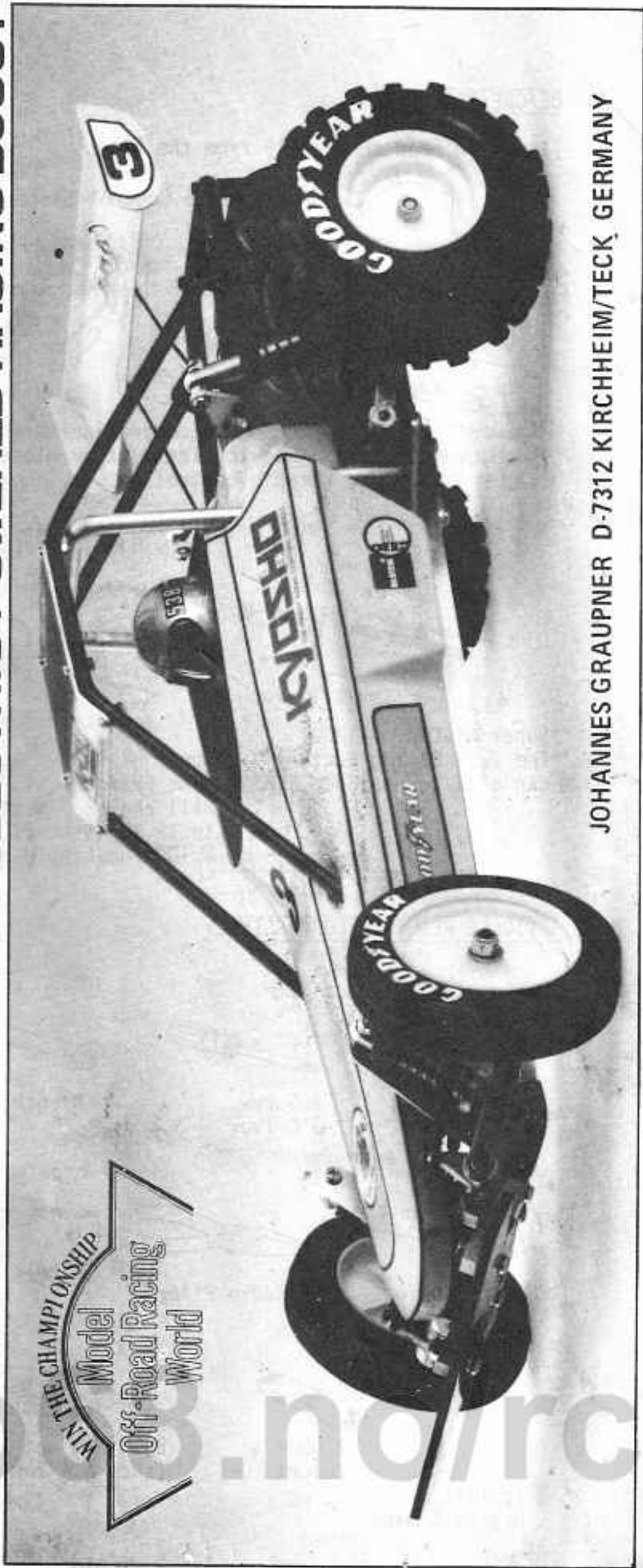


Graupner

to order No. 4966

OFF-ROAD RACER SCORPION

1/10 SCALE RADIO CONTROL ELECTRIC POWERED RACING BUGGY

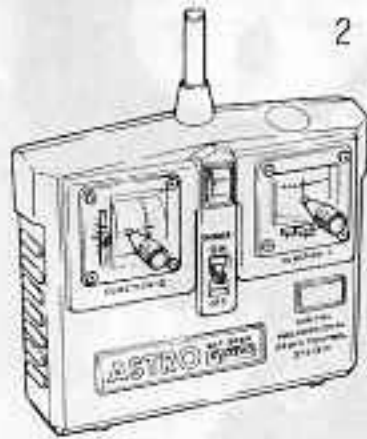


WIN THE CHAMPIONSHIP
Model
Off-Road Racing
World

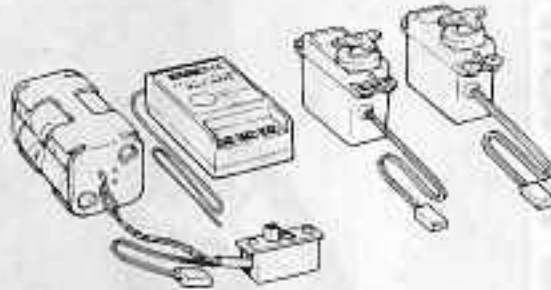
JOHANNES GRAUPNER D-7312 KIRCHHEIM/TECK GERMANY

BEFORE ASSEMBLY

[Items in need separately from the kit]



2 channel Radio Control System



Battery for Radio

- *Transmitter UM3 8 pcs.
- Receiver UM3 4 pcs.

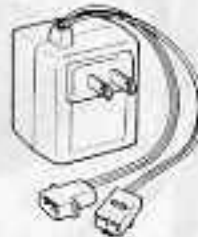


*The radio control units should be handled with care. Read the instruction close which is attached to your radio control set.

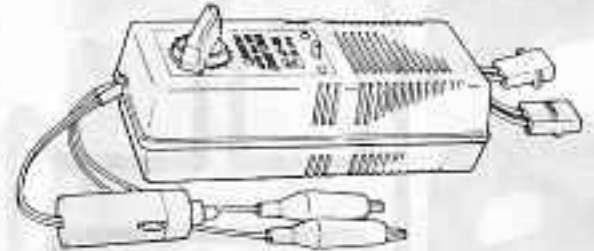
Home Charger or Quick charger



- *Super Ni-Cad 6N-1200
- *The 7.2V Racing Battery can also be employed.



- *Super Ni-Cad Home Charger
- Will charge a battery in 12 to 15 hours from a 100V household outlet.

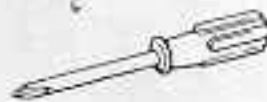


- *Super Ni-Cad Quick Charger
- Will charge it in only 15 minutes from a car cigarette lighter or from a 12V car battery.

ARTICLES REQUIRED FOR ASSEMBLY



Scissors



+ Screw Driver



Wrench



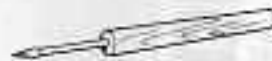
An insulation Vinyl Tape



Cutter Knife



Radio Plier



Awl



Round File

[CEMENT]



Instant drying Cement



Rubber Cement



Bolt and nut locking agent (such as "Thread Lock")



Silicon Compounds (such as "Bathtub coark")

[PAINT]



Racing Color



Brush



Masking Tape

Racing Colors is the best paints for finishing car bodies of poly-carbonate. Easy and safe to use as it is water soluble. Seven different colors are available.

[Please read it before assembly]

*In the assembly drawings, some threaded parts are printed in black as shown below. It indicated that the portion should be applied with thread locking agent and should be tightened firmly so that the bolt and nut will not get loose.

*(Note) There are some components also printed in black, but only threaded part of bolts and nuts requires thread locking agent.



Apply it on the blacken portion.

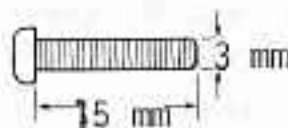


Apply inside.

*Definition

*Length of Bolt:

A bolt indicated as 3mm dia. x 15 mm is ...



*Size of Washer:

A washer shown as 3 mm dia. is ...



3mm Diameter

*Nylon Nut:

is a nut with nylon ring fitted inside for preventing it from getting loose.



Nylon inserted

*Self Tapping Screw:

is a screw similar in shape to a wood screw.

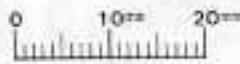
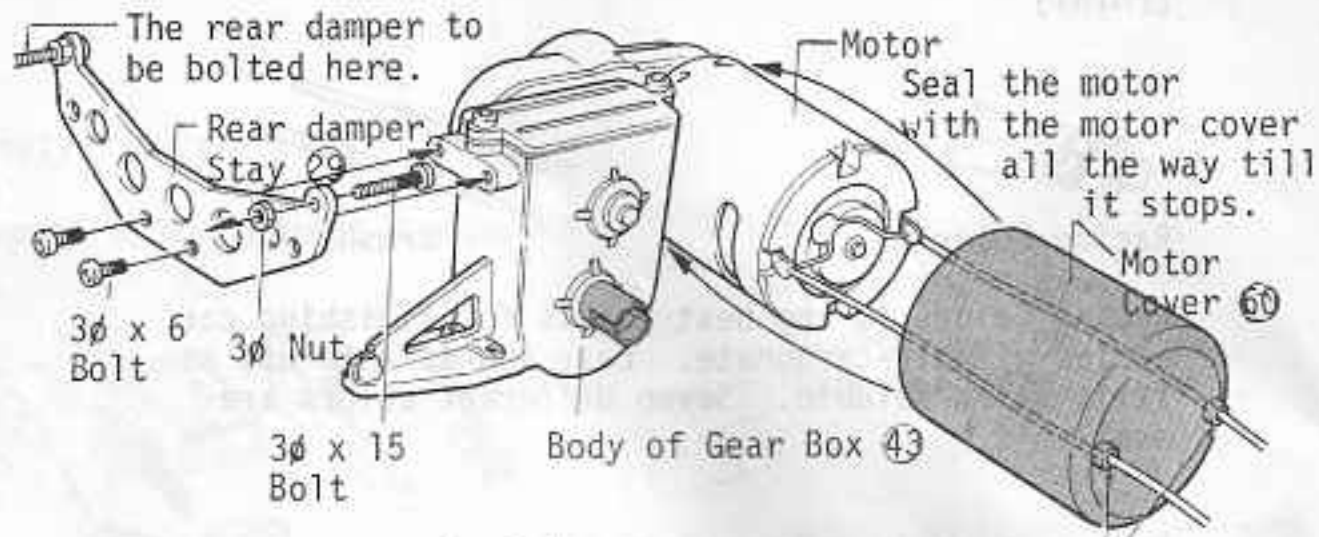


Narrow tip

1 INSTALLATION OF MOTOR COVER

[Small fittings to be used]

- 3φ x 6 Bolt 2 ea
- 3φ x 15 Bolt 2 ea
- 3φ Nut 2 ea



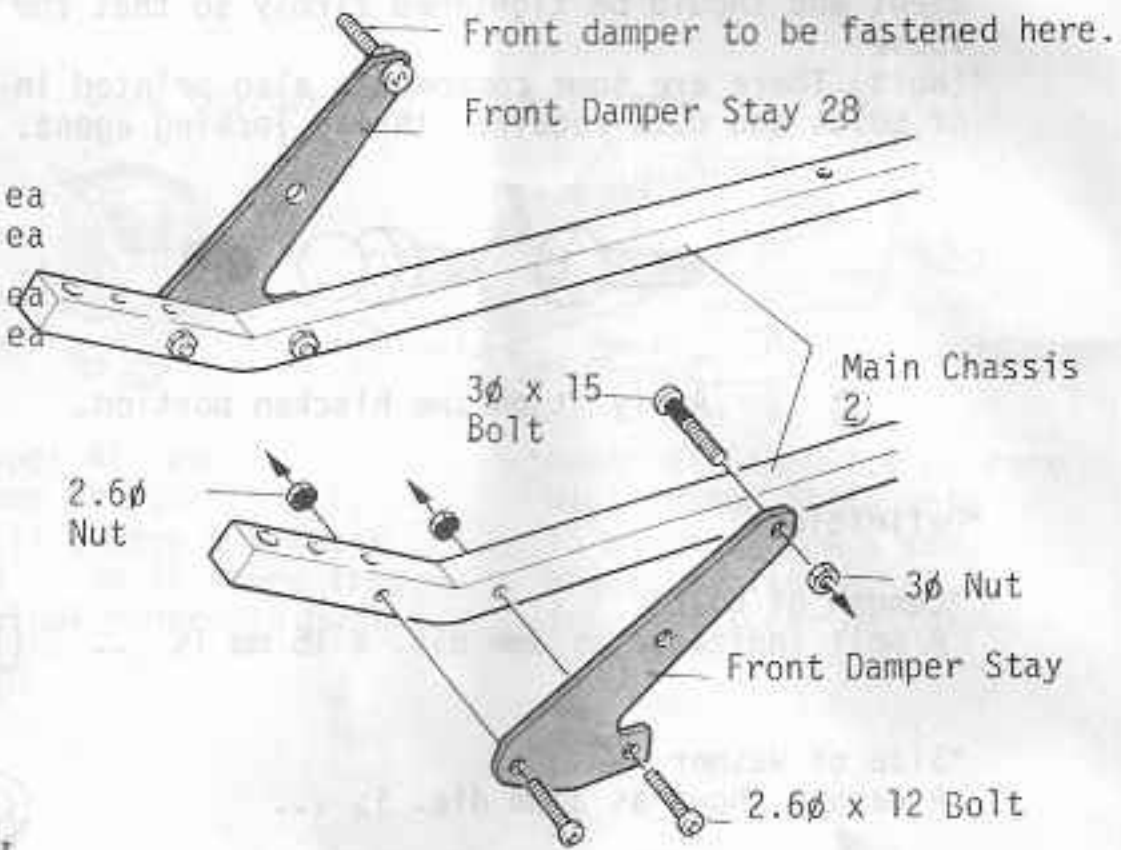
Life size scale - Measure the bolts.

Pull out the lead wire through the hole.

2 INSTALLATION OF FRONT DAMPER

[Small fittings to be used]

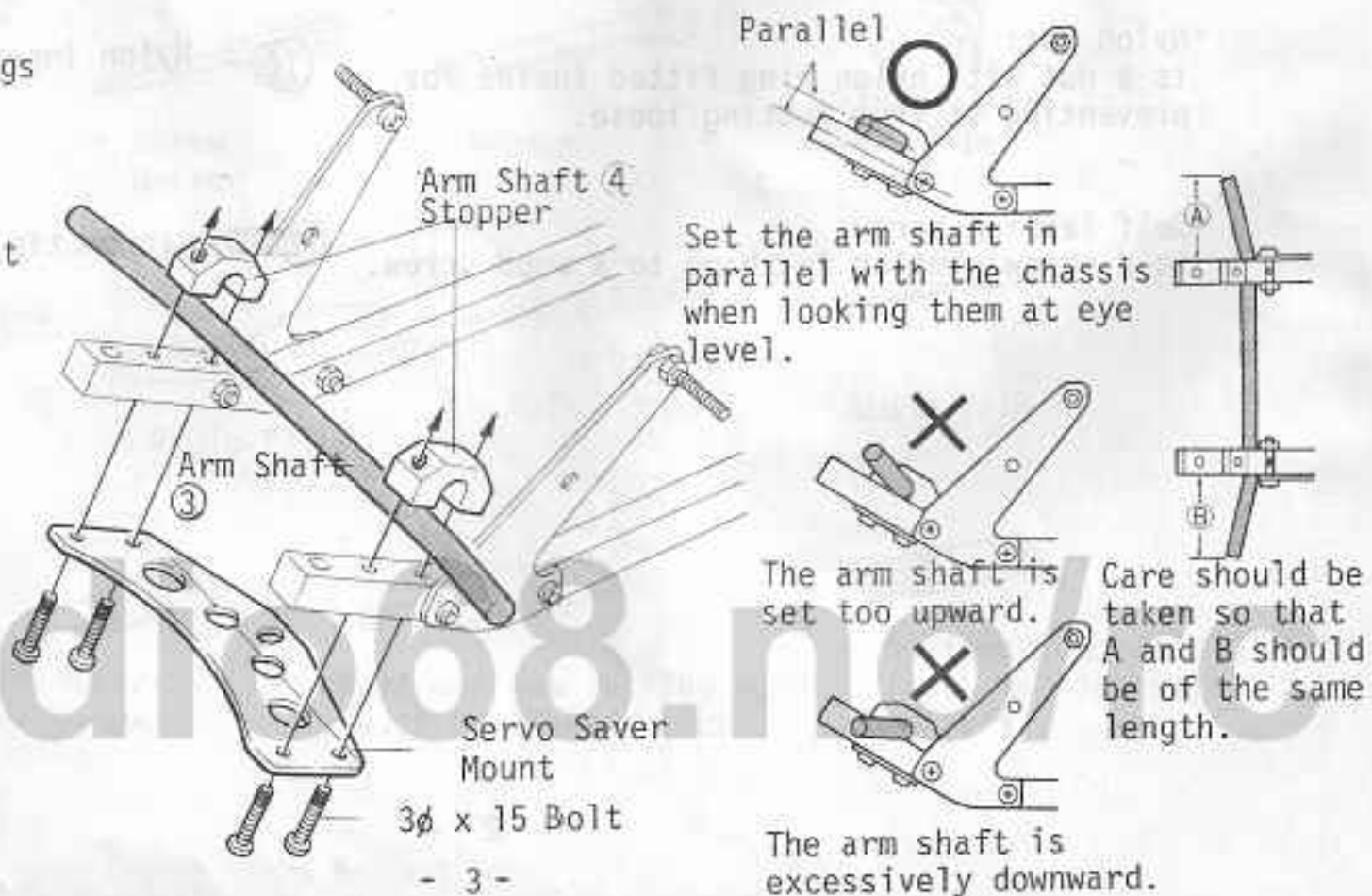
- 2.6φ x 12 Bolt ... 4 ea
- 2.6φ Nut ... 4 ea
- 3φ x 15 Bolt 2 ea
- 3φ Nut 2 ea



3 INSTALLATION OF ARM SHAFT

[Small fittings to be used]

- 3φ x 15 Bolt 4 ea

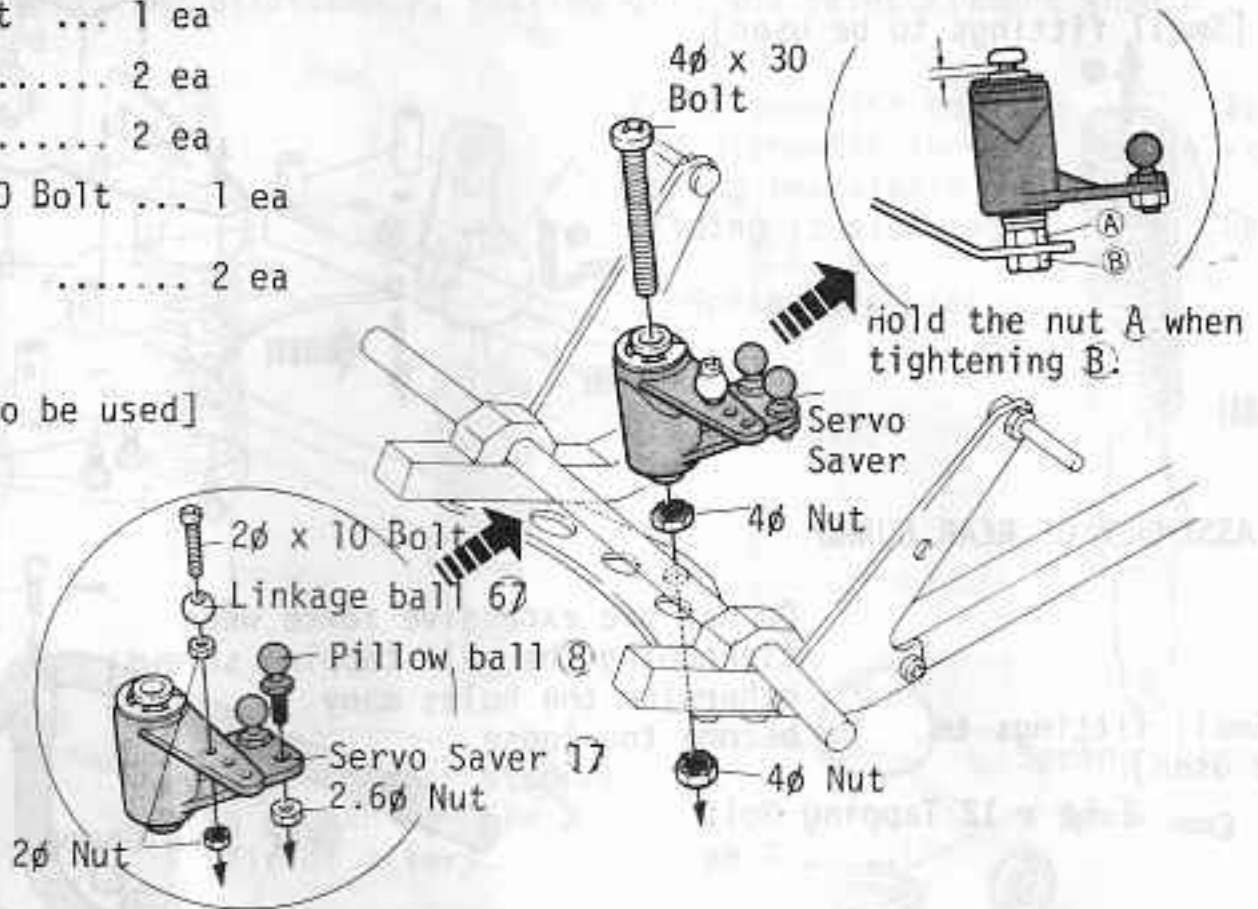


4 INSTALLATION OF SERVO SAVER

-  Pillow Ball 2 ea
-  Linkage Ball ... 1 ea
-  2φ x 10 Bolt ... 1 ea
-  2φ Nut 2 ea
-  2.6φ Nut 2 ea
-  4φ x 30 Bolt ... 1 ea
-  4φ Nut 2 ea

[Small fittings to be used]

Leave an clearance of 5mm in order that the servo saver may swing smoothly.



