



**NEXSYS® TPPL BATTERY**  
Equipped with Accelerated  
Throughput Package (ATP)



**OWNER'S MANUAL**



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# INTRODUCTION



The information contained in this document is critical for safe handling and proper use of the NexSys® TPPL battery equipped with the Accelerated Throughput Package (ATP) for powering electrical industrial trucks. It contains a global system specification as well as related safety measures, codes of behavior, a guideline for commissioning and recommended maintenance. This document must be retained and available for users working with and responsible for the battery. All users are responsible for ensuring that all applications of the system are appropriate and safe, based on conditions anticipated or encountered during operation.

This owner's manual contains important safety instructions. Read and understand the sections on safety and operation of the battery before operating the battery and the equipment into which it is installed.

It is the owner's responsibility to ensure the use of the documentation and any activities related thereto, and to follow all legal requirements applicable to themselves and the applications in the respective countries.

This owner's manual is not intended to substitute for any training on handling and operating the industrial truck or NexSys® TPPL battery that may be required by local laws and/or industry standards. Proper instruction and training of all users must be ensured prior to any contact with the battery system.

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**Your Safety and the Safety of others is Very Important**

**⚠ WARNING** You can be killed or seriously injured if you don't follow instructions.

# USE & BATTERY ARCHITECTURE

## Intended Use

NexSys® TPPL batteries with ATP are designed for industrial truck applications only. Only EnerSys®-approved chargers are to be used with NexSys® TPPL batteries of any type.

The truck harness used between NexSys® TPPL batteries and the industrial truck is dictated by the truck original equipment manufacturer (OEM). The truck harness shall comply with requirements in relevant standards for current carrying capability and truck interface requirements

(EN 1175 and EN 60204-1 for CE and UKCA certification). Truck harness compliance with relevant standards shall be confirmed by the truck OEM and/or integrator.

**⚠ WARNING** Installing the battery in a non-compliant truck is a fire risk due to a potential for improperly sized cable harnesses, and will void your warranty.

## Battery Architecture

The parts of the battery are shown in **Figures 1 & 2**.

**Figure 1:** NexSys ATP Battery Overview

**Figure 2:** Fuse Box

**Fans:** ATEX Fans are fans that are ATEX (explosive areas) prove. The abbreviations "II 3G EX ec IIC Gc Oty" are ATEX classifications.

**Tray Openings:** Area openings sized according to airflow volume and energy content.

**Cable Outputs:** Secured through the cover, meeting fixation standards.

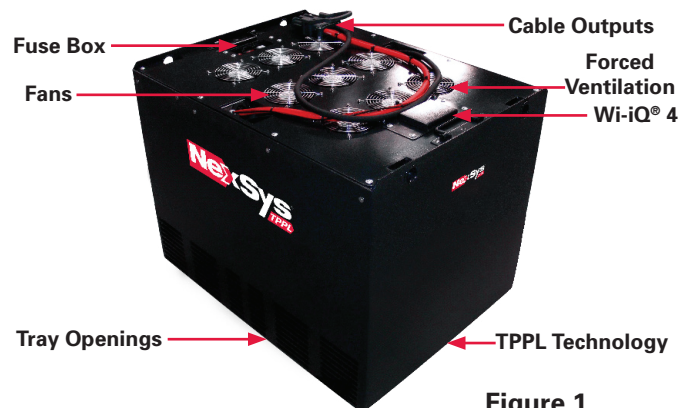
**Wi-iQ® 3 and 4 device:** Integrated in the cover; allows data recording and communication with NexSys+ chargers, ENS Connect and Wi-iQ Report. Also allows CAN integration (CAN open, depending on OEM) and connection to operator interfaces.

**Forced Ventilation:** Air cooling conducted between and below cells. Airflow ensuring +10°C max above ambient at 240% C5 throughput per day.

