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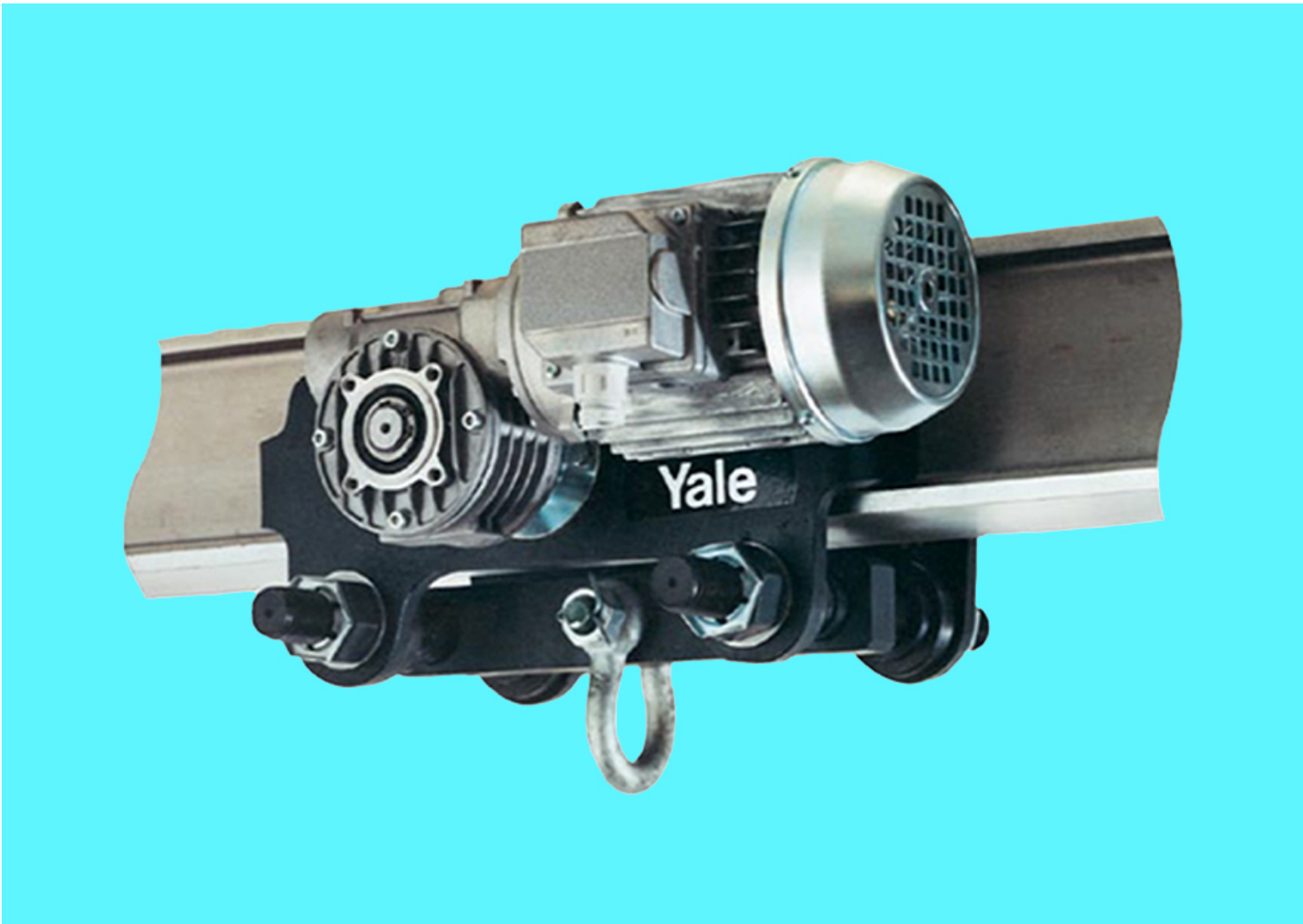
Kinesys Elevation Beam Trolley VTE

Operating & Maintenance Manual
[ORIGINAL]

A beam trolley system controlled by Elevation



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Contents

1. Introduction

1.1 Product description

The Kinesys Elevation Beam Trolley VTE combines the bearing mechanism design of a VTE trolley with the variable speed control of the Kinesys Elevation Drive.

All beam trolleys are fitted with a belt driven toothed encoder for precise positioning functionality. A travel motor with worm gear transmission ensures a smooth start and self-breaking. A secondary trolley is also provided, which can be attached to the primary beam trolley to move in tandem without requiring power. Beam trolleys are available in US, China and European voltage variants can be used for horizontal travel on 58-180 mm or 180-300 mm I-beams.

