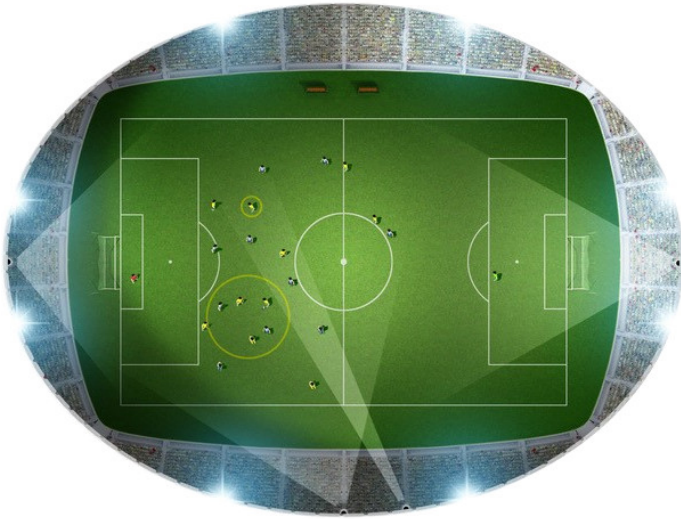




MARK ROBERTS MOTION CONTROL

POLYMOTION PLAYER



QUICK START GUIDE

Product code: MRMC-1998-01

Polymotion Player Quick Start Guide

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Chapter 1 Polymotion Player Overview

Polymotion Player is a system of multiple heads configured for fully-automated player and team formation tracking in stadium environments. There can be two forms of Polymotion Player systems:

- **Tracking with Tracab server:** The Polymotion Player system uses real-time external tracking data feed from ChyronHego's TRACAB™ solution to move the cameras on the MRMC heads to position, automatically adjusting zoom and focus to keep the player or team in the frame at all times.
- **Manual tracking:** The Polymotion Player system assigns one head controlled by the operator as a Master automatically making all other MRMC heads in the system 'slaves'. The framing on the master head is automatically used by all the other heads. There should be at least two heads assigned to the same user for Manual tracking to work.

For the camera to follow a steady pan velocity in manual tracking, it is recommended that the participating head is mounted **6m above the pitch level and 6m away from the edge of the pitch.**

Polymotion Player system with Tracab relies on incoming Tracab data for player tracking failing which it has the capability to shift to Manual tracking.

Polymotion and TRACAB Solution

TDCGraphics is the software that translates the real-time field data from TRACAB in a form usable by MHC. For the Polymotion Player system to work, MHC PC needs to connect to TDCGraphics and TRACAB server. There are two possible configurations of this system that are done by MRMC:

- Configuration 1: MHC PC connects directly with the TRACAB server which hosts the TRACAB and TDCGraphics software.
- Configuration 2: MHC PC hosts the TDCGraphics software in which case MHC connects to TDCGraphics, which in turn connects to the TRACAB Server.

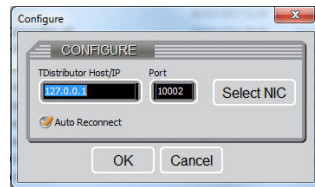
MHC Server does not store any data incoming from the TRACAB system and only ever has the last positions sent from the TRACAB system for processing.

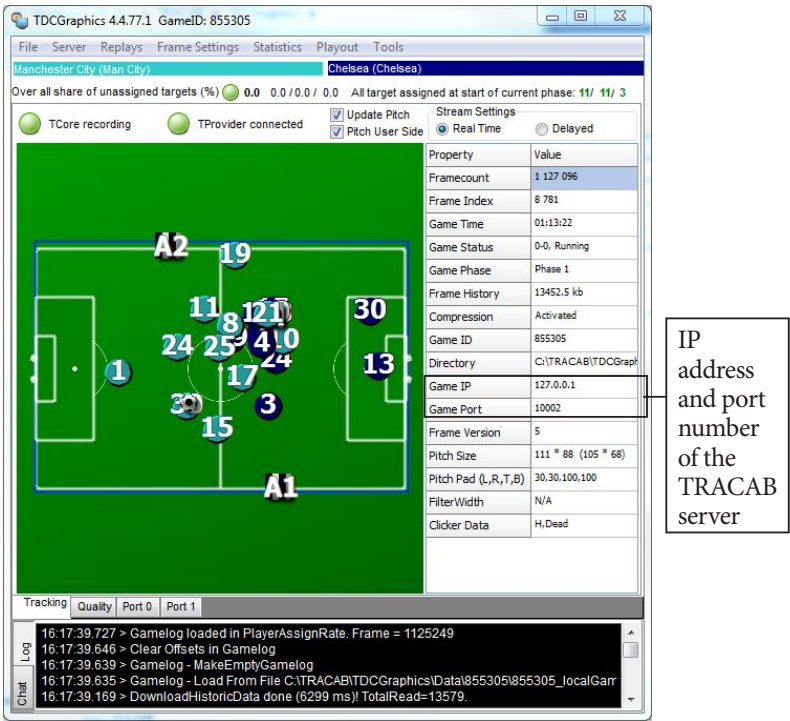
To use Polymotion Player system for auto tracking robots following are the high-level steps:

1. Ensure that the heads are mounted at the desired locations with respect to the football pitch.
2. Set up TDCGraphics. (Only for Configuration 2).
3. Prepare the heads to be used in Polymotion Player.
4. Install Polymotion Launcher on all participating PCs in the Polymotion Player system.
5. Specify TRACAB server connectivity options in MHC.
6. Set up player tracking options in MHC.
7. Begin tracking.
8. Use the Spotter screen to manage robots during tracking.

Setting up TDCGraphics (only for Configuration 2)

If TDCGraphics is installed on the same PC as MHC Server, when you launch TDCGraphics, a dialog box is displayed where you need to specify the IP address of the TRACAB server on the different PC. The Configure dialog always shows 127.0.0.1 if the TRACAB Server is on the same computer otherwise enter the IP address of the TRACAB Server.





Port tabs

Each port tab provides a port number for MHC Server to connect, to receive data and a configuration for defining the position of the Robot relative to the centre spot of the pitch and configuration of the zonal data that will be sent. The zonal data can be either a position of general play with field of view (FOV), or a position of a cluster of players with FOV.

Each Port tab correspond to a robot, so you might need to add Port tabs if the stadium setup includes more than two robots to track zonal data.

The screenshot shows the TDCGraphics 4.4.77.1 interface. The top menu bar includes File, Server, Replays, Frame Settings, Statistics, Playout, and Tools. The main window displays a soccer field with player positions for Manchester City (Man City) and Chelsea (Chelsea). The property table on the right lists various settings:

Property	Value
OutPortType	Multicast
OutSignalPort	49001
OutSignalNIC	0.0.0.0
BroadcastAddress	192.168.7.51
OutPortNumber	9010
OutProtocol	Hego ASCII
SlaveTo	None
SlaveToPort	0
SlaveToOffset	0
SendOffsideFlag	No
AdditionalOutPortNumber	0
AdditionalOutPortIP	
HistRequestOffset	0
PrevBallPositionWhenDead	No
AutoCamActive	Yes (Main Camera)
ClientCount	0
InputFrameCount	1144318
OutputFrameCount	No clients connect

Annotations on the right side of the image point to specific settings:

- Port used as source by MHC (points to OutPortNumber: 9010)
- Used to enable zonal data (points to AutoCamActive: Yes (Main Camera))
- Changes to 1 if MHC server is connected (points to ClientCount: 0)

The chat window at the bottom shows the following messages:

```
16:27:58.692 > DownloadHistoricData done (5750 ms)! TotalRead=779.
16:27:58.236 > PlayerNo: 10 = 10 Team: 1 = 1
16:27:58.230 > PlayerNo: 25 = 25 Team: 1 = 1
16:27:58.224 > PlayerNo: 2 = 2 Team: 3 = 3
16:27:58.219 > PlayerNo: 15 = 15 Team: 0 = 0
```

To specify camera position:

1. Double-click AutoCamActive value cell to display the Set Offset for Slave Type window.
2. Check AutoCam active to turn zonal data on.

- Set the Camera Position value to the one given by Chyron Hego.

Set offset for slave type

Autocam active ☒

Camera settings

Camera Type: Main camera

Zoom Offset: 0

Camera position

Camera Position X: 0

Camera Position Y: -30

Camera Position Z: 30

Result:

X: 26.9397

Y: 6.5887

Z: 0.0000

FOV: 0.6815

Home Team Players:

- ☐ 27 David Button
- ☐ 2 Bruno
- ☐ 4 Shane Duffy
- ☐ 33 Dan Burn
- ☐ 30 Bernardo
- ☐ 7 Beram Kayal
- ☐ 6 Dale Stephens
- ☐ 11 Anthony Knockaert
- ☐ 16 Alireza Jahanbakhsh
- ☐ 42 Viktor Gyokeres
- ☐ 13 Pascal Groß
- ☐ 8 Yves Bissouma
- ☐ 9 Jurgen Locadia
- ☐ 49 Jayson Molumby
- ☐ 31 Robert Sanchez
- ☐ 3 Gaëtan Bong
- ☐ 57 Leo Skiri Ostigard
- ☐ 22 Martin Montoya

Away Players:

- ☐ 21 Kelle Roos
- ☐ 37 Jayden Bogle
- ☐ 6 Richard Keogh
- ☐ 5 Fikayo Tomori
- ☐ 44 Tom Huddlestone
- ☐ 4 Craig Bryson
- ☐ 7 Harry Wilson
- ☐ 9 Martyn Waghorn
- ☐ 11 Florian Jozefzoon
- ☐ 14 Jack Marriott
- ☐ 26 Ashley Cole
- ☐ 46 Scott Malone
- ☐ 23 Duane Holmes
- ☐ 28 David Nugent
- ☐ 47 Hennrich Ravas
- ☐ 2 Andre Wisdom
- ☐ 17 George Evans
- ☐ 15 Bradley Johnson

Load Rosters

OK Cancel Apply

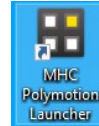
- Click **Apply** and then click **OK**.

