Operating Instructions

TEREX

Wheel Loader
TL120

Keep in a safe place for later use!

Place of safe keeping: Behind the driver's seat.

Ausgabe • Edition

2006-10

GÜLTIG AB FZ-ID.NR. • VALID FROM SERIAL NO. • A PARTIR DU NO. DE SERIE

TL01200101 > TL01200279

TEREX GMBH • D-74595 LANGENBURG

Hauptverwaltung/Verkauf Direction générale/Vente Headquarters/Sales	Kundendienst Service après-vente Customer Service	Ersatzteile Pièces de rechange Spare Parts
TEREX GmbH Postfach 61 • D-74595 Langenburg Schaeffstr. 8 • D-74595 Langenburg Phone +49 (0) 79 05 / 58-0 Fax +49 (0) 79 05 / 58-1 14	TEREX GmbH Postfach 12 64 • D-91534 Rothenburg Erlbacher Str. 115 • D-91541 Rothenburg Phone +49 (0) 98 61 / 9 72-4 51 Fax +49 (0) 98 61 / 9 72-4 60	Terex Ersatzteile GmbH Postfach 12 64 • D-91534 Rothenburg Erlbacher Str. 115 • D-91541 Rothenburg Phone +49 (0) 98 61 / 9 72-0 Fax +49 (0) 98 61 / 9 72-4 10

Order number: 5 780 200 343 englisch

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1 Introduction

You decided to buy a TEREX TL120 Wheel Loader.

The confidence you have placed in this model will be rewarded by efficient and economical performance of the machine.

These Operating Instructions contain all information necessary for the correct use of the machine.

This instruction book is intended for use by personnel responsible for operation, maintenance, repair, and supervision of the machine.

This Operating Manual must be read thoroughly and understood before commissioning the machine and is always to be kept within reach at all times.

Please contact your dealer immediately if you need any further explanations or anything is unclear.

Special equipment and attachments are not included in this Operating Manual.

We reserve the right to make improvements on the machine within the scope of impending technical developments, without incurring any obligation to change these Operating Instructions.

Attention

Any modifications of TEREX products and their equipment using extras and work attachments which are not included in our product range require our written approval. If our approval is not sought, our warranty expires, as does our product liability for any resulting consequential damage.

Please always quote the vehicle type and vehicle identification number when making an inquiry and for all correspondence.

Attention

The vehicle identification number of the machine is stamped onto the type plate (1/1).

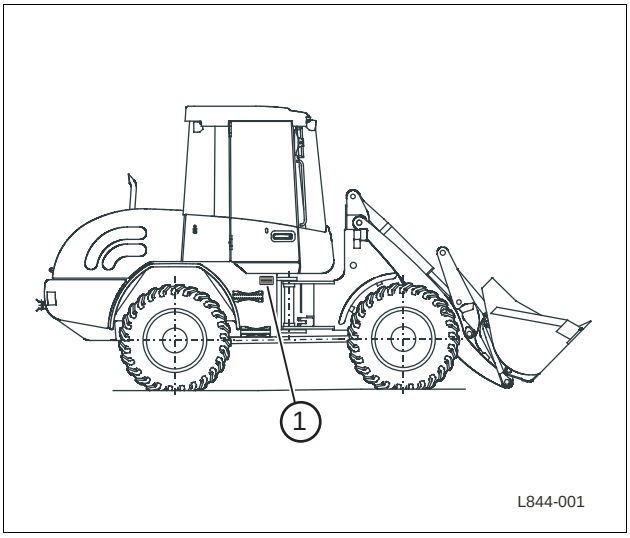


Fig. 1 Type plate

1 Introduction

1.1 Warranty and Maintenance

The warranty period covers 12 months, beginning with the day the machine is handed over or put into operation.

Safe working conditions and good working order of the machine are prerequisites for efficient work. Your TEREX wheel loader fulfils these requirements when correctly handled and when serviced and maintained as specified.

Careful observation of the machine whilst in function and the use of the specified fuels, lubricants, and coolants will prevent malfunction.

Trained specialist personnel are responsible for any servicing of the machine which requires expert knowledge. This means that inspections and repair work must be performed by your dealer's customer service personnel.

In respect of possible claims for damages during the warranty period, all work specified in the maintenance and inspection plan must be carried out at the specified intervals.

After the warranty period, too, regular maintenance must be performed to ensure that the machine is constantly in good working order and enjoys a reasonable service life.

Insist that only original TEREX spare parts are used for all repair work which may arise. In this way, you will have a product of lasting high quality, thereby ensuring that your machine maintains its original condition.

1.2 Copyright

1.3 Notes on using the Operating Manual

Presentation of Figures and Items

(1/1) = Figure 1, Item number 1

Presentation of cross references to Chapters and activities

➔ 1.4, 7 = Chapter/Section 1.4, Page 7

Pictogram "Danger to life"

Danger to life

This indicates a potential danger represented by the machine which, if appropriate precautions are not taken, may result in death.

Pictogram "Danger of injury/machine damage"

Danger of injury/machine damage

This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property/equipment damage.

Pictogram "Attention"

Attention

This symbol is employed for information containing important notes about the correct use and/or how to proceed. Non-compliance may lead to malfunction.

1.4 Regulations concerning environmental protection

Applicable environmental requirements must be observed for all tasks performed on and with the machine.

During installation, repair and maintenance tasks, particular care must be taken that substances that would damage the environment such as:

– lubricating grease and oils

– hydraulic oils

– fuels

– coolants

– cleaners containing solvents

are not allowed to come in contact with the soil or the water system.

These substances must be stored in suitable containers and must be properly transported, collected and disposed of.

If the substances listed above do reach the soil, the leak or outlet must be stopped immediately and the fluid must be cleaned up with a suitable absorbent material. If necessary, the soil involved must be removed. Absorbent materials and removed soil must be disposed of properly. Applicable environmental requirements must be observed.

1.5 Pictograms

The following Table explains the meaning of the pictograms which may be attached to the machine.

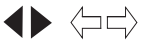
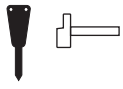
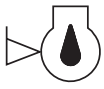
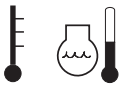
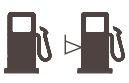
Symbol	Description		Symbol	Description
	Danger to life			Horn
	On machine: Caution, maintain safety distance In Operating Manual: Danger of injury/machine damage			Direction indicator LT/RT
	Attention			Working floodlight
	Battery charge indicator			High-beam indicator
	Preheating			Rotating beacon
	Engine oil pressure			Hazard warning system
	Engine oil temperature			Hydraulic rock breaker
	Engine oil level			Working hydraulics shut-off
	Coolant temperature			Unlocked
	Coolant level			Locked
	Air filter			Float position
	Fuel, fuel level			On machine: Safe distance
	Hydraulic oil Hydraulic oil level			Danger of injury
	Hydraulic oil temperature			Danger of crushing

Table 1 Pictograms on the machine

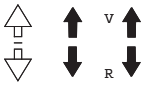
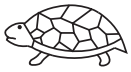
Symbol	Description		Symbol	Description
	Hydraulic oil filter clogging indicator			Observe guidelines given in the Operating Manual
	Fan for heating/ventilation			Grease gun
	Windshield washer and wiper system			Operating mode indicator Operating hours
	Parking brake			Lashing points
	Travel direction FWD/REV			Suspension points for loading by crane
	Travel speed, FAST			First-aid kit
	Travel speed, SLOW			Fire extinguisher

Table 1 Pictograms on the machine

1 Introduction

2 Safety and Accident Prevention

2.1 Declaration of Conformity

CE

Declaration of Conformity

The machine conforms to all basic requirements of the relevant European guidelines.

Conformity has been proven. The corresponding documentation and original of the Declaration of Conformity are kept by the manufacturer.

A copy of the Declaration of Conformity is attached to the sales documentation.

2.2 Introductory remarks

Before putting the earth-moving machine into operation, read these Operating Instructions carefully and strictly observe the indicated references for safe operation.

National safety regulations - e.g. the Accident Prevention Regulations, "Earth-Moving Machinery" (BGR 500, 2.12) and "Vehicles" (BGV D29) in the Federal Republic of Germany - must also be complied with when operating the earth-moving machine.

In addition to the Operating Instructions, legal regulations governing road traffic and accident prevention must also be observed. Such requirements could also apply in respect of handling hazardous goods or the wearing of personal safety gear, for example.

Furthermore, safety laws governing work in particular locations (tunnels, adits, quarries, pontoons, contaminated areas, etc.) must likewise be observed.

2.3 Proper use

The earth-moving machine with standard bucket equipment is intended solely for work which is suitable for the function of the machine and its work implements.

Such work involves loosening, taking up, transporting and dumping soil, rock or other materials as well as loading these materials on trucks, conveyor belts or other means of transport, when the transport of the material is normally done by positioning the earth-moving machine.

The mounting of special work implements such as multi-purpose buckets, side-dump buckets, sweepers, fork lift attachments, etc. allows the machine to perform above mentioned work.

Any usage above and beyond that specified here, e.g. the transport of persons or the usage of the lift equipment as work platform is regarded as improper use. The supplier cannot be held responsible for any damage resulting from improper use. The risk is carried solely by the user.

Compliance with the operating and maintenance instructions, the performance of maintenance work as specified and adherence to replacement intervals all form part of the concept of proper use.

2.4 General safety instructions

- It is important to refrain from any working methods which impair safety.
- The earth-moving machine is only to be used with a cabin or canopy.
- The earth-moving machine is only to be used if it is in a safe and operational condition.
- The manufacturer’s Operating Instructions must be complied with for operation, maintenance, repair, assembly and transportation.
- The plant operator must provide additional special safety instructions, wherever necessary, for specific local conditions.
- The Operating Instructions and any information pertaining to safety must be carefully kept in the driver’s cab.
- The Operating Instructions and safety notes must be complete and fully readable.
- Safety equipment on earth-moving machines must not be deactivated or removed.
- Protective clothing must be worn during operation. Rings, scarves and unbuttoned jacket should be avoided. Protective goggles, protective boots, helmets, gloves, reflecting jackets, ear-muffs, etc. may be required.
- Before commencing work, information must be obtained on first aid and possible means of rescue (emergency ambulance, fire brigade, helicopters).
- A check must be carried out to ensure that the first aid box is at hand and that its contents comply with regulations.
- Personnel must be aware of the location and method of operation of the fire extinguishers on the earth-moving machine as well as on-site fire-warning and fire-fighting equipment.
- Loose parts such as tools or other accessories must be secured to the earth-moving machine.
- Doors, windows, covers, flaps etc. must be closed or secured against slamming shut if in an open condition.

2.5 Operation

Earth-moving machines are only to be independently operated and serviced by persons who:

– are physically and mentally suitable

– have been instructed in the operation or maintenance of earth-moving machines and have demonstrated this ability to the plant operator

– and who can be expected to perform their allocated duties reliably.

All such persons must be of the legal minimum age.

They must be designated by the plant operator to operate or service the earth-moving machine.

Operating equipment and controls are only to be operated from the driver's seat.

The earth-moving machine is only to be ascended and entered using the entrances and surfaces intended for this purpose.

It is the driver’s responsibility to ensure that the operator’s stand, entrances and other surfaces of the earth-moving machine which have to be stepped on are kept free of dirt, grease, oil, ice and snow.

2.6 Danger zone

- No-one is allowed to enter the danger zone of earth-moving machines.
- The danger zone encompasses the area around the earth-moving machine in which persons may be injured by operational movements of the earth-moving machine, its work implements and attachments, or by swinging out or falling loads.
- The machine operator is only to work the earth-moving machine if no-one is in the danger zone.
- The machine operator must give a warning signal to anyone who might be in danger.
- The machine operator must stop work with the earth-moving machine if someone remains in the danger zone despite the warning.
- To ensure no danger of crushing, a sufficient safety distance (min. 0.5 m) must be kept from solid objects, e.g. buildings, excavation slopes, scaffolding, other machines, etc.
- If the above safety distance cannot be maintained, the area between solid objects and the working zone of the earth-moving machine must be blocked off.
- If conditions are such that the machine operator's view of the driving and working zone is restricted, he must be guided or the driving and working zone must be marked by a solid barricade.

2.7 Transport of persons

The transport of persons on the machine is forbidden.

2.8 Stability

- The earth-moving machine must be used, driven and operated in such a manner that its stability against overturning is ensured at all times.
- The machine operator must drive at speeds which are suitable for local conditions.
- The permitted payload of the earth-moving machine must not be exceeded.
- The earth-moving machine must remain at a sufficient distance from the edges of quarries, pits, mounds and slopes to ensure there is no risk of falling. Earth-moving machines must be secured so that they cannot roll or slip when in the vicinity of excavations, shafts, ditches, pits and slopes.

2.9 Driving

Before putting the earth-moving machine into operation, the driver's seat, mirrors and operator's controls must be adjusted so as to ensure safe working.

The safety belt must be fastened.

The windows must be clean and clear of ice.

Driving tracks must be designed so as to ensure smooth, safe operation, i.e. they must be sufficiently wide, on ground which has as few slopes as possible and sufficient carrying capacity.

Downhill tracks must be set out in such a way that earth-moving machines can be safely braked.

Before driving downhill, the appropriate gear must be selected and the gear lever not be moved during downhill travel (road or off-road gear).

On steep drops and uphill gradients, the load must be carried on the uphill side, if possible, to increase stability.

The carrying capacity of bridges, cellar roofs, vaults, etc. must be verified before the earth-moving machine can drive over them.

The internal dimensions of constructions must be observed before entering underground passages, tunnels, etc.

It is the plant operator's responsibility to ensure that equipment such as first-aid box, warning triangle, hazard lights are kept with the machine according to the traffic regulations valid in the user’s country (e.g. in Germany "StVZO") and that the driver has the appropriate license as required by the national traffic laws of the country in question.

Outside areas covered by general traffic regulations, e.g. on factory premises, traffic regulations should be applied in the proper manner. This should also apply with regard to drivers' licenses.

2.10 Operation

Daily before commencing work and after every change of work attachments, the machine operator must check the correct fastening of the work attachments as well as the correct lock of the quick-mount hitch. Work attachments are to be carefully moved at low height. During this check the danger zones of earth-moving machines have to be free of personnel.

The machine operator must only swing the work equipment over occupied driver’s seats, operator consoles and workplaces of other machines if these are protected by canopies (FOPS).

If a cab does not have the required protection, the driver of this vehicle must leave the driver’s stand while the work equipment is being swung overhead.

The vehicles must be loaded in such a manner as to ensure that there is no overloading and no material can be lost as long as the machine is moving. The vehicle must be loaded from the lowest possible height.

At dumping points, earth-moving machines may only be operated if suitable measures have been taken to prevent rolling or falling.

2.11 Guides

Guides must be easily recognizable, for example by means of reflective clothing. They must remain within the machine operator's vision field.

While guiding the machine, guides must not be given other jobs which may distract them from their task.

2.12 Danger of falling objects

Earth-moving machines are only to be used where there is a danger of falling objects if the operator's stand has a canopy (FOPS). A front guard must be employed if there is a risk of materials breaking through into the cab.

In front of walls e.g. of stacked materials, earth-moving machines must be positioned and operated in such a way that the driver’s seat and entry to the driver’s seat are not situated on the side facing the wall.

Demolition work is only to be performed by earth-moving machines where there is no danger to persons and where the machine is equipped with a canopy, cab-mounted front guard and appropriate operating equipment.

See regulations book "Demolition work" (ZH 1/614) published by the Tiefbau-Berufsgenossenschaft (Civil Engineering Employer's Liability Insurance Association).

2.13 Working in the vicinity of underground power lines

Before commencing excavating work using earth-moving machines, it must be determined whether any underground power lines are present in the intended working zone which may present a danger to persons.

If underground power lines are present, their exact position and course must be determined in consultation with the proprietor or operator of the lines, and the necessary safety precautions decided and implemented.

The course of power lines in the work area must be clearly marked, under supervision, before commencing any earth-moving work. If the position of lines cannot be determined, search ditches must be dug - manually, if needed.

If underground power lines are encountered unexpectedly or they or their protective covers are damaged, the machine operator must discontinue work immediately and notify the supervisor.

2.14 Working in the vicinity of overhead power lines

If the earth-moving machine is being used in the vicinity of overhead power lines and trolley wires, a safety distance which varies depending on the nominal voltage of the overhead line must be maintained between the lines and the earth-moving machine and its work equipment, to prevent current overspill. This also applies to the distance between these lines and attached implements or loads.

The safety distances specified below must be complied with.

Nominal voltage in kV	Safety distance in meters
– 1	1.0
> 1 to 110	3.0
> 110 to 220	4.0
> 220 to 380	5.0
unknown nominal voltage	5.0

Table 2 prescribed safety distances

In the observation of safety distances, all working movements of earth-moving machines, e.g. positions of the work equipment and the dimensions of attached loads must be taken into consideration. Uneven ground which would cause the earth-moving machine to be inclined and thus nearer to overhead lines must also be taken into account.

Both overhead lines and operating equipment may swing out in windy conditions, thus reducing the safety distance.

If it is impossible to maintain sufficient distance from overhead power lines and trolley wires, the plant operator must consult with the proprietor or operator of the overhead lines to find other safety precautions to prevent current overspill. Such measures could include

– switching off the power,

– re-routing the overhead line,

– cabling, or

– limiting the operating zone of earth-moving machines

2.15 Operation in closed spaces

If earth-moving machines are to be used in closed rooms, these areas must be sufficiently ventilated and the special regulations be observed.

2.16 Work stoppages

Before rest periods and at the end of the working day, the driver of the earth-moving machine must park the machine on ground which has sufficient carrying capacity and is as level as possible, and must secure it against unintended movement.

Before rest periods and at the end of the working day, the driver must lower the work equipment onto the ground or secure it so that it cannot move.

The driver is not to leave the earth-moving machine if the work equipment has not been lowered to the ground or secured.

Earth-moving machines are only to be parked in places where they do not present an obstacle, e.g. on the construction site or to plant traffic. Warning devices, e.g. triangles, warning cordons, flashing or hazard lights are to be used if necessary.

Before leaving the operator stand, the driver must bring all operating equipment into home position, switch off the working hydraulics and apply the brakes.

If the driver is leaving the earth-moving machine unattended, he must first turn off the engine and ensure that it cannot be started up by unauthorized persons (e.g. removing ignition keys).

2.17 Change of work attachments, maintenance, repair

Earth-moving machines are only to be converted, maintained or serviced under the guidance of a suitable person designated by the plant operator and following the manufacturer's Operating Instructions.

After every change of work attachments, the driver must convince himself that the quick-mount hitch is correctly fastened and locked.

Work on e.g.

– braking,

– steering,

– hydraulic and

– electric systems

of the machine is only to be carried out by expert personnel specially trained in these areas.

Stability must be ensured during all type of work on the machine at all times.

The machine must be suitably secured by chocks so that it cannot roll away whenever work is performed, particularly under the machine.

The work equipment must be secured against movement by lowering it to the ground or equivalent measures, e.g. cylinder supports, trestles. As long as the engine is running, the unprotected working and articulation range must not be entered.

When jacking up earth-moving machines, all jacking devices must be positioned so that they cannot slip. Jacks must be positioned and applied absolutely straight, without tilting.

Raised earth-moving machines must be supported by suitable structures such as crosswise stacks of planks, square timbers or steel trusses.

Earth-moving machines which are raised using operating equipment must be stabilized by a supporting structure immediately after lifting. Work under raised machines which are only supported by their hydraulics is forbidden.

The engine/motor(s) must be turned off prior to all maintenance and repair work. This requirement can only be ignored in the case of maintenance or repair work which cannot be performed without the engine/motor(s) running.

When performing maintenance and repair work on the hydraulic system, it must be relieved of pressure. With the engine turned off, lower the work equipment to the ground and actuate all hydraulic control levers until there is no pressure left in the hydraulic system.

- Before working on the electric system or when performing arc-welding on the machine, the connection to the battery must be disconnected.
- When disconnecting the battery, first the negative pole then the positive pole must be disconnected. The battery must be re-connected in reverse order.
- During repair work around the battery, it must be covered with insulating material. Tools should never be placed on or near the battery.

Protective devices of moving machine parts are only to be opened or removed after the drive has been switched off and cannot be switched on again by unauthorized persons. Protective devices are e.g. engine/motor covers, doors, protective grating, trim.

Upon completion of assembly, maintenance or repair work, all protective devices must once more be attached in the proper manner.

Load-bearing parts of earth-moving machines are only to be welded following consultation with the manufacturer and in accordance with recognized welding principles.

Protective structures (ROPS, FOPS) are not to be welded or drilled in any way.

Before commencing work on the hydraulic system, the operating pressure, pilot pressure, back pressure and pressure inside the tank must be let off.

Swallowing lubricants, or long and repeated skin contact, can be hazardous to health. Used properly, there is no particular danger to health. The safety specification sheets from the oil companies must be observed.

Only the hoses specified by the manufacturer may be used.

Hydraulic hoses must be routed and assembled by expert personnel.

Smoking and naked flames are prohibited in the vicinity of fuel or batteries.

2.18 Recovery, loading and transportation

Earth-moving machines are only to be recovered if adequate towing vehicles are used.

The tow fixing points specified by the manufacturer must be used.

For loading and transportation, earth-moving machines and all necessary auxiliary equipment must be secured against unwanted movement.

The traveling gear and crawler unit of earth-moving machines must be sufficiently cleaned of mud, snow and ice to ensure that ramps can be driven up without risk of slipping.

When transporting the earth-moving machine on trucks, flatbed trailers, or by rail, it must be sufficiently secured with chocks and by attachment to the lashing points.

Before setting off, the route to be taken must be examined to determine whether the roads are wide enough, entrances and passages under bridges are large enough and that roads and bridges have sufficient carrying capacity.

2.19 Monitoring and inspections

The machine must be submitted to a general inspection according to the existing Accident Prevention Regulations valid in the user's country. This inspection must be carried out by an expert (e.g. machine engineer or machine foreman):

– before the machine is put into operation for the first time and before the machine is again put into operation after significant modifications have been made

– at least once a year

– in the meantime, according to operating conditions and local environments

The results of this inspection have to be recorded in writing and this record kept until the next inspection takes place.

Prior to every work shift, the machine operator must check the earth-moving machine according to the inspection and maintenance plan.

Hydraulic hoses must be replaced as soon as the following damage is recognized:

– damage to the outer layer which reaches the intermediate layer,

– embrittled patches on the outer layer,

– deformations when under pressure or without pressure which differ from the original shape of the installed hose,

– leaks,

– damage to hose fittings or to the connection between the fitting and the hose.

The coolant level should only be checked after the engine has cooled down; the cap must be turned carefully in order to let off excess pressure.

Prior to operations, the machine operator must check the function of the safety devices.

The machine operator must advise the supervisor immediately - and his replacement, if there is a change of operator - with regard to any shortcomings.

In the event of shortcomings which jeopardize the operating safety of the earth-moving machine, it is not to be used until these have been eliminated.

2.20 Fire protection

- Switch off the engine when filling the fuel tank and take special care as long as the engine is hot.
- Never smoke or handle open flames whilst refueling the tank of the machine.

The fire extinguisher must be kept in the cab.

The fire extinguisher symbol must be attached.

2.21 Emergency exit

The right-hand cab door acts as an emergency exit.

2.22 Notes concerning residual dangers

Failure of hydraulic system

If the hydraulic system fails because the diesel engine is not running, the hydraulic pump is damaged or hydraulic oil has been lost, only the following emergency functions can still be performed:

– manual steering (without servo assistance) and

– lower work equipment (only if ignition is switched on)

