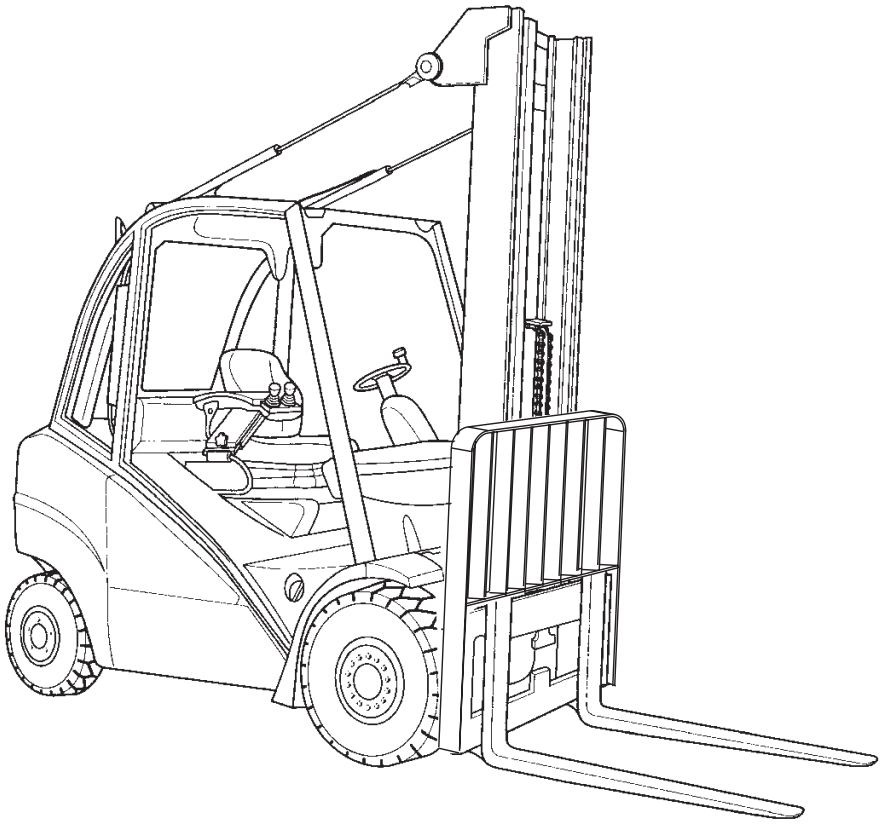
LINDE LIFT TRUCK CORP.
A MEMBER OF THE LINDE GROUP



IC Sit-Down Rider Trucks

SAFETY TIPS

and a guide to the
Information Plates,
Operation and Warning Decals
found on your truck

161970 February 2003

Foreword

This Operator's Manual is not a training manual. It is a guide to help Operators safely operate their equipment by pointing out the correct methods and procedures. The Operator's Manual cannot cover every possible hazard or potential accident situation. It is up to you, the Operator, to avoid or correct these potential dangers. It is important that you know and understand the information in this manual as well as the equipment you will be operating. Do not operate a damaged or malfunctioning truck. Practice safe operation every time you use your lift truck so that we can join together to set high standards for safety.

The lift truck is designed for lifting and transporting of pallets or loads of material. The truck is designed for operation on smooth and dry surfaces. The truck has the ability to climb or descend smooth and dry ramps with or without a load. Ensure you use the truck only for the job it was intended to do.

NOTE:

The descriptions and specifications included in this manual were in effect at the time of printing. Linde Lift Truck Corporation reserves the right to make improvements and changes in specifications or design without notice and without incurring obligation. Please check with your authorized Linde dealer for information on possible updates or revisions.

Regular care and maintenance of your truck is not only important for full and efficient truck life, it is essential for equipment and Operator safety. The importance of maintaining the truck in a safe operating condition with regular planned servicing and prompt repairs when necessary cannot be emphasized too strongly. Experience has shown that powered industrial trucks can cause injury if improperly used or maintained. To assist in keeping your truck in service and in good operating condition, a Maintenance section is included in this manual.

The section outlines maintenance and inspection procedures to be done at regular intervals. These procedures are considered essential to the life and safe performance of your truck.

The following highlighted data and information are used in this manual to ensure safe operating and maintenance procedures. Heed them.

NOTE:

Indicates information or points of particular interest for more efficient and convenient operation.

This manual contains operating and periodic maintenance instructions as well as specifications for the lift truck. The manual is designed to assist in the proper care and maintenance of your truck while providing maximum safety and efficient operation. Consider this manual a special tool which, if properly applied, can help ensure years of safe and efficient material handling. Your local dealer or the factory can arrange for Operator training and/or maintenance instructions for your truck should you need them.

Parts and Service

See your Linde dealer for genuine Linde parts (the only factory-authorized replacements), factory-trained service personnel and manuals for your equipment.

General Safety Rules

Safety signs and messages are placed in this manual and on the truck to provide instructions and identify specific areas where potential hazards exist and special precautions should be taken. Know and understand the meaning of these instructions, signs, and messages. Damage to the truck, death or serious injury to you or others may result if these messages are not followed.

⚠ CAUTION:

INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT MAY ALSO RESULT IN DAMAGE TO YOUR MACHINE.

⚠ WARNING:

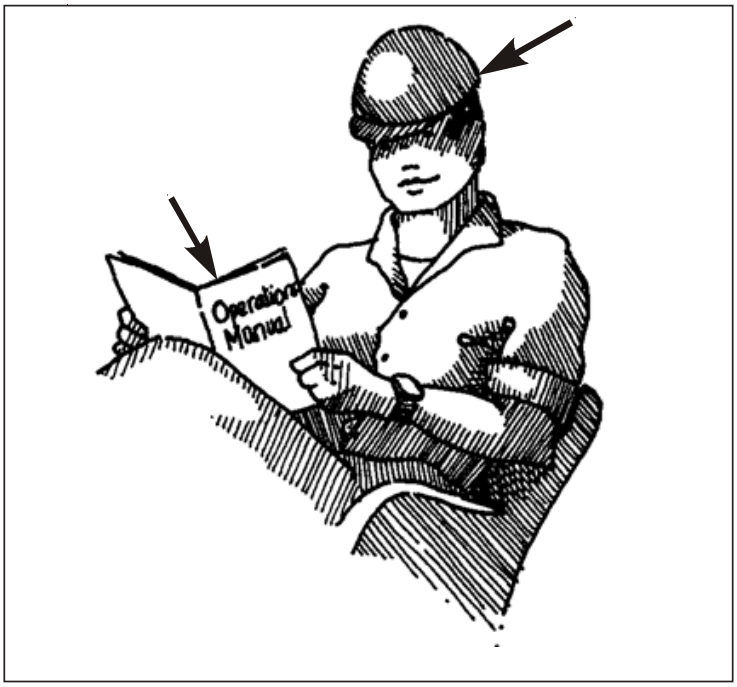
INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH IF NOT AVOIDED COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ DANGER

INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH IF NOT AVOIDED WILL RESULT IN DEATH OR SERIOUS INJURY.

You, as the Operator, are ultimately responsible for your own safety and the safety of those around you. **Read and Study** this manual. Be sure to understand all the operating procedures and safety precautions before operating the truck.

SAFETY TIPS



The Occupational Safety and Health Act (OSHA) states, “The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph.” **Do not attempt to operate this truck unless you are fully trained and authorized.**

Before Operation

Before using the truck, inspect your work area. Check that it is neat, well lit, adequately ventilated, and free from hazardous material. Aisles and roadways should be unobstructed and well marked.

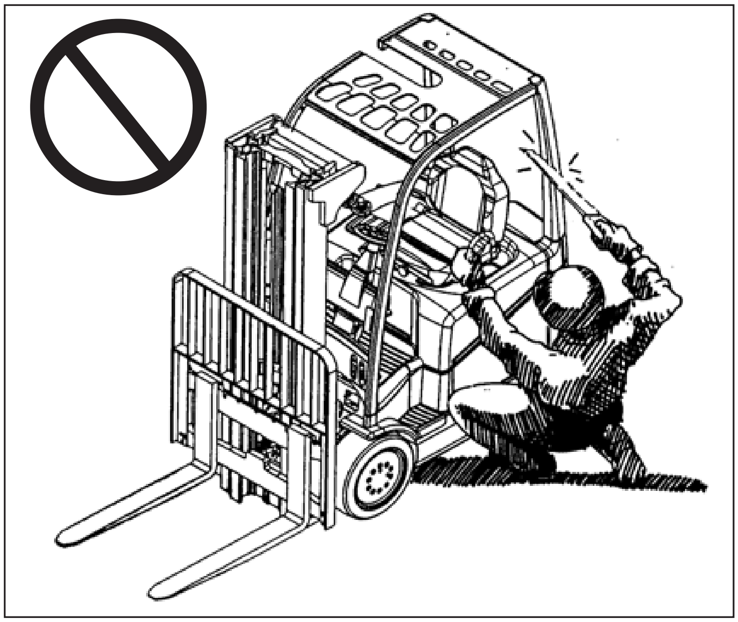
Fire extinguishers and other emergency equipment should be visible and easy to reach. Wear safety equipment when required. Don’t smoke in “No Smoking” areas, when refueling. Don’t mix drugs or alcohol with your job.

The truck is designed for safety. **Unauthorized additions or modifications** without Linde’s approval are **prohibited**. Do not remove or alter nameplates.

If you have any questions or concerns about lift truck safety, talk to your supervisor. If an accident should occur, report it *immediately.*

⚠ WARNING:

Start the engine only when securely seated in the operator’s compartment.



⚠ CAUTION:

Do not remove any safety guards or other safety devices. These include the Overhead Guard, Load Backrest Extension, and if equipped by the Owner, alarm, lights and mirrors.

The Overhead Guard is intended to provide protection to the Operator from falling objects, but cannot protect from every possible impact.

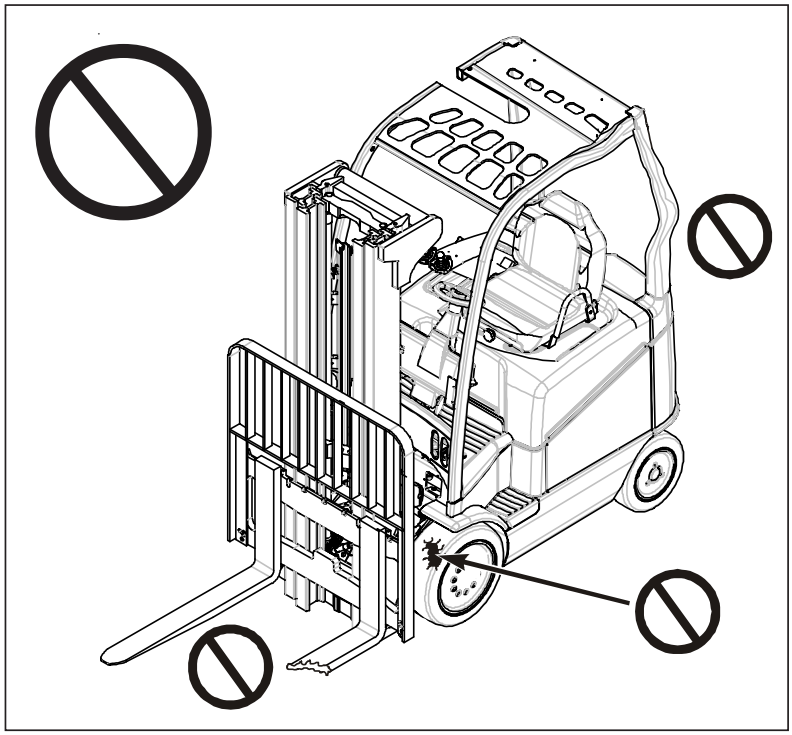
Checklist for IC Sit-down Trucks

OPERATOR'S DAILY CHECKLIST

At the beginning of each shift, inspect your truck by using the **Linde Operator's Daily Checklist** . Check for damage and maintenance problems. Have repairs made before you operate the truck.

CAUTION:

Do not make repairs yourself. Lift truck mechanics are trained professionals. They know how to make repairs. Periodic maintenance is vital to safe operation of the truck. Adhere to a strict inspection, lubrication, and maintenance schedule. Allow only authorized personnel to work on the truck.



WARNING:

Do not operate a damaged or defective lift.

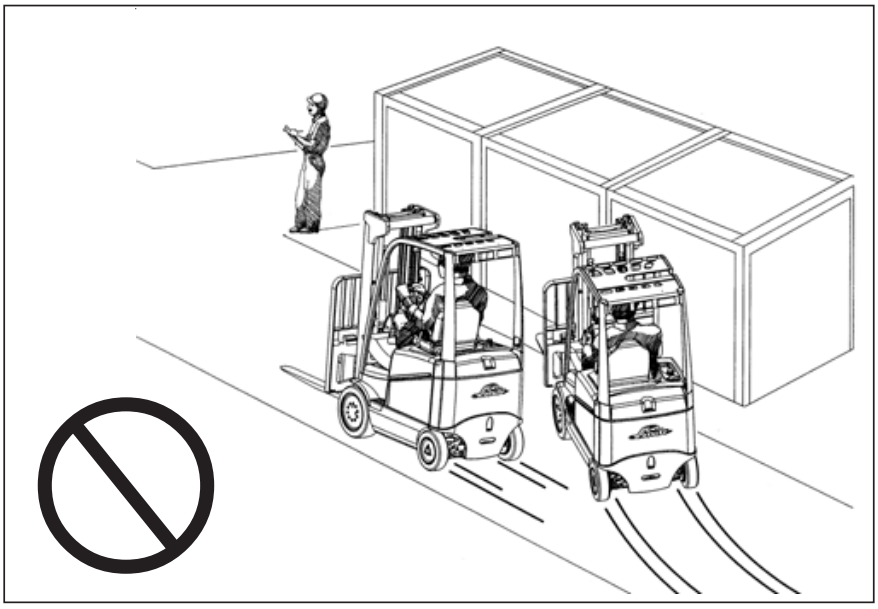
CAUTION:

If warning decals are damaged or missing, they must be replaced.

Know your Truck's capacity. The capacity of your truck is listed on the Capacity Plate. Read and understand the Capacity Plate. The capacity of your truck is listed on the Data Plate. Never attempt to lift or transport a load exceeding the truck's rated capacity.

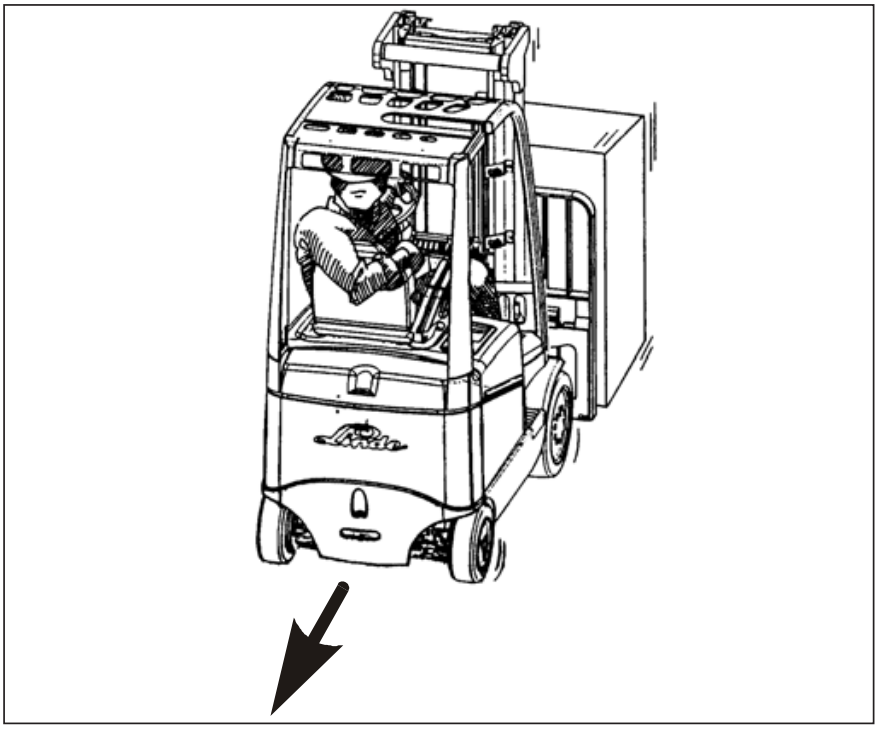
WARNING:

Never attempt to lift or transport a load exceeding the trucks rated capacity.

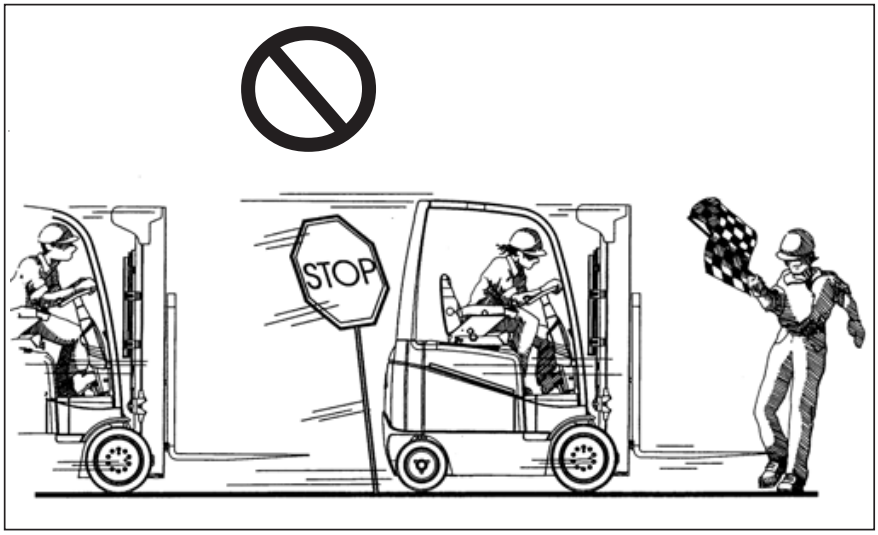


PEDESTRIANS

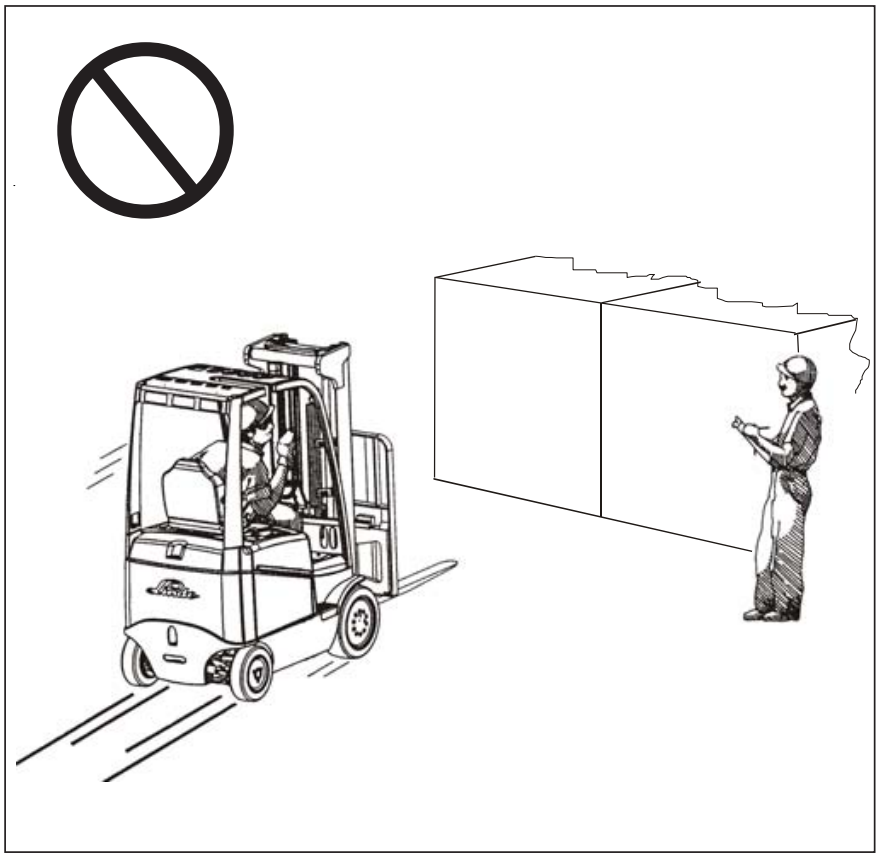
Watch out for pedestrians. Always yield the right-of-way to pedestrians. Do not drive the truck up to anyone standing in front of a rack or other fixed object. Do not pass another truck traveling in the same direction at an intersection, blind spot or other dangerous location. Sound horn at intersections and other locations where vision is obstructed. Always look in the direction of travel.



If your vision is restricted, then operate the truck in reverse. Be sure to pivot in your seat to the right to provide maximum visibility to the rear.



Do not engage in stunt driving or horseplay. Use lights in dark and dim areas. Always ensure that there are no pedestrians in the trucks rear swing area before turning. Watch for pedestrians beside the truck.

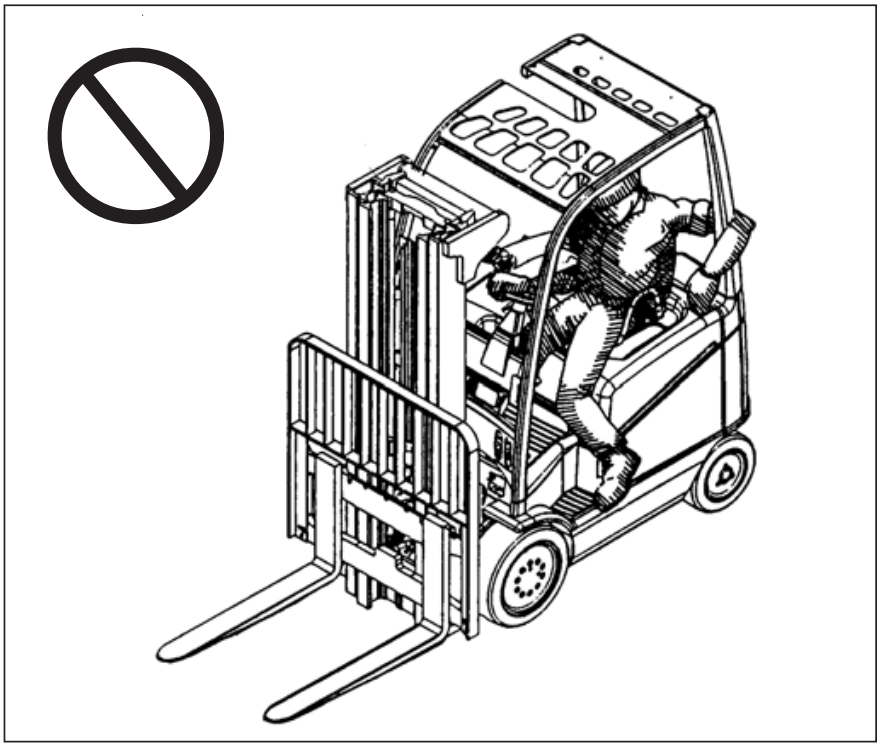


⚠ DANGER

Watch for people in your work area because they may not watch for you, even if you have lights or alarms.

OPERATING POSITION

Face the truck when mounting and dismounting. Maintain a three-point contact, one foot and two hands with the truck when mounting or dismounting. Never exit a moving truck. Never jump on or off the truck.



WARNING:

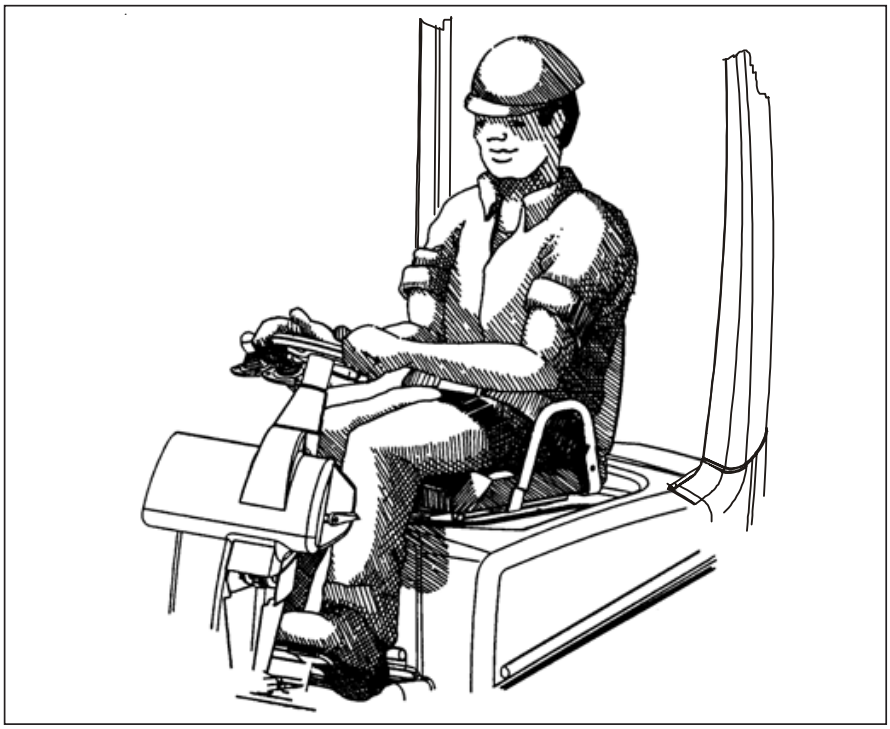
Operate the truck only when you are in the normal operating position. Keep hands and feet inside the Operator's Compartment.

WARNING:

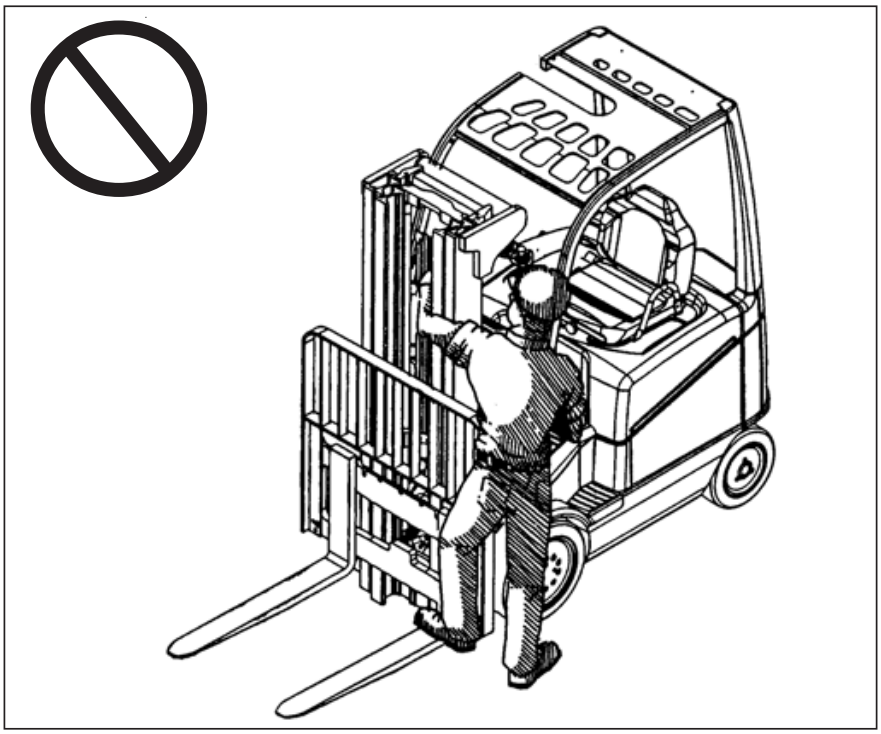
Keep hands, feet and legs out of the upright.

DANGER

Never allow anyone to walk under raised forks.



Wear your seat belt at all times when operating the truck.



Do not place yourself between the mast and the body of the truck. Do not use the upright as a ladder. Do not transport personnel at any time. Do not lift personnel using the forks of the truck, or with a work platform. The truck is not designed to lift personnel.

TRAVEL

The truck is designed for operation on smooth, and dry surfaces such as warehouse and factory floors, loading docks or paved surfaces. Under all travel conditions, operate the truck at a speed that will permit it to be brought to a stop in a safe manner.

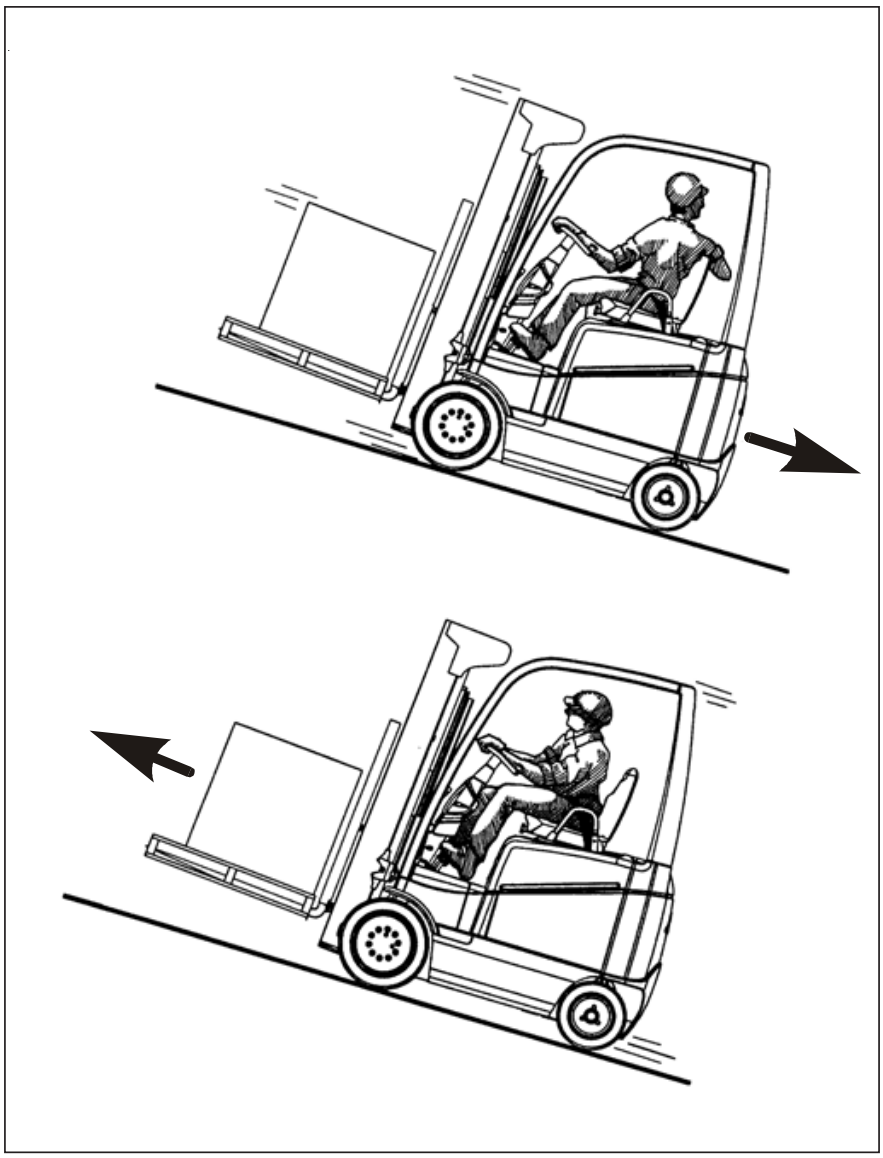
WARNING:

Do not travel at excessive speeds; keep your truck under control at all times.

Travel with the load near the floor, tilted back to cradle the load whenever possible. Never lift or lower the load when the truck is in motion. When handling bulky loads that restrict your vision operate your truck in reverse to improve visibility. Unstable loads are a hazard to you and to your fellow workers. Always make certain that the load is well stacked, secured and evenly positioned across both forks. Never attempt to lift a load with only one fork. Do not travel on an uneven surface. Watch for overhead obstructions such as lights, wiring, pipes, sprinkler systems, doorways, etc. Do not move railroad cars or trailers with this truck, or use to operate or close railroad car doors.

WARNING:

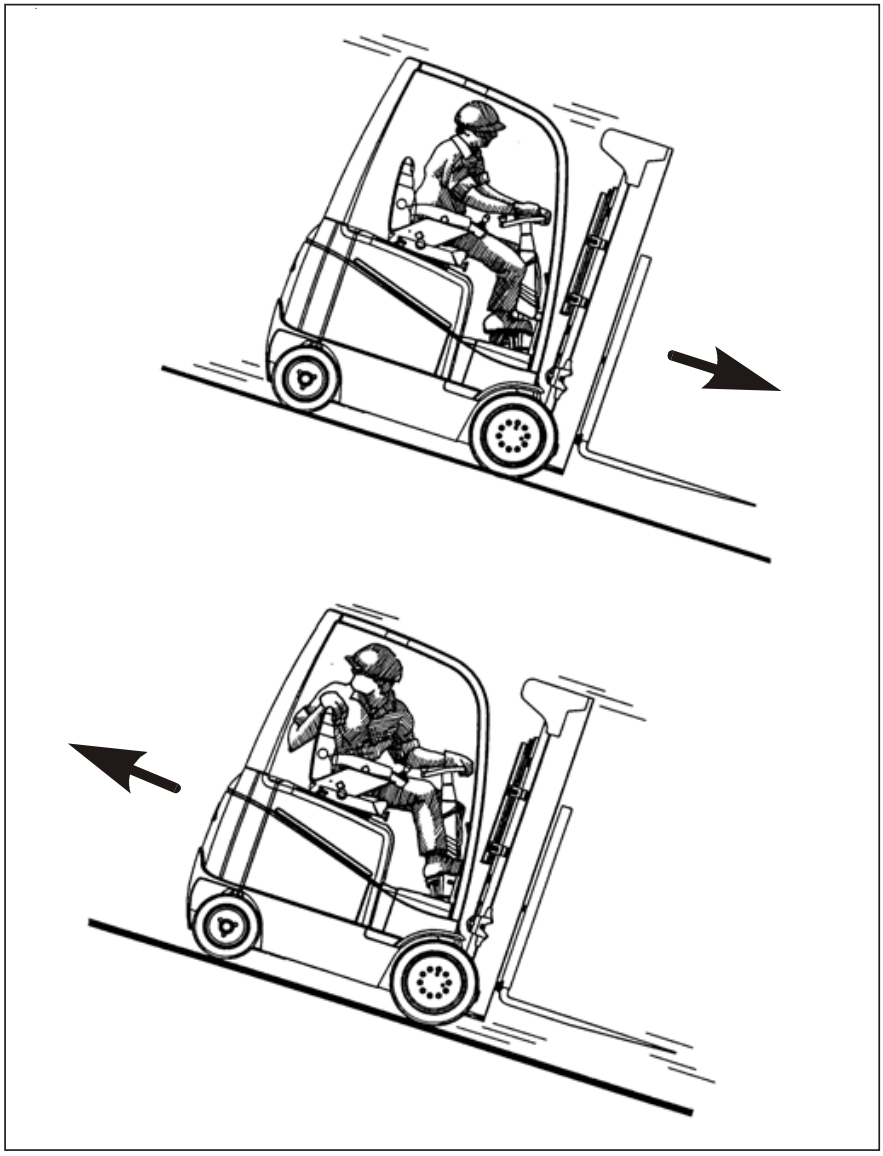
Watch for slack chain condition. Slack chains mean rail or carriage hang-up. Raise the forks before you move. Do not attemp to repair yourself, always get a trained mechanic.



INCLINES, RAMPS, DOCKS, ELEVATORS

If you must travel on an incline, do so with caution. Do not operate truck on a wet incline. Keep the load upgrade to maintain control when traveling up or down an incline with a loaded truck

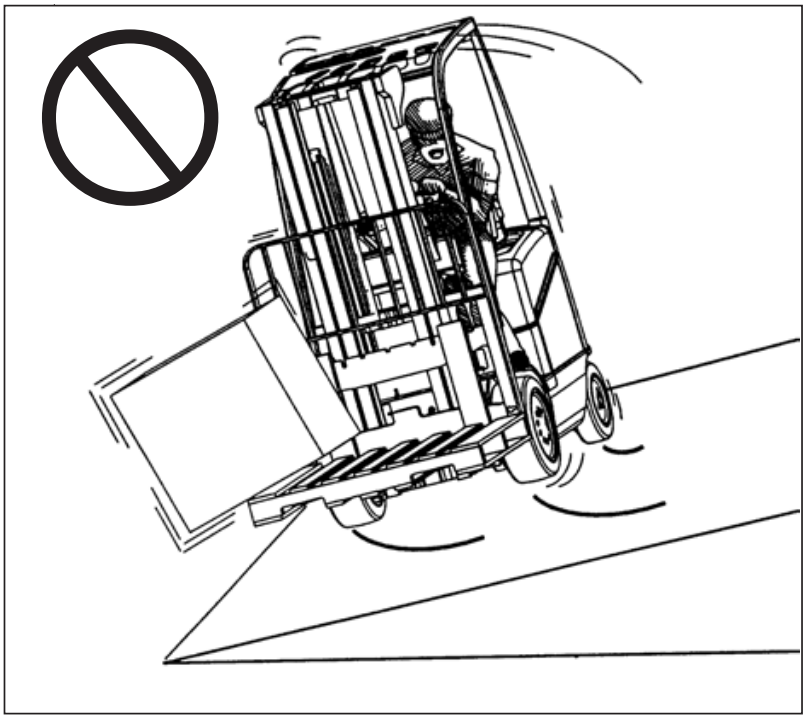
Be aware that when descending an incline your stopping distance will be greater than when on a level surface. Reduce your speed, and ensure that there is adequate clear space at the bottom of the ramp to stop and turn.



Keep the counterweight upgrade when traveling up or down an incline with an empty truck

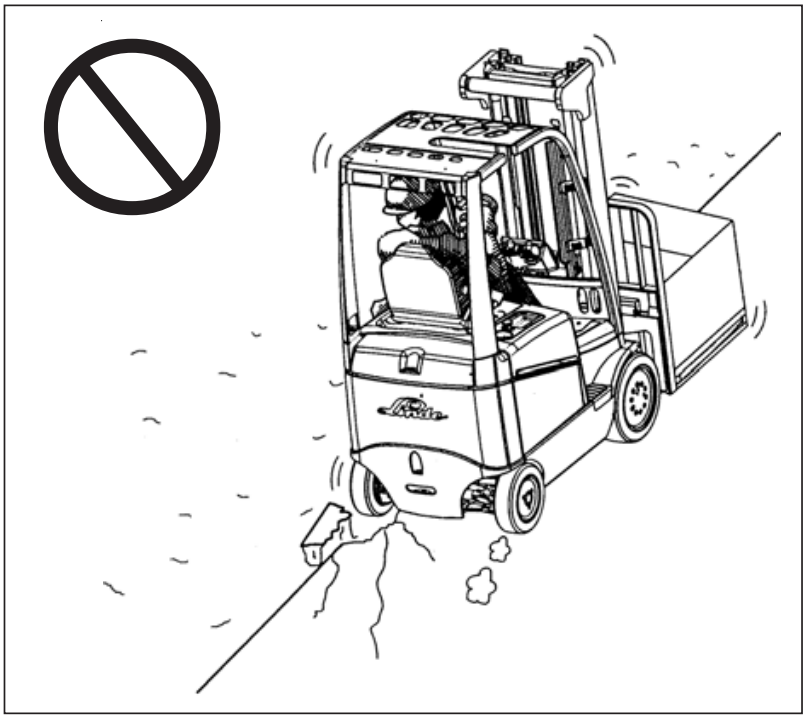
To avoid hazards associated with a dock, you should personally check that the trailer brakes have been applied, wheel chocks are in place, and that any trailer-to-dock locking systems are being utilized. The impact of moving in and out of a trailer may cause the trailer to creep or move. Confirm that the driver will not move the trailer until you are done.

Do not drive the truck onto an elevator without specific authorization. Verify that the capacity of the elevator exceeds the weight of your truck and the weight of the load.



DANGER

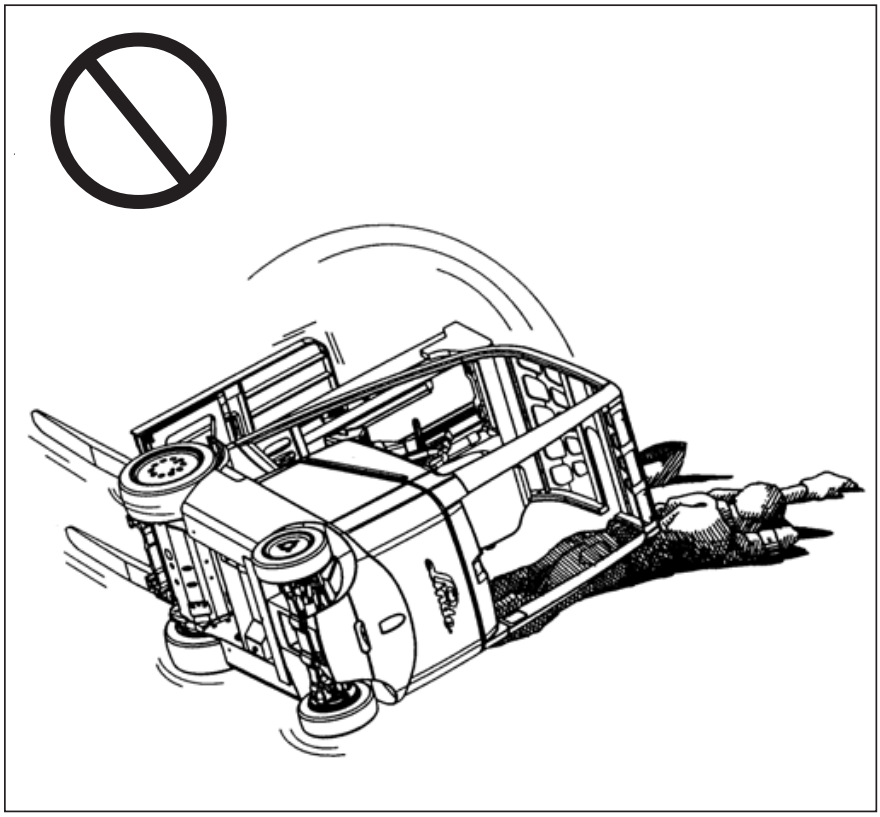
Never turn on an incline or ramp either loaded or unloaded. Travel straight up or straight down.



