Rigger

Product Manual

Manual Version 1.7.0

Rigger

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Table of Contents

1 Introduction

The Rigger 8, Rigger 16 and Rigger 24 are handheld control units designed specifically for use with Kinesys' Elevation range of chain hoist control products. They offer a very straightforward and simple way to control chain hoists, both fixed and variable speed. The chain hoists are controlled via Elevation controllers and can be used in place of, or in conjunction with, a computer control system. The units are modeled on industry standard handheld chain hoist controllers and as such offer an instantly recognisable method of operation. Their simplicity and rugged construction ensures that the units can be operated safely with a minimal amount of training.

This manual was written referencing version 1.5.1 of the Rigger software.

Note:
Rigger controllers with software version 1.1.0 or higher installed will only offer full functionality with Elevation 1+ control units having software version 3.12 or higher installed. The Rigger will still operate units with an earlier software version but all the features including limit bypass will not be available.

2 Safety Advice

If in doubt about any aspect of moving objects always seek professional advice.
SAFETY MUST ALWAYS BE THE FIRST PRIORITY!

- If you are unsure of any aspect of moving loads with the system stop and seek professional advice on the appropriate usage of the system.
- Never run the system without all and emergency stop switches connected and in position. “Cheater” plugs (where supplied) are for the purpose of maintenance and fault-finding only, and should never be used to bypass the emergency stop system during a performance.
- Ensure all operators and maintenance personnel are aware of the location of emergency stop switches.
- Test the emergency stop system daily.
- Never operate hoists without having a clear view of the load or reliable communication with an observer
- If an unexpected move presents a potentially hazardous situation, use the emergency stop button to bring all axes to an immediate stop.
- Use extreme caution when using any limit bypass facilities in the system.
- Carry out a full risk assessment for your particular application.
- Only allow competent personnel to operate the system.

3 Specifications

Power Supply	24V D.C
Enclosure	2 / 1.6mm Aluminum, RAL5011 stove enamelled and silk screened
Environmental	IP40
Operating Temperature	0 - 55°C (32 - 131 F)
Dimensions	284 x 170 x 86 (8 way) 284 x 254 x 86 (16 way) 284 x 338 x 86 (24 way)
Weight	1.4 kg (8 way) 2.1 kg (16 way) 2.8 kg (24 way)

4 Self Test Mode

Display Software Version Number

If the Rigger is powered on with the control key switch in the spring loaded Limits position the version number will be shown on the controller indicators, in binary format. The status indicators show the major version number, the up indicators show the minor version number and the down indicators show the revision number. The least significant bit of each binary number is represented by channel 1 and the most significant bit by channel 8.

For example V1.4.1 would be indicated by
Channel status Light 1 = 1
Channel up light 3 = 4
Channel down light 1 = 1

In another example V1.5.0 would be indicated by
Channel status light 1 = 1
Channel up lights 1 and 3 = 5
Channel down lights all off = 0

