SERVICE MANUAL

Machine: PLP

Manual No 119002

Edition 2008B

1 General information and technical data

Edition 2008B

1 General information and technical data

Scope of Service Manual

General

This manual describes the service procedures for ATLET low lifter PLP. Use the manual for quick and correct service of respective truck models.

You may find contradictions in the manual compared to the models supplied due to optional designs and upgrades, and the like.

⚠ ***Warning!***

If the truck is rebuilt after delivery or supplemented in such a manner that safety may be affected, ATLET AB or its authorised representative should be contacted.

Unauthorised modification of the truck is not permitted. The user may only implement changes or modifications to the truck if the truck manufacturer no longer exists as a company and no other company has taken over the operations of the truck manuafacturer, on the assumption that the user:

- Arranges so that the modifications or changes are designed, tested and implemented by one or more experts on industrial trucks and their safety.
- Prepares and archives documentation for the design, testing and implementation of the modifications or changes.
- Approves and makes suitable changes to type plates, decals, and markings, and in the instruction manuals.
- Attaches a permanent and clearly visible sign, or the equivalent, that reports in which way the truck has been modified or changed, together with the date of the modification or change and the name and address of the organisation that has conducted the assignment.

 The material has undergone careful examination with regard to correctness. Subject to alteration. In the event of inconsistent information in the Swedish and translated editions, it is the Swedish edition that applies.

Modifications and updates will be distributed via ATLET AB Service Manual Change.

Scope of the P series

The manual covers the low lifters PLP 200 and PLP 250.

How to use the manual

Structure

The manual is built up according to the same principles as ATLET spare parts catalogues, with the truck divided into one subsystem per section.

Sections 1 - 3 in this manual contain more comprehensive information regarding technical data, general service instructions and tools.

Sections 4-12 in this manual contain information limited to a specific area in the truck concerning the description of the mechanical handling of different components, e.g. Masts (section 6) and Hydraulic system (section 8).

The software is described in section 10.

The main principle for extra accessories is to place them under the respective sections. Otherwise they are placed under section 12 “Miscellaneous”. For this reason section 12 is not always included in the Service Manual.

For specific problems or information about procedures, look in the main index for the correct section in the manual.

Symbol key

Warning!

Used for risk of personal injury.

Important!

Used for risk of damage to machine.

Note!

Used for general observation.

Safety instructions

General

Extreme importance must be placed on precautionary measures to avoid accidents during all work on the vehicle.

A general rule is to always implement preventive measures that are adapted to the type of vehicle to be worked on. The general rules below must always be observed:

- Smoking or naked flames are strictly forbidden as there is a risk of explosion in the vicinity of batteries and while working on gas equipped vehicles.
- The battery should always be protected during grinding work.
- Local fire directives should always be followed.
- The drive wheel should always be lifted up free from the floor during service work to prevent the vehicle from moving.
- The battery plug should be pulled out before working on the electrical system. The battery plug may only be connected while trouble shooting, and when the greatest of care is exercised, (with the truck raised).
- To prevent injuries caused by crushing the battery plug should always be removed when working on and around the mast and hydraulic unit. The mast or hydraulic unit can be actuated due to an electrical fault or a mistake while working.

Warning!

Having the power connected to the truck while working on and around the mast can lead to fatal injury!

- When working on and around lifting devices and the hydraulic unit, they must be locked by using the mast lock, wooden blocks or some other appropriate means.
- No other persons should be in the vicinity of the truck when it is test run in conjunction with repair work, in view of the risk of accidents or near-accidents from the truck making an unexpected manoeuvre.
- The system should not be pressurised, e.g. the pump motor switched off and the forks in their lowest position, when dismantling parts of the hydraulic system.
- All metal objects such as watches, chains, spectacles and rings should be removed when working on the electrical system, or in its immediate vicinity. A short-circuit from such objects can result in serious burn injuries.

Gas springs in platform and steering arm

Inspection/Preparation

The functioning of the platform and steering arm should be checked. The gas springs in both of these functions are a very critical factor for their correct functioning.

Since the gas springs are exposed to dirt and a large number of operations, they should be checked very carefully during preventive maintenance.

During service and preventive maintenance it is important if the truck is a model with a foldable platform to check that the platform is raised up automatically when the driver gets off it. If this does not happen it should be reported to the truck supervisor, with the recommendation that the truck be taken out of service until the requisite measures have been implemented.

During service and preventive maintenance it is important to check that the steering arm is raised up automatically when the driver releases it. If this does not happen it should be reported to the truck supervisor, with the recommendation that the truck be taken out of service until the requisite measures have been implemented.

⚠ ***Warning!***

Great caution must be observed when dismantling the gas springs.