Be especially cautious when driving the truck on ramps or bridge plates. Be sure to maintain a safe distance from each edge. Before driving the truck over a ramp or bridge plate, verify that their position is secured to prevent movement of the plates.

TIP-OVER

Lateral tip over can occur with a combination of speed and sharpness of turn. This condition of instability is even more likely with an unloaded truck. With the load raised, lateral tipover can occur while turning and/or braking when traveling in reverse or accelerating and turning while traveling forward. Lateral tip over can occur loaded or unloaded by turning on a ramp. Longitudinal tip over can occur with a combination of overloading and load elevated. This condition is even more likely with excessive forward tilt, braking in forward travel or accelerating rearward.



DANGER

Lift truck tip over can cause serious injury or death if the operator is trapped between the truck and the ground.

DANGER

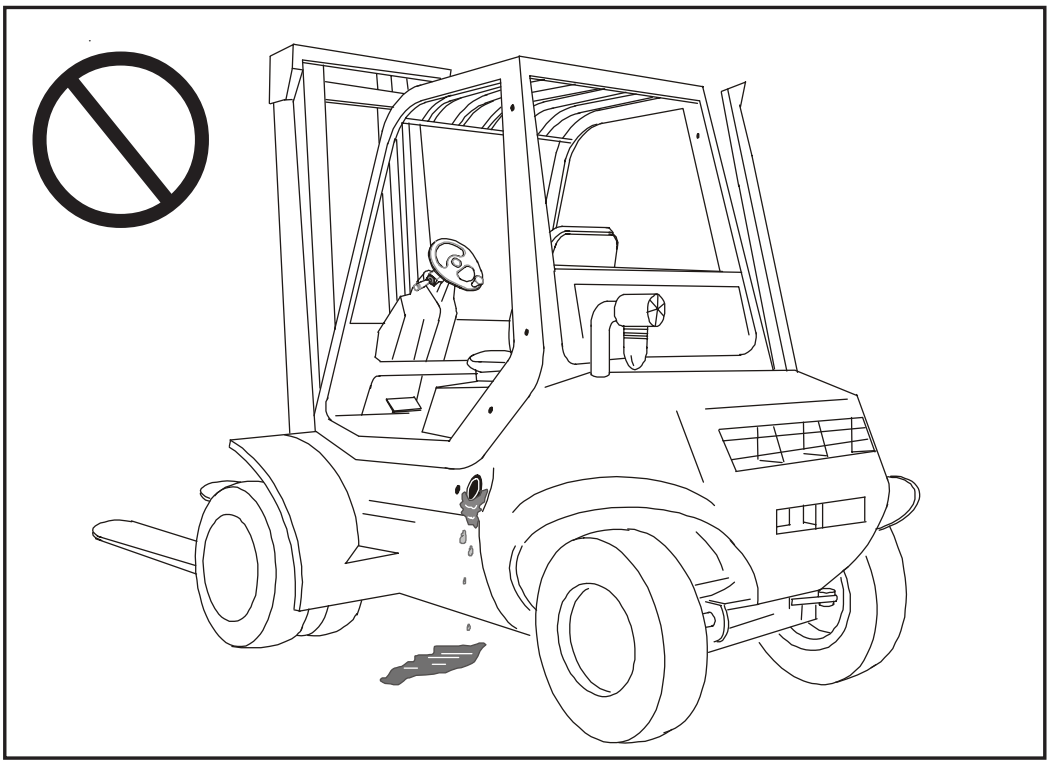
If your truck starts to tip over **DO NOT JUMP!** Make sure your seat belt is securely fastened, stay in the seat, grip the wheel, lean away from impact and brace your feet.

CAUTION:

Confirm the engine type before filling the tank with the recommended fuel.

WARNING:

Lift Trucks should be refueled only at designated safe locations. Safe outdoor locations are preferable to those indoors. Never fill the tank near open flame or when the engine is running. Explosive fumes may be present during refueling. **DO NOT** smoke in refueling areas. Before fueling an internal combustion truck, turn the engine off and leave the operator's compartment. When filling, keep the funnel or fuel hose nozzle in contact with the tank's metal. This avoids the possibility of an electric spark igniting the fuel.



After refueling, close the cap tight and wipe up any spilled fuel carefully and completely. Verify that fuel tank cap has been replaced securely before restarting engine.

NOTE:

Do not allow the lift truck to become low on fuel or completely run out of fuel. Sediment or other impurities in the fuel tank could be drawn into the fuel system. This could result in difficult starting or damage to components.

DO NOT fill the tank to the top. Fuel expands when it gets warm and may overflow.

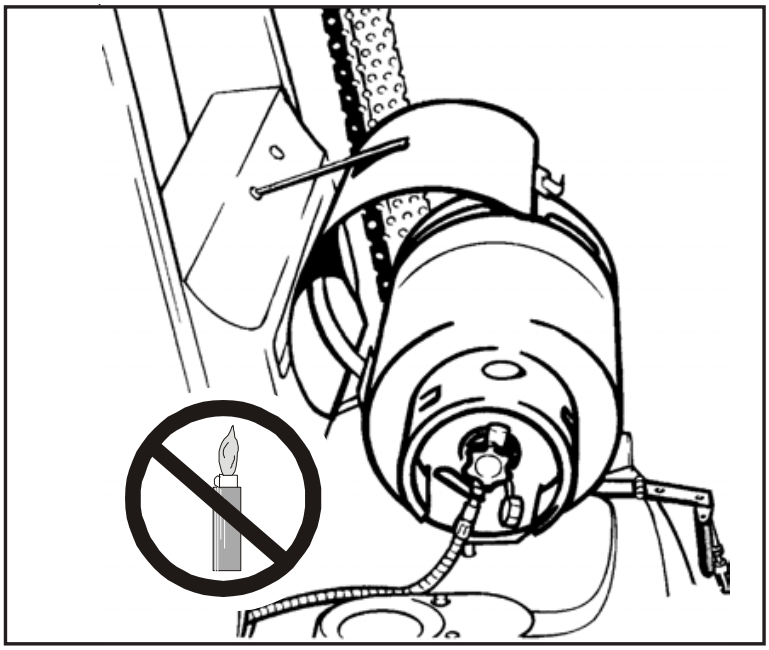
WARNING:

Only Trained, authorized personnel should fill or exchange LP-Gas tanks. Protective clothing such as a face shield, long sleeves and gauntlet gloves should be worn.

Do not refuel or store LP-Gas powered life trucks near underground entrances, elevator shafts, or other places where LP-Gas could collect in a pocket and cause potential danger for an explosion.

Do not leave the lift truck, for even a short time, near equipment that generates high temperatures. Oven and furnaces are examples. The heat may raise the pressure of the fuel tank in place.

Close the service valve on the tank when LP-Gas fueled lift trucks are parked overnight or stored for long periods indoors with the fuel tank in place. Close Valves on empty tanks.



WARNING:

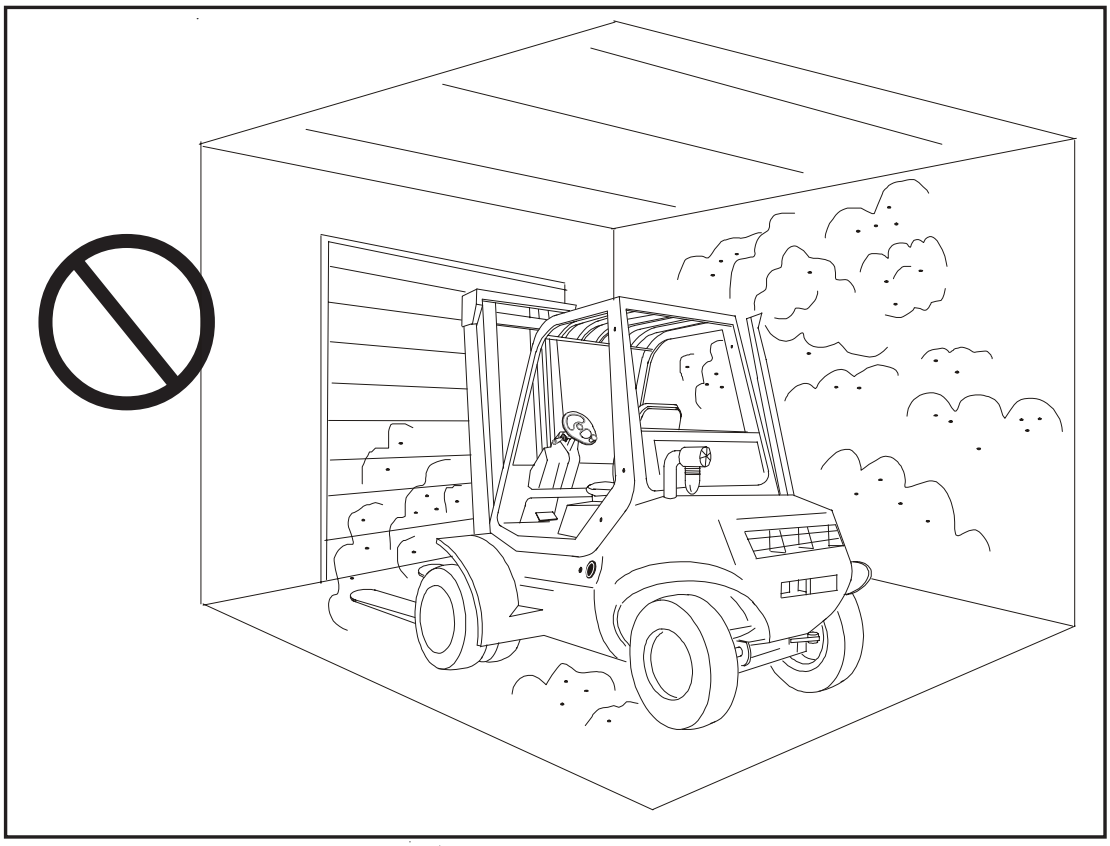
Never use an open flame to check the liquid level in the fuel tank, the condition of LP Gas lines/connectors, or the electrolyte level of the battery. Examine LP-Gas tanks before filling and before reuse. Look for damage to the valve, liquid gauge, fittings and hand wheels. Check for dents, scrapes or other damage to the pressure vessel and for dirt or debris in the openings.

Inspect the LP-Gas fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.

All defective or damaged LP-Gas tanks must be removed form service.

WARNING:

Serious accidents can occur if LP-Gas tanks are not properly handled. To reduce the risk of damage to tanks, use extreme care when transporting them.



WARNING:

Do not leave the engine running where there is poor ventilation. The engine exhaust gas contains carbon monoxide. There is danger that this will cause gas poisoning which may result is serious injury or death.

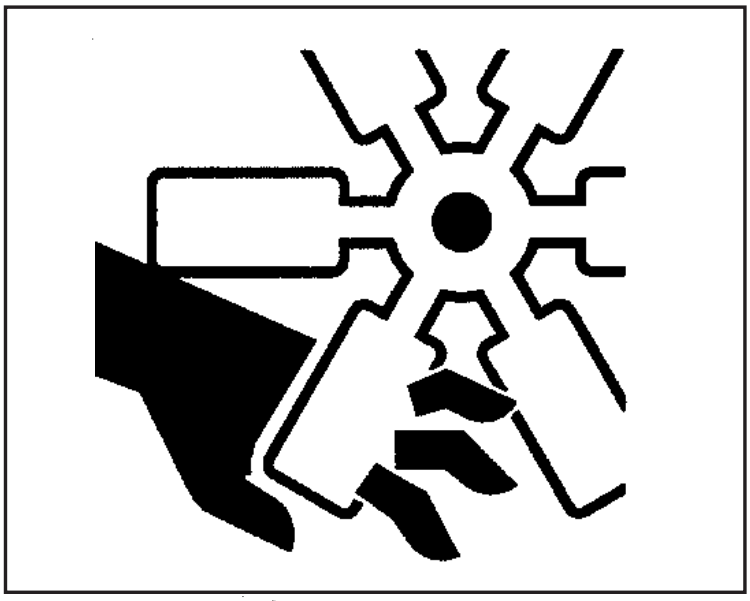
WARNING:

Immediately after using the lift truck, the engine coolant is at high temperature and high pressure. Do not remove the radiator cap under these conditions. Hot water may spurt out and cause burns.

When removing the radiator cap, turn it slowly to release the internal pressure.

When checking the coolant level, stop the engine and wait for the engine and radiator to cool down before checking. For lift trucks equipped with a subtank or reservoir, check the level in the subtank.

When adding water on lift trucks equipped with a subtank, add the water to the subtank.



WARNING:

It is extremely dangerous if you or any tool touches or gets caught in the fan or fan belt when the fan is rotating. Never touch the fan when it is rotating.

Always stop the engine before inspecting rotating parts.

When inspecting the areas around rotating parts, do not allow anything to come close which may get caught.

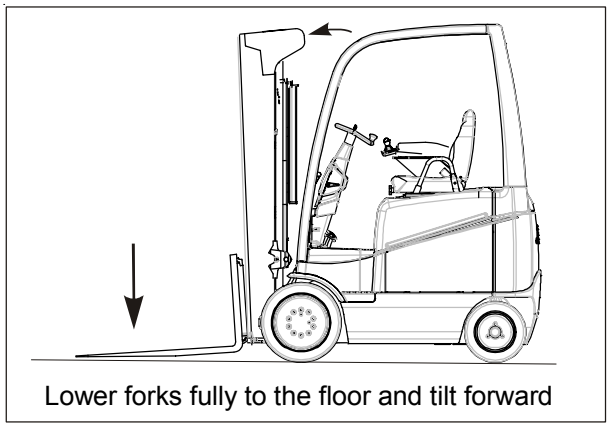
WARNING:

If the tire inflation pressure is low, it will affect truck stability. However, do not inflate the tires immediately. The inflation pressure may have gone down because of damage to the rim. If the rim is damaged or cracked and the tires are inflated, there is danger that the rim will break when the tire is under high pressure, and this may cause personal injury or death.

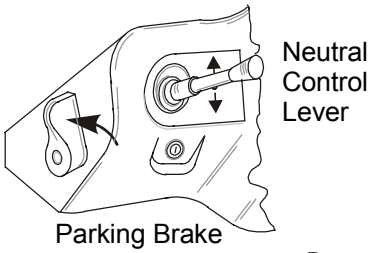
For safety, when checking tire pressure, place your body in front of the tread face of the tire. Do not check from the side face of the tire.

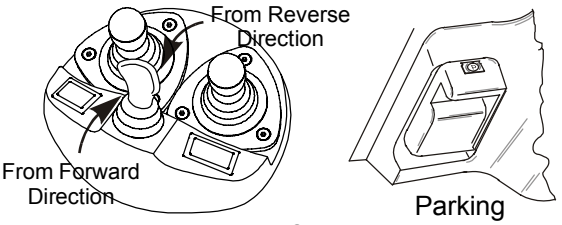
Suitable qualifications are needed for tire inflation work. Always have the work carried out by properly qualified personnel.

The tire inflation pressure on a forklift truck is several times higher than the pressure on an automobile. The use of an inflation cage, or some other safety device, helps prevent serious injury. When the tires are being inflated, there is danger that dirt or dust may be thrown up by the compressed air and enter your eyes, so always wear safety glasses.

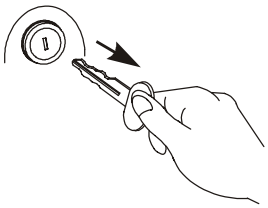


Lower forks fully to the floor and tilt forward





(3 Position) Directional Control Lever (Option) (Place in Neutral Position as shown)



Key to OFF position

PARKING

When you are finished with the truck, observe proper shutdown procedures.

- Never park on a grade
- Always come to a complete stop before leaving truck
- Place travel controls in Neutral.
- Lower forks fully to the floor and tilt forward
- Set Parking Brake
- Turn key to OFF position.

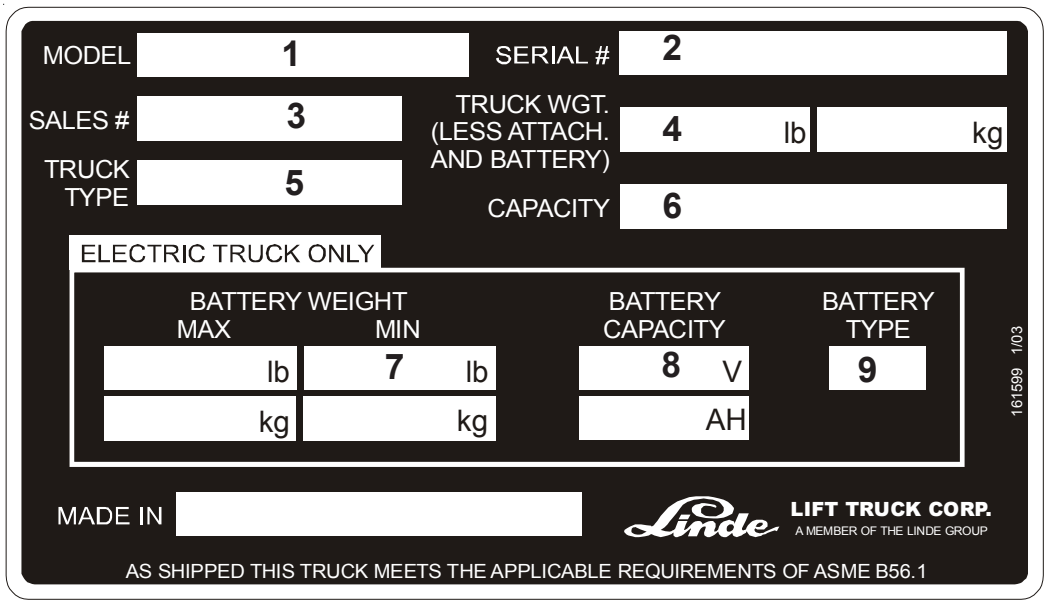
⚠ WARNING:

Do not park on a grade or incline. Do not park in areas which block emergency equipment or routes, access to fire aisles or fire equipment, or stairways.

⚠ WARNING:

Failure to properly shutdown the truck may allow the truck to move causing injury to pedestrians and damage to property.

DATA PLATE



1. **Model designation of the truck**

2. **Truck serial number**

3. **Truck sales order number** - the sales and serial numbers are assigned to each specific truck and should be used when requesting any information on the truck. Also, these numbers should be referenced when ordering service parts from your authorized Linde dealer.

4. **Truck weight** - with removable attachment.

5. **Truck type** - the code letters in this block signify the type of construction with safeguards against fire, shock hazards and explosion in classified and nonclassified areas. Check with the proper authority before entering areas containing flammable or explosive materials.

6. **Not used, see Capacity Plate.**

7*. **Minimum battery weight required**.

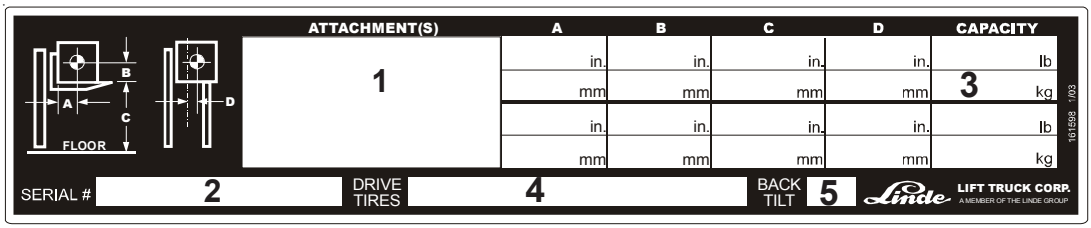
8*. **System voltage of the truck**

9*. **Battery Type**

*** Used for Electric trucks only.**

SAFETY TIPS

CAPACITY PLATE



1. **Attachment** (Sideshifter, Clamp, etc.) - if an attachment is installed on the truck at the time of purchase, it will be indicated in this block.

2. **Truck serial number**

3. **Truck capacity, load center and lifting height** - these show the maximum load capacity of the truck in relation to load centers and lift heights. Capacity may be reduced when lifted above certain heights. Operators of this truck need to be aware of these capacities. Personal injury or damage to the truck can occur if these capacities are exceeded.

CAUTION:

NEVER ATTEMPT TO LIFT A LOAD GREATER THAN THE MAXIMUM CAPACITY LISTED ON THIS PLATE (#3 ABOVE).

4. **Drive Tires-** Size and type can affect the capacity of your truck. Ensure truck is equipped with tires specified.

5. **Back Tilt-** Maximum**.**

OPERATOR WARNING AND SAFETY DECALS *(continued)*

Operator Warnings Decal

Read and understand the following before operating the truck:

⚠ WARNING

SIT-DOWN RIDER TRUCK OPERATOR WARNINGS

1. CHECK YOUR TRUCK - The truck should be checked daily before being placed in service. If found to be in need of repair, defective, or in any way unsafe it should be reported immediately to the proper authority and removed from service until restored to a safe operating condition.

2. KNOW YOUR TRUCK - Do not operate this truck unless you have been trained and authorized to do so. Read all warnings and instructions in the Operator's manual on this truck; or obtain them from plant Safety Director or the local Linde representative.

3. KEEP INSIDE - Operate truck only from designated operating position. Operate the truck only when you are in the normal operating position and seated in the Operator's seat. Never place any part of your body into the mast structure, between the mast and the truck, or outside the truck. Do not carry passengers.

4. PROTECT YOURSELF - Do not operate truck without overhead guard.

5. SEAT BELT - MAKE SURE YOUR SEAT BELT IS FASTENED BEFORE OPERATING THE TRUCK.

6. LATERAL TIPOVER - Can occur loaded or unloaded by a combination of speed and sharpness of turn. SLOW DOWN BEFORE TURNING. With the mast raised, lateral tipover also can occur by turning and/or braking when moving rearward, turning and/or accelerating forward or turning on an incline or ramp. TRAVEL WITH THE MAST LOWERED. The potential for lateral tipover will be further increased by overloading, excessive rearward tilt or off-center positioning of the load. Don't risk injury or death. Drive smart.

7. LONGITUDINAL TIPOVER - Can occur by driving with the load down slope on an incline or ramp, overloading, excessive forward tilt or aggressive braking when moving forward or accelerating rearward with the mast elevated. TRAVEL WITH THE MAST LOWERED. Don't risk injury or death. Drive smart.

8. LATERAL OR LONGINTUDINAL TIPOVER - Can occur if the truck is driven over objects on the floor or ground, off the edge of improved surfaces, or into potholes, or by impacting overhead obstacles or collision with other objects. Don't risk injury or death. Drive smart.

9. DON'T JUMP OFF - If your truck begins to tip over, DON'T JUMP. Hold the steering wheel tightly, brace feet, and lean away from tip. Stay in the seat to avoid being trapped between the truck and the ground.

10. HIGH LOADS - Do not handle loads which are higher than the load backrest or load backrest extension unless load is secured so that no part of it could fall backward.

11. STABILIZE YOUR LOAD - Do not handle unstable or loosely stacked loads. Use special care when handling long, high, or wide loads to avoid losing the load, striking bystanders, or tipping truck.

12. CENTER YOUR LOAD - When using forks, space forks as far apart as load will permit. Before lifting, be sure load is centered and forks are completely under load.

13. NEVER OVERLOAD - Do not overload truck. Check capacity plate for load weight and load center information.

14. AVOID SUDDEN MOVEMENTS - Start, stop, travel, steer, and brake smoothly. Sudden movements can endanger yourself and others.

15. LOOK OVERHEAD - Elevate forks or other lifting mechanism only to pick up or stack a load. Lift and lower with mast vertical or slightly back - NEVER FORWARD. Watch out for obstructions, especially overhead.

16. MINIMUM TILT - Operate tilting mechanism slowly and smoothly. Do not tilt forward when elevated except to pick up or deposit a load. When stacking use only enough backward tilt to stabilize load.

17. EYES AHEAD - Travel with load or lifting mechanism as low as possible and tilted back. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with lifting mechanism trailing (except when climbing ramps).

18. CARE ON RAMPS - Use special care when operating on ramps - travel slowly, and do not angle or turn. When truck is loaded, travel with load uphill. When truck is empty, travel with lifting mechanism downhill.

19. SLOW DOWN - Observe applicable traffic regulations. Yield right-of-way to pedestrians. Slow down & sound horn at cross aisles and whenever vision is obstructed.

20. WATCH PEOPLE - Do not allow anyone to stand or pass under lifting mechanism, directly behind truck or within rear swing area when turning.

21. WORK PLATFORMS - DO NOT LIFT OR CARRY PERSONNEL USING THE FORKS OF THE TRUCK, not even with a work platform. The truck is designed for transporting, warehousing and stacking of material, not personnel.

22. SHUT DOWN COMPLETELY - Before getting off truck, neutralize travel control, fully lower lifting mechanism and set the parking brake. Also shut off power when leaving truck unattended. Block wheels if truck is parked on an incline.

139950 2/99

Failure to comply with these warnings will create an unreasonable risk of injury to yourself and others.

OPERATOR WARNING AND SAFETY DECALS *(continued)*

Trained Operator Warning Decal

This decal reinforces the requirement that only trained and authorized personnel are to operate the truck.

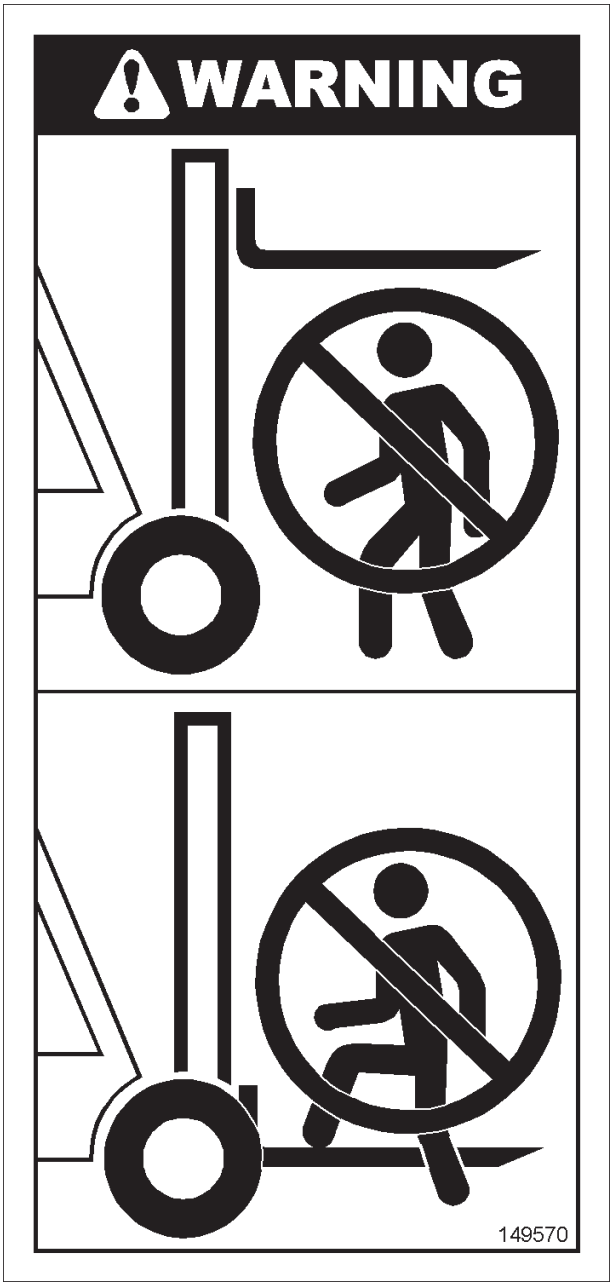
Hood Latch Warning Decal

This decal reinforces that the Operator should verify that the Hood Latch is securely fastened before operating the truck.

OPERATOR WARNING AND SAFETY DECALS *(continued)*

"Don't Walk Under or Stand On Forks" Warning Decal

This decal is located on both sides of the Mast Uprights and warns both the Operator and any pedestrians not to stand on or walk under a raised load at any time.



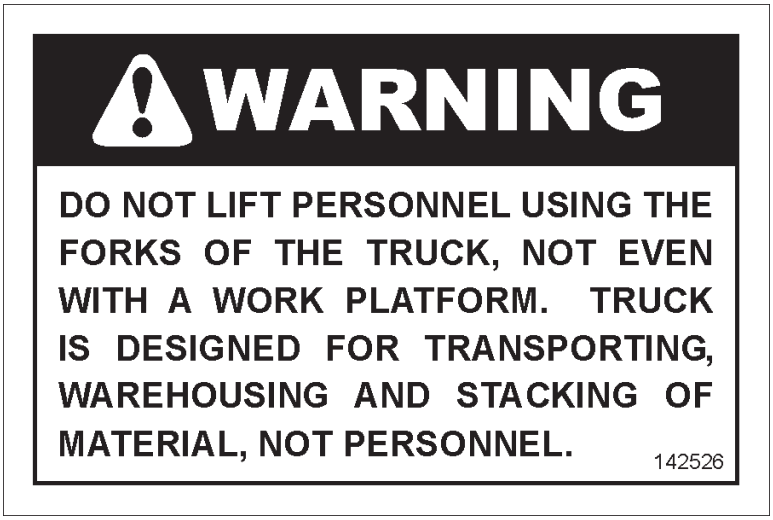
OPERATOR WARNING AND SAFETY DECALS *(continued)*

Brake Warning Decal

This decal reinforces that the Operator should engage the Parking Brake lever whenever necessary, as it is not automatically applied.

Personnel Warning Decal

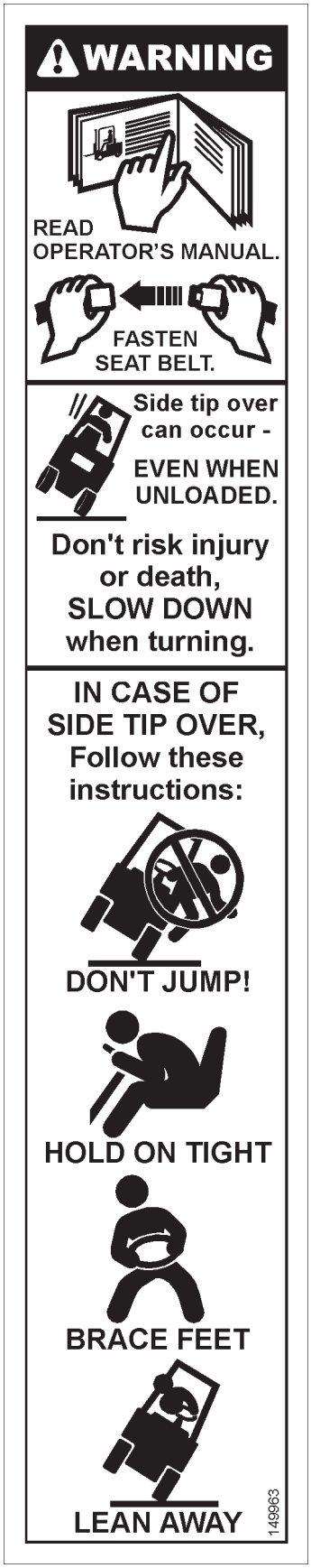
This decal reinforces that the Operator should never use the Forks to lift personnel for any reason.



OPERATOR WARNING AND SAFETY DECALS *(continued)*

Seat Belt / Tip-Over Warning Decal

This decal reinforces that the Operator should read the Operator's Manual and engage the Seat Belt before operating the truck. It also instructs the Operator on what to do in the event of a tip-over of the truck.



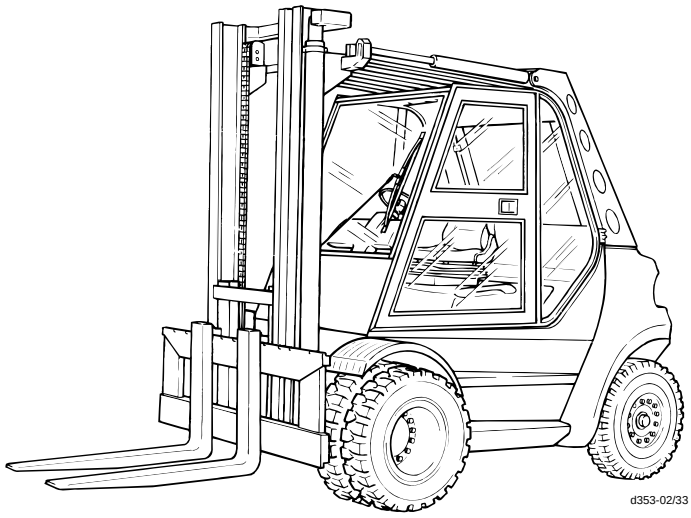
NOTES:

NOTES:

LINDE LIFT TRUCK CORP.

A MEMBER OF THE LINDE GROUP

2450 West 5th North Street
Summerville, S.C. 29484
PHONE (843) 875-8000 FAX (843) 875-8329



Operating Instructions

Linde Fork Lift Truck

H 50 - 02 / H 60 - 02 / H 70 - 02
H 80 - 02 / H 80/900 - 02

With Diesel Engine

353 804 3001 GB

0702

Linde - Your Partner

Linde AG Linde Material Handling Division

Werk II, Aschaffenburg-Nilkheim

Fenwick-Linde, Châtellerault

Lansing Linde Ltd., Basingstoke

Werk I, Aschaffenburg

Werk III, Kahl am Main

Linde Heavy Truck Division Ltd., Merthyr Tydfil

Linde, an enterprise operating worldwide in the investment and service sector, is one of the large industrial enterprises in the EC with its three business segments and six divisions.

The Linde Material Handling division is a leading manufacturer of industrial trucks and hydraulics. It includes eight manufacturing plants in the Federal Republic of Germany, France and Great Britain, as well as subsidiaries and branches in all economically important countries.

Linde industrial trucks enjoy a worldwide reputation - thanks to their high quality in engineering, performance and service.

Your Linde lift truck

offers the best in economy, safety and driving convenience. Therefore it lies mainly in the hands of the operator to preserve the qualities of the trucks for a long and profitable service life and to make full use of their benefits on the job.

These operating instructions tell you all you need to know about starting, operation, running, and servicing the truck.

For maintenance and repair work not described in these operating instructions special technical skill and knowledge, measuring equipment and special worshop tools are often required. Please contact your authorised Linde dealer for this service.

Only qualified persons authorised by Linde are allowed to service the trucks.

For some options, follow the operating instructions supplied with that equipment. Follow the operating instructions for your truck and perform the services specified in the inspection and maintenance schedule regularly, on time and with the specified oils and lubricants.

Keep a record of all maintenance services, otherwise your warranty may become void.

The terms “front“, “rear“, “left“ and “right“ refer to the position in which the item is installed in the truck, looking in the forward travel direction of the truck.

Authorised applications

Your Linde truck is designed for transporting and lifting the loads specified in the load capacity diagram.

In particular, we refer to the VDMA booklet "Rules for the Normal and Proper Use of Industrial Trucks" supplied with this manual, to accident prevention rules of your employer's liability insurance and to the requirements of traffic regulations.

The rules for the normal and proper use of industrial trucks must be followed under all circumstances by the responsible persons, in particular by the operators and service personnel.

The user, and not the manufacturer Linde, is liable for any hazards arising from unauthorised applications.

If you wish to use the truck for applications not mentioned in these guidelines, please first contact your Linde distributor before supplementing or retrofitting it for this purpose.

No changes, in particular no conversions or retrofits, may be made to the truck without the prior permission of the manufacturer.

353 804 3001.0702

Technical note

These operating instructions or excerpts thereof may only be copied, translated or used by third parties after prior written approval by the manufacturer.

Linde pursues a policy of continuous improvement in the design and construction of its products. As a result, the illustrations and technical details regarding design, equipment and engineering of trucks are subject to change or modification as a result of technological progress.

Therefore, no liability based on the specifications, illustrations and descriptions contained in this operating manual will be accepted.

Please submit all enquiries concerning your truck and all orders for spare parts to your authorised distributor, making sure to state your correct shipping address.

For repairs use only genuine Linde spare parts to ensure that your truck will retain its original technical standard.

When ordering spare parts, specify the part numbers and also the

Lift truck model: _____

Manufacturer's number/year built: _____

Takeover date: _____

Also state the manufacturer's number of the engine and mast when ordering parts for these assemblies.

Engine number: _____

Mast number: _____

Mast lift height: _____ mm

When taking over the fork truck, transfer the data from the assembly type plates into this manual.

Takeover inspection

Every fork lift truck undergoes careful inspection before leaving the factory, in order to make sure that it will be in satisfactory condition and fully equipped as ordered when delivered to the customer. Authorised distributors are under obligation to re-inspect the truck before delivery and to hand it over in proper order.

With a view to avoiding later complaints, we request you to check the condition of the truck, to make sure that it is equipped as ordered, and to acknowledge the proper handing/taking over of the truck in the manufacturer's certificate of conformity.

The following technical documents belong to each fork lift truck:

1 Operating instructions
1 Manufacturer's declaration of conformity
(manufacturer declares that the industrial truck conforms to the EC directives for machines)
1 Rules for the Normal and Proper use of Industrial Trucks (VDMA)

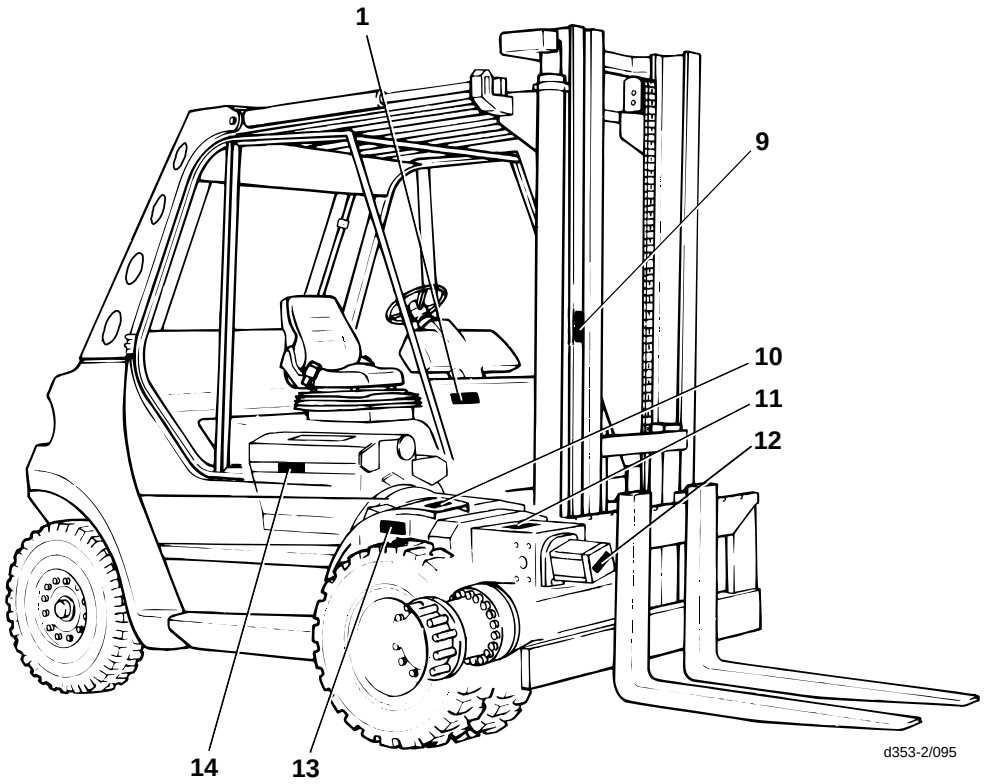
Wishing you satisfactory operation,

Linde AG
Linde Material Handling Division
Aschaffenburg

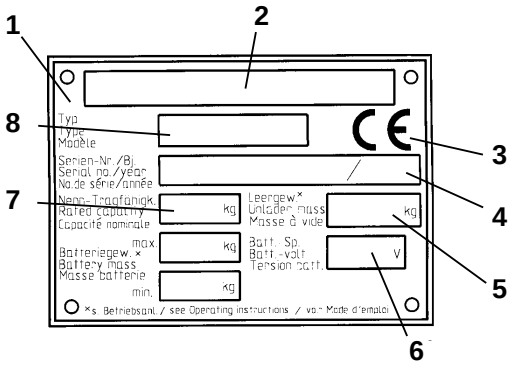
353 804 3001.0702

Type plates

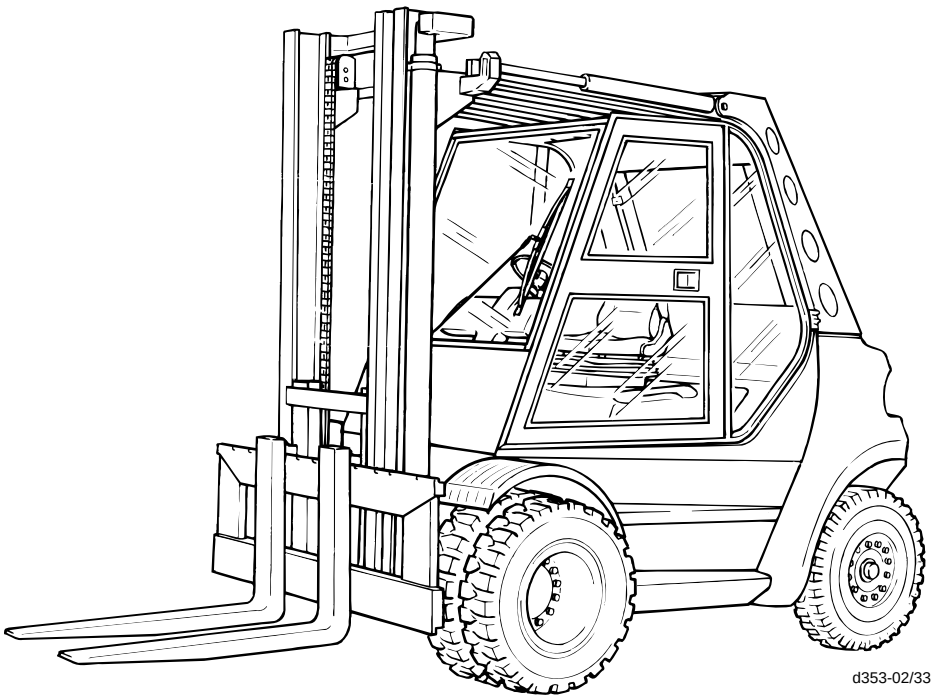
1 Manufacturer's plate
2 Manufacturer
3 CE symbol
(The symbol certifies that the EC directives for machines and all applicable guidelines are fulfilled.)
4 Serial number / year built
5 Weight of empty truck
6 Battery voltage
7 Rated capacity
8 Type
9 Lift mast number (stamped)
10 Chassis number (stamped on side)
11 Working hydraulics pump plate
12 Power steering pump plate
13 Traction hydraulics pump plate
14 Engine type plate



d353-2/095



Innovative technology,
easy and ergonomic operation,
energy-efficient, environment- and maintenance-friendly,
solid manufacture and
because almost all spares are of our own manufacture they are readily available!
The success of a company
with about 9600 employees in eight manufacturing sites.



d353-02/33

The driver's position and operating features are designed using the latest research in ergonomics. Each operating element is designed in regard to position and operation to ensure the driver's convenience guaranteeing effortless and safe operation.
Of course, this also includes the easy hydrostatic power steering with a kick-back safety, the proven double-pedal travel control - forward with the right pedal, reverse with the left - and only one main lever for all mast functions.

