

Safety regulations

1 Fundamental safety instruction

1.1 Warnings and symbols

In this operation manual the following designations or symbols are used for important information.



NOTE

Special information for the economical use of the machine.



CAUTION

Special information for necessities and prohibitions for avoiding damages.



DANGER

Information or necessities and prohibitions for prevention of damage to persons or extensive damage to goods.

1.2 Use of the loader as authorized

1.2.1 This machine was designed according to the state of the art and recognized safety rules. Nevertheless the use of the machine may cause danger for the user or third parties or impairments to the machine or other real values.

1.2.2 The machine and attachments may only be used in a technical non-objectionable condition, taking all safety regulations especially with regard to the operating manuals (machine and engine). In particular defects which could have a detrimental effect on the safety of the machine should be eliminated immediately.

1.2.3 The machine is determined exclusively for the purposes described in this operating manual. Any other utilization is not permitted. The manufacturer is not liable for any damage caused in this connection. The user solely carries the risk.

The authorized use of the machine also requires the observation of the operating manual (machine and engine) as well as the observation of the inspection and maintenance conditions.

1.3 Organizational measures

1.3.1 The operating manual (machine and engine) must be available at all times and at the site where the machine is in operating condition.

1.3.2 In addition to the operating manual (machine and engine) the general applicable and other binding regulations for the prevention of accidents (especially the safety regulations of the German Trade Association - VBG 40) as well as the regulations for environment protection must be observed and the personnel must be accordingly instructed. Traffic regulations must also be observed.

1.3.3 The personnel in charge of working with the machine must read the operating manual (machine and engine) before start of work, especially the chapter concerning safety precautions.
This also applies to personnel working occasionally with the machine, e.g. during maintenance work.

1.3.4 The driver must wear a seat belt during operation.

1.3.5 Personnel working with the machine must not wear long flowing hair, loose clothing or jewelry including rings as this could cause injuries by getting caught up or pulled in by the machine.

1.3.6 All safety and danger plates on the machine must be observed.

1.3.7 All safety and danger plates must be attached to the machine and must be kept in legible condition.

1.3.8 In case of modifications to the machine, especially in case of damages or changes in the operating behavior of the machine which could influence the safety of the machine, stop the machine immediately and inform the competent person in charge about the incident.

1.3.9 Without the manufacturer's consent, do not make any modifications or conversions to the machine which could affect safety. This also applies to the installation and adjustment of safety devices, valves and welding work to supporting parts.

1.3.10 Check hydraulic system, especially hydraulic pipes, at regular intervals for defects. Immediately eliminate any defects found.

1.3.11 The prescribed inspection periods set down in the operating manual (machine and engine) and the maintenance plan must be observed.

1.4 Selection of personnel and necessary qualifications

Fundamental obligations

1.4.1 The machine may only be driven and maintained by personnel selected by the employer for this purpose.

These persons must:

- have attained the age of 18 years,
- be physically and intellectually suitable,
- have been instructed in the operation or maintenance of the machine and must have demonstrated their ability to their employer,
- must be expected to carry out the work conveyed to them in diligent manner.

1.4.2 Electrical work on the machine may only be carried out by a qualified electrician or persons supervised by a qualified electrician according to the electrotechnical regulations.

1.4.3 Only qualified specialists may carry out work on the transmission mechanism and to the hydraulic system.

1.4.4 Only personnel with special experience and the necessary know-how are permitted to carry out work on the hydraulic system.

1.5 Safety Information for Certain Operating Phases

1.5.1 Normal Operation

1.5.1.1 Other persons must not be transported!

1.5.1.2 Start and drive the machine from the driver's seat only!

1.5.1.3 During starting and switching-off operation observe the control lamps according to the operation manual (machine and engine)!

1.5.1.4 Before commencing work/driving check brakes, steering, signal lights and lights for their functioning!

1.5.1.5 Before moving the machine always check that the attachments are safely stowed so that no accident may occur!

1.5.1.6 Before commencing work make yourself familiar with the working environment. This means observing obstacles on the working site, quality and resistance of the soil ground, undertaking the necessary protection precautions between the building site and the public traffic.

