VNM SIMULATION., JSC

VNM DIRECT DRIVE USER MANUAL

REVISION 1.0

Contents

Please read the manual carefully before installing or operating the wheelbases.

1. VNM Direct Drive Wheelbase specifications

VNM Direct Drive Wheelbase Family (abbreviated as: "wheelbase") has 4 types which have different specifications as bellow

	Premier	Elite	Supreme	Xtreme
SKU	VNM-DD01PRE	VNM-DD01ELI	VNM-DD01SUP	VNM-DD01XTR
Motor	5 polepairs smooth motor	5 polepairs smooth motor	5 polepairs smooth motor	5 polepairs smooth motor
Encoder	23-bit encoder	23-bit encoder	23-bit encoder	23-bit encoder
Maximum torque	13Nm	18Nm	25Nm	32Nm
VNM QR Base Side	Included	Included	Included	Included
EMC Stop Button	Regular (Superior optional)	Regular (Superior optional)	Superior	Superior
Power supply	300 W	360 W	480w	480w
Wheelbase Dimensions (without QR base side)	130x130x228mm	130x130x247mm	130x130x267mm	130x130x271 mm
Wheelbase weight (kg)	11.6	13.3	15.7	16
Packing Box(cm)	47x35x24	47x35x24	49x35x24	49x35x24
Box includes	- Wheelbase - Power Supply - USB A to B cable - USB A to C cable - EMC Stop Button - VNM Quick Release Base Side			

| | - 4xM8 bolts |
| | - A hex wrench set |

2. Wheelbase Mounting Pattern

2.1. Front mounting pattern

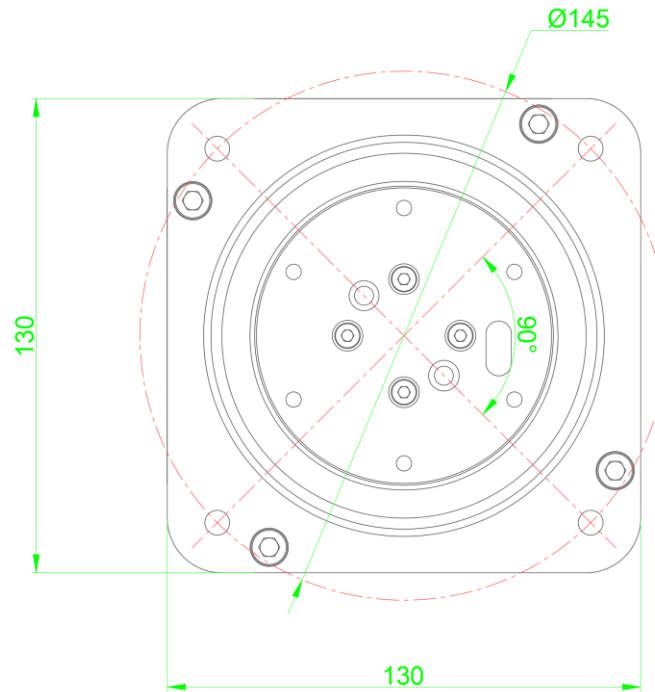All wheelbase of VNM has same front mounting pattern as following:
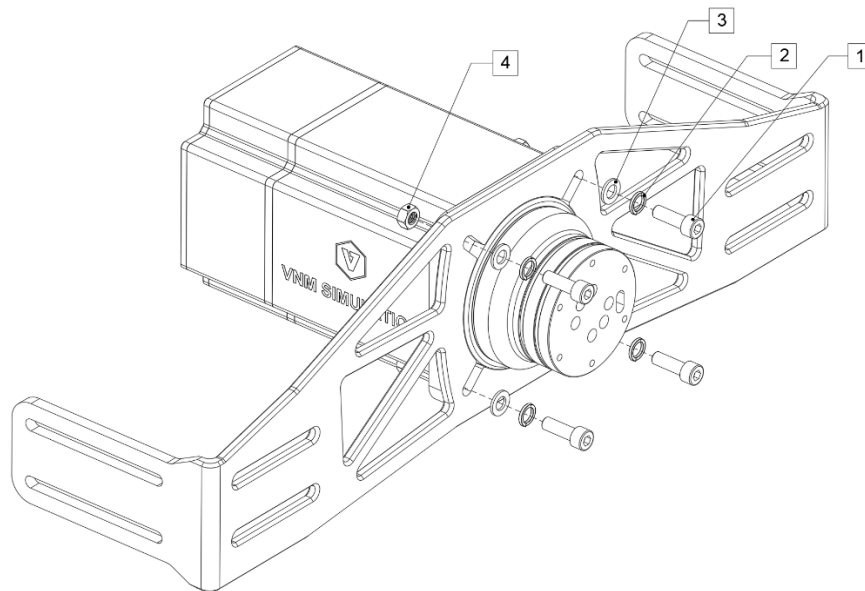

Figure 1. VNM Wheelbase Front dimensions

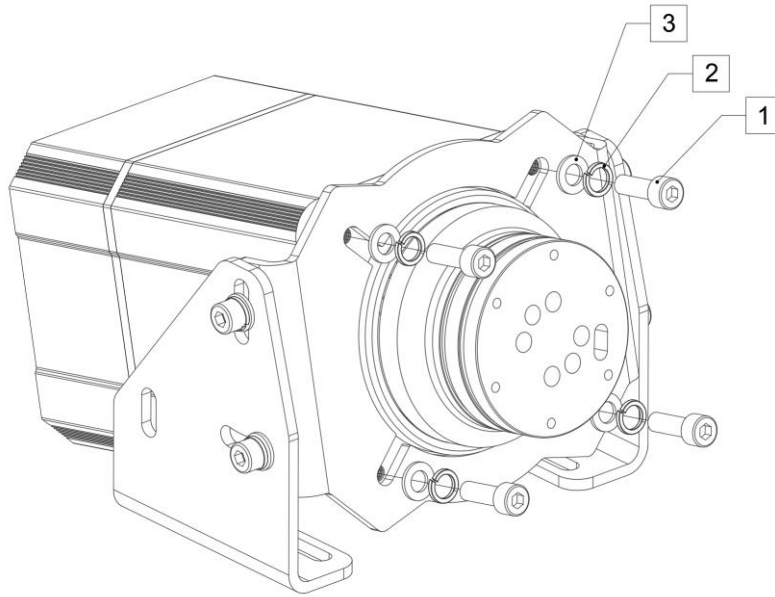Figure 2. Mounting VNM Wheelbase on a simulator rig front mount bracket.

