MARK ROBERTS MOTION CONTROL

MHC (CLASSIC) V3.3

QUICK START GUIDE

Product code: MRMC-1485-33

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MHC (Classic) v3.3 Quick Start Guide

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Chapter 1 **Getting Started with MHC**

MHC Overview

Multi-Head Controller, or MHC, is software by Mark Roberts Motion Control used to control the MRMC camera heads via Ethernet. It gives you a smooth, precise and real-time control over a multitude of MRMC robotic heads at the touch of a button from a single workstation. You can also connect additional controls via USB, such as a Joystick Controller, to the PC running MHC.

You launch the MHC Server first and the MHC Client, which can run on the same or different PCs.

> Note
>
> MHC is configured by MRMC for the type and number of heads, the lens motors used and the lens types as delivered. This includes MHC License, network settings and names for each head, configuring homing for each robot axis and lens motors (if supplied), setting the axes soft limits and scaling for the heads supplied. These settings do not need to be changed. This Quick Start Guide details the changes to the settings that can be made by the Administrator and the Operator, if needed.
>
> For more information on how to change network settings, refer to *Changing system configuration and network settings* on page 4. For more information on how to change robot settings, refer to Chapter 4 *Robot Settings Page (Engineer, Supervisor Users only)*.

MHC Installation

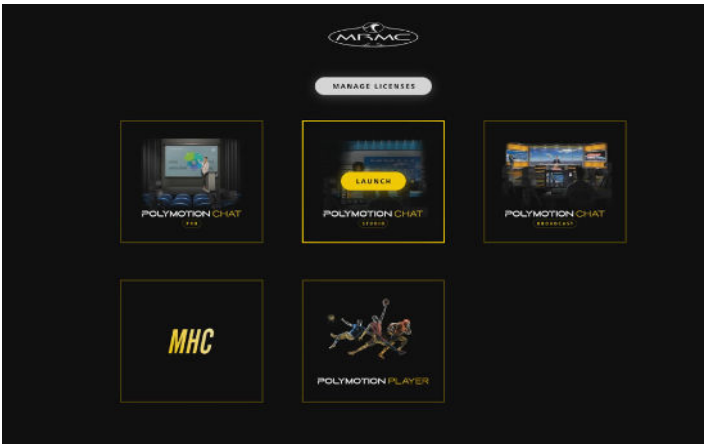
You can download and install MHC v3.3 from www.mrmoco.com. Once you have downloaded the installer, follow the on-screen instructions to install MHC. The minimum system requirements for installing MHC v3.3 are:

- Windows 10
- Intel i3 CPU

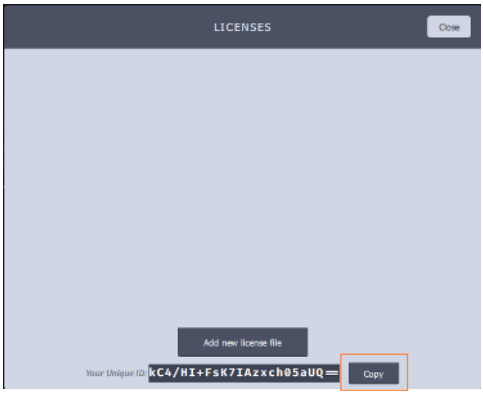
- 4 GB RAM
- Ethernet adapter
- A graphic card with support for Open GL v4.3 or greater

MHC Licensing Information

If you have recently installed MHC, when you launch MHC Polymotion Launcher, click **Manage Licenses**.



On the Licenses window, click the Copy button the bottom of your MHC screen to copy the UID and paste it your license request including any other products such as Polymotion Chat or Polymotion Player to support@mrmoco.com.



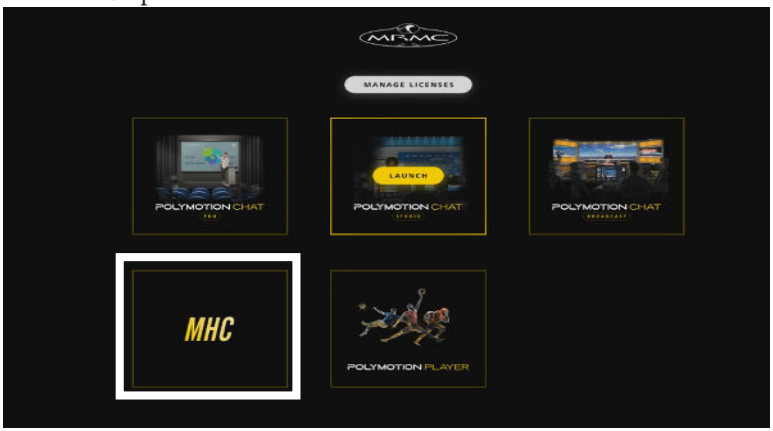
On the receipt of your license file, save it on to the disk, launch Polymotion Launcher. Click the **Add new licence file** button and select the new license file. Once the license is added, you will be ready to use the product.

Powering up a head and the PC

1. Cable together and power up all heads including camera and lens motors.

1. Use the icon on desktop to launch Polymotion Launcher.

2. Click/tap **MHC**.



3. If you are launching this for the first time, you will be required to add a new license file or a license code. Contact MRMC Support for a new license. Refer to *MHC Licensing Information* on page 2.

4. Once you have supplied a license code, MHC Server and Client are launched, login to MHC Client as Admin:
Username: Admin
Password: Admin1234

Note

At any time, if you need to restart MHC, perform the following steps:

1. Close the MHC Client and the MHC Server windows.
2. Double-click or tap the MHC Server desktop icon to launch it.
3. Double-click or tap the MHC Client icon to launch it. The MHC Client can be launched on the same or a different computer present on the same network.

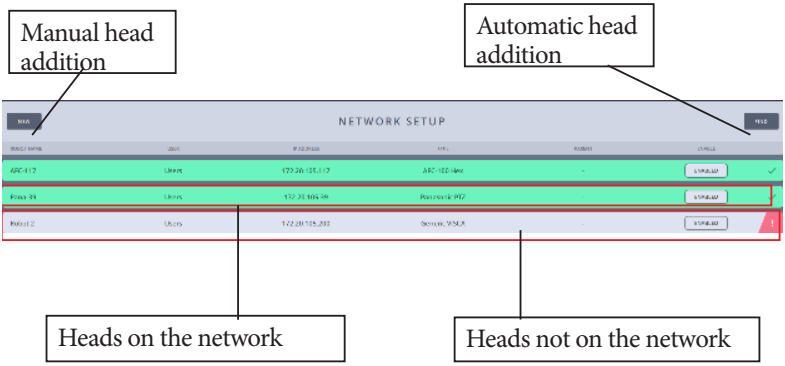
Changing system configuration and network settings

You can click the **Settings** ( ) button to display the Settings menu. The tabs in the menu are:

- **NETWORK** – Adding/deleting heads and changing head network settings
- **PREFERENCES** – Preferences page can be accessed via Admin login allowing the administrator to set head-specific axis speeds, limits and homing. For more details on these settings, refer to Chapter 3 *Preferences Page*.
- **CONTROLLER MAPPING** – View and modify functions assigned to USB joystick controller buttons. Refer to *MHC User Manual* for further details.
- **USER** – Add/change user accounts.

The **Settings** menu is different for Administrator and User login. For more information on Settings menu for the User login, refer to *Settings menu* on page 14.

Network setup



When you log in as the Administrator, the NETWORK SETUP page launches and provides a general overview of all the heads linked to the system's network. If you are loading MHC for the first time you probably have 4 robots already set up with addresses from 192.168.1.236 to 192.138.1.239. You can delete these if you want a clean slate to start from.

The two row colours represent the status of the heads:

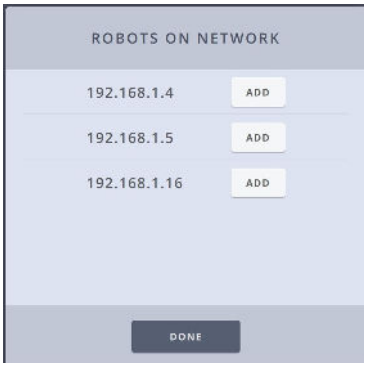
- **Green**: The head is successfully connected and ready to operate.
- **Grey**: The head with the IP address is not connected with the system's network or is not powered up.

A connected head can also be 'disabled', which means that it will not be available to any user.

Adding heads

1. Click the **FIND** button to automatically find the connected MRMC head(s). This will show you all the heads that are connected.