1.2 Scope and purpose

This manual describes the key features, means of operation and maintenance operations of the Elevation Beam Trolley VTE. The variants covered in this manual are:

- BMT-00-0110 Motorised Trolley 2T 400V
- BMT-00-0120 Motorised Trolley 2T 208V

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.

1.3 Support requests

For support, 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've 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 automation equipment 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 - Directive relating to electromagnetic compatibility
2014/35/EU	EC - Electrical equipment designed for use within certain voltage limits

Harmonized regulations

EN ISO 12100	Safety of machinery. General principles for design. Risk assessment and risk reduction.
EN 60204-1	Safety of machinery. Electrical equipment of machines. General requirements
EN 349	Safety of machinery. Minimum gaps to avoid crushing parts of the human body

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 9.755:1993	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 install the Elevation Beam Trolley VTE or do maintenance to the Elevation Beam Trolley VTE in an area that is accessible to children or other unqualified persons.**
- **Do not use the Elevation Beam Trolley VTE 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 lifting equipment.**
- **Do not use the Elevation Beam Trolley VTE in outdoor environments.**
- **Do not use the Elevation Beam Trolley VTE if it does not appear to be in 100% working order.**
- **Do not modify the Elevation Beam Trolley VTE in any way unless explicitly advised by the manufacturer.**
- **Do not use the Elevation Beam Trolley VTE for the transportation of people.**
- **Do not pull the attached load to the side.**

Safety precautions before operation

- **Do a full risk assessment of the location where the Elevation Beam Trolley VTE and its connected devices are intended to be used.**
- **If used in rigging, the Elevation Beam Trolley VTE and its connected lifting device must 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 Elevation Beam Trolley VTE and attached load are installed can safely support the combined weight of the equipment.**
- **Do not start movement operations until a qualified person has inspected the Elevation Beam Trolley VTE 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.**
- **Make sure all machine stop buttons, 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 machine stop buttons, emergency stop buttons and enabling switches in the system.**
- **Make sure all attached loads are unobstructed and will not come into contact with**

other static or moving objects during movement.

- **Make sure all attached loads are 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 attached loads.**
- **Make sure all persons in the hazard zone underneath the lifting equipment are aware of the potential for movement.**

Safety instructions during operation

- **If you notice any unexpected or dangerous movement during operation, press the machine stop button to bring all movement to an immediate stop. Note that not all stop buttons in the system necessarily stop the movement an individual lifting device. 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 connected lifting device, be aware that releasing it may cause movement to stop unexpectedly.**
- **After a 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 stop button must then be reset before continuing operation. Note that the stop button reset procedure may be different for different devices - refer to individual product manuals for more details.**

Safety instructions during maintenance

- **Maintenance and repairs to the Elevation Beam Trolley VTE 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.**
- **Always disconnect the power and remove the load when carrying out maintenance procedures.**
- **Make sure the maintenance area is secure before carrying out maintenance work.**

2.3 Visible damages

If any damage or breakages are detected during operation or during tests, do not operate the Elevation Beam Trolley VTE 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 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.

2.5 Handling and storage

Condensation

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

Shocks

Do not shake, knock or drop the Elevation Beam Trolley VTE and avoid excessive force when installing and operating the product.

Handling

Do not lift the Elevation Beam Trolley VTE by any of its cables or connectors as this may cause damage to the unit and/or the cables.

