

# THE 2000 FIRST ROBOTICS COMPETITION

## TEAM UPDATE #7

Date: February 3, 2000

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### REMINDER

CHAIRMAN AWARD SUBMISSIONS ARE DUE AT FIRST OFFICES BY 5:00PM ON FRIDAY, FEBRUARY 11, 2000. SEE YOUR COMPETITION MANUAL FOR DETAILS.

### CORRECTIONS AND UPDATES TO THE MANUAL

The following parts have been modified in the Additional Hardware List as follows:

#### Fasteners

Fasteners, Washers, Nuts, Adhesives	Any size, Any amount
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### CLARIFICATION OF RULES

SC1.

In the event that it is not visually obvious to the referees whether or not a robot is touching the surface of the playing field, we will set a minimum clearance of 1/8". The measurement device will be a flat bar of aluminum measuring a nominal 1/8" thick. Robots which are obviously touching or not touching the floor (such as hanging 3" above the ramp, or resting completely on top of another robot) will not be measured.

M9.

The revolving light should be mounted so that the alliance color is visible in at least 4 locations 90 degrees apart around the sides of the robot from a distance of at least 50 feet. The orientation of the light does not matter as long as it can be seen from the 4 sides as indicated above.

### MOTORS

If you are interested in purchasing additional window motors contact your local GM parts dealer. The window motors are for a 1994-1997 Oldsmobile Cutlas Supreme for the rear door only, part number 12362292 or 12362293.

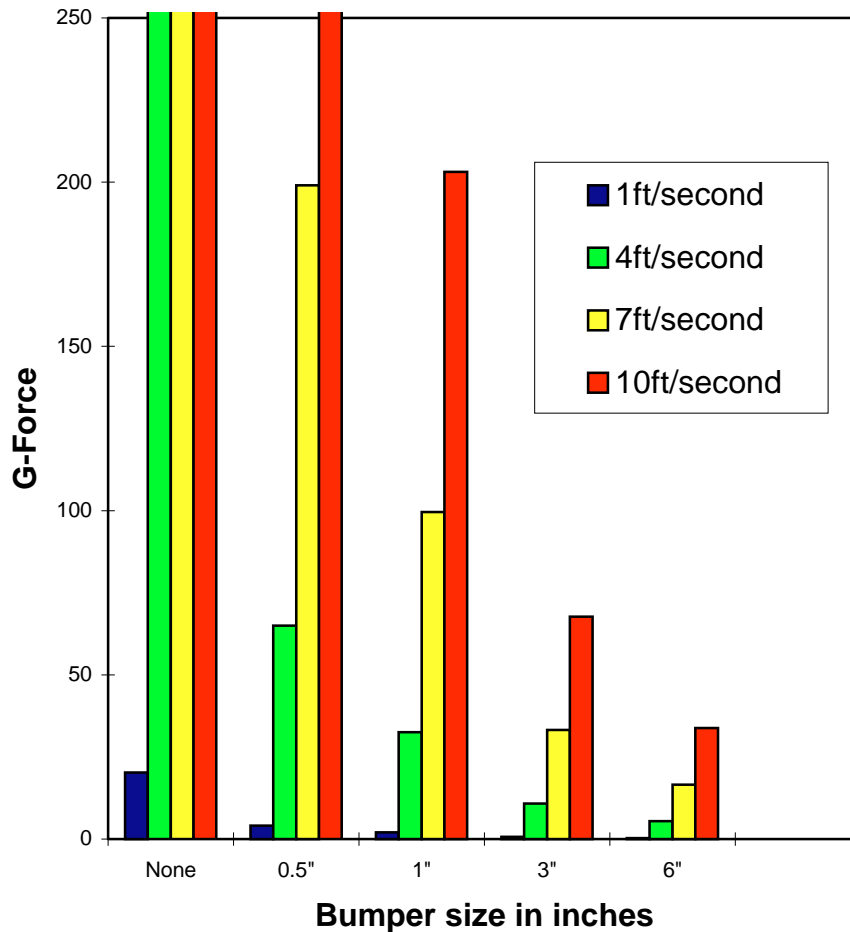
### XENOTRONIX

If you are interested in purchasing additional battery chargers contact Xenotronix sales line at 800-624-9366. The part number for the charger is HPX-60-1.

## BUMPER INFORMATION

The following graph and chart contains important information regarding a 130 pound robot hitting a stationary object at different speeds with different thickness' of bumper. Exact results may vary depending on bumper material used.

**Calculations of G-Force with respect to speed and bumper size**



Bumper size	1ft/second	4ft/second	7ft/second	10ft/second
None (0.1")	20.31	325.00	995.31	2031.25
0.5"	4.06	65.00	199.06	406.25
1"	2.03	32.50	99.53	203.13
3"	0.68	10.83	33.18	67.71
6"	0.34	5.42	16.59	33.85