Figure 3. Mounting VNM Wheelbase using a mounting bracket

Wheelbase Xtreme	is mounted with 4xM8 bolts length 30mm with 1,25mm thread pitch (1); 4xM8 spring washers (2); 4xM8 flat washers (3) and 4xM8 nuts (4) in Figure 2
Wheelbase Premier, Elite, Supreme	are mounted with 4xM8 bolts length 25mm with 1,25mm thread pitch (1); 4xM8 spring washers (2) and 4 xM8 flat washers (3) in Figure 3.

2.2. Side mounting pattern

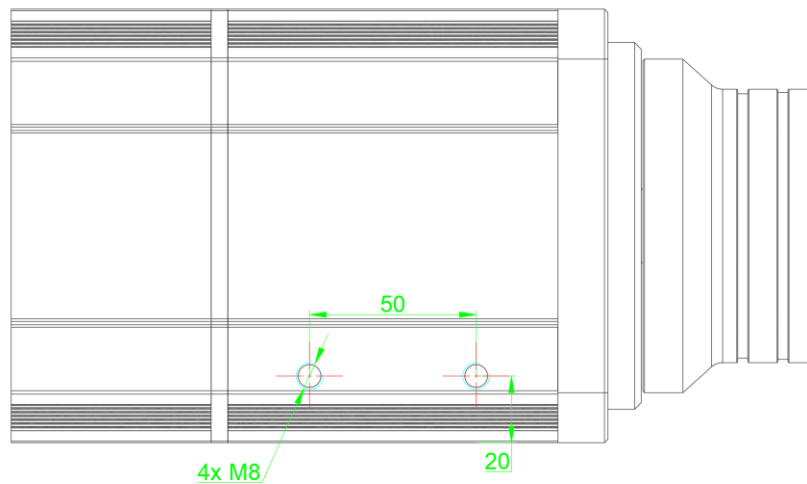Only The wheelbase Premier, Elite, Supreme have side mounting pattern

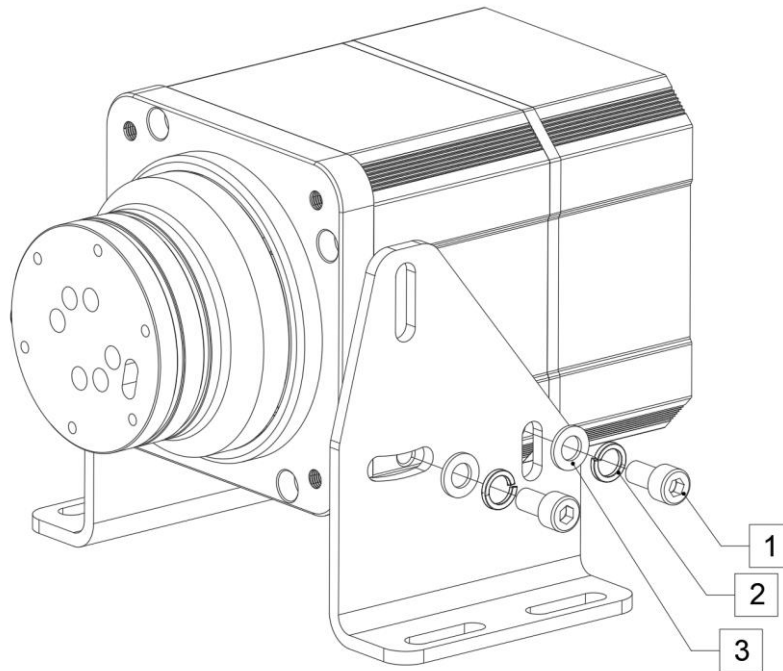Figure 4. VNM Wheelbase Premier, Elite, Supreme side mounting pattern

Figure 5. Mount VNM Wheelbase Premier, Elite, Supreme with side mount bracket.
Wheelbase Premier, Elite. Supreme are mounted with 4xM8 bolts length 20mm with 1,25mm thread pitch (1);4xM8 spring washers (2) and 4xM8 flat washers (3).

2.3. Bottom mounting pattern

Only The wheelbase Premier, Elite, Supreme have bottom mounting pattern
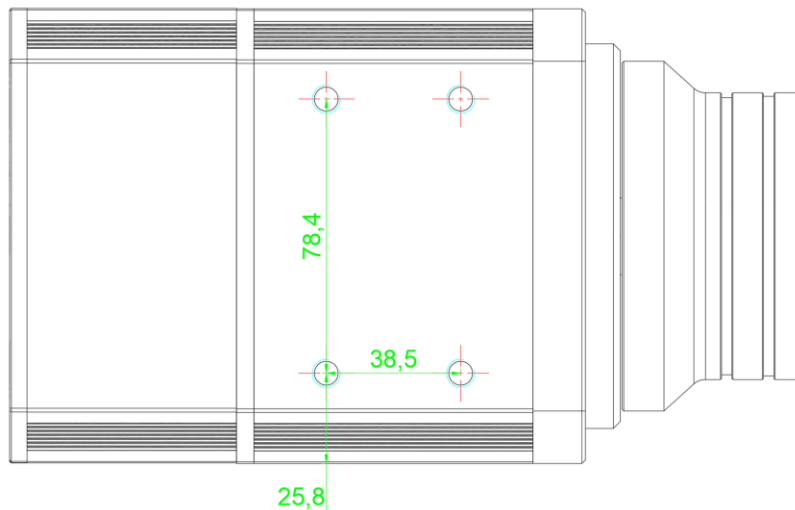
2.3.1. The Wheelbase Premier