- Make sure that no other persons are in the vicinity or in the lengthwise direction of the gas springs.
- Stand to the side of the gas spring when removing.
- Never point the gas spring toward any person or part of the body.

Lifting the truck

Inspection/Preparation

- When the truck is lifted using a jack, make sure you secure it with blocks. The truck must not rest on the jack, while work is carried out.
- Ensure that straps, wires or chains have a sufficient lifting capacity before lifting the truck.
- Ensure that the drive wheel runs free of the floor before trouble shooting.

Permitted lifting points

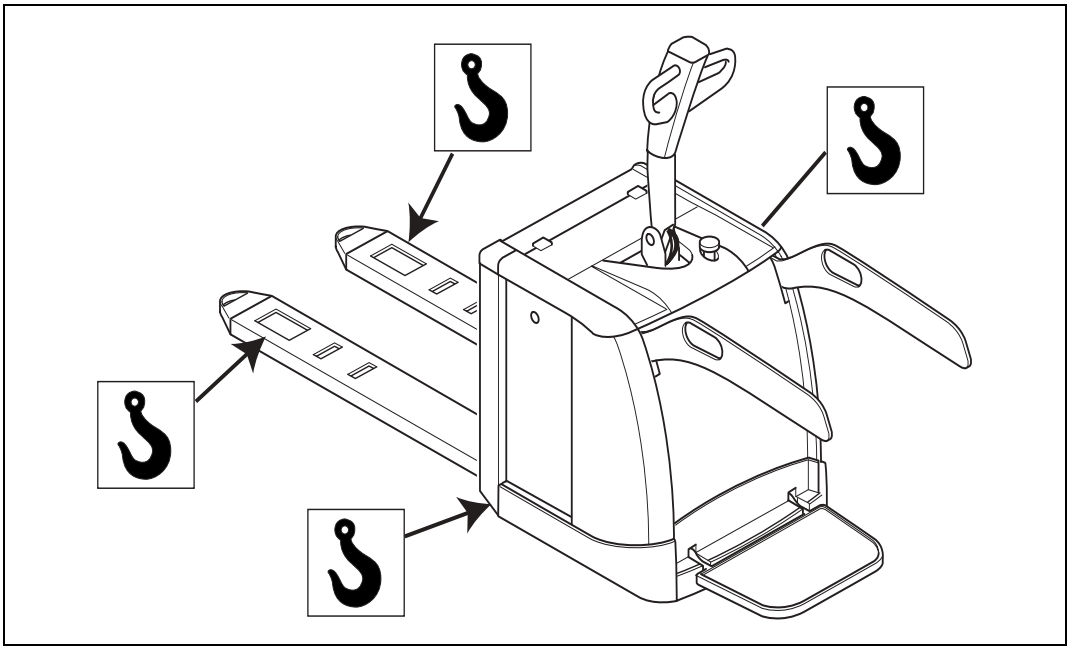


Figure 1.1 Permitted lifting points

Figure1.1 shows where the permitted lifting points are placed on the truck.

⚠ ***Warning!***

The machine must never be lifted in any other points than the ones shown.

Figure 1.2 shows where the jack should be placed.

