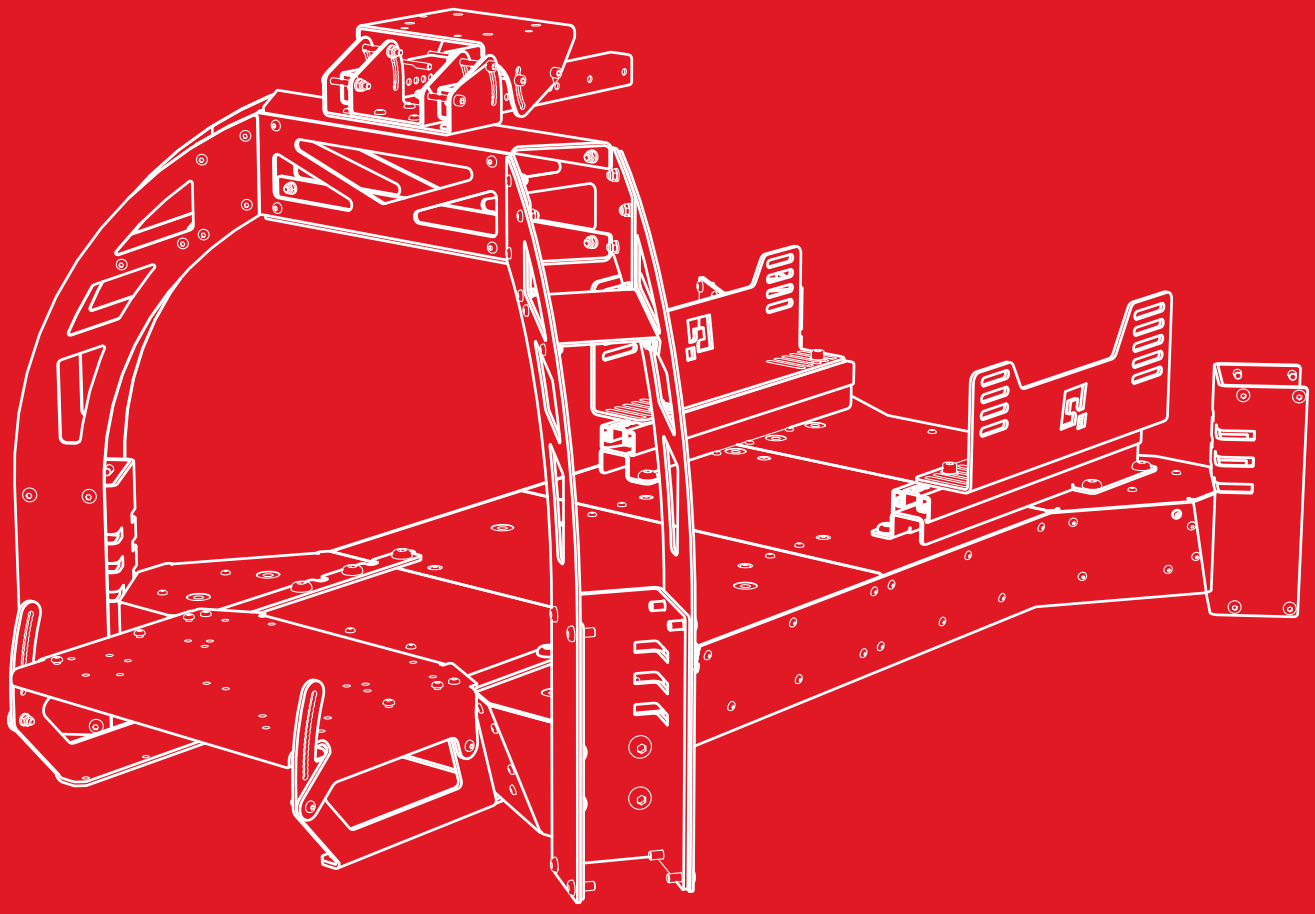
QS-CH1

User Manual



QUBICSYSTEM

The Motion Systems, manufacturer of Qubic System, would like to thank you for choosing the QS-CH1 , an innovative product that helps you develop highly reliable training and entertainment solutions that reproduce key immersive elements, such as surface textures, acceleration, engine vibrations and vehicle dynamics for multiple types of land, air or sea vehicles. Our motion system has been designed to deliver the most realistic simulation experience. We hope you enjoy your new Qubic System!

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Contents

1. SAFETY PRECAUTIONS

INFO

Read all safety instructions before installing and using this product. Save this document for future reference. If ownership of this product is transferred, be sure to include this manual.

WARNING

QS-CH1 is not intended for use by children under 16 years of age. Close supervision and safety instruction is required when this product is used by or near children or people with reduced physical, sensory or mental capabilities. Keep the packaging away from small children as it poses a suffocation risk.

1.1. ESSENTIAL INFORMATION

To reduce the risk of burns, fire, electrical shock, injury or mechanical damage:

- Use the QS-CH1 only for its intended purpose, according to instructions.

WARNING

Always turn all switches off before plugging and unplugging the QS-CH1 .Dangerous voltages level can be present in Power Cabinet for a few minutes after turning off the machine.

- Unplug the QS-CH1 from the power source if it is not used for an extended period or when there is a need to perform hardware installation, maintenance, servicing or repairs.
- Turn the QS-CH1 off when it is not in use.
- The QS-CH1 was designed for indoor use only - **DO NOT** store or use the product outdoors.
- Keep the QS-CH1 away from the heat sources, high humidity, water, and other liquids. **DO NOT** store in extremely cold place where condensation may occur.
- **DO NOT** disassemble the product. Any tampering with or altering the product will void the warranty, poses a serious risk of electric shock, and may irreparably damage the product.

- **DO NOT** cover the vents.
- Keep the power cord plug and the socket dry, clean and dust-free.
- Protect the power cord from damage caused by being stepped on, rubbed against, or pinched.
- **DO NOT** use the QS-CH1 if the ambient temperature is below 4° Celsius (39° Fahrenheit) or above 45° Celsius (113° Fahrenheit).
- **DO NOT** use the QS-CH1 if it has been damaged, or any component is broken or missing. Please contact technical support.
- **DO NOT** use attachments or replacement parts not recommended or approved by the manufacturer. **DO NOT** replace the power cables provided with the product. Use certified power and USB cables only.
- Connect the QS-CH1 to a properly grounded outlet only. See grounding connections in the QS-220-PL User manual.
- If you want to increase safety level of the system you can add external safety devices. For detailed information check section Advanced applications in the QS-220-PL User manual.

WARNING

Stop using the QS-CH1 immediately and contact technical support when the machine starts to emit unusual noise, smoke or any other suspicious behaviour indicating the machine is not working properly.

1.2. BEFORE START

The safety of Qubic System users is the top priority. To protect users and bystanders against injuries caused by mechanical parts movement and electrical connectivity, the following instructions must be strictly performed.

WARNING

As with any mechanical device, the user is responsible for inspecting the condition of the machine prior to use and adhering to safe operating procedures.

Even though possibilities with QS-CH1 are broad, some things should be kept in mind when the place for the rig is chosen. Motion Systems **DOES NOT** approve exceeding or ignoring any of these points and **IS NOT** responsible for malfunctions or failures that, are the results of these actions.

- **DO NOT** use the QS-CH1 on very soft or fragile surfaces like rubber, glass, or foam.
- Ensure that all QS-CH1 modules are mounted properly.
- Be aware that QS-CH1 will crawl a little in every direction during operation. Those movements could damage the surface in the long term. Manufacturer, its subsidiaries, and their partners are not responsible for any floor damages.
- **DO NOT** mount the rig in tight or cluttered spaces – remember that QS-CH1 moves and nothing should restrict its motion range.
- Seatbelts and other harnesses should be mounted to parts of the motion rig that move in the same way as the seat. **DO NOT** attach them to any static part or ground.
- Cables must not be stretched and should be kept in a way that prevents them from getting under actuator or any part that can crush or tear them.
- If you want to use the QS-CH1 in an unusual application, and you are not sure, that the desired setup is feasible, please contact, the distributor/reseller.
- Check if cables are mounted properly – they are not stretched or loosely connected to the socket.
- Check if there are no objects in the motion range of the platform.
- Check that all elements are properly fixed.
- Check if there are no sharp edges nearby.
- Check if everyone around is aware of machine rapid movements.
- Make sure that no one stands in the range of motion (minimum 1.5 m).
- Kids should be kept away from the machine.

- Pets should be kept away from the machine.
- When the QS-CH1 is turned on, it performs start-up calibration.

> **WARNING**
>
> QS-CH1 will move automatically after turning it on in order to perform start up procedure. Stay in the safe distance from that movement and do not try to interrupt it.

- **DO NOT** interrupt or change the weight of payload mounted to the QS-CH1 during start-up calibration.
- Motion Lock Switch should be mounted close to the operator or user of the machine – it has to be easily reachable in every situation.
- Check Motion Lock Switch **AT LEAST** once a month to reduce the possibility of unknown failure – more information available in chapter 4 on page 33.
- Before getting on or off the machine **ALWAYS** activate Motion Lock (press the red button)
- In case of game crash or freeze, the Motion Lock Switch must be pressed before getting off the machine.

> **WARNING**
>
> Motion Lock and Park Mode option **DOES NOT** guarantee safety. For more details see section Advanced applications in QS-220-PL User manual.

- For VR Headset users:
  - Remove the VR goggles before entering or exiting the rig.
  - Ensure that VR Headset is not limiting the operation range of QS-CH1 .
  - Check if the whole VR setup is not in range of motion of the machine.
  - **DO NOT** place the connection loosely under the motion rig.

INFO

Check if connected PC is capable of running the game at stable 90 frames per second or more when VR Headset is used. Lower values can cause VR sickness.

- **DO NOT** use QS-CH1 if you are pregnant, tired, or under the influence of alcohol or drugs.
- **STOP USING** the QS-CH1 immediately if pain, fatigue or any discomfort appears.
- For every two hours of using the system, we recommend at least **15 MINUTES OF BREAK**.
- **DO NOT** put your hands or legs in the actuators range of motion!
- **DO NOT** use the QS-CH1 around small children or pets.
- **DO NOT** put any items between actuators and stabilization plates.
- **DO NOT** pull the wires connecting the actuators with the power cabinets.

2. SYSTEM DESCRIPTION

The QS-CH1 modular motion system dedicated to land vehicles and car driving simulation. It consists of 3DoF motion platform that provides cues for vehicle acceleration, road curvature and obstacles such as side walks and potholes. Full set of the QS-CH1 motion system includes 4 electrical actuators with dedicated power cabinets (2x QS-220-PL set) with a special place for its installation under the cockpit and accessories for mounting the car seat, steering wheel and pedals. System needs only 1.5 square meter place, and it is ideal for projects where the key is to reproduce the ergonomics of the original vehicle within a compact and mobile form. Power cabinets are located in the lower part of the QS-CH1 motion platform, under the cockpit, which significantly reduces the usable space and improves safety.

The QS-CH-1 base motion system consists of :

- QS-CH1 main frame
  - 4x actuator mounting bracket

The QS-CH1 full set consists of:

- 2x QS-220-PL motion set :
  - 4x QS-L1 linear actuator with stabilization plate
  - 2x QS-SB2 power cabinet
  - 2x QS-SBML-2 motion lock cable (up-link/down-link) – 2 meters long
  - 2x Ethernet RJ-45 cable – 2 meters long
  - 2x Power cable
  - 4x Actuator stabilization pads

INFO

For additional information about the device check QS-220 user manual.

- 1x QS-MC6 controller set:
  - 1x M10 – USB controller
  - 1x QS-SBML-1 – motion lock with additional cable
  - 1x QS-MBT-1 – M-BUS terminator (RJ45 plug with resistor)
  - 1x USB cable (mini)
  - 1x Ethernet RJ-45 cable – 3 meters long

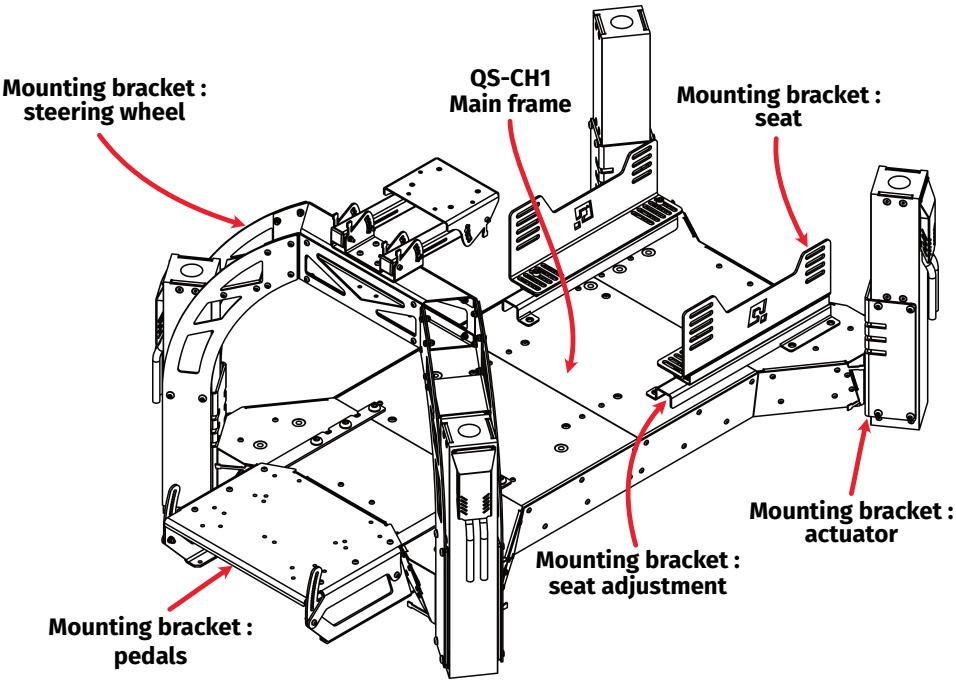
INFO

For additional information about the device check QS-220 user manual.

