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KING OF THE ENTRY
LEVEL IMMERSION

USER MANUAL

QS BT1

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Document revision history

Version	Date	Comment
1.0	2024-05-31	First release
1.1	2024-06-31	Added sections with mounting adapters for QS-S25, QS-V20, QS-CH1, NLR MP V3, added new components to component list.
1.3	2024-09-02	Added chapter Advanced application, Post-assembly check list, updated belt connection diagrams.

1. INTRODUCTION

QS-BT1 is a multi-purpose, dual-channel, direct-drive seat belt tensioner that increases the immersion of a racing simulator. It is powered by the same technology as QS-220 and provides force feedback similar to that offered by direct-drive wheels. QS-BT1 generates vibrations to simulate a running engine, tensions up with downshifts, upshifts, in corners, and finally - gives a strong pull when crashing. Importantly, it can also work as a standalone, fully independent device.

2. SAFETY PRECAUTIONS

WARNING

The device is intended solely for individuals over the age of 16. In case of use by individuals with limited physical, sensory, or mental capabilities, strict supervision is required. Read safety instructions before using the device.

WARNING

The device is not allowed to be used by a pregnant woman.

WARNING

DO NOT use the device around pets.

WARNING

DO NOT place hands, neck, or head under or wrap them around the belts.

WARNING

Always ensure that cockpit attachment points can withstand forces generated by the device (approved construction or tested for expected load). The maximum force generated by the QS-BT1 is 200 N on each belt.

WARNING

Always **TURN OFF THE POWER SUPPLY** before plugging and unplugging the power source. Dangerous voltage levels can remain in electrical circuits of the device for up to a few minutes after powering off.

3. ESSENTIAL INFORMATION

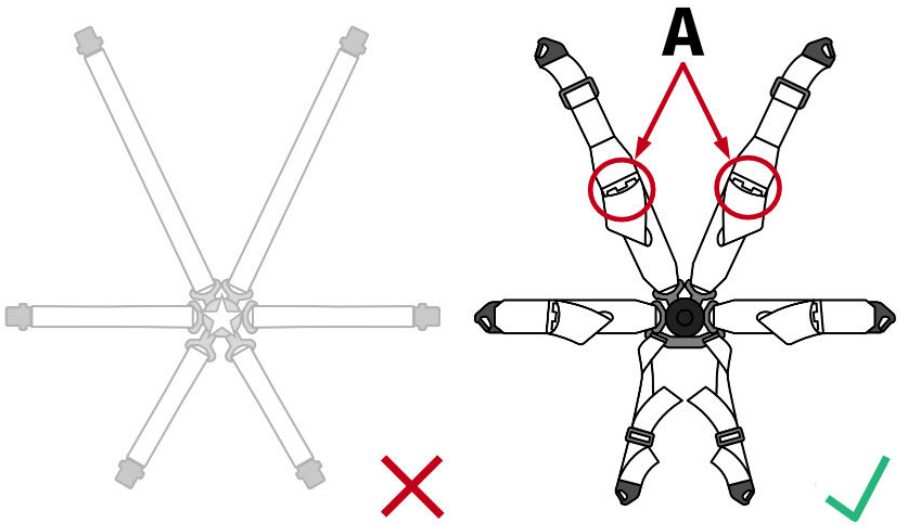
INFO

Read all the 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.

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

- Use the QS-BT1 only for its intended purpose, according to instructions.
- Unplug the QS-BT1 from the power supply if it is not used for an extended period of time or when there is a need to perform hardware installation, maintenance, service or repair.
- Turn off the QS-BT1 when it is not in use.
- The QS-BT1 was designed for indoor use only - **DO NOT** store or use the product outdoors.
- Keep the QS-BT1 away from heat sources, high humidity, water, and other liquids. **DO NOT** store in places where water vapor condensation may occur due to low temperatures.
- **DO NOT** disassemble the product. Any tampering with or altering the product will void the warranty, pose a serious risk of electric shock, and may irreparably damage the product.

- If the device starts emitting unusual noises, smoke, or indicating that the device is not working properly, **STOP** using the QS-BT1 immediately and contact technical support.
- **DO NOT** cover the ventilation holes in the device.
- Keep the power cord plug and the socket dry, clean and dust-free.
- Protect the power cord from being damaged by being stepped on, rubbed against, or pinched.
- **DO NOT** use the QS-BT1 if the ambient temperature is below 5°C (41°F) or above 40°C (104°F).
- **DO NOT** use the QS-BT1 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. If you must replace a damaged power cord, use only certified products with the same rating as the one being replaced.
- Before each use of the device ensure that it is securely mounted to the motion rig.
- Before each use of the device ensure that belt buckles are securely mounted to the belts.
- Use only certified components (seat belts, fasteners) when installing QS-BT1 to your motion rig.
- Use 4, 5 or 6-point racing harness, with adjusters (look at point A in the drawing below), preferably with FIA certification.



4. TECHNICAL DETAILS

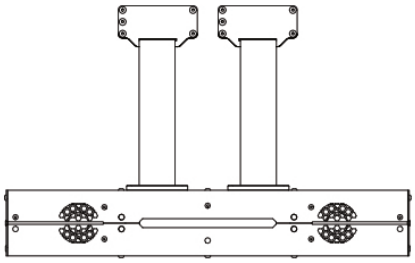
4.1. INTENDED USE

The device is intended to work as a **INDOOR** seat belt tensioner for vehicle and flight simulations. It is not classified as a safety device and can be used **ONLY** for entertainment and training purposes.

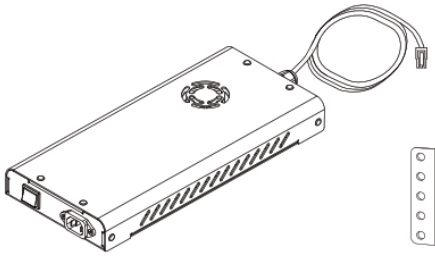
WARNING

It is forbidden to use the device in applications other than intended.

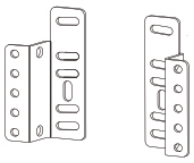
4.2. LIST OF COMPONENTS



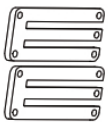
Main unit QS-BT1 (x 1)



Power supply (x 1)



Universal mounting adapters and fasteners (x 2)

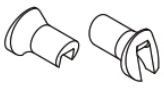


Belt buckles and fasteners (x 2)

Power supply cable (x 1)

Motion Lock interlink cable (x 1)

USB cable (x 1)



Low friction inserts and velcro strips (x 2)

Motion lock jumper (x 1)

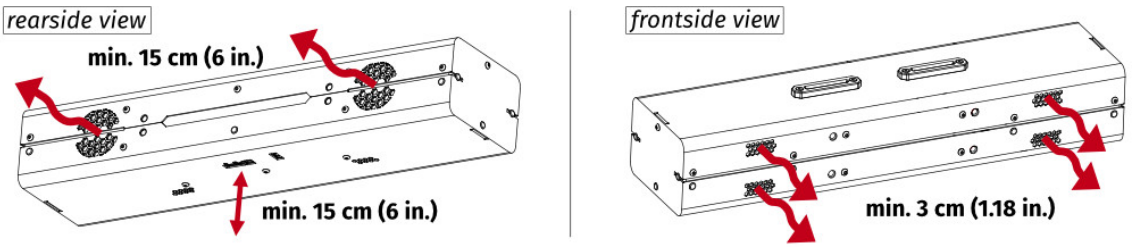
INFO

The QS-BT1 package does not include seat belts; they need to be obtained separately.

4.3. OPERATING AND STORAGE CONDITIONS

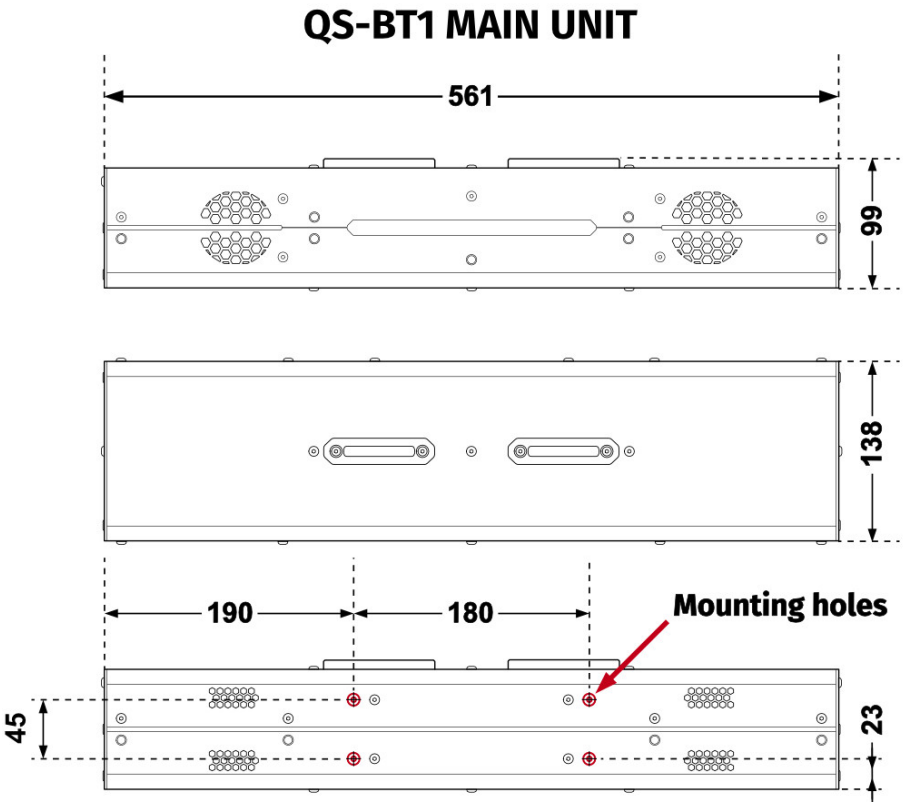
QS-BT1 should be operated and stored within conditions as specified below:

- Only indoor use and storage
- Temperature: 5°C - 40°C (41°F - 104°F)
- Humidity: 0% - 70% (without water vapor condensation)
- Maximum altitude: 0 - 2000 m (6561 ft)
- Ensure a correct distance from QS-BT1's cooling vents on the backside (min. 15 cm / 6 in.) and on the frontside (min. 3 cm / 1.18 in.), and for cable plugs underneath (min. 15 cm / 6 in.).

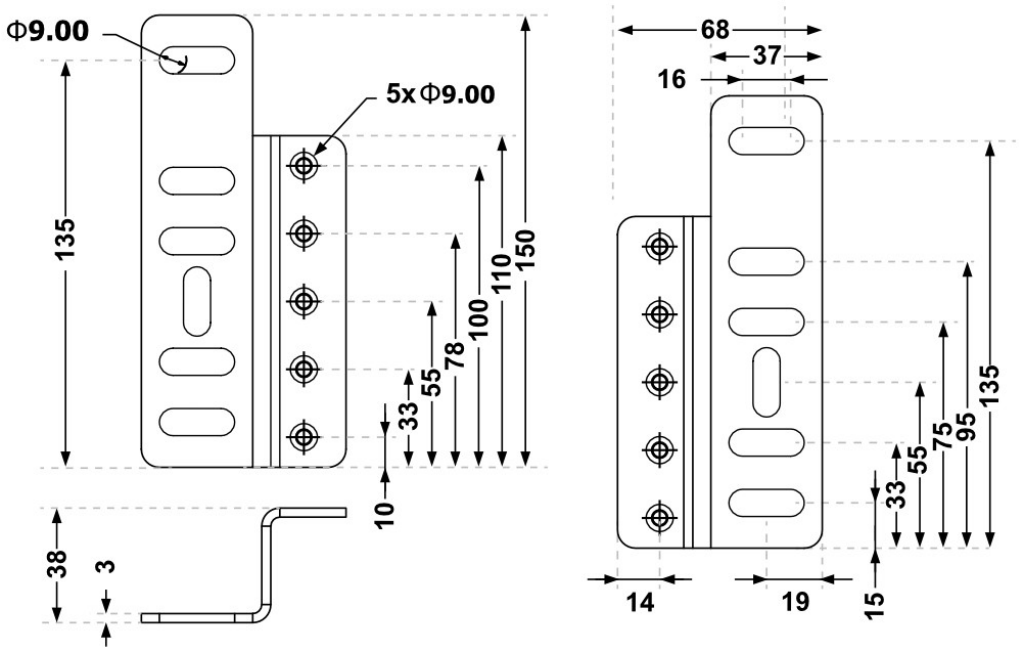


4.4. DIMENSIONS AND WEIGHT

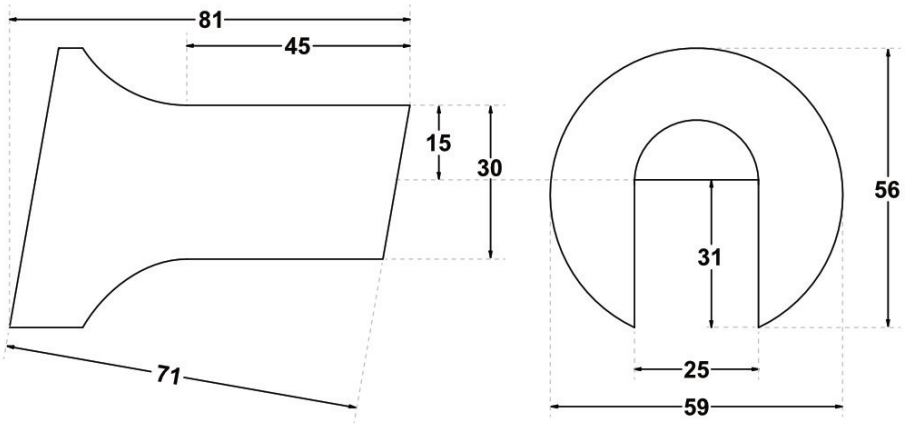
QS-BT1 MAIN UNIT DIMENSIONS



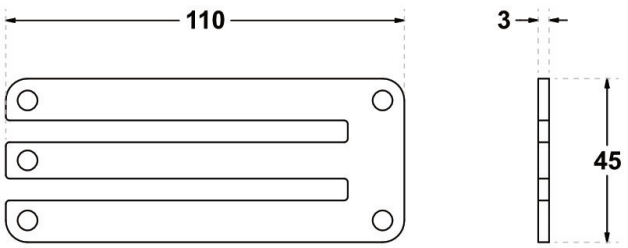
UNIVERSAL MOUNTING ADAPTER DIMENSIONS



SEAT INSERTS DIMENSIONS



BELT BUCKLE DIMENSIONS



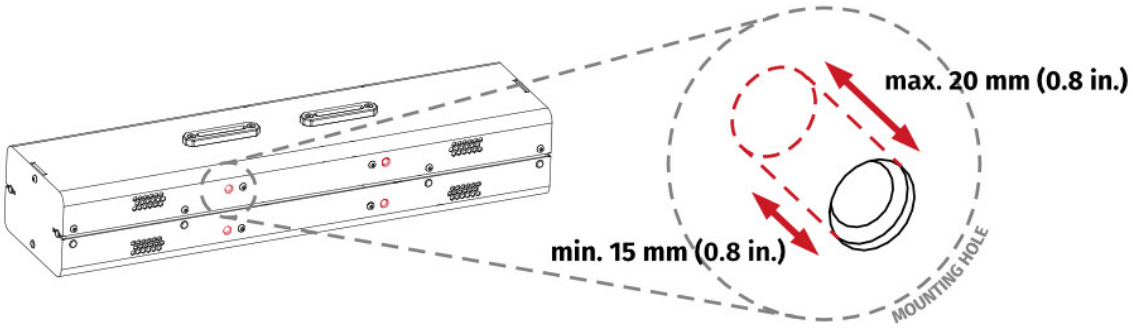
* ALL DIMENSIONS IN MILLIMETERS

QS-BT1'S WEIGHT

The QS-BT1 unit's weight is: **13 kg (28.66 lbs)** [without cockpit mounting adapters].

MOUNTING HOLE DIMENSIONS

The QS-BT1's mounting bolts insertion depth **CANNOT** exceed **20 mm** and **CANNOT** be less than **15 mm**.



INCLUDED CABLES LENGHTS

- Power supply's integrated cable - 1.9 m (75 in)
- Power cord for power supply - 1.8 m (71 in)
- USB cable - 3 m (118 in)
- Motion lock interlink cable - 2 m (79 in)

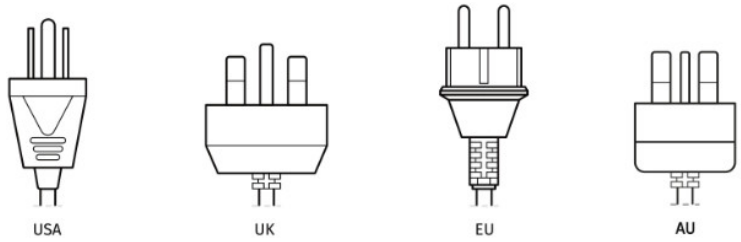
4.5. POWER SUPPLY SPECIFICATION

QS-BT1 requires 120/230 VAC 50-60 Hz single phase power source with neutral and protective earth connection.

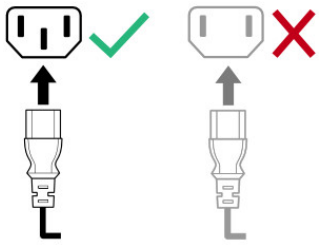
WARNING

The power supply for QS-BT1 includes an electric cord with an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching socket that is correctly installed and grounded in accordance with appropriate local codes and ordinances.

Applicable plugs for different regions:



Check if the power cord plug has a grounding connection (with 3 pins). To reduce the risk of electric shock, **DO NOT** use the plug without a grounding connection (without a center pin).



WARNING

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

4.6. POWER REQUIREMENTS AND CONSUMPTION

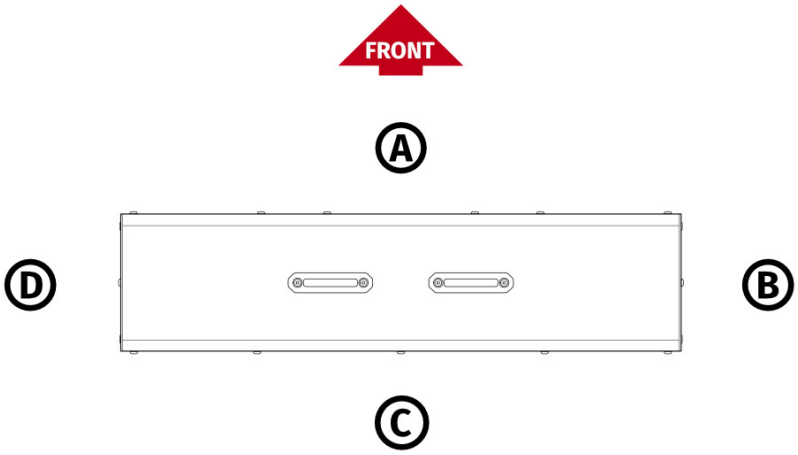
	Apparent Power*		Current Specification**	Power consumption	
Voltage [V]	Average Power [VA]	Peak Power [VA]	Peak Current [A]	Average Power (stress test) [W]	Average Power (typical game) [W]
230	30	120	1.2	70	10
120	30	120	2.6	80	20

* For converter / UPS specification

** For circuit breaker specification

4.7. NOISE EMISSION

The QS-BT1 was checked for noise level emission. Noise level during normal work conditions is not over 50 dB. Measurements method complies with ISO 11202 standard. Four measuring positions as shown on the picture are placed 160 cm from the floor level and 100 cm from the edge of the device.



