

PSE

Operating Instructions





51814819

08.19

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1.0 / 1.0 mono

Declaration of Conformity



Manufacturer:

ANHUI HELI CO., LTD., No.668 Fang Xing Road, Economic Development Zone, 230601 Hefei, Anhui, P. R. China

Imported by (For all countries besides China) / Authorized by (for China) Jungheinrich AG, Friedrich-Ebert-Damm, 22047 Hamburg, Germany

Model	Option	Serial no.	Year of manufacture
PSE 1.0 PSE 1.0 mono			

Additional information



On behalf of HELI EUROPE

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Name of the signatory: QINGFENG MA

Title: Chief engineer

GB EC Declaration of Conformity

The undersigned hereby declare that the powered industrial truck described below in detail complies with the European Directives 2006/42/EG (Machinery Directive) and 2014/30/EU (Electromagnetic Compatibility - EMC) including amendments as well as the legislative decree to incorporate the directives in national law. The signatories are in each case individually authorized to compile the technical documents.

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Foreword

Notes on the operating instructions

The present ORIGINAL OPERATING INSTRUCTIONS are designed to provide sufficient instruction for the safe operation of the industrial truck. The information is provided clearly and concisely. The chapters are arranged by letter and the pages are numbered continuously.

The operator manual details different industrial truck models. When operating and servicing the industrial truck, make sure that the particular section applies to your truck model.

Our trucks are subject to ongoing development. We reserve the right to alter the design, equipment and technical features of the system. No guarantee of particular features of the truck should therefore be assumed from the present operating instructions.

Safety notices and text mark-ups

Safety instructions and important explanations are indicated by the following graphics:

⚠ DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

↑ WARNING!

Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

↑ CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

NOTE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.

- Used in front of notices and explanations.
 - Indicates standard equipment
 - Indicates optional equipment

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A Correct Use and Application

1 General

The truck must be used, operated and serviced in accordance with the present instructions. All other types of use are beyond its scope of application and may result in damage to personnel, the industrial truck or property.

2 Correct application

NOTE

The maximum load and load distance are indicated on the capacity plate and must not be exceeded.

The load must rest on the load handler or be lifted by an attachment approved by the manufacturer.

The load must be fully raised, see page 50.

The following operations are in accordance with regulations and are permitted:

- Lifting and lowering of loads.
- Stacking and retrieving loads.
- Transporting lowered loads.

The following operations are prohibited:

- Travelling with a raised load (>30 cm).
- Carrying and lifting passengers.
- Pushing or pulling loads.

3 Approved application conditions

- Operation in industrial and commercial environments.
- Permissible temperature range 5°C to 40°C.
- Operation only on secure, level surfaces with sufficient capacity.
- Do not exceed the permissible surface and spot load limits on the travel routes.
- Operation only on routes that are visible and approved by the operating company.
- Operation illumination must reach at least 50 Lux.
- Negotiating inclines up to a maximum of 5 % / 7 % (5 % with load).
- Do not travel across or at an angle on inclines. Travel with the load facing uphill.
- Operation in partially public traffic.

⚠ WARNING!

Use under extreme conditions

Using the truck under extreme conditions can result in malfunctions and accidents.

- ▶ Special equipment and authorization are required if the truck is to be constantly used in extreme conditions, especially in dusty or corrosive atmospheres.
- ▶ The truck cannot be used in areas at risk of explosion.
- ▶ In adverse weather conditions (thunder, lightning) the industrial truck must not be operated outside or in endangered areas.

4 Proprietor responsibilities

For the purposes of the present operating instructions the "operating company" is defined as any natural or legal person who either uses the industrial truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting) the proprietor is considered the person who, in accordance with existing contractual agreements between the owner and user of the industrial truck, is charged with operational duties. The proprietor must ensure that the industrial truck is used only for the purpose it is intended for and that danger to life and limb of the user and third parties are excluded. Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The operating company must ensure that all users have read and understood these operating instructions.

NOTE

Failure to comply with the operating instructions invalidates the warranty. The same applies if improper work is carried out on the truck by the customer or third parties without the permission of the manufacturer.

5 Adding attachments and/or optional equipment

The mounting or installation of additional equipment which affects or enhances the performance of the industrial truck requires the written permission of the manufacturer. Local authority approval may also need to be obtained. Local authority approval however does not constitute the manufacturer's approval.

B Truck Description

1 Application

PSE 1.0/PSE 1.0 mono is a four-wheeled, tiller-controlled electric truck with steered drive wheel.

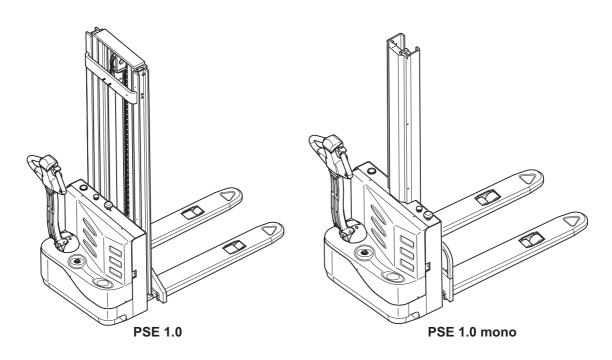
It is designed for use on level surfaces for lifting and transporting goods on pallets. Pallets with open bases or roll cages can also be lifted.

PSE 1.0/PSE 1.0 mono is designed for light-duty use, the maximum continuous operation period is approximately five hours.

Its capacity is model-dependent. The capacity can be determined from the model name.

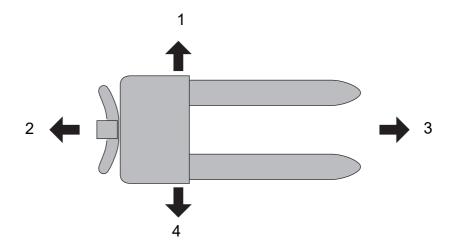
PSE	
1.0 / 1.0 mono	Rated capacity 1000 kg

The capacity is not always the same as the permitted maximum load. The capacity is specified on the truck capacity plate.



2 Travel direction definition

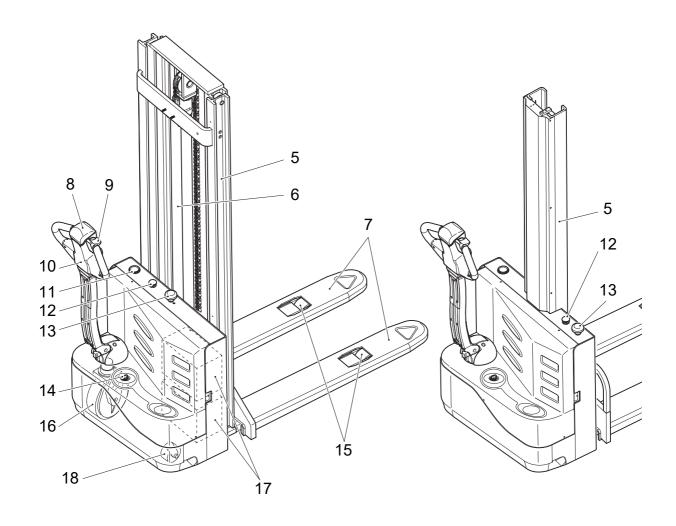
The following determinations have been made for travel direction specification:



Item	Travel direction
1	Left
2	Drive direction
3	Load direction
4	Right

3 Assemblies and Functional Description

3.1 Assembly Overview



Item		Component	Item		Component
5	•	Mast	12	•	Key switch
6	•	Lift cylinder	13	•	Emergency disconnect switch
7	•	Load handler	14	•	Mains plug
8	•	Collision safety switch	15	•	Load wheels
9	•	Travel switch	16	•	Drive wheel
10	•	Tiller and tiller head	17	•	Batteries
11	•	Battery discharge indicator	18	•	Support wheel

3.2 Functional Description

Safety equipment

- An enclosed, smooth truck geometry with rounded edges ensures safe handling of the truck.
- The wheels are surrounded by a solid skirt offering collision protection.
- Activating the emergency disconnect switch rapidly cuts out all electrical functions in hazardous situations.

Hydraulic system

- Lifting and lowering are activated via the lift and lower buttons.
- When lifting is activated, the pump unit starts to operate, supplying hydraulic oil from the oil reservoir to the lift cylinder.

Drive system

An electric motor actuates the drive wheel via a multi-stage transmission. The
electronic traction controller ensures smooth drive motor speed control and hence
smooth travel, powerful acceleration and electrically controlled braking.

Tiller

The user steers with an ergonomic tiller. All travel and lift operations can be performed sensitively without taking a hand from the tiller.

Controls and displays

Ergonomic controls ensure fatigue-free operation for sensitive application of the travel and hydraulic operations. The battery discharge indicator displays the service hours and the available battery capacity.

Mast

The load handler runs on permanently lubricated and hence maintenance-free angled rollers.

Electrical systems

The truck has an electronic traction controller. The operating voltage of the truck's electrical system is 24 volts.

4 Technical Specifications

The technical specifications comply with the German "Industrial Truck Data Sheet" Guidelines.