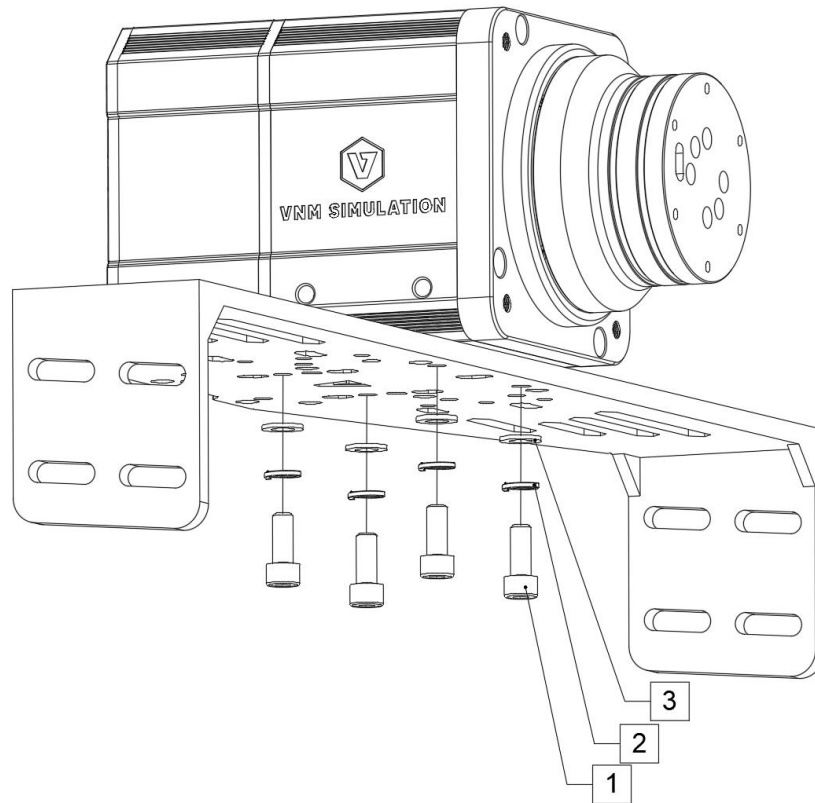Figure 6. VNM Wheelbase Premier mounting pattern.

Figure 7. Mounting VNM Wheelbase Premier on bottom mounting bracket.
Wheelbase Premier is mounted with 4 x M8 bolts length 20mm with 1,25mm thread pitch (1); 4 x M8 spring washers (2) and 4 x M8 flat washers (3).
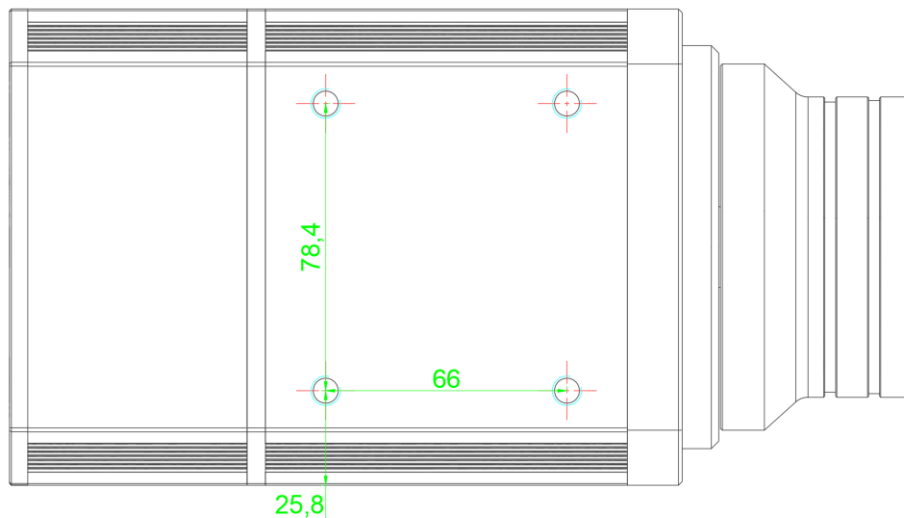
2.3.2. The Wheelbase Elite

Figure 8. VNM Wheelbase Elite bottom mounting pattern.

Figure 9. Mounting VNM Wheelbase Elite on bottom mounting bracket.

Wheelbase Elite is mounted with 4xM8 bolts length 20mm with 1,25mm thread pitch (1); 4xM8 spring washers (2) and 4xM8 flat washers (3).