Notes

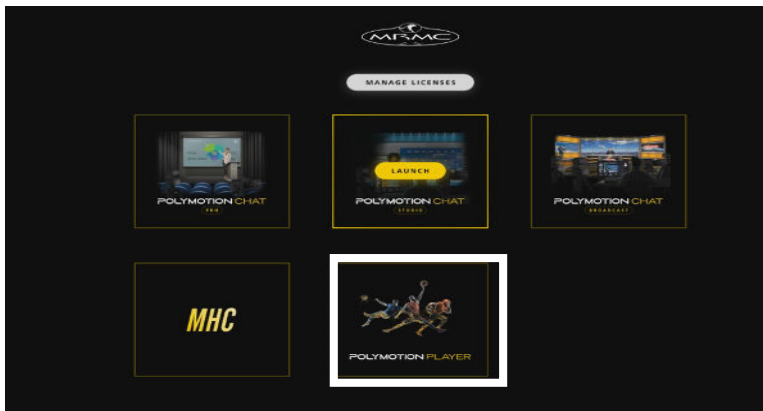
Chapter 2 Using Polymotion Player Tracking

Launching Polymotion Player

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



2. Click/tap **Polymotion PLAYER**.

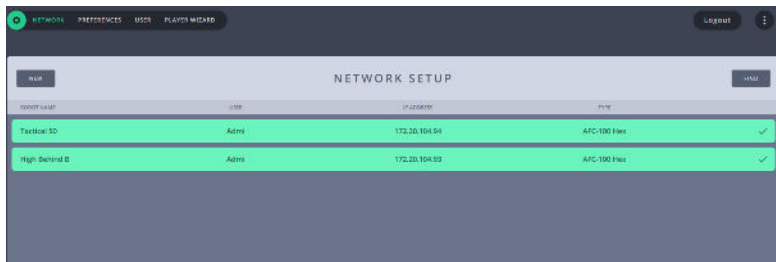


3. If you are launching this for the first time, you will be required to add a new license file or a license code. Contact MRMC Support for a new license.
4. Once you have supplied a license code, MHC Server and Client are launched, login to MHC Client as Admin:
Username: Admin
Password: Admin1234

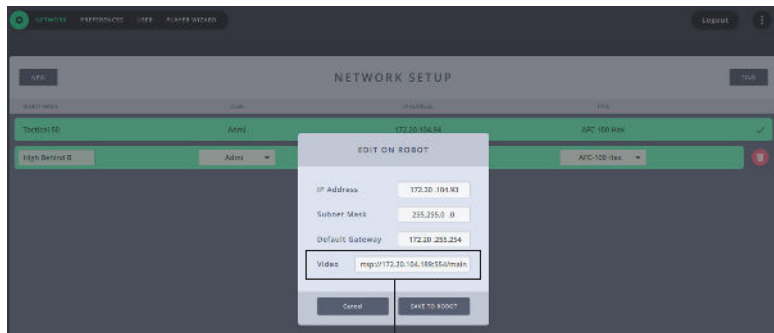
Preparing the robots for Polymotion Player

1. Ensure that you have cabled the robots and added them in MHC using the Settings (⚙️) > **NETWORK** settings page. Cabling the robots and adding them in MHC is outside the scope of this guide. For detailed instructions on this, refer to the product's hardware Quick Start Guide and the MHC Quick Start Guide.

- Click FIND to find all the robots connected on the network.

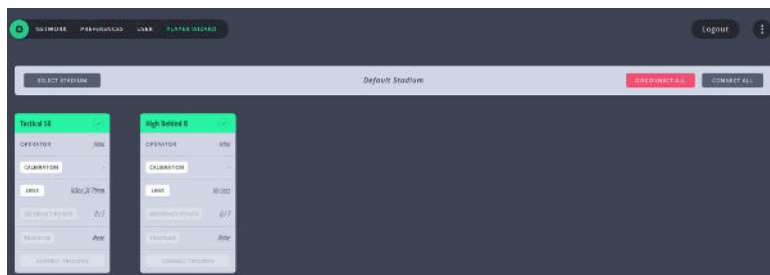


- If you want to see the LiveView from the cameras in the MHC screen, add the RTSP stream address in the IP Address box for each head.



RTSP stream address

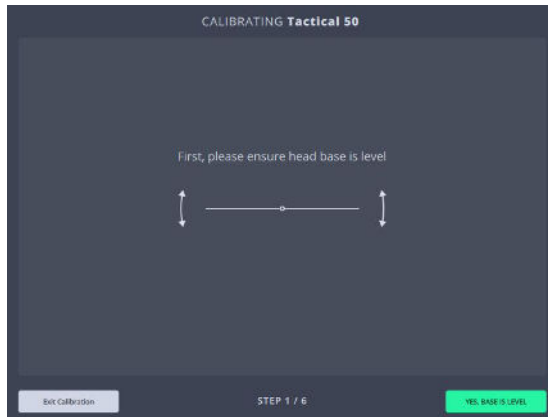
- Select Settings (⚙️) > **PLAYER WIZARD**.



- SELECT STADIUM** to load the pitch data into the Player Wizard if one is stored already.

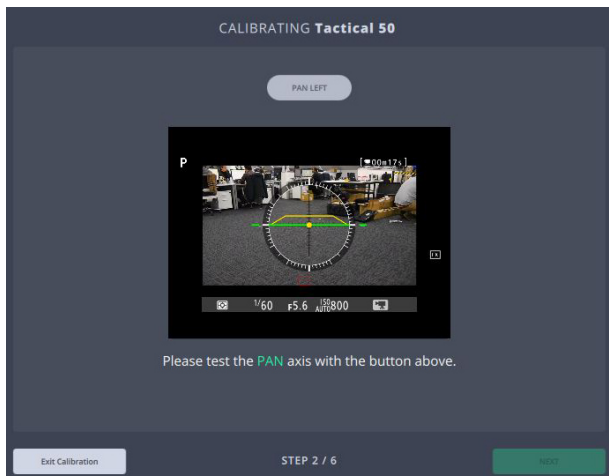
6. Configure each robot as follows:

- 6.1 Click **CALIBRATION** and follow the wizard screens to calibrate the robot. For heads that have external cameras, like AFCs, this wizard includes screens to level tilt and align the camera centre to that of the pitch:



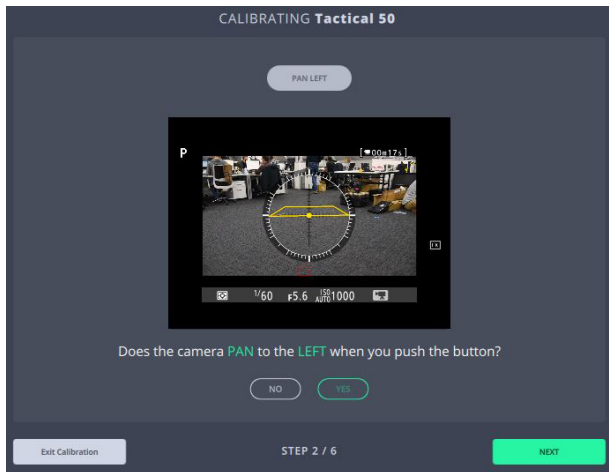
Calibration Step 1 - Levelling the robot

Use a spirit level to level the base of the head.



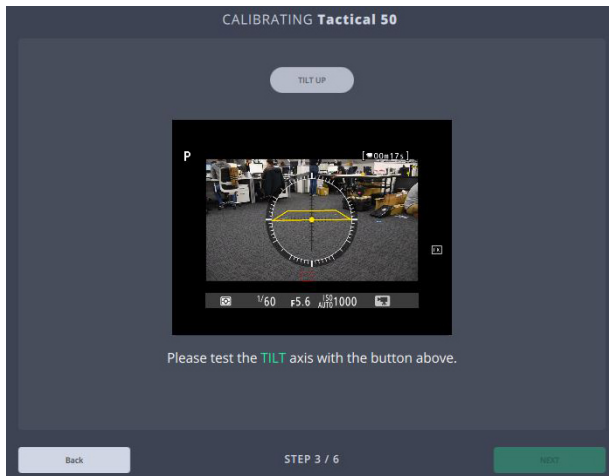
Calibration Step 2

Click the **PAN LEFT** button.