## RULES QUESTIONS & ANSWERS

- Q179. Suppose a robot, near the end of a match, finds a quiet spot on the field, gathers up 3 or more balls, and climbs up on top of them to raise himself off the field and score 10 points. Is this legal?
- A179. In Rule SC1 part 3 it is worded that you must either hang from the center bar OR be picked up by your partner. If you were to drive up on a pile of balls (and not damage them), you may be off the floor but would not be picked up by your partner and therefore would not earn the 10 points.
- Q180. Are the Small Parts telescoping tubes allowed to be moved by compressed air?
- A180. No, that would violate Rule M15.
- Q181. We have ordered belts from a catalog. We understand that they are part of the Additional Hardware List, so they have unlimited amounts. Our question is if the fasteners designed to hold two ends of a belt together are legal parts. These fasteners would take the belt and make it one continuous loop.
- A181. Yes, they would be considered fasteners and are okay.
- Q182. May we use wire ties to fasten the wires and the fan to the board? Does that fall into the general category of "Fasteners, Washers, Nuts, Adhesives: Any amount - Joining ONLY"? Do screws fall into this category too?
- A182. Yes. Wire ties and screws are considered fasteners.
- Q183. If a robot is within the size and weight requirement, are the parts required to be connected to the base of the machine as they will be when in use? For example, if a component was produced that fastened on in place of another with a different function could it be placed on the robot for inspection differently than when it will be used in the competition? Does it have to be physically attached? For example could it be stored in a basket on the machine?
- A183. During inspection, your robot should be configured as it will be at the start of a match. If you have several mechanisms which you may use, then you should have the size and weight measured once for each configuration.
- Q184. When I called S-B Power Tools to purchase additional drill motors, they offered an 'update package'. Is this a legal substitution for the drill motors?
- A184. The 'update package' they are referring to is a drill package containing the motor, drive assembly and housing. This package contains the same motor and drive assembly that came in your kit, so it would be allowed. They temporarily ran short of replacement motors and only had complete kits to immediately ship out.

Q185. Are Worm Gears considered "free parts" under the Additional Hardware List, "sprockets, gears & pulleys" section?

A185. Yes.

Q186. Is "hard backing" required for the bumpers? If so how hard is hard?

A186. No, a hard backing is not required. The wood backing is an example of one way to mount an energy-absorbing material.

Q187. A bumper that is "vertically centered" at a given height may be interpreted to imply some rough symmetric shape that is center-able. Is there a requirement that the bumpers have some sort of symmetry about the centerline?

A187. There is no symmetry requirement.

Q188. Is it the whole bumper that must be "vertically centered" or is it the outermost edge of the bumper that must be "vertically centered"? Also, does each cross-section of the bumper have to be "vertically centered" or can the entire bumper be "vertically centered"?

A188. The vertical bounds (envelope) of the bumper (as a whole) must be centered at 6.5". For example, if your bumper was only 3" high, it would have the top-most edge at 8" and the bottom-most edge at 5".

Q189. Does the bumper have to be fastened with "bolts with recessed heads" or are other fastening methods acceptable?

A189. Other fastening methods are acceptable, however, you should not have any sharp edges exposed.

Q190. Does the mounting surface of the robot have to be PRECISELY at the edge of the robot as shown in the figure or may we mount to our robot frame somewhere a bit inboard?

A190. You may mount the bumper to inner sections of the robot. However, the bumper needs to be easy to remove for inspection.

Q191. Would a "hoop skirt" type bumper, made from thin walled aluminum tubing, qualify as an "energy absorbing material" or not? How about sheet of 0.020 thick aluminum formed into some (hopefully legal) shape?

A191. The intent is that the bumper will absorb and/or redistribute (over time or space) the impact of two robots running into each other in a way that reduces the potential for damage to the two robots. We will use common-sense engineering intuition during inspection and a watchful eye during matches. If it is clear that a "bumper" is more likely to act as a battering ram than a protective device, it will be disallowed. One simple way we could test a "suspect" bumper would be to ask the owners to conduct a crash-test versus some hard object, such as a wall. If the bumper fails to compress appreciably, or causes damage to the wall, then it is more like a battering ram and will be disallowed.

Q192. Our team would like to know if we are permitted to build a duplicate drive system to practice with after our robot is shipped. We will not be using the duplicate to build onto our robot, it will be used only to practice driving. Is this allowed?

A192. Yes, you can use whatever you want for practice. However, you will need to ship all parts that you intend to use at the event (including the control system) with the robot.

Q193. Is it recommended to remove the robot controller from the robot when welding? Also, do the speed controllers or relays need to be removed when welding?

A193. Yes, you should remove the control system from the robot when performing machining or welding.

Q194. In rule clarification A155, you say steel plate on the additional hardware list can be melted and recast into rod. Likewise, it says in the additional hardware list we may use an unlimited amount of aluminum sheeting; may we use this aluminum to extrude into our own forms, even if they are larger than the 2" x 3" extruded aluminum listed in the additional hardware list?

A194. If you fabricate your own aluminum extrusions from allowed raw materials, then they are not considered aluminum extrusions per the Additional Hardware List and are thus not limited to a 2"x3" cross-section.

Q195. Do we have to use only 1 sheet of plywood or we can use the area ( 4' by 8') of plywood as appendix C says?

A195. You may purchase 1 sheet of 1/2" plywood up to 4' by 8' and cut it up as desired. You may also purchase 1 sheet of 1/4" plywood up to 4' by 8' and cut it up as desired. The Additional Hardware List specifically states the quantities as 1 sheet, rather than 32 square feet.

Q196. May we have more than two motors built into the robot?

A196. You are welcome to use all the motors in the kit on the robot. You may not use additional motors, but you may purchase extra motors (of the same models supplied in the kit) and use them as spares for the motors in the kit.