

Quarterscale Racing Specialties

MODEL

ST-4

1/4 SCALE - STADIUM RACE TRUCK

ASSEMBLY, OPERATING, AND MAINTENANCE
INSTRUCTIONS

IMPORTANT NOTICE

This QUARTERSCALE RACING SPECIALTIES product is designed strictly for competition use only. QRS is not liable for any loss, damage, or injury directly or indirectly arising from the use of this product.

READ THIS MANUAL BEFORE OPERATING VEHICLE

SAFETY WARNINGS

1. Gasoline is highly flammable:
 - * always turn off engine when refueling.
 - * take care not to spill fuel on exhaust, engine, or radio.
 - * NEVER SMOKE NEAR FUEL!
2. Do not touch moving or heated parts.
3. Never run engine in closed area for any length of time.
4. Do not operate near dry grass or other flammables.
5. Operation should occur only on a closed course.
6. Caution must be taken when operated near people.
7. Do not operate where other radio frequencies may interfere with the operation of the truck.
8. Always check the radio operation of the truck, with the engine off, before operating.
9. Operate in areas where view of the truck is not obstructed.

Though the ST-4 has survived jumps as high as four feet, this type of use will only promote breakage and early wear.

Recommended for ages 16 and up. (PARENTAL GUIDANCE REQUIRED)
Some data in this manual may become outdated due to improvements made to the model in the future. If there are any questions you may have regarding this QRS product, please consult your nearest QRS dealer.

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GENERAL INFORMATION

PART OF THE TEAM

The Engineers at QRS have put many hours of testing and development into the ST-4 to give you the most reliable and competitive truck available.

By selecting the ST-4 as your 1/4 scale race vehicle, you have placed yourself in a distinguished team of 1/4 scale-race truck owners.

The purpose of this manual is to acquaint you with the assembly, operation, and maintenance of your new ST-4. Please take time to read this manual carefully. Proper care and maintenance are essential for trouble free operation and optimum performance.

Your authorized QRS dealer will be glad to provide any further information or assistance.

MACHINE IDENTIFICATION

It is important that you know the serial number of your truck. You will need the model number and the serial number when ordering parts from your QRS dealer. The numbers provide the dealer with positive identification.

The serial number can be found in the mid-section of the frame. Write down the serial number for future reference.

Model: ST-4

Serial Number: _____

ASSEMBLY INSTRUCTIONS

IMPORTANT ASSEMBLY NOTES

- Before starting you will need the following:
 1. Radio equipment
 - A) 2-Servos
 - B) Receiver
 - C) Two Channel Transmitter
 - D) 5-cell Ni-cad Battery Pack
 2. 10w-40 Oil (shocks)
 3. Heavy Grease
 4. American Allen Wrench Set
 5. 11/32, 3/8, and 7/16 Wrenches
 6. Pliers
 7. Loc-tite
 8. Rubber Cement
- Remove items from the packages, one at a time, to examine the parts and to compare with the packing list.
- Do not mix parts from one package with those of another package.
- Perform each assembly step in the order indicated.
- It is advisable to place loc-tite on all threaded fasteners.

ASSEMBLY AND INSTALLATION OF:

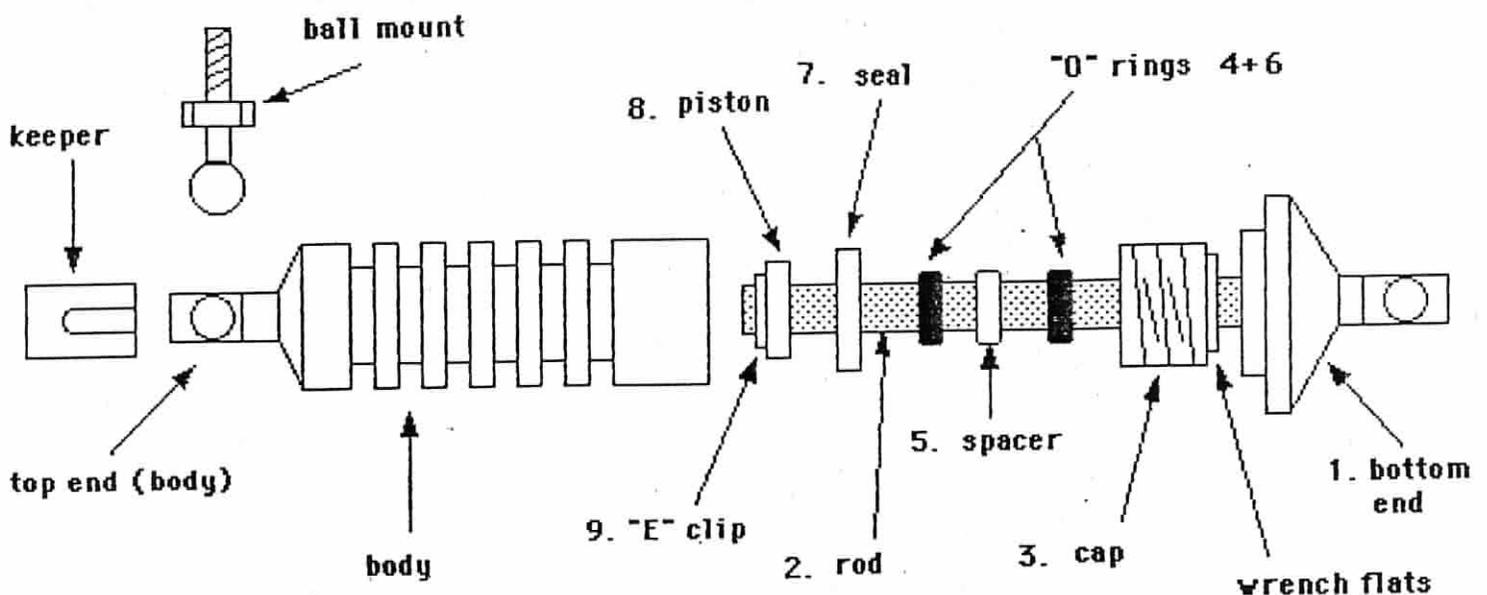
SHOCKS

- 1) Open package #1.
- 2) Lay shock parts out flat in the same order as shown in Fig. 2-1.
- 3) Slide cap onto rod with the wrench flats towards the bottom end piece.
- 4) Slide onto rod; o-ring, spacer, o-ring, seal, and piston, in that order.
- 5) Press the e-clip into the groove on the end of the rod.
- 6) Fill shock body 3/4 full with 10w-40 oil.
- 7) Fully compress the assembled rod into shock body (oil should over flow) and tighten cap by holding onto wrench flats.