353 804 3001.0702

Table of contents

353 804 3001.0702

353 804 3001.0702

June 1999	Fork Lift Trucks (Designation VDI 2198)	Data Sheet for Material Handling Equipment	DFG (to VDI 2198)	VDI 2198

Characteristics	1.1	Manufacturer (see page 1)						
	1.2	Model designation		H 50 D	H 60 D	H 70 D	H 80 D	H 80 D/900
	1.3	Power unit: battery, diesel, petrol, LPG, mains power		Diesel	Diesel	Diesel	Diesel	Diesel
	1.4	Operation: manu., pedest., stand-on, seated, ord. pic.		seated	seated	seated	seated	seated
	1.5	Load capacity	Q [t]	5.0	6.0	7.0	8.0	8.0
	1.6	Load centre	c [mm]	600	600	600	600	900
	1.8	Axle centre to fork face	x [mm]	590	590	600	600	630
	1.9	Wheelbase	y [mm]	2160	2160	2160	2160	2510
Weight	2.1	Service weight	[kg]	9300	9550	10760	11500	12400
	2.2	Axle load with load, front/rear	[kg]	12200 / 2100	13770 / 1780	15650 / 2110	17160 / 2340	18200 / 2200
	2.3	Axle load without load, front/rear	[kg]	4450 / 4850	4470 / 5080	4770 / 5990	4730 / 6770	5400 / 7000
Wheels and Tyres	3.1	Tyres, front/rear (SE = CS superelastic, L = pneum.)		L (SE)	L (SE)	L (SE)	L (SE)	L (SE)
	3.2	Tyre size, front		300 - 15/22 PR 2)	355/65 - 15/24 PR 2)	8.25 - 15/18 PR 2)	8.25 - 15/18 PR 2)	8.25 - 15/18 PR 2)
	3.3	Tyre size, rear		8.25 - 15/18 PR 2)	8.25 - 15/18 PR 2)	8.25 - 15/18 PR 2)	300 - 15/18 PR 2)	300 - 15/18 PR 2)
	3.5	Wheels, number front/rear (x = driven)		2x (4x) / 2 3)	2x (4x) / 2 3)	4x / 2	4x / 2	4x / 2
	3.6	Track width, front	b10 [mm]	1594 4)	1594 4)	1748	1748	1748
	3.7	Track width, rear	b11 [mm]	1600	1600	1600	1550	1550
Dimensions	4.1	Mast/fork carriage tilt, forward/backward	degrees	6 / 10	6 / 10	6 / 10	6 / 10	6 / 10
	4.2	Height of mast, lowered	h1 [mm]	2730 1) 5)	2730 1) 5)	2730 1) 5)	2730 1) 5)	2730 1) 5)
	4.3	Free lift	h2 [mm]	150	150	150	150	150
	4.4	Lift	h3 [mm]	3550 1)	3550 1)	3150 1)	3150 1)	2750 1)
	4.5	Height of mast, extended	h4 [mm]	4450 1)	4450 1)	4250 1)	4250 1)	4150 1)
	4.7	Height of overhead guard (cabin)	h6 [mm]	2714	2714	2714	2714	2714
	4.8	Height of seat/stand-on platform	h7 [mm]	1432	1432	1432	1432	1432
	4.12	Tow coupling height	h10 [mm]	810	810	810	810	810
	4.19	Overall length	l1 [mm]	4590	4590	4600	4600	5590
	4.20	Length to fork face	l2 [mm]	3390	3390	3400	3400	3790
	4.21	Overall width	b1/b2 [mm]	1894 (2262) / 1850 3)	1948 (2262) / 1850 3)	2262 / 1850	2262 / 1850	2262 / 1850
	4.22	Fork dimensions	s/e/l [mm]	60 x 130 x 1200	60 x 130 x 1200	70 x 150 x 1200	75 x 150 x 1200	70 x 200 x 1800
	4.23	Fork carriage to DIN 15173, class/form A, B		4 A	4 A	4 A	4 A	4 A
	4.24	Width of fork carriage	b3 [mm]	1800	1800	2180	2180	2180
	4.31	Ground clearance, mast	m1 [mm]	202	202	202	202	202
	4.32	Ground clearance, centre of wheel base	m2 [mm]	245	245	245	245	240
	4.33	Aisle width with pallets 1200x1000 across forks	Ast [mm]	4850	4850	4860	4860	5175
	4.34	Aisle width with pallets 800x1200 along forks	Ast [mm]	5050	5050	5060	5060	5375
	4.35	Turning radius	Wa [mm]	3060	3060	3060	3060	3345
	4.36	Min. distance between the centres of rotation	b13 [mm]	975	975	975	975	975
Performance	5.1	Travel speed, with/without load	km/h	22 / 22	22 / 22	22 / 22	22 / 22	22 / 22
	5.2	Lifting speed, with/without load	m/s	0.53 / 0.53	0.53 / 0.53	0.42 / 0.42	0.42 / 0.42	0.42 / 0.42
	5.3	Lowering speed, with/without load	m/s	0.50 / 0.50	0.50 / 0.50	0.42 / 0.42	0.42 / 0.42	0.42 / 0.42
	5.5	Tractive force, with/without load, 60 minute rating	N	61000 / 31000	57000 / 33000	58000 / 35000	58000 / 35000	58000 / 42000
	5.7	Climbing ability with/without load, 30 minute rating	% 6)	45 / 28	35 / 27	29 / 28	26 / 27	-
	5.9	Acceleration time with/without load (first 10 m)	s	4.7 / 4.3	5.2 / 4.7	5.7 / 5.1	6.2 / 5.3	6.2 / 5.3
	5.10	Service brake		hydrostatic	hydrostatic	hydrostatic	hydrostatic	hydrostatic
IC engine	7.1	Manufacturer of engine/type		KHD / BF 6M 1012	KHD / BF 6M 1012	KHD / BF 6M 1012	KHD / BF 6M 1012	KHD / BF 6M 1012
	7.2	Engine rated power to ISO 1585	kW	85	85	85	85	85
	7.3	Rated rpm	RPM	2200	2200	2200	2200	2200
	7.4	Number of cylinders / cc	n/cc	6 / 4800	6 / 4800	6 / 4800	6 / 4800	6 / 4800
	7.5	Fuel consumption to VDI	l/h kg/h	5.3	5,6	5.9	6.2	6.7
Others	8.1	Type of drive control		hydrostatic transmission	hydrostatic transmission	hydrostatic transmission	hydrostatic transmission	hydrostatic transmission
	8.2	Working pressure for attachments	bar	260	260	260	260	260
	8.3	Oil quantity for attachments	l/min	-	-	-	-	-
	8.4	Mean noise level at driver's ear	dB (A)	-	-	-	-	-
	8.5	Towing coupling, design/type DIN, no.		-	-	-	-	-

Notes:

1) **Additional lifting mast heights; see table.**

2) **Aditional optional tyres upon request.**

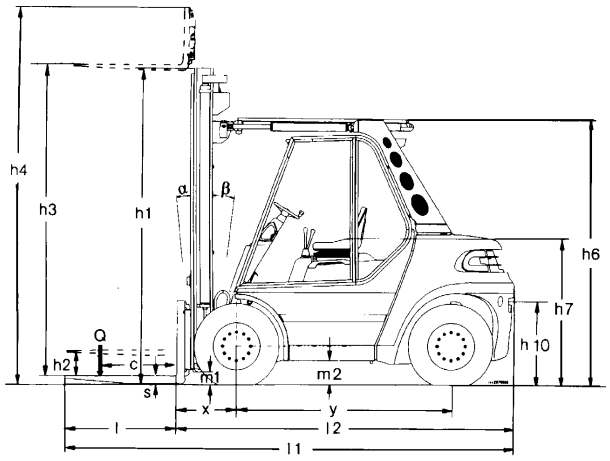
3) **Values in brackets for double wheels 8.25 - 15/18 PR.**

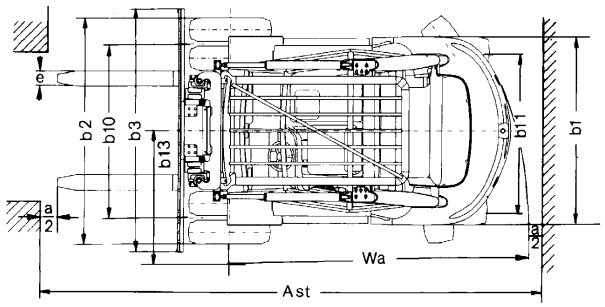
4) **1718 mm for double wheels 8.25 - 15.**

5) **With a free lift of 150 mm.**

6) **On short slopes, when crossing obstacles (refer to section "Travel").**

353 804 3001.0702

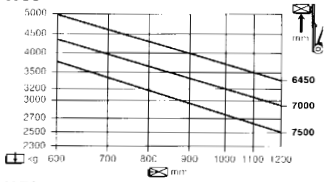




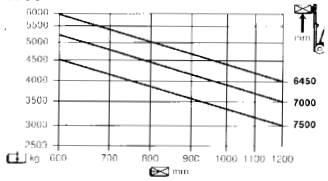
Safety distance “a” = 200 mm

Lifting capacity diagrams:

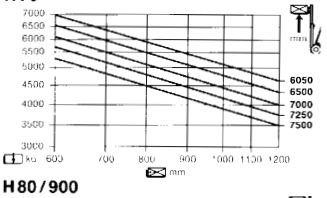
H50



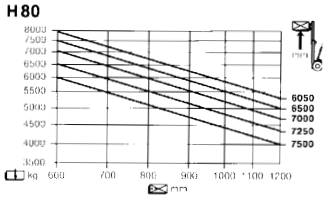
H60



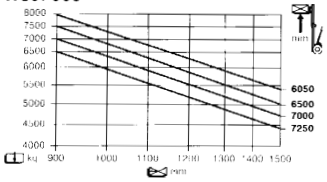
H70



H80



H80/900



Load capacities apply for SE tyres.

Mast and lifting height H 50, H 60 (in mm)						
Lifting height	h3	3550	4150	4550	5250	6050
Mast retracted (with 150 mm free lift for standard)	h1#	2730	3030	3230	3580	3980
Mast extended	h4	4450	5050	5450	6150	6950
Mast and lifting height H 70, H 80 (in mm)						
Lifting height	h3	3150	3750	4150	4850	5650
Mast retracted (with 150 mm free lift for standard)	h1#	2730	3030	3230	3580	3980
Mast extended	h4	4250	4850	5250	5950	6750
Mast and lifting height H80/900 (in mm)						
Lifting height	h3	2750	3350	3750	4450	5250
Mast retracted (with 150 mm free lift for standard)	h1#	2730	3030	3230	3580	3980
Mast extended	h4	4150	4750	5150	5850	6650

Noise emission levels

Determined in a test cycle in accordance with EN 12053 from the weighted values in the operating modes DRIVING, LIFTING, IDLING.

Noise level at driver's station

H 50 - H 80	L_{PAZ} = 78 dB (A)
Uncertainty	K_{PA} = 4 dB (A)

Sound level at driver's place

While lifting	L_{Pa} = 80 dB (A)
While idling	L_{Pb} = 65 dB (A)
While driving	L_{Pc} = 83 dB (A)
Uncertainty	K_{PA} = 4 dB (A)

Acoustic power level

H 50 - H 80	L_{WAZ} = 100 dB (A)
Uncertainty	K_{WA} = 2 dB (A)

Acoustic power level

While lifting	L_{Wa} = 101 dB (A)
While idling	L_{Wb} = 87 dB (A)
While driving	L_{Wc} = 105 dB (A)
Uncertainty	K_{WA} = 2 dB (A)

Guaranteed acoustic power level

Acc. to directive 2000/14/EC	L_{WA} = 105 dB (A)

The directive legally requires this information. This value has been calculated from the acoustic power levels for "Lifting" and "Driving" and is only be used as a comparable value for different trucks. For the determination of the real environmental noise stress this value is less appropriate, as it is not representative of normal truck operation, which includes "Idling".

NOTE

Higher or lower noise emissions can exist during operation of the truck, for example due to type of operation, environmental influences and additional noise emission sources.

Frequency characteristic for human body vibrations (preliminary values as only a draft standard is available)

The values are determined in conformance with prEN 13059 on trucks with standard equipment according to the technical data sheet (driving over test course with bumps).

Frequency characteristic acc. to EN 12096

Measured frequency characteristic	$a_{w,zs}$ = 0.8 m/s²
Uncertainty	K = 0.3 m/s²

Frequency characteristic given for hand and arm vibrations

Frequency characteristic	< 2.5 m/s²

NOTE

The frequency characteristic for the human body can not be used to determine the actual frequency load during operation. This load depends on the working conditions (condition of roadway, type of operation, etc) and must therefore be determined at the site, if necessary.
The specification of hand and arm vibrations is required by law, even if the values, as in this case, do not indicate any danger.

353 804 3001.0702

The 353 fork lift truck series is designed for loading and spotting loads of up to 5 tons with the H 50, of up to 6 tons with the H 60, of up to 7 tons with the H 70 and 8 tons with the H 80 with a load centre distance of 600 mm.

The H 80 / 900 is designed for loading and spotting loads of up to 8 tons with a load centre distance of 900 mm.

The trucks have a compact and low profile design.

The low centre of gravity and the optimum distribution of weight ensures optimum stability under all operating conditions.

Engine

A water-cooled, 6-cylinder supercharged Diesel engine with direct fuel injection is installed as power unit. It drives the hydraulic pumps of the truck at load-dependent speed.
The combustion air is cleaned by dry air filter with a paper element.

Hydraulic system

The drive system consists of one variable-displacement pump for driving the two traction hydraulics variable-displacement motors, one hydraulic pump each for the working and steering hydraulics, and one hydraulic pump for boost pressure.

The variable-displacement hydraulic motors in the drive units are supplied with pressure by the variable-displacement pump. They power the traction wheels via two lateral drive axle hub differentials.

Operation

The hydraulic pump and the speed are simultaneously controlled by the forward and reverse accelerator pedals. The truck speed can be regulated by the hydrostatic power source from a standstill up to the maximum speed with infinitely variable control in both directions. The double pedal control permits easy as well as safe and time-saving handling of the lift truck.

Both hands are always free for steering and control of the work movements. The net result is quick reversing and energy-saving stacking.

There is only one control lever (main control lever) for controlling the work motions lifting, lowering and tilting. Additional control levers are supplied for the operation of supplementary attachments.

Lift mast

Overhead tilt cylinders are fitted for sensitive tilting and for mast stabilisation. The LTS (Linde Torsion Support), also functioning as overhead guard, ensures high strength against torsion, i.e. easy working due to reduced torsional vibrations of the mast and so a long service life.

For lifting the inner mast, there are two lift cylinders mounted on the outer upright channel.

The fork carriage is lifted by two flyer chains running at the inner upright channel.

Brakes

The hydrostatic transmission is used as service brake. The two multiple disc brakes integrated in the compact axle are utilised as a parking brake.

When the engine is stopped, the multiple disc brakes are applied = automatic braking.

The brake pedal is also used as parking brake. To park the truck, lock the brake pedal mechanically.

Steering

The steering is a hydrostatic power steering system, which turns the rear wheels with the steering wheel via the steer cylinder.

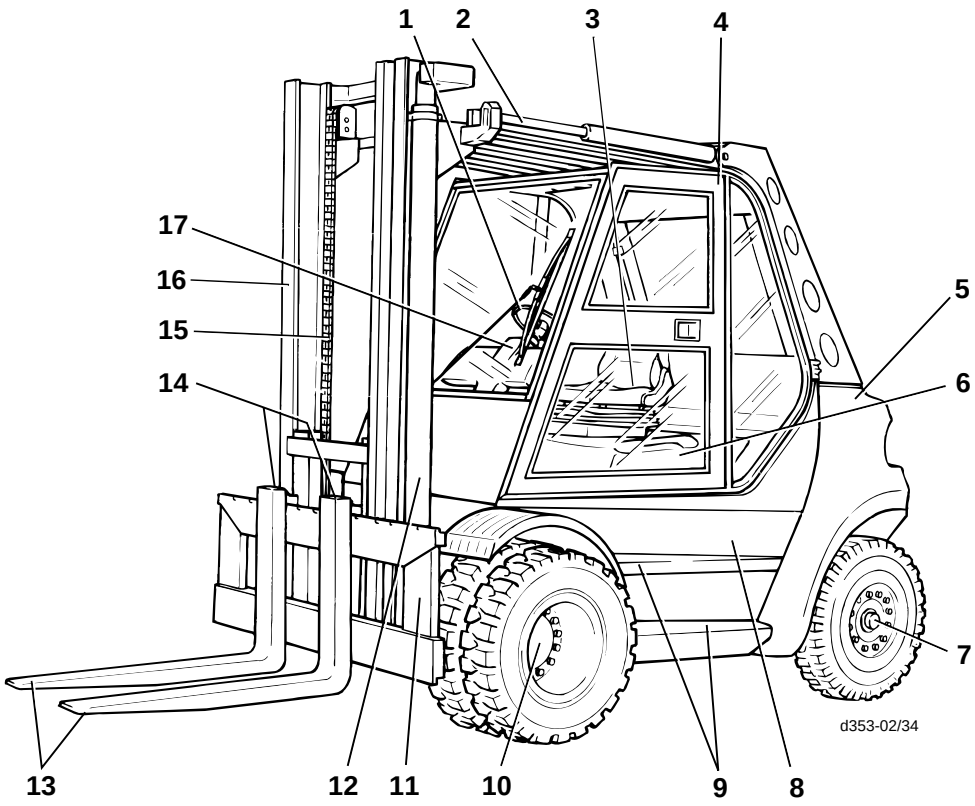
The steering system can also be operated when the engine is stopped, but a greater effort is required to turn the steering wheel.

Electrical system

The electrical system is supplied by a three-phase current generator with 12 VDC. For starting the engine, a 12-volt battery is installed.

353 804 3001.0702

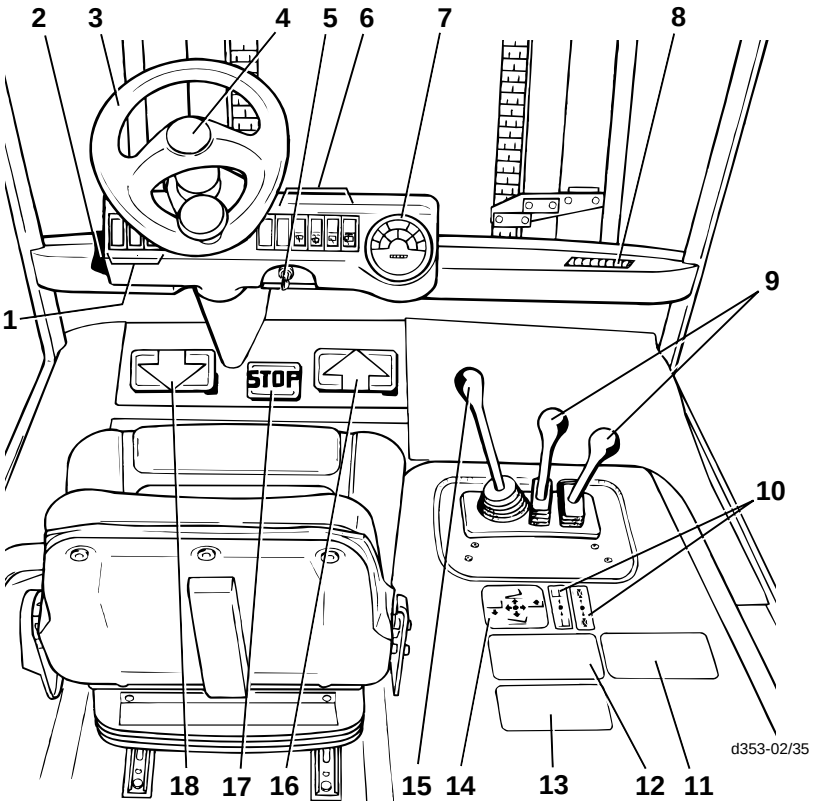
1 Steering wheel
2 Tilt cylinder
3 Driver's seat
4 Cabin*
5 Counterweight
6 Bonnet
7 Steering axle
8 Electrical system cover
9 Foot steps
10 Left drive axle hub differential
11 Fork carriage
12 Lift cylinder
13 Forks
14 Fork quick-releases
15 Lift chain
16 Lifting mast
17 Control console



* Option

353 804 3001.0702

1 Toggle switches for supplementary functions*
2 Parking brake lever
3 Steering wheel/hydrostatic power steering
4 Horn button
5 Ignition switch and key switch
6 Toggle switches for supplementary functions*
7 Composite instrument
8 Air outlet*
9 Control lever for supplementary hydraulics (attachments)*
10 Label for supplementary hydraulics*
11 Notice label
12 Load capacity diagram
13 Load capacity plate (attachment)*
14 Symbol label for working hydraulics
15 Control lever for working hydraulics
16 Forward accelerator pedal
17 Brake pedal
18 Reverse accelerator pedal



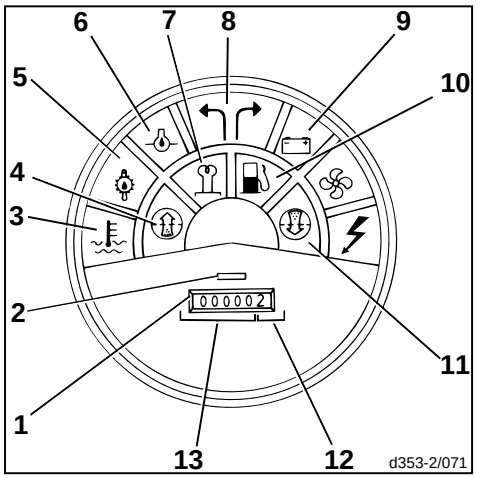
353 804 3001.0702

* Option

The composite instrument contains the following control and indicator elements:

1 Hour meter
2 Hour meter on indicator light
3 Coolant temperature control indicator, coolant level indicator
4 Particle filter warning light
5 Hydraulic oil temperature warning light
6 Engine oil pressure warning light
7 Pre-heating indicator light
8 Flasher indicator light
9 Battery charge indicator light
10 Fuel level warning light
11 Air filter restriction indicator light

353 804 3001.0702



Indicator element	Function	Possible fault(s)
Hour meter (1). The row of figures (13) shows the full service hours, the last figure (12) 1/10 of an hour	Indicates lift truck service hours. The display serves as reference for elapsed working hours and for the required inspection and maintenance activities	☞ **NOTE** **The elapsed service hours should be recorded when replacing a defective hour meter. Record data on durable tape and affix next to hour meter**
Hour meter ON indicator light (2)	Indicates that the hour meter is running	
Coolant temperature control indicator, coolant level indicator (3)	Indicates that the coolant temperature is too high or that the coolant level is too low	- Fan V-belt slack - Dirt on the radiator - Leak in the cooling system - Low coolant level
Particle filter warning light* (4)	Indicates that the particle filter must be regenerated	- Regenerate the particle filter
Hydraulic oil temperature warning light (5)	Monitors the hydraulic oil temperature	- Dirt on oil cooler - Oil filter blocked - Oil level in hydraulic system is too low - Oil not as specified
Engine oil pressure warning light (6)	Indicates low oil pressure of engine lubrication	- Low oil level in crankcase - Engine is overheating - Oil not as specified - Internal leakage in lubricating system
Pre-heating indicator light (7)	It is illuminated if the pre-heating function is on	
Flasher indicator light* (8)	Indicates operation of flasher unit when direction indicator is on	
Battery charge indicator light (9)	Indicates malfunctions in the electrical system	- V-belt broken or slipping - Cables broken - Alternator faulty - Regulator or relay faulty
Fuel level warning light (10)	Indicates a fuel reserve of approx. 8.0 litres.	
Air filter restriction indicator light (11)	Indicates excessive accumulation of dirt on air cleaner element	- Air filter element restricted

* Option

The responsible persons, particularly the truck operator and servicing personnel, must be instructed in the safety guidelines for the normal and proper use of industrial trucks included with these operating instructions.
The employer must ensure that the operator has understood all safety informations.

Please observe the guidelines and safety rules therein for example:
- information on the operation of industrial trucks
- rules for roadways and work areas
- rights, duties and safety rules for the operator
- operation in special areas
- information related to starting, driving and braking
- service and repair information
- recurrent inspections, accident prevention check
- disposal of greases, oil and batteries
- remaining risks.

The operator (employer) or the responsible person must ensure that all the guidelines and safety rules applicable for your truck are observed.

When instructing a trained operator, acquaint him with the
- special features of the lift truck (double-pedal control, main control lever, brake pedal)
- optional attachments
- special operating and working area characteristics,

by training and practicing driving, shifting and steering operations until they are completely mastered.

Only then start to practice shelf-stacking.

The stability of the truck in the work area is ensured if employed properly. Should the truck tip over during an unauthorised application or due to incorrect operation, always follow the instructions depicted below.

Important safety information

The precautions WARNING, CAUTION, ATTENTION and NOTE in this manual are provided to indicate special dangers or unusual information requiring special identification:

WARNING
indicates hazards that may result in personal injury or death and/or substantial damage to the product.

CAUTION
indicates hazards that may result in personal injury and/or substantial damage to the product.

ATTENTION
indicates hazards that may result in damage to or destruction of the product.

This note is found on various positions of the truck where special attention is required. Read the appropriate section of your operating instructions.

Further warning notices are also used for your safety. Please observe the various symbols.

NOTE
identifies technical information requiring special attention because the connection may not even be obvious to skilled personnel.

Handling fuels and lubricants

Always handle fuels and lubricants as required and as specified by the manufacturer.

Only store fuels and lubricants in approved containers at specified storage places. As they could be inflammable, do not contact them with hot objects or a naked flame.

Only use clean containers when replenishing fuels and lubricants.

Follow the manufacturer's safety and disposal instructions when using fuels and lubricants and cleaning compounds.

Avoid spilling fuels and lubricants. Remove any spillage immediately with a suitable binding agent and dispose of as specified.

Also dispose of used or contaminated fuels and lubricants as specified.

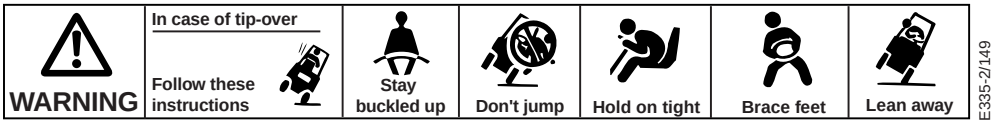
Follow laws and regulations.

Clean the area surrounding the part in question before lubrication, filter renewal or repairs in the hydraulic system.

Discard parts in a way friendly to the environment.

CAUTION
Do not allow hydraulic oil under pressure, for example at a leak, to penetrate the skin. Medical aid is required if such an injury occurs.

CAUTION
Improper handling of coolants and coolant additives puts your health and the environment at risk.



E335-2/149

353 804 3001.0702

Accident prevention check

The accident prevention rules in some countries require that the fork lift truck must be checked at least once a year for proper working condition by trained personnel. Please contact your authorised distributor for this inspection.

Operation of industrial trucks in the plant area

ATTENTION
Many plant areas are so-called limited public traffic areas.
We advise you to check if your company liability insurance covers any damages occurring with your fork truck against third parties on limited public traffic areas.

Diesel engine emissions

In Germany, fork trucks equipped with diesel engines must conform to TRGS 554. According to this regulation, diesel emissions are carcinogenic and they should, if at all possible, not permeate the air of workplaces.

If trucks equipped with diesel engines are used in totally or partially enclosed spaces, the labour protection authority must first be notified. Appropriate notices must be posted in the work areas (refer to TRGS 554 for an example).

Particle filter system inspection (option)

The responsible authorities require that particle filter systems must be serviced every six months by an expert. Record the inspection results in a “Diesel engine emission inspection certificate“ and insert it in the logbook (e.g. accident prevention check book for the truck).

Running-in instructions

The lift truck can be operated at full speed directly. However, avoid sustained high loads on the working hydraulic system and the travel drive in the first 50 hours of operation.

During initial operation and after each wheel change, tighten wheel nuts daily prior to starting operation until they are seated firmly, i.e. until no further tightening is possible.

The opposite wheel fasteners for tightened to a torque of:
front and rear ..... 600 Nm

NOTE
Observe the tightening instructions on the tag attached to the steering column.

Services prior to first operation*

- Check the engine oil level
- Check the header tank coolant level
- Refuelling
- Check condition, electrolyte level and specific gravity of the battery
- Check the tyre inflation pressure
- Check the wheel fasteners for tightness
- Check the hydraulic oil level
- Check the drive axle hub differential oil level and for leaks
- Braking system
- Steering system
- Operation of lifting device and attachments
- Regenerate the particle filter (option)

Daily checks*

- Check the engine oil level
- Check the header tank coolant level
- Check the fuel level
- Check the tyre inflation pressure

* A description of the service can be located in the alphabetical index.

Opening the bonnet

- Lift the lever (9) and tilt the backrest (4) forward.
- Pull the seat adjustment lever (3) and slide the seat fully forward.
- Unlock the bonnet lock (1) on the left and right side by inserting the key (5) and turning it anti-clockwise.
- Open the rotary lever (6) and turn it anti-clockwise as far as possible.
- Unhook the clip (7) from the bracket (8) and tilt it up.
- Open bonnet by tilting it back with the grip (2).

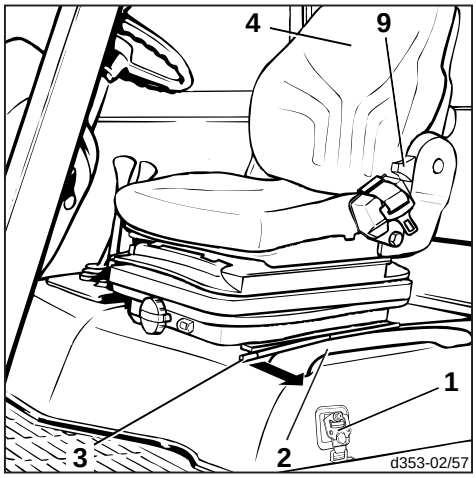
NOTE
The bonnet is held open by the gas-filled strut.

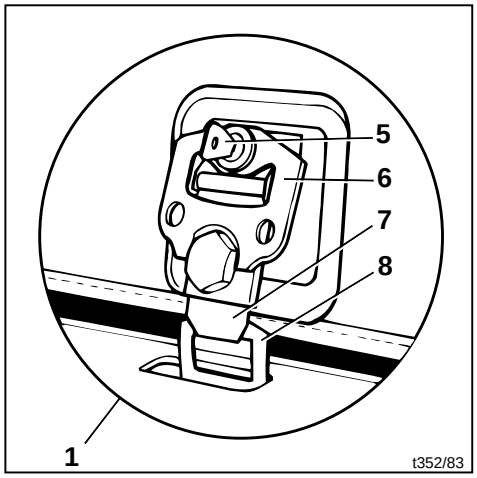
Closing the bonnet

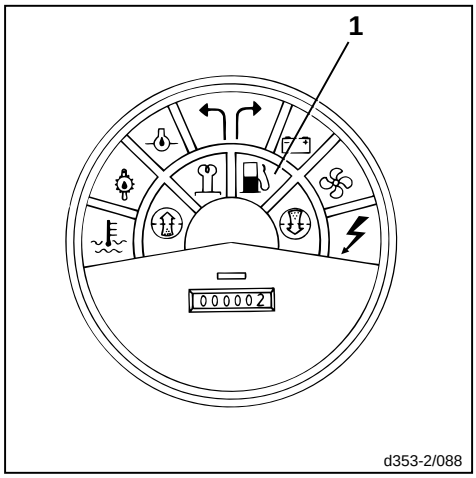
- Close the bonnet.
- Hook the clip (7) of the left bonnet lock into the bracket (8).
- Turn the rotary lever (6) clockwise as far as possible.
- Turn the key (5) clockwise and remove it.
- Also lock the bonnet lock on the right.

Check the fuel level

The fuel level warning light (1) at the instrument panel goes on when 8.0 litres of fuel remain in the tank.
Filling diesel fuel becomes necessary.







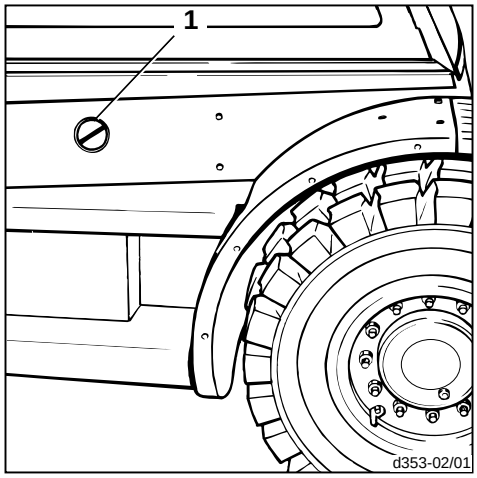
353 804 3001.0702

Refuelling

CAUTION
Stop the engine before refuelling. No smoking or naked flames when refuelling. Do not spill any fuel and do not allow any fuel to come in contact with hot parts. Follow the regulations for refuelling.

- Open the fuel filler cap (1) on the right side of the truck and fill with clean diesel fuel.
  Max. fuel capacity ..... 70.0 litres

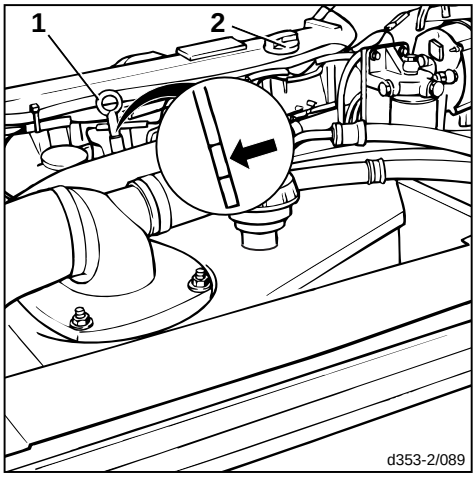
ATTENTION
To avoid malfunctions caused by the injection system sucking in air, do not allow the fuel tank to become completely empty.



Check the engine oil level

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

- Open the bonnet.
- Pull out the oil dipstick (1) at the engine on the right-hand side of the truck.
- Wipe the dipstick with a clean cloth.
- Fully re-insert the dipstick and pull it out again.
- The oil level should be between the markings.
- If necessary, fill oil to the upper marking.
- To fill oil, first remove the oil filler cap (2).
- Refit and tighten the oil filler cap.
- Close the bonnet.



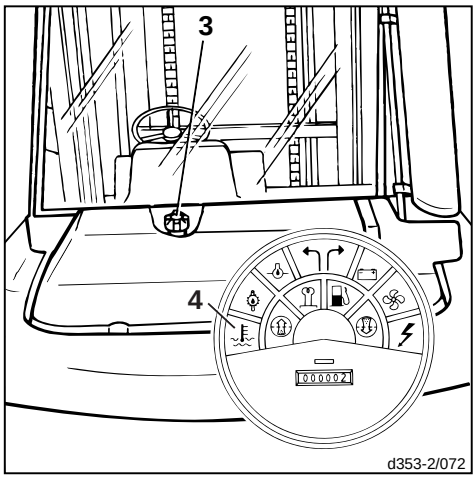
Check the header tank coolant level

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

CAUTION
Do not open the reservoir cap (3) when the reservoir is hot. The reservoir is pressurised. Risk of scalding!

NOTE
If the indicator light (4) illuminates, it is possible that the coolant level is low and coolant must be added.

- Remove the filler cap (3) from the radiator. The coolant must be approx. 10 mm under the filler cap opening.
- Top up coolant in the reservoir as required.
- Refit and tighten the filler cap.



Check the tyre inflation pressure

ATTENTION
A low tyre inflation pressure reduces the service life of the tyres and the stability of the truck.

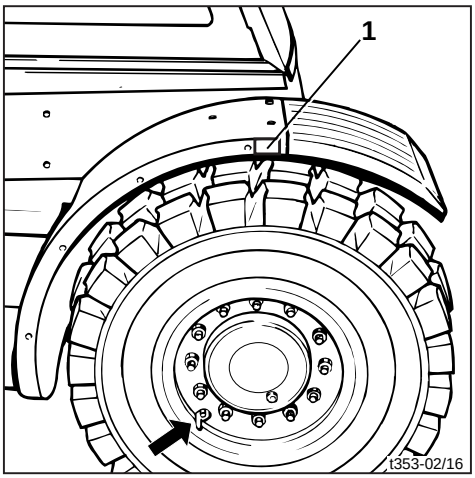
- Check the tyres for the specified inflation pressure.
- If necessary, inflate the tyres at the filler valves.

Inflate the tyres according to the informations on the front label (1) and rear label.

Drive axle - single tyre
- H 50 — 300-15/22 PR ..... 10 bar
- H 50 / H 60 / H 70 — 355/65-15/24 PR ... 10 bar

Drive axle - twin tyres
- H 50 / H 60 / H 70 — 8.25-15/18 PR ..... 8 bar
- H 80 — 8.25-15/18 PR ..... 10 bar

Steer axle
- H 50 / H 60 / H 70 — 8.25-15/18 PR ..... 8 bar
- H 50 / H 80 — 300-15/18 PR ..... 6 bar



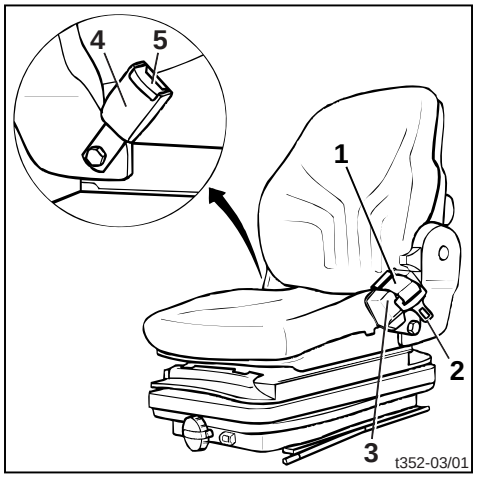
353 804 3001.0702

Applying the seat belt

DANGER
The seat belt must always be applied during the operation of the truck! The seat belt is only for securing one person.
Drivercabs with closed, solid doors or bar-type doors comply with the safety requirements for driver retaining systems. We recommend the additional use of the seat belt. The seat belt must be used if the truck is operated with the doors open or removed.

NOTE
The automatic lock blocks the belt when the truck is tilting heavily. The belt can then not be pulled out of the retractor.
To unlock the automatic lock, carefully drive the truck off the side slope.

- Pull the seat belt (1) out of the retractor with a smooth movement.
- Place the seat belt over the thighs, not over the belly.
- Engage the tongue (2) in the lock (4).
- Check seat belt tension. The belt should be snug on the body.



CAUTION
The webbing should not be twisted, stuck or knotted.
Protect the lock (4) and retractor (3) against foreign particles and dirt.

NOTE
During operation of the truck (e.g. driving, lifting, etc.) the operator should sit as far back as possible so that the back contacts the backrest.
The automatic lock of the retractor allows sufficient freedom of movement on the seat during normal operation of the truck.

Opening the seat belt

- Press the red button (5) on the belt buckle (4) to disengage the belt.
- Return the tongue (2) back to the roller (3) by hand.

