kinesys

VTE Beam Trolley

Elevation 1+ converted

Operating & Maintenance Manual

[ORIGINAL]

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The contents of this manual are believed to be correct at the time of printing. In a commitment to a policy of continuous development and improvement, Kinesys reserves the right to change the specification of the product or its performance, or the contents of this manual, without notice.

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1 Introduction

1.1 Product Introduction

Kinesys converted VTE Beam Trolleys combine the bearing mechanism design of a VTE trolley with the variable speed control of the Elevation 1+.

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 slave trolley is also provided, which can be attached to the master 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, functions and means of operation of the Kinesys converted VTE Beam Trolley.

This manual applicable to the following products variants:

- BMT-00-0110 Motorised trolley 2T 400V
- BMT-00-0120 Motorised trolley 2T 208.

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.

2 Safety Information

WARNINGS

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

- **Only personnel fully familiar with the operations and procedures outlined in this manual are permitted to operate the beam trolley.**
- **Do a full risk assessment of the location where you intend to use the beam trolley and its connected devices.**
- **Make sure you know the locations of the emergency stop buttons on all connected devices and systems.**
- **Alternative, software independent means of stopping must be provided, including a hardware emergency stop system that is compliant with all local regulations.**
- **If you notice any unexpected or dangerous movements, use the emergency stop button/s to bring all movement to an immediate stop.**

- **Do not use the beam trolley unless all emergency stop buttons are connected and functioning properly.**
- **Do not start movement operations until a competent and trained person has inspected the connected equipment.**
- **Do not use the beam trolley if it does not appear to be in 100% working order.**
- **Do not modify the beam trolley unless instructed to do so by Kinesys.**
- **Before starting work on electrical components switch off the main power supply and make sure it cannot be switched on again unintentionally.**
- **Do not leave a suspended load unattended for a longer period of time than necessary.**
- **Do not exceed the rated capacity of the beam trolley.**
- **Do not use the beam trolley for the transportation of people.**
- **Do not pull the attached load to the side.**
- **Do not use the beam trolley without having a clear view of all the attached devices and loads. If you do not have a clear view, make sure you have reliable communication with someone who does.**

2.1 Operating environment

The beam trolley is designed for indoor use only and to work in ambient temperatures between 0°C to 40°C (32°F to 104°F).The beam trolley has an Ingress Protection (IP) rating of IP55 (protected against dust and water jets).

2.2 Transport and storage

Condensation

The beam trolley 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 beam trolley to a power source immediately. Leave the beam trolley disconnected until the unit has reached a safe temperature.

Shocks

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

Handling

Do not lift the beam trolley controller by cables or connectors as this may cause damage to the unit and/or the cable.

