Electric tow tractor

Linde Material Handling

Operating Instructions

1191 series – 11918011540 rv01 US – 3/2016

Linde – Your Partner

With over 100,000 fork lift trucks and warehouse machines sold annually, Linde is one of the world's leading manufacturers of material handling equipment. There are many reasons for this success: Linde products are renowned not only for their innovative, cutting-edge technology, but also for their low energy and operating costs, which are up to 40 percent lower than those of their competitors.

The high quality of Linde products is also matched by the quality of our service. With ten production plants worldwide and an extensive network of sales partners, we are at your service around the clock and around the world.

Your local Linde partner can offer you a complete package from a single source; ranging from expert advice on all aspects of sales and service through appropriate finance options.

Linde trucks are sold in North America by:

KION North America Corporation
2450 West 5th North Street
Summerville, S.C. 29483
Phone (843) 875-8000
FAX (843) 875-8329

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.

Proposition 65

⚠ WARNING

This warning is provided pursuant to **California Health & Safety Code Sections 25249.5 et. seq.**

This product contains and emits chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

Copyright and proprietary rights

1 Introduction

2 Safety

3 Overview

4 Operation

1

Introduction

Scope

This manual contains operating and periodic maintenance instructions as well as specifications for the industrial truck to which it applies. If this manual applies to a trailer or other towed equipment, then operation or maintenance of the towing vehicle is outside the scope of this manual. Important safety rules and descriptions of some operating hazards and how to avoid them are also included. The manual is intended to assist the owner and operators in maximizing safety and efficiency in material handling while achieving maximum product life. It describes how to correctly and safely operate and maintain the truck and all standard variants available at the time of printing. Special designs, special attachments, or other custom modifications carried out by the manufacturer to meet specialized customer requests are not covered in this manual.

This manual is not a training manual and is not to be used as the basis for formal training. It is intended to supplement such training with information specific to this truck as well as applicable good practices and safety rules which may be general in nature. This manual cannot address every possible hazard or potential accident situation. Ultimately it is the responsibility of the owner and operator(s) of the equipment to avoid or correct such potential dangers.

To assist in keeping the truck in good operating condition, a separate section devoted to maintenance is included in this manual. This section contains a list of items to be checked daily by the operator. It also has a schedule for maintenance procedures to be performed at regular intervals by those responsible for truck maintenance. All of these procedures are essential for safe operation and maximum service life of the truck. Scheduled maintenance tasks or repairs must only be performed by qualified forklift technicians. Details and instructions for performing such work are outside the scope of this manual. This information is covered in the applicable service manual available from authorized dealers.

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

Obligations of the Equipment Owner

The Occupational Safety and Health Administration (O.S.H.A.) requires employers of industrial truck operators to adhere to a number of regulations regarding operation. These regulations are codified in section 1910.178 of title 29 of the Code of Federal Regulations. This section establishes a number of specific rules pertaining to truck operation, inspection and maintenance, and areas of use. It is up to the owner to ensure that use and maintenance of any powered industrial truck is consistent with these rules.

In addition, 29 CFR 1910.178 describes required operator training in detail. It requires employers to establish and maintain a training program to ensure that all operators of powered industrial trucks are competent and trained in the safe and proper operation of powered industrial trucks.

Many of the rules set forth in 29 CFR 1910.178 are based on the American National Standards Institute's (ANSI/ITSDF) B56 standards. The owner should be familiar with 29 CFR 1910.178 as well as the ANSI/ITSDF B56 standards. Other federal standards may apply depending on specific industry. Owners should also be aware of any state OSHA rules that may differ from the federal rule. This equipment meets all applicable requirements of the ANSI/ITSDF B56 standards at time of manufacture. 29 CFR 1910.178 prohibits any modifications and/or additions which affect

capacity or safe operation of industrial trucks without prior written approval of the manufacturer. An owner should consult the authorized dealer if the owner's intended application for a truck is inconsistent with the designated performance characteristics of that truck. KION North America Corporation will not assume, and expressly disclaims, any liability for injuries or damages arising from or caused by unauthorized modification, removal, disconnection or disengagement of any part from any of its trucks. It is recommended that all replacement parts be of OEM (Original Equipment Manufacturer) origin.

Operator Responsibilities

It is the responsibility of the operator to operate any powered industrial truck in a safe manner. In order to do this, all operators must have completed training in the safe operation of powered industrial trucks. Operators must know and understand all general safety rules as well as any safety information specific to the environment in which they will be working. They must then practice these safe operating procedures whenever using a truck.

In addition, all operators must be familiar with the specific truck they use. Therefore they must be familiar with the procedures for correct and safe operation explained in this manual. They must understand the potential hazards and safety precautions covered in the manual. This manual however, cannot cover all possible hazards. Operators must be able to identify any hazards that may exist or arise in their work environment and know how to avoid or correct them.

Finally, operators are responsible for identifying and reporting any truck that is in unsafe condition. They must know how to inspect the truck they operate and they must perform this inspection before placing a truck in service each day. Operators must not operate a truck found to be damaged or malfunctioning.

Proper Use

The truck is designed for towing rolling loads. Some models may also be provided with a designated area for transporting burdens directly on the truck. The maximum draw bar force from towed loads is specified on the truck data plate. The truck is not designed or intended to transport passengers unless a passenger seat or designated riding area is provided.

The truck may be operated outdoors or in buildings only on surfaces that are flat and stable. Operation on inclines and ramps is permitted if the incline surface is flat and stable. If the truck is operated on public roads it must be equipped with lights and any other devices as required by state or local law. If the truck is to be operated in refrigerated storage areas, it must be equipped with an optional cold storage package suitable for the specific application. (Not available on all models.) A truck must not be operated in any hazardous environment unless the truck carries the designation appropriate for that environment per 29 CFR 1910.178. It is the responsibility of the owner to ensure the safety of all operating areas and surfaces and to restrict the truck to the uses and areas for which it is designed and rated.

Hazard messages

Hazard symbols 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. Operators must understand the meaning of these symbols and messages. Damage to the truck, as well as serious injury or death to the operator or others may result if the instructions conveyed by these symbols and messages are not followed.

⚠ CAUTION

Indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury.

⚠ 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.

NOTE

Indicates further information presented to ensure clarification of a particular item

ENVIRONMENT NOTE

The information contained herein must be observed, otherwise environmental damage may occur.

2

Safety

Before Operation

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

Operators must know the UL classification for the truck and use the truck only in permissible areas.

Ensure that there are no loose objects on the truck or in the operator compartment, especially on the floor plate where they could interfere with pedal operation (if equipped) or foot room.

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, or while charging batteries or refueling combustion engine trucks.

Never operate the truck with greasy hands. This will make the controls slippery and result in loss of truck control.

Any questions or concerns about safety should be brought to the attention of a supervisor. If an accident should occur, it must be reported immediately.

⚠ WARNING

Unauthorized modifications to the truck can result in injury or death.

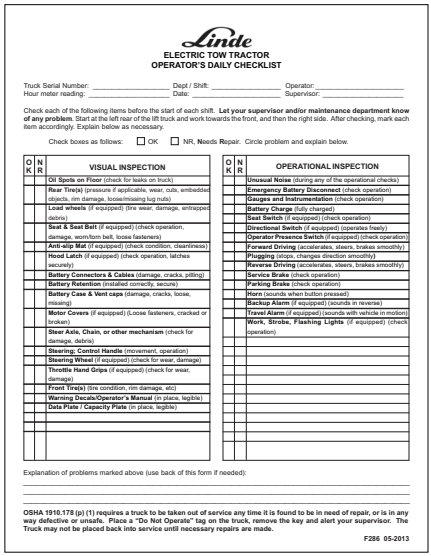
Do not remove, disable or modify any safeguards or other safety devices. These include any alarms, lights, mirrors, overhead guards, and load backrest extensions. If present, an overhead guard is intended to provide protection to the operator from falling objects, but cannot protect from every possible impact.

Operator Daily Checklist

At the beginning of each shift, inspect your truck by using an Operator's Daily Checklist. If necessary, refer to the Maintenance section of this manual for details on how to carry out this inspection. Check for damage and maintenance problems. Any necessary repairs must be completed before the truck is operated. In addition to daily inspection, scheduled maintenance is vital to safe operation of the truck. Adhere to the inspection, lubrication and maintenance schedule given in the Maintenance section of this manual.

NOTE

Any repairs or maintenance to the truck must be performed only by trained and authorized technicians.



Linde

ELECTRIC TOW TRACTOR
OPERATOR'S DAILY CHECKLIST

Truck Serial Number: _____ Dept / Shift: _____ Operator: _____
Hour meter reading: _____ Date: _____ Supervisor: _____

Check each of the following items before the start of each shift. **Let your supervisor and/or maintenance department know of any problem.** Start at the left rear of the lift truck and work towards the front, and then the right side. After checking, mark each item accordingly. Explain below as necessary.

Check boxes as follows: ☐ OK ☐ NR, **N**eeds **R**epair. Circle problem and explain below.

OK	NR	VISUAL INSPECTION
		Oil Spots on Floor (check for leaks on truck)
		Rear Tire(s) (pressure if applicable, wear, cuts, embedded objects, rim damage, loose/missing lug nuts)
		Load wheels (if equipped) (tire wear, damage, entrapped debris)
		Seat & Seat Belt (if equipped) (check operation, damage, worn/torn belt, loose fasteners)
		Anti-slip Mat (if equipped) (check condition, cleanliness)
		Hood Latch (if equipped) (check operation, latches securely)
		Battery Connectors & Cables (damage, cracks, pitting)
		Battery Retention (installed correctly, secure)
		Battery Case & Vent caps (damage, cracks, loose, missing)
		Motor Covers (if equipped) (Loose fasteners, cracked or broken)
		Steer Axle, Chain, or other mechanism (check for damage, debris)
		Steering; Control Handle (movement, operation)
		Steering Wheel (if equipped) (check for wear, damage)
		Throttle Hand Grips (if equipped) (check for wear, damage)
		Front Tire(s) (tire condition, rim damage, etc)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Emergency Battery Disconnect (check operation)
		Gauges and Instrumentation (check operation)
		Battery Charge (fully charged)
		Seat Switch (if equipped) (check operation)
		Directional Switch (if equipped) (operates freely)
		Operator Presence Switch (if equipped) (check operation)
		Forward Driving (accelerates, steers, brakes smoothly)
		Plugging (stops, changes direction smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service Brake (check operation)
		Parking Brake (check operation)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)

Explanation of problems marked above (use back of this form if needed):

OSHA 1910.178 (p) (1) requires a truck to be taken out of service any time it is found to be in need of repair, or is in any way defective or unsafe. Place a "Do Not Operate" tag on the truck, remove the key and alert your supervisor. The Truck may not be placed back into service until necessary repairs are made.

F286 05-2013

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.

The normal operating position is defined as being seated on the seat with hands and feet inside the operator's compartment on or near the controls.

⚠ WARNING

Risk of injury!

Operate the truck only when you are in the normal operating position. Always keep hands and feet inside the operator's compartment during operation.

Travel

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

⚠ WARNING

Loss of control!

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

Always watch for pedestrians. When travelling in reverse (load end leading) be careful of drive end swing. The drive end of the truck will swing out if a turn is made while travelling in reverse. Always use caution when turning into an aisle, especially when towing trailers. The radius for clearance in turns is reduced when towing trailers. Trailers will therefore cut corners during turns more than the truck itself. This can lead to collisions. This effect is magnified when multiple trailers are towed as a train. Plan your route to avoid turns that are too sharp for the trailers to clear.

Multiple trailers connected in a train can not be moved in reverse. Attempts to operate a train of trailers in reverse will push the trailers out of alignment and damage the couplings. Always plan a route that does not require reverse operation when towing multiple trailers.

Unstable loads are hazardous. Ensure all towed loads are secure and correctly coupled to the truck. Never carry anything on any part of the truck unless a specific area has been provided by the manufacturer.

During travel, always watch for overhead obstructions such as lights, wiring, pipes, sprinkler systems, doorways, etc. Never overtake another truck at an intersection, blind spot or other dangerous location. Use the horn at intersections and any location where visibility is limited.

Inclines, Ramps, Docks, Elevators

If you must travel on an incline, do so with caution. Do not operate truck on a wet incline.

⚠ DANGER

Tip-over will occur if you turn while travelling on a ramp or travel at an angle other than straight up or straight down a ramp.

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

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.

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 the truck and the weight of the load. Approach elevators slowly and ensure that the elevator car is level with the floor before entering. Enter elevators squarely with the load end leading. Ensure that no part of the truck or load contacts any part of the elevator other than the floor. Once on the elevator, neutralize the truck controls, shut off the power, and set the brakes. Any other personnel should leave the elevator before the truck is allowed to enter or leave.

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 its position is secured to prevent movement. Never exceed the rated capacity of a ramp or bridge plate.

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.
- If the truck has a manual parking brake, apply it.
- Turn the truck off.
- If the truck has a key switch and the operator is more than 25 ft (7.5 m) away, or out of sight of the truck, the key should be removed.

⚠ WARNING

Failure to properly shut down the truck may allow inadvertent movement and result in a collision.

Never park on a grade. Ensure the parking brake is applied and turn the truck off. On trucks with a direction switch, always place it in neutral.

⚠ WARNING

Improper parking can interfere with emergency response.

Do not block stairways, main passageways or emergency routes. Do not block access to fire or emergency equipment.

Battery Safety

⚠ WARNING

Batteries contain dissolved sulfuric acid, which is poisonous and caustic. Batteries also can produce explosive gases.

Remain aware of the following information.

- Wear protective equipment (protective apron and gloves) and protective glasses when working with battery acid. If clothing, skin or eyes come into contact with battery acid, immediately flush the affected areas with water. If acid contacts the eyes, seek medical attention at once. **Clean spilled battery acid immediately with large amounts of water.**
- Remove any metal rings, bracelets, bands, or other jewelry before working with or near batteries or electrical components.
- Never expose batteries to open flame or sparks.

- Areas in which batteries are stored or charged must be well ventilated to prevent concentration of explosive gases.
- If a battery is charged while installed in the truck, the battery cover must remain completely open during the entire charging period.
- Shorting of battery terminals can cause burns, electrical shock, or explosion. Do not allow metal parts to contact the top surface of the battery. Make sure all terminal caps are in place and in good condition.
- Batteries may only be charged, serviced, or changed by properly trained personnel. Always follow all instructions provided by the manufacturers of the battery, charger, and forklift truck.

Safety During Maintenance

Personnel Qualifications

Only qualified personnel authorized by the owner are permitted to perform maintenance or repair work. All items listed in the Scheduled Maintenance Charts must be performed by qualified forklift technicians only. They must have knowledge and experience sufficient to assess the condition of a forklift truck and the effectiveness of the protective equipment according to established principles for testing forklift trucks. Any evaluation of safety must be unaffected by operational and economic conditions and must be conducted solely from a safety standpoint.

Daily inspection procedures and simple maintenance checks, e.g. checking the hydraulic oil level or checking the fluid level in the battery, may be performed by operators. This does not require training as described above.

Hazardous Substances

Oils

⚠ WARNING

Oils are flammable!

- ➢ Always comply with applicable legal regulations.
- ➢ Do not allow oil to come into contact with hot engine parts.
- ➢ Do not smoke in areas where oils are used or stored.

⚠ WARNING

Oils are toxic!

- ➢ Avoid skin contact, inhalation, or ingestion.
- ➢ If oil mist or vapors have been inhaled, seek fresh air.
- ➢ If oil comes into contact with the eyes, flush thoroughly (at least 10 minutes) with water and then seek medical assistance.
- ➢ If oil is swallowed, do not induce vomiting. Seek medical assistance immediately.

⚠ WARNING

Prolonged intensive contact with the skin can result in loss of natural skin oils and irritate the skin.

- ➢ Avoid skin contact.
- ➢ Wear protective gloves, long sleeves, and eye protection.
- ➢ If oil contacts the skin, wash the affected area with soap and water.
- ➢ Change oil-soaked shoes or clothing immediately.

⚠ WARNING

Spilled oil presents a risk of slipping, particularly when combined with water.

- ➢ Immediately treat spilled oil with an oil binding agent, and then dispose of it according to local regulations.

ENVIRONMENT NOTE

All oils are potent contaminants of water.

- *Recycle used oil if possible.*
- *Always store oil in appropriate containers.*
- *Avoid spills.*
- *Spilled oil should be removed with oil-binding agents at once and disposed of according to local regulations.*
- *If recycling is not possible, dispose of used oil according to local regulations.*

Pressurized Hydraulic Oil

⚠ WARNING

Like other oils, hydraulic oil is flammable, toxic, and a skin irritant.

- ➢ Do not allow hydraulic fluid to come into contact with hot motor parts.
- ➢ Avoid inhalation or skin contact of hydraulic oil.
- ➢ Refer to the safety information under "Oils".