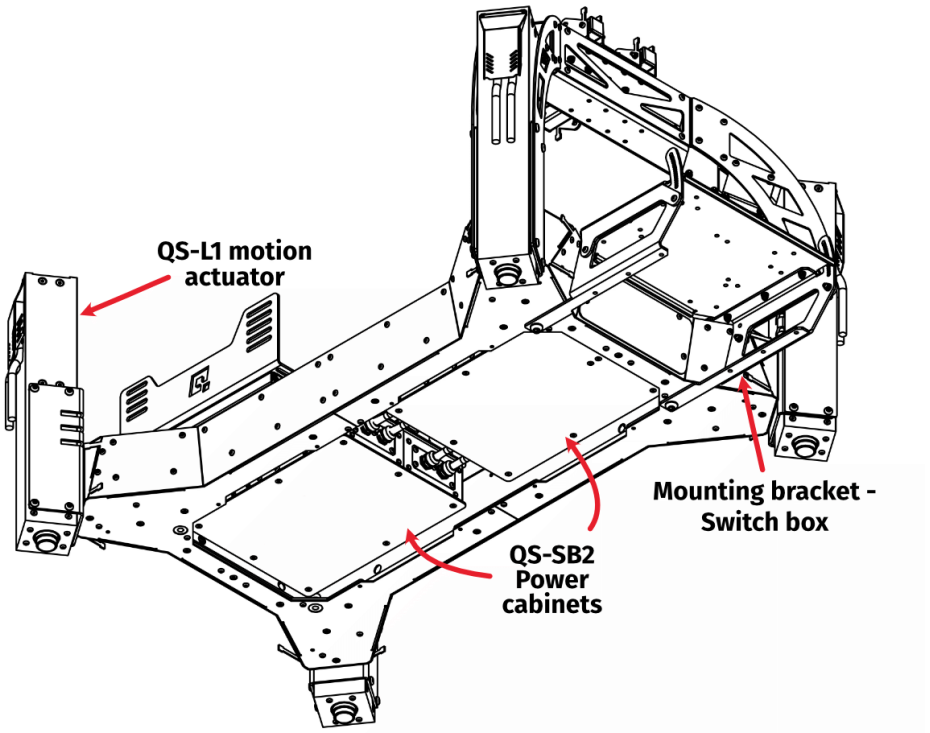
- 1x QS-CH1 base motion system
  - 1x QS-CH1 main frame
  - 4x actuator mounting bracket
  - 1x steering wheel mounting bracket
  - 1x pedals mounting bracket
  - 1x seat mounting bracket
  - 1x seat adjustment bracket
  - 1x Switch Box

2.1. SYSTEM COMPONENTS

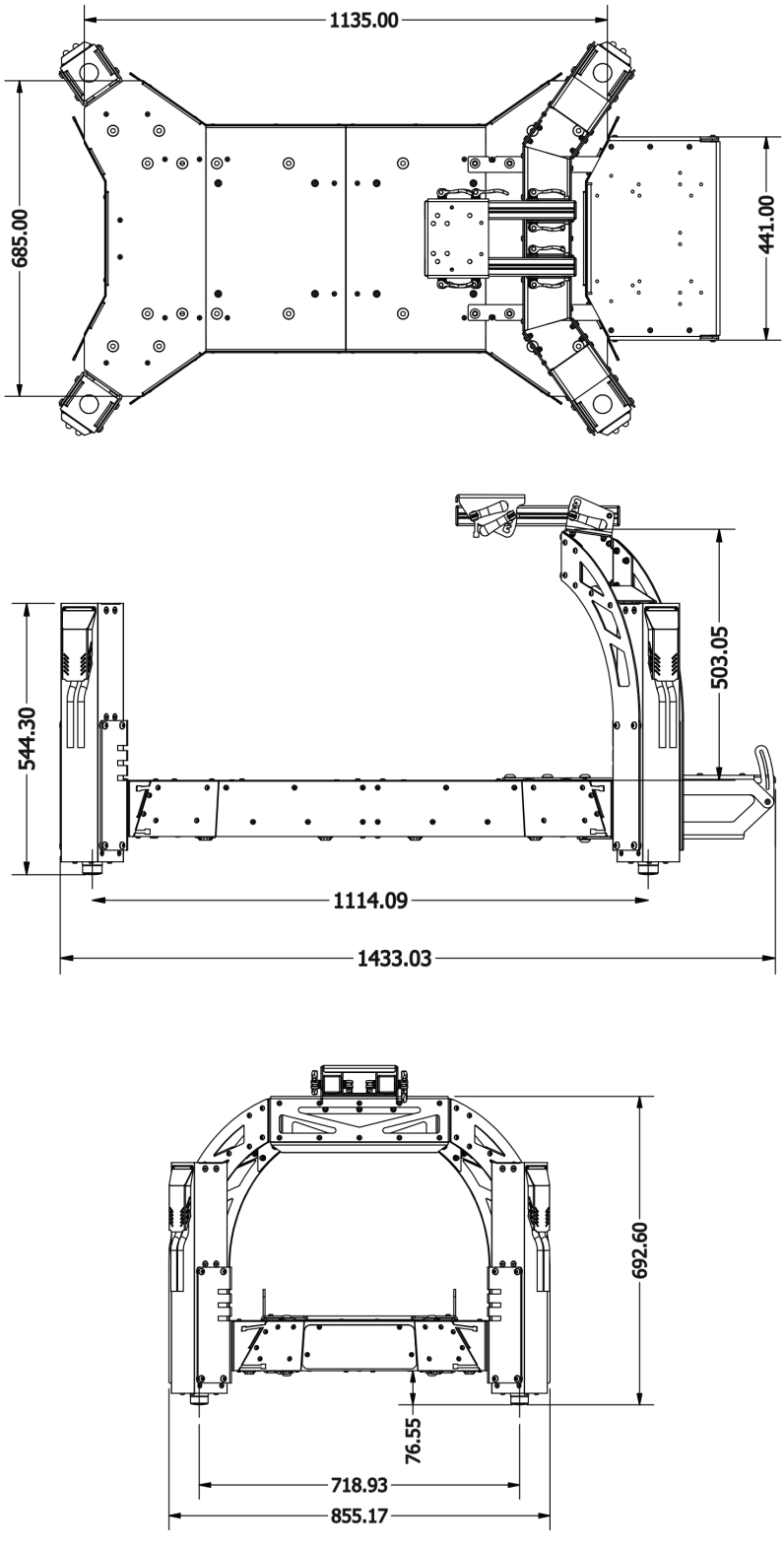
2.1.1 QS-CH1 FULL SET OVERWIEW (TOP SIDE)



2.1.2 QS-CH1 FULL SET OVERVIEW (BOTTOM SIDE)



2.1.3 QS-CH1 FULL SET DIMENSIONS



2.2. SYSTEM SPECIFICATION

QS-CH1 full set	
Architecture	3DOF
Actuator stroke	100 mm
Platform weight	160 kg
Gross moving load	300 kg
Vibration frequency range	0-100 Hz
Maximum control frequency	1000 Hz
Excursions	
Heave	– 50 mm, 50 mm
Roll	-7.9°, 7.9°
Pitch	-5.1°, 5.1°
Maximum velocity	800 mm/s
Maximum acceleration	0.8G*

*Value of acceleration is limited for safety reasons.

2.3. POWER REQUIREMENTS

Power Cabinet (QS-SB2) contains the power supply for connected actuators. If there is no certainty if fuses or entire electrical installation can handle QS-CH1 , contact a qualified electrician.

Voltage	120V	230V
Power supply requirements	2 x Single Phase 120V	220-250 VAC Single Phase
Average power for converter specification [kVA]	0,8	0,9
Peak power for converter specification [kVA]	1,5	1,5
Peak current for breaker specification [A]	13	7
Average power consumption (stress test) [kW]	0,5	0,5
Average power consumption (typical game) [kW]	0,2	0,2

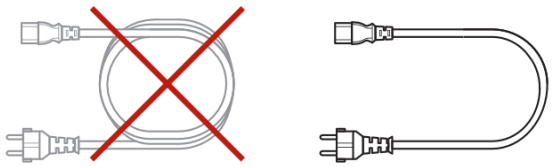
*With heavy payload and /or intensive simulation, average power consumption may rise.

WARNING

For safety reasons, **DO NOT** attempt to modify machines or cables by yourself. QS-CH1 can be used in 120V AC/230V AC, 50~60Hz environment. Remember to use adequate cables with proper grounding in each case!

WARNING

Always **UNWIND THE CABLE COMPLETELY** when using a cable reel and untangle an extension cord before connecting the device to the power supply.



WARNING

This device is **NOT** intended to be used in an IT earthing/grounding system.

3. INSTALLATION

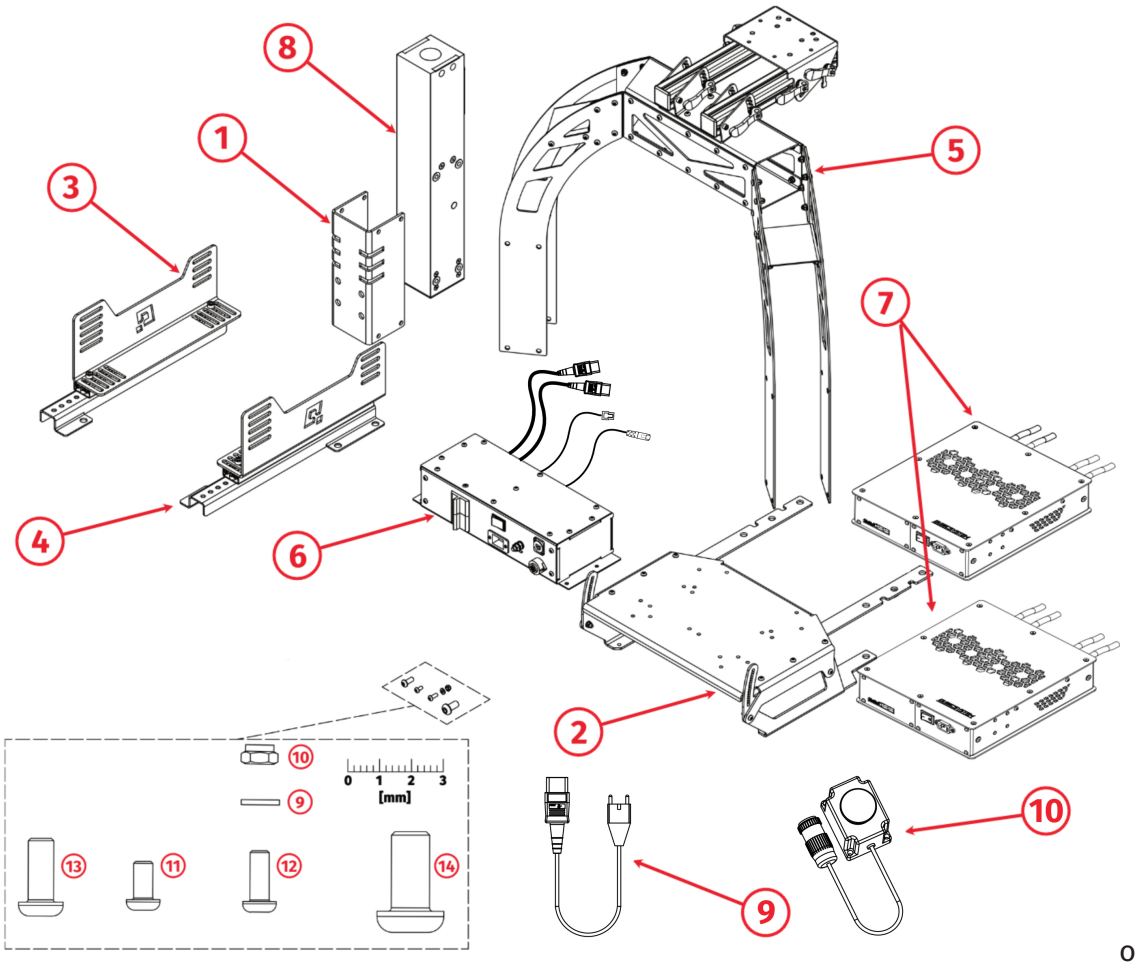
3.1. PARTS LIST

QS-CH1 full set acessories:

ID	Part description	Qty.
1	Mounting bracket - actuator	1
2	Mounting bracket - pedals	1
3	Mouting bracket - seat	1
4	Mounting bracket - seat adjustment	1
5	Mounting bracket - steering wheel	1
6	Switch box	1
7	QS-SB2 power cabinet	2
8	QS-L1 motion actuator	4
9	Power Cable for Switch box	1
10	Motion Lock button for Switch box	1

Assembly parts:

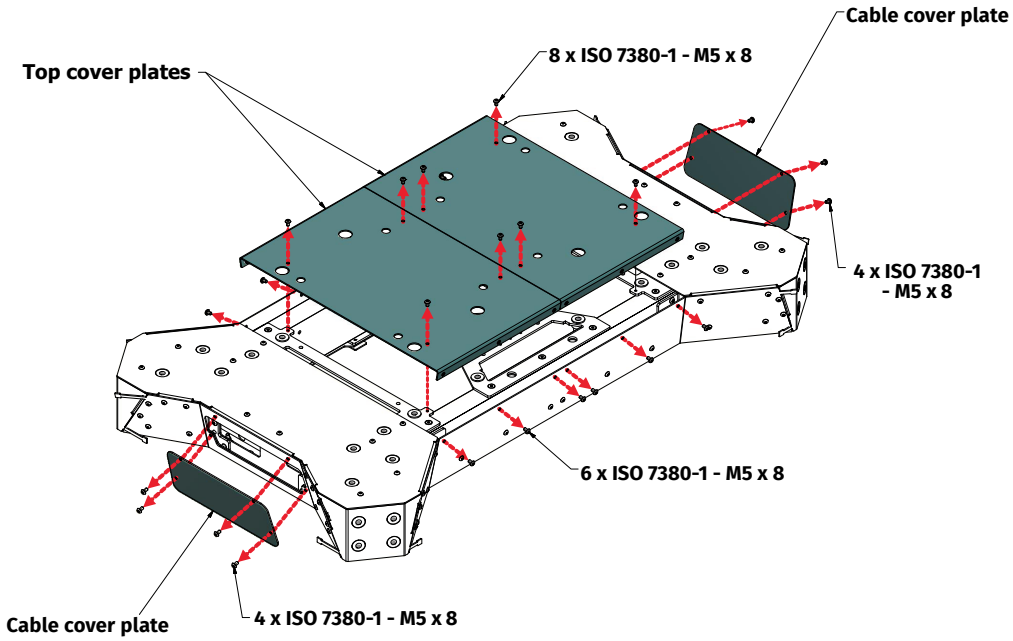
ID	Part description	Qty.
9	Washer DIN 125 - A 6,4	4
10	Nut DIN 985 - M6	4
11	Bolt ISO 7380-1 - M6 x 12	8
12	Bolt ISO 7380-1 - M6 x 16	4
13	Bolt ISO 7380-1 - M8 x 20	32
14	Bolt ISO 7380-1 - M12 x 25	30



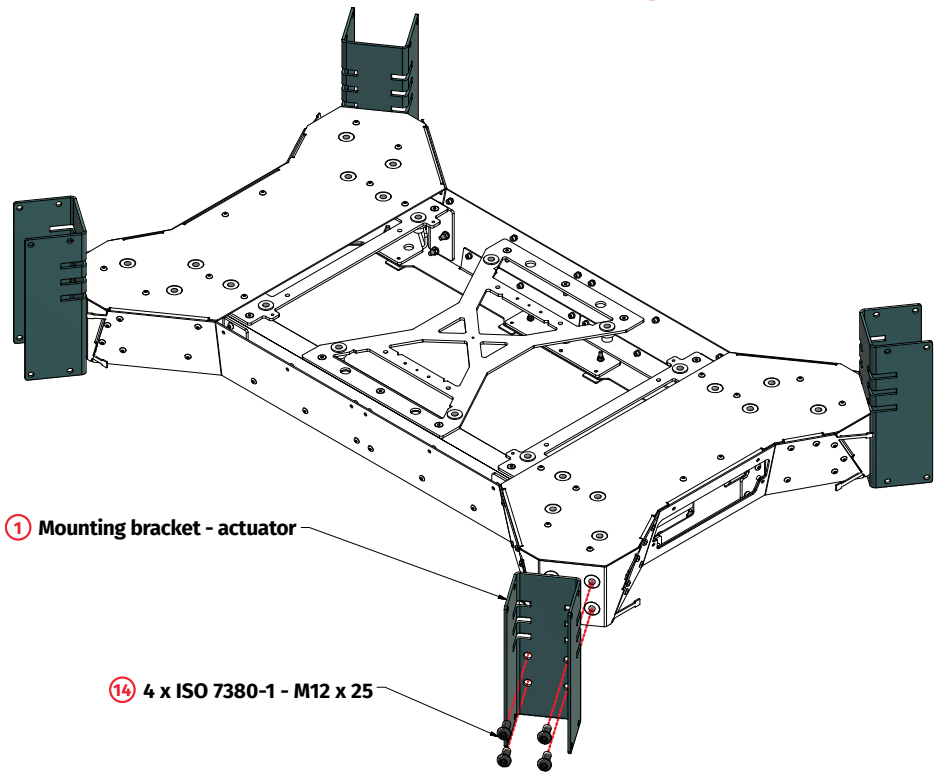
optional

3.2. ASSEMBLY INSTRUCTIONS

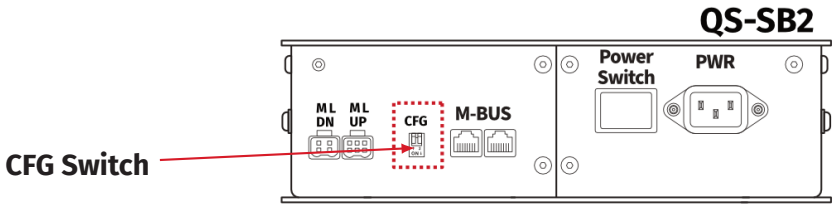
1. Unscrew and remove top cover plates and cable cover plates to get access to mounting points:



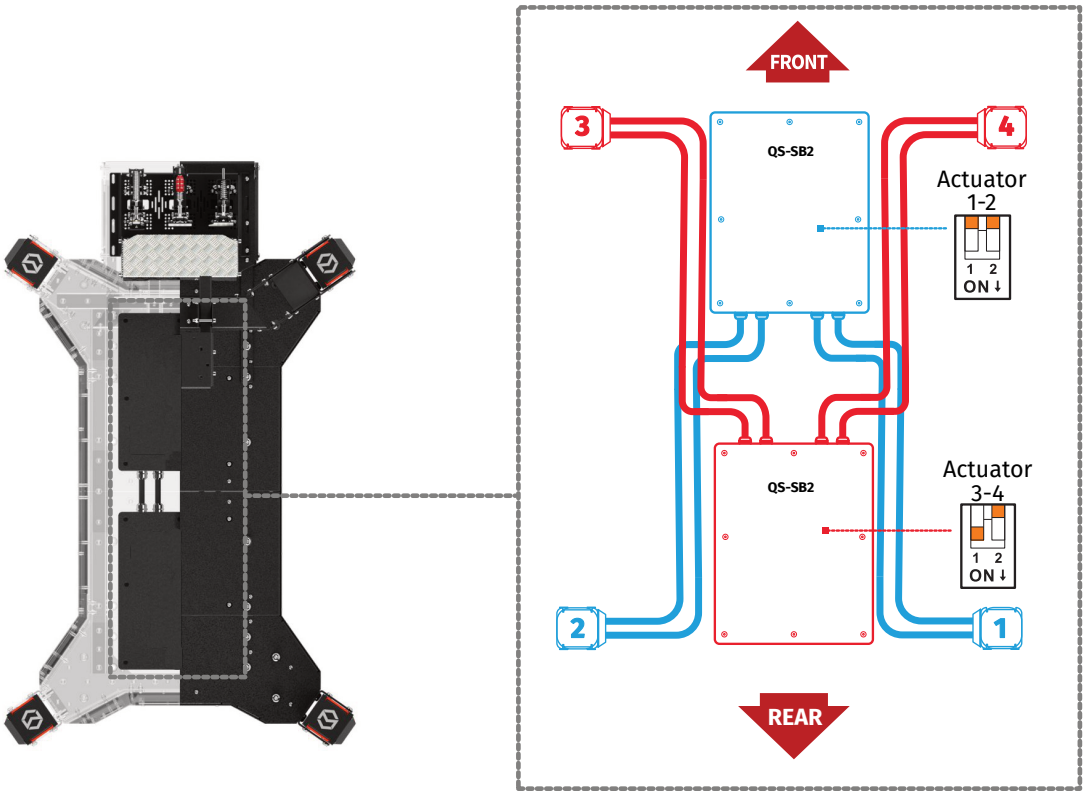
2. Screw in actuator mounting brackets (1) using 4x (14) bolts for each bracket:



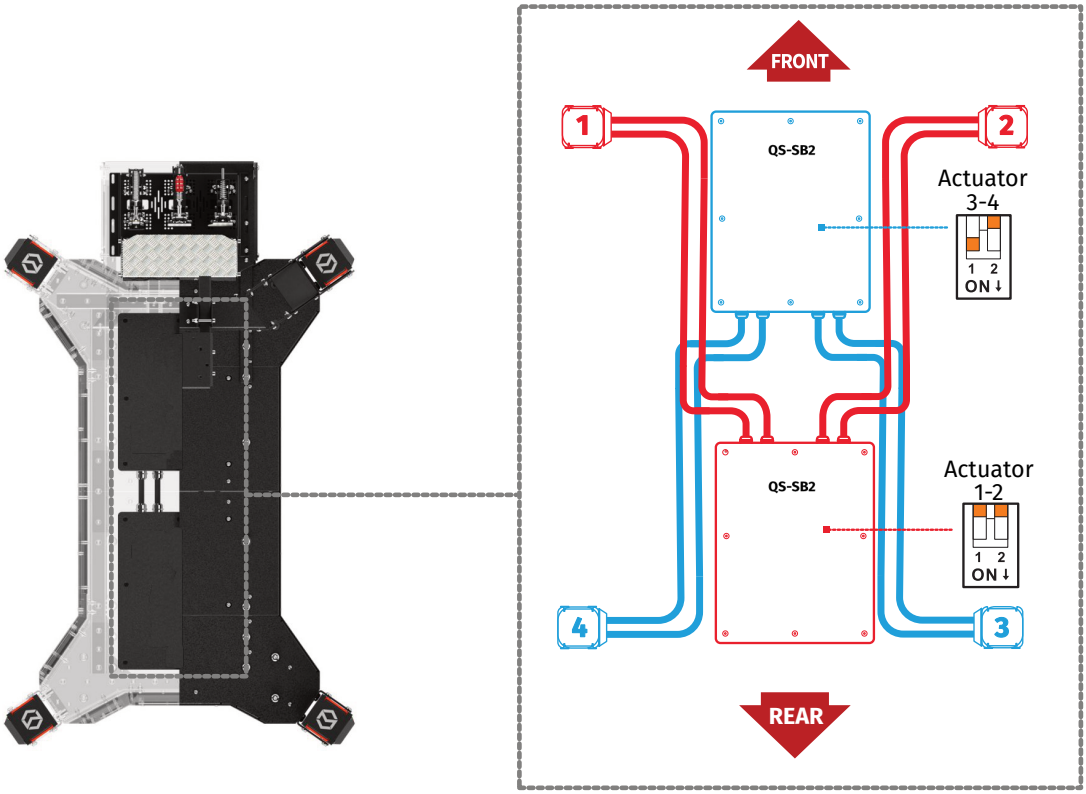
3. Choose one between two of the available layouts of the actuators, then set the DIP switches on the QS-SB2 power cabinets according to the chosen layout:



Layout A (topside view):



Layout B (topside view):



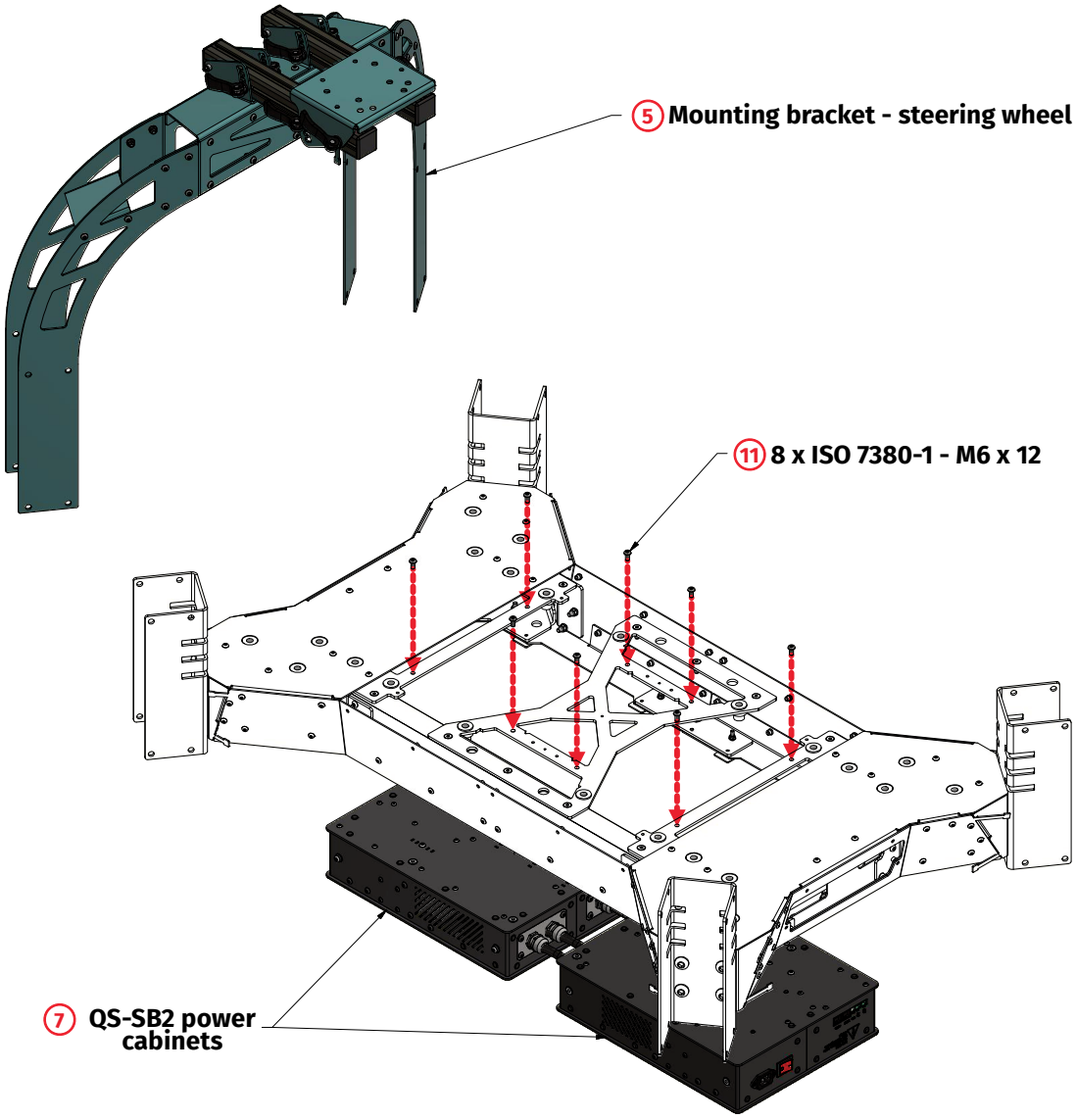
WARNING

The DIP switches **CAN NOT** be set in the same position in both QS-SB2 power cabinets.

