

Original instructions

Lithium-ion batteries

EXD 20
EXD 20 SF
EXH 20 SF
EXH 25
EXH 25 SF
EXH 30



0183 0184 0185 0186 0307
0313

first in intralogistics

11538013551 EN - 01/2019

Address of manufacturer and contact details

STILL GmbH
Berzeliusstraße 10
22113 Hamburg, Germany
Tel. +49 (0) 40 7339-0
Fax: +49 (0) 40 7339-1622
Email: info@still.de
Website: <http://www.still.de>



1	Introduction	
	Introduction	2
	Information on the conformity of lithium-ion batteries	3
2	Safety	
	Special lithium-ion safety rules	6
	What to do in the event of incorrect use	7
	Personal protective measures following an incident	8
	What to do in the event of an accidental spillage	8
	Transporting a lithium-ion battery	10
	Scrapping lithium-ion batteries	11
3	General views	
	Lithium-ion battery types	14
	Labels on the top of lithium-ion batteries	15
	Labels on the sides of lithium-ion batteries	16
4	Use	
	Checking the charge status	18
	Connecting/disconnecting the battery connector	18
	Commissioning a truck equipped with a side access lithium-ion battery	19
	Automatic battery shut-off	20
	Battery fitted with a compartment	20
	Specific features of the display	21
	Installing the external charger	22
	Charging lithium-ion batteries using an external charger	23
	Using the side socket to charge the battery	25
	Battery charging times	28
	Using the on-board charger	29
	Changing the battery	32
	Battery error codes	33
	Lithium-ion batteries: Long-term storage	34

5 Maintenance

Maintenance plan for lithium-ion batteries	38
Chassis, bodywork and fittings	39
Cleaning the lithium-ion battery	39
Electrical equipment	40
Harnesses and cables	40

Introduction

Introduction

This supplement is specific to lithium-ion batteries. It complements the operating instructions. The latter describe the conditions for using the lithium-ion battery in the truck that you own. An Ion label affixed on the truck allows you to differentiate from trucks fitted with a Gel or Lead battery.

DANGER

Electrical risk

Refer to the specific lithium-ion safety rules.

Lithium-ion elements and batteries are on the list of dangerous materials in accordance with

the United Nations recommendations on the transport of dangerous goods.

The battery must not be opened.

It must be stored in a cool, dry and ventilated place. High temperatures (above 40°C) reduce the battery life.

DANGER

There is a risk of fire, leakage or explosion

Do not store lithium-ion batteries in bulk (risk of short circuit). Keep the battery in its original packaging until it is used.

Do not destroy or incinerate them.

Information on the conformity of lithium-ion batteries

The manufacturer of the lithium-ion battery and Kion group provider declares that:

the lithium-ion battery

conforms with the provisions of the following EU directive **2004/108/EC**

in accordance with **EN 61000-6-2:2006 and EN 61000-6-3:2007**.

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

2

Safety

Special lithium-ion safety rules

Special lithium-ion safety rules

⚠ DANGER**There is a risk of fire.**

Have class D fire extinguishers or inert gas, carbon dioxide, powder or foam fire extinguishers near the zone in which the lithium-ion batteries are used.

⚠ 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 ($> 70^{\circ}\text{C}$). 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
- Do not expose the battery unit to humidity or water ($> 95\%$)
- Install the batteries in a Level 2 pollution zone in accordance with standard EN 60664-1
 - Batteries must be installed in a room that can be easily ventilated in the event of incorrect use.
 - The forklift operator must drive the truck carefully to avoid any risk of piercing or damaging the lithium-ion batteries.

⚠ DANGER**Risk of injury**

In the event of an accident (shock, fall, collision), the battery may be damaged, pierced or deformed. Establish a 5-metre safety perimeter around the battery. Contact the emergency services and tell them that there is a lithium-ion battery fire. Contact the after-sales service department.

- Store strapped batteries on pallets. Do not store them too high to reduce any risk of falling. Do not store on the ground to reduce the risk of humidity and impacts. We recommend that batteries are stored at a height between 60 and 120 cm.
- If an unusual smell, change of shape or any other anomaly is observed during operation, immediately disconnect the battery (using either the emergency stop or the charger socket). Contact the after-sales service department. If necessary, also contact the emergency services and tell them that there is a lithium-ion battery fire.

What to do in the event of incorrect use

Lithium-ion batteries present no chemical danger in the context of normal use. Batteries must not be opened or burned for example.

In the event of exposure to the internal components or of their being burned, follow these instructions.

In the event of contact with eyes

The content of an open battery can cause eye irritation.

Dust is likely to cause inflammation of the eyelids.

- Rinse immediately and thoroughly with water for at least 15 minutes
- See a doctor as quickly as possible

In the event of contact with skin

An open battery can lead to skin irritation and allergies.

- Remove contaminated clothes
- Rinse the parts of the skin affected thoroughly for at least 15 minutes
- Wash the skin using soap and water
- See a doctor if the irritation persists

In the event of inhalation

An open battery can cause irritation of the respiratory tracts and mucous membranes or an allergic reaction.

During disassembly of the battery, a gas may be released and irritate the throat.

