MARK ROBERTS MOTION CONTROL

# ANIMOKO

PROFESSIONAL TABLE-TOP ANIMATION MOTION CONTROL RIG

## QUICK START GUIDE

QSG Product Code: MRMC-1495-02
Product covered: MRMC-1193-03

## Animoko Quick Start Guide

QSG Product Code: MRMC-1495-02
Product covered: MRMC-1193-03

© 2020 Mark Roberts Motion Control Ltd. All rights reserved.

No part of this publication may be reproduced, transmitted, or translated by any means — graphical, electronic, or mechanical — including photocopying, recording, taping, or storage in an information retrieval system, without the express written permission of Mark Roberts Motion Control.

Although every care has been taken to ensure that the information in this document is accurate and up to date, Mark Roberts Motion Control continuously strives to improve their products and may make changes to the hardware, firmware, and software described in this document. Mark Roberts Motion Control therefore cannot be held responsible for any error or omission in this document.

All product names mentioned herein are the trademarks or registered trademarks of their respective owners.

**Contact information**

**Mark Roberts Motion Control Ltd.**
Unit 3, South East Studios
Blindley Heath
Surrey
RH7 6JP
United Kingdom

| | |
|---|---|
| Telephone: | +44 (0) 1342 838000 |
| E-mail: | info@mrmoco.com (sales and general enquiries)<br>support@mrmoco.com (customer support) |
| Web: | www.mrmoco.com<br>www.mrmocorentals.com |

# Contents

**Chapter 1 Assembling the hardware ..... 1**

Safety ..... 1
Overview ..... 1
General procedure ..... 4
Mounting the Animoko on a track ..... 5
Mounting the Animoko on the track bearings ..... 5
Mounting the track motor gear and pinch wheel ..... 8
Mounting the head ..... 10
Adjusting the Outer Arm Height ..... 11
Connecting the cables ..... 13
PC - RT-14 - umbilical cable - Animoko connections ..... 13

**Appendix 1 Animoko pinouts ..... 16**

Track, Lift, Rotate, Extend, Pan, Tilt, Focus and Zoom ..... 16
Mains In connector ..... 16
E-Stop connector ..... 17
Ethernet Connector ..... 17
Trigger connector ..... 17

**Appendix 2 Dragonframe ..... 18**

**Appendix 3 Specifications ..... 22**

Animoko 1200 ..... 23
Animoko 900 ..... 24

# Chapter 1 **Assembling the hardware**

## Safety

- Due to the size and weight of Animoko components, it is recommended that you use at least **two** people to assemble it.

- Do not use around flammable gas. All electrical equipment can generate sparks that can ignite flammable gas.
- Keep away from pets and children. Animoko has powerful motors that can pinch, so take care not to get your hands trapped in the rig or cabling.
- Keep the equipment dry. The system has **not** been made weatherproof. Do not use with wet hands.
- Keep cables tidy. Use cable ties to keep them out of harm's way. If you have a head with slip rings then make use of them; avoid running any cables between Animoko and the rotating head or camera if possible.
- Use a 240V AC power supply that is properly **earthed** (grounded). This is not only for safety reasons; electrical noise on an unearthed system can make axes controller boards trip out unpredictably, interrupting the shoot and creating intermittent problems that can be difficult to trace.

## Overview

Thank you for using the Animoko motion control rig from Mark Roberts Motion Control (MRMC). Animoko is designed for precise stop-motion animation in professional studio environments.

- The ANIMOKO is a STOP FRAME ANIMATION RIG designed for stop-frame and 3D stereoscopic animation, where live action speeds are not required, the Animoko features very precise zero backlash gearing to ensure pinpoint accuracy
- The Animoko is ideal for table-top animation with full control of the track, extend, lift, rotate, panand tilt axes; plus has optional focus and zoom controls, delivering excellent flexibility for animators.
- The Animoko rig uses MRMC's Flair software to control its motion and integrates well with the Target Tracking feature, to deliver incredibly precise camera movement.
- There are two sizes of rig. The standard model has a 1200cm reach on lift and extend; the smaller 900cm.
- When fully retracted for storage both rigs is very compact, making it ideal for studios and education centres where space is at a premium
- Despite the rigs inherent safe operating characteristics it is provided with an E-Stop system, essential for preventing damage to expensive modelling during close-up work
- Can be used from a fixed position mounted to the floor, on wheels or track mounted on 3m lengths of rail providing an additional axis of motion.
- Track unit carries a mains supply for powering accessories for lighting or as needed at the rig head.
- Fully supports the mounting of either the SFH 30 or larger SFH 50 pan tilt heads including roll unit.