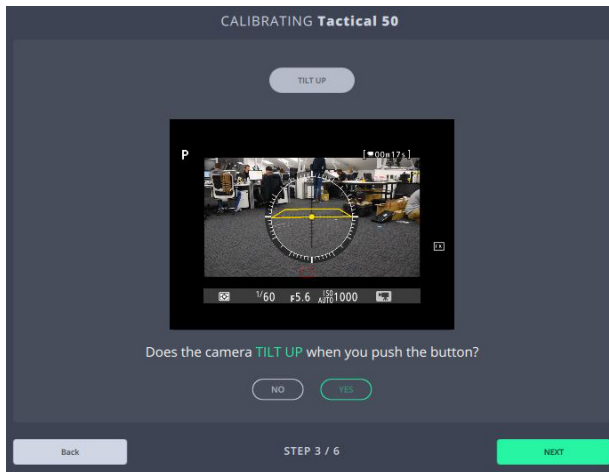
Calibration Step 2

If the robotic head does pan left, click **YES**. If it doesn't, click **NO** and the direction of the pan axis will be corrected by the software.



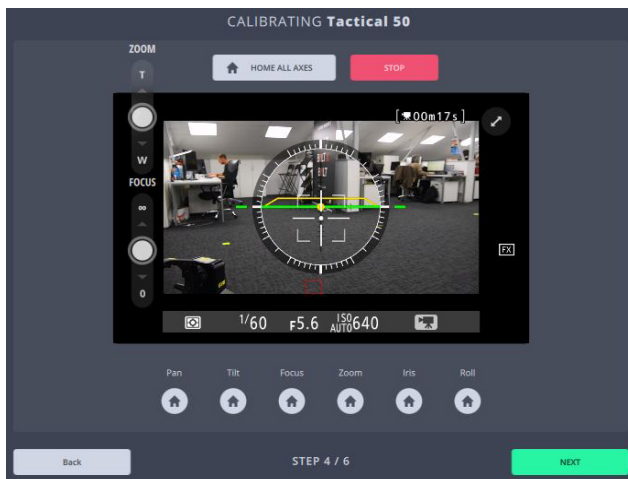
Calibration Step 3

Click the **TILT UP** button.



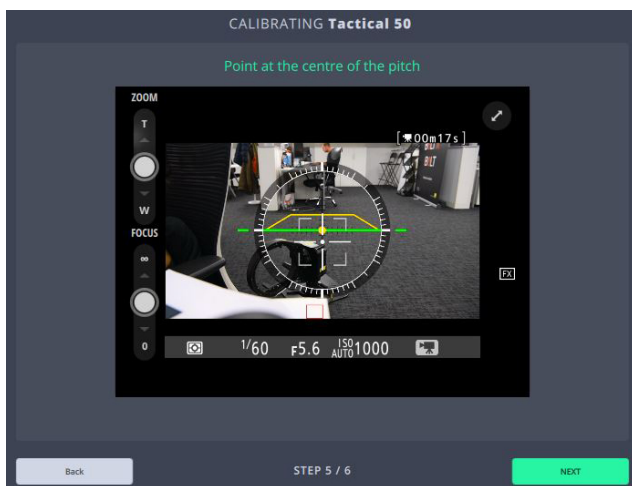
Calibration Step 3

If the robotic head does tilt up, click **YES**. If it doesn't, click **NO** and the direction of the tilt axis will be corrected by the software.



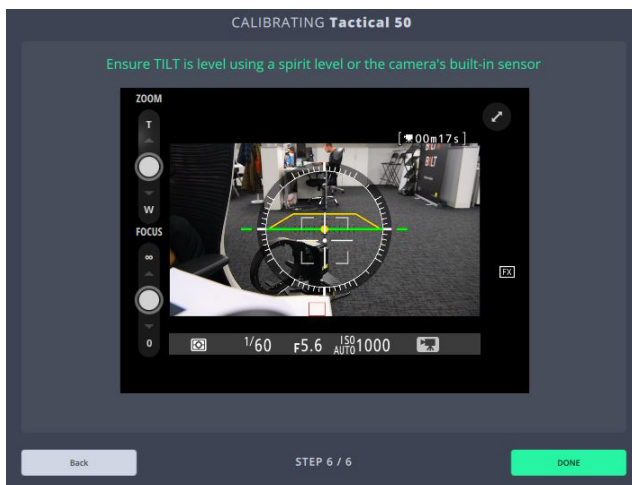
Calibration Step 4- Homing the axes

Click **HOME ALL AXES** to home all axes one after the other or click individual axis Home buttons.



Calibration Step 5 - Centre of the pitch

Point the camera to the centre of the pitch such that the centre of the camera screen overlaps the pitch centre.

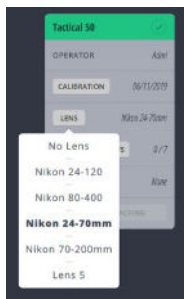


Calibration Step 6 - Level tilt

Move the camera up and down so that there's a single line in the centre of the camera screen.

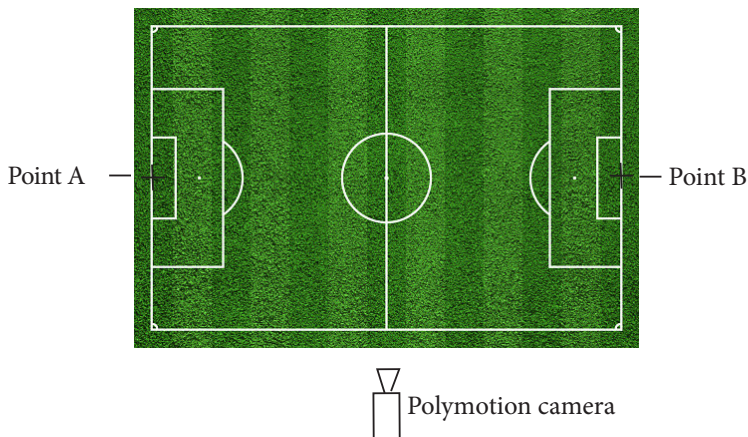
For each robot, the Player Wizard page displays the date the robot is calibrated.

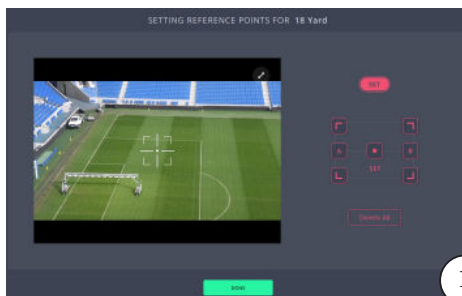
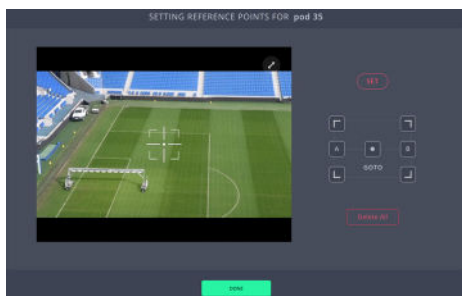
- 6.2 Select a lens configuration for the camera in the robot.



Select the lens configuration

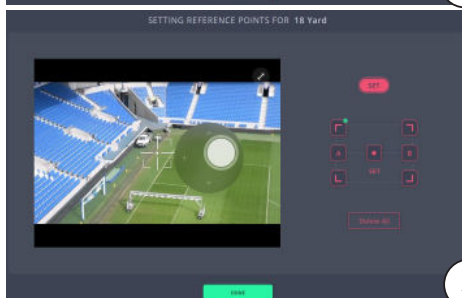
- 6.3 Set the 7 **Reference Points** that emulate the 7 pitch positions. For the **corner** reference points, the camera crosshair should respectively point at the four corner flags on the pitch. The **A** and **B** correspond to the centre points on left and right, respectively, behind the goal posts with respect to the TRACAB camera.





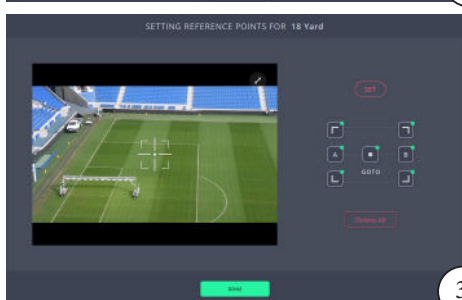
1

Click/tap the **Set** button to switch to edit mode.



2

Move the robot to the point using the on-screen joystick and then click/tap the respective reference point. A reference point once set appears with a green dot.



3

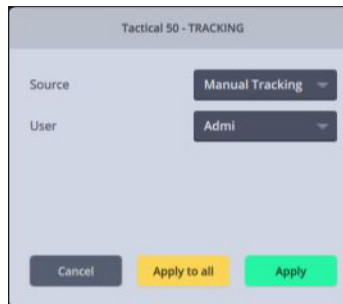
After setting all reference points, click/tap the **SET** button again to store these positions. The reference points are converted to **GOTO** buttons. Use them to test if all the reference points are set correctly.

- 6.4 Click/tap the **Tracking** drop-down box to specify the tracking data:
- **Source:** Select whether source of tracking is **Manual**, **Tracab** or **None** if this is a non-tracking head. You can change the source at a later point.



