LIMITED WARRANTY

TEKIN ELECTRONICS, INC. guarantees this TSC 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, 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 TEKIN assume any liability.

Additionally, these items void the warranty:

- Using the same polarity connectors on the battery and motor wires from the Speed Control.
- Wires or connections which are exposed and not insulated properly.
- Allowing water or moisture into the Speed Control.
- Incorrect wiring.

By the act of using this Speed Control the user accepts all resulting liability.

TEKIN 432M MARINE

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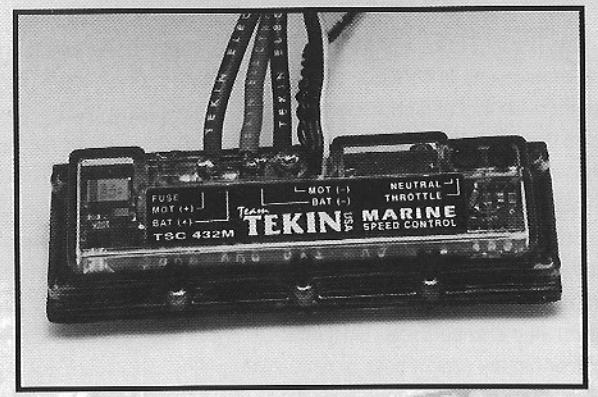
OWNER'S MANUAL

432M MARINE



TEKIN®

Introduction

The TEKIN TSC 432M MARINE Speed Control is the highest performance unit of it's type. It provides smooth proportional throttle for maximum control at high speeds. Designed specifically for Marine R/C model use, the 432M has many advanced features such as high frequency regenerating motor drive. This makes the motor run much cooler and therefore last many times longer. Because the motor runs cooler and more efficiently, more power is developed and the run time is also increased by up to 25%. High power Mosfet output stage handles 4-32 cells, and up to a "0.25" cobalt sized motor. Twin ".05" or ".075" motors may also be used. Built in B.E.C. eliminates need for separate receiver battery (on 14 cells or less). The makes installation quicker, easier, and saves drag-causing weight. The unique solder-drop fuse protects against accidental voltage reversal without causing power loss. Rugged construction with built in water cooled heatsink is compact, lightweight, and very powerful. The large bore water passage provides optimum thermal transfer, for maximum cooling. The unit may easily be waterproofed (to a depth of 12") with silicone glue. Water resistant power switch mounts easily in a round hole. The boat will slow down and "go dead" slowly in order to allow sufficient time to return to shore. These and other features make the TEKIN 432M the best choice for every electric R/C boat.

432M

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Specifications

TRANSISTOR TYPE	PREMIUM SIFET MOSFET
OPERATING FREQUENCY	2700 Hz
FORWARD CURRENT RATING	300 amps
VOLTAGE INPUT	4 to 14 Ni-Cd cells
with receiver battery pack	4 to 32 Ni-Cd cells
VOLTAGE DROP @ 10 AMPS	0.03 volts
BEC OUTPUT	5 volts
DIMENSIONS	1.96 x 1.72 x .66 inches (49.8 x 43.7 x 16.8 mm)
WEIGHT (with wires)	2.47 ounces (70 grams)
POWER WIRES	(4) 15-gauge silicone

FEATURES:
Thermal overload protection, metal tab transistors (FETs), water resistant case, LED indicator, Tamiya-type battery connector, bullet-type motor connectors, and plugs to fit all popular radio receivers.

Specifications subject to change without notice

Section 1: Connector Selection

The first step to preparing your 432M for installation is to ensure that it's compatible with the type of radio receiver you are using. This speed control is equipped with the Tekin Universal Connector System. By installing one of the included receiver adapter plug housings, the 432M can be used with Airtronics, Sanwa, Futaba J, KO Propo, MRC, JR, and Kyosho Pulsar radio systems. The 432M is equipped with a Futaba "J" type adapter plug from the factory. This plug is compatible with Futaba, MRC, Tekin, and with slight modification, Kyosho, ACOMS, and JR receivers. For use with other brands of receivers, it will be necessary to change the receiver plug. Refer to the chart below to determine which adapter plug is required for your radio system.