Animoko is typically part of a complete motion control system that includes:

- **Animoko** itself.
- The **trolley** wheels on which Animoko is mounted. You can use Animoko directly on wheels, or use the trolley wheels to lift Animoko onto a **track** or alternative base. You can leave the trolley wheels on or remove them.
- A **head** such as SFH-50, on which you mount your video camera.

- A Windows PC running **Flair** Motion Control Software.
- An **RT-14** interface box, which handles the connections between the triggers and the rig.
- Additional **controllers** such as a Hand-Held Box (HHB), MSA-20 Handwheels or Pan Bars.

# General procedure

1. Mount Animoko on a track - page 5.
2. Mount the head - page 10.
3. Connect the cables - page 13.

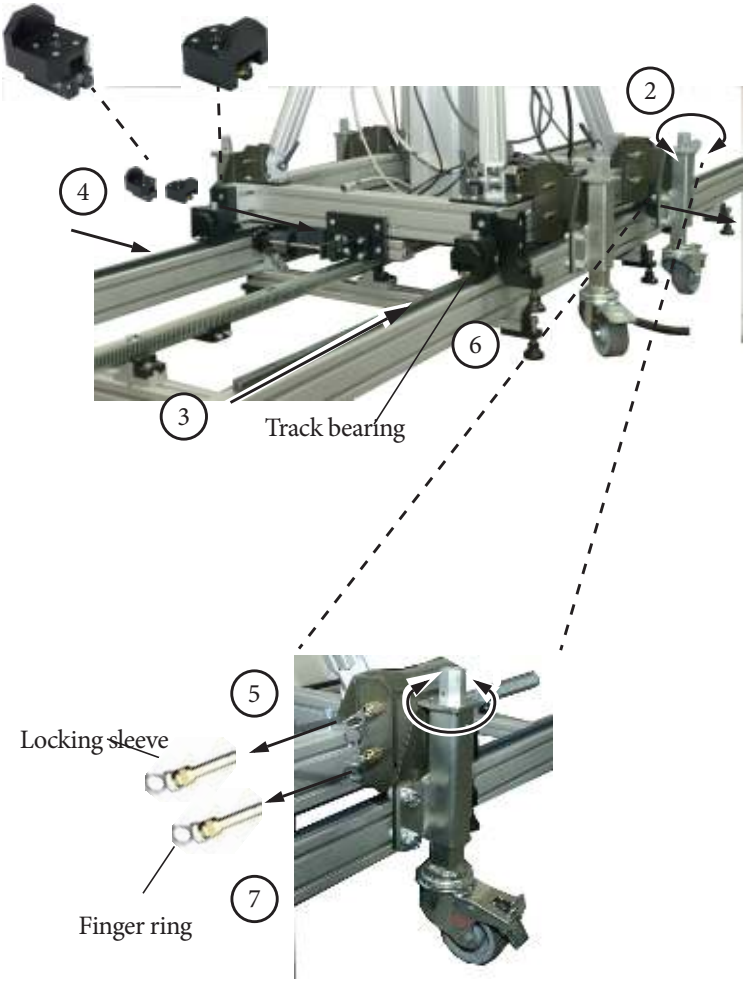
# Mounting the Animoko on a track

These instructions describe how to mount a heavy, fully built rig onto the track. If you want, you can mount the base on the track first and then build the rig on the track.

## Mounting the Animoko on the track bearings

1. Roll the Animoko to a position just off the end of the track, and rotate the base on its wheels to be the correct way around for the track. The base must be oriented so that when you install the track motor gear later in these instructions, the gear engages with the toothed side of the rack. Use the pictures below to help you orient the base, but do not install the track motor gear yet. If the track motor gear is already installed on the base you can leave it in place.

