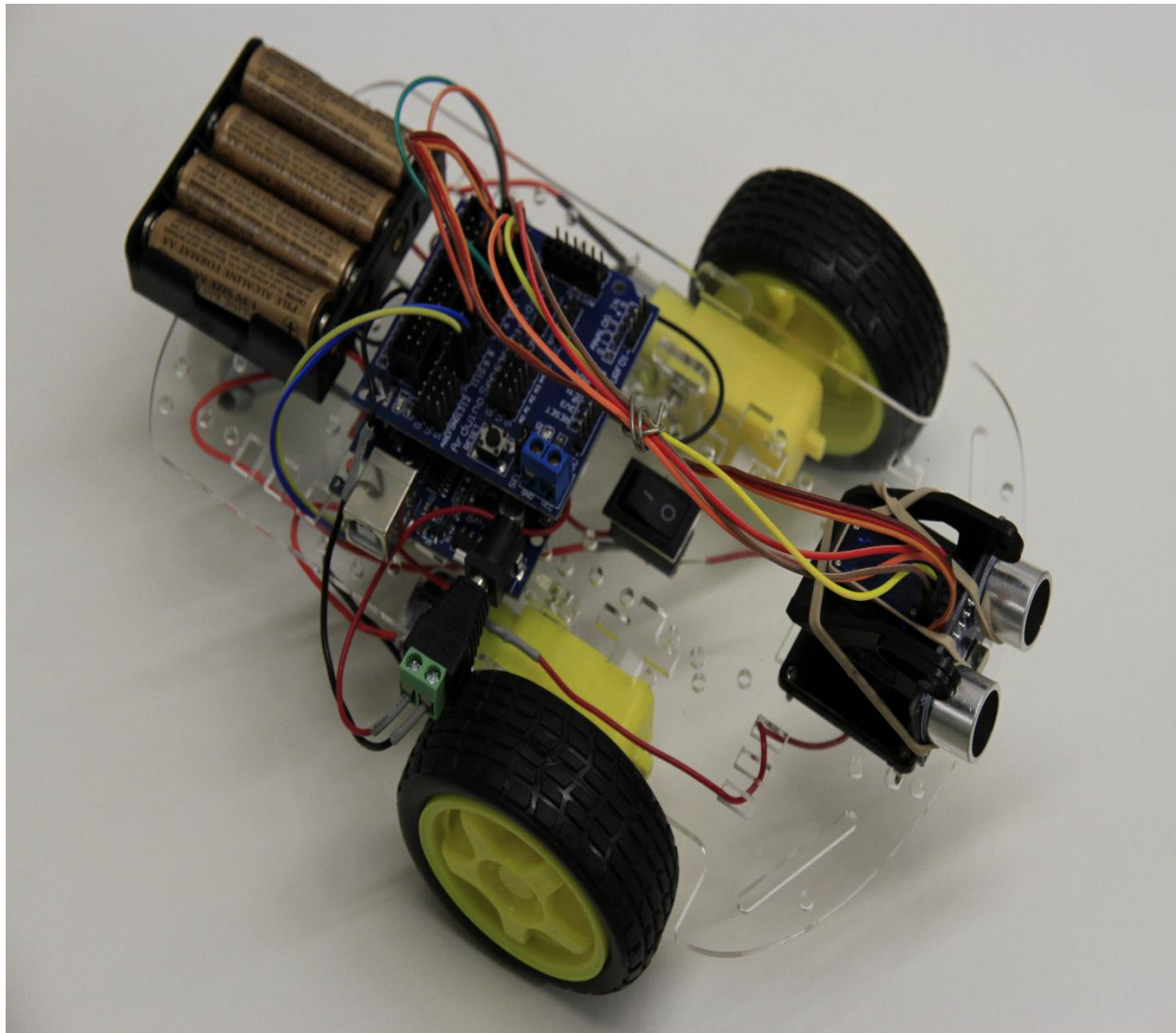# ARDUINO 2WD SMART ROBOT CAR KIT

Level: Beginner   **GK-KIT-003**

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PARTS LIST

Please make sure that the following pieces are included in your kit

Component	Quantity	Remarks
Arduino Sensor Shield v5.0	1	Align pins using needle nose plier, if needed
L298N Dual H-Bridge Motor Driver	1	Both DC Motors will be connected here
Arduino Uno Board	1	DO NOT plug in USB and DC at the same time
40 Pin Breakable Headers	1	Not required for the kit
Servo Mounting Brackets	4	Required for servo fastening
Servo Beams	3	Required for servo mounting
Servo Motor (SG90)	1	HC-SR04 will be mounted on this component
Arduino USB Cable	1	Allows programming of Arduino board
HC-SR04 Sensor	1	Ultrasonic Ranging Detector
DC Motors	2	
2.51" Rubber Wheels	2	High Grip Rubber Tires
Acrylic Robot Chassis	1	Covered with Adhesive Protection
Speed Encoders	2	Not required for the kit
DC 1.5V Battery Holder	1	Connected to switch
Motor Blocks	4	Used to connect DC Motors to the Chassis
Stranded 24 AWG Wire Sets	2	Used to connect switch and other components
ON-OFF Switch	1	Kill Switch
Metal Ball Caster	1	The third wheel
Female DC Power Adapter	1	Connected to Arduino
M3 Screw, Spacer and Nut Set	1	
M3 18 MM Black Screw Set	1	
Jumper Wire Set	1	
Untapped Spacer Set	1	

