Operating Instructions

SCHAEFF TEREX

Wheel Loader

SKL 823 Basic

AUSGABE • EDITION

2002-08

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

823/0772>

SCHAEFF-TEREX GMBH&CO KG • D-74595 LANGENBURG

Hauptverwaltung/Verkauf Direction générale/Vente Central administration/Sales	Kundendienst Service après-vente Service department	Ersatzteile Pièces de rechange Spare parts
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Order no.: *6 481 022 015*
Vehicle identity no.: *823/0772>*
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1 Introduction

1.1 General

You decided to buy a **SCHAEFF SKL 823 Basic Wheel Loader**.

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

These operating instructions contain all information necessary for the correct use of the machine. Please read them carefully before putting the machine into operation and make sure that they are kept at hand at all times.

If you require additional information or if any point is unclear, please contact your dealer immediately.

Special equipment and attachments are not included in these operating instructions.

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.

*Any modifications of **SCHAEFF** 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 state the vehicle type and the vehicle identity number (1/1) when making inquiries or orders, and in all written correspondence.

*The **vehicle identity number** of the machine is stamped on the identification plate located below the cab, on the front right-hand side.*

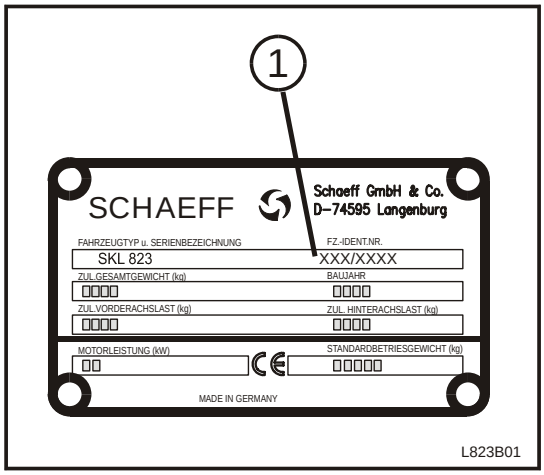


Fig. 1

1.2 Warranty and Maintenance

The warranty period covers **1,000 operating hours**, not exceeding a maximum of twelve months, whichever comes first, 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 **SCHAEFF** 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 lubricants will prevent malfunction.

Trained specialist personnel are responsible for any servicing of the machine which requires expert knowledge. Inspections and repairs must therefore be carried out by your dealer's customer service.

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 in order to ensure that the machine is constantly in good working order and enjoys a reasonable service life.

Insist that only **original SCHAEFF spare parts** are used in the event of any repair work. In this way, you will have a product of lasting high quality, thereby ensuring that your machine maintains its original condition.

1.3 Notes on using the instruction book

References to pictures and items

The references to pictures and items contained in the text, such as "Figure 12/4" mean Figure 12, Item 4 (Bild = Figure).

The Figures shown in this list partly contain additional equipment.

Symbols

"DANGER"

This symbol is employed for a high risk of injury to persons. It is essential that the safety notes are observed.

"WARNING"

This symbol is employed for information whose non-compliance may lead to severe material damage. It is essential that the safety notes are observed.

"NOTE"

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 Environmental requirements

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 oil
- Hydraulic oil
- Fuel
- Coolants
- Cleaning fluids containing solvents

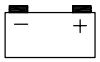
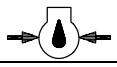
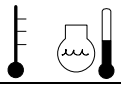
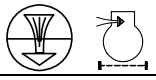
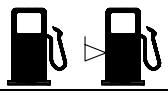
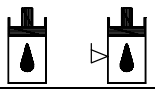
are not allowed to come in contact with the soil or the water system.

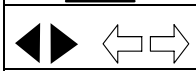
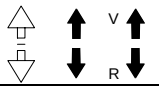
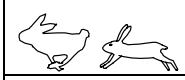
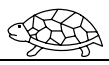
These substances must be stored in suitable containers and must be properly transported, collected and disposed of.

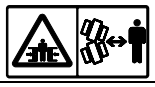
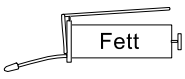
If the substances listed above do reach the soil, the leak or outlet must be stopped immediately and the fluid must be cleaned up with a suitable absorbent material. If necessary, the soil involved must be removed. Absorbent materials and removed soil must be disposed of properly. Applicable environmental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

1.5 Pictograms

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

Symbol	Description
	Danger
	In Operating Instructions: WARNING On machine: CAUTION
	Note
	Battery charge indicator
	Pre-heating
	Engine oil pressure
	Engine oil temperature
	Engine oil level
	Coolant temperature
	Coolant level
	Air filter
	Fuel / Fuel level
	Fan Heater / Ventilation
	Windshield wash/ wipe system
	Hydraulic oil Hydraulic oil level

Symbol	Description
	Hydraulic oil temperature
	Hydraulic oil filter clogging indicator
	Horn
	Operating status Operating hours
	Parking brake
	Brake accumulator pressure
	Hazard warning system
	Direction indicator, left/ right
	Working floodlight(s)
	High beam indicator
	Direction of travel, forward/ reverse
	Rotating beacon
	Lashing points
	Suspension point for loading by crane
	Travel speed, fast
	Travel speed, slow

Symbol	Description
	Working hydraulics cut-off
	Unlocked
	Locked
	Float position
	Engine speed control
	Only shift at standstill
	High speed
	First-aid kit
	Fire extinguisher
	Bucket return positioning Lift frame height limitation
	Shock absorption
	On machine: Keep safety distance
	Danger of crushing
	Danger of injury
	Observe notes in Operating Instructions
	Grease gun Lubricating point

1.6 Copyright

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

2 Safety and Prevention of Accidents

2.1 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” (VBG 40) and “Vehicles” (VBG 12) 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 road safety measures 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.

2.2 Proper use

The earth-moving machine with standard loader 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, and any non-compliance with the manufacturer’s instructions is regarded as improper use. The manufacturer shall not be liable for damage resulting from improper use. This risk is borne solely by the plant operator.

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.

2.3 General safety notes

It is important to refrain from any working methods which impair safety.

The earth-moving machine is only to be used when it is in a safe, operational condition.

The manufacturer's 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 devices on earth-moving machines shall not be deactivated or removed.

Protective work clothing must be worn during operation. Rings, scarves and unbuttoned jackets are to 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 (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.

Open doors, windows, covers, flaps, etc. must be closed or secured so that they cannot slam shut.

2.4 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
- 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 is 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 free of dirt, grease, oil, ice and snow.

2.5 Danger zone

- No one is 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 movements of the earth-moving machine during operation, its work implements and attachments, or by swinging out or falling loads.
- The machine operator is only to work the earth-moving machine when the danger zone is free of personnel.
- The machine operator must give a warning signal to persons who may be in danger.
- The machine operator shall stop work with the earth-moving machine if anyone 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.

2.6 Transport of persons

The transport of persons on the machine is forbidden.

2.7 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 shall 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.

2.8 Travel operation

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.

A safety belt (seat belt), if installed, must always be fastened.

The windows must be clean and free 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 transmission mode for the terrain must be selected and the gear lever shall not be moved during downhill travel (high gear or low 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 noted 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 in compliance with 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 construction sites, traffic regulations should be applied in the proper manner. This should also apply with regard to drivers’ licenses.

2.9 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 is only to swing the work equipment over occupied driver’s seats, operator consoles and workplaces of other machines when 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 when equipment has to be slewed overhead.

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

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

2.10 Guides

Guides must be easily recognizable, e.g. by means of reflective clothing. They must remain within the machine operator's field of sight.

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

2.11 Danger of falling objects

Earth-moving machines are only to be used where there is a danger of falling objects when the driver's stand has a canopy (FOPS). A front guard must be employed if there is a risk of materials breaking 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 if the machine is equipped with canopy, cab-mounted front guard and the appropriate work implement.

See regulations book "Demolition work" (ZH 1/614) published by the Tiefbau-Berufsgenossenschaft (the employer's liability insurance association).

2.12 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.

2.13 Working in the vicinity of overhead power lines

When the earth-moving machine is being used in the vicinity of overhead power lines and trolley wires, a safety distance which varies depending upon 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 Volt	Safety distance in meters
- 1000 V	1.0 m
over 1 kV - 110 kV	3.0 m
over 110 kV - 220 kV	4.0 m
over 220 kV - 380 kV	5.0 m
nom. voltage unknown	5.0 m

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.

During work in windy conditions, both overhead lines and work equipment may swing out, 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 be, e.g.

- Switching off the current
- Re-routing the overhead line
- Cabling, or
- Limiting the work zone of earth-moving machines.

2.14 Operation in closed rooms

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

2.15 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 shall not leave the earth-moving machine when 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).

2.16 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 work equipment must be secured against movement by lowering it to the ground or equivalent measures, e.g. cylinder supports, trestles. With the engine running, the unprotected articulation range of articulated loaders shall not be entered.

When jacking up earth-moving machines, 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 with work 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. These requirements are only to 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 in the hydraulic system.

Before working on the electrics 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, the battery 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 when 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.

Alterations, such as welding of the hydraulic system, are only to be undertaken with the manufacturer's permission.

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

Only the hoses specified by the manufacturer are to be used.

Hydraulic hoses must be routed and assembled by expert personnel.

In the vicinity of fuel or batteries, smoking and naked flames are prohibited.

2.17 Recovery, loading, transportation

Earth-moving machines are only to be loaded onto recovery vehicles when adequate towing vehicles are used.

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

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

The traveling gear and track-laying gear 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.

2.18 Monitoring and inspections

The machine must be submitted to a general inspection in compliance with the existing UVV-regulations (Accident Prevention Regulations). 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 essential modifications have been made
- at least once a year
- in the meantime, in compliance with operating conditions and local environments

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

Prior to every work shift, the machine operator must check the earth-moving machine in compliance with 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 is only to be checked after the engine has cooled down; the cap must be turned carefully 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 shall not be used until these have been eliminated.

2.19 Fire protection

The fire extinguisher must be kept in the cab. The fire extinguisher symbol must be attached.

2.20 Emergency exit

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

2.21 Other dangers

Failure of hydraulic system

If the hydraulic system fails because the diesel engine is not running, the hydraulic pump is defective or hydraulic oil has been lost, only the **EMERGENCY functions**

- manual steering (without power assistance) and
- lower work equipment (only if ignition is switched on)

can be performed.

3 Technical Data

3.1 Views

- General-purpose bucket

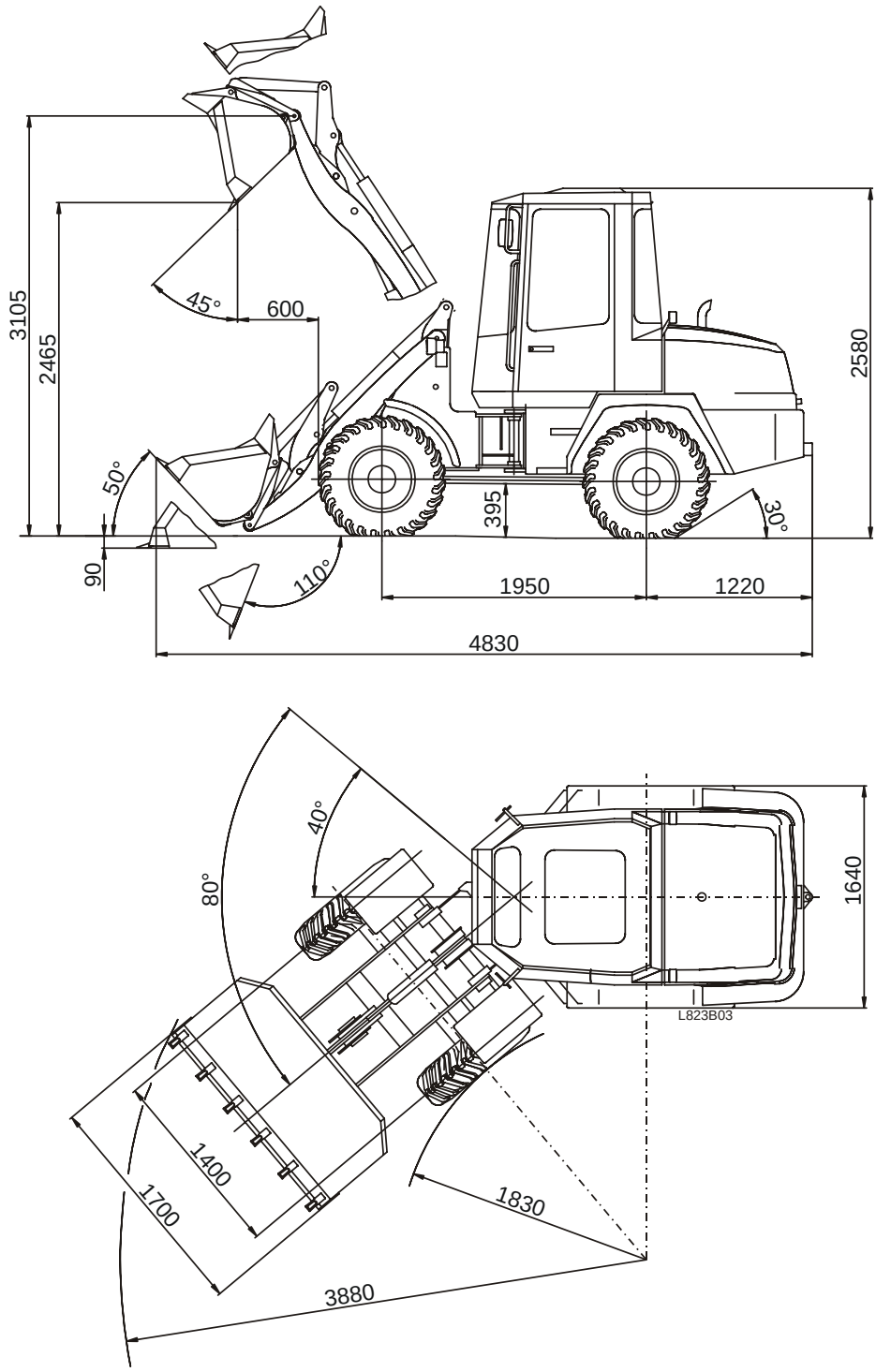


Fig. 3

10.5-18 MPT tires mounted

- Multi-purpose bucket

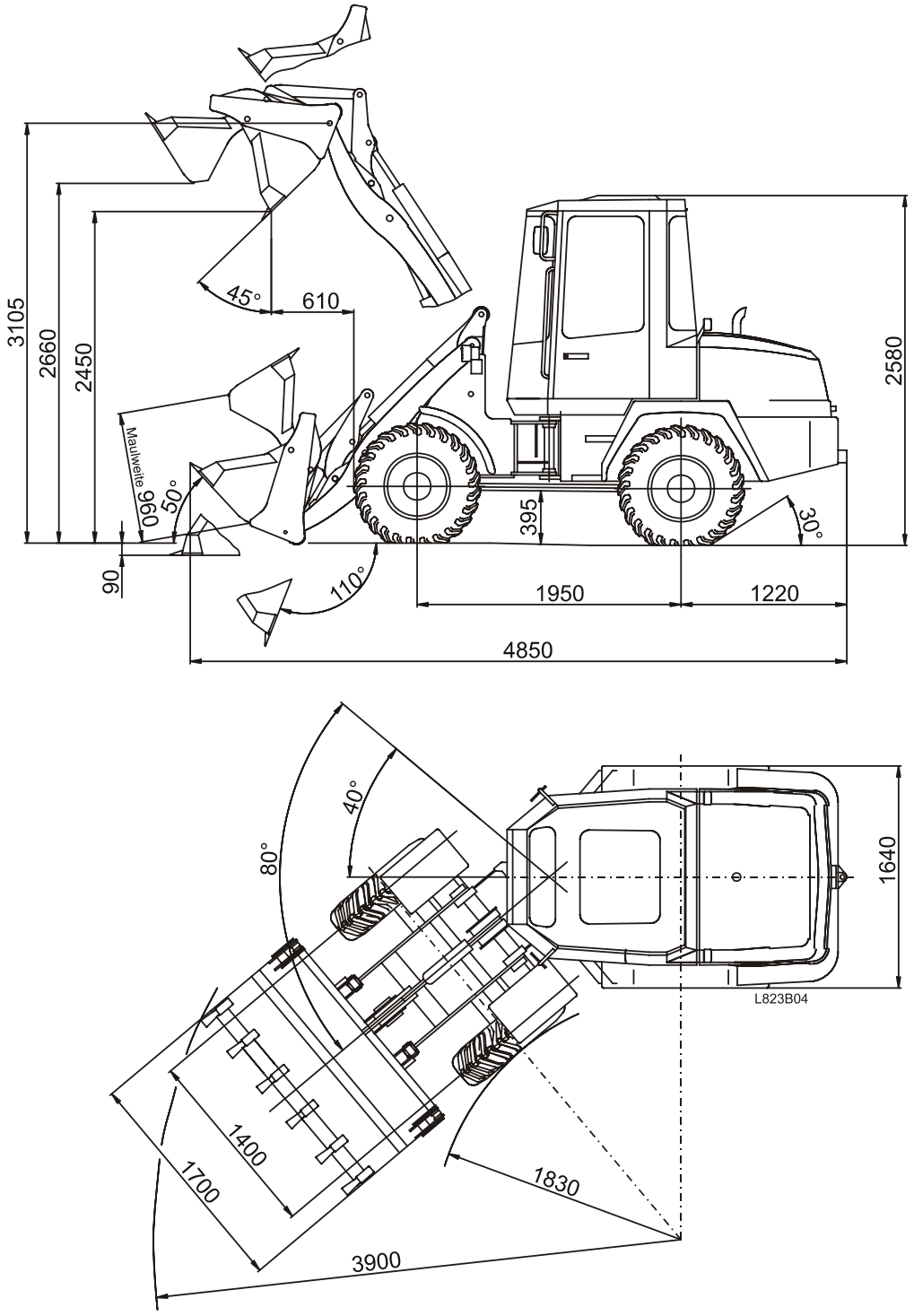


Fig. 4

10.5-18 MPT tires mounted

- Fork lift attachment

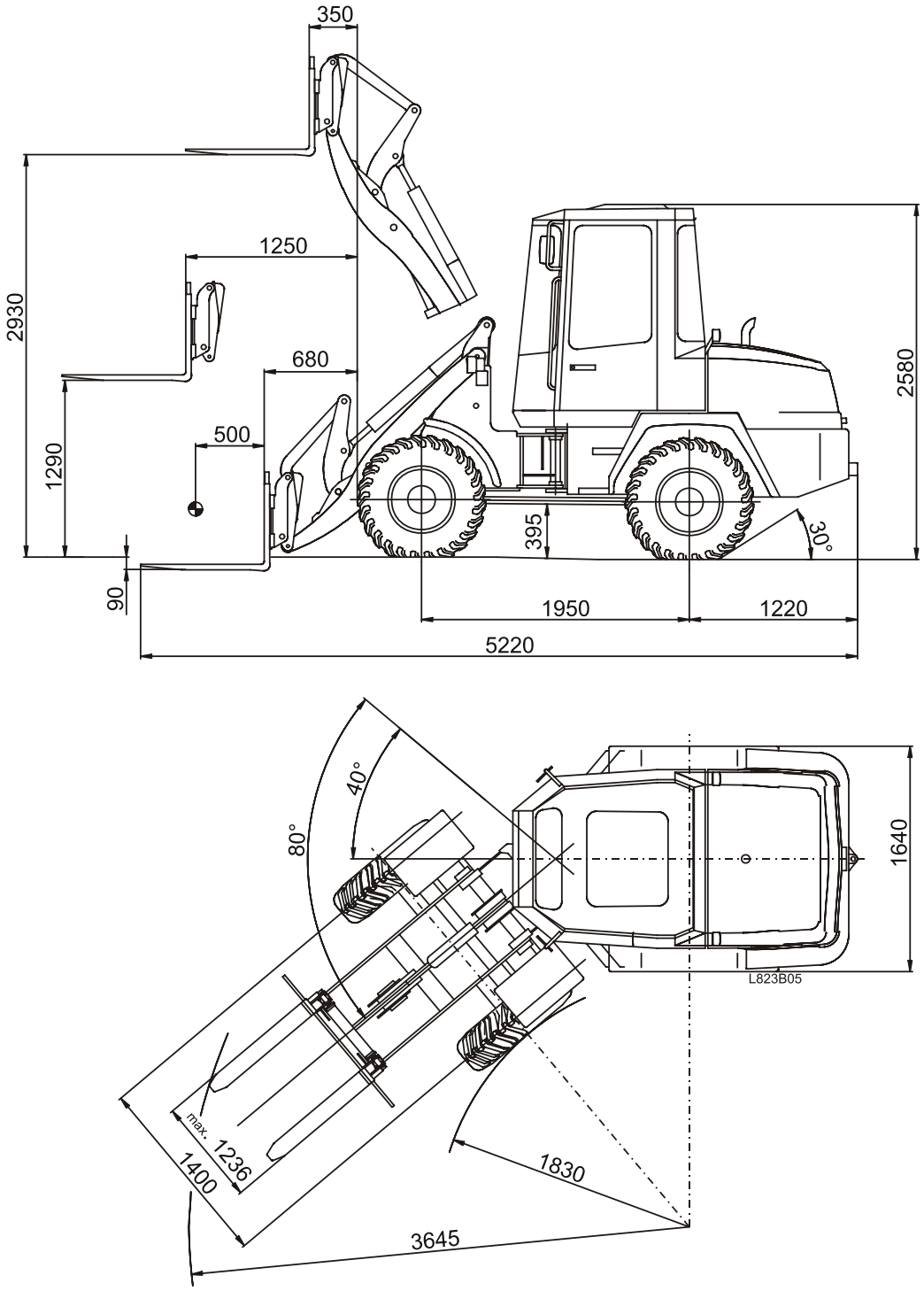


Fig. 5

10.5-18 MPT tires mounted

3.2 Diesel engine

Make:	Perkins
Type:	704-30
Design:	4-cylinder, in line
	Four-stroke diesel engine with direct fuel injection
Displacement:	3,000 cm^3
Power to DIN 70020:	37.0 kW at n=2,400 rpm
Torque:	max. 186 Nm / 1,600 rpm
Specific fuel consumption:	215 g/kWh
Cooling:	Water-antifreeze for all-year operation
Heating:	Fresh air with heat exchanger connected to coolant circuit

3.3 Electrical system

Operating voltage:	12 V
Battery:	12 V / 72 Ah / 420 A
Generator:	12 V 65 A three-phase current
Starter:	2.5 kW
Starting aid:	Glow plugs
Lighting system:	Halogen H4 floodlights in compliance with Regulations Authorizing the Use of Vehicles for Road Traffic (StVZO) in Germany

3.4 Travel drive

Travel drive:	Variable displacement pump, flange-mounted directly onto diesel engine, two-stage variable displacement motor with power shift on the rear axle reduction gear.
	Suction filter in the form of a fixed tank filter.
Travel speed:	Forward - Reverse
	Standard version
	Gear range I "Work": ..... approx. 0-6.5 km/h
	Gear range II "Road": ..... approx. 0-20 km/h
Power transmission:	Hydrostatic travel drive in closed circuit with automatic adjustment of propulsive force and speed due to load-sensing control of variable displacement pump.
	Continuous speed control forward and reverse.
	Four-wheel drive via propeller shaft connection
Max. operating pressure "Travel":	360 bar

3.5 Brakes

Service brake:	Hydraulically actuated center-mounted drum brake on front axle, combined with hydrostatic brake of travel drive.
	The brake acts on all four wheels via four-wheel drive.
Parking brake:	Mechanically actuated drum brake on front axle.
Auxiliary brake:	The hydrostatic travel drive in the closed circuit acts as an additional non-wearing auxiliary brake.

3.6 Hydraulic system

Hydraulic pump:	Gear pump on diesel engine power take-off
	Max. pump capacity: 42.0 l/min. Operating pressure, steering: 175 bar Operating pressure, loading: 250 bar
Priority valve:	Priority supply of hydraulic oil to steering by means of **load-sensing system**, which ensures that all the available oil can be provided to the steering if necessary. In this way, rapid steering movements are possible even at low revs.
Steering:	Fully hydraulic, proportionally acting articulated steering by means of steering control unit and one double-acting steering cylinder.
Total steering angle:	80°
Loader installation:	Double-acting work cylinders, one lift cylinder and one tilt cylinder.
	3-circuit control valve
	Combined return suction filter in the form of a fixed tank filter.
Hydraulic oil cooler:	Thermostatically controlled

3.7 Axles

Front axle:	Rigidly mounted planetary final drive axle with self-locking differential and integrated center-mounted drum brake.
Rear axle:	Oscillating planetary final drive axle with integrated reduction gear. Oscillating angle: ± 12°

3.8 Tires

Tire size	Type	Profile	Tire pressure, front	Tire pressure, rear
10.5-18	MPT-02 10 PR	TR 2	3.0	2.0
15.5/55	R 18	PG 7	2.5	2.0
Non-standard tires available on request!				

