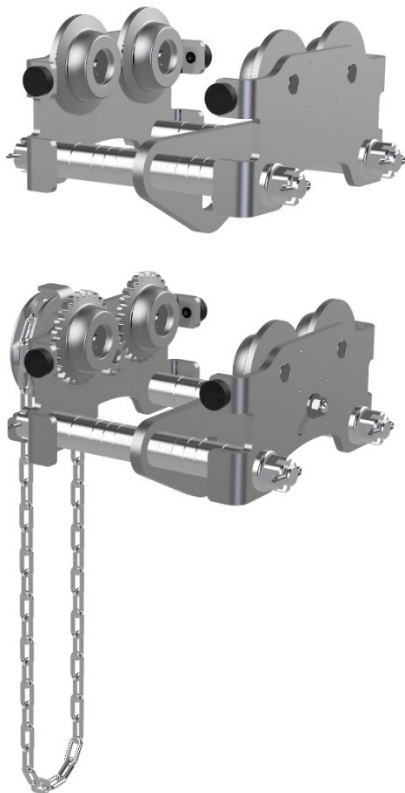


EN: Translated version of the original instruction Monorail trolley

LST-H-EX (500 - 10.000) kg

LST-G-EX (500 - 20.000) kg



Dear Customer,
Thank you very much for purchasing our device. We value your trust in our brand and hope you are satisfied with your purchase. If you have any questions or problems, please do not hesitate to contact us. Have fun with your new device!



Read these instructions carefully before use and keep them safe.

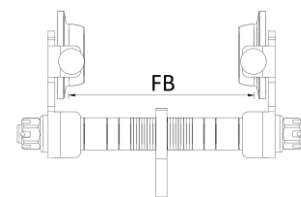


Please note the serial number and flange width before first use.

Serial number: _____

Flange width range

FB= _____ mm



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PLANETA-Hebetechnik GmbH
Resser Str. 17 | 44653 Herne | Germany



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1 Introduction

1.1 General information



Read these instructions carefully before use and keep them in a safe place.



These instructions provide information on proper commissioning, intended use and safe and efficient operation and maintenance. The operating instructions are an integral part of the product. The illustrations shown in these operating instructions are for basic understanding and may differ from the actual design.



Fitters, operators and maintenance personnel must observe in particular the operating instructions and the documentation provided by the employers' liability insurance association.



Please observe their local regulations and rules. Information on safety, installation, operation, testing and maintenance from these operating instructions must be made available to the appropriate persons. Make sure that these operating instructions are available in close proximity to the product during the period of use of the product.

1.2 Information on the manufacturer

Name: PLANETA-Hebetechnik GmbH
Adresse: Resser Str. 17 | 44653 Herne | Germany

E-Mail: info@planeta-hebetechnik.de
Phone: 49-(0)-2325-9580-0

1.3 CE declaration and declaration of incorporation



A ready-to-use machine with all its associated safety devices has a CE declaration of conformity and is labelled with a CE mark. Incomplete machines are supplied without a CE mark and only contain a Declaration of Incorporation in accordance with the current Machinery Directive.

1.4 Copyright



These original operating instructions are protected by copyright. The authorised user has a simple right of use within the scope of the purpose of the contract. Any modified use or exploitation of the contents provided, in particular reproduction, modification or publication of any deviating kind, is only permitted with the prior consent of the manufacturer. If the operating instructions are lost or damaged, a new copy can be requested from the manufacturer. The manufacturer has the right to change the operating instructions without prior notification and is not obliged to replace earlier copies.

1.5 Warranty



The warranty is contractually regulated (see General Terms and Conditions or contract).

Warranty and liability claims for personal injury and damage to property are excluded if these are due to one or more of the following causes:

- Improper use of the device.
- Improper operation and maintenance of the device and improper commissioning.
- Failure to follow the instructions in the operating instructions.
- Unauthorized structural changes to the device.
- Disasters caused by foreign bodies and force majeure.
- Inadequate monitoring of equipment parts that are subject to wear and tear.
- Improperly performed repairs.
- Wear parts are not covered by liability for defects.
- We reserve the right to make technical changes to the device in the context of improving the performance characteristics and further development.



For the purposes of this document

Qualified professional:	A qualified professional is a person who has specific knowledge, skills and experience in a particular field. These professionals usually have formal training or relevant work experience that qualifies them for their job. They are able to perform complex tasks independently and responsibly and bring a high level of expertise to the job. Qualified professionals are employed in various fields such as engineering, medicine, IT, crafts, education, management and many others.
Competent person:	Qualified persons for testing are persons who have the required specialist knowledge due to their technical training, knowledge and experience as well as their recent professional activity. The exact requirements for qualification are specified in the relevant regulations and codes of practice. As a rule, these are specialists for occupational safety, experts for the inspection of work equipment or persons with comparable qualifications. However, the exact qualification and competence depends on the type and scope of the inspection. It is important to ensure that the person appointed has the necessary expertise and can carry out the inspection properly.
Expert:	An expert is a "recognised competent person" who, due to his professional training and experience, has knowledge in the field of the work equipment to be tested and is familiar with the relevant state occupational health and safety regulations, regulations of the employers' liability insurance association and generally recognised rules of technology. This competent person must regularly inspect and assess work equipment of the appropriate design and regulations. This qualification is granted by approved inspection bodies.
Electronic specialist:	An electronic specialist is a person who has specific knowledge and skills in the field of electronics. He is able to install, maintain and repair electronic equipment.
Hoist:	Hoist is the generic term for all equipment used to move or lift weights (loads).
Device:	A device is a technical appliance or machine designed to perform a specific function or task. It can be operated electronically, mechanically or manually and consists of various components that work together to achieve the desired result.
Crane:	A crane is a lifting device that can lift loads with a load-bearing device and also move them in one or more directions.
Lifting equipment:	Lifting equipment is equipment that is permanently attached to the hoist, e.g. ropes, chains, lifting beams, grabs, crane hooks, tongs. They are permanently installed in the hoist and are used to take up slings, load handling attachments or loads.

2 Safety

2.1 Safety information



Most accidents when handling technical equipment are due to disregard of basic safety rules. Recognising a possible hazard can prevent an accident before it occurs.



Disregarding the safety instructions can result in death or serious injury. As the manufacturer of the appliance, we cannot foresee all possible circumstances that may contain potential hazards. Consequently, the safety instructions in this manual are not all-inclusive.



The appliance must not be used in any way that deviates from the considerations in this manual. All applicable safety regulations and protective measures at the place of use must be observed, including site-related regulations and protective measures at the workplace.



Information, descriptions and illustrations in this manual are based on information available at the time of writing.

2.2 Regulations and directives



Please take into account the current rules and regulations in your country. The guidelines listed here may not apply to every single device or machine.

Table 1 European directives & regulations

European directives & regulations	
Regulation-2023/1230	EU L165/1 Machinery Product Ordinance
Directive- 2014/34/EU L 96/309	ATEX-Directive**
Directive-2014/53/EU 02014L0053	Funkanalgen-Directive*
Directive-2014/30/EU	EMV-Directive*
Directive-2012/19/EU L197/38	WEEE-Directive*
Directive-94/62/EG 01994L0062	Packaging -Directive
Directive-2011-65/EU L174/88	RoHS-Directive*
Regulation-1907/2006 L136/3	REACH-Regulation

*These listed directives only apply to motor-driven devices or those equipped with an RFID chip.

** These listed directives only apply to equipment used in potentially explosive atmospheres.

2.3 Personal protective equipment



Appropriate work clothing must be worn for each task.

For safety reasons, operators and other persons in the immediate vicinity of the machine must wear personal protective equipment (PPE). There are different types of protective equipment that must be selected according to the requirements of the working environment. The chapter "Symbols, command signs and signal words" lists the Personal Protective Equipment that must be worn as a minimum.

Safety

2.4 Duties of care and requirements



The requirements for safeguarding safety and health have been met. However, this safety can only be achieved in operational practice if all necessary measures are taken. The operator of the device must plan these measures and control their execution. The operator is responsible for safe operation. The operator must ensure that the operating and maintenance personnel are instructed in good time before any work is carried out with or on the equipment. Due to the risk of injury caused by e.g. getting caught or pulling in, these personnel are not allowed to wear loose clothing, open long hair or jewelry, nor rings. Persons under the influence of drugs, alcohol or drugs that affect their ability to react must not carry out any work with or on the product. The user must have the necessary instruction and experience, as well as any necessary tools, to be able to carry out work on and with the device. Personnel to be trained may only work on the component under the supervision of an experienced person. The user must also have sufficient physical and mental abilities.



It is essential to follow the safety instructions for the device, as failure to do so can result in serious injury or even death. As a manufacturer, we cannot anticipate all potential hazards, so the safety instructions in this guide are not all-encompassing. No work may be carried out if the relevant information has not been read and understood. The user is responsible for ensuring the safety of himself and others in the event of deviations from the work equipment, actions, working methods or working techniques suggested by the manufacturer.

2.5 Intended and non-intended uses

2.5.1 Intended uses



The intended use of monorails in permanently installed steel girders is to move loads along the girder in a linear manner. Horizontal movement is usually only possible after the load has been picked up and lifted by the attached hoist, such as a spur gear pulley.

Monorails that have integrated hoists are considered cranes. Before their first use, they must be approved after assembly and installation by a qualified person authorized to carry out tests. This applies in particular to manually or partially power-driven cranes with a lifting capacity of less than 1,000kg. In the case of a higher load capacity or if at least two movements are motorized, an acceptance by an expert is required. The exact requirements may vary depending on the country and applicable regulations and must be observed and implemented accordingly.



It is the responsibility of the user or operator to ensure that the monorail is used in accordance with the applicable regulations and standards. Improper use can pose an increased risk of accidents and damage. Therefore, the equipment should only be used for its intended purposes and within its carrying capacity and specification limits. It is recommended to contact recognized professionals or experts in the crane industry for accurate information and advice that complies with local regulations.

2.5.2 Non- intended uses



Misintended uses are those in which the above-mentioned device is not used in accordance with the intended conditions of use and safety regulations. These include, but are not limited to:

- Improper installation: If a monorail chassis is not installed as shown in the following documentation, it can lead to serious accidents.
- Use in an environment with explosive or flammable materials: The above equipment without a specification change must not be used in areas where explosive or flammable materials are present, as this may lead to hazardous situations.
- Use in an environment with strong vibrations or shocks: The above device should not be used in environments with high vibration or shock, as this may cause damage to the device.
- Use in an environment with harsh chemicals: The above device must not be used in areas where aggressive chemicals are present, as this may cause corrosion and damage to the equipment.
- Improper maintenance and inspection: Neglect of regular maintenance and inspection of the above device can lead to malfunctions and safety risks.
- Use without proper training and qualifications: Persons operating the above device must have the necessary training and qualification to ensure that it is used properly.
- Use without proper monitoring during operation: The above device must be constantly monitored during operation to ensure that it is working properly and does not show any signs of wear or damage.
- Use without adequate safety distances from other work areas or obstacles: The above equipment should always be used at a sufficient distance from other work areas or obstacles to avoid collisions or other accidents.
- Use without adequate safety precautions: The above device should always be used taking into account the necessary safety precautions, such as wearing personal protective equipment or setting up barriers in the work environment.
- Use without adequate protection against accidental fall of the load: The above-mentioned equipment must always be equipped with appropriate safety devices to prevent accidental falling or derailment.
- Tampering or modifying: Any tampering or modification of the above device without the manufacturer's permission may cause security issues and void the warranty.
- Use for passenger transport: The above device is not designed for the carriage of passengers and may therefore not be used for this purpose.



