



What Parts Could be in your Robot Kit



FIRST
LEGO
LEAGUE JR.

FIRST
LEGO
LEAGUE

FIRST
TECH
CHALLENGE

FIRST
ROBOTICS
COMPETITION

Housekeeping

This session will be recorded and available on our Youtube Channel.

There will be time at the end of the presentation for questions, or you can type them in the Q&A box.

The slides will be available on the *FIRST*RoboticsBC.org website in the FTC Resources tab.

Presenters

Who???

Joel, Ishaan, Ryan

Topics



Things to Remember

Motor Types - DC and Servos

Mecanum Wheels

Lift Systems

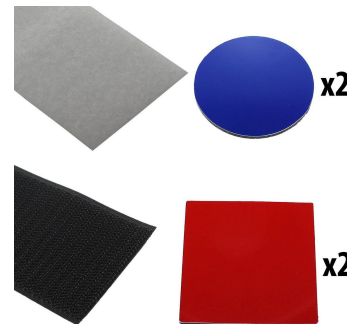
General Parts

Things to Remember

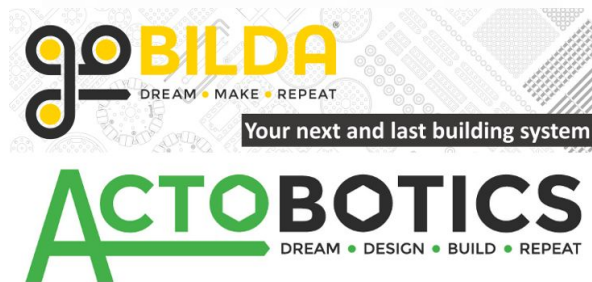
Read Game Manual Part 1 - Chapter 7 Robot Rules

Check the FTC Forums for rulings on what's allowed

Teams provide their own
alliance markers



Robot Parts



These companies offer discounts
to FTC Teams!



Motor Types

- Rev Hex Motor
- Ultra Planetary
- Andymark

Ultraplanetary Motor

Pros

- Variety of gear ratios
- Replace the size of your axles
- Can change its gear ratio

Neutral

- The axle is in the centre

Cons

- They come with plastic gearboxes
- They are really long which takes up more space compared to the standard DC motors used by most teams



Price

\$21.00

Rev Hex Motor

Pros

- It is stronger than a servo but weaker than a normal DC motor
- It is easier to adjust the axle to the perfect length
- You can use very long axles

Cons

- It can be awkward if you mix it with different kits, although it is possible

Price

\$21.00



FTC Legal

Andymark NeveRest

Pros

- plenty of different gearbox options
 - NeveRest 40
 - NeveRest 60
 - NeveRest orbital 20
- choice of power connectors
 - anderson power poles
 - “JST VH 2-PIN connects directly to REV Controllers (am-3103b)”



Cons

- They don't make NeveRest 20 anymore

Price

\$29.50 – \$35.00
(depending on the gear ratio)

Servos

- Hitec
- Actuonix Linear Actuators
- REV Programmable Servo

Hitec

Pros

- Both 180° and fully rotational
- Easy to mount
- Easy to program
- Light weight
- Variety in the motor capabilities

Cons

- Not much torque
- Teeth can strip

Price \$20 - \$40

Actuonix Linear Actuators

Pros

- Different gear ratios
 - Can be strong, or fast.
- Different lengths
- Fun to play with
- Programmed like a servo