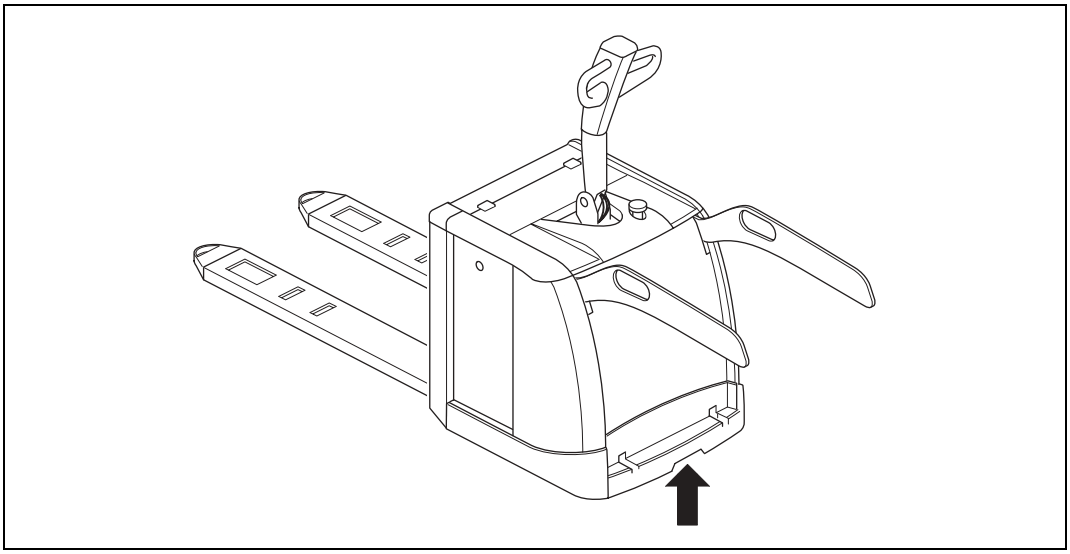


Figure 1.2 Lifting point, jack

Welding on the truck

- During welding work the battery plug should always be disconnected and all connections to the control units and controllers (applies to all electronic units) disconnected. On completion of welding work the contactors should first be connected to the electronic units, after which the battery plug is then connected to the battery.
- The return cable clamp should always be connected as close to the welding area as possible to eliminate damage to surrounding components.

Atlet AB takes care of the environment

The majority of our products consist of metal that can be completely recycled.

Environmental impact

All products have an impact on the environment throughout their entire life cycle.

The consumption of energy during their use is one of the most important factors that influences the environment.

Through correct care, maintenance and use the consumption of energy can be reduced, thereby reducing the environmental impact.

Waste

Waste material in conjunction with repairs, maintenance, cleaning, or scrapping, should be collected and disposed of in an environment-friendly way and in accordance with the directives of respective countries. Such work should only be carried out in areas intended for this purpose.

Recyclable material should be taken care of by specialised authorities.

Environmentally hazardous waste, such as oil filters, batteries and electronics, can have a negative effect on the environment, or health, if handled incorrectly.

Preparations

Service

- Go through all the safety instructions.
- Make sure that you have all the essential tools close at hand before starting work.
- Before cabling or other electrical components are disconnected, check the colour codes and check for damage to cables or connections.
- When complex components are repaired and dismantled, make sure that you have good control of the different component parts to avoid the risk of confusion.
- When repairing or maintaining sensitive components, make sure that you use clean tools and work on a clean work surface.
- Dismantle, inspect and adjust components according to the prescribed routines. See respective sections for detailed information.

Trouble shooting

When you suspect that a component is defective, do not replace it immediately. First check the surrounding equipment and carry out complete trouble shooting according to the trouble shooting chart. Make sure you know the reason for the fault before replacing a component.

Data PLP

Designations

Truck designation

Table 1.1 Truck designations

Truck type	PLP 200	Low lifter
	PLP 250	Low lifter
Load capacity	PLP 200	2,000 kg
	PLP 250	2,500 kg