The screenshot shows a dialog box titled "Tactical 50 - TRACKING". It has two main input fields: "Source" and "User". The "Source" field is currently open, displaying a list of options: "Manual Tracking" (at the top, with an upward arrow), "None", "Tracab", and "Manual Tracking" (at the bottom). The "User" field is empty. At the bottom of the dialog, there are three buttons: "Cancel" (grey), "Apply to all" (yellow), and "Apply" (green).

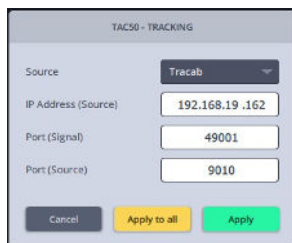
- For **Manual Tracking**:
 - Select the **User** to be assigned as the **operator** for the robotic head.



The screenshot shows the same "Tactical 50 - TRACKING" dialog box. In this state, the "Source" dropdown is closed and shows "Manual Tracking". The "User" dropdown is also closed and shows "Admi". The "Cancel", "Apply to all", and "Apply" buttons remain at the bottom.

- For **Tracab**:
 - Enter the **IP address (Source)** is the IP address of the server running TDCGraphics. (This could be the same server computer or the TRACAB server depending on where the TDCGraphics is installed.)
 - **Port (Signal)** is same as the **OutSignalPort** field in the TDCGraphics software.

- **Port (Source)** is the number of the incoming connection of the data from TRACAB. This is the same as the **OutPortNumber** field in the TDCGraphics software.



Set the Tracking Source

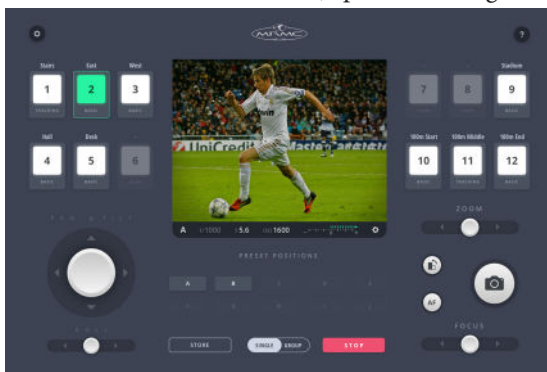
- 6.5 If you want to select the same tracking source for all connected heads, click/tap **Apply to all** or if it applies to the current head only, click **Apply**.
7. Perform all substeps under step 6 for all heads.
 - 7.1 Click CONNECT TRACKING to connect a single head to the tracking server at a time.
8. Click CONNECT ALL to connect all heads to the server together.


Polymotion Player User settings in MHC

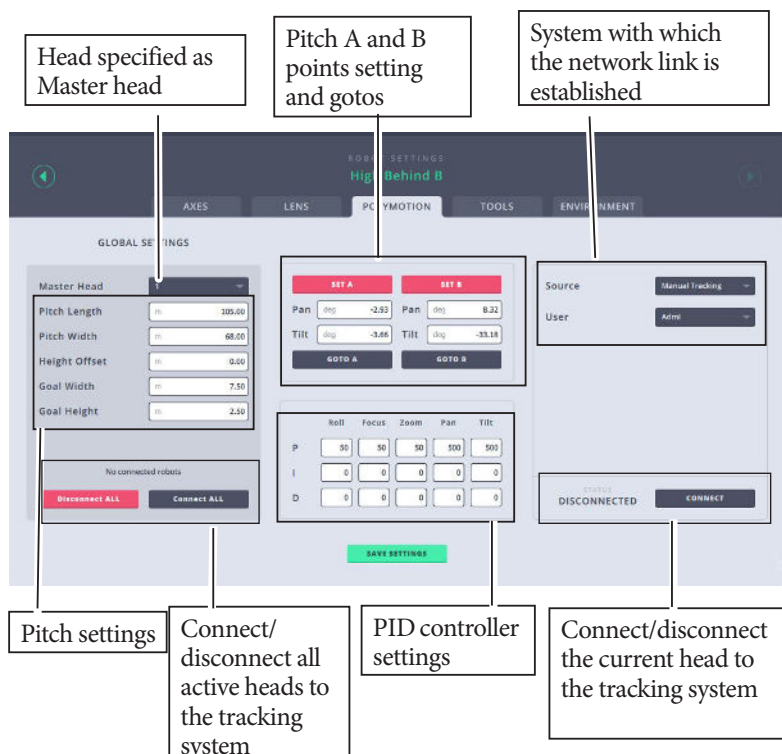
Before the Polymotion Player system can track players on the field, tracking settings need to be specified, such as the players on the football field, and configure the MHC server to communicate with the TRACAB system. To do this:

1. Launch TDCGraphics as above, if it hasn't been started already.

- Log in to the MHC client as a user (Operator or Engineer).



- Click the Settings  > **ROBOT** to open the Robot Settings page. These settings are available only to Engineering type users. Select **Polymotion** to specify the Polymotion settings.



4. Under **GLOBAL SETTINGS**, specify:
- Select the head that you want to set as the **Master Head**. the framing on the master head will be automatically used by all the other heads. During Manual tracking, this is the head that the operator control using Pan Bars and all other heads in the tracking system act as Slave heads.
 - The **Pitch length** and **Pitch width** are set in the Player Wizard. You can tweak these settings here. Specify the **Height Offset** which is how far off the ground the robots should target. If height offset is set to zero, the tracking system will target ground level. A value of 1m is usually used, as this is about waist height of a football player. **Goal Width** and **Goal Height** are with and height of the goal post, respectively.
 - Specify the **PID controller settings**, as shown to begin with. You might not require to change these.

	Roll	Focus	Zoom	Pan	Tilt
P	<input type="text" value="0"/>	<input type="text" value="50"/>	<input type="text" value="30"/>	<input type="text" value="500"/>	<input type="text" value="500"/>
I	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="5"/>	<input type="text" value="5"/>
D	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

5. The source settings, are same as those set in Player Wizard (refer to page 15). However, these can be altered on Polymotion tab. For Tracab, these can look like:

Source	Tracab ▼
IP Address (Source)	<input type="text" value="192.168.19.162"/>
Port (Signal)	<input type="text" value="49001"/>
Port (Source)	<input type="text" value="9010"/>

6. Use the **SET A** and **SET B** buttons to tweak the A and B points. These values are the same as those specified as the A and B reference points in Player Wizard.

7. Click **SAVE SETTINGS** to save these settings and then click **CONNECT** to connect the current head or **CONNECT ALL** to connect all the participating heads. For TRACAB, both TRACAB Server and TDCGraphics must be running to connect.

Note that the value in **ClientCount** field in TDCGraphics changes to 1.

The screenshot shows the TDCGraphics 4.4.77.1 interface. The main window displays a soccer game between Manchester City (Main City) and Chelsea (Chelsea). The game field is visible with player positions and numbers. The 'Property' table on the right lists various settings, with 'ClientCount' highlighted and a callout indicating it changes to 1 when MHC is connected to TDCGraphics. The 'Log' window at the bottom shows game events.

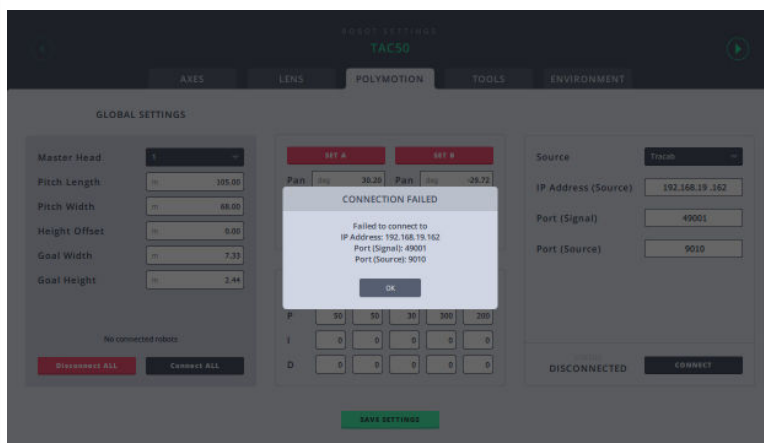
Property	Value
OutPortType	Multicast
OutSignalPort	49001
OutSignalNIC	0.0.0.0
BroadCastAddress	192.168.7.51
OutPortNumber	9010
OutProtocol	Hego ASCII
SlaveTo	None
SlaveToPort	0
SlaveToOffset	0
SendOffsideFlag	No
AdditionalOutPortNumber	0
AdditionalOutPortIP	0
HisRequestOffset	0
PrevBallPositionWhenDead	No
AutoCamActive	Yes (Main Camera)
ClientCount	1
InputFrameCount	1130321
OutputFrameCount	1130321

Changes to 1 when MHC is connected to TDCGraphics

- If required, perform the steps 1-5 for each head participating in player tracking.

Note

While using Polymotion Player with Tracab, the connection is lost to the Tracab server, the following message is displayed on screen.



