



PRODUCT MANUAL

PS-6TM-150

Motion Platform

R1.3



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Product properties

Product model	Description
PS-6TM-150	Motion platform
PS-SB230	Power cabinet
PS-SB230-FI123	Power cabinet
PS-SB230-FI456	Power cabinet
PS-SBR	Remote controller

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Safety precautions

This product manual is dedicated to the persons that will be operating, maintain, service, apply preventive measures against risks arising from handling and using of the platform - hereinafter referred to as **operator**. Persons that will use the platform are hereinafter referred as **user**.

Motion platform is potentially dangerous device that can cause serious injury or death. It can perform rapid movements in a matter of seconds, faster than being able to move away for someone. Body parts can be trapped between moving and fixed parts of the platform or payload. It is very important that operator and user of the platform understand safety notes on the following chapter in order to stay safe. Motion Systems made every effort to assure that the platform is safe to use by having build-in safety features but ultimately it is the operator of the platform who is responsible for the safe use of the equipment so never bypass any of the safety points listed here.

Following coloured frames are used in this manual to draw attention to information of importance:

DANGER!

Instructions included in this frame indicates dangerous situation which, if not avoided, will result serious injury or death and total failure of the machine.

WARNING

Instructions included in this frame indicates dangerous situation which, if not avoided, could result serious injury or death and serious machine damage.

INFORMATION

Instructions included in this frame indicates information which are considered important, but not injury or damage related.

DANGER!

General safety

- Do not use the platform for the purposes other than intended.
- Read all instructions included in this manual before using the platform.
- No other than highly trained operator with full understanding of the system operation should operate and perform maintenance of the platform.
- Person under drugs use or medicines that has impact on the ability to react (including sedatives and hypnotics) under any circumstances shall not use, maintain, repair, use or operate the platform.
- Person having limited physical, sensory, intellectual abilities or kids shall be supervised by responsible operator.
- Users of the platform shall be aware of the placement of the emergency stops (E-STOP) to quickly react and stop the motions of the platform without delay in case of emergency.
- Do not climb or use elements of the platform to move up on it.
- Do not use E-STOP just to stop the motion of the moving platform. It shall be used only in emergency situation or in particular procedure when it is needed to be pressed. To stop the platform follow shut-down procedure.
- All power supply cabling and grounding connections shall be done by certified electrician.
- All instructions and requirements are prerequisites before using the system
- Do not leave powered device unattended, always power off the device after finishing using it.
- Do not use the device if any component is broken or missing.
- Keep the device away from the heat sources, high humidity, water and other liquids.
- Ensure that power supply is properly grounded and has correct voltage.

DANGER!

Safety related to the Power Cabinet

- Do not power up the cabinet if there is visible water condensation on the enclosure or switches.
- Do not use or store the power cabinet outdoors.
- Do not cover ventilation holes in the enclosure of the power cabinet.
- Do not put any containers containing liquids on the power cabinet housing.
- Do not unscrew or try to open enclosure of the power cabinet - guarantee label will get damaged causing void guarantee.
- Do not touch internal components of the power cabinet- it can cause electric shock or burns.
- In case if any of the circuit breaker trips and goes into open state (down position - OFF) do not try to close it, you might damage either power cabinet

or the platform and there is a risk of serious injury or death, contact Motion Systems support.

DANGER!

Safety related to Operation

- It is owner of the platform responsibility to install an active protection of the Motion Systems platform to prevent people from entering the motion envelope or step on the cabling during operation or maintenance. This protection can consist of:
 - Safety stanchions with access gates
 - Optical sensors
 - Motion detectors (for areas outside of the motion envelope)
 - Always operate the platform only when operator is standing within easy reach of the safety stop buttons
- It is operator of the platform responsibility to check all safety features build in the platform before starting use the device or conduct maintenance works.
- Before each start of the platform or at least once a month conduct E-STOP buttons check
- Before each start of the platform conduct visual check that includes:
 - Check if there are no loose or missing bolts or other mechanical connections
 - There are no cracks or deformations in the support structures of the motion platform (Base, base frame, upper frame)
 - Cables and wires are layed in the safe position (preferably in the cables waterfall) and there is no risk of damaging them
 - All grounding cables are properly connected
 - All emergency stops (E-STOP) buttons are connected and working properly
 - There are no oil leaks on the base floor or other platform elements
- Whenever a malfunction of the platform is observed or it is impossible to start, contact Motion Systems support immediately.

DANGER!

Safety related to Maintenance

- Always follow producer documentation and instructions regarding maintenance works.
- All maintenance works must be done by authorized, qualified personnel or service provided by Motion Systems.
- Always unplug the platform from the power source before conducting maintenance works, unless maintenance operation requires otherwise.
- During maintenance works the power source has to stay unplugged and secured from unintentional plugging to the platform. Use LOTO procedure together with access gates or warning signs if no other means exists.

DANGER!

Safety related to the Payload

- The Motion Systems platform does **NOT** contribute towards stiffness of the payload. The payload should be a stiff structure by itself.
- It is owner of the platform responsibility to ensure that the payload or the inertial forces placed upon the platform shall not exceed the payload specifications.
- Do not transport or move the platform with attached payload, it must be dismounted from the upper frame for transportation or displacement purposes.

2

System description

The system consist of the motion platform that is powered up using dedicated external power cabinet which is connected to the platform using cables that are supplied together with the platform.

WARNING

Upon delivery check whether the accessories and quantities are correct according to the following table. If any item is missing or damaged contact Motion Systems support.

2.1 System components



PS-6TM-150 Motion Platform (x 1)



PS-SB230 Power Cabinet (x 1)



PS-SBR remote controller (x 1) with key
(x 1)



PS-SB230FI123 Power Cabinet (x 1)



PS-SBEC E-STOP button with connection cable (x 1)



PS-SB230FI456 Power cabinet (x 1)



PS-SBR remote controller connection cable (x 1)



Safety jumper (x 1)



CAN – CAN IN connection cable
- 0,55 m long (x 1)



CAN OUT – CAN IN connection cable
- 0,55 m long (x 1)



MOTOR POWER - UP LINK POWER connection cable - 0,5 m long (x 1)



DOWN LINK POWER - UP LINK POWER connection cable - 0,5 m long (x 1)



LOGIC - LOGIC IN connection cable
- 0,5 m long (x 1)



LOGIC OUT - LOGIC IN connection cable
- 0,5 m long (x 1)



MAIN POWER wall socket 230V 32A (x 1)

MAIN POWER connection cable
- 5 m long (x 1)

USB connection cable (x 1)

2.2 Platform description

The PS-6TM-150 motion platform is the smallest 6DoF in professional series. It is the most compact, but yet powerful and reliable unit greatly applicable into single implementations for simulation and entertainment. Smooth movement with impressive angles gives a lot of possibilities in testing and verification for industry purposes. Due to VRHeadway, all virtual reality applications work easy and perfectly both home and professional use. Platform is suitable for :

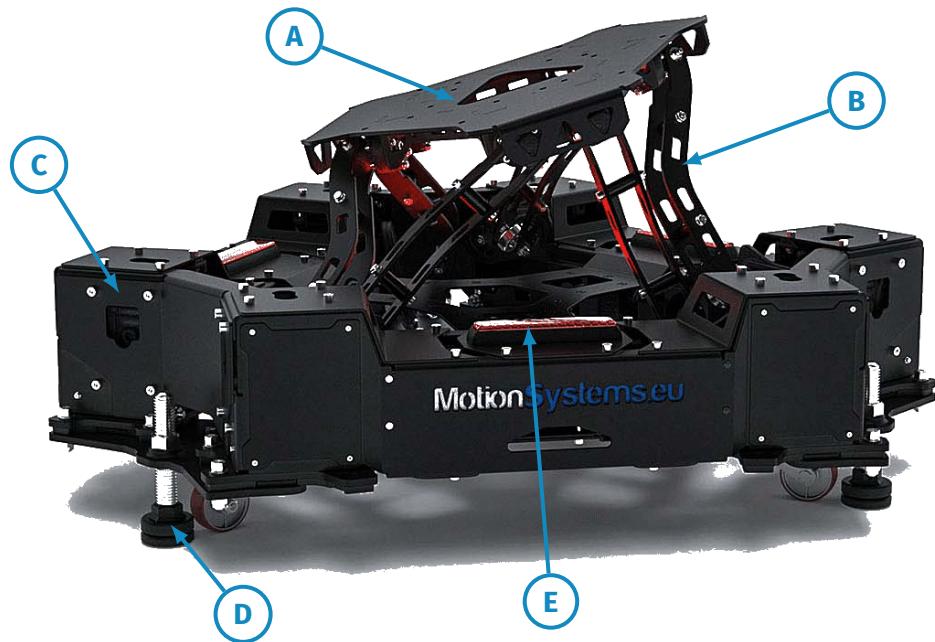
- Small flight simulators
- Vehicle training simulators for 1 person
- Small and medium size military training simulators for up to 1 person
- Small and medium size mining equipment simulators
- Industrial testing
- VR for entertainment and simulation for 1 person

WARNING

Using the platform for purposes other than described is prohibited. Motion Systems does not take the responsibility for the product if the platform is used for purposes other than intended or was modified in any way.

PS-6TM-150 Motion platform assembly

- A** : Upper frame with mounting points
- B** : Pulling arm with ball joints
- C** : Motor drive unit
- D** : Positioning foot
- E** : Warning light

**INFORMATION**

Warning lights (indicated as **E**) will back-light and start blinking indicating that the platform is powered-up and operational.

2.3 PS-SB230 Power cabinet description

PS-SB230 power cabinet is intended to power up compatible Motion System platforms listed below. It is prohibited to use it as power source to other devices. It acts as safety and control device and allows to control the platform via PC. It contains AC and DC fuses, handles remote safety devices and provides power to the inverters and motion controller.

WARNING

Motion Systems company does not accept any liability for damage or injury caused by:

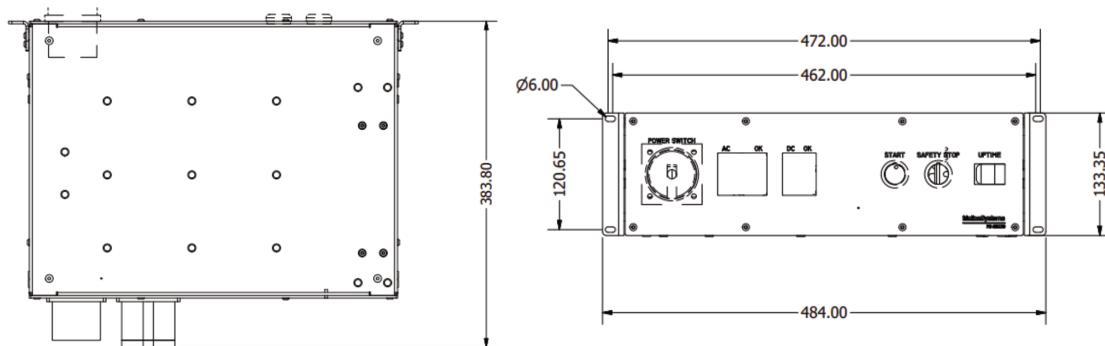
- Inappropriate use, operation or adaptation of the power cabinet.
- Unauthorized removal or modification of housing elements, safety and inspection covers, guarding etc.
- Unauthorized modifications to any of the power cabinet components.
- Improper maintenance or repair work on the motion platform.
- Damages caused during shipment or transportation.
- Disregard of the important safety notes or product manual instructions.
- Disregard of specified environmental conditions given by the manufacturer.

List of compatible platforms

The PS-SB230 power cabinet is designed to be used only with the Motion Systems platforms:

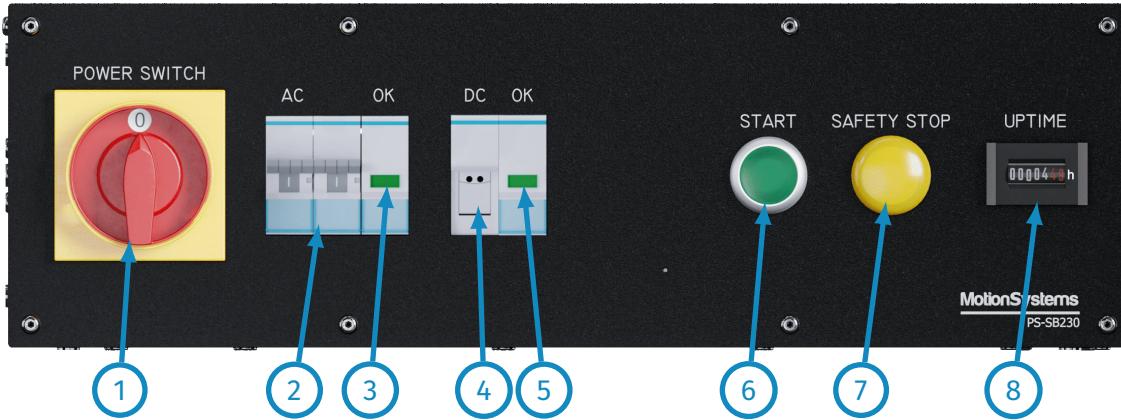
- PS-2RM-150
- PS-3TM-200
- PS-3TM-LP550
- PS-6TM-150

PS-SB230 dimensions (in [mm]):



INFORMATION

The power cabinet size is 3U and it's designed to fit into 19" rack cabinet.



Interface description

Power cabinet PS-SB230 is fitted with front control panel and rear connections sockets panel. Front panel consists of switches, indicators and fuses as described below:

- 1. POWER SWITCH** - Main power switch. It powers 230V section and 24V DC control and safety section. Turn clockwise to power up, turn anti-clockwise to turn the power off.
- 2. AC circuit breaker** - If circuit breaker is down (OFF) the main power will not be provided to platform and indicators will not back-light. Set switches up to close the circuit. Circuit breakers are shipped in the up (ON) position.

INFORMATION

Check the circuit breaker position before turning on the power. If it is in the down position (OFF - 0) set the switches in the up position (ON - 1) then turn on the power.

DANGER!

In case if the circuit breaker trips and goes into open state (down position - OFF) after the power is switched or during platform operation, **do not** try to close it, contact Motion Systems support.

- 3. 1x LED AC indicator** - Indicates if the AC voltage is on.
- 4. 24V DC fuse socket** - Contains fuse for 24V DC.
- 5. 1x LED DC indicator** - Indicate if the current is present in the circuit for the 24V DC.
- 6. START** - Main button for starting the device, when not back-lighted - indicates that platform is in standby mode and ready to start up or powered off. Press to switch the device into operational status. After button is pressed the back-light will turn on.
- 7. SAFETY STOP** - When NOT back-lighted indicates that safety function (E-STOP, limit switch etc.) is NOT triggered. When safety function (E-STOP, limit switch etc.) is triggered the back-light will turn on and the system will be stopped.
- 8. UPTIME** - Total device uptime indicator. It shows for how many hours the device has been operational (START is back-lighted).

Back connection panel consist of sockets described as below:



1. **USB** - Default USB connection for operator PC, required to use ForceSeatPM application and set the motion to the platform.
2. **CAN** - Controller Area Network connection, connects the power cabinet with the motion platform.
3. **REMOTE** - PS-SBR remote controller connection, connects remote controller to the power cabinet.
4. **EMCY 1** - Connection for PS-SBEC E-STOP button.
5. **AUX** - Auxiliary connection.
6. **ETHERNET** - Optional Ethernet connection for user PC.
7. **EMCY 2** - Connection for safety sensors, depending of the platform configuration connections may vary. See section 4.4 on page 31 for correct connection.
8. **LOGIC** - Low voltage power source output for inverters and warning lights.
9. **GROUNDING** \perp - Grounding/earthing connection.
10. **MOTOR POWER** - High voltage power source for inverters and motors.
11. **MAIN POWER** - Main power connection, socket allows to connect the power cabinet to the power source.

DANGER!

Do not insert any plug other than provided by the Motion Systems into the **EMCY** sockets. Any modifications of the sockets or plugs might lead to serious injury or death of the operator or platform user.