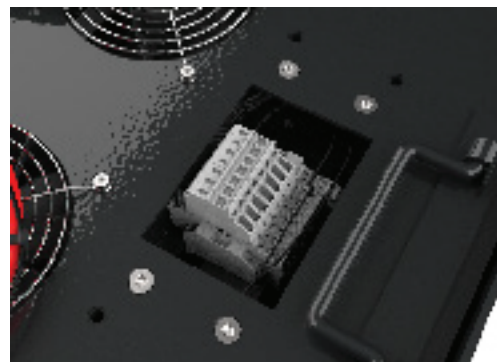
**TPPL Technology:** Embedding TPPL DIN or BS cells within usual tray dimensions to secure standard fitment in existing trucks.

**Fuse Box:** Easy access with screwdriver to individual fan fuses.

**NOTE:** Any unused connector must be protected by a threaded cover to prevent the ingress of contaminants or foreign material.



**Figure 1**



**Figure 2**

# OPERATOR INTERFACES

## Operator Interfaces

An operator interface (Truck iQ™ smart battery dashboard) is recommended to be installed in the truck cabin for ease of use and to ensure the operator is alerted to any visual or audible warnings such as low SoC. This in-cabin interface can be the Truck iQ™ smart battery dashboard. During operation as the SoC decreases, the operator interfaces will provide an audible alarm and visual warnings when the battery drops to the Warning SoC level. After the battery continues to fall below the alert level, the alarm will increase in speed.

**Truck iQ™ Smart Battery Dashboard:**  
**Figures 3 & 4:** Truck iQ™ smart battery dashboard

**Truck iQ™ Dashboard:**  
 The Truck iQ™ smart battery dashboard is an operator interface that provides operators with detailed battery information. The Truck iQ™ device includes audible and visual alarms. The Truck iQ™ device must be installed per the installation instructions provided with the Truck iQ™ device unit. The Truck iQ™ device must be permanently and securely fixed in a position where the operator can view the information.

Low SoC Audible Warnings

SoC	Buzzer	Stop Condition
Warning	3 beeps every 30s	Normal SoC/On Charge
Alert	3 beeps every 5s	Normal SoC/On Charge

Refer to Truck iQ™ smart battery device manual for further information.

### CAN bus Connectivity

The NexSys® TPPL battery can be integrated into an OEM industrial truck CAN bus system which allows full integration of the battery.

Please contact your local EnerSys® service representative for this option. This requires engineering consultation between EnerSys® and the industrial truck OEM.

### E Connect™ App Connectivity:

All data relating to the battery cycle life are stored in the Wi-iQ® 3 and 4 device (**Figure 5**).



The Wi-iQ® 3 and 4 device data can be read wirelessly through the E Connect™ app available on both iOS® and Android™ platforms. Contact your EnerSys® service representative for more information.