- Carry the person into the open air
- See a doctor as quickly as possible

In the event of ingestion

- Rinse the mouth thoroughly with water
- Drink lots of water

- Do not make the person vomit
- See a doctor as quickly as possible

In the event of a fire

If a fire breaks out, follow these instructions:

For a small fire:

- Use class D fire extinguishers or inert gas, carbon dioxide, powder or foam fire extinguishers
- Establish a safety perimeter of five metres around the battery
- Call the emergency services and tell them that it is a lithium-ion battery fire
- After extinguishing the fire, do not reuse the battery. Contact the after-sales service department.

For a large fire:

- Establish a safety perimeter of five metres around the battery
- Call the emergency services and tell them that it is a lithium-ion battery fire

Special fire-fighting procedures (intervention of firefighters):

- Firefighters must wear self-contained breathing apparatus
- Use an approved mask to avoid inhalation of toxic fumes
- Wear protective clothing and equipment to avoid accidental bodily contact with the electrolyte solution
- All the types of extinguishing agents given above can be used on the batteries
- Use a large amount of water to cool the outside of the batteries if they are exposed to fire to prevent them rupturing
- After extinguishing the fire, do not reuse the battery. Contact the after-sales service department.

Personal protective measures following an incident

⚠ DANGER

Electrical risk

Do not use water on connected batteries in the charging room.

⚠ DANGER

Risk of explosion: release of gas that may create an explosive atmosphere

After extinguishing the fire, establish a safety perimeter of at least five metres around the battery.

⚠ DANGER

Risk of release of toxic products

Personal protective measures following an incident

⚠ WARNING

Handle an open battery only in a well-ventilated place.

Respiratory protection	If an element is opened or if it leaks, use a gas mask covering the entire face and fitted with ABEK filters or self-contained breathing apparatus (escape mask-type). Firefighters must wear self-contained breathing apparatus.
Hand protection	Use polypropylene, polyethylene, rubber or Viton gloves to handle leaking or broken elements.
Eye protection	Wear safety goggles with side shields or a mask covering the face to handle leaking or broken elements.
Other	Wear a rubber apron and a protection suit to handle leaking or broken elements.

What to do in the event of an accidental spillage

Take the following precautions in the event of leakage:

Precautions for individuals

- Evacuate staff from the contaminated area until the vapours have dispersed
- Avoid inhaling the gas in the event of electrolyte leakage from an element or a battery
- Follow the instructions on **What to do in the event of incorrect use** if there is contact with

the skin or eyes, or if there is inhalation or ingestion

- Wear goggles and protective gloves

Precautions for the environment

- Avoid pollution of wastewater, surface water and groundwater
- Avoid pollution of the soil and atmosphere
- Use absorbent materials (sand, earth) to absorb exudation

What to do in the event of an accidental spillage

- Seal battery leakages
- Put the contaminated absorbent product in a plastic bag and dispose of it as special waste according to the local regulations in force

⚠ DANGER**Environmental danger**

Do not reuse a lithium-ion battery that has leaked.
Call the After-Sales Service Centre.

Transporting a lithium-ion battery

Transporting a lithium-ion battery

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.

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 equipped with a lithium-ion battery
- Transporting only the lithium battery

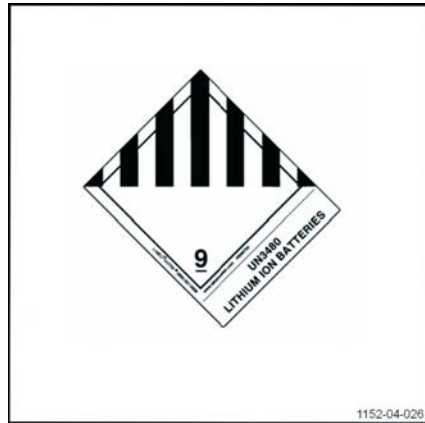
A class 9 danger label must be affixed to the packaging for transport.

It is different if the battery is transported on its own or in a truck. An example of a label appears in this supplement. 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.

NOTE

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



Scrapping lithium-ion batteries



ENVIRONMENT NOTE

Comply with current regulations for scrapping batteries. Take care to minimise, as far as possible, any impact on the environment.

Lithium-ion batteries must be sent to the collection centre to be recycled. Contact the After-Sales Service Centre to agree how to send them.

Apply the following main rules for transport:

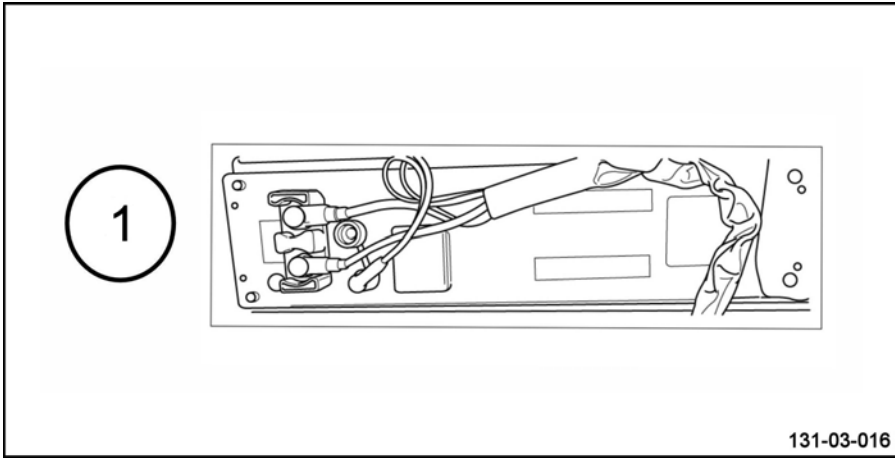
- Make sure that the battery is discharged
- Affix the **Class 9** transport label on the battery
- Use packaging that complies with international regulations
- Use the original packaging, if possible. Use sturdy packaging capable of bearing the weight of the batteries. Store it in a dry place.
- Wedge the battery well in the packaging to prevent it moving during transport
- Pack batteries individually in plastic bags. Package them to prevent any risk of short-circuit between terminals.
- Identify the type and number of batteries on the outside of the packaging
- Do not store near to a heat source