3 Technical Specifications

3.1 Views

3.1.1 Dimensioned drawing with general-purpose bucket

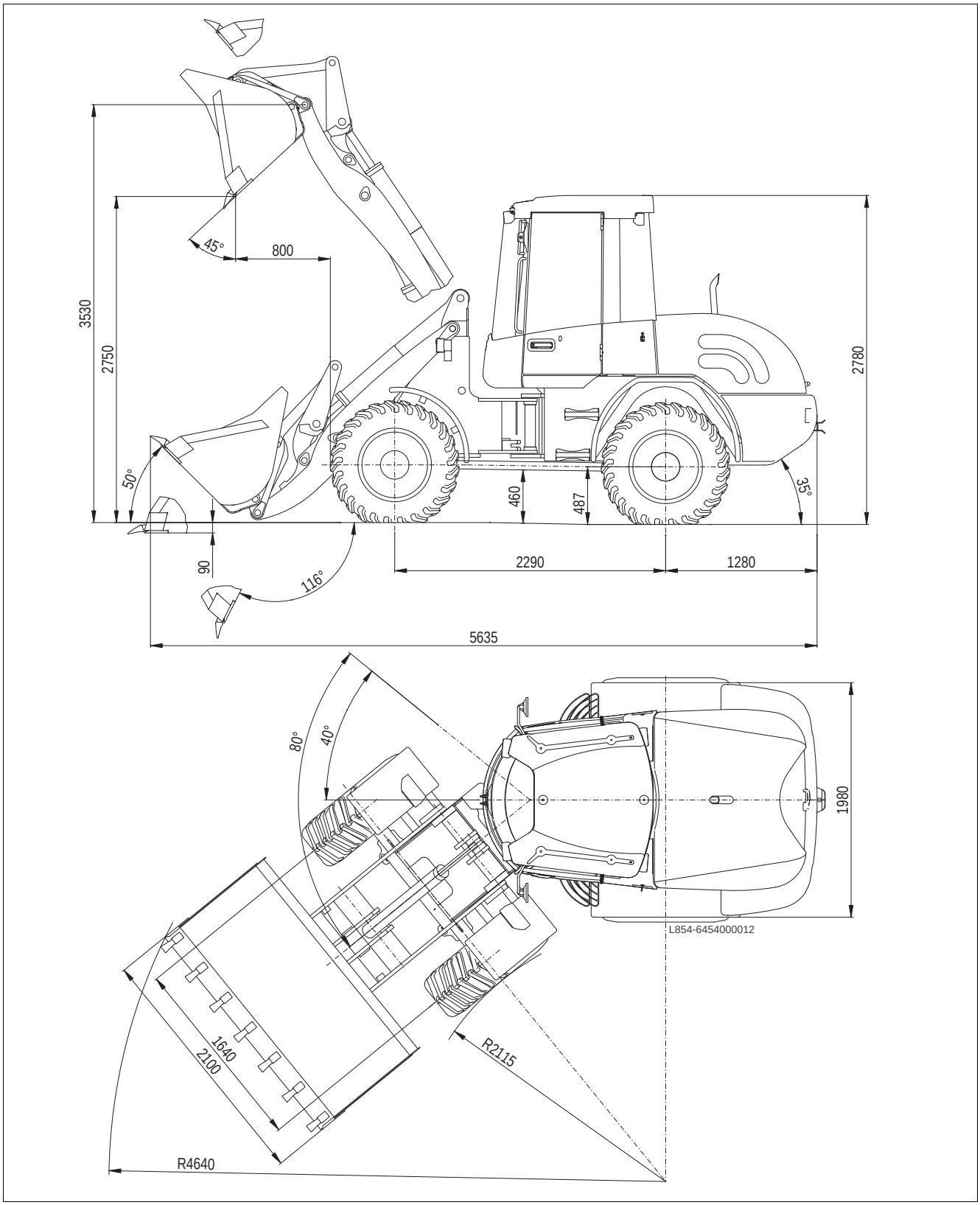


Fig. 2 Dimensioned drawing with general-purpose bucket and 405/70 R 20 tires

3.1.2 Dimensioned drawing with multi-purpose bucket

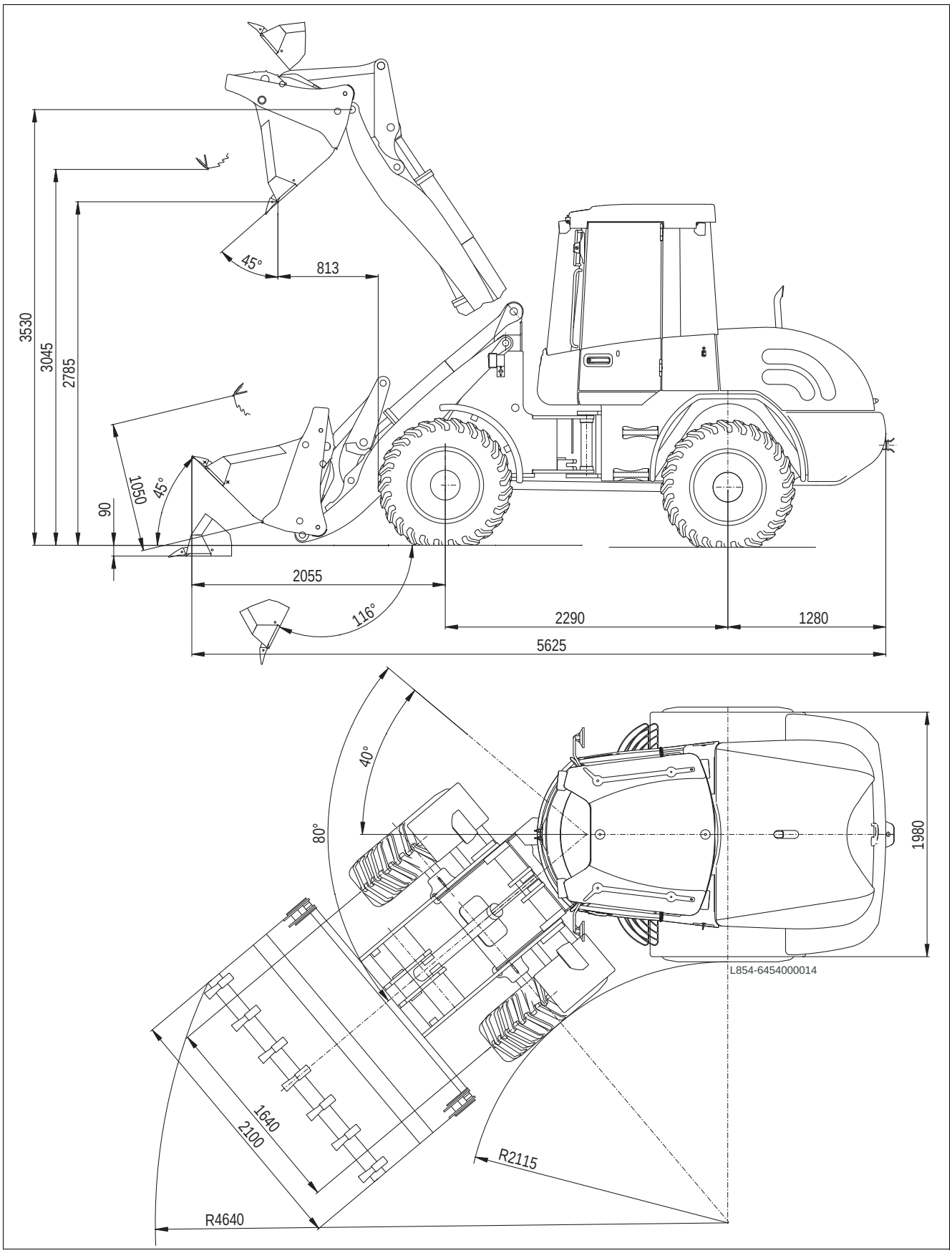


Fig. 3 Dimensioned drawing with multi-purpose bucket and 405/70 R 20 tires

3.1.3 Dimensioned drawing with fork lift attachment

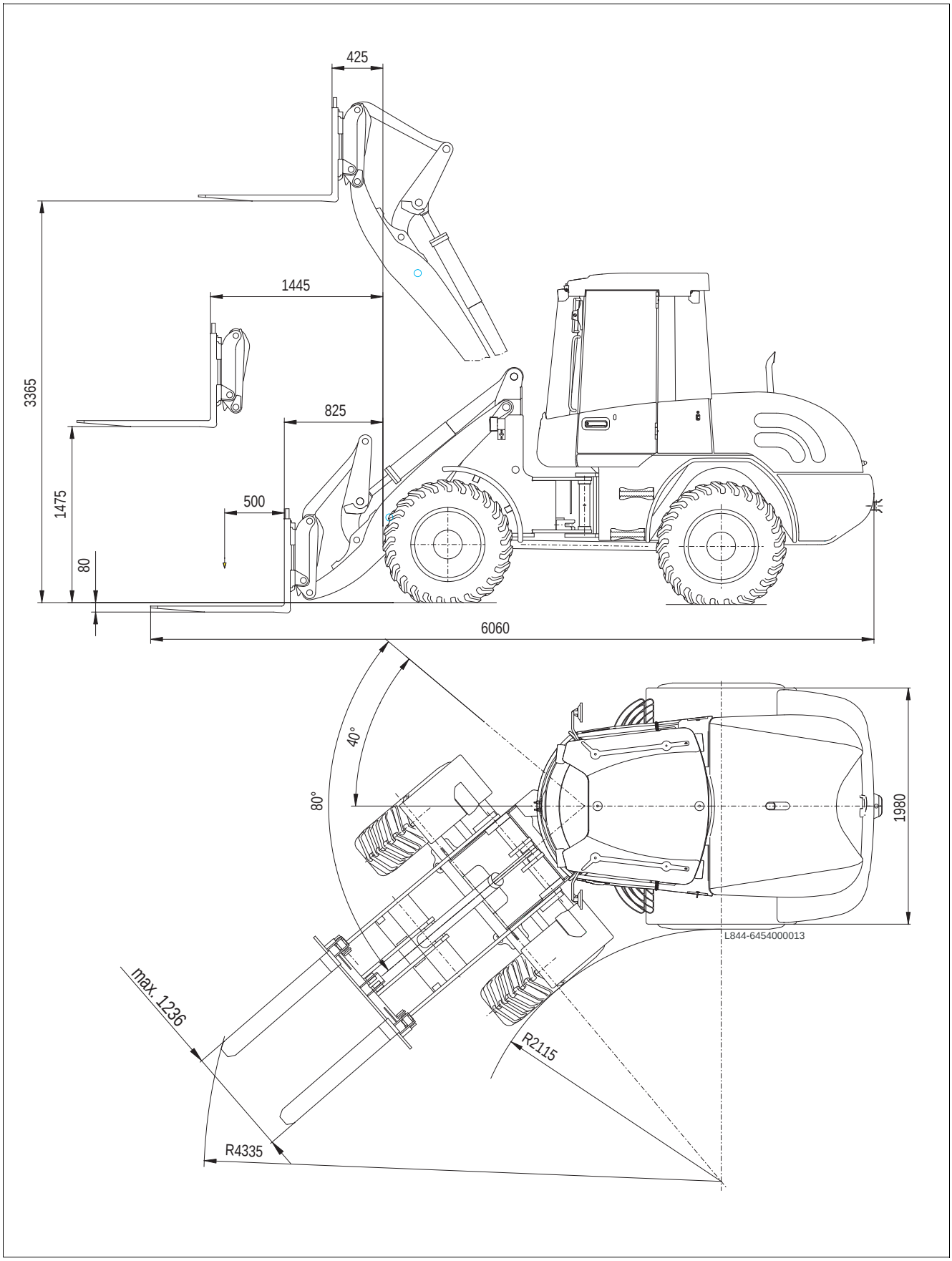


Fig. 4 Dimensioned drawing with fork lift attachment and 405/70 R 20 tires

3.2 Engine

Engine	
Manufacturer	Perkins
Type	1104C-44 four-stroke diesel engine
Design	4-cylinder in-line engine 4-stroke diesel engine with direct fuel injection, exhaust-gas optimized (EPA TIER 2)
Displacement	4400 cm^3
Power output according to DIN 70020	61.5 kW at 2200 rpm
Max. torque	302 Nm / 1400 rpm
Specific fuel consumption at nominal engine speed	211 g/kWh
Cooling	Water-antifreeze mixture for all-year operation
Heating	Fresh air with heat exchanger connected to coolant circuit
Max. inclined position	30° in all directions
Engine lubricating-oil supply	Observe the overturning limit angle of the machine!

Table 3 Technical specifications - engine

3.3 Electrical system

Electrical system	
Operating voltage	12 V
Battery	12 V – 105 Ah / 760 A (EN) / 450 A (DIN)
Alternator	14 V – 75 A
Starter	3.0 kW
Cold-starting aid	1 glow element per cylinder
Lighting system	in compliance with German Road Traffic Regulations (StVZO) with Halogen H 4 headlamps 2 front working floodlights

Table 4 Technical data - electrical system

3.4 Travel drive

Travel drive				
Travel drive	Variable displacement pump, flange-mounted directly onto diesel engine, two-stage variable displacement motor with power shift on rear axle reduction gear. High-speed version featuring rear axle manual transmission shiftable in standstill position. Suction return filter in the form of a tank insert filter.			
Driving speed	Forward - Reverse			
		TL120	**TL120S**	
			Travel range I	Travel range II
	Travel range "Work"	0 – 6.0 km/hour	0 – 6.0 km/hour	0 – 19 km/hour
	Travel range "Road"	0 – 20 km/hour	0 – 11 km/hour	0 – 36 km/hour
Power transmission	Hydrostatic travel drive with advanced driving automatics. Automatic adjustment of propulsive force and speed. Continuous speed regulation forward and in reverse. Four-wheel drive via propeller shaft connection.			
Max. operating pressure - driving	440 bar			

Table 5 Technical specifications - travel drive

3.5 Brakes

Brakes	
Service brake (standard)	Hydraulically actuated center-mounted drum brake, acting on all four wheels via four-wheel drive.
Service brake (high-speed version)	Hydraulically actuated center-mounted drum brake, acting on all four wheels via four-wheel drive, and inboard-mounted disc brake on rear axle.
Parking brake	Mechanically actuated center-mounted drum brake on front axle.
Additional brake	Hydrostatic through closed-circuit travel drive.

Table 6 Technical specifications - brakes

3.6 Hydraulic system

Hydraulic system	
Hydraulic pump	Gear pump on throughdrive of variable displacement pump Max. pump capacity: 76 l/min Operating pressure, steering: 175 bar Operating pressure, loading: 250 bar
Priority valve	Priority supply of hydraulic oil to steering through load-sensing system, ensuring that all the available oil can be provided if necessary. Rapid steering movements even at low engine revs.
Steering	Fully hydraulic, proportionally acting articulated steering. Two double-acting steering cylinders.
Total steering angle	80°
Loader installation	Double-acting work cylinders, one lift cylinder and one tilt cylinder. Control valve with 3 control circuits. Electro-hydraulically operated float position for "Lower" work function. Single, four-way control lever (joystick) with integrated direction-of-travel switch, float position switch and switch for additional control circuit.
Auxiliary control circuit	Max. oil flow 76 l/min Max. operating pressure 230 bar
Hydraulic oil cooler	Thermostatically controlled

Table 7 Technical specifications - hydraulic system

3.7 Axles

Axles	
Front axle	Rigidly mounted planetary drive axle with self-locking differential and integrated center-mounted drum brake.
Rear axle (standard)	Oscillating planetary drive axle with self-locking differential and integrated reduction gear.
Rear axle (high-speed version)	Oscillating planetary drive axle with self-locking differential and integrated 2-stage reduction gear.
Rear axle oscillating angle	± 12°

Table 8 Technical specifications - axles

3.8 Tires

Tire size	Type	Profile	Tire pressure in bar front	Tire pressure in bar rear
405/70	R 20	EM 01	3.2	3.0
425/75	R 20	XM 27 TL	2.0	1.5
14.5-20	MPT 10 PR	E 91	3.2	2.0
16/70-20	EM 10 PR	E 91-2	3.2	2.4
365/80	R 20 EM		4.0	3.2
375/75	R 20 XM	27 TL Michelin	3.2	2.4

Table 9 Technical specifications - tires

Special tires available on request!

If solid-rubber or foamed tires are used, special measures must be taken and restrictions apply.

Attention

The tire pressure refers to standard equipment. During fork lift operations, the tire pressure of the front wheels must be increased by at least 0.5 bar.

3.9 Fuels, lubricants and coolants

3.9.1 Fluid capacities

All values stated are approximate. The level marking is always the decisive factor.

Fluid capacities	in liters (l)	Fuels and lubricants
Fuel tank	110.0	Diesel fuel
Engine with oil filter	8.5	Engine oil (change quantity)
Hydraulic oil, tank and system	93.0*	Hydraulic oil
Hydraulic oil tank	62.0	Hydraulic oil (oil change quantity)
Service brake	0.25	ATF-oil
Front axle center housing	7.8	Transmission oil
Rear axle center housing and transmission (standard)	8.4	Transmission oil
Rear axle center housing and transmission (high-speed version)	9.3	Transmission oil
Wheel hubs, front / rear axle	0.85 each	Transmission oil
Coolant	17.5	Mixture of water, additives and glycol

Table 10 Fluid capacities

** The hydraulic oil quantity depends on the equipment level of the machine.*

3.9.2 Fuel, lubricant and coolant specifications

Use	Code designation according to Bi [1]	Prescribed fuels, lubricants and coolants for Central Europe Designation	Specification, standards, Quality	Remarks
Engine	–	Diesel fuel	EN 590 ASTM D975 1-D / 2-D	***Attention*** *Before using RME fuels (rape oil methyl ester), it is essential to consult your responsible TEREX dealer for further details.*
Engine	EO 1540 A	Engine oil	SAE 15W-40 API CF4 ACEA E3 or E2	See also engine manufacturer's Operating Manual.
Hydraulic system	HYD 1040	Hydraulic oil or multi-grade engine oil	HVLP 46 or SAE 10W-40	The following viscosity limit values must be observed (according to ASTM 445): at 100°C min. 8 mm^2/s (cSt) at –10 °C approx. 1500 mm^2/s (cSt)
	BIO-E-HYD-HEES	Biodegradable hydraulic oil on a synthetic ester base	Filling according to customer specifications. Brand label on the machine. ***Machine damage*** *caused by non-mixable bio oils.* • *Do not mix bio oils from different manufacturers.*	The same viscosity specifications apply as for mineral hydraulic oils. ***Attention*** *When changing from mineral to biodegradable hydraulic oils, the tank and the hydraulic system must be completely drained, cleaned and flushed.* *For further details before changing oils, please consult your responsible TEREX dealer.*
Axles Wheel hubs	GO 90 LS	Transmission oil	SAE 85W-90LS API-GL 5	Alternative recommendations SAE 90LS SAE 80W-90LS
Lubricating points	MPG-A	Multi-purpose, lithium-soap based grease	K2K-30 DIN 51825	
Brake	ATF	Brake oil	ATF Type A Suffix A Dexron-IID	
Cooler		Mixture of water, additives and glycol	***Machine damage*** *due to incorrect coolant and mix proportions.* *Observe the information on the cooling system given in the engine manufacturer's Operating and Maintenance Manual.*	The antifreeze is factory-set to approx. -25 °C.

Table 11 Specification of fuels, lubricants and coolants

[1] *In conformity with the regulation lubricants of the Main Association of the German Building Industry e.V.*

Alternative recommendation for other temperature ranges

Engine oil

In compliance with API CG 4 or CH 4 and in compliance with ACEA E3 or E5

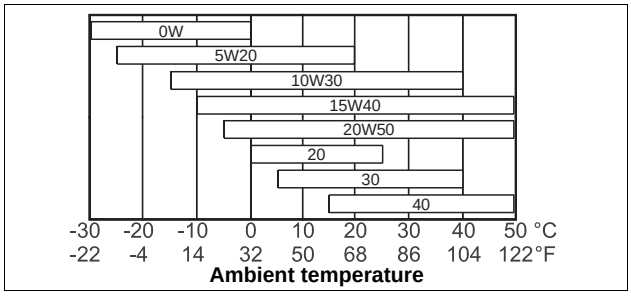


Fig. 5 Recommended viscosity classes applying to engine oil

Hydraulic oil

In compliance with DIN 51524.T3 HVLP

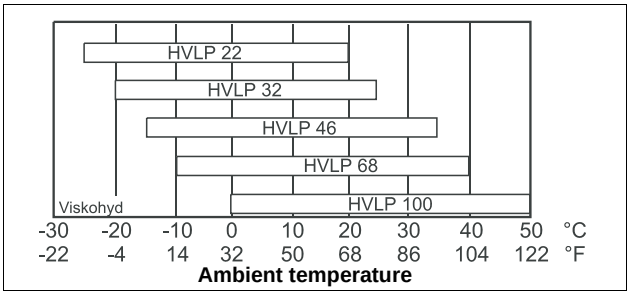


Fig. 6 Recommended viscosity classes applying to hydraulic oil

3.10 Permissible loads in compliance with German Road Traffic Regulations (StVZO)

Permissible loads in compliance with German Road Traffic Regulations (StVZO)	
Permissible total weight	see type label, and / or General Certification
Permissible axle load, front	
Permissible axle load, rear	

Table 12 Permissible loads in compliance with German Road Traffic Regulations (StVZO)

3.11 Sound level values, vibration

Sound level values		
Guaranteed sound power level:		L_{WA} = 102 dB (A)
Sound pressure level (at driver's ear):		L_{PA} = 76 dB (A)

Table 13 Sound level values in compliance with directive 2000/14/EC and EN 474

Vibration values		
Effective values of acceleration **below**	0.5 m/s^2	for entire body
and	2.5 m/s^2	for upper limbs

Table 14 Vibration values in compliance with directive 98/37/EEC and EN 474

3.12 Dimensions and weights

Dimensions and weights	
Operating weight, standard equipment[1]	approx. 6800 kg
Total length, standard bucket on ground	5635 mm
Total width	2100 mm
Total height (cab roof)	2780 mm
Wheel base	2290 mm
Tire tread with, FR / RR	1640 mm
Rear overhang angle	35°
Ground clearance below propeller shaft	460 mm
Turning radius at outside edge of bucket in transport position	4640 mm
Turning radius at inside edge of tires	2115 mm

Table 15 Dimensions and weights - Specifications refer to general-purpose bucket and 405/70 R 20 tires

1 In compliance with ISO 6016

Front loader installation	
Width of bucket	2100 mm
Capacity to DIN/ISO 7546 (max. density = 1.8 t/m^3)	approx. 1.2 m³
Payload in bucket	2160 kg
Dump height at 45° dump angle	approx. 2750 mm
Dump reach at max. dump height	approx. 800 mm
Max. bucket hinge pin height	approx. 3530 mm
Tilt-back angle	50°
Dump angle at max. dump height	45°
Digging depth, horizontal bucket	approx. 90 mm
Lift capacity at ground level[1]	approx. 71000 N
Ripping force at cutting edge of bucket[1]	approx. 59000 N
Tipping load, straight[1]	approx. 4900 kg
Tipping load, articulated[1]	approx. 4330 kg
Work cycle times, "Lift"	5.8 sec.
"Lower"	3.7 sec.
Dumping in uppermost position "In"	1.3 sec.
"Out"	1.5 sec.

Table 16 Dimensions and weights - Specifications refer to general-purpose bucket and 405/70 R 20 tires - Stability conforms to DIN 24094

1 In compliance with ISO 8313

Bucket	Width mm	Capacity, heaped m^3	Max. density (γ) t/m^3
General-purpose bucket	2100	1.2	1.8
Multi-purpose bucket	2100	1.05	1.6
Earth bucket	2100	1.35	1.6
Light-material bucket	2100	1.55	1.2
Super light-material bucket	2200	1.8	0.8
Side-dump bucket	2100	0.85	1.8
High-tip bucket	2100	1.2	1.2
High-tip bucket	2200	1.8	0.6
Compost bucket	2100	1.2	1.2

Table 17 Bucket dimensions

3 Technical Specifications

Fork lift attachment	mm
Width of fork carrier	1240
Length of forks	1120
Fork cross section	140 x 50
Max. stacking height	3365

Table 18 Dimensions of fork-arm connection in compliance with ISO/FEM Class 2 Form B, DIN 15 173 / ISO 2328 respectively

The payloads are determined in compliance with DIN 24094 / ISO 8313 respectively with a stability factor of 1.25 or 80% of the tipping load and the machine moving over level ground.

The payloads are valid for the machine fitted with 405/70 R 20 tires and the equipment condition as described in compliance with ISO 6016.

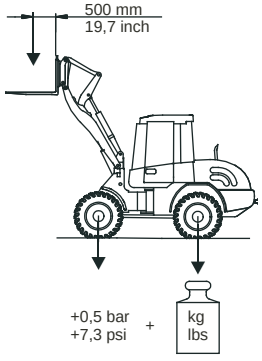
Total lift range				
			S=2.0	S=1.25
		kg	1680	2700
		lbs	3710	5950
	kg lbs	kg	1870	3000
	kg lbs	lbs	4120	6600

Table 19 Total lift range of fork attachment

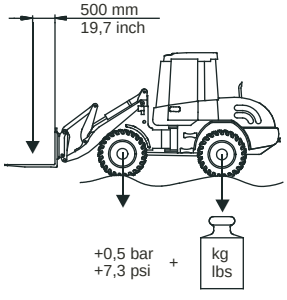
Transport position				
			S=1.67	S=1.25
		kg	2470	3300
		lbs	5440	7270
	kg lbs	kg	2610	3500
	kg lbs	lbs	5760	7700

Table 20 Transport position of fork lift attachment

kg lbs

If screw-on rear axle weights or rear tires with hydroinflation are used.

Attention

During fork lift operations, the tire pressure of the front wheels must be increased by at least 0.5 bar.

3.13 Optional accessories

– Orthopedic air-cushioned driver’s seat
– Fire extinguisher
– Height and tilt-adjustable steering wheel
– Pressurized cab
– Air-conditioning
– Engine-independent diesel heater with timer
– Diverse electrical accessories such as working floodlights, rotating beacon, radio, etc.
– FOPS-roof guard
– Sliding window, right-hand door
– Diesel exhaust cleaner
– Catalytic converter
– High-speed version

– Ride control system (LSD)
– Anti-theft device
– Back-up alarm system
– Electric refueling pump
– Quick-attach system, hydraulically operated
– Snow blade
– Sweeper
– Load hook for attaching to forks
– Rear axle weights
– Outlet for hydraulic hand hammer
– Filling with biodegradable hydraulic oil (ester-based "BIO-E-HYD-HEES")

Further optional equipment available on request!

Machine damage

due to unauthorized alterations to the design, additional equipment and work tools of TEREX products.

- *Please note that any modification requires the written approval from the manufacturer. If our approval is not sought, our warranty expires, as does our product liability for any resulting consequential damage.*

3 Technical Specifications

4 Operation

4.1 Initial familiarization

Danger to life

due to unintentional operation of controls.

- *The machine must be entered from the left-hand side as seen in the direction of travel.*

The right-hand cab door acts as an emergency exit.

If the cab is entered by the right-hand door, the joystick may be operated unintentionally.

- If you are not familiar with the controls and indicators of this machine, read this Chapter thoroughly before operating the machine.

All the functions are described in this Chapter.

- Before driving and operating this machine, you must memorize the controls and indicators well.
- Prior to any initial start-up, the machine must be subjected to a thorough visual inspection. During this inspection, pay special attention to damage, loose or missing screws and bolts, accumulation of oil and oil or fuel leaks. Problems must be eliminated immediately. If the operational safety of the machine is endangered, the machine must not be taken into operation until the problems have been eliminated.
- Every time the machine is taken into operation, the inspections described in Chapter ➔ 7.8, 72 must be performed.

4.2 Display elements and operator controls

Attention

The following list includes non-standard equipment!

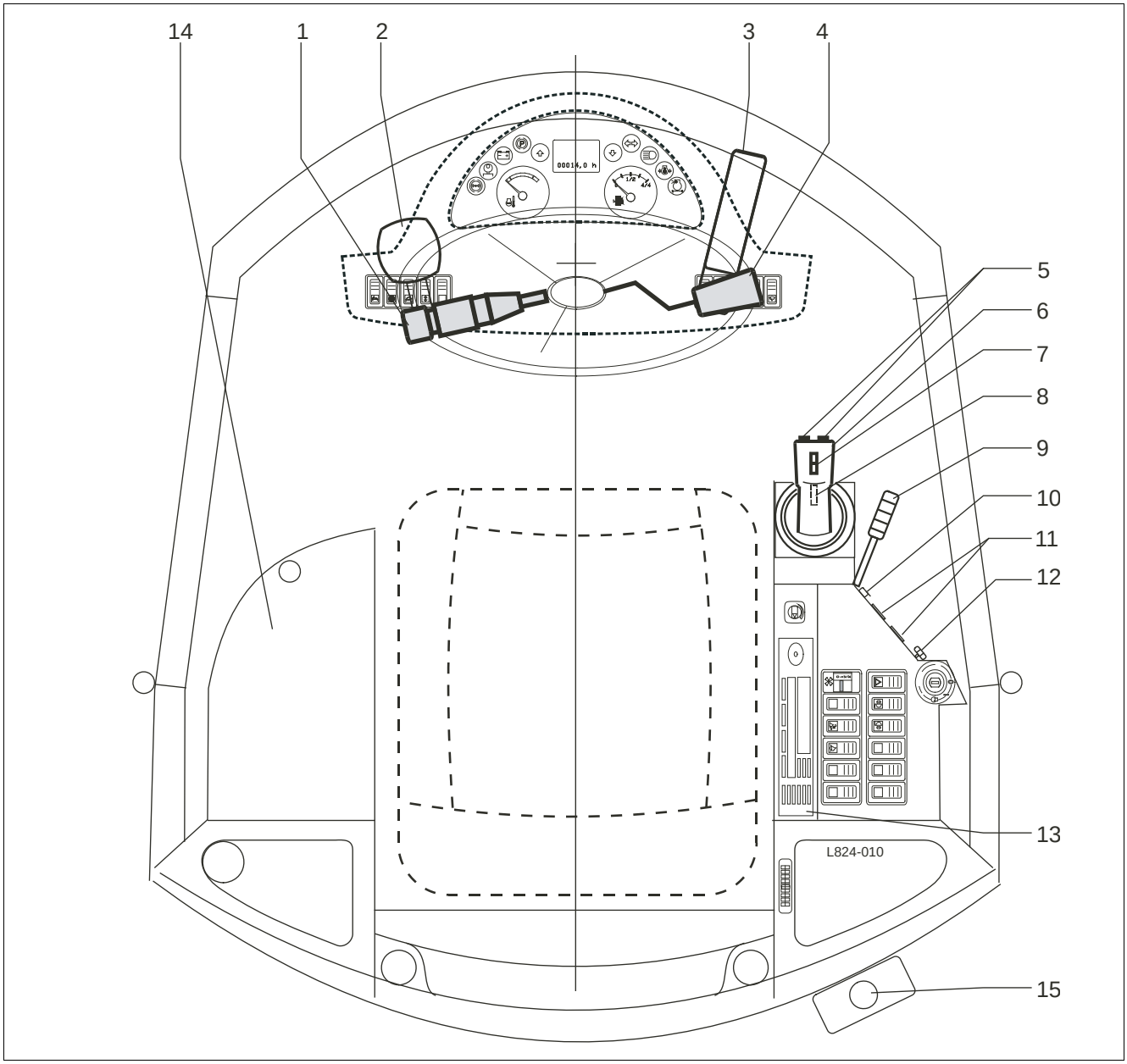


Fig. 7 Operator controls

Legend **Fig. 7**

1 *Direction indicator, horn, low/-high beam (steering-column switch)*

2 *Brake-inching pedal*

3 *Accelerator pedal*

4 *Tilt adjustment of steering wheel (option: height adjustment)*

5 *Operation - additional control circuit*

6 *Control lever - loader installation*

7 *Travel direction preselection (without function if working hydraulics are disabled)*

8 *Impulse mode - float position*

9 *Parking brake*

10 *Power socket*

11 *Fuse carrier*

12 *Fresh air - recirculating air*

13 *Radio*

14 *Control rod for mechanical quick-attach device*

15 *Washer fluid tank*

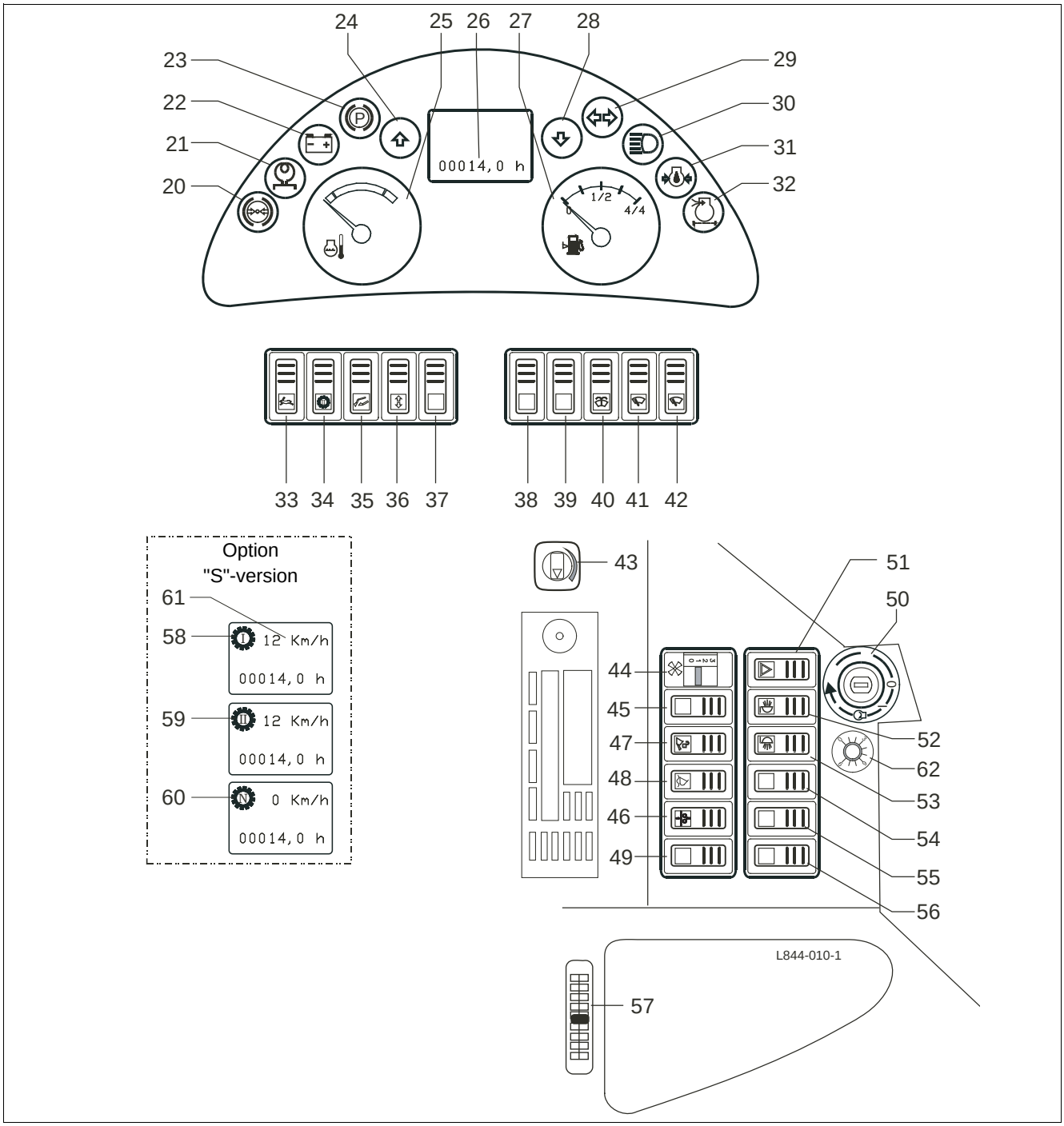


Fig. 8 Instrument panel

Legend **Fig. 8**

20 *Not assigned*

21 *ORANGE - pre-heating monitor*

22 *RED - battery charge indicator*

23 *RED - parking brake*

24 *GREEN - travel direction, forward*

25 *Coolant temperature*

26 *Operating hour meter*

27 *Fuel-level indicator*

28 *GREEN - travel direction, reverse*

29 *GREEN - direction indicator*

30 *BLUE - high beam*

31 *RED - engine oil pressure*

32 *RED - air filter indicator*

33 *Travel speed - FAST - SLOW*

34 *High-gear changeover switch*

Attention

Only press if machine is at standstill!