Recommended Tools

Needle Nose Plier	*Flush Wire Cutter*	*Wire Stripper*

Heat Shrink (Optional)	*Soldering Iron (Optional)*	*Brass Sponge (Optional)*

Screwdriver (+)	*Hammer*

## *Installation of Compone*

1. Remove the adhesive protection from the robot chassis plate (both sides).
2. First, use two motor blocks per each DC motor in order to install the latter on the robot chassis (Red oval shape in figure below).
3. Use the long screws and two nuts in order to fasten the DC motors in between the blocks and on the chassis. If done correctly, each motor should be mounted just like that which is shown in the figures below.
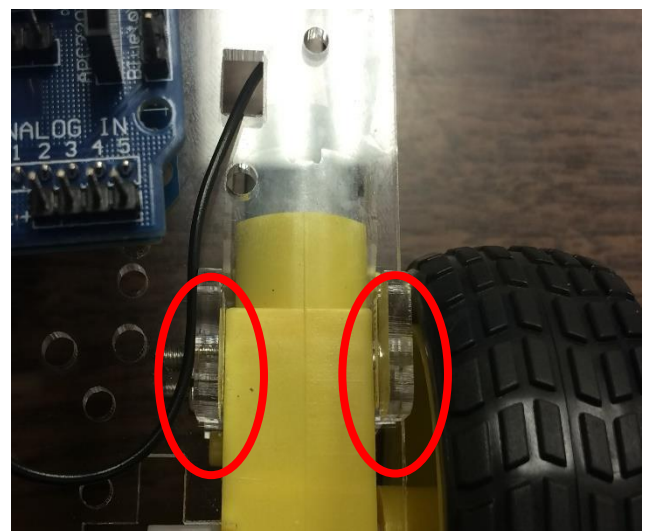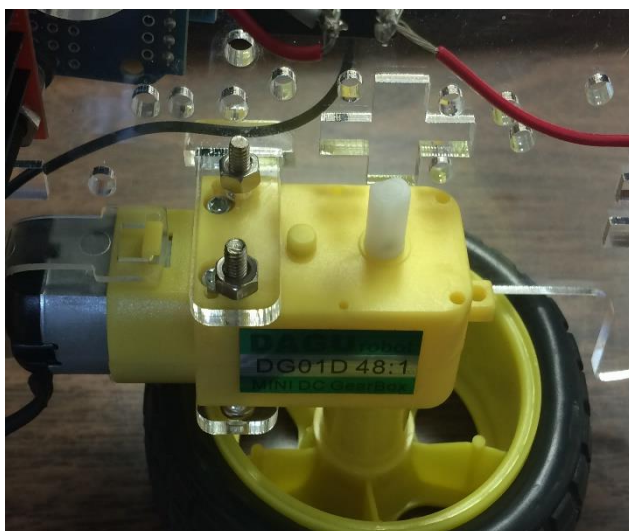
4. Repeat the same steps for the second motor.
5. Insert the ON/OFF switch in its rectangular position roughly in the middle of the chassis.