FIGURE 1-1: Plug Receiver Selection

PLUG	RECEIVER
FUT (Factory Installed)	Futaba, Tekin, MRC, Kyosho*, JR* ACOMS*
AIR	Airtronics, Sanwa
KO	KO Propo, Graupner

To install a different plug on the 432M, the original plug must be removed. Depress the small metal tabs holding the wires in place and remove all of the wires (one at a time) from the adapter plug. Before re-installing, bend the small metal tabs at the end of each wire back into their original position with a small screwdriver or a hobby knife (refer to Figure 1-2). When re-installing the wires, be sure the metal tab is in line with the opening in the adapter plug. Push each wire in until the metal tab snaps into place.

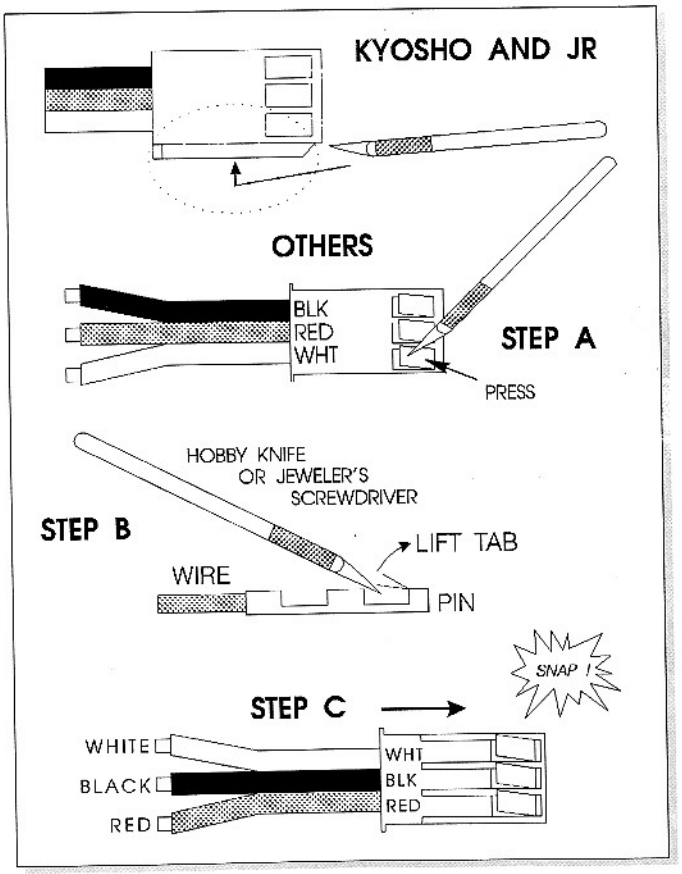


FIGURE 1-2

When changing receiver adapter plugs, be sure to insert the wires according to the lettering on the adapter plug. The red wire slot is labeled "RED," the black wire slot is labeled "BLK," and the white wire slot is labeled "WHT." If you are unsure about the proper wiring configuration for your radio system, check with your local hobby shop or contact a technician. Improper installation of these wires may cause damage to the radio receiver and/or the speed control and will void the warranty. When using a modified version of the Futaba receiver adapter plug for use with Kyosho, ACOMS, or JR receivers, be sure the plug is inserted into the receiver with the white wire facing inward (closest to the receiver's label).

Section 2: Waterproofing

The TSC 432M comes in a water resistant case. It however is not waterproof. If your boat does not have a water-tight radio compartment, you may waterproof the speed control to avoid damaging it. To do this, use ordinary clear silicone glue. Place glue in the wire exit cavity, being sure all areas are covered. Also glue around the receiver/switch wiring harness opening. Place rubber plugs into the adjustment pot holes after setting. Doing this properly will give you a completely waterproof speed control.