Please note that the above examples of improper use of the above device are only excerpts and do not fully cover all possible scenarios. They are only intended as a guide to give you an overview of potential risks. It is important to emphasize that the responsibility for the safe use of the above-mentioned devices lies with the user or operator.

Safety

2.6 Symbols, Bid Signs, and Signal Words



This instruction manual contains a large number of mandatory and warning signs that are intended to provide the user with important information and instructions. These signs are used to identify potential hazards and take appropriate precautions. However, it is important to note that not all characters contained in this instruction manual may be accurate or significant. The use of certain signs depends on various factors, such as the specific model, application or local regulations. It is therefore imperative that the user reads the instructions carefully and identifies the relevant signs that apply to their specific situation. It is recommended to contact the manufacturer or authorized professionals in case of ambiguity for a correct interpretation of the signs. Please note that this owner's manual may not cover all possible hazards or situations. It is the User's responsibility to assess their environment and take appropriate measures to ensure their own safety and the safety of others.



Information

This icon indicates important information.



Danger

This symbol warns of an imminent danger to the health and life of people. Ignoring such a warning will result in serious injury, possibly fatal.



Warning

This symbol warns of situations that can potentially endanger people's health and lives. Ignoring such a warning can lead to serious injury, possibly resulting in death.



Suspended load warning

It is forbidden to be under a suspended and/or moving load. This is life-threatening!



Warning of entrapment

Risk of entrapment and cuts on hands and fingers, legs and other limbs. Sufficient personal protective equipment must be worn.



Warning of counter-rotating rollers

There is a considerable danger due to the risk of pulling in rotating parts. Objects such as clothing or body parts can be severely damaged or injured.



Warning of obstacles on the ground

Pay attention to surrounding objects or machine parts on the ground, as there is a risk that you could trip or slip.



Warning of sudden loud noise

Watch out for sudden loud noises, as they could affect your hearing. Protective measures such as wearing hearing protection may be necessary to prevent hearing damage.



Warning of skin-incompatible or corrosive substances

Attention, there is a risk of skin irritating or injurious substances. Therefore, it is necessary to wear appropriate workwear.



Warning about electricity

Only experienced electricians and competent persons may open enclosures and shields marked with this symbol. Before commissioning, all cables must be connected according to the instructions and without damage and the entire system must be able to be switched off with the main switch.



Explosive Atmosphere Warning

Warning of an area where explosive atmospheres may occur.



Use head protection

This sign indicates that a safety helmet must be worn in a certain area. This can be the case, for example, on construction sites or in factories.



Use handguards

This mandatory sign indicates that gloves should be worn in a certain area to ensure protection.



Use protective clothing

This sign indicates that protective clothing must be worn in a certain area. This can be the case, for example, on construction sites or in factories.



Wear hearing protection

This sign indicates that hearing protection must be worn in a certain area to minimize the risk of hearing damage.



Use foot protection

This sign indicates that safety shoes must be worn in a certain area. This can be the case, for example, on construction sites or in factories.

2.7 Hazards according to DIN EN ISO 12100



The following hazards may occur when handling the device.

Please note that the following types of hazards and examples of how to use the device are only excerpts and do not fully cover all possible scenarios. They are only intended as a guide to give you an overview of potential risks. It is important to emphasize that the responsibility for the safe use of the above-mentioned devices lies with the user or operator.

2.7.1 Mechanical hazards



Various mechanical hazards can occur when handling stationary monorails. Here are a few examples:

- Fall hazard: If the monorail is not installed properly or if it is overloaded, there may be a risk that the monorail will detach from the kickstand and fall, resulting in injury.
- Tripping, slipping and crushing hazards: If the hooked load is not made with a "push" motion, the user may trip or fall on objects lying around. If the user also moves Rückert, it can happen that the user is knocked over by the load or trapped.
- Risk of overloading: If a monorail truck is loaded beyond its maximum load capacity, there is a risk of breakage or damage to the equipment, which can lead to accidents.
- Uncontrolled movements: If the device is not properly controlled or technical faults occur, it can cause uncontrolled movements, which can lead to accidents.
- Tipping hazard: If the load is not evenly distributed or if the monorail is not used properly, it can tip over and endanger people nearby.
- Electrical hazards: Electrically operated monorails pose a risk of electric shock or short circuit, especially if the equipment is not properly maintained.
- Lack of maintenance: If monorails are not regularly maintained and checked, signs of wear and tear can occur, which can lead to equipment failure and therefore pose a hazard.

2.7.2 Electronic hazards



Various electronic hazards can arise when handling electrically powered monorails. Here are some examples:

- Risk of electric shock: If electric monorails are not properly insulated or have damaged wires or plugs, there is a risk of electric shock for anyone operating the device or being in the vicinity of the device.
- Risk of short circuit: Damaged cables or plugs can lead to a short circuit, which can not only damage the hoist itself, but also cause fire or other electrical malfunctions.
- Risk of overheating: If electric monorails are overloaded or run for an extended period of time without adequate cooling, there is a risk of overheating the equipment, which can lead to failures or even fires.
- Lack of grounding: If an electric monorail is not properly grounded, it can cause electrostatic discharge, which can be dangerous for both the equipment itself and people nearby.
- Improper use of extension cords: If extension cords are used to drive the device, they must meet the appropriate safety standards and must not be overloaded. Otherwise, there is a risk of short circuits or fires.
- Lack of maintenance: Electric monorails need regular maintenance and inspection to ensure that all electrical components are working properly and that there is no risk of electrical malfunctions.

Safety

2.7.3 Material and/or substantial hazards



Various mechanical hazards can occur when handling stationary monorails. Here are some examples:

- Hazardous or toxic substances: When handling the equipment, loads containing hazardous or toxic substances may be transported. If these substances leak or are released, there is a risk of injury or poisoning to people nearby.
- Explosive materials: Transporting explosive materials with the device can pose a significant hazard. Improper handling or accidental dropping of such loads can lead to explosions and endanger both people and property.
- Heavy or unstable material: Handling heavy or unstable material can lead to increased danger. For example, if a heavy load is not lifted properly or shifts during transport, it can cause accidents and injure people.
- Chemical hazards: Contact with certain chemicals or aggressive cleaning agents can attack or damage the material.
- Material fatigue: Repetitive stress can cause fatigue and associated structural weaknesses.
- Corrosion: Moisture and aggressive environments can lead to corrosion and thus material weakening.
- Wear and tear: Mechanical stress can cause wear and tear that can affect the performance and safety of the device.
- Material defects: Manufacturing defects or material defects can cause unexpected failures.

2.7.4 Acoustic hazards



When handling monorails in conjunction with hoists, various hazards can arise due to acoustic noise. Here are some examples:

- Hearing damage: The operation of lifting equipment can result in significant noise pollution that can damage hearing. Long-term exposure to high noise levels can lead to permanent hearing damage.
- Communication difficulties: Due to the loud noise level, communication and understanding between employees can be difficult. This can lead to misunderstandings or mistakes and compromise security.
- Distraction: Noise can be distracting and affect employee concentration. This can lead to errors in the operation of the hoist or carelessness, which in turn increases the risk of accidents.
- Stress and fatigue: Continuous noise can cause stress and lead to fatigue. This can affect job performance and increase the risk of errors or accidents.
- Interference with warning signals: In a noisy environment, audible warning signals or alarm signals may not be heard, which can lead to a delayed response to potential hazards.

2.8 Residual risks

2.8.1 General residual risks



When handling the device, different residual risks can occur in different phases of life. Although it is impossible to completely eliminate all risks, residual risks can be minimized by various measures. Here are some ways to avoid residual risks:

- Risk assessment: Conduct a thorough risk assessment to identify potential hazards and assess their likelihood and impact. This allows you to take targeted measures to minimize risks.
- Technical protective measures: Use technical protective measures such as protective devices, emergency stop switches or safety systems to shield or control sources of danger.
- Organizational measures: Implement organizational measures such as clear work instructions, employee training, regular maintenance and inspections, and compliance with safety standards and regulations.
- Personal Protective Equipment (PPE): Provide appropriate PPE and ensure that employees use and maintain it correctly.
- Training and awareness-raising: Regular training for employees to educate them about potential hazards and provide them with the necessary knowledge and risk prevention skills.
- Continuous improvement: Regularly review your security measures and procedures to identify and improve potential vulnerabilities.
- Collaborate with experts: Consult professionals such as safety engineers or occupational health and safety experts to conduct an informed risk assessment and recommend appropriate risk mitigation measures.

It is important that all employees are actively involved in the identification and mitigation of residual risks. Through a holistic safety approach, residual risks can be minimized and a safe workplace can be guaranteed.

2.8.2 General Types of Residual Risks:



There are different types of residual risks that can persist despite all security measures. Here are some examples:

- Accepted risks: These are risks that are considered acceptable due to their low probability or impact. They can occur, for example, when all possible risk mitigation measures have been taken, but a residual risk remains.
- Unforeseen risks: In any situation, there is always some uncertainty and unpredictability. Unforeseen risks can arise when new sources of danger or unexpected events arise for which no specific safety precautions have been taken.
- Human error: Despite training and guidance, human error can occur, whether through negligence, inattention, or misjudgment. This can lead to residual risks, as not all employees always act correctly.
- Technical defects: Although machines and systems are regularly maintained and checked, there is always the risk of technical defects or failures, which can lead to residual risks.
- External influences: External factors such as weather conditions, natural disasters, or human error can create residual risks that are beyond the company's control.
- Change in the work environment: As the work environment or working conditions change, new risks may arise that may require additional protective measures.

It is important to note that residual risks cannot be completely avoided. It is best to take all possible measures to mitigate risk and to continuously train and sensitize employees to keep the residual risk as low as possible.

Safety

2.9 ATEX-Basic information

2.9.1 Importance of ATEX



The word ATEX can be derived from the French terms "**AT**mospheres **EX**plosibles" and is at the same time an important guideline in the field of protection of people and equipment in potentially explosive atmospheres. The term ATEX is the widely used synonym for the explosion protection directives in the European Union. The directive currently includes the following two directives in the field of explosion protection.

- Product Directive 2014/34/EU
- Establishment Directive 1999/92/EC
-

2.9.2 ATEX-Label & Marking



The hexagonal ATEX logo with the letters **E** and **X** will be affixed to the equipment together with other equipment markings once the conformity validation has been completed. The ATEX symbol has two prerequisites:

- A type has been tested by a conformity assessment body within the EU.
- The piece test showed that the model and the device match.