Measurement point	A	B	C	D
Measurement conditions: ■ Seat belt tensioned ■ 100% power	49,4 dB	49 dB	49 dB	49,1 dB
■ Seat belt tensioned ■ 100% power ■ Power supply fan off	44,6 dB	47 dB	48 dB	42 dB

5. SETUP AND INSTALLATION

5.1. ATTACHING TO THE ALUMINUM BASED COCKPIT PROFILE

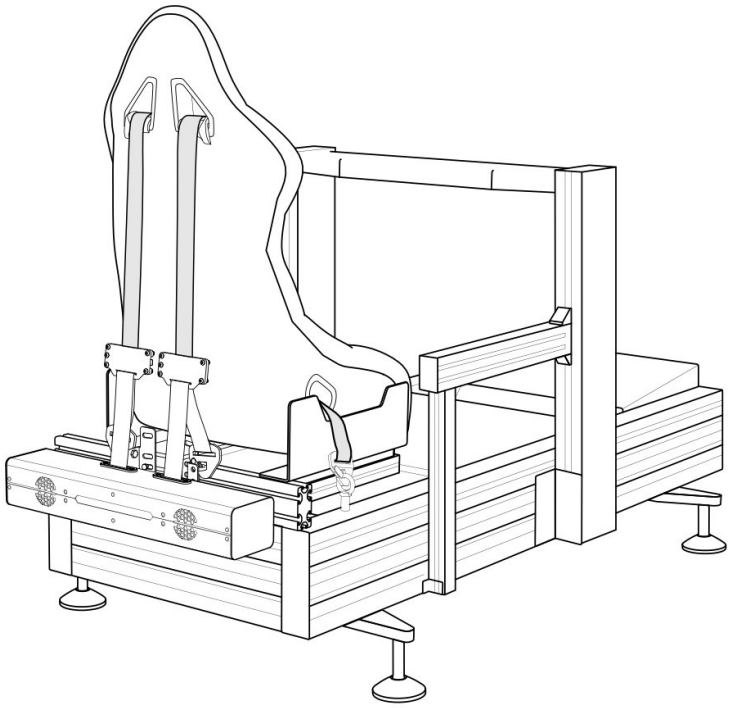
If you have a custom cockpit based on aluminum profiles, QS-BT1 must be mounted using universal mounting adapters.

Assembly parts included with QS-BT1:

No.	Part description	Qty.
1	Universal mounting adapter	2
2	T-slot nut M8	4
3	Bolt M8 x 16 (DIN 933)	8
4	Washer A8,4 (DIN 125)	8

INFO

Illustration of a finished assembly with a sample aluminum based cockpit profile.



WARNING

Ensure that your cockpit construction and attachment points can withstand forces generated by the device. The maximum generated force is 200 N on each belt.

WARNING

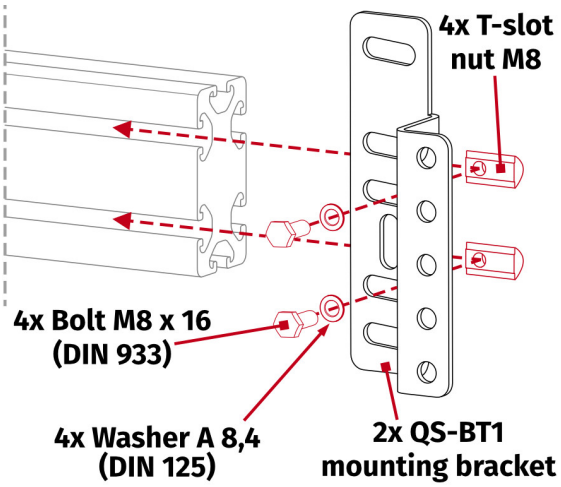
In case of motion platform implemented cockpits - the QS-BT1 always **MUST BE** mounted to a position that is moving along with the seat.

Seat belts must always be tightened in order for QS-BT1 to work correctly.

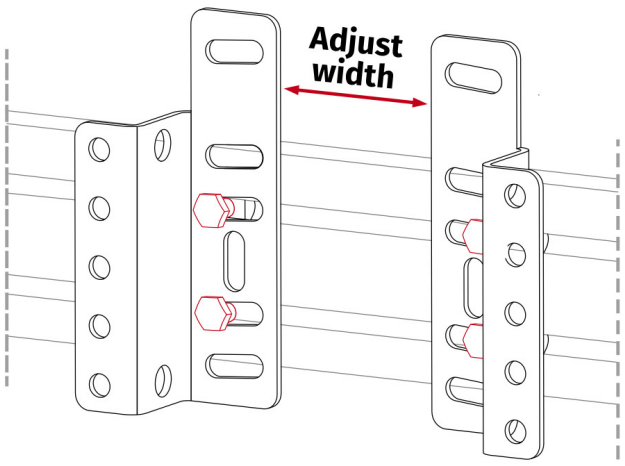
INFO

Before installing the QS-BT1 to a cockpit - write down Serial Number which is located on the underside of the device. Refer to section 7.2 on page 43 for details. Serial Number is also available on the side of packaging box.

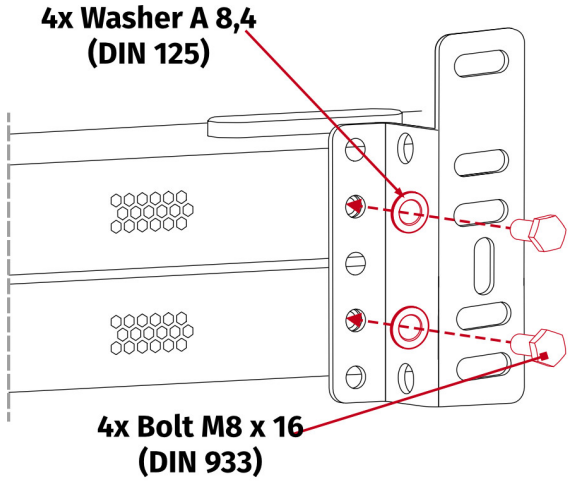
1. Slide the T-Slot nuts (they can also be inserted directly into the T-slot nut channel at any spot) into the cockpit rear profile bar and then screw in the universal adapter using bolts and washers by hand. Do not torque down the bolts yet.



2. Adjust the space between mounting brackets to match the belt tensioner mounting holes.



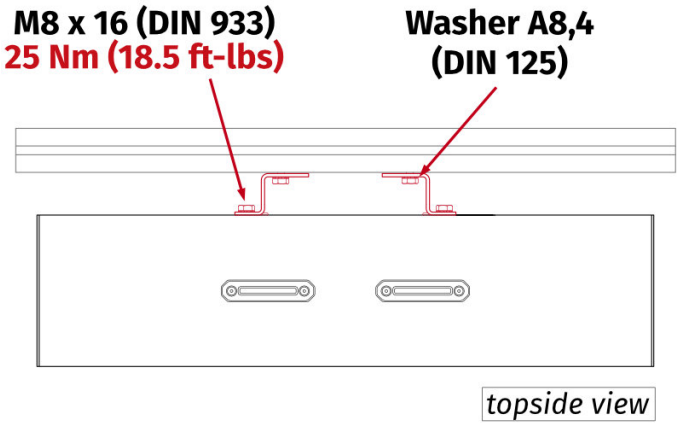
3. Attach the QS-BT1 to the mounting brackets.



4. Align and adjust the position of the belt tensioner. It should rest flat against the bracket. Tighten all eight bolts down (**25 Nm [18.5 ft-lbs]** of torque applies for bolts with an 8.8 metric grade).

WARNING

- Ensure that cockpit construction and attachment points can withstand forces generated by the device. The maximum generated force is 200 N on each belt.
- A device running with incorrectly tightened bolts is dangerous to a user and will cause irreversible damage to the hardware and mounting points.



5.2. ATTACHING TO QS-CH1

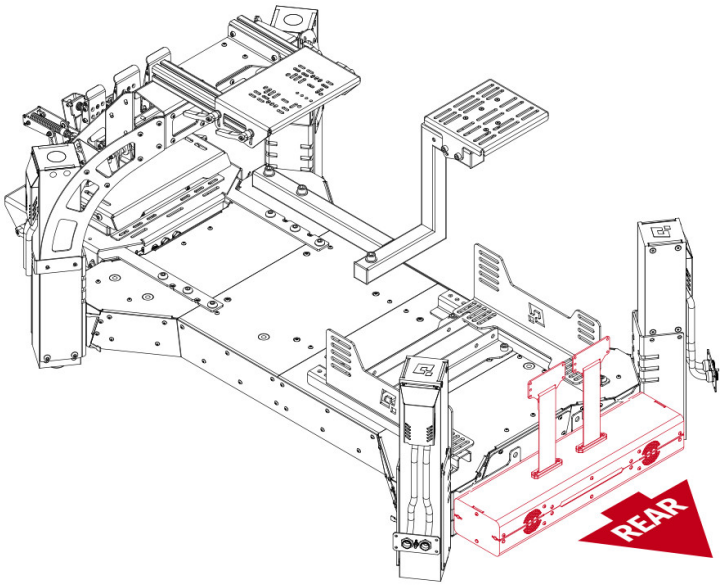
The QS-BT1 should be attached to QS-CH1 using two mounting brackets (not included - can be purchased separately from our retailers).

Assembly parts included with QS-BT1:

No.	Part description	Qty.
1	Mounting bracket	2
2	Bolt M8 x 16 (DIN 933)	4
3	Washer A8,4 (DIN 125)	4

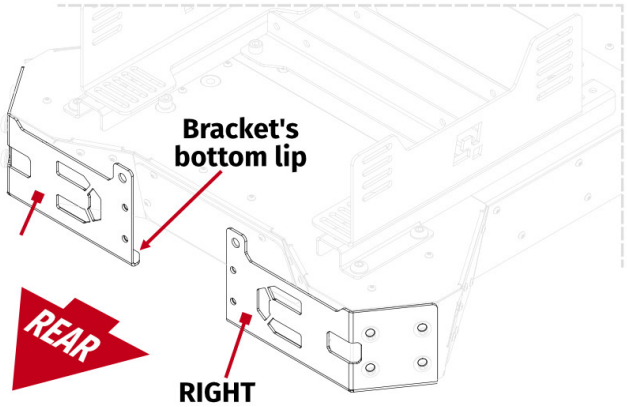
INFO

Illustration of a finished assembly.



INFO

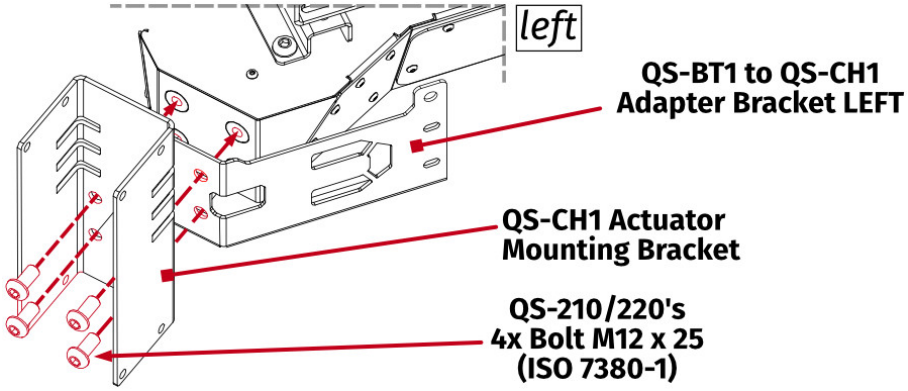
Mounting brackets are not interchangeable. Metal lip must be at the bottom.



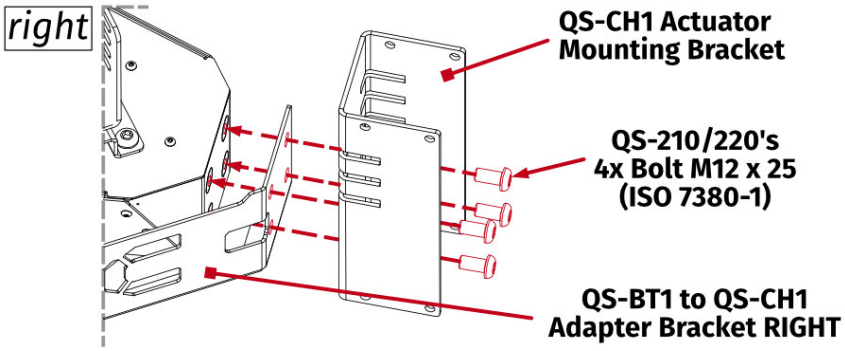
INFO

Before installing the QS-BT1 to a cockpit - write down Serial Number which is located on the underside of the device. Refer to section 7.2 on page 43 for details. Serial Number is also available on the side of packaging box.

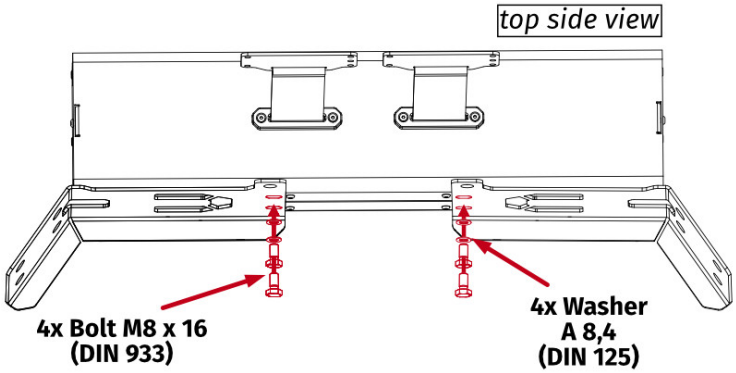
1. Unscrew QS-210/220's back actuators. Attach the QS-BT1 mounting bracket between the device's base and the actuator mounting bracket. Tighten all QS-210/220's four bolts to **25 Nm (18.5 ft-lbs)** of torque.



2. Repeat the operation on the other side.



3. Attach the QS-BT1 to the brackets. Rest the QS-BT1 flat against the brackets and screw in the bolts. Tighten all four bolts down to **25 Nm (18.5 ft-lbs)**.



4. Attach the actuators back to their brackets. For details, refer to QS-CH1 user manual.

5.3. ATTACHING TO QS-V20

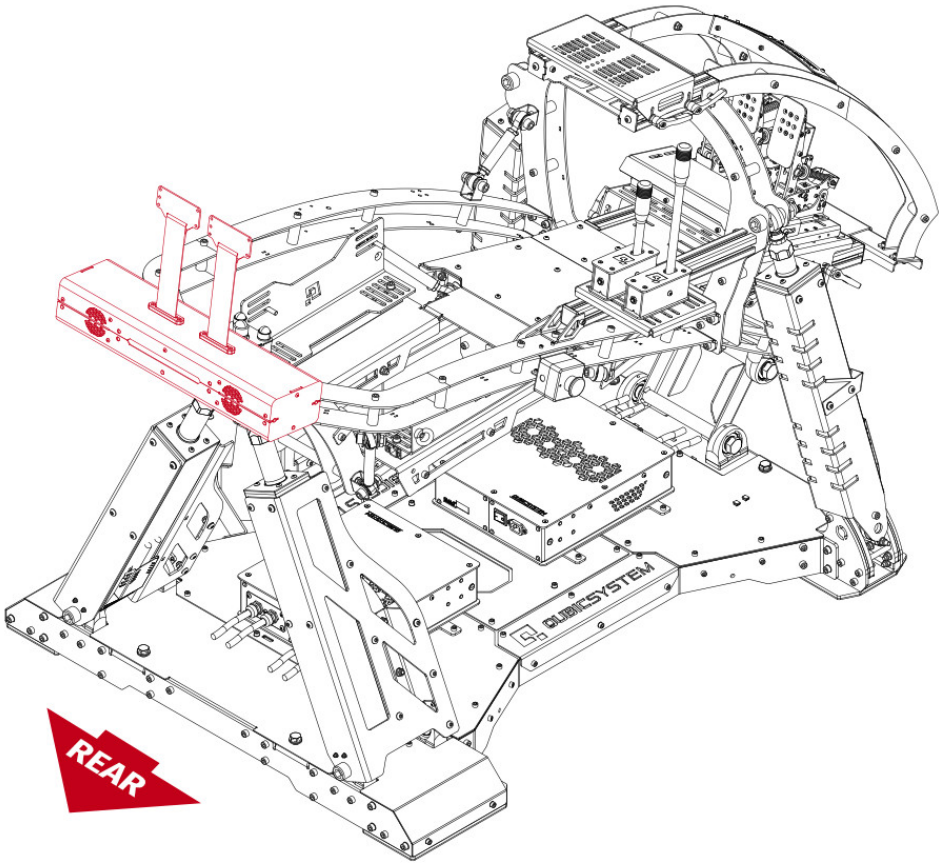
The QS-BT1 should be attached to QS-V20 using a mounting bracket (not included - can be purchased separately from our retailers).

Assembly parts included with QS-BT1:

No.	Part description	Qty.
1	Mounting bracket	1
2	Bolt M8 x 25 (DIN 912)	4
3	Nut M8 (DIN 985)	4
5	Bolt M8 x 16 (DIN 933)	4
4	Washer A 8,4 (DIN 125)	6

INFO

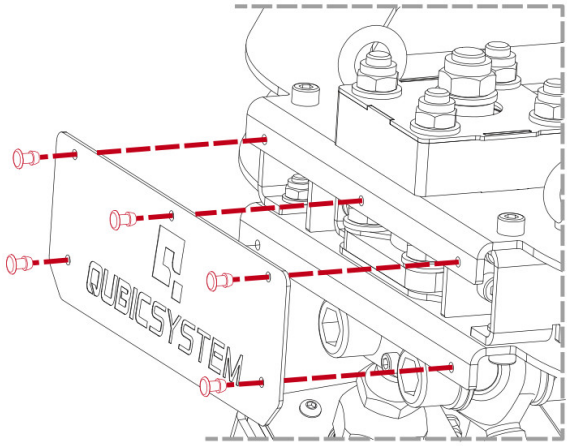
Illustration of a finished assembly.



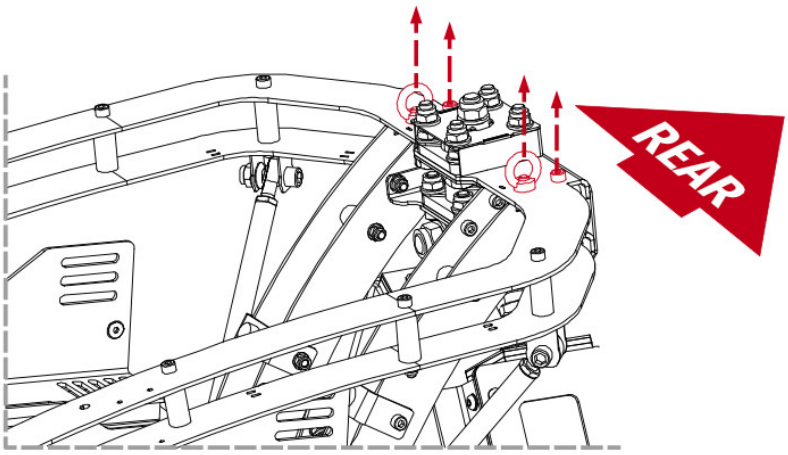
INFO

Before installing the QS-BT1 to a cockpit - write down Serial Number which is located on the underside of the device. Refer to section 7.2 on page 43 for details. Serial Number is also available on the side of packaging box.

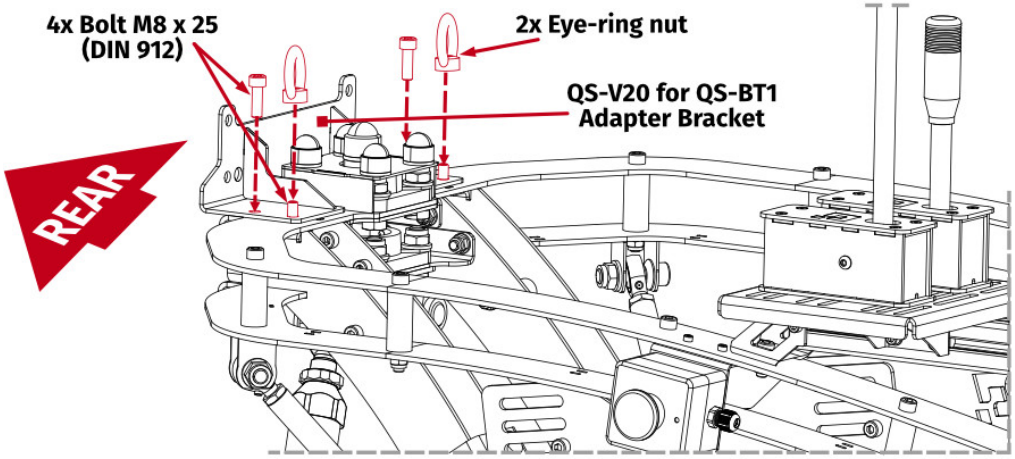
1. **OPTIONAL for easier access** - unscrew the rear logo plate (in case of rivets using assembly - drill them out).