35 *Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel preselection switches from Pos. 7 auf Pos. 36*

Machine damage

due to incorrect operation.

Only press if machine is at standstill!

36 *Preselection of travel direction - Function only active if working hydraulics are disabled*

37 *Not assigned**

38 *Not assigned**

39 *Not assigned**

40 *Windshield washer function front/rear*

41 *Windshield wiper, front*

42 *Windshield wiper, rear*

43 *Switch for air-conditioning and temperature control*

44 *Fan switch - heating*

45 *Not assigned**

46 *Option - Preselection switch - Ride Control System*

47 *Preselection switch - operation of additional control circuit (Pos. 5)*

48 *Preselection switch - float position - OFF/Impulse/Continuous operation*

49 *Not assigned**

50 *Glow plug and starter switch*

51 *Hazard warning switch*

52 *Working floodlight, front*

53 *Working floodlight, rear*

54 *Not assigned**

55 *Not assigned**

56 *Option - 4th control circuit*

57 *Heater control*

58 *Monitor - indicator "manual transmission range I"*

59 *Monitor - indicator "manual transmission range II"*

60 *Monitor - indicator "manual transmission not ready for operation"*

Attention

If this symbol comes up, the manual transmission is in an intermediate position. The machine is not ready for operation! This can be remedied by performing brief steering movements until the manual transmission engages.

61 *Speed indicator*

62 *Option - flow setting for 4th control circuit, e.g. rotating speed of sweeper*

* for non-standard equipment

4.3 Engine

4.3.1 Starting

Attention

Each time before putting the machine into operation, the inspections according to (➔ 7.8, 72) must be carried out.

Danger to life

due to presence in the danger zone.

- *Always ensure that no-one is in the danger zone of the machine before switching on the engine.*

- All gearshift levers to neutral.
- Parking brake (9/9) applied, direction-of-travel preselectors (9/7; 9/36) in position "0".
- Insert ignition key in glow plug and starter switch (9/50).

Hot start

- Switch on ignition and wait for approx. 5 sec.

Attention

The display establishes the internal readiness for operation. As a result, all indicator lamps are briefly activated for a functional check.

- The indicator lamps (9/22, 9/31) light up.
- Press the accelerator pedal (9/3) completely down for normal start and to the quarter-open position for hot start.
- After the indicator lamp (9/21) has gone out, turn the glow plug and starter switch to "START". As soon as the engine is running, turn the ignition key to "1" and decrease the revs to low idle speed. The indicator lamps should go out.
- If the engine has not started after max. 20 seconds, turn the ignition key to "1" or "0", and pause for at least 1 minute before trying again. Repeat the start-up procedure.

Engine damage

Avoid damaging the engine by:

- *not driving the engine at full throttle straight away.*
- *driving with restraint until the engine has reached its operating temperature.*

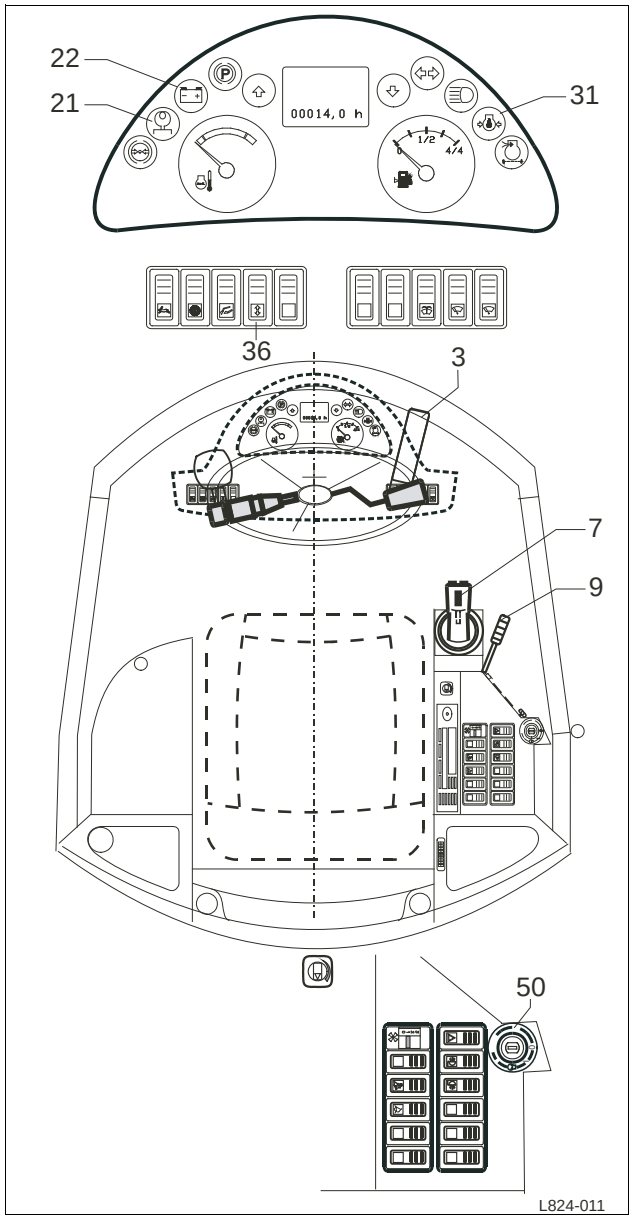


Fig. 9 Starting the engine

4.3.2 Monitoring the machine during operation

Engine damage

due to fault which has not been remedied.

- *The fault must be remedied before starting the engine and operating the machine.*

- If the battery charge indicator lamp (10/22) or the engine oil pressure indicator lamp (10/31) lights up, switch off the engine immediately and determine the cause, or call for service personnel.
- If the permitted coolant temperature (10/25) is exceeded, stop work, open the engine hood and keep the engine running at low idle to allow it to cool down.
- Once the engine has cooled down, turn it off and determine the cause of overheating, or call for service personnel.
- If the air filter service indicator lamp (10/32) lights up, perform the necessary air filter maintenance.

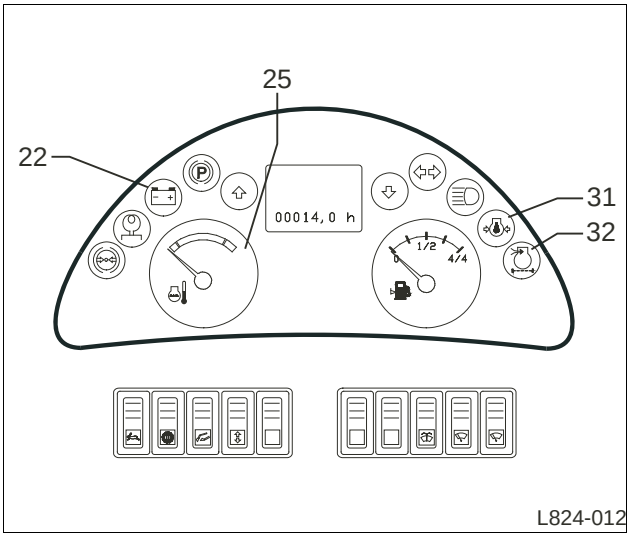


Fig. 10 Monitoring and switching off the engine

4.3.3 Switching off the engine

Attention

Do not switch off the engine when running at full throttle, but allow it to run for a short time without load at low idle-running speed.

- Turn the ignition key to "0".
- The engine stops automatically.

4.4 Driver's seat / Steering wheel tilt adjustment

The comfort seat is spring-mounted with oil-pressure operated shock absorbers and lap belt.

The seat meets international quality and safety standards in compliance with ISO 7096 and ISO 6683 (Fig. 11).

1 Horizontal adjustment

2 Weight adjustment

3 Seat back adjustment

4 Armrest (option)

5 Vertical adjustment

- Raising seat:
  Raise seat until it clicks audibly into place.
- Lowering seat:
  Raise seat as far as the stop; the seat then sinks to its lowest position.

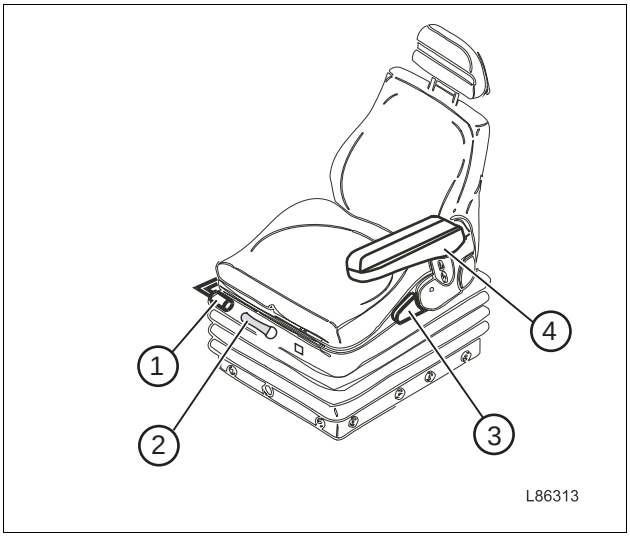


Fig. 11 Driver's seat

Tilt adjustment of steering wheel

- Push down lever (12/4).
- Adjust steering-wheel tilt.
- Release lever.

Height adjustment of steering wheel (option)

- Push up lever (12/4).
- Adjust steering-wheel height.
- Release lever.

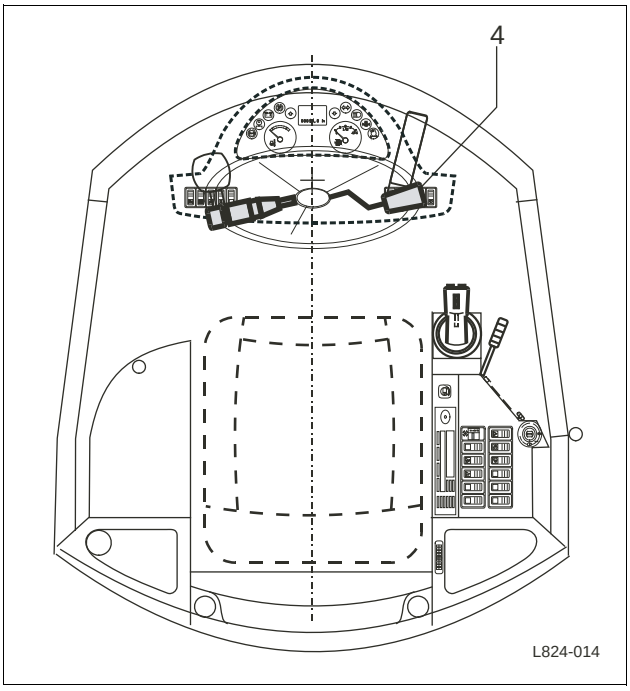


Fig. 12 Tilt and height adjustment of steering wheel

4.5 Heating/ventilation

Heating

- The heater is connected to the engine oil circuit.
- The fan is operated using the switch (13/44); temperature is adjusted using the control (13/57) and can be operated with fresh air and re-circulating air.
- Open aspirating hole (13/12) for re-circulating air mode.
- The air is distributed by adjusting the air vents.

Ventilation

- In ventilation mode, the valve towards the engine coolant circuit remains closed.
- The fan is operated using the switch (13/44).
- The air is distributed by adjusting the air vents.

Air-conditioning (option)

- Operate the air-conditioning system using the switch (13/43).

4.6 Lighting in compliance with German Road Traffic Regulations (StVZO)

- The lighting of the loader is switched on and off by turning the steering-column switch (13/1).

Setting 0	Light OFF
Setting 1	Parking light
Setting 2	Driving light (low beam / high beam). Switch from one to another by lifting the steering-column switch (13/1). Blue indicator lamp for high-beam (13/30) lights up.

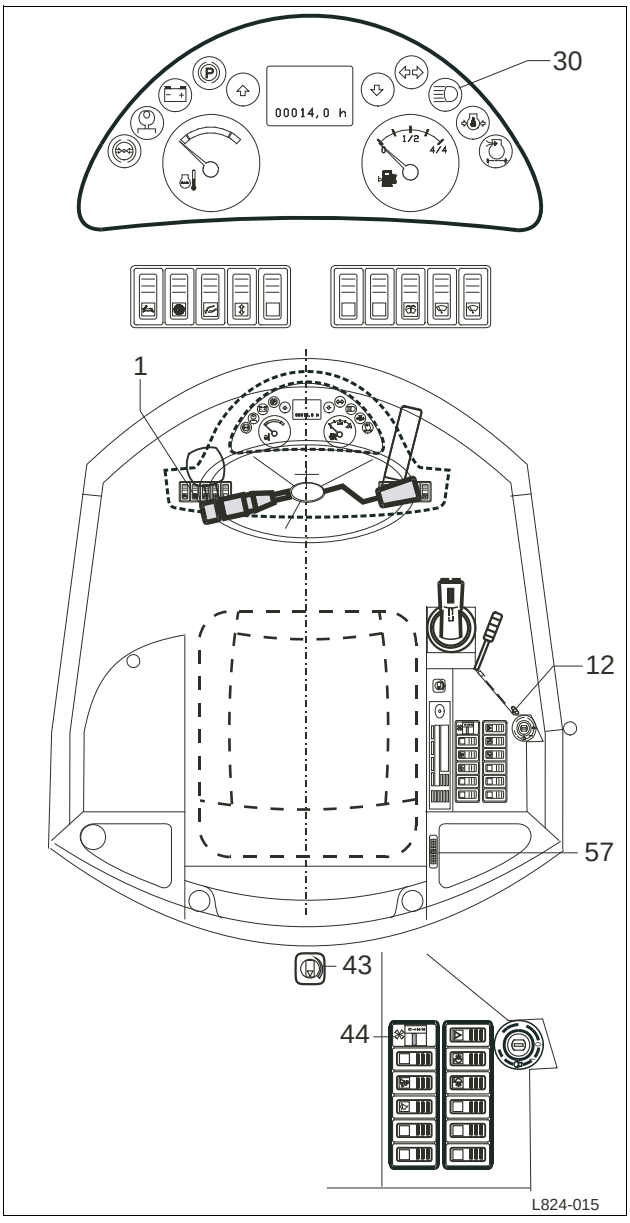


Fig. 13 Heating, ventilation, air-conditioning, and lighting

4.7 Hydroinflation of tires

When the loader is used with a fork lift attachment, the rear wheels may be filled with a water-antifreeze mixture to increase the lifting capacity.

Prepare the mixture in an appropriately sized container. Allow it to cool and stir until there are no more lumps.

Danger to health

due to incorrect handling of magnesium chloride.

Observe the following items when handling magnesium chloride:

- *Always pour magnesium chloride into the water, not the other way round!*
- *Do not allow the solution to come into contact with eyes, skin or clothing - caustic substance!*

Type of tire	Values per wheel		
	$MgCl_2$ approx. kg	H_2O l	Total kg
405/70 R 20	83	107	190
425/75 R 20	115	141	256
14.5-20 MPT 10 PR	57	74	131
16/70-20 EM 10 PR	68	87	155
365/80 R 20 EM	68	88	156
375/75 R 20 XM	83	102	185

Table 21 Water-antifreeze filling - Recommendation when filled to 75% with antifreeze protection to -30 °C

$MgCl_2$ = Magnesium chloride

H_2O = Water

4.8 Driving, steering and braking

4.8.1 Driving

Attention

When driving on public roads, the wheel loader, as a self-propelled work machine, is subject to the legal regulations valid in the user's country. (For example, in the Federal Republic of Germany, StVZO and StVO).

The machine has two preselection switches for travel direction which are alternately active.

Change-over by means of the multi-function switch (14/35).

One preselection switch for travel direction (14/36) is located on the instrument panel and another such switch on the joystick (14/7) operating the working hydraulics.

Danger to life

due to false actuation of controls.

- *The multi-function switch (14/35) is only to be pressed if the machine is at a standstill and both travel direction preselection switches are in neutral position. If the two direction-of-travel preselection switches are pressed in a contradictory manner, the machine stops.*
- When driving on roads, the joystick (14/7) for the work equipment must be deactivated by operating the multi-function switch (14/35). By doing so, the travel direction preselection switch on the joystick (14/7) is without function, too.

The direction of travel is preselected using the switch (14/36) on the instrument panel.

In working mode, the joystick (14/7) for the work equipment must be deactivated by operating the multi-function switch (14/35). By doing so, the switch (14/36) on the instrument panel is without function.

The direction of travel is preselected using the travel direction preselection switch on the joystick (14/7).

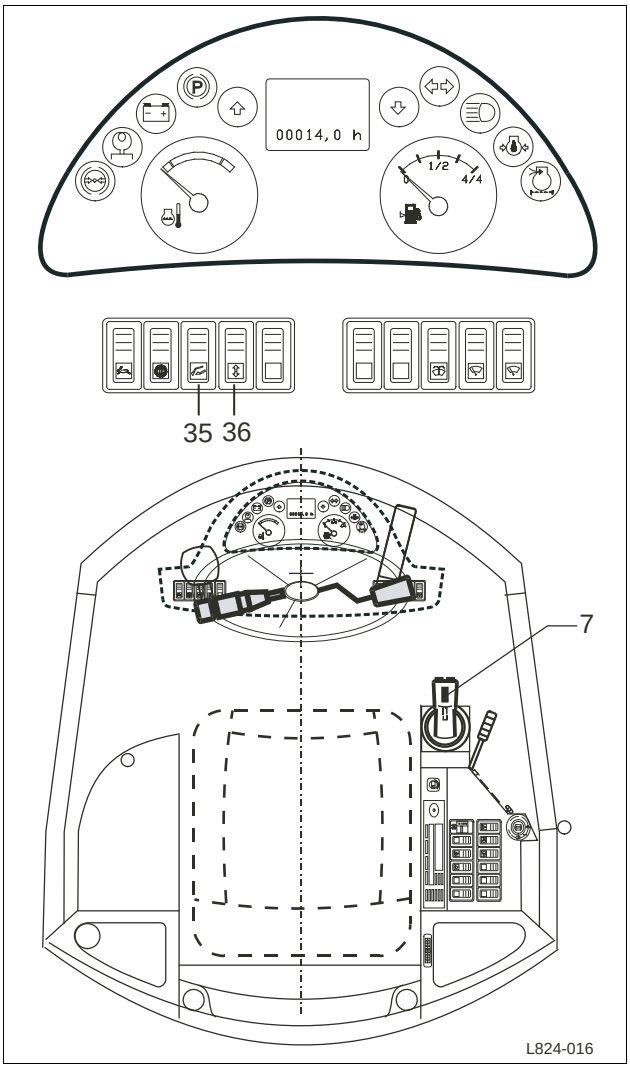


Fig. 14 Driving and steering

Driving off

- Set the travel direction preselection rocker switch on the joystick (15/7) and on the instrument panel (15/36) to "0" (neutral position).
- The indicator lamps (15/24 and 15/28) must not light up.
- Start engine.
- Raise lift frame as far as the "Travel" height mark (16/1).
- Select speed range "FAST" or "SLOW" (15/33) as required.
- High-speed version (option) - select speed range I or II.
- Observe the indicator lamp (15/58-60).
- Release the parking brake (15/9).
- Adjust the desired travel direction using the preselection switches for travel direction (15/7 / 15/36 respectively).
- The indicator lamp (15/24 or 15/28) lights up.
- Press accelerator pedal (15/3). The machine only drives off once a certain engine speed is reached.
- Travel speed is increased and decreased using the accelerator pedal. Travel speed directly depends on engine speed.
- The direction of travel may be changed quickly by operating the preselectors (15/7 / 15/36 respectively).

Coming to a halt

- Travel speed is reduced by releasing the accelerator pedal. The hydrostatic travel drive acts as a non-wearing auxiliary brake.
- Operate the brake-inching pedal (15/2) as required.
- Also refer to ➔ 4.8.3, 47.

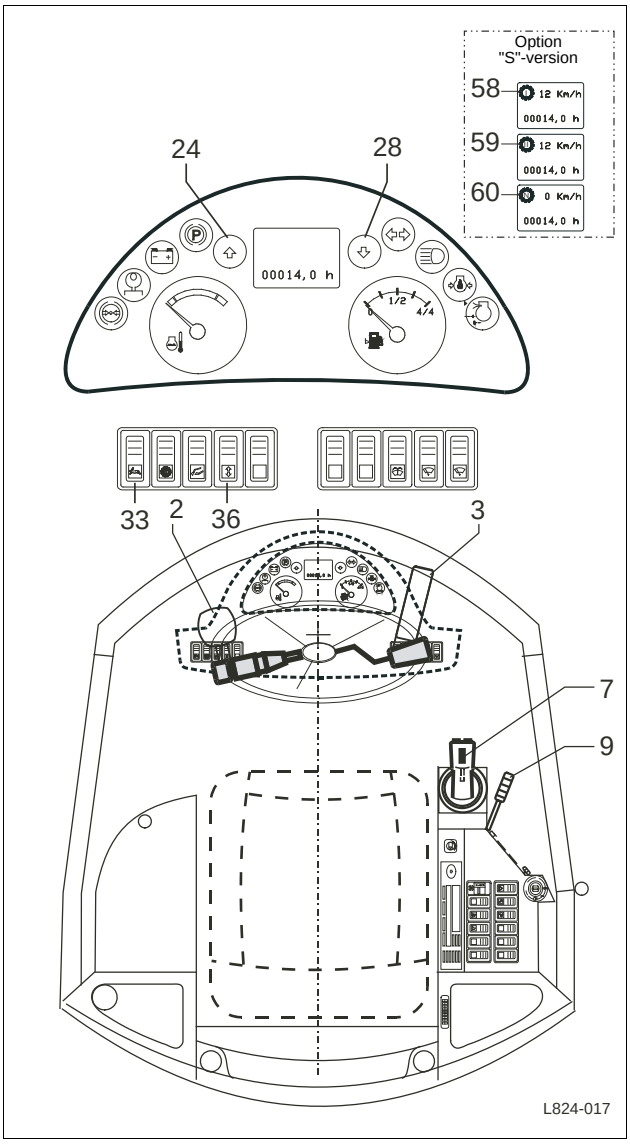


Fig. 15 Driving off and coming to a halt

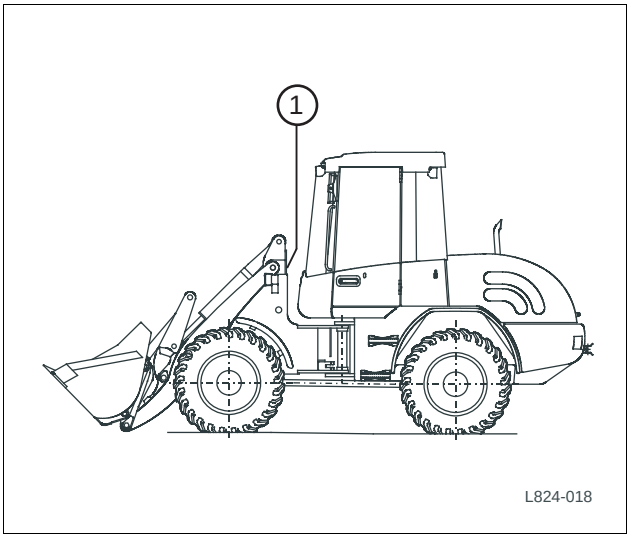


Fig. 16 Height mark

4.8.2 Steering

- The wheel loader features a fully hydraulic, proportionally acting articulated steering.
- Priority supply of hydraulic oil to steering through load-sensing system.

Machine damage

due to fault which has not been remedied.

- *In the event of steering malfunctions, determine the cause immediately (see Trouble-Shooting Table) and call for service personnel if necessary.*

4.8.3 Brakes

Service and auxiliary brake

- To bring the machine to a halt, release the accelerator pedal (17/3). The hydrostatic travel drive then acts as an auxiliary brake.
- Operate the brake-inching pedal (17/2) as required.

Parking brake

- Only apply the parking brake (17/9) if the machine is stationary.

Attention

Once the parking brake is applied (17/9), the travel drive is deactivated.

Brake-inching mechanism

- The machine features a brake-inching mechanism altering the relationship between travel speed and engine speed.
- When the brake inching pedal (17/2) is operated, travel speed is reduced - irrespective of engine speed - until the machine comes to a stop. This mechanism permits sensitive driving at maximum engine speed, e.g. when loading a truck, where fast working cycles are required.

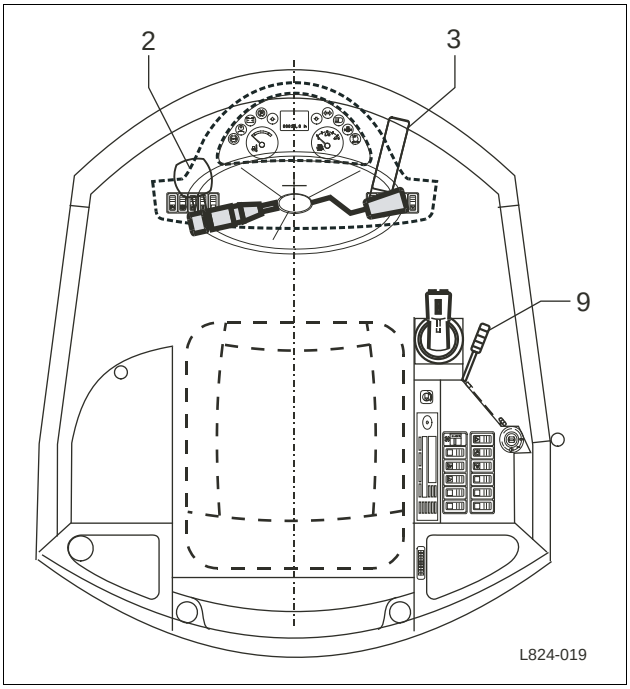


Fig. 17 Brakes

4.8.4 Driving on roads

- Before driving on open roads, the following points have to be observed:

Endangerment of road-traffic

due to missing equipment.

Ensure that the wheel loader is equipped as stipulated by the regulations authorizing the use of vehicles for road traffic in the user's country.

- Empty the bucket and tilt back completely.
- Attach the protective device on the front bucket edge.
- Secure the side-dump bucket with socket pins.
- Completely retract the high-tip bucket.
- Fold up the forks of the fork lift attachment, lock in place and secure against lateral shifting.

