

4x4 Strut Kit for Club Car Series Electric Cars

- ❖ Thank you for purchasing your 4x4 conversion kit. *Safety at all times whether during installation or operation is utmost importance.*

READ BELOW BEFORE GOING ANY FURTHER

Safety - Installation and Operation:

Golf Cars are recommended for use only by those aged 16 years and older that holds a valid drivers licensed driver or has taken an ATV or similar driving course. *Golf cars can be especially hazardous to operate and driver need to respect that any vehicle can cause serious injury or death.* Never have more than two persons on the vehicle at any time. Never engage in stunt driving or drive on public roads. Avoid excessive speeds going down hill and on difficult or rough terrain. Imaginative Manufacturing reserves the right, at any time, to discontinue or change designs, features, specifications, models or equipment without notice and without incurring any obligation. Always remember that operating or riding any vehicle while under the influence of drugs/alcohol does not mix. Installing this kit should be performed by a professional. The kit purchaser assumes sole and entire responsibility for, and shall indemnify and save harmless Imaginative Manufacturing Incorporation, from any and all claim, liability, responsibility, and damage, or any costs or expenses resulting from any loss of life or injuries or claimed injuries to persons or property that may be sustained in connection with the use of this kit before or after purchase. The kit purchaser also shall indemnify Imaginative Manufacturing Inc. harmless with respect to any and all liability that may be incurred.

If you do not agree to follow and take the responsibility of the above statement do not install the kit and return the kit to the dealer.

Attention !!!!!

- ❖ Do not operate this vehicle with out being training on its use first. No one under the age of 18 should operate this vehicle.
- ❖ This vehicle requires the same diameter front and rear tires. The front tire can be slightly smaller in diameter. The front tire must never be larger diameter than the rear tire or damage to the drive train can occur or personal injury may also result.
- ❖ We recommend that the front tire width not exceed 10” and mounted a not more than a 7” wide wheel. The idea tire width would be 8” mounted on a wheel width of 6”. The backspace of the wheel should never be less than 3” and cannot exceed 3.5”. If these recommendations are not followed personal injury may result. If any of these terms are not known to you contact Imaginative Manufacturing at (607) 738-7380 immediately prior to driving this vehicle.
- ❖ **The diameter to the front wheels must be at least 10” to fit on the front of this vehicle.**
- ❖ **Maximum Tire diameter for a 7” lift with heavy-duty front spring is 25”.**

❖ **Parts Identification picture:**



1. A & A1 - right and left strut assemblies
2. B – Frame and Differential mount
3. C – Differential
4. D – Right angle gearbox
5. E – Rear Drive Shaft
6. F – Front Drive Shaft
7. G – Sprocket, large 40 tooth (#35 double)
8. H – Right Angle Gearbox Mounting Bracket
9. J – Hub Cap
10. K – Chain #35 double
11. M – Halfshafts, are interchangeable and work on either side
12. N – Sprocket, Small 16 tooth (#35 double)
13. O – Master link (#35 double)
14. P – Front Drive Shaft mounting bracket assembly with bearing
15. Q – Upper frame supports
16. R – A-arms
17. S – Strut Upper bearings
18. T- Lighted On/Off switch
19. U – Relay, Ice cube type
20. V – Wire, 20 feet
21. W – Wheel Hubs
22. X – Steering Rack mounting bracket
23. Y – Steering Shaft
24. Z – Steering Rack

Optional Components

25. C3 – High Output Controller
26. E5 – Heavy Duty Springs

- ❖ **Retighten all bolts after- one day, one week and one month of use. Check every three months afterwards. If a bolt or bolts should continue to loosen after first three bolts checks as outlined above contact your dealer immediately.**

Warning: Prior to starting this project **do the following:**

- ❖ **First, read the instructions and call your dealer with any questions you have prior to starting.**
- ❖ **Disconnect batteries**, picture 1 and remove them from the vehicle.



- ❖ **Lift the car frame** – approximately 18” off the ground, picture #2,



using jack stands or other secure method, picture 3A.



Make sure to support the frame and not the axle or



suspension components, picture 3B.

Check to confirm

vehicle stability on vertical supports before going under the car.

- ❖ **Remove all bodywork, front bumper & tires once the car is raised**



(picture 4).