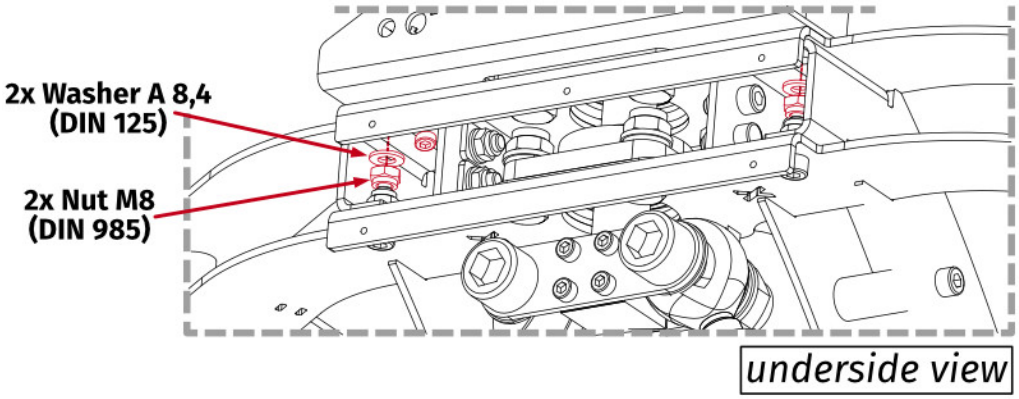
2. Unscrew the bolts and eye-ring nuts from the QS-V20's frame.



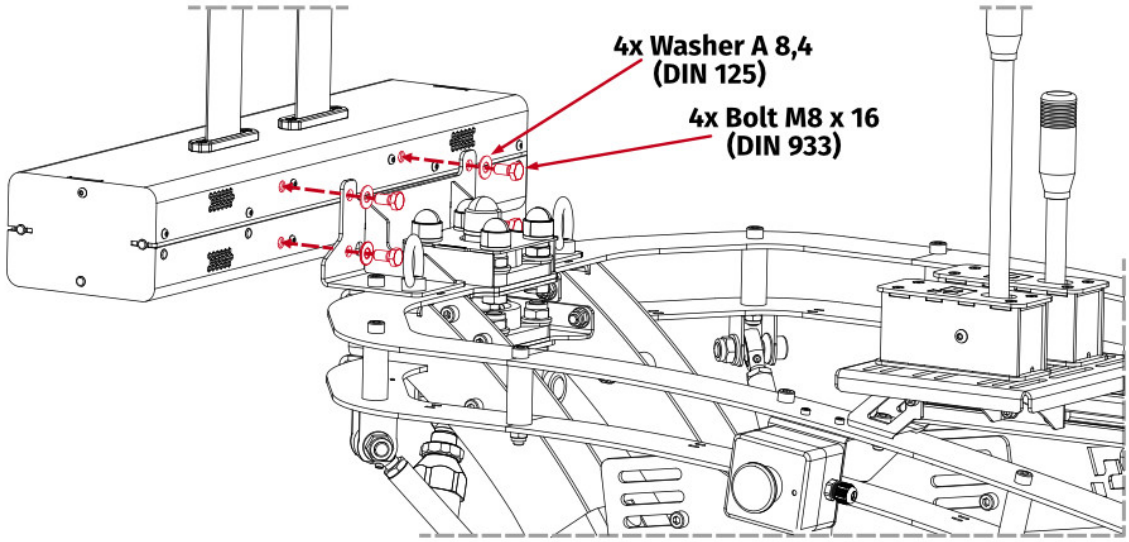
3. Rest the bracket flat on the QS-V20 frame and put through back mounting bolts from the top. Screw on eye-ring nuts on the front bolts put through from the bottom.



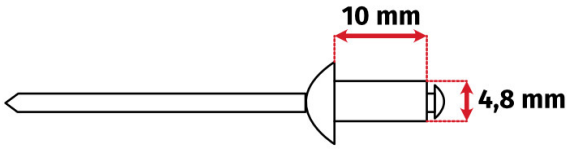
4. Screw nuts on the back bolts from underneath. Torque down all four bolts to **25 Nm (18.5 ft-lbs)** of torque while holding two nuts from underneath with a flat wrench and eye-rings from the top.



5. Rest the QS-BT1 flat against the bracket and screw in the bolts by hand. Then torque down all four bolts to **25 Nm (18.5 ft-lbs)** of torque.



6. **OPTIONAL** - mount the logo plate back on - use a rivet gun with 4.8 mm x 10 mm blind rivets.



5.4. ATTACHING TO QS-S25

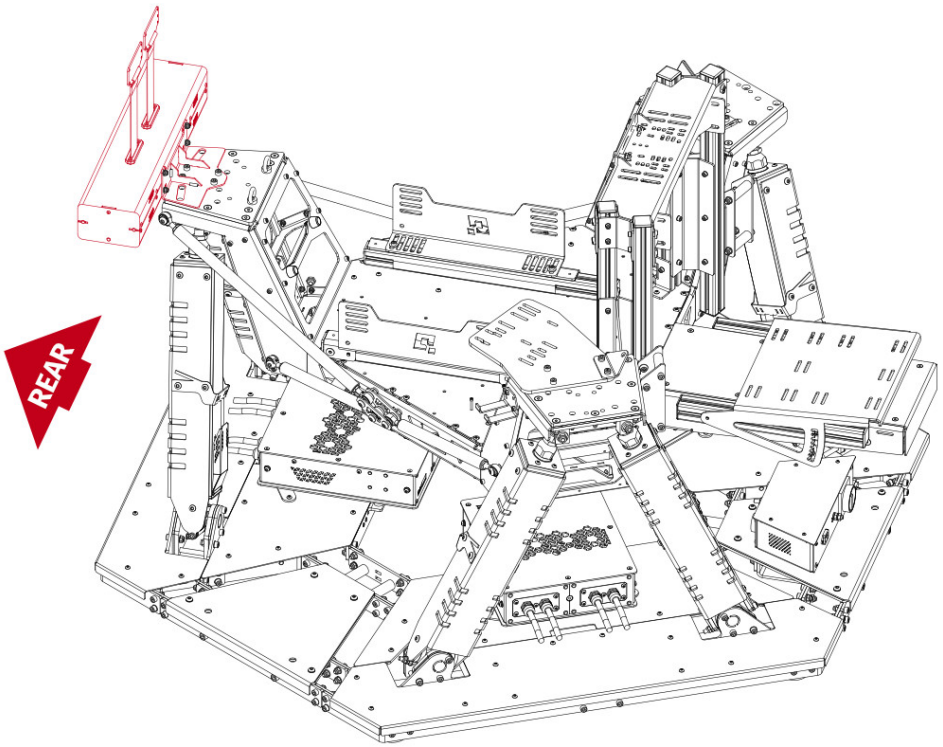
The QS-BT1 should be attached to the QS-S25 using a mounting bracket (not included - can be purchased separately from our retailers).

Assembly parts:

No.	Part description	Qty.
1	Mounting bracket	1
2	Bolt M8 x 35 (DIN 912)	4
3	Nut M8 (DIN 985)	4
4	Bolt M8 x 16 (DIN 933)	4
5	Washer A 8,4 (DIN 125)	8

INFO

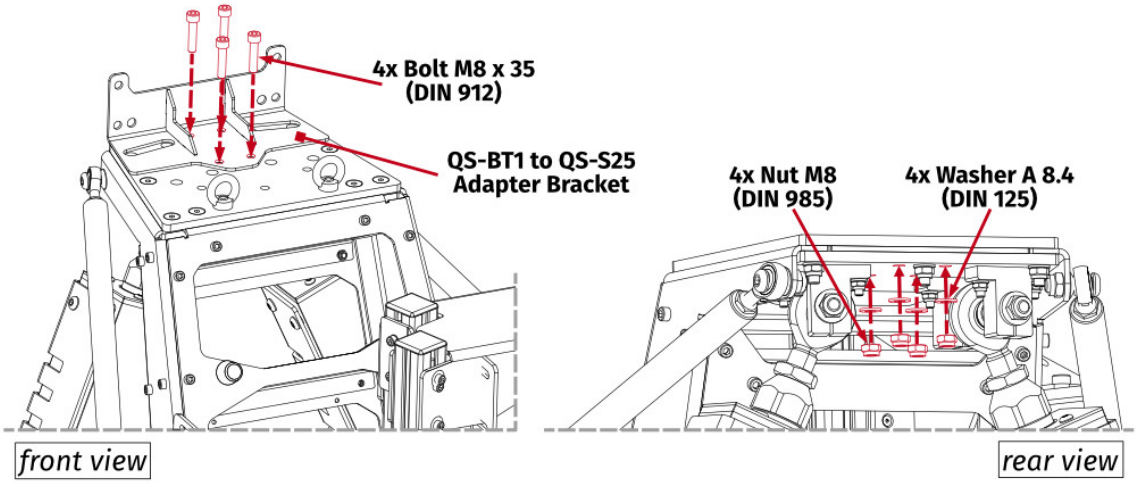
Illustration of a finished assembly.



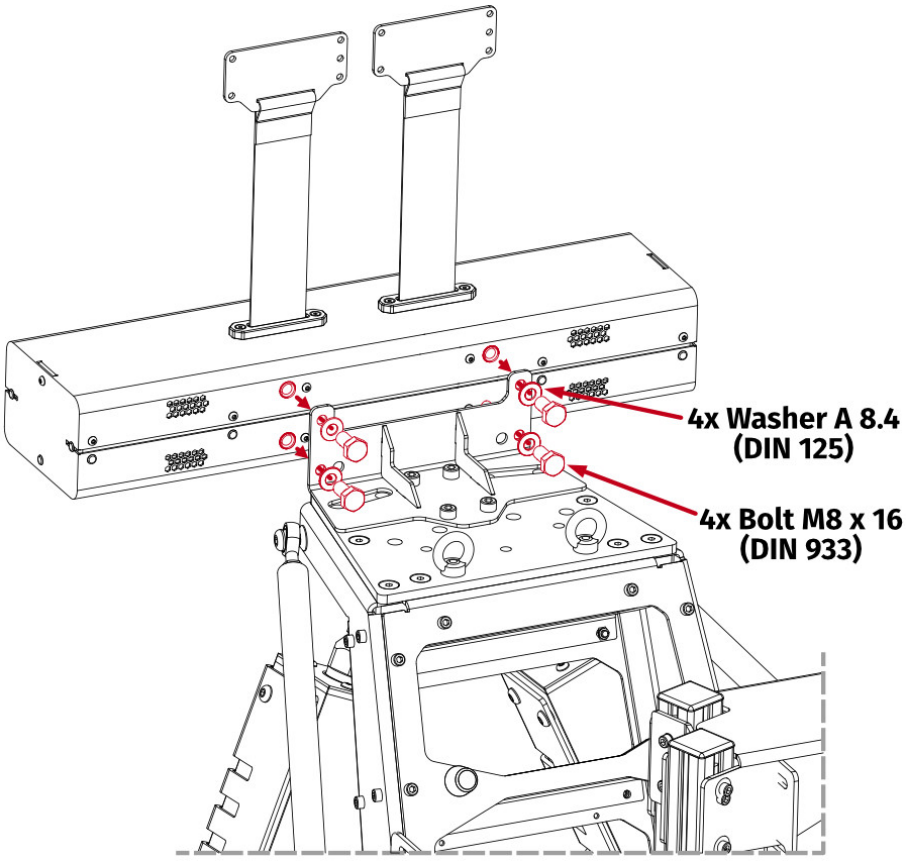
INFO

Before installing the QS-BT1 to a cockpit - write down Serial Number which is located on the underside of the device. Refer to section 7.2 on page 43 for details. Serial Number is also available on the side of packaging box.

1. Attach the QS-BT1 bracket to the back of QS-S25 frame. Rest the bracket flat on the QS-S25 frame and put through mounting bolts. Screw in the nuts on the bolts from underneath. Torque down all four bolts to **25 Nm (18.5 ft-lbs)** of torque while holding the nuts from underneath with a flat wrench.



2. Attach the QS-BT1 to the back of the mounting bracket. Rest the QS-BT1 flat against the bracket and screw in the bolts by hand. Then tighten down all four bolts to **25 Nm (18.5 ft-lbs)** of torque.



5.5. ATTACHING TO NEXT LEVEL RACING MOTION PLATFORM V3

WARNING

- **DO NOT** attach QS-BT1 to the platform cockpit. Belt tensioner **MUST** be attached to a mobile top frame of the NLR Motion Platform V3 unit.
- You **CANNOT** use QS-BT1 with standard Buttkicker Gamer 2 bracket.
- Adding QS-BT1 reduces maximum user weight for NLR Motion Platform V3 down to 115 kg (253 lbs).

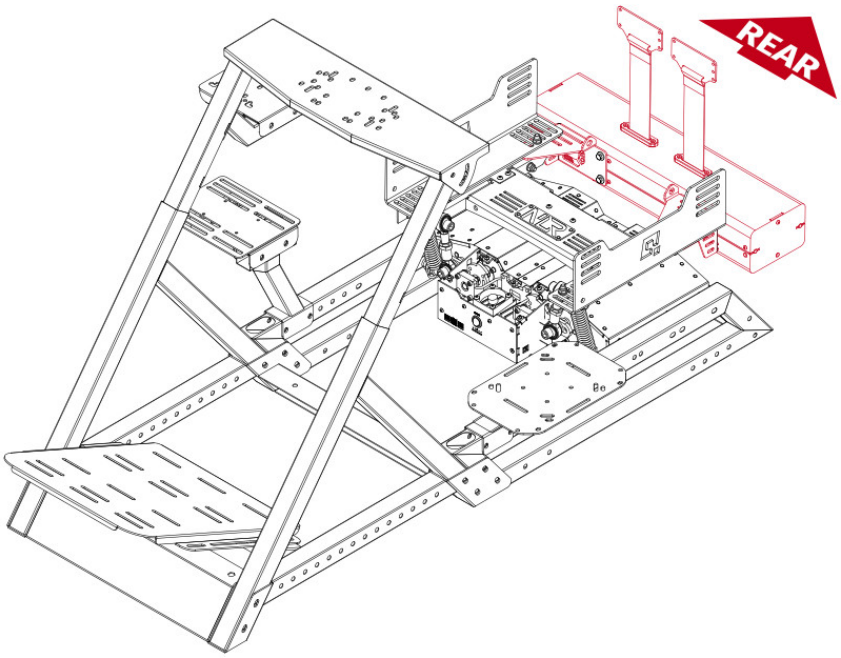
The QS-BT1 should be attached to NLR Motion Platform V3 using two mounting brackets (not included - can be purchased separately from our retailers).

Assembly parts:

No.	Part description	Qty.
1	Mounting bracket + spacer	2
2	Bolt M8 x 55 (DIN 912)	2
3	Nut M8 (DIN 985)	6
4	Washer A 8,4 (DIN 125)	10
5	Bolt M8 x 25 (DIN 912)	4
6	Bolt M8 x 16 (DIN 933)	4

INFO

Illustration of a finished assembly with a sample cockpit.

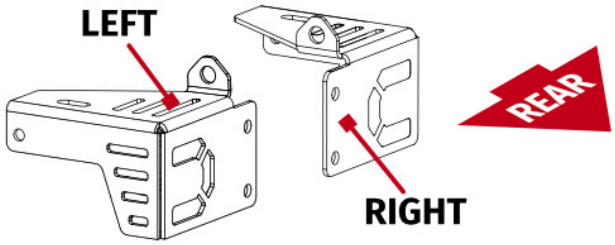


INFO

Before installing the QS-BT1 to a cockpit - write down Serial Number which is located on the underside of the device. Refer to section 7.2 on page 43 for details. Serial Number is also available on the side of packaging box.

INFO

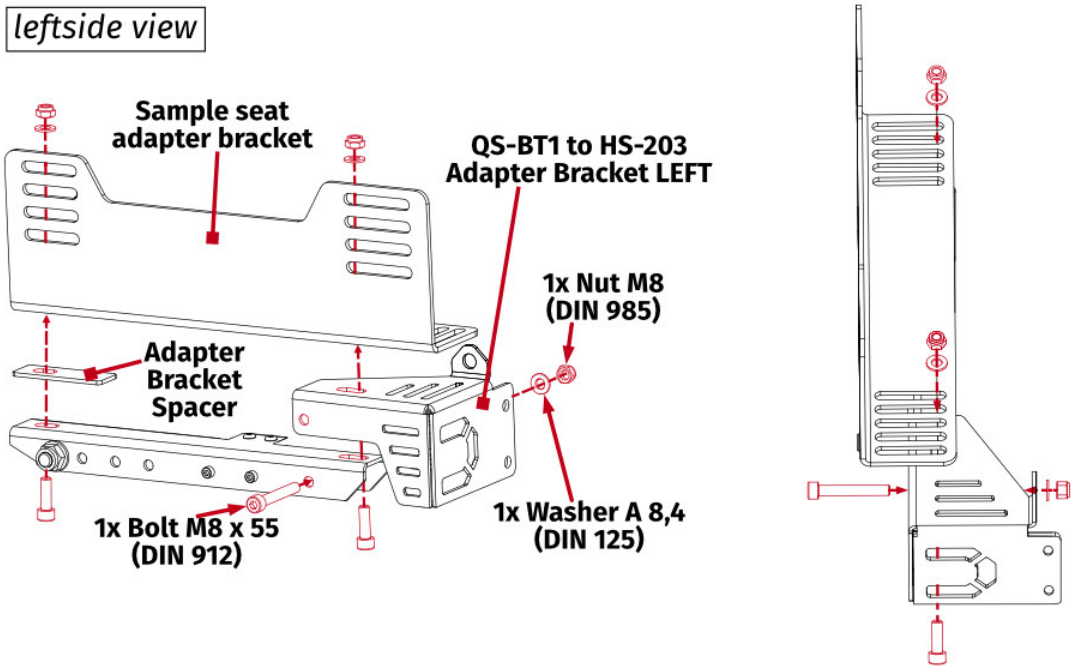
Adapting brackets are not interchangeable. Refer to illustration below.



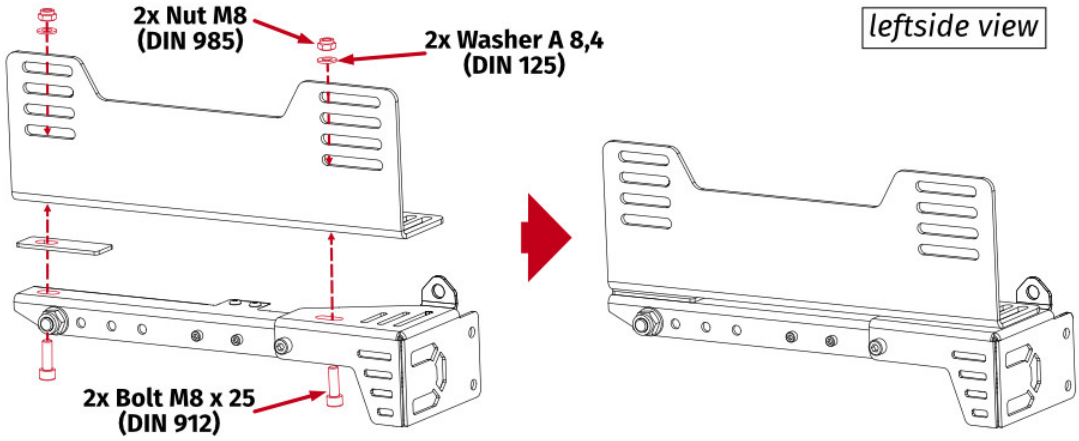
1. Remove the seat from seat adapter bracket.
2. Attach the QS-BT1 mounting bracket and spacer between the top frame of the NLR Motion Platform V3 motion unit and the seat mounting bracket.

INFO

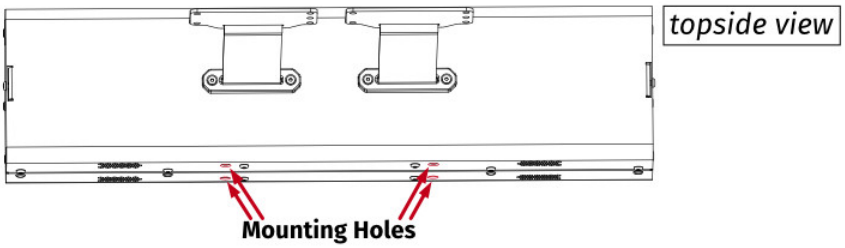
The seat adapter bracket in the illustrations below serves only as an example. The QS-BT1's adapter brackets must be attached to your seat adapter/seat rails.

