operator, be considerate of other drivers. If traffic backs up behind you, it is a good idea to pull over periodically and allow traffic to pass when it is safe to do so.

Stop at all railroad crossings and look both ways before proceeding. Never park in traffic areas. If it is necessary to stop at night, pull off the road and set up flares or reflectors. When driving at night, use appropriate lights.

Watch Out for Obstacles

Adjust your speed to conditions. Avoid crossing ditches, curbs or exposed railroad tracks. If obstacles are unavoidable, reduce speed and cross at an angle.

Operate Safely

Keep your machine under control. Keep speed to a minimum when visibility is poor.

Before entering underpasses, tunnels or bunkers, check for oncoming traffic or obstructions.

Obey traffic regulations

Work at Night Safely

Night operations require additional precautions to stay safe. Pay close attention and stay alert. Others passing through the work site may not be aware of hazards.

Plan the job, communicate the plan and inspect the work area during daylight. Mark obstacles ahead of time with reflective material.

Wear appropriate reflective apparel at all times – for operators and crew on night operations.

Ensure visibility of gauges and controls.

Ensure adequate lighting to illuminate work zone in compliance with state and local regulations and requirements.

Ensure adequate hazard lights (strobe or flashing/ rotating lights) in compliance with state and local regulations and requirements.

Utilize direct line of sight, not mirrors, when working at night. Use spotters when direct line of sight is not possible. Lights can reflect in mirrors, causing a hazard to be unseen, or a masked visibility area.

Lack of natural light will impact visibility and may increase the risk of being backed over by vehicles or equipment.

Adjust work lights to minimize glare for traffic and workers.

Know where the other workers are at all times. Tell others where you are going.

Beware of fatigue. Check on crew members.

Stay in assigned work zones.

Enter and exit machine on side away from traffic, if possible.

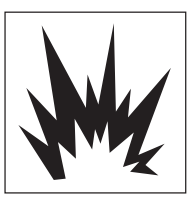
Exhaust Fumes in a Closed Space Can Kill

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

⚠ **WARNING!** Exhaust fumes can kill. **Do not breath exhaust fumes from any kind of engine.**

Operating in Flammable/Explosive Atmospheres

⚠ **WARNING! A roller compactor cannot 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.



Loading and Unloading Safely

Always wear your seat belt/operator restraint when loading or unloading your machine from a transport device, such as a flatbed truck.

When transporting a compactor, follow the manufacturer's recommended loading and unloading procedures.

Extreme care should be exercised when loading or unloading a walk-behind roller. It is generally best to stand behind and off to one side rather than directly behind a machine moving up or down a ramp.

Several precautions are applicable to all machines:

- Never load or unload a machine by yourself.
- Keep bystanders away.
- Load and unload on a level surface.
- Maintain proper visibility by loading or unloading in well-lit areas, and away from other vehicles, equipment or buildings.
- Block transport vehicle with wheel chocks so it cannot move.
- Ensure trailer bed and ramps are in good condition.
- Use ramps of adequate size and strength, with a low angle and proper height.

- Rear of trailer must be blocked or supported.
- Keep trailer bed and ramps free of clay, oil, ice, snow, and other materials which could become slippery.
- Chain and block the machine securely for transport. Use tie-down points as marked on the machine by the manufacturer. Follow the manufacturer's instructions in the operator's manual for tying down.
- Cover or remove rear-facing SMV sign on the roller compactor, if equipped, to avoid confusing drivers following the transport vehicle.
- Unload the machine by driving off in the opposite direction; do not turn the machine around.

Transporting Safety Tips

General

When towing a machine on a trailer, or a machine equipped with "portability or transport wheels," always use a hauling vehicle of sufficient weight, horsepower and braking capacity to maintain proper control.

Never attempt to tow a trailer or machine if the hitching devices are of insufficient or questionable capacity, improperly matched in size or shape, or positioned at improper heights.

When towing a machine equipped with portability or transport wheels, always follow the manufacturer's towing instructions.

Before Towing

When connecting a trailer to a hauling vehicle, block under the trailer's tongue before attempting to make the connection. Never attempt to lift heavy tongues or move heavy trailers by hand. Never get any part of your body under the tongues when hitching or unhitching.

Make sure the hitch pin is of the proper size and securely locked in place before towing.

If the roller is designed to hang from the tailgate of a vehicle when being transported, be certain the hook brackets meet the roller manufacturer's specifications.

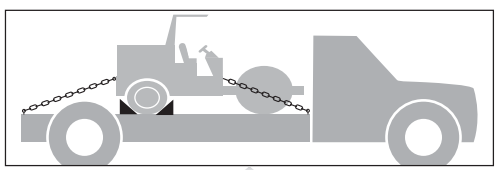
Use tow bars between the hauling vehicle and trailer or towed machine. Be sure the chains are properly and securely connected at both ends. Cross the chains under the tongues when connecting to the hauling vehicle.