5 INSTALLATION OF REAR SUSPENSION STAY

[Small fittings to be used]

-  Rear Suspension Holder (A) 34 2 ea
-  Rear Suspension Holder (B) 33 2 ea
-  3φ x 15 Bolt ... 4 ea
-  3φ x 6 Bolt ... 2 ea
-  3φ Nut 2 ea

Put the rear suspension holders in a way so that the holes should be on the straight.

Rear Suspension Holder (A) 34

3φ x 6 Bolt

3φ Nut

Rear Suspension Holder (B) 33

3φ x 6 Bolt

3φ x 15 Bolt

*The shape of the rear sus. plate is not symmetrical. The arrow in the drawing indicates the front.


Install it with the bend downward.

Gear Box Mount (30)

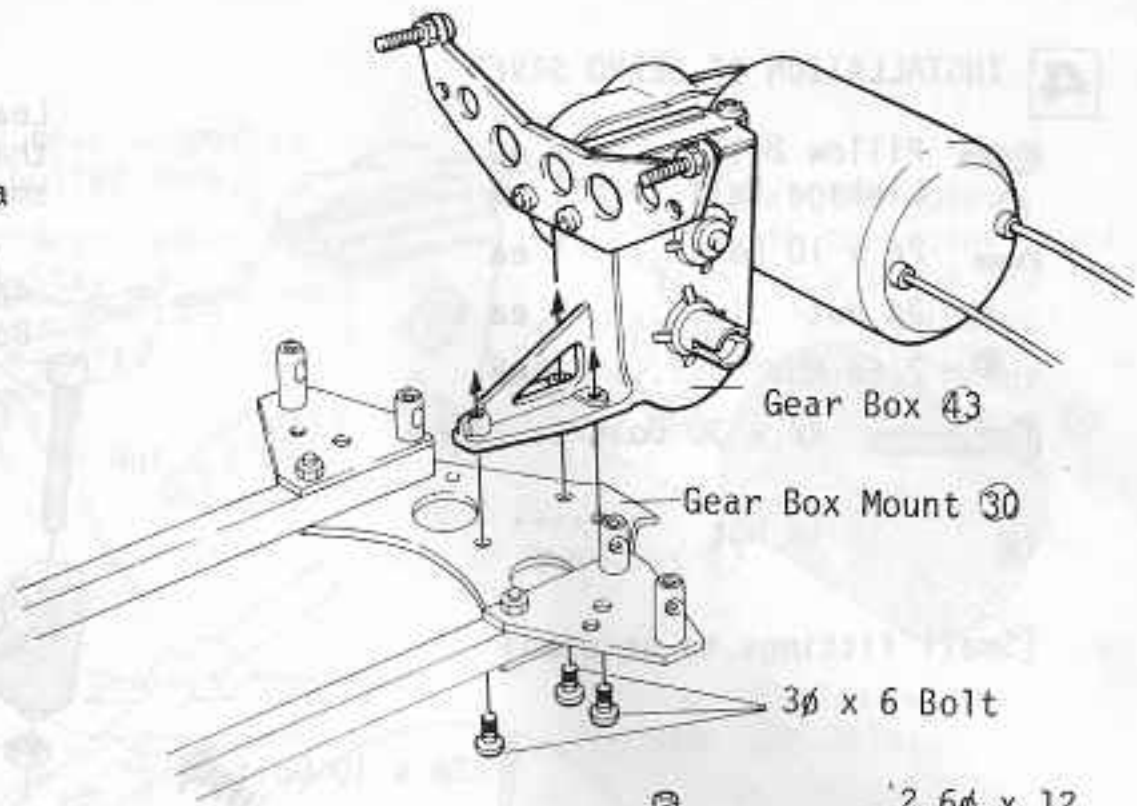
When the rear suspension holders are bolted, rear sus. shaft (32) may be placed in the position through the holders temporarily for alignment, it should be removed after the installation.

0 10mm 20mm Life size scale

6 INSTALLATION OF GEAR BOX


 3ø x 6 Bolt 3 ea

[Small fittings to be used]

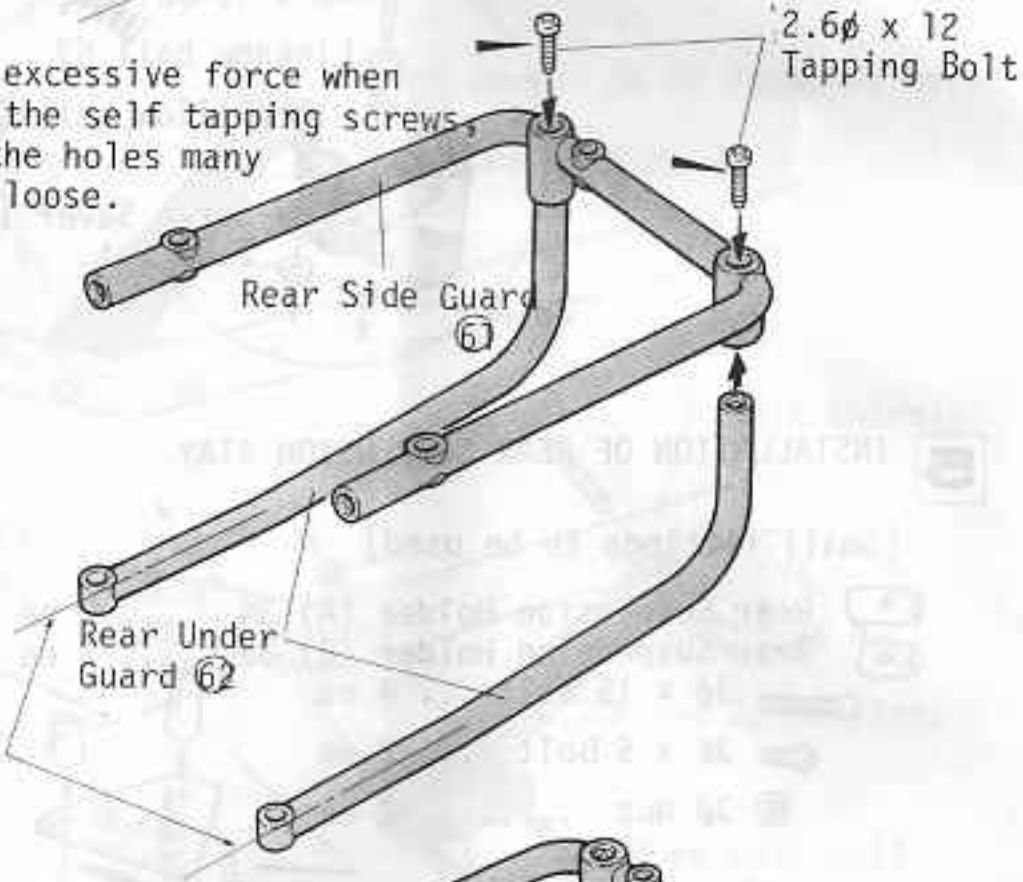


7 ASSEMBLY OF REAR GUARD

[Small fittings to be used]

 2.6ø x 12 Tapping Bolt 2 ea


Do not use excessive force when tightening the self tapping screws, otherwise the holes may become too loose.




Set them in parallel.

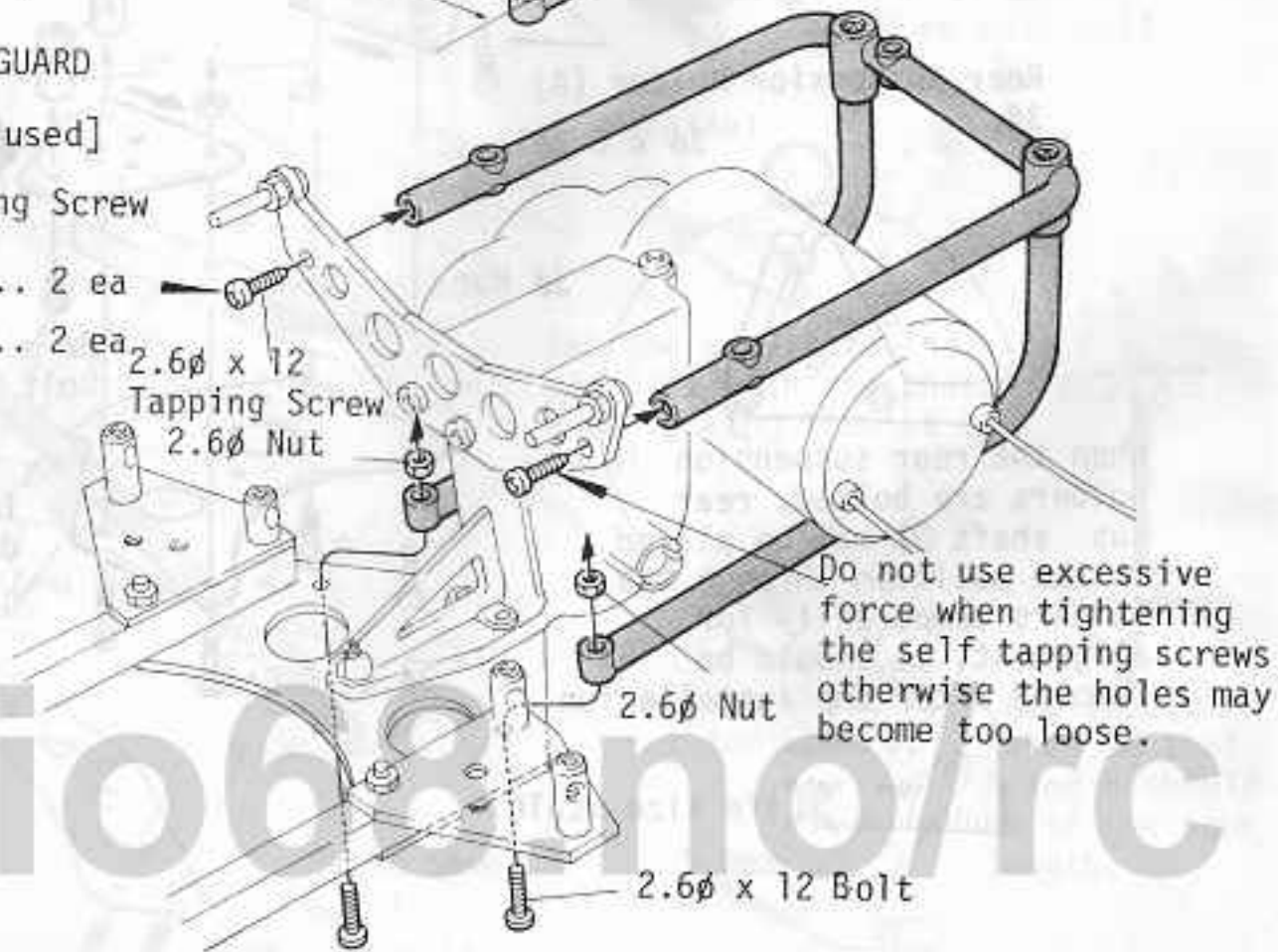
8 INSTALLATION OF REAR GUARD

[Small fittings to be used]

 2.6ø x 12 Tapping Screw 2 ea

 2.6ø x 12 Bolt .. 2 ea

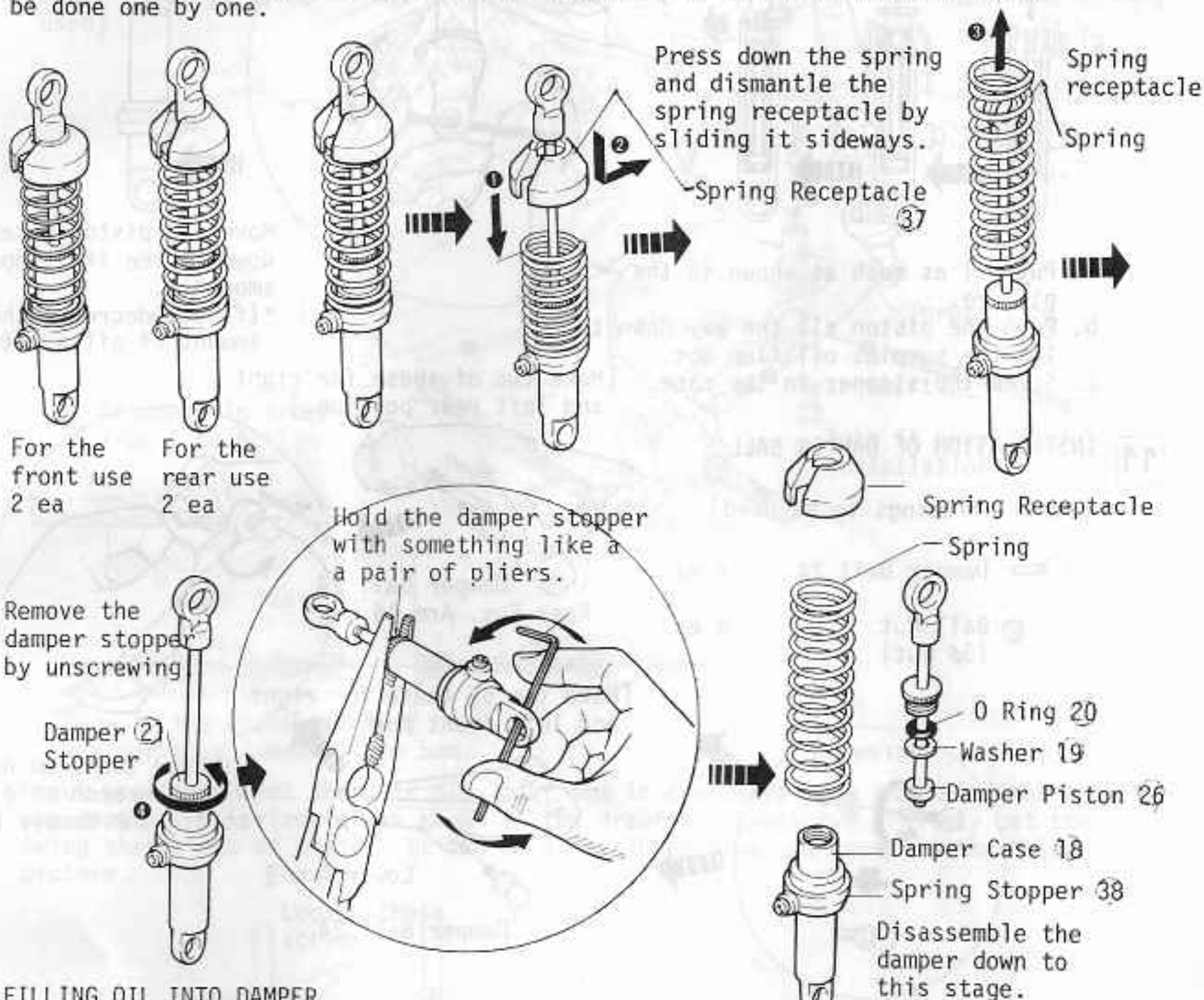
 2.6ø Nut 2 ea



Do not use excessive force when tightening the self tapping screws, otherwise the holes may become too loose.

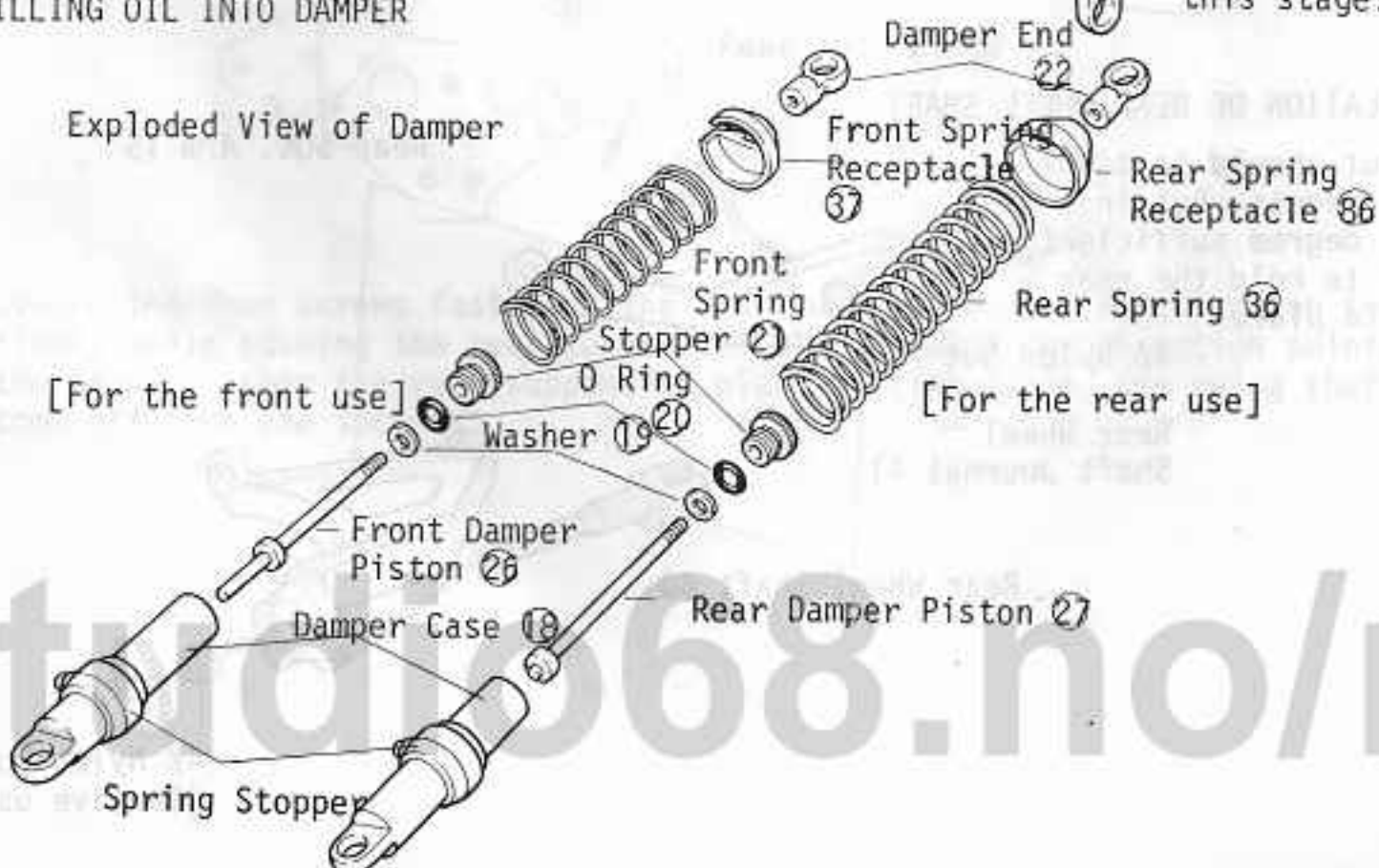
9 DETAILS OF DAMPER

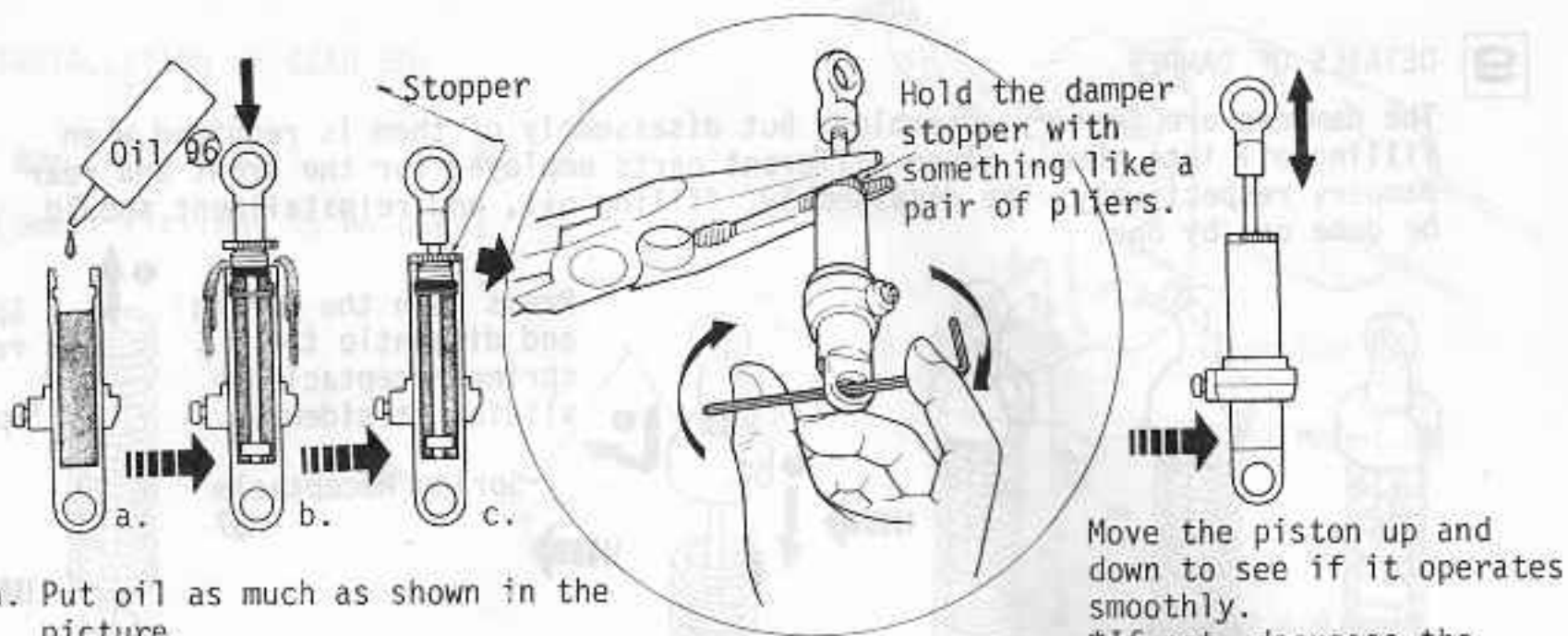
The dampers are factory assembled, but disassembly of them is required when filling oil into them. Since different parts employed for the front and rear dampers respectively; the disassembly, filling oil, and reinstallation should be done one by one.