3

General views

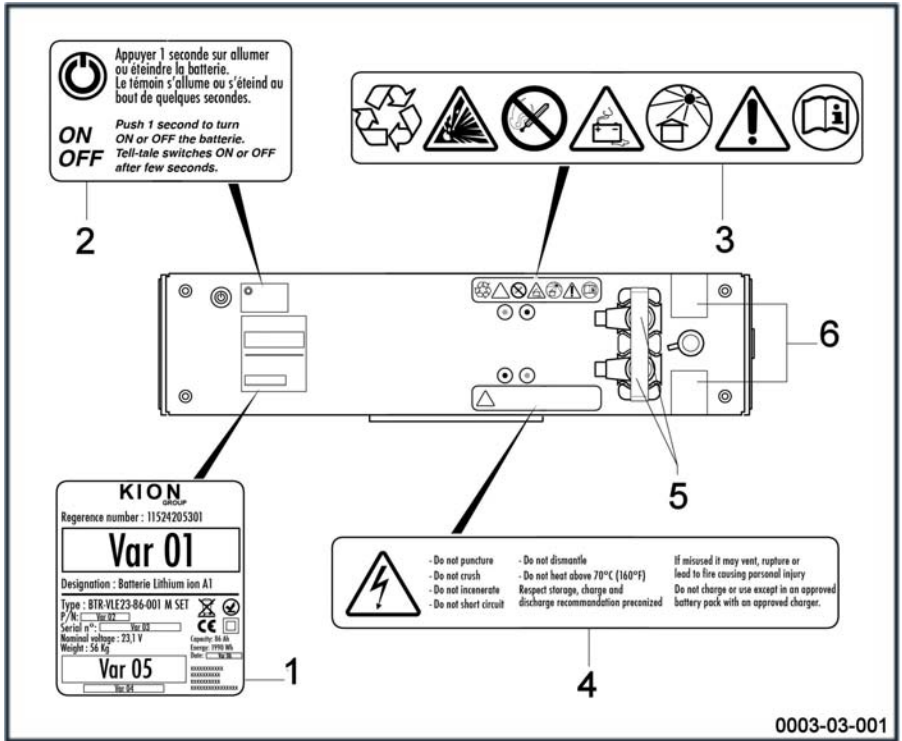
Lithium-ion battery types

Lithium-ion battery types



Battery type (1)	Dimensions				Nominal voltage (V)	Nominal capacity (Ah)
	Length (mm)	Height (mm)	Depth (mm)	Weight (kg)		
B1 (one module)	718	618	210	108	23.1	205
B2 (two modules)	718	618	210	139	23.1	410

Labels on the top of lithium-ion batteries



- 1 Identification label
- 2 How to switch on the battery label
- 3 Recommendation pictograms label

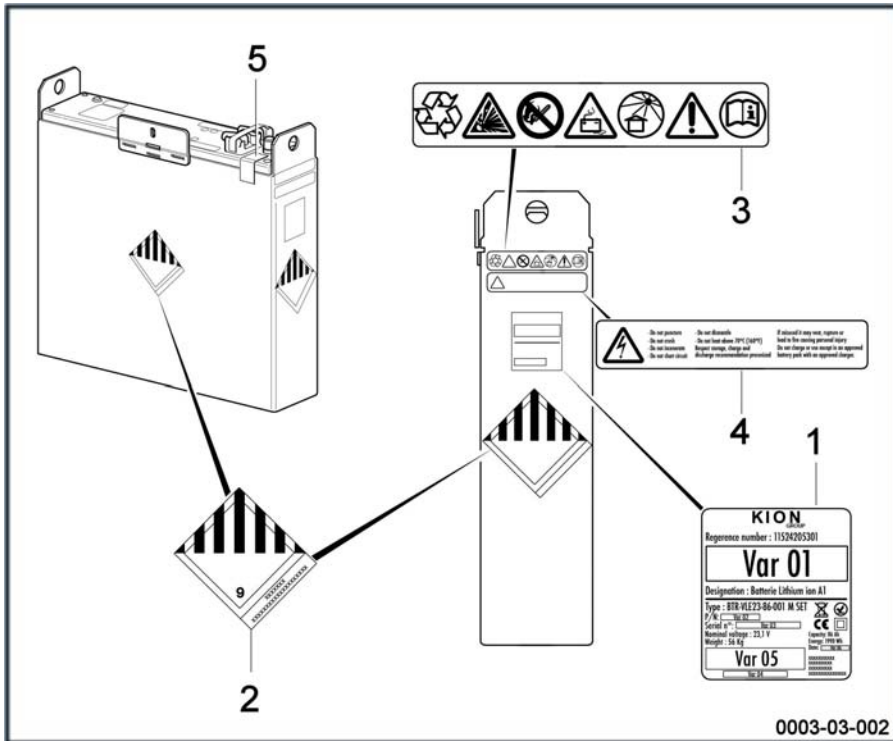
- 4 High Voltage label
- 5 + and - poles on the terminal board
- 6 Tamper-proof label

i NOTE

This illustration shows the location of labels on the A1 and A2 batteries. The positioning is slightly different on the B1 and B2 batteries.