Packaging

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

3. Product overview

3.1 Encoder side layout

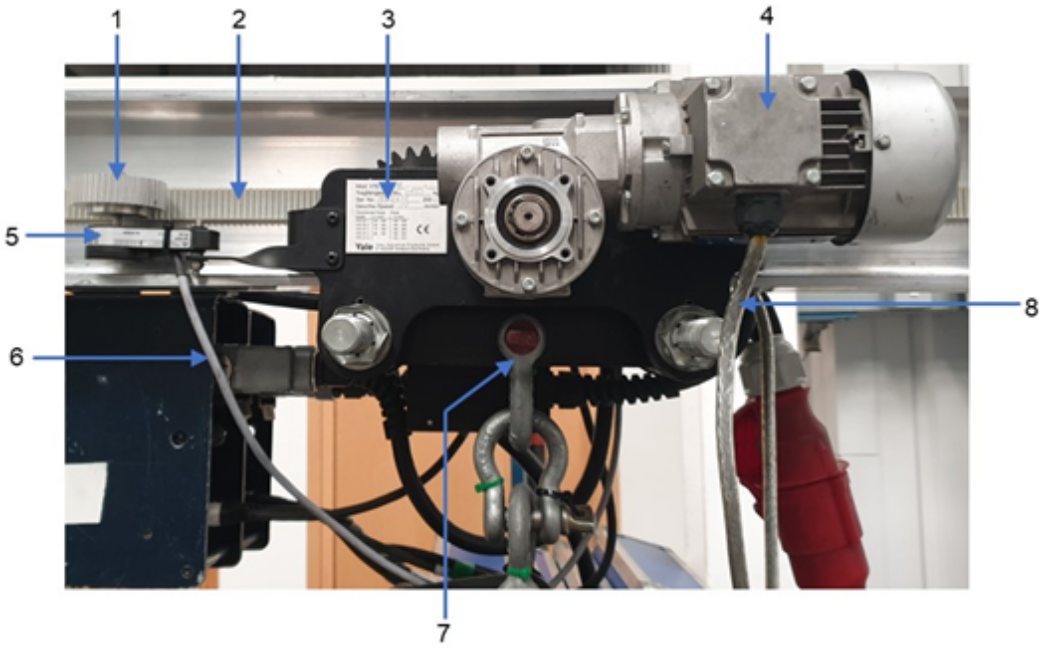

Figure 1. Encoder side layout

Item #	Description	Notes
1	Encoder timing pulley	
2	Toothed belt	
3	Name plate	Displays information such as model number, safe working load, serial number and maximum speed.
4	Motor	
5	Encoder	
6	Encoder cable	
7	Suspension hook	Attachment point for loads or hoists.
8	Motor cable	

3.2 Control box connections

The control box is on the opposite side to the encoder and motor. It features all the cable connections required to operate the beam trolley.

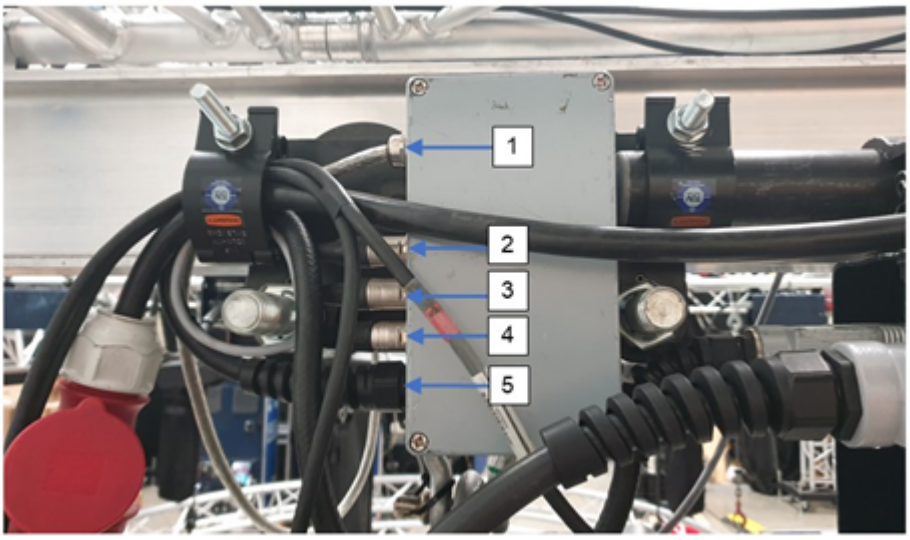

Figure 2. Control box connections

Item #	Description	Notes
1	Motor cable	
2	Up/Forward limits switch cable	Connects to an Up/Forward limits switch (if not connected, install the shorting plug)
3	Down/Backward limits switch cable	Connects to a Down/Backward limits switch (if not connected, install the shorting plug)
4	Encoder cable	
5	Elevation cable	Connects to the Elevation Drive for power and data.

4. Installation

4.1 Connecting to the Elevation system

The beam trolley can be operated singularly or be part of a much larger system of multiple hoists, beam trolleys and load cells, depending on the user requirements.

