

**PTL1.5** 

# **Electric Pallet Truck**

**Operation Manual** 

52550008 (en-GB) V1 07/25

# **Foreword**

This operation manual provides instructions to ensure the safe operation of the industrial truck. The instructions are clear and concise.

Our trucks are continuously being developed. Manufacturer reserves the right to make changes to the design, equipment, and technical specifications of the system. This operation manual does not provide guarantees for specific features of the truck.

► Safety notices and text mark-ups

i NOTE

Pay attention to Instruction.

Safety instructions and important explanations are indicated by the following graphics:
<u> </u>
Means that failure to comply can cause risk to life and/or major damage to property.
★ WARNING
Please strictly adhere to these safety instructions to avoid personal injury or major damage equipment.
▲ CAUTION
Please pay attention to the important safety instructions.

## **▶** Conformity marking

The manufacturer uses the conformity marking to document the conformity of the industrial truck with the relevant directives at the time of placing on the market:

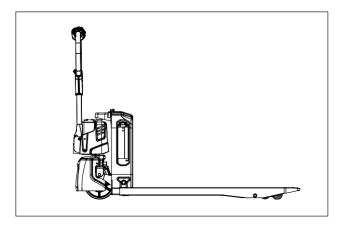
- CE: in the European Union (EU)
- UKCA: in the United Kingdom (UK)

The conformity marking is applied to the nameplate. A declaration of conformity is issued for the EU and UK markets. An unauthorised structural change or addition to the industrial truck can compromise safety, thus invalidating the declaration of conformity.



### **▶** Schematic views

View of functions and operations
This documentation explains the (usually sequential) chain of certain functions or operations. Schematic diagrams of a truck are used to illustrate these procedures.
These schematic diagrams are not representative of the structural state of the documented truck. The diagrams are used solely for the purpose of clarifying procedures.







Hersteller/ Manufacturer / Fabricant / Fabricant / Fabricante / Fabricante / Costruttore / Producent / Producatorul / Produsent / Tillverkare / Valmistaja / Výrobce / Gyártó / Producent /

Κάτασκευαστής / Üretici / Proizvajalec / Výrobca / Изготовитель / Tootja / Ražotājs / Gamintojas / Производител / Proizvođač / 制造商

## Jungheinrich AG, 22039 Hamburg, Germany

Bezeichnung / Description / Désignation / Aanduiding / Denominación / Designação / Denominazione / Betegnelse / Betegnelse / Beteckning / kuvaus / Označení / Megnevezés /Oznaczenie/ Ovoμασία / Tanımlama / Poimenovanje / Označenie / Наименование / nimetus / Nosaukums / Рачаdіпітаs / Обозначение / Oznaka / 设备类型名称

Flurförderzeug / Industrial truck / Chariot / Intern transportmiddel / Carretilla elevadora/ Porta-paletes / Mezzo di movimentazione / Truck/ Vehicul industrial / Truck/ Truck / Tr

Typ / Type / Type / Type / Tipo / Modelo / Modello / Type / Tipul / Type / Typ / Tyyppi / Model / Típus / Typ / Túmoς / Tip / Tip / Typ / Тип / Tüüp / Modelis / Tipas / Тип / Tip / 型号	Option / Option / Option / Optie / Opción / Opção / Opzione / Tilvalg / Opţiune / Ekstrautstyr / Tillval / Lisävaruste / Volitelné příslušenství / Opció / Opcja / Етпλоуń / Seçenek / Opcija / Voliteľné vybavenie / Опция / Valik / Opcija / Parinktis / Опция / Opcija / 选项	Serien-Nr. / Serial no. / N° de série / Serienr. / N° de serie / N.º de série / Numero di serie / Serienr. / Număr de serie / Serienr. / Serienr / Sarjanumero / Sériové č. / Sorozatsz. / Nr seryjny / Ар. Σειράς / Seri no. / Serijska številka / Sériové číslo / Серийный ном. / Seerianr / Sěrijas nr. / Зегіјоѕ nr. / Сериен № / Serijski br. / 序列号	Baujahr / Year of manufacture / Année de construction / Bouwjaar / Año de fabricación / Ano de fabricación / Ano de fabricación / Byggeår / Anul fabricaţiei / Byggeår / Tillverkningsår / Valmistusvuosi / Rok výroby / Gyártási év / Rok produkcji / Έτος κατασκευής / Üretim yılı / Leto izdelave / Rok výroby / Год изготовления / Väljalaskeaasta / Izgatavošanas gads / Радаminimo metai / Година на производство / Godina izrade / 制造年份
PTL1.5			

Im Auftrag / On behalf of / Par ordre / In opdracht / Por orden / Por procuração / Incaricato / Navn og stilling på underskriftsbemyndigede / Împuternicit / På oppdrag / På uppdrag / Psta / Z pověření / Megbízó / Z upoważnienia / Kατ' εντολή / Vekaleten / Naročnik / Z poverenia / По поручению / Volitatud allkirjastaja / Pilnvarotais parakstītājs / Įgaliojus / По поръчение / Po nalogu / 受托人

Hamburg, dd.mm.yyyy (date of manufacture)

XXXX XXXXXXXX XXXXXXXXX

Datum / Date / Date / Datum / Fecha / Data / Data / Dato / Data / Dato / Datum / Pvm / Datum / Dátum / Data / Ημερομηνία / Tarih / Datum / Dátum / Дата / Kuupäev / Datums / Data / Дата / Datum / 日期

Leiter Entwicklung

Leiter Qualität

#### de EG-KONFORMITÄTSERKLÄRUNG

Die Unterzeichner bescheinigen hiermit, dass das im Einzelnen bezeichnete kraftbetriebene Flurförderzeug den Europäischen Richtlinien 2006/42/EG (Maschinenrichtlinie) und 2014/30/EU (Elektromagnetische Verträglichkeit - EMV) in ihrer aktuellen Fassung entspricht. Der Hersteller ist bevollmächtigt, die technischen Unterlagen zusammenzustellen.

#### en EU DECLARATION OF CONFORMITY

The undersigned hereby declare that the powered truck described in detail complies with the current versions of European Directives 2006/42/EC (Machinery Directive) and 2014/30/EU (Electromagnetic Compatibility - EMC). The manufacturer is authorised to compile the technical file.

#### fr DÉCLARATION DE CONFORMITÉ CE

Les signataires certifient par la présente que le chariot désigné individuellement satisfait aux directives européennes 2006/42/CE (directive machine) et 2014/30/CEE (compatibilité électromagnétique - CEM) dans leur version en vigueur. Le fabricant est habilité à constituer les documents techniques.

#### nI EG-VERKLARING VAN OVEREENSTEMMING

De ondertekenaars verklaren hierbij dat het genoemde aangedreven intern transportmiddel voldoet aan de Europese richtlijnen 2006/42/EG (machinerichtlijn) en 2014/30/EU (elektromagnetische compatibiliteit - EMC), en overeenkomt met hun actuele tekst. De fabrikant is gemachtigd te technische documenten samen te stellen.

### es DECLARACIÓN DE CONFORMIDAD CE

Los signatarios certifican por medio de la presente que la carretilla elevadora motorizada descrita en esta documentación cumple con las Directivas Europeas 2006/42/CE (directiva de máquinas) y 2014/30/UE (compatibilidad electromagnética - CEM) en sus versiones actuales. El fabricante está autorizado para compilar la documentación técnica.

#### pt DECLARAÇÃO DE CONFORMIDADE CE

Os signatários vêm por este meio certificar que o porta-paletes motorizado, pormenorizadamente descrito, está em conformidade com as diretivas europeias 2006/42/CE (Diretiva sobre as máquinas) e 2014/30/UE (Compatibilidade eletromagnética - CEM), na sua versão atual. O fabricante está autorizado a compilar os documentos técnicos.

#### it DICHIARAZIONE DI CONFORMITÀ CE

Con la presente i firmatari attestano che il mezzo di movimentazione a motore descritto nel dettaglio è conforme alle direttive europee 2006/42/CE (Direttiva Macchine) e 2014/30/UE (compatibilità elettromagnetica - CEM) nella loro versione attuale. Il Costruttore è autorizzato a redigere la documentazione tecnica.

#### da EF-OVERENSSTEMMELSESERKLÆRING

Undertegnede erklærer hermed, at følgende kraftdrevne truck overholder de væsentligste krav i Rådets direktiv 2006/42/EF (Maskindirektivet) og 2014/30/EU (Elektromagnetisk kompatibilitet – EMC) i deres aktuelle version. Producenten er bemyndiget til at samle de tekniske dokumenter.

### ro DECLARAȚIE DE CONFORMITATE CE

Subsemnații adeveresc prin prezenta că vehiculul industrial cu motor, specificat mai jos, corespunde Directivelor Europene 2006/42/CE (Directiva privind echipamentele tehnice) și 2014/30/UE (Compatibilitatea electromagnetică - CEM), în varianta actuală. Producătorul este împuternicit să redacteze documentația tehnică.

### no EU-SAMSVARSERKLÆRING

Undertegnede bekrefter hermed at de enkelte betegnede truckene med kraftdrift overholder de europeiske retningslinjene 2006/42/EF (maskindirektiv) og 2014/30 EU (elektromagnetisk kompatibilitet - EMC) i gjeldende versjon. Produsenten har fullmakt til å sammenstille de tekniske underlagene.

### sv EG-FÖRSÄKRAN OM ÖVERENSSTÄMMELSE

Undertecknade intygar härmed att den specificerade trucken uppfyller de europeiska direktiven 2006/42/EG (maskindirektivet) och 2014/30/EU (elektromagnetisk kompatibilitet – EMC) i den aktuella versionen. Tillverkaren har fullmakt att sammanställa de tekniska dokumenten.

### fi EY-VAATIMUSTENMUKAISUUSVAKUUTUS

Allekirjoittaneet vakuuttavat täten, että yksilöity moottorikäyttöinen trukki täyttää eurooppalaisten direktiivien 2006/42/EY (konedirektiivi) ja 2014/30/EU (sähkömagneettinen yhteensopivuus – EMC) ajankohtaisten versioiden vaatimukset. Valmistaja on oikeutettu laatimaan tekniset asiakirjat.

#### cs ES - PROHLÁŠENÍ O SHODĚ

Níže podepsaní tímto potvrzují, že podrobný popis vozidla s motorovým pohonem odpovídá Evropským směrnicím 2006/42/ES (směrnice pro strojní zařízení) a 2014/30/EU (elektromagnetická kompatibilita - EMC) v jejich aktuálním znění. Výrobce je zplnomocněný k sestavení technických podkladů.

### hu EK-MEGFELELŐSÉGI NYILATKOZAT

Alulírottak ezennel igazoljuk, hogy a részletesen körülírt gépi meghajtású targonca megfelel a 2006/42/EK (Gépdirektíva) és a 2014/30/EU (Elektromágneses összeférhetőség - EMC) európai irányelvek hatályos változatában foglaltaknak. A műszaki dokumentáció összeállítására a gyártó jogosult.

### pi DEKLARACJA ZGODNOŚCI WE

Niżej podpisani potwierdzają niniejszym, że opisany tutaj napędzany wózek jezdniowy spełnia wymagania określone w dyrektywach Europejskich 2006/42/WE (Maszyny) i 2014/30/UE (Kompatybilność elektromagnetyczna – EMC) w ich aktualnej wersji. Producent jest upoważniony do skompletowania dokumentacji technicznej.

#### el ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ ΕΚ

Οι υπογράφοντες βεβαιώνουν με το παρόν έγγραφο ότι ο μηχανοκίνητος μεταφορέας διαδρόμου που περιγράφεται με κάθε λεπτομέρεια, συμμορφώνεται με τις Ευρωπαϊκές Οδηγίες 2006/42/ΕΚ (Οδηγία περί μηχανών) και 2014/30/ΕΕ (Οδηγία περί ηλεκτρομαγνητικής συμβατότητας

- ΗΜΣ), στην τελευταία ισχύουσα έκδοσή τους. Ο κατασκευαστής είναι εξουσιοδοτημένος για τη σύνταξη των τεχνικών εγγράφων.

#### tr AT UYGUNLUK BEYANNAMESİ

İmza sahipleri işbu belgeyle, belirtilen kuvvet tahrikli istif aracının Avrupa Yönetmeliklerine 2006/42/AT (Makine Yönetmeliği) ve 2014/30/AB (Elektromanyetik uyumluluk - EMU) güncel versiyonuyla uygun olduğunu onaylamaktadırlar. Üreticinin, teknik belgeleri oluşturma yetkisi vardır.

#### si izjava es o skladnosti

Podpisniki potrjujejo, da podrobno opisano motorno transportno vozilo ustreza direktivama 2006/42/ES (direktiva o strojih) in 2014/30/EU (elektromagnetna združljivost) v veljavni različici. Proizvajalec je pooblaščen za pripravo tehnične dokumentacije.

#### sk ES VYHLÁSENIE O ZHODE

Podpísané osoby týmto potvrdzujú, že podrobne popísaný pozemný dopravník s motorovým pohonom zodpovedá európskym smerniciam 2006/42/ES (smernica o strojových zariadeniach) a 2014/30/EÚ (smernica o elektromagnetickej kompatibilite – EMC) v ich aktuálnom znení. Výrobca je splnomocnený na zostavenie technických podkladov.

#### ru ЗАЯВЛЕНИЕ О СООТВЕТСТВИИ НОРМАМ ЕС

Настоящим лица, подписавшие документ, подтверждают, что напольное подъемно-транспортное средство с силовым приводом в указанной спецификации соответствует Европейским директивам 2006/42/EG (Директива о машинах) и 2014/30/EU (Директива об электромагнитной совместимости — ЭМС) в их текущей редакции. Изготовитель уполномочен на составление технической документации.

#### et EÜ vastavusdeklaratsioon

Allakirjutanud tõendavad käesolevaga, et nimetatud mootorajamiga transpordimasin järgib Euroopa direktiive 2006/42/EÜ (masinadirektiiv) ja 2014/30/EL (elektromagnetilise ühilduvuse direktiiv) selle käesolevas versioonis. Tootja on volitatud koostama tehnilist dokumentatsiooni.

#### IV EK ATBILSTĪBAS DEKLARĀCIJA

Ar šo zemāk parakstījušās personas apliecina, ka šeit minētais mehāniskās piedziņas iekrāvējs atbilst Eiropas Savienības Direktīvām 2006/42/EK (Mašīnu direktīva) un 2014/30/ES (Elektromagnētiskā savietojamība – EMS) to pašreizējā redakcijā. Ražotājs ir pilnvarots sastādīt tehniskās dokumentācijas.

#### It EB ATITIKTIES DEKLARACIJA

Čia pasirašiusieji patvirtina, kad išsamiai aprašytas savaeigis autokrautuvas atitinka galiojančio leidimo Europos direktyvas 2006/42/EB (Mašinų direktyva) ir 2014/30/ES (Elektromagnetinio suderinamumo direktyva). Gamintojas yra įgaliotas parengti techninius dokumentus.

### bg ЕО ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

С настоящото подписалите лица удостоверяват, че конкретно посоченото подемно-транспортно средство със силово задвижване отговаря на Европейските директиви 2006/42/EO (Директива относно машините) и 2014/30/EC (Електромагнитна съвместимост – EMC) в настоящата им редакция. Производителят е упълномощен да съставя техническата документация.

#### hr EZ-IZJAVA O SUKLADNOSTI

Ovim dokumentom potpisnici potvrđuju da detaljno opisan viličar na električni pogon udovoljava aktualnim zahtjevima europskih Direktiva 2006/42/EZ (za strojeve) i 2014/30/EZZ (za elektromagnetsku podnošljivost (EMV)). Proizvođač je ovlašten za sastavljanje tehničke dokumentacije.

## zh 欢盟一致性声明

签署人在此证明· 这款经详细描述的动力驱动型叉车符合欧盟指令2006/42/EC(机械指令)和2014/30/EU(Electromagnetic Compatibility,电磁兼容性 - EMC)。已授予制造商对技术资料进行编制。



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# **i** NOTE

The appendix contains further manufacturer documentation (e.g. for the batteries, chargers and attachments)



# 1 General

### 1.1 Introduction

### Introduction to/purpose of this instruction handbook

The truck described in this operator manual is designed for lifting and transporting material loads. It must be used, operated, and serviced as specified in the following instructions. Any other type of use is beyond the scope of application and can result in damage to personnel, the truck or property. Avoid overloading the truck with loads which are too heavy or placed on one side. The data plate attached to the truck, or the load diagram are binding for the maximum load capacity. All nameplates and safety signs on the truck should be cleaned regularly to maintain visibility.

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.

### Mounting of attachments

The mounting or installation of any attachments which will interfere with, or supplement, the functions of the truck is permitted only after written approval by the manufacturer has been obtained. If necessary, the approval of local authorities has to be obtained. Any approval obtained from local authorities does not, however, make the approval by the manufacturer unnecessary.

Check that loads are handled safely before commissioning a truck with attachments. It may be necessary to make adjustments, depending on the type of attachment, e.g. to pressure settings or adjusting stops and operating speeds.

### Modification

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

Do not remove, disable or modify any safeguards or other safety devices.

Exception: Only in the event that the truck manufacturer is no longer in business and there is no successor in the interest to the business, may the user arrange for a modification or alteration to a powered industrial truck, provided, however, that the user arranges for the modification or alteration to be designed, tested and implemented by an engineer(s) expert in industrial trucks and their safety.

maintains a permanent record of the design, test(s) and implementation of the modification or alteration.

approves and makes appropriate changes to the capacity plate(s), decals, tags and operation

affixes a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered, together with the date of the modification or alteration and the name and address of the organization that accomplished those tasks.

### Pallet truck handover

To avoid the inconvenience of making a claim after use, check the truck is in perfect condition and repair, and confirm your satisfaction with the vehicle on the manufacturer's product qualification certificate upon handover.



## 1.2 Definition of responsible persons

### **Drivers/Operator**

This truck may only be driven by suitable people who are at least 18 years of age, have been trained in driving, have demonstrated their skills in driving and handling loads to the operating company or an authorized representative, and have been specifically instructed to drive the truck. Specific knowledge of the truck to be operated is also required.

The training requirements under §3 of the Health and Safety at Work Act and §9 of the plant safety regulations are deemed to have been satisfied if the driver has been trained in accordance with BGG (General Employers' Liability Insurance Association Act) 925. Observe the national regulations for your country.

### User

A user is a natural person or legal entity responsible for the truck. The user may operate the truck themselves or delegate the task of operating the truck to someone else (e.g., a driver/operator). In specific circumstances, such as leasing, responsibility will be borne by the user according to the effective contract between the owner of the vehicle and the personnel operating the truck.

### **Specialist**

A qualified person is defined as a service engineer or a person who fulfils the following requirements:

- A completed vocational qualification that demonstrates their professional expertise, such as a vocational certificate or a similar document.
- Professional experience indicates that the qualified person has gained practical
  experience of industrial trucks over a proven period during their career. During this
  time, this person has become familiar with a wide range of symptoms that require
  checks to be carried out, such as based on the results of a hazard assessment or a
  daily inspection
- Recent professional involvement in the field of the industrial truck test in question and an appropriate further qualification are essential. The qualified person must have experience of carrying out the test in question or of carrying out similar tests.

Moreover, this person must be aware of the latest technological developments regarding the industrial truck to be tested and the risk being assessed

### User rights, duties and rules of behavior

Everyone operating the truck has read and understood this manual and has been approved in the relevant truck operator training. Operate the truck in a safe manner to avoid endangering the lives and health of the driver and/or others. Adhere to all warnings and instructions in this manual. This manual is available for use by drivers/operators.

### Driver rights, duties and rules of behavior

Complete training before using the truck. Also, ensure you have a local license to drive a truck. Always locate the technical specifications for the specific truck before use. Trucks may have optional features and enabled/disabled assist systems that you must understand before operation. Addressed to local safety regulations and instructions for safety equipment. Wear safety shoes when using the truck. Do not use any load support as a step. If the vehicle is damaged or has faults affecting safety or safe use, do not use the vehicle. All repairs must be carried out by properly trained personnel. Report all accidents resulting in personal injury or material damage to management. Check the functionality of the truck before each use.



### Permissible operating conditions

- Ambient temperature for continuous operation: +25°C
- Maximum ambient temperature for short-term use (up to 1 hour): +40°C
- Minimum ambient temperature for indoor operation: +5°C
- Minimum ambient temperature for outdoor operation: -20°C
- Recommended operating temperature range: 15°C~35°C
- Permissible charging temperature range: 5°C~40°C
   Charging is not permitted below 0°C.
- Maximum permissible operating altitude: 2000m.
- Operate the truck only within the specified rated load.
- Do not operate the truck in rain or on wet surfaces.
- Use is restricted to designated areas such as factories, tourist facilities or recreational grounds.
- Operate only on firm, level surfaces with sufficient load-bearing capacity.
- Do not drive over bumps, holes, or depressions. The small wheel diameter may cause the truck to tip over
- Operate only on routes with clear visibility and appropriate use authorization, where required.
- Use the truck only in adequately illuminated areas. If ambient lighting is insufficient, install additional lighting to ensure the operator has a clear view of the working area.
- When operating on slopes
  - The maximum gradient must not exceed A % under full load
  - The maximum gradient must not exceed **B** % when unloaded. (Refer to the "Performance Data" section for values A and B.)

# **i** NOTE

Conditions of operation road surface: the truck should run on solid, flat, level and paved road surfaces (including both running and lifting)

### **/**N WARNING

Personal protective equipment (e.g. safety shoes, helmet, hi-vis vest, gloves) must be worn during truck operation, maintenance, and handling of consumables.

### **⚠** CAUTION

If the working area is insufficiently illuminated, provide additional lighting to ensure safe operation.

# **i** NOTE

Special equipment and authorization are required for continuous operation under extreme temperatures or fluctuating air humidity. In such cases, we recommend using specially adapted trucks or purchasing a version designed for cold storage applications. If you are unsure, contact the manufacturer's customer service department.



# **i** NOTE

Lithium battery charging temperature range: 5~40°C, 0°C below the low-temperature environment under the conditions of large-scale charging will cause damage to the battery. Discharge temperature range: -20°C~55°C, low temperature (-20°C~0°C) discharge capacity than at room temperature may be reduced compared to normal, it is normal. battery can be 40°C~55°C Ambient temperature, but the battery ambient temperature is too high, especially in the long-term high temperature battery environment, will accelerate the aging of the battery material, shorten the battery life, it is not recommended for long-term use at this temperature. Ambient temperature exceeding the above range of charge and discharge temperature may adversely affect the battery performance or damage, may greatly shorten the battery life, it should be avoided at the above temperature.

### Wind loads

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

Lightweight loads must be properly secured if exposed to wind to prevent them from slipping or falling.

In both cases, stop the truck immediately and secure the load before continuing operation.

### Intended use

This industrial truck is designed for transporting loads as specified on the nameplate. It is intended for use in accordance with the following regulations:

- The safety regulations of your relevant trade association.
- National provisions regarding the operation of vehicles on public roads.
- Other applicable local laws and regulations.

The truck may only be used as intended and in accordance with the approved applications. These rules must be observed at all times by all responsible persons, particularly by operators and service personnel.

The operator or owner is responsible for any risks or damage resulting from use outside the approved applications. The manufacturer assumes no liability for any hazards arising from unauthorized use.

If you want to use the truck for applications not mentioned in this manual, please first contact your authorised dealer.

No modifications or additions may be made to the truck without prior written approval from the manufacturer.



# Impermissible use

Do not allow unauthorized personnel to use the truck.

Riding on the truck is prohibited.

Do not use the truck to carry or lift people.

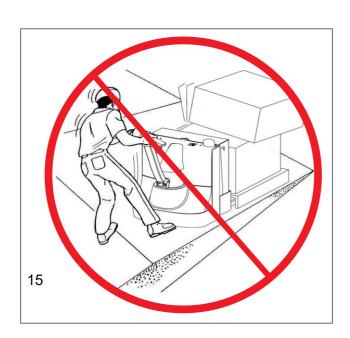


Do not operate the truck on slippery surfaces.

(such as those with oil, residual snow, or ice)



Do not transport goods on steep slopes.





Do not leave the truck unattended unless it has been properly parked and secured.



Do not operate the truck if unauthorized persons are in the hazardous area. Stay focused and avoid distractions while operating the truck



Keep hands and other body parts away from moving parts of the truck to avoid crushing injuries.

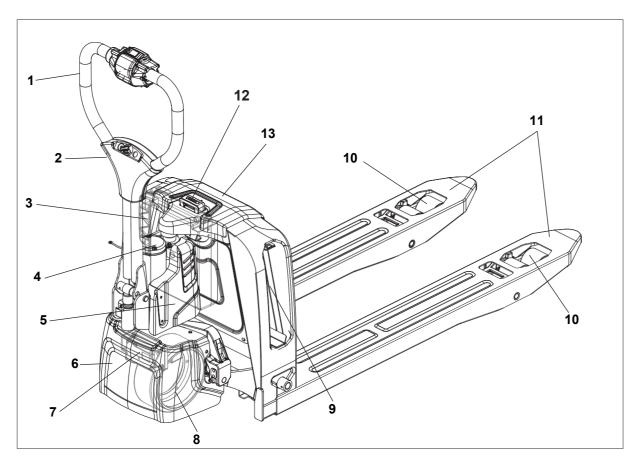




# 2 Truck description

# 2.1 Truck overview

# **Truck components**



1	Control handle	8	Driving wheel
2	Control handle cover	9	Document boxes
3	Lithium-ion battery	10	Load wheels
4	Hydraulic unit	11	Forks
5	Hydraulic cover	12	Supply plug and display instrument
6	Driving hood	13	Upper cover
7	Controller		



### **Function Description**

This product has a compact chassis, balanced tiller and a microprocessor electronic control system. The machine is lightweight, highly efficient and easy to handle.

## **▶** Design

The latest ergonomic and practical design, adaptable to all operators and working conditions.

#### ▶ Tiller

The tiller is used for smooth steering and control of drive speed, lifting and lowering, braking and the horn without changing the position of the hand. The long tiller shaft allows effortless steering and a safe distance to the truck. A gas spring returns the tiller always into a vertical position that activates the brake automatically.

## **▶** Driving

The electronic control unit ensures comfortable use and lower costs. Precise control of driving speed.

Jolt-free starting and smooth acceleration to maximum speed. Simply release or turn the drive direction switch to brake.

Booster circuit prevents the truck rolling back when starting on a gradient.

### **▶** Hydraulics

Gear pump driven by fully enclosed air-cooled motor.

Safety valve and lowering brake protect the hydraulic system.

Pressing the lifting button starts the pump unit, supplying hydraulic oil from the oil reservoir to the lift cylinder. Pressing the lifting button raises the load handler at a constant speed. pressing the lowering button lowers the load handler.

### **▶** Brake system

The truck will be stopped by a regenerative service brake and hold by an automatic electromagnetic parking brake in it's parking position.

### ► Electrical system

The truck has an electronic traction controller. 24V lithium-ion battery, efficient work, easy to change.

### **▶** Lifting system

The load is lifted by a hydraulic cylinder that activates a lifting shaft that transmits the lifting movement by a push-rod to the load wheels.

### **Standard Version Specifications**

Technical specification details in accordance with VDI 2198. Technical modifications and additions reserved.



