# Optional equipment

# Assistance system zoneCONTROL

05.24

Operating Instructions

en-US

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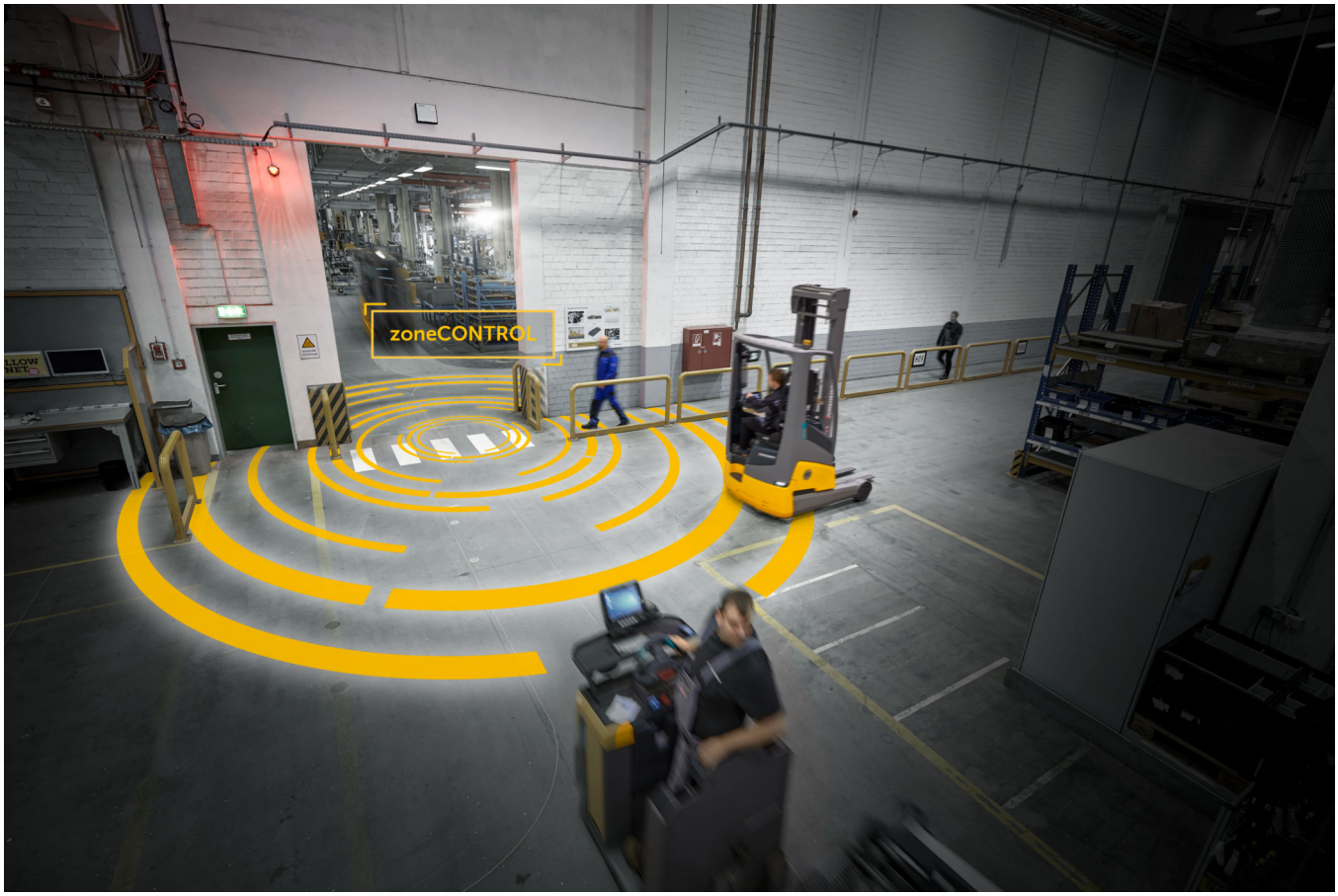
zoneCONTROL
Base zone






JUNGHEINRICH

# Foreword

**References to the operating instructions**

Safe operation of the industrial truck with the zoneCONTROL assistance system also requires knowledge that can be acquired from these ORIGINAL OPERATING INSTRUCTIONS. Information is set out concisely and in a clear format. The chapters are arranged by letter and the pages are numbered sequentially.

These operating instructions document only the zoneCONTROL assistance system in connection with an industrial truck. Industrial trucks can be equipped in the factory or subsequently with the zoneCONTROL assistance system.

➔ Retrofitting of the zoneCONTROL assistance system must be performed by the manufacturer's customer service or a customer service that is authorized by the manufacturer.

Please refer to the operating instructions of the respective truck for truck-specific information.

All operators of industrial trucks should be familiar with applicable local, regional and national regulations. Operators in the United States should be familiar with the standards and regulations of the Occupational Safety and Health Administration (OSHA) and ANSI/ITSDF B56.1 Safety Standards, the safety standards of the Industrial Truck Standards Development Foundation (ITSDF) for low lift and high lift trucks (Safety Standard for Low Lift and High Lift Trucks).

Safe operation of the truck requires special knowledge, which is acquired from the ORIGINAL OPERATING INSTRUCTIONS for the industrial truck, from the training required by OSHA under 29 CFR 1910.178, and by training the operating personnel in factory installations and their functions.

Refer to the www.osha.gov internet page for further information about requirements for powered industrial trucks according to OSHA (Regulations (Standards - 29 CFR) Powered industrial trucks – 1910.178).
Refer to internet page www.itsdf.org for further information regarding the ITSDF safety standards for low lift and high lift trucks (B56.1 Safety Standards for Low Lift and High Lift Trucks).

This translation of the ORIGINAL OPERATING INSTRUCTIONS is a supplement to the ORIGINAL OPERATING INSTRUCTIONS of the industrial truck.

## Safety instructions and markings

Safety instructions and important information together with their relative importance are indicated by the following safety warning symbols and indicator words:

**⚠ DANGER!**

This message indicates an acute hazardous situation that, if not avoided, will result in death or serious injury. The instructions, safety precautions, actions, or procedures relating to this message must be observed to avoid the risk of death or serious injury.

**⚠ WARNING!**

This message indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The instructions, safety precautions, actions, or procedures relating to this message must be observed to avoid the potential risk of death or serious injury.

**⚠ CAUTION!**

This message indicates a situation that may lead to minor or moderate injury if disregarded. The instructions, safety precautions, actions, or procedures relating to this message must be observed to avoid the risk of minor or moderate injury.

***NOTICE***

This message appears if special precautionary measures are needed to ensure that the correct action is taken or to prevent damage to or malfunction of the industrial truck or a component.

This message appears if special information, instructions, or indications are needed with regard to procedures, equipment, tools, pressures, loads, and other special data.

| | |
|---|---|
| ● | Denotes standard equipment |
| ○ | Denotes optional equipment |

It is impossible for the manufacturer to foresee every possible operational circumstance that could involve a potential hazard. For that reason, the warnings in this manual and the warning labels on the equipment itself do not encompass all possible circumstances.

With the use of tools, procedures, work methods or operating techniques that are not expressly recommended by the manufacturer, you yourself must ensure that your safety and that of third parties is not compromised.

You should also ensure the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications and illustrations in this manual are based on information available at the time it was published.

In the interests of technical advancement, the manufacturer reserves the right to make changes, while retaining the essential features of the zoneCONTROL assistance system described here, without amending these Operating Instructions at the same time. Therefore, no claim of certain characteristics of the assistance system may be inferred from the content of these Operating Instructions.

Specifications, measurements, settings, illustrations, and all other data are subject to change at any time.

Before performing work, you should request the latest version of all available information from the manufacturer. Up-to-date information can be obtained from your dealer.

**Assistance system manufacturer**

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**Copyright**



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# A Compliance with regulations - Legal requirements and common sense

In 1998 OSHA produced a report on its wide-ranging study into the use of powered industrial trucks in industry. This report was published in the **US Federal Register**/ Vol. 63, No. 230.

In this report OSHA sets out the many reasons why employers should train their employees in connection with the use of powered industrial trucks and why untrained personnel should only use industrial trucks in controlled operating conditions such as a training session.

The report shows how **extremely important** a training program as required by the OSHAguidelines is for the safety of equipment and personnel in connection with the use of powered industrial trucks (29 CFR 1910.178)

In simple terms, extensive training prior to using an industrial truck is **extremely important** and **must** take place before an industrial truck is used, since accidents leading to injury and death or property damage are almost always the consequence of disregarding the underlying risks held by the use of industrial trucks or of ignoring safety instructions and safety precautions designed to minimize or eliminate such risks.

The training by OSHAis designed to address those risks. OSHA demonstrates in its report that the training requirements for operators and employers are based on experience and good judgment.

Jungheinrich has provided an truck which complies with the requirements of 29 CFR 1910.178 and ANSI/ITSDF B56.1 . Jungheinrich representatives are available to assist and answer any questions which may arise concerning the load capacity, operation, use and maintenance of the truck.

According to OSHApersonnel do not start out with the knowledge and skills needed to safely operate trucks with electrical drive. Quite the contrary: This knowledge can only be acquired through theoretical and practical training. Therefore the fact that a truck is in compliance with legal regulations and the requirements of standards is not by itself sufficient to guarantee the safety of persons and machines.

It is up to you, the operator, and your employer to be aware of your responsibilities and of all national and regional regulations and laws governing training requirements and the safe use of powered industrial trucks, not only because the law requires it but because it is a matter of common sense.

Powered industrial trucks may only be operated by trained and tested persons. Training programs must satisfy OSHA requirements and as a minimum address the topics mentioned here.

Safe operation is the responsibility of the operator ANSI/ITSDF B56.1. The user portion of ANSI/ITSDF B56.1 is recommended to employers and operators for careful review and observance.

# B Recognition and avoidance of risks

In its 1998 investigation into the use of powered industrial trucks, OSHA determined the ways in which accidents commonly occur and the causes of these accidents. OSHA concluded that considerable risks to operators themselves and to other persons in their immediate vicinity can be put down to the inadequate or non-existent training of operating personnel.

According to OSHA, incorrect and unsafe operation are the principal causes of accidents in connection with powered industrial trucks and the resulting injuries and fatalities. It is therefore no coincidence that in reviewing its own research, OSHA found that in almost all cases accidents were attributable to situations or actions which the operator, or the employer and the operator together, could have influenced or could have prevented.

This finding was confirmed by a simple check of the accident causes cited by OSHA . Of the 208 accidents investigated involving powered industrial trucks, 184 of which were fatal accidents or resulted in serious injuries, a full 50 percent of them were due to loading problems, including overloading, unstable loads, dropped loads, or incorrect lifting of loads.

25 percent of the cases involved the tipping or overturning of the industrial truck. A further 20 percent of the accidents were caused by the industrial truck falling from a platform or a trailer or by persons falling from an elevated position in an industrial truck. Although only 4% of the accidents were due to an absence of training and instruction, OSHA nevertheless noted that many accidents could also have been caused by inadequate training.

For example, the overturning of a truck could just as easily be caused by poor or inadequate instruction of the operator with regard to the loading of the industrial truck. Other, less frequent accident causes, which could nevertheless still have been avoided by employers and operators, were excessive speed and the use of inappropriate equipment.

The following measures are therefore of vital importance:

– Operators must be trained and aptitude-tested before working with a powered industrial truck.
– Operators must be physically, mentally, and emotionally capable of operating a powered industrial truck.
– Operators must possess and apply all practical knowledge in relation to the safe loading and correct operation of the industrial truck. The capacity limits of the machine must be known and must never be exceeded.
– All circumstances that could cause the industrial truck to tip or overturn must be avoided. Attention must be paid in this regard to shifting centers of gravity, correct loading and the safe transport of loads, and to defensive driving, taking account of edges, bends, slopes, and other driving conditions.
– Without appropriate operator training and the correct type of truck, passengers should never be carried nor persons lifted under any circumstances. Furthermore, the correct procedure for this must be observed.
– Traffic rules must always be observed. Operators must always be aware of the position of colleagues and of other trucks and must pay attention to local conditions.

– The manufacturer shall not be held liable for the consequences of dismantling the industrial truck or for modifications outside the manufacturer's control.
– The manufacturer's liability is limited to the configuration of the industrial truck or plant described in the declaration of conformity. The manufacturer is absolved from all liability if modifications or additions are made or equipment from another manufacturer is used. In such a case the manufacturer's liability is transferred to the user/customer.
– These Operating Instructions shall cease to be valid if the machine is modified by a company outside our Group, even if original spare parts are used and our company logo can still be seen on the machine.

# C Proper use

## 1 General

The assistance system truck must be used, operated and serviced in accordance with these operating instructions. Any other type of use is beyond the scope of application and can result in accidents, injury to persons and damage to industrial trucks or property.

The Jungheinrich assistance system assists the operator but does not relieve him of his responsibility:
With the use of the assistance system, the operator retains responsibility for the safe operation of the industrial truck. This responsibility includes the operator becoming familiar with the convenience of the system and possible associated hazards in case the system fails. The operator always remains obligated to monitor the surrounding area and check the industrial truck.

The zoneCONTROL assistance system is based on radio technology, which means that system-related functional failures, due for example to shadowing or obscuring of the anchor, truck tag or personnel tag, cannot be ruled out.

zoneCONTROL is not a safety system in the sense of ISO 13849. If there are requirements for a safety system, zoneCONTROL must not be used.

## 2 Permissible usage conditions

**⚠ WARNING!**

**Danger of collision due to use under extreme conditions**

Use of the assistance system outside the described conditions can lead to malfunctions and failure of the assistance system and also constitutes a potential hazard for persons and operation. The operating conditions of an assistance system can have a significant impact on the wear of components of the assistance system.

- ▶ Use in areas subject to explosion is prohibited.
- ▶ Use in the vicinity of unprotected active parts of electrical systems is prohibited.
- ▶ During adverse weather conditions (storm, lightning), the assistance system must not be operated outside or in areas that are at risk.
- ▶ Observe the permissible operating range of the industrial truck and assistance system. The operating range of the assistance system does not extend the permissible operating range of the truck.
- ▶ In case of use with heavy dust accumulation or strong temperature fluctuations, as far as permissible, or in case of multi-shift use, the maintenance, inspection and replacement intervals must be shortened appropriately.

***NOTICE***

**Risk of material damage due to condensate**

Due to rapid temperature change, there can be a build-up of condensate and damage to the assistance system display.

- ▶ Do not switch on the industrial truck until after it has adjusted to the room temperature.

– Use in an industrial and commercial environment.
– Use the anchor with as clear a view as possible of the entire zone area.
– Permissible temperature range for zoneCONTROL without personnel tags (●):
  -28 °C (-18.4 °F) to +50 °C (122 °F) at a relative humidity of 10 % to 95 %, non-condensing.
– Permissible temperature range for zoneCONTROL with personnel tags (○):
  -20 °C (-4 °F) to +50 °C (122 °F) at a relative humidity of 10 % to 95 %, non-condensing. Charging process for personnel tag only permitted from +10 °C (50 °F) until +30 °C (86 °F).
– Permitted ambient altitude during operation up to 2000 m (2187 yd) above mean sea level.
– The truck is not authorized for use in explosion hazard areas.
– The anchors of the assistance system are not approved for outdoor use.
– Covering anchors or truck tags is not permitted.

# 3 Residual risk

Residual risks are special hazards when working with industrial trucks that cannot be eliminated despite a design that meets all safety requirements. Residual risks are not obviously recognizable and may be the source of possible accidents, injuries or health hazards.

Transport, set-up, operation and maintenance of the industrial truck with possible optional equipment and attachments - as well as other reasonably foreseeable uses - can be carried out under the designated conditions without persons being exposed to danger.

Risks must be eliminated or minimized as much as possible. Non-designated use is prevented if it entails risks. Necessary protective measures must be taken against risks that cannot be eliminated.

Reference is made to risks that remain after risk reduction is complete in the operating instructions.

The remaining residual risk can be additionally reduced by trained and professionally qualified personnel and by responsible and safety-conscious behavior during operation and maintenance.

➔ Compliance with the Operating Instructions as well as intended use of the industrial truck with possible additional equipment and attachments does not release the operator from his obligation to identify and assess all hazards or health risks present at a workplace or triggered by an activity.

# 4 Duties of the operator

The operating company, as the term is defined in ANSI / ITSDF B56.1 and used in these Operating Instructions, is any natural person or legal entity using the assistance system or by whose order the industrial truck is used. In special cases (e.g. leasing or renting) the operating company is considered to be the person who, in accordance with existing contractual agreements between the owner and user of the assistance system, is charged with operational duties.

Users will usually be employers, and the truck operators will often be their employees for purposes of OSHA regulations. Every user must know and apply the

applicable rules and regulations relating to the use and operation of the industrial truck. Compliance with the Operating Instructions is mandatory for all users. They are directed toward and should be provided to the persons who will actually operate the assistance system.

The operating company must ensure that the assistance system:

– is only used according as designated,
– is only used within its design limits,
– and that all types of dangers to the life and health of the user or third parties are avoided.

In addition, relevant accident prevention requirements and other safety-related rules and operating, maintenance, and repair regulations must be observed.

The operating company must ensure that all operators of the assistance system:

– have read and understood these Operating Instructions.
– have successfully completed all legally required training and aptitude testing before working with the assistance system.

***NOTICE***

Failure to comply with the Operating Instructions shall void the warranty. The same applies if improper work is carried out on the truck by the customer or third parties without the permission of the manufacturer.

## 5 Adding attachments or optional equipment

Attaching or installing additional devices that are involved with or add to the functions of the assistance system is only permitted with the manufacturer's prior written approval. Approval of local government agencies may also be required.
However, approval of government agencies does not replace the approval of the assistance system manufacturer.

## 6 Removing Components

Changing or removing components of the industrial truck, especially protective and safety devices, is prohibited.

If you are not certain what to do, contact the manufacturer's Customer Service.

## 7 General instructions for operating personnel and the owner

**⚠ WARNING!**

The instructions set out below apply to all users, including managers, supervisors, operators, carriers and employees working in the vicinity of industrial trucks. The user is responsible for the safe use of this industrial truck, and employers and operators must work closely together to ensure that the safety regulations applying to the use of the industrial truck are observed and enforced.

These operating instructions must be read before the industrial truck is placed in operation for the first time and their content must be observed when using the truck.

The owner and operator must make certain that the industrial truck is used only for its originally intended purpose. The owner and operator may NOT:

– Permit the industrial truck to be used for any other than its designated purpose
– Disable the safety systems
– Overload the industrial truck or use it if the arrangement of the load does not match that shown in the capacity plate
– Use the industrial truck as a crane
– Lift or transport other persons
– Lock a control in a single position
– Ignore the standard load handling procedures
– Transport loads over the heads of persons
– Push or pull loads
– Participate in games, e.g. race the truck
– Transport unstable loads

The owner and operator must check the load-bearing capacity of floors (to prevent damage), racks, and in general all aisles in which the industrial truck may possibly be used.

Read the instructions on the labels attached to the industrial truck and make sure that they are always legible.

These operating instructions must be made available to all operators

Make certain that only trained, tested, and responsible persons who are capable of operating the truck safely are allowed to operate the industrial truck.

Make certain that the industrial truck cannot be tampered with when it is not in use.

An industrial truck that is clearly not in good operating condition may not be used.

The industrial truck may never be used to transport a load or to apply a force if the maximum permissible operating load would be exceeded as a consequence.

The industrial truck must only be used in the manner for which it was designed.

The applicable safety requirements and regulations for this industrial truck must be read and compliance with them is mandatory.

The manufacturer accepts no liability for consequences arising from the dismantling of the industrial truck or from modifications outside the manufacturer's control.

The manufacturer’s liability is restricted to the configuration of the machine described in the Declaration of Conformity. The manufacturer is absolved from all liability if modifications or additions are made or equipment from another supplier is used. In this case, the manufacturer's liability shall be transferred to the user.

