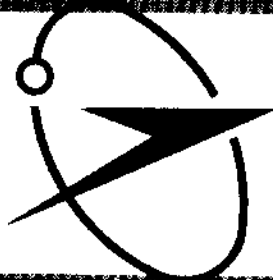


**CS2P Pistol Grip
R/C System**



AIRTRONICS®

CS2P Pistol Grip R/C System

THANK YOU FOR SELECTING AIRTRONICS!

We appreciate your purchase of this new Airtronics CS2P Two-Channel Radio Control System. These instructions are intended to acquaint you with the many unique features of this advanced radio. Please read them carefully so that you may obtain maximum success and enjoyment from its operation.

We ask that you pay particular attention to the design of the transmitter. Notice that it has been human engineered for the most natural and precise operation of all land and water-borne models: it is not just another model airplane transmitter with some channels omitted! This unprecedented design was arrived at after careful study of the requirements imposed by the fast and manueverable car and boat models of today. It is no longer necessary to build and operate your models within the limitations dictated by the transmitter design - this transmitter was made especially for them.



SAFETY

R/C modeling is one of the most enjoyable and rewarding hobbies available today. The rewards and satisfaction from R/C are only there if safety is on the R/Cer's mind whenever he is operating his equipment. You must keep in mind at all times that you are responsible for the safety of not only yourself but those spectators or other modelers that are near you whenever you operate your R/C model. This is not a responsibility that should be taken lightly.

Though model car and boat operation is not considered as potentially dangerous as model airplanes, both are now capable of attaining speeds fast enough to damage themselves and to cause injury to anything or anybody they may happen to come in contact with at high speeds.

The instructions and installation guidelines presented in this manual should be followed at all times. Deviating from the instructions could create an unsafe condition and cause your model to not respond properly to your commands. If you are new to the R/C hobby, it is best to ask advice of an experienced modeler who can check your radio installation.

The rules for radio control model operation and competition and the safety standards for their operation are carefully laid down by national and in some cases, international organizations. They also sponsor and manage all meets and contests, all local clubs belong to these national associations. They, both the local and national clubs, are your best source of technical and competition information. Depending on your particular modeling interests, we suggest that you contact one of the groups listed, who will in turn direct you to the nearest club.

MODEL POWER BOATS, RACING

- * International Model Power Boat Association,
38355 Hidden Lane
Mt. Clemens, MI 48003
- * NAMBA International, Inc.
6073 Sunrise Dr.
Lower Lake, CA 95457

MODEL POWER BOATS, SCALE

- * North American Scale Warship Combat Ass'n.
P.O. Box 116
Gig Harbor, WA 98341

MODEL SAIL BOATS

- * American Model Yacht Ass'n
2716 Briarwood Dr., West
Arlington, Heights, IL 60005

MODEL CARS, RACING

- * Radio Operated Auto Racing
P.O. Box 29362
Cumberland, IN 46229

MODEL CARS, OFF ROAD

- * Off Road R/C Ass'n.
P.O. Box 8938
Calabasas, CA 91302-8938



AIRTRONICS FEATURES

TRANSMITTER

- High, 500 milliwatt, R.F. output.
- Unique pistol grip design, with reversible handle for left handed operation.
- Trigger operated throttle, with proportional brake, trim, end point adjustments, variable exponential control, and servo reverse.
- Adjustable brake action for use with electrical speed controllers, switched in on demand.
- Wheel type directional control, with trim, end point adjustments, variable dual rates, variable exponential control, servo reverse and tension adjustment.
- Power output meter, and high intensity "ON" indicator.
- Safety strap hook, and carrying handle.
- Direct Servo Controller for no-signal adjustments.
- Available on all 27 and 75 MHz FM Bands. 75 MHz frequencies are changed by plug-in modules, while 27 MHz frequencies are changed by plug-in crystals.
- Alkaline battery powered, Ni-Cd conversion available.
- Measurements overall: 6.9 x 9.5 x 5.25 inches.
- Weight, including alkaline cells: 26.2 ounces.
- Retractable antenna, 24" in length fully extended.

