



totem

ROBOTICS KIT

HANDBOOK

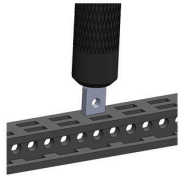
with

7 real-life
engineering
examples



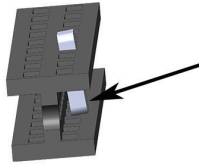
STARTING TIPS

Inserting nuts (1)



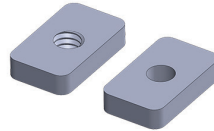
It is a good idea to start every step inserting nuts into beams (if the step requires). Use the back of the screwdriver to push in the nuts.

Inserting nuts (2)



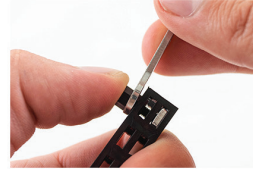
After entering the first slot, nuts tend to tilt. Use your thumb to push it back straight, and then again use the screwdriver to insert the nut all the way in.

Faulty threads



Some of the nuts are missing threads. This is a manufacturing issue and we are working on it. In the mean time, we add few extra nuts. We apologize for the inconvenience.

Tightening standoffs



Push Nylon Standoff with your thumb while tightening it with the wrench.

Ruler



Use Beam/Bolt ruler to determine the length of beams and bolts.

For more tips, please visit the link below:

<https://totemaker.net/blog/totem-mechanics-for-beginners/>

Totem Tools

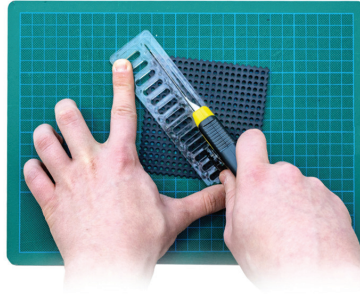
Beam Pro-Cutter

- Totem Beam Pro-Cutter cuts the beam in a blink, just like the scissors.
- Cut Beams to the lengths you need - a ruler allows for consistent sizes to be cut.



Board Cutter

- Simple but super smart tool for cutting Totem Boards. Ruler pins fits into the grid of the board.
- Easily cut the boards in straight or 45° angled cuts – depends on the side of the ruler.



Magnetic Screwdriver

- Super strong magnetic grip - bolt firmly stays on screwdriver even when shaking it.
- Makes things easier - conveniently grab bolts and nuts from the compartment box with the magnet.



TOOLS CAUTION: cut hazard. Sharp blade. Contact may result in injury. Always keep blades away from fingers and body. Handle with care. **Keep out of reach of children!**

In this 7-in-1 Robotics Kit there are 7 already made models that you can build, upgrade or recreate.
We encourage you to use your imagination's full potential but here are some ideas that you can use for the starting point:

4WD

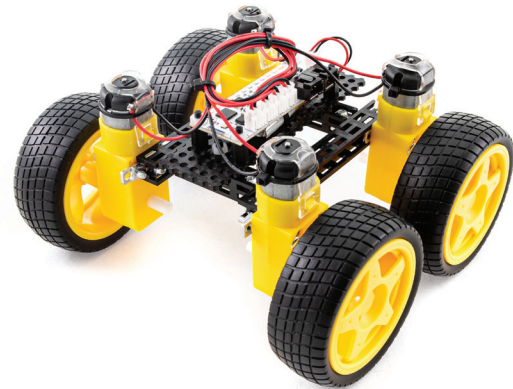
Robotic car with independent wheel control.
Turns in all directions by the wheels friction force.



Different methods for propulsion and steering.



The same kind of wheel-system is used in small loader machines.



Gripper Bot

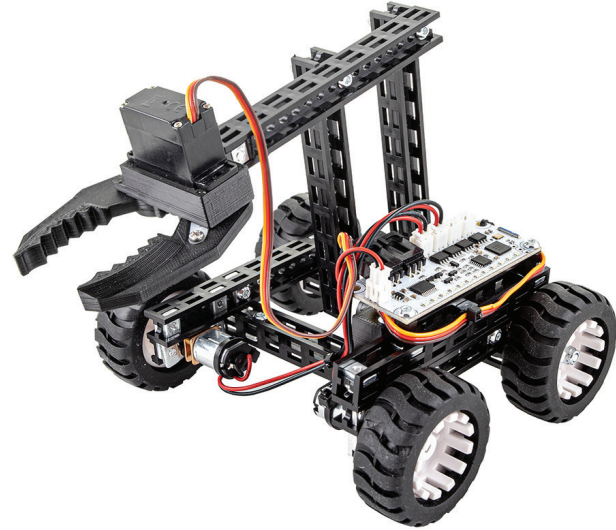
Car with a controllable gripper arm. Use servo motors for rotation and applied force.



Learn differences between motors and their use. Make forward motion from rotating action.



Grippers with robotic arm are used in assembly lines in many factories.



Mini Spider

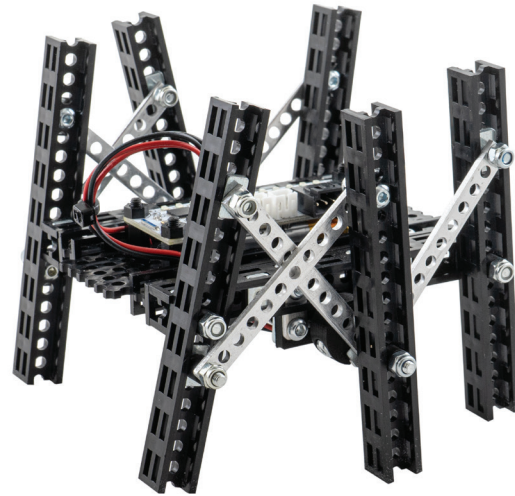
Mimic a walking animal from a rotating force.



Teaches how a rotating motor can drive walking legs.



Similar mechanisms are used in steam locomotives, piston movement in the internal combustion engine, stamping press, many heavy machinery where rotary movement is converted to linear.



Lucas Robot

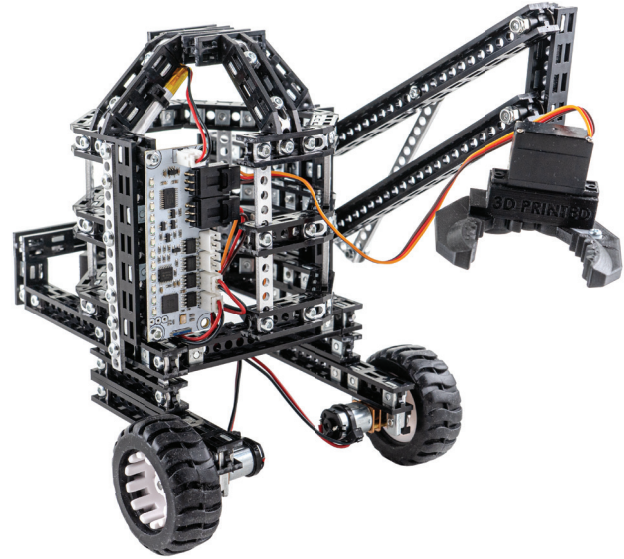
Caster Wheel based robot, inspired by sci-fi movies. A true little robot, turns 360 , grips and lifts.



Learn Caster Wheel mechanical principle, advanced building techniques.



Mars rovers and demining robots are very similar robots with gripper and wheels.



See page no. 30 in the Robotics Kit Handbook for Caster Wheel instructions



Hockey Bot

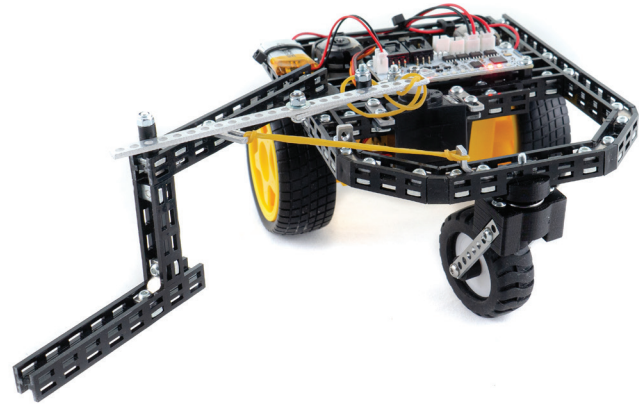
Car with a retractable swinging arm that accumulates and later releases the energy by swinging the arm to kick the ball.



Demonstrates how to store potential energy and convert it to kinetic energy.



Similar idea is used in bows and crossbows, mouse traps.