10 FILLING OIL INTO DAMPER

Exploded View of Damper







- a. Put oil as much as shown in the picture.
- b. Push the piston all the way down to let the surplus oil flow out.
- c. Screw the stopper in the case. [Make two of these for right and left rear portion.]

Move the piston up and down to see if it operates smoothly.
 *If not, decrease the amount of oil a little.

11 INSTALLATION OF DAMPER BALL

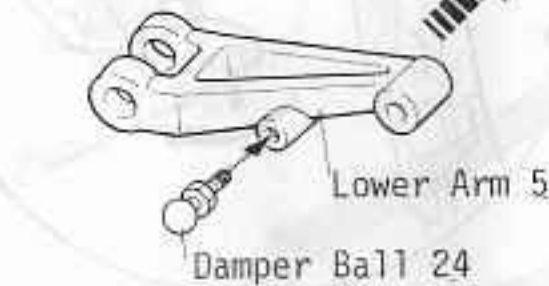
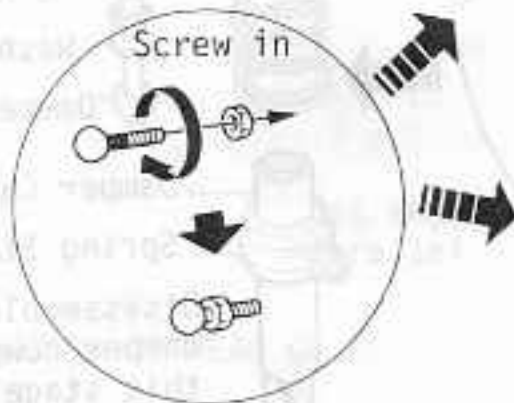
[Small fittings to be used]

-  Damper Ball 24 ... 4 ea
-  Ball Nut 4 ea (3φ Nut)



[Make two of these for right and left front portion.]

Tighten the 3 mm nut with a wrench or pliers to fix the damper ball.



12 INSTALLATION OF REAR WHEEL SHAFT

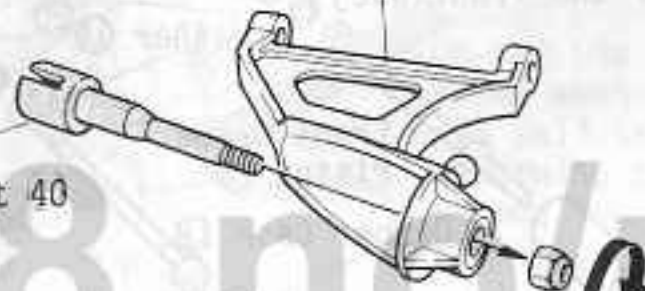
This nut should be tight not to excess, but in such a degree sufficient enough to hold the rear wheel in place.

4φ Nylon Nut

Rear Wheel Shaft Journal 4)

Rear Wheel Shaft 40

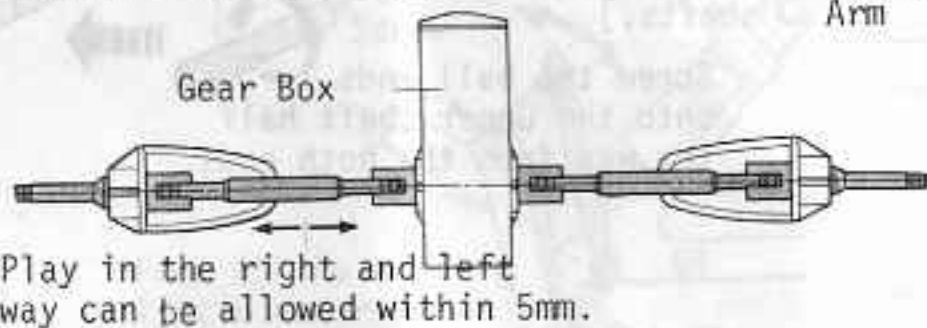
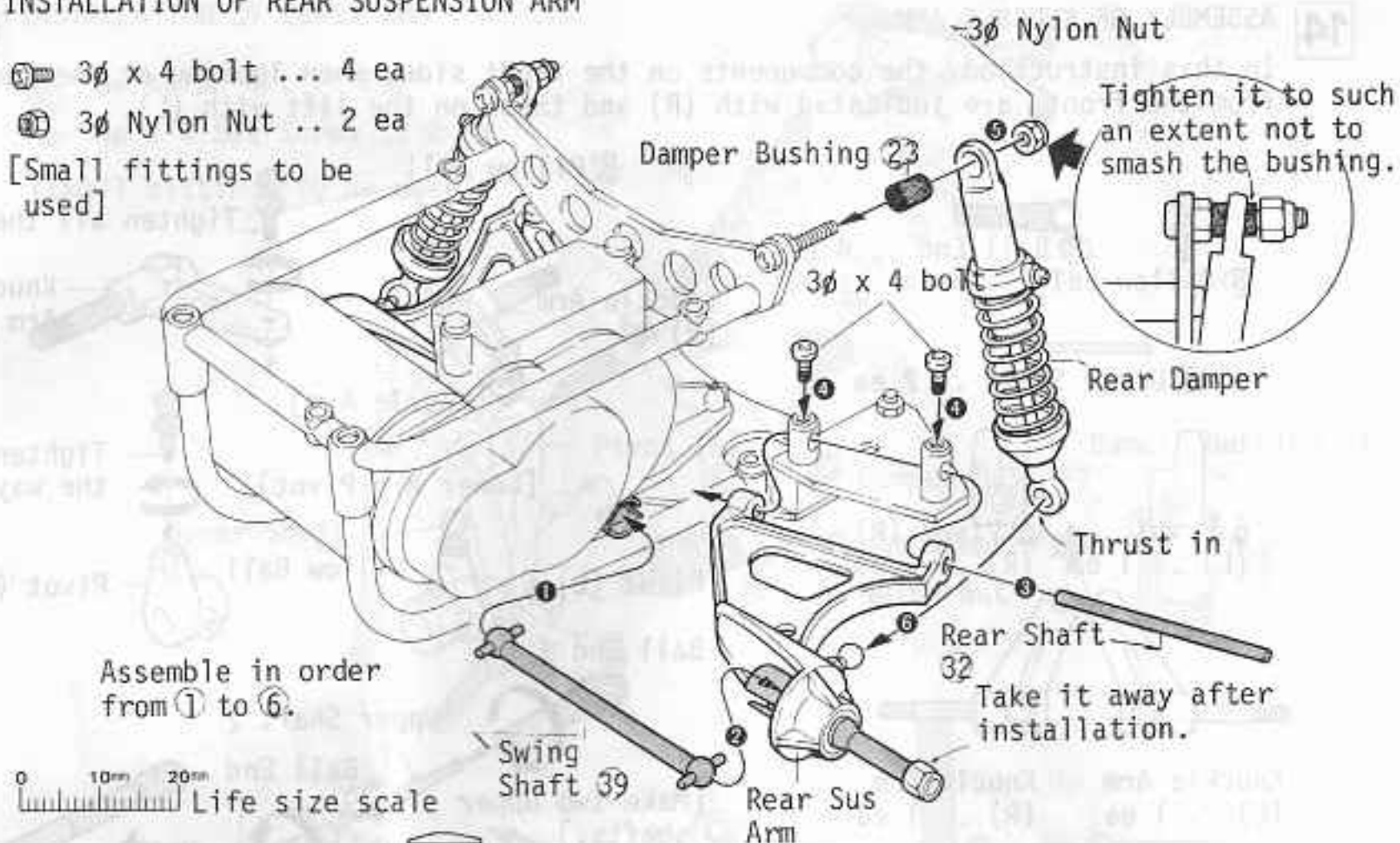
Rear Sus. Arm 15



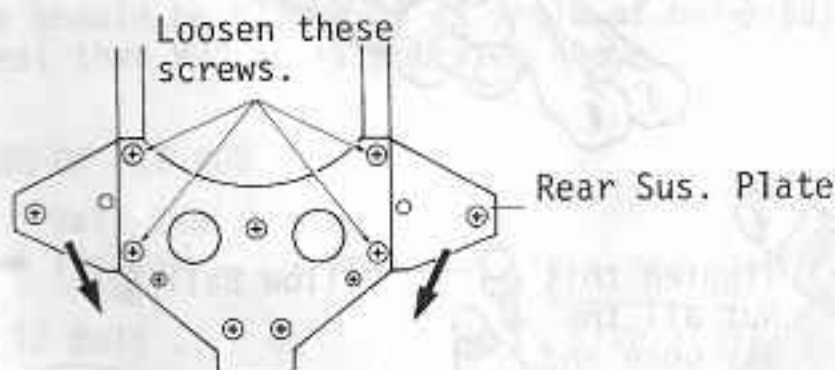
4φ Nylon Nut (Tentive use)

13 INSTALLATION OF REAR SUSPENSION ARM

- ① 3ø x 4 bolt ... 4 ea
- ② 3ø Nylon Nut .. 2 ea
- [Small fittings to be used]



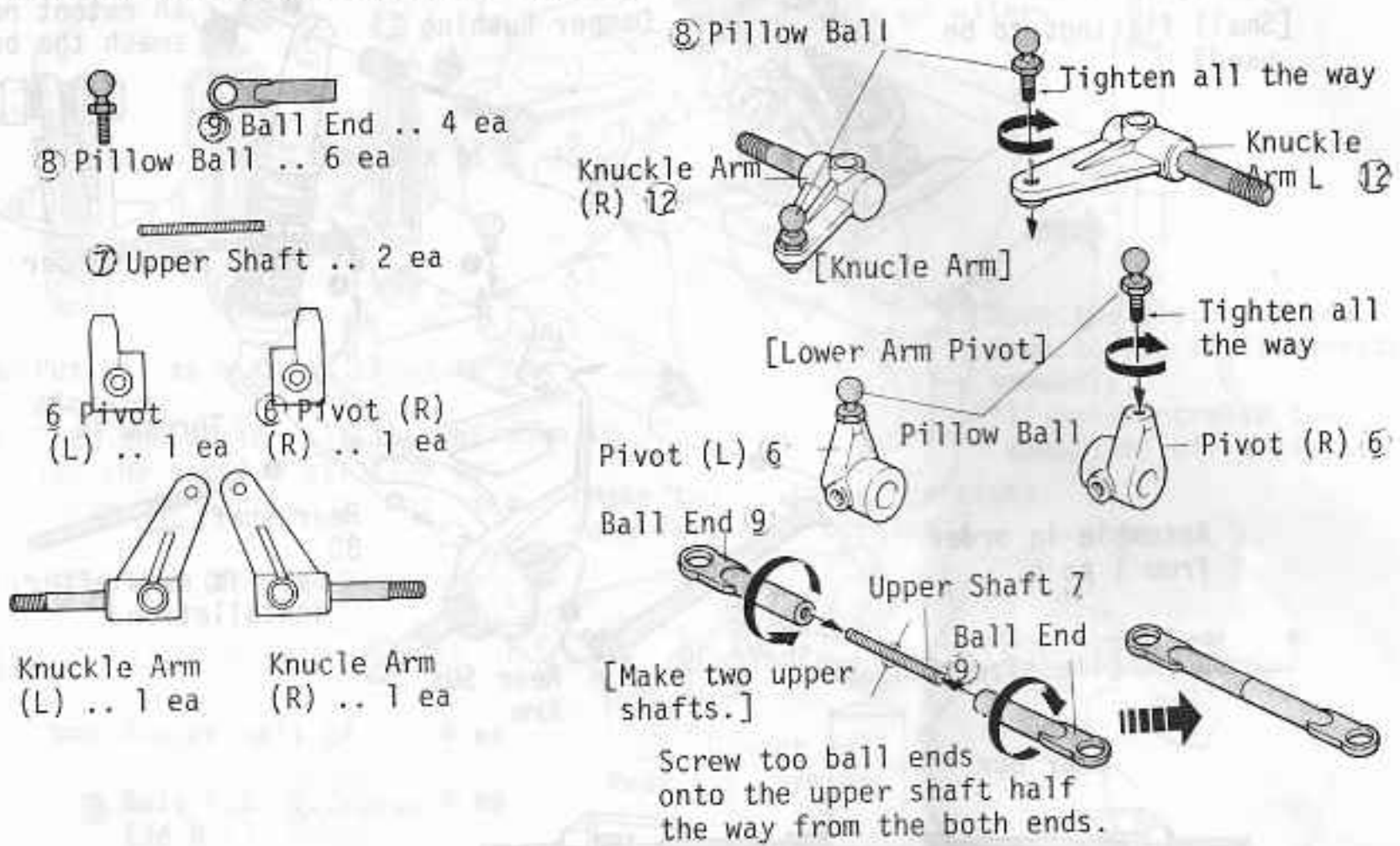
Check whether or not there is play over 5mm in crossways when the swing shafts are kept to be horizontal as shown in the drawing. Excessive play may get the swing shafts out of place. It can be adjusted in a way as shown in the below picture.



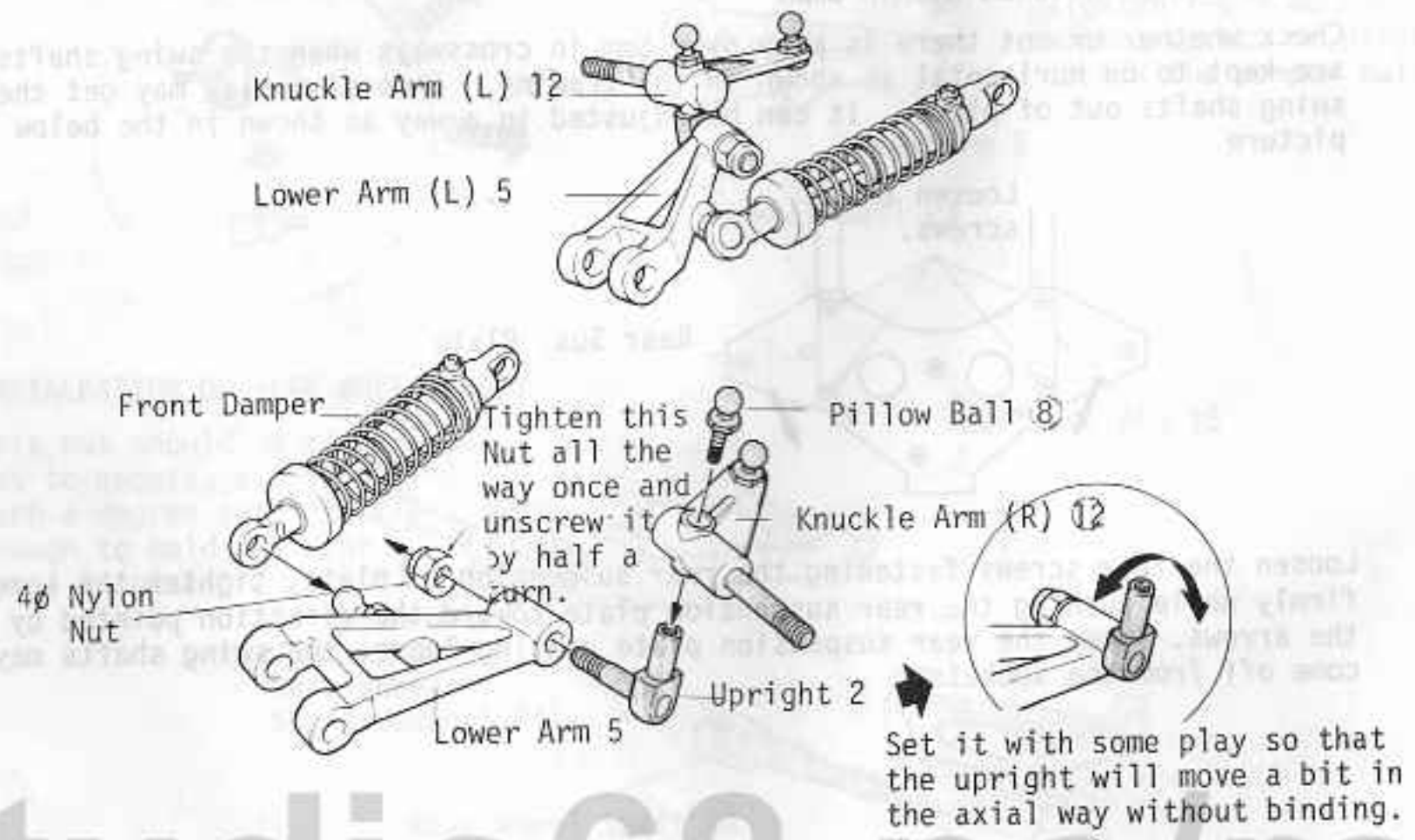
Loosen the four screws fastening the rear suspension of plate, tighten the screws firmly while pushing the rear suspension plate toward the direction pointed by the arrows. When the rear suspension plate getting loose, the swing shafts may come off from the sockets.

14 ASSEMBLY OF KNUCKLE ARM

In this instruction, the components on the right side, when looking at the car from the front, are indicated with (R) and those on the left with (L).