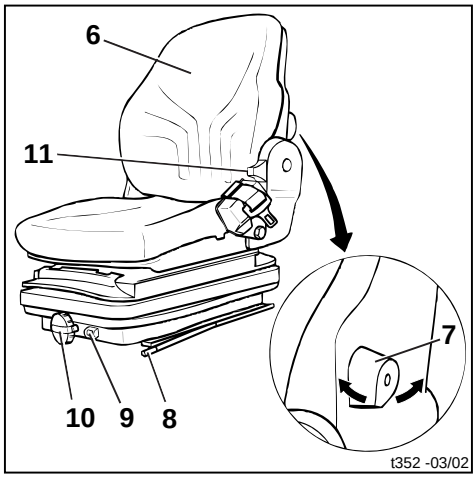
NOTE
A belt which returns too fast can trigger the automatic lock when the tongue hits the enclosure. The belt can then not be pulled out with the usual force.

Adjusting the operator seat

- For a horizontal adjustment of the seat, pull the adjustment lever (8) out.
- Slide the seat in the guide rails either forward or back until the optimum position in relation to the steering wheel, accelerator pedals and control levers is obtained.
- Re-engage the lever.
- The adjustment of the backrest is by means of the backrest adjuster (11).
- Push up and hold the backrest adjuster (11).
- Tilt the backrest forward or back until the position is comfortable for the driver.
- Release the backrest adjuster (11).
- Pull out the knob on the adjusting handwheel (10) and turn the handwheel to set the cushioning to the weight of the driver.
  The adjustment range from 50 kg to 130 kg is visible at the weight range indicator (9).
  To increase the weight, turn handwheel clockwise. To reduce the weight, turn handwheel anti-clockwise.
- To adjust the backrest upholstery* (6), move button (7) until a comfortable sitting position is reached. Turning the knob anti-clockwise makes the backrest upholstery arch out.
  Turning the knob clockwise returns the backrest upholstery to its original position.

NOTE
Long sitting puts excessive strain on the spinal column. Prevent strain with regular, light exercising.

* Option



Starting the engine

NOTE
If at all possible, avoid frequent engine starts and short duty cycles so that the engine can reach its operating temperature. Frequent cold starts increase engine wear.

NOTE
Close the engine cover. All control levers (2) must be in neutral.

- Sit on the driver's seat.
- Apply the seat belt.
- Place both feet on the accelerator pedals (3) (brake pedal (4) locked, as the engine will only start with the brake pedal locked).
- Insert the ignition key (1) into the heater starter switch and turn from the zero position to position I. The electrical system is now switched on.
- The coolant temperature warning light (6) comes on briefly, the engine oil pressure warning light (8) and battery charge warning light (10) are illuminated red. The preheating indicator light (9) and the particle filter indicator light (7) are illuminated yellow.
- Hold the ignition key in position I until the yellow preheating indicator light (9) is extinguished, and then turn the key further to position II.
- Operate the starter for a maximum of 20 seconds without interruption. As soon as the engine starts, release the ignition key.
- Should the engine not start, cease the starting procedure and wait at least 1 minute before next starting attempt. Should the engine also not start after the third starting attempt, check whether the viscosity of the engine oil and the Diesel fuel and the battery state of charge is as specified in the operating instructions.
- As soon as engine is running, the warning lights for battery charge and engine oil pressure should go out.

The engine speed is controlled automatically, depending on the engine load.

NOTE
When the particle filter* warning light (7) is illuminated refer to the section on regenerating the particle filter.

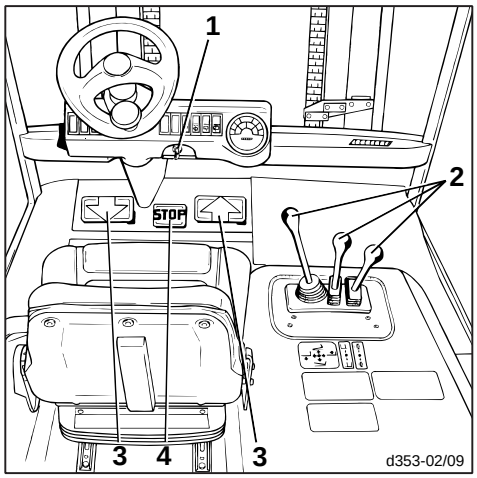
ATTENTION**
Observe the exhaust nozzle for about 5 s after each engine start. If the exhaust gases are continuously very smoky, stop ant take the truck out of service.
Please contact your authorised dealer.

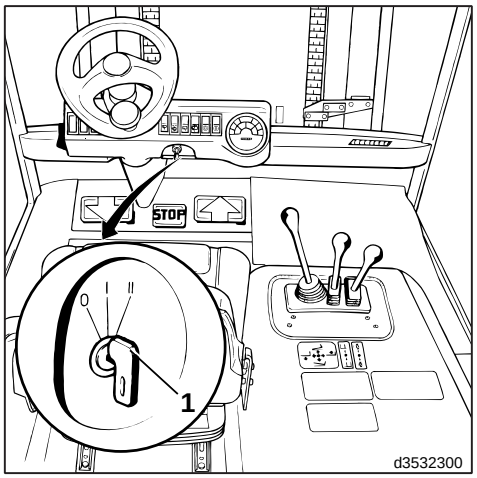
WARNING
Do not let the engine run in unventilated enclosed spaces. Risk of carbon monoxide poisoning!

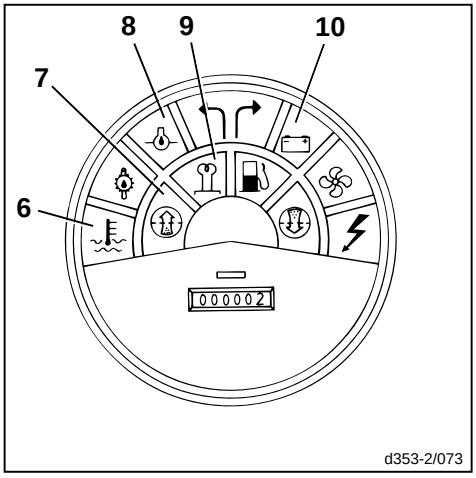
NOTE
Do not let the engine warm up in idle.
The engine will be at operating temperature in a short time if driven with a load and fast.

* Option

** Particle filter system only.







353 804 3001.0702

Cold start

NOTE
Starting at temperatures below 0 °C should be performed with the accelerator pedal fully depressed in order to obtain the extra amount of fuel required for starting.
This method of starting is recommended for below 0 °C temperatures as it clearly improves the starting characteristics at low temperatures and/or with a weak battery.

Stopping the engine

NOTE
Do not stop the engine at full throttle.

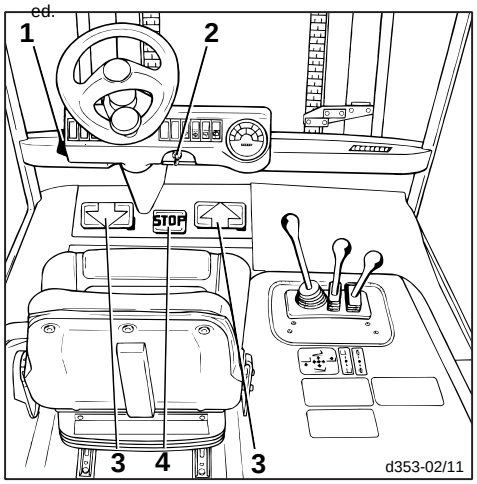
- Release the accelerator pedals (3) and let the engine run briefly without a load to balance the temperature.

ATTENTION
In addition, the danger exists that the turbo charger crankshaft (engines with a turbo charger) can be damaged, because of the high revolutions (approx. 100,000 RPM) and insufficient oil lubrication on the crankshaft bearing.

- Turn the ignition key (2) to the zero position.

NOTE
Turning off the engine applies the brake.

- Set the parking brake lever (1) to the up position.
- Depress the brake pedal (4). The brake pedal will lock in this position.
- Remove the ignition key when leaving the truck unattended.



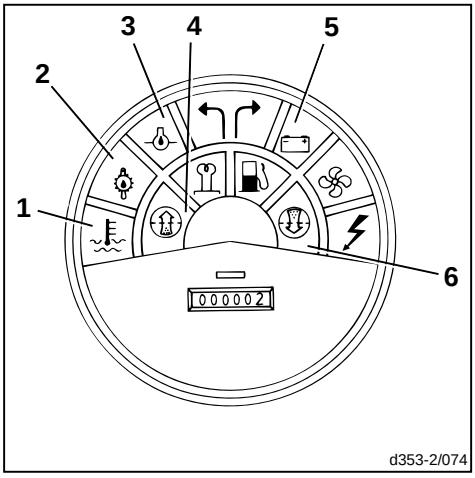
Malfunctions during operation

ATTENTION
If one of the following indicator lights illuminates during operation, shut off the engine immediately and eliminate the malfunction. (see: Troubleshooting Guide)

- Coolant temperature warning light (1)
- Hydraulic oil temperature warning light (2)
- Engine oil pressure warning light (3)
- Battery charge indicator light (5)

NOTE
If air filter restriction indicator (6) lights up during operation, the air filter must be serviced.
When the particle filter warning light (4) is illuminated, the particle filter* must be regenerated.

* Option



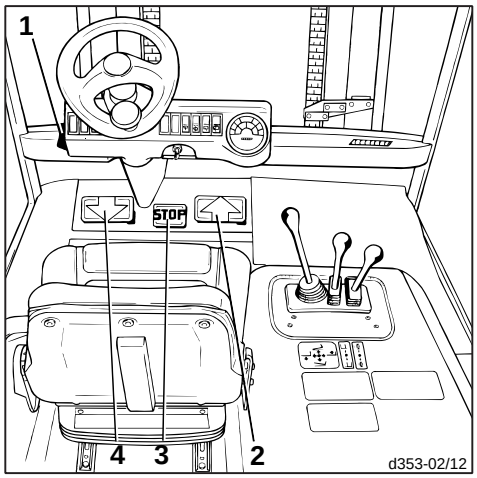
353 804 3001.0702

CAUTION
Do not drive on slopes with gradients over 15 %, due to the specified minimum brake applications and truck stability characteristics. Before driving on steeper slopes, you should first consult your distributor. The climbing ability rates given in the data sheet were derived from the drawbar pull of the truck and they apply only for crossing roadway obstacles and for minor differences in height. Your driving style should always be consistent with the conditions of the roadway (rough surfaces, etc.), particularly hazardous work areas, and the load.

CAUTION
When using rear view mirrors it should be noted that the latter are only provided to monitor the rear traffic area and that reversing is only allowed with a direct view in the reverse direction of travel.

NOTE
When the particle filter* warning light (5) is illuminated refer to the section on regenerating the particle filter.

* Option



- Start the engine.
- Elevate the forks slightly and tilt the mast back.
- Push the parking brake lever (1) to the right to release the brake pedal (3).

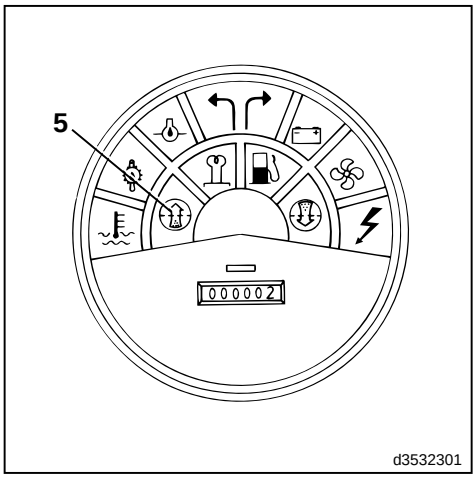
Driving forward

- Depress the right accelerator pedal (2) gently. The speed of the truck depends upon how far the pedal is depressed.

NOTE
Depressing the accelerator pedal fully quickly is not recommended as maximum acceleration is controlled automatically.

Reversing

- Depress the left accelerator pedal (4) gently. The truck will reverse slowly or fast, depending upon how far the accelerator pedal is depressed.



Reversing the direction of travel

- Release the actuated accelerator pedal. The hydrostatic drive will act as service brake.
- Depress the accelerator pedal for the opposite direction of travel. The lift truck will now be accelerated in the selected direction.
- When driving, keep both feet on the accelerator pedals in order to be able to control all movements of the truck easily.
- The accelerator pedals can be depressed directly. The hydrostatic drive will brake the truck to a standstill and then accelerate it in the opposite direction.

Stopping

- Release the actuated accelerator pedal slowly. The hydrostatic drive acts as service brake.
- When stopping on a slope, keep both feet on the pedals and apply light pressure on the pedals for upslope travel to compensate drive slippage due to technical reasons.
- When stopping for a long time, depress the brake pedal.
- When dismounting from the truck with the engine running to perform a task in the immediate vicinity of the truck (opening a gate, uncoupling the trailer, etc.), depress and lock the brake pedal, open the seat belt. Stop the engine in case of a long stop. If leaving the truck unattended, remove the ignition key.

353 804 3001.0702

Starting the engine

NOTE
If at all possible, avoid frequent engine starts and short duty cycles so that the engine can reach its operating temperature. Frequent cold starts increase engine wear.

NOTE
Close the engine cover.

- Sit down on the driver's seat.
- Apply the seat belt.
- The brake pedal (4) is locked (engine will start only with the brake pedal locked).
- The direction control lever (1) and the control levers (3) must be in the neutral position.
- Insert the key (2) into the preheating switch and turn it from the zero position to position I. The electrical system is now switched on.
- The coolant temperature warning light (6) comes on briefly, the engine oil pressure warning light (8) and battery charge warning light (10) are illuminated red. The preheating indicator light (9) and the particle filter indicator light (7) are illuminated yellow.
- Hold the ignition key in position I until the yellow preheating indicator light (9) extinguishes, then turn the ignition key to position II.
- Operate the starter max. 20 seconds without interruption. As soon as the engine has started, release the ignition key.
- Should the engine not start, cease the starting procedure and wait at least 1 minute before the next starting attempt. Should the engine also not start after the third attempt, check whether the viscosity of the engine oil and of the Diesel fuel and the battery state of charge is as specified in the operating instructions.
- As soon as engine is running, the warning lights for battery charge and engine oil pressure should go out.

The engine speed is controlled automatically, depending on the engine load.

NOTE
When the particle filter warning light (7) is illuminated refer to the section on regenerating the particle filter.

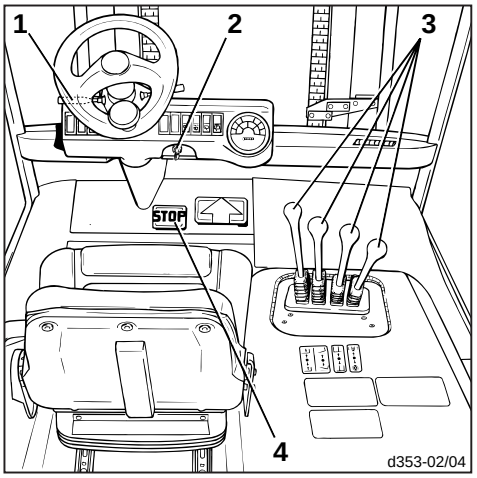
ATTENTION**
Observe the exhaust nozzle for about 5 s after each engine start. If the exhaust gases are continuously very smoky, stop ant take the truck out of service.
Please contact your authorised dealer.

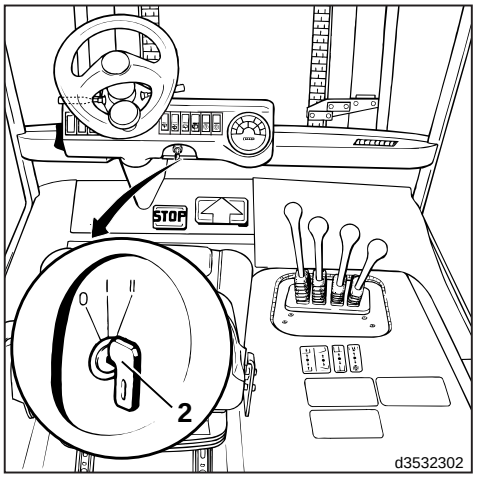
WARNING
Do not let the engine run in unventilated enclosed areas. Risk of carbon monoxide poisoning!

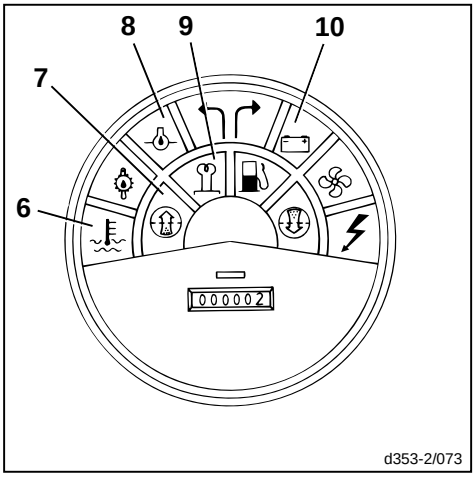
NOTE
Do not warm up the engine at idling speed.
The engine will attain its running temperature after running briefly with a moderate load and at various speeds.

* Option

** Particle filter system only.







Cold start

NOTE
Starting at temperatures below 0 °C should be performed with the accelerator pedal fully depressed in order to obtain the extra amount of fuel required for starting.
This method of starting is recommended for below 0 °C temperatures as it clearly improves the starting characteristics and spares the battery.

Stopping the engine

NOTE
Do not stop the engine at full throttle.

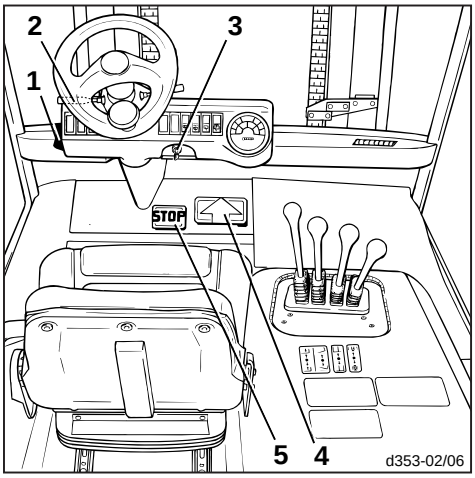
- Release the accelerator pedal (4).
- Place the direction control lever (2) in neutral, and to achieve a temperature balance, leave the engine idling for a short time.

ATTENTION
In addition, the danger exists that the turbo charger crankshaft (engines with a turbo charger) can be damaged, because of the high revolutions (approx. 100,000 RPM) and insufficient oil lubrication on the crankshaft bearing.

- Turn the ignition key (3) to the zero position.

NOTE
The brake engages when the engine is stopped.

- Set the parking brake lever (1) to the up position.
- Push down the brake pedal (5). The brake pedal engages in this position.
- Remove the ignition key when leaving the parked truck unattended.



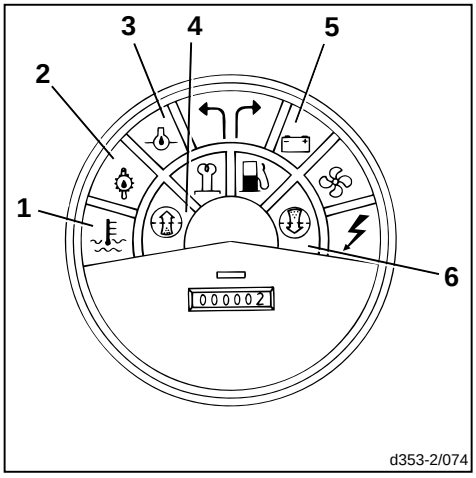
Malfunctions during operation

ATTENTION
If one of the following indicator lamps illuminates during operation, shut off the engine immediately and eliminate the malfunction. (see: Troubleshooting Guide)

- Coolant temperature warning light (1)
- Hydraulic oil temperature warning light (2)
- Engine oil pressure warning light (3)
- Battery charge indicator light (5)

NOTE
If air filter restriction indicator (6) lights up during operation, the air filter must be serviced.
When the particle filter warning light (4) is illuminated, the particle filter* must be regenerated.

* Option



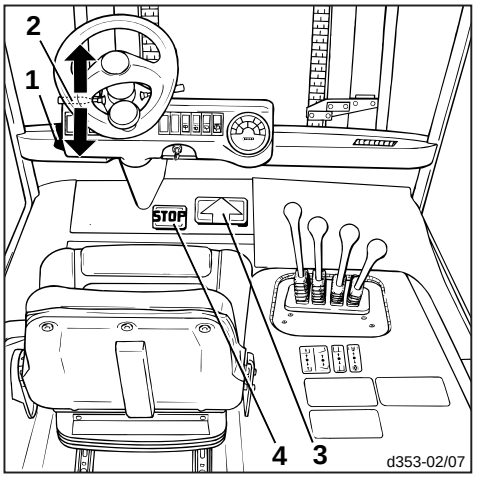
353 804 3001.0702

Driving

CAUTION
Do not drive on slopes with gradients over 15 % due to the specified minimum brake applications and truck stability characteristics. Before driving on steeper slopes, you should first consult your distributor. The hill climbing rates given in the data sheet were derived from the drawbar pull of the truck and they apply only for crossing roadway obstacles and for minor differences in height. Your driving style should always be consistent with the conditions of the roadway (rough surfaces, etc.), particularly hazardous work areas, and the load.

CAUTION
When using rear view mirrors it should be noted that the latter are only provided to monitor the rear traffic area and that reversing is only allowed with a direct view in the reverse direction of travel.

* Option



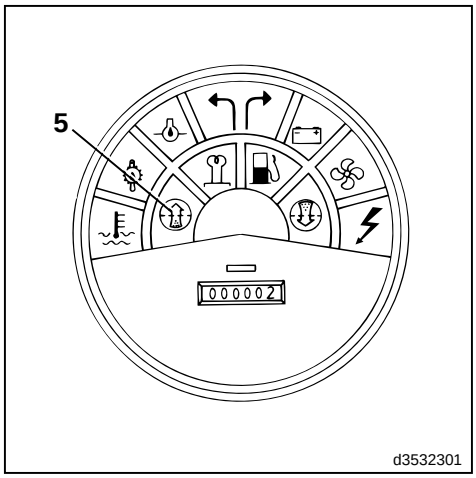
NOTE
When the particle filter* warning light (5) is illuminated refer to the section on regenerating the particle filter.

- Start the engine.
- Slightly raise the forks and tilt the mast backward.
- Push the parking brake lever (1) forward to release the brake pedal (4).

Driving forward

- Move the direction control lever (2) forward.
- Depress the accelerator pedal (3) smoothly. Truck speed depends upon how far the pedal is depressed.

NOTE
Depressing the accelerator pedal fully quickly is not recommended because maximum acceleration is controlled automatically.



Reversing

- Pull back the direction control lever (2).
- Depress the accelerator pedal (3) gently. The truck will accelerate slowly or fast, depending upon how far the pedal is depressed.

Changing the direction of travel

- Release the depressed accelerator pedal (3). The hydrostatic drive will act as a service brake.
- Shift the direction control lever (2) to the opposite travel direction.
- Depress the accelerator pedal (3) to accelerate in the new direction of travel.

The direction control lever (2) can be shifted directly. The hydrostatic drive will brake the lift truck to a standstill and then accelerate it in the opposite direction.

Stopping

- Release the accelerator pedal. The hydrostatic drive will act as service brake.
- When stopping on a slope, keep your foot on the accelerator pedal, move the travel direction control lever (2) to upslope travel and apply light pressure to the accelerator pedal to compensate drive slippage due to technical reasons.
- When stopping for a long time, depress the brake pedal.
- When dismounting from the truck with the engine running to perform a task in the immediate vicinity of the truck (opening a gate, uncoupling the trailer, etc.), depress and lock the brake pedal, open the seat belt. Stop the engine in case of a long stop. If leaving the truck unattended, remove the ignition key.

353 804 3001.0702

Steering

Due to the hydrostatic power steering, very little effort is required to turn the steering wheel. This is especially useful when stacking in narrow aisles.

- Start the engine and drive the truck.
- Turn the steering wheel from left to right full lock.

WARNING
Contact your authorised distributor if steering is difficult and if there is too much play.
Your lift truck must not be operated with faulty brakes.

Turning radius
- H 50, H 60, H 70, H 80 ..... 3060 mm
- H 80/900 ..... 3345 mm

Service brake

- Allow the accelerator pedals to return to the neutral position. The hydrostatic drive will act as a service brake. The braking can be controlled from gentle to abrupt braking by allowing the accelerator pedals to return to the neutral position slowly or quickly.

ATTENTION
For emergency braking depress the STOP pedal located between the accelerator pedals. This will bring the truck to a full stop.

NOTE
It is recommended that the operator acquaint himself with the function and effect of this brake without a load on the truck. Drive on a roadway without traffic at a slow speed.Parking brake
The multiple disc brakes are used for parking the lift truck.

Parking brake

The multiple disc brakes are used as parking brake.

Applying the parking brake:

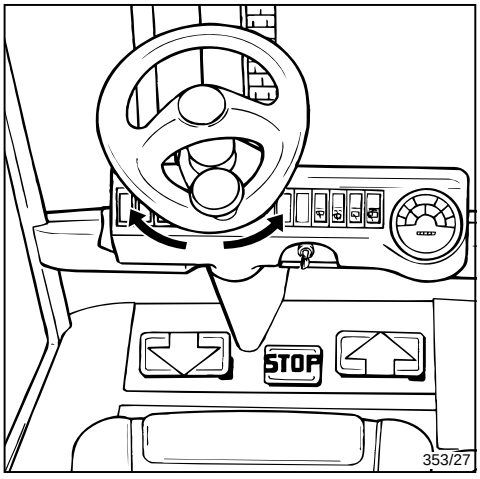
- Set the parking brake lever (1) to the left.
- Depress STOP pedal (2). The pedal will engage in this position.

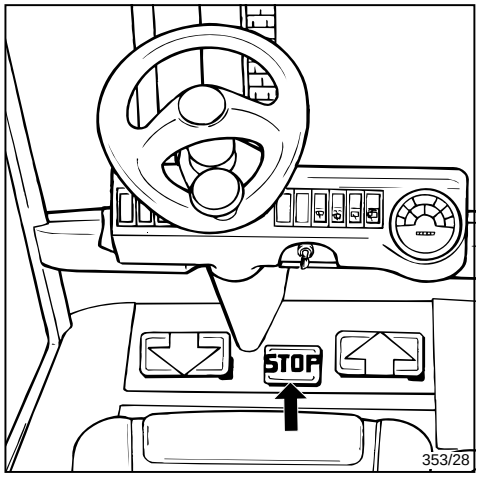
Releasing the parking brake:

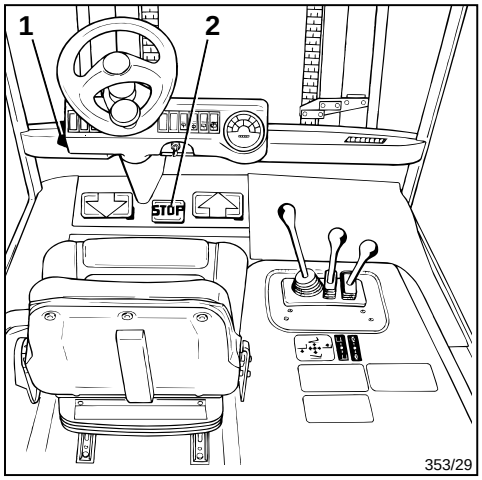
NOTE
The disc brakes can only be released when the engine is running.

- Push the parking brake lever (1) down to release the brake pedal.

WARNING
Please contact your authorised distributor if faults or signs of wear become evident in the braking system.
Your lift truck must not be operated with faulty brakes.







353 804 3001.0702

ATTENTION
Use the lifting device and attachments only for authorised applications. The operator must be instructed in the handling of the lifting device and attachments. Observe the maximum height of lift.
Do not put your hands into or step into the mast or in the area between the mast and truck.

Always operate the control levers smoothly and without jerking. The lifting, lowering and tilting speed is determined by how far the control levers are moved.
The control levers return to their neutral position automatically when released.

NOTE
Note the operating symbols with direction arrows.

Tilting the mast forward

- Push the control lever (1) forward.

Tilting the mast back

- Pull the control lever (1) back.

Lifting the fork carriage

- Push the control lever (1) to the right.

Lowering the fork carriage

- Push the control lever (1) to the left.

CAUTION
The mast and fork carriage can be lowered even when the engine is shut off.

Operating the attachments

Attachments can be installed as options (e.g. sideshift, clamp, etc.). Note the working pressure and operating instructions of the attachments.
One or two additional control levers are fitted for their operation.

NOTE
For each attachment, affix a load capacity plate and a symbol label on the bonnet and a symbol label behind the appropriate control lever.

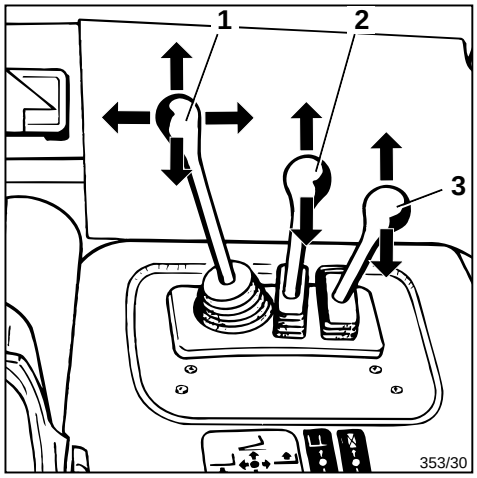
Operating the sideshift

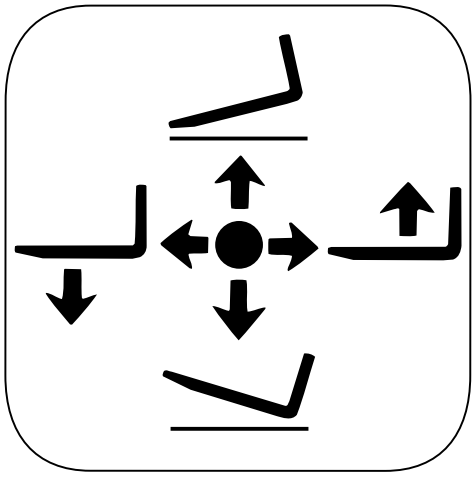
- To move the sideshift to the left, push the control lever (2) forward.
- To move the sideshift to the right, pull the control lever (2) back.

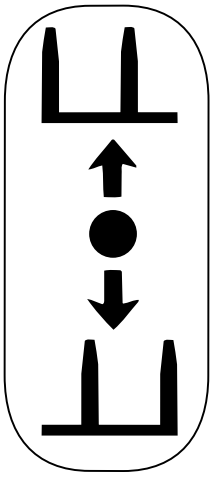
Operating the clamp

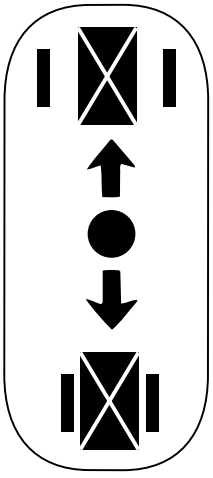
- To open the clamp, push the control lever (3) forward.
- To close the clamp, pull the control lever (3) back.

CAUTION
Attachments not supplied with the truck may only be employed if your authorised dealer ascertains that they will not reduce the load capacity and stability of the truck.









ATTENTION
Use the lifting device and attachments only for authorised applications. The operator must be instructed in the handling of the lifting device and attachments. Observe the maximum height of lift.
Do not put your hands into or step into the mast or in the area between the mast and truck.

Always operate the control levers smoothly and without jerking. The lifting, lowering and tilting speed is determined by how far the control levers are moved.
The control lever returns to its initial position automatically when released.

NOTE
Note the operating symbols with direction arrows.

Lifting the fork carriage

- Pull the control lever (1) back.

Lowering the fork carriage

- Push the control lever (1) forward.

CAUTION
The mast and fork carriage can be lowered even when the engine is shut off.

Tilting the mast forward

- Push the control lever (2) forward.

Tilting mast back

- Pull control lever (2) back.

Operating the attachments

Additional equipment can be installed as option (e.g. sideshift, clamp, etc.). Observe the working pressure and operating instructions of the attachments.
One or two additional control levers are fitted for their operation.

NOTE
For each attachment affix a load capacity plate on the engine cover and a symbol label depicting the attachment behind the appropriate control lever.

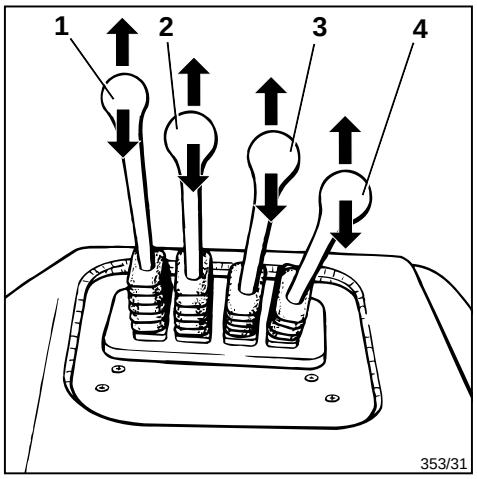
Operating the sideshift

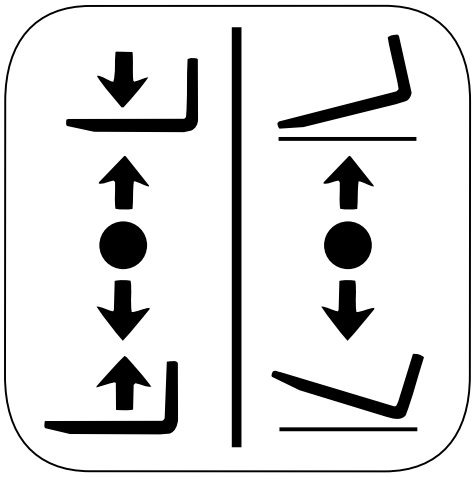
- To move the sideshift to the left, push the control lever (3) forward.
- To move the sideshift to the right, pull control lever (3) back.

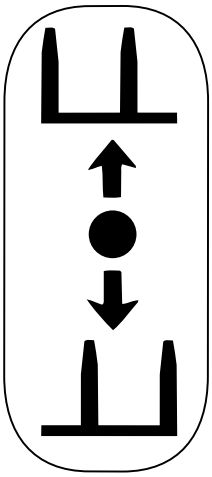
Operating the clamp

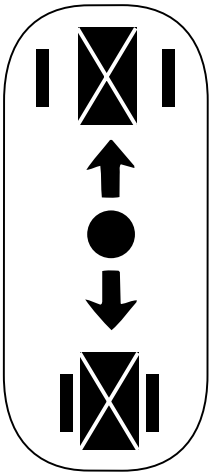
- To open the clamp, push the control lever (4) forward.
- To close the clamp, pull the control lever (4) back.

CAUTION
Attachments not supplied with the truck may only be employed if your authorised dealer ascertains that they will not reduce the load capacity and stability of the truck.









353 804 3001.0702

Installation of additional equipment

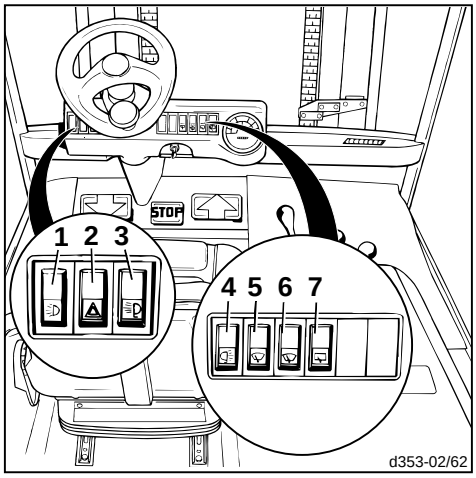
ATTENTION
Electrical additional equipment (lights, seat heater etc.) should be connected to the free connectors of the cable loom provided for this purpose. Further connections beyond this anticipated range are only permitted after contacting Linde. Only qualified skilled persons who observe the applicable rules and use appropriate material should carry out these activities.

NOTE
The location of individual switches can be different, depending on the truck version. Please note the switch symbols.

Turning on the lighting

- Depress the light switch (1) to the intermediate position to switch on the side marker lights and license plate light.
- Fully depress the light switch to switch on the dip beam headlights.

* Option



Turning on the hazard warning light

- Depress the hazard warning light switch (2).

Turning on the front working lights

- Turn the front working light on or off with toggle switch (3).

Turning on the working light (at rear)

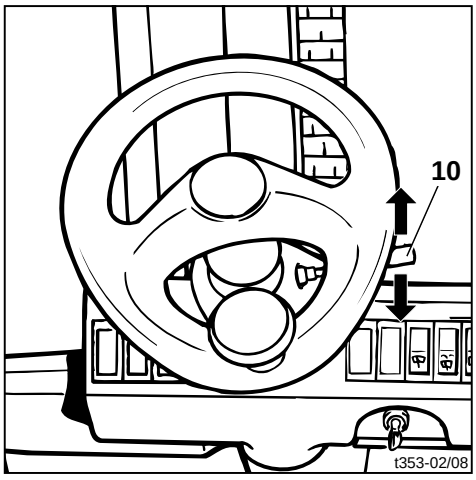
- Turn the working light on or off with toggle switch (4).

Operating the intermittent front windscreen wiper

- Depress the wiper switch (5) to the intermediate position.

Operating the front windscreen wiper

- Depress the wiper switch (5) fully to switch the wiper on. The wiper operates.



Operating the front windscreen washer

- Depress the wiper switch (5) fully to switch the wiper on.
- Depress the washer switch (6) fully to operate the front windscreen washer. It will continue to operate as long as the switch is depressed.

Intermittent switch for rear and top windscreen wiper

- Depress switch (7) to the intermediate position.

Operating the rear windscreen and top screen wipers

- Depress the wiper switch (7).

Operating the rear windscreen and top screen washer

- Depress the wiper switch (7).
- Depress the wiper switch (6) fully to operate the rear windscreen and top screen washer. It will continue to operate as long as the switch is depressed.

Operating the directional indicator lights

- Move the directional indicator switch (10) on steering column forward or back to turn on the left or right directional indicator lights.

Turning on the dome light

Turn the dome light on and off with the toggle switch on the dome light.

353 804 3001.0702

Controls

The fan switch (1) turns on the fan and permits air flow regulation in three stages.

Move the air intake control lever (2)
- to the right for air intake from the cabin through the air vent (4)
- to the left for air intake from outside the cabin.

Move the temperature control lever (3)
- to the right for less heat
- to the left for more heat

The vents (5) at the front windscreen can be opened individually. Depending on the position of the control lever (2), either warm or cool air flows through the vent outlets.

☞ **NOTE**
When lever (3) is pushed to the right and lever (2) to the left, fresh air will flow through the vent outlets from the outside. To prevent outside air from being taken in, move the lever (2) to the right.
All controls can be set to any intermediate positions.

Fan motor fuse

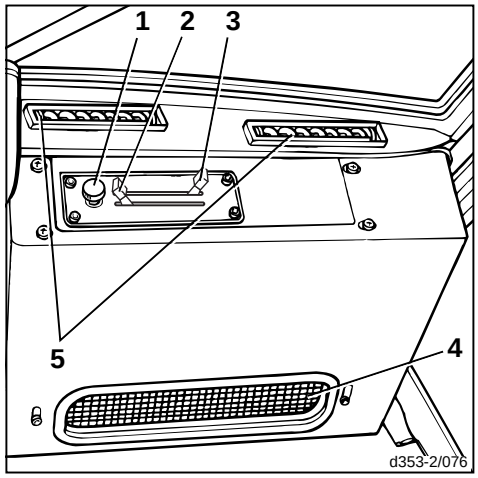
☞ **NOTE**
The fan motor fuse is located behind the electrical system cover.

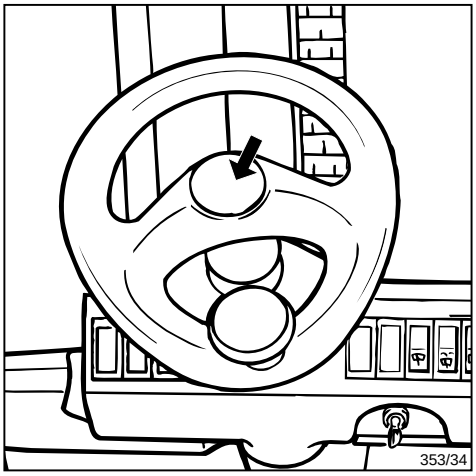
Operating the horn

The horn serves as a warning signal at blind corners and junctions.

- Pressing the horn push on the steering wheel will sound the horn.

* Option





353 804 3001.0702

Check fuses, renew if required

NOTE
Depending on options mounted on the truck, up to four fuse boxes for the electrical system may be mounted on the left side of the truck, under the cover above the second step.

- Remove the four screws (1).
- Remove the cover (2).

The fuses of each fuse box are numbered. They protect the following circuits:

Fuse box (I)
1 Ignition switch, composite instrument (F11) ..... 10 A
2 Voltage supply, preheating time controller (F12) .... 10 A
3 Lighting switch, heater* (9F13) ..... 15 A
4 Seat heater* (9F14) ..... 20 A
5 Horn (4F15) ..... 10 A
6 One pedal operation* (9F16) ..... 5 A

* Option

Fuse box (II)
1 Windscreen washer*, front, dome light (9F21) ..... 15 A
2 Windscreen washer*, rear and roof (9F22) ..... 15 A
3 Spare fuse*
4 Working light (9F24) ..... 15 A
5 Working light (9F25) ..... 15 A
6 Working light (9F26) ..... 15 A

Fuse box (III)
1 Direction indicators* (5F31) ..... 15 A
2 Direction indicators* (5F32) ..... 15 A
3 Left side marker lights* (5F33) ..... 5 A
4 Right side marker light* (5F34) ..... 5 A
5 Left dip beam headlight* (5F35) ..... 10 A
6 Right dip beam headlight* (5F36) ..... 10 A

The fuse box for the soot filter system is located under the cover (3) of the bottom step.