Labels on the sides of lithium-ion batteries

Labels on the sides of lithium-ion batteries



- | | | | |
|---|--|---|---------------------------------|
| 1 | Identification label | 3 | Recommendation pictograms label |
| 2 | Transport label (check the regulations in force in your country) | 4 | High Voltage label |
| | | 5 | Tamper-proof label |

 **NOTE**

This illustration shows the location of labels on the A1 and A2 batteries. The positioning is slightly different on the B1 and B2 batteries.

4

Use

Checking the charge status

Checking the charge status

⚠ DANGER

Electrical danger

The battery must be charged and serviced in accordance with the instructions provided with the battery and the external charger.

- Before using the truck, check that the battery is correctly charged.
- Switch on the battery.
- Connect the battery connector.

- Depending on the model selected, turn the switch key or enter the PIN code on the electronic key.
- Check the battery charge on the display screen.

⚠ WARNING

Improper use of the battery may cause it to become excessively or completely discharged. This may damage the battery or render it unusable.

If this is the case, do not recharge the battery. It is essential to contact the After-Sales Service.

Connecting/disconnecting the battery connector

⚠ WARNING

Electrical risk

Regularly check the condition of the contacts of the connectors.

Each ½ connector has a polarising pin. Ensure that the connectors are present and in good condition. They prevent any risk of reverse polarity.

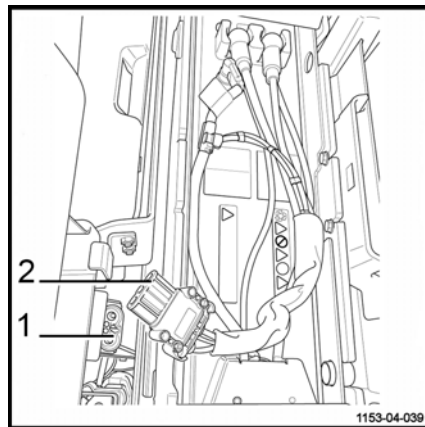
Disconnecting the battery connector

- Immobilise the truck.
- Switch off the ignition and remove the key.
- Press the emergency off switch.
- Open the battery hood.
- Unplug the battery connector (2) from the fixed socket (1) on the truck.

It is not necessary to switch off the lithium-ion battery once the battery connector has been disconnected.

Connecting the battery connector

- Push the battery connector (2) into the fixed socket (1) on the truck.



Automatic battery shut-off

Automatic battery shut-off

It is not necessary to switch off the battery. If the truck is not used for a certain period of time, the battery is automatically switched off.

This period of time is normally 2 hours and 5 minutes. It can be configured.

Contact the After-Sales Service to configure this.

When the battery is switched off, simply pressing the button for one second will switch it back on.

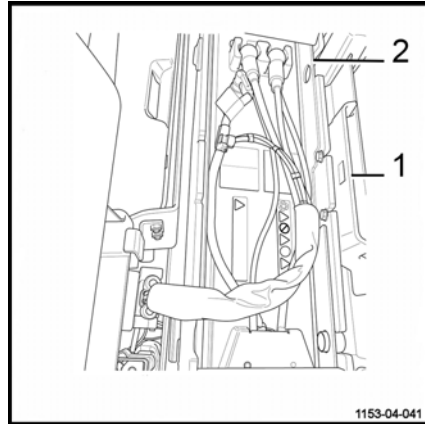
Battery fitted with a compartment

The lithium-ion battery is placed in a battery compartment (2).

The battery is attached to the compartment using a mounting (1).

Removing the battery from the compartment and loosening the mounting are prohibited.

If the battery is faulty, please contact the After-Sales Service.



Specific features of the display ▾

The operating unit shows the battery charge level.

The operator can refer to the battery icon (1) or (2).

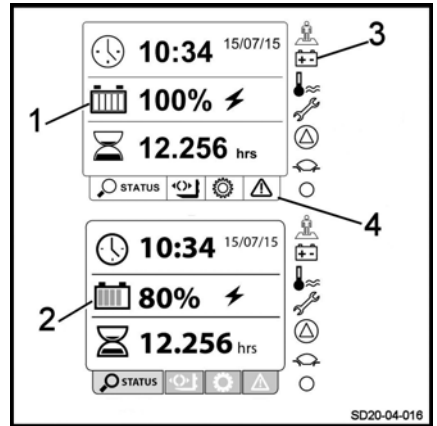
The number of bars shown indicates the battery charge level.

- From 0 to 20%: 1 bar
- From 21 to 40%: 2 bars
- From 41 to 60%: 3 bars
- From 61 to 80%: 4 bars
- From 81 to 100%: 5 bars

The **battery** light (3) comes on in the event of a deep discharge of the battery or in the event of a fault.