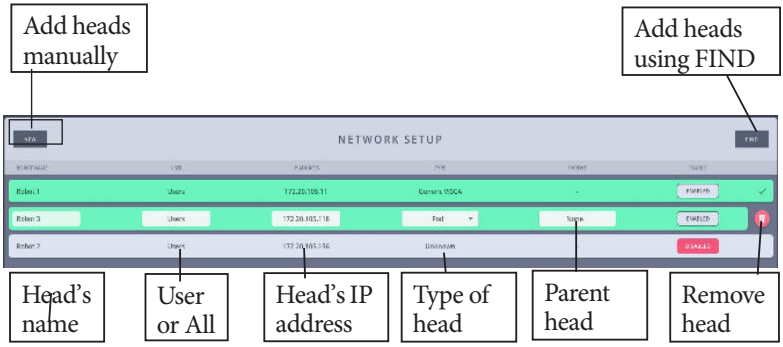
2. Select the head's row that you want to connect to and click the **ADD** button. This will connect the head to the system, and move it to the group of connected heads (the green section).



If a selected robot does not go green, then check it is on the same IP address range as the server PC. The Find button does a network wide broadcast, therefore it finds heads even on different subnets.

Some heads such as Panasonic PTZ even if present on the network are not auto-detected using the FIND button. These can be added manually by entering their IP address after clicking the **NEW** button.

3. Then, enter the **TYPE** of head and a **NAME** for it.The row for the head stays grey until the head is actually present on the network.



Adding the Type of head

The first thing you should do is check what type of head you have and what type of lens you are using. If you are using a serial lens then you

would choose one with **Serial** in the name. If you are using external Servo motors then you would choose one **without Serial**. For example, if you are using a Hex head with Servo motors, choose **AFC-100 HEX** from the **Type** dropdown. Certain head types are auto-detected by MHC but other non-MRMC heads will need to be selected. For example for BirdDog head, specify the head type as **VISCA - Birddog**. For an unknown head type, you can add **Generic VISCA** or **Generic NDI** depending on the connection protocol followed between the head and the server. It is important to choose the **Type** of head in MHC before entering the robot IP address because once it is connected MHC will try to change it to whatever it currently set to. Ensure that you choose the correct head because if you chose the wrong one, the head either won't work as expected or won't work at all. For more detail on the rig types that can be added, refer to *MHC v3.3 User Manual*.

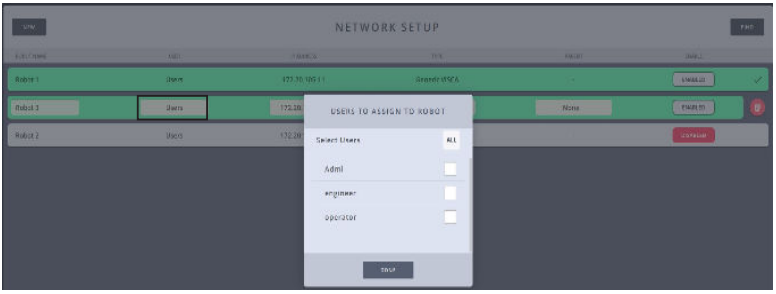
Changing a head's name

You can change the name of a connected or disconnected head. The name appears in the **ROBOT NAME** column. To change the head's name:

1. Select the row for the head.
2. Click or tap in the box representing the name of the head.
3. Enter the name for the head.

Assigning heads to user(s)

A head can be assigned to a specific user or **All** users. Assign a head to the user by selecting the user from the list. If you select **All** from the User drop-down, then all users who are logged in to the MHC Server can use the head. Selecting **NONE** will mean none of the users can use the head.

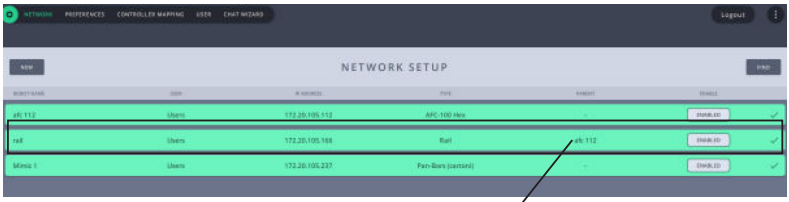


Assigning a Parent Head

Sometimes, two different robotic heads are required to operate using the controls in one of the two heads, for example if an AFC is mounted on a rail, the rail controls are added to AFC. In this case, AFC is added first in the Network Setup and when the rail is added, AFC can be selected as the **parent** to the rail.

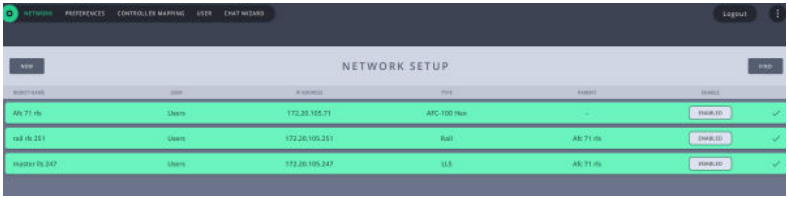
Rail or Lift Setup

If you have a rail in a system, they are configured in the network setup as the 'child' of the 'parent' head that moves along the rail.



Rail set up as 'child' of 'parent' AFC head

For a Dual LLS – a rig with two LLS robots but a single IP address with a head that moves along the rail that sits on the dual LLS – the network settings page allows adding an LLS to the parent that already has rail as a child and adding a rail to a parent that already has LLS as a child.



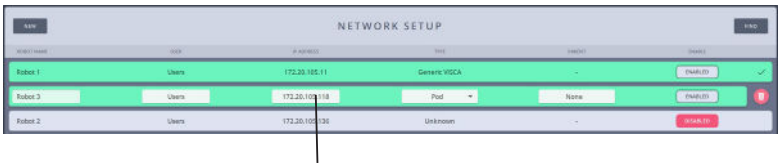
Removing a head

To remove a head, click the appearing **remove** ( ) button on the head's row.

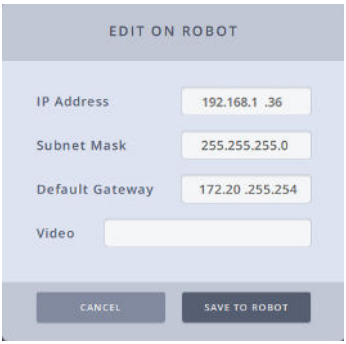
Editing network settings on the head

On the NETWORK SETUP page, only the disconnected (grey) head's IP address is editable. Only when the head is connected, can the network settings be changed on it.

Select a robot that is connected (green) and click in the **IP ADDRESS** box.



Use the appearing dialog box to change the IP settings of the robot. Your system will also automatically update its local reference address, so you won't lose the connection to the edited robot.



Enter the **IP Address, Subnet Mask,** and **Default Gateway** if your network IT Manager deems it necessary. To view the video stream from the camera in the robot, specify the URL of the IP stream from the camera in the **Video** box. This will depend on whether your robotic head IP stream is that of NDI, RTSP, Decklink or USB.

Clicking **SAVE TO ROBOT** will change the IP address on the head and also tell MHC where to find the head at the new address. If you are changing across to a different subnet, the head will appear disconnected until you change your computer network IP address to the new subnet range. You can also use this dialog box to configure FTP server settings for a Robotic Pod. For more detail on this, refer to the Robotic Pod Quick Start Guide.

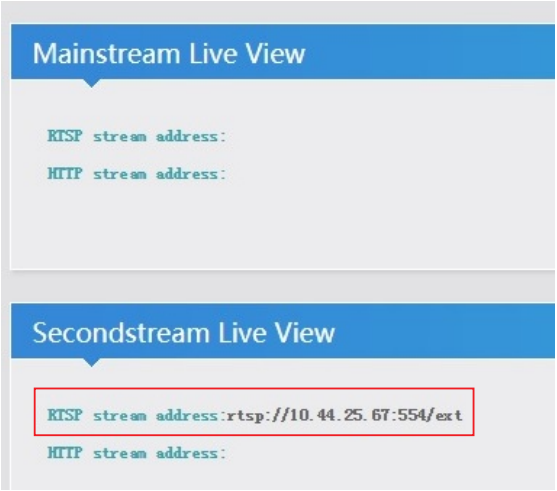
Note

You must be logged in as Administrator to change network settings on the head.