# ► Performance data for standard trucks

	uishing mark			
1.1	Manufacturer			Anton
1.2	Model designation			PTL1.5
1.3	Drive unit			Electric
1.4	Operator type			Pedestrian
1.5	rated capacity	Q	kg	1500
1.6	Load center distance	С	mm	600
1.8	Load distance	Х	mm	950
1.9	Wheelbase	У	mm	1180
Weight			l	1
2.1	Service weight (including battery)		kg	112
2.2	Axle loading, laden driving side/loading side		kg	477/1135
2.3	Axle loading, unladen driving side/loading side		kg	84/28
Types,	Chassis		l	ı
3.1	Tire type driving wheels/loading wheels Poly		Polyurethane	
3.2.1	Tire size, driving wheels (diameter × width) mm Φ2 <sup>-</sup>		Ф210х70	
3.3.1	Tire size, loading wheels (diameter × width)	pading wheels (diameter × width) mm Φ80x61 (		Ф80х61 (Ф74х88)
3.4	Tire size, caster wheels (diameter × width))		mm	74×30
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1x,-/4
3.6	Track width, front, driving side	b10	mm	/
3.7	Track width, rear, loading side	b11	mm	410/(535)
Dimens	ions			
4.4	Lift height	h3	mm	105
4.9	Height drawbar in driving position min./max.	h14	mm	645/1145
4.15	Lowered height	h13	mm	82
4.19	Overall length	l1 mm 1550		1550
4.20	Length to face of forks	12	mm	400
4.21	Overall width	b1/ b2	mm	590(695)
4.22	Fork dimensions	s/ e/ l	mm	55x150x1150
4.25	Distance between fork-arms	b5	mm	560(685)

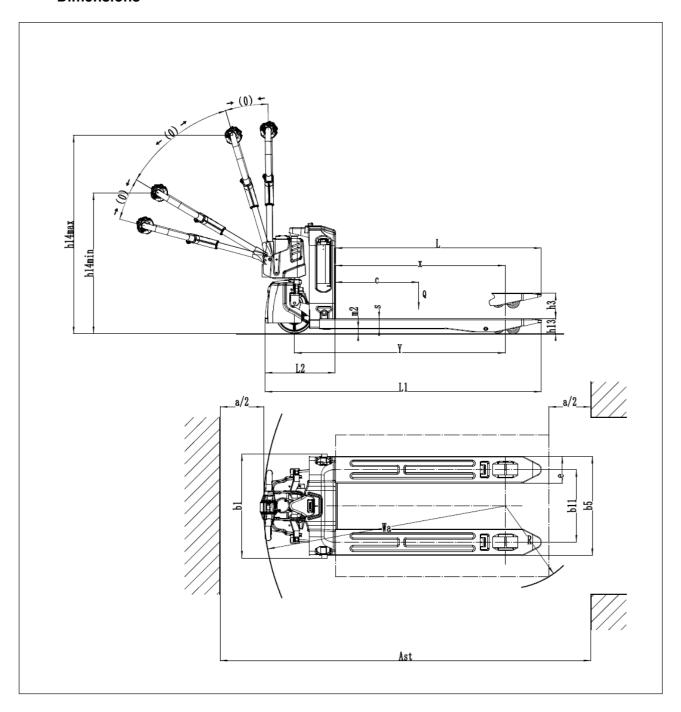


4.32	Ground clearance, center of wheelbase m2 mm 27		27	
4.34.1	Aisle width for pallets 1000 × 1200 crossways		2160	
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast mm 2025		2025
4.35	Turning radius	Wa	mm	1360
Perform	nance data			
5.1	Travel speed, laden/ unladen	km/ h	km/h	4/4.5
5.2	Lifting speed, laden/ unladen		m/s	0.017/0.020
5.3	Lowering speed, laden/ unladen m/s 0		0.057/0.036	
5.8	Max. gradeability, laden/unladen %		6/16	
5.10	Service brake type		Electromagnetic	
Electric	engine			
6.1	1 Drive motor rating S2 60 min kW 0.75		0.75	
6.2	Lift motor rating at S3 15% kW 0.5		0.5	
6.4	Battery voltage/nominal capacity K5 V/ Ah 24/20		24/20	
6.5	Battery weight kg 5		5	
Addition	nal data			
8.1	Type of drive control DC		DC	
10.5	Steering type	Steering type mechanical		mechanical
10.7	Sound pressure level at the driver's ear dB (A) <74		<74	

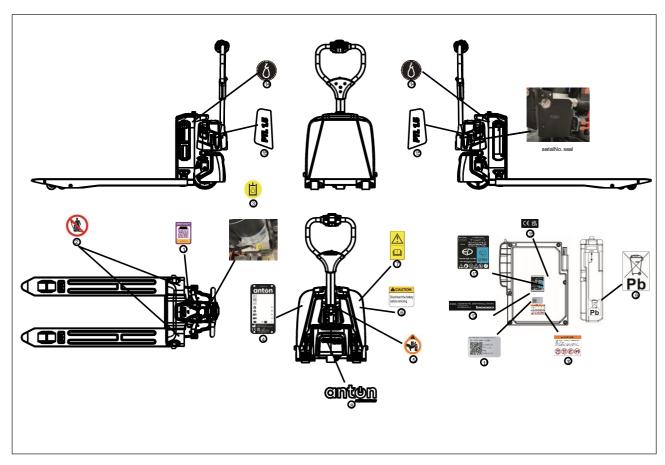
a=200mm



# **Dimensions**







# **Identification points**

Item	Description
1	QR code
2	Do not rest on the pallet truck label
3	"Fill Hydraulic fluid port" label
4	Nameplate
5	Anti-pinch hand label
6	Caution "disconnect the battery before removing" label
7	Read the "Instruction handbook" before operation label
8	Anton logo
9	Pb battery sorting and collection label
10	Battery warning label
11	Battery serial number QR code label
12	Anton battery label
13	Battery nameplate
14	Use a hoist lift the truck via sling point. Sling point position see the sling point label of the
	truck. Please refer to our electronic version operation manual for during hoisting.
15	CE UKCA label



# Truck data plate

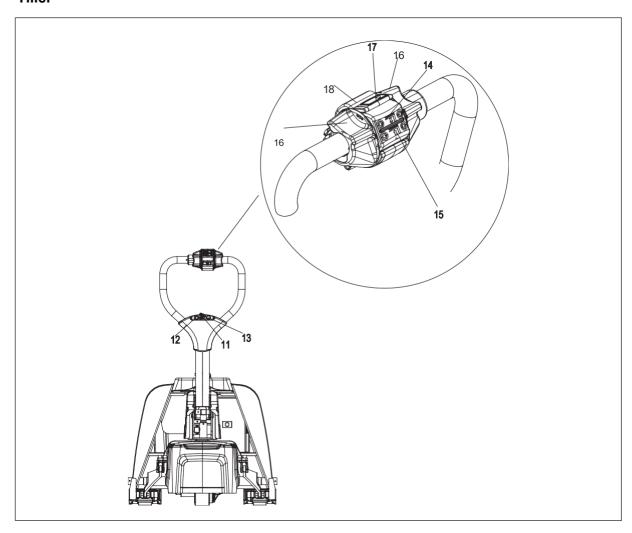
Item	Description
1	Model + fork dimension
2	Serial No.
3	Manualfactory date
4	Unladen weight w. battery
5	Min./Max. Battery weight
6	Rated capacity
7	Load centre distance
8	Nominal drive power
9	Voltage





# 2.2 Display and Controls

# Tiller



11	Key switch	Connect and interrupt control current.
12	Fault indicating lamp	Remain red light lit under normal, flashing show the failure
		state of truck. Shows the error state of the truck (see the
		Service Manual error code)
13	Creep speed switch	Keeping the handle in the vertical position, simultaneously
		press creep speed switch and drive switch, the truck will
		move at a low speed.
14	Lift button	Raises the load device. When the battery is
		consumed about 85%, lifting function will be locked.
15	Lower button	Lowers the load device.
16	Drive switch	Controls travel direction and speed
17	Horn button	Send out sound warning signals.
18	Emergency reverse switch	By pressing this switch, the vehicle starts to travel in the opposite direction.



### Key switch

Connect and interrupt control current.

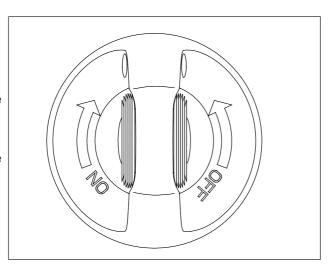
- When the key rotates to gear "OFF", the control current of the truck will be interrupted.
- When the key rotates to gear "ON", the control current of the truck will be connected.

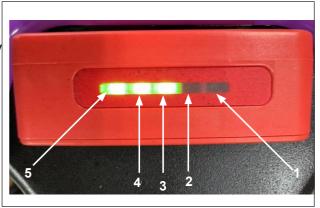
# **i** NOTE

Pulling out the key switch of a truck before leaving can prevent the truck from starting accidentally.

# **Battery charge indicator**

After powering on, the five LED lights flash once before entering the battery level display phase. When the battery level is below 15%, D5 light flashes, indicating the need to charge the truck. When the battery level is between 15% and 20%, D5 light remains on. For battery levels between 20% and 40%, D4 and D5 lights remain on. Battery levels between 40% and 60% result in D3, D4, and D5 lights remaining on. When the battery level is between 60% and 80%, D2, D3, D4, and D5 lights remain on. For battery levels above 80%, all lights remain on.





### **⚠** WARNING

When the residual light indicator (5) is flashing, the truck will be power off.you need to charge the truck immediately.

# **i** NOTE

If the truck is out of power, you need to wait for 5-10 minutes until the battery power is restored before moving the car and charging it immediately.



### 2.3 Related Safety Instruction and Standard (For CE)

### **Electrical requirements**

The manufacturer certifies 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.

### **Vibrations**

Vibrations to which the hands and arms are exposed

The following value is valid for all truck models:

Specified characteristics for upper limb vibra	ation specified characteristics for upper limb			
vibrations				
vibration characteristics	< 2.5 m/s2			

# **i** NOTE

It is mandatory to specify the hand-arm vibrations, even where the values do not indicate any danger, as in this case.

## **⚠** CAUTION

The value expressed above can be used to compare trucks of the same category. It cannot be used to determine the operator's daily exposure to vibrations during real operation of the truck. these vibrations depend on the conditions of use (floor conditions, method of use etc.) and therefore daily exposure must be calculated using data from the place of use.

#### Continuous sound level

< 74 dB(A)

according to EN 12053 as stipulated in ISO 4871

The continuous sound level is a value averaged according to standard regulations, taking the sound pressure level into account when driving, lifting and idling. The sound pressure level is measured at the ear.

## Electromagnetic compatibility (EMC)

The truck fulfills the requirements for electromagnetic compatibility (EMC) in accordance with applicable standards and regulations.

Electromagnetic compatibility includes the following aspects:

- Limiting the emission of electromagnetic interference (EMI) to a level that does not affect the operation of nearby electronic equipment.
- Ensuring sufficient immunity to external electromagnetic interference so that the truck functions reliably under expected environmental conditions.

EMC testing verifies both the electromagnetic emissions of the truck and its resistance to external electromagnetic influences, based on the intended operating environment. Various electrical design measures have been implemented to ensure compliance with EMC requirements.



# 3 Safety

### 3.1 Safety Instructions

- Only trained and authorized personnel may operate the truck.
- Operators must wear appropriate personal protective equipment (e.g. helmet, safety shoes, gloves)
- Do not clean or store the truck outdoors when it is exposed to rain. Clean only in suitable indoor areas.
- If the truck malfunctions, stop operation immediately. Display a warning or fault sign, remove the key, and report the issue to a supervisor. Only resume operation once the fault has been properly resolved.
- Do not operate the truck during extreme weather conditions such as sandstorms, heavy rain, thunderstorms, or typhoons. Operation is also prohibited when wind speeds exceed 5 m/s.
- Due to their small wheels, pallet trucks are not permitted for use on public roads. Use only in designated stacking or warehouse areas.
- When carrying bulky loads that obstruct the operator's view, operate the truck in reverse or use a guide.
- Do not operate the truck when the forks are raised.
- Goods must remain centered on the forks. If the load is off-center, turns or travel on uneven surfaces can lead to loss of stability and increase the risk of tipping.
- Keep the control handle and pedals clean and free of oil, grease or water.

## 3.2 Safety regulations for the operation of truck

### **Driver Authorization**

The truck may only be operated by trained and authorized personnel who have demonstrated the ability to safely drive, handle loads, and operate the truck.

### **Unauthorized Use of Truck**

The operator is responsible for the truck during operation and must prevent unauthorized persons from using or operating it. Do not transport passengers or lift personnel under any circumstances.

### **Damage and Faults**

Any damage or malfunction must be reported to a supervisor immediately.

If the truck is not safe to operate (e.g., brake or wheel defects), it must not be used until the issue has been repaired and the truck declared operational.

### Repairs

The operator must not perform any repairs or modifications to the truck.

All maintenance and repair work must be carried out by trained and authorized technicians only. The driver must never disable or adjust safety mechanisms or switches.



### **Hazardous Area**

A hazardous area is defined as any zone where persons may be endangered by the truck's movements, lifting operations, the load handler (e.g., forks or attachments), or the load itself. This includes areas that may be reached by falling or lowering loads.

- Keep unauthorized persons out of hazardous areas.
- When there is danger to personnel, a warning (horn) must be sounded with sufficient notice.
- If unauthorized persons remain within the hazardous area, stop the truck immediately.
- This truck is designed for use on clean, dry, level floors in non-refrigerated indoor environments only.

### Safety devices and warning signs

All safety devices, warning signs, and safety instructions in this manual must be strictly observed and maintained in legible condition.

### Travel routes and work areas

Operate the truck only on routes designated for truck traffic. Keep unauthorized persons out of work areas. Only place loads in storage locations specifically designed and approved for that purpose.

### Nature of loads to be carried

The operator must make sure that the load is in a satisfactory condition. Only carry loads that are positioned safely and securely. Use suitable precautions to prevent parts of the load from tipping.

### **Before operation**

Before operating the truck, inspect the work area. It must be clean, well-lit, adequately ventilated, and free of obstructions or hazardous materials.

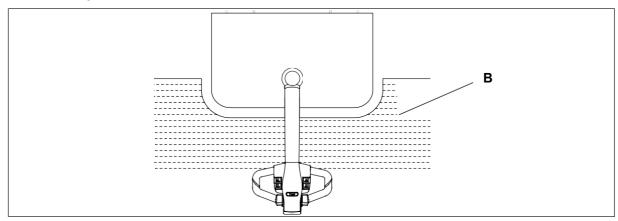
Traffic routes must be clearly marked and free of obstacles.

The operator must know the truck classification and may only use the truck in approved environments.

Never operate the truck with greasy or slippery hands, as this may impair control.

### Operating position

The truck may be operated in either direction while walking. When operating in reverse (forks leading direction, always keep both hands on the tiller. When operating in forks-trailing direction keep one hand on the controls and, if possible, walk ahead and to the side of the truck. During operation, always grasp the handle at the travel control. Keep fingers within the protected area of the handle at all times. The operator position for operating the truck within the operating area B.





### **∆Warning**

Injury to hands can occur if the handle is grasped incorrectly. Keep hands and fingers within the protected area of the handle.

If any part of your body is outside the operating area B, there is a risk of crushing. Ensure that your entire body is within the area when operating the truck.

### **Travel**

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

### **⚠** Warning

Loss of control!

Do not travel at excessive speeds. keep your truck under control at all times. Always watch for pedestrians.

Unstable loads are hazardous. Ensure all loads are secure and evenly positioned across both forks. Never lift a load with only one fork. Never carry anything on any part of the truck except the forks unless a specific area has been provided by the manufacturer. Never overtake another truck at an intersection, blind spot or other dangerous location. Use the horn at intersections and any location where visibility is limited.

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

Keep the forks upgrade to maintain control when travelling up or down an incline with a loaded truck. Keep the forks downgrade when travelling up or down an incline with an empty truck.

### **Stability**

Stability is guaranteed if your truck is used properly in accordance with its intended purpose. Common reasons for the loss of truck stability include:

- Emergency stops or sharp turns
- Driving with a raised load or a load handling device
- Turning the vehicle around on or driving across a slope
- Driving up or down a slope with the load pointing downhill
- Driving with a wide load
- · Carrying a swinging load
- Driving near the edge of a ramp or up steps
- Tilting the mast forward while carrying a raised load
- Driving on uneven surfaces
- · Overloading the truck
- Carrying bulky loads in strong winds
- When carrying liquids, the center of mass inside the container may shift due to inertial forces (such as during acceleration, braking, or turning)



### **⚠ DANGER**

- Tip-over will occur if you turn while travelling on a ramp or travel at an angle other than straight up or straight down a ramp.
- Never turn on an incline or ramp either loaded or unloaded. Travel straight up or straight down.
- Be aware that when descending an incline your stopping distance will be greater than when on a level surface. Reduce your speed and ensure that there is adequate clear space at the bottom of the ramp to stop and turn.
- To avoid hazards associated with a dock, you should personally check that the trailer brakes have been applied, wheel chocks are in place, and that any trailer-to-dock locking systems are being utilized. The impact of moving in and out of a trailer may cause the trailer to creep or move. Confirm that the driver will not move the trailer until you are done.
- Do not drive the truck onto an elevator without specific authorization. Verify that the capacity of the elevator exceeds the weight of the truck and the weight of the load. Approach elevators slowly and ensure that the elevator car is level with the floor before entering. Enter elevators squarely with the load end leading. Ensure that no part of the truck or load contacts any part of the elevator other than the floor. Once on the elevator, neutralize the truck controls, shut off the power, and set the brakes. Any other personnel should leave the elevator before the truck is allowed to enter or leave.

Be especially cautious when driving the truck on ramps or bridge plates. Be sure to maintain a safe distance from each edge. Before driving the truck over a ramp or bridge plate, verify that its position is secured to prevent movement. Never exceed the rated capacity of a ramp or bridge plate.

### **Battery safety**

Remain aware of the following information.

- Wear protective equipment (protective apron and gloves) and protective glasses when working
  with battery acid. If clothing, skin or eyes come into contact with battery acid, immediately flush
  the affected areas with water. If acid contacts the eyes, seek medical attention at once. Clean
  spilled battery acid immediately with large amounts of water.
- Remove any metal rings, bracelets, bands, or other jewelry before working with or near batteries or electrical components.
- Never expose batteries to open flame or sparks.
- Shorting of battery terminals can cause burns, electrical shock, or explosion. Do not allow
  metal parts to contact the top surface of the battery. Make sure all terminal caps are in place
  and in good condition.
- Batteries may only be charged, serviced, or changed by properly trained personnel.
- Always follow the battery manual provided by the manufacturers of the battery charger.



# 4 Operation

## 4.1 Checks and tasks before daily use

- Damage to the truck or the attachment (variant), non-functional switches or safety systems and modification of predefined set values can lead to unpredictable and dangerous situations.
- The following checks and tasks enable causes of this type to be identified in good time. It is
  important to run through all the checks and tasks listed in the following table from top to bottom
  before daily use of the truck.
- If damage or other defects are identified on the truck or the attachment (variant), the truck must not be used until it has been properly repaired.

	Operator	's Daily (	Checklis
Date	Operator		
Truck No	No		
Department Runtime			
Meter Reading			
Daily Check Items		O.K.(√)	Remark
Check for fluid leakage.			
Visually inspect the chassis, fork for da deformation.	mage, cracks or		
Check decal condition.(See Page 12 Se Identification points")	ection"2.1.5		
Check wheels for damage and smooth	movement.		
Check the function of the emergency bring plug. (See Page 29 Section "Emergency plug)")	* * *		
Check the chassis frame and apply gre the position reset function of the operat	•		
Check the lifting and lowering functions (See Page 32 Section"4.3.4 Goods pick	· ·		
Check display equipment, alarm system Page 14 Section"2.2 Display and Control	` `		
Check the control handle mechanical of (See Page 28 Section"4.2.9 Braking")	perating braking function.		
Check forward and reverse running fun (See Page 25 Section"4.2.6 Running")	ctions by drive switch.		
Check emergency reverse function of the switch. (See Page 28 Section 4.2.9 Brakens)	· · · · · · · · · · · · · · · · · · ·		
Check the brake system.(See Page 28	Section"4.2.9 Braking")		



Operator's I	Daily Checklist Continu	ber
DateOp	perator	_
	0	
Runtime		
Meter Reading		
Daily Check Items	O.K.(√) Remark	
Test the parking brake function.		
(See Page 28 Section"4.2.9Braking")		
Check the steering system.		
(See Page 27 Section"4.2.7Steering")		
Check the vertical creep of the truck. (if equipped)		
Visually inspect the bolts and nuts.		
Visually inspect if there are any broken hoses or broken wires.	en electric	
Perform a visual inspection for integrity, deformation, da with connector pins at the bottom of the battery.	amage	
Visually inspect the cover are secure and check for dam	mage.	
Do not restrict the field of vision. Ensure the visible area specified by the manufacturer is observed.	a	
Attachment parts must be properly secured and function	on	
according to their operating instructions. (if equipped)		
Check that there are no foreign objects that could hinde operation of the wheels and rollers.	er the	
Visually inspect the battery and recharge the battery.		
(See Page 37 Section"4.5 Battery and Chager")		

# **i** NOTE

- Do not use the truck if there is any damage or defect.
- Contact your authorised service centre.



### 4.2 Using the truck

### Commissioning

The truck must only be operated on battery current!

To prepare the truck for operation after delivery or transportation, the following operations must be performed:

- Check the equipment for completeness.
- If necessary, install the battery. Make sure that the battery cable is not damaged.
- Fully charge the battery.
- · Check for fluid leakage.
- Check the brake function.
- Check the lifting and lowering function.
- Check the driving function.
- Check the steering function.
- The truck can now be started, see Page 24 Section "4.2.5 Truck starting".

### **M** Warning

The truck must only be operated with a lithium-ion battery.

# **i** NOTE

If the truck is delivered in multiple parts, setup and commissioning must only be performed by trained, authorized personnel.

### 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.

### **Environmental considerations**

### **Packaging**

During delivery of the truck, certain parts are packaged to provide protection during transport. This packaging must be removed completely prior to initial start-up.

# **i** NOTE

The packaging material must be disposed of properly after delivery of the truck.

### **During running-in**

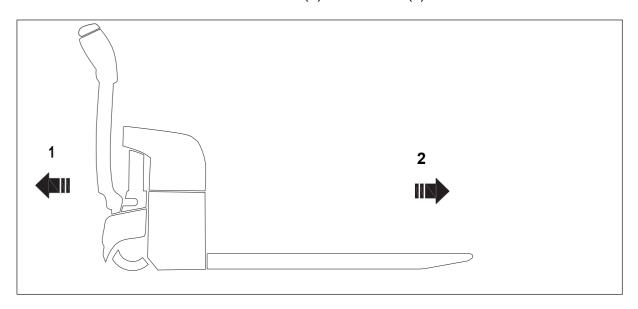
To ensure optimal performance and long-term reliability, operate the truck under light-load conditions during the initial running-in period (approximately the first **100 operating hours**). Observe the following recommendations during this phase:

- Charge the battery when the remaining capacity falls below 20%
- Perform all specified preventive maintenance tasks thoroughly and on time.
- Avoid sudden starts, stops, or sharp turns.
- Perform oil changes and lubrication earlier than the standard service intervals, if possible.
- Do not exceed 70–80% of the truck's rated load capacity



# **Defining directions**

The drive directions of the truck are forward (1) and reverse (2).

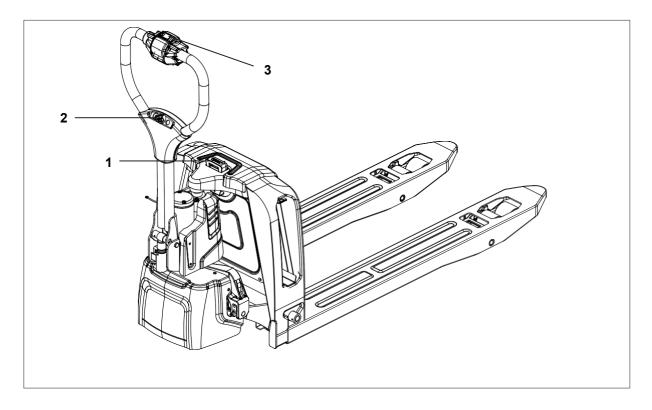


# **Truck starting**

Carry out check before operation and make sure each function and state are normal (see Page 23 Section "4.2.1 Commissioning").

Before start, press the horn button (3) and make sure there are no people around.

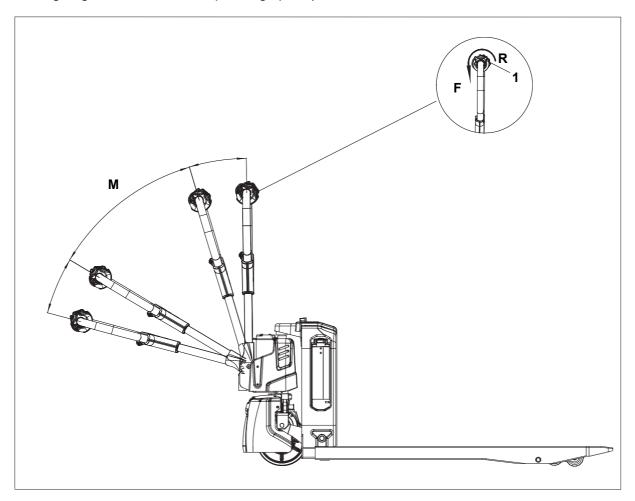
- Engaged the supply plug (1).
- Open the key switch (2) to start the truck.





# Running

Set the control lever to the running area (M). Set the drive switch (1) to the required direction (F for Forward, R for Reverse). Control the travel speed with the drive switch (1) (the lager the turning angle, the faster corresponding speed)



# **i** NOTE

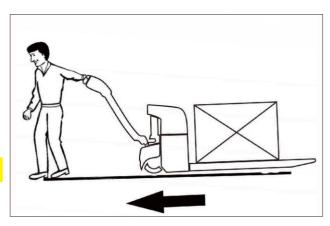
When using the truck on a ramp or a uneven road, please lift the forks of the truck to prevent its bottom from colliding with the road surface.

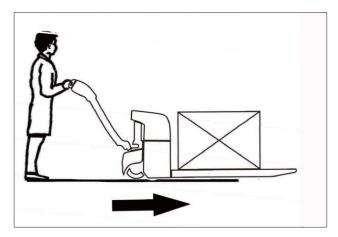


Driver should walk in front of the truck and keep at the side front of the truck when travelling. One hand holds the handle and operates travel switch with thumb. Always watch moving direction and guide the truck. Or hold the handle with both hands and push the truck go forward.

## **CAUTION**

- Operator must wear protective boots.
- When enter narrow area as lift, first get
- fork go.
- Travel according to regulated route. Keep road clean and no slipping.



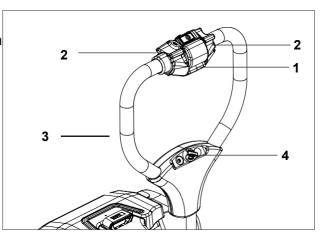


## ► Slow travel

When you apply the slow travel speed button and keep the handle in the vertical position, the truck travels at reduced speed and acceleration.

### **Procedure:**

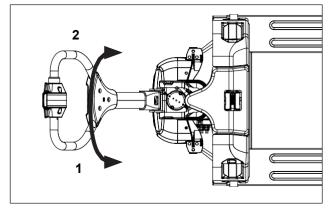
- Keeping the handle in the vertical position, simultaneously press the slow travel speed button (4) and drive switch
- (2). The truck will reduce its speed to 30% of the maximum speed.
- The truck can be operated with a control lever (3) (e.g. in congested areas/travel seat).
- Set the drive switch (2) to the required direction (forward or backward).
- The truck travels at slow speed.





### **Steering**

Move the control hand to the left (1) or right (2).

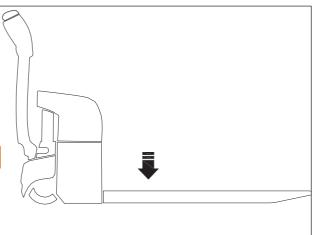


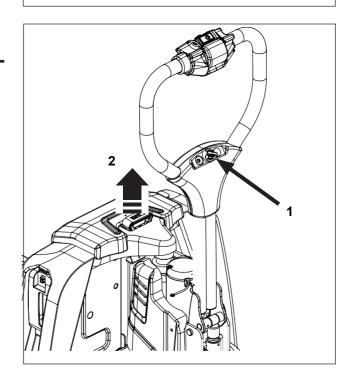
### Parking the truck securely

- Drive the truck to safe area or appointed area.
- Lower the forks to the bottom.
- Turn off the key switch(1).
- Pull out the supply plug (2).

### **⚠** WARNING

- Should it be necessary for operators to leave the truck, even for just a moment, the truck should also be well parked as specified.
- The trucks are not allowed to park on the slopes.
- The forks must be lowered to the bottom.







### **Braking**

### ► Mechanical operating brake

The truck is braked when the operating handle is released.