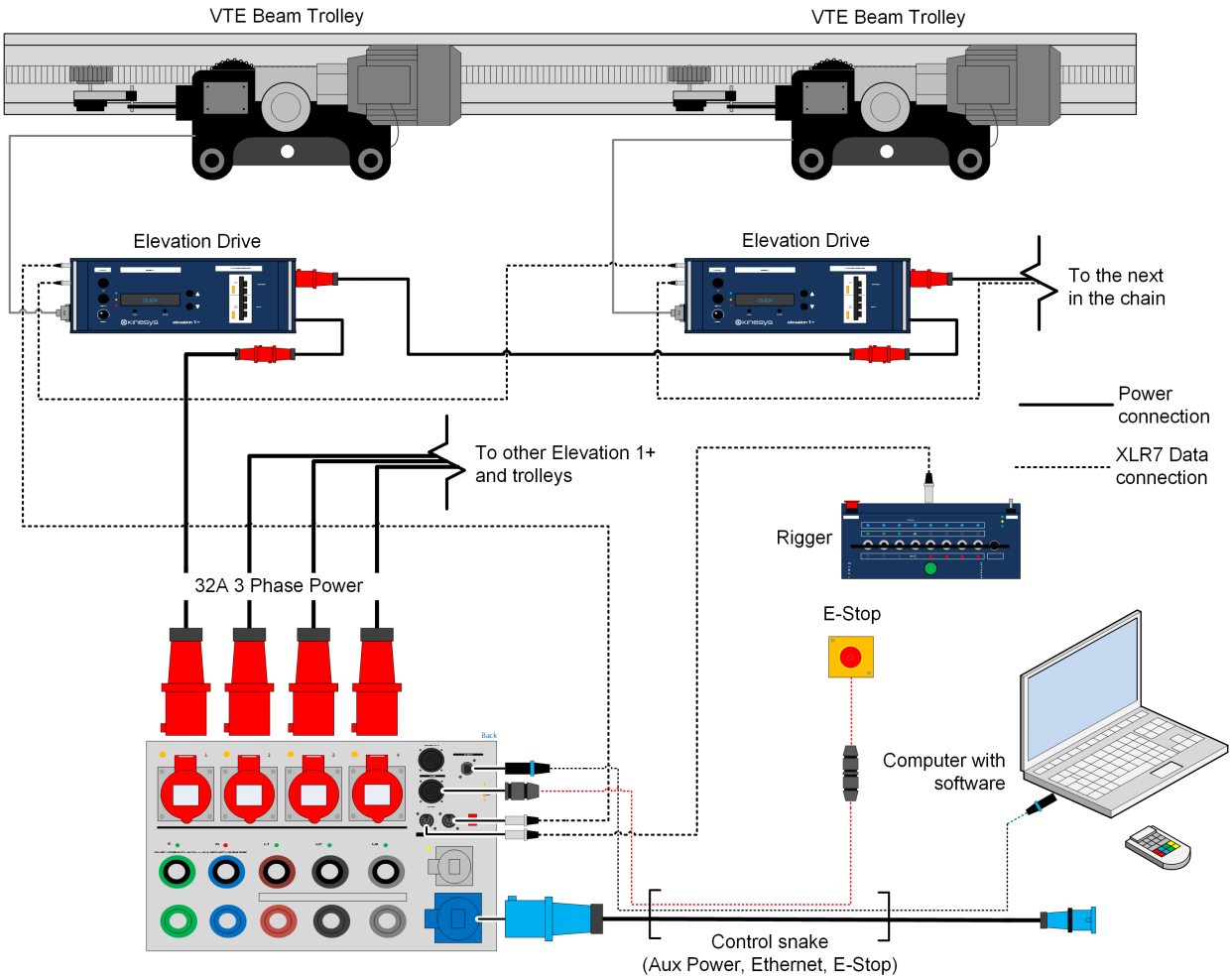

Figure 3. System example

To operate each beam trolley, it must be connected to its own dedicated Elevation Drive to provide the necessary power and data communications. The Elevation Drive must be connected to a power/emergency stop distribution system such as Array PD-ES or Mini Array PD-ES.

In some situations it may be necessary to attach an Elevation Hoist to a beam trolley to allow for lateral and up/down movements of a load; in this scenario the hoist and beam trolley would each require their own Elevation Drive,

Movement of the beam trolley can either be via by computer software, such as Vector or K2, or a remote controller such as the Elevation Rigger.

If you require guidance on setting up your specific application, please contact support@taittowers.com . For information on other Kinesys products within the Elevation system consult the relevant product operating manuals.

4.2 Attaching a secondary trolley

A secondary beam trolley may be attached to the original to create a primary/secondary beam trolley system. Secondary beam trolleys can be connected using a connecting beam, which attaches to the clamps on the control box side.