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

3.9 Lubricants

3.9.1 Filling quantities

Fuel tank:	approx.	72.0	l	diesel fuel
Engine with oil filter:	approx.	8.2	l	engine oil (change qty.)
Hydraulic oil, tank and system:	approx.	61.0	l	hydraulic oil
Hydraulic oil tank:	approx.	46.0	l	hydr. oil (change qty.)
Service brake:	approx.	0.25	l	ATF-oil
Front axle center housing:	approx.	6.5	l	transmission oil
Rear axle center housing:	approx.	6.5	l	transmission oil
Transmission:	approx.	1.5	l	transmission oil
Wheel hubs, front/rear axles:	each approx.	0.35	l	transmission oil
Coolant:	approx.	13.0	l	water with anti-corrosion agent and antifreeze

All values stated are approximate values.

The level marking is always the decisive factor.

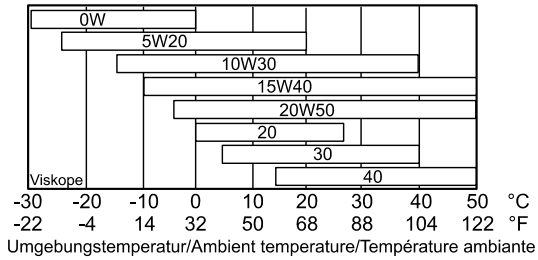
3.9.2 Fuel, lubricant and coolant specifications

Application	Code designation in compliance with Bi [1)]	Prescribed fuels, lubricants and coolants for Central Europe		Remarks
		Designation	Specification, Standards, Quality	
Engine	--	Diesel fuel	DIN 51601 ASTM D975 1-D / 2-D	*Before using RME-fuels (**r**ape oil **m**ethyl **e**ster), it is essential to consult your responsible **SCHAEFF** dealer for further details.*
Engine	EO 1540 A	Engine oil	SAE 15W-40 API CF4	See also engine manufacturer's instructions
Cooling for engine	SP-C	Coolant	Antifreeze based on ethylene glycol	See also engine manufacturer's instructions
Hydraulic system	HYD 1040	Hydraulic oil or multi-grade engine oil	HVLP D 68 or SAE 10W-40	**the following viscosity limit values must be kept (in compliance with ASTM 445)** at 100° C min. 10 mm ^{2}/s (cSt) at -10° C approx. 1,500 mm ^{2}/s (cSt)
	BIO-E-HYD-HEES	Biodegradable hydraulic oil on synthetic ester base	Filling in compliance with customer specifications. Brand label on machine. ***Do not mix** biodegradable oils of different suppliers.*	The same viscosity specifications apply as for mineral hydraulic oils. *When changing from mineral to biodegradable hydraulic oils, the tank and hydraulic system must be completely drained, cleaned and flushed.* *For further details before changing oils, please consult your **SCHAEFF** dealer.*
Axles, Wheel hubs, Transmission	GO 90 LS	Transmission oil	SAE 80W-90LS API-GL 5	Alternative recommendations SAE 90LS SAE 85W-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	

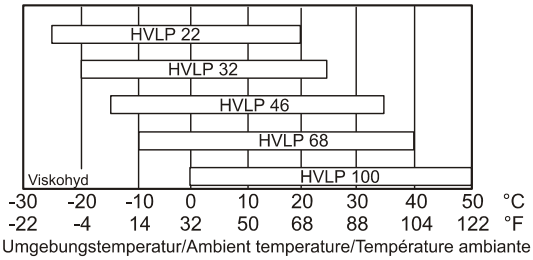
[1)] In conformity with the regulation lubricants of the Main Association of the German Building Industry e.V.

Alternative recommendation for other temperature ranges

Engine oil
in compliance with API CG 4 or CF 4 and
in compliance with ACEA E3 or E2



Hydraulic oil
in compliance with DIN 51524.T3 HVLP



3.10 Permissible loads in accordance with StVZO

(Regulations Authorizing the Use of Vehicles for Road Traffic in Germany)

Permissible gross weight ..... ⇨see nameplate

Permissible axle load, front..... or

Permissible axle load, rear ..... ⇨General Operating License

3.11 Sound level values, vibration

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

Guaranteed sound power level:	$L_{W(A)}$ =	99 dB (A)
Sound pressure level:	$L_{P(A)}$ =	77 dB (A)

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

Weighted r.m.s. value of acceleration is **below**	0.5 m/s^2	for entire body
and	2.5 m/s^2	for upper limbs

3.12 Dimensions and weights

Data referring to general-purpose bucket and 10.5-18 MPT tires

Operating weight with standard equipment:..... approx.	3,800	kg
Total length on ground:.....	4,830	mm
Total width:	1,700	mm
Height over cab:.....	2,580	mm
Wheel base:.....	1,950	mm
Tire base, front and rear:	1,400	mm
Rear overhang angle:	30	°
Ground clearance beneath propeller shaft:.....	395	mm
Turning radius at outside edge of bucket in transport position: ...	3,880	mm
Turning radius at inside edge of tires:.....	1,830	mm
Turning radius at outside edge of tires:.....	3,510	mm

3.13 Front loader installation

Data referring to general-purpose bucket and 10.5-18 MPT tires

Width of bucket:		1,700	mm
Capacity in compliance with DIN / ISO 7546 (g = 1.8 t/m³):	approx.	0.65	m³
Payload in bucket:		1,170	kg
Dumping height at 45° dumping angle:	approx.	2,465	mm
Dumping reach at max. dumping height:	approx.	600	mm
Max. bucket hinge pin height:	approx.	3,105	mm
Tilt-back angle:	approx.	50	°
Dumping angle at max. dumping height:	approx.	45	°
Digging depth:	approx.	90	mm
Lift capacity at ground level:	approx.	32,300	N*
Ripping force at cutting edge of bucket:	approx.	33,900	N*
Tipping load, straight:	approx.	2,670	kg*
Tipping load, articulated:	approx.	2,355	kg*
Cycle time, lift:		4.9	sec
Cycle time, lower:		3.4	sec
Dumping in uppermost position, in:		1.1	sec
Dumping in uppermost position, out:		1.4	sec

*in compliance with ISO 8313

Stability in compliance with DIN 24094

3.14 Buckets

	Capacity, heaped (m³)	Width (mm)	Max. density (g) per t/m³
General-purpose bucket	0.65	1,700	1.8
Earth bucket	0.72	1,700	1.6
Multi-purpose bucket	0.6	1,700	1.6
Light-material bucket	0.8	1,700	1.2
Light-material bucket	1.0	1,850	0.8
Side-dump bucket	0.5	1,750	1.6
High-tip bucket	0.65	1,850	1.2

*Any modifications of **SCHAEFF** 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.*

3.15 Fork lift attachment

Fork connection to ISO/FEM Class 2 Form B DIN 15 173 or ISO 2328 respectively

Width of fork carriage ..... 1,240 mm

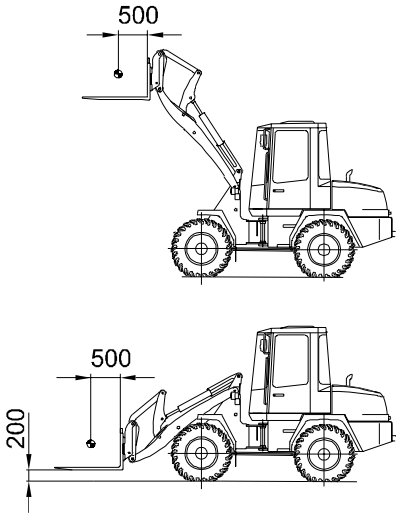
Fork length ..... 900 mm or 1,120 mm

Max. stacking height ..... 2,930 mm

The stated payload is based on the machine traveling over level ground and with a lowered load, with a stability factor of 1.25 (80%) of the tipping load.

When operating the machine on uneven ground and with lowered load, the payload is stated with a stability factor of 1.67 (60%) of the tipping load with the machine traveling. With a load hook attached, the payload is stated with a stability factor of 2.0 (50%).

The payloads are valid for the equipment condition as described in compliance with ISO 6016.



	Payload with 10.5-18 MPT tires and fork length 900 mm	
Total lift range	standard	with weights*
Standard (factor 1.25)	1,500 kg	1,620 kg
(factor 2.0)	960 kg	1,030 kg
Transport position		
Standard (factor 1.25)	1,800 kg	1,900 kg
(factor 1.67)	1,340 kg	1,400 kg

* When additional weights, e.g. screw-on rear axle weights or rear tires with water filling are used.

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

4 Operation

4.1 First commissioning

If you are not familiar with the operator controls and display elements of this machine, read this Chapter carefully **before** operating the machine.

This Chapter deals with all functions.

Before driving and working with the machine it is necessary to thoroughly familiarize yourself with the operating and display elements.

Each time before putting the machine into operation it must be subjected to a thorough visual inspection.

Ensure that there is no damage, loose or missing screws, oil accumulations, oil or fuel leakage. Defects must be remedied immediately. In the event of shortcomings which jeopardize the operating safety, the machine shall not be put into operation until these have been eliminated.

Each time before putting the machine into operation, the inspections in compliance with Section 7.5 must be carried out.

4.2 Display elements and operator controls

The following list includes non-standard equipment!

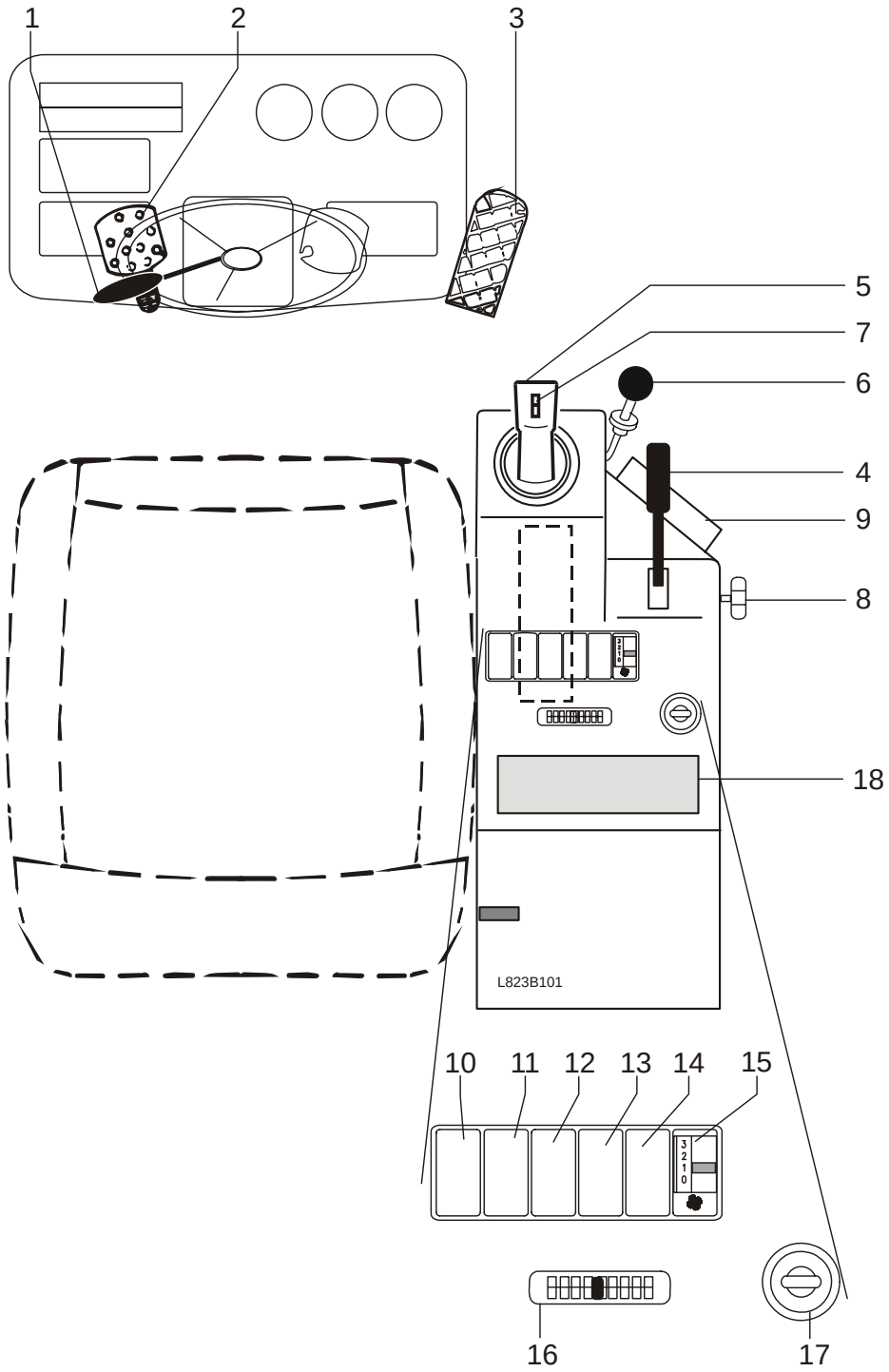


Fig. 10.1

Description Fig. 10.1

1 Direction indicator - horn – low-high beam switch (steering column mounted switch)
2 Brake inching pedal
3 Accelerator pedal
4 Parking brake
5 Control lever for loader installation with circular interlock
6 Additional control circuit with circular interlock
7 Direction-of-travel pre-selection (without function when working hydraulics are switched off)
8 Fan operation: fresh air/ re-circulating air
9 Fuse and relay box
10 not assigned
11 not assigned
12 not assigned
13 not assigned
14 not assigned
15 Fan switch
16 Heater operation
17 Pre-heat/ starter switch
18 Radio (option)

- Display elements and operator controls

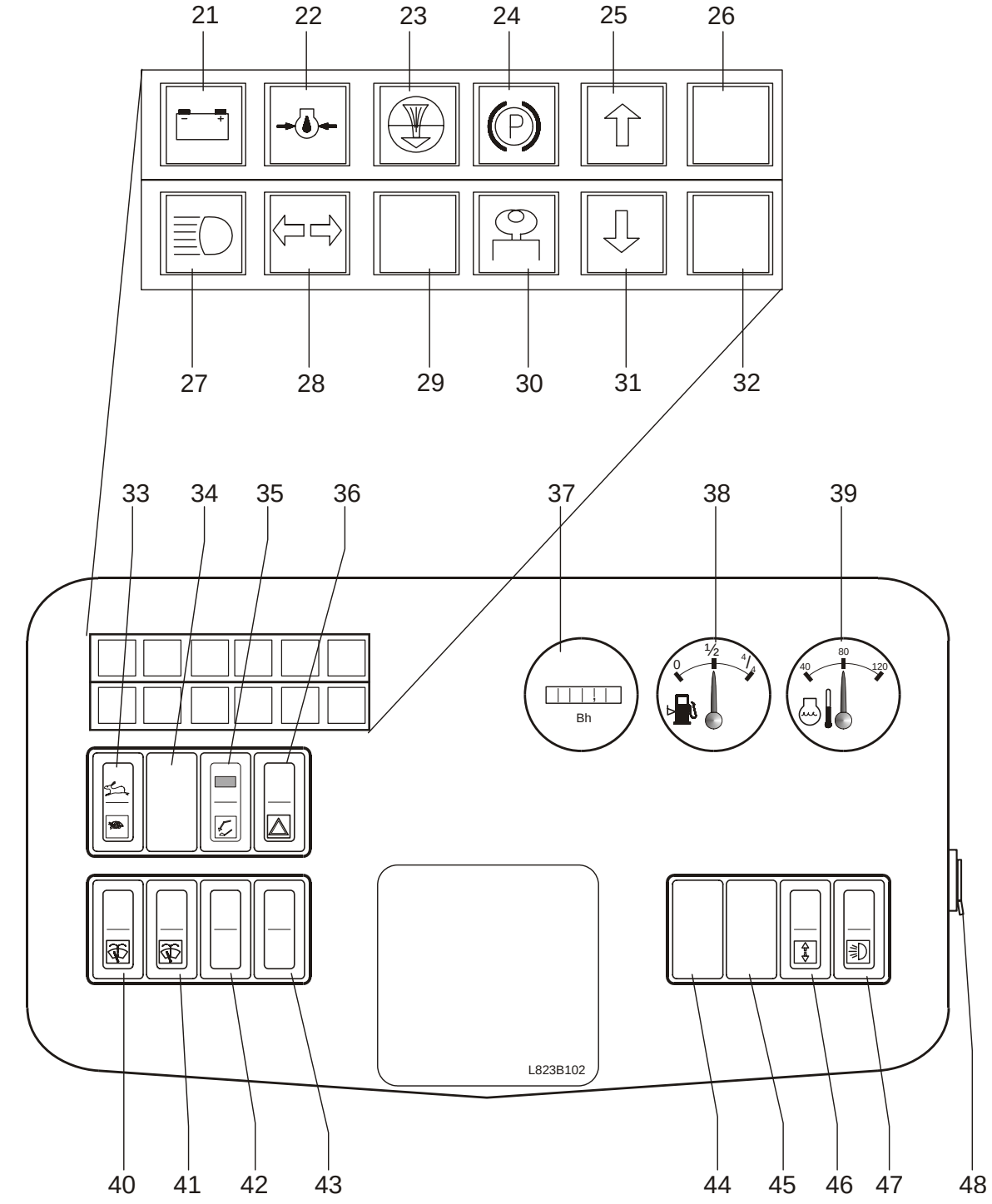


Fig. 10.2

Description Fig. 10.2

21 Charge control
22 Engine oil pressure indicator
23 Air filter clogging indicator
24 Parking brake indicator lamp
25 Travel, forward
26 not assigned *
27 High beam
28 Direction indicator
29 not assigned *
30 Pre-heat indicator
31 Travel, in reverse
32 not assigned *
33 Travel speed switch — FAST-SLOW
34 not assigned *
35 Multi-function switch with lock for change-over of direction-of-travel pre-selectors (from Pos. 07 to Pos. 46)

Only press when machine is at standstill!

36 Hazard warning switch
37 Operating hour meter
38 Fuel gauge
39 Coolant temperature indicator
40 Switch for windshield wiper, front, wash/ wipe function
41 Switch for windshield wiper, rear, wash/ wipe function
42 not assigned *
43 not assigned *
44 not assigned *
45 not assigned *
46 Pre-selection of direction-of-travel - (Function only activated when work equipment switched off)
47 Light switch
48 Socket

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlight(s), etc.

4.3 Engine

4.3.1 Starting the engine

Each time before putting the machine into operation, the inspections in compliance with Section 7.5 must be carried out.

Before switching on the engine, ensure that no one is on the machine or in the danger zone.

- All shift levers must be put into neutral position.
- Hand brake (11/4) applied, direction-of-travel pre-selector (11/7; 11/46) set to “O”.
- Insert ignition key in pre-heat/ starter switch (11/17).
- Turn clockwise to “1”, the indicator lamps (11/21; 11/22) light up.
- Pre-ignition starts; the indicator lamp (11/30) lights up.
- Press accelerator pedal (11/3) completely down for normal start and to the quarter-open position for hot start.
- After the indicator lamp (11/30) has gone out, turn the pre-heat/ starter switch to “2”. As soon as the engine is running, turn the key back to “1” and decrease the revs to low idle speed. The indicator lamps should go out.
- If the engine has not started after max. 15 sec., turn the ignition key to “1” or “0”, and pause for at least 10 sec. before trying again. Repeat the start-up procedure.

Do not drive the engine at full throttle straight away. Drive with restraint until the engine reaches operating temperature.

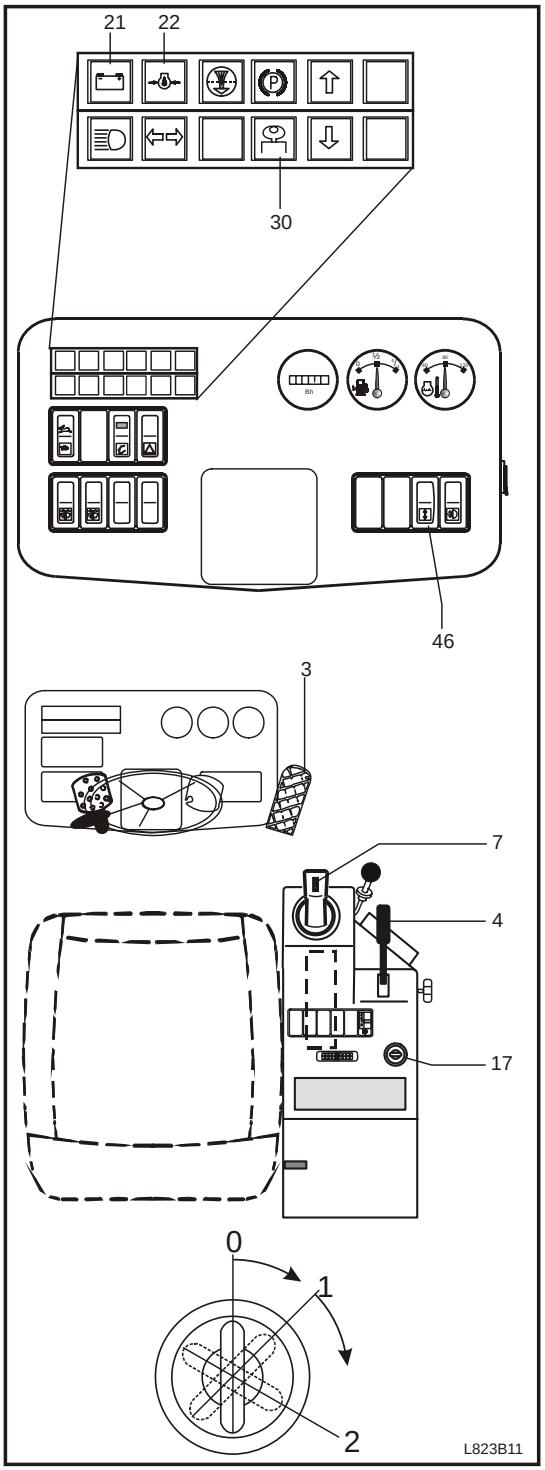


Fig. 11

4.3.2 Monitoring during operation

- If the battery charge indicator lamp (12/21) or engine oil pressure indicator lamp (12/22) light up, turn off the engine immediately and determine the cause. Call for service personnel, if necessary.
- If the admissible coolant temperature (12/39) is exceeded, stop work, open engine hood, and keep the engine running at idle speed to allow it to cool down.
- Once the engine has cooled down, turn it off and determine the cause, or call for service personnel.

*If the engine and the machine are put into operation **without** prior remedy of the defect, severe damage to the engine may result!*

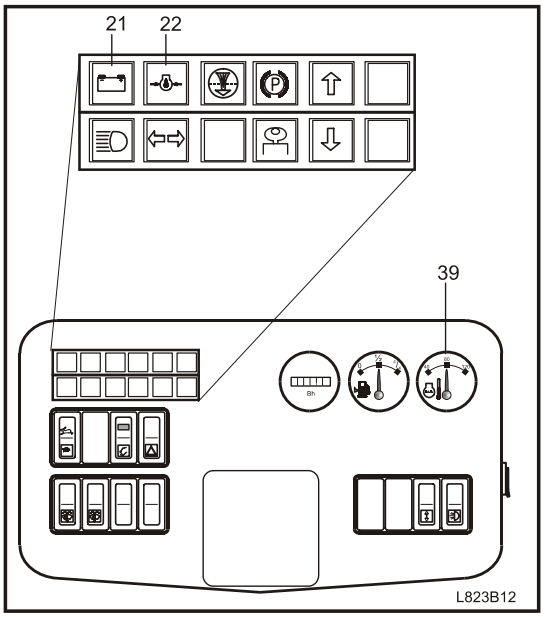


Fig. 12

4.3.3 Switching off the engine

Do not switch the engine off when running at full throttle, but allow it to run for a short time at no load.

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

4.4 Driver's seat

Driver's seat

The deluxe seat is spring-mounted with oil-pressure-operated shock absorbers. The seat meets international quality and safety standards in compliance with ISO 7096 Class 3 and ISO 6683 (Fig. 13).

1. Horizontal adjustment
2. Weight adjustment
3. Seat back adjustment
4. Vertical adjustment

   Raising seat:

   - Raise seat until it clicks audibly into place.

   Lowering seat:

   - Raise seat as far as the stop; seat then sinks to its lowest position.

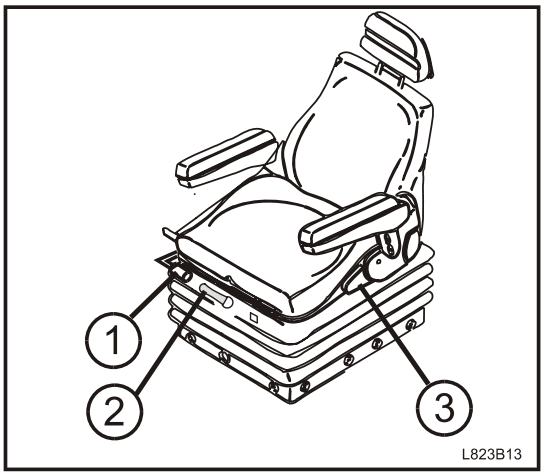


Fig. 13

4.5 Heating / Ventilation

Heating

- The heater, which is connected to the coolant circuit, is adjusted with the control (14/16).
- The fan is operated using the switch (14/15). It can be operated with fresh air and re-circulating air.
- Open aspirating holes (14/8) for re-circulating air mode.