Setting up video feed from the camera

Live SDI video stream from the camera can be sent to MHC via an HDMI video encoder which converts SDI input into an IP stream that is web managed and can be viewed over LAN or public Internet. To set up live feed on MHC via SDI out:

1. Connect the HD video encoder to the network (PC and the head). Ensure that your PC on which you want to view that video feed from the head is on the same LAN as the head and the encoder.
2. Open the encoder's web interface in the Web browser and note the RTSP address of the video stream.



3. Copy this RTSP stream address in the **Video** box in the network settings.

Adding users

On the User page, two types of users can be added: Engineer and Operator. **Operator** type users have the controls to operate the heads whereas **Engineer** type users have additional controls to edit robot and lens settings and also some tools to troubleshoot if an issue occurs. A **Supervisor** type user has access to basic functionality and configuration, in addition to having all robots automatically assigned to them. By default, there is three User accounts added to the system: Operator, Engineer and Supervisor. You can have up to 15 user accounts including the default ones. However, if you require you can add more Users. To do this:

1. Click/tap Settings ( ) > **USER**.
2. Click/tap **ADD USER**.
3. Enter the username and password that you want to assign to the user. Select a Login Group.

4. Click/tap **SAVE**.

Once user(s) are added, the heads can be assigned to them.

Logging in as a User

Once robots are added, accounts are created and robots are assigned to users, log out of the Administrator login and log in as a User.

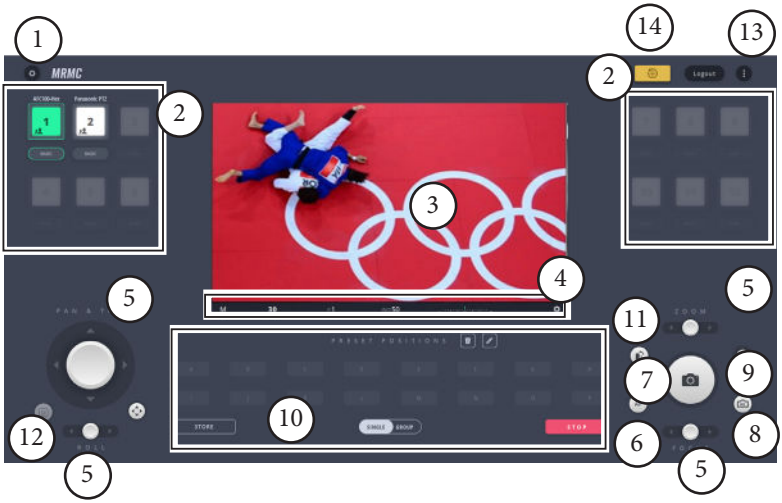
Default Username	Default Password
operator	password
engineer	password
supervisor	password

Testing head connectivity

Logging on as a user will take you to the MHC Main Page. You should be able to move the robot now with either the on-screen controls or the joystick if you have one connected. Check the pan and tilt are working now, just to check if the head is connected properly. For detailed explanation of the controls, see Chapter 2 *Main Page*.

Chapter 2 **Main Page**

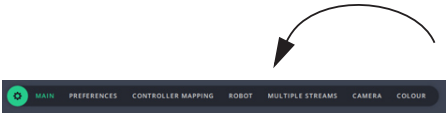
The following figure shows the controls available on the Main page.



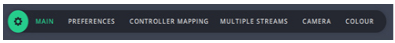
1. **Settings menu**
2. **Head selection**
3. **LiveView**
4. **Camera settings**
5. **Manual controls**
6. **AutoFocus toggle button**
7. **Shutter release button**
8. **All Cameras Shutter Release Toggle**
9. **Focus Point Selector**
10. **Presets**
11. **Portrait switch**
12. **Lv toggle button**
13. **Help button**
14. **Send All to Zero button**

Settings menu

You can navigate the different sections or pages of MHC using the Settings menu.To display the Settings menu, click the **Settings** ( ) button. The Settings menu for Engineer login type has an additional page, **ROBOT** that allows to access and edit the robot settings. For more detail, refer to *Chapter 4 Robot Settings Page (Engineer, Supervisor Users only)*.

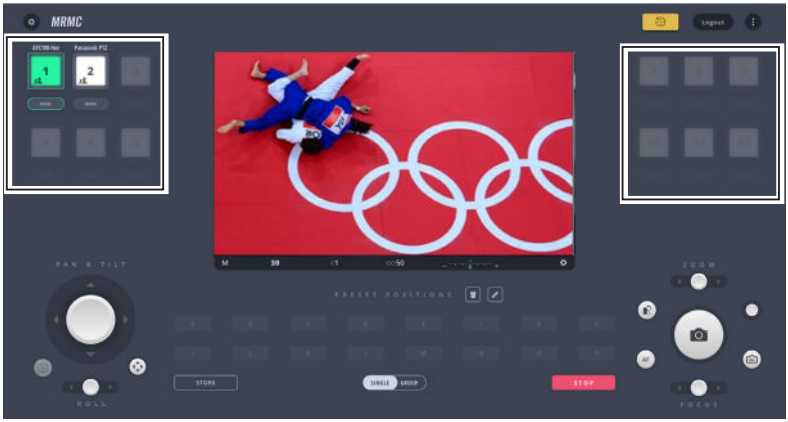


Settings menu for Engineer login type



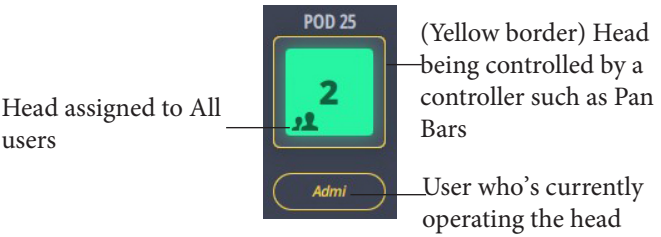
Settings menu for Operator login type

Head selection

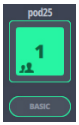
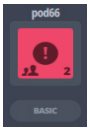


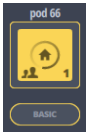
The icons on the page represent the heads that you can view and control using the MHC client. MHC can support up to 12 connected heads.

Parts of a head icon



You can select head icons for operation and read their statuses and errors. Various colours of head icons indicate a particular state.

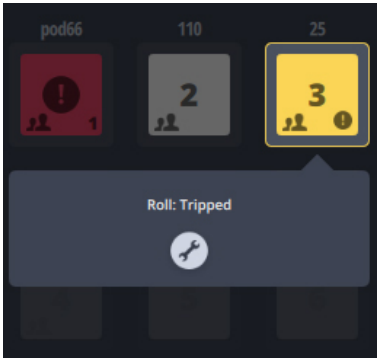
Colours of states	Description
	The head is available to use, but not selected.
	The head is selected.
	There is a problem with communication to the head, it cannot be used at the time.
	There is a problem with the head, but you can still select and use it.

Colours of states	Description
	The slot is empty, no head assigned to the icon.
	A yellow icon also indicates that the head is being operated indicating a 'busy' state.

Selecting a head

You can select an available head by clicking or tapping on it. If the head has an error, this action will present the error message.

Error messages on heads



If a head displays an error state, you can read the error message by simply clicking/tapping on the head icon. On the message box, there could be a repair button depending on the type of the error you are facing. Click/tap the repair ( ) button to initiate an automated fix on the problematic head.

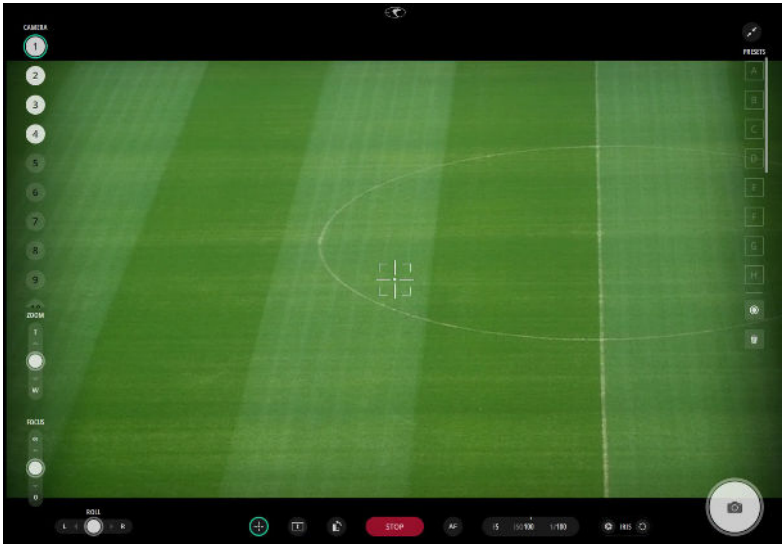
Some errors can be fixed (for example, tripped axis) and some cannot.

