Manitoba Robot Games

Super Scramble

Instructions

We at the Manitoba Robot Games, want you to have a successful and fun time building and competing with your Super Scramble Robot. If you have any comments please direct them to ***ian@****mb****robot****games****.ca***

Follow these steps to construct your Super Scramble robot.

Step 1

READ all the instructions carefully before opening any packages!

Step 2

There are many ways to build your robot. Study the options and make a decision. You can always rebuild it later in a different configuration. Winning robots are always the result of testing, modifications, rebuilds, improvements, sweat and some luck.

Step 3

Collect all the tools you will need, and especially a tray so that small parts have less chance of rolling onto the floor and falling into oblivion.

Tools

You will need:
Hobby Knife, Small Side Cutters, #0 & #1 Phillips Screwdrivers, Small Needle Nose Pliers, Soldering Pencil and Solder, Materials to customize your robot.

The safest knives are sharp ones. Hobby knives can be sharpened on a small piece of waterproof sand paper about 320 or 400 grit (that is the black sandpaper with the green backing).

Gear Box Options

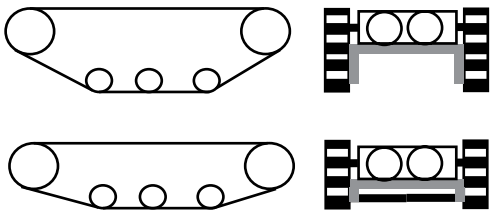
The Tamiya gearbox that is included in your kit can be assembled in one of four ways as shown on the gearbox carton. Each gives a different gear ratio. 'A' is the fastest but has the lowest torque(a measure of its strength), while 'D' is the slowest and strongest ratio. For the first time builder we suggest you use the 'C' ratio for a tethered robot, but be sure to keep all the extra parts and instructions so that you can change it at a later time.
Type A - 1039 rpm, Type B - 345 rpm,
Type C - 115 rpm, Type D - 38 rpm.
The A and C type have the axle positioned about 12 mm in from the back of the gearbox, while the B and D type are about 25mm from the back. Remember, the object of this competition is to be "first to the opposite end with your payload intact" so the competition is a balance between speed and torque.

Universal Plate Options

The Tamiya Universal Plate that is included in your kit is a quick and convenient way to mount the gearbox and wheels, but you can use any other material, including wood, aluminum, sheet plastic or a coke bottle. Let your imagination fly!

Track Options

The Tamiya track that is included in your kit can be assembled in different combinations to make several different lengths of track. Try building the tracks using 1 long, 2 medium and 1 short section each side.
Choose the layout of the driving wheels, support wheels, then add the last pair of wheels to provide the tension on the track.



The track kit assumes that you will use the axles provided, but that limits the clearance

Track Options cont...

under the robot. To create the greatest clearance between the body of the robot and any obstacles, think about how you might mount the support wheels without using the long axles. To do what you plan may mean that you need to acquire some other materials, not provided in this kit.

You may need to do some experimentation with the tracks and with the positions of the wheels.

Step 4

Route the control wires and connect to the motors.

Step 5

A good design is never complete. Here are some suggestions to improve your robot's chance of winning.

Optimizing Appearance

There is only one rule that applies here, which states that the name of the robot and/or some other suitable identity for the robot must be clearly visible so that spectators can identify the contestants. There are many options here. You could shape a body from styrofoam and paint it, add sponsor's decals, or simply have the robot's name emblazoned across the front in flashing lights. It's your choice. Have fun with this step but remember to keep the message appropriate. After all, your robot may be displayed by the news media.

Making the Electrical Connections

The MRG controller in your kit will need some assembly. There are instructions included with the controller.

Be sure to secure the wires to the body of the robot so they are not pulled from the solder tabs on the ends of the motors (a small zip tie works well). We suggest installing two "AA" cell batteries into the controller body and then hold the Blue and Yellow wires to the right motor tabs. Push the right controller lever forward and look at the direction that the track rotates. It should be going forward. If that is not the case then reverse the positions of the Blue and Yellow wires and try again.

When you are satisfied that you have the correct wiring pattern, you may solder these connections. Repeat this with the left motor and the White and Red wires.

Note: Be careful during this process that the bare wires do not touch each other or you will get a short circuit and the batteries will get hot.

Optimizing Performance

Think about the shapes that the robot will have to climb over: half cylinder, step, diagonal steps, sand, rolling spheres and rolling cylinders. What will be the best attack angle of the track in order to gain the best traction on that surface? Try to find a compromise between each shape/material. How can you best support the track between the wheels?

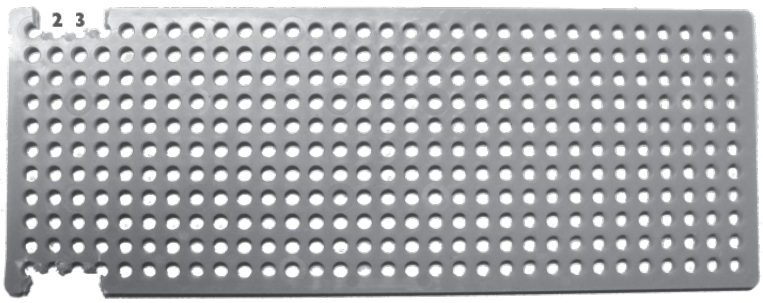
Remember that the Maximum size for your robot is 20 cm x 20 cm., no more than 15cm high and weigh no more than 750 grams.

One important rule says that the robot must be able to accept a 1" diameter Steel ball from a height of 7" from the playing field surface and still have this ball at the completion of the course. A simple, and inexpensive, container to accomplish this is the top third of a 600 ml soft drink bottle mounted upside down. Can the seating of the steel ball trigger a light to tell you that the round has begun?