DO NOT OVER TIGHTEN

- 8) Slide on spring and clamp into place with the pre-load collar.
- 9) Follow steps 1 thru 7 for the other shocks.
- 10) Set the shocks, keepers, and ball mounts aside until needed later.

Fig. 2-1

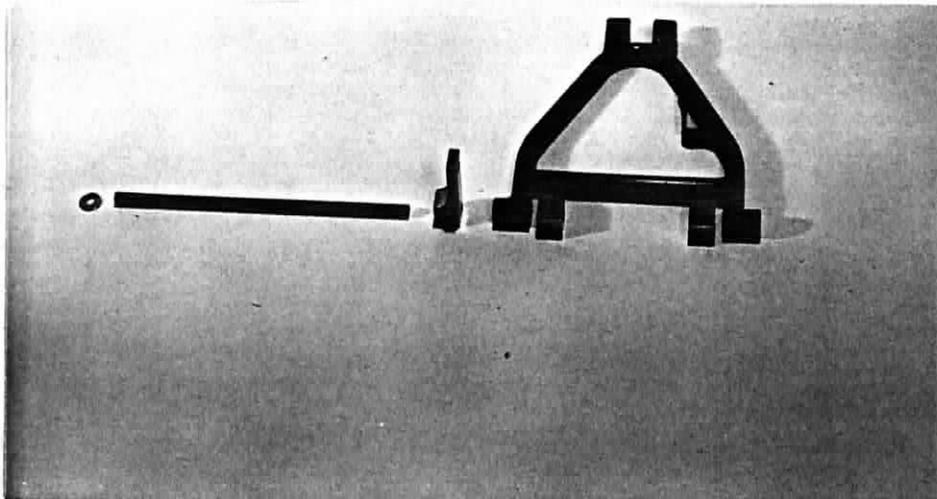


FRONT END

- 1) Open package #2.
- 2) Start with the right side of the truck first.
- 3) Snap e-clip into groove of pivot shaft.
- 4) As shown in Fig. 2-2, lay the lower control arm flat with the shock mount towards the rear of the truck.
- 5) Lay the idler arm in front of the lower control arm.
- 6) Place two pivot shaft supports towards the inside of the lower control arm.
- 7) Now take the pivot shaft and run it thru all the holes of the parts you just lined up. The clip is at the front of the truck.
- 8) Using two 8-32x3/4" cap screws and #8 split lock washers, bolt the pivot shaft supports to the side of the frame.
- 9) Next place an 8-32x3/16" set screw into the threaded hole on the lower control arm pivot and tighten down on to the pivot shaft.
- 10) Follow steps 1 thru 9 for the left side.
- 11) Place bottom of upright into mounting points at the end of the lower control arm. Bolt together with 10-32x1-3/4" cap screw and lock nut.

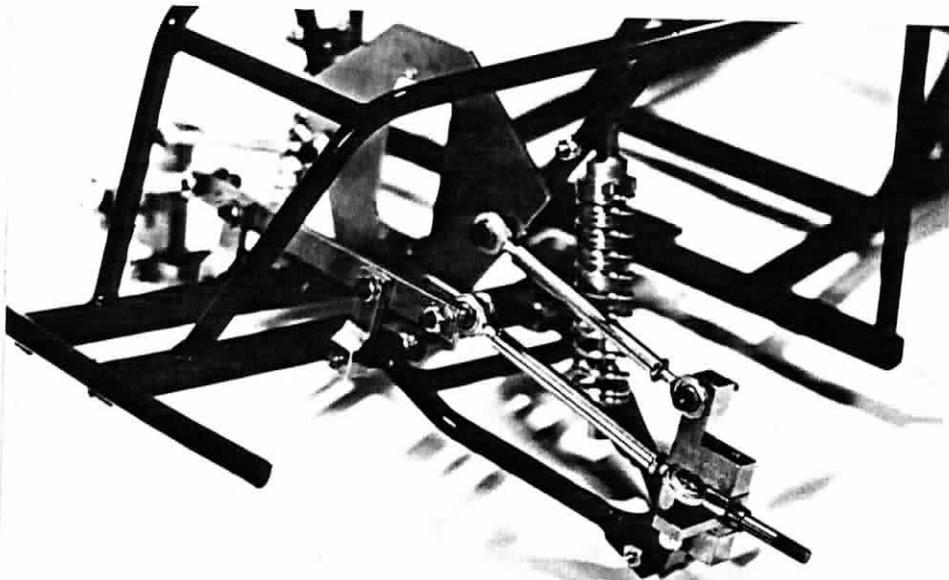
STOP CHECK THAT THE PARTS MOVE FREELY. OVER TIGHTENING WILL CAUSE THEM TO BIND.

Fig. 2-2



- 12) Next place the spindle assembly into mounting points of upright. Position the spindle assembly so the threaded spindle points towards the side and the extension arm points towards the front of the truck, see Fig. 2-3.
 - 13) Slide king pin thru the holes of the upright and spindle assembly to hold the king pin in place, tighten a 10-32x 1/4" set screw into the threaded hole in the spindle assembly. Do the same for both sides of the truck.
 - 14) Next take the relay rod and place it behind the two idler arms. Place a #10 washer between the relay rod and the idler arm, then bolt together with 10-32x 3/4" cap screws by threading into the idler arms. Place nuts on both cap screws to lock them into place.
- STOP CHECK AGAIN FOR FREE MOVEMENT. IF THE PARTS ARE HARD TO MOVE, YOU HAVE OVER TIGHTENED SOMEWHERE.