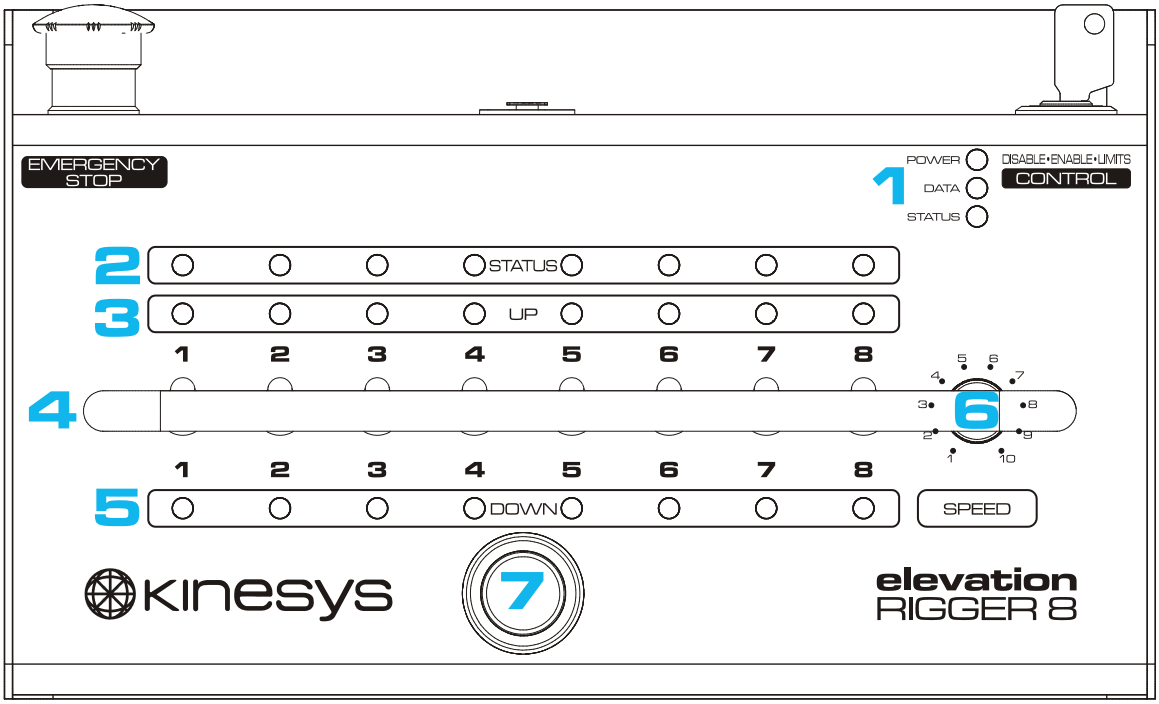
Self Test mode

If the Rigger is powered on with the control Key switch in the spring loaded Limits position and any channel select switch not in the OFF position. The self test mode will be entered a short time after the software version number has been displayed. The unit will exit this mode when all channel select switches are in the OFF position. Any channel select switch that is not in an OFF position will illuminate either the up or down indicator to show that the system has read the switch correctly. The Speed Control will illuminate the Status indicators, and the GO button will invert these indicators.

Self Test mode in Firmware Versions prior to V1.5.0

For Rigger firmware versions prior to V1.5.0 DIP switch 6 is used to enable the display of the software version number. As above if any channel select switch is not in an off position the self test mode will be entered.

5 Top View



1. **UNIT POWER, DATA AND STATUS INDICATORS**
   Provide feedback about the current state of the controller

2. **CHANNEL STATUS INDICATORS**
   Shows the current state of each channel and its associated chain hoist controller

3. **UP DIRECTION INDICATORS**
   Show whether a channel has been selected to run up and whether there is a fault in that direction

4. **DIRECTION SELECTION SWITCHES**
   Select the desired direction of travel for each chain hoist

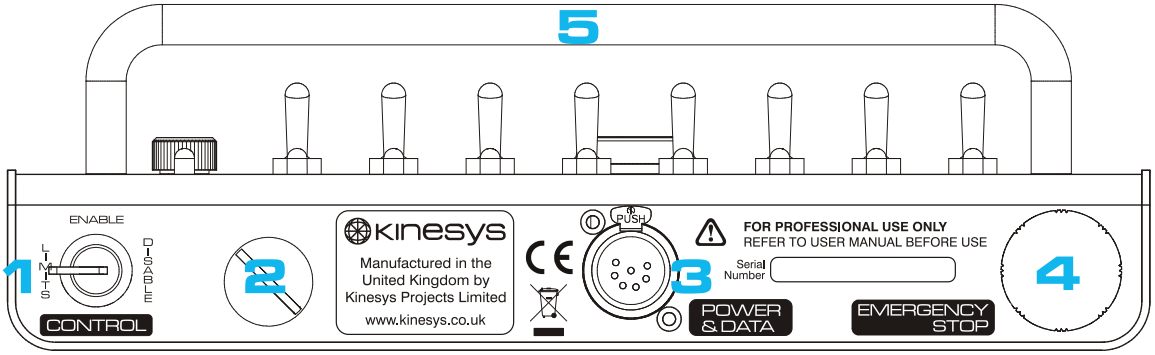
5. **DOWN DIRECTION INDICATORS**
   Show whether a channel has been selected to run down and whether there is a fault in that direction

6. **SPEED CONTROL**
   Set the running speed of all chain hoists at a value between zero and the maximum speed defined by the DIP switches

7. **RUN BUTTON**
   Press and hold to make the selected channels move

6 Rear View

Rear View



1. **CONTROL KEY-SWITCH**
   Selects between unit disabled, unit enabled and software limits bypass enabled

2. **DIP SWITCHES**
   Concealed behind a cover the DIP switches allow the unit to be configured for the chain hoists being controlled