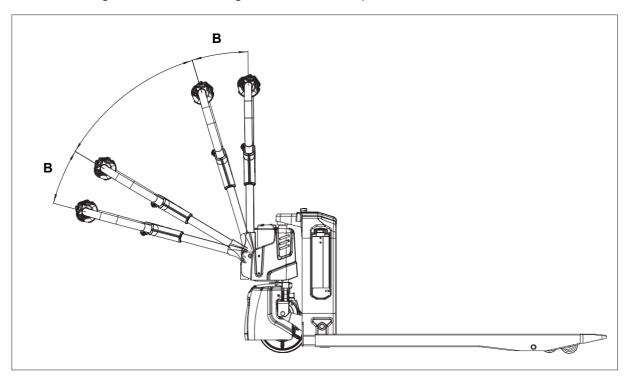
The mechanical brake engages when the tiller is positioned in (B) area.

### **ACAUTION**

If the control handle moves slowly into the brake position, identify the cause and rectify the fault. If necessary, replace the spring!

### ▶ Regenerative braking

Release the drive switch. The drive switch will automatically return to the initial position and the vehicle will begin to enter the regenerative braking state. When it decelerates to <1 km/h, the electromagnetic brake will bring the motor to a stop.





### ► Reverse braking

Braking can be accomplished by changing the direction of travel.

Press the reverse switch in the opposite direction until the truck comes to a stop, then release the drive switch.

### / CAUTION

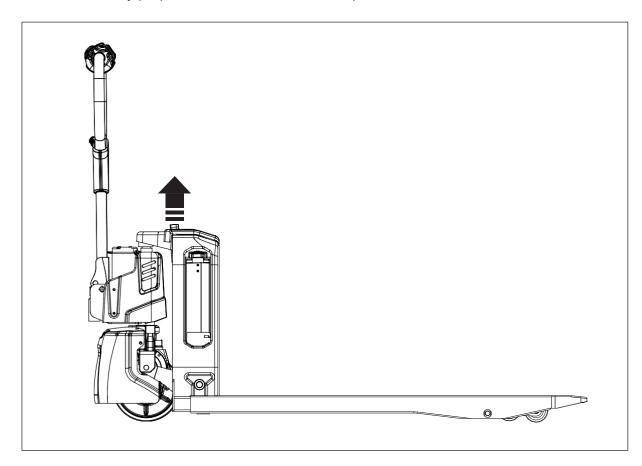
Open the drive switch. if the drive switch cannot quickly return to the initial position or resets very slowly, identify the cause and rectify the fault.

### **▶** Parking brake

The mechanical brake applies automatically when the truck comes to rest.

### ► Emergency stop switch (supply plug)

The supply plug also serves as the emergency stop switch. Pull out the supply plug, and then all the electrically propelled functions will be interrupted.





### 4.2.7 Using the truck on a slope

Be particularly careful near slopes: Never attempt a slope with a gradient greater than that specified in the truck's data sheet. Make sure that the ground is dry with a non-slip surface and that the route is clear.

### ► Ascending slopes

Always ascend slopes travelling in the reverse direction, with the load facing uphill. Without a load, it is recommend to ascend slopes forwards.

### **▶** Descending slopes

Travel down slopes must always be forwards, with the load uphill. Without a load, it is recommended to descend slopes forwards. In all cases, travel at a very low speed and brake very gradually.

### **⚠ DANGER**

- Risk to life and/or risk of major equipment damage.
- Never park the truck on a slope.
- Never make a U-turn or take shortcuts on a slope. On a slope, the operator must drive very slowly.

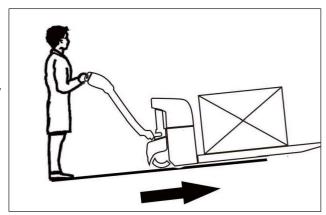
### ► Starting on a slope

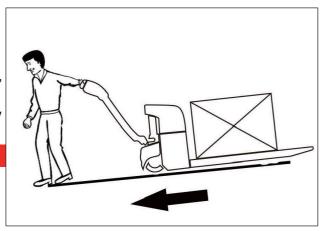
If you have to stop and then start on slope, proceed as follows:

- Stop on the slope by pressing the accelerator in the opposite direction until the machine comes to a standstill.
- Return the accelerator to the neutral position, then release the accelerator control button to apply the parking brake.
- To restart, press the accelerator button for the desired direction.
- The truck will move.

### [i]NOTE

Incorrect use of the truck on slopes places stress on the traction motor, brakes and battery.







### 4.3 Handling loads

### Loading

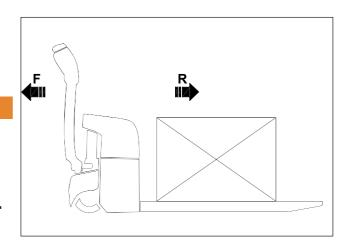
- Approach the load carefully.
- Adjust the height of the forks until they can be easily inserted into the pallet. Insert the forks under the load.
- If the load is shorter than the forks, position the forks so that the front of the load overhangs them by a few
- centimeters, to avoid interference with the load immediately ahead.
- Raise the load a few centimeters above its support.
- Drive the truck away from the stack or any neighbouring loads, gently and in a straight line.

### **Transporting loads**

Always carry loads in the forward direction of travel (F) in order to have the best visibility.

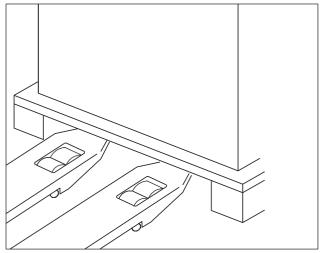
### **↑** WARNING

When carrying a load on a slope, always ascend or descend with the load uphill. Never drive sideways across a slope or perform a U-turn.



## [i] NOTE

Since visibility is reduced when travelling in this direction, drive only at very slow speed.





### **Unloading**

- Carefully drive the truck to the unloading area.
- Lower the load until the fork arms are free from the pallet.
- Drive the truck away in a straight line.
- · Raise the forks to proper height.

### **A**CAUTION

If the field of vision is poor, ask a guide for assistance.

### **Goods picking**

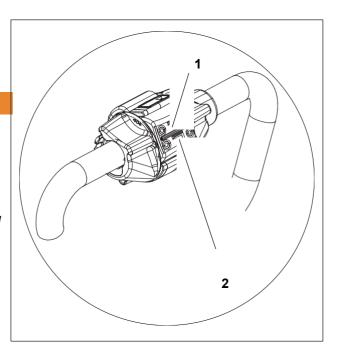
- Keep pressing the lifting button (1) until reaching the required lifting height.
- Lower the pallet forks to the bottom through pressing the lowering button (2).

### **⚠ WARNING**

Goods failing to be arranged and fixed may result in accidents.

## **i** NOTE

To avoid shortening the service life of the oil cylinder, try not to lift the forks to the highest state for lifting.





### 4.4 Transport

### Location for lifting and/or slinging points

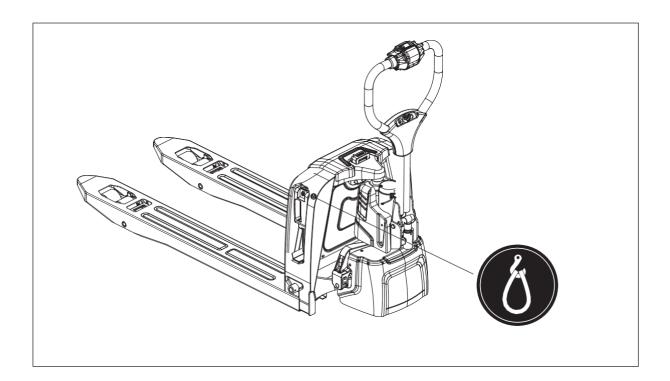
- Park the truck securely
- Secure the lifting slings to the strap point and prevent them from slipping. Crane slings
- should be fastened in such a way that they do not come into contact with any attachments when lifting.
- Load the truck and park it securely at its destination.

### **A DANGER**

Personnel must not stand below or near the truck when the pallet truck is being lifted.

Only use lifting gear with sufficient capacity (for truck weight see truck nameplate).

When hoisting or laying down, it should be stable and slow to avoid collision or accident.





### Securing the truck during transport

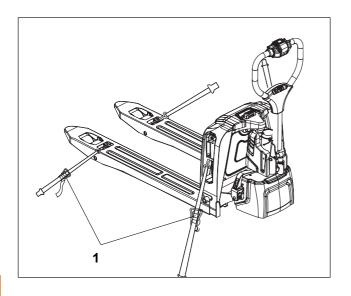
Secure the truck properly to prevent movement during transport by truck or trailer.

#### Procedure:

- · Park the truck securely.
- Place the tensioning belt around the truck and attach it to the fastening rings of the transport vehicle.
- Use wedges to prevent the truck from moving.
- Tighten the tensioning belt using the tensioner.



- The truck or trailer must be equipped with suitable fastening rings.
- Use wedges to prevent the truck from moving.
- Only use tensioning belts or straps with sufficient rated strength.



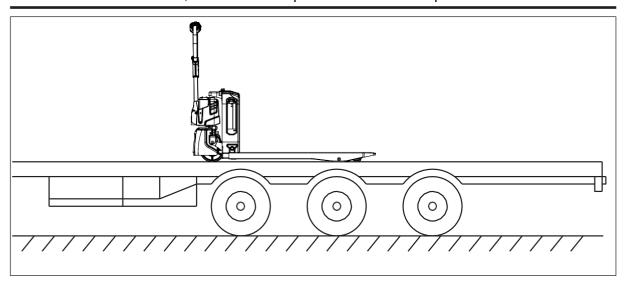
### **Transport**

The pallet truck is designed for short-distance material handling only and is inappropriate for long-distance transportation. If needed, the truck must be transported by using lifting device or platform to place it on truck or trailer. Before operation, fix the pallet truck firmly on the transport vehicle with belt and block the wheel to avoid relative motion during transportation.

## **i** NOTE

The truck must be suitably protected from the effects of the weather during transport and storage.

To load or unload the truck, use an inclined plane or a mobile ramp.





### ► How to remove a broken truck

It's not allowed to tow the truck on the ground directly when the truck is broken down or damaged since the brake of the truck is closed under normal circumstances. Appropriate vehicles should be used to remove the broken trucks.

## i NOTE

Only use haulage equipment with sufficient load capacity.

## [i]NOTE

- The load weight includes the net weight of the truck(including battery weight) and the wooden pallet.
- The pallet or wooden box should be large and strong enough to withstand the weight of the truck.
- Pay attention to the fork blades when lifting the truck onto the pallet, to prevent injuries caused by the forks.

## **i** NOTE

Follow the prescribed steps and park the vehicle correctly.

## **i** NOTE

Make sure the forks are aligned with the pallet, move slowly and stop after inserting the forks as far into the pallet as possible.

### / CAUTION

Operate on open, level ground and pay attention to ground conditions when lifting and lowering the pallet to prevent the truck from tipping.

When transporting the truck, make sure it is fully secured and take precautionary measures against bad weather.



► Operating the truck without its own drive system

If the truck must be moved after a failure has rendered it immobile, proceed as follows:

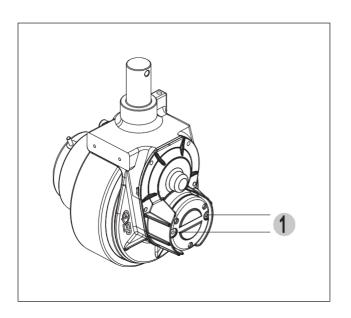
- Set the emergency stop switch "OFF".
- Set the key switch "OFF" and remove the
- key.
- Prevent the truck from rolling away.
- Remove the cover.
- Screw in two screws (1), M4\*30mm) until the truck can be moved (no braking action).
- Set the emergency stop switch "ON".
- Set the key switch "ON", which the truck
- powered all the time.
- After setting down the truck at the destination, unscrew two screws (1).
   Braking action is restored.

## [i]NOTE

Inoperative trucks movement after brake release must ensure that the power of the truck is on or risk damaging the truck controller.

### **↑** WARNING

This operating mode is not permitted when negotiating inclines and gradients.





### 4.5 Battery and Chager

### Information for battery and charger

Truck type	Battery type	Voltage/ Rated capacity	Charging time	Dimensions <sup>1)</sup>
			(used 10A Charger)	
PTL1.5	ZL2420-91	24V/20Ah (24V/20Ah×2	2h(4h)	290*235*75
		optional)		
1)The battery handle is installed in different directions.				

### Safety regulations for Charging the battery

- Avoid the existence of any metal object in the surface of the lithium-ion battery.
- Do not pierce the battery case with nails or other sharp objects.
- Do not short-circuit the battery with wires or other metal objects!
- The plug connection parts should be inspected in terms of obvious damages before charging.
- Fire-fighting equipment must be kept in the charging place.
- Before charging, check if there is damage on the cable connection and plug connection pieces.
- · Do not use irregular charging sockets.
- Charging in non-charging area is prohibited.
- No inflammable substances or spark-generating materials being present or stored within a
- distance of 2 meters of the truck parked for battery charging.
- No smoking or open fire around when charging.
- When charging, do not wrongly connect the battery polarity, otherwise it may damage the battery.
- Please charge the lithium-ion battery at an ambient temperature of 0°C to 40°C. Do not charge the lithium battery below 0°C.
- The safety provisions related to the lithium-ion battery and the manufacturer of charging station must be strictly abode by.

## **i** NOTE

The workplace regulations must be observed (emergency exits, escape routes, traffic routes, ...) must be kept clear.

Lithium-ion battery systems offer the advantage that they can be recharged temporarily, allowing industrial trucks to be charged at any time. As a result, shorter charging times can usually be achieved and charging with higher currents is also possible.



### Charging the battery with an external charger

- Park the truck securely.
- Pull up the supply plug and remove the lithium-ion battery according to section 1.2 Battery removal and installation.
- Visual Inspection the external charger.
- If undamaged, Insert the charger charging plug into the battery plug.
- Insert the charger power plug into a suitable power outlet.

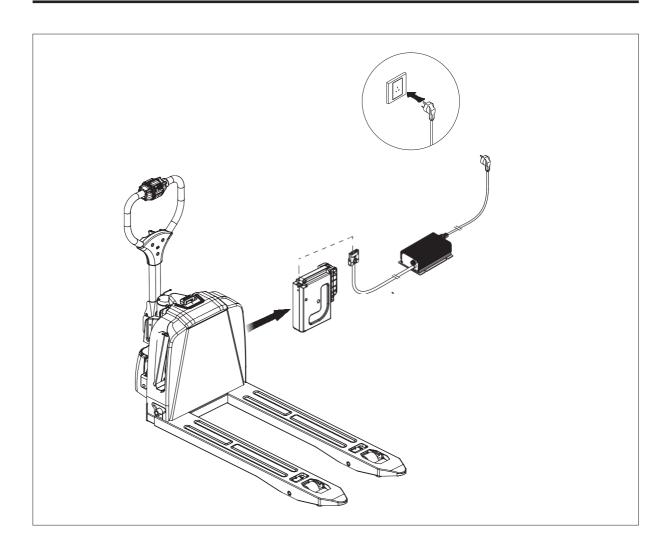
## **i** NOTE

- The charge indicator lights up, the battery is charging.
- LED charging indicator: Red charging
- LED charging indicator: Green charged

### **⚠** WARNING

Charger 24V/10A maximum input power 333W.

Please strictly implement the above data to prevent equipment damage and accidental risks such as fire.





### **/**N WARNING

Store the charger in a clean and dry environment after charging. Do not place the charger in the frame to prevent damage to the charger after outdoor rain and cause dangerous accidents such as short circuit or fire in the charging process.

### **⚠** WARNING

Damage to battery and charger!

- The charger must be matched to the battery in terms of voltage and charging capacity!
- Observe the correct combination of battery and charger to avoid overheating and fire hazard.
- Only use the charger that is suitable for the corresponding battery.

### Battery removal and installation

Park the truck securely (Page 27 Sec-tion "4.2.8 Parking the truck securely") and turn off the power before removal and installation of the battery.

# ► Battery removal and installation steps:

- Open the cover (1) and pull out the plug assembly handle (2).
- Hold the battery handle and remove the lithium-ion battery from one side.

### **⚠** WARNING

Before removing the battery, make sure the vehicle is completely powered off.





### 4.6 Cleaning

### Clean the truck

Washing instructions

- Always park the truck as specified.
- Disconnect the battery connector .

### **⚠** CAUTION

Disconnect the battery connector when washing the truck.

Washing the exterior of the truck

### / WARNING

Do not use inflammable fluids for cleaning. Observe the above safety precautions for preventing sparks through shorts (disconnecting the battery connector). When the truck is being cleaned, carefully cover all vulnerable components, particularly electric components. Observe the manufacturer's instructions for handling the cleaners.

- Clean the truck exterior with water and cleaning agents soluble in water (sponge, rags).
- · Clean especially the oil filler openings and the surrounding area.
- Grease the required assemblies (controls and joints).

### Cleaning the electrical system

### / WARNING

Do not aim the steam cleaning device directly on electric motors and other electric components, brakes and bearings.

## **i** NOTE

Use only dry cleaning agents as cleaning agents. Do not remove covers, etc.

• Clean electrical components with a nonmetallic brush and blow dry with a weak jet of air.

### After washing the truck.

- Dry the truck thoroughly (e.g. with compressed air).
- Take the truck back into operation according to recommissioning.
- If moisture has penetrated the motors despite the precautionary measures, dry them first with compressed air. if not, there is the risk of short circuits! The truck must only then be turned on and taken into operation to prevent any damage due to corrosion.



### 5 Maintenance

### 5.1 Operational safety and environmental protection

The servicing and inspection operations contained in this chapter must be performed in accordance with the intervals indicated in the service checklists.

Only use original spare parts that have been certified by our quality assurance. Used parts, oils and fuels must be disposed of in accordance with the applicable environmental protection regulations. Upon completion of inspection and servicing, carry out the activities listed in the "Restoring the truck after Decommissioning" section.

### 5.2 Maintenance Safety Regulations

### Lifting and jacking up

When a fork truck is to be lifted, the lifting gear must only be secured to the points specially provided for this purpose. When the truck is to be jacked up, suitable measures must be taken to prevent the truck from slipping or tipping over (use of wedges, wooden blocks). Work underneath the raised load lifting device must only be carried out when the fork is immobilised and supported by a chain of adequate strength.

### Service plan

Maintenance work must be performed according to the hour meter.

Refer to the truck's maintenance plan.

Follow the recommended service intervals to ensure safe operation.

Reduce maintenance intervals under harsh operating conditions (e.g. high dust levels, extreme heat or cold).

### Work on the electric system

Only qualified and authorized personnel may perform electrical work on the truck. Before starting any work on the electrical system:

- Remove all metallic accessories (e.g. rings, bracelets) from your hands
- Implement all protective measures to prevent electric shock

### Grade and quantity of lubricants and other consumables

Use only lubricants and consumables specified in this manual.

Approved products are listed in the maintenance specifications table.

- Do not mix different grades or types of oil or grease.
- If changing lubricant types, flush the system thoroughly before refilling.
- Clean all areas around the hydraulic system before opening filters or connections.
- Use only clean containers for filling or transferring oil.

### Working on the hydraulic equipment

Before starting any work, the hydraulic system must be fully depressurized.

### Safety devices

After maintenance and repair work, all safety devices must be reinstalled and tested for operational reliability.



### Maintenance operations that do not require special training

Simple maintenance tasks, such as checking the hydraulic fluid level, can be performed by personnel without special training. No formal qualification is required for these basic procedures.

More complex maintenance tasks—such as replacing the battery, changing wheels, or performing electrical work—must only be carried out by an authorized service center. Refer to the maintenance section of this manual for further information.

### Servicing and maintenance personnel

Only qualified personnel authorized by the owner may perform maintenance and repair work. All tasks listed in the Scheduled Maintenance Charts must be carried out by trained and authorized technicians.

These individuals must have sufficient knowledge and experience to:

- · assess the condition of the truck
- evaluate the effectiveness of protective equipment, and
- conduct safety checks in accordance with established testing principles.

Safety evaluations must always be carried out objectively and independently of operational or economic constraints.

Operators may perform basic inspection and maintenance tasks, such as checking hydraulic fluid levels. No special training is required for these activities.

### **Battery maintenance staff**

Batteries must only be charged, maintained, or replaced by specially trained personnel. Personnel must strictly follow the manufacturer's instructions for:

- The battery
- The battery charger
- The truck

Always follow the battery maintenance and charger operating instructions to ensure safety and performance.

### Ordering spare parts and consumables

Only original spare parts certified by the manufacturer's quality assurance department may be used. To ensure safe and reliable operation of the truck, use only the manufacturer's spare parts. Used parts, oils and fuels must be disposed of in accordance with the relevant environmental protection regulations. For oil changes, contact the manufacturer's specialist department.



## 5.3 Servicing and inspection

## ► Maintenance Checklist

50-hou	ır/ 7-Day maintenance
1	Check the functions of the operation switches and display.
2	Check display equipment, alarm system and safety devices.
3	Check the emergency reverse switch, reverse braking, emergency disconnect switch and regenerative braking.
4	Check tiller steering functions.
5	Check the drive wheel and load wheel for worn or damage.
6	Check for brake condition when the control handle on horizontal position and vertical position.
250-ho	our/ 2-month maintenance
After o	perating for 250 hours in total, the truck should also be maintained according to the
	ng procedures in addition to the 50-hour maintenance mentioned above
7	Inspect where there is any damage in the cables and whether the terminals are reliable.
8	Inspect whether there is any screw losing or slipping out.
9	Inspect whether there is any abrasion or damage in the oil pipes.
10	Inspect where is any leakage in the hydraulic oil.
11	Clean and lubricate the contact surface with grease.
500-ho	pur/ 3-month maintenance
	perating for 500 hours in total, the truck should also be maintained according to the
	ng procedures in addition to the 250-hour maintenance and 50-hour maintenance
	ned above
12	Check that the battery cable connections are tight and grease the battery poles if
	necessary.
13	Check if the signs are legible and complete
14	Inspect and fasten the controller and other electrical apparatus elements
15	Check for oil leakage.
16	Check for oil level, change oil
17	Check if the clearance is proper and adjust, if necessary
1000-h	our/ 6-month maintenance
	perating for 1000 hours in total, the truck should also be maintained according to the
	ng procedures in addition to the 50-hour maintenance,250-hour maintenance and 500-hour
	nance mentioned above
18	Inspect whether there is any abnormal sound or disclosure of the gear box.
19	Inspect the abrasion situations of the driving wheel/bearing wheel and please timely
	replace seriously abraded ones.
20	Inspect whether all the oil pipes, pipelines and joints are reliably connected and whether
	all the sealing elements are reliable.
21	Clean foreign matter
22	Check the frame for damage.
23	Inspect where there is any damage in the oil cylinders and whether corresponding installations are reliable
24	Inspect and check the hydraulic filter, replaced if necessary.
	<u> </u>



25	Inspect the air gap of the electromagnetic brake, and if the air gap is larger than 0.4 mm,		
	please replace the friction plates.		
26	Check cylinder block and piston for damage and ensure that they are properly sealed		
	and secured.		
27	Inspect whether the bearing capacity reaches the rated load and implement		
	corresponding adjustment through the flood valve adopted in the hydraulic station		
28	Inspect whether all the labels are clear and intact		
29	Check if there is abrasion between shaft and bearing of front and rear fork.		
30	Check if there is deformation or check if there is deformation or fracture on the upper		
	and down connecting rod.		
31	Check for looseness of each joint.		
32	Add lubricating grease to the pin roll.		
2000-hc	ur/12-month maintenance		
After op	erating for 2000 hours in total, the truck should also be maintained according to the		
following	following procedures in addition to the 50-hour maintenance, 250-hour maintenance, 500-hour		
mainten	ance and 1000-hour maintenance mentioned above		
33	Check hydraulic oil level.		
34	Replace hydraulic oil.		
35	Visually inspect the chassis, fork for damage, cracks or deformation.		

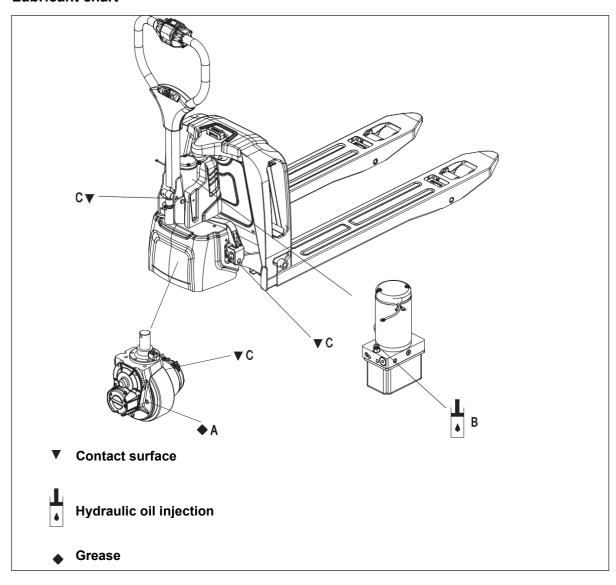
## **i** NOTE

If the truck is used in an extreme environment (such as excessive heat, excessive cold or areas with high dust concentrations), the time intervals given in the maintenance tables should be reduced accordingly.



### **5.4 Lubrication Points**

### **Lubricant chart**



Code	Туре	Specification	Amount	Position
A	Grease 3#(MoS₂)	-	110 grams	Gearbox
В	Anti-wear hydraulic oil	L-HM32	210-250ml	Hydraulic System
С	Multi-purpose grease	Polylub GA352P	Appropriate amount	Contact Surface

**i** NOTE

Add hydraulic oil till you can't hear explosion sound during lifting any more.



### 5.5 Maintenance Instructions

### Prepare the truck for maintenance and repairs

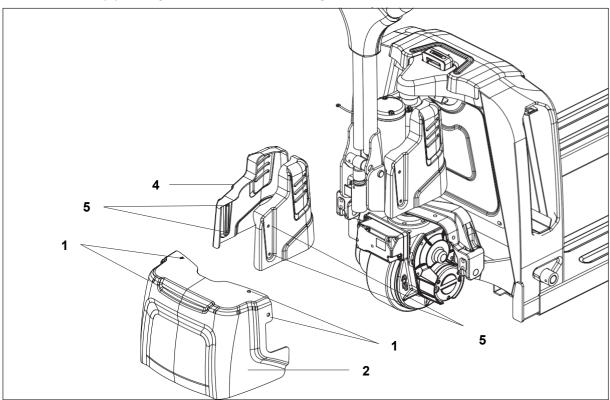
All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

Park the truck securely (See Page 27 Section "4.2.8 Parking the truck securely"). Remove the key to prevent the truck from accidentally starting.

When working under a raised lift truck, secure it to prevent it from tipping or sliding away.

### Remove the cover

- Unscrew the four screws (1) and remove the driving cover (2).
- Swivel the control handle 90° and unscrew hydraulic cover (4) by removing the four screws (5) through the accessible openings.



### **⚠** WARNING

Remove or install the drive cover, carefully clip hand!

When the drive cover is removed, it is dangerous and does not allow operation of the truck.

### Checking the gear oil level and replace gear oil

Prepare the truck for maintenance and repairs (See Page 46 Section "5.5.1 Prepare the truck for maintenance and repairs").

Remove the cover

Add grease of the correct grade (See Page 45 Section "5.4 Lubrication Points"). Add transmission oil every 500 operating hours, or at least annually.

Re-installation in the reverse order.



### Checking and replace hydraulic oil

- Prepare the truck for maintenance and repairs (See Page 46 Section "5.5 Maintenance Instructions").
- Remove the hydraulic cover (See Page 46 Section "5.5.2 Remove the cover").
- Disconnect the return pipe and connector (1).
- Prepare a measuring tool, such as a round rod with a diameter of less than 8 mm and a length of approx. 100 mm.
- Insert the measuring rod vertically into the oil reservoir through the filling port. The hydraulic oil level should be 30–40 mm below the top edge of the port.
- If the oil level is too low, carefully top up with the manufacturer-approved hydraulic oil until the specified level is reached
- Reinstall all removed components in reverse order.



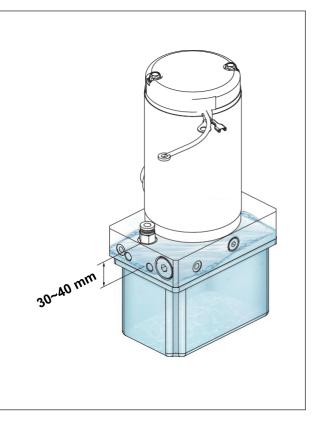
to corrosion.

Prohibit the amount of hydraulic oil cannot overflow the refueling port.

