

2.3 Residual Risks



⚠ WARNING

Serious injury or death hazard

Improper operation of the machine can result in serious injury or death. Before operating this machine, make sure to:

- ▶ Read and understand the operator's manual.
- ▶ Read and understand all labels on the machine.
- ▶ Have training in the safe and proper use of the machine.
- ▶ Follow all applicable laws and regulations that pertain to this machine.

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, residual risks can include exposure to:

- Heat, noise, exhaust, and carbon monoxide from the engine
- Burns from hot hydraulic oil or hot surfaces
- Fire hazards from improper refueling techniques
- Fuel and its fumes
- Personal injury from improper lifting techniques
- Crushing hazards from improper operation (feet, legs, or arms extending outside of the operator work station) and for other persons in the work zone

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.
- Contact Wacker Neuson for additional training if necessary.

When operating this machine:

- Do not allow improperly trained people to operate the machine.
- Do not operate the engine while wearing a headset to listen to music or radio because it will be difficult to hear the alert signals.
- 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 PPE, or obeying traffic regulations.

The machine must not be accessed or operated by:

- Children
- People impaired by alcohol, drugs, or prescription drugs
- People who are feeling ill

Jobsite



⚠ WARNING

Electric shock hazard

Electric shock can cause severe injury or death.

- ▶ Maintain a safe distance from overhead energized electric lines.

The operator and any people in the jobsite are at risk if the machine is not operated correctly. Know the rules for the jobsite, which include but are not limited to the following:

- Remain aware of changing positions and the movement of other equipment and personnel in the jobsite.
- Use extra care when operating over uneven ground, on hills, or over soft or coarse material. The machine could shift or slide unexpectedly.
- Use caution when operating the machine near the edges of pits, trenches, or platforms. Ensure the ground surface is stable enough to support the weight of the machine with operator and there is no danger of the machine sliding, falling or tipping.
- Do not operate the machine in areas that contain flammable objects, fuels, or products that produce flammable vapors.
- Do not place diesel fuel or other flammable material such as oil, hay, or dried grass close to the engine during engine operation or shortly after shutdown.
- Keep the area around the muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could ignite the debris and start a fire.
- When operating the machine in contaminated areas, take appropriate measures to protect the operator and the machine.
- Familiarize yourself with the jobsite before beginning work, especially when operating in buildings or enclosed areas. Be aware of:
 - Obstacles in the operating and traveling area

- Any necessary barriers separating the jobsite from public roads
- Height of the ceiling/clearances
- Width of entrances
- Maximum load of ceilings and floors
- Sufficient room ventilation to reduce the risk of carbon monoxide poisoning
- Observe the risk zone.
- Be aware of overhead electric lines. If the machine touches an energized electric line:
 - Do not leave the machine until the energized electric line has either been de-energized or removed from the machine.
 - While the machine is touching the energized electric lines, warn others against approaching and touching the machine.
 - Move the machine away from the energized electric lines.
 - Have the energized electric lines de-energized.

Environmental conditions for operation

- Avoid operating in extremely dusty conditions.
- Avoid operating in the presence of chemical gases or fumes.
- Avoid operating in a corrosive atmosphere such as salt water spray.
- Do not expose the engine to the rain.
- When the engine is operated in dusty conditions, inspect the air cleaner element more frequently.
- Contact your authorized YANMAR industrial engine dealer or distributor if the engine will be operated at an altitude of 1,676 m (5,500 ft) or higher. High altitude reduces engine power, de-stabilizes operation and generates exhaust gas that exceeds the specification amount in design.

Dust precaution

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

Demolition or excavation work

- When working on roofs or similar structures, check the resistance and the structure itself before starting work. The building can collapse, causing serious injury, death, and damage.
- Do not place the machine directly under the workplace during demolition. Debris can fall onto the machine or the building can collapse, causing serious injury, death, and damage.
- Look out for hazards such as high-voltage lines, underground cables, buried utility lines (electrical, gas, water, communication, sewer), etc., during excavation work.

Before any digging begins:

- Contact the person responsible for jobsite utilities. Follow their recommendations for support and securing of utility lines.