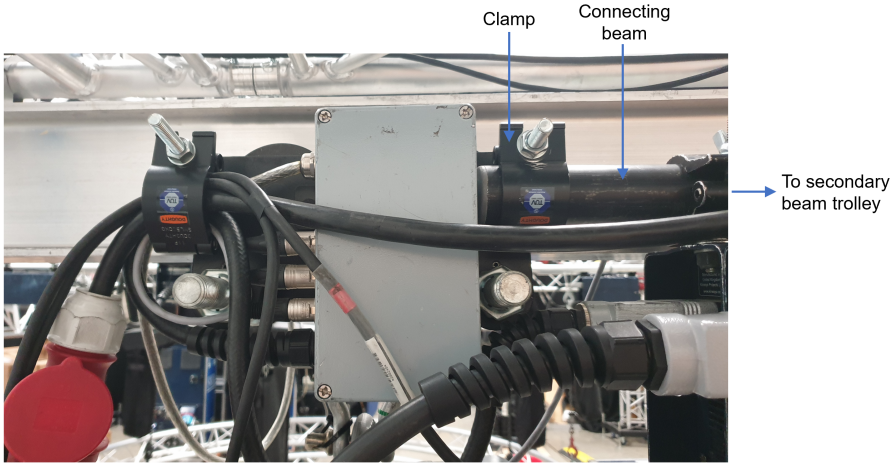

Figure 4. Attaching a secondary beam trolley

Note that the secondary trolley does not require connection to an Elevation Drive as it is either pushed or pulled mechanically by the master trolley, depending on the direction of movement, and does not require electrical power.

4.3 Attaching the tooth belt to the beam

Warning! The position of the tooth belt must be correct and consistent along the entire length of the beam before operating the beam trolley. If the position of the tooth belt is incorrect it could cause damage to the beam trolley and/or beam.

The distance between the bottom of the tooth belt and the bottom of the beam must be exactly 40 mm. This applies to all sizes of beam, as shown below. The tooth belt must be attached on the side of the beam where the encoder and motor are present – this is the side that is visible in Figure 1.

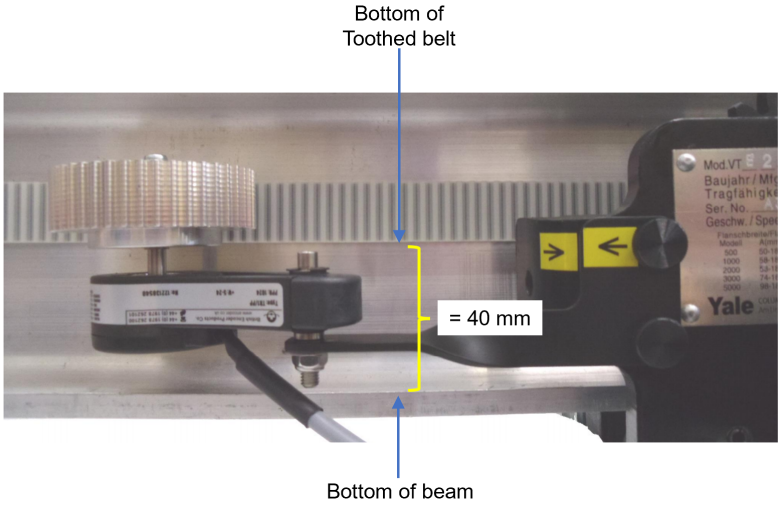

Figure 5. Toothed belt installation distance

The method of attachment of the tooth belt to the beam is at the discretion of the customer. Whichever method is used, ensure that the tooth belt is fully secured to the beam along the entire length before attaching the beam trolley.

4.4 Assembling the beam trolley to the beam

Before installation, make sure the width of the beam trolley is correct for the intended carrying beam.

Refer to Figure 6 and Figure 7

1. Unscrew the locking and securing nuts and remove the side plates from the traverses.
2. Measure the flange width “b” of the beam.
3. Find the measurement “B” between the shoulders of the round nuts on the threaded traverses. Make sure the four bores in the round nuts face towards the outside. Adjust the measurement “B” so that it equals the measurement “b” plus 4 mm. Make sure that measurement “A” is 2 mm and that the suspension traverse is centred between the shoulders of the round nuts.
4. Install one side plate making sure that the roll pins in the side plate engage into the bores in the round nuts. To achieve this it may be necessary to rotate the round nuts slightly.
5. Install the washers and tighten the securing nuts. Screw on the locknuts finger tight and tighten a further 1/4 to 1/2 a turn.
6. Loosely install the second side plate on the traverse and loosely install the remaining washers, nuts and locknuts.
7. Raise the complete pre-assembled trolley to the carrying beam.
8. Fully install the second side plate making sure that the roll pins in the side plate engage into the bores in the round nuts. To achieve this it may be necessary to rotate the round nuts slightly.
9. Tighten the securing nuts on the second side plate. Tighten the locknuts finger tight and tighten a further 1/4 to 1/2 a turn.
10. Connect the beam trolley to the Elevation Drive using the supplied Harting cable.
11. By slowly moving along the beam trolley along the length of the beam, make sure of the following:

    - A clearance of 2 mm on each side between the wheel flanges and beam edge is maintained.
    - All locknuts are fitted and secure.