Type designation

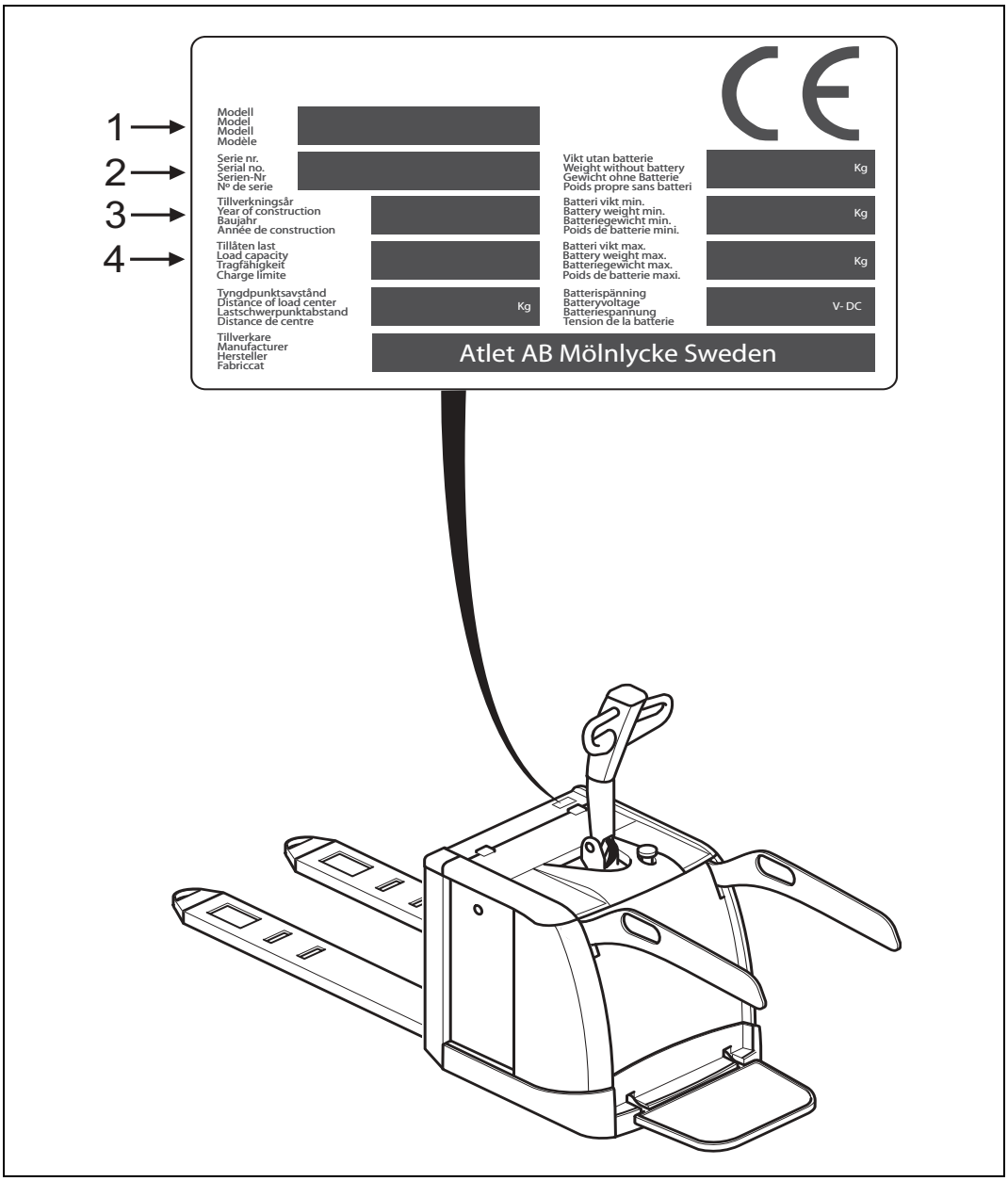


Figure 1.3 Example of type plate (–2006w36)

1. Model designation.
2. Type Series no./Version (S=Special ver.).
3. Year of manufacture, week, and warranty period in months (only Sweden). (On the assumption that the service instructions in the warranty regulations are followed).
4. Where appropriate, load limitations depending on the position of the load on the forks (D) and/or lifting height (Q).