6. To install the metal ball caster, use the four brass standoffs and eight screws provided in order to mount this component on the front of the chassis just like that which is shown in the figure below in blue (Please note that the figure shows the bottom view of the chassis).
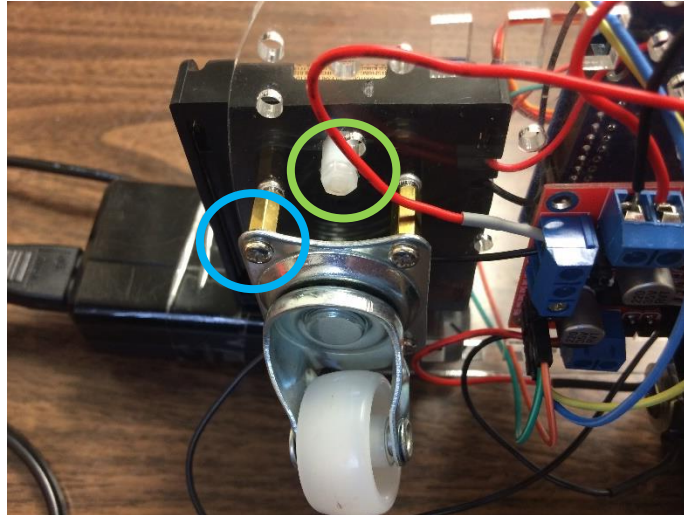
7. The battery holder can be installed on the other side of the chassis plate on top of the metal ball caster. However, use two plastic spacers, two screws and two nuts in order to separate it from the chassis plate. Please refer to the figure on the previous page in order to see the proper mounting spot for the battery holder can be seen in green.
8. In order to install the L298N Dual H-Bridge motor driver, use the two long 18 mm black screws along with the two untapped metal spacers and two nuts to mount this component on the bottom side of the