Animoko base with track motor attached



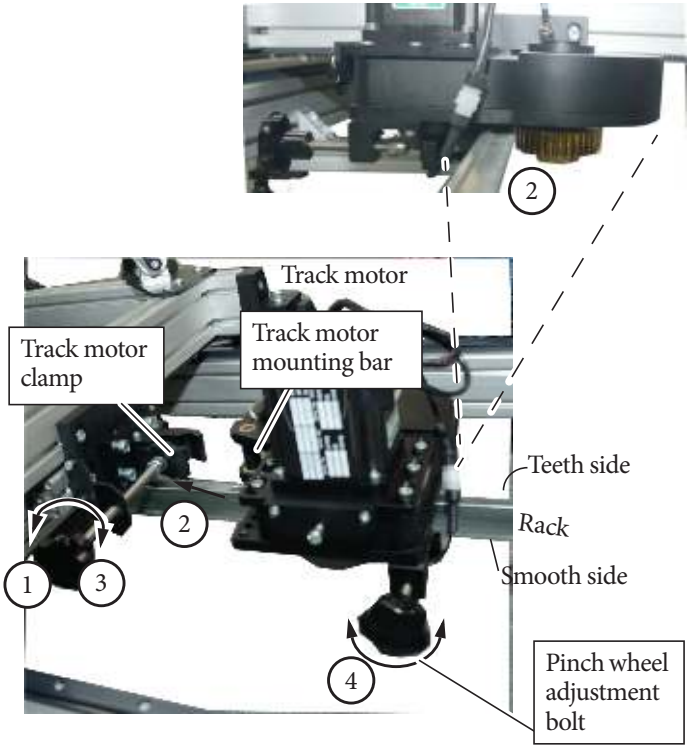

2. Rotate the wheel caps to raise the Animoko on its wheels high enough to go over the track with about 7 cm of clearance.
3. Roll the Animoko on its wheels over the track about a metre.

4. Push the four track bearings onto the ends of the bearing rails (two on each rail) and into position under the four corners of the Animoko base.

> Hint
>
> Always mount and remove the track bearings with care. Try to keep them squared up and in-line with the bearing rail to avoid damaging them or loosing a bearing.

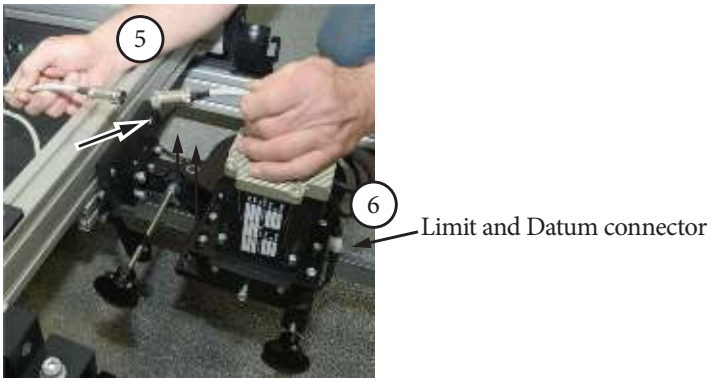
5. Carefully lower the Animoko onto the four track bearings, making sure that all four bearings are aligned with the corners of the Animoko base. If the track motor is already installed, make sure the track motor gear on the on the underside of the Animoko clears the rack. (The track motor pivots on its mounting clamp so you can move the track motor gear out of the way to clear the rack.)
6. Insert and tighten the four track bearing mounting bolts at the corners. You might have to raise or lower the base slightly so you can nudge the track bearings into perfect alignment and then completely tighten the bolts.
7. Raise the wheels off the ground and remove them by pulling out their retaining pins (two on each wheel). You must remove the wheels so they don't hit any track components when the rig is moving along the track.
8. Insert the pins back into the wheel units for safe keeping away from the rig. (Remove and reinsert the pins by using the finger ring only, not the locking sleeve.) If you are going to store the wheels for weeks or months, release the wheel brakes so they don't leave a dent in the wheel rubber.
9. Attach the track motor gear and pinch wheel, described in the next section.