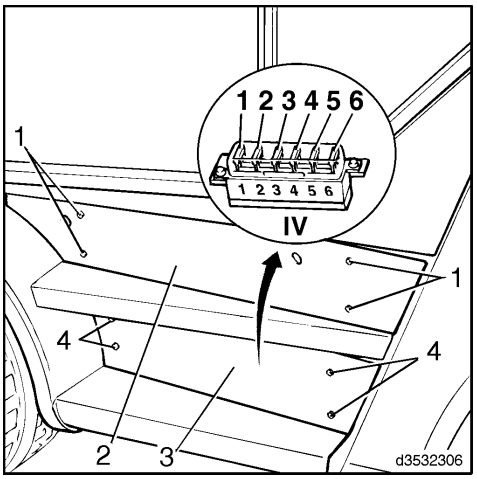
- Remove the four screws (4).
- Remove the cover (3).

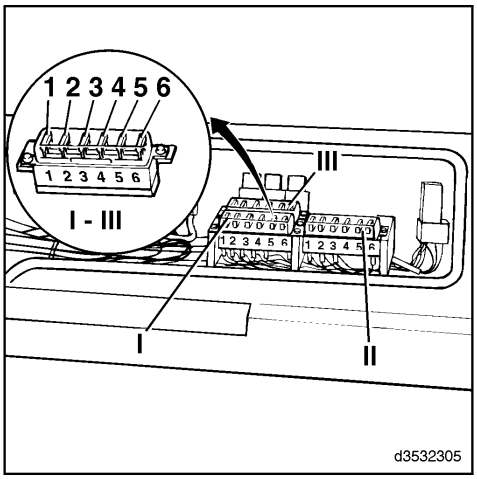
Fuse box (IV)
1 Particle filter system* (7F15) ..... 5 A
2 Particle filter system* (7F16) ..... 30 A
3 Particle filter system* (7F17) ..... 30 A
4 Particle filter system* (7F18) ..... 20 A
5 Particle filter system* (7F19) ..... 1 A
6 Not used

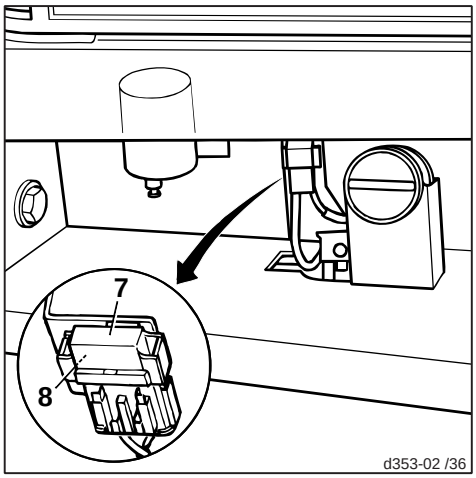
A further MTA fuse (8) is located on the right side of the truck behind the cover beside the fuel tank filler. This fuse protects the total electrical system.

- Unscrew the four screws and remove the cover.
- Remove the cover (7) from the fuse mount.
- Main circuit fuse (8) for the total electrical system (F1) ..... 80 A

ATTENTION
Use only original Linde fuses.





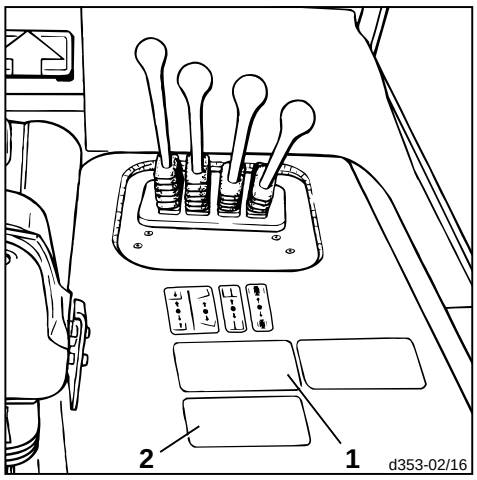


Before lifting a load, check the capacity diagram (1) on the bonnet.

WARNING
If attachments are fitted, check the capacity plate (2) for that equipment.
Figures given in the capacity diagram or plate apply to compact and homogeneous loads, which must not be exceeded, as this will reduce the stability of the fork truck and the strength of the forks and mast.

The maximum load capacity depends on the height of lift and the load centre distance from the fork face.

NOTE
Check the load capacity limits and contact your authorised distributor before transporting the following loads
- **off-centre or swinging loads,**
- **loads with the mast tilted forward or the load not near the ground,**
- **loads beyond the centre of gravity,**
- **before operating attachments and accessories,**
- **loads by wind strengths of 6 or more.**



Example

Load centre distance ..... 1000 mm

Height of lift..... 5650 mm

- Follow the vertical line for a load centre distance of 1000 mm to the point where it intersects the line for a lifting height of 5650 mm.
- Read to the left of the point of intersection of the horizontal line for the maximum load.
- Maximum weight here ..... 6000 kg

Proceed accordingly for other lift heights and load centre distances. The determined values apply to loads distributed evenly on both forks.

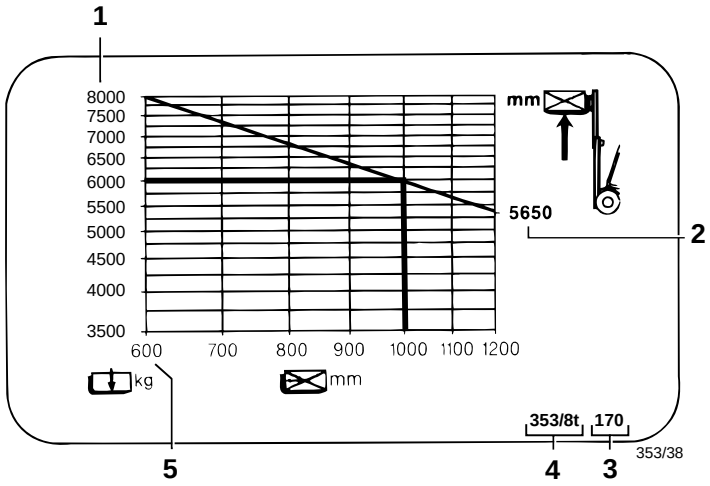
1 Maximum allowed load in kg

2 Height of lift in mm

3 Mast type

4 Fork truck series designation and maximum capacity

5 Distance of load centre from fork-face in mm

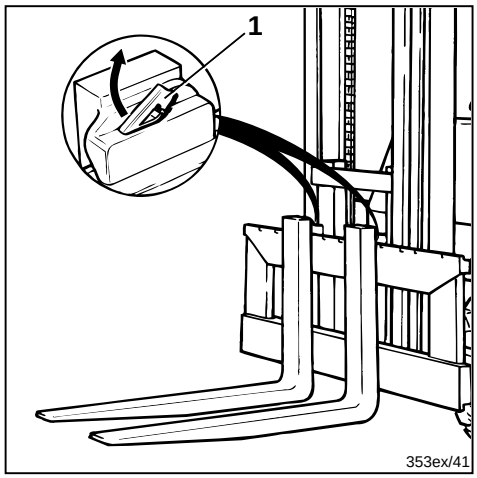


353 804 3001.0702

Adjusting the fork spread

- Raise the fork quick-releases (1).
- Move the forks further apart or closer together depending on the size of the load to be lifted. Make sure that both forks are equally distant from the truck centre.
- Allow the quick-release to engage in a notch.

☞ **NOTE**
The load centre should be in the centre between the forks.

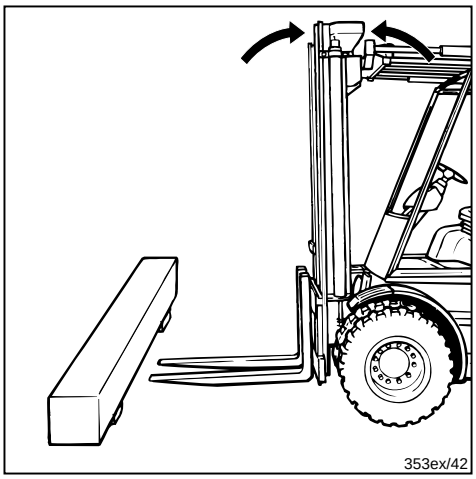


353ex/41

Loading

☞ **NOTE**
Stow loads so that they do not project over the truck load area and can not slide, tip over or fall off.

- Approach the load to be lifted carefully and as accurately as possible.
- Put the mast to the vertical position.
- Lift or lower the fork carriage to the required height.
- Carefully drive the truck forward under the centre of the load until the load contacts the fork-face, if possible, while taking care not to dislodge adjacent loads.
- Lift the fork carriage until the load rests on the forks.
- Reverse the lift truck until the load is clear.
- Tilt the mast back.


353ex/42

CAUTION
Do not stand under an elevated load. Drive the fork lift truck only with the load lowered and the mast tilted back.


E336-2/081

Transporting a load

☞ **NOTE**

When sending goods by freight, the consignor must load and fasten, if necessary, the transported goods safely. Pay attention to proper stacking and make sure that the packaging, pallets, etc. are not damaged. The freight carrier is responsible for the safe handling.

- Do not drive with the load (1) shifted to the side (if a sideshift is fitted, for example).
- Transport the load near the ground.
- Always travel with the load facing uphill on inclines, and do not drive or turn across the slope.
- If visibility is reduced, work with a guide.
- Drive the lift truck in reverse if the load (2) being transported is stacked so high as to obstruct vision in the direction of travel.

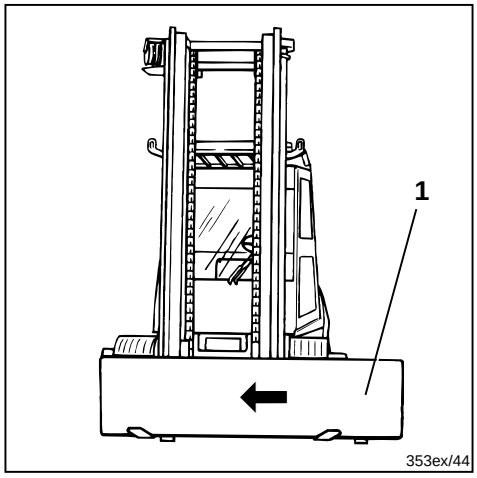
Depositing a load

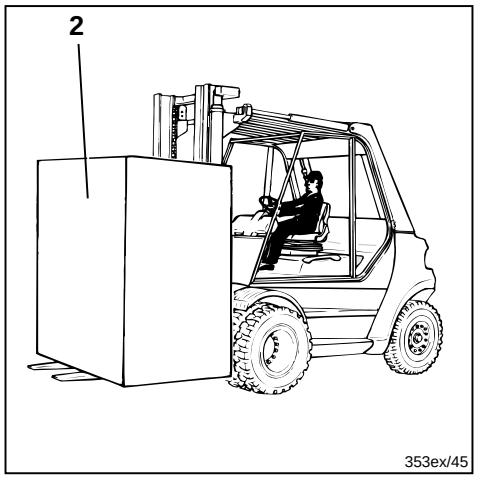
- Carefully approach the area receiving the load.
- Lift the fork carriage to the required height.
- Set the mast to the vertical (load horizontal) position.
- Carefully drive the load above the area receiving the load.
- Carefully lower the load until the forks are clear.
- Reverse the lift truck.

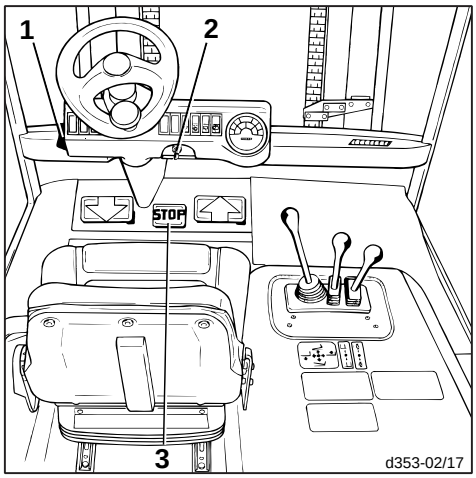
WARNING
Do not park the truck and leave it unattended with an elevated load.

Before leaving the lift truck unattended

- Deposit the load and lower the fork carriage.
- Slightly tilt the mast forward until the forks touch the ground.
- Move the parking brake lever (1) to the up position.
- Depress the brake pedal (3). It will lock in this position.
- Shut off the engine.
- Remove the ignition key (2).







353 804 3001.0702

Transport with lorry or low-bed semi-trailer

- Lower the mast.
- Operate the parking brake.
- Chock the truck.
- Lash the truck down.

Hoisting the truck with a crane

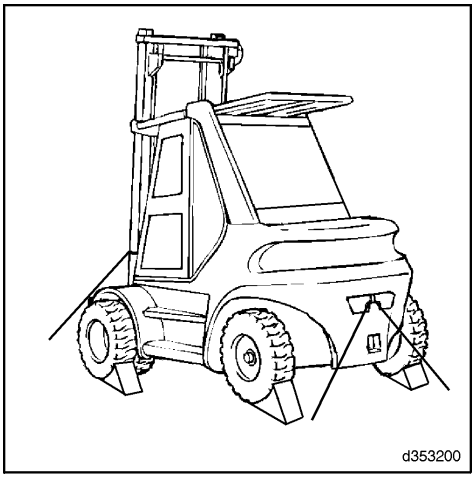
WARNING
When hoisting the truck, be sure that no persons are in the working range of the crane.
Do not step under a lifted load!

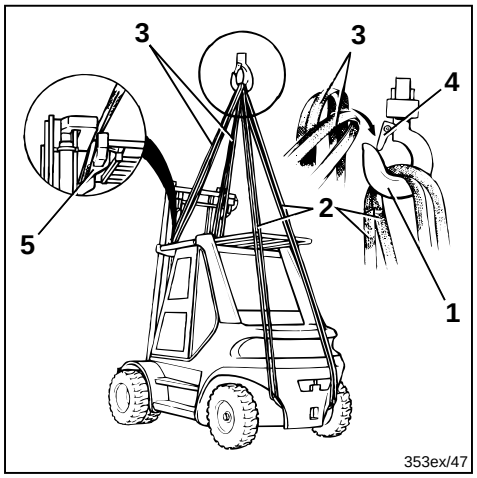
CAUTION
Only use a hoisting gear and loading crane with sufficient capacity.
See the manufacturer's plate for the weight of the truck.

To hoist with a crane, attach the lifting slings at the points provided. The lifting points on your truck are not labelled extra.

- Sling the lifting sling (2) (minimum capacity 7000 kg) under the counterweight, lead around the overhead guard and attach to the hook.
- Attach the lifting slings (3) (minimum capacity 3000 kg) around the tilt cylinder pivots (5) left and right on the outer upright of the mast.
  Protect the sling from sharp edges on the cross member by using edge protectors.
- Hook the ends into the crane hook (1).

ATTENTION
After inserting the slings into the crane hook, the safety lock (4) must close.
When the truck is hoisted, the slings must not rub against the sides of the overhead guard and any attachments or accessories fitted.





353 804 3001.0702

Hoisting the truck with lifting eyes*

CAUTION
Only use a hoisting gear and loading crane with sufficient capacity.
See the manufacturer's plate for the weight of the truck.

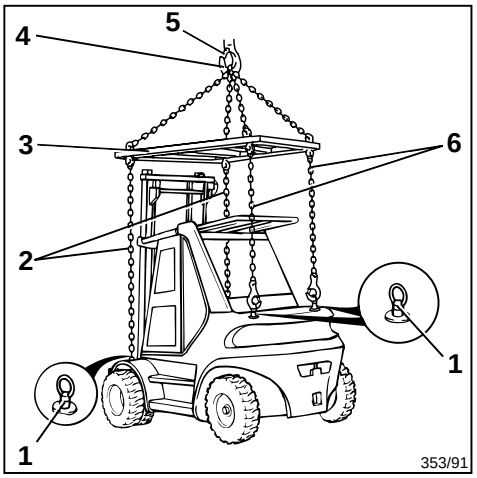
ATTENTION
Hoist the truck with lifting eyes (1) only with the appropriate lifting gear (3) on which the chains (2, 6) lead straight up from the lifting eyes (1). The truck must hang level in the hoisting gear.

- Attach the chains (6) (minimum capacity 7000 kg) in the lifting eyes (1) at the counterweight.
- Attach the chains (2) (minimum capacity 3000 kg) to the lifting eyes (1) on the frame.

* Option

ATTENTION
The safety lock (5) must close after attaching the chains into the crane hook (4).

ATTENTION
When the truck is being hoisted, the chains must not rub against the sides of the overhead guard, mast and any attachments fitted.



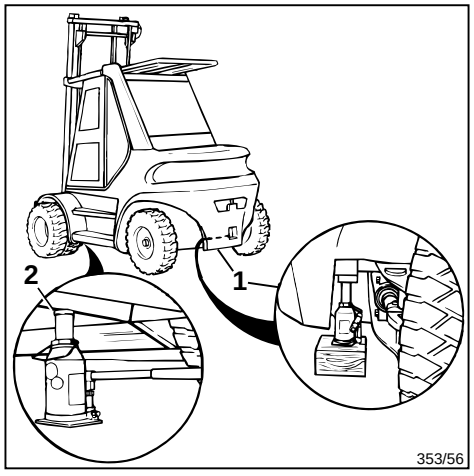
Wheel change

CAUTION
Only use a jack of sufficient lifting capacity. The lifting capacity should be at least 6500 kg.

- Loosen the fasteners of the wheel to be changed.
- Locate the jack only at the centre of the counterweight (1) ahead of the steer axle.
- At the front, locate the jack only at the chassis frame (2) vertical at the frame on the left and right-hand side.

CAUTION
The truck may only be raised at these locations at the front left and right side and at the rear centre.

- Raise the truck with the jack until the wheels are clear.
- Secure the truck with wooden blocks under the frame or counterweight.
- Remove the wheel fasteners and change the wheel.
- Install the wheel fasteners and tighten them by hand.
- Lower the truck.
- Torque the wheel fasteners to 600 Nm.



353 804 3001.0702

Mast removal

ATTENTION
Attach the lifting sling on the outer upright of the mast at the left and right tilt cylinder pivot (1).
When removing the mast, secure the moveable overhead guard (2) and the tilt cylinder against movement with a suitable wooden block (4) and with a steel band (3).

WARNING
Do not step under a lifted load!

This work must only be done by your distributor's skilled personnel.

Securing the moveable overhead guard

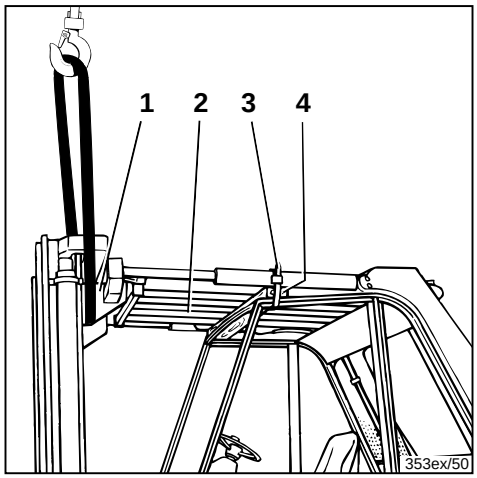
ATTENTION
When removing the mast, the moveable overhead guard must also be secured horizontally.
Secure the overhead guard cross member (1) to cross member (3) at the front of the truck with a tensioning belt (2).
Secure the overhead guard (5) to the cross member (3) at the rear of the truck with tensioning belt (4).
This work may only be done by your distributor's skilled personnel.

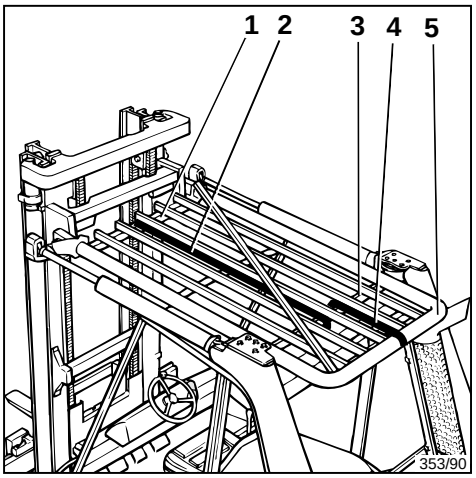
Trailer coupling

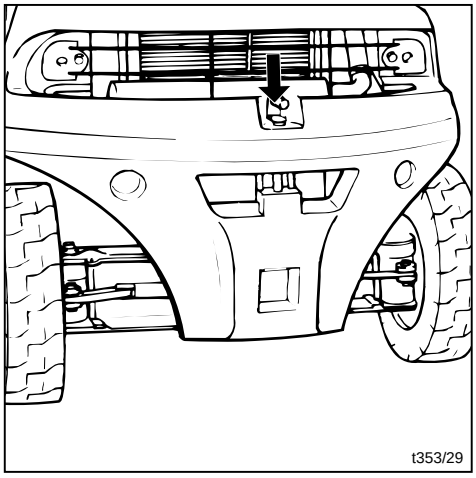
NOTE
The trailer coupling should be used only to tow light trailers inside the plant.
(Observe the applicable accident prevention and technical guidelines.)

- Turn the lever 90° degrees to the rear and then raise the tow bolt.
- Place the towbar in the coupling sleeve.
- Press down the tow bolt against spring pressure, turn 90° degrees and let engage in the safety.

353 804 3001.0702







Towing

Should it become necessary to tow the truck, then it is possible
- to by-pass the hydraulic oil circuit,
- to release the disc brakes on the wheel drives (1) with the by-pass valve.

CAUTION
The truck cannot be braked now.

Towing the truck is only allowed with a solid connection (tow bar). The tractor used to tow the fork truck must have sufficient tractive and braking power for the unbraked trailer.

Towing procedure

- Lower the load so that forks do not scrape the ground during towing.
- Deposit the load.
- Attach the tractor (be sure that tractive effort and braking power are sufficient) with the tow bar to towing pin of lift truck.
- Chock the wheels.

Releasing the disc brake

- Open bonnet, remove floor plate.
- Unscrew the cap nut (4) left of the pedal box and remove the seal ring (3).
- Loosen locknut (2).
- Screw in the setscrew (6) as far as possible and tighten to 10 Nm.
- Lock the setscrew with the locknut (2). Tighten the locknut to 25 Nm.
- Apply about 4 shots of grease with a grease gun through the grease nipple (5) until the brake is released.

Opening the hydraulic by-pass valve

- Loosen the 18 or 19 mm locknut (8) under the pedal box.
- Turn the 10 mm setscrew (7) with socket out two turns.
- Lock the setscrew with locknut (8). Torque the nut to 40 Nm.

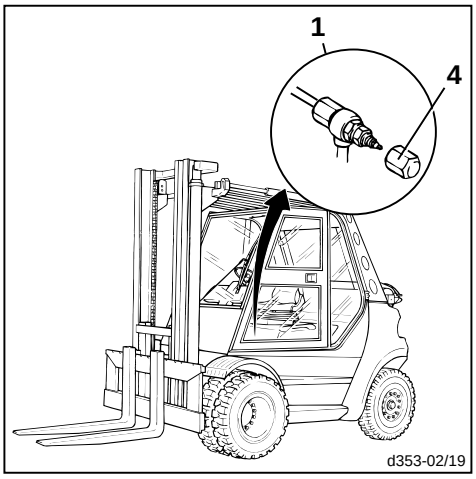
After towing

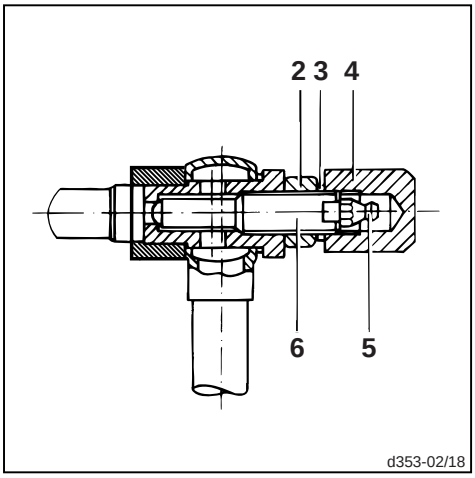
- Chock the wheels at the lowest wheels.
- Loosen the locknut (8).
- Screw in the setscrew (7) (10 mm hex-socket) and torque to 20 $^{+5}$ Nm.
- Lock the setscrew with the locknut (8) and tighten the nut to 40 Nm.

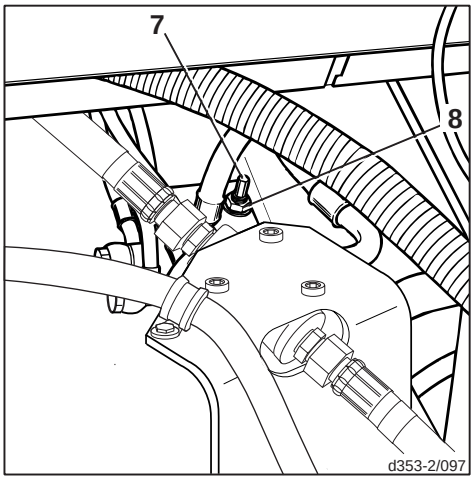
Making the brakes operational again

- Loosen the locknut (2).
- Loosen the setscrew (6) two turns.
- Lock the setscrew with the locknut (2) and tighten the locknut to 25 Nm.
- Fit the sealing ring (3).
- Screw on the cap nut (4) and tighten to 30 Nm.

Check brake function after completing repairs.







353 804 3001.0702

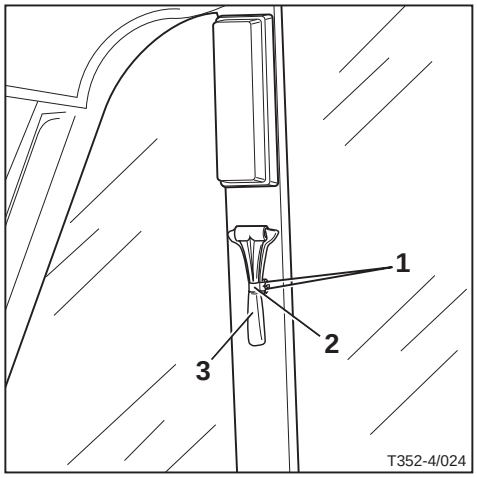
Emergency exit for trucks with rear windscreen

NOTE
If the truck is fitted with a front and rear windscreen, it may not be possible to dismount at the side if the truck breaks down in a narrow aisle. In case of acute danger, the driver can leave the truck through the rear window. To do so, the driver must destroy the window with an emergency hammer.

- Pull the cotter pin (1) out of the mounting (2) at the right rear support of the overhead guard.
- Take the hammer (3) out of the mounting and cautiously break the window pane.

CAUTION
Risk of injury

- Remove any pane remnants.
- Carefully dismount from the truck through the rear window.



353 804 3001.0702

If the truck is taken out of operation for over 2 months, it must be parked in a well ventilated, frost-free, clean and dry room and the following measures must be carried out.

Measures before taking the truck out of operation

- Thoroughly clean the truck.
- Fully elevate the fork carriage several times, tilt the mast forward and back and, if fitted, operate the attachment several times.
- Lower the forks on a support until the chains are slack.
- Check the hydraulic oil level and add oil, if needed.
- Add diesel fuel.
- Apply a thin film of oil or grease on all unpainted mechanical parts.
- Lubricate the truck.
- Check the condition and electrolyte level of the battery. Coat the battery terminals with non-acidic grease. (Follow the instructions of the battery manufacturer.)
- Spray all open electrical contacts with a suitable contact spray.

ATTENTION
Block up the truck so that all wheels are clear of the ground. This will prevent tyre deformation.

NOTE
Do not use plastic foil as this enhances the formation and collection of condensation water.

NOTE
If the vehicle is to be taken out of operation for over 6 months, contact your authorised dealer for further measures.

Putting the truck back into operation

- Thoroughly clean the truck.
- Lubricate the truck.
- Coat the battery terminals with non-acidic grease.
- Check the condition and electrolyte level of the battery.
- Check the engine oil for condensation water and change the oil, if necessary.
- Check the hydraulic oil for condensation water and change the oil, if necessary.
- Perform the same services as for commissioning.
- Take the truck into service.

General information

Your truck will remain operational only if the maintenance and checks are carried out regularly and according to the information and instructions in the operating manual. The maintenance may only be performed by qualified authorised personnel. This work can be carried out by your authorised dealer under a service contract.

If you wish to do the work yourself, we recommend that the first three customer service checks be carried out by your dealer's mechanic in the presence of the responsible mechanic in your workshop, so that your staff can receive the appropriate instruction.

For all servicing, the truck must be placed on a level surface and the wheels secured.

Stop the engine and remove the switch key.

When working on the truck with the fork carriage and/or mast elevated, secure them against inadvertent lowering.

For work on the front end of the truck, secure the mast against tilting back.

No changes, particulary no modifications and additions, may be made to the truck without the approval of the manufacturer.

ATTENTION
Missing or damaged plates and/or adhesives must be replaced. For location and oder no. refer to Parts catalogue.

Perform a functional check and trial run after every servicing.

NOTE
When operating the truck under extreme conditions (i.e. extreme heat or cold, intensive dust concentration, etc.), the intervals given in the maintenance schedule should be reduced accordingly.

ATTENTION
Follow the precautions for handling fuels and lubricants.

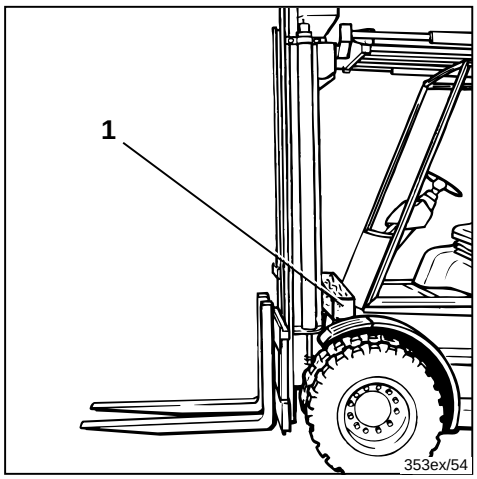
353 804 3001.0702

Servicing the mast and the front part of the truck

WARNING
Before attempting to carry out repairs or adjustments on the raised mast and fork carriage, be sure that the following safety procedures are carried out. These safety precautions suffice only for the general servicing of your truck (inspections and lubrication). When carrying out repairs (e.g. chain renewal, lift cylinder removal), further safety measures must be taken. Please contact your authorised distributor.

Securing the mast against tilting back

To prevent the lift mast from tilting back accidentally, insert a hardwood block (1) of dimensions 120 x 120 x 1000 mm.



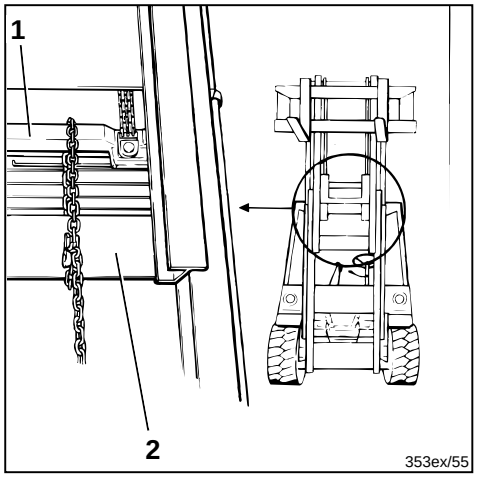
Standard mast

FUNCTION
When the inner mast is lifted, the fork carriage is raised at a ratio of 2:1.

Securing the raised standard mast

WARNING
Use a suitable chain for the particular lift mast. Do not exceed the maximum height of lift.

- Raise the mast.
- Fasten the chain around the cross member of the outer upright (1) and the cross member of the inner mast (2).
- Lower the inner mast until it is held by the chain.



Maintenance after the first 50 service hours

NOTE
A description of the services can also be found in the index.

- Renew the engine oil and the engine oil filter canister
- Check and tension V-belt drives
- Check valve tip clearances
- Check the exhaust system for leaks and tightness
- Check the parking brake
- Check wheel fasteners for tightness
- Renew the fuel filter canister
- Check the tyre inflation pressure
- Check the tyres for damage and foreign objects
- Check the hydraulic system, hydraulic pumps, valves and lines for leaks
- Renew the hydraulic pressure, suction and breather filters
- Check the condition, electrolyte level and specific gravity of the battery
- Check the engine mounting for condition and tightness
- Check the engine mounting, moveable overhead guard, steer axle and drive axle hub differentials for tightness
- Clean and lubricate the steer axle
- Grease the mast pivots, tilt cylinder and overhead guard pivots
- Check the condition, operation and security of the mast, lift chains and stops
- Check the pre-tension of double hoses if attachments are fitted
- Adjust the lift chains, lubricate with chain spray
- Check the condition and security of electric cables, connectors and cable connections
- Renew the drive axle hub differential oil and clean the magnetic plug
- Drain the water separator in the fuel system

353 804 3001.0702

Services (The description can be found by using the index.)	Before initial operation	After the first 50 service hours	Daily checks	As required
Refer to page 19 for servicing	●			
Refer to page 45 for servicing		●		
Check the engine oil level			●	
Check the header tank coolant level			●	
Check the fuel level			●	
Check tyre inflation pressure			●	
Clean the fork truck				●
Clean and spray the lift chain				●
Clean the air filter				●
Emptying the dust bowl in the air filter cover				●
Renew the safety element				●
Clean the pre-filter				●
Regenerate the particle filter				●
Check wheel fasteners for tightness (at least every 100 hours)				●
Check the tyres for damage and foreign objects				●
Lubricate the steer axle, mast and tilt cylinder bearings				●
Clean the radiator and engine oil, hydraulic oil and fuel cooler, check for leaks				●
Drain the water separator in the fuel system				●
Check seat belt for condition and operation				●

353 804 3001.0702

Services (The description can be found by using the index.)	Every 500 hours	Every 1000 hours	Every 2000 hours	Every 3000 hours
Clean and lubricate the steer axle	●			
Grease the mast pivots, tilt cylinder and overhead guard pivots	●			
Check the engine mounting, moveable overhead guard, steer axle and drive axle hub differentials for tightness	●			
Check the forks and quick-releases	●			
Check the condition, operation and security of the mast, lift chains and stops	●			
Adjust the lift chains, lubricate with chain spray	●			
Check the pre-tension of double hoses if attachments are fitted	●			
Check and oil other pivots and joints	●			
Check the engine cooling system for leaks	●			
Check and oil the pedals, accelerator and engine control linkage	●			
Renew the engine oil and the engine oil filter canister (at least every 12 months)	●			
Check the hydraulic oil level	●			
Check the coolant concentration	●			
Check the particle filter system	●			
Check and tension V-belt drives	●			
Drain the water separator in the fuel system	●			
Clean the radiator, hydraulic oil and fuel cooler	●			
Renew the drive axle hub differential oil and clean the magnetic plug (once after 500 service hours, then every 3000 service hours)	●			
Check the condition and security of electric cables, connectors and cable connections	●			
Check the condition, electrolyte level and specific gravity of the battery (even with a maintenance-free battery)	●			
Renew the hydraulic pressure, suction and breather filters		●		
Renew the fuel filter canister		●		
Check the engine mounting for condition and tightness		●		
Renew and tension the V-belt drive		●		
Check the exhaust system for leaks and tightness		●		
Check the hydraulic system, hydraulic pumps, valves and lines for leaks		●		
Renew the air filter element, check the vacuum switch (every one year or after cleaning 5 times)		●		
Check the parking brake		●		
Check the drive axle hub differential oil level and for leaks		●		
Check the particle filter system		●		
Check the particle filter system			●	
Check valve tip clearances			●	
Renew the safety element			●	
Renew the hydraulic oil (Bio hydraulic oil Aral Forbex SE 46 every 6000 hours)				●
Renew the drive axle hub differential oil and clean the magnetic plug				●
Renew the coolant (or every 2 years)				●

353 804 3001.0702

Cleaning the lift truck

NOTE

The necessity of cleaning depends on the use of the truck. If used with aggressive media such as salt water, fertilizer, chemicals, cement, etc., clean the truck thoroughly after every application.

Hot steam or intensive degreasing solution should be used with the utmost care! If not, the grease in the lubricated-for-life bearings will dissolve and leak out. As regreasing is not possible, damage to the bearings will result.

Do not wash the truck when the engine is hot.

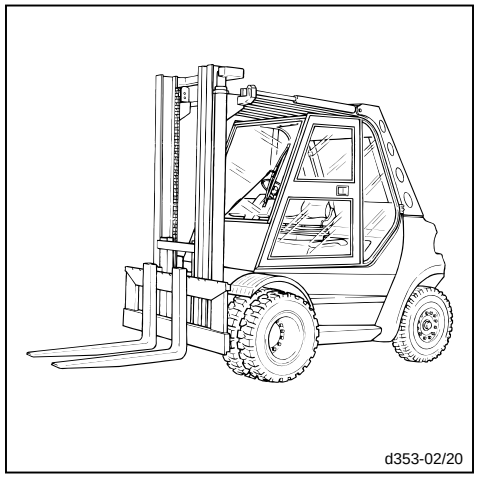
ATTENTION

Do not aim the jet directly on the electrical system and the insulating material, cover them first.

Regularly remove inflammable debris especially on or in the area of parts with a high temperature such as exhaust pipes.

When cleaning with compressed air, remove sticking dirt with a cold cleaner.

Clean the oil filler openings, surrounding areas and grease nipples before lubrication.



d353-02/20

Cleaning and spraying the mast chain

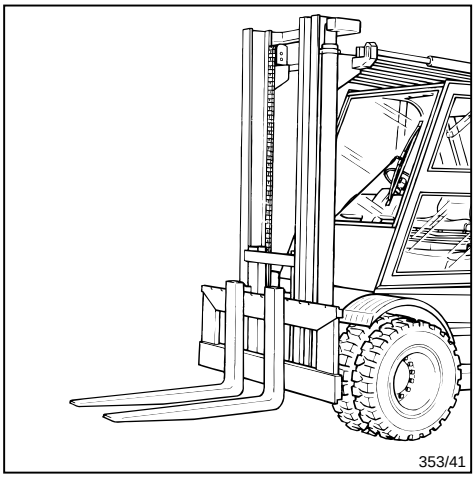
NOTE

The mast chain must be cleaned if the dust on the chain prevents penetration of the lubricant.

- Place a container under the mast.
- Clean the chain with paraffin derivatives such as washing petrol (observe manufacturer's notes on safety).
- When using a steam jet, clean without additives.
- After cleaning, blow dry the chain at once to remove any water in the chain links and on the surface. Move the chain several times during this procedure.
- Immediately spray chain spray on the chain, while also moving it.

CAUTION

Lifting chains are safety components. The use of cold cleaners, chemical cleaning agents and caustic or acidic and chlorinated fluids can be a direct cause of damage to the chain.



353/41

353 804 3001.0702

Cleaning the air filter

NOTE
Cleaning the air filter element is necessary only when the air filter restriction indicator in the composite instrument illuminates.

A restricted air filter results in loss of power and increased engine wear. Therefore careful and regular servicing of the air filter is essential to engine life and performance. Carry out all services on the air intake system with the engine stationary. Do not start engine when the filter element is removed.

- Open the engine cover.
- Loosen the clips (1) and remove the dust bowl (2).
- Unscrew the nut (3) and extract the filter element (4).

Cleaning with compressed air

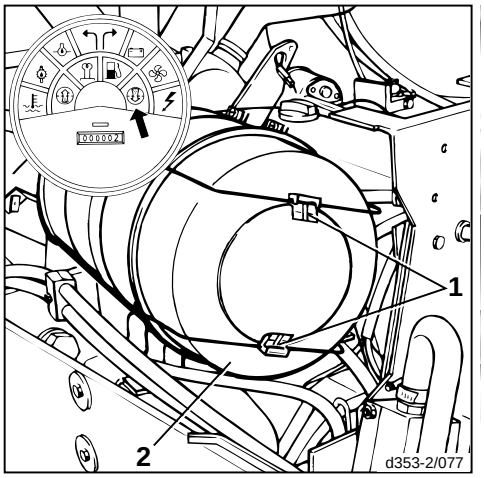
ATTENTION
Do not clean the filter casing with compressed air, wipe it with a clean damp cloth.

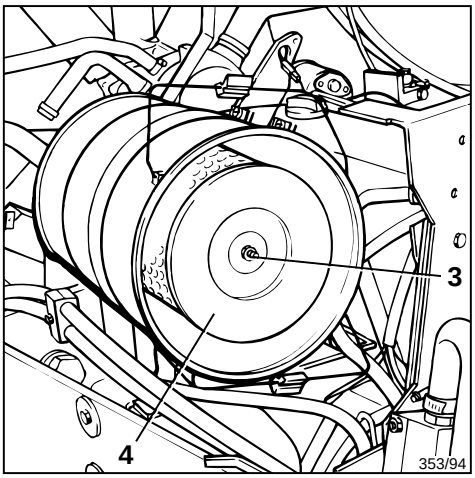
- To clean the filter element (4), blow dry compressed air at max. 5 bar pressure from the inside to the outside until the filter is free of dust.
- Before installing the cleaned air filter element, examine it for damage eg at paper of filter element, rubber seals, for dents or bulges on the metal frame
- Using an inspection lamp, examine the paper part of the filter element for cracks and holes.
- Renew a damaged filter element.

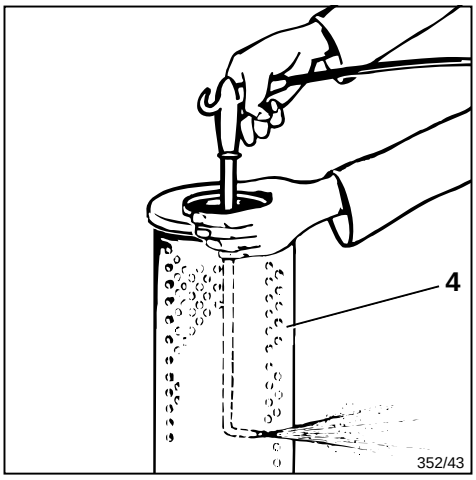
NOTE
Mark every servicing on the filter element.
Mark the safety element.
Discard the filter element if it has been cleaned 5 times, if damaged, after 1000 service hours, or at least every 12 months.