2.3.3. The Wheelbase Supreme

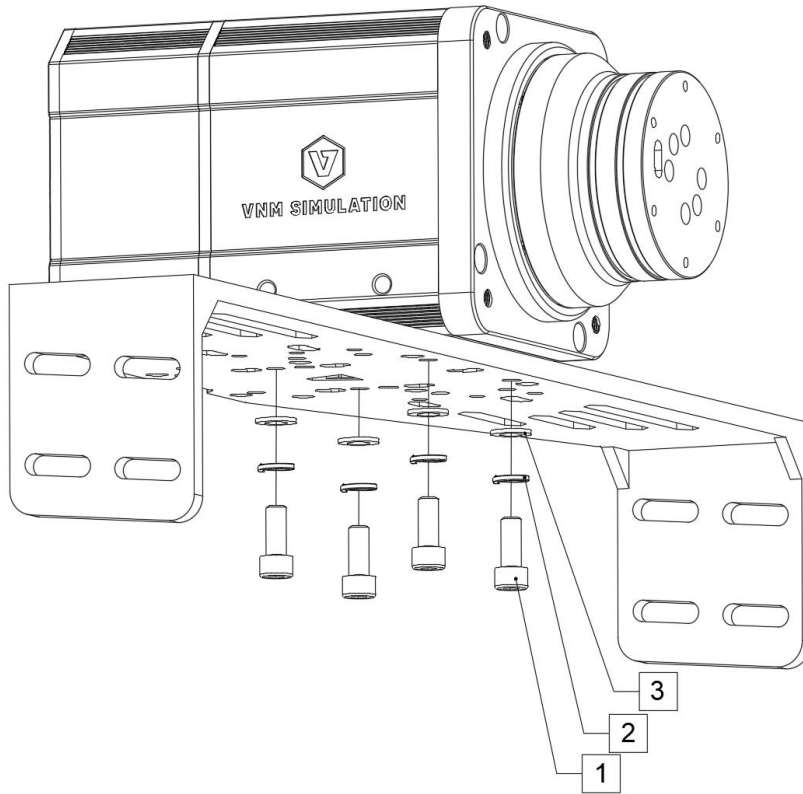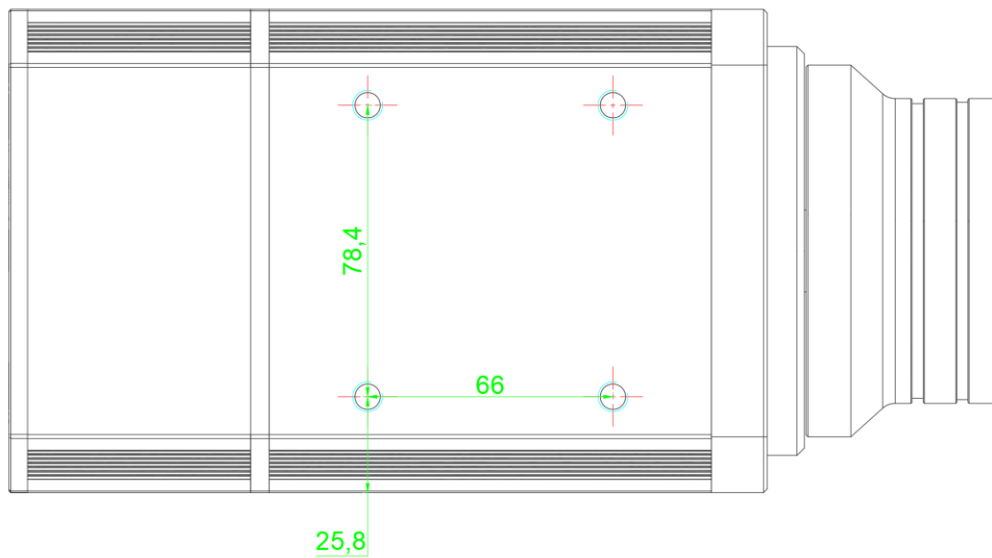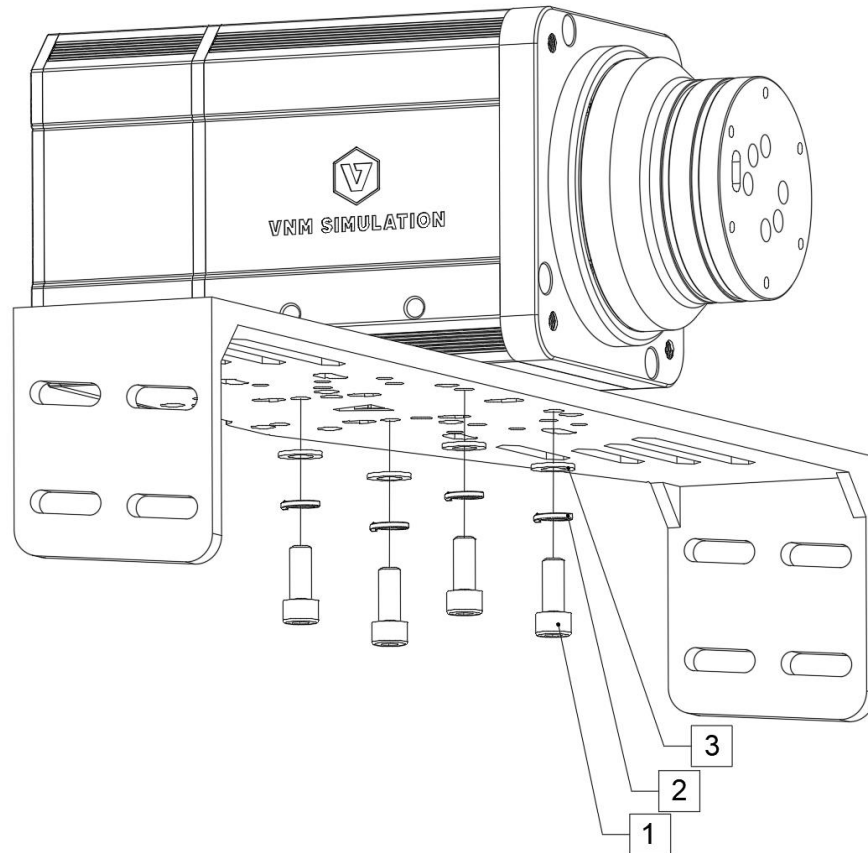Figure 10. VNM Wheelbase Supreme bottom dimensions

Figure 11. Mounting VNM Wheelbase Supreme on bottom mounting bracket. Wheelbase Supreme is mounted with 4xM8 bolts length 20mm with 1,25mm thread pitch (1);4xM8 spring washers (2) and 4xM8 flat washers (3).
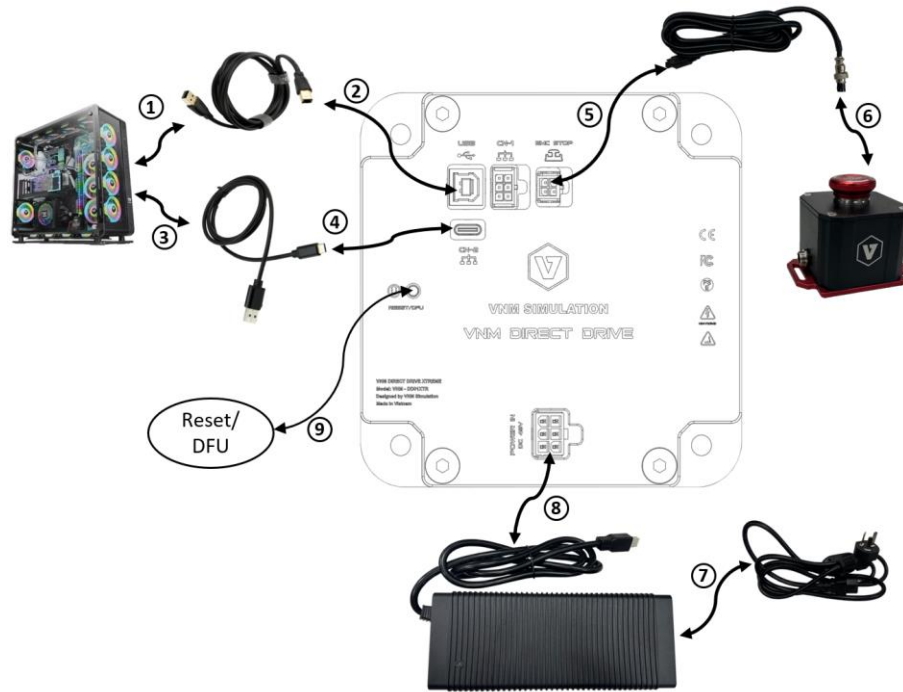
3. Connection

