

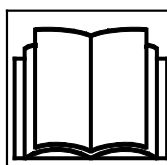
AVANT[®]



Operator's Manual

2019-

From serial number 92846-



Read this Operator's Manual, safety decals, and other safety related instructions before operating the loader. If you do not obey these instructions, there is a risk of serious injury. Keep all manuals for reference.

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Introduction

Foreword

AVANT TECNO OY wants to thank you for purchasing this battery powered Avant loader. It represents a new level of quiet operation with no local emissions and low operating costs. The battery powered model range is designed and built upon Avant’s long experience with compact loaders and is manufactured in Finland. We ask you that you read and understand the contents of this Operator’s Manual completely before operating the loader. This Operator’s Manual is intended to help you to:

- operate this machine safely and efficiently
- observe and prevent situations that may cause a risk or danger
- keep the machine in good condition and its life span as long as possible

The following warning symbols are used throughout this Operator’s Manual to indicate factors that must be considered to reduce the risk of personal injury or damage to property:

	<p>WARNING:</p> <p>SAFETY ALERT SYMBOL</p>
	<p>This symbol means: “Warning, be alert! Your safety is involved!”</p> <p>This safety symbol refers to important safety information in this Operator's Manual. It warns of an immediate hazard that could cause serious personal injury to yourself or others near the equipment.</p> <p>The safety alert symbol by itself and with related safety statement indicates important safety messages throughout this Operator's Manual. It is used to draw attention to instructions involving your personal safety or the safety of others. When you see this symbol, be alert: Your personal safety is involved. Carefully read the message that follows and inform other operators.</p>

DANGER This signal word indicates a hazardous situation which, if not avoided, will cause death or serious injury.

WARNING This signal word indicates a potentially hazardous situation which, if not avoided, could cause serious injury or death.

CAUTION This signal word is used when minor injury could result if the instructions are not followed properly.

NOTICE This signal word indicates information about the correct operation and maintenance of the equipment.

Failure to observe the instructions accompanying the symbol can lead to equipment breakdown or other property damage.

Make sure all relevant manuals are available



Wrong use of the equipment can cause death or serious injuries - Make sure to read all relevant Operator's Manuals and instructions thoroughly and keep them available for all operators.

Using each attachment requires specific information about correct use, mounting procedure, safety, and how to avoid hazardous situations. An attachment may introduce risks that are not present when operating the loader with other kinds of attachments. Always read the Operator's Manual of each attachment carefully.

Contact your local Avant dealer for any questions, service, spare parts or about any problems that may occur with the operation of your loader or its attachments.

Always keep this Operator's Manual with the loader. If this Operator's Manual gets lost, ask for a new copy from your Avant dealer. Remember also to give this Operator's Manual to the new owner when the loader changes ownership.

Manuals of attachments



Attachments can create significant risks that are not covered by this Operator's Manual of the loader.

Make sure you have all attachments manual available. Wrong use of an attachment can cause serious injuries or death.

Each attachment is accompanied by its own respective Operator's Manual. The Operator's Manual will show important information related to safety, and how to attach, use, and maintain each attachment correctly.

Spare parts list



All spare parts of the loader are listed in a separate spare parts list.

Contact your Avant service partner or dealer to order parts. Have the serial number of the loader available when ordering to ensure correct parts.

Intended use

The Avant e series loaders are battery powered, hydraulically operated, articulated compact loaders. They are designed and manufactured for both private and professional use. The loader can be equipped with a range of attachments offered by Avant Tecno Oy, which enables you to do several different jobs with the same machine. Because of this multi-purpose nature of the machine and the various attachments and tasks, read always not only this Operator's Manual but also the Operator's Manual of the attachment, and follow all instructions. Every person who deals with this machine must follow work safety regulations, all other generally accepted rules related to work health and safety, and all road traffic regulations.

Remember that safety consists of several factors. The loader, by itself or equipped with an attachment, is very powerful and can cause serious personal injuries or property damages if operated in a wrong or careless way. Never allow the compact size of the loader to distract from this fact and keep it in mind when you consider allowing another user to operate it. Do not operate an attachment unless you have familiarised yourself with the use of it and the eventual dangers and risks related to it. Take the keys with you when you leave the loader unattended to prevent other, unauthorized persons to operate the machine. The loader is not intended to lift or transport people or be used as a work platform. Different jobs require different attachments, and it is not allowed to handle any material or loads without any attachment fitted.

This loader has been designed to need as little maintenance as possible. The operator can perform the routine maintenance operations. There are however more demanding service operations that can be done by professional service personnel only. Wear appropriate protective equipment when you do any service or maintenance work. Original spare parts must be used. Familiarise yourself with the service and maintenance instructions in this Operator's Manual. Operating a loader that is in poor condition, or that has received unauthorised modifications, can be hazardous to the operator and bystanders.

Contact your local Avant dealer, if you are uncertain of anything concerning the operation and maintenance of this loader, or for any questions, service, or spare parts.

In addition to the safety instructions included in this Operator's Manual, you must observe all occupational safety regulations, local laws, and other regulations concerning the use of the equipment. Particularly the regulations concerning the use of the equipment on public road areas must be observed. Contact your Avant dealer for more information about local requirements before you operate the loader on road areas.

Battery operated e5**NOTICE**

Always follow the instructions related to the use and charge cycles of the battery. The useful life of the battery depends heavily on how it is used and charged.

Recharge battery immediately when the charge level has dropped to 50 %. Do not leave battery discharged.

The optimum lifetime of the battery depends on the operating conditions, and on how the battery is discharged and charged. For optimal lifetime of the battery, recharge the battery before the charge level is below 40 %. Discharges to 20 % level, or lower, are so called deep discharges, and they will shorten the life expectancy of the battery considerably.

Recharge the battery whenever possible. There is no need to wait until the charge drops below a certain percentage. The battery should always be kept as full as possible.

Always charge immediately after use to avoid battery deterioration. The battery will get damaged whenever the charge level is dropped to below 50 %. Allowing the charge level to drop to 20 % or lower will reduce the capacity and life of the battery significantly.

For battery related diagnostics and troubleshooting the battery module is equipped with a logging device. The information is stored locally on the device. It can be accessed with service tools only when the loader is nearby. If necessary, the log can be uploaded for analysis.

Ambient temperature will affect the power that is available from the battery. Battery performance will decrease significantly at temperatures below 0 °C (32 °F). For the best performance in cold conditions, it is recommended to store the loader in a warm place. The upper ambient temperature limit for using the loader is 40 °C. Higher temperatures shorten the life of the battery, while lower temperatures reduce the available capacity.

Discharged batteries may freeze in cold environment. Frozen batteries must never be charged. To avoid the possibility of a freezing battery, never allow the battery to get discharged to below 30 % in cold temperatures. Charging the battery outdoors in freezing temperature will not recharge the battery to the full capacity. Because of this it is not recommended to charge the loader at temperatures below 0 °C (32 °F). See instructions in this Operator's Manual regarding operating environment, charging, and safety of the battery and the electric systems of the loader.

The loader is designed to operate with the battery pack that is supplied with the loader and approved by the manufacturer. The battery pack must be charged only with the charger that is provided with the loader, or other charging system supplied by Avant specifically for this loader model. Using any other batteries or chargers can cause fire or explosion of batteries and risk of electric shock.

Maintenance tasks that you can do to this system without special training and qualification are limited to charging, cleaning, and replacement of fuses. Never connect any device directly to the battery.

Operator qualification

Only operators who have studied this Operator's Manual, and all relevant attachment manuals, are allowed to use this loader. Regardless of your possible earlier experience with lawn-mowers, loaders, ATVs, or other equipment, it is important that you learn the driving principle of this loader. Practice how to operate the loader and its attachments safely at an open area before you use the loader near other persons.

You must be in good physical and mental condition with the ability to stay alert and to observe the surrounding areas. Never use the equipment while under influence of medication which could impair your abilities to operate the equipment safely. Do not operate the loader if you are under the influence of alcohol or any other intoxicant.

Depending on operating area, you may also be required to read, understand, and comply with all applicable Employer, Industry, and Governmental rules, standards, and regulations.

Electric qualification

You can replace the battery pack with a similar one supplied by the manufacturer. Other battery or electric related maintenance that is not shown in this Operator's Manual, is prohibited. Leave all electric parts from the battery connector forward to authorised service professionals to avoid risk of electric shock, fire, and short-circuiting and explosion of battery. High-voltage cables and connectors, inverters, and electric motors do not have components that can be maintained or serviced by user.

Availability of options

Some equipment or options that are shown in this Operator's Manual may not be available. Pictures in this Operator's Manual may show optional equipment. Availability of optional equipment is subject to change. Some options may preclude the installation and use of some other option or options. Check with your Avant dealer for more information.

Versions of this Operator's Manual

Avant has a policy on continuous product development. Updated versions of the Operator's Manual replace the previous versions of this Operator's Manual as long as the year on the cover page matches with the original Operator's Manual. You can ask for the latest Operator's Manual from your dealer. Some of the features or technical details presented in this Operator's Manual may change without notice. The pictures in this Operator's Manual may show optional equipment or features that are not currently available in your market area. We reserve the right to change the contents of the Operator's Manual without notification.

Keep this manual with the loader



Read this Operator's Manual before use. Put this Operator's Manual, as well as Operator's Manuals of attachments, into the storage box behind driver's seat when you have read those. Always keep this Operator's Manual with the loader. If this Operator's Manual gets lost or damaged, ask for a new copy from your Avant dealer. Also remember to give this Operator's Manual to the new owner when the machine changes ownership. Ask for the electronic copy of this Operator's Manual from your dealer.

Avant warranty

This warranty specifically applies to the Avant e5 loader only and not to any attachments used with this product. The battery is covered by special warranty clauses listed below. Any repairs or modifications performed without the prior authorisation of Avant Tecno Oy will cancel this warranty. During the first *two years of operation or first 1000 hours* (whichever is the soonest) Avant Tecno Oy warrants to replace any part or repair any defect which may occur, subject to the terms detailed below:

1. The product has received regular maintenance in accordance with schedules given by the manufacturer.
2. Any damage caused by operation in a negligent manner or exceeding the approved specifications detailed in this Operator's Manual is excluded.
3. Avant Tecno Oy accepts no responsibility for interruption to working or any other consequential losses resulting from any failure of the product.
4. Only Avant Tecno Oy approved replacement or original quality parts shall be used during routine maintenance.
5. Any damage caused by the use of incorrect fuel, lubricants, cooling liquid, or cleaning solvents is excluded.
6. The Avant Warranty excludes any consumable parts (e.g. tyres, batteries, filters, belts etc.) except where it can be clearly shown that these parts were defective on original supply.
7. Any damage caused resulting from the use of attachments not approved for use with this product is excluded.
8. The battery must be used, recharged, and maintained as instructed in this Operator's Manual. Damages caused by neglected maintenance or repeated deep discharge cycles are not covered by the warranty. See warranty period for battery below.
9. In the event a fault occurs which is attributable to manufacturing or assembly defect you should arrange to return your Avant loader to your authorised dealer for repair. Travel and freight costs are excluded.

Special warranty terms regarding the battery

During the first year of use, battery is under full warranty covering parts regarding the battery. After the first year and until the end of second year (months 13 to 24) the battery is under partial warranty. During this 13 to 24 month term warranty coverage is calculated by the age of the battery, and the cover declines by the operation age of the battery. The responsibility of the customer regarding parts and material costs of the battery starts from month 13 of the warranty period at 13/24 parts of the full cost of replaced parts, ending at full 24/24 at the end of the warranty period.

Safety First



DANGER

Incorrect or careless use of the loader can cause a serious accident. Before you operate the loader, familiarise yourself with the correct use of the loader. Read and understand this Operator's Manual, as well as all relevant safety instructions, local regulations, and safe working practices.



Understand the limitations of speed, braking, steering, and stability, as well as load capacity of the loader before starting use. Make sure that everyone who operates or works with this equipment is familiar with these safety precautions.

If you have no previous experience of the loader, make sure to do all testing at a safe and open place, where there are no persons in the area of operation.

General safety instructions

1. Remember the correct working position. When driving, be comfortably seated in the driver's seat, keep your feet in their proper place in the footwell and at least one hand on the steering wheel.
2. When seated, always keep the seat belt fastened and keep hands and feet inside the operator's area.
3. Before leaving driver's seat, always:
 - Lower the loader boom and place attachment flat on ground
 - Relieve residual hydraulic pressure, see page 79
 - Engage the parking brake
 - Switch off the electric motors, remove the ignition key
4. Start the operation slowly and carefully. Practice driving of the machine at a safe and open place before connecting any attachment. Follow the instructions in this Operator's Manual and also the Operator's Manual of the attachment.
5. Operate the control levers with careful and deliberate movements. Avoid abrupt movements when handling the load, in order to prevent the load from falling and to keep the machine stable.
6. Keep away from the danger zone of the lifted boom and don't let anyone go there.
7. Keep your hands, feet and clothing away from all moving parts, hydraulic components, and hot surfaces.
8. Make sure that there is enough open space around the machine for safe driving.
9. Do not transport the load with the boom lifted. Always carry bucket or attachment as low as possible, and put the load down whenever you leave the machine.
10. Never transport persons with this machine. Do not transport or lift persons in the bucket or in any other attachment. Lifting of persons is only allowed with the attachment designed for this purpose: the Avant Leguan 50 access platform, following the instructions in the Operator's Manual of Leguan 50 attachment.
11. Do not exceed the tipping load. Familiarise yourself with and follow the load diagrams in this Operator's Manual.
12. When turning with the machine, remember that the driver's seat extends beyond the turning radius of the wheels (collision risk).
13. Do not operate the loader in an explosive environment or in a place where dust or/and gasses can create a fire or explosion hazard.
14. Keep the areas around the battery, inverter, electric motors, and cooling fan clean of flammable materials.
15. Read the lifting, towing and transportation instructions on page 82.
16. Remove the ignition key from the ignition whenever leaving the machine unattended to prevent unauthorized use of the loader.

- 17. Follow all inspection, service and maintenance instructions. If you notice any faults or damages on the machine, these must be repaired before starting operation.
- 18. Before any maintenance or repair operation always stop and switch off the loader, lower the boom down and release pressure from hydraulic system. Read safety instructions for maintenance on page 95.
- 19. Do not let any person operate this loader who has not read safety instructions and is not familiar with the safe and correct use of this loader.
- 20. Never operate the loader or attachments while under the influence of alcohol, drugs, medication that may impair judgment or cause drowsiness, or if not otherwise medically fit to operate the equipment.



Risk of crushing under boom or attachment - Stay away from lifted boom and attachment.

Always remember that load can fall and the boom can lower unexpectedly due to loss of stability, mechanical fault, or if another person operates the controls of the loader, leading to crushing hazard. Lower the boom or any attachment or load on the ground before leaving the driver's seat. The attachment or the loader are not intended to be left to keep a load elevated for longer periods. The stability of the loader can change when leaving the driver's seat, leading to tipping over of the machine. Do not allow anyone to get under or near a lifted boom or attachment.



Risk of falling from height and getting overrun by loader - Never lift or transport other people. Never use the loader or its attachments to lift or carry persons, or as any kind of work platform even temporarily. Never climb on the loader or on the attachment. Seating capacity of the loader: one person only, regardless of attachments.



Risk of serious injury or death from falling objects. Never tilt the attachment back when it is lifted high. Operate only with machines equipped with ROPS and FOPS structures. Secure loads on attachments if loads can fall. Use correct type of attachments for different loads and follow Operator's Manuals of attachments.



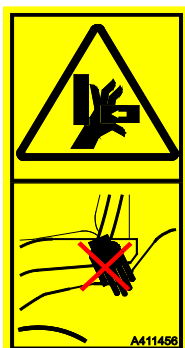
Hydraulic pressure - Risk of injury. Escaping hydraulic fluid under pressure has enough force to penetrate skin, causing serious personal injury. Never use hands to search for possible leaks in hydraulic systems - use a piece of cardboard instead. Release residual hydraulic pressure before disconnecting any fitting and before any service operation. See a physician immediately if hydraulic fluid penetrates skin, serious injury can result quickly.



Risk of being crushed by moving loader - Engage parking brake before leaving the driver's seat. Follow safe stopping procedure to prevent all movements of the loader. Avoid leaving the loader parked on hill. If it is necessary to park on a hill, use chocks or other additional means to prevent the loader from moving.



Safety devices are installed for your safety - Never modify or bypass any safety function. Safety functions are installed for your safety. Never modify or block any of the safety systems of the loader. If you notice that a system is not in good condition, stop the use of the loader and make sure the loader is serviced.



Pinching points - Avoid getting hands or feet crushed between the front and rear frames of the loader, or between loader and walls - Keep all body parts within the safety frame. Movements of the articulated frame creates pinching hazards. Keep your head, hands, and feet inside the loader. Be especially careful while you drive near walls and trees. Keep your hands on steering wheel and joystick.



Risk of crushing between tyres - Do not turn the steering wheel while standing near the loader. Turning the articulated frame creates a pinching hazard to a person standing near the tyres of the loader. Never grab the steering wheel while entering or leaving the driver's seat to avoid turning of the frame. Stop the loader if other persons get close to the machine. Check that tyres that are larger than standard tyres leave enough space between the tyres for safe use.

Seat belt



Always wear seat belt when using the loader. The seat belt will keep you inside the ROPS area in case the loader tips over. If you don't wear the seat belt, there is risk of getting crushed between the ROPS and ground in case the loader tips over. See more information about seat adjustments and seat belt on page 55.

Hazardous areas around the loader

Make sure that there are no persons in the danger zone of the loader and the attachment. The safe distance to other persons depends on the attachment that is installed, and the type of work. The danger zone of the loader covers the reach area of the loader boom, the turning area and wheels on both sides of the loader, and the front and rear areas of the loader. Stop the loader and its attachment immediately if there are other persons close to the loader.

Always make sure that it is safe to reverse with the loader. Never assume that bystanders will remain where you last saw them; especially children are often attracted to the moving equipment.

Pay attention to other machines and persons that are moving in the area. When learning how to operate the loader, drive on level ground at a clear, open area.

When you leave the loader unattended, always follow the safe stopping procedure that is described in this Operator's Manual. In particular, always lower the loader boom completely down, or lower the attachment on the ground. The loader is not designed to stay with the loader boom and load lifted. Remove the key from the ignition to prevent unauthorised use.

Handling of heavy loads



WARNING



Handle heavy loads and attachments with care - Risk of tipping over.

- Follow all instructions and warning labels to avoid tipping over of the loader.
- Always lower the load or attachment down on the ground before you leave the driver's seat.
- Keep loads as low and as close to the loader as possible.
- Never take a heavy load on the loader from high level – e.g. from truck, shelf etc.
- When loading, always keep the loader frame as straight as possible. If you turn the loader during load handling, the stability of the loader will decrease, and it may overturn the machine.
- The use of extra rear weights or ballasted tyres is recommended. See pages 52 and 34 for different options.
- Make sure to follow the recommended tyre pressures and pay attention to the condition of tyres.
- When you estimate the lifting capacity of the loader, remember to take the weight of the attachment into account.

Whenever you handle heavy loads or heavy attachments:

- Always handle heavy loads only on firm, level ground while you drive slowly with the loader.
 - Uneven or inclined terrain significantly reduces the Rated operating capacity (see also page 38).
 - Use the maximum loads indicated in the load chart on the loader and in this Operator's Manual as a guideline.
 - All rated operating capacities are based on the criteria that the loader is level on firm ground. When the loader is operated in conditions that deviate from these criteria (e.g. on soft or uneven ground, on a slope, or when subject to slide loads), you must take these conditions into account.
 - Remember that the actual load carrying capacity varies greatly according to operating conditions and control manner.
- Keep in mind that a heavy load or long distance between the loader and the centre of gravity of the load will affect the balance and handling of the loader.



Risk of overturning - Articulated frame. Turning articulated frame can lead to overturning of the loader on inclined terrain or when driving at high speed. Never turn frame towards the slope while operating on inclined ground.

Always drive slowly when carrying load or when turning with the loader.



Risk of overturning - Sudden movements can tip the machine over. Movements, such as stopping, turning, or lowering the boom abruptly, can cause loss of stability. Always drive slowly and operate the controls of the loader very carefully, especially when handling heavy loads.

Operation on uneven surfaces, gradients, and near excavations



Uneven ground can cause the loader to overturn - Risk of serious injury or death. The stability and the load handling capacity of the loader are significantly reduced on inclined terrains and maximum lifting capacity can be achieved only on firm, level ground. On horizontally tilted terrain the load must be kept close to the ground and must never be lifted high.

Handle heavy loads only on even surfaces.

On uneven ground:

Extra caution is needed when using the equipment on inclined terrains and slopes. Drive slowly especially on inclined, uneven, or slippery surfaces, and avoid sudden changes in speed or direction. Operate the controls of the loader with careful and smooth movements. Watch out for ditches, holes on the ground, and other obstacles, as hitting an obstacle may cause the loader to tip over.

All rated operating capacities are based on the criteria that the loader is level on firm ground. When the loader is operated in conditions that deviate from these criteria (e.g. on soft or uneven ground, on a slope, or when subject to slide loads), you must take these conditions into account.



Risk of tipping over on uneven ground - Drive slow on inclined surfaces. Always keep loads close to the ground. Keep the seat belt fastened to stay within the Roll over protective structure. Always handle heavy loads or only on firm, level ground while you drive slowly with the loader.

- Uneven or inclined terrain significantly reduces the Rated operating capacity (see also page 36). Remember that the actual load carrying capacity varies greatly according to operating conditions and control manner.
- Use the maximum loads indicated in the load chart on the loader and in this Operator's Manual as a guideline.
- Keep the articulated frame of the loader in straight position when driving on inclined surfaces. If you turn the loader on an inclined surface, the stability of the loader will decrease in both forward and sideways directions, and may cause the loader to tip over.
- The use of extra side weights or ballasted tyres is recommended. See pages 52 and 34 for different options.

Whenever you operate the loader on uneven ground keep the following in mind:

- Handle heavy loads only on even surfaces. Lifting a load or turning on uneven surfaces can cause the loader to tip over.
- Do not drive on a too steep gradient - watch out for ditches, manholes and steep slopes, which may cause the loader to tip over.
- On steep slopes drive straight up or down, not across the slope. Keep the heavier end of the loader towards downhill - When driving with a load or heavy attachment, keep the load downhill and close to the ground, and reverse the hill up.
- Never drive along an excavation. Note that the excavation or trench may suddenly cave in. Exercise extreme caution when driving near ditches or embankments, and avoid driving along a ditch or trench, as the machine could suddenly tip over if an edge caves in. Avoid driving along trenches and keep at least a distance equal to width of a trench.
- Do not park the loader on a slope. If this can't be avoided, engage the parking brake, preferably park the loader across the slope and lower the load or attachment onto the ground. If needed, use wheel blocks. Always engage the parking brake.

Personal safety and protective equipment

Wear safe clothing and personal protective equipment.

- Protect yourself against work hazards like noise, ejecting debris or dust for example.
- Follow regulations regarding protective equipment. Wear eye protection and hard hat or other protective equipment as needed.
- Read Operator's Manual of the attachment for more information about protective equipment needed in the work.



- The noise level at the driver's seat may exceed 85 dB(A), depending on the attachment and type of work. Wear hearing protection while working with the loader.



- Wear protective gloves.



- Wear safety boots whenever working with the loader.



- Wear safety glasses when handling hydraulic components and during maintenance or service work.

Depending on the installed attachment and type of work, safety glasses may be needed while using the loader.



- Always fasten seat belt while operating the machine.



- When working at construction sites, a safety helmet is recommended and may be mandatory in addition to the falling objects protective structure (FOPS) on the loader.



- Depending on work and working area, also a respirator mask or other breathing air filtering apparatus may be required. Find out about other necessary safety equipment at your specific work site.



Stay within the space protected by the ROPS safety frame. Always keep seat belt on to stay on driver's seat and to avoid getting crushed between ground and a loader that tips over.



Silica dust warning. Prolonged or repeated exposure to crystalline silica can cause serious or fatal respiratory disease. Occupational health and safety officials recommend limiting exposure to dust that is present at most earth-moving and many other work sites. Avoid spreading of dust where possible, keep loader cabin clean from dust, and use respiration mask when necessary.

Safety frame (ROPS) and safety canopy (FOPS)

The loader is equipped with a Rolling Over Protective Structure (ROPS) and a Falling Object Protective structure (FOPS). These safety structures are important parts of operator safety, and they must be fitted on the machine.

Safety frame (ROPS) protects the operator in case the machine tips over. Fasten seat belt while operating a machine with a ROPS. All cab versions are ROPS & FOPS tested and certified.



Crushing hazard - Always keep safety structures installed. Never remove the safety structures, modify them, or attempt to repair. If damaged, contact service.

Always fasten the seat belt in order to stay inside the protected area of the safety frame. If you do not wear seat belt you may become crushed under the ROPS or other structure of the loader in case the loader tips over.

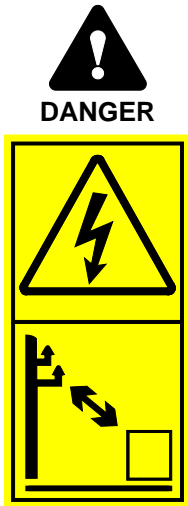
Falling objects protection system (FOPS)

The loader is equipped with a Level 1 Falling Object Protective structure (FOPS), which gives protection against moderate impacts from objects falling from above. Understand the limitations of the Level 1 FOPS. Your work environment may have specific risks related to falling objects and the level of protection that is needed to reduce the risk. Use of the loader with FOPS level 1 may be prohibited in the work area.

Modifications

Any modification to this machine must be approved beforehand by an authorised Avant representative. If you modify the loader or attachment, it can become dangerous and cause serious injuries or even death. Unauthorised modifications can increase the risk of accidents and damage or shorten the service life of the machine. Modifications to electric systems can create serious risks of electric shock, fire, and damage or explosion of the battery. Modifications or incorrect repairs can also make the loader no longer compliant with regulations concerning electromagnetic emissions. Use only original spare parts to make sure that the product is kept in safe operating condition.

Working near powerlines



Electrocution hazard - Stay away from electric cables. Contact with or working too close to electric wires can cause a lethal electric shock. Keep the loader and any attachment at a sufficient distance from all electric cables, see the table below. Never assume a cable is disconnected.

Table 1 - Safety distance from powerlines

Use this table for minimum safety distances for electric cables, if other information is not available.

Voltage level	Safety distance, minimum
0 - 1000 V	2 m
1 - 45 kV	3 m
110 kV	4 m
220 kV -	5 m
Unknown voltage	5 m

In case of inadvertent contact or proximity with live electric source, or if electric cables are exposed during digging:

- Do not leave the loader until the electricity has been disconnected by qualified technicians, usually by the local electric company.
- If absolutely necessary, jump out from the loader, keeping feet next to each other, and continue jumping away from the loader until at a safe distance.
- Warn others not to approach the loader until safe to do so.

Safety of digging

Digging may expose buried electric cables, and some attachments may make it possible to reach overhead powerlines with the loader, creating hazard of electric shock and electrocution.

Plan work ahead and take necessary safety precautions.

Deeper excavations may cave in. Depending on various factors, such as the type of the soil, moisture content, rainwater, steepness of the excavation, the excavation can collapse and bury in people. Contact local authorities or surveying companies for information about how to reduce the risk of caving in of excavations.

Keep in mind that all pipes might not be marked correctly. Contact local surveying companies for searching of potential hazards in ground whenever in doubt.

Contact local authorities before digging

At some areas you may be obligated to contact relevant authorities before digging ground. Some areas have a direct telephone line or information on a website where you can find more information about possible hazards in the ground. Find out about your local regulations before digging.

Damaging any electric or communications cables, gas or water pipes, or similar structures buried in the ground can put you in risk of serious injury or even death. Damages while digging can cause also significant property damages. As the operator of the equipment you are responsible for the safety of any digging work and you may be responsible for any damages caused by digging.

Electric system and handling of the battery pack



WARNING

Risk of electric shock, fire, and acid spill - Handle the battery with care. The loader is fitted with a high-energy battery pack that can output hazardous, lethal levels of current and voltage. Misuse or using of damaged battery system creates a risk of battery explosion, fire, hazardous electric shock, and acid spill from battery. Follow the instructions regarding charge, use, and maintenance of the battery and the electric systems in this Operator's Manual.