Danger to life

due to rigid forks.

- *Rigid forks must be dismounted before driving on public roads!*

- Raise the lift frame as far as the height color mark (18/1) until sufficient ground clearance is secured.
- Set the travel direction preselection rocker switch on the joystick (19/7) and on the instrument panel (19/36) to "0" (neutral position).
- Switch off the working hydraulics (19/35).

Attention

Only press when machine is stationary!

- Check the function of the direction indicators, hazard warning lights, horn, low/high beam.
- Close the cab door.

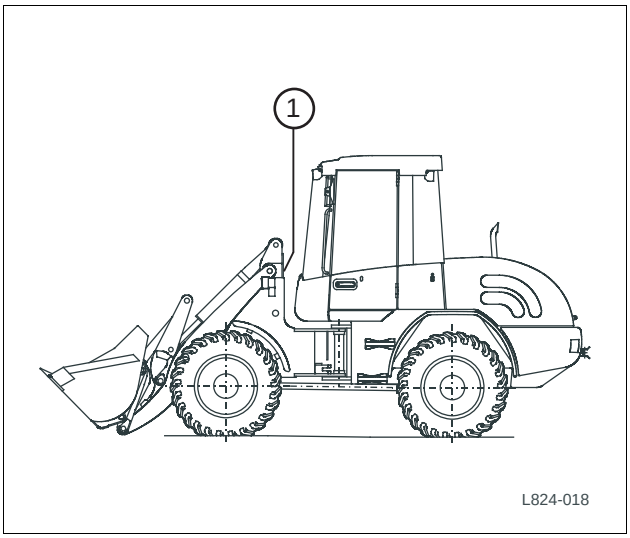


Fig. 18 Height color mark

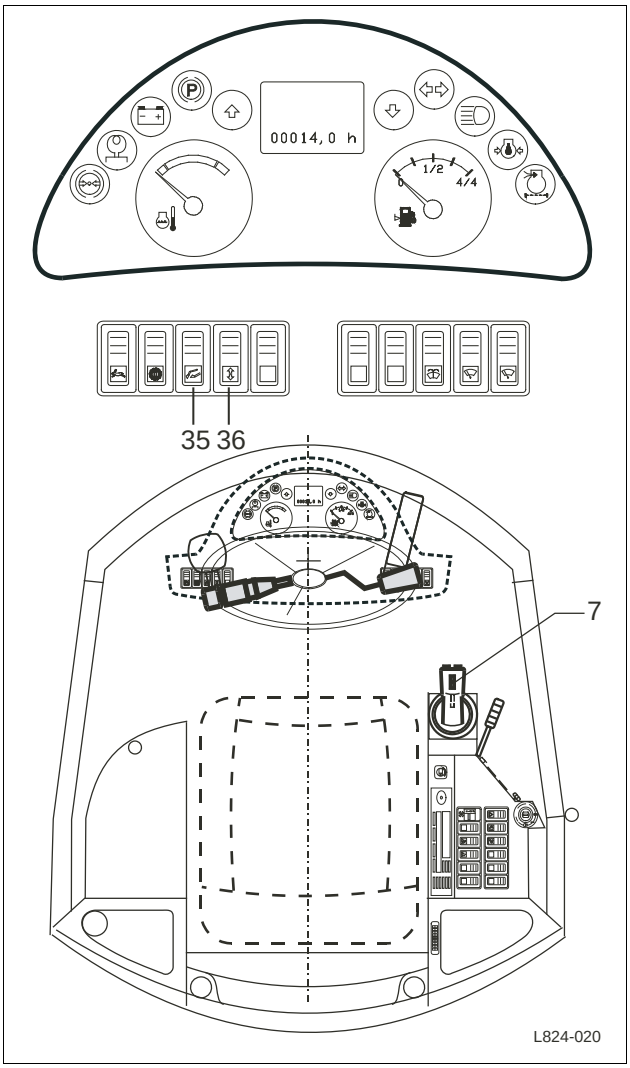


Fig. 19 Driving on roads

4.8.5 Switching off the machine (parking)

- Set the direction-of-travel preselection rocker switches (20/7 and 20/36) to "0".
- Lower the work tool onto the ground.
- Switch off the working hydraulics (20/35).
- Apply the parking brake (20/9).
- Stop the engine and remove the ignition key.
- Lock the cab after finishing work to keep unauthorized persons from getting in.

Danger to life

due to rolling away of machine.

If necessary, secure the machine with chocks to prevent it from rolling away.

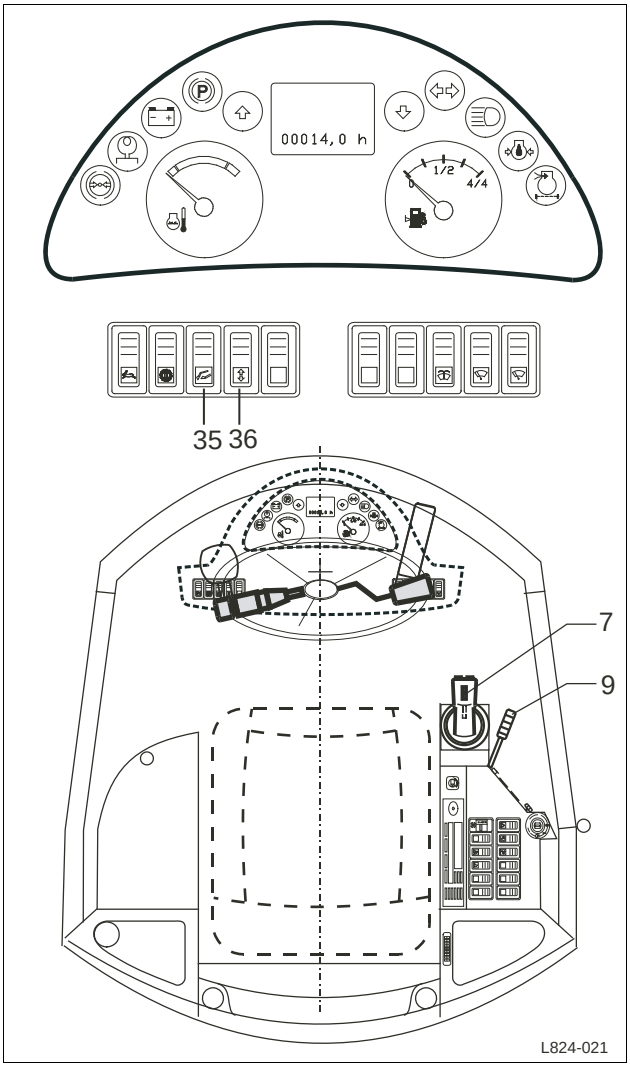


Fig. 20 Switching off the machine (parking)

4 Operation

5 Working Operation

Danger to life

due to incorrectly fastened work attachments.

- *Daily before commencing work and after every change of work attachments, a check must be carried out to ensure that the work attachment is correctly fastened, and the quick-mount hitch is properly locked.*
- *The bucket must be moved carefully at a low height.*

- Before commencing loading work, memorize the lever controls well.
- During loading operations, driving and work movements should flow in smooth succession.
- Drive slowly when familiarizing yourself with the controls.

5.1 Operation - Loader

- Switch on the work equipment (21/35).

Operation - Bucket

- Operate joystick (21/6).

Operation - Additional control circuit

- Additional control circuit (21/47) in Position 1.
- Press right-hand / left-hand push-button switch (21/5) (e.g. open/ close multi-purpose bucket).

Attention

The additional control circuit must always be switched off unless additional equipment is operated.

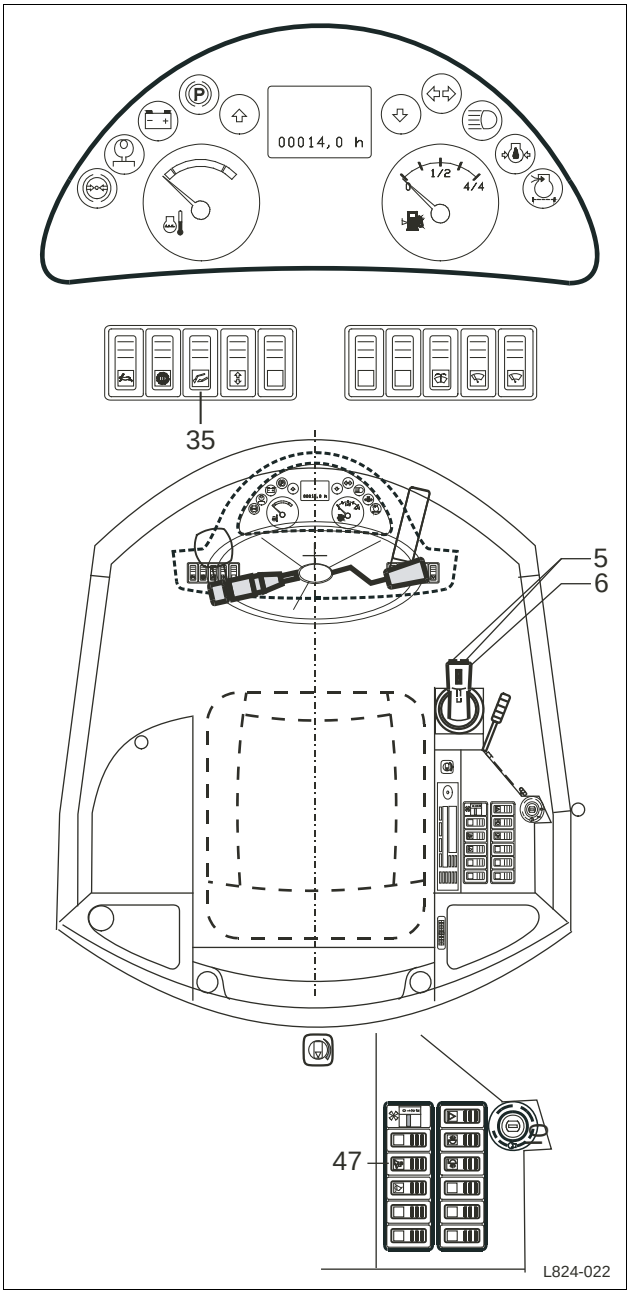


Fig. 21 Operating the loader

Continuous operation - Additional control circuit

- Additional control circuit (22/47) in Position 2 - red indicator lamp lights up.

Danger to life

due to incorrect operation.

- *Observe the function of the attachment (e.g. rotating direction of attachment).*

Attention

The additional control circuit must always be switched off unless additional equipment is operated.

Operation - Float position of lift frame

Attention

The float position must always be switched off unless operated. Switch (22/48) in Position "0".

Impulse Mode

- Float position switch (22/48) in Position "1".
- Lower the bucket onto the ground.
- Press switch (22/8). Float position is activated.

Continuous operation

- Lower the bucket onto the ground.
- Switch (22/48) in Position "2" - green indicator lamp lights up.

Option - 4th control circuit, adjustable

Attention

The hydraulic power of a number of attachments must be adjusted, e.g. rotational speed of sweepers, etc.

- Move the attachment to operating position.
- Press switch (22/56).
- Operate the turning knob (22/62) to adjust hydraulic power (e.g. rotational speed).

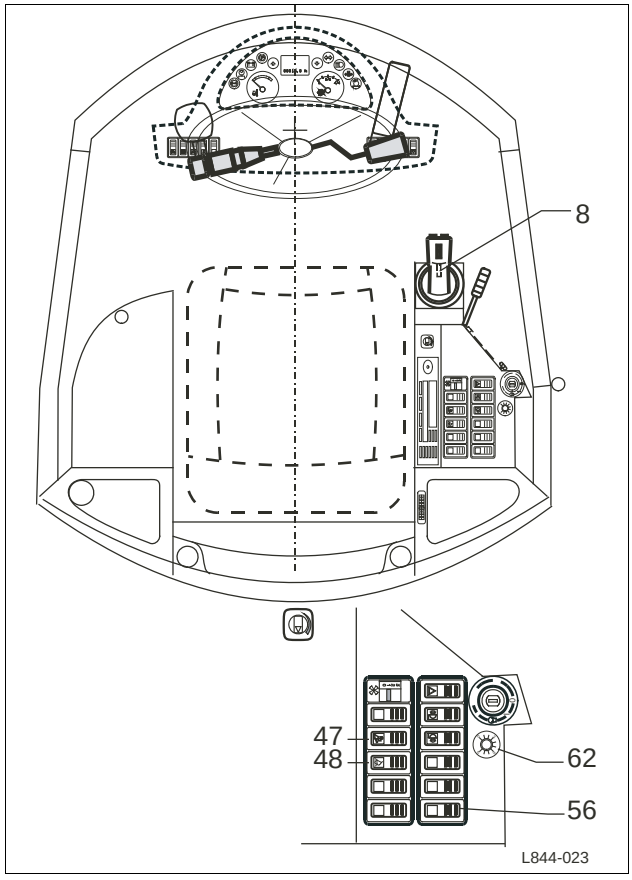


Fig. 22 Operating the loader

5.2 Changing work attachments

5.2.1 General

To achieve maximum utilization of the machine for a variety of applications, a great number of work attachments and accessories are available.

The machine is equipped with a quick-attach system, to shorten the time it takes to change attachments.

When mounting a multi-purpose bucket, front sweeper, etc., an additional control circuit is required.

Attention

Under certain circumstances, it is possible to use the work attachments of predecessor models on our machines. When mounting work attachments of predecessor models, however, these may have to be adjusted and/or are subject to utilization restrictions. The installation of work attachments which are not included in our product range requires our written approval. It is essential to consult your dealer before mounting such a work attachment.

Danger of injury

due to unsecured work attachments.

- *When attachments have been removed, they must be secured against overturning to avoid possible injury to persons.*

5.2.2 Assembly of work attachments

Attention

- *Ensure that the bearings of the lift frame, work attachment and quick-mount hitch are free from dirt.*
- *Before disconnecting hydraulic connections, the system must be released from pressure.*

Procedure for changing directly mounted work attachments

Attention

- *In the event of a hydraulically operated attachment, first of all the hydraulic connection must be disconnected (system must be without pressure).*

- Lower the work tool to the ground and position so that it cannot tip over.
- Remove the pin of the linkage and the pin of the lift frame.
- Move the lift frame out of the work attachment and install a new one.

Procedure for changing work attachments with mechanical quick-attach system

Attention

- *In the event of a hydraulically operated attachment, first of all the hydraulic connection must be disconnected (system must be without pressure).*

- Lower the work tool to the ground and position so that it cannot tip over.
- Raise pin (23/2) and open the quick-mount hitch using the control rod (23/1) until the locking bolts are completely retracted.
- Check the function of the quick-mount hitch lock and lubricate the pins if required.
- Attach another work attachment and close the quick-mount hitch until the locking bolts are completely extended and the lock clicks in.
- Ensure that the work attachment and the lock are properly seated.
- The control rod is kept in the left-hand storage box in the cab.

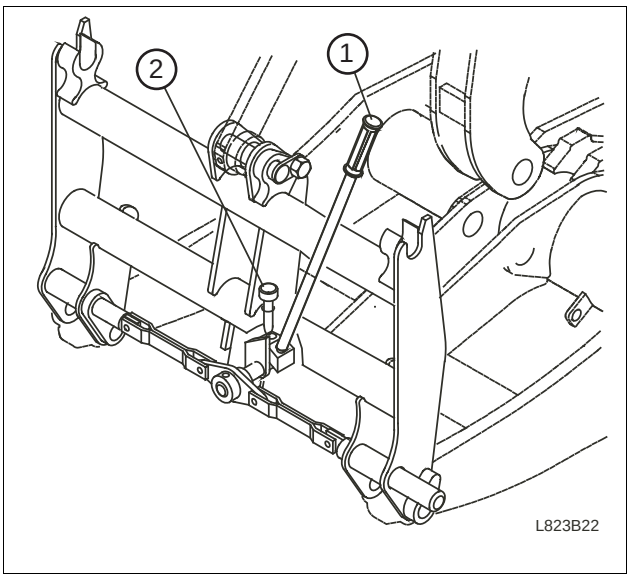


Fig. 23 Quick-attach system

Procedure for changing work attachments with hydraulic quick-attach system

- Lower the work tool to the ground and position so that it cannot tip over.
- Switch off the diesel engine.
- Switch on the ignition.
- Operate the push-button switches (24/5) for pressure relief.
- In the case of a hydraulically operated work attachment: The hydraulic connections on both manifold blocks must be disconnected.
- Ball valve in position "Unlock quick-mount hitch" (Fig. 25).
- Start diesel engine.
- Unlock the quick-mount hitch (24/5) and move out of the work attachment.
- Take up new work attachment and lock by pressing the push-button switch (24/5).

Danger to life

due to incorrectly fastened work attachments.

- *Visual check to ensure that the quick-mount hitch is correctly locked.*

- Switch off the diesel engine.
- Switch on the ignition.
- Operate the push-button switches (24/5) for pressure relief.
- Ball valve in position "Quick-mount hitch locked" (Fig. 25).
- Connect the hydraulically operated work attachment to the connection of the additional control circuit.

Machine damage

due to additional control circuit which has not been switched off.

- *The additional control circuit (24/47) must be switched off unless a hydraulically operated additional attachment is connected.*

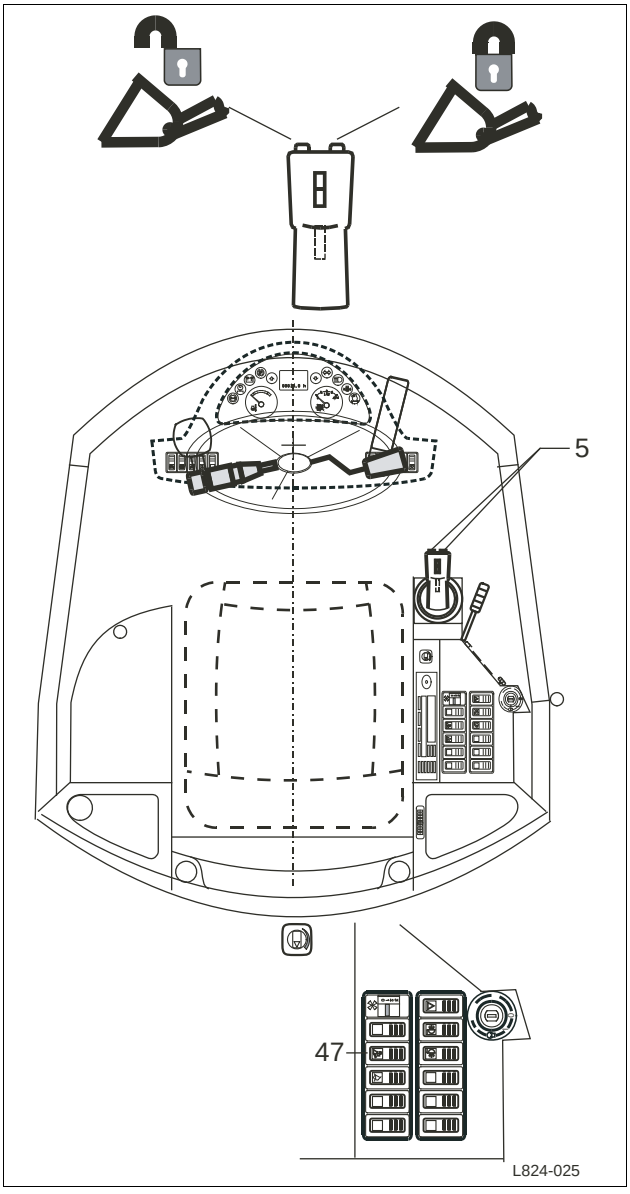


Fig. 24 Operating the quick-attach system

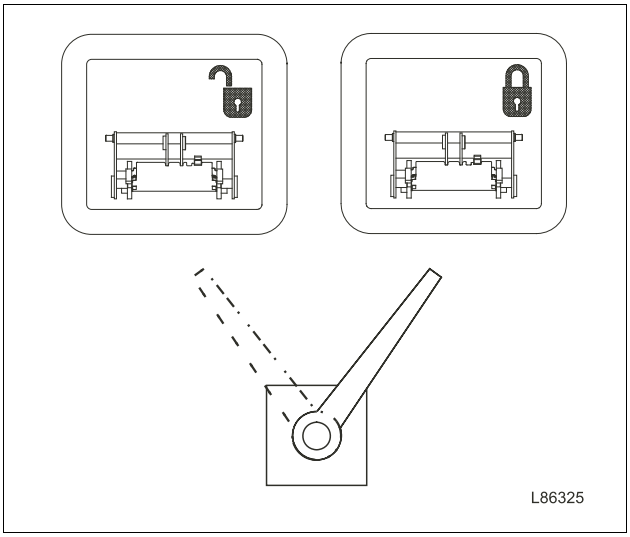


Fig. 25 Releasing and locking the hydraulic quick-mount hitch

5.3 Notes on how to work with the machine

5.3.1 Loading

During transport, the bucket - either filled or empty - must be kept as close to the ground as possible.

If possible, avoid long transport distances!

Attention

- *For loading, lower the bucket and position the cutting edge parallel to the ground. Reduce driving speed by inching as required.*
- *Move the bucket into the material to be loaded.*
- *As soon as the bucket is filling, slightly raise the lift frame and tilt back the bucket.*
- *For dumping, raise the bucket until it is above the point of dumping and dump the material.*

5.3.2 Scraping and grading

- Lower the lift frame and move the cutting edge into the ground keeping a flat angle of inclination. Do not penetrate too deeply to ensure smooth removal of earth.
- During this operation, the depth is only to be leveled by moving the bucket in and out.

5.3.3 Excavating

- To dig out an excavation, strip layers which are as regular as possible.
- Plan the excavating work in such a way as to enable the wheel loader to drive forward with full bucket out of the excavation.
- Keep the outward run of the excavation as flat as possible.

6 Recovery, Loading and Transporting

6.1 Recovery

Towing of the wheel loader must be restricted to clearing a junction or a road, to prevent damage to the hydrostatic travel drive.

If possible, let the diesel engine run at low idle during towing.

Machine damage

due to excessively fast towing.

- *Tow the machine at walking speed.*

Towing lugs

- Front: right and left on the axle plates.
- Rear bottom right and left on the side plates of the rear end.

Attention

Max. load suspension of towing lugs approx. 5,300 kg.

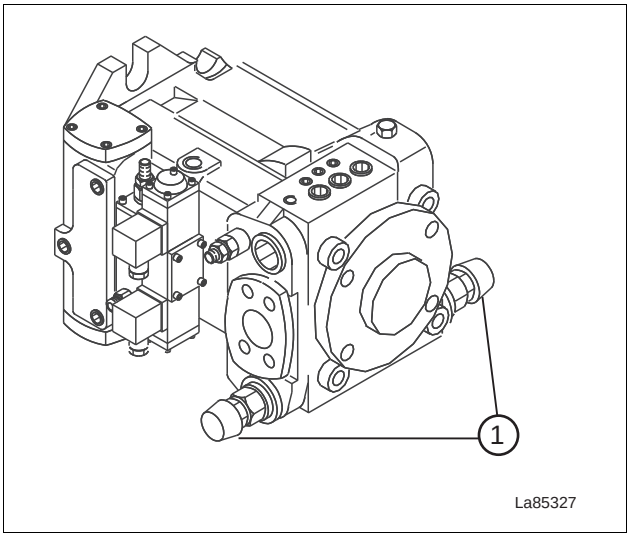


Fig. 26 Hydraulic pump

- Whenever the wheel loader has to be towed, for whatever reason, the "Travel" oil circuit must be opened so that the hydrostatic transmission no longer acts as an auxiliary brake.
- At the two high-pressure relief valves (26/1) with bypass, loosen the screw (27/1) by approx. 3 turns.
- After towing, screw back in screw (27/1) until the stop.

Machine damage

due to hydraulic system contamination.

- *Absolute cleanliness is essential when working on the hydraulic system.*

Danger to life

due to rolling away of machine.

- *Always secure the machine with chocks and relieve the hydraulic system of pressure before carrying out maintenance and repair work.*

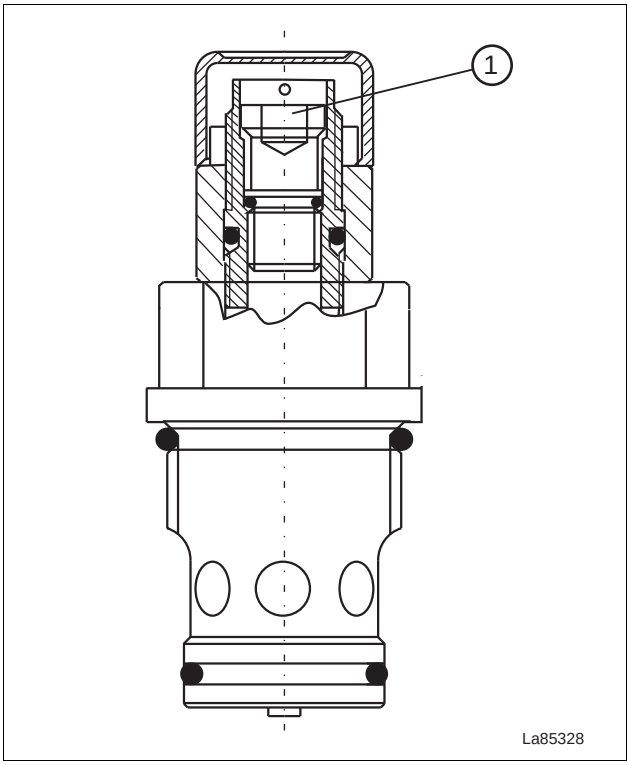


Fig. 27 High-pressure relief valve

6.2 Loading with a crane

Danger to life

through exceeding the maximum lifting capacity.

- *Ensure that the maximum lifting capacity of the crane and the crane harness is not exceeded.*

To load the machine by use of a crane, the following preparations are required:

- Empty the bucket and tip back.
- Move the lift frame to travel position.
- Apply the pin of the articulation lock (28/1 on the articulation).
- Switch off the engine.
- Dismount from the machine and close the doors.
- Attach the loader to the hoisting appliance at the specified, marked points (Fig. 28) in the correct manner.

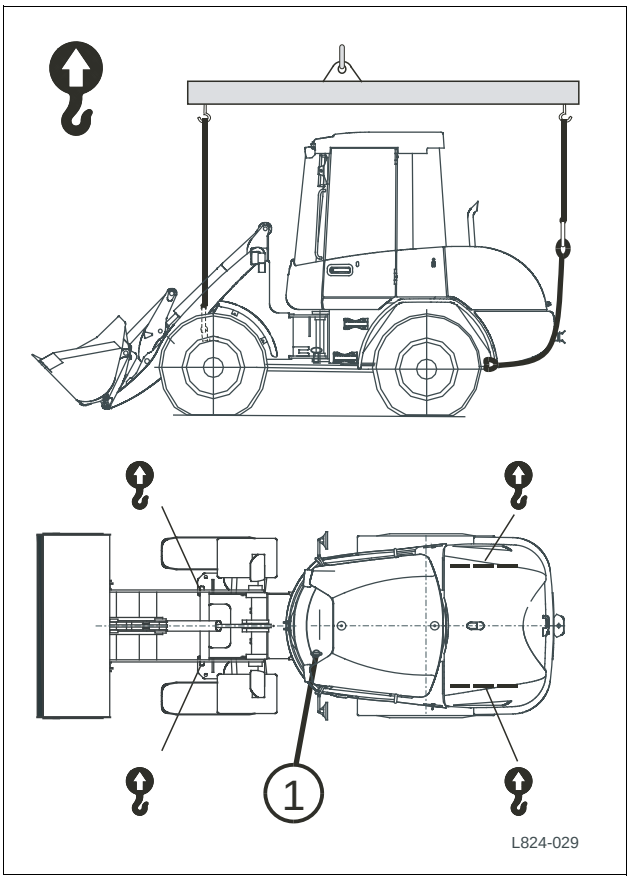


Fig. 28 Loading the machine using a crane

6.3 Transport of the machine

To transport the machine onto a flat bed trailer, railway goods wagon, etc. the following measures must be taken:

- Empty the bucket and tilt back.
- Drive the machine onto the flat bed trailer, goods wagon, etc., or lift by crane if required.
- Apply the pin of the articulation lock (29/1 on the articulation).
- Lower the work tool onto the ground.
- Switch off the engine.
- Dismount from the machine and close the doors.
- Attach the machine at the points illustrated (Fig. 29) in the correct manner.

Danger to life

due to disregarding the total transport height.

