

Q&A

VEXU 2022-2023: Spin Up

Tagged: VUR12

Welcome to the official VEX Robotics Competition Question & Answer system, where all registered teams have the opportunity to ask for official rules interpretations and clarifications. This Q&A system is the only source for official VEX U Spin Up rules clarifications, and the clarifications made here from the Game Design Committee (GDC) are considered as official and binding as the written [Game Manual](#) (including the VEX U Appendix C) itself.

Please review the [Q&A Usage Guidelines](#) before posting. This system is only intended for specific VEX U Spin Up rules questions.

- For event, registration, or other competition support questions, please contact your [REC Foundation Manager](#).
 - For VEX technical support, contact support@vex.com or sales@vex.com.
- For game questions, suggestions, or concerns outside of specific and official rules questions, contact GDC@vex.com.

3008: <VUR12> Clarification on Additional Battery Pack

28-Dec-2025

VUR12

[<VUR12cii>](#)

From an additional lithium ion, lithium iron, or nickel metal hydride battery pack (only one (1) additional battery can be used for Sensor/processing power). This additional battery pack must operate at a maximum of 12 volts nominal.

Our team is looking into using the [Xiaomi 165W](#) lithium ion powerbank that the manufacturer specified, contains 4 battery cells with each cell having a nominal voltage of 3.6V.

Four battery cells with a battery power equivalent to 10000mAh: The power bank features 4 battery cells with a nominal voltage of 3.6V and a rated capacity of 2500mAh each, which is equivalent to the battery power of a single cell with a nominal voltage of 3.6V and a rated capacity of 10000mAh.

The power bank specification page also gave various combinations of input and output parameters that the power bank is capable of outputting after conversion. We would like to check if the rule "operate at a maximum of 12 volts nominal" means that the voltage of the physical battery pack connection must be at or below 12 volts nominal or that the battery pack output voltage after conversion must still remain below 12 volts? Based on our understanding, this power bank has a cell nominal voltage of 3.6V but is able to output up to 20V-2.25A after conversion. In this case, would this battery pack be legal since the nominal voltage of the power bank itself is 3.6V?

Xiaomi 165W Power Bank 10000mAh (Integrated Cable)

[Overview](#)[Specs](#)[Review\(6\)](#)**\$52.00**[Buy Now](#)

Dual port output

5V-4A 9V-6A 12V-6A 15V-6A
20V-8.25A

Input parameters

USB-C integrated cable (IN1)
5V- 3A 9V - 3A 12V-3A 15V-3A
20V-4.5A
USB-C (IN2)
5V-3A 9V-3A 12V-3A 15V-3A
20V-2.25A

Output parameters

165W max.
120W (USB-C with integrated cable)
+ 45W (USB-C)
USB-C with integrated cable (OUT1)
5V-3A 9V-3A 11V-3A 11V-6A
12V-3A 15V-3A 20V-3.25A 20V-6A
max.
USB-C (OUT2) 5V-3A 9V-3A
11V-3A 12V-3A 15V-3A 20V-2.25A
max.

Product dimensions

143 x 48 x 36mm

*Rated capacity of 5500mAh (5V/4A): When discharging at 5V/4A, the power bank delivers a minimum of 5500mAh.

Answered by committee

An additional battery pack must output a maximum voltage of less than 13 volts (12v plus some allowance for tolerance). We'll make this change in the next game manual update.

Because the power bank you describe can output 20v, it is not legal for use on a VURC Robot.

2513: PCB's in relation to VUR7

7-Feb-2025

VUR7 VUR12

<VUR7>

VUR7 states that teams are not allowed to purchase parts that they have designed from third party sources ie you can't have a company 3D print a part. However in relation to teams being allowed to have additional electronic which may include custom PCB's designed by the team, are they allowed to purchase said PCB's from third parties considering that most teams do not have the resources to create said components. Or are additional electronics not considered fabricated parts.

Answered by committee

Additional Electronics are not considered Fabricated Parts.