⚠ WARNING

Hydraulic oil is pressurized during operation of the forklift truck and may remain pressurized after shut down. An escaping stream of pressurized hydraulic oil can cause serious injury.

- ➢ If pressurized hydraulic oil is found to be escaping from the truck, shut down the truck immediately and have the leak repaired before returning the truck to service.
- ➢ Only trained service personnel should attempt to repair any portion of the hydraulic system.
- ➢ Do not allow hydraulic fluid to come into contact with the skin.
- ➢ Avoid inhaling spray or mist created by escaping hydraulic oil.
- ➢ Penetration of pressurized fluids into the skin is particularly dangerous if these fluids escape at high pressure due to leaks in the hydraulic system. In case of such injury, immediate medical assistance is required.
- ➢ To help prevent injury, use appropriate personal protective equipment (e.g. protective gloves, long sleeves and industrial goggles).

ENVIRONMENT NOTE

Hydraulic oil is a potent contaminant of water.

- *Recycle used hydraulic oil if possible.*
- *Always store hydraulic oil in appropriate containers.*
- *Avoid spills.*
- *Spilled hydraulic oil should be removed with oil-binding agents at once and disposed of according to local regulations.*
- *If recycling is not possible, dispose of used hydraulic oil according to local regulations.*

Battery Acid

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is toxic.

- ➢ Avoid contact and consumption.
- ➢ In case of injury, seek medical advice immediately.

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is corrosive.

- When working with battery acid, always wear protective clothing and eye protection.
- Do not allow any acid to get onto clothing or skin or into the eyes; if this does happen, rinse immediately with plenty of clean water.
- In case of injury, seek medical advice immediately.
- Immediately rinse away spilled battery acid with plenty of water.

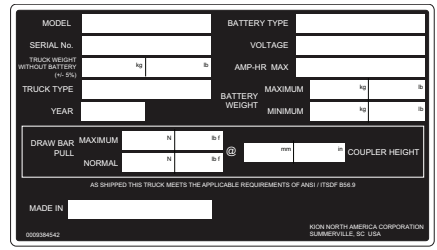
ENVIRONMENT NOTE

- Dispose of used battery acid according to local regulations.

Operator Warning Decals

Data plate

The data plate is designed to inform personnel of truck capacity and other important truck specifications. The operator should locate, read, and understand the data plate prior to using the forklift truck.

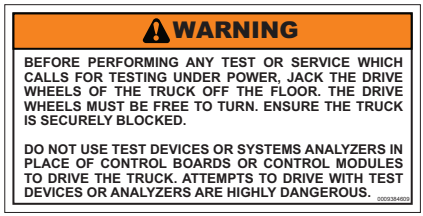


Trained operator warning decal

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

Test or service warning decal

This decal gives important safety information for personnel servicing or testing the truck.



Voltage decal

This decal indicates the proper battery voltage for the truck's electrical system. Using a battery of wrong voltage could damage the truck.

Back up alarm warning decal

This decal is present if the truck is equipped with a back-up alarm. The decal reminds the operator that the alarm must sound anytime the truck is moving in reverse. It also warns the operator to maintain a clear view in the direction of travel.

3

Overview

Technical Description

General

The 1191 series of trucks are electric rider tow tractor models. (ITA class 3). The nominal rolling load capacity is

13,200 lbs (6000 kg) for P60

17,600 lbs (8000 kg) for P80.

13,600 lbs (6200 kg) for W08

Exact capacity is governed by the draw bar rating on the data plate.

Drive unit

The drive unit is comprised of a 48-volt brushless AC drive motor mounted horizontally to a reduction gear unit. The gear unit transfers motor torque to each rear wheel through a differential and two axles. An electro-mechanical brake is installed at the right-hand end of the drive motor. The brake engages whenever the vehicle is stationary or switched off.

Travel control

Travel direction is controlled through a direction selector lever on the steering column. Speed is controlled through an automotive style foot pedal arrangement. When the accelerator pedal is released, the truck will decelerate via regenerative braking. More aggressive slowing is available by moving the travel direction lever into the opposing direction. The degree of braking for both of these functions is adjustable in the truck control software. The foot brake pedal may also be used to engage hydraulic drum brakes on each rear wheel.

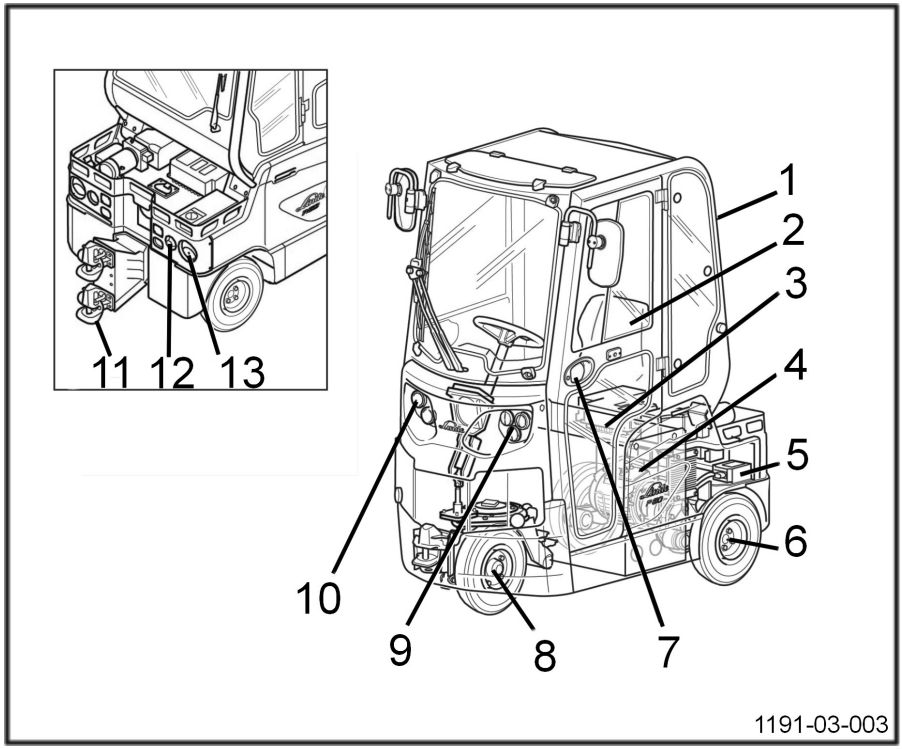
Steering system

The front wheel is manually pivoted through a chain and gear arrangement.

Electrical system

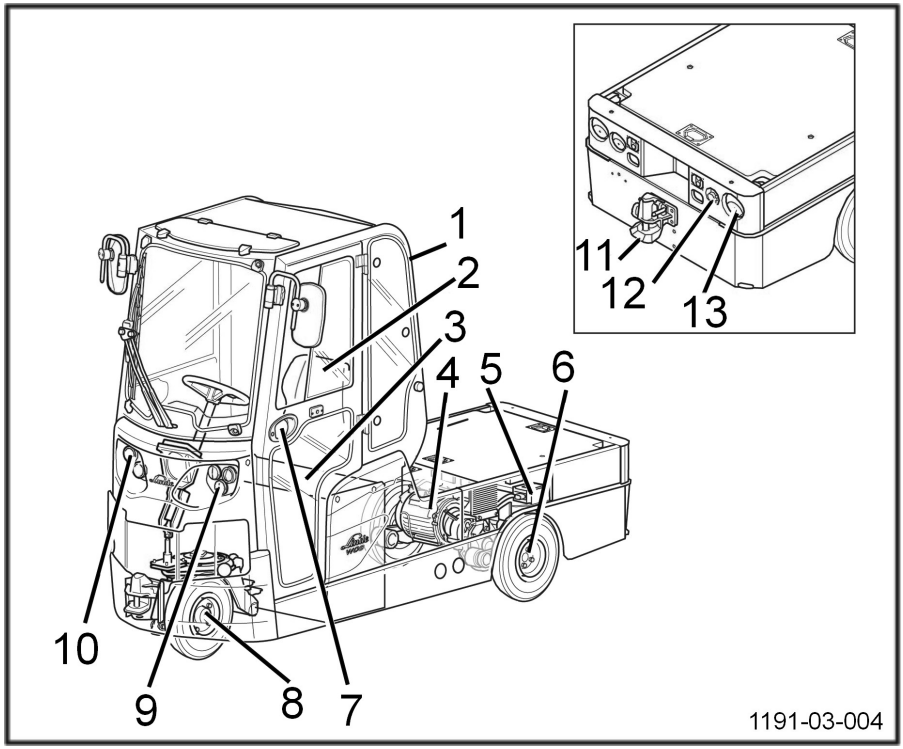
The truck is equipped with a 48-volt electrical system. A single line contactor controls power to the system once the key switch is on. All travel function is controlled by a transistorized main controller. The main controller contains both control logic and an array of power transistors for the drive motor. The control logic processes signals from sensors, interlocks, and operator controls and generates the appropriate release and speed signals to the power transistors to operate the drive motor. One fuse for the power circuit is present. A number of control fuses are used for the remainder of the system and certain options. A diagnostic connector is provided in the wiring harness to connect a handset or laptop computer to the controller for diagnostics or adjustment of certain performance parameters.

General view of the tow tractor



1	Cab (optional)	8	Steering axle and front wheel
2	Driver's seat	9	Dipped beam headlights
3	Battery compartment	10	Direction indicator lights
4	Traction motor	11	Rear tow coupling
5	Electronic control	12	Trailer lighting socket
6	Drive axle and rear wheels	13	Rear light unit
7	Solid door (optional)		

General view of the carrier



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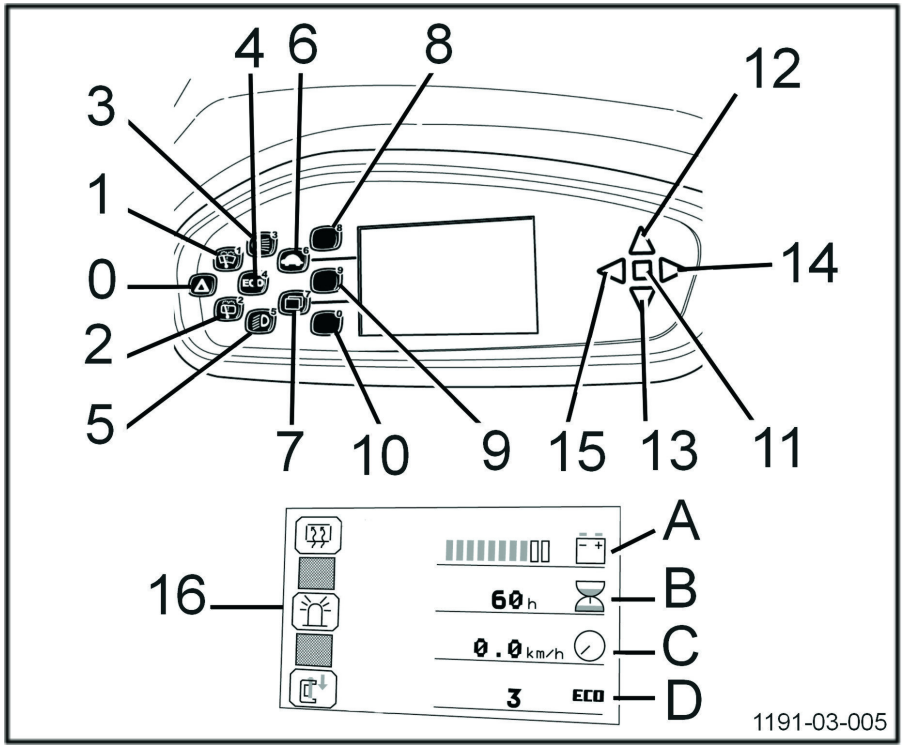
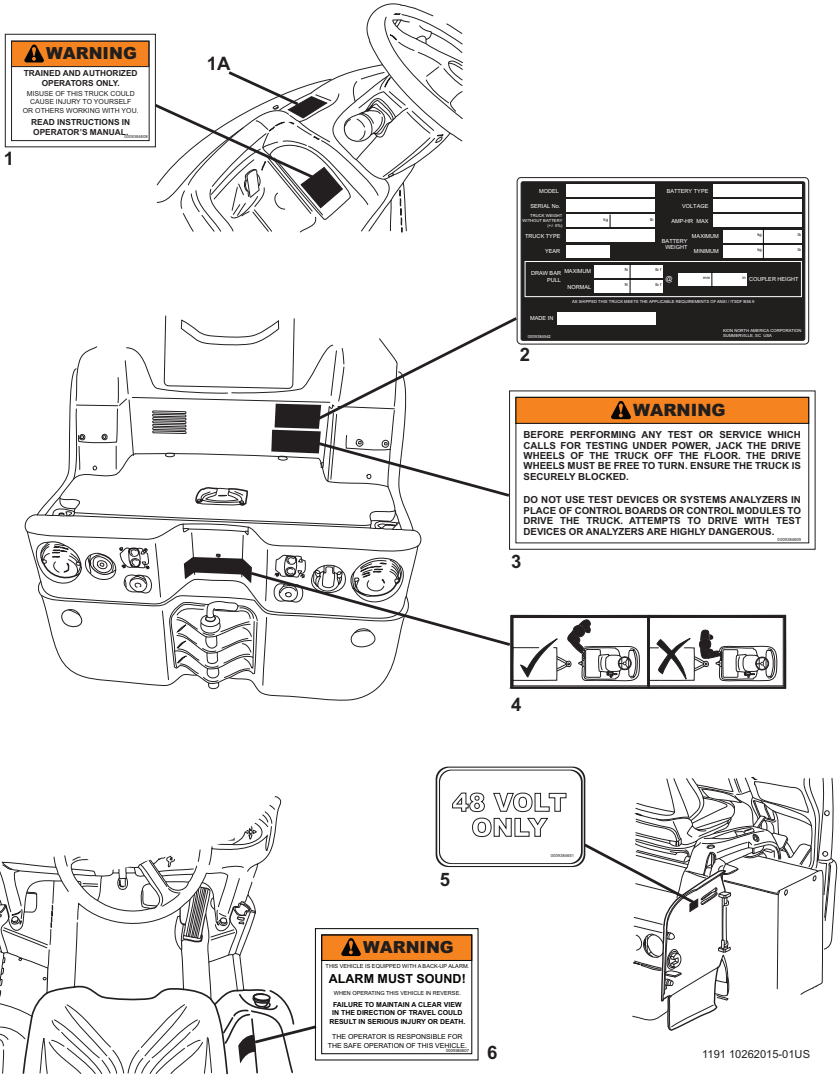
Display



Posi-tion	Icon	Features
0	**Hazard warning lights** button	This button allows you to switch on the hazard warning lights (Warning) and to warn other users of a potential danger.
1	**Front windscreen wiper** button	Press the button briefly to start the front windscreen wiper Press the button briefly a second time to stop the front wind-screen wiper Press and hold the button (for more than 2 seconds) to activate the washer system. Keep holding the button down. This action engages the washer system for the front and rear wipers at the same time.
2	**Rear windscreen wiper** button	Press the button briefly to start the rear window wiper Press the button briefly a second time to stop the rear window wiper Press and hold the button (for more than 2 seconds) to activate the washer system. Keep holding the button down. This action engages the washer system for the front and rear wipers at the same time.