12. Once the beam trolley has been assembled correctly, mount and adjust the encoder in accordance with sections 4.5 and 4.6 respectively.

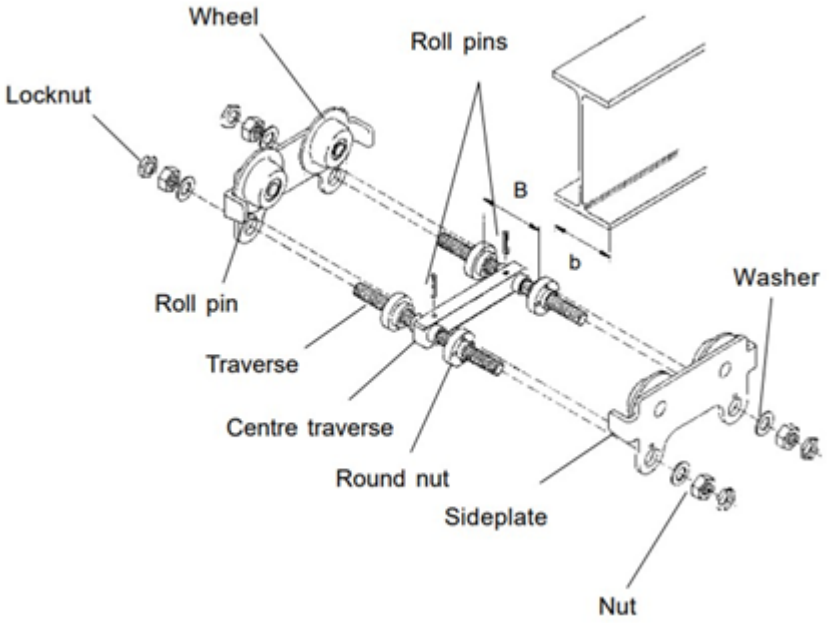

Figure 6. Assembling the beam trolley to the beam (1)

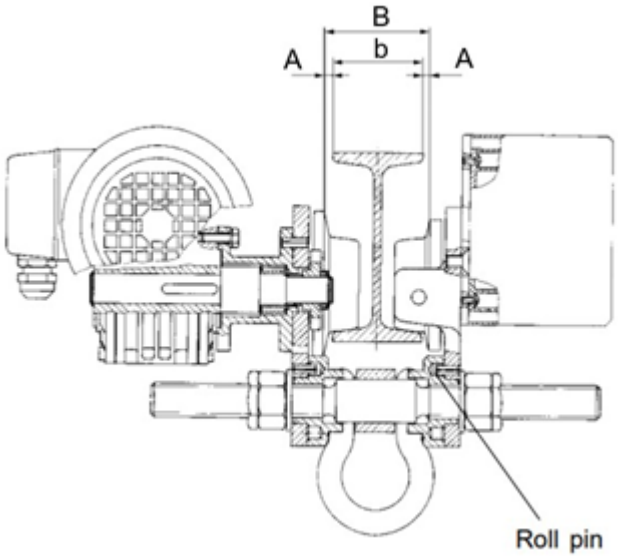

Figure 7. Assembling the beam trolley to the beam (2)

4.5 Mounting the encoder

The beam trolley comes with a belt-driven toothed encoder for precise positioning functionality. To ensure the beam trolley functions properly, the encoder must be mounted correctly.

There are two thumb screws that come with each encoder – these attach to two holes to left of the name plate. When fitted correctly, the two arrows on the beam trolley and encoder should meet, as shown in Figure 8.