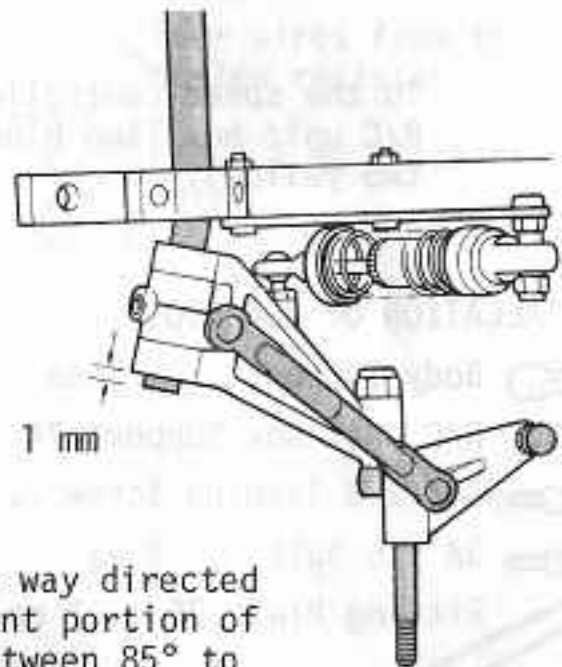
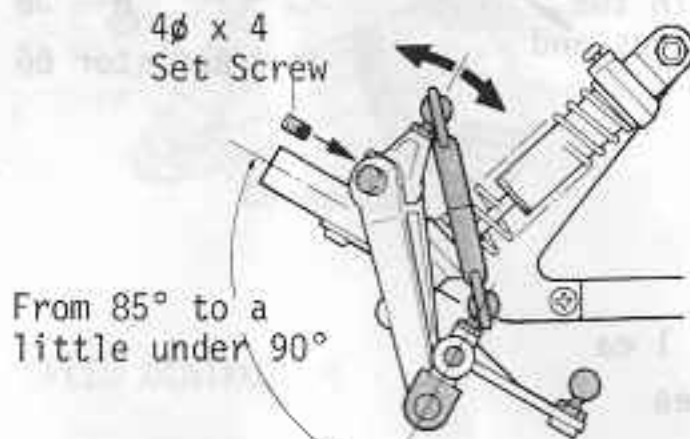
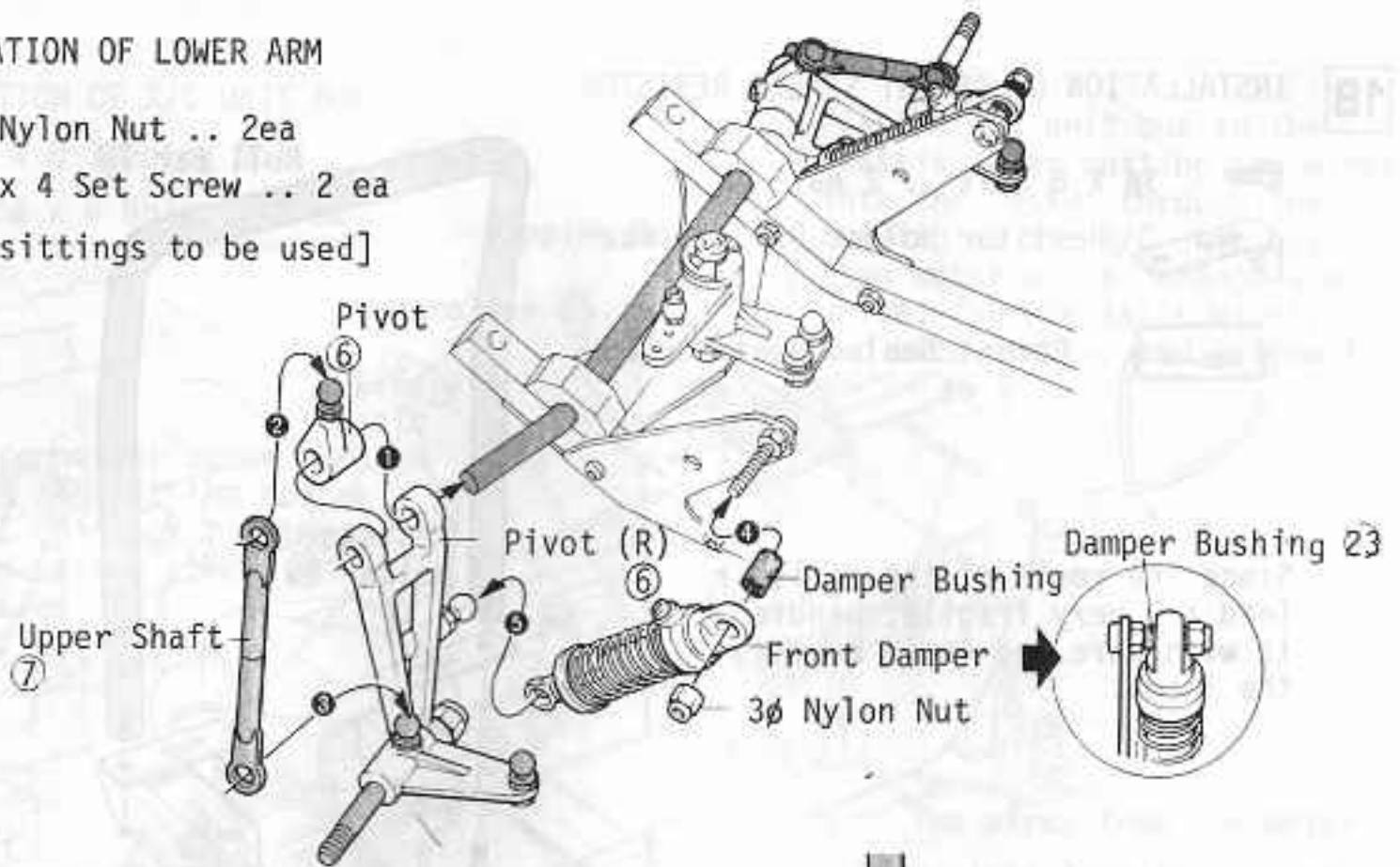


15 INSTALLATION OF KNUCKLE ARM



16 INSTALLATION OF LOWER ARM

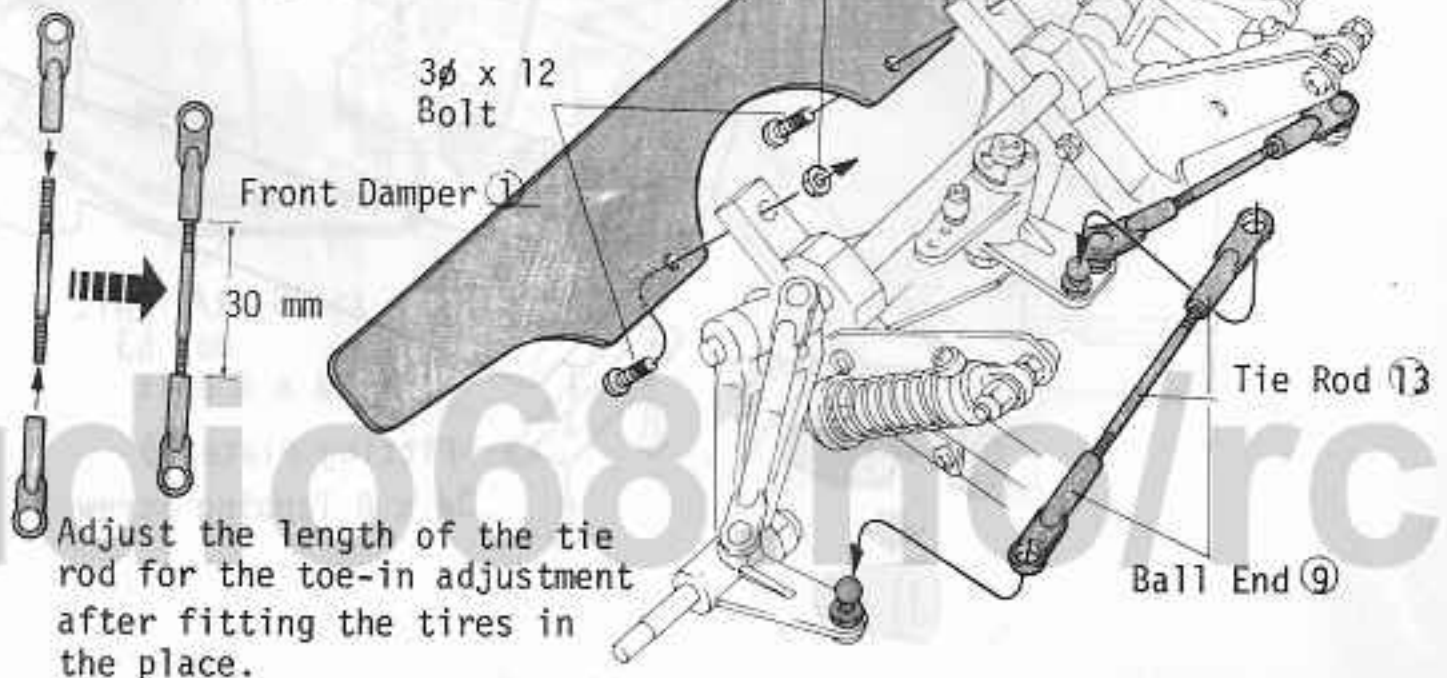
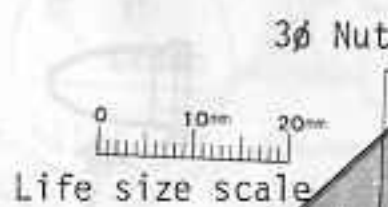
- ① 3φ Nylon Nut .. 2ea
 - ② 4φ x 4 Set Screw .. 2 ea
- [small sittings to be used]






Adjust an angle of the pivot by moving it in a way directed by the arrows so that the king pin and the front portion of the chassis should be placed at an angle of between 85° to a little less than 90° as illustrated above.

17 INSTALLATION OF TIE ROD

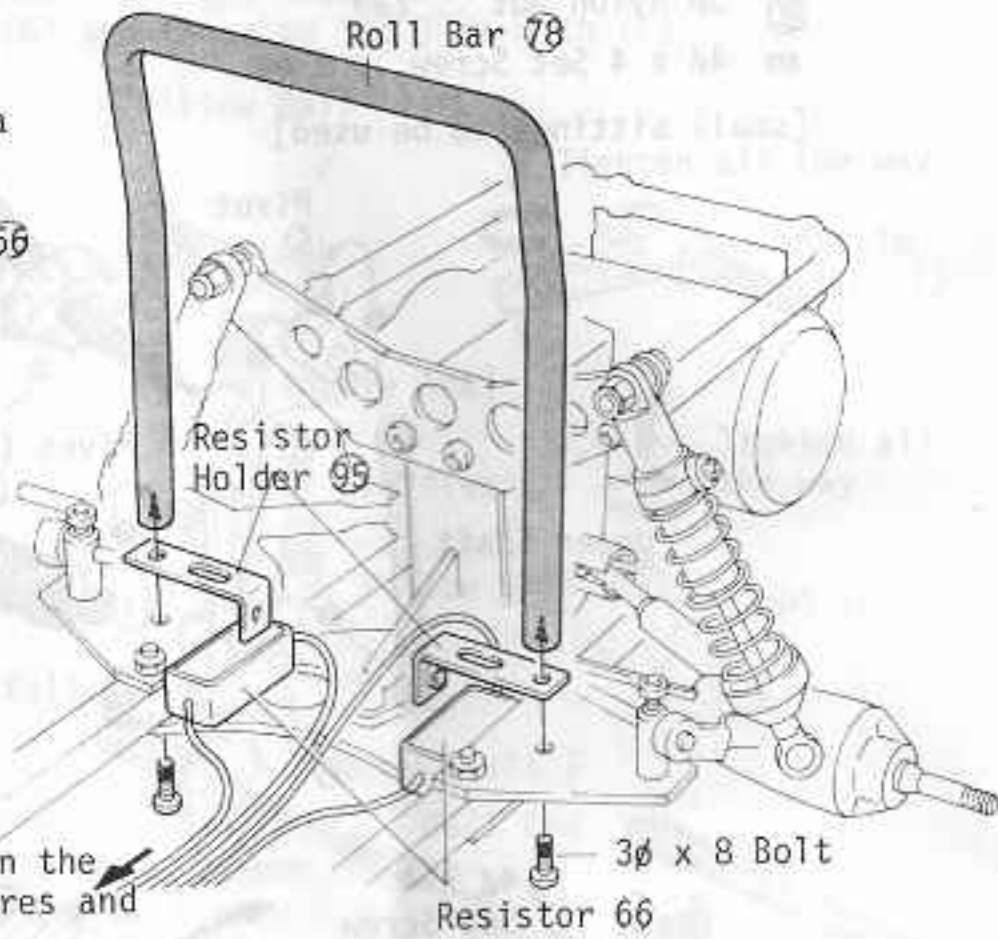
- ③ Ball End .. 4 ea
- ④ Tie Rod ... 2 ea
- ⑤ 3φ x 12 Bolt .. 2 ea
- ⑥ 3φ Nut .. 2 ea



18 INSTALLATION OF CEMENT SEALED RESISTOR






-  3ø X 8 Bolt .. 2 ea
-  Resistor Holder 95 .. 2 ea
-  Cement Sealed Resistor 66 .. 2 ea

Since the roots of the resistor lead are very fragile, handle it with care and avoid bending the leads.



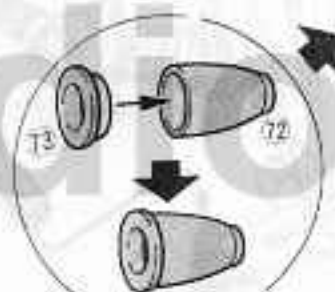
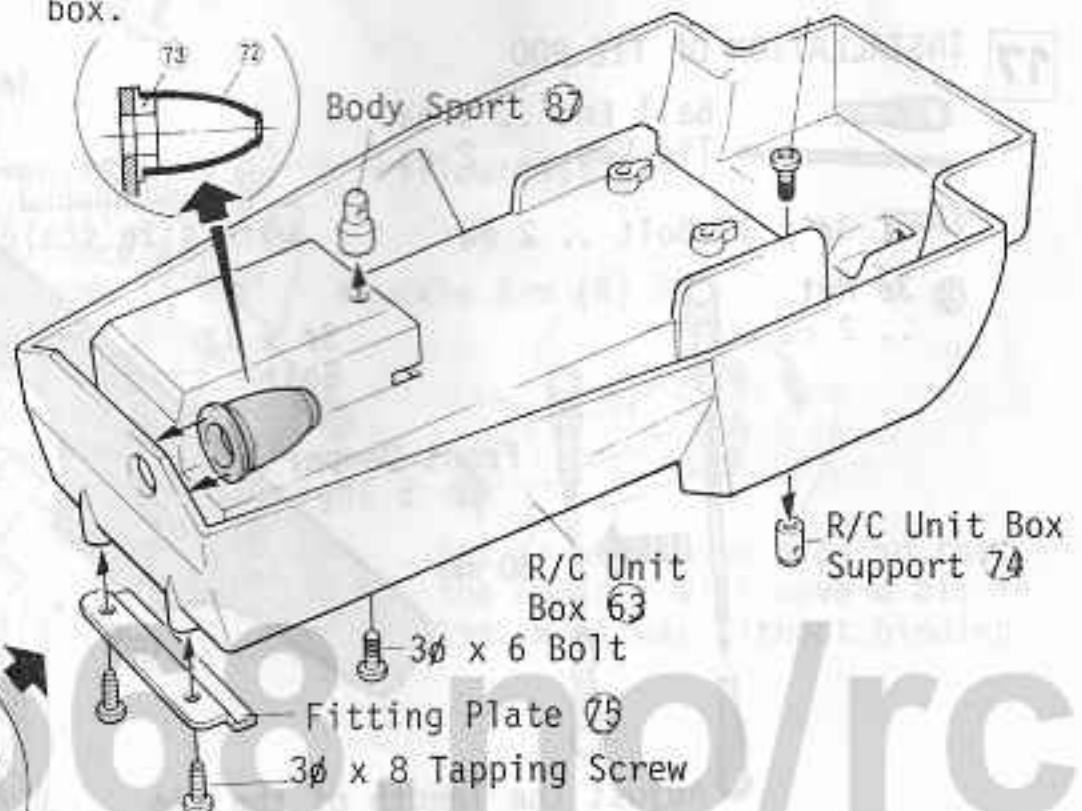
To the speed controller in the R/C unit box (two blue wires and two yellow).

19 INSTALLATION OF ROD BOOT

-  Body Support .. 1 ea
-  R/C Unit Box Support 74 .. 1 ea
-  3ø x 8 Tapping Screw .. 2 ea
-  3ø x 6 Bolt .. 2 ea
-  Fitting Plate 75 .. 1 ea

-  Rod Ring .. 1 ea
-  Rod Boot .. 1 ea

Glue it down in accord with the opening on the R/C unit box.