Cons

- Awkward to mount onto robot
- Awkward to mount mechanisms onto the actuator



Price \$65 - \$100

REV Programmable Servo

Pros

- Programmable range
- Easy to program in java
- Same pros as Hitec servos

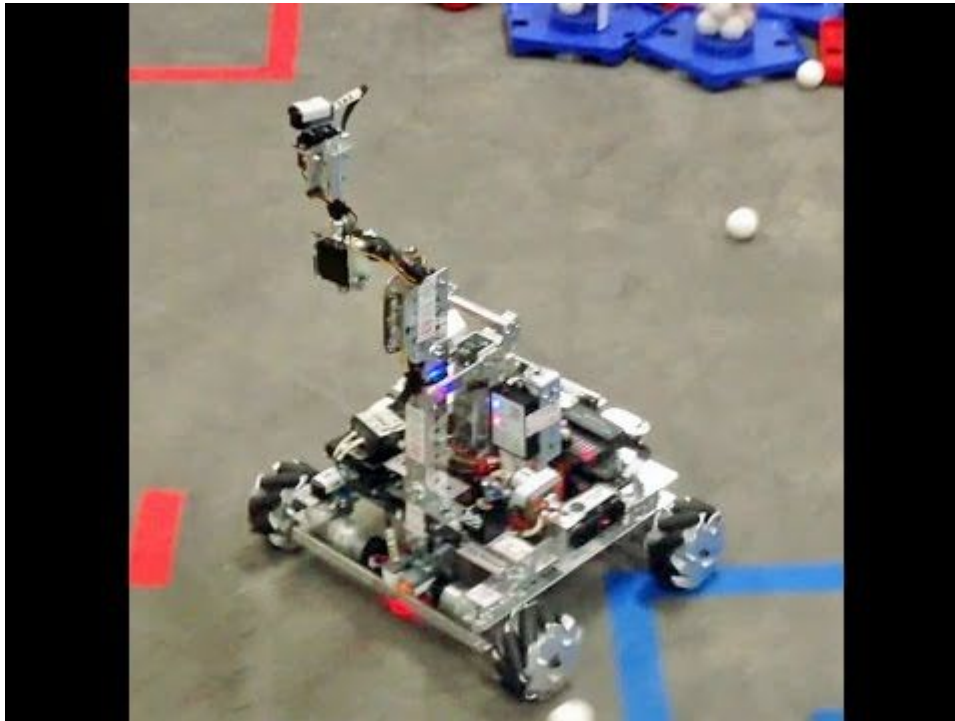


Cons

- Weird to set points
- Confusion 360 (programmers only)
- Same cons as Hitec servos

Price \$24.00

Mecanum Wheels



Mecanum Wheels

Pros

- More options for direction
- Makes driving more versatile but makes the game easier
- Easy to strafe

Cons

- Complicated to program
- Makes wheel maintenance harder
- Have to build specifically

Tetrix Mecanum Wheels



Gobilda Mecanum Wheels

Pros

- Can customize roller colours
- Much quieter
- Smooth



4 inch Nexus Mecanum Wheels

Pros

- Works efficiently
- Last a long time

Cons

- Sound bumpy
- Rollers sometimes get stiff



Lift Systems

Different types of lift systems

- Tetrix Rack and Pinion Linear Slide
- REV Linear Motion Kit
- Scissor Lift
- DIY Linear Slide using drawer slides



Lift Systems

Tetrix Rack and Pinion Linear Slide

Pros

- Easy to use, easy to assemble slide system, providing linear motion
- A decent amount of torque when paired with a good gear train (motors)

Cons

- Has some issues regarding the mounting of the plastic racks
- Plastic racks can wear down from heavy usage
- The axils can warp under a decent amount of pressure
- Can't go too high

Price: \$21.95

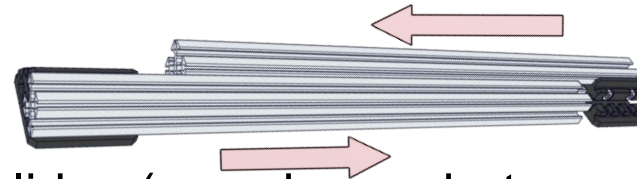


Lift Systems

REV Linear Motion Kit

Pros

- Linear motion provided different slides (can choose between cascading or continuous)
- Actuated through a motor/servo
- Linear motion can be created through different methods (pulleys, gears, sprocket and chains etc.)



Cons

- Need to buy different parts to build working linear slide

Price: \$52.00 (all inclusive)

Lift Systems

Scissor Lifts

Pros

- Can be quick, and go quite high

Cons

- Unstable at times as all of the slack from the joints add up
- Takes a lot of force to lift as the weight adds up
- Generally a challenge to build and hard to master (However there are solutions to most of these issues)

Price: ~\$50 - \$300



Lift Systems

Using drawer slides from the hardware store

Pros

- Very hands on experience (some 3d printing etc.)
- Can work very well with a lot of customizability

Cons

- Choice of material can make it heavy, requiring of upwards of 2 motors
- **Parabellums Pick:** Misumi SAR320 Drawer Slides

Price: ~\$9-\$28 per slide



General Parts

- Actobotics servo block



General Parts

- Actobotics servo block
- Hex Axles



General Parts

- Actobotics servo block
- Hex Axles
- Compliant wheels



General Parts

- Actobotics servo block
- Hex Axles
- Compliant wheels
- S3 Andymark tubes



Any Questions?