Three distinct warnings may be displayed if the battery charge is insufficient:

- 1) 10% of charge remaining: the icons (3) and (4) flash and an audible beep sounds. A warning message appears at the icon (4) and remains on until the battery is recharged
- 2) 5% of charge remaining: the icons (3) and (4) flash and an audible beep sounds. A warning message appears at the icon (4) and remains on until the battery is recharged
- 3) 2% of charge remaining: three regular beeps sound, lifting is restricted, the icon (3) flashes and the icon (4) remains on with a new warning message



Installing the external charger

Installing the external charger

The lithium-ion battery must be recharged only with a special charger.

Do not use a charger other than the one provided by the Kion group.

The temperature of the room where the charger is installed must be between 5° and 45°C. The humidity level must be below 95%.

The following wall chargers are available:

- An external wall charger
- An external charger that stays on the ground
This is heavier

The vertical access and the side access lithium-ion batteries can be recharged with both types of external chargers.

DANGER

Electrical danger

The charger must be installed and maintained only by electrical engineers or qualified staff.

DANGER

There is a risk of fire.

The charger must be installed in a room without any inflammable elements.

WARNING

Avoid the charger overheating.

Do not obstruct the air vents. The air must be able to circulate correctly.

Do not install the charger near a heat source or in a place exposed to direct sunlight.

Do not install it in an area that is subject to excessive dust or shocks or mechanical vibrations.

Charging lithium-ion batteries using an external charger

Read the information in the documentation provided with the charger.

This provides information on:

- The various charger screens.
- Possible error messages.
- Precautions for use.

⚠ CAUTION

Risk of damage to the battery

A compatible charger must be used for charging the lithium-ion batteries.

⚠ DANGER

Electrical danger

Do not touch the lithium-ion battery when it is charging and do not wear rings or jewellery. Do not place metal objects on or near the battery. Do not light a naked flame in the vicinity of the charging zone or near charging batteries.

⚠ WARNING

Risk of sparks

Always connect the battery connector before switching on the battery charger and disconnect the connector after switching off the charger.

⚠ CAUTION

Risk of damage to the battery

It is important to charge the lithium-ion battery fully at least once a week.

The LED located on the truck display flashes red. You must therefore recharge the battery to 100%.

Charging the side access battery using an external charger

⚠ CAUTION

Risk of damage to the battery

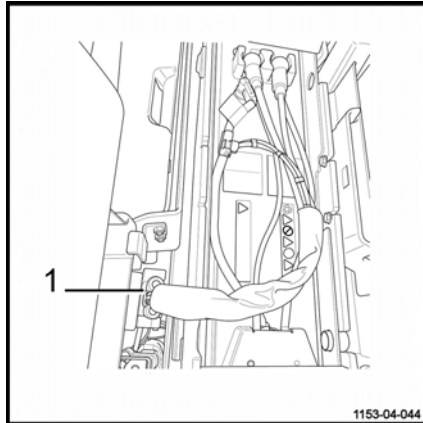
It is essential not to switch off the lithium-ion battery during charging.



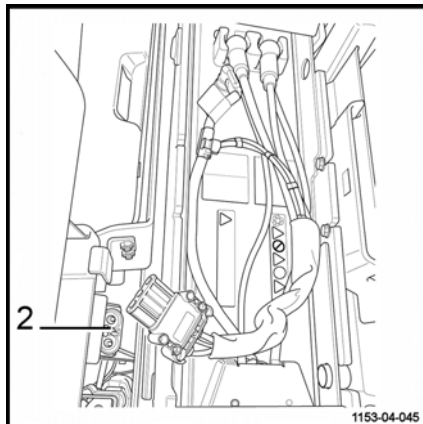
Charging lithium-ion batteries using an external charger

To recharge the lithium-ion battery, proceed as follows:

- Park the truck close to the charging station.
- Immobilise the machine. Lower the fork arms.
- Switch off the ignition (key or electronic key).
- Press the emergency off switch.
- Open the battery hood.
- Pull the battery connector (1) to unplug it. ▷



- Plug the socket of the battery charging station into the fixed socket (2). ▷
- Switch the charger on as directed in the specific instructions for the charger. A screen appears displaying the words **Battery connected**. Charging the battery is automatically managed by the on-board electronics of the battery.
- When charging is complete and the charger has stopped, unplug the charger.



NOTE

It is possible to stop charging before the end of the complete cycle. The forklift operator can resume work more quickly. It is advisable to recharge the battery after each use if possible. The battery charge percentage is indicated on the display screen. The charging time is indicated on the screen of the charger.

Using the side socket to charge the battery

- Reconnect the battery connector (1) into the fixed socket (2) on the truck.
- Then close the battery hood
- Switch on the ignition (key or electronic key) and check the charging status of the truck on the display.

The truck is now ready for use.

If the charger stops before charging is complete, follow these steps:

- Press the UP button for five seconds.

The charger will stop charging. The external charger display shows the following message: **Manual Stop**.

- Reconnect the truck battery connector (1).
- Then close the battery hood
- Return the truck to service.

Using the side socket to charge the battery

A side socket (1) can be installed on the battery on the side of the truck. The socket allows you to charge the battery without removing the battery connector (emergency stop handle) of the truck.

⚠ CAUTION

Risk of damage to the battery

It is essential not to switch off the lithium-ion battery during charging.