Risk zone awareness

- The risk zone is the area in which persons are at risk due to the movements of the machine, work equipment, additional equipment, or material.
- Stop work immediately if persons do not leave the risk zone in spite of warnings.
- The risk zone also includes areas affected by falling material, equipment, or construction debris. For further information, [see Risk of Injury or Death on page 35](#).

Before machine operation

The machine, including all components, safety devices, labels, and attachments must be in good condition before use.

- If the machine is functioning unpredictably or in event of malfunctions, turn off the machine immediately, remove the key, and report the malfunction to a qualified technician or supervisor. Safety-relevant damage or malfunctions of the machine must be repaired immediately.

Machine operation

- When stepping on or off the operator platform, face the machine and use three points of contact.
- Keep the attachments or work equipment close to the ground. Keep the load low when moving on slopes—up, down, and across.
- Do not get on or off a moving machine, and do not jump off the machine.
- Remain aware of the machine's moving parts. Keep hands, feet, and loose clothing away from the machine's moving parts.
- Know the machine's lifting capacity. Do not exceed the ROC for the machine. For further information, [see Forces on page 112](#).
- Do not use a mobile device while operating this machine.
- Do not allow anyone underneath a raised load.
- Do not leave the machine running unattended.
- Do not operate the machine before it has reached its operating temperature.
- Do not consume the operating fluids used in this machine.
- Do not use the machine as a crane. These loaders are not approved for craning applications. These craning applications include raising, transporting, and lowering point loads with the help of slings and load-securing devices (for example, ropes and chains). This applies, for example, to lifting and lowering pipes, shaft rings or containers.

PPE

Wear the following PPE while operating this machine:

- Close-fitting work clothes that do not hinder movement
- Eye protection
- Hearing protection
- Safety-toed footwear

Tie back long hair and remove all jewelry (including rings).

Operator presence system

- This machine is equipped with an operator presence system that locks out machine operation when the operator has not engaged the operator presence pedal.
- Do not operate the machine when the operator presence system or any safety device is malfunctioning. Contact a Wacker Neuson dealer.
- Start and operate the machine from the operator platform only.

Traveling

- Before moving the machine, check whether the attachments have been safely attached.
- Adjust your travel speed to the road/ground conditions, machine handling, and to the visibility conditions.
- Look to the rear before moving the machine in reverse.
- In certain situations, use another person to direct movement of the machine on the jobsite safety.

3.3 Safety Guidelines for Attachments

Information regarding attachments

- Do not lift, lower, or transport people on the machine or in/on an attachment.
- Use approved attachments only. See your local Wacker Neuson dealer.
- Attachments and counterweights affect handling and the machine's steering capability.
- Lower the attachment to the ground before exiting the machine.

Installation and removal of attachments

- Follow attachment mounting instructions in this operator's manual.
- Before uncoupling or coupling an attachment with the hydraulic coupler:
 - Ensure the attachment is lowered to the ground and level.
 - Release the pressure in the auxiliary hydraulic system. For further information, [see Auxiliary Hydraulic Connections on page 60](#).
- Ensure the attachment is securely attached and that it functions correctly.
- Connect all hydraulic and electrical devices for the attachment and check their function before operating the machine.

- Secure the attachments against unintentional movement.
- Keep others away from the machine when installing or removing an attachment.

3.4 Safety Guidelines for Maintenance

General maintenance notes

- Follow all instructions in the Maintenance chapter of this operator's manual. For instructions on adjustment, maintenance, and inspection activities and intervals, [see Maintenance on page 67](#).
- Wacker Neuson requires the machine owner to have maintenance performed under all circumstances. Otherwise, the warranty shall not be given in full.
- For inspection and maintenance work, ensure all tools and service center equipment are capable of performing the tasks prescribed. Do not use malfunctioning or broken tools. Use certified measuring devices that are routinely calibrated for accuracy (for example torque wrench, pressure gauge, ammeter).
- Retighten any screws, electrical connections, or hose connections that may have been loosened during maintenance and repair.
- Recycle scrapped parts and drained fluids according to environmental and hazardous material requirements. To avoid fire and health hazards, dispose of soiled shop towels by approved methods.
- If any lockout/support devices are removed for setup, maintenance, or repair purposes, they must be refitted and checked immediately upon completion of the maintenance/repair work.

Service training

Before servicing or maintaining the machine, [see Safety Guidelines for Operating the Machine on page 14](#).