This Operating Manual shall cease to be valid if the machine is modified by a company outside the manufacturer's Group, even if original spare parts are used and company logo still appears on the machine.

Exceptional operating conditions require additional safety precautions and special operating instructions.

Supervision is essential to the safe use of powered industrial trucks.

Wheel chocks and wheel locks (where fitted) are only suitable for holding the industrial truck in the required position on a level surface.

**⚠ WARNING!**

Extreme risk can arise from an overloaded industrial truck, obstacles to free passage of the load, impact with objects or pedestrians, poor maintenance, and the use of equipment for which the industrial truck was not designed or developed. Changes to the load(s), dimension(s), coupling method(s) and/or position(s), or to the nature of the ground or floor can have a negative impact on the capacity and safe operation of the industrial truck. Only stable or securely fastened loads may be transported.

The user is responsible for making sure the load is sufficiently stable and correctly attached. If necessary, carry out a test.

# D Important basic information

## 1 Responsibilities

### 1.1 Instructions for the operating company for introduction of the assistance system

Assistance systems are systems that support the operator in handling the truck with information, warnings and / or direct intervention.

Assistance systems relieve the operator by supporting routine tasks (for example by automating manual switching tasks such as gate switching).

Basically, assistance systems cannot fulfill any safety function. This means they are not necessary for the safe operation of the industrial truck. Assistance systems must not be used as a substitute, but exclusively as support for the safe operation of the industrial truck.

Assistance systems support the company operating the industrial truck operator in reducing the risk of accidents depending on the operational environment and in dispensing with other operational actions (such as a general speed limit).

A risk assessment must be carried out when an assistance system is retrofitted. The preparation of this risk assessment is one of the industrial safety obligations of the company operating the industrial truck.

### 1.2 Risk assessment of the operating company

The risk assessment must consider the following hazardous situations in particular and implement appropriate safety measures:

- Check that the assistance system is used exclusively for support and not as a substitute for safety-related actions and equipment.
- Check whether hazards can arise from the installation of the assistance system.
- Check whether the operating limits of the assistance system are observed.
- Define implementation of access restrictions for untrained persons (such as visitors).
- Check whether accident hazards may arise due to faults or malfunctions of the assistance system.
- Check whether accident hazards may arise from unauthorized use of the assistance system.
- Analyze hazards due to damage and other defects in the assistance system and determine suitable inspection intervals (at least once a year).
- Analyze accident hazards during mixed operation of industrial trucks with non-uniformly configured assistance systems or without assistance systems and provide for suitable actions.
- Risk of accidents due to entering danger zones and suitable actions.
- Danger due to misuse:
  - Compliance with the limits corresponding to the individual system components

– Risk of accident due to entering danger zones or access to areas with residual risks according to risk assessment:
  • Organize the space by defining traffic areas, work areas and restrictive areas.
  • Mark the areas and routes with floor markings or other markings.
  • Separate consideration of permanent work areas (picking stations, etc.) and safe design with the aid of the necessary protective measures.
– Check whether the operator becomes accustomed to the convenience and thus possible hazards can occur in the event they fail. Provide for instruction of industrial truck operators and regular training.

## 1.3 Responsibilities of the manufacturer and the operating company when installing the assistance system

Jungheinrich AG has developed and delivered the zoneCONTROL assistance system in accordance with the requirements of European and US directives.

If Jungheinrich installs the assistance system, Jungheinrich AG assumes responsibility for the proper functioning of the assistance system and the industrial truck.

If the assistance system is retrofitted by the operating company or a competent person or company appointed by the operating company (often referred to as a system integrator), the retrofitter must ensure that all the requirements of the installation instructions and the Operating Instructions are met.

It must be ensured that the correct installation points are selected for the components of the assistance system and that implementation of functional tests is documented.

The retrofitter assumes full responsibility for proper installation and documentation.

After the assistance system has been installed, the zoneCONTROL system must be configured and integrated by the assistance system manufacturer's customer service or by personnel trained by the manufacturer.

If the installation involves intervention in the industrial truck (for example by making changes to control circuits of the industrial truck or by attaching components to frame structures including masts and overhead guards) that lead to a significant modification of the industrial truck, the retrofitter becomes the manufacturer of the modified machine and must in particular carry out a new assessment of conformity process.

**⚠ WARNING!**

**Uninstructed or untrained maintenance personnel**

The assistance system may only be serviced or repaired by maintenance personnel who are medically fit, have the necessary knowledge and have been trained in safe handling.

▶ Instruct maintenance personnel annually on the previously mentioned points.

▶ The completed and successful instruction of the maintenance personnel should be confirmed in writing.

# 2 Legal notices

This translation of the ORIGINAL OPERATING INSTRUCTIONS is part of the assistance system.

These Operating Instructions may not be reproduced, distributed, modified, transferred or passed on to third parties, either in whole or in part, without the express written permission of the assistance system manufacturer.

These Operating Instructions must be kept for the entire service life of the assistance system and updated if necessary.

Warranty claims will **not** be accepted by the assistance system manufacturer if any of the following apply:
- Insufficient qualifications or authorization of persons working on the assistance system.
  For example: Lack of qualifications or authorization for maintenance and repair work.
- Improper use of the assistance system.
- Failure to comply with the instructions for proper operation of the assistance system given in these Operating Instructions.
- Faulty or non-performed maintenance or repair work on the assistance system.
- Unauthorized changes to the assistance system.
- Installation of spare or wear parts not approved for use.

# 3 Observance of the Operating Instructions

These Operating Instructions are part of the assistance system. The Operating Instructions must always be kept in a readily accessible place close to the assistance system.

It must be ensured that all persons (operators or maintenance specialists) who work with the assistance system can refer to the Operating Instructions at any time. This also applies to the entire service life of the assistance system.

If supplements or adaptations to these Operating Instructions are issued, they must be enclosed with the Operating Instructions.

In addition to the Operating Instructions, other operating instructions as defined by the German Occupational Health and Safety Act and the German Ordinance on the Use of Work Equipment (accident prevention regulations of the Employers' Liability Insurance Associations) must also be provided.

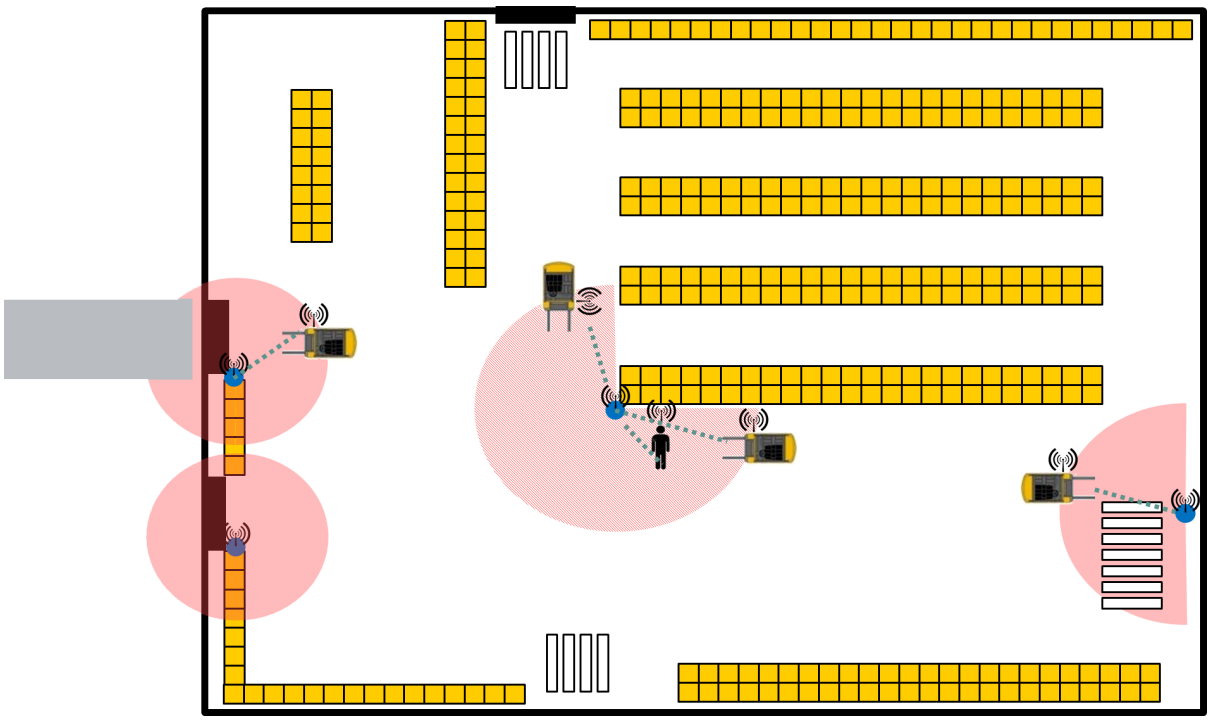
| | |
|---|---|
|  | **Comply with the Operating Instructions**<br>– Description:<br>Failure to observe the information in the Operating Instructions, in particular the warning and safety instructions, may result in personal injury or damage to property.<br>– Proper conduct:<br>Information from the Operating Instructions, in particular the warning and safety instructions, must be observed. |

# 4 Illustrations in these Operating Instructions

The illustrations used in these Operating Instructions are for illustrative purposes only and may differ from the supplied assistance system.

# E Description of the assistance system

## 1 Description of use



**zoneCONTROL assistance system**

The assistance system makes it possible to mark different types of potential danger points in the warehouse as zones, to detect possible collisions with equipped persons and industrial trucks via cyclic radio distance measurements and to reduce the probability of a collision.

The assistance system does not include any safety functions and does not intervene in the safety functions of the industrial truck. A situation-dependent limitation or reduction of the travel speed is optionally possible. The assistance system does not brake the industrial truck to a complete stop.

The assistance system does not exempt the operator from safety rules for travel mode; see the Operating Instructions of the industrial truck, for example regarding visibility conditions when driving.

# 2 Description of components and functions

The zoneCONTROL assistance system is based on radio technology, which means that system-related functional failures, for example due to shadowing or obscuring of the anchor, truck tag or personnel tag, cannot be ruled out: Distances are calculated and data transmitted cyclically between stationary infrastructure components (anchors) and one or more moving components (tags). After the data is evaluated, response combinations are determined and implemented.

The zoneCONTROL system consists of several components:
- Truck tag for each industrial truck participating in the system
- Assistance display for each industrial truck participating in the system
- Anchor for each area to be marked in the system
- Personnel tag (○) for each person participating in the system
- Charging cradle (○) with power supply, for up to 10 personnel tags

The truck tag as a radio component mounted on the industrial truck is supplied with power from the industrial truck together with the assistance display. Ideally, the truck tag is mounted raised and not inside the industrial truck to minimize interference or shielding of the radio signals.

The display and calculation unit of the assistance display is located in the operator's field of view. Warnings are displayed as pictograms and if necessary supplemented by advisory tones or info tones. It is optionally possible to connect the assistance display to the industrial truck. The assistance display is operated via the front buttons and the touchscreen.

Each anchor as an infrastructure component is installed at a stationary position and parameterized with up to 7 different zones with defined responses. Anchors cyclically attempt to calculate distances to truck tags and personnel tags within range at floor level. If the current distance of a tag to the anchor is less than the distance between the anchor and the edge of an active zone, the tag is within this zone and the corresponding zone response is executed. The anchor is supplied by a power supply unit. The output of the anchor can be used to control gates, lamps or traffic lights, for example. The current status of the anchor is displayed via LEDs.

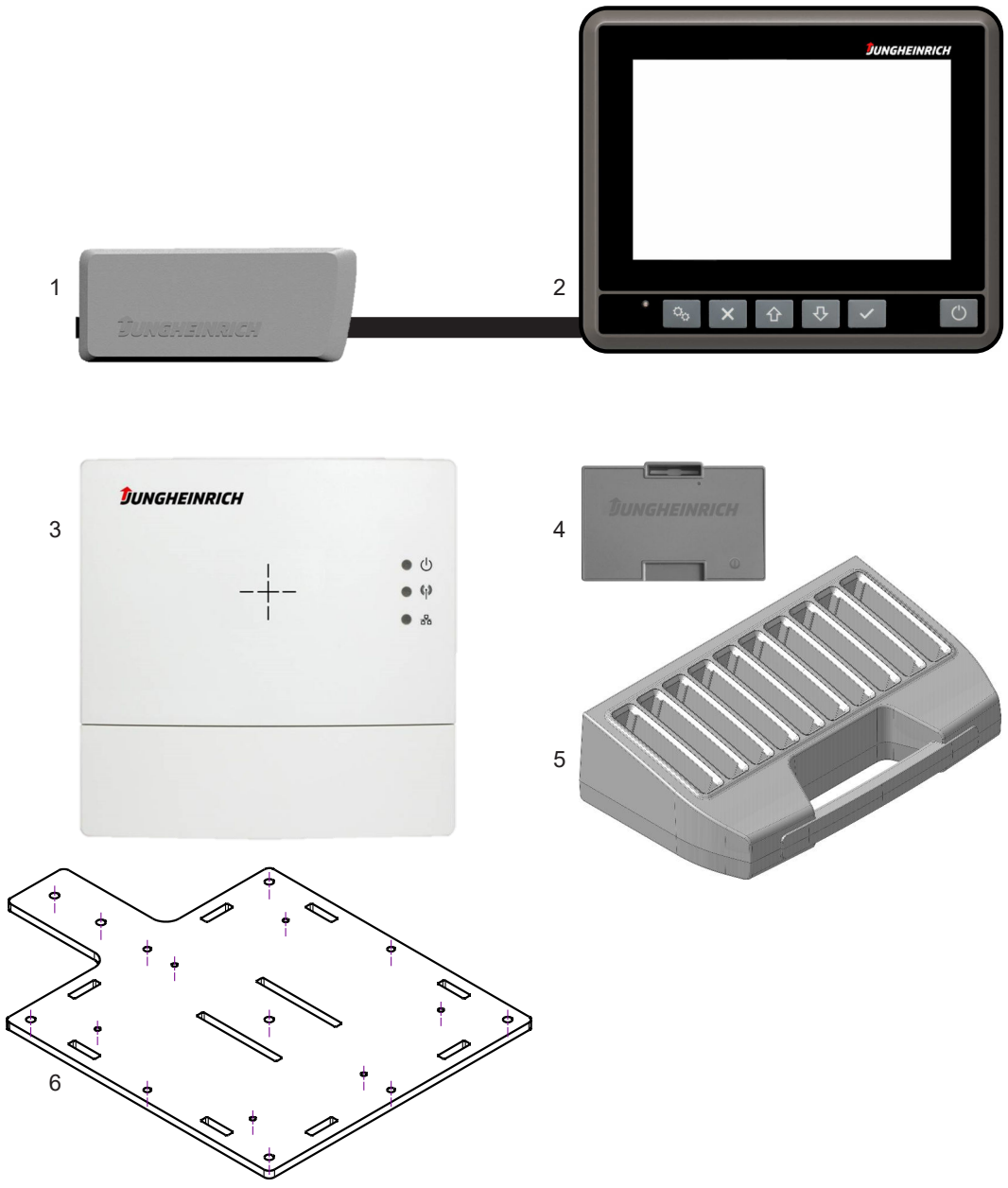
As a wearable radio component, the personnel tag can display its status by means of an LED and provide information by beeping or vibrating. The internal battery supplies the personnel tag for one shift.

The charging cradle can be used to charge up to 10 personnel tags simultaneously. The charging electronics are located in the respective personnel tag.

The zoneCONTROL assistance system can optionally be connected to the industrial truck in order to limit (○) or reduce (○) the travel speed depending on the situation or to activate or deactivate defined states (○), such as the activation of lights or the restriction of work functions of the industrial truck.

## zoneCONTROL assistance system

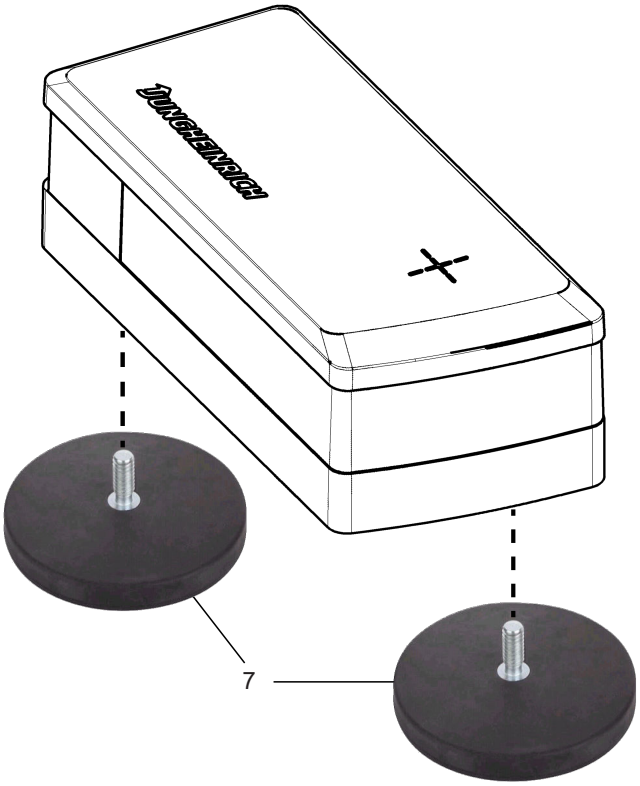
| Item | | Designation |
|---|---|---|
| 1 | ● | Truck tag |
| 2 | ● | Assistance display |
| 3 | ● | Anchor |
| 4 | ○ | Personnel tag |
| 5 | ○ | Charging cradle |
| 6 | ○ | Mounting plate for anchor |



## Truck tag

| Item | | Designation |
|---|---|---|
| - | ● | Support |
| 7 | ○ | Magnetic feet with rubber coating [1] |
| [1)] *A warning label is required for mounting with magnetic feet.* | | |

If the truck tag is not mounted directly with the holder (●), it is attached via screwed-in magnetic feet (○).




**⚠ WARNING!**

**Influencing of the function of medical and technical devices due to exposed magnets**

If the truck tag is detached from the fastening position or is not fastened properly, the magnets of the screwed-in magnetic feet are exposed. Exposed magnets generate a magnetic field. This magnetic field can interfere with the function of medical or technical devices (such as heart pacemakers, hearing aids, credit cards, debit cards, etc.), leading to malfunctions.

▶ Keep a safe distance of 100 mm (3.9 in) between medical or technical devices (such as pacemakers, hearing aids, credit cards, EC cards) and exposed magnets.

**⚠ CAUTION!**

**Risk of injury due to improper handling of magnets**

The magnetic feet contain powerful neodymium magnets. Due to the high magnetic force, improper handling can result in crushing between magnets and ferrous metals (for example the overhead guard) or damage to the magnets and cuts on sharp edges or fragments.

- ▶ Do not place the truck tag with screwed-in magnetic feet vertically on the fastening position. Instead position it laterally with a subsequent tilting movement.
- ▶ After placing the truck tag on the mounting position, check that it is firmly seated and that the magnetic feet are in good condition.
- ▶ Replace damaged magnetic feet immediately.