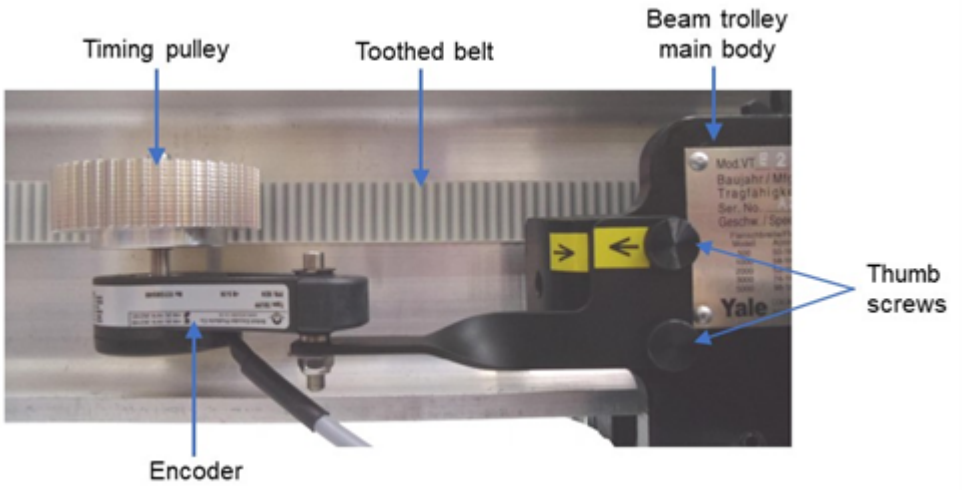

Figure 8. Mounting the encoder

4.6 Adjusting the encoder

Once attached to the beam trolley, the encoder must be adjusted so that the timing pulley achieves sufficient contact and pressure against the toothed belt on the beam. If this is not done correctly, the encoder can slip and cause positional errors.

1. Remove the rubber rubber cap on the end of the encoder housing.
2. Insert a 3/32 Allen key into the set screw and use the Allen key for leverage to rotate the collar around the pivot shaft in the direction necessary to increase the spring force that holds the timing pulley against the toothed belt.
3. While maintaining pressure, tighten the set screw securely to avoid loss of spring pressure.
4. Refit the rubber cap to the end of the encoder housing.

Figure 9. Adjusting the encoder

5. Operation

5.1 Inspection before initial operation

Before initial operation, make sure of the following.

1. Inspect the beam trolley and all other load bearing constructions for defects and damage. Make sure the beam trolley has not been damaged by incorrect storage or transportation. In particular, check that the roll pins are correctly fitted.
2. Check that the trolly, hoist and load are correctly seated. The selection and calculation of the suspension point is the responsibility of the user.
3. Check the beam structure for correct assembly and visually check for defects, deformations, cracks, wear, and signs of corrosion.
4. Check the clearance between the trolley wheel flange and the beam outer edge is equal on both sides and within the tolerances. Do not enlarge the clearances to enable the beam trolley to negotiate tighter curves.

5.2 Moving the beam trolley

Movement of the beam trolley can either be done via the front panel controls on the Elevation Drive, a remote controller such as the Elevation Rigger, or computer software such as Vector or K2.

The principle of operation is the same as moving hoists up and down, with the up command equivalent to forward motion and the down command equivalent to backward motion.

5.3 Reversing the rotor direction

Warning! After reversing the rotor direction, all operators of the equipment must be notified to avoid movement in unexpected directions.

Warning! Reversing the rotor direction involves reconfiguring wires, which is potentially electrically hazardous. Always disconnect the power supply before doing these procedures.

The rotor within the control box of the beam trolley is hardwired to work in a given direction when an up or down command is sent.

The direction of movement can be changed in one of two ways:

- Swapping two motor phases so that the motor rotates in the opposite direction.
- Swapping encoder A and B lines so that the encoder counts in the correct direction.

5.3.1 Swapping motor phases

1. Remove the control box cover.
2. 2. Swap the posiitons of the black and brown wires. Once swapped the black wire should be connected to the first terminal T1 and the brown wire to the second terminal T2 as shown in Figure 10.
3. Refit the control box cover.

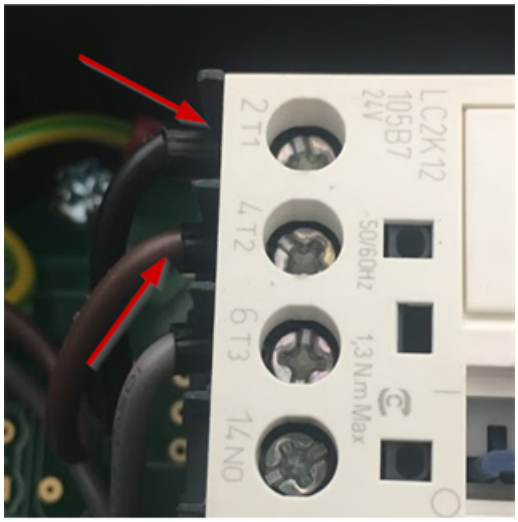

Figure 10. Swapping motor phases

5.3.2 Swapping encoder signals

Warning! Swapping the encoder wires involves the use of a soldering iron. Only qualified people with the necessary experience in the use of solering irons are permitted to carry out this procedure.