## Mounting the track motor gear and pinch wheel




1. Turn the tightening knob to loosen the track motor clamp.
2. Mount the track motor assembly onto the Animoko base by inserting the track motor mounting bar into the track motor clamp. Ensure that the track motor gear meshes with the teeth side of the rack.
3. Turn the tightening knob to tighten the track motor clamp.
4. Hand-tighten the pinch wheel adjustment bolt so that the rubber pinch wheel presses against the back of the rack but not tightly. This

holds the track motor gear firmly against the toothed side of the rack.




5. Connect the track motor cable. Note that the motor itself might be mounted on the drive unit in an orientation other than that shown in the picture.
6. Ensure that the Limit (L) and Datum (D) connectors are connected.

## Mounting the head

You can mount the head under-slung as shown or over-slung.

- Mount the head to the front with 8 bolts.

  If a heavy camera is to be used, then counter weights can be added to the rear of the extend.

# Adjusting the Outer Arm Height

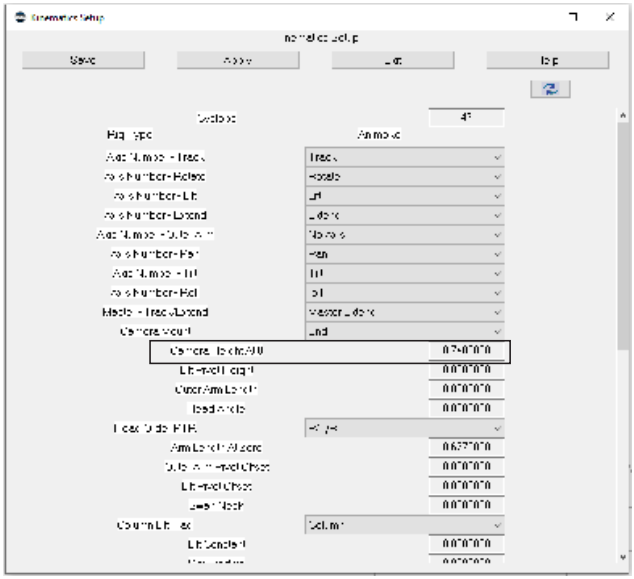
1. Unscrew the 4x M8 screws that attach the outer arm with the main arm.
2. Move the outer arm up or down as required.

> Note
>
> The outer arm can be adjusted by 65mm in each of 6 fixed positions up to a maximum of 390mm.

3. Replace the 4xM8 screws to secure the outer arm with the main arm.
4. Ensure that the cable ties in the outer arm are adjusted to allow for change in height so the cable is long enough to move when various axes in the rig move.
5. In Flair:

    5.1 Go to **Setups** → **Kinemetics Setup**.

5.2 Change the value of **Camera Height At 0** by the measure that you moved the outer arm up or down. When you move the outer arm up increase the existing value by 0.065m and when you move it down decrease the value for Camera Height At 0 by 0.065m for each step.



