LIMITED WARRANTY

TEKIN ELECTRONICS, INC. guarantees this speed control to be free from factory defects in materials and workmanship for a period of 120 days from date of purchase, verified by sales receipt. *This warranty does not cover:* suitability for specific application, components worn by use, application of reverse or improper voltage (fuse provides protection in most cases), tampering, misuse, or shipping. Our warranty liability shall be limited to repairing unit to our original specifications. Because we have no control over the installation or use of this product, in no case shall our liability exceed the original cost of the product.

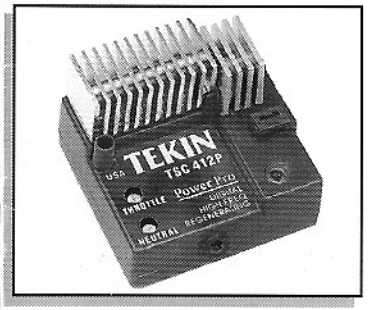
Additionally, these items void the warranty:

1. Using the same polarity connectors on the battery and motor wires from the Speed Control.
2. Allowing water or moisture into the unit.
3. Incorrect wiring.
4. Not using the heatsink.
5. Use inconsistent with the instructions.

By the act of using this Speed Control, the user agrees to accept all resulting liability.

TEKIN®

OWNER'S MANUAL



TSC 412P
TSC 408S

DIGITAL SPEED CONTROLS with REVERSE VOLTAGE PROTECTION and NEW DIGITAL CONTROL CHIP

TEKIN® CHAMPIONSHIP ELECTRONICS

- Digital High Frequency Design
- Uses TEKIN's Universal Connector System
- Electronic B.E.C bypass switching
- High Frequency Linear Current Motordrive:
  - *Makes your motor's commutator last 2 to 5 times longer, while also extending run time by 15-25%*
- Regenerative Battery Charging:
  - *Charges your batteries when you apply the brakes*
- Built-In 32 Amp Schottky Diode:
  - *No external diodes needed*

INTRODUCTION

The TEKIN TSC series are the best performing, most advanced, speed controls available.

Here's Why . . .

- They allow motor commutators to last 2 to 5 times longer than standard speed controls.

- Regenerative charging feature actually recharges your batteries when brakes are applied.

- New 3rd generation Digital Signal Processing chip has built-in digital glitch detection and elimination system, improved brakes, smoother operation, and higher efficiency.

- Fully compatible with autocount lap scoring systems.

- Robotically assembled Surface Mount Technology (SMT) for the highest component density, lightest weight, and reduction of through hole parts.

- Built-in heavy duty 6 volt Battery Eliminator Circuit (B.E.C.). Short circuit proof design.

- Built in electronic B.E.C. bypass. Automatically bypasses the B.E.C. when the voltage drops, for easy 4-cell operation.

- Four wire power system for easy hook-up.

Step 1 - CONNECTOR SELECTION

This electronic speed control is equipped with the TEKIN Universal Radio Connector System. It can be used with TEKIN, Airtronics/Sanwa, Futaba J, JR, KO Propo, and Kyosho Pulsar R/C receivers.

The standard connector supplied with this unit is the Futaba J. This plug is used on all newer Futaba radio systems. If your receiver is a TEKIN or a newer Futaba, then the included plug will fit without modification. If you have a Kyosho receiver, use the Futaba J housing and cut off the small plastic tab with a pair of cutters or a small hobby knife *(figure 1-1)*

When using this speed control with Airtronics, JR, or KO Propo receivers, follow the steps below:

1) First make sure the battery is disconnected from the speed control. Using a small hobby knife, or jeweler's screwdriver, press in the three metal tabs only far enough that each of the wires can be removed from the black plastic plug housing. *(figure 1-2, step A)*

2) After removing the wires from the receiver plug, use a hobby knife or jeweler's screwdriver to lift the metal tabs on each of the wires back up. *(figure 1-2, step B)*

3) Select the plug housing that matches your radio system and insert the wires into the housing. Make sure that you put the wires in according to the lettering on the plastic housing. The red wire goes into "RED", the black wire goes into "BLK", and the white wire goes into "WHT" *(figure 1-2, step C)*. Wires will snap into place when inserted into the plug housing correctly.