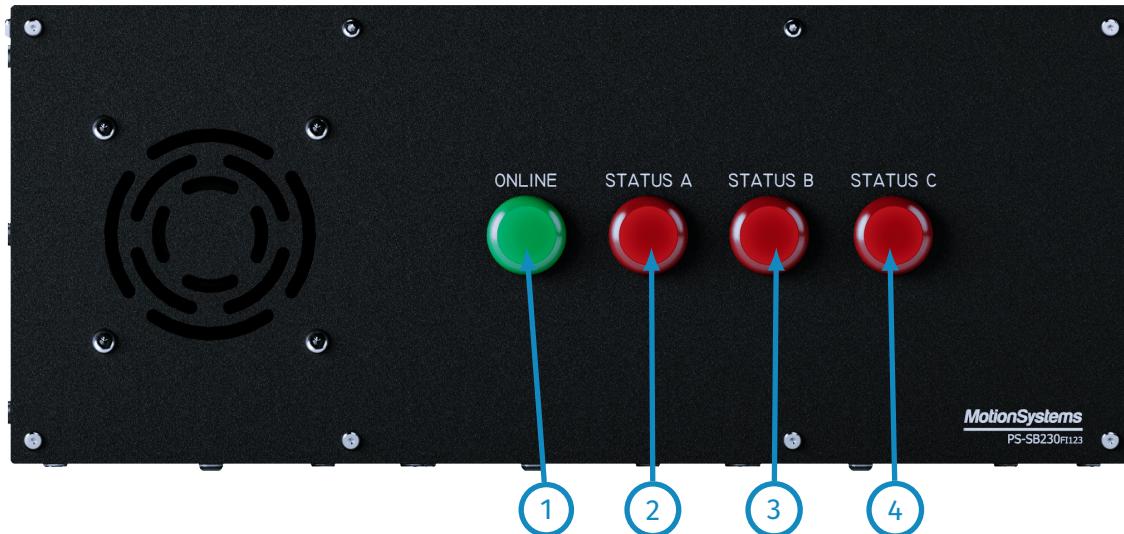
WARNING

The power cabinet is equipped with a low resistance protective-earth bolt, located on the backside sockets panel (indicated as 9) of the power cabinet. It is recommended to connect the facility solid protective earth to the point in order to increase suppression level. Use at least 10 mm² copper wire for the connection.

2.4 PS-SB230-FI123 Power cabinet description

Interface description

Power cabinet PS-SB230FI123 contains inverters for the motors which are located in the platform. It is fitted with front control panel and rear connections sockets panel. Front panel consists of ONLINE button and inverters status indicators.



- 1. ONLINE** - Indicator with button, when not back-lighted indicates that platform is in standby mode and ready to start up. When back-lighted indicates that the platform is operational.

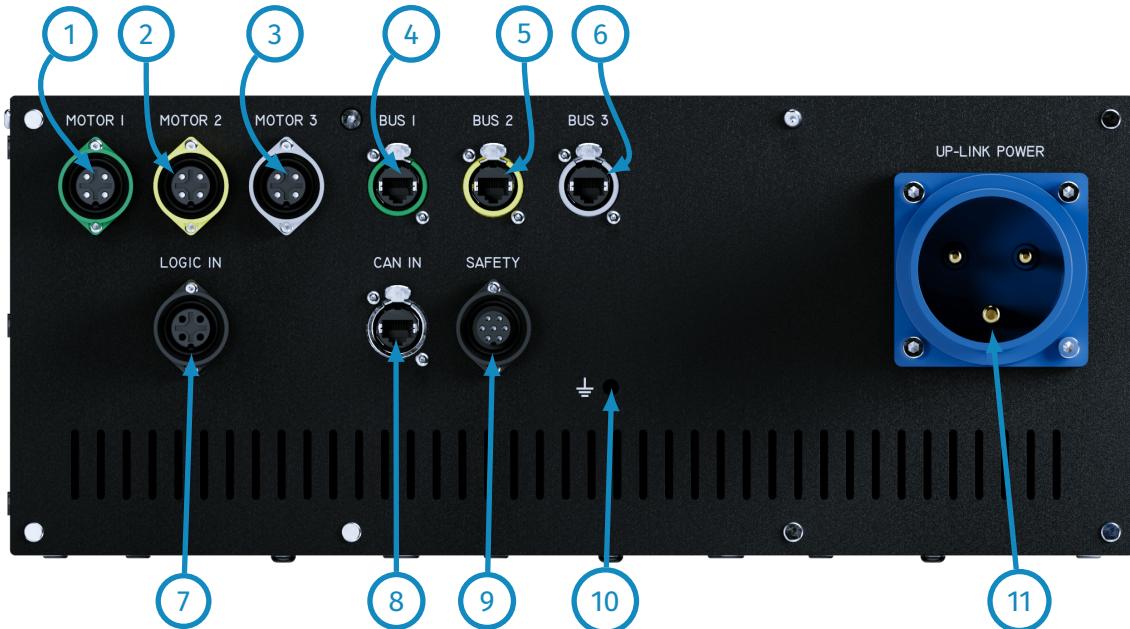
WARNING

Do not press the ONLINE button, when it is back-lighted (when the platform is powered-up). It shall be used only for the service or maintenance purposes under the manufacturer supervision.

- 2. STATUS A** - Motor 1 inverter status light.
- 3. STATUS B** - Motor 2 inverter status light.
- 4. STATUS C** - Motor 3 inverter status light.

INFORMATION

If any of the status light remains back-lighted it indicates fault of the inverter. Contact technical support.



Back connection panel consist of sockets described as below:

- 1. MOTOR 1** - Motor 1 power connection socket.
- 2. MOTOR 2** - Motor 2 power connection socket.
- 3. MOTOR 3** - Motor 3 power connection socket.
- 4. BUS 1** - Motor 1 control connection socket.
- 5. BUS 2** - Motor 2 control connection socket.
- 6. BUS 3** - Motor 3 control connection socket.
- 7. LOGIC IN** - DC input voltage for inverters/warning indicators.
- 8. CAN IN** - CAN control input socket.
- 9. SAFETY** - Limit switches, warning indicators, fans - DC voltage output
- 10. GROUNDING** \downarrow - Grounding/earthing connection.
- 11. UP-LINK POWER** - Power input from PS-SB230-FI456. connection socket.

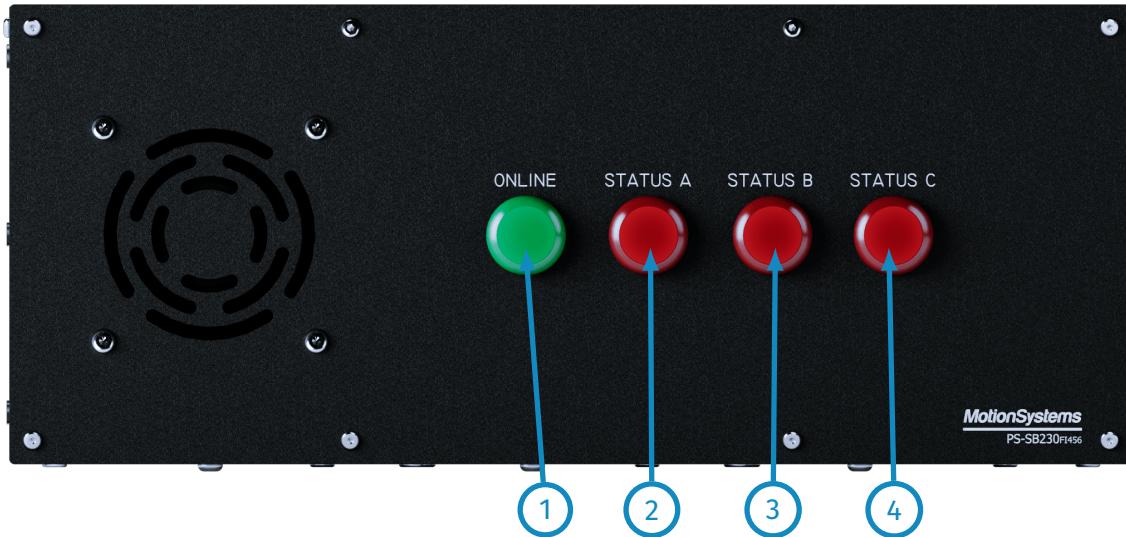
WARNING

The power cabinet is equipped with a low resistance protective-earth bolt, located on the backside sockets panel (indicated as ⑩) of the power cabinet. It is recommended to connect the facility solid protective earth to the point in order to increase suppression level. Use at least 10 mm² copper wire for the connection.

2.5 PS-SB230-FI456 Power cabinet description

Interface description

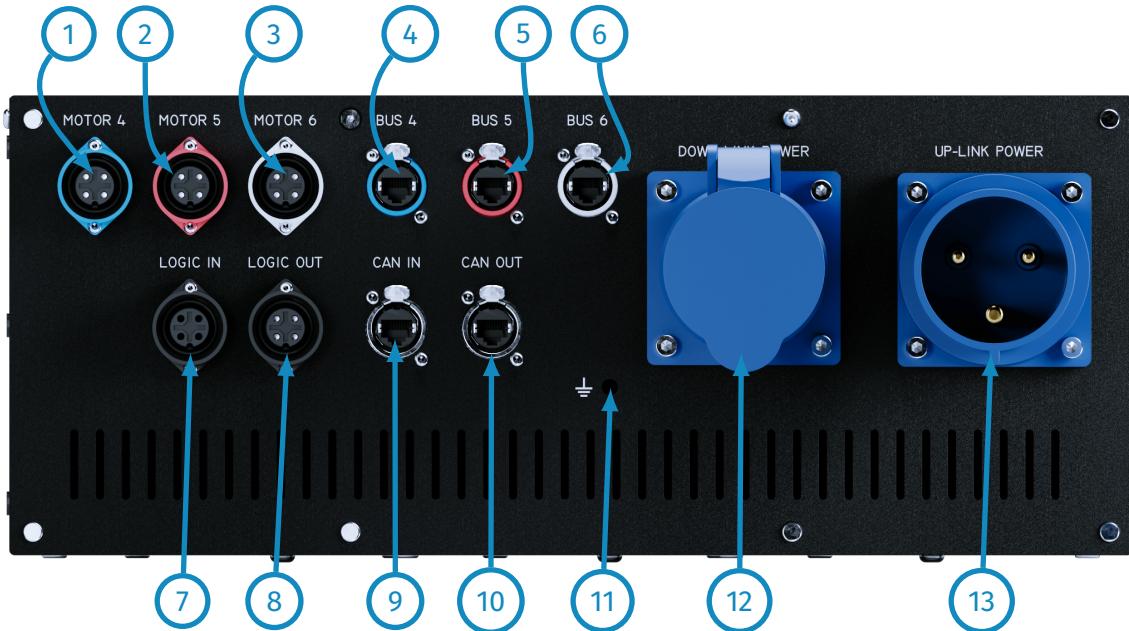
Power cabinet PS-SB230-FI456 contains inverters for the motors which are located in the platform. It is fitted with front control panel and rear connections sockets panel. Front panel consists of ONLINE indicator and inverters status indicators.



1. **ONLINE** - When not back-lighted indicates that platform is in standby mode and ready to start up. When back-lighted indicates that the platform is operational.
2. **STATUS A** - Motor 4 inverter status light.
3. **STATUS B** - Motor 5 inverter status light.
4. **STATUS C** - Motor 6 inverter status light.

INFORMATION

If any of the status light remains back-lighted it indicates fault of the inverter. Contact technical support.



Back connection panel consist of sockets described as below:

- 1. MOTOR 4** - Motor 4 power connection socket.
- 2. MOTOR 5** - Motor 5 power connection socket.
- 3. MOTOR 6** - Motor 6 power connection socket.
- 4. BUS 4** - Motor 4 control connection socket.
- 5. BUS 5** - Motor 5 control connection socket.
- 6. BUS 6** - Motor 6 control connection socket.
- 7. LOGIC IN** - DC input voltage for inverters.
- 8. LOGIC OUT** - DC output voltage for inverters
- 9. CAN IN** - CAN control input socket.
- 10. CAN OUT** - CAN control output socket.
- 11. GROUNDING \downarrow** - Grounding/earthing connection.
- 12. DOWN-LINK POWER** - Power output to PS-SB230-FI123.
- 13. UP-LINK POWER** - Power input from PS-SB230 connection socket.

WARNING

The power cabinet is equipped with a low resistance protective-earth bolt, located on the backside sockets panel (indicated as (11)) of the power cabinet. It is recommended to connect the facility solid protective earth to the point in order to increase suppression level. Use at least 10 mm² copper wire for the connection.

2.6 Remote controller description

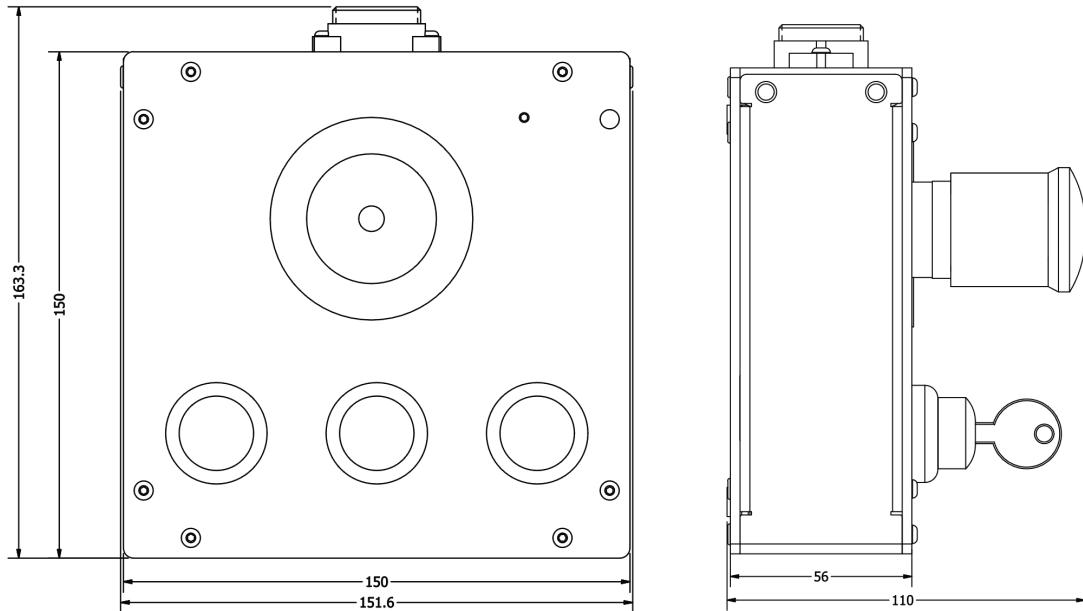
PS-SBR remote controller extends functions provided by the power cabinet with additional E-STOP function, KNEE function and POWER LOCK function. It switches 24V DC for safety and control circuits. It works as safety device and allows to park the platform. POWER LOCK contains key, which is necessary to power up control and safety circuits. Only platform operator shall be in possession of the key. Before removing the key from the key lock it shall be switched to the 'O' position. After finishing working with the platform the key shall be removed from the key lock to avoid power-up of the platform by an unauthorized person. In case of broken or missing key contact Motion Systems support.



- 1. EMERGENCY STOP (E-STOP)** - Button used to stop the platform in case of emergency. E-STOP button activation is also necessary after using KNEE function to assure that working zone of the platform is safe for entering or exiting.
- 2. POWER LOCK with KEY** - Power switch for the safety and control circuits provided with a key for the operator.
- 3. START** - Main button for starting the device, when not back-lighted - indicates that platform is in standby mode and ready to start up or powered off. Press to switch the device into operational status. After button is pressed the back-light will turn on.
- 4. KNEE** - Button that allows to lower the platform to the parking position. In order to activate the KNEE button function the platform has to be powered-up and in working mode (**START** indicator has to be back-lighted). KNEE function requires to press E-STOP button after the platform has finished parking.

WARNING

1. **KNEE** does not act as a safety function. After activating KNEE and lowering platform to the parking position operator must press **E-STOP** button to assure that the motion system is safely stopped.
2. It is forbidden to enter working area of the platform when **RUNNING** indicator is back-lighted, even when the motion of the platform is stopped.
3. Each time after switching from the standby mode to working mode (after pressing **START** button) the device will start calibration process and motion of the platform. It is forbidden to enter the working area of the platform during the calibration process.
4. **POWER LOCK** switch does not act as a **E-STOP** button. To safely stop the platform **E-STOP** button must be pressed.