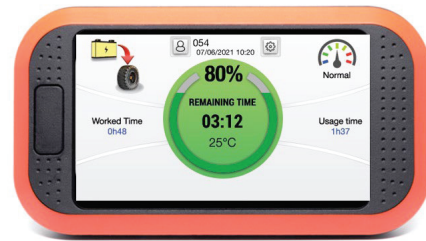


Figure 3

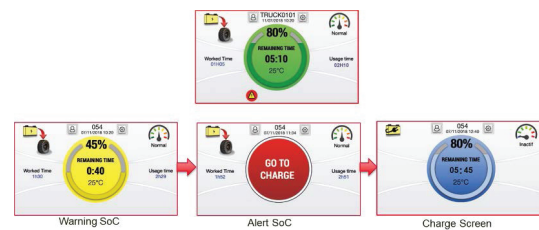


Figure 4

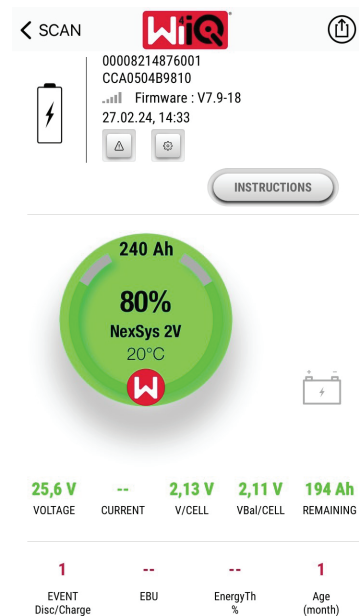


Figure 5



## Safety

### Important Safety Instructions

- Read all safety and operation instructions before operating this battery.
- Anybody involved in handling, operating, or maintenance of this battery must receive appropriate training and use appropriately rated tools and personal protective equipment.
- Follow all regulatory requirements for handling electrical systems. The voltage of an electrical system may impact what regulations are applicable.
- Do not over-discharge or overcharge NexSys® TPPL batteries as this poses a substantial risk of damaging the battery.
- Only store and operate the battery within the limitations given in the sections on operational data and environmental limits.
- Keep the battery away from heat and ignition sources.
- Do not charge or operate the battery in hazardous environments.
- Only handle and store the battery in a dry environment.
- Store only in monitored areas with suitable fire control and protection per local requirements, including local fire regulations.
- Recharge or operate only in monitored areas with suitable fire control and protection per local requirements, including local fire regulations.
- Recharge requires ventilation (refer to local standards or contact your EnerSys® service representative).
- Do not customise the battery hardware or software as supplied by EnerSys®, or your warranty may be voided.
- Only operate with EnerSys®-approved interface devices.
- Service of the battery must only be performed by EnerSys®-approved technicians.
- Dismantling of the battery is not authorised except by qualified EnerSys® personnel due to potential hazards involved, or your warranty may be voided.
- In the case of any error that cannot be reset, do not attempt to continue the operation of the battery until support and direction is provided by EnerSys®, or your warranty may be voided.
- Do not leave the truck idle in temperatures below the battery operating temperature as this may result in the truck becoming nonoperational.

- Do not attempt to operate this battery in temperatures above the operating range.
- Do not expose the battery to extended periods of direct sunlight that allow the temperature of the battery to rise above the storage or operating temperatures of the battery.
- Do not operate the battery outdoors without suitable weatherproof protection.
- Do not immerse the battery in water or clean the battery using pressurised water.
- Do not operate the battery in condensing environments.
- Do not install the battery on the underbody of an electrical industrial truck.

### Interoperation with truck and battery charger

- The instructions in this owner's manual do not replace or supersede the instructions for the truck and battery charger.
- The operation limits given in this owner's manual do not replace or supersede the permissible operation parameters of the industrial truck or charger.
- Only charge this battery with EnerSys®-approved chargers for NexSys® TPPL batteries.
- The battery must be installed in a truck with appropriately sized cables.

### Risks posed during normal operation

- This battery is designed to be stable and tolerant to the applications within the scope laid out in the operating conditions, however, battery systems are inherently hazardous.
- Do not short the battery terminals. A shorting event with a high current may occur, leading to various hazards for the operator. A resulting electric arc fault may emit an intense hot flash of infrared, visible, and ultraviolet light. Molten and vaporised metal may be ejected. Toxic fumes may be released. Components may become extremely hot.
- The weight and size of the battery make it cumbersome to handle.
- Proper handling procedures must be followed to avoid injury. Failure to restrain the battery may result in the battery shifting or dropping. Additionally, this may result in the battery crushing, pinching, or impacting personnel or nearby equipment.

# SAFETY, LIMITS, & HANDLING

## Safety (cont.)

### Damaged batteries

- Exposure of the battery to conditions outside of its operational and environmental limits poses a substantial risk of damage to the battery. Do not assume damage to the battery will be apparent.
- If the battery experiences conditions outside of the allowable limits as stated in this document, immediately cease and do not resume operation, and contact your EnerSys® service representative.
- If the mechanical integrity of the battery is compromised (e.g., penetration of case, rupture of the case, etc.) immediately cease and do not resume operation of the battery. Contact your EnerSys® service representative.
- Stop operation of the battery if there is a crush, pinch, cut, or other damage to the power cables or power connectors.
- If any material, such as liquid electrolyte, from a damaged battery comes into contact with a person's skin or eyes, rinse the affected areas with clean water for at least 15 minutes. Then immediately obtain medical attention.
- If any material, such as liquid electrolyte, from a damaged battery comes into contact with the mouth or is swallowed, rinse out the mouth as well as the area around the mouth. Then immediately obtain medical attention.
- Contact with heated gases or components of a damaged battery may cause serious thermal burns. Treat any thermal burns, then immediately obtain medical attention.