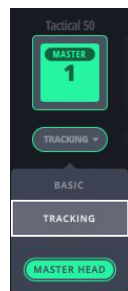
In such cases, you can switch the Source to Manual using the Polymotion tab or Spotter Screen (Refer to *Emergency Manual tracking button* on page 36)

Setting up player tracking

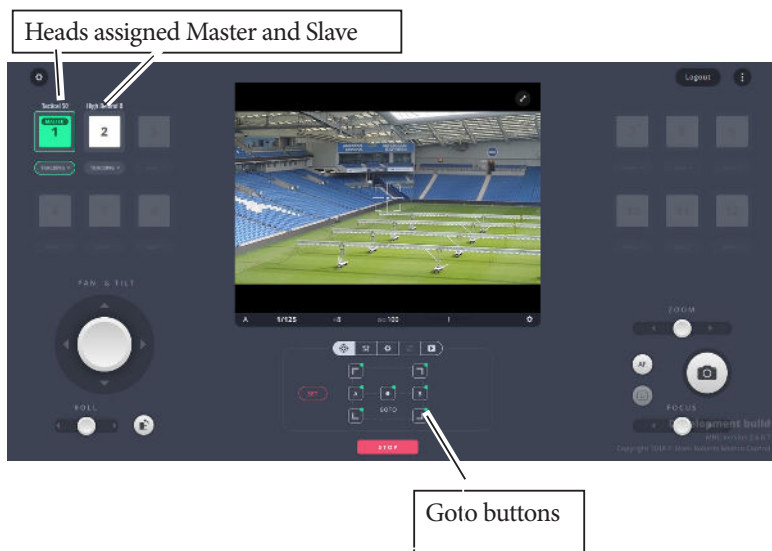
Once you set player clustering on, the player cluster data received from the TRACAB server would be in accordance with the player clustering settings specified in TDCGraphics.

Operating in MHC using Polycam Player

All tracking robots should be in the Tracking mode while the non-tracking robots can remain in the default Basic mode on the MHC Client operator login Main page. Once the Player tracking options have been set up using Player Wizard, the default mode will change to TRACKING. To manually change the mode for a robot, click/tap and hold the robot icon you want to enable tracking on. Select **TRACKING**. Note that in the Preset Positions area, you now have the Tracking options.

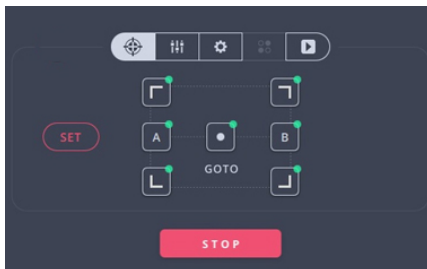


MHC Operator Main page for Polymotion Manual



Reference Points

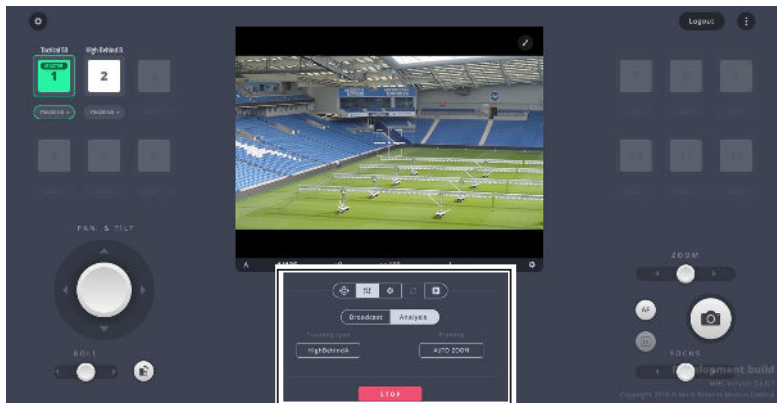
If the reference points are set up in the Player Wizard, the points are shown on goto buttons with a green dot. These can be used to test or reset them by clicking/tapping the **SET** button.



Tracking Mode

Click the Tracking Mode tab (second tab) in the Tracking section, and specify the Tracking type options.

Tracking Mode

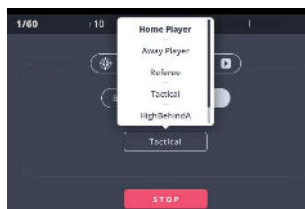


For example, you can select the **Tracking Mode** as **Broadcast** or **Analytics**. You can further select a Tracking type. For Broadcast, you can select Tactical, Offside A or Offside B tracking types and for Analytics,

you can select **Home Player**, **Away Player**, **Referee**, **Tactical**, **HighBehindA** or **HighBehindB**.



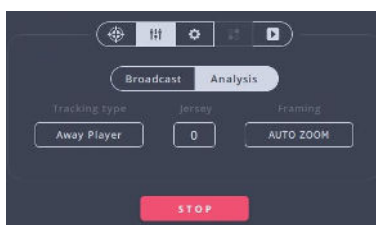
Tracking types for Broadcast



Tracking types for Analytics

If you select Tracking type as **Home Player** or **Away Player**, enter the **Jersey** number of the player you want to track. You can also specify whether you want to **AutoZoom**. You can select the Tracking type as **Tactical** if tracking a player cluster.

Tracking Modes

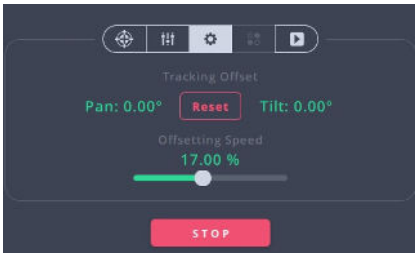


Tracking Offset

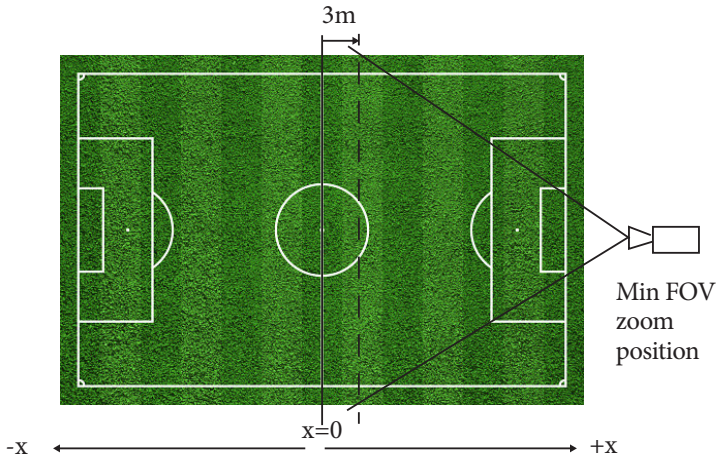
Select the Tracking Offset tab in the Tracking section. This tab is dynamic and changes depending on the Tracking type selected in the previous tab. The following options appear when the Tracking type is Home Player, Away Player, and Referee. The Offsetting Speed and the Master Robot Speed (set on the Preferences page) are used by the robot during tracking.

You can tweak this to adjust the framing of the target within the view. Use the **Reset** button to remove any offsets.

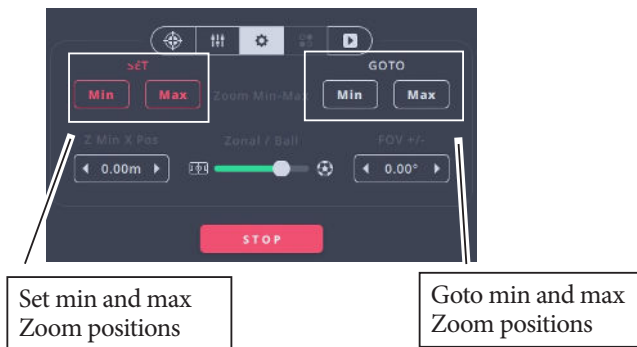
Tracking Offset – Analysis Home Player, Away Player and Referee



When the Tracking type is Analysis High Behind A or Analysis High Behind B, the following options appear in the Tracking Offset tab. **Z Min X Pos** is the x position on the pitch from the centre spot in meters that the minimum stored zoom position can see both sides of the pitch.



Tracking Offset – Analysis High Behind A or Analysis High Behind B



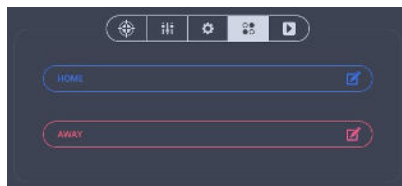
Max zoom should be set when the corner flags at the end of the pitch are just in frame.

Min zoom should be the closest zoom position to see the near side of the pitch.

For all other tracking types, no settings appear on this tab.

Player Preselection (Not available for Manual tracking)

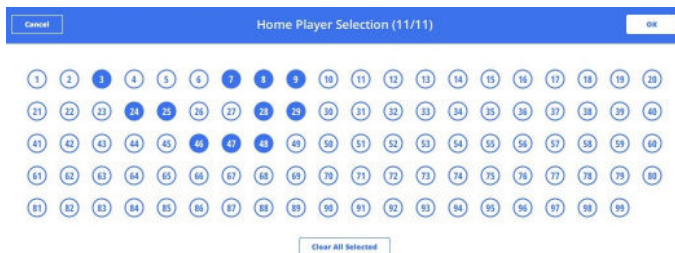
This menu allows you to setup player selection before any Tracab data is received, or before the match starts.