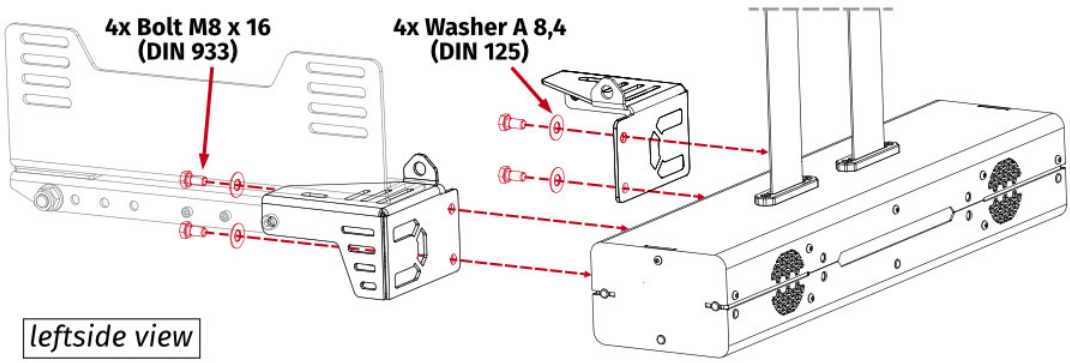


3. Attach the seat mounting bracket to the top frame of NLR Motion Platform V3 motion unit. Tighten M8x25 bolts to **25 Nm (18.5 ft-lbs)** and M8x55 bolts to **20 Nm (14.7 ft-lbs)** of torque while holding the nuts with a flat wrench.



4. Rest the QS-BT1 flat against the brackets and screw in the bolts. Torque down all four bolts to **25 Nm (18.5 ft-lbs)** of torque.





5.6. CONNECTING BELTS

5.6.1 ATTACHING HARNESS TO THE PLATFORM

INFO

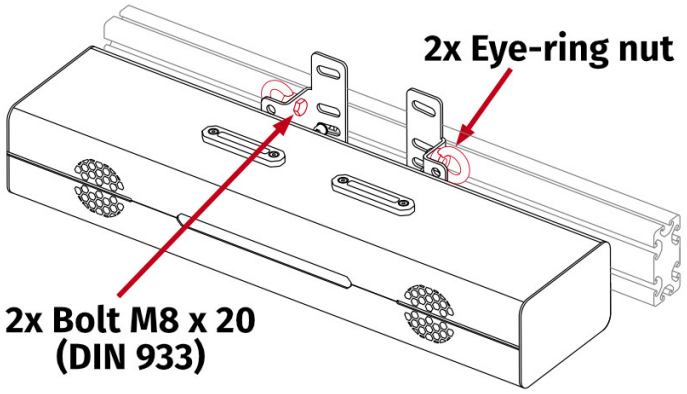
- Attaching harness to the platform (with snap-hooks or a shackle) is highly **recommended**. The QS-BT1 should only work as a belt tensioner, not a belt's hooking point.
- **First** - attach the harness to a cockpit and adjust it for the user (section 5.7.1 on page 34), **second** - attach tensioner buckles to the harness.

WARNING

All operations **MUST** be performed with the power switched OFF.

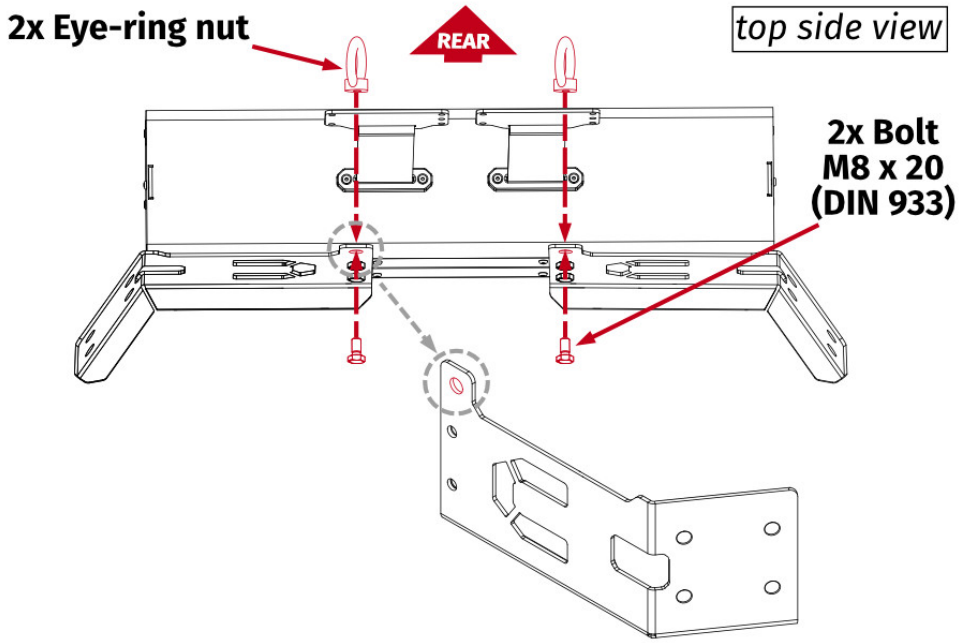
1. Universal adapter bracket

   Mount eye-ring nuts to the QS-BT1's mounting bracket (hardware not included). Then attach the seat belt's snap hooks to the eye-ring nuts.



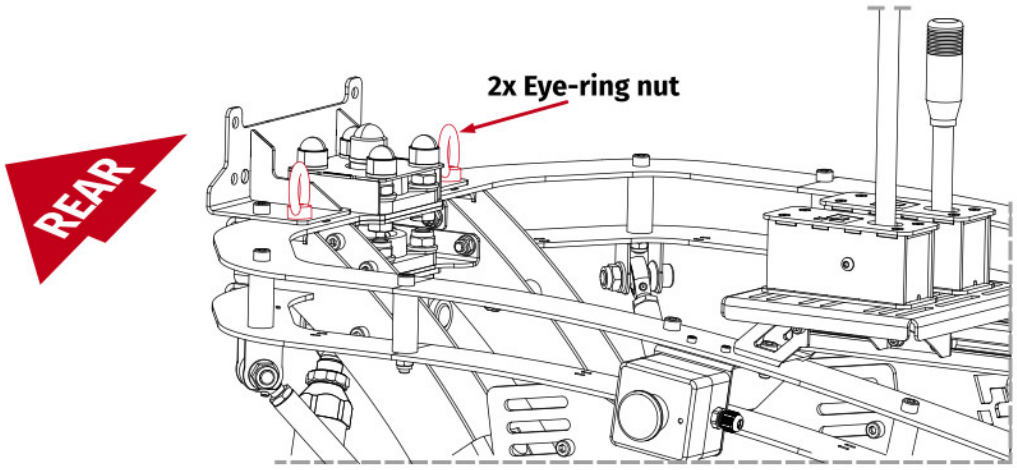
2. QS-CH1

Mount eye-ring nuts to the QS-BT1's mounting bracket (hardware not included). Then attach the seat belt's snap hooks to the eye-ring nuts.



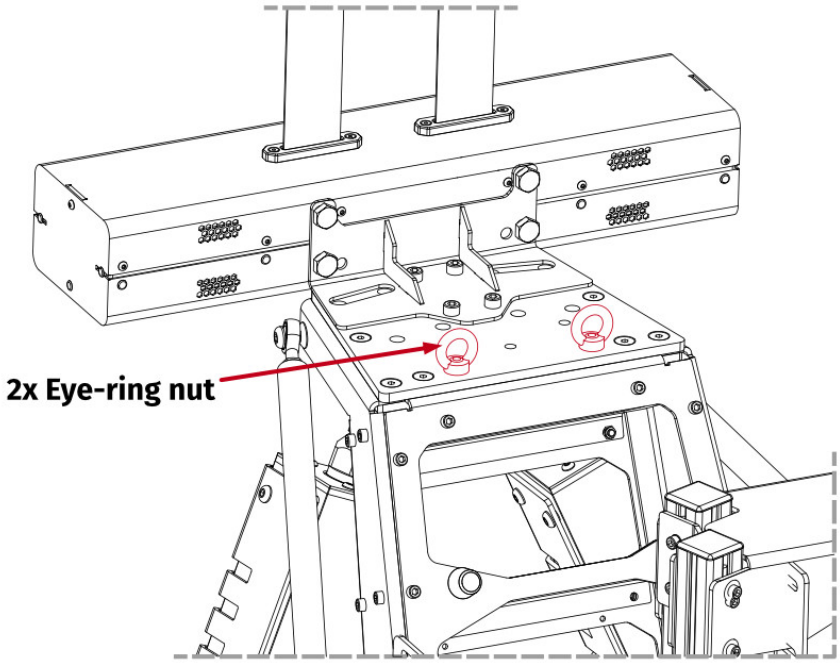
3. QS-V20

Attach the seat belt's snap hooks to the eye-ring nuts. Eye-ring nuts are equipped from factory.



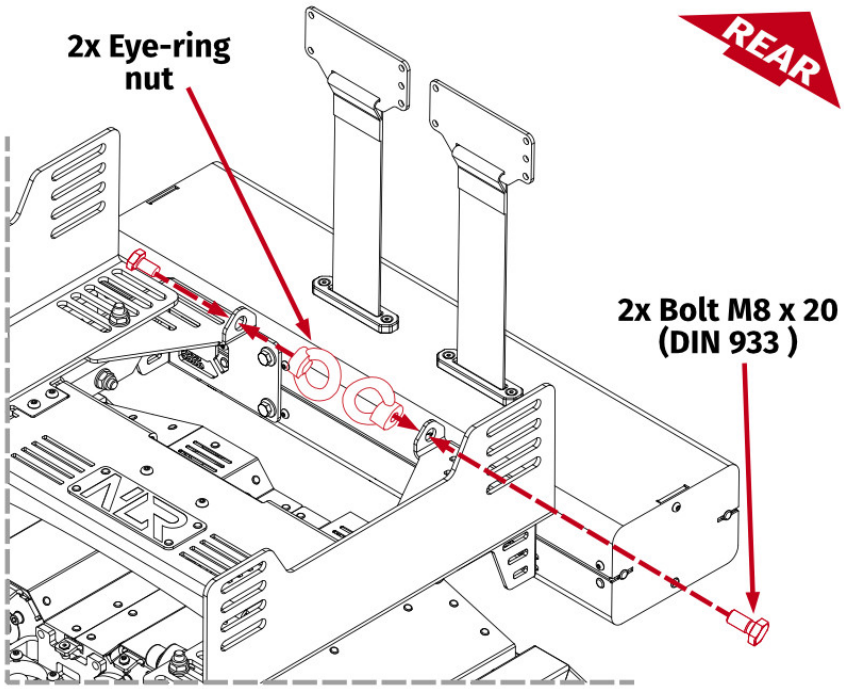
4. QS-S25

Attach the seat belt's snap hooks to the eye-ring nuts. Eye-ring nuts are equipped from factory.



5. Next Level Racing Motion Platform V3

Mount eye-ring nuts to the QS-BT1's mounting bracket (hardware not included). Then attach the seat belt's snap hooks to the eye-ring nuts.



5.6.2 ATTACHING TENSIONER BUCKLES TO THE HARNESS

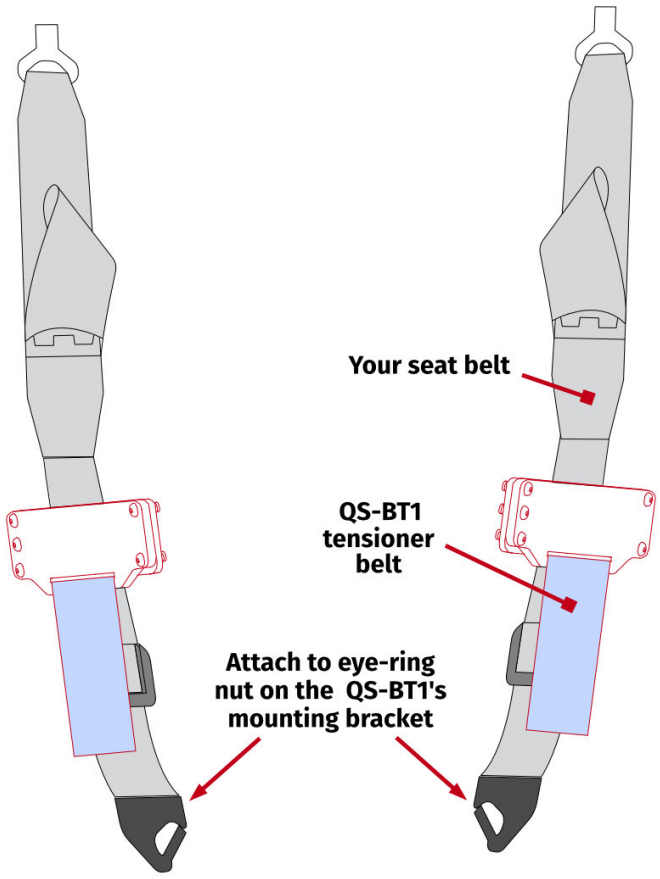
QS-BT1's Tensioner Buckles should be mounted to your seat belts (harness) using included Belt buckles and fasteners. Use seat inserts for the holes in your racing seat.

Assembly parts included with QS-BT1:

No.	Part description	Qty.
1	Belt buckle	2
2	Bolt M5 x 12 (ISO 7380-1)	10
3	Nut M5 (DIN 986)	10
4	Washer A 5,3 (DIN 125)	10
5	Seat inserts (interchangeable)	2
6	Velcro strips	2 x 2

INFO

Illustration of a finished belt buckles assembly.

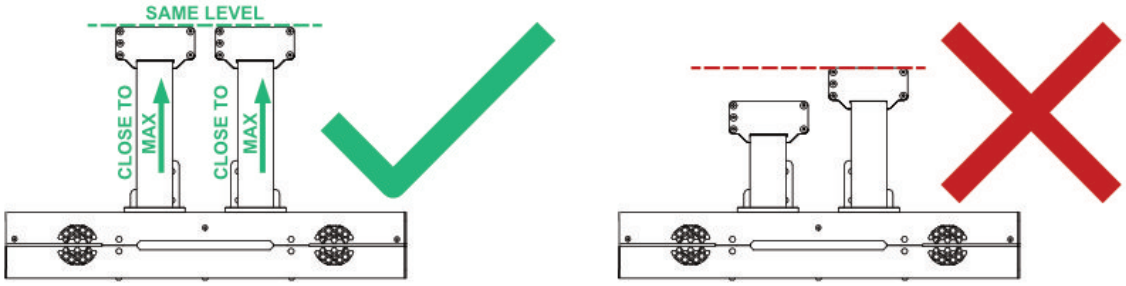


WARNING

All operations **MUST** be performed with the power switched OFF.

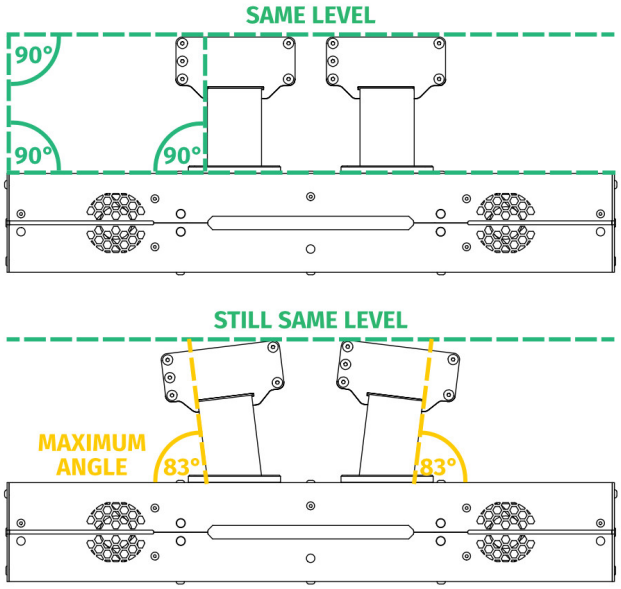
Before installing, ensure that your target assembly meets the requirements below:

- The built-in tensioner belts **MUST BE** fully extended **before installation** - otherwise it will affect the tensioning force and therefore reduce the immersion.



The QS-BT1 comes from factory with the belts fully extended.

- **Preferably** - QS-BT1's Tensioner Buckles should be mounted on the same level and evenly in relation to each other - parallel to the QS-BT1's main unit. If necessary maximum angle of belt's inclination is 83°.

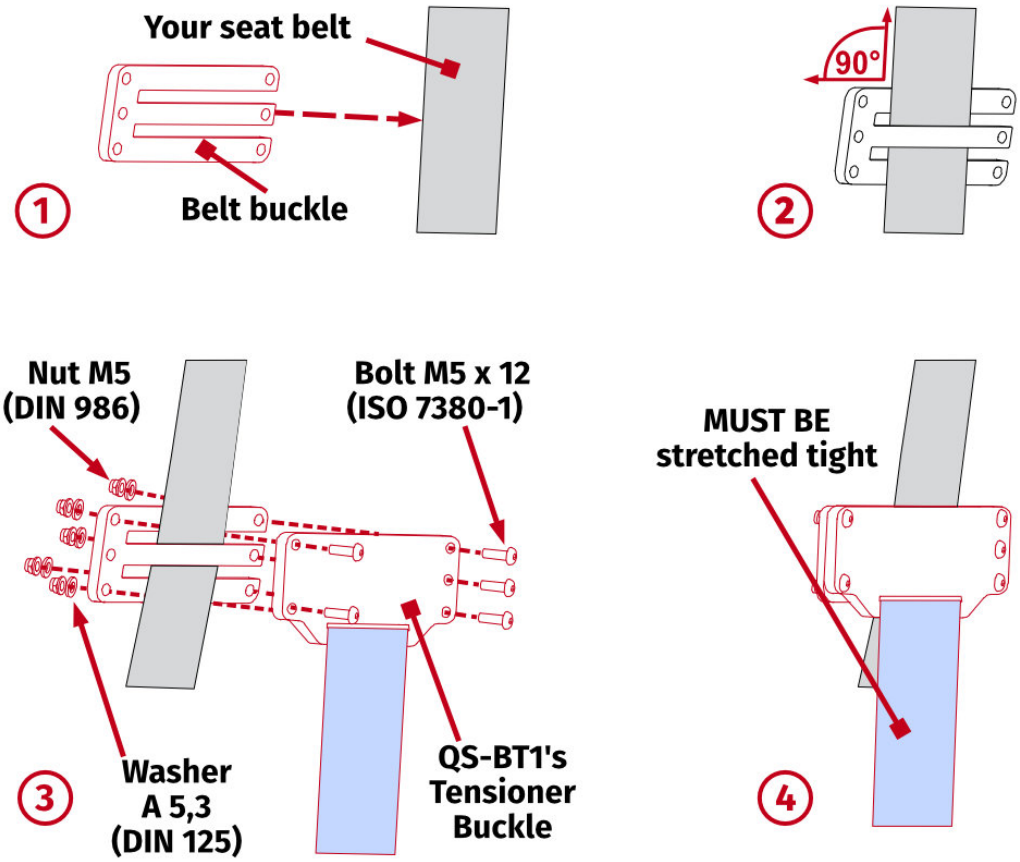


- **First** - attach the harness to a cockpit (section 5.6 on page 26) and then adjust it for the user (section 5.7.1 on page 34), **second** - attach QS-BT1's tensioner buckles to the harness.

Installation:

1. Run your seat belt through the belt buckle and mount it with QS-BT1's tensioner buckle. Start from screwing in top bolts, then proceed to the ones below. Ensure they are perpendicular to the belt.

   Belts should not have too much slack initially - before screwing the bolts down ensure proper tightening of the belts. They will be tensioned later by the QS-BT1 after in-game engagement (for more details go to section **6** on page **41**).

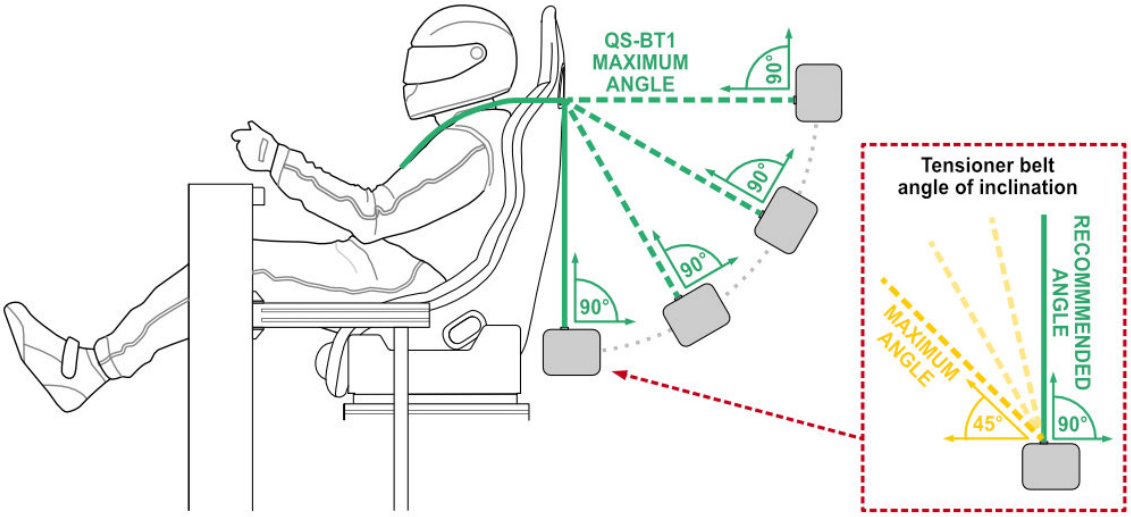


INFO

- Ensure correct mounting of the tensioner and belt buckles as this may have negative impact on device's performance and user's feeling of immersion.
- The belt tensioner generates a maximum of 200 N of force on each side. Install adjustable seat belts that can withstand forces generated by the device, preferably with FIA certification.