Fig. 2-3



15) Now assemble the tie rod ends into the tie rods.

CAUTION: TIE RODS, UPPER CONTROL ARMS HAVE A RIGHT-HAND THREAD ON ONE END AND A LEFT-HAND ON THE OTHER. BE SURE THE THREADS OF THE TIE ROD ENDS MATCH THE THREADS OF THE TIE RODS. THEY SHOULD THREAD TOGETHER EASILY-DO NOT FORCE THEM.

NOTE: TIE ROD AND CONTROL ARM LOOK THE SAME.

- 16) Thread a nut onto the two right-hand thread rod ends and the two right-hand rod ends with studs. Thread each right-hand rod end into the right-hand thread side of each rod. Thread in about half way.
- 17) Now thread the left-hand thread rod ends into the other side of the rods. Thread in about half way.
- 18) Next thread a nut onto the servo saver rod. Then thread the rod half way into the rod end.
- 19) Take a 10-32x 1-1/2" cap screw and run it thru the servo saver end, one tie rod which contains a studded tie rod, one #10 by 1/4" long spacer, and then thru the hole on the left side of the relay rod. Tighten with a lock nut.
- 20) On the left side of the truck, place the studded end of the tie rod into the hole of the spindle arm. Tighten down with a lock nut.
- 21) Do the same for the right side using a 10-32x 1" cap screw instead of the 10-32x 1-1/2".
- 22) Align the front servo plate with the holes in the frame, then run a 10-32x 1-1/4" cap screw thru the rod end of the upper control arm, the plate and the frame. Now tighten a lock nut on to hold in place.
- 23) Now bolt the other end of the upper control arm to the upright using a 10-32x 1-1/4" cap screw and lock nut. do the same for the other side.
- 24) Bolt the shock ball mounts, from package #1, to the lower control arms and to the frame. Place the shocks onto the ball mounts and snap the keepers into place.

STOP NOW CHECK FOR FREE MOVEMENT OF ALL PARTS. The spindles should move in and out easily and the suspension should move up and down smoothly. If anything feels too stiff, then check for any over tightened fasteners.

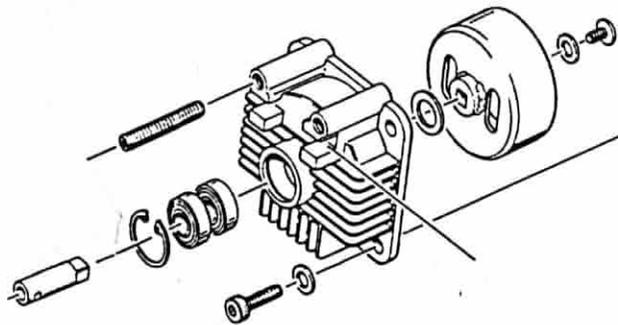
NOTE: YOU MAY NEED TO SQUEEZE LIGHTLY ON THE KEEPERS WITH PLIERS TO ASSURE THAT THEY CLICK INTO POSITION ON THE END OF THE SHOCK.

- 25) To mount the hubs to the spindles, first slide on a bearing, then the hub, then another bearing. Now tighten into place with a 1/4-28 lock nut. DO NOT OVER TIGHTEN.
- 26) Later we will see how to adjust the front end.

ENGINE

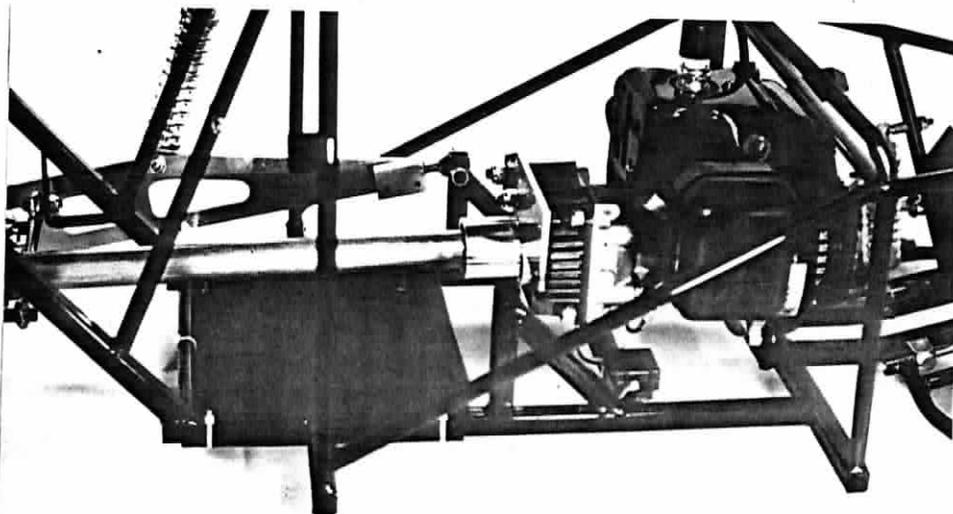
- 1) Open package #3.
- 2) Examine Fig. 2-4. Press both bearings into the end of the plastic bell housing. Place a circle clip into the groove to hold the bearings in place.
- 3) Using three 8-32x 7/8" with lock washers, bolt the bell snout to the bell housing.
- 4) Now slide the clutch idler shaft thru the bearings.
- 5) Next place 3/8" flat washer and the clutch bell onto the clutch idler shaft inside the bell housing. Bolt together with an 8-32x 3/8" cap screw and flat washer.

Fig. 2-4



- 6) Place the bell housing assembly onto the engine, make sure the two bolt towers are at the top. Bolt together with 6mm x 3/4" cap screws. Now bolt the servo mounting plate to the two bolt towers using two 1/4-28x 1/2" cap screws.
- 7) Bolt the engine to the frame using two 10-32x 1/2" and one 10-32x 1-1/4" cap screw with lock washers. Place #10 x 1/4" spacer between rear engine mounting hole and cross member.
- 8) Cable tie the small black electrical box to the frame. Plug the black wire into the mating wire. Ground the red wire to the frame by running the rear engine mount bolt thru the red wire connection.
- 9) With five cable ties, install the plastic radio tray to the frame. See Fig. 2-5.