INFO

After configuring the chosen layout mind the positions of the actuators as it can influence the behaviour of the motion system.

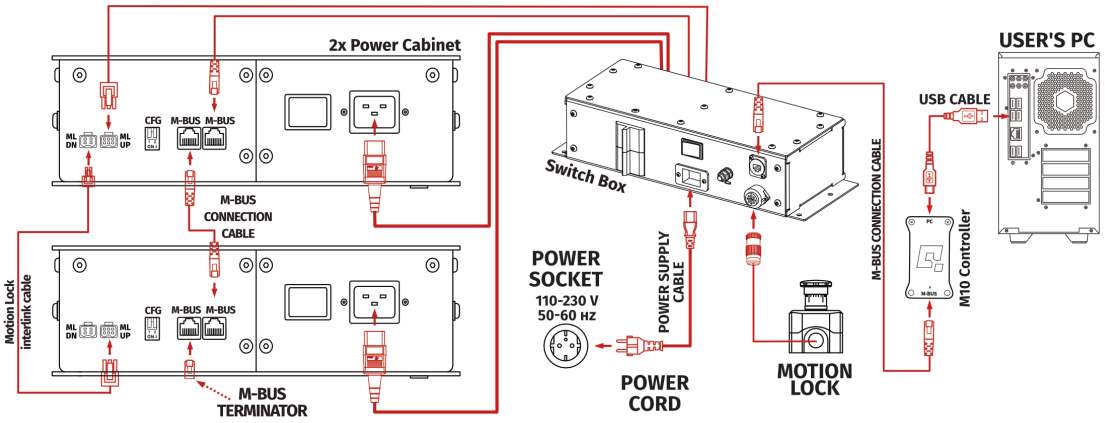
4. Screw in QS-SB2 power cabinets (7) using 8x (11) bolts. Align the steering wheel mounting bracket (5) with front actuator brackets.



WARNING

DO NOT crimp the wires from the QS-SB2 power cabinets to the actuators, as gap between them is smaller than recommended bend radius of the cables.

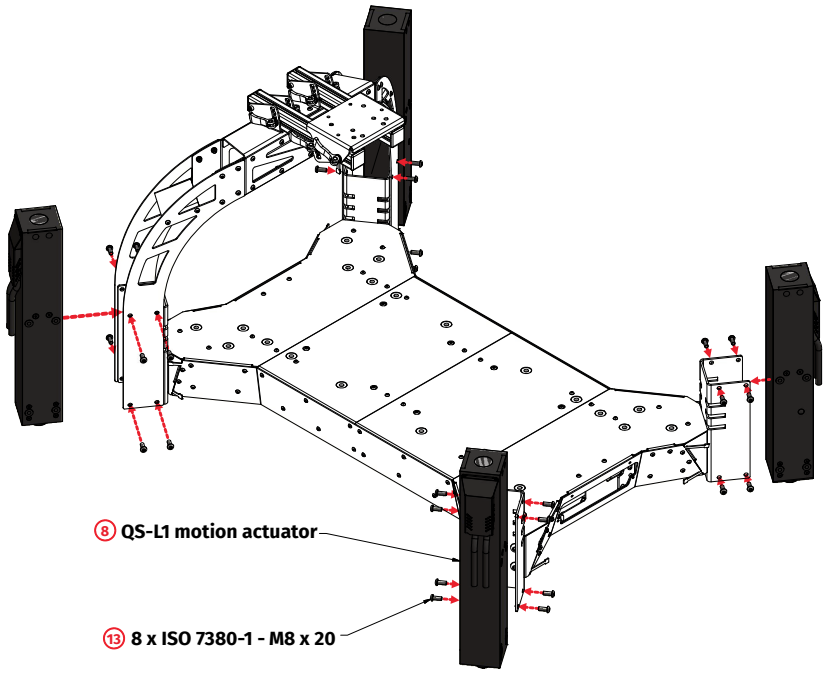
5. Connect the QS-SB2 Power Cabinets and Switch box (leave it unattached for now) using cables provided with the system, as shown on the interconnections diagram:



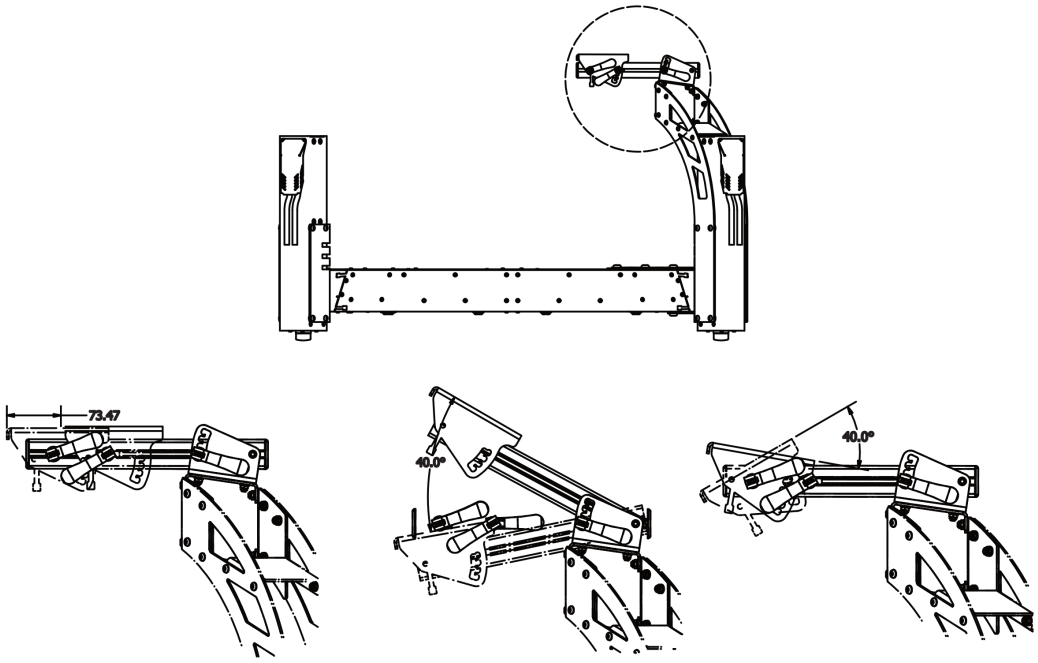
INFO

Order of connecting the cables is not important, keep the CFG switches setting according to appropriate layout.

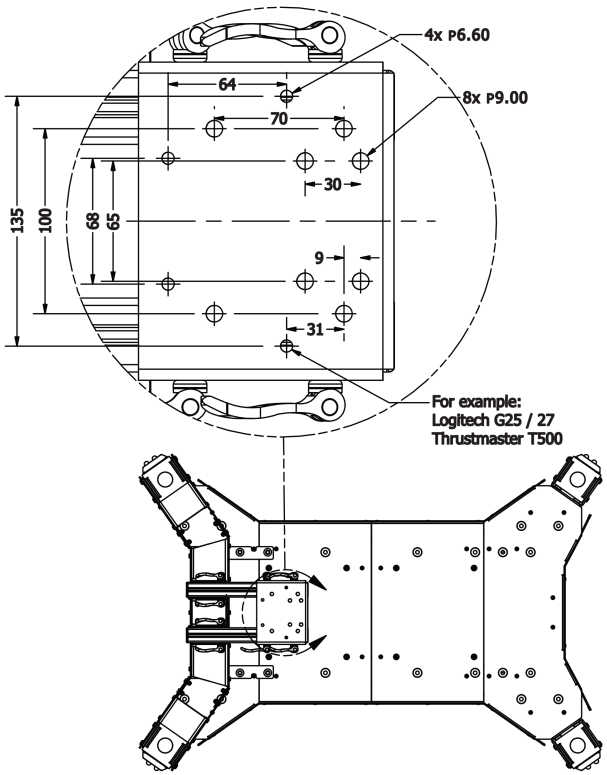
6. Put in actuators (8) and steering wheel bracket in the actuators mounting brackets and screw them in using 8x (13) bolts for each actuator.



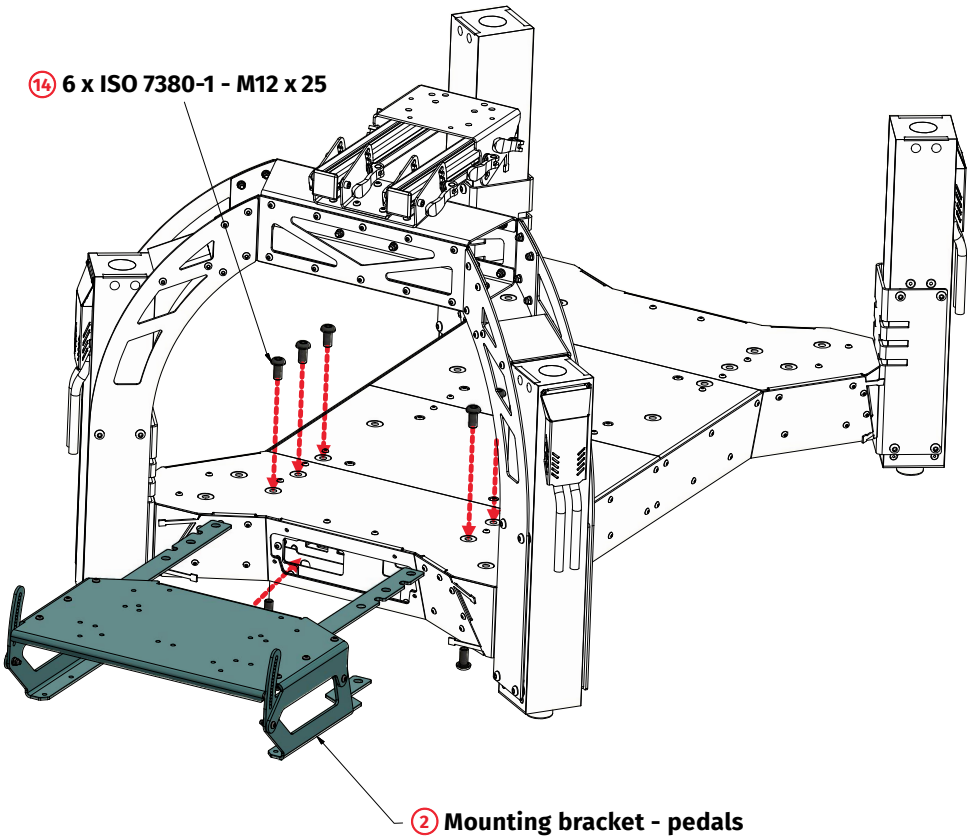
7. Adjust the steering wheel desk angle to fit your preferences by unscrewing the clamping lever and tightening it in the desired position.