Ventilation

- In ventilation mode the heater control (14/16) remains in the "cold" position.
- The fan is operated by pressing the switch (14/15).
- The air is distributed and aimed as desired by adjusting the air vents.

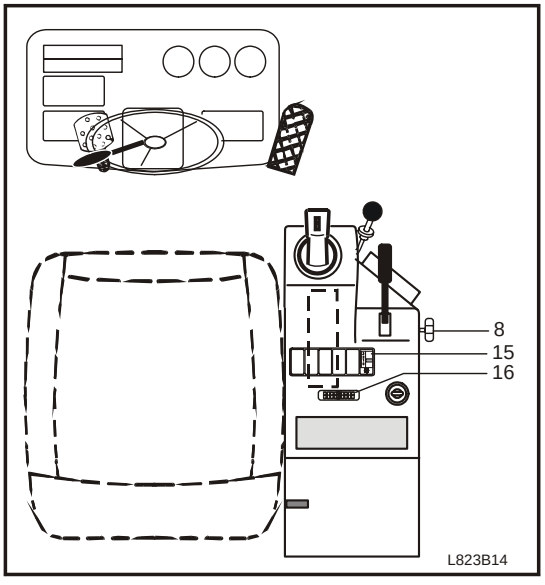


Fig. 14

4.6 Light switch

The lighting of the loader is switched on and off using the light switch (15/46).

Setting 0	Light off
Setting 1	Parking light
Setting 2	Driving headlamps
	(low beam / high beam)
	Switch from one to another by lifting the stalk control (15/1)
	Blue indicator lamp (15/27) lights up

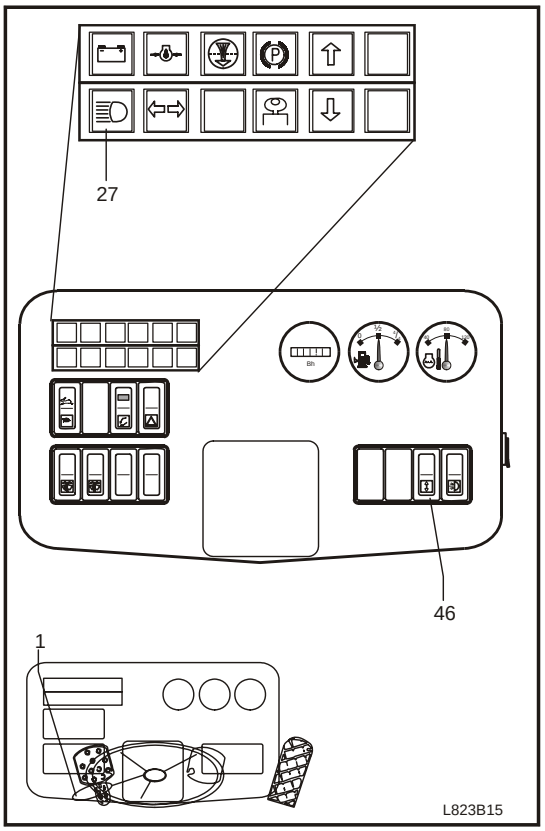


Fig. 15

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.

STOP ***Always pour magnesium chloride <u>into the water</u>, not the other way round!***

Do not allow the solution to come into contact with eyes, skin or clothing - ***caustic substance!***

Recommendation when filled to 75% with antifreeze protection to -30° C. Values per wheel:			
Type of tire	**$MgCl_2$ approx. kg**	**H_2O lt.**	**Total kg**
10.5-18 MPT 10 PR TG 32	28	36	64
15.5-55 R 18 MPT PG 7	44	57	101

$MgCl_2$ = Magnesium chloride

H_2O = Water

4.8 Driving, steering and braking

4.8.1 Driving

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

The vehicle has a direction-of-travel selection switch (16/46) on the instrument panel and another such switch (16/7) on the working hydraulics control lever.

When driving on roads, the direction-of-travel selection switch on the instrument panel is active due to the deactivation of the multi-function switch (16/35).

Before activating the multi-function switch, ensure that both direction-of-travel selection switches are set in the same travel direction.

***The multi-function switch is only to be pressed when the machine is at a standstill** in order to avoid unintentional braking or changes in the travel direction.*

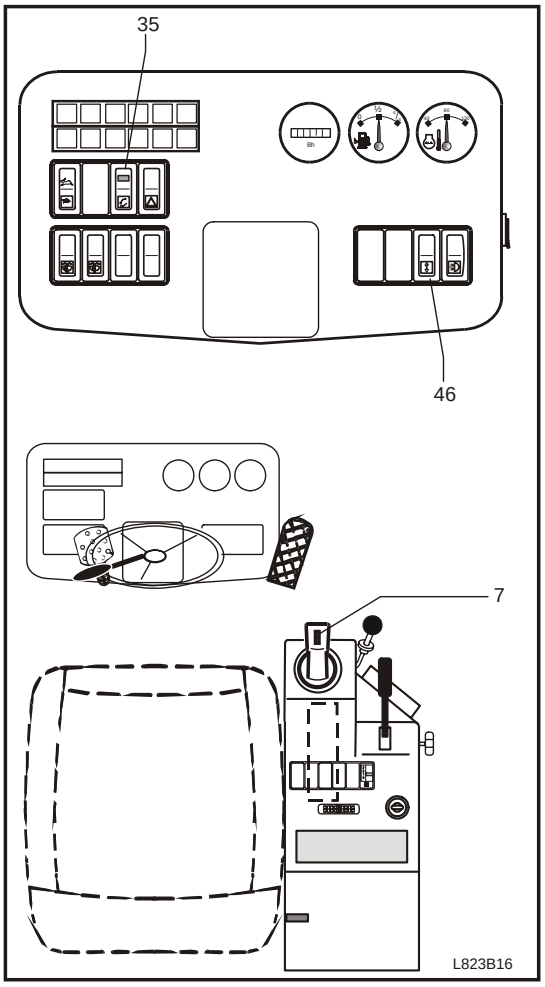


Fig. 16

Driving off

- Direction-of-travel pre-selection rocker switch in joystick (17/7) and on instrument panel (17/46) set to “O”- neutral.
- Start engine.
- Raise lift frame as far as the “Travel” height mark (18/1).
- Select travel speed “FAST” or “SLOW” (17/33) as required.
- Release parking brake (17/4).
- Set the desired travel direction with the direction-of-travel pre-selector (17/7 or 17/46 respectively).
- Press accelerator pedal (17/3). The automatic transmission means that the machine only drives off once a certain engine speed is reached.
- Travel speed is increased / decreased by means of the accelerator pedal. Travel speed directly depends on engine speed.
- The direction of travel may be changed quickly using the pre-selection lever.

Coming to a halt

- Travel speed is reduced by releasing the accelerator pedal. The hydrostatic drive then acts as a non-wearing auxiliary brake.
- See also Section 4.8.3, “Brakes”.

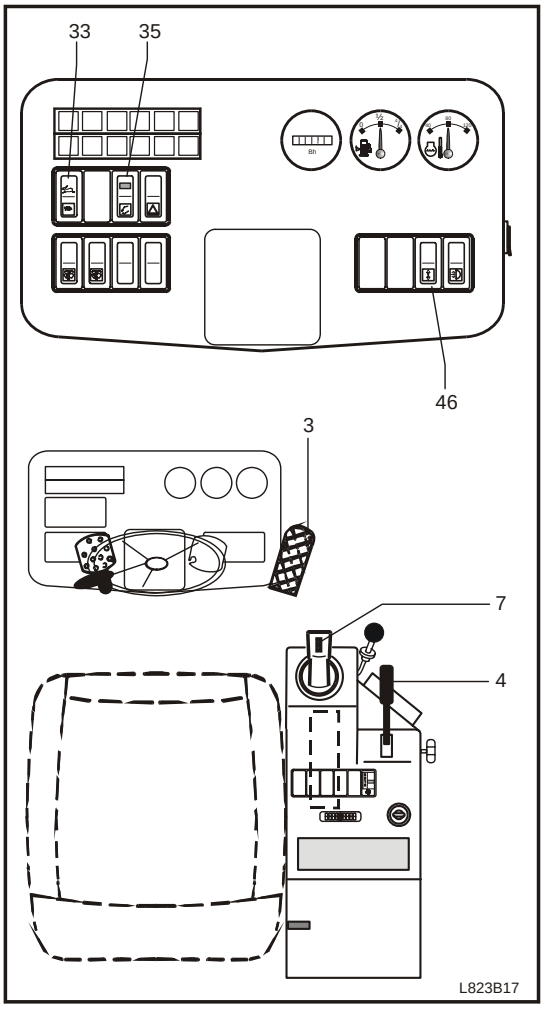


Fig. 17

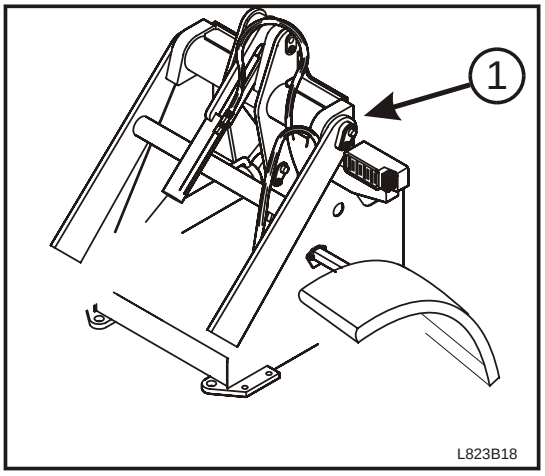


Fig. 18

4.8.2 Steering

The wheel loader has hydraulically operated articulated steering, which is actuated by a steering control unit.

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 stop the machine, release accelerator pedal (19/3). The hydrostatic drive then acts as an auxiliary brake. Press the brake inching pedal (19/2) as required.

Parking brake

- Apply the parking brake (19/4) only when machine is stationary.

When the parking brake (19/4) is applied, the travel drive is switched off at the same time.

Brake inching mechanism:

- The machine is equipped with a brake inching mechanism which changes the relationship between travel speed and engine speed.
- When the brake inching pedal (19/2) is pressed, travel speed is reduced - irrespective of engine speed - as low as zero.
- This permits sensitive driving while maintaining full engine speed, e.g. when loading a truck, where fast work cycles are required.

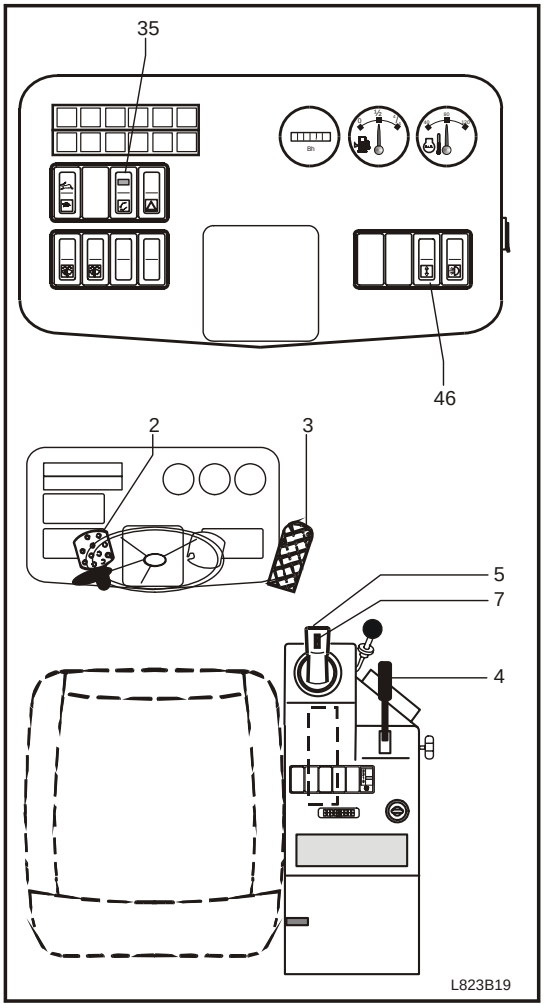


Fig. 19

4.8.4 Driving on roads

Prior to driving on public roads, observe the following points:

- 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 the forks of the fork lift attachment completely upward, lock them in place and secure against side-shifting.

Rigid forks must be dismounted!

- Raise the lift frame as far as the height mark (18/1) until there is sufficient ground clearance.
- Switch off the working hydraulics (19/35).

Only press switch when machine is stationary!

- Deactivate the control lever (19/5) by applying the circular interlock (press downward).
- Check the function of direction indicators, hazard warning lights, horn, low beam and high beam.
- Close cab door.

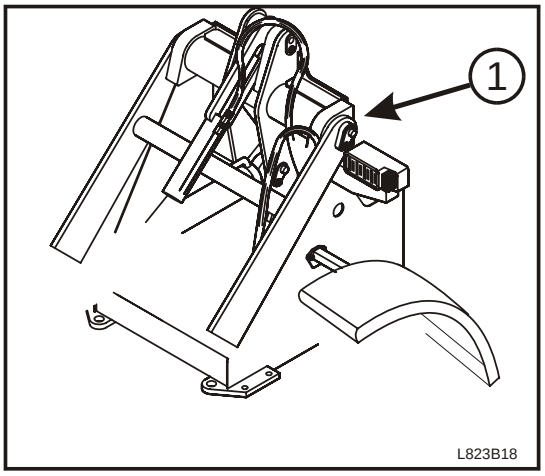


Fig. 18

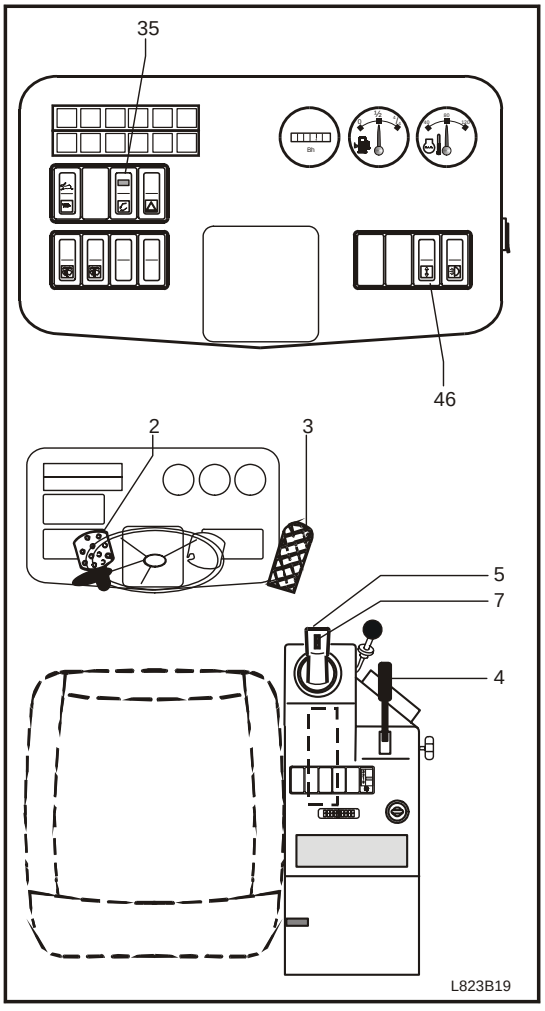


Fig. 19

4.8.5 Parking the machine

- Set the direction-of-travel pre-selection rocker switch (20/7 or 20/46 respectively) to “0”.
- Lower the work equipment to the ground.
- Switch off working hydraulics (20/35).
- Apply circular interlock of control lever (20/5) (press circular interlock downward).
- Apply the parking brake (20/4).
- Switch off the engine and remove ignition key.
- Lock the cab after finishing work to keep **unauthorized persons** from getting in.

If necessary, secure the machine with chocks so that it cannot roll away.

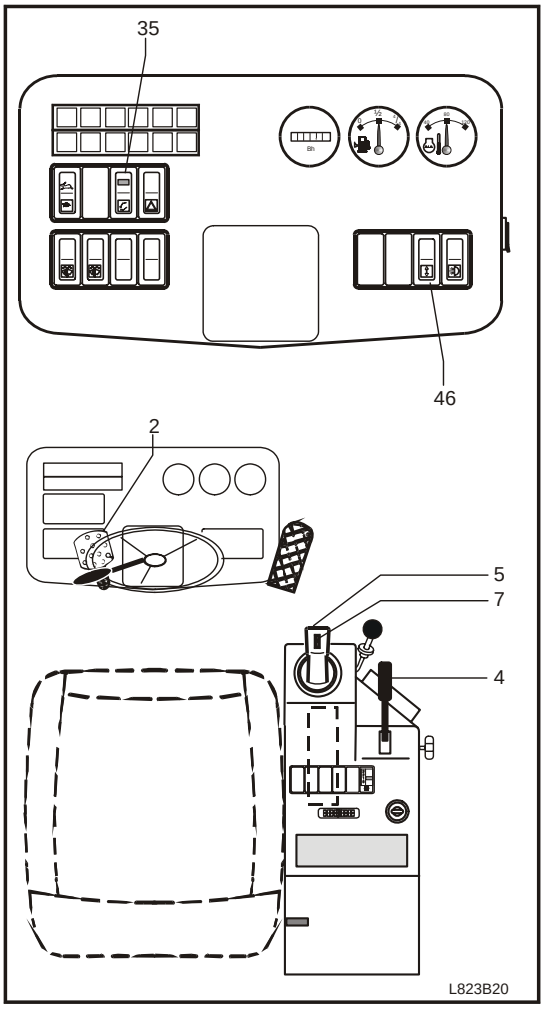


Fig. 20

5 Working operation

5.1 General

Every day before commencing work, and after each change of equipment, 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 work, driving and work movements should flow in smooth succession.
- Drive slowly when familiarizing yourself with the controls.

5.2 Loader operation

- Switch on working hydraulics (21/35).
- Release circular interlock of control lever (21/5) (press circular interlock upward).

Actuation - Lift frame and bucket

- Use control lever (21/5).

Actuation - Float position

- Lower the bucket to the ground.
- Move control lever (21/5) forward until the stop (it clicks in).
- For deactivation of this function, move lever in reverse direction to neutral position.

Actuation - Additional control circuit

- Release circular interlock of control lever (21/6) (press circular interlock upward).

Other attachments, e.g. a multi-purpose bucket, side-dump bucket, etc., may also be connected to this additional control circuit.

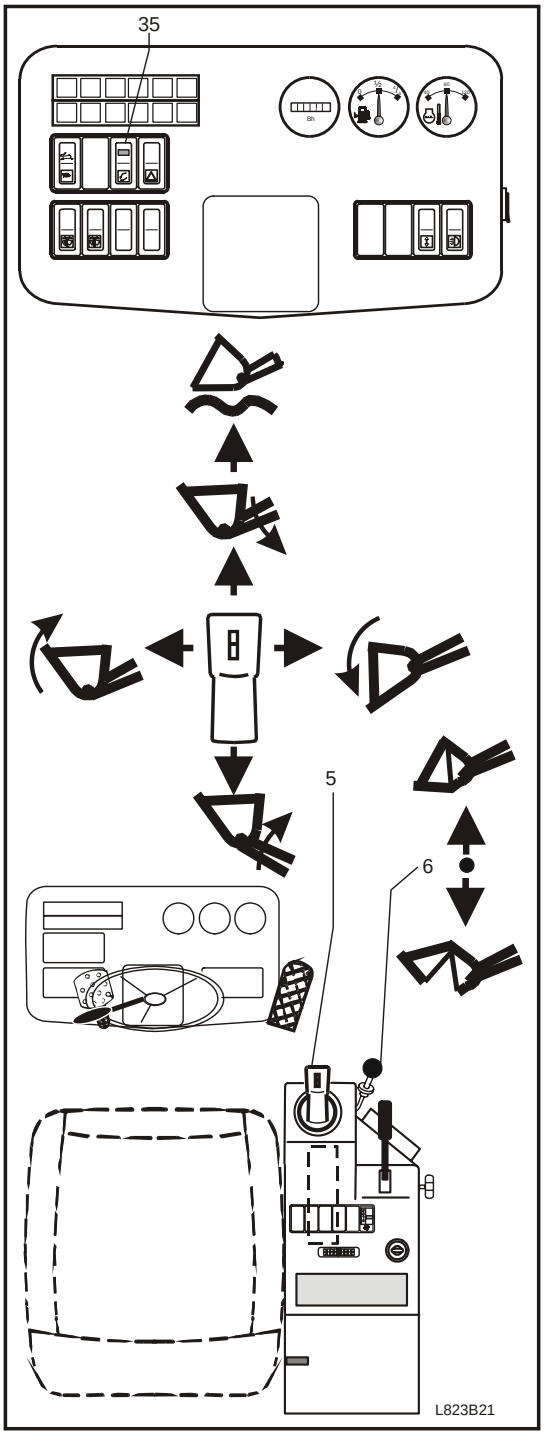


Fig. 21

5.3 Changing work attachments

5.3.1 General

Various work attachments are available to achieve maximum utilization of the machine for a variety of applications.

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

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

It is possible to use the work attachments of predecessor models for our machines under certain circumstances. When mounting the work attachments of predecessor models they may have to be adjusted and/ or they are subject to utilization restrictions.

*It is **essential** to consult your dealer before mounting such a work attachment.*

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

5.3.2 Assembly of work attachments

The bearings of the lift frame, the work attachment and the quick-mount hitch must be free from dirt.

Procedure for changing directly mounted work attachments

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

- Rest the attachment on the ground so that it cannot overturn.
- Remove the pin of the linkage and the pin of the lift frame.
- Move the lift frame out of the attachment and take up a new one.

Procedure for changing work attachments with mechanical quick-attach system

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

- Rest the attachment on the ground so that it cannot overturn.
- Lift the pin (22/2) and release the quick-mount hitch using the control rod (22/1) until the locking bolts are completely retracted.
- **Check the function of the quick-mount hitch lock and lubricate the bolts if required.**
- Attach another work attachment and close the quick-mount hitch until the locking bolts are completely extended and the pin clicks in.
- The control rod must be kept in the operator's cab.

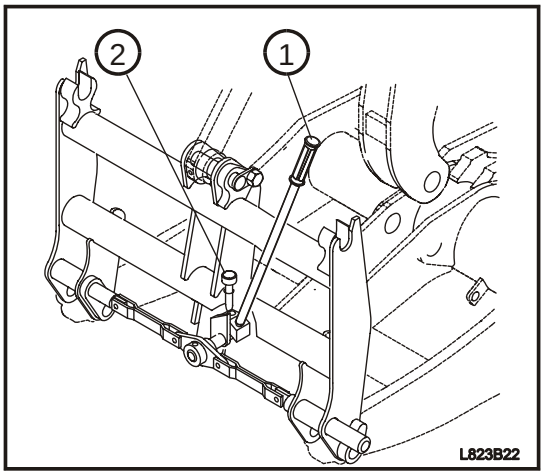


Fig. 22

Procedure for changing work attachments with hydraulic quick-attach system

- Rest the attachment on the ground so that it cannot overturn.
- Switch off the diesel engine.
- Operate the control lever (23/6) for pressure relief.
- In the case of a hydraulically actuated work attachment, the hydraulic connections on both manifold blocks must be disconnected.
- Ball valve (24) must be set to “Unlock quick-mount hitch”.
- Start the diesel engine.
- Unlock quick-mount hitch (23/6) and move out of the work attachment.
- Take up new work attachment and lock by operating the control lever (23/6).

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

- Switch off diesel engine.
- Operate control lever (23/6) for pressure relief.
- Ball valve (24) must be set to “Quick-mount hitch locked”.
- Connect hydraulically actuated work attachment to connection of additional control circuit.

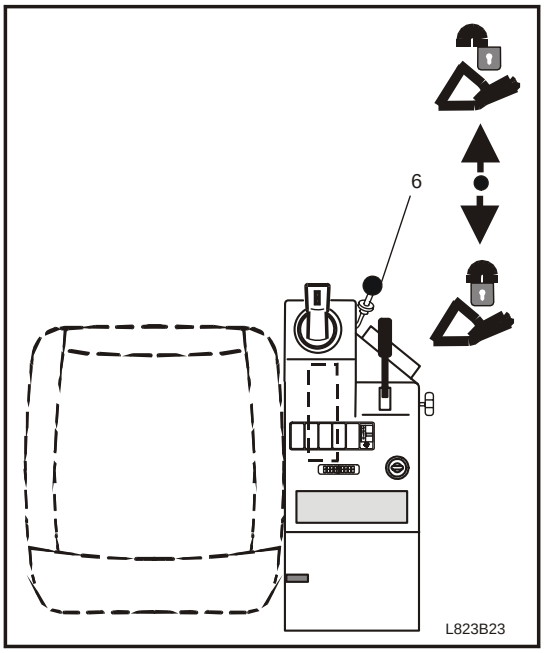


Fig. 23

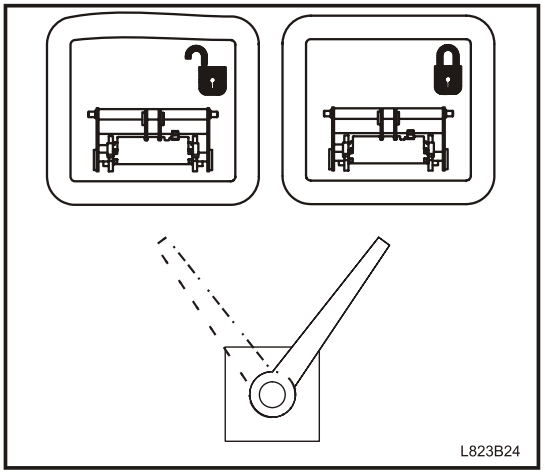


Fig. 24

5.4 Notes on how to work with the machine

5.4.1 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!