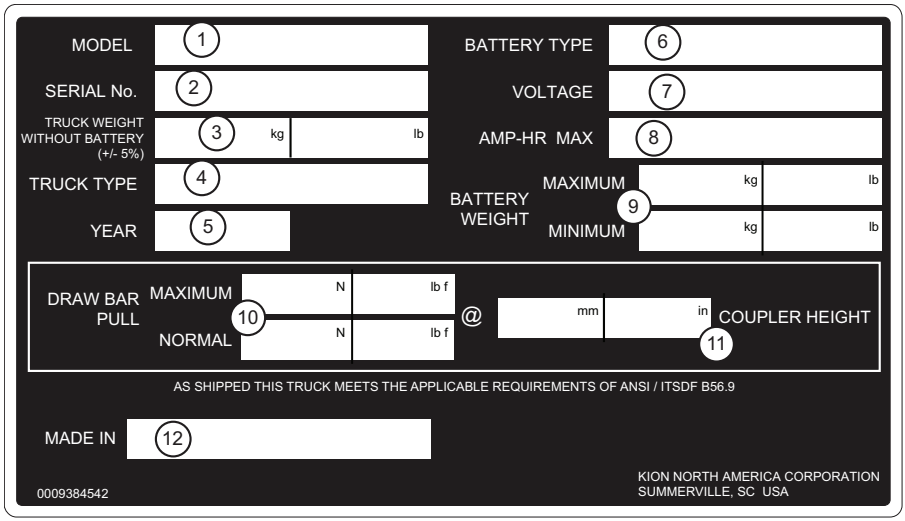
3	**Working light** button	Option that allows you to activate the work lights.
4	**Eco mode** button	Allows you to work in battery-saving mode. Reduces the performance of the tow tractor or the carrier (for example the speed, acceleration).
5	**Signal lights** button	Press once to switch sidelights on. Press twice to switch dipped beams on. Press three times to switch sidelights on and dipped beams off. Press four times to switch sidelights off and dipped beams off.
6	Button for selecting **tortoise** drive programme	Allows you to reduce or increase the speed of the tow tractor.
7	Button for changing the display	For accessing additional options. A long press displays menu 2.
8	**Rear demisting** menu	Allows you to demist the rear window.
9	**Rotating beacon** button	Allows you to switch on the rotating beacon for the cab.
10	Button	Provides access to options (if enabled).
11	**Stop** light	This light signals that the parking brake is applied. It also signals that errors are present.
12	**Forward travel** indicator light	When this indicator light is switched on, the truck is moving forwards.
13	**Reverse travel** indicator light	When this indicator light is switched on, the truck is moving backwards.
14	**Right turn indicator** indicator light	When this indicator light is switched on, the forklift truck driver is preparing to turn right.
15	**Left turn indicator** indicator light	When this indicator light is switched on, the forklift truck driver is preparing to turn left.
16	Start-up screen	Menu 1: A / Battery charge status B / Hour meter C / Speed D / Eco mode Menu 2: A / Odometer B / Number of hours before the next service inspection C / Number of kilometres per day D / Standard mode and tortoise mode

Decal and Data Plate Location



1	Warning Decal, Trained & Authorized Operator	3	Warning Decal, Service Work
1A	Alternate location for item 1 if key pad is present	4	Decal, Jog Button Operation (option)
2	Data Plate	5	Decal, 48 Volt
		6	Warning Decal, Back-up Alarm

Data Plate



(1) **MODEL** – shows the model designation of the truck.

(2) **SERIAL No** – shows the serial number of the individual truck.

(3) **TRUCK WEIGHT** – shows the weight of the truck (in pounds and kilograms). This weight does not include the battery on electric trucks.

(4) **TRUCK TYPE** – shows the designation of the truck with respect to hazardous environments as outlined in 29CFR1910.178. This designation corresponds to the environment(s) in which the truck is approved for use.

(5) **YEAR** – shows the year in which the truck was manufactured.

(6) **BATTERY TYPE** – (electric trucks only) – shows the required battery designation, as outlined in ANSI B56.1. A battery of the correct designation must be installed in order for the TRUCK TYPE designation to be valid.

(7) **VOLTAGE** – (electric trucks only) – shows the system voltage of the truck.

(8) **AMP-HR MAX** – shows the maximum current capacity in amp-hrs for any battery to be used in the truck.

(9) **BATTERY WEIGHT** – (electric trucks only) – shows the allowable weight range (MAX and MIN) for the battery in pounds and kilograms.

(10) **DRAW BAR PULL** – the NORMAL field gives the maximum towing force (in pounds and kilograms) that can be continuously applied to the truck. The MAXIMUM field gives the maximum towing force that can be safely applied to the truck for brief periods (e.g. acceleration; gradients).

(11) **COUPLER HEIGHT** –shows the height above the floor at which the draw bar pull ratings shown are applicable.

(12) **MADE IN** – shows the country in which the truck was originally manufactured.

Data Plate

4

Operation

Unloading and Preparing a New Truck for Operation

When unloading a new truck, it may be necessary to tow or lift the truck. See the corresponding sections in this manual for instructions regarding towing or lifting.

Before placing a new truck into service, perform the Daily Maintenance Inspection as found in the Maintenance section.

The truck can then be operated at full speed immediately upon being placed in service. However, during the first 50 operating hours, avoid subjecting the drive motor to high continuous loads.

⚠ WARNING

Wheel mounting hardware sometimes requires several cycles of tightening before it fully seats. For this reason, wheel mounting screws or nuts will often work loose in the period immediately following initial tightening.

When placing a new truck into service, the wheel mounting screws or nuts must be checked for tightness every 10 hours until no further loosening is detected. See the procedure for checking wheels and tires in the Maintenance section.

Operator Compartment Adjustments

Safety guidelines for adjustment work

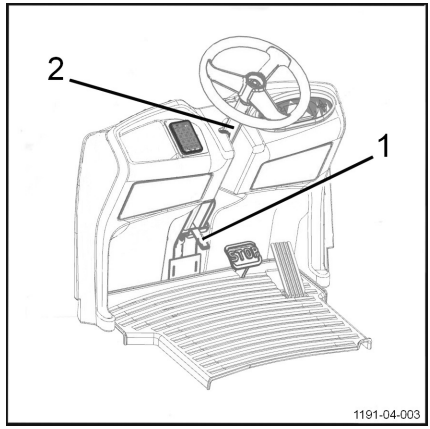
⚠ WARNING

Do not make adjustments while driving, as this could cause you to lose control of the tractor.

Carry out adjustment work only when the tow tractor is at a standstill.

Once the adjustment work is complete, check that the item is positioned and secured correctly.

Steering column adjustment ▷

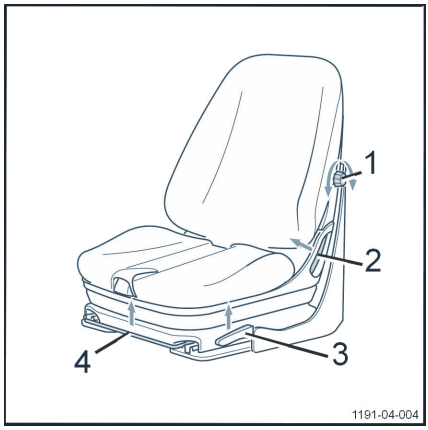


It is possible to adjust the steering column (2) to obtain a more comfortable driving position.

Proceed as follows:

- ➢ Unlock the lever (1) by pulling it upwards Hold the steering wheel because the steering column (2) will lower by itself
- ➢ Move the steering wheel and the steering column to the desired position
- ➢ Lock the lever (1) again in the lower position

Adjusting the driver's seat



It is advisable to adjust the seat to ensure a comfortable driving position.

The instructions below may vary from one seat to another. Depending on the seat chosen, certain settings may not be available.

Adjusting the backrest

➢ The lever (2) is used to change the tilt of the seat backrest.

Adjusting the suspension

The lever (4) allows you to adjust the height of the seat depending on the weight of the forklift operator.

The seat is fitted with a spring suspension.

➢ Sit on the seat to adjust it

➢ Adjust the driver's seat to the weight of the forklift operator and therefore to the desired height using the lever (4)

➢ Release the lever to lock the driver's seat in position

Front or rear adjustment

⚠ WARNING

Do not place your hands in the adjustment rails.

It is advisable to leave one hand on the steering wheel while adjusting the seat.

➢ Lift the lever (3) to move the driver's seat forwards or backwards

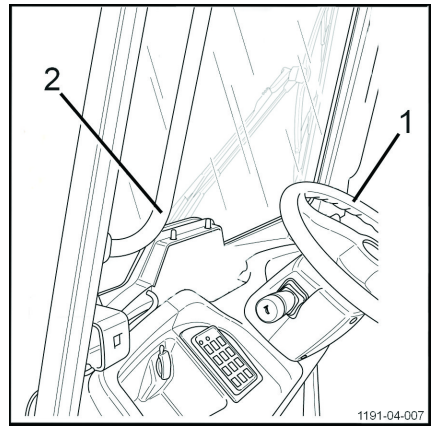
➢ Move the driver's seat into the desired position

➢ Release the lever to lock the driver's seat in position

Lumbar adjustment (if equipped)

➢ Use the turning knob (1) to adjust the lumbar support

Entering and exiting the tow tractor



⚠ WARNING

Risk of falling, tripping or slipping when climbing into/out of the tractor.

Face the tractor when entering or exiting.

Make sure that the step is clean.

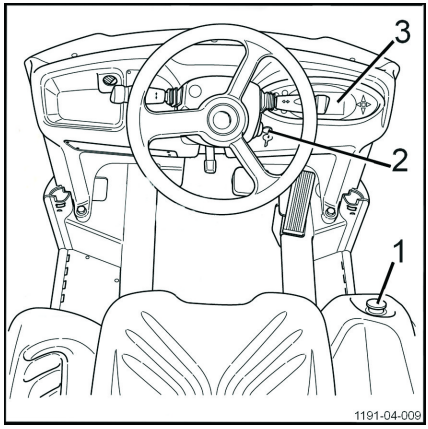
- ➢ Use the steering wheel (1) to help you enter or exit the tractor
- ➢ Use the vertical bar (2) (in the case of a tractor equipped with a cab)

⚠ WARNING

Pay attention to your surroundings when climbing out of the tractor.

Driving

Starting using a key



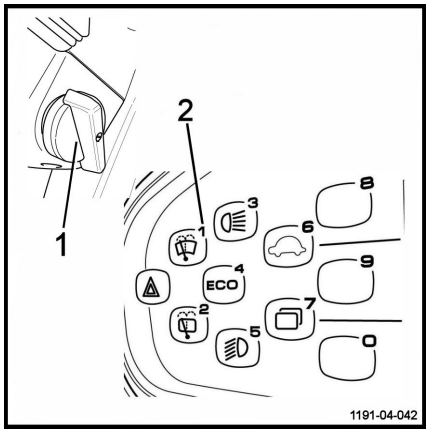
NOTE

Check that no commands are activated before starting the tow tractor.

- Check that the battery is connected and locked, and that the door is closed correctly
- Check the condition of the steps. Enter the tow tractor
- Sit on the seat and adjust it
- Release the emergency off switch (1) if it has been pressed
- Turn the key (2) clockwise.

The driver's display (3) will illuminate.

Starting using an electronic key



NOTE

Check that no commands are activated before starting the tow tractor.

- Check that the battery is connected and locked and that the door is closed correctly.
- Check the condition of the steps. Enter the tow tractor.
- Sit on the seat and adjust it.
- Release the emergency off switch if it has been pressed.
- Turn the turning knob (1) clockwise.
- Using the numbered keys (2), enter the five-digit PIN code.

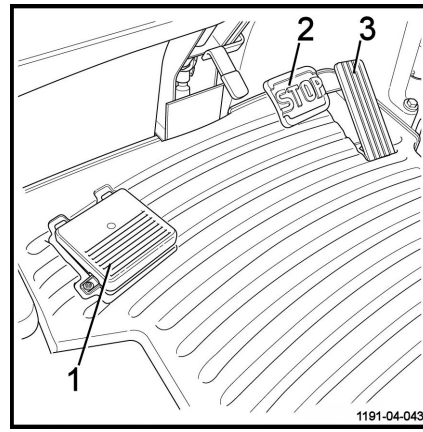
NOTE

NOTE: The default PIN code is 1 2 3 4 5.

The driver display will illuminate.

Interlock Pedal (optional equipment) ▷

The interlock pedal (1) must be held down with the operator's left foot in order for the truck to travel. If the pedal is released during travel, the accelerator pedal will no longer function and the brake will be automatically applied.

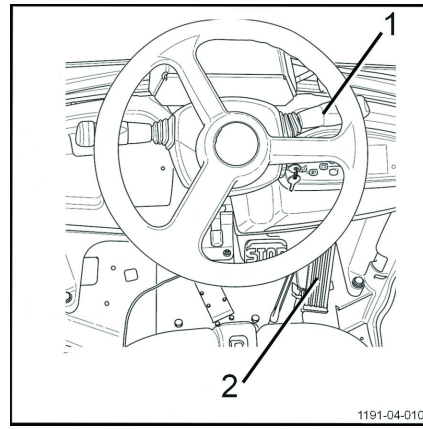


Forward travel ▷

⚠ WARNING

Identify the direction selection lever. Depending on the model ordered, the selector for forward travel and for reverse travel may be found to the right or to the left of the steering wheel.

- ➢ Push the direction selection lever (1) upwards
- ➢ Depress the accelerator pedal (2) gently. The tractor will move forwards. The tractor speed increases depending on how far the accelerator is depressed



NOTE

Depressing the accelerator pedal fully will not increase the rate of acceleration. The maximum rate of acceleration is regulated automatically.

NOTE

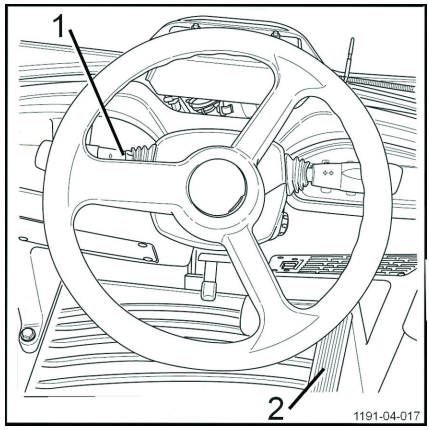
Carefully check that your path is clear before performing the manoeuvres.

Adapt your driving to the ground and to the environment.

When approaching and going round a bend, slow down and drive carefully.

The **Curve Speed Assist** option is available. This option allows you to automatically adjust the speed of the tractor when cornering. It is an aid to driving.

Reverse travel



⚠ WARNING

Identify the direction selection lever. Depending on the model ordered, the selector for forward travel and for reverse travel may be found to the right or to the left of the steering wheel.

⚠ WARNING

Exercise caution during reverse travel.

The field of vision is reduced.

It is necessary to adapt your speed.

- ➢ Push the direction selection lever (1) downwards
- ➢ Depress the accelerator pedal (2) gently. The tow tractor will move backwards. The tractor speed increases depending on how far the accelerator is depressed

NOTE

Depressing the accelerator pedal fully will not increase the rate of acceleration. The maximum rate of acceleration is regulated automatically.

NOTE

Carefully check that your path is clear before performing the manoeuvres.

Changing the drive direction

⚠ WARNING

Carefully check the surrounding area before performing this manoeuvre.

- ➢ Release the accelerator pedal

➢ Using the direction selection lever (1), select the opposite drive direction

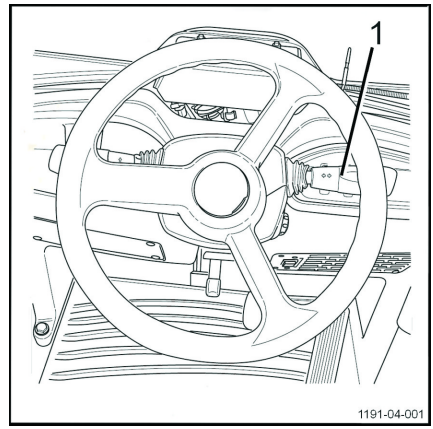
➢ Depress the accelerator pedal. The tractor will accelerate in the new direction

NOTE

The direction control lever can be moved directly to the opposite direction of travel without releasing the accelerator pedal. The tractor will be braked electrically to a standstill then accelerated smoothly in the opposite direction.

Changing direction

▷



NOTE

Always check the surrounding area before changing direction.

⚠ WARNING

Identify the direction indicator. Depending on the model ordered, the selector for changing direction may be found to the right or to the left of the steering wheel.

Turning to the right

➢ Push the direction indicator (1) upwards or downwards depending on which side of the steering wheel the direction indicator is located

➢ Check the change of direction information on the display

➢ The right-hand direction indicators operate and indicate your intention to turn right

Turning to the left

➢ Push the direction indicator (1) upwards or downwards depending on which side of the steering wheel the direction indicator is located

➢ Check the change of direction information on the display

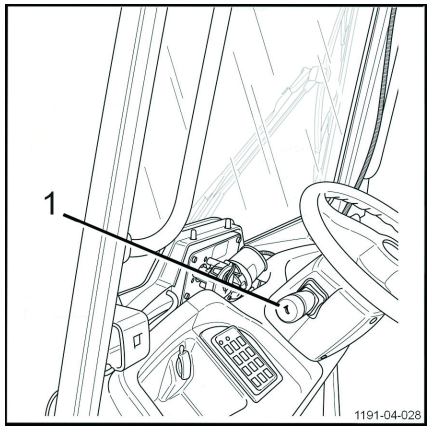
➢ The left-hand direction indicators operate and indicate your intention to turn left

Horn

The horn must be used in the following situations:

- On routes where there is poor visibility
- At junctions
- In the event of immediate danger

➢ Press the control selector (1).



Operating ECO mode

With efficiency mode, called ECO mode, you can save battery power. This mode decreases the performance (speed, acceleration) of the tow tractor or carrier.

It is possible to choose between three levels of ECO mode:

- ECO mode 1: Economic
- ECO mode 3: Efficiency
- ECO mode 5: Performance

Only After-Sales Service can change the mode choice that has been selected.