PS-SBR dimensions (in [mm]):

3

General specification

3.1 Motion platform performance

	Excursions Single DOF	Velocity	Acceleration
Surge	-0.10 m, 0.12 m -3.94 in, 4.72 in	0.3 m/s	2.5 m/s ²
Sway	-0.10 m, 0.10 m -3.94 in, 3.94 in	0.37 m/s	2.3 m/s ²
Heave	-0.11 m, 0.12 m -4.33 in, 4.72 in	0.27 m/s	1.6m/s ²
Roll	-26.0°, 26.0°	69°/s	420°/s ²
Pitch	-25.0°, 25.6°	69°/s ²	420°/s ²
Yaw	-22.5°, 22.5°	83°/s ²	490°/s ²

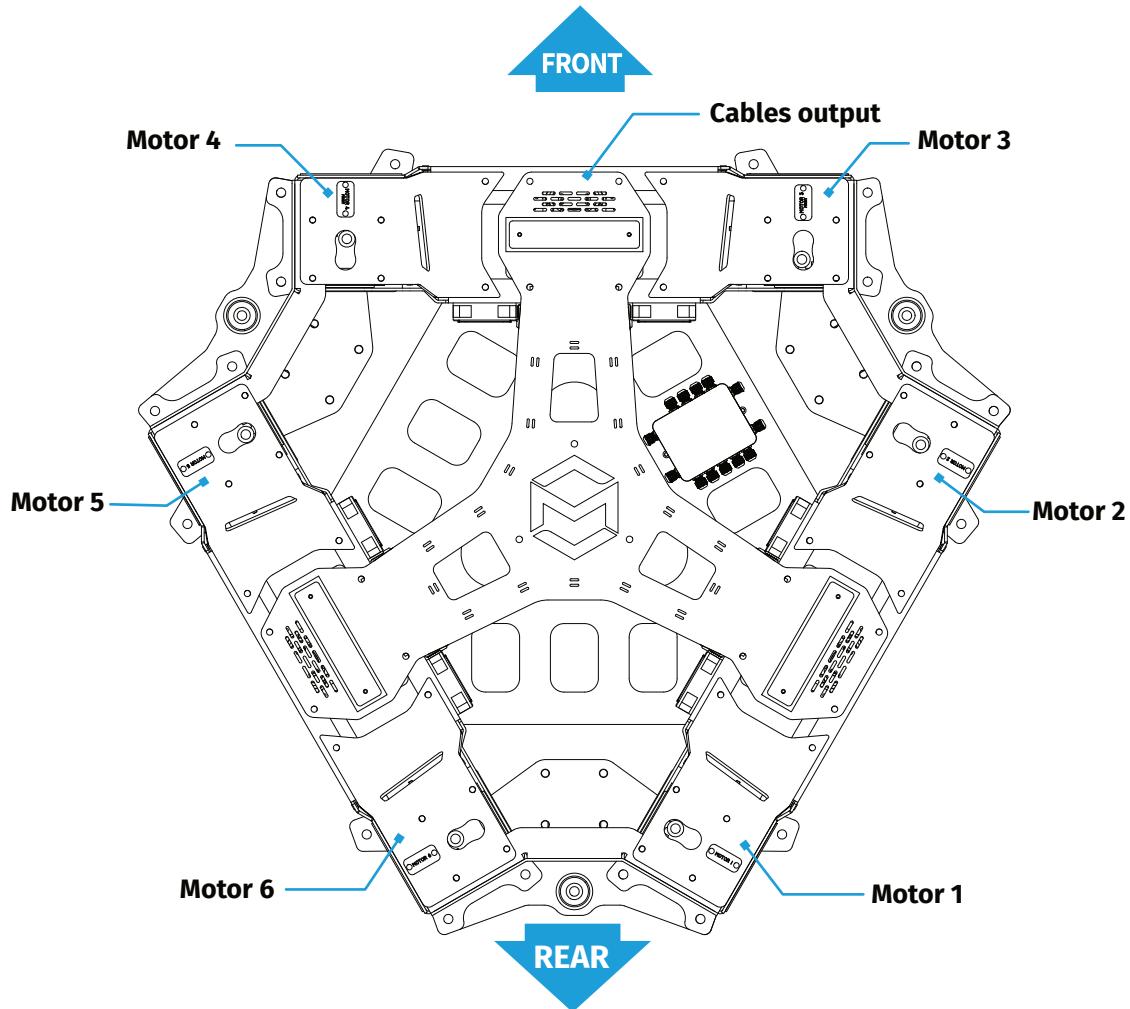
3.2 Payload and weight specification

	Value
Payload	150 kg
Center of Gravity height above Moving Platform Centroid	500 mm
Platform weight	305 kg
Moment of inertia	65 kg x m ²

3.3 Energy consumption

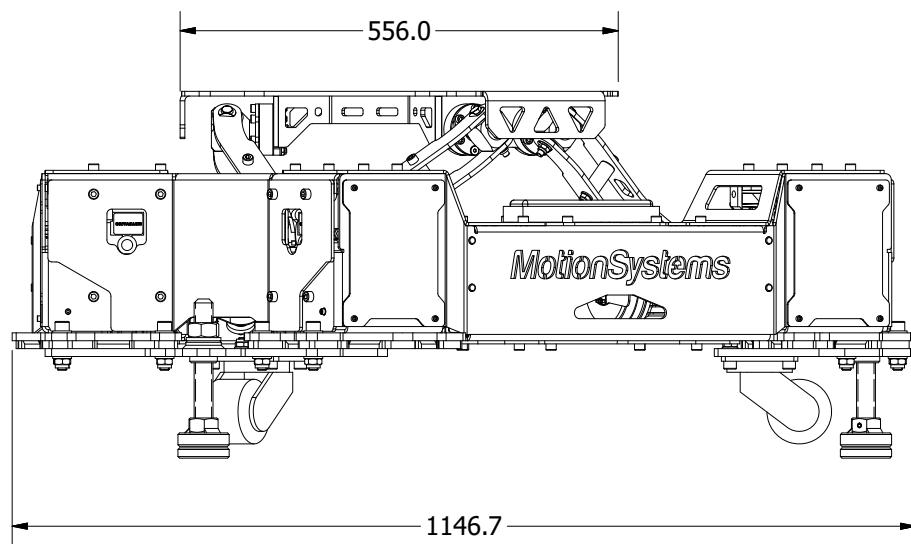
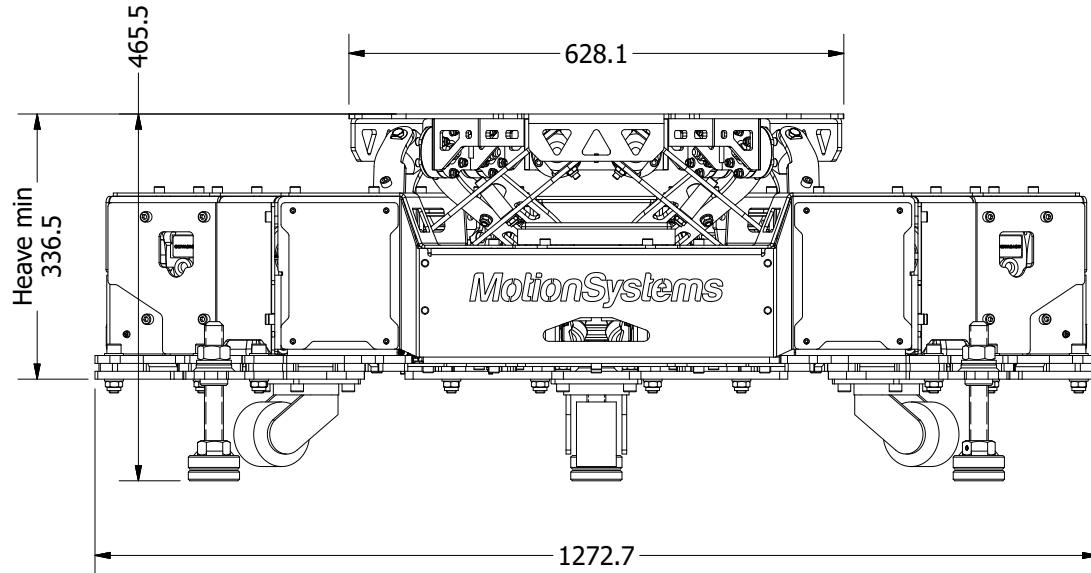
Converter specification		Breaker specification	Power consumption	
Average Power [kVA]	Peak Power [kVA]	Peak Current [A]	Average Power (stress test) [kW]	Average Power (typical game) [kW]
2,7	5,3	23	1,5	0,8

3.4 Platform layout



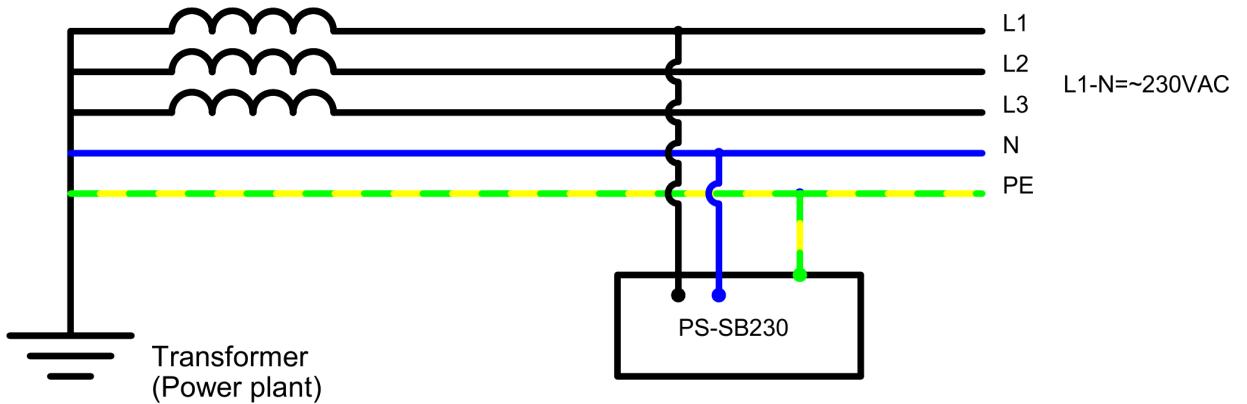
3.5 Platform dimensions

PS-6TM-150 platform with attached positioning feet:



3.6 Voltage system

PS-6TM-150 Motion Platform requires one-phase power line in Wye connection, with ground and neutral connection.



4

Installation

4.1 Installation site

The facility for the platform shall have provisions to maintain cool and dry and dust-free environment where the platform is placed. Operating conditions:

- Temperature : from +5°C to +40°C
- Relative humidity : from 20% to 70% (non-condensing)
- Sunlight : No direct sunlight

Delivery

Upon delivery the customer needs to check the condition of received system elements for any damage. All system parts shall be stored indoors until installation.

Motion platform installation

Motion systems platform is designed to be used indoors. When assessing base type for the platform have in mind it's weight, dimensions and motions range with the payload. Do not place the platform in the place where the motion envelope can be interrupted or there is not enough space for safety gates etc.

Power cabinet placement

- PS-SB230 power cabinet must be placed on the solid, levelled surface in the safe distance from motion envelope of the platform, preferably inside rack cabinet sized to fit the power cabinet.
- PS-SBR remote controller shall be placed within the range of the platform operator.
- External PS-SBEC E-STOP button shall be placed within the range of the platform user.
- Power cabinet housing holes shall remain uncovered.
- Watch out for backside sockets connections, do not pull or stand on the cables and make sure the cables are not tighten up or it might damage the connection port.
- All cabling between the power cabinet and the motion platform shall be placed inside electrical conduit to avoid damaging them or the sockets.

INFORMATION

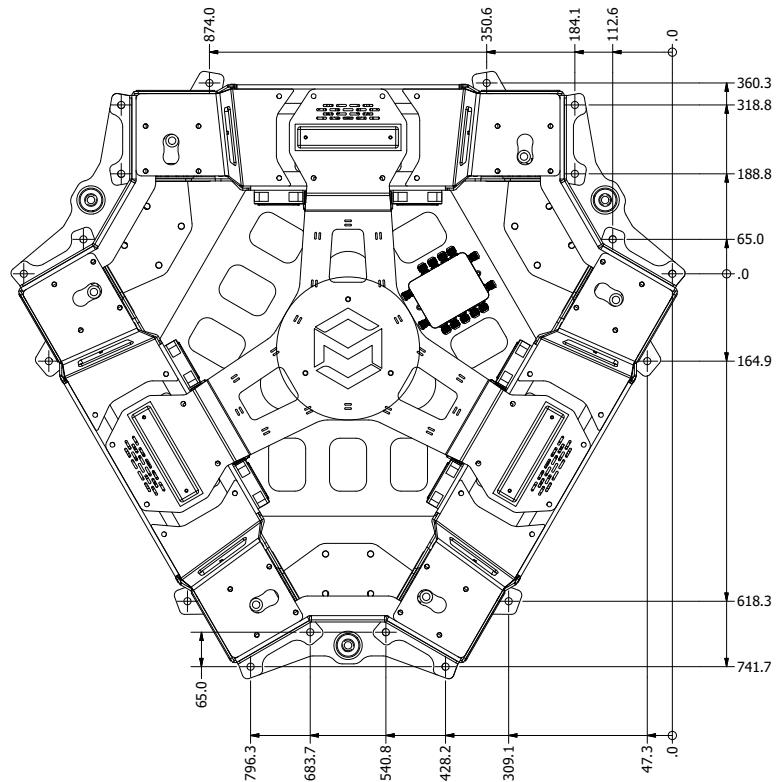
It is recommended to install the device inside rack cabinet. It prevents the dust and humidity from accumulating on the device and helps to keep it in good working conditions therefore it prolongs the lifetime of the power cabinet.

4.2 Anchoring

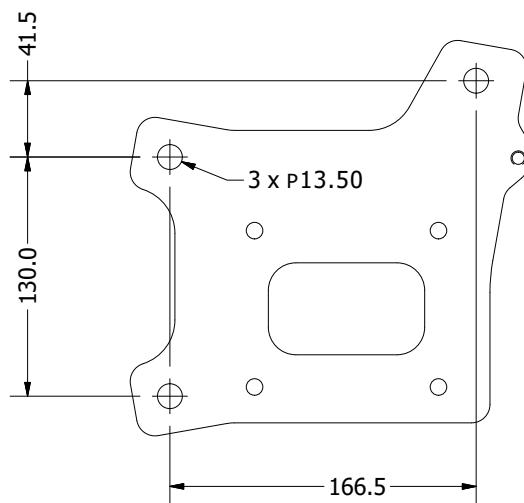
INFORMATION

The platform shall be anchored to the surface using 3 x M8 anchoring bolts for each of the anchoring foot.