Additional information can be found in the safety data sheet for the VRLA batteries, SDS 853023.

## Operational Data and Limits

- Nominal capacity: Nominal Capacity (C5): see the safety data sheet
- Nominal voltage: 48V, 80V, 120V
- Max charging rate: 0.5 C5, up to a max of 320 A per harness
- Max Discharge current (continuous): up to a max of 320 A per harness
- Max energy throughput per day: up to 240% C5

## Handling

### General Handling Considerations

- Handling of the battery is only allowed by trained personnel that are familiar with the potential risks of traction batteries for industrial trucks and for lifting heavy loads.
- Avoid sudden acceleration, deceleration, drops, and other mechanical abuse conditions while handling the battery.
- Handling must only be performed after the battery is disconnected from all electrical loads and charge sources.
- Prior to lifting, secure all connectors and cables so that they will not be crushed, pinched, or otherwise damaged during the lift. User interfaces may be removed prior to handling.
- Appropriate PPE must be worn during all lifts.
- Appropriate lifting methods and tools that can safely lift and control the load must be checked prior to all lifts. Tools must be properly rated for weight.
- Attach lifting tools to the tray lifting points.
- The battery must only be lifted vertically. Do not allow the battery to swing during lifting.
- The operational and safety instructions of the lifting gear manual must be respected.
- If the battery is being handled while installed on a truck, for instance during the battery installation or removal operation, the truck must be secured to prevent movement.

# INSTALLATION & OPERATION

## Installation into Industrial Truck

### Mechanical Installation

- This battery is designed to be a direct replacement of a standard lead-acid battery intended to power an electric industrial truck.
- Upon receipt of the battery, it must be checked for any visible signs of damage to the battery and all cables, plugs, and accessories.
- Before installation, check that the battery is supplied with the appropriate cable harness to connect the battery to the industrial truck.
- Ensure that the battery weight and center of gravity requirements per the truck manufacturer are followed.
- The battery must be handled in a way that mitigates the risk of drop events and crashes. The correct tools, lifting points, and methods should be used.
- After placement of the battery into the truck's battery compartment, the technician must ensure the battery is mechanically secured in the truck against movement as specified by the industrial truck manufacturer. After the battery is secured in the truck's battery compartment, the battery unit must be checked again to ensure no cables, wires, or plugs were crushed, pinched, cut or damaged during insertion.

### Electrical Installation

- The battery must be connected with the appropriate cables and connector to the industrial truck per the truck manufacturer's recommendation.
- Only use EnerSys®-approved fasteners, connectors, cabling, and plugs with this battery.
- The cable dimensioning and DC connecting plug will vary depending on the truck and end-user requirements. The truck harness shall comply with relevant requirements for current carrying capability and truck interface requirements. Compliance shall be confirmed by the truck's OEM.

**⚠ WARNING** Defective cables and connectors can result in functional issues and/or severe safety hazards such as short circuits and/or fire. Cables and connectors must be regularly inspected for any damage or issues. Cables and connectors should only be repaired or replaced by an authorised EnerSys® service representative using the correct factory replacement parts. No substitution is allowed.

## Operation

While EnerSys® has used reasonable efforts towards the application of legal requirements, this documentation should neither be considered nor relied upon as legal advice.

Anybody using this battery must be trained on the aspects of the battery they are responsible for as required by local laws and regulations.

The battery must be handled, operated, stored, maintained, and serviced in accordance with the instructions in this owner's manual.

**⚠ WARNING** Failure to follow the instructions in this owner's manual can result in serious damage to the battery and may result in serious injury. Failure to follow the instructions in this owner's manual or using parts that are non-original will void the battery warranty.

Opportunity charging is highly recommended to maximise the daily operating capability of the battery. It will also optimise the service life of the battery by decreasing the discharge window of the battery during discharge.