- ❖ **Steam clean the entire vehicle. Use caution not to spray electrical components directly.**
- ❖ **Follow all directions and safety warnings carefully. If at any time you are unsure of how to proceed safely consult the dealer with questions.**

Steps to convert the Rear:

- ❖ **There are 7 changes to the rear of the car.**
 - 1. Rear leaf springs**
 - 2. Electric Motor change**
 - 3. Controller change**
 - 4. Right angle gearbox bracket installation**
 - 5. Right angle gearbox installation**
 - 6. Chain & Sprockets installation**
 - 7. Rear shock installation**

- 1) **Rear leaf springs** - need to be replaced (picture 5)



. To do this support, the rear axle assembly using jack



stand supports (picture 6) Remove only one leaf spring at a time, to prevent injury caused by an unbalanced rear axle assembly.

- A. **Removing original spring** -Using a 9/16" wrench remove the 3/8" mounting bolts front and rear that are holding the leaf spring (picture 7)



Once these two bolts are removed the axle on that side is supported by the jack stand (picture 8)



The shock needs to be removed at this point



(picture 9) Next support each end of the



spring (picture 10) and remove the axle retaining plate and U- bolt using a 5/8" wrench. Remove the spring from the supports.

- B. **Removing spring bushings** – Once the spring has been removed the bushing on either end are required for the new spring. Using a pair of pliers remove the bushing and inner sleeve. Install the old bushing in the new spring. If you damage the bushings or inner sleeve purchase replacements from your dealer.

C. **Installing the new springs and spring perch – (Some find it easier to install the motor before installing springs)** - The new springs will now be mounted above the axle. Slide the new spring perch on the top of the axle. Install the front spring bolt first. Route brake cable under new spring and then swing the rear end of the spring up into position and install the rear mounting bolt. Now Raise the axle up and align the hole in the spring perch with the bolt in the center of the spring. Install shock mount bracket and U-bolt as shown. Slide the axle retaining plate under the spring and install the u-bolt. Tighten the U-bolt nut evenly until the shock mounting bracket start to bend slightly.



D. Repeat steps A thru C for passenger side spring. Install driver side shock per shock installation instructions. **Do not install the new shock on the passenger side, right side, at this time. This makes installing the new motor easier.**

- 2) **Install the new electric motor** - This is a very heavy and awkward to handle. Place a strap and use a vertical support to support the motor during removal and re-installation. **Caution verify - the batteries are disconnected before continuing.**
- A. There are four bolts holding the motor and four electrical lugs.
 - B. Mark the four cables with masking tape as to where they go on the motor. Remove the four battery cable from the electrical lugs. The four electric lugs will require a ½" wrench to remove the nuts.
 - C. Once the four cables are removed the motor can now be removed. **Support the motor as outlined above.** There are four motor retaining bolts that connect the

motor to the transaxle. There is one bolt on the underside of the motor, 1/2" wrench and three bolts around the outside of the motor, 7/16" wrench for these.

- D. Remove the under side bolt, 1/2" wrench. Loosen the other three bolts 1/2 turn, 7/16" wrench. Remove all but the top most bolt. Adjust the support to balance the motor on the strap. Remove the top most bolt. Remove the electric motor.
- E. **Install the new motor** – Place the lifting strap around the new motor. Lower the new motor into the car and align the splines of the new motor with the splines of the transaxle. Loosely install all the bolts into the transaxle; some axial force may be required to get the bolts started. Using fingers tighten each bolt 3 or 4 revolutions. Tighten the four retaining bolts. Install the four cables on to the four electrical lugs. Remove support strap.
- F. **Passenger side or right side shock may be installed at this time.** Follow the shock installation instructions provided with the shocks.

3) **Install the Motor Controller** - **Caution verify - the batteries are disconnected before continuing.**

- A. Four bolts retain the controller to the frame. There are six electrical connections.
- B. Remove each of the three smaller wires, and mark them with masking tape. Remove each of the heavier wires one at a time bolting together all the wires from their respective terminals. Using masking tape to mark the location the group of wires came from.
- C. Remove the old controller by using a 3/8" socket. Remove the bottom bolts first.
- D. The new controller is larger, but it will fit into the existing controller mounting



holes (see picture 11) . The new controller may require that you move the solenoid relay over as one of the solenoid relay mounting hole maybe covered by the new controller.

- E. Reattach the wires on the new controller placing the wires on the same controller lugs as marked by the masking tape.

4) **Install the right angle gearbox bracket**

- A. Start by placing the bracket underneath the motor assembly as shown (picture



12A&B)

. Remove the two



axle retaining bolts using a 17mm wrench (picture 13). Place bracket into position and loosely install the two original axle retaining bolts. Using two $\frac{1}{4}$ "x $\frac{3}{4}$ " retaining bolts and two $\frac{1}{4}$ " washers attach the bracket to the motor face. Tighten all bolts in this assembly now.

