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Kinesys Elevation Hoist

Operating & Maintenance Manual
[ORIGINAL]

A variable-speed electric chain hoist

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Glossary

The following glossary terms relate to the Apex system specifically as well as the automation industry generally.

Chain hook assembly

An assembly that consists of the hook mechanism, to which loads are attached, a rubber buffer and the casings and fasteners that hold the hook in position on the end of the load chain. Synonyms: hook block.

Dead end

In relation to electric chain hoists, this is the end of the load chain that does not bear any load. In the case of the Apex Hoist, this end is permanently attached to the bracket on the side of the hoist during operation.

Dead man's handle (DMH)

See "Enabling switch".

Double-reeved

In relation to electric chain hoists, a design that incorporates a load chain that goes around a sprocket wheel inside the main body and then goes around a second sprocket wheel inside the chain hook assembly. After passing through the chain hook assembly, the end is secured inside the main body. This design allows for double the load capacity compared to single-reeved designs but also halves the maximum lifting speed. Synonyms: Double-fall.

Duty cycle

The ratio of running time to running time + period of rest. Synonyms: Duty rate.

Emergency limit

See "Ultimate limit".

Enabling switch

A device that requires continuous input from the user in order to initiate and maintain movement. Once released, movement of the selected channels will stop. This can be in the form of a button, bar or handle, depending on the design of the machinery. Synonyms: Dead man's handle (DMH), Hold-to-run (HTR).

Entertainment Load Limit (ELL)

According to EN 17206, the maximum load that an item of equipment is designed to raise, lower, or sustain.

Hold-to-run (HTR)

See "Enabling switch".

Initial limit

The position, in either direction, where the hoist will cause a controlled stop of movement, as programmed by the limit switches during manufacture. Movement beyond this limit is unlikely to cause damage to the equipment. In the Apex Hoist, this limit is known as the "operational" limit, and is displayed as such on the Limits PCB. Synonyms: Operational limit.

Lift limiter

A device assembled to the dead end of the load chain that prevents the chain from passing fully through the hoist. In reality, the chain should never reach this point during normal operation as it would have to overcome both sets of limits. Synonyms: Chain stop.

Limit

The extent of travel allowed for a hoist in either direction, determined by the hoist manufacturer and set during manufacture. According to EN 17206, two types of limit must be programmed into the device to achieve the maximum safety standard: "initial" (sometimes known as "operational") and "ultimate" (sometimes known as "emergency").

Limits PCB

A device located on the inside of the hoist that contains switches for bypassing limits and LEDs that illuminate when limits have been struck. This is needed for some maintenance operations such as removing and installing load chains.

Load chain

A chain designed specifically to withstand the static and dynamic forces experienced during the lifetime of a hoist. In many cases, this gets shortened to just "chain".

Operational limit

See "Initial limit".

Single-reeved

In relation to electric chain hoists, a design that incorporates a single line of load chain that goes around a sprocket wheel inside the main body and lifts the attached load via the chain hook assembly. Synonyms: Single-fall.

Ultimate limit

The position, in either direction, where the hoist will cause an immediate stop to movement should the initial limits fail, as programmed by the limit switches during manufacture. Movement beyond this limit may cause damage to the equipment. During normal operation, movement should never reach the ultimate limits, but they are required as a redundancy system in order to achieve the maximum safety level. Synonyms: Emergency limit.

1. Introduction

1.1 Product description

The Elevation Hoist is a variable speed electric chain hoist available in load capacities of 250 kg, 500 kg and 1000 kg. The compatible drive used for controlling the Elevation Hoist is the Kinesys Elevation Drive.

The hoist shares many mechanical features with the Kinesys Apex Hoist range, including a latching chain hook, black load chain and 24 m height of lift as standard.

All Elevation Hoists are fitted with double brakes, four position limit switches, encoder and – in conjunction with Libra Cell – they can reach conformity with many of the world's most rigorous safety standards.

1.2 Scope and purpose

This manual describes the key features, means of operation and maintenance operations of the Elevation Hoist.

The equipment described in this manual may only be operated by personnel qualified to do so. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with this and associated equipment.

Qualified personnel must have training as well as experience in the field of lifting and rigging operations in the entertainment industry. They must possess an excellent knowledge of the relevant work safety regulations, directives, and general accepted rules of lifting techniques, which enables them to decide whether the lifting equipment is in a safe working condition or not.

No responsibility is taken by the manufacturer for damage or operating trouble due to:

- Improper operation
- Operator errors
- Unauthorized modifications to the equipment

1.3 Model part numbers

This manual applies to the following hoist model:

Kinesys part number range	Hoist model
ELE-01-XXXX-YY	Elevation Hoist

Note: The last two digits in the Kinesys part number ("YY" above) refer to the height of lift (HOL) in m of the load chain.

The Elevation Hoist is compatible with the following models of Elevation Drive:

Kinesys part number range	Drive model
ELE-00-0010 to 0060	Elevation Drive 1+
ELE-00-2001 to 2002	Elevation Drive V2

The rated voltage of the Elevation Hoist must match that of the connected Elevation Drive.

1.4 Support requests

For technical support on this product, please use the following contact details:

support@taittowers.com
Tel: +44(0) 20 8481 9850

To resolve your support request as quickly as possible, please provide the following information, if available, when contacting Kinesys:

- Site name, address, machine location details and your contact details.
- As much detail as possible on the behaviour observed, including any unusual changes in behaviour that are different from normal operation and any environmental conditions that may be a factor (e.g. fluctuations in temperature and water damage).
- Details on the behaviour that should have been expected.
- The exact steps required that produce the issue.
- Any solutions to fix the issue that you have already tried.
- Any workarounds that you have found.
- Equipment item numbers and serial numbers, such as those displayed on the identification plates/labels.
- Version numbers of any software being used.
- Any screen shots, photographs or videos of the issue.

2. Safety information

The following symbols are used to indicate specific items which require special attention by the user:

	**Warning: Instructions which relate to safety**
	**Warning: Instructions which relate to safety where there is a particular risk of electric shock**
	**Warning: Instructions which relate to safety where there is a particular overhead risk**
	**Danger: Prohibited actions which are forbidden under all circumstances**
	**Additional important information**

2.1 Safety regulations

The following regulations serve as the basis for assembly, installation, certification and maintenance of electric chain hoists within the area of the European community. For countries other than those mentioned, local legislation and directives may apply in addition to or in place of the European regulations as stated in this manual.

The manufacturer's guarantee depends on the consideration of these regulations and the operating instructions.

European regulations

2006/42/EC	EC - Machinery Directive
2014/30/EU	EC - EMC Directive
2014/35/EU	EC - Low Voltage Directive

BGV accident prevention regulations (Germany only)

DGUV Vorschrift 3 (BGV A1)	Principles of accident prevention
DGUV Vorschrift 3 (BGV A3)	Electrical facilities and equipment
DGUV Vorschrift 52 (BGV D6)	Accident prevention regulation for use in crane systems
DGUV Vorschrift 54 (BGV D8)	Accident prevention regulation for electric winches, lifting and pulling equipment
DGUV Regel 100-500 (BGR 500)	Hoisting accessories
DGUV Grundsatz 309-001 (BGG 905)	Principles for crane inspections

Harmonized regulations

EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 14492-2	Cranes - Power driven winches and hoists
EN 818-7	Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T
EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems; General principles for design
EN 60034-1	Rotating electrical machines; Rating and performance
EN 60034-5	Rotating electrical machines; Degrees of protection provided by the integral design of rotating electrical machines
EN 60204-1	Electrical equipment of machines, General requirements
EN 60204-32	Electrical equipment of machines; Requirements for hoisting machines
EN 60529	Degrees of protection provided by enclosures (IP-Code)
EN 60947-1	Low-voltage switchgear and control gear
EN 61000-6-2	Electromagnetic compatibility; Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility; Emission standard for industrial environments
EN 82079-1	Preparation of instructions for use - Structuring, content and presentation

European regulations

EN 17206	Machinery for stages and other production areas; Safety requirements and inspections

Regulations and technical specifications

FEM 9.511:1986	Rules for the design of series lifting equipment; Classification of mechanisms
FEM 9.683:1995	Series lifting equipment; Selection of hoisting and travelling motors
FEM 9.751:1998	Series lifting equipment; Power driven series hoist mechanisms; Safety
FEM 9.755:1993	Serial hoist units; Measures for achieving safe working periods

2.2 Safety warnings

IF IN DOUBT ABOUT ANY ASPECT OF MOVING OBJECTS, ALWAYS SEEK PROFESSIONAL ADVICE BEFORE OPERATION.

Make sure this Operating & Maintenance Manual is always kept in a complete and fully readable condition and that it is always accessible to all operators of the equipment.

Prohibitions of operation

- **Do not use the hoist to carry people. It is strictly prohibited unless a specific risk assessment by a qualified person states otherwise and a rescue plan has been drafted by a qualified person.**
- **Do not install the hoist or do maintenance to the hoist in an area that is accessible to children or other unqualified persons.**
- **Do not use the hoist in an aggressive environment. An aggressive environment is defined as an environment which contains hazardous substances that may degrade the load bearing capacity of the hoist.**
- **Do not attach a load to the hoist more than the ELL. The ELL is displayed on the serial label and chain hook body.**
- **Do not use the load chain to sling loads - the chain hook is the only permitted method of load attachment.**
- **Do not use a load chain that is longer than that stated on the chain bag.**
- **Do not turn the load chain over any edges or surfaces - always make sure the load chain is unobstructed during movement.**
- **If the hoist is being used at a height that is reachable at ground level, do not touch the hoist at the chain entry position. Make sure proper safety measures are in place to avoid the risk of crushing or entanglement.**
- **Do not use the hoist if it does not appear to be in 100% working order.**
- **Do not modify or attempt to repair the hoist in any way other than those described in the maintenance procedures within this manual.**

Safety precautions before operation

- **Do a full risk assessment of the location where the hoist and its connected control devices are intended to be used.**
- **Hoists and their loads must only be attached from suitable scaffolds, approved working platforms, or similar safe working positions.**
- **Make sure a qualified rigging specialist has assessed that the structure where the hoist will be installed can safely withstand the weight of the hoist and its attached load.**
- **Do not start movement operations until a qualified person has inspected the hoist**

and all other connected equipment, and confirmed that is in 100% working order.