See page no. 30 in the Robotics Kit Handbook for Caster Wheel instructions

Larva Mobile

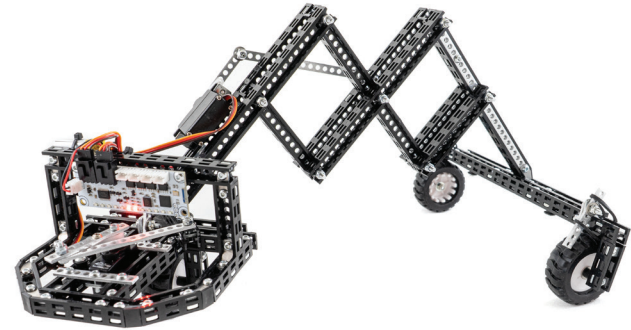
Inspired by the nature, inch-worm, this robot uses scissors principle shape shifting for movement.



This robot teaches using shape shifting for movement. Learn about applying braking mechanisms and their use.



Similar mechanism is used in scissor lift. Wheels can only rotate to one direction and it is a similar design to a ratchet tool.



Lift Mobile

Uses scissor mechanism in a robotic lifting platform.



Learn how to construct a lift that always has the platform level.



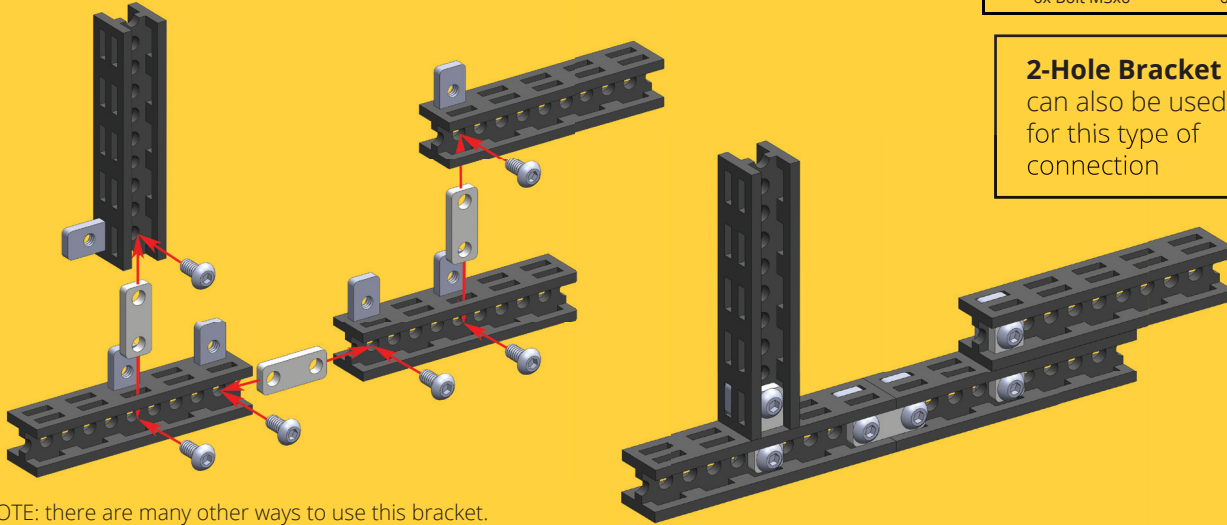
Simple version of scissor lift which are used in real life to reach high places.



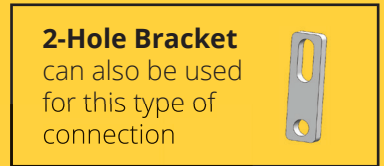
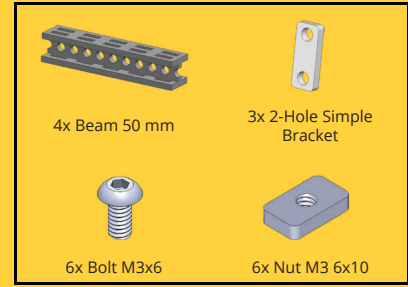
Totem building techniques

The following are examples how to use the Robotics Kit parts to build your projects. Please note that there are many other ways to use Totem parts. Set your imagination free!

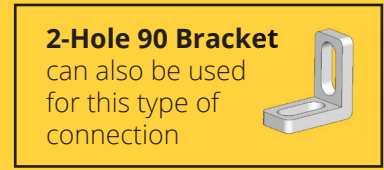
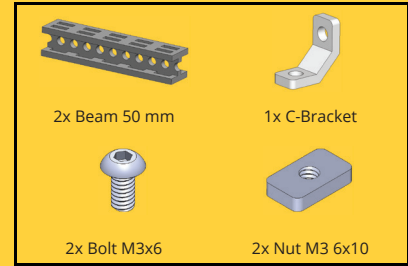
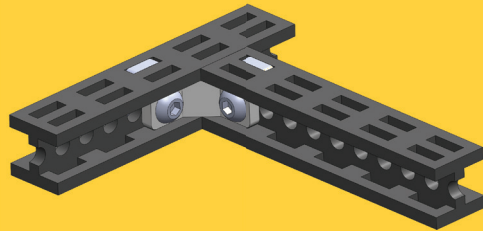
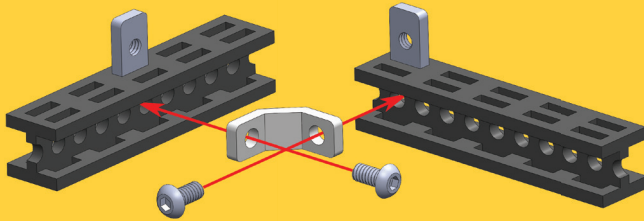
2-Hole Simple Bracket



NOTE: there are many other ways to use this bracket.

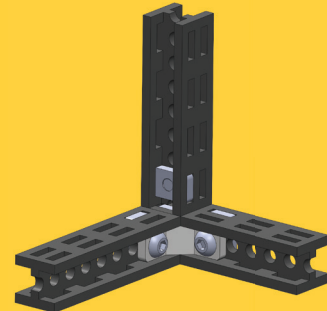
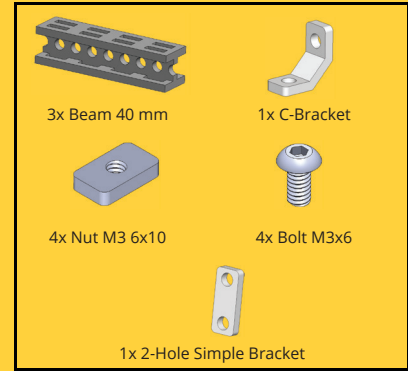
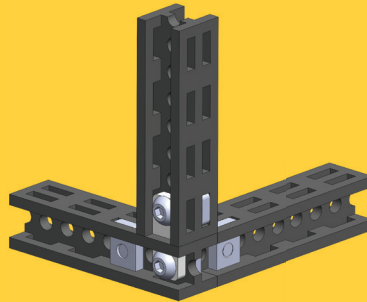
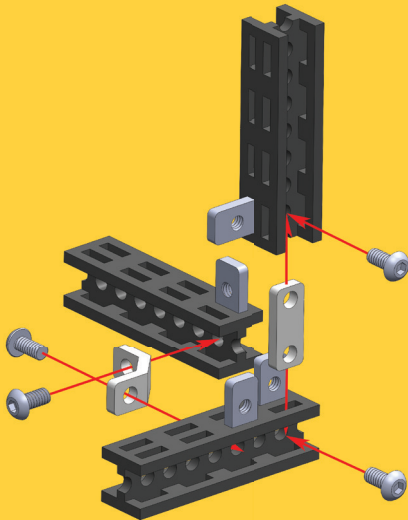