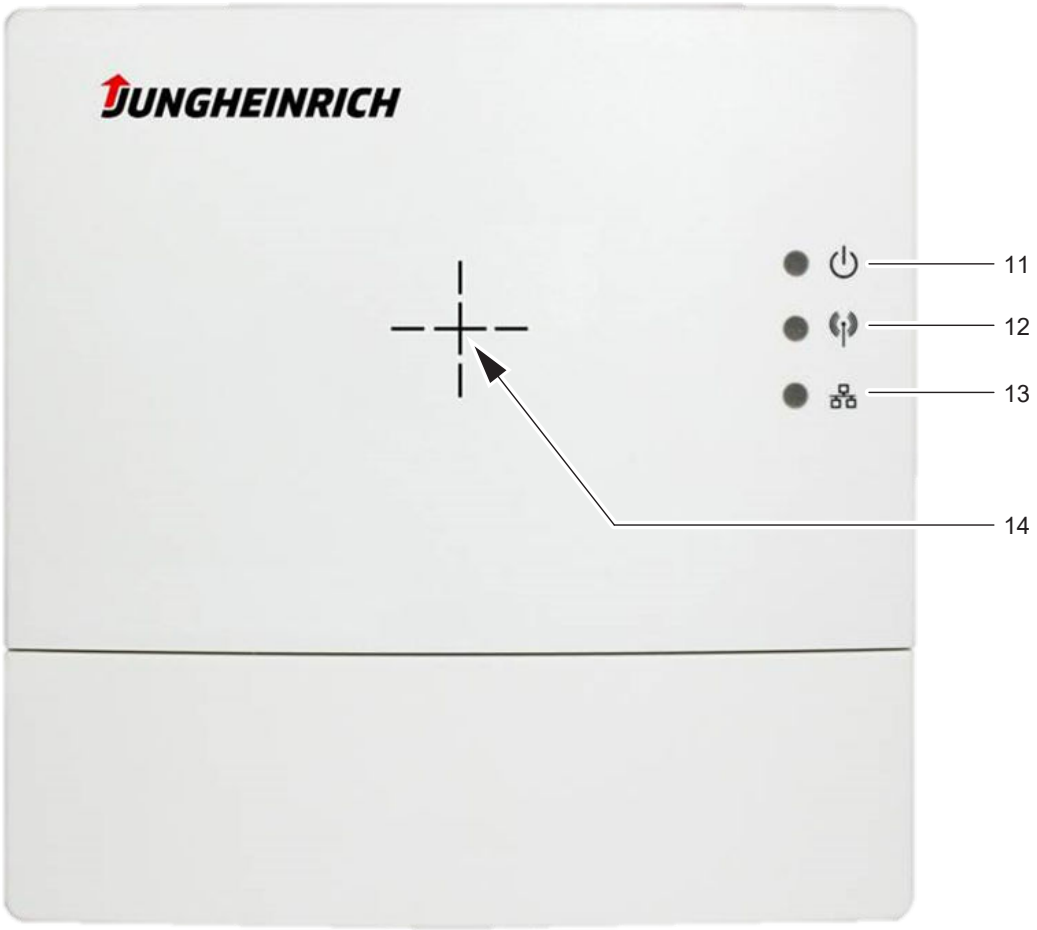
## Assistance display

| Item | Designation |
|---|---|
| 8 | Capacitive touchscreen |
| 9 | Unused key<br>The assistance display is switched on by switching on the industrial truck, and switched off by switching off the industrial truck. Standby operation is optionally available on designated industrial trucks with appropriate equipment. |
| 10 | Front buttons keypad |

**Anchor**

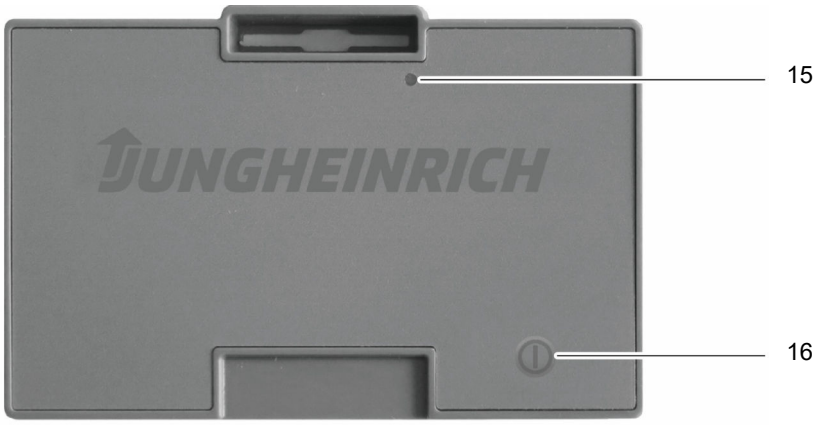
| Item | Designation |
|---|---|
| 11 | Power supply LED:<br>– Green light when supply voltage is applied during normal operation<br>– Red light for error states |
| 12 | Radio activity LED:<br>– Yellow light during distance measurements (sending and or receiving) |
| 13 | Network LED:<br>– Blue light during network activity (not used with base zone product design) |
| 14 | Measurement marking:<br>– Determination of the height of the anchor above floor level |

When the anchor is being configured, all LEDs flash synchronously.



**Personnel tag**

| Item | Designation |
|---|---|
| 15 | Status LED (status of the personnel tag):<br>– In regular operation, alternating red/green light every second outside the radio range of the anchor, continuous green light within radio range of at least one anchor<br>– If the battery is deeply discharged, it flashes red every second[1]<br>– Green flashing every second during charging, green flashing every 10 seconds when fully charged<br>– Continuous red light in the event of a permanent fault[2] |
| 16 | On or off button:<br>– Switch off (press and hold for 2 to 3 seconds, release when the LED (15) goes out)<br>• To make it more difficult to switch off unintentionally, pressing the on or off button in a different way does not cause the personnel tag to be switched off and remain switched off.<br>– Switch on (press and hold for 2 to 3 seconds, release when the LED (15) lights up)<br>• To make unintentional activation and premature discharge more difficult, pressing the on or off button differently does not cause the personnel tag to switch on and remain switched on. |
| [1] *Fully recharge the personnel tag immediately in the charging cradle.*<br>[2] *In the event of a permanent fault, contact the customer service of the assistance system manufacturer.* | |



# 3 Technical data

➔ Subject to technical modifications and additions.

## 3.1 Usage conditions

- Use in an industrial and commercial environment.
- Use the anchor with as clear a view as possible of the entire zone area.
- Permissible temperature range for zoneCONTROL without personnel tags (●): -28 °C (-18.4 °F) to +50 °C (122 °F) at a relative humidity of 10 % to 95 %, non-condensing.
- Permissible temperature range for zoneCONTROL with personnel tags (○): -20 °C (-4 °F) to +50 °C (122 °F) at a relative humidity of 10 % to 95 %, non-condensing. Charging process for personnel tag only permitted from +10 °C (50 °F) until +30 °C (86 °F).
- Permitted ambient altitude during operation up to 2000 m (2187 yd) above mean sea level.
- The truck is not authorized for use in explosion hazard areas.
- The anchors of the assistance system are not approved for outdoor use.
- Covering anchors or truck tags is not permitted.

The components of the assistance system can be used in the permissible temperature range for cold storage operations. Continuous alternating cold store operation is only permitted with special approval from the manufacturer of the assistance system.

➔ Observe the permissible temperatures of the industrial truck. The permissible range of the assistance system's operating temperature does not extend the permissible range of the truck's operating temperature.

## 3.2 Product specifications

PULSE: Radio operation for distance determination
PHASE: Radio operation for data transmission, optionally for distance determination

| **Anchor** | |
|---|---|
| Dimensions (width x length x height) | 180 mm x 180 mm x 48 mm<br>(7.1 in x 7.1 in x 1.9 in) |
| Installation | With 3 M4 threaded screws, for example on mounting plate (○) |
| Protection rating | IP 54 (EN 60529)<br>Outdoor use is not permitted. |
| Permissible temperature range | -28 °C (-18.4 °F) - +55 °C (+131 °F) |
| Operating voltage | 24 V DC (8 V - 30 V DC) |
| Energy consumption | 9 W |
| Voltage (U) of the connected power supply | Maximum 30 V DC |
| Radio procedure | IEEE 802.15.4-2011 UWB (PULSE)<br>IEEE 802.15.4-2011 (PHASE) |
| Frequency range | 3649.6 MHz - 4337.6 MHz (PULSE)<br>6240.0 MHz - 6739.2 MHz (PULSE)<br>2480 MHz ISM band (channel 26 according to IEEE 802.15.4-2011) (PHASE) |
| Transmission power | 0.037 mW (PULSE)<br>100 mW, adjustable (PHASE) |
| Antennas | Integrated |
| Digital output | Switched input voltage, maximum current 200 mA<br>A freewheeling diode must be provided for switching inductive loads. |

| **Power supply of the anchor / power supply unit (○)** | |
|---|---|
| Design | Project-specific, see system documentation |

| **Mounting plate (○)** | |
|---|---|
| Dimensions (width x length x height) | 277 mm x 200 mm x 5 mm<br>(10.9 in x 7.9 in x 0.2 in) |
| Material | PVC |
| Mounting the anchor | With 3 threaded bolts M4 x 8 |
| Mounting options for the mounting plate | Drill holes for screws:<br>4x Ø 4.2 mm (0.17 in),<br>5x Ø 5.1 mm (0,201 in),<br>2x Ø 5.2 mm (0,205 in),<br>Openings for cable ties:<br>8x 20 mm x 5 mm (0.31 in x 0.79 in),<br>2x 60 mm x 5 mm (2.36 in x 0.20 in) |

| **Assistance display** | |
|---|---|
| Dimensions (width x height x depth)[1]) | 200 mm x 162 mm x 38 mm<br>(7.9 in x 6.4 in x 1.5 in) |
| Protection rating | IP 64 (EN 60529)<br>Do not open the housing and do not bring it into contact with jet water |
| Permissible temperature range | -28 °C (-18.4 °F) - +50 °C (+122 °F) |
| Operating voltage | 24 V DC (16.8 V - 31.2 V DC) |
| Display diagonal | 178 mm (7 “) |
| Display type | matt low-reflection, LED-backlit |
| Display resolution | 1280 pixels x 800 pixels (color) |
| Brightness | ≥ 450 cd/m² |
| Contrast | ≥ 800:1 |
| Viewing angle (horizontal / vertical) | 176 ° / 176 ° |
| Touchscreen | Capacitive [2] |
| [1]) *without connection plug*<br>[2]) *The touchscreen can only be used to a limited extent with gloves.* | |

| **Truck tag** | |
|---|---|
| Dimensions (width x length x height) | 160 mm x 70 mm x 51 mm<br>(6.3 in x 2.8 in x 2.0 in) |
| Weight | 0.202 kg (0.445 lb) |
| Installation | With 2 M8 threaded screws |
| Protection rating | IP 54 (EN 60529) |
| Permissible temperature range | -28 °C (-18.4 °F) - +55 °C (+131 °F) |
| Operating voltage | 24 V DC (16.8 V - 31.2 V DC) |

| Truck tag | |
|---|---|
| Radio procedure | IEEE 802.15.4-2011 UWB (PULSE)<br>IEEE 802.15.4-2011 (PHASE) |
| Frequency range | 3649.6 MHz - 4337.6 MHz (PULSE)<br>6240.0 MHz - 6739.2 MHz (PULSE)<br>2480 MHz ISM band (channel 26 according to IEEE 802.15.4-2011) (PHASE) |
| Transmission power | 0.037 mW (PULSE)<br>100 mW, adjustable (PHASE) |
| Antennas | Integrated |

| Personnel tag | |
|---|---|
| Dimensions (width x length x height) | 95 mm x 61 mm x 13 mm<br>(3.7 in x 2.4 in x 0.5 in) |
| Weight | 0.078 kg (0.172 lb) |
| Protection rating | IP 40 (EN 60529) |
| Permissible temperature range for use | -20 °C (-4 °F) - +50 °C (+122 °F) |
| Permissible temperature range for charging process | +10 °C (+50 °F) - +30 °C (+86 °F) |
| internal power supply for use | Rechargeable lithium-ion battery 3.7 V DC / 1900 mAh |
| External power supply for charging process | Charging cradle 5 V DC (U < 5.5 V; I < 18 A; P < 100 W) |
| Radio procedure | IEEE 802.15.4-2011 UWB (PULSE)<br>IEEE 802.15.4-2011 (PHASE) |
| Frequency range | 3649.6 MHz - 4337.6 MHz (PULSE)<br>6240.0 MHz - 6739.2 MHz (PULSE)<br>2480 MHz ISM band (channel 26 according to IEEE 802.15.4-2011) (PHASE) |
| Transmission power | 0.037 mW (PULSE)<br>100 mW, adjustable (PHASE) |
| Antennas | Integrated |

## 3.3 Open source licenses

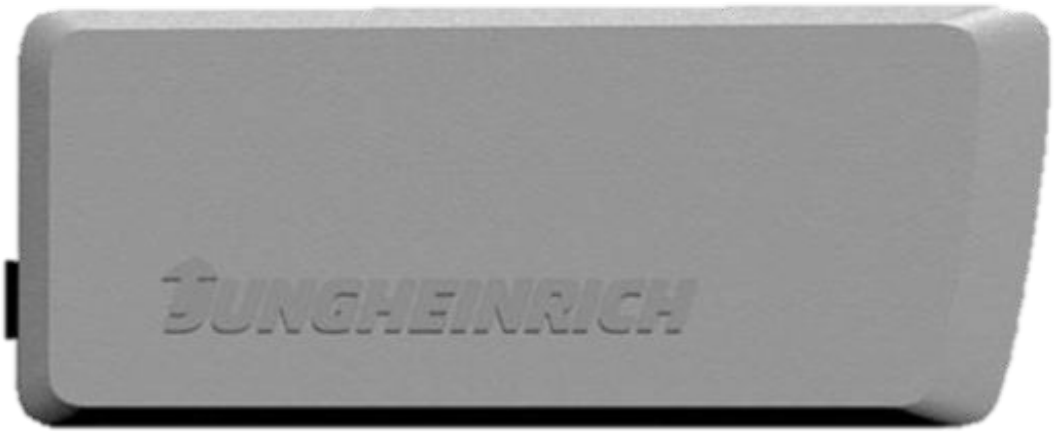
Parts of the assistance system and or related programs contain open source software (OSS) in the form of applications or components.

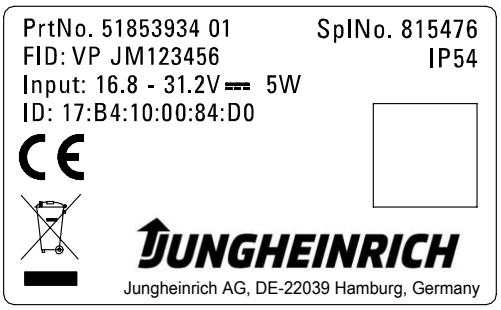
**License terms**

An overview of the open source software (OSS) used is publicly available at no charge online with details of the respective copyright notices and license texts:
https://www.jungheinrich.de/open-source-assistance-systems

# 4 Position of labels and nameplates

## 4.1 Truck tag

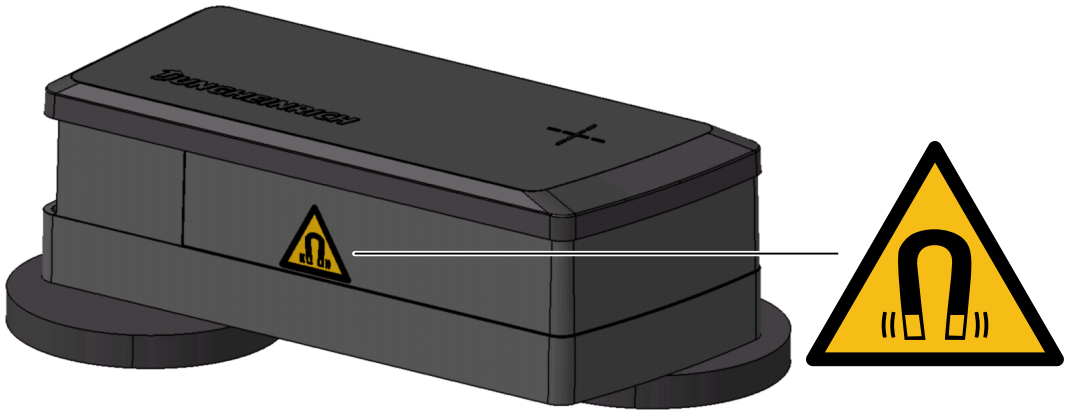


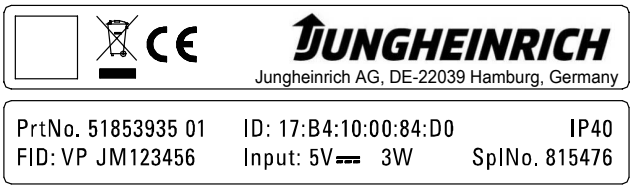

### 4.1.1 Warning Label "Influencing of the Function of Medical Devices Due to Magnets"

If the truck tag is not mounted directly with a support, but instead attached via screwed-in magnetic feet, a warning label is affixed to both long sides of the truck tag.

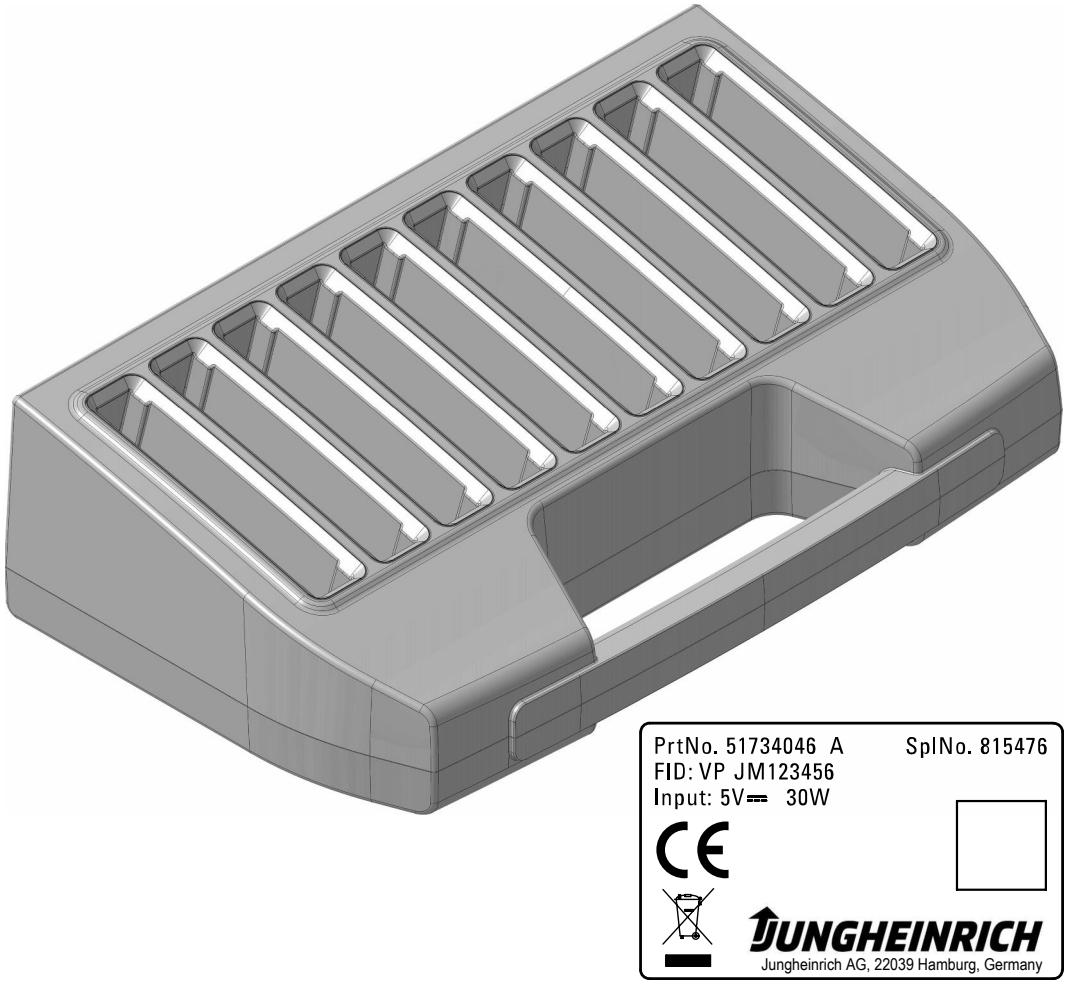
➔ The warning labels must always be legible and must be replaced if necessary.



