Barbie Volkswagen 6V Ride-On Car Modification

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Introduction

- This GoBabyGo! Project build is for Eileen who has Spina Bifida. Our goal is to build and design a car that meets her needs.

- We are a team of students from Wichita State University in the course ENGR 202 Service Learning in Engineering. This is a multi-disciplinary class project that involves students from engineering and volunteer students from physical therapy. The children for whom we are building this car receive their therapy services from Rainbows United, a non-profit organization that provides center based, community based, and home based service options for young children with special needs. The child’s licensed Rainbows physical therapist advised our team on measurements and modifications for the child.
How to get the most out of your car

⚠️ DO NOT use your car for the first time without having it checked by an electrical engineer or other professional.

⚠️ DO NOT use a battery if the wires or casing shows any sign of damage or modification.

⚠️ DO NOT allow the child to use the car unsupervised.

⚠️ DO NOT use the car outside in any inclement weather or leave the car outside in such weather.

⚠️ DO NOT use the car if you smell or smell smoke.

⚠️ DO NOT leave the toggle switch in the ON position when the car is not in use.

⚠️ DO NOT TAKE ANY UNNECESSARY RISKS WHEN USING OR MODIFYING THE CAR!

⚠️ DO contact a clinician about your child’s use of a modified ride-on car and involve him/her in the modification process and later ride-on car use.
Before Modifying

⚠ Please always wear safety glasses and be sure to wear gloves to remove plastic burrs.

⚠ Always be aware of where your fingers and hand are during the modification process, especially when drilling or using PVC Cutters.

⚠ Do not use wire of a gauge higher than 16. A higher gauge means thinner wire, which may run this risk of causing overheating and wire melting.

⚠ When stripping wire, make sure to cut only through the plastic tubing and not the wire itself. Also, make sure to strip only enough wire so that you do not leave wire exposed when connecting wires together.
  ○ Cutting too deep into the wire or leaving unprotected wire may cause sparks, short circuits, and overheating. Always use wire strippers and not scissors.
  ○ Please note that you should never cut wires on the battery.

⚠ Please cover any wire nuts and crimp terminals with electrical tape.
Tools and Hardware

- Tools:
  - Power drill
  - 1”, ½”, ¼” drill bits
  - Wire cutter
  - 16 gauge wire stripper
  - Wire crimper
  - Phillips head screwdriver
  - Flat head screwdriver
  - PVC cutter
  - Pliers
  - Scissors
  - X-acto blade/cutting tool
Tools and Hardware

• Hardware:
  – Bolts
  – Nuts
  – (4) ft industrial-strength Velcro

• Electrical:
  – Big Red Twist Switch
  – (2) Ring Crimp Connectors
  – SPST Toggle Switch
  – Wire Nuts
  – 14-16 Gauge Wire
  – Female Crimp Connectors
  – Male Crimp Connectors
  – Electrical Tape/Duct Tape
Tools and Hardware

Other Materials:

- ¾” PVC Pipe (10’ section)
- (2) 5’ Pool Noodles
- Tape measure
- Walking wings (to fit the needs of the individual child)
- WSU Sticker
- Styrofoam kickboard(s)
- 10” Zip Ties
Initial Set-Up

- Unpack the 6V Battery powered Pink Barbie Volkswagen and assemble it as given in the instructions.

- Don’t forget the WSU Branded Sticker. Right in the front.

- Before working with the wires, unplug the internal battery and plug it in to charge.
Install the SPST Switch (Kill Switch)

- Step 1: Under the seat, cut the red wire that connects the car to the battery.
- Step 2: Using ring crimp connectors, and attach 2 lengths of 14-16 gauge wire. Mount the 2 wires to the SPST switch. Then drill a hole in the back of the car with a battery operated drill (diameter will correspond to switch).
- Step 3: Route the SPST wires through the hole into the battery compartment, then mount the switch in the exterior drilled hole.
- Step 4: Connect the SPST switch “ON” wire to the cut wire (the side away from the battery connector). Connect the “OFF” wire to the side nearest the battery connector.
Install Big Red Switch

- On the Big Red Twist Switch, cut the black wire near the end that looks like an AUX cable or headphone adapter. The Big Red will act as the accelerator button that will allow the car to move when pressed.

- Please discard the audio jack connector, as you will not need it.

- Remove original foot accelerator switch housing.

- Completely remove the switch from the housing.
Install Big Red Switch

- On the steering wheel, drill a small diameter hole right next to the steering shaft, then route the wires through the drilled hole down to the plug located behind the foot pedal housing.
- Using wire-strippers and a crimper, secure male crimp connectors to each wire.
- Connect one end of the Big Red to the Battery Pos (+) pin of the existing plug.
- Connect one end of the Rig Red to the MTR (or signal) pin of the existing plug.
- Take a length of 14-16 gauge wire, connect one end to the Battery (-) pin of the existing plug. Route wire to the battery compartment, and connect make connection to any GND (-) easily available.
Install Big Red Switch

– Ensure all electrical connections are secure, and replace any sections removed during the wire routing process.

– Using Industrial strength Velcro, secure the Big Red to the steering wheel. *Note: if it does not feel secure enough, use zip-ties to strap it to the steering wheel as well.

– Cut or file down any sharp edges that may be present.
Installation of fitting materials

- Using any webbing of your choice and some plastic buckles, fashion a very simple seatbelt.
- Attach the seatbelt ends to each side of the car’s removable seat.
- Using the foam kickboard and an X-acto knife, fashion a seat and back cushion, and secure to removable seat with industrial strength Velcro.
- Using a tape measure, determine the interior sections of the car that need cushioning to avoid any falls or bumps.
  » Then using an X-acto knife and the pool noodles, section the noodles down the center, and secure to all needed areas of the interior with industrial strength Velcro.
Installation of fitting materials

– Using the PVC and cutters, cut a section that will form an upside-down U that can be joined with 90 degree elbows.

» Height will be determined on an individual basis.

– Using a battery operated drill, mark, then drill 2-3 mounting holes on each side of the car (ensure that you mark and drill the PVC sections to suit).

» Now secure the 2 sections of PVC with adequate bolts and lock-nuts.

– Place the 90 degree elbows, and top section, to ensure a proper alignment.

– Next, cut pool noodle sections the can wrap this U-shaped roll cage you have just assembled.
Installation of fitting materials

– Lastly, using the Walking Wings of your choice, slide the hand-held(s) over the top section of the PVC roll cage.

» Once the child is present adjustments may need to be made to the height of the roll cage as well as adjustments to the Walking Wing shoulder and chest straps.
Warning

- If you smell smoke or notice any burning/melting, UNPLUG IMMEDIATELY!

- Pay close attention for any weird smells, actions from the motor etc.
CONGRATULATIONS!
YOU’VE FINISHED YOUR BARBIE VW RIDE-ON CAR MODIFICATION!