LiveView

Here you can see what the camera sees. It is either accomplished by using a small 'eye-piece' camera attached to the optical viewfinder of the DSLR, or using the camera's video output stream directly.

When you point on the LiveView window, play, pause, and stop buttons appear briefly and disappear when you point away. These buttons can be used to play, pause, or stop LiveView. Note that these will only change what you see in the LiveView window and not the actual camera output.

LiveView can be toggled to Full Screen view by using the ( ) button on top.



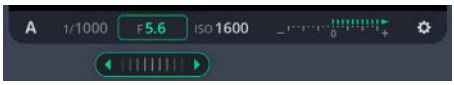
Camera settings

If using a Nikon D5 camera, MHC has a direct camera control interface. You can change the settings of the camera in two levels. The most common properties—Camera mode, Shutter speed, Aperture, ISO, Exposure meter—are placed under the LiveView window.

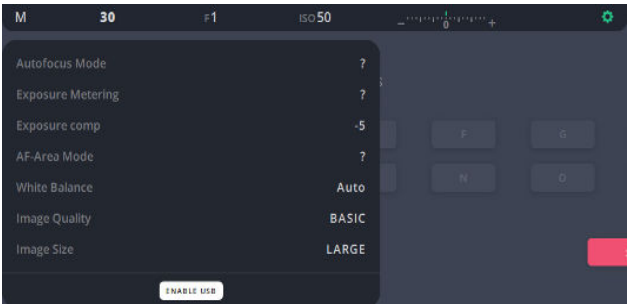
Camera mode markings: **A** - Aperture priority, **S** - Shutter priority, **P** - Program, **M** - Manual

Changing the camera settings

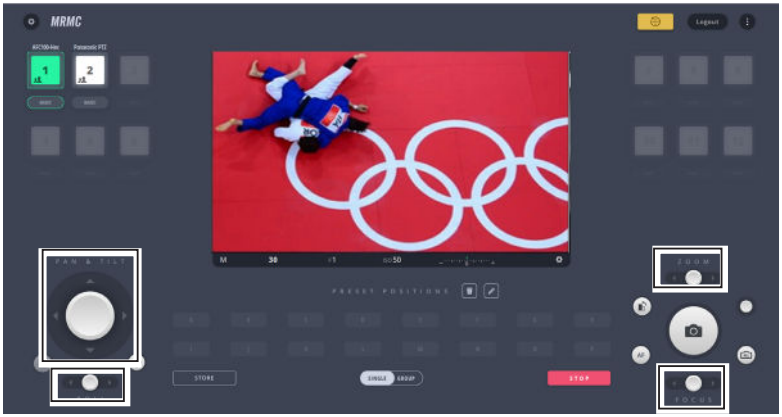
You can change camera settings by clicking/tapping on them and then using the set-wheel or the arrows on the side. If a value is faded grey instead of white, that means it cannot be changed. This happens if a particular camera mode is selected, which has that property automatically set by the camera. The exposure meter is just a reading from the camera, nothing to change on it. (It is not the same as exposure compensation.)



To access additional camera controls you can open the rest of the camera settings by clicking/tapping on the cog in the right hand side of the bar. That will present a box with camera controls that are usable via TenPin. Some other camera controls AutoFocus Mode, Exposure Metering and AF-Area Mode can be accessed via USB by clicking the **Enable USB** button.



Manual controls



The manual controls are joysticks for Pan, Tilt, Roll (if applicable), focus, zoom, and iris. The joysticks provide manual velocity controls. The further you drag their handle from the centre, the faster the robot will move in that direction. As long as you hold a manual control in a position other than the centre, it will keep moving (if it can).

Pan and Tilt Control

This is a two-function control to pan and tilt the head with a two-axes joystick. While the vertical movement of the control will tilt the head, the horizontal will change its pan angle.

Pan-Tilt Lock and Nudge

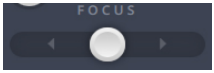
Pan-tilt lock and nudge button can be toggled to lock the movement of joystick to pan or tilt or both. When selected, clicking the pan/tilt arrows in the joystick, should nudge the individual axis into that direction by a small amount.

Roll

You can manually control the Roll axis on heads which have a Roll axis.

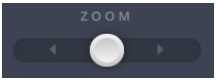
Focus

You can manually focus the camera lens on the MRMC head by using this joystick control.



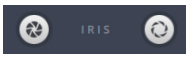
Zoom

You can manually zoom the camera lens on the MRMC head by using this joystick control.



Iris

Use this control for the Iris on the camera.



Rail and Lift

If the selected rig type of the child of the current head is SLH, then additionally the **Lift** control will appear on the Main screen. Similarly, the **Rail** control would appear for Rail rig type and both **Rail** and **Lift** for TRH.

Example: Lift and Rail controls appearing for a head with 'child' rig type TRH.

Shutter release button

To capture a picture, you need to tap/click on the shutter release button. If you want to take multiple shots rapidly (burst), keep pressing the button.

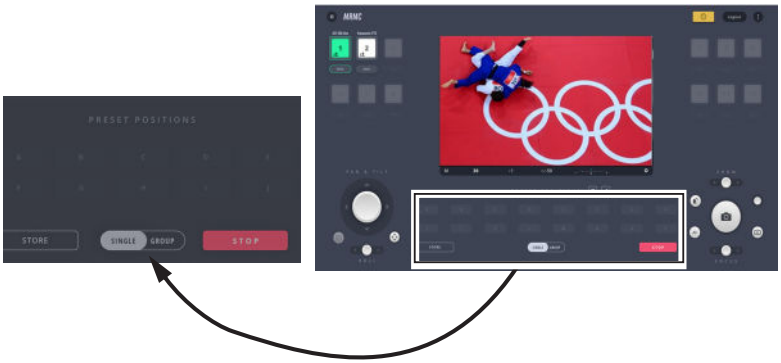
All Cameras Shutter Release Toggle

When this toggle button active, pressing the Shutter Release button will release the shutter for all the connected cameras being operated by that user.

Focus Point Selector

Use this control to move the focus point on the live view from the camera.

Presets



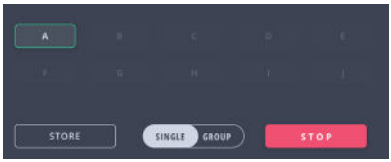
Presets can be used when the mode of the head is set to BASIC. You can store the position of the head as a preset and later make it to go to a recorded position (this motion is called Goto). When storing a position, all the axes will be stored. A preset button is faded when no position is stored in them.

Storing a position as a preset

1. Use the controls to go to a head position of your choice. Ensure that the Zoom and Focus axes are in correct positions.

2. Get into store mode by clicking/tapping on the **STORE** button under the preset buttons.

3. Click/tap on the preset button to store the current head position.



Activating a preset

To activate a preset you simply click/tap on the preset button. A green border will appear around the preset and the head will move to the preset position. You can either activate the preset for a **single** head that is active or if all the connected heads have a particular preset stored, you can activate it for all of them just by clicking the preset button. To run a preset

move for all connected heads, select **GROUP** and then click the preset that you want to run. Note that if a preset button does not have a move stored for a head, then the head will not move.

If a Goto is in progress, you can immediately stop the movement by clicking/tapping the red **STOP** button. The speed of the robot moving into preset positions can be adjusted in the **Preferences** tab. For more information, refer to *Goto Speed* on page 28.

Deleting a Preset

To delete a preset, click/tap to enable delete mode indicated by the red border around the delete button. Click/tap the preset(s) to be deleted. Click/tap again to exit delete mode.

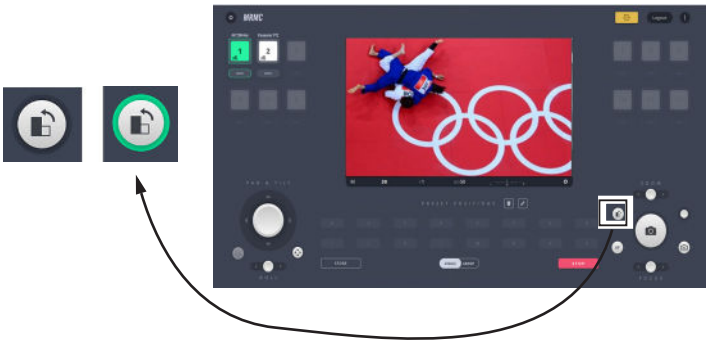
Editing a Preset Name

To edit the name of a preset, click/tap to enable edit mode. Click inside a stored preset and modify its name. Click/tap again to exit the edit mode.