Fig. 2-5

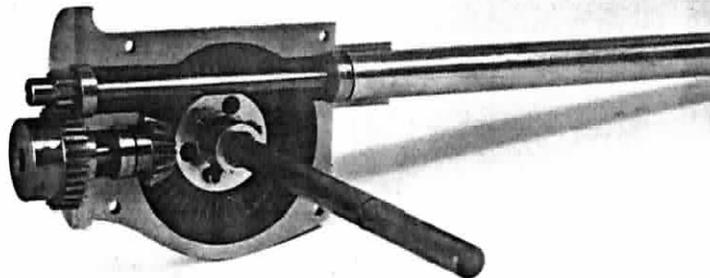


REAR END

NOTE: Tapered set screws are used to hold the gears in position on the shaft. The taper of the screw sets into a taper in the hole. Make sure the set screw sets into the large end of the hole.

- 1) Open package #4.
- 2) Bolt the ring gear to the ring gear sleeve using three 8-32x 1/2" cap screws and lock washers. See Fig. 2-6.
- 3) Now slide the ring gear onto the axle. Locate the gear so it is in the same position as shown in Fig. 2-6. Now tighten an 8-32 tapered set screw which is lined up with the hole on the axle.
- 4) Now slide the axle into the left case half.
- 5) Place a circle clip onto the drive shaft. Then slide two bearings onto the drive shaft and locate into the left case half.
- 6) Next place the pinion gear onto the pinion gear shaft and tighten down with an 8-32 tapered set screw. Make sure set screw locates into the hole.
- 7) Place two bearings onto the pinion gear shaft and position into case as shown in Fig. 2-6.

Fig. 2-6

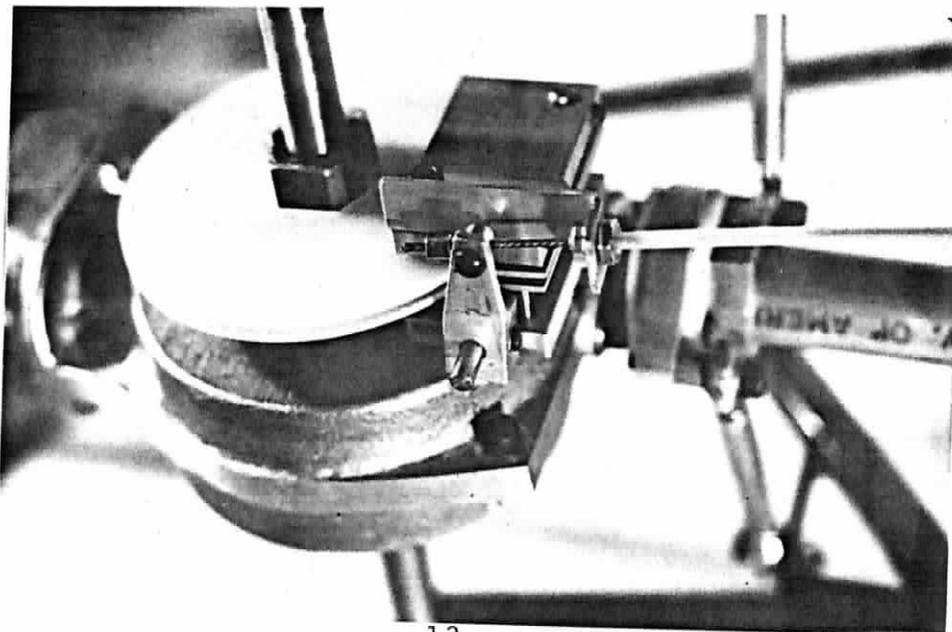


- 8) Spread heavy grease on gears, then slide the right case half into place. Place the torque tube into the front snout of the gear box, then bolt the case halves together using 10-32x 3/4" and lock nuts.

STOP CHECK THAT THE AXLE AND SHAFTS ROTATE FREELY.

- 9) Place watts idler bearing and watts idler onto the snout of the gear box. Hold in place by sliding on collar and clamping in place.
- 10) Now slide hex collar onto the right side of the gear box and tighten into place using an 8-32 set screw. Make sure the screw sets into the flat on the axle. See Fig. 2-7.
- 11) Install the change gears in the rear. A flat washer goes behind each gear. The small gear goes on top, use an 8-32 tapered set screw to hold each gear on. Make sure they line up with the holes on the shaft. Apply grease and put the cover on.
- 12) Lay the brake cam into the slots on the right side of the case. Then slide a brake pad onto the posts. Put on one brake disk, one brake pad and one brake disk, in that order.
- 13) Slide the backing plate on. Locate the arm of the cam so that it points towards the right side of the truck.
- 14) Now slide the backing plate up so all parts fit close when the arm is pointing to the right. Tighten two 8-32 lock nuts onto the threaded studs.

