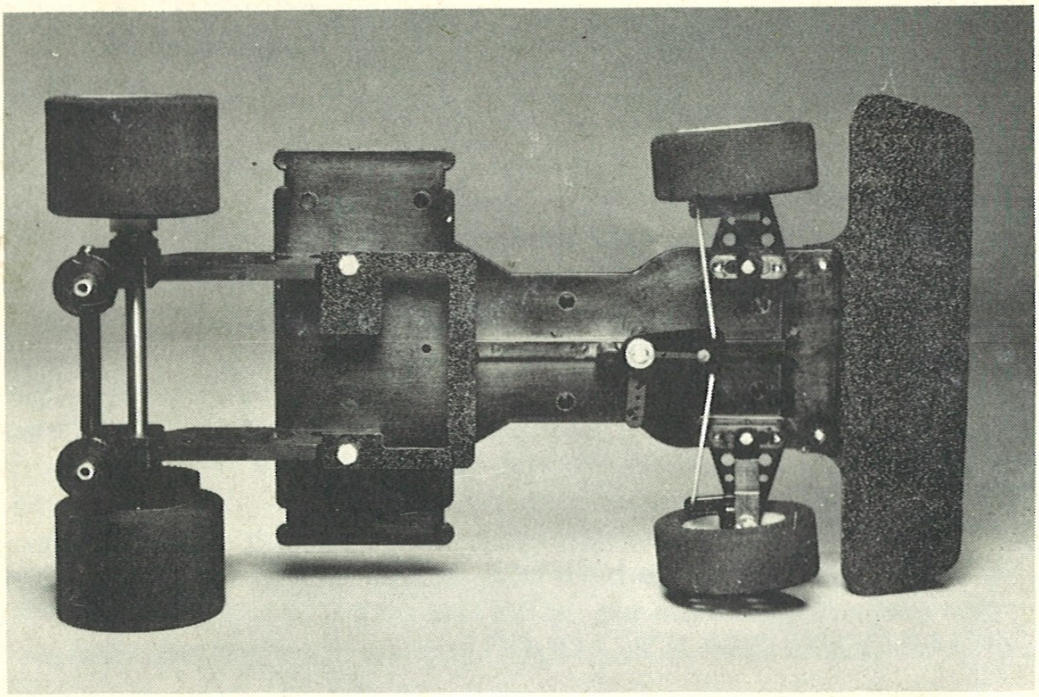
GP-12
GRAN PRIX 1/12th SCALE

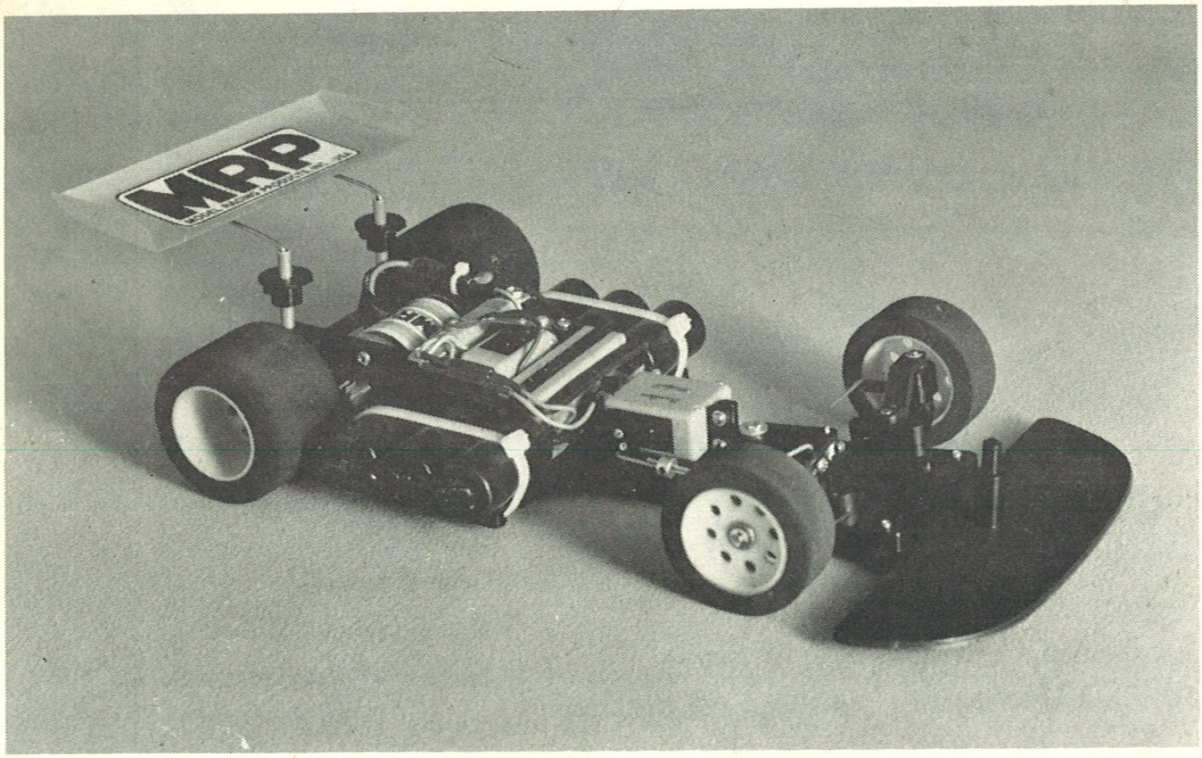
by

MRP
MODEL RACING PRODUCTS, INC. - USA



INSTRUCTION MANUAL

Assembly, Radio Installation & Operation



INTRODUCTION

Welcome to the world of R/C car racing. The GP-12 and Pro-120X are without a doubt the most technically advanced yet functionally simple R/C cars ever offered to the public. Utilizing exotic materials and design characteristics far beyond the competition, we are sure you will find this car easy to build and drive.

We suggest that before any assembly work is started, you read through this instruction manual and familiarize yourself with the different parts and order of assembly. Taking time to collect the needed tools and following the instructions will guarantee quick and correct construction.

Although this car, as with all MRP cars, was designed by what is cumulatively the most experienced, winningest and knowledgeable personnel in the R/C car world you may find that you have a technical question. We at MRP offer our experience, technical advice, and an interested ear to your problems. By calling (206) 823-0800, between 9 a.m. and 5 p.m. our staff can hopefully answer your questions and offer technical advice. GOOD LUCK AND GOOD RACING.

To become really competitive as a driver you must also become very familiar with the car mechanically. Knowing what changes cause certain characteristics to occur during actual competition is very important. We have included a glossary of terms to help you learn what specific parts are, or do, plus terms which involve the handling and setup of your car.

Tweak - Torsional and/or longitudinal bend in chassis pan.
Toe In - Difference measured between front and rear of front tires.
Preload - More static weight on diagonal wheels caused by bent suspension components or tweaked chassis.
Caster - Back slant or angle of kingpin measured from chassis pan.
Wing Trail - Measurement of trailing edge of wing in relation to the rear axel.
Tire - Material of tires, whether cut foam, molded foam or molded
compound - hard rubber.
Understeer - The car tends not to turn when steering is applied, as the front tires are not biting.
Oversteer - The car tends to spin out as the front tires are biting too well.
Stagger - When the tires front or rear are not equal distance from the chassis.
End Play - Measurement of in and out movement on a shaft.
Gear Lash - Fine adjustment of the mesh of the gear train.

