

DV207 Vibratory Roller

SERVICE MANUAL

Part number 84555711A

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English

April 2012

CASE
CONSTRUCTION

Product: Case DV207 Vibratory Roller Service Repair Manual 84555711A
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QUICK REFERENCE – CHAPTER GUIDE

SECTION 00 – MAINTENANCE

GENERAL INSTRUCTIONS

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2. Safety precautions
3. Repair safety precautions
4. Product identification
5. Check the tightening of bolted joints

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SECTION 00 – MAINTENANCE

GENERAL INSTRUCTIONS

1.Introduction

SECTION 00 – MAINTENANCE – CHAPTER 1

This service manual is divided into several chapters. It includes technical and assembly data, adjustment guidelines and instructions in the use of special tools, jigs and aids.

The primary purpose of this Service Manual is to provide basic information on removal, installation and servicing/repair of the machine's main groups.

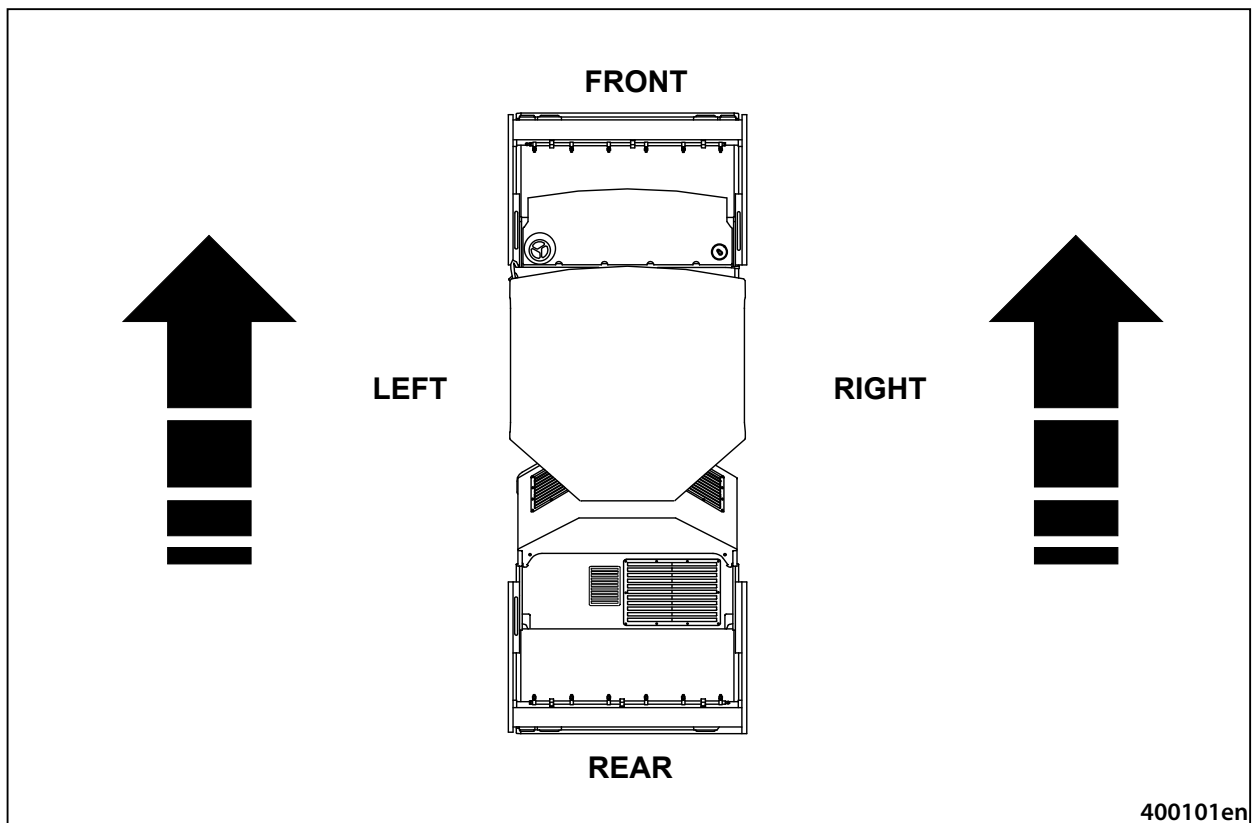
Machine group identification in this manual corresponds to the Spare Parts Catalog.

Before beginning work, we recommend that you mark any removed parts that will be reinstalled and that you cover all holes in individual hydraulic system parts to prevent hydraulic circuit contamination.

When installing individual parts in the machine, tighten individual bolts or nuts as indicated in the torque tables (appendix) unless otherwise indicated in the text.

ALWAYS observe the safety instructions and precautions indicated in Chapter 2.

The manufacturer is continually improving the products based on operational experience and the latest knowledge. Consequently, the manufacturer reserves the right to make changes to the illustrations, descriptions, procedures or design patterns given in this manual as developments are made.