3. **POWER/DATA IN & CONTROL OUT**
   Data, supply voltage, emergency stop and remote enable are supplied and controlled through this connection

4. **EMERGENCY STOP**

5. **PROTECTION HANDLE**
   Used to provide physical protection to the switches and to prevent them from being selected by accident

7 Software

The Rigger handsets communicate with chain hoist controllers via a digital data link. The software within them is designed to make the controllers as easy to use as possible. There are several settings, however, that can be set by the user. These customise the controllers and allow them to be optimised to work with the chain hoists that are being used. These settings are selected using DIP switches that are located behind a protective cover on the back of the controller and their functions are outlined later in the manual.

In addition to the familiar up and down direction indicators each channel also has an indicator which informs the user of the status of the channel. Whether the indicator is illuminated, steady on or flashing illustrates the channel's current state.

Three unit status indicators also exist which show the current state of the communications with the units, the emergency stop and enable switch status and whether the microprocessor is powered and running.

8 Indicators

Power

The power indicator is controlled by the microprocessor in the unit. Once illuminated it shows that the microprocessor is running correctly.

Data

The data indicator provides a way of detecting any faults in the communications with the chain hoist controllers. Under normal operating conditions the indicator will be continually illuminated showing that the controller has good communications with its attached Elevation control unit(s). The indicator is turned off whenever the Rigger controller is not getting responses from a controller that it has detected during its initial scan of addresses. For example if four chain hoist controllers were detected initially and then one of them is removed from the system the indicator will be on for approximately 75% of the time and off for 25%. If half the units were removed the flash rate would be 50% on, 50% off. When used in conjunction with the channel status indicators the data indicator provides an easy way to detect communications faults in the system.

Unit Status

The status indicator can illuminate in one of three colours, red, yellow or green. It shows the current state of the Rigger controller. The indicator will flash the current colour if the software limits bypass is active and will be steady if the software limits are intact.

Red

This shows that the emergency stop on the unit is pressed and no movement is possible, all connected units will show faults on their status indicators.

Yellow

The emergency stop has been released but the enable key-switch is set to ‘OFF’ and not ‘ON’ or ‘ENABLE’. The connected units are in standby but cannot be moved as their hardware enable line is not present.

Green

The unit is ready to operate. The emergency stop is released and the key-switch has been set to ‘ON’ or ‘ENABLE’.

Channel Status

Each channel on the Rigger controller has a status indicator associated with it. This tells the user whether a chain hoist controller is present on that channel and if so the current state of that controller. The status indicator can be in one or four states, each of which are detailed below.

Off

No chain hoist controller was found for this channel. In standard addressing mode this means that the specific address that relates to that channel could not be found. In auto addressing mode this means that all the active chain hoist controllers have already been found and are located on channels lower than this one.

Steady On
If the status indicator is lit constantly then the chain hoist is standing by and ready to run.

Slow Flash
A slow flashing indicator is shown when the hoist has been selected to move and the ‘ GO’ button is pressed.

Fast Flash
Fast flashing indicates either a fault with the chain hoist controller or that the Rigger controller cannot communicate with the controller. Channels with fast flashing status indicators cannot be moved and if their direction switch is set to either up or down then no movement will be allowed on any channel on the Rigger controller until the faulty channel has either its direction select switch set to ‘OFF’ or the fault is rectified.

The chain hoist controllers can also send back warning information as well as fault information. When this happens the status indicator will flash for a short period of time and will then clear back to ‘Steady On’. If the warning message relates to movement in a certain direction e.g. struck upper hard limit, then the appropriate direction indicator will continue to flash to indicate which direction cannot be selected.

Channel Up/Down

Each channel has a channel up and channel down indicator. A green indicator represents the up direction and a red indicator is used for the down direction. Like the status indicator these indicators have several states.

Off
Movement in this direction is not selected.

On
Movement in this direction has been selected. The status indicator for this channel must be ‘Steady On’ for movement to occur when the ‘GO’ button is pressed.

Fast Flash
The chain hoist controller for this channel has issued a warning to state that movement in this direction is prohibited.

9 Operation

The Rigger control units were designed with ease of operation as a priority.

Rigger controllers connect to the Elevation range of controllers via the data/power connection fitted to every unit. The Rigger controllers draw their power from the Elevation units and as such do not need an external power supply. Rigger controllers communicate with Elevation units using the same protocol as the Vector computer control system and therefore where a large number of hoists are being used it may be preferable to set up the units using the computer system before using the Rigger controller for manual operation.