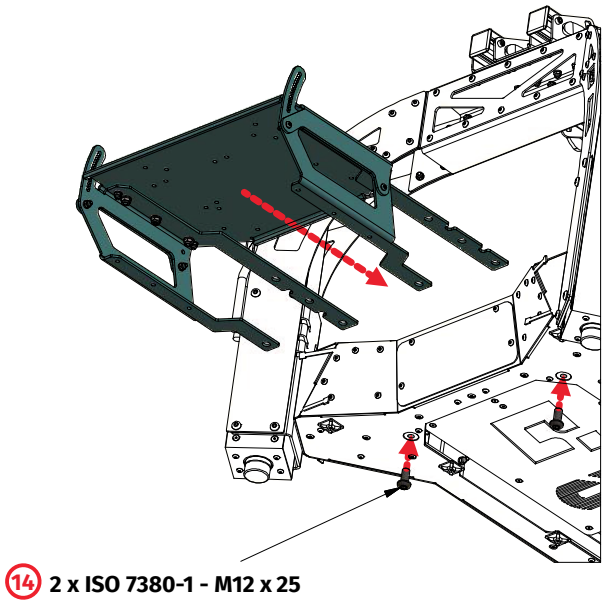


8. Mount the steering wheel using mounting points as shown below:

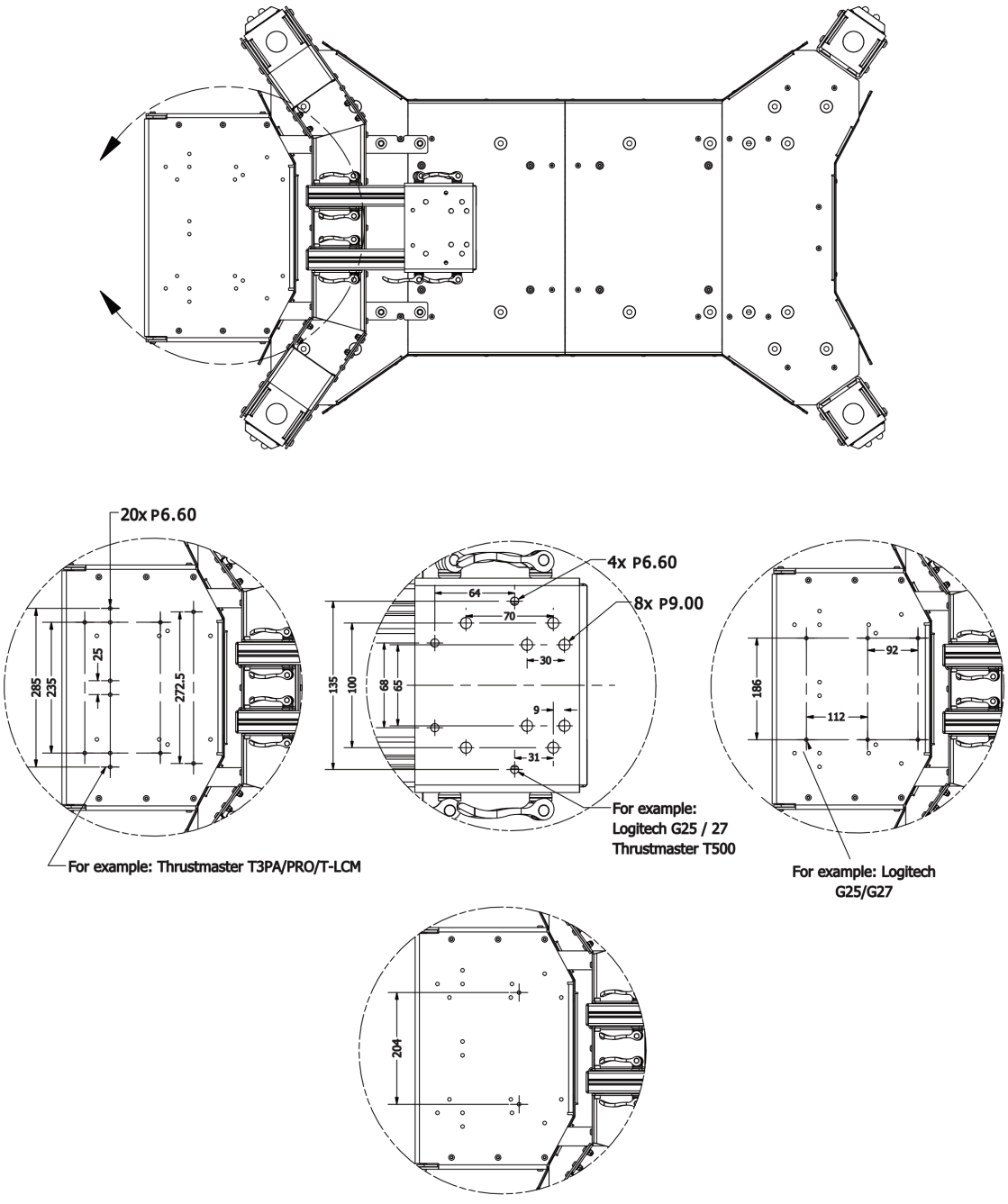


9. Put in (2) pedals mounting bracket and screw it in using 6x (14) bolts on the topside and 2x (14) bolts from the downside.

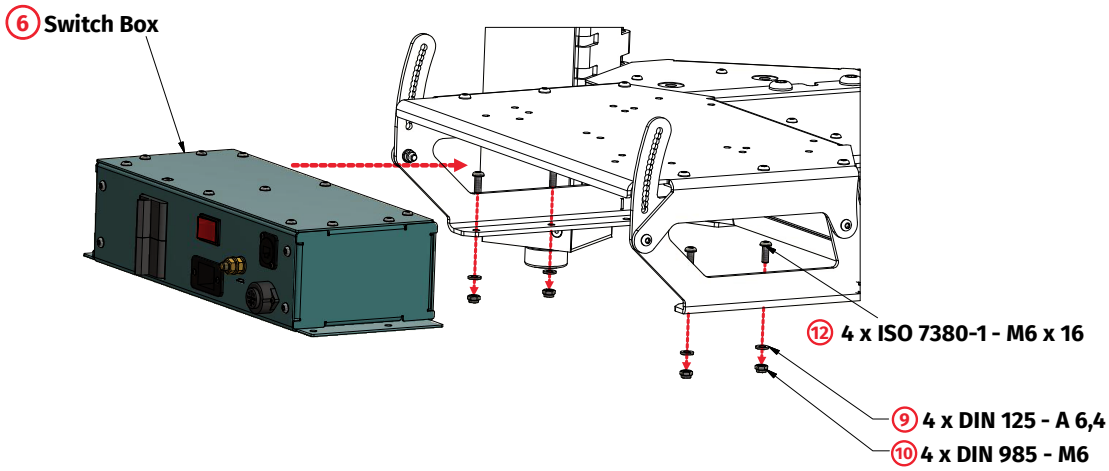




10. Mount the pedals using mounting points as shown below:

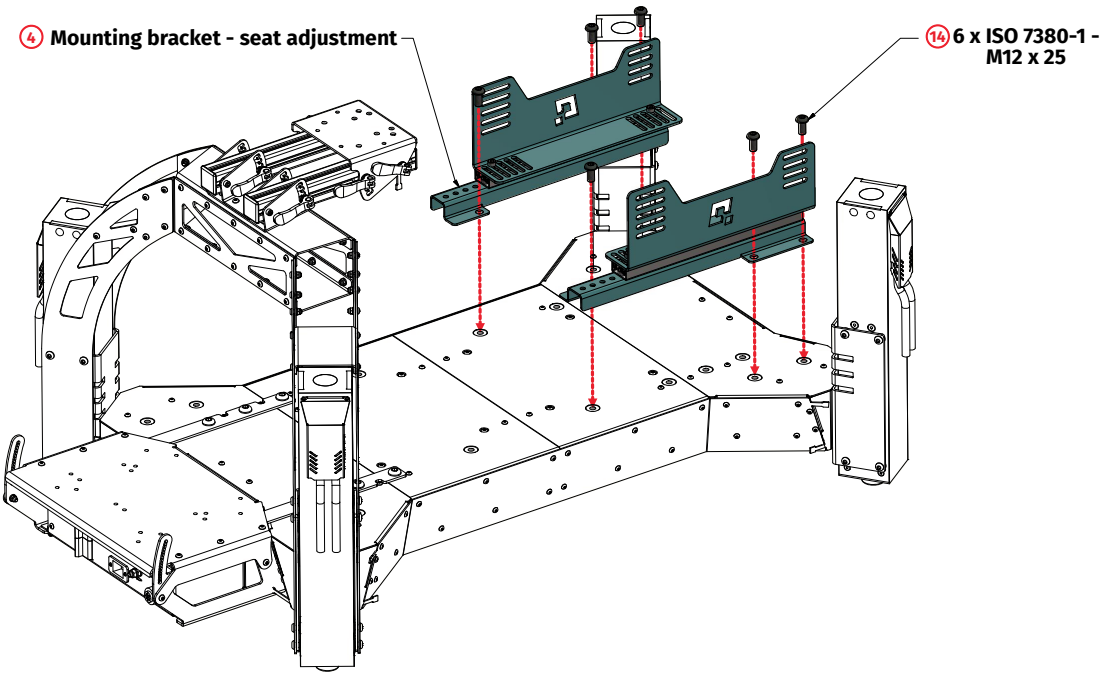


11. Put in the switch box under the pedals bracket and screw it in using 4x (12) bolts with 4x (9) washer and 4x (10) nut.

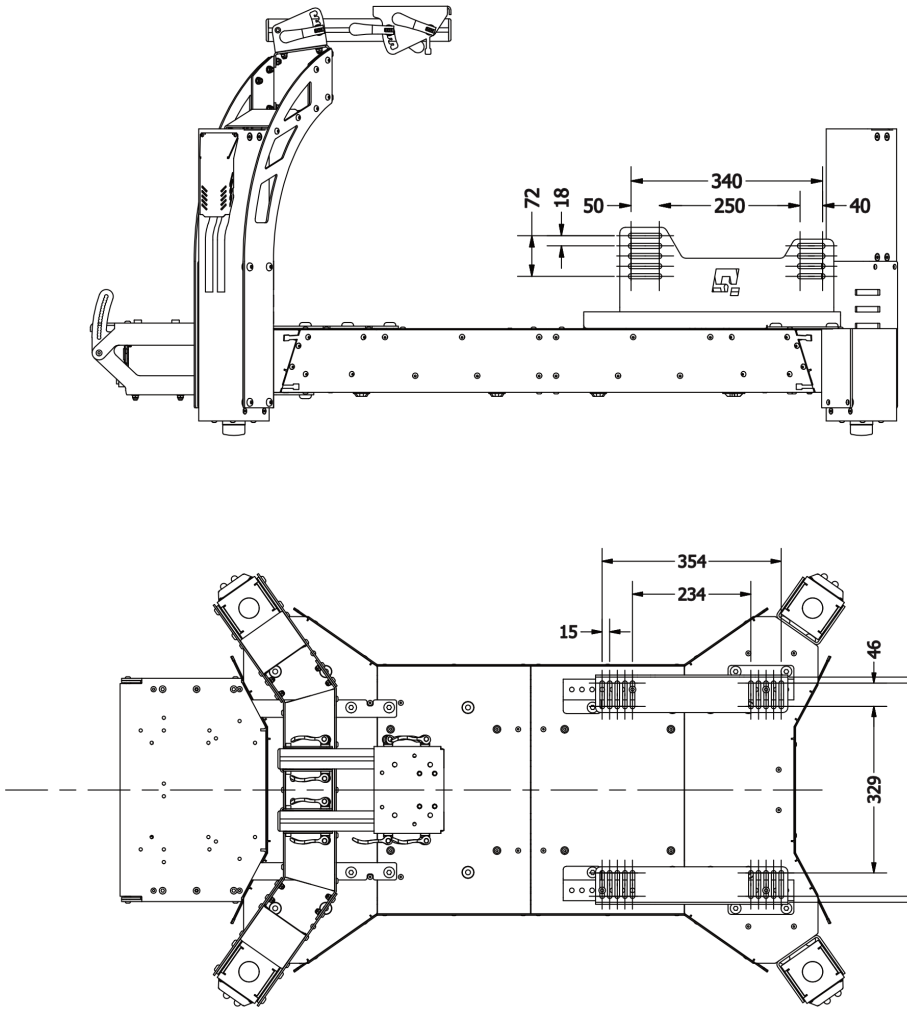


12. Attach the Motion Lock button to the rig within arm's reach of the user. Plug in the Power cord.

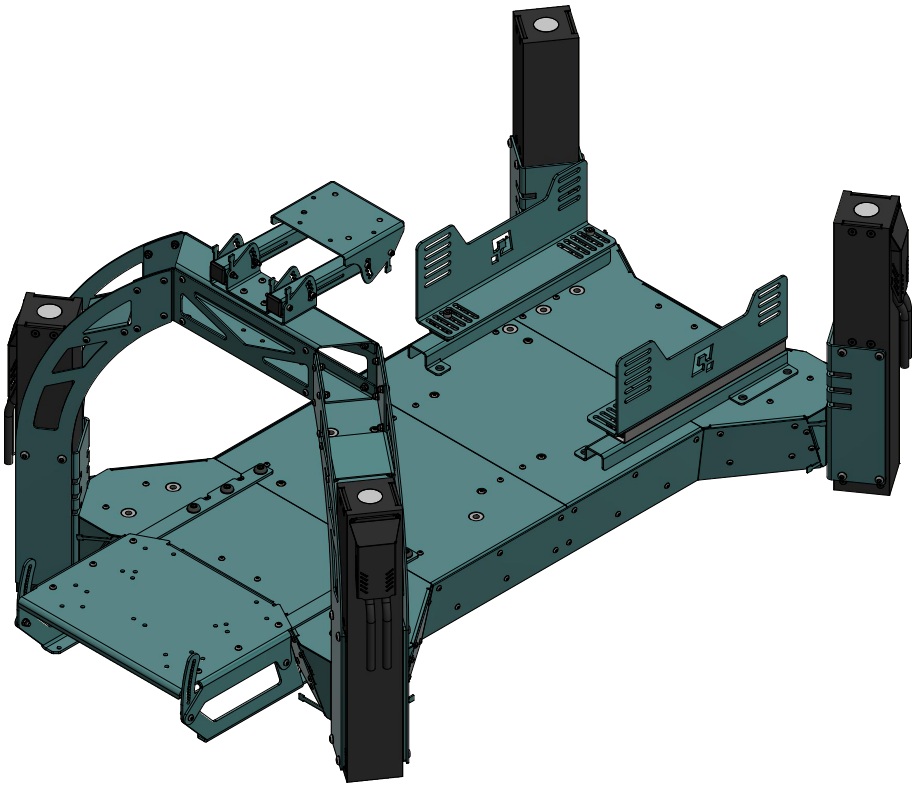
13. Screw in seat adjustment bracket using 6x (14) bolts.