Note

Pressing the **delete** ( )button will delete the goto move stored in the preset button but not its name whereas deleting/editing the name of a preset will alter its name only but not the goto move itself.

Portrait switch



Use this switch if you want to take portrait pictures. It flips the LiveView image and rotates the camera by -90°.

AutoFocus toggle button

You can turn on/off the AutoFocus feature of the camera lens with this toggle button.

Lv toggle button

The Lv button on the MHC main page works exactly like the Lv button in the Nikon D5 camera. Pressing this button raises the mirror in the D5 so the subject can't be viewed in the viewfinder, therefore the IP camera (in a Pod) will not have a view. The video stream address once configured in the MHC Network Settings page in the Admin login displays the SDI video feed from the camera when the Lv button is pressed. The button is disabled for all other cameras.

Help button

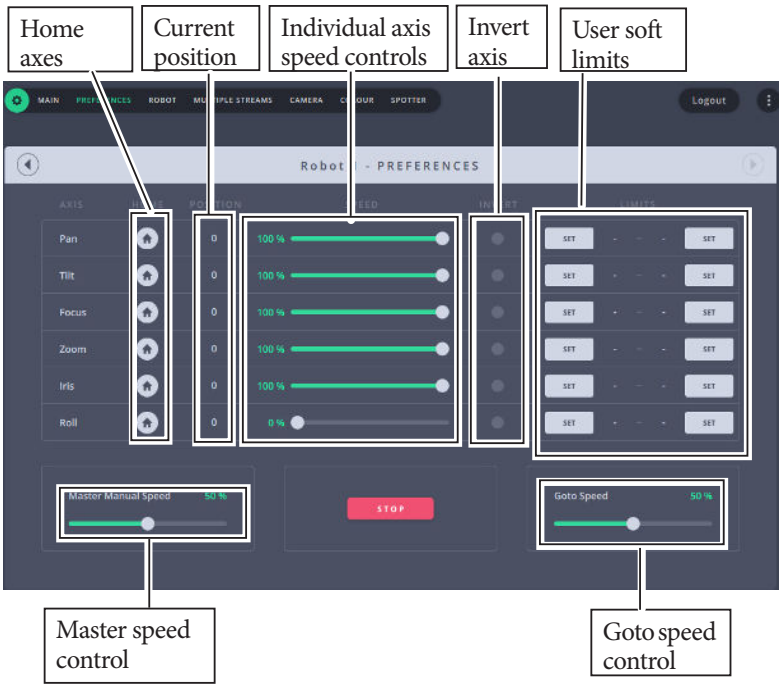
allows you to access MHC Quick Start Guide intended to get you started on MHC and a more detailed MHC User Guide as well other related MRMC manuals.

Send All to Zero button

allows a user to send all assigned heads to their zero position.

Chapter 3 **Preferences Page**

This screen provides a general overview of the speed and soft limits set for all available axes for a head. The limits set in the Preferences page are saved in the local disk and not stored on the head (unlike those in the Robot Settings page), thus providing a faster way of setting limits.



Master Manual Speed

The **Master Manual Speed** control specifies how fast you want all axes to move. Note that this is user dependent that is in case the robot is assigned to more than one user then each user can set this value individually.

Goto Speed

The value in this field will be used for the head movement during presets. Like Master Manual Speed, Goto speed is also user dependent and can be set individually by each user for a given robot.

Individual axis speed control

Individual axis speed controls to specify how fast you want the axis to move. These speeds are set on the robot and if the robot is controlled by many users, it will be set by the user who last controls the axis.

Max. Limit and Min. Limit

The current positions can be stored as minimum and maximum limits for each axis using the **SET** button. These are user limits and not stored on the head. These limits are checked at run time to see that the move does not exceed the allowed limits of travel.

> **Note**
>
> Ensure that you don't set minimum limit same as the maximum limit set on the Robot Settings page or vice versa. This will result in the axis not moving at all.
>
> Also, if the limits on this page are outside the range of limits set on the Robot Settings page, then smallest range of travel will be applied.

Invert

Use this button to invert the direction of the input control for the axis.

Homing

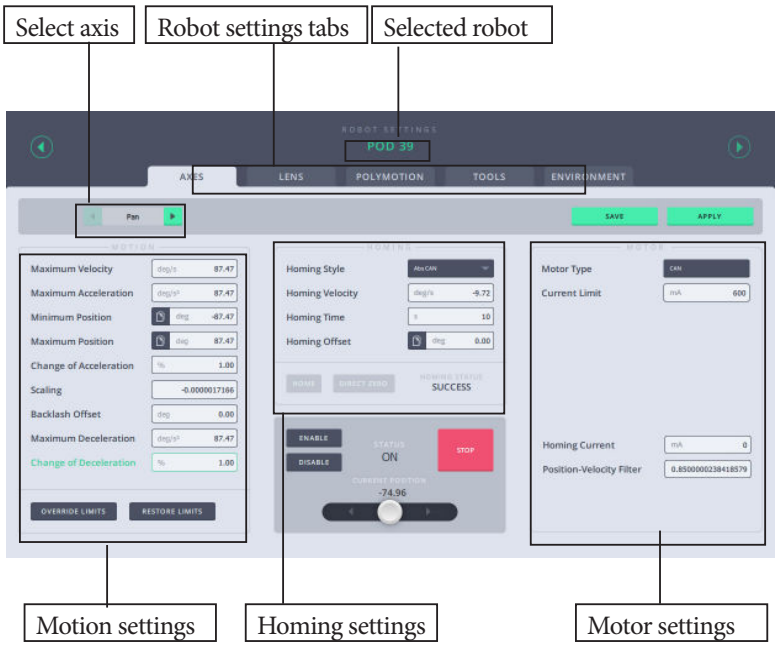
You can use the axis Home ( ) button to home each axis individually. This button is not available for pan and tilt axes for Pods.

Notes

Notes

Chapter 4 **Robot Settings Page (Engineer, Supervisor Users only)**

The Robot Settings page is a collection of engineering type displays related to the head. They are separated into pages for each head assigned to the user and indicated with selectable tabs near the top.

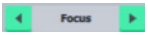


Selecting different robots

You'll find the name and number of the currently selected robot in the header of the page in green. With the green arrow buttons on the side of the header, you can browse through all of your robots, while staying at the same robot settings sub-section. (For example, you want to change the same parameter on all of your connected robots.)

Axes tab

Use the Axes tab to store the settings for all the axes of the head. You can browse the axis you want to set up at the



top of the page by using the arrows. Any axis that are added for the head, such as Rail, will also appear here.

After setting the options, when you click **Apply** the settings are saved in the RAM of the head and are volatile. However, when you click **Save** after applying the settings, they are saved in the flash memory of the head and are permanent until you modify and save them again. Note that while the head tries to store the modified settings, it disconnects for a few seconds and does not accept any command.

Motor settings

Motor type depends on the type of motor that the head uses for that axis. The motor type must be set to the type of motor on that axis. You will need to refer to the product specification for the exact motor type. For Lens axes you want to check that if you are using a serial lens these say "Focus serial" or "Zoom serial". If you are using external servo motors then this should say "Servo (PWM)" (or whatever type of motor you have plugged in). You cannot actually change this setting from here but you can see what it has been set to. If it is not correct then you will need to go back to the Admin page to change the Type of head. Note that this value is fixed based on the type of head you are using and was selected in the Network Settings page in the Administrator login.

Motion settings

Speed limits

Set the **Maximum Velocity** to limit the head's maximum speed to a safer setting. Be sure not to exceed the product specification otherwise unexpected movement will occur. **Maximum Acceleration** sets how quickly (or slowly) the head attains a speed.

Soft limits (Min-Max Positions)

You might need to restrict the range of movement of the robot in some cases. Minimum and Maximum position is the range that the axis is allowed to move.

If there is limited space for the robot, you must avoid collisions to the surrounding objects. You can keep the view in a certain field for easier operation.

Minimum and **Maximum Positions** can be set, the unit is degrees. The recommended way to set these values, is to slowly approach the desired limit while carefully watching the robot. Once satisfied with the position, read the value over the joystick control and use that number as the soft

limit for one end of the desired track. If min and max are both 0 or set the wrong way round then the robot will not move.