SECTION 00 – MAINTENANCE – CHAPTER 1

[illegible]

SECTION 00 – MAINTENANCE

2.Safety precautions

2.1. Safety section

Your safety and that of people around you depends on you. It is essential that you understand this manual to ensure the correct operation, inspection and maintenance of this machine.

Read this manual carefully and check that you fully understand:

- The symbols on the controls and the safety signs used in this manual and on the machine.
- The speed, stability, braking and steering characteristics of the machine. If you are in any doubt, consult your dealer.

The safety messages in this manual concern situations which may arise during normal machine operation and servicing. These safety messages also indicate the various ways of coping with these situations.

2.1.1. Precautionary statements – personal safety signal words



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Throughout this manual and on the machine safety signs, you will find the signal words **DANGER**, **WARNING** and **CAUTION** followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



DANGER



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with **DANGER** is RED.



WARNING



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with **WARNING** is ORANGE.



CAUTION



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with **CAUTION** is YELLOW.

FAILURE TO FOLLOW DANGER, WARNING AND CAUTION INSTRUCTIONS COULD RESULT IN DEATH OR SERIOUS INJURY.

2.1.2. Machine safety and information signal words

NOTICE: NOTICE indicates a situation that could result in machine or property damage if not avoided. The color associated with NOTICE is BLUE.

Throughout this manual, you will find the signal word NOTICE followed by special instructions to prevent machine or property damage. The word NOTICE is used to address practices not related to personal safety.

NOTE: NOTE indicates additional information that clarifies steps, procedures or other information in this manual.

Throughout this manual, you will find the word NOTE followed by additional information about a step, procedure or other information in the manual. The word NOTE is not intended to address personal safety or property damage.

2.1.3. General safety rules

- Never operate the machine under the influence of alcohol, drugs or while otherwise impaired.
- Never permit anyone other than the machine operator to ride on the machine.
- A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.
- Any person who operates the machine or performs machine maintenance or repairs must be familiar with the guidelines given in this Operator's Manual.
- Keep clear of moving parts. Loose clothing, jewelry, watches, long hair and other loose or hanging items can become entangled in moving parts.
- Always use personal protective equipment (PPE), such as work clothing, safety boots, hard hat and hearing protection.
- Make sure all guards and shields are in good condition and properly installed before operating the machine. Never operate the machine with the shields or guards removed.
- Make sure all components are in good condition and tighten all connections before starting the engine or pressurizing the system.
- Dirty or slippery steps, ladders, handholds, walkways and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.
- Operate machine controls only when seated in the operator seat.
- Before starting the machine, be sure that the drive controls are in their neutral position.
- DO NOT attempt to remove material from any part of the machine while it is being operated or components are in motion.
- Never smoke or handle open flames when checking or pumping fuels, refilling oils, lubricating the machine or inspecting or pressurizing the accumulator.
- Seat belt inspection and maintenance:
 - a. Keep seat belts in good condition.
 - b. Keep the belts away from sharp edges and items that could cause damage.
 - c. Periodically check belts, buckles, retractors, tethers, slack take-up system and mounting bolts for damage.
 - d. Replace all parts that have damage or wear.
 - e. Replace belts that have cuts that can make the belt weak.
 - f. Check that bolts on the seat bracket or mounting are tight.
 - g. If the belt is attached to the seat, make sure the seat or seat brackets are mounted securely.
 - h. Keep seat belts clean and dry.
 - i. Clean belts with soap solution and warm water only.
 - j. Do not use bleach or dye on the belts because this can make the belts weak.

CALIFORNIA**PROPOSITION 65 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.

Battery posts, terminals and related accessories contain lead and lead compounds. Wash your hands after handling.

SECTION 00 – MAINTENANCE – CHAPTER 2

2.1.4. General operating safety

Before starting work, the operator must do the following:

- Be familiar with the work site environment, i.e. with the slopes, utility line system, as well as with necessary types of work site protections.
- Indicate each machine start-up with an acoustic or light signal and allow a few moments for personnel to leave the work area before turning on the machine engine.
- Confirm brake and steering functionality before operating the machine.
- Always make sure the work area is clear of tools, parts, other persons and pets before you start operating the machine.
- Always keep windows, mirrors, all lighting and the Slow Moving Vehicle (SMV) emblem clean to provide the best possible visibility while operating the machine.
- Never operate the machine in enclosed spaces as harmful exhaust gases may build up.
- DO NOT operate the machine during an electrical storm.
 - If lightning should strike during operation, remain in the cab. Do not leave the cab or operator's platform. Do not make contact with the ground or objects outside the machine.
 - If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.
- Before leaving the machine:
 - a. Park the machine on a firm, level surface.
 - b. Put the drive controls in their neutral position.
 - c. Turn off the engine and remove the key.
- Start the engine from the operator seat only.
- DO NOT roll and compact at slopes of such angles where there is a risk of soil breaking off (dropping) under the machine or a risk of loss of grip followed by uncontrolled slip.
- Depending on the bearing capacity of the subsoil, DO NOT roll and compact at such a distance from the edge of the slope or trench that there is a risk of landslide or the shoulder breaking off (dropping) together with the machine.
- DO NOT roll and compact with vibration at such a distance from walls, cuts or slopes that would cause them to slip (slide) and cover the machine.
- DO NOT compact with vibration at such a distance from buildings or facilities and equipment that there is a risk of them being damaged due to vibration transfer impact.
- DO NOT operate the machine when within hazardous reach of other machines or transportation means aside from those that operate in mutual concert with the machine.
- DO NOT operate the machine at places impossible to see from the operator platform and where hazard to people or property could occur unless work safety has been secured through some other way, such as via signaling by duly instructed personnel.
- DO NOT operate the machine under reduced visibility or at night, unless the machine's work area and the work site are illuminated sufficiently.
- Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety. If the machine comes into contact with high voltage, observe the following principles:
 - do not attempt to leave the operator platform while in the hazardous zone
 - warn others to keep off and not touch the machine
 - try to drive the machine out of the hazardous zone
- When parking the machine on a road, always take into consideration the effect the weight of the machine will have on the road.
- Exposure to loud noises could cause hearing damage. Always wear hearing protection when operating noisy equipment or when working in a noisy environment.

SECTION 00 – MAINTENANCE – CHAPTER 2

2.2.1. Safety signs

NOTICE

Clean the safety signs and keep them legible – do not use solvent, gasoline or other harsh chemicals to clean the safety signs.

Replace all worn, damaged or missing safety signs.

If a safety sign is on a part that is replaced, make sure the new part has the safety sign.

1. Runover hazard!



Maintain a safe distance from the machine. Failure to comply will result in death or serious injury. (Symbol located at the back)

Part no.: ND148560

Quantity: 1

2. Explosion hazard!

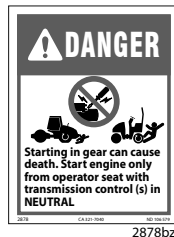


Read the procedure in the Operator's Manual before jump starting or servicing to avoid injury. Failure to comply will result in death or serious injury. (Symbol located on the inner side of the battery door at the rear of the machine)

Part no.: ND106581

Quantity: 1

3. Starting in gear can cause death!



Starting in gear could cause death. Start the engine from the operator seat only with the transmission control(s) in neutral. Failure to comply will result in death or serious injury. (Symbol located on the hood)

Part no.: ND106579

Quantity: 1

4. Hot surface hazard!



Maintain a safe distance from the hot part of the machine. Failure to comply could result in death or serious injury. (Symbol located above the exhaust)

Part no.: ND106591

Quantity: 1

5. Hot liquid under pressure hazard!



Do NOT open the expansion tank cap until the liquid cools down below 50°C (122°F). Failure to comply could result in death or serious injury. (Symbol located on the righthand side of the hood above the door)

Part no.: ND146955

Quantity: 1

6. Entanglement hazard!

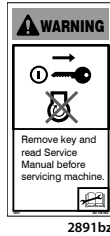


Maintain a safe distance from the rotating cooling fan, pulley and belt. Keep clear or stop engine before servicing. Failure to comply could result in death or serious injury. (Symbol located on the right side of the hood and on the cooler)

Part no.: ND109916

Quantity: 2

7. Adjust when stationary!



2891bz

Do NOT perform any adjustments or maintenance while the engine is running. Stop the engine, remove the ignition key and read the Service Manual before servicing the machine. Failure to comply could result in death or serious injury. (Symbol located on the left-hand side)

Part no.: ND106592

Quantity: 1

8. Welding hazard!



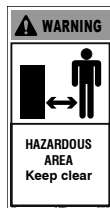
2892bz

Read Operator's Manual before welding on the machine. Disconnect the alternator before welding on the machine. Failure to comply could result in death or serious injury. (Symbol located on the dashboard)

Part no.: ND106593

Quantity: 1

9. Danger area



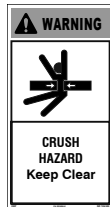
2885bz

Maintain a safe distance from the machine. Failure to comply could result in death or serious injury. (Symbols located on both sides of the machine)

Part no.: ND106586

Quantity: 2

10. Clamping hazard



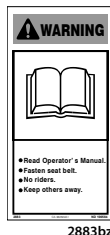
2887bz

Maintain a safe distance from the machine. Risk of being clamped between the front and rear frame of the machine. Failure to comply could result in death or serious injury. (Symbols located on the left and right near steering joint)

Part no.: ND106588

Quantity: 4

11. Read Operator's Manual!



2883bz

Before starting the machine, thoroughly read the safety measures and instructions for controlling the machine and its actuators in the manuals supplied with the machine. Fasten the seat belt. Do not carry passengers or riders. Keep others away. Failure to comply could result in death or serious injury. (Symbol located on the dashboard)

