Q&A

VRC 2022-2023: Spin Up

Tagged: VUR10

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 VRC 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 itself.

Please review the Q&A Usage Guidelines before posting. This system is only intended for specific VRC 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.

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R21c V5 Smart Cables + VEXU Custom Electronics

8-Feb-2023
VUR10 R21

In the 3.0 Game manual update, R21c was added which says the following:

> V5 Smart Cables may only be used for connecting legal electronic devices to the V5 Robot Brain.

From our understanding, R21c was added to prevent teams from using V5 smart cable stock as "string" for endgame extension. We believe our use of V5 smart cable and cable stock is within the legal intention of VUR10 and R21c, but clarity would be appreciated.

Our robot makes use of V5 smart cable stock and V5 smart cables to connect some of our VUR10 custom electronics to the V5 brain. Is this legal?

Our robot also makes use of V5 smart cable stock and V5 smart cables to connect some of our custom electronics to each other (said electronics are themselves connected to the V5 brain in accordance to VUR10). Is this legal?

> **Answered by committee**
>
> Yes, both of those uses for V5 Smart Cable would be legal.

Wiring

23-Jan-2023
R20 R21 VUR10

Does there need to be a single continuous wire between a brain and a motor? As a VEXU team would it be legal to have two wires connected to each other as long as the wires are not connected using non legal parts?

> **Answered by committee**
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> This system is only intended for specific VRC Spin Up rules questions. Because your question only pertains to VEX U and has no effect on VRC robots or rules, you will need to resubmit it in the Official VEXU 2022-2023: Spin Up Q&A for us to consider it. Thank you.

Q&A 1341 Follow up

13-Jan-2023
VUR4 VUR6 VUR7 VUR10 R7

Previously, in Q&A 1341 the GDC has ruled:

> Per rule <R7e>, all rope/string (or string-like material) on a Spin Up Robot must measure at least 3mm in diameter at its narrowest point, regardless of how it is used on the Robot. This is an intentional change from the rules regarding string in previous competition seasons, and applies to both VRC & VEX U Robots.

R7e:

> An unlimited amount of non-elastic rope / string, with a thickness / diameter between 1/8” (imperial standard) / 3mm (metric standard) and 1/4” (6.35mm). String must measure at least 1/8” / 3mm in diameter at its narrowest point while on the Robot under no load.

VUR4:

> Fabricated Parts must be made from raw materials. For the purpose of this rule, a “raw material” is any material that would not be considered a “pre-fabricated” part (i.e., has not undergone any of the fabrication techniques listed in VUR3). Standard raw material finishing processes, such as extrusion, heat treating, or anodizing, are not considered pre-fabrication.

VUR6:

> Teams may use commercially-available springs on their Robots. For the purposes of this rule, a “spring” is any device used for storing and releasing elastic potential energy. Examples include, but are not limited to: a. Compression, tension, torsion, constant force, or conical springs made from spring steel. b. Springs made from elastic thread or rubber, such as surgical tubing, bungee cords, or stretchable braided rope. c. Closed-loop (pneumatic) gas shocks

VUR7:

> Teams may use any commercially available fastener on their Robot. Examples include (but are not limited to) screws, nuts, washers, rivets, hinges, pins, rod ends, threaded rods, hose clamps, bushings, spacers, or standoffs. To be considered a legal “fastener” in the context of this rule, the primary function of the part must be to join or fasten together two otherwise legal parts.

VUR10:

> There is no restriction on sensors and other Additional Electronics that Robots may use for sensing and processing, except as follows:

1. Does the maximum sizing restriction of 1/4" also apply for string-like materials in VEXU?
2. Does R7e take precedence over VUR4? If so, does this mean that any Fabricated Part which could be considered "string-like" must abide by the sizing restrictions in R7e?
3. Does R7e take precedence over VUR6? If so, does this mean that any spring which could be considered "string-like", such as elastic thread, rubber, surgical tubing, bungee cords, or stretchable braided rope, must abide by the sizing restrictions in R7e? If so, should measurements be taken when the spring is stretched or unstretched?
4. Does R7e take precedence over VUR7? If so, does this mean that any Fastener which could be considered "string-like" must abide by the sizing restrictions in R7e?
5. Does R7e take precedence over VUR10? If so, does this mean that any Additional Electronics which could be considered "string-like", such as thin and flexible wires, must abide by the sizing restrictions in R7e?
6. If the answer to #5 is Yes, would thicker (but still thinner than 1/8") wires, solid or stranded, be restricted in size under R7e? Previously in Tipping Point Q&A 1027 the GDC has said that single strand wire of 1/8" in size should be considered rope/string.