Packaging

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

3 Beam trolley layout

3.1 Encoder side layout

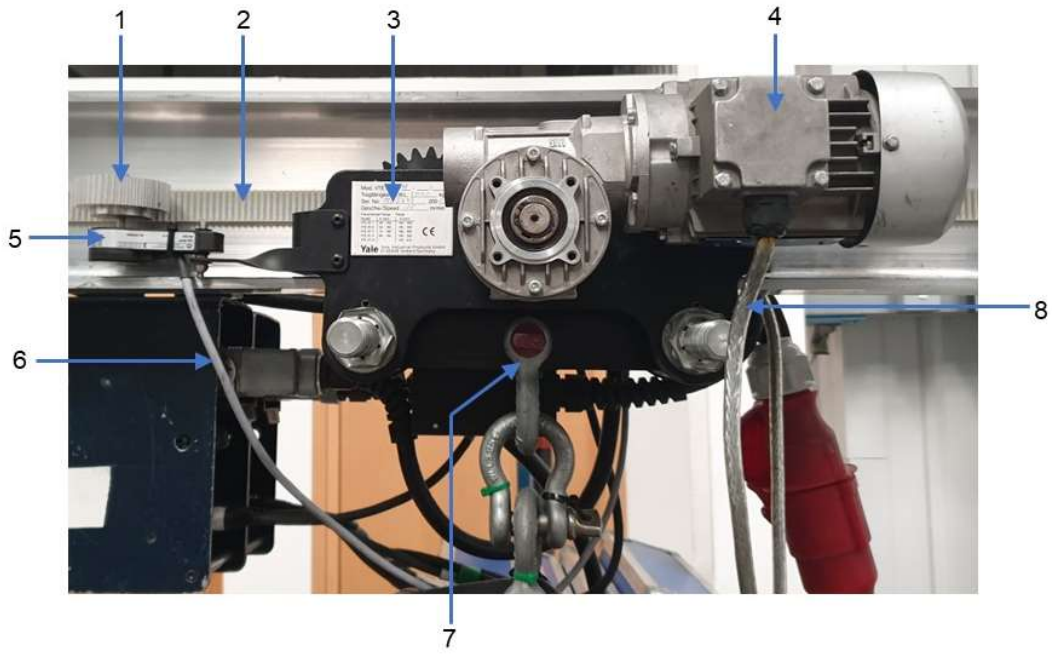
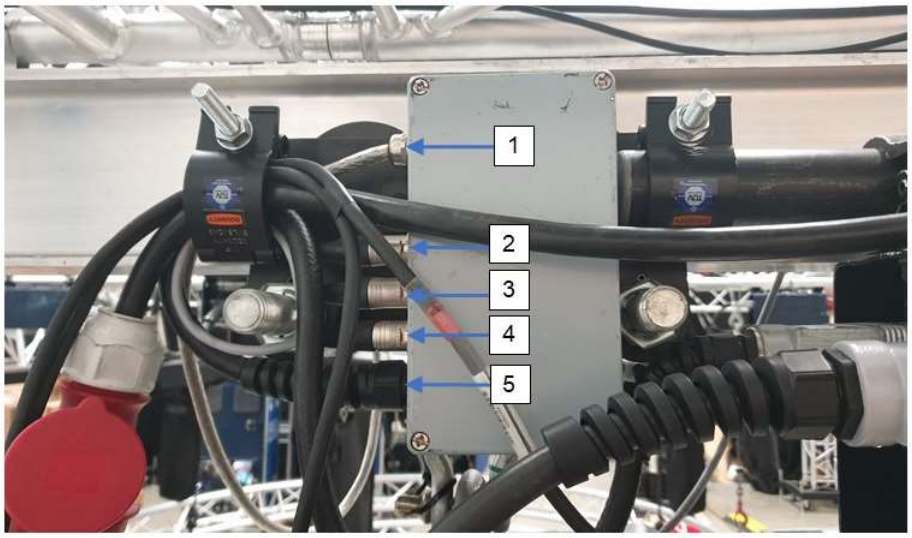


Figure 1 Beam trolley layout – encoder side

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.



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 tail** – connects to the Elevation 1+ controller for power and data.