Section 3: Motor & Battery Selection

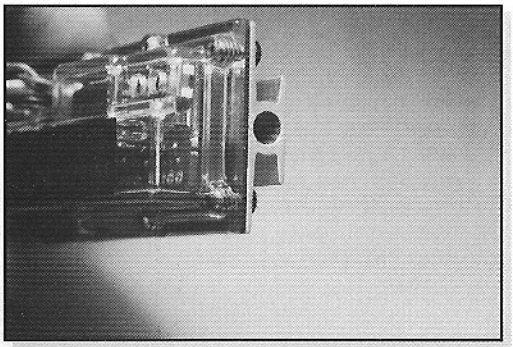
The 432M can use a variety of motor and battery combinations. Generally the motor/battery recommendation of the kit manufacturer should be followed. If your boat uses a single 6 cell SCE type battery pack for power, then generally a 1700 Mah 7 cell P170 or SCRC battery can be substituted for a nice power gain, with the same motor and prop. The 432M can drive twin "0.075" stock motors. The maximum number of cells for twin "0.075" motors is 14, with the motors wired in parallel (+ to + and - to -). When using over 14 cells, it is recommended that they be rated at 1200 MAH or less. Depending on the motor/battery combination, the fuse on the speed control can blow if the prop is too large or the motor too powerful for the batteries used. If the fuse continually blows install part #SCH500 Schottky Diode on the motor. This part is required when running over 14 cells. The fuse will blow easiest when running at about 1/4 - 1/2 throttle, as this is when the most regenerating occurs.

Whenever you run more than 7 cells the speed control must be water cooled (see Figure 4-1), or the unit can overheat. If the unit gets too hot the fuse may blow, and/or it may shut-off in the middle of a run, in which case it will usually come back on shortly afterwards. If you install part #SCH500 diodes on the motor, the speed control will run slightly cooler.

Section 4: Mounting & Cooling

When choosing a location for the speed control, look for an area to protect the speed control from moisture, and as far away from the radio receiver as possible. The speed control is water-resistant; but it is not warranted to be waterproof. All speed controls generate radio signals through the wires for the motor and battery that can cause interference when placed too close to the receiver. The mounting location you choose should also allow you to connect the wires to the motor and battery pack without modification.

The TEKIN 432M has water-cooling capabilities. You must purchase an accessory water pick-up (PITOT) tube in order to water cool the speed control. It should have 1/8" size tubing. Mount it to the transom. Run a silicone water line (supplied) from the water pickup to the speed control. Cut to length and insert the silicone water line tubing into the hole in the heatsink on the back of the speed control. Moisten the tubing and insert between 1/4", and 1/2" into the metal heatsink. It will stay in place by itself (see Figure 4-1). Then run the tubing from the other end of the heatsink to the motor brushes then motor housing, if you are using a water cooled motor. If you are not using a water cooled motor just run the tubing overboard.



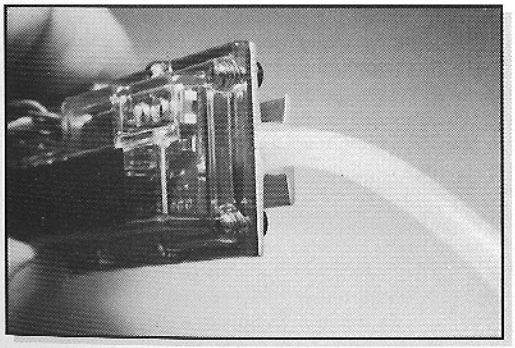


FIGURE 4-1: Water-Cooling Connections

Use the double sided tape included with the speed control to mount the 432M. Clean the bottom of the speed control and the chassis with a mild solvent (be sure not to damage any plastic parts). Oil residue from handling the speed control with your fingers will effect proper adhesion of the double-tape, so be sure to avoid touching the areas the tape will be installed. Place the double sided tape on the bottom of the speed control, then stick the unit in place by pressing down firmly.