The Product Directive 2014/34/EU not only specifies the essential health and safety requirements, but also the conformity assessment procedure for products and equipment that can be used in potentially explosive atmospheres. All equipment, protective systems and installations covered by this Product Directive and placed on the market must therefore be labelled as follows:

- Name and address of the manufacturer
- CE marking and, if applicable, identification number of the notified body involved
- Series designation and type
- Serien-Number bzw. Fabrikations Issue
- Year of construction
- Device group and category
-



In addition, the product must have an EU declaration of conformity that describes the procedures for the required health and safety requirements and whether these could be complied with in the course of the conformity test. Furthermore, the product must be accompanied by an operating manual. The CE marking on the equipment (e.g. on the nameplate) must contain further data relating to explosion protection in the marking. The minimum information of the marking is contained in the ATEX Directive. The following information must be indicated in addition to the CE marking:

Table 2 non-electrical appliances

Gases / Vapours	CE	NB1)	EX	II	2G	Ex h	IIC	T6	Gb	X
Dusts	CE	NB1)	EX	II	2D	Ex h	IIIC	T80°C	Db	X
	1	2	3	4	5	6	7	8	9	10

Table 3 electrical appliances

Gases / Vapours	CE	NB1)	EX	II	2G	Ex db eb	IIC	T6	Gb	X
Dusts	CE		EX	II	2D	Ex tb	IIIC	T120°C	Db	X
	1	2	3	4	5	6	7	8	9	10

No.	Designation	No.	Designation
1	CE marking	6	Explosion protection
2	Number of the notified body	7	Explosion group
3	ATEX License Plate	8	Temperature class
4	Device Group	9	Device Protection Level (EPL)
5	Equipment category + type of explosive atmosphere	10	Additional marking

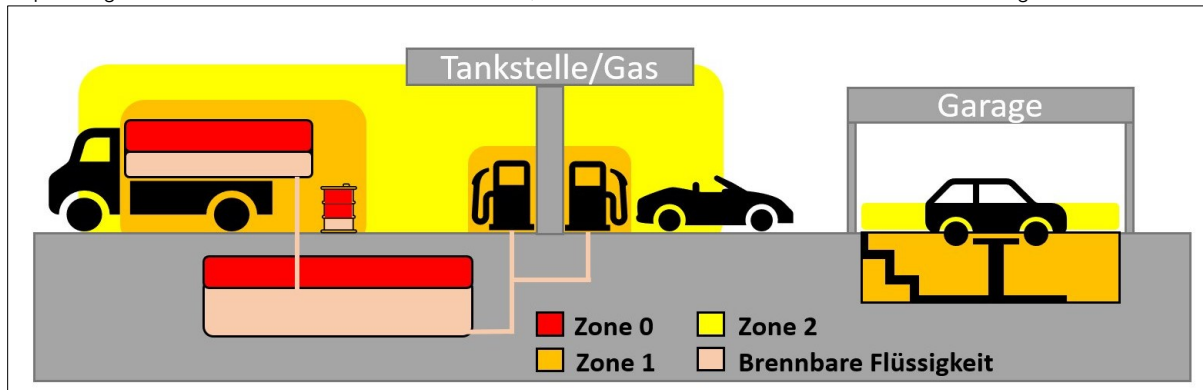
2.9.3 Zoning



The potentially explosive atmospheres are divided into different zones, depending on the frequency and duration of the occurrence of hazardous explosive atmospheres. Zones 0, 1 and 2 stand for areas in which such an atmosphere of air and flammable gases, vapours or mists can form. Zone 0 is the area with more than 50% presence of an explosive atmosphere during the service life, mostly inside pipes and containers. Zone 1 is the area with less than 50% presence of such an atmosphere. Zone 2 is the lowest classification and exists when the duration of the presence of an explosive atmosphere is about 30 minutes per year.

Zones 20, 21 and 22 stand for areas in which an explosive atmosphere is created in the form of combustible dust in the air. Zone 20 is the area with long-term or frequent presence of such an atmosphere. Zone 21 is the area with occasional occurrence of a dangerous atmosphere. Zone 22 is the area where this atmosphere usually does not occur or only occurs for a short time.

Depending on the zone in which a device is located, measures must be taken to reduce the risk of ignition sources.



- **Zone 0/20:** An explosive atmosphere occurs **constantly, over long periods of time or frequently**.
- **Zone 1/21:** An explosive atmosphere occasionally occurs during normal operation.
- **Zone 2/22:** An explosive atmosphere does not occur during normal operation or occurs for a short time.

2.9.4 Equipment grouping



Based on the zone classification in explosion protection, equipment is specifically selected for each zone that must meet the essential requirements according to 2014/34/EU. A distinction is made between equipment group and equipment category. Basically, there are 2 different equipment groups according to Directive 2014/34/EU.

- **Equipment group I** applies to equipment for use in underground operations of mines and their surface installations which may be endangered by firedamp and/or combustible dust.
- **Equipment group II** applies to equipment for use in the other areas which may be endangered by a potentially explosive atmosphere.

2.9.5 Equipment categories



According to the ATEX Directive, the equipment category is the classification of equipment within each equipment group according to Annex I, from which the required level of safety that must be ensured results.

Equipment categories 1, 2 and 3 describe the safety levels of equipment that can be used in potentially explosive atmospheres.

- **Category 1** provides the highest level of safety and is intended for use in areas where a potentially explosive atmosphere is present continuously or frequently.
- **Category 2** provides a high level of safety and is intended for use in areas where an explosive atmosphere may occasionally occur.
- **Category 3** provides a normal level of safety and is intended for use in areas where an explosive atmosphere is likely to occur infrequently and for short periods only.

Table 4 Equipment categories

Device category	Avoidance of effective ignition sources	Level of security	Applicable in zone/s	Presence of explosive atmosphere
1	Even in the event of rare malfunctions	very high	0, 1, 2 20, 21, 22	Long-term, permanent or frequent
2	Even in the event of normal operating faults	high	1, 2 21, 22	Occasionally
3	in normal operation	normal	2 22	Rarely and briefly

2.9.6 Safety measure EPL protection level



The abbreviation "EPL" stands for "Equipment Protection Level" and means "equipment protection level". According to IEC 60079-0, as of the 2007 edition, equipment for potentially explosive atmospheres is classified into three protection levels (for equipment in mines exposed to firedamp, however, only two protection levels are specified):

- **EPL Ga or Da:** Equipment with a "very high" level of protection for use in potentially explosive atmospheres where there is no risk of ignition during normal operation, foreseeable or infrequent faults/misfunctions,
- **EPL Gb or Db:** Equipment with a "high" level of protection for use in potentially explosive atmospheres where there is no risk of ignition during normal operation or foreseeable faults/misfunctions,
- **EPL Gc or Dc:** Equipment with "extended" level of protection for use in potentially explosive atmospheres where there is no risk of ignition during normal operation and which has some additional protective measures to ensure that there is no risk of ignition in the event of normally foreseeable malfunctions of the equipment.

The following applies to the mining sector (underground):

- **EPL Ma:** Equipment with a "very high" level of protection for installation in mines susceptible to firedamp that ensures the required level of safety that there is no risk of ignition during normal operation, foreseeable or infrequent faults/misfunctions, even if the equipment is still in operation during a gas leak. Required for equipment that must continue to operate even if there is a gas leak in the pit.
- **EPL Mb:** Equipment with a "high" level of protection for installation in mines susceptible to firedamp that ensures the required level of safety that there is no risk of ignition during normal operation or foreseeable faults/malfunctions, in the time between gas leakage and switching off the equipment.

Table 5 EPL protection level

Device category	Protection level EPL	Level of security	Applicable in zone/s
Gases, vapours and dusts			
1G 1D	Ga Da	very high	0, 1, 2 20, 21, 22
2G 2D	Gb Db	high	1, 2 21, 22
3G 3D	Gc Dc	medium	2 22
Mine workings at risk of firedamp			
M1	Ma	very high	Continued operation in ex-atmosphere
M2	Mb	high	Switching off with ex-atmosphere

2.9.7 Explosion group



The minimum ignition energy that just ignites a mixture willing to ignite is divided into explosion groups for flammable gases. The danger of the different types of gas is subdivided according to their specific ignition capabilities. Therefore, in this area, equipment is subdivided according to explosion group. The danger increases progressively from explosion group IIA to IIC. Propane, for example, falls into explosion group IIA, hydrogen, on the other hand, into explosion group IIC, since hydrogen requires a lower minimum energy to be ignited. The requirements for electrical equipment increase according to the explosion group. Equipment approved for IIC may also be used for all other explosion groups. Explosion groups are determined by the equipment group and equipment category in which zones an item of equipment can be used. It is determined via the explosion group and temperature class for which media within the zones the equipment may be used.

Table 6 Explosion groups

Group II explosive gas atmospheres			Group III explosive dust atmospheres		
Propane Ammonia Methane Ethan	Acrylonitrile Ethylene Ethyl glycol Hydrogen sulphide	Hydrogen Acetylene Carbon disulphide	combustible suspended solids	non- conductive dusts	conductive dusts
IIA			IIIA		
IIB			IIIB		
IIC			IIIC		

2.9.8 Temperature classes



Equipment may only be operated in a potentially explosive atmosphere if its maximum surface temperature is below the ignition temperature of the surrounding explosive mixture. The temperature classes are used to assess how high the maximum surface temperature of the equipment may be. There are six temperature classes from **T1** to **T6** which determine the maximum permissible surface temperature. T6 is the highest temperature class, the unit may only have a maximum surface temperature of 85°C. This temperature class is selected if substances are to be heated. This temperature class is selected when substances such as carbon disulphide are used. Carbon disulphide has an ignition temperature of 95°C at which it ignites. Therefore, the surface of the equipment must also have a lower temperature. Equipment and devices that have a higher temperature class, such as T6, are automatically suitable for the lower temperature classes, such as T1 to T5.

Table 7 Temperature classes

Group II explosive gas atmospheres					
max. 450°C	max. 300°C	max. 200°C	max. 135°C	max. 100°C	max. 85°C
		T3	T4	T5	T6
T1	T2				

Safety

2.9.9 Operational instructions and safety precautions



The operating instructions must be kept correctly and be easily accessible to the operator. Check at regular intervals that work is being carried out in a safety-conscious manner. Observe the intervals specified for regular maintenance and tests. Record reports in the product's log book. Ensure correct implementation of safety regulations and accident prevention guidelines.



Hoists and trolleys in Ex-design are to be used for maximum operating conditions in the following maximum, uninterrupted operating times of the hoists are to be observed:

The spur gear hoists are manual hoists which are not suitable for continuous operation during the lowering process. In order to avoid impermissibly high temperatures of the brake discs, max. uninterrupted operating times for use in the Ex area must not be exceeded: based on a max. ambient temperature of up to + 40° Celsius.



When lowering, a max. operating travel of approx. 3 m uninterrupted lowering travel must not be exceeded, as the brake heats up strongly during lowering. After this 3 m operating travel (lowering), an approx. 20 minute break must be observed for the hoist brake to cool down. Flammable dust deposits on the hoists must be avoided. Every day before starting work, free the hoist from dust deposits and ensure that no dust can settle between the moving parts.



Repair work should only be carried out outside the potentially explosive atmosphere.