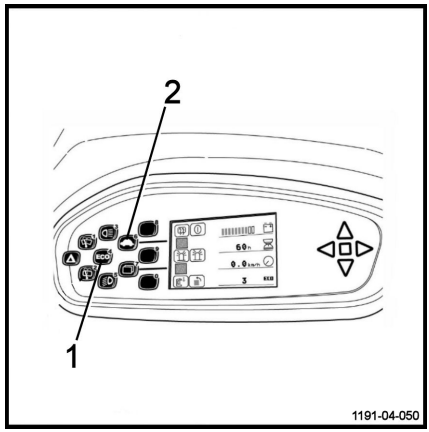
To activate ECO mode, proceed as follows:

➢ Press the ECO(1) button

If mode 1 is the chosen default setting, the tow tractor remains in mode 1 even if the operator presses the ECO(1) button.

If mode 3 is the chosen default setting, the tow tractor enters mode 1 if the operator presses the ECO(1) button.

If mode 5 is the chosen default setting, the tow tractor enters mode 1 if the operator presses the ECO(1) button.



If ECO mode is activated and the operator steps off the truck, the following functions are deactivated:

- Main beam lights are switched off To switch the main beam lights back on, just press button 5 for the signal lights The sidelights remain lit
- The heating is turned off
- The rear defroster is switched off
- The front windscreen wiper and the rear window wiper are stopped Press button 1 for the front windscreen wiper or button 2 for the rear window wiper to switch these back on
- The seat heater is switched off

There is a five-second delay before the different functions are switched off.

To deactivate ECO mode, proceed as follows:

➢ Press the ECO(1) button

The speed reduction function

With the speed reduction button (2) or tortoise button, you can reduce the speed of the tractor or of the carrier.

To activate this function, proceed as follows:

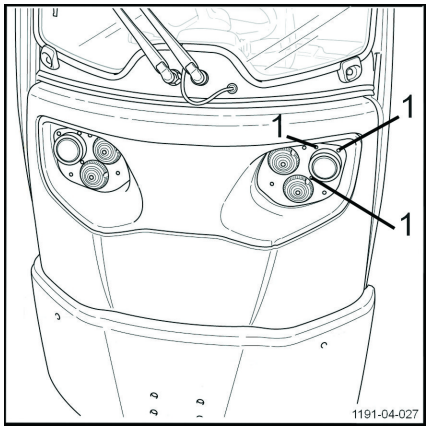
➢ Press the tortoise button (2).

Below is a list of tow tractor performance and carrier performance depending on the functions activated.

		Tow tractor speed (km/h)		Carrier speed (km/h)	
		Tortoise button not activated	Tortoise button activated	Tortoise button not activated	Tortoise button activated
Forward travel	ECO Mode 1	16	12	16	12
	ECO Mode 3	18	12	18	12
	ECO Mode 5	20	12	20	12
Reverse travel	ECO Mode 1	10	8	10	8
	ECO Mode 3	10	8	10	8
	ECO Mode 5	10	8	10	8

This list of performance takes the default factory-set speeds into account. Specific adjustment work can be performed by the After-Sales Service at the customer's request.

Lighting option



⚠ WARNING

Risk of accident

If the truck needs to be used outdoors at night, it must be equipped with headlights.

We recommend that you switch off the main beam headlights when the truck is at a standstill.

The headlights are available as an option. They allow you to use the tow tractor and the carrier in poorly lit areas.

Turn off the main beam headlights when the forklift operator leaves the truck.

Check the condition of the signal lights. Report any faults identified to your manager.

⚠ WARNING

Risk of burns

Do not touch the headlights, particularly the main beam headlights, during and after operation.

It may be necessary to adjust the main beam headlights.

➢ Adjust the 3 screws (1) to adjust the lights

Starting on an incline

When the tow tractor needs to be stopped and restarted on an incline, proceed as follows.

- ➢ Stop the truck using controlled electrical and hydraulic braking
- ➢ To move off, press the accelerator. The tow tractor is equipped with a starting aid option for use on an incline
- ➢ The parking brake is released automatically

NOTE

Depressing the accelerator pedal fully will not increase the rate of acceleration. The maximum rate of acceleration is regulated automatically.

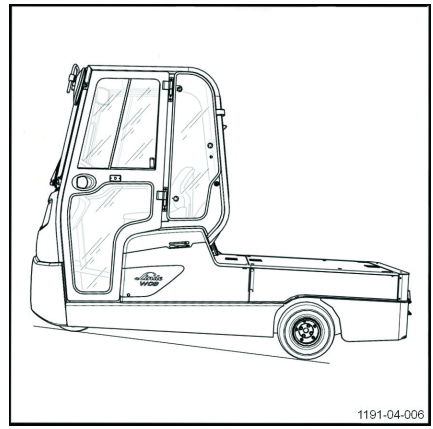
It is important to drive carefully when on an incline. The forklift operator must adapt the speed to the incline.

DANGER

Risk of loss of control

Drive slowly on an incline.

If the tractor is towing a trailer, do not manoeuvre on an incline.



Before leaving the tow tractor

DANGER

Risk of collision!

Always park the tow tractor in an open area. It must not cause congestion or a dangerous situation.

- ➢ Park the tow tractor
- ➢ The parking brake is activated automatically
- ➢ Switch off the ignition using the switch key or turning knob
- ➢ Remove the key
- ➢ Press the emergency off switch
- ➢ Disconnect the battery if the tow tractor is not being used for an extended period of time

Braking

⚠ DANGER

Heavy braking of the tow tractor may move the loads. There is also a risk that the trailer may no longer be in alignment with the tractor.

Most emergency stops can be avoided if you travel at an appropriate speed and allow for road and load conditions.

Lift off braking

The tractor is equipped with automatic lift off braking.

➢ Release the accelerator pedal (2) The tow tractor will be electrically braked until it comes to a standstill

⚠ DANGER

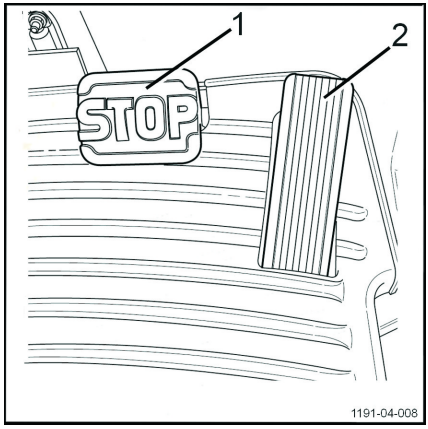
Do not rely on lift off braking to stop the tractor in an emergency.

Always use the hydraulic brake pedal (1) in an emergency and press the emergency off switch if necessary.

Hydraulic brake pedal

➢ Release the accelerator pedal (2)

➢ Press the brake pedal (1)



NOTE

Depressing the brake pedal actuates the hydraulic brakes on all three wheels. It is recommended that, before starting the tractor, drivers acquaint themselves with the function and effect of the hydraulic brake while the tractor is in an unladen state.

Engaging and releasing the parking brake

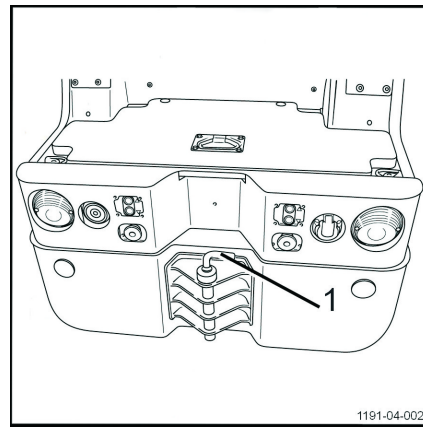
The parking brake is automatically activated when the tractor is at a standstill.

It is automatically deactivated when the tractor starts to move again.

Activating the emergency off switch activates the parking brake.

Trailer Coupling

Connecting and Disconnecting Trailers



NOTE

The standard hitch is illustrated. Other custom hitches may be installed per customer specifications. Follow the manufacturer's instructions for operating such hitches.

⚠ WARNING

Loose hitch mounting can result in trailer or hitch damage, loss of control and injury from accident.

Always ensure that the hitch mounting hardware is secure before connecting any trailer to the hitch.

Connecting Trailers

➢ Carefully maneuver the truck into position near the tongue or draw bar of the trailer to be connected.

⚠ WARNING

Personnel can be injured if caught between the truck and trailer while positioning the truck to engage the hitch.

Never allow personnel to come between the truck and trailer while the truck is moving.

NOTE

If the truck is equipped with the optional inching buttons, these may be used to back the truck into position. The inching buttons are described in the following section.

➢ The standard hitch has three sections to accommodate tows of various heights. Select the section of the hitch closest to the height of the trailer tongue or draw bar. The tongue or draw bar of the trailer should be horizontal when the trailer is in its normal travel position. For hydraulically operated trailers, this is usually the raised position.

➢ For the standard hitch, push the tow pin (1) down against spring pressure and turn it 90 degrees, then lift it out.

➢ Insert the trailer tongue or draw bar into the hitch and replace the tow pin. Ensure the

tow pin passes completely through the hole in the tongue or draw bar so that it engages the hole in the lower plate of the hitch. For custom hitches, follow the manufacturer's instructions for connecting trailers.

Disconnecting Trailers

⚠ WARNING

Disconnected trailers will roll away uncontrolled if disconnected while on an incline.

Always ensure that the truck and all connected trailers are on a flat level surface before disconnecting trailers.

➢ Disconnect the trailer from the hitch by removing the tow pin and removing the trailer tongue or draw bar. Replace the tow pin when the trailer is clear of the hitch.

Inching mode option

The inching mode function (Inching) cannot be used when a forklift operator is sitting in the driver's seat.

⚠ DANGER

Risk of crushing feet. Never step between the tractor and the trailer when operating the inching mode control buttons.

Stand to the side, clear of the tractor wheels.

Wear safety footwear.

⚠ WARNING

Risk of slipping

Do not perform this adjustment when on an incline.

To facilitate trailer coupling, inching mode control buttons (Inching) can be found to the rear of the tow tractor.

➢ Check that the surrounding area is clear and allows you to manoeuvre safely

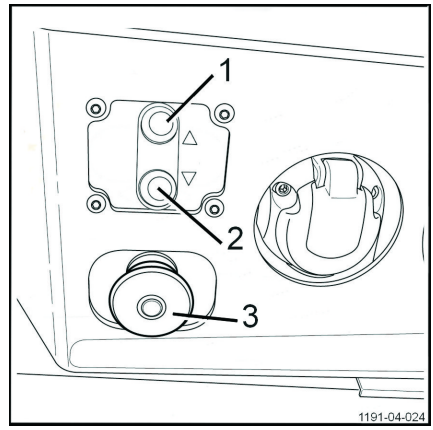
➢ Stand clear of the tractor wheels and press the button (1) for forward travel or the button (2) for reverse travel

Each time these buttons are pressed, the tractor moves a short distance forwards or backwards.

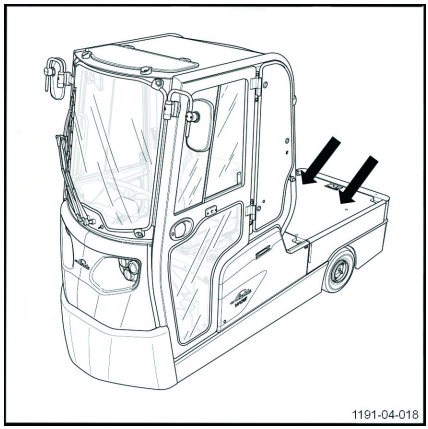
The emergency off switch (3) actuates the parking brake in order to stop the tractor, and cuts off the power supply.

➢ Always take care when making the adjustments

➢ Pull the emergency off switch (3) to restore the power supply



Loading the platform



⚠ CAUTION

Ensure that the weight of the load does not exceed the capacity of the tow tractor (150 kg) or the carrier (800 kg).

Refer to the nominal capacity specified on the capacity label for the tow tractor or carrier.

It is important that the platform is loaded correctly.

Load the tractor or the carrier on firm and level ground.

Ensure that the load of the carrying compartment is:

- Properly secured (use the tie-down rings)
- Stable
- Centred
- Evenly distributed
- Suitable for the size of the tow tractor or carrier
- Suitable for the nominal load capacity of the tow tractor

Check that the load is not damaged.

Do not transport oscillating loads.

Check that the load does not obscure the signal lights to the rear of the tractor.

There must be nobody in the tractor or carrier during loading and unloading.

⚠ DANGER

Risk of injury

Safety footwear must be worn.

Transporting people is strictly prohibited.

⚠ DANGER

Risk of loss of stability

It is essential to slow down when approaching a corner or on wet floors.

Adapt your driving to the load being transported and to the size of the load.

Cab option

The tow tractor and the carrier can be equipped with a cab featuring various options.

Five cab types are available.

Depending on the type chosen, the cab may have:

- Rigid doors, flexible doors or no door
- Front and rear window wipers
- Interior/exterior rear-view mirrors
- An optional heating/demisting function

⚠ WARNING

Risk of accident

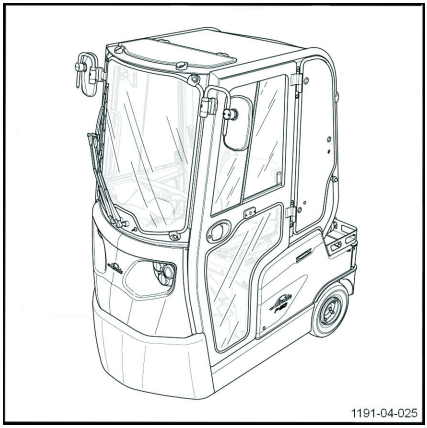
Always take care to keep the windscreen and the windows clean and in good condition to ensure visibility.

The cab may not, under any circumstances, be considered equivalent to an overhead guard. It is therefore important that the loads being transported are positioned correctly, regardless of the equipment fitted to the tow tractor or carrier.

⚠ WARNING

Risk of accident

Before driving through access doorways, ensure that the height of the tow tractor or carrier fitted with a cab is suitable for the height of the doorway.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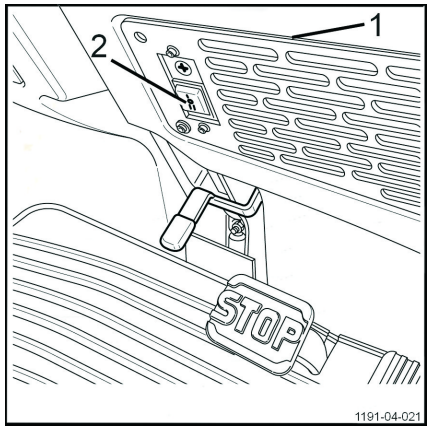
Heating/demisting option



All cabs can be equipped with the heating option. This option is also used for demisting.

The heating system is supplied by the battery.

The switch panel (1) is at knee height, and is located to the right of the steering column.

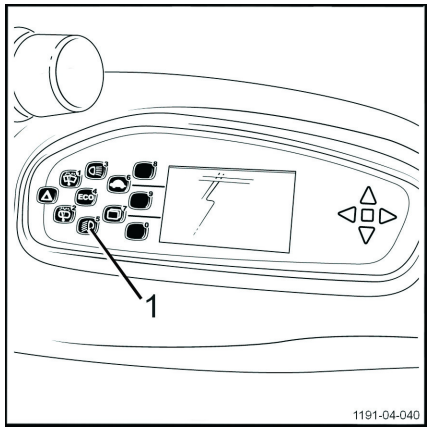
The control button for heating (2) has three positions:

- Position 0: heating is switched off
- Position 1: corresponds to speed 1
- Position 2: corresponds to speed 2

➢ Use the control button (2) to reach the desired intensity

The same control button is used for heating and demisting.

Automatic lights option



The tow tractor can be equipped with automatic signal lights.

The side lights switch on automatically when the forklift operator sits in the driver's seat.

To switch the signal lights on or off, simply press the button (1) on the display.

➢ Press once: main beam headlights on

➢ Press twice: main beam headlights off and side lights on

➢ Press three times: main beam headlights off and side lights off

Battery

Accessing the battery

⚠ WARNING

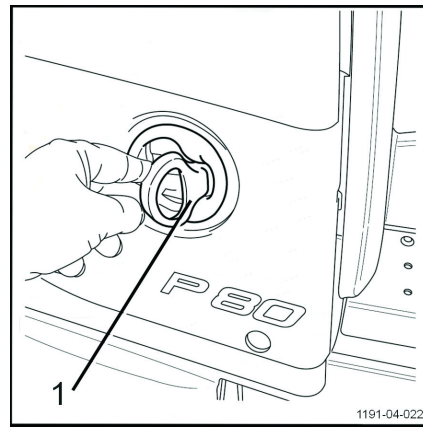
We recommend that you wear safety footwear when carrying out any work on the tow tractor.