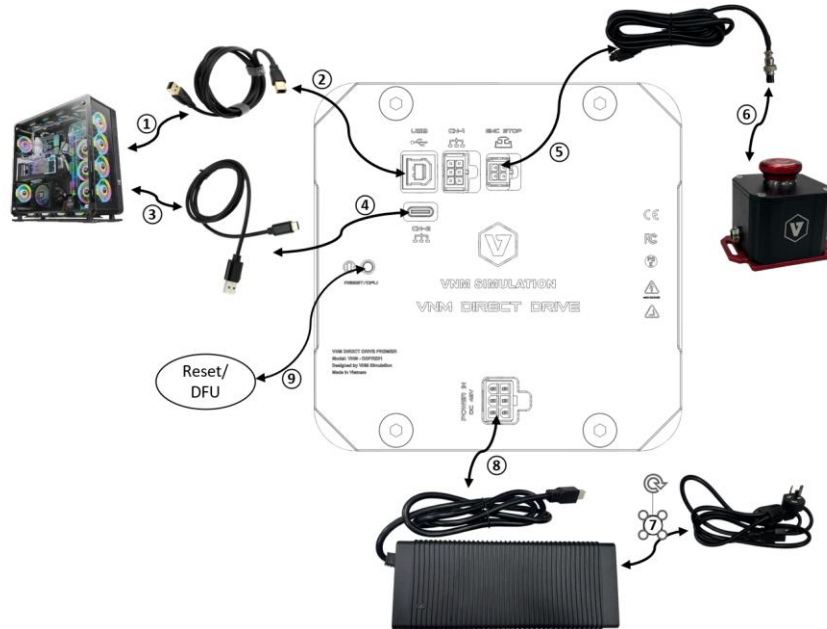Figure 12. Connection ports of VNM Wheelbase.

Figure 13. Connection ports of VNM Wheelbase Supreme

Wheelbase Premier, Lite uses a normal EMC Stop Button, and lower power adapters which has different appearance and the connection are same with the wheelbase Supreme.

CN-4 is used for future use.

Disclaimer:

Please note that the appearance of VNM wheelbases may vary from the illustrations in this User Manual and from the product images on the VNM Simulation website (https://vnmsimulation.com)

4. Product safety warnings and instructions

4.1. Intended Use and User Responsibility

- The Wheelbase Supreme and Xtreme are designed for professional use only. Any other usage is at the user's own risk.
- These wheelbases are intended for use by adults who are in good physical and mental health.

4.2. Torque and Control

- The wheelbases can generate high torque up to 32Nm.
- Do not set the torque level higher than what can be safely managed with one hand.
- If the torque becomes uncontrollable, release the steering wheel and press the EMC stop button.

4.3. Damage and Contact

- If the wheelbase shows any signs of damage, discontinue use immediately and contact the seller or VNM Simulation.

4.4. Indoor Use and Environmental Conditions

- These wheelbases are intended for indoor use only.
- Avoid exposing the wheelbases to heat sources or direct sunlight.
- Do not place the wheelbases in damp environments or in contact with water.
- Recommended operating temperature: 10-35 degrees Celsius.

4.5. Power Supply and Connection

- Unplug the power cord during thunderstorms or when the wheelbase will not be used for extended periods.
- Always connect the DC side of the power supply to the wheelbase before connecting the AC side to the power outlet.
- Only use the power supply and power cord provided with the wheelbase or obtained from an authorized reseller.

4.6. Device Handling and Safety

- Do not open the casing of the wheelbase.

- Handle the power supply with care to avoid damage.
- The wheelbase contains magnets that may interfere with electronic devices. Keep such devices at least 20cm away.

4.7. Usage Recommendations

- It is recommended to use the wheelbases for no more than 2 hours per day, with breaks after every hour. Excessive use of force feedback may be harmful to your health.
- The surface temperature of the wheelbase can reach up to 70 degrees Celsius (158°F). Do not touch the wheelbase surface during operation or within 2 hours after use.

5. Safe Operation instruction

5.1. Read the User Manual

Carefully read the user manual before installing or operating the wheelbases.

5.2. Secure Installation

- Securely mount the wheelbases on a rigid platform, such as a sim racing rig, using the specified mounting pattern in section 2.
- Never operate the wheelbases without securing them to a rigid platform. Other types of fixings are not allowed.
- Firmly install the EMC Stop button on the rigid platform in a position where it can be easily pressed.

5.3. Before Powering On

- Download and open the VNM Config software from VNM Simulation to see operating status of the wheelbases.
- Attach a steering wheel firmly using the VNM quick release set (not included with the wheelbase).
- Ensure that children under 15 years old are kept away from the wheelbases.
- Keep all loose objects, such as hair, clothing, and cables, away from the wheelbases.
- Use a USB type B to type A cable to connect the wheelbases to the computer.
- Connect the DC side of the power supply to the wheelbase.

5.4. Power On

- Only plug the power supply into a 110-240 V AC outlet with protective earth after completing all the above steps.
- Test the function of the EMC stop before each usage session.

5.5. Safety Precautions

- Do not touch the freely rotating steering wheel directly or indirectly.

- Always use the EMC stop button to stop and prevent motion.
- Children under 15 years old are not allowed to use the Premier or Elite wheelbase in high torque mode, and any mode of the Supreme and Xtreme wheelbase.
- After each use, press the EMC stop button or unplug the power supply.
- Always press the EMC stop button before removing or attaching a steering wheel to the wheelbases.
- Always use the EMC stop button to stop and prevent motion.
- Children under 15 years old are not allowed to use the Premier or Elite wheelbase in high torque mode, and any mode of the Supreme and Xtreme wheelbase.
- After each use, press the EMC stop button.
- Always press the EMC stop button before removing or attaching a steering wheel to the wheelbases.
- Do not release the EMC button unless the VNM Quick release handle is closed and the VNM Quick release is secure.
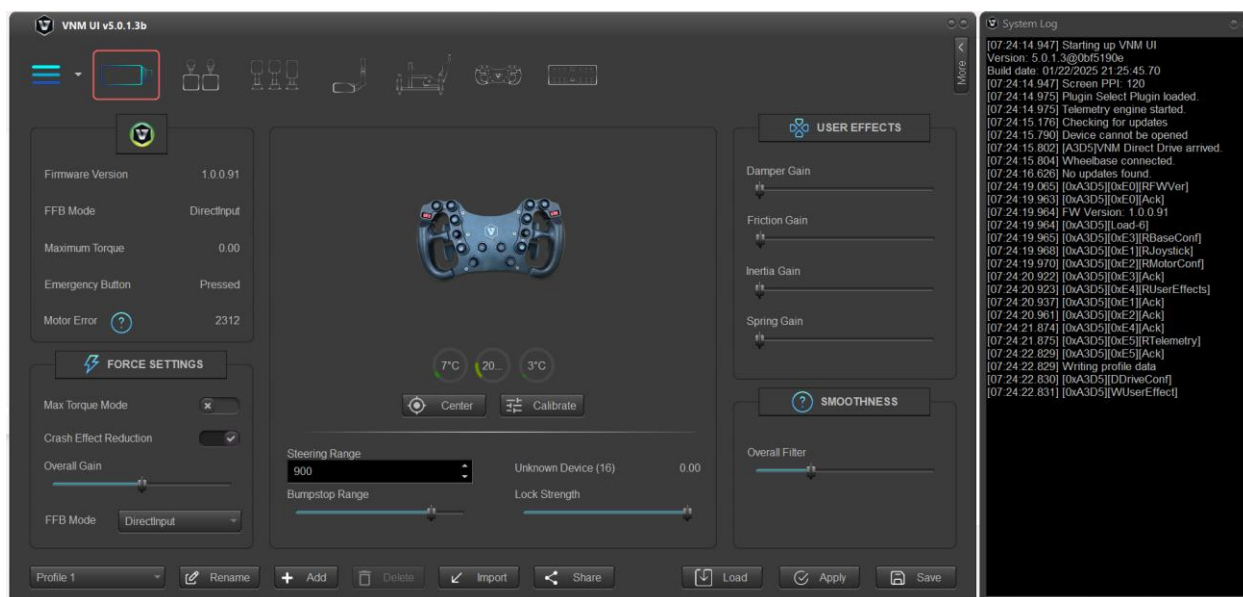- Inform other users of the safe usage of the wheelbases before use.