Each Robot should be Unique and Identifiable.

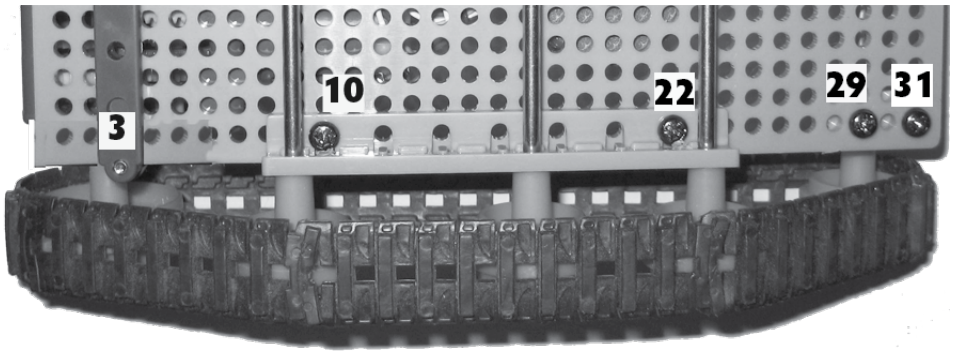
Don't forget to add your Robot's Name also.

Use a small pair of side cutters to carefully nibble out two notches to allow for the grey plastic bar which clamps the gearbox to the universal plate.
In this photo we have removed enough material so that the gearbox can be placed for both Type B and Type C.

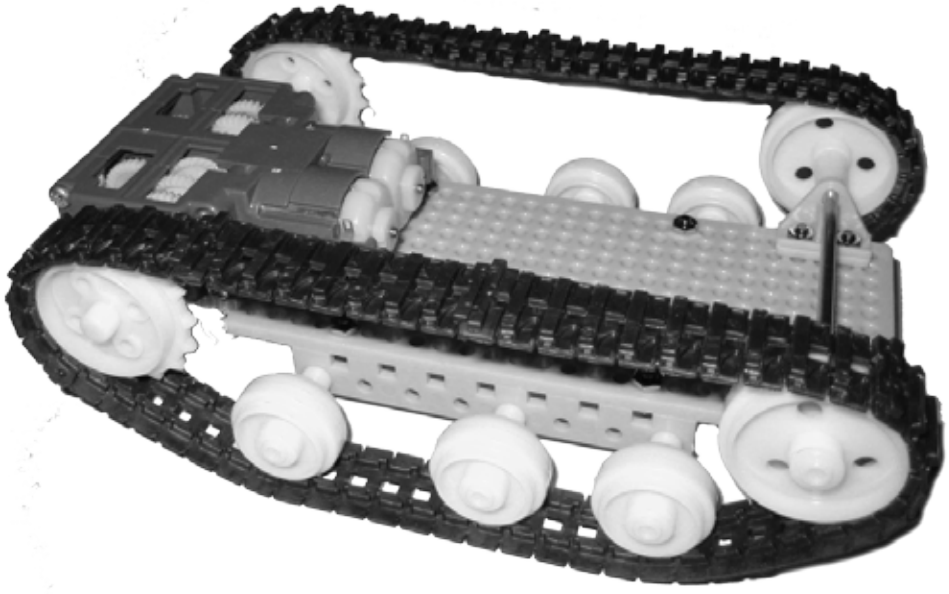


For a lower speed and higher torque, build the gearbox as in Type C 114.7:1, 115 rpm. Use the large sprocketed wheels on the gearbox and stagger the position of the small sprocketed wheels on different shafts. Don't use the two large plain wheels with this layout.

A configuration like this uses these track sections on each side;
1 long section
2 medium sections
1 short section

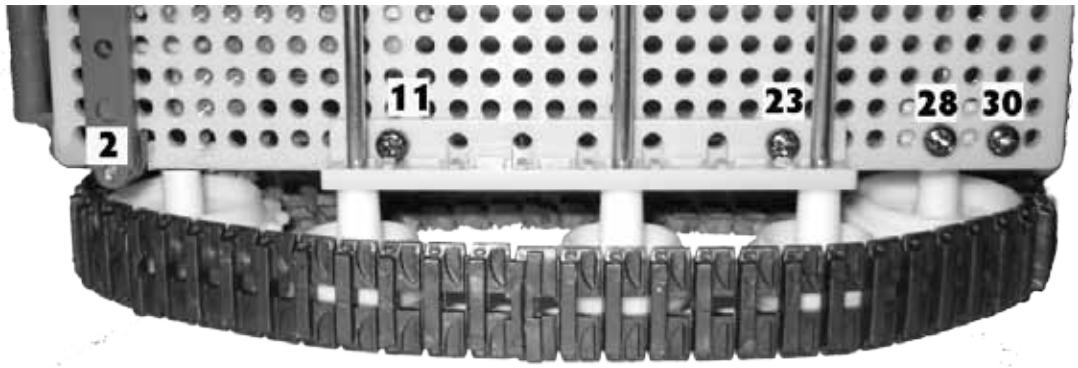


For a slightly faster rig build the gearbox as a Type B 38.2:1 345 rpm



Type B uses the same track configuration as the Type C.

Counting the rows of holes from back to front, mount the gearbox at row 2 and the screws for the long angles at rows 10 and 22 or 11 and 23. Bolt the short angles on the gearbox side at rows 28 and 30.



Other kits from Manitoba Robot Games.

The Robo-Critter, which was designed for students up to Grade 6 but which can be used with Jr/Sr students as a design problem.

The Mini-Max, which was designed as an entry level robot for middle years to Grade 12 students. The Mini-Max is a tethered mini sumo robot, but is an ideal base to convert it to autonomous operation.

Check out our website at **www.**mb**robot**games**.ca** for more information.