Battery systems on e5

The energy from the battery pack is used in two parallel systems:

- 48-Volt supply from battery is converted by an inverter to a high-voltage and high-current electric power to drive the electric motors.
- A 48 V to 12 V DC converter supplies electricity to the control systems of the loader, hydraulic valves, dashboard, electric socket, etc.
- Optionally, an additional 12 V battery may be installed to the front of the loader to supply road traffic lights, and to reduce load on the standard 12 V system when using high power electric equipment.

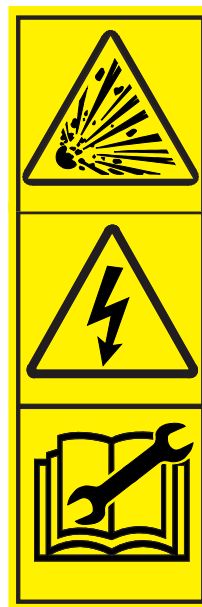
Never modify the 48-Volt system or connect any device directly to it. This system can output high current that can kill or cause electric shock and burns, if handled carelessly and safety systems are bypassed. See maintenance instructions on page 102.

Handle battery with care

- Battery contains corrosive sulphuric acid which causes serious burns upon skin contact. Avoid contact with skin or clothes. If electrolyte gets on your skin or clothes, flush with a lot of water. In case of contact with eyes, flush with a lot of water for at least 15 minutes and see a doctor immediately.
- If a fuse is blown repeatedly, find out the cause. Always use fuses with correct rating.
- Disconnect the battery by separating the main connector. Never disconnect individual battery cells.



DANGER



Short-circuit can cause the battery to explode or burn - Disconnect battery before maintenance.

Isolate the battery from the electric systems of the loader by separating its quick connector before working on the electric systems of the loader, see page 103. Check that all insulator sleeves and caps are in good condition and that battery terminals are not exposed. Never lay metal objects on the battery.



CAUTION



Risk of exposure to battery acid - Handle battery with care and read maintenance instructions.

Using a damaged battery, extreme heat, improper charging procedure, or other type of wrong use can cause the battery cells to rupture and leak or spray acid electrolyte. Always follow use and maintenance instructions. Never use damaged battery.



Lead warning - Wear protective gloves. Battery and its terminals contain lead, a harmful substance which should not be handled more than what is necessary. Wear protective gloves when handling battery. Wash hands with soap and water after handling the battery. Dispose of and recycle a used battery correctly.



Risk of electric shock and contact with acid - Never disassemble the battery pack. Battery pack does not include other serviceable parts than those described on page 102. Never remove individual battery cells from the battery pack. Keep all insulators in place.

First aid measures



Risk of serious burns - Avoid contact with battery acid. Battery contains sulphuric acid as electrolyte. This acid is highly corrosive and can cause serious skin burns, in case of contact with skin. If acid gets to eyes, there is a serious risk of severe eye injury. Follow correct handling instructions of battery to avoid exposure to acid. Always use only battery that is in good condition.

In case you are exposed to battery electrolyte (sulphuric acid):

- After contact to skin:
Rinse immediately with plenty of water. Remove and wash wetted clothing.
- After contact with eyes:
Rinse immediately with plenty of running fresh water for at least 15 minutes and seek medical advice immediately.
- If you inhale acid mist:
Inhale fresh air and seek medical advice.
- After swallowing:
Drink a lot of water immediately. Swallow activated carbon and seek medical advice immediately.

Follow correct charging procedure



WARNING



Battery produces explosive gas during recharge - Make sure to charge only on well ventilated area.

- Make sure that there is sufficient ventilation when charging the battery.
- Never charge the loader in a small garage or shed where there is no machine powered ventilation to outside.
- Keep arcs, sparks, flames, and lighted tobacco away from battery.
- Never charge damaged or frozen battery.
- See detailed instructions about charge process starting from page 88.

Ensure ventilation and remove the rear cover before recharge

During charge, some of the water in the battery is broken into hydrogen and oxygen gases. This gas mixture is highly flammable and can become explosive, if enough gas is accumulated. The area where the loader is charged must be ventilated so that the amount of these released fumes will not become explosive.

To allow the battery fumes to ventilate properly, remove the rear top cover and leave open when recharging the battery. Leaving the rear cover removed will also allow the battery to cool better during recharge.

- Make sure there is sufficient ventilation when charging the battery. Preferably charge the loader outdoors.
- Keep arcs, sparks, flames, lighted tobacco and other sources of heat away from battery.
- Check the battery for external damages, leakages, and deformations. Never charge the battery or operate the loader if you see that the battery is damaged.

Use only the integrated charger of the loader to charge the battery

Use only the original, integrated charger to charge the battery. This ensures that the charge voltage and current are optimised in different phases of the charge cycle. Other charger types, especially those with higher output current, can overheat the battery. Overheating can cause the electrolyte to boil and battery can deteriorate or its useful life will be shortened as a result.



WARNING

Risk of battery explosion - Never charge frozen battery.

Discharged battery can freeze. A frozen battery can explode during charging. Never charge a frozen battery, allow the loader to warm at a warm place first, if loader has been left in freezing temperatures with low battery. Prevent freezing by keeping the battery charged especially when there are chances of freezing temperatures.

Fire prevention

- Always keep the loader clean to avoid build-up of flammable, combustible debris, such as dust, leaves, hay, straw, etc. See page 104 for more instructions about cleaning of the loader.
- There are many parts on the electric system that operate at high temperatures in normal use. To avoid fire, and to ensure that the cooling of electric systems is ensured, keep the electric parts clean. Overheating of electric parts can shorten their service life.
- **Static electricity can produce sparks when removing plastic covers.** Do not remove, clean, or otherwise handle the plastic covers while the loader is connected to a charger.
- Do not smoke while you work near the battery, or do any maintenance work of the hydraulic system.
- Add hydraulic oil only at a well ventilated place.
- Oil leaks can ignite on hot components. Repair any damaged or leaking components before using machine.

Know where fire extinguishing equipment is located near your working site. At some areas a fire extinguisher may be mandatory. Keep a multi-purpose, approved type fire extinguisher available near the place where you store the loader.

Fuses

There are several fuses located in different fuse boxes on the loader. Always replace a blown fuse only with a fuse with the same rating. For more information about fuses see page 119.

To ensure fire safety during recharge

Follow correct recharge instructions. Battery produces explosive gasses during recharge and therefore ventilation must be ensured.

- Keep sparks, lighted tobacco products, and other sources of ignition away from loader during recharge.
- Plug the loader only to a grounded mains plug.
- Use a mains outlet that is equipped with a residual current switch device to protect from electric shock in case insulation of cables is damaged. Those devices must be tested periodically.
- Use extension cables only if necessary. Use as short cables as possible. Choose only high quality cables with large conductor cross-section. Poor quality cables can heat up and even burn.
- Avoid cable loops to prevent heating of the cable. Unwind any long cable that is coiled, otherwise the cable can overheat and burn. During charge, the electric power that runs through the cable can be as high as about 2300 watts.
- Make sure the fuses of the mains plug are adequate for the loader.
- Avoid creating static electricity while loader is charging. Do not wipe or otherwise clean the loader during charge.
- Make sure all charger and battery cables are insulated and correctly connected.

Description of the loader

Identification of the loader

Write down the identification information of your loader in the following fields. Have this information ready when ordering spare parts.

1. Loader model _____
2. Loader serial number _____
3. Manufacturing week and year _____

Serial number of the loader is printed on the type plate, which also indicates the loader model.

Dealer: _____

Contact information _____

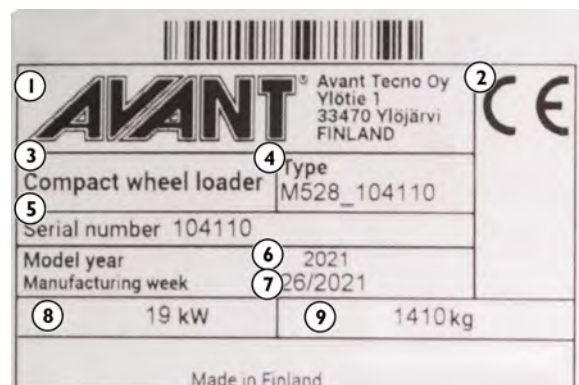
Loader identification plate:

Loader identification plate is located near the steering wheel on machines with ROPS canopy and cab L.

On loaders that are equipped with a cab LX or DLX the ID plate is located near the drive pedals.

Contents of the identification plate:

1. Manufacturer's name and address
2. CE mark
3. Designation of machinery
4. Type code of your loader*
5. Serial number*
6. Model year*
7. Manufacturing week / year*
8. Net installed power*
9. Operating mass*



* The labels shown in this Operator's Manual are examples of the labels on loaders. See the identification plates on your loader for detailed information about your specific loader unit. Some loaders that are intended to be used outside of the European Union may not bear the CE mark.

NOTICE

Write down the serial number and the manufacturing week of your loader and have them ready when you communicate with your dealer or Avant dealer or service partner. The serial number together with the manufacturing week make it possible to identify the correct spare parts for your loader.

Main parts of the loader

The following picture shows the main parts of the loader. These general parts are the same regardless of the cab type.



1. Front frame

On the front frame are mounted: driver's seat, operating controls, hydraulic control valves, hydraulic oil tank, auxiliary hydraulics outlet, front wheels, hydraulic motors and the loader boom with attachment coupling plate.

2. Back frame

On the back frame are mounted: battery pack, electric motors, integrated charger and its socket, hydraulic pumps, rear wheels, hydraulic motors, parking brake, and counterweights.

3. Articulation joint

Articulation joint connects the front and back frame. The loader is steered hydraulically by the steering cylinder which is mounted between the front and back frames. Hydraulic hoses and electric wires are conducted through the articulation joint.

4. Loader boom

Loader boom is mounted on the front frame and is controlled with control lever from the driver's seat. The attachment coupling plate is mounted at the end of the boom. The boom is telescopic, extending 600 mm hydraulically. The boom can be fitted with a hydraulic self-levelling system

5. Attachment coupling plate

Attachments are mounted on the attachment coupling plate. The locking pins on the plate can be operated manually (standard) or hydraulically (option).

6. Auxiliary hydraulics outlet

The hydraulic hoses of hydraulically operated attachments are mounted on this outlet. The outlet is equipped with the multi connector quick coupling system and is double acting: it has two pressure lines and one tank line, see page 78.

7. ROPS safety frame

ROPS frame (Roll-over protective structure) complies with the standard ISO 3471:1994 with Amendment 1:1997 and Technical Corrigendum 1:2000 for a maximum machine configuration mass of 2720 kg.

8. FOPS canopy

FOPS canopy (Falling objects protective structure) mounts on the ROPS. It meets the ISO 3449:2005 (1365 J) criteria.

Signs and decals

Shown in the figure below and listed on the following page are the labels and markings, which must be visible on the equipment. Replace any warning label which has become unclear, or has detached completely. New labels are available via your retailer or contact information provided on the cover of this Operator's Manual.

Other than safety or warning labels are listed in the separate spare parts catalogue.

To apply a new decal

Before applying a new decal, clean the surface from dirt, dust, grease, or other material. Peel small portion of the decal backing paper and apply exposed adhesive to cleaned surface, aligning the decal properly. Peel rest of backing paper and press firmly with hands or decal application tool to smooth out the decal and to activate the glue of the label.



The warning labels contain important safety information and they help to identify and remember the hazards related to the equipment.

Make sure that the following signs and decals are clean, undamaged and readable. If any of these decals is missing or is unreadable it should be replaced without delay. Ask for new decals from your local Avant dealer.



Table 2 - List of safety labels and markings on the machine

Label		Location
1		<p>Panel in front of driver's seat</p> <p>Product code A441476</p>
Symbol	Safety message	
<p>a</p>	<p>b</p>	<p>WARNING</p> <p>a Wrong use, misuse, or careless use can cause hazards that could be prevented with following the instructions properly.</p> <p>Read all instructions carefully before operating the loader.</p>
<p>c</p>	<p>d</p>	<p>b Lowering of loader boom can crush, causing death or serious injury.</p> <p>Keep out from the danger zone of the machine.</p>
<p>e</p>	<p>f</p>	<p>c Risks of falling from height and getting run over.</p> <p>Never lift people or carry passengers with the loader or its attachments.</p>
		<p>d High pressure fluid injection hazard.</p> <p>Never use hands to search for leaks. Use a piece of cardboard and a magnifying glass when searching for leaks.</p>
		<p>e Risk of dropping of attachment.</p> <p>Make sure both locking pins are locked. Check both locking pins before moving the attachment.</p>

Label		Message
<p>g</p>		<p>f Risk of getting crushed by moving loader. Apply parking brake and lower attachment on the ground. Make sure loader will not move when leaving the driver's seat.</p> <p>g Follow safe stopping procedure and information regarding maintenance and service. Always remove the ignition key from the loader when leaving the loader unattended.</p>
<p>h</p>	<p>i</p>	<p>h Always wear seat belt.</p> <p>i Wear hearing protection. Noise level at the driver's seat and at the operating area of the loader will reach 88 dB(A), or higher, depending on use, and type of attachment. Exposure to noise can damage hearing.</p>
<p>j</p>	<p>k</p>	<p>j Wear protective gloves which have good grip.</p> <p>k Wear safety boots with good grip and feet protection.</p>
Label		Message
<p>2</p>	<p>Location ROPS Canopy: Near steering wheel</p> <p>Product code A442339</p>	<p>CAUTION Stop before using the parking brake. Engaging the parking brake while the machine is moving may cause locking of wheels and sudden stop. Repeated use while driving will damage the hydraulic motors. The parking brake should be used to stop the machine only in emergency.</p>

Label		Location	Message
3		<p>Panel near steering wheel</p> <p>Product code A441497</p>	<p>WARNING</p> <p>Risk of tipping over to the side when driving on uneven ground and when driving at high speed, or with heavy load.</p> <ol style="list-style-type: none"> 1. Keep loads close to the ground 2. Drive slowly on uneven ground, and when transporting heavy loads. 3. Always use seat belt <p>WARNING</p> <p>Risk of tipping over - Keep loads close to the ground. Avoid overload.</p> <p>Read this Operator's Manual for information about how to avoid tipping over.</p>
4		<p>Panel near steering wheel</p> <p>Product code A442391</p>	<p>WARNING</p> <p>Always follow this safe stopping procedure.</p> <ol style="list-style-type: none"> 1. Release the auxiliary hydraulics control lever to its neutral position. 2. Lower the attachment on the ground. 3. Engage parking brake. 4. Stop the motors by turning the ignition key to the OFF position (turn to the left). 5. Release residual pressure of hydraulic circuits. Move control levers to their extreme positions a couple of times. 6. Unfasten seat belt 7. Remove ignition key 8. Make sure the battery is fully disconnected by removing the ignition key.

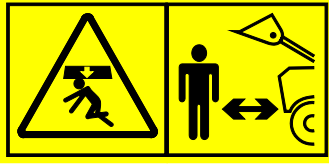


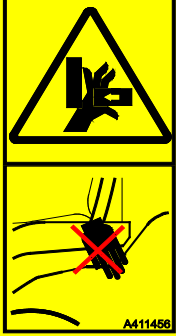
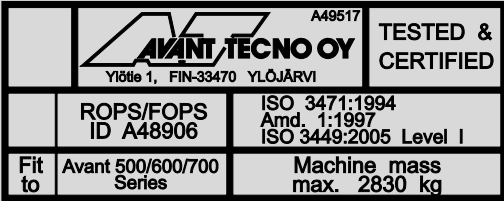



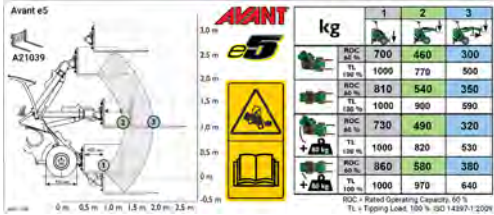
Label	Location	Product code	Message
5		Boom, on both sides	A417273 (2 pcs) DANGER Lowering of loader boom can crush, causing death or serious injury. Keep out from the danger zone of the machine.
6		Near electric motors	A417270 WARNING Risk of burns - Extremely hot surfaces. Keep clear. Allow loader to cool completely before maintenance.
7		At loader entry point	A411455 WARNING Risk of crushing - Small gap between tyres of articulated loader. Do not grip the steering wheel from outside the machine or when getting into the driver's seat to prevent moving of the wheels.
8		At loader entry point	A411456 WARNING Risk of crushing - Keep hands and feet within the driver's area.

Table 3 - Information labels

Label	Message	
<p>9</p> 	<p>ROPS/FOPS Approval, on loaders with ROPS frame or CAB L.</p>	<p>Location ROPS frame, inside</p> <p>Product code A49517</p>
<p>10</p> 	<p>Sound pressure level at driver's seat</p>	<p>Location Right panel near driver's seat</p> <p>Product code A433538</p>
<p>11</p> 	<p>Sound power level 2000/14/EC</p>	<p>Location Right panel near driver's seat</p> <p>Product codes A433537</p>
<p>12</p> 	<p>Correct type of hydraulic oil See page 112</p>	<p>Location Front panel below driver's seat</p> <p>The original hydraulic oil filled by the manufacturer is shown with one of the following labels.</p> <p>Product codes A446611 A446612</p>
<p>13</p> 	<p>Information about Rated operating capacity. For more information see page 38</p>	<p>Location Roof panel</p> <p>Product code A451109</p>

Technical specifications

Dimensions

General dimensions	With standard wheels
Length	2570 mm
Width	1130 mm
Height (with standard tyres)	1985 mm
Mass Operating mass ISO 6016*	1640 kg
Standard tyres	See page 31
Lifting height, max	2790 mm
Max horizontal reach	1418 mm (distance from front axle to quick coupling plate)
Turning radius, inside/outside	995 mm / 2050 mm
Ground clearance	200 mm

* Operating mass, ISO 6016. This mass represents the weight of a loader with standard counterweight, typical options, standard tyres, with no attachment fitted, and 75 kg driver on the driver's seat. Additional options or counterweights can increase the mass of the loader. The mass of your specific loader may also be lower.

Height and width

Tyre	Width	Height
23 x 8.50-12" TR	1080 mm	1980 mm
23 x 10.50-12" TR	1130 mm	1985 mm
26 x 12.00-12" TR	1290 mm	2013 mm
320/60-12" HD TR	1290 mm	2013 mm
27 x 8.50-15" TR	1030 mm	2026 mm
26.5 x 14.00-12" GR	1420 mm	2020 mm
23 x 8.50-12" GR	1080 mm	1980 mm
23 x 10.50-12" GR	1130 mm	1985 mm
26 x 12.00-12" GR	1290 mm	2013 mm

Tyre types:

- TR** Tractor type tyre tread pattern, with aggressive grooves for best possible traction
- GR** Grass type tyre tread pattern, with smoother surface and larger contact area



General specifications

Model	Avant e5
Category	Earth-moving machinery / Loader / Compact loader EN ISO 6165
Product code	A433127
Drive system	Hydrostatic 4WD
Lift capacity ISO 14397-1 Load on a pallet, lifted from the ground *	900 kg
Rated operating capacity	See page 36
Max. breakout force / 50 cm	1100 kg
Standard tyres	23x10.50-12" TR or GR
Auxiliary hydraulics *See also page 35	Max pressure: 18,5 MPa (185 bar) Max flow: 30 l/min
Hydraulic pumps	1 auxiliary hydraulics pump, 1 drive pump
Auxiliary hydraulics	Standard: Faster multiconnector system on front Optional: Extra auxiliary hydraulics outlet at front or rear of loader
Attachment coupling	Avant quick coupling attachment plate
Hydraulic oil capacity	36 l
Hydraulic oil type	ISO VG 46, mineral oil only See page 112
Sound pressure level 2000/14/EC L _{pA} , ISO 6396	79 dB(A)
Sound power level 2000/14/EC L _{WA} , ISO 6395	91 dB(A)
Hand-arm vibration, total	< 2,5 m/s ²
Whole-body vibration, max.	< 0,5 m/s ²
Technically permissible maximum masses (With standard tyres)	Front axle: 1400 kg Rear axle: 1400 kg Total: 2800 kg
Maximum mass of a trailer	1000 kg

*) Load is measured when the load is placed on pallet forks A21047, with the location of the center of gravity of the load at 400 mm from the vertical part of the pallet fork arm. The attachment weight (90 kg) is taken into account. The figure applies with driver (75 kg) seated on driver's seat, and with standard counterweights.

Electric system and battery

Battery	Avant e5
Battery type	AGM (Absorbent Glass Mat) lead-acid battery
Battery product code	A432383
Stored energy	13,6 kWh
Capacity	285 Ah
Voltage (nominal)	48 V
Electric motors	2
Net power, drive	7,2 kW
Net power, auxiliary hydraulics	2 kW
Maximum operating temperature (ambient)	40°C
Maximum battery temperature	55°C
Control system and accessories	12 V / 40 A DC-DC converter
Charging system	Integrated charger
Mains current plug for charger	Schuko, grounded
Charger voltage and current	Controlled by charger Max output 40 A, 48 V DC Input 10 A, 230 V AC. See page 93

Extra 12 V power kit	A441250
Battery product code	A437091
Battery type	AGM (Absorbent Glass Mat) lead-acid battery
Voltage (nominal)	12 V
Capacity	2,9 Ah

Tyres

The loader can be equipped with different type of tyres for different operating conditions. Grass pattern (GR) tyres will damage the ground surface less than tractor (TR) tyres, but provide less traction.

The overall diameter of the tyre affects the maximum drive speed pulling force of the loader. Larger tyres increase tyre speed but decrease available pulling force.

All tyres have maximum rating for load capacity and drive speed, or their combination. Inflation pressure of the tyre has an effect on maximum allowed speed of the tyre, or the load carrying capacity. Keep tyre pressures within near recommended pressures.

Use tyre and rim models that are recommended by Avant to ensure that the tyres meet the dimension, load, and speed requirements for this loader model. Replace tyres if there are visible damages on the tyre or rim, or if the wear surface of the tyre has worn, or if there are visible differences between the tyres. Always use the same size of tyres on all wheels.

Tyre	Tread pattern	Code	Fill pressure	Fits with fenders		Fits with snow chains	
				Front	Rear	SD	HD
27 x 8.50-15"	TR	65414	4,1 bar	-	-	65723	-
23 x 8.50-12"	TR	65995	2,3 bar	x	x	64746	64455
	GR	65994	4,6 bar	x	x	64746	64455
23 x 10.50-12"	TR	65997	2,5 bar	x	x	-	64745
	GR	65996	2,9 bar	x	x	-	64745
26 x 12.00-12"	TR	65739	2,1 bar	x	x	-	64973
	GR	65212	3,4 bar	x	x	-	64973
320/60-12" HD	TR	65224	4,0 bar	x	x	-	65603
26.5 x 14.00-12"	GR	65787	1,8 bar	-	-	-	-

* When using the 26,5x14.00-12" tyres (code 65787), use of 40 mm wheel spacers is mandatory to fit these tyres. See page 34.

Use the widest possible tyres

For the best stability and controllability, always use the widest tyres possible. Tyres that are narrower than the standard tyres are intended for special purposes only with width restriction on the machine.

Use only tyres and rims that meet the original specifications and dimensions to avoid potential issues with load capacity, tyre size, or bearing load on drive motors. Special tyres, such as studded wheels may also be available. Consult your dealer for further information.



Risk of tipping over - Make sure tyres are not damaged. Loss of tyre pressure can cause loader to tip over. Make sure there are no visible damages on tyres. Keep tyre pressure within recommendations.

Drive speed and pulling force

	Tyre	Drive speed	Pulling force
e5 TR	23 x 8.50-12" TR	9 km/h	100%
	23 x 10.50-12" TR	9 km/h	100%
	26 x 12.00-12" TR	10 km/h	85%
	320/60-12" HD TR	10 km/h	80%
	27 x 8.50-15" TR	10 km/h	80%
e5 GR	23 x 8.50-12" GR	9 km/h	95%
	23 x 10.50-12" GR	9 km/h	100%
	26 x 12.00-12" GR	10 km/h	85%
	26.5 x 14.00-12" GR	11 km/h	75%

* The maximum speed of the loader is the highest speed that can be achieved in optimal conditions. Load distribution, tyre pressures, ground surface, and many other conditions influence the maximum speed.

** The pulling force depends on the size of the tyres. In the table pulling force with each tyre model is listed as comparison with the standard tyres (100 %).

Wheel spacer kit

The wheels can be fitted with spacers that increase the width of the loader for better stability. The wheel spacer kit A418958 includes four 40 mm thick spacers. They must be installed in order to fit the wide 26.5x14.00-12" tyres.



WARNING

Wheel spacers improve the lateral stability of the loader. Do not remove the wheel spacers unless operating the loader on flat areas, where the total width of the loader must be reduced to as narrow as possible.

NOTICE

Use only spacers recommended by Avant. Too thick spacers may damage the hydraulic motors. Contact your Avant dealer for more information.

Snow chains

There are two types of snow chains. See the tyre table on page 33 for a list of chains that are available for the tyre size of your loader.



SD

HD

Follow the installation instructions that are provided with the snow chains. Contact service if necessary. Check that snow chains fit without hitting any part of the loader. Check also that the snow tyres will fit when the loader is turned to maximum articulation.

Ballasted tyres

Some tyres can be filled with special type of heavy foam that creates additional counterweight. The filled tyres are also useful in area where frequent tyre puncture with normal tyres would be expected.

When driving with a loader that has ballasted tyres, the acceleration and stopping distances may be increased.

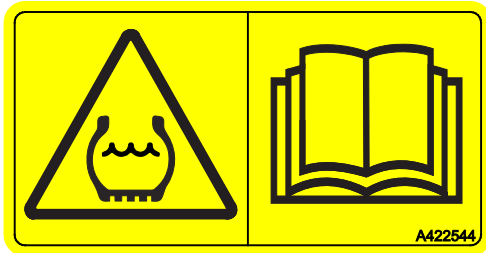
Ballasted tyres do not have air pressure inside them and do not require air pressure checks.



CAUTION

Ballasted tyres are heavy - Handle ballasted tyres with care. Filling of tyres should be left to professional tyre service.

When the loader is equipped with ballasted tyres, the following symbol must be applied to a visible location on the loader frame near tyres. If you replace the tyres and install normal tyres, make sure to also remove this label.



Auxiliary hydraulics oil flow

The graph below shows auxiliary hydraulics output flow at different rpm levels of the electric motor. The rpm of electric motor of the auxiliary hydraulics pump is controlled with the hand throttle lever.

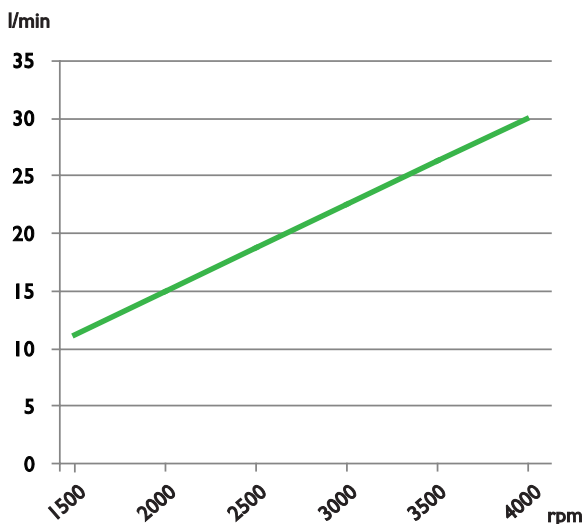
The auxiliary hydraulics oil flow is displayed on the Multi-function display of the loader. See page 49 for more information.

Some attachment may work optimally at certain flow level, use the graph to estimate correct rpm setting.

NOTICE

The hand throttle lever controls only the auxiliary hydraulic pumps. **The position of the hand throttle lever does not affect the speed or pushing power of the drive system.**

Keep the rpm setting as low as possible to smoothly operate the attachment to conserve energy. Pull the throttle lever back when not operating an attachment.