ASSEMBLY

The car should be assembled one group of components at a time and toward this end each group of components required for a certain assembly are individually bagged at MRP.

BAGGED HARDWARE PACKAGE CONTENTS

Bag No. 1: Chassis Components

2 - rear bearing blocks
2 - A-arms
2 - upper supports
2 - spindles
2 - 1/8 E-rings
2 - no. 4 washers, thick
2 - aluminum tubes
12 - 6–32x3/8 F.H. Phillips
2 - no. 4x5/8 sheet metal screws
2 - no.2x5/16 slot pan
1 - nylon rod
2 - nylon body posts

Bag No. 2: Rear Drive

1 - axle
2 - axle spacers
2 - E-rings, 3/16
2 - nylon bearing inserts
1 - gear, 52 or 48 tooth
2 - axle washers, ¼"
2 - axle shims ¼"
2 - oilite bushings

Bag No. 3: Front & Steering Linkage

1 - servo saver arm
1 - servo saver base
1 - 4–40x5/8" PAN
1 - no. 6 washer
2 - tie rods
1 - 1/8" collar with 4–40x3/16" screw
2 - no. 4 washers, thick
2 - no. 4 washers, thin
2 - 1/16" collars & screws
2 - 1/8" E-rings

Bag No. 4: Radio/Body Mounting

1 - long body post
1 - short body post
2 - hood pins
1 - radio/servo tray
4 - no. 4x½" sheet metal screws
2 - no. 6x3/8" hex sheet metal screws
2 - 4–40x3/8" Phillips
2 - no. 4 washers, thick
4 - no. 2x5/16" sheet metal screws
4 - ¼"x¼" nylon spacers

LOOSE IN BOX: chassis, bumpers, front & rear wheels and tires, 6 tie wraps; 4 large 11", 2 - 3".

BASIC CHASSIS ASSEMBLY

Bag No. 1 – Study the exploded drawing and familiarize yourself with all the parts and their location. Start assembly by pushing 8 of the 6–32x3/8" flat head screws up from the bottom of the chassis into the countersunk holes. Now attach the rear bushing blocks and the front A-arms to the chassis using a good no. 1 Phillips screw driver. Once these are secured install the rear spreader rod using two no. 4x5/8" Phillips sheet metal screws. Now set the rear of the bearing blocks onto a hard surface and pound the aluminum tubes into the top

of each bearing block. Don't force the tubes too deep (approx. ½") or you could deform the bearing blocks. Now slide the rear body rests onto the tubes; these are friction fit so you can adjust the heights for different body styles you may use.

Up front slide the spindles onto the A-arm pins using a small drop of 3-in-One type oil. Now slip on the upper reinforcing arms noting the indexing section goes down to the A-arm. Secure these pieces with 2 no. 2x5/16" slot screws, 2 no. 4 washers and the 1/8" E-rings provided.

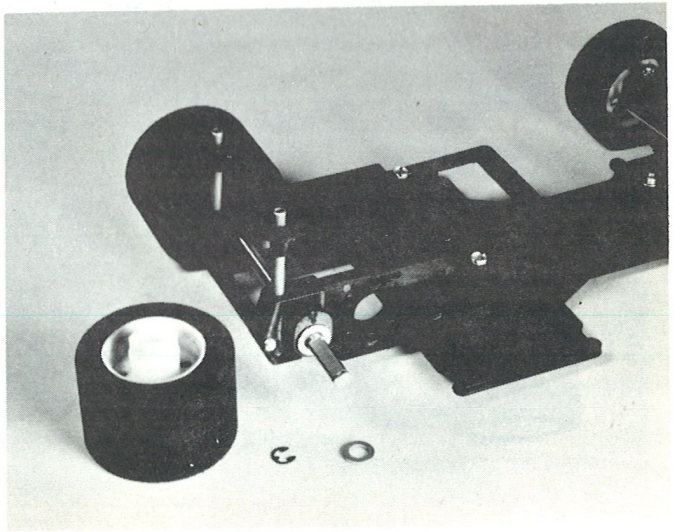
Attach the bumper to the chassis with two 6–32x3/8" flat head screws. Do no overtighten these screws as the bumper could get warped.

Bag No. 2: Identify the two nylon oval bearing inserts and 2 flanged oilite bearings. Press the oilite into the bearing insert so the flange rests on the larger surface of the bearing insert (see assembly drawing).

Now slide the axle into one wheel and secure with an E-ring. Slide on the drive gear with the square pocket indexing on the square hub of the wheel. Check this gear indexing in all four positions to find the best fit onto the wheel. The gear should be a little loose on the wheel which aids in obtaining good quiet gear mesh. Next slide on one tubular axle spacer and one thin washer, now one of the bearing inserts with the flange toward the gear.

Install this unit thru the right bearing block of the car and index the bearing insert into the pocket of the bearing block. (Notice that the insert can go both directions which will give you different ground clearances.) We suggest for now you use the setting for the most ground clearance. Slip on the other bearing insert the same way and another thin washer. Now a tubular spacer and the other rear wheel. Push this assembly together until both wheels index on the inner end of the axle flats.

Check the axle end play and if there is too much, then add another washer or two provided to obtain a .010–.040 total end play on the axle assembly. When you're happy with this, attach the right wheel E-ring to the axle and give the wheels a spin. They should be free of binds and spin easily. If not, check end play again and be sure both bearing inserts are pushed all the way into the rear bearing blocks.



Bag No. 3: Attach the front wheels using a small amount of 3-in-One type oil on the spindle shafts and one no. 4 washer, then the E-ring. Spin the wheels and check for excessive end play. If there is too much end play, remove the wheel and add another thin no. 4 washer (provided) to get as little end play as possible without binding the wheel.

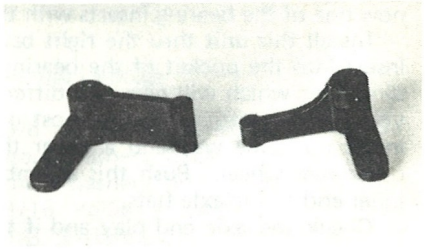
Bend up the tie rods as shown in Fig. 1, and install them into the spindle arms and then into the two holes in the servo saver arm. Secure the tie rods with the 2 - 1/16" collars and set screws provided. Now push the two servo saver pieces together as shown and install onto the forward post of the chassis. Secure with the 4–40x5/8" screw and washer. Do not overtighten this screw but use it to set the end play on the servo saver. NOTE in picture 1 that the servo saver spring tension can be softened by cutting away the leaf spring section of the lower arm as shown. Be sure you keep this cut smooth and sand it smooth before installing. This softening of the servo saver is used when servos with weak gear trains are used such as Cox/Sanwa types.