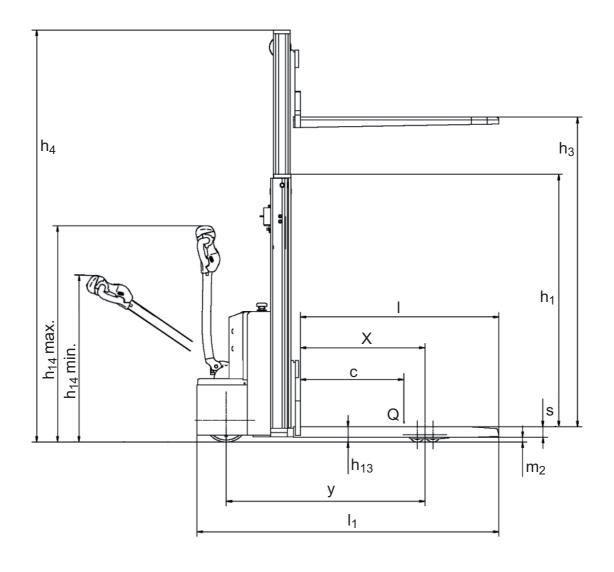
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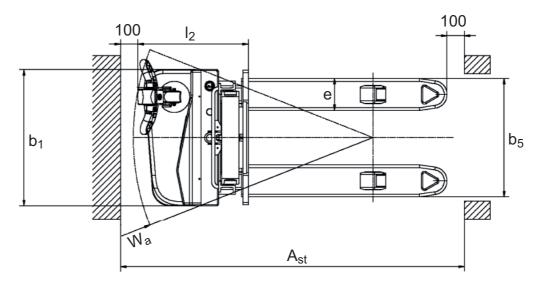
4.1 Performance data

	Description	PSE 1.0	PSE 1.0 mono	
Q	Rated load	1000	1000	kg
С	Load centre distance with standard fork arm length	600	600	mm
	Travel speed with/without load	3/3.5	3/3.5	km/h
	Lift speed with/without load	120/180	120/180	mm/s
	Lowering speed with/without load	120/120	120/120	mm/s
S2	Gradient performance with/without load	5/7	5/7	%

4.2 Dimensions PSE 1.0

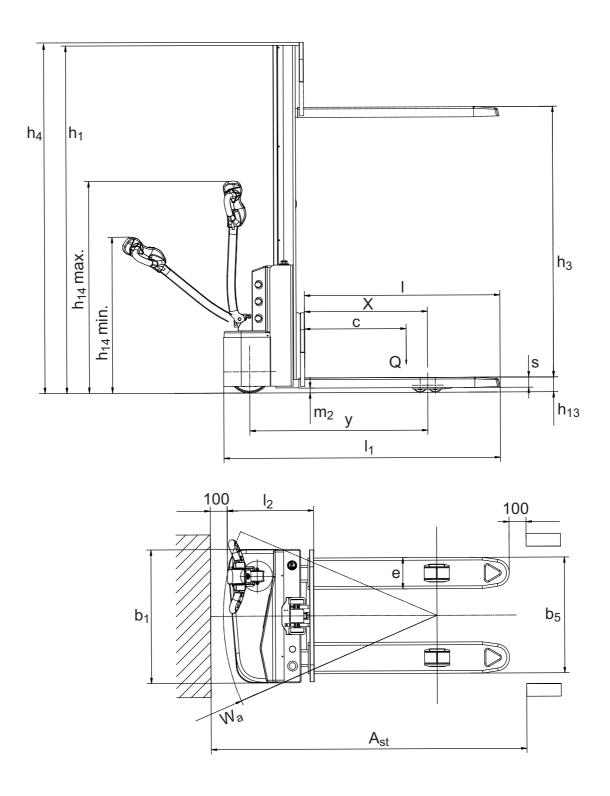
	Description	PSE 1.0	
h1	Overall height	1560/1810/2060/2210	mm
h3	Rated lift	1910/2410/2910/3210	mm
h4	Extended mast height	2515/3015/3515/3815	mm
h13	Fork arms lowered	90	mm
h14	Tiller height min./max.	850 / 1252	mm
у	Wheelbase	1150	mm
l1	Overall length	1733	mm
12	Headlength	583	mm
х	Load distance	600	mm
b1	Truck width	790	mm
b5	Total distance, fork arms	550	mm
s	Height of fork	55	mm
е	Width of fork	185	mm
I	Length of fork	1150	mm
m2	Ground clearance	25	mm
Ast	Aisle width 1000 x 1200 transverse	2058	mm
Ast	Aisle width 800 x 1200 lengthways	2108	mm
Wa	Turning radius	1430	mm
	Truck weight	see truck data plate	
	•	•	





4.3 Dimensions PSE 1.0 mono

	Description	PSE 1.0 mono	
h1	Overall height	2055/2405	mm
h3	Rated lift	1510/1860	mm
h4	Extended mast height	2055/2405	mm
h13	Fork arms lowered	90	mm
h14	Tiller height min./max.	850/1252	mm
У	Wheelbase	1070	mm
I1	Overall length	1634	mm
12	Headlength	484	mm
Х	Load distance	600	mm
b1	Truck width	790	mm
b5	Total distance, fork arms	550	mm
S	Height of fork	55	mm
е	Width of fork	185	mm
I	Length of fork	1150	mm
m2	Ground clearance	25	mm
Ast	Aisle width 1000 x 1200 transverse	1958	mm
Ast	Aisle width 800 x 1200 lengthways	2008	mm
Wa	Turning radius	1335	mm
	Truck weight	see truck data plate	



4.4 Weights

Description	PSE 1.0	PSE 1.0 mono	
Weight with battery	580	460	kg
Axle load with load, drive wheel / load wheels	522 /1058	482 / 978	kg
Axle load without load, drive wheel / load wheels	394 / 186	313 / 147	kg

Weights and axle loads vary depending on truck features.

4.5 Battery

Description	Voltage/capacity	Weight
Maintenance free batteries	2 x 12 V/70 Ah	2 x 24 kg

4.6 Tyre type

Description		
Drive wheel size	Ø 250 x 70	mm
Load wheels	4 x Ø 84 x 70	mm
Additional wheel	Ø 115 x 55	mm

4.7 EN standards

Continuous sound pressure level

- PSE 1.0: 70 dB(A)

- PSE 1.0 mono: 70 dB(A)

in accordance with EN 12053 as harmonized with ISO 4871.

- The continuous sound pressure level is calculated according to standard procedures and takes into account the sound pressure level when traveling, lifting and idling. The sound pressure level is measured at the operator's ear.
- Noise levels can fluctuate depending on the floor composition and wheel lining.

Electromagnetic compatibility (EMC)

The manufacturer confirms that the truck adheres to the limits for electromagnetic emissions and resistance as well as the static electricity discharge test in accordance with EN 12895 as well as the standardized instructions contained therein.

No changes to electric or electronic components or their arrangement may be made without the written agreement of the manufacturer.

↑ WARNING!

Medical equipment can be damaged by non-ionized radiation

Electrical equipment on the truck emitting non-ionized radiation (e.g. wireless data transmission) can affect operators' medical equipment (pacemakers, hearing aids etc.) and result in malfunctions. Consult a doctor or the manufacturer of the medical equipment to clarify whether it can be used near the industrial truck.

4.8 Conditions of use

Ambient temperature

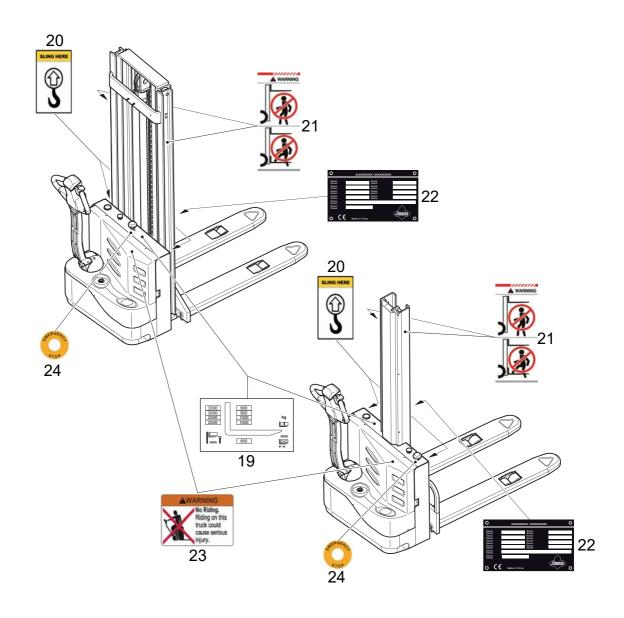
- operating at 5°C to 40°C
- Special equipment and authorization are required if the truck is to be used continually in conditions of extreme temperature or condensing air humidity fluctuations.

4.9 Electrical Requirements

The manufacturer confirms compliance with the requirements for the design and manufacture of electrical equipment, according to EN 1175 "Industrial Truck Safety - Electrical Requirements", provided the truck is used according to its purpose.

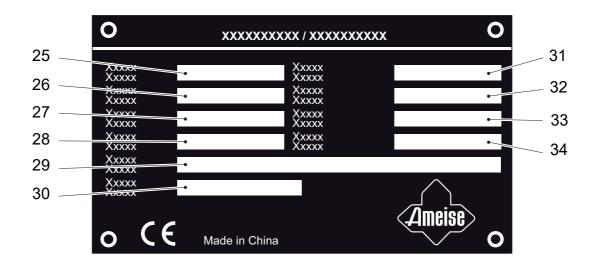
4.10 Identification points and data plates

Warnings and notices such as capacity charts, strap points and data plates must be legible at all times. Replace if necessary.



Item	Description		
19	Capacity plate		
20	Attachment points for loading by crane		
21	Prohibition plate: "Do not step under or on the load handler"		
22	Data plate		
23	Prohibition plate: "No passengers"		
24	Emergency stop sticker		

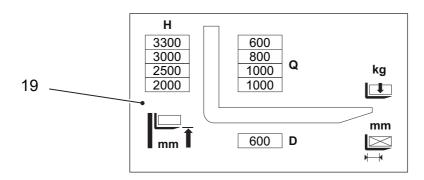
4.10.1 Data plate



Item	Description	Item	Description
25	Туре	31	Option
26	Serial-no.	32	Year of manufacture
27	Rated capacity	33	Load centre distance
28	Nominal power	34	Mass of truck
29	Imported by		
30	Manufacturer		

For queries regarding the truck or ordering spare parts always quote the truck serial number (26).

4.10.2 Truck Capacity Plate



The capacity plate (19) indicates the maximum capacity Q (in kg) for a given load centre D (in mm) and corresponding lift height H (in mm) for the truck with a horizontal load.

Example of how to calculate the maximum capacity:

At a load centre distance D (600 mm) and a maximum lift height H (3000 mm) the maximum capacity is Q (800 kg).

C Transport and Commissioning

1 Lifting by crane

↑ DANGER!

All persons involved in loading by crane must be trained

Incorrect crane loading procedures due to untrained personnel can cause the truck to fall. There is a risk of injury to personnel and a risk of material damage to the truck.

