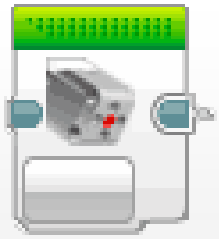
FIRST mindstorms EV3 Programming Quick Reference

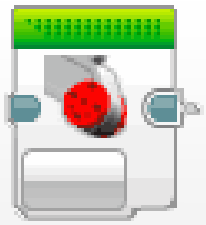
Block	Description	Attributes



Medium Motor Controller

This block is used to make the medium motor on the robot move. It can only move medium motors so keep in mind the right port.

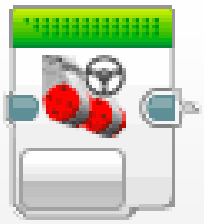
- Power: This attribute controls the speed at which the motor is moving. Set the value to negative to move backwards.
- Duration: This attribute controls the distance the motor will rotate. It can either be set to rotations, degrees, or seconds.
- Brake: This attribute controls whether the motor brakes/locks up after it has completed the set duration or lets the motor coast.



Large Motor Controller

This block is used to make large motors on the robot move. It can only move large motors so keep in mind the right port.

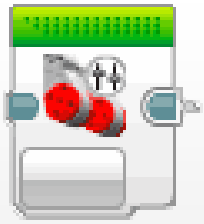
- Power: This attribute controls the speed at which the motor is moving. Set the value to negative to move backwards.
- Duration: This attribute controls the distance the motor will rotate. It can either be set to rotations, degrees, or seconds.
- Brake: This attribute controls whether the motor brakes/locks up after it has completed the set duration or lets the motor coast.



Move Steering Controller

This block is used on the two main drive motors. Moving the slider will change how the robot will turn as it drives forward.

- Power: This attribute controls the speed at which the motors are moving. Set the value to negative to move backwards.
- Steering: This attribute controls the direction the two motors will move. Move the slider to make the robot turn that way.
- Duration: Controls the motors travel distance.
- Brake: Controls whether the motors brake at the end.



Move Tank Controller

This block is used on the two main drive motors. Both motors are controlled independently so the robot will move like a tank.

- Power 1: Controls the motors speed of the first motor port you selected. Set the value to negative to move backwards.
- Power 2: Controls the motors speed of the second motor port you selected. Set the value to negative to move backwards.
- Duration: Controls the motors travel distance.
- Brake: Controls whether the motors brakes at the end.

FIRST mindstorms EV3 Programming Quick Reference

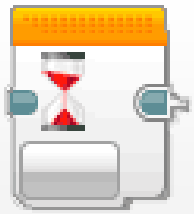
Block	Description	Conditions

Start Program

This block is where you start your program. Each file needs one to work. Connect all your blocks in the order you want them after this block.

Loop Interrupt

This block is used only inside of loops. Use this block to tell your program to stop looping when a certain condition is met.



Wait for Condition

This block stops the robot until a condition is met. This is very useful when used with sensors or when completing timed missions.

Time Condition: Selecting this option allows you to set how many seconds you want your robot to wait before continuing.

Color Condition: Robot will wait until a color is detected by the selected sensor. Choose *Color Sensor* > *Compare* > *Color* when using.

Touch Condition: Robot will wait until the selected sensor.is touched. Choose *Touch Sensor* > *Change* > *State* when using.

Loop until Condition

Place code inside this block and it will be repeated until a condition is met. These are used when creating line followers or repetitive tasks.

Time Condition: Selecting this option allows you to set how many times you want the robot to repeat the code inside.

Color Condition: Robot will loop until a color is detected by the selected sensor. Choose *Color Sensor* > *Compare* > *Color* when using.

Touch Condition: Robot will loop until the selected sensor is touched. Choose *Touch Sensor* > *Change* > *State* when using.

Switch

This block is used to choose between two routes of code. If the condition is true it runs the top code and if it is false it will run the bottom.

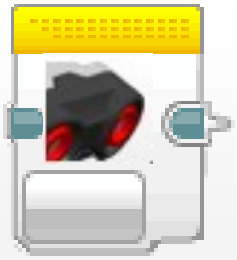
Logic: Robot will switch true or false based on the logic condition piped in from an outside part of the code.

Color Condition: Robot will switch true or false depending on what color it sees. Choose *Color Sensor* > *Compare* > *Color* when using.

Touch Condition: Robot will switch true or false depending on the button state. Choose *Touch Sensor* > *Change* > *State* when using.

FIRST mindstorms EV3 Programming Quick Reference

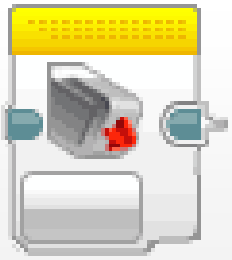
Block	Sensor	Ways to Use



The Ultrasonic Sensor

The ultrasonic sensor is used to calculate the distance a robot is from an object. This sensor gives you distance values in cm or inches.

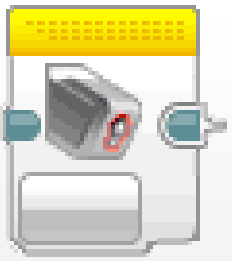
- Read a Value: To read the value the sensor is reading use the yellow block. Then you can use that number value throughout your code.
- Wait until Value: The ultrasonic sensor is built into the orange wait block. Use this to determine when you are in range of an object
- Switch based on Value: The sensor is built into the orange switch block. Use this to choose what to do based on your board location.



The Touch Sensor

This sensor is able to tell if it has been pressed or not. The red tip works as a button that the robot can read. You can make bumpers on it.

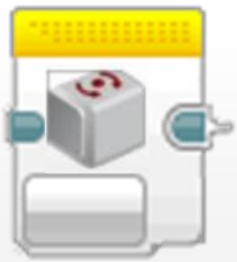
- Read a Value: To read the value the sensor is reading use the yellow block. This returns true or false based on whether it's pressed.
- Wait until Value: The touch sensor is built into the orange wait block. Use this to determine when you bump into an object.
- Switch based on Value: The sensor is built into the orange switch block. Use this to choose what to do if the button is clicked or not.



The Color Sensor

This sensor uses reflected light to determine the color closest to the sensor. This sensor is sensitive so make sure to create a light shield around it.

- Read a Value: To read the value the sensor is reading use the yellow block. You can read what color the sensor is currently seeing.
- Wait until Value: The color sensor is built into the orange wait block. Use this to determine when see a certain color on the board.
- Switch based on Value: The sensor is built into the orange switch block. Use this mainly in line following programs.



The Gyro Sensor

The gyro sensor is able to determine the angle at what it is turned at. It is extremely sensitive so make sure it's still when turning on the robot.

- Read a Value: To read the value the sensor is reading use the yellow block. You can read what angle the robot is facing.
- Wait until Value: The gyro sensor is built into the orange wait block. This can be used to turn the robot until it turns to a certain angle.
- Switch based on Value: The sensor is built into the orange switch block. This can be used to create turn correction programs.