- **Software-independent means of stopping movement must be provided, including a hardware emergency stop system that is compliant with all local regulations (e.g. Mentor).**
- **Make sure all emergency stop buttons and enabling switches in the system have been tested and are functioning correctly.**
- **Make sure all operators know the locations of the emergency stop buttons and enabling switches in the system.**
- **Make sure the load chain is fully lubricated along its entire length before initial operation.**
- **Make sure the load is always placed vertically underneath the hoist. Do not turn the load chain over any edges or surfaces.**
- **Make sure the load is properly seated in the chain hook.**
- **Make sure the load is attached safely and distributed evenly onto the hoist. Consult an expert or trained specialist if in doubt.**
- **Make sure the load is unobstructed and will not come into contact with other static or moving objects during movement.**
- **Make sure the load is always visible to the operator where possible. If this is not possible, make sure the operator has reliable communication with a person who can clearly see the load.**
- **Make sure all persons in the hazard zone underneath the hoist are aware of the potential for movement.**

Safety instructions during operation

- **If you notice any unexpected or dangerous hoist movement during operation, press the appropriate emergency stop button (either on the connected Elevation Drive or on a venue-wide safety controller) to bring all movement to an immediate stop. Note that not all emergency stop buttons in the system necessarily stop the movement a particular hoist. Alternatively, if an enabling switch is used in the system, then release the enabling switch.**
- **If an enabling switch is used in your system to initiate movement of the hoist, be aware that releasing it may cause movement to stop abruptly.**
- **After an emergency stop button has been pressed, the reason for its actuation must be found, and all possible failures in the system removed by trained personnel. The emergency stop button must then be reset before continuing operation. Note that the emergency stop button reset procedure may be different for different devices - refer to individual product manuals for more details.**
- **Where emergency stop switches are used which do not cover the entire installation familiarize yourself with the operation span of each emergency stop device prior to operating any equipment.**

Safety instructions during maintenance

- **Maintenance and repairs to the hoist must only be carried out by competent and trained personnel.**
- **Only use original Kinesys parts when replacing components, including all fixings such as nuts, washers and screws.**
- **Do not modify or attempt to repair the hoist in any way other than those described in the maintenance procedures within this manual. If a hoist needs repair work done beyond what is described in this manual, contact Kinesys or your supplier to arrange a repair.**
- **Always disconnect the power and remove the load when carrying out maintenance procedures, unless instructed otherwise in this manual.**
- **Make sure the maintenance area is secure before carrying out maintenance work.**

2.3 Visible damage

If any damage or breakages are detected during operation or during hoist tests, do not operate the hoist until it has been repaired and a qualified person has checked and approved it.

2.4 Spare parts

Only original fixing components, spare parts, and accessories listed in the manufacturer's spare parts catalogue are acceptable for use. The manufacturer's guarantee is given for those spare parts only. The manufacturer cannot be held responsible for any damages due to the use of non-original parts or accessories.

Use the original 11x31 mm chain of the manufacturer only. Different sized chains are not permitted. The original chain meets the stress and service life standards required for this hoist.

2.5 Operating environment

The Elevation Hoist is designed for indoor use only and to work in ambient temperatures between 5°C and 40°C (41°F and 104°F). The humidity of the environment must not exceed 90%.

The storage temperature range of the Elevation Hoist extends to between -20°C and 80°C (-4°F and 175°F).

The ingress protection rating for the Elevation Hoist is IP55 (protected from low water jets from any direction; limited ingress protection).

2.6 Handling and storage

Condensation

The Elevation Hoist is designed for indoor use only. If the product has been exposed to temperature fluctuations, for example during transport, there may be a risk of condensation which may result in damage. Do not connect the Elevation Hoist to a power source immediately. Leave the unit disconnected until it has reached a safe temperature

Shocks

Do not shake, knock or drop the Elevation Hoist. Avoid excessive force when installing and operating the product.

Handling

Do not lift the Elevation Hoist by any of its cables or connectors as this may cause damage to the unit and/or the cables; use the transportation handles instead.

Packaging

Where possible, use the original packaging to transport the Elevation Hoist. Alternatively, a purpose-made flight case may be used (available separately).

3. LibraProduct overview

3.1 Single-reeved vs double-reeved modes

The Elevation Hoist is available to order in single-reeved chain configurations only. Double-reeved configurations are not permitted on this hoist. If a larger load capacity is required, a higher-rated chain hoist must be used.

3.2 Standard "Motor Up" configuration

In the majority of show situations and day-to-day usage, the Elevation Hoist will be used in a "Motor Up" configuration where the chain hook is positioned beneath the main body and used for lifting and lowering an attached load.

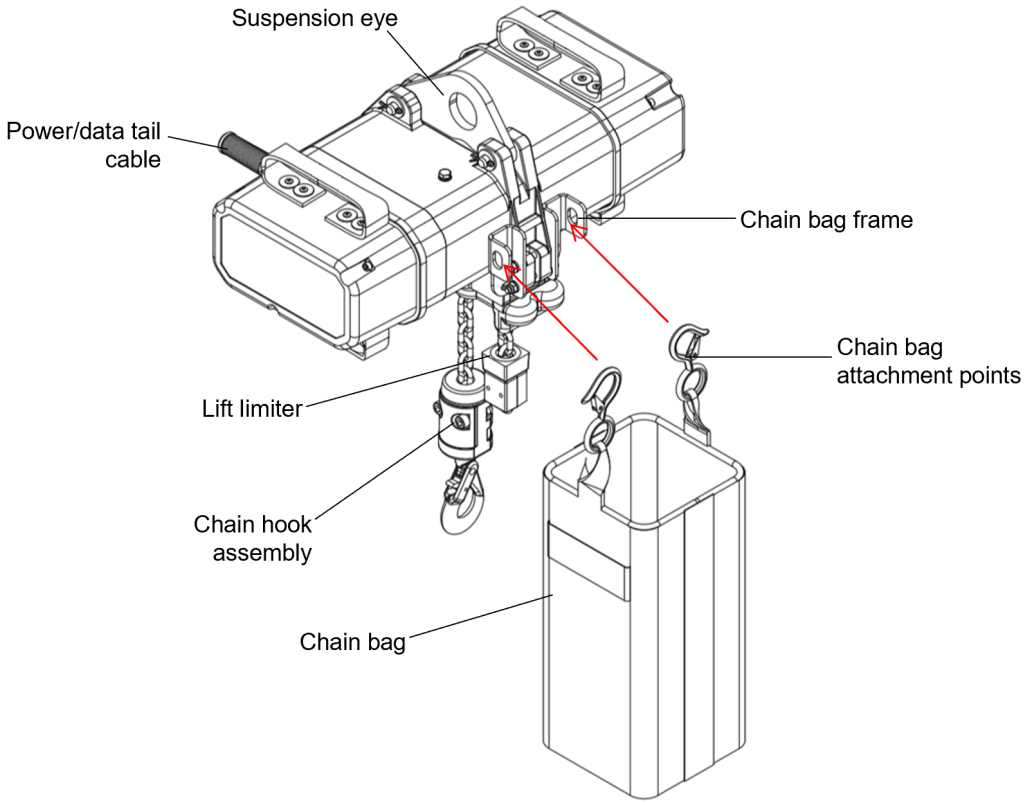


Figure 1. Standard "Motor Up" configuration

3.3 Inverted "Motor Down" configuration

In some situations, the hoist may be used in “Motor Down” mode, where the chain hook is positioned above the main body and the hoist moves up and down its own chain.

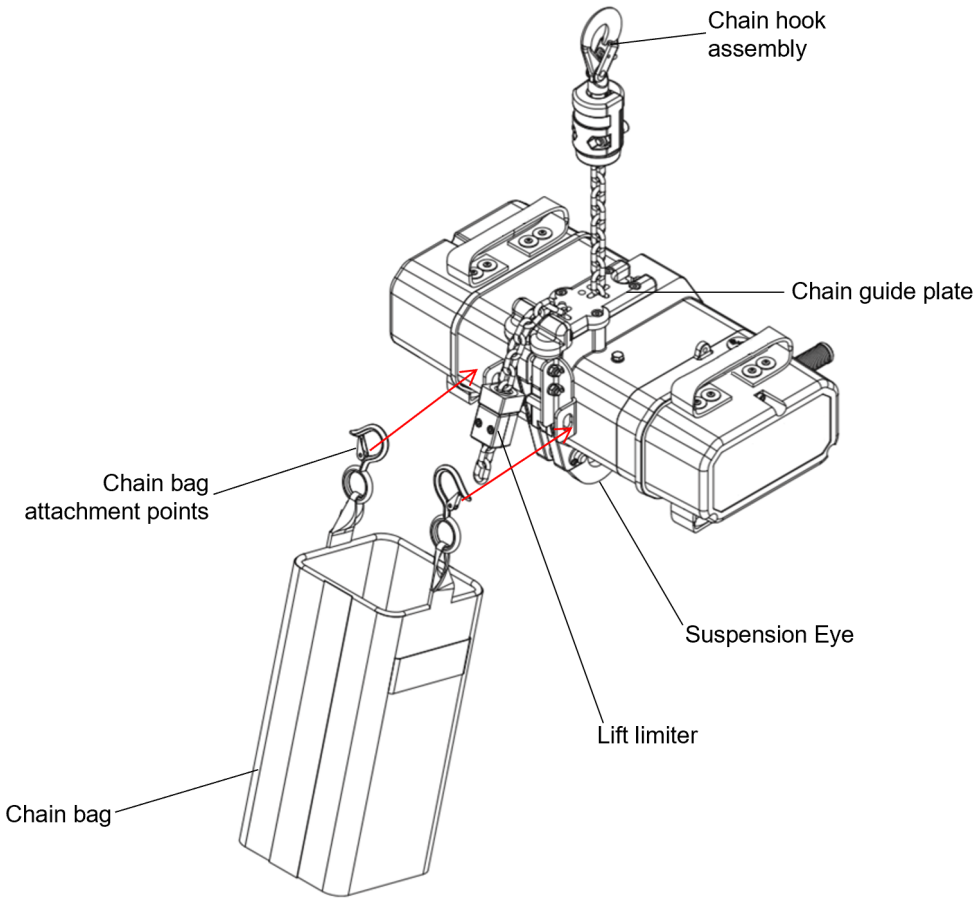


Figure 2. "Motor Down" configuration

3.4 Chain bag

The chain bag attaches to the bracket on the side of the hoist without the need for any other fixings. The "Flip" design allows it to be used in both "Motor Up" and "Motor Down" configurations.

The chain dimensions and capacity are shown on the side of the chain bag.

Warning! Make sure the chain bag is big enough for the length of chain and do not overfill the chain bag. The chain must fill less than 50% of the chain bag when the hook is fully retracted. There must not be any possibility for the chain to spill due to lack of chain bag capacity.