The round rod should be clean and resistant

### **Checking electrical fuses**

- Prepare the truck for maintenance and repairs.
- Check condition and rating of the fuses in accordance with your parts manual or service manual.

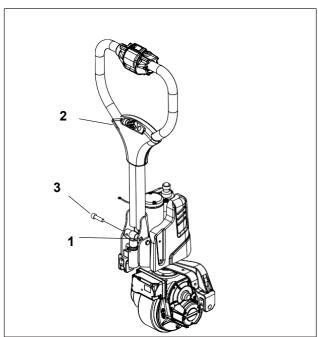


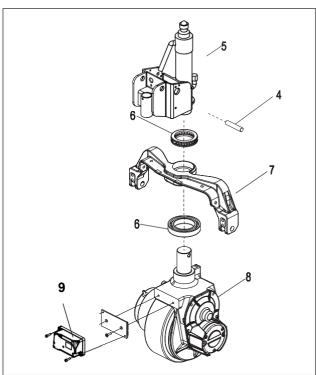


### **Drive Wheel-Removal and Installation**

### ► Removal

- Prepare the truck for maintenance and repairs (See Page 46 Section "5.5.1 Prepare the truck for maintenance and repairs").
- Remove the cover (See Page 46
- Section "5.5.2 Remove the cover").
- Unscrew the pin (1) and remove the controller assembly (2)
- Unscrew the two screws (3) to separate the hydraulic unit from the cylinder (5).
- Disconnect the elbow wire harness from the main wiring harness.
- Disconnect the interlock switch from the main wiring harness.
- Disconnect the E-brake from the main wiring harness
- Remove the controller (9) from the drive motor.
- Unscrew the heavy-duty flex pins (4) and remove the cylinder (5) from the drive motor.
- Tap the drive assembly (8) downward using a hammer and remove the two bearings (6).

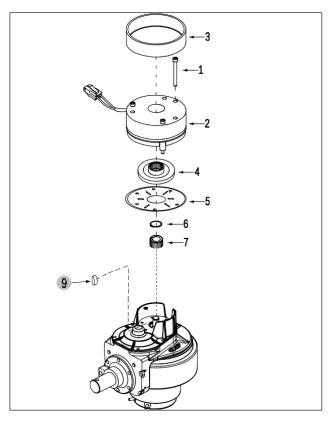






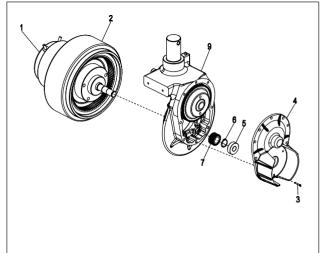
### **Electromagnetic Brakes**

- Disconnect the truck from the power supply and unplug the brake connectors
- Remove the three mounting screws (1)
  using a wrench. Remove the
  electromagnetic coil (2) and dust cover (3).
- Remove the brake pads (4) and friction plates (5) in sequence.
- Use circlip pliers to remove the circlip (6) from the shaft. Then remove the brake gear (7)



### **Drive Wheel**

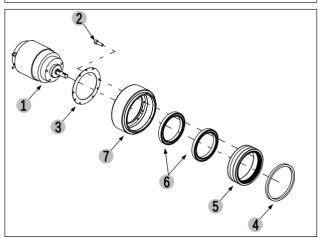
- Disconnect the motor cables.
- Loosen the screws (3) with a wrench and remove the gearbox cover (4).
- Remove the oil seal (5) and circlip (6), then remove the gear (7).
- Unscrew the screws (8) and tap out the drive wheel assembly (2) from the gearbox housing (9).



- Tap out the drive motor (1) from the assembly (2)
- Unscrew the nine screws (2) with a wrench and remove the mounting plate (3)
- Remove the oil seal (4) and gear ring (5) by tapping them out
- Remove the two bearings (6) from the wheel (7).

### ► Installation

Reassemble all components in the reverse order of disassembly.



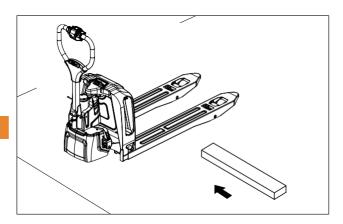


### Load Wheels-Removal and Installation

Park the truck safely in accordance with the regulations, lift the vehicle slightly with lifting equipment, and place the wooden wedge pads under the frame near the load wheels so that the load wheels are suspended.

### **⚠** WARNING

Ensure that the lifting equipment is solid and sturdy and that the lifting load is greater than the total weight of the vehicle.



### **⚠** CAUTION

When replacing the wheels, care must be taken to ensure that the truck does not tilt.

### Removal

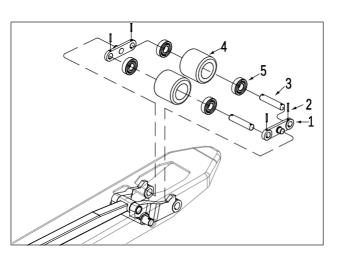
- Remove the coiled elastic cylindrical pin (2) within the wheel bridge (1) with an ejector pin.
- Turn the wheel bridge to vertical direction, knock out the wheel pin shaft (3) from side, and remove the load wheel and bearing assembly.
- Remove the bearing (5) of load wheel (4) with hammer and jacking equipment.

### ▶ Installation

- Install according to the reverse order of removal.
- Run the truck to see if the load wheel isfunctioning properly. If there is blocking or noise, please install again.

### / CAUTION

When installing, please apply appropriate amount of grease on the axle first.





### **Caster - Removal and Installation (optional)**

### ▶ Removal

- Prepare the truck for maintenance and repairs (See Page 46 Section "5.5.1 Prepare the truck for maintenance and repairs").
- Remove the cover (See Page 46
- Section "5.5.2 Remove the cover").
- Unscrew two screws (1), then remove the caster (2).

### **▶** Installation

Install according to the reverse order of removal.

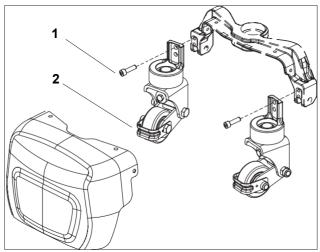
### ▶ Adjustment

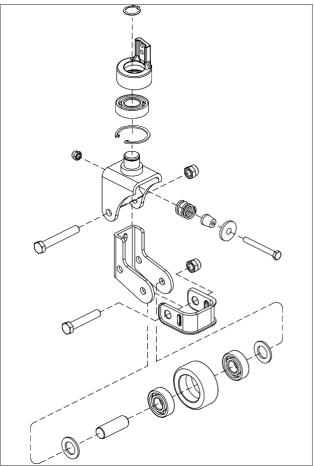
Park the truck with replacement completed on level ground to see if the casters and drive wheel can both be in contact with the ground.

When the truck is running, check if the caster is functioning properly.

After long time of use, the drive wheel will wear and tear to certain level, at this time, adjust the height of caster through increasing or decreasing the number of adjustment shims to make the two casters and drive wheel to be in close contact with the ground.

Upon maintenance or replacement for parts of the caster, please refer to figure:







### 5.6 Decommissioning the trucks

If the truck is to be out of service for more than a month, it must be stored in afrost-free, clean, dry location and 0-40°C condition. All necessary measures must be taken before, during and after decommissioning as described hereafter.

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.

### Prior to decommissioning

Clean the truck thoroughly.

Check the hydraulic oil level and top up if required.

Apply a thin layer of lubricating oil or grease to all nonpainted mechanical components.

Lubricate the truck in accordance with the lubrication schedule.

Charge battery.

[i]NOTE

Do not cover the truck with plastic film as it may gather water vapour.

### / CAUTION

If the battery is not used for a long period of time, it can become damaged through discharge.we recommend charging the battery every two month for lead-acid battery/ three month for lithium-ion battery.

### Restoring the truck to operation after decommissioning

Thoroughly clean the truck.

Clean the battery. Grease the pole screws using pole grease and reconnect the battery. Recharge the battery.

Check if the hydraulic oil contains condensed water and change if necessary. Follow the daily checklist.

### Final decommissioning, disposal

Final, proper decommissioning or disposal of the truck must be performed in accordance with the regulations of the country of application. In particular, regulations governing the disposal of batteries, fuels, hydraulic oil, plastic 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.

**INOTE** 



### Disposal of consumables

Materials that have to be disposed of following maintenance, repair and cleaning must be systematically collected and disposed of in accordance with regulations. Observe the national regulations for your country. Work may only be carried out in areas designated for this purpose. Take care to minimise, as far as possible, any impact on the environment.

- Any spillage of fluids such as hydraulic oil, brake fluid or gear lubricant oil must be
- immediately soaked up with an oil-binding agent.
- The regulations for disposal of used oil are applicable.
- Any spillage of battery acid must be neutralised immediately.

Disposing of components and batteries	Disposing	of com	ponents :	and	batteries
---------------------------------------	-----------	--------	-----------	-----	-----------

The truck is made up of different materials.

if components or patteries must be replaced and scrapped, they must be:
disposed of treated or recycled in accordance with regional and national regulations.
i NOTE
The documentation provided by the battery manufacturer must be observed when disposing of
batteries.

THO IE
We recommend working with a waste management company when disposing of components
and hatteries



## 6 Troubleshooting

If the fault cannot be rectified after carrying out the remedial procedure, notify the Manfacture's sevice department, as any further troubleshooting can only be performed by specially trained and qualified service personnel.

Fault	Probable Cause	Action
Truck does not start.	-Battery connector not plugged in -Key switch in "0" position -Incorrect LED Fault indicator -Battery charge too low -Faulty fuse -Truck in charge mode	-Check the battery connector and connect if necessarySet key switch to "I" -Check LED Fault indicator -Check battery charge, charge battery if necessary -Check fusesInterrupt charging
Load cannot be lifted	-Charging capacity below 15% -Truck not operational -Hydraulic oil level too low -Faulty fuse	-Charging the battery -Carry out all measures listed under "Truck does not start" -Check the hydraulic oil level -Check fuses.



## 7 Lithium battery

### 7.1 Lithium Battery Use and Maintenance

Information on the conformity of lithium-ion batteries

The manufacturer of the lithium-ion battery and manufacturer group provider declares that: the lithium-ion battery conforms with the provisions of the following

EU directive 2014/30/EU in accordance with EN12895.

This declaration of conformity with EU directives applies only to battery use that conforms to the recommendations described in the operating instructions.

### Special lithium-ion safety rules

### **⚠** Danger

There is a risk of fire.

Use water-based extinguishers, CO2, dry chemical fire extinguishers.

### **⚠** Danger

- Electrical danger
- Do not open the battery. Electrical risk.
- Only the After-Sales Service Centre technicians can open the battery.

### ▶ It is necessary to respect the following guidelines:

Read the documents provided with the battery carefully.

Only persons who have been trained to work with lithium-ion technology are permitted to work on the batteries (for example After-Sales Service Centre technicians).

Do not place lithium-ion batteries on or near flames or hot heat sources (> 65°C). This may cause the batteries to overheat or burst into flames. This type of use also impairs the performance of the batteries and reduces their service life.

Improper use may cause overheating or serious injury. Respect the following safety rules:

- Never short circuit the battery terminals
- Do not reverse the battery polarity
- Do not open the battery
- Do not submit the battery to excessive mechanical constraints

### Intended use

- Operational application temperature 0° C-40° C, humidity < 80%.</li>
- Charging application temperature 5° C-40° C.
- The battery's maximum operation altitude is up to 2000m.
- The truck shall not be used in a potentially explosive atmosphere or in an especially dusty environment.



### Reasonably foreseeable misuse

- Never short circuit the battery terminals.
- Do not reverse the battery polarity.
- Do not overcharge.

#### **Accessories**

Do not use a charger that is not released by manufacturer for lithium-ion battery.

### **BMS (Battery Management System)**

- The manufacturer battery management system (BMS) for a lithium-ion battery is crucial for the safety and performance of the system. Here are the most important features and functions:
- Current, voltage and temperature monitoring: the BMS continuously monitors the charging current, battery voltage and temperature of the cells, as well as the individual modules, during the charging and operating cycle.
- Differentiation for cells and modules: The BMS can differentiate between the individual cells and modules and monitor and control individual parameters for each cell or module to ensure even utilization and optimum performance.
- Safety shutdown: If safety limits are exceeded, such as critical temperatures, currents or voltages, the BMS safely shuts down the system to prevent damage to the battery and ensure safety.
- Output of error codes with corresponding action: The BMS recognizes errors and outputs corresponding error codes. Depending on the severity of the fault, the BMS can take measures such as issuing warning messages or switching off the system.
- Permanent communication with the vehicle's CAN bus: The BMS communicates continuously with the vehicle's Controller Area Network (CAN) bus to exchange important data and ensure that the BMS and other vehicle systems work in a coordinated manner.

### **Battery Usage Guidelines and Manufacturer Compliance**

The use of batteries must comply strictly with the manufacturer's instructions. Any modification to lithium batteries or their associated safety devices is prohibited without prior written approval from the manufacturer. Only original spare parts that meet the manufacturer's quality standards may be used to ensure safe operation and compliance. The manufacturer accepts no liability for malfunctions, damage, or accidents resulting from the use of non-original components.

For additional details, refer to the lithium battery warranty terms and applicable contractual agreements



### 7.2 Warning Indications

Always follow the battery manufacturer's instructions. Keep operating instructions clearly visible near the battery charger Immediately remove the battery from service if any fault or abnormality is detected. Contact the manufacturer's service department for evaluation.



Wear protective equipment (e.g. safety goggles and gloves) when handling battery cells or packs!



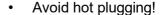
- Do not smoke or allow fire or glowing materials near the battery.
- Keep away from open flames, sparks, hot surfaces, and metal objects.
   Lithium-ion batteries are flammable and may explode under certain conditions!



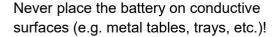
- Avoid short circuits.
   Never connect terminals directly or allow tools to bridge them
- Do not expose the battery to impact, crushing, or excessive vibration. Mechanical damage may lead to internal short circuits!

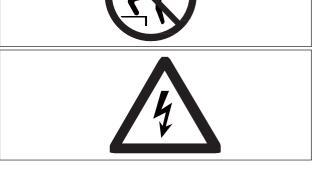


Don't trample on the battery to prevent it from fierce shaking or shacking!



- Danger: High voltage.
- Do not place objects or tools on top of battery cells. Metal tools can cause short circuits or injury





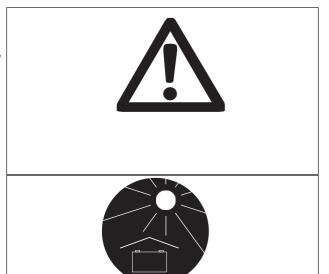




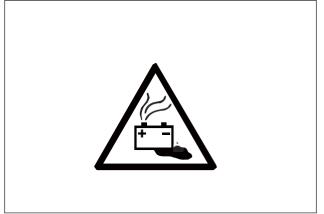
- Do not knock over the battery!
- Use only approved lifting and transport devices. Protect the battery cell, connectors, and cables from damage during handling!
- If the materials leak out, do not inhale the fumes. Wear safety gloves!
- After completing work, wash your hands thoroughly.
- Protect the battery from direct sunlight and any form of heat radiation.
- Do not expose the battery to heat sources such as stoves, heaters, or hot surfaces.

Electrolyte fluid can be discharged if the battery is physically damaged. Electrolyte fluid is harmful and must not come into contact with the skin or eyes.

- Do not alter, strike, crush, compress, notch, dent, or modify the battery in any way.
- Do not open the battery, damage, penetrate, bend, heat or allow it to become hot, do not throw it on the fire, short or immerse it in or wash it with water.
- Do not drop it or allow anything to fall on it, do not store it or operate it in a microwave oven, kiln or pressure vessel etc.









### Labelling for Lithium-ion battery maintenance instructions





- Temperature requirements: charging:0~40°C discharging: -20~50°C.
- Must be charged when remaining charge is lower than 20%, avoid over-discharging.
- Remaining charge should be higher than 50% during short period of storage. Running the truck is strictly prohibited when in the case of short circuit, low voltage or high temperature.
  It is recommended to be fully charged at least once a week during normal use.
- When it is not going to be used for more then 3 months, you should ensure that the battery is recharged once a month.
- Handle gently, do not throw, roll or collide.

## WARNING

- 1.Do not use or store this truck below 20% state of charge!
- 2. Strictly follow the battery maintenance instructions found in the operation manual!



Item	Description
1	The use of the battery is strictly prohibited when leakage between the communication terminal at the bottom of the battery and the charging/discharging pins, or when leakage is present in the gaps around the pins.
2	The use of the battery is strictly prohibited if there are visible impact marks, cracks, or traces of damage on the battery.
3	The use of the battery is strictly prohibited if it emits pungent odors, exhibits housing swelling at the mid-joint, or shows abnormal swelling/bulging of internal cells
4	The use of the battery is strictly prohibited if the connector pins burnt, deformation, ablation



### 7.3 Potential hazards

- No hazards are anticipated if the equipment is used correctly.
- Do not use the equipment for anything other than its intended purpose.
- The following hazards can arise in the event of improper use:

### Physical damage

This can occur if a battery falls or is deformed through pressure (e.g. truck forks penetrate the battery housing).

Mechanical damage includes cracks, breakage, splinters or holes in the battery housing. This type of damage may be caused by a short circuit inside the battery, which may result in harmful materials leaking, fire or battery explosion.

### **Short circuits**

These may be caused by connecting the two battery terminals (e.g. battery immersed in water)

### **Temperature effects**

High temperatures caused for example by sunlight or being store in warm locations (e.g. near ovens) can result in harmful materials leaking, fire.

In order to avoid fire and leakage of harmful materials, a safe place for storing batteries must satisfy the following criteria:

- Do not store in places often frequented by personnel.
- Do not store in places where valuable objects (e.g. cars) are stored.
- Fire extinguisher must be available to put out any fires.
- Small amounts of discharge from a single battery are not critical to the environment. Above- average natural ventilation is required in this case.
- No ventilation intake pipes should be in the vicinity, as discharged content could spread within a building.

### Examples of where to store a non-functional battery

- Roofed outdoor position.
- · Ventilated container.
- Covered box with pressure and smoke discharge option.

#### Fire hazard

### **⚠** WARNING

Physical damage, thermal effects or incorrect storage in the event of a defect can result in fire. Since the extinguishing of burning lithium-ion battery systems with suitable extinguishing agents, the responsible fire brigade should be informed in advance or the company fire. Fire protection assistants should be trained accordingly.

## **i** NOTE

A suitable method is cooling down cooling with water. Accordingly the parking area and charging stations should be equipped with extinguishing facilities.



### **⚠ DANGER**

There is a risk of fire.

Use water-based extinguishers, CO2, dry chemical fire extinguishers.

### Material discharge

### ► Battery electrolyte fluid can be hazardous

Electrolyte fluid can be discharged if the battery is physically damaged. Electrolyte fluid is harmful and must not come into contact with the skin or eyes.

If it does, rinse the affected parts with plenty of water and seek medical assistance immediately.

In the event of skin irritation or if any substances are breathed in, seek medical assistance immediately.

In the event of inhalation bring the affected person into the fresh air and keep them still.

### ▶ Precautionary measures for personnel

- Keep personnel away and facing the wind.
- Block off the affected area.
- Ensure there is adequate ventilation.
- Wear personal protective equipment.
- If vapours / dust / aerosols are present, use self-contained breathing apparatus.

### ► Precautionary measures for the environment

Do not allow spilled fluids to enter the water system, drainage system or the underground water.

### ▶ Cleaning measures

The leaked fluid must be removed professionally by the operating company on the basis of a risk assessment and disposed of in the correct manner. The fire brigade, the Agency for Technical Relief or similar institutions must be used. Absorb residues with liquid-absorbent material (such as vermiculite, sand, universal binders and pebble grain).

### 7.4 Touch voltage hazard

### **WARNING**

Touch voltage hazard!

Hazardous touch voltages may occur in the event of a technical or mechanical defect on the battery. Touch voltages also occur on seemingly discharged batteries. Touching the battery terminals or live attachments (battery cable, battery connector etc.) can result in dangerous current flows through the body. There is a risk of serious, irreversible or fatal injuries.

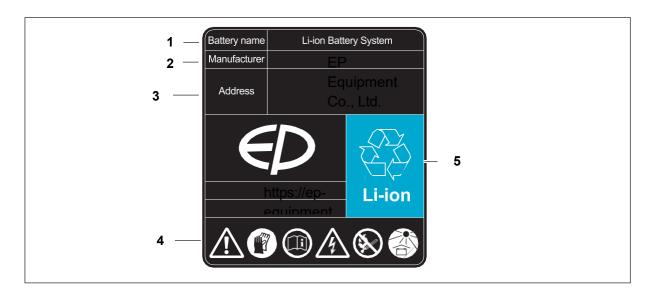
- Tag out the faulty battery and take out of service.
- Do not touch faulty batteries
- Do not place any objects or tools on the lithium-ion battery to avoid short-circuiting
- the battery.
- Do not short-circuit the lithium-ion battery.
- Notify the customer service department.



## 7.5 Nameplate

## Nameplate

Item	Description
1	Battery name
2	Manufacturer
3	Address
4	Warning Indications
5	Recycle sign



## **i** NOTE

The label position is subject to the actual lithium-ion battery.



# 7.6 Information on the conformity of lithium-ion batteries:

- 1) Regulation (EU) 2023/1542 in Articles 6, 10 and 13.
- 2) Directive 2011/65/EU including amendment (EU)2015/863 in the latest valid version.
- 3) EMC Directive 2014/30/EU in the latest valid version in the harmonised standards EN 12895:2015+A1:2019, EN IEC 61000-6-2:2019 and EN IEC 61000-6-4:2019.
- 4) The harmonised standard EN 62619 in the latest valid version and to the harmonised standard EN 1175:2020 Annex C.2 as energy sources for industrial trucks.
- 5) If a radio system is installed, we declare that it complies with the RED Directive 2014/53/ EU.

# 7.7 Lithium-ion battery routine inspection

# **⚠** CAUTION

The following items should be checked every day.

Daily inspection items /Additional servicing work to be performed every 1000 hours or every 6 months.	Troubleshooting
Liquid leakage and corrosion at the charging/ discharging contacts at the bottom of the battery	Stop using the battery and handle in accordance with the chapter "7.10 Hazard of faulty or discarded battery and
Signs of liquid leakage at the bottom of the battery  Case broken	recycle".
Swollen battery	
Connector pins burnt, deformation, ablation	Contact your authorised dealer to replace the contacts or Connector pins should be performed by a certified technician

### 7.8 Instructions on faulty batteries inspection

### **△DANGER**

Faulty batteries may cause short circuits and lead to fires. To eliminate potential safety hazards and avoid unnecessary economic losses and other consequences, daily inspection is required · please act in strict accordance with the guidelines.

### 7.9 Checking batteries for signs of malfunction

- Whether there is any leakage between the communication terminal and charging/discharging pins at the bottom of the battery, and in the gaps around the pins.
- Check whether there are pungent smells.
- Check the middle connection of the body for swelling of the housing or internal cells abnormal expansion, bulge
- · Check whether there are crack or damage
- Check the battery for signs of impact and damage.



### 7.10 Hazard of faulty or discarded battery and recycle

Please monitor the battery status when in use and in storage. If you find any broken batteries, electrolyte leakage, abnormal expansion or pungent odors due to shipping damage or abnormal vibration, please stop use immediately and keep at least a 5 meter perimeter around the effected batteries. Please dispose of the damaged batteries properly and contact a recycling company to recycle the batteries (See chapter 10 Instructions for disposal). For batteries that are under manufacturer warranty policy, manufacturer will access the warranty claim according to your submission of the battery nameplate photo. During the period waiting for disposal or recycle, please stock damaged and old batteries carefully by following instructions:

- 1. Damaged and discarded battery temporary storage needs to be placed in an iron or plastic container with water that can cover whole battery at least 5 days (The battery may emit smoke when immersed in water. This is the process of consuming energy by the leaking battery, which is a normal reaction).
  - Keep the container and batteries outdoors and 5 meters away from other things, especially
  - flammable items.
  - Use protective gloves when putting batteries in or out of water.
  - Do not stack damaged or old batteries.
- 2. For big battery with inner and outer boxes structure, Keep the batteries outdoors at least 5 days and contact a recycling company to recycle the batteries. Place the faulty batteries outdoors in an open and shaded area, this area must be well-ventilated and be equipped with fire equipment.

# 7.11 Charging

ion batteries.

When charging, make sure the battery charger is turned OFF before connecting the battery charging cables. Lithium-ion batteries allow for fast charging, if the battery does not charge completely in a normal period or if the battery management system (BMS) indicates a fault, then remove the battery from service. Manufacturer recommends to opportunity charge lithium-ion batteries.

This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.

The positioning of chargers offers new possibilities compared to lead-acid batteries. For instance, they can be placed in parking spaces near break rooms. Furthermore, there is no hydrogen outgassing during the charging and discharging process, which contrasts with lead-acid batteries. During the charging and discharging process, no technical measures are needed for ventilation or air circulation due to the absence of hydrogen outgassing with lithium-

However, fire protection regulations remain consistent with those for lead-acid battery chargers, requiring a minimum distance of 2.5 meters from combustible materials.



# **i** NOTE

The workplace regulations must be observed (emergency exits, escape routes, traffic routes, ... must be kept clear).

# **!** CAUTION

- No metal objects should be placed on the battery.
- Be careful of short-circuiting the battery!
- No modification of the lithium-ion battery connector.
- Do not use irregular charging sockets.
- The necessary extinguisher (yellow sand and powder fire extinguisher) should be equipped around the charger so that emergency extinguishing can be carried out under extreme conditions.
- Do not modify or disassemble the charging port and charging equipment, which may result in
- charging failure and fire.
- After the charging is finished, do not disconnect the charging device when it is wet or
- standing in the water, as this may cause electric shock and cause personal injury.
- To avoid damage to charger cord plug and receptacle, do not pull on charger cord plug. Do
  not twist, rock or bend plug sideways. Do not use if plug or receptacle is damaged. Loose or
  feels hot otherwise fire, property damage or personal injury may result.
- Connect only properly grounded AC outlet. Do not touch uninsulated protion of output connector or uninsulated battery terminal. Never try to change a frozen battery. There's the danger of explosion!

Maintenance and repair must only be carried out by a qualified specialist who is familiar with the dangers involved and aware of relevance regulations.

### 7.12 Storage

Try to ensure that the battery or battery pack's power is  $\geq$ 50% before long-term storage as the battery has the function of self-discharge, be sure to charge the battery once every 2 months to ensure the battery power is  $\geq$ 50%.

The battery should be stored in a temperature environment of 0°C~40°C.

The battery in a dry, ventilated and cool environment, avoid direct sunlight, high temperature, high humidity, corrosive gas, severe vibration, etc.

DO NOT stack, stacking of the batteies is not allowed.

Disconnect the batteries from other electrical items before storage, it is prohibited to have any form of discharge behavior during storing.

If the battery is found to be bulged, cracked, or has a low voltage value after long-term storage, the battery may be damaged. please contact the relevant technical department of the company for technical support.

After not using the battery for a long time, do not charge or discharge the battery if the smell of leakage is found near the battery.

### **⚠** WARNING

- Do not store used batteries for a long time.
- No load bearing, squeezing and contact stacking when storing batteries.
- Do not place batteries near cargo warehouses or near flammable and explosive dangerous goods.



### 7.13 Transportation

Before transporting any lithium-ion battery, check the current regulations on the transport of dangerous goods. Comply with these when preparing the packaging and transport. Train authorised staff to dispatch lithium-ion batteries.

# **INOTE**

It is recommended that the original packaging is kept for any subsequent dispatch. A lithium-ion battery is a special product.

Special precautions should be taken when:

Transporting a truck packed with Equipment or Lithium batteries contained in Equipment

- Transporting only the lithium battery
- A class 9 danger label must be affixed to the packaging for transport.

It is different if the battery is transported on its own or in a truck. An example of a label appears in this supplement(see figure below). Refer to the latest current regulations before dispatch as the information might have changed since this supplement was written. Special documents must be sent with the battery. Refer to the applicable standards or regulations. The applicable IATA, ADR and IMDG regulations must be observed during transport.

For UN3480	Lithium-ion Batteries	
For UN3481	Lithium-ion Batteries packed with Equipment or Lithium batteries built into Equipment	Fig0000-00080OM

### **⚠ WARNING**

Do not pack higher than 1.2 m above the floor of the container and secure properly.