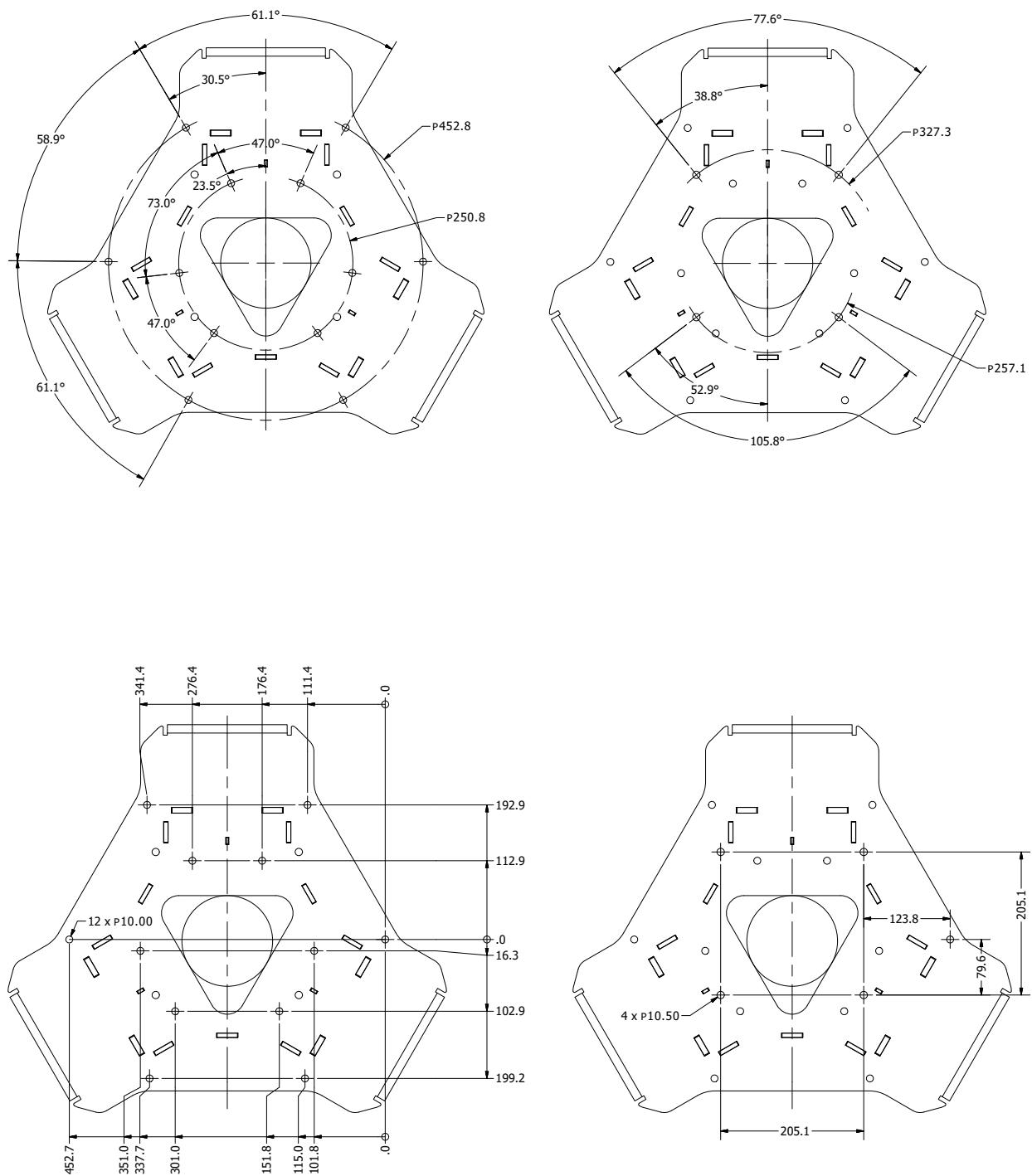
Anchoring foot layout:



Anchoring foot dimensions:



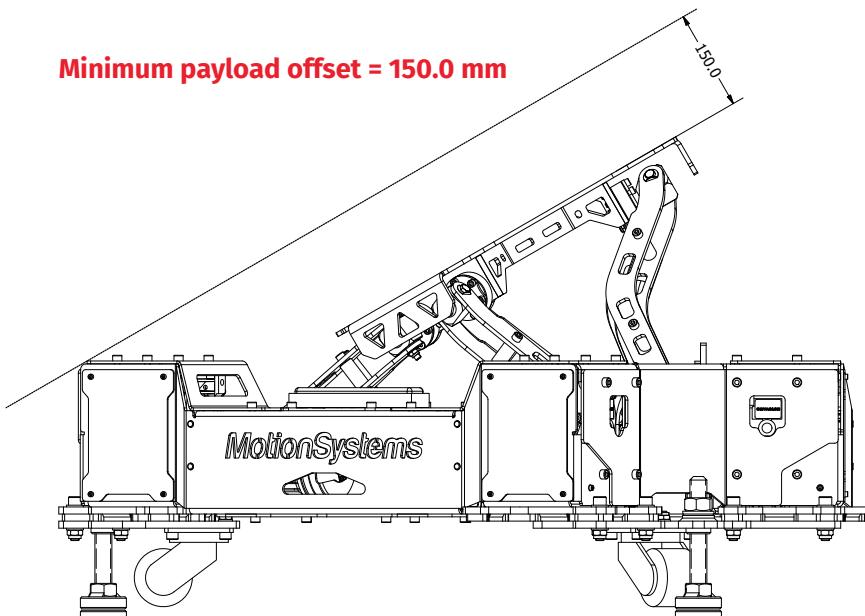
4.3 Payload mounting points



4.3.1 Payload offset

WARNING

When attaching payload set a minimum offset of **150 mm** to avoid collision with the platform.



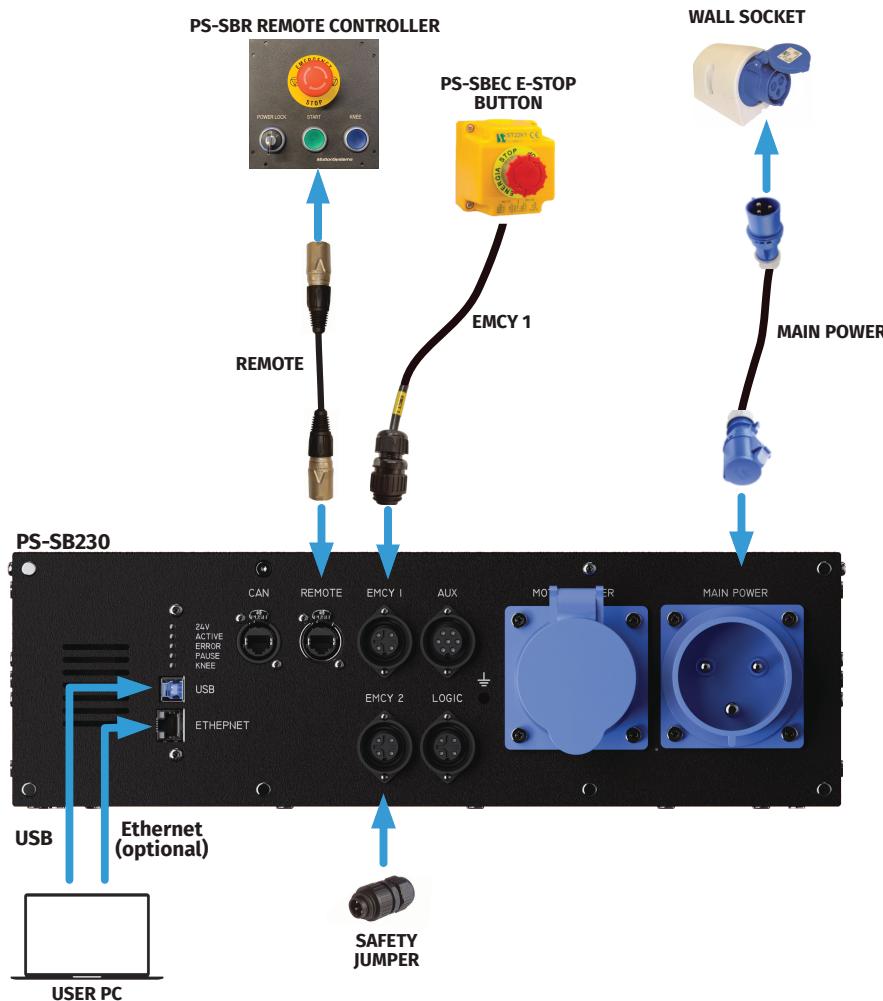
4.4 Power cabinet and platform interconnections

The platform is connected to the power cabinet as shown on the scheme below, all cables are provided together with the platform.

WARNING

Before connecting the platform check cables provided by the Motion Systems for any damages that may occur during the transportation.

Connecting USER PC, REMOTE, EMCY 1, EMCY 2 JUMPER, MAIN POWER

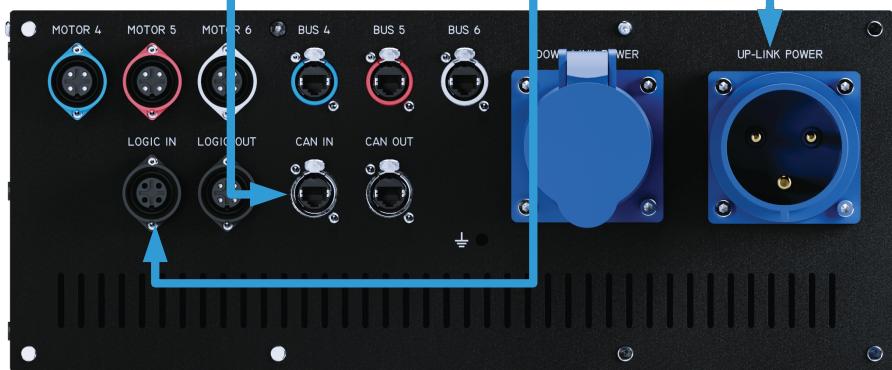


Connecting CAN, LOGIC, MOTORS POWER

PS-SB230

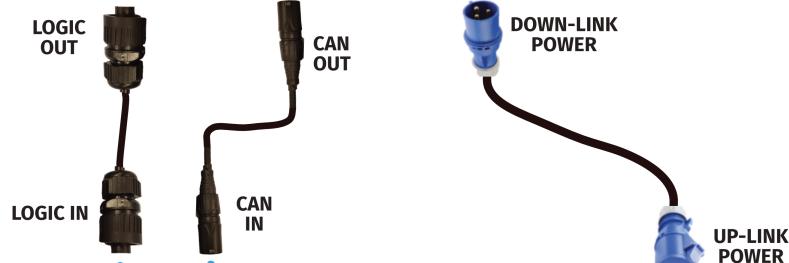
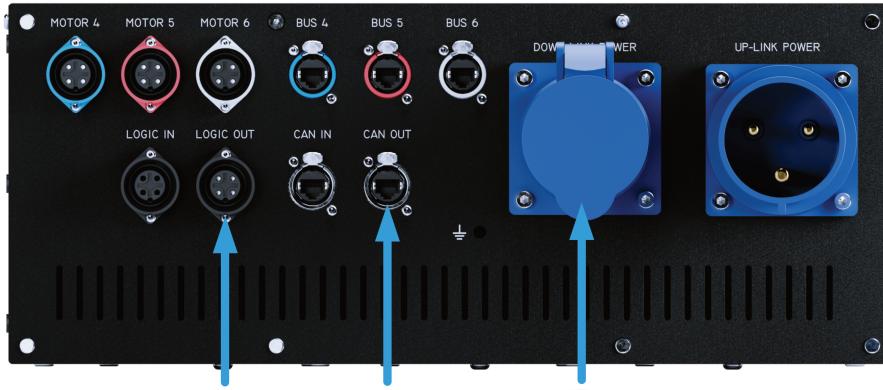


PS-SB230FI456



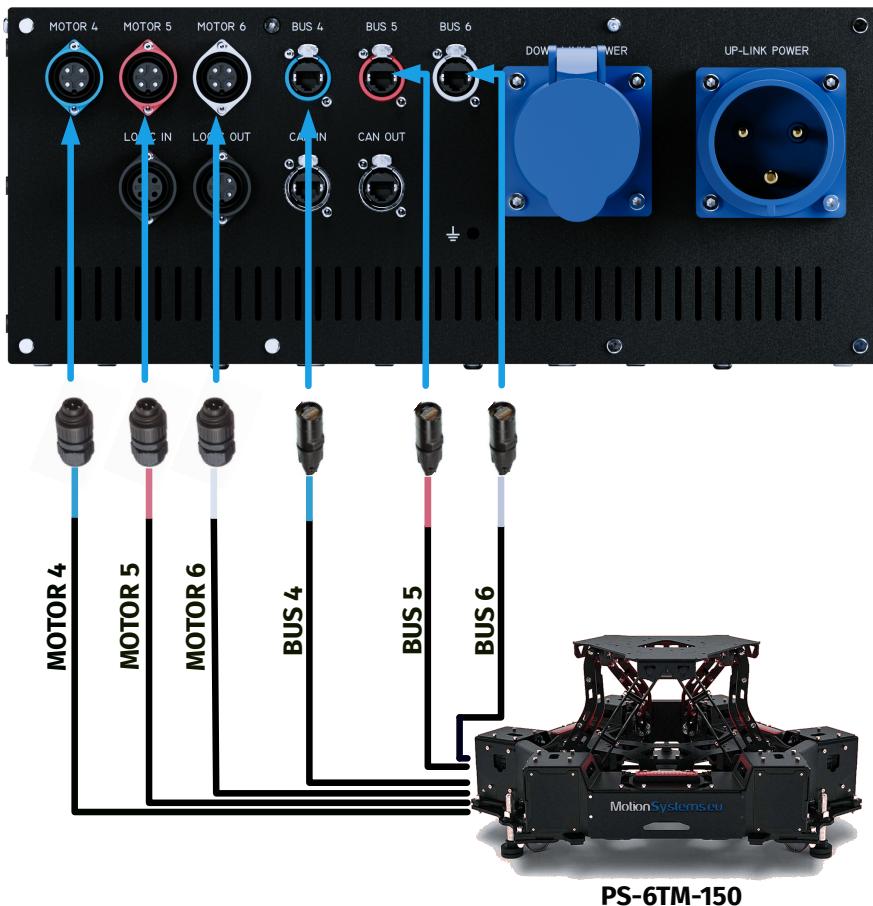
Connecting LOGIC OUT, CAN OUT, DOWN-LINK POWER

PS-SB230FI456



PS-SB230FI123



Connecting MOTOR 4-6, BUS 4-6**PS-SB230FI456**

Connecting MOTOR 1-3, BUS 1-3, SAFETY

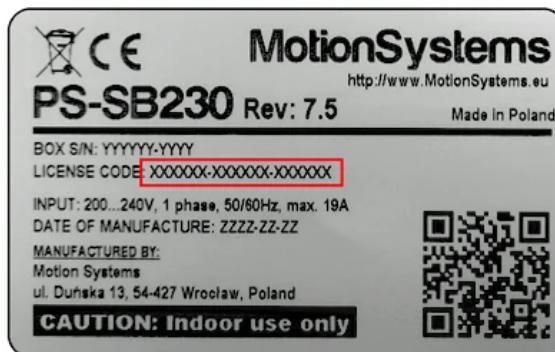
4.5 Software installation

4.5.1 ForceSeat Platform Manager

To every Motion Platform purchase The Platform Manager software is added without a charge. This applies to all Motion Platforms available. This application allows to: use motion platforms with supported games, perform diagnostic, monitor motion platforms operation, update firmware, compensate head movements thanks to VR HeadWay included and use SDK - ForceSeatMI to connect it to your custom applications. Moreover all of Motion Systems platforms work with VR technology and software is constantly updated. To download the platform manager enter the following page:

<https://motionsystems.eu/downloads/fspm/>

The serial number can be found on the rating plate located on the upper panel of the power cabinet housing :



Enter the licence code to get access to download the application.

WARNING

Before starting the installation make sure that the platform is shut-down (power switch is in the 0 position)

ForceSeatPM installation

1. Download ForceSeatPM application using link above.
2. Enter the serial number from the rating plate.
3. Install the ForceSeatPM on PC.

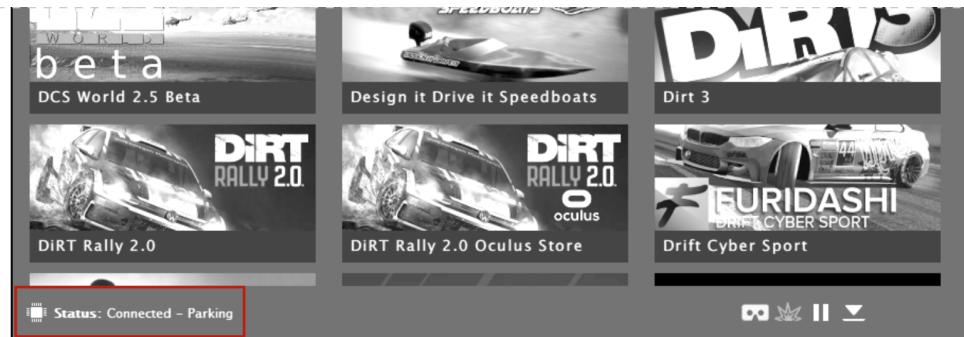
Using ForceSeatPM with platform

1. Launch the ForceSeatPM application.
2. Connect the PC with PS-SB400-P3 power cabinet using USB cable - see power cabinet and platform interconnections.