Protect the hoist from impact, friction, rough handling and moisture. When operating with a hoist, make sure that the operator wears conductive clothing (shoes, gloves). Gloves should have a leakage resistance of < 10 to the power of 8 ohms. Removing clothing can lead to ignitable discharges and is therefore not permitted.



Electrostatic flammability hazards can be prevented by safe earthing. In zone 1, earthing of lifting gear is required! This must be done via the load hook or the load eye when the hoist is connected to the appropriately earthed parts. In the case of trolleys, the surfaces of the rollers and the running rail must never be painted, as this can lead to impermissibly high earth resistance values. Loads must be earthed during transport; a separate earth is required, for example when using non-conductive slings.



To prevent mechanical sparking in Zone 1 but also in Zone 2 for Group IIC gases, hydrogen sulphide and ethylene oxide- the chain and load must always be moved in such a way that sliding and/or frictional contact with other equipment or components is excluded. To ensure the required degree of earthing, rusty chains must no longer be used in zones 1 and 2. Depending on the degree of corrosion, the earth leakage performance of the chain may be affected to an unacceptable degree. The working environment must be safe and free from obstructions. The risk of potential explosion hazards must be minimised.



The working environment must be safe and free from obstructions. The risk of potential explosion hazards must be minimised. The operating instructions must be kept correctly and be easily accessible to the operator. Check at regular intervals that work is being carried out in a safety-conscious manner. Observe the intervals specified for regular maintenance and testing. Record reports in the product's log book. Ensure correct implementation of safety regulations and accident prevention guidelines.

2.9.10 Explosionsschutz Ausführung und Zusatzinformationen Teil-1



Die folgenden Informationen beruhen auf unseren intern gesammelten Erfahrungen, basierend auf der ATEX-Richtlinie 2014/34/EU und der Norm DIN EN ISO 80079-36 und -37. Technische Unterlagen für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen sind beim TÜV SÜD Product Service GmbH hinterlegt.

Tabelle 8 ATEX Typenschlüssel

BASIC		MEDIUM		HIGH	
	II 3 G Ex h IIB T4 Gc X oder		II 2 G Ex h IIB T4 Gb X oder		II 2 G Ex h IIC T4 Gb X oder
	II 3 D Ex h IIIB T 135 °C Dc		II 2 D Ex h IIIB T 135 °C Db oder		II 2 D Ex h IIIC T 135 °C Db oder
			I M 2 Ex h I T 135 °C (T4) Mb X		I M 2 Ex h I T 135 °C (T4) Mb X

**BASIC:**

Die Geräte der Gruppe „BASIC“ dürfen nur im Normalbetrieb ohne zu erwartende Störungen und ohne seltene Störungen außerhalb des Bergbaues weiter betrieben werden, wenn eine explosionsgefährdete Atmosphäre durch Gase der Gruppe IIB (z.B. Propan und Butan) oder Stäube der Gruppe IIIB (nicht leitfähige brennbare Stäube (z.B. Baumwolle, Filterstoffe) kurzzeitig auftritt und sich anschließend schnell verflüchtigt.

**MEDIUM:**

Die Geräte der Gruppe „MEDIUM“ dürfen im Normalbetrieb und bei zu erwartenden Störungen außerhalb des Bergbaues weiter betrieben werden, wenn eine explosionsgefährdete Atmosphäre durch Gase der Gruppe IIB (z.B. Propan und Butan) oder Stäube der Gruppe IIIB (nicht leitfähige brennbare Stäube (z.B. Baumwolle, Filterstoffe) gelegentlich auftritt und sich anschließend verflüchtigt.

Besonderheit: Sie dürfen auch im Normalbetrieb und bei zu erwartenden Störungen Untertage jedoch unter Ausschuss einer Ex-Umgebung eingesetzt werden.

**HIGH:**

Die Geräte der Gruppe „HIGH“ dürfen im Normalbetrieb und bei zu erwartenden Störungen außerhalb des Bergbaues weiter betrieben werden, wenn eine explosionsgefährdete Atmosphäre durch Gase der Gruppe IIC (z.B. Wasserstoff) oder Stäube der Gruppe IIIC (leitfähige brennbare Stäube (z.B. Metall- und Aluminiumstäube) gelegentlich auftritt und sich anschließend verflüchtigt.

Besonderheit: Sie dürfen auch im Normalbetrieb und bei zu erwartenden Störungen Untertage jedoch unter Ausschuss einer Ex-Umgebung eingesetzt werden.



Alle drei Gerätegruppen „Basic, Medium und High“ sind ausgelegt für Gase, Ablagerungen (Schichtdicke 5mm) und Staubwolken mit einer Zündtemperatur $\geq 135^{\circ}\text{C}$.



Achtung! Ausgenommen sind: Ethylenoxide und Schwefelwasserstoffe. Genauer beschrieben siehe Ausschuss der Verwendung.



The following information is based on our internal experience, based on the ATEX Directive 2014/34/EU and the DIN EN ISO 80079-36 and -37 standard.

Table 9 ATEX assignment

Range:	BASIC	MEDIUM	HIGH
Zone:	2 / 22	1,2 / 21,22	1,2 / 21,22
Device group:	II	II + I	
Device category:	3G / 3D	2G / 2D / M2*	
Explosion protection:	Ex h		
Explosion group:	IIB + IIIB		IIC + IIIC
Exception:	except ethylene and hydrogen sulfide		
Temperatures:	T4 (135°C)		
Protection level EPL:	Gc / Dc	Gb/Db/Mb	
Additional marking:	X		
Protective measures:	basic protection against sparks, fast-moving contact parts and against corrosion of critical contact parts	Further protection against sparks, fast-moving contact parts and against corrosion of critical contact parts	high protection against sparks, fast-moving contact parts and corrosion of critical contact parts. Replacement of some components with non-corrosive and low-spark materials (sometimes accompanied by a reduction in load capacity)

M2* If an explosive atmosphere occurs, the movement of the device must be stopped immediately. The device may only continue to operate when there is a normal atmosphere

X See Exclusion of Use

2.9.12 Explosion protection Exclusion of use



The use of the units in potentially explosive atmospheres corresponding to equipment group II, equipment category 1 (zone 0) according to ATEX directive 2014/34/EU is prohibited, as rare malfunctions cannot be ruled out.



The use of the equipment in environments containing ethylene oxide is excluded because under certain conditions ethylene oxide as an unstable substance has no upper explosion limit (UEL). Furthermore, ethylene oxide tends to polymerise easily, especially in liquid form or when tin (IV) chloride and a little water are added. Then it often polymerises in a highly exothermic reaction to polyethylene glycol. Particularly violent reactions can result from the interaction of catalytic substances such as iron oxide with ethylene oxide.



The use of the units in environments containing hydrogen sulphide is excluded, as hydrogen sulphide leads to corrosion of most metals. The use of the units is also excluded under the influence of chemically reacting substances, extreme temperature fluctuations and in contact with hydraulic fluids.

The risk of mechanical sparking is reduced as far as possible by the manufacturer. However, a risk reduction to 0% against mechanical sparking is not possible. Therefore, it is always the operator's responsibility to take measures to reduce the risk of explosion in the environment before using the unit in that environment.



The explosion protection of the units is essentially based on a surface finish using zinc, stainless steel or bronze, which do not provide sufficient protection in the long term! Underlying steel components can then corrode.



In areas at risk of explosion from combustible dusts, the surface temperature must not exceed $\frac{2}{3}$ of the minimum ignition temperature in degrees Celsius (°C) of the dust/air mixture. Temperatures of surfaces on which dangerous deposits of smouldering dusts can form must be lower than the minimum ignition temperature of the layer that can form from the dust in question by a safety distance. A safety distance of 75 Kelvin between the minimum ignition temperature of a layer of dust (glow temperature) and the surface temperature of the appliance is used here. Larger safety distances are required if the layer thickness of the dust exceeds 5 millimetres. A corresponding note is included in the operating instructions.



The unit version (product group) underwent several tests to determine the maximum surface temperature. The tests were carried out at a room temperature of 20°C without dust deposits and safety factors. The temperature was measured several times during continuous lowering with 100% load over a minimum distance of 1 metre.

3.1 General information



Installation and maintenance work may only be carried out by persons who are familiar with it and have been commissioned by the operator to install and maintain it. These persons must be familiar with the relevant accident prevention regulations, such as DGUV 52, DGUV 54, etc., and must have been instructed accordingly, as well as have read and understood the operating and assembly instructions drawn up by the manufacturer.



In accordance with the Ordinance on Industrial Safety and Health, monorails with integrated hoists are subject to certain acceptance procedures before they are put into operation for the first time. This acceptance must be carried out by a test expert if the combination of monorail and hoist can achieve a load capacity of more than 1,000kg or if two movements are operated by force. However, if the load capacity is less than 1,000kg and either both or only one movement is force-driven, the removal can be carried out by a qualified person instead. There is an exception to the obligation to accept before the first commissioning if the crane is already delivered ready for operation and either proof of type approval (type examination) or a declaration of conformity is available.



It should be noted that the above regulations may not apply universally and may differ depending on the country or the respective installation regulations. Therefore, it is of great importance to ensure that all relevant national rules and regulations for the installation and operation of the device are complied with.



Before assembling and commissioning the device, it is necessary to pay attention to several points:

Make sure that the device meets the required specifications, such as load capacity, beam flange width, etc.

Inspect the device for possible damage in transit.

Immediately after unpacking your device, write down the essential device information such as serial number and carrier flange width in the table provided for this purpose (see cover sheet).

Check the location where you want to install the device. Also, consider the height and access routes for installation.

Make sure that all safety precautions have been taken to prevent accidents. Check that the equipment has the necessary safety features such as emergency stop switches, overload protection, and safety couplings.

Make sure that all parts are properly assembled and that all connections are secure and tight.

If the appliance is electrically operated, make sure the electrical connection is properly installed and complies with local regulations. Also, check if the power supply is sufficient to run the devices.

Before commissioning, perform a thorough inspection of the equipment to ensure that it is working properly. Check all functions, such as the movement and braking (if electrically operated) to make sure they are working properly.

Make sure that the operators of the equipment have the necessary knowledge and skills to operate them safely. Where appropriate, provide training to ensure operators have the necessary knowledge.



It is important to follow all safety regulations and guidelines to avoid accidents and injuries. If you are unsure, you should contact the manufacturer or a professional for more information and assistance.

3.2 Trolley assembly



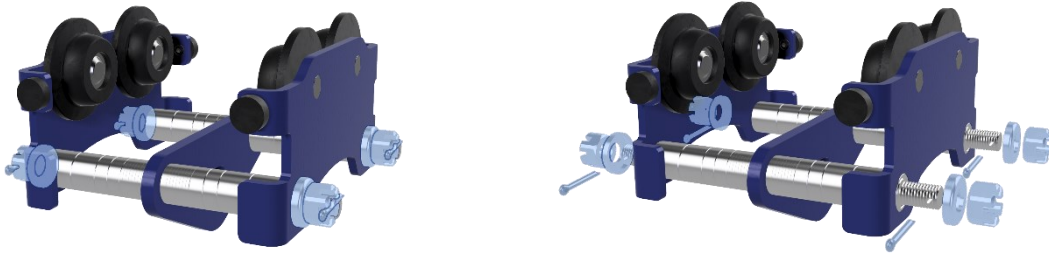
To install a monorail trolley correctly, you must first ensure that one of the two ends of the beam is freely accessible. If not, you must position the monorail trolley on the carrier track from below and assemble it. Extreme care must be taken during the entire process to avoid damage and injury. To assemble the monorail trolley correctly, carry out the following steps in sequence.