# **i** NOTE

"Overpack" is the name for the outer packaging of the dangerous goods.

# **i** NOTE

Recharge the lithium-ion battery before transporting it taking account of the transport mode (sea, road,air). Excessive discharge on arrival could damage the performance of the battery.

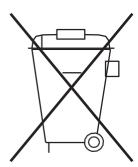
### Shipping faulty batteries

To transport these faulty lithium-ion batteries, contact the manufacturer's customer service department. Faulty lithium-ion batteries must not be transported independently.



### 7.14 Instructions for disposal

- Lithium ion batteries must be disposed of in accordance with the relevant environmental protection regulations.
- Used cells and batteries are recyclable economic goods. In accordance with the
- mark showing a crossed rubbish bin, these batteries may not be disposed of as domestic waste. Return and / or recycling must be ensured as required by the
- Batteries Legislation.
- The method of battery recovery and reuse can be discussed with our company.
- We reserve the right to change the technology.





# ► The requirements of recycling

- Only authorized manufacturer dealers who have attended the after sales training, are
- authorized to do repairs on manufacturer batteries.
- All Li-ion battery should be placed in safe place according to the manufacturer Li-ion battery Manual
- The transport of Li-ion battery must meet local regulation, manufacturer will supply UN38.3 and MSDS
- files according with UN and ADR regulation.
- The package of Li-ion battery before delivery must meet the UN 3480 or local carrier regulation.
- Used cells and batteries are recyclable economic goods. In accordance with the mark showing
  a crossed rubbish bin, these batteries may not be disposed of as domestic waste. Return and /
  or recycling must be ensured as required by the Batteries Act (Act regarding the
  commissioning, return and environmentally responsible disposal of batteries and
  accumulators). For battery disposal please contact the manufacturer's customer service
  department.



### 7.15 Common Problems and Solutions

During the use and maintenance of the lithium-ion battery, the battery or battery system may have one or more of the following abnormal conditions, please organize the professional engineers and technicians to perform the necessary processing according to the instructions in this manual. If you have any questions about the status or solutions, please contact your dealer or after-sales service department of the company to obtain professional technical support.

If the battery is found to have abnormal mechanical characteristics such as swelling, cracked casing, melted casing deformation and distortion of the casing before and during installation, stop using the battery immediately and store it separately.

If abnormalities such as looseness, cracks, in the insulation layer, burn marks, etc. of the battery's pole pressing bolts, conductive strips, main circuit wires and connectors are found before and during the installation, stop using the battery immediately, check the reason for analysis and give it a fix.

If the polarity of the positive and negative terminals of the battery is found not match the polarity identification before installation, please stop using the battery immediately and contact the after-sales service department to replace the battery or obtain other solutions.

If the temperature of the battery exceeds65°C before and during installation, stop using the battery immediately and leave it separately, if the temperature continues torise, it needs to be buried with sand.

If there is fire or smoke happens to the battery, move it to the open air immediately, evacuate people in time and contact a recycling company to recycle the batteries.

### 7.16 Service

### Cleaning

The manufacturer recommends to only use compressed air at less than 207 kPa (30 psi) or a slightly damp towel to clean the battery. The battery, or its charging station, may be equipped with fans, heat sinks, or other cooling devices that require periodic cleaning. Always know and follow the battery manufacturer's recommendations for cleaning and service.

### **Optimize Battery Life**

Always use and follow the battery management system (BMS). The BMS is the electronic system that monitors battery data and use that data to its operating environment to influence the battery's safety, performance, and service life. It also functions as a safety cut-off device in case of overcharging, overcurrent, or overheating. Lithium-ion battery life is greatly reduced if used outside a temperature range of 0°C to 40°C (32°F to 104°F) or in an environment with greater than 85% humidity. Manufacturer recommends to opportunity charge lithium-ion batteries.

This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.



# Maintenance table

No.	Maintenance content	Method of operation	Note	Frequency
1	Check if battery capacity is too low	Check instrumentation SOC display	Make sure the battery is not stored without charge for a long time. If the battery system needs to be put on hold for a long time, it is best to keep the battery in half power state and charge the battery every 3 months to ensure that the battery system is in half power state.	Everyday
2	The battery pack charge and discharge current	Check instrumentation display	make sure battery pack charge and discharge current meet with operation manual	Everyday
3	Connector pins at the bottom of the battery(if necessary)	Perform a visual inspection	If any ablation or deformation occurs in daily inspection, the battery connector pins should be replaced in time.	Everyday
4	Check whether the appearance is deformed, whether the surface is oxidized, paint removing, the mounting position is offset, and the cabinet is damaged.	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday
5	Check the entire battery as well as the surface beneath it for signs of fluid leakage.	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday
6	Clean the lithium battery and charger with a dry cloth or compressed air.	Perform a visual inspection, Wear insulated gloves and shake it gently	Make sure it tight	weekly

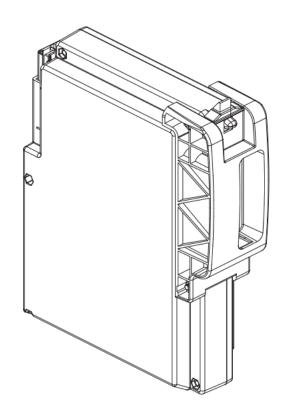


No.	Maintenance content	Method of operation	Note	Frequency
7	Whether the external wiring harness has worn, imprint, creases and exposed line core	Perform a visual inspection	Make the wiring harness fixed well	weekly
8	Check that the surface of lithium-ion battery looks clean	No dust, no water, no corrosion, oxidation, rust, etc.	Clean surface if you found dust, corrosion, oxidation, rust by using dustless cloth or air compressor ,water battery is strictly prohibited to use	weekly
9	Check that the outside screws of the battery are fastened	Torque wrench correction requires no loosening	Reinforce screws	weekly
10	Check for water or foreign matter in the plug and socket and check for rust or charring (if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
11	Check the cable for damage and loose joints (if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
12	Check the battery case for abnormalities such as cracks, deformation, and bulging.	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly

**i** NOTE

The manufacturer instrumentation is used for serviced.





ZL2420-91

# **Lithium-ion battery**

**Operation Manual** 

V1 07/25 (en-GB)



### **Foreword**

Thank you for buying our products.

The manual will show you the way of correctly using the battery as well as relevant preventive maintenance and safety operation. The battery should be operated only by well-trained professionals and by no means by non-working personnel. Operators are supposed to read through the manual before actually operating the battery.

# **Explanations on the manual**

With the continuous upgradation and improvement of our company's products, you may find a slight difference existing between your carrier and some introductions in the manual. All the information, specifications and illustrations in the manual are effective in times of printing and our company maintains the right to modify the specification (s) or design (s) of our products at any time without any beforehand notification.

### Relevant documents (e.g. operating instructions)

Depending on the application, other operating instructions (e.g. truck, battery charger) may have to be observed when operating the lithium-ion battery.

The execution, operating, warning and safety instructions in these operating

instructions must be observed and complied with at all times to prevent personal injury and material damage.

Observe additional device-related provisions and regulations.

### Safety notices and text mark-ups

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

# **↑** DANGER

Means that failure to comply can cause risk to life and/or major damage to property.

### **MARNING**

Please strictly adhere to these safety instructions to avoid personal injury or major damage to equipment.

### **⚠** CAUTION

Please pay attention to the important safety instructions.

# **INOTE**

Pay attention to Instruction.



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# 1 General

# 1.1 Lithium-ion battery Introduction

Lithium-ion (Li-ion) batteries have many advantages over traditional lead acid and other types of batteries. EP's Li-ion batteries are classified as LFP 'Lithium Iron Phosphate' or LiFePO4. The lithium-ion battery unit is composed of battery cells in series or in parallel; It is equipped with battery management system for monitoring and protecting the lithium-ion battery; The different or the same electrical connector design for charging and discharging; The circular meter shows data, error code, total voltage and temperature, ect. When stored, handled, and used properly, they also have a longer service life than other batteries have a higher power density, don't need a cooling down period, and can be opportunity charged. EP's priority is safety and establishing the following safety procedures for storing, handling and use of these batteries will help prevent fires and explosions. Companies training employees to recognize the hazards of Li-ion and other types of batteries as well as how to handle, store and manage them properly will help to avoid damage to the batteries resulting in possible fires and explosions.

This battery should not be used at a very low SOC (state of charge) status. To ensure the battery life, should avoid the discharge depth of more than 80% of the rated capacity of the battery. Whether it is partially discharged or fully discharged, the battery should be immediately charged.

Lithium batteries have a special charger and may not be charged with other types of battery chargers, so as not to charge lithium batteries. The new factory battery should not be discharged, it must be fully charged before use.

### 1.1.1 Proprietor responsibilities

For the purposes of these operating instructions, the "owner" is defined as any natural or legal person who either uses the lithium-ion battery himself, or on whose behalf it is used. In special cases (e.g. leasing or renting), the owner is considered to be the person who is to carry out the specified operational duties in accordance with existing contractual agreements between the proprietor and operator of the lithium-ion battery.

The owner must ensure that the lithium-ion battery is used only for the purpose for which it is intended and that dangers to life and health of the operator or third parties are excluded. Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The owner must ensure that all operators have read and understood these operating instructions.

### 1.1.2 Intended use

- Powering electric forklifts for material handling and logistics operations.
- Providing reliable energy storage for prolonged usage in warehouse environments.
- Enhancing efficiency and productivity in industrial settings.
- Facilitating indoor and outdoor material transportation tasks.
- Supporting sustainable operations through reduced emissions and maintenance requirements.

# i NOTE

Please note that using our lithium-ion batteries for purposes other than those specified above may compromise performance and safety. For inquiries regarding the intended use of our lithium-ion batteries for electric forklifts, please contact our After-sales service department.

1



# 1.1.3 Permissable operating conditions

The lithium-ion battery is intended exclusively for use in industrial trucks specified and approved by the manufacturer. Any other use beyond the scope of the above is not appropriate. The owner or user of the lithium-ion battery alone shall be liable for any damage arising from the above. Furthermore, any liability and warranty claims shall be rendered null and void.

- Operational application temperature 0° C-40° C, humidity < 80%;</li>
- Charging application temperature 5° C-40° C;
- The battery's maximum operation altitude is up to 2000m;

# **i** NOTE

Lithium-ion battery working temperature is divided into charging temperature requirement and discharging temperature requirement:

The charging temperature range is 0°C-40°C. A high-rate recharging operation below 0°C may lead to battery damage, so we recommend temperature range is 5°C-40°C;

The discharging temperature range is -20°C-55°C. If used in low temperature °C-20°C-0°C, battery discharge capacity will be smaller compared with the one in normal temperature condition, which is normal; battery used between 40°C-55°C in the long run will accelerate the aging of the internal material. It may shorten the service life of battery, so not recommended. So we recommend working temperature is 0°C-40°C.

### 1.1.4 Reasonably foreseeable misuse

- · Never short circuit the battery terminals.
- · Do not reverse the battery polarity.
- · Do not overcharge.

#### 1.1.5 Accessories

Do not use a charger that is not released by EP for lithium-ion battery.

### 1.1.6 BMS (Battery Management System)

- The EP battery management system (BMS) for a lithium-ion battery is crucial for the safety and performance of the system. Here are the most important features and functions:
- Current, voltage and temperature monitoring: the BMS continuously monitors the charging current, battery voltage and temperature of the cells, as well as the individual modules, during the charging and operating cycle.
- Differentiation for cells and modules: The BMS can differentiate between the individual cells
  and modules and monitor and control individual parameters for each cell or module to ensure
  even utilization and optimum performance.
- Safety shutdown: If safety limits are exceeded, such as critical temperatures, currents or voltages, the BMS safely shuts down the system to prevent damage to the battery and ensure safety.
- Output of error codes with corresponding action: The BMS recognizes errors and outputs corresponding error codes. Depending on the severity of the fault, the BMS can take measures such as issuing warning messages or switching off the system.
- Permanent communication with the vehicle's CAN bus: The BMS communicates continuously with the vehicle's Controller Area Network (CAN) bus to exchange important data and ensure that the BMS and other vehicle systems work in a coordinated manner.



Integrated telemetry system (optional): In certain EP vehicle types, a lithium-ion battery is
equipped with an integrated telemetry system. This system records and transmits important
battery operating data, such as cell voltages, temperatures and currents. This telemetry
data can be accessed online and enables real-time monitoring and analysis of battery
performance.

### 1.1.7 Battery Usage Guidelines and Manufacturer Compliance

The use of batteries must strictly follow the manufacturer's instructions. Any modification to lithium batteries or their safety devices is strictly prohibited unless prior written approval is obtained from our company. Only original spare parts ensure compliance with the manufacturer's quality management standards. Our company shall not be liable for any vehicle malfunctions or accidents caused by the use of non-original spare parts. For more details, please refer to the lithium battery warranty agreement and relevant contract terms.



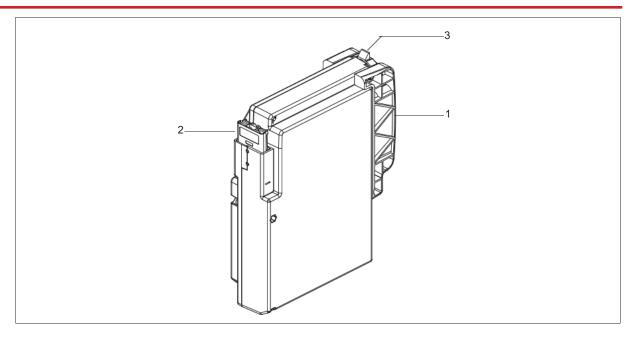
# 2 Lithium-ion battery description

# 2.1 Performance data for lithium-ion battery

# 2.1.1 Battery nominal data

	Battery cell			
1	Cell material	LFP		
2	Nominal Voltage	3.2V		
3	Voltage rang	2.6V~3.65V		
		Battery system		
1	Battery box size	298*237*76		
2	Weight	5kg±0.5kg		
3	Group method	Series-parallel connection method		
4	Rated voltage	25.6V		
5	Rated capacity	20Ah&25℃ 0.33C discharge		
6	Voltage rang	20V~29.2V		
7	Total enery	512Wh		
8	Rated charging current	10A		
9	Maximum charging current	20A		
10	Rated discharge current	20A		
11	Peak discharge current (60 seconds)	50A		
12	Ambient relative humidity	≤80%RH		
14	Standard discharge temperature range	-20℃~ 50℃		
15	Standard charging temperature range	0°C ~ 45°C		





Item	Description	Function	
1	Handle	The lithium-ion battery grip handle	
2	Integrated power interface	It provides connectivity to both power transfer ports and communication interfaces	
3	Battery locking tab	For installing and securing the battery	

# 2.1.2 Information for battery and charger

Battery type	Vlotage/Rated capacity	Dimensions	Weight	Charger
ZL2420-91	25.6V/20Ah	298*237*76	5kg±0.5kg	10A



# 2.1.3 Charger nominal data

1	Adaptive voltage	20-29.4V	
2	Output current	10A	
3	Intput voltage	185V-240V	
4	Output voltage	20-29.4V	
5	Output power	0.3kW	
6	Protected mode	Input overvoltage protection, input undervoltage protection, output overvoltage protection, output overcurrent protection, short circuit protection, product overtemperature protection, battery reverse protection, battery open circuit protection	
7	Communication function	CAN communication	
8	Charging port	TSBS75A plug-in	
9	Way to install	Place it in the right position and no installation is required	
10	Display	/	
11	Mechanical life	10000 times	
12	Operating temperature	-10℃ ~40℃	
13	Operating humidity	30%RH~50%RH	

# 2.1.4 BMS nominal data

	BMS management system function			
No.	No. Item Function Function description		Function description	
1		Monomer voltage detection	Accurate acquisition of all cell voltage data	
2		Total voltage detection	Accurate acquisition of total voltage data	
3	Inspection/	Temperature collecting	Accurate detection of battery temperature	
4	estimates	Current inspection	Accurate detection of charge-discharge currents	
5		SOC Estimate	Hall sensor is used to obtain the input and output current of the battery, and the SOC estimation of the battery is carried out by the method of Ampere-time integration	
6	Communication CAN communication		Communication and Debugging	
7		Short-circuit protection	Power circuit short circuit, contractor disconnect	
8		Over current protection	Over current occurs, contractor disconnect	
9	Protection function	Over charging protection	Over charge occurs, contractor disconnect	
10	Talloudin	Over discharging protection	Over discharge occurs, contractor disconnect	
11		Over temperature protection	Over temperature occurs, contractor disconnect	
12	Sleep wake	Sleep awakening function	Charge communication wake-up, battery switch button wake-up	

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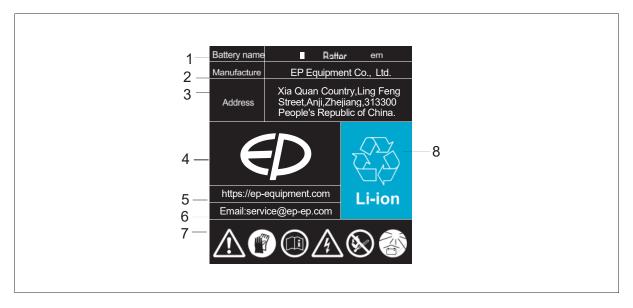
	BMS specification parameters				
No.	Item		Remark		
1	Working voltage range	20V~29.2V	Selection		
2	Normal power consumption	10mA	Stable		
3	Detection number of series	8 series	Selection		
4	Temperature detection points	2PCS	Selection		
5	Measurement range of cells voltage	2.4V~4.5V	Selection		
6	Measurement accuracy of cell voltage	±10mV	Selection		
7	Current detection accuracy	±1A	Selection		
8	Electricity display accuracy	±1%	Stable		
9	Temperature range	-45~100°C	Selection		
10	Temperature measurement accuracy	±1 ℃	Selection		
11	Equalizing current	42mA	Selection		
12	Communication functions	CAN	Selection		
13	low power consumption	20uA	Stable		
14	Working environment temperature range	-30℃~ 75 ℃	Stable		



# 2.2 Nameplate

# 2.2.1 Nameplate

Item	Description
1	Battery name
2	Manufacturer
3	Address
4	EP logo
5	EP website
6	EP email
7	Warning Indications
8	Recycle sign

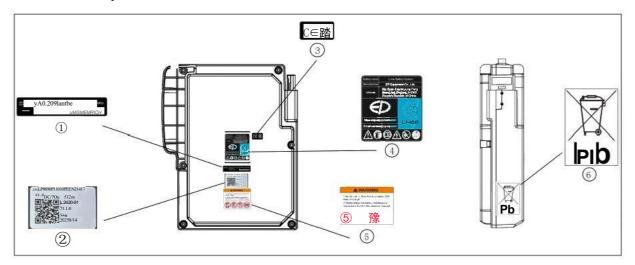


# **i** NOTE

The label position is subject to the actual lithium-ion battery.



# 2.2.2 Identification points



Item	Description
1	Jungheinrich information label
2	Remote link QR code label
3	CE/UKCA label
4	Nameplate for lithium-ion battery usage and maintenance instructions
5	Warning label
6	Pb battery classification collection label

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# 2.3 Information on the conformity of lithium-ion batteries:

- 1) Regulation (EU) 2023/1542 in Articles 6, 10 and 13.
- 2) Directive 2011/65/EU including amendment (EU)2015/863 in the latest valid version.
- 3) EMC Directive 2014/30/EU in the latest valid version in the harmonised standards EN 12895:2015+A1:2019, EN IEC 61000-6-2:2019 and EN IEC 61000-6-4:2019.
- 4) The harmonised standard EN 62619 in the latest valid version and to the harmonised standard EN 1175:2020 Annex C.2 as energy sources for industrial trucks.
- 5) If a radio system is installed, we declare that it complies with the RED Directive 2014/53/EU.

### 2.4 Battery lifetime and maintenance

# 2.4.1 Optimize Battery Life

Always use and follow the battery management system (BMS). The BMS is the electronic system that monitors battery data and use that data to its operating environment to influence the battery's safety, performance, and service life. It also functions as a safety cut-off device in case of overcharging, overcurrent, or overheating. Lithium-ion battery life is greatly reduced

if used outside a temperature range of 0°C to 40°C (32°F to 104°F) or in an environment with greater than 85% humidity. EP recommends to opportunity charge lithium-ion batteries.

This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.

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# 2.4.2 Maintenance table

No.	Maintenance content	Method of operation	Note	Frequency
1	Check if battery capacity is too low	Check instrumentation SOC display	Make sure the battery is not stored without charge for a long time. If the battery system needs to be put on hold for a long time, it is best to keep the battery in half power state and charge the battery every 2 months.	Everyday
2	The battery pack charge and discharge current(if necessary)	Check instrumentation display	Make sure battery pack charge and discharge current meet meet requirements	Everyday
3	Check the voltage and temperature of a lithium battery(if necessary)	Check instrumentation display	Make sure battery pack charge and discharge current meet meet requirements	Everyday
4	Connector pins at the bottom of the battery(if necessary)	Perform a visual inspection	If any ablation or deformation occurs in daily inspection, the battery connector pins should be replaced in time.	Everyday
5	Check whether the appearance is deformed, whether the surface is oxidized, paint removing, the mounting position is offset, and the cabinet is damaged;	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday
6	Check the entire battery as well as the surface beneath it for signs of fluid leakage.	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday



No.	Maintenance content	Method of operation	Note	
7	Clean the lithium battery and charger(if equipped) with a dry cloth or compressed air.	Perform a visual inspection, Wear insulated gloves and shake it gently	Make sure it tight	weekly
8	Whether the external wiring harness has worn, imprint, creases and exposed line core	Perform a visual inspection	Make the wiring harness fixed well	weekly
9	Check that the surface of lithium-ion battery	No dust, no water, no corrosion, oxidation, rust, etc.	Clean surface if you found dust, corrosion, oxidation, rust by using dustless	weekly
			cloth or air compressor ,water battery is strictly prohibited to use	
10	Check that the outside screws of the battery are fastened	Torque wrench correction requires no loosening	Reinforce screws	weekly
11	Check for water or foreign matter in the plug and socket and check for rust or charring(if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
12	Check the cable for damage and loose joints(if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
13	Check the battery case for abnormalities such as cracks, deformation, and bulging.	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly



# 3 Safety

# 3.1 It is necessary to respect the following guidelines

- The battery is not used at a loss of power. To ensure the battery life, should avoid the discharge depth of more than 80% of the rated capacity of the battery. Whether it is partially discharged or fully discharged, the battery should be immediately charged.
- Lithium-ion batteries have a special charger, may not be charged with other types of battery charger, so as not to charge lithium batteries
- The new factory battery should not be discharged, it must be fully charged before use.
- Only trained and authorized personnel are permitted to charge, service and replace the batteries.
- Do not place lithium-ion batteries on or near flames or hot heat sources (> 65°C). This may cause the batteries to overheat or burst into flames. This type of use also impairs the performance of the batteries and reduces their service life.
- It is forbidden to take out the battery in the charging state.
- It is forbidden to use and store the battery at low power (the use and storage of power loss will cause the early loss of battery system capacity and accelerate the service life of the battery pack);
- It is forbidden for unqualified personnel to dismantle and overhaul the battery system and supporting charger and other devices; the battery system is a dangerous product, and maintenance and replacement can only be performed by professionals;
- Do not hit, throw or trample on the battery, do not heat the battery, do not throw the battery into the water.
- Use carbon dioxide or dry powder fire extinguishers if the battery harness smokes and ignites. If the battery is on fire, use a high-pressure water gun to extinguish the fire at a long distance.
- If the connection of the battery pole is found to be oxidized, wipe it with a dry cloth and polishit with a fine sandpaper before use. Otherwise, it may cause poor contact and the function fails.
- Prohibit the use of strong static electricity and strong magnetic field, otherwise easy to damage the battery safety protection device, bringing security risks.
- Do not use this series of products with other models or types of batteries in series or in parallel; prohibit the entire system with lithium-ion battery protection circuit board or battery management system, the power system in series or in parallel operation, if necessary, please contact this Company technical department to obtain the correct technical support.
- When charging and discharging Try to avoid splashing water or other conductive objects on the battery cover and pole, such as exposure to heavy rain.
- Once inadvertently make some kind of conductor come into contact with the positive and negative poles of a single battery or battery pack at the same time to cause a short circuit, be sure to disconnect the circuit which causes the short circuit in the shortest time.
- Risk of fire or smoke: LFP batteries can leak / evaporate or decompose and release flammable electrolyte under the condition of 150 °C if they are improperly used or affected by the environment. Hydrogen fluoride (HF) and phosphorus oxides may form during fire, and chemical reactions between LIPF6 and water in the electrolyte will produce fluoride and carbon dioxide.



- Contact with eyes: Electrolyte inside the battery will cause eye irritation and inadvertent
  contact. Please do not rub it. Rinse immediately with plenty of water for at least 15 minutes.
  If necessary, please go to the hospital for treatment immediately. Otherwise it will hurt your
  eyes.
- Contact with skin: The electrolyte inside the battery may cause skin infections, inadvertent contact, take off contaminated clothing and wash the infection with plenty of water and soap for at least 15 minutes, do not rub the ointment.
- Inhalation: When the battery is leaked or ruptured, the internal components of the battery may cause mucus, edema and other respiratory tract problems, inadvertently inhaled, to fresh air and ventilated contaminated area. If necessary, oxygen or artificial respiration.
- Special Protection Tools: Use breathing apparatus to avoid inhalation of irritating gases. Wear protective clothing or other devices to prevent body contact with the electrolyte.
- Using lifting and delivery devices as specified. Prevent the battery cell, interface and connection cable from being damaged by the lifting hook!
- This lithium-ion battery may not be approved for your specific forklift. Only use a lithium-ion battery, if it has been approved by he forklift manufacturer for your forklift. The lithium-ion battery shall only be handled by trained and authorized personnel.

# **⚠ DANGER**

Failure to comply with these safety instructions can result in fire and explosion or the leakage of harmful materials.

# **/ WARNING**

Should such issues as failing to abide by the operation manual, failing to use the original parts for maintenance or damaging caused by users themselves occur, the quality guarantee will be invalid automatically!

# **!** DANGER

Electrical danger

Only the After-Sales Service Centre technicians can open the battery.



# 3.2 Warning Indications

Follow the operating instructions and keep them in a visible position near the battery charger. If any faults are found on the lithium-ion battery, immediately take it out of service and contact the manufacturer's customer service department.



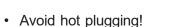
Always wear protective clothing (e.g. safety goggles and safety gloves) when working on cells and batteries!



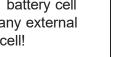
- No smoke and fire!
- · Avoid the existence of open fire, fiery metal wire or sparks around the lithiumion battery, otherwise explosion or fire disaster may occur!



- · Explosion or fire disaster is likely to occur; avoid short circuit!
- Keep the battery away from all fire sources, heat sources and flammable or explosive materials!



- · Dangerous voltage!
- · Notice: the metal part of the battery cell is electrified, so don't place any external object or tool on the battery cell!





Do not place the battery on top of conductive objects!



- Don't knock over the battery!
- Using lifting and delivery devices as specified. Prevent the battery cell, interface and connection cable from being damaged by the lifting hook!
- If the materials leak out, do not inhale the fumes. Wear safety gloves!
- Always wash your hands after completing the work. Use only insulated tools.

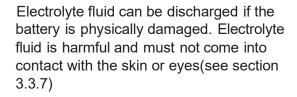


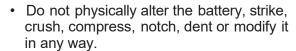


Don't trample on the battery to prevent it from fierce shaking or shacking!



- Protect the battery from solar radiation or other forms of heat radiation.
- Do not expose the battery to any sources of heat.

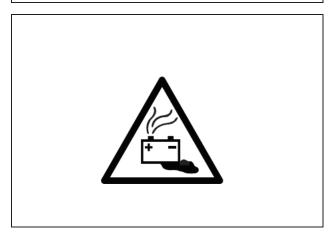




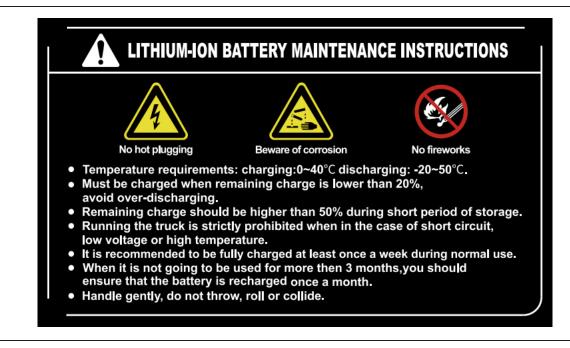
- Do not open the battery, damage, penetrate, bend, heat or allow it to become hot, do not throw it on the fire, short or immerse it in or wash it with water
- Do not drop it or allow anything to fall on it, do not store it or operate it in a microwave oven, kiln or pressure vessel etc.