INFORMATION

It is recommended to connect motion platform to a dedicated wired network (wireless is not recommended) to reduce latency and interferences with other devices.

3. Power-up the platform.
4. Check the platform status in the main window of the application - status shall be visible in the lower left corner:



5. Check Action Center with a list of actions that require attention. It is possible to solve them one by one or by pressing the "Resolve All" button. Firmware update may require additional confirmation in the dialogue box.

ForceSeatPM opens few UDP ports on localhost in order to get telemetry data from games. This can also cause a Windows Firewall (or 3rd party firewall software) pop-up to be displayed. If you block this connections, some games will not work correctly.

Below is an exemplary list of games that require UDP ports, notice that the list can be modified in the future when a support for new game is added.

- Codemaster's GRID, GRID 2, GRID Autosport, Dirt 2, Dirt 3, F1 2011, F1 2012, F1 2013, F1 2014 – **UDP 10010**
- Games that use Open Motion Interface – **UDP 10017**
- Digital Combat Simulator World – **UDP 10018**

4.5.2 ForceSeat Motion Interface

ForceSeatMI (Motion Interface) is a programming interface that allows to add a support for motion platforms for basically any application or a game. The ForceSeatMI does not control hardware directly - it sends all data to ForceSeatPM. This approach delegates responsibility of transforming telemetry data to a real motion from the application to ForceSeatPM. It means that application developers do not have to worry about things like platform disconnections, transmission errors, thermal protection warnings or signal filtering. To download the Motion Interface enter the following page:

<https://motionsystems.eu/downloads/fsmi/>

The serial number can be found on the rating plate located on the upper side of the cabinet housing.

4.5.3 ForceSeat Direct Interface

ForceSeatDI (Direct Interface) is lower level interface than ForceSeatMI. It controls hardware directly and ForceSeatPM is not required at all. All error handling and status checking have to be performed by your application. This interface allows to control more than one motion platform from the same PC and allows to create complex but fully synchronized movements of multiple motion platforms. To download the Motion Interface enter the following page:

<https://motionsystems.eu/product/software/sdk-forceseatdi/>

ForceSeatDI license is kept in the motion controller so the activation process is different from for ForceSeatMI. Once you receive the activation code do following steps:

1. Install ForceSeatPM
2. Open ForceSeatPM main window
3. Click Tools and Diagnostic and then Devices
4. Click Quick Codes
5. Enter the activation code. The verification might take a while.
6. Once finish, close the Quick Codes window.
7. Turn off the device
8. Turn on the device
9. In Devices window you should see FSDI displayed in Features field

4.5.4 Actions Center

It contains a list of issues that require platform user attention. The list is usually quite long on a first start and depends on number of games that are installed on the PC. In most cases it is enough to click the button next to each issue to resolve it. Click on Install and ForceSeatPM will install necessary components

The installation of game connectors is not performed automatically due to the fact that:

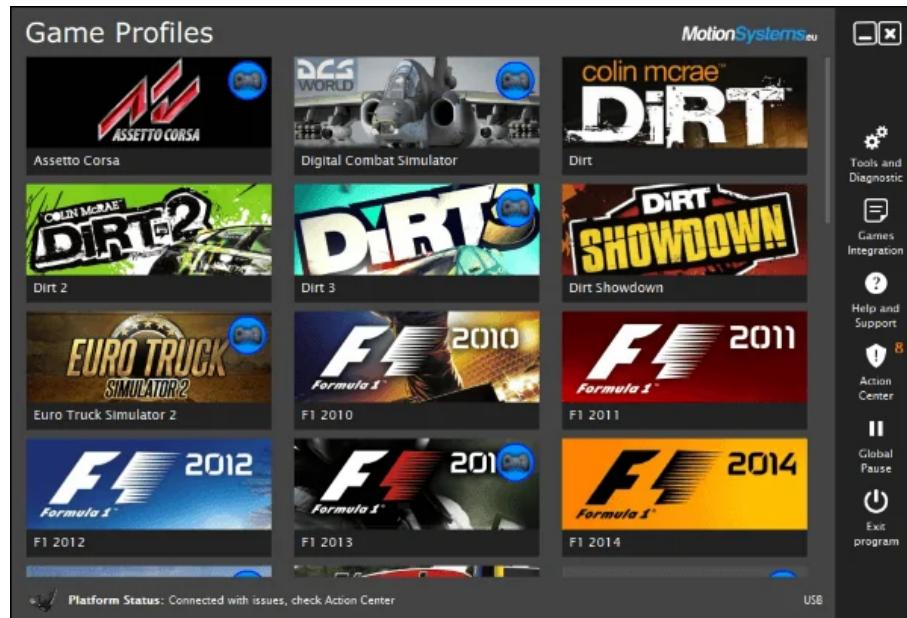
1. Installing connector is a kind of integration within a game (3rd party software). It can break something (e.g. it can cause a conflict with other plug-in). We do not want to perform that kind of operations without informing user about it and without user's confirmation.
2. Usually games are installed in Program Files. Copying anything to that folder requires permission elevation. We could display many elevation prompts during start-up of the system but this would be confusing for the user.

Above statements should explain why we have chosen explicit mechanism for connector installation instead of automatic installation. User clicks Install and immediately see UAC prompt as result of his/her actions.

4.5.5 Main window and game profiles

Main program window is a list of profiles. It also has a quick access tool bar on the right.

Typical scenario is to click on a profile of the game and then click Run the game. It will activate the profile and automatically start the game.



Alternatively you can click a game-pad icon. It will activate the profile and start the game.



Not all profiles have associated games (missing gamepad icon). There are three reasons:

1. Game is not installed in your system.
2. Game is installed but it has not created any registry entries or other files so ForceSeatPM could not find it.
3. Game has been installed after ForceSeatPM has already been started.

In the first case, the only solution is to install the game. In the second case, you can:

1. Click on a profile, then click Edit, go to Game tab and browse for game executable.
2. Click on a profile, then click Activate. Then close (or leave opened) ForceSeatPM main window and start the game from e.g. desktop shortcut.

INFORMATION

Notice that clicking on the close icon (X Button) does not close the ForceSeatPM but only the main window. The program is still available in system tray. In order to completely close the program, click Exit program or Quit from tray icon menu.

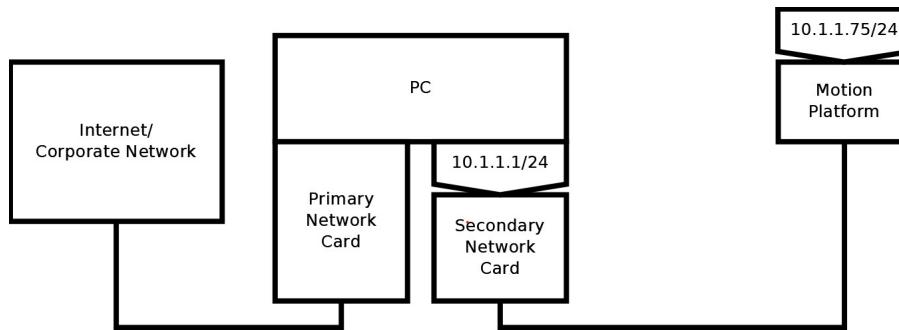
4.6 Connecting to PC

The default connection type is USB. To connect the device plug in the USB cable into the PC or laptop. The platform should be recognized and has 'connected' status in the ForceSeatPM software. It is recommended to connect motion platform to a dedicated wired (wireless is not recommended) network to reduce latency and interferences with other devices.

4.7 Network configuration

It is recommended to connect the motion platform directly to network card (peer to peer connection) – if it is not possible, a switch/hub might be used. By default all PS-SB400-P3 Power Cabinets has the same IP address configured as factory setting: **10.1.1.75/24**

Network configuration scheme with one motion platform:



4.7.1 Setting IP and MAC address of the platform

1. Connect the PS-SB400-P3 Power Cabinet to the PC via USB and turn it on.
2. If you have more than one motion platform, connect one at a time, then proceed with another platforms.
3. Use the command line tool **mosyct.exe** - available to download at :
<https://motionsystems.eu/files/3757230870e17ac7/mosyct.zip>
4. Open the application to configure unique IP and MAC address (it should be already unique as factory setting), enter commands in the application window:

```
mosyct.exe usb set-ip 10.1.1.75
mosyct.exe usb set-mac 2D ef 00 13 43 22
```

5. Shut-down the platform and then power-up.
6. Use **mosyct.exe** to verify IP address and MAC address:

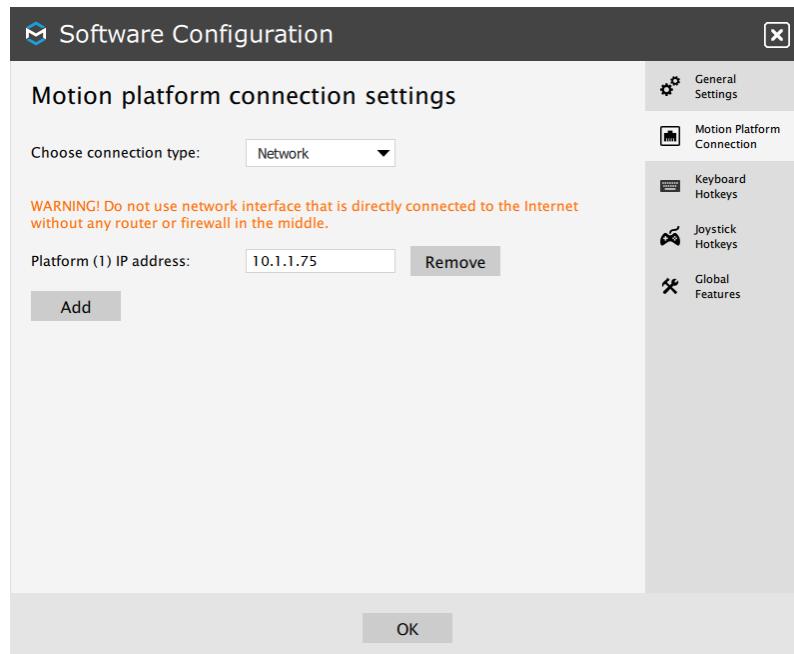
```
mosyct.exe usb get-ip
mosyct.exe usb get-mac
```

INFORMATION

Ensure that the MAC and IP addresses are correct, otherwise the platform will not work.

4.7.2 Configuring network connection in ForceSeatPM

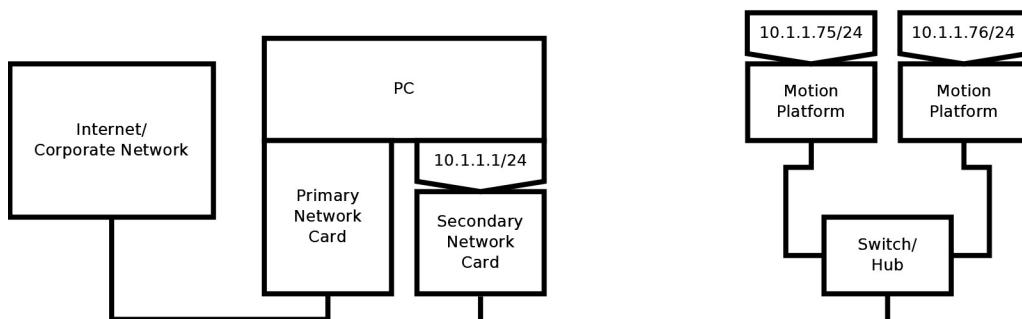
1. Make sure that your secondary network card has static IPv4 configured and it is in the same network as the motion platform.
2. Go to ForceSeatPM, Tools and Diagnostic, Software Configuration
3. Switch to Motion Platform Connection tab.
4. Change connection type to Network and specify your motion platform IP address:



4.7.3 Adding another motion platform to the network

To control more than one motion platform additional IP addresses needs to be added. ForceSeatPM requires that all specified motion platforms are up and running, so if you configure two devices and use only one, the software will not work correctly. Follow the instructions that are displayed in the software configuration window.

Network configuration scheme with two motion platforms:



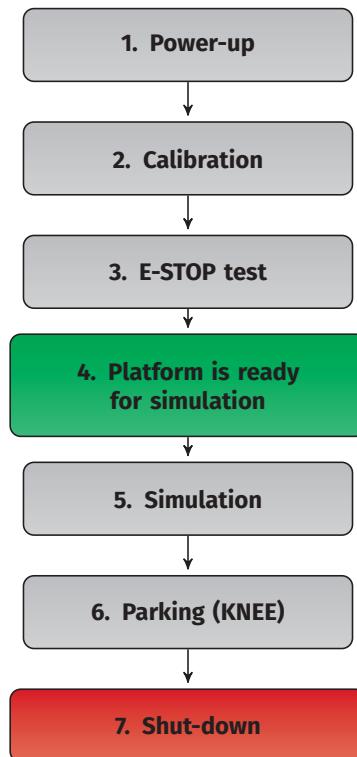
5

Initial start-up

Before start using the platform it is necessary to :

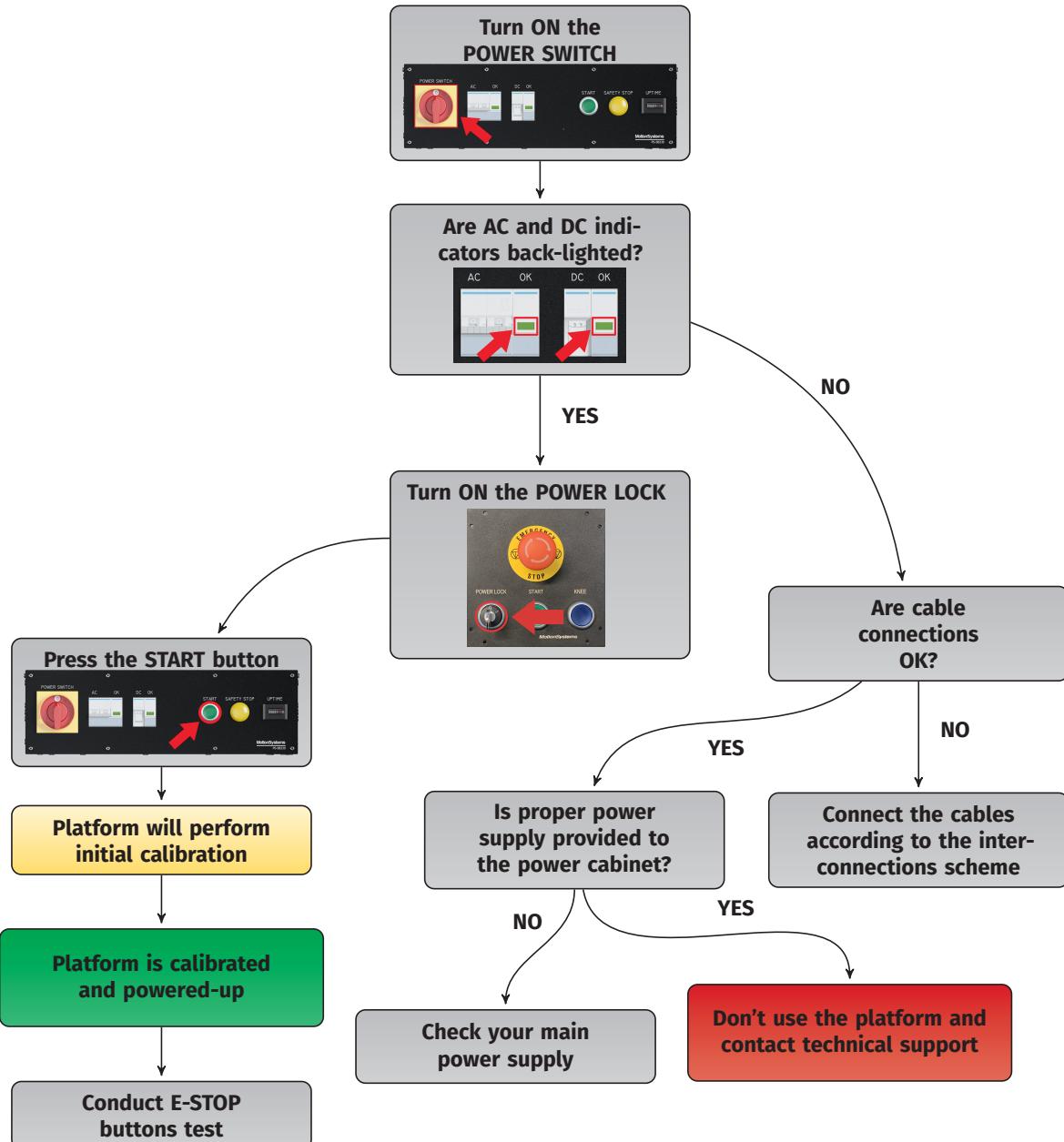
1. Install default control software ForceSeatPM.
2. Power-up the platform
3. Test the E-STOP buttons to assure that the platform is safe to use

5.1 Procedural steps of using the platform



INFORMATION

Before power-up of the platform check if any of the **E-STOP** buttons is pressed. If so, unpress the button by turning it according to the arrow markings on the button.