RECEIVER

- Small size (2.4 x 1.3 x .8"); lightweight (1.25 ounces); rugged construction.
- Plug-in crystal for rapid channel changes. Note: Band or modulation changes are not possible, a different receiver is required.
- Connectors compatible with all Airtronics servos and control accessories.
- Power Supply, 4.8 - 6.0 volts, alkaline or Ni-Cd cells.

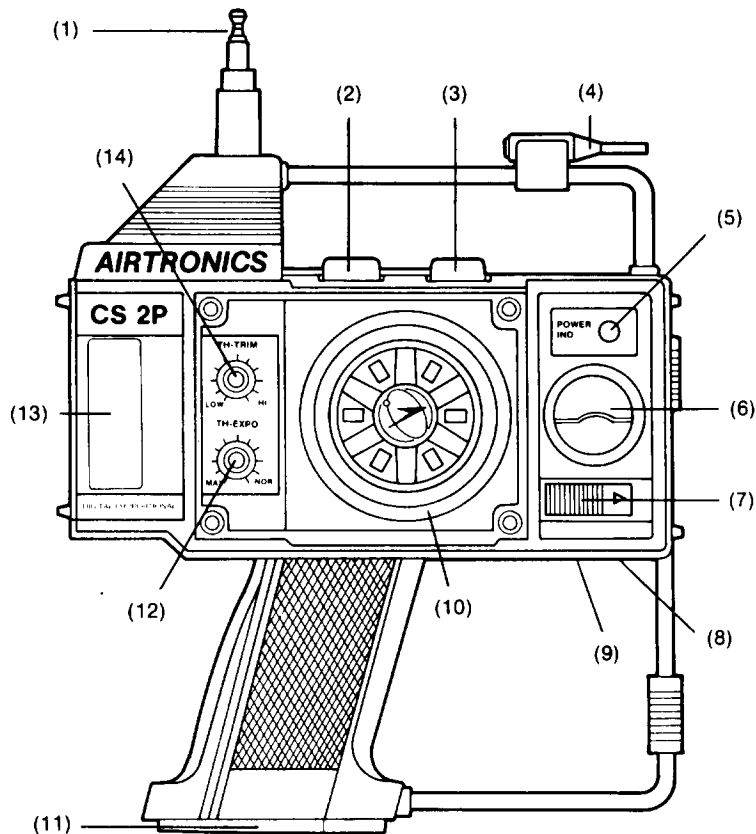
SERVOS

The Airtronics CS2P system is available in three versions with different servos for specific uses:

- CS2P/394. with Standard servos, 48 oz. in. torque, 1.8 oz., 1.54 x 0.79 x 1.59", all average uses.
- CS2P/462. with High Speed Ball Bearing Mini's. 27 oz. in. torque, 1.1 oz., 1.45 x .70 x 1.15".
- CS2P/554. with Coreless, Ball Bearing, Hi-Power 73.5 oz. in. torque, 2.08 oz., 1.46 x .75 x 1.44".
- All feature carbon potentiometers with carbon button wipers for precision and long life.
- Compatible plug-in speed controllers and sail winches for specialized applications.