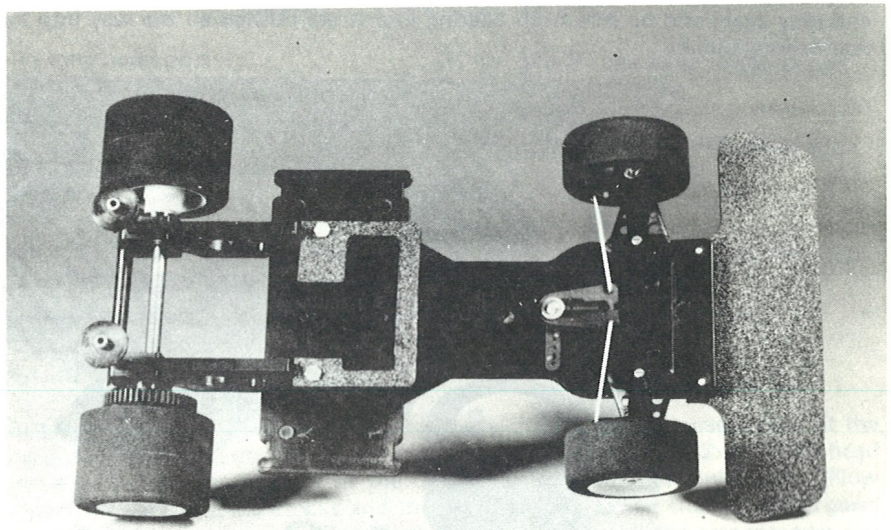
Now you have a rolling chassis ready to install your radio, speed control and battery pack.

KIT No. 923 – skip over to radio installation.

FIG. 1

TIE ROD
Full size bending pattern





SOLDERING

Most of your time spent in assembling this car will be in soldering various wires to components. The time involved is not as important as the results, as one bad solder joint can keep your car from running properly, forcing you to retrace your steps to find the defective solder job.

A good soldering iron is important for good results and the Ungar 40 watt iron, equipped with a pencil tip, is highly recommended. The prototype car was built using an inexpensive 25 watt iron, also with a pencil tip, simply to determine if assembly was feasible with this type of iron, but the Ungar unit would have made satisfactory solder joints easier to obtain.

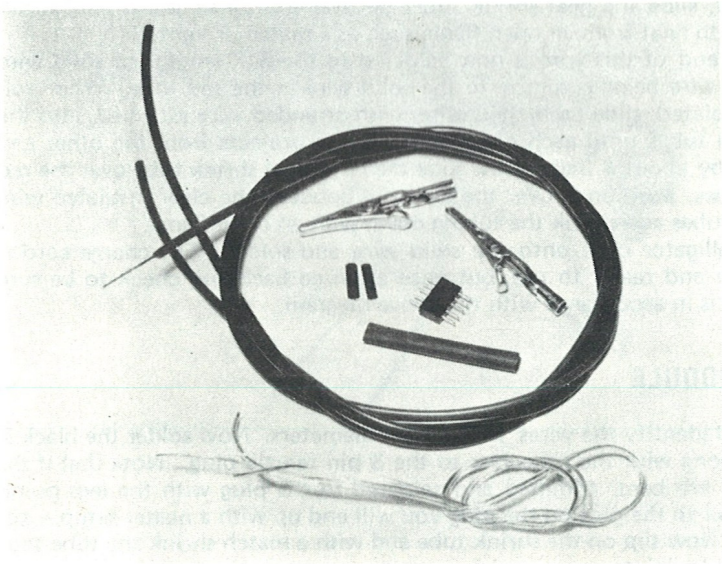
In any case, do not use a pistol-grip type of iron with various wattage output and quick start capability. This type of iron can demagnitize the electric motor in your radio's servos if operated in close proximity to the servos.

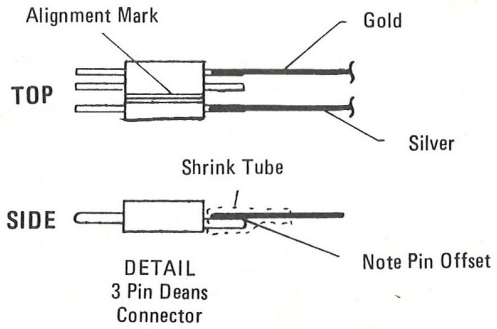
The solder recommended is 60/40 rosin core solder. The use of flux is not required with this solder. DO NOT use acid core solder, as corrosion will result.

When doing assembly work, be sure to *pre-tin* all solder joints. This applies to both pieces to be joined, for instance both the plug and the wire to be soldered to the plug should be pre-tinned before actual soldering is attempted.

When soldering, be sure to apply heat to the pieces being joined, not just the solder. Hot solder dripped onto the pieces being assembled will generally just result in a coating of solder on the pieces rather than an effective bond, both mechanically and electrically. Propersolder joints are shiny and indicate the proper application of heat. Dull looking solder joints indicate a lack of adequate heat and should always be suspect. If in doubt, re-solder before going to the next assembly.

If you do not have previous experience in soldering, be sure to thoroughly read and understand the instructions supplied with your soldering iron and then practice on scrap pieces of wire before starting assembly of this car.





CHARGE CORD

The 922 kit does not include the charge cord module becuase the kit is intended for experienced competitors who already own a proper charger.

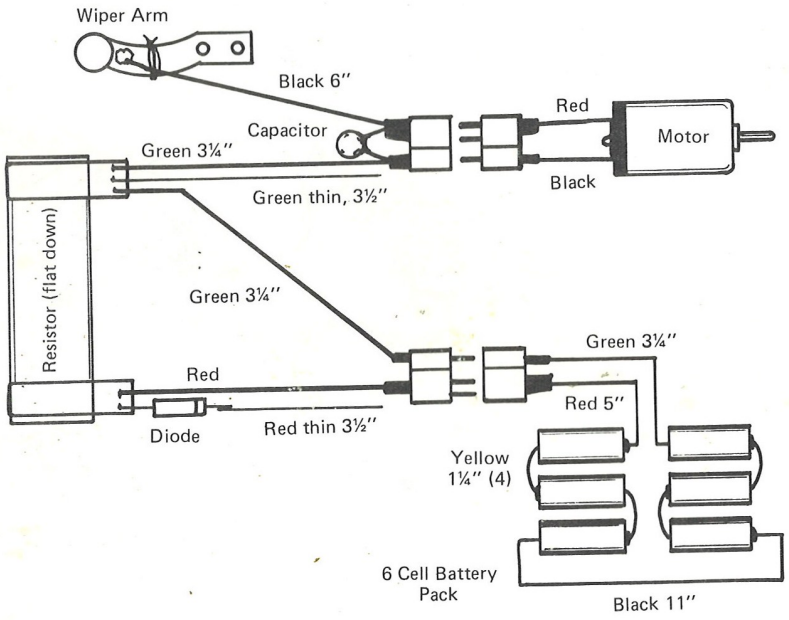
Referring to the above picture and diagram, lay out all pieces required for assembly and pre-tin all solder joints. When wiring any of the modules it is suggested that you start at the plug end, so position the 3 pin Deans plug to match the above diagram (note the alignment mark). Note: The pins that are offset in the plug are the ones to solder to. This is common to all Deans connectors. Lightly clamping the plug in a small vise will make assembly earier and more accurate. The wire with the clear insulation will now be soldered to the plug. A piece of the small heat shrink tubing is slipped over each of the two wires and then the wires are soldered to the pins on the Deans plug. BEING VERY SURE that the gold wire and the silver wire are soldered to the proper pins. With this, and all other wiring operations, double-check your work before proceeding to the next step. If this solder joint is acceptable and you are sure the wiring is right, slide the heat shrink tubes up over the solder joints and shrink them down with heat from an open flame such as a match or lighter.