For loading, lower the bucket and position the cutting edge parallel to the ground. Reduce speed by inching as required.

Penetrate the bucket in 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 location where to unload the material and then start to unload.

5.4.2 Scraping, grading

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

5.4.3 Excavation work

- To excavate a basement, attempt to excavate layers which are as homogeneous as possible.
- Plan the excavation work in such a manner that the wheel loader can drive out of the basement with full bucket in forward direction.
- Attempt to keep the exit of the basement as flat as possible.

6 Recovery and Transport

6.1 Recovery of the machine

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

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

Towing lugs:

- Front: Right and left on the axle plates
- Rear: On the towing fixture

Max. load capacity of towing lugs approx. 4,200 kg.

- 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 both high-pressure relief valves (26/1) with bypass, slacken the nut (27/1) in the connecting plate of the hydraulic pump, and screw in the bolt (27/2) until it is level with the nut.
- Tighten the nut.
- After towing, screw in the bolt until the stop.
- Re-tighten the nut.

Absolute cleanliness is essential when working on the hydraulic system. Always secure the machine with chocks and relieve the hydraulic system of pressure before carrying out maintenance and repair work.

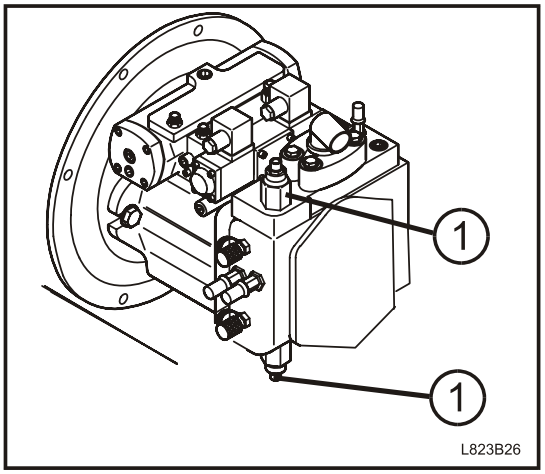


Fig. 26

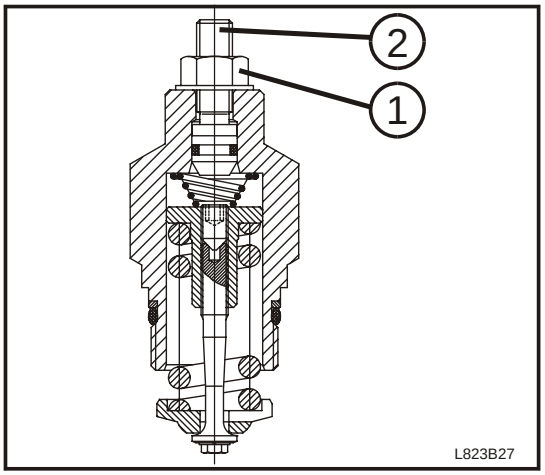


Fig. 27

6.2 Loading the machine using a crane

Use a crane harness and a crane with sufficient lifting capacity!

To load the machine using a crane, the following activities must be carried out:

- Empty and tip back the bucket.
- Move the lift frame to travel position.
- Insert the bolts of the articulation lock (28/1).
- Turn off the engine.
- Dismount from the machine and close the doors.
- Attach the machine in the proper manner to the 3-point hoisting appliance at the marked points (Fig. 28).

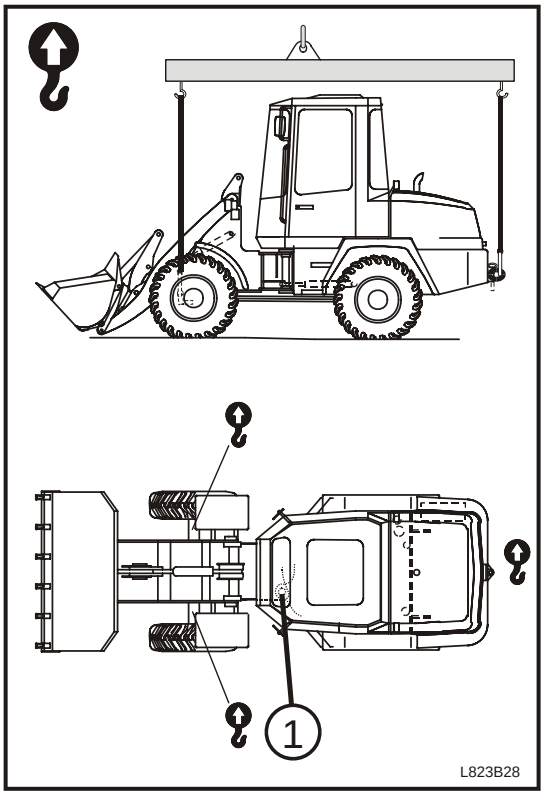


Fig. 28

6.3 Transport of the machine

To load the machine onto a flat bed trailer, goods wagon, etc., the following steps must be taken:

- Empty and fold in the bucket.
- Move the machine onto the flat bed trailer, goods wagon, etc., or lift by crane if required.
- Apply the articulation lock (29/1).
- Place the work equipment on the ground.
- Stop the engine.
- Dismount from the machine and close the doors.
- Attach the machine at the points illustrated (Fig. 29) in the correct manner.

Be aware of the total transport height.

Risk of accident when driving in tunnels, under bridges, etc.!

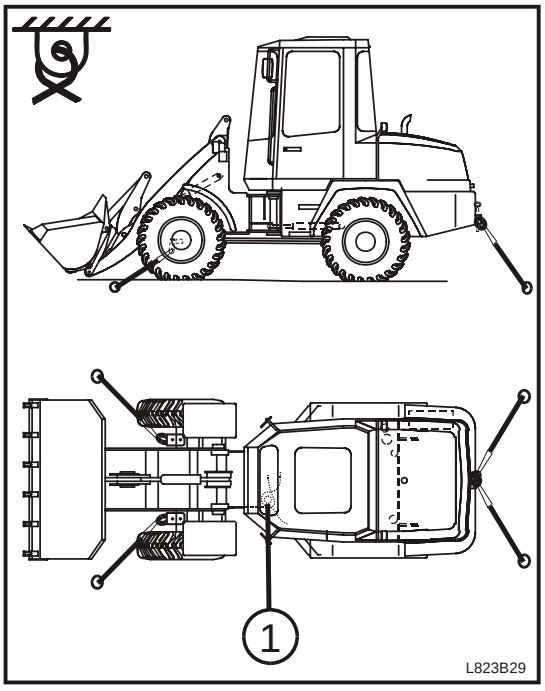


Fig. 29

7 Maintenance and Service

7.1 General

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

Therefore, the specified maintenance work and strict observation of maintenance intervals should always be the owner's top priority. This Chapter deals in detail with periodic maintenance, service and lubrication tasks.

Furthermore, during the warranty period thorough inspections are stipulated, which must be carried out by trained specialist personnel.

Type-specific maintenance and inspection plans for this purpose are contained in every instruction book and every warranty certificate.

Inspection intervals		
1st inspection	after approx.	100 operating hours
2nd inspection	after approx.	500 operating hours
3rd inspection	after approx.	1,000 operating hours
Subsequently,	every	500 operating hours

The inspections are obligatory and must be paid for.

If omitted, the warranty covered by us may be subject to restrictions.

It is **essential** that the recommendations in **Chapter 2, "Prevention of Accidents"** are observed.

7.2 Inspection parts and aids

Maintenance parts	Spare part no.
Hydraulic oil filter insert of combined filter	5 003 650 368
Breather with screen element	5 003 650 362
Engine oil filter	5 568 656 894
Fuel filter with seal	5 568 656 315
Air filter - main cartridge	5 501 660 957
Air filter - safety cartridge	5 501 660 956
V-belt	5 568 656 896
Valve cap seal	5 568 656 895
Extras	
SCHAEFF - Hydraulic oil, mineral	4 312 005 050
SCHAEFF - Hydraulic oil, biodegradable	For further information, please contact your **SCHAEFF** dealer!
Transmission oil (SAE 85 W 90 LS).....	4 314 005 775
Engine oil (SAE 15 W 40)	4 312 905 759
Antifreeze and anti-corrosion agent	4 440 305 025

Maintenance and wearing parts for inspections should be ordered well in advance!

Lubricants

- The machine's life expectancy and operating condition are largely dependent upon 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.
- For lubricant specifications see Section 3.9

7.3 Care and cleaning

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

- Neither a steam-jet appliance nor a high-pressure cleaning apparatus may be used for cleaning during the first two months after the machine is used for the first time or when newly painted to ensure that the paint can sufficiently 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 shall not exceed 80° C and a spray pressure of 70 bar.
- Linings (insulating materials, etc.) shall not be exposed directly to water, steam or high-pressure jets.
- When cleaning with water or steam jets, take care not to spray exhaust-gas and air filter openings.
- If cleaning the engine with water or steam jets, do not expose sensitive engine parts, such as generator, cabling, oil pressure switch, etc. directly to the jet.
- After each wet clean, the machine must be lubricated in accordance with the lubricating plan and a test of all work cycles, steering and driving functions carried out.

7.4 Notes for winter operation

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 in compliance with the ambient temperature at the machine's place of operation.
- See lubricant specifications, Section 3.9.2

Coolant

- Before the beginning of the cold season, check the level of antifreeze and adjust in line with the ambient temperature if necessary.
- At the factory, the antifreeze protection is set to approx. -25° C.

Battery charge

- A good cold start performance requires a well-charged battery. By warming the battery to approx. +20° (remove the battery after the engine has been turned off and store it in a warm room), the minimum starting temperatures can be lowered by 4-5° C.
- When installing the battery, ensure good contact of terminal connections.
- Only tighten terminal screws so that they are "hand-tight", to prevent deformation of the terminal cones!

Fuel

- Use only winter diesel fuel in winter, in order to prevent cables becoming blocked through paraffin deposits. At very low temperatures, troublesome deposits may also occur when winter diesel is used.

7.5 Jobs before putting into operation

7.5.1 Checking the engine oil level

- Check the oil level daily before starting, with the machine parked on level ground.
- The notches on the oil dipstick (31/1) indicate the min. and max. oil levels.
- If necessary, top up engine oil. Unscrew the cap (31/2) and top up oil using a clean container.

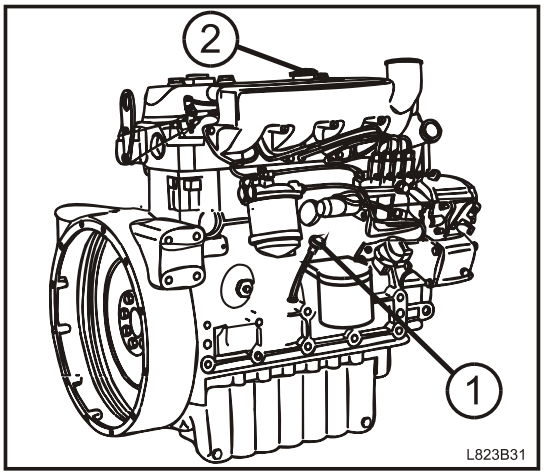


Fig. 31

7.5.2 Cooling system

Coolant level

Only check when the engine is cold. ***Danger of scalding*** *from hot coolant!*

- Remove cap (32/1) and top up water. The surge tank must be filled to the half when the engine is cold.

Top up with a mixture of 50 % water and 50 % antifreeze.

Checking the antifreeze

- Before the beginning of the cold season, the antifreeze protection must be checked.
- At the factory, the antifreeze protection is set to approx. -25° C. If temperatures are lower, the level of antifreeze must be increased accordingly.

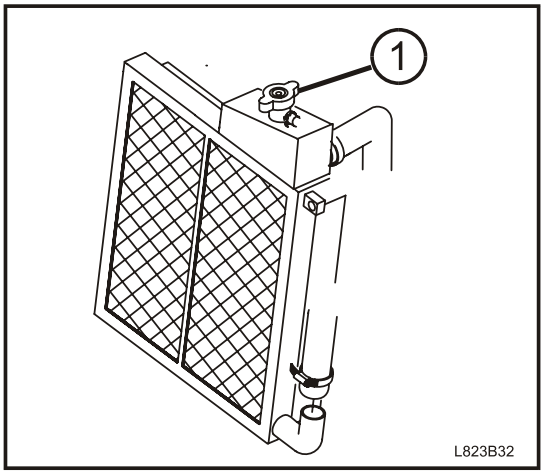


Fig. 32

7.5.3 Fuel system

Fuel level

- Check fuel level on the fuel gauge (instrument panel).
- In order to prevent condensation from forming before the machine is next put into operation, top up the fuel every day after use (33/1).

Do not allow the fuel tank to run empty, as otherwise the fuel system must be vented.

Water separator

- Check daily using the sight glass (33/2) and drain water if required.

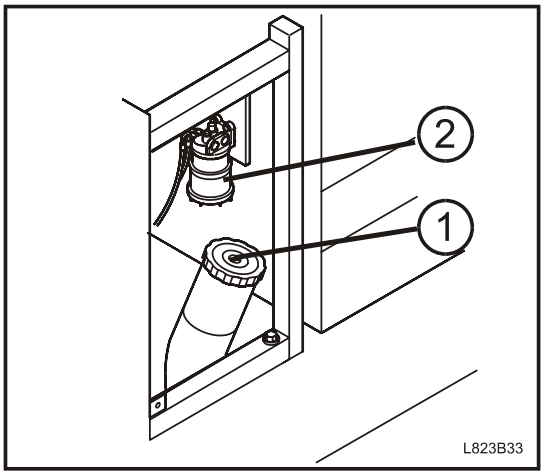


Fig. 33

7.5.4 Checking the hydraulic oil level

- Check the hydraulic oil level with the oil dipstick (34/1) and add hydraulic oil if required.

7.5.5 Checking the brake oil level

- Visual inspection of brake oil level (34/2).

Only top up with ATF-oil!

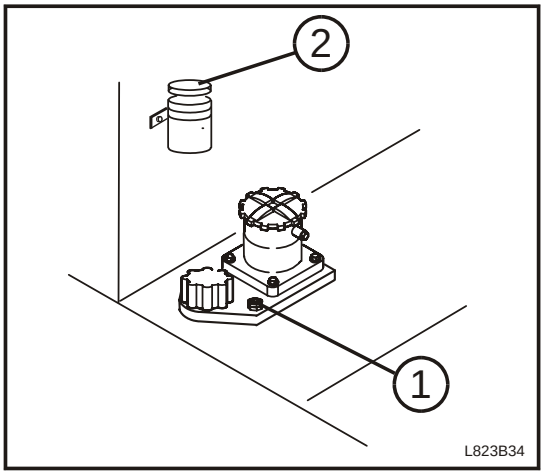


Fig. 34

7.5.6 Checking the axle oil levels

Remove the following inspection plugs, check the oil level and top up oil, if necessary.

- Front axle differential 35/1)

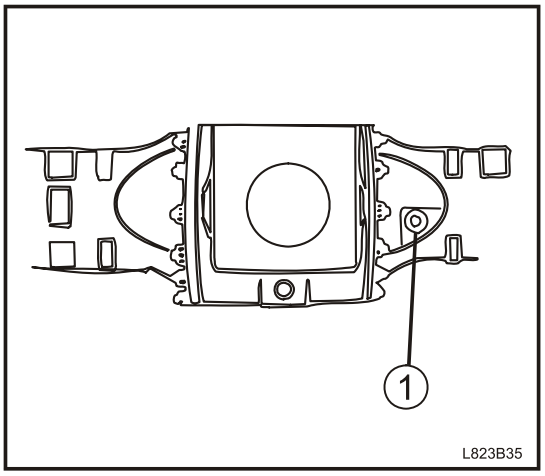


Fig. 35

- Rear axle differential (36/1)
- Reduction gear (36/2)

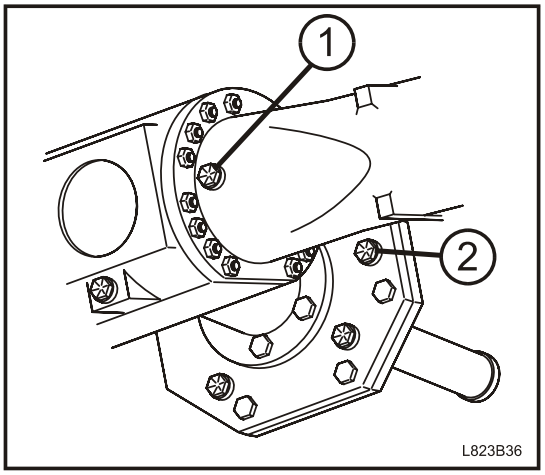


Fig. 36

- Wheel hub (37/1)

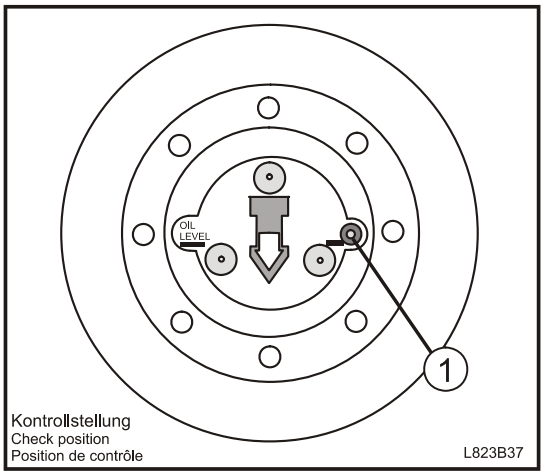


Fig. 37

7.5.7 Checking the tire pressure

- Check the tire pressure in accordance with the pressure chart, Section 3.8.

7.5.8 Tightness of wheel nuts

- During the first 50 operating hours, check the tightness of the wheel nuts daily, and subsequently at regular intervals, and tighten to the correct torque if necessary.
- **Tightening torque: 325 Nm**
- When fitting a wheel, tighten the nuts to the correct torque crosswise in several stages.

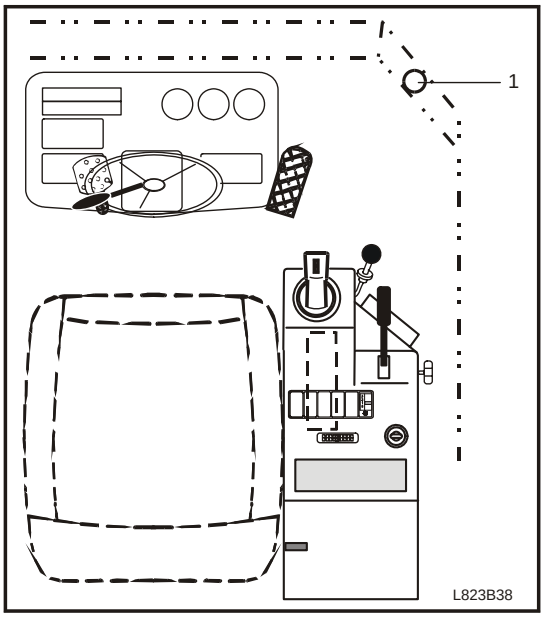


Fig. 38

7.5.9 Windshield washer

- Top up the washer tank (38/1) as required.
- Add antifreeze when temperatures are around or below freezing.

7.5.10 Electrical system

- The lighting and warning devices must be checked - including function test of indicator lamps - before use.

7.6 Inspection and maintenance work

7.6.1 Engine oil change

For engine oil change filling quantity and engine oil specification, see Section 3.9.

Change in compliance with inspection plan, Section 7.7.3

Collect the waste oil, do not allow it to seep into the ground.

Dispose of in compliance with regulations!

Oil change

- Run the engine until it reaches operating temperature, engine oil temperature approx. 80° C·
- Park the machine on a level surface.
- Stop the engine.
- Remove the cover on the bottom of the rear carriage.
- Place suitable oil drip pans below the opening.
- Screw the oil drain hose (40/1) onto the oil-change valve.

Danger of scalding *when hot oil is drained!*

- Remove the oil drain hose and screw the protective cap onto the valve.
- Close the service hole with the cap.
- To change the engine oil filter, see Section 7.6.2.
- Top engine oil up to the “MAX” mark on the oil dipstick (40/3) via the filler hole (40/2).
- Start the engine and run at low idle speed for approx. 2 min.
- Switch off the engine.
- Check the oil level and top up if necessary.

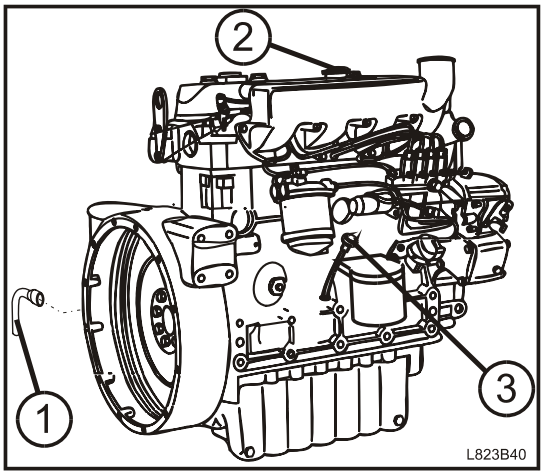


Fig. 40

7.6.2 Engine oil filter

The engine oil filter must be replaced with every engine oil change.

- Place oil drip pan below the engine oil filter.
- Clean the outside of the engine oil filter.
- Unscrew the filter cartridge (41/1) and check that the fastening stud is firmly secured in the filter head.
- Dispose of the filter cartridge in compliance with regulations.
- Check filter head condition.
- Fill the new filter with oil, wet the seal ring with oil and tighten firmly by hand.
- After a test run, check the tightness of the engine oil filter cartridge.

7.6.3 Engine breather assembly

Change in compliance with inspection plan, see Section 7.7.3

The area around the vent opening (42/6) must be clean and the opening accessible.

Ensure that the components of the breather assembly (42/1) are fitted in their correct positions. If they are incorrectly fitted, the engine can be damaged.

- Loosen the four setscrews and remove the breather cover.
- Disassemble the diaphragm along with the adapter ring (42/2); remove the spring (42/4).
- Loosen the clip retaining the breather pipe and remove the latter.
- Clean the cavity of the engine breather assembly in the valve cover (42/5); clean the breather pipe and opening (42/6).
- Insert a new spring (42/4) in the cavity of the breather.
- Insert a new adapter ring in the new diaphragm and fit the two parts on the spring.
- Re-fit the breather cover. Screw in the four setscrews and tighten.
- Re-fit the breather pipe and secure the clips.

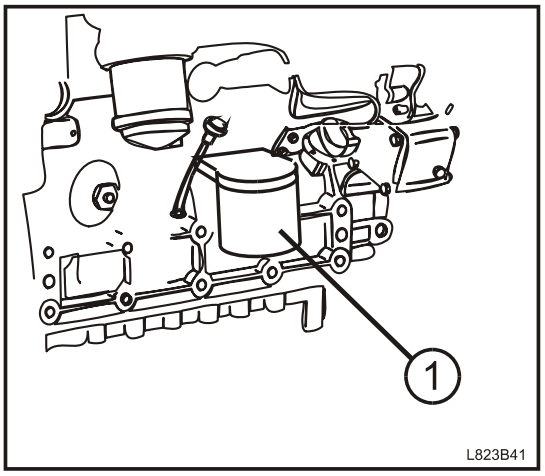


Fig. 41

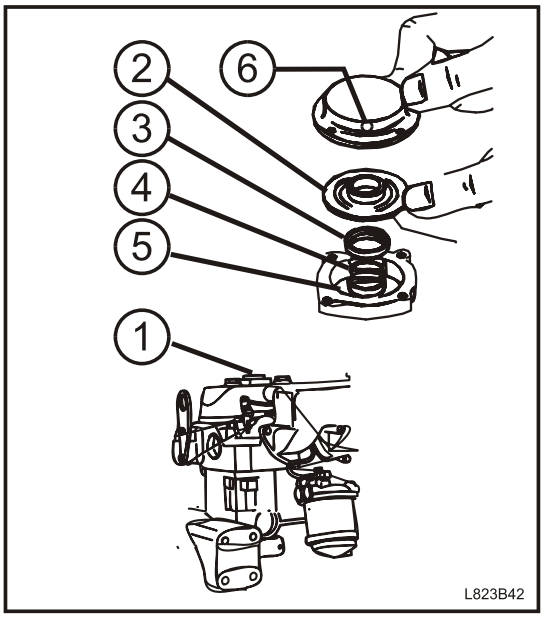


Fig. 42

7.6.4 Fuel system

7.6.4.1 Fuel filter

Change in compliance with inspection plan, Section 7.7.3

- Clean the outside of the fuel filter (43/1). Open the drain plug on the bottom of the filter and drain the fuel.