C-Bracket



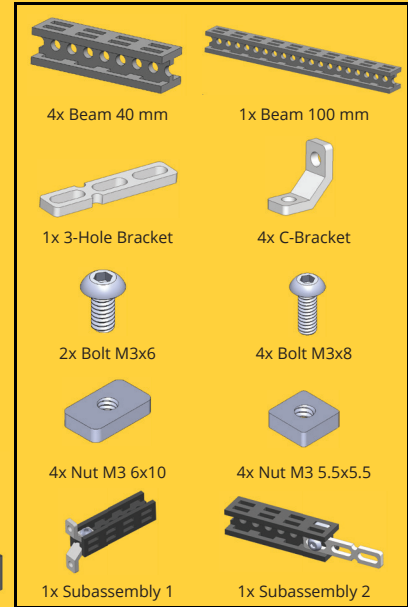
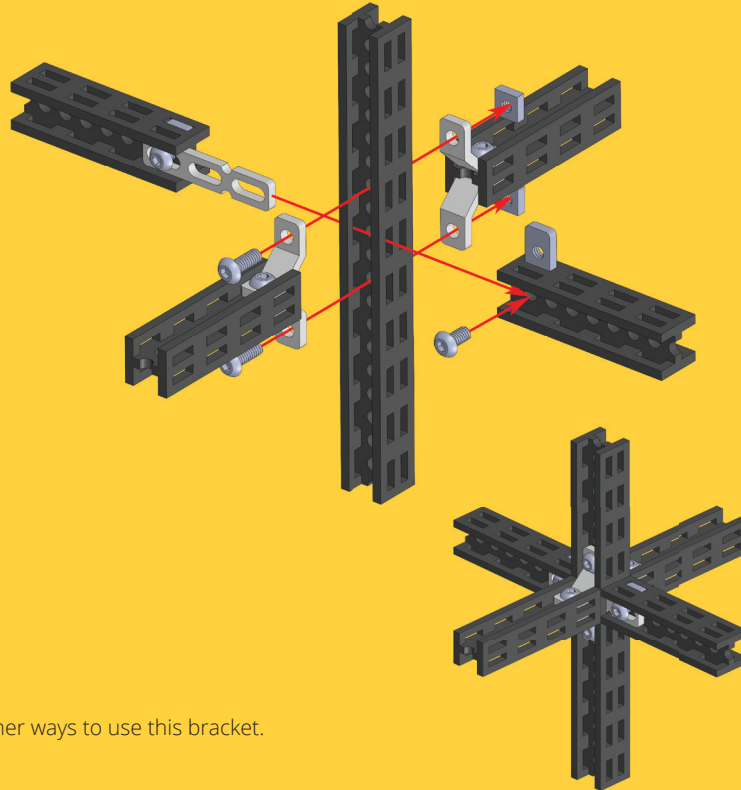
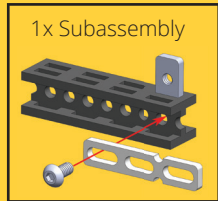
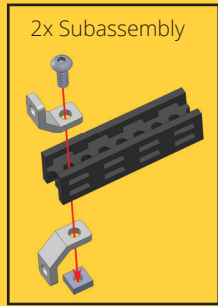
NOTE: there are many other ways to use this bracket.

Typical C-Bracket Corner



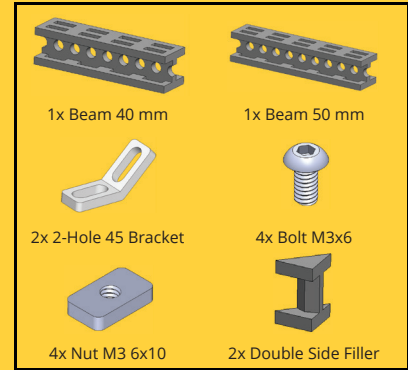
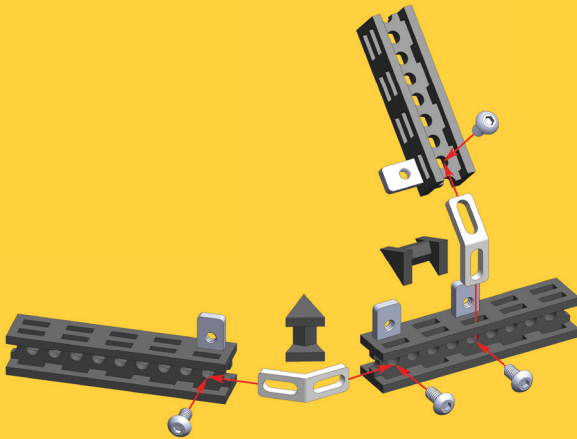
NOTE: there are many other ways to use this bracket.

C-Bracket and 3-Hole Bracket



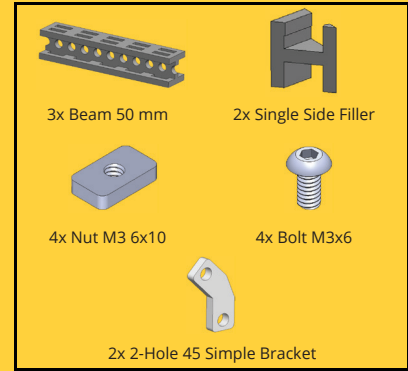
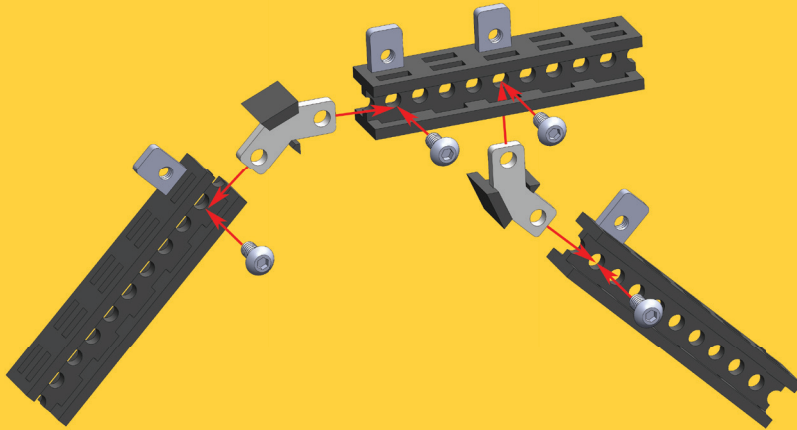
NOTE: there are many other ways to use this bracket.

2-Hole 45 Bracket



NOTE: there are many other ways to use this bracket.

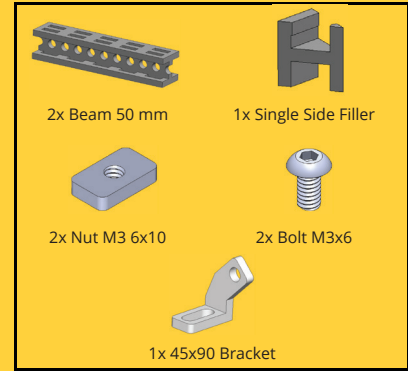
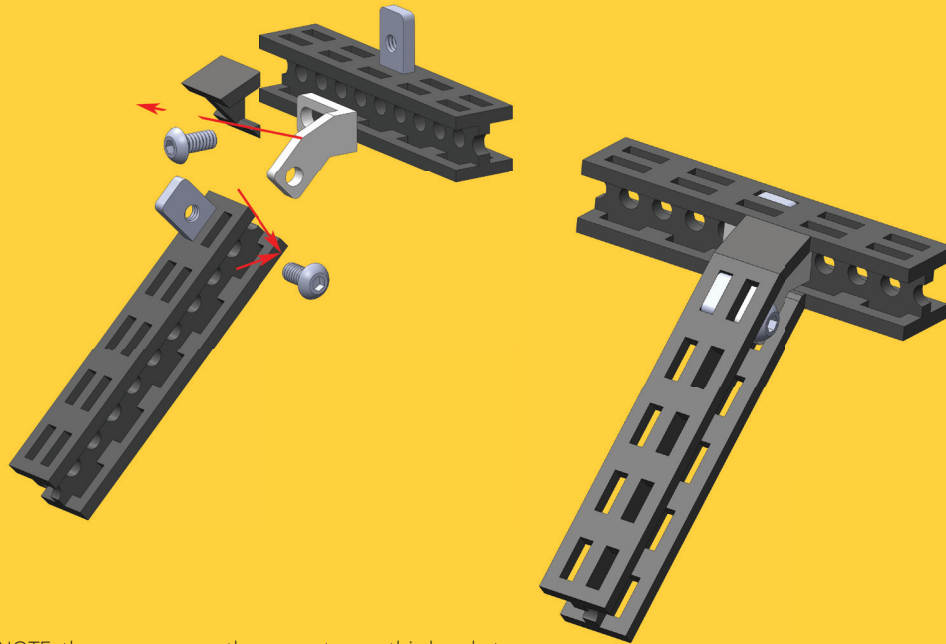
2-Hole 45 Simple Bracket



NOTE: there are many other ways to use this bracket.