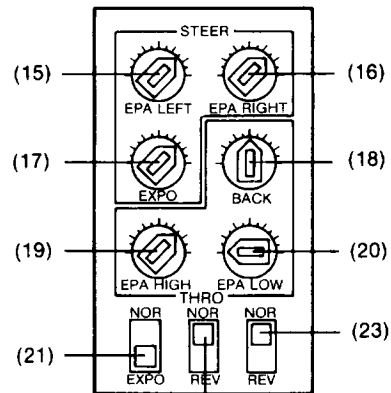


AIRTRONICS CS2P TRANSMITTER



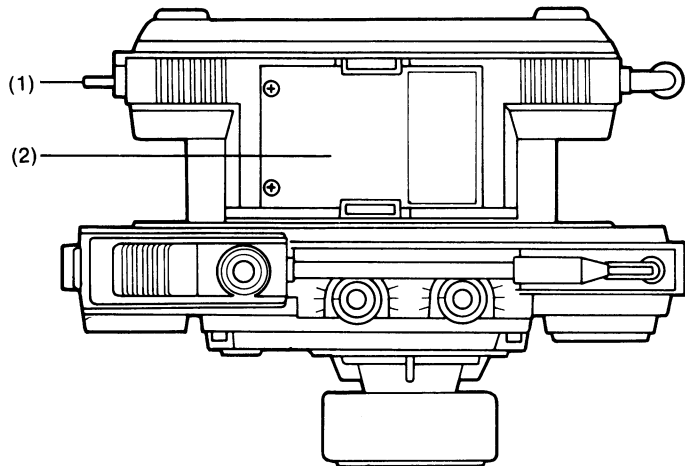
1. Retractable Antenna
2. Steering Dual Rate Adjust
3. Steering Trim
4. Mini-Screwdriver Holder
5. LED "ON" Indicator
6. R.F. Output Meter
7. "ON-OFF" Switch
8. D.S.C. Jack
9. Ni-Cd Charging Jack
10. Steering Wheel
11. Battery Compartment Cover
12. Throttle Exponential Adjust
13. Trimmer Panel Cover
14. Throttle Trim
15. Steering E.P.A. Left
16. Steering E.P.A. Right
17. Steering Exponential Adjust
18. Back (Brake) Adjust
19. Throttle E.P.A. High
20. Throttle E.P.A. Low
21. Steering Exponential Switch
22. Steering Servo Reverse Switch
23. Throttle Servo Reverse Switch

TRIMMER PANEL





TRANSMITTER TOP VIEW



1. Safety Strap Hook. A strong leather neck strap is available from Airtronics. As an alternative, a camera type wrist strap may be used. Whichever type you prefer, the use of a safety strap is highly recommended.
2. Removable Frequency Module. Two different types are available, for 27 or 75 MHz.

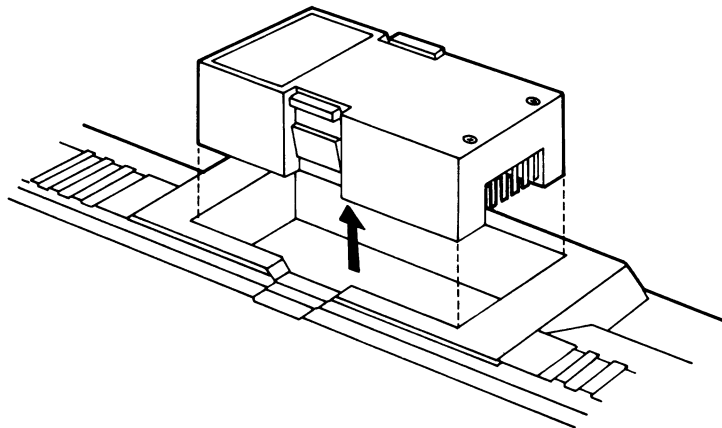
REMOVAL OF FREQUENCY MODULE

To remove the Airtronics Frequency Module, press in on the two locking tabs located midway on each side and pull straight up.

To replace the module, drop it into position, the multi-contact plug should be on the left, the name plate to the right and push it down slowly but firmly.

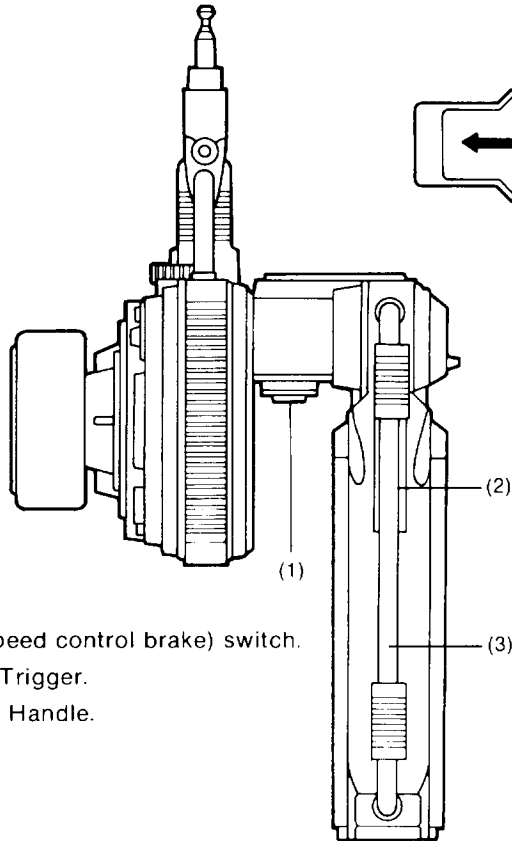
Frequency changes within the 27 MHz band only are permissible by changing the plug-in crystal on the underside of the module.