Each Elevation chain hoist controller has upper and lower software limits. These are the maximum and minimum positions that the Elevation controller will move its associated chain hoist(s) between. By setting these appropriately the Rigger controller can be used to move motors between exact upper and lower positions with full speed control. The following explanation about the operation of the Rigger controller assumes that the Elevation controllers have already been set up correctly.

9.1 Power Up

If a cable is connected between the Rigger controller and an Elevation control unit then as soon as the Elevation unit is powered up the Rigger controller will also power up. Depending on the DIP switch settings the unit may display the version number of the software on its indicators before starting the self-test and scanning operations.

The self-test procedure consists of illuminating all the indicators for channel 1, then for channel 2 etc. up to either channel 8, 16 or 24 depending on the controller type. This allows the user to confirm that all the indicators are working correctly.

The Rigger controller then scans for Elevation controllers connected to the network. This can take milliseconds in standard addressing mode and up to 5 seconds when the unit is set to automatic addressing. During this time the power indicator will flash.

Once the address scan is complete the unit is ready for operation. Channels that have been successfully located will have their status indicators illuminated.

9.2 Running Chain Hoists

Using the direction select switches set each channel to either ‘UP’, ‘OFF’ or ‘DOWN’. Any channels showing faults must have their switches set to ‘OFF’ as they will stop any of the other channels moving if this is not done.

If the hoists to be moved include variable speed motors then set the speed control to an appropriate speed and press and hold the ‘GO’ button. Fixed speed chain hoists connected via Elevation 1 or Elevation 24 controllers will start moving immediately. Variable speed chain hoists connected via Elevation 1+ controllers will accelerate to the speed chosen on the speed control. The speed of the variable speed units can be changed mid-movement if required. All moving variable speed hoists will be affected by this change.

As the hoists reach their software limits they will stop automatically, unless the key-switch is in the ‘limits bypass’ position, if you wish to stop the movement before the hoists reach their limits release the ‘GO’ button. Fixed speed hoists will stop immediately, variable speed chain hoists will decelerate to a stop using the ramp rate set in the ‘FAST’ parameter within the Elevation 1+ unit.

If any of the selected channels develop a fault while moving all the hoists will be stopped. To start the hoists moving again either the fault must be cleared or the channel with the fault must be deselected.

10 DIP Switch Settings

Eight DIP switches are available to the user. To access them unscrew the protective blanking plug on the back of the unit. Through the hole the switches are numbered one to eight from left to right. The switches are OFF when they are in the down position and ON when they are slid to their top position.

DIP Switch	Setting	Use
1	OFF	Standard Addressing
	ON	Auto Addressing
2 and 3	OFF – OFF	Addresses 1 → 8
	ON – OFF	Addresses 9 → 16
	OFF – ON	Addresses 17 → 24
	ON – ON	Addresses 25 → 32
4 and 5	OFF – OFF	Maximum Speed – 100 mm/s
	ON – OFF	Maximum Speed – 200 mm/s
	OFF – ON	Maximum Speed – 400 mm/s (See Note Below)
	ON – ON	Maximum Speed – 800 mm/s (See Note Below)
6 and 7	OFF – OFF	Acceleration / Deceleration Ramp Rate – 100 mm/s/s
	ON – OFF	Acceleration / Deceleration Ramp Rate – 200 mm/s/s
	OFF – ON	Acceleration / Deceleration Ramp Rate – 400 mm/s/s
	ON – ON	Acceleration / Deceleration Ramp Rate – 800 mm/s/s
8	OFF	Operating Mode
	ON	Programming Mode

Note: The dip switch settings shown above, relate to Rigger units with software version 1.5 onwards. The dip switch settings for previous versions of the Rigger software are shown in the Legacy Dip Switch Settings section of this manual.

Address Mode

Two addressing modes are available, Standard and Auto Addressing.

Standard addressing assigns addresses sequentially, starting with channel 1 and finishing with channel 8 or 16 depending on the controller type. The start address is determined by the setting of DIP switches 2 and 3.