VNM SIMULATION., JSC

VNM DIRECT DRIVE CONFIGURATION MANUAL
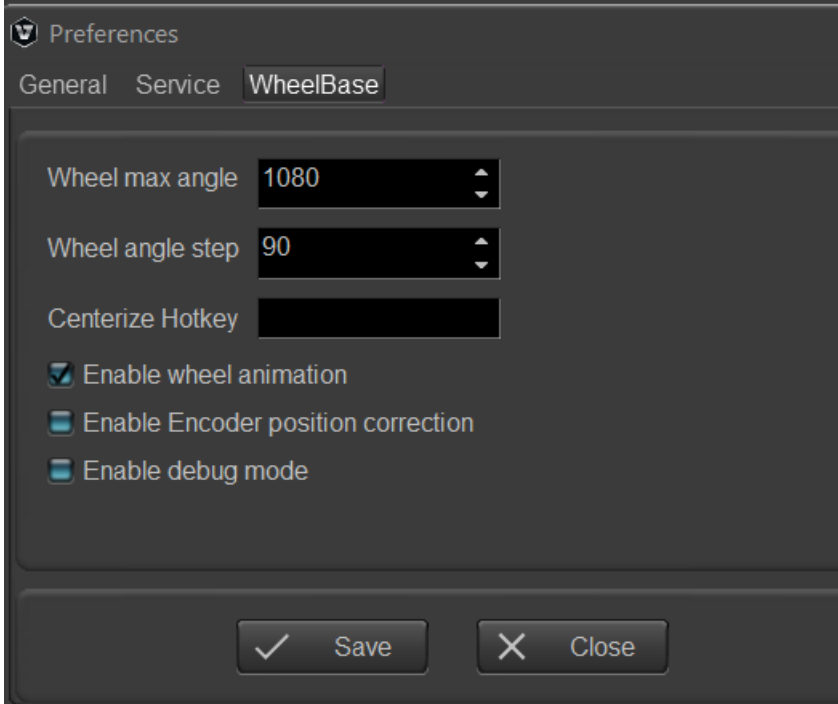
1. UI Configuration

1.1. Basic Setting

In the manual the UI uses the black theme. User can change the theme.


Click more to view extra settings

Items	Description	Default Value
Base Status		
	Connection status of VNM Direct Drive Wheelbase. Green color means "connected"	
Firmware version	Firmware version of the base	0.0.0.0

FFB Mode	Actual ffb mode in the base	Direct Input
Maximum Torque	Actual current max torque of the base	0.0
Emergency Button	The Emergency Stop Button must be connected to the base and the EMC Stop Button released for the base to operate. The EMC Stop button attempts to stop the base immediately when it is pressed	Pressed
Motor Error	Click on to read the description and solution of the error.	0
Force Settings		
Max Torque Mode	It is disabled by default, enable it for double ffb torque.	Disable
Crash Effect Reduction	In some cases of crashes, the base will move slower.	Enable
FFB Mode	There are some modes like: - Direct Input: This is a legacy API - Telemetry - Iracing 360Hz: Not yet implemented TDI: Telemetry + Direct Input, Not yet implemented	Direct Input
Force Range	Increase minimum force and reduce max force	0-10000
Reverse force	Reverse ffb	disable
Wheel Settings		

Steering Angle	Lock to lock rotation. Can increase the max rotation to 7200 degree in Preferences -> WheelBase -> Wheel max angle	900
Bumpstop Range	The locking force increases from 0 to maximum locking force corresponding to the steering angle to bumpstop range	920
Lock Strength	locking force strength.	10000
⊙ Center	Recenter the wheel	NA
⇄ Calibrate	The base will perform a calibration process (1 turn left and 1 turn right). Do not touch the steering wheel during calibration. Normally, this process will happen automatically after flashing the firmware.	NA
Temperature	Base's temperatures	NA
Device name	Name of the base and maximum torque	NA
User Effects User can add some effect to simulate nature of steering wheel movement, only active when a game runs. The value is ffb gain.		
Spring	Make the steering wheel try to center all time.	0
Damper	Make the steering wheel less oscillation	0
Inertia	Simulate the steering wheel weight	0
Friction	Simulate the friction of steering wheel	0
Game Settings		

	Ffb gain of each effects that game want the base simulates. See description of each effect bellow to understand what effects are.	100
Smoothness The smaller smoothness value, the smoother force feedback. 0 means don't use this feature.		
Overall	Smooth total force	150
Damper	Only smooth damper force	0
Inertia	Only smooth inertia force	0
Friction	Only smooth friction force	0

1.2. Profile Settings
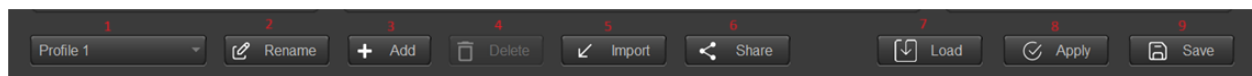
1 – Select profile: 1st to 4th profile are saved to the base. From 5th profile is saved to PC.