Make sure electrical and other connections between the hauling vehicle and trailer or towed machine are properly and securely made. After connecting, check the lights for proper operation. If the towed trailer or

machine is equipped with brakes operable from the hauling vehicle, check to make sure they are operating properly.

Always be sure the portability or transport wheels, on machines so equipped, are locked in the lowered position.

Check all tires for proper pressure, excessive or abnormal wear, and potentially dangerous cuts, bruises or bulges. Have any problems corrected before proceeding.



Chain and block compactor securely for transport

Towing

Use care when towing a trailer or machine when:

- Maneuvering in tight places
- Backing (visibility is reduced, and jackknifing must be avoided)
- Towing on steep grades.

Know and obey all local, state and federal laws and regulations.

Do not travel at speeds above those recommended by the manufacturer.

Do not allow anyone to ride on a trailer or towed machine.

When necessary to disconnect and park a trailer or towed machine, select a location that is level and, if possible, where children are unlikely to be present. Before disconnecting a trailer, block the front AND rear of the wheels and block under the tongues.

Walk-Behind Rollers

Start-up

Only operate a walk-behind roller if you are thoroughly familiar with the manufacturer's operating instructions. If you have any questions or uncertainty, consult the manufacturer or dealer before attempting to operate it.

Always follow the manufacturer's instructions for starting the engine. All controls must be in the correct position before attempting to start the engine

Starting fluid is not recommended when hand starting an engine, because the engine may kick back, causing injury.

Operation

When operating a walk-behind roller, exercise extreme care to avoid having your feet or clothing caught under the dolly wheels or roller. When possible, stand behind and off to one side of the machine, rather than directly behind it.

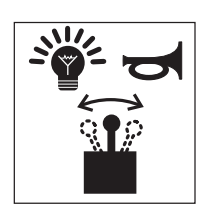
Particular care must be exercised when operating near obstructions and on slippery surfaces, grades and side slopes. Wear slip-resistant safety shoes or boots.

Do not ride on a walk-behind roller unless it is designed to accommodate riders and an appropriate seat is provided.

Do not attempt to shift on a grade if the roller has a mechanical transmission.

Do not operate a walk-behind roller in unshored trenches or near steep, unsupported banks. The vibrations could cause a cave-in.

Uneven grades can cause the handle to raise or lower unexpectedly, striking the unwary operator.



Set all controls to correct position before starting the engine

Operate Safely

Towed Rollers

Most general safety precautions covered earlier in this manual are also applicable to towed roller operation. There are many precautions specific to towed rollers that must be taken. Study your manufacturer's manual for instructions on your specific towed roller. Consult the manufacturer or dealer with any concerns.

Use a tow tractor of sufficient weight, drawbar horsepower and braking capacity to properly control the towed roller. Proper weight balance and distribution is also essential.

Block under the tongues of the towed roller before attempting to connect it to the towing vehicles or machine. Do not attempt to lift heavy tongues or move towed rollers by hand. Do not get any part of your body under the tongues when hitching or unhitching.

Make sure the hitch pin is of the proper size, and is securely locked in place before towing. If safety chains are provided, make sure they are properly and securely connected at both ends. Cross the chains under the tongues when connecting to the towing vehicle. Make sure all electrical or hydraulic connections are made properly and securely.

Landfill Compactors

Operators of landfill compactors should carefully handle materials that could be picked up and thrown by the wheels, become lodged in the machine, or that are highly flammable.

Frequent checks should be made for wire, cable or other material wound around the axle members. Remove them immediately.

Travel with the blade as low as possible.

Maintain good operator visibility. Keep all mesh and windows free of accumulated materials.

When parking the machine, always lower the blade.

Shut Down Safely

Select a Proper Parking Site

Park in an off the road area, out of traffic, or as instructed. If necessary to park in a traffic lane, use the appropriate flags, barriers, flares, lights and warning signals. Provide advance warning signals in the traffic lane to warn approaching traffic.

Park on level ground whenever possible. When that's not possible, position the machine at right angles to the slope. Make sure the machine is on a firm footing, and that there is no danger of sliding. Do not leave your machine until you are sure it is safely blocked in both directions and parking brakes are firmly applied.

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

Safe Shutdown

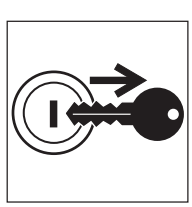
Know the proper shutdown procedure for your machine. As with the starting procedure, this varies with the type and model of machine.

If equipped, always lower the dozer blade when parking.