Note: All LST trolleys are always supplied with the largest or maximum flange width.

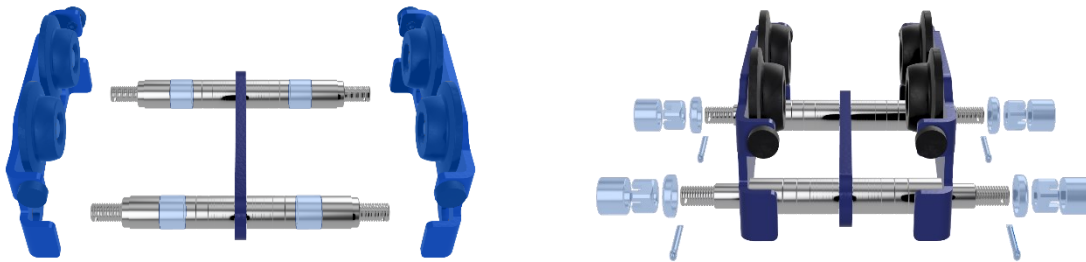
Assembly instructions:

Start by measuring the average width of the steel beam and the distance between the rollers. Make a careful note of the narrowest and widest point of the flange width of the beam so that you can remove or add the corresponding number of spacer discs precisely later.

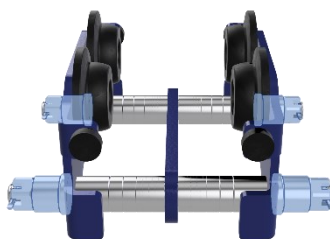
First remove all locking pins and then loosen the castellated nuts, turning them anti-clockwise. Then remove the respective bottom discs by pulling them off.



To set the track width of your monorail undercarriage correctly, first remove both sides of the undercarriage and then remove or add the correct number of spacer discs. Make sure that there is an air gap of about 2 mm per side between the wheel flange and the beam flange. This air gap allows the running gear a certain amount of play, which compensates for temperature and thickness tolerances of the beam. This is to ensure that the monorail trolley can travel smoothly along the beam.



Now carry out the steps described above in reverse order. Ensure that the previously removed spacers are correctly positioned between the castellated nut and the spacer disc (see illustration below). Tighten the total of four hexagon nuts and make sure that the hole pattern matches. Finally, insert a new split pin into the holes provided and bend the ends over. This step is crucial to ensure that the castle nuts cannot come loose either by themselves or due to vibrations. By fastening the castellated nuts correctly and inserting the split pin properly, you ensure the safety and stability of the entire assembly. Ensure that all fastening elements are firmly and securely tightened to ensure reliable operation.



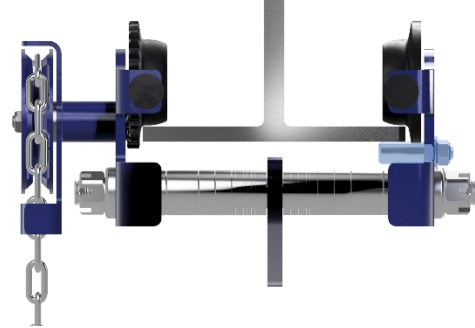
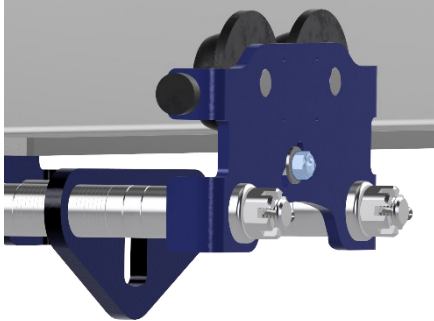
Assembly, installation and commissioning

3.3 Adjustment of the anti-tipping device



In order to be able to properly adjust the anti-tilt device of the monorail chassis, the following steps must be carried out one after the other.

Loosen the nut and move the anti-tilt bolt towards the steel beam. Make sure to maintain a distance of about 2 mm between the bottom of the steel beam and the anti-tilt bolt to avoid grinding on the beam and ensure smooth operation. Then tighten the nut with a hand force of about 10 Nm to tighten it tightly, but not excessively. If you want to be on the safe side, use the correct tightening torque of the respective screw.



4 Product description

4.1 Area of application



Ideally, the equipment should be installed in a protected space to ensure optimal performance. If outdoor installation is unavoidable, the equipment must be protected from the effects of adverse weather conditions such as rain, snow, hail, direct sunlight and dust. Particular care should be taken in humid environments, as large temperature fluctuations can lead to condensation, which could impair functions. Particular attention should also be paid to the alignment of the devices on a flat surface. The driving plane must not be inclined more than 0.17° in the longitudinal direction to ensure correct functioning. In environments with increased humidity and large temperature fluctuations, there is a risk of condensation, which can interfere with proper functionality. The ambient temperature can range from -20°C to $+50^\circ\text{C}$, and the humidity must not exceed 100%, taking care to ensure that the equipment is not submerged. Careful adherence to these guidelines ensures long-term and reliable performance of the installed equipment.



The permissible load of the device must not be exceeded! This does not apply to a possible load test before the first commissioning by a recognised qualified person.



On request, the device can be designed specifically for use in other situations, such as:

- in dusty environments and/or in high humidity,
- offshore and/or under corrosive conditions,
- in potentially explosive environments (EX environments),
- in the food industry,
- at extremely high or low temperatures,

4.1.1 Committee of Use



In particular, the following may not be used:

- for tearing away stuck loads as well as oblique pull if the device cannot align with the load.
- Use as for passenger transport.
- Use in event and production facilities for scenic representation when people are under a suspended load.

4.1 Typenschild/s



A nameplate with product-specific information is attached to the device.
The nameplate may differ from the illustration below.

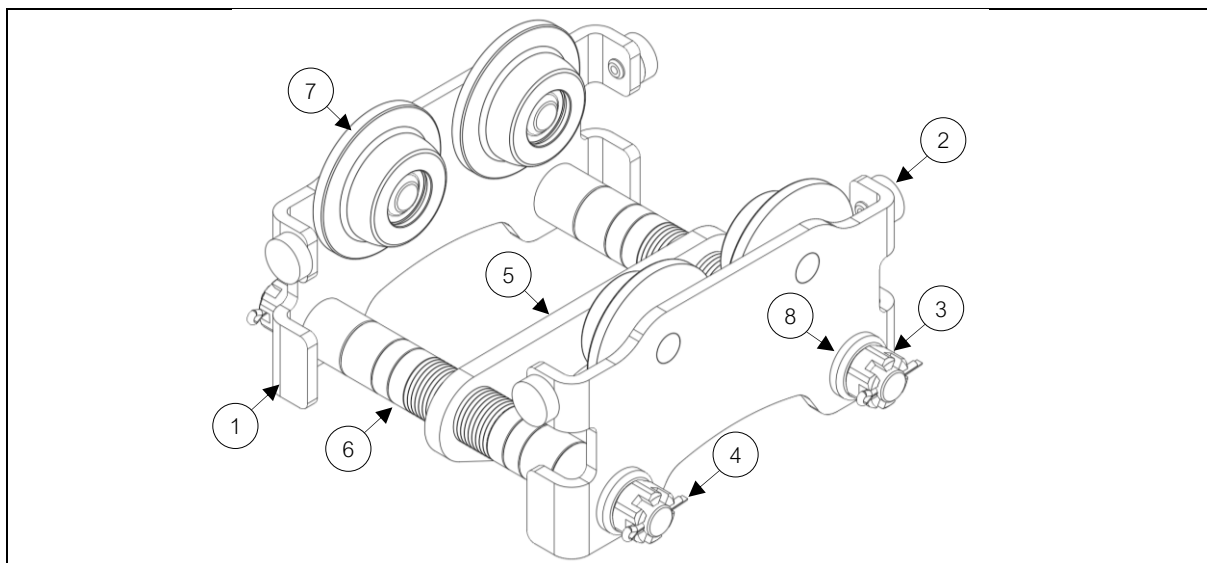
Standard	ATEX



In accordance with DIN EN 13157 Chapter 7.4.3, all monorail trolleys must have a permanently affixed marking in a clearly visible place with the following information:

- Name and address of the manufacturer,
- Series or type designation,
- Serial number
- Carrying capacity
- Year of construction.

LST-H-EX / LST-G-EX

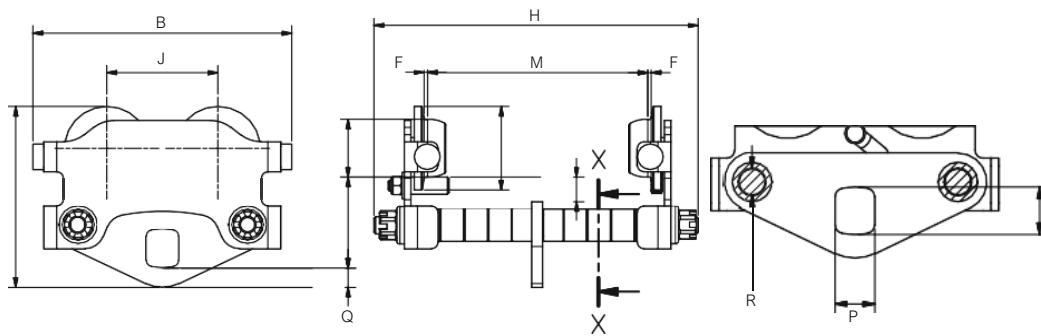


1.	Side part	2.	Rubber buffer
3.	Castle nut	4.	Safety split pin
5.	Crossbar	6.	Support bolt incl. spacer discs
7.	Running wheels	8.	Washer