## 4.2 Personnel tag


## 4.3 Charging cradle



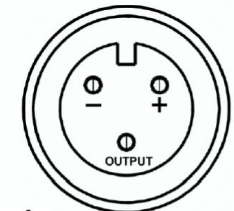
## 4.4 Anchor


PrtNo. 51853936 01 SplNo. 815476
FID: VP JM123456 IP54
Input: 8-30V⎓ 9W
ID: 17:B4:10:00:84:D0

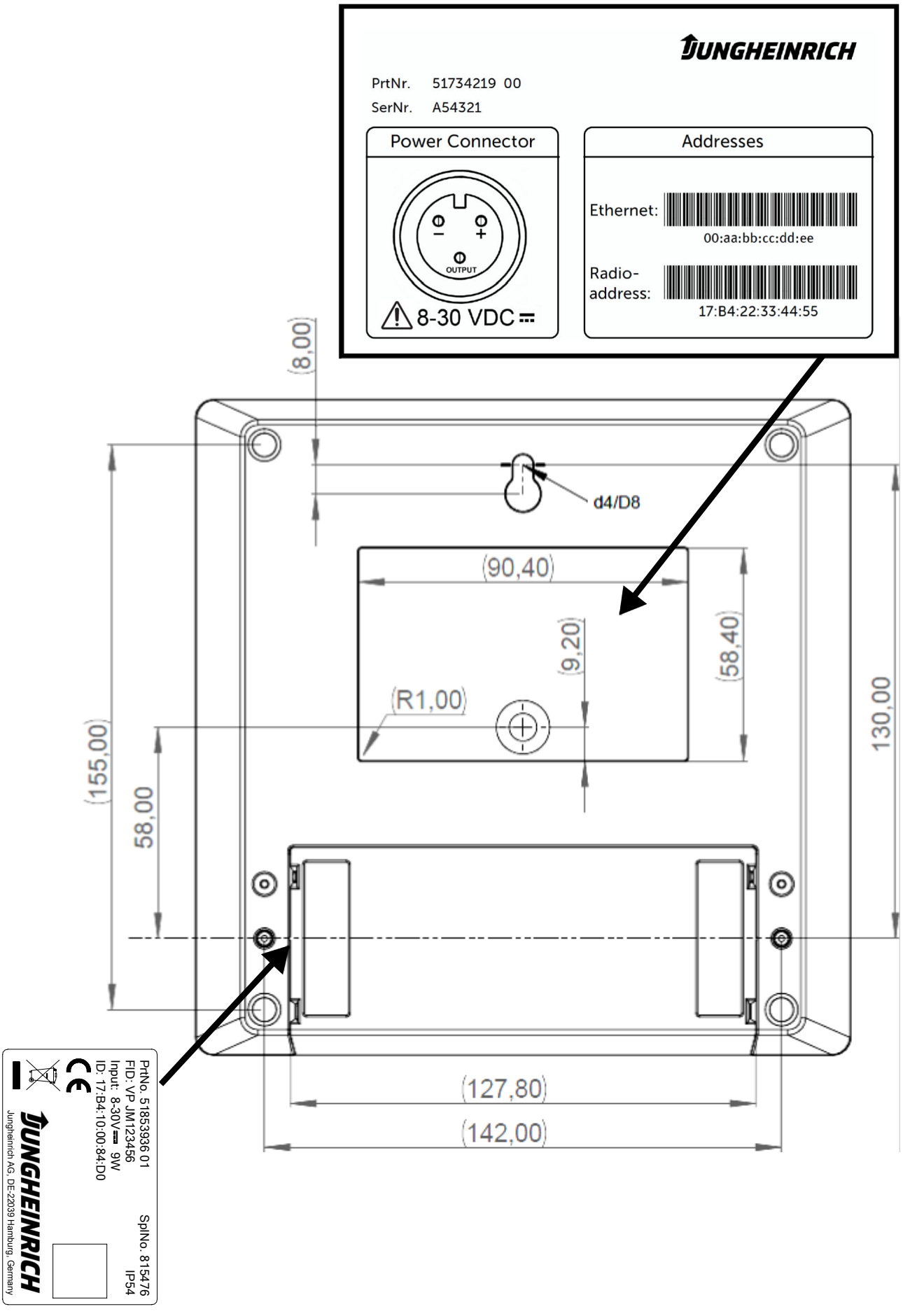
JUNGHEINRICH
Jungheinrich AG, DE-22039 Hamburg, Germany

JUNGHEINRICH

PrtNr. 51734219 00
SerNr. A54321

| Power Connector | Addresses |
|---|---|
|   8-30 VDC⎓ | Ethernet: 00:aa:bb:cc:dd:ee<br>Radio-address: 17:B4:22:33:44:55 |

### 4.4.1 Positions of signs



# 5 Declaration of Conformity

The following declaration of conformity must be observed for the assistance display component.

**SUPPLIER'S DECLARATION OF CONFORMITY**

Jungheinrich 51873810; assistance display

The Jungheinrich assistance display is a class B device in accordance with FCC 47 CFR Part 15 Subpart B.
This equipment can be identified by their manufacturer article number 51873810.

It has been tested and found to comply with the following standards:
- FCC 47 CFR Part 15 Subpart B
- ANSI C63.4 (2014)

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential area. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution to the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Party issuing Supplier's Declaration of Conformity**

Jungheinrich AG
Friedrich-Ebert-Damm 129
22047 Hamburg
Germany

**Responsible party – U.S. Contact Information**

Jungheinrich Lift Truck Corp.
2121 West Sam Houston Parkway North
Houston, TX 77043-2305

www.jungheinrich.com

**FCC Statement**

Jungheinrich 52445054; anchor

The Jungheinrich anchor is an UWB device.
This equipment can be identified by their manufacturer article number 52445054.

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution**
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
This equipment may only be operated indoors. Operation outdoors violates 47 U.S.C. 301 and could subject the operator to serious legal penalties.

**Note**
FCC Regulations §15.521 - Technical requirements applicable for all UWB devices.
(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

**Party issuing this Statement**

Jungheinrich AG
Friedrich-Ebert-Damm 129
22047 Hamburg
Germany

**Responsible party – U.S. Contact Information**

Jungheinrich Lift Truck Corp.
2121 West Sam Houston Parkway North
Houston, TX 77043-2305

www.jungheinrich.com

**FCC Statement**

Jungheinrich 52445052; truck tag

The Jungheinrich truck tag is an UWB device.
This equipment can be identified by their manufacturer article number 52445052.

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution**
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Note**
FCC Regulations §15.521 - Technical requirements applicable for all UWB devices.
(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

**Party issuing this Statement**

Jungheinrich AG
Friedrich-Ebert-Damm 129
22047 Hamburg
Germany

**Responsible party – U.S. Contact Information**

Jungheinrich Lift Truck Corp.
2121 West Sam Houston Parkway North
Houston, TX 77043-2305

www.jungheinrich.com

**FCC Statement**

Jungheinrich 52445053; truck tag

The Jungheinrich truck tag is an UWB device.
This equipment can be identified by their manufacturer article number 52445053.

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution**
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Note**
FCC Regulations §15.521 - Technical requirements applicable for all UWB devices.
(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

**Party issuing this Statement**

Jungheinrich AG
Friedrich-Ebert-Damm 129
22047 Hamburg
Germany

**Responsible party – U.S. Contact Information**

Jungheinrich Lift Truck Corp.
2121 West Sam Houston Parkway North
Houston, TX 77043-2305

www.jungheinrich.com

**FCC Statement**

Jungheinrich 52445055; personnel tag

The Jungheinrich personnel tag is an UWB device.
This equipment can be identified by their manufacturer article number 52445055.

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution**
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Note**
FCC Regulations §15.521 - Technical requirements applicable for all UWB devices.
(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

**Party issuing this Statement**

Jungheinrich AG
Friedrich-Ebert-Damm 129
22047 Hamburg
Germany

**Responsible party – U.S. Contact Information**

Jungheinrich Lift Truck Corp.
2121 West Sam Houston Parkway North
Houston, TX 77043-2305

www.jungheinrich.com

# F Operation

## 1 General

**⚠ WARNING!**

**Danger of collision when operating the assistance system**

Operating the assistance system during travel or hydraulic movements truck can lead to collisions with persons and objects.

- ▶ Do not operate the assistance system during travel or hydraulic movements.
- ▶ Before operation, adjust the holders of the assistance display (●) and truck terminal (○) to the operator so that injuries are prevented in proper operation.
- ▶ Before operation, adjust the driver's seat in such a way that bumping into the assistance display (●) or truck terminal (○) is impossible during intended operation, but the industrial truck can be operated safely.

**⚠ WARNING!**

**Risk of collision due to limited view or distraction**

The assistance display and optional truck terminal can restrict the operator's view depending on the mounting position. Restricted view or distraction can cause collisions with persons and objects.

- ▶ Increased attention during driving and hydraulic movements.
- ▶ Make sure that the operating and work areas are clear.
- ▶ Adjust driving speed and handling of the load to the visual conditions.
- ▶ Do not change the mounting position of the assistance display or truck terminal (○).
- ▶ Do not cover the display of the assistance display or truck terminal (○).
- ▶ Check assistance display, truck terminal (○), holder and accessories weekly to ensure they are seated tightly.

**⚠ WARNING!**

**Danger of collision due to malfunctions, poor visibility or habituation to operating the industrial truck**

Faults or malfunctions of the assistance system can result in the content of the assistance display of the industrial truck no longer being updated or further functions no longer being executed. Operating the industrial truck with poor visibility of the operating and working area or loss of attention due to becoming habituated may lead to collisions with persons and objects,.

- ▶ Check the status of the assistance display when turning on the industrial truck.
- ▶ Do not continue operating an industrial truck within the complete system with faults or malfunctions in the assistance system, see page 68. Contact the customer service of the assistance system manufacturer.
- ▶ Increase attention during travel and hydraulic movements and around crossing zones to prevent collisions.
- ▶ When operating the industrial truck using the assistance display, always still check the operating and working area in addition by looking directly at it. This will also serve to prevent a loss of attention due to becoming habituated.
- ▶ Adjust driving speed and handling of the load to the visual conditions.

**⚠ WARNING!**

**Danger of collision due to malfunctions, poor visibility or habituation to using the personnel tag**

Faults or malfunctions of the assistance system can result in the assistance display of the industrial truck no longer being updated or other functions no longer being performed, such as triggering beeps and/or vibrating the personnel tag in crossing zones. Operating industrial trucks with poor visibility of the operating and working area or loss of attention due to becoming habituated may lead to collisions.

- ▶ Check personnel tag for condition when switching on and during use. Replace the personnel tag with a deeply discharged battery immediately and charge it fully in the charging cradle.
- ▶ Pay more attention at intersections to prevent collisions.
- ▶ When entering areas and routes, even when the personnel tag is functioning, always still check in addition by looking directly at the relevant area. This will also serve to prevent a loss of attention due to becoming habituated.
- ▶ Adapt your own behavior to the visibility conditions.

# 2 System

When the zoneCONTROL assistance system in the base zone product design is switched on, the following independently configurable zone functions are available: collision warning (conditional), maximum speed, maximum clearance height, block passage, block goods storage as well as warehouse function switching (switching the respective anchor output) and truck function switching (switching the assistance display output).

➔ If there is a connection (○) to the industrial truck, it may be possible to limit (○) or reduce (○) the travel speed depending on the situation, or to activate or deactivate defined states (○) such as the activation of lights.

All anchors, personnel tags, truck tags and assistance displays of the assistance system must be activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during initial startup.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, this must be taken into account.

Each industrial truck equipped with components of the assistance system must be adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during the initial startup, as well as for the functions according to the Operating Instructions of the industrial truck.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, the highest and lowest possible heights must be checked in addition to the heights for regular travel mode.

If anchors are replaced or their position is changed or if assistance displays are replaced or fitted to other industrial trucks, regular operation is no longer permitted until they have been activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer.

➔ If the height position of an anchor is changed, the setting of the corresponding anchor must be corrected by the customer service of the assistance system manufacturer.

After an anchor is replaced, each assistance display with an individual zone configuration that differs from this anchor must be supplemented with corresponding entries.

**System performance and system limitations**

The system performance is limited, among other things, by the number and ranges of radio components that influence each other, as well as by local environmental influences (reflection, shielding, interference).

➔ To optimize system performance, the assistance system manufacturer recommends a usage analysis on-site. The customer service of the assistance system manufacturer can adjust individual components according to the application analysis.

Incorrect measurements or measurement failures are unlikely if all preconditions for successful measurements are met:
– Truck tags and anchors are not covered.
– Person and/or truck tags have a clear view of the anchors.

– Person and/or truck tags are within radio range of the anchors. The recommended maximum distance is 30 m (98 ft). Greater distances can lead to reduced usability.
– There is a maximum of 6 anchors within radio range at any one time.
– The maximum number of personnel tags / truck tags is not exceeded within the radio range:
  With 6 anchors maximum 16 personnel tags / truck tags
  With 5 anchors maximum 19 personnel tags / truck tags
  With 4 anchors maximum 23 personnel tags / truck tags
  With 3 anchors maximum 30 personnel tags / truck tags
  With 2 anchors maximum 42 personnel tags / truck tags
  With 1 anchor maximum 69 personnel tags / truck tags

With accelerated movements, the effort required to precisely determine distances increases, meaning that a zone can be activated up to 1 m (39.4 in) later.

The effects of possible latency and hysteresis situations are taken into account by adjusting the zone size and switching behavior in order to reduce unintentional alternating changes (flickering) between triggered and non-triggered states at the zone edge: A zone hysteresis is set in each assistance display, within which the triggering of a triggered zone is maintained beyond the corresponding zone radius. The manufacturer's customer service can adjust the setting.

A zone hysteresis of 1 m (39.4 in) is preset in order to largely avoid alternating states. With a zone hysteresis between 1 m (39.4 in) and 0.25 m (9.8 in) alternating states occasionally occur. With a hysteresis of less than 0.25 m (9.8 in) alternating states can occur more frequently due to the system, as typical system inaccuracies are also in this order of magnitude.

**Zones in the assistance system**

Each anchor is parameterized with up to 7 different zones with defined actions that are executed when triggered.

Possible zones on the anchor:
– Collision warning (conditional)
– Maximum speed
– Maximum headroom
– Block passage
– Block goods storage
– Warehouse function switching
– Truck function switching

Possible actions of triggered zones on the anchor:
– Trigger the switching output

Possible actions of triggered zones on the personnel tag:
– Trigger the beep function
– Trigger the vibrate function

Possible actions of triggered zones on the assistance display:
– Triggering warning symbols
– Triggering an advisory tone
– Trigger the switching output for slow travel
– Trigger the switching output for additional functions (switch the truck function)

– Limit the travel speed according to the configuration (only if equipped with assistance interface)
– Limit the travel speed according to the displayed warning symbol of the maximum speed zone (only if equipped with assistance interface)

Possible actions of conditional zones with unfulfilled trigger condition on the assistance display:
– Trigger an info tone

The warning symbols "Slow travel" and "Maximum speed" describe two possible adjustable states of the same zone (maximum speed) and cannot be set together on one anchor.

**Reacceleration behavior**

Depending on how the industrial truck is equipped, the truck accelerates again automatically when the travel switch is deflected accordingly as soon as the slow travel or travel speed limit is no longer triggered, or only after a zero transition (center position) of the travel switch and corresponding renewed deflection.

**Effect of the height of the truck tag on the distance measurement**

The effect of the height of the truck tag is greatest directly under the anchor without compensation and decreases with increasing lateral distance from the anchor.

If the truck tag is attached higher or raised, a smaller distance to raised anchors is achieved and measured by the system:
– Zones are triggered earlier in travel operations when the industrial truck is moving towards anchors than when the truck tag is attached further down or is lowered.
– In travel operations when the industrial truck moves away from anchors, zones are no longer triggered earlier than when the truck tag is attached further down or is lowered.
– Zones that have not yet been triggered may be triggered initially as soon as the truck tag is raised.

When the truck tag is attached further down or lowered, a greater distance to raised anchors is achieved and measured by the system:
– In travel operations when the industrial truck moves towards anchors, zones are triggered later than when the truck tag is attached higher or raised.
– In travel operations when the industrial truck moves away from anchors, zones are not triggered later than when the truck tag is attached higher or raised.
– In some cases, previously triggered zones will no longer be triggered after the truck tag has been lowered.

Warning symbols are also shown on the assistance display depending on the situation. The warning symbols are displayed in descending order of priority: The currently most important active zone is always displayed, followed by other zones as far as the current display allows.

The active zones, which are shown in the current display, can be overridden via the touchscreen of the assistance display if overriding is possible for them.

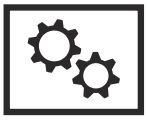
The keypad on the assistance display can be used to switch to the assistance system display or to the start page of the configuration view or to override the currently most important active zone if it can be overridden and is displayed in the current view.

The touch screen is used to select, activate or deactivate available selection options (○).

→ Extended selection options are grayed out if they are not available depending on the equipment.

## 3.1 Button assignment of the display unit

### Keypad of the assistance display

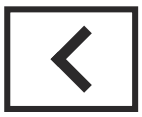
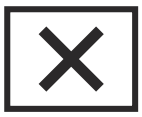
| Icon | Function |
|---|---|
|  | Functional level:<br>– Switch to the start page of the configuration view |
|  | Cancel:<br>– Overriding the currently most important zone, if overriding is possible and it appears in the current display.<br>➔ Operation of the assistance system, for example if it is not possible to operate the capacitive touchscreen when wearing protective gloves.<br>➔ Subordinate zones in the side information column cannot be overridden via the keypad. |

➔ The other keys are not assigned when equipped without additional assistance systems, for example addedVIEW.

➔ The available functions of the buttons depend on the settings and the current operating situation or operating mode.

### Buttons in the configuration views of the assistance display

➔ The buttons in the configuration views of the assistance display can only be operated via the touchscreen.

| Icon | Function |
|---|---|
|  | Back:<br>– Switch to the previous configuration view |
|  | Cancel:<br>– Exit the configuration view |

## 3.2 Switching on and off

***NOTICE***

**Risk of material damage due to condensate**

Due to rapid temperature change, there can be a build-up of condensate and damage to the assistance system display.

▶ Do not switch on the industrial truck until after it has adjusted to the room temperature.

After the truck's EMERGENCY OFF is released, the required supply voltage is made available. The assistance display and other components on the industrial truck are switched on when the industrial truck is switched on.

Standard design: The switched-on assistance display starts and an advisory tone sounds to check the function of the internal loudspeaker.

Design with standby operation (○): The switched-on assistance display immediately begins the start process, but still without activating the display. After switching on by means of a switch lock or keyless entry system, the start process is completed, the display is activated, and an advisory tone sounds to check the function of the internal loudspeaker.

After the startup process is completed, the assistance display is ready for operation. If the startup process is not completed after 120 s at the latest, or if no advisory tone sounds, not even after switching off and switching on again, there is a fault (see page 68).

Design with standby operation (○): Switching off via switch lock or keyless access system deactivates the display.

Switching off the assistance display and other components is only possible by pressing the EMERGENCY OFF of the industrial truck.

Restarting is only possible by actuating and releasing EMERGENCY OFF and switching on the industrial truck.

## 3.3 Advisory tone

Indicated zone functions can optionally be supported by a beeping advisory tone from the assistance display's internal speaker.

Regardless of the system configuration, if the assistance display is configured accordingly, an advisory tone sounds once after each time the system is switched on to check the function of the loudspeaker.

If the operating company specifies the advisory tone as necessary for the operation of the industrial truck in the overall system, a truck may not be operated in the overall system without a functioning advisory tone.