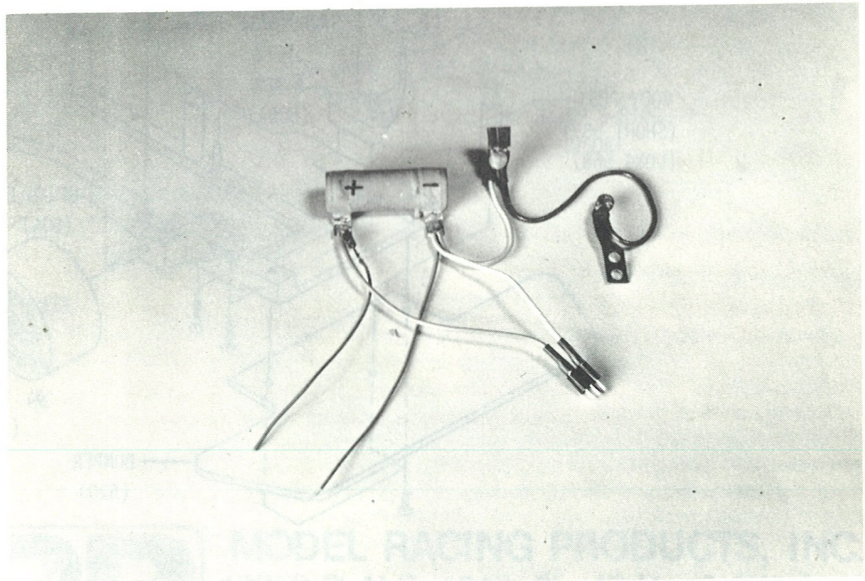
The other end of this wire is now soldered to the 31" lengths of solid wire with the gold wire being common to the solid wire in the red tube. When soldering is completed, slide each solid wire, with stranded wire attached, into the black and red tubes until each piece of solid wire projects from the other end of each tube by about 1 inch. Now slide the large heat shrink tube over the red and black tubes, position it over the juncture between the clear insulated wire and the hard tubes and shrink the tubing down with an open flame.

Slide the alligator clips onto the solid wire and solder. The charge cord is now complete and ready to use, but once again go back and check to be sure that all wiring is in accordance with the above diagram.

RESISTOR MODULE

Locate and identify the wires' lengths and diameters. Now solder the black & green wires along with the capacitor to the 3 pin female plug. Note that if the capacitor legs are bent, trimmed and soldered to the plug with the legs pointing out parallel to the pins on the plug you will end up with a neater setup — see photo no. 3. Now slip on the shrink tube and with a match shrink the tube snug around the solder joints.

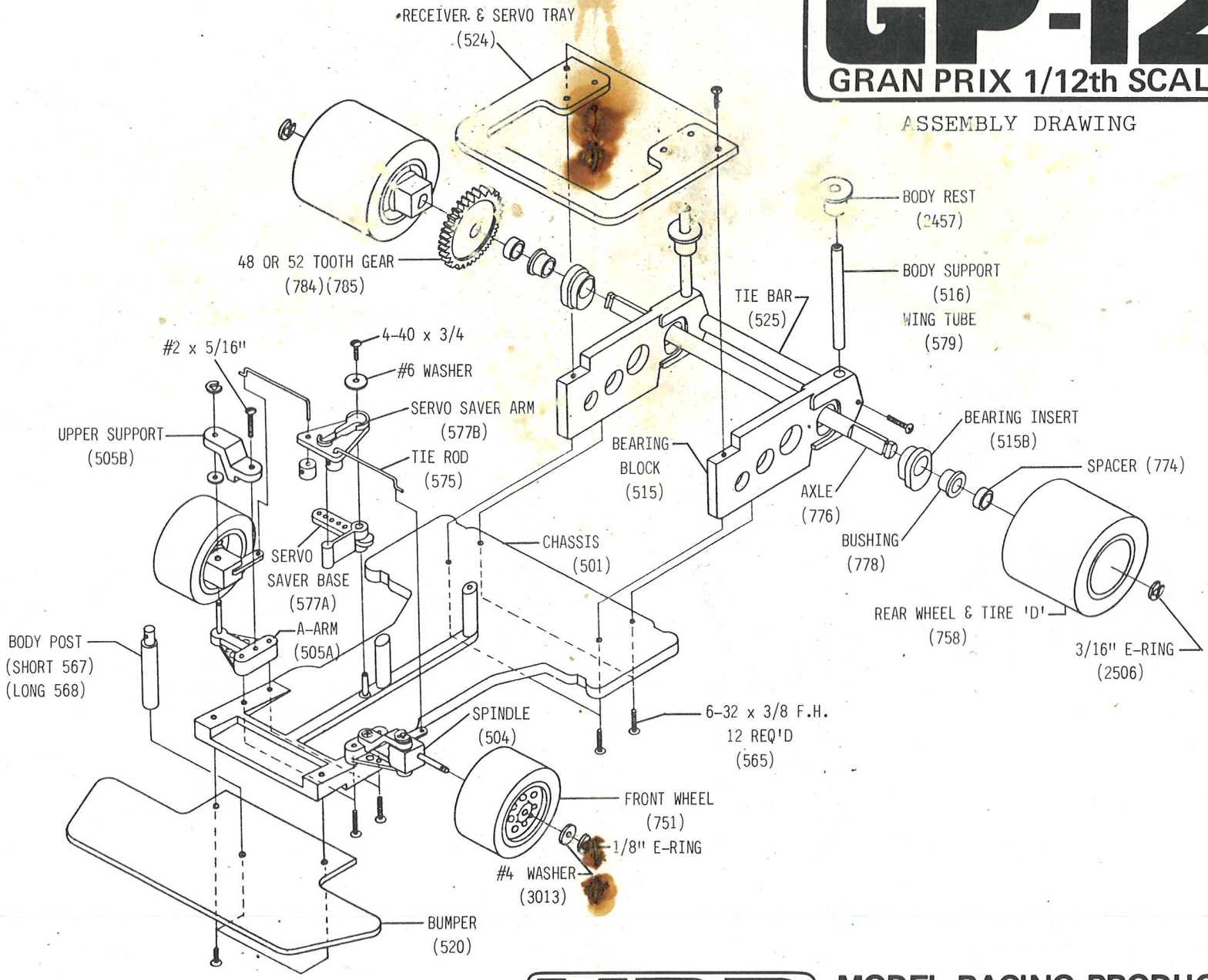




GP-12

GRAN PRIX 1/12th SCALE

ASSEMBLY DRAWING

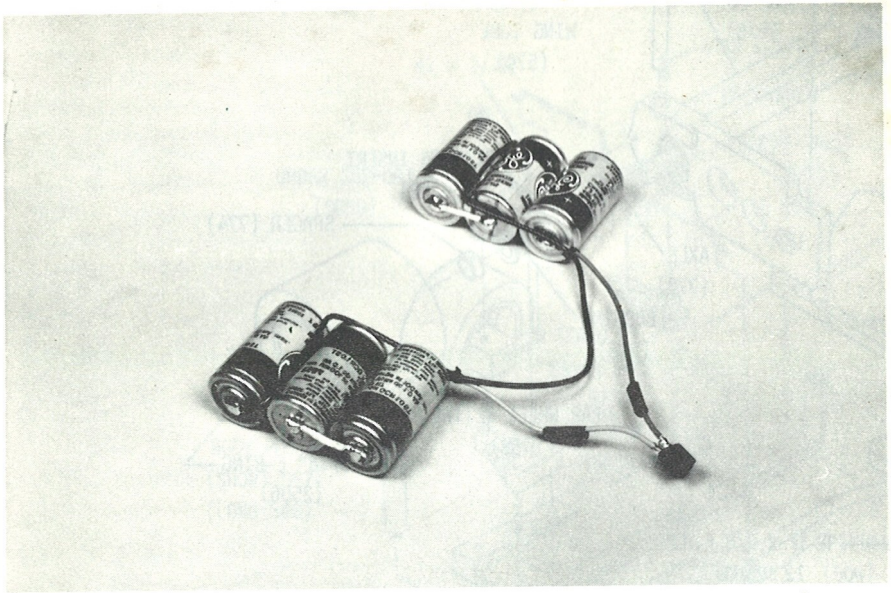


MRP
MODEL RACING PRODUCTS, INC. - USA

MODEL RACING PRODUCTS, INC.
12702-D N.E. 124th St., Kirkland, WA 98033
Phone (206) 823-0800

Now identify the negative or brake band of your resistor and solder all three green wires to it. Next solder the thin red wire to the diode as shown with the band on the diode toward the wire. Now solder the other end of the diode and both of the thick red wires to the high speed band of the resistor. The thick green and thick red wires will now be soldered as shown to the remaining male 3 pin connector – don't forget the shrink tube.