4 Operation

4.1 Connecting to and 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.

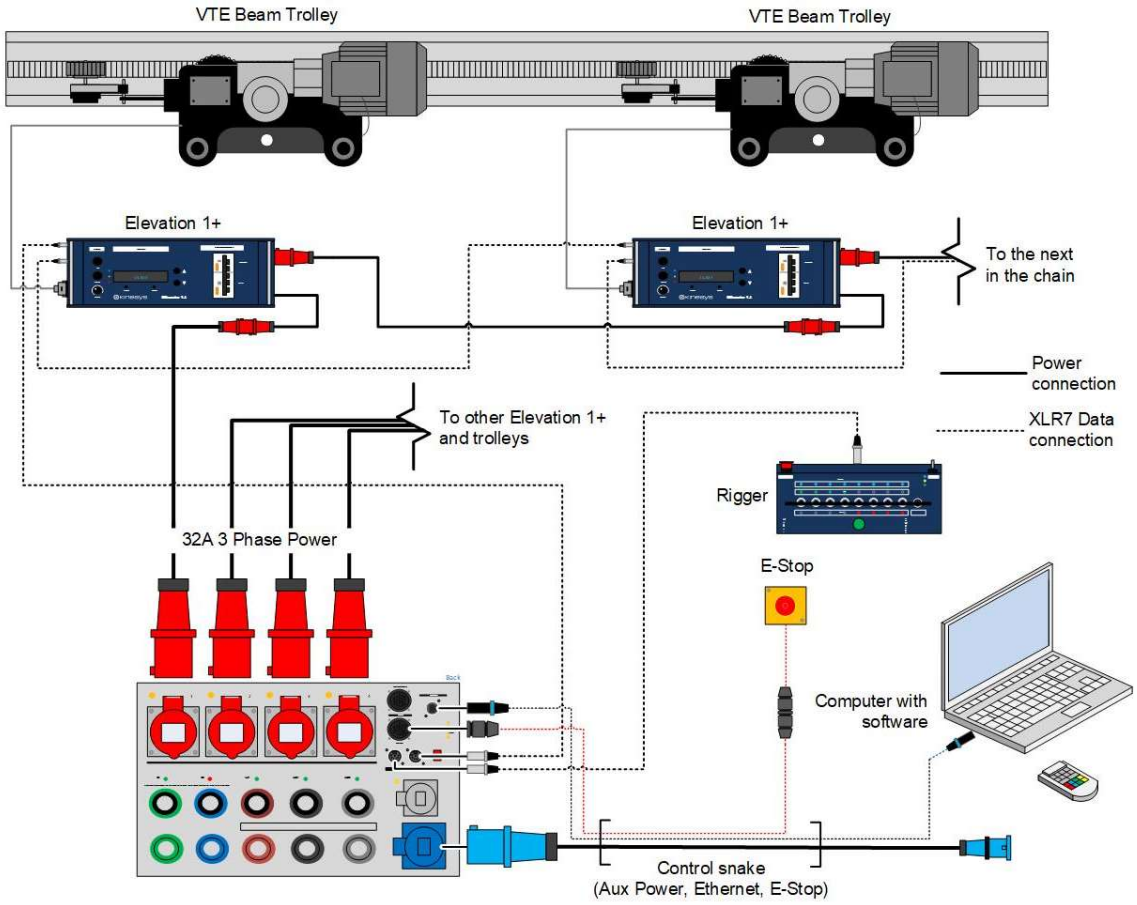


Figure 2 Example beam trolley system

To operate each beam trolley, it must be connected to its own dedicated Elevation 1+ controller to provide the necessary power and data communications. The Elevation 1+ controller/s 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 1+ controller.

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

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

4.1.1 Attaching a slave beam trolley

A second beam trolley may be attached to the original to create a master and slave beam trolley system. Slave beam trolleys can be connected using a connecting beam, which attaches to the clamps on the control box side.