Replacing parts and labels

- Spare parts must comply with the technical requirements specified by Wacker Neuson. Contact your Wacker Neuson dealer for assistance.
- Replace worn or damaged components.
- 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 Wacker Neuson replacement parts or those parts equivalent to the original in all types of specifications, such as physical dimensions, type, strength, and material.

Cleaning and servicing

- Keep machine clean and free of debris such as leaves, paper, cartons, etc.
- Keep labels legible. When pressure washing decals, direct the stream at a 90 degree angle to the surface with the spray nozzle at least 12 inches away.
- Do not clean the machine while it is running.
- Never use gasoline or other types of fuels or flammable solvents to clean the machine. Fumes from fuels and solvents can become explosive.

3.5 Safety Guidelines for the Engine Control Unit (ECU)

- Never use the ECU for purposes that are not intended by YANMAR; such as using unauthorized ECU, writing unauthorized data to ECU, leaving it broken, or removing sensors and actuators. Doing so could result in the violation of emission control regulations and will void the product warranty.
- Be sure to use the ECU in conjunction with the engines whose models or serial numbers are specified by YANMAR. Other ECU/engine combinations than specified will void the engine warranty.
- Replacing the fuel injection pump involves rewriting the fuel injection data in the ECU. Be sure to contact your local YANMAR dealer before replacing the fuel injection pump. Failure to rewrite the fuel injection data before replacing the fuel injection pump will void the engine warranty.
- Replacing the ECU involves migrating the fuel injection data to the existing ECU to the new unit. Be sure to contact your local YANMAR dealer before replacing the ECU. Failure to migrate the fuel injection data before replacing the ECU will void the engine warranty.
- Improper use or misuse of the ECU may result in death or serious injury due to an abrupt and unexpected increase in engine speed.

3.6 Special Hazards

Electrical energy

- Use only fuses with the specified current rating.
- Stop the machine immediately if an electrical system malfunction occurs. Disconnect the battery and contact a trained technician to perform troubleshooting procedures.
- Regularly inspect the machine's electrical components. Immediately repair any defects such as loose connections, damaged or corroded connectors, or cracked or scorched cables.
- Attachments with electrical connections must be compatible with the machine's voltage specifications (12 volts).
- For specific safety precautions when working with batteries, [see Maintaining the Battery on page 98](#).

Hydraulics

The machine's hydraulic system can still be pressurized even when the engine is not running.

- Be careful operating the machine when the hydraulic oil is very cold. Proceed with caution even after the cold system restriction warning turns off. Cold hydraulic oil can still be present in certain circuits.
- Do not touch hydraulic components while the machine is operating. Wait until the machine is cool.
- Hydraulic oil is flammable. Stop the engine immediately if a hydraulic leak is detected.

3

3.7 Safety Guidelines when Using Internal Combustion Engines

Running the engine

- Check the fuel lines for leaks and cracks before starting the engine.
- Do not run the machine if fuel leaks are present or the fuel lines are loose.
- Engine exhaust can kill you in minutes. Engine exhaust contains carbon monoxide. Never run the machine indoors or in an enclosed area such as a deep trench unless there is adequate ventilation.
- Do not run the engine near open flames or in potentially explosive areas.
- Do not touch the engine or exhaust when the engine is running or immediately after it has been turned off.
- Do not operate a machine when its fuel cap is loose or missing.
- Do not remove the radiator cap when engine is running or hot. The radiator fluid is hot and under pressure, and can cause severe burns.

3.8 Disposal



Environment

The operating fluids in this machine, including fuel, engine oil, and grease, may be considered hazardous waste in many areas. Responsible disposal prevents toxic chemicals and materials from harming the environment. Follow the product-related safety regulations SDS (Safety Data Sheet – MSDS).

All fluids, lubricants, materials, etc., used on the machine are subject to specific regulations regarding collection and disposal. Dispose of different materials and consumables separately and responsibly in accordance with environmental protection legislation.

If the machine is no longer used according to its designated use, ensure it is decommissioned or put out of operation and disposed of according to applicable regulations.

- Follow all applicable safety regulations during machine disposal.
- Machine disposal must be performed in accordance with state-of-the-art standards that apply at the time of disposal.