Follow the manufacturer's operation manual for your machine. Remove the key(s) to prevent unauthorized starting and movement, and position and lock any antivandalism devices.

Dismount Properly

Make sure your machine is fully stopped and shut off before dismounting. When you leave the compactor, always maintain three-point contact with the steps and grab handles. Face the compactor as you dismount. Never jump off a machine.



Shut engine off, remove key

Use three points of contact when mounting or dismounting

Perform Maintenance Safely

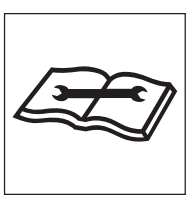
Know What You're Doing

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 manuals.** Study the instructions. Check the lubrication charts and examine all the instruction messages on the machine.



Protect Yourself

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

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

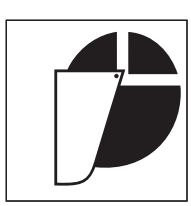
⚠ **WARNING!** Avoid death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

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.



Perform Maintenance Safely

Prepare the Work Area

- Position the machine on 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 and dry slippery surfaces.
- Clean around the area to be serviced to minimize contamination.

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.

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

- Place controls in NEUTRAL or LOCKED position before shutting off engine.
- Set parking brake or block wheels.
- Allow all moving parts to stop.
- Shut off engine.
- Relieve hydraulic system pressure by moving controls several times in all directions or per manufacturer's instructions.

Avoid falls, clean slippery surfaces

- Lock out the unit according to the manufacturer's manual.
- Attach a "DO NOT OPERATE" warning tag to the control levers.
- 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).
- Disable the battery switch (if equipped).
- Securely support or block up machine or other components with approved locking devices before working 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

⚠ **WARNING!** Unsupported raised machines or other equipment may drop unexpectedly. **Never go under equipment when raised unless supported by an approved support device(s).** Death or serious crushing injury could result from falling equipment.

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

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

Use a "DO NOT OPERATE" tag

Common Maintenance Safety Practices

Use Proper Ventilation

If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, make sure you open doors and windows to get plenty of outside air into the area.

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.

Perform Maintenance Safely

Use Jacks and Hoists Carefully

Safety stands or blocks must be located on a rigid part of the machine. Do not position stands under axles or wheel supports that may rotate. Refer to manufacturer's manual.

⚠ **WARNING!** Prevent crushing injury. **Never use concrete blocks for supports. They could collapse under even light loads.**

If you must work beneath raised equipment, always use wood blocks, jack-stands or other rigid and stable supports. When using jacks or hoists, always be sure they are adequately supported.

Make sure the hoists or jacks you use are in good repair. Never use jacks with cracked, bent, or twisted parts. Never use frayed, twisted or pinched cables. Never use bent or distorted hooks.

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.
- Always ground the fuel nozzle against the filler neck to avoid sparks.
- 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.

Perform Maintenance Safely

Ulra-Low Sulfur Diesel (ULSD) Hazard

⚠ **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.**

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.

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.

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 high-pressure oil 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 you discover a leak:

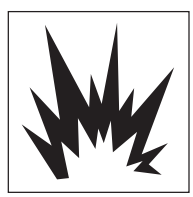
- Ensure engine is turned off; relieve pressure in hydraulic circuit.
- Wear proper hand and eye protection.
- Visually examine the hydraulic hoses or fluid lines in the vicinity of the leak for breaks or cracks. **Do not** use your hand to check for leaks.
- Repair or replace hydraulic lines according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

Diesel Particulate Filter Hazard

You may need to run an active regeneration on some machines with a diesel particulate filter (DPF). Running an active regeneration to clean a DPF can create extremely high temperatures. Consult your operator's manual for the proper procedure for running an active regeneration.

⚠ **WARNING!** Extremely high temperatures can cause a fire or explosion, so **do not run an active regeneration in an explosive or flammable atmosphere.**



Perform Maintenance Safely

Electrical System Hazards

Light Bulbs and Illumination

Some machines are equipped with High-Intensity Discharge (HID) Xenon light bulbs which operate at very high voltage. Do not begin installation of HID-Xenon lamps unless the lamps are turned off, the engine is turned off, the key is removed (if equipped), and you are wearing appropriate eye protection.

⚠ **WARNING! Do not look directly into HID-Xenon lamps.** Eye damage could occur.

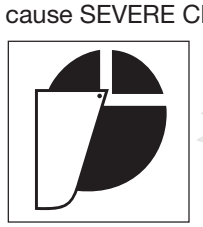
Wear gloves and safety glasses when handling bulbs. Dangerous voltage sparks may occur and cause injury or damage to the connector. See manufacturer's warnings packaged with replacement bulbs.

Before working on the electrical system, either hit the main power disconnect switch, if equipped, or disconnect the battery cable(s).