2031: VUR12 Odometry Pod Kit Clarification

7-Jun-2024

VUR12

Relating to VUR12: Do odometry pods such as <https://www.gobilda.com/odometry-pod-43mm-width-48mm-wheel/> fall under the definition of a Sensor for the purposes of this rule? Would an Odometry Pod kit [an odometry pod that does not come pre-assembled] be legal under this rule? Would an odometry pod built by a team be legal under this rule, even if the components of the pod were purchased by a team individually (rather than as part of a kit)?

Answered by committee

Do odometry pods fall under the definition of a sensor, and does it make a difference whether the kit comes assembled or unassembled?

The odometry pod as a whole is not considered a sensor, and would instead be considered an assembled item or pre-arranged kit of unassembled items that form a single, more complex component. This type of component is specifically disallowed by the 3rd row of the table in rule [<VUR5>](#). An encoder, like the one integrated into this odometry pod, is a sensor and is permitted by rule [<VUR12>](#).

Would an odometry pod built by a team be legal under this rule, even if the components of the pod were purchased by a team individually (rather than as part of a kit)?

Use of this odometry pod after purchasing and assembling these separate, individual parts would still be illegal. Individual parts that are not considered legal raw stock (and which are not made legal under other rules) are illegal based on rule [<VUR5>](#).

1171: Follow up to Q&A 1131

2-Aug-2022

VUR10 VUR12

Almost 2 months ago [Q&A 1131](#) was asked. The answer to that Q&A was the following:

Thank you for the detailed question and quoted references. This question requires additional consideration time in order to provide a thorough and accurate response, and will not be resolved in the June 28 Game Manual update. We will provide a second unscheduled Game Manual update to the VEX U Appendix, and update this response, once a clarification has been reached.

Since that answer was posted three game manual updates have been published, on June 28th, July 19th, and August 2nd. I understand that this particular question might need extra consideration, however the continued uncertainty that not answering the question for nearly two months causes for VEXU teams is significant. Does the GDC have an estimate for when Q&A 1131 will be answered?

Answered by committee

The questions posed by Q&A 1131 have been answered in the October 4, 2022 Game Manual Update, via updates to rules VUR9, VUR10, and VUR12.

1131: Follow up to Powering Commerical Pneumatics

11-Jun-2022

VUR10 VUR12

Hello, upon reading the reply to this Q&A question <https://events.vex.com/VEXU/2022-2023/QA/1111> the legality of powering non vex solenoids is ruled legal as long as they are meeting VUR10 and VUR12 however reading the wording and the answer

There are 2 ways that VUR10b can be interpreted. Either, it applies to "VEX (motors or solenoids)" or it applies to "(VEX motors) or (solenoids)" The former interpretation would allow custom electronics to interface directly with non-vex solenoids. This would be useful, as most commercially available solenoids do not function of of the 5v provided by the V5 brain, and instead require 12v power which can be provided by

custom electronics. If this is not legal, then it is not possible to use most commercial solenoids.

Is it still legal to power commercial solenoids using custom electronics?

Yes, this is legal, provided that no other rules are violated (i.e. all portions of VUR10 and VUR12).

The portion in question means that VUR10B only applies to vex solenoids and not commercially available solenoids as extra componentry to power the solenoid externally not from the brain.

b. Sensors and electronics CANNOT directly electrically interface with VEX motors or solenoids.

My questions are as follows:

1: Could we get a firm clarification on if VUR10B is referring only to specifically vex solenoids or whether it is referring to solenoids in general as this is still ambiguous?

2: If solenoids in general are included in VUR10B does this mean the external electronics to allow to power solenoids at higher voltages than 5 volts are an exception to VUR10B

3: Based on the interpretation of the previous Q&A and from Q1 would it then be legal to interface commercially available solenoids through a processor used for sensor processing rather than directly through the V5 brain as this is powering the solenoid?

4: Additionally would having a non-programmatic solenoid activation be allowed e.g a circuit powered through the press of a bumper or other sensor foregoing the processor entirely hardwiring the circuit independent of the V5 brain other than providing power to the solenoid (disabling the solenoid on power disable)

Answered by committee

Thank you for the detailed question and quoted references. Rules <VUR9>, <VUR10>, and <VUR12> were updated in version 2.1 of the Spin Up Game Manual to clarify these points.