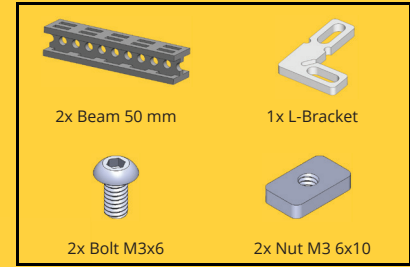
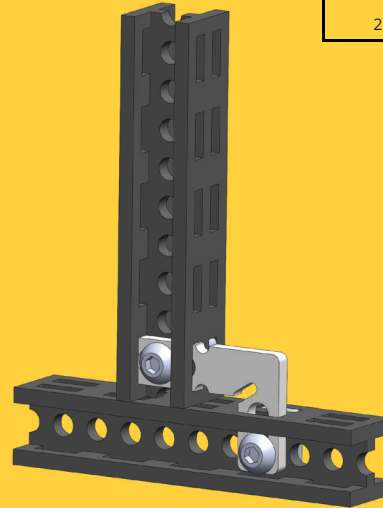
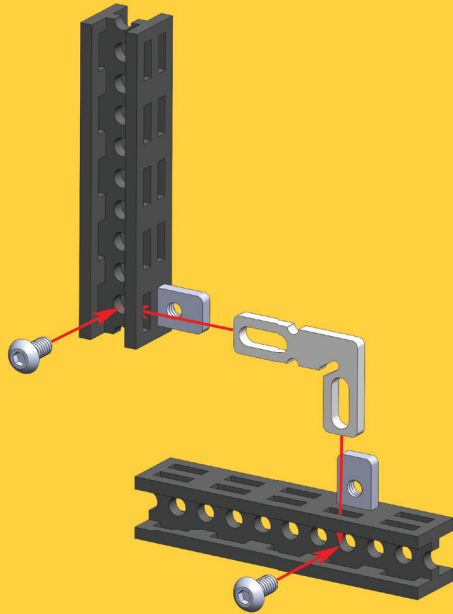
45x90 Bracket

Tip: mirroring brackets are used the same way



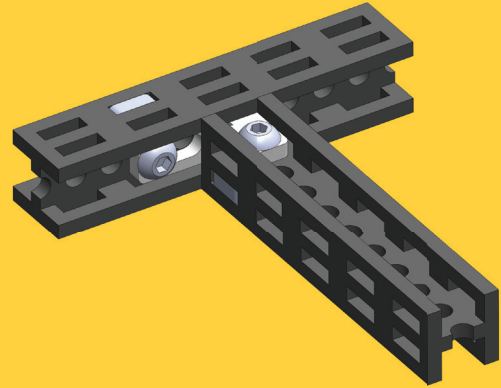
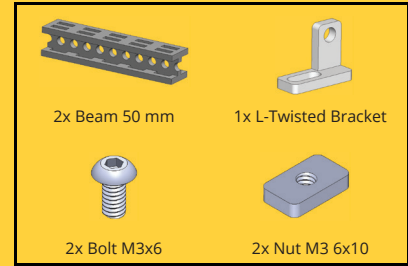
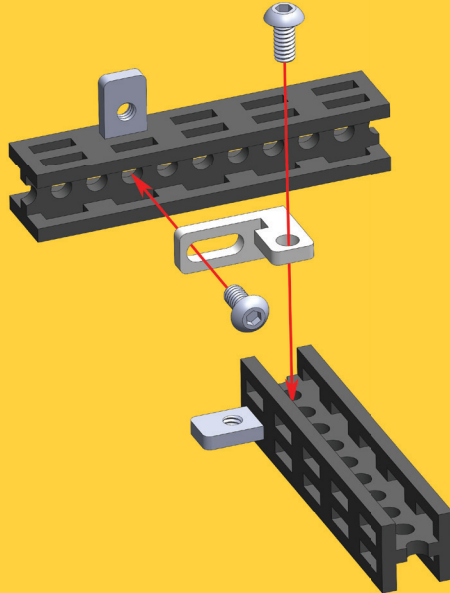
NOTE: there are many other ways to use this bracket.

L-Bracket



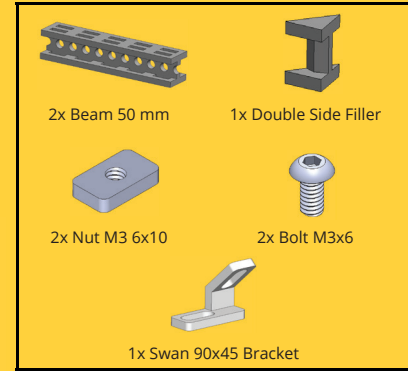
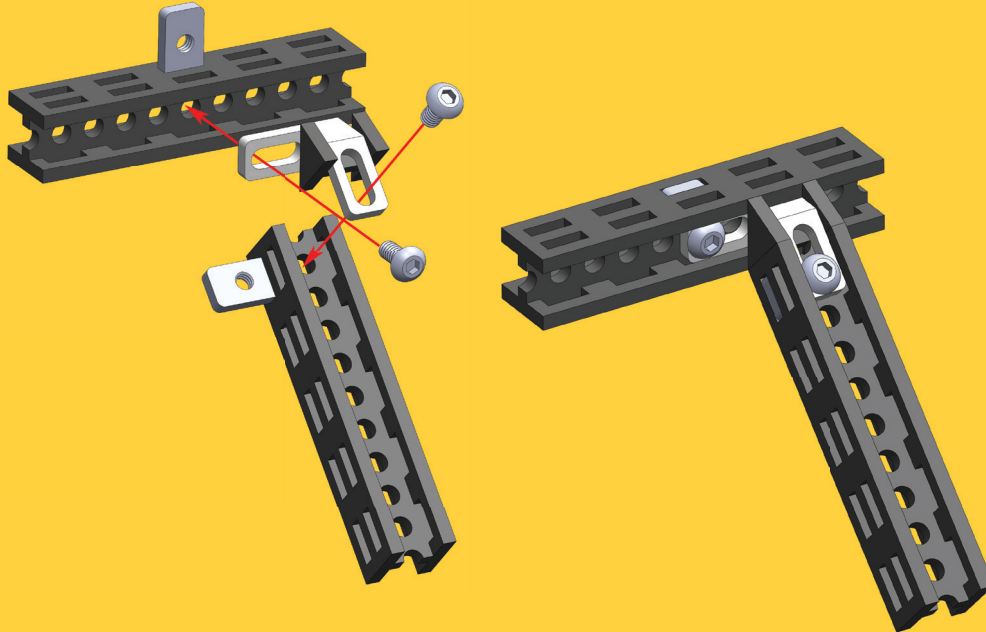
NOTE: there are many other ways to use this bracket.

L-Twisted Bracket



NOTE: there are many other ways to use this bracket.

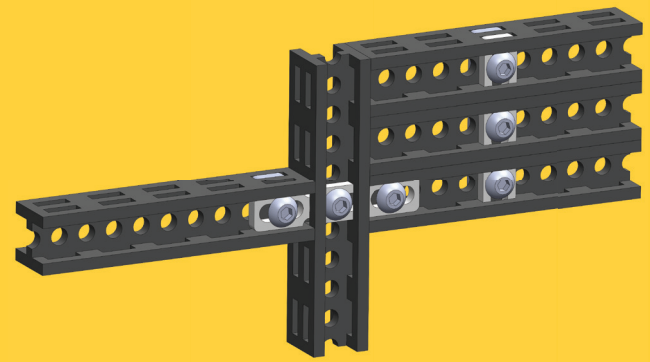
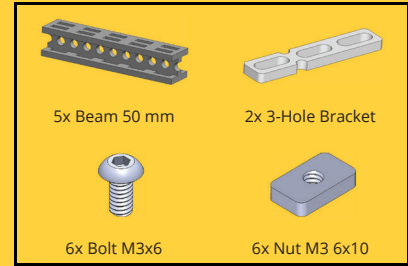
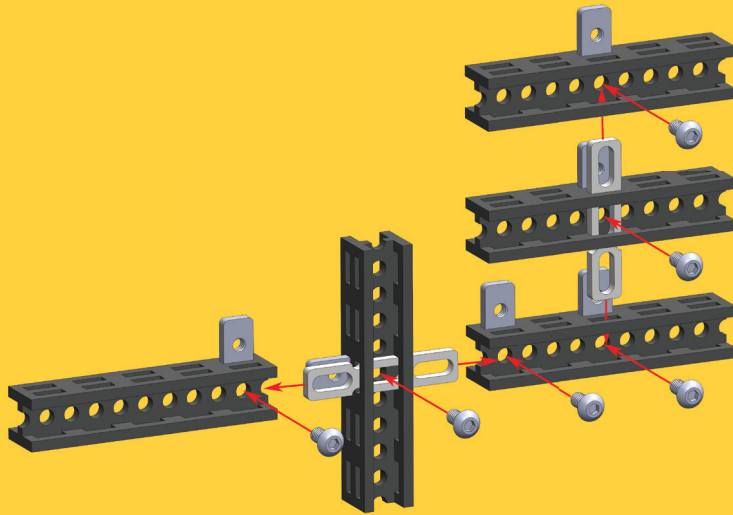
Swan 90x45 Bracket



NOTE: there are many other ways to use this bracket.