Opening the battery compartment

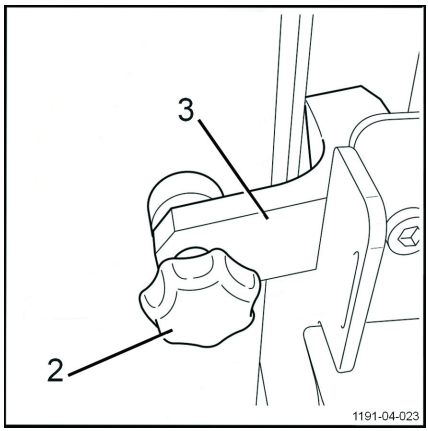
- Immobilise the tow tractor
- Switch off the ignition and remove the key
- Press the emergency off switch
- Climb out of the tractor, paying attention to your surroundings

The battery compartment can be found on the right-hand side of the tractor.

- Open the battery compartment door using the handle (1)



Unlocking the battery



- Disconnect the battery
- Turn the handwheel (2) to unlock it
- Lift the stop (3)

You can now pull the battery towards you using a suitable tool (see chapter entitled "Battery replacement" below).

⚠ WARNING

Risk of trapping fingers

Always wear suitable gloves when handling the battery.

Locking the battery

⚠ DANGER

Risk of damage to the tow tractor or injury to a person

It is essential that you lock the battery before closing the battery compartment door and manoeuvring the tow tractor.

- Fully lower the stop (3)
- Turn the handwheel (2) to lock it
- Connect the battery

The battery is now locked.

Closing the battery compartment

It is essential that you close the battery compartment door before driving. The door will close only if the battery is locked correctly.

- Carefully check that the battery is locked correctly
- Close the battery compartment door

⚠ WARNING

Risk of trapping fingers

Do not position your fingers at the edge of the door when closing it.

- Restart the tractor

Changing the Battery ▷

⚠ WARNING

Specialized training is required to handle batteries safely.

Batteries may only be changed by properly trained personnel in accordance with the instructions of the battery manufacturer and the following procedure.

The battery can be changed in various ways:

- Using a pallet jack (taking care to stay within its permissible load carrying capacity) in conjunction with an appropriately sized battery support fixture.
- Using specialized side extraction equipment or a transfer tray if the truck is equipped with the optional battery roller tray.

⚠ WARNING

If any lifting equipment (forklift trucks or other lifting equipment) used to change a battery has insufficient load carrying capability and/or forks whose length is too short, there is a risk of accidental injury or death.

Use only equipment of sufficient size and load carrying capability to change batteries.

➢ Park the truck safely.

➢ Switch off the truck and remove the key.

➢ Press the emergency stop button.

➢ Open the battery compartment door.

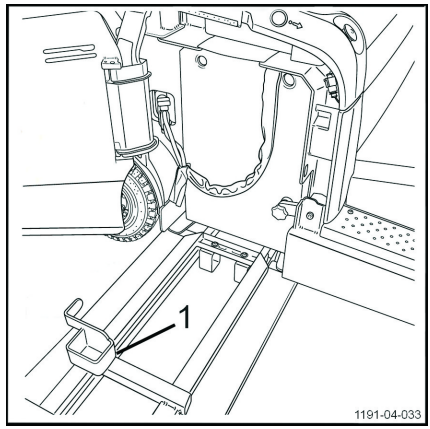
⚠ WARNING

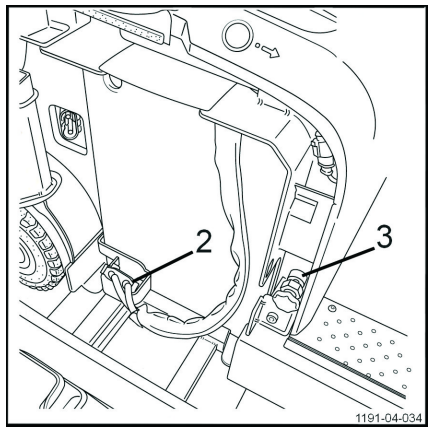
Shorting of battery terminals can cause burns, electrical shock, or explosion.

Do not allow metal parts to contact the top surface of the battery. Make sure all terminal caps are in place and in good condition.

A specially designed battery changing fixture is available from Linde which will adapt most pallet jacks for battery removal.

➢ If using a pallet jack with battery fixture, position it beneath the truck at the battery. Ensure the handling fixture corner stop (1) is correctly aligned with the battery. If using side extraction equipment or a transfer tray, position it beside the truck.





- Disconnect the battery connector. If using the Linde battery support fixture, place the connector in the location provided (2). Otherwise, carefully place the connector on top of the battery as it is withdrawn.
- Unlock the battery retainer at the knob (3) and lift the retainer out of way.
- If using a pallet jack, carefully raise it just enough to lift the battery off of the battery support rails of the truck and move it slowly out of the truck chassis. If the truck is equipped with the optional battery rollers the battery may be rolled out of the battery compartment.
- Check the battery for leaking acid, cracked housing or raised plates.
- Check that the battery plug and cable are in good condition and leave the battery in a safe place.

⚠ WARNING

Batteries of incorrect size or weight can reduce traction and braking ability.

Install only batteries whose weight meets the specification listed on the truck data plate.

- Carefully position the replacement battery in the battery box. Disconnect and remove any battery handling equipment.
- Swing the battery retainer into position and tighten snugly against the battery with the knob.

⚠ WARNING

On trucks equipped with battery rollers, an unsecured battery can roll out of the truck during operation and cause severe injury.

Ensure that both battery retainer plates are in place before operating the truck.

- Plug the battery plug into the battery connector socket.
- Close the battery compartment door. Ensure it is latched securely.

⚠ WARNING

Batteries produce explosive gases.
Always store batteries in well ventilated areas.

Connecting the Battery to an External Charger

⚠ WARNING

Specialized training is required to charge batteries safely.

Batteries may only be charged by properly trained personnel in accordance with the instructions of the charger manufacturer and the following procedure.

⚠ WARNING

Explosive gases are released during battery charging.

Charge batteries only in well ventilated areas.

- ➢ Park the truck safely.
- ➢ Turn off the key switch and press the emergency stop button.
- ➢ Open the battery door.

⚠ WARNING

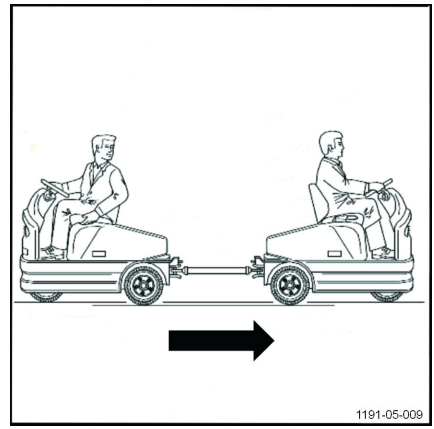
Dangerous concentrations of explosive gases can occur during battery charging if the battery door is not open.

The battery door must be left completely open during the entire charging period to allow ventilation.

- ➢ Unplug the battery connector.
- ➢ Attach the battery connector on the battery cables to the connector plug of the external battery charger.
- ➢ Charge the battery in accordance with the charger manufacturer's instructions.

Towing the Truck

If the truck cannot be switched on, the automatic brake must be manually released. Two M6x55 mm screws are required for use as brake spring override screws in this procedure.



⚠ CAUTION

Do not tow a tow tractor with a mechanical failure in the transmission or steering system in case further damage is incurred.

In an emergency, use a maintenance dolly or other suitable equipment.

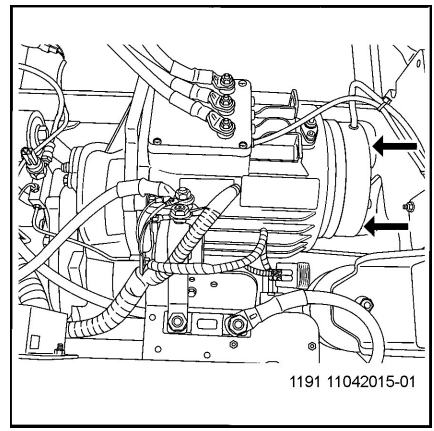
- Remove the load.
- Ensure that the direction selection lever of the tow tractor is in the neutral position.
- Attach a towing vehicle (with sufficient tractive and braking force) to the tow coupling using a **SOLID** tow bar.
- Disconnect the battery.

⚠ CAUTION

If the truck can not be switched on, the mechanical brake will remain applied and the drive wheels will not turn.

To prevent damage from dragging the drive tires, the mechanical brake must be overridden.

- Remove the rear access cover and install two M6x55 mm screws into the two override screw holes in the brake. Tighten the screws evenly and slowly until the truck can roll.
- Someone must be seated on the tractor being towed in order to steer it and to operate the brakes if required.
- **When towing the tractor, do not exceed the maximum recommended speed of 10 km/h.**



⚠ CAUTION

Ensure that the vehicle used for towing has sufficient tractive and braking force to tow the tractor safely.

Towing the Truck

NOTE

When towing on a gradient, reduce speed to a minimum and ensure that wheel chocks are available.

Transporting the tow tractor

⚠ CAUTION

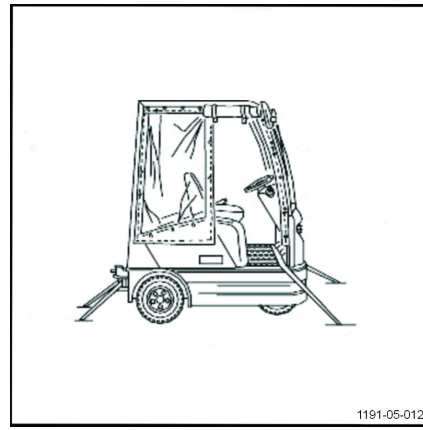
To secure the tow tractor in order to transport it, use only the attachment points shown.

Using attachment points other than those shown may damage the tow tractor.

NOTE

Protect the areas on the tow tractor that come into contact with the straps.

Tow tractors without a cabin or fitted with a weather protection canopy ▷

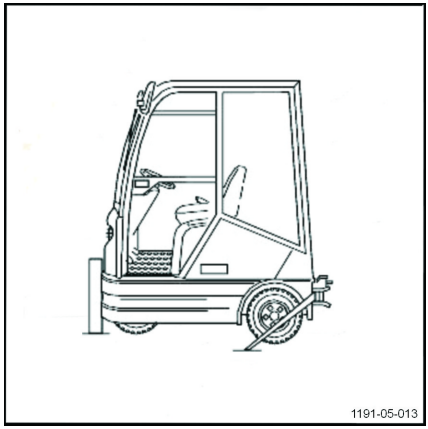


- Immobilise the tow tractor.
- Switch off the ignition and remove the key.
- Push the emergency off switch and disconnect the battery.
- Ensure that the battery is properly locked and that the battery compartment door is closed
- Chock all three wheels securely.
- Pass a ratchet strap through the tow coupling to prevent the tow tractor from rolling forwards.
- Pass a ratchet strap over the bottom plate to prevent the tow tractor from rolling backwards.

NOTE

If the tow tractor has a front tow coupling, pass the ratchet strap through the front tow coupling to prevent the tow tractor from rolling backwards.

Tow tractors fitted with a full cabin with solid doors ▷



- Park the tow tractor against the trailer headboard.

NOTE

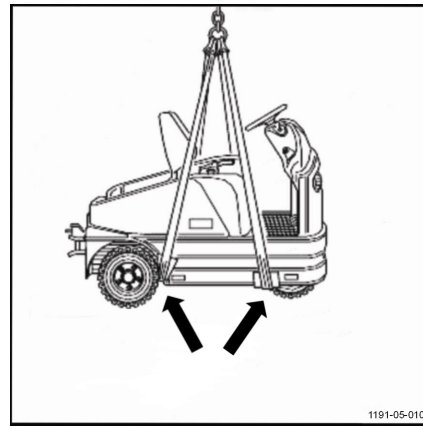
Protect the areas on the tow tractor that come into contact with the headboard.

- Immobilise the tow tractor.
- Switch off the ignition and remove the key.
- Push the emergency off switch and disconnect the battery.
- Ensure that the battery is properly locked and that the battery compartment door is closed
- Chock all three wheels securely.
- Pass a ratchet strap through the rear trailer coupling to prevent the tow tractor from rolling backwards

NOTE

If the tow tractor has a front tow coupling, pass ratchet straps through both tow couplings to prevent the tow tractor from moving.

Slinging the tow tractor



⚠ DANGER

Only use lifting equipment with sufficient lifting capacity.

Refer to the truck type/capacity plate to determine the weight of the tow tractor and the battery.

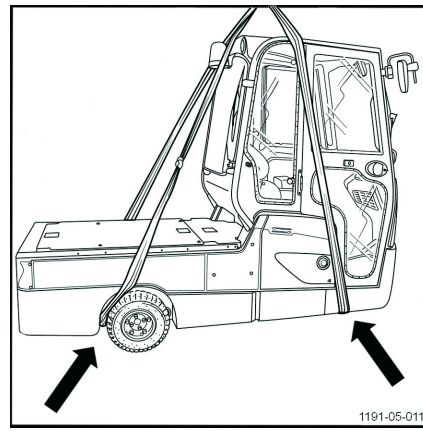
⚠ DANGER

Sharp edges can damage and weaken slings.

Protect the slings from sharp edges.

Please observe the following instructions:

- ➢ Immobilise the tow tractor.
- ➢ Switch off the ignition and remove the key.
- ➢ Press the emergency off switch.
- ➢ Remove any items that could fall.
- ➢ Ensure that the battery is properly locked and that the battery compartment door is closed
- ➢ Protect all parts that come into contact with the lifting device.
- ➢ Attach the lifting device as illustrated.
- ➢ Lift the tow tractor slowly and carefully.



⚠ DANGER

Never step under an elevated load.

When lifting the truck with a crane, ensure that no persons are within the vicinity.

Slinging the tow tractor

5

Maintenance

Personnel Qualifications

Only qualified personnel authorized by the owner are permitted to perform maintenance or repair work. All items listed in the Scheduled Maintenance Charts must be performed by qualified forklift technicians only. They must have knowledge and experience sufficient to assess the condition of a forklift truck and the effectiveness of the protective equipment according to established principles for testing forklift trucks. Any evaluation of safety must be unaffected by operational and economic conditions and must be conducted solely from a safety standpoint.

Daily inspection procedures and simple maintenance checks, e.g. checking the hydraulic oil level or checking the fluid level in the battery, may be performed by operators. This does not require training as described above.

Cleaning the Truck

The need for cleaning depends on use of the truck. If highly aggressive media are involved, e.g. salt water, fertilizer, chemicals, cement etc., thorough cleaning is required after finishing the work assignment.

Hot steam or cleaning materials with a powerful degreasing effect should only be used with great caution as this will affect the grease filling of bearings with lifetime lubrication, causing it to escape. As re-lubrication is not possible, the bearings will be irreparably damaged.

When using compressed air for cleaning, remove stubborn soiling with cold cleaner.

During cleaning pay special attention to the oil filler openings and the surrounding areas as well as the lubricating nipples prior to greasing.

Run the truck immediately after cleaning to check operation and to aid in drying in case any motors became exposed to moisture.

⚠ CAUTION

Never wash truck when switched on.

Switch the truck off and disconnect the battery before any cleaning operations.

⚠ CAUTION

When cleaning with a water jet (high-pressure or steam cleaner etc.), it should not be applied directly to the drive unit, any electric or electronic components, connector plugs or insulating material. High pressure water also should not be applied directly to the operator controls on the control handle.

If this is unavoidable, the parts concerned should be covered up beforehand or only cleaned with a dry cloth or clean compressed air.

Operator Inspection and Maintenance

Daily Inspection Overview

The following inspection tasks in this section should be carried out by the operator or designated service personnel before each shift or at least daily. This inspection is not part of the regularly scheduled maintenance listed elsewhere in this chapter and is not intended to replace any of it. Regularly scheduled maintenance must be performed by a qualified forklift technician at the intervals indicated. If any problem affecting safety is noted, it must be repaired immediately by a trained forklift technician. The truck must not be operated until such repairs are complete. This list does not cover attachments or special equipment from other manufacturers. Refer to the respective manufacturer's documentation for maintenance information pertaining to such items.

⚠ WARNING

To prevent accidents during maintenance activities, the truck must be secured against unintentional movement or start-up.

Before beginning any maintenance, the key switch must be turned off. The truck must remain off throughout the maintenance process except for individual maintenance activities that specifically require otherwise.

Daily Inspection Checklist

ELECTRIC TOW TRACTOR
OPERATOR'S DAILY CHECKLIST

Truck Serial Number: _____ Dept / Shift: _____ Operator: _____
Hour meter reading: _____ Date: _____ Supervisor: _____

Check each of the following items before the start of each shift. **Let your supervisor and/or maintenance department know of any problem**. Start at the left rear of the lift truck and work towards the front, and then the right side. After checking, mark each item accordingly. Explain below as necessary.