chassis plate **(Please note that only two sides of the motor driver can be screwed on the chassis plate; the other two sides do not need to be connected)**. Use the following figure to guide you in this process.
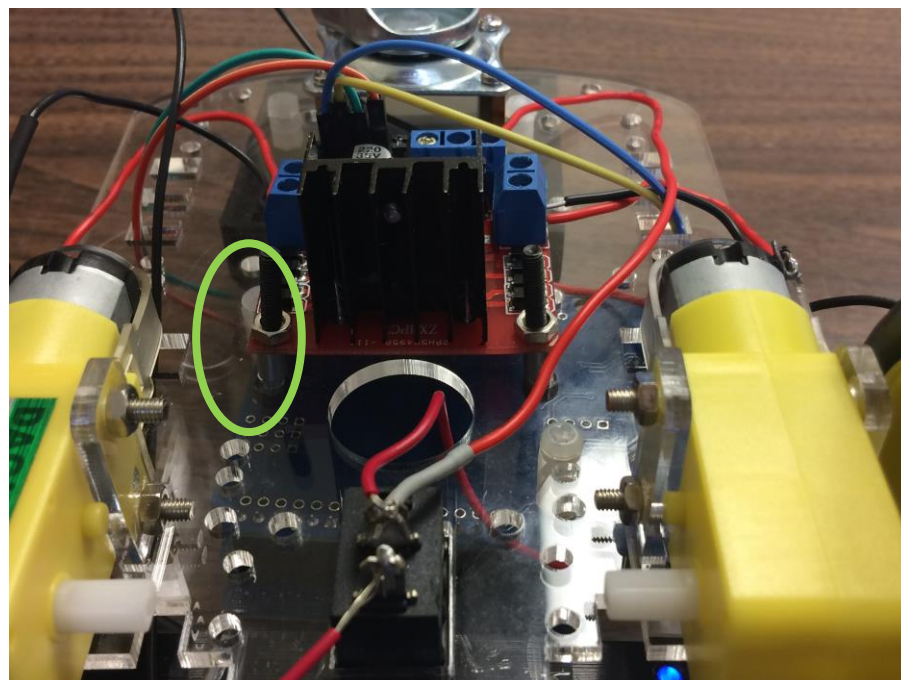
9. In order to install the Arduino Uno board, use one plastic spacer along with one screw and one nut and mount the board on the chassis on the opposite side of the motor driver. Refer to the figure below to see the installation spot **(Please note, once again, that only one side of the Arduino can be screwed on the chassis plate in this specific position. You can use the other plastic spacers provided to keep the other sides of the Arduino board at the same level – This can be seen on the figure below on the right**).
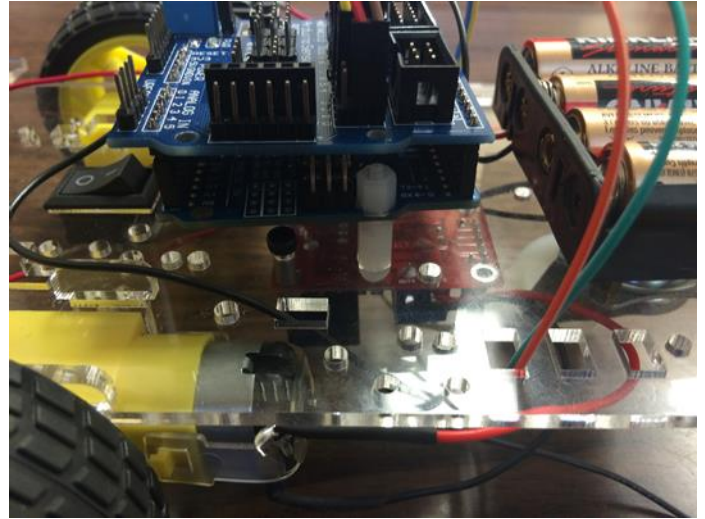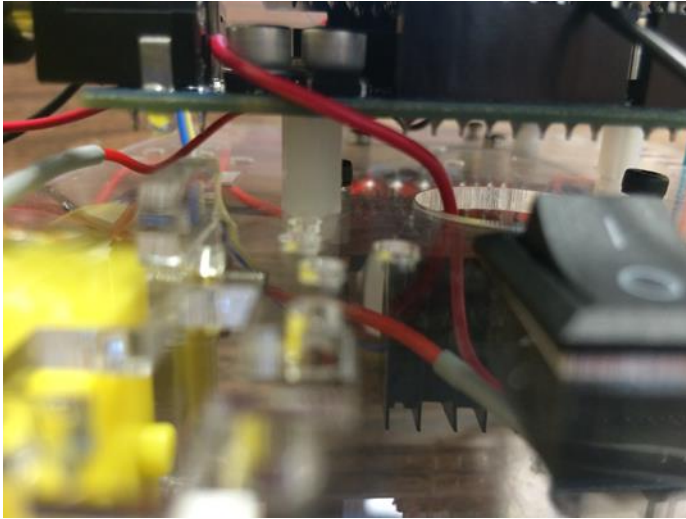