NOTICE

Maximum auxiliary hydraulics oil flow cannot be used with all attachments. Check correct rpm level for each attachment with the help of this graph and the Operator's Manual of each individual attachment. Attachment may get damaged, run too fast, or it may be difficult to control precisely when oil flow is too high.

NOTICE

Using an incompatible attachment that requires constant high flow and pressure of hydraulic oil will result in drop of auxiliary hydraulics output. This happens because the control electronics of the loader limit the temperature of the electric motors and inverters.

Lift capacity

Tipping load is the load at which the rear tyres lose contact with the ground and the loader begins to tip forward. Tipping over can happen also on even ground. If the movement that causes the loss of stability is not prevented or corrected in time, the loader can tip over causing potentially serious personal injuries or even death. Read the instructions in this Operator's Manual regarding safe handling of loads to avoid the situation where the loader will tip over.

Tipping over can be caused by a single reason, or as the combined effect of the operating conditions, movements of the loader, and the work situation. Avoid the following basic situations to prevent the loader from tipping over:

- too heavy load is being lifted
- when the loader boom is moved to another position, the load moves away from the loader, reducing the stability of the loader
- driving or other movements of the loader affect the balance of the loader

More information about how to take these factors influencing the tipping load into account are shown on page 41.

There are many influencing factors that affect the stability of the loader. Use the load chart and ROC table to estimate the load handling capacity of the loader. Observe the instructions and information given in this Operator's Manual.

The lifting capacity and the stability of the loader are at the best, when:

- the ground is level
- the loader frame is kept in straight position
- the centre of gravity of the load is as close to the loader as possible
- counterweights are fitted to the loader
- swinging of the load is prevented and all controls are used in a calm and careful manner - sudden movements of the loader or the load can cause the loader to tip over

See also page 70 for more information about safe handling of heavy loads and for a list of typical factors that influence the stability of the loader.



Risk of tipping over - Follow safety instructions. The lifting capacity of the loader is limited by the possibility of tipping around the front axle.

Pay attention to safe operating conditions whenever handling loads or heavy attachments. The indicated values apply only in favorable conditions. Read the instructions in this Operator's Manual.

To estimate the load carrying capacity of the loader

There are two representations of the tipping load in this Operator's Manual:

- Load chart with pallet forks, including the table of Rated Operating Capacity (ROC)
 - This information is also presented as a label on the loader
- Load diagram

Both of these show the same information about the tipping load of the loader, but in a different way, and with different details. The information in the load diagram is more general, and can be applied to other attachments as well to help you to avoid exceeding the tipping load with any attachment.

Any illustration, chart, table, or value of tipping load and the ROC table are valid only, when the following conditions are met:

- The ground is firm and level
- Loader is stationary or driven slowly, max 2 km/h, with smooth and slow control movements
- Driver 75 kg is seated on the driver's seat
- Load is distributed evenly on pallet forks, with the load centre of gravity at 500 mm from the vertical part of pallet fork arms. The weight of the fork attachment is taken into account in the indicated load values



All counterweights affect stability - Also the driver. Always lower the load on the ground before leaving the driver's seat. If the load is close to the tipping load in the position and in the current situation of the loader, the loader could tip over as a result of leaving the driver's seat.

Load charts of other attachments

In this Operator's Manual there is only a load chart for the pallet forks A21039. All Avant attachments have their own Operator's Manual which include more information about their rated operating capacities when used with different loader models.

Always keep the manuals of all attachments available for all operators of the loader. If you don't have all manuals available, contact your Avant dealer.



Risk of getting crushed under falling load - Never exceed maximum load of the attachment. The lifting force of the loader and the tipping load may exceed the maximum allowed load of an attachment. The Rated Operating Capacity in this Operator's Manual shows information for pallet forks and it does not apply to other attachments. Check the Operator's Manual of the attachment and the identification plate of the attachment for information about their maximum loads. Overloading an attachment can cause damage that becomes visible only later.

Rated operating capacity

To easily determine how much load the loader can handle safely, a table of the tipping load and a calculated Rated Operating Capacity (ROC) are shown in the ROC label. The label is also visible from the driver's seat.

Rated operating capacity depends on type of use of the loader:

- In bucket and general application the rated operating capacity is 50% of tipping load
- In pallet fork application the rated operating capacity is 60% of tipping load

The information shown in the table is the worst case minimum load, with the conditions listed below. Actual lifting capacity could be significantly higher, or it may be lower, depending on terrain conditions, available lifting force, and load distribution. Adding or removing counterweights will affect the indicated ROC.

The load charts help you to estimate the weight of the load that can be lifted with the loader without tipping over on firm, stable ground. They describe the loads that can be handled at different positions of the loader boom.

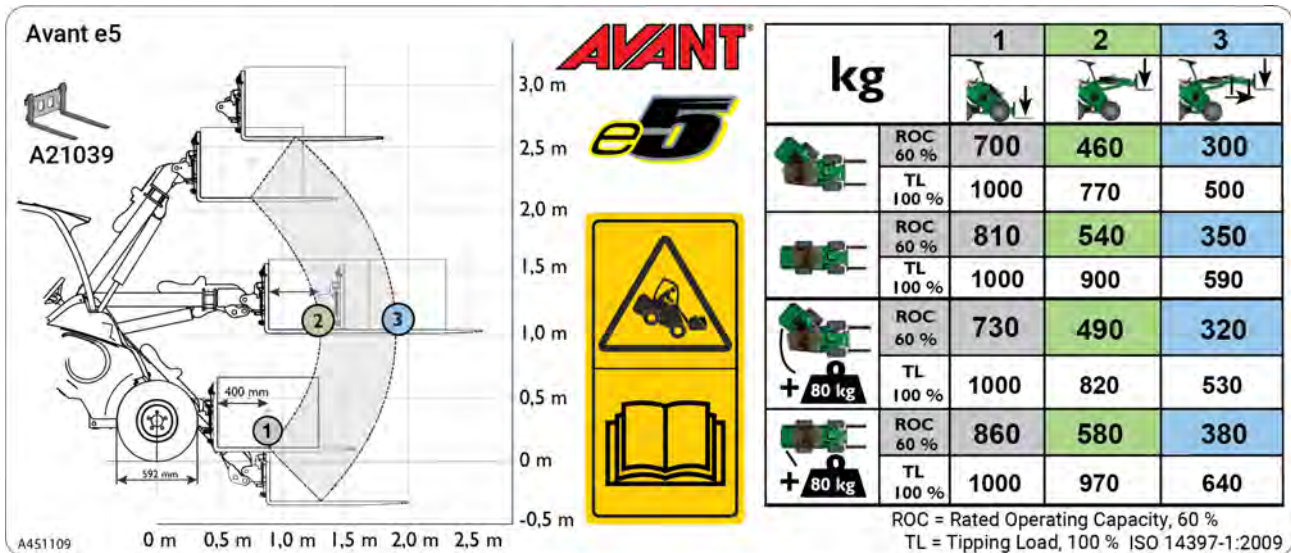
The ROC label below shows the lifting capacity with pallet forks in different positions of the loader boom. The lifting capacity of the loader depends on the horizontal distance between the center of gravity of the load and the front axle of the loader.

When the load is lifted off from the ground, the loader boom moves further away from the loader, decreasing the stability of the loader. At the horizontal position of the loader boom the load will be the furthest away from the loader, and the tipping load is the lowest. When the telescopic boom is extended the tipping load is further reduced.

The ROC table is valid, when:

- The ground is firm and level
- Loader is stationary or driven max 2 km/h, with smooth and slow control movements
- Driver weighing 75 kg is seated on the driver's seat
- Load is distributed evenly on pallet forks, with the load centre of gravity at 500 mm from the vertical part of pallet fork arms. The weight of the fork attachment is taken into account in the indicated load value

Rated operating capacity label A451109, in kilograms



Load chart on the left side of the label:

The graphic on the left side of the label shows the distance of the load in different positions of the loader boom. In this graphic, and in the Rated operating capacity table, the load is placed so that its center of gravity is at 400 mm forward from the vertical part pallet fork arms.

The numbered points are the positions of the rated operating capacity table.

Different positions of the loader boom, columns in the table:

1. Maximum tipping load, stability when lifting load just off the ground with pallet forks
 - a) Rated operating capacity, 60 % of tipping load with pallet forks
 - b) Tipping load (100%) in this position

NOTE: The tipping load exceeds the maximum lift capacity of the loader.
2. Boom lifted to horizontal position:
 - a) Rated operating capacity, 60 % of tipping load with pallet forks
 - b) Tipping load (100%) in this position
3. Boom lifted to horizontal position, telescopic boom fully extended (least stable position)
 - a) Rated operating capacity, 60 % of tipping load with pallet forks
 - b) Tipping load (100%) in this position

Different loader configurations, rows in the table:

- a Loader frame in fully articulated position, standard counterweight fitted
- b Loader frame in straight position, standard counterweight fitted
- c Loader frame in fully articulated position, with additional 180 kg counterweights fitted to the loader
- d Loader frame in straight position, with additional 180 kg counterweights fitted to the loader

Tipping load - Load diagram

With the load diagram in this chapter, you can estimate the load handling capability of the loader depending on the horizontal distance of the load from the loader. The tipping load depends according to the distance between the centre of gravity of the load and the front axle of the loader.

The horizontal distance of the load on typical pallet forks is also shown in different positions of the boom. In the diagram, the load is placed at 500 mm from the vertical part of the fork arm.

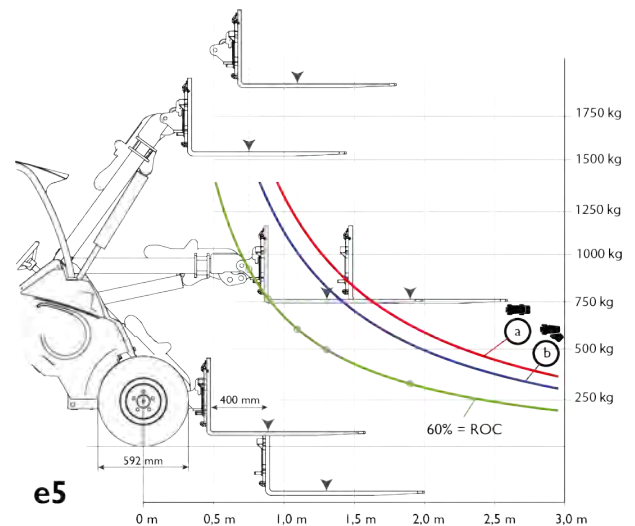
NOTE: The load diagram represents the forward stability only. *It does not refer to maximum available lift force.*



WARNING

Avoid overloading the loader - Know the load and the lifting capacity of the loader. Heavy load can cause the loader to tip over. The diagram is valid only on firm and level ground, with the conditions listed on page 36. The load can exceed tipping load and loader can tip over when you move the loader boom to another position.

Load diagram e5



How to read the load diagram

- a Tipping load with the loader frame in straight position.
- b Tipping load with the loader frame in maximum articulation.
- ROC (Rated operating capacity), defined as 60 % of tipping load for pallet forks.

The tipping load chart describes only the stability of the loader to forward direction - it does not refer to maximum available lift force.

The tipping load lines in the chart extend beyond the hydraulic lift capacity of the loader.

Example: If the centre of gravity of the load is 870 mm in front of the front axle (400 mm from the vertical part of pallet fork arms, forks at ground level)

- When the boom is lifted to horizontal position, the tipping load is about 900 kg (line a in load diagram, the horizontal distance of the center of the load on forks increases to about 1290 mm).
- Tipping load would be above 1000 kg when lifting from ground surface level, which is higher than what the loader can hydraulically lift.

How to estimate actual lifting capacity

The actual tipping load and stability of the loader depends on many factors that you must consider when you handle heavy loads or attachments. Listed in the table below are many factors that influence the stability of the loader.

Always keep in mind the conditions listed in the following table.

Influencing factor	How you should take it into account
Position of the loader boom and telescope	<p>Keep load as close to the ground as possible while you drive. Lift only when ready to unload the bucket or attachment</p> <ul style="list-style-type: none"> ▪ See load chart and ROC table to estimate the lift capacity of the loader on level ground. Reduce the indicated maximum load by always taking the local operating conditions into account
The total load on the loader boom	<p>Estimate the combined weight of an empty attachment and load</p> <ul style="list-style-type: none"> ▪ Load chart is based on weight of pallet forks (90 kg) ▪ If the attachment you use is heavier, subtract its weight from the listed tipping load accordingly ▪ See the Operator's Manual of each attachment for attachment weight and possible information about permitted loads.
The distance of the load from the front tyres	<p>The further away the load is from the loader, the less stable the loader is</p> <ul style="list-style-type: none"> ▪ Keep the load as close to the ground and the loader as possible ▪ Never drive while load is lifted more than just off the ground
Straight or articulated position of the loader frame	<p>If you turn the articulated frame, the loader will tip over more easily</p> <ul style="list-style-type: none"> ▪ Keep the loader in straight position when lifting heavy loads
Levelness of the ground	<p>All listed values are applicable only on level, even ground</p> <ul style="list-style-type: none"> ▪ Drive slowly on uneven ground ▪ Keep load close to ground and as close to the loader as possible
Installed counterweights	<p>If counterweights are installed, the loader stability is better</p> <ul style="list-style-type: none"> ▪ Keep standard counterweights fitted ▪ Consider the use of additional counterweights or ballasted tyres for additional stability
Driver presence	<p>Driver acts as additional counterweight</p> <ul style="list-style-type: none"> ▪ Load chart is calculated with a 75 kg driver present on driver's seat ▪ If you leave the driver's seat, loader can tip forward.
Movements of the loader and the load	<p>Lifting of the maximum load is possible only when loader is not moving</p> <ul style="list-style-type: none"> ▪ Operate the controls of the loader slowly and in a smooth manner. Dynamic loads can cause loader to tip over ▪ Secure load on the attachment. If load moves or swings, the loader can tip over ▪ Use correct type of attachment for each type of load ▪ Never lift swinging loads

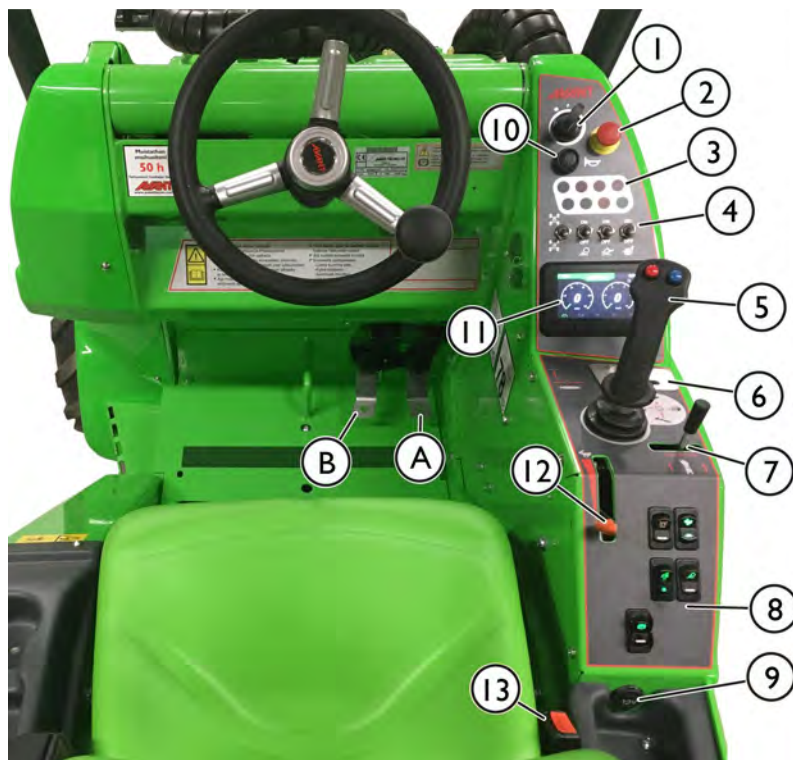
Controls and options of the Loader

This chapter describes the location and function of the controls of the loader. The location and function of controls may be slightly different in different models and cab versions. See the following pages for information about the controls and the options of the loader.

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Overview of controls



Reference **Page**




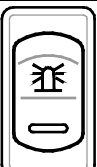



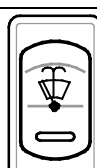

- | | | |
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| 13. | Seat belt buckle | 55 |

Controls in footwell

- | | | |
|---|-----------------------------------|----|
| A | Drive pedal, right: drive forward | 65 |
| B | Drive pedal, left: drive backward | 65 |

Switches on the panel

NOTE: Some of the switches presented here are for optional equipment and might not be installed on the loader.
The position of the switch may be different than shown in here.

	Auxiliary hydraulics outlet selection switch Optional equipment See page 53		Extra work lights on the ROPS frame, 2 front, 1 rear Optional equipment		Drive mode / speed range selection switch. See page 66
	Warning beacon Optional equipment See page 57		Operating mode selection switch See page 66		Hydraulic locking pins, attachment coupling Optional equipment See page 76
	Parking brake See page 48		Windscreen wiper and washer (CAB L option) See page 58		Emergency blinker Optional equipment

Dashboard

On the dashboard there is the ignition key, and additional switches and indicator lamps.

The multi-function display shows information about battery charge level, hours of use, and diagnostics related trouble codes. The display is on whenever the ignition key is turned to position P or ON, see page 62. The hour meter runs whenever the electric motors are running.



Indicator lights

	Symbol	Colour	Remarks
1			<i>Not in use in this loader model</i>
2		Red	Hydraulic oil cooler fan fuse Hydraulic oil cooler malfunction.
3		Red	Hydraulics locked ---
4		Green	Turn signal indicator Road traffic light kit only
5		Green	Seat heater on
6		Yellow	Boom floating on (optional equipment) See page 51
7		Green	Work lights on Work light switch at lower part of dashboard
8		Blue	High beam headlights on Road traffic light kit only

Switches on the dashboard

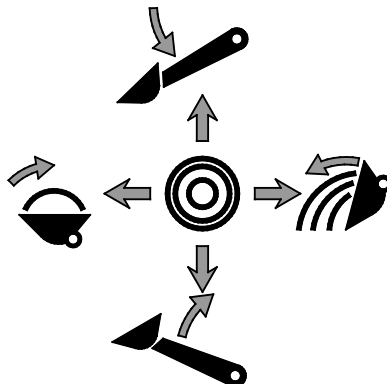
	Symbol	Switch
A		Ignition switch See page 62
B		Emergency stop button
C		Signal horn
D		Cross lock valve switch See page 67
E		Work light switch Standard front work lights of the loader.
F		Boom floating on (optional equipment) See page 51.
G		Seat heater switch See page 55

Control of loader boom, auxiliary hydraulics and other functions

Most of the functions of the loader are controlled with the controls at the right side of the operator: Boom and bucket movements, auxiliary hydraulics (attachments), auxiliary hydraulics pump speed etc., depending on loader model. Following paragraphs show the different functions.

1. Control lever of boom and bucket

The loader boom and bucket are controlled with the multi-function lever (joystick) sideways (tilt) and back & forward (boom up & down). In addition, the boom floating is controlled with the joystick

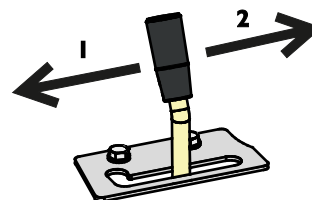


- Pull backward to lift the boom
- Push forward to lower the boom
- Push left to raise the tip of the bucket (filling)
- Push right to lower the tip of the bucket (emptying)

2. Control lever of auxiliary hydraulics (hydraulically operated attachments)

Hydraulically operated attachments are connected to the loader using the multi connector system, for more information see page 78.

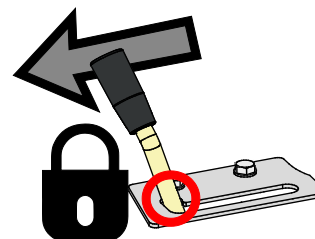
- Operation directions depend on the attachment used.
 - When using an attachment for the first time, carefully move the lever to test and check the operating direction of the attachment.
- For continuous operation of rotating attachments, turn the lever to direction 1 set it to its locking position.
- If operating the buttons of the electric joystick, this lever will not move. Either the lever or the buttons can be used to control the attachment as needed.



NOTICE

When you operate attachments that require continuous flow, such as attachments with hydraulic motors, it is important to have the control lever in fully engaged position. If the control valve is not fully open, restricting the flow of hydraulic oil, hydraulic system may overheat quickly.

If necessary, adjust the locking plate so that the lever is locked to fully open position.



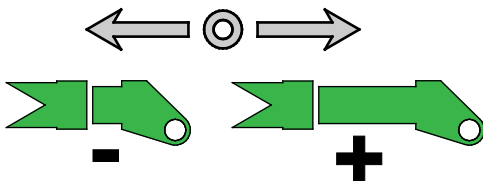
3. Telescopic boom control lever

The telescopic boom makes many tasks easier, also those that do not involve lifting. You can, for example, push material further with a bucket, reach into difficult areas, and improve visibility to the work area with some attachments.



The telescopic boom can be extended by 600 mm. It increases the maximum lifting height by 485 mm.

Turn the control lever of the telescopic boom to the right to extend the boom, and turn to the left to retract it.



Risk of tipping over - Extended boom can cause the loader to tip over. Use telescopic boom with caution. The stability of the loader depends on the distance of the load from the front of the loader. When you extend the boom, you increase the effect of the weight and reduce safe handling capacity. See pages 36 and 70 for further instructions about tipping load and safe material handling.

4. Joystick - 6 function (optional extra)

If the loader is equipped with the optional 6 function joystick, the auxiliary hydraulics can be controlled with electric buttons on the joystick:



- Push and hold either button to operate hydraulic feature of the attachment.
- Release buttons to stop.
- Either these buttons or the control lever can be used, depending on the attachment and kind of work.
- The operation of the buttons depends on the attachment, see the Operator's Manual of the attachment.
- Make sure the manual control lever is not locked when operating electric joystick.

If the joystick has an additional switch on the backside of it, it is the control switch for the anti slip valve. See page 67.



Avoid abrupt movements of an attachment - Use electric buttons with caution. When you use certain attachments with the electric joystick buttons, the attachments can move abruptly. This can cause falling of material from the attachment, loss of stability, or damage to attachment. Use the manual control lever for work or attachments requiring smooth movements.

5. Hand throttle lever for pump RPM control



The position of the Hand throttle lever controls only the RPM of the auxiliary hydraulics system. Position of this lever will not affect drive speed or pulling force. The drive system works independently from the other hydraulic circuits that are controlled with the hand throttle lever.

As the hand throttle lever controls the output of hydraulic flow, this will also influence the speed of a hydraulically driven attachment. In general, the more throttle, the faster the attachment operates. Make sure not to exceed max. allowed oil flow of the attachment, see Auxiliary hydraulics oil flow on page 35.

- Push the lever forward to increase rpm of hydraulic pumps and increase auxiliary hydraulics oil flow
- Pull backward to reduce rpm of hydraulic pumps and to decrease auxiliary hydraulics oil flow

NOTICE

The position of the Hand throttle lever will not affect driving speed or pulling force.

Keep the hand throttle lever set to a low rpm setting to conserve energy.

Use the hand control lever as needed when using the loader boom or operating a hydraulically operated attachment.

The electric motors run when the ignition key is switched to ON position, and when the operator is seated on driver's seat, or other operating mode is selected. See more information about the operating mode on page 66.

The auxiliary hydraulics pump will also provide pressure for the release of the parking brake, and to flush the drive circuit. This is why the auxiliary hydraulics pump will operate whenever the loader is ready to be driven. However, to conserve battery energy, adjust the speed of the pump to a minimum setting whenever not actively using a hydraulic attachment.

6. Opticontrol® (option)

Opticontrol® is an option that makes it easy to use attachments that have multiple controlled functions. Opticontrol® replaces the previously available Attachment control switch pack option for Avant loaders.

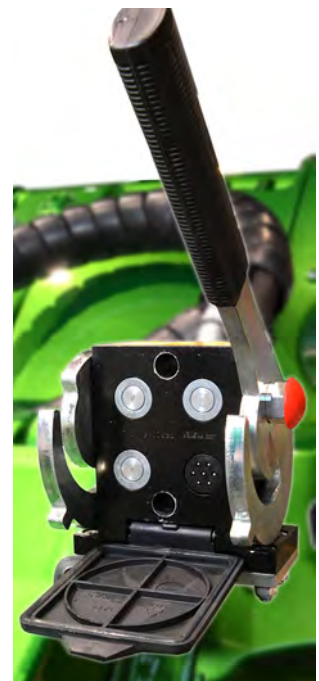
If your loader is equipped with the Opticontrol®, the electric functions or additional hydraulic functions of an attachment can be controlled with the extra buttons fitted on the joystick.

When the Opticontrol® is installed to the loader, there are the following additional features on the loader:

1. Additional control buttons on the joystick. Check the Operator's Manual of each attachment to see how to control the attachment.



2. An electric socket in the Multi connector connects the electric harness of the attachment at the same time as the hydraulic hoses of the loader.



NOTICE

Check the Operator's Manual of the attachment to see how to control each attachment. Function of the Opticontrol® and the Attachment control switch pack depend on the attachment.

Operating modes of Opticontrol®

Check the Operator's Manual of the attachment to see how to control each attachment.

There are two operating modes of the Opticontrol®. Choose the mode depending on the attachment.



Keep the switch in OFF position, unless using an attachment that is intended to be used with the combined control mode.

Switch ON (combined control mode)

The combined mode of hydraulic and electric control enables more simple and flexible operation of certain attachments. In this mode Opticontrol® combines the auxiliary hydraulic control of the loader and electric control of the attachment. Auxiliary hydraulic outlet is switched on automatically only when a control button is activated, making control of attachments with multiple functions easier and more efficient. With Opticontrol®, only one auxiliary hydraulics outlet is needed on the loader, when using an attachment that is compatible with the Opticontrol® system.

The attachment must be compatible with this operating mode. In this mode the auxiliary hydraulics control lever must be left to its middle position.

Switch OFF (normal mode)

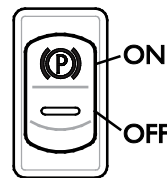
Use only the electric controls of attachment. Auxiliary hydraulics control lever can be left to its locking position.

Keep the Opticontrol® switch OFF whenever there is no compatible attachment coupled to the loader.

NOTICE

Opticontrol® system in the integrated hydraulic control mode will benefit only specific attachments that are intended to be used with it. The attachment must be originally fitted with its own control valve that is designed to be used with the Opticontrol® option. Some types of attachments may need an extra hydraulics outlet on the loader.

Parking brake switch



Switch on the parking brake whenever leaving the driver's seat.

The loader is equipped with a brake system that locks the rear wheels. The parking brake is operated with the switch on the control panel right. On cab LX/DLX the switch is located in the panel up right.

- A red indicator on the switch lights up when parking brake is engaged.
- The green backlight under the "P" is lit whenever the ignition of the loader is in position "ON".



Risk of sudden stop - Do not engage the parking brake when the loader is moving unless in emergency. Using the parking brake while machine is moving may cause locking of wheels and sudden stop.

Electric 12 V outlet

A 12 V electric power socket is located near the driver's seat. This standard type outlet is powered when ignition is switched on. Maximum current: 15 A.

When the loader is not equipped with the Opticontrol® system, the electric harness of the attachment can be connected to this socket.

Extra 12 V power kit

The 12 V electric power output capacity of the standard loader is limited. This available power is shared between lights, control systems, and all additional accessories, such as seat heater etc. When operating devices that require periodically high current, the loader should be equipped with the extra 12 V power kit. The kit includes an additional 12 V battery installed to the front of the loader, and an additional DC-DC converter.

When the loader is equipped with the road traffic light kit A434812, the loader is always equipped with the extra 12 V battery kit to power the road traffic lights even if the ignition switch has been removed from the loader. The extra 12 V battery is automatically recharged whenever the loader is used.

Keep in mind that all additional electric equipment reduce the battery run time. Switch off all unnecessary equipment.

Electric socket on the multiconnector

There is an electric socket for the attachment on the multiconnector if the loader is equipped with the optional attachment control switch pack.