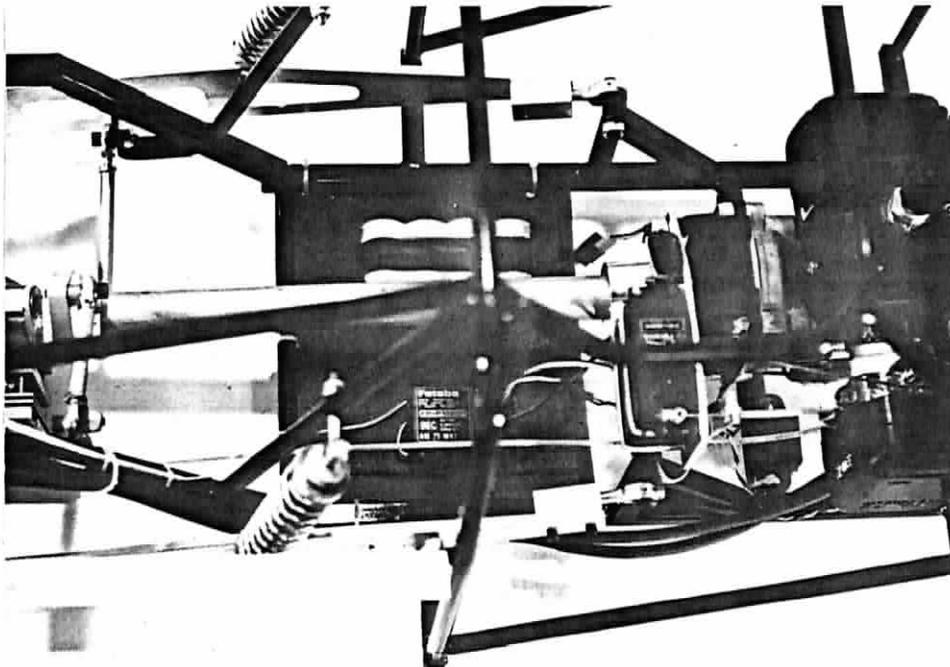
Fig. 2-7



STOP CHECK AGAIN THAT THE AXLE ROTATES FREELY. IF NOT, THE BACKING PLATE MAY BE SET TOO CLOSE WHICH CAUSES THE BRAKES TO DRAG.

- 15) Place circle clips in grooves of axle. Press bearings into bearing carriers. Now slide the bearing carriers up against the clips on the axles.
- 16) Bolt the trailing arm blocks to the trailing arms using 6-32x 1/2" cap screws and lock washers. Now thread heim joints half way into the blocks. See Fig. 2-8.
- 17) Using 8-32x 1/2" cap screws and lock washers, connect the trailing arms to the inside of the bearings on the axle.
- 18) Slide an axle spacer onto each side of the axle. Place the wheel hubs on the axle with the flat side pointing out. Use 10-32x 1/4" set screw to hold in place. Make sure screw sets into the flats on the axle.
- 19) Now place the drive cable into the torque tube. Rotate so it falls into square. Make sure there is plenty of grease inside the torque tube.

Fig. 2-8

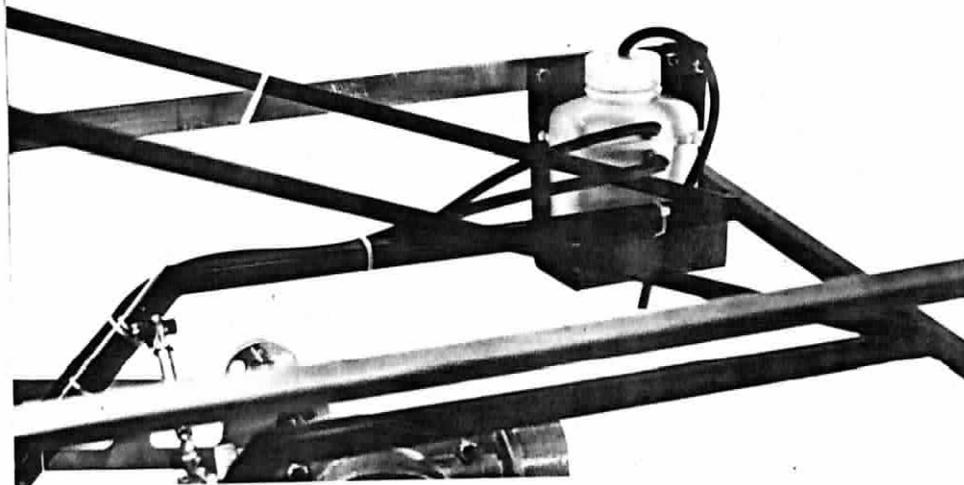
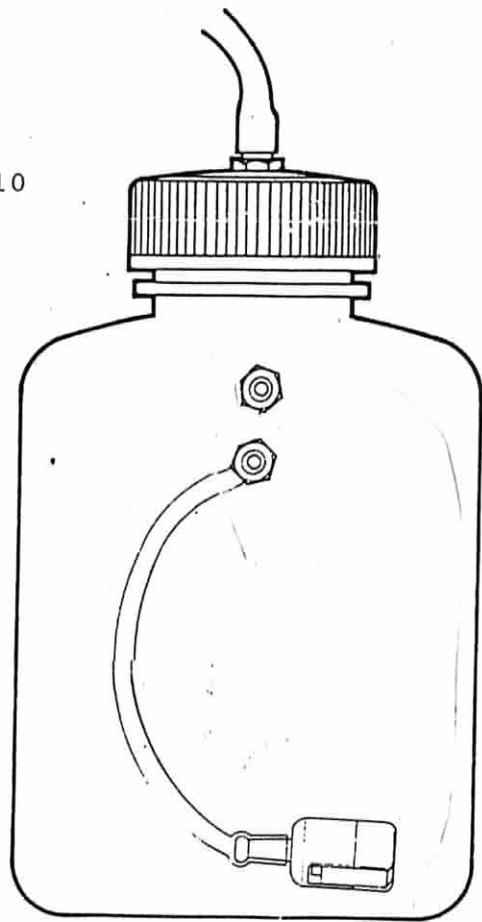
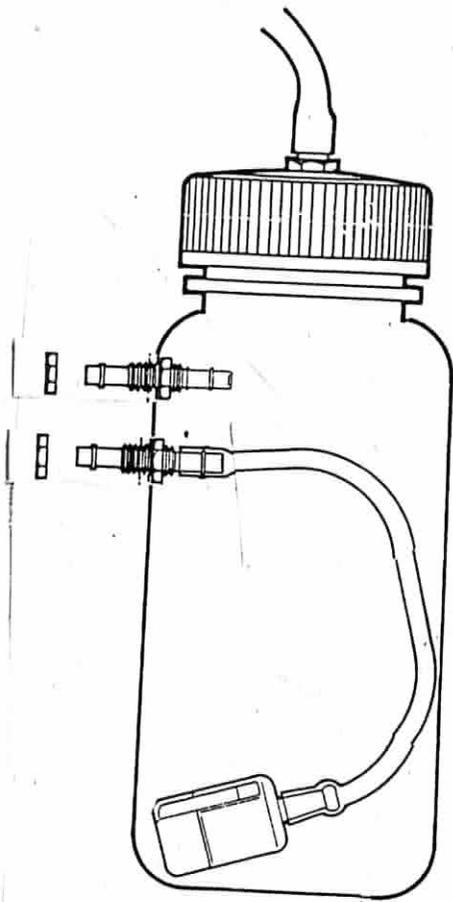