Collect the fuel and dispose of in compliance with regulations!

- Hold the bottom cover of the filter element and release the setscrew (43/2) which is fitted through the filter head above the center of the filter element.
- Lower the bottom cover (43/3) of the filter.
- Remove the filter insert and dispose of in compliance with regulations.
- Clean the top and bottom parts of the filter.
- Renew the seal rings (43/4, 43/5, 43/6) and slightly wet them with fuel.
- Fit the new filter insert on the bottom part and hold the element squarely to the filter head.
- Tighten the setscrew.
- Vent the fuel system (see Section 7.6.4.3)

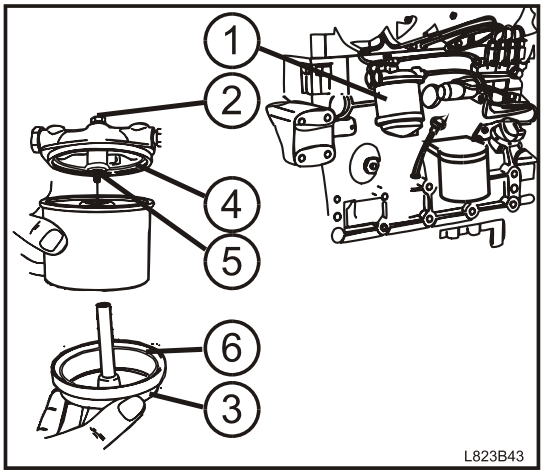


Fig. 43

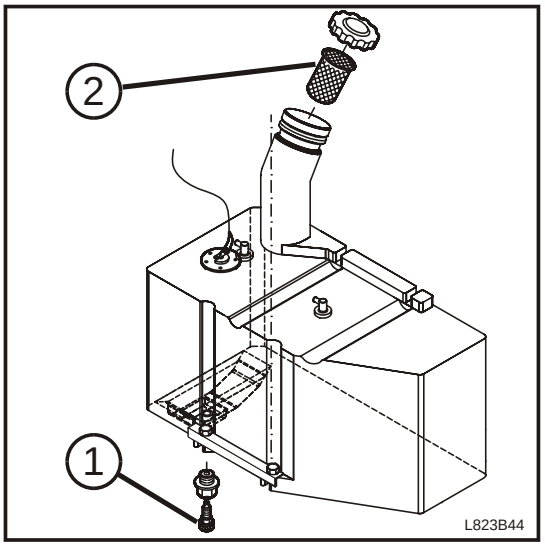


Fig. 44

7.6.4.2 Fuel tank

Maintenance in compliance with inspection plan, Section 7.7.3

- Drain water from the fuel tank via the drain plug (44/1).
- Clean the filler screen (44/2) and check for damage.

7.6.4.3 Venting the fuel system

If air enters the fuel system, it must be vented immediately before the engine can be started.

Air penetrates the system when

- the tank is run empty
- fuel lines are removed
- fuel filters are replaced

Venting

- Open the vent plug (45/1) on the side of the fuel injection pump.
- Actuate the fuel-pump hand lever (45/2) until fuel free of bubbles leaves the filter vent plug.

If the cam of the camshaft is set to max. delivery, the effect of the hand lever becomes unfavorable. In this case, turn the crankshaft further by one turn.

- Tighten the vent plug.
- Turn the pre-heat/ starter switch to “1”.
- Actuate the starter in 15-second intervals until the engine starts.

If the engine runs normally for a short time but then stops or runs irregularly, check whether there is still air in the fuel system.

If so, examine the low-pressure system of the fuel system and repeat venting procedure.

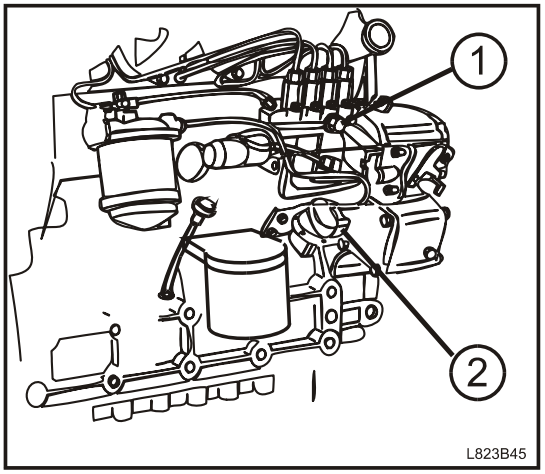


Fig. 45

7.6.5 Air filter, air intake

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.

7.6.5.1 Dust ejection valve

- Dust ejection valves (46/1) are largely maintenance-free.
- Any baked-on dust can be removed by squeezing the valve together.

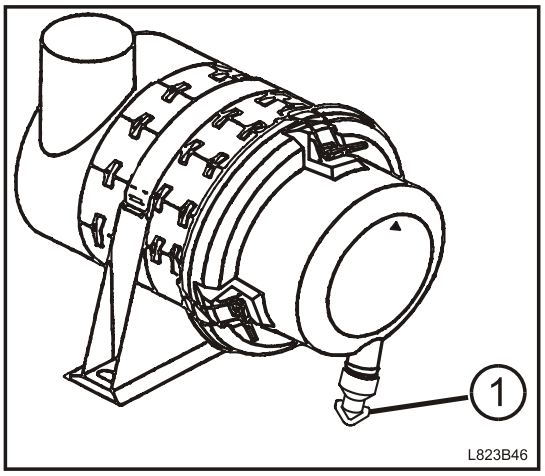


Fig. 46

7.6.5.2 Air intake

- Check the air filter attachment and retaining straps for damage.
- Check the tightness of the air duct between the air filter and the engine.
- Examine rubber parts for damage.

Defective parts must be replaced immediately!

7.6.5.3 Cartridge maintenance interval

Air filter - Main cartridge

- The air filter main cartridge must be replaced as soon as the filter maintenance indicator lamp (47/23) on the instrument panel lights up during operation.
- Brief delay in maintenance does not result in lower filter efficiency.

Air filter - Safety cartridge

The air filter safety cartridge must be replaced in the following cases:

- After the fifth 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 defective
- If the safety cartridge is defective

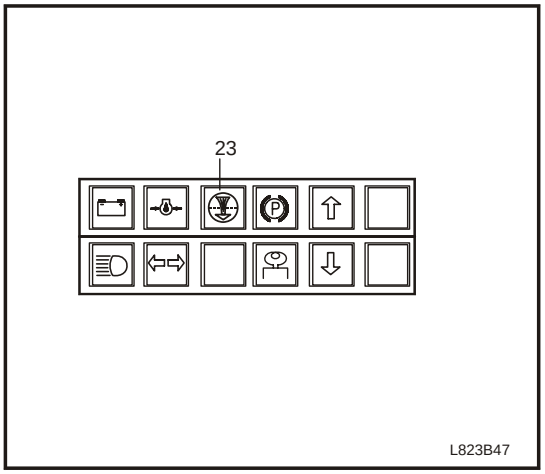


Fig. 47

7.6.5.4. Replacing cartridges

Main cartridge

- Release the wire fasteners (48/1) and remove the bottom of the housing (48/4).
- Withdraw the main cartridge (48/2) by twisting slightly to and fro.
- Check whether the safety cartridge (48/3) must be replaced.

*Remove the safety cartridge **only** in the case of necessary maintenance work. Only open the seal (48/5) of the safety cartridge for the purpose of replacement.*

- Note down the date of maintenance in the appropriate sections of the safety cartridge (48/3).
- Insert the new or cleaned main cartridge (48/2) carefully into the filter housing beginning with the open side and check that it is correctly positioned.
- Fit on the lower part of the housing (48/4) (observe the position of the dust ejection valve).
- Place the wire fasteners in the groove of the flange on the filter housing and tighten.

Safety cartridge

- Remove main cartridge.

*Do not clean the safety cartridge and, once it has been removed, do **not use it again.***

- Using a suitable tool (e.g. screwdriver), pierce the seal (48/5) of the safety cartridge from the inside, then lift up the two clips (48/6).
- Grasp the safety cartridge (48/3) by the two clips (48/6), withdraw by twisting slightly to and fro, and dispose of it.
- Insert a new safety cartridge and check that it is correctly positioned.
- Install the main cartridge.

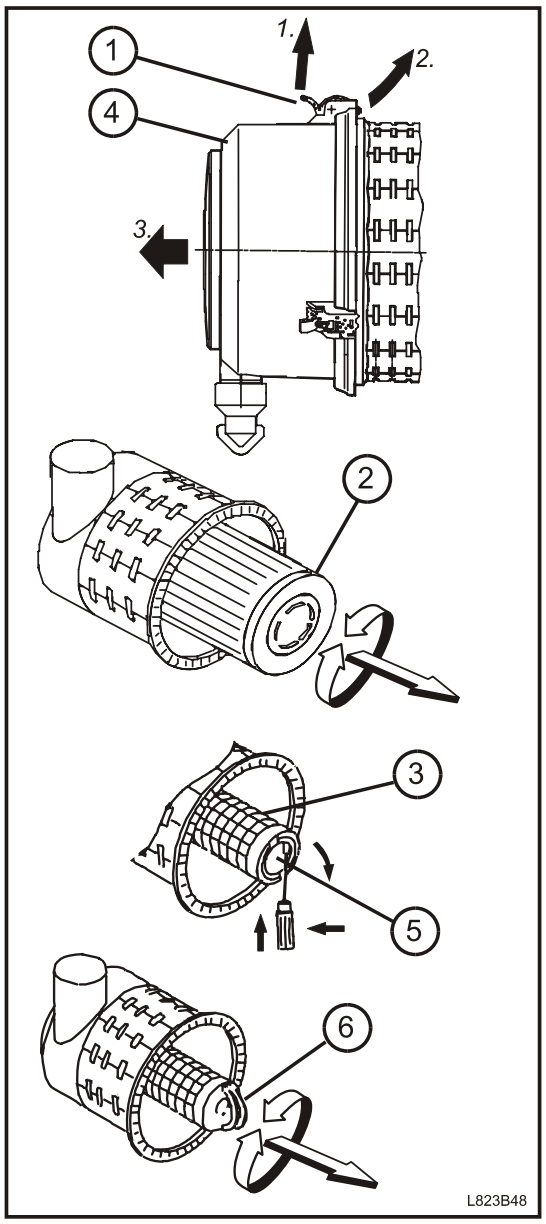


Fig. 48

7.6.5.5 Cleaning the 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 5 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, a pipe the end of which is bent at 90° should be attached to the 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. Continue until no more dust escapes.
- Check the clean main cartridge for damage to the paper bellows and rubber seals. Tears and perforations in the paper bellows can be determined using a torch.

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

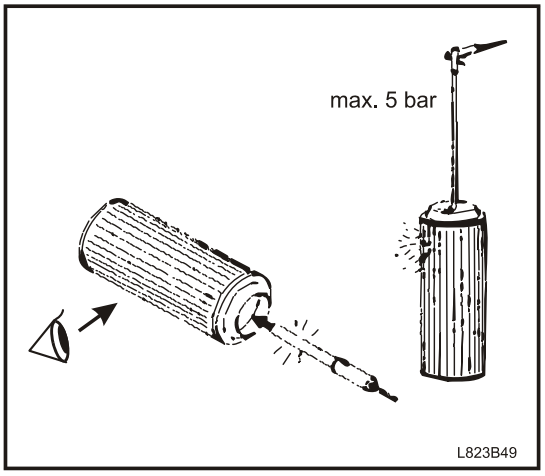


Fig. 49

7.6.6 Combined hydraulic oil-water cooler

7.6.6.1 Cleaning the cooling fins

Clean in compliance with inspection plan, Section 7.7.3

Dirt accumulation in coolers causes the engine and/or the hydraulic oil to overheat.

- The combined cooler is cleaned from the outlet side with compressed air.
- If necessary, e.g. if there is oil in the cooler, clean with cold cleaner or a steam jet appliance.
- After cleaning, run the engine until it reaches operating temperature in order to dry the cooler.

7.6.6.2 Changing the coolant

Change in compliance with inspection plan, Section 7.7.3

Only open the cooler cap when the engine is cold.

***Danger of scalding** from hot coolant!*

- Park the machine on level ground.
- Switch off the engine.
- Remove the cap (50/1) of the coolant surge tank.
- Unscrew the water drain plug (51/1) on the cylinder block and drain coolant.
- Remove the lower water hose from the cooler and drain the coolant.
- If necessary, flush the cooling system with clean water.
- Re-fit the drain plug on the engine and the water hose on the cooler.
- Fill the cooling system with coolant (see Technical Data Section 3.9.) and close the cap.
- Start the engine and bring to operating temperature, then turn off and allow to cool.
- Check the coolant level and top up (several times, if necessary).

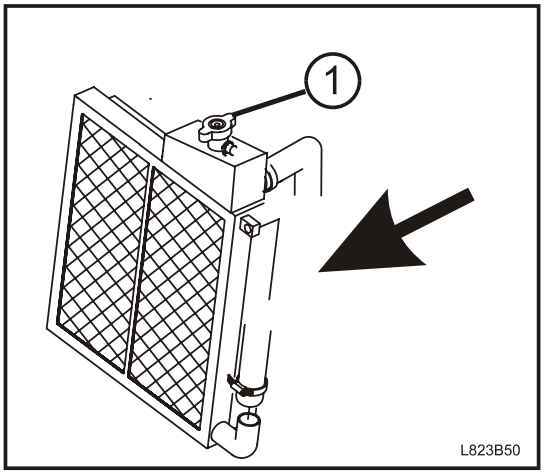


Fig. 50

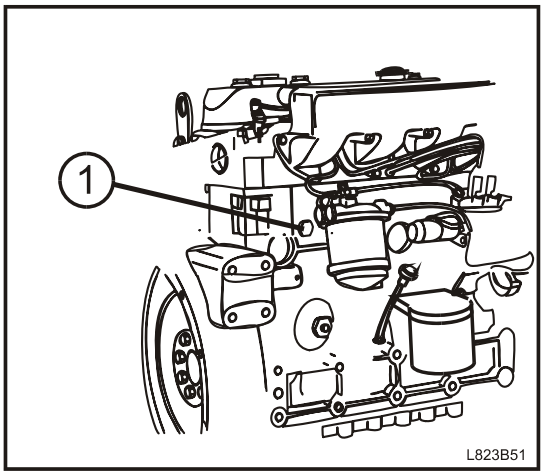


Fig. 51

7.6.7 Checking V-belts

Maintenance in compliance with inspection plan, Section 7.7.3

Only check and tension V-belts with the engine off!
Danger of injury!

- Visual inspection of the V-belts over whole length in order to ensure that they are not damaged.

Replace worn or damaged V-belts immediately.

Checking the V-belt tension

In order to check the V-belt tension, a tension measuring device is recommended. Check the tension in compliance with the manufacturer's operating instructions.

Checking the V-belt tension without a 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.
- Using medium thumb pressure of approx. 45 N, the V-belt sag should equal 10 mm.

Tensioning V-belts

- Slacken the fastening screws (52/1) on the generator and control handle (52/2).

*Do **not** loosen the adjusting screw (52/3) of the control handle as the thermostat housing may be damaged.*

- Rotate the generator until the tension is correct.
- Tighten the fastening screws of the generator and the control handle.
- Check the tension again

When new V-belts are fitted, their tension must be checked and adjusted if necessary after the first 15 min.

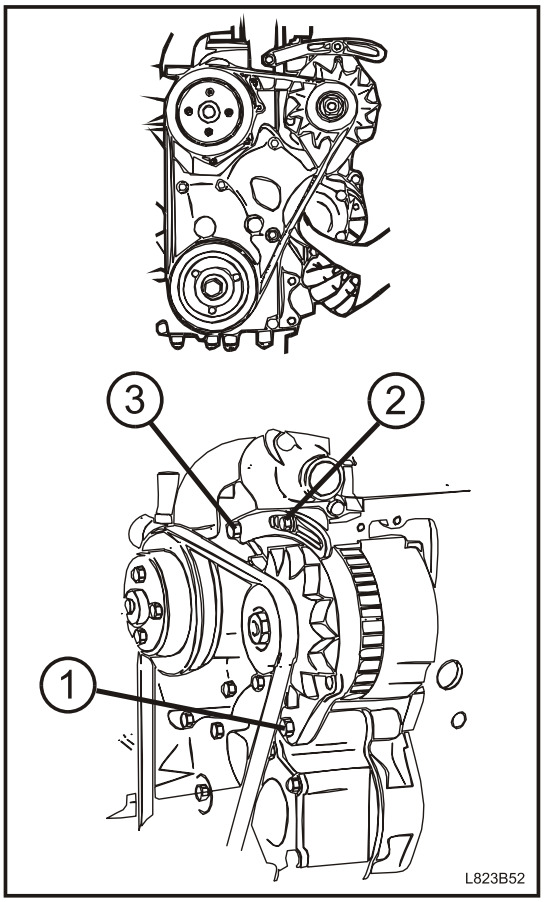


Fig. 52

7.6.8 Checking the valve lash

Maintenance in compliance with inspection plan, Section 7.7.3

- The valve lash (53/1) is tested by means of a reed gauge placed between the upper part of the valve stem (53/3) and the rocker arm (53/2) on the engine.

The correct valve lash is

0.35 mm for the inlet valve and

0.35 mm for the exhaust valve.

Number 1 cylinder is located at the front of the engine.

- Remove the valve cover.
- Turn the crankshaft in clockwise direction until both valves intersect at number 4 cylinder
- In this position, check the valve lash of the valves of number 1 cylinder.

If required, adjust valve lash. To do so, proceed as follows:

⇒ Slacken the lock nut (53/4).

⇒ Using a screwdriver, adjust the setting screw (53/5) in such a manner that the correct valve lash (53/1) is obtained when the lock nut is tightened.

- When the valves of number 2 cylinder intersect check the valve lash of the valves of number 3 cylinder and adjust, if necessary.
- When the valves of number 1 cylinder intersect check the valve lash of the valves of number 4 cylinder and adjust, if necessary.
- When the valves of number 3 cylinder intersect check the valve lash of the valves of number 2 cylinder and adjust, if necessary.
- Re-fit the valve cover with new seal.

Tightening torque of cap nut: 11 Nm

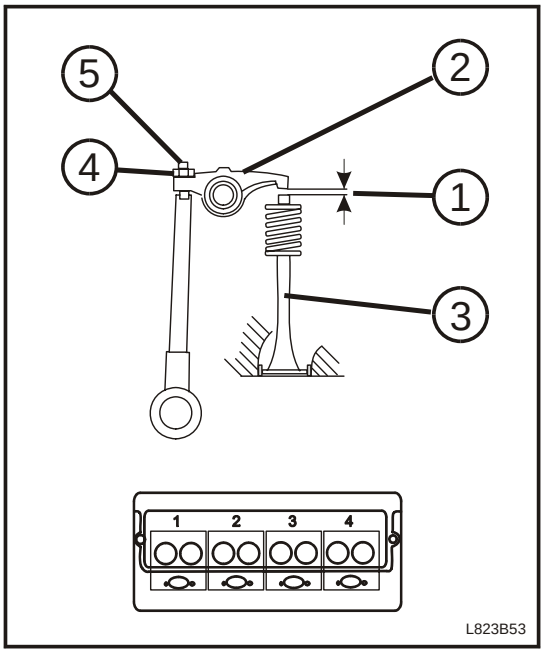


Fig. 53

7.6.9 Battery

Maintenance in compliance with inspection plan, Section 7.7.3

The battery is located on the rear right-hand side of the rear carriage.

The instructions of the battery manufacturer must be observed when using the battery for the first time.

- The acid level should be approx. 10 mm above the edges of the plates. If necessary, top up with pure distilled water.
- Only check the battery with the engine off.

With maintenance-free batteries, this check can be omitted

Removing the battery

- Disconnect first the battery ground cable, then the positive cable.
- Remove the clamping bracket (54/1).
- Lift out the battery.

Installing the battery

- Lay the battery in the machine and secure with clamping bracket.
- Connect the positive (+) cable, then the battery ground cable (-).

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

- In winter, in particular, ensure that the battery is well charged.

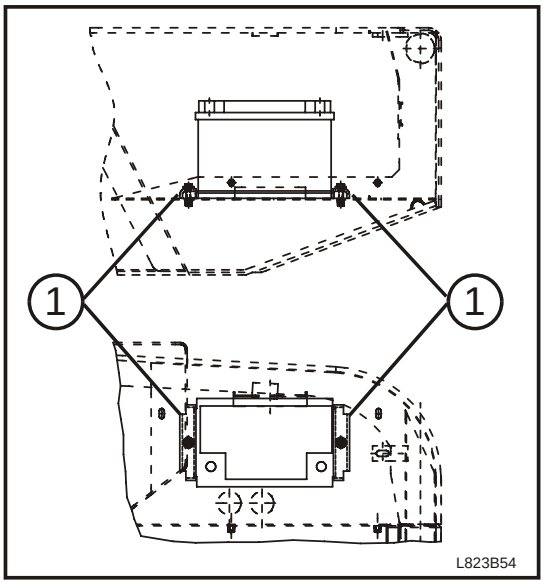


Fig. 54

7.6.10 Changing the brake oil

Maintenance in compliance with Section 7.7.3

Only top up with ATF-oil!

Collect the waste oil, do not allow it to seep into the ground.

Dispose of in compliance with regulations!

- The brake oil must be changed by trained specialist personnel.

7.6.11 Changing the hydraulic oil

For hydraulic oil filling quantities and specifications, see Technical Data, Section 3.9.

Change in compliance with inspection plan, Section 7.7.3

Hydraulic oil change

Change the hydraulic oil at operating temperature.

- Retract all hydraulic cylinders.
- Stop the engine.
- Unscrew the oil dipstick (56/1).
- Remove the drain plug (56/4) from the hydraulic oil tank and drain oil into clean containers.

Collect the waste oil, do not allow it to seep into the ground.

Dispose of in compliance with regulations!

- Flush and clean the hydraulic oil tank as required (to do so, remove combined return suction filter 56/2, see Section 7.6.12).
- Screw on the drain plug carefully.
- Fill up with clean hydraulic oil via the breather. To do so, remove filter head.
- Screw on breather (56/3).
- Screw in the oil dipstick.

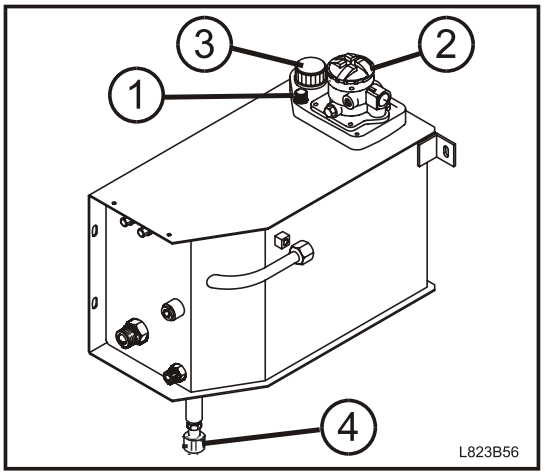


Fig. 56

7.6.12 Hydraulic oil combined filter

Change in compliance with inspection plan, Section 7.7.3

After a larger repair job, following the test run the filter cartridge of the hydraulic oil filter must be renewed as well.

Replacing the filter cartridge

- Unscrew the oil dipstick (56/1).
- With the aid of a tool, remove the filter cap (57/1).
- Take out the filter cartridge (57/5) together with the screw neck (57/3) by pulling and turning at the same time.
- Remove the filter cartridge from the screw neck and dispose of in compliance with regulations.
- Ensure that the gasket (57/2) in the cap and the O-ring (57/4) on the screw neck are in faultless condition and replace defective parts.
- Fit new filter cartridge on screw neck and insert together in filter.
- Screw on filter cap (57/1) and tighten using a torque of 20 Nm.
- Screw in oil dipstick.
- Check the tightness of the filter by means of a test run.