5.2 Calibration of the platform

Each time after switching from the standby mode to working mode (after pressing **START** button) the platform will automatically perform calibration of the actuators position and will slightly move during this process. After finishing calibration process the platform will stop movement and is ready to be used.

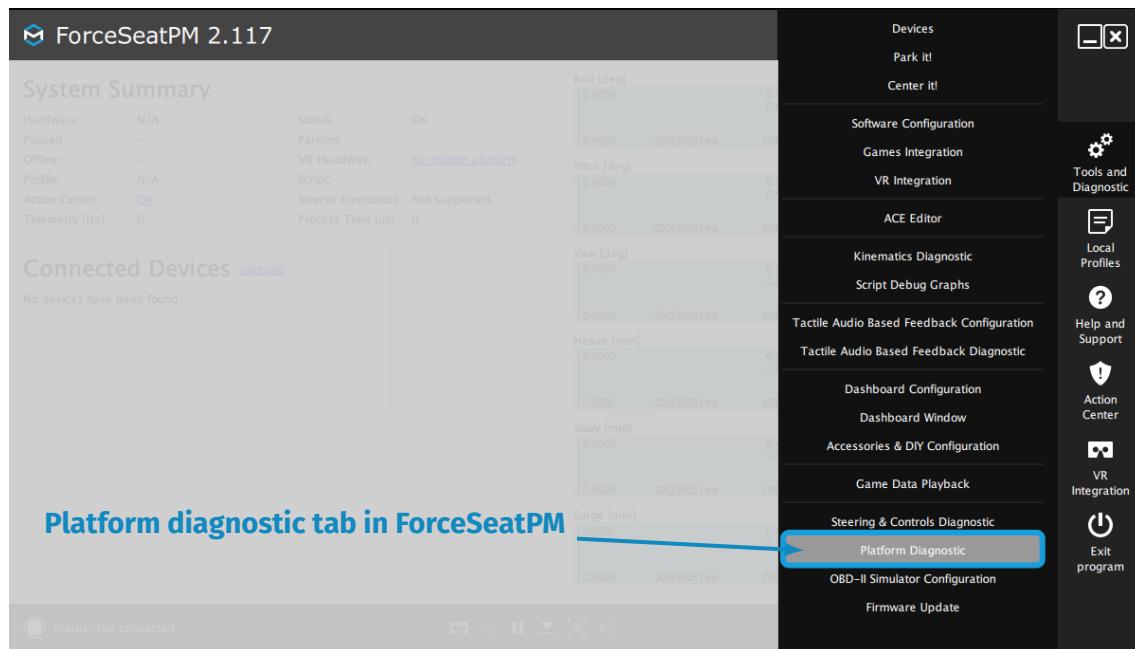
DANGER!

It is forbidden to enter the working area of the platform during the calibration process.

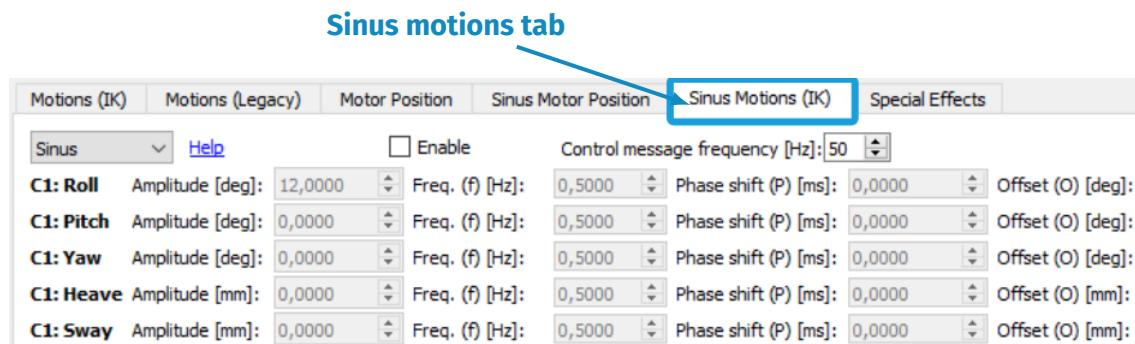
5.3 Setting motions to the platform

Setting motions to the platform is necessary to perform E-STOP buttons test to verify it's functionality. Testing the E-STOP button procedure is described in the following section. To enable motions use default control software ForceSeatPM.

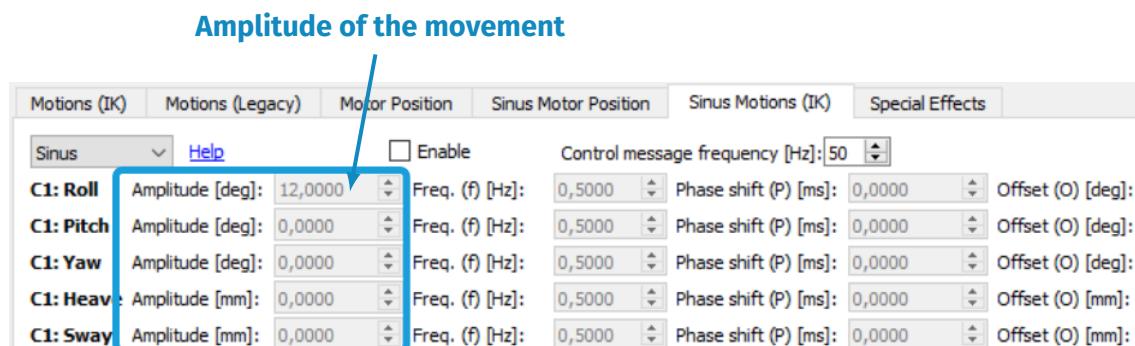
1. Select Platform Diagnostic in Tools and Diagnostic



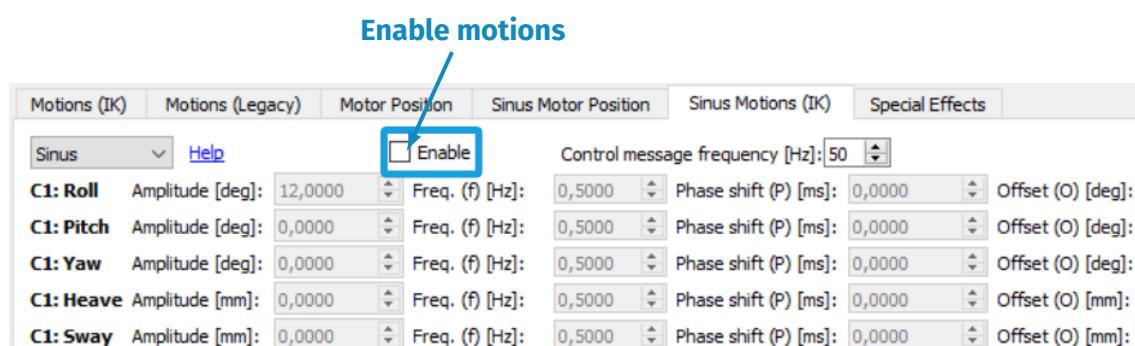
2. Select sinus motions tab



3. Set amplitude of the movement



4. Enable movement of the setted motions



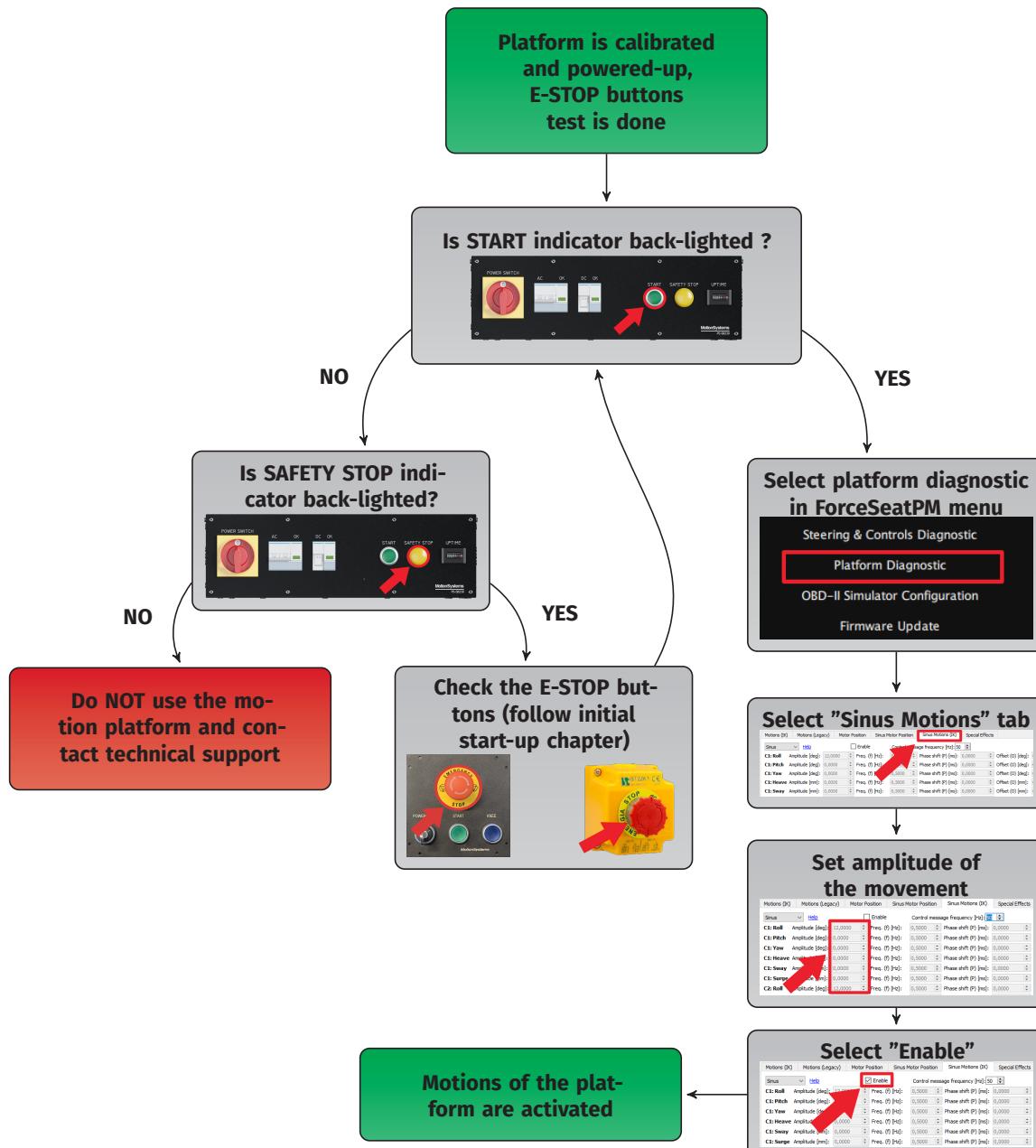
DANGER!

After setting amplitude of the movement and selecting "Enable" in the ForceSeatPM the **platform will start moving immediately. Do not enter** in working zone of the platform.

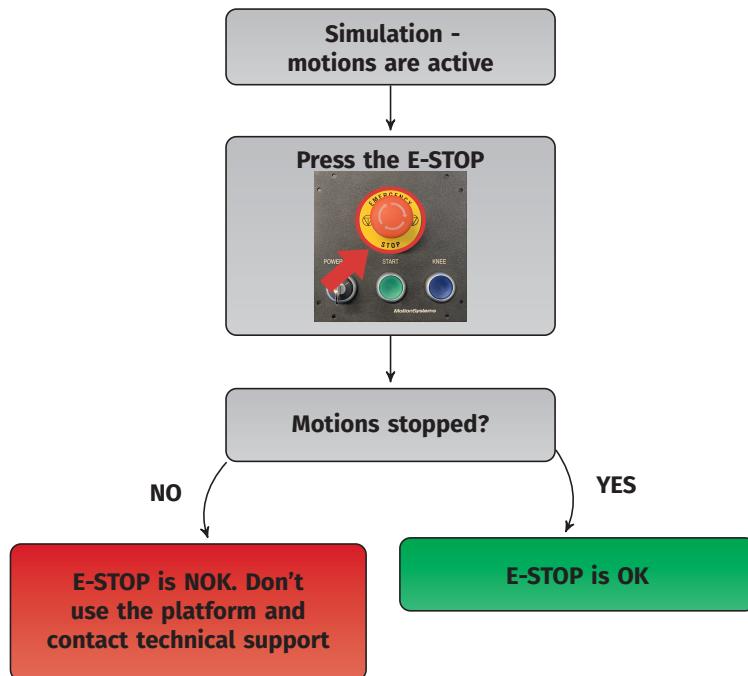
5.4 E-STOP buttons test

Checking E-STOP at least once a month (daily check is recommended) is **mandatory** operation in order to assure that the platform can be safely stopped using E-STOP buttons. To check the E-STOP buttons the platform has to have activated motions. To activate the motions follow procedure described below using ForceSeatPM software:

5.4.1 Activating motions



5.4.2 Testing E-STOP button on PS-SBR remote controller

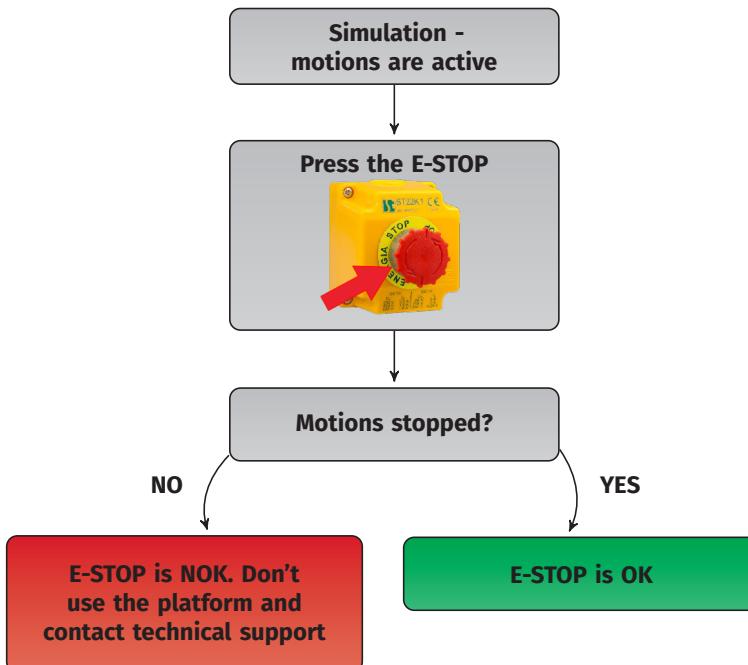


5.4.3 Testing external PS-SBEC E-STOP button

INFORMATION

Before testing external PS-SBEC E-STOP button :

1. Unpress the E-STOP on the PS-SBR remote controller
2. Press the RESET button
3. Start the simulation to enable motions



