# GB42 Gearbox

## Assembly Guide for the Mini-EV motor

Thank you for purchasing the Robot Power GB42 planetary gearbox. This guide is a brief how-to on assembling the GB42 to the “Mini-EV” Johnson motor.

**Kit contents:**

The GB42 kit consists of the following:

- GB42 gearbox unit
- 4 - M5 x 12mm motor mounting bolts
- 1 - 5mm bore motor pinion

**Motor preparation:**

The shaft on the Mini-EV motor is slightly too long to fit into the GB42 gearbox. Before the motor pinion can be pressed onto the motor shaft it is necessary to trim approximately 3mm off the motor shaft. This can be done with a Dremel type hobby tool, with a bench grinder or other grinding tool. Even a hand file may be used without too much trouble, as the Mini-EV shaft is fairly soft steel.

Mark 3mm down from the end of the Mini-EV shaft and grind carefully down toward your mark. You can check the length of the shaft by fitting the assembled GB 42 onto the motor. If the shaft is too long the mounting ring on the gearbox will not sit flat onto the face of the motor because the shaft is hitting the first stage planet gear carrier. Don’t grind off too much or the motor pinion will not fully engage the first stage planet gears. Work slowly and check the gearbox fit several times until the gearbox fits flush with the motor face. Now holding the gearbox firmly on the motor spin the gearbox shaft. There should be no more resistance than spinning the shaft on the gearbox alone.

Once you are satisfied with the length of the motor shaft you should gently round the end of the shaft toward the center. This is to allow easier pressing of the motor pinion. Feel the motor shaft and make sure there are no burrs or rough spots around the end. We like to do this with a fine hand file; drawing the file from the motor toward the end of the shaft and angling it toward the center of the shaft. This pulls any burrs toward the center of the shaft and leaves a nice smooth edge. Be careful not to grind any extra length off the shaft.

**Pressing the motor pinion:**

Once the motor shaft is the proper length you can press on the motor pinion. This is best done with an arbor press but can be done with a bench vise as well. **Never hammer the pinion on the motor** you can bend the motor shaft and destroy the motor. Carefully press the pinion straight onto the motor shaft with your press or vise as far as it can go. The end of the pinion should be at exactly the same length as the motor shaft. Do a trial fit with the gearbox to make sure the gearbox fits flat onto the motor. If the pinion hits the gear carrier you can carefully press it a tiny bit further down the shaft by pressing on the edge of the gear teeth slightly off-center. Check again and repeat until the pinion clears the carrier. You can check by spinning the gearbox shaft. There will be some resistance due to the gear reduction but the shaft should spin fairly easily.

**Assembling the gearbox to the motor:**

With the pinion assembled to the motor the hard part is over. Now simply remove the 4 small bolts holding the gearbox together and pull off the aluminum back ring. Place this onto the motor and secure it in place with the four M5x12mm hex head bolts. Some of the motor holes may not exactly match up to the holes in the ring. You can carefully enlarge the holes in order to allow the bolts to fit. The center boss on the motor will keep the pinion centered with the gearbox. You may wish to use some thread-locking compound at this time. Reassemble the gearbox to the motor/back ring assembly again using thread locker if desired and you are finished. Test the motor/gearbox by attaching a battery to the Mini-EV terminals. The motor should spin smoothly without any excessive heating or grinding noises.

**Usage notes:**

The GB42 has a double ball bearing on the output side, which makes it suitable for overhung wheel mounting for light loads. For heavier loads an outboard bearing should be used to support the shaft. The shaft is 3” long, with enough length for a wheel and outboard support bearing. The only other item to consider is the fact that a hard impact or pressure on the end of the shaft toward the motor can cause the entire gear assembly to compress and bind on the motor pinion. Care should be taken to protect against impact or heavy loads in this direction.

The GB42 can be mounted with either a clamp mount or via the four M4 mounting bolts located on a 36mm bolt circle on the front face of the gearbox.

Best of luck with your project and please feel free to contact us (www.robot-power.com) with any questions or problems you have using your GB42.