The thin red and green wires will power your radio but be sure you are aware of which is positive and negative on your receiver plug leads. Usually red or white are positive and green or black are negative. The black wire should be soldered to the wiper arm and contact button. Wrap this arm and wire as shown with some thread to secure the wire so the solder joint and wire won't get fatigued during constant throttling action during operation. This completes the resistor module which can be mounted to the bearing blocks as shown and explained in the radio section of the manual.



SIX CELL BATTERY MODULE

Caution: *These batteries are of a very sophisticated nature and if exposed to too much heat or are oversharged, could give off corrosive material and could even explode.*

Referring to photo no. 4 and the preceding wiring diagram, locate and identify all components. Solder the red and green wires to the Deans 3 pin connector and take CAREFUL NOTE of the alignment mark on the connector. Also note that the red wire is soldered to two pins, the wire and the solder forming a bridge between two pins. Apply heat shrink tubing.

Very carefully arrange the batteries into two groups of three cells with the positive and negative ends arranged per the wiring diagram. To ease the awkwardness of soldering the batteries together, it is suggested that they be glued to each other with Hot Stuff, a small amount of epoxy, hot melt glue, etc.

When soldering the wires to the batteries, it is suggested the solder tabs be up away from the batteries before soldering and bent back down flat when soldering is completed, The batteries themselves can act as heat sinks making good solder joints difficult if the tabs are left flat on the ends of the batteries while soldering.

Solder the four short jumper wires in their respective positions, then solder the two leads from the 3 pin plug to the batteries, again referring to the wiring diagram and DOUBLE CHECKING all positioning of wires BEFORE soldering. A mistake here can short out a battery, rendering it useless.

Be very careful with the battery pack, as it is possible to accidentally touch one of the 3 cell packs to the other causing battery damage. As soon as possible neatly wrap the packs in electrical tape, being sure to insulate all wiring.

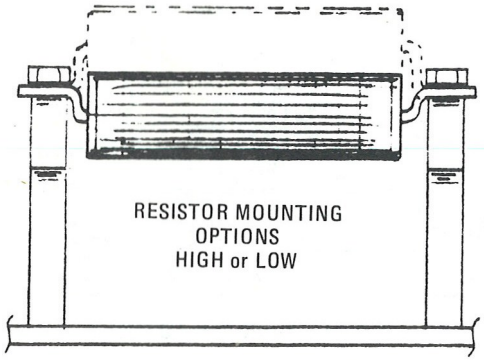
Kraft radios should work using all six cells with no fear of radio damage.

RADIO SELECTION AND INSTALLATION

Although we recommend and show Futaba radio gear in our illustrations, most any quality two channel radio system will fit. In choosing a radio system we suggest one which features trim controls for both throttle and brake and a wheel type steering control if it is to be used for competition. Most servos can be used, however speed, gear strength and weight should be considered for competition. Transit speed should be no more that .5 seconds while the gear train should be able to withstand the abuse of racing. Weight is less critical than the previous two considerations, since most current sub-miniature servos are extremely light and compact. The major consideration is that the radio features changeable crystals.

The first step in mounting your radio gear is the mounting of the resistor module. If an electronic speed control is to be used, skip ahead to Electronic Speed Controls. The pre-wired resistor module can be mounted two ways, depending on the size of the throttle servo used. If a standard or miniature servo (FPS-17, 18, 22, Kraft, etc.) is used the resistor should be mounted above the rear bearing blocks/motor mount. See Fig. 2. This is accomplished by using the pre-punched aluminum resistor mounts, so that they extend above the bearing blocks. If sub-miniature or micro servos are used (FPS-20, Kraft, KPS-18A, Novak, bantam, midget, etc.) the resistor can be mounted below and between the bearing blocks/motor mount by turning the resistor mounts upside down and using the left side for the right and vice versa. See Fig. 2. In either case please note that when the mounting surface of the resistor is flat that the leg

FIG. 2



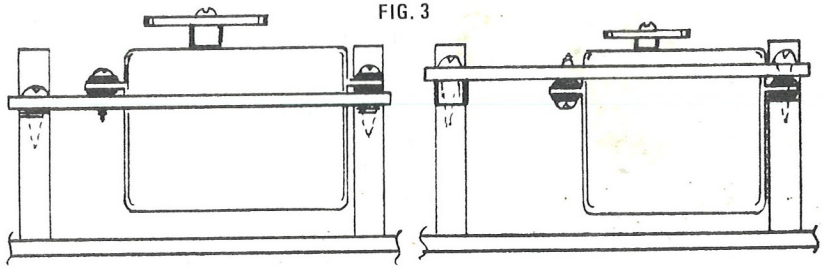
which goes into the mounting slot in the resistor is angled. This angle should match the angle of the mounting grooves when the exposed ribbon surface of the resistor is flat. Note that the mounting holes in the aluminum resistor mounts are oversize to allow for a bit of movement. The resistor mounts are held in place with 2 no. 6x3/8" hex head sheet metal screws in the pre-drilled holes in the bearing blocks. Excess mount material may be trimmed.

The pre-punched Kydex receiver and throttle servo/speed control mounting plate is cut out for micro or sub-miniature servos. If larger units are used excess material can be trimmed with tin snips, scissors or x-acto knife. When mounting the throttle servo try to keep the output shaft toward the center of the car. If it must be set to one side it is preferred that it is toward the full power band side of the resistor. As shown in Fig. 3, larger servos mount on top of the radio plate with white poly spacers between the bearing block and radio plate for the added clearance needed. Smaller, compact servos can be mounted from below the radio tray to form a lower installation. In all cases leave about ¼" between the servo case and resistor. Also be sure to use rubber grommets that are usually supplied with the radio system. The wiper arc/contact button should be layed down on top of the output arm with the contact button resting on the resistor and with the inside hole of the wiper over the output arm attachment screw. You may have to slightly bend the wiper arm up or down to make up the height differential between the face of the resistor and the output arm. It is now necessary to turn the radio on and move the throttle to full on position. Position the wiper arm contact button so that it is fully on the power band of the resistor. If the wiper arm moves in the wrong direction when you operate the throttle simply turn the resistor (complete with brackets) end for end and remount. Use an oversize washer (no. 4) with the output arm screw and a no. 2x¼"sheet metal screw with a similar washer through the hole on the end of the wiper arm to the output arm. Although most output arms have sufficient holes in them you may find it necessary to drill a 1/16" hole for the later screw. Return the throttle until the wiper arm is completely on the brake band of the resistor and set your trim or affix a stop at this point.