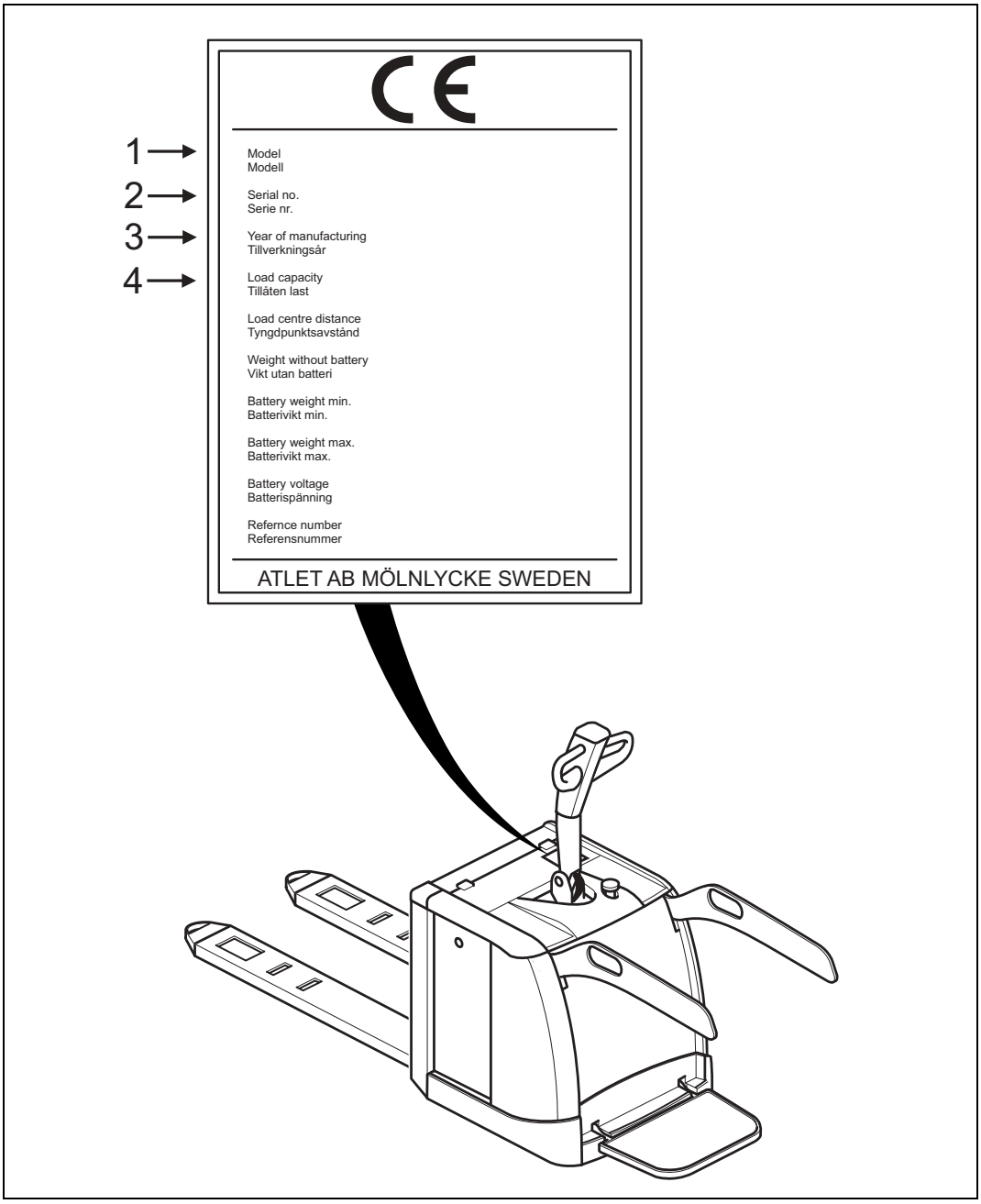


Figure 1.4 Example of type plate (2006w37–)

1. Model designation.
2. Type Series no./Version (S=Special ver.).
3. Year of manufacture, week, and warranty period in months (only Sweden). (On the assumption that the service instructions in the warranty regulations are followed).
4. Where appropriate, load limitations depending on the position of the load on the forks (D) and/or lifting height (Q).

Note!

In cases where the machine plate has been lost or become illegible, it must be renewed immediately. In order to identify the machine's serial number, there is a plate located on each main component such as drive motor, gearbox, hydraulic unit, TMC etc. For some machines there is even a plate attached inside the battery compartment, or serial number punched on the side of the mast.

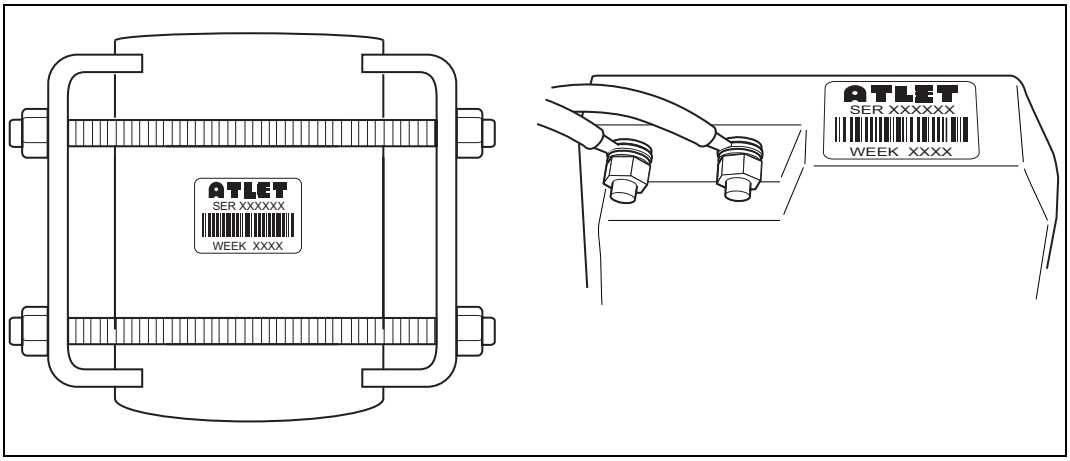


Figure 1.5 Example of plate with serial number.