To change bands (27 to 75) or frequencies on 75 MHz only, a different module is required. Remember that the receiver to be used must match the module in band, channel, & modulation.



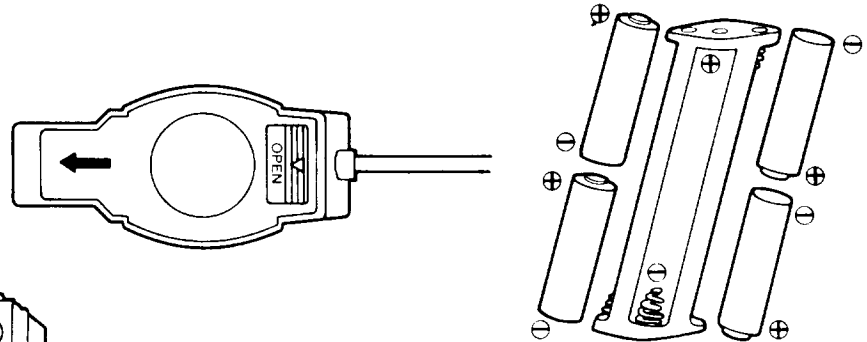


TRANSMITTER SIDE VIEW



1. Back (Speed control brake) switch.
2. Throttle Trigger.
3. Carrying Handle.

TRANSMITTER BATTERY INSTALLATION



The transmitter batteries are located in the pistol grip handle. To install or replace, first open the bottom cover. Press down on the end marked "OPEN", and slide cover in the direction of the arrow.

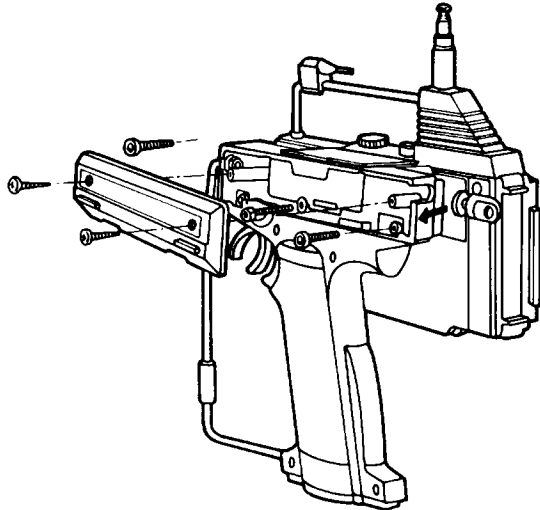
The battery holder will now drop out. Install eight Alkaline Type "AA" dry cells as shown. Observe the polarity (positive and negative) markings on the cells and on the sides of the battery holder. Notice that the contact springs inside the holder always go to the cell negative end.

Install the battery holder back in the handle; the slanted ends should match and the end of the battery holder with the two contacts goes in first. Replace the compartment cover.

An Airtronics rechargeable Ni-Cd battery pack is also available. It is installed in the same manner, except that the wire harness from the battery must be plugged into a socket located under the compartment cover. Charging is through the socket under the switch.



TRANSMITTER HANDLE REVERSE

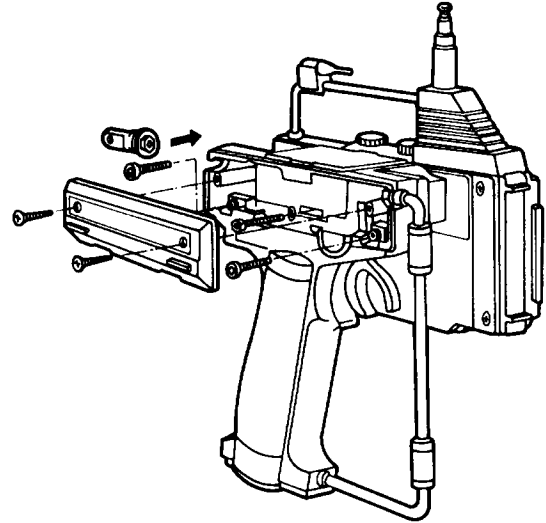


TO REMOVE HANDLE:

1. Remove the two screws holding the rear handle cover; remove the cover.
2. You will now see three Allen Head screws holding on the handle. Using a 3/32" Allen wrench, remove these screws.
3. Remove the safety strap hook from it's socket.
4. Remove the pistol grip handle, including the metal carrying handle. Notice the two wire harnesses still connected.