Check boxes as follows: ☐ OK ☐ NR, **N**eeds **R**epair. Circle problem and explain below.

OK	NR	VISUAL INSPECTION
		Oil Spots on Floor (check for leaks on truck)
		Rear Tire(s) (pressure if applicable, wear, cuts, embedded objects, rim damage, loose/missing lug nuts)
		Load wheels (if equipped) (tire wear, damage, entrapped debris)
		Seat & Seat Belt (if equipped) (check operation, damage, worn/torn belt, loose fasteners)
		Anti-slip Mat (if equipped) (check condition, cleanliness)
		Hood Latch (if equipped) (check operation, latches securely)
		Battery Connectors & Cables (damage, cracks, pitting)
		Battery Retention (installed correctly, secure)
		Battery Case & Vent caps (damage, cracks, loose, missing)
		Motor Covers (if equipped) (Loose fasteners, cracked or broken)
		Steer Axle, Chain, or other mechanism (check for damage, debris)
		Steering; Control Handle (movement, operation)
		Steering Wheel (if equipped) (check for wear, damage)
		Throttle Hand Grips (if equipped) (check for wear, damage)
		Front Tire(s) (tire condition, rim damage, etc)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Emergency Battery Disconnect (check operation)
		Gauges and Instrumentation (check operation)
		Battery Charge (fully charged)
		Seat Switch (if equipped) (check operation)
		Directional Switch (if equipped) (operates freely)
		Operator Presence Switch (if equipped) (check operation)
		Forward Driving (accelerates, steers, brakes smoothly)
		Plugging (stops, changes direction smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service Brake (check operation)
		Parking Brake (check operation)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)

Explanation of problems marked above (use back of this form if needed):

_____
_____
_____

OSHA 1910.178 (p) (1) requires a truck to be taken out of service any time it is found to be in need of repair, or is in any way defective or unsafe. Place a "Do Not Operate" tag on the truck, remove the key and alert your supervisor. The Truck may not be placed back into service until necessary repairs are made.

F286 05-2013

Check for fluid leakage

Check the entire truck as well as the surface beneath it for signs of fluid leakage.

Check battery connector

Inspect the battery connector and its cables for damage.

Check battery retention

Ensure that all battery retention devices are in place, undamaged, and hold the battery firmly.

Check decal condition

Inspect all decals and the data/capacity plate for condition and legibility. Decal locations are given in the Overview section of this manual. Refer to the decal descriptions in the Safety section of this manual if necessary. Any damaged or unreadable decals must be replaced.

Check the seat

Check the seat condition and mounting. Verify that seat mounting hardware is tight and that the seat is stable.

Check chassis and hitch

Inspect the chassis and back plate for deformity, cracks, or other damage. Check the hitch mounting, function, and condition.

Check wheels and tires

⚠ WARNING

Uneven wear or excessive damage to the tires can reduce stability as well as brake performance. On pneumatic tires, this can also result from insufficient air pressure as well. Reduced stability can cause tip-over. Reduced brake performance can cause collisions.

Have worn or damaged tires changed immediately. Ensure pneumatic tires have the correct inflation pressure.

⚠ WARNING

This truck may be equipped with pneumatic tires. If handled incorrectly, pneumatic tires on heavy equipment present an explosion hazard due to high inflation pressures.

Pneumatic tires must only be inflated or changed by personnel trained in handling pneumatic heavy equipment tires and then only when the proper protective equipment is used. Always deflate tires before wheel or tire removal or disassembly. Always use protective equipment when inflating tires.

Inspect the tires for damage or excessive wear. For pneumatic tires, check also for low pressure. Correct tire pressure is 116 psi (8 bar).

Check wheel mounting hardware for looseness. This is especially important if a wheel has recently been removed and reinstalled for repairs, replacement, or any other reason. Have any loose wheel mounting hardware tightened to the following torque before operation.

Drive wheel fasteners should be tightened to 144 ft-lb (195 Nm).

Steer wheel fasteners should be tightened to 155 ft-lb (210 Nm).

⚠ WARNING

Wheel mounting hardware sometimes requires several cycles of tightening before it fully seats. For this reason, wheel mounting screws or nuts will often work loose in the period immediately following initial tightening.

Whenever a wheel is removed and replaced for any reason, the wheel mounting screws or nuts must be checked for tightness every 10 hours thereafter until no further loosening is detected.

Operational checks

Before returning the truck to service, conduct an operational check of the following items:

- Emergency stop button (if equipped)
- Electric brake
- Seat switch
- Multi-function display/battery discharge indicator
- Working lights
- Horn
- Forward and reverse travel
- Back-up alarm if equipped

Routine Lubrication and Inspection

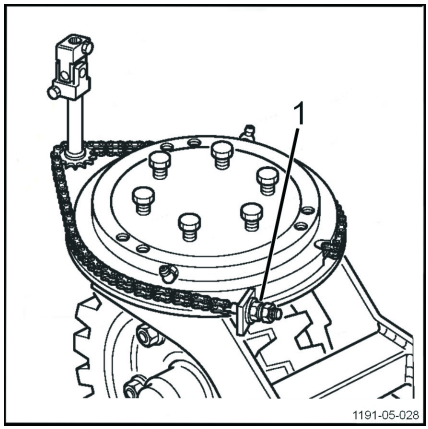
Routine Lubrication and Inspection Intervals

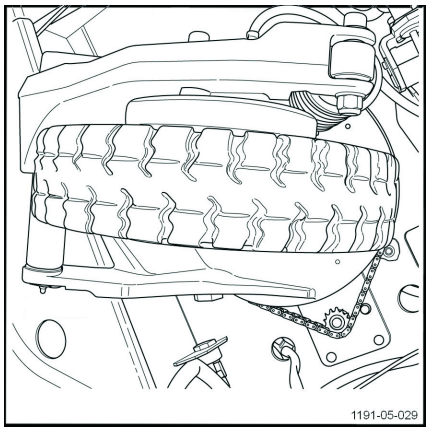
The items in this section must be performed based on usage and environment. They do not need to be performed daily but may require completion more frequently than the major scheduled maintenance intervals. These intervals can often be based on maintenance experience by those familiar with equipment in the given environment. Intervals given herein for specific items however must not be exceeded in any case. Your Linde dealer will be able to provide application-specfic interval recommendations if required.

Chassis Inspection and Lubrication

The suspension, steering, and brake fluid level must be checked regularly based on usage and environment but at least every 1000 hours. The front suspension and steering also requires regular lubrication with grease. Consult your Linde dealer for application-specific interval recommendations.

Checking and lubricating the steering chain ▷



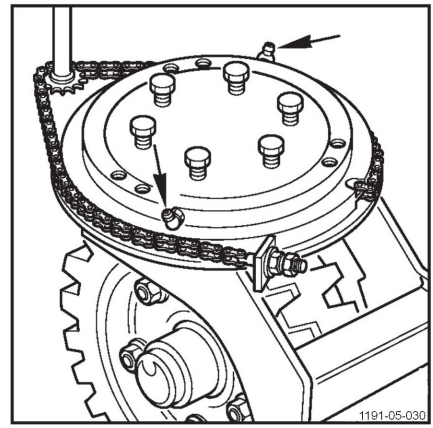


- Park the tow tractor safely
- Switch off the ignition and remove the key
- Press the emergency stop button
- Open the battery compartment door
- Disconnect the battery connector
- Jack the truck front and chock securely
- Check the chain tension. The chain deflection must be no more than 3–5 mm at the midpoint

If the chain is too tight, steering will be heavy and chain wear will increase. If the chain is not tight enough, the steering wheel play will be greater.

- To adjust the tension of the chain, remove the rubber mat from the floorplate. Turn the steering wheel until the adjustment nut (1) is accessible through the left-hand cutout in the floorplate
- Clean and lubricate the chain and ring gears
- Check the ring gears and chain links for wear
- Remove the chocks and the jack
- Reconnect the battery connector.
- Close the battery compartment door
- Restart the tow tractor

Lubricating the steering turntable bearing



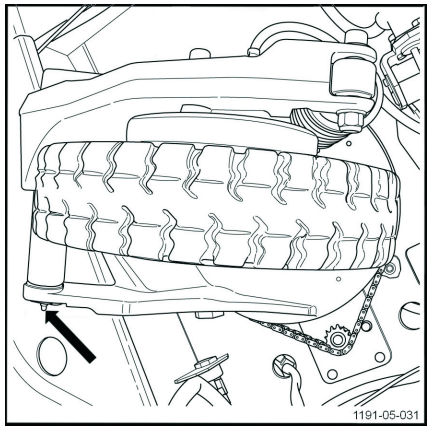
- Park the tow tractor safely
- Switch off the ignition and remove the key
- Press the emergency stop button
- Open the battery compartment door
- Disconnect the battery connector
- Remove the floorplate rubber mat to access both cutouts in the floorplate

NOTE

The steering turntable bearing has two lubrication points.

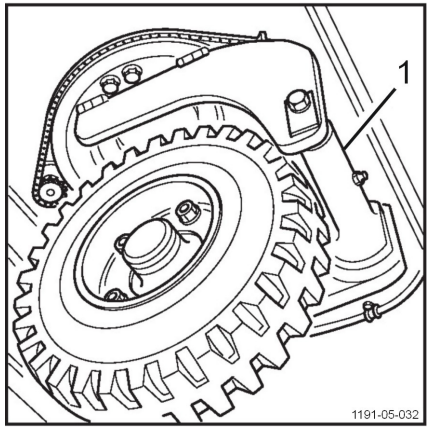
- Turn the steering wheel until one of the lubrication points is accessible through the left-hand cutout in the floorplate
- Lubricate until fresh grease emerges from the bearing
- Turn the steering wheel in the opposite direction until the second lubrication point is accessible through the right-hand cutout in the floorplate
- Lubricate until fresh grease emerges from the bearing
- Operate the steering from lock to lock to distribute the grease
- Reconnect the battery connector.
- Close the battery compartment door
- Restart the tow tractor

Lubricating the front suspension



- Park the tow tractor safely
- Switch off the ignition and remove the key
- Press the emergency stop button
- Open the battery compartment door
- Disconnect the battery connector
- Jack the truck front and chock securely
- Lubricate the front suspension arm pivot until fresh grease emerges from the pivot
- Remove the chocks and the jack
- Reconnect the battery connector.
- Close the battery compartment door
- Restart the tow tractor

Checking the front suspension

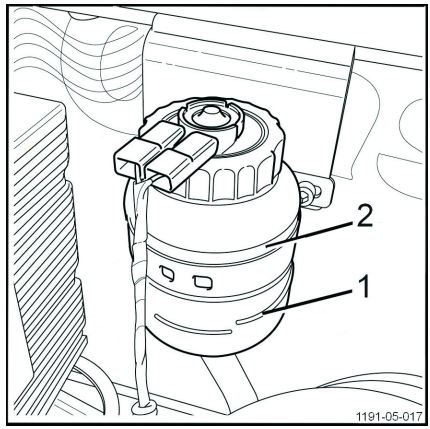


- Park the tow tractor safely
- Switch off the ignition and remove the key
- Press the emergency stop button
- Open the battery compartment door
- Disconnect the battery connector
- Jack the truck front and chock securely
- Check the front suspension arm bearing (1) for wear and excessive play

If wear or damage is evident, please contact the after-sales service department.

- Remove the chocks and the jack
- Reconnect the battery connector.
- Close the battery compartment door
- Restart the tow tractor

Checking the brake fluid level ▷

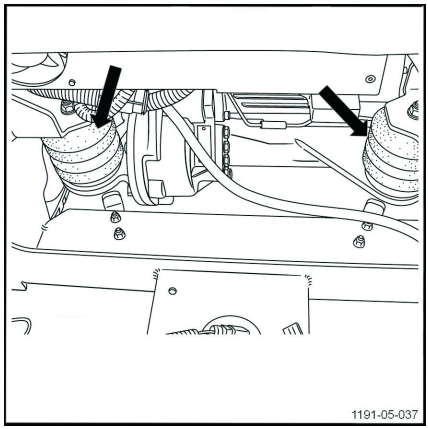


NOTE

A low brake fluid level indicator is fitted and will indicate on the driver's display when the brake fluid level is low. However, it is advisable to check the brake fluid level every 1000 hours.

- Switch off the ignition and remove the key
- The parking brake is activated automatically
- Press the emergency stop button
- Open the battery compartment door and disconnect the battery
- Lift and remove the technical compartment cover
- Check the level of the brake fluid reservoir is up to the maximum level (2). The brake fluid level must never drop below the minimum level (1)
- If necessary, open the reservoir filler cap and add brake fluid up to the maximum level (2)
- Replace the reservoir filler cap
- Reposition the technical compartment cover
- Reconnect the battery connector and lock the battery
- Close the battery compartment door
- Restart the truck

Checking the drive axle rubber shock mounts ▷



- Park the tow tractor safely.
- Switch off the ignition and remove the key.
- Press the emergency off switch.
- Open the battery compartment door.
- Disconnect the battery connector.
- Remove the cover.
- Check the condition of the drive axle rubber shock mounts. Look for cracks in particular.

⚠ WARNING

Risk of accident

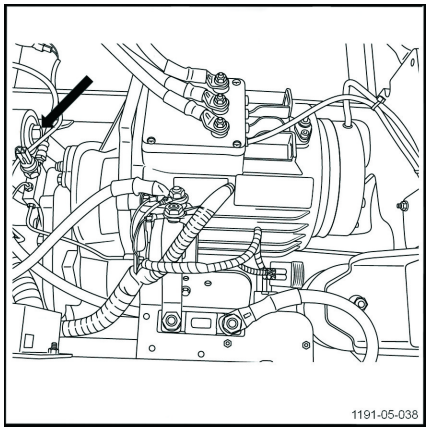
The shock mounts affect the safety and operation of the tow tractor.

Damaged shock mounts must be replaced.

Contact the After-Sales Service Centre.

- Reconnect the battery connector.
- Close the battery compartment door.
- Return the tow tractor to service.

Checking the drive axle suspension bushes ▷



- Park the tow tractor safely.
- Switch off the ignition and remove the key.
- Press the emergency off switch.
- Open the battery compartment door.
- Disconnect the battery connector.
- Remove the cover.
- Check the drive axle suspension bushes for condition and wear.

If wear is evident, please contact the after-sales service department.

- Refit the cover.
- Reconnect the battery connector.
- Close the battery compartment door.

➢ Return the tow tractor to service.

Scheduled Maintenance

General Maintenance Information

This section contains all information required to determine when the truck must be serviced and what must be done. This information is presented as scheduled maintenance charts on the following pages. Be sure to perform maintenance within the time limit given in the maintenance charts. Proper and timely maintenance is essential to obtain the full operability, performance and service life from the truck, and is a prerequisite for any warranty claims.

Maintenance Intervals

Maintenance intervals are based on operating hours but are also subject to the maximum intervals (based on years in service) listed at the top of each chart.

All lubrication and service intervals must be reduced for dusty conditions, large temperature fluctuations or intensive use.

Scheduled Maintenance Charts

The scheduled maintenance charts provide a list of maintenance tasks and associated time intervals at which they must be carried out. Tasks listed under successive intervals are not cumulative; only the additional tasks required are listed under successive intervals.

Use only high-quality lubricants or other materials meeting the specifications listed in Fluid and Lubricant Specifications. All work must be performed only by qualified forklift technicians. Custom-fitted equipment is not covered by the scheduled maintenance charts. If such equipment is installed, refer to the manufacturer's documentation for maintenance requirements.

Service plan

Note on maintenance operations
The maintenance operations require specialist knowledge. Special tools may also be required. Contact the After Sales Service Centre.