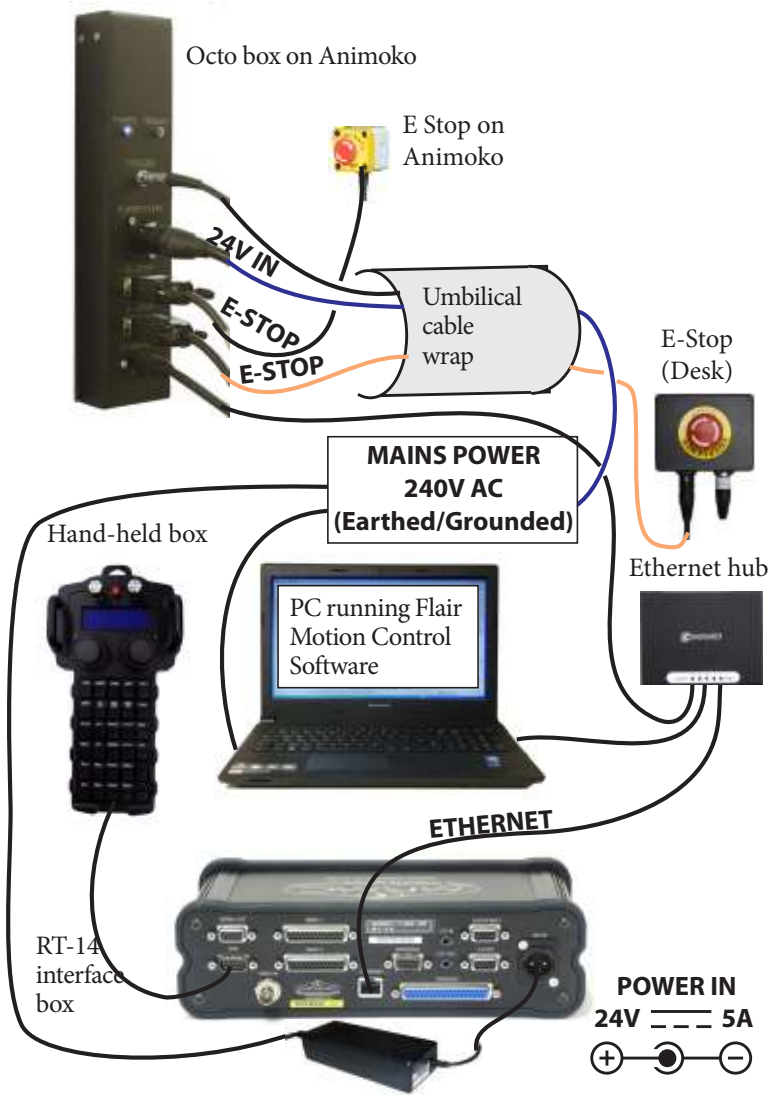
5.3 Save and Apply the settings.

5.4 **Rebuild** the model of the rig in the Rig Model view.

# Connecting the cables

## PC - RT-14 - umbilical cable - Animoko connections

If a hand-held box (HHB) is attached to the RT-14, the correct operating position for the key on the estop box is vertical. If a hand-held box is not attached, the correct operating key position is horizontal.

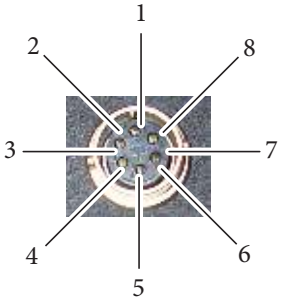


Notes

Notes

# Appendix 1 **Animoko pinouts**

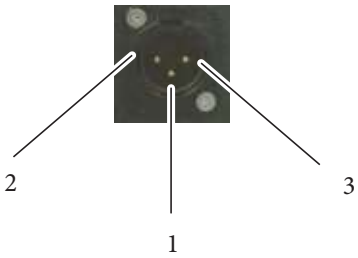
## Track, Lift, Rotate, Extend, Pan, Tilt, Focus and Zoom




1. GND
2. +24V
3. +5V
4. Limit In
5. Step
6. Direction

## Mains In connector

Power input connector for Animoko and its attachments. 240 Volts AC.




1. Earth
2. Live
3. Neutral

## E-Stop connector

E-Stop is a (9-way D-type Female) connector used for connecting the emergency stop to the Animoko. Short Pin1&Pin5 to enable the robot.

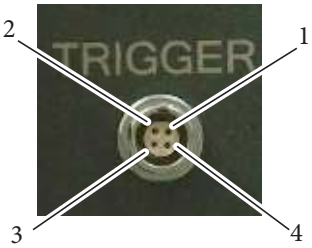
1. Pin1 – Estop1
2. Pin5 – Estop1

## Ethernet Connector

The Ethernet RJ45 connector in the Animoko controller box is connected to the hub on the computer stack (via the umbilical cable). This Ethernet port is rated at 100 Mbits/sec.

## Trigger connector

1. Gnd
2. Trigger 1
3. Trigger 2
4. +5V



# Appendix 2 **Dragonframe**

The Flair Motion Control software by MRMC is used to operate and program moves on the Animoko rig. You can also pair the Dragonframe stop animation software for more efficient workflow. The two scenarios for Flair and Dragonframe setup are:

**Flair and Dragonframe on different PCs**: In this case a network connection between Flair PC and Dragonframe PC needs to be established. If the Flair PC has an INtime running, then Intime holds the access to one network port installed. In this case, an additional network card will need to be used:

- A USB3GIG Ethernet adapter can be used, or
- A spare network port already installed ensuring that it is under Window operating system and not on INtime.