### 3.2.1 Labelling for Lithium-ion battery maintenance instructions



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# !WARNING

- 1. Do not use or store this truck below 20% state of charge!
- 2. Strictly follow the battery maintenance instructions found in the operation manual!



Item	Description
1	The use of the battery is strictly prohibited when leakage between the communication terminal at the bottom of the battery and the charging/discharging pins, or when leakage is present in the gaps around the pins.
2	The use of the battery is strictly prohibited if there are visible impact marks, cracks, or traces of damage on the battery.
3	The use of the battery is strictly prohibited if it emits pungent odors, exhibits housing swelling at the mid-joint, or shows abnormal swelling/bulging of internal cells
4	The use of the battery is strictly prohibited if the connector pins burnt, deformation, ablation



### 3.3 Potential hazards

- · No hazards are anticipated if the equipment is used correctly.
- Do not use the equipment for anything other than its intended purpose.
- The following hazards can arise in the event of improper use:

# 3.3.1 Physical damage:

This can occur if a battery falls or is deformed through pressure (e.g. truck forks penetrate the battery housing).

Mechanical damage includes cracks, breakage, splinters or holes in the battery housing. This type of damage may be caused by a short circuit inside the battery, which may result in harmful materials leaking, fire or battery explosion.

#### 3.3.2 Short circuits:

These may be caused by connecting the two battery terminals (e.g. battery immersed in water)

### 3.3.3 Temperature effects:

High temperatures caused for example by sunlight or being store in warm locations (e.g. near ovens) can result in harmful materials leaking, fire.

In order to avoid fire and leakage of harmful materials, a safe place for storing batteries must satisfy the following criteria:

- Do not store in places often frequented by personnel.
- Do not store in places where valuable objects (e.g. cars) are stored.
- · Fire extinguisher must be available to put out any fires.
- There should not be any fire or smoke detectors in the vicinity in order to ensure that an automatic fire detection system is only activated in the event of actual danger (e.g. naked flames).
- Small amounts of discharge from a single battery are not critical to the environment. Above-average natural ventilation is required in this case.
- No ventilation intake pipes should be in the vicinity, as discharged content could spread within a building.

### 3.3.4 Examples of where to store a non-functional battery

- Roofed outdoor position.
- · Ventilated container.
- Covered box with pressure and smoke discharge option.

### 3.3.5 Fire hazard

### **↑** WARNING

Physical damage, thermal effects or incorrect storage in the event of adefect can result in fire.

Since the extinguishing of burning lithium-ion battery systems with suitable extinguishing agents extinguishing agents, the responsible fire brigade should be should be informed in advance or the company fire. Fire protection assistants should be trained accordingly.



# i NOTE

A suitable method is cooling down cooling with water. Accordingly the parking area and charging stations should be equipped with extinguishing facilities.

# **↑** DANGER

There is a risk of fire.

Use water-based extinguishers, CO2, dry chemical fire extinguishers.

### 3.3.6 Material discharge

### Battery electrolyte fluid can be hazardous

Electrolyte fluid can be discharged if the battery is physically damaged. Electrolyte fluid is harmful and must not come into contact with the skin or eyes.

If it does, rinse the affected parts with plenty of water and seek medical assistance immediately.

In the event of skin irritation or if any substances are breathed in, seek medical assistance immediately.

In the event of inhalation bring the affected person into the fresh air and keep them still. **Precautionary measures for personnel** 

- · Keep personnel away and facing the wind.
- · Block off the affected area.
- Ensure there is adequate ventilation.
- Wear personal protective equipment.
- If vapours / dust / aerosols are present, use self-contained breathing apparatus.

### **Precautionary measures for the environment**

Do not allow spilled fluids to enter the water system, drainage system or the underground water.

### Cleaning measures

The leaked fluid must be removed professionally by the operating company on the basis of a risk assessment and disposed of in the correct manner. The fire brigade, the Agency for Technical Relief or similar institutions must be used. Absorb residues with liquid-absorbent material (such as vermiculite, sand, universal binders and pebble grain).



# 3.4 Touch voltage hazard

# **MARNING**

Touch voltage hazard!

Hazardous touch voltages may occur in the event of a technical or mechanical defect on the battery. Touch voltages also occur on seemingly discharged batteries. Touching the battery terminals or live attachments (battery cable, battery connector etc.) can result in dangerous current flows through the body. There is a risk of serious, irreversible or fatal injuries.

- Tag out the faulty battery and take out of service.
- Do not touch faulty batteries
- · Do not place any objects or tools on the lithium-ion battery to avoid short-circuiting
- · the battery.
- Do not short-circuit the lithium-ion battery.
- · Notify the customer service department.



# 4 Operation

# 4.1 Lithium-ion battery routine inspection

# **ACAUTION**

The following items should be checked every day.

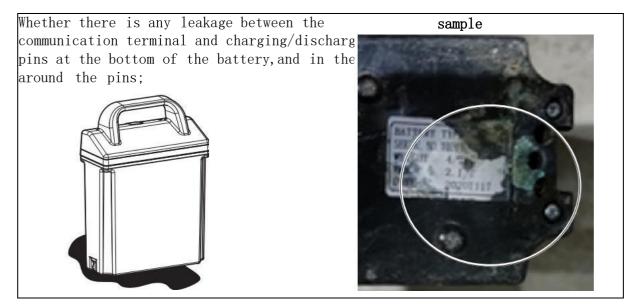
Daily inspection items IAdditional servicing work to be performed every 1000 hours or every 6 months.	Troubleshooting
la constant de la con	Stop using the battery and handle in accordance with the chapter "4.3 Hazard of faulty or discarded battery and
Signs of liquid leakage at the bottom of the battery	
Case broken	
Swollen battery	
Connector pins burnt, deformation, ablation	Contact your authorised dealer to replace the contacts or Connector pins should be performed by a certified technician

# 4.2 Instructions on faulty batteries inspection

# **△DANGER**

Faulty batteries may cause short circuits and lead to fires. To eliminate potential safety hazards and avoid unnecessary economic losses and other consequences, daily inspection is required, please act in strict accordance with the guidelines.

# 4.3 Checking batteries for signs of malfunction

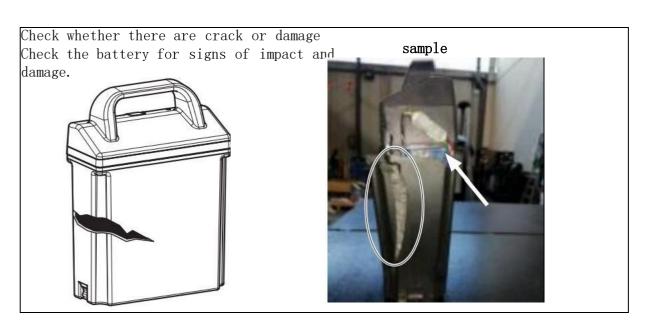




Check whether there are pungent smells; Check the middle connection of the body for swelling of the housing or internal cells abnormal expansion, bulge









# 4.4 Hazard of faulty or discarded battery and recycle

Please monitor the battery status when in use and in storage. If you find any broken batteries, electrolyte leakage, abnormal expansion or pungent odors due to shipping damage or abnormal vibration, please stop use immediately and keep at least a 5 meter perimeter around the effected batteries. Please dispose of the damaged batteries properly and contact a recycling company to recycle the batteries (See chapter 10 Instructions for disposal). For batteries that are under EP warranty policy, EP will access the warranty claim according to your submission of the battery nameplate photo.

During the period waiting for disposal or recycle, please stock damaged and old batteries carefully by following instructions:

- 1.Damaged and discarded battery temporary storage needs to be placed in an iron or plastic container with water that can cover whole battery at least 5 days (The battery may emit smoke when immersed in water. This is the process of consuming energy by the leaking battery, which is a normal reaction).
- Keep the container and batteries outdoors and 5 meters away from other things, especially flammable items.
- · Use protective gloves when putting batteries in or out of water.
- Do not stack damaged or old batteries.
   2.For big battery with inner and outer boxes structure, Keep the batteries outdoors at least
   5 days. and contact a recycling company to recycle the batteries. Place the faulty batteries outdoors in an openand shaded area, this area must be well-ventilated and be equipped with

# **i** NOTE

fire equipment.

Lithium-ion batteries that are damaged or in uncertain conditions shall only be handled by special trained and authorized lithium-ion battery technican.

# **MARNING**

Dispose of faulty or discarded batteries in time;

### **↑** WARNING

Do not store faulty or discarded for a long time.

### **↑** WARNING

No load bearing, squeezing and contact stacking when storing faulty or discarded temporary;

### **↑** DANGER

Do not place faulty or discarded near cargo warehouses or near flammable and explosive dangerous goods.



# 4.5 Commissioning

### **↑** WARNING

Unsuitable batteries that have not been approved by EP 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 EP, 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 EP-approved batteries may be used on the truck. Battery equipment may only be replaced with the agreement of EP. 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.

If damage or other defects are identified on the lithium-ion battery, the lithium-ion battery must not be used until it has been properly repaired.

Report any defects immediately to your supervisor. Tag out the faulty lithium-ion battery and take it out of service. Do not return the lithium-ion battery to service until the fault has been identified and rectified. Inform the manufacturer's customer service department or a customer service organization authorized by the manufacturer.

- · Check that the equipment is complete.
- Check the lithium-ion battery for damage.
- Check the battery cables and cable connections for damage and correct seating (if present).
- Install the lithium-ion battery if necessary

# 4.6 Charging

When charging, make sure the battery charger is turned OFF before connecting the battery charging cables. Lithium-ion batteries allow for fast charging, if the battery does not charge completely in a normal period or if the battery management system (BMS) indicates a fault, then remove the battery from service. EP recommends to opportunity charge lithium-ion batteries.

This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.

The positioning of chargers offers new possibilities compared to lead-acid batteries. For instance, they can be placed in parking spaces near break rooms. Furthermore, there is no hydrogen outgassing during the charging and discharging process, which contrasts with lead-acid batteries. During the charging and discharging process, no technical measures are needed for ventilation or air circulation due to the absence of hydrogen outgassing with lithium-ion batteries. However, fire protection regulations remain consistent with those for lead-acid battery chargers, requiring a minimum distance of 2.5 meters from combustible materials.

# **i** NOTE

The workplace regulations must be observed (emergency exits, escape routes, traffic routes, ... must be kept clear).



#### **CAUTION**

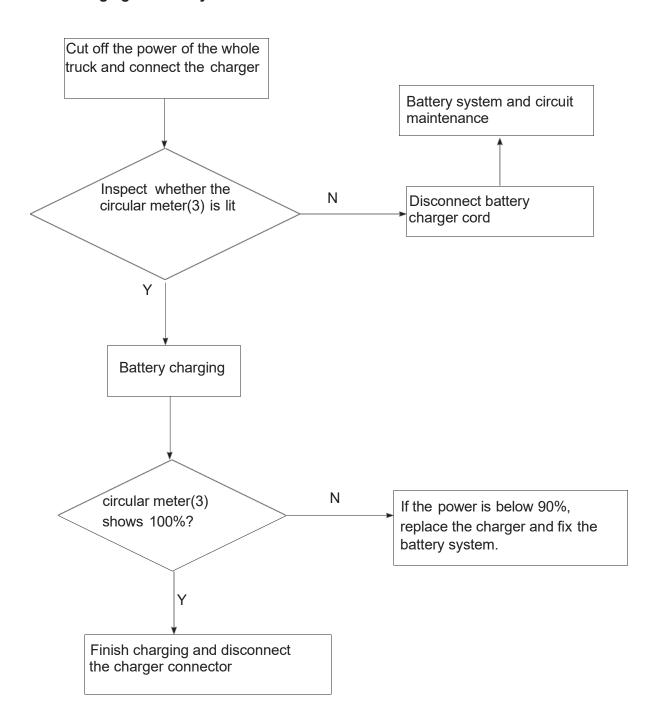
- · No metal objects should be placed on the battery.
- · Be careful of short-circuiting the battery!
- · No modification of the lithium-ion battery connector;
- Do not use irregular charging sockets;
- The necessary extinguisher (yellow sand and powder fire extinguisher) should be equipped around the charger so that emergency extinguishing can be carried out under extreme conditions.
- Do not modify or disassemble the charging port and charging equipment, which may result in charging failure and fire.
- After the charging is finished, do not disconnect the charging device when it is wet or standing in the water, as this may cause electric shock and cause personal injury.
- To avoid damage to charger cord plug and receptacle, do not pull on charger cord plug. Do not twist, rock or bend plug sideways. Do not use if plug or receptacle is damaged. Loose or feels hot otherwise fire, property damage or personal injury may result.
- Connect only properly grounded AC outlet. Do not touch uninsulated protion of output connector or uninsulated battery terminal. Never try to change a frozen battery. There's the danger of explosion!

#### **MARNING**

Charging must only be performed by individuals who are fully familiar with the relevant charging safety instructions.

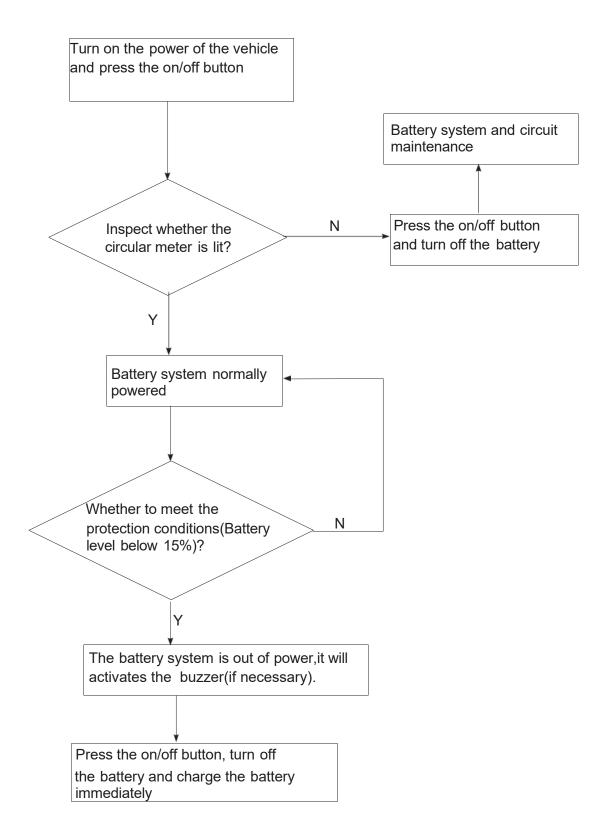


#### 4.6.1 Charging the battery





#### 4.6.2 Discharging the battery



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#### 4.7 Transportation

Before transporting any lithium-ion battery, check the current regulations on the transport of dangerous goods. Comply with these when preparing the packaging and transport. Train authorised staff to dispatch lithium-ion batteries.

### i NOTE

It is recommended that the original packaging is kept for any subsequent dispatch.

A lithium-ion battery is a special product.

Special precautions should be taken when:

Transporting a truck packed with Equipment orLithium batteries contained in Equipment ·Transporting only the lithium battery

·A class 9 danger label must be affixed to the packaging for transport.

It is different if the battery is transported on its own or in a truck. An example of a label appears in this supplement (see figure below). Refer to the latest current regulations before dispatch as the information might have changed since this supplement was written. Special documents must be sent with the battery. Refer to the applicable standards or regulations. The applicable IATA, ADR and IMDG regulations must be observed during transport.

For UN3480	Lithium-ion Batteries	A
For UN3481	Lithium-ion Batteries packed with Equipment or Lithium batteries contained in Equipment	

#### 个 WARNING

Do not pack higher than 1.2m above the floor of the container and secure properly.

## i NOTE

"Overpack"is the name for the outer packaging of the dangerous goods.

## i NOTE

Recharge the lithium-ion battery before transporting it taking account of the transport mode (sea,road,air). Excessive discharge on arrival could damage the performance of the battery.

#### 4.7.1 Shipping faulty batteries

To transport these faulty lithium-ion batteries, contact the manufacturer's customer service department. Faulty lithium-ion batteries must not be transported independently.



## 4.8 Lifting by crane

#### **MARNING**

All persons involved in loading by crane must be trained.

- Incorrect crane loading procedures due to untrained personnel can result in the battery falling. There is a risk of injury to personnel and a risk of material damage to the battery.
- 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.

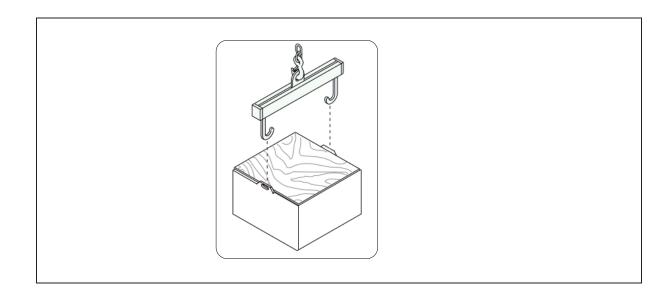
#### **↑** WARNING

Improper lifting of the battery by crane can cause accidents.

The use of unsuitable lifting gear and the improper use of correct lifting gear can cause the battery to fall when being lifted by crane.

Prevent the battery from striking other objects when they are being raised, and avoid any uncontrolled movement. If necessary secure the battery with guide ropes.

- The battery should only be laden by people who are trained in handling lifting slings and lifting equipment.
- Wear personal protective equipment (e.g. safety boots, helmet, hi-vis jacket, protective gloves etc.) when loading by crane.
- Use the lifting slings only in the prescribed load direction.
- Always attach the crane lifting gear to the prescribed strap points and prevent them from slipping.
- Avoiding diagonal pull
- When lifting the lithium-ion battery, ensure that the battery remains level.
- Ensure that no one is in the working range of the hoist when using it to lift the battery!
- Walking around under the lifted battery is absolutely prohibited.
- Use lifting equipment and a hoist that has sufficient carrying capacity to lift the battery. For the battery weight, see section nameplate data for lithium-ion battery.
- The sling must be fastened at the designated lifting points(handle) when using the hoist.



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#### 4.9 Removing or installing the battery

When moving, installing, or removing the battery, do the following:

- Ensure the service area is equipped with the proper tools designed for moving industrial batteries, such as a conveyor or overhead hoist.
- Use lifting hooks that have safety latches and are the correct size.
- Use a specialized attachment device, such as an insulted spreader bar, to install the lifting device to the battery. The width of the spreader bar must be the same as the width of the battery, to prevent damage to the battery.
- Chain hoists must be equipped with containers to accumulate any excess lifting chain.
- Keep all tools and other metal objects away from the battery terminals.
- Only authorized personnel familiar with handling industrial batteries move, store, install, or remove the battery.
- · Use insulated tools and lifting equipment only.
- If installing a new battery, check the battery for damage before installing.

#### **MARNING**

Risk of short-circuits during removal and installation of the lithium-ion battery
Battery cables can be trapped or severed when lifting out the battery. If the contactor
inside the lithium-ion battery is closed in the event of a fault, the battery voltage exists
between the battery terminals. This presents a risk of short-circuits (live parts).

The short-circuit produces a high electric current. This current can lead to dangerous current flows through the body, burns or electric arcs.

- Only have the lithium-ion battery installed and removed by authorised maintenance personnel.
- · Remove any rings, metal wristbands etc.
- Wear personal protective equipment (e.g. safety gloves, safety shoes, hi-vis jacket, hard hat).
- Position the battery connector, plus and minus cables such that they cannot be trapped or severed.
- Do not place any objects or tools on the lithium-ion battery to avoid short-circuiting the battery.

30



#### **↑** WARNING

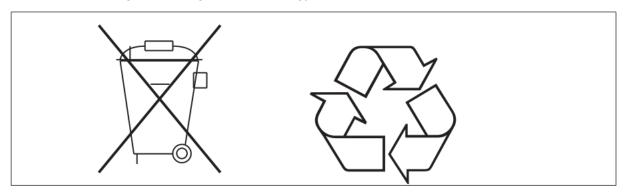
Risk of crushing during removal and installation of the lithium-ion battery

Due to the weight of the battery, there is a risk of crushing of the arms and legs when
removing or installing the lithium-ion battery.

- Only have the lithium-ion battery installed and removed by authorised maintenance personnel.
- · Remove any rings, metal wristbands etc.
- Wear personal protective equipment (e.g. safety shoes, hard hat, hi-vis jacket, protective gloves).
- Park the truck securely on level ground before installing or removing the lithium-ion battery.
- In exceptional circumstances (e.g. defective brake), place wedges underneath the wheels to prevent the truck from rolling away.
- Do not place any parts of the body between the lithium-ion battery and the truck or ground.
- Note the centre of gravity of the battery.
- Only use crane lifting gear with sufficient capacity when replacing the battery.
- Use only approved battery replacement devices (e.g. battery roller stand, battery replacement station).
- Insert battery retainers after installing the lithium-ion battery in the battery compartment.
- Check that the battery is securely seated in the battery compartment.

#### 4.10 Instructions for disposal

- Lithium ion batteries must be disposed of in accordance with the relevant environmental protection regulations.
- Used cells and batteries are recyclable economic goods. In accordance with the mark showing a crossed rubbish bin, these batteries may not be disposed of as domestic waste. Return and / or recycling must be ensured as required by the Batteries Legislation.
- The method of battery recovery and reuse can be discussed with our company.
- We reserve the right to change the technology.



#### 4.10.1 The requirements of recycling

- Only authorized EP dealers who have attended the after sales training, are authorized to do repairs on EP batteries.
- All Li-ion battery should be placed in safe place according to the EP Li-ion battery Manual;
- The transport of Li-ion battery must meet local regulation, EP will supply UN38.3 and MSDS files according with UN and ADR regulation;
- The package of Li-ion battery before delivery must meet the UN 3480 or local carrier regulation;



#### 4.11 Storage

Before a long period of inactivity, the battery must be fully charged.

- We recommend that batteries are stored at a height between 60 and 120 cm. EP recommends storing lithium-ion batteries in a raised rack or shelf that allows for protection from possible collision damage.
- Store the battery in a dry place at a temperature between 0 and 40° and a maximum humidity of 85%. Lithium-ion batteries should be stored indoors, away from heat sources and direct sunlight, and in a well-ventilated;
- When storing a battery for an extended period, inspect it regularly (every 1 months) and maintain a charge level of 50% or greater.
- Disconnect the lithium-ion battery from the truck if it is to remain unused for longer than a week (e.g. detach the battery connector / interface connector).

#### **CAUTION**

Discharge can damage the battery

If the battery is not used for a long period of time, it can become damaged through discharge.

#### **MARNING**

Do not store the faulty or discarded battery for a long time;

#### **MARNING**

No load bearing, squeezing and contact stacking when storing the batteries;

#### **DANGER**

Do not place the batteries near cargo warehouses or near flammable and explosive dangerous goods.

#### 4.12 Cleaning

The manufacturer recommends to only use compressed air at less than 207 kPa (30 psi) or a slightly damp towel to clean the battery. The battery, or its charging station, may be equipped with fans, heat sinks, or other cooling devices that require periodic cleaning. Always know and follow the battery manufacturer's recommendations for cleaning and service.

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## **5 Troubleshooting**

#### 5.1 Common Problems and Solutions

During the use and maintenance of the lithium-ion battery, the battery or battery system may have one or more of the following abnormal conditions, please organize the professional engineers and technicians to perform the necessary processing according to the instructions in this manual; if you have any questions about the status or solutions, please contact ep dealer or after-sales service department of the company to obtain professional technical support.

- If the battery is found to have abnormal mechanical characteristics such as swelling, cracked casing, melted casing, and distortion of the casing before and during installation, stop using the battery immediately, place it in open and well-ventilated space, and contact the aftersales service.
- If abnormalities such as looseness, cracks, cracks in the insulation layer, burn marks, etc. of the battery's pole pressing bolts, conductive strips, main circuit wires and connectors are found before and during the installation, stop using the battery immediately, check the reason for analysis and give it a fix;
- If the polarity of the positive and negative terminals of the battery is found not match the polarity identification before installation, please stop using the battery immediately and contact the after-sales service department to replace the battery or obtain other solutions;
- · If the battery is found to emit smoke or fire:

#### 5.2 Emergency measures for battery pack smoke or fire

#### 5.2.1 Overheating warning

- When the battery temperature is higher than 60°C, the battery reports the fault code: 17A104 (for batteries with round gauges). The driver should end the operation, drive to a safe area, open the protective cover and expose the battery to cool down; the cooling area should be equipped with fire extinguisher.
- When the battery temperature is higher than 65°C, the battery reports fault codes: 17A040, 17A041, 17A042, 17A043, 17A044, 17A045, 17A181 (for batteries with round gauges) depending on the locations of the high temperature. The driver should end the operation, quickly evacuate the crowd, open the protective cover and expose the battery. Also prepare a fire extinguisher and water, ready to respond to abnormal battery problems.

#### 5.2.2 Smoke and fire burning and exploding

- When the battery smokes, please notify personnel to leave the faulty vehicle quickly and immediately implement power-off operation and use carbon dioxide or dry powder fire extinguisher to cover the battery with oxygen isolation. Then move the faulty battery to an open area according to the site conditions and repair or recycle the battery. If you meet complex problems, please call the after-sales service for advice.
- To deal with batteries with open flames, operators should also immediately power off the
  batteries and use carbon dioxide or dry powder fire extinguishers to suppress the fire as
  well as water-based extinguishers to cool it down. Place in an open area at least 5 meters
  away and repair or recycle as appropriate. In accordance with the relevant regulations of the
  environmental protection department, the damaged battery must be recycled within 5 days.

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- For vehicles with people trapped in the fire, adhere to the principle of "saving people first, scientific rescue" and carry out simultaneous demolition, fire-fighting and rescue operations.
- Depending on the site environment and the fire, judge whether to carry out a stabilization operation on the vehicle on fire, and if possible, use other forklifts to move the burning forklift to an open area.
- Use a fire-filtered integrated gas mask or air breathing apparatus, as appropriate, to provide respiratory protection to trapped personnel.
- When the fire cannot be effectively controlled, fire blankets and other equipment can be used
  to protect the trapped personnel to avoid injury to the greatest extent possible, and to quickly
  use breaking (breaking process is strictly forbidden to blindly penetrate the battery pack,
  cutting, prying open operations to avoid increasing the fire and electric shock), lifting and
  other life-saving equipment to launch rescue operations.
- Firefighters should extinguish fires in vehicles where no personnel are trapped at a distance of 10 to 15 meters from the vehicle on fire.
- When protective components are usually present around the battery pack and the whole vehicle after adaptation, and it is difficult to spray directly to the point of ignition. A large amount of water should be used to cool the exterior of the battery pack sufficiently to prevent the spread of fire.
- Move the damaged battery to an open and safe area and evacuate the surrounding area quickly, to reduce the spread of damage to people and property.
- Due to the flammable and polluting nature of electrolyte fumes and vapors, keeping away from people also serves to reduce secondary hazards caused by starting fires.
- Quickly remove combustible materials near a battery that has spontaneously combusted to avoid causing a wider fire.
- If permitted, the battery pack can be removed from the vehicle and buried directly into the earth or sand to prevent the battery from re-igniting and exploding and to prevent the spread of smoke and dust. And a large amount of water should be used for cooling. If not permitted, the battery should be continuously cooled down by water spraying after the open fire is extinguished until the battery temperature drops below 60°C and the risk of re-ignition and explosion is assessed before the rescue operation can be stopped.

Lithium-ion batteries typically require no maintenance. If needed, any service or maintenance should be performed by a certified technician.



## 300A series

Battery charger from **WEIHAI TL POWER CO., LTD.** 

## **Operation Manual**

(en-GB)





#### **Foreword**

By carefully reading the operating instructions, the user can acquire the necessary technical knowledge to safely operate the charger. The operating instructions contain concise and well organized information sections are arranged alphabetically, and page numbers are numbered.

The company will continue to develop chargers therefore, Manufacturing company must reserve the right to modify the appearance, equipment, and technology. For these reasons, no claims for any device-specific performance may be derived from the contents of these operating instructions.