2 – Rename selected profile

3 – Add new Profile

4 - Delete a selected profile, only from 5th profile

5. Import profile from other users

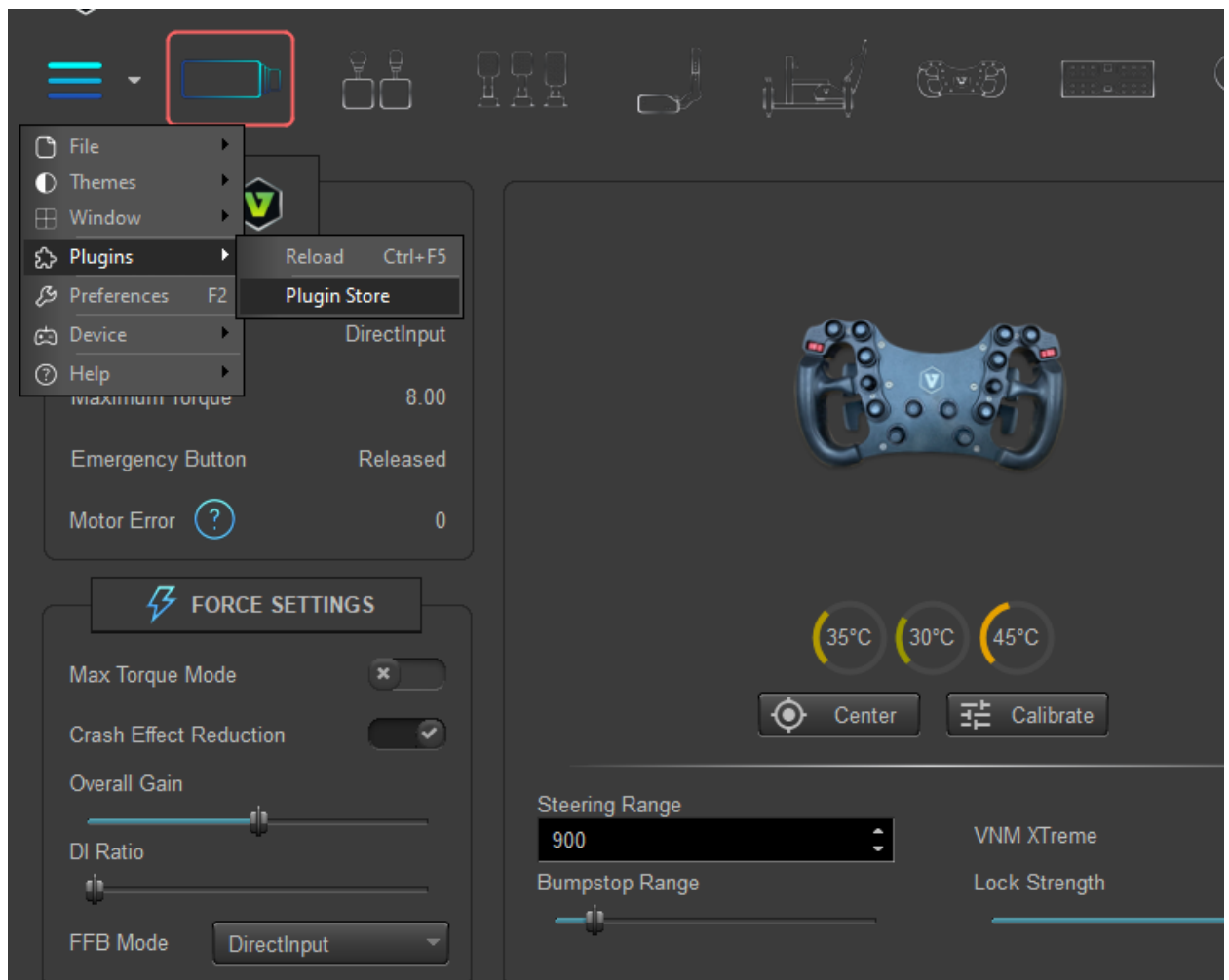6. Export profile to share with other users

7– Load profile from the base in case you want rollback a configuration hasn't been applied to the base.
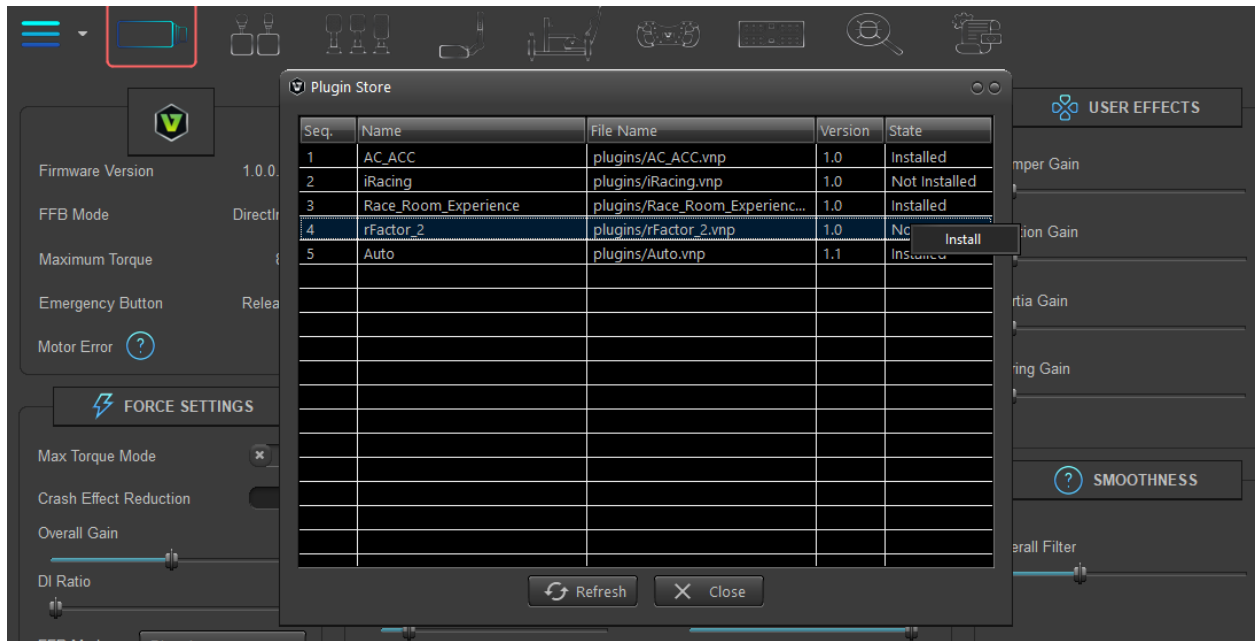
8 - Apply the configuration to the base.