When routing the speed control's wires for the motor and battery pack, be sure to secure them in place and at a safe distance from all moving parts with the included zip-ties. This will keep the wires in good condition and prevent them from coming near the receiver or the antenna, preventing potential interference. If a wire comes closer than 1" to the receiver, interference can occur.

A final step to connecting your speed control is to plug the receiver harness into the radio receiver. This speed control includes a BEC (battery eliminator circuit) that eliminates the need for a separate receiver battery pack. It is good when using up to 14 cells in series. If you use more than 14 cells you must use a separate receiver battery; see page 15. Plug the 432M's harness into channel number two of your radio receiver and the wiring is complete.

Section 5: Wiring

The 432M has the popular Tamiya style (JST) battery connector and bullet-style motor connectors. The bullet-style connectors will adapt to most motors included with R/C kits. If these connectors are not suitable for your application, the original connectors must be removed from the speed control and an appropriate connector reinstalled. Your dealer should have suitable connectors in stock.

The battery connector included with the 432M is a Tamiya-type (JST). It will fit Tamiya and many other battery packs. **WARNING:** Kyosho and some other battery packs use a Tamiya style connector as found on the

432M. However, the plus (+) and minus (-) wires are arranged opposite from Tamiya. If one of these Kyosho battery packs are plugged into the 432M, the polarity will be backward. There will be high current flow and the fuse will blow; to repair fuse see page 16. Before plugging a battery pack into the speed control make sure the red and black wires on the speed control line up with the red and black wires on the battery pack. In the event the battery you choose doesn't have a suitable connector, it will have to be removed and a new one installed.

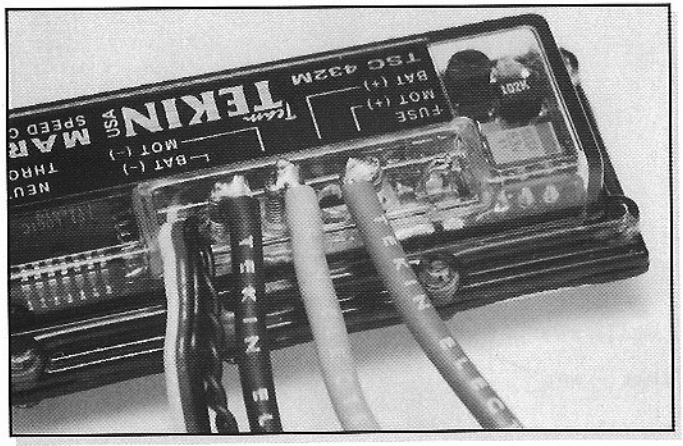
FIGURE 5-1: Speed Control Wire

COLOR	ATTACH TO:
Red Wire	Battery Positive (+)
Black Wire	Battery Negative (-)
Red Wire	Motor Positive (+)
Blue Wire	Motor Negative (-)

The speed control has solder terminals on it that the wires attach to. If you are running dual batteries or motors you may need to solder additional wires to the terminals on the speed control, or make a harness. Often wiring cables can be re-used from off the mechanical speed control that comes with the kit. See *Figure 5-3* (on page 10) on how to connect the wires.