3.5 Motor components

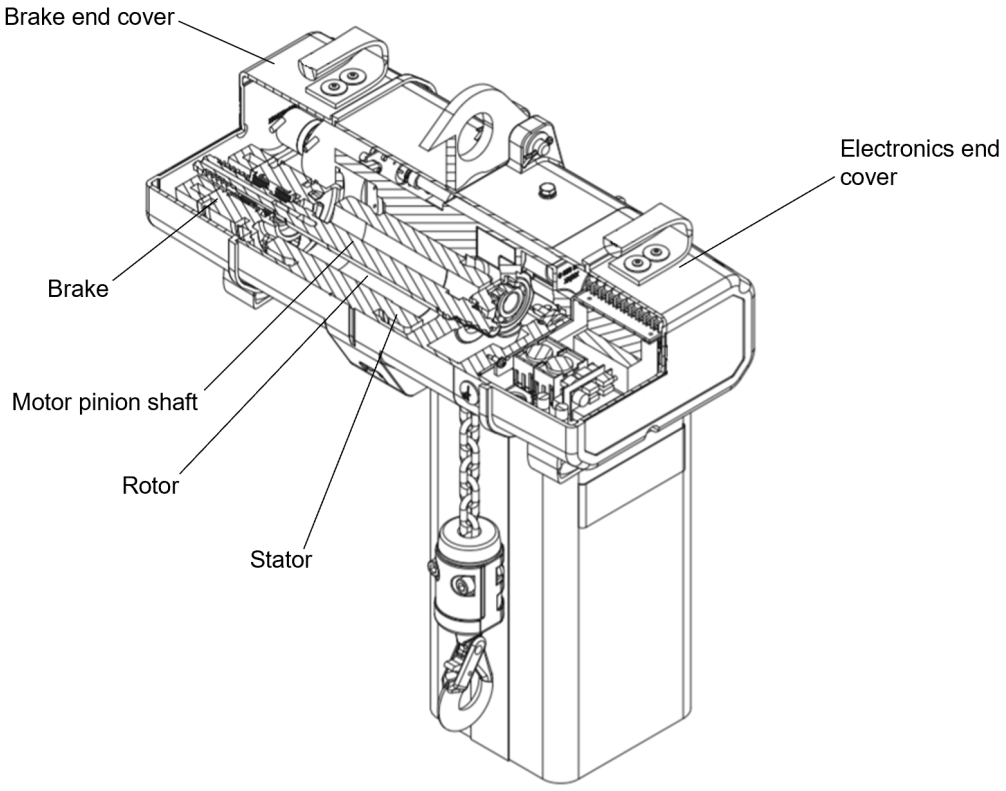


Figure 3. Internal components

3.6 Brake end components

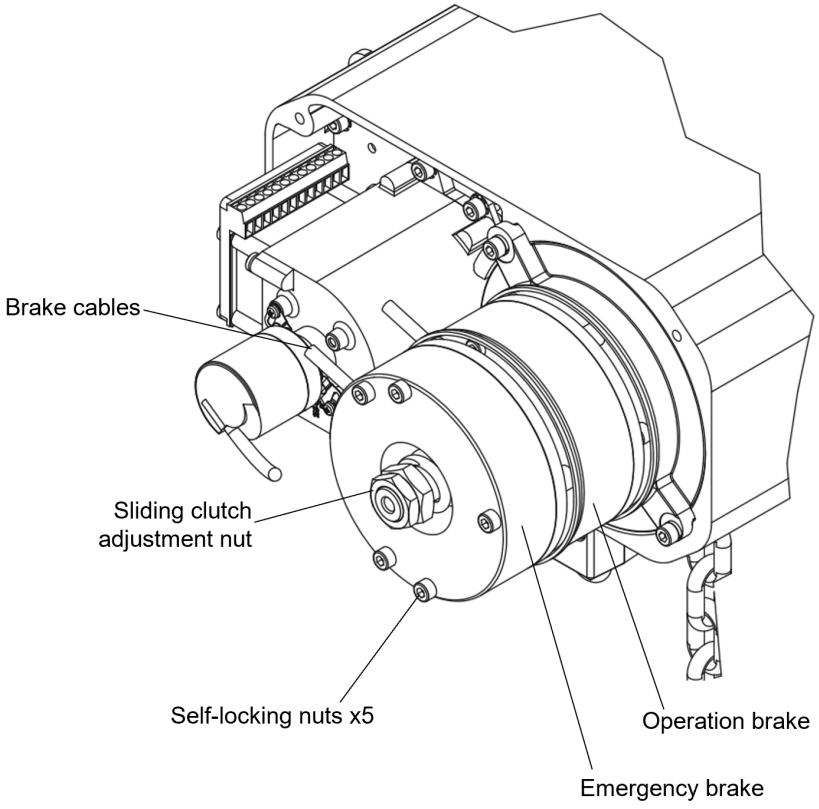


Figure 4. Brake end components

3.7 Chain hook assembly

The hook block is designed specifically to hold the 7x22 mm chain used in the Elevation Hoist.

For single-reeved configurations, the hook block consists of two casings that match the shape of the pressure disk. The casings hold the pressure disk in position along with the last link in the load chain. The two casings are held together using hex-head screws, washers and self locking nuts. The rubber buffer prevents damage should the chain hook assembly come into contact with the hoist body.

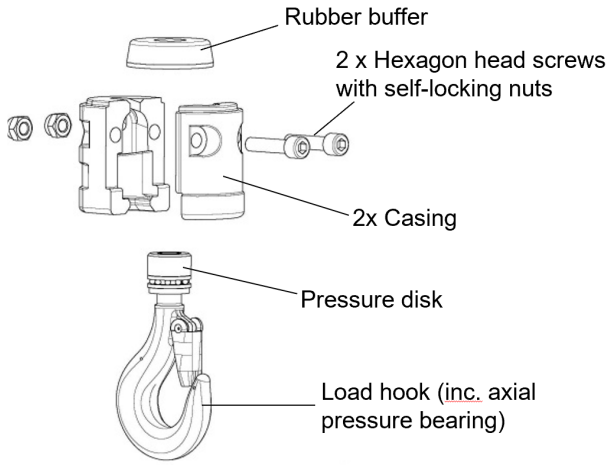


Figure 5. Chain hook assembly

3.7.1 Hook mechanism

The single-reeved chain hook features a spring-loaded "latch-lock" hook mechanism. This is a safety measure that prevents loads from inadvertently opening the latch. This means that the only way the hook can open is by a person intentionally pushing the latch.

3.8 Double brake assembly

The operational brake (Brake 1) and emergency brake (Brake 2)operate independently. They are arranged in a row on the motor pinion shaft. Both brakes are DC operated to minimize stop times. In normal operation, the Elevation control safety system will apply both brakes.

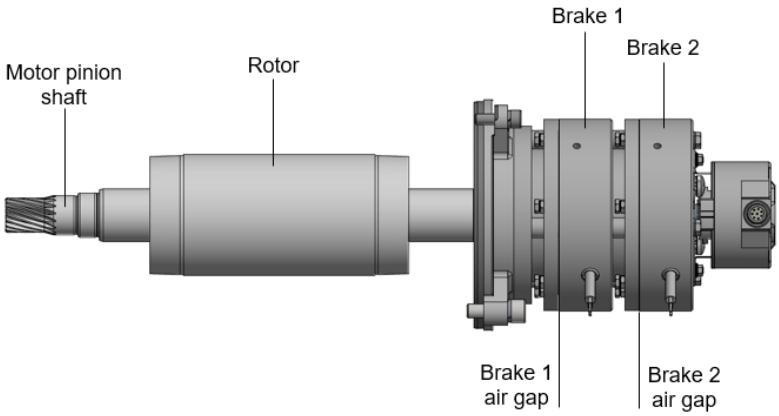


Figure 6. Double brake assembly

3.9 Sliding clutch mechanism

The sliding clutch is located between the rotor of the lifting motor and the main pinion shaft and transmits the driving torque. At the same time, it limits the transmissible power depending on the set coupling torque. Hence an overloading o the chain hoist will be prevented.

An advantage of the sliding clutch is that it is situated before the operating brake. In case of heavy wear at the clutch lining, any uncontrolled downward movement of the load will be prevented, because the load can be held at every lifting point by the brake.

The clutch unit acts as a dry clutch with asbestos free linings. The clutch is easily adjustable and accessible. The wear resistant special lining material does not require readjustment under normal operational circumstances.

3.9.1 Construction of the sliding clutch

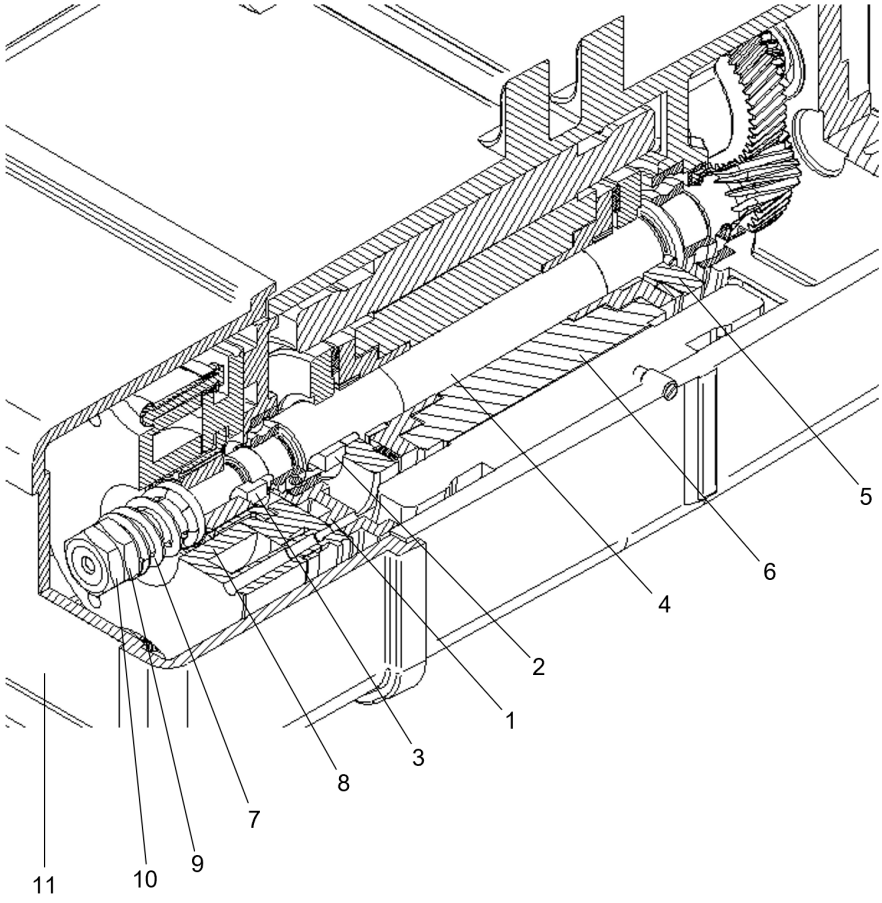


Figure 7. Construction of the sliding clutch

Figure reference	Description
1	Motor cover
2	Pressure piece 1
3	Pressure piece 2
4	Motor pinion shaft
5	Clutch discs 1 and 2 with lining

Figure reference	Description
6	Rotor
7	Clutch spring
8	Double brake assembly
9	Adjusting nut
10	Counter nut
11	Brake end cover

3.10 Load chain configuration

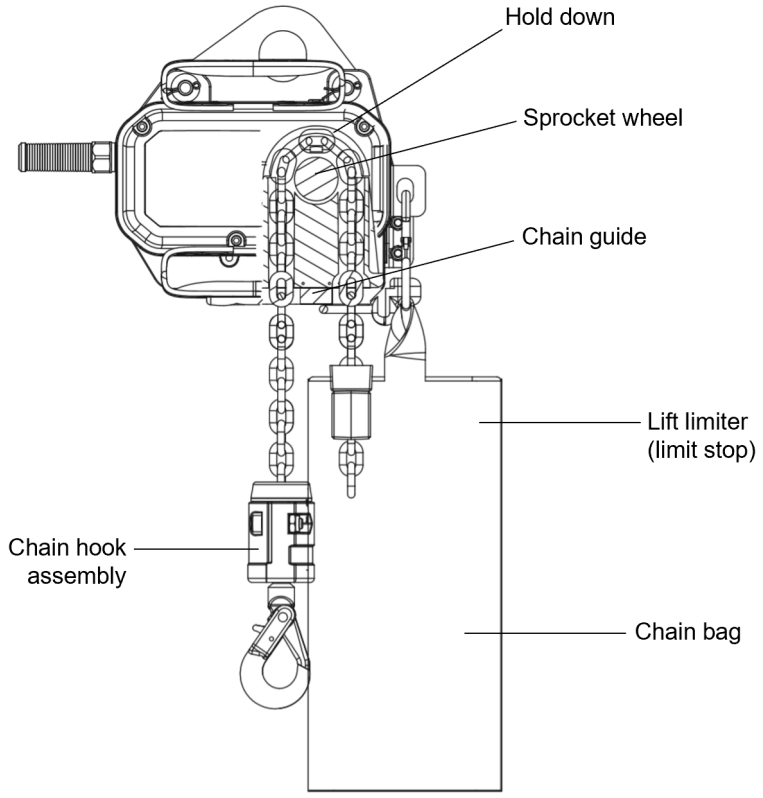


Figure 8. Load chain configuration

3.11 Checking the supply voltage

The Elevation Hoist is configured to operate on a supply voltage of either 400 V or 208 V to suit the connected Elevation Drive.