In this case the electric plug of the attachment will be connected simultaneously with its hydraulic hoses. In case there is no electric plug on the multiconnector of the attachment, use the separate electric adapter to connect to the regular 12 V outlet of the loader. You can also contact your Avant dealer to fit an electric plug to the attachment multiconnector.



Risk of fire and electric shock - Never connect any device directly to the battery. The battery is able to produce high electric current that can burn or injure severely, and even cause death. Short-circuit can cause the battery to burn or explode. Never connect any device directly to the 48 Volt systems of the loader.

Diagnostics port

Next to the 12 V electric power socket near the driver's seat there is a diagnostics port. This port is used for software updates and fault code diagnostics by authorized service. Even though the port is USB type, it cannot be used for charging electrical devices such as mobile phones. Keep the protective cover of the port installed at all times.



Multi-function display

The multi-function display shows various information regarding the operation of the loader. This information includes the following in normal use of the loader:

- Battery state of charge, as percentage
- Estimated remaining battery run time in hours and minutes (*estimate - actual remaining battery life will vary heavily depending on use and load of the loader, and the ambient temperature*)
- Instantaneous power consumption
- Output flow of auxiliary hydraulics - in litres per minute
- Drive speed
- Operating hours of the loader

- Any fault codes detected by the control systems of the loader



Button keys of the multi-function display

Press the button keys at the bottom of the screen to change through different display modes and to choose the page you want to have on the display.

NOTE: Some display modes have additional information available, which you can access by pressing a button key multiple times. All display modes may not have additional information available.

During recharge:

When the integrated charger of the loader is connected to mains outlet, the display will show estimate of the remaining time left until the battery is fully charged. The estimated time will vary on the temperature of the battery, and can change significantly during recharge.

During recharge only some of the information that is available in normal use is available.

See page 92 for information about the charge process.

Access to battery and storage spaces on the loader

Access to battery

To open the battery cover, open the quick locks on the rear frame cover and lift it aside.

There is no storage space in the battery compartment or elsewhere in the rear frame. Never place any objects on the battery.



Risk of fire and damage to the battery - Do not use battery compartment as storage space.
There is no storage space near the battery. Do not place any objects on the battery. Always keep the battery clean.



Risk of burns - Allow loader to cool before opening covers.
Electric and hydraulic parts may be extremely hot after use.



The adjacent warning label is located visibly below the rear cover. Hot areas include the hydraulic components and hoses, and surfaces of electric motors and inverters.

Storage inside cab

There are storage areas around the driver's seat and elsewhere in the cab. Place objects so that they will not interfere with controls of the loader, and will not block visibility.

Boom self-levelling (option)



Self-levelling is a system that keeps the attachment tilted in same position when lifting or lowering the boom.

Self levelling is an automatic hydraulic system. There is a levelling cylinder on the left side of the boom which follows the movements of the loader boom and keeps the attachment level.

NOTE: Self levelling is disabled when the boom floating is switched on.

NOTICE

When the attachment tilt is turned to either extreme position, the boom lift cylinder will have to work against the pressure of the self levelling cylinder.

To prevent extreme stresses to the loader boom, operate the bucket tilt control to move out from extreme tilt before lifting or lowering the boom.

NOTICE

Self levelling is disabled when the boom floating is switched on. Boom can't be pushed down with hydraulic force, when floating is on. Use boom floating only when necessary.

Boom floating (option)

The boom floating is a system that allows an attachment to follow the surface of the ground. The floating system releases the lift cylinder and allows it to float upwards from the position where it is when boom floating is switched on. When boom floating is switched on, it is not possible to push down with the boom.

To switch on the boom floating:

1. Lower the attachment on the ground to the position where it will be used
2. Switch on the floating with a switch on the dashboard, see page 44.



Boom floating indicator light on the dashboard is lit when the system is switched on.

NOTICE

If the loader is also equipped with the Smooth drive option, the floating function will be activated whenever the smooth drive is activated.

NOTICE

The switch may installed on the dashboard also when the boom floating option is not installed on the loader. The presence of the switch does not mean the boom floating or Smooth drive options are fitted.



Risk of lowering of the boom when switching on boom floating - Lower boom to close to the ground before switching on boom floating.

Switch on the boom floating only when stationary and when the load is close to the ground. Boom can move down when you switch on the boom floating, if the loader is equipped with the Smooth drive option.

Keep the boom floating switched off during normal use of the loader, and when lifting loads with the loader.

NOTICE

Some attachments have a floating linkage built in the attachment coupling, making use of the floating on the loader unnecessary. Refer to the Operator's Manual of the attachment for more information.

After using the boom floating

During boom floating, some air may become trapped into the lift and tilt cylinders. To avoid unexpected or inaccurate movements of the boom, the air in cylinders must be removed by moving the boom to extreme lift positions after switching off the floating system.



Risk of unexpected movements - Move the loader boom after you have switched off the boom floating to remove air from cylinders. During the use of boom floating air can get trapped in the hydraulic system. This can cause inaccurate movements of loader boom and the boom can even move down.

Therefore the boom and attachment coupling plate should always be moved to extreme end positions after switching off boom floating.

Counterweights

Additional counterweights can be installed to increase the longitudinal stability of the loader when handling heavy loads or attachments.

1. 29 kg individual weights A35957

Max 3 pcs.

If you install a trailer coupling, only one extra weight can be used.



2. 80 kg side weight kit A36401

One 40 kg weight to both sides of the loader.



The 180 kg side weight kit can not be installed on e series loaders.

Avant e series loaders use its battery pack as a standard counterweight. The 170 kg rear counterweight, available for some loader models, cannot be installed to e series loaders because of different rear frame construction.

**WARNING**

Risk of loss of control of loader - Too much counterweight can make the front of the loader too light. If you install too much counterweights to the loader, the front wheels of the loader will be easily lifted from the ground. This will make steering of the loader difficult. If counterweights are fitted to handle a certain attachment, remove counterweights if driving without an attachment.

**DANGER**

Risk of moving or falling of the loader - Never lift or tie down loader from side counterweights. Eyelets on extra side counterweights are for installing or removing the side counterweight only. Never attempt to lift the loader from the counterweights or use them as tie-down points. **Always remove the eyelets from the counterweights immediately after installation work.**

Trailer coupling

The loader can be equipped with a trailer coupling for towing of light trailers. There are two types available:

1. 50 mm ball hitch
A417323



2. 50 mm ball hitch
with towing pin
A417337



Trailer coupling can be mounted either directly on the rear bumper or on the extra rear counterweight.

- Max. allowed vertical load 500 kg
- Maximum towing load is 1000 kg.

Make sure that the weight on the trailer is distributed correctly so that the trailer cannot cause an upward lifting force on the trailer coupling. Keep an attachment fitted at the front of the loader to add weight to the front of the loader.

**DANGER**

Risk of tipping over - Overload on the trailer coupling may cause loss of control. Tow only light garden trailers. Make sure that the weight on the trailer is distributed correctly so that the trailer cannot cause an upward lifting force on the trailer coupling.

Extra auxiliary hydraulics outlets, front and rear

In addition to the standard auxiliary hydraulics outlet, the loader can be equipped with a double acting extra outlet. This extra hydraulic outlet can be fitted either to the front of the loader or to the rear. The couplers are conventional type quick couplers.

If installed to the front, the extra quick couplers are located under the multi-connector.



If fitted to the rear, the quick couplers are located at the top of the rear grille.



For instructions about use and how to connect or disconnect the extra hydraulic couplings, see page 45.

- Test the operation of the attachment after each time it is coupled to the loader. The quick couplings can be coupled in a way that reverses the function of the control lever.
- The loader can be equipped with either front or rear extra hydraulics outlet - but not with both.
- Keep the couplings clean and use their protective covers.

Rear carrier

To use certain attachments, or carry extra loads at the rear of the loader, a rear carrier is available.



DANGER

Risk of loss of control of the loader - Never add too heavy load on the rear. Too heavy loads or attachment at the rear of the loader, especially if combined with extra counterweights, can make the front of the loader too light. Front wheels can lose contact from the ground. Ensure that loader is loaded evenly. Remove counterweights if necessary.



WARNING

Risk of shearing of hands or fingers and impact - Unlocked or improperly locked rear carrier can swing. Make sure both of the locking pins of the rear carrier are locked. Unlocked carrier can swing in uncontrolled way, creating hazards of impact, crushing, and pinching between its linkage. If attachment gets damaged because of unlocked carrier, it can cause oil spray and fire. Unlock the carrier in controlled way and keep hands clear from linkage.

Reverse buzzer (option)

A reverse buzzer gives an audible signal whenever reversing with the loader. This alarms others of an approaching machine. Always ensure good visibility from the driver's seat and look before you reverse with the loader - the buzzer itself does not prevent accidents.

Seat - Seat belt and seat adjustments



Risk of falling from the loader and getting run over by loader - Never carry passengers. The seating capacity of the loader is strictly one person only. Never carry passengers on any part of the loader or with any attachment.

Always use seat belt while driving. Clean the seat belt regularly with a sponge, warm water, and soap. Use compressed air to clean the buckle.

Replace the seat belt if any damage is seen, or if the seat belt is exposed to high load or chemicals.

Seat adjustments

Make sure that the seat is properly adjusted for easy reach to the operating controls and to keep vibrations transmitted by the seat at minimum. Long term exposure to vibrations may cause health effects. Also, as far as possible, keep the operating terrain in good condition to minimise vibrations.

Seat heater

The suspension seat is equipped with an electric seat heater. Seat heater switch and its indicator lamp are situated on the dashboard.



Suspension seat



The suspension seat has the following adjustments:

1. **Seat position**
The distance of the seat from the steering wheel can be adjusted with the lever which is located under the front edge of the seat.
2. **Arm rest angle adjustment**
The angle of the arm rest can be adjusted by turning the roller under the arm rest.
Adjust the arm rest to position which allows to use controls of the loader comfortably while keeping arm on the arm rest.
3. **Seat suspension adjustment**
By turning the knob counter-clockwise suspension gets harder, by turning it clockwise the suspension gets softer.
4. **Back rest angle adjustment**
The angle of the back rest can be adjusted by pulling the lever.



Risk of injury - Make sure that the adjustments of the seat are locked in place before using the loader. Unlocked adjustment of the seat can cause the seat to move, or even slide off from its rails, causing risk of loss of control and injury.

Lights

Work lights

The loader is equipped with standard work lights at the front of the loader, which are controlled with a switch near the ignition switch.

If the loader is equipped with the optional road traffic light kit, the standard work lights are replaced with road headlights. Make sure that the road traffic lights are kept adjusted so that they do not blind oncoming traffic and comply with regulations.

Extra work light kit (option)

The loader can be equipped with extra work lights, making it easier to work in low light. The Extra work light kit includes two extra lights on the front and one at the rear. The lights are operated with the switch on the control panel.



Avant work lights are LED modules. There are different brightness options, check your Avant dealer.



CAUTION

Risk of burns - Never touch the lamp units. The front surface and the housing of the LED lamps can get extremely hot during use. Never touch or adjust the lights during or immediately after their use.



CAUTION

Risk of dazzling - Check that lights are directed correctly. Bright and powerful work lights may dazzle yourself or other persons nearby. Direct the lights so that they do not disrupt the visibility from the cab.

Headlight, beacon, blinker & reflector kit (option)

The optional light and accessory kit makes it possible to register the loader for road traffic use in certain countries.



Requirements vary in different countries, please consult your local Avant dealer.

Always use lights and reflectors which comply with local regulations.

When the e series loader is equipped with the road traffic light kit, the loader is also equipped with the extra 12 V battery. This makes it possible to keep the necessary lights or hazard signal lights on even if the loader is switched off.

NOTICE

The road traffic light kit itself does not guarantee that the loader can be used on road traffic area. Check your local regulations concerning the use of the loader on road areas, need for registration, and need for insurance.

Light control switch (road traffic light kit)

Loaders that are fitted with the road traffic light kit have a multi-function control switch fitted to the steering column.



The switch has the following controls:

- Headlights
- High beam lights
- Signal horn (duplicate switch, both the switch on near the ignition key and switch on multi-function control are connected)
- Turn signals

Warning beacon (option)

A warning beacon is available as an option. The warning beacon warns others about the moving loader. The control switch for the beacon is located in the control panel, see page 44.

If necessary, for example when driving through low doorways, the beacon can be removed quickly by loosening its retaining screw and then by pulling the beacon out. Place the protective seal on the beacon stand to prevent water entering and damaging the connectors.



Handle the beacon with care. The beacon is sealed and its inner components cannot be replaced or repaired by user.

CAB L (option)

The e5 can be equipped, as an option, with cab L. Shown in this chapter are the controls and features that differ from the standard ROPS model.



Windscreen washer and wiper (Cab L and LX)

On machines with cab L and LX, the windscreen washer is operated with a switch on the switch panel. The switch has the following functions:



2. Spray washer fluid
1. Continuous operation
0. Off

The windscreen washer fluid tank is located on under the access step of the loader. The filler opening is on the access step.

Cab Safety

Make sure visibility from the cab is adequate. Keep all window panels clean and clear of snow, ice, etc.

Familiarise yourself with the special drive features and space needs of this articulated loader, equipped with cab, on a flat, even and open place.

Remember that, when turning, the cab extends beyond the turning radius of the wheels. This should be taken into consideration especially when driving in confined spaces, in order that the rear of the cab will not get damaged.

Place objects, clothing, and other items in the cab so that they will not hamper with visibility from the loader, and that they do not interfere with the controls of the loader.



In case the normal opening on the left side of the loader is blocked, the windscreen can be used as an emergency exit.

If necessary, the windscreen can be broken with the emergency hammer located in the cab.

Always make sure that the following equipment are functional and present in the cab:

- Emergency window hammer
- Removable safety pin on the right side window
- Windscreen wiper and washer
- Functional heater and its blower for de-misting the windscreen
- Side mirrors
- Cab air filter must be in place



CAUTION

Risk of collision - Never drive the loader when the visibility is poor. Do not drive unless basic visibility in all directions is achieved. Allow the loader to warm up properly.

Operating instructions



DANGER

Always remember – safety first. Test all the functions of the loader at an open and safe place. Make sure that there are no persons in the operating area of the machine and the danger zone of the attachment.



DANGER

Careless operation can injure you or bystanders - Keep the loader under control at all times. Operating a powerful loader and its attachments requires the full attention of the operator. Do not perform distractive actions while operating, such as using mobile devices.



WARNING

Risk of collision - Pay attention to other machines and persons that are moving in the area. Make sure that there are no persons in the danger zone of the loader and the attachment. The danger zone of the loader covers the reach area of the loader boom, the turning area on the side and in the front and rear of the loader. Always lower down the load or the attachment before leaving the driver's seat – the loader is not designed to stay with the loader boom and load lifted. Learn and practice how to operate the loader at a safe area.

Starting the loader

Before start

Before starting the loader do the daily checks, see page 100.

Adjust the seat so that you have a good working position and unrestricted field of vision from the driver's seat. Check that all controls function correctly. Make sure that the operating area is safe.

Check that the attachment is locked and connected correctly, if an attachment is fitted.

Always make sure you have all Operator's Manuals available. Read and follow all operating and safety instructions.

Check the operating area is safe. If necessary:

- Remove or mark obstacles at the operating area.
- Some tasks may require a safety distance to other persons. Plan work ahead to ensure a safe distance to people and to detect and to avoid potential fragile surfaces at the work area. See the Operator's Manual of each attachment for more information.
- If working at an area where there is other traffic, ensure that proper workplace safety procedures are in place. Use the warning beacon of the loader, consider using a reverse buzzer, and switch on lights of the loader. Everyone should wear high visibility clothing.



Collision hazard - Prevent unintended movements of the loader. Keep hands and feet away from other controls of the loader while starting.



Risk of injury to bystanders - Avoid unintended movements of the attachment:

- If the auxiliary hydraulics is switched on during starting and there is a hydraulically operated attachment on the machine, the attachment can move suddenly and cause a dangerous situation.
- Make sure that the auxiliary hydraulics control lever is in neutral position during starting.
- Do not actuate the auxiliary hydraulics control buttons on the joystick (if fitted) when starting.

NOTICE

The e5 loader will not start in either of the following conditions:

- Electric motors will not start if driver is not seated on driver's seat.

When the ignition switch is switched to position ON, motors will start as soon as driver is seated on the seat.

Note: If the Operator mode switch is activated (disabling the drive pedals), the auxiliary hydraulics pump will start. See page 66 for more information.

- Drive functions are disabled if either drive pedal is depressed during start of the loader. Drive function is enabled after release of pedals.

Ignition key



The ignition key can be switched into three positions:

1. **• (OFF)** In this position:
 - The electric systems of the loader are switched off.
 - Ignition key can be removed.
 - Charging of the battery is possible.
2. **P** In this position, some of the electric systems of the loader can be used:
 - The multi-function display is powered and will show some information, including the state of charge.
 - Some lights of the loader can be switched on.
 - The automatic main switch of the loader (battery) is ON.
 - Charging of the battery is possible.

3. **ON** In this position:
 - The electric systems of the loader are in normal operation mode. The electric motors will run, depending on use of the loader and the active operating mode. See more information on page 66.
 - All functions of the multi-function display are available.
 - The automatic main switches of the loader are ON.
 - Charging of the battery is possible.

Emergency stop button

4. The emergency stop button will shut down electric motors of the loader when pushed.

The shut down state is close to the same as when turning the ignition key to the position P. In addition, the motor controllers are on and give contactor fault on display.

To reset the emergency stop button, twist the red button to release it back to original position. Shut down the loader with the ignition key and start again.

NOTICE

Use the emergency stop button only in emergency situations. In normal operation, stop the loader from the ignition key. Continuous use of Emergency stop button may damage the loader.

To start the loader:

1. Perform daily checks (see Maintenance & Service on page 95).
2. Sit on the driver's seat, adjust seat, and fasten seat belt.
3. Move the hand throttle lever to idle position.
4. Make sure that auxiliary hydraulics is switched off (lever in neutral position), see page 45. *Do not press on the drive pedals.*
5. Turn the ignition key to position ON.

- Automatic battery disconnect switch will be switched on when ignition key is in this position.

It may be possible to turn the ignition key further, beyond the position ON. However, this has no effect on e5 loader model.

After this the loader boom and drive pedals are in operating mode. You can adjust the speed of the pump of the boom and auxiliary hydraulics by turning the Hand throttle lever for pump RPM control.



Prevent unintended movements of the loader. Keep hands and feet away from other controls of the loader while starting. A fault code will appear if you press a pedal during start of the loader.



Misuse can be dangerous - Prevent unauthorised use, remove key. Powerful loader and its attachments can be dangerous in the hands of an inexperienced temporary operator. Take the key with you to prevent unauthorised use of the equipment.

NOTICE

To operate the auxiliary hydraulics or drive pedals, you must be seated on the driver's seat. Safety system prevents use of hydraulic systems, unless seated on the seat. If you use an attachment that is controlled from other position than the driver's seat, see page 66.

After starting:

NOTICE

Make sure there are no remaining warning messages on the multi-function display after start. If the motors do not start after you have turned the ignition switch to position ON, See troubleshooting on page 122.

Stopping the loader (Safe stopping procedure)



Safe stopping procedure

Stopping the loader and its attachment to a safe state

1. Lower the boom completely down.
2. Stop any attachment (move auxiliary hydraulics control lever to neutral position, see page 45), set hand throttle to rear position. Place the attachment firmly on the ground.
3. Engage the parking brake.
4. Stop the motors by turning the ignition key to the OFF position (turn to the left).
5. Release auxiliary hydraulics pressure, see page 79. Move the boom control lever and the control lever of the telescopic boom towards all of their extreme positions to release residual pressure from the hydraulic circuits of the boom.
6. Prevent unauthorised use of the loader. Take the ignition key with you. If parking on a slope is necessary, use additional wheel chocks to prevent the loader from moving.

Stop if you notice any of the following:**NOTICE**

Stop the loader to a safe state as soon as possible if you observe any of the following symptoms. Find out the cause before restarting.

- Battery charge level is dropped to 40 %. Drive to a charging location and avoid heavy load.
- Electric motor rpm increases and/or decreases suddenly by itself, even if you don't move the throttle lever, or press the pedals
- You notice sudden increase in vibration or noise levels
- You notice a leak

Battery disconnect switch

The loader is equipped with an electrically controlled battery disconnect switch (main switch) - There is no separate, manually usable main switch. Whenever ignition key is switched to position **OFF** the 12 V DC system is switched off, and the contactor for the inverters of the electric motors is also off.

To switch on the 12 V electric systems of the loader, turn the ignition key to position **P**. In position **ON** also the main contactor for the electric motors is switched on.

Drive control

Principle of operation

The drive pedals control the speed and direction of travel. The pedals control the electric motor that drives the hydraulic drive pump of the loader.

The position of the Hand throttle lever controls only the RPM of the auxiliary hydraulics system. Position of this lever will not affect drive speed or pulling force. The drive system works independently from the other hydraulic circuits that are controlled with the hand throttle lever.

- Use the pedals to control driving direction and travel speed
- Only the speed is controlled with the pedals. The more you press a pedal, the faster the loader will travel. The pulling force is kept steady by the control systems of the loader regardless of the speed.
- Choose the most suitable drive mode with the drive/operating mode selection switch, see page 66.

**WARNING**

Risk of collision or tip over - Use low speed when you practise the use of the loader. Familiarise yourself with the driving of the machine on low speed and on a flat, even and open place. Make sure that there are no persons in the operating area of the machine to avoid injuries that could result from unintended movements. When you have learned how to drive with slow speed operating mode, increase speed gradually and learn how to drive and steer the loader with higher drive speeds.

Drive pedals

Using the drive pedals:



- Driving forward: press gently on the right drive pedal until the machine starts to move slowly.
- To drive backward: press gently on the left drive pedal.
- When you wish to stop gently release the pedal by lifting of your foot, and the machine will slow and stop.

If you need stop more quickly, press the drive pedal of the opposite drive direction. Release both pedals as soon as the loader has stopped, otherwise the loader will immediately start to move to the direction of the drive pedal that is pressed.

NOTICE

The position of the Hand throttle lever will not affect driving speed or pulling force.

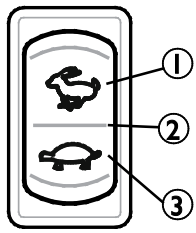
Keep the hand throttle lever set to a low rpm setting to conserve energy.

Use the hand control lever as needed when using the loader boom or operating a hydraulically operated attachment.

**WARNING**

Risk of tipping over - Avoid high speed turns. The loader can tip over, if you turn the steering wheel sharply while driving. Slow down before making sharp turns. Always control and steer the loader with smooth movements.

Driving modes



Driving mode selector changes the response of the drive pedals. The system can be optimised for speed, maximum battery life, or greatest accuracy of control.

The maximum pulling force is the same regardless of the position of the switch.

1. Power mode

Use this mode when you need high driving speed and quick acceleration. The loader will respond quickly to drive pedals.

Battery run time may be short as result.

2. ECO mode

Use this mode for maximum battery run time.

Management of electric systems and hydraulic flow are optimised to avoid waste of energy.

Maximum driving speed and acceleration are limited.

3. Slow / inching mode

This mode provides a modified response to the drive pedal. This helps you to operate the loader in tight spaces, where great accuracy is needed, or when learning to operate the loader.

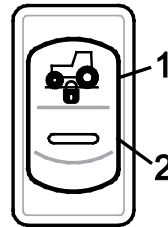
When you want to have a high pulling force:

The control systems of the loader keep pulling/pushing force of the loader full in all positions of the drive pedals.

- Drive pedals adjust the speed of the loader. Pushing pedal further down will increase speed, but not pulling force.
- The position of the driving mode switch does not affect pulling force.
- The position of the hand throttle lever does not affect pulling force or drive speed.
- If the battery charge level is low, the loader may not be able to produce maximum pulling force or high drive speed. Push pedal lighter in this case.

Operating mode switch

The loader is equipped with a safety system that restricts the use of controls of the loader, if there is no driver on the driver's seat. There are two operating modes that are controlled with a switch on the panel:



1. When control mode switch is switched to this position, auxiliary hydraulics can be operated while not seated on the seat. Drive pedals are disabled.

This makes it possible to operate attachments that are controlled with their own control systems. Those attachments may be intended to be operated from other position than from the driver's seat. See the intended use and operating position from the Operator's Manuals of those attachments.

2. In this mode, the drive pedals boom movements and auxiliary hydraulics can be used only while seated on the driver's seat

OptiDrive®

The e5 loaders are equipped with the efficient Avant OptiDrive® hydraulic drive system as standard.

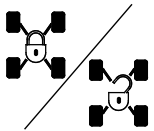
The system is designed for optimal hydraulic oil flow, which helps to conserve energy by minimising losses. This is achieved with the use of integrated high efficiency Avant valve blocks and EO3 type hose fittings.

OPTIDRIVE®

X-lock (Cross lock) and anti slip

X-lock (Cross lock)

The hydraulic drive circuit has a system that allows the wheels on the left and right side of the loader to roll at different speeds. This will help to leave less tyre marks on soft surfaces, and reduces tyre wear on hard surfaces. The cross lock system limits the flow of hydraulic oil between the hydraulic motors on each side, functioning in similar way as a limited parallel differential lock, increasing pushing force of the loader.



The X-lock system can be switched on from the switch in the dashboard.

The position of the X-lock switch also affects the function Anti slip valve (optional equipment).

X-lock OFF: In this mode, the hydraulic oil can flow from the hydraulic motors one side of the loader to another. The wheels will roll more freely and the loader leaves less tyre marks on soft surfaces.

X-lock ON: In this mode the hydraulic oil flow from side to side is restricted. The effect is similar to a limited differential lock in operation. This improves the pushing capability of the loader. With the X-lock is switched on, the hydraulic motors on one side of the loader may receive larger portion of the total hydraulic flow, leading to spinning of the wheels on one side of the loader.

In general, the X-lock should be switched off during general use, where high pushing force is not needed. Also, when operating on hard surfaces, the X-lock should be switched off to reduce tyre wear. When driving on slippery surfaces the X-lock should be switched on.

Anti-slip valve (option)

If the loader is equipped with the optional anti-slip valve, there is an additional switch on the back of the joystick. The valve equalizes the oil flow between the left and right side hydraulic motors, improving traction on slippery and uneven surfaces.



The anti-slip valve is engaged by pressing continuously on the switch on the joystick.

As soon as the switch is released, anti-slip valve is released.

The function of the anti-slip valve does not depend on the position of the X-lock switch. Whenever the anti-slip is activated, also the X-lock is switched on automatically.

Operation in cold conditions

Allow the loader to warm up properly

Hydraulic oil temperature has an effect on the hydrostatic drive system of the loader. When the ambient temperature is below 5 °C, make sure the general response to drive pedals is normal. If the drive feels sluggish, allow the hydraulic system to warm up by letting the loader to run at idle until the drive system works normally. Drive carefully until the loader has reached its normal operating temperature.



WARNING

Risk of decreased braking power - Make sure hydraulic oil is not overheated. When hydraulic oil gets hot, driving characteristics of the drive system change. When the oil is hot and the hydraulic oil cooler has switched on, stopping distance of the machine can be longer than when the machine is cold. If the loader is used constantly in high ambient temperatures, hydraulic oil type and viscosity must be suitable for these conditions. Contact Avant service.



WARNING

In case braking power of hydrostatic drive system has decreased, engage the parking brake. The rear wheels may lock immediately. Parking brake acts as an emergency brake, and will also engage in case of loss of oil pressure. Parking brake is intended to keep the loader stationary and not for repeated braking. Engage while loader moves only when necessary.

Battery system in cold environment

The battery pack is less capable to supply energy in cold environment. This sets a limit to the minimum operating temperature where the loader can be practically used. Operating in cold conditions will decrease battery performance and cold, stiff hydraulic oil will waste more energy.

The electrolyte temperature inside the battery cells should be at least +10°C before charging. Otherwise the battery will not recharge to completely full state.

To reach maximum battery capacity in freezing conditions, keep the loader stored in warm shelter. Battery will then remain relatively warm during use and will be able to output as much energy as possible.

Steering of the loader

Steering of the loader is controlled with the steering wheel. The steering system is hydraulically powered. A practical way of steering is to steer with your left hand on the knob of the steering wheel. This way your right hand is free to operate other functions of the loader.