- Preferably the assembly method would ensure that the belts are perpendicular to the device. If necessary - maximum angle of belt inclination is 45°.

  If the belts rub against the housing while in normal operation - the pulling force will significantly drop, reducing the immersion.



WARNING

In case of motion platform implemented cockpits - the QS-BT1 always **MUST BE** mounted to a position that is moving along with the seat.

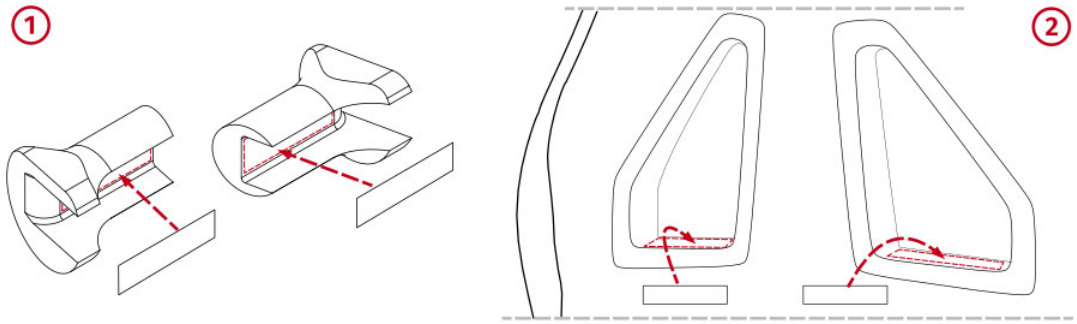
In order for QS-BT1 to work correctly it is recommended that it always is mounted directly to a cockpit and not separately.

- Excess seat belt should be rolled and attached permanently to rest of the harness. It cannot interfere with platform movement.

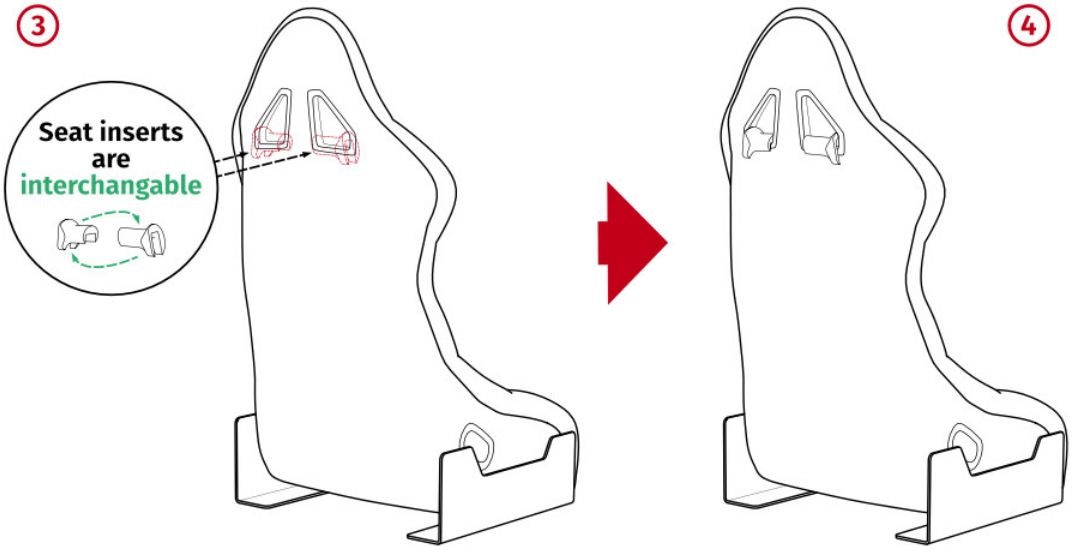
INFO

Seat inserts are provided with the QS-BT1 mainly for better belt stability. They also keep your race seat from getting worn down and are a low friction attachment to reduce the sound of harness rubbing against the seat.

2. Check if the seat inserts fit your r ace seat's shoulder harness slots. If so, apply self adhesive velcro strips (included) inside seat inserts and harness slots.



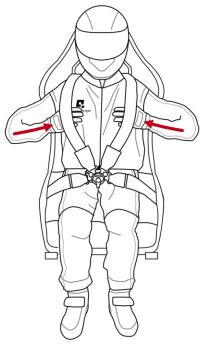
Attach seat insert inside race seat's shoulder harness slots. Inserts are identical and will fit interchangeably.



5.7. SEAT BELT SETTINGS

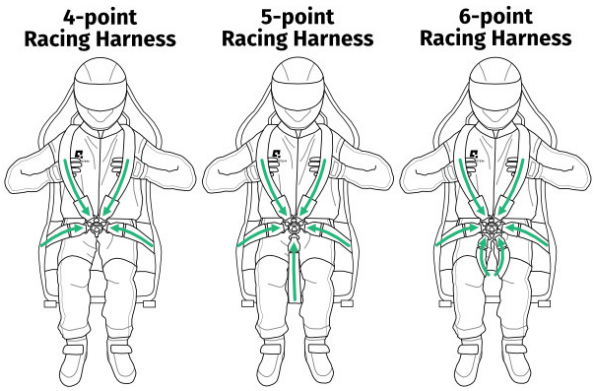
5.7.1 SEAT BELT SETUP

For your comfort and the best simulation experience, the seat belt must be set up correctly (seat belt not included).



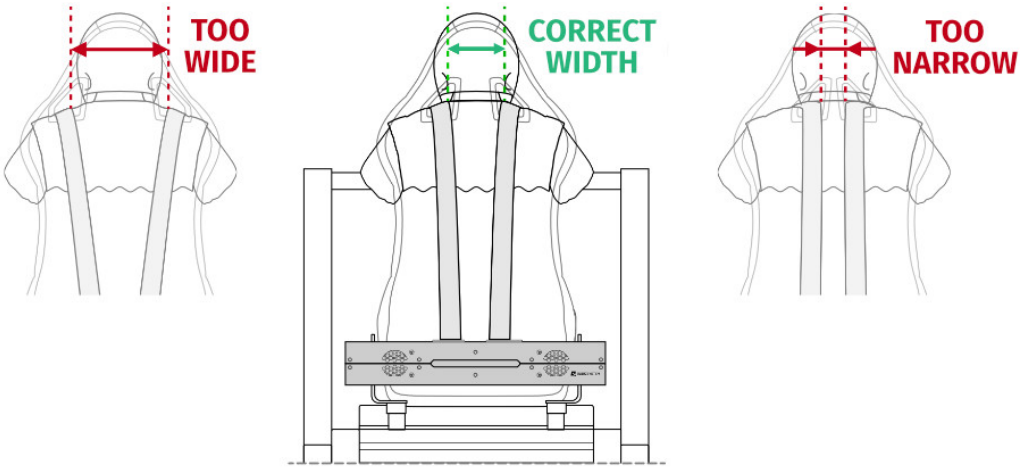
1. Correct seat belt tension can be determined by **placing your hands underneath the belts**. If your hands can move freely - tighten the belt. If you cannot put your hands under the belt - loosen the belt.

2. **All tongues** of the seat belt should be fastened to the buckle, as shown in the picture.



INFO

For the most realistic and immersive experience, seat belts should be horizontally positioned with **the same width as your neck width**. If the belts are positioned too wide or too narrow, pain or scratches in the neck area will occur.

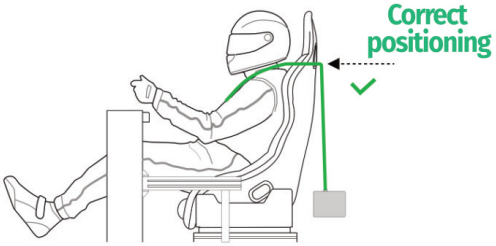


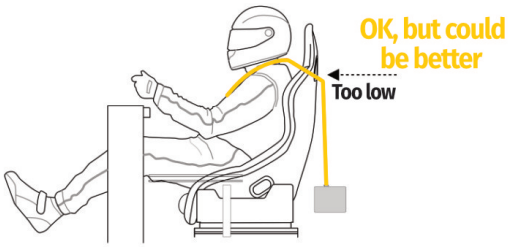
5.7.2 VEHICLE VS. FLIGHT SIMULATIONS SETUP

INFO

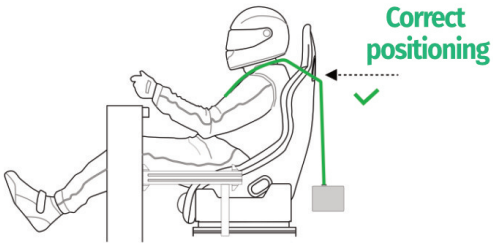
To have the most immersive experience in vehicle or flight simulations you need a compatible seat with specific seat belt slots height.

In **vehicle simulations** you should have **horizontal pulling force** instead of upward or downward pulling force. Seat belt slots should be at the same level as your shoulders.





In **flight simulations** you should have **downward pulling force** instead of upward or horizontal pulling force. Seat belt slots should be positioned lower than your shoulders.

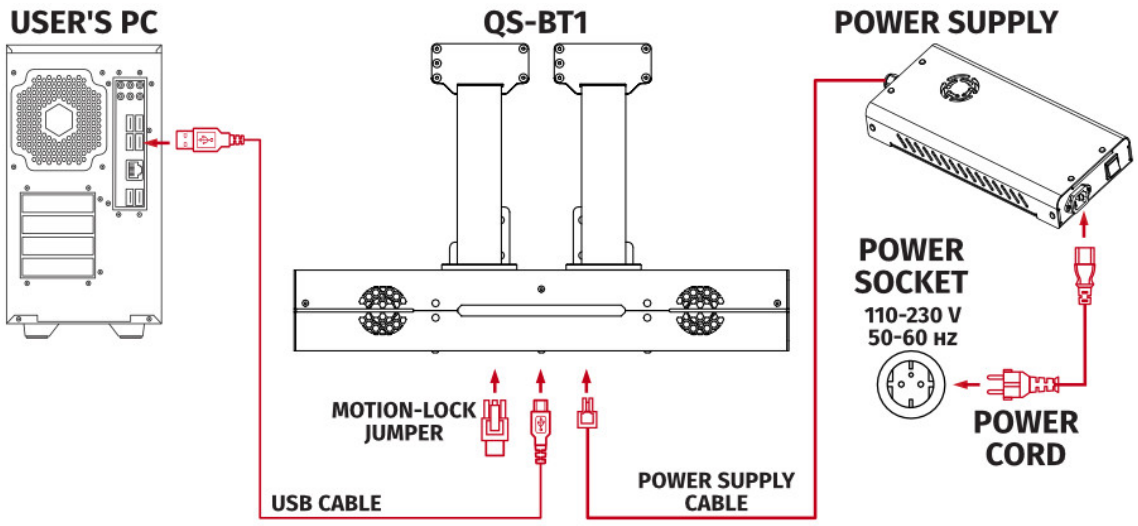


5.8. CABLE CONNECTIONS

5.8.1 BASIC CONNECTION DIAGRAMS

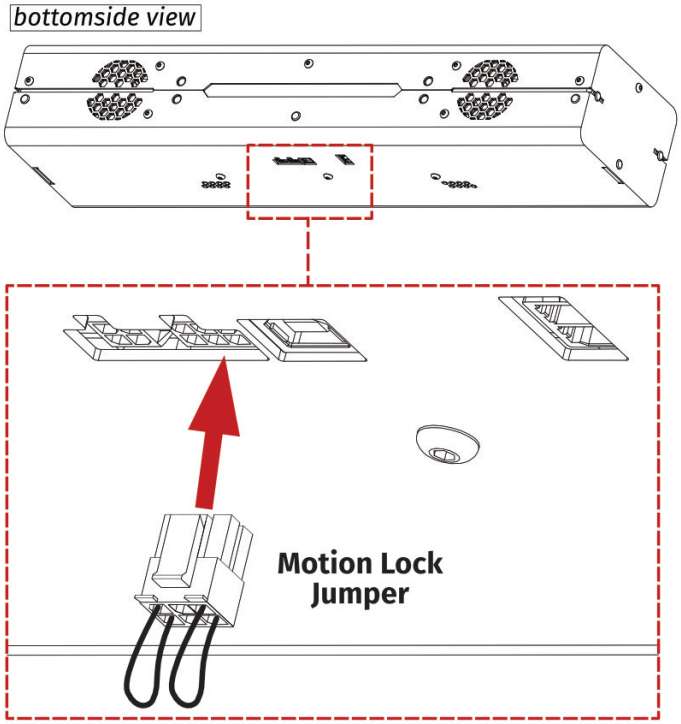
WARNING

The power supply **must be switched off** when connecting to the power socket.



WARNING

If QS-BT1 works with no Motion Lock feature, then Motion Lock jumper **MUST** be plugged in, as shown in the illustration below.



5.8.2 MOTION LOCK CONNECTION DIAGRAMS

It is **recommended** that you install a Motion Lock button within arm's reach of the user.

It is possible to run QS-BT1 device individually with a dedicated Motion Lock button. It is not included and can be purchased separately as an accessory from our retailers.

WARNING

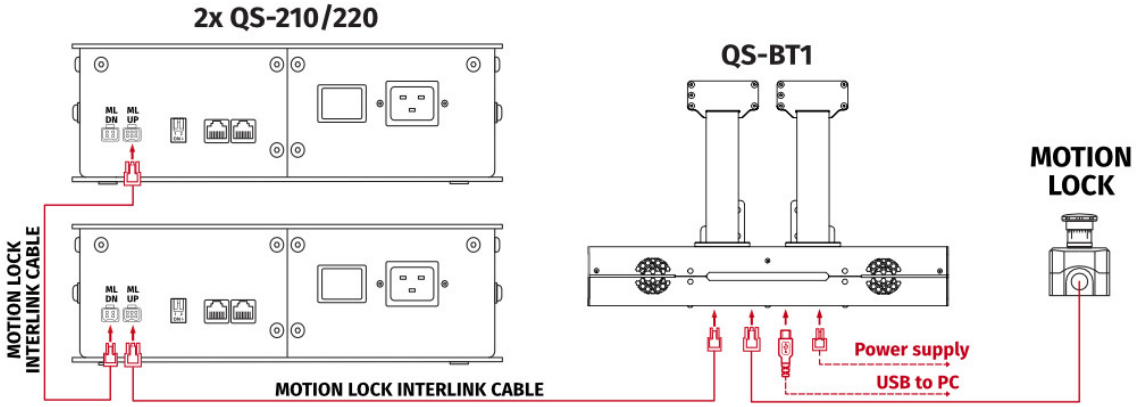
1. All Motion Lock connections must be performed with **power switched OFF**.
2. Motion Lock interlink cables have different ML/UP (6 pin) and ML/DN (4 pin) plugs on each side.
3. Motion Lock is not a standalone device - QS-BT1 must be plugged in to power and via USB to PC.

INFO

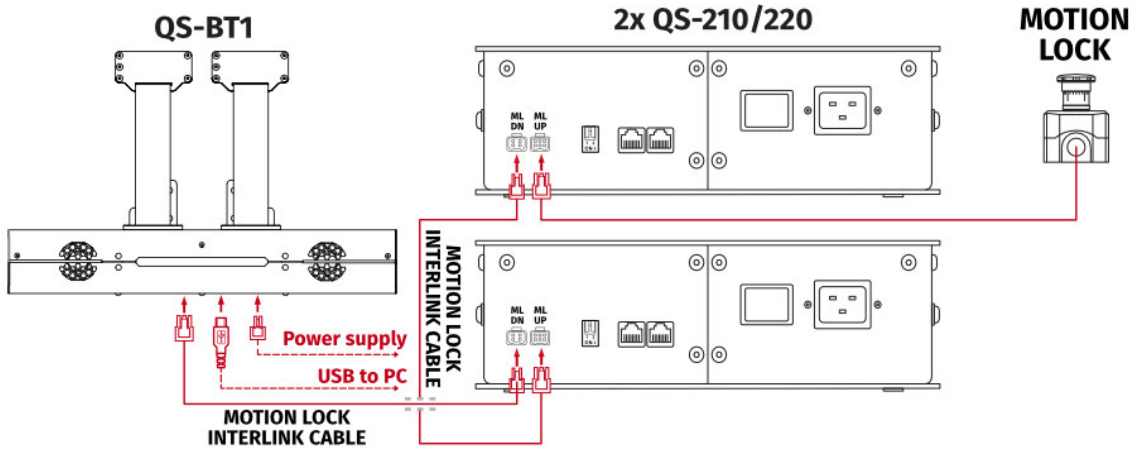
We recommend including QS-BT1 in the Motion Lock circuit, if you are running other QS-series devices. Refer to diagrams below.

1. Seat belt tensioner (**QS-BT1**) with two power cabinets (**QS-210/220**).

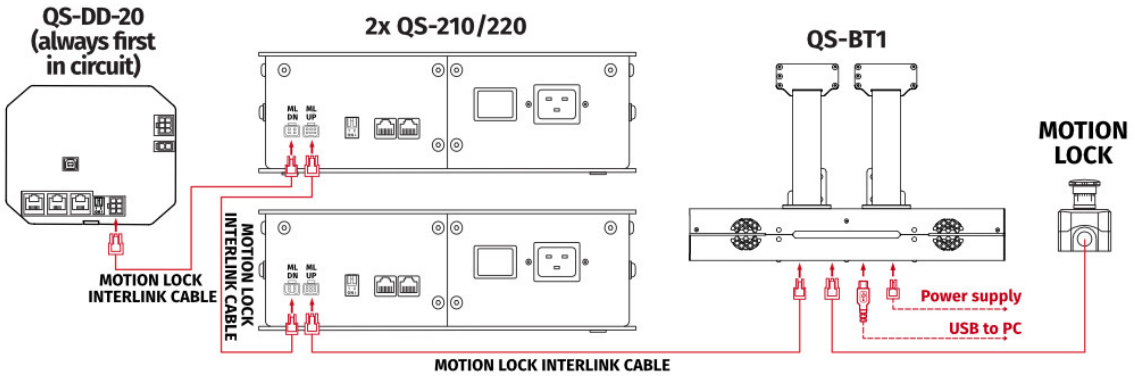
Variant #1



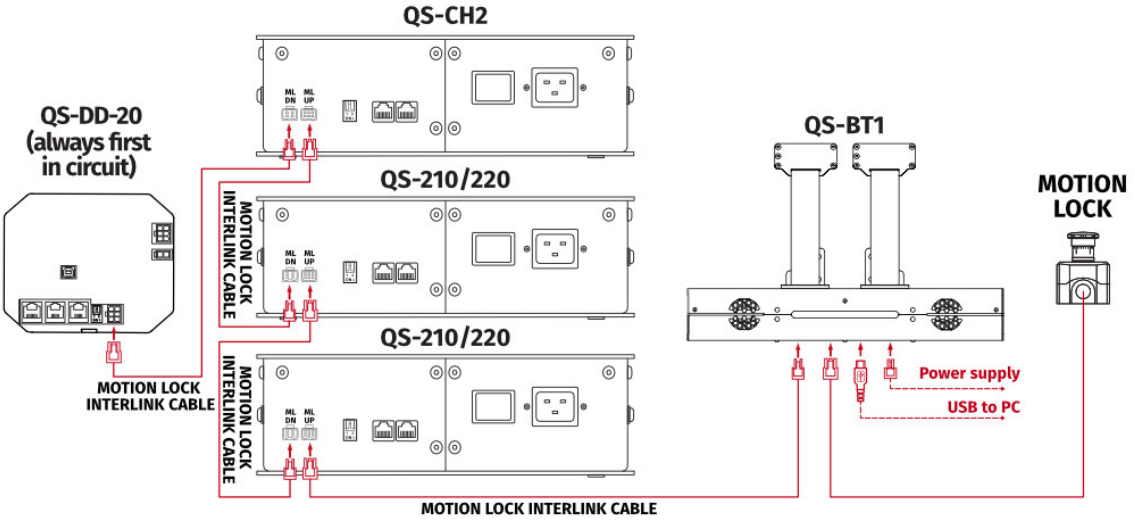
Variant #2



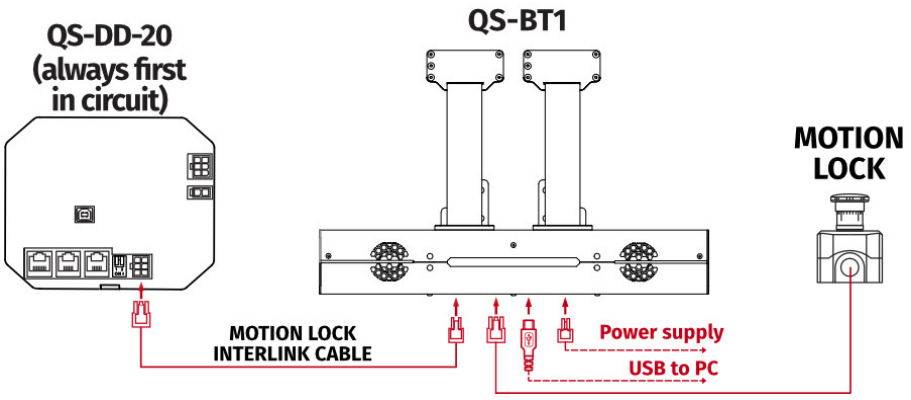
2. Seat belt tensioner (**QS-BT1**) with two power cabinets (**QS-210/220**) and a direct drive steering wheel (**QS-DD-20**).