- 20) Install the whole assembly into the truck. To do this, make sure the drive cable is lined up with the square hole as the torque tube slides into the bell snout. Using 1/4" spacers and 1/4-28x 1-1/2" bolts, bolt the hiem joints to the frame. See Fig. 2-8.
- 21) Bolt the shock ball mounts to the frame and to the trailing arms and mount the shocks.
- 22) The watts linkages have right and left-hand threads just like the front end, so take caution when threading the hiem joint ends into the rods.
- 23) Thread the nuts onto the right-hand ends. Then thread the ends into the rods half way.
- 24) Thread the left-hand threads into the other end of the rods.
- 25) The shorter rod mounts on the top from the frame to the watts idler. Use a 10-32x 3/4" cap screw and a lock nut to hold it to the frame. Use a 10-32x 1/2" cap screw to hold it to the watts idler. Mount the lower rod the same way.
- 26) Adjust the linkages to where smooth movement is felt when the rear of the truck is moved up and down. To adjust, twist the watts linkage rods in or out. Once you have it set where SMOOTH MOVEMENT IS FELT, TIGHTEN THE NUTS DOWN TO LOCK AGAINST THE RODS.

FUEL SYSTEM

- 1) As shown, in Fig. 2-9, install the brass fuel line connectors to the tank. Then mount the tank to the frame with large cable ties in the position shown in Fig. 2-10.
- 2) Run fuel line to the carburetor. The line in the tank which contains a filter on the end should connect to the barbed connection on the carburetor. The other line on the carburetor is an overflow and should connect back to the other connection on the tank. The other line on the tank is a breather tube and should loop up then hang below the tank.
- 3) Use cable ties to hold the fuel line close to the frame.

Fig. 2-10



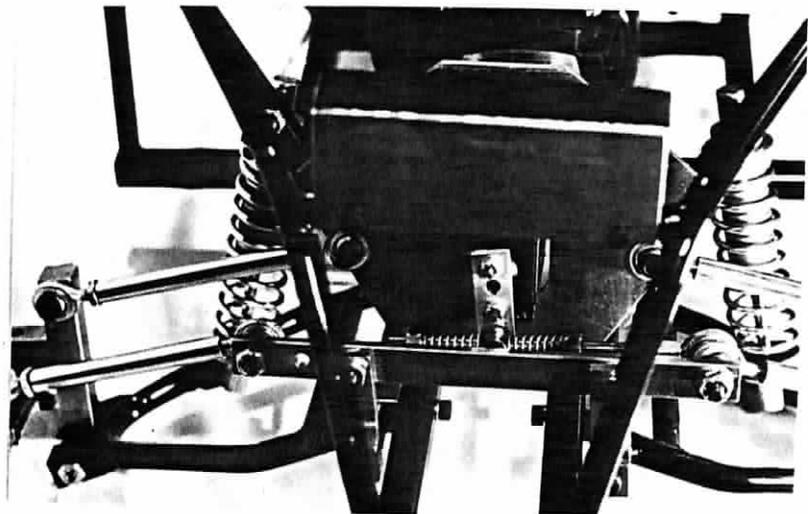
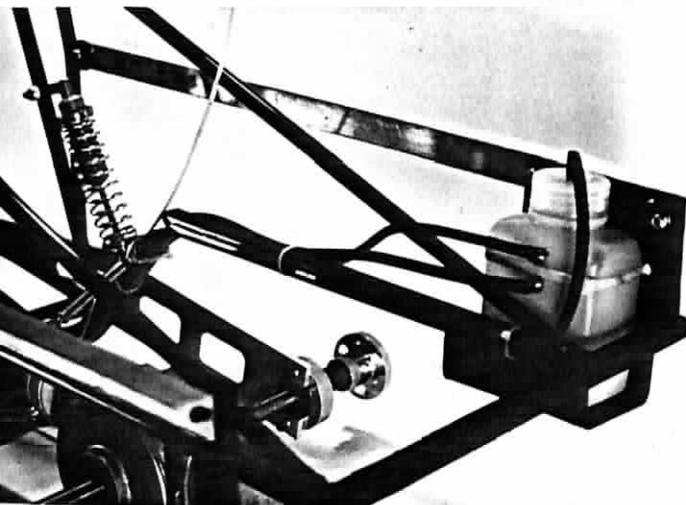
WHEELS, TIRES, AND FRONT END ADJUSTMENT

- 1) Open package #5.
- 2) The rear wheels and tires are wider than the front. Spread rubber cement on the inside of the tire. Place the wheel inside the tire and bolt together using 4-40x 3/4" cap screws and lock nuts, six per wheel. Do all four the same way.
- 3) Bolt each wheel to a hub using three 8-32x 3/8" cap screws and lock washers.
- 4) With the front wheels on, look straight down on the truck, point the wheels straight forward. The wheels should point straight forward with no angle in or out.
- 5) To adjust, loosen the nuts on the tie rods. Now twist the rods in or out until the wheels point straight ahead. Tighten the nuts so the rods are locked from twisting.
- 6) With truck on bench, look at it from the front. The wheels should sit flat with no angle in or out. Adjust the upper control arms to eliminate any angle. Tighten the lock nuts.