4.3 Technical data

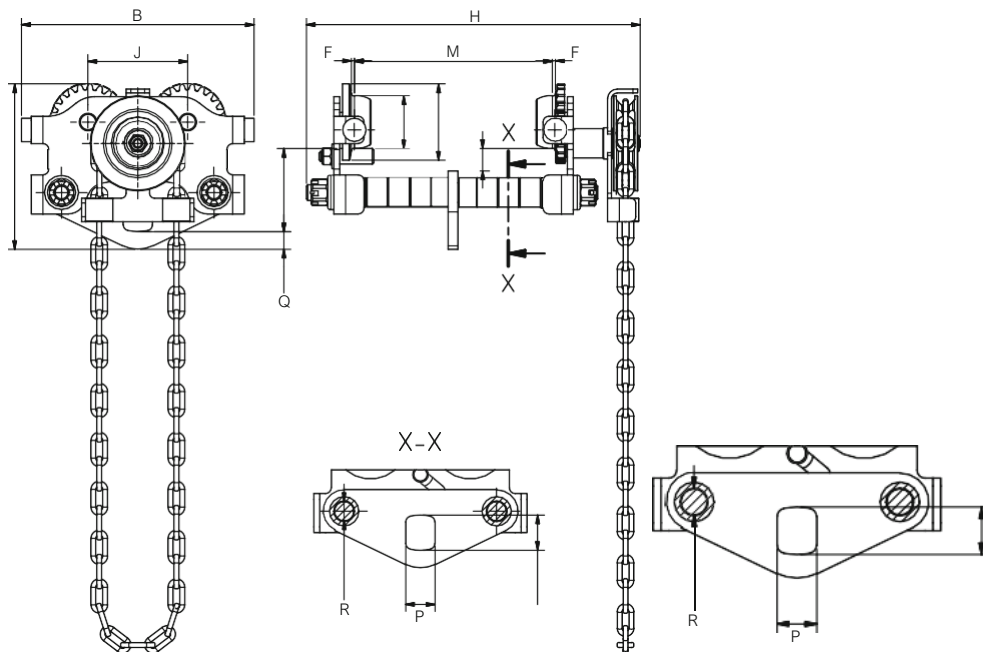
4.3.1 Monorail trolley

LST-H / -EX



4.3.2 Monorail reel trolley

LST-G / -EX



TYP	LST-H / -EX	0.5	1	2	3	5	10	-
TYP	LST-G / -EX	0.5	1	2	3	5	10	20
Load capacity	kg	500	1.000	2.000	3.000	5.000	10.000	20.000
Flange width M min. - max.	mm	50 – 203	64 – 203	88 – 203	100 – 203	114 – 203	124 – 203	136 – 203
Min. curve radius	m	0,85	1	1,1	1,3	1,4	2	a.A.
Hand chain operating length LST-G	m	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Reel travel for 1 m travel LST-G	m	2,96	3,63	4,65	5,66	6,34	7,98	10,63
A (dimensions)	mm	85	104	115	125	143	187	250
B	mm	238	288	338	390	472	476	564
C	mm	169	207	237	271	307	381	514
D	mm	54	67	80	100	109	133	170
E	mm	78	96	111	133,5	145	176	228
F	mm	3	3	3	4	4	4	4
H (LST-H)	mm	298	314	325	355	381	388	–
H (LST-G)	mm	342	363	374	403	428	445	498
J	mm	102	112	131	153	168	194	234
O	mm	36	40	48	54	66	80	130
P	mm	30	36	40	46	52	64	100
Q	mm	18	22	26	29	37	40	65
R	mm	Ø 20	Ø 24	Ø 29	Ø 34	Ø 39	Ø 44	Ø 59
S	mm	23	24	28	26	28	50	55
Net weight LST-H	kg	9	14	22	36	55	86	–
Net weight LST-G	kg	11	16	24	39	59	89	190

5.1 General Protective Measures and Rules of Conduct

General requirements for operation with the device:

- **Training:** The operator should have undergone appropriate training that familiarizes him with the basic knowledge of how to handle the equipment safely. This training can take place, for example, as part of vocational training or training.
- **Experience:** In addition to training, practical experience in the use of the device is also important. The operator should already have experience and be familiar with the various functions and controls of the device.
- **Sense of responsibility:** The operator should be aware of his responsibility and observe the safety regulations and measures when operating the device. This includes, for example, wearing personal protective equipment and adhering to the prescribed load limits.

It is important to note that the exact requirements and requirements for operating such a device may vary depending on the country and area of use. It is therefore advisable to find out about the rules and regulations in force before operating.

5.1.1 Before operating the device

Before operation, the following steps must be carried out by the operator:

1. Inspect the device for visible damage or wear. If damage is detected, it should be repaired before use.
2. Checking the working environment for obstacles or hazards that could interfere with the safe operation of the equipment. Obstacles should be removed and sources of danger eliminated.
3. Checking the load to be lifted or pulled for weight, size and stability. The device may only be used for loads for which it is designed.
4. Checking the attachment points of the device to ensure that the device is stable and secure.
5. Verification of the proper lubrication of the load chain.
6. Preparation of the device's controls and safety devices to ensure that they are working properly and are easily accessible.
7. Instructing other people working in the vicinity of the equipment about the planned use and the safety precautions that need to be taken.
8. Perform a final visual check of the device and work environment to ensure that everything is ready and that there are no obvious hazards.

Only after these steps have been completed and the operator is sure that the device is working properly and can be used safely, the actual operation can begin.

5.1.2 While operating the device

During operation, it is imperative that you pay attention to and take into account the following points. Failure to observe these points may result in damage to the device or injury:

- When moving loads, a minimum distance of 0.5m to parts in the surrounding area must be maintained.
- The maximum permissible load capacity of the hoist must be observed.
- Before lifting, slack load-bearing equipment must first be tensioned.
- Load-bearing equipment must be guided in such a way that it can run in and out unhindered.
- Loads must always be lifted from a standstill at the lowest available lifting speed.
- The attached load must always be attached to the centre of mass. Swinging, rocking or an inclined pull is prohibited.
- The attached load must not be left hanging for a long period of time.
- Secondary safeguards must be used to hold loads over persons with lifting equipment in accordance with DGUV V54.

Please note that the above examples are only excerpts during the uses and do not fully cover all possible scenarios. They are only intended as a guide to give you an overview of potential risks. It is important to emphasize that the responsibility for the safe use of the above-mentioned devices lies with the user or operator.

5.2 Operation

5.2.1 Monorail trolleys

Monorail trolleys (position 1) are primarily set in motion by applying a compressive force to the load, either directly on the load hook or on the load chain. Movement by pulling poses a significant risk because, in certain unfavourable circumstances, there is a possibility that the load may move uncontrollably, and people may be endangered by being caught or rolled over by the load. This type of chassis is therefore only suitable for load capacities up to a maximum of 5,000kg.

5.2.2 Monorail reel trolleys

Monorail reel trolleys (position 2) are set in motion by the manual actuation of a control chain, also known as a hand chain or reel chain. This control chain is connected to a gear mechanism that serves to transfer the forces exerted on the control chain to the wheels of the reel chassis. This transmission allows precise control and movement of the reel chassis along the steel beam. By pulling on the control chain, the operator can control the speed and direction of the reel chassis, which allows for efficient and safe handling of loads or other objects on the monorail.



6.1 General information about storage



The following points should be observed when storing the unit:

1. location: The storage location should be dry, well ventilated and protected from direct sunlight. Moisture can cause corrosion, while direct sunlight can weaken the materials.
2. cleanliness: The units should be cleaned before storage to remove dirt, dust and other contaminants. This prevents corrosion and increases the life of the units.
3. securing: The appliance should be stored securely to prevent accidents or damage. It should be stored on stable and secure shelves or racks to prevent it from tipping over or falling down.
4. maintenance: Before storage, the unit should be serviced to ensure that it is in good working order. This may include checking wearing parts, refilling lubricants or replacing damaged parts.
5. labelling: The unit should be clearly labelled for easy identification and accessibility. This facilitates storage and access to the unit when needed.
6. documentation: it is important to document all relevant information about the unit, including maintenance records, repairs and inspections. This allows for better tracking and planning for future operations.
7. training: persons responsible for storing the equipment should have the proper training and knowledge to ensure that the equipment is stored properly and does not pose a hazard.



It is important to follow the manufacturer's specific instructions and take extra precautions, if necessary, to ensure the safety and longevity of the winches, hoists and pulling equipment.

6.2 General information about transport



The device should be transported correctly to avoid accidents and damage. Here are the steps to follow before, during and after transporting the device:

6.2.1 Before transport:

- Inspect the device for visible damage or wear.
- Make sure that the device has been properly maintained and that all safety precautions are in place.
- Check the load capacity of the device and make sure it is suitable for the intended transport.
- Make sure all instruction manuals and safety instructions are available.

6.2.2 During transport:

- Use appropriate means of transport, such as forklifts or cranes, to move the equipment.
- Make sure the device is properly secured to prevent it from slipping or falling during transport.
- Keep the device in a stable position and avoid abrupt movements or vibrations.
- Make sure that no people are standing near the device or could be in danger.

6.2.3 After transport:

- Check the device again for any visible damage or wear that may have occurred during transit.
- Perform a thorough inspection to ensure that all parts and components are intact.
- Follow maintenance instructions according to local and legal regulations to keep the device in good condition.
- Store the device in a suitable place away from weather conditions and damage.

It is important to follow these steps carefully to ensure safety when transporting equipment and to avoid possible damage or accidents.

7 Maintenance

7.1 General information



Persons responsible for inspection and maintenance of the unit should have appropriate expertise and experience. As a rule, these are qualified specialists, such as mechanical engineers, electrical technicians or mechanics.



When inspecting and maintaining the unit, it is essential to ensure compliance with applicable safety regulations. This includes, among other things:

- Regular inspection of the equipment for wear, damage or malfunctions.
- Checking the load-bearing capacity and load-bearing capacity of the equipment.
- Checking the safety devices, such as emergency stop switches or overload fuses.
- Checking the electrical connections and wiring.
- Visual inspection of ropes, chains or belts for damage or wear.
- Lubrication and maintenance of moving parts.
- Documentation of the inspections and maintenance carried out.



It is important that inspection and maintenance is carried out by qualified personnel to ensure the safety of the equipment and the health of the users.

7.2 Maintenance



Maintenance is the umbrella term for all work steps that are intended to ensure the functionality of machines and systems. Maintenance therefore includes inspection, servicing and repair. This also includes work steps such as improvement and weak point analysis. The entire maintenance process is regulated by DIN 31051.

7.2.1 Inspection



Inspection is a part of maintenance and refers to the regular inspection of a machine to ensure its proper condition, functionality and safety. Components, assemblies and equipment are examined for signs of wear, visual inspections are carried out and actual values are compared with target values. The goal is to determine the progress of wear and tear and determine the reasons for it. The inspection, also known as periodic testing, is carried out by a qualified person at predefined intervals, depending on environmental influences and machine utilization. The results of the inspection have consequences for the further handling and use of the plant.

7.2.2 Maintenance



During maintenance, work takes place on the machine. The target state is restored. Maintenance work is intended to delay the progression of wear and tear or, in the best case, to prevent it altogether. All actions taken should be recorded in a protocol. Regularly carried out and documented maintenance maintains the warranty claim and increases the resale value of a machine or system. Normally, the interval between two maintenance is one year.

7.2.3 Restoration



If a defective component is discovered and replaced during maintenance work, this is a repair measure. The target state, i.e. perfect, functional operating behaviour, is restored. Through inspections and maintenance, the machine is observed, cared for and wear is inhibited. After a certain period of time, however, even when a machine is used as intended, wear-and-tear damage often occurs. Repairs must be carried out immediately after the damage has been discovered. The defective parts are either repaired or replaced, depending on the situation and costs. Entire assemblies can also be replaced. At the end of the day, operability and functional safety must be restored. All repair measures must also be entered in the maintenance log.

7.2.4 Spares



Damaged components that need to be replaced due to wear and tear or faulty conditions during maintenance or repair should be replaced by a qualified person. Only original fasteners, spare parts and accessories according to the manufacturer's spare parts list are to be used. Only these parts are covered by the warranty. Any liability of the manufacturer is excluded for damage caused by the use of non-original parts and accessories.



Incorrect or faulty spare parts can lead to damage, malfunction or total failure of the device.