You can steer the loader with the steering wheel even in case hydraulic power is lost. There is an integrated emergency steering system, but more force is needed to turn the steering wheel in case there is a problem with the steering system of the loader.



Risk of tipping over - Keep loads close to ground while driving.

When driving, always keep the loader boom as low and close to the loader as possible. Risk of tipping over increases considerably when there is a heavy load on the loader (a heavy attachment or a big load in the bucket) and the boom is up when driving.



Risk of tipping over - Avoid high speed turns.

The loader can tip over, if you turn the steering wheel sharply while driving. Slow down before making sharp turns. Always control and steer the loader with smooth movements.

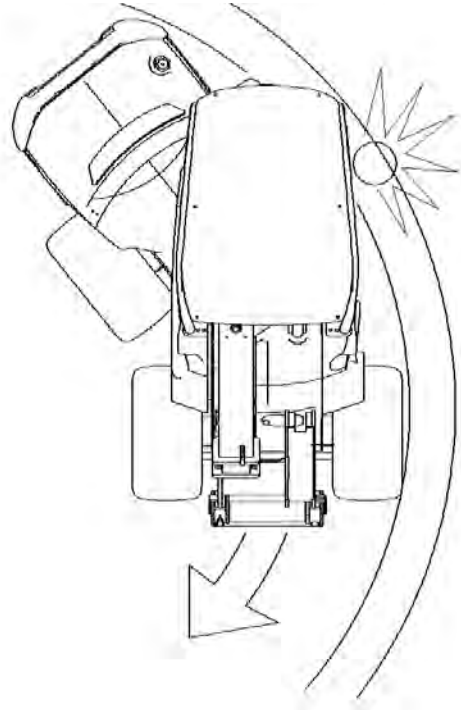


Risk of tipping over - Never use a high drive speed when turning.

In particular: when the loader boom is up the stability of the machine is much weaker when turning. Keep loads close to ground while driving.



Risk of collision and crushing - Stay and keep hands and feet inside the safety frame. Always remember that when turning the driver's seat extends beyond the turning radius of the wheels.



Material handling

Make sure to use correct type of attachment for each handled material. Use correct size and type of bucket for general loose material handling, and pallet forks for handling pallet loads. Read the Operator's Manual of the attachment, e.g. Operator's Manual of the bucket, for further information for safe and correct use. Observe the lift capacity rating of the loader when planning material handling operations.

The loader is not intended for lifting operations for hanging loads; never put slings, chains, or ropes on the loader boom. Never tie or connect ropes, chains, slings, or similar to attachments, unless told to do so in the Operator's Manual of an Avant attachment.



WARNING

Risk of tipping over - Loader can tip over when you leave the driver's seat. Always put the load down on the ground before you leave the driver's seat. Follow safe stopping procedure shown on page 63.

Handling of heavy loads

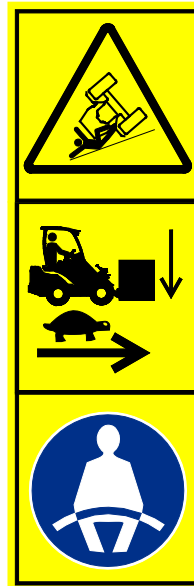


WARNING

Risk of tipping over - always carry heavy loads as close to the ground as possible, and only on level ground. Carrying heavy loads can shift the centre of gravity of the loader and lead to tipping over of the loader. Always transport the load as low and close to the machine as possible to keep the centre of gravity low and for the best stability.



DANGER



Risk of rolling over - Keep loads close to ground, and drive slowly when carrying load. Always use seat belt.

On uneven ground the loader can roll over to its side more easily. Always drive slow and keep loads close to the ground. Avoid sharp turns also on level ground. Use seat belt to stay inside the protective ROPS. If you don't use seat belt, there is a risk of getting thrown off from the driver's seat and being pinned under the ROPS in case the loader tips over.



DANGER



Risk of tipping over towards forward - Keep load close to ground, drive slowly.

Read Operator's Manual carefully. Never drive with heavy loads lifted. Keep loads, including attachments, as low and as close to the loader as possible. See information in this Operator's Manual about how to avoid tipping over.

In case the loader tips over

Avoid tipping over of the loader with careful operation and with the instructions given throughout this Operator's Manual. However, it is important to know what to do in case the loader tips over.

The loader can tip over either to the side, or towards the front.



Risk of being crushed by the ROPS structure in case the loader tips over - Always use the seat belt and stay within the space protected by the ROPS safety frame.

Always keep seatbelt on to stay on driver's seat and to avoid getting crushed between ground and a loader that tips over.

NOTICE

In case the loader tips over

Switch off the loader immediately. Running electric motors and pumps of an overturned loader will get damaged quickly and will spill hydraulic oil.

As soon as possible, lift the loader back on its wheels to prevent spilling of hydraulic oil and battery electrolyte. The loader can in many cases be lifted back on its wheels by having a few persons to lift from the ROPS frame.

Working with attachments

Requirements for attachments

Any attachment mounted on the loader must meet applicable safety and technical standards and requirements. An attachment that is not specifically designed for the loader may cause unnecessary safety risks. Make sure that e5 is specifically listed as compatible loader in the Operator's Manual of the attachment. Some attachments may require the use of additional special protective guards or personal safety equipment. See the Operator's Manual of the attachment.



WARNING

Risk of serious injury - Always make sure that the attachment is intended to be used with this loader model.

- Read the Operator's Manual of the attachment before you begin to install or use any attachment. Always follow the instructions in the Operator's Manual of the attachment.
- Make sure that the attachment is compatible with the loader: Avant e5 must be specifically listed in the Operator's Manual of the attachment. Contact your Avant dealer if necessary. Incompatible attachments can cause risks of injuries resulting from eg. the stability of the loader, contact with moving parts, reduced visibility, or ejected debris.
- Use all attachments only for their intended purpose that is described in the Operator's Manual of the attachment.
- Make sure that the attachment is connected properly on the quick coupling plate of the loader, and as described in the Operator's Manual of the attachment.
- Follow all instructions regarding personal protective equipment, safety distances, and possible additional guards that are needed when operating certain attachments.
- Familiarise yourself with the operation and stopping of the attachment at a safe place. Put the attachment down on the ground and switch off the loader before leaving driver's seat, and follow possible additional steps for safe shutdown of the attachment.
- Keep attachments in good and safe operating condition. Follow the inspection, maintenance, and service instructions of the attachment.

Manuals of attachments



Attachments can create significant risks that are not covered by this Operator's Manual of the loader.

Make sure you have all attachments manual available. Wrong use of an attachment can cause serious injuries or death.

Each attachment is accompanied by its own respective Operator's Manual. The Operator's Manual will show important information related to safety, and how to attach, use, and maintain each attachment correctly.



Risk of injuries from incompatible attachments - Make sure attachment is intended to be used with this loader model. Wrong type of attachment, poor locking of the attachment, or wrong technical characteristics of coupling brackets can cause hazards that are not taken into account by design of the loader or the individual attachment. Never use other than original Avant attachments and brackets.

Third party manufacturers of attachment must carry out detailed engineering and risk assessment to ensure safety, performance, and reliability of the combination of the loader and the attachment. Consult your Avant dealer if you are unsure about the compatibility of the equipment with your Avant loader.

Compatibility of attachments

Use only Avant attachments that have been designed for your loader model. Any attachment that is fitted to the loader must be designed to be used specifically with Avant e5, and this must be stated in the Operator's Manual of the attachment. The manufacturer of the attachment is responsible for evaluating the risks related to coupling the attachment and using it with this loader model. Do not operate any attachment if the manufacturer of the attachment has not declared its compatibility with this loader model in writing.

NOTICE

Check the maximum allowed hydraulic oil flow for the attachment. Adjust the speed of the hydraulic pump so that the output flow is suitable for the work and the attachment. See page 35.

NOTICE

Notice that some third party attachments may have hydraulic oil that is not intended to mixed with the oil in the hydraulic oil of the loader. Flushing of the hydraulic oil circuit of the attachment may be necessary before coupling to the loader. Incompatible oils can cause wearing of hydraulic pumps and motors.

Coupling the attachments

The attachment is mounted to the loader boom by using the quick coupling plate on the loader boom and the counterpart on the attachment. As standard, the attachment is coupled with two manually operated locking pins of the coupling plate. As an option, hydraulic coupling pins are available, which are controlled with an electric switch. The following steps show the coupling procedure regardless of the type of coupling.

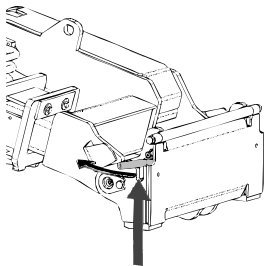
Coupling the attachment to the loader is quick and easy, but it must be done carefully. If the attachment is not locked to the loader, it may fall from the loader and cause a hazardous situation. The loader must not be driven and the boom must never be lifted when the attachment has not been locked. To prevent hazardous situations, always follow the coupling procedure shown below. Also remember the safety instructions shown in this Operator's Manual.



Risk of crushing - Make sure that an unlocked attachment will not move or fall over. Do not go to the area between the attachment and the loader. Mount the attachment only on level surface. Never move or lift an attachment that has not been locked.

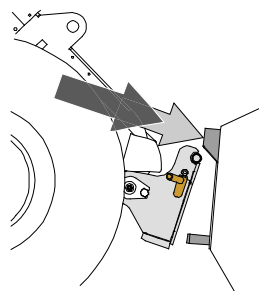


Always read also the additional instructions for coupling and using of the attachment in the Operator's Manual of the attachment. The coupling procedure of an attachment may require additional steps in addition to the basic steps described below. Always follow instructions in the Operator's Manual of the attachment.



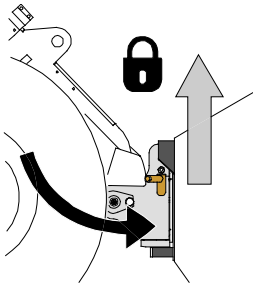
Step 1:

- Lift the locking pins of the quick coupling plate up and turn them backwards into the slot so that they are locked in the upper position.
If your loader is equipped with a hydraulic attachment locking system, see how to operate the hydraulic locking on the following page.
- Ensure that the hydraulic hoses (and the electric harness, if applicable) are not in the way during installation.



Step 2:

- Enter the driver's seat, fasten the seat belt, start the loader, and tilt the quick coupling plate forward.
- Drive the loader onto the attachment. If your loader is equipped with a telescopic boom, you can use it to reach the coupling brackets of the attachment.
- Align the upper pins of the loader's quick coupling plate so that they are under the corresponding brackets of the attachment.

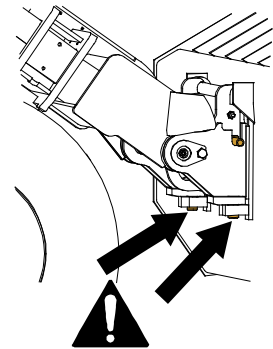
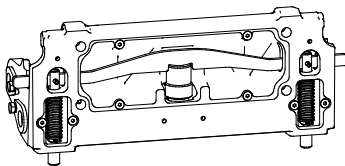
**Step 3:**

- Lift the boom slightly – pull the boom control lever backward to lift the attachment just off the ground.
- Turn the boom control lever left to turn the bottom section of the quick coupling plate of the loader onto the attachment.
- Lock the locking pins manually or lock the hydraulic locking.
- **Always check the locking of both locking pins.**

**DANGER**

Risk of getting crushed under or hit by a falling attachment, risk of loss of control of loader due to dropped attachment - Always ensure that the attachment is fully locked.

- Before moving or lifting the attachment, make sure that the locking pins are in the lower position and come through the fasteners on the attachment on both sides.
- An attachment that has not been completely locked to the loader may fall on the boom or towards the operator, or fall under the loader during driving, causing injuries or loss of control of the loader. Never move or lift an attachment that has not been fully locked with both locking pins.

**Hydraulic attachment coupling**

The optional hydraulic attachment coupling plate enables locking and unlocking of an attachment from driver's seat.

A control switch is located at the control panel on the right (see page 43). The switch is equipped with a sliding lock to deter accidental unlocking of an attachment.

There is a hydraulic cylinder inside the attachment coupling plate which moves the locking pins up and down. The electro-hydraulic system works when the loader ignition switch is in position ON.

**DANGER**

Risk of falling of attachment - Familiarize yourself with the controls of the loader.

Avoid dropping of the attachment. Operate the hydraulic coupling only when the attachment is close to the ground.

Always make sure that the locking pins lock properly down in the holes of the attachments also when using the hydraulic locking. Both pins must be locked.

Connecting the hydraulic hoses of the attachment

Hydraulic hoses of the attachment are equipped with the multiconnector system, which connects all hoses at the same time.

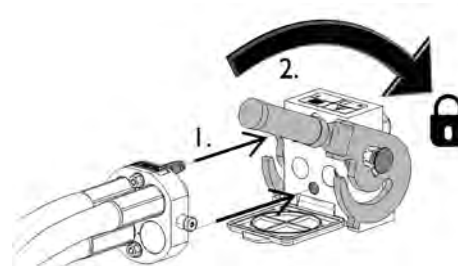


WARNING

Risk of movement of the attachment and ejection of hydraulic oil - Never connect or disconnect quick couplings or other hydraulic components while the control lever of the auxiliary hydraulics control lever is locked on or if the system is pressurized. Connecting or disconnecting the hydraulic couplings while the system is pressurized may lead to unintended movements of the attachment, or ejection of high-pressure fluid, which can cause serious injuries or burns. Follow safe stopping procedure before disconnecting hydraulics.

Connecting the multiconnector system:

1. Align the pins of the attachment connector with corresponding holes of the loader connector. The multiconnector will not connect if the attachment connector is upside down.
2. Connect and lock the multiconnector by turning the lever towards the loader.

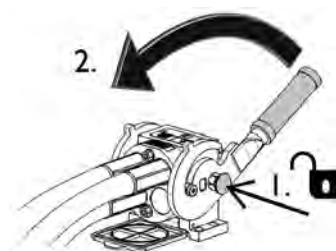


The lever should move easily all the way to its locking position. If the lever does not slide smoothly, check the alignment and position of the connector and clean the connectors. Also shut down the loader and release the residual hydraulic pressure, see page 79.

To disconnect the multiconnector system:

Before disconnecting put the attachment down on a solid and even surface.

1. Switch off the auxiliary hydraulics of the loader.
2. While pushing unlock button, turn the lever to disconnect the connector.
3. After ending operation put the multiconnector on its holder on the attachment.



NOTICE

Keep all fittings as clean as possible; use the protective caps on both the attachment and the loader. Dirt, ice, etc. may make using the fittings significantly more difficult. Never leave the hoses hanging on the ground; place the couplings onto the holder on the attachment.

NOTICE

When fitting an attachment, make sure that the hydraulic hoses are not overstretched and are not in a position where they can be trapped during the operation of the machine and attachment.

Using the auxiliary hydraulics

Auxiliary hydraulics (hydraulically operated attachments) are controlled with the lever on the control panel, or with the buttons on the 6-function joystick (See page 45).

The locking position of the lever facilitates operation of the attachments that require constant oil flow (rotary broom, backhoe, etc.). Make sure to release the lever when not operating an attachment to prevent unnecessary energy consumption.

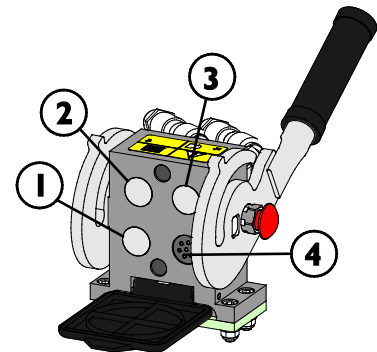


DANGER

Risk of serious injuries from moving parts of the attachment - Keep all persons clear from the danger area of the attachment and loader boom. Going near an attachment that is in operation can cause a serious risk of injury. Switch off auxiliary hydraulics before leaving driver's seat. Operate the controls only when sitting in the driver's seat.

The control lever of the auxiliary hydraulics and electric buttons of the joystick (see page 45) directs hydraulic oil as follows:

1. Moving the control lever towards the locking position will direct hydraulic flow to port 1.
This is normally the normal or positive movement of the attachment.
2. Moving the lever away from the locking position will direct flow in reverse direction, pressure in port 2.
3. The port 3 is a free return line to tank. This is required by some attachments.
4. The port 4 is for the integrated electric socket of the optional Attachment control switch pack.



On Avant eSeries loaders, the auxiliary hydraulics can be used when:

- Driver is seated on the driver's seat
- or
- External use mode is selected with the Operation mode switch, see page 66.



WARNING

Risk of ejection of machine parts, stones, soil, and other debris - Overspeed of the attachment can cause injuries or dangerous movements of the attachment. The attachment can break down in a dangerous way, throw objects, or produce excessive noise and vibrations if operated at too high speed. Never exceed maximum allowed hydraulic flow of the attachment. Check correct operating flow from the Operator's Manual of the attachment, and use the chart on page 35 of this Operator's Manual.

Releasing the residual pressure of hydraulic system

Make sure that there isn't pressure in the hydraulic system that could cause danger during service operations.



Hydraulic energy stored in the hoses and other hydraulic components can cause ejection of hydraulic oil and movements of the hydraulic cylinders or motors. To release the pressure in hydraulic system:

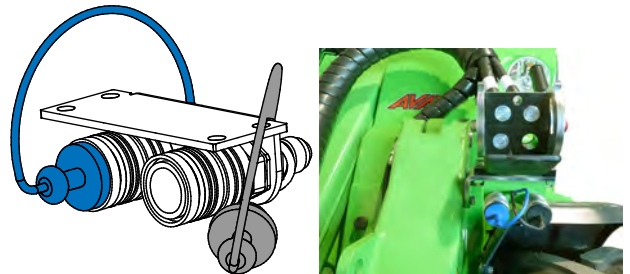
1. Lower the boom down completely and place attachment firmly on the ground
2. Switch off the loader
3. Move all control levers, including the control lever of the telescopic boom and auxiliary hydraulics, to extreme end positions a couple of times

Remember that the boom or attachment can move when releasing the pressure. Move the levers until all movements have stopped.

Extra auxiliary hydraulics coupling

The extra hydraulics coupling is a double-acting hydraulic with two fittings. A pair of standard type hydraulic quick couplings are located at the front of the loader, just below the multiconnector.

- Before you connect or disconnect standard couplings, relieve hydraulic pressure as described on page 79.
- To connect and disconnect the standard couplings, move the collar at the end of the female fitting
- Note that the protective caps on the loader and the attachment can be fastened to each other during operation to reduce the accumulation of dirt.
- When disconnecting the standard quick couplings a small amount of oil may drip from the couplings. Wear protective gloves and have some cloth at hand to keep the equipment clean.

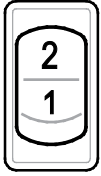


For more information about the possibility to fit an extra hydraulics coupling see page 53.

To use the extra hydraulics coupling:

The installed extra outlet is controlled with the same lever as the standard auxiliary hydraulics, or with the buttons of the 6-function joystick. To choose which is used, use the switch on the dashboard:

Switch for choosing which auxiliary hydraulics outlet to use:



Switch In position 2: The optional extra auxiliary hydraulics outlet

Switch In position 1: Standard auxiliary hydraulics outlet (multiconnector on front of the loader)

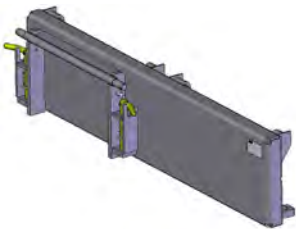
The quick couplings can be coupled in a way that reverses the function of the control lever. Test the operation of the attachment after each time it is coupled to the loader. Keep the couplings clean and use their protective covers. You can operate either the hydraulic function connected to the standard multiconnector, or the function that is connected to the extra outlet. Simultaneous use is not possible.

-
- Test the operation of the attachment after each time it is coupled to the loader. The quick couplings can be coupled in a way that reverses the function of the control lever.
- The loader can be equipped with either front or rear extra hydraulics outlet - but not with both.
- Keep the couplings clean and use their protective covers.

Coupling adapters

Avant offers coupling adapters to help the use of some specific attachments. See the Operator's Manual of each attachment if an adapter can be used.

Both adapter types are locked to the quick coupling plate of the loader. The adapters have similar quick coupling system to lock the attachment onto the adapter and loader.



Side shift adapters A37097 and A37166

Side shift adapter is a rigid adapter plate which moves the attachment 60 cm to the right or to the left side depending on the model. It is intended for better side reach with attachment that are used on the ground, such as flail mowers on the side of a road.



Hydraulic side shift adapter A37235

The hydraulic side shift adapter offers easy, stepless side shift of attachment, operated from the driver's seat. The design features strong sliding guides which can also be lubricated.

If a hydraulic attachment is mounted on the hydraulic side shift adapter, the loader must be equipped with the optional second auxiliary hydraulics outlet in the front. The attachment hoses are mounted on the multi connector and the side shift adapter hoses on the optional outlet.

Contact your Avant dealer for more information about the availability of the side shift adapter.



Tilt adapter A34148 or A36505

With a tilt adapter the attachment can be tilted sideways, which makes it possible to:

- Make different forms to the ground with a bucket or leveller
- Keep pallet fork level when you are driving on surfaces with gradient
- Load pallets that are on uneven ground
- Level ground on uneven surfaces

The tilt adapter is intended mainly for non-hydraulically operated attachments. With the optional second auxiliary hydraulics outlet in the front, it is possible to use hydraulically driven attachments, such as 4 in 1 bucket, pallet fork with hydraulic side shift, grabbing tool, and artificial turf attachment at the same time.



Rotating adapter A424406

The rotating adapter is intended for same kind of work as the tilting adapter. The fully rotating adapter makes it possible to turn the attachment fully upside down. This can be helpful in levelling work.



WARNING

Risk of tipping over - A side shift adapter decreases the sideways stability of the loader significantly. Use all adapters only for specific tasks, as instructed in the Operator's Manuals of each attachment. Remove all adapters for general use of the loader. Adapters decrease stability of the loader and must be used only on level ground.



CAUTION

Adapter plates reduce lifting capacity - Do not use adapters with heavy loads or attachments. The adapter plates move the centre of gravity of the attachment further away from the loader. This increases the risk of tipping over and can limit the use of heavy attachments.

NOTICE

All coupling adapters are intended only for specific attachments that can be safely and efficiently used with an adapter. The adapters are not intended for general use. Any adapter should be removed from the loader when no longer using an attachment requiring it.

NOTICE

Do not use the bracket adapters that are intended for mounting of 200 series 1 attachments on other loaders. The 200 series 1 attachments are not designed to be used with other loader models than the 200 series.

Storage, Transport, Tie down points and Lifting

Before transporting or lifting the loader:

- Mount the articulation frame lock, see page 98
- Lower the boom down



Always lock the frame lock before transporting or lifting the loader. Also remember to remove the frame lock and test the steering of the loader after transport.

Tie down points

The loader must be tied down securely if transporting it on a trailer, for example. All four tie down points must be used. If an attachment is fitted, also it must be tied down.

As standard, there are 4 tie down points:

- Two on the front frame, close to the boom
- Two on the rear frame, near rear counterweight

Tie down points at the front of the loader:



Tie down points at the rear of the loader:



Preparing the loader for transport:

1. Always secure the load. Make sure all equipment is secured also before just a short transport.
 - It may be necessary to tie down attachments separately.
2. Lower the boom completely down.
3. Lock the articulated frame lock.
4. Always use straps or chains that are in good condition and rated for use as load securing device. Check all hooks and locks.
5. Consider weight distribution on a trailer. Sometimes it might be appropriate to load the loader on trailer rear end first.
6. Always make sure the trailer is balanced when loaded in sideways and front/rear directions. Trailer must never cause an upward, lifting force on the trailer coupling of the towing vehicle.
7. Make sure that all panels are locked in place. Remove ignition key and any loose material that could come off during transport.
8. Consider using a transport cover to protect the loader from dirt during transport. See picture below.

Transport cover

To protect the loader during transport, transport cover is available. Contact your Avant dealer.

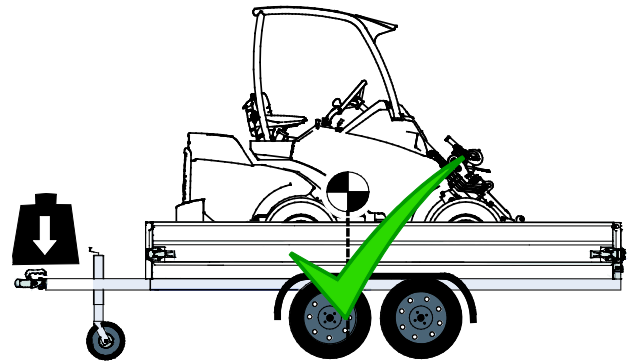
**NOTICE**

Do not use the full, closed transport and weather cover over long periods of time as it promotes corrosion due to moisture that will condense inside it. The light weather cover can be used.

Transport on trailer

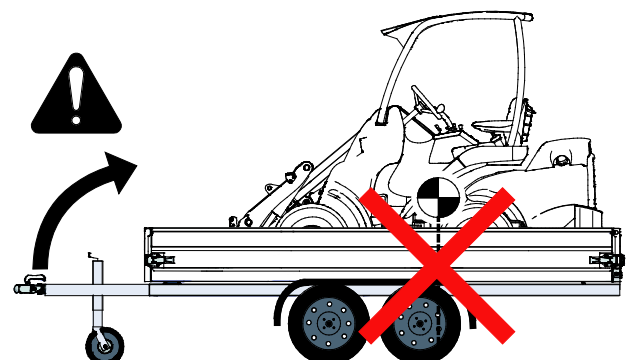
If you transport the loader on a trailer make sure that the center of gravity of the load is forward from the axle of the trailer. To load the trailer correctly, it may be necessary to load the loader on the trailer backwards.

The center of gravity of a loader without an attachment is located slightly forward from the rear axle. Take into account the size and weight of the attachment, and any additional counterweights on the loader. Always secure the loader and its attachment onto the trailer.

**DANGER**

Risk of loss of control of towing vehicle - Never load trailer so that there is lifting force on the tow bar. Trailer must never be loaded so that the center of gravity is behind the axle of the trailer. If trailer is loaded in this way, the trailer can cause loss of control of the towing vehicle.

Load on the trailer coupling of the towing vehicle must never be negative. When uncoupling the trailer coupling the tow bar can swing up.



Take into account all additional counterweights, attachments, and other equipment when estimating the load on the trailer. Additional counterweights, among other options and equipment, may make the loader heavier than indicated in the identification plate. Never exceed the maximum allowed masses of the trailer, the towing vehicle, etc.

Always check the maximum allowed tow bar weight of the towing vehicle. It is recommended to measure the tow bar load with a scale. Small variation of the location of the loader on the trailer may make the load on tow bar excessive or negative, making the trailer and towing vehicle unstable. Always make sure that there is moderate load on the tow bar within the limits shown in instructions of the towing vehicle.

Tie down options

Optional equipment for frequent trailer transport

If transporting the loader frequently on a trailer, optional tie down brackets are available for easier securing of load.

Tie down bracket A418623 installed at the rear bumper or counterweight



Tie down bracket A418623 installed at the side of rear frame

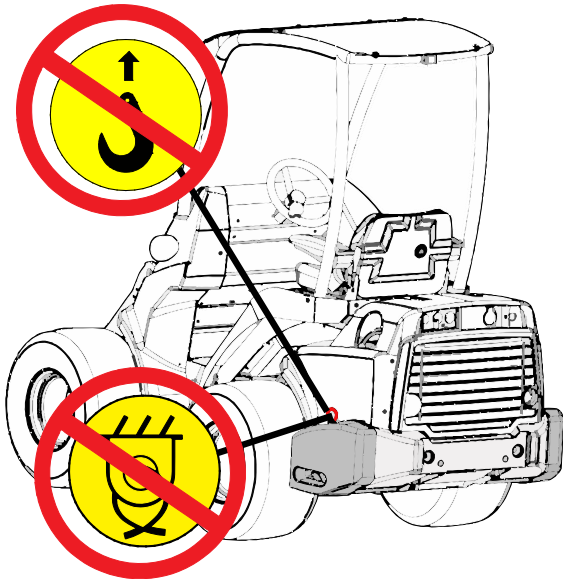


For side installation, two brackets are needed.