Part no.: ND106584

Quantity: 1

12. Crush hazard!



3447bz

Avoid crushing. Do not jump if machine tips. Use the seat belt. Failure to comply could result in death or serious injury. (Symbol located on the dashboard)

Part no.: ND148014

Quantity: 1

SECTION 00 – MAINTENANCE – CHAPTER 2

13. Crush hazard!



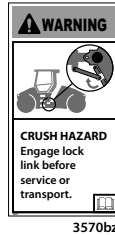
3431bz

Engage the hood lock before servicing the machine. Failure to comply could result in death or serious injury. (Symbol located on the left hand side)

Part No.: ND147576

Quantity: 1

14. Crush hazard!



3570bz

Secure the steering joint (lock link) when loading and transporting the machine on a vehicle. Failure to comply could result in death or serious injury. (Symbol located to the left on the rear frame near the joint)

Part No.: 84595622

Quantity: 1

15. Hood locking



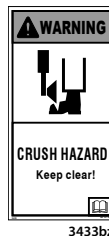
3326bz

Lock the hood. (Symbol located on the left side of the machine)

Part no.: ND140504

Quantity: 1

16. Crush hazard!



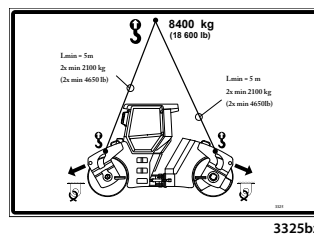
3433bz

Make sure that no one is within the danger area surrounding the edge cutter. Failure to comply could result in death or serious injury. (Symbol located on right-hand side of the machine (option))

Part No.: ND147578

Quantity: 1

17. Lifting diagram



3325bz

Use rigging of sufficient loading capacity to lift the Machine. Secure the Machine's joint before lifting. (Symbol located on the left side of the machine)

Part no.: ND140503

Quantity: 1

18. Lifting lugs



2153bz

Lift the machine using these lugs. (Symbol located on both sides of the machine)

Part no.: ND081460

Quantity: 4

19. Sling points



3048bz

The machine is to be rigged in these points. (Symbols located on both sides of the machine)

Part no.: ND119495

Quantity: 4

20. Machine's max height



Caution when passing locations with height limit. (Symbol located on the left beneath the cabin, on the Machine frame)

Part no.: ND128599

Quantity: 1

21. Jacking point



Place to install hand jack or fixed support of the machine. (Symbol located on both sides of the machine)

Part No.: ND128663

Quantity: 4

22. Read Operator's Manual

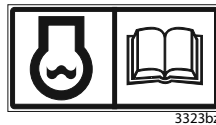


The Operation Manual stowage box. (Symbol located on the box at the rear of the seat)

Part no.: ND081612

Quantity: 1

23. Coolant

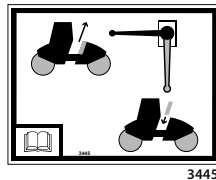


Coolant is hazardous to health. Read the Operator's Manual before filling up or changing coolant. (Symbol located on the coolant tank)

Part no.: ND140501

Quantity: 1

24. Hood lifting



Pump to lift the hood. (Symbol located on the inner side of the disconnecter door)

Part no.: ND148109

Quantity: 1

25. Hearing protection required



Wear hearing protection with the machine if it does not have a cab. (Symbol located on the dashboard)

Part no.: ND081592

Quantity: 1

26. No washing



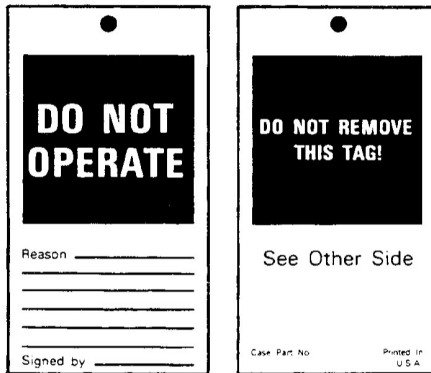
Cover electrical devices when washing the machine. (Symbol located on the dashboard)

Part no.: ND081530

Quantity: 1

2.3. General maintenance safety

- Before you begin machine servicing, attach a “DO NOT OPERATE” warning tag to the machine in an area that will be visible.



- Service on the machine must only be performed by a professionally trained person using appropriate tools and in compliance with the safety instructions located in the manuals shipped with the machine.
- Do not attempt to clean, lubricate, clear obstructions or make adjustments to the machine while it is in motion or while the engine is running.
- Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.
- Only service the machine on a firm level surface, secured against accidental movement (wheel chocks), with the engine OFF, the key removed, the battery disconnected and the drive controls in their neutral position.
- Improper removal of coolant caps could result in scalding. The cooling system operates under pressure. Hot coolant can spray out if a cap is removed while the system is hot. Allow the system to cool before removing the cap. When removing a cap, turn it slowly to allow pressure to escape before completely removing the cap.
- Engine, transmission, exhaust components and hydraulic lines may become hot during operation. Take care when servicing such components. Allow surfaces to cool before handling or disconnecting hot components. Wear personal protective equipment, such as hard hat, safety glasses or goggles, heavy gloves, hearing protection and protective clothing.
- The body must be protected with proper gloves and clothing.
- Close all access doors and install all panels, guards and shields after servicing the machine.
- Replace damaged or worn tubes, hoses, electrical wiring, etc.
- Only replace parts with new, genuine parts

specified in the Spare Parts Catalog.