***IMPORTANT:** Wiring the plug incorrectly may damage the speed control or radio receiver, and will void the warranty.*

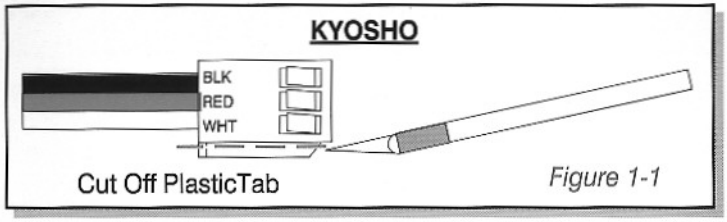


Figure 1-1

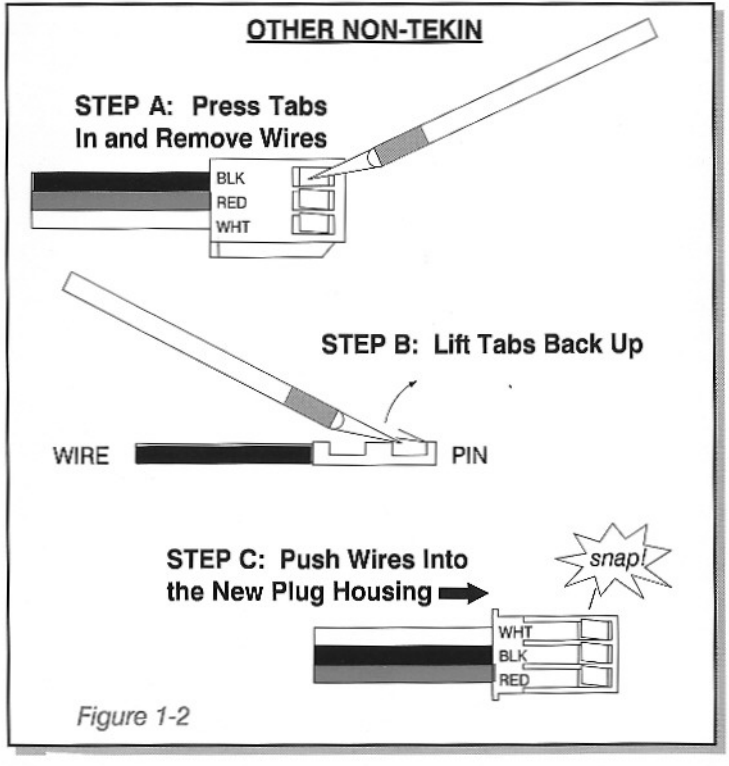


Figure 1-2

HOOK-UP TIPS

Because of its advanced design, the operation of this speed control is a bit different from that of others.

RECEIVER PACKS:

If you are running this speed control on 8 cells or less, there is no need to run a receiver pack... *In fact, it will only slow the car down! The excess power drawn by the servo and radio receiver is about enough to power the car for less than 4 seconds. The extra weight of a receiver pack will slow the car down more...* This is made possible by the built-in B.E.C. Bypass circuit which keeps the receiver voltage up until the end of a run.

However, a receiver pack may be used if desired by simply plugging it into the "BAT" socket on the receiver. When doing this, the speed control must be left turned off. Place a piece of tape over the switch, or remove the switch entirely to make sure it does not get turned on. If the TSC should get switched on accidentally, it can be damaged and will void the warranty. A small switch should be used on the receiver pack to operate the radio. The receiver pack must have a maximum of 4-5 cells and should be charged on a TEKIN 'BC' digital charger. *A receiver pack is recommended only if you are running 4 cells, or if your car is under weight.*

CHANGING PLUG TYPES:

Changing the motor and battery plugs will not void the warranty, as long as the instructions are followed, and proper polarity is observed.

Step 2 - MOUNTING

A) Mount the speed control using the provided double-sided tape. Position unit for maximum air-flow over heatsinks. Heatsinks are MANDATORY for all races of 8 minutes or less, and for any model which pulls more than 15 amps average current. DO NOT USE SUPER GLUE or any other type of glue or damage can result. If heatsinks are too loose, press the end fins slightly inward to increase tension. Make sure the heatsinks are away from any metal where a short circuit could occur.

B) Mount the switch with servo tape, supplied contact cement, or silicone glue. Again, DO NOT USE SUPER GLUE.

C) On RC 10 cars, mount the TSC in the pan and the receiver and antenna on the shock tower to avoid radio interference.