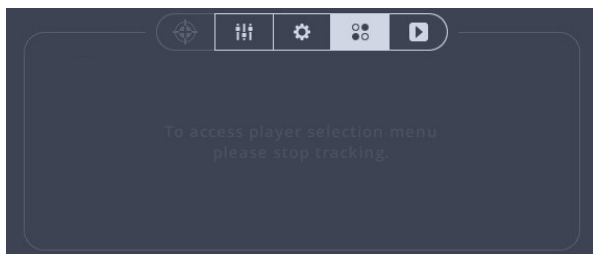
The menu is available for the following target types:

- Broadcast Tactical
- Analysis Tactical
- Broadcast Offside Camera A & B

To select the players, click the Edit () button and select the player's jersey number for each team.



This menu is not available if the robot is tracking. In this case, all player manipulations should be done via the Spotter Screen, as detailed on *Spotter screen* on page 28.

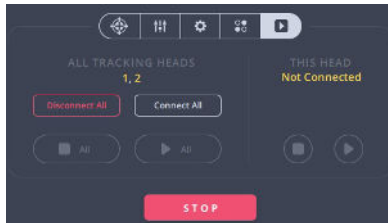


Begin Tracking

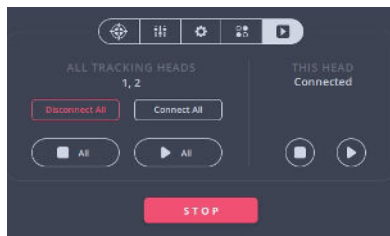
Finally, on the fifth tab, you can use the **Play** button to begin player tracking. When pressed, the Play button should become green. You can Play or Stop the tracking on **This Head** or **All Tracking Heads**. Before you click the Play button, ensure that the connection with the TRACAB server is established indicated by the green server connectivity icon. You

can click the icon to toggle TRACAB server connectivity provided all options are specified correctly in the Polycam tab in MHC.

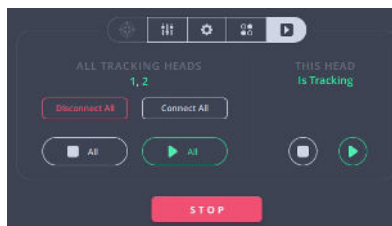
Start/Stop Tracking



All robots not connected and not tracking



All robots connected but not tracking



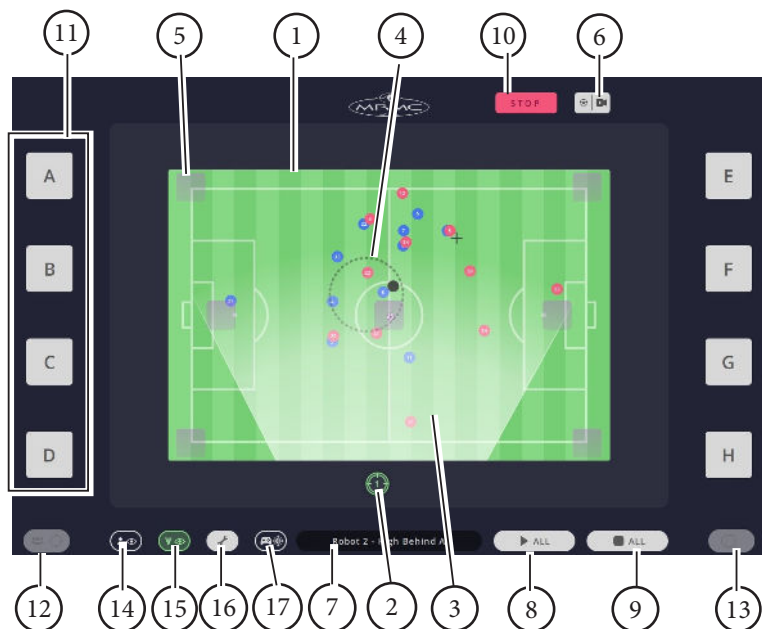
All robots tracking

Note

If you are using an Xbox 360 controller to control the robots, you can use the Red button to stop the player tracking but to restart you must press the Stop and Play buttons on the MHC display.

Spotter screen

Spotter screen provides a top view of the football pitch with players, ball and camera positions in relation to the field. The controls and presets on this page are only available when robots are in tracking mode.



1. Football pitch
2. Camera icon
3. FOV triangle
4. Target selection
5. On field goto
6. Layout (Main/Split) switch button
7. Info display
8. Play All button
9. Stop All button
10. Emergency Stop button

11. Presets
12. Grouping menu
13. Offset menu
14. Player layer button
15. FOV on/off button
16. Fix All Button
17. Emergency Manual tracking button

Football pitch

Football pitch mimics the real-life football pitch. The white marks are adjusted to match the proportions of the given field. Players, referees and the ball are positioned on the pitch using the coordinates received from TRACAB which are scaled to the size of the pitch on the Spotter screen. The zone is only visible if the selected camera is configured to track the zone, but its position is also received from TRACAB server.

Camera icon

Camera icon is visible only for the cameras that are in tracking mode. Unlike the FOV triangles it is not positioned at the real-life camera position. If the camera

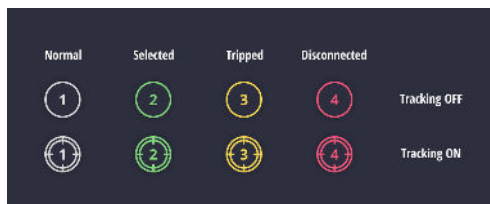
is positioned at the top or at the bottom of the pitch (in 2D view of the pitch), then camera's X position will be preserved and Y position will be adjusted to be closer to the pitch. If the camera is positioned on the left or the right of the pitch, its Y position will be preserved and X will be adjusted to be closer to the pitch.

To select a camera, click its camera icon.

FOV triangle

FOV triangle is only visible for the cameras that are tracking. It starts at the actual position of the camera in relation to the pitch, however you only see the part inside the pitch. It shows the direction in which camera

States of camera icon



is pointing and the angle of the current FOV. The FOV triangle will have higher opacity if it belongs to the selected robot.

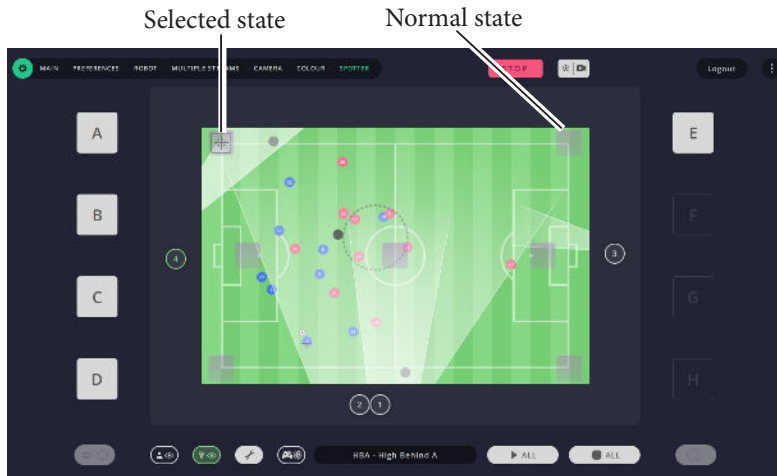
Target selection

Target selection is a dotted circle around the target object. The Spotter screen shows the selection for the currently selected robot (if the robot is in tracking mode). If the target is home/away player, the small selection circle appears around the target player. If the camera tracks referee, the target selection will be around the referee on the pitch. If the tracking type is Analysis High Behind A/B, the big selection circle appears at the zone position. For these types of tracking, the operator can change whether the camera tracks more of the zone or the ball, this will not affect the position of the zone circle.

If grouping is enabled for the selected camera, the target selection is represented in the different way. For more information on grouping menu, refer to *Grouping menu* on page 33.

On-Field Goto

The light purple buttons on the field are on-field gotos. This button sends a command to all robots in tracking mode with source type Tracab and Tracking type High Behind A or High Behind B to look at the corresponding point of the pitch. The speed with which robots will go to the needed position can be set in the Preferences tab with **Goto Speed** slider. Goto button has two states: normal and selected.



When at least one camera leaves a goto position, the button goes back to the normal state.

Layout (Main/Split) Switch Button

This button switches the screen between two layouts: main and split. If the main layout is enabled, the button is grey, if split layout is enabled that button is green. The functionality of the split layout is described separately.

Info Display

Info display shows the name of the camera and tracking type (e.g. Home Player or Tactical). If the tracking type is Home or Away player it also shows the jersey number. If the selected camera is not in tracking mode, the info display will show “Info Display” text.

Play All button

Clicking the Play All () button starts tracking for all the robots that are in tracking mode and have source type set to TRACAB (Spotter Screen currently does not support Polycam One).

If all available robots are tracking it appears green().

If none or some available robots are tracking it is grey ().

Note

The Play All button affects the robots in Tracking mode only. When there are no robots in tracking mode, the button is disabled.

Fix All button

The **Fix All** button sends commands to fix trips on all axes of all robots. The robot mode does not affect this functionality.

Stop All Button

Stops tracking for all robots in Tracking Mode.

Stop button

The **Stop** button stops all movement on all robots as well as stops tracking on robots that were tracking a target.