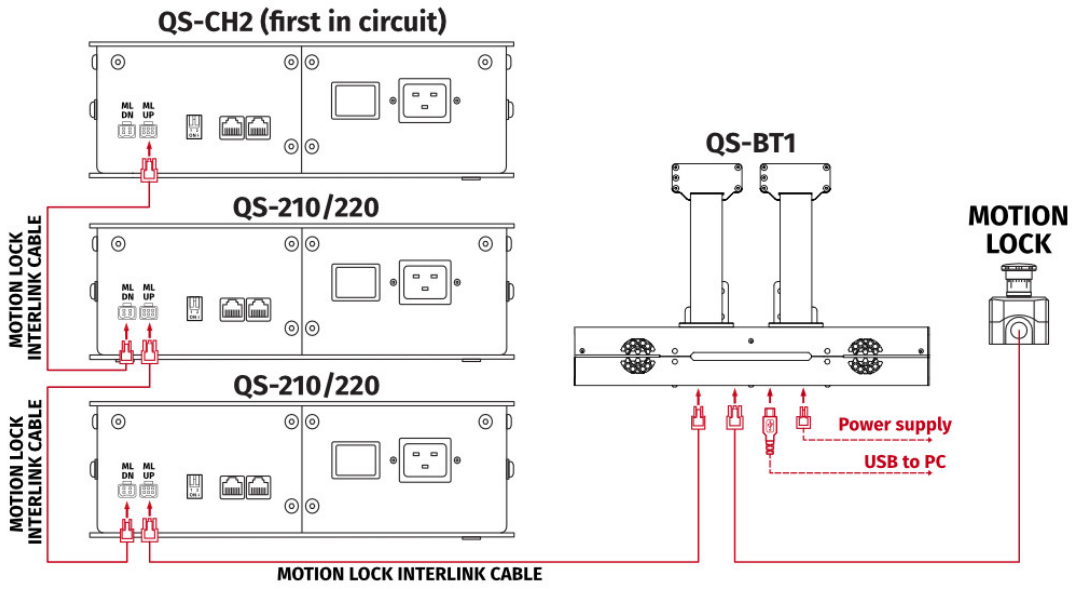
3. Seat belt tensioner (**QS-BT1**) with a direct drive steering wheel (**QS-DD-20**), motion platform (**QS-CH2**) and two power cabinets (**QS-210/220**).



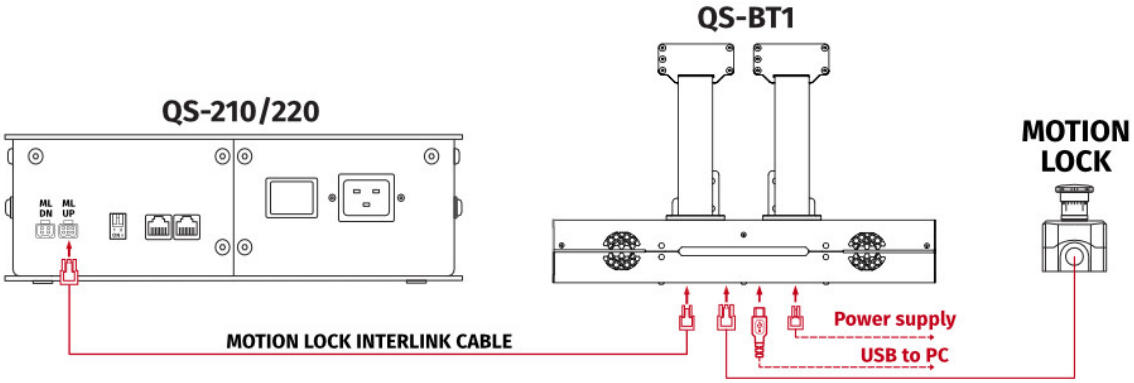
4. Seat belt tensioner (**QS-BT1**) with a direct drive steering wheel (**QS-DD-20**).



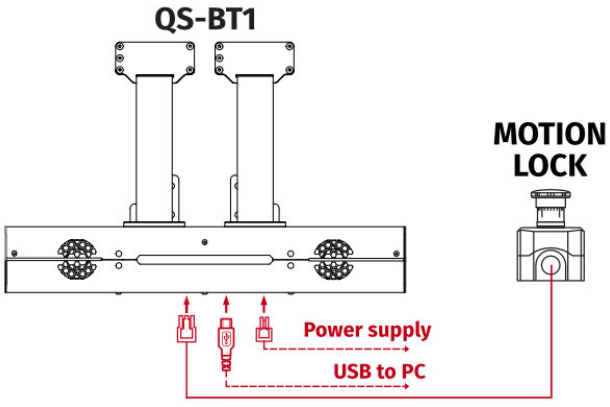
5. Seat belt tensioner (**QS-BT1**) with a motion platform (**QS-CH2**) and two power cabinets (**QS-210/220**).



6. Seat belt tensioner (**QS-BT1**) with one power cabinet (**QS-210/220**).

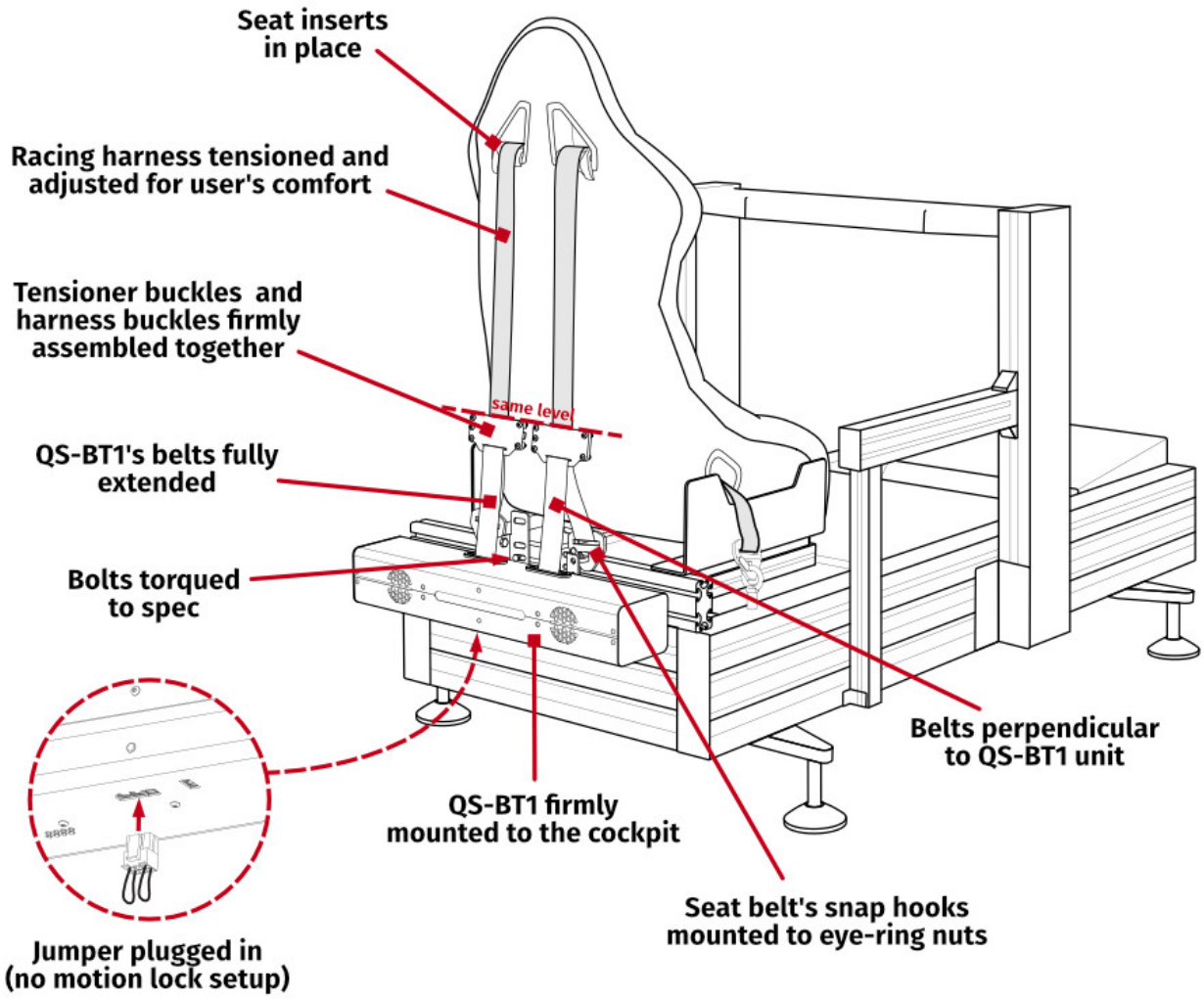


7. Seat belt tensioner (**QS-BT1**) with Motion Lock only.



5.9. POST-ASSEMBLY CHECK LIST

After successfully connecting the QS-BT1 to the power, PC and installation to the platform - check if everything is ready to operate:

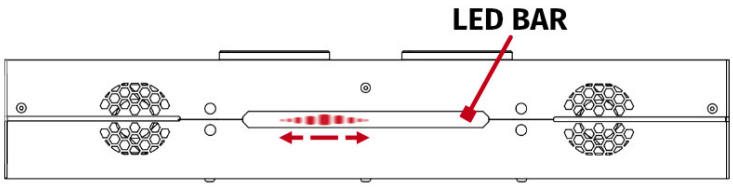


6. OPERATION

INFO

For connecting and setting up the QS-BT1, see section **5.8** at page **36**.

1. After turning on the **QS-BT1**, red light scanning effect at the led bar begins. The device is in standby mode.



2. Launch QubicManager software (QS devices need QubicManager software to operate in background). For details refer to section **7** at page **42**.
3. Activate a correct profile in QubicManager main application window. (if game is launched without activating a profile - software will activate a default profile automatically).
4. You may check the status of the device in bottom left corner - it should say "Connected".
5. **No calibration of the device is needed.**
6. The QS-BT1 will start tensioning the belts after in-game race or flying session will begin:
   (a) In a racing simulation the **QS-BT1** will tension the belts (depending on a game) after firing the engine, first braking or a downshift action.
   (b) In a flight simulation the **QS-BT1** will tension the belt (depending on a game) after sudden braking on a landing strip or a sudden control stick movement while in the air.
7. Anytime you pause or exit the game the **QS-BT1** will release the tension of the belts.
8. After you resume the game the **QS-BT1** will tension the belts again after any action from point 4 (a) or 4 (b) will occur.

7. SOFTWARE

INFO

- This section refers to the QubicManager, which is the default Qubic Systems software. If you already own another Qubic System device, the QS-BT1 will be automatically added to your device list in the QubicManager after connecting and powering up.
- QubicManager is the same software that is used to manage other motion platforms.

7.1. QS-BT1 SOFTWARE COMPATIBILITY

Choose the software based on your primary motion platform family.

Motion Platform Model	Qubic Manager	ForceSeatPM	Next Level Racing® Platform Manager
QS-210	✓	✓*	X
QS-220	✓	✓*	X
QS-CH2	✓	✓*	X
QS-S25	✓	✓*	X
QS-V20	✓	✓*	X
PS-6TM-XXX	X	✓	X
PS-6TL-XXX	X	✓	X
PS-3TM-XXX	X	✓	X
PS-2RM-XXX	X	✓	X
Next Level Racing® Motion V3	✓	X	✓
Next Level Racing® Motion Plus	✓	X	✓
Next Level Racing® Traction Plus	✓	X	✓
No motion platform	✓	✓*	X
3rd party motion platform	✓	✓*	X

*ForceSeatPM will also work but it is recommended to use QubicManager

WARNING

If you have previously installed the software, ensure that it is up to date before running the QS-BT1.

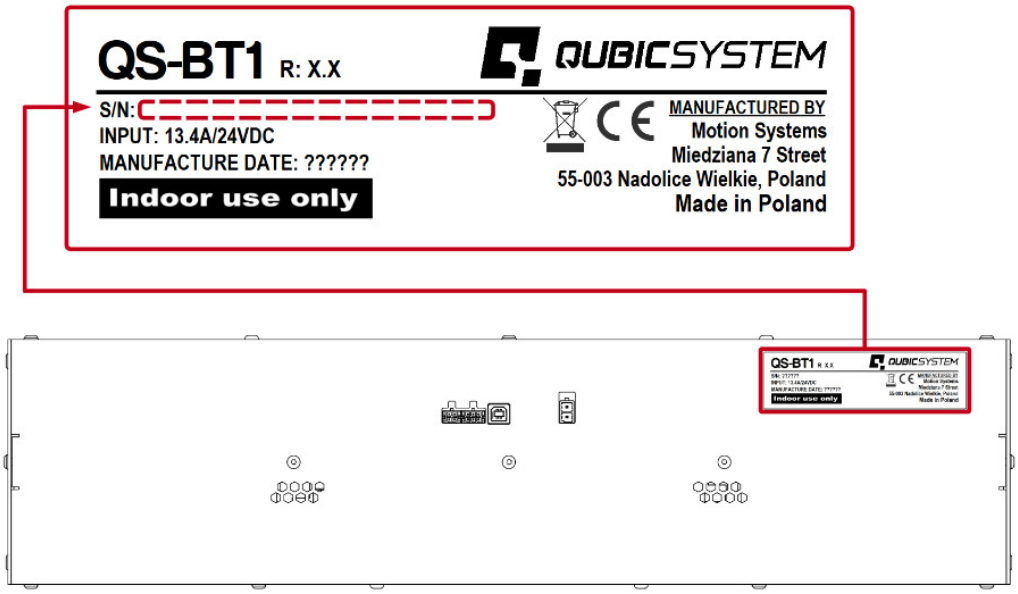
7.2. DOWNLOAD AND INSTALLATION

INFO

The QS-BT1 is compatible with Qubic Manager, MotionSystems ForceSeatPM and Next Level Racing's Platform Manager. If you already have software installed, no changes are necessary - device will be automatically added to device list, and all steps from this section should be skipped (ensure that your software version is up to date).

The **SERIAL NUMBER** required to access software download can be found on the underside of the belt tensioner housing. It's printed on the rating label in the **XXXXXX-XXXXXX-XXXXXX-XXXXXX** format.

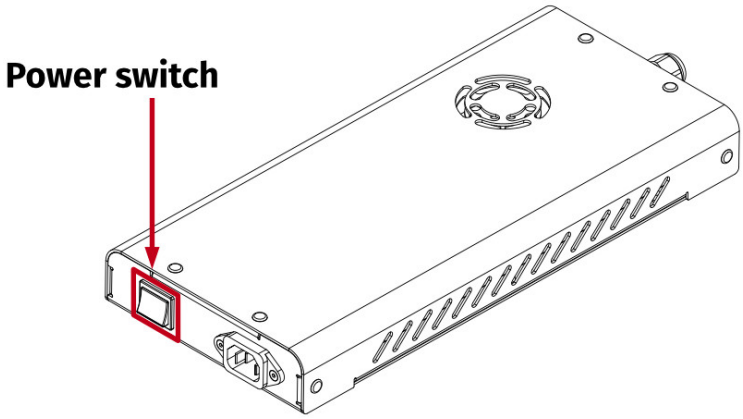
Serial Number is also available on the side of packaging box.



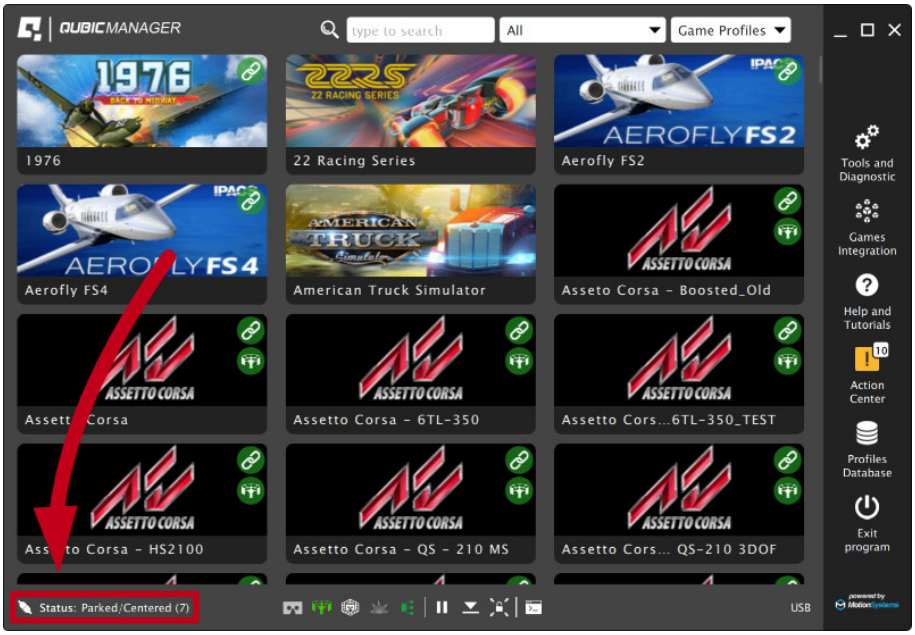
underside view

Software installation procedure:

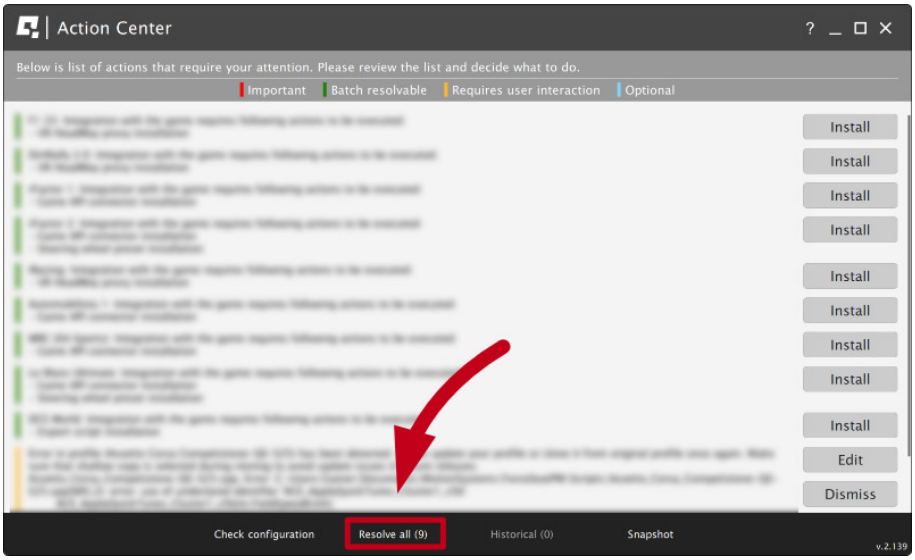
1. Connect the devices according to the interconnection diagram (see section **5.8** on page **36**).
2. Download QubicManager from **QubicSystem.com/Download**
3. Enter the serial number located on the identification label.
4. Proceed with the installation steps and launch the application.
5. Turn on the device by switching on the power switch button on the power supply unit.