The factory setting voltage is indicated on a label on the hoist body and the Harting connectors which connect the hoist to the Elevation Drive.

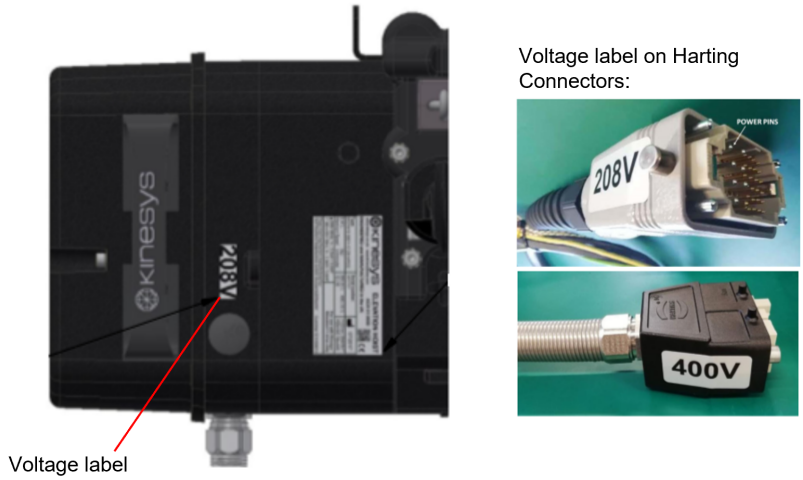


Figure 9. Voltage labels

3.12 Load information

The maximum allowable load (Entertainment Load Limit) permitted on the hoist is displayed in two locations:

- Label on the chain hook body
- Serial Label

3.13 Duty cycle of an electric chain hoist

The duty cycle is limited by the permissible degree of heat in the lifting motor and other electrical components.

The allowable running time is dependent on the lifting height, lifting speed and the load.

4. Installation

Warning! Observe all safety instructions listed in section 2.2 before installation of the hoist.

Warning! The electrical installation must be carried out by suitably qualified personnel. The equipment must first be disconnected from the mains power supply and secured against unauthorized application of mains power.

4.1 Connecting the hoist to Elevation Drive

The Elevation Hoist is configured for a nominal 400V or 208V mains supply. This is factory set to match the supplied Elevation Drive controller. .

The hoist power and data cable must be connected to the Harting connector on the rear panel of the Elevation Drive. The connection to the Elevation Drive is made using a Harting modular connector with a locking lever.

When installing, check the orientation of the connector and socket - the connector can only be inserted one way. To prevent accidental disconnection, make sure the locking lever is fully secured after making the connection.

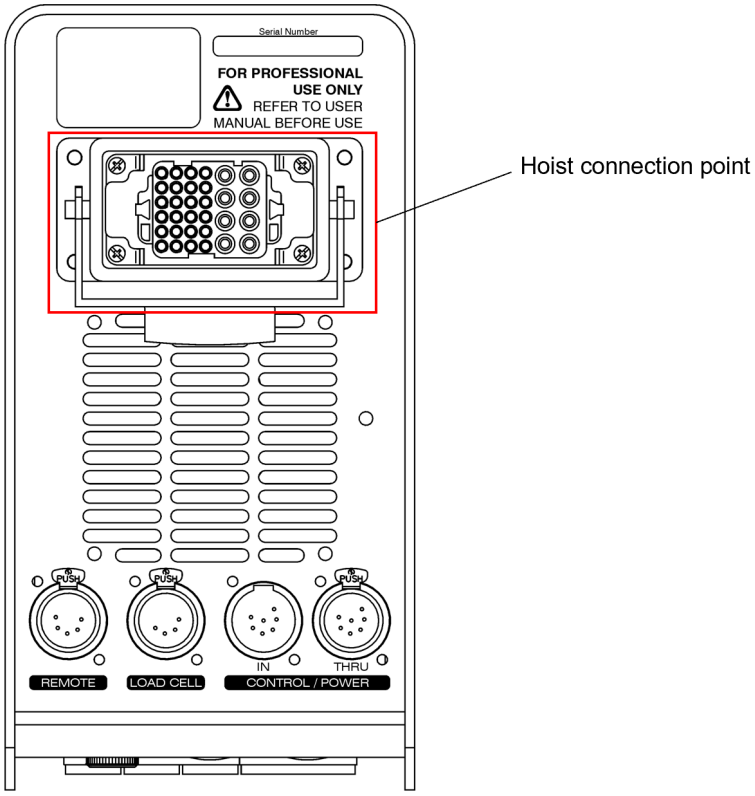


Figure 10. Elevation Drive connection

4.2 Electrical connections

The electrical installation must comply with the relevant regulations. After having completed the installation, checks shall be made in accordance with the EN 60204-32:2008, section 19 or national regulations. Details of the control can be seen in the wiring diagram. The electrical installation of the chain hoist complies with the currently valid EN 60204-32:2008. All control and power connections to the Elevation Drive are made through the pre-wired hoist tail with ILME multipole connector.

4.3 Chain bag installation

Make sure the chain bag has enough capacity for the length of load chain - the chain dimension and bag capacity are shown on the chain bag label.

1. Use the Elevation Drive in Local mode and run the chain DOWN until the lower initial limit is reached. This means the shortest length of chain possible (without bypassing limits) is visible at the dead end.
2. Attach the chain bag to the bracket by sliding the connectors into the slots - no other fixings are necessary.
3. Use the Elevation Drive in Local mode and run the chain UP to its upper initial limit so that the chain passes through the hoist and into the bag. Make sure there are no twists or knots in the chain as it enters the bag.
4. Make sure that the chain fills less than 50% of the bag when the chain has reached its upper initial limit.

4.3.1 Oversized load chains

If the total chain weight is more than 25 kg, the strain of the chain bag must be relieved with a special textile strap. This must be provided by the end-user as the installation conditions are unknown.

5. Operation

The load chain must be properly lubricated before initial operation and at regular 3 month intervals thereafter - refer to section 8 for details.

5.1 Hoist control methods

Movement of the hoist can be initiated in different ways:

- Simple up and down commands can be initiated using the front panel buttons and display on the Elevation Drive or a remote hand-held controller / pendant.
- More complex sequences of moves and cues can be programmed using Kinesys or TAIT software as part of a console.

This manual covers the operation and maintenance of the Elevation Hoist only. For more details on the different methods of control within the Elevation system, refer to the Elevation Drive manual as well as the relevant console manuals.

5.2 Entertainment Load Limit (ELL)

All attached loads must adhere to the Entertainment Load Limit (ELL) of the hoist. This limit is displayed in two locations:

- Label on the chain hook body
- Serial Label

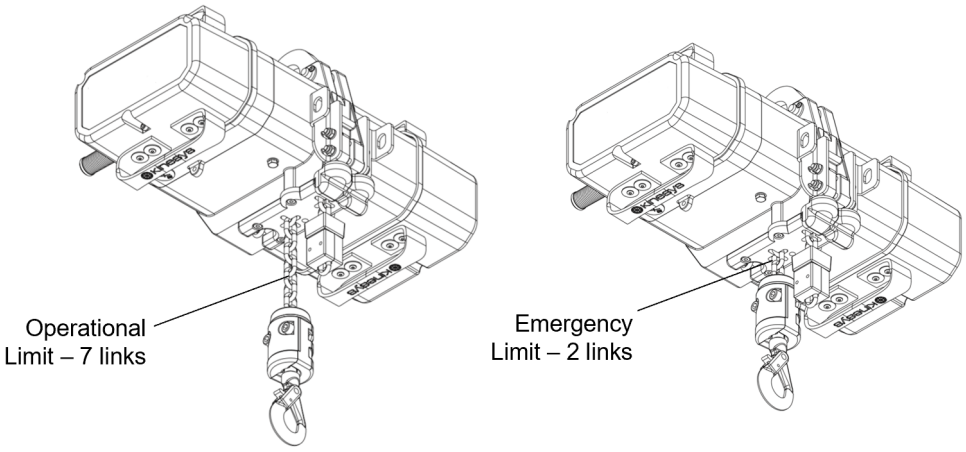
5.3 Safety advice

Safety instructions during operation

- **If you notice any unexpected or dangerous hoist movement during operation, press the appropriate emergency stop button (either on the connected Elevation Drive or on a venue-wide safety controller) to bring all movement to an immediate stop. Note that not all emergency stop buttons in the system necessarily stop the movement an individual hoist. Alternatively, if an enabling switch is used in the system, then release the enabling switch.**
- **If an enabling switch is used in your system to initiate movement of the hoist, be aware that releasing it may cause movement to stop abruptly.**
- **After an emergency stop button has been pressed, the reason for its actuation must be found, and all possible failures in the system removed by trained personnel. The emergency stop button must then be reset before continuing operation. Note that the emergency stop button reset procedure may be different for different devices - refer to individual product manuals for more details.**
- **Where emergency stop switches are used which do not cover the entire installation familiarize yourself with the operation span of each emergency stop device prior to operating any equipment.**

5.4 Hoist limits

Four different limits are programmed into the hoist during manufacture using the integrated limit switch assembly. Limits are safety features designed to stop movement of the hoist in different ways when the chain has reached certain positions.



If the load chain needs to be replaced, the operating and ultimate limits must be reset using the limit switches - refer to section 7.4 for details.

The hoist limits are as follows:

Limit	No. of chain links
Operating UP	7 between hook and hoist body
Ultimate / Emergency	2 between hook and hoist body
Operating DOWN	7 between lift limiter and hoist body
Ultimate / Emergency DOWN	2 between lift limiter and hoist body

5.4.1 Hoist limit definitions

Limit	Meaning
Operating	Movement will stop and the hoist may be moved in the opposite direction away from the limit using standard controls.
Ultimate / Emergency	Movement will stop. Further movement is not possible until the limit switch is bypassed. This can only be done using the Bypass functions on the Elevation Drive.
UP	Relates to the distance between the rubber buffer of the chain hook assembly and hoist body.
DOWN	Relates to the distance between the rubber buffer of the lift limiter and hoist body.

5.5 Elevation system example

In an Elevation system, multiple hoists may be connected in a daisy chain setup, with each hoist being connected to an Elevation Drive. An Array PD-ES is used to provide the power and data to the controllers and E-Stop channels. An Array RS485 Hub may also be used to split and distribute multiple hoists if the Array PD-ES does not have enough ports.

For more information on how to install an Elevation system, contact Kinesys and consult the relevant product operation manuals.