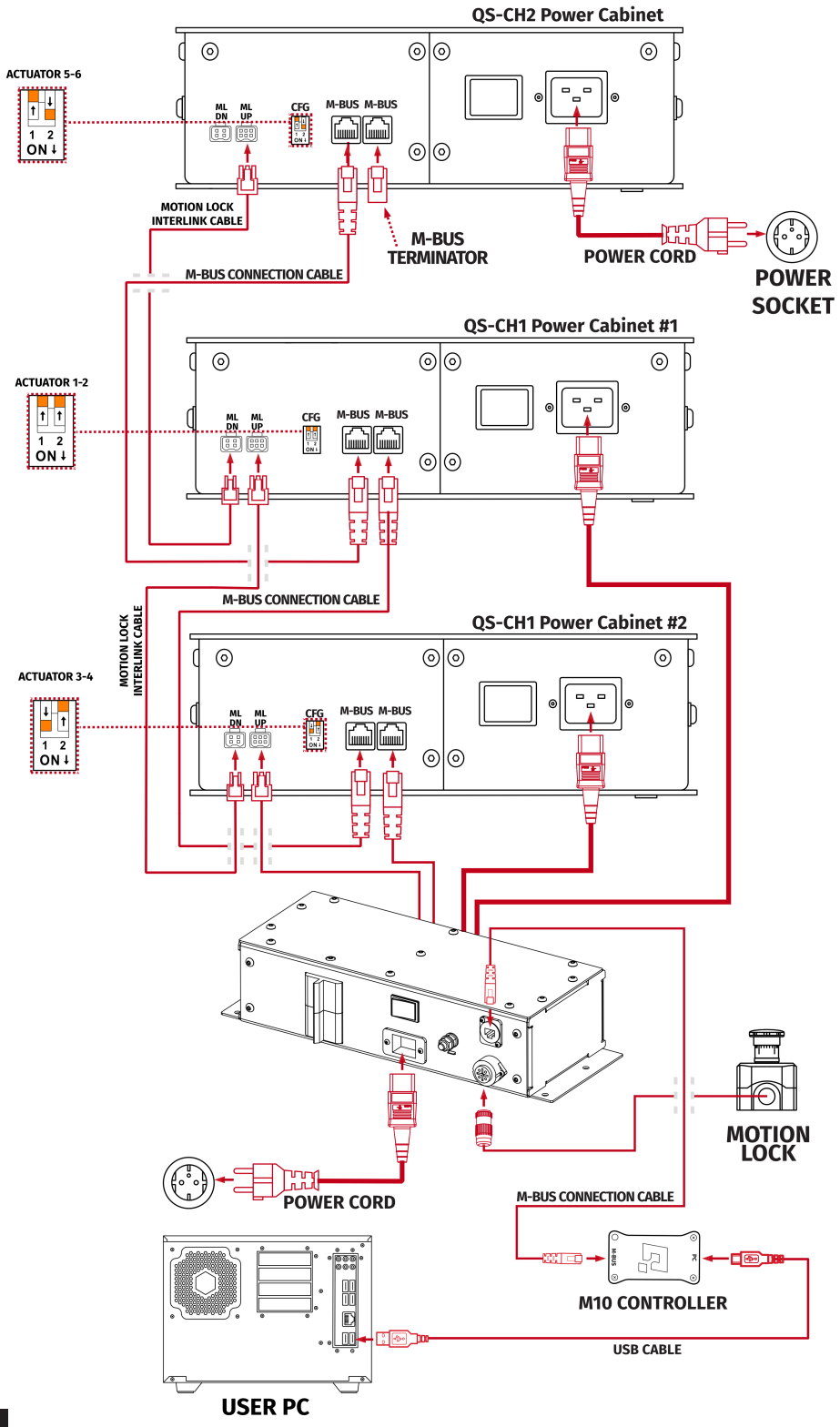
14. Adjust and mount seat to the seat bracket using mounting points as shown below:



15. Assembly of the QS-CH1 full set is completed.



3.3. CONNECTING WITH TRACTION LOSS SYSTEM (QS-CH2)

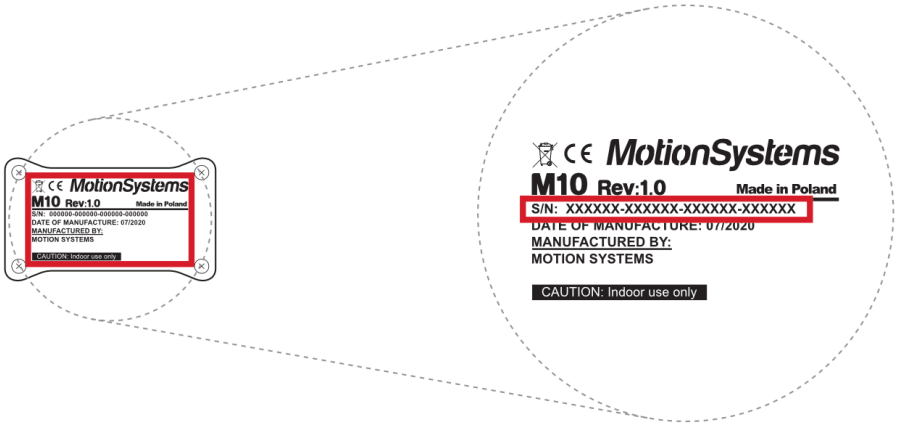


INFO

When connecting QS-CH1 with QS-CH2 the CFG switches in the QS-CH2 must be set to actuator 5-6 setting (as shown on the connections scheme).

3.4. SOFTWARE INSTALLATION

The **SERIAL NUMBER** can be found on the M10 identification label in the **XXXXXX-XXXXXX-XXXXX-XXXXXX** format. This serial number is also used for activation of FSMI (ForceSeatMI) and MT (Motion Theater) licenses - check information in section **3.4** on page **32**.



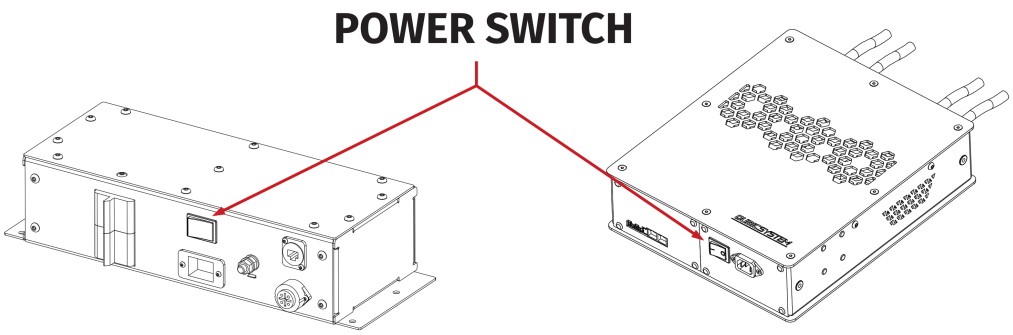
Software installation procedure:

1. Connect the devices according to the cables connection diagram.
2. Download QubicManager from **QubicSystem.com/Download**
3. Enter the serial number located on the identification label.

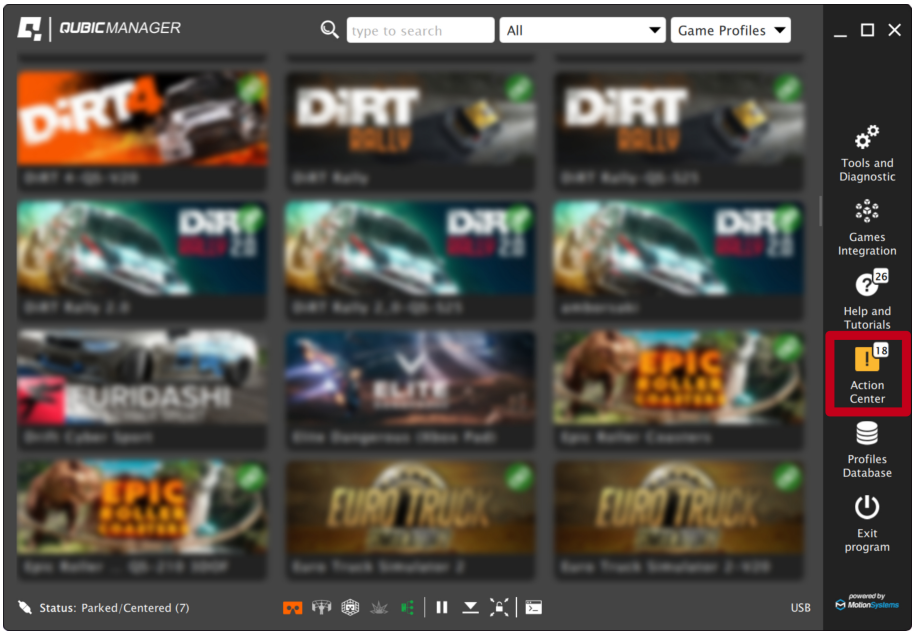
INFO

Alternatively, you can download a small application that will read the code directly from your device (if it is connected via USB): **Download link**

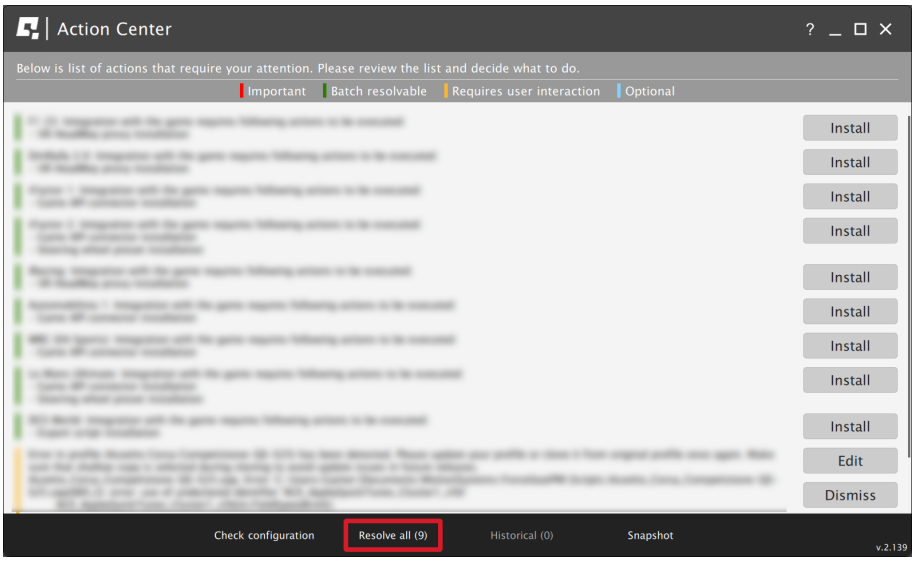
4. Proceed with the installation steps and launch the application.
5. Turn on the device by switching on the power switch button on the Power Cabinet (on all of them, if you have more than one) and on Switch Box.



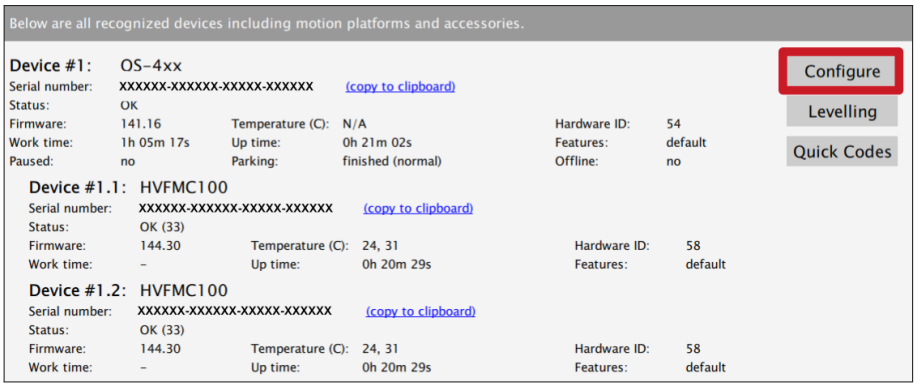
6. Check position of the Motion Lock Switch - unpress if needed (go to subsection **5** on page **34** for a reference illustration).
7. The QS-CH1 will perform a start-up calibration - **DO NOT** change the payload of the QS-CH1 until the procedure is over.
8. If QubicManager has recognized the QS-CH1 correctly, the status of the machine visible in the lower left corner will change to **Connected**.
9. Check **Action Center** on the right side panel for a list of actions that requires attention:



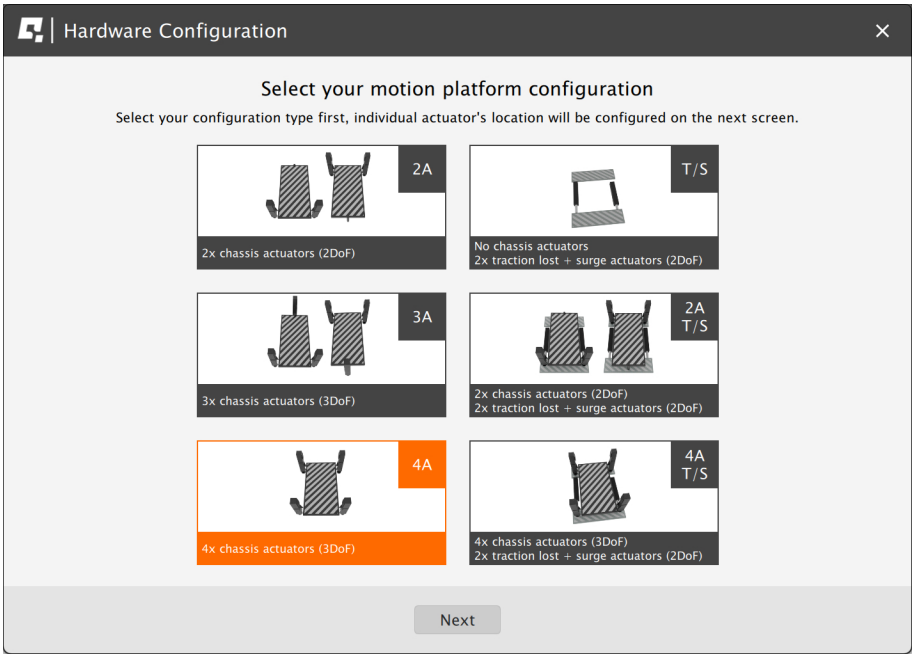
It is possible to solve them one by one or by pressing the **Resolve All** button. Firmware update may require additional confirmation in the dialogue box.



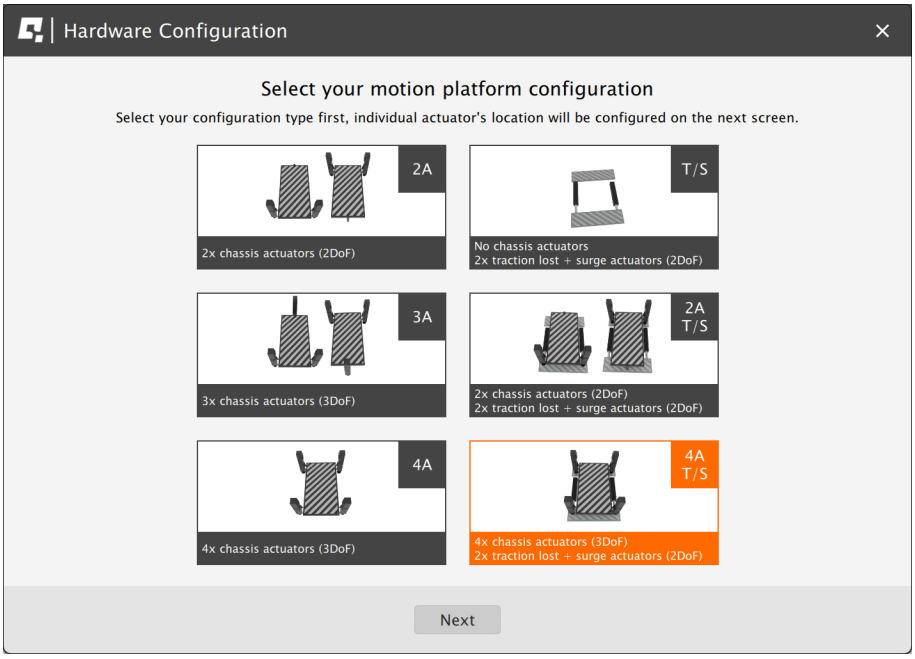
10. Go to **Tools and Diagnostics →Devices** and select **Configure**.