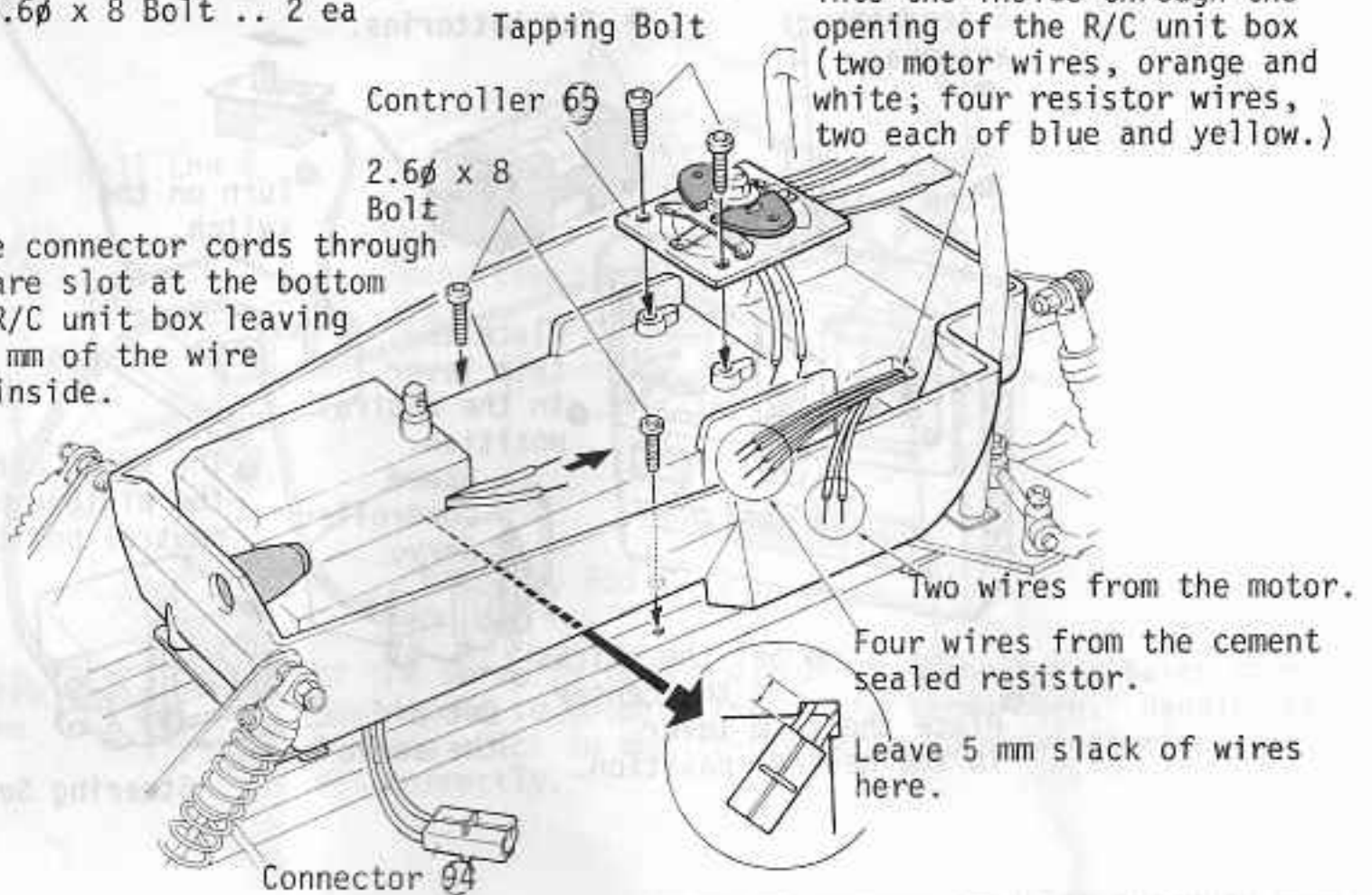


20 INSTALLATION OF R/C UNIT BOX

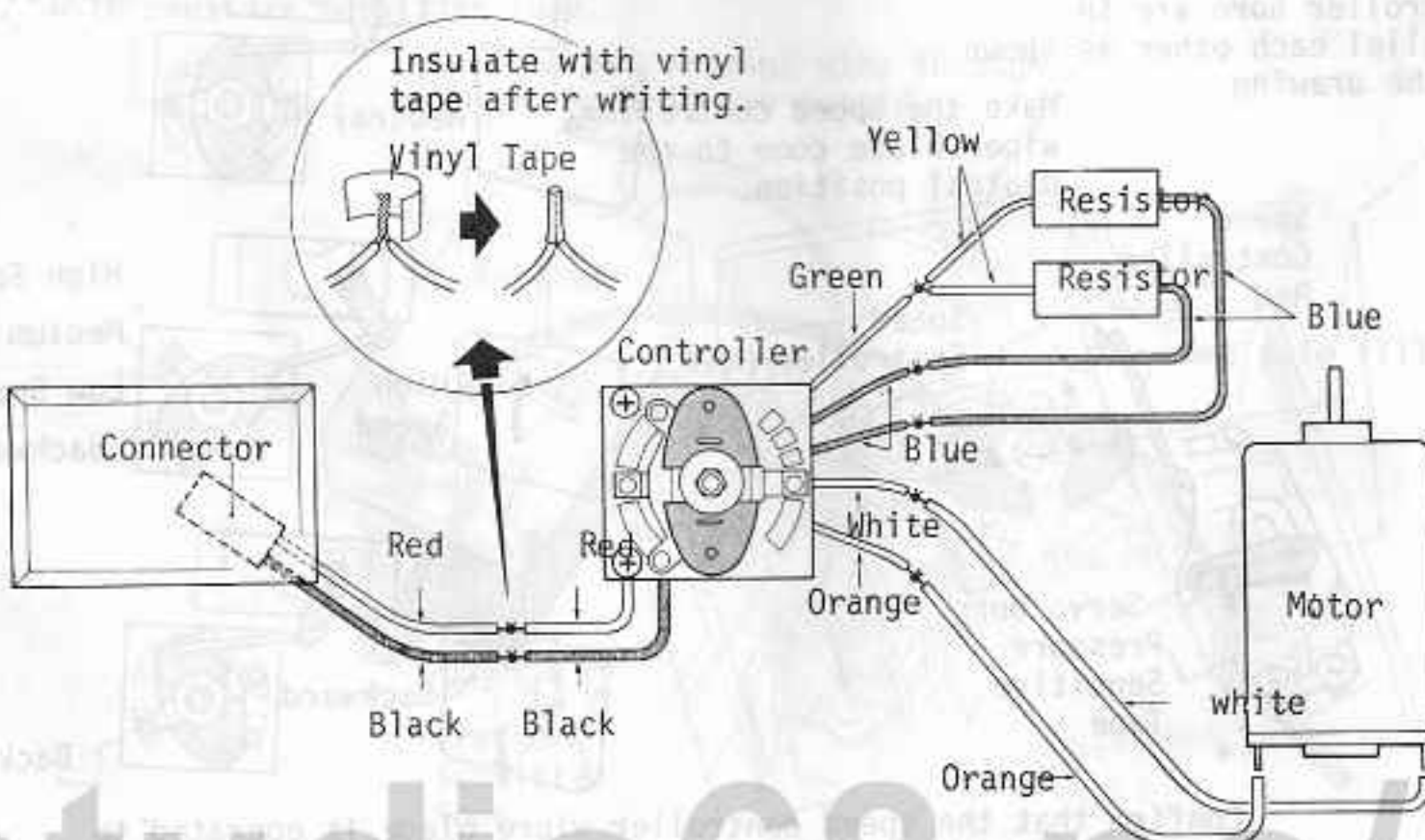
- 3φ x 8 Tapping Bolt .. 2 ea
- 2.6φ x 8 Bolt .. 2 ea

Fix the R/C unit box to the chassis after putting the wires into the inside through the opening of the R/C unit box (two motor wires, orange and white; four resistor wires, two each of blue and yellow.)

Pass the connector cords through the square slot at the bottom of the R/C unit box leaving about 5 mm of the wire leeway inside.



21 WIRING OF SPEED CONTROLLER

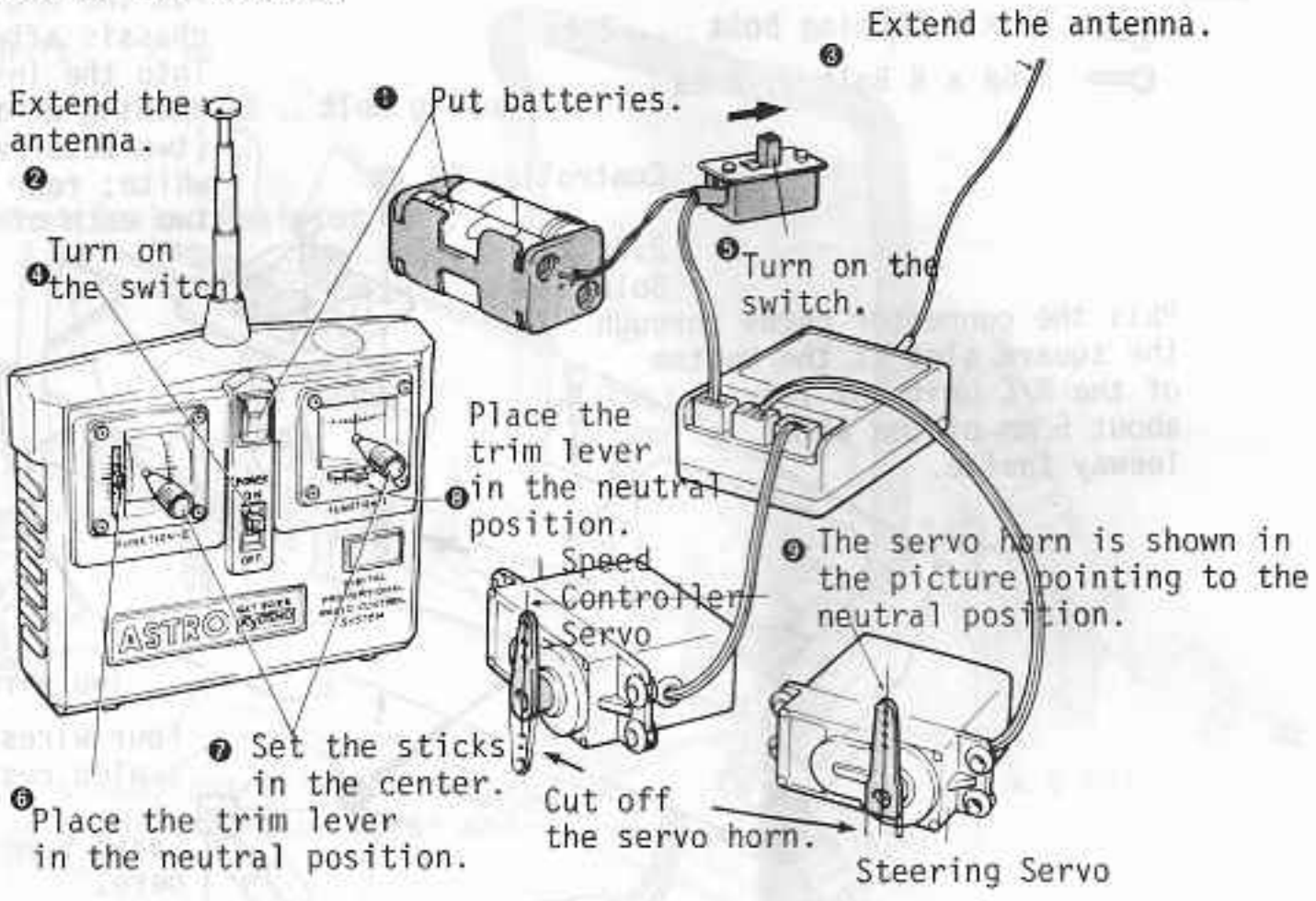


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22

CHECKUP OF RADIO CONTROL UNIT

Inspect in order of the numbers

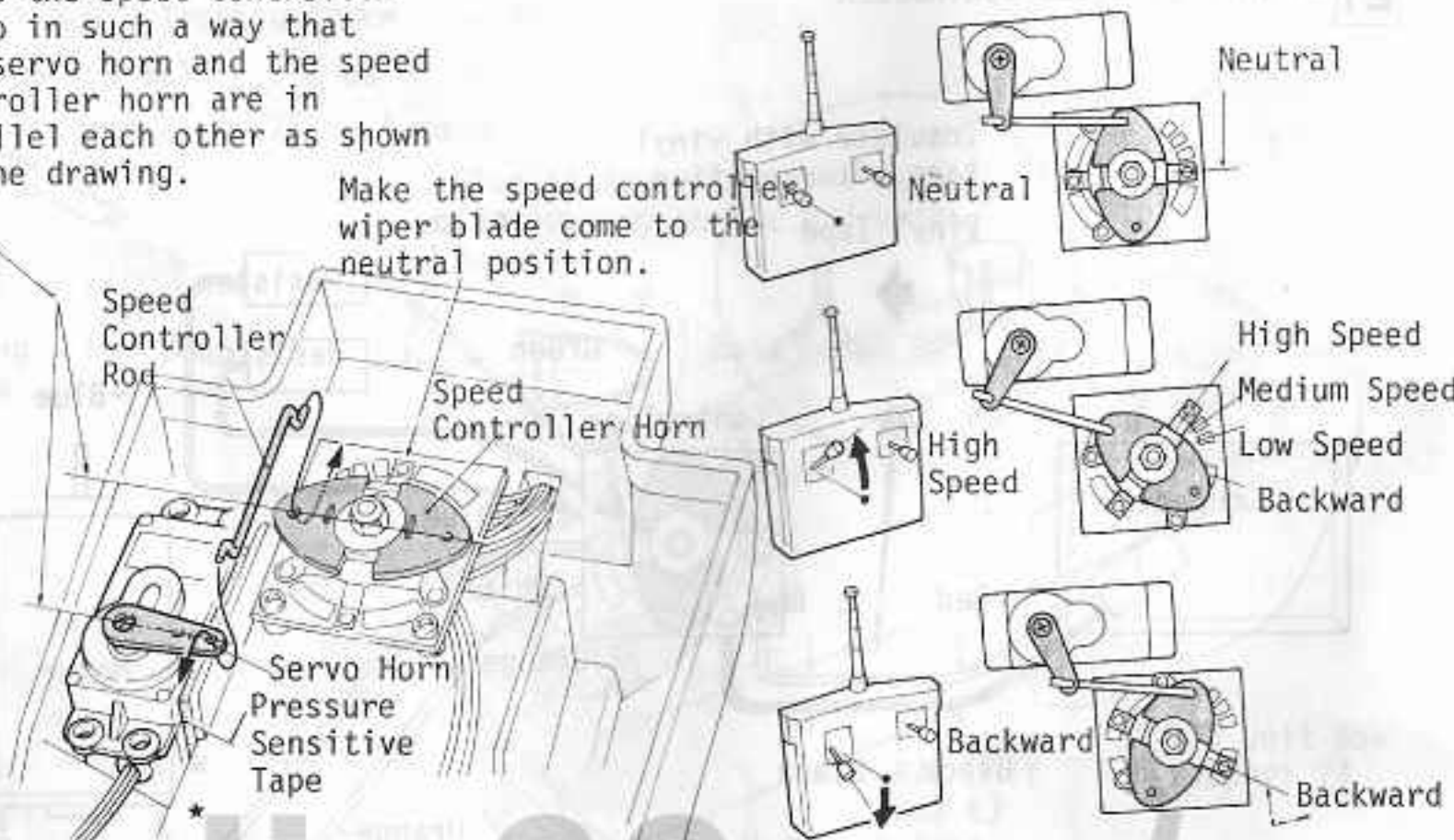


23

MOUNTING OF SPEED CONTROLLER SERVO

Place the speed controller servo in such a way that the servo horn and the speed controller horn are in parallel each other as shown in the drawing.

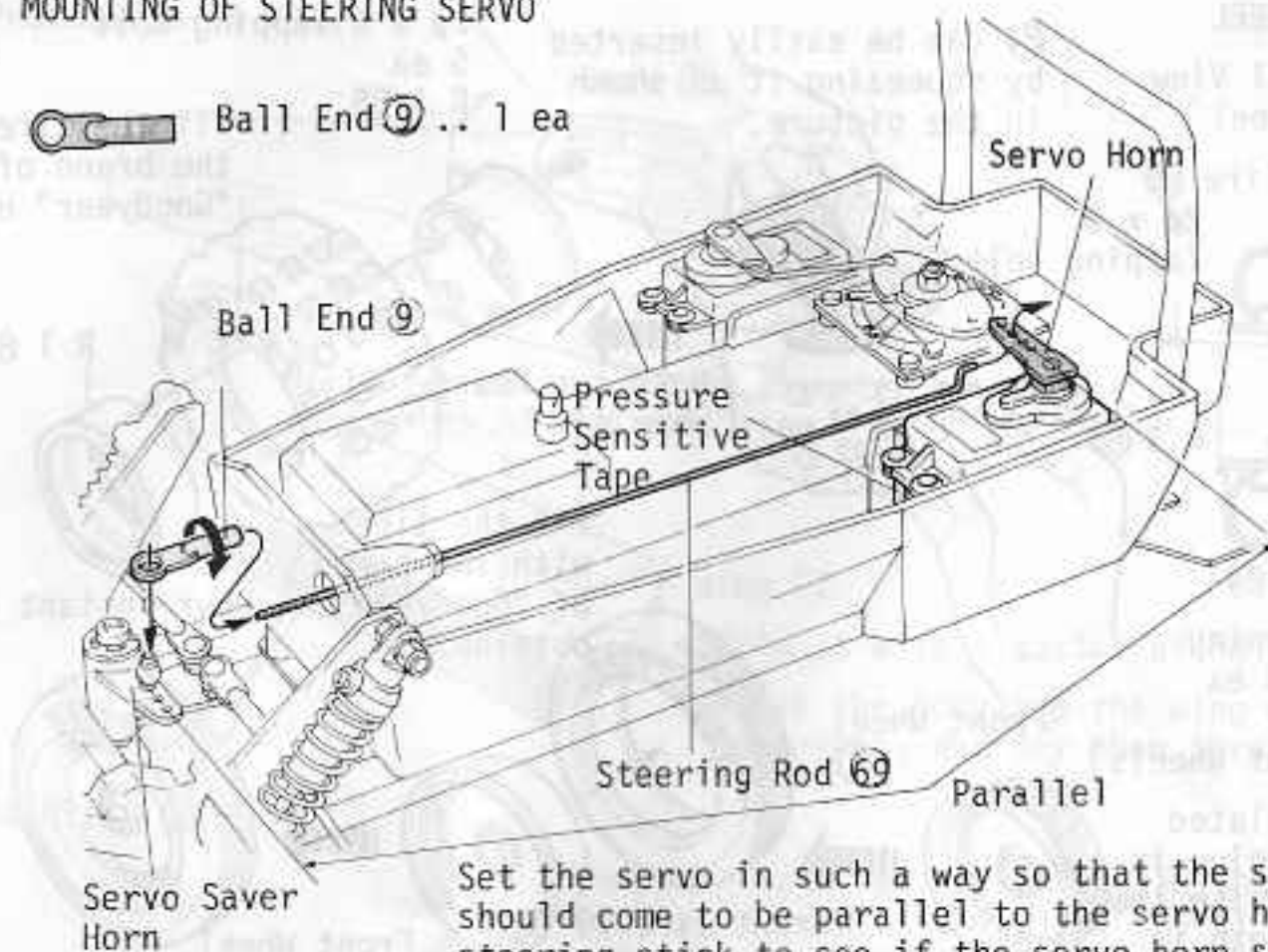
Make the speed controller wiper blade come to the neutral position.



Confirm that the speed controller wiper blade is operated to each control segment accurately in accordance with your manipulation of the radio control transmitter stick of the speed control.

24 MOUNTING OF STEERING SERVO

Ball End 9 .. 1 ea

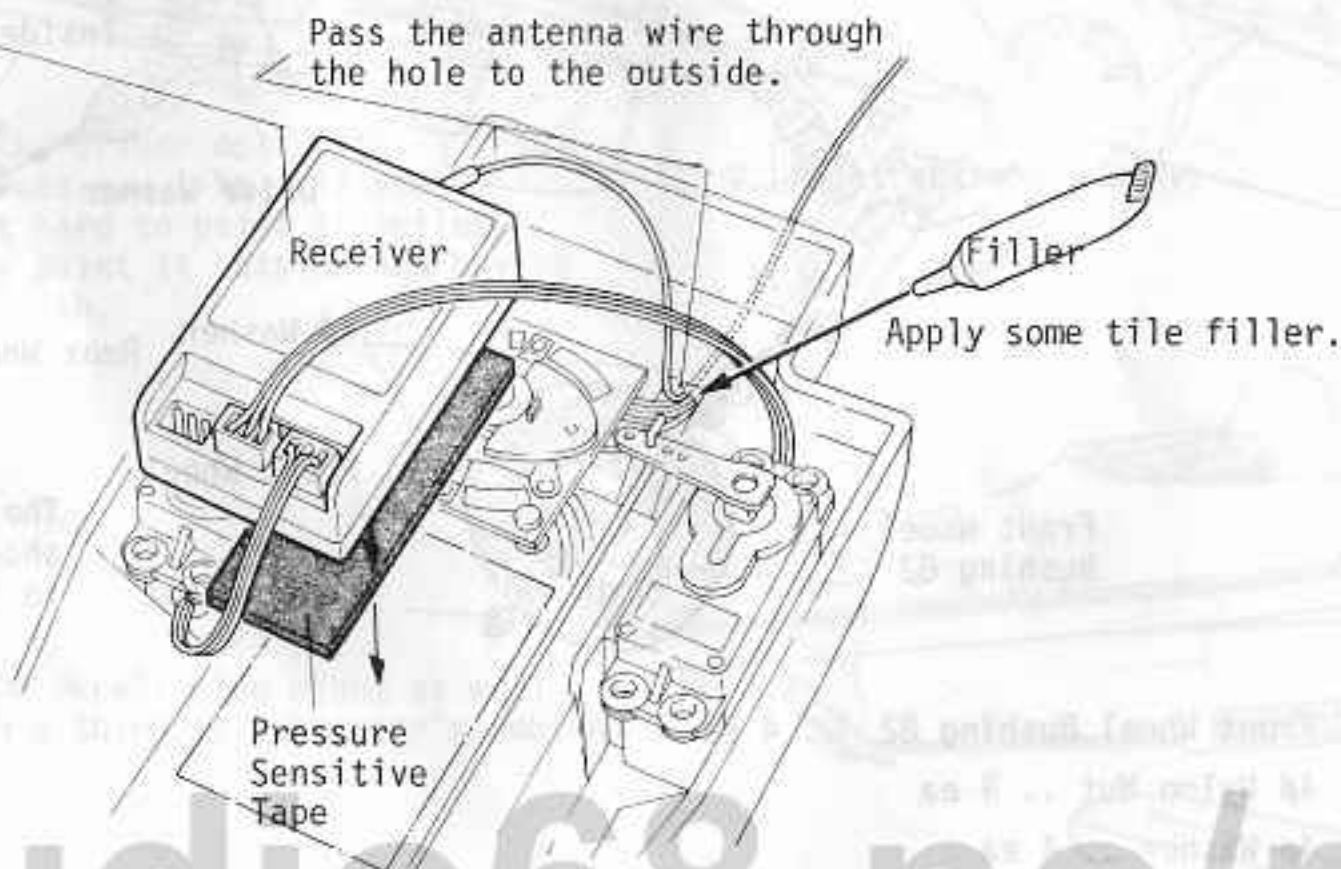


Set the servo in such a way so that the servo saver horn should come to be parallel to the servo horn. Handle the steering stick to see if the servo horn swings right and left correctly.

25 MOUNTING OF RADIO CONTROL RECEIVER

Fix the receiver in a place as close as to the speed controller with pressure sensitive tape.