- *It is essential to observe the clearance heights of tunnels, bridges, etc.*

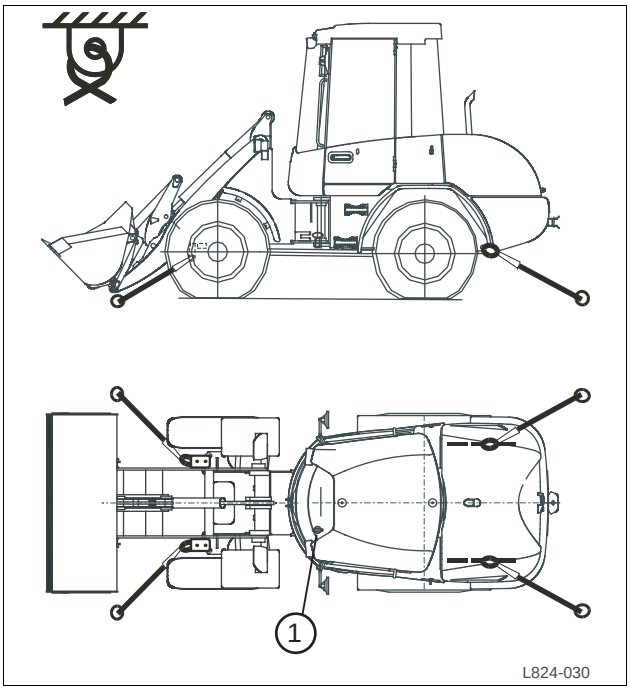


Fig. 29 Lashing for transport

7 Care and Maintenance

The good operating condition and life expectancy of machines are largely influenced by care and maintenance.

For this reason, it is in every machine owner's interest to perform the specified maintenance work and comply with the service intervals. This Chapter deals in detail with periodic maintenance, inspection and lubricating tasks.

The type-specific maintenance and inspection plan lists all work to be performed on the machine at regular intervals. Maintenance and inspection plans for this purpose are contained in every instruction book.

It is essential that the recommendations in the Chapter "Safety and Prevention of Accidents" (➔ 2, 13) are observed.

7.1 Intervals

First inspection	First inspection once before first putting into operation	➔ 7.7.1, 64
Daily jobs	Every 10 operating hours or every shift [1]	➔ 7.7.2, 66
Weekly jobs	Weekly or after 50 operating hours [1]	➔ 7.7.2, 66
100 operating hours	Once after first putting into operation [2]	➔ 7.7.4, 70
Every 500 operating hours	After every 500 operating hours or 6 months	➔ 7.7.4, 70
Every 1000 operating hours	After every 1000 operating hours or 12 months	➔ 7.7.4, 70
Every 2000 operating hours	After every 2000 operating hours or after 2 years	➔ 7.7.4, 70

Table 22 Intervals

[1] *The first date to arrive always applies.*

[2] *Also applicable if new or overhauled diesel engines are put into operation.*

7.2 Regular oil analyses

Oil analyses are not intended as a substitute for the oil change intervals but – apart from a possible reduction of maintenance costs and as a form of preventive maintenance – they take into account the increasing environmental awareness.

Advantages of an oil analysis

– extension of the oil change intervals under standard or light-duty operating conditions

– minimum wear of high-quality components with optimum use of the lubricants

– periodic laboratory analyses enable an early detection of imminent damage

– repairs performed before they actually become absolutely necessary help prevent serious and unexpected damage

– sequential damage can be avoided

How often should the oil be analyzed?

Periodic oil analyses reveal trends in the condition of the oil and the machine. The oils should be analyzed at the following intervals:

– hydraulic oil: 1000 operating hours

– transmission oil: 500 operating hours

– engine oil: 100 operating hours

Based on the first results, the laboratory recommends the interval for the next sampling. Ask your *TEREX* dealer for an information booklet detailing the scope and procedures.

7.3 Warranty

During the warranty period thorough inspections are stipulated which are obligatory and which must be carried out by trained specialist dealer personnel.

Attention

The inspections are obligatory and must be paid for.

The performance of the obligatory inspections must be confirmed on the inspection cards in the warranty / handing over certificate.

If they are omitted, the warranty may be subject to restrictions.

7.4 Inspection parts and aids

Maintenance parts	Spare part number
Hydraulic oil filter insert	5 003 659 218
Breather with screen element	5 003 650 362
Engine oil filter	5 568 656 650
Fuel filter with seal	5 568 664 196
Air filter - main cartridge	5 501 660 912
Air filter - safety cartridge	5 501 660 914
V-belt 13 x 1300 (2 pieces)	5 568 656 478
Valve-cover gasket	5 568 664 195
Service package after 100 operating hours	
Service package every 500 operating hours	
Service package every 1000 operating hours	
Extras	
TEREX hydraulic oil, mineral	4 312 005 050
TEREX hydraulic oil, biodegradable	Please contact your TEREX dealer for further information.
Transmission oil (SAE 85 W 90 LS)	4 314 005 775
Engine oil (SAE 15 W 40)	4 312 905 759

Table 23 Inspection parts and aids

Attention

Maintenance and wear parts for inspections should be ordered well in advance.

Fuels, lubricants and coolants

– The machine's life expectancy and operating condition largely depend on the use of the specified lubricants and compliance with the service intervals.

– If lubricants which do not conform to our recommendations are used, consequential damage may occur for which we will not assume liability, even inside the warranty period.

– Observe the specifications for fuels, lubricants, and coolants (➔ 3.9.2, 29)!

7.5 Care and cleaning

Attention

The machine must be cleaned on a suitable surface with an oil separator.

- Neither a steam-jet appliance nor a high-pressure cleaning apparatus are to be used for cleaning during the first two months after the machine is used for the first time or when newly painted to allow the paint to harden.
- Do not use aggressive detergents for cleaning the machine. We recommend using commercially available cleaning agents for passenger cars.
- When cleaning with a steam-jet appliance, the hot water jet should not exceed 80°C and the spray pressure should be no greater than 70 bar.
- Linings (insulating materials, etc.) should not be exposed directly to water, steam or high-pressure jets.
- Take care not to spray exhaust-gas and air filter openings when cleaning with water or a steam jets.
- When cleaning the engine with water or a steam jet, do not expose sensitive engine parts, such as the alternator, cabling, oil pressure switch, etc. directly to the jet.
- The machine must be lubricated after each wet clean in accordance with the lubricating plan and a test of all work cycles, support and driving functions should be carried out.

7.6 Notes for operation in winter

The following points - and the relevant notes in the Engine Instruction Book - should be observed during winter operation:

Hydraulic oil

– If the machine is not used for longer periods at temperatures around and below freezing, warm up the engine by running at medium revs. (for approx. 3 – 5 min).

Engine oil

– The oil viscosity (SAE class) should be selected according to the ambient temperature at the machine's place of operation.

Coolant

– Check the level of antifreeze before the beginning of the cold season and adjust in line with the ambient temperature if necessary. The antifreeze is factory-set to approx. -25 °C.

Condition of the battery

– A good cold start performance requires a well-charged battery. The minimum starting temperatures can be lowered by 4-5°C by warming the battery to approx. +20°C (remove the battery after the engine has been turned off and store it in a warm room).

– Ensure that there is good contact of terminal connections when installing the battery.

– Only tighten terminal screws "hand-tight" to prevent deformation of the terminal cones.

Fuel specification

The use of high-quality fuel is a prerequisite for achieving the engine output specified.

Recommended fuel specification

- N590-diesel engines - Auto/C0/C1/C2/C3/C4
- BS2869 Class A2
- ASTM D975-91 Class 2-2DA, US DF1, US DF2, US DFA
- JIS K2204 (1992) Class 1, 2, 3 and special class 3.

Attention

If sulfur-free fuel is used, additions to lubricants must be used.

Sufficient fuel specification

Attention

The fuel specification listed below is sufficient but may reduce the life expectancy of the fuel injection system.

- ASTM D975-91 Class 1-1DA
- JP7, MIL T38219 XF63
- NATO F63

Fuel with low sulfur content

- Only use commercially available brand-name diesel fuel with a sulfur content of less than 0.5%.

Sulfur content in fuel in %	Oil change interval
< 0.5	normal
0.5 to 1.0	0.75 of normal
>1.0	0.50 of normal

Table 24 Oil change interval if sulfur content in fuel is higher

Winter fuel

In winter, only use winter diesel fuel to prevent clogging of the fuel system due to paraffin separation. Even if winter diesel fuel is used, disturbing separations may occur at very low temperatures.

7.7 Checking, maintenance and inspection plans

7.7.1 Initial inspection (hand-over inspection)

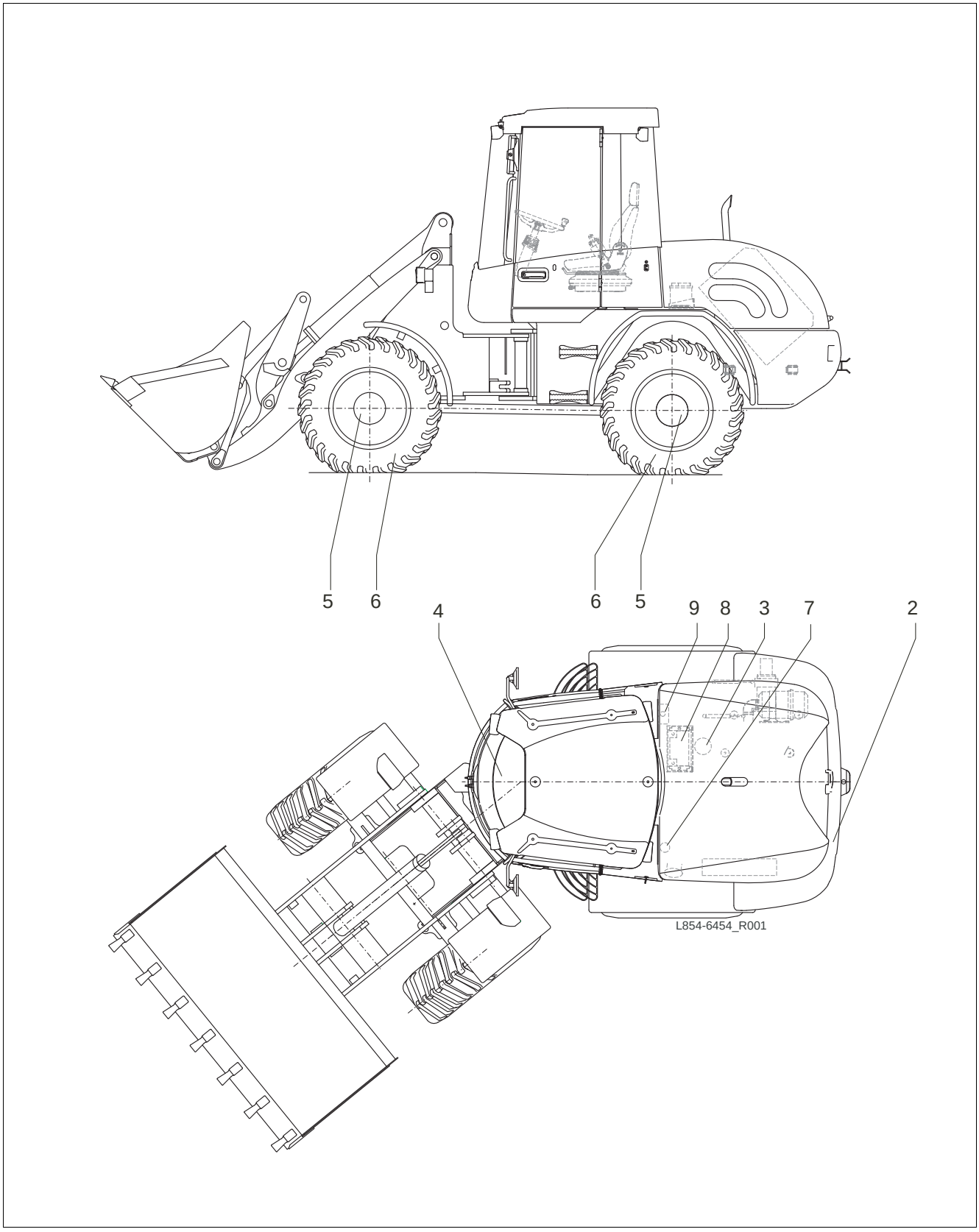


Fig. 30 Initial inspection

Work to be carried out by trained dealer service personnel.

Activities		Chapter
1	Check whether machine-specific instruction book is in the machine.	
2	Check the engine oil level.	➔ 7.8.1, 72
3	Check the hydraulic oil level.	➔ 7.8.9, 87
4	Check the fuel level.	➔ 7.8.4.1, 76
5	Check oil level of differential and axle hubs.	➔ 7.8.12.2, 91
6	Check tire pressure and tightness of wheel nuts.	➔ 7.8.13, 92
7	Check brake oil level.	➔ 7.8.8, 85
8	Battery fluid level and charge.	➔ 7.8.15, 93
9	Top up windshield washer system.	➔ 7.8.17, 95
9	Grease machine (all lubricating points).	➔ 7.7.3, 68
10	Test run, hydraulic function check and test work.	
11	Visual inspection for tightness of all hoses, pipes, cylinders, etc.	
12	Check function of electrical indicating and warning elements, and the lighting system.	
13	Initial delivery/handing-over certificate and return to manufacturer.	

Table 25 Work involved in initial start-up

7.7.2 Daily and weekly tasks

Inspection and maintenance jobs to be performed by operating personnel.

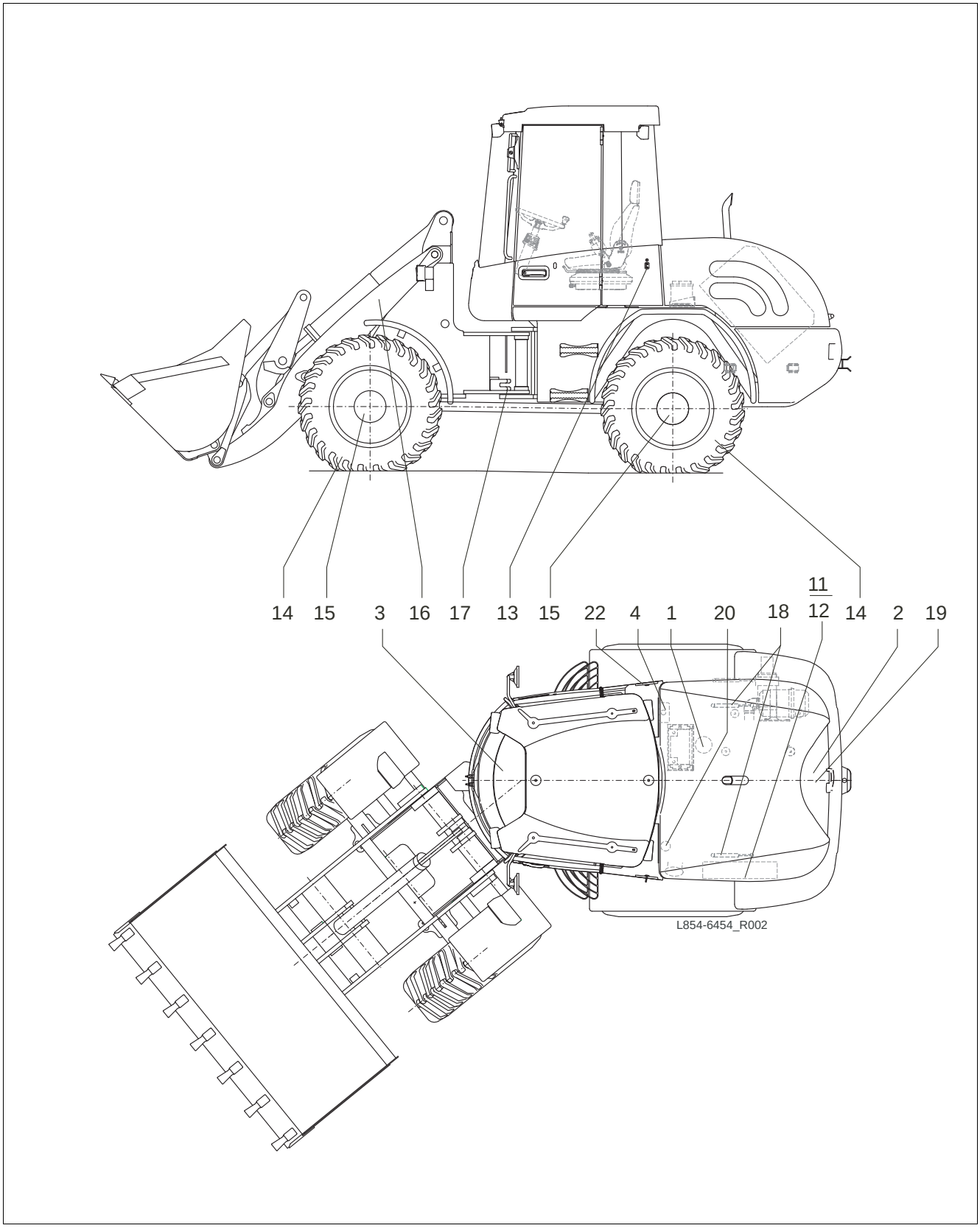


Fig. 31 Inspection and maintenance plan

Daily		Chapter
1	Check the hydraulic oil level.	➔ 7.8.9, 87
2	Check the engine oil level.	➔ 7.8.1, 72
3	Check the fuel level (fuel gauge on instrument panel).	➔ 7.8.4.1, 76
4	Check windshield washer-fluid level.	➔ 7.8.17, 95
5	General visual inspection for material cracks, external damage, completeness, etc.	
6	Check for leaks in pipes, hoses, control unit, hydraulic pumps, cylinders, etc. ***Attention*** *When tightening hoses or pipeline connections, counterlock fittings to prevent turning.*	
7	Check function of electrical indicating and warning elements, and the lighting system.	
8	Check smooth running of operator controls.	

Table 26 Daily tasks

Weekly		Chapter
11	Clean cooling fins of the hydraulic oil cooler. ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	➔ 7.8.3.3, 75
12	Clean cooling fins of the water cooling system ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	➔ 7.8.3.3, 75
13	Check that door catches function perfectly.	
14	Check tire pressure and tightness of wheel nuts.	➔ 7.8.13, 92
15	Check fastening of axles and propeller shaft.	
16	Check bearing bushings and bolts of the work equipment.	
17	Check bushings and bolts of the work equipment.	
18	Check that pneumatic springs of engine hood function perfectly.	
19	Drain fuel filter.	➔ 7.8.4.3, 77
20	Check brake oil level.	➔ 7.8.8.1, 85
21	Check function of brakes.	
22	Check if the dust filter for cab ventilation is dirty and clean if required. ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the inspection and cleaning intervals.*	➔ 7.8.16.1, 95
23	Check the function, condition and completeness of safety devices.	
24	Grease machine according to overview of lubricating points.	➔ 7.7.3, 68

Table 27 Weekly tasks

7.7.3 Overview of lubricating points

Machine damage

due to damaged lubricating nipples.

- *Replace damaged grease nipples immediately and check if grease passes through.*

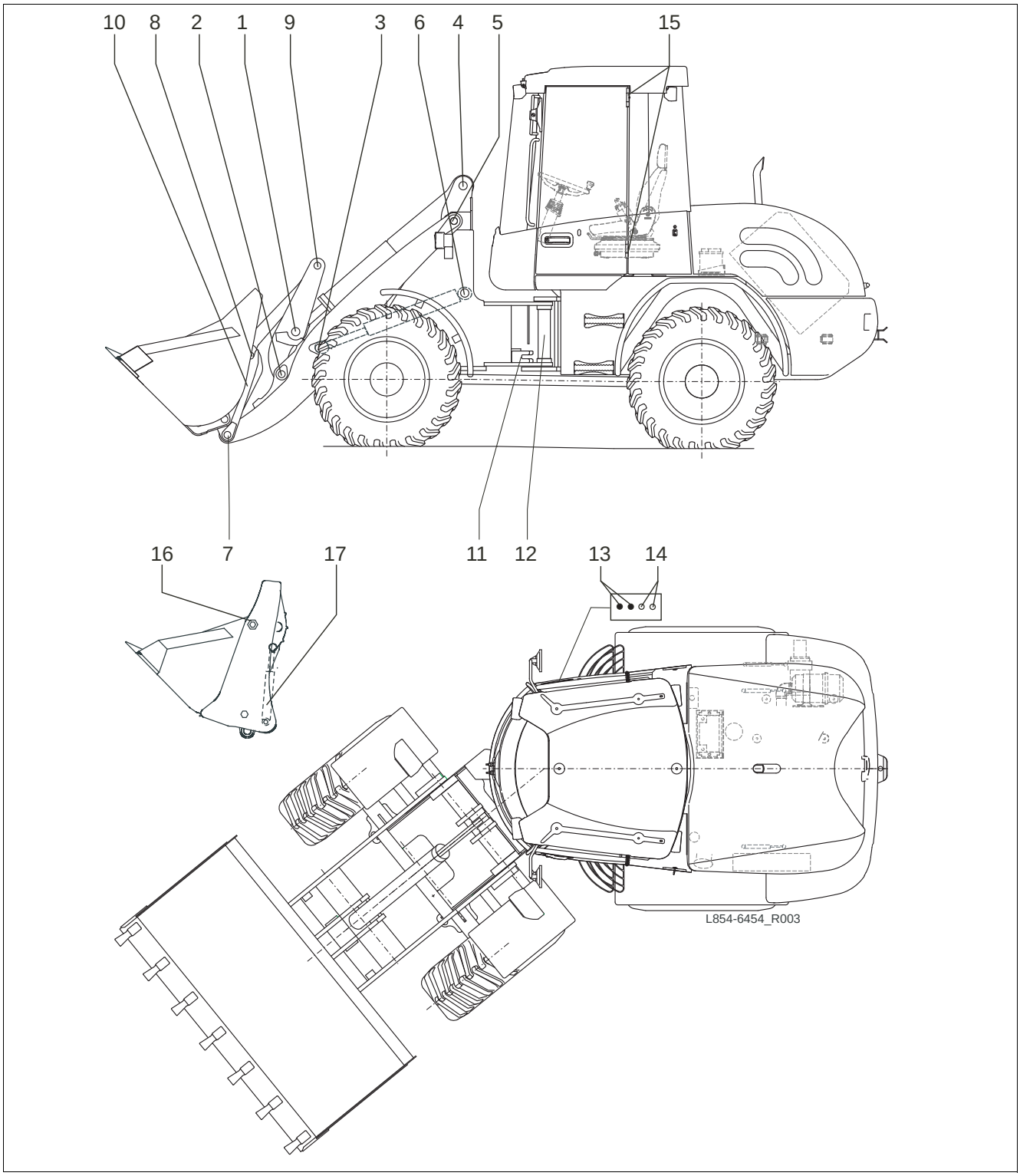


Fig. 32 Overview of lubricating points

- Grease all lubricating points with multi-purpose grease.

Attention

The intervals stated are only valid for single-shift operation.

- *Shorten the intervals for special operating conditions, for example sandy ground, in order to achieve self-cleaning of the bearing points.*

Item	Lubricating point	Number	Daily	Weekly	Chapter
1	Tilt cylinder – Tilt control lever	1		X	--
2	Lift frame – Tilt control lever	1		X	--
3	Lift cylinder – Lift frame	1		X	--
4	Tilt cylinder – Front-end	1		X	--
5	Lift frame – Front-end	2		X	--
6	Lift cylinder – Front-end	1		X	--
7	Lift frame – Quick-mount hitch	2		X	--
8	Linkage – Quick-attach system	1		X	--
9	Tilt control lever – Linkage	1		X	--
10	Mech. quick-mount hitch Hydr. quick-mount hitch	3 2		X X	--
11	Steering cylinder – Front-end	2		X	--
12	Pivot point	3		X	--
13	Steering cylinder – Rear-end	2		X	--
14	Rear axle bearing	2		X	--
15	Door hinges	4		X	--
16	Multi-purpose bucket	2		X	--
17	Multi-purpose bucket cylinder	4		X	--

Table 28 Lubricating points

7.7.4 Inspection plan

Work to be carried out by trained specialist dealer personnel.

O = Checking, maintenance X = Replace Perform work with machine at operating temperature		Operating hours				min. 2 x	min. 1 x	
		after 100	every 500	every 1000	every 2000	annu-ally	annu-ally	Chapter
1	Check whether machine-specific instruction book is in the machine.	O	O					
2	Change engine oil.		X				X	➔ 7.8.1.2, 72
3	Change engine oil filter.		X				X	➔ 7.8.2, 74
4	Drain water from fuel tank.	O	O			O		➔ 7.8.4.5, 78
5	Change fuel filter.		X				X	➔ 7.8.4.4, 77
6	Check the air intake.	O	O					➔ 7.8.5, 78
7	Replace air filter main cartridge.	according to service indicator					X	➔ 7.8.5.5, 80
8	Replace air filter safety cartridge.	as required [1]						➔ 7.8.5.4, 79
9	Clean cooling fins on the hydraulic oil cooler. ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O		
10	Clean cooling fins of water cooler (combined cooler). ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant.						O	➔ 7.8.3.2, 74
12	Change coolant.	as required [1]						➔ 7.8.3.4, 75
13	Check V-belt tension.	O	O					➔ 7.8.6.2, 82
14	Check engine mounts and pump attachments.	O	O					
15	Check engine speed adjustment, upper and lower idling speeds.	O	O					
16	Check valve lash of engine and adjust if necessary.			O			O	➔ 7.8.7, 84
17	Check injection valves.			O				➔ 7.8.7, 84
18	Check crankcase breather in valve cover.				O			
19	Check acid level and battery connections.	O	O					➔ 7.8.15.1, 93
20	Check condition of tires, tire pressure and tightness of wheel nuts.	O	O					➔ 7.8.13, 92
21	Check fastening of axles and propeller shaft.	O	O					
22	Check bearing bushings and bolts of work equipment and replace if necessary.	O	O					
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O					
24	Check that door catches function perfectly, and replace if necessary.	O	O					
25	Clean or replace the dust filter for cab ventilation.	O		X			X	➔ 7.8.16.1, 95
26	Check electrical indicating and warning elements and lighting equipment.	O	O					
27	Check smooth running of operator controls and adjust if necessary.	O	O					

Table 29 Inspection plan

[1] *At least once every two years.*

[2] *Extension of oil change intervals according to oil sample analysis and laboratory report ➔ 7.2, 60.*

[3] *Within warranty.*

O = Checking, maintenance X = Replace Perform work with machine at operating temperature		Operating hours after 100	every 500	every 1000	every 2000	min. 2 x annually	min. 1 x annually	Chapter
28	Check for leaks in all pipes, hoses, control valves, hydraulic pumps, cylinders, etc. ***Attention*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O					
29	Check or change hydraulic oil.	O	O	X [2]			X	➔ 7.8.9, 87
30	Replace insert of hydraulic oil return suction filter.	X	X			X		➔ 7.8.10, 88
31	Replace breather.			X			X	➔ 7.8.11, 89
32	Check function of brakes, replace brake oil.	O	O		X		X	➔ 7.8.8.2, 85
33	Bleed brake.	O	O					➔ 7.8.8.2, 85
34	Differential – rear axle with transmission / Option: manual transmission: oil check or oil change resp.	X	O	X			X	➔ 7.8.12.2, 91
35	Differential – front axle oil: check or oil change resp.	X	O	X			X	➔ 7.8.12.1, 90
36	Wheel hubs of front and rear axles: oil check or oil change	X	O	X			X	➔ 7.8.12.3, 92
37	Grease machine according to overview of lubricating points.	O	O					➔ 7.7.3, 68
38	Check function, condition and completeness of safety devices.	O	O					
39	Hydraulic function check with pressure function test.	O	O					
40	Test run and test work.	O	O					
41	Initial inspection card and return to manufacturer.	O	O [3]					➔ 7.3, 60

Table 29 Inspection plan

[1] *At least once every two years.*

[2] *Extension of oil change intervals according to oil sample analysis and laboratory report ➔ 7.2, 60.*

[3] *Within warranty.*

7.8 Inspection and maintenance work

7.8.1 Engine oil

7.8.1.1 Checking the engine oil level

- The oil level must be checked daily before start-up with the machine standing on level ground.
- Insert the oil dipstick (33/1) until the stop. The notches on the dipstick indicate the minimum and maximum oil levels.
- Top up engine oil if necessary. Open the filler neck (33/2) and add oil using a clean container. Close the filler neck again.