Tie down bracket on wheel hub A423091

Installed to a wheel hub with 5 bolts:



**DANGER**

Risk of moving or falling of the loader - Never lift or tie down loader from side counterweights. Eyelets on extra side counterweights are for installing or removing the side counterweight only. Never attempt to lift the loader from the counterweights or use them as tie-down points. **Always remove the eyelets from the counterweights immediately after installation work.**

**WARNING**

Risk of dropping of the loader - Use appropriate equipment and follow safety instructions and safe practices when lifting the loader.

- Remove heavy attachment and possible extra weights from the loader.
- Lower the boom down.
- Mount the frame articulation lock to the frame of the loader.
- Follow the instructions given in the Operator's Manual of the lifting kits for each cab type.
- Never lift a loader with persons riding the machine.

Lift the loader as smoothly as possible, and do not allow it to drop or wobble.

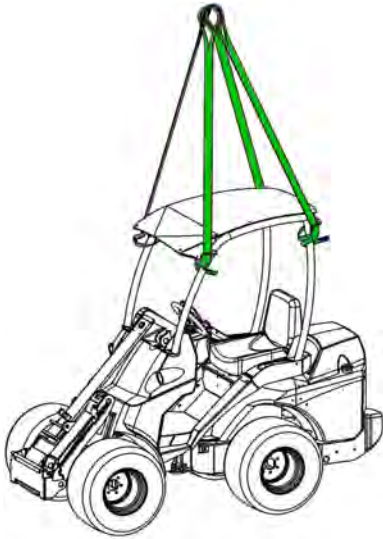
The following picture shows the principle of lifting a loader with the ROPS frame using four lifting straps:

Lifting of the loader

Lifting a loader with ROPS: When lifting a loader equipped with the ROPS frame, use four lifting slings that are approved for lifting purpose, and which are minimum 2000 mm (79 inches) long. Loop the slings around the four ROPS posts. Lifting kit A418706 includes all necessary parts and detailed instructions to lift a loader with ROPS frame.

Make sure that the lifting slings cannot move and that the loader doesn't swing during lifting. Loop the lifting straps around all four ROPS posts and make sure they are not tied or get damaged by e.g. sharp corners.

CAB L: When lifting a loader that is equipped with the Cab L, remove the window panels (front, side and rear window panel) before lifting.

**WARNING**

Risk of dropping of loader - Never attempt to lift the loader from the counterweights or use them as tie-down points. Eyelets on extra side counterweights are for installing or removing the sideweight only. Remove eyelets from counterweights to prevent their use.

Towing (retrieval of the machine)

The hydrostatic drive system of the loader makes it impossible to tow the loader in other cases than moving the loader for a short distance. It is not possible to release the hydraulic parking brake or the drive circuit.

If necessary, the loader can be towed with a rigid tow bar. The wheels of the loader will not spin. Tow only at low speed and short distances.

Storage

If outdoors storage is necessary, protect the machine with the designated weather cover (part no. 65436).



Always charge the battery to full charge after use. The battery will get damaged, if the loader is left parked with a battery that is not fully charged.

Before long term storage (more than 1 month), prepare the loader to ensure long service life and trouble-free use of the loader.

- **Prevent damage to battery during storage. See instructions about how to maintain the battery during even a short-term storage.**
- It is recommended to have the periodic service made before storage. Contact Avant service.
- Clean the loader carefully.
- Check and touch-up painted surfaces, if necessary, to avoid rust damages.
- Grease the greasing points and lubricate the piston rods of the cylinders with oil.
- Inflate the tyres to the recommended tyre pressure.
- Store the loader indoors if possible. Do not store the loader in direct sunlight

Storage of electric loader

NOTICE

Charge the battery to full charge before leaving the loader unused. Discharged battery will get damaged during storage, if it is not recharged periodically.

Recharge the battery regularly during storage.

NOTICE

To avoid damage of the battery, and to maintain the performance of the battery, follow the instructions regarding the storage and recommended storage temperatures.

Completely discharged battery can get damaged during storage.

The battery must be fully charged before putting the loader to storage. The best place to store the battery pack is in a dry, frost-free place. The battery does not need to be removed or disconnected from the loader for short term storage. However, before long storage periods, disconnect the battery quick coupler from its counterpart on loader.

Recharge the battery monthly to keep the battery in optimal condition. The battery will self-discharge slowly even if it is disconnected from the loader. Discharged battery will get permanently damaged during storage.

Even a short-term storage with an empty battery will damage the battery. Never leave the loader stored when the battery charge level is below 50 %, even for short periods. The battery must be charged to full charge to avoid damage to the battery.

Storage temperature

For the best current delivery capacity of the battery in daily use of the loader, it is recommended to use and park the loader in temperatures between +10 °C and +30 °C. In this temperature range the temperature of the hydraulic oil of the loader is warm enough for high efficiency.

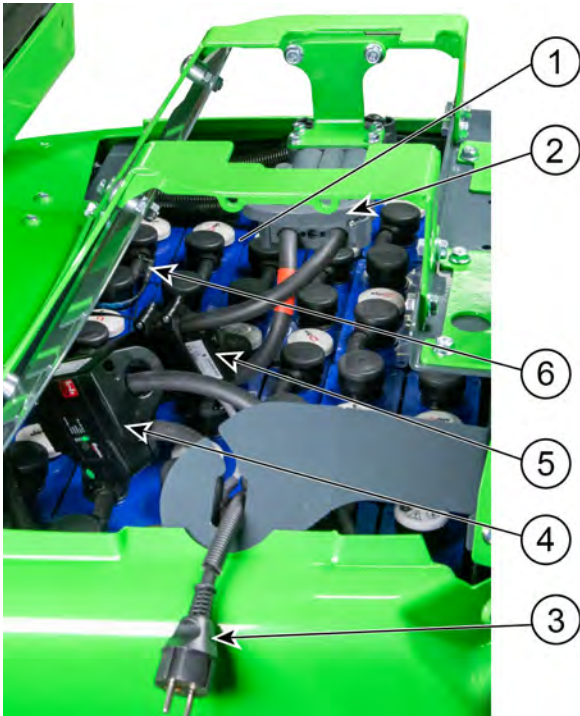
NOTICE

A discharged battery can get frozen in cold environment. Frozen battery is permanently damaged. Never attempt to recharge a loader which could have a frozen battery, the battery cells can rupture.

Battery and Charging

Follow the instructions in this chapter to ensure the full capacity and service life of the battery.

Correct charge cycle, safe area for recharge, and correct operating and charge temperatures must be taken into account when operating or recharging the loader.



Open the two latches to remove the rear cover to access battery and its connector.

Under the cover you can see the following main parts of the battery pack:

1. Battery pack: 24 2-Volt battery cells that are connected in series.
2. Battery main connector - use to disconnect the battery from the loader. See page 103.
3. Mains plug for recharge, integrated charger.
4. Battery log module. See page 90.
5. Battery low level alarm device. See page 90.
6. Battery cell probe.

Recharge - General principles

For the best performance of the battery, obey the following principles:

- Recharge the battery latest when the charge level has dropped to 40 %.
- Charge the battery immediately after using the loader. When you keep the battery fully charged, you ensure that the battery pack will retain its capacity as long as possible.

NOTE: Allow the loader to cool before recharge, if the battery temperature is above 35 °C.

- Never allow the battery to become discharged to below 40 %. This so called deep discharge will damage the battery.
- Charge the battery before storage, and frequently during storage.
- Do a full charge frequently. Full charge ensures that the charge level between individual battery cells is balanced. Unbalanced cells may get damaged due to unequal load between battery cells.

- Follow safety instructions. Always charge the battery in a well-ventilated area. Keep all sources of ignition away from battery that is being charged.
- Observe the instructions of the ambient temperature.
- The battery can be charged at any remaining charge level when convenient.
- Drive to a charging location latest when the charge level drops to **40 %**. Use below this charge level is possible, but will reduce the service life of the battery.
- If you feel that the loader starts to lose power even when the multi-function display of the loader shows plenty of charge left, recharge the battery immediately.

NOTICE

Avoid deep discharge of the battery. Complete discharge will permanently damage the battery.

Never operate the loader until there is no power left to drive the loader. A single deep discharge will damage the battery permanently and can destroy the battery to a point where it can no longer be used.

Charge the battery latest when the multi-function display shows that there is 40 % charge left. Battery will wear out quickly in deep discharge cycle use. Discharging the battery below this level is reserved for situations where a shorter life of the battery is accepted.

Charge the battery immediately, if the low battery alarm is activated.

Battery life

Correctly used and maintained battery pack will slowly degrade towards the end of its useful life. Extreme conditions can shorten the battery life quickly.

The battery life will be significantly shortened in at least the following cases:

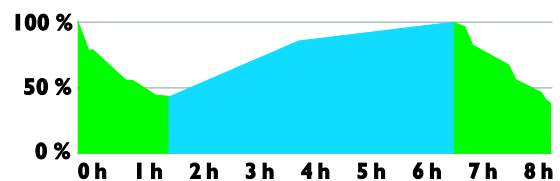
- if the battery is allowed to get completely discharged
- If the battery has been repeatedly discharged to below 40 %
- If the balancing charge is not made
- if the battery is exposed to high temperatures
- if the loader is stored when the battery is not fully charged
- if the battery or its cables have been damaged or corroded

Recommended use and charge cycles

In typical use of the e5 loader the recharge should begin latest, when the battery charge level has dropped to 40 %.

The charge process will get slower as the battery is more full. You can interrupt the charge process before it gets to 100 %, but after a few interrupted charge cycles the battery must be allowed to complete the full charge cycle to balance the battery cells.

The picture below represents a typical use and charge cycle. Actual use time depends heavily on use.



The actual work times will vary greatly, depending on several factors. The following have high influence on battery use time:

- Work cycle, accelerations and frequent stopping
 - See page 94 for tips about how to increase battery life
- Mass of carried or lifted loads and repeated lifting of heavy loads
- Use of rotating attachments
- Ambient temperatures
- Correct charging of the battery
- Condition of the battery

Using attachments that have a hydraulic motor and require constant, high flow and power of hydraulic oil, will use the energy of the battery quickly. Attachments that are used only for short periods of time are best suited for the e5 loader.

A new battery pack will reach its maximum capacity only after a few recharge cycles. Correctly used and maintained battery pack will slowly degrade towards the end of its useful life. Extreme conditions can shorten the battery life quickly.

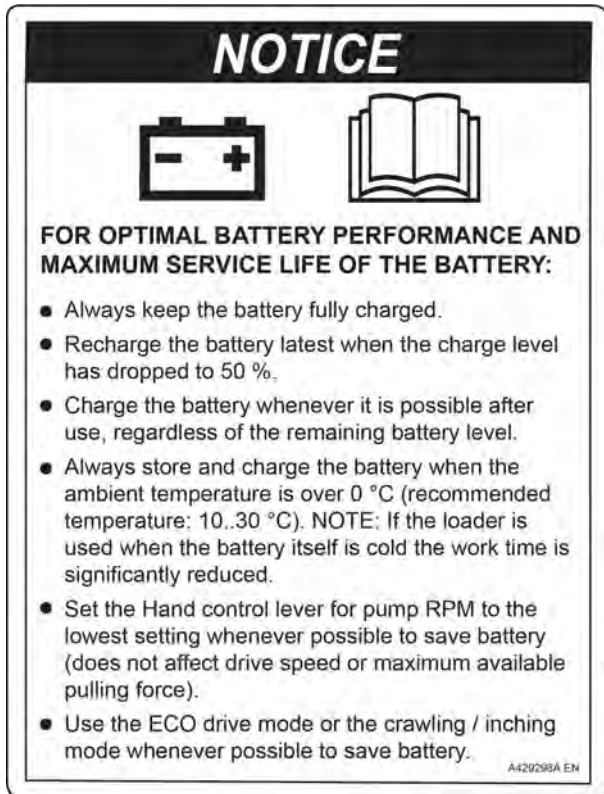
Discharged battery can get frozen, which can permanently destroy the battery. The battery life will be significantly shortened in at least the following cases: if the battery is allowed to get completely discharged, if it has been damaged or corroded.

For the best current delivery capacity of the battery, it is recommended to use and store the loader in temperatures between +10°C and +30°C.

As a reminder, the following text may be added as a label on top of the battery cover of your loader:

For optimal battery performance and maximum service life of the battery (text in label):

- Always keep the battery fully charged.
- Recharge the battery latest when the charge level has dropped to 50 %.
- Charge the battery whenever it is possible after use, regardless of the remaining battery level.
- Always store and charge the battery when the ambient temperature is over 0 °C (recommended temperature: 10..30 °C). NOTE: If the loader is used when the battery itself is cold the work time is significantly reduced.
- Set the Hand control lever for pump RPM to the lowest setting whenever possible to save battery (does not affect drive speed or maximum available pulling force).
- Use the ECO drive mode or the crawling / inching mode whenever possible to save battery.



Battery low charge alarm

On the battery connector cable there is a device that gives an audible warning when the battery is discharged to below certain voltage levels.

- The alarm will sound a warning every 3-5 minutes, when the battery level has dropped to the point where battery must be recharged. Stop working with the loader and move it to a charging location.

Using the loader after the alarm has sounded will damage the battery.

- The alarm will sound a warning every minute, when the battery charge level has dropped to point where the battery will become significantly damaged. Recharge the battery immediately when this repeated alarm is activated. Using the battery after this point will quickly shorten the life of the battery.

Battery log

For battery related diagnostics and troubleshoot the battery module is equipped with a logging device. The information is stored locally on the device. The collected by the log device is also accessible by users via mobile device application. Contact Avant service for more information. If necessary, the log can be uploaded for analysis.

- Charge cycles
- Minimum voltage levels of the battery pack, and of an individual battery cells
- Balance between battery cells
- Battery temperatures

Charging the battery

To keep the battery in good condition

To preserve the current draw capacity of the battery, observe the following rules regarding charge level and daily maintenance of the battery:

- Always charge the loader immediately after use.
After heavy load or high ambient temperature, allow the loader and its battery to cool before recharge.
- Always charge the battery as soon as the charge level is dropped to 50 %.
- Never allow the battery charge level to drop below 40 %. Discharge below this level should always be avoided, as deep discharge will damage the battery.
 - Never discharge the battery fully to a point where there is no energy left to drive the loader. Battery will get damaged and it will no longer charge to full capacity.
- When the continuous battery low level alarm signal appears, stop the loader immediately and recharge the battery.

Preparation for charging

In preparation for charging, do the following:

- After heavy load or high ambient temperature, allow the loader and its battery to cool before recharge.
- Choose a well ventilated place, where you can leave the loader safely for charging. Do not recharge in direct sunlight or rain.

When charging, proper provisions must be made for venting of the charging fumes.

- Open the rear cover of the loader to allow good ventilation.

Leave all vent plugs, tubes, and covers of the battery itself installed.

- Also read the safety information regarding the battery and electric systems on page 18.

Charge after loader is allowed to cool

After heavy use, allow the loader to cool before charging. During recharge the temperature of the electrolyte inside the battery rises by about 10 °C, so begin to charge the loader only if the electrolyte temperature is below 35 °C.

If the battery charge level is below 50 % after heavy use, charge the battery immediately above 50 % level and then let the battery cool down. Continue the recharge after the battery has cooled down.

The loader is equipped with a cooling fan that activated automatically when the temperatures of the inverters or the electric motors have risen above a determined level. The fan may be off even though the battery is warmer than what is the recommended charging temperature.

Charging site

Charge the loader in shade. In direct sunlight the battery may overheat during recharge.

Choose a well ventilated place, where you can leave the loader safely for recharge. When charging, proper provision must be made for venting of the charging gasses. Even though the hydrogen gas emission of the AGM battery is low, never recharge in a closed building without good ventilation.



WARNING



Battery produces explosive gas during recharge - Make sure to charge only on well ventilated area.

- Make sure that there is sufficient ventilation when charging the battery.
- Never charge the loader in a small garage or shed where there is no machine powered ventilation to outside.
- Keep arcs, sparks, flames, and lighted tobacco away from battery.
- Never charge damaged or frozen battery.
- See detailed instructions about charge process starting from page 88.

Charger

An integrated charger is standard equipment for all e5 loaders. The charge process is fully automatic. Charging is started by plugging the charger to a mains outlet.

Charge progress is shown on the multi-function display. Battery is fully charged and all cycles completed when the multi-function display indicates that the charge process is completed. The output current and voltage are controlled by the internal charger during the charge process. The charge will slow down towards the end of the charge cycle.



Equalising charge

During the end of normal charge cycle, the slight differences of individual cells are balanced. The final phase of the charge cycle, called equalising charge, is completed when the green charge indicator light is lit.

For optimal performance of the battery, it is recommended to leave the charger mains plug connected until the battery is completely full. This full charge process must be made at least every 3 to 5 discharge cycles. The equalising charge is a slower charge process, but important for the performance of the battery.

NOTICE

Frequent equalising charges are vital for the life of the battery and to maintain its capacity. Full charge is especially necessary after a deep discharge or repeated incomplete recharges. Equalising charges are carried out following normal charging cycle, until the green indicator light on the dashboard is lit.

Charger troubleshooting

The charge progress is displayed on the multi-functional display whenever the charger is plugged in mains supply. The display will also display any errors related to the charge process.

In case of trouble with charging, and the multi-function display does not show the status of charge process, see the indicator lights on the integrated charger itself. To see these indicator lights, remove the cover of the loader below the seat frame.

Use only the integrated charger

Use only the integrated charger of the loader to charge the battery. The charger output voltage and current are automatically adjusted during different phases of charge process. Using a wrong type of charger creates a risk of fire. Wrong type of charger can also cause overheat or boiling of the battery, venting of explosive gasses from the battery, or other permanent damage to battery cells.

The integrated charger is optimized specifically for the battery in e5 loader. Never attempt to adjust the charger parameters, as it will cause damage to the battery.

Charge times



4-5 h (80%)
5-8 h (100%)

Charge times shown here are typical times in normal operating temperatures and with a battery that is in good condition.

If the battery has been completely discharged, allow the charger to remain plugged for longer period of time to complete also the equalising charge phase.

Charger plug type

The standard plug type to connect the loader to electric outlet is grounded CEE 7/7, commonly known in Europe as "Schuko" type. If you use the loader in areas where different kind of plug is needed, your local Avant dealer will give you any needed additional information. Regardless of the type of the plug, other instructions in this chapter apply to all electric Avant loaders.

The charger must be connected to electric outlet with correct voltage and current output: Charge only from a grounded electric socket, which is also protected with a fully functional residual current protection switch.

Voltage	Frequency	Required current (fuse)
220-240 V	50-60 Hz	10 A (minimum) 16 A (recommended)

If the use of electric plug or socket adapters can't be avoided, use only high-quality versions that are rated for outdoor use and that have also the grounding wire connected.

Keep extension cables as short as possible. Use good quality cables that have adequate cable cross-section for the required current.

Avant recommends to use a power outlet that has a built-in switch to disconnect the power before unplugging the mains cable. Disconnecting the cable during charging causes sparking in contact elements and may weaken their electrical conductivity. Using a power outlet that is equipped with a switch prolongs the lifetime of the charger plug.



**Risk of cable overheating and fire -
Avoid using extension cables.**

Long or thin extension cables can heat significantly during charging and melt, causing risk of electric shock or fire. Avoid using extension cables. If necessary, use only as short as possible, good quality cable with large enough conductor cross-section.



**Risk of electric shock or fire -
Avoid additional plug adapters.**

Bad quality adapters can be inadequately protected against dust and water. Some can even leave the pins of the plug exposed, creating a serious risk of electric shock. Never use plugs that leave the grounding wire unconnected.

Contact a local licensed electrician to replace the plug if necessary.



**Risk of battery overheating and fire -
Use only the built-in charger of the loader to ensure correct charge cycle.** The current and voltage output are optimized in the integrated charger to ensure quick charge and long life of the battery. Modified or different type of charger can overheat the battery or cause sparks, creating fire. Too high current or voltage will boil the electrolyte of the battery, potentially releasing battery acid.

Drive while charging

On the e5 series 2 loaders (starting from serial number 89295), the use of the loader during recharge is not possible. The hydraulic systems of the loader are disabled when the charger of the loader is plugged in to mains outlet.

Until serial number 89294:

The charging system allows to operate the loader during charging. Make sure that the cable will not get entangled or pulled during use of the loader.

Charge time can be long while using the loader at the same time. At heavy load, the battery can even discharge, even if charger is connected to mains outlet.

Leaving the charger connected

Disconnect the charger from the mains after the battery is fully charged.

Leaving the charger connected will actually start to discharge the battery over time, as the display and other systems of the loader are activated, whenever the charger is connected. The standard charger does not have a trickle charging function.

Tips to increase battery life

- Operate the auxiliary hydraulics only at the speed that is necessary for the attachment or work. Too high flow will waste energy.
- If not operating an attachment, keep the Hand throttle lever for pump RPM control at minimum setting. See page 47.
- Use the ECO drive mode or the crawling / inching mode whenever possible to save battery. See page 66.
- Store the loader in within the recommended ambient temperatures - This way the battery and the hydraulic systems of the loader stay warm during use of the loader, and deliver the best performance, even when operating in cold conditions.

When the loader and its battery get cold during storage in cold temperatures, the efficiency of the battery and the hydraulic systems will drop.

Service and maintenance



Risk of personal injuries - If the loader is damaged or poorly maintained it can cause or increase risks of unsafe operation.

To ensure long service life it is important to maintain the loader in good condition. The maintenance procedures listed in this chapter can be performed by trained or otherwise experienced operators. If you are not sure about how to do any service operation, ask for additional information before you start any service or maintenance work.

If the maintenance schedule is not followed, and services made are not marked in the table in this Operator's Manual, the warranty may not cover for damages of the loader.

Service parts are available through your Avant dealer or authorised service. Contact your local Avant service or dealer for any questions or information.

Safety instructions



Always keep the following instructions in mind when doing any maintenance or service:

- Switch off the loader and let it cool down before starting any service operation.
- Put the service support on the boom lift cylinder when working under the boom. Keep boom lowered otherwise.
- Install the frame lock when lifting the machine, and, for instance, when changing tyres.
- Disconnect the battery before working on the electric system or battery.
- Check hydraulic hoses for cracks and wear. Follow the wear of the hoses and stop operation if the outer layer of any hose has worn out. If there are signs of oil leakage, put a piece of cardboard under the probable leakage place in order to find the leakage. Never use hands to search for leaks, read instructions in this Operator's Manual about safe handling of hydraulic components. If you find a fault, the hose or the component must be replaced.
- Contact your Avant dealer or service for spare parts.

**DANGER**

High-pressure ejection of fluid may penetrate skin and cause serious injuries - Never handle pressurised components.

Before handling hydraulic components, make sure that the hydraulic system of the attachment and the loader are completely de-pressurised. Do not hold your hand near a fitting when tightening or opening it, and never use hands to search for leaks. If a leak is suspected, set a piece of cardboard to detect a leak.

See a physician immediately in case hydraulic fluid is injected through skin, or if it is suspected. Immediate specialized medical care is important to limit the possible serious injuries caused by injected oil. Initial injury might be barely visible, but serious injury can develop within just hours.

**WARNING**

Risk of burns, cuts, and sprayed oil or dirt - Use Safety goggles and gloves during all maintenance operations. Always wear protective gloves, safety goggles and protective clothing. Hot surfaces and sharp edges can cause injuries. Also general skin contact with oil and grease can be harmful, wash hands thoroughly after contact with oil.

**WARNING**

Risk of injuries and burns caused by leaking hydraulic oil - Never operate loader or attachments if there are hydraulic leaks. Check hydraulic hoses and components only when the loader is safely stopped and hydraulic pressure is released. Repair all leaks as soon as you have noticed them, because a small leak can quickly change into a big one. Leaking hydraulic fluid can cause serious personal injuries and is also harmful to the environment. Hot hydraulic oil can cause severe burns.

Check hydraulic hoses for cracks and wear. Follow the wear of the hoses and stop using the loader if the outer layer of any hose has worn out. If you find a fault, the hose or the component must be replaced.

Also repeated or prolonged skin contact with hydraulic oil can be harmful, wash hands thoroughly after contact with oil.

Access to electric motor compartment



WARNING



Risk of burns - Allow loader to cool before opening covers.

Electric and hydraulic parts may be extremely hot after use.

The adjacent warning label is located visibly below the rear cover. Hot areas include the hydraulic components and hoses, and surfaces of electric motors and inverters.

Consider the environment



The fluids in the machine are harmful to the environment. Never allow fluids to leak in the environment.

Take waste oil and fluids to recycling station. Find out about your local requirements concerning the recycling or disposal of other components.

Installing of service support and frame lock

Installing boom service support:

The red service support of the boom lift cylinder is located at the tip of the boom, behind the attachment coupling plate.

Make sure that the boom stays up during maintenance operations by putting the service support on the lift cylinder piston rod. Secure the service support by locking it on the piston rod with the long screw that is on the support.

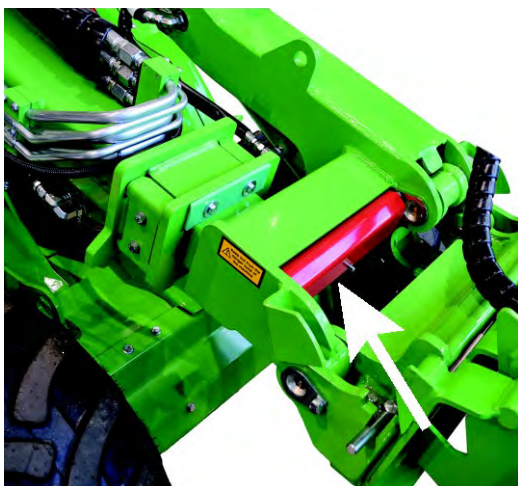


WARNING



Falling of load - Risk of crushing. Always secure the loader boom with the provided service support, before going under the loader boom. Remove any load and attachments from the loader before service or maintenance.

Service support stored at the tip of the boom



Service support in place



Frame lock:

A red frame lock bar is stored under the operator's cab.



This lock bar is intended to lock the articulated frame to make the loader frame stay straight during e.g. lifting or transportation.

The holes for the frame lock bar are on the left side of the loader, below the access step.

1. Slide the hook type end of the bar through a hole on the rear frame of the loader.
2. Turn the bar towards the front hole. The other end should remain locked in the hole on the rear frame.
3. Align the holed end of the bar and the frames by turning the steering wheel. This can be done without starting the loader.
4. Once aligned, slide the bar and lock with its cotter pin.



Daily inspections and periodic service schedule

The loader must be serviced and maintained in order to keep it in good and safe condition. This part of the Operator's Manual shows the maintenance and service points and intervals of the loader. There are more detailed instructions about each service operation, in numerical order, on the following pages.

In this Operator's Manual the needed service is divided into parts:

1. Daily maintenance, which all users of the loader can do without special equipment or training. As part of your daily routine, check the condition of the loader and its equipment before starting it. Remedy any issues found before using the loader.
2. Periodic maintenance of the loader, where special equipment and training may be needed. The service schedule establishes a more thorough examination of the loader in addition to the daily maintenance.

Some periodic service procedures are intended to be made by qualified service technicians. These service operations are marked in the service schedule table, and in the instructions of each service operation. Authorized Avant service points have the special tools and equipment that are needed.

All maintenance and service operations are intended to be made when the loader is off, except those checks that are specifically intended to be made while the loader is running.

Follow the recommended service schedule. Keep records of services made. Contact Avant service if you are unsure about any of the service procedures, or if you need spare parts.

NOTICE

Keep the loader in good condition. Always do the daily inspections and follow the maintenance schedule. Lack of maintenance can significantly and quickly shorten the useful life of the loader, and cause safety risks.

First service after 50 hours of use

NOTICE

Remember to perform the first service after 50 hours of use. The first service is vital for the performance and endurance of the hydraulic systems. All hydraulic components break-in during the first 50 hours of use, causing the hydraulic oil and filters to collect these initial wear products. If the first service is not made on time, the hydraulic pumps, motors, and valves may wear beyond repair. The warranty will not cover for damages that are caused by neglected service. The first service includes also tasks that are otherwise important for the safety and reliability of the loader.