BODY

- 1) Use 100 grit sandpaper or a file to smooth out any rough edges on the body.
- 2) Before painting, you should use 400 grit paper on the body to prepare the surface for paint. Use a good lacquer or enamel paint and follow the directions on the can.
- 3) Now put the body mounts onto the frame using 6-32x 1/2" cap screws and lock nuts, as shown in Fig. 2-11

Fig. 2-11

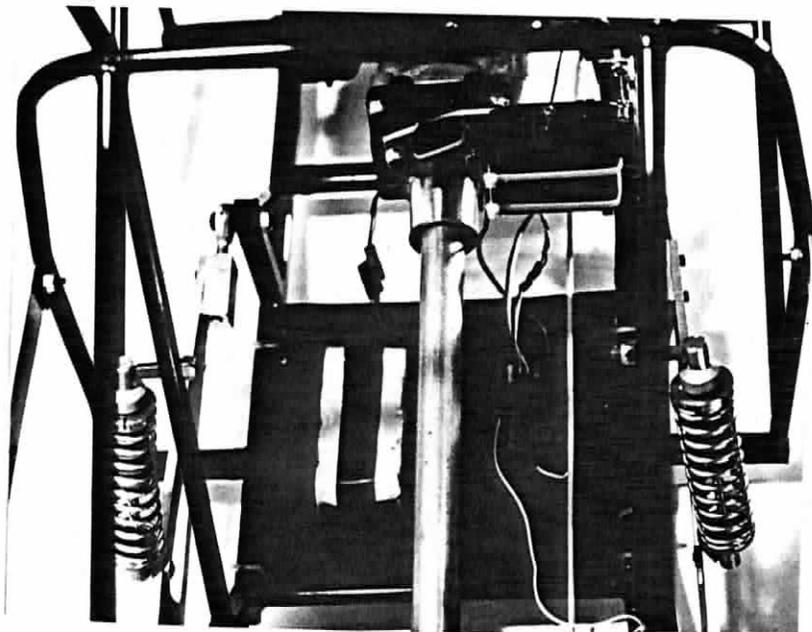
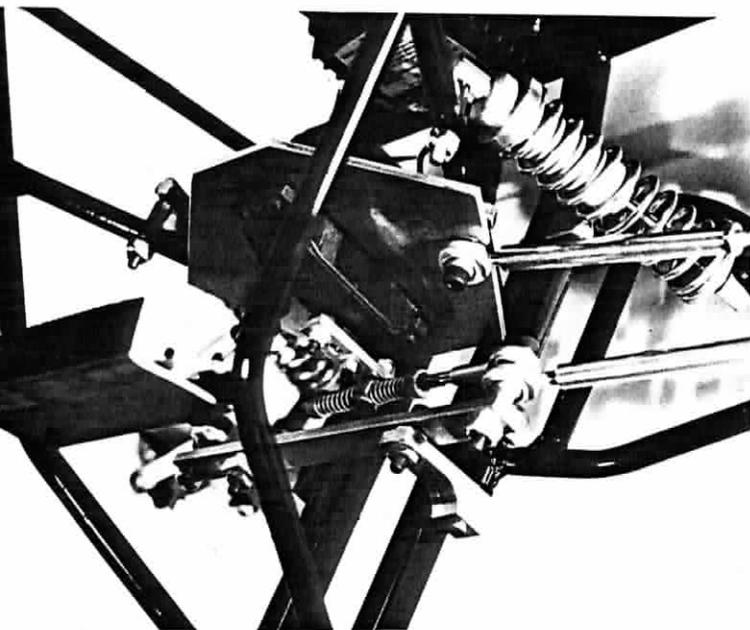


- 4) When applying the velcro, peel the adhesive covering on one side only, then stick it to the body mounts you just installed. Set the body onto the frame to see where it fits best. Then take it off again.
- 5) Next, with the mating velcro pieces stuck together, peel off the second adhesive covering. Now set the body straight down into position on the frame so the body will stick to the adhesive on the velcro. Put pressure on the body so it sticks to the velcro adhesive. Now when you lift the body up, the velcro should be stuck to the body and the mating piece of velcro stuck to the mounts on the frame.