The 432M has wiring terminals on the side of the unit, for easy installation of various connectors. The motor positive (+) and battery positive (+) are both common, they connect together and to the left most terminal on the speed control. The motor negative (-) has a separate wire running to it from the middle terminal on the speed control. The battery negative (-) also gets a separate wire from the battery negative (-) terminal to the right most terminal marked "BAT (-)" on the speed control (see Figure 5-2). Be very careful when connecting the wires

FIGURE 5-2: Solder Terminals



as you can damage the speed control. See your dealer if you need assistance. When soldering to the speed control terminals take care not to cause any shorts or apply excessive heat, as the speed control may be damaged. The proper procedure is to first strip the wire 1/8" and than apply solder to the wire (tin it). Apply a small amount of solder to the speed control terminal. Then touch the wire to the speed control terminal and apply the soldering iron to join them together. **Do not solder any wires to the speed control's fuse pins on the left of the terminal (see page 16).**

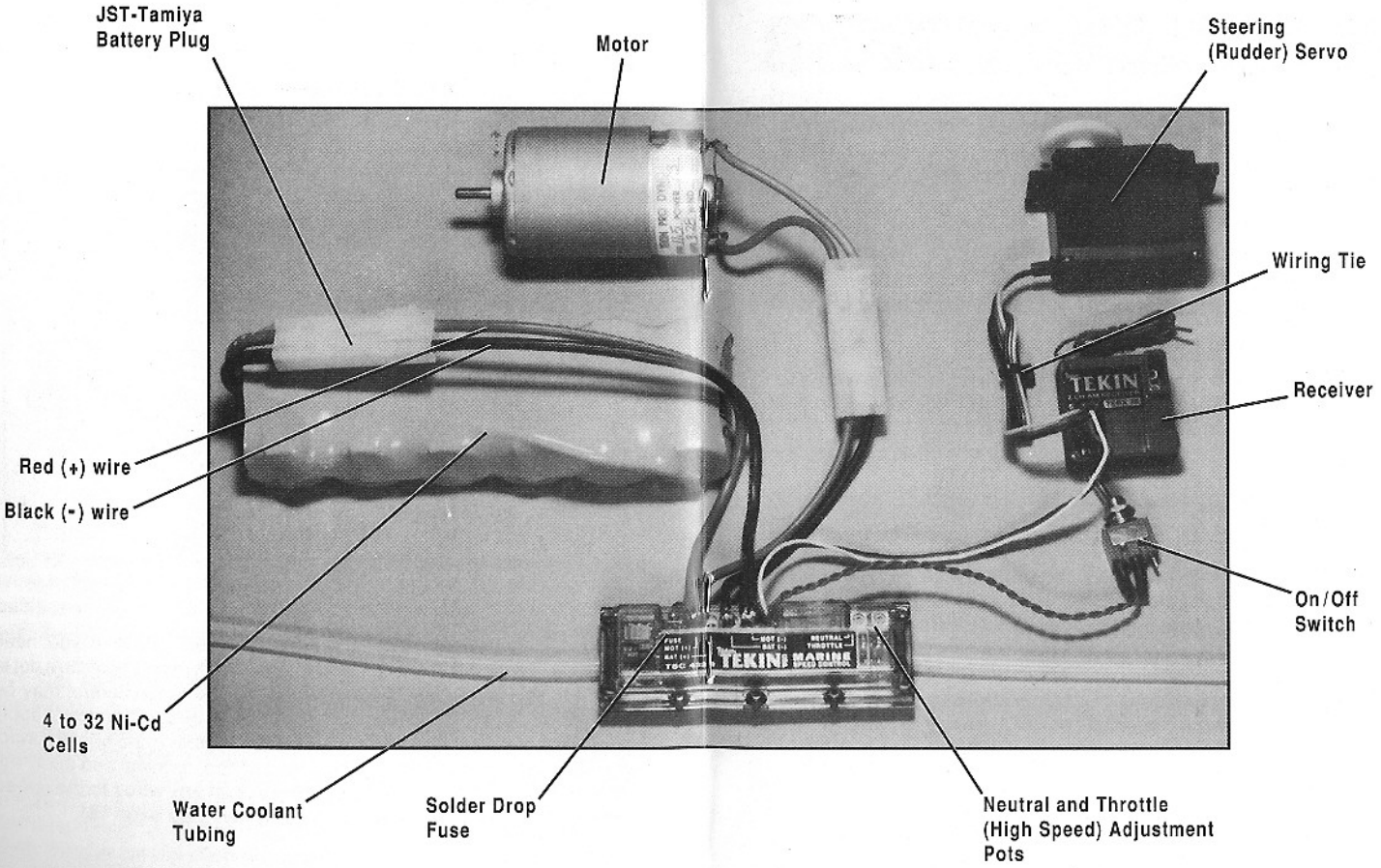


FIGURE 5-3: Wiring Diagram

Section 6: Capacitor installation

To prevent radio interference, a minimum of two (2) uf capacitors (refer to Figure 6-1) should be attached to the driving motor. Some motors may already have 2 or 3 capacitors installed, which would be adequate for use with the 432M. If the motor you plan to use does not have capacitors, you must install them.

Most open-endbell stock and modified motors have four tabs, two positive and two negative. For these applications, it is easiest to install the two .1uf capacitors next to each other on one side of the endbell. Take a capacitor and solder one of its leads to the positive tab of the motor. Solder a lead from the other capacitor to the negative tab of the motor. Solder the remaining lead from both capacitors to a ground. On a stock class motor, they must be soldered directly to the can of the motor. Modified class motors have a third tab held in place by the motor endbell screw, where the remaining leads from the capacitors are soldered (refer to Figure 6-1).