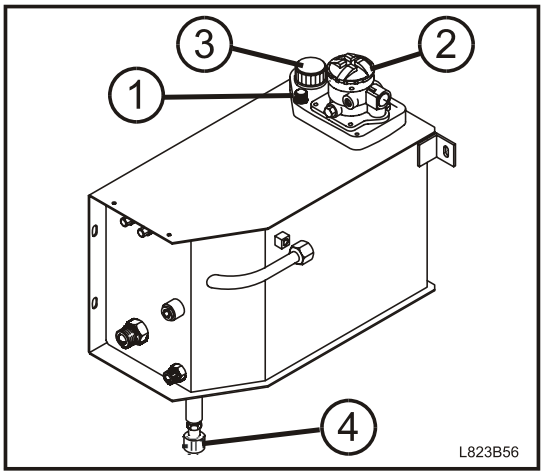


Fig. 56

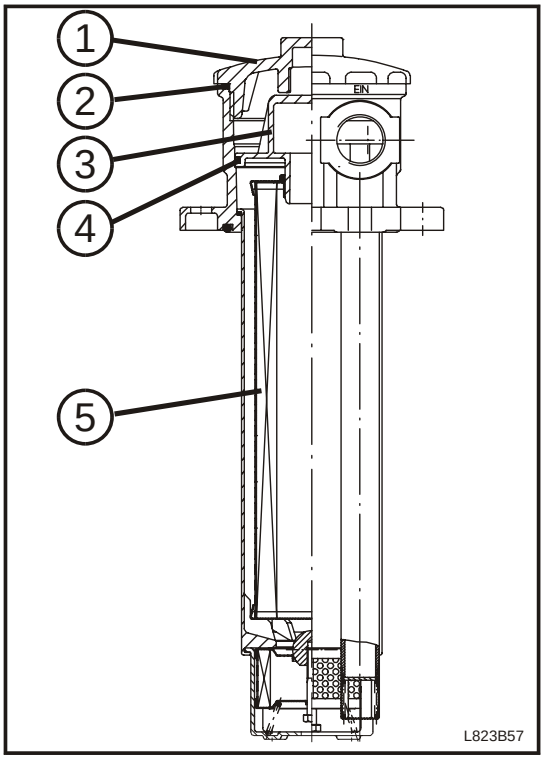


Fig. 57

7.6.13 Breather

Change in compliance with inspection plan, Section 7.7.3

- Unscrew oil dipstick (58/4).
- Remove breather (58/1) and dispose of in compliance with regulations.
- Clean screen (58/3), check for damage and replace, if necessary.
- Screw in new breather (58/1) with O-ring (58/2) and tighten so that it is hand-tight.
- Screw in oil dipstick.

The breather must also be replaced if it is dirty, e.g. due to hydraulic oil mist.

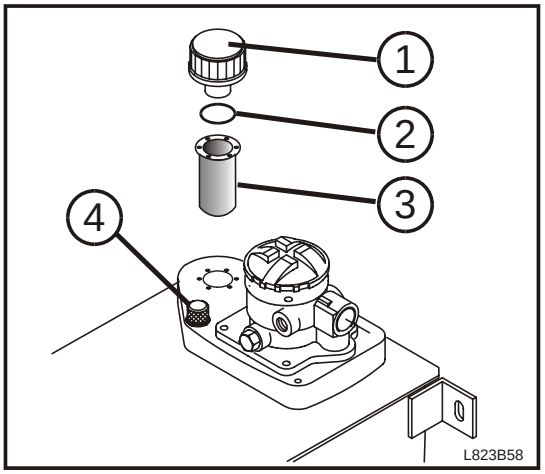


Fig. 58

7.6.14 Changing the axle oil

For oil specifications and filling quantities, see Section 3.9.

Change in compliance with inspection plan, Section 7.7.3

The axle oil must be changed at operating temperature.

Collect the waste oil, do not allow it to seep into the ground.

Dispose of in compliance with regulations!

After filling the axles with oil, move the machine for approx. 5 min., to ensure that the oil is evenly distributed. Check oil level once again and top up oil if required.

7.6.14.1 Differential of front axle

- Park the machine on level ground.
- Open the inspection/ filler plug (59/1).
- Open the drain plug (59/2) on the differential and drain the oil.
- Purge the axle if necessary.
- Carefully close the drain plug.
- Pour in oil via the inspection/ filler hole until oil escapes.
- Carefully close the inspection/ filler plug.

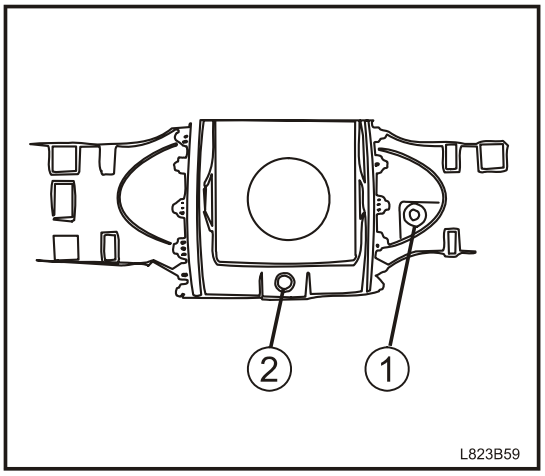


Fig. 59

7.6.14.2 Differential of rear axle

- Park the machine on level ground.
- Open the inspection/ filler plug (60/1).
- Open the drain plug (60/2) on the differential and drain the oil.
- Purge the axle if necessary.
- Carefully close the drain plug.
- Pour in oil via the inspection/ filler hole (60/1) until oil escapes.
- Carefully close the inspection/ filler plug.

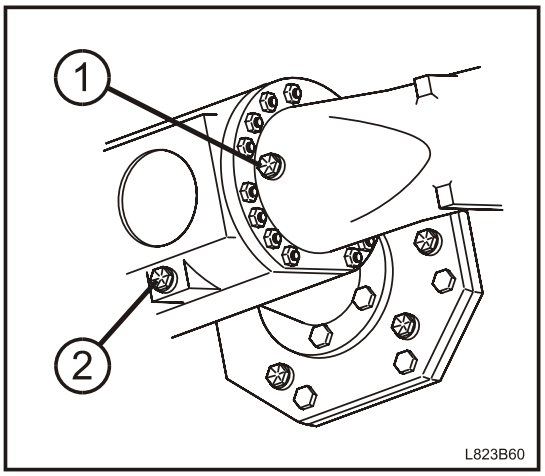


Fig. 60

7.6.14.3 Reduction gear

- Park the machine on level ground.
- Open the inspection plug (61/1) on the reduction gear.
- Open the drain plug (61/2) on the reduction gear and drain the oil.
- Purge if necessary.
- Carefully close the drain plug.
- Pour in oil up to inspection hole.
- Carefully close the filler/inspection plug.

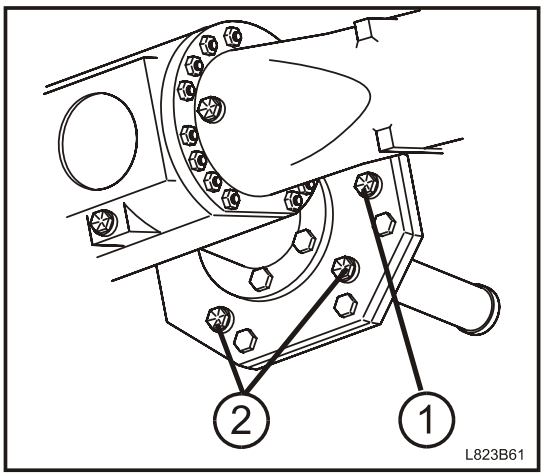


Fig. 61

7.6.14.4 Wheel hub

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

- Turn the wheel until the screw plug (62/1) is on the bottom of the hub.
- Open the screw plug and catch the escaping oil.
- Purge if necessary.
- Turn the wheel to the filling and inspection position: The inspection mark must be horizontal.
- Fill in oil up to the lower edge of the hole.
- Carefully close the screw filler plug.

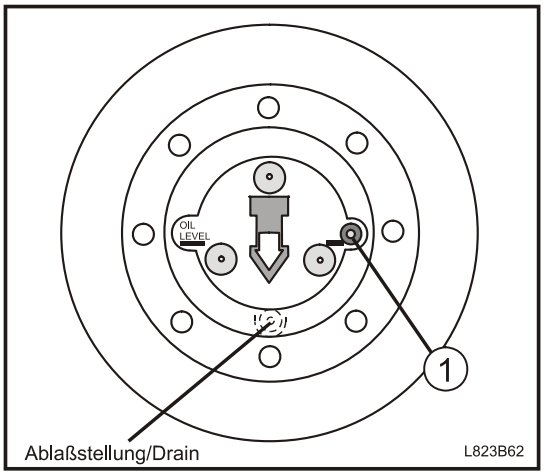


Fig. 62

7.6.15 Cab ventilation dust filter

- The air intake system of the cab is equipped with a dust filter or optionally with a charcoal/ pollen filter.

Removal

- Remove ventilation grid (63/1).
- Remove angle bracket (63/2).
- Take out dust filter (63/3).
- Clean the filter or replace it.

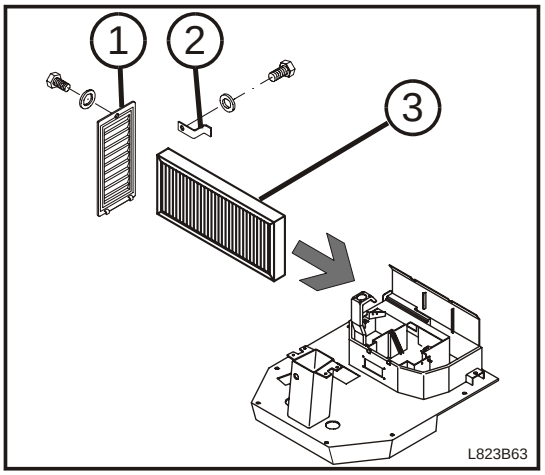


Fig. 63

Cleaning the dust filter

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 clean filter for damage to the paper bellows and rubber seals.

Never continue to use damaged dust filters!

Installation

- Insert new or cleaned dust filter until stop.

Observe the mounting position!

The air flow arrows must point towards the cab.

- Attach the dust filter with the angle bracket.
- Fit the ventilation grid.

7.7 Maintenance and inspection plans

7.7.1 Daily and weekly tasks

Inspection and maintenance jobs to be performed by service personnel.

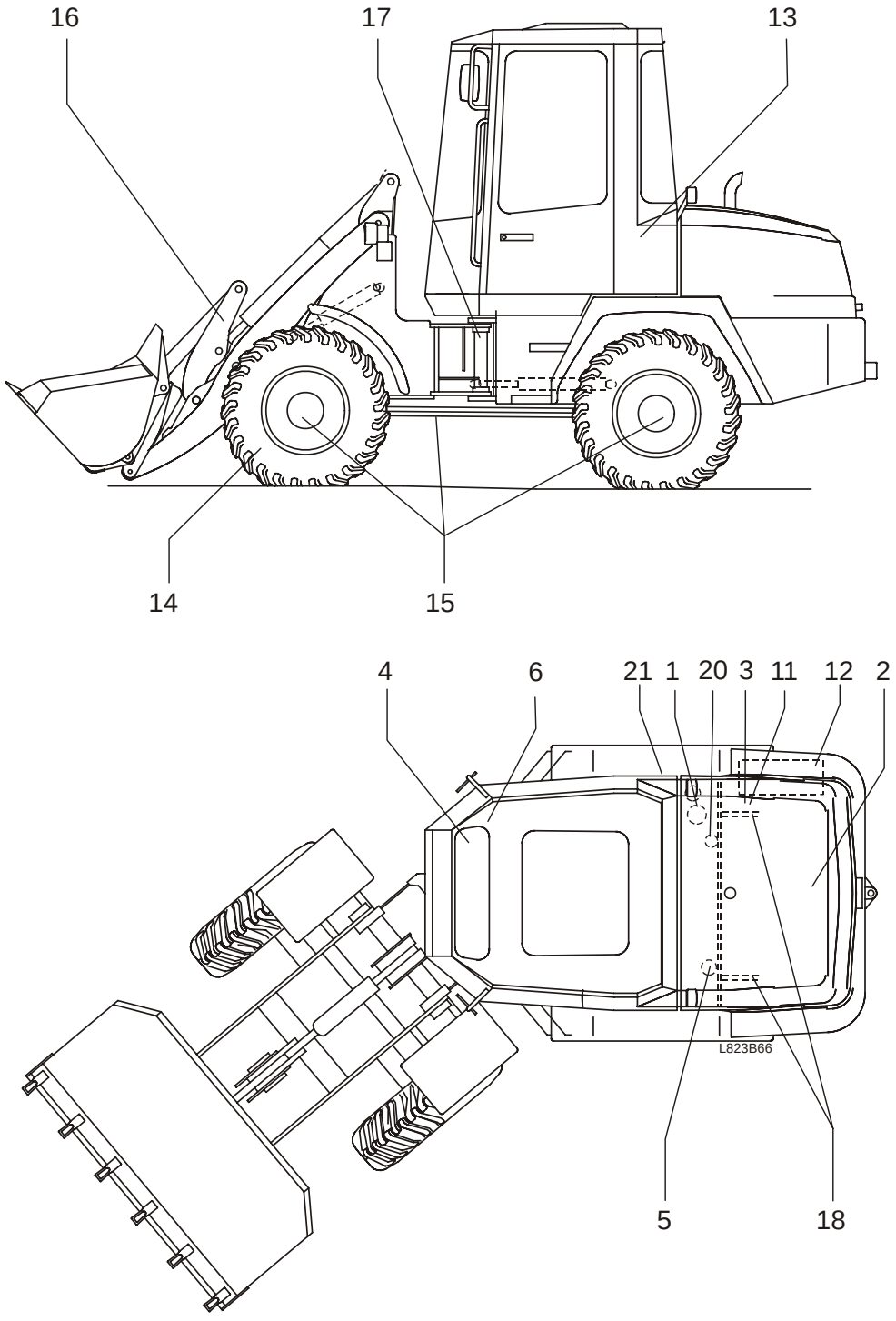


Fig. 66

Daily

1 Check hydraulic oil level.
2 Check engine oil level.
3 Check coolant level.
4 Check fuel level (fuel gauge on instrument panel).
5 Check fuel pre-filter for water accumulation. Drain water if necessary.
6 Check water level for windshield wash/ wipe system.
7 General visual inspection for material cracks, external damage, completeness, etc.
8 Check for leaks in:
pipes, hoses, control valve, hydraulic pumps, cylinders, etc.

 *When tightening hoses or pipeline connections, counterlock fittings to prevent turning.*

9 Check electrical indicating and warning elements, and the lighting system.
10 Check smooth running of operator controls.

Weekly

11 Clean cooling fins of the combined hydraulic oil-water cooler.

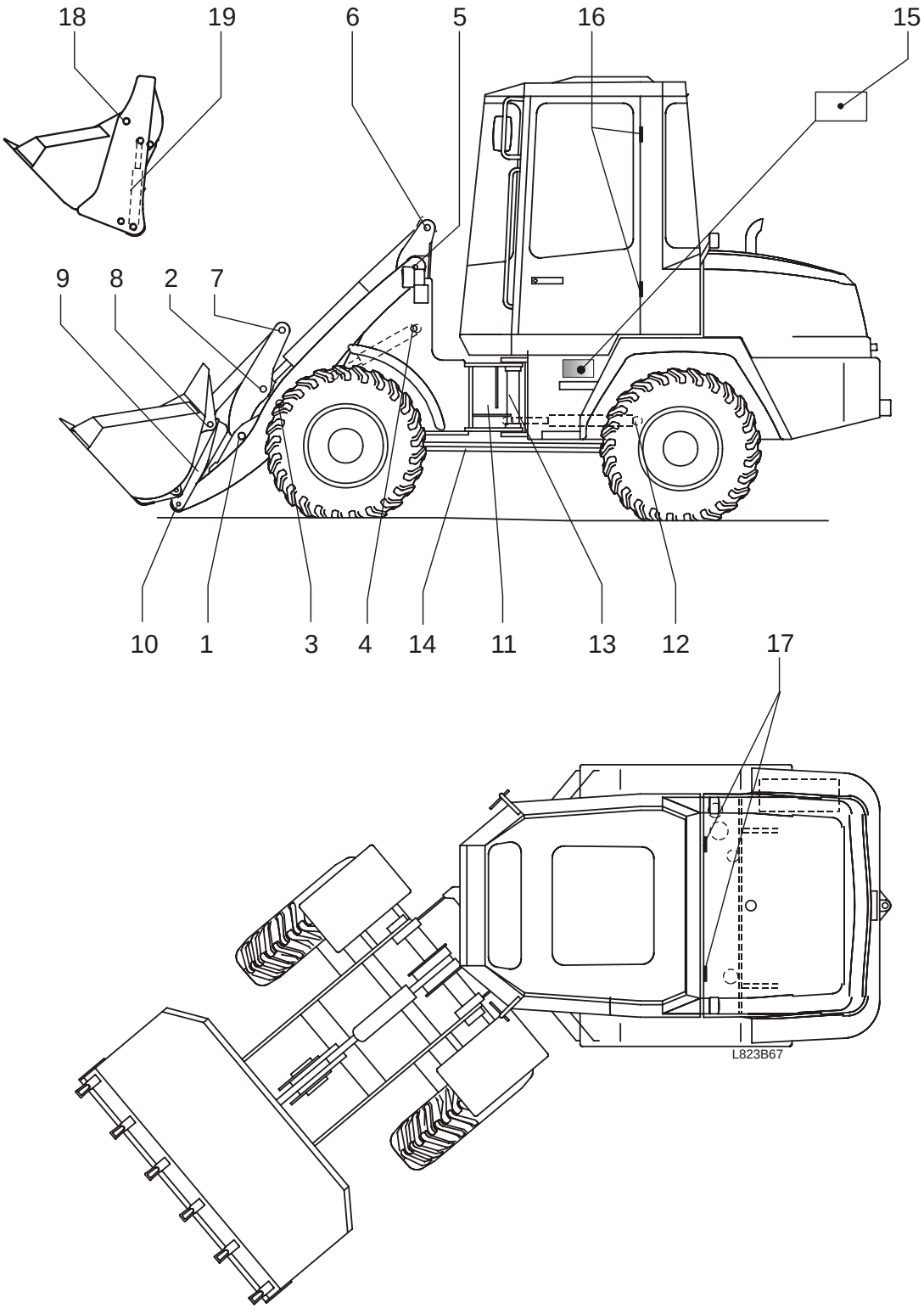
 *In case of extreme exposure to dust, shorten cleaning intervals.*

12 Check acid level and connections of battery.
13 Check that door catches function perfectly.
14 Check tire pressure and tightness of wheel nuts.
15 Check fastening of axles and propeller shaft.
16 Check bushings and bolts of the work equipment.
17 Check bolts, bushings and the linkage of the articulated steering.
18 Check that pneumatic springs of engine hood function perfectly.
19 Check function, condition and completeness of safety devices.
20 Check brake oil level.
21 Check if the dust filter for cab ventilation is dirty and clean if necessary.

 *In case of extreme exposure to dust, shorten checking and cleaning intervals.*

22 Check function of brakes.
23 Grease machine in compliance with overview of lubricating points.

7.7.2 Overview of lubricating points



Grease all lubricating points with multi-purpose grease.

The intervals stated are valid for one-shift operation				
Item	**Lubricating point**	Qty.	Daily	Weekly
1	Lift frame - Tilt lever	1		X
2	Tilt cylinder - Tilt lever	1		X
3	Lift cylinder - Lift frame	1		X
4	Lift cylinder - Front carriage	1		X
5	Lift frame - Front carriage	2		X
6	Tilt cylinder - Front carriage	1		X
7	Tilt lever - Linkage	1		X
8	Linkage - Quick-attach system	2		X
9	Mechanical quick-mount hitch	3		X
	Hydraulic quick-mount hitch	3		X
10	Lift frame - Quick-mount hitch	2		X
11	Steering cylinder - Front carriage	1		X
12	Steering cylinder - Rear carriage	1		X
13	Pivot point	3		X
14	Joints of propeller shaft	2		X
15	Rear axle bearing	1		X
16	Door hinges	4		X
17	Engine hood hinges	2		X
18	Multi-purpose bucket	2		X
19	Hydraulic cylinder of multi-purpose bucket	4		X

We recommend that for special operations, e.g. on sandy ground, the lubrication intervals are shortened. Increased frequency of lubrication helps self-cleaning of bearing points.

7.7.3 Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* **X = *Replacement***		**Operating hours**							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
2	Change engine oil	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**
3	Change engine oil filter	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**
4	Drain water from fuel tank	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	
5	Change fuel filter		**X**	**X**	**X**	**X**	**X**	**X**		**X**
6	Check air intake	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
7	Change air filter - main cartridge	**in compliance with service indicator**								**X**
8	Change air filter - safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil-water cooler. *In case of high exposure to dust, shorten the cleaning intervals.*	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
10	Check antifreeze level in coolant									**O**
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
13	Check engine mounts and pump attachments	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
14	Check engine speed adjustment, top-end and low idle speed	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
15	Check valve lash of engine and adjust if necessary			**O**		**O**		**O**		
16	Check injection nozzles **3)**							**O**		
17	Replace crankcase breather in valve cover **1)**					**X**				
18	Check acid level and battery connections	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
19	Clean dust filter for cab ventilation and replace if necessary	**O**	**O**	**X**	**O**	**X**	**O**	**X**		**X**
20	Check condition of tires, tire pressure and tightness of wheel nuts	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
21	Check secure fastening of axles and propeller shaft	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
22	Check bearing bushings and bolts of work equipment and replace if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
24	Check that door catches function perfectly, and replace if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		

1) at least every 2 years

3) every 3,000 operating hours by specialist personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
25	Check electrical indicating and warning elements, and lighting system	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
26	Check smooth running of operator controls and adjust if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
28	Check or change hydraulic oil **2)**	**O**	**O**	**X**	**O**	**X**	**O**	**X**		**X**
29	Replace hydraulic oil filter insert	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
30	Replace breather			**X**		**X**		**X**		**X**
31	Differential of rear axle - oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
32	Differential of front axle - oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
33	Reduction gear: oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
34	Wheel hubs of front and rear axles - oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
35	Check function of brakes, change brake oil	**O**	**O**	**O**	**O**	**X**	**O**	**O**		**X**
36	Grease machine in compliance with overview of lubricating points	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
37	Check function, condition and completeness of safety equipment	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
38	Hydraulic function check with pressure function test	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
39	Test run and test work	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
40	Initial inspection cards and return to manufacturer	**O**	**O**							

2) **Extension of hydraulic oil change interval -** Hydraulic oil change in compliance with oil sample analysis and lab report. Oil sample intervals as specified by test lab.

7.8 Shutdown

7.8.1 Preservation (temporary shutdown)

In order to prevent damage (corrosion, etc.) from storage during shutdown periods over three months, certain preservation measures must be taken:

- We recommend keeping the machine in a dry, dust-free room during the storage period.
- Clean the inside and outside of the machine, including the engine.
- Lubricate the machine in compliance with the lubrication plan.
- Check the oil levels of all assemblies, such as axles, transmissions, etc. and top up if necessary.
- Check the hydraulic oil level and top up if necessary.
- Repair paint damage.
- Fill the diesel tank completely, in order 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 instructions.
- Check the tire pressure in compliance with the prescribed values and protect the tires (rubber crawlers) from direct sunlight.
- Treat bare piston rods with a commercially available anti-corrosion agent.
- Remove and clean the battery and keep it in compliance with 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.

7.8.2 During shutdown

- 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 min.
- 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.

7.8.3 After shutdown

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.
- The openings of the air filter and exhaust pipe must be freed.
- Check the condition of the air filter main cartridge / safety cartridge and replace if required.
- Clean the machine with a neutral detergent.
- Check and - if required - re-charge and install the battery.
- Carry out all measures for putting the diesel engine back into operation stated in the engine operating instructions.
- If the machine has been out of use for more than 6 months, the oil in the assemblies such as axles, transmissions, etc. must be changed.
- If hydraulic filters have been out of use for 6 months, suction and return filters as well as breathers - if installed - must be replaced.
- Lubricate the machine in compliance with the lubrication plan.

8 Operating Problems

8.1 General

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 the responsible Service Agent must be called in.

8.2 Engine

All defects and faults in the diesel engine must be examined as described in their specific operating instructions.