6. If QubicManager has recognized the QS-BT1 correctly, the status of the device will change to **Connected**. Device status is visible in the lower left corner.

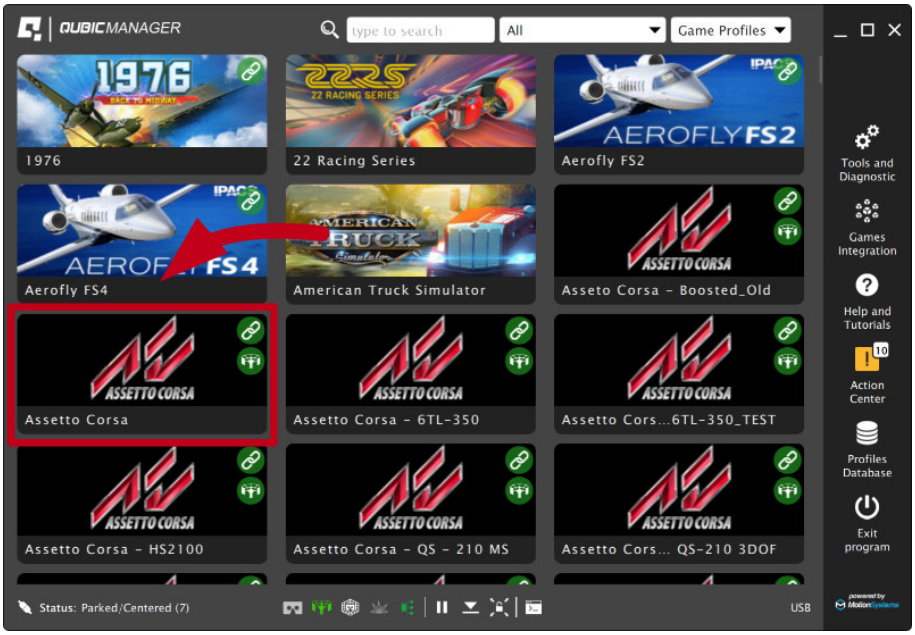


7. Check the **Action Center** on the right side panel for a list of actions that require attention. It is possible to solve them one by one or by pressing the **Resolve All** button. Firmware updates may require additional confirmation in the dialogue box.



7.3. ADJUSTMENTS

1. Select the profile in the Qubic Manager main application window:



2. In the profile window select "Seat Belt Tensioner" and then adjust the settings to your own preferences using sliders in the profile window. Changes can be made "on the fly" without quitting or restarting the simulation application.

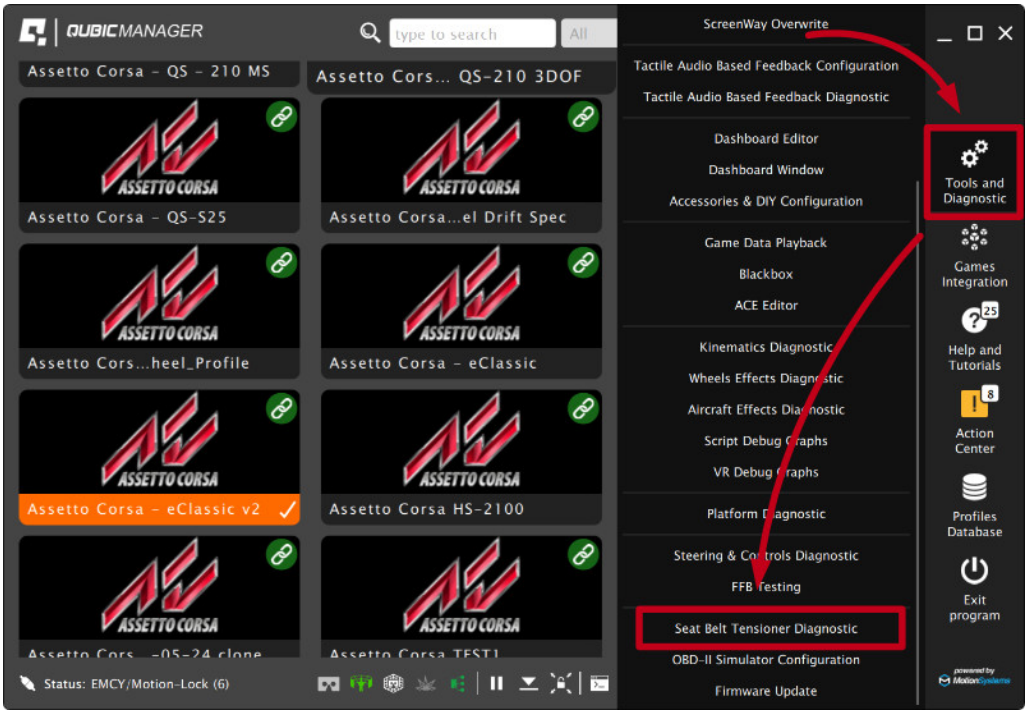
8. TROUBLESHOOTING

WARNING

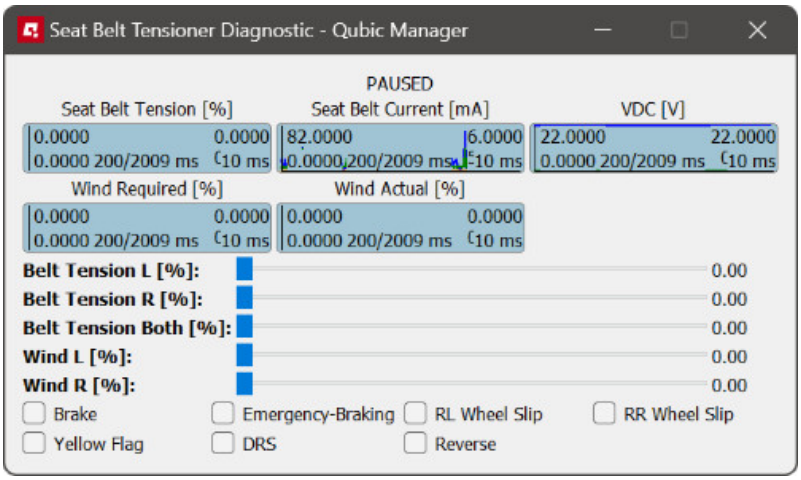
DO NOT attempt to do any repairs by yourself. It is dangerous and will result in loss of warranty! All repairs should be consulted with technical support and performed by a qualified technician.

Before contacting technical support, try this:

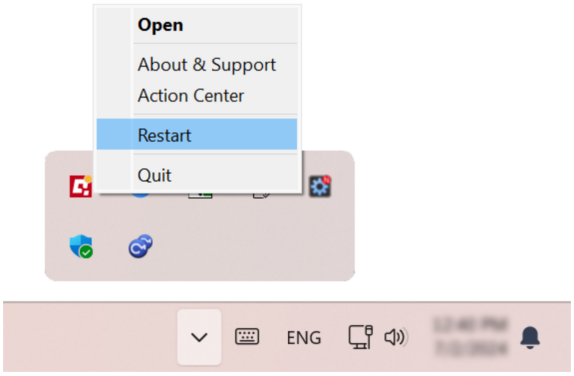
- Check the Action Center in QubicManager.
- Open the diagnostic window to check if the device is responsive.
    1. Select **Tools and Diagnostic →Seat Belt Tensioner Diagnostic**



2. Diagnostic window allows pulling belts by using the sliders. It also displays the input data signal from the application.



- Check all cable connections of the device. Refer to section **5.8** on page **36**.
- Restart QubicManager application by right-clicking on the application icon in the system tray and selecting **Restart**



- Try different USB ports in your PC.
- If a problem occurs abruptly, it could be caused by thermal protection. Turn off QS-BT1, disconnect it from power outlets and wait at least 15 minutes to let it cool down.
- 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.

INFO

If none of the diagnostic advice listed above works, create a snapshot. It compiles all the necessary details for technical support to resolve the issue.

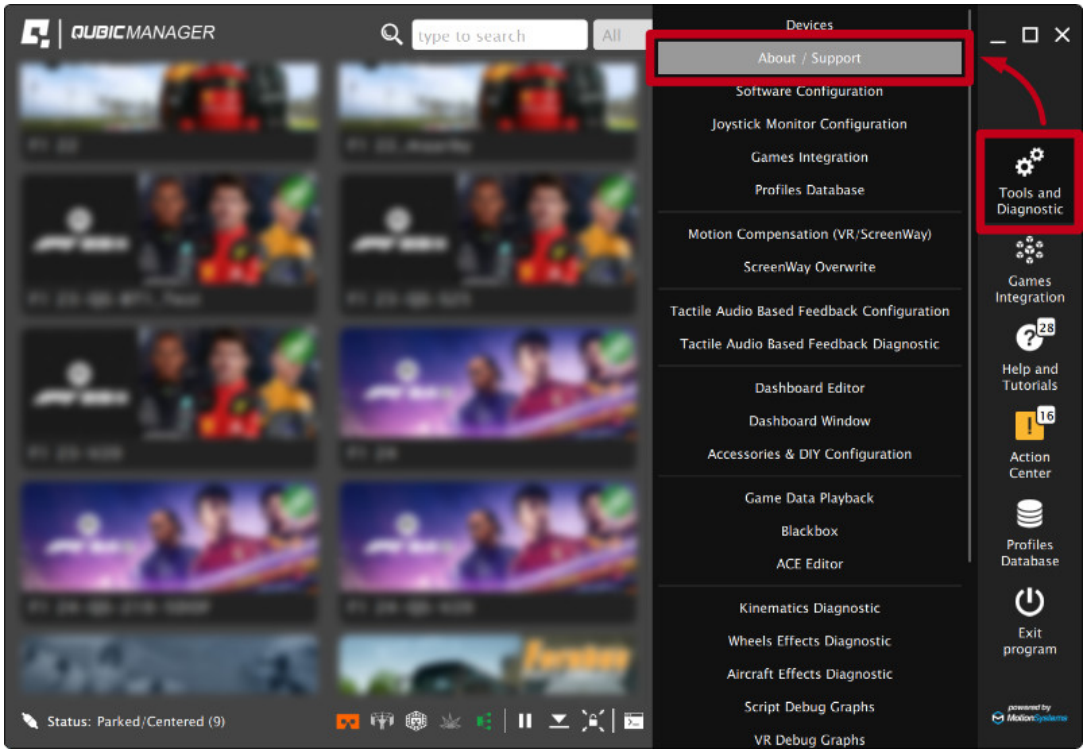
8.1. CREATING A SNAPSHOT

A snapshot is the easiest and fastest way to diagnose a problem. If you send in the zip file generated in the snapshot 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.

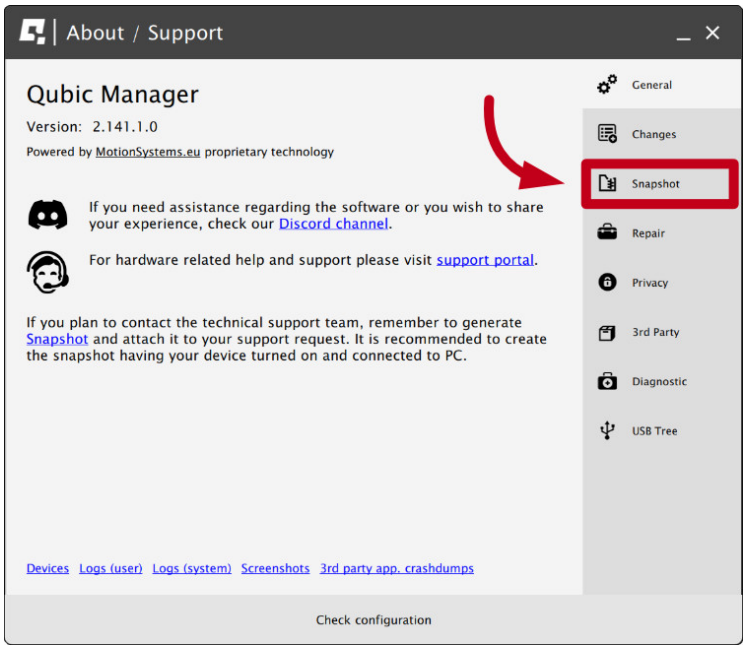
WARNING

The QS-BT1 and all interconnected Power Cabinets **MUST BE** be powered up when creating the snapshot.

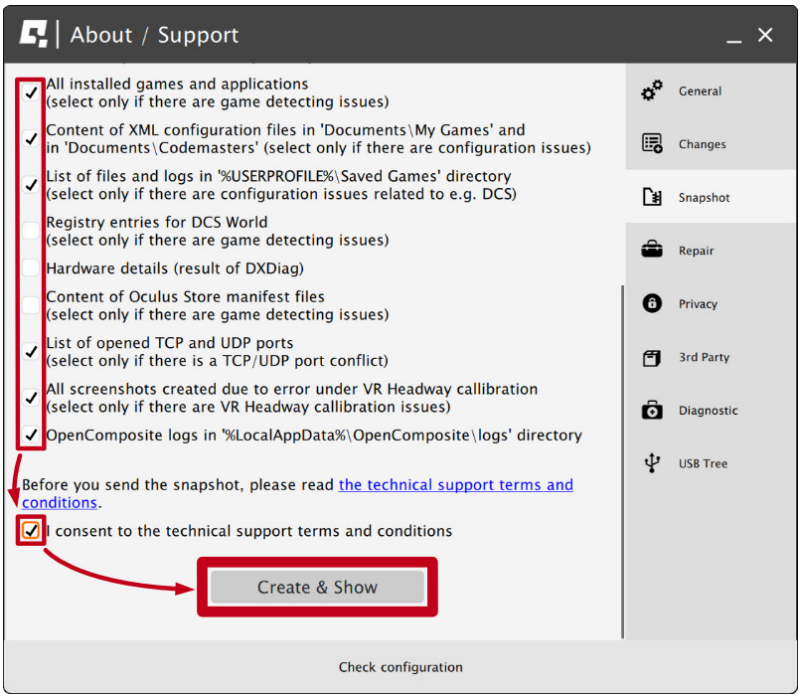
1. Open the main window of the Qubic Manager application.
2. Go to **Tools and Diagnostic →About / Support**



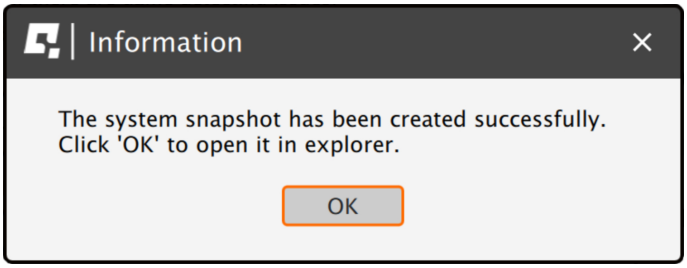
3. Open the **Snapshot** window:



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



6. Wait for the processing to finish. After the snapshot has been created, click on the **OK** button - the folder with the snapshot ZIP file will open.



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

8.2. 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

9. ADVANCED APPLICATIONS

INFO

Examples shown in this section describes optional application of external safety and power cut-off devices. If you wish to expand the functionality of your motion system, read the whole section to have a good understanding of how to apply and what functionality to expect. Apply at your own discretion.

WARNING

Motion Lock input is not a SIL/PL (safety integrity level/performance level) rated and **DOES NOT** guarantee safety. If you wish to achieve specific SIL/PL ranking, consider introducing a power cut-off device that is controlled by an external safety relay and cuts off the power to all QS-SB2. Example application of the power cut-off contactor can be found in section 9.3.2 and 9.3.3.

INFO

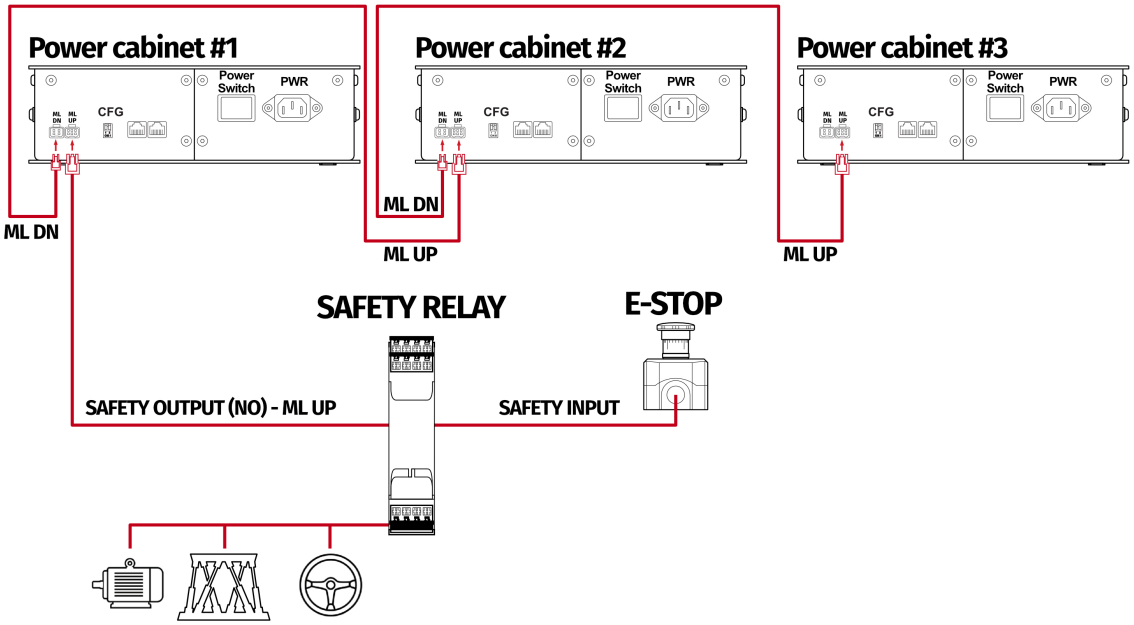
When applying safety relay to the Motion Lock :

- Use input cables according to your safety relay manual.
- Use output cables according to your safety relay manual and cross section no less than 0,75 mm^2

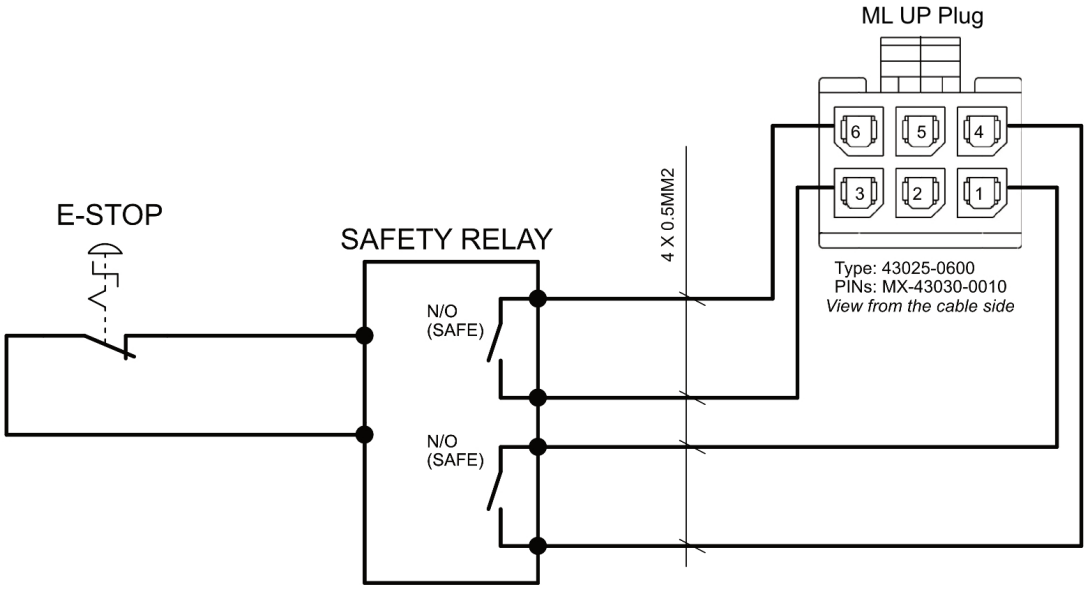
9.1. ADDING ADDITIONAL DEVICES TO THE MOTION LOCK CIRCUIT

If there is necessity to stop other devices, apart from the QS-BT1, ML (Motion Lock) and additional user devices can be controlled by safety relay outputs. In the example application, the E-STOP button is connected to the external safety relay. When the E-STOP is triggered, the safety relay will activate the Motion Lock function, which will stop motion of the platform and additional devices.