ELECTRONIC SPEED CONTROLS

If an electronic speed control (ESC) is to be used, mounting will vary with the physical dimensions of the unit. Jomac type units mount like a standrad servo while Latrax, Electro Craft, or similar "pancake" type units can either be set on their side behind the receiver or can mount flat on top or below the radio plate with receiver on the opposite side.

FIG. 3



SERVO & RADIO TRAY OPTIONS

The receiver rests in the space directly in front of the throttle servo. A strip of servo mounting or foam cushion tape can be used on the bottom edge of the receiver for added protection. The antenna tube should be forced through the 1/8" hole provided on the front corner of the radion plate. The receiver antenna can now be threaded through the tube with the excess neatly bundled and taped up in front of the receiver.

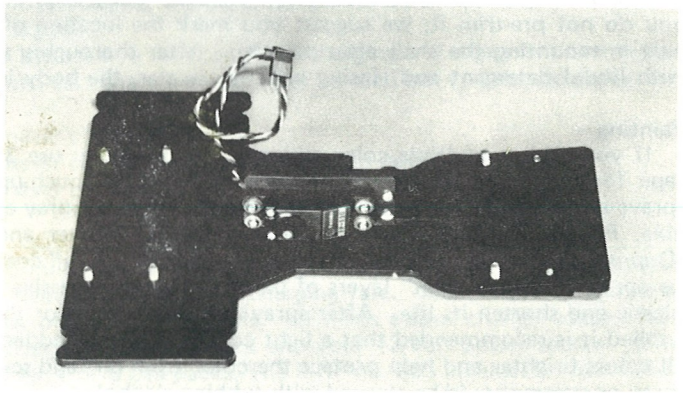
The steering servo mounts are pre-molded for your convenience. Most popular servos will fit without modification. However micro size units (FPS-20, KPS-22A) servos require an additional spacer plate. See photo no. 5. This is made from the .090 black Kydex provided in the kit. Tin snips, x-acto knife or small rotary grinder (Dremel) can be used for the necessary trimming. The no. 2x5/16" sheet metal screws or the screws provided with the radio system are used to mount the steering servo. Cut the linkage wire with pre-bent z-bends in either end 1" and 1½" from the bends. See Fig. 4.

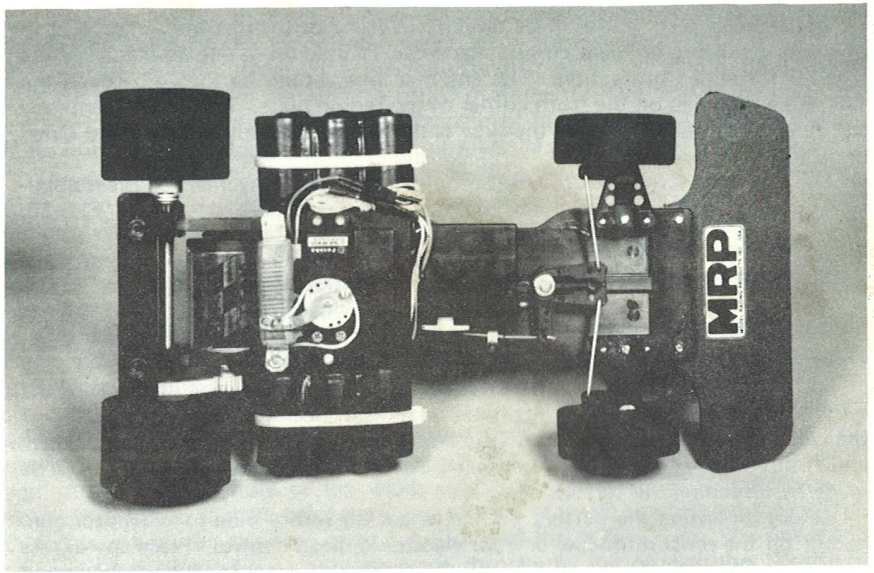
Push one z-bend into the output arm and the other into the end hole of the servo saver. Using the 1/8" collar provided, insert both free ends, one on top of the other and after centering both the steering servo and the front wheels, insert and firmly tighten the 4–40 Allen head cap screw. Future adjustments can be made by loosening this screw.

Before mounting the battery pack connect the motor plug to the motor connector on the resistor module or your electronic speed control. Place any excess wire or radio wire into the void below the resistor or in front of the receiver and tape or tie in place. The battery packs rest on the pans to either side and are held in place with 11" pull ties. An additional wrapping of electrical tape is suggested for safety.

FIG. 4

STEERING LINK
Full size
2 required





BODY PREPARATION, PAINTING AND FINISH

M.R.P. bodies are made from genuine G.E. Lexan and have proven to be the most durable break resistant, yet attractive and superior handling units available.

Preparation

The body finish is applied to the INSIDE of the Lexan shell. This allows the fresh, bright paint finish to resist dulling from oxydation or damage from the inevitable contacts of racing. The Lexan becomes a clear, tough protector of the finish, from which minor abrasions can be buffed out without damaging the paint itself.

You may or may not want to trim the clear body shell before painting. If you do not pre-trim it, we suggest you mark the location of body mounts to aide in mounting the shell after painting. After thoroughly washing the body with liquid detergent and rinsing with hot water, the body is ready for paint.

Painting

If you wish a multiple color scheme we suggest you use 3M brand masking tape for stripes or panels. Rustoleum, automotive touch-up and most vinyl sprays are adequate for spray can application. If small spray equipment is available, Parma, Dupont, Ditzler or Nasson acrylic lacquer and a slow thinner (Dupont 36055) may be used. In all cases only light "dry" coats of paint should be applied. Heavy "wet" layers of paint will cause excessive brittleness of the plastic and shorten its life. After spraying lighter colors or the last color to be applied it is recommended that a light coat of white be added. This will make all colors brighter and help protect the color from dirt and scratches. Any over spray or excess should be cleaned with rubbing alcohol.

Finish

Scissors or an x-acto (n. 1) type knife can be used for final trimming. After scoring a line with the x-acto knife the excess body flash can be bent back allowing it to crack and fall free. Panel lines, vents, and small lettering can be done with a Sharpe or similar indelible marker. A full selection of numbers, sponsor logos and Mylar stickers are available from M.R.P. for that race car look.

BATTERIES: CARE & FEEDING, AND CAUTIONS

It is important to carefully read and understand the following information on batteries. A little care and easy maintenance will yield excellent performance and life.

Battery Theory

Nicads should never be overcharged or drained below .9 volts per cell. Overcharging creates heat that forces the battery to vent which allow gaseous electrolite to escape. Extreme discharging risks the capacity and possible loss of polarity. Either of these conditions will greatly diminish the future capacity and ability to hold a charge.

Fast Charging

When charging sub-C size, 1,000 milliamp (1 amp) or more capacity, batteries it is important not to exceed a charge rate of more than 4 amps. Since it is difficult to figure actual usage on a partial run, it is best whenever possible to charge only when the batteries are discharged. If it is necessary to charge partially discharged batteries you should try to match the charge time to the discharge time, i.e. 10 minutes of run time should be charged for only 12-13 minutes at 4 amps, or 20 minutes at 2 amps, etc. To fast charge a 6 cell MPR pack no. 542 or a 4 cell pack no. 541, use an MRP no. 533 charge cord. This will safely charge your batteries at a rate of about 3.75 amps. Total charging time will be about 3 to 4 minutes more but this is a safer rate, especially with the Sanyo high performance cells. NOTE: MRP charge cords should get slightly warm while charging. If not warm: 1) the charge cord is not making proper contact with the power source, or 2) the power supply (12 v. battery) is dead, or 3) the battery pack has a broken wire on either the batteries or at the plug. The charge cord or batteries should never get HOT.