> Important
>
> One thing is different with a Serial lens axis (i.e. focus, zoom or iris), specifically when using a serial lens. It's important to have the minimum position set to 0. For the maximum position, move the lens axis to the farthest marker and use this position as max. If the range is outside these values, you can have a situation where MHC thinks the lens is moving and you will see the axis position change however the lens itself is rejecting the input from MHC and just not moving. Only when the axis position falls within the acceptable range will the lens move – it can be different depending on the lens.

Change of Acceleration

Use this setting to smoothen the head movements and make them less jerky. You can set it to a value between 0.1 and 1.0. 1 being no smoothing and 0.1 being the most.

Scaling and direction

Scaling is the ratio between 1 degree on the software and how much the motor needs to be moved. Usually it is best to leave at the factory default setting. If this is set incorrectly the head will either move very slow or very fast, so it needs to be just right which is what the default is.

You can reverse the direction for the selected axis by inverting the value in the text field. To do that add or remove the minus sign (-) in the beginning of the number to invert the control of the axis.

Backlash offset

This setting compensates for backlash in the motor during Goto moves and manual control. Backlash is when you have a bit of "wiggle room" usually between where gears are meshing the axis can be moved a little without the motor actually moving. Normally 0 is the best setting unless you have problems with backlash.

Override and restore limits

OVERRIDE LIMITS will temporarily disable these settings if you want to ensure the robot is not stopped because of a limit problem. Doing this

will display a red border around the limits that will be overridden. Use this option to perform certain checks on the settings or whilst troubleshooting axes movements. After you have finished, ensure that you click **RESTORE LIMITS** to restore the limits for safer head movement.

Maximum Deceleration

This would set how quickly (or slowly) the head would slow down.

Change of Deceleration

Use this setting to smoothen the head movements when slowing down and make them less jerky. You can set it to a value between 0 and 1.

Home Zeroing

The process of Homing or Zeroing, both meaning the same, is used to let the computer know exactly where each axis is. The zero points themselves are not stored in the head or lens when the power is off, so you need to define them at the start of each session, by Home Zeroing the axes. The MHC software physically moves the axes to the home positions that are built into the hardware and then assigns these positions as the zero points for the axes.Once zeroed, an axis can be controlled to not hit its limits of travel, and can be programmed to move to preset positions and provide accurate Target Tracking information.

The method of Home Zeroing depends on the hardware setup and is pre-configured by MRMC.

Homing settings

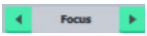
When an axis is zeroed by the computer, it is moved in a certain direction set by the **Homing Velocity** value until it reaches a sensor, once the sensor is detected, the axis slows down and stops. If the sensor is not detected within a certain time (**Homing Time**), then the zeroing will stop and an error will be reported. Once the computer has stopped on a sensor, it moves the motor slowly away until the sensor can no longer be detected and this point is used as a reference point to zero the axis. The axis is then moved further away from the sensor by an amount set in the **Homing Offset** value to its standard Zero point and then the axis position is set to 0.0.

Types of Homing

Controllers usually offer two different ways to Home the axes: an automatic method and a manual method.

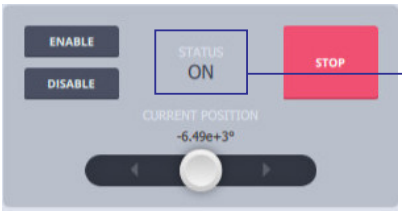
In the **automatic** method, MHC moves the axes to the home positions that are built into the hardware and then assigns these positions as the zero points for the axes. This is for Pan, Tilt, and Roll axes on the head. The Focus and Zoom axes having end-stops are Homed differently by MHC but are done automatically. To home an axis from Robot Settings page:

1. Use ⚙ > **Robot** > **Axes** tab to Home each axis. Select the axis you want to Home at the top of the page.



   – Ensure that the values in the **Minimum** and **Maximum Position**, and **Homing Type** are correct for the lens on the head for the axes you are homing. This is done automatically for Zoom with end stops (Homing type: **Lens**). The Focus is normally Homing type: **Slip.**

   – Check that the Status of the axis is **ON** in the grey box. If it is not, click the **ENABLE** button to turn it on.

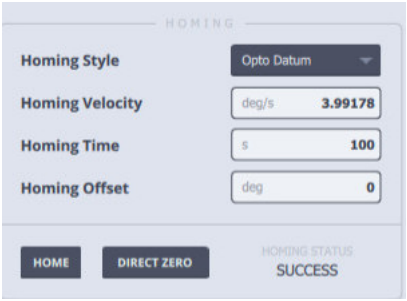


2. Click/tap the **HOME** button to home the selected axis.

Alternatively, you can use the Preferences page, to home an axis. Refer to Chapter 3 *Preferences Page*.

In the **manual** method, while observing the position of the axis, use the controls to take the axes to an end point and then click/tap **DIRECT ZERO**. Conventionally **Focus** is zeroed at **infinity** and **Zoom** is zeroed at **wide angle**.

Homing Style



This setting depends on the type of the motor of the head. The default setting of this field is set for your head so you don't need to alter Homing Style. However, if you need to set it again, contact MRMC to know the Homing Style.

Homing Velocity

The speed at which the axis will seek its reference point (The direction is set by the sign). This should be set low at first. It is in display scaled units just like the maximum velocity.

Homing Time

This setting determines the time allowed to look for the home position before timing out.

Homing Offset

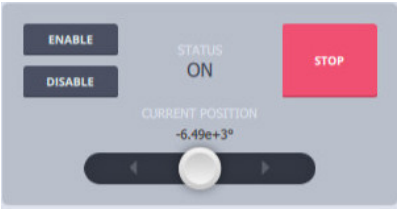
Once a reference point has been properly located, the axis will move a given distance from this point back to its normal zero position, this is known as the **Homing Offset.** This is useful for making small adjustments to an existing zero.

Homing when changing lenses

The values for the **Minimum** and **Maximum Position** must be entered for the lens fitted to the head. It is a good idea to label each lens with the Minimum and Maximum Position for Focus axis.

> Important
>
> During homing of the Focus axis, the lens ring is driven to each end of the travel. Ensure that the lens motors are sufficiently tight on their matte bars and remain in mesh with the lens gear.

Enabling and disabling the axis



Enable the axis is needed if an axis trips. You will get a message here in the STATUS area. For example, if the current limit is exceeded then the axis will “trip” as a warning that something is wrong. Either the motor is overloaded or there is something wrong in the axis settings. Once you have fixed the problem or to re-test you click the ENABLE button to allow the axis to move.

You can also disable the axis if you don’t want it to move even when the user move the controller. The status will display as “USER” when it is disabled by the user.

Stopping the head

Use the **STOP** button to stop the head movement.

Test the axis with manual control

You can test your axis settings with the joystick control at the bottom.The **Current Position** of the axis is shown above the joystick control.

> Note
>
> There other settings here known as **Motor Tuning** settings, which are advanced settings and should be fine left as the default settings.

Save and apply settings to the head

To save and apply the settings to the robot, use the two buttons in the top right corner.

Tools tab

The TOOLS tab allows resetting of the head and exporting and importing MHC settings.

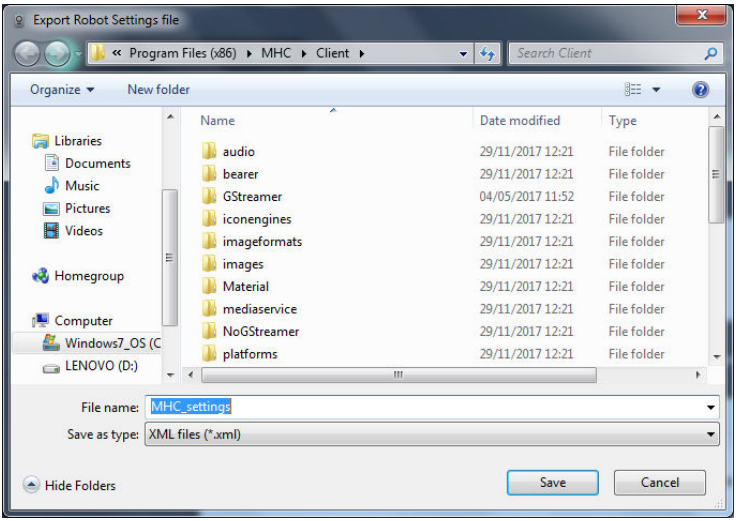
Tools tab for Pods

When the Robot Type is set to Pod in MHC, the TOOLS tab contains additional buttons, as below:

EXPORT ROBOT SETTINGS

Use this button to store all the settings in MHC to an XML file which you can import later. This can be used to copy settings to another robot or save the factory settings to be restored later.