1.5.1.7 Before starting the machine make sure that no person is endangered by the machine!

1.5.1.8 Take measures so that the machine can be operated in a safe and functional manner. The machine may only be operated when all safety devices, e. g. detachable safety devices, sound-absorption, exist and function.

1.5.1.9 Avoid any work operation which appears to be dangerous!

1.5.1.10 Persons must not be carried in the working equipment, e.g. in the attachments!

1.5.1.11 The operator may only carry out work with the machine when no persons are in the danger zone.

The danger zone means that area near the machine where persons may be injured

- by work-induced movements of the machine,
- by work attachments and devices,
- by loads swiveling out,
- by loads falling down,
- by attachments falling down from the machine.

1.5.1.12 In case of danger to persons the operator must give appropriate warning signs. It may be necessary to stop work.

1.5.1.13 In case of functional defects stop machine immediately and safeguard it. Eliminate defects immediately!

1.5.1.14 Check machine at least once every shift for external visible damage and defects with regard to any changes and to the operating behavior of the engine. Report any defects or changes immediately to the person in charge. If necessary stop the machine immediately and safeguard it.

1.5.1.15 The driver may only slew the attachments overhead driving, operating and working areas if these areas are suitably safeguarded by protective roofing. These protection roofs must offer appropriate safety against loads and goods falling down. In case of doubt, it should be assumed that they are **not** protective roofs.

1.5.1.16 When driving, the attachment is to be kept as close to the ground as possible.

1.5.1.17 Please observe the applicable traffic regulations when driving on public roads, paths or open spaces. The machine must be brought into road-worthy condition in beforehand.

1.5.1.18 In general, switch on lights in poor visibility and during darkness.

1.5.1.19 If lights of the machine are not adequate for the safe execution of certain work, additional lighting must be provided on the working site, especially at dumping points.

1.5.1.20 Should the driver's sight of his driving and working area be restricted due to work-induced influences, he must be given guidance or he must safeguard the working area by a firm barrier.

1.5.1.21 The person giving guidance must be a reliable person and must be informed about his tasks before commencement of the work.

1.5.1.22 The driver and guide must agree on signals for communication. These signals may only be given by the driver and guide.

1.5.1.23 The guide must be easily recognizable e.g. by wearing warning clothing and must always be in the driver's field of vision.

1.5.1.24 When passing subways, bridges, tunnels, electrical over-head lines make sure that there is adequate clearance!

1.5.1.25 Keep good clearance when working at the edge of quarries, pits, rubbish dumps and embankments to eliminate any danger of the machine plunging down. The contractor or his deputy must stipulate the distance from the edge taking the soil bearing capacity into consideration.

1.5.1.26 The machine may only be used at stationary dumping areas when firmly integrated installation are provided to prevent the machine from running or sliding down.

1.5.1.27 Avoid such work which could have detrimental effect on the stability of the machine.

The stability can be detrimented by:

- overloading,
- too soft ground,
- abrupt acceleration or deceleration of driving movement or working movement,
- reversing out of high driving speed,
- working on slopes,
- driving too quickly round sharp bends,
- driving the machine on rough terrain with the bucket arm swung.

1.5.1.28 Do not drive along slopes in traverse direction. Always carry working equipment and loads near the ground, especially when driving down slopes. Sudden cornering is forbidden!

1.5.1.29 On steep inclines and gradients, the load is to be carried on the uphill side.

1.5.1.30 Before the slope, reduce the speed and always adapt to the local conditions! Always adapt the speed of the machine to the environmental conditions when driving down slopes! Never change into low gear when driving on slopes but before entering the slope!

1.5.1.31 Reversing over a longer period must be avoided!

1.5.1.32 When leaving the machine always safeguard the machine to prevent it from unintentionally rolling away or prevent non-authorized persons from using it!

1.5.1.33 The driver must not leave the machine if the attachments are not lowered or safeguarded.

1.5.1.34 During work-brakes and after work hours the driver should endeavor to leave the machine on good bearing soil and if possible on level ground and safeguard the machine to prevent it from unintentionally rolling away.