▶ Loading must only be performed by specialist personnel trained for this purpose. The specialist personnel must be instructed in securing loads on road vehicles and handling load securing devices. In each case correct measurements must be taken and appropriate safety measures applied.

↑ DANGER!

Incorrect lifting by crane can result in accidents

Improper use or use of unsuitable lifting gear can cause the truck to fall when being lifted by crane.

Prevent the truck from hitting other objects during lifting, and avoid uncontrolled movements. If necessary, secure the truck with guide ropes.

- ➤ The truck should only be loaded by personnel trained in the use of lifting slings and tools.
- ► Wear personal protective equipment (e.g. safety shoes, safety helmet, hi-vis jacket, protective gloves, etc.) when loading by crane.
- ▶ Do not stand under suspended loads.
- ▶ Do not enter or stand in a hazardous area.
- ► Always use lifting gear with sufficient capacity (for truck weight see truck rating plate).
- ► Always attach the crane lifting gear to the prescribed strap points (see page 27) and prevent them from slipping.
- ▶ Use the lifting slings only in the prescribed loading direction.
- ► Crane slings should be fastened in such a way that they do not come into contact with any attachments when lifting.
- The strap points (20) on the mast are intended for lifting the truck with crane lifting gear.

Lifting the truck by crane

Requirements

- Park the truck securely, see page 42.

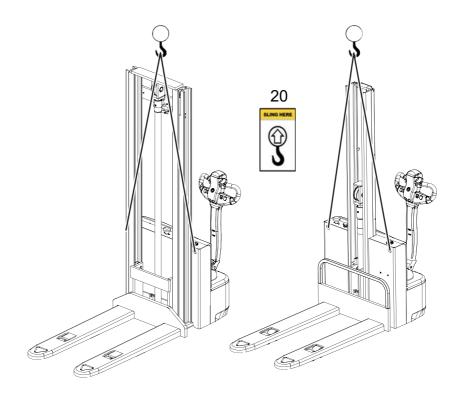
Tools and Material Required

- Lifting gear
- Crane lifting gear

Procedure

• Attach the crane lifting gear to the strap points (20).

The truck can now be lifted by crane.



2 Transport

↑ WARNING!

Uncontrolled movement during transport

Improper fastening of the truck and mast during transport can result in serious accidents.

- ▶ Loading is only to be carried out by specially trained staff. The specialist personnel must be instructed in the securing of loads on road vehicles and in the use of load-securing equipment. When securing the truck, the appropriate measures must be determined and applied for each individual case.
- ▶ The truck must be securely fastened when transported on a lorry or a trailer.
- ▶ The lorry or trailer must have lashing rings.
- ► Use wedges to prevent the truck from moving.
- ▶ Use only lashing straps with sufficient load rating.
- ► Use anti-slip material to secure loading aids (pallets, wedges,...), e. g. anti-slip mats.

Securing the industrial truck for transport

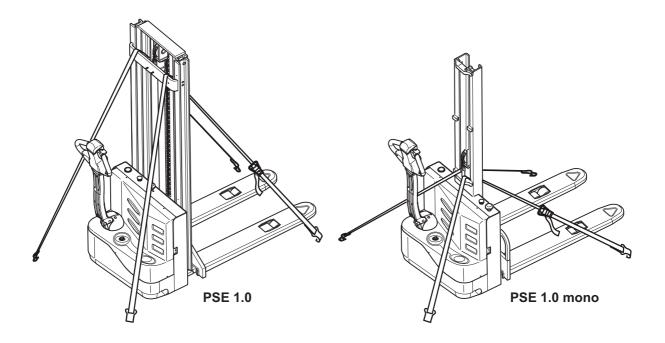
Tools and Material Required

- Tensioning belts / tie down straps

Procedure

- Load the truck onto the transporting vehicle.
- Park the truck securely (see page 42).
- Only PSE 1.0 mono: remove the cover from the mast (see page 69).
- Sling tensioning belts around the mast of the truck and attach them to the fastening rings of the transporting vehicle.
- Tighten the tensioning belt with the tensioner.

The truck can now be transported.



3 Using the Truck for the First Time

↑ WARNING!

The use of unsuitable energy sources can be hazardous

Rectified AC current will damage the assemblies (controllers, sensors, motors etc.) of the electronic system.

Unsuitable cable connections (too long, insufficient wire cross-section) to the battery (tow cables) can overheat, setting the truck and battery on fire.

▶ The truck must only be operated with battery current.

Procedure

- Check if the equipment is complete.
- · Charge the battery, see page 34.

The truck can now be started, see page 40.

Wheel flattening

If the truck has been parked for a long period, the wheel surfaces may tend to flatten. This flattening has a negative effect on the safety and stability of the truck. Once the truck has covered a certain distance, the flattening will disappear.

D Battery - Servicing, Recharging, Replacement

1 Safety Regulations Governing the Handling of Lead-Acid Batteries

Maintenance personnel

Batteries may only be charged, serviced or replaced by trained personnel. These operating instructions and the manufacturer's instructions concerning batteries and charging stations must be observed when carrying out the work.

Fire Protection

Do not smoke and avoid naked flames when handling batteries. Wherever an industrial truck is parked for charging there must be no inflammable material or consumables capable of creating sparks within a minimum distance of 2 m from the truck. The room must be ventilated. Fire protection equipment must be available.

↑ CAUTION!

The use of unsuitable fire protection equipment can result in scalding

Extinguishing fires with water can cause a reaction with the battery acid. This can result in scalding from the acid.

- ► Use powder extinguishers.
- ▶ Never extinguish a burning battery with water.

↑ CAUTION!

Short circuits can cause fires

Damaged cables can cause a short circuit, setting the truck and the battery on fire.

▶ Before closing the battery cover make sure that the battery cables cannot be damaged.

Battery disposal

Batteries may only be disposed of in accordance with national environmental protection regulations or disposal laws. The manufacturer's disposal instructions must be observed.

↑ WARNING!

Batteries can be hazardous

Batteries contain an acid solution which is poisonous and corrosive. Avoid contact with battery acid at all times.

- ▶ Dispose of used battery acid in accordance with regulations.
- ▶ Always wear protective clothing and goggles when working with batteries.
- ▶ Do not let battery acid come into contact with skin, clothing or eyes. If necessary, rinse with plenty of clean water.
- ▶ In the event of physical damage (e.g. skin or eye contact with battery acid) call for a doctor immediately.
- ▶ Spilled battery acid should be neutralised immediately with plenty of water.
- ▶ Only batteries with a sealed battery container may be used.
- ► Follow national guidelines and legislation.

⚠ WARNING!

Unsuitable batteries that have not been approved by Jungheinrich for the truck can be hazardous

The design, weight and dimensions of the battery have a considerable effect on the operational safety of the truck, in particular its stability and capacity. The use of unsuitable batteries that have not been approved for the truck by Jungheinrich, can lead to a deterioration of the braking characteristics of the truck during energy recovery, causing considerable damage to the electric controller and resulting in serious danger to the health and safety of individuals.

- ▶ Only Jungheinrich-approved batteries may be used on the truck.
- ▶ Battery equipment may only be replaced with the agreement of Jungheinrich.
- ▶ When replacing/installing the battery make sure the battery is securely located in the battery compartment of the truck.
- ▶ Do not use batteries that have not been approved by the manufacturer.

Park the truck securely before carrying out any work on the batteries (see page 42).

2 Battery types

PSE 1.0/PSE 1.0 mono is equipped with two maintenance-free 12 V / 70 Ah batteries.

The optimum battery usage duration is achieved at a battery temperature between 25 and 30°C. Low temperatures can reduce the available battery capacity, high temperatures can shorten the useful life of the battery.

NOTE

40°C is the maximum temperature for batteries at which point the truck cannot be operated.

When the industrial truck is parked securely the battery can be electrically separated from the industrial truck by pushing the emergency switch (connector). The industrial truck should not be stored without a battery compensation charge for more than 3 months at 20°C or 2 months at 30°C.

3 Exposing the batteries

↑ CAUTION!

Trapping hazard

▶ Make sure there is nothing between the cover and the truck when you fit the cover.

↑ WARNING!

An unsecured truck can cause accidents

Parking the truck on an incline or with a raised load handler is dangerous and is strictly prohibited.

- ▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges.
- Fully lower the load handler.
- ➤ Select a place to park where no other people are at risk of injury from the lowered load handler.
- ▶ If the brakes are not working, place wedges underneath the wheels of the truck to prevent it from moving.

Requirements

- Park the truck on a level surface.
- Park the truck securely, see page 42.
- Front cover disassembly, see page 68.

4 Charging the battery

↑ WARNING!

The gases produced during charging can cause explosions

The battery produces a mixture of oxygen and hydrogen (electrolytic gas) during charging. Gassing is a chemical process. This gas mixture is highly explosive and must not be ignited.

- ▶ Before charging, check all cables and plug connections for visible signs of damage.
- ▶ Ventilate the room in which the truck is being charged.
- ▶ Do not smoke and avoid naked flames when handling batteries.
- ▶ Wherever an industrial truck is parked for charging there shall be no inflammable material or lubricants within 2 m around the truck.
- ▶ Fire protection equipment must be on hand.
- ▶ Do not lay any metallic objects on battery.
- lt is essential to follow the safety regulations of the battery and charger.

4.1 Charging the battery with the integrated on-board charger

DANGER!

Risk of electric shock and burning

Damaged and unsuitable cables can cause electric shocks and can overheat, resulting in fires.

- ► Always use mains cables with a maximum length of 30 m. Local regulations must be observed.
- ► Unwind the cable reel fully when using it.
- ► Always use original manufacturer's mains cables.
- Insulation safety, acid and caustic ratings must comply with the manufacturer's mains lead.
- ▶ The mains plug must be dry and clean when used.

CAUTION!

Improper use of the on-board charger can cause material damage

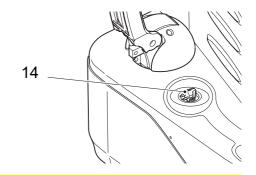
The on-board charger consisting of a battery charger and battery controller must not be opened. If faulty, contact the manufacturer's service department.