5) [Install the right angle gearbox](#)

A. Place the right angle gearbox on top of the right angle gearbox mounting bracket and using four $\frac{5}{16}$ " x $\frac{3}{4}$ " bolts and four $\frac{5}{16}$ " flat washers hand tighten the assembly.

6) [Install the sprockets and chain](#) – (29 side links)

A. Slide the large 40-tooth sprocket on the right angle gearbox with the hub facing toward the center of the vehicle. Align the sprocket keyway with the gearbox keyway and install the $\frac{3}{16}$ "x 1" square key. Slide the small 16-tooth sprocket on the motor with the hub facing toward the center of the vehicle. Align the sprocket keyway with the motor keyway and install the $\frac{3}{16}$ "x 1" square key. Using a straight edge along the face of the



two sprockets bring them into alignment (picture 14)

Tighten both setscrews on the two sprockets and add the chain. Once the master link has been installed in the chain, slide the right angle gearbox forward tightening the chain. Tighten the four $\frac{5}{16}$ " gearbox mounting bolts.

7) [Install the rear shocks](#) – Do not cut the shock collapse straps until the shocks are installed into the mounting holes.

A. Remove the nuts, washers and rubber grommets from the two packages. Install the washer & grommets per the package instructions on the shock. The shock with the inner two most grommets installed into the holes in the car frame, top, and hole in the axle retaining bracket. Install the outer two grommets, washers and nuts and tighten per the package instructions.

Steps to convert the front:

❖ The frame should still be supported as outlined in **Safety and Introduction** section

❖ **Pre-assemble Hub to Spindle**

❖ There are 11 change required to modify the front of the car. They are:

1) Remove original front suspension and brackets

2) Add steering shaft extension (align u-joints)

- 3) Bolt differential & add differential mounting bracket and leaf spring
- 4) Bolt on new upper A-arm extensions
- 5) Bolt on new Lower spindle mounts
- 6) Front half shafts, hubs and spindles
- 7) Rack adjusting sleeve
- 8) Front Drive shaft installation
- 9) Front drive shaft bearing and support bracket assembly
- 10) Rear drive shaft
- 11) Steering Dampener
- 12) 4X4 switch, relay and wiring

Pre-assembly – Hub and spindle

Clean the hub with a grease solvent to wash off the oil on the hub to protect it during shipping and storage. After cleaning, assemble the hub to the spindle by using a press. Lightly oil the end of the hub prior to placing the end into the bearing. The hub should install easily through the first bearing and then get more resistance pressing through the second bearing. The whole pressing process works best if you start push the hub in using one continuous motion. You no that the hub is fully seat when you turn over the hub and strut assembly and see the inside bearing and hub are almost flush together.



- 1) **Remove original front suspension and brackets** – The front frame cleared of all the original suspension and steering components

A. Before frame the front suspension is removed.



After removal. Remove the three ball joints. Two are at the ends of the steering link and the third is connected to the passenger side spindle steering arm



(picture 16)

Use a pair of pliers to remove the cotter pins and a 9/16" wrench to remove the three castle nuts.

- B. The spindles need to be removed using a 3/4" wrench.
- C. The upper and lower spindle mounting brackets need to be removed on each side using 9/16" wrench.
- D. The front leaf spring suspension is below the frame and is held on with four bolts. Support the leaf spring on either end during removal of the leaf spring. Use a 9/16" wrench to remove the four bolts holding the leaf spring and leaf spring brackets.
- E. The front suspension above the frame is held on with four bolts. Use a 9/16" wrench to remove the four bolts that hold the top suspension assembly.



- F. The steering u-joint assembly (picture 17 & 18)



must have two bolts removed (one on the steering shaft and the other on the steering rack) using a 12mm wrench. The steering u-joint assembly can be easily removed after the rest of the front suspension is loose.