If, despite appropriate configuration of the assistance display, no advisory tone sounds after switching on and also not after switching off and switching on again, there is a fault (see page 68).

➔ The advisory tone (function check after switching on or zone function) and info tone (zone condition of a conditional zone not fulfilled) sound the same.

## 3.4 Info tone

If the triggering condition set in the configuration of the anchor is not met when entering a conditional zone such as the collision warning zone (conditional), an info tone may sound from the loudspeaker of the assistance display if configured accordingly (○).

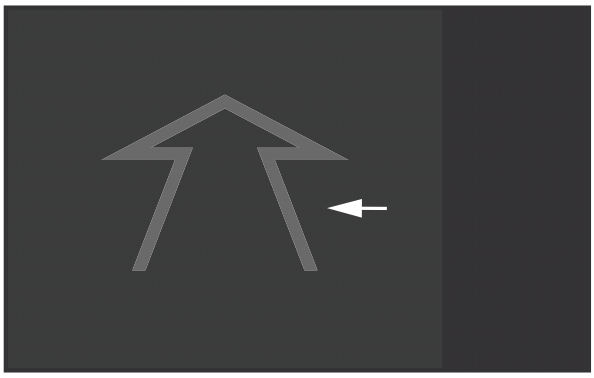
➔ The info tone (zone condition of a conditional zone not fulfilled) and the advisory tone (function check after switching on or zone function) sound the same.

## 3.5 Content of display

The main area of the assistance display shows free travel or the most important triggered message or zone with a warning symbol. In the side information column, the display continues in descending order of priority from top to bottom.

If more than four messages or zones are triggered, only the four messages or zones with the highest priorities are displayed with warning symbols.

Triggered warning symbols can be overridden (deactivated) by pressing the touchscreen or keypad if it is enabled for the respective zone in the anchor, see page 53.



If the assistance system in the industrial truck fails to function, zone responses and other functions are no longer performed. The display of free movement and triggered zones is replaced by a warning pictogram.

Faults and malfunctions of the system, see page 68.

The table shows the warning symbols for the adjustable zones in the order in which they are triggered in the assistance display.

| Icon | Meaning | Color | Function |
|---|---|---|---|
|  | Collision warning (conditional): Collision warning triggered | Red | Zone collision warning (conditional): The warning symbol and slow travel (○) or travel speed limit (○) are triggered if at least one truck tag is present within the zone and the minimum number of truck tags (0 - 10) and/or personnel tags (0 - 10) set in the configuration of the anchor has been reached. |
|  | Collision warning (conditional): Collision warning not triggered | Gray | |
|  | Slow travel | Red | Maximum speed zone: The warning symbol and slow travel (○) are triggered. |
|  | Switching the warehouse function | Gray | Warehouse function switching zone: Warning symbol is triggered, switching output of the anchor is triggered. |
|  | Truck function switching | Gray | Truck function switching zone: Warning symbol is triggered, switching output of the assistance display is triggered. |
|  | Passage blocked | Orange | Passage block zone: Warning symbol is triggered. |
|  | Maximum headroom | Orange | Maximum clearance height zone: Warning symbol showing the set maximum clearance height (1 m (3.3 ft) - 15 m (49.2 ft)) is triggered. |
|  | Maximum speed | Orange | Maximum speed zone: Warning symbol showing the set maximum speed (2 km/h (1.2 mph) - 20 km/h (12.4 mph)) is triggered.<br>Travel speed is limited according to the displayed warning symbol (if equipped with assistance interface). |
|  | Block goods storage | Orange | Block goods storage zone: Warning symbol is triggered. |
|  | Free travel | Gray | Free travel: no triggered zone |

## 3.6 Control display

**⚠ WARNING!**

**Risk of collision due to malfunctions of the assistance display**

Faults or malfunctions of the assistance system can result in the content of the assistance display of the industrial truck no longer being updated or further functions no longer being executed. The pulsating control indicator remains off or shows abnormal behavior.

- ▶ Check the status of the assistance display when turning on the industrial truck.
- ▶ Increase attention during travel and hydraulic movements and around crossing zones to prevent collisions.
- ▶ When operating the industrial truck using the assistance system, always still check the operating and working area in addition by looking directly at it.
- ▶ Adjust driving speed and handling of the load to the visual conditions.

In the upper right corner of the assistance display, a gray dot is shown pulsating every 1.6 seconds as a control indicator.

If the pulsating control display does not appear, there is a fault in the assistance display: The content of the assistance display is no longer updated and zone responses or other functions are no longer executed correctly.

As soon as the assistance system detects the fault, it triggers a restart. Zone responses or other functions are executed again once the restart is complete.

Faults and malfunctions of the system, see page 68.

## 3.7 System settings

### Configuration views

Selection options in the start page of the configuration view:
– Selecting the language to be used in the views
– Access to Administration mode (not used if not equipped with additional assistance systems, for example addedVIEW)
– Access to Service mode

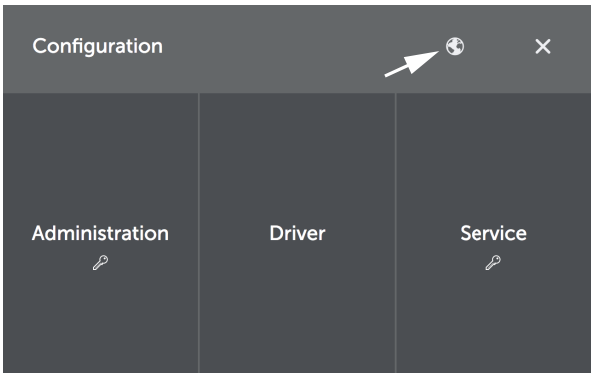
Access to the Service mode is protected. The default settings can be adjusted by the customer service department of the assistance system manufacturer.

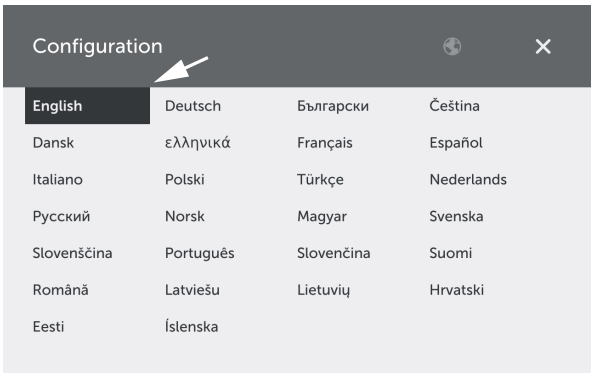
***Selecting the language to be used in the views***

*Procedure*

- Click the globe icon in the top right corner of the header.
- Select the desired language from the list.

*Desired language is selected.*



# 4 Personnel tag


The personnel tag has two purposes:
– Identify wearers as participants in the crossing zone
– Indicate approaching truck tags to wearers in the crossing zone

As the system is based on radio connections, the personnel tag requires a clear view of the anchors within range at all times for unrestricted operation.

To compensate for short-term failures, the assistance system continues to assume for three seconds that the personnel tag is still within range if the connection between the personnel tag and the anchor is lost.

The LED (15) indicates the status of the personnel tag and its radio connection:
– In regular operation, continuous green light within radio range of at least one anchor: There is a radio connection to at least one anchor and the distance to the personnel tag will be determined.
– In regular operation, the red/green light changes every second outside the radio range of the anchors: There is no radio connection to an anchor and the distance to the personnel tag cannot be determined.
– If the battery is deeply discharged, it flashes red every second
– Green flashing every second during charging, green flashing every 10 seconds when fully charged
– Continuous red light in the event of a permanent fault

If the necessary preconditions are met, the activated personnel tag indicates this for two seconds by beeping and/or vibrating:
– A crossing zone is set in the anchor.
– The notifications are activated in the anchor by beeping and/or vibrating.
– The personnel tag is located within the radius of the crossing zone.
– When entering the crossing zone, an industrial truck tag is already in the zone or an industrial truck tag is entering the zone.

If a personnel tag is switched off or charging, it cannot be used for distance measurement, is not registered within crossing zones and does not indicate anything by beeping or vibrating.

When switching on and during use, the status of the personnel tag must be checked using the LED (15). Replace the personnel tag with a deeply discharged battery immediately and charge it fully in the charging cradle.

The battery of the personnel tag is designed for a service life of one shift.

When entering the crossing zone of an anchor, check the beeping and/or vibrating of the personnel tag with the presence of a truck tag in the zone.

In the event of malfunctions or permanent faults, contact the customer service of the assistance system manufacturer.

**NOTICE**

**Material damage due to deep discharge**

A fully charged personnel tag can become so deeply discharged after about 6 months without charging that the internal battery begins to deteriorate.

- ▶ Check personnel tag for condition when switching on and during use. Replace the personnel tag with a deeply discharged battery immediately and charge it fully in the charging cradle.
- ▶ Fully charge the personnel tag after each use and before storage or prolonged non-use.
- ▶ Fully recharge the personnel tag on a regular basis, at least every 3 months.
- ▶ If a severely discharged battery or a permanent fault is displayed prematurely, do not operate the personnel tag any longer.

### *Switching on the personnel tag*

*Procedure*

- Press the on or off button (16) and hold it down for 2 to 3 seconds.
- Release the on or off button (16) when the LED (15) lights up.

To make unintentional activation and premature discharge more difficult, pressing the on or off button differently does not cause the personnel tag to switch on and remain switched on.

Functions associated with switching on the personnel tag are not switched on if the on or off button is pressed differently.

*LED (15) lights up, the personnel tag is switched on.*

### *Switching off the personnel tag*

*Procedure*

- Press the on or off button (16) and hold it down for 2 to 3 seconds.
- Release the on or off button (16) when the LED (15) goes out.

To make it more difficult to switch off unintentionally, pressing the on or off button in a different way does not cause the personnel tag to be switched off and remain switched off.

Functions associated with switching off the personnel tag are not switched off if the on or off button is pressed differently.

*LED (15) goes out, the personnel tag is switched off.*

### *Fully charging the personnel tag*

*Requirements*

– The charging cradle is supplied with power via the power supply unit.
– Permissible ambient temperature from +10 °C (50 °F) to +30 °C (86 °F).

*Procedure*

- Insert the personnel tag into a free slot in the charging cradle. The charging process is indicated by the LED (15) every second.

➔ Insert the personnel tag so that the contact surfaces on the bottom touch the contact pins in the charging cradle.

- Do not remove the personnel tag from the charging cradle until the LED (15) only flashes green every 10 seconds.

➔ The maximum charging time of a personnel tag at +20 °C (68 °F) is 8.5 h.

*Personnel tag is fully charged.*

*The personnel tag is automatically switched on when it is removed from the charging cradle.*

➔ The charging cradle can be used to charge up to 10 personnel tags simultaneously. The charging electronics are located in the personnel tag.

**Power failure**

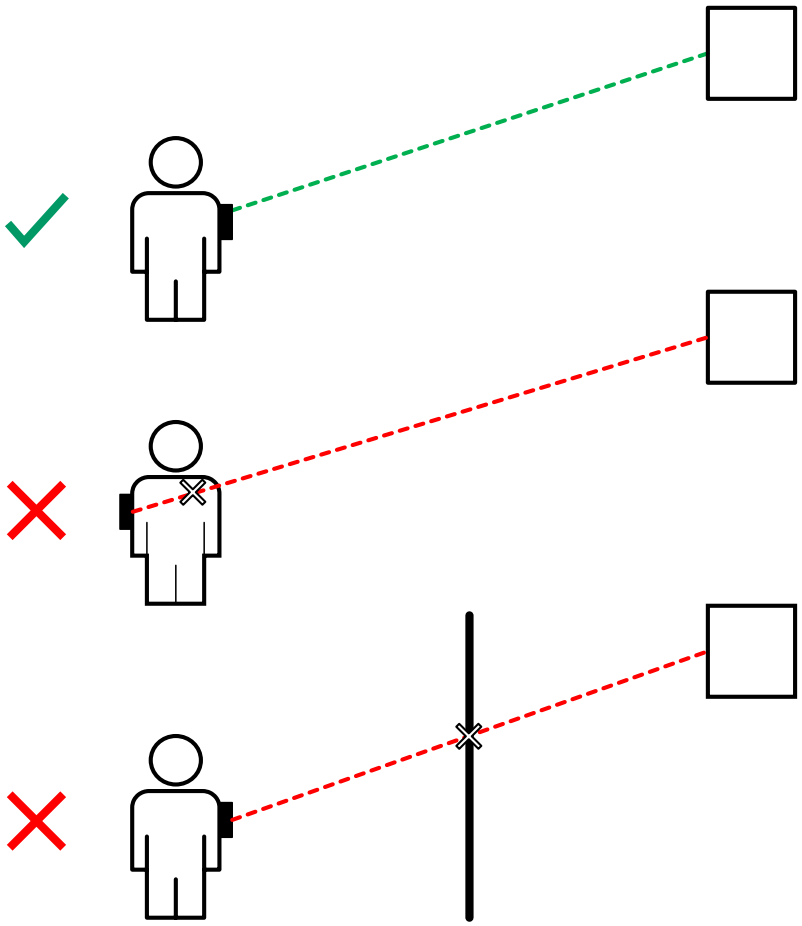
Charging continues automatically after a power failure.

**Trickle charging**

A daily or continuous trickle charge beyond the full charge is not necessary for the lithium-ion battery of the personnel tag due to its design.

Fully charged personnel tags can remain plugged into the charging cradle for automatic trickle charging.

## 4.1 Carrying method



To achieve the required reception quality, wear the personnel tag on the upper arm, with Jungheinrich lettering facing outwards and with a clear view of the anchors within reach. Wearing the device in a different way can reduce the reception quality and impair the function, for example if your own body is not in clear view of the anchor or another body or object is blocking the view of the anchor.

To wear the personnel tag, a suitable upper arm pocket (such as the Jungheinrich personnel tag upper arm pocket 51872747) must be attached to the clothing as shown.

# G Maintenance

## 1 Spare Parts

***NOTICE***

Only original spare parts are subject to the quality control of the assistance system manufacturer. To ensure safe and reliable operation of the industrial truck, use only spare parts of the assistance system manufacturer.

## 2 Operating safety and environmental protection

The checks and maintenance listed in section "Maintenance, inspection and replacement of maintenance parts that require replacement" must be carried out according to the defined maintenance intervals (see page 101).

The assistance system manufacturer recommends replacing the maintenance parts also listed in section "Maintenance, inspection and replacement of maintenance parts that require replacement" according to the specified replacement intervals (see page 101).

## 3 Consumables

| Order no. | Delivery quantity | Designation | Use for |
|---|---|---|---|
| 51224491 | 750 ml | Glass cleaner (containing ethanol) | Cleaning the touchscreen of the assistance display |
| | | Cleaner with 5% alcohol content, for TFT displays | |
| 51085537 | 1 | Cleaning cloth (optical cloth) | Cleaning the touchscreen of the assistance display |
| | | Soft cotton cloth, microfiber cloth or soft disposable paper towel | |

## 4 Description of maintenance and servicing jobs

All necessary safety measures must be taken to reduce risks during maintenance and servicing. The following preparations must be made:

*Procedure*

- Completely lower the load lifting device.
- Park and secure the industrial truck.
- Remove the key from the key switch to protect the truck from being placed in operation without authorization.
- Press EMERGENCY OFF.

## 4.1 Cleaning the touchscreen

***NOTICE***

**Note on cleaning the touchscreen**

Use a dust-free cloth lightly moistened with detergent to clean the touchscreen. After cleaning, wipe dry with a clean cloth.

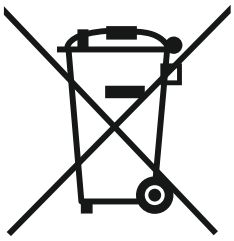
- ▶ Disconnect the assistance display from the supply voltage by switching off the industrial truck before cleaning.
- ▶ Use only suitable cleaning agent. Do not use any water.
- ▶ Only use clean soft cotton cloths, microfiber cloths or new soft disposable paper towels, otherwise the touchscreen could be scratched.
- ▶ Do not apply cleaning agent directly to the touchscreen, but only via the clean soft cotton cloth, microfiber cloth or the new soft disposable paper towel.

# 5 Permanent decommissioning and disposal

The proper permanent decommissioning or disposal of the components of the assistance system must be carried out in accordance with the applicable legal provisions of the country in which it is used. In particular, regulations related to the disposal of electronics must be observed.

Disassembly of the components of the assistance system may only be performed by trained persons and the manufacturer's recommended procedures must be followed.

***NOTICE***



**Lithium-ion batteries are waste that requires special monitoring.**

According to the labeling, lithium-ion batteries and components with lithium-ion batteries must not be disposed of with household or commercial waste, but must be disposed of properly in accordance with the applicable national environmental protection regulations.

- ▶ Return and recycling must be in compliance with German Federal battery regulations (BattG, law regarding placing on the market, return and environmentally compatible disposal of batteries and accumulators).
- ▶ It is also generally possible to return lithium-ion batteries and components with lithium-ion batteries to the manufacturer of the assistance system. To do this contact the customer service of the assistance system manufacturer. Separate arrangements must be considered.

# 6 Tests by the Operator

All anchors, personnel tags, truck tags and assistance displays of the assistance system must be activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during initial startup.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, this must be taken into account.

Each industrial truck equipped with components of the assistance system must be adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during the initial startup, as well as for the functions according to the Operating Instructions of the industrial truck.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, the highest and lowest possible heights must be checked in addition to the heights for regular travel mode.

If anchors are replaced or their position is changed or if assistance displays are replaced or fitted to other industrial trucks, regular operation is no longer permitted until they have been activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer.

The assistance system with all its components must be checked at regular intervals to ensure that it is in proper condition, in particular that all set zones are functioning correctly.

The manufacturer of the assistance system has customer service technicians who are specially trained for these tasks.

If an industrial truck is braked to a complete stop by the assistance system, a malfunction has occurred.

In the event of malfunctions, follow the instructions for troubleshooting, see page 68.

# 7 Troubleshooting

This chapter enables the operator to identify and rectify basic faults and the effects of incorrect operation. When trying to locate a fault, follow the order of measures shown in the table for rectifying faults.

If the truck assistance cannot be restored to operation after carrying out the following “remedial actions," or if a fault in the electronics system is displayed with a corresponding error code, contact the customer service department of the assistance system manufacturer.

Additional troubleshooting may only be performed by the customer service department of the assistance system manufacturer. The manufacturer of the assistance system has customer service technicians who are specially trained for these tasks.