- Jack or lift the machine only at the jacking or lifting points indicated in this manual.
- Stop the engine, remove the key and relieve the pressure before connecting or disconnecting fluid lines.
- Stop the engine and remove the key before disconnecting or connecting electrical connections.
- When welding, follow the instructions in the manual. Always disconnect the battery before welding on the machine. Always wash your hands after handling battery components.
- When the machine is taken out of service because it is damaged beyond repair or has reached the end of its service life, removal, scrapping and/or recycling of components, fluids, etc. must only be performed by a qualified technician using service instructions and in compliance with local laws and regulations.
- Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.
 - DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
 - If hydraulic oil or diesel fuel penetrates the skin, seek medical attention immediately.
 - If hydraulic oil or diesel fuel comes into contact with the skin, wash the affected area immediately.
 - Continuous, prolonged contact with hydraulic oil may cause skin cancer. Avoid prolonged contact and wash the skin promptly with soap and water.

2.3.1. Fire and explosion prevention

- Always have a fire extinguisher on or near the machine.
- Make sure the fire extinguisher is maintained and serviced according to the manufacturer's instructions.
- Do not smoke or use an open flame when at work.
- Fuel or oil leaks or spills on hot surfaces or electrical components could cause a fire.
- Trash, debris, bird nests or flammable material can ignite on hot surfaces.
- At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as engine, transmission, exhaust, battery, etc. More frequent cleaning of the machine may be necessary depending on the operating environment and conditions.
- At least once each day, remove debris accumulation around moving components such as bearings,

pulleys, belts, gears, fan, etc. More frequent cleaning of the machine may be necessary depending on the operating environment and conditions.

- Inspect the electrical system for loose connections or frayed insulation. Repair or replace loose or damaged parts.
- Do not store oily rags or other flammable material on the machine.
- Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvent before welding or flame cutting.
- Do not expose the machine to flames or explosives.
- Promptly investigate any unusual smells or odors that may occur during operation of the machine.

2.3.2. Hazardous chemicals

- If you are exposed to or come in contact with hazardous chemicals, you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.
- Material Safety Data Sheets (MSDS) provide information about the chemical substances contained in a product, safe handling and storage procedures, first-aid measures and procedures to be taken in the event of a spill or accidental release. MSDS are available from your dealer.
- Before servicing your machine, check the MSDS for each lubricant, fluid, etc. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, on manufacturer containers and in this manual when servicing the machine.
- Dispose of all fluids, filters and containers in an environmentally safe manner in accordance with local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.
- Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.
- Keep out of reach of children and other unauthorized persons.
- Additional precautions are required for applied chemicals. Obtain complete information from the manufacturer or distributor of the chemicals before using them.
- Never mix diesel with gasoline or alcohol. These mixtures may cause an explosion.
- Do not smoke, weld, grind or use an open flame near hazardous chemicals.

2.3.3. Battery safety

For specific information on the machine's battery and electrical system, refer to electrical system sections in this manual.

- Always wear eye protection when working with batteries.
- Do not create sparks or have an open flame near a battery.
- Ventilate when charging or using in an enclosed area.
- Disconnect the negative (-) terminal first and reconnect the negative (-) terminal last.
- When welding on the machine, disconnect both terminals of the battery.
- Do not weld, grind or smoke near battery.
- When using auxiliary batteries or connecting booster cables to start the engine, use the procedure shown in Operator's Manual chapter "17. Electrical installation".
- Follow manufacturer's instructions when storing and handling batteries.
- Battery posts, terminals and related accessories contain lead and lead compounds. Wash your hands after handling. Lead is a toxic substance. This is a California Proposition 65 Warning.
- Battery acid causes burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes and clothing.
 - Antidote (external): flush with water.
 - Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately.
 - Antidote (internal): drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
- Keep out of reach of children and other unauthorized persons.
- Use rubber gloves and safety glasses when handling the batteries.
- Protect your skin and clothing against any stain caused by electrolyte or lead particles..
- If electrolyte comes in contact with the eyes, immediately flush the eyes with large amounts of water for several minutes. Get prompt medical attention.
- If skin or clothing is stained with electrolyte, remove the contaminated clothing and flush immediately with large amounts of soapy water or a baking soda/water solution. Get prompt medical attention.
- If electrolyte is ingested, give as much milk, calcined magnesia dissolved in water or plain water as possible and get prompt medical attention.