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

Fault	Possible cause	Remedy
8.3 No steering movement		
1	Oil supply to pump interrupted	Check and repair suction line
2	Hydraulic pump defective	Repair or replace
3	Priority valve defective	Remedy fault (call Service Agent)
4	Steering control unit defective	Remedy fault (call Service Agent)
5	Steering cylinders defective	Repair
6	Mechanical fault	Repair
8.4 Insufficient performance of service brake		
1	Brake discs worn	Adjust or repair (call Service Agent)
2	Main brake cylinder defective	Repair or replace (call Service Agent)
3	Mechanical fault	Repair (call Service Agent)

Fault	Possible cause	Remedy
8.5 Insufficient performance of parking brake		
1	Wear of drum brake	Adjust or repair
2	Mechanical fault in brake actuation	Repair and/ or re-adjust
8.6 Hydrostatic drive has no neutral position		
1	Switch for direction of travel defective	Repair or replace
2	Solenoids of valve defective	Repair or replace
3	Neutral position has shifted	Check, re-calibrate (call Service Agent)
4	Internal damage to travel pump	Replace travel pump
5	Idling speed of engine too high	Adjust
8.7 Hydraulic oil exceeds max. admissible temperature		
1	Thermo switch defective	Replace
2	Oil level too low	Top up oil to mark on dipstick
3	Oil cooler clogged or faulty	Clean, check, replace if necessary
4	Suction filter clogged	Replace
5	High-pressure valves do not respond all the time or too early	Check high-pressure valves, re-adjust or replace if necessary
6	Flushing circulation does not function	Check pressure of flushing and filling pump, possible back pressure in cooling circuit, check housing pressure
7	Travel pump or travel motor damaged (worn)	Replace
8	Main pump worn	Replace
9	Main relief valve defective	Replace

Fault	Possible cause	Remedy
8.8 Sluggish acceleration and deceleration, too little propulsive power		
1	Insufficient engine power	Check diesel engine
2	A brake has got stuck	Check, remedy damage
3	No tank pressurization	Check breather, replace
4	Suction filter clogged	Replace filter
5	FAST-SLOW-transmission does not shift electrically or mechanically	Check power supply and solenoid valve, repair and replace if necessary, check travel motor
6	Fault in brake inching mechanism	Check, adjust, replace
7	Filling pump sucks up air	Check, eliminate leakage
8	Travel pump mis-adjusted	Re-adjust travel pump
9	Filling or supply pressure too low	Check pressure, adjust
10	Supply circuit pressure relief valve clogged or defective	Check, adjust or renew if necessary
11	High-pressure too low	Check high-pressure (pressure cut-off), and re-adjust high-pressure valves or replace if necessary
12	Travel pump does not open fully, pilot pressure too low	Nozzles clogged, check, repair
13	Internal damage to travel pump or travel motor	Replace units
14	Travel motor mis-adjusted	Re-adjust travel motor
8.9 Transmission works in one direction only		
1	Switch for direction of travel defective	Repair or replace if necessary
2	Solenoid valve sticks or is defective	Repair or replace if necessary
3	Power supply to switch for direction of travel or solenoid valve interrupted	Check and repair (incl. earth connection)
4	Pilot pressure too low on one side	Nozzles clogged, check, clean
5	High-pressure relief valve is faulty or incorrectly set	Swap valves around. If machine now travels in the other direction, examine valve, clean and replace if necessary

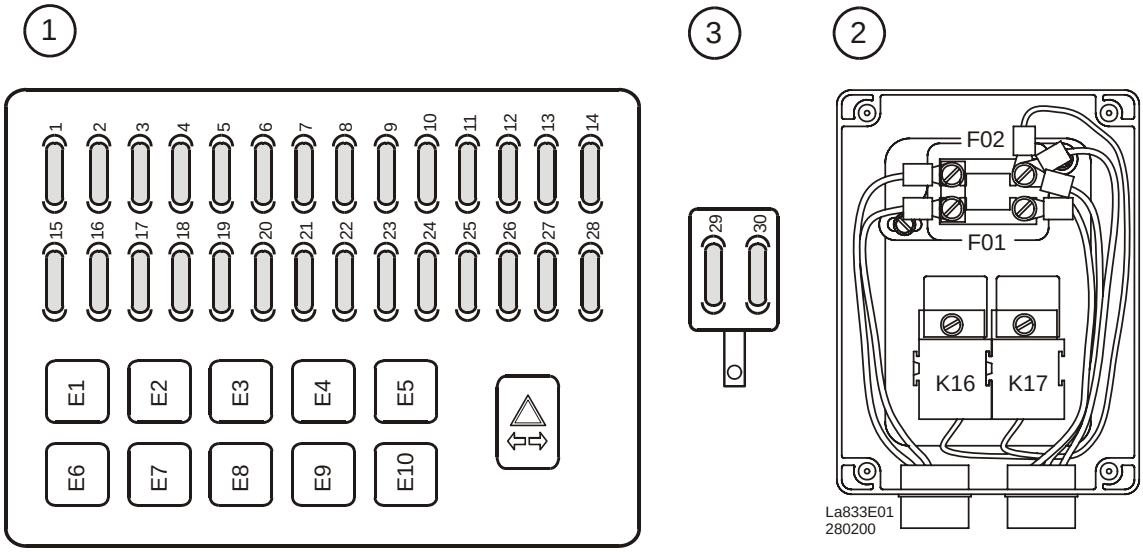
Fault	Possible cause	Remedy
8.10 Transmission works in neither direction		
1	Too little hydraulic oil in tank	Top up to mark on dipstick
2	Mechanical connection to diesel engine faulty	Check, repair
3	Filling pump defective, no filling pressure	Remove pump and examine, install new pump if necessary
4	Switch for direction of travel defective	Repair and replace if necessary
5	Solenoid valve for direction of travel defective	Repair and replace if necessary
6	Suction filter clogged	Replace filter
7	Suction line from tank to pump kinked	Check and eliminate kink
8	Power supply to switch for direction of travel and solenoid valve interrupted	Remedy cause of interruption
9	Internal damage to travel pump or travel motor	Replace units completely
10	Mechanical connection of travel motor to axle interrupted	Check, repair
8.11 Loader installation is not working		
1	Oil supply to pump interrupted	Check suction line and repair if necessary
2	Main relief valve defective	Check and replace if necessary
3	Hydraulic pump defective	Check, repair or replace
4	Hydraulic pump drive mechanically interrupted	Check and repair
8.12 Decrease in machine's performance (loader installation)		
1	Insufficient engine power	Check diesel engine and adjust if necessary
2	Hydraulic oil level too low	Top up hydraulic oil to the mark on the dipstick
3	Pump is sucking up air	Tighten hose connections. Replace O-ring or seals
4	Insufficient working pressure	Re-adjust main relief valve, replace if necessary
5	Wear of pump	Replace pump
6	Incorrect hydraulic oil	Quality of hydraulic oil must conform to our recommendation

Fault	Possible cause	Remedy
8.13 Working cylinders are not working satisfactorily		
1	Seals in cylinders worn	Re-seal cylinders
2	Secondary valves faulty	Check secondary valves and replace completely if necessary
8.14 Trouble in the electrical system		
1	Outside and/or internal lighting defective	Check cables, connections, bulbs and fuses
2	Windshield wiper does not work	Check cables, connections and fuses. Examine windshield wiper for mechanical damage. Replace complete wiper if necessary
3	Horn does not work	Check cables, connections and fuses. Replace complete horn
4	Control organs are imprecise	Determine the fault or source of the problem, call Service Agent if necessary
5	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 complete unit if necessary.

9 Appendix

9.1 Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box .....Seat console, right, bottom

2 = Starter box .....Engine compartment dividing wall - tank side, right

3 = Fuse box .....Behind fuse and relay box (Pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safeguard
E 3	K 3	Travel, in reverse
E 4	K 4	Travel, forward
E 5	--	not assigned
E 6	--	not assigned
E 7	--	not assigned
E 8	K 8	Brake inching
E 9	K 9	Working floodlight, front
E 10	K 10	Working floodlight, rear
	K 11	Flasher transmitter
	K 13	Pre-heat relay (engine compartment dividing wall - near generator)
	K 16	Shut-off
	K 17	Start-up

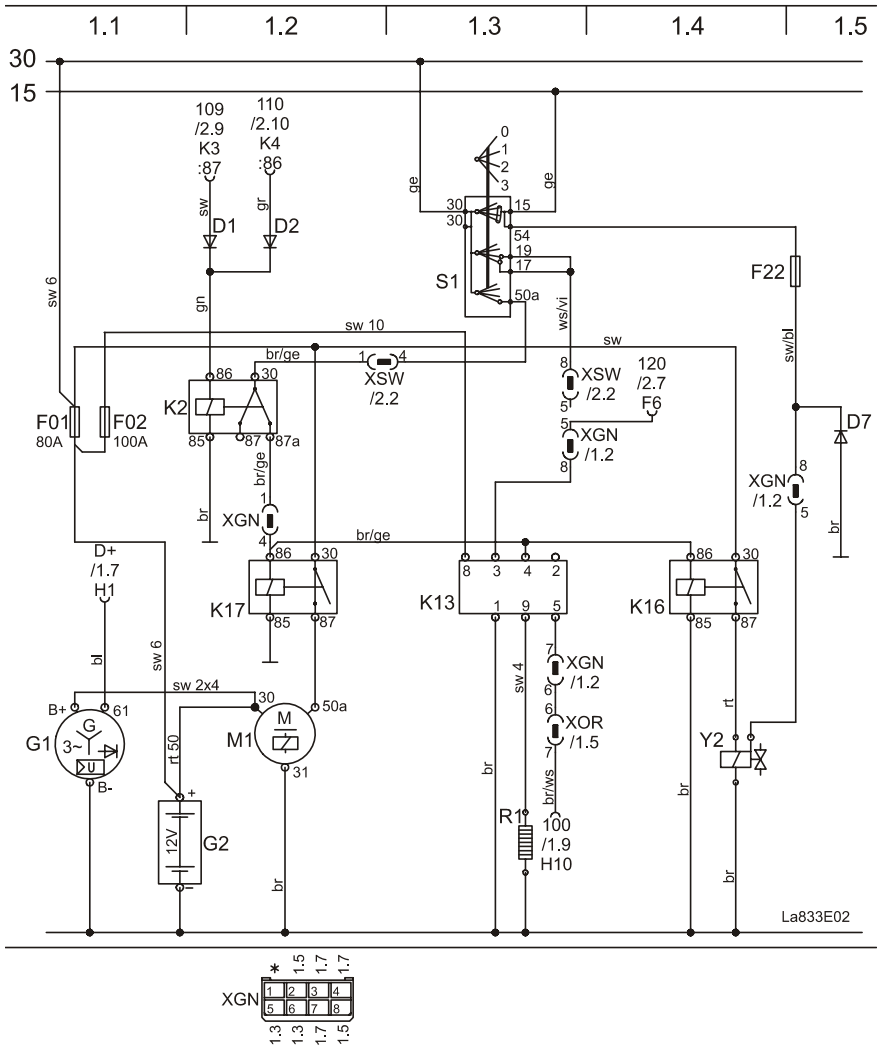
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	--		F 16	10	Rotating beacon Interior light
F 3	15	Travel - FAST-SLOW	F 17	10	Socket Radio
F 4	15	Hand brake switch Travel, forward/ reverse Hydrostatic brake	F 18	15	Low beam
F 5	10	Horn	F 19	15	High beam
F 6	10	Brake light	F 20	10	Side marker lamp, left Front working floodlight
F 7	15	Heater fan	F 21	10	Instruments' lighting Rear working floodlight Side marker lamp, right
F 8	15	Front wiper	F 22	20	Shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-up alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	--		F 25 D 3	Diode 3A	Activation FAST-SLOW when hydrostatic brake is actuated
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safeguard
F 13	--		F 27 D 2	Diode 3A	Starting safeguard
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off recovery diode
F 29	15	Front working floodlight	F 30	15	Rear working floodlight
F 01	80	Pre-heat/ starter switch	F 02	100	Starter

Cable and plug colors

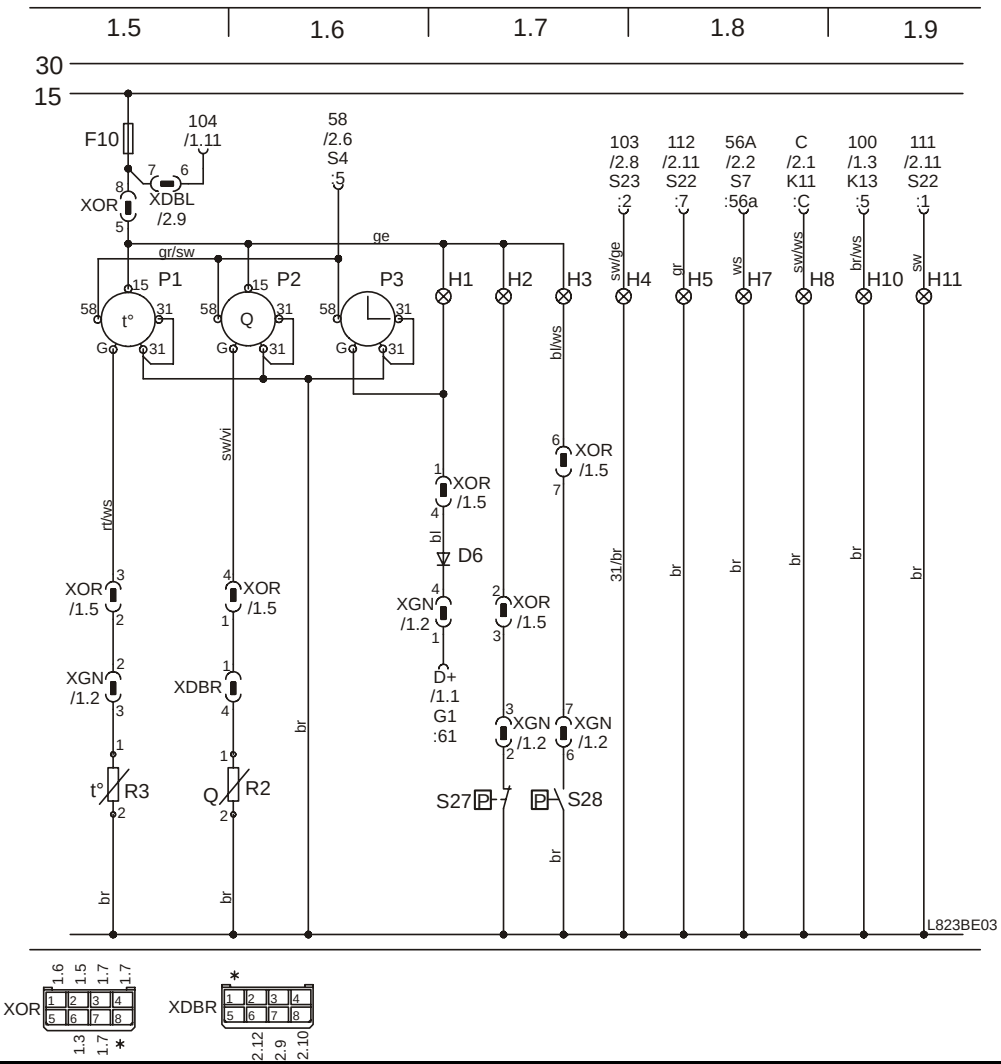
bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Pre-heat, start-up system



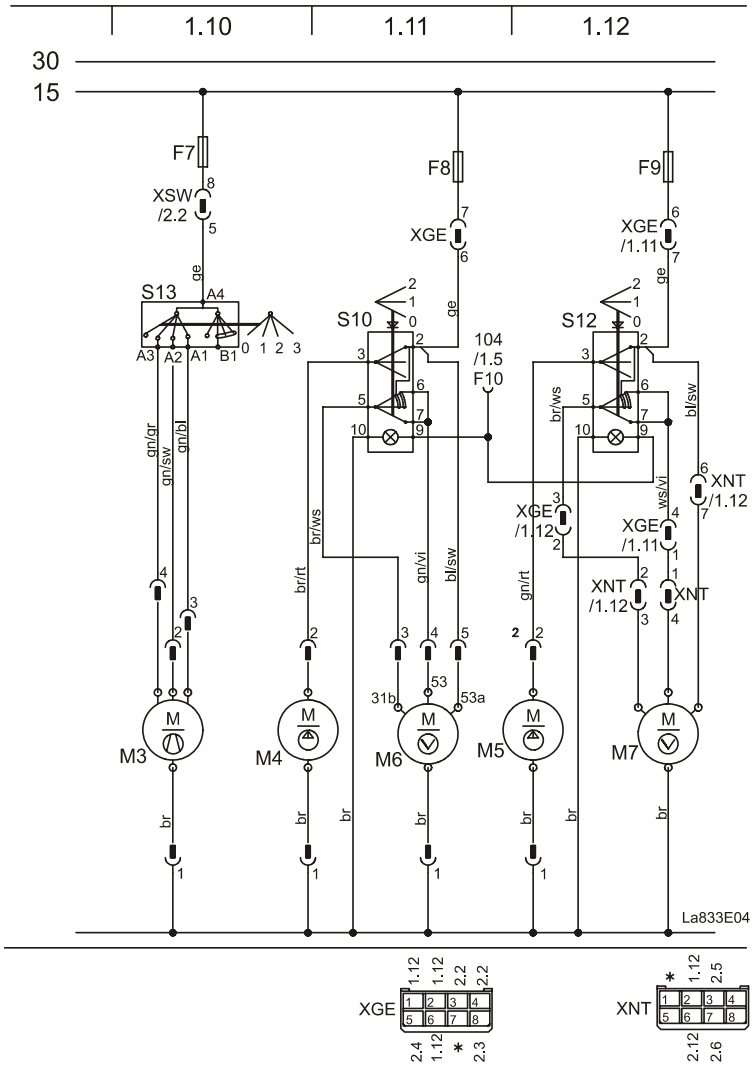
Path	Designation	Device	Path	Designation	Device
		Pre-heat, start-up system	1.2	D2	Diode
1.1	F01	Blade-type fuse 80A	1.3	R1	Glow plugs
1.1	F02	Blade-type fuse 100A	1.3	S1	Pre-heat/ starter switch
1.1	G1	Generator	1.3	K13	Pre-heat relay
1.1	G2	Battery, 12 V	1.4	K16	Cut-off relay
1.2	M1	Starter	1.4	Y2	Shut-off
1.2	K2	Start relay (starting safeguard)	1.5	D7	Diode
1.2	K17	Start relay (starting aid)	1.5	F22	Fuse
1.2	D1	Diode			

Instruments, indicators



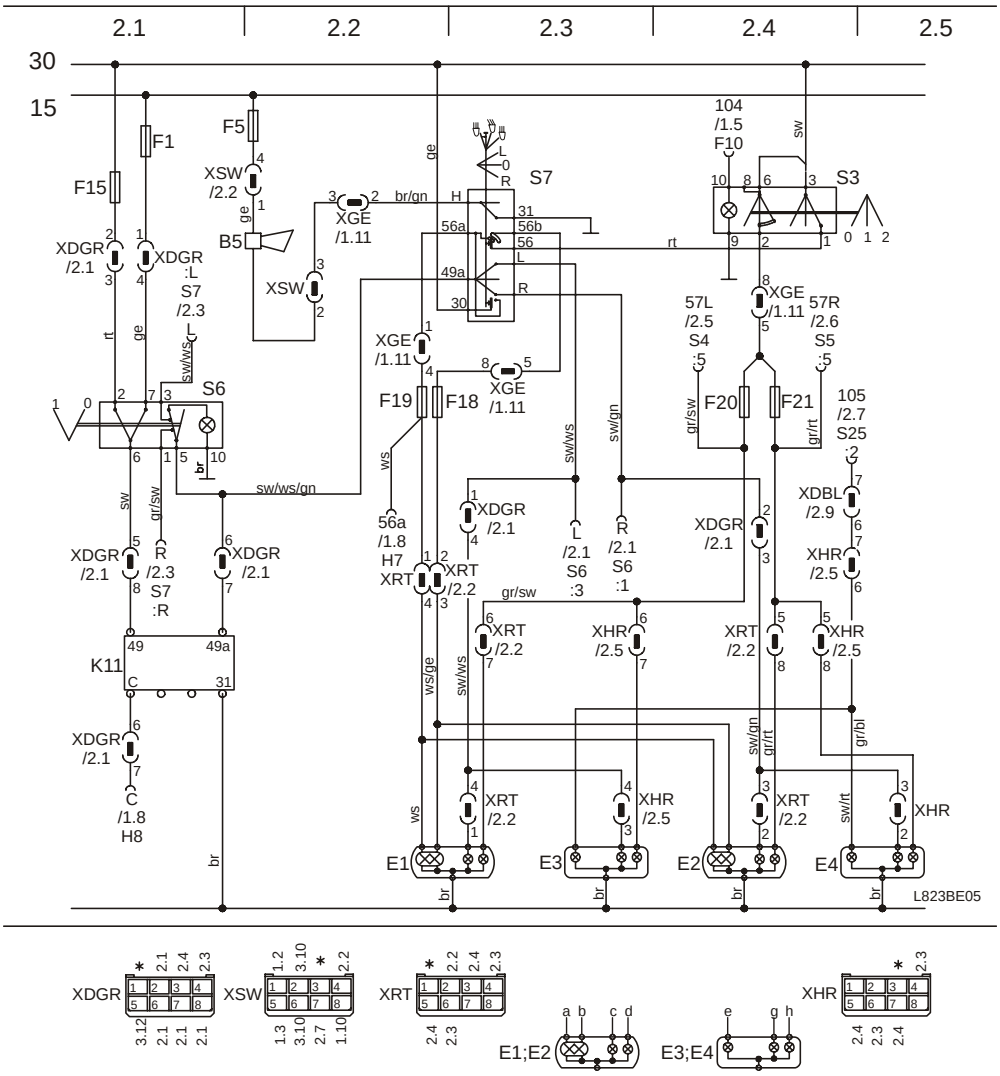
Path	Designation	Device	Path	Designation	Device
		Instruments, indicators	1.7	H4	Parking brake indicator lamp
1.5	P1	Temperature indicator	1.8	H5	Travel, forward
1.6	P2	Fuel gauge	1.9	H11	Travel, in reverse
1.6	P3	Operating hour meter	1.8	H7	High beam indicator lamp
1.5	R3	Coolant temperat. sensor	1.8	H8	Direction indicator
1.6	R2	Fuel gauge transmitter	1.9	H10	Pre-heat indicator lamp
1.5	F10	Fuse	1.7	D6	Diode
1.7	H1	Charge control lamp	1.7	S27	Engine oil pressure switch
1.7	H2	Engine oil pressure indicator lamp	1.7	S28	Air filter clogging switch
1.7	H3	Air filter clogging indicator lamp			

Heater fan	Wash/ wipe system



Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater fan	1.11	S10	Front wash/ wipe switch
1.10	F7	Fuse	1.12	S12	Rear wash/ wipe switch
1.10	S13	Heater fan switch	1.10	M4	Front washer pump
1.10	M3	Heater fan	1.11	M6	Front wiper motor
		Wash/ wipe system	1.12	M5	Rear washer pump
1.11	F8	Fuse	1.12	M7	Rear wiper motor
1.12	F9	Fuse			

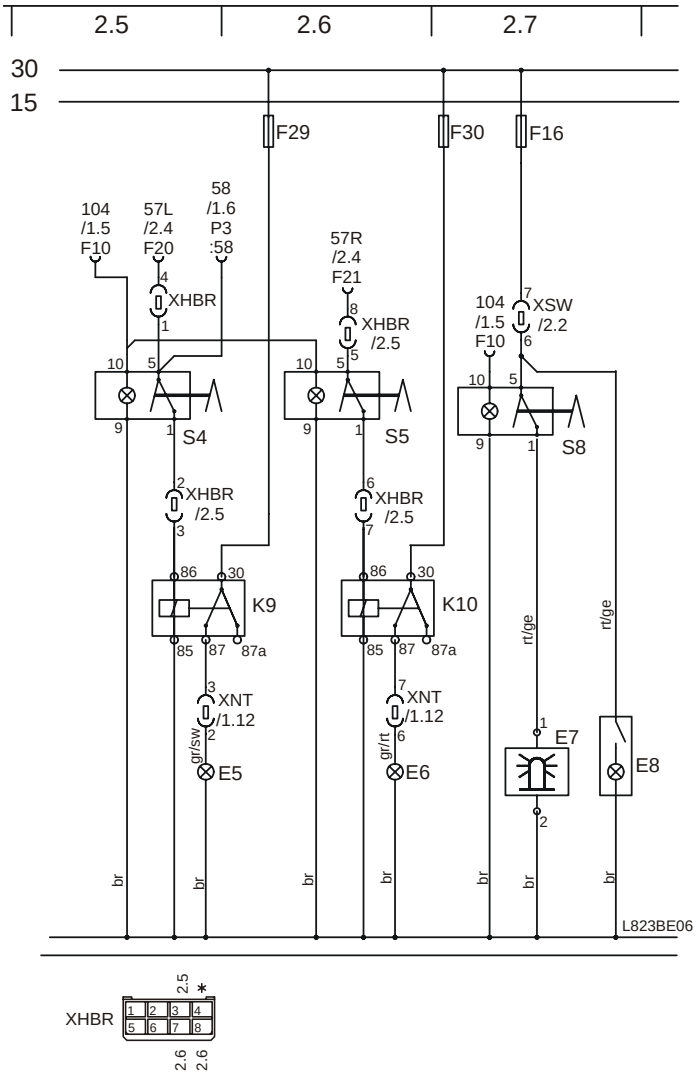
Lighting and signaling system



a = High beam
b = Low beam
c = Direction indicator
d = Side marker lamp
e = Brake light
g = Direction indicator
h = Side marker lamp