- ▶ The charger must only be used for batteries supplied by Jungheinrich or other approved batteries provided it has been adapted by the manufacturer's service department.
- ▶ Batteries must never be swapped from truck to truck.
- ▶ Do not connect the battery to two chargers simultaneously.

Starting charging with the on-board charger

Mains connection

Mains supply:230 V/110 V (±10%) Mains frequency:50 Hz/60 Hz (±4%) PSE 1.0/ PSE 1.0 mono is equipped with an on-board charger as standard. The battery charger detects and automatically adapts the mains voltage. The mains cable (14) to the battery charger can



be accessed from outside.

The on-board charger must not be opened.

NOTE

During charging, the temperature of the battery is approx. 10°C. Battery charging may only be started at a battery temperature below 35°C. The battery temperature before charging must be at least 15°C, otherwise charging may be impaired.

5 Battery removal and installation

PSE 1.0 / PSE 1.0 mono

Removing the battery may only be performed by trained user for these tasks. Otherwise removing the battery may only be performed by customer service department.

6 Battery charging/discharging indicator / hourmeter

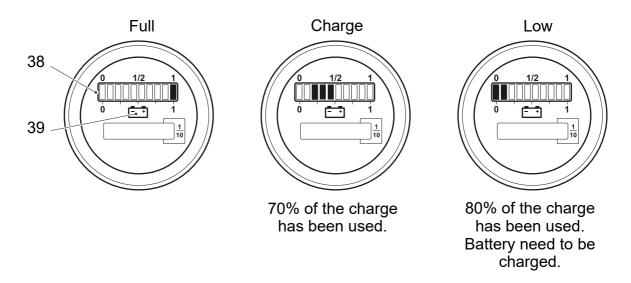
Battery charging indicator

The red LED (39) in the battery symbol indicates that the battery is charging.

Battery discharging indicator

The battery discharge status is indicated by 10 LEDs (38) on the battery discharge indicator/hourmeter.

One LED corresponds to 10% of the battery capacity.



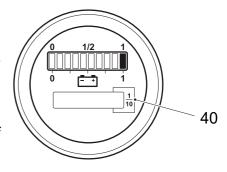
Self-discharge can cause the battery to fully discharge. Depletion shortens the useful life of the battery.

Charge the battery at least every 2 month, see page 34.

Hour meter

The hourmeter (40) shows the running time of the truck. The service hours are counted only during travel and lifting. The running time is continually stored and is not deleted when the batteries are disconnected.

The last digit on the LCD display indicates tenths of an hour.



E Operation

1 Safety Regulations for the Operation of Forklift Trucks

Driver authorisation

The truck may only be used by suitably trained personnel, who have demonstrated to the proprietor or his representative that they can drive and handle loads and have been authorized to operate the truck by the proprietor or his representative.

Operator's rights, responsibilities and rules of conduct

The driver must be informed of his duties and responsibilities and be instructed in the operation of the truck and shall be familiar with the operating instructions. Safety shoes must be worn on pedestrian-operated trucks.

Unauthorized use of truck

The operator is responsible for the truck during the time it is in use. The operator must prevent unauthorized persons from driving or operating the truck. Do not carry passengers or lift other people.

Damage and faults

The supervisor must be informed immediately of any damage or faults to the truck or attachment. Trucks which are unsafe for operation (e.g. wheel or brake problems) must not be used until they have been rectified.

Repairs

The operator must not carry out any repairs or alterations to the truck without authorisation and the necessary training to do so. The operator must never disable or adjust safety mechanisms or switches.

Hazardous area

\triangle

WARNING!

Risk of accidents/injury in the hazardous area of the truck

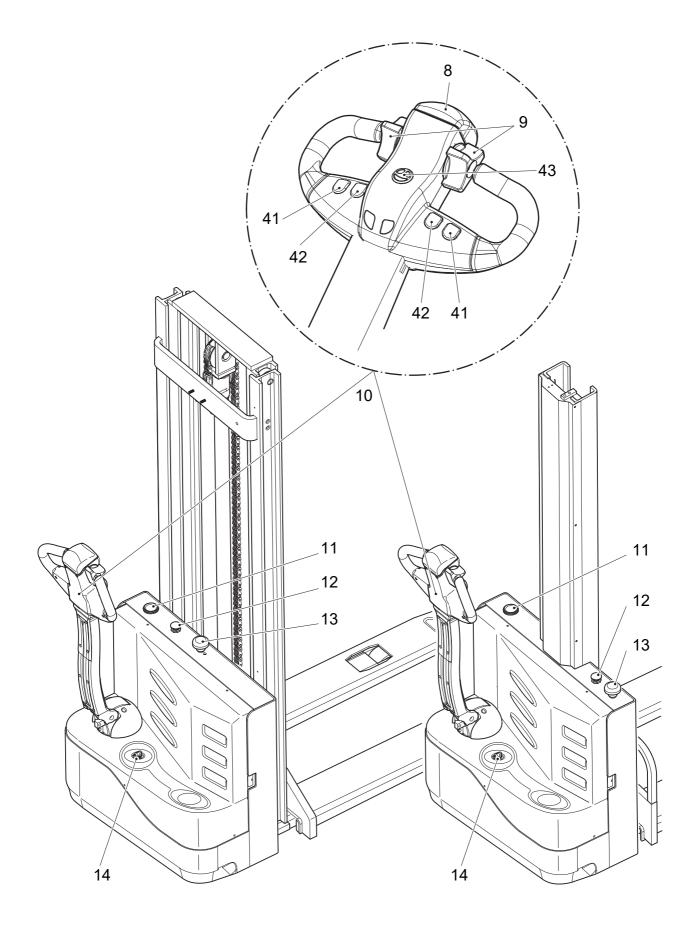
A hazardous area is defined as the area in which people are at risk due to travel or lifting operations of the truck, its load handler or the load. This also includes the area within reach of falling loads or lowering/falling operating equipment.

- Instruct unauthorized persons to leave the hazardous area.
- ▶ In case of danger to third parties, give a warning signal in good time.
- ▶ If unauthorized persons are still within the hazardous area, stop the truck immediately.

Safety devices, warning signs and warning instructions

Safety devices, warning signs (see page 24) and warning instructions in the present operating instructions must be strictly observed.

2 Displays and Controls



Item	Control /Display	PSE 1.0	Function
		PSE 1.0 mono	
9	Travel switch	•	Controls travel direction and speed.
8	Collision safety switch	•	Safety feature. When pressed the truck travels for approx 3 seconds in the fork direction. The parking brake then applies. The truck remains switched off until the controller is briefly restored to neutral.
10	Tiller	•	Used for steering and braking.
11	Battery discharge indicator/ hour meter	•	Battery charge status. Displays the service hours.
12	Key switch	•	Activates the truck. Removing the key prevents the truck from being switched on by unauthorized personnel.
13	Emergency Disconnect Switch	•	Disconnects the battery supply. All electric functions are deactivated and the truck decelerates
14	Mains plug	•	Charges the truck's batteries.
41	Load handler raise button	•	Raises the load handler.
42	Load handler lower button	•	Lowers the load handler.
43	Warning signal button (horn)	•	Warning button

3 Starting up the truck

3.1 Checks and Operations to Be Performed Before Starting Daily Work

↑ WARNING!

Damage and other truck or attachment (optional equipment) defects can result in accidents.

If damage or other truck or attachment (optional equipment) defects are discovered during the following checks, the truck must be taken out of service until it has been repaired.

- ▶ Report any defects immediately to your supervisor.
- ► Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Pre-start inspections

Procedure

- Check the whole of the outside of the truck for signs of damage and leaks. Damaged hoses must be replaced immediately.
- Test hydraulic system.
- Check the battery attachment and wire connections for damage and make sure they are secure.
- Check battery and battery components.
- Make sure the battery connector is secure and operating correctly.
- Check the load handler for visible signs of damage such as cracks, bent or severely worn forks.
- Check the drive wheel and load wheels for damage.
- Check that the markings and labels are present, clean and legible, see page 24.
- Check the control handle (damper) is restored to its normal position.
- Check the controls are automatically restored to zero after being applied.
- Test the warning signal.
- Test the brakes.
- Test the collision safety switch and Emergency Disconnect switch.
- · Check doors and/or covers.
- Check the mast protection pane / grille and their attachments are secure and undamaged.
- Make sure the drive panels and covers are secure and check for damage.

3.2 Preparing the truck for operation

Starting up the truck

Requirements

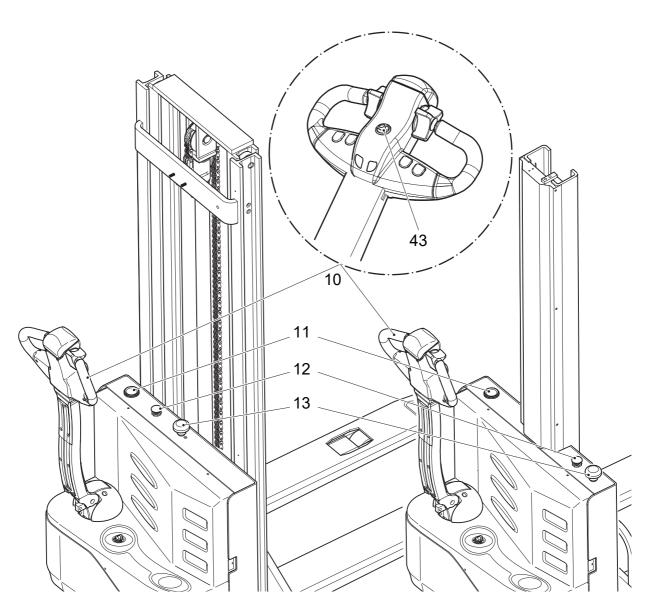
 For checks and operations to be performed before starting daily operation, see page 40.

Procedure

- Pull the Emergency Disconnect (13).
- · To switch on the truck, do this
 - Insert the key in the key switch (12) and turn it as far right as it will go.
- Test the warning signal button (43).
- Test lifting operations.
- · Test the steering.
- Test the brake function of the tiller (10).

Truck is operational.

The battery discharge indicator/hour meter (11) shows the current battery charge status and the service hours.



3.3 Parking the truck securely

⚠ DANGER!