Explanation of Model designation

Example: **PLP 200 160 30**

Truck type
Load capacity/10
Battery Ah/5
Charger Ampere

Dimensions and weights

Dimensions PLP

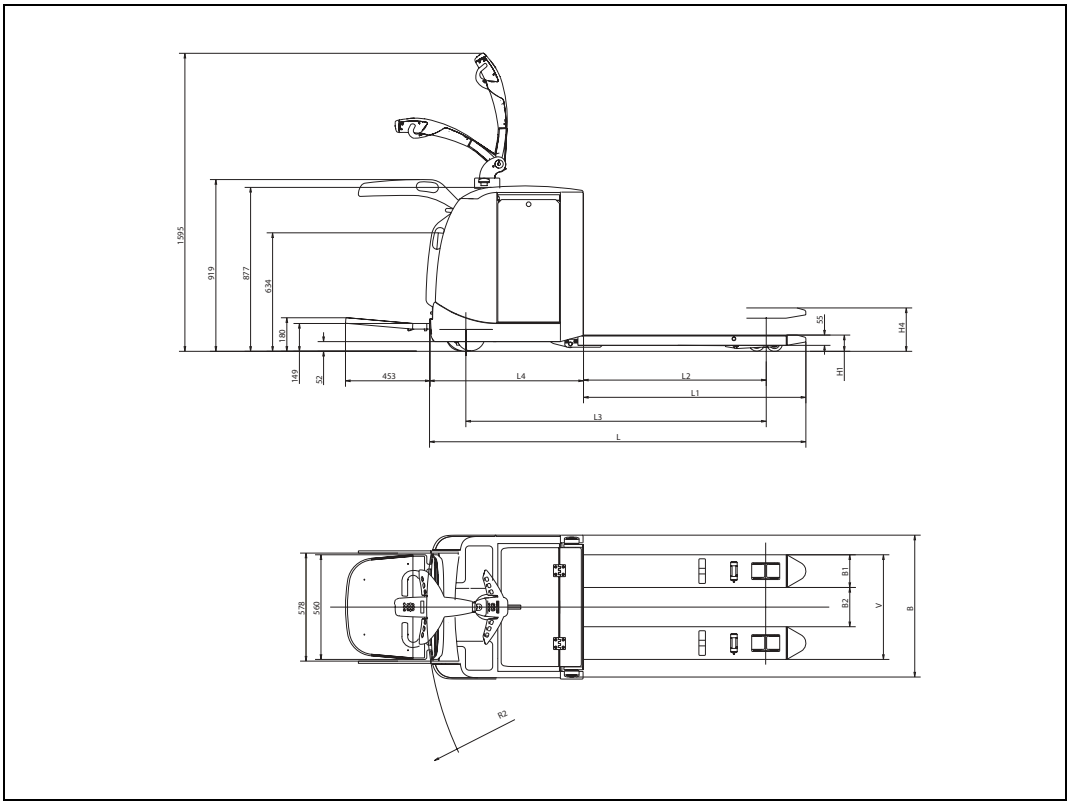


Figure 1.6 Positions for dimensions PLP

Machine specification

No.				PLP 200	PLP 250
1 1a	Lifting capacity, rated Distance to centre of gravity	Q D	kg mm	2000 600	2500 600
2 2a 2b 2c 2d	Lifting height Mast height Transport free lift Full free lift Straddle lift	H4 H3 H5 H2	mm mm mm mm	200	200
4 4a	Lifting speed without load – with rated load Lifting time without load – with rated load		m/s s	2.0-2.5	2.0-2.7
5	Lowering speed without load – with rated load Lifting time without load – with rated load		m/s s	2.5	2.5
6	Driving speed without load – with rated load Driving speed without load – with rated load		km/h m/s	10.0-8.5 2.77-2.36	12.0-9 3.3-2.77
8	Reversing capacity without load – with rated load	Max	%	10-10	10-10
10	Turning radius	R2	mm	770 + L2	835 + L2
11	Minimum aisle width Ast incl. 200 mm R2-L2 + load length + 200 Load length 800 mm Load length 1,000 mm Load length 1,200 mm	 Ast Ast Ast	 mm mm mm		
13	Height over protective roof	H6	mm		
14	Truck length	L	mm	750 + L1	825 + L1
15	Truck width	B	mm	770	770
16	Fork length, std	L1	mm	1000 / 2375	1000 / 2375
17 17a	Width over forks, std max-min Width between fork gaffel shanks	W	mm mm	680 / 460 W - 350	680 / 480 W - 350
19	Truck length to fork support area	L4	mm	750	825
20 20a	Fork arm, width – thickness For height, min	B1 H1	mm mm	175 - 55 85	175 - 55 85
21	Straddle lift height	H7	mm		
22	Width between fork straddle lift	B2	mm		
23	Dim. for front axle – fork support area	L2	mm	785 - 1765	785 - 1465
24	Wheelbase	L3	mm	551 + L2	626 + L2
25	Wheel track – front, back centre of wheel		mm	W - 175/526	W - 175/526
26	Ground clearance, half wheelbase load		mm	30 - 145	30 - 145
27	Service weight with/without battery		kg	860 - 530	925 - 545
28	Max axle pressure, load wheel with/without rated load		kg	212 / 1828	212 / 2238
29	Max axle pressure, drive wheel with/without rated load		kg	705 - 1110	715 - 1215
39 39a	Battery capacity Battery voltage		kWh Ah V	4.8-9.6 200-400 24	7.5-14.4 300-600 24
41	Traction motor		kW	2.2 / 2.4 AC	2.2 / 2.4 AC
42	Speed controlling			Transistor	Transistor
43 43a	Lift motor Hydraulic tank		kW - %/ min MPa	2.2 - 12/10 9	2.2 - 12/10 11
44 44a	Wheel type Number of drive/castor/load wheels			Vulkollan 3-4	Vulkollan 3-4