Keep record of service and maintenance

NOTICE

Record of periodic service is on page 124 of this Operator's Manual. All periodic services must be filled and signed to the table by the service technician who has made the service. Damages or wear that are caused by lack of service are not covered by warranty.

Daily maintenance and inspections

- Do a walk-around check of the loader before each working shift. Complete the tasks listed below daily before starting to use the loader and after each 10 working hours.
- Check at least the following listed points. Do not use the loader if you notice problems with any of the listed items, or in other parts of the loader. See the following pages for detailed description of each inspection listed below.
- Adjust the seat and mirrors (if fitted) so that you have a good working position and unrestricted field of vision from the driver's seat. Check that windows and mirrors are clean.
- Check that all controls of the loader function correctly.
- Check the operating area. If necessary, remove or mark obstacles that could cause risks to safety or stability of the loader.

Daily and weekly inspections		Check daily or before each work shift	Check weekly
1	Ensure that the battery is charged to full charge	●	
2	Check the battery charge level	●	
3	Check the cleanliness and condition of battery visually. Check the battery connectors and cables visually.	●	
4	Check the general condition of the loader, its equipment, and safety labels	●	●
5	Clean the loader	■	●
6	Clean the battery	■	●
7	Add grease to the lubricating points	■	●
8	Check the boom, pivot pins, and other metal structures visually	●	●
9	Check tightness of bolts, nuts, and fittings	●	●
10	Check wheels	●	●
11	Check the attachment and the quick coupling plate	●	●
12	Check hydraulic oil level	■	●
13	Test the movements of boom	●	●
14	Test drive control and steering	●	●
15	Test parking brake	■	●

- Maintenance operation
- When necessary

Periodic service and maintenance

In addition to the items listed in the daily and weekly inspections, the following service procedures must be completed periodically.

Service schedule for periodic service		<i>After the first 50 hours of use</i>	<i>After every 400 hours of use or annually (whichever comes first)</i>
1	Change hydraulic oil	●	●
2	Change hydraulic oil filters	●	●
3	Clean or replace hydraulic oil tank breather	●	●
4	Check electric cables, relays, and other electric components*	●	●
5	Check hydraulic hoses, fittings, and other hydraulic components	●	●
6	Measure hydraulic pressures of auxiliary and boom hydraulics, adjust if necessary*	●	●
7	Check and adjust slide pads of telescopic boom, replace if necessary*	●	●
8	Check fastening and operation of drive motors*	●	●
9	Check the safety frame, seat, seat belt, reverse buzzer, and all installed lamps and reflectors	●	●
10	Test function of optional equipment (cab, boom floating, cross lock, anti-slip valve, and other equipment installed on the loader)	●	●
11	Service the hydraulic attachment locking system*	●	●
12	Check articulation joint	●	●
13	Test insulation resistance of electric system*	●	●
14	Perform battery condition tests*	■	■

*Service operations that are marked with an asterisk are intended for professional service technicians.

Battery maintenance

To keep the battery in good condition, follow the recommended use and charge cycles. As part of daily maintenance:

1. Ensure that the battery is regularly charged to full charge.
2. Check that the battery is fully charged even before starting a short work task.
3. Check the battery condition and cleanliness visually.
4. Check that the cables and connectors are firmly attached and free from corrosion.

The battery modules themselves (battery cells) are maintenance free. Service tasks related to the troubleshooting and analyzing of the battery are intended to be made by experienced technicians who have the correct tools and equipment available.

NOTICE

Follow the battery related use and charge instructions to keep the battery in good condition.

Neglecting the recommended use and charge cycles will cause permanent damage to the battery that can't be reversed with any service method. A single deep discharge can cause the battery to degrade to state needing full replacement.

Recharge daily

Recharge the battery after each time the loader is used. Also partially drained battery must be recharged. This ensures maximum life of the battery. For charge instructions see page 88.

1. Ensure full charge

To balance the charge between all individual battery cells, do a full charge at least weekly. Allow the charger to be plugged in until the multi-function display shows that the charge cycle is completed. The balancing charge is made at the end of charge cycle. It is recommended to do the full charge cycle as often as possible.

2. Check the battery charge level

Before starting to use the loader always check the remaining battery charge level. Do not operate the loader if the battery charge level is below 40 %.

Charge the battery when ending work.

Keep the battery fully charged to keep the battery life as long as possible.

3. Check battery visually

Check the battery, all cables, and insulators visually for signs of dirt and mechanical damage. Search for the following:

- Dirt or dust on battery or between battery cells
- Dirt around battery and between battery and its metallic tray
- Liquid leakages on battery, between cells, or on battery tray
- All cables, cable insulators, cell caps, and connectors

Battery

Dirt that gets between the cells or the battery tray can cause wear of the battery cells. If battery gets worn enough, so that insulation from each other or from external conductive parts can be suspected to be damaged, the battery must be taken off from service and replaced. Discontinue use of the battery if there are signs of leaks or mechanical damage on it.

Cables and insulators

Check the battery, all cables, and insulators visually for signs of dirt and mechanical damage. Make sure all cables are routed and fastened in a way that prevents them from becoming chafed during use of the loader. If there are signs of wear on any cable or insulator, prevent further damage to the cables and service the loader before continuing use.

Battery connector

To disconnect the battery pack manually from the loader pull the connectors apart from each other from the handle of the battery connector.

Disconnect battery in at least the following cases:

- before you do any maintenance that requires access near electric motors or other main electric parts
- before maintenance of any electric component or replacement of a fuse
- before you disconnect any electric cable
- whenever there is a risk of fire
- when loader is being transported
- there is visible mechanical damage on battery
- when you plan to store the loader for long storage period.

Daily and routine maintenance procedures

4. Check the general condition of the loader

- Check that all safety decals are in place and legible.
 - Never operate loader if safety decals are damaged or missing. Replace missing or damaged safety decals before using the loader.
- Check the underside of the loader and ground for leakages. Also check ground/floor surface for signs of leakage.
 - Never operate the loader or its attachments, if you have noticed a leak. Repair all leaks before use.
- Check the condition of the safety frame, seat belt, lamps, and other safety equipment:
 - Safety frame (ROPS) and protective roof (FOPS) must be fitted. Safety structures must not have visible damage or deformations. They must be replaced with new ones after any incident.
 - Make sure all lighting devices and reflectors are functional and clean
 - Check operation of reverse buzzer (if installed).
- Check if the loader must be cleaned before continuing with other daily maintenance procedures in this chapter. Damaged parts or other faults may not be visible if the loader is dirty.
- Check the metal parts for damages or rust.
 - Do not use the loader if you see damaged, bent, corroded, or deformed metal parts. Contact Avant service for service, if necessary.
 - Check the condition of the loader after cleaning of the loader. For more instructions about inspecting the metal structures, bolts, and fittings, see sections starting from page 107.

5. Clean the loader

Cleanliness of the loader is not only a question of outer appearance. A dirty machine will run hotter and can cause poor performance, shorter battery life, or stopping of loader to overheat.

Pay special attention to the cleanliness of the battery, electric motors, inverters, charger, the hydraulic pump compartment, hydraulic quick couplings and the oil tank cover.

All surfaces, painted and others, will stay in better condition when they are cleaned regularly.

Make sure all lamps are clean and functional.

Keep the access steps clean

Always keep the access steps, the floor of the loader, and the pedals clean. If there are worn grip surfaces on the steps or the floor, replace them with new ones.

A. Clean the exterior of the loader

Clean the outer surfaces of the loader with water hose and mild detergent.

You can also use a pressure washer to clean the outer surfaces of the loader. Use low pressure and only wash outer surfaces with a pressure washer. To avoid damage, do not spray at hydraulic components, controls of the loader, electric parts, operator's area, decals, or radiators. Never use pressure washer to clean the inner parts of the loader.

Also, wash the hydraulic components (hoses, cylinders), any external electric component, decals, and the radiators carefully, never with high pressure washer.

Wipe the hydraulic quick couplings, and the oil tank cover with a rag.

Clean also the space between the front hydraulic motors periodically by removing the cover panel at the front of the loader.

After cleaning the exterior of the loader grease all greasing points.

B. Clean the interior of the loader

Clean cab and interior with appropriate mild detergent and cleaning supplies. Keep the cab and the driver's seat clean to reduce exposure to dust.

C. Clean the inside of the rear frame

Keep the inside of the rear frame clean. Dust, hay, and other combustible materials on and around electric components will cause a fire hazard. Dirt in the rear frame can also cause mechanical damage to the electric cables, hydraulic hoses, or other components.

Never use pressure washer to clean the inner parts of the loader or the battery. Electric parts or the battery may become damaged.

Clean the inside of the rear frame using compressed air, and wet cloth. Wipe parts clean with cloth, or use a brush or sponge. Do not pour water on the internal parts of the loader.

Never spray in the engine compartment with a pressure washer.

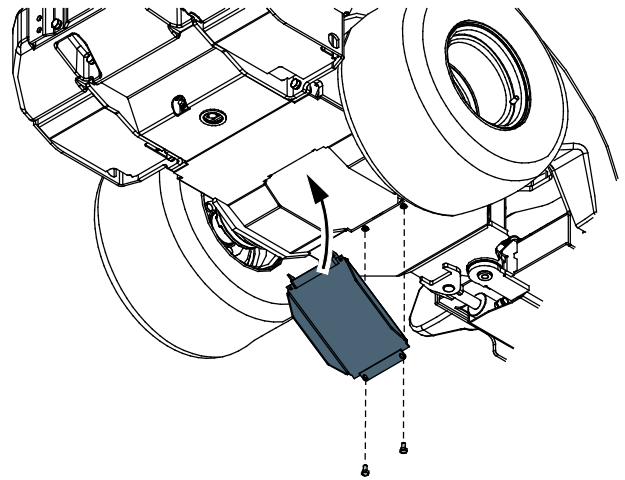
NOTICE



Never spray the battery or electric motor compartment with a pressure washer. Battery and electric connectors and insulators may get damaged. Use cool or warm water to use other parts of the loader, never use hot water (above 70°C). Use damp cloth to wipe the battery and electric motors clean. Always disconnect the battery before cleaning any part inside the rear frame.

Service hatch at the bottom of the loader

There is a service hatch under the loader to help with the cleaning of the rear frame. Remove the service hatch, fastened with two bolts, before cleaning the engine bay to remove dirt from the rear frame. Reinstall the cover plate after cleaning to protect the internal components of the loader.



6. Cleaning of battery

The battery should always be kept clean and dry to prevent so called leakage currents between battery cells. Any dirt or liquid on the battery can cause current to flow between battery cells. This will cause discharge of individual cells and poor overall performance of the battery pack.

Any liquid on the battery or in the battery tray must be considered as acid and necessary precautions must be taken. Wear safety gloves that protect from contact with acids. Use preferably a suction system to remove any liquid on battery. Dispose materials used for cleaning in appropriate manner.

During battery recharge, small quantities of electrolyte particles escape and form a weakly conductive layer on the cell covers. Leakage current flows through this layer then, leading to increased and varying self-discharging. If suspecting that battery capacity is weakened after weekend storage, this dirt can be the cause.



Risk of sparks, fire, and explosion - Dirt on battery can cause current to flow between battery cells. Dirty battery can cause short-circuit of battery cells and sparks. This can be a source of ignition for gases produced during charge. Clean the top of the battery before recharge. Never clean during recharge to avoid sparks caused by static electricity.



Risk of battery damage and acid spill - Never use pressure washer to clean the battery.

Pressure washer can damage the battery cells or the caps on top of the battery, allowing water to enter battery. This will result in battery damage, and can also cause battery electrolyte (acid) to spill from battery. Clean battery as instructed in this Operator's Manual.

Cleaning procedure



Risk of acid burns - Wear personal protective equipment when handling battery. Wear safety goggles, gloves, and protective clothing when cleaning the battery. Electrolyte that has spilled or evaporated from the battery can be acid.

The plastic parts of the battery may only be cleaned with water or water-soaked rags without additives. After cleaning, the battery surface must be dried by suitable means, e.g. with compressed air or cleaning cloths. Hot air devices with open flame or glow wires must not be used.

The battery base is sealed and will collect water. If liquids are on battery drain tray, keep in mind that any liquid must be extracted by suction, handled as acid, and disposed of correctly. There are a few small solid plastic tubes in between the battery cells to reach the bottom of the battery tray with a suction device.

Observe the local regulations relating to the use of water and treatment of waste. Never allow washing water to drain into the environment.

Clean hydraulic cooler

Keep the hydraulic oil cooler clean to ensure reliable operation and long service life of the loader. If you operate the loader in dusty conditions, clean the cooling fans and surfaces more frequently.

NOTICE

The loader is equipped with a hydraulic oil cooler, which is located at the right side of the loader, near the controls of the loader. Make sure to clean the oil cooler cell with compressed air every time you are servicing the loader - and even more frequently if the loader is being used in dusty conditions.

NOTICE

Proper cooling is essential. To prevent overheating, clean screens, cooling fins, and external surfaces of electric motors, inverters, and the charger. Avoid spraying water at wiring harness or any electrical components.

7. Add grease to the lubricating points

NOTICE

Greasing of the pivot points is essential to avoid wear of joints. Lack of greasing can cause significant damage to the articulation joint and boom pivots in short period of time.

The following table and pictures show the location of grease nipples. Check the lubrication points before each work shift.

Make sure all joints are lubricated and clean. Suitable lubrication interval depends heavily on operating conditions. The need for lubrication must be checked at least after every 10 hours of use. Add grease if the joints have become dirty. Adequate lubrication of the joints must be ensured. Lack of lubrication will cause the joints to wear quickly.

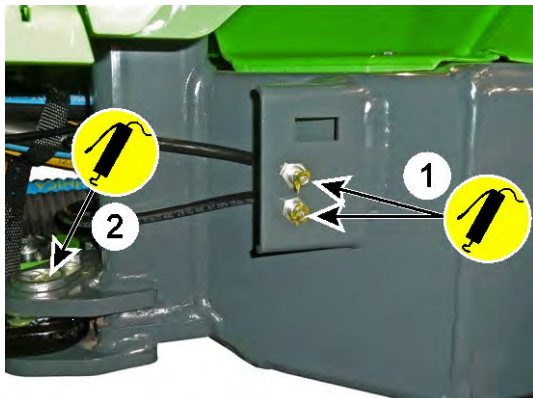
Use general purpose machine grease. A grease gun is needed to apply grease to grease nipples. All lubrication nipples are standard R1/8" nipples. Replace any damaged nipples.

Clean the end of the nipple before greasing and add only a small amount of grease at a time. New lubricant will push out dirt from joints. Wipe excess grease with a cloth.

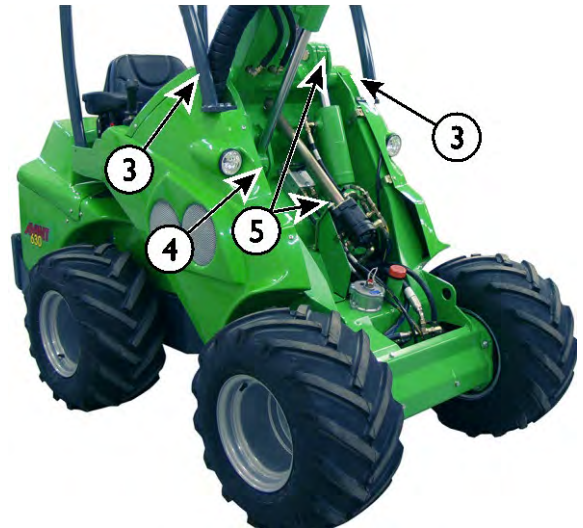
Greasing points are listed in the following table.

Reference		Number of points	
A	1.	Articulation joint Left side of loader	2
	2.	Steering cylinder Both ends of steering cylinder, near articulation joint	2
B	3.	Boom pivot pin Both ends of boom pivot	2
	4.	Lift cylinder	2
	5.	Levelling cylinder If fitted. Lower end accessible under front cover.	2
C	6.	Telescopic boom Grease when boom is completely retracted	2
D	7.	Tilt cylinder	2
	8.	Attachment coupling plate Pivot pins and tilting mechanism	5

A. Articulation joint and steering cylinder



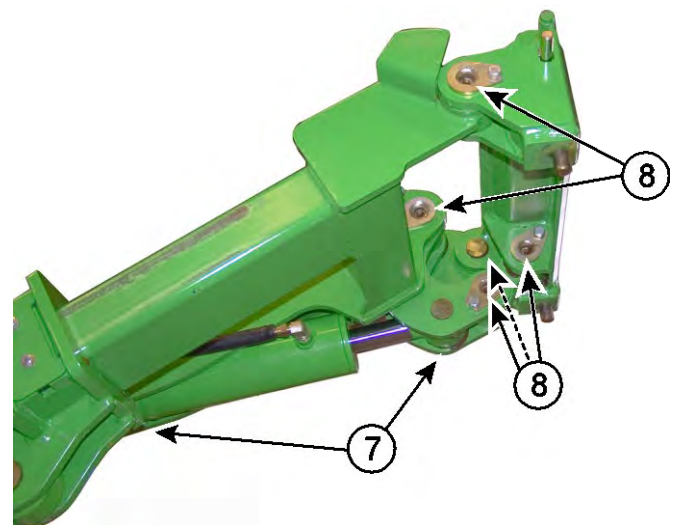
B. Front frame



C. Telescopic boom



D. Coupling plate



8. Check the boom, pivot pins, and other metal structures visually

Check the loader structures visually. Do not use the loader if there is visible damage, signs of bending, ruptures, cracks, or buckling. Also check if there is heavy rust.

- All pivot pins must be in good condition and secured in place.

Make sure that the pivot pins are not worn and there is no excessive slack in the joints. Worn pins lead to wear and failure of the joints, only small slack is acceptable.

- The telescopic boom has slide pads that wear during use. The telescopic inner part of the boom must not move significantly when manually handling it. If it is necessary to adjust or to replace the slide pads, see page 114.
- Check the steering cylinder, its pivot pins, hydraulic fittings, and brackets connecting the cylinder to the front and rear frames.



Risk of dropping of load - Check all pivot pins. Check the tightness of the locking screws of all pivot pins. Also check the pivot pin connecting the boom to the front frame. If any of them is loose, use thread locking compound and tighten.



Risk of serious injuries - Discontinue the use of the loader and contact Avant service in case the steel structure of the loader gets damaged. A faulty reparation, or wrong methods and materials used for reparation, can cause hazardous failures or further damage the loader.



WARNING

Damaged or modified safety structures do not protect in same way as original ones. In case the ROPS safety frame or the FOPS canopy of the machine gets damaged, the machine must be taken to Avant service for checking. It is not allowed to repair the ROPS and FOPS.

9. Check tightness of bolts, nuts, and fittings

Check tightness of bolts, nuts, and hydraulic fittings regularly. Check visible bolts and hydraulic fittings visually daily. Check bolts and fittings more thoroughly as part of periodic maintenance. Do not start the loader if any bolt, pivot pin, or hydraulic fitting is loose, damaged, or missing.

Check pivot pins

Check the pivot pins and the tightness of the locking screws that lock the pivot pins:

- pins connecting the articulated frames
- pins connecting the steering cylinder
- pin connecting the boom to the front frame
- all pins of the boom and its cylinders

If any pivot pin locking bolt is loose, apply thread locker compound and tighten the bolt.



WARNING

Risk of dropping of load - Check all pivot pins. Check the tightness of the locking screws of all pivot pins. Also check the pivot pin connecting the boom to the front frame. If any of them is loose, use thread locking compound and tighten.

Check wheel nuts

Check tightening of the wheel nuts with a torque wrench. Wheel nuts must be tightened to 225 - 275 Nm. The wheels and nuts settle in after first few hours of use, check the tightness after 5 hours of use.

NOTICE

Tighten wheel nuts after first 5 operating hours. Check tightness of wheel nuts regularly.

Other bolts and nuts

Bolts and nuts on the loader are standard metric system type. If replacement of bolt or nut is necessary, replace both at the same time with ones that are identical in size and grade.

Most bolts and nuts on the loader are metric grade 8.8. See the spare parts catalog for information about bolts, nuts, and washers. Contact Avant service if you are unsure of suitable fasteners.

- Check the bolts connecting the rear frame extension to the rear frame. These bolts must be tightened to 227 Nm. These bolts must be grade 10.9.
- Check the fastening of the drive motors. For more information see page 115.

These bolts must be checked after the first 50 hours of service, and then after every 400 hours or 1 year of use, whichever comes first.

Check hydraulic fittings

Check hoses and fittings visible on the loader boom. Push and pull the hoses manually and look if any fitting is loose.

Do not overtighten hydraulic fittings. Tighten any hydraulic fitting only if there are signs of leakage or loose connection. Tightening of a hydraulic fitting unnecessarily can damage it.

Make sure that replacement hoses and fittings are compatible with the fittings on the loader. Contact Avant service when hoses or fittings need to be replaced.

Hydraulic fittings of drive motors and hoses of drive system

Hydraulic fittings of the drive system are equipped with a visible marker where a yellow marker is fully visible, when the fitting is tightened correctly. If a hose or fitting needs to be replaced, use only hoses which are equipped with compatible fittings.

Reuse of hydraulic hoses or fittings

Never reuse pressed fittings that are part of hydraulic hoses. If a hose must be replaced, it must always be equipped with new fittings. Use only high quality hoses and fittings. Hoses must be made with professionally made pressed fittings. Do not use reusable hose fittings.

Tapered JIC-type hydraulic fittings may get damaged when removed and re-tightened. Note that JIC type fittings are not tightened with torque and fitting will break when tightened too much.

10. Check wheels

Check the condition of tyres and rims visually daily. Do not use if there is visible damage on tyres or rims. If a tyre is punctured take the tyre to a professional tyre shop. It may not be possible to repair all punctures safely. Do not repair tyres yourself.

Check tyre pressure with a pressure gauge whenever you suspect wrong pressure. Check the tyre pressures at least monthly. Check tyre pressure when heavy attachments and extra counterweights are not attached.

Check that the tyre models are appropriate for the loader model and listed on page 33. The load and speed rating of the tyre and rim must be appropriate for the loader model.

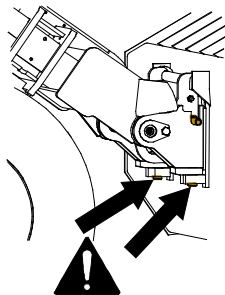
The correct tyre pressure depends on tyre model and intended load. Refer to Chapter Technical Specifications.



Risk of loss of stability due to tyre failure - Never attempt to repair a tyre by yourself. The loader is equipped with heavy duty tyres that must only be repaired by a qualified tyre technician.

11. Check the attachment and the quick coupling plate

Check the locking of attachment and locking pins on attachment coupling plate. Check both locking pins:



- Both pins must move easily and come through the lower brackets of the attachment.
- To check the attachment and any additional coupling instructions for individual attachments, see the Operator's Manual of the corresponding attachment.

The locking pins must return easily to their locking position. Do not operate the loader if the coupling pins do not lock down.

Clean the locking pins when cleaning the loader. Move the locking pins regularly, even if you do not change attachments regularly.

The quick coupling plate and its pin on top of it must not be bent, cracked, or otherwise damaged.

Make sure that the attachment is locked, if an attachment is mounted on the quick coupling plate. Check the operation of the attachment, and position of the hydraulic hoses of the attachment. Hoses must not rub against sharp surfaces, or get stretched or pinned when moving the loader boom and the attachment.

Hydraulic attachment locking:

If your loader is equipped with hydraulic attachment locking, check that both locking pins move up and lower down completely by using the switch on the dashboard. Do not operate the loader if the attachment locking system pins do not lower down completely.

Use the hydraulic locking periodically even if you don't change attachments.

12. Check hydraulic oil level

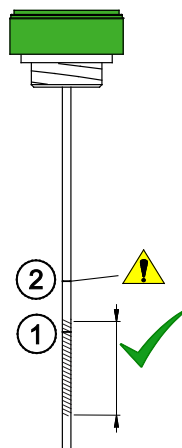
Check the level of hydraulic oil with the dipstick of the filler cap. Remove the front panel to access the filler. Keep the loader boom completely lowered.

Check level of hydraulic oil especially after using a new attachment that drains hydraulic oil from the loader as the hydraulic system of the attachment fills up. Check also if you have noticed a leak of hydraulic oil.

Oil level should be approximately at the lower mark of the dipstick (1) when the loader boom is up.

Tighten the dipstick on its threads for measurement. Refill when necessary, but never exceed the upper limit mark (2). Doing so can cause oil to overflow when lowering the boom.

Hydraulic oil tank filler is located on the front of the boom, under a hatch.



1. Target marker. Fill to this mark when hydraulic system is **cold**.

The area highlighted in the adjacent figure shows approximately the acceptable level.

2. The second mark on the dipstick indicates max level of hydraulic oil. Oil can reach this level when hydraulic system is **hot**.

Never overfill the hydraulic oil tank. Oil can flow over, or foam inside tank.

Inspections after starting the loader

13. Test the movements of boom

- The boom should move smoothly to all extreme positions, when using it without an attachment.
- If the telescopic function of the boom starts to stick under load, add grease to the lubrication points on top of the boom. Do not apply grease directly on the inner boom as it will collect dirt and cause wear. Extend the boom fully and spray PTFE lubricant onto the inner boom.
- If the wear pads are worn, there may be too much play between the boom sections. If there is noticeable play, adjust or replace the slide pads of the boom.
- If an attachment is fitted, check that the boom moves smoothly within its normal operating range.

Hydraulic hoses or electric cables must not get pinched or stretched in any position of the boom



CAUTION

Risk of collision - Avoid moving the attachment to a position where it can contact the loader.

Some attachments may reach the front tyres, boom, or structures of the loader when moving the boom or tilting to the extreme positions. Use any attachment only for its intended use.

14. Test drive control and steering

- Check operation of pedals and steering. Pedals must move freely and not get stuck or feel stiff.
- Check that loader stops when not pressing the drive pedals. Do not use the loader if the braking performance is decreased, or if the loader creeps.
- Allow the loader to warm up and check steering. When the engine is running, turning the steering wheel should be easy. When the engine is off the steering will work but it will need more effort. There is a built-in backup steering that makes it possible to turn the loader in case the hydraulic flow to steering is interrupted.

If you notice any trouble with pedals, stopping of the loader, creeping, or trouble with normal or back-up steering, switch on the parking brake, shut down the loader, and service the loader before continuing use.

15. Test parking brake

Test the parking brake periodically.

1. When the loader is running, switch on the parking brake.
2. Switch drive speed mode to slow.
3. Press drive pedals. The loader must not move when parking brake is on.
4. Increase engine RPM and test the parking brake to both front and rear directions.

If the loader moves when drive pedals are pressed, stop using the loader. Service the brakes before using the loader.

Periodic service

These maintenance and service procedures may require special equipment, tools, or skills. They are recommended only for experienced and knowledgeable individuals.

1. Change hydraulic oil

When changing hydraulic oil, the oil can be removed with a suction pump or by opening the drain plug on the right side of the front frame, next to the articulation joint. In both cases it is important to clean the magnetic drain plug. Hydraulic oil tank capacity is 36 l.

Hydraulic oil type

Always use correct type of clean, high-quality hydraulic oil with extra lubrication additives. Recommended oil types are:

- ISO VG-46 certified mineral oil
- Mobil SHC™ Hydraulic EAL biodegradable mineral oil based hydraulic oil

Check the label on the loader for information which oil has been added in factory.

If ambient temperature is hot, higher viscosity oil may be required. Contact your Avant dealer or authorized service.

In freezing temperatures use high quality oil which has wide viscosity index, and which is also intended to be used in cold temperatures. Correct type of oil makes cold starting easier, and improves the performance of the loader in cold temperatures.

NOTICE

Use of synthetic oils, or use of other types of bio hydraulic fluids than listed above, may cause premature wear or damage to the hydraulic components and is not permitted. Using wrong type of hydraulic oil will void the warranty.