10. Next up, we are going to work on preparing the servo mounting brackets and the servo beams. Using a flush wire cutter or any other cutting tool, cut the cross-shaped white beam into that which is shown in the figure below and install it inside the servo holder using the two small screws **(Please note that you will have to use a hammer and your screwdriver to create new spots on the servo holder in order to screw your beam inside of it**).


11. Afterwards, use the two servo mounting brackets provided and fasten the servo in between them and then, use the longer screws provided in the servo screw bag to connect the mounting brackets together tightly. Place the servo motor on the white beam inside the holder prepared in the previous step and use one of the screws found in the bag with the beams to connect the beam to the servo in order to make sure the servo motor stays straight.

You can then mount the HC-SR04 sensor on the servo mounting brackets and install the servo holder on the back of the chassis plate using four screws and four nuts as shown in the figures below **(Please note that the HC-SR04 sensor should be tilted a bit upwards in order to prevent it from reading the ground as an object in the software)**.
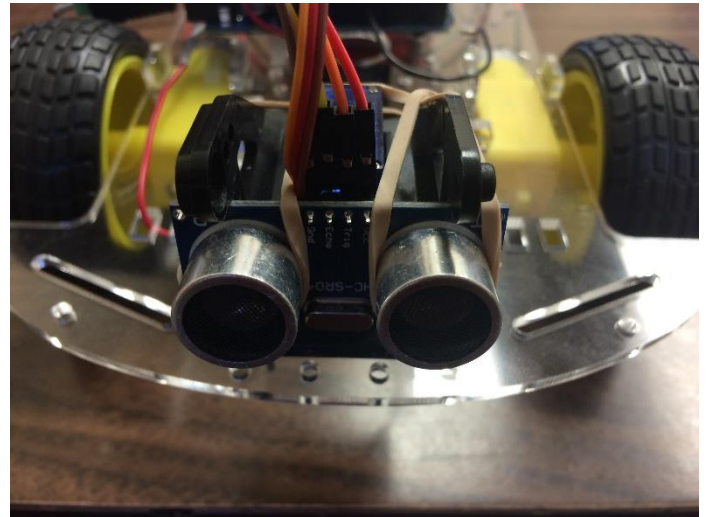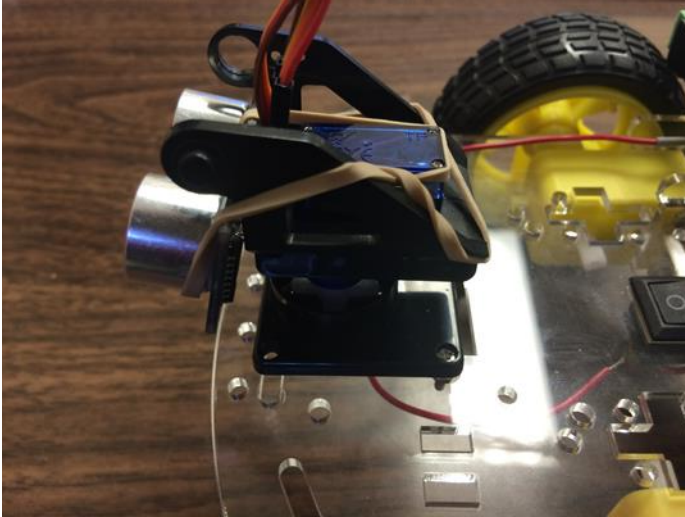

12. Next up, we are going to connect everything together using the wire jumpers and the AWG wires provided. First, connect the battery holder's power wire (red) to the lead under the "O" part of the ON/OFF switch and its ground wire (black) to the negative sign on the power jack provided in the kit. Then, connect another power wire (red) from the lead under the "I" part of the ON/OFF switch to the positive sign on the power jack **(Please do note that the wires can either be hooked on the leads of the ON/OFF switch or they can be soldered. Also, please use the heat shrinks provided to extend the wires anywhere necessary)**.