#### Safety notices and text mark-ups

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

# ⚠DANGER Means that failure to comply can cause risk to life and/or major damage to property.

#### **MWARNING**

Please strictly adhere to these safety instructions to avoid personal injury or major damage to equipment.

#### **ACAUTION**

Please pay attention to the important safety instructions.

<b>i NOTE</b> Pay attention to Instruction.		

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#### 1 General

#### 1.1 Introduction

This operation guide helps the model to use 1200BG models of 24V30A charger as a reference object to achieve safe operation of the charger specifications. Its 300A, 750A, 2000A, 3000A, and 3000BG series chargers can still use this manual.

This manual must be readily available and kept in a prepared place This manual is intended for use by all persons who have access to the operating process of the charger, including transportation, installation and installation, operation, maintenance, and disassembly.

In commercial use, in addition to the operating instructions, the relevant guidelines, regulations, and laws in force in the place of use or the country of use should be followed to ensure safe and standardized operations.

Information other than this operating manual is provided by a professional on the part of the manufacturer or supplier.

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Obligations and Responsibilities of the User of the Equipment: In this Manual, the term "User" refers to any natural or legal person who directly uses or appoints another person to use the Equipment In special cases such as rental, sale or rental, "Equipment User" represents a party that has specific operational obligations under the terms of the contract concluded between the Owner of the Equipment and the User.

In addition, the user of the equipment must strictly comply with the provisions for the prevention of accidents, other safety technical regulations, and guidelines for the use, maintenance and repair of the equipment The user must ensure that all operators carefully read and fully understand the contents of this manual.

The Company shall not be liable for any damages arising from the improper operation of the equipment by the customer or the user of the equipment or a third party without the permission of the Company's customer service department.

If additional equipment needs to be installed or added, and if it affects or complements the functionality of the equipment, prior written consent must be obtained from the manufacturer and, depending on the actual situation, approval from the relevant certification body may also be required.



#### 1.2 Important safety tips

The charger is produced in accordance with EU directives and state-of-the-art technology and provides additional safety tips to ensure the absolute safety of personnel.

#### **MDANGER**

- The following conditions can result in serious personal and property damage:
- Improper use or incorrect operation.
- Turn on the charger without permission.
- Installation errors or improper maintenance and repairs .
- Replace the input and output wires without permission.
- Charge the damaged battery.

#### **MDANGER**

Attention must be paid to and all instructions contained in this operating instruction regarding proper use, residual risks, installation, operation, and maintenance.

#### **∧DANGER**

Charging a battery that is not suitable for this charger will cause damage to the charger and battery The battery will swell or burst:

- It can only charge EP brand electric industrial forklift batteries.
- Please determine the battery type that the charger is compatible with before use.
- Do not cross-use or change the charger adaptation type.

#### **MWARNING**

Dangerous voltage warning

Chargers are electrical devices in which voltage and current can endanger personal safety:

- The charger should only be operated by a trained and authorized professional.
- Before intervening in the charger or working on the charger, the power supply should be disconnected and if necessary, the battery should be disconnected.
- The charger can only be opened and repaired by EP Customer Service.

#### **MWARNING**

Damage or other defects in the charger can lead to accidents

If it is determined that there are safety-related changes, damage, or other defects in the charger or in performance, the charger must not be used until repairs have been carried out in accordance with the Regulations:

- Identified deficiencies must be reported to the EP immediately.
- Mark the damaged charger and deactivate it.
- The charger should only be reused after the fault has been identified and troubleshooting.

#### **ACAUTION**

This charger is not suitable for use by:Persons (including children) with impairments in physical, sensory, or mental abilities, or lack of electrical experience and knowledge system and battery charging unless someone supervises or instructs them in using the charger Be responsible for their safety Children should be supervised to ensure they are not playing with the charger.



#### 1.3 Permissable operating conditions

This series of chargers is suitable for charging industrial lithium batteries. Any other use of the equipment is non-compliant and may result in injury, damage to the equipment, or other property damage:

- The rated operating input voltage range, frequency range, maximum input current, and input power are all specified in detail on the nameplate .
- The rated working output voltage range, current range, and constant power are all specified in detail on the nameplate.
- Used in industrial environments .
- The permissible temperature range is between -10°C and 45°C.
- Relative humidity is 5%~95%.
- The altitude should not exceed 2000 m.
- Input voltage fluctuation range of ±15%.
- Storage temperature: -20 °C~75 °C.
- Storage humidity 5%~95%.

Note: When the environmental conditions exceed the above range, you should contact us in advance to negotiate and solve.

#### 1.4 Intended use

- Damage and other defects to the charger or accessories must be reported to the supervisor immediately. Chargers and accessories that are not safe to operate should not be used until they have been properly serviced.
- Safety installations and switches may not be removed or rendered unusable. Specified settings may only be changed with the approval of the manufacturer.
- The charger must not use more than the limit set by the manufacturer, and the fluctuation range must not exceed ±15%.
- Warning signs need to be added to the charger working area.
- In order to maintain LVD compliance with EMC, any replacement of exterior parts requires prior contact with the manufacturer.
- When using the utility grid, the regulations must be followed, as well as country-specific restrictions for winter.

#### 1.5 Impermissible use

- If the charger is used in a way that is not permitted, the user, not the manufacturer, is responsible.

  The following list is for informational purposes only and is not intended to be exhaustive:
- Charge commercial batteries.
- Charge non-EP brand batteries.
- Modify or destroy safety devices.
- Modification or replacement of unauthorized parts.
- Extend or shorten the AC/DC end cable.
- The usage environment is beyond the scope of Section 1.3.
- Personnel have not undergone safety training or have not consulted the instructions for operation.



#### 1.6 Definition of the person who is used

#### 1.6.1 Operator

The charger should only be operated by a person who is at least 18 years of age, has been trained in electrical safety and operational safety, and who demonstrates their basic electrical skills to the user or an authorized representative. It is also necessary to have a specific understanding of the working logic of the charger to be used.

#### 1.6.2 Users

The user is the natural person or legal entity responsible for pumping the charger. Users can operate the charger themselves or delegate the task of operating the charger to someone else, such as an operator. In the case of specific cases such as rentals, the liability is borne by the user in accordance with a valid contract between the owner of the car and the operator of the charger.

#### 1.6.2 Specialist

A qualified person is defined as a service engineer or a person who meets the following requirements:

- Full professional qualifications that demonstrate their expertise. The certificate should include a professional qualification or similar document.
- Professional experience shows that the qualified person has gained hands-on experience with the charger during their career During this time, the person has become familiar with the various symptoms that need to be examined, such as based on the results of hazard assessments or routine inspections.
- Recent professional involvement in the field of relevant charger testing or R&D and appropriate further qualification is essential. Qualified personnel must have experience in conducting relevant tests or conducting similar tests.
- In addition, the person must be aware of the latest technological developments and the risks being assessed for the charger to be made.

#### 1.6.3 User right, duties and rules of behaviour

Everyone operating the charger has read and understood this manual and has been approved with the relevant charger operator training. Operate the charger in a safe manner so as not to endanger the life and health of the operator and/or others. Follow all warnings and instructions in this manual This manual is available for use by the operator.

#### 1.6.4 Operator Rights, Duties and Code of Conduct

For the purposes of these operating instructions, the operating company is defined as any natural or legal person who uses the charger on its own or on its behalf. In exceptional cases (e.g. lease or rental). The operating company is considered to be a person who performs specific operational duties under an existing contractual agreement between the charger owner and the operator.

The operating company must ensure that the charger is used only for its intended purpose and to prevent danger to the health and safety of the operator and third parties. In addition, accident prevention regulations, safety regulations, and operation, maintenance, and repair guidelines must be complied with. The operating company must ensure that all operators have read and understood these operating instruction



## 2 Charger description

#### 2.1 Charger appearance

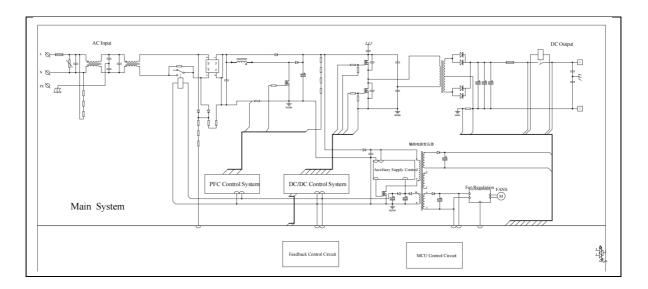


#### 2.2 Feature description

The fixed OBC charger is characterized by small size, high conversion efficiency, and a higher level of IP protection, which makes it suitable for a wider range of environments, and it also has power-off compensation and fault indicators to make the charging status clear at a glance. The charger adopts forced air cooling cooling, and has the functions of input over-voltage, under-voltage protection, output over-voltage, under-voltage, over-current, output short circuit, fan fault protection and so on.

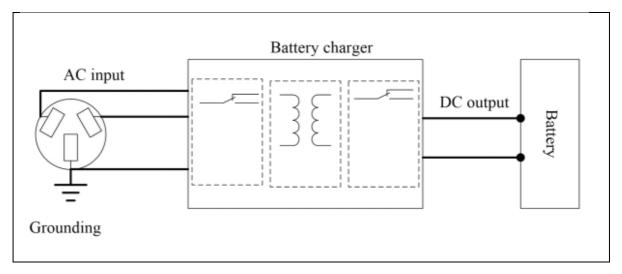
#### 2.3 Description of how it works

#### 2.3.1 Design Principles





#### 2.3.2 How it works



The implementation principle of the high-frequency PFC (Power Factor Correction) module charger generally follows these steps:

Input current rectification: Firstly, the AC input power is rectified into a DC power source. High-frequency conversion: The DC power source is converted into a high-frequency AC power source, typically achieved through high-frequency switching power supplies using devices such as MOSFETs. PFC control: The PFC controller monitors the input current and voltage and controls the high-frequency switch to minimize the phase difference between the input current and voltage, thereby maximizing the power factor.

DC-DC conversion: The power source, after power factor correction, enters a DC-DC converter to convert the high-frequency AC power into the desired DC voltage. This typically involves an inductor, a capacitor, a switching element (such as a MOSFET), and control circuitry.

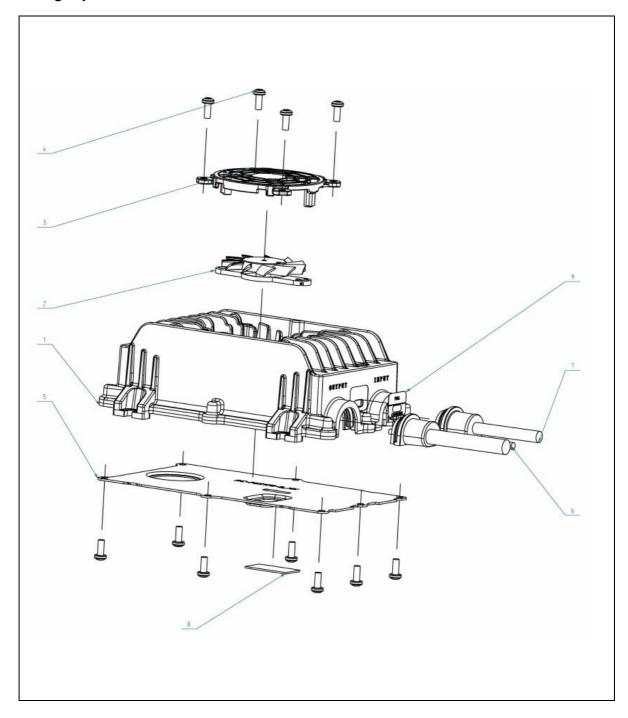
Control and protection: The charger also includes control and protection circuits to ensure that the output voltage and current are within safe ranges and to monitor various conditions during the charging process, such as overvoltage, overcurrent, overtemperature, etc., and take appropriate measures to protect the charger and battery.

Note: The above instructions apply to all chargers under the 300A, 750A, PM,ZLC,1200BG,3000BG and ZBB models Technical parameters.

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## 2.4 Charger parts information



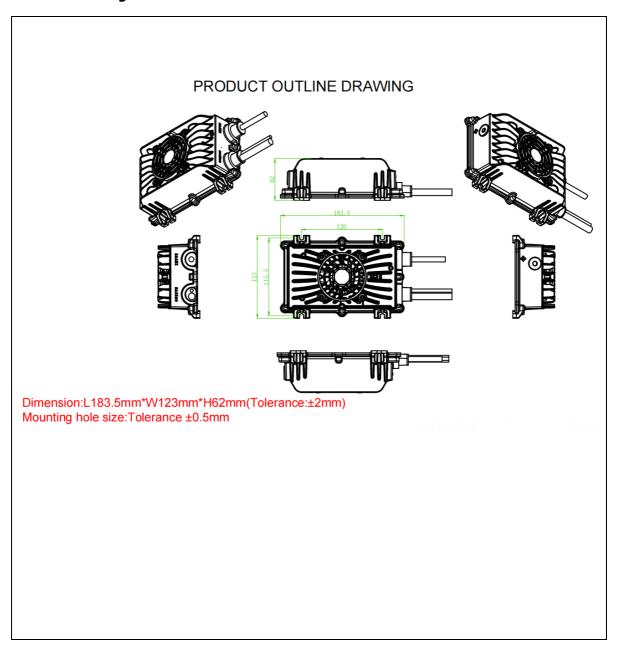
Applicable Models	300A 24V/10A
	300A 48V/5A
	300A 48V/6A



No.	NAME	DRAWING NO./SPECIFICATION	QTY
1	Die-cast housing	YZ-PSS183-B_V13	1
2	Air blower	6010	1
3	Fan screen	70 Fan mesh cover	1
4	screw	M4-10	11
5	Cover plate	RE - PSS179 - B_V1. 0	1
6	microcalorie	Output microcard	1
7	microcalorie	Input microcard	1
8	tag	Program port tag	1
9	tag	Two-color indicator label	1
10			
11			
12			
13			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



## 2.5 Outline drawings



Applicable Models	300A 24V/10A
	300A 48V/5A
	300A 48V/6A

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## 2.6 Technical data sheets of 300A series chargers

## 2.6.1 Charger appearance parameter table

Name	300A		
Model	24V10A	48V6A	
volume (mm)	L:183.5;W:123;H:32	L:183.5;W:123;H:32	
WEIGHT (KG)	1.2±0.3	1.2±0.3	
AC input (plug)	10	10	
DC output	-:RNB3.6-5terminal	-:RNB3.6-5terminal	
DC output	+:PP1100348terminal	+:PP1100348terminal	
Enter the wire (mm²)	3*0.75	3*0.75	
Output wires (mm²)	2.1+2.1+2*0.5	2.1+2.1+2*0.5	
IP rating	IP65		

## 2.6.2 Electrical performance parameter table

Name	300A		
Model	24V10A	48V6A	
Input Voltage (AC)	85-270	85-270	
Input current Max (A)	4	4	
Input current Rated (A)	4	4	
Operating frequency (hz)	50Hz/60Hz		
Input power (KW)	373	373	
Output voltage (DC)	34	66	
Output current (A)	10	6	
Output power (KW)	0.36	0.36	
Power factor (PF)	≥0.99		
Operating noise (db)	≤45(measured working noise of the charger assembly at a distance of 1m from the horizontal position of the noise source and a height of 1m to 1.5m from the ground, under the condition of rated load and ambient noise not exceeding 40dB).		

## 2.6.3 Electrical function parameter table

Name	300A		
Model	24V10A	48V6A	
Phase-loss protection	V	V	
Input undervoltage protection	V	V	
Input overvoltage protection	V	V	
Output undervoltage protection	V	V	

ler's grow	maether

Output overvoltage protection	V	V
Input overcurrent protection	V	V
Short-circuit protection	V	V
Reversepolarity protection	V	V

#### 2.6.4 Work environment support

Name	300A	
Model	24V10A	48V6A
Voltage adaptive (%)	±15	±15
Work Scenario	indoor	indoor
Operating temperature (°C)	-25~60	-25~60
Operating humidity (g/m³)	10-92	10-92
elevation (*m)	2000	2000
Dust level	IP65	IP65

#### 2.6.5 Safety performance

Name	300A	
Model	24V10A	48V6A
Leakage current (ma)	< 10	< 10
Ground resistance (Ω)	< 0.1	< 0.1
Transient over-voltages (V)	50	50
Insulation resistance(Ω)	> 50M	> 50M
Insulation withstand voltage	3000	3000

#### 2.7 Model description

Take model 300A2410L as an example:

The "300A" part indicates the maximum power output of the charger is 300W.

The "2410" part indicates that the charger output voltage is rated at 24V and the current is 10A.

The "L" part indicates that the charger is adapted to the lithium battery and can only be a lithium battery charger.

## 2.8 Nameplates and logotype

MODEL:300A2410 ITEM:A			
INPUT:100-265Vac 50/60Hz MAX.2A 328W			
OUTPUT:DC24V-10A			
BATTERY TVPE:maintenance-free battery 12V65AH(20HR)			
Serial NumberZJZL2410-341605408			
Weight:			
Serial Number: Manufacture Date:			

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Certificate

Inspector: 10

Date: 2025.07.26

Manufacturer:

Weihai Tl Power Co.. Ltd.

No.1 shanhai Rd., chucun Town, High-tech Zone, Weihai City, Shandong Province, P.R. China

Importer: EP Equipment Europe

Address: Gustave Demeurslaan 69 -bus A1.1654Huizin gen, Belgium

TL POWER **Indicators State EUREPSTAR GmbH** 1. Red is on: Charging Unterlettenweg 1a, 85051 Ingolstadt, Germany 2. Green is on: Full Charge MODEL: 300A2410 ITEM:A INPUT: 100-265Vac 50/60Hz Max.2A 328W OUTPUT: DC24V-10A **BATTERY TYPE:** maintenance-free battery 12V65AH(20HR) Danger:There is high voltage in the charger, forbidden to open the cover! Away from inflammable or explosive materials! ZJZL2410-341605408 Attention: Please read the manual carefully before using it!

MODEL:300A4806 ITEM:A

INPUT:100-265Vac 50/60Hz MAX.3.65A 400W

Weihai TL Power Co., Ltd.

OUTPUT: DC48V-6A

BATTERY TVPE:maintenance-free battery 12V39AH

Serial NumberZJZL4806-34100243

Weight:

Ν

t

Serial Number:

Manufacture Date:

Manufacturer:

Weihai Tl Power Co.. Ltd.

No.1 shanhai Rd., chucun Town, High-tech Zone, Weihai City, Shandong Province, P.R. China

No.1 Shanhai Rd., Chucun Town, High-tech Zone, Weihai City, Shandong Province, P.R. China

Importer: EP Equipment Europe

Address: Gustave Demeurslaan 69 -bus A1.1654Huizin gen, Belgium

TL POWER **Indicators State** Certificate EUREPSTAR GmbH Inspector: 10 1. Red is on: Charging Unterlettenweg 1a, 85051 Ingolstadt, Germany Date: 2025.06.30 2. Green is on: Full Charge MODEL: 300A4806 ITEM:A INPUT: 100-265Vac 50/60Hz Max.3.65A 400W OUTPUT: DC48V-06A **BATTERY TYPE:** maintenance-free battery 12V39AH Danger:There is high voltage in the charger, forbidden to open the cover! Away from inflammable or explosive materials! ZJZL4806-341500243 Attention: Please read the manual carefully before using it! Weihai TL Power Co., Ltd. No.1 Shanhai Rd., Chucun Town, High-tech Zone, Weihai City, Shandong Province, P.R. China

C is marked as CEC energy efficiency and FCC is EMC

#### **Enforce the standard** 2.9

е

The charger is designed and manufactured in accordance with the technical specifications that have obtained the following technical certifications Therefore, when used correctly, it does not pose a threat to the safety and health of operators or third parties.

The charger is CE marked The necessary isolation spacing must be observed All circuits use primary and secondary protection devices, which are protected by a set current intensity and trigger characteristics.

All live components are fitted with a housing or cover that can only be loosened with a tool All cables and plugs are shielded and grounded as specified The charger is designed to comply with the IP 65 protection rating.

All metal parts are grounded by a ground wire system.



The charger is equipped with a CAN safety function that prevents the battery from overcharging by means of information recognition.

#### Standard table

serial number	Standard number	Standard name
1	IEC 60512-6-4:2002	Dynamic stress test
2	IEC 68-2-27	Impact test
T <sub>3</sub> h	IEC 61000-4-2	Electromagnetic Compatibility Test & Measurement Technology Electrostatic Discharge Immunity Test
e <sub>4</sub>	IEC 61000-4-3	Electromagnetic Compatibility Test & Measurement Technology RF Electromagnetic Field Radiated Immunity Test
A C <sup>5</sup>	IEC 61000-4-4	Electromagnetic Compatibility Test and Measurement Technology Electrical Fast Transient Burst Immunity Test
i 6	IEC 61000-4-5	Electromagnetic Compatibility Test & Measurement Technology Surge (Shock) Immunity Test
p <sup>7</sup> u t	IEC 61000-4-6	Electromagnetic Compatibility Test & Measurement Technology RF field-induced immunity to conducted disturbances
8 o	IEC 61000-4-11	Electromagnetic compatibility test and measurement technology voltage
f <sub>9</sub>	IEC 61000-6-1	Generic standards - Immunity standard for residential, commercial and light-industrial environments
t 10	IEC 61000-6-2	Common Criteria - Immunity to Industrial Environments
h e 11	IEC 61000-6-3	Generic standards - Emission standard for equipment in residential environments
a 12 b	IEC 61000-6-4	General Criteria - Emission standards for industrial environments
0 13	IEC 60529:2001	Enclosure rating
V 14	EN 50699	Recurrent Tests of Electrical Equipment
e 15	CEC-400-2017-002	2016 APPLIANCE EFFICIENCY REGULATIONS

series of chargers is optional, you can choose the corresponding AC power cord according to the power of the charger and the use area, we provide the following optional models. If the following plugs do not fit for your region, please contact us.

## 2.10 AC input plug

#### Power cord model list 1

Model	Compatible charger	AC wire diameter	Plug photo
Straight European	≤24V50A	1.5mm*3	
Standard 10A	≤48V25A		
Spring line European	≤24V30A	0.75mm*3	2
Standard 10A	≤48V15A		
Spring line Italy 10A	≤24V50A	1.5mm*3	~4
Spring line italy 10A	≤48V25A	1.5111111 5	
Straight line Italy 10A	≤24V30A	0.75mm*3	1
Straight line Italy 10A	≤48V15A	0.73111111 3	
Spring line British	≤24V30A		
standard 13A	≪24V30A ≪48V15A	0.75mm*3	
			0 0
Spring line Australian	≤24V30A	0.75mm*3	



standard 10A	≤48V15A		
Straight line Australian	≤24V50A	1.5mm*3	
standard 10A	≤48V25A	1.5111111111111111111111111111111111111	
Spring line Israel 10A	≤24V30A	0.75mm*3	1
Spring line israel 10A	≤48V15A	0.75111111115	
Ctualabt line lave at 100	≤24V50A	1 5 22 22 * 2	
Straight line Israel 10A	≤48V25A	1.5mm*3	37.1.
Caring Line Brazil 10A	≤24V30A	0.75mm*3	
Spring Line Brazil 10A	≤48V15A	0.75111111115	122
Charicht Line Bassil 404	≤24V50A	4.5*2	
Straight Line Brazil 10A	≤48V25A	1.5mm*3	
Industrial plug 16A	≤24V100A	2.5mm*3	
muustriai piug 10A	≪48V50A	2.3111111 3	

#### Power cord model list 2

Model	Compatible charger	AC wire diameter	Plug photo
Spring line greater	≤24V30A	0.75mm*3	
South Africa 10A	≤48V15A	0.70	
Straight line greater	≤24V50A	1.5mm*3	650
South Africa 10A	≤48V25A	1.5111111 5	
Spring Line	≤24V30A	0.75mm*3	
Switzerland 10A	≤48V15A		
Spring line Japanese	≤24V50A	1.5mm*3	
standard 12A	≤48V25A	2.011111	
Straight line Japanese	≤24V50A	1.5mm*3	
standard 12A	≤48V25A	1.3111111 3	
Spring line American	≤24V30A	0.75mm*3	-
Standard 10A	≤48V15A	0.75iffm*3	
Straight line American	≤24V50A	1.5mm*3	
Standard 10A	≤48V25A	1.3111111.3	

## 2.11 DC Output connectors

The output of the above series charger is optional, you can choose according to the current output connector of the battery, we provide the following optional models.

Output connection table

Model	Adaptation type	Battery type	Plug photo
OT series	Built	Lead-acid/lithium-ion battery	
MD5.5-250	Built	Lead-acid/lithium-ion battery	
EVN4012	Built	Lead-acid/lithium-ion battery	



SR50A	External	Lead-acid/lithium-ion battery	
GPS75XFP	External	lithium-ion battery	

#### 3 Safety

#### 3.1 Safety tips for installation

#### 3.1.1 Fire hazard

#### **MDANGER**

Safety warning for external chargers

- There must be no flammable materials near the charger Included shipping and packaging materials are included:
- There must be no flammable materials within 2.5 m of the charger.
- The horizontal distance between the charger and the combustible material is at least 2.5 m. It is forbidden to store flammable materials (e.g. on shelves) above the charger or to use flammable building materials. The distance from areas with a risk of fire, explosion and explosives must be at least 5 m.

#### **MDANGER**

Built-in charger safety warning

- The charger cannot be installed close to the controller.
- The positive pole of the charger output connection is not allowed to be directly connected to the battery.
- After the charger output is installed, a pipe sheath needs to be installed to protect it from bare metal touching the metal powder.

#### 3.1.2 Water ingress risk

#### **MDANGER**

There must not be any liquid in the vicinity of the charger.

Do not place any liquid on top of the charger.

#### 3.1.3 Stress risk

#### **MDANGER**

- Avoid the charger exceeding the stress level and do not place anything on top of the charger.
- Electrical installation according to uniform regulations (wire cross-sections, safety devices, ground connections) Avoid the input and output stress of the charger exceeding the range, and do not modify any parameters of the cable (including length, wire diameter, voltage carrying range, etc.) without the authorization of the manufacturer. Before electrical installation, please check the parameters on the nameplate (voltage/frequency/current, etc.) and compare them with the performance parameters of the power connector. Prevent the charger from ultra-high stress ranges (voltage, frequency, and current) by connecting the grid safety device in series.

#### 3.1.4 Water ingress risk



#### **MDANGER**

- Missing or improperly designed leakage protection devices can lead to a risk of electric shock and fire
- Missing or poorly designed residual current protection devices can cause fatal injuries by causing electric shock or fire in the event of a malfunction necessary, use Type B or B+RCD (Residual Current Device, RCD).
- In order to operate the charger, the location of use must have a grid interface. The supply voltage and frequency must match the instructions on the rating plate (see the section "Identification and Labeling on the Charger"). As specified, grid interfaces must be properly grounded.
- The charger must be protected from excessive contact voltages according to the regulations of the local power supply unit (EVU) .
- If the power cord of the charger is damaged, it must be replaced by the manufacturer or its customer service department or appropriate qualified personnel to avoid danger.

#### 3.1.5 Installation environmental risks

#### **MWARNING**

Safety warning for external chargers

- The side distance to the next charger is at least twice the width of the charger. If the spacing to the next charger cannot be respected, the chargers need to be staggered.
- Please install the charger in a vertical position, and there are no foreign objects around the fan to
  prevent the fan from getting foreign objects inside the charger when working Do not allow
  horizontal installation.
- Maintain a minimum lateral distance of 0,5 m from the next wall.
- Do not install this charger in a commercial environment.
- Fire extinguishing equipment must be prepared around the charger.
- Ensure optimal ventilation of the charger:
- When installing/installing the charger, you should pay attention to:
  - No corrosive gases, e g acid gases,
  - No conductive dust, such as soot or metal dust,
  - No excessive non-conductive dust is deposited,
  - No water should enter the inside of the charger
- Pay attention and comply with the regulations set by the battery manufacturer.
- In addition to the restrictions on the choice of installation site mentioned in this operating instruction national regulations must be observed.