9 – Save Configuration permanently to base or PC.

1.3. Telemetry Settings

- Download plugin:

- Install plugin by right-click and choose to install.

User can active Telemetry setting by press CTRL+T (For iRacing, set irsdkLog360Hz=1 in file app.ini which is located in C:/Users/<account>/Documents/iRacing folder)

- Telemetry is being developed. If it is complicated for you, pls use Direct Input. It works out of the box.
- Plugins

    + Auto plugin automatically detects game (AC, ACC, iRacing, RF2, LMU).

    + AC/ACC plugin can use for ACE

    + RaceRoom plugin can use for raceroom but not stable to get data from RaceRoom.

Telemetry Settings

☑ Telemetry   Auto

☑ Base/Direct Drive   ☑ Wheel

Force Reduction Threshold (Degree)   5
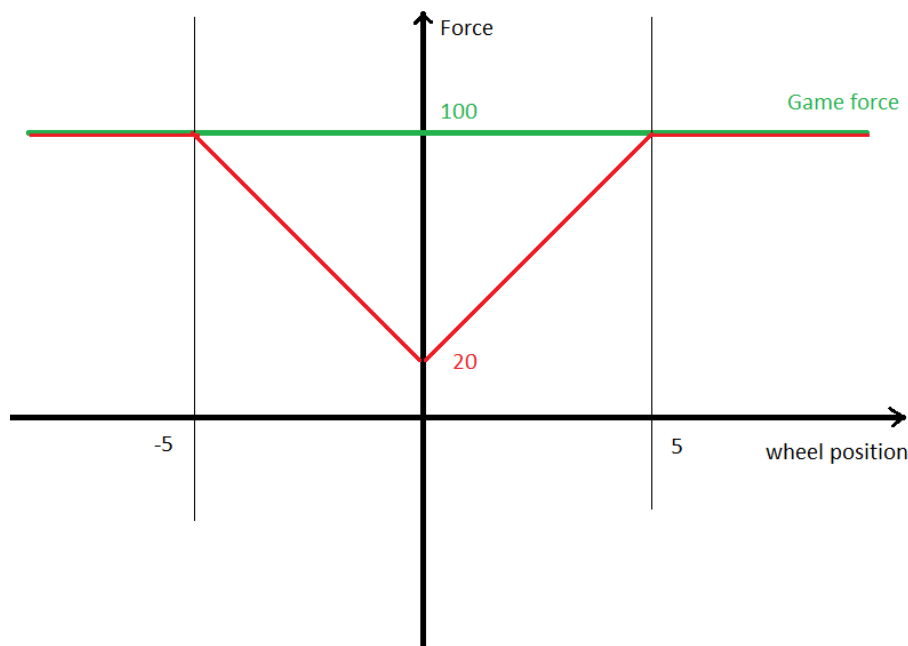
Force Reduction Factor   20

Road Texture Gain   0

Select Profile   Save

- Telemetry can be sent to Base, Wheel…
- Force Reduction Threshold(degree): the force will be reduced from [- Force Reduction Threshold, Force Reduction Threshold] degrees.
- Force Reduction Factor: the lowest force will be reduced to.
- Road Texture Gain: add more road texture effect.

After changing value, click save. You can save your profile for each game/car.
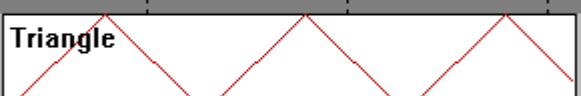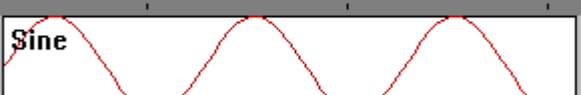
1.4. Motor code Error translation

Bit	Severity	Description	Solution
0	Critical	Internal Error	Reset direct drive
1	Critical	Over Voltage Protection	Reset direct drive
2	Critical	Over Current Protection	Reset direct drive
3	Critical	No response from Encoder	Reset direct drive, check encoder connection
4	Critical	Encoder value is abnormal	Reset direct drive, check encoder connection
5	Critical	Encoder internal error	Reset direct drive
6	Critical	Brake temperature is too high	Turn of DD 30 minutes
7	NA	Reversed	
8	Major	EMC Stop Pressed	Release EMC Stop Button
9	Major	USB disconnected	Connect USB cable to PC
10	Major	Over Voltage Protection	Press and release EMC Stop Button
11	Major	Under Voltage Protection	Press and release EMC Stop Button
12	Major	Mosfet temperature is high	Turn off DD at least 5 minutes
13	Major	Driver temperature is high	Turn off DD at least 60 minutes
14	Major	Brake temperature is high	Turn off DD at least 5 minutes

2. Game Tunning

2.1. Effects description

Effect Name	Description	Picture of effects
Constant force	A steady force in a single direction	
Ramp force	A force that steadily increases or decreases in magnitude	
Square force	Create a square wave form force	
Triangle force	Create a triangle wave form force	

Sine force	Create a sine wave form force	
Sawtooth Up force	Create a sawtooth up/down form force	
Sawtooth Up force		
Spring force	The force increases in proportion to the distance of the steering wheel from center.	
Damper force	The force increases in proportion to the speed with which the user moves the steering wheel	
Inertia force	The force increases in proportion to the acceleration of steering wheel	
Friction force	The force is applied when the steering is moved and depends on the defined friction coefficient.	

Depends on each game user can increase/decrease gain of each force

2.2. Game Tunning

Game	Game effect	User Effect
AC/ACC/iRacing/ F1 2020	Constant gain, damper gain	All
AMS2	Constant gain	All
Dirt4/Rally 2.0	Constant gain, friction gain	All
Project car 2	Constant gain, sine gain	All
Raceroom	Sine gain	All
RF 2	Sine gain, damper gain	All
WRC Generation	Ramp gain, square gain, sine gain, spring gain, damper gain	All
WRC 10	Constant gain, sine gain, spring gain, damper gain	All
To be updated		

3. Bug report

If software is crash. Send me bugreport.txt via discord channel

Other issues, you can send messages in discord channel.

VNM Simulation is always willing to listen from community. Welcome any recommendations to improve features 😊