An unsecured truck can cause accidents

Parking the truck on an incline with a raised load or load handler is dangerous and is strictly prohibited.

- ▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges, see page 29.
- Fully lower the load handler.
- ➤ Select a place to park where no other people are at risk of injury from the lowered load handler.
- ▶ If the brakes are not working, place wedges underneath the wheels of the truck to prevent it from moving.

Parking the truck securely

Procedure

- Fully lower the load handler.
- Turn the key in the key switch (12) to the left as far as the stop and remove the key.
- Press down the Emergency Disconnect (13).

The industrial truck is parked

4 Industrial Truck Operation

4.1 Safety regulations for truck operation

Travel routes and work areas

Only use lanes and routes specifically designated for truck traffic. Unauthorized third parties must stay away from work areas. Loads must only be stored in places specially designated for this purpose.

The truck must only be operated in work areas with sufficient lighting to avoid danger to personnel and materials. Additional equipment is necessary to operate the truck in areas of insufficient lighting.

↑ DANGER!

Do not exceed the permissible surface and point loading on the travel lanes. At blind spots get a second person to assist.

The driver must ensure that the loading dock/dock leveler cannot be removed or come loose during loading/unloading.

Travel conduct

The operator must adapt the travel speed to local conditions. The truck must be driven at slow speed when negotiating bends or narrow passageways, when passing through swing doors and at blind spots. The operator must always observe an adequate braking distance between the forklift truck and the vehicle in front and must be in control of the truck at all times. Abrupt stopping (except in emergencies), rapid U turns and overtaking at dangerous or blind spots are not permitted. Do not lean out or reach beyond the working and operating area.

Travel visibility

The operator must look in the direction of travel and must always have a clear view of the route ahead. If the truck is carrying loads that affect visibility, the truck must travel against the load direction. If this is not possible, a second person must walk alongside the truck as a lookout to observe the travel route while maintaining eye contact with the operator. Proceed only at walking pace and with particular care. Stop the truck as soon as you lose eye contact.

Negotiating slopes and inclines

Negotiating slopes and inclines up to 5 % / 7 % is only permitted when they are recognized lanes. The slopes and inclines must be clean, have a non-slip surface, and negotiating them safely must be within the technical specifications of the truck. The truck must always be driven with the load facing uphill. The industrial truck must not be turned, operated at an angle or parked on inclines or slopes. Inclines must only be negotiated at slow speed, with the driver ready to brake at any moment.

Negotiating lifts and docks

Lifts may only be negotiated if they have sufficient capacity, are suitable for driving on and authorized for truck traffic by the owner. The driver must satisfy himself of the above before entering these areas. The truck must enter lifts with the load in front and must take up a position which does not allow it to come into contact with the walls of

the lift shaft. Persons riding in the lift with the forklift truck must only enter the lift after the truck has come to a rest and must leave the lift before the truck. The driver must ensure that the dock cannot move or come loose during loading / unloading.

↑ WARNING!

Electromagnetic influence can result in accidents

Strong magnets can cause electronic components such as Hall sensors to become damaged, resulting in accidents.

▶ Do not use magnets in the operating area of the truck. Exceptions to this rule are commercial, weak clamping magnets for attaching notices.

4.2 Emergency Disconnect

⚠ DANGER!

Applying maximum braking can result in accidents

Applying the Emergency Disconnect switch during travel will cause the truck to decelerate to a halt at maximum force. This may cause the load to slide off the load handler. There is a higher risk of accidents and injury.

- ▶ Do not use the Emergency Disconnect switch as a service brake.
- ▶ Use the Emergency Disconnect switch during travel only in emergencies.

↑ DANGER!

Faulty or non-accessible Emergency Disconnect switches can cause accidents

A faulty or non-accessible Emergency Disconnect switch can cause accidents. In dangerous situations the operator cannot bring the truck to a halt in time by applying the Emergency Disconnect switch.

- ▶ The operation of the Emergency Disconnect switch must not be affected by any objects placed in its way.
- ▶ Report any defects on the Emergency Disconnect switch immediately to your supervisor.
- ► Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Releasing the Emergency Disconnect switch

Procedure

• Pull the Emergency Disconnect switch (13) to unlock it.

All electrical functions are enabled and the truck is operational again (provided the truck was operational before the Emergency Disconnect was pressed).

4.3 Automatic braking

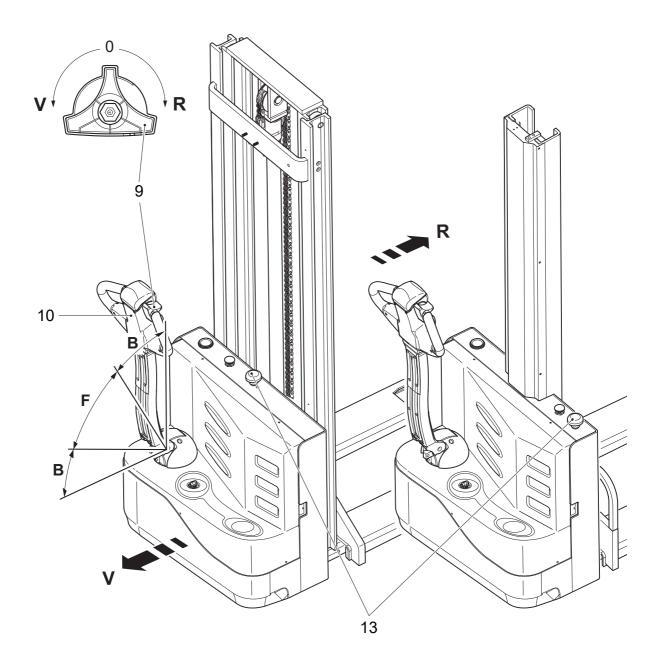
When the tiller is released, it returns automatically to the upper brake zone (B) and the brakes are applied automatically.

↑ WARNING!

Risk of collision due to a defective tiller

Operating the truck with a defective tiller can lead to collisions with persons or objects.

- ▶ If the tiller returns to the brake position slowly or not at all, the truck must be taken out of service until the cause of this fault is be rectified.
- ▶ Contact the manufacturer's customer service department.



4.4 Travel

↑ WARNING!

Collision hazard when operating the truck

Collisions with personnel and equipment can result if the truck is operated with open panels.

▶ Do not operate the truck unless the panels and covers are closed and properly locked.

Requirements

- Start up the truck, see page 40

Procedure

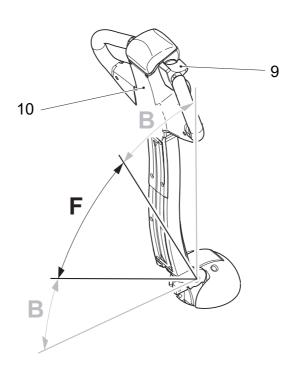
- Set the tiller (10) to the travel range (F) and press the travel switch (9) in the desired direction (fwd. or rev.).
- Control the travel speed with the travel switch (9).

 When the travel switch is released it automatically returns to its original position.

The brakes are released and the truck moves in the selected direction.

Preventing the truck from "rolling downhill":

If the truck rolls backwards on an incline the controller detects the situation and the brake applies automatically after a short movement.



4.4.1 Changing direction during travel

↑ CAUTION!

Danger when changing direction during travel

Changing direction during travel causes the truck to decelerate sharply. When the truck changes direction, it can start travelling at high speed in the opposite direction unless the travel switch is released in time.

- ▶ After setting off in the opposite direction, apply the travel switch gently or not at all.
- ▶ Do not perform any sudden steering operations.
- ► Always face in the direction of travel.
- ▶ Maintain an adequate overview of the route you are travelling.

Changing direction during travel

Procedure

• Set the travel switch (9) to the opposite direction while travelling.

The truck decelerates until it starts to travel in the opposite direction.

4.5 Steering

Procedure

• Move the tiller (10) to the left or right.

The truck is steered in the required direction.

4.6 Brakes

↑ WARNING!

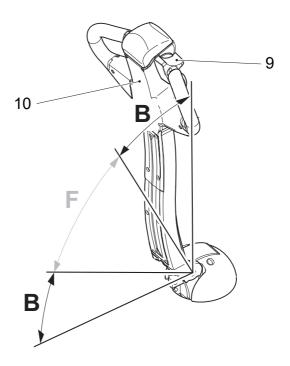
Accident risk

The brake pattern of the truck depends largely on the ground conditions.

- ▶ The operator must take into account the travel route conditions when braking.
- ▶ Brake with care to prevent the load from slipping.
- ▶ Allow for increased braking distance when travelling with load.

↑ CAUTION!

▶ In hazardous situations set the tiller to the brake position or press the Emergency Disconnect switch.



Braking with the service brake

Procedure

Move th

Move the tiller (10) up or down to one of the brake zones (B).
 Initially the truck brakes regeneratively. The mechanical brake is only applied when this brake fails to achieve the necessary braking force.

The truck will decelerate at the maximum rate and the service brake will apply.

Inversion braking

Procedure

• You can set the travel switch (9) to the opposite direction when travelling.

The truck brakes regeneratively until it starts to move in the opposite direction.

Regenerative braking

Procedure

• If the travel switch is set to 0, the truck automatically brakes regeneratively.

The truck brakes to a halt regeneratively via the regenerative brake. The service brake then applies.

With regenerative braking energy is recuperated to the battery, ensuring a longer service time.

Parking brake

The mechanical brake (parking brake) applies when the truck comes to rest.

4.7 Lifting, transporting and depositing loads

↑ WARNING!

Unsecured and incorrectly positioned loads can cause accidents.

Before lifting a load unit, the driver must make sure that it has been correctly palletised and does not exceed the truck's capacity.

- ▶ Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous area.
- ▶ Only carry loads that have been correctly secured and positioned. Use suitable precautions to prevent parts of the load from tipping over or falling off the truck.
- ▶ Damaged loads must not be transported.
- ▶ Never exceed the maximum loads specified on the load diagram.
- ► Never stand underneath a raised load handler.
- ▶ Do not stand on the load handler.
- ▶ Do not lift other people on the load handler.
- ▶ Insert the load handler as far as possible underneath the load.
- ▶ Take care that the centre of the load have to be between the forks to prevent tilting.