- Re-install the filter element into the filter casing. Make sure that the filter element is not damaged and that the seal on the filter casing fits properly.

353 804 3001.0702



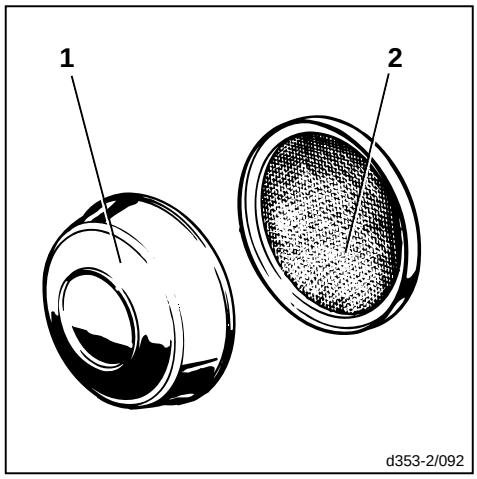




Emptying the dust bowl in the air filter cover

NOTE
The dust bowl should never be more than half filled with dust. Daily servicing may be necessary under excessive dust conditions.

- Remove the cover (2) from the dust bowl (1) and empty the bowl.
- Refit the cover (2).
- Install the air filter element.
- Be sure that the marking „oben“ is at the top.
- Refit the dust bowl and secure it with the clips.

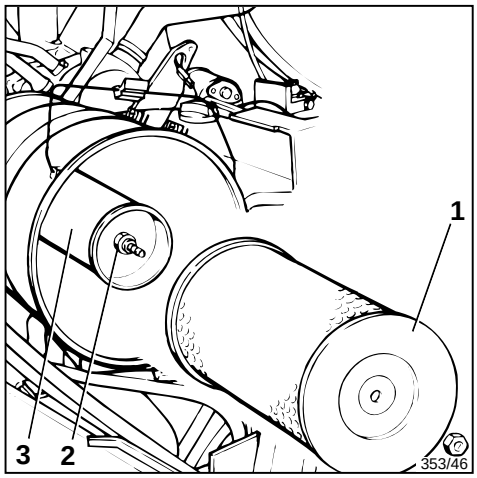


Replacing the safety element

Changing the safety element (3) is required:

- After cleaning the main element (1) five times.
  The number of services (renewal or cleaning) must be recorded on the appropriate marks of the safety element.
- After 2 years of operation maximum.
- If, after servicing the main element, the maintenance indicator responds again.
- When the main element is damaged:
  - Remove the cover and remove the main element (1).
  - Unscrew the hexagon nut (2) and pull out the safety element (3).
  - Install the new safety element and fasten with the hexagonal nut (2), install the main element (1) and refit the cover.
- Close the engine cover.

ATTENTION
Safety elements may neither be cleaned nor re-used.

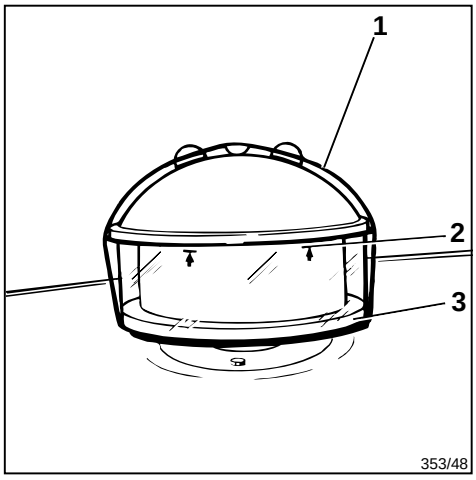


Clean the pre-filter*

NOTE
The dust bowl (3) should never be more than half full (2) with dust. In a dusty environment this may require daily emptying.

- Loosen the clip (1), remove and clean the dust bowl.
- Install the dust bowl and secure with the clip.

* Option



353 804 3001.0702

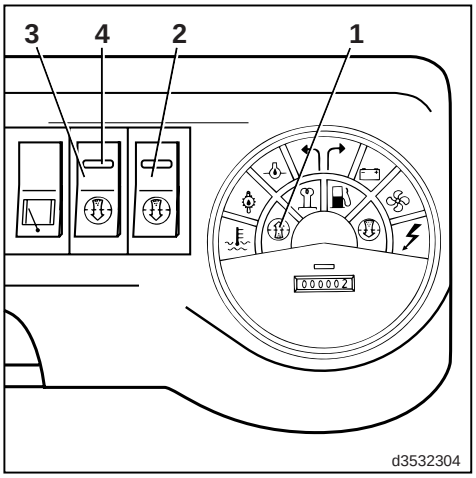
Regenerate the particle filter*

WARNING
Do not refuel during filter regeneration.

NOTE
The particle filter must be regenerated at least every 8.5 engine operating hours. The yellow soot yellow warning lamp (1) in the combined instrument illuminates after 7 hours as an optical indication. Regenerate the filter within the next 30 minutes. If this time is exceeded, a buzzer sounds (1/2 hour intermittently, thereafter continously) and the jellow indicator light (1) comes on in the composite instrument. Stop the engine as soon as possible and carry out a regeneration.

NOTE
The filter can also be regenerated before the maximum time is reached.

CAUTION
Perform the regeneration only in the open air and with the engine at operating temperature and not in the vicinity of inflammable goods. High temperatures occur at the soot filter, exhaust system and the surrounding area. Danger of burning if contacted.

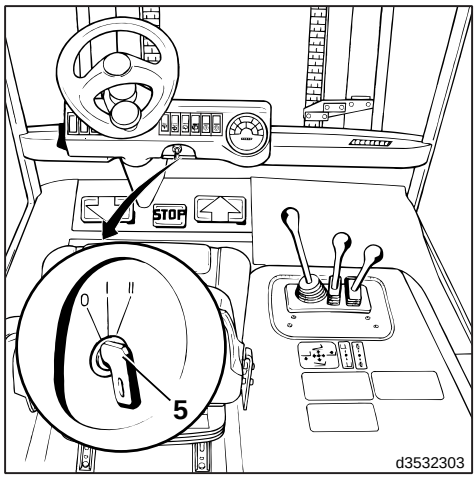


For safety reasons, do not conduct the exhaust gases into an exhaust facility.

ATTENTION
The regeneration is only possible with the engine stopped and the heater starter switch (5) in the zero position (ignition off).

- Thoroughly clean the exhaust passage.
- If over 30 min have passed since the engine was stopped, set the heater starter switch to position I and then back to the zero position (ignition on briefly and then off again). The soot filter control remains active for another 30 min and during this time the regeneration can be triggered.
- Unlock the starter switch (3) pushing down the lock (4). Then press the switch for approx. 3 seconds, until the built-in yellow switch light (ON indicator) illuminates. The lamp will stay on until the end of the regeneration cycle, which lasts approx. 23 minutes.

* Option



NOTE
The regeneration procedure runs automatically, i.e. preheating about 60 seconds, combustion about 10 minutes and ventilation about 12 minutes. The switch light (on indicator) will extinguish after the regeneration is completed and the truck can be taken into operation again.

ATTENTION
The engine can not be started when regeneration is in progress. If the truck must be taken out of a safety area, or regeneration must be aborted for safety reasons, unlock the stop switch (2) and depress it. This will stop the regeneration procedure directly and the truck can be started. (Operate only in an emergency as damage could result to the system).

ATTENTION
The particle filter is not regenerated when the regeneration procedure is interrupted.

If a soot warning was indicated before the regeneration was aborted, the warning will remain. In this case, a complete regeneration must be carried out immediately.

ATTENTION
In case of a malfunction during regeneration, the soot warning is reset after the regeneration is completed. In this case start a new regeneration (a maximum of unsuccessful 5 regeneration starts are possible). If the error persists, take the truck out of operation and contact your authorised distributor.

NOTE
While driving, the glow plugs of the regeneration system are cleaned every 1.75 hours with intermediate heating.

353 804 3001.0702

Check wheel fastener for tightness

ATTENTION
Check the wheel fastener at least every 100 hours.

- Torque all wheel fasteners to 600 Nm.

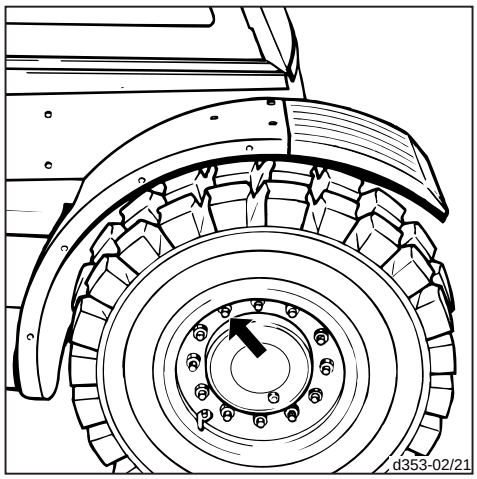
Check the tyres for damage and foreign objects

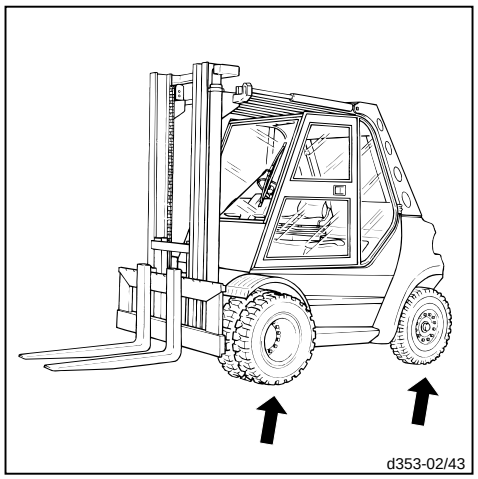
- Secure the truck against rolling (apply the parking brake).
- Chock a wheel that is not to be raised.
- Raise the truck with a jack until the wheels are clear of the ground.
- Secure the truck with squared timbers.
- Check the wheels for ease of rotation and remove anything hindering their free movement.
- Replace worn or damaged tyres.

Lubricate the steer axle, mast and tilt cylinder bearings

If used in clean and dry areas, truck servicing every 500 service hours is sufficient as a rule. For mixed use inside and outside, it is recommended that the lubrication interval be halved.
In an environment with dust, dirt, water and possibly de-icing salt or chemicals, weekly lubrication will extend the service life of the bearings substantially.

NOTE
Preferably lubricate the bearings with less grease more often than a lot of grease less frequently.


d353-02/21


d353-02/43

Clean the radiator and engine oil, hydraulic oil and fuel cooler, check for leaks

NOTE
The cooling system may only be cleaned with the engine stopped and cool.

- Open the bonnet.
- Remove the cover (1) in the counterweight.
- Remove the radiator cover (2).

Clean with compressed air

- First clean the radiator on the counterweight side, then blow on the engine side with compressed air.
- Flush out any loosened dirt with a water jet.

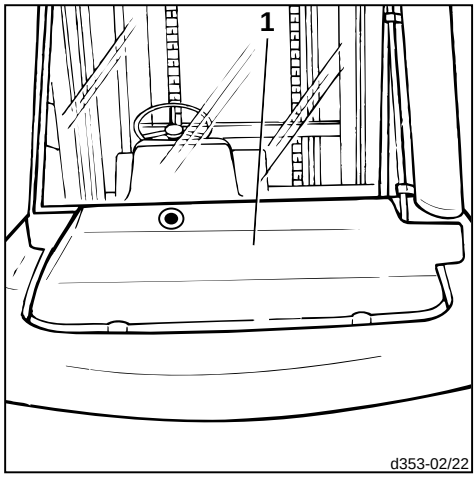
Clean with a cold cleaner

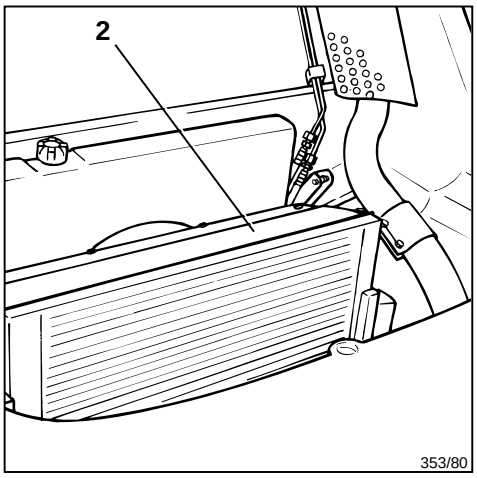
- Spray the radiator with a commercial cold cleaner and let it soak in for about 10 minutes.
- First clean the radiator from the counterweight side, then from the engine side with a sharp water jet.
- Check the fittings, hoses, pipes on the radiator and hydraulic oil cooler for leaks.
- Renew porous hoses and tighten hose clamps, if necessary.

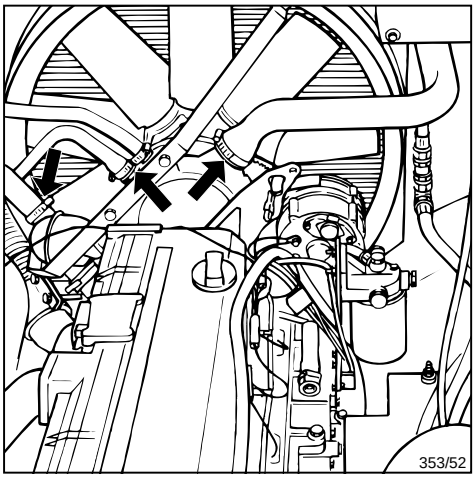
ATTENTION
Do not point the water jet directly at sensitive engine components, e.g. alternator, wiring and electronic components.

- Install the cover on the radiator and couterweight.
- Close the bonnet.
- To prevent corrosion, let the engine run warm so that any residual water will evaporate.

353 804 3001.0702





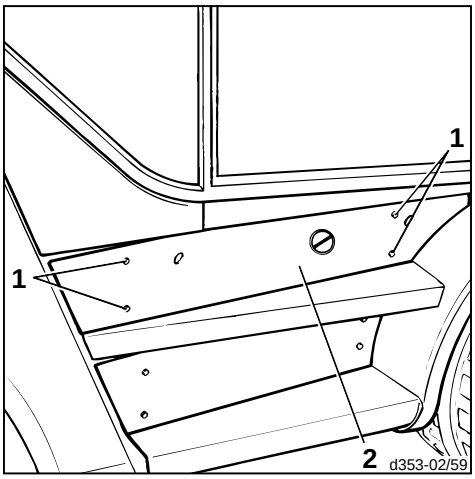


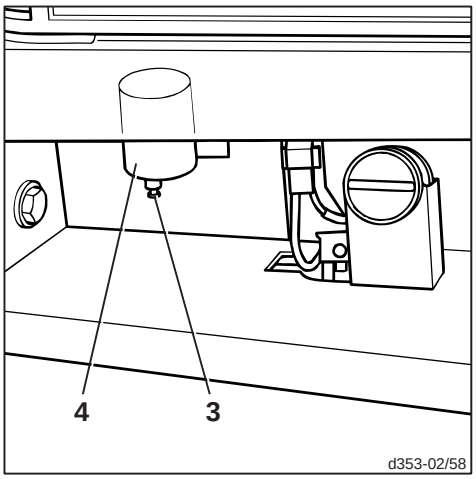
Drain the water separator in the fuel system

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

NOTE
The water separator is mounted on the right side of the truck, under the cover above the second step.

- Remove the four screws (1) and remove the cover (2).
- Loosen the drain screw (3) at the water separator (4) and drain approx. 100 cm^3 fluid into a container until clean fuel emerges.
- Tighten the drain screw.
- Mount the cover above the second step into place.



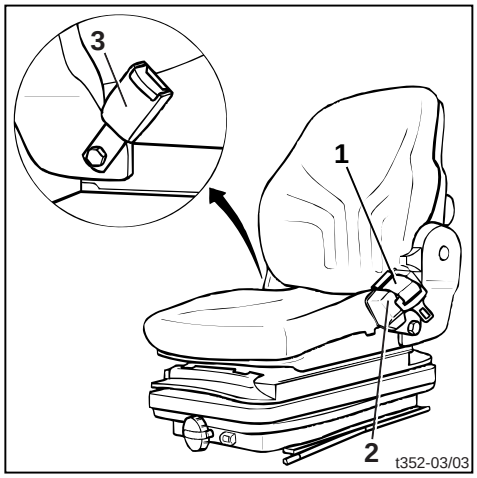


353 804 3001.0702

Check seat belt for condition and operation

NOTE
For safety reasons the condition and operation of the retention system should be inspected regularly (monthly). Under extreme operating conditions this check is required daily before taking the truck into operation.

- Pull the belt (1) out fully and inspect for fraying.
- Check the lock (3) for correct operation and the retractor for proper return of the belt.
- Check covers for damage.
- Check the automatic lock.
  - Park the truck on level ground.
  - Pull out the belt with a jerk.
    The automatic lock should prevent the belt from unrolling from the retractor (2).
  - Slide the seat fully forward.

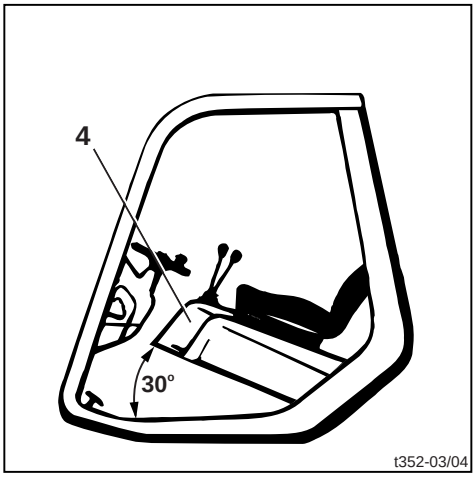


NOTE
When opening the bonnet, watch out for a possibly installed rear windscreen*.

- Open the bonnet (4) about 30°.
  The automatic lock should prevent the belt from unrolling from the retractor (2).

CAUTION
Do not operate the truck with a faulty seat belt. Have a defective seat belt replaced immediately by your authorised dealer.

* Option



CAUTION
To prevent back injury, the weight setting should be set to the individual weight of the driver.
To prevent injuries, do not store any objects in the tilting range of the seat.
To prevent accidents, check that all adjustments are properly engaged before operating the truck.
Do not operate the seat adjusting devices while operating the truck.
Seat belts must be applied before operation of the truck. After an accident, the seat belt must be renewed. In the case of seat belts attached to the operator seat, the seat and mounting of the seat must also be inspected by qualified personnel.
Nuts and bolts should be checked regularly for tightness. A wobbling of the seat can indicate loose bolts or other faults. If malfunctions in the operation of the seat are detected (e.g. seat cushioning), contact your authorised dealer immediately to eliminate the cause. In case of non-observance, you put your health in danger and there is a higher risk of accidents.

353 804 3001.0702

Clean and lubricate the steer axle

- Clean the steer axle with water or a cold cleaner.

NOTE
For lubrication use a specified lubricating grease.

- Lubricate the king pins and steering knuckles at the grease nipples (see arrows) with grease.

- Lubricate with a grease gun until new grease emerges at the bearings.

Grease the mast pivots

NOTE
Fully lower the mast.

NOTE
For lubrication use a specified lubricating grease.

- Lubricate the grease nipples at the cylinder pivots on the left and right-hand side of the frame with grease.

- Lubricate with a grease gun until new grease emerges at the bearings.

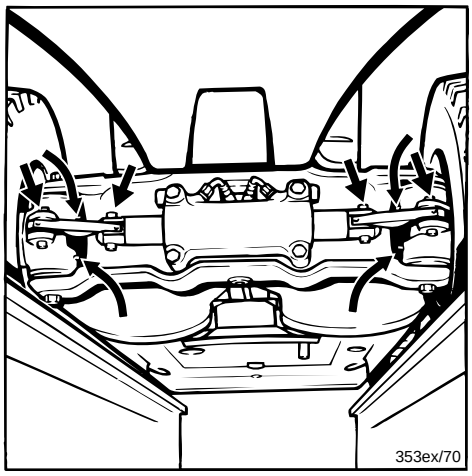
Grease the tilt cylinder and overhead guard pivots

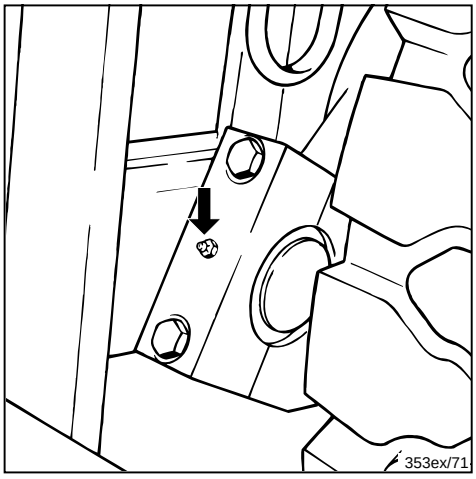
NOTE
For lubrication use a specified lubricating grease.

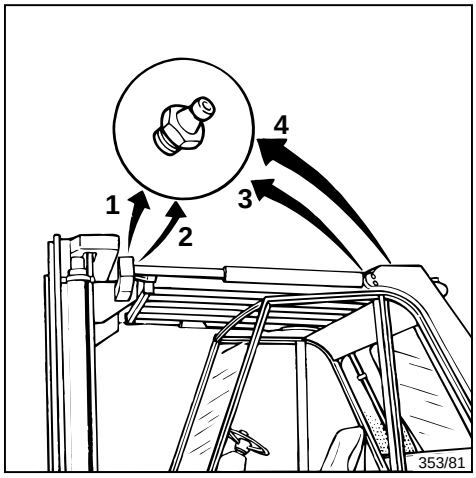
- Lubricate two grease nipples (1 and 3) at the tilt cylinder pivots and one grease nipple (2) at the overhead guard pivot and the guide roller mounting (4) on the left and right-hand side of the truck with grease.

- Lubricate with a grease gun until new grease emerges at the bearings.

353 804 3001.0702







Check the engine mounting, movable overhead guard, steer axle and drive axle hub differentials for tightness

- Check the engine mounting, movable overhead guard, steer axle and drive axle hub differentials for tightness of the fastening elements and for wear.
- Tighten any loose nuts and bolts.
- Replace any damaged parts.
- If necessary, touch up the paint coat.

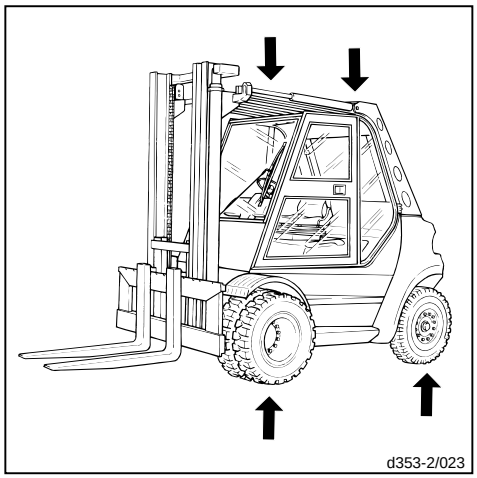
Check the forks and fork quick-releases

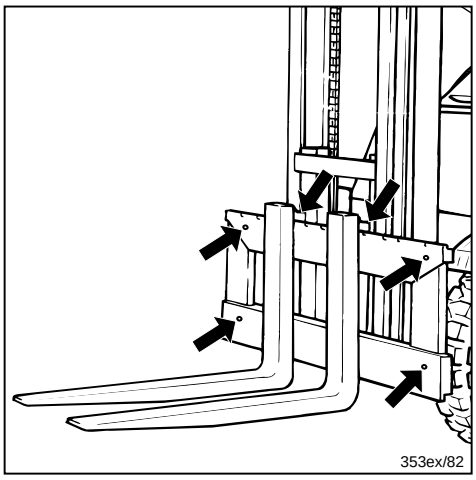
- Inspect the forks for visible distortion, wear and damage.
- Check the fork stops and the fork quick-releases for proper seating and damage.
- Replace any damaged parts.

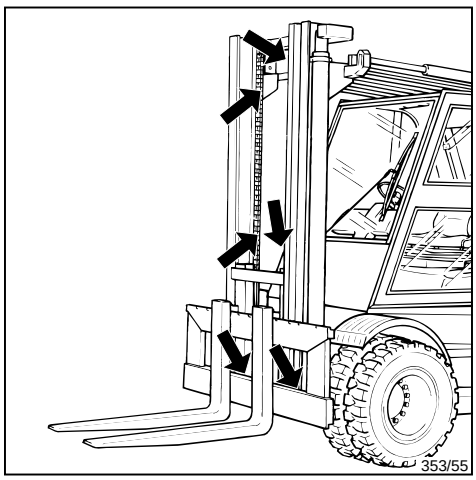
Check the mast, lift chains and stops for condition, operation and security

- Clean the mast channels and chains.
- Check the chains for condition and wear, particularly in the pulley area.
- Check the attachment of the chains at the chain anchor.
- Replace a damaged chain.
- Check the condition and mounting of the mast, channel surfaces and pulleys.
- Check the tightness of the mast pivot fastening bolts.
- Check the condition and operation of the stops.

353 804 3001.0702







Adjust the lift chains

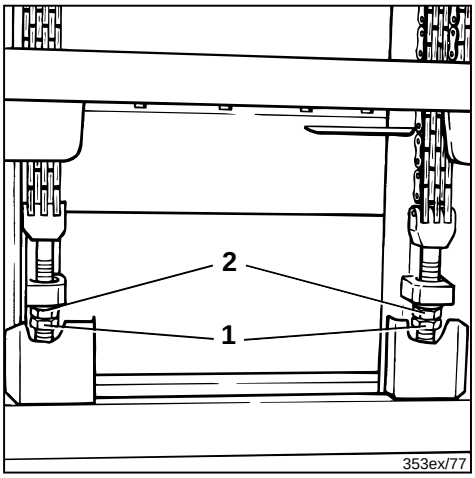
NOTE
As a lift chain stretches with time, the right and left chains must be adjusted.

- Fully lower the mast.
- Slacken the locknut (1).
- Adjust the chain at the adjusting nut (2) on the chain anchor. The lower guide roller on the fork carriage must not project over 45 mm from the inner mast channel.
- Tighten the locknut (1) firmly.

Lubricate with chain spray

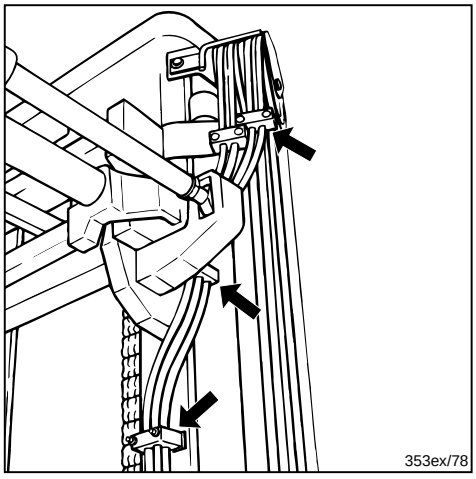
- Lubricate the channel surfaces and chain with Linde chain spray.

NOTE
Trucks in service in the food industry must be lubricated with a thin oil approved for the food industry instead of chain spray.



Check the pre-tension of double hoses if attachments are fitted

- The pre-tension of double hoses should be 5 - 10 mm per metre referred to initial length.
- Adjust hose pre-tension to the specified tension by shifting the hoses in the clamps.

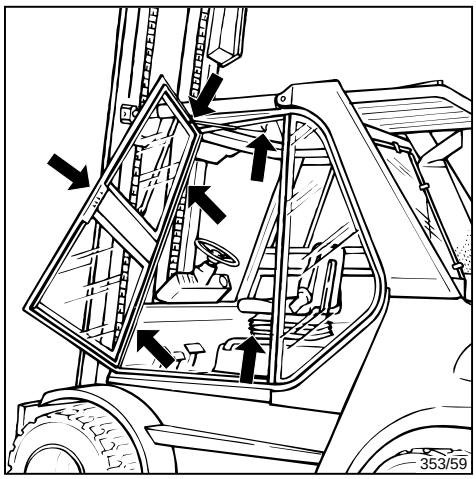


Check and oil other pivots and joints

Check and lubricate the following pivots and mountings:

- Driver's seat guide, bonnet hinge bolts
- Windscreen wiper mountings*
- Cabin* door locks and hinges
- Check the fastening and pre-tension of the bonnet lock and grease lock.

* Option



353 804 3001.0702

Check the engine cooling system for leaks

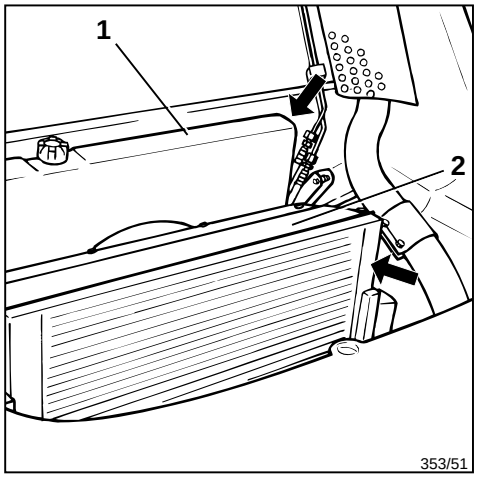
- Remove the cover in the counterweight.
- Check the coolant header tank (1) and radiator (2) for leaks.
- Open the bonnet.
- Check all engine coolant hoses, water pump, header tank and radiator for leaks. If necessary, tighten unions and hose clamps.
- Replace any porous hoses.
- Inspect the hoses for chafing and replace, if necessary.
- Refit the cover in the counterweight.

Check and oil the pedals, accelerator and engine control linkage

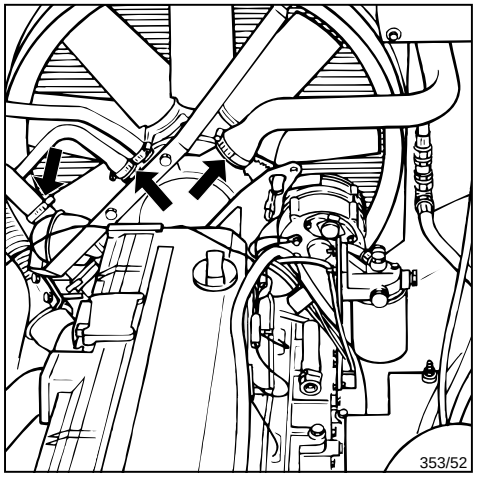
ATTENTION
The following work must be carried out by qualified skilled personnel. Please contact your authorised distributor in this regard.

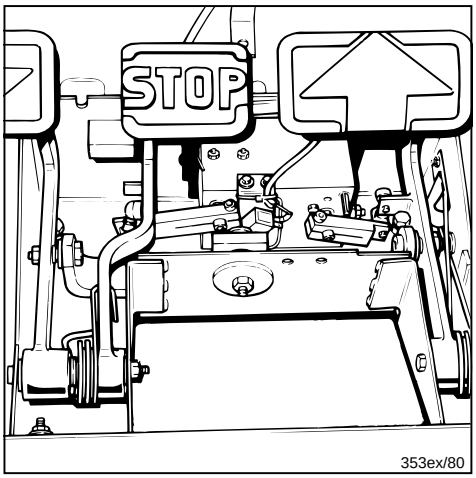
- Open the floor plate.
- Check the pedals for easy movement.
- Check that the pin and pivot retainers are secure.
- If necessary, slightly oil lever pivots and yokes.
- Close the floor plate.
- Close the bonnet.

353 804 3001.0702



353/51


353/52



353ex/80

Renew the engine oil (at least every 12 months)
Drain the engine oil

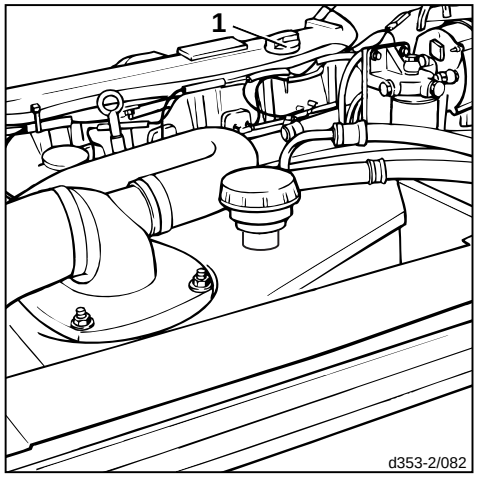
ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

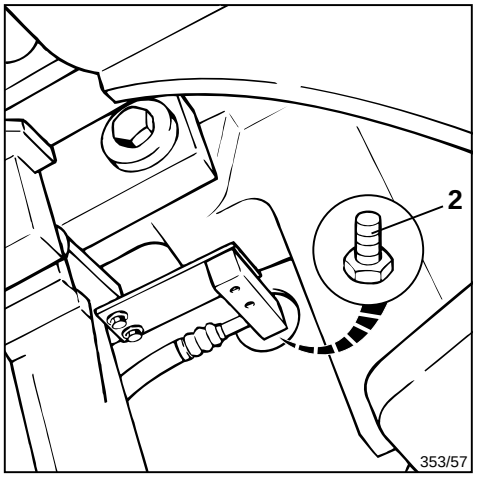
CAUTION
Engine oil may be hot.
Danger of burns and scalding.

NOTE
Change the oil only when the engine is at operating temperature.

- Position the truck over a pit.
- Place a catch tray under the left side of the truck frame.
- Open the bonnet.
- Remove the filler cap (1).
- Remove the oil drain plug (2) from below.
- Allow the oil to drain completely into the tray.
- Refit the drain plug using a new sealing washer.

Torque ..... 25 Nm



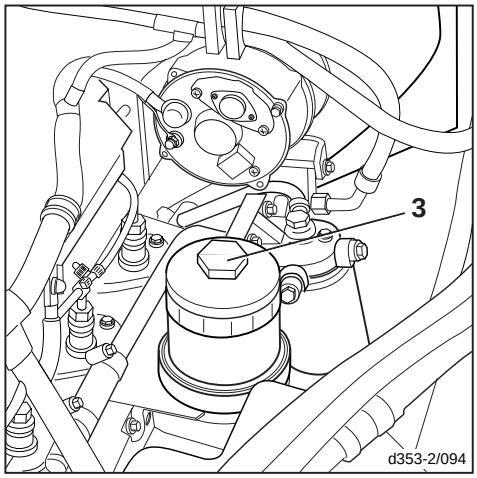


Renew the engine oil filter

CAUTION
Engine oil may be hot. Danger of scalding! Follow the safety rules for handling fuel, lubricants and fuel.

- Loosen the filter housing (3) using a socket wrench, then unscrew by hand.
- Catch the oil running out of the filter and discard in a way friendly to the environment.
- Pull the filter housing with the cartridge cautiously a little bit out of the tank, so that the oil can return.

  Only then pull out completely.
- Separate the cartridge from the housing and discard in a way friendly to the environment.
- Check the O-ring on the housing, if necessary renew.
- Insert a new cartridge to the housing.
- Re-install the filter and tighten firmly with the socket wrench.
- Check the engine oil filter in a trial run.



353 804 3001.0702

Add engine oil

- Remove the filler cap (1).
- Fill new engine oil through the filler opening.

Capacity ..... approx. 15.5 litres

- Check the engine oil level after filling with the dipstick (5) and, if necessary, add oil up to the maximum mark.
- Replace the filler cap (1).

☞ **NOTE**
After the oil change and filter renewal, start the engine and watch the oil pressure warning light. Check for leaks at the oil drain plug and oil filter seal faces.

An accurate check of the oil level, particularly after renewing the oil filter canister, requires stopping the engine again and rechecking the oil level after about one minute.

Check the hydraulic oil level

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

☞ **NOTE**
To check oil level, the mast fork carriage must be fully lowered.

- Screw out the breather filter (1) (with oil dipstick) on the left-hand side of the truck.

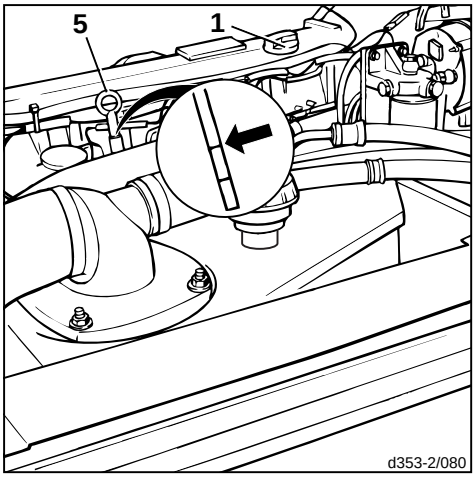
☞ **NOTE**
The reservoir is slightly pressurised. Some air will escape.

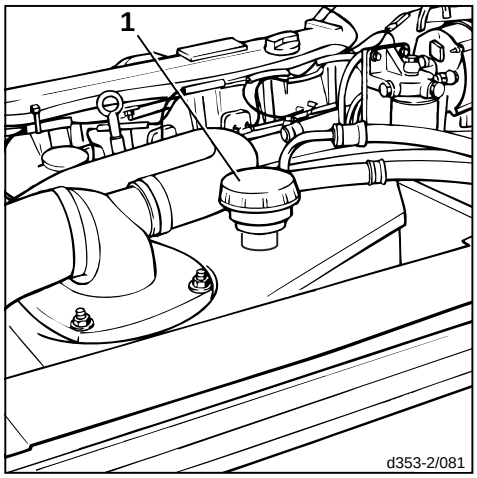
- Wipe the dipstick with a clean cloth.

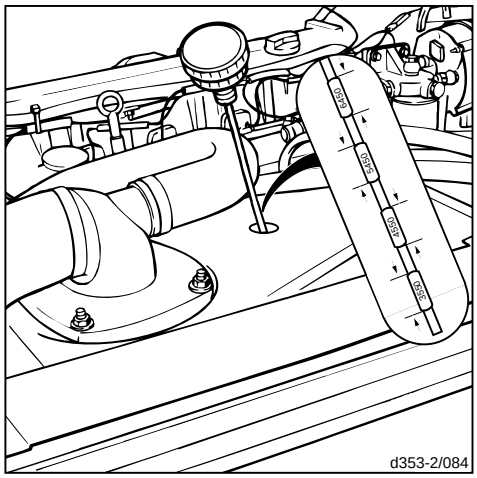
☞ **NOTE**
The four markings on the oil dipstick are for different mast heights.
The different mast heights are stamped on the dipstick. Check only at the marking applicable for your truck.

- Fully screw in the breather filter with the oil dipstick and remove it again.
- The oil level should be between the markings on the dipstick for the applicable mast height.
- If necessary, fill hydraulic oil up to the mark applicable for your truck.

Difference between max. and min. marks for the applicable mast height:
Mast height 6450 mm and 5450 mm ..... approx. 2.0 litres
Mast height 4550 mm and 3550 mm ..... approx. 2.6 litres







Check the coolant concentration

The cooling system must be filled with a mixture of water and antifreeze throughout the year in order to prevent scaling and damage due to frost and corrosion.

CAUTION
Do not open the reservoir cap (1) when the reservoir is hot. The reservoir is pressurised. Risk of scalding!

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

- Remove the reservoir cap (1).
- Check the coolant concentration in the coolant header tank.
- The frost protection should be sufficient for temperatures down to -25 °C. The mixing ratio in this case is 40 % antifreeze and 60 % drinking water.

Mixing ratio for lower temperatures:

Temperature	Antifreeze	Drinking Water
-30 °C	45 %	55 %
-35 °C	50 %	50 %

To add antifreeze to the mixture:

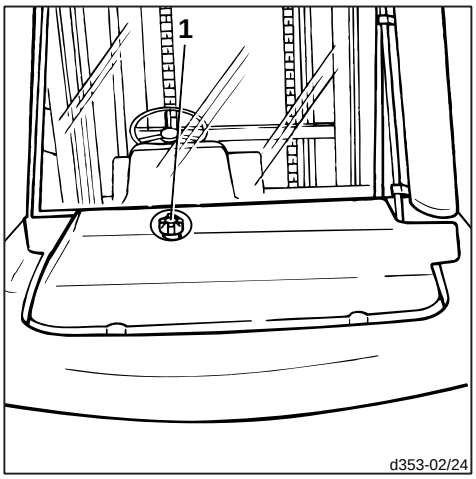
- Place a dish of sufficient capacity.
- Loosen the clamp (2), pull the hose (3) and partially drain the coolant.
- Dispose coolant concentration in an environment-friendly way.
- Refit the hose and tighten with the clamp.
- Fill antifreeze until the correct mixing ratio is obtained.
- Tighten reservoir cap.