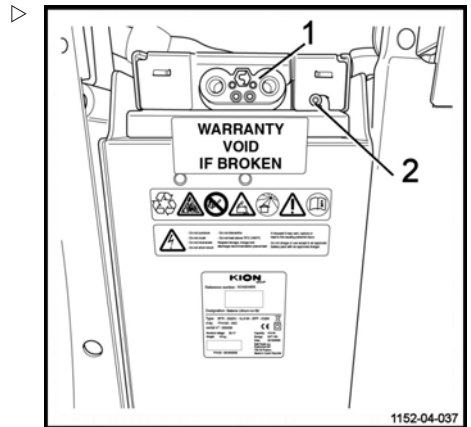
⚠ CAUTION

Risk of damage to the battery

Do not connect two external chargers to charge the battery. The operator must use either the side socket or the truck socket (emergency stop handle) for charging.

Proceed as follows:

- Park the truck close to the charging station.
- Immobilise the machine. Lower the fork arms.



Using the side socket to charge the battery

- Switch off the ignition (key or electronic key).
- Disconnect any additional electrical equipment before charging. Charging cuts off the electrical supply to the truck and to additional equipment.
- Plug the connector of the charging station into the side socket (1) located on the side of the truck.
- Switch the charger on as directed in the specific instructions for the charger. A screen appears displaying the words **Battery connected**. Charging of the battery is automatically managed by the on-board electronics of the battery.

A green LED (2) lights up. The LED indicates that the connector of the side socket (1) is correctly inserted and that charging is in progress.



NOTE

If the LED remains off, the connector is not detected. Please contact the After-Sales Service Centre.

- When charging is complete and the charger has stopped, unplug the charger.



NOTE

It is possible to stop charging before the end of the complete cycle. The operator can resume work more quickly. It is advisable to recharge the battery after each use if possible. The battery charge percentage is indicated on the display screen. The charging time is indicated on the screen of the charger.

- Switch on the ignition (key or electronic key) and check the charging status of the truck on the display.

The truck is now ready for use.

⚠ CAUTION

Risk of damage to the side socket

The side socket is intended only for charging the battery.

If the socket is faulty, please contact the After-Sales Service Centre.

Battery charging times

Battery charging times

The charging time for lithium-ion batteries depends on the charger used. There are two types of chargers.

The charging times indicated in the table are provided for information only. They correspond to a complete battery recharge (from 0% to 100%).

	Battery A1 – 82 Ah BS vertical access compartment		Battery A2 – 164 Ah BS vertical access compartment		Battery B1 – 205 Ah 2 PzS side access compartment		Battery B2 – 410 Ah 2 PzS side access compartment	
	25°C	0°C	25°C	0°C	25°C	0°C	25°C	0°C
Wall charger V90 (single phase, 90 A)	1 hr 30	4 hrs 30	2 hrs 10	4 hrs 50	2 hrs 40	5 hrs	5 hrs 10	5 hrs 10
Wall charger V160 (three phase, 160 A)	1 hr 30	4 hrs 30	1 hr 40	4 hrs 50	1 hr 50	5 hrs	3 hrs	5 hrs 10
Wall charger V225 (three phase, 225 A)	1 hr 30	4 hrs 30	1 hr 40	4 hrs 50	1 hr 40	5 hrs	2 hrs 20	5 hrs 10

NOTE

These charging times may increase if:

- *The battery is stored at a low temperature before recharging*
- *The battery is not fully charged (100%) at least once a week*

Using the on-board charger

CAUTION

Precautions for installation and use

- The electric installation must comply with the standard applicable in your country.
- The electric wall socket must be a 2-pole + earth 16-A, 230-V type socket that is correctly connected and protected.
- Before charging, check the condition of the connections and cables, and retighten as required.
- Charging must be carried out in an area where there is no condensation or pollution and where there is sufficient ventilation.
- The charger must not be exposed to oil, grease or other similar substances.
- Charging must be carried out with the truck stopped.

Thanks to the on-board charger, it is no longer necessary to use a charging room. In fact, this charger can be connected to any 2P+T, 230-V, 16-A socket.

However, before charging in this way, it is necessary to ensure that the location selected for charging satisfies all of the safety requirements.

NOTE

This charger is compatible with lithium-ion batteries recommended by the truck's manufacturer.

The charger is designed:

- To be incorporated in the truck
- To remain permanently connected to the battery
- To operate in all positions
- To remain connected to the mains during periods of truck downtime to ensure the availability of the machine

CAUTION

Risk of damage to the equipment.

Do not disconnect the battery connector during charging (green indicator light flashes).

The truck cannot be operated during charging.

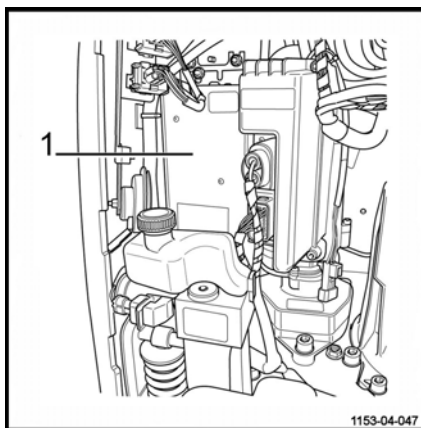
Using the on-board charger

The on-board charger is intended to recharge the battery.