Overall, I believe the GDC's intention in answering Q&A 1341 in the manner they did was to prevent teams from using small diameter rope and string-like material as part of end game mechanisms. I agree with this intention. However, the ruling itself goes far beyond this and potentially restricts VEXU teams' exercise of many VEXU rules. To prevent this, I ask that the GDC modify its ruling for Q&A 1341 to only restrict other VEXU rules when legal materials under those rules are then used as part of an end game mechanism.

> **Answered by committee**
>
> 1. Does the maximum sizing restriction of 1/4" also apply for string-like materials in VEXU?
>
> Yes.

2. Does R7e take precedence over VUR4? If so, does this mean that any Fabricated Part which could be considered "string-like" must abide by the sizing restrictions in R7e?

R7e takes precedence. All string-like materials must comply with R7e.

3. Does R7e take precedence over VUR6? If so, does this mean that any spring which could be considered "string-like", such as elastic thread, rubber, surgical tubing, bungee cords, or stretchable braided rope, must abide by the sizing restrictions in R7e? If so, should measurements be taken when the spring is stretched or unstretched?

R7e takes precedence. It would be measured unstretched.

4. Does R7e take precedence over VUR7? If so, does this mean that any Fastener which could be considered "string-like" must abide by the sizing restrictions in R7e?

R7e takes precedence. All string-like materials must comply with R7e.

5. Does R7e take precedence over VUR10? If so, does this mean that any Additional Electronics which could be considered "string-like", such as thin and flexible wires, must abide by the sizing restrictions in R7e?

Wiring to additional electronics does not fall under R7e.

6. If the answer to #5 is Yes, would thicker (but still thinner than 1/8") wires, solid or stranded, be restricted in size under R7e? Previously in Tipping Point Q&A 1027 the GDC has said that single strand wire of 1/8" in size should be considered rope/string.

Q&As from prior seasons do not apply to this season. Wire that is used for any purpose other than wiring to the additional electronics specified in VUR10 should be considered string, and must comply with R7e.

Follow up Q&A 1106 and 1146

6-Dec-2022
VUR10

<R20> Reads, "No modifications to electronic or pneumatic components are allowed. Motors (including the internal PTC or V5 Smart Motor firmware), microcontrollers (including V5 Robot Brain firmware), cables, sensors, controllers, battery packs, reservoirs, solenoids, pneumatic cylinders, and any other electrical or pneumatics component of the VEX platform may NOT be altered from their original state in ANY way.

d. For the purposes of this rule, the gear cartridges found within the V5 Smart Motor are considered “part of the motor”. Therefore, any physical or functional modifications to official gear cartridges is not permitted."

In Q&A 1106 from this season it was ruled that the removal of the back plate on the V5 optical and distance sensor was not allowed. However the precedent of <R20> in VEXU has already been disregarded with Q&A 1146 / Q&A 612 where it has been made legal for VEXU teams to modify the internals of the motor cartridges as long as the electronics of the motors were not interfered with.

Given the precedent set by the ruling on motor gear cartridges would it be legal for VEXU teams to manufacture custom back plates(a non electronic component) for the V5 Optical and Distance sensors out of permitted materials and methods, as long as the electronics of the sensors were kept intact and unmodified in the same way V5 motors are?

Answered by committee

Given the precedent set by the ruling on motor gear cartridges would it be legal for VEXU teams to manufacture custom back plates(a non electronic component) for the V5 Optical and Distance sensors

> out of permitted materials and methods, as long as the electronics of the sensors were kept intact and unmodified in the same way V5 motors are?
>
> Thank you for your question. Yes, VEX U teams may manufacture custom back plates for the V5 Optical and Distance sensors using permitted materials and methods, providing the electronics of the sensors are not modified.

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.

Follow up to Powering Commerical Pneumatics

11-Jun-2022
VUR10 VUR12

Hello, upon reading the reply to this Q&A question https://www.robotevents.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 refererring 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.

Powering Commercial Solenoids

1-Jun-2022
VUR10

Last season Q&A 990 (https://www.robotevents.com/VEXU/2021-2022/QA/990) was asked but never answered regarding the legality of driving non-vex solenoids. This question is similar to that question.

VUR10b states:

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

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.

Historically, the GDC has ruled this to be legal, as it did in Q&A 93:

https://www.robotevents.com/VRC/2018-2019/QA/93

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

> **Answered by committee**
>
> > 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).