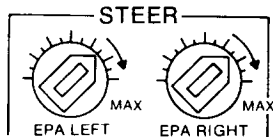
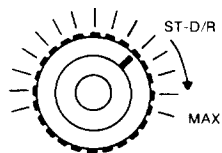
TO REINSTALL HANDLE:

1. Rotate handle half a turn and place into position. The carrying handle now fits into the socket previously occupied by the safety strap hook. Route the wires out of the way.
2. Replace the safety strap hook in the opposite socket.
3. Replace the three Allen Head screws. Do not over tighten.
4. Replace the rear handle cover and reinstall the two retaining screws. Do not over tighten.
5. Check for proper operation. There is no control reversal!





TRANSMITTER STEERING ADJUSTMENTS



STEERING DUAL RATE ADJUSTMENT

The steering dual rate adjustment is the left of the two knobs located on top of the transmitter. It is used to reduce the overall throw of the steering servo to reduce a model's sensitivity. With the dual rate knob fully clockwise, the servo will rotate 90 degrees with full steering wheel movement. At full counterclockwise position of the knob, the servo throw is reduced to 20 degrees. Servo rotation is reduced equally on both sides with this control.

END POINT ADJUSTMENTS (E.P.A.)

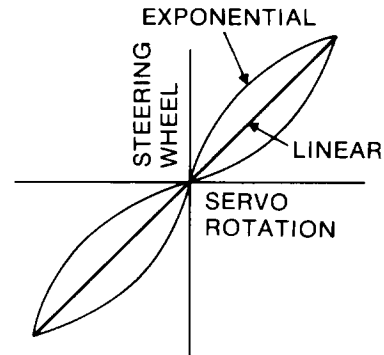
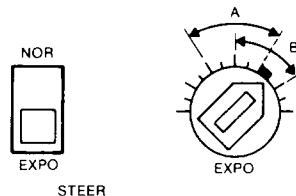
The E.P.A. are located under the sliding trimmer cover. Notice that there is a left, and a right control. They are used for independent control of the servo steering wheel movement, and can be used to balance out a model that is more responsive to steering control in one direction than it is in the other. Full servo rotation is obtained with the E.P.A. control fully clockwise. Turning the knob fully counterclockwise will reduce the amount of servo rotation down to 30 degrees.

There is some interaction between the Dual Rate control and the E.P.A. The amount of control reduction introduced with the Dual Rate remains under the setting of the E.P.A.

STEERING EXPONENTIAL ADJUSTMENT

The normal steering-to-servo movement relationship is a linear one to one motion. Exponential control modifies this relationship to a lesser effect in the center, increasing to full movement at the extreme position of the steering wheel. Exponential steering is introduced whenever the STEER EXPO switch is placed in the downward position. The degree of exponential control is controlled by the adjacent variable adjustment.

The degree of exponential control to be used can only be determined by experience and experimentation. As a guideline for R/C cars, the best position for individual suspension racers is within range A. Four wheel drive cars work best within range B.





TRANSMITTER THROTTLE ADJUSTMENTS

TH—EXPO

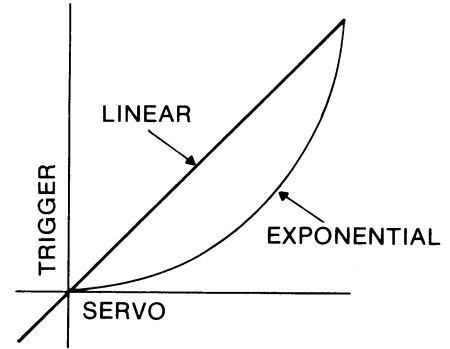
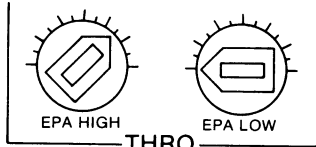
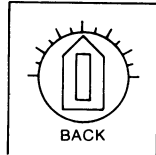
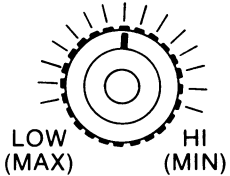


THROTTLE EXPONENTIAL

Throttle exponential works similarly to steering exponential, in that it reduces the trigger to servo (or speed controller) action around the center with full action taking place at the extreme position of the throttle. It is controlled by the position of the lower front knob, TH-EXPO. The best degree of throttle exponential to use is dependent on the type of model and it's propulsion method. Do not be afraid to experiment.