Overcharging causes batteries to lose capacity. If for any reason the batteries become hot from overcharging, the batteries should be slow charged to balance them (see Slow Charging).

We recommend the use of a timer to aid in charging and to prevent overcharging. The MRP timed fast charger no. 801 can be used but you should always be careful to:

never charge in reverse
never charge at greater than 4 amp rate
never overcharge

Slow Charging

Charging at 150 milliamps or less will not damage batteries, as they can dissipate any excess heat created by this charging rate. Many slow chargers are available that work off of house current. MRP has a slow charger adapter no. 535 that goes between the battery pack and your 12 volt power source. This will work with either 4 or 6 cell packs. The MRP no. 801 includes an automatic slow charge feature.

Charging Tip

For maximum capacity, life and running time, Nicads must be equally charged (matched, or "balanced") and never overcharged.

Problem: batteries by their manufacturing imperfections never charge or discharge at the same rate.

Solution: every 6 to 12 fast charges it is recommended that you slow charge (50–100 milliamps) the batteries for 12 to 16 hours. This slow charge will raise all batteries to their maximum capacity and "match" the cells without overcharging.

MRP battery packs must be unplugged to be recharged. A remote charge plug can be added at your own risk. If a remote plug is used and the radio is on, **non-warranty** damage will occur.

OPERATION

After carefully charging your batteries as per instructions you are ready to run your car. At this point a few Do's and Don't's are in order. You should always turn the transmitter on first and off last. Try to avoid running your car around standing water as the radio system can easily be damaged if it becomes wet. Last but not least, use caution when operating your car in a public area as they can distract motorists and be potentially harmful to spectators.

Before actual operation on the track surface it is a good idea to make a quick check to make sure the car is ready for trouble-free running. The most important thing to check is the resistor. Make sure it is dust and dirt free. If any dark burned spots are present you should check the tension on the wiper arm. You should also periodically clean the resistor face with a pencil eraser.

When running your car you should first turn on your transmitter, checking the power level of the output or batteries to be sure they are in the safe range. The car can now be plugged in. On early models, small black Deans plugs are used. These plugs have a groove in them that should be used for proper alignment. The white amps type plug can only be plugged in one way. Also make a quick check of wheels, tires and gears for binding, breakage or extreme wear. **Cautions:** When running your car do not stall the motor while under power. A good example is having the car stuck against a barrier while the throttle is on. You risk burning out the motor or resistor if this continues. If while running your car you notice that the radio response and speed decrease noticably, you should pull the car off the track. The batteries are about to reach critical discharge level and radio control could be lost; at this point the batteries need to be recharged (see section on battery charging).

Spur (Driven) Gear	Pinion (Drive) Gear					
	11	12	13	14	15	16
44	4.00	3.67	3.38	3.14	2.93	2.75
46	4.18	3.83	3.54	3.29	3.07	2.88
48	4.36	4.00	3.69	3.43	3.20	3.00
50	4.55	4.17	3.85	3.57	3.33	3.13
52	4.73	4.33	4.00	3.71	3.47	3.25
54	4.91	4.50	4.15	3.86	3.60	3.38

GEARING

Gearing is critical for top performance. It must be understood however, that there are other factors which interact with gearing in the actual operation of your car. The size of the rear wheels will change performance of the car as much as a change in the gears. Smaller tires are equal to lowering the gearing. As an example: a rear tire difference of ¼" diameter could be the difference of 2 to 4 teeth on the spur gear – if a 13 tooth pinion were used the difference between a 46 tooth spur (3.54 to 1) and a 50 tooth spur (3.85 to 1). The other factor to be considered is the motor. Rewound Hi-current motors require a lower (larger numerically) gear ratio than a stock motor. Additionally, the length of the track and use of a 4 or 6 cell pack for power will influence gear selection. It is impossible to give absolute gear ratios, but the following guidelines will help. Longer tracks with wide turns would require numerically higher (3.00 to 1) gearing than a short track with tight turns (4.00 to 1); four cell power usually requires about .25 -.40 higher (numerically smaller) gearing than the same car with 6 cell power. Modified motors require additionally lower gear ratios but the actual amount will vary with the size wire and amount of timing on the particular motor. In general you will find that the higher (smaller numerically) the gear ratio the slower the car will accelerate, but it will reach a higher terminal speed. Inversely the lower the gear ratio (numerically larger) the quicker the car will accelerate but the terminal speed will be less. You will also find that the higher gear ratios will use batteries at a higher rate. Do not hesitate to try different gears as this is a quick, easy method of finding added performance.

Parts & Pricing Order Form

• KITS • SEMI-KIT MODELS 1/12 & 1/8 scale

	921	GP12 Kit less body	54.00	
	922	Pro-120X Deluxe Racer Kit w/Sanyo batteries, differential, ¾ ohm motor control, rewound motor, spare gear, etc. Sept.	148.00	
	923	GP12 Assembled-wired w/Batteries, chg. cord, resistor & Painted Body, less radio	130.00	
	924	GP-12 unassembled kit w/NiCad batteries, chg cord, motor speed control, balanced motor	105.00	
	927	ATV Datsun BAJA Pickup Kit w/05 Motor	68.00	
	928	ATV Unassembled Kit w/batteries, motor, motor speed control, charge cord	130.00	
	981	Electric Boat Kit 6 cell, Semi-kit less radio	115.00	
	982	Electric Boat Kit - partially assembled	42.00	
	2005	1/8 scale PRO-180 Racer Kit	165.00	
	2010	1/8 scale PRO-180X Racer Deluxe Kit, w/wing tank, rear bumper, spares, etc.	210.00	
	2011	1/8 scale Pro 180X w/differential	295.00	
	2006	1/8 scale Electric Basic Kit Oct.	169.00	
	2008	1/8 scale Electric Deluxe Kit w/batteries motor, chargers, body, etc., less radio Oct.	335.00	

• CHASSIS COMPONENTS 1/12 scale

	501	GP12 Graphlon® chassis w/battery tray/screws	12.00	
	502	ATV chassis w/bolts	12.00	
	503	ATV body mount	3.00	
	504	GP12 Spindle w/E ring & axle	1.75	
	505	GP12 A-arm & upper support	2.75	
	508	Spindle w/spring & E ring each	1.75	
	509	A-arm w/E ring each	1.75	
	511	ATV Rear bearing block each	1.95	
	512	Rear bearing block for ball bearings	2.10	
	513	ATV Motor/bearing block	3.00	
	514	Motor/bearing block for ball bearings	3.25	
	515	GP12 Rear bearing block & motor mount	3.00	
	516	Rear body support & tubes	3.50	
	518	ATV Bumper Kydex®	2.50	
	519	Bumper Pro-120 Kydex®	3.00	
	520	GP12 Kydex® bumper	2.25	
	521	Radio & battery mount tray Pro-120	3.00	
	524	GP12 Receiver & servo tray	2.50	
	525	GP12 Tie Bar w/screws	1.50	