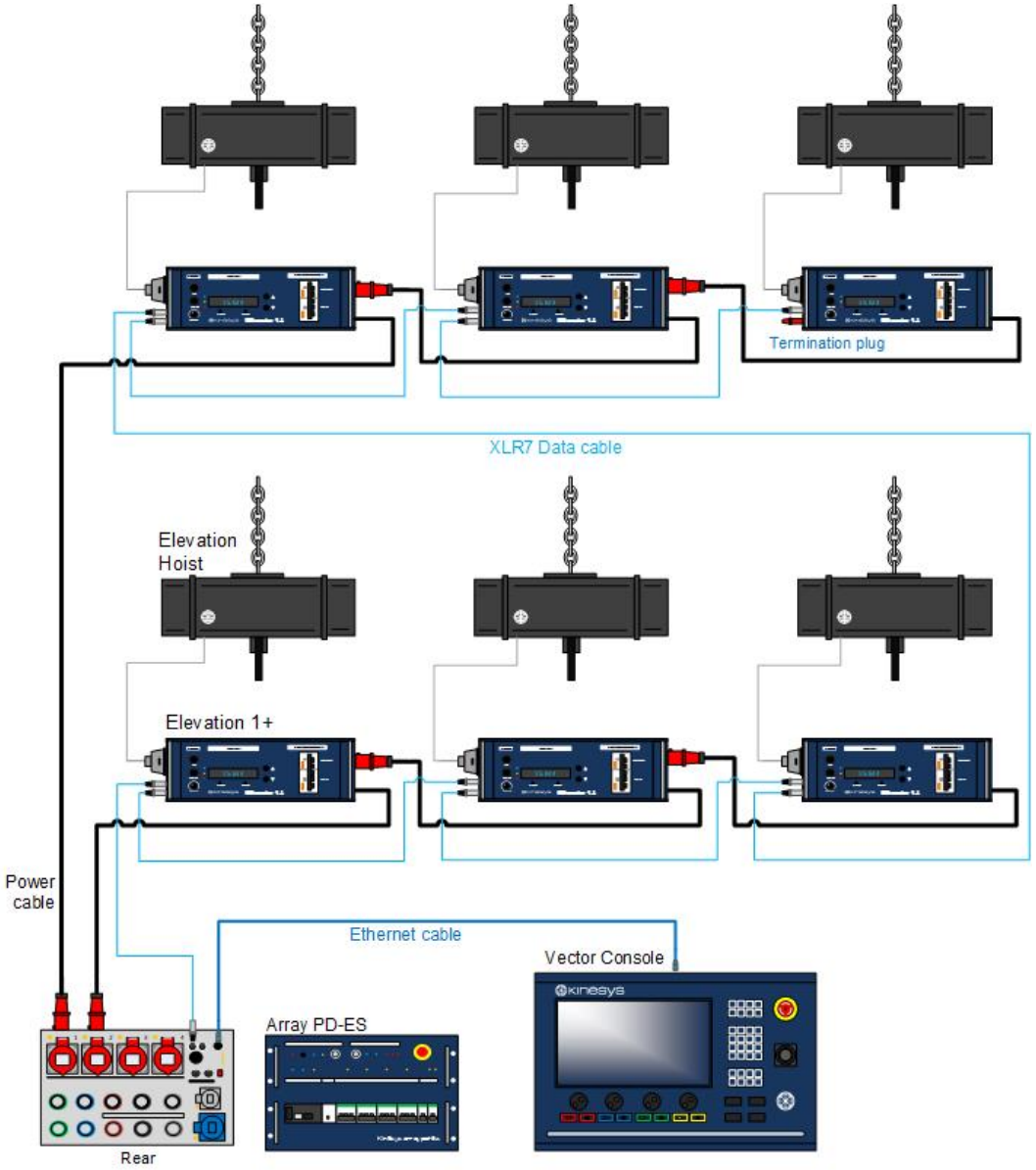


Figure 11. Elevation system example

6. Inspection

6.1 Regular inspection schedule

The following minimum intervals are recommended for hoist inspections. However, these may be shortened if the hoist is subject to adverse operating conditions on a regular basis such as high duty cycles or extreme temperature environments.

	Minimum inspection interval		
Check	**Weekly**	**Quarterly**	**Yearly**
Visual inspection of the hoist's general condition (wear, deformation, cracks, rusting)	X		
Functional check of the double brake		X	
Functional check of the brake circuits		X	
Functional check of the limit switches		X	
Visual inspection of the load chain		X	
Visual inspection of rubber buffers (hook block and lift limiter)		X	
Visual inspection of the chain hook		X	
Visual inspection on the condition of the chain bag (particularly wear of the textile material)		X	
Inspection of the brake air gap			X
Visual inspection of all screws			X
Visual inspection of the chain guide			X
Visual inspection of the hoist cable tail			X

6.2 Functional check of the double brake

1. Attach a nominal load to the hoist.
2. Raise the load to a suitable height where the brake functionality can be observed during lowering.
3. Run the load downwards and then stop movement, either by releasing the button / enabling switch or pressing the emergency stop button. Make sure the load stops smoothly without any unexpected noise and that the length of travel after stopping does not exceed two chain link lengths.

6.3 Functional check of the brake circuits

This functional check ensures that each brake operates independently and can hold the attached load if the other fails.

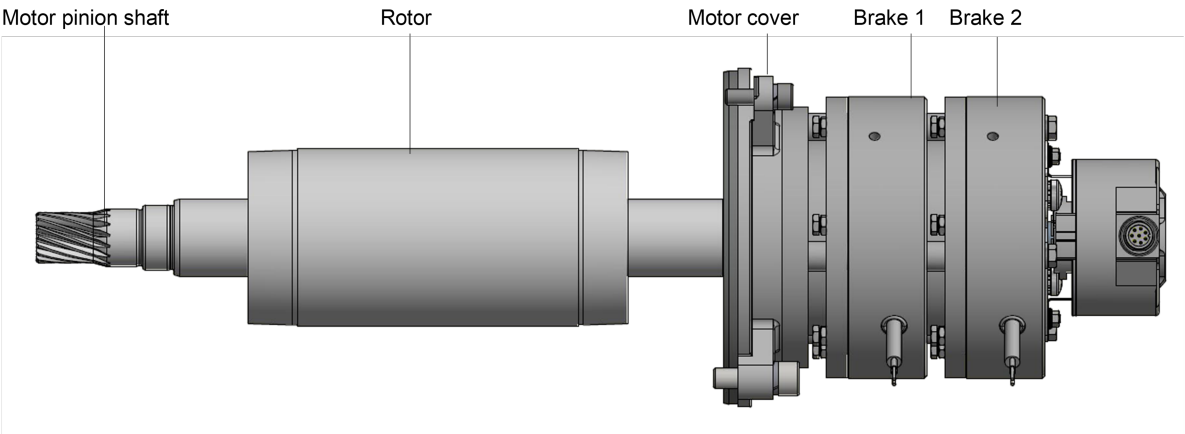


Figure 12. Motor and brake assembly

1. Attach a nominal load to the hoist.

Inspection of brake circuit 1 (brake closest to the motor):

2. Energize brake circuits 1 and 2 and raise the load to a suitable height using the Elevation Drive in manual mode.
3. De-energize brake circuit 1 and inspect the stopping distance. Make sure the load stops smoothly without any unexpected noise. Also make sure that the length of travel after de-energizing does not exceed two chain link lengths.
4. De-energize brake circuit 2.

Inspection of brake circuit 2 (brake furthest from the motor):

1. Energize brake circuits 1 and 2 and raise the load to a suitable height using the Elevation Drive in manual mode.
2. De-energisze brake circuit 2 and inspect the stopping distance. Make sure the load stops smoothly without any unexpected noise. Also make sure that the length of travel after de-energizing does not exceed two chain link lengths.
3. De-energize brake circuit 1.

6.4 Inspection of the brake air gap

Under normal circumstances, the brake microswitch gap should not be adjusted from the factory settings. Consult Kinesys before making any changes.

The double brake assembly is designed for long term usage and under normal circumstances the air gap should not deviate from the correct value and should not need to be changed.

The air gap between the armature disk and coil carrier should be 0.2 to 0.5 mm. This is the factory setting and ensures correct functionality of the brakes when energize and de-energized.

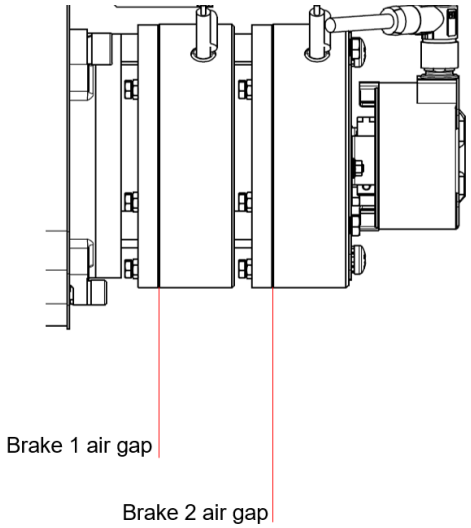


Figure 13. Brake air gap check

To inspect the air gap, insert a range of feeler gauges into the air gap on both Brake 1 and Brake 2. Insert the feeler gauges at different points around the circumference of each brake. Make sure the air gap is within the permissible range of 0.2 to 0.5 mm.

If the air gap is outside the permissible range, contact Kinesys to arrange repair or to have a new brake assembly sent. For instructions on how to replace the brake assembly, refer to section 7.5.

6.5 Visual inspection of the load chain

Regular checking of the load chain is compulsory in order to prevent accidents. The load chain must be inspected before first operation and approximately every 200 operating hours or 10,000 load cycles thereafter under normal conditions.

Check every link in the load chain, particularly at their points of contact, for wear, cracks, deformation and other damage.

If certain sections of the load chain are subject more stresses than others (such as the section that passes regularly through the sprocket wheel) then pay particular attention to those sections during inspection.

6.5.1 Load chain deformation inspection

The load chain must be replaced if:

- The thickness of any link has reduced by 10% or more.
- An individual chain link has elongated by 5% or more.
- A section of eleven chain links has elongated by 2% or more.
- The links are rigid and do not move up and down smoothly as a result.

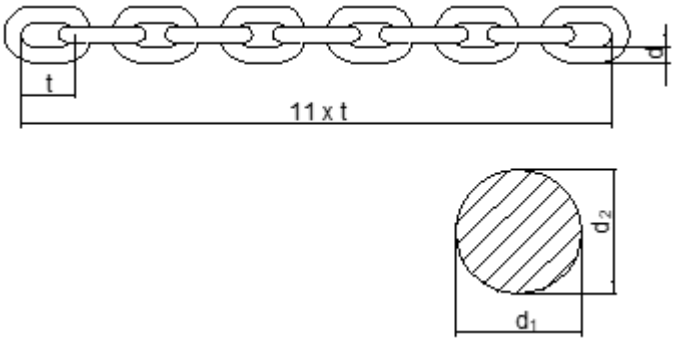


Figure 14. Load chain dimensions

Chain link dimension	Symbol	Value (mm)
Nominal diameter	d	7
Minimum allowable wear diameter	d_m	6.3
Nominal length of one link	t	22
Maximum allowable elongated length of one link	t_{max}	23.1
Nominal length of eleven links	11 x t	242
Maximum allowable elongated length of eleven links	$(11 \times t)_{max}$	246.8

To replace the load chain, refer to section 7.3.

6.6 Visual inspection of the chain hook

Inspect the chain hook for the following conditions:

- Excessive damage, corrosion or rusting to the chain hook or casings.
- Excessive damage or wear to the rubber buffer.
- The latch lock mechanism is deformed or not closing fully

To replace the chain hook, refer to section 7.1

6.7 Visual inspection of the lift limiter

Inspect the lift limiter must for the following conditions:

- Excessive damage, corrosion or rusting
- Excessive damage or wear to the rubber buffer

To replace the lift limiter, refer to section 7.2.