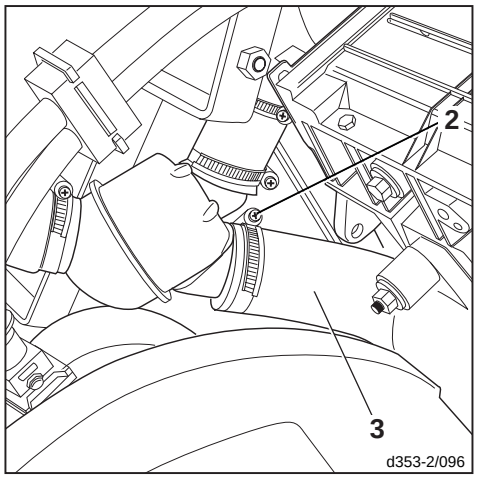
Check the particle filter system*

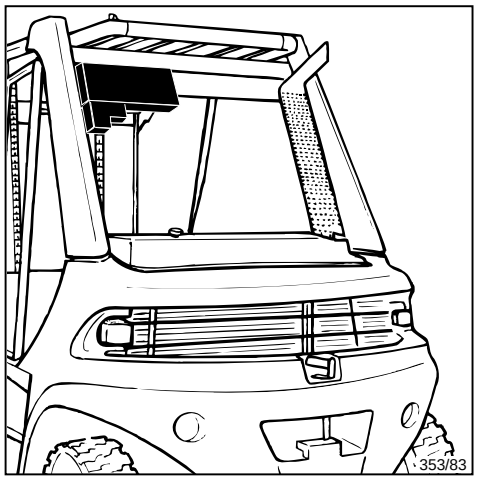
- Check the electric contacts for tightness, corrosion and damage.
- Examine the air intake line for damage, leaks and tightness.
- Inspect the fuel lines for damage, leaks and tightness.
- Check the system for operation (soot warning, buzzer, regeneration, diagnostic indicator light).
- Check the burner mounting for leaks, secure attachment and distortion.
- Clean the corrugated hose and elbow (fan to burner).

Please contact your authorised distributor for this servicing.

* Option







353 804 3001.0702

Check and tension V-belt drives

ATTENTION
A broken and loose V-belt reduces cooling.

- Check the V-belts for excessive wear, cracks, broken flanks and traces of oil.
- Replace damaged belts. Always change both V-belts.

Check with belt tension gauge:
- Place belt tension gauge (4) on the V-belt (1) and carry out the measurement.

Tension: ..... 250 $^{\pm 50}$ N

Tighten V-belt drives

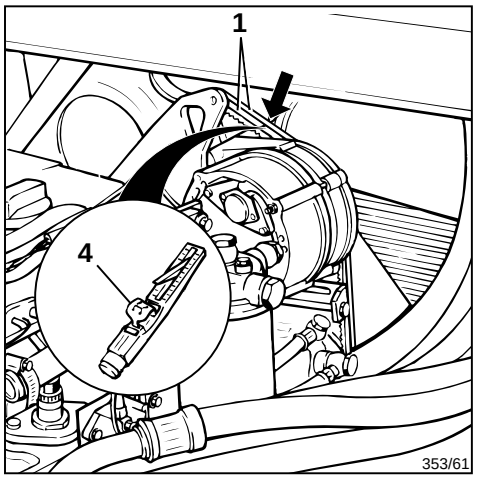
If V-belt tension is insufficient:
- Slacken bolt (2) at the alternator.
- Turn bolt (3) clockwise until the correct tension is obtained.
- Tighten bolt (2) firmly.

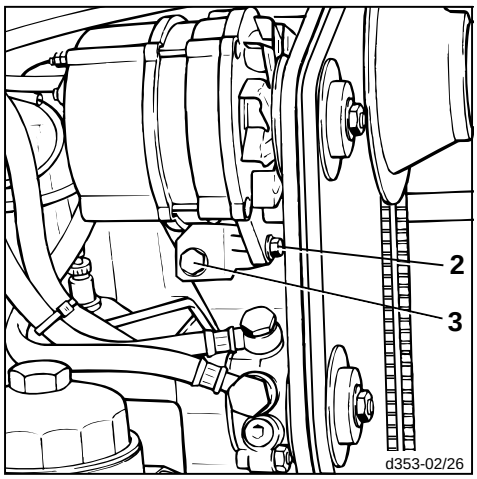
Drain the water separator in the fuel system

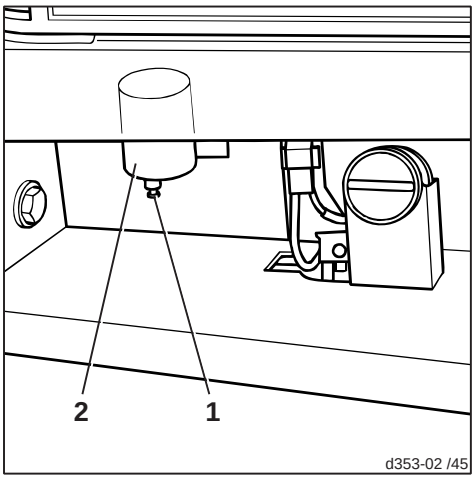
ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

NOTE
The water separator is mounted on the right side of the truck, under the cover above the second step.

- Remove the four screws at the water separator (2) and remove the cover.
- Loosen the drain screw (1) and drain approx. 100 cm^3 fluid into a container until clean fuel emerges.
- Tighten the drain screw.
- Mount the cover above the second step into place.







353 804 3001.0702

Clean the radiator, hydraulic oil and fuel cooler

NOTE
Clean the cooling system only with the engine stopped and cool.

- Remove the cover in the counterweight.
- Remove the radiator cover (1).

Cleaning with compressed air

- First clean the radiator from the engine side, then from the counterweight side with compressed air.
- Flush out any loosened dirt with a water jet.

Cleaning with cold cleaner

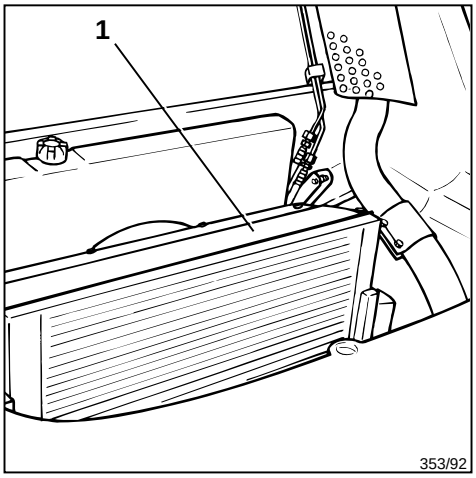
- Spray the radiator with a commercial cold cleaner and let it soak in for about 10 minutes.
- First clean the radiator from the counterweight side, then from the engine side with a sharp water jet.

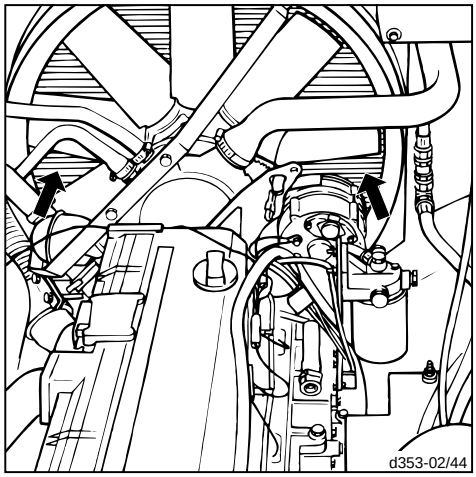
ATTENTION
Do not point the water jet directly at sensitive engine components, e.g. alternator, wiring and electronic components.

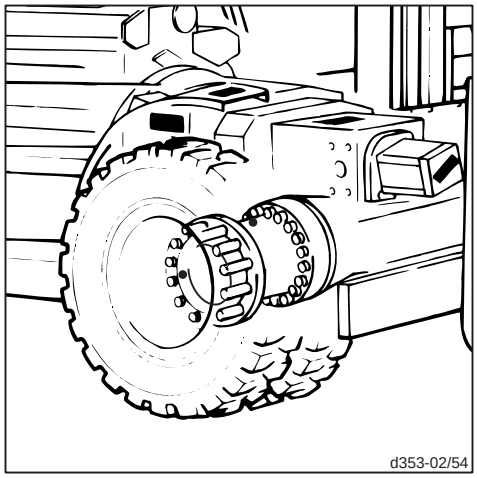
- Close the bonnet.
- To prevent corrosion, let the engine warm up so that any residual water will evaporate.
- Check the fittings, hoses, pipes and the radiator and hydraulic oil cooler for leaks.
- Renew porous hoses and tighten hose clamps, if necessary.
- Clean the radiator ribs, cooler ribs and the counterweight compartment.
- Install the radiator cover and counterweight cover.

Renew the drive axle hub differential oil and clean the magnetic plug

NOTE
The oil in the drive axle hub differential must only be renewed once after 500 service hours, further oil changes follow every 3000 service hours (see 3000-hour inspection and maintenance for procedures).







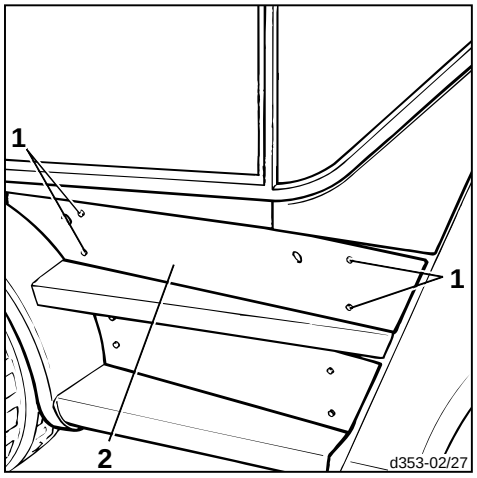
353 804 3001.0702

Check the condition and security of electric cables, connectors and cable connections

- Remove the cover, located on the left side of the truck (upper step), from the electrical system.
- Remove the four screws (1) and remove the cover (2).
- Check the cable connections for looseness and corrosion.
- Inspect the earth lead for loose connection.
- Examine the electric wiring for chafing and loose connections.

NOTE
Corroded connections and cracked cables lead to a drop in voltages. This can cause starting difficulties.

- Remove any corrosion and replace broken cables.
- Mount the electrical system cover.

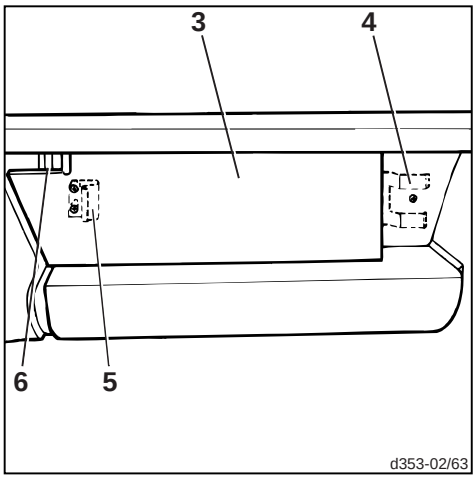


Check the condition, electrolyte level and specific gravity of the battery

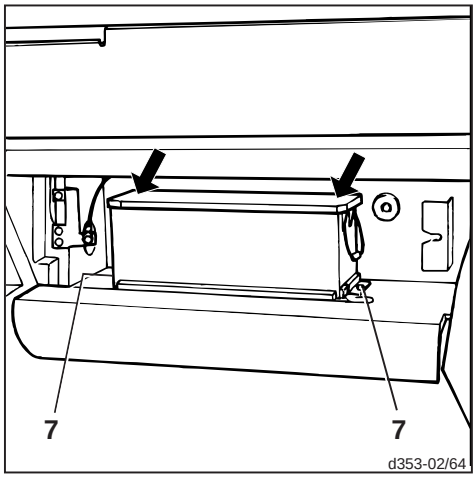
ATTENTION
Even a so-called maintenance-free battery must be checked for proper condition, electrolyte level and specific gravity.

ATTENTION
Battery acid is very caustic, so avoid any contact with battery acid. If battery acid nevertheless contacts clothing, skin or eyes, flush the affected parts immediately with water. If the eyes are affected, seek medical attention at once. Neutralize any spilled battery acid at once.

- Reach through the notch (6) of the cover (3) (Battery compartment on the right side of the truck under the step), pull t the cover out of the lock position (5), then pull the cover out of the mounting (4) by sliding to the left.
- Loosen the battery mountings (7) and slide the battery out.
- Check the battery for cracked casing, lifted plates and electrolyte leaks.



- Unscrew the caps and check the electrolyte level. On batteries with check tubes, the electrolyte should reach the bottom of the tubes. On batteries without tubes, the electrolyte should be 10 - 15 mm above the plates.
- If the electrolyte level is low, top up with distilled water only.
- Remove any corrosion on the battery poles and coat with non-acidic grease.
- Retighten the pole clamps firmly.
- Check the electrolyte with a hydrometer. The specific gravity should be between 1.24 and 1.28 kg/l.
- Slide the battery back in and secure with the retainers (7).
- Push the cover (3) from left to right into the mounting (4) and then push in the left side of the cover until it locks (5), paying attention to the centring pin.



Renew the hydraulic pressure, suction and breather filters

Renew the pressure filter

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

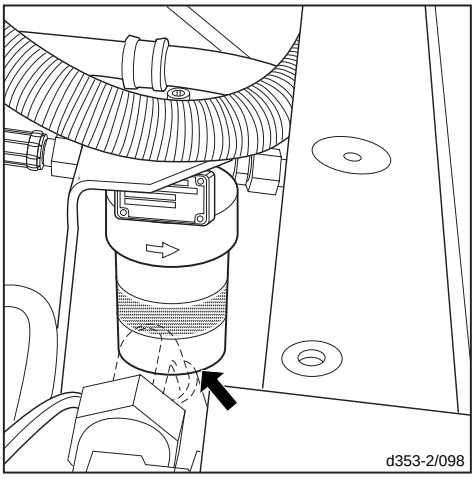
- Fully lower the mast.
- Open the bonnet and remove the floor plate.
- Loosen the renewable filter at the hexagon with an open end wrench (27 mm).

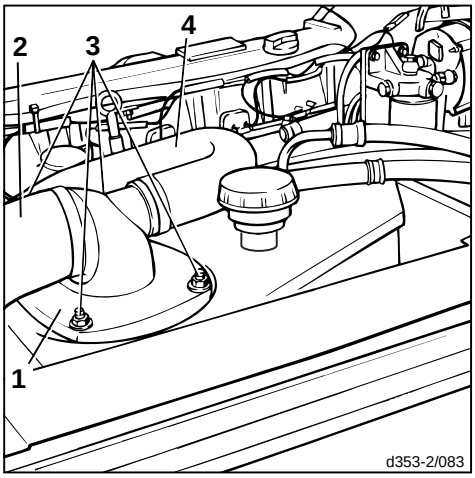
☞ **NOTE**
Hydraulic oil will run out - place a cloth under the filter!

- Remove the filter by hand.
- Separate the cartridge from the housing and discard in a way friendly to the environment.
- Check the O-ring on the filter head, if necessary renew.
- Insert a new cartridge to the filter head.
- Re-install the filter and tighten firmly to 40 $^{+10}$ Nm.
- In a trial run check the filter sealing faces for leaks.
- Replace the floorplate.

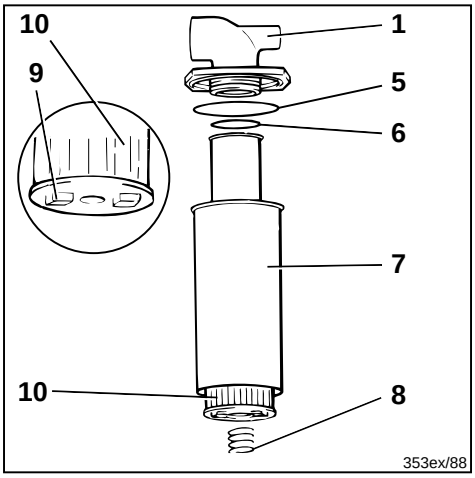
Renew the suction filter

- Remove the fastening nuts (3) on the filter cover (1).
- Loosen the clamps on intake hoses (2) and (4).
- Pull the intake hoses (2) and (4) from the filter cover.
- Withdraw the filter cover and suction filter casing (7) slowly so that the hydraulic oil can flow into the tray. Only then remove the filter completely.
- Pull the filter cover off the suction filter case.
- Inspect the filter cover O-rings (5) and (6), renewing them if damaged.
- Remove the spring (8) from the filter element (10) by turning it anti-clockwise.
- Insert a screwdriver through the opening (9) in the filter element and turn it anti-clockwise.
- Screw out the filter and dispose of in an environmental friendly manner.
- Carefully insert a new suction filter into the filter casing and fasten through opening (9) by turning with a screwdriver in clockwise direction.
- Refit the spring into the filter element by turning it clockwise.
- Insert the filter casing into the hydraulic oil tank and mount the filter cover with the O-rings.
- Reconnect the intake hoses to the filter cover.
- The hydraulic system bleeds automatically when the engine is running.
- Check the filter cover for leaks in a trial run.


d353-2/098



d353-2/083



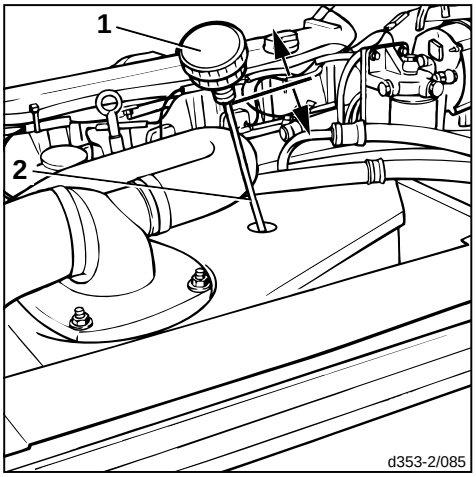
353ex/88

353 804 3001.0702

Renew the breather filter

- Pull the breather filter (1) with oil dipstick out of the filler neck.
- Pull the dipstick (2) from the breather filter (1) and install it on the new filter.
- Discard the used filter in an environment-friendly way.

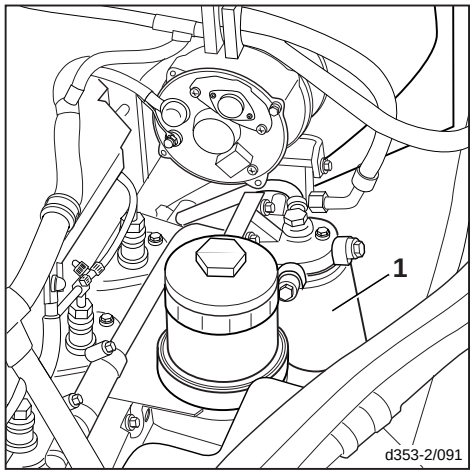
NOTE
In a dusty environment, more frequent servicing of the filter may be necessary.



Renew the fuel filter canister

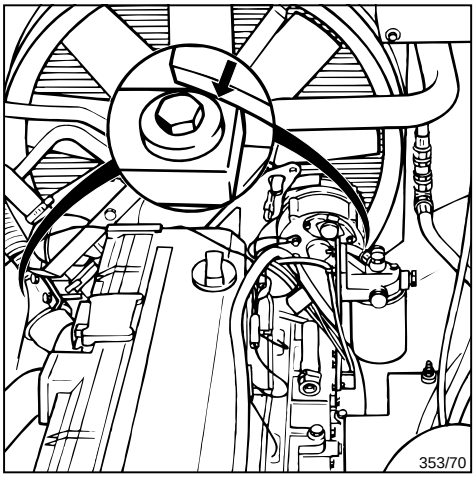
ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

- Remove the fuel filter canister (1), if necessary with a strap-type filter wrench, and discard in an environment-friendly way.
- Collect any fuel flowing out in a tray and discard in an environment-friendly way.
- Clean the filter contact face on the filter head.
- Lubricate the sealing ring of new fuel filter canister lightly with clean fuel oil.
- Fit the filter canister by hand to the filter head and tighten until the sealing ring contacts the contact face. Turn the filter canister a further half turn.



Check the engine mounting for condition and tightness

- Move the engine mounting to the left and right with a mounting bar (arrow).
- Contact your authorised distributor if there is any play.



353 804 3001.0702

Renew and tension the V-belt drive

- Remove the bolts (1) on the impeller shaft (2) and remove the shaft with the fan.
- Loosen bolt (3).
- Turn the adjusting bolt (4) anti-clockwise and push the alternator (5) towards the engine.
- In this position the V-belts (6) can be removed.

ATTENTION
When renewing the V-belts, also check the alternator pulley for wear and renew, if necessary. Renew V-belts only as a set.

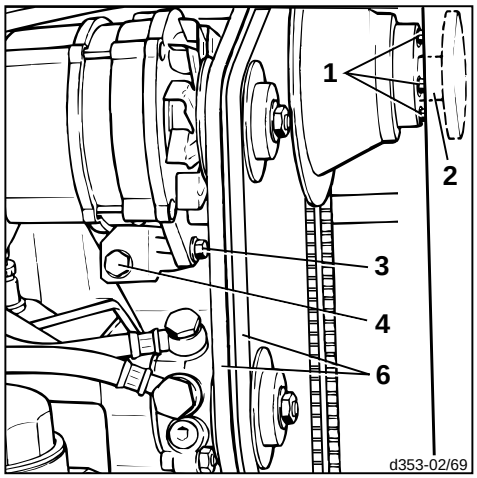
- Install the new V-belts (6).
- Turn the adjusting bolt (4) clockwise until the correct belt tension is obtained.

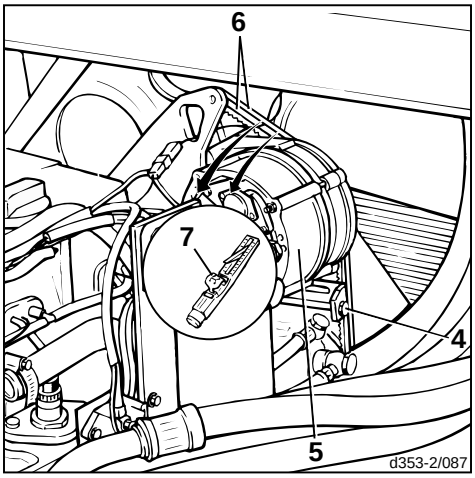
Check with belt tension gauge:
- Place belt tension gauge (7) on the V-belts (6) and carry out the measurement.

Tension for new V-belts: ..... 400 $^{\pm 50}$ N
Tension after running 20 - 30 min: ..... 300 $^{\pm 50}$ N

- Tighten the fastening screw (3) firmly.
- Refit the impeller shaft with fan.

NOTE
Retension the new V-belts after 15 - 20 minutes of operation.





353 804 3001.0702

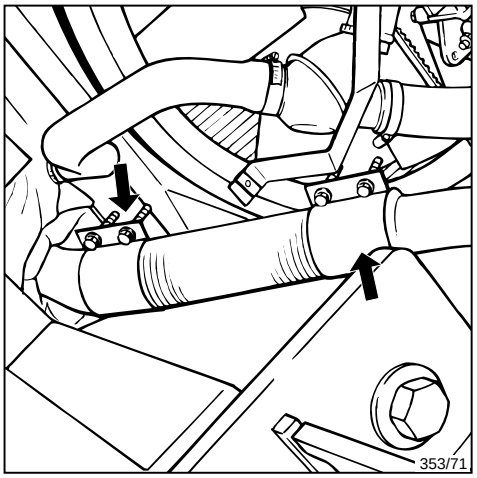
Check the exhaust system for leaks and tightness

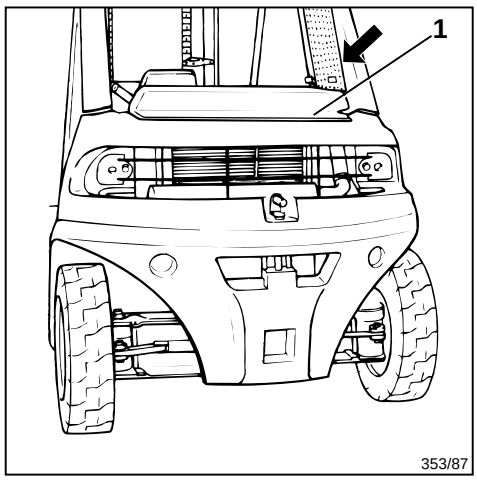
- Inspect the air intake and exhaust pipes for leaks. If leaks exist, tighten the fastening screws and replace gaskets, if necessary.
- Check the air intake hoses at the air filter for condition and leaks. Tighten the hose clamps and replace cracked or damaged hoses.
- Check the pipe connection at the exhaust manifold for leaks. Tighten nuts, if necessary, or renew.
- Remove the cover (1) in the counterweight.
- Check the exhaust pipes for leaks. If leaks exist, tighten the fastening screws or replace gaskets, if necessary.
- Check the exhaust pipe fastening screws in the counterweight and at the torsion support and tighten, if necessary.
- Install the counterweight cover.

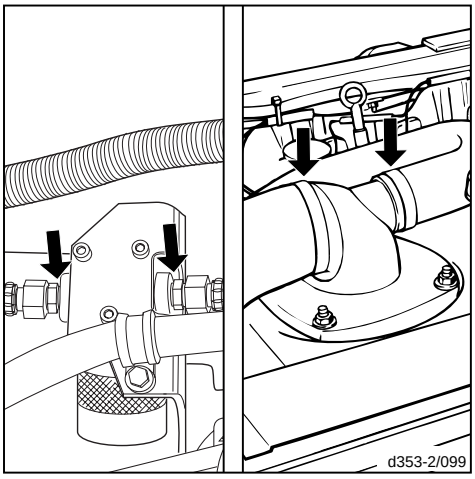
Check the hydraulic system, hydraulic pumps, valves and lines for leaks

- Examine all connections between the hydraulic oil tank, hydraulic pumps, hydraulic motors and control valves for leaks. Tighten the connections, if necessary.
- Inspect the lift, tilt and steer cylinders for leaks.
- Replace porous hoses.
- Examine the pipes and hoses for chafing and replace, if necessary.

353 804 3001.0702







Renew the air filter element, check the vacuum switch

(every one year or after cleaning 5 times)

- Open the clips (1) and remove the dust bowl (2).
- Unscrew the nut (3) and take out the air filter element (4).
- Thoroughly clean the inside of the filter casing. Do not clean with compressed air.
- Take care not to damage the element when installing it, and be sure that it is installed in the correct direction.
- Secure the filter element with the nut and install the dust bowl.
- Disconnect the hose (5) from the air filter inlet.
- With the engine running, slowly close the air filter intake opening (eg with a cardboard or metal plate) until the air filter restricted warning light in the composite instrument lights up. To prevent damage, do not close the opening further after the warning light illuminates.

☞ **NOTE**
If the air filter restriction indicator light is not illuminated, please contact your authorised distributor.

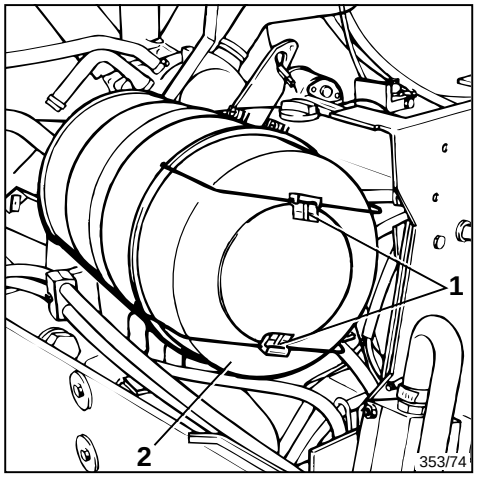
- Refit the hose.
- Close the bonnet.

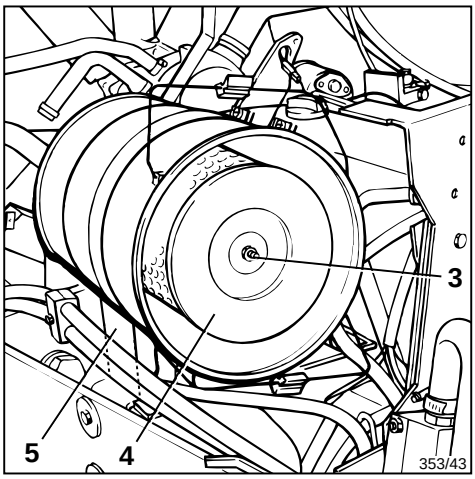
Check the parking brake

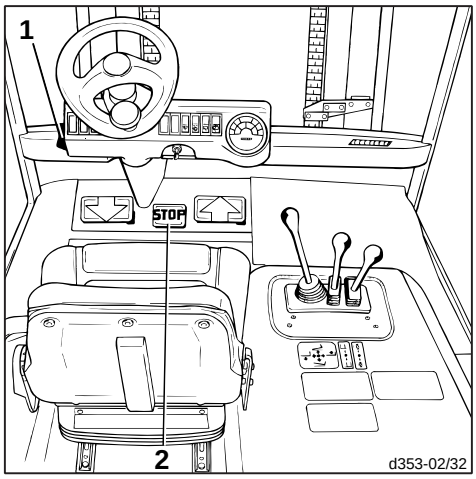
Drive the lift truck with a maximum load on a 15 % slope.

- Depress the brake pedal (2).
- Place the parking brake lever (1) up. The brake pedal will engage. The truck must not move.
- Push the parking brake lever (1) down. The brake pedal will return to its initial position.
- Stop the engine. The truck must remain stationary.

☞ **NOTE**
If the parking brake is not operating correctly, please contact your authorised distributor.







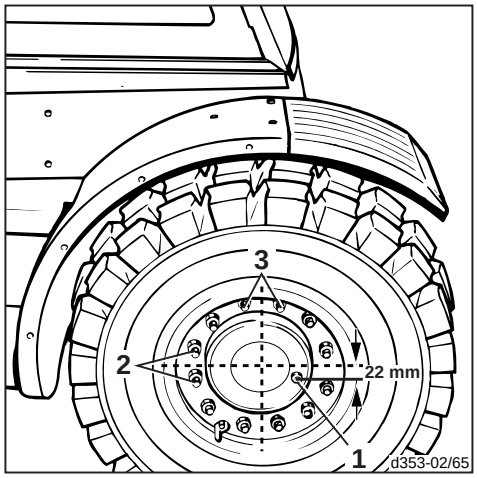
353 804 3001.0702

Check the drive axle hub differential oil level and for leaks

- Park the truck so that the middle points between wheel bolts (2 and 3) form vertical and horizontal lines; in this parking position the level/filler plug (1) is positioned approx. 22 mm below the horizontal line.
- Clean the area surrounding the level/filler plug (1).
- Screw out the level/filler plug (1).
- Check that the oil is visible at the base of the level/filler plug (1).
- If necessary, replenish with gear oil until oil seeps from the filler hole. To replenish, the wheel must be dismounted (see: Drive axle hub differential oil change).
- Refit the level/filler plug (1) with a new sealing ring and tighten firmly.

Torque ..... 37 Nm

- Check oil level on the opposite differential in the same manner.
- Visually inspect the left and right drive axle hub differentials for leaks. Contact your authorised distributor if leaks are detected.

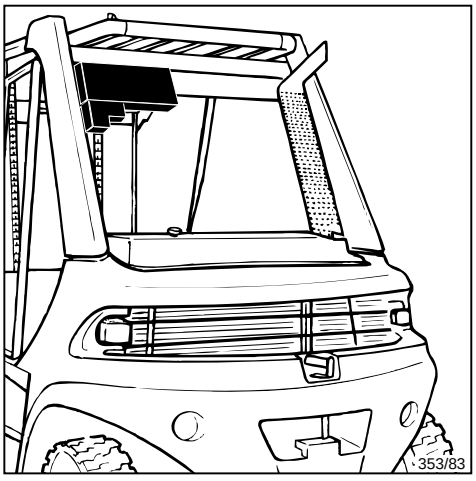


Check the particle filter system*

- Check that the filter mounting is secure.
- Examine the exhaust parts for leaks.
- Clean the air intake pipe (loosen olive fitting and remove soot deposits with a round wire brush).
- Check the filter casing screws and exhaust parts for tightness.

Please contact your authorised distributor for the servicing.

* Option



353 804 3001.0702

Check the particle filter system*

- Examine the glow plug helix for strong distortion and carbonisation.

Please contact your authorised distributor for the servicing.

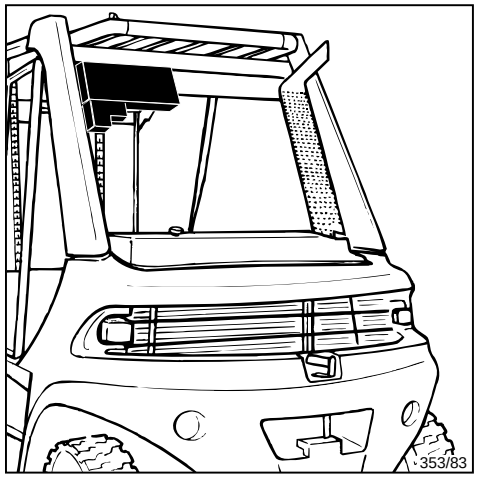
Check valve tip clearances

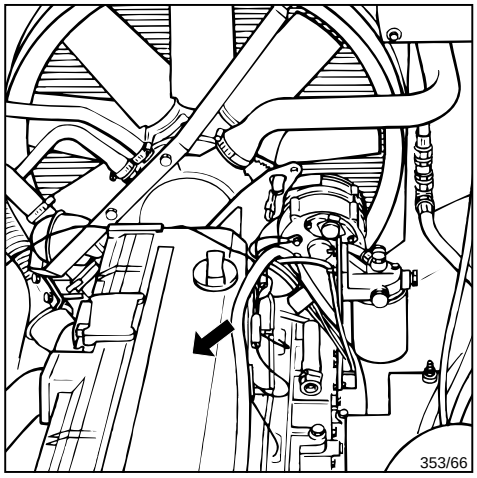
Check and adjust the valve tip clearances only when the engine is cool.

The adjustment must be left to an workshop with the necessary know-how. Please contact your authorised distributor.

353 804 3001.0702

* Option





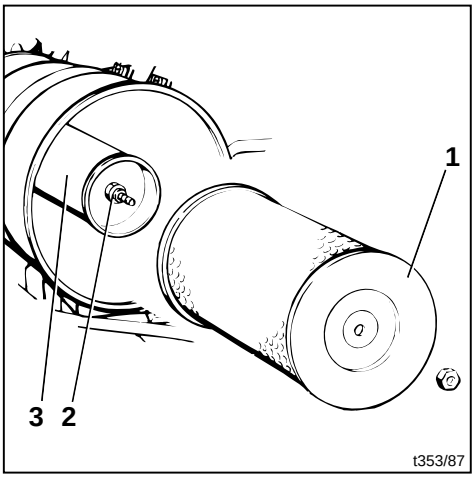
Renew the safety element

- Open the bonnet.
- Remove the air filter cover.

The safety element (3) is must be renewed:

- After cleaning the air filter element (1) five times. Mark the number of services (renewal or cleaning) on the safety element markings.
- After 2 years of operation maximum.
- If, after servicing the main element, the air filter restriction indicator responds again.
- If the air filter element is damaged.
  - Remove the dust bowl.
  - Remove air filter element (1).
  - Unscrew the hexagonal nut (2) and pull out the safety element (3).
  - Install a new safety element and fasten with the hexagon nut (2).
  - Install the air filter element.
- Install the dust bowl.
- Close the bonnet.

ATTENTION
Do not clean or reuse safety elements. Do not start the engine with the air filter element removed.



Renew the hydraulic oil

Drain the hydraulic oil

NOTE
The fork carriage must be lowered completely.

ATTENTION
Follow the rules for handling fuel, lubricants and coolant.

- Position the truck over a repair pit.
- Put a catch tray underneath the truck on the right side.
- Open the bonnet.
- Remove the breather filter with dipstick (2).
- Remove the rubber cover (3) from the cut-out in the frame and remove the drain plug (1) on the hydraulic oil tank.
- Allow the oil to drain completely.
- Clean the area around the oil drain thoroughly.
- Refit the drain plug.
- Refit the rubber cover (3).

Filling/replenishing hydraulic oil

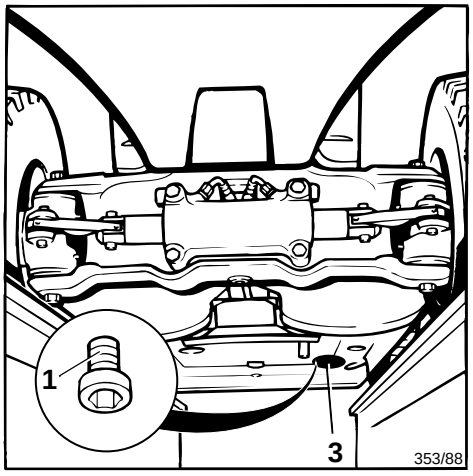
Filling capacity for:

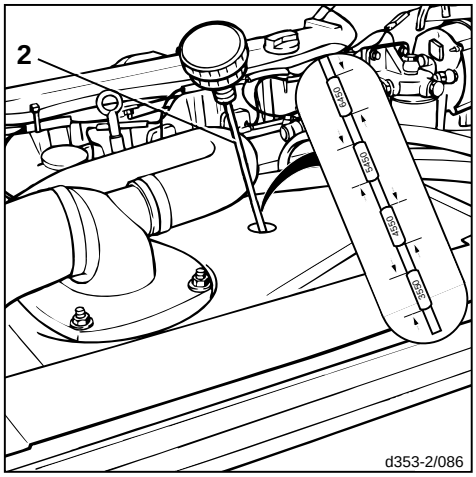
Mast height 3550 mm	77.0 litres
Mast height 4550 mm	82.0 litres
Mast height 5450 mm	87.0 litres
Mast height 6450 mm	92.0 litres

NOTE
The four markings on the oil dipstick are for the different mast heights.

- Fill hydraulic oil at the filler opening.
- Fully screw in the breather filter with the oil dipstick and remove it again.
- Check the oil level with the dipstick (2) and add oil up to the upper mark on the dipstick.
- Run the engine briefly and repeat the oil level check.
- Close the bonnet.

NOTE
The hydraulic system is bled automatically when the engine is running.





353 804 3001.0702

Drive axle hub differential: Renew oil and clean the magnetic plug

- Drive the truck until the drive axle hub differential is at operating temperature.
- Park the truck so that the middle points between wheel bolts (2 and 3) form vertical and horizontal lines; in this parking position the level/filler plug (1) is positioned approx. 22 mm below the horizontal line.
- Jack up the truck at the front left or right and secure the truck on blocks.
- Remove the wheel (see wheel change).
- After removing the wheels, level the truck so that the axle hub differentials lay horizontally. The oil can only completely drain in this position.
- Clean the areas surrounding the level/filler plug (1), filler plug (4) and drain plug (5).
- Place a catching pan under the drain plug (5).
- Screw out the level/filler (1), filler (4) and drain (5) plugs and allow the oil to drain completely.
- Clean the magnetic plug on the drain plug (5).
- Install the drain plug (5) (with magnetic plug) with a new seal and tighten.

Torque on the drain plug (5) ..... 66 Nm

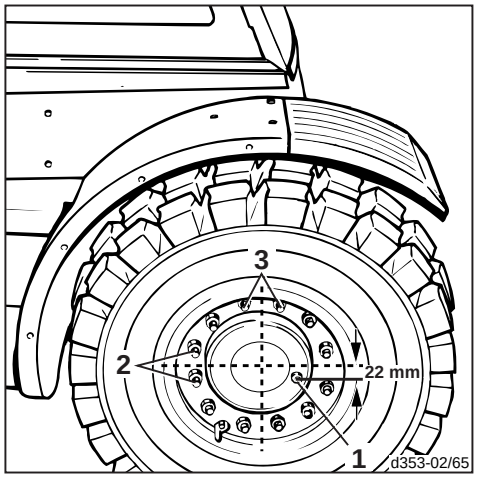
- Add gear oil into the filler plug hole.

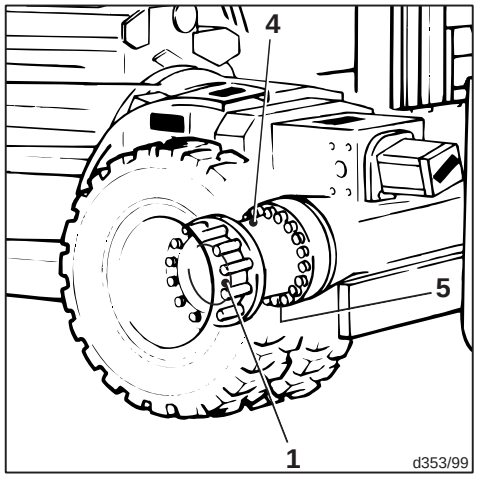
Oil capacity, per side ..... max. 1.5 litres

- Check the axle hub differential oil level after approx. 5 minutes and add oil if necessary. The oil must be up to the base of the level/filler plug hole.
- Refit the filler plug and level/filler plug (with new sealing rings) and tighten securely.

Torque on the level/filler plug (1) ..... 37 Nm
Torque on the filler plug (4) ..... 37 Nm

- Mount the wheel and lower the truck.
- Repeat this procedure for the second drive axle hub differential.





Renew the coolant

In all seasons the cooling system must be filled with a mixture of water and unphosphated glycol-based antifreeze with an anticorrosion additive to provide protection against calcium deposits, frost and corrosion damage, and to raise the boiling temperature.

CAUTION
Do not open the coolant reservoir cap (1) when the engine is hot. The reservoir is slightly pressurised. Danger of scalding.

ATTENTION
Follow the precautions for handling fuels, lubricants and coolant.

- Open the bonnet.
- Place a dish of sufficient capacity.
- Loosen the clamp (2), pull the hose (3) and allow the coolant to drain out.
- Dispose the coolant as required by local laws and regulations.
- Refit the hose and tighten with the clamp.
- Fill new coolant into the coolant reservoir.