Example application of single-channel safety relay that controls ML and additional devices :



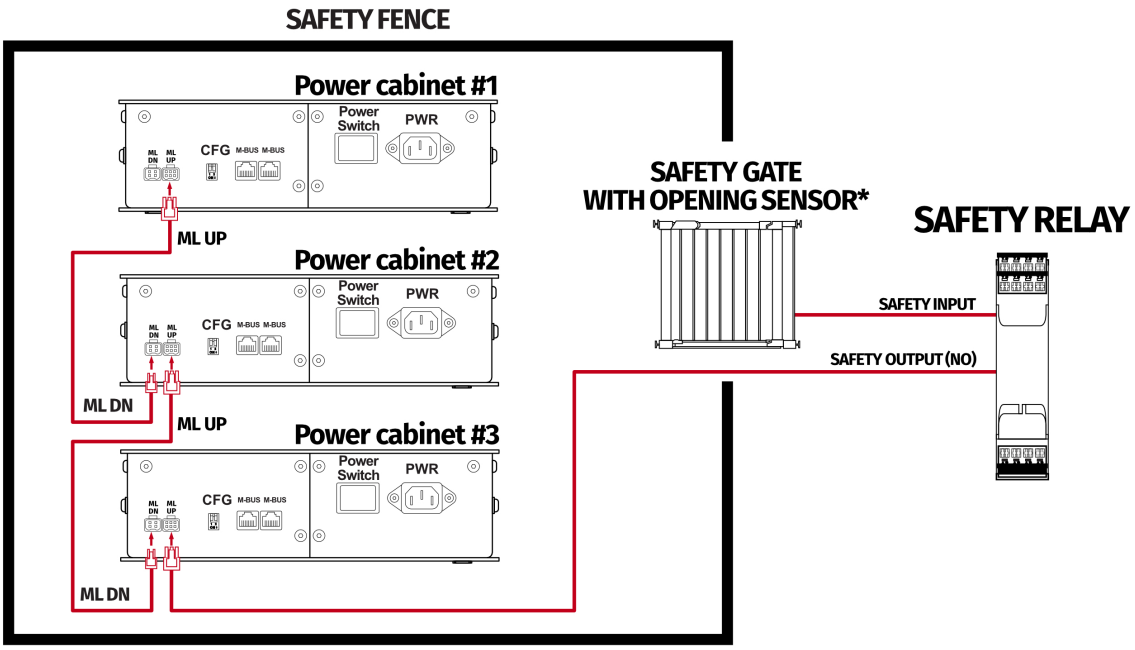
Example wiring diagram of application of one-channel safety relay with E-STOP button:



9.2. IMPLEMENTING THE WORKING ZONE PROTECTION

For protection against accidental hit from moving parts of the platform, safety gate with opening sensor* can be connected to safety relay input for activating ML function. When the gate is opened, the safety relay output activates the ML (Motion Lock) function and stops the motions of the platform.

Example application of safety gate opening sensor:



*Check your safety relay manual for list of applicable sensors

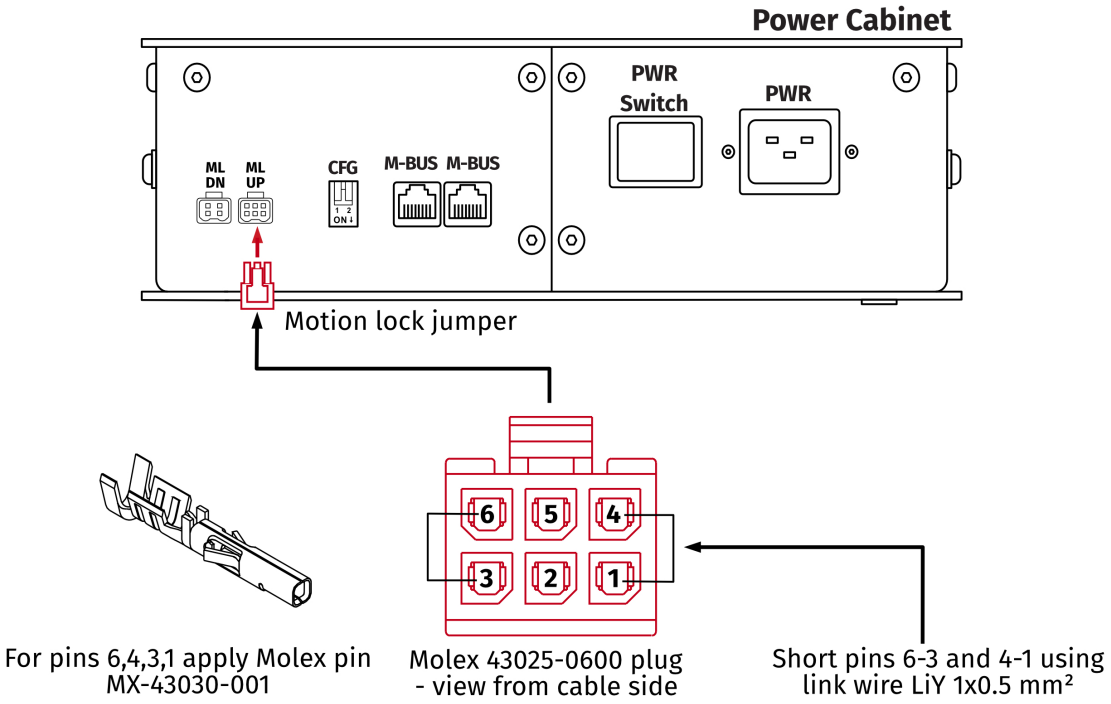
9.3. INCREASING SAFETY LEVEL

WARNING

Modifications of the safety system, involving application of the power line contactors, shall be performed only by a competent person. A competent person is a qualified and knowledgeable person, who because of their training, experience has the knowledge required to apply those changes. It is user responsibility to commission modification of the safety system to a competent person, experienced with industrial wiring practices, which will be required to undertake the installation. Commissioning shall be undertaken by a trained electrical technician experienced in safety installations.

9.3.1 ASSEMBLING MOTION LOCK JUMPER

To apply solutions which require to use power line contactors, Motion Lock connection cables in the QS-SB2 power cabinet needs to be replaced with jumpers. To prepare a jumper, you need to assemble recommended connector as shown below:



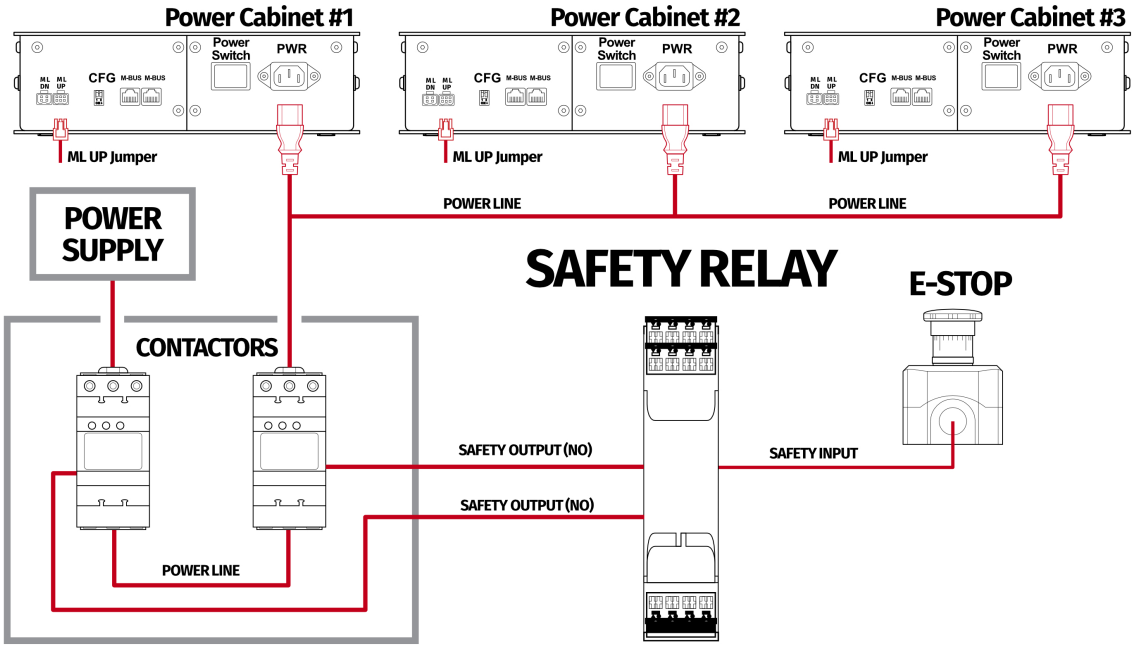
9.3.2 ADDING POWER-CUT CIRCUIT WITH E-STOP BUTTON

If specific SIL/PL rated level needs to be achieved, it might be necessary to install a power cut-off device. Two contactors connected in series and controlled by safety relay can be used to provide or cut-off power line to QS-SB2 power cabinets. When safety function on safety relay input is triggered, a safety relay will switch off the contactors, thus cutting-off the power to the platform. To apply this solution, ML UP connection cables needs to be replaced with prepared jumper as described in section 9.3.1

INFO

To achieve required safety performance level it is necessary to perform safety risk assessment at user site.

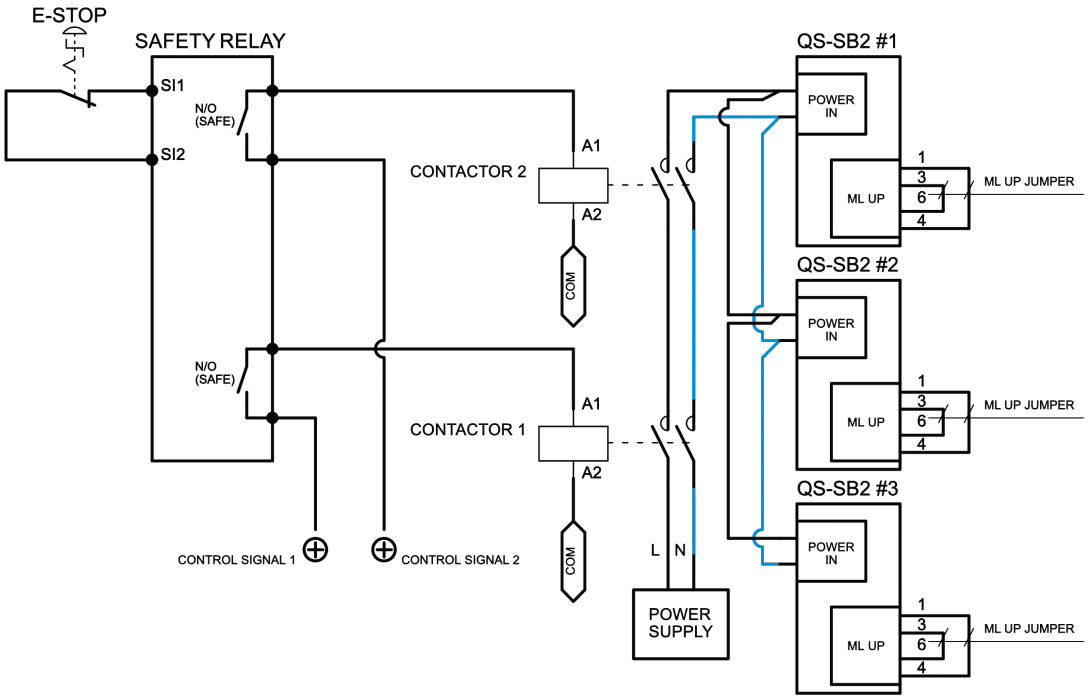
Example application of power line contactors and E-STOP button:



INFO

In order to increase SIL/PL level it's a good practice to apply well-known contactors of two different manufacturers in order to decrease probability of failure resulting from serial production.

Example wiring diagram of application of power line contactors and one-channel safety relay with E-STOP



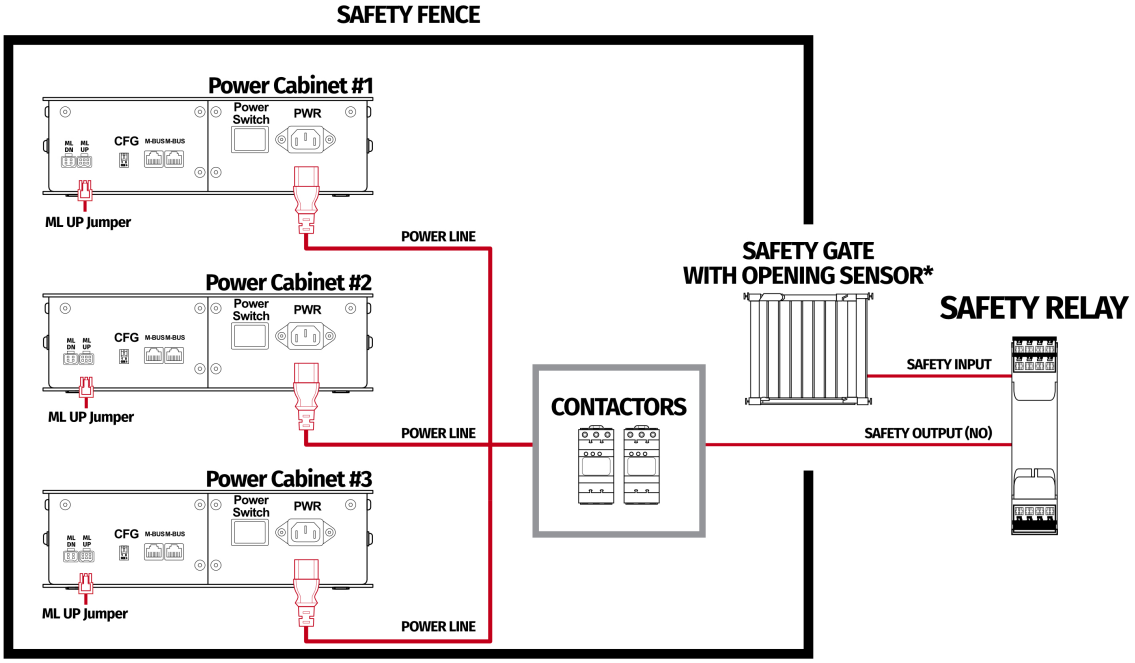
INFO

PE (protective grounding/earthing) connection is omitted for better transparency

9.3.3 IMPLEMENTING THE WORKING ZONE PROTECTION WITH POWER-CUT CIRCUIT

In example application contactors connected in series provide power line to the QS-SB2 power cabinets. When safety function on safety relay input is triggered, a safety relay will switch off the power contactors, thus cutting-off the power to the platform.

Example application of power line contactors with safety gate opening sensor:



*Check your safety relay manual for list of applicable opening sensors

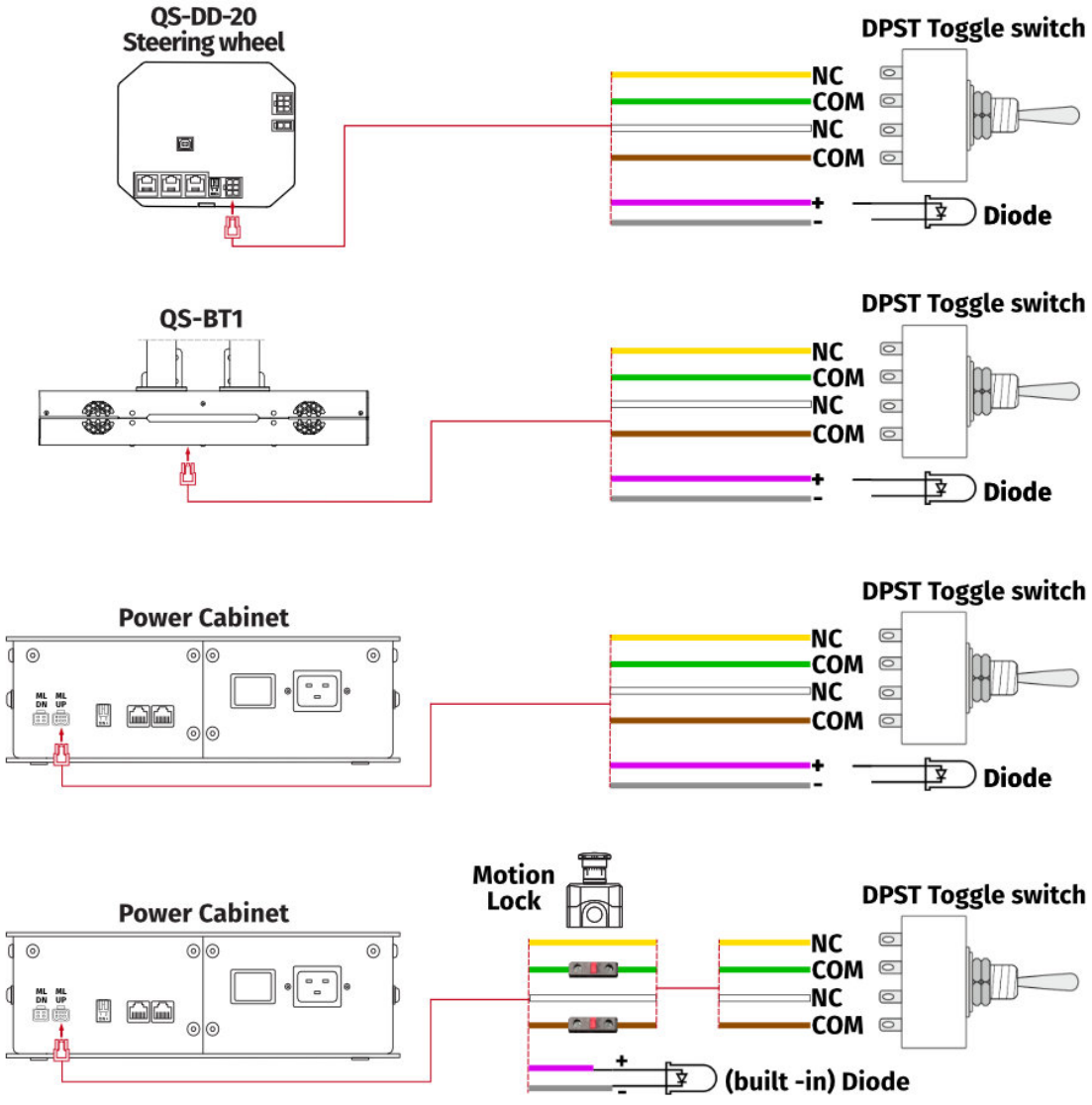
INFO

When applying safety relay and contactors to the power line remember to:

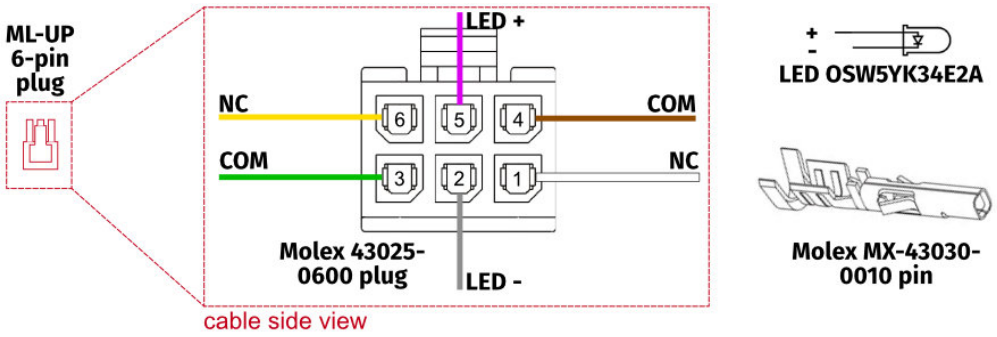
- Use control cables according to your safety relay manual
- Power line cables shall be chosen accordingly to power requirements of motion system. See power requirements of specific motion system.

9.4. IMPLEMENTING NON-FACTORY MOTION LOCK SWITCH

If you want to assemble custom motion lock switch or a button box setup (only Double Pole Single Throw switch compatible) using QubicSystem Motion Lock interlink cable, follow the diagrams below:



For non-factory Motion Lock plug setup, you must assemble plug and connectors as shown below:



10. CONFORMITY INFORMATION

The QS-BT1 carries a CE mark and complies with essential requirements of the European Union regulations.

11. ENVIRONMENTAL INFORMATION

DO NOT dispose of this product with standard household waste; leave it at the nearest collection point for the disposal of electrical and electronic equipment.

QS-BT1 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 regarding the nearest collection point.

12. MANUFACTURER INFORMATION

Qubic System is a brand that belongs to **Motion Systems**
HQ address is: Miedziana 7 Street, 55-003 Nadolice Wielkie
Poland
https://qubicsystem.com

INFO

For support queries, to get the quickest and most targeted support, we recommend you contact your regional reseller.

QUBICSYSTEM

QS BT1