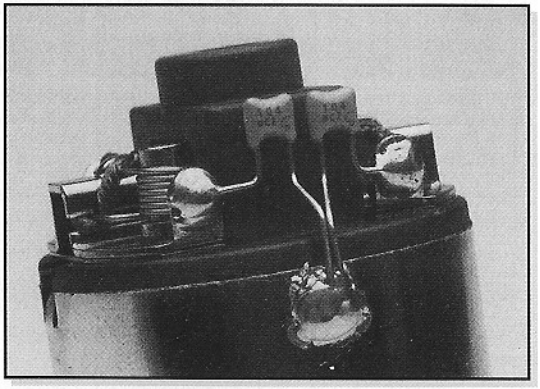
NOTE: It's best to cut the leads of the capacitors as short as possible, while still allowing proper installation.

A closed endbell, or Mabuchi motor has only two tabs, one positive and one negative. This requires the capacitors be installed on opposite sides of the motor using the same procedure as the stock class motor. Solder one lead of each capacitor to the positive and negative tabs of the motor. Solder the remaining leads to the can of the motor.

NOTE: For best results when soldering capacitors directly to the motor, scrape or lightly file any plating or paint from the can. Doing so will make solder application much easier.

CAUTION: Do not use a 47 uf "Barrel" type capacitor on the 432M. These types of capacitors are not compatible with high frequency speed controls and can explode if used.

FIGURE 5-1:
Capacitors



Section 7: Transmitter adjustment

Before turning on your speed control, there are a few transmitter adjustments that are necessary to insure proper operation. On the next page is a chart listing most popular radio systems. This chart outlines some of the radio's features that if not properly adjusted, may affect proper operation of the speed control. Find your radio system on the chart, Figure 7-1 (listed by manufacturer and type), and adjust accordingly.

OTHER TRANSMITTERS:

If you don't find your transmitter listed in the chart, generally, settings should remain in their neutral position and the throttle should be switched to the reverse position.

FIGURE 7-1: TRANSMITTER ADJUSTMENTS

TX TYPE	TH EXPO	ATL	ATV or EPA HIGH	ATV or EPA LOW	TH. 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.	1/3	ATL
FP-T2PBKA	--	--	10	10	Low 5	--	Rev.	Left	ATV Low Pot
FP-T2NCS	--	--	--	--	Down	--	--	--	None
FP-T2NBR	--	--	--	--	Down	--	Rev.	Up	None
PCM 1024	0	10	6	10	N	8	Rev.	1/3	Throttle Trim
AIRTRONICS/SANWA									
3P-FM	--	--	140%	CW	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 PROPO									
ALPINA-2	--	--	10	10	Mid.	--	NOR	--	Throttle Trim
PCM	--	--	--	--	CCW	--	NOR	1:1	None
R756*	0	--	H100	B100	Up	0	NOR	--	Trim Tab, Knob
KO PROPO									
EX-1	Min.	--	Max.	--	Mid.	--	Left	--	CH 2 Trim
EX-1 FM	Min.	--	CW	--	B	--	Down	--	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