# CHARGING BATTERY

## Operation (cont.)

In contrast to traditional lead-acid batteries, it is beneficial to operate NexSys® TPPL batteries at a partial state of charge with frequent and rapid opportunity charges during periods of non-use (operator breaks, shift changes, etc.).

This battery is designed to be charged indoors in the truck.

The battery temperature influences the capacity of the battery. For example, run time may be reduced at lower temperatures. Battery temperatures at the extreme ends of the temperature limits as stated in this owner's manual will influence performance.

Respect all visual and audible warnings from the user interface devices.

## Charging Battery

This battery must only be charged by EnerSys®-approved chargers for NexSys® TPPL Batteries equipped with the AT Package, which are specially designed to allow optimum energy transfer. This ensures a safe and optimal operation of the system. All operating instructions found in the owner's manual of the charger must be followed.

Charge the battery only in an appropriate environment. Additionally, follow all environmental requirements from the charger manual.

When using the battery in opportunity charge application, it is recommended to use embedded anti-arc contacts to reduce arcing while performing inadvertent hot disconnect operations.

### Charging Sequence

- Inspect the battery and charging cable(s) to ensure they have no damage and are free of contaminants prior to connecting.
- Connect the charger to the battery-charging connector.
- Charging will begin after Wi-iQ® communication device has started between the battery and the charger, which occurs when the charging

cable is connected. The optimal charge current will automatically be determined based on the battery conditions (SoC, temperature, etc.) and charger conditions (temperature, charger size). The charge level will dynamically change during the charging process, ensuring fast charging and optimal lifetime of the battery. If the battery detects a fault condition, the charging will stop.

- To stop prior to completion of full recharge, such as during opportunity charging, press the ON/OFF button on the charger prior to disconnecting.

**⚠ WARNING** Even if the battery is equipped with anti-spark systems, the battery should not be disconnected while still being charged by the charger.

- After a full charge cycle is complete, the charger screen will indicate that charging is complete. At this point, the charger is no longer supplying power to the battery and the charging cable(s) can be disconnected from the battery. After completely disconnecting the charging cable(s), the battery will then automatically be ready for operation. If the battery remains connected, the charger will periodically provide a refresh charge to maintain the battery's full state of charge.

## Service and Maintenance

NexSys® TPPL battery is designed to be virtually maintenance-free. However, external cabling, connectors, etc. (including operator interfaces) must be regularly examined to ensure there is no damage to such parts and in compliance with local regulations. If any of these parts are damaged or show signs of serious wear, they need to be replaced. Please contact your EnerSys® service representative for all repairs and replacements. All repairs must be done by an authorised EnerSys® technician trained on NexSys® TPPL products.

All power cables must be checked any time the battery has been exposed to any type of stress, whether it be overvoltage, overcurrent, or mechanical stresses such as crushing.

### Cleaning instructions

- Do not clean the battery with pressurised water.

## Troubleshooting

### Battery does not provide power to the truck.

- Inspect power cables to the truck to ensure they are not damaged and are plugged in correctly.
- Contact your EnerSys® service representative for further troubleshooting steps.

### Single fan is not working.

- Check for fuses inside Fuse Box (**Figure 2**).

### Error codes:

- Refer to the Wi-iQ® device and Charger Manuals.

### Battery will not charge.

- Ensure the charger is powered and the charger does not display any errors. In case of an error on the charger, follow the instructions in the charger owner's manual.
- Ensure the charging cables are properly connected to an EnerSys®-approved charger.
- Check connectors and auxiliary pins for damage.
- Contact your EnerSys® service representative for further troubleshooting steps.

# STORAGE & SHIPPING

## Storage

Refer to GLOB NexSys TPPL Battery Owner's Manual (GLOB-EN-OM-NEX-TPPL 1023).

## Shipping NexSys® TPPL Batteries

NexSys® TPPL batteries are classified as “non-spillable wet electric storage batteries” and may be shipped by air or ground transportation without restriction.

## Disposal and Recycling

Refer to GLOB NexSys TPPL Battery Owner's Manual (GLOB-EN-OM-NEX-TPPL 1023).

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