13. Afterwards, connect the DC motors to the L298N Dual H-Bridge motor driver using the power and the ground wires provided. Refer to the figure below to see the proper connection spots shown inside circles in green **(Once again, you can either solder or hook the wires onto DC motor leads)**.
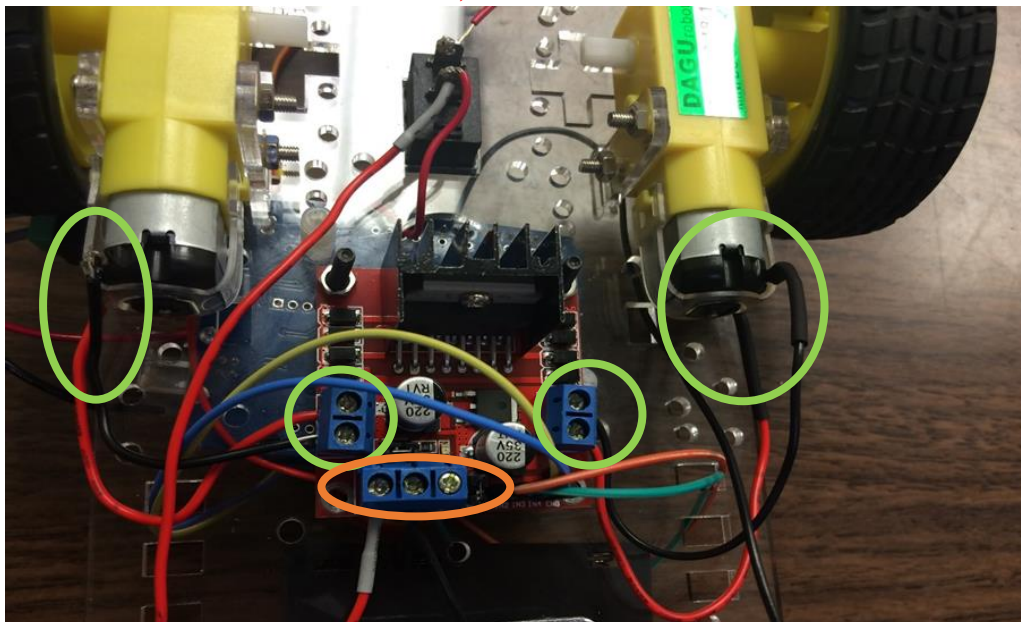
14. Now, the motor driver also needs to be powered. So, connect a power wire (red) from the lead under the "I" part of the ON/OFF switch to the motor driver to the left lead under the orange oval shape. Then, connect a ground wire (black) from the middle lead under that same orange oval shape to one of the GND (ground) pins on the Arduino board.
15. Now, place the Arduino Sensor Shield on top of the Arduino board. Make sure you connect the matching pins on both boards together.
16. Next up, connect the servo and the HC-SR04 pins to the correct pins on the Arduino Sensor Shield using the jumper wires provided in the kit. Please refer to the figure below to see which pins