If you have any questions or order spare parts, please have the factory or order number (test book, load plate on the device) ready. Providing this data ensures that you receive the correct information or the required spare parts.

7.3 Legal framework



In Germany, inspections on machines are carried out by qualified personnel. The exact requirements and qualifications for inspection personnel may vary depending on the type of machine and the specific regulations. The legal basis for carrying out inspections on machinery in Germany is set out in various laws and regulations, including:

- **Industrial Safety Ordinance (BetrSichV):** The Industrial Safety Ordinance regulates the safety and protection of employees when using work equipment, which also includes machinery. It contains general requirements for the testing and maintenance of machinery.
- **Technical Rules for Operational Safety (TRBS):** The TRBS provide recommendations and information on the implementation of the Industrial Safety Ordinance. They contain, among other things, information on the requirements for inspection personnel and their qualifications.
- **Employers' liability insurance associations (BGV):** The employers' liability insurance associations issue regulations to ensure the safety and health protection of employees in certain sectors or areas of activity. These regulations may also include requirements for inspection personnel.

The specific requirements for inspection personnel may vary depending on the type of machine. In some cases, special training or certification may be required to be allowed to conduct inspections. It is recommended to consult the relevant regulations and technical rules in order to determine the specific requirements for inspection personnel. In addition, the manufacturer's specifications and recommendations can also contain important information on the qualifications of inspection personnel.



Attention: In order to be allowed to test electronic components, the person qualified to test must either have completed vocational training in electrical engineering or have another sufficient electrotechnical qualification. Suitable vocational training includes, for example, electronics technician in various disciplines or a degree in electrical engineering.



If an inspection check is not performed or is performed incorrectly, various negative consequences can occur. Here are some possible impacts:

- **Security risks:** If these checks are not performed or are flawed, potential security risks may be missed or not addressed. This can lead to accidents, injuries or damage.
- **Operational disruptions:** Periodic inspections can also be used to identify and remedy potential failures or malfunctions at an early stage. If these tests are not performed or are faulty, failures or malfunctions may occur, which may affect operations and lead to production losses or delays.
- **Legal consequences:** In some industries, periodic inspections are required by law. If these checks are not carried out properly, it can lead to legal consequences, such as fines, liability, or even criminal prosecution.
- **Costs:** If periodic inspections are not performed or are faulty, additional costs may be incurred. This can be caused, for example, by repairs, spare parts or the loss of production time.



During an inspection of equipment, various aspects are examined to ensure that the equipment is functioning properly and complies with applicable safety standards. The exact examinations may vary depending on the type of device and the specific requirements, but in general, the following points are checked:

- **Visual inspection:** Checks if the device is externally damaged, such as cracks, deformations or signs of wear.
- **Functional test:** The hoist is tested for its functionality by loading and moving it. This involves verifying that all parts are working properly and that there are no unusual noises or vibrations.
- **Load Capacity Testing:** The maximum load capacity of the hoist is checked to ensure that it meets the required standards. This can be done by load testing or by checking the manufacturer's specifications.
- **Inspection of safety devices:** All safety devices of the hoist are checked to ensure that they are working properly. These include, for example, overload protection, brakes and safety hooks.
- **Checking the instruction manual and marking:** It is checked that the hoist is provided with an up-to-date instruction manual and the necessary markings.

It is therefore extremely important to carry out regular inspections to ensure safety, prevent damage and ensure smooth operation. If any damage or defects are found, appropriate repairs or replacements should be carried out before the device is used again. These checks should be carried out in accordance with the manufacturer's recommendations and applicable regulations.

7.4 Inspection and maintenance interval



The intervals for inspections and maintenance of the device depend on the duration of use and the operational stress. As a rule, short, regular inspections and maintenance are recommended to ensure the proper functioning of the device and to detect possible problems at an early stage. For some equipment, an annual inspection may be sufficient, while others may require maintenance every six months or even more often. National law and regulations must be complied with in any case. In addition, regular maintenance such as lubricating moving parts, checking wear parts, and cleaning the device should also be performed. The following information is provided as a guideline.

Table 10 Types of use of the device

Types of use	
Normal use / operation:	Use with randomly distributed loads within the nominal load limit or with uniform loads below 65% of the maximum load capacity for a maximum of 15% of the operating time.
Difficult use / operation:	Application in which the equipment is operated within the nominal load limit and which goes beyond normal use.
Tough use / operation:	Application in which the equipment is operated under normal or difficult conditions with abnormal operating conditions.

Table 11 Intervals depending on the type of use of the device

Intervals depending on the type of use	
Daily Inspection:	by the operator or other designated persons prior to daily operation.
Frequent Inspection:	by the operator or other specified persons at intervals determined by the following criteria: <ul style="list-style-type: none"> • Normal use: monthly • Difficult operation: weekly to monthly • Hard work: daily to weekly There is no need to keep records.
Periodic inspection:	by designated persons at intervals determined by the following criteria: <ul style="list-style-type: none"> • Normal use: annually • Difficult assignment: every six months • Hard work: quarterly Records shall be kept for the continuous assessment of the condition of the equipment.

Maintenance

7.5 Inspection & Maintenance Plan



As part of our efforts to ensure the safety and functionality of the device, we would like to provide you with important information about the minimum test criteria for the periodic tests. These test criteria are intended as a guideline and should be carefully considered during each periodic audit to minimize potential risks.

7.5.1 Visual inspections

o.B.: without complaint B: Complaints n.r.: not relevant

Document Type / Component	o.B.	B.*	n.r.	Remark / Deficiency
Instruction manual(s)				
Declaration of Conformity(s)				
Risk assessment(s)				
Test report(s) or test book				
Markings (nameplate)				
Side Shields				
Bearings				
Fasteners and screws				
Controls (reel chain / control bottle)				
Reel drive (handwheel / hand chain)				
Impellers				
Rubber bumpers				
Gears and pinions				
Load and spacer bolts				

7.5.2 Functional tests

o.B.: without complaint B: Complaints n.r.: not relevant

Component / Type of Functional Test	o.B.	B.*	n.r.	Remark / Deficiency
Controls (reel chain / control bottle)				
Function without load				
Function under Nominal Load (Maximum Load)				
Function under overload (overload protection test) *				

*applies only to devices that are equipped with an overload protection.

7.5.3 Lubrication



All mechanically moving parts should be thinly coated with a creeping lubricant on a regular basis. Gearboxes and transmission components should also be regularly coated with a lubricant. In this case, we recommend the use of an EP2 class lubricant. Exception: Brake parts must not be lubricated! When not in use, hang the device in a dry place. Please note that only if original spare parts are used can a safe and flawless operation be guaranteed. If you would like to have the device checked or repaired within the scope of the warranty, we ask you to send the device in its assembled condition. Unfortunately, we can no longer recognize warranty claims when disassembled devices are sent in

Table 12 Lubricant

Delivery company	Designation
FUCHS LUBRITECH	Stabylan 2001
FUCHS LUBRITECH	Stabylan 5006
FUCHS LUBRITECH	Ceplattyn 300 (Graphitpaste)
Klüber Lubrication München KG	Klüberoil CA 1-460
Klüber Lubrication München KG	Klüberoil 4UH 1-1500
CASTROL	Optimol Viscogen KL300

8 Troubleshooting and fault rectification

8.1 Faults

If there is a malfunction during use with the unit, the following steps should be taken:



- Immediately stop use and check the cause: Stop use immediately to avoid further damage or accidents. Examine the unit carefully to identify the cause of the malfunction. Check the gears, chain and other components for damage, wear or blockages.
- Remedy the malfunction and restore functionality: Depending on the type of malfunction, various measures may be necessary. For example, remove foreign objects or dirt that are blocking the unit. If there is wear or damage, parts may need to be replaced or repaired. In the case of serious malfunctions, you should call in a specialist to carry out the repair. Make sure that the unit functions properly after the malfunction has been corrected. Re-check all components to make sure they are properly assembled and in good condition.
- Safety check: Before using the unit again, carry out a safety check to ensure that it is safe and reliable. Check the load bearing capacity, fixing points and all safety devices.



It is important that only trained personnel repair or perform maintenance on the unit to prevent further damage or accidents.

8.2 Causes of malfunctions and measures



The table below provides a summary of the main disorders and checkpoints for each symptom. Please note that this is not a comprehensive list of all possible faults.

Table 13 trolley of malfunctions and measures

Disturbance	Possible Cause of Error	Test point(s)
trolley runs hard or not at all	Raceway of steel beam dirty	Cleaning the running track
	Raceway of steel beam has notches	Maintain your career
	Drive sprocket dirty or blocked	Clean and grease the drive, replace worn parts if necessary
	Hand chain twisted or blocked	Put on the hand chain properly

9.1 Decommissioning and disposal



The device should be taken out of service and/or disposed of if it stops working or is irreparably damaged. This can also be the case if the device is outdated and needs to be replaced with a newer version. It is important that disposal is carried out in accordance with local regulations and laws to avoid environmental damage. In some cases, devices can also be recycled or reused instead of simply throwing them away. When not in use, store the device in a dry place. Please note that only if original spare parts are used can a safe and flawless operation be guaranteed. If you would like to have the device checked or repaired as part of the warranty, we ask you to send the device in its assembled condition. Unfortunately, we can no longer recognise warranty claims when disassembled devices are sent in. Please note that electronic waste, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and may therefore only be disposed of by approved specialist companies. National disposal regulations must be observed with regard to the environmentally sound disposal of the machine. Further information can be obtained from the relevant local authority.