Step 3 - HOOK-UP

Please exercise extreme care when installing your speed control, as damage can be easily done. See your dealer if you need assistance.

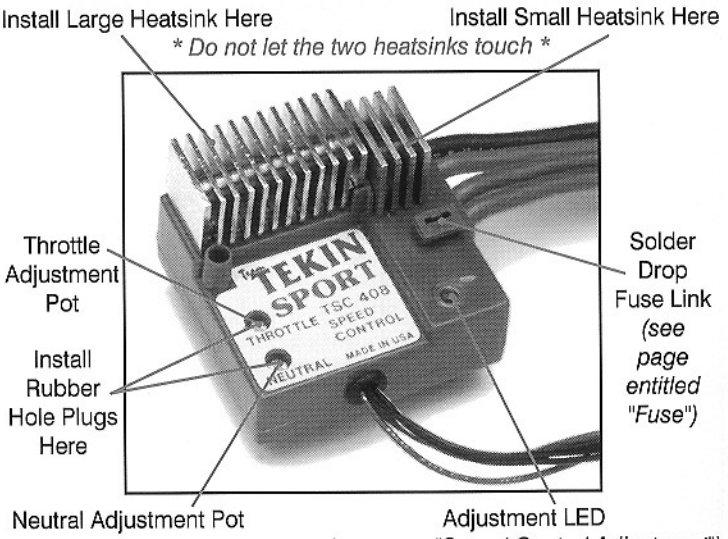
NOTES: The speed control supplies power to the receiver and servo. No additional power supply should be used for the receiver (see page entitled "Hook-up Tips"). Make sure the battery plug of the receiver in disconnected. Be careful to avoid turning on the radio when the batteries are charging.

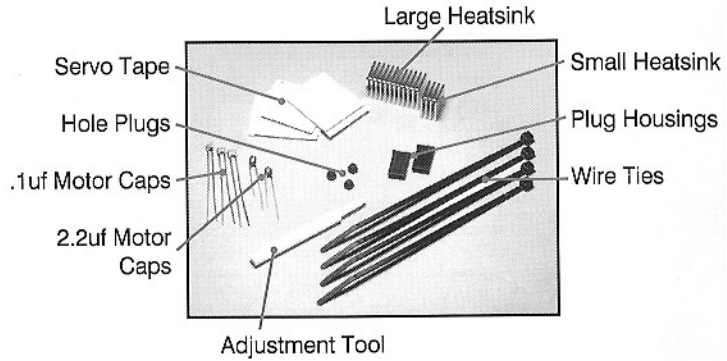
A) Plug the wire harness from the speed control into the throttle channel of the receiver. The TSC supplies a regulated 5 volts to the receiver and servo when running on 4 to 8 cells. The regulator puts out enough current for a maximum of one servo.

B) Wires should be connected as follows:

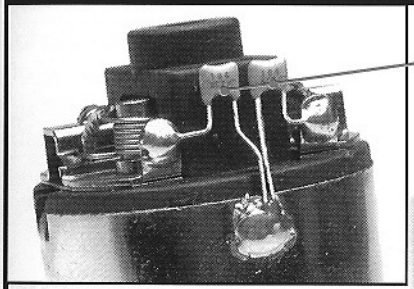
SPEED CONTROL	BATTERY	MOTOR
Black wire	(-) Negative	
Light Blue Wire		(-) Negative
Red Wire (1 of 2)	(+) Positive	
Red Wire (2 of 2)		(+) Positive

For maximum motor power, keep the wires as short as practical. If plugs are used be sure there are no exposed pins from the speed control when the motor is unplugged.





WIRING DIAGRAM



.1uf capacitors (2); Solder as shown from motor wires to can or center screw *(2.2uf cap is no longer used)*