7. Maintenance

Safety instructions during maintenance

- **Maintenance and repairs to the hoist must only be carried out be competent and trained personnel.**
- **Only use original Kinesys parts when replacing components, including all fixings such as nuts, washers and screws.**
- **Do not modify or attempt to repair the hoist in any way other than those described in the maintenance procedures within this manual. If a hoist needs repair work done beyond what is described in this manual, contact Kinesys or your supplier to arrange a repair.**
- **Always disconnect the power and remove the load when carrying out maintenance procedures, unless instructed otherwise in this manual.**
- **Make sure the maintenance area is secure before carrying out maintenance work.**
- **When replacing hoist components such as the load chain, chain hook assembly or lift limiter make sure there are never any twists in the load chain.**

7.1 Replacement of the chain hook

The hook block must be replaced if any of the following conditions are found:

- Excessive damage, corrosion or rusting to the chain hook or hook block
- Excessive damage or wear to the rubber buffer at the top of the hook block
- The latch lock mechanism is deformed or not closing fully

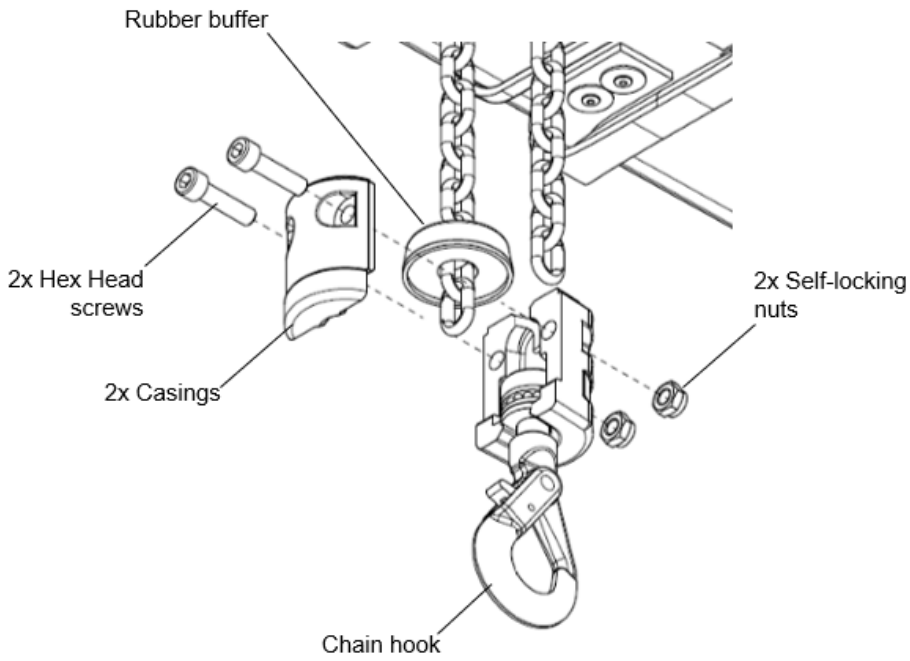


Figure 15. Chain hook replacement

7.1.1 Removal

1. Remove the two nuts, M10 hex-head screws and washers that hold the two casings together.
2. Separate the two casings and remove them from the chain, along with the chain hook.
3. Slide the rubber buffer off the chain.

7.1.2 Installation

1. Separate the components of the new chain hook assembly.
2. Slide the rubber buffer onto the chain.
3. Position the top of the chain hook into the recess of one of the casings. Make sure the chain hook is in the correct orientation.
4. Bring the two casings together over the last link of the chain so that the link fits securely into the recess of each casing.
5. Push the rubber buffer into the top of the two casings and make sure it is secure.
6. Secure the two casings using the two M10 hex-head screws, washers and nuts. Apply a torque load of 35 Nm.

7.2 Replacement of the lift limiter

The lift limiter must be replaced if any of the following conditions are found:

- Excessive damage, corrosion or rusting
- Excessive damage or wear to the rubber buffer

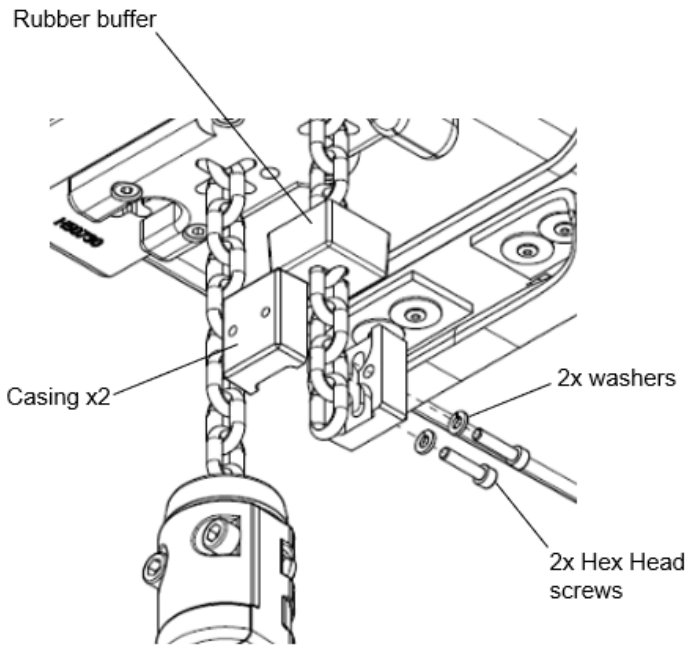


Figure 16. Lift limiter replacement

7.2.1 Removal

1. Remove the two hex-head screws and washers that hold the two casings together.
2. Separate the two casings and remove them from the chain.
3. Slide the rubber buffer off the chain.

7.2.2 Installation

1. Slide the rubber buffer onto the chain.
2. Bring the two casings together over the chain so that the link fits securely into the recess of each casing.
3. Push the lip of the rubber buffer into the top of the casings so it is secure.
4. Secure the two casings using the two screws and washers. Apply a torque load of 35 Nm.

7.3 Replacement of the load chain

The load chain must be replaced if it fails any of the inspection criteria listed in section 6.5

7.3.1 Removal of the load chain

1. Remove the chain bag from the hoist.
2. Remove the lift limiter from the dead end of the chain (refer to section 7.2.1.
3. Remove the chain hook from the end of the chain (refer to section 7.1.1
4. Run the chain in the UP direction using the Elevation Drive in manual mode. Once the UP operating limit is reached (7 links), movement will stop and the limits must be overridden in order to continue.
5. Use the Bypass function on the Elevation Drive to bypass the ultimate limit - refer to section 7.8. Continue to run the chain in the UP direction until it has fully passed through the body of the hoist.

7.3.2 Installation without existing load chain installed

This method should be used when there is no existing chain installed to the hoist.

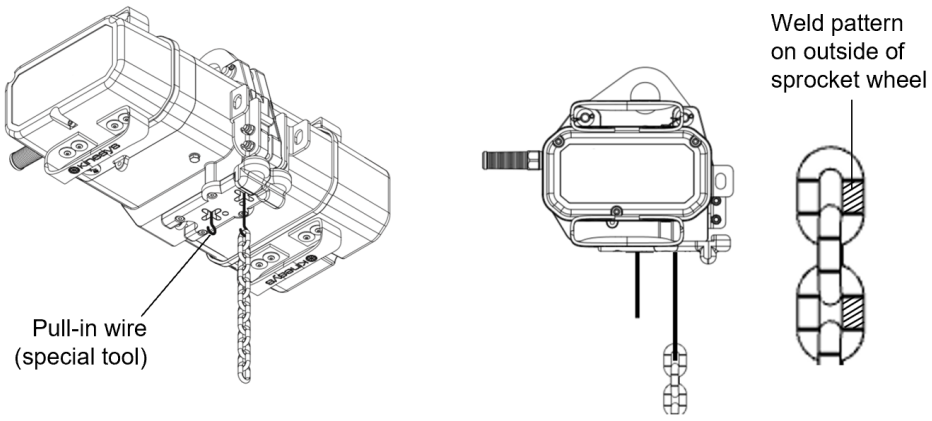


Figure 17. Load chain installation

Required item - Pull-in wire (special tool)

1. Push the pull-in wire (special tool) into and through the chain guide cross plate until it comes out from the cross-shaped hole on the opposite side.
2. Start with a flat chain link and feed the chain end into the hoist using the pull-in wire.
3. Make sure the weld pattern of the first chain link is on the side that goes around the outside of the sprocket wheel.
4. Move the chain into the hoist using the Elevation Drive in Manual mode.
5. Install the chain hook assembly to the end of the chain (refer to section 7.1.2).
6. Install the lift limiter to the dead end of the chain (refer to section 7.2.2)
7. Assemble the chain bag to the hoist.
8. Lubricate the entire length of the new load chain and run the chain into the chain bag.
9. Set the hoist limits (refer to section 7.4).

7.3.3 Replacement with existing load chain installed

This method should be used when an existing chain is already installed to the hoist.

Required item - Cut link (a single chain link with a gap)

1. Remove the chain bag from the hoist.
2. Remove the lift limiter from the dead end of the chain (refer to section 7.2.1.
3. Remove the chain hook from the end of the chain (refer to section 7.1.1
4. Attach the cut link to the end of the chain where the hook was removed.
5. Attach the new load chain to the cut link.
6. Make sure the weld pattern of the first chain link is on the side that goes around the outside of the sprocket wheel.
7. Run the chain in the UP direction using the Elevation Drive in manual mode. Once the UP operating limit is reached (7 links), movement will stop and the limits must be overridden in order to continue.
8. Use the Bypass function on the Elevation Drive to bypass the ultimate limit - refer to section 7.8. Continue to run the chain in the UP direction until it has fully passed through the body of the hoist.
9. Detach the old chain from the cut link and remove the cut link from the new chain.
10. Continue to run the hoist in the UP direction until enough links are visible so that the lift limiter can be assembled at the end.
11. Install the chain hook assembly to the end of the chain (refer to section 7.1.2).
12. Install the lift limiter to the dead end of the chain (refer to section 7.2.2)
13. Assemble the chain bag to the hoist.
14. Lubricate the entire length of the new load chain and run the chain into the chain bag.
15. Set the limit switches and zero the encoder (refer to section 7.4).

7.4 Setting the limits

The limit switches have been factory set for compatibility with the Elevation Drive. Do not use any limit values other than those listed in this manual.