G. Once everything is removed you are ready to install the new kit.



- H. Pre-assemble the lower frame before installing on golf car. Install front differential by using (4) 3/8" x 1"lg Bolts. Install steering rack mounting bracket on the rear of the differential mounting bracket using (4) 3/8" x 1"lg bolts and (4) 3/8" lock nuts. Mount the steering rack using (3) 5/16"x 3-1/2 lg and (2) 5/16"x 3/4 lg. Bolts and (5) 5/16" lock nuts. Install the front drive shaft to the differential using (1) 5/16"x 2"lg bolt and (1) 5/16 locknut. Slide the carrier bearing over the end of the drive shaft (flange, bearing and flange). Sandwich the three parts together and using the hardware included bolt on to the backside of the shaft bracket.
- I. Then put two 3/8"x 1" long bolts through the front bumper mount and use (2) 3/8" locknuts to secure the bracket. **(Note on some cars these holes need to be drilled to 3/8" to install 3/8"x1" bolts.)** Then swing the rearward part of the lower frame assembly up to the frame of the car. Center the drive shaft mounting bracket on either side of the frame. Use clamps to hold the rearward frame section up to the frame. Drill the frame to accept the rear mounting bracket. You now drill two 13/32" holes in the frame using the rear differential mounting bracket



holes as a template.



- J. Once all holes are drilled in the frame, you now need to install two 3/8" x 4" bolts you remove from the front suspension during disassembly.



Differential installed (picture)



Place 1/4" x 24" long clear vent tube over differential vent pipe and use a tie wrap to clamp the tubing. The other end should extend up to the area of the key switch and fasten to the side of the frame.

. **Take caution** not to pinch the differential wires



Install steering rack "L" brackets to support the top of the steering rack bracket. You will need to loosely install the "L" brackets on the steering rack brackets, using 3/8" bolts and lock nuts. You will need to drill a hole in each "I" beam to install the top bolts. Once installed all bolts and need to be tightened.

Steering rack bracket

2) Add steering shaft (align u-joints)

Using a 12mm wrench install the rack u-joint on the rack and install the other u-joint on the end of the steering shaft. Tighten both of the u-joint bolts with the 12mm wrench. Slide the steering shaft into the rack u-joint. .



3) Install Upper strut Bearings

The upper Strut bearing can be installed as shown below or mounting under the frame to lift the front-end 1/2" if desired. Using a (4) 5/16-20x3/4" and lock nuts on each side mount the upper strut bearing to the frame (see picture below)



4) Add strut mounting bracket

Using (2) 3/8"x 4" bolts, 5/16" washers from the original disassembly. The bolts are installed in the rear most set of holes.



5) Add strut bracket supports

Place strut support brackets as shown. Note passenger side bracket is on the outside of the frame. Using (4) 3/8"x 1" bolts loosely attach the strut bracket supports to the strut mounting bracket.



Remove the (2) 3/8" locknuts off of the steering column. Side bracket on bolts.



Install (2) 3/8"x1"lg bolts, (2) 3/8" flat washers and (2) 3/8" locknuts through upright frame.
Tighten all hardware.

6) Add Strut and Hub assemblies

Install the Strut and hub assemblies in the upper strut bearing using a 7/16-20 jam nut to



hold the struts. (see picture)

7) Bolt on A-arm assemblies

Using (2) 3/8-16x1" bolts, (2) 3/8" lock washer and (4) shim on each side mount the new A-arm to mounting bracket using the upper set of holes and strut assembly lower ball joint using a 3/8-20 castle nut with a cotter pin.



Castle nut & cotter
pin install
HERE

8) Half shafts - hubs and spindles

Push the half shaft into the differential and lift the strut & hub assembly up and slide the outer end of the half shaft through the hub. Unbolt the A-arm and push the A-arm out away from the differential. Slide the halfshaft into the strut assembly and install a 5/8" washer & castle nut and tighten. Place a cotter pin through the hole in the A-arm bolt and slot in castle nut. Repeat this procedure for the other side.



(4x2) only - Part list: 1/2" x 3 1/2" long Bolt, bearing retainer, 1/2" lock nut and 1/2" washer



9) Install the Rear Drive Shaft

Slide the rear drive shaft on the front drive shaft and collapse the entire rear drive shaft to its shortest length. Install a 3/16" x 1" square key in the keyway of the right angle gearbox forward facing shaft. Next swing the back of the rear drive shaft up and align the rear drive shaft keyway with the gearbox keyway. Slide the rear drive shaft over the right angle gearbox shaft. Using a hex wrench adjust the setscrew to tighten the yoke and shaft together. **All of the mechanical components should now be in place.**

10) Wire, switch and relay installation

Using a 1/2" drill bit drill a hole approximately 2" below the center of the key switch hole. Use caution not to drill any deeper than is required so as to not drill into any other wiring on the other side. Follow the wiring diagram below:

