

Solar 220LL

Shop Manual

2023-7134E

Serial Number 1001 and Up

Daewoo reserves the right to improve our products in a continuing process to provide the best possible product to the market place. These improvements can be implemented at any time with no obligation to change materials on previously sold products. It is recommended that consumers periodically contact their distributors for recent documentation on purchased equipment.

This documentation may include attachments and optional equipment that is not available in your machine's package. Please call your distributor for additional items that you may require.

Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

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SAFETY

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TO THE OPERATOR OF A DAEWOO EXCAVATOR



DANGER!

Unsafe use of the excavator could lead to serious injury or death. Operating procedures, maintenance and equipment practices or traveling or shipping methods that do not follow the safety guidelines on the following pages could cause serious, potentially fatal injuries or extensive damage to the machine or nearby property.

Please respect the importance of taking responsibility for your own safety, and that of other people who may be affected by your actions.

The safety information on the following pages is organized into the following sections:

1. "General Safety Essentials" on page 5
2. "Location of Safety Labels" on page 5
3. "Summary of Safety Precautions for Lifting in Digging Mode" on page 6
4. "Work-site Precautions" on page 7
5. "Operation" on page 9
6. "Equipment" on page 14
7. "Maintenance" on page 18
8. "Shipping and Transportation" on page 22
9. "Lifting With Sling" on page 22



SAFETY ALERT SYMBOL



Be Prepared - Get To Know All Operating and Safety Instructions.

This is the Safety Alert Symbol. Wherever it appears in this manual or on safety signs on the machine you should be alert to the potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

LEARN THE SIGNAL WORDS USED WITH THE SAFETY ALERT SYMBOL

The words "**CAUTION**", "**WARNING**", and "**DANGER**" used throughout this manual and on decals on the machine indicate degree of risk of hazards or unsafe practices. All three degrees of risk indicate that safety is involved. Observe precautions indicated whenever you see the Safety Alert "Triangle," no matter which signal word appears next to the "Exclamation Point" symbol.



CAUTION!

Indicates potential of a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a generally unsafe practice.



WARNING!

Indicates potential of a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against a highly unsafe practice.



DANGER!

Indicates imminent hazard of a situation that, if not avoided, is very likely to cause death or extremely serious injury. It may also be used to alert against equipment that may explode or detonate if handled or treated carelessly.

GENERAL SAFETY ESSENTIALS

ACCESSORY APPLICATIONS

This excavator has been primarily designed for moving logs. For use other object handling devices, contact Daewoo for proper installation and application. Lifting-work applications (unless restricted or prohibited by local regulations) are permitted in approved lift configuration, to rated capacity only, with no side-loading. DO NOT use the machine for activities for which it was not intended. DO NOT use the grapple for lifting work (other than logs).

Use of an accessory hydraulic hammer (breaker), work in rough terrain, demolition applications or other hazardous operation may require installation of additional protective structures to safeguard the operator.

LIFTING CAPACITY RATING CONFIGURATION

Lifting capacity ratings that are printed at the end of this safety section are based on the machine being level, on a firm supporting surface, with hooks and slings attached in approved configuration. Loads must be balanced and supported evenly. Use taglines to keep the load steady if wind conditions and large surface area are a problem. Work crew hand signals, individual tasks and safe procedures should all be universally understood before the lift is made.

IMPORTANT

Before using the excavator to make lifts check municipal and regional regulations or statutes that could apply. Governing ordinances may require that all heavy lifting be done with single purpose equipment specifically designed for making lifts, or other local restrictions may apply. Making heavy lifts with a general purpose excavator that can be used for digging, loading, grading or other work may be expressly forbidden by a regional injunction or other legal prohibition. Always follow all of the other instructions, guidelines and restrictions for Safe Lifting in the Operation and Maintenance and Shop Manuals.

LOCATION OF SAFETY LABELS

Location of safety labels (decals) can vary from unit to unit. Refer to appropriate Operation and Maintenance Manual, and parts manual for your unit.

Always replace damaged or faded decals.

SUMMARY OF SAFETY PRECAUTIONS FOR LIFTING IN DIGGING MODE



DANGER!

Unsafe use of the excavator while making rated lifts could cause serious, potentially fatal injuries or extensive damage to the machine or nearby property. Do not let anyone operate the machine unless they've been properly trained and understand the information in the Operation and Maintenance Manual.

To lift safely while in Digging Mode, the following items must be evaluated by the operator and the work-site crew.

- Condition of ground support
- Excavator configuration and attachments
- Weight, lifting height and lifting radius
- Safe rigging of the load
- Proper handling of the suspended load

Taglines on opposite sides of the load can be very helpful in keeping a suspended load secure, if they are anchored safely to control points on the ground.



WARNING!

NEVER wrap a tagline around your hands or body.

NEVER rely on taglines or make rated lifts when wind gusts are in excess of 48.3 km/hr (30 mi/h). Be prepared for any type of wind gust when working with loads that have a large surface area.

Always engage the "Digging Mode" control on the Instrument Panel before using the excavator for lifting work.



WARNING!

If you need more information or have any questions or concerns about safe operating procedures or working the excavator correctly in a particular application or in the specific conditions of your individual operating environment, please consult your local Daewoo representative.

UNAUTHORIZED MODIFICATIONS

Any modification made without authorization or written approval from Daewoo can create a safety hazard, for which the machine owner must be held responsible.

For safety's sake, replace all OEM parts with the correct authorized or genuine Daewoo part. For example, not taking the time to replace fasteners, bolts or nuts with the correct replacement parts could lead to a condition in which the safety of critical assemblies is dangerously compromised.

WORK-SITE PRECAUTIONS

ATTACHMENT PRECAUTIONS

Options kits are available through your dealer. Contact Daewoo for information on available one-way (single-acting) and two-way (double-acting) piping/valving/auxiliary control kits. Because Daewoo cannot anticipate, identify or test all of the attachments that owners may wish to install on their machines, please contact Daewoo for authorization and approval of attachments, and their compatibility with options kits.

AVOID HIGH-VOLTAGE CABLES

Serious injury or death can result from contact or proximity to high-voltage electric lines. The grapple does not have to make physical contact with power lines for current to be transmitted.

Use a spotter and hand signals to stay away from power lines not clearly visible to the operator.

VOLTAGE	MINIMUM SAFE DISTANCE
6.6kV	3.0 m (9' - 10")
33.0kV	4.0 m (13' - 1")
66.0kV	5.0 m (16' - 5")
154.0kV	8.0 m (26' - 3")
275.0kV	10.0 m (32' - 10")

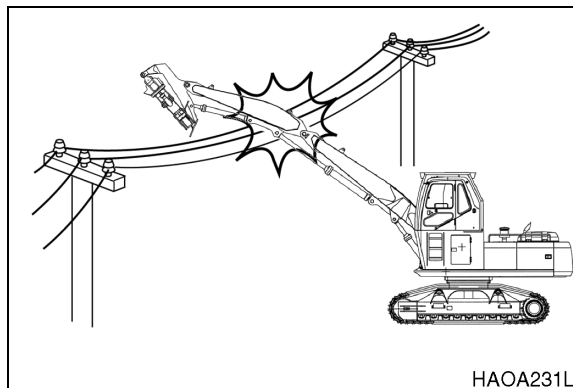


Figure 1

Use these minimum distances as a guideline only. Depending upon the voltage in the line and atmospheric conditions, strong current shocks can occur with the boom or grapple as far away as 4 - 6 m (13 - 20 ft) from the power line. Very high voltage and rainy weather could further decrease that safety margin.

NOTE: *Before starting any type of operation near power lines (either above ground or buried cable-type), you should always contact the power utility directly and work out a safety plan with them.*

BE AWARE OF HEIGHT OBSTACLES

Any type of object in the vicinity of the boom could represent a potential hazard, or cause the operator to react suddenly and cause an accident. Use a spotter or signal person working near bridges, phone lines, work-site scaffolds, or other obstructions.

USE CARE ON LOOSE SUPPORT

Working heavy loads over loose, soft ground or uneven, broken terrain can cause dangerous side load conditions and possible tipover and injury. Travel without a load or balanced load may also be hazardous.

If temperatures are changing, be cautious of dark and wet patches when working or traveling over frozen ground. Stay away from ditches, overhangs and all other weak support surfaces. Halt work and install support mats or blocking if work is required in an area of poor track support.

USE SOLID SUPPORT BLOCKING

Never rely on lift jacks or other inadequate supports when work is being done. Block tracks fore and aft to prevent any movement.

OVERHANGS ARE DANGEROUS

Digging the workface under an overhang – the work area beneath a cliff or under the edge of a ditch – is dangerous. Know the height and reach limits of the excavator and plan ahead while working. Avoid creating dangerous situations by moving around the work-site while making excavations. Go on to another digging area before steep overhangs are formed. Working around deep pits or along high walls or trenching may require support blocks, especially after heavy rainfalls or during spring thaws. Park the excavator away from overhangs before work shutdown.

SLOPING TERRAIN REQUIRES CAUTION

Dig evenly around the work-site whenever possible, trying to gradually level any existing slope. If it's not possible to level the area or avoid working on a slope, reducing the size and cycling rate of the workload is recommended.

On sloping surfaces, use caution when positioning the excavator prior to starting a work cycle. Stay alert for instability situations in order to avoid getting into them. For example, you should always avoid working the grapple over downhill crawler tracks when parked perpendicular to the slope. Slow all downhill swing movements and avoid full extensions of the grapple in a downhill direction. Lifting the grapple too high, too close to the machine, while the excavator is turned uphill can also be hazardous.

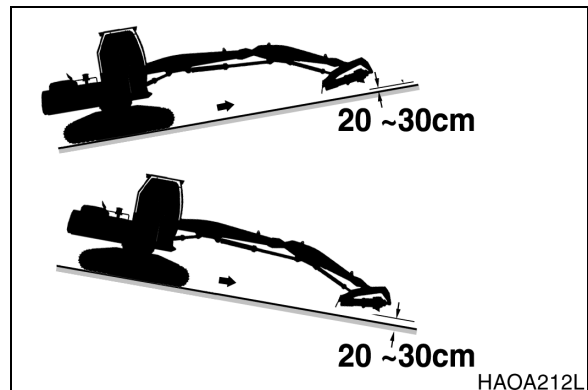


Figure 2

STAY ALERT FOR PEOPLE MOVING THROUGH THE WORK AREA

When loading a truck you should always know where the driver is.

Avoid loading over the cab of a truck even if the driver is in a safe spot. Someone else could have gone inside, for any number of reasons. Avoid working where unseen passersby might be.

Slow down the work cycle and use slower travel speeds in congested or populated areas. Use a commonly understood signal so that other members of the work crew can warn the operator to slow or halt work in an impending hazard situation.

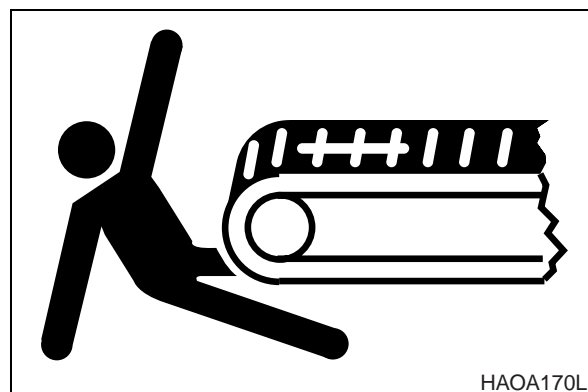


Figure 3

BE AWARE OF AND CONFORM TO LOCAL REGULATIONS

Minimum levels of insurance coverage, work permits or certification, physical barriers around the work-site or restricted hours of operation may be mandated by governing authorities. There may also be guidelines, standards or restrictions on equipment that may be used to perform certain kinds of work. Check and follow all local requirements, which may also be related to below ground hazards and power lines.

OPERATION

OPERATE WHILE SEATED AT THE OPERATOR'S STATION ONLY

Never reach in through a window to work a control. Do not operate the excavator unless you're in the command position stay alert and focused on your work at all times but **DO NOT** twist out of the seat if job activity behind you (or to the side) requires your attention.

Use a spotter or signal person if you can't see clearly and something is happening behind you.

Replace damaged safety labels and lost or damaged owner's manuals.

Do not let anyone operate the machine unless they've been fully and completely trained, in safety and in the operation of the machine.



Figure 4

BEFORE STARTING THE ENGINE

Do a "pre-start" safety check:

- Walk around your machine before getting in the operator's cab. Look for evidence of leaking fluid, loose fasteners, misaligned assemblies or any other indications of possible equipment hazard.
- All equipment covers and machinery safety guards must be in place, to protect against injury while the machine is being operated.
- Look around the work-site area for potential hazards, or people or property that could be at risk while operation is in progress.
- **NEVER** start the engine if there is any indication that maintenance or service work is in progress, or if a warning tag is attached to controls in the cab.
- A machine that has not been used recently, or is being operated in extremely cold temperatures, could require a warm-up or maintenance service prior to start-up.
- Check gauges and monitor displays for normal operation prior to starting the engine. Listen for unusual noises and remain alert for other potentially hazardous conditions at the start of the work cycle.

NEVER USE ETHER STARTING AIDS

An electric-grid type manifold heater is used for cold starting. The glowing heater element can cause ether or other starting fluid to detonate, causing injury.



Figure 5

MOUNTING AND DISMOUNTING

NEVER get on or off a moving machine. Do not jump on/off. The entry/egress path should be clear of mud, oil and spills and mounting hardware must be kept tight and secure.

Always use handholds, steps or track shoes and maintain at least 3-point contact of hands and feet. Never use controls as handholds.

NEVER get up from the operator's seat or leave the operator's station and dismount the machine if the engine is running.



Figure 6

OBSERVE GENERAL SAFETY RULES

Only trained and authorized personnel, with a good knowledge and awareness of safe procedures, may be allowed to operate or perform maintenance or service on the excavator.

All personnel at the work-site should be aware of assigned individual responsibilities and tasks. Communication and hand signals used should be understood by everyone.

Terrain and soil conditions at the job site, approaching traffic, weather-related hazards and any above or below ground obstacles or hazards should be observed and monitored by all work crew members.

ENGINE VENTILATION

Engine exhaust gases can cause fatal accidents, as well as unconsciousness, loss of alertness, judgement and motor control and serious injury.

Make sure of adequate ventilation before starting the engine in any enclosed area.

You should also be aware of open windows, doors or ductwork into which exhaust may be carried, or blown by the wind, exposing others to danger.

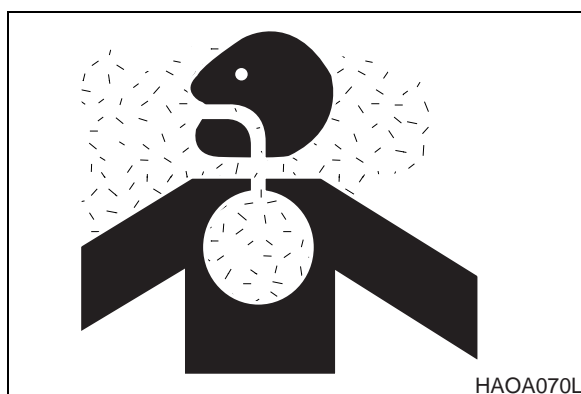


Figure 7

ASBESTOS DUST HAZARD PREVENTION

Asbestos dust can be HAZARDOUS to your health if it is inhaled.

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