The following information is important and helpful for the customer service to be able to respond to the fault quickly and accurately:
– Type and design of the affected component
– Serial number of the affected component (if available)
– Serial number of the industrial truck
– Error number (if displayed)
– Error description
– Current location of the industrial truck with faulty assistance system

**Messages appearing in the assistance display**

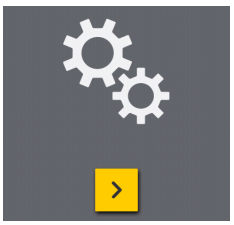
Faults or malfunctions can lead to an information text appearing in the assistance display for the operator. Some information texts can be acknowledged by pressing the touchscreen, others require remedial actions.

| Content of the displayed message | Actions |
|---|---|
| – Industrial truck must be restarted. | – Switch the truck off and on again.<br>– Contact the customer service of the assistance system manufacturer. |
| – Switch off assistance display. | – Park the industrial truck safely if possible.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| – Functionality limited.<br>– Assistance system is switched off. | – Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| Other error messages, as well as other faults of the assistance display or of system behavior without displayed error message | – Switch the truck off and on again.<br>– Check components for visible damage.<br>– Check cables and plug connectors for visible signs of damage.<br>– Write down error message if displayed.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

**Faults and malfunctions of the system**

| Fault | Possible cause | Actions |
|---|---|---|
| No indication on the assistance display<br>➔ The startup process should be completed no later than 120 s after switching on. | – The industrial truck is not switched on | – Turn on the industrial truck.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| | – Fuses of the industrial truck defective | – Check fuses of the industrial truck, replace if necessary.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| | – Damage | – Check components for visible damage.<br>– Check cables and plug connectors for visible signs of damage.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

| Fault | Possible cause | Actions |
|---|---|---|
| No advisory tone after switching on and starting the assistance display | – Configuration of the assistance display without advisory tone after switching on and startup<br>– Malfunction<br>– Damage<br>– The internal speaker of the assistance display is faulty | Remedial action only has to be taken if the assistance display is configured with an advisory tone after switching on and starting:<br>– Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– If the operating company determines the advisory tone to be necessary for the operation of the industrial truck:<br>• Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| No pulsating control indicator (see page 58) on the assistance display. Zone responses and other functions will no longer be performed correctly | – Assistance display malfunction | – When the assistance system detects the fault, it independently triggers a restart.<br>– Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| Permanent restart | – Fault. The assistance system detects a malfunction and independently triggers a restart. The process is repeated permanently. | – Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

| Fault | Possible cause | Actions |
|---|---|---|
|  <br>Warning pictogram is displayed, zone responses and other functions are no longer performed | – Functional failure of the assistance system in the industrial truck | – Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
|  <br>Warning pictogram is displayed, limited functionality: Zone responses and other functions dependent on the connection via the assistance interface are not carried out on the industrial truck. | – No communication between assistance display and assistance interface of the industrial truck controller<br>– Damage<br>– Faulty connection to the industrial truck | – Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– Check cables and plug connectors for visible signs of damage.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
|  <br>Warning pictogram is displayed, zone responses and other functions are not performed | – Integration of the assistance system in the industrial truck not completed<br>– Assistance system not activated in the assistance display | – Do not operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

| Fault | Possible cause | Actions |
|---|---|---|
| Optional reduction or limiting of the industrial truck speed is not activated correctly despite configuration | – Assistance display malfunction<br>– Malfunction of the connection to the industrial truck<br>– Connection to industrial truck not activated | – Switch off the industrial truck, press and release the EMERGENCY OFF button, switch on the industrial truck.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| | – Damage<br>– Relay mechanically fatigued | – Check components for visible damage.<br>– Check cables and plug connectors for visible signs of damage.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

| Fault | Possible cause | Actions |
|---|---|---|
| Optional reduction or limiting of the industrial truck speed is permanently activated | – Damage<br>– Relay mechanically fatigued | – Check components for visible damage.<br>– Check cables and plug connectors for visible signs of damage.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| The industrial truck is braked by the assistance system until it comes to a complete stop | – Damage<br>– Malfunction of the connection to the industrial truck<br>– Faulty connection to the industrial truck | – Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |
| Red LED on the anchor is lit | – Error status on the respective anchor | – Disconnect or switch off the power supply from the power supply unit or disconnect the power supply unit from the anchor, then reconnect or switch on again.<br>– Do not continue to operate the overall system. Contact the customer service of the assistance system manufacturer. |
| Unexpected behavior of the assistance system | – Interfering influence of other radio systems on the truck tag in the industrial truck<br>– Insufficient distance between other radio systems in the industrial truck and the truck tag | – Check other radio systems for permissible operation and required minimum distances.<br>– Do not continue to operate the industrial truck in the overall system. Contact the customer service of the assistance system manufacturer. |

**Indicated faults and malfunctions of the personnel tag**

| Fault | Possible cause | Actions |
|---|---|---|
| Status LED on the personnel tag does not light up | – Personnel tag not switched on<br>– Personnel tag battery deeply discharged | – Switch on the personnel tag.<br>– Fully recharge the personnel tag immediately in the charging cradle. |
| Status LED on the personnel tag flashes red quickly | – Personnel tag battery deeply discharged | – Fully recharge the personnel tag immediately in the charging cradle. |
| Status LED on the personnel tag is lit red continuously | – Continuous disruption of the personnel tag | – Do not continue to operate the personnel tag. Contact the customer service of the assistance system manufacturer. |
| Status LED on the personnel tag alternates between red and green light every second despite the radio anchor being within radio range | – Personnel tag is faulty | – Do not continue to operate the personnel tag. Contact the customer service of the assistance system manufacturer. |

# H Installation and startup

## 1 Preconditions for correct function

The anchors should be as far away as possible from WLAN access points in the 5 GHz band, especially in the 5.725 - 5.875 GHz range in North America.

The anchors should have as clear a view as possible of the entire zone area, without interfering influences such as attenuation by water or fog, reflection from metal, and without highly reflective adjacent walls (made for example of metal, reinforced concrete, but not drywall).

- Highly reflective walls (made for example of metal, reinforced concrete, but not drywall) impair the accuracy of the assistance system. The interference can be reduced if the affected anchors are mounted on suitable radio absorbers.
- Interference from electromagnetically harsh environments on the anchor supply cables can be reduced by additional sheath wave filters (hinged ferrites).
- Interference from highly metallic environments, washing systems and low ceiling heights should be given special consideration during planning. To optimize system performance, the assistance system manufacturer recommends a usage analysis on-site.

# 2 Preparation for startup

The anchors must be attached in such a way that the respective front side faces the location of the desired zone, if possible with a clear view of the entire zone area.

Recommended mounting positions:
– Wall mounting at the center of the zone
– Ceiling mounting above the center of the zone

To ensure the expected function of the assistance system, the heights of the anchors within the relevant radio range of the truck tags used there must be at least 1.5 m (4.9 ft) above the highest installed corresponding truck tag at all times. Otherwise, deviating system-related behavior of the system may be possible with set zones being activated or deactivated at significantly greater distances than the set zone radii. A truck tag above the corresponding anchor is not permitted within a zone to be triggered.

Note for industrial trucks with operator position that can be raised: The distance to the anchors is reduced when the operator position is raised and the truck tag is raised as a result: If necessary, observe the height of the raised truck tag.

The height of the measurement mark above floor level must be determined and documented for each installed anchor.

For anchors with a height of significantly more than 20 m (65.6 ft) above the highest installed truck tag, check whether the desired zone sizes can still be implemented or whether restrictions are to be expected. Also in peripheral areas where the radio waves of the anchors can be attenuated, check whether the desired zone sizes can still be implemented or whether restrictions should be expected.

➔ To optimize system performance, the assistance system manufacturer recommends a usage analysis on-site.

➔ Any dimensions required for the installation of anchors are shown in the illustration on the back of the anchor, see page 40.

**Mounting plate for anchor**

The anchors can be attached using mounting plates (○).

An anchor is attached to the mounting plate with 3 M4 x 8 screws.

➔ The 6 M4 threaded holes in the mounting plate are marked separately in the illustration and are not available for attaching the mounting plate if they are required for attaching the anchor or are covered by the anchor.

Mounting options for the mounting plate (as per illustration, dimensions given in mm (in)):
– 4 holes Ø 4.2 mm (0.17 in)
– 5 holes Ø 5.1 mm (0,201 in)
– 2 holes Ø 5.2 mm (0,205 in)
– 8 openings 20 mm x 5 mm (0.31 in x 0.79 in) for cable ties
– 2 openings 60 mm x 5 mm (2.36 in x 0.20 in) for cable ties

***Mounting an anchor***

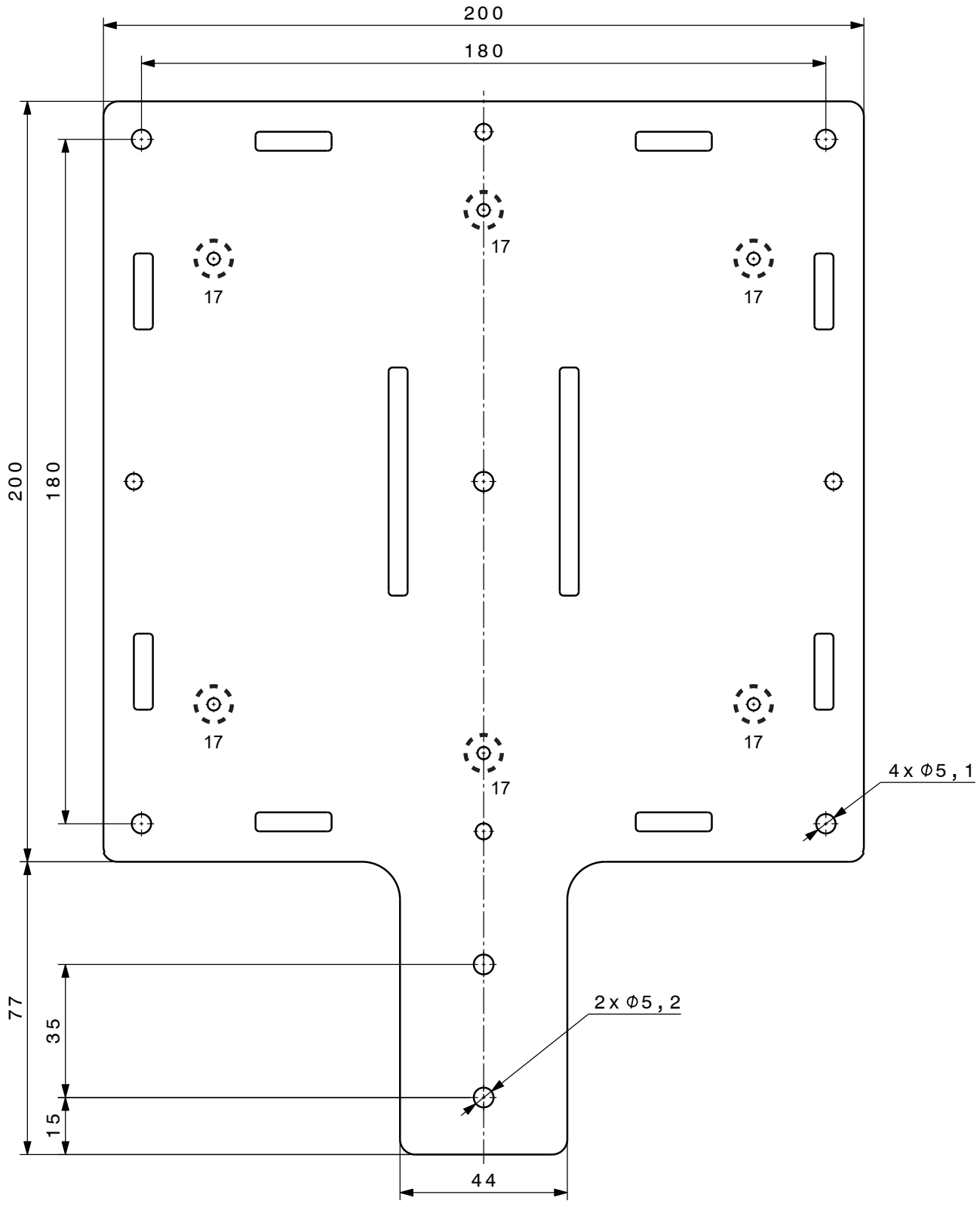
*Requirements*

– Startup prepared and mounting position of the anchor determined, see page 78.

*Procedure*

- Align the mounting plate and mount it on the prepared wall or ceiling using screws or cable ties so that one of the threads (17) is centered at the top.
- Screw the M4 x 8 screw into the top center threaded hole (17) of the mounting plate.
- Remove the T10 hexalobular socket screws from the cover on the lower third of the anchor front and remove the cover.
- Hook the anchor onto the screw that is screwed into the mounting plate.
- With the lower third of the anchor open, screw 2 M4 x 8 screws through the holes in the anchor into the threaded holes in the mounting plate and tighten them.
- Insert the electrical connections and fix them in place.
- Insert the cover into the front of the anchor and mount with T10 screws.
- Determine and document the height of the measuring mark of the anchor above floor level.

*The anchor is mounted.*



## 2.1 Connecting the electrical system

**⚠ DANGER!**

**Danger of death from electric shock**

When working on the electrical system, there is a risk of serious injuries and burns that can be fatal.

- ▶ Only a suitably trained electrician may work on the electrical system (e.g. assembling and installing electrical components).
- ▶ Remove any rings, metal wristbands etc.
- ▶ Use protective equipment (insulating work clothing and equipment).
- ▶ Use only insulated tools.
- ▶ Observe national regulations:
  Release the required parts in the electrical system.
  Secure released parts in the electrical system from being switched on again.
  If required, define and secure the working area.
  Make sure that all poles of the released parts of the electrical system have no voltage supply.
  If required, earth and short-circuit at the workplace to ensure a voltage-free condition for the duration of the work.
  Cover or enclose neighboring live parts.

**⚠ WARNING!**

**Risk of accident due to malfunctions if unsuitable electrical components are used**

The use of electrical components that are not suitable for the electrical system or do not meet the necessary requirements may result in accidents due to malfunctions of the assistance system.

- ▶ When installing electrical components (anchor and power supply, etc.), observe the technical data and necessary preconditions, see page 32.
- ▶ Anchor connection cables (power supply, Ethernet network) must not leave the installation building.

***NOTICE***

**Material damage due to the use of unsuitable electrical components**

The use of electrical components that are not suitable for the electrical system or do not meet the necessary requirements may result in material damage.

- ▶ When installing electrical components (anchor and power supply, etc.), observe the technical data and necessary preconditions, see page 32.
- ▶ Anchor connection cables (power supply, Ethernet network) must not leave the installation building.
- ▶ Installed electrical components must be tested before initial startup in accordance with IEC 60364-6.

Work on the electrical system for mounting and installing the anchor with power supply and accessories (contactors, relays, warning devices) and for integration into the existing system installation may only be carried out by a trained specialist (qualified electrician).

To optimize system usage, the assistance system manufacturer recommends a usage analysis on-site. With an appropriately extended installation and adaptation,

equipped cold store trucks could for example automatically open the roller shutter door to the cold storage area connected to the switching output of the anchor when approaching.

Optional accessories depend on the desired application and are not included in the standard scope of delivery.

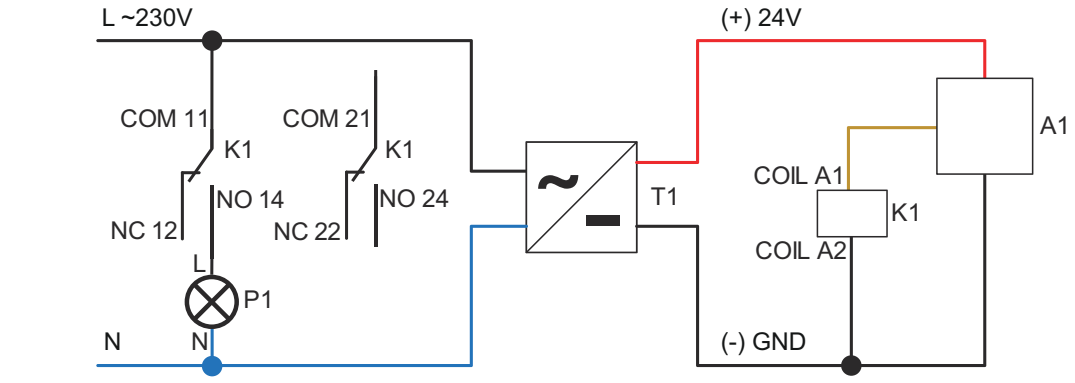
The connection of an anchor is shown below using a simplified example.

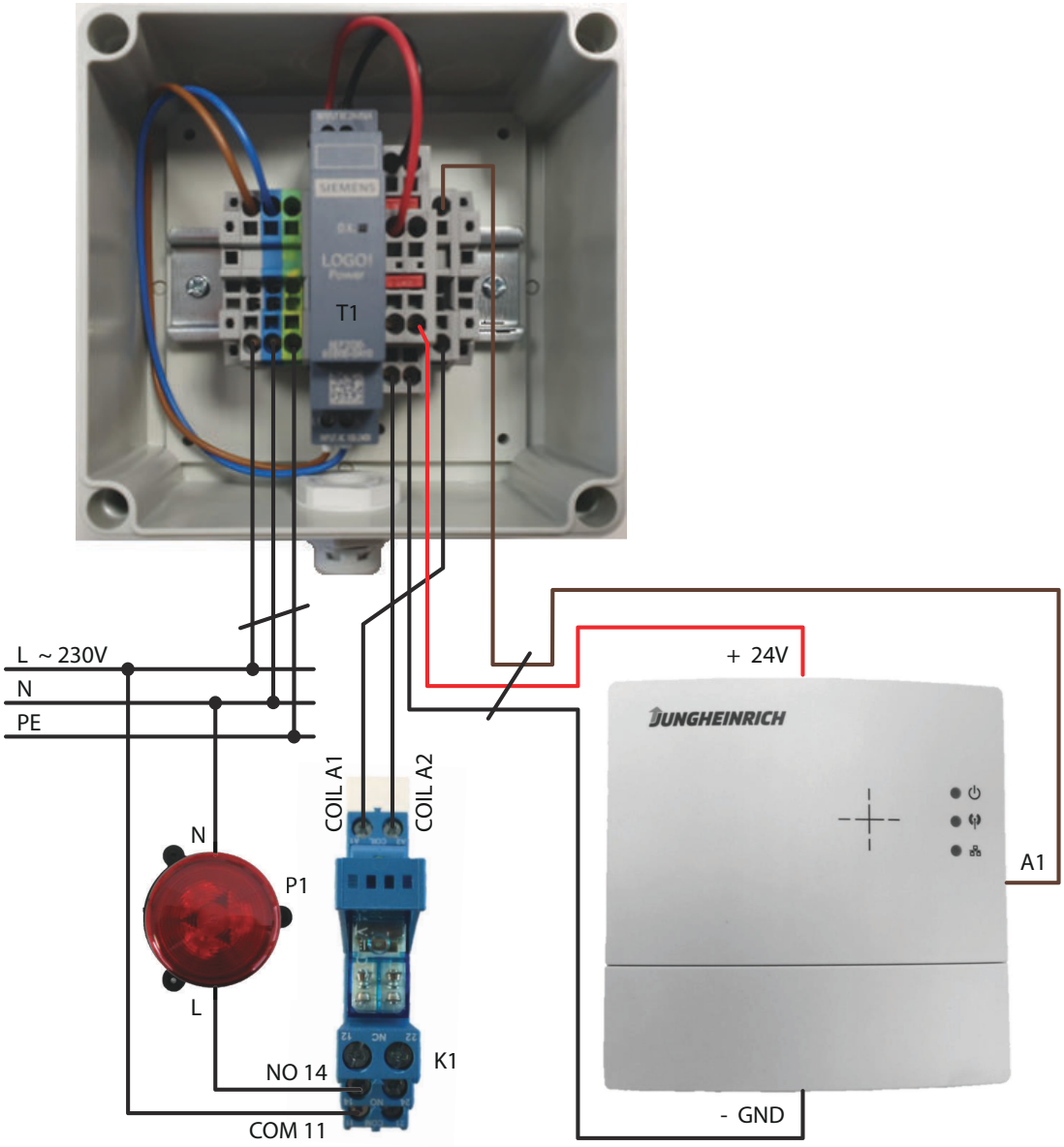
➔ The illustrations shown are examples and do not represent the equipment supplied.

**Simplified connection example: 230 V component**

➔ Selective fusing is not shown here.

➔ Observe the technical data (current carrying capacity) of the power supply unit.



# 3 Installing the assistance system on third-party devices

A "third-party device" as used below is defined as an industrial truck whose manufacturer is not Jungheinrich Aktiengesellschaft.

The zoneCONTROL assistance system is approved as a display assistance system on third-party devices.