- Battery Black Wire

4 - 8 Cells

+ Battery Red Wire

Steering Servo

Antenna

Tamiya (JST) Connector

TSC

Assoc. (AMP) Connector

Red Wire

Blue Wire

On/Off Switch

Receiver *(Plug TSC into CH 2 Throttle)*

Step 4 - TRANSMITTER ADJUSTMENT

TX TYPE	* THR EXPO	ATL	ATV or EPA HIGH	ATV or EPA LOW	THR TRIM	SUB TRIM	REV SW	MECH ADJ	COAST BRAKE
FUTABA									
FP-T2PKA	--	--	5	6	--5	--	Right	Pos. 2	ATV Low
FP-3PG	0	--	10	--	--5	--	NOR	Pos. 2	Brake Trim
FP-T2P	--	--	--	--	--5	--	Rev.	1/2	None
FP-T2PB	--	--	--	--	--5	--	Rev.	Left	None
FP-T2PD	--	5	5	6	Low 5	0	Rev.	1/2	ATL
FP-T2PBKA	--	--	10	10	Low 5	--	Rev.	Left	ATV Low Pot
FP-T2NCS	--	--	--	--	Down	--	--	--	None
FP-T2NBR	--	--	--	--	Down	--	Rev.	Up	None
PCM 1024	--4	10	5	5	N	8	Rev.	1/3	Throttle Trim
AIRTRONICS / SANWA									
3P-FM	--	--	140%	CCW	CW	--	NOR	--	Throttle Trim
XL-2P	--	--	Max.	Max.	Mid.	--	NOR	--	Throttle Trim
CS-2P	NOR	--	CW	CW	Mid.	--	NOR	--	Throttle Trim
VT-2P	--	--	--	--	Low	--	Left	Down	None
JR PROPPO									
ALPINA-2	--	--	10	10	Mid.	--	NOR	--	Throttle Trim
PCM	--	--	--	--	CCW	--	NOR	1:1	None
R756	0	--	H100	B100	Up	0	Left	--	Trim Tab, Knob
KO PROPPO									
EX-1	Min.	--	Max.	--	Mid.	--	Left	--	CH 2 Trim
EX-1 FM	Min.	--	CW	--	B	--	Dowm	--	Brake Dial
EX-II	--	--	Max.	--	Mid.	--	Up	--	Brake Trim
EX-5	--	--	Max.	--	Mid.	--	Right	--	Brake Trim
EX-7	--	--	--	--	CCW	--	Down	Pos. B	None
EX-9	Min.	--	Max.	Max.	Mid.	--	Left	--	CH 2 Trim
KYOSHO / PULSAR									
PRO 2001	--	--	H	L	Up	--	NOR	1/2	EPA Low

CCW = Counter Clockwise CW = Clockwise

** Adjust Throttle Exponential control for best balance of low speed and high speed driving power.*

Step 5 - SPEED CONTROL ADJUSTMENT

1) It is recommended that you remove the pinion gear prom the motor and/or make sure the car is on a stand before adjusting. This helps prevent any accidents.

2) Turn the transmitter and speed control ON.

3) Using the provided adjustment tool, carefully rotate the **Neutral** pot on the speed control until the motor just stops. The LED will come on bright indicating neutral.

4) Advancing the throttle slightly should cause the motor to spin. If not, flip the throttle reversing switch on the transmitter and repeat step 4.

5) Advance to full throttle on the transmitter, then adjust the **Throttle** pot on the speed control just until the LED suddenly comes on bright, then increase it a tiny bit more. The LED should go off when the transmitter trigger is backed off about 1/8 inch from full throttle.

6) Adjust the brakes with the transmitter bake trim. As brakes are applied, the LED will come on. When the throttle is on, the LED will turn off. Full throttle causes the LED to come on brighter. *The LED is more precise than a digital voltmeter and is your guarantee that you are reaching full throttle.*

7) Feel free to readjust as required for best operation. When you are finished, cover the adjustment holes with the hole plugs.

FUSE

This speed control uses a zero-loss solder-drop fuse for the highest performance, coolest operation, and elimination of the need to replace a fuse or schottky diode if you accidentally connect the speed control to the battery backwards. Instead, just the solder will blow out of the fuse.

This speed control has its own exclusive circuit with the schottky diode built in for maximum performance. There is no need to use an external schottky diode on the motor, although one may be used if desired.

It is important that you use the minimum amount of solder possible when repairing a fuse. This will assure the fuse will continue to protect under all conditions.

To repair the fuse, use a small-tipped soldering iron, and always wipe the tip off before starting. Touch the tip of the iron to the metal pins on the fuse, then apply a **small amount of solder** as close to the pins as possible. Hold the iron upright so the solder can drip down the iron onto the pins.

If you apply too much solder, hold the speed control upside down and touch the iron to the solder allowing it to melt and drip down onto the iron tip. Wipe the solder off the tip and start over.