THROTTLE TRIM

The TH-TRIM knob located on the top, front panel controls the point at which braking action starts to take effect. Normally, it's effect is softer in the HI position, and sharper in the LOW.



BACK SWITCH

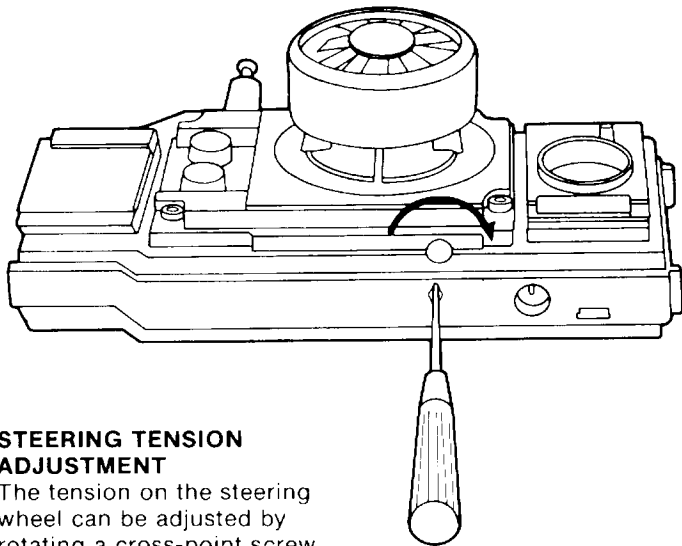
The BACK switch is located under the transmitter (see side view) and is actuated by the thumb of the throttle hand. It is a maximum brake control, the action of which is controlled by the BACK adjustment located on the trimmer panel. For a starting point, adjust the brake normally, and turn the adjustment to the point at which brake action starts as the switch is depressed. Increase the braking action as desired.

THROTTLE E.P.A.

The Throttle E.P.A. controls (left) located on the trimmer panel are used to equalize the trigger to motor control action as necessary for best operation.



MISCELLANEOUS TRANSMITTER ADJUSTMENTS

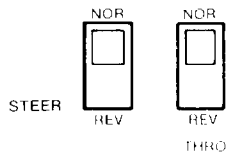


STEERING TENSION ADJUSTMENT

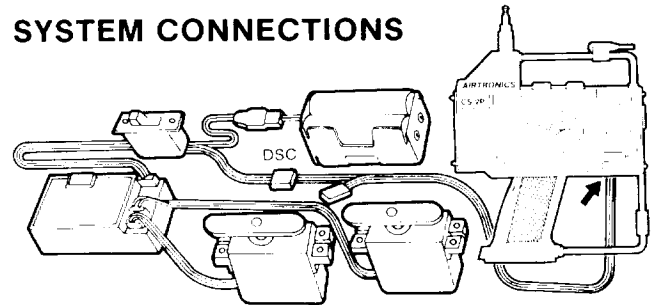
The tension on the steering wheel can be adjusted by rotating a cross-point screw accessible through a hole in the bottom of the transmitter. Clockwise increases tension!

SERVO REVERSE SWITCHES

Servo reverse switches for steering and throttle are located on the trimmer panel. Preset as necessary.