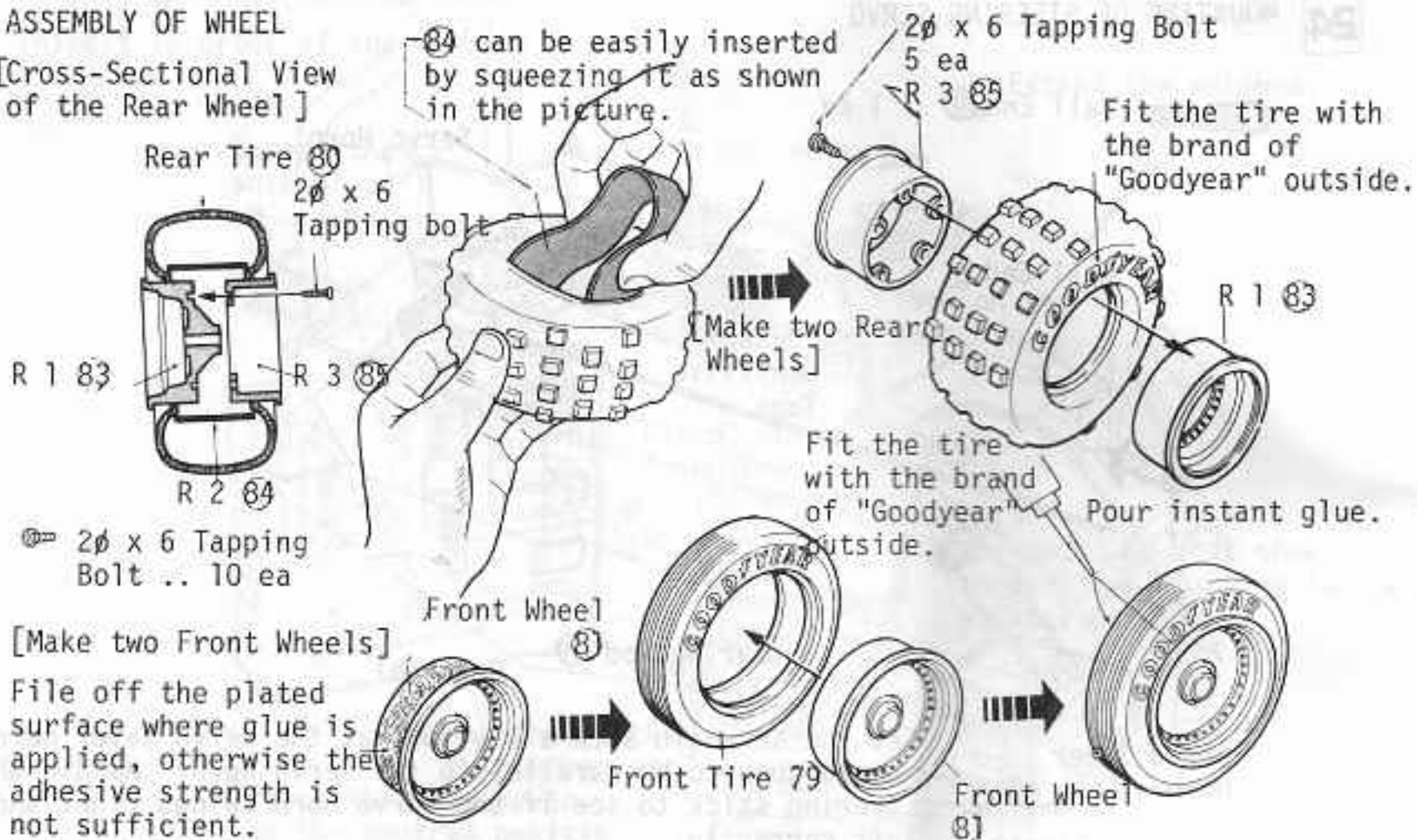
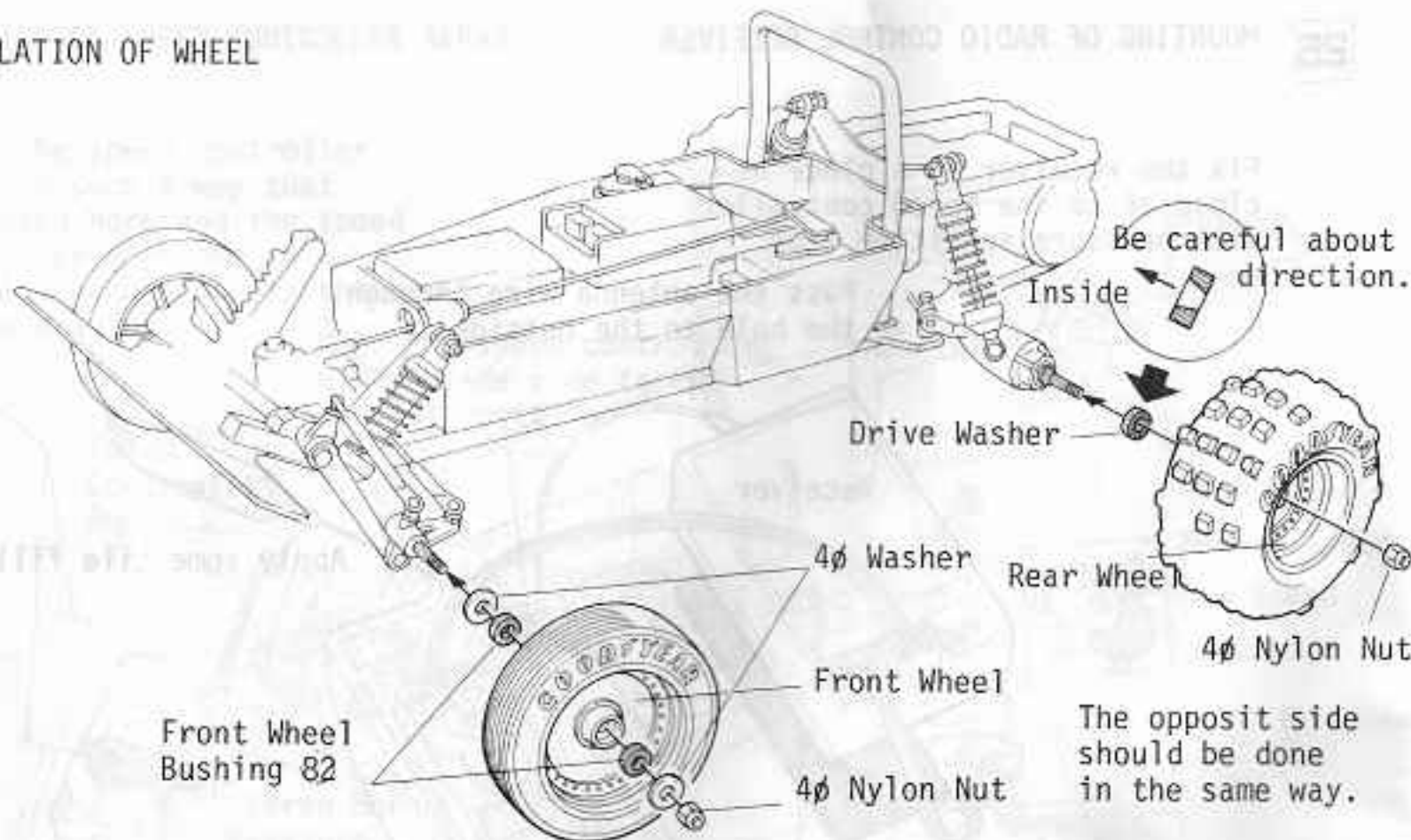
Pass the antenna wire through the hole to the outside.



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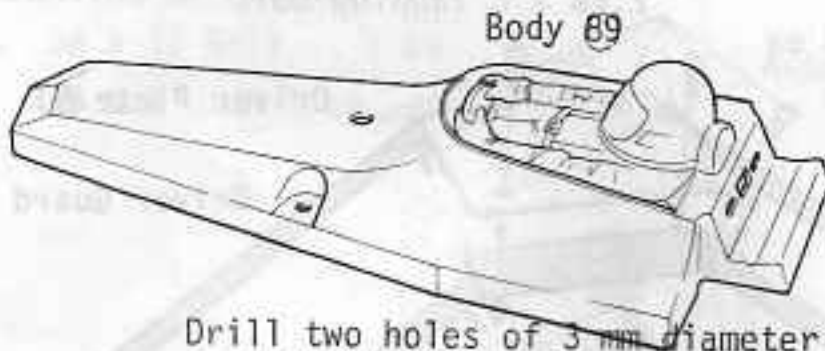
26**ASSEMBLY OF WHEEL**

[Cross-Sectional View of the Rear Wheel]

**27****INSTALLATION OF WHEEL**

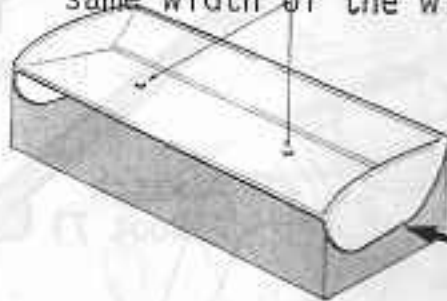
- Ⓒ Front Wheel Bushing 82 .. 4 ea
- Ⓒ 4φ Nylon Nut .. 4 ea
- Ⓒ 4φ Washer .. 4 ea
- Ⓒ Drive Washer 42 .. 2 ea

28 PROCESSING ON WING



Body 89

Drill two holes of 3 mm diameter at the same width of the wing stay.



Wing 92

Trim it with a cutter along the cut-out line. Rinse the body and the wing with neutral detergent, and dry them thoroughly.

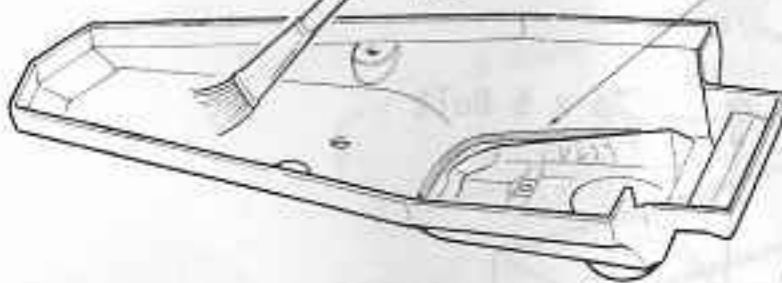
29 PAINTING OF BODY



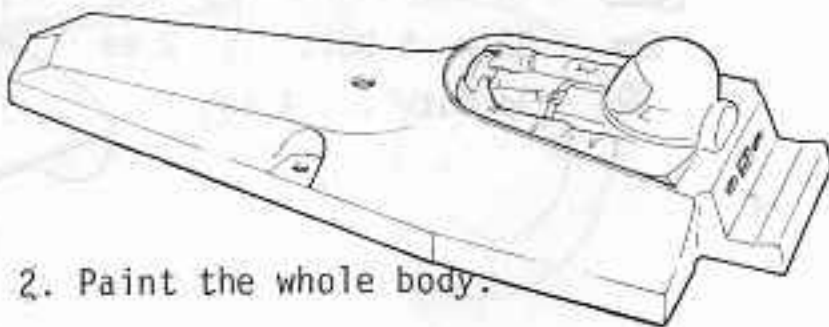
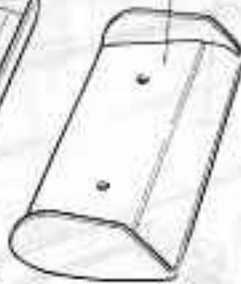
*Polycarbonate bodies can be finished to be lustrous when painted on the inside. So if you like to make the whole body glossy, paint it all inside. When you want to have partly flat finish, paint the area on the out side. when you apply many colors, put the lightest color first, then to darker colors.

Masking is recommended to avoid color bolt, using something like the Micro-Line-Tape.

Wing should be also painted inside.

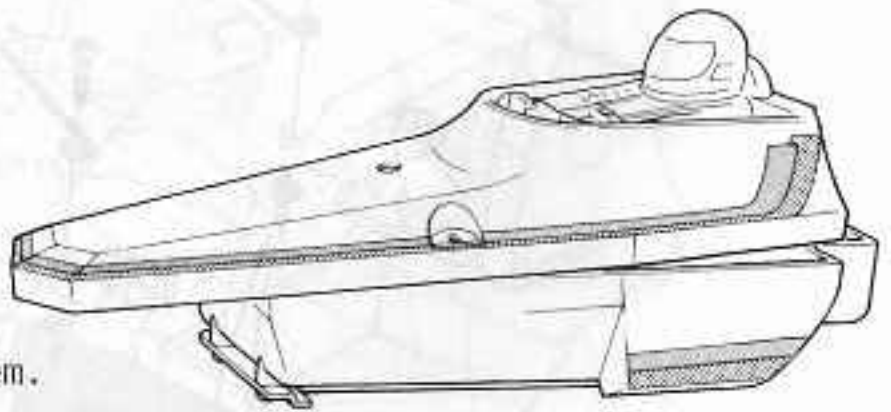


1. Paint the driver doll with any colors you like. If you find it hard to paint it inside, you may paint it outside and having flat finish.





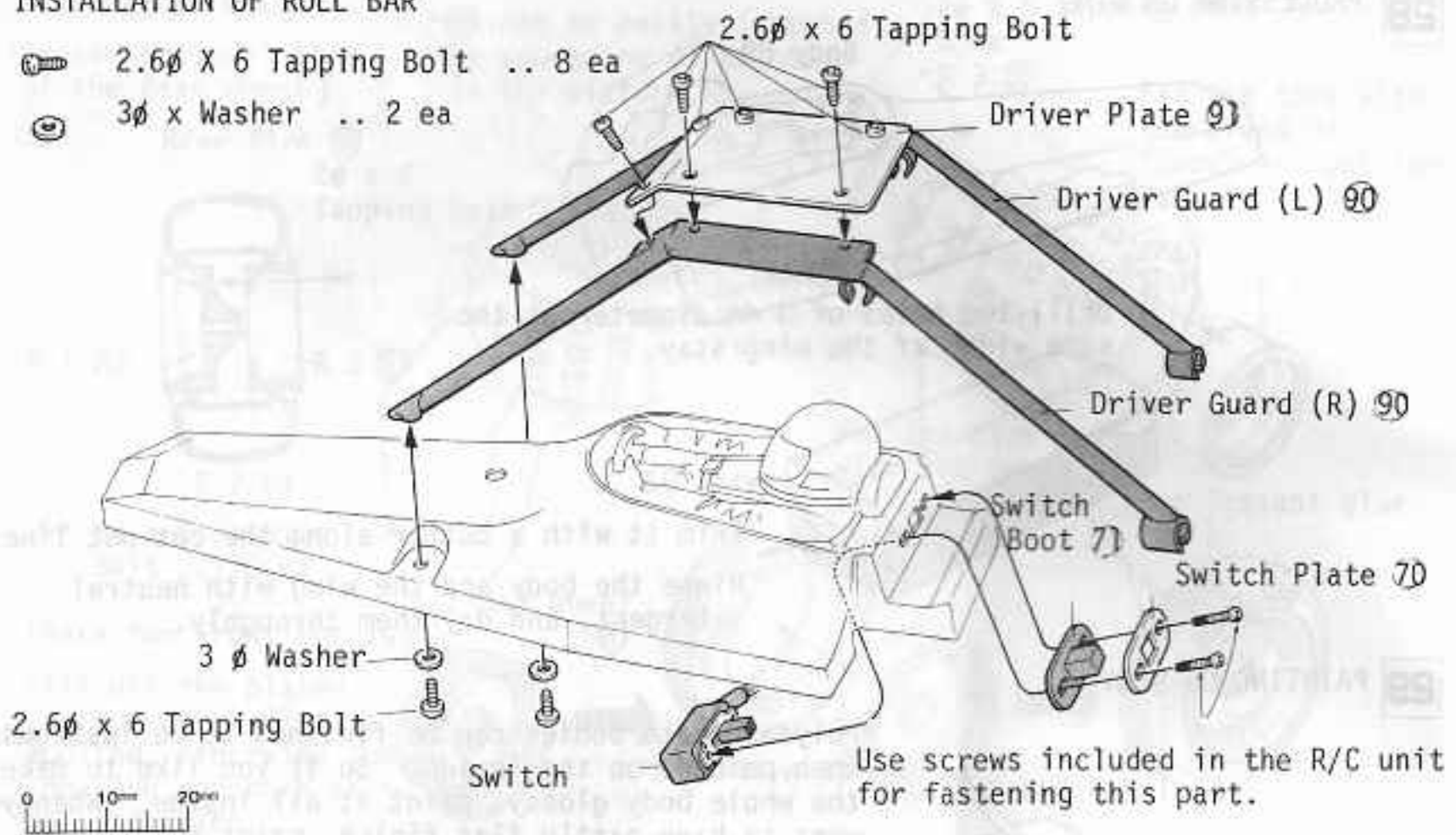
2. Paint the whole body.





3. Affix the decal. You might as well put such a thing as a sponcer's emblem.

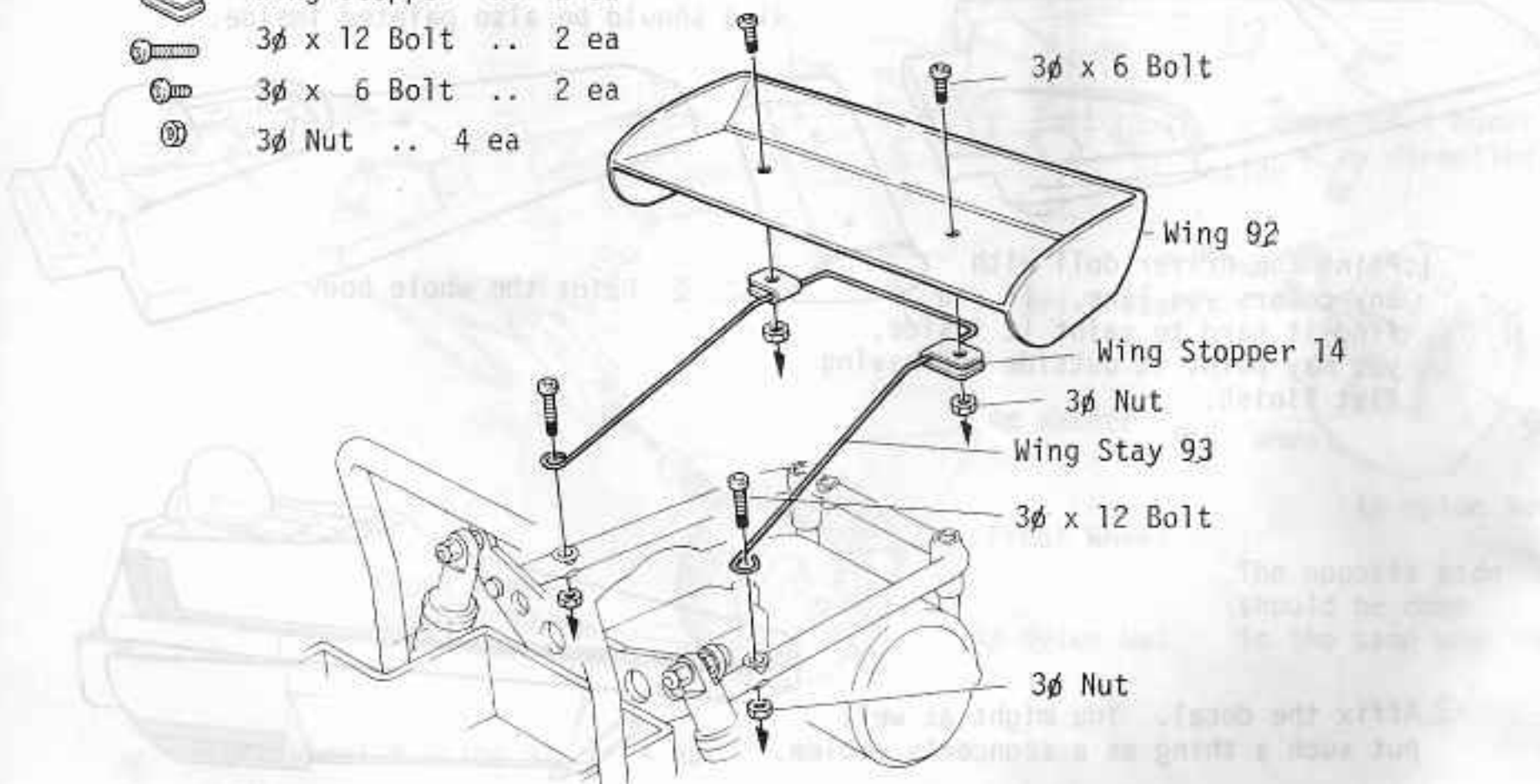


30**INSTALLATION OF ROLL BAR**

-  2.6 ϕ X 6 Tapping Bolt .. 8 ea
-  3 ϕ x Washer .. 2 ea

**31****INSTALLATION OF WING**

-  Wing Stopper .. 2 ea
-  3 ϕ x 12 Bolt .. 2 ea
-  3 ϕ x 6 Bolt .. 2 ea
-  3 ϕ Nut .. 4 ea