• ELECTRIC ACCESSORIES • RESISTORS • BATTERIES

	530	Gear Puller	5.00	
	531	Resistor mounting clips L.H. & R.H.	1.75	
	533	Charge cord 6 cell w/plug	6.50	
	534	Wiper arm w/button	1.50	
	535	Slow charge adapter 4 or 6 cell	5.00	
	536	Race resistor 1.25 ohm w/adj. brake	8.50	
	537	Resistor 2 ohm standard	7.00	
	538	Resistor module pre-wired 2 ohm w/wiper arm	15.50	
	539	Race resistor .75 ohm w/adj. brake	6.50	
•	540*	Battery sub C G.E. nicad w/solder tabs	5.50	
•	541*	4 cell battery pack wired & dipped	29.00	
•	542*	6 cell battery pack wired & dipped (G.E.)	40.00	
•	543*	Sanyo Sub C Ni-cad w/solder tabs	6.00	
•	544*	6 cell battery pack kit (Sanyo) w/plug	35.00	
	545	Siliflex multistrand 18 ga. wire. This is the BEST you can buy - 18" each, Red & Black	3.00	
	546	3 pin deans plugs 1 ea. male & female	2.50	
	547	5 pin deans plugs 1 ea. male & female	2.75	
	548	Shrink tubing assortment	1.50	
	549	Tie strap nylon (6) 11"	1.50	

• RACING ELECTRIC MOTORS 1/12 scale

	550	Motor 05 ROAR stock production class	10.00	
	551	Motor 05 epoxied, balanced & trued comm.	14.50	
	552	Motor 05 factory team set up	18.75	
•	553*	Motor 05 ball bearing, custom wound	48.00	

• MISCELLANEOUS ACCESSORIES 1/12 scale

	562	.1 motor capacitor (2 each)	1.00	
	563	Dropping diode (2 each)	1.00	
	565	Chassis screws flathead	1.00	
	566	Solution racing lube	1.50	
	567	Body posts nylon w/pins (2 each)	1.00	
	568	Long body posts nylon w/pins (2 each)	1.00	
	569	Body post extensions w/pins (2 each)	1.00	
	574	Servo Saver (Universal) w/screws	3.25	
	575	GP12 Tie rod set 7 pieces	3.00	
	576	Tie Rod	.75	
	577	Wing, Lexan-ROAR legal	1.75	
	578	Wing wire & screws	2.25	
	579	Wing tubes, 3/16" x 2" aluminum	2.00	

• •• NOT STANDARD DISCOUNT ITEMS

• DIFFERENTIALS & PARTS

	600	Differential for ¼" axles w/2 gears	16.00	
	600A	Differential for ¼" axles w/2 gears w/rubber GTD	20.00	
	601	Differential w/axle, 2 mounted wheels & tires, glued & trued, gears, axle spacers, etc. complete	26.00	
	602	Wheel	3.00	
	603	Wheel w/rubber "D" type	6.00	
	604	46 tooth gear	2.00	
	605	48 tooth gear	2.00	
	606	50 tooth gear	2.00	
	607	Ball bearings (20)	3.00	
	608	Washers (4)	1.50	
	609	Hub w/set screw & wrench	7.50	
	610	Nut-Nylok	1.00	

• WHEELS, TIRES 1/12 scale

	741	Chrome wheels front pr.	6.00	
	742	Chrome front w/rubber mounted	10.50	
	743	Chrome wheels rear sq. dr. pr.	6.00	
	744	Chrome rear w/rubber mounted	11.00	
	749*	Front wheels w/tires ball bearing	24.50	
	750	Front wheels w/oilite bearings	4.25	
	751	Front wheels w/Med. A tire	8.00	
	752	Front wheels w/firm tires	8.00	
	753*	Ball bearing front wheels	20.00	
	754	Rear wheels w/flat & sq. drive	4.00	
	756	Rear wheels & tires sq. drive type D	10.50	
	758	Rear wheels & tires sq. drive type C	10.50	
	759	Front wheels & tires ATV	9.00	
	760	Rear wheels & tires knobby hex drive ATV	12.00	
	761	Rear tires type D	4.00	
	762	Rear tires type C	4.00	
	763	Front tires firm	4.00	
	764	Front tires Med. A	3.50	
	765	Molded Front Tires, firm	4.50	
	766	Molded Front Tires, soft	4.50	
	767	Molded Rear Tires, soft	5.50	

• DRIVE COMPONENTS

	774	Axle spacers & washers ¼"	1.25	
	775	Axle hex standard ATV	2.00	
	776	Axle stainless steel w/flats ¼"	3.25	
	777*	Ball bearings 1/4" i.d. x 3/8" o.d. (pair)	10.00	
	778	Oilite bearings 1/4" i.d. x 3/8" o.d. (pair)	1.50	
	779*	Ball bearings front wheel (pair) 1/8" x 5/16" flanged	10.00	
	780	Oilite bearings 1/8" i.d. x 5/16" o.d. (pair)	1.50	
	781	Gear 58T Hex ATV	1.75	
	784	Gear 52T sq. drive nylon	1.75	
	785	Gear 48T sq. drive nylon	1.75	
	786	Pinion 12 tooth steel w/set screw	2.25	
	787	Pinion 13 tooth steel w/set screw	2.25	
	788	Pinion 14 tooth brass w/set screw	2.25	
	789	Pinion 15 tooth brass w/set screw	2.25	
	790	Pinion 16 tooth brass w/set screw	2.25	
NOTE: Add Letter C for Hard Chrome Pinions			@ 4.75	

• 1/12 SCALE LEXAN® BODIES

	931	Abarth Osella (Can Am) Clear	11.00	
	931P	Abarth Osella (Can Am) Painted	16.50	
	932	Kemp Cobra II (GT) Clear	11.00	
	932P	Kemp Cobra II (GT) Painted	16.50	
	933	Renault (Formula 1) Clear	11.00	
	933P	Renault (Formula 1) Painted	16.50	
	934	Datsun (Pick Up) Clear	11.00	
	934P	Datsun (Pick Up) Painted	16.50	
	935	Triumph TR7 (GT) Clear	11.00	
	935P	Triumph TR7 (GT) Painted	16.50	
	936	Lotus Esprit (GT) Clear	11.00	
	936P	Lotus Esprit (GT) Painted	16.50	
	937	Hayashi Dome (GT) Clear	11.00	
	937P	Hayashi Dome (GT) Painted	16.50	
	938	TOJ-BMW Clear	11.00	
	938P	TOJ-BMW Painted	16.50	
	939	Porsche 924 Turbo Clear	11.00	
	939P	Porsche 924 Turbo Painted	16.50	
	940	Renault LeMans V6 Turbo Clear	11.00	
	940P	Renault LeMans V6 Turbo Painted	16.50	
	941	Ampex PROPHET (Can-Am) Clear	11.00	
	941P	Ampex PROPHET (Can-Am) Painted	16.50	
	942	Busch (ground effects) Can-Am Clear	11.00	
	942P	Busch (ground effects) Can-Am Painted	16.50	
	943	Toyota Dome Celica Turbo Clear	11.00	
	943P	Toyota Dome Celica Turbo Painted	16.50	
	944	Frissbee (Can-Am)	11.00	
	944P	Frissbee (Can-Am) Painted	16.50	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MRP
MODEL RACING PRODUCTS, INC. - USA

MODEL RACING PRODUCTS, INC.
12702-D N.E. 124th St., Kirkland, WA 98033
Phone (206) 823-0800