6

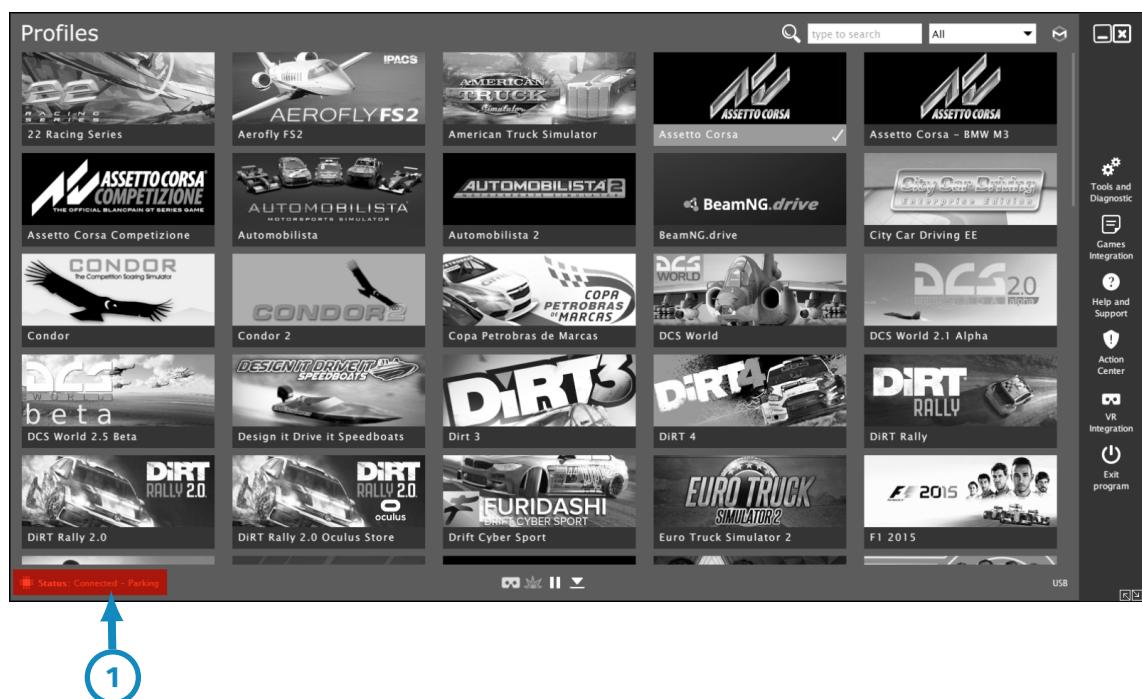
Operating instructions

There are two main ways to start the simulation :

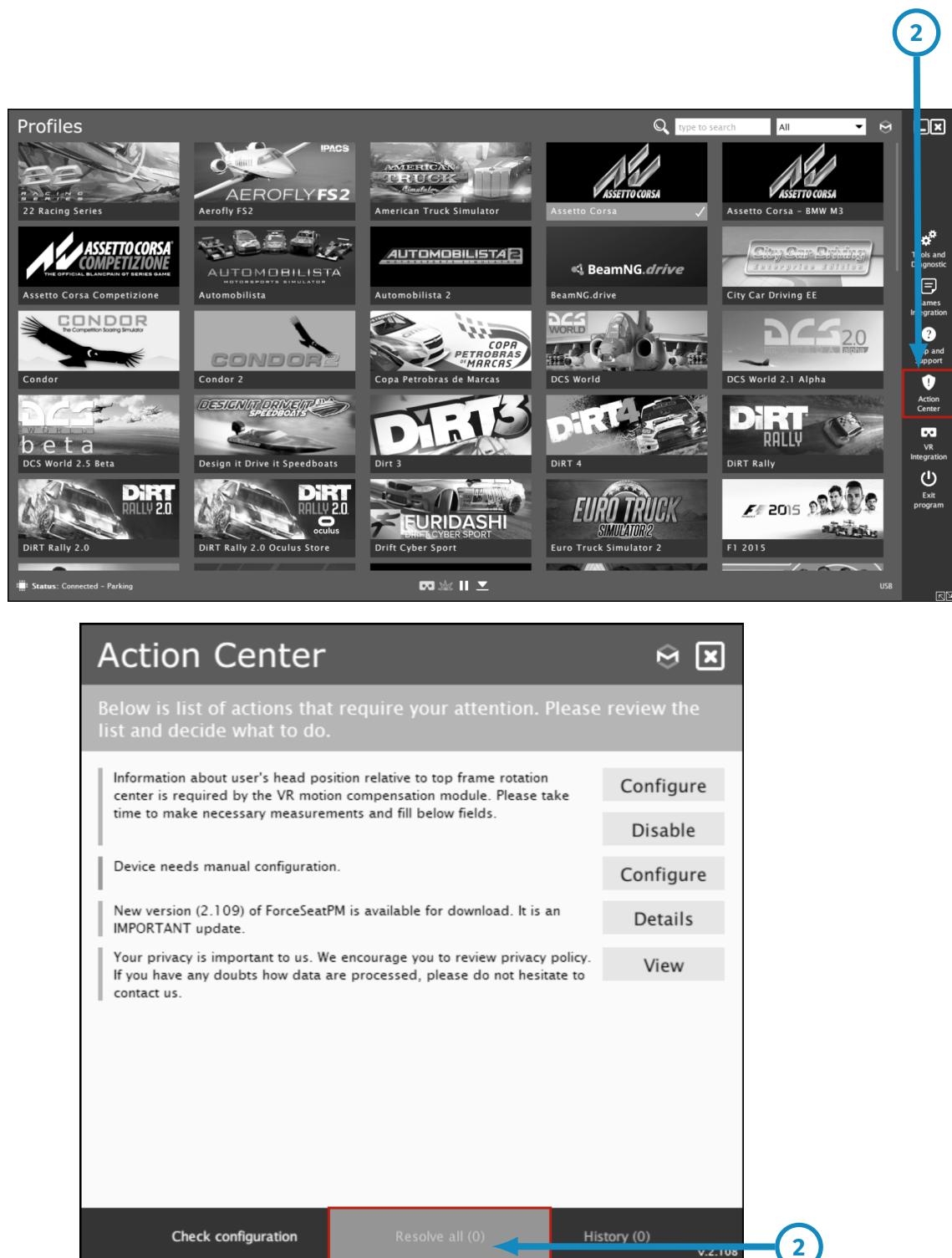
1. Simulating game motions via ForceSeatPM
2. Define and activate input signal to the actuators via Platform Diagnostic in ForceSeatPM

6.1 Simulating game motions

1. Check connection status of the platform by looking at the main window of the application, it shall be displayed as "Connected" status.



2. Check Action Center with a list of actions that requires attention. It is possible to solve them one by one or by pressing the "Resolve all" button. Firmware update may require additional confirmation in the dialogue box.



The screenshot shows the MotionSystems software interface. A blue circle labeled '2' points to the 'Action Center' option in the vertical menu on the right side of the screen. Another blue circle labeled '2' points to the 'Resolve all (0)' button at the bottom of the Action Center window.

Profiles

Status: Connected - Parking

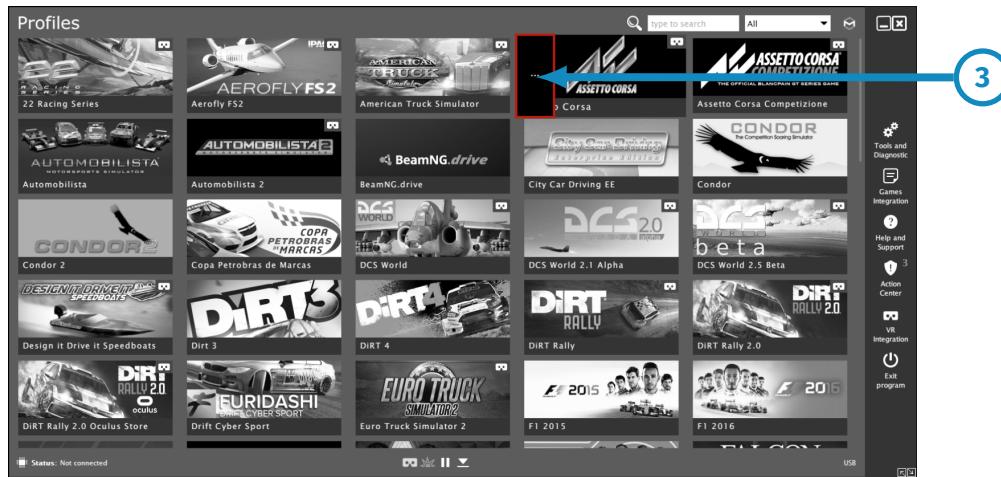
Action Center

Below is list of actions that require your attention. Please review the list and decide what to do.

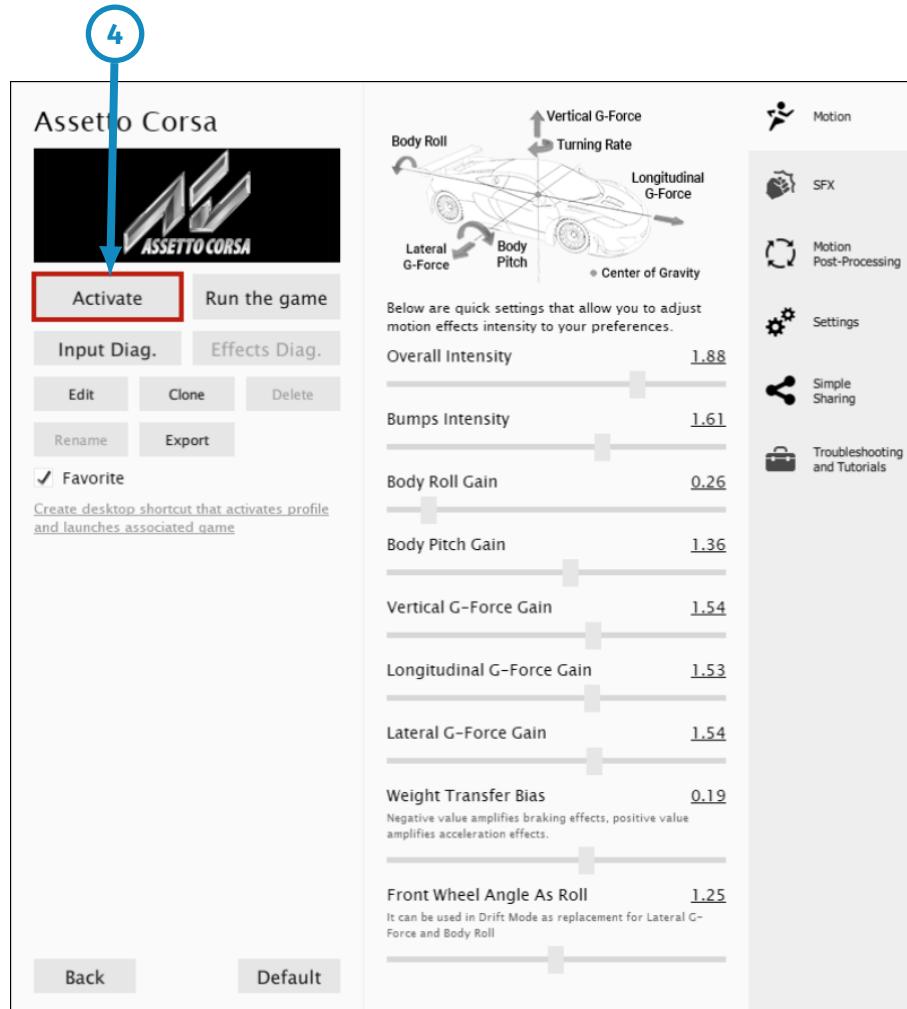
- Information about user's head position relative to top frame rotation center is required by the VR motion compensation module. Please take time to make necessary measurements and fill below fields. Configure Disable
- Device needs manual configuration. Configure
- New version (2.109) of ForceSeatPM is available for download. It is an IMPORTANT update. Details
- Your privacy is important to us. We encourage you to review privacy policy. If you have any doubts how data are processed, please do not hesitate to contact us. View

Check configuration Resolve all (0) History (0) v.2.108

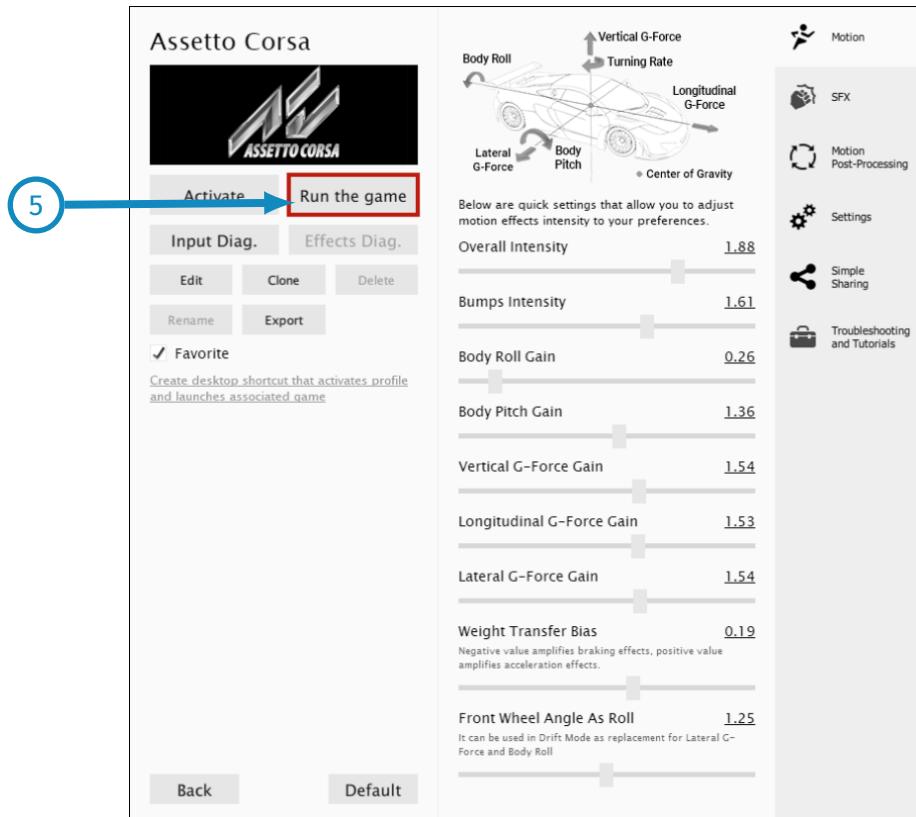
3. Choose the game and check profile details by clicking on the game thumbnail.



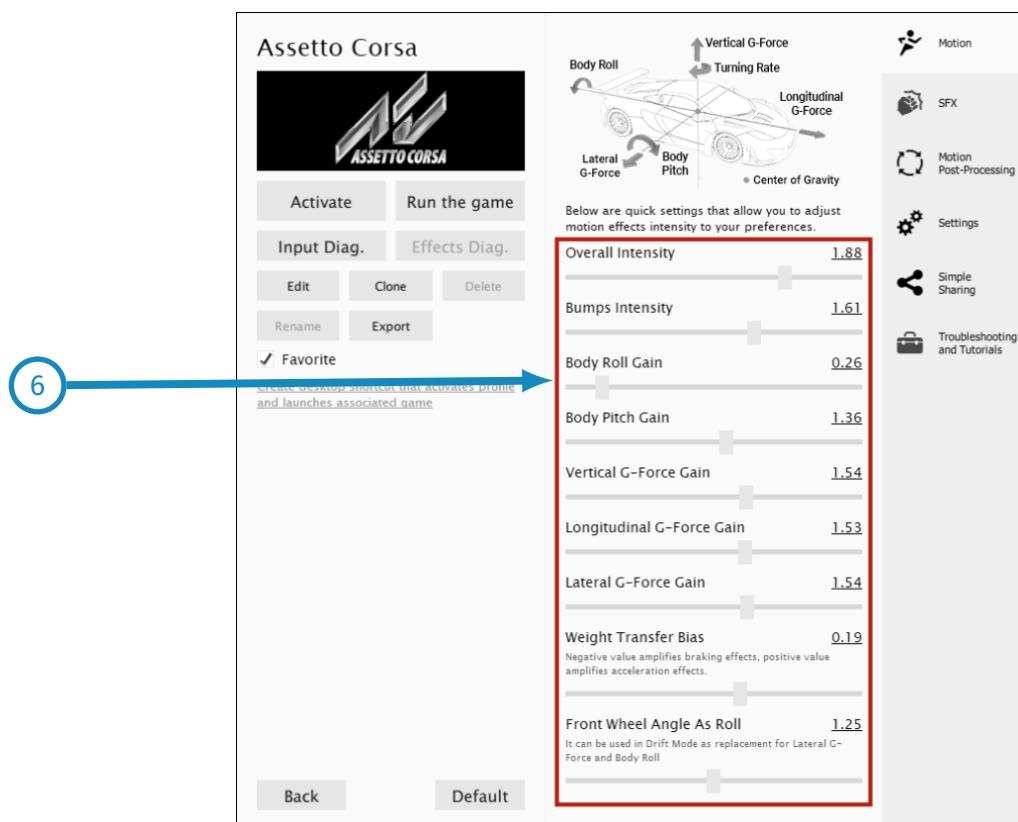
4. Activate profile by clicking the "Activate" button.