NOTE

Adapt a slower speed when stacking and retrieving.

4.7.1 Raising a load

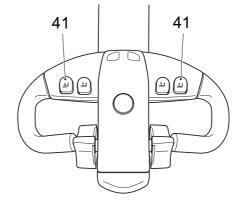
Requirements

- Load unit correctly palletised.
- Load unit weight matches the truck's capacity.
- Forks evenly loaded for heavy loads.

Procedure

- Drive the truck carefully up to the pallet.
- Slowly insert the forks into the pallet until the fork shank touches the pallet.
- The load unit must not extend by more than 50 mm beyond the fork tips.
 - Press the left or right "Lift" button (41) until you reach the desired lift height.

The load unit is raised.



Λ

CAUTION!

▶ Release the "Lift" button as soon as you reach the load handler limit position.

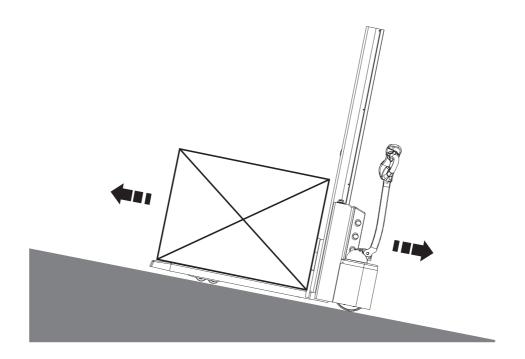
4.7.2 Transporting a load

Requirements

- Load raised correctly.
- Load is not on the ground.
- Perfect ground conditions.

Procedure

- Accelerate and decelerate with care.
- Adapt your travel speed to the conditions of the route and the load you are transporting.
- Travel at a constant speed.
- · Be prepared to brake at all times.
 - Brake gently in normal circumstances.
 - · Only stop suddenly in dangerous situations.
- · Watch out for other traffic at crossings and passageways.
- · Always travel with a lookout at blind spots.
- Do not travel across or at an angle on inclines. Do not turn on slopes and inclines, and always drive with the load facing uphill (see graphic).



NOTE

Loads must not be deposited on travel or escape routes, in front of safety mechanisms or plant equipment that must be accessible at all times.

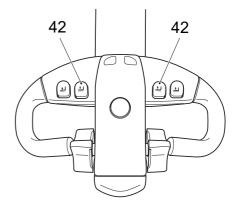
Requirements

Storage location suitable for storing the load.

Procedure

- Drive carefully up to the storage location.
- Press the left or right lower load handler button (42).
- Avoid depositing the load roughly to prevent damage to the load and the load handler.
 - Carefully lower the load handler so that the forks are clear of the load.
 - · Carefully remove the forks from the pallet.

The load unit is lowered.



4.7.3 Wind loads

Wind forces can affect the stability of a truck when lifting, lowering and transporting loads with large surface areas.

Light loads must be especially secured when they are subjected to wind forces. This will prevent the load from sliding or falling.

Stop the truck in both cases.

5 Troubleshooting

This chapter enables the operator to localize and rectify basic faults or the results of incorrect operation himself. When trying to locate a fault, proceed in the order shown in the remedy table.

→

If, after carrying out the following remedial action, the truck cannot be restored to operation or if a fault in the electronics system is displayed with a corresponding error code, contact the manufacturer's service department.

Troubleshooting must only be performed by the manufacturer's customer service department. The manufacturer has a service department specially trained for these tasks.

In order for customer services to react quickly and specifically to the fault, the following information is essential:

- Truck serial number
- Event message from the display unit (if applicable)
- Error description
- Current location of truck.

5.1 Truck does not start

Possible Cause	Remedy
Emergency Disconnect switch pressed	Unlock the emergency disconnect switch
Key switch set to O	Set the key switch to "I"
	Check battery charge and Charge the battery as required
Faulty fuse	Check fuses

5.2 Load cannot be lifted

Possible Cause	Remedy
Truck not operational	Carry out all measures listed under "Truck does not start"
Hydraulic oil level too low	Check the hydraulic oil level
Battery discharge monitor has switched off	Charging the battery
Faulty fuse	Check fuses
Excessive load	Note maximum capacity, see data plate

6 Operating the truck without its own drive system

The brake may only be released by the manufacturer's customer service department. The manufacturer has a dedicated service department for such eventualities.

F Industrial Truck Maintenance

1 Operational Safety and Environmental Protection

The checks and servicing operations contained in this chapter must be performed in accordance with the maintenance checklist service intervals.

↑ WARNING!

Risk of accidents and component damage

Any modification to the truck, in particular the safety mechanisms, is prohibited.

Exception: Operating companies should only make changes or have changes made to powered industrial trucks if the truck manufacturer is no longer operating in the field and there is no successor to the business; operating companies must however:

- Ensure that the changes to be made are planned, tested and performed by a specialist engineer in industrial trucks taking safety into account.
- Keep permanent records of plans, tests and completion of changes
- Carry out and have authorized the respective changes to the capacity data plates, decals and stickers as well as the operator and service manuals.
- Attach permanent and clearly visible marking to the truck indicating the types of changes made, the date of the changes and the name and address of the organisation responsible for the work.

NOTE

Only original spare parts are subject to the manufacturer's quality control. To ensure safe and reliable operation, use only the manufacturer's spare parts.

For safety reasons, only components which have been specially agreed by the manufacturer for this truck may be installed near the computer, controllers and wire guidance sensors (antennae). These components (computers, controllers, wire guidance sensors (antennae)) must therefore not be replaced by similar components from other trucks of the same series.

2 Maintenance Safety Regulations

Maintenance personnel

The truck should only be serviced and repaired by the manufacturer's specialist customer service personnel who have been trained to do this. We therefore recommend that you enter into a maintenance contract with the manufacturer's local sales office.

↑ WARNING!

Lifting and jacking up the truck safely

In order to raise the truck, the lifting gear must only be secured to the points specially provided for this purpose.

You may only work under a raised load handler if it has been secured with a sufficiently strong chain or the fastening bolt.

In order to raise and jack up the truck safely, proceed as follows:

- ▶ Jack up the truck only on a level surface and prevent it from moving accidentally.
- ▶ Always use a jack with sufficient capacity. When jacking up the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).
- ▶ In order to lift the truck, the lifting gear must only be secured to the points specially provided for this purpose, see page 27.
- ▶ When jacking up the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).
- ► For jacking the truck, make sure to use structural parts of the truck as contact point for the jack (e.g. truck chassis).

↑ CAUTION!

Fire hazard

Do not use flammable liquids to clean the industrial truck.

- ▶ Disconnect the battery before starting cleaning work.
- ► Carry out all necessary safety measures to prevent sparking before cleaning (e.g. by short-circuiting).

Electrical system

⚠ WARNING!

Accident risk

- ▶ Only suitably trained electricians may operate on the truck's electrical system.
- ▶ Before working on the electrical system, take all precautionary measures to avoid electric shocks.
- ► Always disconnect the battery before starting cleaning operations.

↑ WARNING!

Electric currents can cause accidents

Make sure the electrical system is voltage-free before starting work on it. Before starting maintenance on the electrical system:

- ▶ Park the truck securely (see page 42).
- ▶ Press the Emergency Disconnect.
- ▶ Disconnect the battery.
- ▶ Remove any rings or metal bracelets etc. before working on electrical components.

↑ CAUTION!

Consumables and used parts are an environmental hazard

Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations. Oil changes should be carried out by the manufacturer's customer service department, whose staff are specially trained for this task.

▶ Note the safety regulations when handling these materials.

Welding

Remove electrical and electronic components from the truck before performing welding operations, to avoid damage.

Settings

When repairing or replacing hydraulic, electric or electronic components or assemblies, always note the truck-specific settings.

↑ WARNING!

The use of wheels that do not comply with the manufacturer's specifications can result in accidents

The quality of wheels affects the stability and driving characteristics of the truck.

Uneven wear affects the truck's stability and increases the stopping distance.

- ▶ After replacing wheels, make sure the truck is not skewed.
- ▶ Always replace wheels in pairs, i.e. the left- and right-hand wheels at the same time.



When replacing wheels fitted at the factory, only use the manufacturer's original spare parts. Otherwise the manufacturer's specification will not be adhered to.

↑ WARNING!

Leaky hydraulic systems can result in accidents

Hydraulic oil can escape from leaky and faulty hydraulic systems.

- ▶ Report any defects immediately to your supervisor.
- ► Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.
- ▶ Remove any spilled hydraulic immediately with an appropriate bonding agent.
- ▶ The bonding agent / consumable mixture must be disposed of in accordance with regulations.

↑ WARNING!

Faulty hydraulic hoses can result in injury and infection

Pressurised hydraulic oil can escape from fine holes or hairline cracks in the hydraulic hoses. Brittle hydraulic hoses can burst during operation. People standing near the truck can be injured by the hydraulic oil.

- ▶ Call for a doctor immediately in the event of an injury.
- ▶ Do not touch pressurised hydraulic hoses.
- ▶ Report any defects immediately to your supervisor.
- ► Mark defective truck and take it out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

NOTE

Testing and replacing hydraulic hoses

Hydraulic hoses can become brittle through age and must be checked at regular intervals. The application conditions of the industrial truck have a considerable impact on the ageing of the hydraulic hoses.

- ▶ Check the hydraulic hoses at least annually and replace if necessary.
- ▶ If the operating conditions become more arduous the inspection intervals must be reduced accordingly.
- ▶ In normal operating conditions a precautionary replacement of the hydraulic hoses is recommended after 6 years. The owner must carry out a risk assessment to ensure safe, prolonged use. The resulting protection measures must be observed and the inspection interval reduced accordingly.

Lift chains

⚠ WARNING!

Non-lubricated and incorrectly cleaned lift chains can cause accidents

Lift chains are safety-critical parts. They must not contain any serious contamination. Lift chains and pivot pins must always be clean and well lubricated.