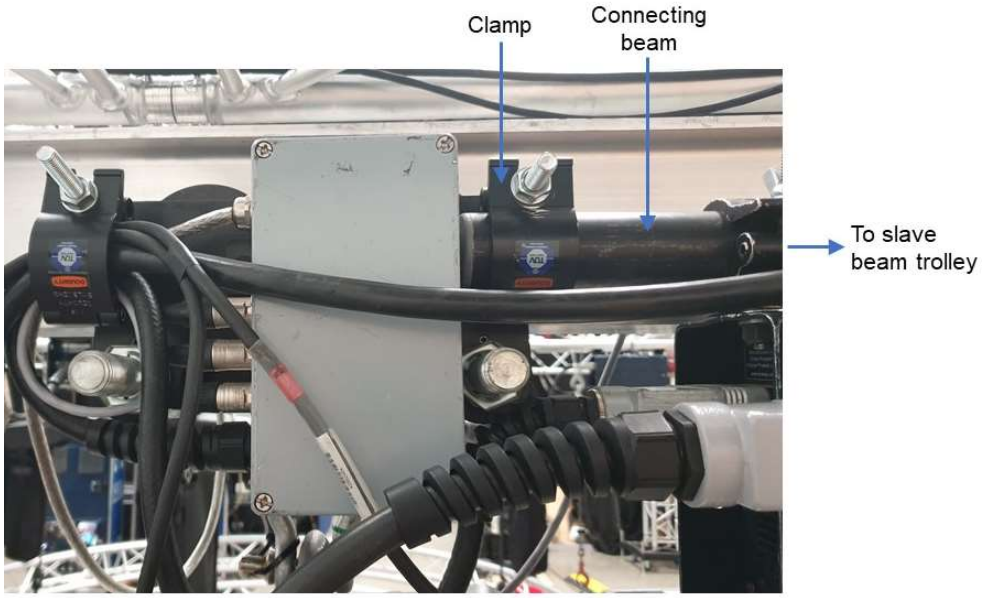


Figure 3 Attaching a slave beam trolley

Note that the slave trolley does not require connection to an Elevation 1+ controller as it is either pushed or pulled by the master trolley, depending on the direction of movement.

4.2 Attaching the tooth belt to the beam

Warning! **The position of the tooth belt must be correct 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 shall be 40 mm. This applies to all sizes of beam. The tooth belt must be attached on the side of the beam that will have the encoder and motor – this is the side that is visible in Figure 2.

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.

4.3 Assembling the beam trolley

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

To assemble the beam trolley to the beam, refer to Figure 4 and continue as follows:

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 1+ controller using the Harting cable supplied with the Elevation 1+.
11. By 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 4.4 and 4.5 respectively.

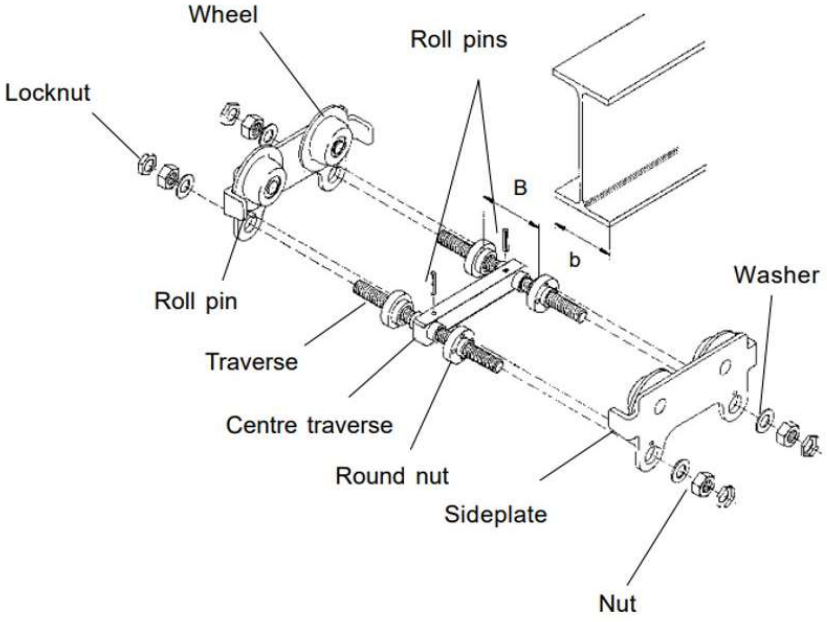


Figure 4a Assembling the beam trolley

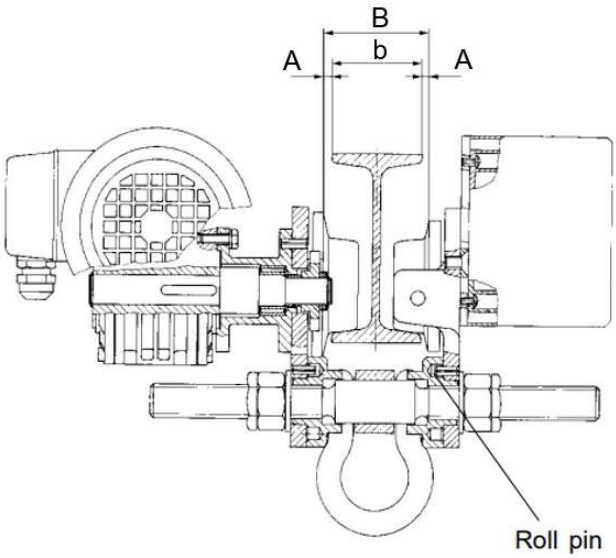


Figure 5b Assembling the beam trolley

4.4 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 6.