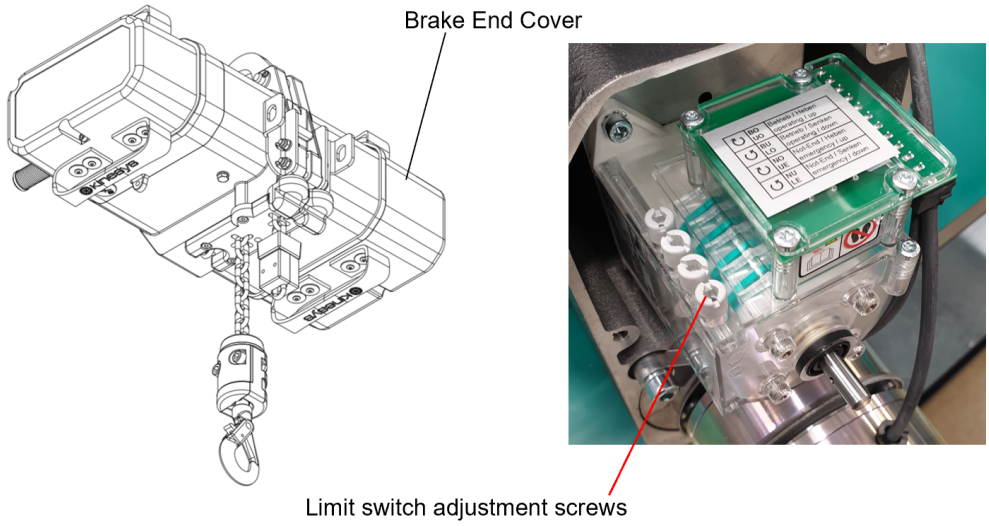


Figure 18. Limit switch box location

1. Remove the brake end cover to gain access to the limit switch box.
2. Identify which of the four limits to set:

Limit	No. of chain links
Operating UP (BO/UO)	7 between hook and hoist body
Ultimate / Emergency UP (NO/UE)	2 between hook and hoist body
Operating DOWN (BU/LO)	7 between lift limiter and hoist body
Ultimate / Emergency DOWN (NU/LE)	2 between lift limiter and hoist body

3. Run the chain in the appropriate direction using the Elevation Drive until the limit position is reached.
4. Use an Allen key to turn the appropriate limit switch adjustment screws until the cam inside the limit switch touches the button and you hear a click and the limit switch indicator illuminates. Note that the direction to turn each adjustment screw is shown on the label on top of the limit switch. This is an iterative process and may take some trial and error to re-adjust until it is correct.
5. Check each limit position by running the hoist in the opposite direction to the limit, and then running back at slow speed until the limit switch stops the hoist motion.
6. Once all four limits have been set, refit the brake end cover.

7.5 Replacement of the double brake assembly

1. Loosen the screws and spring washers that secure the brake end cover.
2. Remove the brake end cover.
3. Disconnect the brake cables.
4. Loosen the self-locking nuts on the outside of the double brake unit. The threaded bolts should remain with the motor cover.
5. Slide off the double brake unit from the shaft.
6. Fit the new double brake unit to the shaft.
7. Secure the double brake unit using the self-locking nuts and tighten to 5.0 Nm.
8. Re-connect the brake cables according to the wiring diagram.
9. Refit the brake end cover.

7.6 Replacement of the brake-clutch group

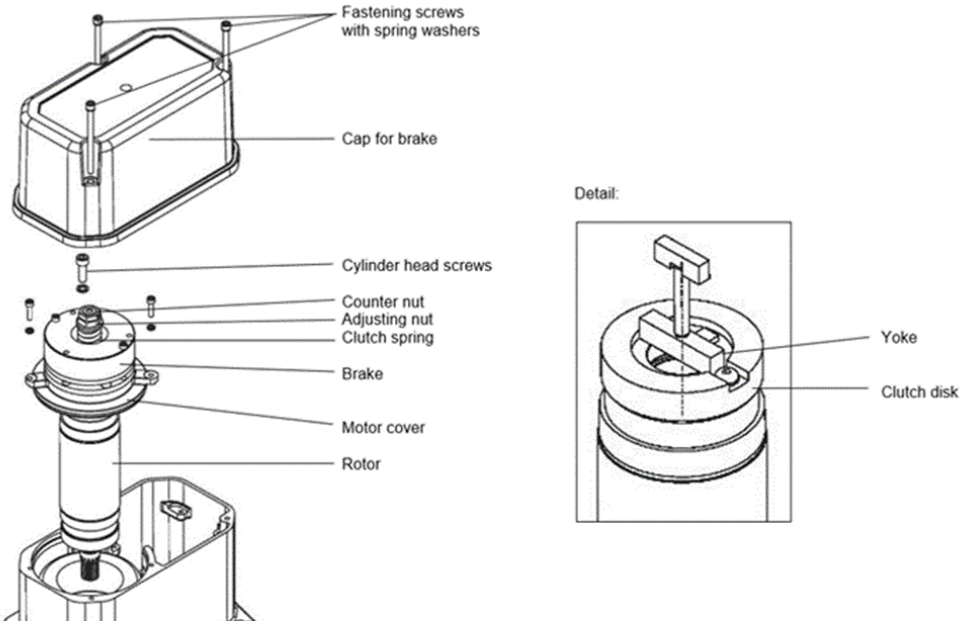


Figure 19. Brake-clutch group

7.6.1 Removal

1. Loosen the screws and spring washers that secure the brake end cover.
2. Remove the brake end cover.
3. Disconnect the brake cables.
4. Loosen the three cylinder head screws and washers on the motor cover.
5. Pull out the motor cover complete with the brake-clutch assembly and motor.

7.6.2 Assembly

1. Before assembly make sure the yoke is correctly seated in the clutch disk as shown in the detail. The yoke must be centered and pre-tensioned with the adjusting nut.
2. Assembly is carried out in the reverse order of the above procedure.
3. After replacing the brake-clutch group, adjust the clutch in accordance with section 7.7.

7.7 Adjusting the sliding clutch

In the event that the hoist fails the static or dynamic load test, adjust the clutch as follows.

Tools required:

- 22 mm spanner
- 24 mm spanner
- Digital Height Gauge (e.g. UJK 1036555)
- Sliding clutch label (Kinesys P/N 7694372)
- Permanent marker pen
- Red tamper evident seal (e.g. RS 196-5245)

1. Loosen the outer (M14) nut using a 22 mm spanner by turning it counter-clockwise. Note: a 24 mm spanner may be needed to hold the inner M16 nut to prevent the shaft from spinning.
2. Adjust the inner (M16) nut using a 24 mm spanner. Rotate clockwise about a quarter turn.
3. TIghten the outer (M14) nut while keeping the inner (M16) nut in position. Carry out the relevant load test on the hoist. If the hoist continues to fail, repeat steps 1 to 3.
4. Apply red tamper evident seal between the outer (M14) nut and the end of the drive shaft.
5. Using a digital height gauge, measure the distance between the face of the outer (M14) nut and the brake surface. Note the value.
6. Add a new clutch adjustment label (7694372) and write the value noted in Step 5 using a permanent marker.

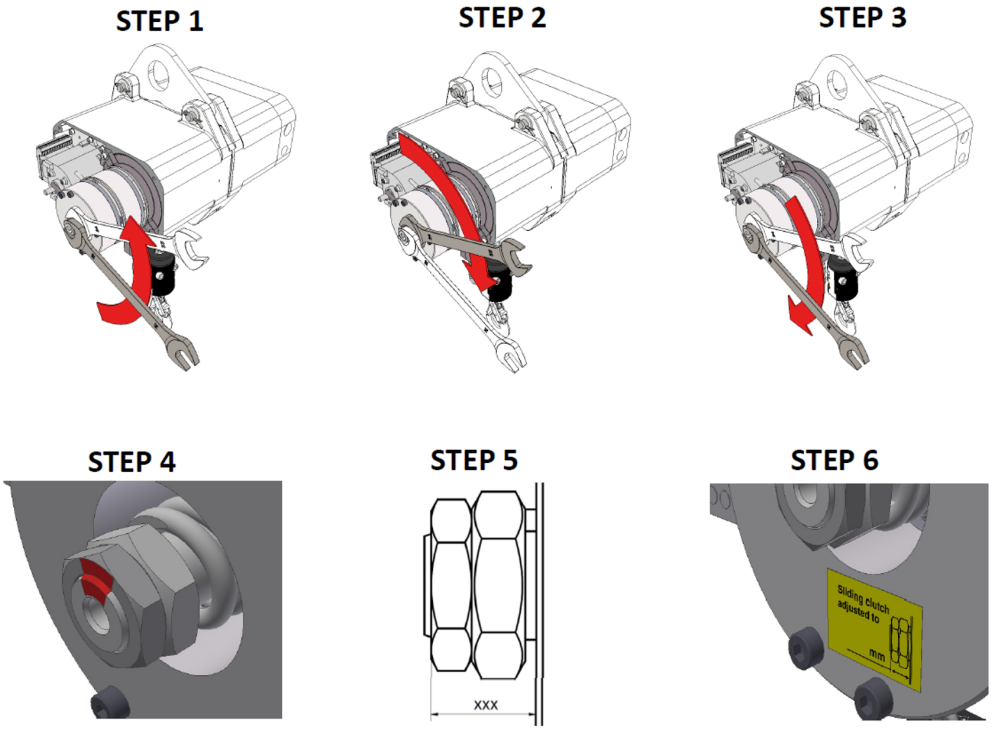


Figure 20. Clutch adjustment procedure

7.8 Bypassing the ultimate limits

This procedure involves the use of the menus and buttons on the Elevation Drive. For information on how to navigate the menus refer to the Elevation Drive operating manual.

This procedure will only work when the Ultimate Up/Down limit has been reached by the hoist.

Note: When bypassing the Ultimate limits, the speed of the motor is reduced to 10%.

1. Enter the Setup menu on the Elevation Drive - see Figure 21. Enter the Limits menu and then the Ultimate Bypass menu. Then set the option to ON.
2. Hold both the Menu Up and Menu Down buttons (see Figure 22) and make a manual move in any direction.
3. Once the contactors in the hoist can be heard engaging, the limit may be bypassed.

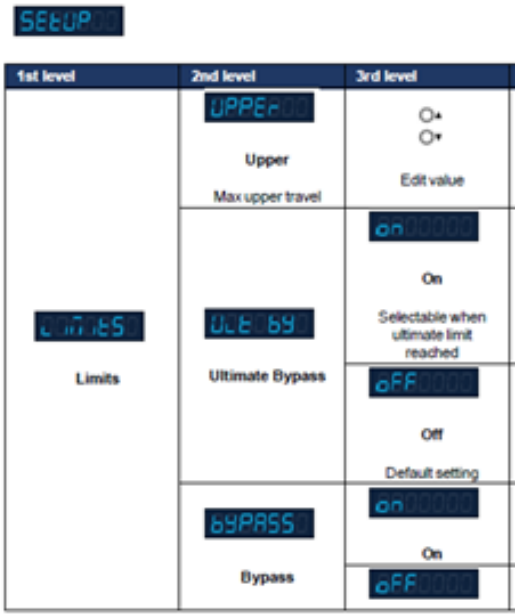


Figure 21. Elevation Drive Setup menu

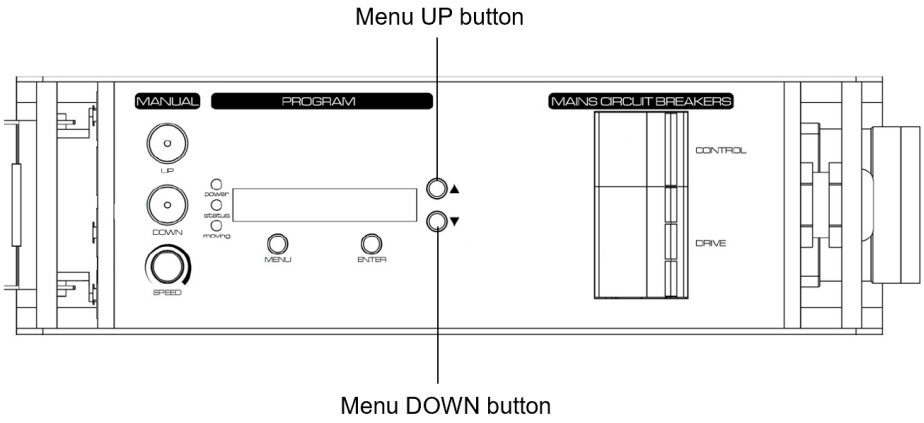


Figure 22. Elevation Drive Menu buttons

8. Lubrication

8.1 Regular lubrication schedule

The following minimum intervals are recommended for lubrication procedures. However, these may be shortened if the hoist is subject to adverse operating conditions on a regular basis such as high duty cycles or extreme temperature environments.