Preparatory tasks
Clean the truck (if necessary)

Maintenance operations every 1000 hours, but at least every 12 months
Traction Unit
Check the fixation of drive wheels
Transmission
Visual check: Tightness of housing and wheel hub
Clean and check the gearbox breather
Drain and refill the drive axle (only at 1000 hours and then every 12 000 hours)
Chassis unit
Check the fixation of the battery interlock
Check and lubricate hinges if necessary
Check and lubricate the automatic tow coupling (option)
Check and adjust the battery door lock if necessary
Steering Unit / Wheels / Tyres
Lubricate the steering unit
Check fixation of steering wheel
Check and lubricate the steering chain
Check the steering end stops for wear and fixation
Check the front suspension for leakage
Controls
Check easy movement of the pedals, lubricate if necessary
Adjust the accelerator pedal
Check the electric parking brake
Check the brake system for damage, corrosion and leaks
Check the front and rear brake shoes for wear

Maintenance operations every 1000 hours, but at least every 12 months
Check the brake fluid level
Check the horn function
Electrical Control
Clean the power module including the cooling ribs
Clean the electrical components
Check the battery according manufacturer specification
Check and clean the fan
Equipements spéciaux
Check the antistatic wristband
Check and clean the fan of onboard charger or opportunity charging (option)
Clean the heating unit including grid
Battery Roll Off and Bridge : Check and lubricate rollers and hinges

Additional maintenance operations every 3000 hours, but at least every 3 years
Traction Unit
Check the drive axle suspension bushes
Check the drive axle rubber shock mounts
Chassis unit
Check the fixation of the cabin (option)
Steering Unit / Wheels / Tyres
Check the fixation of the steering unit
Controls
Change the brake fluid
Electrical Control
Check the condition and security of electrical connections and cables
Check the power connections of the power module

Additional maintenance operations every 6000 hours, but at least every six years
Transmission
Drain and then fill the drive axle (after 1000 hours and then after 12,000 hours and then every 6000 hours)

Final tasks
Check and delete the actual error codes
Set the service interval
Check the time and date settings of the display
Test drive, functional check, place the inspection label

Technical data for inspection and maintenance

Assembly	Material/Lubricant	Capacity/Adjustment value	
Drive axle	Gearbox oil		1.2 litres
Tyres		Front	8 bar
		Rear	8 bar
Brake system	Brake fluid		As required
	Brake linings		Minimum thickness 2 mm
Steering chain	Chain spray		As required
General lubrication points	Grease/oil		As required
Electrical equipment			
Main circuit	Fuse	48 V	1 x 160 A
Battery	Distilled water		As required
	Non-acidic grease		As required
Traction motor		28 V AC	

Recommended lubricants

⚠ DANGER

Toxic products.

Oils and other consumables are toxic products. It is advisable to handle and use them with the utmost care.

Multi-purpose grease

Lithium soap grease, extreme pressure with anti-wear additive - Standard DIN 51825 - KPF 2K - 30, KPF 2K - 20, KPF 2N - 30.

Gearbox oil

Oil T55–85W140.

NOTE

If in doubt, please contact the After-Sales Service Centre. You should also consult your local dealer if a representative of an oil company offers you an oil product that is not specified in these operating instructions. Only the oils listed above are approved by the manufacturer. Using oil mixtures or hydraulic fluids that are not recommended can cause damage that may be expensive to rectify.

Steering chain

Chain spray

Brake fluid

Original ATE DOT4 brake fluid, type “S”, classification FMVSS 116 or SAE J 1703 issue 1980 and ISO 4925.

NOTE

Contact the After-Sales Service Centre for further information.

ENVIRONMENT NOTE

Used oil must be stored in a suitable place until it is disposed of in compliance with environmental protection measures. Never dispose of used oil in drains or allow it to penetrate soil. Disposal of waste and soiled

packaging must be carried out according to current regulations.

ENVIRONMENT NOTE

Do not allow the product to disperse into the environment. Do not dispose of directly into drains or rivers. Packaging that has contained this product must be treated as waste. Contaminated packaging must be completely emptied and may then be recovered following a thorough clean.

Jacking the tow tractor

⚠ DANGER

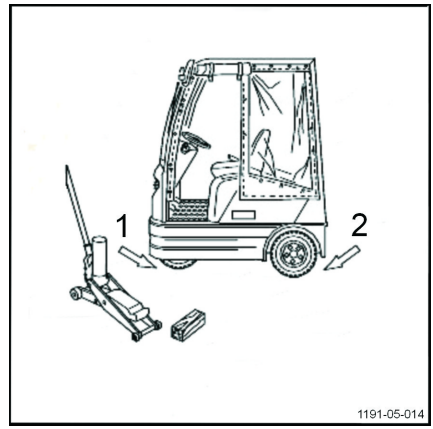
Only use a hydraulic jack with sufficient lifting capacity.

Refer to the tow tractor or carrier capacity plate to determine the weight of the truck and battery.

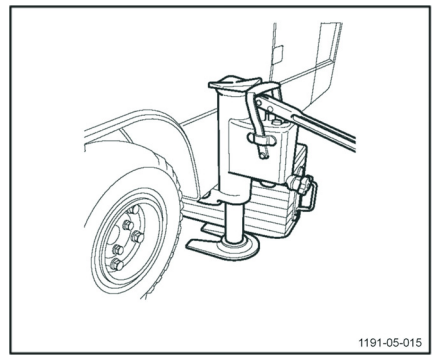
⚠ DANGER

Never work on a jacked tow tractor or carrier or leave it unattended.

Always chock the raised tow tractor securely after jacking.



- Before lifting the tow tractor, ensure that the load has been removed.
- Only raise the tow tractor at lifting points (1) and (2).



Access to the technical compartment

⚠ WARNING

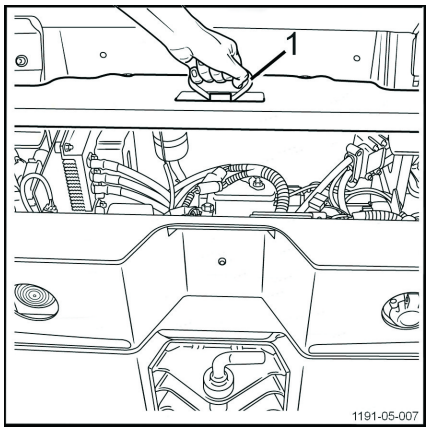
Pay attention to the weight of the tow tractor cover and the carrier.

Do not hesitate to use a lifting system to remove the cover of the tow tractor or the carrier.

Access to the technical compartment of the tow tractor

In order to perform maintenance on various tow tractor components, it is necessary to access the technical compartment.

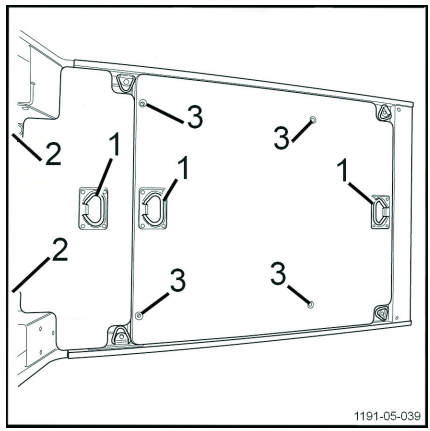
- Immobilise the tow tractor in an open area.
- Switch off the ignition and remove the key.
- Press the emergency stop button.
- Dismount the tow tractor.
- Loosen and remove the 2 screws holding the cover in place.
- Lift the cover using the handle (1).
- Remove the cover and put it to the side.



It is now possible to access the technical compartment. After the operation, the cover must be repositioned.

- Put the cover in position.
- Tighten the 2 screws that hold the cover in place.
- Return the tow tractor to service.

Access to the technical compartment of the carrier ▷



Proceed as follows to access the technical compartment of the carrier.

- ➢ Immobilise the carrier in an open area.
- ➢ Switch off the ignition and remove the key.
- ➢ Press the emergency stop button.
- ➢ Dismount the carrier.
- ➢ Loosen and remove the 2 screws (2) holding the first cover in place.
- ➢ Lift the cover using the handle.
- ➢ Remove the cover and put it to the side.
- ➢ Loosen and remove the 4 screws (3) holding the second cover in place.

It is now possible to access the technical compartment. After the operation, the cover (or covers) must be repositioned.

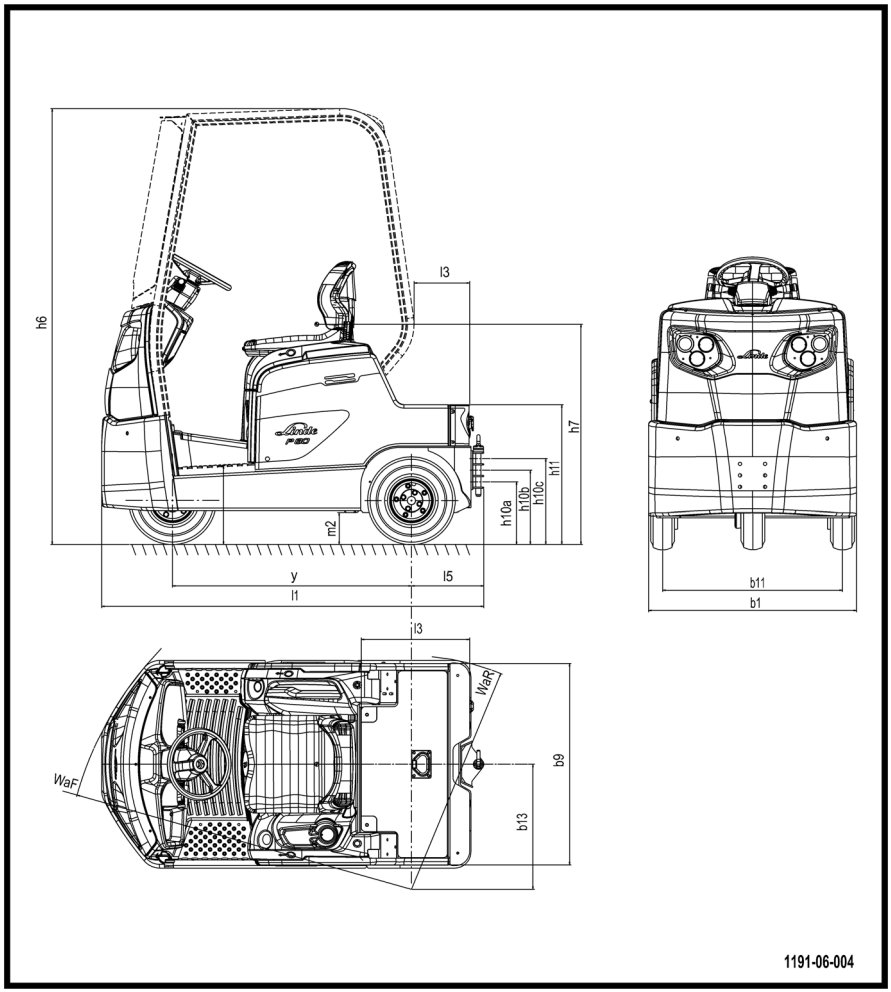
- ➢ Put the covers back in position.
- ➢ Tighten the 6 screws holding the covers in place.
- ➢ Return the carrier to service.

Access to the technical compartment

6

Technical data

Datasheet for P60 and P80 tow tractors



DESCRIPTION					
1.1	Manufacturer			Fenwick-Linde	
1.2	Model type			P60	P80
1.3	Method of propulsion: battery, diesel, petrol, LPG, mains power			Battery	Battery
1.4	Driving: manual, pedestrian, standing, seated, order picking			Seated	Seated
	Towing capacity(1)		t	6 (1)	8 (1)
1.5	Load capacity	Q	t	0.15	0.15
1.7	Rated drawbar pull	F	N	1200	1600
1.9	Wheelbase	y	±5 mm	1190	1190

WEIGHT				P60	P80
2.1	Kerb weight (with cab)	kg	±10%	1515	1515
2.2	Axle load without load, front/rear (with cab)	kg	±10%	665/850 (2)	665/850 (2)
2.1	Kerb weight (without cab)	kg	±10%	1260	1260
2.2	Axle load without load, front/rear (without cab)	kg	±10%	550/710 (2)	550/710 (2)
2.2	Axle load with load, front/rear (with cab)	kg	±10%	665/1000 (2)	665/1000 (2)
2.2	Axle load with load, front/rear (without cab)	kg	±10%	550/860 (2)	550/860 (2)

WHEELS AND TYRES				P60	P80
3.1	Tyres, front/rear (SE = CS super-elastic, P = pneumatic) (3)			pneumatic (SE optional) (3)	pneumatic (SE optional) (3)
3.2	Tyre size, front			4.00–8/6 PR	4.00–8/6 PR
3.3	Tyre size, rear			4.00–8/6 PR	4.00–8/6 PR
3.5	Wheels, number front/rear (x = driven)			1/2 x	1/2 x
3.6	Track width, front	b10	±5 mm	0	0
3.7	Track width, rear	b11	±5 mm	860	860

DIMENSIONS				P60	P80
4.7	Height of the overhead guard with/without cab	h6	±5 mm	2070/1915	2070/1915
4.8	Seat/stand-on platform height	h7	±5 mm	1020	1020
4.12	Tow coupling height	h10	±5 mm	a) 1285 b) 340 c) 395	a) 1285 b) 340 c) 395
4.13	Platform height, without load	h11	±5 mm	645	645

4.16	Length of the loading platform (with and without cab)	l3	±5 mm	265/520	265/520
4.17	Rear overhang	l5	±5 mm	350	350
4.18	Loading platform width	b9	±5 mm	900	900
4.19	Overall length	i1	±5 mm	1830	1830
4.21	Total width	b1	±5 mm	1000	1000
4.32	Ground clearance at centre of wheelbase	m2	±2 mm	135	135
4.35	Turning radius, front	WaF	±20 mm	1650	1650
	Turning radius, rear	WaR	±20 mm	1115	1115
	Minimum steering angle 180°		±20 mm	2765	2765
4.36	Minimum pivot point distance	b13	±20 mm	600	600

PERFORMANCE DATA				P60	P80
5.1	Driving speed, with/without load		±5% km/h	12/20	10/20
5.5	Tractive force, without load, 60 minute rating	N		1200	1600
5.6	Maximum tractive force, without load, 5 minute rating	N		6250	6250
5.7	Climbing ability, with/without load, 30 minute rating	%		See graph	See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating	%		See graph	See graph
5.10	Service brake			Hydraulic/electric	Hydraulic/electric

DRIVE SYSTEM				P60	P80
6.1	Drive motor, 60 minute rating	kW		AC 4.5	AC 4.5
6.3	Battery type in accordance with DIN/EC			DIN 43531 (12 - 1998)	DIN 43531 (12 - 1998)
6.4	Battery voltage and nominal capacity (5 h)	V/Ah		48/375	48/375
6.5	Battery weight (±10%)	kg	±10%	560	560
6.6	Energy consumption according to VDI cycle (2012)	kWh	±10%	3.84	4.27
6.6	Energy consumption according to VDI cycle (2002)	kWh	±10%	1.65	1.73
6.7	Turnover output (consumption)	kWh	±10%	4.31	4.89
6.8	Turnover output (transfer of capacity)	t/h	±10%	552	688

MISCELLANEOUS				P60	P80
8.1	Type of drive control			Electronics	Electronics
8.4	Noise level at operator's ears	dB (A)	±2.5	60	60
8.5	Tow coupling, design/type, DIN			See the list of options	See the list of options

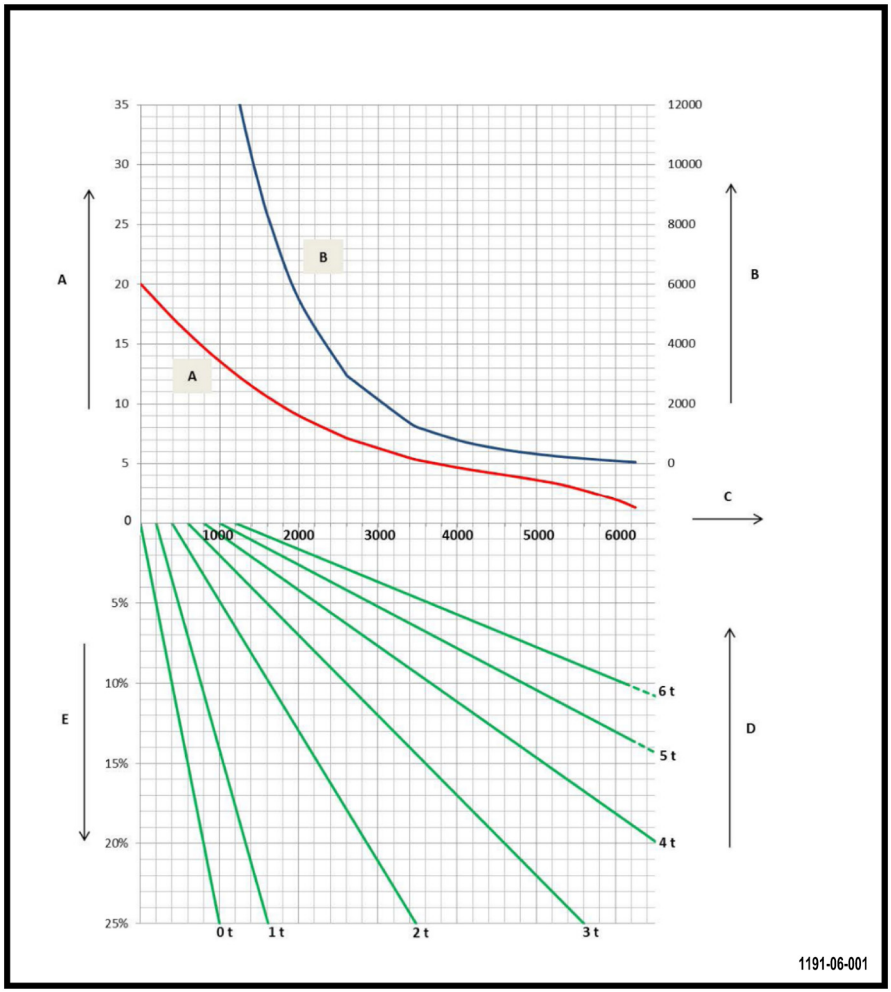
(1): Based on a level, dry surface with rolling resistance of 200 N/T.