NOTICE

Never use plant based bio oils. Only the bio oil type shown above is approved for use. It ensures wear resistance and performance of the hydraulic system. Only this oil can be added without flushing the hydraulic oil circuits. Handle waste bio oil as normal waste oil. Never leave any oils into environment. Always dispose of hydraulic oil following local regulations.

2. Change hydraulic oil filter

The loader is equipped with a hydraulic oil return filter. It is located on top of the hydraulic tank, next to the dipstick. Take off the cover and replace the oil filter cartridge. Dispose used filters as instructed by your local authorities. Never throw oil filters in general trash.



3. Clean or replace hydraulic oil tank breather

There is a breather filter inside the dipstick cap which must be cleaned or changed once a year.

4. Check electric cables, relays, and other electric components

Check other electric cables and their routing and fastening. If you see signs of damage on electric cables or components, stop using the loader and disconnect the battery. Replace the cables and insulators before you continue to use the loader.

Check the relays, cables, and fuse boxes near the hydraulic oil cooler on the right side of front frame. Make sure all connectors are fully in place. Check all cables and individual conductors for signs of damage.

5. Check hydraulic hoses and fittings

Check the positioning and routing of the hydraulic hoses. The outer layer of any hydraulic hose must not be damaged so that any inner layer is visible. Replace hoses that show signs of damage.

Move the hoses manually and see if the fittings of the hoses are loose. Check if hydraulic fittings show signs of leakage.

Hydraulic hoses age over time. Exposure to sunlight can accelerate aging of the hoses. Replace any hose that has cracks on its surface when you bend the hose.

6. Check pressure of hydraulic system

It is recommended to leave the measurement and adjustment of hydraulic pressures to qualified service technicians. At minimum, a hydraulic pressure gauge with appropriate measurement scale and fittings are required to complete the measurement.

The specified pressures for each hydraulic circuit must not be exceeded. Wrongly made adjustment can cause significant damage to the hydraulic components of the loader, and to the metal structures of the loader. Also attachments may get damaged.

The main pressure relief valve for the auxiliary hydraulics pump is located on a valve block at the rear frame of the loader. However, the pressure of the boom and auxiliary hydraulics is adjusted from the boom control valve. The main pressure relief valve must never be adjusted. If boom pressure can't be adjusted high enough from the boom control valve, the pump and main relief valve must be checked. Contact Avant service.



WARNING

Risk of injection of hydraulic oil
 - Wrong handling of the hydraulic system or wrong tools can cause ejection of hydraulic oil. It is recommended that pressures should only be checked or adjusted by a competent and experienced technician. Contact your Avant dealer if you need assistance.

Pressure measurement from multiconnector

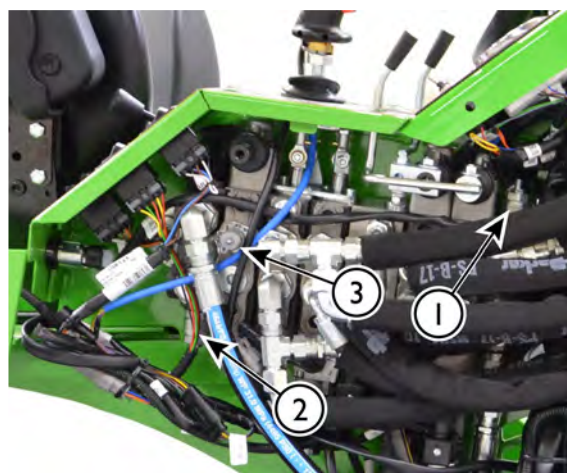
To measure the pressure of the auxiliary hydraulics, it recommended to use the pressure gauge adapter A422475.



Boom control valve pressure

There are two pressure relief valves at the main control valve of the boom and auxiliary hydraulics. The auxiliary hydraulics pressure can be measured from the multiconnector, but the boom pressure must be measured from the valve assembly with a pressure gauge that has a measurement fitting.

1. Auxiliary hydraulics pressure relief valve
2. Boom hydraulics pressure relief valve
3. Boom pressure measurement fitting



NOTICE

Never adjust pressure to higher level than recommended setting. The electric drive system is designed to operate at the intended pressure level. Other settings can damage electric drive, modify the response of the controls, and decrease battery life. Warranty will not cover for damages caused by wrong pressure setting. Never remove tamper resistant seals from pressure relief valves.

Drive pressure check

Drive pressure should be checked only by qualified service technicians. If you suspect that the pulling force of the loader has decreased contact your nearest Avant service. There are two pressure relief cartridges which have fixed pressure setting. Also the power control valve, the hydraulic drive motors, drive pump feed pressure, and brake release pressure should be checked when investigating drive system related troubles.

The drive pressure can be checked only with a pressure gauge connected to the drive pump valve block. A pressure gauge with a minimum range of up to 400 bar is needed. The setting of the fixed pressure relief cartridges can not be adjusted.

NOTICE

Drive pressure check is recommended only for experienced service professionals. Special instruments are required.

Adjusting hydraulic pressures

Adjustment of hydraulic pressures should be left for qualified service technicians. If you have the equipment and skills to do the adjustment yourself, keep the following in mind.

1. Turn adjustment screw of a pressure relief valve only with small increments, max 1/8 rounds at a time.
2. Check pressure after each adjustment.
3. Check pressure once again after tightening the securing cap nut back.
4. Make sure the pressure does not exceed specified values.



Never exceed the recommended hydraulic pressure settings. Excessive hydraulic pressure may lead to hydraulic oil ejection by hose burst or component failure. Wrong adjustment will damage or wear the hydraulic pumps, cylinders, and hydraulic motors. Warranty does not cover damages caused by excessive hydraulic pressure.

7. Adjust and replace slide pads of telescopic boom

The telescopic boom is equipped with replaceable slide pads. The slide pads are wear parts that wear during normal use of the telescopic function. All slide pads can be replaced, and the nylon slide pads on the outer boom can also be adjusted. Adjustment or replacement of the slide pads is necessary to compensate for wear and to adjust the play between the outer and inner telescopic boom.

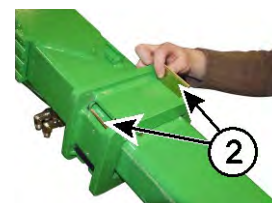
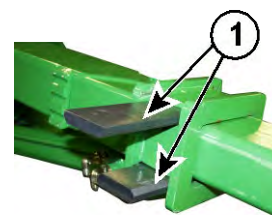
- At the lower end of the outer boom there are pairs of nylon slide pads 1 and 2, accessible from around the boom.
- In addition, there are pairs of aluminium-bronze alloy slide pads 3 and 4, at the upper end of the inner boom. To access pads 3 and 4, the inner boom must be separated from the outer boom. Lifting equipment is needed to complete this. It is recommended to leave the check and replacement of slide pads of the inner boom to professional service.

Slide pads 1 and 2

Slide pads 1 and 2 can be adjusted by mounting thin adjustment sheets between the boom and the slide pad.

Fully extend the telescope and press the boom gently against the ground. This way it is the easiest to mount an adjustment sheet under lower slide pad 1.

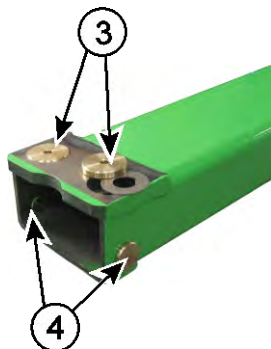
However, if there is substantial wear in the slide pads it is advisable to replace both pads 1.



Slide pads 3 and 4

Slide pads 3 and 4 at the upper end of the inner boom last long in normal use. They should be checked after every 400 operating hours and replaced at least after 800 hours of use.

To check these slide pads, take the inner boom completely out of the outer boom. If the pads have worn so much that they are in level with the boom, or excessive boom play can't be removed by adjusting slide pads 1 and 2, replace all slide pads.



NOTICE

To replace slide pads 3 and 4 the boom must be partially disassembled. Lifting equipment is required in order to do the service safely. It is recommended to leave this service operation to your nearest Avant service partner.

Slide pad part numbers	
Slide pad 1	A48339
Adjustment sheet, long:	A48014
Slide pad 2	A412868
Adjustment sheet, short:	A412971
Slide pad 3	A47922
Spacer under slide pad 3	A47941
Slide pad 4	A48343

8. Check mounting and operation of drive motors

Check the tightness of the drive motor fastening bolts. The bolts should be tightened to 200 Nm.

Test the functionality of the drive motors by pushing against a fixed structure, or a pile of sand, for example. All four wheels should spin.

9. Check the safety frame, seat, seat belt, lamps, and other safety related equipment

Check, test, and, if necessary, clean all safety related equipment of the loader.

- Check the ROPS and FOPS structures for visible damages. If ROPS or FOPS is damaged they must be replaced with new ones.
- Check the installation, condition, and adjustments of the seat. Make sure the suspension system works and that it can be adjusted. Test all adjustments. Clean the surface of the seat with appropriate cleaning supplies.
- Check and test the seat belt. Make sure the buckle locks firmly and can be released easily. Test the reeling of the seat belt, the belt must reel in completely, and it must lock instantly when pulling the belt quickly. Clean the seat belt with damp cloth and mild soap.
- Test all lamps and lighting devices. If the loader is equipped with road traffic light kit, check the alignment of the headlights. Check and clean all reflecting parts.
- Check the grip surfaces on the floor of the loader and on the access steps. Clean the surfaces and replace if necessary.
- Check that the boom service support and the frame lock are stored in their place and that they have the necessary locking parts.
- Test the function of the reverse buzzer, if installed on the loader.

If the loader is equipped with a cab:

- Check the condition of the windscreen. Cracked or worn windscreen must be replaced.
- Check the opening of the side window and door. Test the side window hatch pin so that the window can be opened completely.
- Check the emergency window hammer and its markings. Make sure a hammer is available and usable for emergency situations.
- Check that the door and windows close firmly and that their gaskets are in good condition.
- Check the operation of the ventilation fan. The fan must be in working order.

- Check that the interior panels are not damaged and that they are installed tightly. Loose or damaged panels may cause contact with sharp edges, and may in some cases cause difficulties to operate the controls of the loader.

10. Test function of all controls and equipment

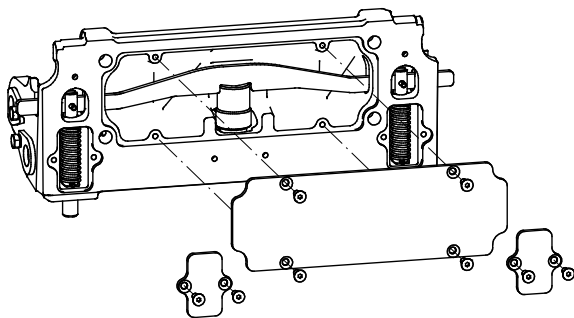
Check the condition and test the function of additional control switches and equipment installed on the loader. Depending on which options are installed, check, for example, the electric connector and switching of the attachment control switch pack, anti-slip valve, drive speed selection switch, boom floating, work lights, and other functions annually.

11. Service the hydraulic attachment locking (option)

Check the correct locking of the attachment daily before starting to use the loader and its attachments. Both locking pins must lower easily completely down, through the holes of the brackets of an attachment.

If the locking pins do not lower completely down stop using the loader and service the quick coupling plate.

Remove the cover panels on front of the quick coupling plate. Clean the cavities around the locking pins and the hydraulic cylinder and its linkage.



12. Check articulation joint

Check for excessive play and ensure proper lubrication

Check the articulation joint at the first 50 hour service, and then at least after every 400 hours of use or annually. If there is play in the joint, the joint must be serviced to prevent severe damage of the joint.

If there is play in the joint and it is not repaired in due time, the play will increase rapidly, causing severe damage to the front and rear frames. Wear can be slowed with proper lubrication and by removing play, if these actions are made in early stages. Contact Avant service if there is play in the articulation joint.

Wear of the articulation joint is usually caused by lack of lubrication. Keep the loader clean and ensure adequate lubrication of the articulation joint.

Check tightness of bolts

The articulation joint is fastened to the rear frame with a series of M12 Allen bolts. Check the tightness of the bolts after the first 50 hours of use and then after every 400 hours, or annually.

The bolts of the articulation joint must be tightened to 136 Nm.

13. Insulation resistance test

The insulation of the electric system must be tested at least once a year using a general purpose multi-meter with resistance measurement capability. To measure insulation resistance:

1. Remove the front right side cover
2. Locate the point of grounding on the lower right hand corner of the hydraulic oil cooler, and a non painted point on the frame (end of a bolt suggested in the figure below).
3. Measure the resistance between these two points.
4. Write down the measured resistance value and the date of measurement to this Operator's Manual. Refer to the Maintenance log on page 124.



$R_{\min} 3000 \Omega$

The resistance between the grounding point and the frame of the loader must be at least 3000 Ω. To get proper result of measurement, find a clean, non painted point for the measurement, and measure multiple times. The lowest tested value must be higher than 3000 Ω. If the resistance is determined to be less than 3000 Ω, discontinue use of the loader, disconnect the battery, and contact Avant service.

14. Battery condition tests

The output voltage of the battery in unloaded condition tells only part of the status of the battery. The individual cells may have become damaged in a way that they output nominal voltage without load, but voltage drops significantly when current is drawn from the battery.

If individual cells are damaged, the performance of the loader can be reduced significantly. Individual cells of the battery can be replaced by your nearest authorised Avant or Enersys service partner. However, some basic tests are described here to help with logging the condition of the battery and with troubleshooting.



DANGER

Risk of electric shock, sparks, fire, and explosion of battery - Tests listed here are intended for experienced operators and service professionals. Use proper instruments and personal protective equipment when you do condition tests.



WARNING

Risk of electric shock, sparks, and fire - Follow correct procedure to measure currents. Never attempt to measure current by connecting an ammeter, a multimeter, or a similar device directly between the battery poles. This wrong method can, at minimum, destroy the metering device, and also cause sparks, fire, or electric shock. Know how to measure electric systems or contact your local service point.

Insulation resistance test of the battery

At least once per year, the insulation resistance of the loader and the battery must be checked by an electrical specialist. The tests on the insulation resistance of the battery must be conducted in accordance with standard EN 1987-1.

The insulation resistance of the battery thus determined must not be below 2400 Ω (50 Ω per Volt of nominal voltage), in compliance with EN 50272-3.

Test of condition of each individual battery cell

Measurement of the output voltage at rest of total battery pack or individual cells will not give accurate result of the condition of the battery. For more accurate results and troubleshoot, measure output voltage of each cell under load.

To test, operate the loader with high motor rpm. Do not lock the auxiliary hydraulics to ON. Notice that the battery must be fully charged before the test.

If the auxiliary hydraulics are locked to ON during test, the motor rpm must be at low level.

Use a voltmeter and measure each individual cell. Write down output voltage of each cell under load and at idle. Those that have lower voltage output under load are likely damaged and need further investigation.

Battery log device

For battery related diagnostics and troubleshoot the battery module is equipped with a logging device. The information can be accessed with service tools. The data is stored only locally, on the device itself. Access to data stored in the log is possible only from close proximity of the loader.

If necessary, the log can be uploaded for analysis. Contact your Avant service for more information.

Electric system & fuses

The e5 loader is equipped with 2 electric systems:

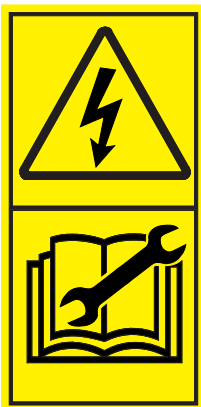
1. The high current and high voltage system for electric motors

This system controlled by two inverters which convert the battery voltage to high current and voltage for the electric motors that drive the hydraulic pumps. See information about the fuses in this system on the following page.

2. Regular 12 V electric system for all instruments and controls
 - Two fuse boxes at the front of the loader
 - Main fuses on a circuit board at rear right side of the loader:
 - 58 V fuses - see more information on next page.



WARNING



Risk of high-current electric shock, fire, and explosion of battery - Never repair or modify the 48 V electric system. If a fuse related to the electric motors and their control systems is blown, it is an indication of more serious fault on the electric system. Contact service. Contact with high-current parts of the electric system can cause a potentially lethal electric shock, regardless of the relatively low voltage. Contact authorized service in case of trouble with the electric drive system.

Main fuse boxes of 12-volt system

There are two fuse boxes located outside the cab, on the right side of the loader boom.










In the event of electric malfunction, always check the two 12 V system fuse boxes first. If a fuse is blown repeatedly, search for cause of burning fuse. Electric cables may be damaged. Contact service.

Lift the boom first for easier access to the fuses, if possible.







Remember to use the service support. If the boom cannot be lifted, the fuses can be checked after removing the right side cover plate.



12 V Fuse box 1

1	F1 25A  H	Hydraulic oil cooler fan fuse
2	F2 10A  	Dashboard, instruments ECU
3	F3 10A  	Standard work lights Signal horn
4	F4 10A 	Boom floating
5	F5 15A  2 EXTRA 1	Extra work light kit Selection switch of hydraulic flow to extra front or rear couplings
6	F6 20A  	Electric joystick switches Seat heater

12 V Fuse box 2

1	F7 25A 	Road traffic light kit
2	F8 5A 	Warning beacon
3	F9 15A 	12 V electric outlet
4	F10 10A 	<i>not in use</i>
5	F11 30A  12V	Switches of Opticontrol® system or attachment control switch pack
6	F12 10A 	Windscreen washer and wiper

Hydraulic oil cooler fan fuse

The red indicator on the dashboard indicates blown hydraulic oil cooler fan fuse. If the indicator is lit, check the 25 A fuse of the oil cooler fan. Check that the cooler fan is clean, can rotate freely, and is not blocked. Contact Avant service if necessary.

Main fuses

The main fuses of the electric drive system are located on a circuit board at the rear right side of the loader. If the loader does not respond to ignition switch, even if battery is charged, check the fuses visible on this circuit board:

- 2 pcs 58 V / 7,5 A fuses
- 2 pcs 58 V / 15 A fuses

On the high current feed cable to the inverters is a 500 A main fuse. On inverters there is a 250 A fuse on one of the inverters and 425 A fuse on the other. If a fuse related to the electric motors and their control systems is blown, it is usually an indication of a more serious fault on the electric system. Contact service. Contact with high-current parts of the electric system can cause a potentially lethal electric shock, regardless of the relatively low voltage. Contact authorized service in case of trouble with the electric drive system.

Fault diagnostic codes

The loader is controlled via CAN bus system. The control units for the electric motors monitor the electric drive systems during start-up and use of the loader.

In case a control unit has detected a fault requiring user action or service, the multi-function display will show a fault code. For more information about the fault message, use the button keys of the multi-function display to access a page showing information about current fault codes.

In case a severe fault is detected, the electric systems of the loader may go into to fault mode, which will reduce power output to protect the battery and electric systems. If necessary, the loader can be driven to a safe location, but must not be loaded or used more than absolutely necessary. The loader must be checked and serviced by authorised service before continuing use.

Diagnosics fault codes

Fault codes may help diagnosing a problem when communicating with authorised service. If you see an error code message displayed on the multi-function display, for more information, use the button keys of the display to choose a page showing fault codes and possible description of the fault. Detailed interpretation of fault codes and MIL reset require contact with service.

Codes have six numbers. The first number indicates the severity of the error type:

- 1 _ _ _ _ _ is an information code, that warns about low battery or similar faults with low severity.
- 2 _ _ _ _ _ and 3 _ _ _ _ _ warn about functional faults, such as sensor errors or if a wrong sequence of controls is used. Restart of the loader may solve the issue.
- 4 _ _ _ _ _ and 5 _ _ _ _ _ indicate a severe fault that must be repaired before continuing the use of the loader. Restarting the loader may also clear these fault codes.

Reset of codes

Many of the indicated trouble codes can be cleared by restarting the loader. Stop the loader safely and turn the ignition key to OFF position for a few seconds, then restart the loader. Also, the fault codes may in some cases be cleared by holding the button key of the multi-function display that is used to access the display page with information related to troubles. Press and hold the button key of the multi-function display to attempt manual clearing of the fault codes.

If the codes and messages are not cleared by restart or reset with the manual reset from the multi-function display, or if the codes appear again frequently, contact Avant service.

Replacing battery pack

Replacing the battery pack requires special tools and equipment. Replacing is required to be done by experienced professional.

To remove the battery pack from the loader, lifting equipment must be capable of lifting the entire battery pack. Never remove individual cells of an installed battery. The battery must be replaced as a complete assembly. Replacing individual cells without full analysis of the condition of all battery, made by a professional technician, can cause the new replaced cells to get damaged quickly.



Metal structures of the loader



Risk of serious injuries - Discontinue the use of the loader and contact Avant service in case the steel structure of the loader gets damaged. A faulty reparation, or wrong methods and materials used for reparation, can cause hazardous failures or further damage the loader.



WARNING

Damaged or modified safety structures do not protect in same way as original ones. In case the ROPS safety frame or the FOPS canopy of the machine gets damaged, the machine must be taken to Avant service for checking. It is not allowed to repair the ROPS and FOPS.

End of life disposal

When the loader is at the end of its useful life recycle and dispose of the loader properly. Drain and collect all fluids and handle following the current local regulations. Dismantle the loader and separate the different materials, such as plastic, steel, and rubber, and recycle each material. Never leave fluids or material in the environment.

Always handle used batteries with care. Take batteries to recycling, contact your Avant dealer for more information.

Troubleshooting

Listed below are possible causes for typical problems and suggested remedies. In case you experience trouble with the operation of the loader, check troubleshoot lists first. If problem is not solved, contact your nearest Avant service point or dealer.

Problem	Possible cause	Remedy
Drive pedals do not respond	Operating mode that prevents the use of the drive pedals is selected	Use the operating mode switch to choose a mode which allows the use of the drive pedals. See page 66.
Electric motors won't start when turning the ignition switch	Driver not seated on driver's seat	Operator must sit on driver's seat in order to use the controls of the loader. Also, other operating mode can be selected to operate certain attachments from another control position, see page 66.
	Ignition switch fuse blown	The ignition switch controls also the electric main switch of the loader. There are two fuses for the ignition switch. Check all fuses, see page 120.
Hydraulic attachment does not work when the auxiliary hydraulics control lever is moved	Attachment hoses are not coupled or the multi connector is not fully locked	Make sure that the multi connector is properly connected.
	Faulty or damaged quick couplers (will restrict or stop oil flow)	Replace quick couplers in multi connector.
	Operator not seated on driver's seat	Operator must sit on driver's seat to activate auxiliary hydraulics. Also, other operating mode can be selected to operate certain attachments from another control position, see page 66.
	Fault in attachment	Check with another attachment, if possible.
Attachment hoses will not go into the extra front or rear quick couplers of the loader	There is back pressure in the auxiliary hydraulics line	Release the pressure by moving the extra auxiliary hydraulics control lever in both directions.
Hydraulic oil overheats	Control valve not fully open	Adjust the locking plate of the aux hydraulics control lever, see page 45.
	Dirty, blocked or faulty hydraulic oil cooler	Clean hydraulic oil cooler, check fan. Check fan fuse, temperature switch, and relay.
	Overload of hydraulic system	Allow to loader cool by leaving on idle, until hydraulic oil cooler stops. Avoid operating an attachment at extreme load continuously. Check that attachment is operated correctly, and no flow restrictors are left half open on hydraulic circuit.
	Low hydraulic oil level	Make sure hydraulic oil level is as shown on page 110.
Electric motors will not run	Battery is discharged or damaged	Charge battery or start with separate battery. Check battery condition, replace if necessary.
	Operator presence control activated	Operator must sit on driver's seat to activate auxiliary hydraulics. Also, other operating mode can be selected to operate certain attachments from another control position, see page 66.
	Auxiliary hydraulics control lever is in locking position	Release the lever to neutral position.
	Blown fuse	Check all fuses
	Cold temperature	The current output capacity of the battery is reduced in extreme cold. Also, hydraulic oil becomes thick (viscous) in cold. Combined with low charge level the hydraulic motors may not start running. Take the loader to warm place to heat, and charge battery. Use high-quality hydraulic oil.

Problem	Possible cause	Remedy
Drive works erratically and boom movements do not work at all, electric motors run	Low hydraulic oil level	Check hydraulic oil level and condition.
Drive and boom movements work erratically, motors run smoothly	Air in hydraulic components	Move boom and steering cylinders and hold at each extreme position to de-air the system. Check hydraulic oil level and condition.
Hydraulic oil pushed out from hydraulic oil filler cap, hydraulic oil foams	Leak in hydraulic suction line connecting tank and hydraulic pumps allows air to sucked in	Replace suction hoses.

Maintenance log

1. Customer _____
2. Loader model _____ Serial number _____
3. Date of delivery _____

Date of service dd / mm / yyyy	Operating hours	Remarks	Served by: Stamp/signature
___/___/___	___/ 50 h		
___/___/___	___/ 450 h		
___/___/___	___/ 850 h		
___/___/___	___/ 1250 h		
___/___/___	___/ 1650 h		
___/___/___	___/ 2050 h		
___/___/___	___/ 2450 h		
___/___/___	___/ 2850 h		
___/___/___	___/ 3250 h		
___/___/___	___/ 3650 h		
___/___/___	___/ 4050 h		



EN	FR	DE
EC DECLARATION OF CONFORMITY	DÉCLARATION DECONFORMITÉ CE	EG-KONFORMITÄTS-ERKLÄRUNG
Manufacturer: Avant Tecno Oy Ylötie 1 33470 Ylöjärvi	Fabricant: Avant Tecno Oy Ylötie 1 33470 Ylöjärvi	Hersteller: Avant Tecno Oy Ylötie 1 33470 Ylöjärvi
Technical Construction File Location Same as Manufacturer	Emplacement du fichier technique de fabrication Le même que celui du fabricant	Ort der technischen Bauunterlagen Identisch mit Hersteller
We hereby declare that the machine listed below conforms to EC Directives	Nous déclarons par la présente que la machine mentionnée ci-après est conforme aux directives CE	Wir erklären hiermit, dass die nachstehend aufgeführte Maschine mit folgenden EG-Richtlinien in Übereinstimmung steht
2006/42/CE (Machinery) Conformity Assessment Procedure Self-certification	2006/42/CE (Machines) Procédure d'évaluation de conformité Autocertification	2006/42/EG (Maschinenbau) Konformitätsbewertungsverfahren Selbstzertifizierung
2014/30/CE (EMC) Conformity Assessment Procedure Type test (Notified Body) Eurofins	2014/30/CE (CEM) Procédure d'évaluation de conformité Examen CE de type (Organisme notifié) Eurofins	2014/30/EG (EMV) Konformitätsbewertungsverfahren Baumusterprüfung (Zugelassene Stelle) Eurofins
2000/14/CE (Noise Emission) Conformity Assessment Procedure Type test (Notified Body) Eurofins Expert Services Oy PL 47, 02151 Espoo, Finland	2000/14/CE (Émission de bruit) Procédure d'évaluation de conformité Examen CE de type (Organisme notifié) Eurofins Expert Services Oy PL 47, 02151 Espoo, Finland	2000/14/EG (Lärmemissionen) Konformitätsbewertungsverfahren Baumusterprüfung (Zugelassene Stelle) Eurofins Expert Services Oy PL 47, 02151 Espoo, Finland
Category EARTH-MOVING MACHINERY LOADERS COMPACT LOADERS	Catégorie ENGINS DE TERRASSEMENT CHARGEURS CHARGEURS COMPACTS	Kategorie ERDBEWEGUNGSGERÄT LADER KOMPAKTLADER
Model	Modèle	Modell
Cabin	Cabine	Kabine
Serial Number	Numéro de série	Seriennummer
Year of Manufacture	Année de fabrication	Baujahr
Week of Manufacture	Semaine de fabrication	Woche der Herstellung
Country	État	Staat
Sound Power Level	Niveau de puissance acoustique	Schallleistungspegel
Guaranteed 91 dB(A)	Garanti 91 dB(A)	Garantiert 91 dB(A)
Measured 91 dB(A)	Mesuré 91 dB(A)	Gemessen 91 dB(A)
_____ Jani Käkälä Managing Director _____, Ylöjärvi, Finland	_____ Jani Käkälä Président Directeur Général	_____ Jani Käkälä Geschäftsführer
Original language	Translation of the original language	Translation of the original language

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