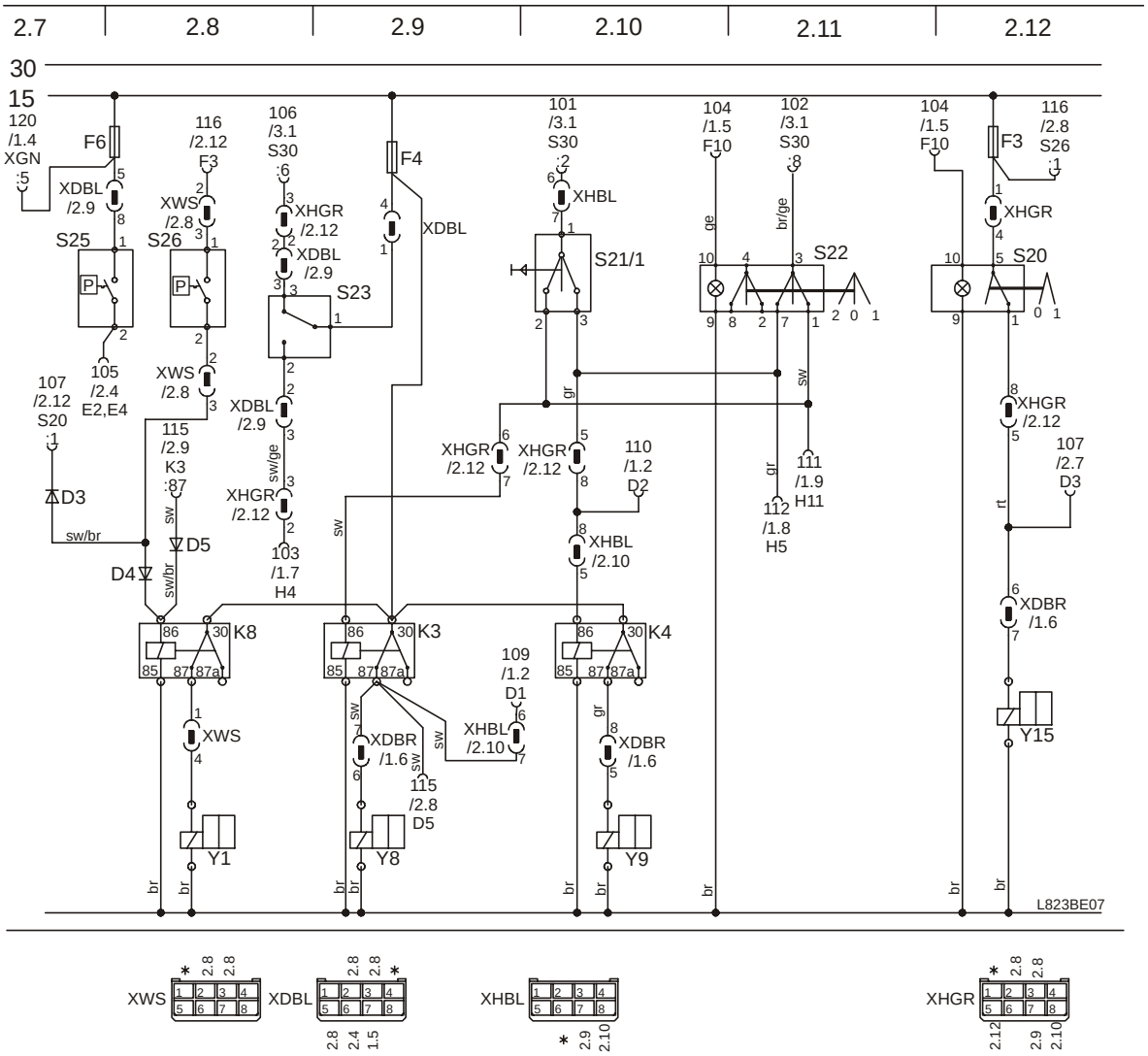
Path	Designation	Device	Path	Designation	Device
		Lighting and signaling system			
2.1	F15	Fuse	2.2	F18	Fuse
2.1	F1	Fuse	2.4	F20	Fuse
2.2	F5	Fuse	2.4	F21	Fuse
2.2	B5	Horn	2.1	K11	Direction indicator relay
2.1	S6	Hazard warning switch	2.2	E1	Headlamp, left
2.3	S7	Stalk control	2.4	E2	Headlamp, right
2.4	S3	Light switch	2.3	E3	Back light, left
2.2	F19	Fuse	2.5	E4	Back light, right

Lighting and signaling system



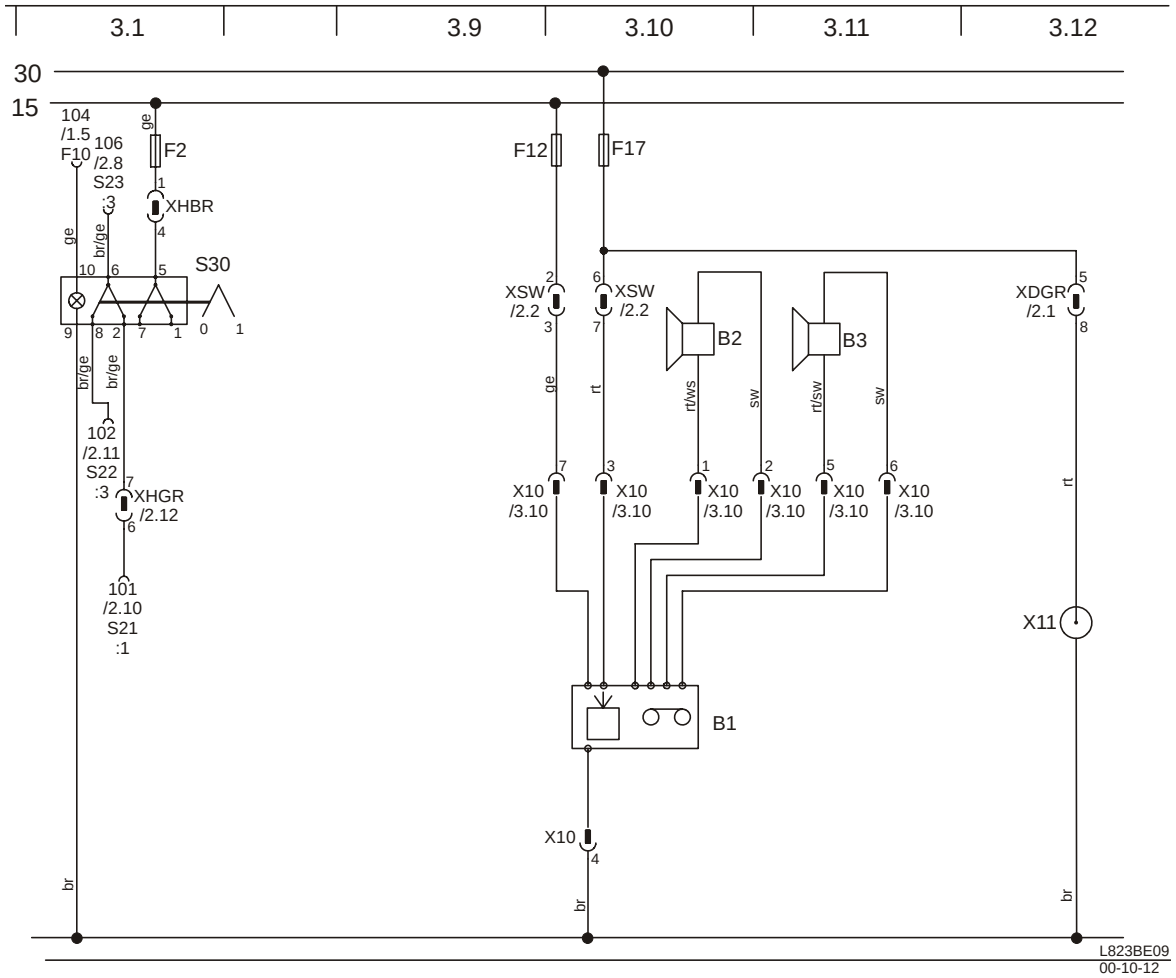
Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system	2.5	K 9	Front working floodlight
2.7	F16	Fuse	2.6	K 10	Rear working floodlight
2.5	S4	Front working floodlight	2.5	E5	Front working floodlight
2.6	S5	Rear working floodlight	2.6	E6	Rear working floodlight
2.7	S8	Rotating beacon	2.7	E7	Rotating beacon
			2.7	E8	Cab lighting

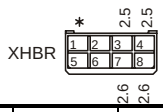
Travel, brakes

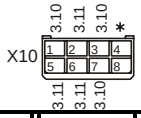


Path	Designation	Device	Path	Designation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, in reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forward
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Travel coordinate lever	2.9	Y8	Valve for travel, in reverse
2.11	S22	Travel, forward - in reverse	2.10	Y9	Valve for travel, forward
2.12	S20	Travel, FAST-SLOW	2.12	Y15	Valve for travel, FAST-SLOW

Working hydraulics, radio, socket





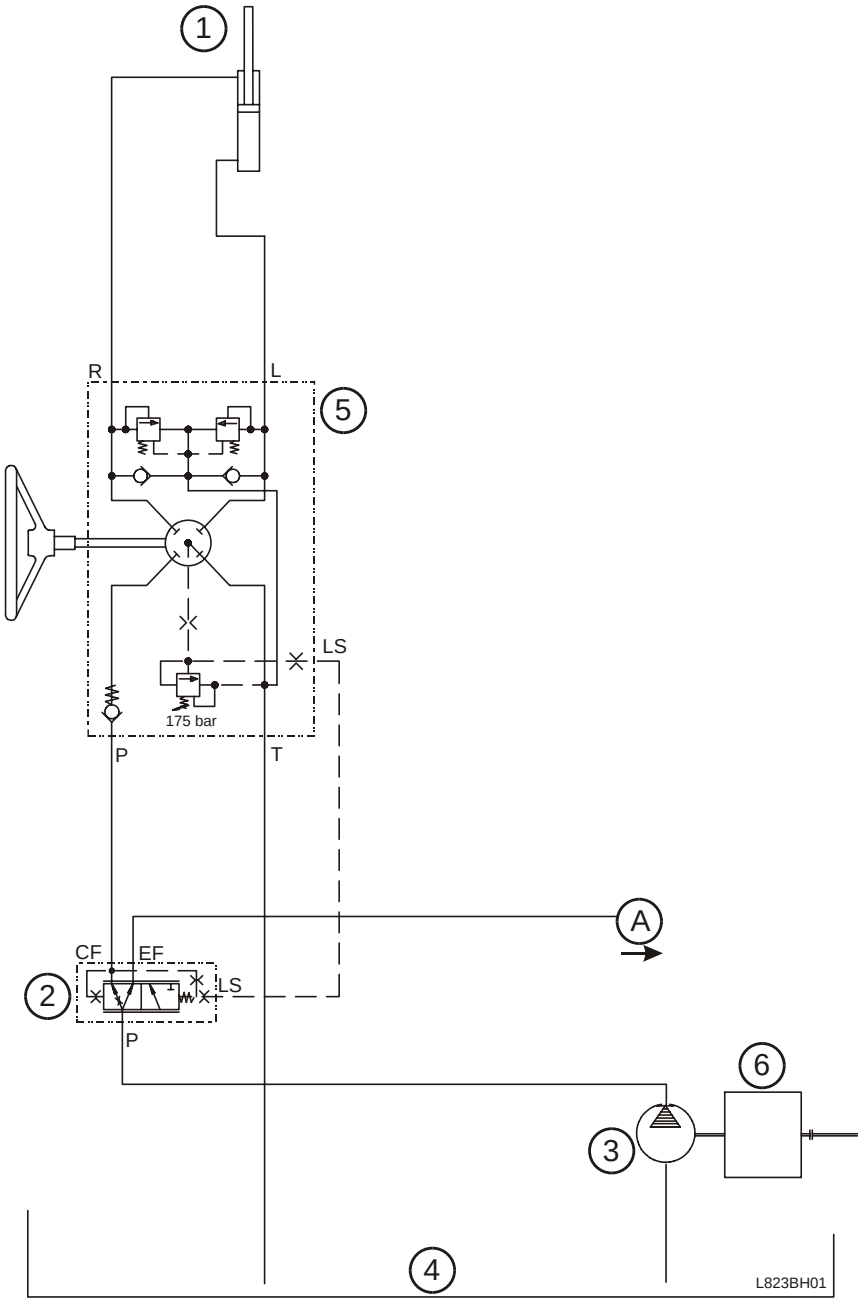


Path	Desig-nation	Device	Path	Desig-nation	Device
		Working hydraulics			***Radio, socket***
3.1	F2	Fuse	3.10	F12	Fuse
3.1	S30	Working hydraulics	3.10	F17	Fuse
			3.10	B2	Loudspeaker
			3.11	B3	Loudspeaker
			3.10	B1	Radio
			3.12	X11	Socket
			3.10	X10	Radio plug (AMP)

9 Appendix

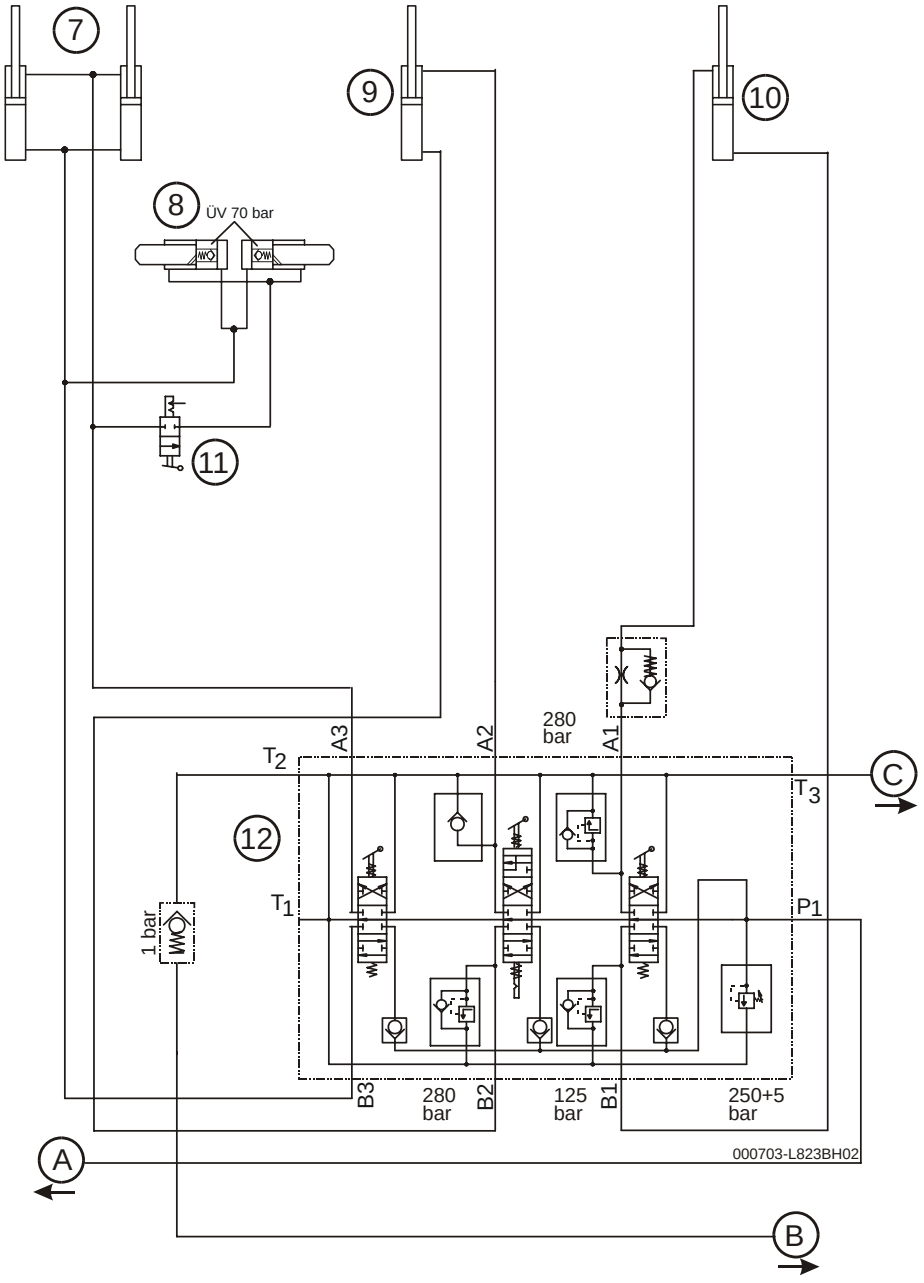
9.2 Hydraulic system

- **Steering**



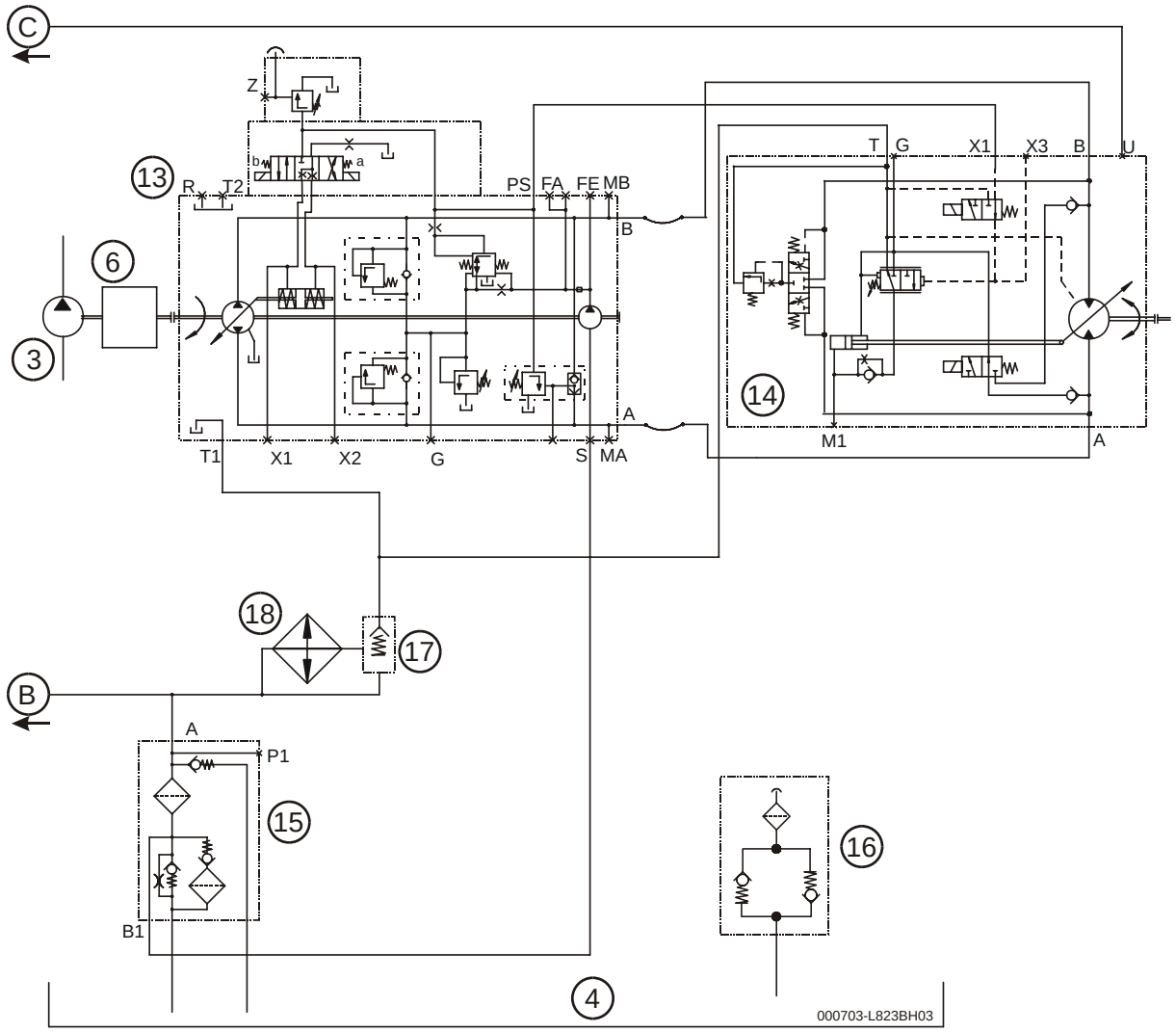
1	Steering cylinders	4	Hydraulic oil tank
2	Priority valve	5	Steering control unit
3	Steering / charge pump	6	Diesel engine

- **Loader installation**



7	Hydr. cylinder - Multi-purpose bucket, etc.	10	Hydr. cylinder - Bucket tilt
8	Hydr. cylinder - Quick-mount hitch	11	Ball valve
9	Hydr. cylinder - Lift frame	12	Control valve

- **Travel drive**



3	Steering/ charge pump	15	Hydraulic oil combined filter
4	Hydraulic oil tank	16	Breather
6	Diesel engine	17	Hydraulic oil temperature control
13	Travel pump	18	Hydraulic oil cooler
14	Travel motor		

9 Appendix

DELIVERY AND HANDING-OVER INSTRUCTIONS

The following checklist is to be followed when handing over the machine to the dealer/ customer:

1. Operating instructions
The operating instructions should be read side by side, and be explained in detail through practical training on the machine.

The following items are of special importance:

- 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
- Specifications for diesel engine start-up
- Starting and switching off the diesel engine
- Explanation of hydrostatic drive
- Driving, speed ranges and notes for driving on roads
- Operation of all functions
- Actuation of the quick-attach system
- Towing and transport of the machine
- Explanation of maintenance and inspection intervals in compliance with Maintenance and Inspection Plan by demonstrating maintenance points on machine
- Lubrication intervals and lubricating points in compliance with lubrication chart and demonstration of these points on the machine
- Handing over the diesel engine operating instructions

2. Spare parts list
- Structure of spare parts list, of Figures and the respective descriptions
- Instructions for ordering spare parts: always state the type of machine, the vehicle identity number (Fz-Id.Nr.), parts designation, complete spare part number, piece number, delivery address, etc.

3. Warranty
- Explanation of warranty covered by manufacturer
- Explanation of inspection cards and note on maintenance and inspection plan
- Fill out warranty/handing-over card properly and return it

Wheel Loader

SKL 823 Basic

Maintenance and Inspection Plan

The careful performance of all prescribed inspections is the best prerequisite for the machine's continuous readiness for operation.
All maintenance work mentioned should therefore be performed in the prescribed sequence with the machine at operating temperature.

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

The machine must be thoroughly cleaned before inspection takes place.

Inspection Table

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* **X = *Replacement***		Hours of Operation							min 2x	min 1x
Work is to be carried out while unit is still warm		100	500	1000	1500	2000	2500	3000	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
2	Change engine oil	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**
3	Change engine oil filter	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**
4	Drain water from fuel tank	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	
5	Change fuel filter		**X**	**X**	**X**	**X**	**X**	**X**		**X**
6	Check air intake	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
7	Change air filter - main cartridge	**in compliance with service indicator**								**X**
8	Change air filter - safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil-water cooler. *In case of high exposure to dust, shorten the cleaning intervals.*	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
10	Check antifreeze level in coolant									**O**
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
13	Check engine mounts and pump attachments	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
14	Check engine speed adjustment, top-end and low idle speed	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
15	Check valve lash of engine and adjust if necessary			**O**		**O**		**O**		
16	Check injection nozzles **3)**							**O**		
17	Replace crankcase breather in valve cover **1)**					**X**				
18	Check acid level and battery connections	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
19	Clean dust filter for cab ventilation and replace if necessary	**O**	**O**	**X**	**O**	**X**	**O**	**X**		**X**
20	Check condition of tires, tire pressure and tightness of wheel nuts	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
21	Check secure fastening of axles and propeller shaft	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
22	Check bearing bushings and bolts of work equipment and replace if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	**O**	**O**	**O**	**O**	**O**	**O**	**O**		

O = *Checking, maintenance* **X = *Replacement***		Hours of Operation							min 2x	min 1x
Work is to be carried out while unit is still warm		100	500	1000	1500	2000	2500	3000	year-ly	year-ly
24	Check that door catches function perfectly, and replace if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
25	Check electrical indicating and warning elements, and lighting system	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
26	Check smooth running of operator controls and adjust if necessary	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
28	Check or change hydraulic oil **2)**	**O**	**O**	**X**	**O**	**X**	**O**	**X**		**X**
29	Replace hydraulic oil filter insert.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
30	Replace breather.			**X**		**X**		**X**		**X**
31	Differential of rear axle - oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
32	Differential of front axle - oil check or oil change	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
33	Reduction gear: oil check or oil change									
34	Wheel hubs of front and rear axles - oil check or oil change.	**O**	**X**	**O**	**X**	**O**	**X**	**O**		**X**
35	Check function of brakes, change brake oil	**O**	**O**	**O**	**O**	**X**	**O**	**O**		**X**
36	Grease machine in compliance with overview of lubricating points	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
37	Check function, condition and completeness of safety equipment	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
38	Hydraulic function check with pressure function test	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
39	Test run and test work	**O**	**O**	**O**	**O**	**O**	**O**	**O**		
40	Initial inspection cards and return to manufacturer	**O**	**O**							

1. at least every 2 years
2. **Extension of hydraulic oil change interval -** Hydraulic oil change in compliance with oil sample

   analysis and lab report. Oil sample intervals as specified by test lab.