Refer to the capacity charts for the specific conditions of use and when application includes gradients and ramps.

(2) The weight of the loaded platform must be added to the rear axle load.

(3) Contoured solid tyres (superelastic) are available.

Towing diagram P60



A Speed (km/h)
B Permissible haul per hour (m)
C Drawbar pull (N)

A Trailer weight (t)
A Gradient (%)

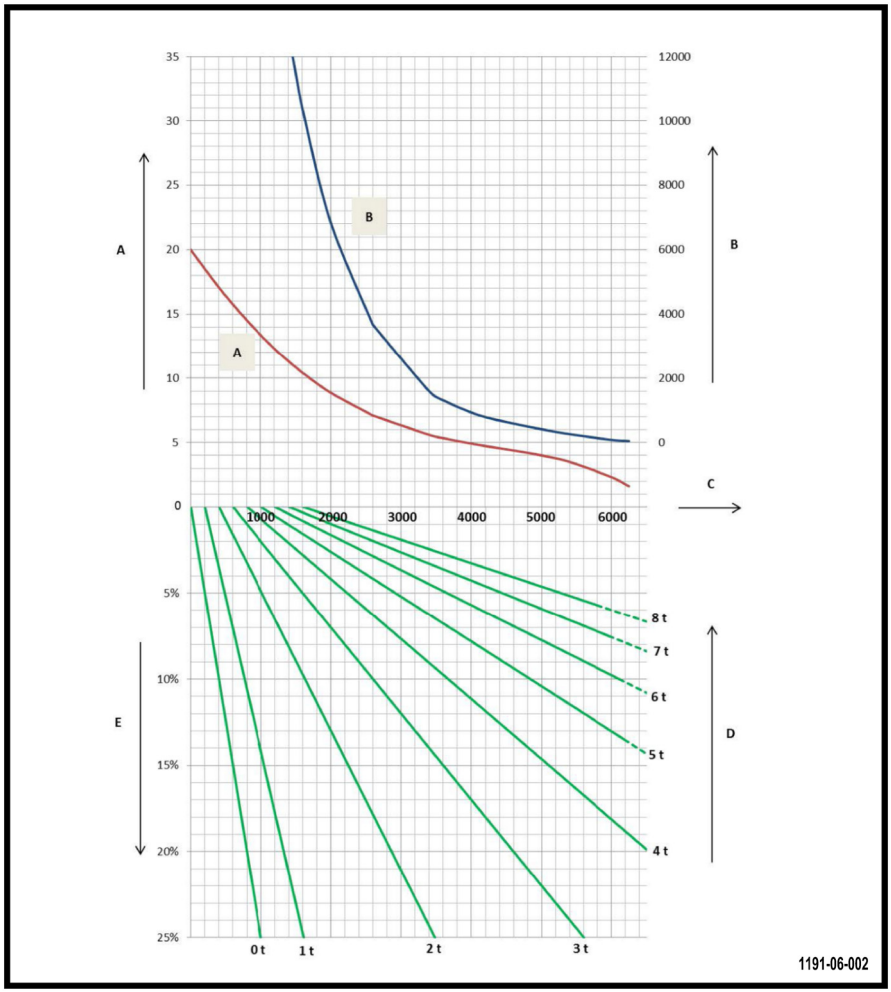
NOTE

The load/gradient combinations shown by the full line can be restarted from stationary on the gradient.

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill slopes.

Towing diagram P80



A Speed (km/h)
B Permissible haul per hour (m)
C Drawbar pull (N)

A Trailer weight (t)
A Gradient (%)

NOTE

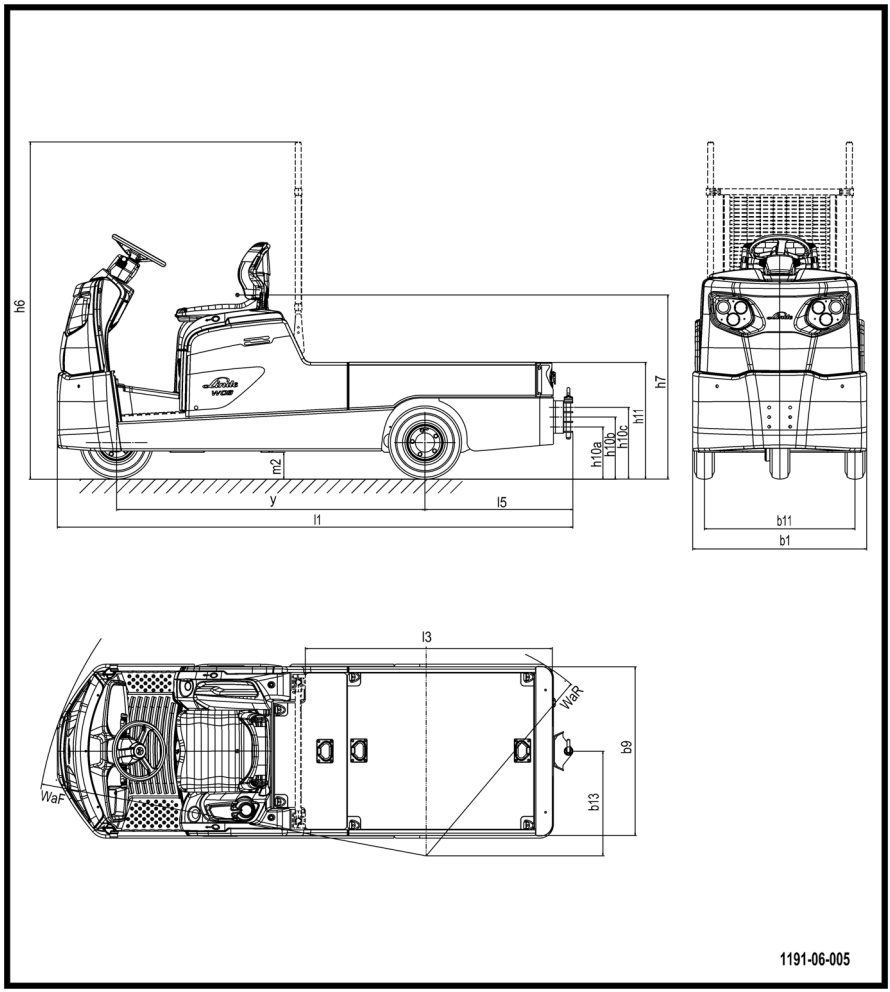
The load/gradient combinations shown by the full line can be restarted from stationary on the gradient.

NOTE

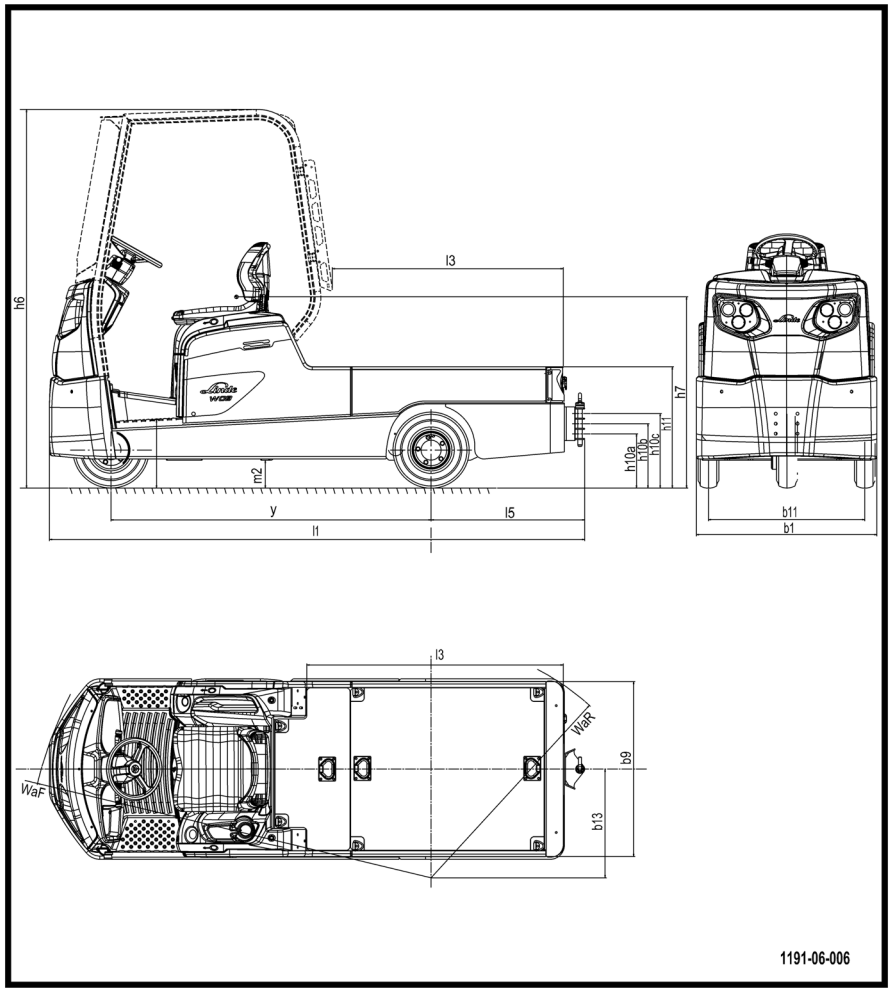
The permissible haul per hour is the total distance travelled, including the return journey and any downhill slopes.

Datasheet for the W08 carrier

Platform tractor without cab



Platform tractor with cab



Datasheet for the platform tractor

DESCRIPTION				
1.1	Manufacturer			Fenwick-Linde
1.2	Model type			W08
1.3	Method of propulsion: battery, diesel, petrol, LPG, mains power			Battery
1.4	Driving: manual, pedestrian, standing, seated, order picking			Seated
	Towing capacity(1)		t	6.2(1)
1.5	Load capacity	Q	t	0.8
1.7	Rated drawbar pull	F	N	1240
1.9	Wheelbase	y	±5 mm	1795

WEIGHT				W08
2.1	Kerb weight (with cab)	kg	±10%	1470
2.2	Axle load without load, front/rear (with cab)	kg	±10%	740/730 (2)
2.1	Kerb weight (without cab)	kg	±10%	1215
2.2	Axle load without load, front/rear (without cab)	kg	±10%	580/635 (2)
2.2	Axle load with load, front/rear (with cab)	kg	±10%	740/1530 (2)
2.2	Axle load with load, front/rear (without cab)	kg	±10%	580/1435 (2)

WHEELS AND TYRES				W08
3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic) (3)			SE
3.2	Tyre size, front			125/75 - 8
3.3	Tyre size, rear			125/75 - 8
3.5	Wheels, number front/rear (x = driven)			1/2 x
3.6	Track width, front	b10	±5 mm	0
3.7	Track width, rear	b11	±5 mm	860

DIMENSIONS				W08
4.7	Height of the overhead guard with/without cab	h6	±5 mm	2070/1915
4.8	Seat/stand-on platform height	h7	±5 mm	1020
4.12	Tow coupling height	h10	±5 mm	a) 1285 b) 340 c) 395
4.13	Platform height, without load	h11	±5 mm	645

4.16	Length of the loading platform (with and without cab)	l3	±5 mm	1275/1415
4.17	Rear overhang	l5	±5 mm	840
4.18	Loading platform width	b9	±5 mm	900
4.19	Overall length	i1	±5 mm	2955
4.21	Total width	b1	±5 mm	1000
4.32	Ground clearance at centre of wheelbase	m2	±2 mm	135
4.35	Turning radius, front	WaF	±20 mm	2230
	Turning radius, rear	WaR	±20 mm	1290
	Minimum steering angle 180°		±20 mm	3520
4.36	Minimum pivot point distance	b13	±20 mm	600

PERFORMANCE DATA				W08
5.1	Driving speed, with/without load		±5% km/h	12/20
5.5	Tractive force, without load, 60 minute rating	N		1240
5.6	Maximum tractive force, without load, 5 minute rating	N		6250
5.7	Climbing ability, with/without load, 30 minute rating	%		See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating	%		See graph
5.10	Service brake			Hydraulic/electric

DRIVE SYSTEM				W08
6.1	Drive motor, 60 minute rating	kW		AC 4.5
6.3	Battery type in accordance with DIN/EC			DIN 43531 (12 - 1998)
6.4	Battery voltage and nominal capacity (5 h)	V/Ah		48/240
6.5	Battery weight (±10%)	kg	±10%	395
6.6	Energy consumption according to VDI cycle (2012)	kWh	±10%	5.26
6.6	Energy consumption according to VDI cycle (2002)	kWh	±10%	1.82
6.7	Turnover output (consumption)	kWh	±10%	4.68
6.8	Turnover output (transfer of capacity)	t/h	±10%	574

MISCELLANEOUS				W08
8.1	Type of drive control			Electronics

8.4	Noise level at operator's ears	dB (A)	±2.5	60
8.5	Tow coupling, design/type, DIN			See the list of options

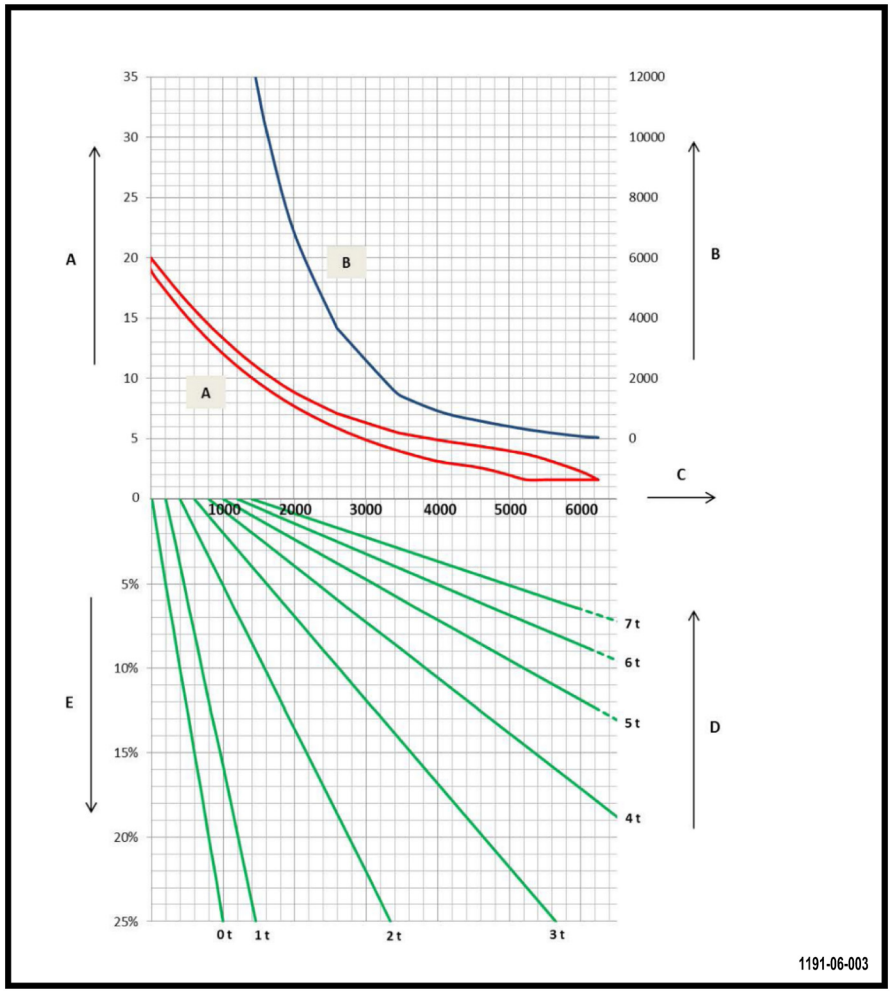
(1): Based on a level, dry surface with rolling resistance of 200 N/T.

Refer to the capacity charts for the specific conditions of use and when application includes gradients and ramps.

(2) The weight of the loaded platform must be added to the rear axle load.

(3) Contoured solid tyres (superelastic) are available.

Towing diagram W08



A	Speed (km/h)	A	Trailer weight (t)
B	Permissible haul per hour (m)	A	Gradient (%)
C	Drawbar pull (N)		

NOTE

The load/gradient combinations shown by the full line can be restarted from stationary on the gradient.

Towing diagram W08

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill slopes.

A

B

C

D

E

F

G

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