The zoneCONTROL assistance system is approved as an assistance system with connection to third-party devices for situation-dependent limitation or reduction of the travel speed if all the necessary requirements for proper installation and intended use are met:

– The third-party device can be switched to limit or reduce the travel speed via an electrical signal (on or off).
– The third-party device must provide an interface for connecting (limiting or reducing the travel speed) of the assistance system that is designed and approved for this purpose by the manufacturer of the third-party device.
– The third-party device must be configured in such a way that no hazards arise if braking occurs when the limitation is switched on or the travel speed is reduced.
– The third-party device must be configured in such a way that switching on the limitation or reduction of the travel speed does not cause the third-party device to come to a standstill.
– The third-party device must be configured in such a way that no hazards arise if acceleration occurs due to or after switching off the limitation or reduction of the travel speed.
– All safety-relevant functions of the third-party device must be fully retained once the assistance system has been connected.
– The connection of the assistance system to the interface of the third-party device and the configuration of the third-party device must be carried out by a specialist authorized by the manufacturer of the third-party device and documented for the operating company, for example in the test logbook of the third-party device.

**⚠ WARNING!**

**Risk of personal injury and damage to property due to improper use and incorrect installation**

Improper use and incorrect installation of zoneCONTROL may result in personal injury and damage to property. In the event of a significant change to the third-party device associated with this, the declaration of conformity of the manufacturer of the third-party device loses its validity.

▶ The zoneCONTROL assistance system may only be installed with a connection for situation-dependent limitation or reduction of the travel speed if all the necessary preconditions are met.

▶ All work on the third-party device must be carried out and documented by a specialist when the device is de-energized.

If all the necessary preconditions are not met, proper installation and designated use are not possible: The zoneCONTROL assistance system is then not approved as an assistance system with connection to third-party devices for situation-dependent limitation or reduction of the travel speed and must not be put into operation as such.

**Possible procedure for installation in a third-party device and startup of the overall system zoneCONTROL**

– Professional installation of the assistance system in the third-party device, see page 91.
– Configuration and integration of the assistance system by the assistance system manufacturer's customer service or by personnel trained by the manufacturer.
– Perform and document the function check: The behavior of the third-party device must not be changed by the assistance system.
– Recommendation: Instruct the operating company in the functioning of the overall system.
– Hand over the Operating Instructions to the company operating the overall system.

➔ The operating company must carry out a risk assessment for the installation of the third-party device and the startup of the entire system, see page 19.

## 3.1 Mounting on the industrial truck

**Mounting the truck tag** (52445052, 52445053)

– Low-vibration fixed position on the truck frame, not on moving parts whose position can be changed.
– Horizontal mounting with the Jungheinrich logo facing upwards, no vertical mounting or mounting with the Jungheinrich logo facing downwards.
– Installation position with a clear view of the anchors within reach at all times, even when loads are being lifted.
– Mounting position with sufficient distance from other wireless components to minimize mutual interference.
– Recommendation: If possible, mount above the center of the truck or the truck center line.
– Mounting with perforated plate mounting kit (51858702) or with magnetic fastening mounting kit (51852094) (contains magnetic feet)
  • When using the magnetic fastening mounting kit: Affix a warning label to both long sides of the truck tag, see page 37.
– Tightening torque on the truck tag: 6 Nm (4.4 lbf ft) (max. 9.5 Nm (7.0 lbf ft))

**Mounting the assistance display**

– The mounting position must not obstruct the operator's view.
– The mounting position must not lead to additional mechanical hazards (due to impact or crushing, etc.).
– For good readability, maintain a sufficiently large distance of at least 20 cm (7.9 in) from the operator.
– Tightening torque on the assistance display: 1.7 Nm (1.3 lbf ft) (max. 2.0 Nm (1.5 lbf ft))

➔ Recommendation: Order the assistance display as a set (51733066) including RAM mount holders and additionally order a connecting element with a length of 90 mm (3.5 in) (51193759) or 144 mm (5.7 in) in length (51193756).

**Laying cables** using the corresponding universal cable set and observing the detailed description (see page 91, see page 95)

– Remove cables that are not needed from the plugs.
– Lay cables directly away from the truck tag, not as cable loops.
– Lay cables at a sufficient distance from powerful consumers (drives, etc.) and their cables.

– Do not run cables over sharp corners or edges.
– Shorten the cables to the required lengths. Excess lengths must not remain coiled in the third-party device.

➔ Depending on the assistance display and vehicle connection, an adapted cable set may be available as an alternative to the corresponding universal cable set in order to reduce the effort required for preparation and installation.

**Power supply** for assistance display and truck tag
– Observe the operating voltage of the assistance display and truck tag (see page 33) and use a suitable voltage transformer if necessary.

### 3.1.1 Power supply

**On-board power supply 24 VDC** or existing infrastructure for an additional system with 24 VDC and up to 60 W
– Use jumper plug (51744714).
– Use suitable electrical fuses.

**Wiring system deviating from 24 VDC with a maximum of 48 VDC**
– Use a suitable voltage transformer, optionally:
  • Truck-specific voltage converter
  • Retrofit kit for voltage converter 12 V to 24 V (51144646)
  • Retrofit kit for voltage converter 48 V to 24 V (51111581)
– Use suitable electrical fuses.

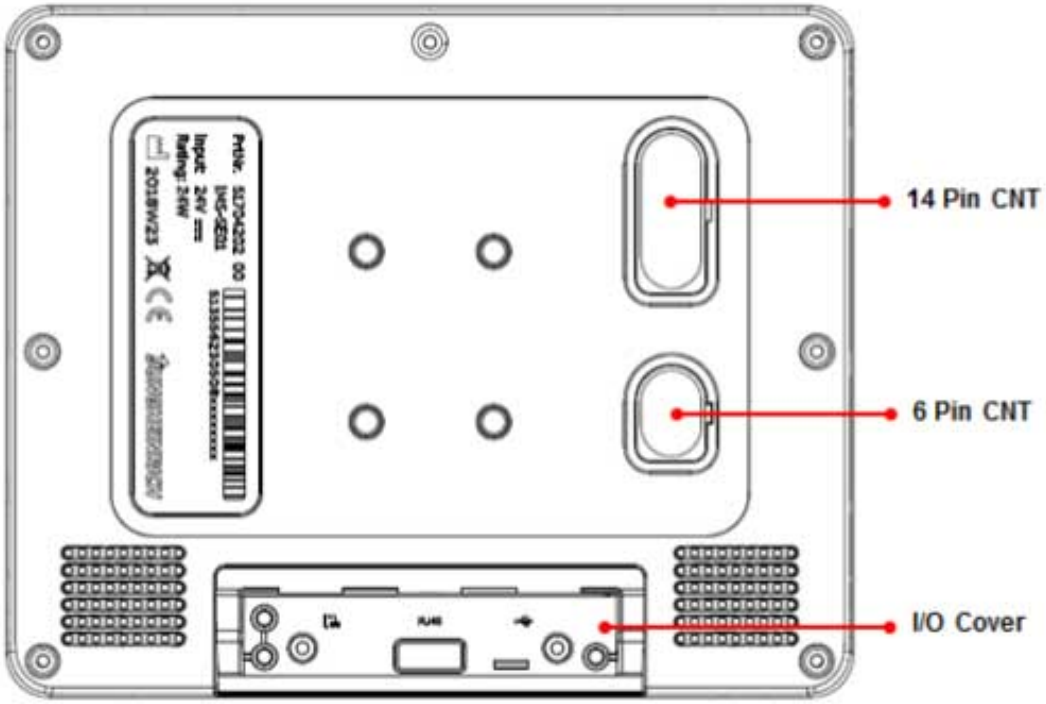
**Fuse holder with fuse**
– Fit and mark the fuse holder in the universal cable set with a fuse corresponding to the connected operating voltage.
  • Operating voltage 12 VDC - 14.4 VDC: Fuse 5 A / 32 V
  • Operating voltage 24 VDC: Fuse 4 A / 32 V
  • Operating voltage 48 VDC: Fuse 2 A / 58 V
– To mark the fuse holder, affix a clearly legible sticker in the immediate vicinity of the fuse holder.

➔ Fuses, stickers and other required parts are included with delivery.

## 3.2 Interfaces

### Interface description for truck tag

| Pin | Designation | Function |
|---|---|---|
| 1 | GND | Power supply: GND |
| 2 | +VCB | Power supply: 24 VDC |
| 3 | OUT1 | Digital output (not used) |
| 4 | | |
| 5 | OUT2 | Digital output (not used) |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | CAN GND | CAN GND for assistance systems |
| 10 | CAN GND | CAN GND for assistance systems |
| 11 | CAN high IN | CAN BUS for assistance systems |
| 12 | CAN low IN | CAN BUS for assistance systems |
| 13 | CAN high OUT | CAN BUS for assistance systems |
| 14 | CAN low OUT | CAN BUS for assistance systems |




**Interface description of assistance display (14-pin socket on the rear of the housing)**

| Pin | Designation | Function |
|---|---|---|
| 1 | +VCB | Power supply: 24 VDC |
| 2 | CAN1 high IN | CAN BUS for Jungheinrich truck connection (not for third-party devices) |
| 3 | CAN1 low IN | CAN BUS for Jungheinrich truck connection (not for third-party devices) |
| 4 | CAN1 high OUT | CAN BUS for Jungheinrich truck connection (not for third-party devices) |
| 5 | CAN1 low OUT | CAN BUS for Jungheinrich truck connection (not for third-party devices) |
| 6 | CAN1 GND | CAN \-GND for Jungheinrich truck connection (not for third-party devices) |
| 7 | GND | Power supply: GND |
| 8 | GPI1 | Digital input<br>Switch to ground<br>Hysteresis: < 3.8 V low, > 6.9 V high<br>– ETM/ETV: Fastboot (display switching) |
| 9 | GPI2 | Digital input<br>Switch to ground<br>Hysteresis: < 3.8 V low, > 6.9 V high<br>– ETM/ETV: Barcode button (○) (addedVIEW fork arms camera) |

| Pin | Designation | Function |
|---|---|---|
| 10 | GPO1 | Digital output for limiting or reducing the travel speed<br>Open collector, max. 1A<br>**Only approved for third-party devices if the necessary preconditions are met.** |
| 11 | CAN2 high | CAN BUS for assistance systems |
| 12 | CAN2 low | CAN BUS for assistance systems |
| 13 | GPO2 | Digital output for additional functions<br>Open collector, max. 1A<br>**Only approved for third-party devices if the necessary preconditions are met.** |
| 14 | CAN2 GND | CAN GND for assistance systems |

**Interface description of assistance display (6-pin socket on the rear of the housing)**

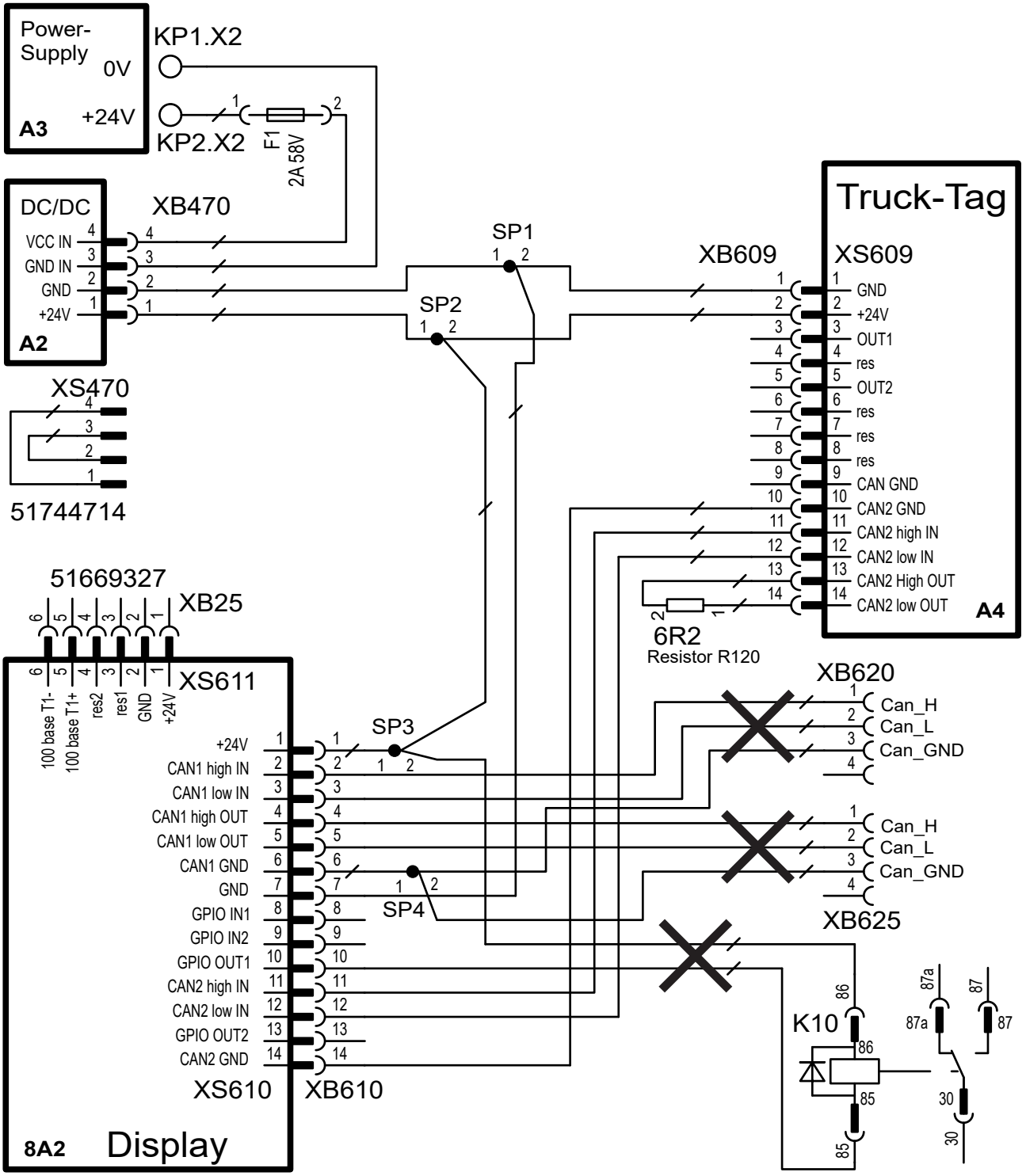
| Pin | Designation | Function |
|---|---|---|
| 1 | +VCB | Power supply for peripherals (depending on input voltage), in normal operation approx. 24 VDC / 0.5 A |
| 2 | GND | Power supply for peripherals GND |
| 3 | | |
| 4 | | |
| 5 | TRX_P_3 | Automotive Ethernet data connection |
| 6 | TRX_M_3 | Automotive Ethernet data connection |

**Switched outputs on the assistance display (zone responses)**

| Zone | Switched outputs | Comment |
|---|---|---|
| **Maximum speed** | **GPO1** (configurable) | Output GPO1 is switched at "slow travel" (configurable).<br>Output GPO2 is not switched.<br>Note: Output on the anchor is not switched. |
| **Collision warning (conditional)** | **GPO2** (configurable)<br>**GPO1** (configurable) | Output GPO2 is switched with "Truck function switching" (configurable).<br>Output GPO1 is switched at "slow travel" (configurable).<br>Note: Output on the anchor is switched (configurable). |
| **Maximum headroom** | | Outputs GPO1 and GPO2 are not switched.<br>Note: Output on the anchor is not switched. |
| **Block goods storage** | | Outputs GPO1 and GPO2 are not switched.<br>Note: Output on the anchor is not switched. |
| **Block passage** (Passage blocked) | | Outputs GPO1 and GPO2 are not switched.<br>Note: Output on the anchor is not switched. |
| **Truck function switching** (switching the truck function) | **GPO2** (configurable) | Output GPO1 is not switched.<br>Output GPO2 is switched (configurable). |
| **Warehouse function switching** (Switching the warehouse function) | | Outputs GPO1 and GPO2 are not switched.<br>Note: Output on the anchor is switched (configurable). |

**The GPO1 and GPO2 outputs are only approved for third-party devices if the necessary preconditions are met.**

## 3.3 Installing an assistance system without a connection



All work on the industrial truck must be carried out by a specialist when the device is de-energized.

Mount the assistance display, see page 85.

Mount truck tag, see page 85.

For assistance display in version 1 (51704202) prepare the universal cable set 51694909:
– Remove pin 2 to pin 6 on connector XB610 (assistance display).
– Remove connector XB620 with cables.
– Remove connector XB625 with cables.
– Remove pin 10 on connector XB610 (assistance display).
– Change pin 1 on connector XB610 (assistance display):
  • Remove pin 1 from connector XB610.
  • Disconnect the cables after the cable splice.
  • Remove relay socket K10 with cables.
  • Crimp a new contact onto the cable to the assistance display, plug it into position pin 1 and lock it securely into place.

For assistance display in version 2 (51873810) prepare the universal cable set 51962704:
– Remove pin 10 on connector XB610 (assistance display).
– Change pin 1 on connector XB610 (assistance display):
  • Remove pin 1 from connector XB610.
  • Disconnect the cables after the cable splice.
  • Remove relay socket K10 with cables.
  • Crimp a new contact onto the cable to the assistance display, plug it into position pin 1 and lock it securely into place.

To install the universal cable set in the industrial truck:
– If necessary, remove the hoods and covers for laying the universal cable set.
– If necessary, fit the voltage transformer and connect it to the power supply of the industrial truck after the switch lock.
– Lay cables directly away from the truck tag, not as cable loops.
– Lay cables at a sufficient distance from powerful consumers (drives, etc.) and their cables.
– Do not run cables over sharp corners or edges.
– Avoid chafing or kinks, especially in the area of hoods or covers.
– Shorten the cables to the required lengths. Excess lengths must not remain coiled in the industrial truck.
– Protect exposed areas with a protective cover ("flex hose").
– Tie a wiring harness if possible.
– If no camera-based assistance system is provided, close off the 6-pin connection of the assistance display with the dummy plug (51669327).
– Seal exposed openings of the plug connections with dummy plugs.
– Connect the universal cable set to connector XB610 (assistance display) and XB609 (truck tag).
– If no voltage transformer is required: Connect the cable with fuse holder after the switch lock to the power supply of the industrial truck and insert the XS470 jumper plug.
– If a voltage transformer is required: Connect the XB470 to the voltage transformer.
– Insert fuse in fuse holder, see page 86.