1.5.2 Special work within the exploitation of the machine and elimination of defects during process or work; disposal

1.5.2.1 The prescribed dates for adjustment work, maintenance work and inspections laid down in the operating manual (machine and engine) must be strictly observed. This also applies to details regarding the interchanging of parts/ part equipment. This work may only be executed by skilled personnel.

1.5.2.2 For all work concerning the operation, conversion or adjustment of the machine and its safety devices as well as inspection, maintenance and repair work please observe the switching and stopping operation in accordance with the operating manual (machine and engine) as well as the related instructions for maintenance work.

1.5.2.3 The engine must be switched off before maintenance or repair work is carried out.

1.5.2.4 The stability of the machine or the attachments must be guaranteed at all times during maintenance and repair work.

1.5.2.5 Maintenance and repair work may only be carried out when the attachment is set down on the ground or supported or when equivalent measures against unintentional movement were taken.

During maintenance and repair work under the bucket arm:

- the bucket arm must be mechanically propped up, e.g. by inserting the bucket arm support (option) (1-1/ arrow).
- the hand levers for the hydraulic loader (1-2/1) and auxiliary functions (1-2/2) must be secured.
- the swing mechanism must be blocked. Remove the blocking wedge (1-3/arrow) out of the mounting, switch to swing blocking (1-4/arrow), and secure with spring pin.

1.5.2.6 If necessary, protect the maintenance area on a large scale.

1.5.2.7 The machine must be protected from unintentionally starting after it was switched off for maintenance and repair work:

- remove the ignition key
- attach warning sign at battery main switch.

This applies especially to works to the electrical equipment.

1.5.2.8 Individual pieces and large assemblies must be carefully secured to hoisting equipment when being substituted to avoid any damage. Only suitable and technical sound hoisting equipment may be used as well as crane equipment with adequate payload. Do not stand or work underneath suspended loads!

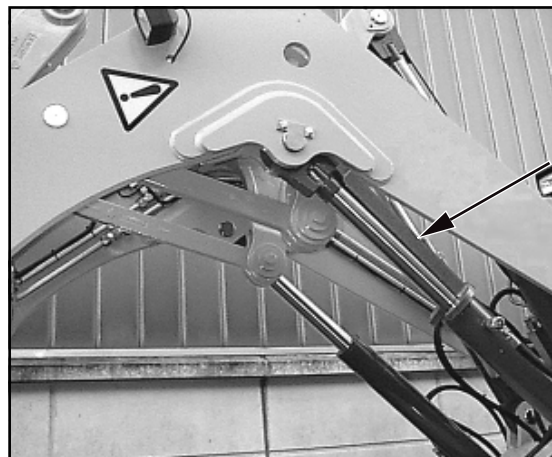


Figure 1-1

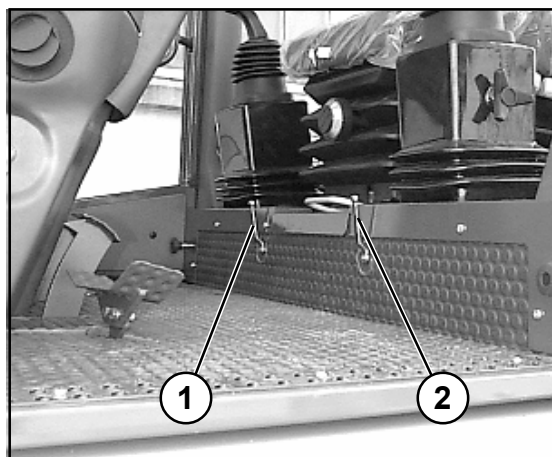


Figure 1-2



Figure 1-3



Figure 1-4

1.5.2.9 Only experienced personnel should be entrusted with the securing of loads!
Loads must be secured so that they cannot slip or fall down.

1.5.2.10 Attached loads may only be moved with the machine when the road is graded.

1.5.2.11 When working with hoisting equipment/elevators the slingers may only work with the approval of the driver and from the side of the boom. The driver may only give his consent if the machine is standing still and the working attachment is not being moved.