RADIO INSTALLATION

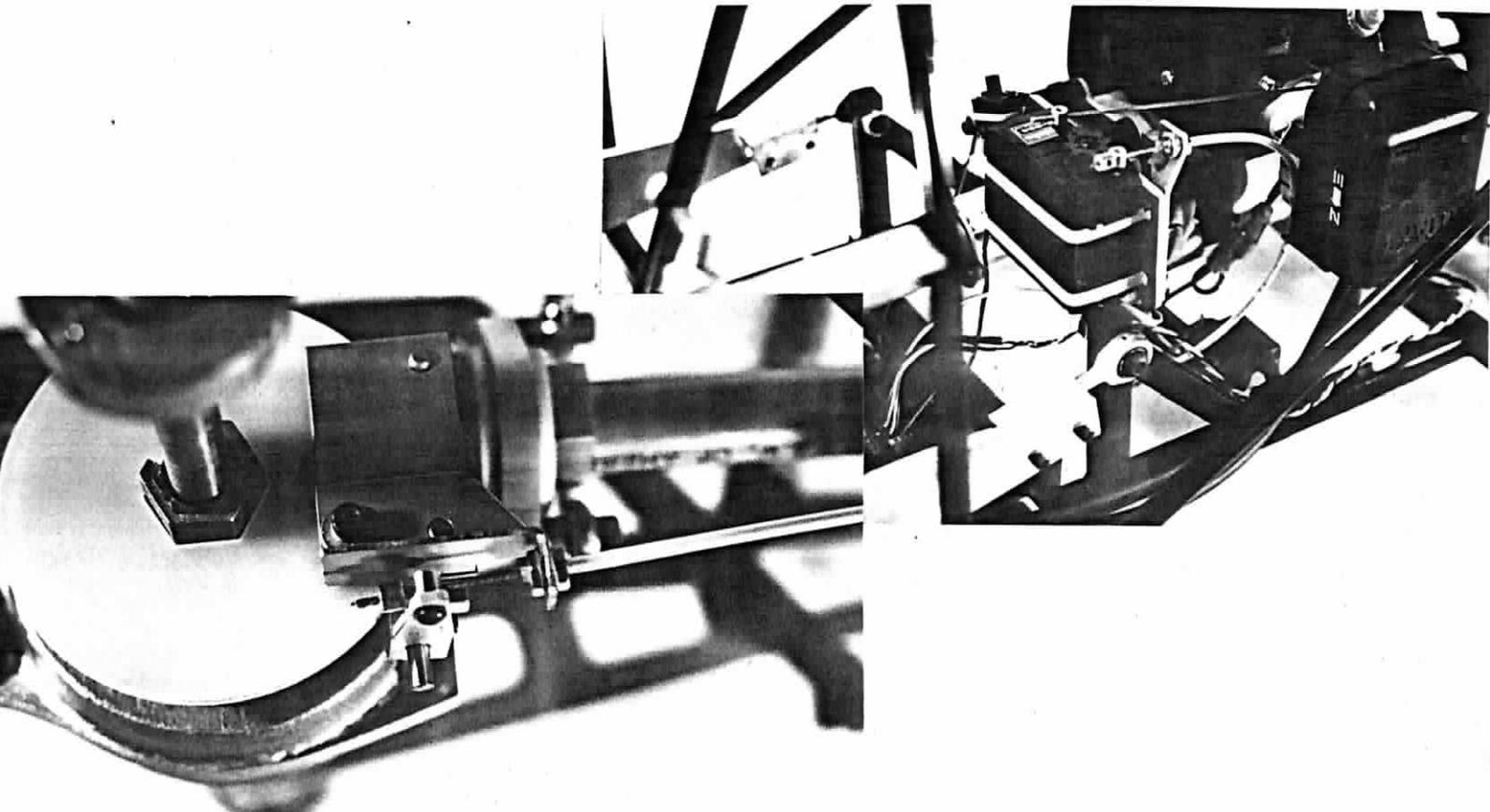
- 1) Mount the front servo, as shown in Fig.2-12, using 4-40x 1/2" cap screws and lock nuts. Now bolt the servo saver bushing to the pitman arm. Then, using 4-40x 3/8" cap screws tighten the pitman arm to the servo out put shaft. Make sure the bushing is positioned towards the bottom of the servo.
- 2) Put a collar and then a spring onto the servo saver rod. Now slide the rod thru the bushing you just installed. Put on another spring and collar. DO NOT TIGHTEN THE COLLARS YET.
- 3) Install receiver using double sided tape, and install battery pack using large cable ties, as shown in Fig. 2-12.

Fig. 2-12



- 4) Now, mount the top servo and the on/off switch on the servo mounting plate using cable ties. Mount antenna mast to frame.
- 5) FOLLOWING THE INSTRUCTIONS SUPPLIED WITH YOUR RADIO EQUIPMENT, connect all wires of the servos, receiver, switch, and battery pack. Make sure all wires are cable tied to the frame and located out of the way of catching on rocks or sticks.
- 6) Turn on the radio equipment and set the trim to its middle position. Then shut off the switches on the controller and truck.
- 7) Now point the wheels straight forward. Secure the front servo rod by sliding the collars against the springs and then tighten the set screws in the collars to hold in place.
- 8) Install the brake cable as in Fig. 2-13. Connect the rod from the servo to the carburetor. Make adjustments so the carburetor opens fully and the brakes lock up. But make sure the brakes DO NOT DRAG.

Fig. 2-13



OPERATING INSTRUCTIONS:

FUEL/OIL AND STARTING ENGINE

- Mix leaded gasoline with 2-cycle oil at a ratio of 25:1.
- To start engine:
 1. Turn on radio equipment, test to make sure it works properly.
 2. Press primer bulb, on bottom of carb., several times.
 3. Flip choke lever up to closed position.
 4. Pull starter until engine starts, use controller to give it the gas.
 5. Once running open the choke half way for 3-5 seconds, then open all the way.
 6. Let the engine warm up before driving.

RADIO

- Follow the radio equipment manufactures instructions for operation and fine tuning.
- When first driving the truck, operate with-in a close range and away from people and solid objects.
- NEVER OPERATE OUT OF RANGE OF YOUR SIGHT.

MAINTENANCE AND ADJUSTMENTS

MAINTENANCE TABLE

TIME INTERVAL	MAINTENANCE	PROCEDURE
EVERY 4 TANK FULLS <u>NOTE:</u> THESE TIMES REFLECT THE USE OF THE STOCK 8 OZ. TANK.	CLEAN AND OIL AIR FILTER.	CLEAN IN SOAPY WATER, DRY, THEN SATURATE IN FILTER FLUID.
	CLEAN TRUCK, CHECK FOR ANY LOOSE FASTENERS.	APPLY LOC-TITE TO ANY LOOSE FASTENERS AND RE-TIGHTEN.
EVERY 6 TANK FULLS.	LUBRICATE TOP OF CARB., FRONT, AND REAR END.	USE A DRY TYPE LUBE WHICH COLLECTS NO DIRT.
EVERY 20 TANK FULLS.	CLEAN SHOCKS AND REPLACE OIL.	SEE SECTION ON "SHOCK ASSEMBLY" AND "SUSPENSION TUNING".
EVERY 30 TANK FULLS.	REPLACE GREASE IN GEAR BOX AND TORQUE TUBE.	USE HEAVY GREASE, WHILE APART, CHECK FOR LOOSE OR WORN PARTS.

SUSPENSION TUNING

- 10w-30 oil in the shocks should be adequate for most track conditions.
- Heavier shock oil can be run if the truck has a tendency to bounce or spring excessively off the jumps or over bumps. Heavier oil will increase the compression and rebound damping.
- WARNING: Do not exceed 50 weight oil or damage will occur to the shock and the ball mounts.
- Bouncing will also occur from too much spring pre-load. To reduce the shock pre-load, loosen the clamp on the shock and slide it to decrease the spring pressure on the shock.