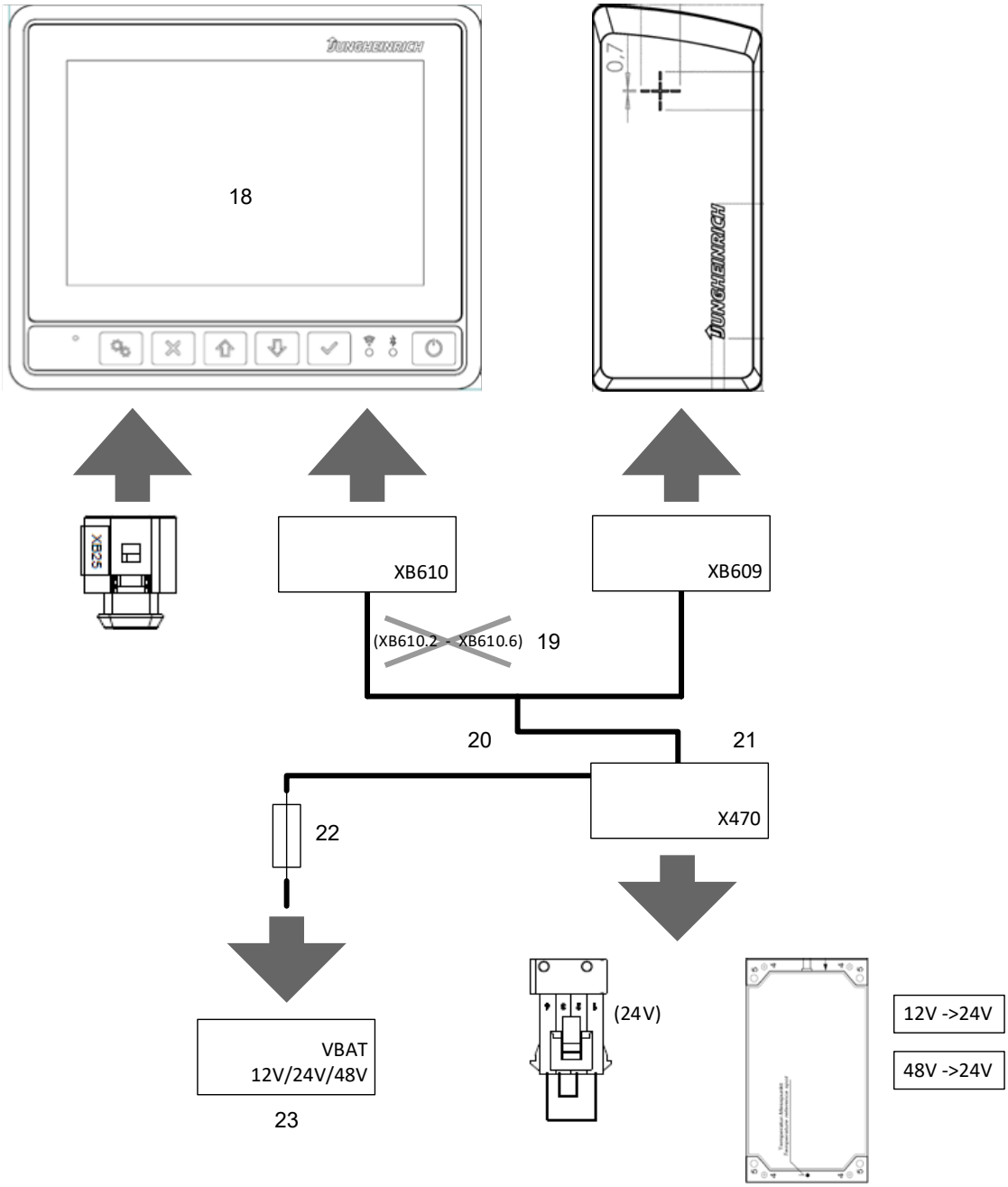
– Check connections.
– Mount removed hoods and covers.

Complete the installation:
– Switch on the industrial truck and check the start process of the assistance display.
– Check the industrial truck: The behavior of the industrial truck must not change when the assistance system is installed.
– Inform the assistance system manufacturer that the assistance display and truck tag have been installed correctly.

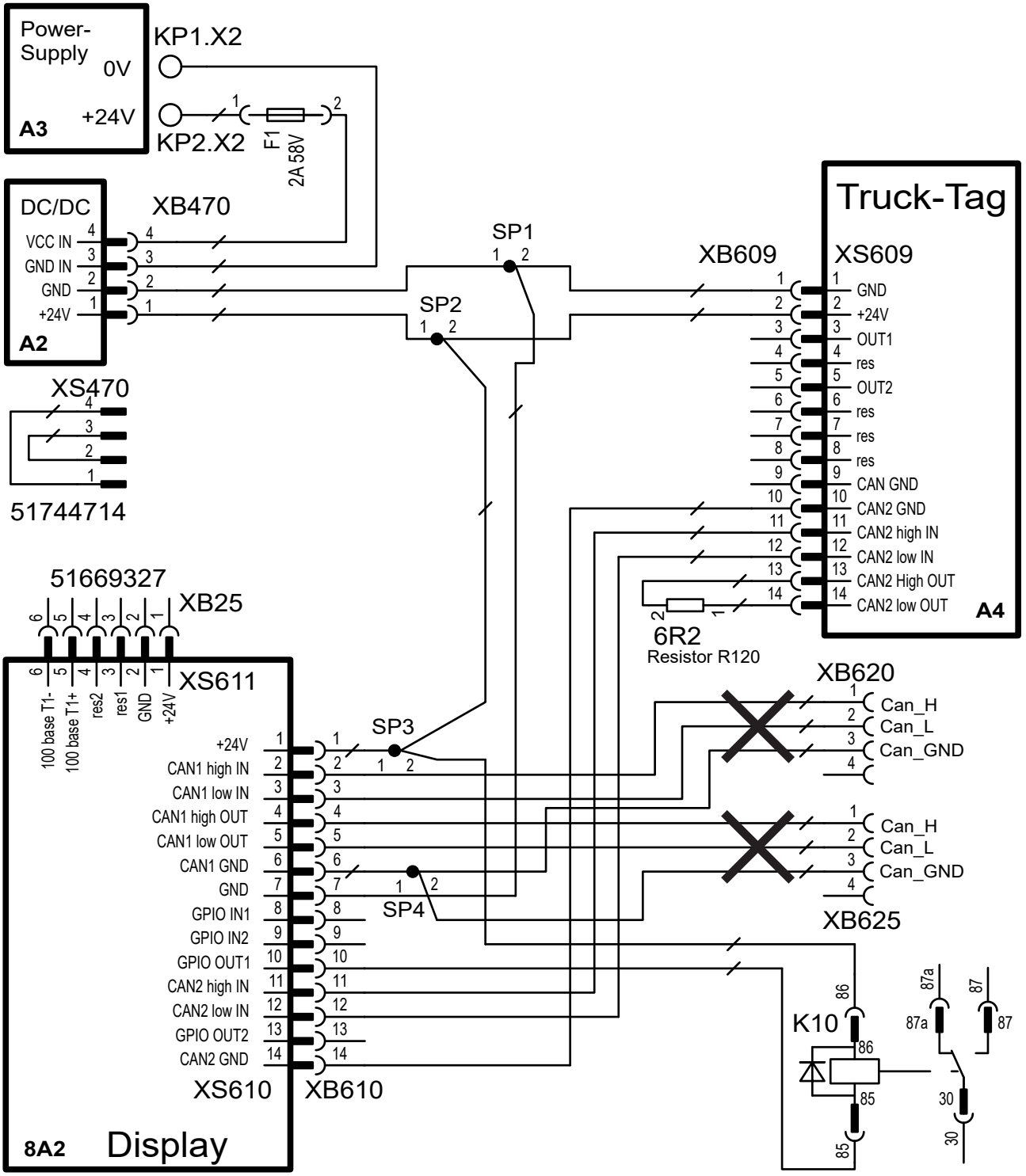
➔ Configuration and integration of the assistance system by the assistance system manufacturer's customer service or by personnel trained by the manufacturer.

### 3.3.1 Notes

| Item | Notes to be observed in particular |
|---|---|
| 18 | The assistance display must not obstruct the operator's view – distance from the operator at least 20 cm (7.9 in). |
| 19 | Remove pin 2 to pin 6 on connector XB610 (assistance display). Then remove pin 10 and replace pin 1. Seal exposed openings with dummy plugs. |
| 20 | Shorten the cables to the required lengths. Excess lengths must not remain coiled in the industrial truck. |
| 21 | Connection of the jumper plug (power supply via 24 VDC vehicle electrical system or existing infrastructure for another system with 24 VDC and up to 60 W), or connection of a voltage converter. |
| 22 | Use suitable electrical fuses, see page 86. |
| 23 | Connect the cable with fuse holder after the switch lock to the power supply of the industrial truck. |



## 3.4 Installing an assistance system with connection



All work on the industrial truck must be carried out and documented by a specialist when the device is de-energized.

Mount the assistance display, see page 85.

Mount truck tag, see page 85.

For assistance display in version 1 (51704202) prepare the universal cable set 51694909:
– Remove pin 2 to pin 6 on connector XB610 (assistance display).
– Remove connector XB620 with cables.
– Remove connector XB625 with cables.

For assistance display in version 2 (51873810), use the universal cable set 51962704.

To install the universal cable set in the industrial truck:
– If necessary, remove the hoods and covers for laying the universal cable set.
– If necessary, fit the voltage transformer and connect it to the power supply of the industrial truck after the switch lock.
– Mount relay socket K10.
– Lay cables directly away from the truck tag, not as cable loops.
– Lay cables at a sufficient distance from powerful consumers (drives, etc.) and their cables.
– Do not run cables over sharp corners or edges.
– Avoid chafing or kinks, especially in the area of hoods or covers.
– Shorten the cables to the required lengths. Excess lengths must not remain coiled in the industrial truck.
– Protect exposed areas with a protective cover ("flex hose").
– Tie a wiring harness if possible.
– If no camera-based assistance system is provided, close off the 6-pin connection of the assistance display with the dummy plug (51669327).
– Seal exposed openings of the plug connections with dummy plugs.
– Connect the universal cable set to connector XB610 (assistance display) and XB609 (truck tag).
– Connect the slow travel control cable from relay socket K10 to the interface of the third-party device.
– Adapt the connection of the relay on the relay base as a normally closed contact, normally open contact or changeover contact according to the requirements of the interface.
– If no voltage transformer is required: Connect the cable with fuse holder after the switch lock to the power supply of the industrial truck and insert the XS470 jumper plug.
– If a voltage transformer is required: Connect the XB470 to the voltage transformer.
– Insert fuse in fuse holder, see page 86.
– Check connections.
– Mount removed hoods and covers.

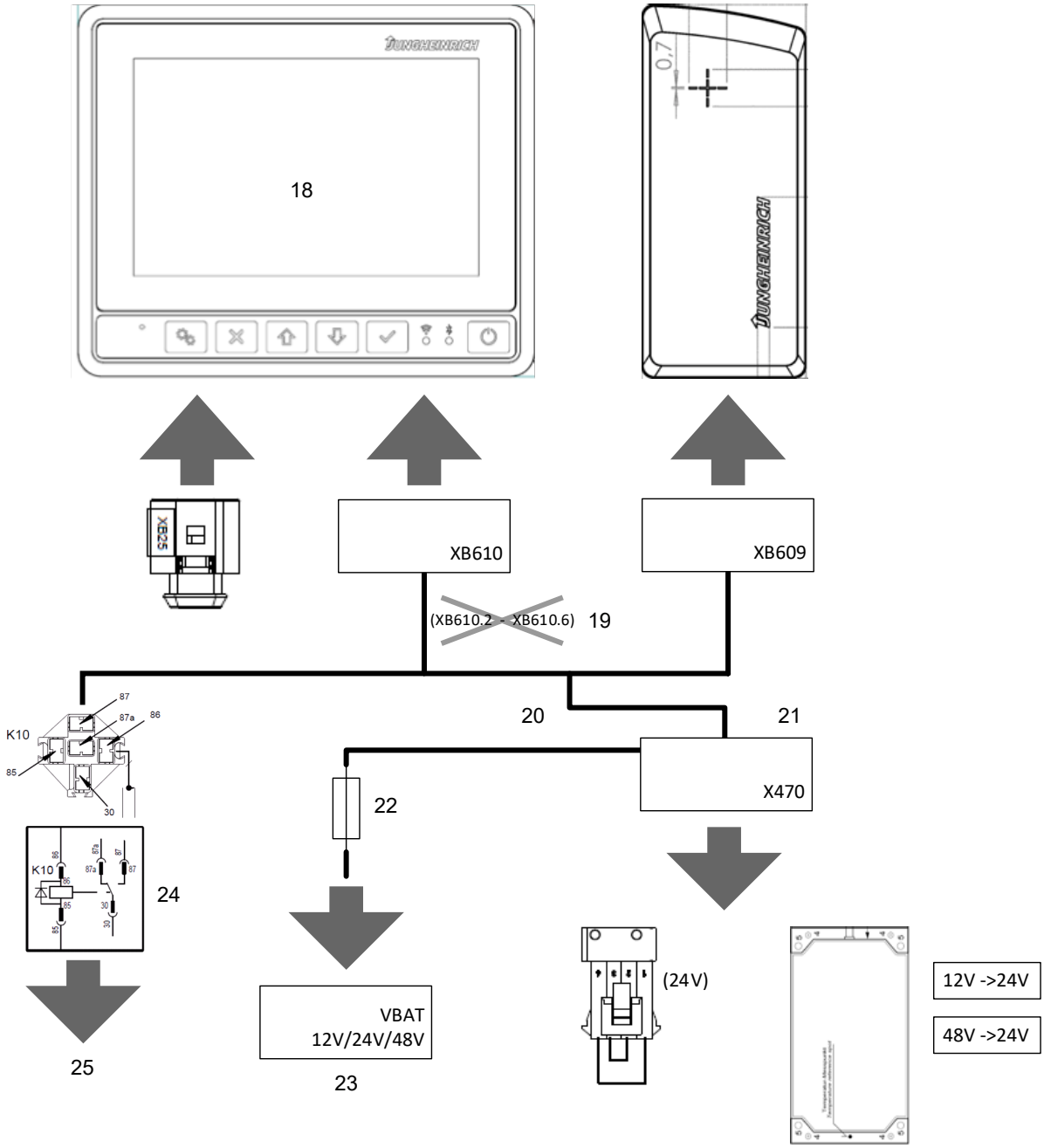
Complete and document the installation:
– Switch on the industrial truck and check the start process of the assistance display.
– Configure the interface for connecting the assistance system if necessary.

– Configure the industrial truck according to the requirements (see page 84):
  • If braking occurs when speed limitation is switched on or the travel speed is reduced, no hazards should arise.
  • Switching on speed limitation or reducing the travel speed must not cause the industrial truck to come to a standstill.
  • If acceleration occurs due to or after switching off speed limitation or reducing the travel speed, no hazards should arise.
– Check the industrial truck according to the requirements (see page 84):
  • All safety-relevant functions of the industrial truck must be fully retained once the assistance system has been connected.
– Inform the assistance system manufacturer that the assistance display and truck tag have been installed correctly.

➔ Configuration and integration of the assistance system by the assistance system manufacturer's customer service or by personnel trained by the manufacturer.

### 3.4.1 Notes

| Item | Notes to be observed in particular |
|---|---|
| 18 | The assistance display must not obstruct the operator's view – distance from the operator at least 20 cm (7.9 in). |
| 19 | Remove pin 2 to pin 6 on connector XB610 (assistance display). Seal exposed openings with dummy plugs. |
| 20 | Shorten the cables to the required lengths. Excess lengths must not remain coiled in the industrial truck. |
| 21 | Connection of the jumper plug (power supply via 24 VDC vehicle electrical system or existing infrastructure for another system with 24 VDC and up to 60 W), or connection of a voltage converter. |
| 22 | Use suitable electrical fuses, see page 86. |
| 23 | Connect the cable with fuse holder after the switch lock to the power supply of the industrial truck. |
| 24 | Adapt the connection of the relay on the relay base as a normally closed contact, normally open contact or changeover contact according to the requirements of the interface. |
| 25 | Connect the slow travel control cable from the relay socket K10 to the interface designed for this purpose and approved by the manufacturer of the third-party device.<br>Configure the interface if necessary. Configure and check the industrial truck according to the requirements. |



# 4 Initial startup

All anchors, personnel tags, truck tags and assistance displays of the assistance system must be activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during initial startup.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, this must be taken into account.

Each industrial truck equipped with components of the assistance system must be adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during the initial startup, as well as for the functions according to the Operating Instructions of the industrial truck.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, the highest and lowest possible heights must be checked in addition to the heights for regular travel mode.

If anchors are replaced or their position is changed or if assistance displays are replaced or fitted to other industrial trucks, regular operation is no longer permitted until they have been activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer.

Settings in the anchor:
– Height of the measuring mark of the anchor above floor level
– Activation / deactivation of the respective zone
– Radius of the respective zone (2 m (6.6 ft) - 20 m (65.6 ft))
– Tunability of the respective zone
– Triggering the advisory tone on the assistance display for the respective zone
– Triggering the info tone on the assistance display for conditional zones
– Triggering the switching output on the assistance display for the respective zone
– Display of the maximum speed (2 km/h (1.2 mph) - 20 km/h (12.4 mph)) or slow travel in the speed zone, optionally limiting or reducing the travel speed (only on industrial trucks designed for this purpose)
– Display of the maximum clearance height (1 m (3.3 ft) - 15 m (49.2 ft))
– Setting the collision warning zone, with number of personnel tags (0 - 10), truck tags (0 - 10) and type of trigger condition required for triggering
– Type of triggering of the personnel tags in the collision warning zone (beeping and or vibrating)

→ If the height position of an anchor is changed, the setting of the corresponding anchor must be corrected by the customer service of the assistance system manufacturer.

For each assistance display, individual zone configurations can be set that differ from the respective anchor, for example so that the roller shutter door to the cold storage area connected to the switching output of the anchor is automatically opened when equipped cold store trucks approach.

After an anchor is replaced, each assistance display with an individual zone configuration that differs from this anchor must be supplemented with corresponding entries.

→ Collision warning zones (conditional) are not individually configurable in a different way for individual industrial trucks.

# I Maintenance, inspection, and change of parts to be changed

**⚠ WARNING!**

**Risk of accident due to neglected maintenance**

Ignoring routine maintenance and inspection can cause the assistance systems to break down and presents a potential risk to persons and equipment.

▶A thorough and professional maintenance service and inspection is one of the most important requirements for the safe use of the assistance system.

***NOTICE***

The operating conditions of an assistance system can have a significant impact on the wear of components of the assistance system. The maintenance, inspection, and replacement intervals specified below assume single-shift operation and normal usage conditions. Under more strenuous conditions such as a very dusty environment, large fluctuations in temperature, or multi-shift operation, shorten intervals accordingly.

▶To adjust on maintenance intervals, the assistance system manufacturer recommends a usage analysis on-site to prevent damage due to wear.

This chapter defines the activities to be performed, the time of performance, and the parts that should be replaced.

All anchors, personnel tags, truck tags and assistance displays of the assistance system must be activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during initial startup.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, this must be taken into account.

Each industrial truck equipped with components of the assistance system must be adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer during the initial startup, as well as for the functions according to the Operating Instructions of the industrial truck.
Note for industrial trucks with operator position that can be raised: If the height of the truck tag is changed by raising the operator position, the highest and lowest possible heights must be checked in addition to the heights for regular travel mode.

If anchors are replaced or their position is changed or if assistance displays are replaced or fitted to other industrial trucks, regular operation is no longer permitted until they have been activated, adjusted and fully tested for the set functions by the customer service of the assistance system manufacturer.

# 1 Contents of the Maintenance zoneCONTROL

Created on: 2024-05-21 10:00

## 1.1 Operator

Perform every 50 operating hours, however at least once a week.

### 1.1.1 Maintenance contents

#### 1.1.1.1 Standard equipment

| Electrical system |
| --- |
| Note: German Social Accident Insurance Regulation 3 Check of person tag for charging cradle. Equivalent regulations apply outside Germany. |

| System components |
| --- |
| Clean monitor. |

### 1.1.2 Inspection contents

#### 1.1.2.1 Standard equipment

The following points must be checked:

| Electrical system |
| --- |
| armature for function and damage |
| person TAGs for function and damage |

| Frame / structure |
| --- |
| labeling for legibility, completeness, and plausibility |

| System components |
| --- |
| additional components on the truck for tight fit and damage |
| setting of the zones, taking into consideration the current warehouse circumstances. |
| display and system behavior on the truck for plausibility. |

#### 1.1.2.2 Optional equipment

The following points must be checked:

## 1.2 Customer service

To be performed according to maintenance interval zoneCONTROL every 1000 operating hours, but at least once a year.

### 1.2.1 Maintenance contents

#### 1.2.1.1 Standard equipment

| Electrical system |
| --- |
| Evaluate logbook. |

| System components |
| --- |
| Clean monitor. |

### 1.2.2 Inspection contents

The following points must be checked:

#### 1.2.2.1 Standard equipment

| Electrical system |
| --- |
| electrical wiring for damage (insulation damage, connections) and the fuses for correct rating |
| optional electrical equipment for function and damage |

| Frame / structure |
| --- |
| labeling for legibility, completeness, and plausibility |

### 1.2.3 Maintenance parts

The manufacturer recommends replacing the following parts at the specified intervals.

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**52433317**