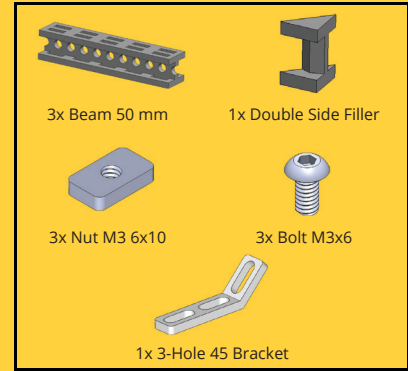
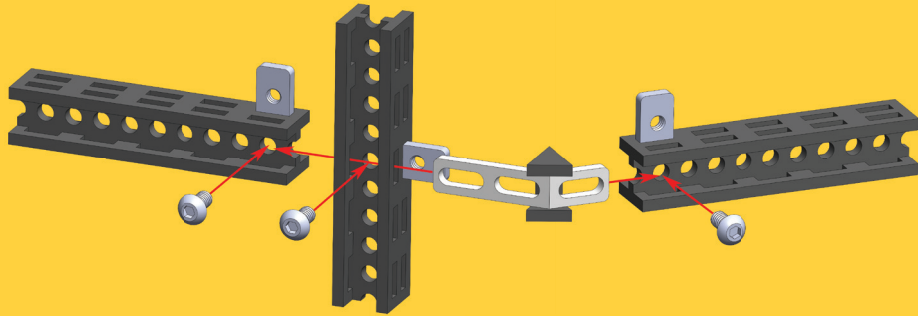
Tip: mirroring brackets are used the same way

3-Hole Bracket



NOTE: there are many other ways to use this bracket.

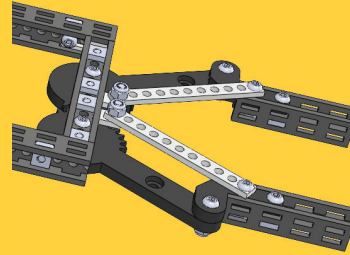
3-Hole 45 Bracket



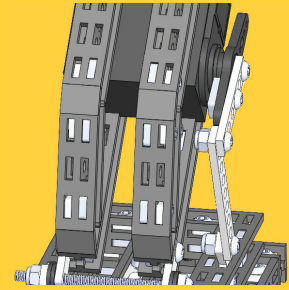
NOTE: there are many other ways to use this bracket.

Using Strip Brackets

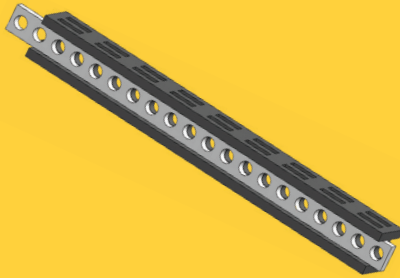
- Perfect when building robotics (pictures 1 and 2).
- Can be cut into any required length.
- Hole diameter: 3 mm.
- Holes can be drilled for 4 mm hardware.
- Strengthen the Beam: Strip Bracket perfectly fits into the track of beam and makes it even more sturdy (picture 3).
- Easy to cut using pliers or hacksaw (picture 4).



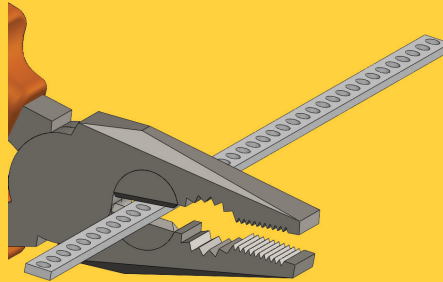
Picture 1



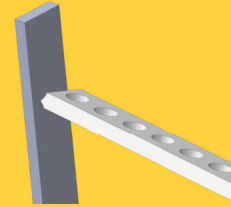
Picture 2



Picture 3

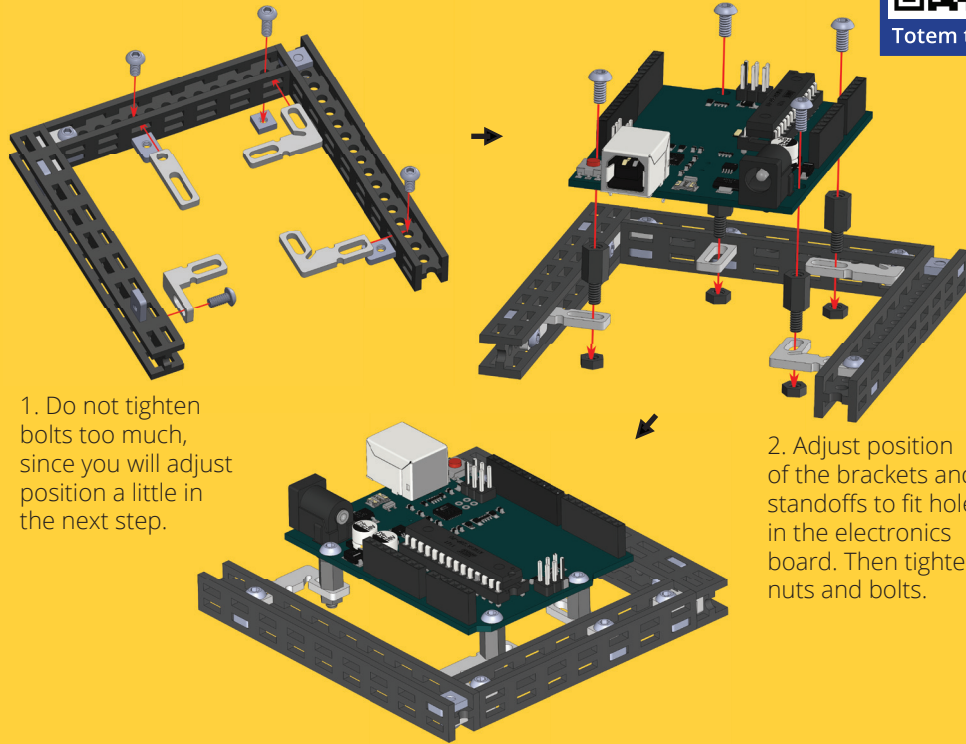


Picture 4



Use file for finishing.

Using Nylon Standoffs to Mount Electronics



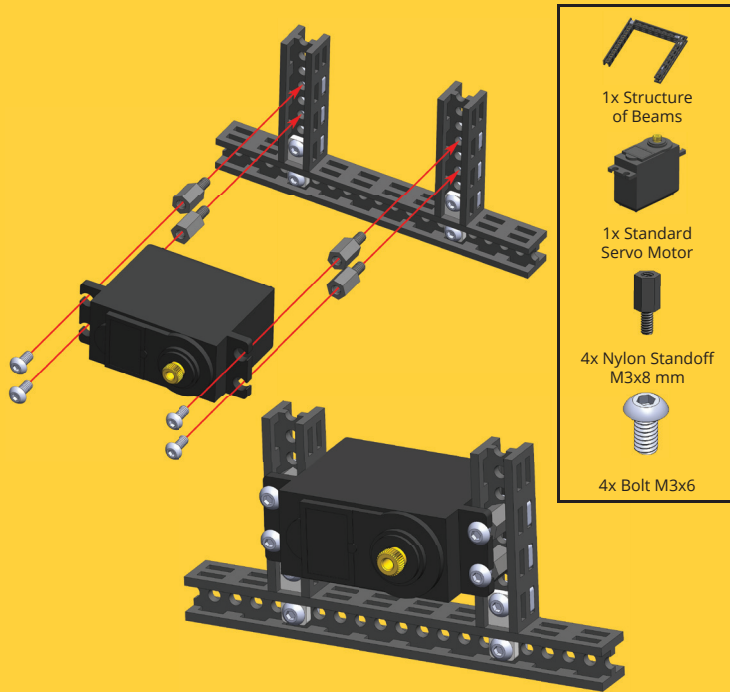
1. Do not tighten bolts too much, since you will adjust position a little in the next step.

2. Adjust position of the brackets and standoffs to fit holes in the electronics board. Then tighten nuts and bolts.

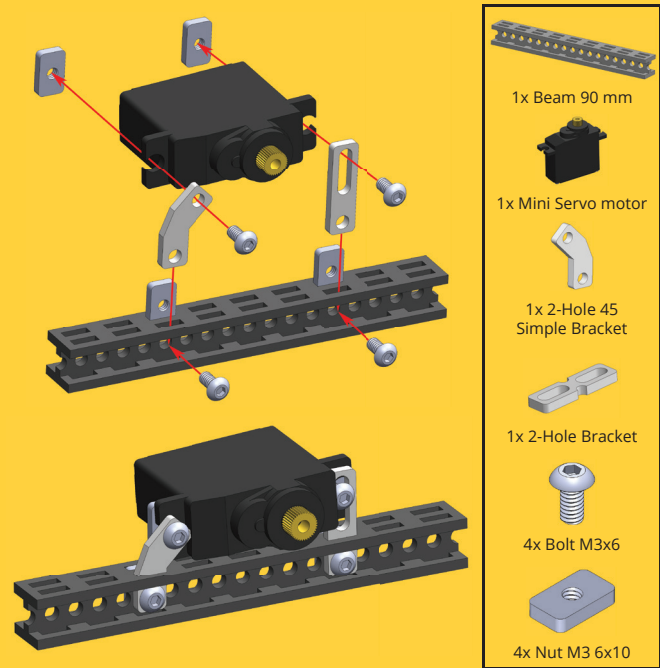
- 1x Structure of Beam
- 1x Electronics Board
- 7x Bolt M3x6
- 1x Bolt M3x8
- 1x 2-Hole Bracket
- 2x L-Bracket
- 1x L-Twisted Adjustable Bracket
- 1x Nut M3 5.5x5.5
- 3x Nut M3 6x10
- 4x Nylon Nut M3
- 4x Nylon Standoff M3x8 mm

Tips for Mounting Motors

Standard Servo Motors: Using Standoffs



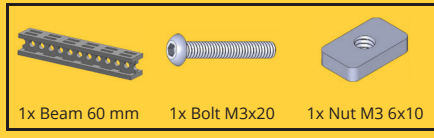
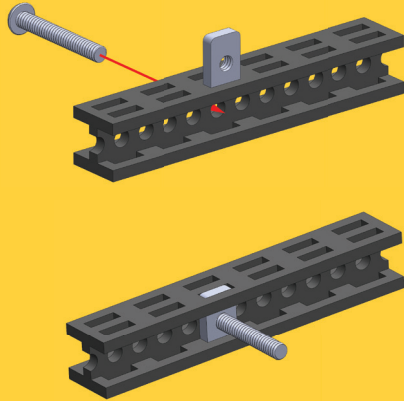
Mini Servo Motors: Using Brackets



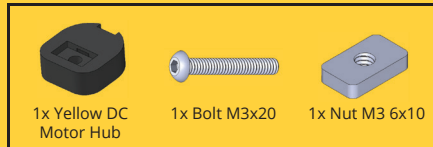
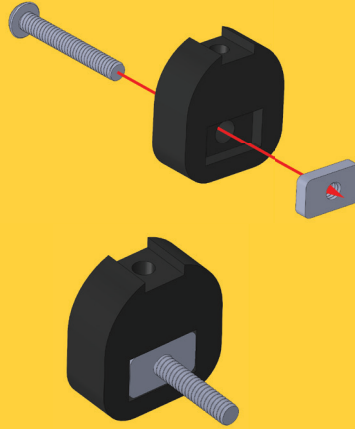
Standard Servo can also be mounted on beams using brackets.

Axles

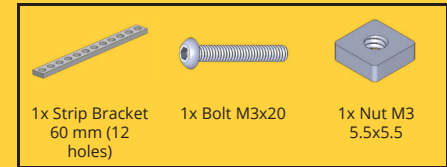
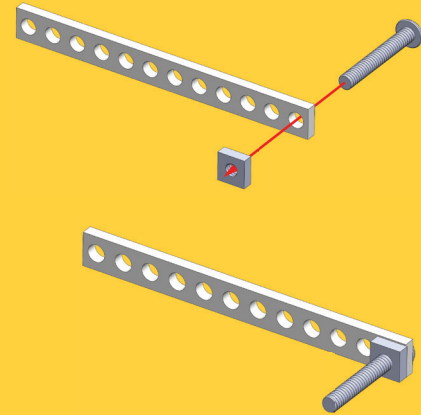
Beam Axle



Motor Hub Axle

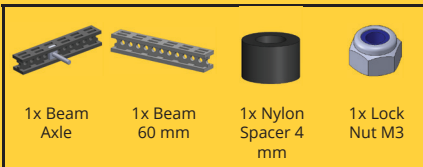
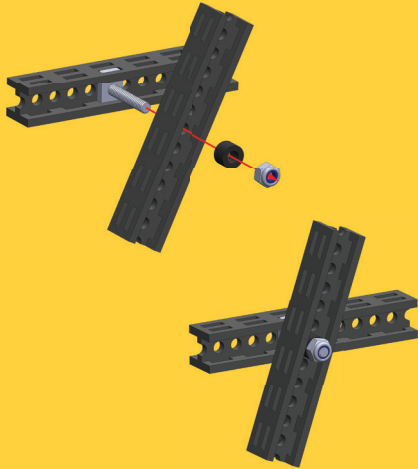


Strip Bracket Axle

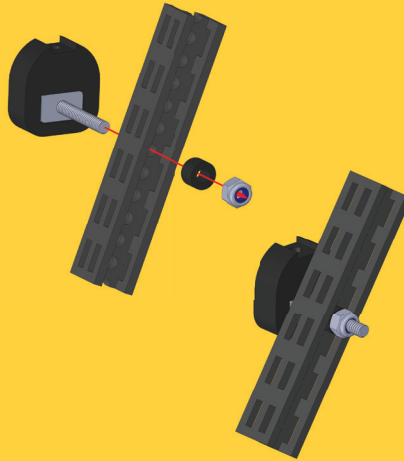


Lock Nuts

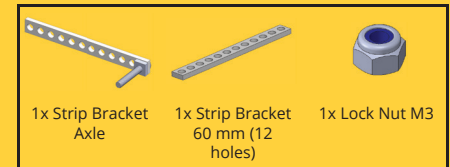
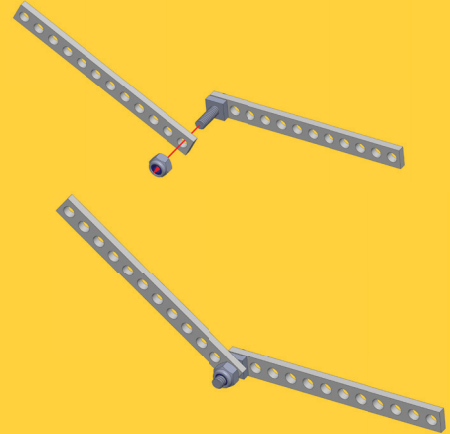
Lock Nut + Beam Axle



Lock Nut + Motor Hub Axle

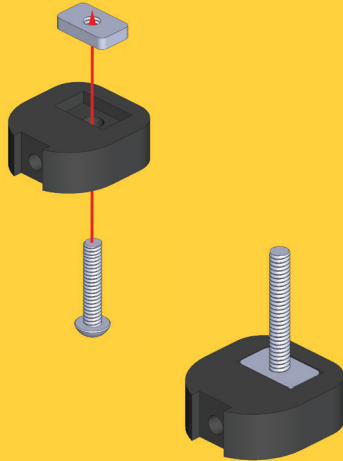


Lock Nut + Strip Bracket Axle

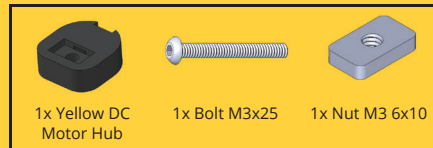
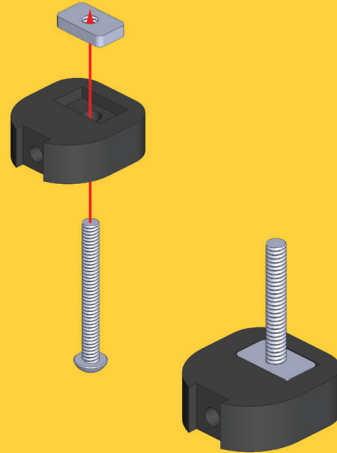


Loco Motion

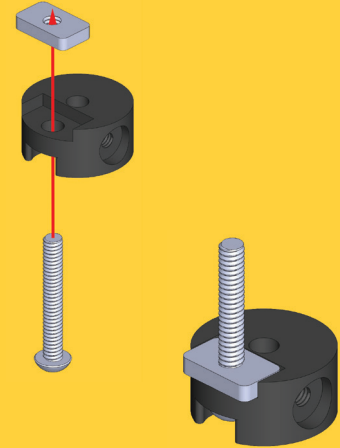
Loco Motion Prep 1



Loco Motion Prep 2

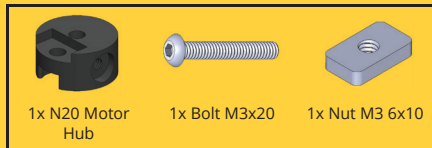
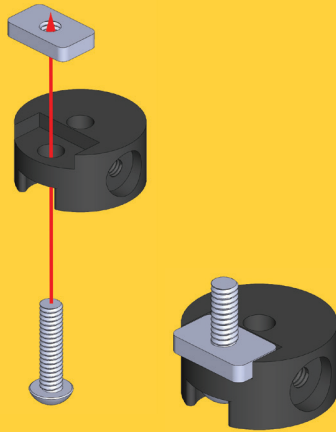


Loco Motion Prep 3

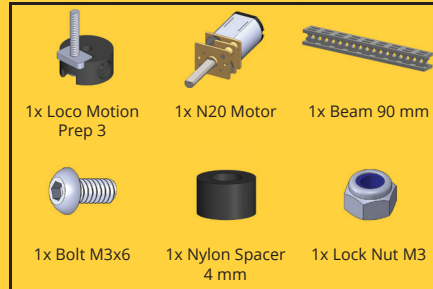
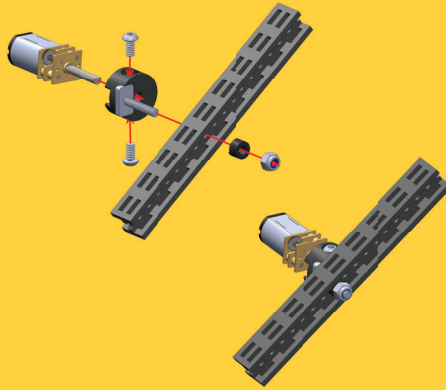


Loco Motion

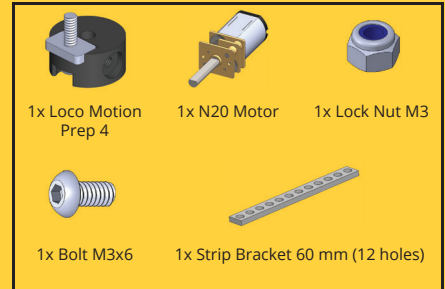
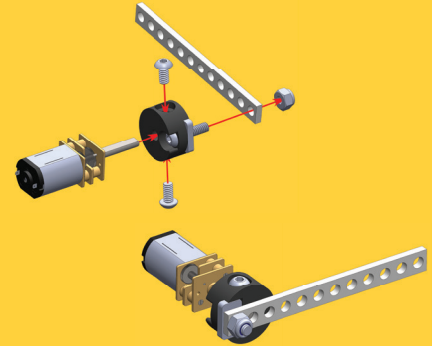
Loco Motion Prep 4



Loco Motion N20 with Beam

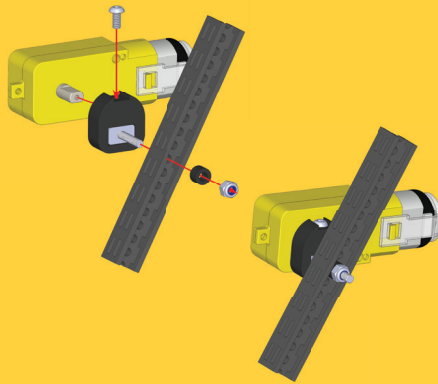


Loco Motion N20 with Strip Bracket

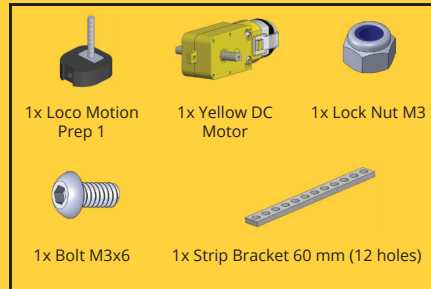
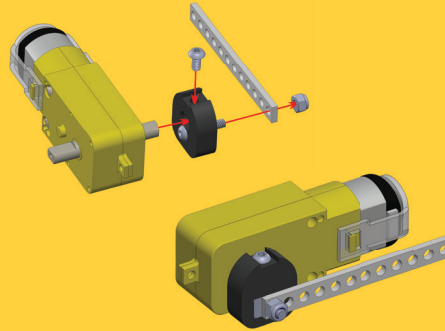


Loco Motion

Loco Motion with Beam

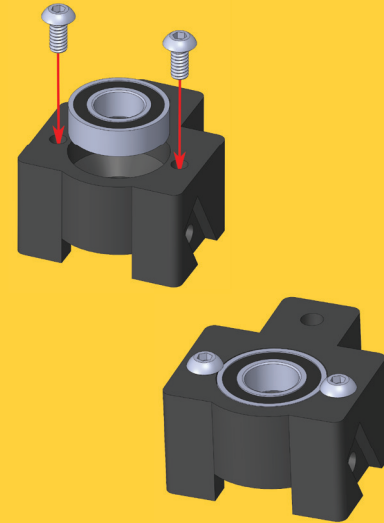


Loco Motion with Strip Bracket



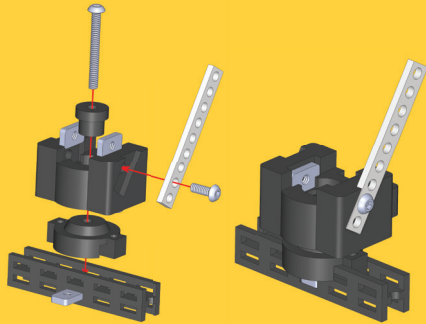
Caster Wheel

Caster Wheel Set Step 1



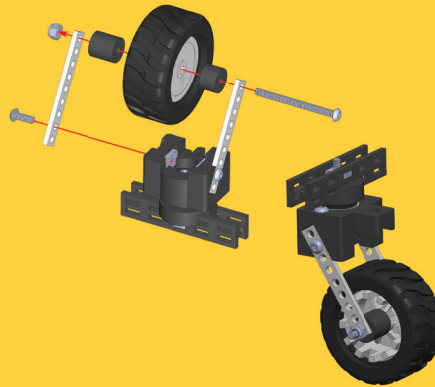
Caster Wheel

Caster Wheel Set Step 2



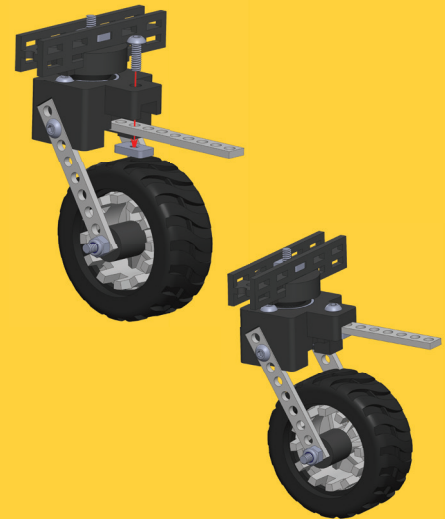
1x Structure of Beam	1x Caster Wheel Mounting Bracket	
1x Caster Wheel Axle	1x Strip Bracket 45 mm (9 holes)	
1x Bolt M3x8	1x Bolt M3x25	1x Nut M3 6x10

Caster Wheel Set Step 3



1x Strip Bracket 45 mm (9 holes)	1x Caster Wheel Spacer 1	1x Caster Wheel Spacer 2
1x Bolt M3x35	1x Bolt M3x8	1x Lock Nut M3

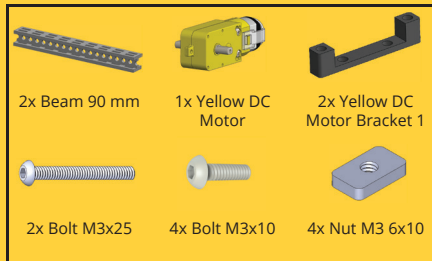
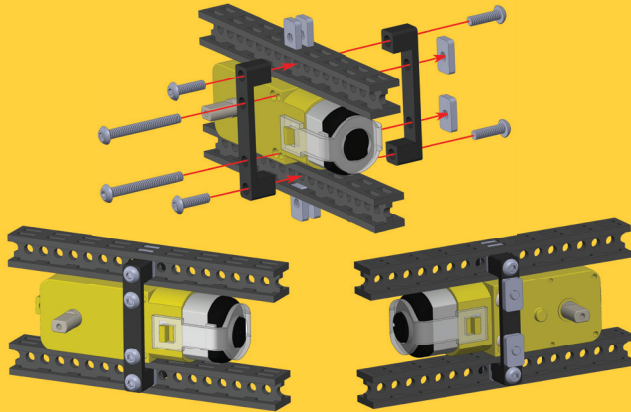
Caster Wheel Set Step 4



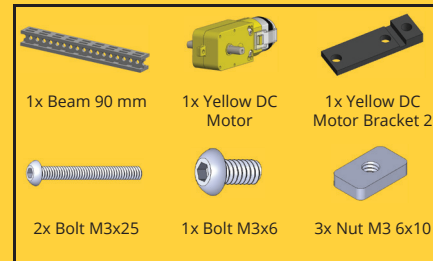
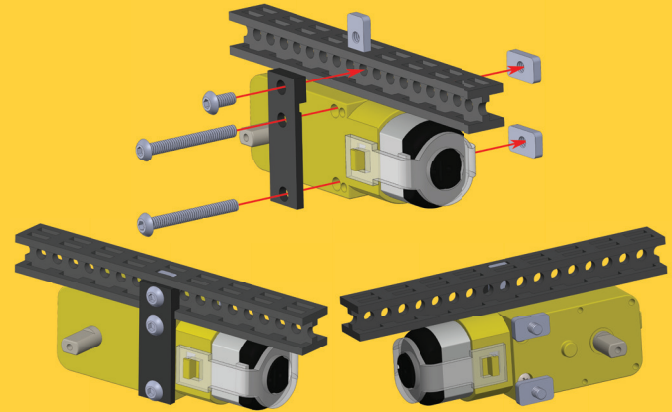
1x Strip Bracket 45 mm (9 holes)	1x Bolt M3x8	1x Nut M3 6x10

Mounting Yellow DC Motor

3D Printed Bracket for Yellow DC Motor 1

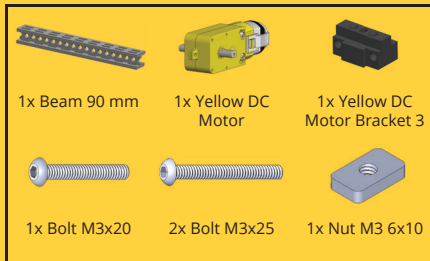
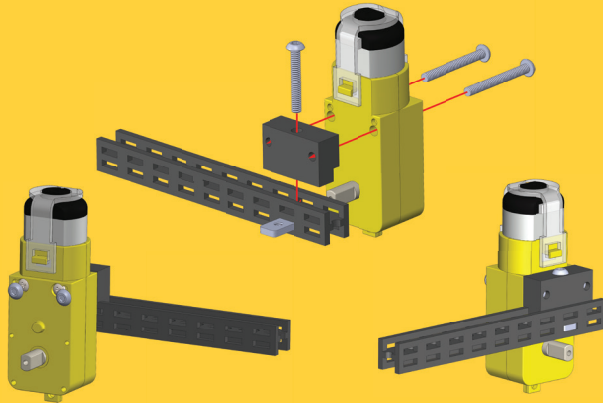


3D Printed Bracket for Yellow DC Motor 2

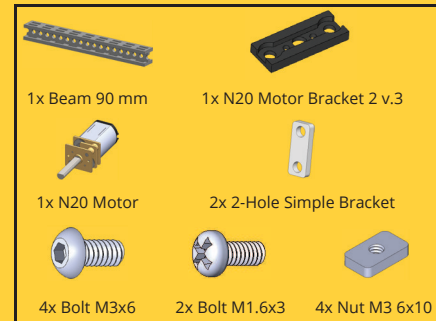
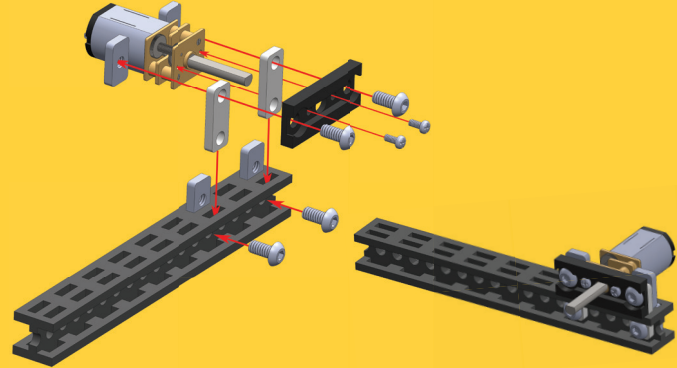


Mounting Yellow DC Motor

3D Printed Bracket for Yellow DC Motor 3



Mounting N20 Motor



MINI CONTROL BOARD X3 TROUBLESHOOT

Can't connect to the Mini Controller Board X3 with Totem mobile application.

- Check if Mini Trooper PCB is powered on (LEDs should blink).
- Only one device can be connected to the PCB at a time. Reconnect the battery to reset the PCB or disconnect with another device.
- Check if your device is running the latest version of Totem mobile application.
- Ensure that your device has Bluetooth functionality and location service (GPS) enabled and Totem mobile application has the location permission.
- Close Totem mobile application and run it again (restart).

Servo motor doesn't spin.

Servo motor connector may be plugged in upside down. Flip it over.

LEDs are flashing when battery is not connected and motors are spined manually.

This is a normal behaviour and doesn't indicate any malfunction.

None of the LEDs are flashing when battery is connected.

Battery voltage is low. Charge the battery.

First LED of light bar is flashing when battery is connected.

Battery voltage is low. Charge the battery.

DC motors are twitching or decelerates while driving.

Battery voltage is low. Charge the battery.

DC motor spin direction is incorrect.

- Check instruction manual if motors are plugged to appropriate DC motor sockets.
- Connect to Mini Trooper using Totem mobile application. Go to "Settings" and switch "DC motor pins" to "Inverted". Write changes by clicking "Save".
- A button configuration may be wrong. Reinstall Totem mobile application in order to reset all the settings.



PRECAUTIONS: ELECTRONICALLY OPERATED PRODUCT

Do not give this product to children because of sharp cutting tools. As with all electronic products, precautions should be observed during handling and use to prevent electric shock. **Adult supervision required.**

SAFETY WARNINGS:

- Do not pick up model while in motion.
- Keep fingers, hair, and loose clothing away from rotating wheels and/or other moving parts to avoid the injury.
- If you stopped operating the model, remember to unplug the battery, to avoid accidental operation.
- If the model is dirty, please clean it with dry and soft cloth. Do not clean electronics.
- Do not expose the model to high temperature, high humidity, or direct sunlight.
- Indoor use only. Do not put this product in water to avoid damaging its electronic components.
- The product is made of complex electronic circuit and electronic components, do not disassemble, or modify the circuit board.

BATTERY SAFETY INFORMATION:

- Do not expose battery to high temperature, high humidity, or direct sunlight.
- There is a risk of fire and personal injury if battery is punctured, damaged or misused.
- Do not disassemble or damage the battery pack.
- Use only the supplied 250 mAh 3.7V LiPo battery. Using any other battery may damage the model.
- Use only the included USB charging cable to charge the battery.
- Please check on a regular basis the wire, plug, battery, charger, and other electronic parts. If any damage is found, please stop using the product immediately.
- Stop charging if battery becomes hot, smells, smokes or gives off strong odour.
- Never throw batteries into fire to avoid explosion or leakage.
- Check the batteries on regular basis to avoid leakage.
- Recycle or dispose of batteries according to local laws and guidelines.

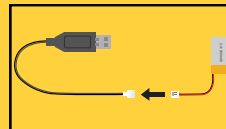
TOOLS SAFETY INFORMATION:

Cut hazard: sharp blade. Contact may result in injury. Always keep blades away from fingers and body. Handle with care. Keep out of reach of children.

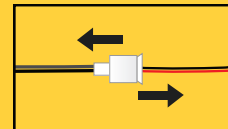
BATTERY CHARGING:

Rechargeable battery must be charged by adult only.

- The new battery pack needs to be charged before use.
- Connect the USB charging cable to 5V USB power source, such as laptop.
- Connect the battery to the charger (see picture 1). The charger will show a red LED light when charging the battery. When the battery is fully charged, the red LED light turns off.
- To disconnect cables, hold the connectors of both cables and pull apart (see picture 2).
- Do not attempt to overcharge the battery.



Picture 1



Picture 2

KEEP THIS INSTRUCTION MANUAL AND THE PRODUCT BOX AS IT CONTAIN IMPORTANT INFORMATION FOR FUTURE REFERENCE.

Due to the continuous product improvement, the pictures on this manual may differ slightly from the actual product. Please adhere to actual product instead.

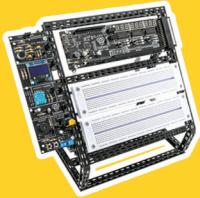
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Sauletekio al. 15-709, Vilnius, 10224, Lithuania
For customer support please contact: support@totemmaker.net

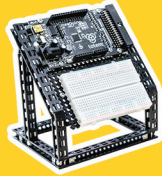


Caution: this is not a toy and is intended for use by or under the supervision of adult.

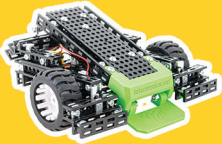
Discover more of Totem:



Mini Lab



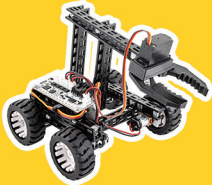
Micro Lab



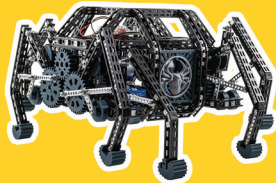
Mini Trooper



Young Engineer Kits



Gripper Bot



Black Spider

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