Note that both the Dragonframe PC and the Windows network ports should be on the same subnet. Now connect these network ports directly using a network cable.

If the Flair PC does not have INtime running, connect the Dragonframe PC with the network hub on the Flair PC.

**Flair and Dragonframe on the same PC**: If Flair and Dragonframe are on the same PC then you can connect them using the loop back address in Dragonframe — **`127.0.0.1:53025`**.

Perform the following steps after you have cabled together the PCs and rig along with the camera.

1. Flair should have the following lines in the .ini
   - **`*Api: TCP`**
   - **`*ApiPort: 53025`**
   - **`*ApiAutoAccept: True`** (This line isn't essential, it just stops a pop up asking if you want to accept the connection every time.)
2. Program the move in Flair before you connect it to Dragonframe, and set rig at start of move – this prevents problems later on.
3. If you haven't already, cable the PCs together as described above.
4. In DragonFrame:

4.1 Goto **Scene → Connections**.

4.2 Add a connection, bottom of the list is **Flair Interface**.

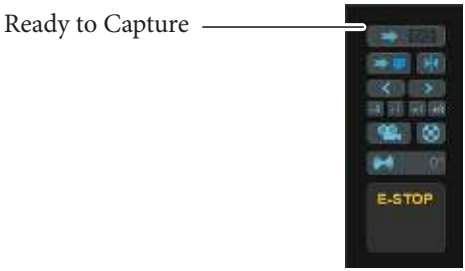
4.3 Enter the IP of the Flair PC followed by the port. For example, 192.168.1.1:53025:

- If Flair running INtime, use the Windows network port IP address (the USB3GIG).
- If Flair is not running INtime, use the network IP address or the network card connected to the hub.
- If Flair and Dragonframe on the same PC, use `127.0.0.1:53025`.

5. In Dragonframe motion control screen there should now be a linear move on a Flair axis.

6. Link the motion control to the camera like normal in Dragonframe, the Animator now has control of the rig!!

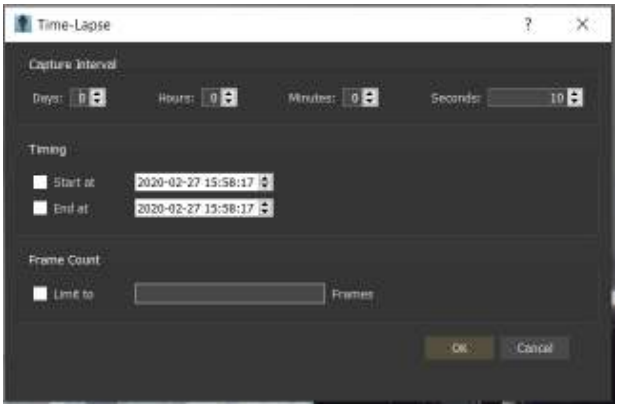
7. When the move is all set up in Flair, click **Ready to Capture** in Dragonframe.




8. In Dragonframe, press **Shoot** for single step capture.

9. If, alternatively, you want to shoot a time-lapse sequence, you can set it up as follows:

9.1 Select **Capture → Time-Lapse**.




9.2 In the Time-Lapse dialog box, specify the **Capture Interval**. The default is **10** seconds. For example, if you want to capture a frame every 1 minute, enter **1** in the Minutes box.

9.3 (Optional) Check **Limit to___ Frames** to end the time-lapse after Dragonframe captures a certain number of frames. Enter the number of frames you want the time-lapse limited to. The default is **1**.

9.4 Click **OK**. The Time-lapse dialog appears. Dragonframe automatically captures the shots you set up, and shows the progress you've made in the dialog. Click **X** if you want to stop the time-lapse sequence.

WARNING!

When using Dragonframe with Flair, operators need to be extremely cautious as the animation software is in-charge of the rig.

Notes

# Appendix 3 **Specifications**

Weight: 192kg (254lbs) including trolley wheels without camera

Payload (camera and head): 16kg

Counter weights: 2 (need not be changed or removed from the rig regardless of the head or camera chosen)

Power requirements: 110-240 Volts AC (earthed/grounded) AC 50-60Hz.