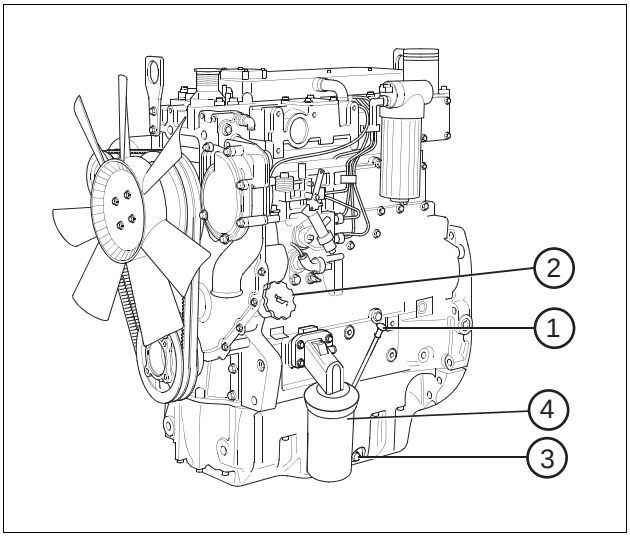


Fig. 33 Engine oil

7.8.1.2 Changing the engine oil

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

- Run the engine until it reaches operating temperature, engine oil temperature approx. 80 °C.
- Park the machine on a level surface.
- Switch off the engine.
- Remove the cover from the bottom rear-end.
- Place suitable drip pans under the opening.

Danger of scalding

due to hot oil getting into contact with skin or eyes.

- *Wear appropriate protective clothing/safety goggles.*

- Screw the oil drain hose onto the oil-change valve (34/3).
- Remove the oil drain hose and screw the protective cap onto the valve (34/3).
- Close the service opening with the cover.
- Replace the engine oil filter (34/4) (➔ 7.8.2, 74).
- Top up engine oil to the "MAX" mark on the oil dipstick using the filling hole (34/2) (34/1).

Machine damage

due to excess oil.

Observe the permissible filling level of the engine oil pan and avoid overfilling. Excess oil may enter the crankcase breathing and lead to engine-speed control faults.

- Start the engine and run at low idle speed for approx. 2 min.
- Switch off the engine.
- Check the oil level and top up oil if required.

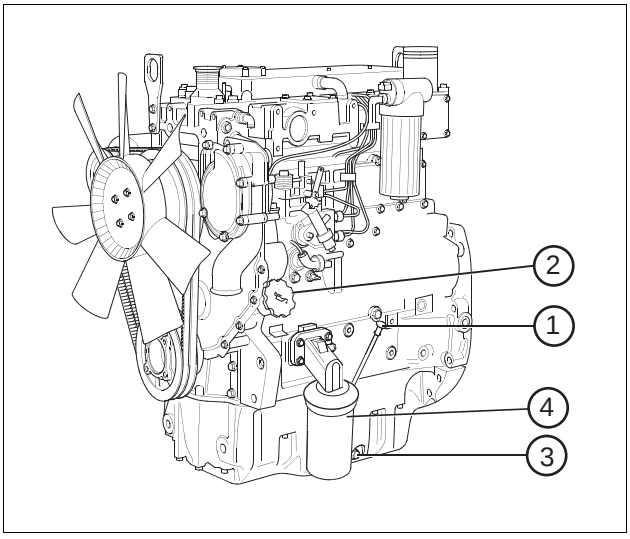


Fig. 34 Engine oil

7.8.2 Changing the engine oil filter

The engine oil filter must be replaced every time the engine oil is changed.

- Place oil drip pan below the engine oil filter.
- Clean the outside of the engine oil filter.
- Unscrew the filter cartridge (35/4) using a commercially available tool and check that the fastening stud is firmly secured in the filter head.
- Dispose of the filter cartridge according to regulations.
- Check filter head condition and clean.
- Fill the new filter with oil, wet the sealing ring with oil and tighten firmly by hand.
- After a test run, check the tightness of the engine oil filter cartridge.

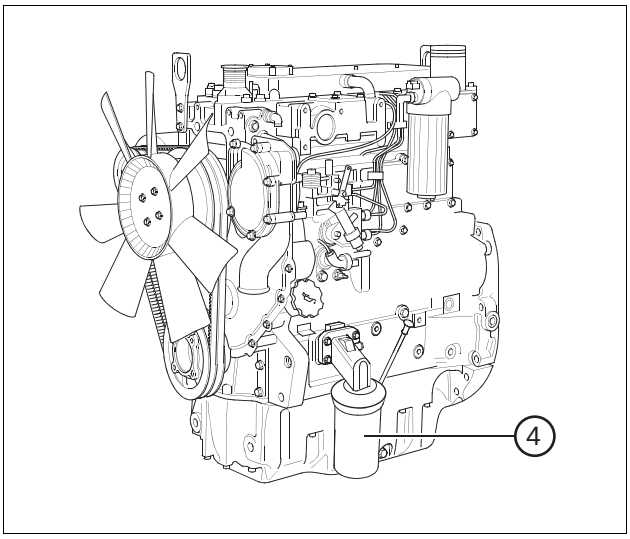


Fig. 35 Changing the engine oil filter

7.8.3 Cooling system - combined hydraulic oil-water cooler

7.8.3.1 Checking the coolant level

Check the coolant level daily before starting, with the machine parked on level ground. To do so, use the sight glass (36/2) of the combined cooler. If the coolant level is insufficient, top up accordingly.

Danger of scalding

due to hot coolant getting into contact with skin or eyes.

- *Only open the cooler cap after the engine has cooled down.*

- Remove the cover (36/1) and top up coolant if required. With the engine cooled down, the compensation tank should be half full.

Attention

Refill with a 50%-50% mixture of water and antifreeze.

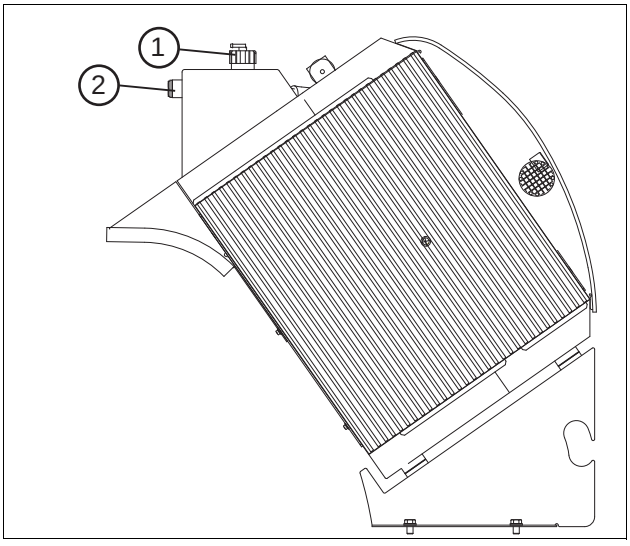


Fig. 36 Combined cooler

7.8.3.2 Check the level of antifreeze

Before the beginning of the cold season, the antifreeze protection must be checked.

- The antifreeze is factory-set to approx. minus 25 °C.
  If temperatures are lower, the level of antifreeze must be adjusted accordingly.

7.8.3.3 Cleaning the cooling fins

Machine damage

due to overheated engine.

- *Thoroughly clean the cooler to prevent overheating of the engine and/or the hydraulic oil.*

- Clean the combined cooler (Fig. 37) from the outlet side with compressed air.
- Clean with cold detergent or a steam-jet appliance if required, e.g. if there is oil in the cooler.
- After cleaning, run the engine until it reaches operating temperature to dry the cooler.

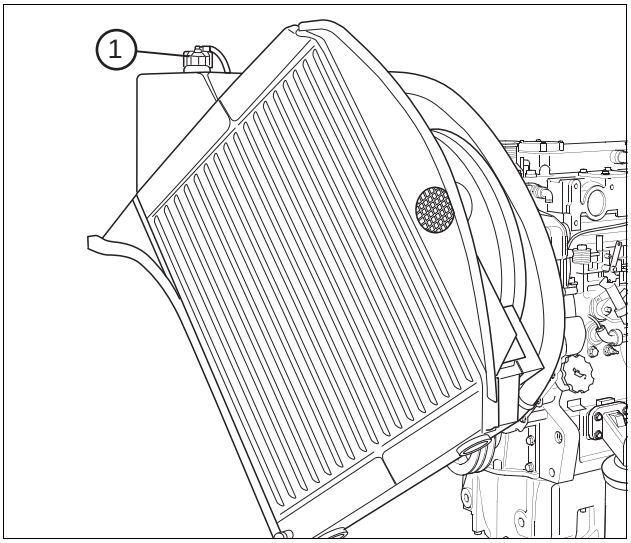


Fig. 37 Combined cooler

7.8.3.4 Changing the coolant

Danger of scalding

due to hot coolant getting into contact with skin or eyes.

- *Only open the cooler cap after the engine has cooled down.*

- Park the machine on a level surface.
- Switch off the engine and **allow the cooling system to cool down**.
- Remove the cooler cap (37/1).
- Unscrew the water-drain plug (38/1) on the cylinder block and drain coolant.
- Remove the bottom water hose on the cooler and drain coolant.
- Flush the cooling system with clean water if required.
- Re-fit the drain plug to the engine and the water hose.
- Fill the cooling system with coolant (➔ 3.9, 28) and close the cap.
- Start the engine and bring to operating temperature, switch off and allow to cool down.
- Check the coolant level and top up (several times, if required).

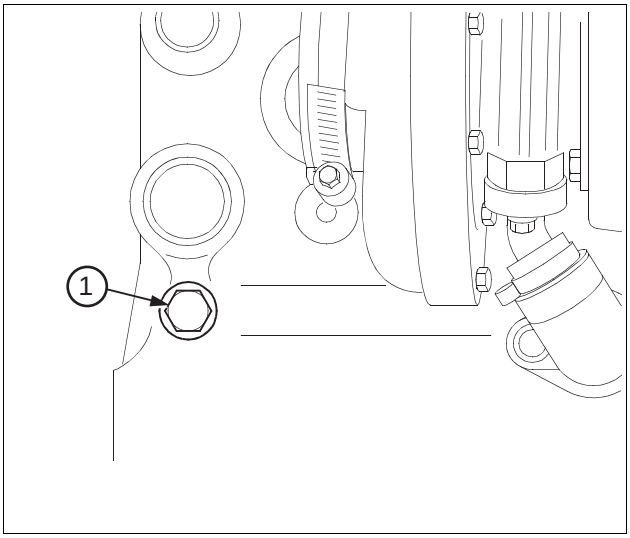


Fig. 38 Changing the coolant

7.8.4 Fuel system

7.8.4.1 Checking the fuel level

- Check the fuel level using the fuel gauge (39/27).

Danger of injury

due to excessive pressure while refueling.

- *Open the fuel tank cap when topping up fuel using the electric refueling pump to avoid excessive pressure in the fuel tank!*

- Top up fuel every day after use to prevent condensation from forming before the machine is next put into operation.

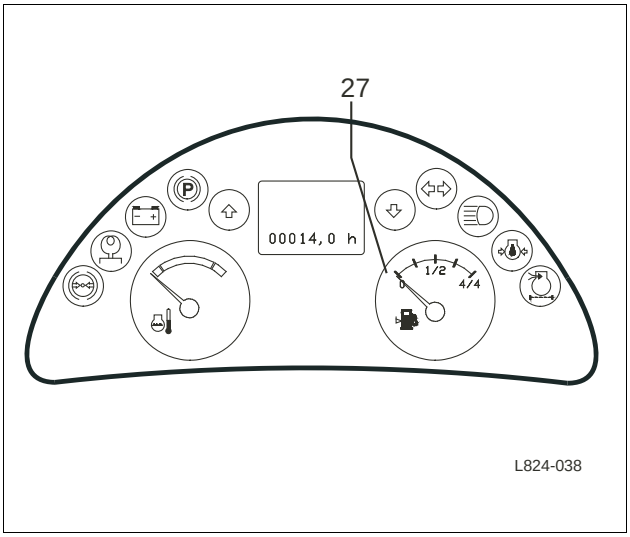


Fig. 39 Checking the fuel level

7.8.4.2 Draining the water separator

Machine damage

due to full water separator.

Never allow the engine to run if the water separator is filled by more than 50%. Failure to do so will result in damage to the engine.

- Check daily using the sight glass (40/1) and drain if required.
- Open the drain (40/2) and collect any escaping water in a suitable container.
- Dispose of the water according to regulations.
- Close again the drain (40/2).

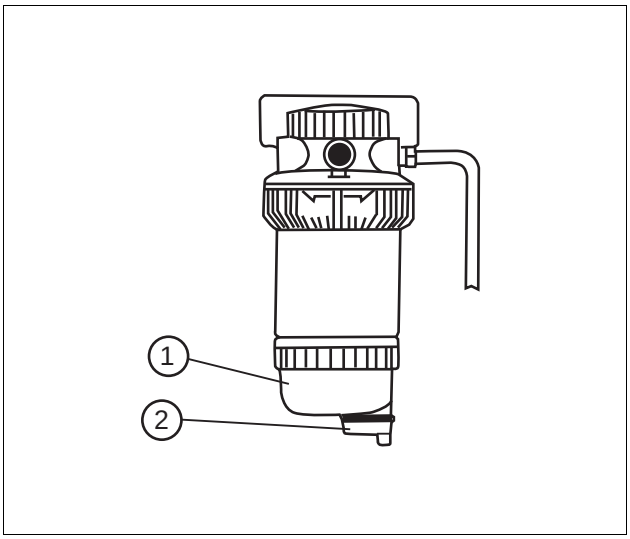


Fig. 40 Draining the water separator

7.8.4.3 Draining the fuel filter

- Open the fuel filter on the water drain (41/2) until pure fuel escapes.
- Close again the water drain.

7.8.4.4 Changing the fuel filter

- Clean the outside of the fuel filter (41/1).

Attention

- *Collect the fuel in a suitable container and dispose of according to regulations.*

- Open the water drain (41/2) on the filter bottom to drain fuel from the filter.
- Unscrew the filter housing (42/4) using commercially available tools and remove the filter housing along with the filter element from the filter flange.
- Push down the filter element against the springs on the filter element (42/1) and turn to the left to remove it from the filter housing (42/4).
- Dispose of the filter element according to regulations!
- Push down the new filter element (42/1) against the springs and turn to the right to snap it into place in the filter housing (42/4).
- Install the new seal (42/3) on the filter housing. Slightly wet the surface of the seal with clean fuel.
- Examine the thread (42/2) on the inside of the filter element for possible damage.
- Place the filter onto the filter flange and tighten by hand until the filter touches the flange. Tighten the filter manually by another quarter turn. Do not use any tools for this purpose.
- Close the drain valve (43/2) and remove the container.

Machine damage

due to air in the filter.

- *Before starting the engine, operate the fuel pump one minute to remove air from the filter.*

- Start the engine and check for leaks.

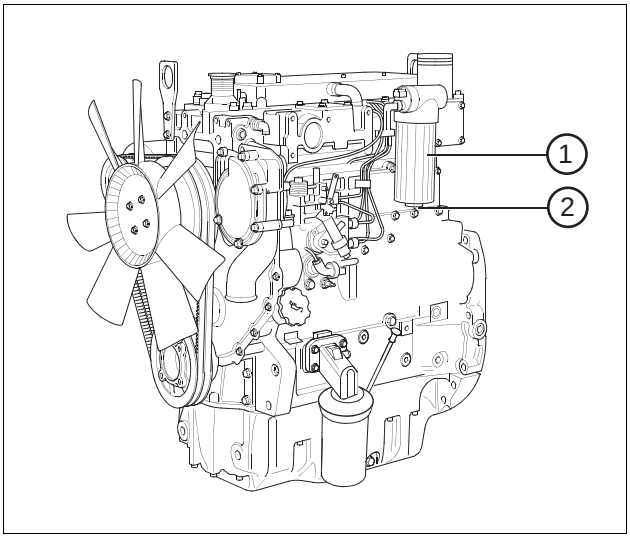


Fig. 41 Draining and replacing the fuel filter

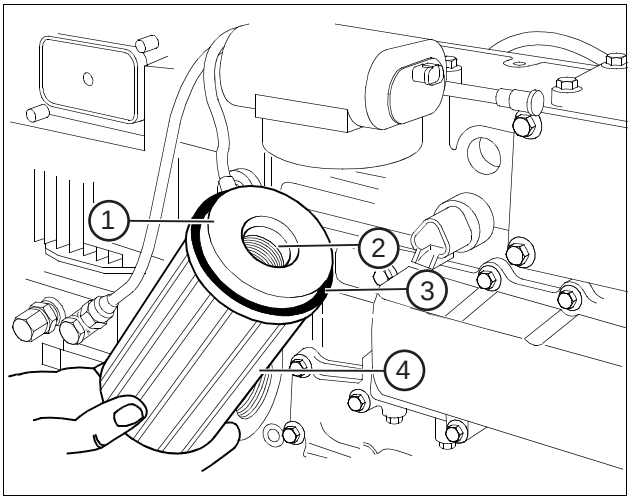


Fig. 42 Changing the fuel filter

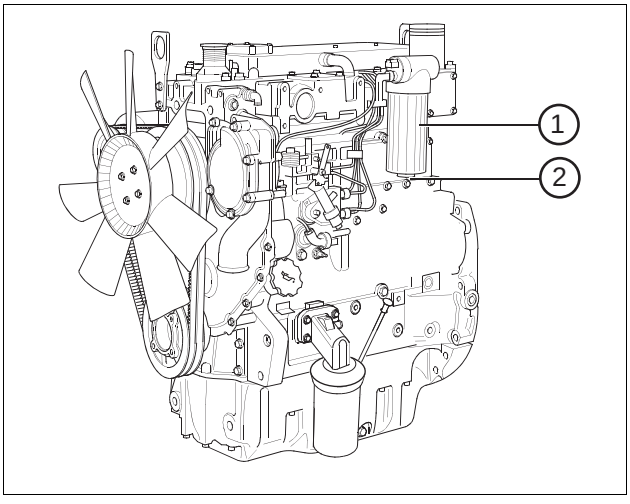


Fig. 43 Changing the fuel filter

7.8.4.5 Draining the fuel tank and cleaning the screen

- Drain water from the fuel tank through the water-drain plug (44/1).
- Clean the filling screen (44/2) and check for damage; replace if required.

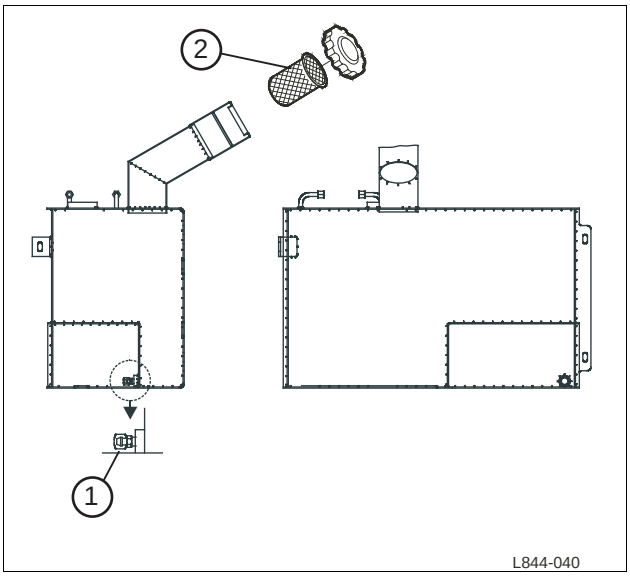


Fig. 44 Draining the fuel tank and cleaning the screen

7.8.5 Air filter, air intake

Machine damage

due to dust being drawn into the engine.

- *All maintenance work on the air intake system must be carried out with the engine off.*
- *Do not start the engine while the filter cartridge is removed.*

7.8.5.1 Cleaning the dust ejection valve

The dust ejection valve (45/1) is largely maintenance-free.

- Any baked-on dust can be removed by squeezing the valve together.

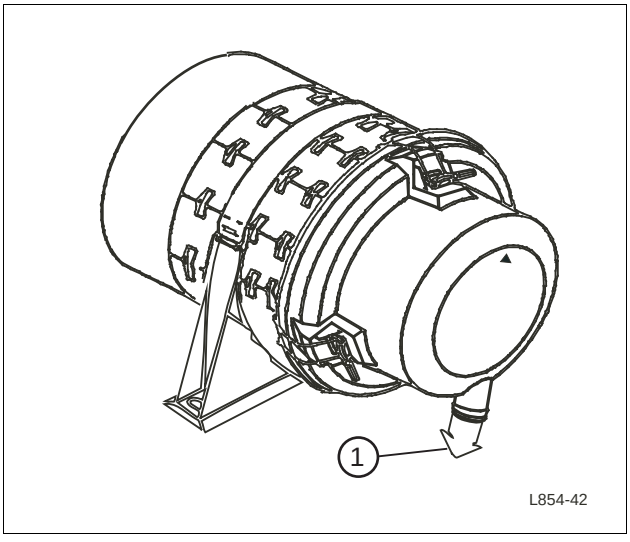


Fig. 45 Cleaning the dust ejection valve

7.8.5.2 Cleaning or replacing the air intake

- Check the air filter attachment and retaining straps for damage.
- Check the tightness of the air intake between the air filter and the engine.
- Examine rubber parts for damage and replace if necessary.

Attention

- Replace damaged parts immediately!

7.8.5.3 Cartridge maintenance interval

The air filter main cartridge must be replaced as soon as the filter maintenance indicator lamp (46/32) on the instrument panel lights up during operation.

Attention

A brief delay in maintenance does not result in lower filter efficiency.

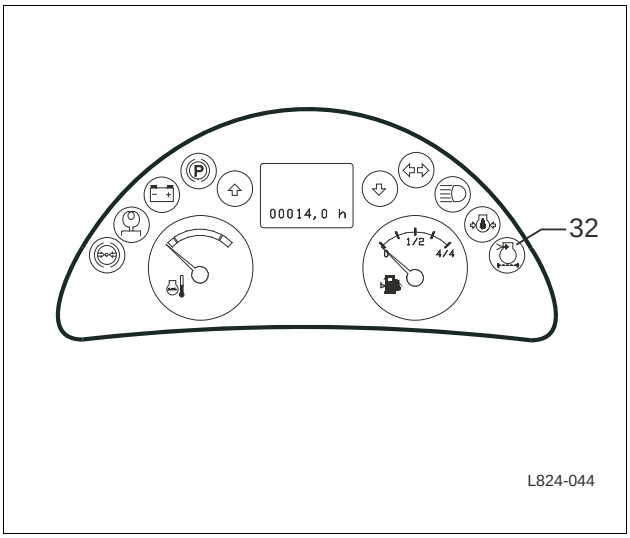


Fig. 46 Filter maintenance indicator lamps

7.8.5.4 Replacing the air filter safety cartridge:

– after the third maintenance of the main cartridge
– after 2 years of operation at the latest
– if the service indicator switches on after the main cartridge has just been serviced
– if the main cartridge is damaged
– if the safety cartridge is damaged

7.8.5.5 Changing the main cartridge

- Release the wire fasteners (47/1) and remove the bottom of the housing (47/4).
- Withdraw the main cartridge (47/2) by twisting slightly to and fro.
- Check whether the safety cartridge (47/3) must be replaced.

Attention

Remove the safety cartridge only in the case of necessary maintenance work. Only open the seal (47/5*) of the safety cartridge for the purpose of replacement*.

- Note down the date of maintenance in the appropriate sections of the safety cartridge (47/3).
- Insert the new or cleaned main cartridge carefully into the filter housing starting with the open side and check that it is correctly positioned.
- Fit the lower part of the housing. (Pay attention to the position of the dust extraction valve).
- Place the wire fasteners in the groove of the flange on the filter housing and tighten.

7.8.5.6 Changing the safety cartridge

- Remove the main cartridge.

Machine damage

due to damaged safety cartridge.

Observe that the safety cartridge must not be cleaned and used again once it has been removed.

- Using a suitable tool (e.g. screwdriver), pierce the seal (47/5) of the safety cartridge (47/3) from the inside, then lift up the two clips (47/6).
- Grasp the safety cartridge (47/3) by the two clips (47/6), withdraw by twisting slightly to and fro, and dispose of it.
- Insert a new safety cartridge and check that it is correctly positioned.
- Re-install the main cartridge.

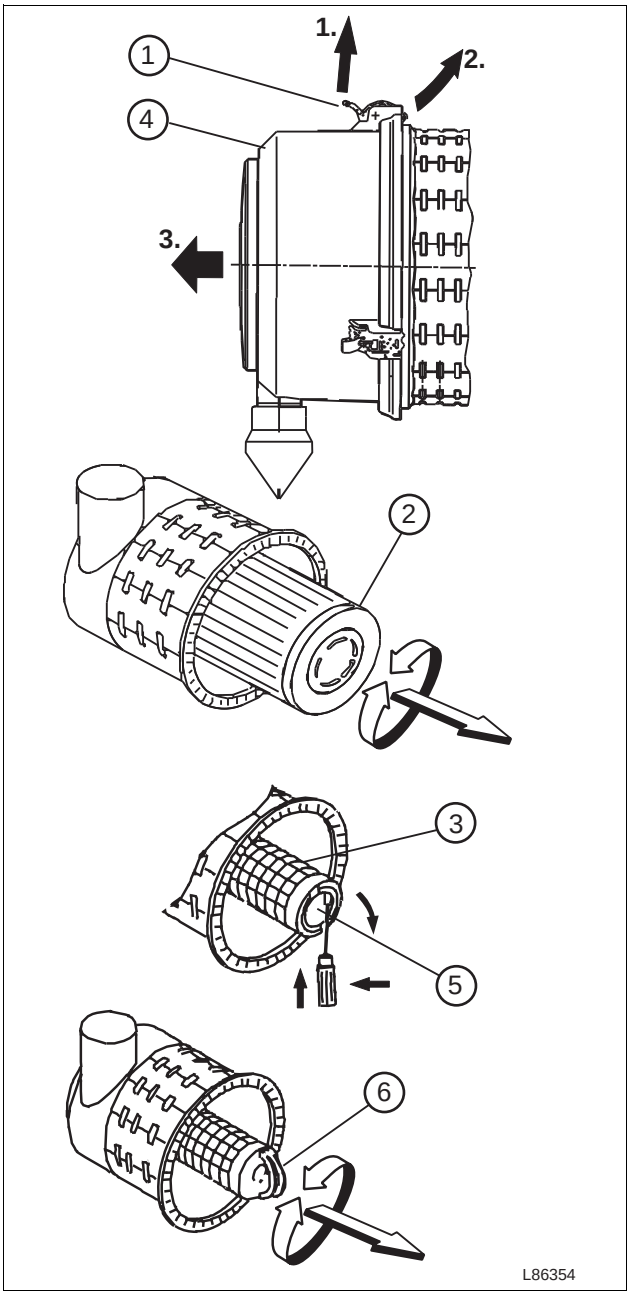


Fig. 47 Changing the air filter cartridges

7.8.5.7 Cleaning the main cartridge

Machine damage

due to damaged main cartridge.

Never wash or brush out the main cartridge.

When blowing out, ensure that dust does not land on the inside of the main cartridge.

- The main cartridge can be cleaned up to five times if necessary. It must be replaced once it reaches its maximum service life of two years, at the latest. The number of times it is cleaned must be marked.
- For cleaning (48/1), a pipe the end of which is bent at 90° should be attached to a compressed-air pistol. It must be sufficiently long to reach the floor of the cartridge. Blow out the main cartridge from the inside to the outside with dry compressed air (max. 5 bar) by moving the pipe up and down in the cartridge and continue until no more dust escapes.
- Check the clean main cartridge for damage to the paper bellows and rubber seals (48/2). Tears and perforations in the paper bellows can be determined using a torch.

Machine damage

due to damaged main cartridge.

Never continue to use damaged main cartridges. If in doubt, use a new one.

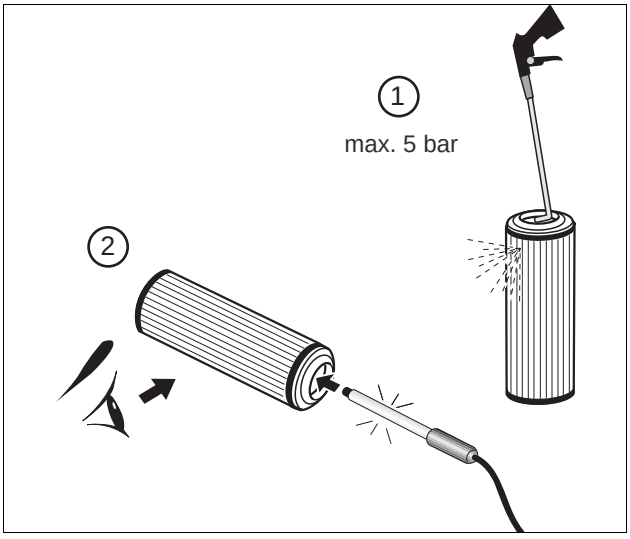


Fig. 48 Cleaning the main cartridge

7.8.6 Double V-belt

7.8.6.1 Checking the condition of the V-belt

Danger of injury

due to rotating V-belts.

- *Only check and tension V-belts with the engine off.*
- *Secure the engine against unauthorized starting.*

Attention

In the case of double V-belts, the following must be observed:

- *If one damaged or worn V-belt must be replaced, always change both V-belts together.*

- Visual examination of the complete V-belts; replace worn or damaged V-belts immediately.