#### **<u>MWARNING</u>**

Built-in charger safety warning

- Please install the charger in a vertical position, and there are no foreign objects around the fan to prevent the fan from getting foreign objects inside the charger when working Do not allow horizontal installation.
- The charger is not allowed to be installed on a liquid lead-acid battery.
- The charger is not allowed to be installed in the controller accessory, at least at a distance of more than 400mm away from the control.
- After the charger output is installed, a pipe sheath needs to be installed to protect it from bare metal touching the metal powder..
- Ensure optimal ventilation of the charger:
- When installing/installing the charger, you should pay attention to:
  - No corrosive gases, e g acid gases,
  - No conductive dust, such as soot or metal dust,
  - No excessive non-conductive dust is deposited,
  - No water should enter the inside of the charger
- Pay attention and comply with the regulations set by the battery manufacturer.



 In addition to the restrictions on the choice of installation site mentioned in this operating instruction national regulations must be observed.

#### 3.1.6 Appearance warning

#### **MWARNING**

The charger has an IP 20 degree of protection against Moisture Ingress and is specially designed for indoor use This is identified by the character 5957 in accordance with IEC 60417.



Please read the operating instructions carefully before use The work of the battery and charger should only be carried out by a professional following instructions The operating instructions must be placed in a prominent location and easily accessible.



Avoid open flames or open ignition sources near the battery or charger, and do not smoke.



Make sure there is adequate ventilation in the chargingarea and do not disconnect.

Note:Dirty batteries or chargers require personal protective equipment (e.g., protective glasses and gloves).



If your charger is not working poperly, you will face many dangers Such as electrical hazards due to mains currents or hazards due to Other causes should be repaired immediately by an authorized Professional.

note: high-performance lithium-ion batteries generate extremely high short-circuit currents The metal part is always live, so do not place foreign objects or tools on the battery Take care to comply with accident prevention regulations such as DIN EN 62485-3.



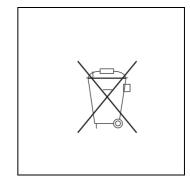
Pay attention to the correct use of the charger as prescribed Otherwise it may lead to greater danger Unprofessiona I or incorrect use will invalidate the product Do not cover the charger in any form during charging In addition, it is necessary to pay attention to the installation instructions



Used chargers are hazardous waste and require special disposal Do not dispose of this product in household waste In accordance with the European WEEE Directive 2012/19/EU on waste electrical and electronic equipment (which has been transposed into national law) used power tools must be collected separately and recycled in an environmentally friendly manner Be sure to return your used charger to the dealer or get information about your



local authorized collection and disposal system



#### 3.2 Use safety reminders

#### 3.2.1 Pre-use safety reminders

#### **MDANGER**

Safety warning for external chargers

- Check before each use of the charger.
- The space for forklift charging should be kept fully ventilated.
- There is no clogging of the fan and no foreign objects around None of the vents were blocked Within a radius of at least 2,5 m around the forklift that needs to be charged, flammable materials and work equipment that could generate sparks must not be placed.
- There are no flammable, explosive, or combustible materials, chemicals, flammable vapors, and other dangerous items in the vicinity of the charger.
- Ensure that the available space around the battery charger is sufficient to provide adequate ventilation and easy access to the cable socket .
- Make sure the charger is not in the environment where any liquid gets in, and do not pour liquid into the charging case or place it on top of the charger.
- Confirm that nothing has been placed on the output cable and input power cord or place it where you can step on it.
- Confirm that there are no defects, cracks, worn, or exposed copper wires inside the output plug and cable, and that the charging output plug is clean and dry, and that there are no dirt, iron filings and other foreign objects inside, and that the cable is not entangled with any items, and that there are no knots.
- Make sure the input and output cables are not scattered and tangled, people may get entangled or trip over the scattered and surrounded cables.
- Confirm that the input plug and wire are free of defects, cracks, wear, or exposed copper wires inside the cable, and that the charging input plug is clean and dry, and that the metal contacts are free of dirt, iron filings and other foreign objects, and that the metal contacts are in a shiny state.
- Whether the enclosure is intact or not .

#### **MDANGER**

Built-in charger safety warning

- Check before each use of the charger.
- The space for forklift charging should be kept fully ventilated.
- Ensure that the available space around the battery charger is sufficient to provide adequate ventilation and easy access to the cable socket .
- Make sure the charger is not in the environment where any liquid gets in, and do not pour liquid into the charging case or place it on top of the charger.
- Confirm that nothing has been placed on the output cable and input power cord or place it where you can step on it.
- Confirm that there are no defects, cracks, worn, or exposed copper wires inside the output plug



- and cable, and that the charging output plug is clean and dry, and that there are no dirt, iron filings and other foreign objects inside, and that the cable is not entangled with any items, and that there are no knots.
- Make sure the input and output cables are not scattered and tangled, people may get entangled or trip over the scattered and surrounded cables.
- Confirm that the input plug and wire are free of defects, cracks, wear, or exposed copper wires inside the cable, and that the charging input plug is clean and dry, and that the metal contacts are free or dirt, iron filings and other foreign objects, and that the metal contacts are in a shiny state.

#### 3.2.2 Run and operate safety reminders

#### **MDANGER**

Safety warning for external chargers

- Before connecting the output, make sure that there is no fault information on the charger display Interface.
- Do not connect batteries that cannot be charged.
- Do not connect any commercial batteries.
- Before connecting the battery, make sure that the charger is compatible with the battery of that model.
- It is forbidden to smoke or use an open flame around the battery.
- Make sure that liquid does not flow into the inside of the charger.
- Before connecting the battery, it is essential to check and follow the instructions on the rating. voltage of the allowable battery voltage (see the "Identification and Labeling on the Charger" section) Place the battery in front of or next to the charger so that the battery plug is within the operating distance of the charger's charging cable (standard 2,5 m).
- The relevant safety regulations of the manufacturer of the battery and the charging station must be strictly followed.
- The charger input and output cables can only be connected or unplugged when the charger and forklift are turned off.
- If the charging process is interrupted by unplugging it, there is a risk of personal injury The resulting spark can ignite the charging gas formed during charging, which can cause a fire or explosion.
- For chargers whose charging procedures can be changed subsequently, the operator is obliged to record the applicable battery type on the housing.
- If it is determined that there are safety-related changes, damage, or other defects in the charger or in performance, the charger must not be used until repairs have been carried out in accordance with the regulations.
- If you find any damage, you can immediately feedback with the EP.
- Mark the damaged charger and deactivate it.
- The charger should only be reused after the fault has been identified and troubleshooting.
- Do not unplug the charger input power plug while the charger is working.
- Do not unplug the charger output while the charger is working.
- Do not directly touch the surface of the charger when the charger is working to avoid high temperature burns.

#### **↑**DANGER

Built-in charger safety warning

- It is forbidden to smoke or use an open flame around the battery.
- Make sure that liquid does not flow into the inside of the charger.
- The relevant safety regulations of the manufacturer of the battery and the charging station must be strictly followed.
- If you find any damage, you can immediately feedback with the EP.
- Mark the damaged charger and deactivate it.
- The charger should only be reused after the fault has been identified and troubleshooting.



- Do not unplug the charger input power plug while the charger is working.
- Do not unplug the charger output while the charger is working.
- Do not directly touch the surface of the charger when the charger is working to avoid high temperature burns.

#### 3.2.3 Safety reminder after use

#### **MCAUTION**

- Prerequisite.
- The charger is fully charged or standby.
- The charger is paused.
- Procedure.
- Turn off the charger air switch.
- Disconnect the charger input.
- Disconnect the charger output.
- When the charging process is over, roll up the charging cable or place it on the cable holder, and when placing the cable, make sure it doesn't get tangled or trip over people.

#### 3.3 Service Safety Reminder

#### **MDANGER**

Dangerous voltage warning.

- Chargers are electrical devices in which voltage and current can endanger personal safety.
- The charger should only be operated by a trained and authorized professional.
- Before intervening in the charger or working on the charger, the power supply should be disconnected, and, if necessary, the battery should be disconnected.
- The inside of the charger can only be opened and repaired by obtaining EP authorized service The charger must be separated from the power supply and battery before maintenance or repair work begins.
- After 5 minutes of separation from the grid and the battery, the charger's housing can be opened from which the installed capacitors can be unloaded.
- No alterations, modifications and additions to the charger that affect safety are allowed without the manufacturer's permission! This also applies to the installation and setting of safety devices• Special care should be taken not to narrow the spacing and air gaps.
- The spare parts used must meet the technical requirements specified by the manufacturer This is always ensured by the use of original spare part.

#### 3.4 Maintenance safety tips

#### **MDANGER**

Dangerous voltage warning.

 Chargers are electrical devices in which voltage and current can endanger personal safet The charger should only be operated by a trained and authorized professional.

#### **ACAUTION**

The wear and tear of the required maintenance parts is highly dependent on the actual operation and conditions of use of the charger. The following must be checked monthly.

- Whether the signal pin inside the output plug-in is firmly linked.
- Clean the dust of the filter screen at the air inlet of the fan, and replace it immediately if it is damaged.
- Use a dry rag to remove any foreign matter from the inside of the plug-in and the signal pin.
- Whether the grid interface is intact.
- Whether the enclosure is intact.
- Whether the insulation of the grid interface cable is intact.
- Whether all bolted joints are fixed or not.

#### **MWARNING**

• The following safety tests must be performed every 6 months or after the replacement of repair part.



Ground resistance test.

- Insulation resistance test.
- Hipot test.
- Leakage current test.
- Output surge.
- Voltage dip test.
- Leakage protection.
- Protection against electric shock.

## 4 operation

#### 4.1 Installation

#### 4.1.1 Disassemble the box

## **<u>MWARNING</u>**

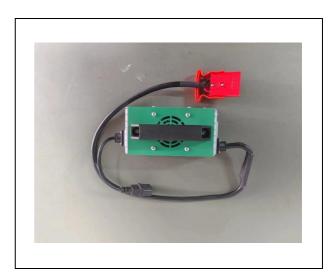
Wear protective gloves when using any tools.



Use a tool to disassemble the box and Remove the charger from the box.



Schematic diagram of the charger



#### 4.1.2 Grid safety devices

#### 

- The following work should only be performed by trained and authorized professionals.
- Do not install the device with electricity.

#### **⚠DANGER**

- Missing or improperly designed leakage protection devices can lead to a risk of electric shock and fire.
- Missing or poorly designed residual current protection devices can cause fatal injuries by causing.
- Electric shock or fire in the event of a malfunction.
- necessary, use Type B or B+RCD (Residual Current Device, RCD).
- In order to operate the charger, the location of use must have a grid interface The supply voltage



- and frequency must match the instructions on the rating plate (see the section "Identification and Labeling on the Charger") As specified, grid interfaces must be properly grounded.
- The charger must be protected from excessive contact voltages according to the regulations of the local power supply unit (EVU).
- If the power cord of the charger is damaged, it must be replaced by the manufacturer or its Customer.
- service department or appropriate qualified personnel to avoid danger.
- Do not install the device with electricity.

Refer to the following table for the safety device of the series power grid

Current rating	Grid safety devices	remark
> 0 to 6 A	6 A gL	A gL fuse can be used Or use a
> 10 to 16 A	16 A gL	circuit autoprotector with K
> 16 to 18 A	20 A gL	performance
> 18 to 23 A	25 A gL	
> 32 to 32 A	35 A gL	

The output current rate of the charger is detailed on the rating plate

char	charger	
Output cu	urrent [A]	At an output voltage of 24 V
from	reach	/
		PN:6.3A;300a:6.3A;PM:8A;
0	50	PMG,1200BG:12A;ZME:16A
		ZLC:12A;3000BG: 25A
char	ger	Fuse data[A]
Output cu	urrent [A]	At an output voltage of 48 V
from	reach	/
0	30	300A:6.3A; PN:6.3A; PM:5A
0	50	1200BG:12A;ZLC:18A
30	50	ZBB:25A; 3000BG:25A
char	charger	
Output cu	Output current [A]	
from	reach	/
30	40	ZBB:25A; 3000BG:25A

#### 4.1.3 Install the charger

#### **MDANGER**

Safety warning for external chargers

• There must be no flammable materials near the charger Included shipping and packaging



materials are included:

- There must be no flammable materials within 2.5 m of the charger.
- The horizontal distance between the charger and the combustible material is at least 2.5 m. It is forbidden to store flammable materials (e.g. on shelves) above the charger or to use flammable building materials. The distance from areas with a risk of fire, explosion and explosives must be at least 5 m.

#### **MDANGER**

Built-in charger safety warning

- The charger cannot be installed close to the controller.
- The positive pole of the charger output connection is not allowed to be directly connected to the battery.
- After the charger output is installed, a pipe sheath needs to be installed to protect it from bare metal touching the metal powder.

#### **MDANGER**

There must not be any liquid in the vicinity of the charger.

Do not place any liquid on top of the charger.

#### **⚠DANGER**

- Avoid the charger exceeding the stress level and do not place anything on top of the charger.
- Electrical installation according to uniform regulations (wire cross-sections, safety devices, ground connections) Avoid the input and output stress of the charger exceeding the range, and do not modify any parameters of the cable (including length, wire diameter, voltage carrying range, etc.) without the authorization of the manufacturer. Before electrical installation, please check the parameters on the nameplate (voltage/frequency/current, etc.) and compare them with the performance parameters of the power connector. Prevent the charger from ultra-high stress ranges (voltage, frequency, and current) by connecting the grid safety device in series.

#### **MDANGER**

- Missing or improperly designed leakage protection devices can lead to a risk of electric shock and fire
- Missing or poorly designed residual current protection devices can cause fatal injuries by causing electric shock or fire in the event of a malfunction necessary, use Type B or B+RCD (Residual Current Device, RCD).
- In order to operate the charger, the location of use must have a grid interface. The supply voltage and frequency must match the instructions on the rating plate (see the section "Identification and Labeling on the Charger") As specified, grid interfaces must be properly grounded.
- The charger must be protected from excessive contact voltages according to the regulations of the local power supply unit (EVU) .
- If the power cord of the charger is damaged, it must be replaced by the manufacturer or its customer service department or appropriate qualified personnel to avoid danger.

#### **AWARNING**

Safety warning for external chargers

- The side distance to the next charger is at least twice the width of the charger. If the spacing to the next charger cannot be respected, the chargers need to be staggered.
- Please install the charger in a vertical position, and there are no foreign objects around the fan to prevent the fan from getting foreign objects inside the charger when working Do not allow horizontal installation.
- Maintain a minimum lateral distance of 0,5 m from the next wall.
- Do not install this charger in a commercial environment.
- Fire extinguishing equipment must be prepared around the charger.
- Ensure optimal ventilation of the charger:
- When installing/installing the charger, you should pay attention to:



- No corrosive gases, e g acid gases,
- No conductive dust, such as soot or metal dust,
- No excessive non-conductive dust is deposited,
- No water should enter the inside of the charger
- Pay attention and comply with the regulations set by the battery manufacturer.
- In addition to the restrictions on the choice of installation site mentioned in this operating instruction national regulations must be observed.

#### **MWARNING**

Built-in charger safety warning

- Please install the charger in a vertical position, and there are no foreign objects around the fan to prevent the fan from getting foreign objects inside the charger when working Do not allow horizontal installation.
- The charger is not allowed to be installed on a liquid lead-acid battery.
- The charger is not allowed to be installed in the controller accessory, at least at a distance of more than 400mm away from the control.
- After the charger output is installed, a pipe sheath needs to be installed to protect it from bare metal touching the metal powder..
- Ensure optimal ventilation of the charger:
- When installing/installing the charger, you should pay attention to:
  - No corrosive gases, e g acid gases,
  - No conductive dust, such as soot or metal dust,
  - No excessive non-conductive dust is deposited,
  - No water should enter the inside of the charger
- Pay attention and comply with the regulations set by the battery manufacturer.
- In addition to the restrictions on the choice of installation site mentioned in this operating instruction national regulations must be observed.

#### **<b>⚠WARNING**

- This series of chargers is suitable for charging industrial lithium batteries Any other use of the equipment is non-compliant and may result in injury, damage to the equipment, or other property Damage.
- The rated operating input voltage range, frequency range, maximum input current, and input power are all specified in detail on the nameplate.
- The rated working output voltage range, current range, and constant power are all specified in detail on the nameplate.
- Used in industrial environments.
- The permissible temperature range is between -10°C and 45°C.
- Relative humidity is 5%~95%.
- The altitude should not exceed 2000 m.
- Input voltage fluctuation range of ±15%.
- Storage temperature: -20 °C~75 °C.
- Storage humidity 5%~95%.



Check whether the charger is internal or external, and select the following installation method according to the charger adaptation type.

- 1: Built-in charger mode: connect the positive and negative poles of the output and the grounding wire.

  Connect the input AC power cable.
- 2: External charger mode: Externally connect the AC power cable, and the charger needs to be placed at a height of 500mm above the ground.



Note: If you want to replace the cable, please refer to Section 2.6 for the relevant technical parameters.

Note: Charger adaptation AC power cords vary by model, see Section 2.6.

Note: If the environmental conditions exceed the above range, you should contact us in advance to negotiate and solve.

#### 4.2 Operators Daily Checklist

#### **⚠DANGER**

Safety warning for external chargers

- The space for forklift charging should be kept fully ventilated.
- There is no clogging of the fan and no foreign objects around None of the vents were blocked Within a radius of at least 2,5 m around the forklift that needs to be charged, flammable materials and work equipment that could generate sparks must not be placed.
- There are no flammable, explosive, or combustible materials, chemicals, flammable vapors, and other dangerous items in the vicinity of the charger.
- Ensure that the available space around the battery charger is sufficient to provide adequate ventilation and easy access to the cable socket .
- Make sure the charger is not in the environment where any liquid gets in, and do not pour liquid into the charging case or place it on top of the charger.
- Confirm that nothing has been placed on the output cable and input power cord or place it where you can step on it.
- Confirm that there are no defects, cracks, worn, or exposed copper wires inside the output plug and cable, and that the charging output plug is clean and dry, and that there are no dirt, iron filings and other foreign objects inside, and that the cable is not entangled with any items, and that there are no knots.
- Make sure the input and output cables are not scattered and tangled, people may get entangled or trip over the scattered and surrounded cables.
- Confirm that the input plug and wire are free of defects, cracks, wear, or exposed copper wires inside the cable, and that the charging input plug is clean and dry, and that the metal contacts are free of dirt, iron filings and other foreign objects, and that the metal contacts are in a shiny state.
- · Whether the enclosure is intact or not .



Built-in charger safety warning

- Check before each use of the charger.
- The space for forklift charging should be kept fully ventilated.
- Ensure that the available space around the battery charger is sufficient to provide adequate ventilation and easy access to the cable socket.
- Make sure the charger is not in the environment where any liquid gets in, and do not pour liquid into the charging case or place it on top of the charger.
- Confirm that nothing has been placed on the output cable and input power cord or place it where you can step on it.
- Confirm that there are no defects, cracks, worn, or exposed copper wires inside the output plug and cable, and that the charging output plug is clean and dry, and that there are no dirt, iron filings and other foreign objects inside, and that the cable is not entangled with any items, and that there are no knots.
- Make sure the input and output cables are not scattered and tangled, people may get entangled or trip over the scattered and surrounded cables.
- Confirm that the input plug and wire are free of defects, cracks, wear, or exposed copper wires inside the cable, and that the charging input plug is clean and dry, and that the metal contacts are free or dirt, iron filings and other foreign objects, and that the metal contacts are in a shiny state.

#### **△WARNING**

Never start the charger until any damage or malfunction of the charger has been resolved.

#### 4.3 Run the charger

#### 

Safety warning for external chargers

- Do not connect batteries that cannot be charged.
- Do not connect any commercial batteries.
- Before connecting the battery, make sure that the charger is compatible with the battery of that model.
- It is forbidden to smoke or use an open flame around the battery.
- Make sure that liquid does not flow into the inside of the charger.
- Before connecting the battery, it is essential to check and follow the instructions on the rating. voltage of the allowable battery voltage (see the "Identification and Labeling on the Charger" section) Place the battery in front of or next to the charger so that the battery plug is within the operating distance of the charger's charging cable (standard 2,5 m).
- The relevant safety regulations of the manufacturer of the battery and the charging station must be strictly followed.
- The charger input and output cables can only be connected or unplugged when the charger and forklift are turned off.
- If the charging process is interrupted by unplugging it, there is a risk of personal injury The resulting spark can ignite the charging gas formed during charging, which can cause a fire or explosion.
- For chargers whose charging procedures can be changed subsequently, the operator is obliged to record the applicable battery type on the housing.
- If it is determined that there are safety-related changes, damage, or other defects in the charger or in performance, the charger must not be used until repairs have been carried out in accordance with the regulations.
- If you find any damage, you can immediately feedback with the EP.
- Mark the damaged charger and deactivate it.
- The charger should only be reused after the fault has been identified and troubleshooting.
- Do not unplug the charger input power plug while the charger is working.
- Do not unplug the charger output while the charger is working.
- Do not directly touch the surface of the charger when the charger is working to avoid high



temperature burns.

#### **ADANGER**

Built-in charger safety warning

- It is forbidden to smoke or use an open flame around the battery.
- Make sure that liquid does not flow into the inside of the charger.
- The relevant safety regulations of the manufacturer of the battery and the charging station must be strictly followed.
- If you find any damage, you can immediately feedback with the EP.
- Mark the damaged charger and deactivate it.
- The charger should only be reused after the fault has been identified and troubleshooting.
- Do not unplug the charger input power plug while the charger is working.
- Do not unplug the charger output while the charger is working.
- Do not directly touch the surface of the charger when the charger is working to avoid high temperature burns.

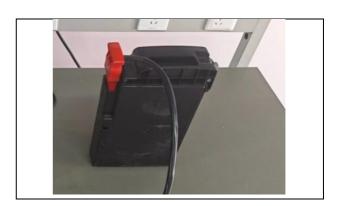
#### **∆WARNING**

Wipe off any water stains on your hands to avoid electric shock

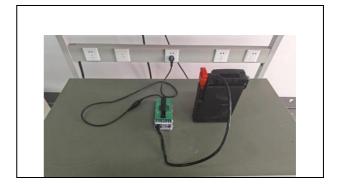
Connect the charger AC input to the power grid.



Using the charger output connector, connect the battery.



Schematic diagram of the completion of the connection



Note: The plug needs to be securely connected at a height of 1 meter from the ground.



#### 4.4 Working status

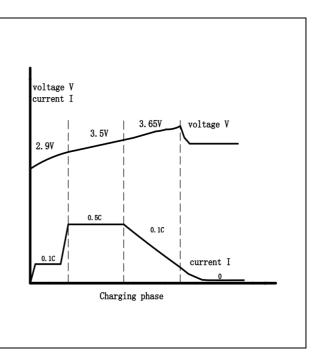
#### **MWARNING**

- Do not unplug the charger input power plug while the charger is working.
- Do not unplug the charger output while the charger is working.
- Do not directly touch the surface of the charger when the charger is working to avoid high temperature burns.

Light Strip Color	Charger State	Photo
RED LIGHTING ON	Charging	
GREEN LIGHTING ON	Fully Charged	
YELLOW FLASHING	Charger Fault	
YELLOW LIGHTING ON	Bettery Fault	

#### 4.5 Running curves

The charger will output the corresponding voltage and current according to the lithium battery CAN message, the above curve is only test data, it does not mean that the charger will be charged according to this curve.





Note: In the curve, V represents the voltage of the monomer, 24V monomer = 8 strings, 48Vmonomer = 15 strings, 80V monomer = 24 strings. The calculated curve voltage should = number of cells \* cell Voltage.

Note: In the curve, C is equal to the actual capacity of the battery. In the calculation, the current Operating current should = the actual capacity of the battery \* the current execution multiple, For example, the 80V400AH battery needs to be charged, according to the above graph, the working logic of the charger should be that when the voltage is lower than 69.6V, the charger will output 40Acurrent. When the battery voltage is greater than 69.6V and lower than 84V, the charger will output 200A current. When the battery voltage is greater than 84V and lower than 87.6V, the charger will output 40A current and maintain it until the battery is fully charged.

Note: The charger does not provide lead-acid battery curve query, please refer to the lead-acid battery manual.

#### 4.6 Once the operation is complete

Disconnect the charger input.

Disconnect the charger output.

When the charging process is over, roll up the charging cable or place it on the cable holder, and when placing the cable, make sure it doesn't get tangled or trip over people.

Use the charger that was placed after completion





#### 5 Description of the fault

#### 5.1 Lead battery fault table

Fault Code	Item	Description
1	Abnormal charging machine	Input AC power failure, internal temperature failure, and issues with one end of the charger causing charging to not continue
2	Battery abnormality	Charging failure caused by improper battery connection

#### Lithium battery fault table

Fault Code	Item	Description
1	Abnormal charging machine	Input AC power failure, internal temperature failure, communication failure, and issues with one end of the charger causing charging to not continue
2	Battery abnormality	Charging failure caused by improper battery connection
3		The charger failed to detect the battery, CAN communication anomaly, The charger is on standby.

#### 5.2 Simple breakdown repairs

#### 5.2.1 Fault 1: Abnormal charging machine

BMS (Battery Management System) faults, please refer to the battery manual

#### **▲DANGER**

- The following faults need to be carried out by a professional electrician.
- Before intervening with the charger, disconnect the charger input and output.
- Do not touch the metal surface on the outside of the charger to avoid high temperature burns.

AC Input Overvoltage/Undervoltage: yellow led flashing

Solution: When the input voltage exceeds the set value of the charger, the charger will automatically enter a protective state and stop running. After eliminating the abnormal AC power, the charger will automatically restart

Check if the input voltage is less than the working voltage of the charger. If it is less than this value, eliminate the AC fault and recharge the charger

Output Overvoltage/Undervoltage: yellow led flashing Solution:When the battery voltage is greater than the maximum value detected internally by the charger or less than the minimum value detected internally, the charger cannot charge the battery normally. At this time, stop charging the battery with too high an overvoltage. For the battery with too low a voltage, replenish it to the normal voltage and then charge it with the charger.







Over temperature protection: yellow led flashing Solution:

The internal temperature of the charger is too high due to excessive external temperature, damaged charger fan, or the charger is in a closed and confined space. Place the charging area in a ventilated environment, and the charger will take care of the skin after the internal temperature drops. If the fan of the charger fails, it is recommended to return to the factory for repair.



Internal fault of charger: yellow led flashing Solution:

After troubleshooting input, output, temperature and other faults, the charger does not start normally, and the charger will stand for 2 hours. Re-connect to the AC power, but the charger still does not start. It is recommended to return to the factory for maintenance.



#### 5.2.2 Fault 2:Battery abnormality

#### **MDANGER**

- The following faults need to be carried out by a professional electrician
- Before intervening with the charger, disconnect the charger input and output
- Do not touch the metal surface on the outside of the charger to avoid high temperature burns

Battery abnormality: yellow lighting on Solution:

please refer to the battery manual



#### 5.2.3 Fault 3: Non-load

#### **MDANGER**

- Before intervening with the charger, disconnect the charger input and output.
- Do not touch the metal surface on the outside of the charger to avoid high temperature burns.
- When detecting the output voltage, voltage, and current, do not touch any of the metal contacts of the connector with your hands.



Communication failure:
yellow led flashing
Solution:
Check whether the CAN-H and CAN-L
have faults such as reverse connection
and poor contact. After the inspection,
they still cannot be charged normally.
Check whether the charging protocol
matches and whether the baud rate
matches.



#### 5.3 Service support

Most of the above situations can be resolved with simple troubleshooting. If it is determined that the issue does not fall into the above category, it may indicate that the charger's hardware is damaged. Customers who meet the after-sales service conditions are kindly requested to contact EP in time for hardware replacement.

If you are unable to identify the problem, need to replace the hardware, or need to change the software, please contact your local distributor. In this case, remote video communication may be required.

When contacting the EP, please provide a detailed description of the problem. For charger fault repairs, please provide charger nameplate information, battery information, and capture CAN communication information during charging if necessary to identify specific problem

#### 6 Waste disposal

## i NOTE

Chargers should be collected separately from household or commercial waste and properly recycled or disposed of Take the old charger (if any) in-house for disposal and hand it over to a professional company (professional waste disposal company) In principle, it is also possible to return the old charger to the manufacturer. To do so, please contact the manufacturer's customer service department. Specific protocols must be adhered to.

According to the European WEEE Directive (2012/19/EU), electrical and electronic equipment must be collected, recycled or professionally disposed of separately from unsorted municipal waste, where pollutants resulting from improper disposal can cause lasting damage to health and the environment.

Detailed information can be obtained at the Waste Disposal Specialist Plant or the relevant authority The packaging of the charger should be disposed of separately. Paper, cardboard and plastic are recycled.