- Remove the battery negative (–) cable(s) first.
- When reconnecting the battery, connect the battery negative (–) cable(s) last.

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 liquid off your skin and regular clothing.

⚠ **WARNING!** Liquids in batteries will damage eyes or skin on contact. **Always wear a face shield to avoid getting liquid in your 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 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.

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.**

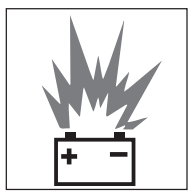
- **Do not** smoke near batteries.
- Keep them away from arcs, sparks and open flames.
- Provide adequate ventilation.

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

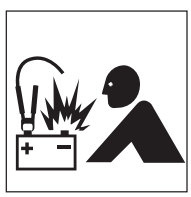
⚠ **WARNING!** Avoid serious injury from battery explosion. **Do not charge a battery or jump-start the engine if the battery is frozen.**

Warm to 60°F (15.5°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.
- Be sure the machines are not touching.
- Observe the polarity of the batteries and connections.
- Make the final cable connection to the engine or the furthest 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

Toxic Chemical Disposal

For the safety of others and the environment, consult with your operator's manual or site supervisor for proper disposal of batteries and any chemicals or fluids.

Perform Maintenance Safely

Tire and Wheel Maintenance

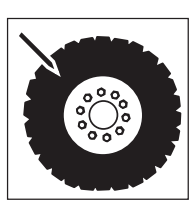
Check your tires and wheels daily, if equipped, because the stability of the machine can be dramatically affected by tire pressure or damage to tires or wheels.

Check tires for:
- Correct pressure.
- Cuts and bulges.
- Nails or other punctures.
- Uneven or excessive wear.
- Condition of valve stems and caps.

Check wheels for:
- Damage to the rims.
- Missing or loose lug nuts or bolts.
- Misalignment.

All tire service should be performed by a qualified tire service center or by an authorized service person who has been properly trained in the procedures and use of safety equipment designed for tire servicing.

⚠ **WARNING!** The types of wheels and tires usually found on this equipment require special care when servicing to prevent death or serious injury. **Do not inflate the tires above the recommended pressure.**



Check tires and wheels for damage

Maintain proper tire pressure

Perform Maintenance Safely

Keep wheel lug nuts tightened to manufacturer's recommendations.

An increase in tire pressure during operation is normal, and should NOT be reduced.

Never reinflate a tire that has been run flat or seriously under-inflated without removing the tire from the wheel. Have the tire and wheel closely inspected for damage before remounting.

Avoid tire explosion

When adding air to a tire, do so from a distance. Always use a long hose with a self-attaching chuck; stand away from the tire sidewall and to one side as far as possible.

Do not inflate tires with flammable gases or from systems using an alcohol injector.

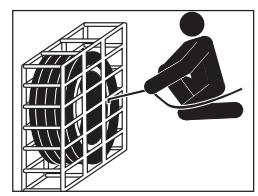
Never cut or weld on a wheel with an inflated tire mounted on it. This could cause explosive decompression.

Check that the tire size and wheel are correctly matched.

When replacing the tires, ensure the tires are of the appropriate rating specified by the manufacturer.

⚠ **WARNING!** Avoid death or serious injury. **Always use a safety cage or cable restraints when reinflating a repaired tire.**

Tires should not be operated at speeds higher than their rated speed.



Use safety devices when reinflating tires

Perform Maintenance Safely

Roll-Over Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) Safety Precautions

Do not remove the ROPS/FOPS except for service. Reinstall them correctly before allowing the machine back into service.

Do not modify ROPS/FOPS in any manner. Unauthorized modifications such as welding, drilling, cutting or adding attachments could weaken the structure and reduce your protection. Replace ROPS/FOPS if subjected to rollover or damage. Do NOT attempt to repair them. See the manufacturer's manual(s) for complete instructions and inspection requirements.

If your machine is equipped with a foldable ROPS, make sure it is upright whenever the machine is in use.

Complete Service and Repairs Before Machine is Released

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

Are there any missing cotter pins, washers, locknuts, etc.? Are there any parts left over?

Start the engine and check for leaks. (See page 36, **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

Final Word to the User

You have just finished reading the AEM Roller Compactor Safety Manual. It is impossible for this manual to cover every safety situation that you may encounter on a daily basis. Your knowledge of these safety precautions and your application to the basic rules of safety will help to build good judgment in all situations. Our objective is to help you develop, establish and maintain good safety habits to make operating a roller compactor easier and safer for you.

Many pictorials in this safety manual can be downloaded at http://pictorials.aem.org.

For additional publications, visit our website at www.safetymaterials.org.

ASSOCIATION OF
EQUIPMENT MANUFACTURERS

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