7.8.6.2 Checking the V-belt tension

Attention

We recommend checking the V-belt tension using a V-belt tension measuring device.

- *Check the tension in accordance with the manufacturer's Operating Instructions.*

7.8.6.3 Checking without using a tension measuring device

- To check the tension, press the V-belt with your thumb in the middle of the greatest free length, and measure the sag.

Attention

Using medium thumb pressure of approx. 45 N (approx. 45 kg), the V-belt sag should equal 10 mm.

7.8.6.4 Tensioning the V-belt

- Slacken the fastening screws 49/1, 49/3 and 50/1.
- Rotate the generator (49/2) until the tension is correct.
- Re-tighten the fastening screws 49/1, 49/3 and 50/1.
- Check the tension again.

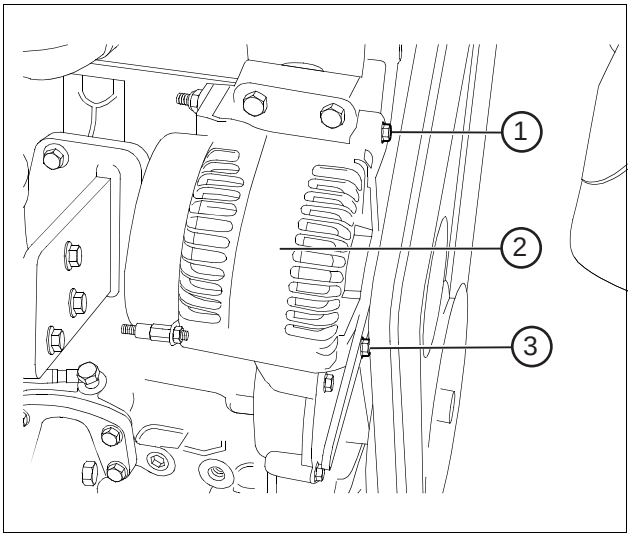


Fig. 49 Tensioning and replacing V-belts

7.8.6.5 Changing the V-belt

- Slacken the fastening screws 49/1, 49/3 and 50/1.
- Swivel the generator against the direction of tensioning.
- Remove the used V-belt and fit new one.
- Swivel the generator (49/2) in the direction of tensioning until the V-belt tension is correct.
- Re-tighten the fastening screws 49/1, 49/3 and 50/1.
- Check the tension again.

Attention

- *If V-belts have been replaced, their tension must be checked again after approx. 20 operating hours.*

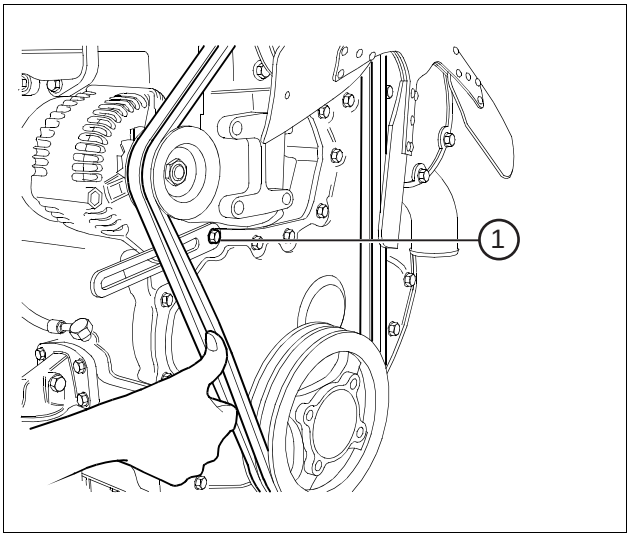


Fig. 50 Tensioning and checking V-belts

7.8.7 Checking the valve lash

- Test the valve lash (51/1) on a cold engine by placing a feeler gauge between the upper part of the tappet (51/3) and the rocker arm (51/2).

  The correct valve lash is as follows:
  Inlet valve = 0.20 mm
  Exhaust valve = 0.45 mm

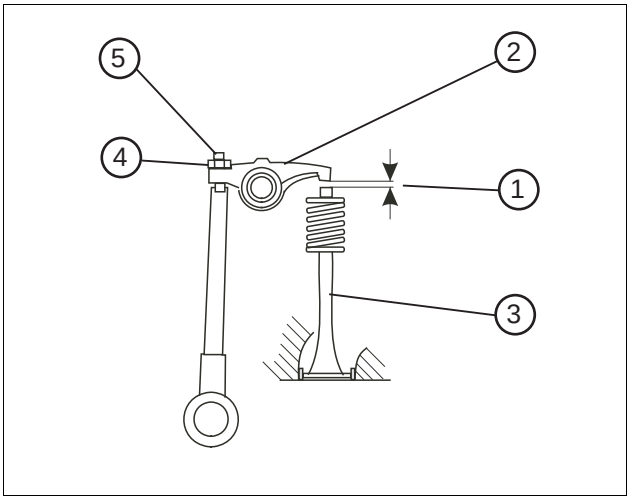


Fig. 51 Adjusting the valve lash

Adjust the valve lash, where necessary, as follows:

- Slacken lock nut (51/4).
- Using a screwdriver, adjust the setting screw (51/5) in such a way that the correct valve lash (51/1) is obtained when the lock nut is tightened.

Attention

The 1st cylinder is located at the front on the fan side of the engine.

Valve adjustment

- Remove the cylinder head cover.
- Turn the crankshaft in normal direction of rotation until the inlet valve 52/7 of cylinder no.4 begins to open; the outlet valve 52/8 of the same cylinder is not yet closed completely.
- Check the valve lash of valves 52/1 and 52/2 of cylinder no. 1 and adjust if required.
- Adjust the valves 52/3 and 52/4 of cylinder no. 2, as described above for the valves of cylinder no. 4, for overlap.
- Then check the valve lash of valves 52/5 and 52/6 of cylinder no. 3 and adjust if required.
- Adjust the valves 52/1 and 52/2 of cylinder no. 1 for overlap.
- Check the valve lash of valves 52/7 and 52/8 of cylinder no. 4 and adjust if required.
- Adjust the valves 52/5 and 52/6 of cylinder no. 3 for overlap.
- Check the valve lash of valves 52/3 and 52/4 of cylinder no. 2 and adjust if required.
- Re-mount the cylinder head cover along with a new seal.

Cylinderno.	**1**		**2**		**3**		**4**	
Valve no.	1	2	3	4	5	6	7	8
Valve **I = inlet** **E = outlet**	I	E	I	E	I	E	I	E

Table 30 Cylinder and valve numbers

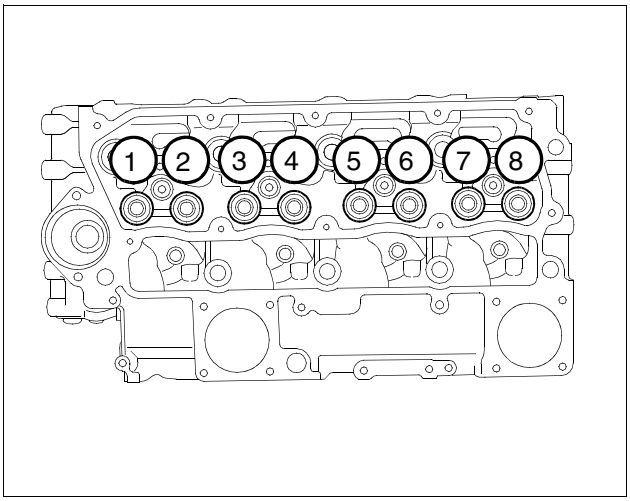


Fig. 52 Valve adjustment

7.8.8 Brakes

7.8.8.1 Checking the brake oil level

- Visual inspection (53/1) of brake oil level.

Danger to life
due to incorrect brake oil.

- *Only top up with ATF-oil!*

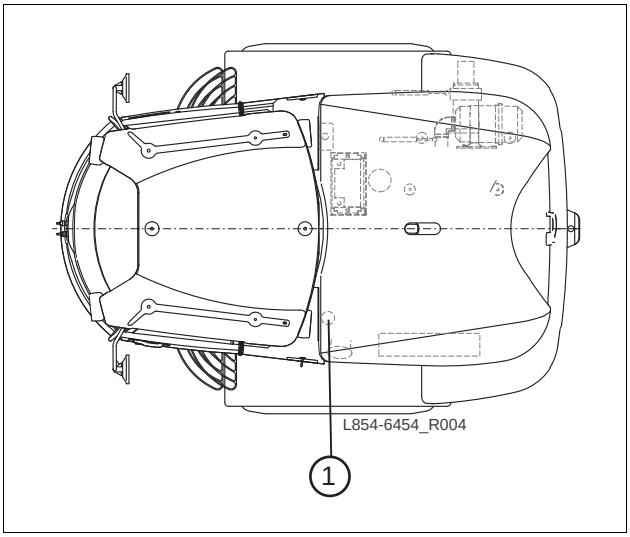


Fig. 53 Checking the brake oil level

7.8.8.2 Changing brake oil and bleeding the brake

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

Attention

- Use a bleeding device for changing brake oil and bleeding.

- Remove the cover on the front-end above the axle.
- Release the bleeder screw (54/1), connect the bleeder hose and insert it into collecting bottle.
- Connect the bleeding device to the brake oil container (53/1).
- Change brake oil and bleed the brake according to the Bleeding Device Operating Instructions.
- Remove the bleeder hose and re-tighten the bleeder screw.
- Release the bleeder screw (54/2) on the inch valve of the "travel" hydraulic pump; connect the bleeder hose and insert it in the collecting bottle.
- Perform the bleeding process.

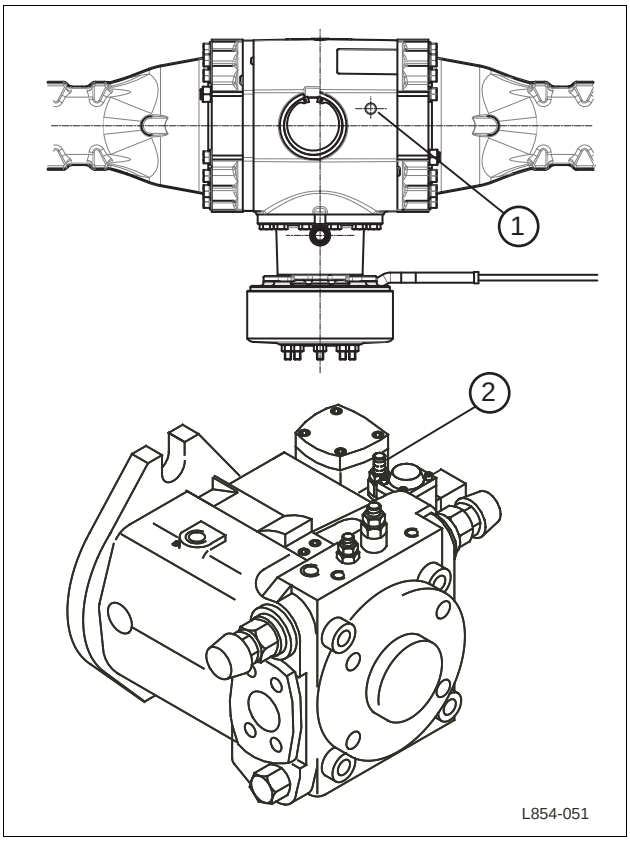


Fig. 54 Bleeding the brake

- Remove the bleeder hose and re-tighten the bleeder screw.

Attention

TL120S - The tasks listed in Chapter ➔ 7.8.8.3, must be performed, as well.

- Dismount the bleeding device and close the brake oil container using the original cover.
- Re-mount the cover on the front-end.

7.8.8.3 TL120 S - Changing the rear axle brake oil and bleeding the brake

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

Attention

Use a bleeding device for changing brake oil and bleeding.

- Release the bleeder screw (55/1), connect the bleeder hose and insert it into collecting bottle.
- Connect the bleeding device to the brake oil container (53/1).
- Change brake oil and bleed the brake according to the Bleeding Device Operating Instructions.
- Remove the bleeder hose and re-tighten the bleeder screw.
- Dismount the bleeding device and close the brake oil container using the original cover.
- Re-mount the cover on the front-end.

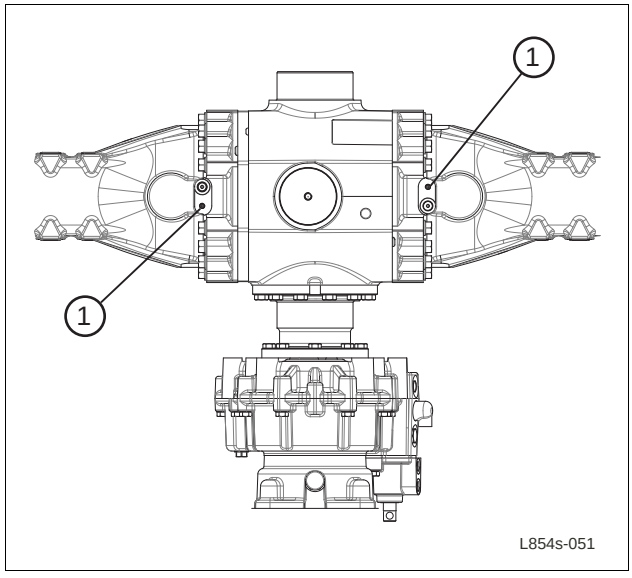


Fig. 55 Bleeding the rear axle brake of TL120S

7.8.9 Hydraulic oil tank

7.8.9.1 Checking hydraulic oil level

- Check the oil level using the oil dipstick (56/1); top up hydraulic oil if required.

7.8.9.2 Changing the hydraulic oil

Danger of scalding

due to hot oil getting into contact with skin or eyes.

- *Wear appropriate protective clothing/safety goggles.*

- Retract all hydraulic cylinders.
- Switch off the engine.
- Unscrew the oil dipstick (56/1).
- Remove the drain plug (56/4) on the hydraulic oil tank and drain oil into a clean receptacle.

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

- Flush and clean the hydraulic oil tank as required; to do so, completely remove the suction filter (56/2).
- Screw on the drain plug carefully.
- Fill up with clean hydraulic oil using the breather. To do so, remove the filter head (56/3).
- Screw back on the breather head.
- Screw back in the oil dipstick.

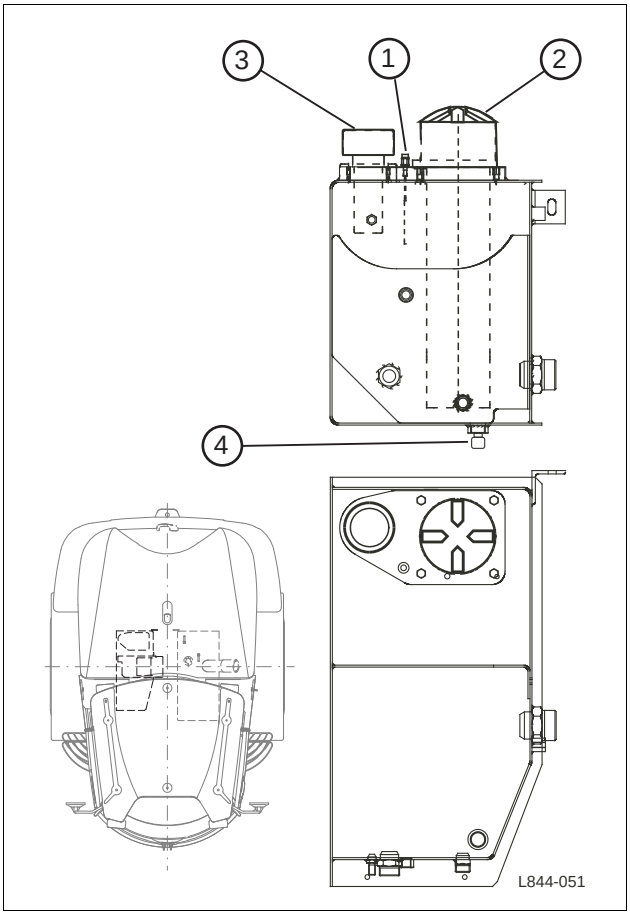


Fig. 56 Checking hydraulic oil level, changing the hydraulic oil

7.8.10 Hydraulic oil return filter

Attention

- *After a larger repair job, renew the filter cartridge following the test run.*

Changing the filter insert

- Switch off the engine.
- Unscrew the oil dipstick (57/1).
- With the aid of a tool, remove the filter cover (58/1).
- Remove the filter element (58/5) along with the inlet connection (58/3) by pulling and turning at the same time.
- Remove the filter element from the inlet connection and dispose of according to regulations.
- Ensure that the seal (58/2) in the cover and the O-ring (58/4) on the inlet connection are in faultless condition and replace any damaged parts.
- Push a new filter element onto the inlet connection and insert together in filter.
- Screw back on the filter cover (58/1) and tighten using a torque of 20 Nm.
- Screw back in the oil dipstick.
- Check the tightness of the filter by means of a test run.

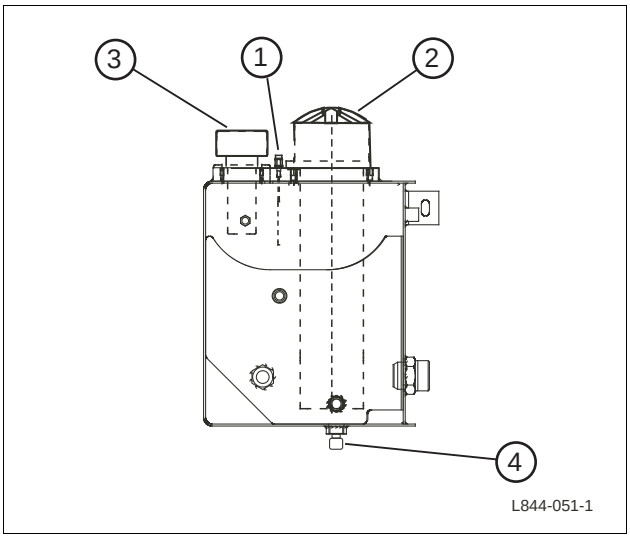


Fig. 57 Hydraulic oil tank

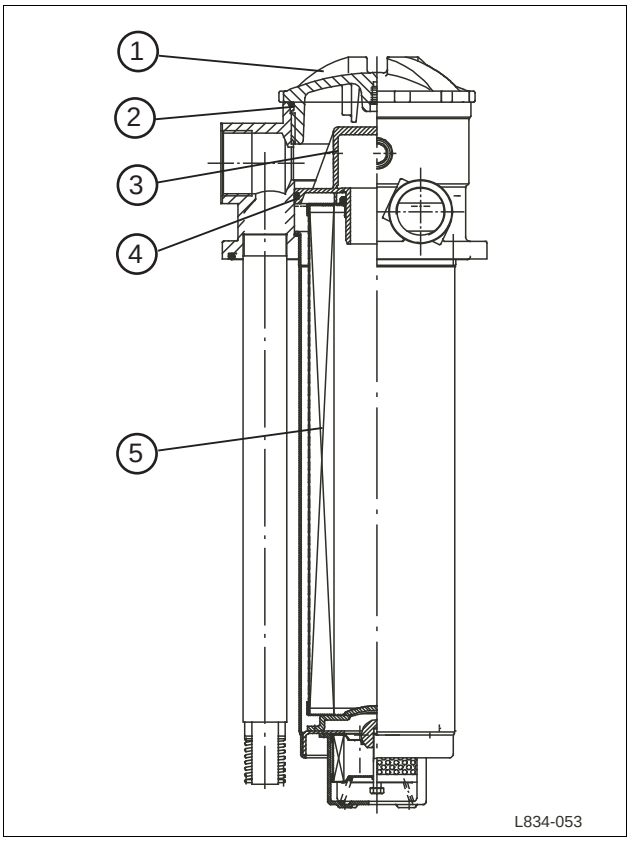


Fig. 58 Changing the filter insert

7.8.11 Replacing the breather

Attention

- *The breather must also be replaced if it is dirty, for example due to hydraulic oil vapor.*

- Unscrew the oil dipstick (59/1).
- Remove the breather (59/2) and dispose of according to regulations.
- Clean the screen (59/4) and check for damage; replace if required.
- Screw in new breather (59/2) with O-ring (59/3) and tighten by hand.
- Screw back in the oil dipstick.

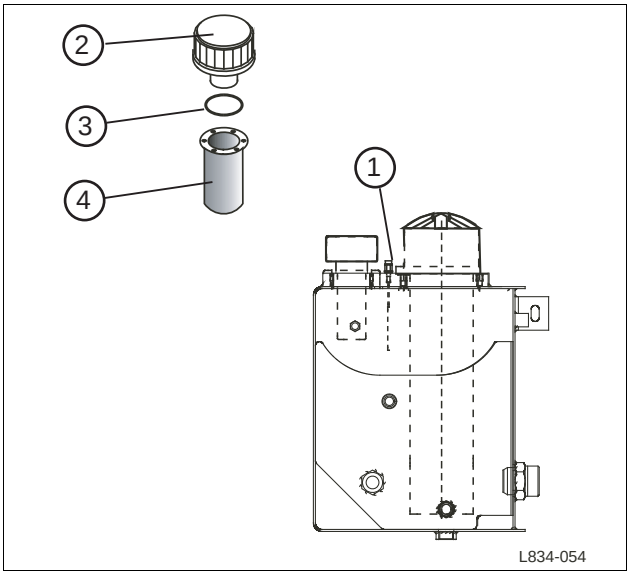


Fig. 59 Replacing the breather

7.8.12 Axles

General

The axle oil must be changed at operating temperature.

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

Machine damage

due to insufficient oil in axles.

- *After filling the axles with oil, move the machine for approx. 5 minutes to ensure that the oil is evenly distributed.*
- *After 5 minutes, check the oil level again, and top up if necessary.*

7.8.12.1 Front axle differential

Checking the axle oil level

- Remove the inspection plug (60/1) check and top up oil if required.

Changing axle oil

- Park the machine on a level surface.

Attention

- *Collect the waste oil in a suitable container and dispose of according to regulations.*

- Open the inspection plug (60/1) and the filler plug (60/3).
- Open the drain plugs (60/2) on the differential and drain oil.
- Flush out the axle if necessary.
- Carefully close the drain plugs (60/2).
- Pour in oil using the filling hole until oil escapes from the checking tap.
- Carefully close the inspection plug (60/1) and the filler plug (60/3).

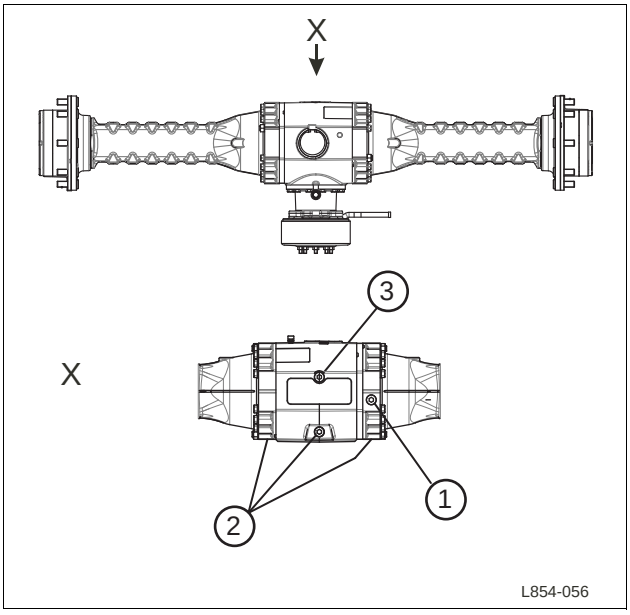


Fig. 60 Changing the axle oil of the front axle

7.8.12.2 Differential of rear axle with transmission

Checking the axle oil level

Remove the inspection plug (61/1), check and top up oil if required.

Changing axle oil

Attention

The rear axle differential and the transmission have combined oil filling.

Attention

- *If you have the TL120 S, please use Fig. 62 instead of Fig. 61 for the following operations. Fig. 62 shows the rear axle installed in the TL120S.*

- Park the machine on a level surface.
- Open the inspection plug (61/1) and the filler plug (61/3).
- Open the drain plugs on the differential (61/2) and the transmission (61/4) and drain oil.
- Flush out the axle if necessary.
- Carefully close the drain plugs.
- Pour in oil using the filling hole (61/3) until oil escapes from the checking tap.
- Carefully close the inspection plug (61/1) and the filler plug (61/3).

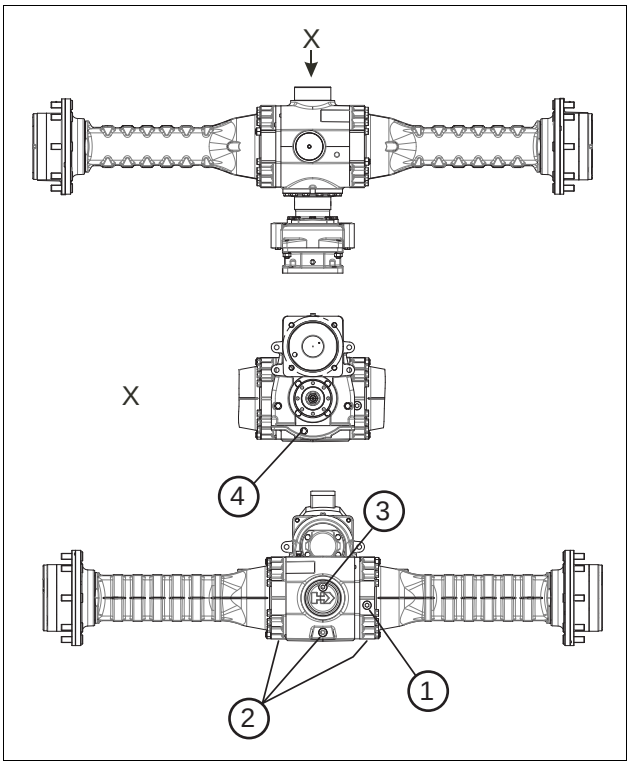


Fig. 61 Changing the axle oil of the rear axle

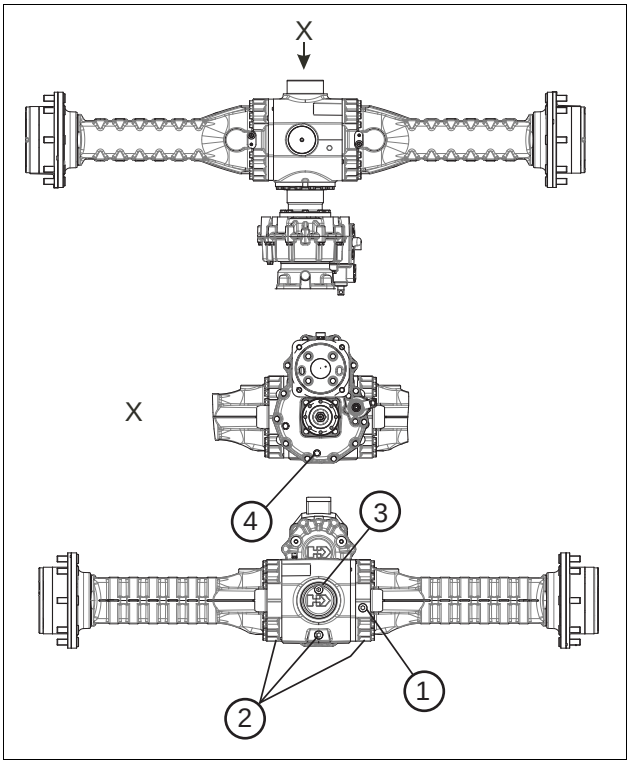


Fig. 62 TL120 S - Changing the axle oil of the rear axle

7.8.12.3 Wheel hub

Checking the axle oil level

- Remove the inspection plug (63/1), check and top up oil if required.

Changing axle oil

Attention

The wheel hub has a combined inspection, filler and drain plug!

- Turn the wheel until the screw plug (63/2) on the hub is at the bottom.
- Open the screw plug and catch the escaping oil.
- Flush out if necessary.
- Turn the wheel to the filling and inspection position; the inspection mark must be horizontal (63/1).
- Fill in oil up to the lower edge of the hole.
- Carefully close the screw plug.