1.5.2.12 Persons assisting with the guidance of loads and slingers may only stay in visual or communication reach of the driver.

1.5.2.13 The operator must move the load as close to the ground as possible and avoid to swivel the load.

1.5.2.14 The operator may not move the load over the heads of persons.

1.5.2.15 In the case of erection work having to be carried out above normal human height, suitable safety ascent devices and working platforms must be used. Do not use engine parts as climbing and descending facilities. Use safety harnesses when working at very great heights. All handles, steps, railings, pedestals, platforms, ladders must be kept free from dirt and ice.

1.5.2.16 Clean the machine, especially connections and screw connections before commencement of maintenance work and make sure that the machine is free from oil, fuel oil or dirt. Do not use aggressive detergents. Use lintless cleaning rags!

1.5.2.17 Before cleaning the machine with water or steam jet (high pressure cleaning unit) or with detergent protect all areas where water/ steam/ detergent may penetrate and affect the functions or safety of the machine by a suitable cover or by applying tape. In particular, such parts as engine components, e.g. injection pump, generator governor, starter are very delicate.

1.5.2.18 After cleaning completely remove all protection covering and tape.

1.5.2.19 After cleaning check all pipelines for fuel, engine oil and hydraulic oil for leakages, loose connections, abraded parts and damages. Eliminate defects immediately.

1.5.2.20 Always fasten screw connections after completion of maintenance and repair work.

1.5.2.21 Should it be necessary to dismantle safety devices during mounting, maintenance or repair work, these safety devices must be re-installed and checked carefully after completed maintenance and repair work.

1.5.2.22 Make sure that fuel, accessory material and interchanged parts are safely disposed of with no danger to the environment.

1.5.2.23 The machine should be checked by a specialist before commissioning. In addition, it should be checked after essential modifications before it returns to service.

1.5.2.24 The machine must be checked by a specialist once a year. Furthermore, a specialist must check the machine whenever necessary because of operating conditions.

1.5.2.25 The test results must be recorded and kept in the archives at least until the following control date.

1.6 Instructions regarding special categories of danger

1.6.1 Electrical energy

1.6.1.1 Only use original fuses (mandatory current). Immediately switch off machine in case of breakdown of electrical supply.



1.6.1.2 When working near overhead lines and overhead wires, a safety clearance must be kept between the machine and its working equipment in order to prevent sparking over. The safety clearance depends on the nominal voltage of the overhead/wire line. This also applies to the distance between the lines and to the attachments and slung loads.

The following safety clearance must be observed, to meet the above mentioned requirement:

Nominal voltage		Safety clearance	
(kilovolt)		(meter)	
	up to	1 kV	1,0 m
above 1 kV	up to	110 kV	3,0 m
above 110 kV	up to	220 kV	4,0 m
above 220 kV	up to	380 kV	5,0 m
unknown nominal voltage			5,0 m

When approaching overhead lines all working movements of the machine must be taken into consideration, e.g. the position of jibs, the swinging of ropes and the dimensions of slung loads.

In addition, attention must be paid to any roughness of soil which could cause an inclined position of the machine thus getting it closer to the overhead line. The fact that overhead lines may swing out during windy weather and may reduce the distance must also be taken into consideration.

1.6.1.3 In the case of sparking over any work or movement must stop. Instructions to be followed: bring the machine out of the danger area by lifting or lowering the attachments or by swiveling away or driving the machine out of the area. If this is not possible then the following rules must be observed:

- do not leave the driver's cabin!
- Warn persons standing near the machine not to approach or touch the machine!
- Give immediate instructions to have the power cut off!
- Leave the machine only when it is sure that the electricity in the damaged/contacted power line is switched off so that the line is dead!

1.6.1.4 Work on the electrical system or on the operating system may only be carried out by a skilled electrician or by personnel instructed or supervised by such trained electrician according to electrotechnical regulations.

1.6.1.5 The electrical installation of a machine must be reviewed/inspected at regular intervals. Any defects, e.g. loose connections or scorched cabling, must be eliminated immediately.

1.6.1.6 Always de-energise machine or system parts to be inspected, maintained or repaired by disconnecting the battery main switch.