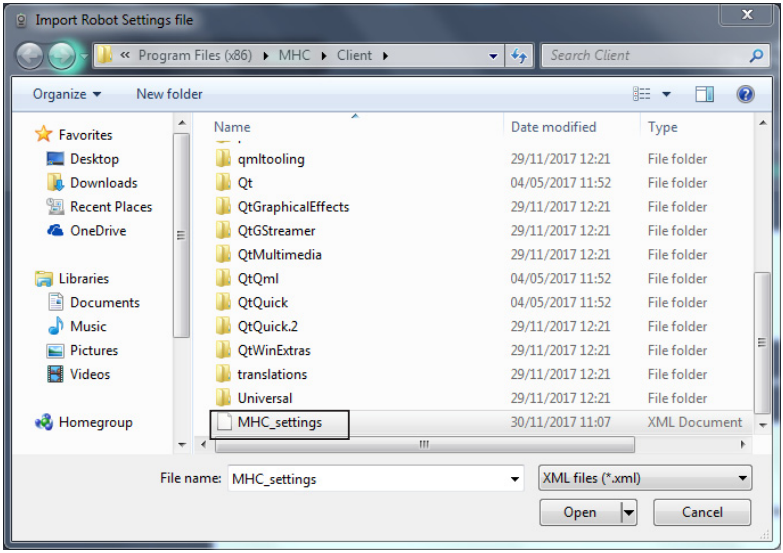
1. Clicking the button will open a dialog box, enter the name of the XML file.



2. Click **Save**.

IMPORT ROBOT SETTINGS

Use this button to import MHC settings from an XML file.



RESER ROBOT

Clicking **Reset Robot** resets the axes (Hex) board in the head. Use this option when the camera has crashed/frozen or a power cycle is required.

RESET CAMERA (Pod only)

Clicking **Reset Camera** resets the Nikon camera as-though you power-cycled it.

RESET 10-PIN (Pod only)

10-pin board is a special board that MHC uses to access special functions in the D5 camera. Clicking **Reset 10-Pin** reinitialises the 10-Pin board, or resets all the camera functions that are accessible via 10-pin protocol, such as ISO, aperture, focus, white balance, image quality etc.

POWER DOWN (Pod only)

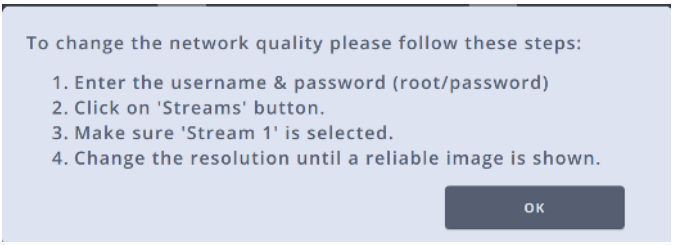
Removes power from the Robotic Pod.

POWER UP (Pod only)

Powers up the Robotic Pod.

CHANGE NETWORK QUALITY (Pod only)

Clicking/tapping this option gives you a message with instructions on how to change the resolution of the imagery from the REP camera. You might need to do this if your bandwidth is limited and you want to reduce the traffic on the network.

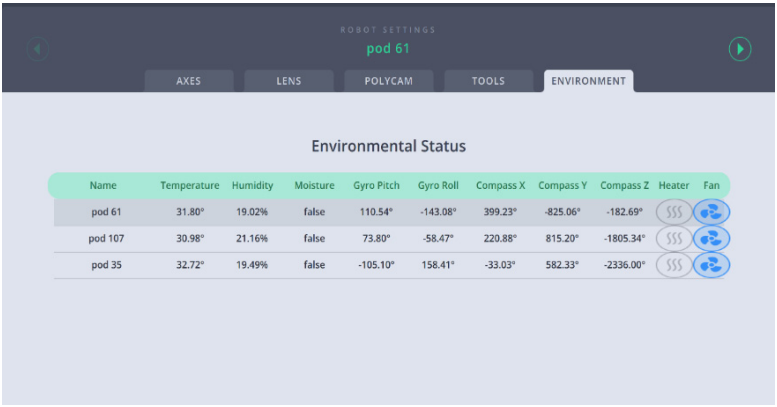


TEST NETWORK QUALITY (Pod only)

This button displays the percentage values of Jitter and Loss in the network.

Environment tab (Pod only)

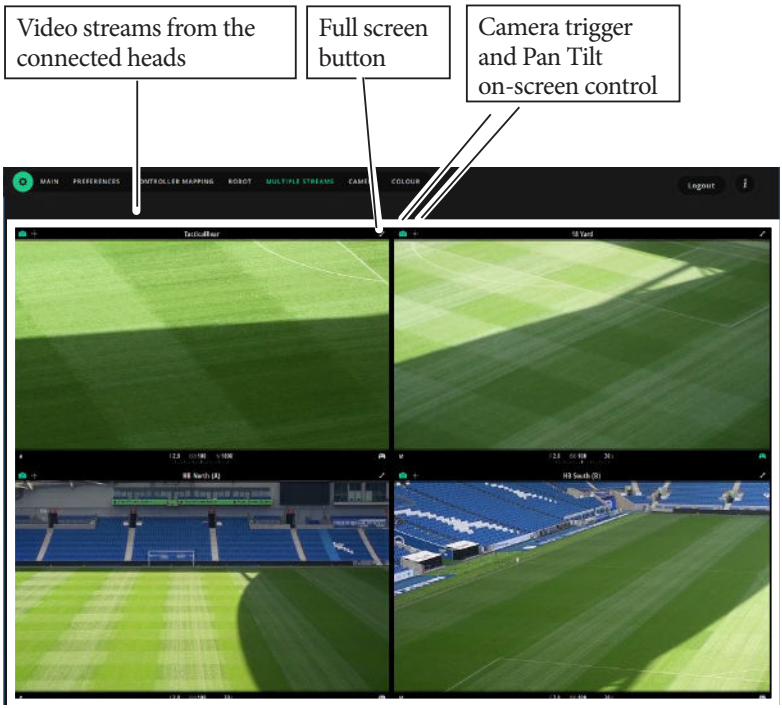
This tab gives you the information about various environmental factors, such as the temperature of the Pod, moisture in the Pod, and others that allow you to level the Pod. Use this tab to turn the heater and fan on and off for Robotic Pod v1.7 and v1.8.



Note that heater can be switched on and remain on when the fan is switched on. Once the fan or heater is turned on, the icon is blue. The heater can remain on for a maximum of 5 minutes, after which it will be switched off automatically.

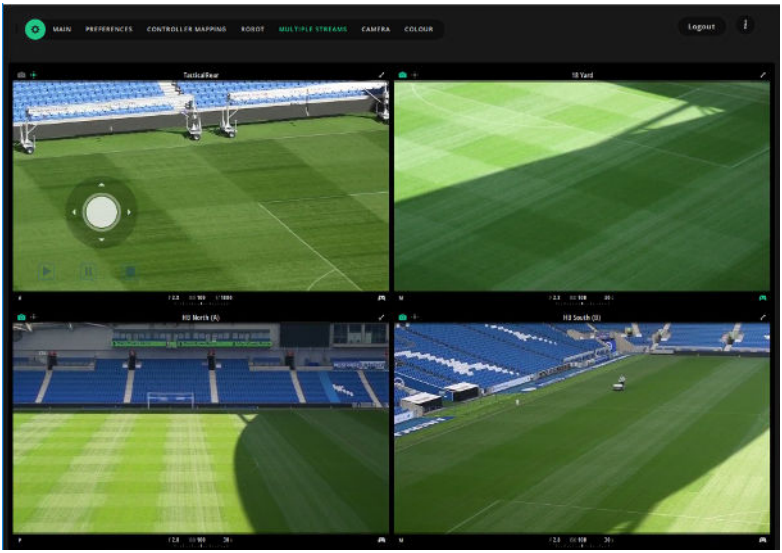
Chapter 5 **Multiple Streams Page**

Multiple Steams page is similar to the Main page except here you can view the live video streams from each head in the placeholder for the head.



To view the Multiple Streams page, click/tap **Settings** ( ) > **Multiple Streams**.

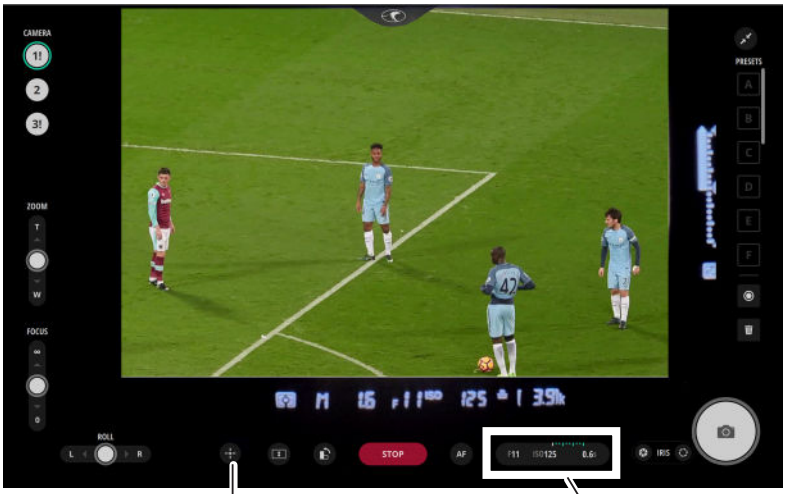
Video stream from each connected head has a dedicated placeholder with controls for the head. The Camera trigger button ( ) and Pan-Tilt on-screen control button ( ) can be toggled. If the Camera trigger button is active (green), clicking/tapping anywhere on the placeholder will capture a photo indicated by a brief flash. If Pan-Tilt control button is green then clicking and holding the video stream will display a Pan-Tilt control on the placeholder, which you can use to pan and tilt the head.



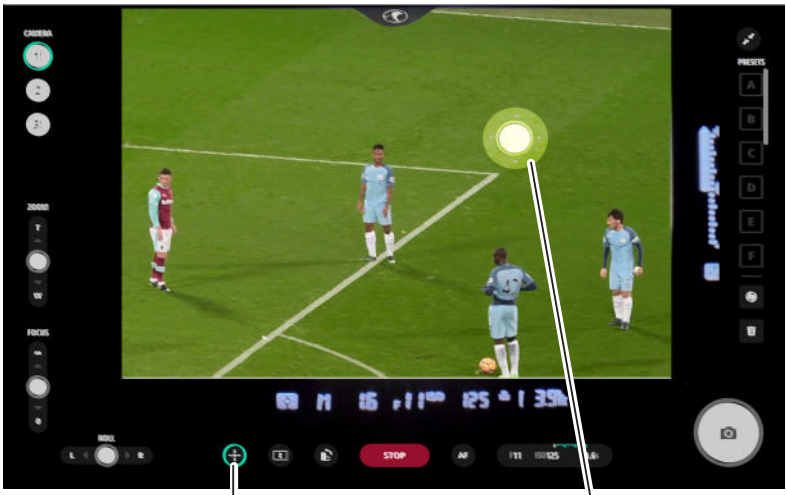
The Joystick control activator ( ) allows for activating the joystick controller for the head. The button is green for the head that can be controlled by the connected joystick controller. At any point only one head can be controlled by the joystick controller.

You can also switch to full screen view for a head by clicking the Full screen button. The screen provides all the controls that are available on the Main page.

Clicking the Camera settings will open a dialog that allows you change them similar to that on the Main page.



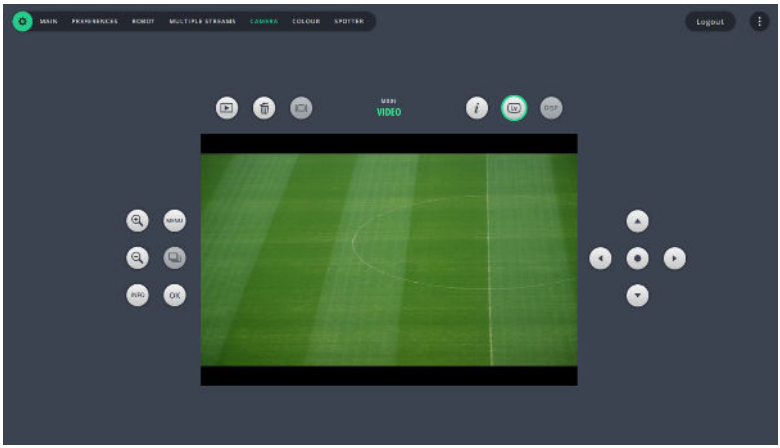
Clicking displays the pan-tilt on-screen control that you can use to pan and tilt the head while in full screen view.



Notes

Chapter 6 **Camera Page (Robotic Pod Only)**

Camera page can be accessed by clicking/tapping **Settings (** **)> Camera**. This page allows the user to use many camera controls on the camera body via the MHC screen.



This page mimics some of the controls on the rear of the Nikon camera.

The Lv button ( ) is disabled for Z6 camera and should be always left turned on for D5 camera. The RTSP video stream from the D5 needs to be configured for this page to display the video stream. To learn more about how to set up RTSP stream from the camera, refer to *Setting up video feed from the camera* on page 10.

Use the **DISP** button in the Z6 camera inside the Pod to view or hide indicators in the video stream.

Notes

Chapter 7 **Colour Page (For Nikon DSLR Only)**

Colour page allows you to change a wide range of remote functions and adjustments including colour, white balance and other image setting parameters on the Nikon DSLR camera attached to the head.

Colour page has combinations of functions that can be accessed via SRF or USB. The default Nikon camera connection for Nikon D5 or Z9 is USB which allows you to colour controls. The selected mode in the camera, STILL PHOTO or VIDEO, is displayed in the top-left corner.

To connect to the camera via SRF:

1. Ensure that the Nikon D5 or Z9 are grouped and an SRF group name is created.
2. Select **Network** from the CONNECTION MODE drop-down list.
3. Select the correct SRF group name to establish the camera connection. Click **CONNECT**.

To save the updated settings to the camera, click **SAVE SETTINGS TO CAMERA**. In the pop up, click **SAVE settings and RESTART camera**.

Appendix 1 **Troubleshooting**

Typical symptoms, causes, and actions

Symptoms	Cause and/or action
The head did not appear connected in MHC In the Network settings, the row for the head is not green.	Check that all cables are connected, and all units have power. In the Network Settings page: • Check you have added the correct IP address of the head in MHC. • Ensure that the Type of robot is correct. • Check that the IP addresses of the head and MHC PC are in the same network range. • Ensure that two devices on the same network do not have the same IP address. If you have connected more than one heads, connected the MRMC system to another local network, or moved the head between networks, check that correct addresses have been entered in MHC.
A '!' appears with the head icon in the MHC Main screen.	Click/tap the spanner( ) icon appearing below the head icon to allow MHC to correct the error.
While tracking, the camera is pointing in the wrong direction.	The Pan axis must move to the left when position is moved positively. If it is incorrect, then scaling for the axis will need its sign changing. The Tilt axis must move up when position is moved positively. If this is incorrect, then scaling for the axis will need its sign changing.

Symptoms	Cause and/or action
The controls are not moving the head or the head doesn't appear to be communicating.	• Check that the soft limits are correct; the min and max limits are not set the wrong way around. These limits should be checked both on Axes tab and the Preferences page. • Click the **Reset Robot** button in the Tools tab. The head will take a few seconds to reconnect after doing this.
The axis settings do not appear to be correct	If the axis settings seem to be out of order or you just want to get back to the original settings, then you can reset the settings to "factory default". This can be done from Server --> Axis.
Camera controls are not responding.	• Click the **Reset Robot** button in the Tools tab.

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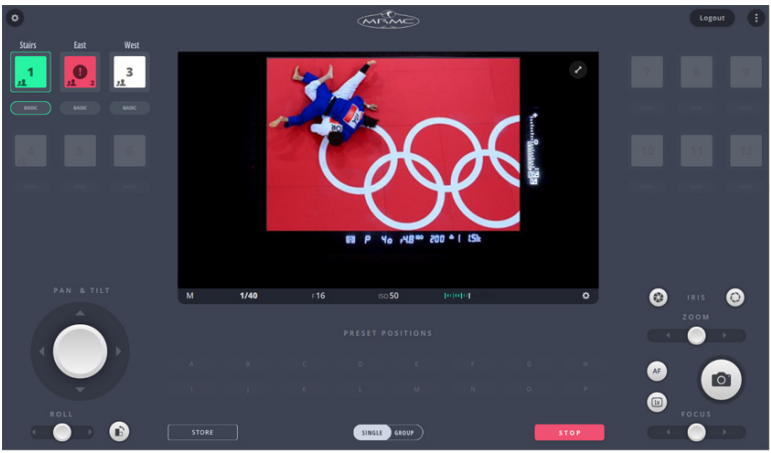

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