** Defualt Values*

CCW = Counter Clockwise CW = Clockwise

Section 8: Speed Control Adjustment

Before turning on the speed control for initial adjustment, we recommend you remove the drive coupling from the motor, or make sure the model is held securely on a stand with the prop clear. This will prevent any movement of the model during initial adjustment of the speed control.

Turn on your radio, then the speed control. The motor may begin to run because the speed control is not yet calibrated to the neutral point of the radio. Rotate the speed control's neutral adjusting pot in either direction with the included screwdriver until the motor just stops running. The neutral point is indicated by the speed control's LED illuminating. Next apply full throttle on the transmitter. Rotate the "throttle" pot until the LED light just comes on.

NOTE: When adjusting for full throttle, it's best to stop rotating the "Throttle" adjuster as soon as the LED lights (the LED should go out after backing off the transmitter throttle about 1/8 inch or 3 mm). This will provide the most proportional throttle control. When all adjustments are set to your satisfaction, use the two rubber plugs included with the speed control to seal the access holes for the adjusting pots. These plugs will help prevent water and other debris from contaminating the electronic components inside the speed control.

Receiver Battery Packs

The 432M is equipped with a BEC that eliminates the need for a separate receiver battery pack when using 14 cells or less. A standard AA-cell or after-market receiver battery pack may still be used if desired. To use a separate receiver pack, simply plug it into the receiver in the location marked for the battery (refer to the receiver's instructions for the proper location). The speed control and receiver will now be activated by the switch

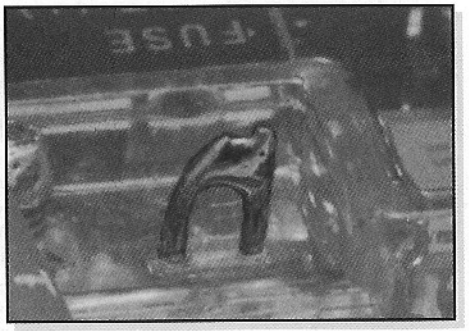
for the battery pack. Be sure to leave the switch for the speed control in the "off" position when using a separate receiver battery pack. Turning on both switches at once may cause damage to the receiver and/or the speed control.

Note: A receiver battery pack MUST be used for:

- More than 1 standard servo (steering or otherwise)
- More than 14 cells connected in series
- Maximum radio range

Solder-Drop Fuse

The TSC 432M has a unique Solder-Drop fuse to protect against reverse voltage without power loss. The fuse consists of 2 gold pins with a drop of solder between them to carry regenerating current. In an overload, the solder will melt and blow of the pins. To repair just re-solder the 2 pins together with ordinary electronic grade solder. ***Do not solder any wires to the fuse.***



TROUBLE SHOOTING

SYMPTOM	CAUSE	SOLUTION
Erratic Radio Operation	No capacitors on motor.	Install capacitors (see Section 5).
	Receiver or antenna too close to speed control and/or wires.	Move receiver away from speed control and wires.
	Main battery voltage to low.	Recharge main battery pack.
Not Reaching Full-Speed	"Throttle" adjuster pot not set correctly.	See Section 7 of instructions.
Overheating	No cool down period between runs.	Allow speed control to cool down between runs.
	Clogged or unconnected water line.	Blow silicone water line clear of debris.
Speed Control Shuts Down	Binding in motor or drivetrain. See also "Overheating."	Ensure drivetrain is operating smoothly.
Motor Won't Shut Off, Runs At Low Speed	Moisture in speed control.	Disconnect battery immediately and let dry.
Throttle Works, Steering Dead	Bad servo and/or wiring. Servo not plugged into channel one.	Replace steering servo. Plug servo into channel 1, steering.