Auto addressing scans all the available addresses from 1 to 999 and assigns them to channels on a first found, first assigned basis. The scan of all addresses occurs on

power up and as a consequence the unit can take up to 5 seconds to complete its scan before operation of the discovered controllers can begin. When using auto addressing care must be taken to ensure that all the chain hoists controllers are powered up before the Rigger starts it scan. If this is not the case then units may be assigned in an unexpected order and therefore hoists may not appear on the channels numbers as expected.

Address Banks

When used in standard addressing mode the start address for channel 1 can be set via DIP switches 2 and 3. This can be set to either 1, 9, 17 or 25 using a combination of the two switches as outlined in the table above.

Maximum Speed

The Rigger control units can control a variety of chain hoists at the same time. As each chain hoist type will have its own maximum speed, sending the position of the speed control as a percentage 0 - 100% would result in the different hoists running at different speeds. The speed is therefore sent to the units as a value in millimeters per second. The speed range is determined by the maximum speed set by DIP switches 4 and 5.

NOTE
In versions of Rigger software prior to 1.5 the maximum speed settings were 100, 200, 300, 400 this has now been changed to 100, 200, 400, 800 to allow for a wider range of control.

Ramp Rate

DIP switches 6 and 7 are used to set the ramp rate, for moves normally a rate of 100mm/s/s is adequate for most situations, but faster motors may require higher ramp rates.
The Ramp rate can only be set in Rigger firmware 1.5 or greater, in earlier versions of the software the Ramp rate was fixed at 100mm/s/s. In earlier versions of the firmware these switches should be left in the off position.

Programming Mode

Development of Rigger controllers is an on-going process and as new features and facilities are added to the software you may wish to take advantage of these by upgrading your controller. This can be done very simply and full details of how to do this will be supplied with any software upgrades. The software can be downloaded from any personal computer that has an available serial port. When programming new software into the controller DIP switch 8 is set to the ON position. At all other times and for normal operation this switch should be left in the OFF position.

For further information or to obtain new versions of the Rigger software please contact Kinesys technical support (details at rear of manual).

10.1 Legacy Dip Switch Settings

As the Rigger software has evolved, the dip switch settings have changed to accommodate new features. Listed below are the dip switch settings for previous versions of the Rigger software. For instructions on displaying which version of the Rigger software a unit has, see the Self Test Mode section of this manual.

Version 1.0 - 1.2

DIP Switch	Setting	Use
1	OFF	Standard Addressing
	ON	Auto Addressing
2 and 3	OFF – OFF	Addresses 1 - 8
	ON – OFF	Addresses 9 - 16
	OFF – ON	Addresses 17 - 24
	ON – ON	Addresses 25 - 32
4 and 5	OFF – OFF	Maximum Speed – 100 mm/s
	ON – OFF	Maximum Speed – 200 mm/s
	OFF – ON	Maximum Speed – 300 mm/s
	ON – ON	Maximum Speed – 400 mm/s
6	OFF	Skip Version Number Display
	ON	Show Version Number on Power Up
7	OFF	8 Channel Unit
	ON	16 Channel Unit
8	OFF	Operating Mode
	ON	Programming Mode

Version 1.3 - 1.4

DIP Switch	Setting	Use
1	OFF	Standard Addressing
	ON	Auto Addressing
2 and 3	OFF – OFF	Addresses 1 - 8
	ON – OFF	Addresses 9 - 16

	OFF – ON	Addresses 17 - 24
	ON – ON	Addresses 25 - 32
4 and 5	OFF – OFF	Maximum Speed – 100 mm/s
	ON – OFF	Maximum Speed – 200 mm/s
	OFF – ON	Maximum Speed – 300 mm/s
	ON – ON	Maximum Speed – 400 mm/s
6	OFF	Skip Version Number Display and Switch Test
	ON	Show Version Number and Switch Test on Power Up
7	OFF	Elevation 1/1+ Comms Mode
	ON	Elevation 24 Comms Mode
8	OFF	Operating Mode
	ON	Programming Mode

11 Contact Information

If you would like to get in touch with Kinesys then please use any of the following methods.

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Feedback

We are always keen to hear feedback from the users of Kinesys products. If you have a feature request, any comments about the documentation or just want to say hello, please get in touch.

In the unlikely event that this product has not performed to the high standards that we work to and our users expect then please let us know as soon as possible.

To leave feedback please email feedback@kinesys.co.uk or call us on +44 (0)20 8481 9850.

If you require technical support please contact us either at +44 (0)20 8481 9850 or support@kinesys.co.uk