Presets

The buttons on the side of the screen match the first 8 presets from the Main page. On the Spotter Screen, they behave as group presets, i.e. when pressed all robots that have this preset position stored go to it (Robot mode does not matter). If at least 1 robot has a corresponding preset stored, the buttons appear light grey – stored state (Presets A-E on the example).

If none of the robots have a corresponding preset stored, they will appear transparent with grey border – empty state (F-H on the example).



If all robots are in the position of the same preset, the preset button changes.




If at least one robot left the position of the preset, the button will go back to its stored state.



Grouping menu



Clicking the Grouping button () opens the Grouping menu that allows you select and track multiple players in a group. The grouping algorithm is available for the Tactical, 18 Yard A and 18 Yard B target types. The following functionality is not applied to Tactical target type, because it is supposed to track 20 players at all times and it should be mounted at the position which will allow such framing.

With Offside cameras it is possible that not all selected players can fit into the frame. In that case, some players will be temporarily excluded from the group.

View mode


When you first click the Grouping button, the Grouping menu opens in View mode. This mode allows you to view players in an ordered list and enable/disable grouping.



In View mode player icons can have three states. If the selected camera is tracking a group, the players on the pitch will mimic these three states

State in Grouping menu	State in pitch	Name	Description
		Selected	This player is selected and is currently tracked
		Selected, not tracked	If the player is selected but can't fit in the frame, the operator will see it crossed out. Once the player is in the frame again, the state will change back to selected.
		Not selected	The player is not selected for the current group.

Edit mode


Clicking the Edit () button will switch the Grouping menu to Edit mode. In Edit mode, you can select/deselect players from the menu list or directly on the field which you want to include in the group. You can also discard any changes in the selection if required. In Edit mode, player icon can have only two states: **selected** and **not selected**.


Edit mode




To group players for tracking:

1. Click/tap the **Grouping** button.

2. Select the home and away players that you want to group by clicking/tapping on the jersey number. To deselect a player, click/tap on the jersey number again.
3. Click () to apply changes.

Discard button (): Discards any changes that were made during editing. Keeps the last saved group.

Select All button(): Selects all players visible in this menu.

Clear All () button: Clears all players from selection.

Enabling/disabling grouping

The **Enabled/Disabled** toggle button allows you to toggle between activating and deactivating grouping and shows the current status of whether grouping is active or not.

Offset menu



The Spotter Screen offset menu provides similar functionality to the offset menu on the main page. It is available if the selected robot has Tracab source type and the tracking type is Home player, Away player or Referee. You can see the current pan and tilt offset, reset it or change the offsetting speed.

Player Layer button

This button defines the layer on which player and ball icons will be displayed. When this button is disabled, the player layer is under the FOV triangles. In this case the button is grey. When the Player layer button is enabled, the player layer is over FOV triangles. In that case the button is green. The purpose of this is to improve visibility of the player icons if needed.





Player layer button disabled



Player layer button enabled

FOV on/off button

This button hides or shows FOV triangles. If it is On, FOV triangles are visible and the button is green. If it is Off, FOV triangles are hidden and the button is grey. By default, it is On.

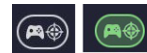


Fix all Button

Fix all button sends commands to fix trips on all axes of all robots.

Emergency Manual tracking button

Enables/disables Manual tracking and passes the robot control to the operator instead of automatic tracking. This is an emergency option and can be used if TRACAB data is not being received by MHC. Green denotes Manual tracking is on.



Split view layout



The split view layout allows you to use basic spotter screen features as well as view video feeds from all cameras.

The Spotter screen features that are available in Split view layout are:

Football field (with player icons, ball, gotos & FOV triangle of the selected camera):

- Start/stop tracking buttons
- Fix all button
- Player layer button
- FOV on/off button
- Emergency stop button

The main video feed shows on the right from the football pitch and contains the stream for the selected camera.

Video grid contains videos for all available cameras. Video grid resizes the video windows depending on the number of available robots (available options are: 2/4/6/8/10/12). You can select the camera by clicking one of the feeds in the grid.

Errors

Tracking Validation Errors

Validation errors can occur when any setting is not correct for accurate or optimal performance of the Polymotion system.



These can occur in one of the following situations:

- Pan A not set
- Tilt A not set
- Pan B not set
- Tilt B not set
- Focus point count invalid (In most cases that's because the lens was not selected)
- Zoom point count invalid (In most cases that's because the lens was not selected)
- All corners not set
- Insufficient angle difference between both the Pan A/Pan B and Tilt A/Tilt B values

General Setup Errors

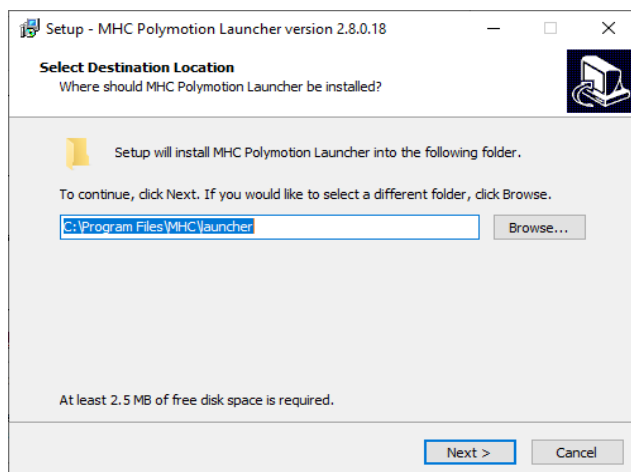
- Pitch width not set
- Pitch length not set
- Robot count error – For Manual Tracking there should be at least two robots in “Manual Tracking” with the same user
- User assigned robot count error – For Manual Tracking there should be at least two robots in “Manual Tracking” with the same user

Appendix 1 Polymotion Player Installation

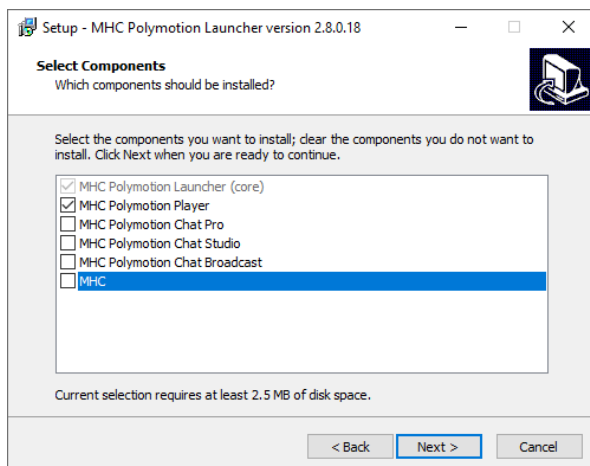
Installing Polymotion Launcher

Polymotion Launcher is a utility that allows you to install additional instances of MHC corresponding to each Polymotion system, such as Polymotion Chat and Polymotion Player. Follow the instructions to install Polymotion Launcher:

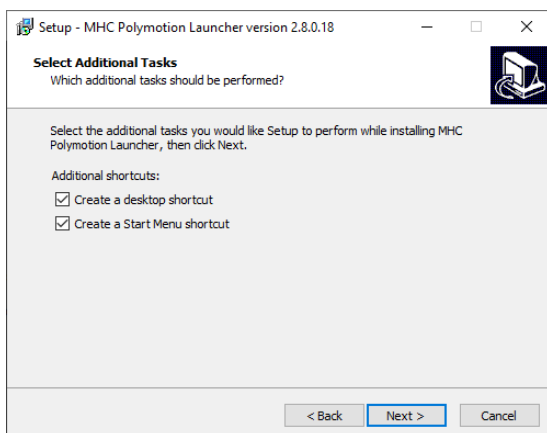
1. Double-click **MHCPolymotionLauncherSetup_x64-v2.8.0.18.exe** to launch the installer.
2. Double-click the MHC and Polymotion installer - **MHCPolymotionLauncherSetup_x64-v2.8.0.18.exe**. Click **Next** on first screen.
3. Specify the location of the MHC application on your hard drive. By default it is installed in **C:\Program Files\MHC\Launcher**. Click **Next**.



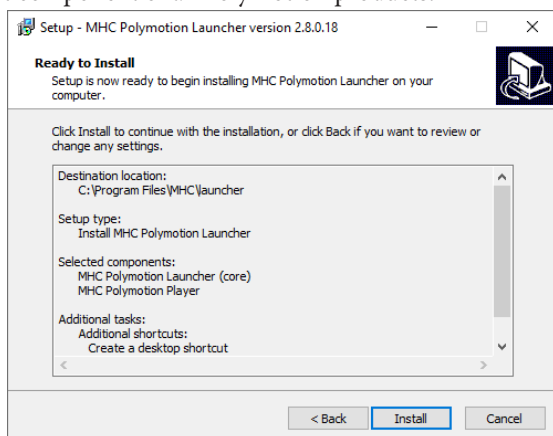
4. On the next screen, selects the MHC components you want to install. Click **Next**.