- ► Lift chains should only be cleaned with paraffin derivatives e.g. petroleum or diesel fuels.
- ▶ Do not clean lift chains with high pressure jets or chemical cleaning agents.
- ▶ Immediately after cleaning, dry the lift chain with compressed air and apply a chain spray.
- ► Always lubricate a chain when it is discharged.
- Lubricate a lift chain with particular care around the pulleys.

3 Lubricants and Lubrication Schedule

3.1 Handling consumables safely

Handling consumables

Consumables must always be handled correctly. Follow the manufacturer's instructions.

⚠ WARNING!

Improper handling is hazardous to health, life and the environment

Consumables can be flammable.

- ▶ Keep consumables away from hot components and naked flames.
- ▶ Always keep consumables in prescribed containers.
- ► Always fill consumables in clean containers.
- ▶ Do not mix up different grades of consumable. The only exception to this is when mixing is expressly stipulated in the operating instructions.

↑ CAUTION!

Spilled consumables can cause slipping and endanger the environment

Risk of slipping from spilled consumables. The risk is greater when combined with water.

- ▶ Do not spill consumables.
- ▶ Spilled consumables must be removed immediately with an appropriate bonding agent.
- ▶ The bonding agent / consumable mixture must be disposed of in accordance with regulations.

↑ WARNING!

Improper handling of oils can be hazardous

Oils (chain spray / hydraulic oil) are flammable and poisonous.

- ▶ Dispose of used oils in accordance with regulations. Store used oil safely until it can be disposed of in accordance with regulations.
- ▶ Do not spill oil.
- ▶ Spilled oils must be removed immediately with an appropriate bonding agent.
- ▶ The mixture consisting of the bonding agent and oil must be disposed of in accordance with regulations.
- ▶ Observe national regulations when handling oils.
- ► Wear safety gloves when handling oils.
- ▶ Prevent oil from coming into contact with hot motor parts.
- ▶ Do not smoke when handling oil.
- ► Avoid contact and digestion. If you swallow oil do not induce vomiting but seek medical assistance immediately.
- ▶ Seek fresh air after breathing in oil fumes or vapours.
- ▶ If oil has come into contact with your skin, rinse your skin with water.
- ▶ If oil has come into contact with your eyes, rinse them with water and seek medical assistance immediately.
- ▶ Replace oil-soaked clothing and shoes immediately.

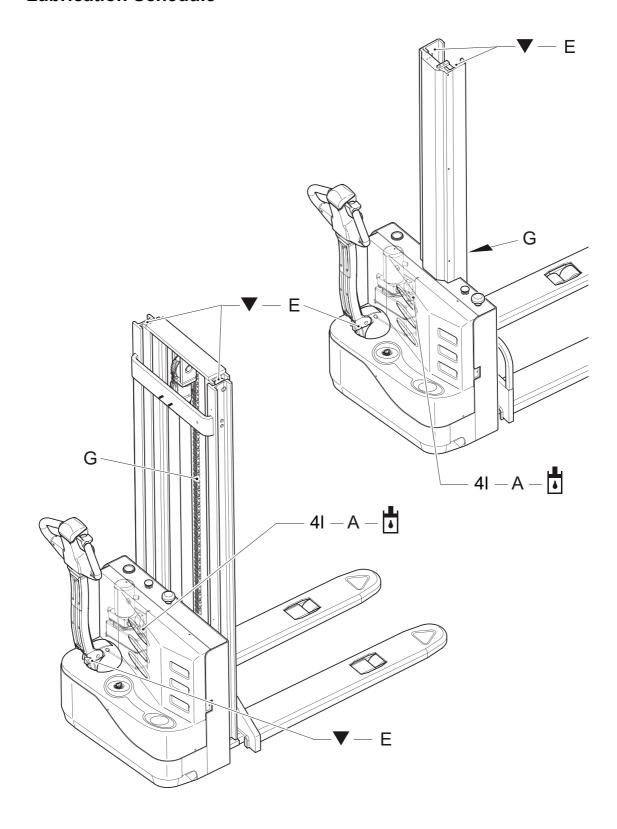
↑ CAUTION!

Consumables and used parts are an environmental hazard

Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations. Oil changes should be carried out by the manufacturer's customer service department, whose staff are specially trained for this task.

▶ Note the safety regulations when handling these materials.

3.2 Lubrication Schedule



•	Contact surfaces
Å	Hydraulic oil filler neck
1	Transmission grease nipples

3.3 Consumables

Code	Order no.	Package quantity	Description	Used for
Α	51 037 499	5.0 L	HVI 46	Hydraulic System
В	51 497 886	0.6 kg	Multi Purpose Grease 3	Gear unit
E	29 202 050	1.0 kg	Polylube GA 352P	Lubrication

3.4 Grease guidelines

Code	Saponification	Dew point °C	Worked penetration at 25 °C	NLG1 class	Application temperature °C
В	Lithium	>180	220 - 250	3	-25/+130
E	Lithium	>220	280 - 310	2	-35/+120

4 Maintenance and repairs

4.1 Preparing the truck for maintenance and repairs

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

Procedure

- Fully lower the load handler.
- Park the truck securely, see page 42.
- Push the emergency switch to prevent the truck from being switched on accidentally.
- When working under a raised lift truck, secure it to prevent it from lowering, tipping or sliding away.

↑ WARNING!

Risk of accidents when working under the load handler and lift truck

- ▶ When working under a raised load handler or a raised truck, secure them to prevent the truck from from lowering, tipping or sliding away.
- ▶ When raising the truck, follow the instructions, see page 27. When working on the parking brake, prevent the truck from accidentally rolling away (e.g. with wedges).

4.2 Lifting and jacking up the truck safely

↑ DANGER!

A truck tipover can cause accidents

In order to raise the truck, use only suitable lifting gear at the points specially provided for this purpose.

- ▶ Note the weight of the truck on the data plate.
- ► Always use a jack with sufficient capacity.
- ▶ Raise the unladen truck on a level surface.
- ▶ When raising the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).

Raising and jacking up the truck securely

Requirements

- Prepare the truck for maintenance and repairs (see page 64).

Tools and Material Required

- Jack
- Hard wooden blocks

Procedure

- Place the jack against the contact point.
- For jacking the truck, make sure to use the structural parts of the truck as contact point for the jack (e.g. truck chassis).
 - · Raise the truck.
 - · Support the truck with hard wooden blocks.
 - · Remove the jack.

The truck is now securely raised and jacked up.

4.3 Cleaning

4.3.1 Cleaning the truck

↑ CAUTION!

Fire hazard

Do not use flammable liquids to clean the industrial truck.

- ▶ Disconnect the battery before starting cleaning work.
- ► Carry out all necessary safety measures to prevent sparking before cleaning (e.g. by short-circuiting).

↑ CAUTION!

Risk of component damage when cleaning the truck

Cleaning with a pressure washer can result in malfunctions due to humidity.

- ► Cover all electronic system assemblies (controllers, sensors, motors etc.) before cleaning the truck with a pressure washer.
- ▶ Do not hold the jet of the pressure washer by the marked points to avoid damaging them (see page 24).
- ▶ Do not clean the truck with pressurised water.

Cleaning the truck

Requirements

- Prepare the truck for maintenance and repairs (see page 64).

Tools and Material Required

- Water-based solvents
- Sponge or cloth

Procedure

- Clean the surface of the truck with water-based solvents and water. Use a sponge or cloth to clean.
- In particular, clean the following areas:
 - Window(s)
 - Oil filler ports and their surroundings
 - Grease nipples (before lubrication)
- Dry the truck after cleaning, e.g. with compressed air or a dry cloth.
- Carry out all the tasks in the section "Recommissioning the truck after cleaning or maintenance work" (see page 70).

The truck is now clean.

4.3.2 Cleaning the electrical system assemblies

↑ CAUTION!

Risk of electrical system damage

Cleaning the assemblies (controllers, sensors, motors etc.) of the electronic system with water can damage the electrical system.

- ▶ Do not clean the electrical system with water.
- ➤ Clean the electrical system with weak suction or compressed air (use a compressor with a water trap) and not a conductive, anti-static brush.

Cleaning the electrical system assemblies

Requirements

- Prepare the truck for maintenance and repairs (see page 64).

Tools and Material Required

- Compressor with water separator
- Non-conductive, antistatic brush

Procedure

- Expose the electrical system, see page 68.
- Clean the electrical system assemblies with weak suction or compressed air (use a compressor with a water trap) and not a conductive, anti-static brush.
- Cover the electrical system, see page 68.
- Carry out all the tasks in the section "Recommissioning the truck after cleaning or maintenance work" (see page 70).

The electrical system assemblies are now clean.

4.4 Replacing the drive wheel

The drive wheel must only be replaced by authorized service personnel.

4.5 Checking the hydraulic oil level

Check oil level

Requirements

- Lower the load handler.
- Prepare the truck for maintenance and repairs, see page 64.
- Remove the panel, see page 68.

Procedure

→

- Check oil level on hydraulic reservoir. The oil level should be visible between the MIN (3.8 I) and MAX (4.0 I) marking.
- Add hydraulic oil with the load handler lowered.
- Add the correct grade of hydraulic oil, see page 62.

Oil level is checked.

4.6 Front cover disassembly

Disassembling the panel

Requirements

- Prepare the truck for maintenance and repairs, see page 64.

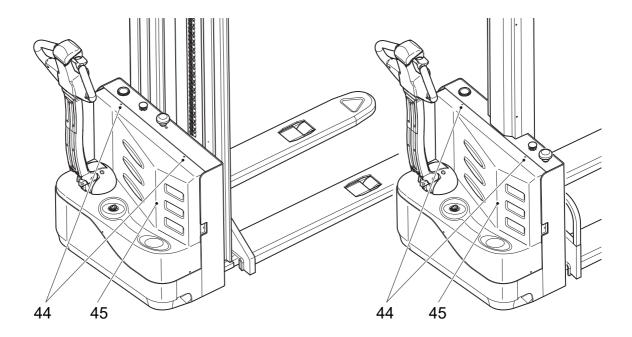
Tools and Material Required

- Allen key

Procedure

- Turn or slightly tilt tiller towards the edge of the truck.
- Remove the 2 screws (44).
- Carefully lift off the front panel (45) and put it to one side.

The front panel is now disassembled.