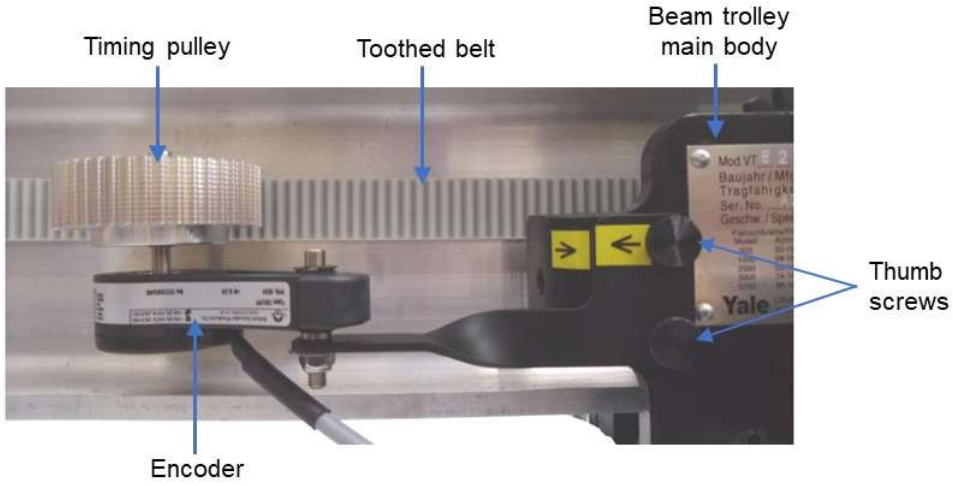


Figure 6 Mounting the encoder

4.5 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.

To adjust the encoder, continue as follows:

1. Remove the 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 7 Adjusting the encoder

4.6 Inspection before initial operation

Before initial operation, make sure of the following:

- Inspect the beam trolley and all other load bearing constructions for defects and damage. Make sure the beam trolley has not damaged by incorrect storage or transportation. In particular, check that the roll pins are correctly fitted.
- Check that the trolly, hoist and load are correctly seated. The selection and calculation of the suspension point is the responsibility of the user.
- Check the beam structure for correct assembly and visually check for defects, deformations, cracks, wear, and signs of corrosion.
- Check that 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.

4.7 Operating the beam trolley

Movement of the beam trolley can either be via the Elevation 1+ controller, a remote controller or computer software such as Vector or K2. The principle of operation is the same as moving hoists up and down, with up command = forward and down command = backwards.

If you wish to reverse the direction of movement when sending up/down commands, see section 4.9.

4.8 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 Kinesys if you require support in rectifying or repairing the beam trolley.

4.9 Reversing the rotor direction

The rotor within the control box of the beam trolley are hardwired to work in a given direction when an up 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.

4.9.1 Swapping motor phases

1. Remove the control box cover.
2. Swap the black and brown wires shown above. Once swapped the black wire should be connected to the first terminal T1 and the brown wire to the second terminal T2 as shown below.

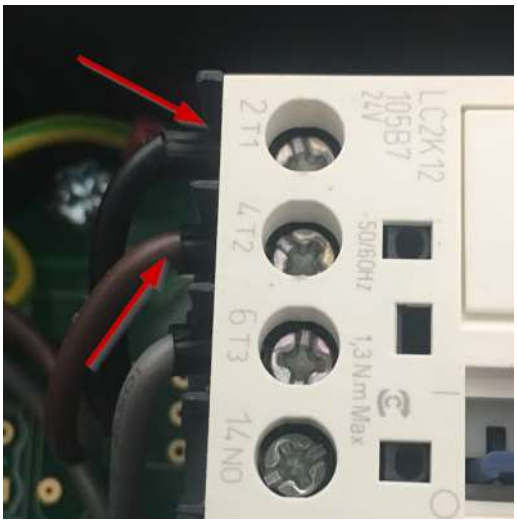


Figure 8 Swapping motor phases

3. Refit the control box cover.

4.9.2 Swapping encoder signals

To swap the encoder signals two wires must be re-soldered. This must be done with the encoder cable disconnected from the control box.