- Switch off the truck.

Do not pull the emergency stop handle. This operation cuts off the circuits and stops the battery from charging.

- Connect the charger plug to a mains wall socket.



Phase	Green LED	Red LED
Mains socket disconnected	Off	Off
Charging phases	Flashing	Off
Stopped-/Equalisation/Maintenance phase	Continuously lit	Off
Battery warning	Off	Continuously lit
Charger polarity reversed (+bat and -bat charger cables reversed, with the battery remaining normally connected to the truck assembly)	Continuously lit	Continuously lit
Battery polarity reversed	Off	Off
Selector in neutral position or charger error	Flashing	Flashing
Battery alarm or errors	Off	Flashing
Communication problem	Flashing	Continuously lit

⚠ CAUTION

Risk of damage to the equipment.

It is strictly prohibited to use an on-board charger other than the one recommended.

⚠ CAUTION

Risk of damage to the mains cable resulting in electric shock and/or burns!

Park the truck sufficiently close to the mains wall socket to ensure that the mains cable on the on-board charger is not taut when connected and charging.

⚠ CAUTION

Risk of damage to the mains cable due to frequent operator handling. Risk of electric shock and/or burns!

The mains cable must be checked regularly as part of periodic statutory checks and maintenance operations.

Adjusting the on-board charger

- When the truck is delivered with its battery, the charger settings are adjusted in the factory.
- When the truck is delivered without its battery, the settings must be adjusted by a qualified technician when the truck is used for the first time.

If the battery is changed during the service life of the truck, make sure that the charger settings correspond to the new battery type. Any modification to the settings must be carried out by a qualified technician.

Changing the battery

Changing the battery

It is not possible to change the vertical access or side access lithium-ion battery.

If the lithium-ion battery is faulty, please contact the After-Sales Service Centre.

Only After-Sales Service technicians are authorised to change the lithium-ion battery.

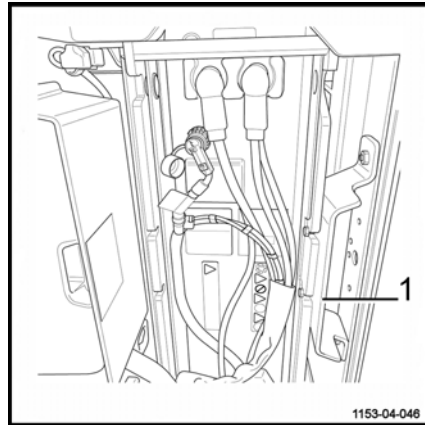
The mounting (1) of the lithium-ion battery must be checked regularly.

⚠ WARNING

If the mounting is loose, the battery can become dislodged from its compartment.

If in doubt, please contact the After-Sales Service.

It is strictly prohibited to disassemble or change the locking system of the battery in the compartment.



Battery error codes

Some errors require only a reset by pushing the ON/OFF button for more than ten seconds.

The user does this first handling.

If the error persists, contact the After-Sales Service Centre.

Lithium-ion batteries: Long-term storage

Lithium-ion batteries: Long-term storage

⚠ DANGER

Electrical danger

We recommend that batteries are stored at a height between 60 and 120 cm.

Remain extremely vigilant when manoeuvring to avoid piercing the batteries.

Special precautions should be taken when storing lithium-ion batteries.

- Store the battery in a dry place at a temperature between 0 and 40° to preserve its service life. This area must not be hermetically sealed to allow air renewal.
- Indicate the storage area. Access should be strictly limited to personnel who are aware of the risks and safety instructions.
- It is strongly advisable to recharge the battery fully before storing it.
- Batteries can be stored for a maximum period of 12 months if they are fully charged (100%).
- Check the battery charge level regularly. Do this at least every three months to maintain the charge level above 30%. Recharge the battery if necessary.
- Completely recharge the battery every three months to avoid impairing the performance of the battery.
- Recharging could take up to 24 hours.

⚠ CAUTION

A battery that has reached an excessively low level cannot be recharged.

Contact your After-Sales Service immediately.

Precautions should be taken if the truck must not be used for a reasonably long period. The operations depend on the length of time it is unused.

Storage of trucks for a period of less than two months

If the truck is not used for a period of up to two months, it is necessary to perform certain operations:

- Clean the truck carefully.
- Check the hydraulic oil level and refill if necessary.
- Coat any unpainted metal parts with a thin layer of oil or grease.
- Grease all hinges and joints.
- Spray contacts with a suitable aerosol product.
- Place the truck on chocks to avoid the tyres becoming flat.
- Cover the truck with a cotton cover to protect it from dust. Avoid using a plastic sheet.

Long-term truck storage

The following work must be carried out on the truck to prevent corrosion if it needs to be stored for a long period of time. If the truck is to be stored for more than two months, it must be positioned in a clean and dry area. The area must be well-ventilated with no risk of freezing.

The following operations must be performed:

- Clean the truck carefully.
- Check the hydraulic oil level and refill if necessary.
- Coat any unpainted metal parts with a thin layer of oil or grease.
- Grease all hinges and joints.
- Recharge the lithium-ion battery every 3 months. Please observe the above instructions.
- Spray contacts with an aerosol product designed for contacts.

- Raise and chock the truck: the wheels must not touch the ground in order to prevent irreversible deformation of the tyres.
- Cover the truck with a cotton cover to protect it from dust.