Temperature range: 0-45 °C (32-113 °F)

Humidity tolerance: 0% to 85% relative humidity, non-condensing

Axes:

Track (optional): As required

Rotate: 360 degrees @ 3°/s

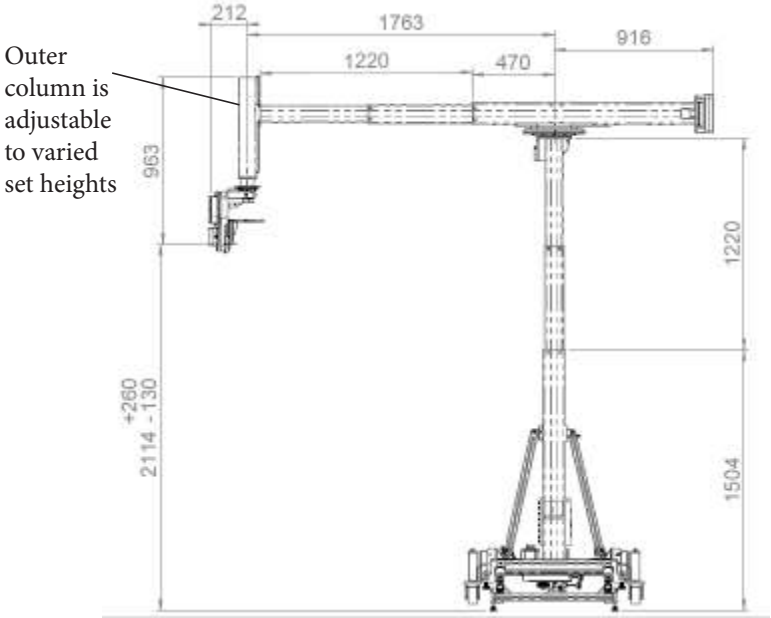
Pan: 360 degrees @30°/s

Tilt: 360 degrees@30°/s

Lift: 96.3cm @2cm/s

Extend: 91.6cm @2cm/s

## Animoko 1200




All measurements are in mm.

Maximum width: 292.9cm

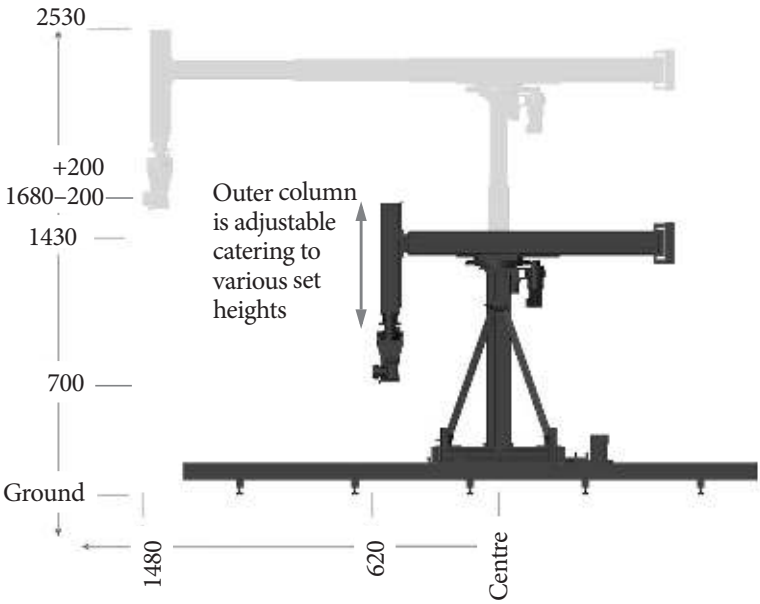
Maximum height: 333.7cm

Lowest position: 76 cm

Highest position: 237.4cm

Maximum reach (from rotate centre): 176.3cm

## Animoko 900


2530
+200
1680–200
1430
700
Ground
Outer column is adjustable catering to various set heights
1480
620
Centre

Notes

Notes

Notes

**Mark Roberts Motion Control Ltd.**
Unit 3, South East Studios, Blindley Heath, Surrey RH7 6JP
United Kingdom
Telephone: +44 (0) 1342 838000
info@mrmoco.com
www.mrmoco.com