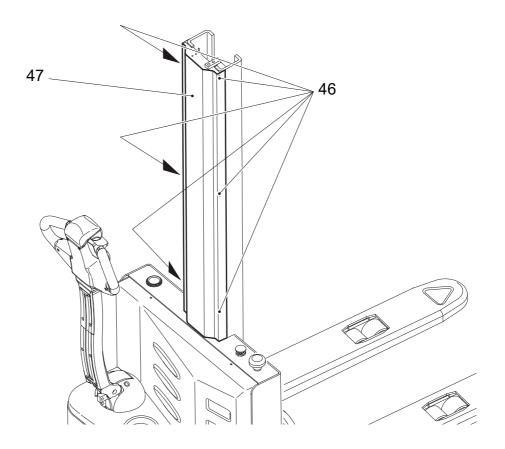


4.7 Mast cover disassembly (only PSE 1.0 mono)

Requirements

- Truck prepared for maintenance and repairs, see page 64.
 Procedure
- Remove the 6 screws (46).
- Carefully take off the mast cover (47) and put it to one side.

The mast cover is now disassembled.



4.8 Checking electrical fuses

Check fuses

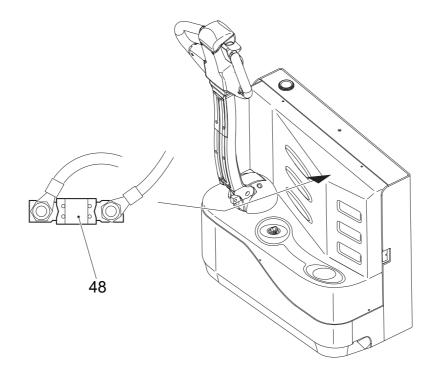
Requirements

- Truck prepared for maintenance and repairs, see page 64.
- Remove the front cover, see page 68.

Procedure

Check the fuse ratings against the table and replace if necessary.

The fuses are now checked.



Item	To protect	Rating
48	Drive motor / pump motor fuse	80 A

4.9 Restoring the truck to service after maintenance and repairs

Procedure

- Thoroughly clean the truck, see page 66.
- Lubricate the truck according to the lubrication schedule, see page 62.
- Clean the battery, grease the terminal screws and connect the battery.
- Charge the battery, see page 34.
- Start up the truck, see page 40.

5 Decommissioning the Industrial Truck

If the truck is to be out of service for more than a month, e.g. for commercial reasons, it must be stored in a frost-free and dry room. All necessary measures must be taken before, during and after decommissioning as described hereafter.

↑ WARNING!

Lifting and jacking up the truck safely

In order to raise the truck, the lifting gear must only be secured to the points specially provided for this purpose.

You may only work under a raised load handler if it has been secured with a sufficiently strong chain or wooden blocks.

In order to raise and jack up the truck safely, proceed as follows:

- ▶ Jack up the truck only on a level surface and prevent it from moving accidentally.
- ▶ Always use a jack with sufficient capacity. When jacking up the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).
- ▶ In order to raise the truck, the lifting gear must only be secured to the points specially provided for this purpose, see page 27.
- ▶ When jacking up the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).

When the truck is out of service it must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

If the truck is to be out of service for more than 6 months, agree further measures with the manufacturer's customer service department.

5.1 Before Taking the Truck out of Service

Procedure

- Thoroughly clean the truck, see page 66.
- · Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and replenish if necessary, see page 67.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the truck according to the lubrication schedule, see page 62.
- · Charge the battery, see page 34.
- Disconnect the battery, clean it and grease the terminals.
- In addition, follow the battery manufacturer's instructions.

5.2 During decommissioning

NOTE

Full discharge can damage the battery

Self-discharge can cause the battery to fully discharge. Full discharge shortens the useful life of the battery.

- ► Charge the battery at least every 2 months.
- Charge the battery, see page 34.

5.3 Restoring the truck to service after decommissioning

Procedure

- Thoroughly clean the truck, see page 66.
- Lubricate the truck according to the lubrication schedule, see page 62.
- Clean the battery, grease the terminal screws and connect the battery.
- Charge the battery, see page 34.
- Start up the truck, see page 40.

6 Safety tests to be performed at intervals and after unusual incidents

The truck must be inspected at least annually (refer to national regulations) or after any unusual event by a qualified inspector. The manufacturer offers a safety inspection service which is performed by personnel specifically trained for this purpose.

A complete test must be carried out on the technical condition of the truck with regard to safety. The truck must also be examined thoroughly for damage.

The operating company is responsible for ensuring that faults are rectified immediately.

7 Final de-commissioning, disposal

Final de-commissioning or disposal of the truck in must be performed in accordance with the regulations of the country of use. In particular, regulations governing the disposal of batteries, consumables and electronic and electrical systems must be observed.

The truck must only be disassembled by trained personnel in accordance with the procedures as specified by the manufacturer.

G Maintenance and Inspection

Lack of maintenance can result in accidents

Failure to perform regular servicing can lead to truck failure and poses a potential hazard to personnel and equipment.

▶ Thorough and expert servicing is one of the most important requirements for the safe operation of the industrial truck.

The application conditions of an industrial truck have a considerable impact on component wear. The following service intervals are based on single-shift operation under normal operating conditions. They must be reduced accordingly if the equipment is to be used in conditions of extreme dust, temperature fluctuations or multiple shifts.

NOTE

To prevent damage due to wear, the manufacturer recommends an on-site application analysis to agree on appropriate service intervals.

The following maintenance checklist lists the activities to be performed and the respective intervals to be observed. Maintenance intervals are defined as:

W = Every 50 service hours, at least weekly

A = Every 500 service hours

B = Every 1000 service hours, or at least annually

C = Every 2000 service hours, or at least annually

= Standard maintenance interval

"W" maintenance interval operations should be performed by the operating company.

1 Maintenance checklist PSE 1.0 / PSE 1.0 mono

1.1 Owner

1.1.1 Standard equipment

Brake	es	W	Α	В	С
1	Test the brakes.				

Elect	rics	W	Α	В	С
1	Test warning and safety devices in accordance with operating instructions.	•			
2	Test the emergency disconnect switch.	•			

Pow	Power supply		Α	В	С
1	Check battery and battery components.	•			
2	Check battery cable connections are secure, check for dirt and grease terminals if necessary.	•			
3	Check battery voltage.	•			

	Drivir	Priving		Α	В	С
Ī	1	Check wheel suspension and attachment.				
Ī	2	Check wheels for wear and damage.				

(Chas	nassis and superstructure			В	С
Ī	1	Check doors and/or covers.	•			
	2	Check labels are legible, complete and plausible.				

Hydr	. movements	W	Α	В	С
1	Check the lubrication of the load chains and lubricate the load chains if necessary.	•			
2	Test hydraulic system.	•			
3	Check hydraulic oil level and top up if necessary.	•			
4	Check forks or load handler for wear and damage.	•			

Stee	ring	W	Α	В	С
1	Check the tiller return function.				

1.2 Customer Service

1.2.1 Standard equipment

Brak	es	W	Α	В	С
1	Check the air gap of the electromagnetic brake.		•		

Elect	trics	W	Α	В	С
1	Check the cables and motor mounting are secure.		•		
2	Test warning and safety devices in accordance with operating instructions.		•		
3	Test the displays and controls.		•		
4	Test the emergency disconnect switch.				
5	Check contactors and/or relays.		•		
6	Check fuse ratings.		•		
7	Carry out a chassis insulation-resistance test.		•		
8	Check the carbon brushes, replace if necessary. Note: When replacing the carbon brushes apply compressed air to the motor.		•		
9	Check electrical wiring for damage (insulation damage, connections). Make sure cable connections are secure.		•		

Powe	er supply	W	Α	В	С
1	Check battery and battery cables for damage, contamination and secure mounting.		•		
2	Check battery and battery components.				
3	Check battery cable connections are secure, check for dirt and grease terminals if necessary.		•		
4	Test the battery latch/battery attachment.				
5	Check battery voltage.		•		

Driving		W	Α	В	С
1	Check drivetrain mountings and bearings.				
2	Check transmission for noise and leakage.				
3	Note: Replace transmission oil after 10,000 service hours.				
4	Check the wheels for wear and damage. Make sure they are secure and check the air pressure if necessary.		•		
5	Check wheel suspension and attachment.		•		

Chas	sis and superstructure	W	Α	В	С
1	Check chassis connections and screw connections for damage.		•		
2	Check doors and/or covers.		•		
3	Check labels are legible, complete and plausible.		•		

Hydr.	movements	W	Α	В	С
1	Test "hydraulic" controls and make sure their labels are legible, complete and plausible.		•		
2	Check cylinders and piston rods for damage and leaks, and make sure they are secure.		•		
3	Test the lift mechanism; check for wear, damage and correct adjustment.		•		
4	Check load chain setting and tension if necessary.				
5	Check the lubrication of the load chains and lubricate the load chains if necessary.		•		
6	Check the load chain fasteners and check the chain bolts for wear and damage.		•		
7	Visually inspect the mast rollers and check the running surfaces for wear.		•		
8	Replace hydraulic oil filter and breather filter.		•		
9	Test hydraulic system.		•		
10	Check that hydraulic ports, hose and pipe lines are secure, check for leaks and damage.		•		
11	Test emergency lowering system.				
12	Check hydraulic oil level and top up if necessary.		•		
13	Replace the hydraulic oil.				
14	Test the pressure relief valve and adjust if necessary.		•		
15	Check forks or load handler for wear and damage.		•		
16	Check the tie/plunger rods.		•		
17	Test lift and lowering speeds.				

Agreed performance		W	Α	В	С
1	Carry out a test run with the rated load and, if necessary, with a customer-specific load.		•		
2	Demonstration after maintenance.		•		
3	Lubricate the truck according to the lubrication schedule.		•		

Steer	ring	W	Α	В	С
1	Check the tiller return function.				

Charger		W	Α	В	С
1	Check mains plug and mains cable.		•		
2	Test the immobiliser on trucks with an on-board charger.		•		
3	Carry out a potential measurement on the chassis while charging is in progress.		•		
4	Check the wires and electrical connections are secure and not damaged.		•		