

**PANTHER**

# Safety Instructions



# Husarion Panther

## Safety Instructions

*Applicable to versions: Panther v1.0, Panther v1.05, Panther v1.06, Panther v1.2, Panther v1.21-v1.30.*

**To avoid malfunction or damage to your Panther please read this safety manual before use.**

### 1. General precautions

- Keep this product away from children. It is not designed to be used by children. It also has rough edges and contain small parts that could be swallowed.
- The connection of unapproved devices to the internal or external ports (I/O, USB, power supply, Ethernet etc.) may affect Panther performance or result in damage to the unit and invalidate the warranty.
- The robot enclosure contains a several compartments. The central compartment, which is the biggest and contain the battery, is designed to be available for user to allow modifications. Any modifications and interference in other compartments, without guidance from the Husarion support, can possibly cause in damage or warranty void.
- Please follow local regulations when using Panther. They may forbid or limit the use of autonomous robots in the certain situations.
- The robot cannot be disposed to the regular trash bin. Obey the local recycling requirements and applicable regulations. When the product is no longer in use, discard it at a recycling location.

### 2. Use of the internal battery

This product contains and is powered from Lithium-Ion battery pack. Lithium-ion cells and battery packs may get hot, explode or ignite and cause serious injury if exposed to abuse conditions. Be sure to follow the safety warnings listed below:

- Use only the battery provided to use with Panther, which is equipped with a protection circuit! Using unprotected batteries may result in serious injuries or fire.
- Do not connect the positive terminal and negative terminal of the battery to each other with any metal object (such as wire). Do not allow the battery terminals to touch the metal enclosure of the robot or any other conductive part.
- Do not pierce the battery with nails, strike the battery with a hammer, step on the battery or otherwise subject it to strong impacts or shocks.
- Do not expose battery to water or salt water, or allow the battery to get wet.

- Use only the battery charger that is included with Panther. The included charger is capable of charging 10S Li-Ion battery configuration (maximum charging voltage: 42,0V), with the maximum current of 5A or 2x5A (for dual battery variant).
- If you use a dedicated WCH01 & WCH02 kit (Wireless charger) for charging Panther, do not connect the cable (standard) charger at the same time. It may result in blowing the safety fuse or even damaging the battery (especially for Panther <v1.23).
- If you need to replace the battery because of wear or damage, please follow the user manual. For obtaining the battery replacement, please contact Husarion at [support@husarion.com](mailto:support@husarion.com).
- Please avoid a deep discharge of batteries which may lower their lifecycle. The original software which is provided with Panther will warn you by slowly pulsating orange or red spot on the LED panels that the battery level is low. Please recharge the battery quickly after you see this warning.
- The battery protection circuit will disconnect the load, when the battery voltage fall below 30V. In this case, Panther will turn off. In this case, use the rotary switch to turn off the robot anyway and recharge the robot within 12 hours, because a deep discharged battery can be dangerous when charged again. If the battery turns off itself and you do not charge it again within 12 hours, please make sure that the battery voltage is still above 27,5V before charging. If the voltage is lower, do not charge the robot, please move the robot with the battery in the safe place and contact Husarion support as soon as possible.
- The battery would be possible to be at the over-discharged state by its self-discharge characteristics in case the battery is not used for long time. In order to prevent over-discharging, the battery shall be charged periodically to maintain a certain voltage range: 39V~40V, 2 months one cycle.

### 3. Maintenance and environmental limitations

- Avoid exposing Panther to excessive dust or moisture for an extended period of time. Panther is designed for internal and external use and its enclosure has an IP54 or IP66 rating. However, some parts of enclosure are removable and in case of improper assembly by user, the IP rating can be degraded.
- The central robot compartment, when not assembled or assembled improperly, will cause the IP rating to be not longer valid. The robot without or with improperly mounted any external cover, should be used only indoor and without the load (cargo) attached.
- Depending on the additional equipment chosen, the IP rating of the assembled robot should be considered as the rating of the most vulnerable component.
- Do not expose it to excessive heat from any source; Panther is designed for reliable operation at normal ambient room temperatures (-20...50°C / -4...122°F).
- The storage or transport temperature range is -20°C...50°C. Please keep the robot in the -20...50°C range for several hours before use.
- Avoid using Panther in places where the robot could fall from a considerable height (above 0,5m without load). It is not designed to resist falls from a high steps or cliffs. The maximum height of the stair-type obstacles should allow Panther to keep touching the ground by 3 wheels at least, for all the time.
- Clean Panther with a damp cloth and mild detergents.
- Periodically check if the wheels are tightened properly.
- If you see any malfunction in the drive mechanism (gearboxes, wheels, axles, motors) or hear any alarming sounds when the robot drives, please stop using the robot and contact support to avoid further damages.
- All peripherals used with the Panther should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met. These articles

include but are not limited to RC servos, sensors, Wi-Fi USB cards, modems, smartphone/tablet, manipulators and USB cables used in conjunction with the Panther.

- Panther contains the internal computer with an Operating System (OS). Please use the Power button to perform a soft power-off. Otherwise, when you use the Battery switch instead, the power is immediately cut off and the filesystem of the OS, or other software components in the filesystem, can be damaged.

## 4. Drive and navigation

- Panther comes with the software that allows you to drive manually. Please drive carefully. Also, Panther can drive autonomously, and the driving algorithm is designed to be modified by user. Be aware that even the best software can be faulty and we cannot fully predict the robots behavior in all possible scenarios. Husarion is not responsible for any damage which could occur when the robot hit a person or other property.
- The sensors set provided with Panther may vary. For this reason, also the safety level is different, depending on the sensors type, quantity and quality.
- The quality and safety of robot movements and navigation fully depend on the software. When you receive the robot, it has a basic software included, but it is your role to provide the safety functionalities.

## 5. End notes

- This product is intended for use only for engineering, development, demonstration and evaluation.
- We do not take responsibility for any damage arising from the use of equipment built or software written by the user on the basis of our device, "reference design", software tools and other educational materials. You have full and exclusive responsibility to assure the safety of your final product or projects made using Panther.
- Some of information provided in this document can change during product modifications and improvements. Therefore, you should keep all tips and warnings in mind, but you should refer to the product manual for the actual information and instructions.



**HUSARION**

Manufacturer:

Husarion sp. z o.o.  
ul. Prądnicka 89/6  
31-202 Kraków  
POLAND

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Support:

[support@husarion.com](mailto:support@husarion.com)

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