5. Turn on the game using the "Run the game" button.

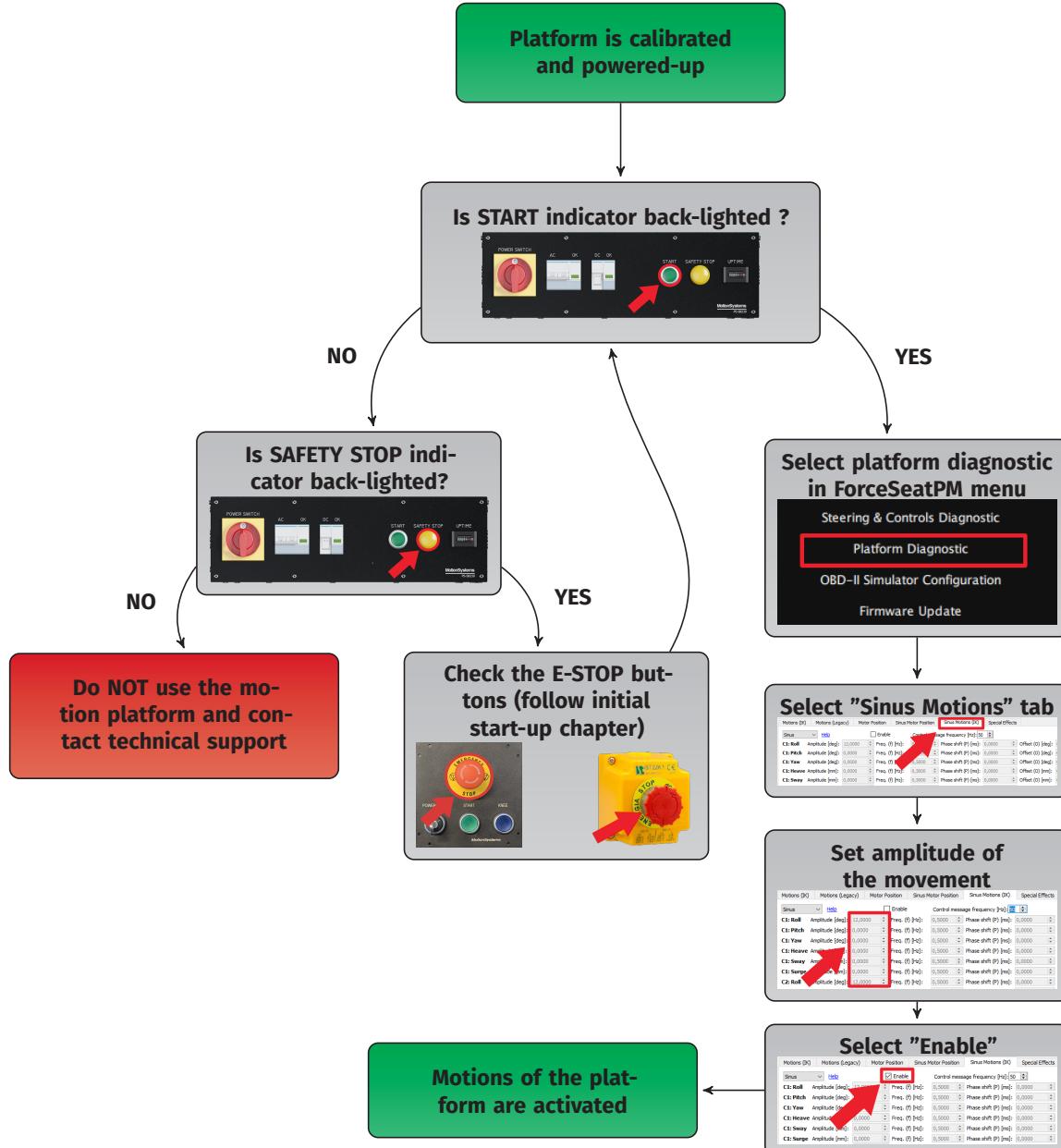


6. Using the quick settings, adjust the intensity of the motion effect to your own preferences. Minimize the game window with a keyboard shortcut ALT+TAB.



6.2 Defining and activating input signal

To define and activate input signal to the platform follow the procedure using Force-SeatPM Platform Diagnostic tool:

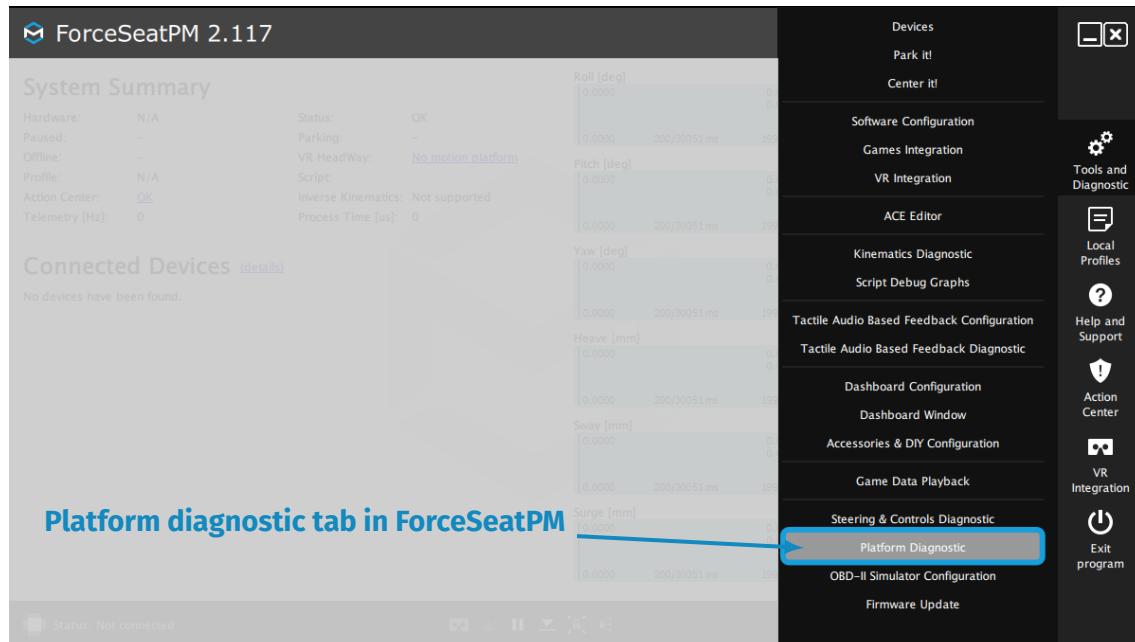


WARNING

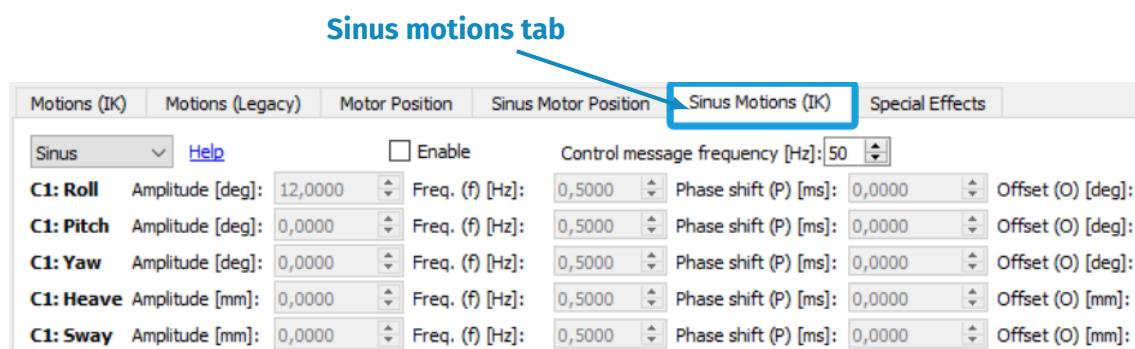
Each time after switching from the standby mode to working mode (after pressing **START** button) the platform will automatically perform calibration and will slightly move during this process. Do not enter into the platform working area during the process. After finishing calibration process the platform will stop movement and is ready to be used.

Defining input signal in "Platform Diagnostic" (enhanced):

1. Select Platform Diagnostic in Tools and Diagnostic tab



2. Select sinus motions tab



3. Set amplitude of the movement

Amplitude of the movement

Motions (IK)	Motions (Legacy)	Motor Position	Sinus Motor Position	Sinus Motions (IK)	Special Effects
Sinus	Help	<input type="checkbox"/> Enable	Control message frequency [Hz]: 50		
C1: Roll	Amplitude [deg]: 12,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Pitch	Amplitude [deg]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Yaw	Amplitude [deg]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Heave	Amplitude [mm]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [mm]:	
C1: Sway	Amplitude [mm]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [mm]:	

4. Enable movement of the setted motions

Enable motions

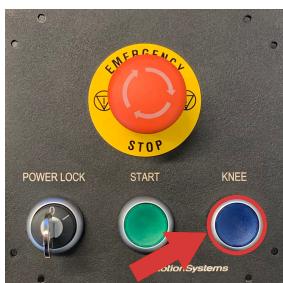
Motions (IK)	Motions (Legacy)	Motor Position	Sinus Motor Position	Sinus Motions (IK)	Special Effects
Sinus	Help	<input checked="" type="checkbox"/> Enable	Control message frequency [Hz]: 50		
C1: Roll	Amplitude [deg]: 12,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Pitch	Amplitude [deg]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Yaw	Amplitude [deg]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [deg]:	
C1: Heave	Amplitude [mm]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [mm]:	
C1: Sway	Amplitude [mm]: 0,0000	Freq. (f) [Hz]: 0,5000	Phase shift (P) [ms]: 0,0000	Offset (O) [mm]:	

DANGER!

After setting amplitude of the movement and selecting "Enable" in the ForceSeatPM the platform will start moving immediately. Do not enter in the working zone of the platform.

6.3 Stopping simulation - parking the platform

To set the platform to the parking position KNEE button function needs to be activated on the PS-SBR remote controller. To activate KNEE function the platform has to be powered-up and in working mode (**START** indicator has to be back-lighted).

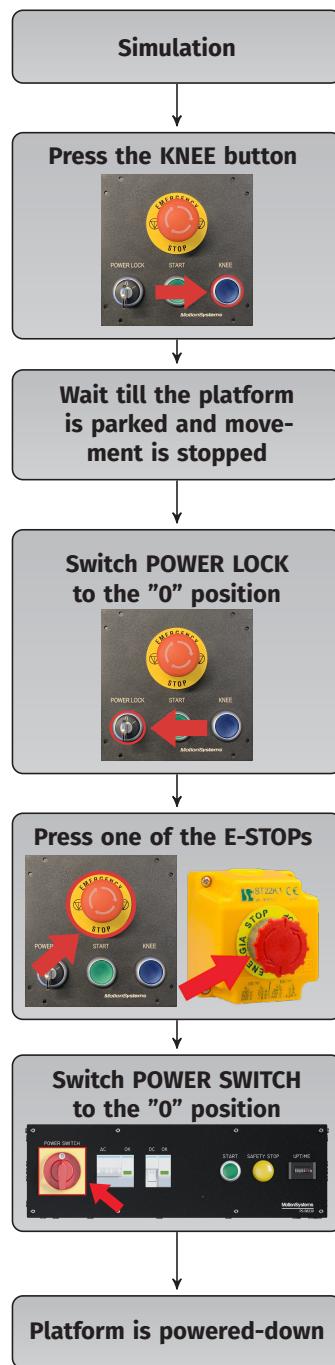


WARNING

KNEE function requires to press the E-STOP button after the platform has finished parking to assure that the motion system is safely stopped.

6.4 Shut-down

In order to shut-down the platform proceed with following steps:



7

Disassembly and packaging disposal

When the system is no longer in use it should be disposed in environmental safe manner in compliance with applicable local work and environmental protection regulations.

WARNING

- Disassembly of the platform shall be performed by trained personnel.
- Disassembly of the electrical components shall be performed by qualified electrician.
- Prior to start disassembly work shut-down the system and disconnect it completely from the power source and discharge residual energy.

7.1 Disposal of the packaging material

The packaging is designed to protect the system from damage that might occur during the transportation, when no longer in use it should be disposed as following:

- OSB boards from transportation box should be disposed as wood and recycled.
- Screws used in transportation box should be disposed as metal and scrapped.
- Plastic foil should be disposed as polypropylene (PP) and recycled.
- Cardboard should be disposed as paper and recycled.
- EPS foam should be disposed as plastic and recycled.

7.2 Disposal of the system components

INFORMATION



Electrical and electronic components of the system contains materials which if handled or disposed incorrectly, could be potentially hazardous to human health and environment. Do not dispose it in the household waste.

If no other agreement of disposal was concluded, the system shall be dismantled for disposal as follows:

- Metal parts should be scrapped.
- Electric and electronic components should be disposed in the specialized disposal center.
- Oil and grease from the actuators should be drained and stored in the proper container and disposed in the oil collection center.
- Other materials should be sorted and disposed accordingly to the local law and regulations.

8

Product Guarantee

The Motion Systems company guarantees that Motion Systems products purchased from the Motion Systems company or an authorized dealer are free from defects in materials and workmanship at the date of original purchase for a period of one year (12 months) from that date. If within the guarantee period the product is determined to be defective due to improper materials or workmanship, the Motion Systems company or an authorized dealer will, without charge for labour or parts, repair or (at Motion Systems discretion) replace the product or its defective parts subject to the terms and limitations below. During guarantee period Motion Systems provides service of the following elements of the motion platform:

- Linear actuators
- Linear actuator motor with control system (servo inverter), measuring system (encoder) and electromagnetic brakes
- Dedicated Power Cabinet to the platform
- Motion controller

8.1 Terms

Guarantee services will be provided only if the original invoice or sales receipt (indicating the date of purchase, model name and dealers name) is presented with the defective product within the guarantee period.

8.2 Guarantee scope

This Guarantee does not cover transport costs and risks associated with transport of your product to and from the Motion Systems company or authorized dealer. This guarantee does not cover periodic maintenance and repair or parts replacement due to wear and tear. This guarantee does not cover damage or changes to the product caused by failure to install or use or maintain the product not in accordance with Motion Systems instructions. This guarantee does not cover damage or changes to the product caused by adjustments, adaptations or repairs made without Motion Systems prior consent. This guarantee does not cover software for which an end-user license agreement is provided.

8.3 Note on customer statutory rights

This guarantee does not affect statutory rights, including rights of consumers under national legislation governing the sale of consumer goods that cannot be waived or limited by contract.

8.4 Limitations

Under no circumstances shall Motion Systems, its suppliers, resellers or service providers be liable for any of the following even if informed of their possibility:

- Third party claims for damages.
- Loss or damage to data.
- Special, incidental, indirect or consequential damages including lost profits, business revenue, goodwill or anticipated savings.

As some states or jurisdictions do not allow to exclusion or limitation of incidental or consequential damages, above mentioned limitations or exclusions may not apply to some customers.