1. 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.

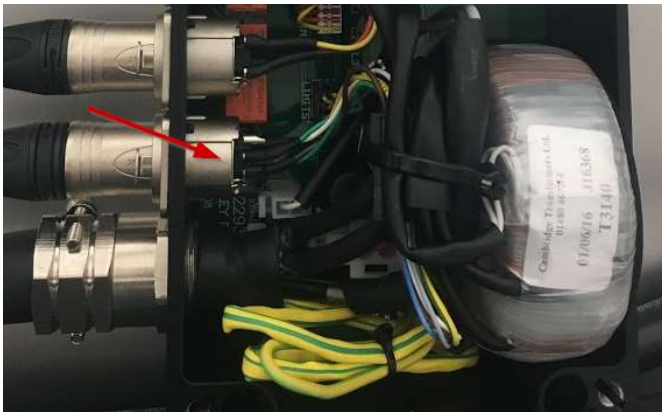


Figure 9 Removing the encoder cable

2. Remove the encoder cable assembly. Once removed it will look as shown below.

Figure 10 Removed encoder cable assembly

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

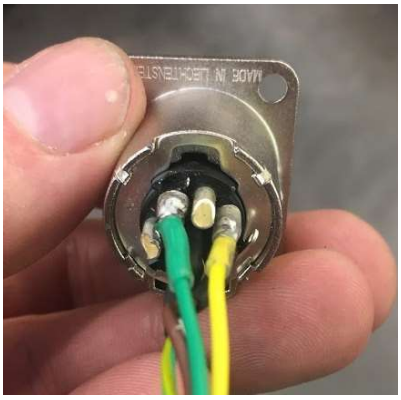


Figure 11 Swapped encoder wires

4. Reassemble the encoder cable assembly to the control box.
5. Refit the cover of the control box.
6. 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 Kinesys for further support.

5 Product Specification

Feature	Specification
Power Supply	230V/400V 3-phase, 32A 50-60Hz
Mains connection	Harting 8+24 to suit Elevation 1+ controller
Control box connections	- Motor cable - XLR7 data inputs – up/down limit switches and encoder cable - Elevation tail
Accessories	- Shorting plugs x2 (for limit switch connections) - Slave trolley - Tooth encoder drive belt
Cooling	Convection
Environmental	Ingress Protection (IP) rating of IP55 (protected against dust and water jets)
Operating Temperature	0°C to 40°C (32°F to 104°F)
Dimensions	TBD
Weight	TBD

6 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.

7 Declaration of Conformity

The below is a sample only. Individual declarations of conformity are supplied with each beam trolley.

kinesys

CE

ORIGINAL

EC Declaration of Conformity

manufacturer: **Kinesys Projects Limited**
address: **Unit 2 Kempton Gate, Oldfield Road, Hampton, Middlesex. TW12 2AF**

in accordance with the following EC directives:
Machinery Directive 2006/42/EC
EMC Directive 2014/30/EU

declares that the products :
description: **Kinesys Elevation Trolley**
Model BMT-00-0110 (VTE Type 400V)
serial number: **xxxxxx**

are 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 60204-1	**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**

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.

The party authorised to compile the technical file is:
Kinesys Projects Limited
Unit 2 Kempton Gate, Oldfield Road, Hampton, Middlesex. TW12 2AF

Equipment referred to in this Declaration of Conformity was first manufactured in 2016

A M Cave
Technical Director
Hampton, 27 January 2016

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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