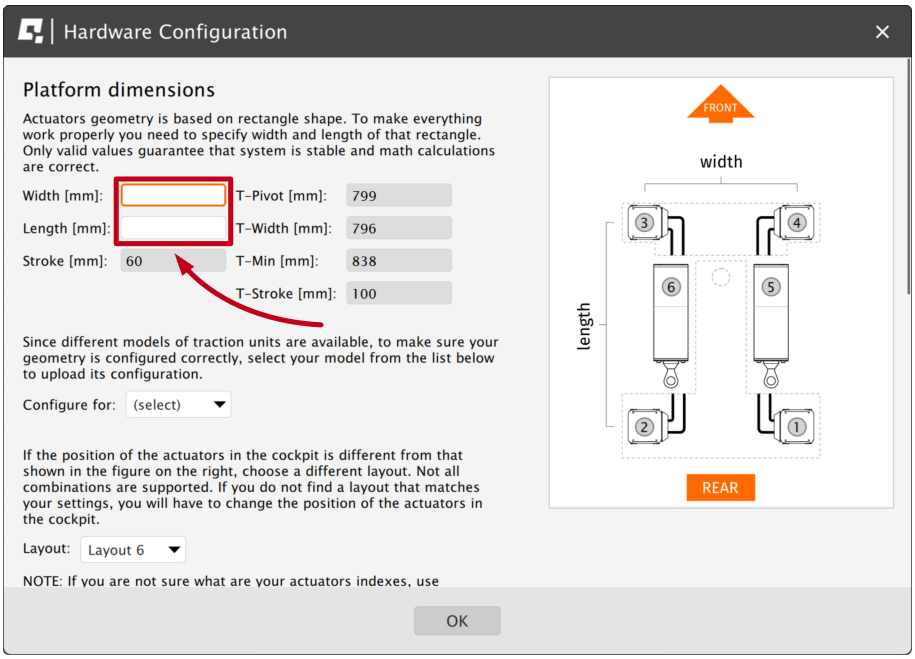
11. Choose the correct layout variant from the list (4 actuators setup).



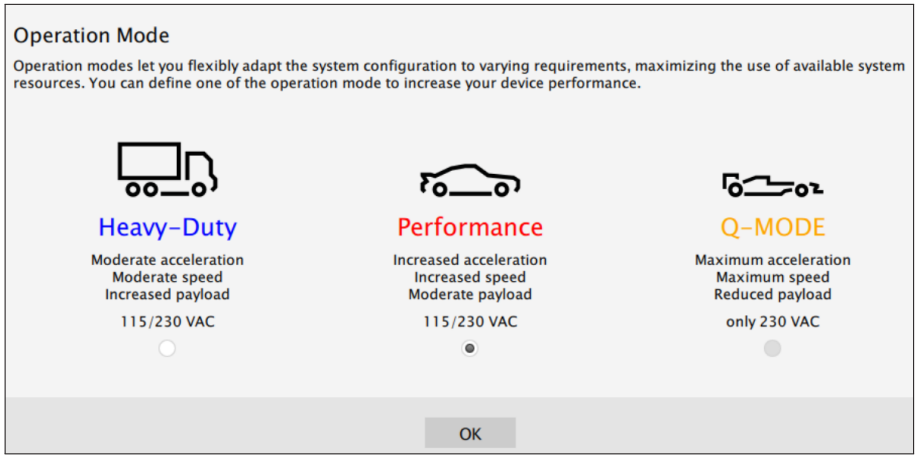
For QS-CH1 set with traction loss control (QS-CH2): Choose the correct layout variant from the list (4A+T setup).



12. Enter the dimensions value in the platform dimensions **Width** field (in millimeters) from section 2.1.3 on page 9.



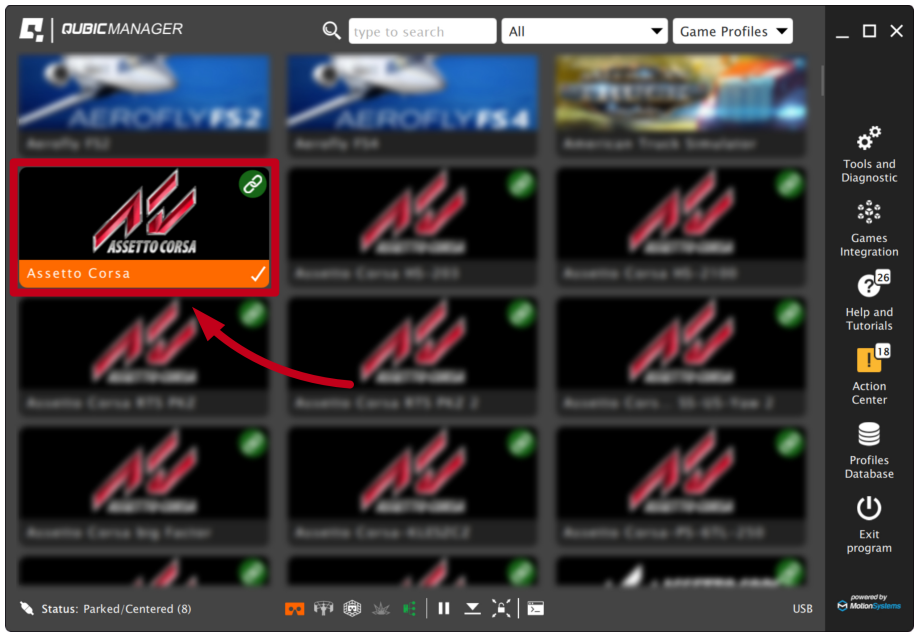
13. Scroll down and choose one of the operation modes:



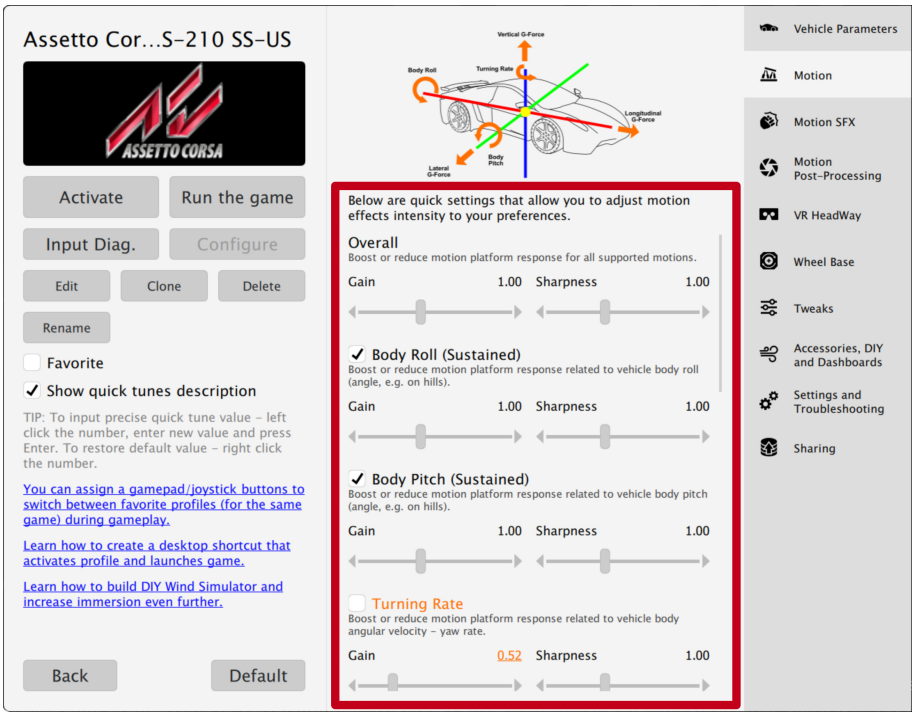
INFO

Q-MODE is unavailable for QS-CH1 in 120 VAC environment.

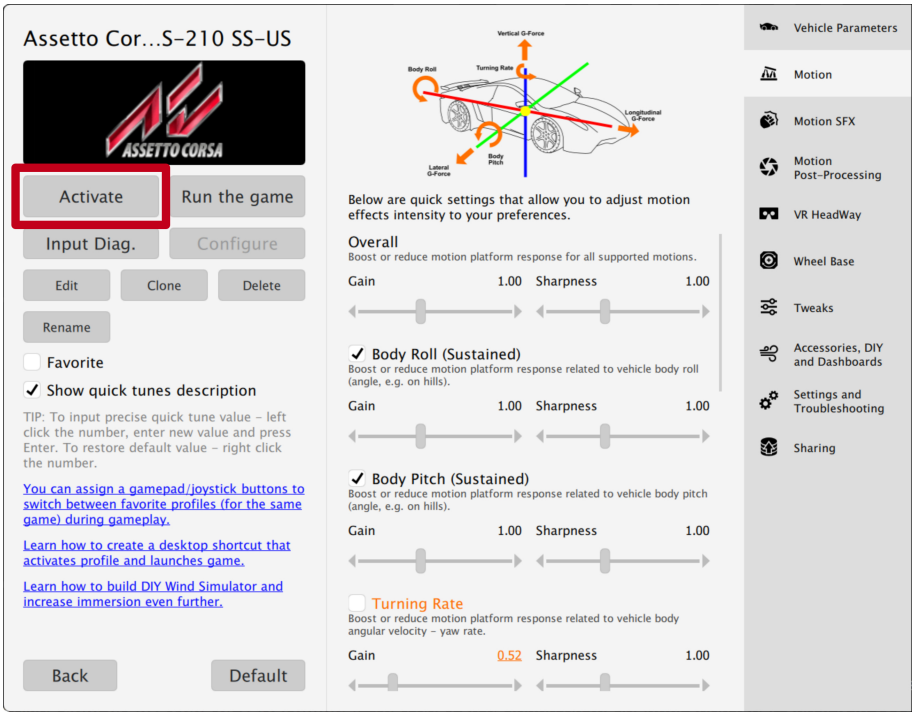
14. Close the configuration and return to the main application window. Choose the game and check profile details by clicking on the game tile.



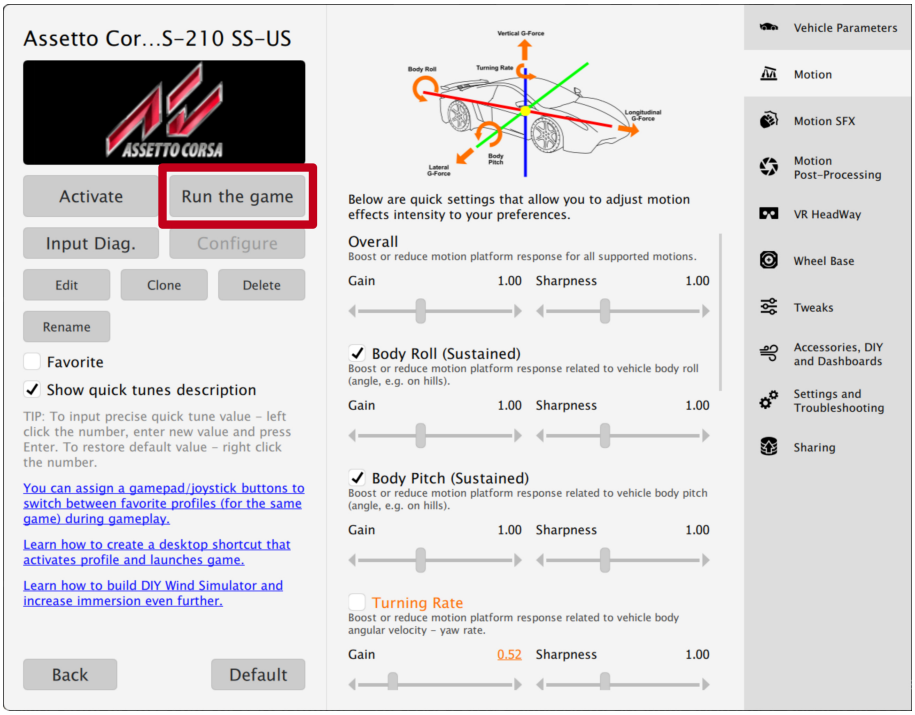
15. Adjust the motion effects intensity up to your preferences in the game profile window. Scroll down to see all of the settings.



16. Activate a profile by clicking the **Activate** button.



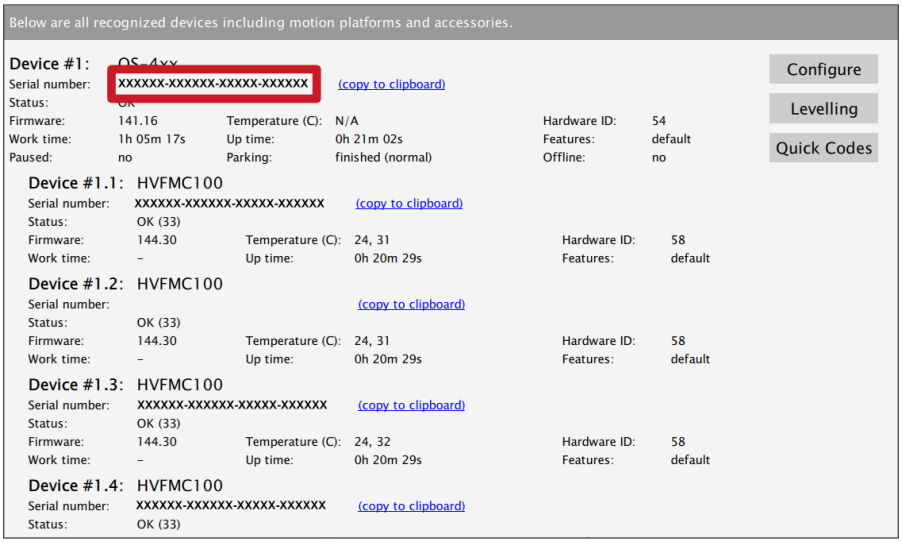
17. Launch the game by clicking the **Run the game** button.