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- NEVER top up cells with distilled water unless work with the machine or recharging outside the machine will follow. Increased self-discharging of the battery would occur.
- NEVER replenish the acid (H_2SO_4)!
- Do NOT turn the batteries over. Electrolyte could pour out from the degassing holes of the battery.
- When acid (electrolyte) is spilled, flush the hit spot with water and neutralize with lime.
- When the batteries are recharged, hydrogen is released and when mixed with air forms an explosive, flammable mixture. Do NOT handle near an open flame or smoke nearby.
- See “Safety Precautions for work on wiring”

2.3.4. Air conditioning system

- The air conditioning system is under high pressure. Do not disconnect any lines. The release of high pressure can cause serious injury.
- The air conditioning system contains gases that are harmful to the environment when released into the atmosphere. Do not attempt to service or repair the system.
- Service, repair or recharging must be performed only by a trained service technician.
- Always wear safety protection when working around liquid refrigerant. Refrigerant can cause serious injury to the eyes and skin.

2.3.5. Transportation safety

For specific information on towing, loading, lifting or transporting the machine, refer to the operating instructions section in this manual.

- Incorrect towing procedures can cause accidents. When towing a disabled machine, follow the procedure in this manual.

Driving on public roads

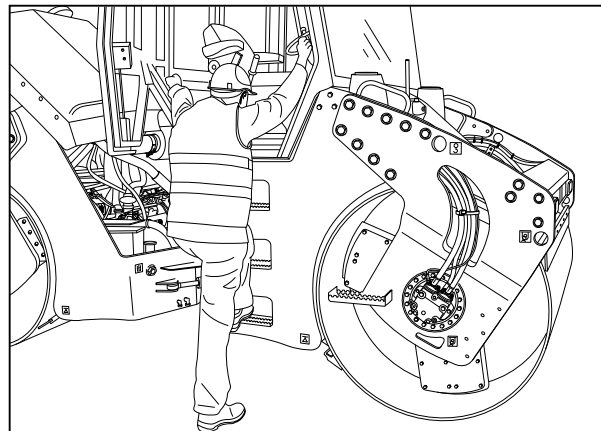
- Comply with local laws and regulations.
- Use appropriate lighting to comply with local regulations.
- Make sure the Slow Moving Vehicle (SMV) emblem is visible.
- Slow down and signal before turning.
- Pull over to allow faster traffic to pass.

Transporting the machine

- When transporting machine on a transport trailer, make sure it is properly secured. Be sure the SMV emblem on the machine is covered while it is being transported on a trailer.
- Be aware of overhead structures or power lines and make sure the machine can pass safely under.
- Travel speed should be such that complete control and machine stability is maintained as all times.

2.3.6. Proper entry and exit

- Proper entry or exit from the cab is the same on both sides.
- Do not use the steering wheel or other controls or accessories as handholds when entering or exiting the machine cab or operator platform.
- Face the machine when mounting and dismounting.
- Maintain a three-point contact with steps, ladders and handholds.
- Mount and dismount the machine only at designated locations that have handholds, steps or ladders.
- Do not jump off the machine.
- Never mount or dismount from a moving machine.
- Make sure steps, ladders and platforms remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.



2.3.7. Operator presence system

- Your machine is equipped with an operator presence system to prevent the use of some features if the operator is not in the operator seat.
- The operator presence system should never be disconnected or bypassed.
- If there is a fault in the system, the system must be repaired immediately.

2.3.8. Operator protective structure

The protective structure is a special safety component of your machine and each machine is equipped with one of the following operator protective structures:

- Rollover Protective Structure (ROPS)
- Falling Object Protective Structure (FOPS)
- Cab with ROPS

A ROPS may be a cab frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the machine are part of the ROPS.

- Seat belts are part of your protective system and must be worn at all times. The operator must be held to the seat inside the frame in order for the protective system to work.
- DO NOT attach any device to the protective structure for pulling purposes.
- DO NOT weld, drill holes, attempt to straighten or repair the protective structure. Modification in any way can reduce the structural integrity of the structure, which could cause death or serious injury in the event of a fire, tip, rollover, collision or accident.

The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the **protective structure MUST be replaced** so that it will provide the same protection as a new protective structure. Contact an authorized dealer for protective structure inspection and replacement.

After an accident, fire, tip or rollover, the following **MUST** be preformed by a qualified technician before returning the machine to field or work site operation:

- The protective structure **MUST be replaced**.
- The mounting or suspension for the protective structure, operator seat and suspension, seat belts and mounting components and wiring within the operator's protective system **MUST** be carefully inspected for damage.
- All damaged parts **MUST be replaced**.
- **DO NOT WELD, DRILL HOLES, ATTEMPT TO STRAIGHTEN OR REPAIR THE PROTECTIVE STRUCTURE. MODIFICATION IN ANY WAY CAN REDUCE THE STRUCTURAL INTEGRITY OF THE STRUCTURE, WHICH COULD CAUSE DEATH OR SERIOUS INJURY IN THE EVENT OF FIRE, TIP, ROLLOVER, COLLISION OR ACCIDENT.**

2.3.9. Utility safety

ALWAYS have all local utility companies mark the location of their lines. Before beginning any machine operation, it is your responsibility to be aware of all utility lines buried and overhead in the area of your project and to avoid them.