to connect. Connect the orange wire to the Trig pin, the yellow wire to the Echo pin, the Red wire to the Vcc pin and the brown wire to the Gnd pin on HC-SR04.
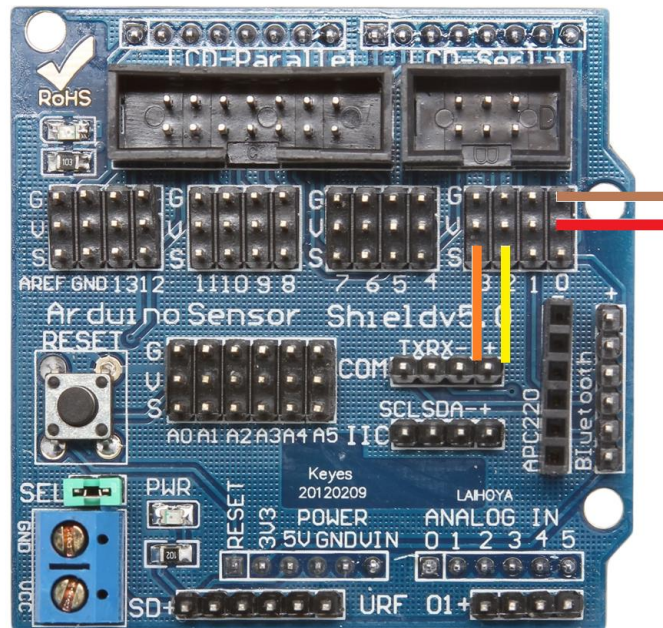
17. Now, connect the three jumper wires of the servo to the correct pins on the Arduino Sensor Shield. Please refer to the figure below to see which pins to connect.
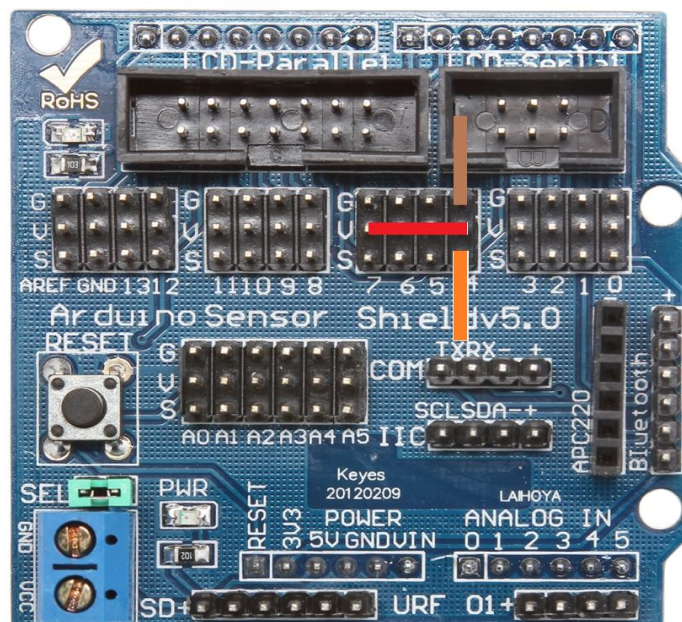
18. Finally, the motor driver's pins have to also be connected to the Arduino Sensor Shield pins. Please refer to the two figures below to see how to connect the jumper wires correctly to the sensor shield and to the motor driver.
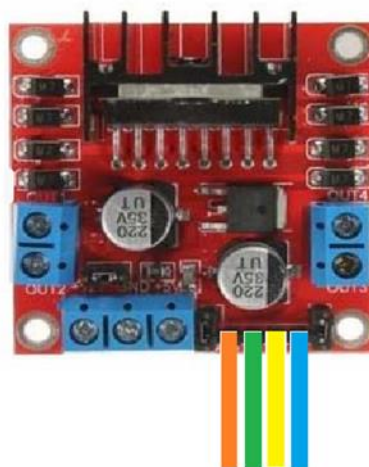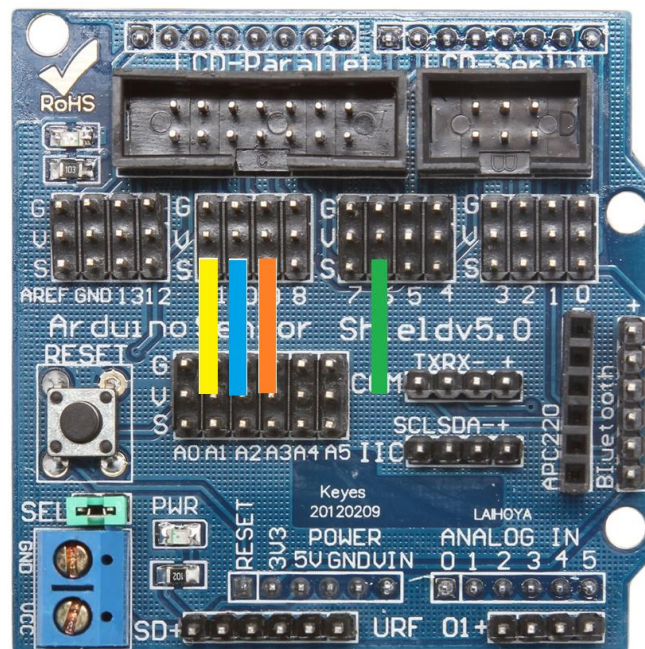
19. Finally, put the batteries in the battery holder and connect the Female DC Adapter to the Arduino. You can use the pre-written code for the robot which can be found on *www.abra-electronics.com*. You can also calibrate your motors and sensor using the codes provided on the same website.