10.1 Spares LST-H-EX / LST-G-EX 500 – 30.000kg

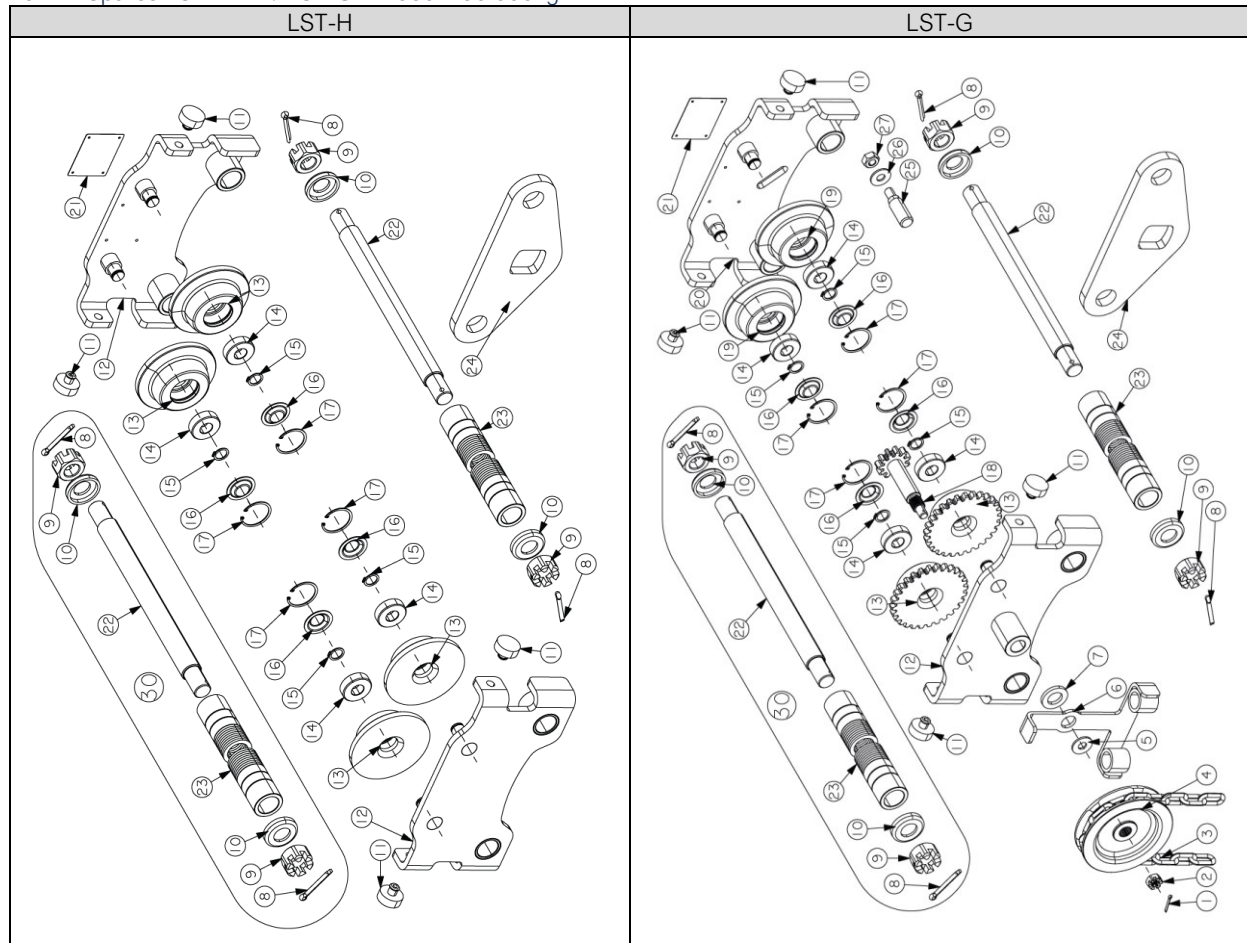


Table 14 Spares LST-H-EX / LST-G-EX 500kg – 30.000kg

Pos.	Number	Description
1	1	LST/LHT Splint Crown Nut
2	1	LST/LHT Crown Nut Reel Drive
3	1	Hand Chain 5x25mm
4	1	LST/LHT hand sprocket
5	1	LST/LHT Lens
6	1	LST/LHT manual chain guide
7	1	LST/LHT Spacer
8	1	LST/LHT Splint Crown Nut
9	4	LST/LHT Crown Nut
10	4	LST/LHT Spacer
11	4	LST/LHT Rubber Puffer
12	2	Set side plate parts: 12, 13(2x), 14(2x), 15(2x)16(2x), 17(2x),
21	1	Nameplate
22	2	LST/LHT lifting bolts up to 203mm
23	2	LST/LHT Set Spacers up to 203mm
24	1	LST-H/-G Suspension Eye
30	2	LST/LHT Set Lifting Bolts up to 203mm, Parts 8(2x), 9(2x), 10(2x), 22, 23
31	2	LST/LHT Set Bearing Bolts up to 305mm, Parts 8(2x), 9(2x), 10(2x), 22, 23
32	1	PTM / GTM/PTS & GTS/LST/LHT impact rivet 3-30t



EU/EC DECLARATION OF CONFORMITY (Original)

*Within the meaning of Regulation (EU) 2023/1230 as defined in Annex V, Part A and
Annex VI, internal production control (Module A) and
within the meaning of ATEX Directive 2014/34/EU, in accordance with Annex VIII*

We hereby declare,
PLANETA-Hebetchnik GmbH independently
that, with the information below, the machine complies with the relevant essential safety and health requirements of EU
Regulation 2023/1230 and the relevant harmonised standards in its design and construction as well as in the version we
place on the market.

In the event of a modification/addition to the machine that has not been agreed with us, this declaration of conformity
loses its validity. Furthermore, this declaration of conformity loses its validity if the product is not used in accordance
with the intended use as indicated in the operating instructions and the regular inspections to be carried out are not
carried out. We also declare that the specific technical documentation for this complete machine has been prepared in
accordance with Annex V, Part A, and we undertake to submit them to the market surveillance authorities through our
documentation department upon request. This declaration of conformity does not imply any assurance of properties.
The safety instructions and instructions of the products must be observed.

Machine Information:

Machines / Product Type:	Monorail trolley
Machines / Product name:	LST-H-EX / LST-G-EX
Function:	Horizontal movement of loads
Serial number:	2000000-001 ... 2999999-999
Carrying capacity:	500kg ... 20.000kg
Year of construction:	2024

The following legal regulations and regulations have been taken into account and complied with:

Regulation (EU) 2023/1230 L165/1	Machinery Product Ordinance
Regulation (EC) No 1907/2006 L136/3	REACH Regulation
RL-2014/53/EU 02014L0053	Radio Equipment Directive*
Directive 2014/30/EU	EMC Directive*
RL-2014/34/EU L 96/309	ATEX Directive
Directive 2014/35/EU	Low Voltage Directive**
Directive 2012/19/EU L197/38	WEEE Directive*
RL-94/62/EC 01994L0062	Packaging Guideline
RL-2011-65/EU L174/88	RoHS Directive*

*The listed legal provisions only apply if the above-mentioned machine contains electronic or radio-capable components.

** Directive 2014/35/EU is complied with in accordance with Chapter 1.5.1. of Regulation (EU) 2023/1230 with regard to its protection objectives and applies to power-driven machinery.

The following harmonised standards have been taken into account and complied with:

DIN EN ISO 12100:2011-03	Safety of machinery -
BS EN ISO 12100:2011-03	General Design Principles Risk Assessment and Risk Mitigation
DIN EN ISO 20607:2019-10	Safety of machinery –
BS EN ISO 20607:2019-10	Operating Instructions General Design Principles
DIN EN 13157:2010-07	Cranes – Safety
BS EN 13157:2010-07	Hand-operated cranes
DIN EN 1127-1:2019-10	Explosive atmospheres - Explosion protection - Part 1:
BS EN 1127-1:2019-08-27	Fundamentals and Methodology
DIN EN ISO 80079-36:2016-12	Explosive atmospheres - Part 36:
BS EN ISO 80079-36:2016-04-30	Non-Electrical Appliances
DIN EN ISO 80079-37:2016-12	Explosive atmospheres - Part 37:
BS EN ISO 80079-37:2016-04-30	Non-Electrical Appliances

Machine labelling:

The machine was developed, manufactured and tested for the type of construction specified below in accordance with the device labelling.

Basic

II 3G Exh IIB T4 Gc X
II 3D Exh IIIB T135°C Dc

Medium

II 2G Exh IIB T4 Gb X
II 2D Exh IIIB T135°C Db
I M2 Exh I T135°C (T4) Mb X

High

II 2G Exh IIC T4 Gb X
II 2D Exh IIIC T135°C Db
I M2 Exh I T135°C (T4) Mb X

The documentation is filed with the notified body named below:

TÜV SÜD Product Service GmbH, Gottlieb-Daimler-Str. 7, 70794 Filderstadt, Germany, identification no.: 0123

Place and date on which the declaration of conformity was issued:

Resser Str. 17 | 44653 Herne | Germany, 01.05.2024



On behalf of Philipp J. Hadern
(CE Coordinator)

EU/EC DECLARATION OF INCORPORATION (Original)

*Within the meaning of Regulation (EU) 2023/1230 in accordance with Annex V, Part B and
Annex VI, internal production control (Module A) and
within the meaning of ATEX Directive 2014/34/EU, in accordance with Annex VIII*

We hereby declare,

PLANETA-Hebetechnik GmbH independently

that, with the information below, the machine complies with the relevant essential safety and health requirements of EU Regulation 2023/123 and the relevant harmonised standards in its design and construction as well as in the version we place on the market.

In the event of a modification/addition to the machine that has not been agreed with us, this declaration of conformity loses its validity. Furthermore, this declaration of conformity loses its validity if the product is not used in accordance with the intended use as indicated in the operating instructions and the regular inspections to be carried out are not carried out. We also declare that the specific technical documentation for this complete machine has been prepared in accordance with Annex V, Part B, and we undertake to submit them to the market surveillance authorities through our documentation department upon request. This declaration of conformity does not imply any assurance of properties. The safety instructions and instructions of the products must be observed.

Machine Information:

Machines / Product Type:	Monorail trolley
Machines / Product name:	LST-H-EX / LST-G-EX
Function:	Horizontal movement of loads
Serial number:	2000000-001 ... 2999999-999
Carrying capacity:	500kg ... 20.000kg
Year of construction:	2024

The following legal regulations and regulations have been taken into account and complied with:

Regulation (EU) 2023/1230 L165/1	Machinery Product Ordinance
Regulation (EC) No 1907/2006 L136/3	REACH Regulation
RL-2014/53/EU 02014L0053	Radio Equipment Directive*
Directive 2014/30/EU	EMC Directive*
RL-2014/34/EU L 96/309	ATEX Directive
Directive 2014/35/EU	Low Voltage Directive**
Directive 2012/19/EU L197/38	WEEE Directive*
RL-94/62/EC 01994L0062	Packaging Guideline
RL-2011-65/EU L174/88	RoHS Directive*

*The listed legal provisions only apply if the above-mentioned machine contains electronic or radio-capable components.

** Directive 2014/35/EU is complied with in accordance with Chapter 1.5.1. of Regulation (EU) 2023/1230 with regard to its protection objectives and applies to power-driven machinery.

The following harmonised standards have been taken into account and complied with:

DIN EN ISO 12100:2011-03	Safety of machinery -
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BS EN ISO 80079-36:2016-04-30	Non-Electrical Appliances
DIN EN ISO 80079-37:2016-12	Explosive atmospheres - Part 37:
BS EN ISO 80079-37:2016-04-30	Non-Electrical Appliances

Machine labelling:

The machine was developed, manufactured and tested for the type of construction specified below in accordance with the device labelling.

Basic	Medium	High
II 3G Exh IIB T4 Gc X	II 2G Exh IIB T4 Gb X	II 2G Exh IIC T4 Gb X
II 3D Exh IIIB T135°C Dc	II 2D Exh IIIB T135°C Db	II 2D Exh IIIC T135°C Db
	I M2 Exh I T135°C (T4) Mb X	I M2 Exh I T135°C (T4) Mb X

The documentation is filed with the notified body named below:

TÜV SÜD Product Service GmbH, Gottlieb-Daimler-Str. 7, 70794 Filderstadt, Germany, identification no.: 0123

The commissioning of the incomplete machine will be prohibited until the incomplete machine complies with the provisions of EU Regulation 2023/123 and the EC declaration of conformity according to Annex V Part A is available.

Place and date on which the declaration of conformity was issued:

Resser Str. 17 | 44653 Herne | Germany, 01.05.2024



On behalf of Philipp J. Hadem
(CE Coordinator)

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