1. Remove the control box cover.
2. Unplug the encoder cable from the control box and unplug the black connector inside the box. Then remove the two Torx T10 screws holding the XLR cable in place.

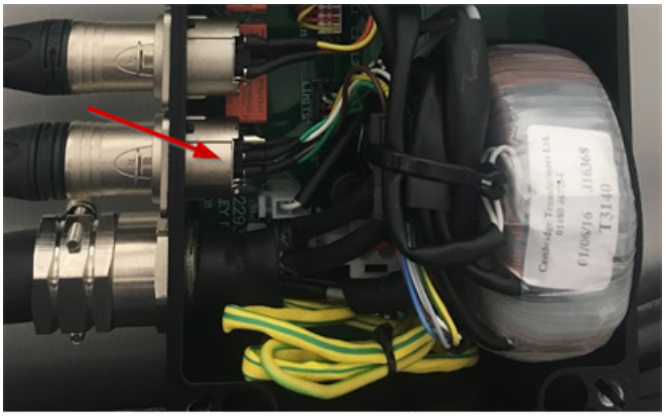

Figure 11. Removing the encoder cable

3. Remove the encoder cable assembly. Once removed it will look as shown in Figure 12.

Figure 12. Removed encoder cable assembly

4. Swap the positions of the green and yellow wires on the XLR connector using a soldering iron. Once swapped they should look as shown in Figure 13 with yellow connected to pin 2 and green connected to pin 4.

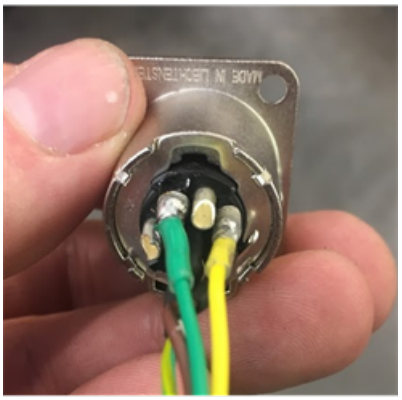

Figure 13. Swapped encoder wires

5. Reassemble the encoder cable assembly to the control box.
6. Refit the control box cover.
7. Once complete, check that the beam trolley now moves in the opposite direction when the up command is sent. If there are any issues or the beam trolley does not move as expected, contact support@taittowers.com.

5.4 Regular inspections

To ensure that the beam trolley remains in a safe working condition, it must be subjected to regular inspections by a competent person. Inspections must be undertaken once a year unless adverse working conditions dictate shorter intervals. The components of the beam trolley must be inspected for damage, wear, corrosion, or other irregularities and all safety devices must be checked for completeness and effectiveness. To check for worn parts it may be necessary to disassemble the trolley.

Repairs may only be carried out by a specialist workshop using original parts. Contact support@taittowers.com if you require support in rectifying or repairing any part of the beam trolley.

6. Product specifications

Feature	Specification
Power supply	208 V or 400 V, 3-phase, 32 A, 50-60 Hz
Mains connection	Harting 8+24 to suit Elevation Drive
Control box connections	Motor cable XLR7 inputs - up/down limit switches and encoder cable Elevation tail
Accessories	Shorting plugs x2 (for limit switch connections) Secondary trolley Tooth encoder drive belt
Cooling	Convection
Ingress Protection (IP) rating	IP55 (Protected from dust and water jets)
Operating temperature	0°C and 40°C (32°F and 104°F)

7. Service & End of Life

In the event of a product being considered beyond economic repair it should 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.

8. 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:	**Low Voltage Directive 2014/35/EU** **EMC Directive 2014/30/EU**
declares that the product:	**Kinesys Elevation Beam Trolley VTE**
with part numbers:	**BMT-00-0110 and BMT-00-0120**

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

EN ISO 12100	**Safety of machinery. General principles of design. Risk assessment**
EN 60204-1	**Safety of machinery. Electrical equipment of machines. General requirements**
EN 349	**Safety of machinery. Minimum gaps to avoid crushing of parts of the human body.**

and the following applied standards and technical specifications:

FEM 9.511	**Rules for the design of series lifting equipment; Classification of mechanisms**
FEM 9.683	**Selection of lifting and travel motors**
FEM 9.755	**Measure for achieving safe working periods for motorized serial hoist units (S.W.P)**

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 2005.

D Weatherhead

D Weatherhead
Managing Director
Hampton, 19 February 2025

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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TAIT Technologies UK Ltd.
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Registered in England and Wales No. 02962782 **+44 20 8208 6890** **taittowers.com**

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