Check with local authorities for laws, regulations and/or strict penalties requiring you to locate and avoid existing utilities.

In the U.S.A. and Canada, call one of many "One Call System Directory" services. If you do not know the local number, call the national number (U.S.A. and Canada only): 1-888-258-0808.

CALL ALL LOCAL UTILITY COMPANIES BEFORE YOU PERFORM ANY MACHINE OPERATION

Know the utility color code (U.S.A. and Canada):

Electrical	Red
Gas, oil or gasoline.	Yellow
Communication, telephone, television	Orange
Water	Blue
Sewer	Green/Brown
Proposed excavation	White
Surveying	Pink
Reclaimed water and slurry	Purple

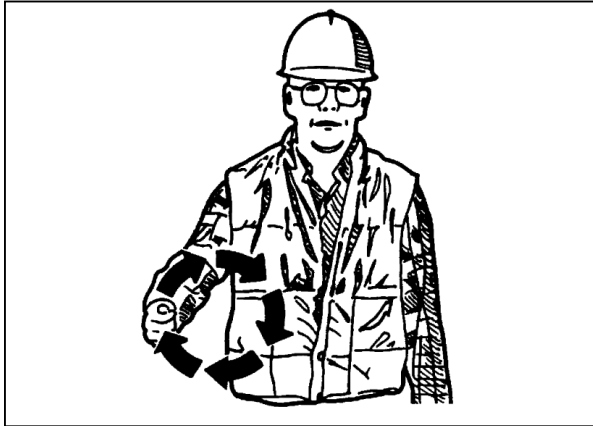
After locating any buried utility lines, carefully dig a hole by hand and/or automatic vacuum equipment to the utility line to verify the location and depth of the line.

The operator must promptly communicate any damage to the utility lines to their owner and at the same time take measures to prevent unauthorized persons from accessing the hazardous area.

2.4. Hand signals

When operating the machine, never attempt to carry out tasks calling for fine control or work in areas where visibility is poor or impaired without seeking the assistance of a signalman. Make perfectly sure that you and the signalman understand the signals to be used.

START THE ENGINE

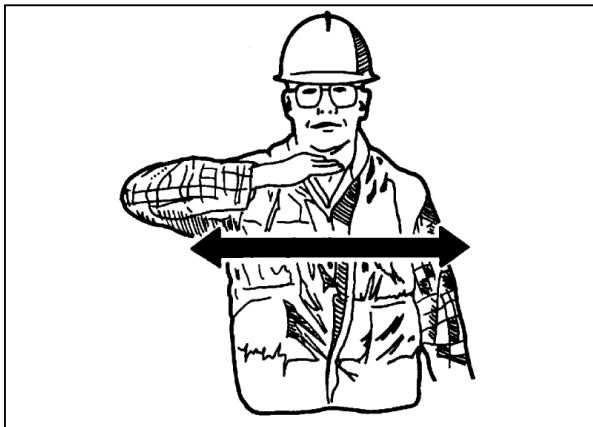


MOVE AWAY FROM ME

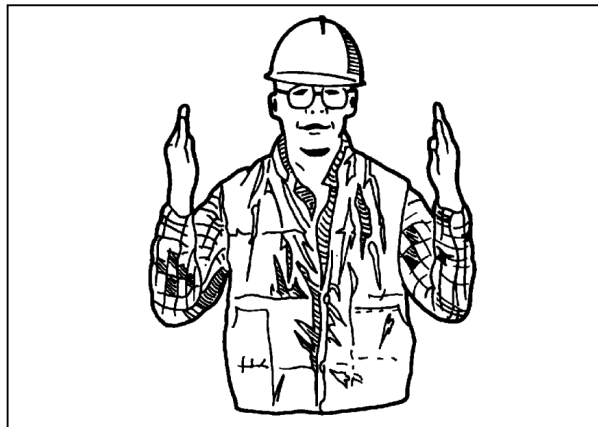
Move hands forward and rearward (palms out).



STOP THE ENGINE

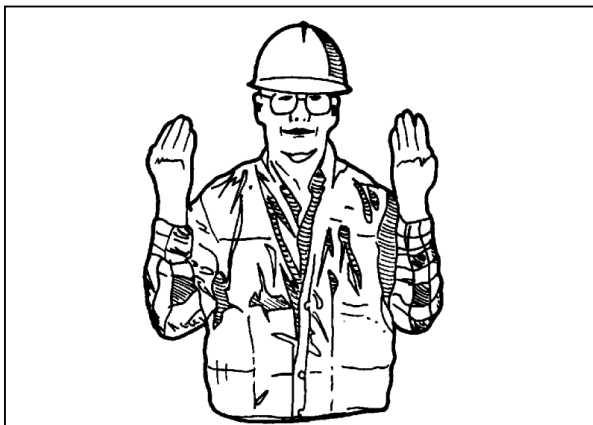


GO THIS FAR

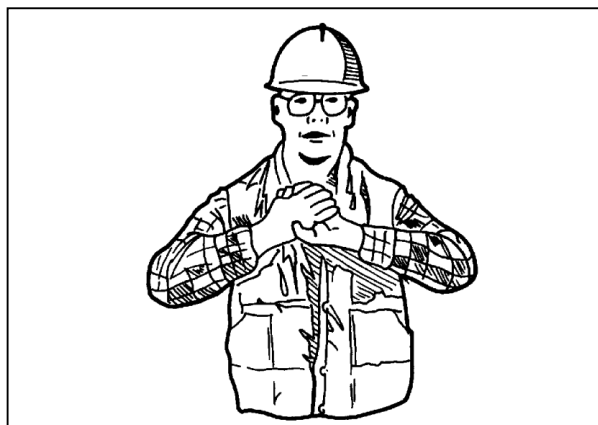


COME TO ME

Move hands forward and rearward (palms in).

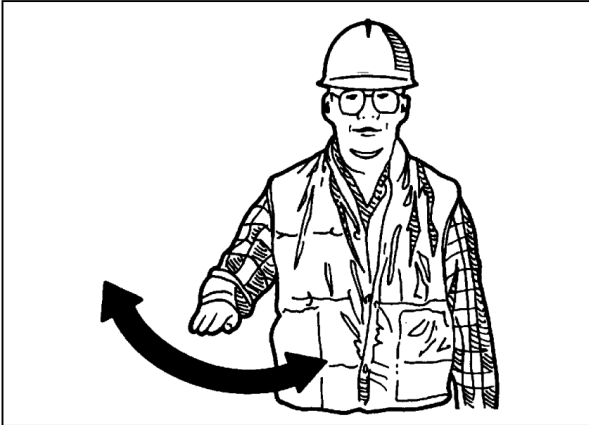


ALL STOP AND HOLD



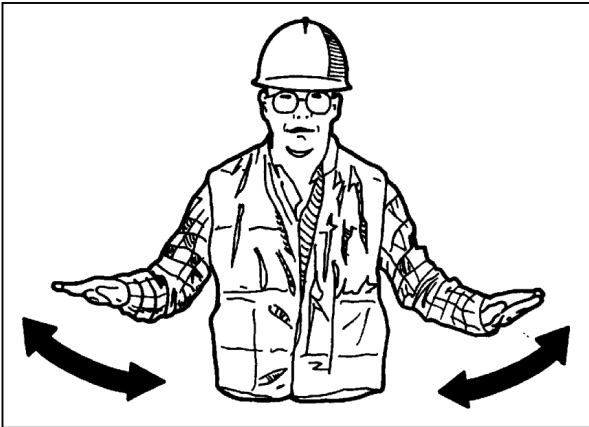
STOP

Move one hand back and forth.



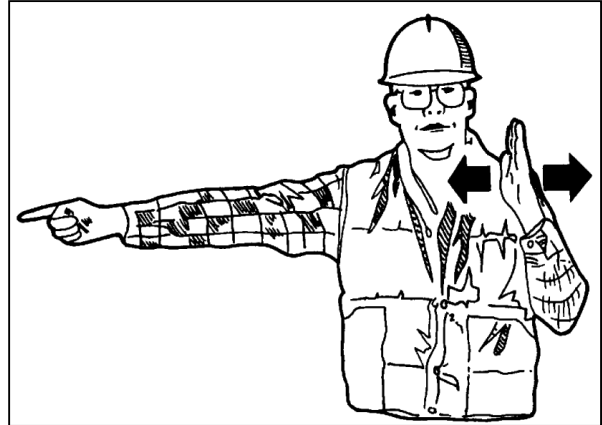
EMERGENCY STOP

Move both hands rapidly back and forth.



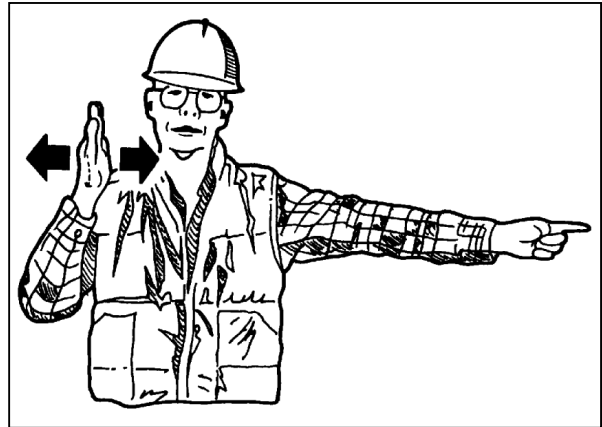
TURN MACHINE LEFT

To stop movement, stop moving your hand and make a fist.



TURN MACHINE RIGHT

To stop movement, stop moving your hand and make a fist.



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[illegible]

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3.Repair safety precautions