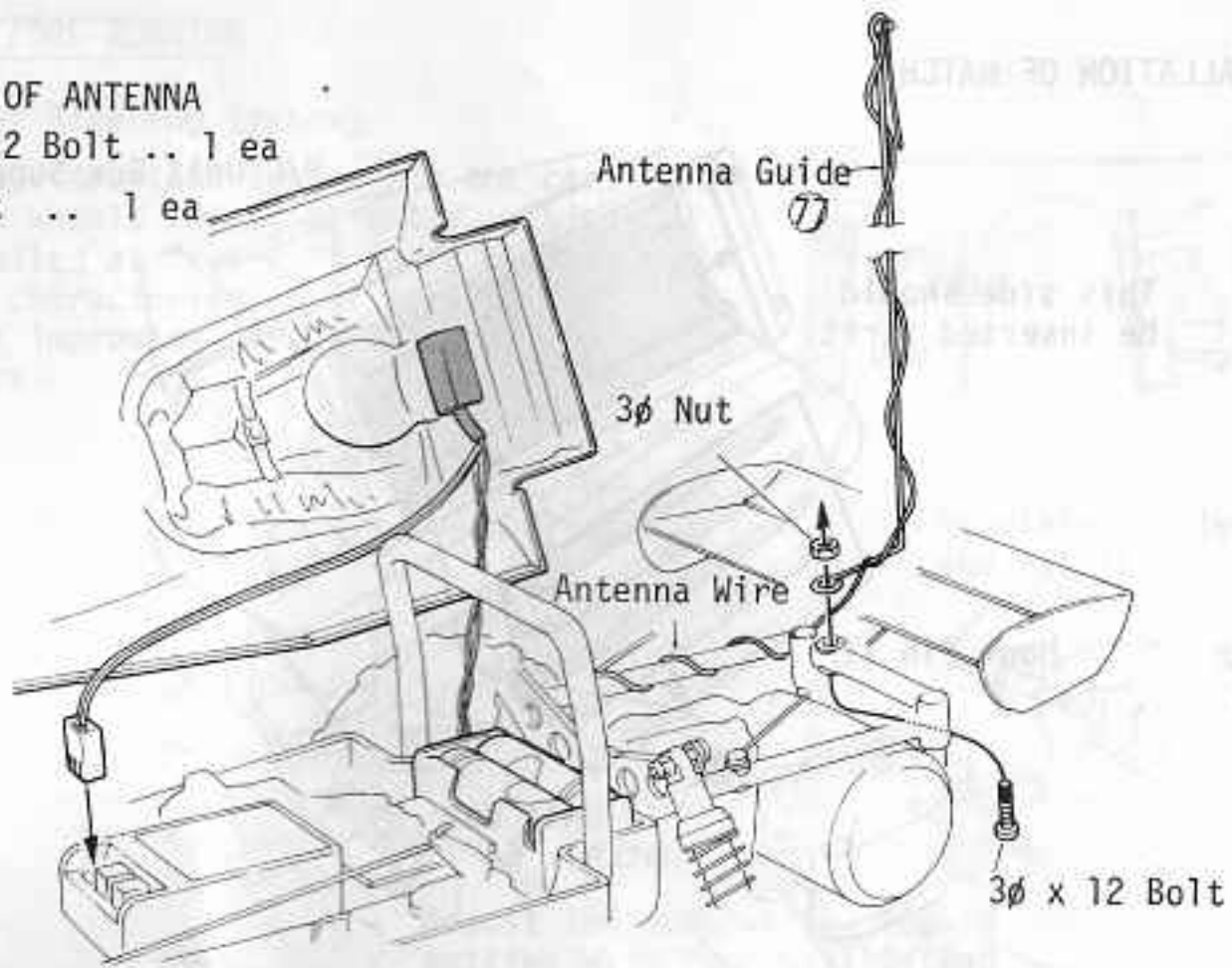


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32 INSTALLATION OF ANTENNA

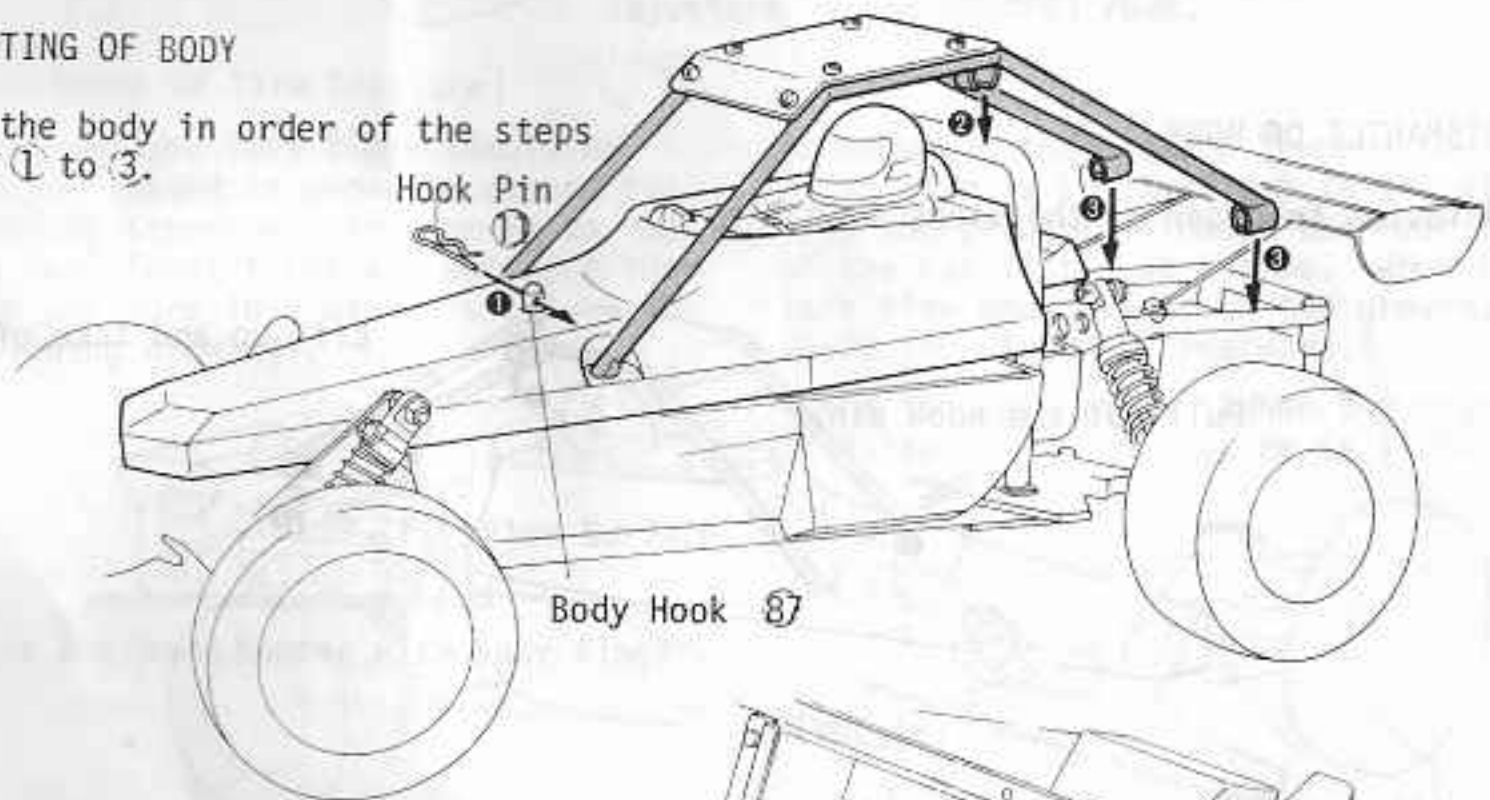
① 3φ x 12 Bolt .. 1 ea

② 3φ Nut .. 1 ea



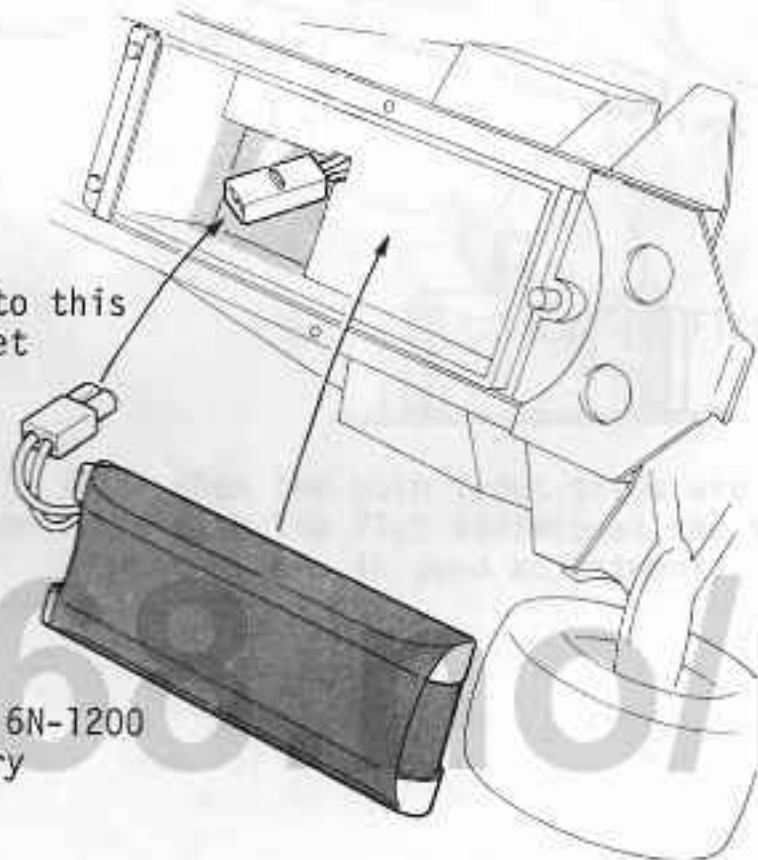
33 MOUNTING OF BODY

Fix the body in order of the steps from ① to ③.



34 MOUNTING OF BATTERY

Put the connector into this square hollow, and set the battery.



Super Ni-Cad Battery 6N-1200
or 7.2V Racing Battery

35 INSTALLATION OF HATCH

This side should be inserted first.

Hook Pin 11

R/C Unit Box Hatch 64

R/C Unit Box Support 74

36 DISMANTLE OF BODY

Unfasten in order of the steps from 1, to 3.

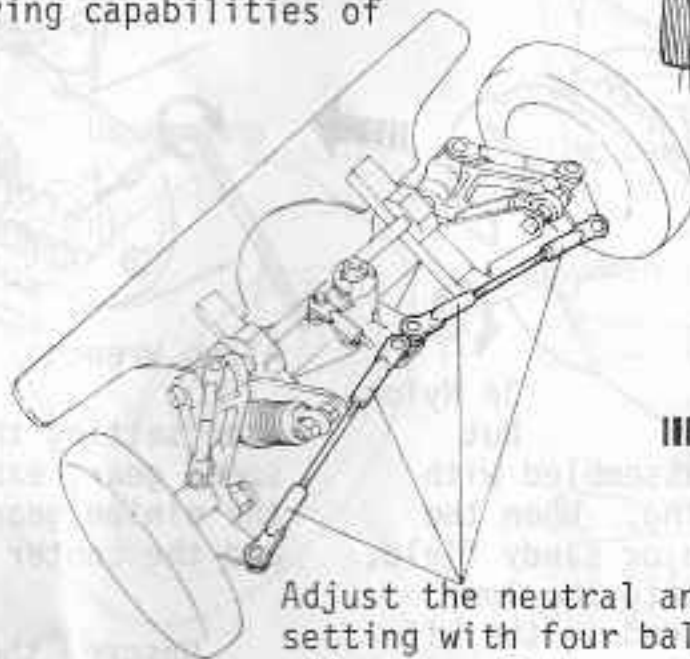
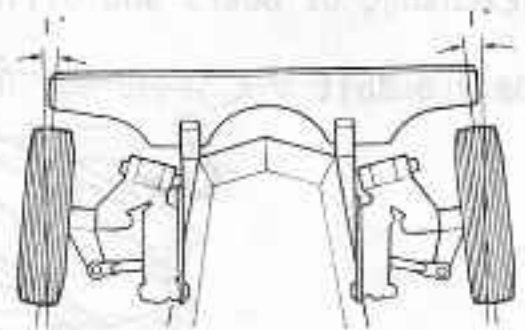
Pull out the hook pin.

Lift up and take off.

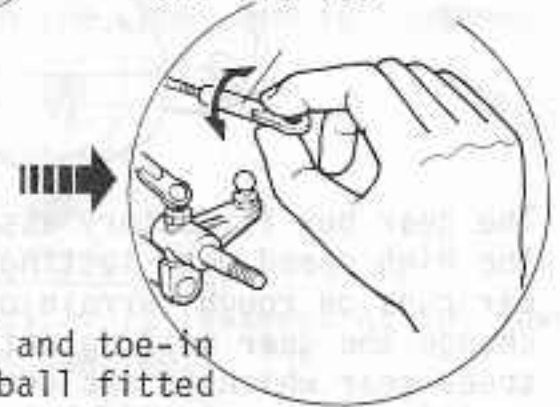
ADJUSTMENT BEFORE RUNNING

[Adjustment of Steering System]

This is a very important system for the car. Set the front wheels intoed slightly. This setting is called as "toe-in"; it is useful for insuring characteristics of straight going and for improving capabilities of taking corners.



Regulate the length and fit it.

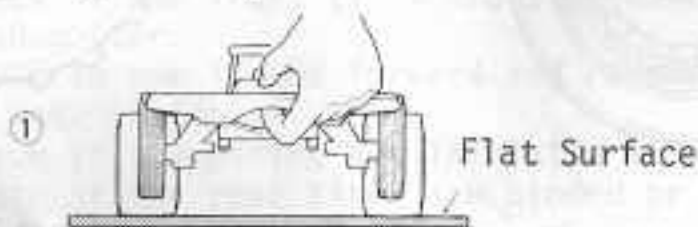


Adjust the neutral and toe-in setting with four ball fitted adjusters of the control rods.

[Adjustment of Tire Pressure]

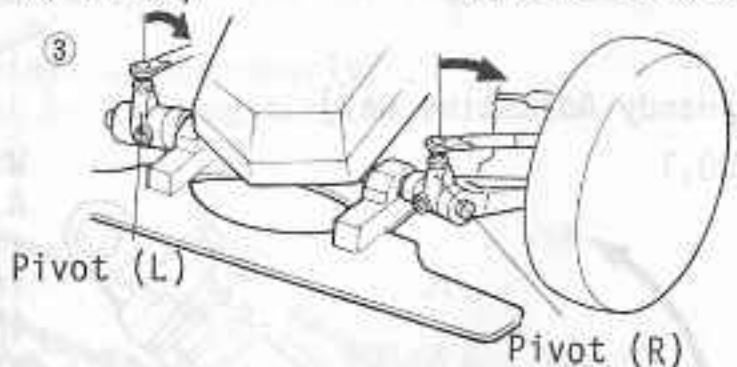
*The right and left tires should be equally loaded in order to assure the balanced steerage. Arrange it so that the both front tires are put upon the same pressure in a way as shown in the following drawings.

As shown in the picture (2) where the right tire is still afloat in the air, move the pivot (R) toward the rear end of the car little at a time. When the left tire does not touch the ground, shaft the pivot (L) rearward.



1 Flat Surface
Raise the front bumper with your finger.

(When the left tire is lifte) (When the right tire is lifted)



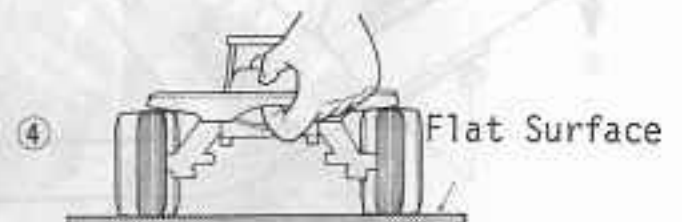
Pivot (L)

Pivot (R)



2 Flat Surface

Then lower the bumper gently to see if the both tires touch the surface at the same time. If not, more adjustment is required.

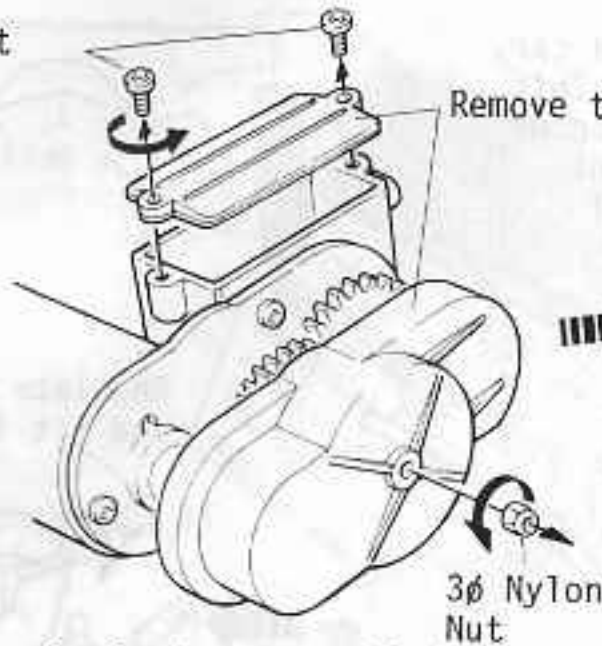


4 Flat Surface
When the both front tires are in touch with the flat surface at the same time, they are in good adjustment.