	Minimum inspection interval	
Procedure	**Quarterly**	**Yearly**
Lubrication of the load chain	X	
Lubrication of the chain hook		X

8.2 Lubrication of the load chain

The load chain must be properly lubricated before initial operation and at regular 3 month intervals thereafter.

Lubricate the entire length of the load chain using a suitable lubricant. Lubricate the chain without a load attached.

8.2.1 Types of chain lubricant

The following lubricants are recommended for lubrication of the load chain, depending on environmental conditions.

The dry-film lubricant is recommended in environments that are more conducive to wear (e.g from sand, grit).

Supplier	Lubricant
Fuchs	Stabylan 2001
Fuchs	Stabylan 5006
Fuchs	CTP D 350
Fuchs	Renolit SO-GFB
Fuchs	Ceplattyn 300 (dry-film lubricant)
Klüber	Klüberoil 4UH 1-1500
Klüber	Klüberoil CA 1-460
Klüber	Microlube GB 00
Castrol	Optimol Viscogen KL300

8.3 Lubrication of the chain hook

Lubricate the anti-friction bearings of the chain hook after approximately 20,000 lifting cycles or at least once a year.

8.3.1 Types of chain hook lubricant

The following lubricants are recommended for lubrication of the chain hook.

Supplier	Lubricant
Fuchs	Renolit Duraplex EP2, EP3
Fuchs	Lagermeister LX EP2

8.4 Changing the gear oil

The gearbox is filled with the correct amount of oil at manufacture. Under normal circumstances, it is a lifetime lubrication and should not need changing.

The gear oil must be replaced in the following situations:

- During overhaul of the hoist
- If visible oil leakages are noticed
- If excessive breathing out is noticed at the air vent
- After each opening of the gearbox (not recommended)

Take extreme care when draining the oil - it will be extremely hot if the hoist has been used recently.

To change the gear oil, remove the oil draining screw on the bottom of the hoist and the oil filling screw on the side of the hoist as necessary.

Oil specification: Mineral oil; viscosity 220 mm^2/s at 40°C.

Amount of oil to be used: **350 ml**

The following gear oils are recommended for use with the hoist.

Supplier	Oil type
Fuchs	Renolin CLP 220
Fuchs	Geralin SF 220
Castrol	Alpha Zn 200
ESSO	EP 220
Mobil	Mobil gear 630
Shell	Omala 220
ELF	Reductelf SP 220
BP	XP 220 BP Energol GR
Exxon Mobil©	Mobilux EP2

9. Service & End of Life

In the event of a product being considered beyond economic repair it must be disposed of with care and in line with local legislation on disposal of Waste Electrical and Electronic Equipment (WEEE).

In Europe WEEE shall be disposed of in accordance with European Union Directive 2012/19/EU.

In most regions of the world, similar legislation exists to ensure that WEEE is handled separately to maximise reuse of materials and avoidance of landfill.

The parts must be disposed in accordance with the local laws of environment protection. Metals, rubber, plastics must be disposed or recycled separately.

10. Product specifications

Feature	Specification
Power supply	3-phase + neutral + earth, 50-60 Hz, 208V or 400V nominal - must match connected Elevation Drive
Motor	3-phase induction motor, 50-60 Hz, standard CE marked
Connections	Harting connector
Controller	Elevation 1+ / Elevation V2 controller
Limit switches	Four individually adjustable switches
Load cell	N/A - compatible with Kinesys Libra Cell
Brakes	Double silent brakes with 100% duty cycle
Dimensions (H x W x L)	284 mm (11.2 in) x 571 mm (22.5 in) x 293 mm (11.5 in)
Weight (excluding chain)	41 kg (90.4 lbs)
Chain weight	1.1 kg/m
Chain size	11 x 31 mm
Reeving options	Single-reeved only
Entertainment Load Limit (ELL)	Depending on model - 250 kg, 500 kg, 1000 kg
Max lift speed	250kg D8+ and 500kg D8: 24m/min 500kg D8+ and 1000kg D8: 12m/min
Ingress Protection	IP55 (protected from low water jets from any direction; limited ingress protection)
Operational temperature	5°C and 40°C (41°F and 104°F)
Storage temperature	-20°C and 80°C (-4°F and 175°F)
Accessories supplied	Chain bag and attachment bracket Load chain (black), length to be specified Lift limiter Chain hook assembly, with latch lock mechanism

10.1 Product dimensions

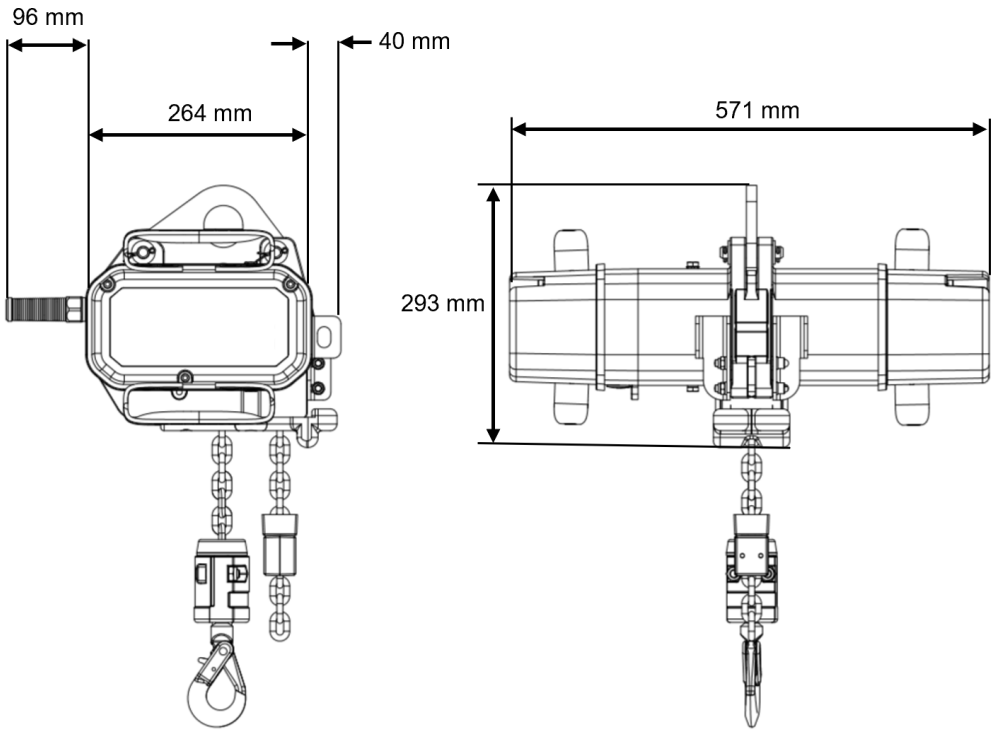


Figure 23. Product dimensions

10.2 Packaging

Where possible, use the original packaging to transport the Elevation Hoist. The unit can be delivered in either a purpose built flight case of dimensions or a cardboard carton which is available in dimensions 650 mm x 400 mm x 320 mm.

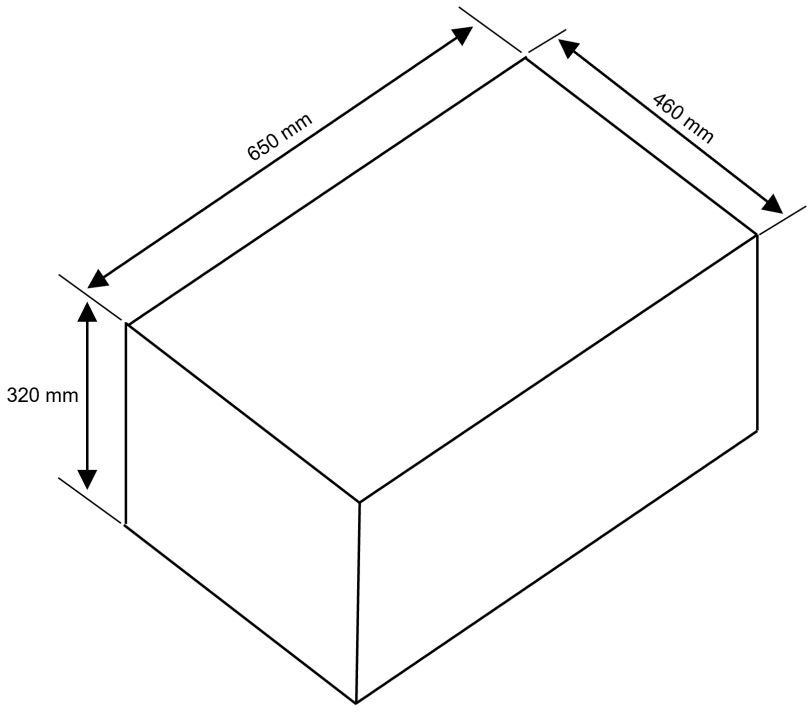


Figure 24. Cardboard carton dimensions

11. Declaration of Conformity

ORIGINAL

EC Declaration of Conformity

Manufacturer:	Kinesys Projects Limited	
of the address:	Unit 2 Kempton Gate, Oldfield Road, Hampton, Middlesex, TW12 2AF, UK	
in accordance with the following EC directives:	**Machinery Directive** **EMC Directive**	**2014/30/EU** **2006/42/EC**
declares that the product:	**Kinesys Elevation Hoist** (when used in conjunction with Kinesys Elevation Drive ELE-00-2001)	
with part number:	**ELE-01-2151**	

is in conformity with the applicable requirements of the following harmonised standards:

EN ISO 12100	**Safety of machinery. General principles for design. Risk assessment and risk reduction.**
EN 60204-32	**Safety of machinery. Electrical equipment of machines. Requirements for hoisting machines.**
EN 14492-2	**Cranes. Power driven winches and hoists. Power driven hoists**
EN 17206-1	**Entertainment technology – Machinery for stages and other production areas – Safety requirements and inspections**
EN 818-7	**Short link chain for lifting purposes. Safety. Fine tolerance hoist chain, Grade T (Types T, DAT and DT)**

and the following standards and technical specifications:

FEM 9.511	**Rules for the design of series lifting equipment. Classification of mechanisms**
FEM 9.751	**Power driven series hoist mechanisms, Safety**

The manufacturer hereby declares that the products named above have been designed to comply with the relevant sections of the above referenced standards. The units comply with all applicable essential requirements of the directives.

In the EU the party authorised to compile the technical file is:
TAIT Netherlands B.V.
Weesperplein 4a, 1018 XA Amsterdam, The Netherlands
In the UK the party authorised to compile the technical file is:
Kinesys Projects Ltd.
Unit 2 Kempton Gate, Oldfield Road, Hampton,
Middlesex, TW12 2AF, UK

Equipment referred to in this Declaration of Conformity was first manufactured in 2014.

D Weatherhead
Managing Director
Hampton, November 2024

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures and limitations to use are available on request and are also contained in the product manuals.

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