45 45a 45b 45c	Wheel dimensions Load wheel D* width Drive wheel D* width Castor wheel		 mm mm mm	 (4x) 85x75 (1x) 230x90 (2x) 150x60	 (4x) 85x75 (1x) 230x90 (2x) 150x60
46	Control system			Tiller arm	Tiller arm
47	Main brake, type – actuated part			El. drive mech.	El. drive mech.
48	Parking brake, type – actuated part			El. drive mech.	El. drive mech.

Component specification

Table 1.2 Component specification

Component	Specification	
Traction motor	Drive voltage	24V
	Output standard	2.2 / 2.4 kW 60 min
Gearbox	Gear ratio (standard)	15:1
	Oil volume	0.85 litre
Hydraulic system	Max pressure	21 MPa
	Oil volume	max 1.6 litre
Hydraulic unit (motor and pump)	Output	2.2 kW
Control system for traction motor	Type FZ2007	AC1 CAN
	Voltage	24 V
	Max current	250A (RMS) for 2 min
Fuses	Control fuse 1	5 A
	Pump motor fuse 1	250 A
	Traction motor fuse 1	250 A

Recommended consumable materials

Oil and grease

Table 1.3 Table of recommended types of oil and grease

Brand	Gearbox oil As per API value GL-5		Hydraulic oil As per ISO VG 32, VG 15		Bearing grease NLGI 2 Lithium base
	Normal	Cold store	Normal (32)	Cold store (15)	
BP	BP Energear HYPO 80W/140 EP	BP Energear SHX-S 75W/140 EP	BP Bartran HV-32	BP Bartran SHF-S	Energrease LC 2
Castrol	-	-	Hyspin SHS 32	Hydraulic oil OM 15 Alt: Hyspin AWH 15	LMx
Mobil	-	-	DTE 13 M SHS 32	Flowrex 1	Mobilplex 48
Shell	-	-	Tellus oil TX 32	Tellus oil T 15	Retinax EP2
Statoil / Exxon	-	-	SHS 32	J 26	Uniway LIX 625
Texaco	-	-	Rando oil HDZ 32	Rando oil HDZ 15	Hytex EP2

Important!

Do not mix different lubricants, and absolutely not synthetic oil with mineral oil, since this can affect the properties of the oil!

Standards and abbreviations

Screws

Tightening torque, screws and nuts

Table 1.4 Tightening torque, screws and nuts

DIM	Tensile grade			
	4.6	8.8	10.9	12.9
	Nm	Nm	Nm	Nm
M4	1.1	2.9	4.0	4.9
M5	2.2	5.7	8.1	9.7
M6	3.7	9.8	14	17
M8	8.9	24	33	40
M10	17	47	65	79
M12	30	81	114	136
M14	48	128	181	217
M16	74	197	277	333
M18	103	275	386	463
M20	144	385	541	649

The tightening torque in the table above are standard values. In some cases a specific tightening torque is specified in respective sections. If no tightening torque is specified in the service instructions, the values shown in the table above apply.

Screw types and tensile grades

Table 1.5

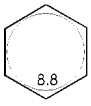
Figure	Screw type	Designation	Tensile grade
	M6S	Hexagon screw	8.8 10.9
	MC6S	Hexagon hole screw	8.8 10.9 12.9

Table 1.5

Figure	Screw type	Designation	Tensile grade
	MF6S	Hexagon hole screw, countersunk	10.9
	MCS	Slotted screw	4.6
	MVBF	Oval head counter-sunk screw	4.6

Marking with the manufacturer's trademark, including the tensile grade, is compulsory for screws with a thread diameter from 5 mm and in tensile grades according to the table above. Marking only takes place when the shape of the product permits this.