18. You can also adjust the settings during the game simulation by pressing **ALT+TAB** and switching between the applications - once the profile is active changes will apply instantly.

INFO

If you need the serial number to activate other software licenses such as ForceSeatMI or ForceSeatDI, it can be found in the QubicManager. After connecting the QS-CH1 go to **Tools and Diagnostics →Devices**. Serial number is visible under the device name:



WARNING

The software is provided ”as is”, without warranty of any kind, express or implied, including but not limited to the warranties of merchantability, fitness for a particular purpose, and non-infringement. In no event will the authors or copyright holders be liable for any claim, damage, or other liability, whether in an action of contract, tort or otherwise, arising from, out of, or in connection with the software or the use or other dealings in the software.

The software sends anonymous usage data to the Motion Systems company. The data is used to improve the software and game profiles. The data is not used for advertising purposes.

4. MAINTENANCE AND CLEANING

To minimize the risk of abnormal heating that can result in system failure, keep the QS-CH1 uncovered, clean and dust-free. Cleaning the unit should be performed with a soft, dry cloth. **DO NOT** use solvents or cleaners that may corrode or damage materials of parts used in the QS-CH1 in any other way.

At least once a month, check if Motion Lock Switch is working correctly – turn on the QS-CH1 (when no one is using the system) and push the red button. If the machine turns off and does not react to any signal (turn on simulation or game to check it) then Motion Lock Switch works properly. If the machine reacts in any different way, stop using it and contact the technical support immediately.

To minimize the risk of QS-CH1 failure, check the condition of the linear actuator's rubber seals once a month, and lubricate them externally, if necessary, using a viscous lubricant spray with dispenser.

INFO

For additional information regarding maintenance and cleaning check QS-220-PL user manual.

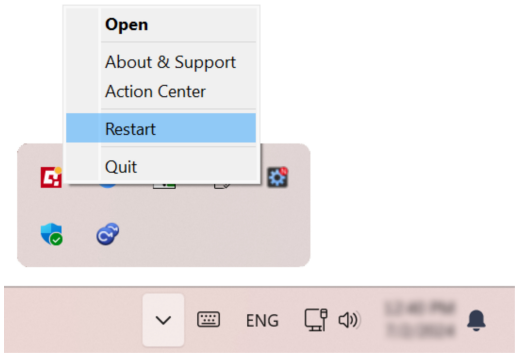
5. TROUBLESHOOTING

WARNING

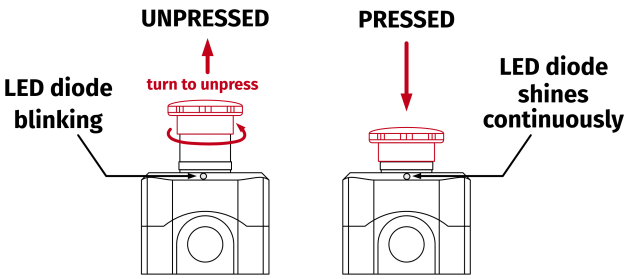
DO NOT attempt to do any repairs by yourself. It is dangerous and voids the warranty! Repairs should be consulted with technical support and then performed by a qualified technician.

Before contacting technical support, try this:

- Check Action Center in QubicManager.
- Check all cable connections in the device.
- Restart QubicManager application by right-click on the application icon in the system tray and selecting **Restart**:



- Check Motion Lock Switch position (it should be unpressed to activate the motion)



- Try different USB ports.
- If a problem occurred abruptly, it could be caused by a thermal protection. Turn off the QS-CH1 , disconnect it from power outlets and wait at least 15 minutes to let it cool down. Try turning it on again later.
- In case of any unclear electrical issues or strange behavior, contact technical support
- If the device suffers from abnormal work conditions, please immediately contact the distributor/reseller for technical support.

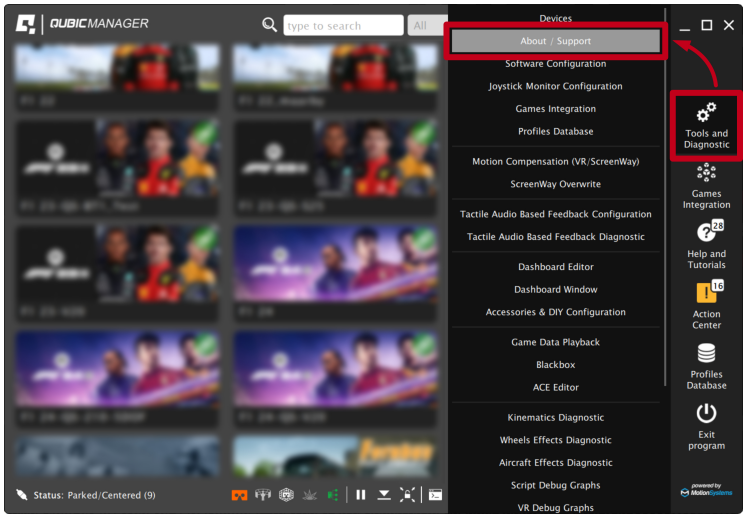
5.1. CREATING A SNAPSHOT

A snapshot is the easiest and fastest way to diagnose a problem. If you send in the zip file generated in the snapshot menu along with a description of the problem, technical support receives the necessary information about the product and its configuration. It can be then analyzed to provide the best solution.

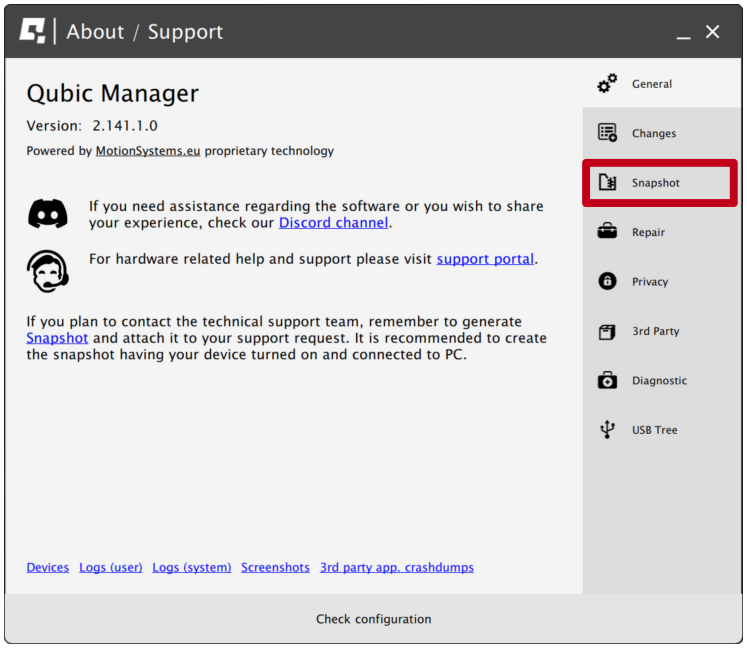
WARNING

The QS-CH1 and all interconnected Power Cabinets **MUST BE** be powered up when creating the snapshot.

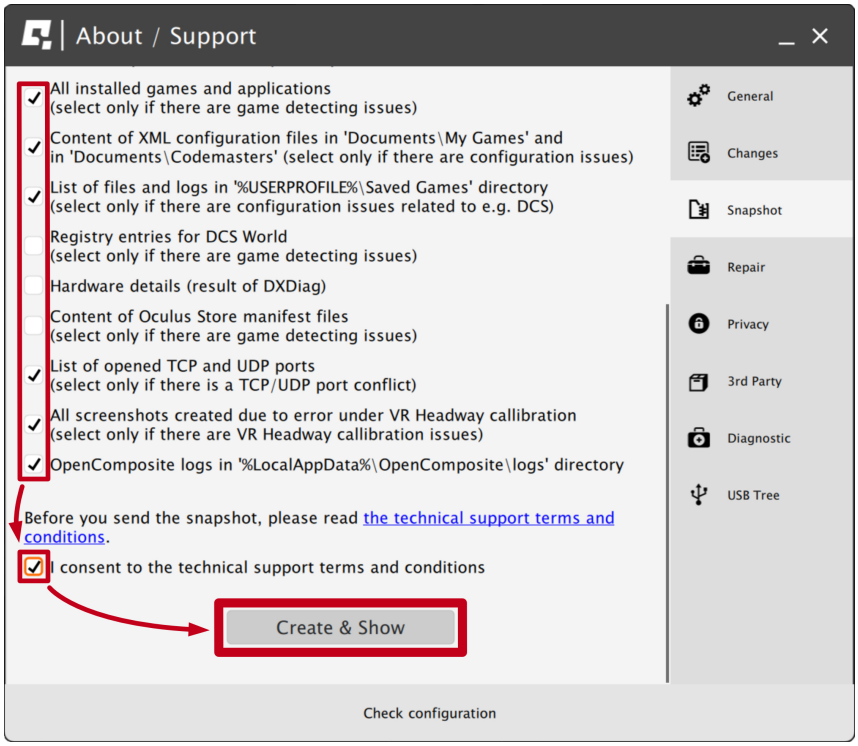
1. Open the main window of the QubicManager application.
2. Go to **Tools and Diagnostic** →**About / Support**.



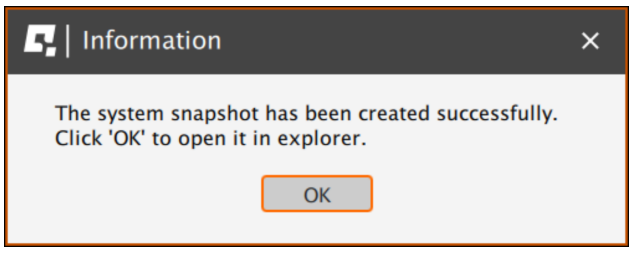
3. Open the **Snapshot** window:



4. Select data that will be included in the snapshot.
5. Scroll down, consent to the technical support terms and conditions and select **Create & Show**:



6. The snapshot has been created, click the **OK** button - the folder with the snapshot ZIP file will open.



7. Attach the snapshot ZIP file to your support request.

INFO

For additional information regarding troubleshooting check QS-220-PL user manual.

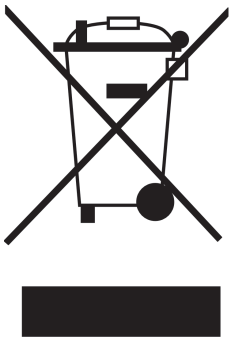
5.2. DISCORD CHANNEL

We strongly recommend joining our discord channel, where our growing community is sharing amazing tips and ideas of how to set up, use and tune the Qubic System products. You can also send questions for technical support or get answers directly from the community.

Join our discord channel by following the invitation link:

https://discord.com/invite/tuAtybvTRn

6. ENVIRONMENTAL IMPACT AND DISPOSAL



DO NOT dispose of this product with standard household waste, but dropped it off at a collection point for the disposal of Waste Electrical and Electronic Equipment for recycling.

QS-CH1 is an advanced device and if stored or disposed of incorrectly, it could harm the environment or/and other people. Please contact your local authorities for information about nearest collection point.

7. LIABILITY DISCLAIMER

If permitted under applicable law, Motion Systems and its subsidiaries disclaim all liability for any damages caused by one or more of the following:

- The product has been modified, opened, or altered.
- Failure to comply with a User Manual.
- Inappropriate or abusive use, negligence, an accident (an impact, for example).
- Normal wear.

INFO

If permitted under applicable law, Motion Systems and its subsidiaries disclaim all liability for any damages unrelated to the material or manufacturing defect with respect to the product (including, but not limited to, any damages caused directly or indirectly by any software, or by combining the QS-CH1 with any unsuitable element or not other elements not supplied or not approved by Motion Systems for this product).

8. WARRANTY

Motion Systems warrants to the consumer that this product shall be free from defects in materials and workmanship, for a warranty period which corresponds to the time limit to bring an action for concerning this product.

For commercial customers, there is a one (1) year limited warranty, starting on the original date of purchase.

Within the warranty period, the product will be repaired or replaced free of charge, excluding shipping charges.

This warranty shall not apply:

- If the product has been modified, opened, altered, or has suffered damage as a result of inappropriate or abusive use, negligence, an accident, normal wear, or any other cause unrelated to a material or manufacturing defect (including, but not limited to, combining the QS-CH1 with any unsuitable element, including in particular power supplies, chargers, or any other elements not supplied or approved by Motion Systems for this product).
- In the event of failure to comply with the instructions provided by technical support.
- To software, said software being subject to a specific warranty.
- To accessories (cables, cases, for example).
- If the product was sold at public auction or if the product has suffered damage as a result of force majeure: flood, fire, earthquake, storm.

This warranty is non-transferable. No new warranty period commences if the product is repaired or replaced. Your statutory rights towards the seller are not affected or restricted by this warranty. Motion Systems, and their partners are not liable for any indirect, incidental, or punitive damages from use of this product. In case of malfunction during the warranty period immediately contact technical support.

9. COPYRIGHT

INFO

Trademark Notice - All brand names, icons, and trademarks that appeared in this manual are the sole property of their respective holders.

10. MANUFACTURER INFORMATION

Motion Systems

Miedziana 7 Street

55-003 Nadolice Wielkie

Poland

INFO

In support queries please contact your reseller.

QUBICSYSTEM

QubicSystem.com