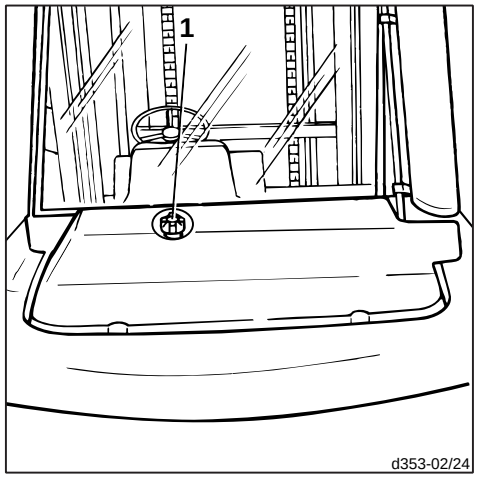
Cooling system capacity ..... approx. 15.0 litres

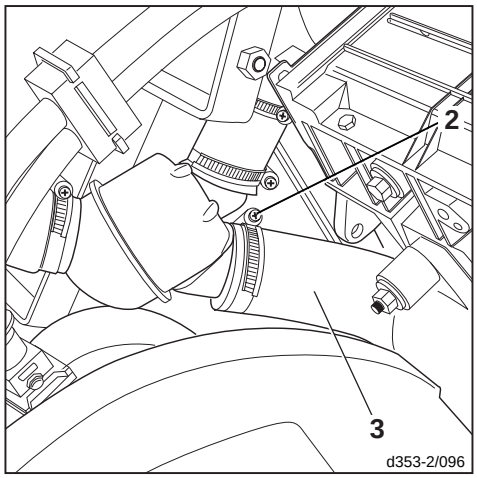
- The antifreeze should be sufficient for temperatures down to -25 °C. The mixing ratio for this is 40% antifreeze and 60% water.

Mixing ratio for lower temperatures:

Temperature	Antifreeze	Drinking water
-30 °C	45 %	55 %
-35 °C	50 %	50 %

- Run the engine until all of the air the cooling system is eliminated.
- Screw on the coolant reservoir cap (1).
- Close the bonnet.





353 804 3001.0702

No.	Assembly	Aids/Oils and Lubrication	Filling Capacity/Rated Values	
1	Engine	Engine oil	With filter renewal	approx. 15.5 litres
2	Fuel tank	Diesel fuel		70.0 litres
3	Cooling system	Antifreeze, drinking water		15.0 litres
4	Hydraulic system	Hydraulic oil	Mast height 3550 mm Mast height 4550 mm Mast height 5450 mm Mast height 6450 mm	77.0 litres 82.0 litres 87.0 litres 92.0 litres
5	Drive axle hub differentials	Gear oil		Capacity with oil change 1.5 litres
6	Battery	Distilled water		As required
7	Tyres	Air		See information on label
8	Wheel mounting nuts			600 Nm
9	Tilt cylinder pivots/steer axle	Grease		As required
10	Mast pivots/overhead guard	Grease		As required
11	Lift chains, mast channels	Linde chain spray		As required
12	V-belt tension	With belt tension gauge: New V-belt After 20 - 30 minutes Till next inspection		 400^{+50} N $300^{\pm 50}$ N $250^{\pm 50}$ N

353 804 3001.0702

Fuel and oil recommendations

Engine oils

API classification CD, CE or CF-4,
CCMC classification D4 or D5.

Oil grades

Prefer oils meeting the API classifications CD, CE or CCMC-D4 to achieve economic operation with the longest oil change intervals possible. In the same way oils meeting classification API-CF-4 or CCMC-D5 can be employed.

If API classification CC oils are used, reduce the oil change interval by half.

The information of the oil manufacturers, as a rule, contains further designations and classifications, for example, API-SE, SF or CCMC-G1-4, MIL-L-..., which are irrelevant for the engine installed in the fork truck.

Trucks equipped with a particle filter* should only be operated with ash-free oils. Residues from the combustion of additives (ash) cannot be regenerated and they will eventually clog the monolith in the long run.

Oil change intervals

During engine operation, part of the oil serving as a lubricant for the piston is burned (consumed). The products of combustion and the high temperatures combined lead to „wear“, particularly of the chemical additives. For this reason, an oil change is required at certain intervals.

Since this oil wear depends on the operating conditions and the quality of the oil (oil performance) and fuel used, oil change intervals of different lengths result.

The longest possible oil change interval for lubricating oil in the engine is 12 months or 500 service hours. This means that the oil must be renewed at least once every 12 months, regardless of the actual service hours.

Oil viscosity

Since the viscosity of lubricants varies with temperature, the ambient temperature at the site determines the viscosity class (SAE class) of the engine oil (see diagram). If the ambient temperature occasionally falls below the temperature limit (e.g. using SAE 15 W-40 at -25 °C), the cold start capability of the engine can be reduced, but no damage to the engine will result.

If the viscosity of the oil is too high, the engine will experience starting problems. Therefore the ambient temperature when the engine is started determines the grade of oil to be used in winter. Seasonal oil changes can be avoided by using multigrade oils. The specified oil change intervals also apply to multigrade oils.

NOTE

Oil additives of any kind may not be added to any of the above-mentioned engine oils. Their use will void the engine warranty.

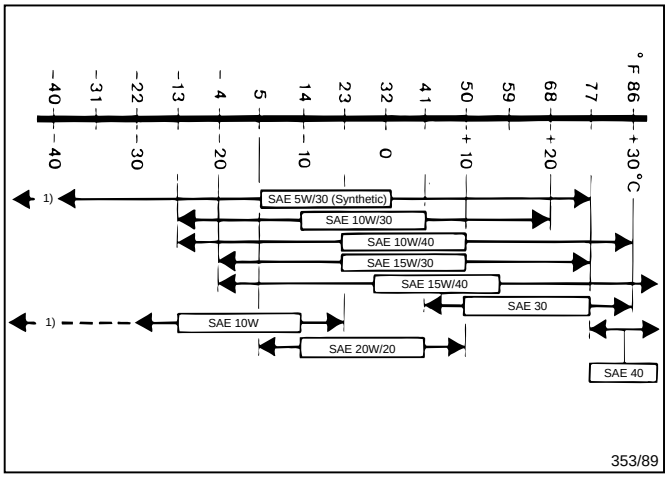
The mixing of different types of oil should be avoided.

Since the temperature ranges of adjacent SAE classifications overlap, the oil does not need to be changed when short-term temperature fluctuations occur.

Use winter engine oil or multigrade oils!

Please note that oil change intervals should be halved when working at temperatures below -10 °C (continuous temperature).

* Option



1) with engine preheating only

353 804 3001.0702

Fuel and oil recommendations

Diesel fuel

Use only Diesel fuel according to DIN EN 590 with a cetane number not lower than 45.

The sulphur content should not exceed 0.5 %. If the sulphur content is 0.5 to 1 %, the oil change intervals must be halved.

If the values are higher, contact the manufacturer of the lift truck or the supplier of the lubricant.

NOTE

As the ambient temperature decreases, so does the viscosity of Diesel fuel due to the precipitation of paraffin. If „summer grade" diesel fuel is used, malfunctions can result. For this reason, „winter grade" diesel fuel that functions reliably at temperatures down to about -22 °C is available in the cold season of the year.

In winter, fill only winter diesel fuel to prevent any clogging caused by paraffin precipitation. At very low temperatures you must reckon with disturbing precipitations even if winter diesel fuel is used. Please first contact your authorised dealer.

CAUTION

For the use of plant diesel fuel (RME acc. to DIN 51606 / preliminary norm) some important items have to be observed.
Please first contact your authorised dealer.

Hydraulic oil

Hydraulic oil recommendation for **normal** duty:
Hydraulic oil **HLP ISO VG 68** to DIN 51524, T.2 (factory filling), average continuous oil temperature 60 - 80 °C.

Hydraulic oil recommendation for **heavy** duty:
Hydraulic oil **HLP ISO VG 100** to DIN 51524 T.2 for heavy duty and multi-shift operation, operation in extreme climate zones or high ambient temperatures, average continuous oil temperature over 80 °C.

Hydraulic oil recommendation for normal and heavy duty:
Hydraulic oil HVLP ISO VG 68 to DIN 51524 T.3 (multigrade oil).

NOTE

The choice of the correct oil is determined by the oil temperature inside the hydrostatic travel drive.

The above-mentioned recommendations are only approximate values.

Bio hydraulic oil

Biologically fast-degradable pressure fluid

Aral Forbex SE 46

ATTENTION

Do not mix bio-oils with mineral oils. Other fluids from other manufactures cannot be recommended.

NOTE

In case of doubt we recommend that you contact your authorised distributor.

Recommendations of representatives of the oil industry should also be checked with your authorised distributor.

Only the above-mentioned oils are approved by the manufacturer. If other hydraulic oils are used or mixed, costly damage can result.

Gear oil

Use oil of classification SAE 80 W - 90 API GL5 by choice, also suitable is SAE 85 W - 90 API GL4 (acc. to DIN 51512).

Grease

Linde heavy duty grease with EP and MOS_2 additives.

Designation acc. to DIN 51825-KPF 2N-20 (see the Parts Catalogue for the order number).

Any mixing with grease types other than lithium-based greases is not allowed.

Coolant

Only use a coolant with a monoethene glycol base with corrosion inhibitor.
Do not mix with anti-freeze containing ethanolamine.

Temperature	Anti-freeze	Drinking water
-25 °C	40 %	60 %
-30 °C	45 %	55 %
-35 °C	50 %	50 %

Battery grease

Non-acidic grease (terminal grease).

Chain spray

Linde chain spray (see Parts Catalogue for order number).

Troubleshooting guide (Diesel engine)

Malfunction	Possible Cause	Remedy	See Page
Engine will not start	Fuel tank empty.	Fill the tank.	21
	Faulty glow plugs.	Replace the glow plugs.	
	Fuel supply not in order.	Disconnect injection line at nozzles, start engine, and check if fuel is being delivered. If there is no fuel delivery, check the fuel lines, fuel filter and tank breather.	67
	Faulty injection nozzles. Injection timing out of adjustment. Faulty injection pump.	These faults should always be checked and remedied by your authorised distributor, as special tools are required.	
	Battery power is too low, battery terminals loose or oxidized, causing poor starter performance.	Check battery, clean terminals, tighten and coat with acid-free grease.	65
Idling problems	Fuel supply not in order.	Renew fuel filter canister. Fuel return or injection lines are leaking, dirty or bent.	67
	Incorrect RPM or adjusting screw loose.	Contact your authorised distributor as special tools are required.	
	Fuel hose between injection pump and fuel filter loose.	Check connections for tightness and replace hose, if necessary.	
	Faulty injection nozzles. Injection timing out of adjustment. Faulty injection pump. Mechanical fault in engine: e.g. faulty engine mounting, damaged piston rings.	These faults should always be checked and remedied by your authorised distributor, as special tools are required.	

353 804 3001.0702

Troubleshooting guide (Diesel engine)

Malfunction	Possible Cause	Remedy	See Page
Excessive black, white exhaust smoke	Air filter dirty.	Clean or replace the air filter element.	49, 70
	Fuel filter dirty.	Renew the fuel filter cartridge.	67
	Maximum RPM out of adjustment. Faulty injection nozzles. Injection timing out of adjustment. Faulty injection pump. Valve tip clearances out of adjustment. Faulty glow plugs. Fuel quality not as specified.	These faults should always be checked and remedied by your authorised distributor, as special tools are required.	79
Poor performance, maximum RPM not reached	Air filter dirty.	Clean or replace the filter element.	49, 70
	Fuel filter blocked.	Renew the fuel filter cartridge.	67
	Fuel lines damaged.	Lines dirty, bent or narrowed. Tank breather blocked.	
	Maximum RPM not reached.	If possible, have your authorised distributor required. check and adjust the RPM, as special tools are	
	Faulty injection nozzles. Injection timing out of adjustment. Faulty injection pump.	These faults should always be checked and remedied by your authorised distributor, as special tools are required.	

353 804 3001.0702

Troubleshooting guide (Diesel engine)

Malfunction	Possible Cause	Remedy	See Page
Fuel consumption too high	Air filter dirty.	Clean or renew the filter canister.	49 ,70
	Idle or maximum RPM too high. Faulty injection nozzles. Injection timing out of adjustment. Faulty injection pump.	These faults should always be checked and remedied by your authorised distributor,as special tools are required.	
Engine overheating	Coolant level too low.	Add coolant. Check the cooling system for leaks, seal if necessary.	21 53, 59
	Water pump V-belt, fan V-belt slack or broken.	Tighten or replace the V-belt.	63, 68
	Radiator fins partly blocked with dirt or foreign objects.	Flush the cooling system with water, and if necessary, clean the radiator cooling fins with a cold cleaner and airjet. **ATTENTION** **The pressure of the air jet must not be too high, as damage to the radiator can result.**	53
	Faulty engine oil filter.	Renew the engine oil filter.	60

Troubleshooting guide (hydraulic system)

Malfunction	Possible Cause	Remedy	See Page
Abnormal noise	Suction filter blocked.	Renew filter.	66
	Suction hoses leaking. Oil foaming.	Eliminate leaks in piping. Check oil level and replenish oil, if necessary.	61, 69, 79
	Hydraulic pump or motor damage; seals defective, ausing air intake.	Have hydraulic unit inspected by an authorised distributor.	
	Incorrect oil viscosity, low oil level in tank or hydraulic pump.	Renew the filter. Change the oil, using specified viscosity. Replenish oil.	74, 79
No or low pressure in system	Suction faulty, noises.	Change oil, add oil.	74
	Pump faulty, leakage loss, pressure valves not closing, valve seat damaged.	Have repaired by an authorised workshop.	
	Pipeline broken or leaking.	Replace line or eliminate leaks.	69
	Oil of low viscosity, causing high leakage losses.	Change the oil, use specified viscosity.	74, 79
	Oil cooler faulty.	Block oil leak; contact an authorized distributor.	
	Oil temperature warning lamp is illuminated.	Check oil level, clean oil cooler.	61, 64
Oil pressure fluctuates	Same cause as under abnormal noise.	See under abnormal noise.	
	Pressure relief valves or boost pressure valves are sticky.	Have system checked by a workshop.	
	Lift and tilt cylinders have tight spots.	Have linings replaced by a workshop.	
	Mast does not extend completely or retracts slightly after being raised.	Replenish oil. Bleed the cylinders.	61
No or low oil flow	Filter blocked (if accompanied by noise).	Clean or renew filter canister.	66
	Pump faulty, leakage losses, pressure limiting valves not closing, valve seats damaged.	Have damage repaired by an authorised workshop.	
	Pipeline broken or leaking.	Replace pipe or eliminate leaks.	69
	Valves blocked.	Have valves checked by an authorised workshop, clean the valves.	
	Hydraulic system overheating.	Check the oil level, use specified oil, clean the oil cooler.	61, 79
Hydraulic oil temperature too high	Pump faulty, valves leaking.	Have repaired by workshop.	
	Oil level too low or oil cooler faulty.	Check the oil level; if necessary, add oil.	61
		Clean the cooler and check for leaks. If faulty, have repaired by a workshop.	53

Electric circuit diagram

A1	Preheating time controller
F1	Fuse, MTA 80 A
F11	Fuse (terminal 30, S1) 10 A
F12	Fuse, preheating time controller supply, shutoff magnet 10 A
4F15	Fuse, horn 10 A
9F13	Fuse, working lights, switch lighting, heater 15 A
9F14	Fuse, options max. 20 A
9F16	Fuse, single pedal 5 A
G1	Alternator with regulator
G2	Battery, 143 Ah
H1	Battery charge indicator lamp 1.2 W
H2	Malfunction in electronic controller*
H3	Engine oil temperature warning lamp, 1.2 W
H4	Hydraulic oil temperature warning lamp, 1.2 W
H5	Engine oil pressure warning lamp, 1.2 W
H6	Air filter restriction indicator lamp 1.2 W
H12	Flasher indicator lamp 1.2 W
H13	Fuel level warning lamp 1.2 W
H24	Fan*
H25	Preheating
H26	Soot filter warning
4H7	Horn 42 W
K2	Starter relay
K3	Signal transmission relay, preheating
K4	Load relay terminal 15
M1	Starter, 3.1 kW
P1	Hour meter
6P3	Composite instrument
R1	Glow plugs
S1	Preheat/starter switch
S2	Engine temperature switch
S3	Hydraulic oil temperature switch
S4	Engine oil pressure switch
S5	Suction filter vacuum switch
S6	Fuel level warning light switch
S7	Temperature switch, additional fuel quantity
S8	Horn push button
S14	Starter lockout switch
S18	Coolant level sending unit
V1	Decoupling diodes
V3	Decoupling diodes
X1	Connector 15 pole
X2	Connector 12 pole
X4	Connector 2 pole
X5	Connector 2 pole
X6	Connector 6 pole
X7	Connector 2 pole
X8	Connector 1 pole
X10	Connector 3 pole
5X13	Connector 1 pole
7X8	Connector 1 pole
7X9	Connector 6 pole
Y1	Shutoff magnet
Y2	Additional fuel magnet

Wire code colours

BU	blue
BN	brown
YE	yellow
GN	green
GY	grey
OG	orange
RD	red
BK	black
WH	white
VT	violet

(a) Lighting, flasher system, electric circuit diagram (options)

(b) Wiring diagram for particle filter

(c) Switching circuit diagram for options

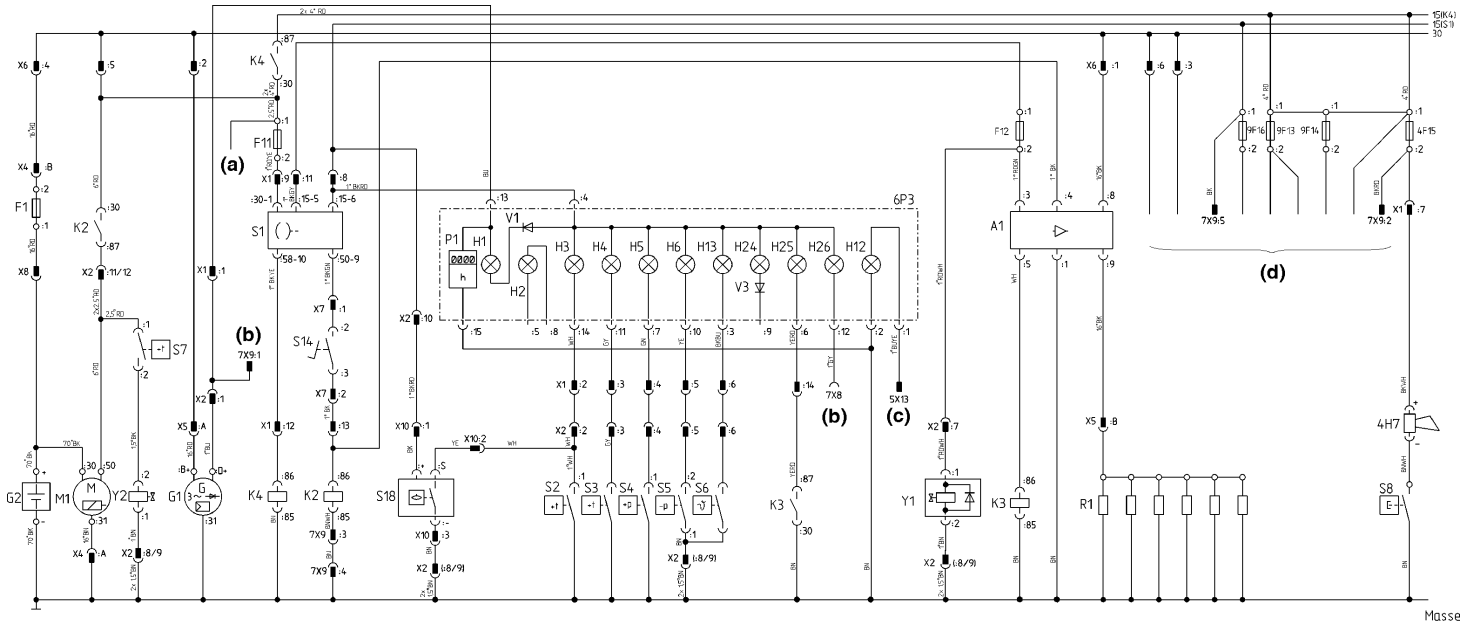
(d) Switching circuit diagram for options and particle filter

All cables without information = 0.75 mm²

* Not used

353 804 3001.0702

Electric circuit diagram



353 802 0126b

353 804 3001.0702

Electric circuit diagram (Options)

5E2	Dip beam, right, 45 W
5E3	Dip beam, left, 45 W
5E4	Side marker light, front right, 4 W
5E5	Side marker light, front left, 4 W
5E6	Side marker light, rear light, left, 10 W
5E7	Side marker light, rear light, right, 10 W
5E8	License plate light, 5 W
9E1-9E6	Working light, 55 W
9E9	Seat heater 80 W
5E13	Dome light 20 W
5F31,32	Fuse, flasher system, 15 A
5F33	Fuse, left side marker lights, 5 A
5F34	Fuse, right side marker lights, 5 A
5F35	Fuse, left dip beam, 10 A
5F36	Fuse, right dip beam, 10 A
9F13	Fuse, heater, switch lighting, working light 15 A
9F14	empty
9F16	Fuse, single-pedal model 5 A
9F20	Magnetic circuit breaker
9F21	Fuse, front wiper, 15 A
9F22	Fuse, top and rear wiper, 15 A
9F23	empty
9F24-26	Fuse, working lights 15 A
5H8	Direction indicator, front left, 21 W
5H9	Direction indicator, rear left, 21 W
5H10	Direction indicator, front right, 21 W
5H11	Direction indicator, rear right, 21 W
5H12,13	Switch lighting, 1.2 W
9H1-9H6	Switch lighting, 1.2 W
5K1	Flasher unit
9K1	Relay, intermittent front wiper
9K2	Relay, intermittent rear and top wipers
9K3	Relay, rear wiper motor
9M1	Windscreen wiper motor, front
9M2	Washer motor, front
9M4	Washer, rear and top
9M6	Heater fan
9M10	Windscreen wiper motor, top
9M11	Washer, front

5S11	Light switch
5S12	Flasher switch
5S13	Direction indicator switch
9S1	Switch, windscreen wiper front
9S2	Switch, wiper rear and top
9S3	Switch, windscreen washer
9S5,6	Working light switch
9S7	Direction switch, single-pedal model
1V11	Freewheel diode*
1V12	Freewheel diode*
5X1	Connector 15 pole
5X3	Connector 6 pole
5X4a	Connector 6 pole
5X4b	Connector 6 pole
5X5	Connector 3 pole
5X11	Connector 6 pole
5X13	Connector 1 pole
9X1	Connector 9 pole
9X2	Connector 6 pole
9X3	Connector 6 pole
9X4	Connector 9 pole
9X5	Connector 2 pole
9X6	Connector 4 pole
9X7	Connector 6 pole
9X8	Connector 6 pole
9X9	Connector 6 pole
9X10	Connector 4 pole
9X11	Connector 3 pole
9X12	Connector 3 pole
9X13	Connector 4 pole
9X14	Connector 4 pole
9X15	Connector 2 pole
1Y1	Solenoid valve, forward direction, single-pedal
1Y2	Solenoid valve, reverse direction, single-pedal

Wire code colours

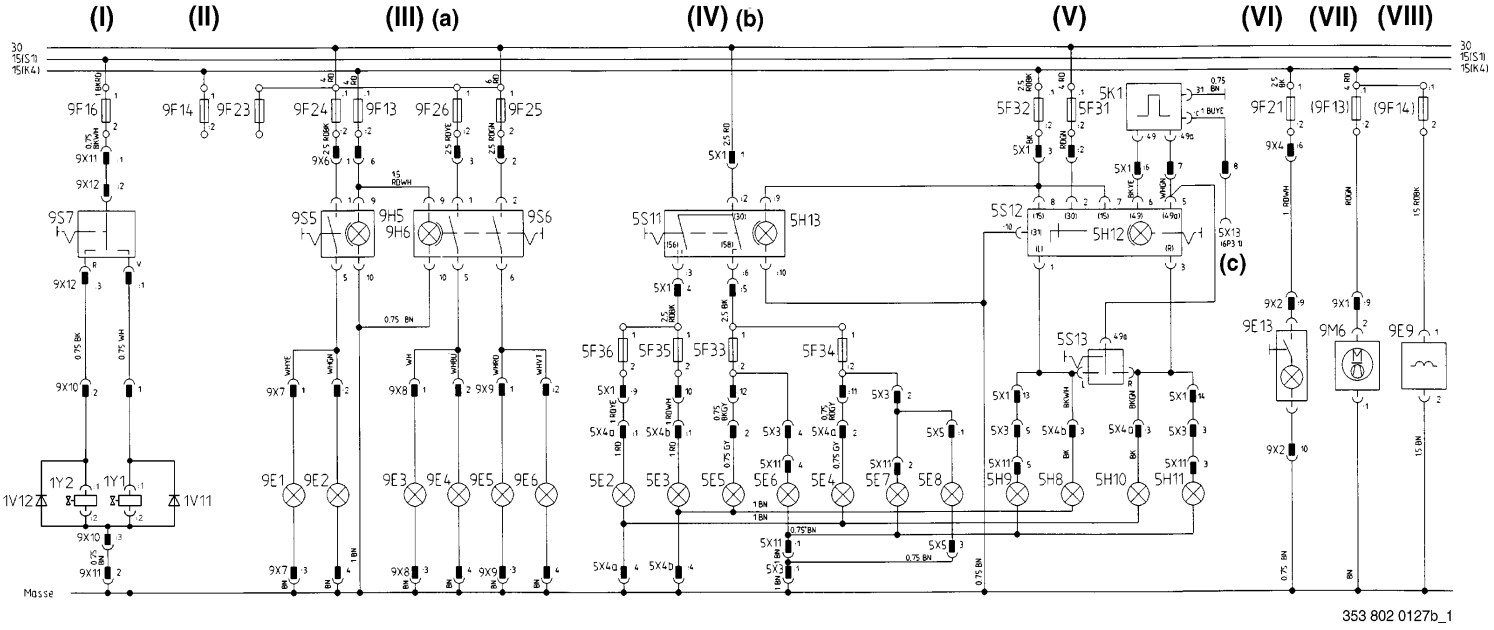
BU	blue
BN	brown
YE	yellow
GN	green
GY	grey
OG	orange
RD	red
BK	black
WH	white
VT	violet

Options

(I)	Single-pedal operation
(II)	Empty
(III)	Working lights
(a)	Numbering of the working lights does not indicate their position
(IV)	Lighting
(b)	Cable set “headlights front” is used twice, thus the marking 5X4a and 5X4b
(V)	Direction indicator and flasher system
(c)	Switching circuit diagram for electrical system
(VI)	Inner lighting
(VII)	Heater
(VIII)	Seat heater
(IX)	Windscreen (front) wiper
(X)	Wiper rear
(XI)	Wiper top
(d)	One connection is bridged in trucks without a washer system. Do not connect anything to switch 9S3.

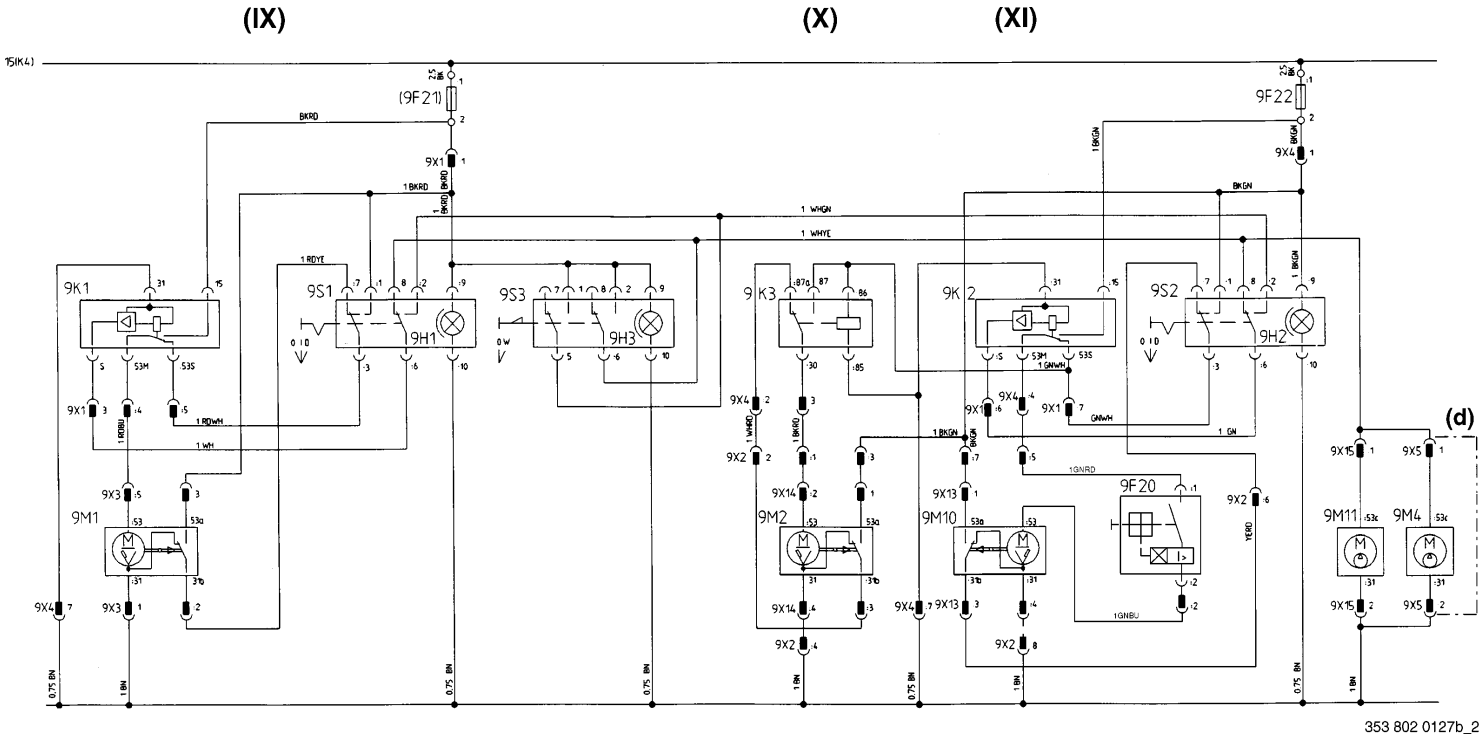
353 804 3001.0702

Electric circuit diagram (Options)



353 804 3001.0702

Electric circuit diagram (Options)



353 802 0127b_2

353 804 3001.0702

Particle filter wiring diagram

7A1 Soot filter controller

7B1 Buzzer 2 W
7B2 Flame sensor 1
7B3 Flame sensor 2

7F15 Fuse, 5 A
7F16 Fuse, 30 A
7F17 Fuse, 30 A
7F18 Fuse, 20 A
7F19 Fuse, 1 A

7H22 Regeneration warning light
7H23 Regeneration fault warning light
H26 Indicator light

7K9 Glow plug current regulator 1
7K11 Glow plug current regulator 2
7K12 Start inhibit relay

7M1 Fan 1, 60 W
7M2 Fan 2, 60 W
7M5 Metering pump 1
7M6 Metering pump 2

7R2 Glow plug 1, 24 W
7R3 Glow plug 2, 24 W

7S16 Starting switch
7S17 Emergency isolator

7V1 Decoupling diode 1
7V2 Decoupling diode 2

6X8 Connector, 4 pin
7X2 Connector, 4 pin
7X3 Connector, 4 pin
7X4 Connector, 2 pin
7X5 Connector, 2 pin
7X9 Connector, 6 pin
7X16 Connector, 16 pin

7Y1 Shutoff valve 1
7Y2 Shutoff valve 2

Wire code colours

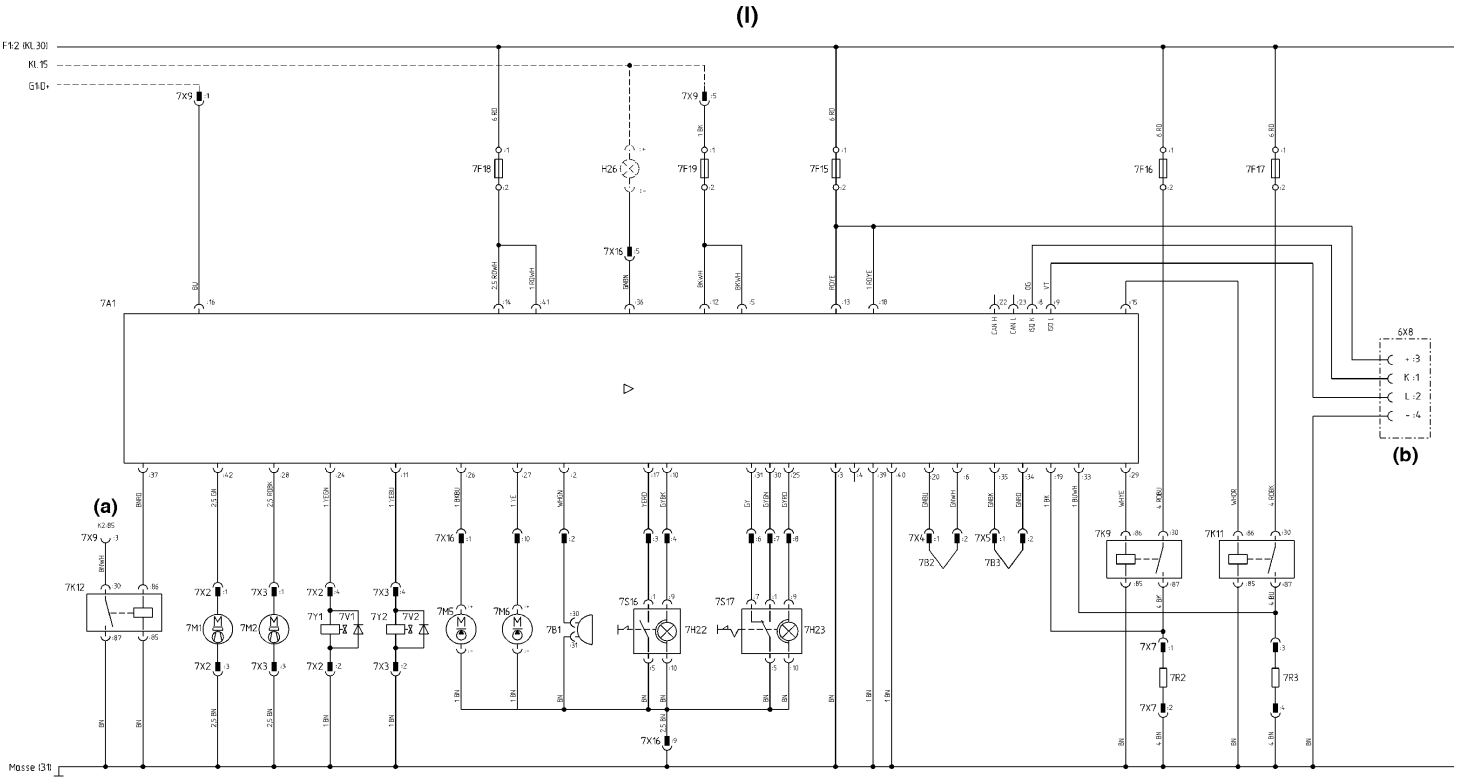
BU blue
BN brown
YE yellow
GN green
GY grey
OG orange
RD red
BK black
WH white
VT violet

The number before the cable colour indicates the cross section of the cable.

All cables without information = 0.75 mm^2

(I) Soot particulate filter with Linde Control
(a) To starting relay
(b) ISO interface

Particle filter wiring diagram



353 802 6005

353 804 3001.0702

Hydraulic circuit diagram

A Working hydraulics

1 Control valve block assembly consisting of:
2 Way valve (supplementary hydraulics)
3 Way valve (supplementary hydraulics)
4 Way valve (tilting)
5 Way valve (lifting)
6 Restrictor
7 Pressure reducing valve
8 2/2-way valve (pressure balance)
9 Maximum pressure valve 265 $^{+5}$ bar
10 Shuttle valve
11 Pressure holding valve
12 Tilt cylinder
13 Slow-down valve
14 Lift cylinder H 50 / H 60
15 Shock valve
16 Lift cylinder H 70 / H 80

B Shuttle valve

C Steering control valve assembly consisting of:

17 Pressure relief valve 150 $^{+5}$ bar
18 Make-up valve 225 $^{+20}$ bar
19 Shock valve
20 Servo valve

D Steering cylinder

E Boost pump

21 Restrictor
22 Gear pump 23 cc/rev
23 Way valve

F Engine

G Engine speed control cylinder

H Variable-displacement hydraulic pump HPV 105-02 consisting of:

24 Variable-displacement pump
25 3/2-way valve
26 3/3-way valve
Reversing lock-out
27 Control piston
28 4/3-way valve - pilot valve
29 Servo piston
30 Combined boost and pressure-relief valve
- pressure-relief valve 285 $^{+15}$ bar (H 50)
- pressure-relief valve 305 $^{+15}$ bar (H 60)
- pressure-relief valve 360 $^{+15}$ bar (H 70 / 80)
- pressure-relief valve 420 $^{+15}$ bar (H 80/900)
31 Boost pressure valve 17.5 $^{+0.5}$ bar

J Working hydraulics - pump

32 Axial piston pump MPF 55

K Steering hydraulics - pump

33 Gear pump 27 cc/rev

L Output limiter

34 6/2-way valve
35 Nozzles
36 Pressure reducing valve 13 bar
37 Pressure-relief valve
38 High-pressure application
39 3/2-way valve
40 By-pass valve

M Travel control unit consisting of:

41 3/2-way valve - signal for engine speed
42 Pressure regulating valve
43 Pressure-relief valve 11 bar
44 Restrictor
45 4/2-way valve - brake actuation
46 2/2-way valve 12 bar
47 4/3-way valve - direction of travel
48 Way valve - selection of direction (single-pedal model)*

O Pressure filter 10 µm

49 Device only for filling

P Hydraulic drive unit consisting of:

50 Pressure-relief valve
51 Restrictor
52 3/3-way valve
53 Hydraulic motor
54 4/2-way directional pilot valve
55 Control piston
56 Multiple disk brake

Q 3/2-way valve - releasing the disc brake

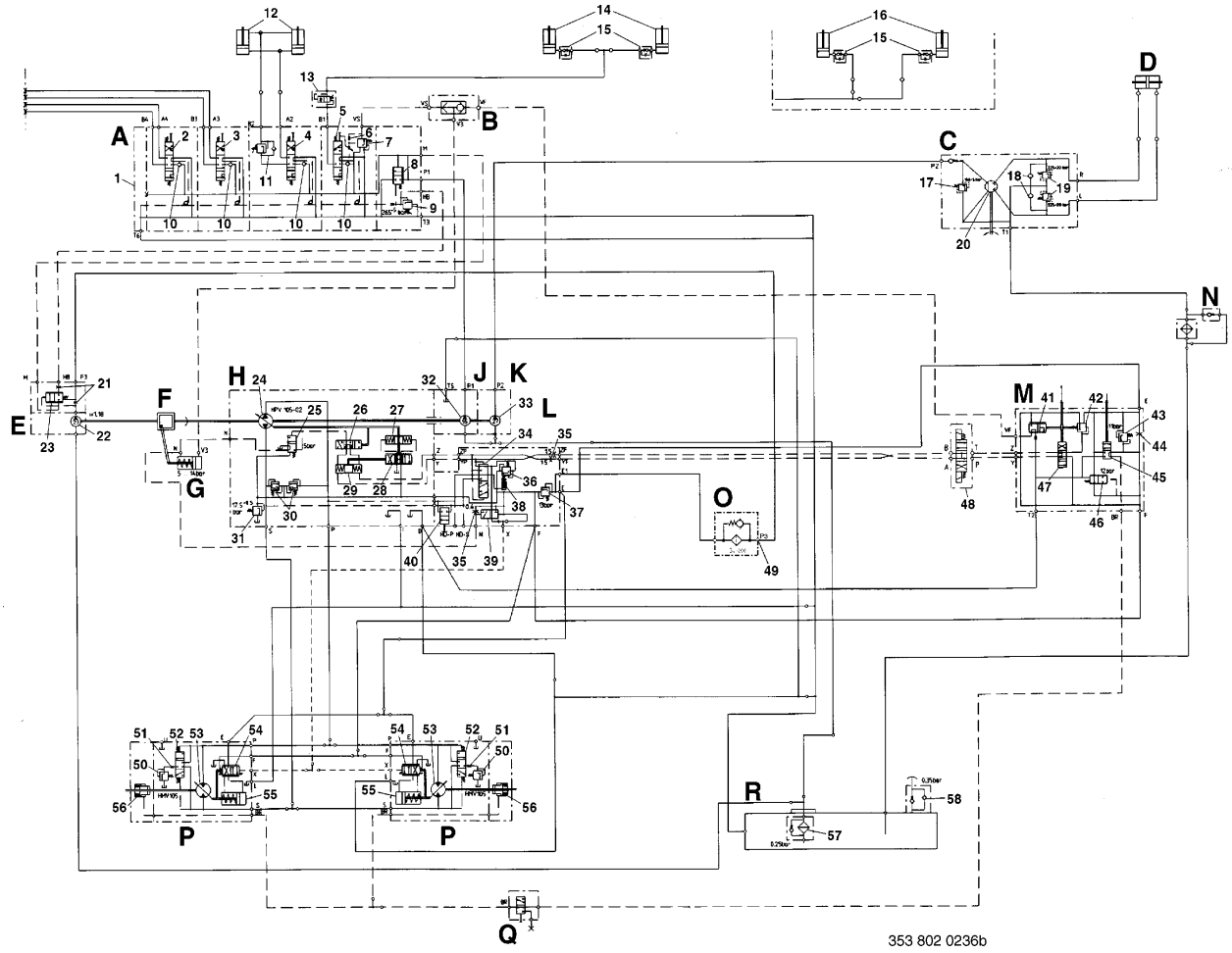
R Oil tank

57 Suction filter 0.25 bar
58 Suction and pressurising valve with filter 0.35 bar

* Option

353 804 3001.0702

Hydraulic circuit diagram



353 804 3001.0702

Index

353 804 3001.0702

Index

353 804 3001.0702

Index

353 804 3001.0702