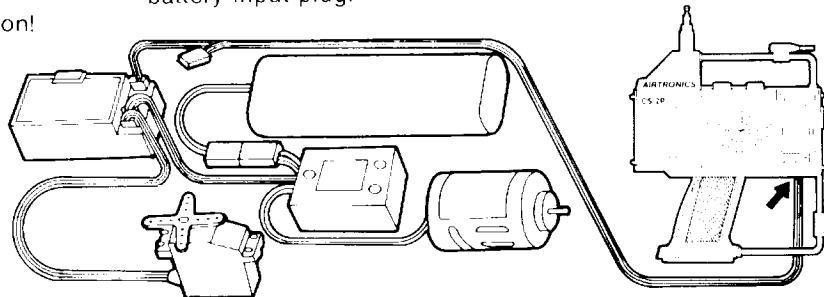


SYSTEM CONNECTIONS



Above we see the connections for the CS2P as normally furnished. Note the use of the DSC cable for non-interference operation. If Ni-Cd rechargeable batteries are used for the receiver, charging is done through the extra connector on the switch harness.

Below we see the CS2P connected for use with an electric powered model, using one steering servo and an Airtronics Speed Controller. A larger battery is used, which also supplies power for the receiver (and servo). Normally, an additional switch turns off this battery, and the receiver. In this case, the DSC cable connects directly to the receiver battery input plug.

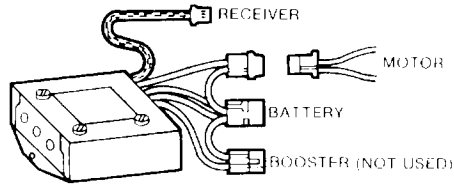




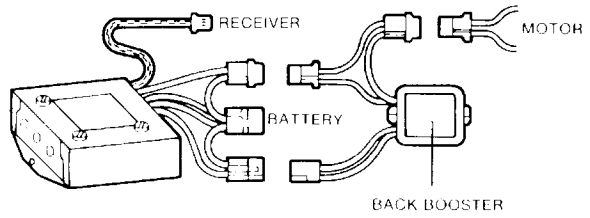
SPEED CONTROLLERS

P/N
96304
IS
OBSOLETE

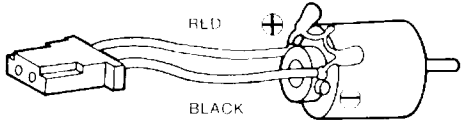
96304 Without Reversing



96304 With 96320 Back Booster for Reversing



Motor Connections



Complete transmission/speed controller adjustment instructions are furnished with each controller. Please observe.

Airtronics has an Electronic Speed Controller available for use with 1/10th or 1/12th scale electric vehicles which is fully compatible with your CS2P system. The 96304 Speed Controller features adjustable forward speed, braking, neutral and reversing capability with the optional Back Booster 96320. It eliminates the need for a throttle servo and provides regulated voltage of the right value for the receiver and steering servo from the main battery. Further specifications are:

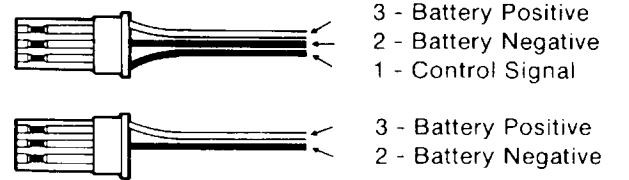
- Rated Voltage: 7.2V (6.5 - 8.5V) (Six Cells)
- Maximum Continuous Current: 30 Amperes
- Maximum Surge Current: 55 Amperes
- Dimensions: 1.89(L) x 1.42(W) x 0.83(H) Inches; 48(L) x 36(W) x 21(H) Millimeters
- Weight: 2.36 Ounces; 67 grams

BACK BOOSTER

- Dimensions: 1.1(L) x 0.96(W) x 0.83(H) Inches; 28(L) x 24.5(W) x 22(H) Millimeters
- Weight: 0.95 Ounces; 27 grams

CONNECTORS:

When using other speed controllers, accessories or testers, the following connections should be observed.





GENERAL INFORMATION

RECEIVER BATTERY INSTALLATION

The receiver uses four Alkaline "AA" type cells for power. They should be installed in the holder furnished, observing carefully the polarity (positive and negative) markings on the inside of the holder.

RECHARGEABLE BATTERY CONVERSION

An Airtronics Rechargeable Battery conversion is available for greater convenience and reliability. It consists of an eight cell transmitter battery, a four cell receiver battery and a dual charger. System operation is the same as when powered with alkaline cells. Initially, the new Ni-Cds should be charged for 24 hours, subsequently they will require only 10 - 12 hour charges. It is recommended that charging take place prior to each days operation.