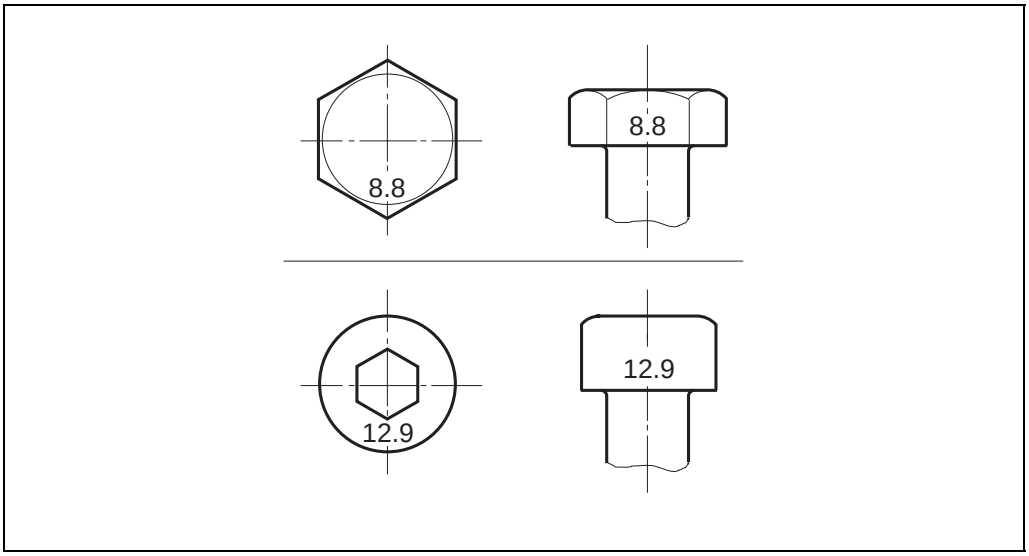


Figure 1.7 Example of marking

Tightening torque, hydraulic couplings

Table 1.6 Tightening torque, hydraulic couplings

Tightening torque: Pipe thread / metric thread:			
Metric fine thread	**Whitworth pipe thread**	**MA (Nm) with pipe olive**	**MA (Nm) with elastic (O-ring coupling)**
M10 x 1	G 1/8"	25	10
M12 x 1.5		30	20
M14 x 1.5	G 1/4"	50	30
M16 x 1.5	G 3/8"	80	35
M18 x 1.5		90	40
M20 x 1.5	G 1/2"	130	50
M22 x 1.5		150	60
M26 x 1.5		250	70
M27 x 1.5	G 3/4"	250	80
M27 x 2		250	90
	G 1"	350	140
M33 x 2		400	140
M42 x 2	G 11/4"	600	240
M48 x 2	G 11/2"	800	300

Conversion tables

Table 1.7 Conversion table, torque units

Newton metre (Nm)	Kilopond metre (kpm)	Poundforce inch (lbg x in)	Poundforce foot (lbf x ft)
1	0.10	8.85	0.74
9.81	1	86.80	7.23
0.11	0.01	1	0.08
1.36	0.14	12.00	1

Table 1.8 Conversion table, pressure units

Pa (N/m2)	Bar (1mb=1hPa)	at (kp/cm2)	dry (mm Hg, 0 C)	atm
1	10 -5	1.020*10 -5	7.501*10 -3	9.869*10 -6
9.807*10 4	0.9807	1	735.6	0.9678
133.3	1.333*10 -3	1.360*10 -3	1	1.316*10 -3
1.013*10 5	1.013	1.033	760	1

Table 1.9 Conversion table, speed

m/s	km/h
1	3.6
0.278	1

Standard abbreviations

Table 1.10 Standard abbreviations

Magnitude	Unit	Designation
Current	Ampere	A
Voltage	Volt	V
Resistance	Ohm	Ω
Output	Watt	W
Torque	Newton metre	Nm
Pressure	Pascal	Pa

Colour of the truck

The truck is painted in colours with the following NCS colour codes:

Table 1.11 NCS colour codes

Machine colour	Designation
Yellow	NCS 0070-Y20R
Medium grey	NCS 7000
Dark grey	NCS 8000

Colour codes, cabling

The colour markings of all cables included in the truck can be seen in the Atlet wiring diagrams. The abbreviations have the following significance:

Table 1.12 Colour codes Atlet wiring diagrams

Code	Cable colour
Y	Yellow
BL	Blue
SB	Black
W	White
GN	Green
GR	Grey
R	Red
BN	Brown
VO	Violet
P	Pink
OR	Orange

Note!

Two-colour cables are shown with both colour codes separated by a slash. E.g. blue/yellow cable is shown with colour code BL/Y.

Designations

Electrical components normally have a designation of two letters:

Table 1.13 First letter

Code	Designation
A	Component or function without its own letter below
C	Capacitor
D/V	Diode
E	Electrical component
F	Fuse
I	Indicator
K	Contactor/relay
L	Coil/inductive element

Table 1.13 First letter

Code	Designation
M	Motor
P/X	Connection
R	Resistor
S	Switch/Change-over switch
T	Terminal
Y	Valve/brake
H	Audible warning unit/lamps/lights
G	Battery

Table 1.14 Second letter

Code	Designation
B	Brake
C	Control system
E	Emergency function
F	Forward
H	Hour
K	Key
L	Lower
M	Manoeuvre
P	Pump
R	Reverse
S	Speed