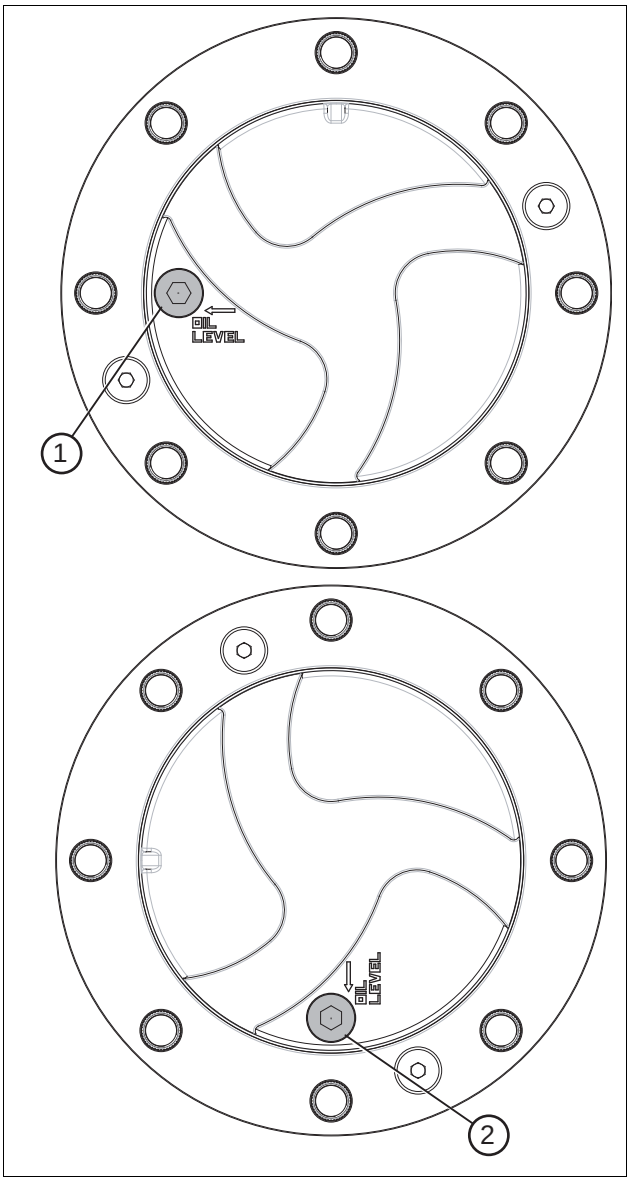


Fig. 63 Checking and replacing the axle oil

7.8.13 Wheels

7.8.13.1 Checking the tire pressure

- Check the air pressure in accordance with the pressure chart given in ➔ 3.8, 28.

7.8.13.2 Checking the tightness of wheel nuts

- During the first 50 operating hours, check the tightness of the wheel nuts (M 20 x 1.5) daily and subsequently every week, and tighten to the correct torque if necessary.

Attention

Note that the tightening torque of 460 Nm applies to the wheel nuts M 20 x 1.5.

- When fitting a wheel, tighten the nuts to the correct torque crosswise in several stages.

7.8.14 Injection valves

Injection valves must be checked by your service specialist.

7.8.15 Electrical equipment

7.8.15.1 Battery

The battery is located under the right-hand side flap.

Attention

Instructions from the battery manufacturer must be observed when using the battery for the first time.

- Only check the battery with the engine not running.
- The acid level should be approximately 10 mm above the edges of the plates. Top up with pure distilled water where necessary.

Attention

This check is not necessary for maintenance-free batteries.

7.8.15.2 Removing the battery

- First disconnect the battery ground cable (-) and then the positive cable (+).
- Slacken clamping bracket (64/1).
- Lift out the battery.

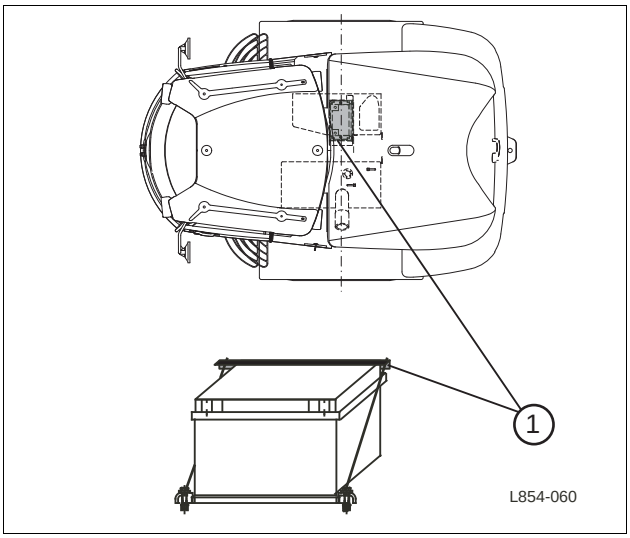


Fig. 64 Removing and installing the battery

7.8.15.3 Installing the battery

- Place the battery in the machine.
- Secure with the clamping bracket.
- Connect first the positive battery cable, then the ground cable.

Machine damage

due to interchange of terminals.

- *Ensure that the negative terminal is connected to the negative pole (–) and the positive terminal to the positive pole (+).*

Attention

Note that the battery charge should be closely monitored particularly in winter.

7.8.15.4 Checking lighting and warning equipment

- Check the function of the lighting equipment.
- Check the function of the indicator lamps.
- Check the function of the warning equipment.

7.8.16 Cab ventilation dust filter

The air intake for the heater and fresh air supply of the cab features a dust filter, optionally a charcoal/ pollen filter.

7.8.16.1 Removing the dust filter for cab ventilation

- Remove the ventilation louver (65/1).
- Remove the angle bracket (65/2).
- Remove the dust filter (65/3).
- Clean the filter or replace it.

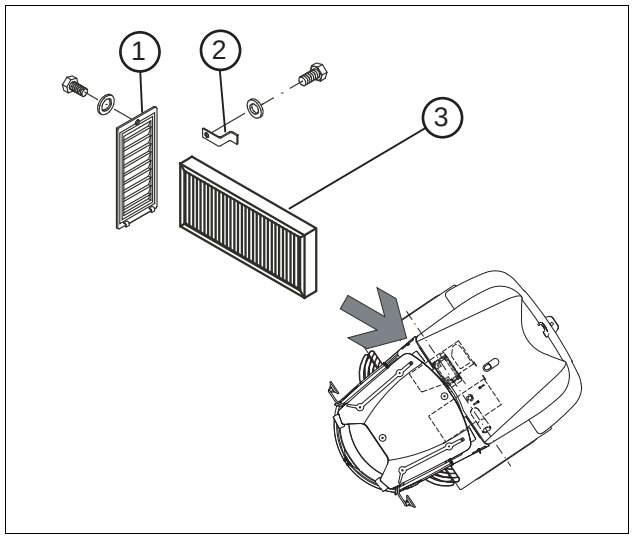


Fig. 65 Removing the dust filter for cab ventilation

7.8.16.2 Cleaning the dust filter

Attention

Never wash or brush out the filter.

- Knock the filter with the intake side (side covered by expanded metal) several times on a flat and hard surface.
- Using dry compressed air (max. 5 bar), blow against the direction of flow.
- Check the filter for damage to the paper bellows and seal.

Attention

Never continue to use damaged dust filters!

7.8.16.3 Installation

- Insert new or cleaned dust filter until the stop.

Attention

Observe the mounting position of the dust filter; the air flow arrows must point towards the cab.

- Fasten the dust filter with the angle bracket.
- Re-install the ventilation louver.

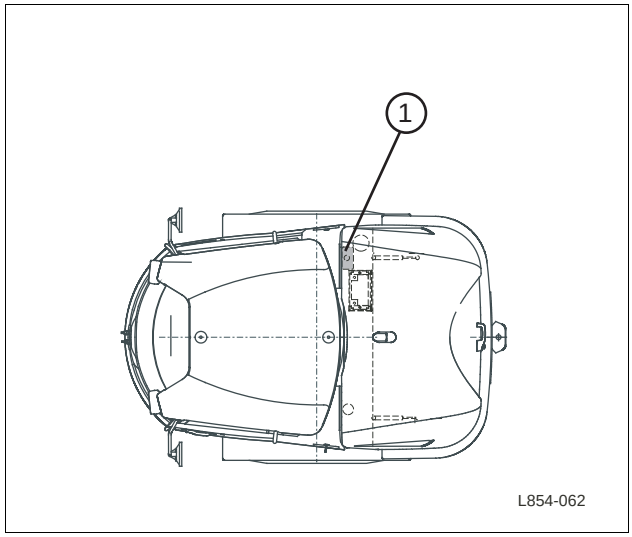


Fig. 66 Top up the windshield washer tank

7.8.17 Windshield washer system

- Topping up the windshield washer tank (66/1) as required.
- Add antifreeze when temperatures are around or below freezing.

7.9 Immobilization

7.9.1 Preservation (temporary immobilization)

Machine damage

due to damage to bearing (e.g. corrosion damage) if the machine has been out of use for more than three months.

- *Perform the preservation measures.*

Preservation measures:

- We recommend keeping the machine in a dry, dust-free room during the storage period.
- Thoroughly clean the inside and outside of the machine, including the engine.
- Lubricate the machine according to the lubrication plan.
- Check the oil levels of all assemblies such as axles, transmission(s), etc. and top up if necessary.
- Check the hydraulic oil level and top up if necessary.
- Repair any paint damage.
- Fill the diesel tank completely, to prevent corrosion of the tank walls.
- Check the antifreeze level in the coolant and adjust if necessary.
- Perform all the preservation measures contained in the diesel engine Operating Manual.
- Check the tire pressure according to the prescribed value and protect the tires from direct sunlight.
- Treat bare piston rods with a commercially available anti-corrosion agent.
- Remove and clean the battery and keep it according to regulations in a dry - in winter, frost-proof - room. Coat connections with a little pole grease.
- Seal off the air intake opening of the air filter system and the exhaust pipe opening.

7.9.2 During the immobilization

When the machine is out of use for 6 months, after this time all assemblies must be brought to operating temperature and maneuvered for approx. 15 minutes.

- Beforehand, the anti-corrosion coat must be removed from the piston rods, and the openings of the air filter system and the exhaust pipe freed.
- After the maneuvering cycle, preserve the machine once more as previously described.

7.9.3 After immobilization

Before putting the machine into operation once more, the following measures must be carried out:

- Anti-corrosion coat must be cleaned from the piston rods.
- Seal off the air intake opening of the air filter and the exhaust pipe opening.
- Remove the air filter insert, check its condition and replace if necessary.
- Clean the machine with a neutral detergent.
- Check and, where required, re-charge and re-install the battery.
- Carry out all measures for putting the diesel engine back into operation listed in the Engine Operating Manual.
- If the machine has been out of use for more than 6 months, the oil in the assemblies such as axles, transmission(s), etc. must be changed.
- If hydraulic oil filters such as suction and return filters as well as breathers have been out of use for more than 6 months, they must be replaced.
- Lubricate the machine according to the lubrication plan.

8 Trouble-Shooting

Operating problems are often the result of incorrect handling of the machine, the use of unsuitable materials or irregular maintenance.

The following Table presents a summary of a range of problems and their probable causes.

If a problem can only be eliminated through repair, then your responsible Service Agent must be called in.

8.1 Engine

All faults in the diesel engine must be examined as described in their specific Engine Operating Instructions.

During the warranty period, malfunctions must be dealt with by the responsible Service Agent or a specialist workshop.

8.2 Table of faults

Possible cause	Remedy
No steering movement	
Oil supply to pump interrupted	Check and repair suction line
Hydraulic pump damaged	Repair or replace
Priority valve damaged	Remedy fault (call Service Agent)
Steering cylinder damaged	Remedy fault (call Service Agent)
Steering cylinder damaged	Repair
Mechanical fault	Repair
Insufficient performance of service brake	
Wear of drum brake	Adjust or repair (call Service Agent)
Master brake cylinder damaged	Repair or replace (call Service Agent)
Mechanical fault	Repair (call Service Agent)
Insufficient performance of parking brake	
Wear of drum brake	Adjust or repair
Mechanical fault in brake actuation	Repair and/ or re-adjust
Hydrostatic travel drive without neutral position	
Switch for travel direction damaged	Repair or replace
Solenoids of valve damaged	Repair or replace
Neutral position incorrectly adjusted	Check, re-calibrate (call Service Agent)
Internal damage to travel pump	Replace travel pump
Engine idling too high	Re-adjust

Table 31 Table of faults

Possible cause	Remedy
Hydraulic oil exceeds max. admissible temperature	
Thermo switch damaged	Replace
Oil level too low	Top up oil to mark on dipstick
Oil cooler dirty or damaged	Clean, check and replace if required
Suction filter clogged	Replace
High-pressure valves do not respond all the time or too early	Check high-pressure valves, re-adjust or replace if necessary
Flushing circulation not functioning	Check pressure of flushing and charge pump, possible back pressure in cooling circuit, check housing pressure
Travel pump or travel motor damaged (wear)	Replace
Loader pump worn	Replace
Main pressure relief valve damaged	Replace
Sluggish acceleration and deceleration, too little propulsive power	
Insufficient engine power	Check diesel engine
Brake has got stuck	Check, remedy damage
No tank pressurization	Check ventilation filters and breathers, replace
Suction filter clogged	Replace filter
FAST-SLOW-gear not functioning due to electric or mechanical fault	Check power supply and solenoid valve, repair and replace if necessary Check travel motor
Fault in brake-inching device	Check, adjust, replace
Charge pump sucking up air	Check, eliminate leaks
Travel pump incorrectly adjusted	Re-adjust travel pump
Insufficient charge or supply pressure	Check pressure, adjust
Pressure relief valve of charge circuit dirty or damaged	Check, re-adjust or replace
Insufficient high-pressure	Check high-pressure; re-adjust or replace pressure cut-off and high-pressure valves if required.
Travel pump does not open fully, pilot pressure too low	Nozzles clogged, check, repair
Internal damage to travel pump or travel motor	Replace units
Travel motor mis-adjusted	Re-adjust travel motor

Table 31 Table of faults

Possible cause	Remedy
Transmission works in one direction only	
Switch for travel direction damaged	Repair or replace if necessary
Solenoid valve gets stuck or is damaged	Repair or replace if necessary
Power supply towards switch for travel direction or solenoid valve interrupted	Check and repair (incl. ground connection)
Pilot pressure too low on one side	Nozzles clogged, check, repair
High-pressure relief valve is faulty or incorrectly adjusted	Swap valves around. If machine now travels in the other direction, examine valve, clean and replace if necessary.
Transmission works in neither direction	
Too little hydraulic oil in tank	Top up oil to mark on dipstick
Mechanical connection to diesel engine faulty	Check, repair
Charge pump damaged, no charge pressure	Remove pump and examine, install new pump if necessary
Switch for travel direction damaged	Repair or replace if necessary
Solenoid valve for travel direction damaged	Repair or replace if necessary
Suction filter clogged	Replace filter
Suction line between tank and pump kinked	Check and eliminate kink
Power supply towards switch for travel direction and solenoid valve interrupted	Remedy cause of interruption
Internal damage to travel pump or travel motor	Replace units completely
Mechanical connection between travel motor and axle interrupted	Check, repair
Loader installation is not working	
Oil supply to pump interrupted	Check suction line and repair if required
Main pressure relief valve damaged	Check and replace if necessary
Hydraulic pump damaged	Check, repair or replace
Hydraulic pump drive mechanically interrupted	Check and repair

Table 31 Table of faults

Possible cause	Remedy
Decrease in machine's performance (loader installation)	
Insufficient engine power	Check diesel engine and adjust if necessary
Hydraulic oil level too low	Top up hydraulic oil to mark on dipstick
Pump is sucking up air	Tighten hose connections. Replace O-ring or seals
Insufficient operating pressure	Re-adjust main pressure relief valve, replace if necessary
Pump worn	Replace pump
Incorrect hydraulic oil	Quality of hydraulic oil must conform to our recommendation
Working cylinders are not working satisfactorily	
Seals in cylinders worn	Re-seal cylinders
Secondary valves faulty	Check secondary valves and replace completely if necessary
Faults in the electrical system	
Outside and/or internal lighting damaged	Check cables, connections, bulbs and fuses
Windshield wiper not working	Check cables, connections, and fuses Examine windshield wiper for mechanical damage, replace if necessary
Horn not responding	Check cables, connections, and fuses Replace complete horn if required
Control organs are imprecise	Determine the fault or source of the problem, call Service Agent if necessary
Starting system does not work satisfactorily	Check charge capacity of battery Test starter function Check connection and condition of power and battery ground cables Check function of ignition lock, replace if necessary

Table 31 Table of faults

9 Appendix

9 Appendix

9.1 Hydraulic system

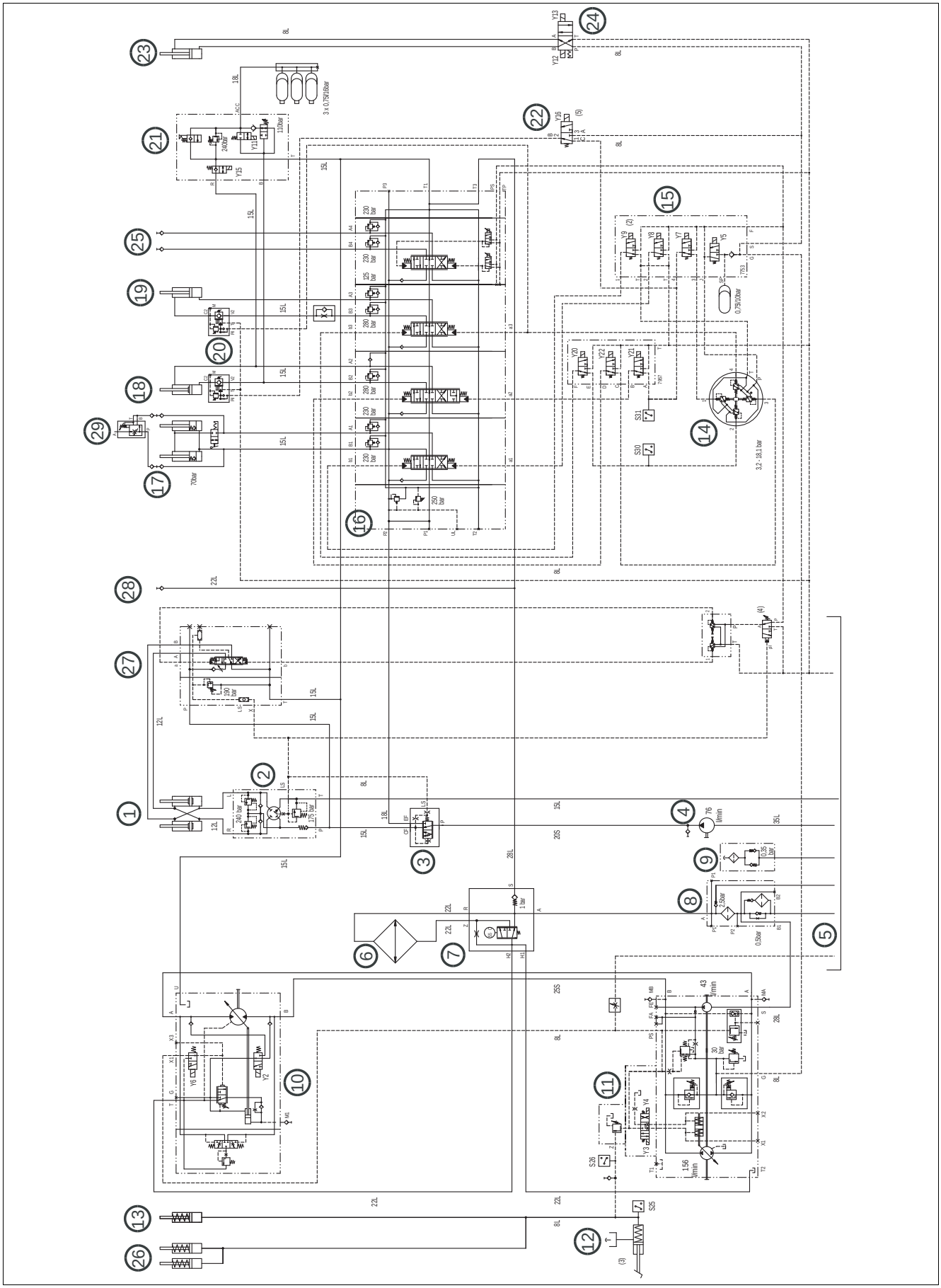


Fig. 67 Hydraulic system including options

Position	Designation
1	Steering cylinder
2	Steering control unit
3	Priority valve
4	Steering / loading pump
5	Hydraulic oil tank
6	Hydraulic oil cooler
7	Hydraulic oil temperature control
8	Combined hydraulic oil filter
9	Breather
10	Travel motor
11	Travel pump
12	Master brake cylinder
13	Front axle brake
14	Loader control lever (Joystick, right – Working)
15	Pilot control unit
16	Control valve (triple as standard; fourfold as an option)
17	Additional control circuit connection; hydr. quick-mount hitch
18	Hydraulic cylinder - lift frame
19	Hydraulic cylinder - bucket tilt
20	Load-retaining valves
21	Vibration damping
22	Release valve (only if Pos. 20 and 21 installed)
23	Manual transmission (high-speed version)
24	Valve (high-speed version)
25	4th control circuit
26	Rear axle brake (high-speed version)
27	Joystick, steering (option)
28	Open return (option)
29	Distributor for hand-held hammer (option)

Table 32 Legend Fig. 67 Hydraulic System

9.2 Equipment options

9.2.1 Ride control system (LSD)

Depending on the machine's operating weight, road conditions, and speed, there may be pitching oscillations when driving wheel loaders.

Reducing pitching oscillations, the ride control system offers the following advantages:

– higher transport speed

– improved material-handling performance

– more stable steering performance

– shorter braking distance

– increased ride comfort

Attention

Load-retaining valves (option) are without function as long as the ride control system is activated!

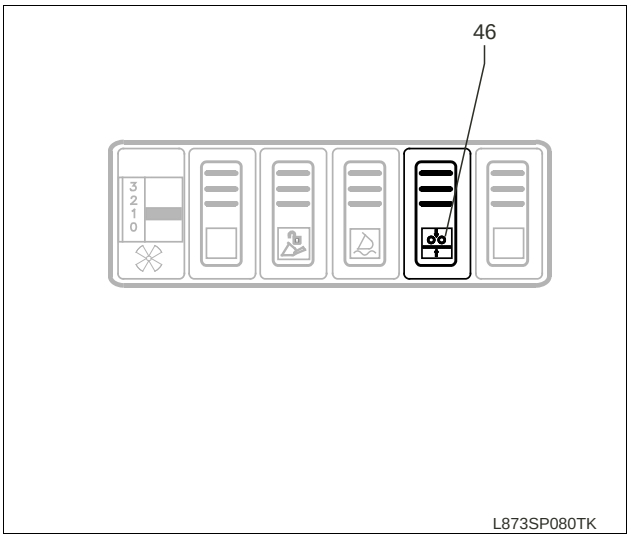


Fig. 68 Operation

Operation

- Switch on the ride control system (68/46)
  - green indicator lamp is ON.

The ride control system is automatically activated as soon as the travel speed is more than 6 km/h.

Attention

The bucket tilt cylinder must not be at a cylinder stop (bucket not completely tilted back) as otherwise free oscillation is not possible.

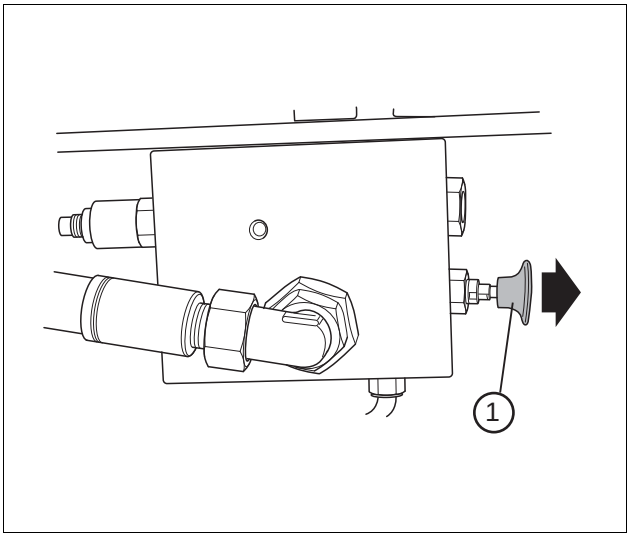


Fig. 69 Pulling the button

Repair

Danger to life

due to pressure in the hydraulic system.

Before working on the loader hydraulic system, the accumulator pressure of the ride control system must be let off.

To do so, proceed as follows:

- *Stop the machine in the proper manner.*
- *Switch off the ride control system* (68/46)*.*
- *Remove the front-end cover.*
- *Pull button (69/1).*

Handing over the machine and instructing the operator

The following checklist should be followed when handing over the machine to the operator:

1. Operating Instructions

Go through the Operating Instructions (page by page) and explain them in detail through practical training on the machine. Items which are particularly important include:

– Accident Prevention Regulations published by the employer's liability insurance associations in the user's country
– Technical specifications
– Operator controls, indicating and warning elements
– Checks before putting the machine into operation
– Diesel engine running-in instructions
– Starting and stopping the diesel engine
– Explanation of hydrostatic travel drive
– Driving, speed ranges, notes for driving on roads
– Recovery and transport of the machine
– Operation of all functions
– Operation of quick-attach system
– Explanation of maintenance intervals and points according to Maintenance and Inspection Plan by demonstrating and explaining maintenance points on machine
– Lubrication intervals and points of lubrication according to lubrication chart and demonstration of these points on the machine
– Handing-over of Diesel Engine Operating Instructions

2. Spare Parts List

– Structure of Spare Parts List, Figures and the associated texts
– Instructions for ordering spare parts - always state the type of machine, the vehicle identification number ("Fz-Id.Nr."), parts designation, complete spare part number, number of pieces, delivery address, etc.

3. Warranty

– Explanation of warranty offered by manufacturer
– Explanation of inspection cards and note on maintenance and inspection plan
– The warranty/handing-over card must be filled out correctly and sent back to the manufacturer

Wheel Loader

TL120

Maintenance and Inspection Plan

(for trained dealer service personnel)

The careful performance of all prescribed inspections is the best prerequisite for the machine's continuous readiness for operation.

The inspections are obligatory. If omitted, this may affect the warranty covered by us.

The following applies to maintenance and inspection work:

- The machine must be thoroughly cleaned before inspection takes place.
- All maintenance work specified should be performed in the prescribed sequence with the machine at operating temperature.

Inspection plan

Work to be carried out by trained specialist dealer personnel.

O = Checking, maintenance X = Replace Perform work with machine at operating temperature		Operating hours after 100	every 500	every 1000	every 2000	min. 2 x annually	min. 1 x annually
1	Check whether machine-specific instruction book is in the machine.	O	O				
2	Change engine oil.		X				X
3	Change engine oil filter.		X				X
4	Drain water from fuel tank.	O	O			O	
5	Change fuel filter.		X				X
6	Check the air intake.	O	O				
7	Replace the air filter main cartridge.	according to the service indicator					X
8	Replace the air filter safety cartridge.	as required [1]					
9	Clean cooling fins on the hydraulic oil cooler. ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O	
10	Clean cooling fins of water cooler (combined cooler). ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O	
11	Check antifreeze level in coolant.						O
12	Change coolant.	as required [1]					
13	Check V-belt tension.	O	O				
14	Check engine mounts and pump attachments.	O	O				
15	Check engine speed adjustment, upper and lower idling speeds.	O	O				
16	Check valve lash of engine and adjust if necessary.			O			O
17	Check injection valves.			O			
18	Check crankcase breather in valve cover.				O		
19	Check acid level and battery connections.	O	O				
20	Check condition of tires, tire pressure and tightness of wheel nuts.	O	O				
21	Check fastening of axles and propeller shaft.	O	O				
22	Check bearing bushings and bolts of work equipment and replace if necessary.	O	O				
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O				
24	Check that door catches function perfectly, and replace if necessary.	O	O				
25	Clean or replace the dust filter for cab ventilation.	O		X			X
26	Check electrical indicating and warning elements and lighting equipment.	O	O				
27	Check smooth running of operator controls and adjust if necessary.	O	O				
28	Check for leaks in all pipes, hoses, control valves, hydraulic pumps, cylinders, etc. ***Attention*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
29	Check or change hydraulic oil.	O	O	X [2]			X
30	Replace insert of hydraulic oil return suction filter.	X	X			X	
31	Replace breather.			X			X
32	Check function of brakes, replace brake oil.	O	O		X		X
33	Bleed brake.	O	O				
34	Differential – rear axle with transmission / Option: manual transmission: oil check or oil change resp.	X	O	X			X
35	Differential – front axle oil: check or oil change resp.	X	O	X			X
36	Wheel hubs of front and rear axles: oil check or oil change.	X	O	X			X
37	Grease machine according to overview of lubricating points.	O	O				
38	Check function, condition and completeness of safety devices.	O	O				
39	Hydraulic function check with pressure function test.	O	O				
40	Test run and test work.	O	O				
41	Initial inspection card and return to manufacturer.	O	O [3]				

Table 33 Inspection plan

[1] *At least once every two years.*

[2] *Extension of oil change intervals after an oil analysis and laboratory report* ➔ *7.2, 60.*

[3] *Within the warranty period.*

10 Keyword index

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