If you follow these simple instructions, your speed control will have a long life of great performance and trouble-free operation.

TROUBLESHOOTING

1) SERVO AND THROTTLE DEAD

Dead batteries. Bad connections to speed control. Bad receiver plug connection. Customer-installed receiver plug is wired wrong. Switch needs replacing. Broken wires. Bad crystals, radio equipment or blown fuse. Speed control is damaged internally by backward connection of battery: TSC must be returned to the factory.

2) SERVO WORKS, THROTTLE DEAD

Motor or connections to motor are bad. Motor brushes hanging up. Speed control not adjusted correctly. Receiver plug or connections are bad. TSC not plugged into throttle channel on receiver.

3) THROTTLE WORKS, SERVO DEAD

Bad Servo. Servo plug or wiring bad or incorrect.

4) STUTTERING UNDER HEAVY ACCELERATION

Receiver getting magnetic field interference: Try mounting receiver on its side and/or spacing it 3/16 inch up from the chassis. If this does not work, try mounting it on its other side. Move power wires away from receiver.

5) MOTOR CUT OUT, RADIO INTERFERENCE or ERRATIC BRAKES

No capacitors or insufficient capacitors on motor: Try 2 sets of capacitors. Incorrect control wiring to receiver or servo. Transmitter Batteries Low or radio out of tune. Three-wire cable from speed control to receiver may also be too long; 6 inches is the maximum.

TROUBLESHOOTING

5) *...continued*

Tips: This TSC radiates very low noise and you should have no trouble with interference. If you do have interference, mount the TSC in the pan, and mount the receiver and antenna at the top of the shock tower. On the JRX, it is best to mount the receiver on the chassis and the speed control on the shock tower. On the Tekin Chassis, mount the receiver on its side in the fromt. Do not run the antenna along a metal or graphite chassis; it should go straight up from where it exits the receiver. **It is always a good idea to keep the receiver and antenna away from the motor, batteries, and power wires.**

6) AUTOCOUNT NOT WORKING

Capacitors required on motor. (see pages entitled "Wiring Diagram") Mount transponder at front of car away from batteries and wires. Move autocount pickup to a place on the track where throttle is wide open *(not accelerating)*. If these do not fix the problem, go to new autocount system #20.

7) MOTOR WILL NOT SHUT OFF OR RUNS SLOWLY

Moisture in speed control: Unhook batteries and let the TSC dry.

8) SPEED CONTROL SHUTS DOWN

Motor or capacitor shorted, or motor stalled. Gears or transmission are binding. TSC overheating: Heatsinks and/or more airflow needed.

9) BRAKES DO NOT WORK AT ALL

TSC damaged or improperly adjusted. Brake heatsink needed. Fuse is blown.

REPAIRS & SERVICE

This electronic Speed Control is the most advanced unit available and we believe also the most reliable. As long as it is not abused it will give years of frequent service. In the rare event you do have a problem, fill out the Service Return Card that is included with your unit and proceed as follows.

WARRANTY: Hobby dealers and distributors are not authorized to replace units thought to be defective. Repairs must be returned directly to the factory. A sales receipt must be enclosed. If unit is working properly and you just want it checked over there will be a small inspection charge.

NON WARRANTY: Repairs may be sent directly to the factory. We are not responsible for independent service stations. No estimate is provided. Customer assumes responsibility for charges, which will never exceed 50% of the list price of the unit. Repairs are returned via UPS COD CASH or billed to a Credit Card. All addresses outside the US require a credit card. You must enclose a filled return card stating the problem, a legible return address and any special shipping instructions. We cannot return units to a P.O. Box unless payment is sent with the TSC. Hobby Dealers will not replace units thought to be defective, these units must be returned directly to TEKIN ELECTRONICS, INC. for repair. Repair prices are as follows: *Flat rate labor* $8.00, *Replace wires $4.00, Replace switch $5.00, Replace plug $5.00, Repair brakes $6.00, COD $4.50, 2-Day return shipping $6.00, Next day return shipping $15.00, Handling $3.00.* Most repairs are shipped back out within 3 working days. Please allow sufficient delivery time *(up to 2 weeks)*. Rates subject to change. Sorry, we do not repair non-TEKIN speed controls.

SHIP REPAIRS TO:

TEKIN SERVICE
940 Calle Negocio
San Clemente, CA 92673
USA