OPERATING TIME

Operating times vary depending on the nature of the model and the equipment being used. Normally, a fresh set of alkaline cells is good for 4 to 5 hours of operation. A freshly charged set of Ni-Cds will provide 2 to 3 hours, however they have the advantage of starting off with full capacity every time and they may be revived hundreds of times. Smaller and larger Airtronics Ni-Cd battery packs are available for the reciever for special operating requirements.

OPERATING FREQUENCIES

The Airtronics CS2P R/C system is available on the following standard non-flying model frequencies. Colors and channels shown are those established for identification.

27 MHz		75 MHz	
Frequency	Color	Channel	Frequency Color
26.995	Brown	62	75.430 Blue/Red
27.045	Red	64	75.470 Blue/Yellow
27.095	Orange	66	75.510 Blue/Blue
27.145	Yellow	68	75.550 Blue/Gray
27.195	Green	70	75.590 Purple/Black
27.255	Blue	74	75.670 Purple/Yellow
		76	75.710 Purple/Blue
		78	75.750 Purple/Gray
		80	75.790 Gray/Black
		82	75.830 Gray/Red
		84	75.870 Gray/Yellow

Band changes and 75 MHz frequency changes to the transmitter are made by changing the module. Frequency changes on 27 MHz are made by changing crystals.

Frequency changes to the receiver are made by changing the crystal. Band and modulation changes can not be made and require a different receiver.

Only Airtronics crystals will work in this system with the desired precision and power. They are available on all of the above frequencies. New frequencies are scheduled to be available in 1988 and again in 1991; they will be added to our list as soon as they are legal to use.



GENERAL OPERATING INSTRUCTIONS

RANGE

Your Airtronics CS2P R/C system has more than adequate range to operate the average sized model well beyond the visual range possible. However, it's range can be somewhat reduced by radio noise generated within the model. A drive motor with dirty or worn brushes, or a metal to metal, make and break linkage, are examples. It is very important that this noise be detected and eliminated if it is present. To do so, place your ready to operate model on a non-metallic support, such as a wooden chair. Support the rear wheels off the surface if it is a car; be sure the propeller is clear if it is a boat. With the CS2P system turned on, transmitter antenna down, and without the drive motor operating, walk away from the model, with the antenna aimed directly at it. Operate the steering servo only; a distance of from 30 to 60 feet will be obtained. At some point, the servo will operate erratically, indicating the end of the operating range. Now, operate the motor, be it electric or glow plug, and again check this range. Some decrease is normal, and 10 - 15% is acceptable, but anything over that should be corrected before running the model.

Most electric motors generally have some noise reduction capacitors connected across the brushes. If yours does not, check it's or the model's instructions for proper type and value. Glow engine noise can be eliminated by the use of plastic control clevises or bonding wires connected to metallic moving parts. With the aid of an assistant, an antenna extended test, with the model on the ground or water, should result in a greater usable range than that at which the model will normally be operated. Do not attempt to run the model without it.

TRANSMITTER ANTENNA

The Transmitter antenna should always be fully extended during operation of the model. The one exception is when the Direct Servo Controller cable is installed. No-signal no-interference operation takes place and the antenna is not needed. The antenna is shorter than usually found on R/C transmitters, for less physical interference with nearby drivers during competition. It is extended by pulling it out by the tip, however, when it is being retracted, do so from the base, a couple of sections at a time. Pushing on the tip to collapse the antenna will sometimes cause it to bend or kink, after which it will not operate easily, and often break at the damaged point.

Operating rules at all model sites require the use of a frequency or channel identifying flag to be installed on the tip of the transmitter antenna. The colors are listed in the Operating Frequencies section of this manual. Proper flags are available from Airtronics.

METER AND INDICATOR LIGHT = *XL & CS* CURRENT METER

It is recommended that the meter and indicator light be visually checked every time the transmitter is ON. They are your Go-No-Go signals, if either is not operating normally, model control will be affected. The meter should be in the silver; yellow is marginal and red is a definite No-Go. The light should be on steady. Abnormal indications will generally be caused by low batteries, which must be replaced if dry or recharged if Ni-Cds. Continuous abnormal indications should be checked by Airtronics or an authorized service center. If needed, call our Customer Service Section for info.