⚠ CAUTION

We recommend that you do not use a plastic sheet as this encourages condensation to form.

Consult the After-Sales Service for further measures to take if the truck must be stored for a longer period of time.

Recommissioning after storage

If the truck has been stored for more than six months, it must be checked carefully before being recommissioned. This check is similar to the workplace accident prevention inspection. It is therefore necessary to check

Lithium-ion batteries: Long-term storage

all points and devices that are important for truck safety.

Carry out the following operations:

- Clean the truck carefully.
- Grease all hinges and joints.
- Check the battery charge status and recharge the battery if necessary.
- Check that there are no traces of condensation water in the hydraulic oil. Drain if necessary.
- Carry out the same maintenance work as for the first time it was commissioned.
- Commission the truck.
- In particular, check the following during start-up:
 - traction, control and steering
 - brakes (service brake and parking brake).

Lithium-ion batteries: Long-term storage

5

Maintenance

Maintenance plan for lithium-ion batteries

Maintenance plan for lithium-ion batteries

Lithium-ion batteries do not require any specific maintenance. However, it is necessary to perform some maintenance operations. These operations are in addition to the standard service plan for the truck.

As required
Clean the battery
Check the battery connections and sockets
Fully charge the battery at least once a week
Check the tightness of the battery terminal. Retighten to the correct torque if necessary
(For the vertical access battery only) Check the tightness of the battery mounting plate screw on the battery compartment. Retighten to the correct torque if necessary
(For the side access battery only) Check the tightness of the battery mounting plate screw on the battery compartment. Retighten to the correct torque if necessary
Maintenance operations every three months
Battery
Fully recharge the battery if it is in the storage area in or out of the truck
Maintenance operations every 1000 hours, but at least every 12 months
Battery
Visually check the battery

Chassis, bodywork and fittings

Cleaning the lithium-ion battery

⚠ DANGER

Electrical danger

Do not open the battery.

Lithium-ion batteries do not require any specific maintenance. However, it is advisable to clean the battery regularly depending on its use.

⚠ CAUTION

Electrical hazards

Always switch off the battery before working on an electrical component.

- Immobilise the truck.
- Lower the forks.
- Switch off the ignition and remove the key.
- Press the emergency off switch.
- Open the battery compartment hood.
- Switch off the battery using the button (1).
- Blow compressed air into the battery to remove dust and impurities.

⚠ WARNING

It is advisable to wear protection goggles and a mask.

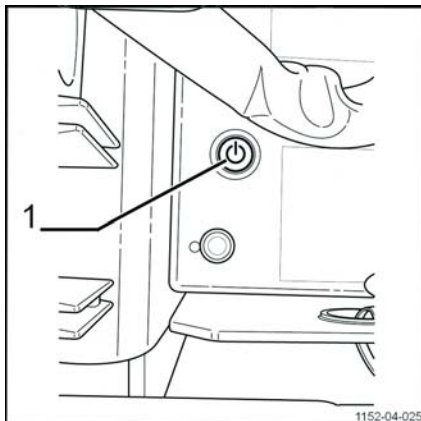
- Check the condition of the terminals.

⚠ DANGER

Electrical danger

Do not wear jewellery or metal objects.

- Switch on the battery.
- Close the battery compartment hood.
- Return the truck to service.



Electrical equipment

Electrical equipment

Harnesses and cables

DANGER

Risk of short circuit

Do not use cables or harnesses other than those provided with the lithium-ion battery that was sold to you.

Using the cables provided with the vertical access lithium-ion battery with a side access lithium-ion battery is strictly forbidden.

Using the cables provided with the side access battery with a vertical access battery is also strictly forbidden.

A short circuit may occur and damage the cable harness and the connector.

A

- Address of manufacturer I
- Automatic battery shut-off 20

B

- Battery charging times 28
- Battery error codes 33
- Battery fitted with a compartment 20

C

- Changing the battery 32
- Charging the battery using an external charger 23
- Charging using an external charger 23
- Checking the charge status 18
- Cleaning the lithium-ion battery 39
- Commissioning a truck equipped with a side access lithium-ion battery 19
- Connecting/disconnecting the battery connector 18
- Contact details I

H

- Harnesses and cables 40

I

- In the event of a fire 7
- In the event of contact with eyes 7
- In the event of contact with skin 7
- In the event of ingestion 7
- In the event of inhalation 7
- Incorrect use 7
- Information on the conformity of lithium-ion batteries 3
- Installing the external charger 22

L

- Labels on the sides of lithium-ion batteries 16
- Labels on the top of lithium-ion batteries 15
- Lithium-ion batteries
 - Lithium-ion batteries: Long-term storage 34
- Lithium-ion battery
 - Maintenance plan for lithium-ion batteries 38
- Lithium-ion battery types 14

O

- On-board charger
 - Adjusting the on-board charger 31

P

- Personal protective measures following an incident 8
- Precautions for individuals 8
- Precautions for the environment 8

S

- Scrapping lithium-ion batteries 11
- Special lithium-ion safety rules 6
- Specific features of the display 21

T

- Transporting a lithium-ion battery 10

U

- Using the on-board charger 29
- Using the side socket to charge the battery 25

W

- What to do in the event of an accidental spillage 8

STILL GmbH

11538013551 EN – 01/2019