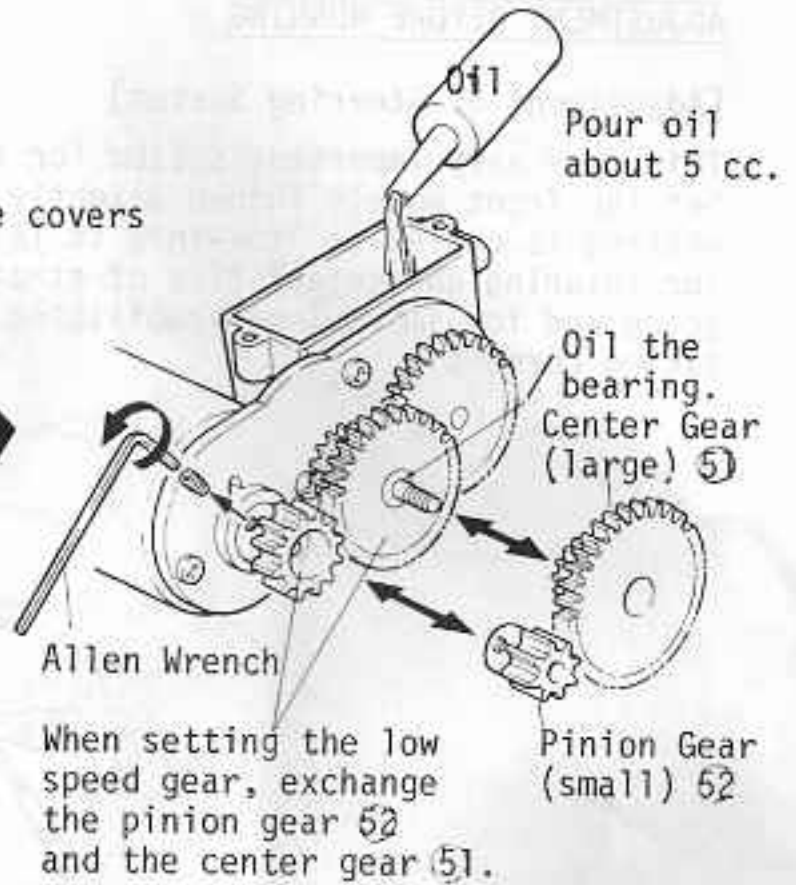
studio68.no/rc

[Exchange of Gears and Oiling]

3ø x 6 Bolt

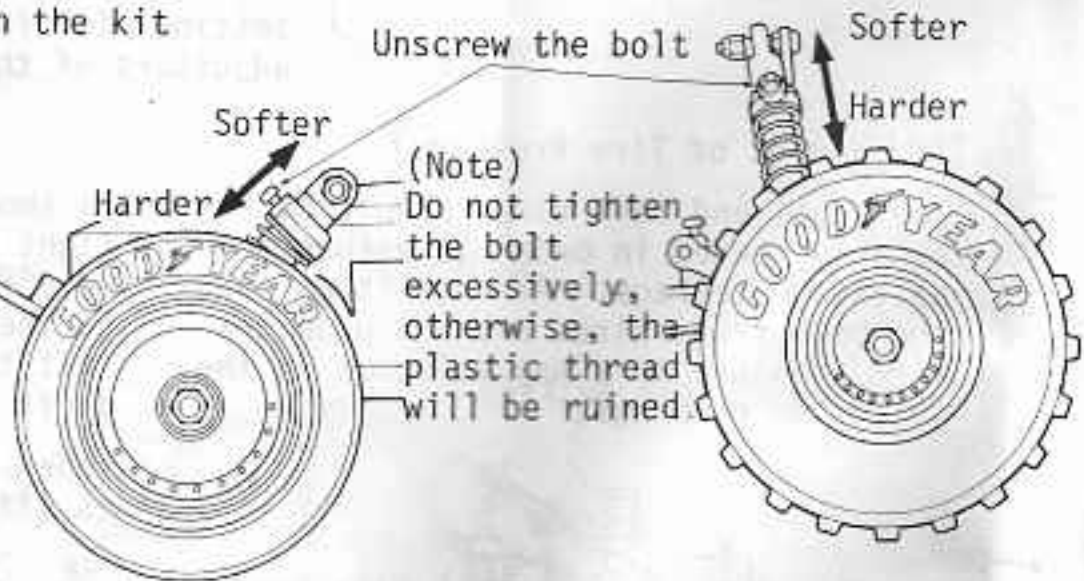


The gear box is factory assembled with the high speed gear setting. When the car runs on rough terrain or sandy field, change the gear setting into the low speed gear which is included in the kit contained in a plastic bag.



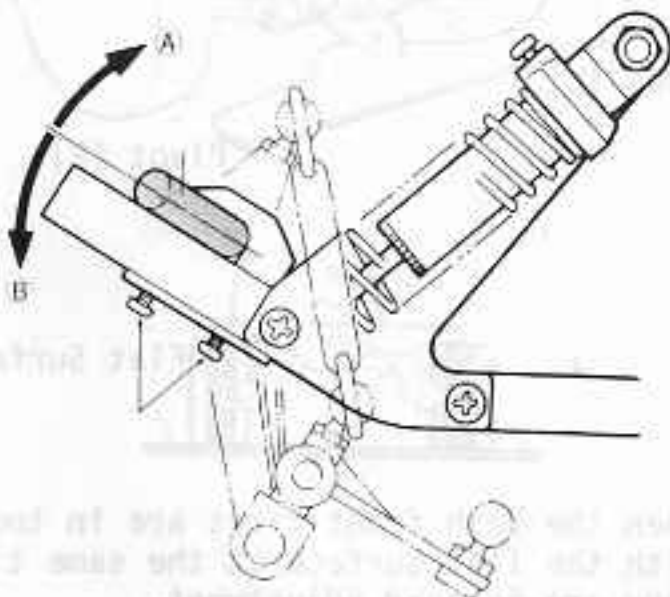
[Adjustment of Spring]

It is recommended to set the fore and aft springs not too tight. In that way they can absorb shocks and vibration more effectively



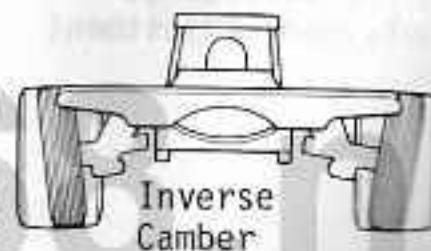
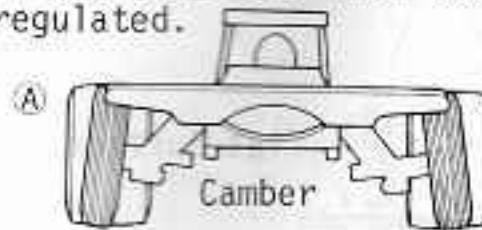
[Handy Adjusting Way]

NO.1



When the arm spindle is raised slightly toward A, the wheels have more camber setting. When it is lowered to toward B, the wheels have inverse camber.

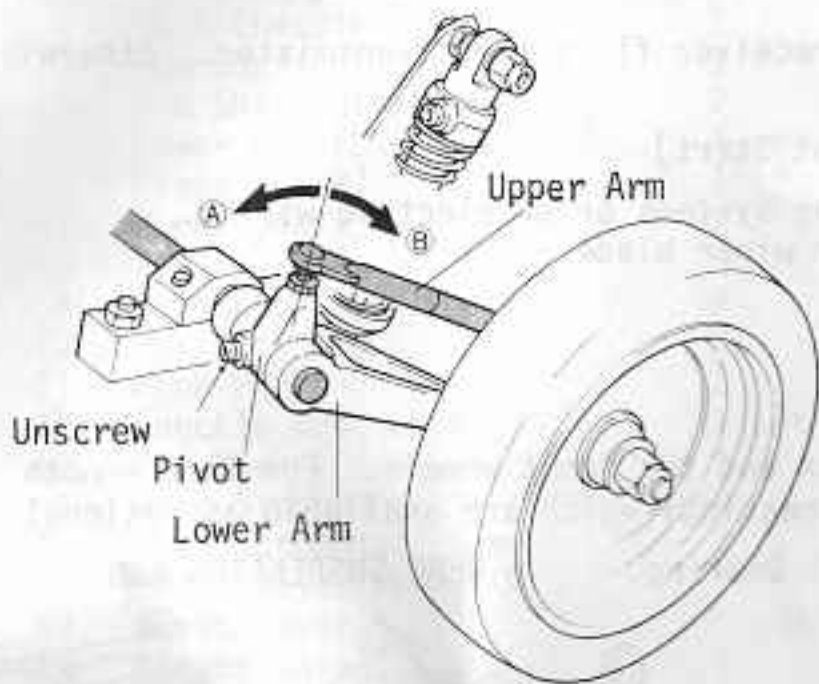
(Note) The toe-in setting should be readjusted at the same time when the camber setting is regulated.



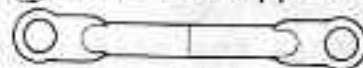
*The car performs well when assembled according to the steps of the instruction. Still it is recommended to learn the adjustment method of the front steering and suspension systems for characterising the car in your own way.

NO.2

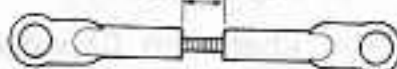
① When the pivot is tilted toward A, the caster adjustment is increased; toward B it is decreased.



② When the upper arm is lengthened ...



Extended

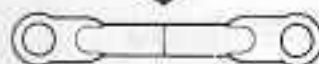


The caster is augmented as the lower arm is being raised.

③ When the upper arm is shortened ...



Cut off.



The caster is lessened as the lower arm is lowered.

[Check before Running]

Before running the car, check the parts in order of the numbers as shown in the picture.

*At the very first operation, drive the slowly for a period while it consumes electricity of one cycle of charging in the battery and check all the moving portions of the car.

- 1 Check if all bolts and nuts are tightened firmly.
- 2 Check if batteries for radio control units and the motor are charged fully.
- 3 Check if the front tires are steered in proportion to your control of the transmitter.
- 4 Check to see if the forward and reverse movement of the car responds accurately to your control.
- 5 Check if all wiring are insulated with vinyl tape properly.
- 6 Check if the rear tires are binded or not by turning them by hand.



[Steps of Operation]

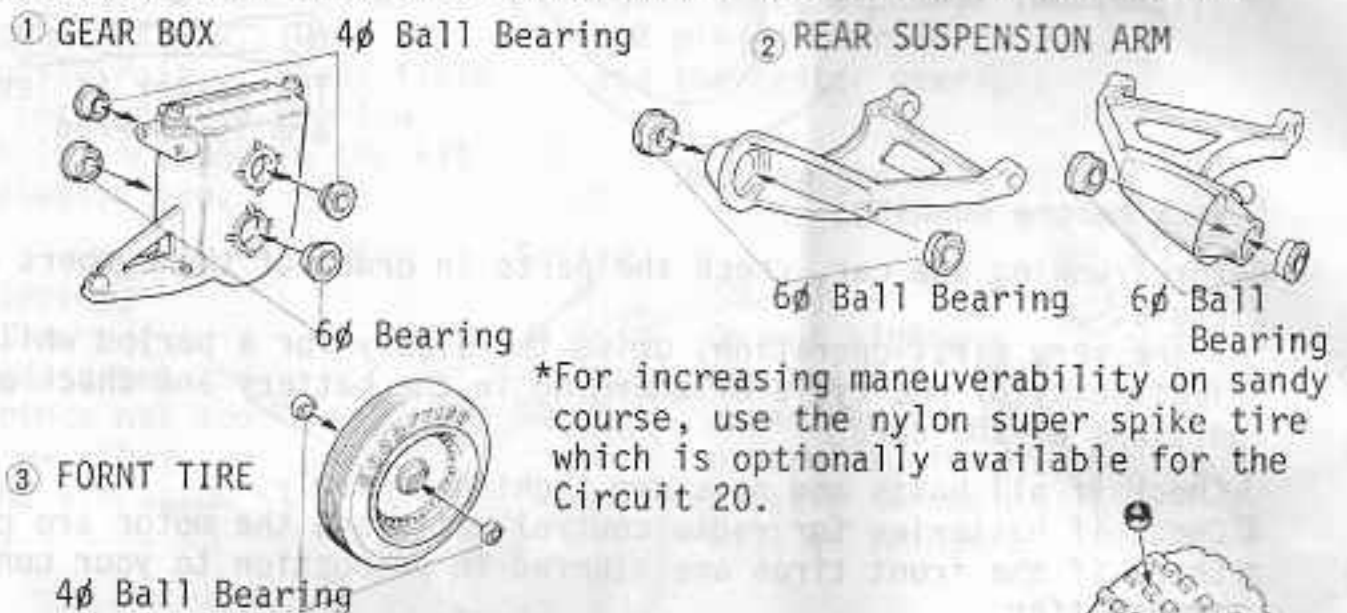
- ① Put batteries into radio control units and power plant.
 - ② Turn on switch of your transmitter.
 - ③ Switch on the receiver.
 - ④ Check to see that the sticks of your transmitter are in good operation; right and left, up and down.
- * When turning off the switches, the receiver first then transmitter. Otherwise, the car may run haphazardly.

[Trouble Shooting When the Car does not Start]

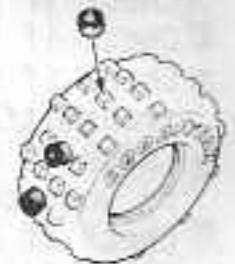
- ① Poor contact of connectors of driving systems or of electric wiring.
- ② Poor contact of the speed controller wiper blade.
- ③ Radio control units are out order.
- ④ Signal jamming from other radios.

Option Parts

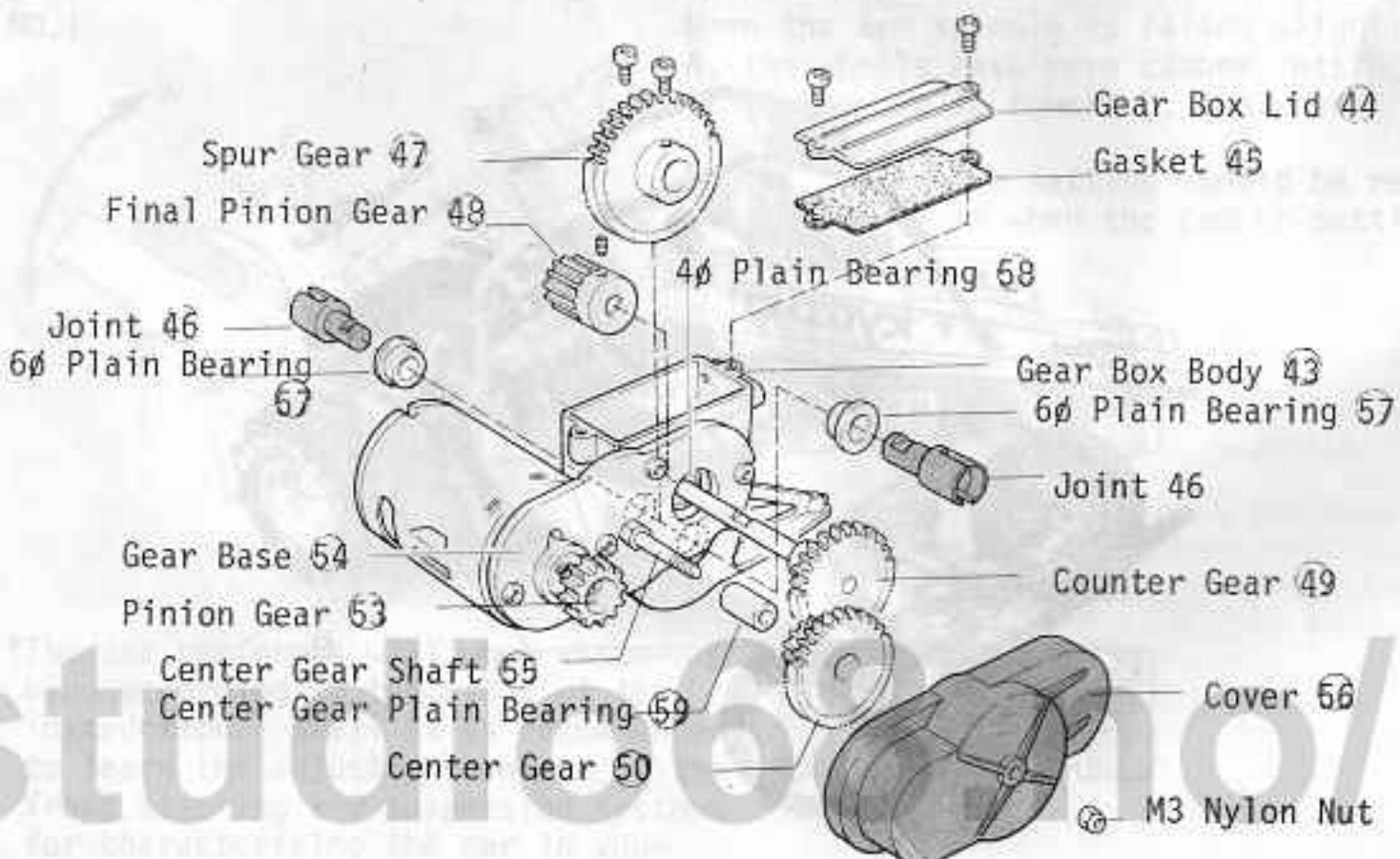
*Plain bearings are set in the gear box and the front wheels. For more smooth rotation, replace them with the ball bearings which are available as optional parts.



*For increasing maneuverability on sandy course, use the nylon super spike tire which is optionally available for the Circuit 20.



EXPLODED VIEW OF GEAR BOX



PARTS LIST

Key No.	Parts Name	Qty.	Key No.	Parts Name	Qty.
1	Front Bumper	1	68	Gear Cover	1
2	Main Chassis	2	67	6ø Plain Bearing	2
3	Arm Shaft	1	58	4ø Plain Bearing	2
4	Arm Shaft Stopper	2	59	Center Gear Plain Bearing	1
5	Lower Arm (L, R)	1 set	60	Motor Cover	1
6	Pivot (L, R)	1 "	61	Rear Side Guard	1
7	Upper Shaft	2	62	Rear Under Guard	2
8	Pillow Ball	8	63	R/C Unit Box	1
9	Ball End	9	64	R/C Unit Box Support	1
10	Upright	2	65	Controller	1
11	Hook Pin	2	66	Resistor	2
12	Knuckle Arm (L, R)	1 set	67	Linkage Ball	1
13	Tie Rod	2	68	Controller Rod	1
14	Wing Stopper	2	69	Steering Rod	1
15	Rear Suspension Arm	2	70	Switch Plate	1
16	Servo Saver Mount	1	71	Switch Boots	1
17	Servo Saver	1 set	72	Rod Boots	1
18	Damper Case	4	73	Rod Boots Ring	1
19	Damper Washer	4	74	R/C Unit Box Support	1
20	Damper O Ring	4	75	Fitting Plate	1
21	Damper Stopper	4	76	Pressure Sensitive Tape	1
22	Damper End	4	77	Antenna Guide	1
23	Damper Bush	4	78	Roll Bar	1
24	Damper Ball	4	79	Front Tire	2
25	Damper Ball Nut	4	80	Rear Tire	2
26	Front Damper Piston	2	81	Front Wheel	2
27	Rear Damper Piston	2	82	Front Wheel Bush	4
28	Front Damper Stay	2	83	Rear Wheel R-1	2
29	Rear Damper Stay	1	84	" R-2	2
30	Gear Box Mount	1	85	" R-3	2
31	Rear Suspension plate	2	86	Rear Spring Receptacle	2
32	Rear Suspension Shaft	2	87	Body Support	1
33	Rear Suspension Holder (S)	2	88	Decal	1
34	" (L)	2	89	Body	1
35	Front Spring	2	90	Driver Guard	2
36	Rear Spring	2	91	Driver Plate	1
37	Front Spring Receptacle	2	92	Wing	1
38	Spring Stopper	4	93	Wing Stay	1
39	Swing Shaft	2	94	Connector	1
40	Rear Wheel Shaft	2	95	Resistor Holder	2
41	Rear Wheel Shaft Journal	4	96	Oil	1
42	Drive Washer	2			
43	Gear Box Body	1			
44	Gear Box Lid	1			
45	Gear Box Gasket	1			
46	Gear Box Joint	2			
47	Spur Gear (w/Boss)	1			
48	Final Pinion Gear	1			
49	Counter Gear (w/shaft)	1			
50	Center Gear (S)	1			
51	Center Gear (L)	1			
52	Pinion Gear	1			
53	Pinion Gear (L)	1			
54	Gear Base	1			
55	Center Gear Shaft	1			

Spare part list

No.	Designation	Set consisting of
4966/1	Front bumper	1
/2	Main chassis	2
/3	Arm shaft set	3,4
/4	Lower arm set	5,6
/5	Upper arm set	7,8,9
/6	Upright set	8,10
/7	Knuckle arm	12
/8	Tie rod	13,8,9
/9	Servo saver mount	16
/10	Front damper set	18,19,20,21,22,23,24,26
/11	Rear damper set	18,19,20,21,22,23,24,27
/12	Front damper set	28
/13	Rear damper set	29
/14	Gear box mount	30
/15	Rear suspension plate	31,32,33,34
/16	Spring set	35,36,37,86,38
/17	Swing shaft	39
/18	Rear wheel shaft	40
/19	Rear wheel shaft journal	41
/20	Drive washer	42
/21	Rear guard set	61,62
/22	R/C unit box	11,63,64,74,75
/23	Controller	65
/24	Linkage set	9,67,68,69
/25	Roll bar	78
/26	Front tyre	79
/27	Rear tyre	80
/28	Front wheel	81
/29	Rear wheel	83,84,85
/30	Body support	11,87
/31	Decal	88
/32	Body	89
/33	Driver guard	91,90
/34	Wing set	92,93,14
/35	Joint	46
/36	Gear base cover	54,55,56
/37	Gear box plain bearing	59,57,58
/38	Spur gear	47
/39	Gear set B	50,51,52,53
/40	Motor cover	60
/41	Servo saver	17
/42	Rear suspension arm	15
/43	Sealed resistor	66
/44	Connector	94
/45	Antenna guide	77
/46	Pressure sensitive tape	76
4973/16	Gear set	48,49
4973/13	Gear case set	43,44,45
4966/47	Linkage boot	70,71,72,73
4983/30	Front wheel journal	82
	<u>Optional parts</u>	
4983/63	Ball bearing 4 mm \varnothing	
4966/48	Ball bearing 6 mm \varnothing	
4982/86	Nylon spikes	