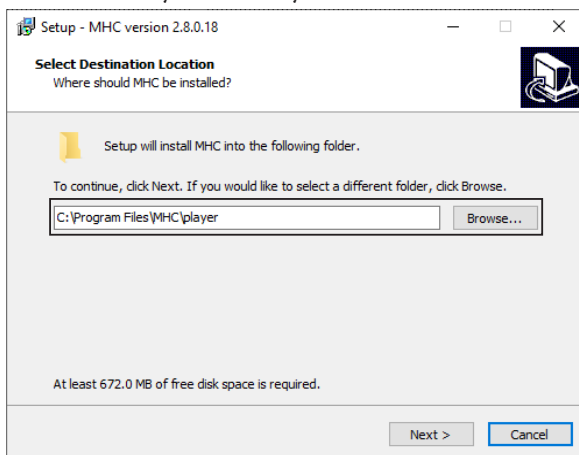
5. Click **Next**.



6. The next screen summarises the components selected for install. Click **Install** to install the MHC Polymotion Launcher (Core) - the default component of all Polymotion products.

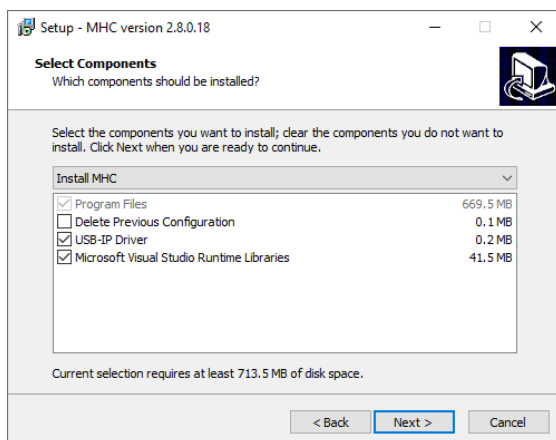


7. Ensure that you choose the install location as one within the MHC folder to install Polymotion Player. Click **Next**.

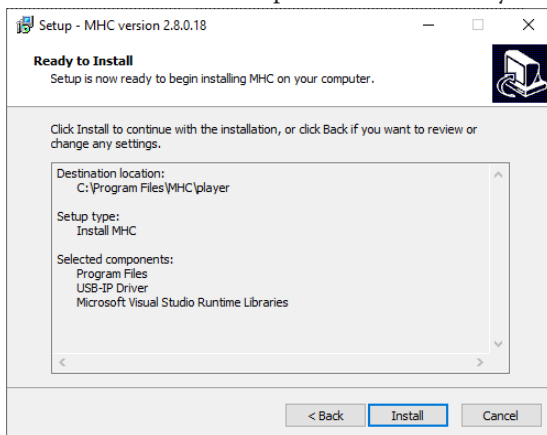


8. Specify whether the installation is upgrade or a new installation and select components to install. The installer auto-selects the

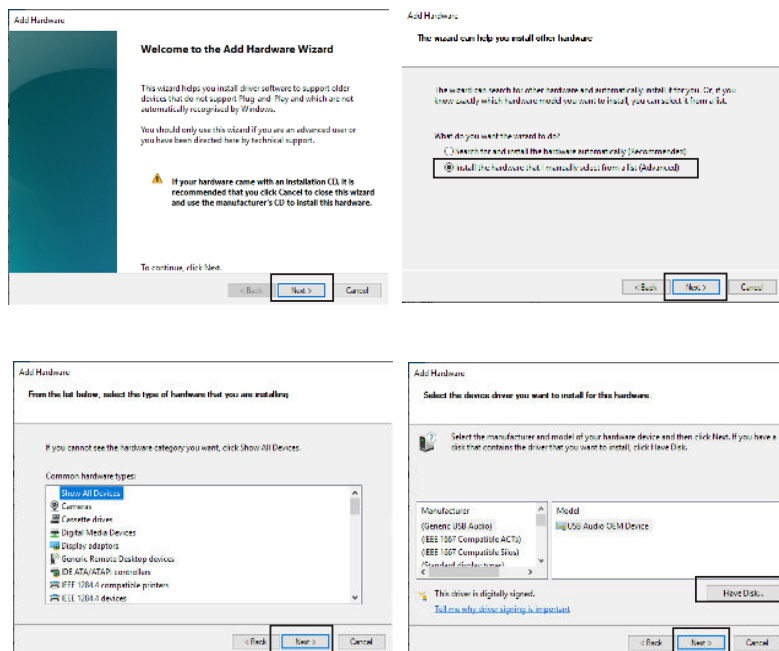
components depending on whether its a new installation or an upgrade.



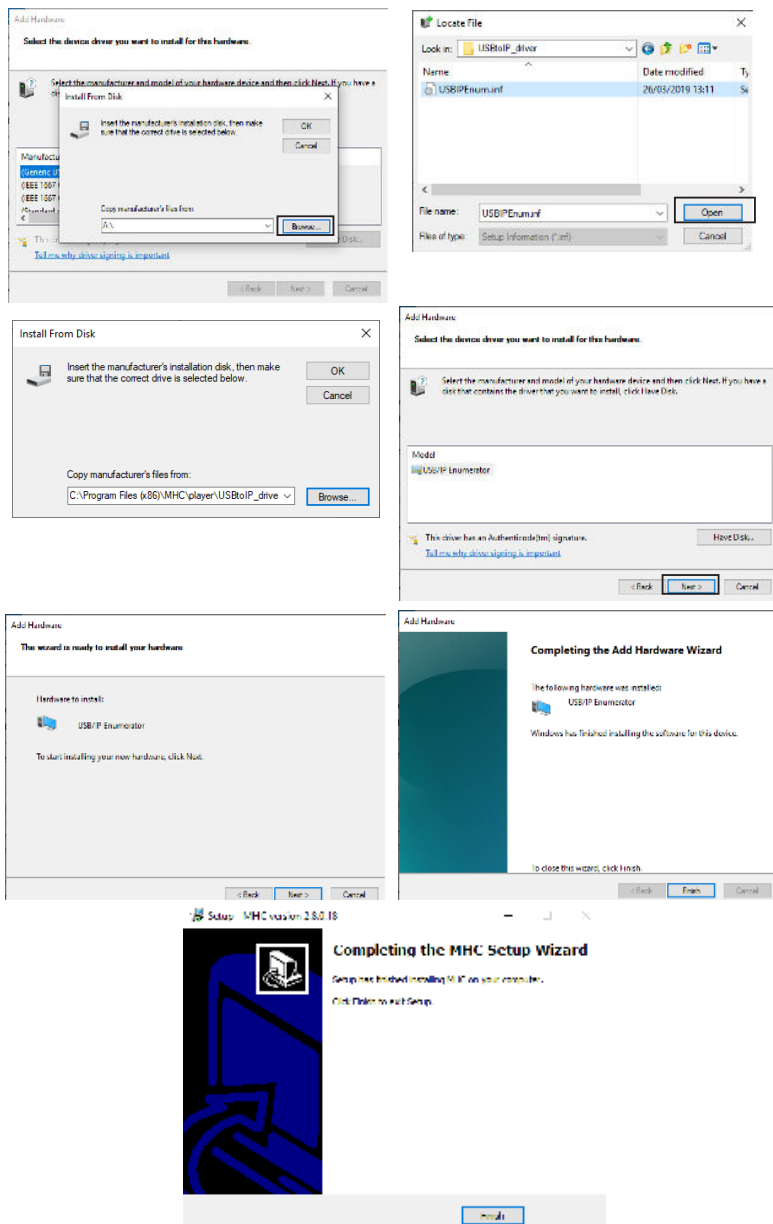
9. The next screen shows the components that are ready to be installed.



10. Follow the on-screen instructions.

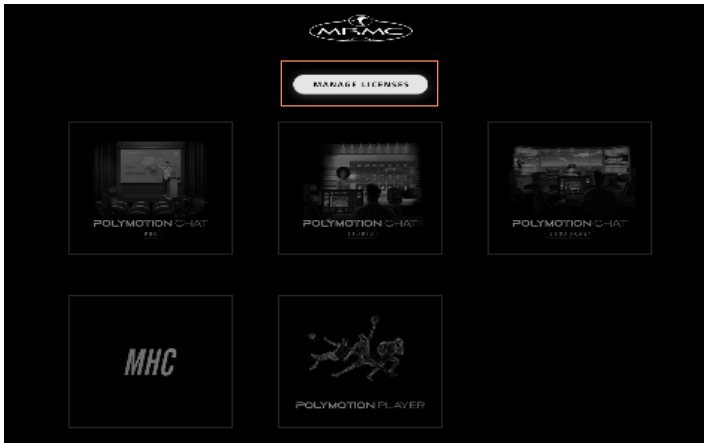


- Click **Browse** and navigate to **C:\Program Files\MHC\player\USBtoIP_driver\USBIPEnum.inf**.

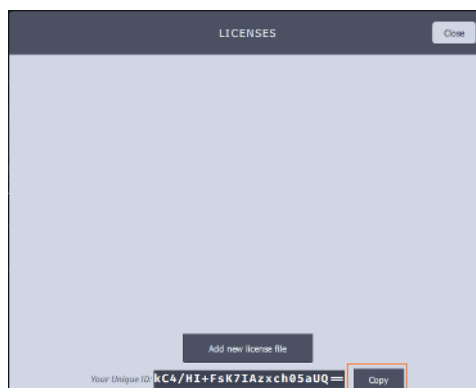


Licensing your Polymotion Product

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.



Once you receive your license file, save it on to the disk, 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.

Notes

Notes



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