1.6.1.7 Always disconnect the battery main switch before starting any electrical welding on the machine. Also unplug the connectors for the engine controller (to the left in the engine compartment) and for the traction drive controller (underneath the maintenance flap behind the driver's seat).

1.6.2 Hydraulic systems

1.6.2.1 Only experts may carry out work on the hydraulic system.

1.6.2.2 All pipelines, hoses and screw connections must be checked regularly for leakages and visible damages. Immediately eliminate such defects. Spurring hydraulic oil may cause injuries and fire.

1.6.2.3 Those hydraulic system segments which are to be opened must be made free of pressure before commencement of the repair work according to the assembly group description.

1.6.2.4 The hydraulic pipelines must be correctly laid and connected. Do not get the connections mixed up. The spare parts must be in an accordance with the technical requirements stipulated by the manufacturer. This is, of course, guaranteed when original spare parts are ordered.

1.6.2.5 Never change factory settings for hydraulic components (such as the maximum permissible speed for the axial piston engine). Changing such settings will cause the warranty to become void.

1.6.3 Noise

Sound protection equipment must be in protective position during operation of the machine.

1.6.4 Oil, grease and other chemical substances

1.6.4.1 The relevant safety regulations must be observed when using oil, grease or other chemical substances.

1.6.4.2 Caution when working with hot fuel and other accessory material (danger of burning and scalding).

1.6.4.3 Caution when working with brake fluid and battery acid.

TOXIC AND CAUSTIC!



1.6.4.4 Be careful when working with fuel.

FIRE HAZARD!



- Before refuel, switch off engine and remove ignition key.
- Do not refuel in a closed operating area.
- Never refuel near open fire or sparks.
- Do not smoke during refueling.
- Immediately wipe up spilled fuel.
- Keep machine free of fuel, oil and grease.



1.6.5 Gas, dust, steam, smoke

1.6.5.1 The machine may only be started and run in closed operating areas where there is sufficient ventilation.

The regulations for the respective working site must be strictly observed.

1.6.5.2 Only carry out welding, burning and grinding work on the machine when this is explicitly approved. Otherwise danger of fire and explosion!

1.6.5.3 Before carrying out welding, burning and grinding work clean the machine and its vicinity from combustibles and make sure that the room is adequately ventilated.

Explosion hazard!

1.7 Transport and towing, restart

1.7.1 The machine may only be towed if the brakes and steering function.

1.7.2 Towing may be carried out only by means of an adequately dimensioned towing bar in connection with towing devices.

1.7.3 When towing drive slowly. Persons must not remain near the towing bar.

1.7.4 When the machine is loaded and transported the necessary auxiliary equipment must be fitted to prevent any unintended movement. The tires must be kept clean of mud, snow and ice so that the machine can drive on the ramp without danger of sliding.

1.7.5 Restart the machine strictly observing the regulations of the operating manual.

1.8 Safety information for the contractor or the contractor's authorized personnel

1.8.1 Organizational measures

1.8.1.1 We would like to emphasize that parts and accessories that are not supplied by us are also not tested and approved by us. Installation and/or use of such products can thus negatively affect the constructional qualities of your loader and thereby reduce the active and passive driving stability. The manufacturer cannot be held responsible for damage that results from the use of non-original parts and accessories.

1.8.1.2 Inform about the location/use of fire extinguishers (1-5/arrow) and first-aid kit (on the maintenance plate behind the driver's seat)!

1.8.2 Selection of personnel, qualifications; additional duties

1.8.2.1 Only reliable persons are allowed to work on/with the machine. The minimum legal age must be observed.

1.8.2.2 Only employ trained or instructed personnel. Clearly define the competencies of the personnel regarding operation, installation, maintenance and repair work. Ensure that only authorized personnel may work on/ with the machine.

1.8.2.3 Determine the driver's responsibility regarding traffic regulations. Authorize him to refuse instructions given by third parties when these instructions are detrimental to the safety of the driver and the machine.

1.8.2.4 Personnel that are being trained are permitted to operate the loader only if they are under constant supervision of an experienced person authorized by the employer!



Figure 1-5