SYMPTOM	CAUSE	SOLUTION
Steering Works, Throttle Dead	Speed control receiver harness improperly wired or not plugged into throttle channel.	Refer to Section 1 and 5 of the instruction manual.
	Faulty motor and/or wiring.	Check condition of motor and related connections.
	Transmitter and/or speed control not adjusted properly.	Refer to Section 7 and 8 of the instruction manual.
	Battery voltage too low.	Recharge battery.
	Faulty battery and/or wiring.	Check condition of battery and related connections.
Throttle And Steering Inoperative	Contaminated on/off switch.	Clean or replace switch or return to factory for repair.
	Dead Battery	Charge Battery
	Bad Radio Crystals	Check / Replace
	Bad Radio Gear	Check / Replace
	Speed control wiring Harness improperly wired.	See section 5
Blown Fuse	Speed control connected to battery backwards. Motor is too powerful for speed control to handle.	Re-solder fuse ink, see page 16. Change motor, battery, or prop.

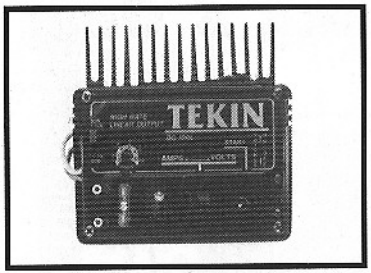
Real ▲ Racing ▲ Gear

TEKIN AM & FM RECEIVERS

Designed specially to reject electric motor noise. All receivers have new ceramic crystal filter I.F. stage that dramatically increases rejection of other transmitters operating on a frequency close to yours. (40 KHz spacing AM, 20 KHz or better FM) Small and light design, 1.19" x 1.19" x .45". Weight .45 oz. Available on 27, 29, 40, 72, 75 MHz. Uses new Futaba J plugs and Airtronics. KO plugs may also be used if adapted according to the instructions.

A TEKIN AM Exclusive!

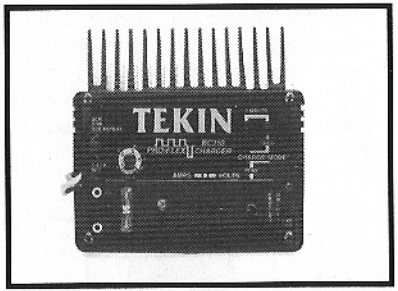
50% narrower bandwidth rejects signals from transmitters on adjacent frequencies. The only Micro AM Receiver with this feature!



BC100L
Linear Charger

The BC100L has a 5-amp linear output, and up to 10-amps in the soft-pulse mode. It's infinitely adjustable down to .5 amps which is ideal for charging receiver packs. A trickle on/off switch allows trickle mode to be disabled. Trickle mode is also capable of charging in linear or soft-pulse modes. Works off a 12V automotive battery charger which few, if any other peak chargers can.

BC210
Proflex Charger



The Proflex BC210 Charger uses negative pulses to recondition worn cells, partially restoring power and run time. Allows recharging the same pack all day without damaging cells, and with minimum loss of performance. Makes all cells develop more voltage under load for ***more punch.*** *Advanced technology from TEKIN.*

Look for Tekin's new battery management system scheduled to be released in the fall of '92!

REPAIRS

This speed control is designed to withstand the demands of most reasonable R/C applications. As long as speed control is not abused, it will give years of frequent service. In the rare event you do have a problem, you may 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. You must enclose a note stating the problem, a legible return address and any special shipping instructions. We cannot return units to a P.O. Box unless payment or valid credit card number (we accept VISA, Master Card, Diner's Club, Carte Blanche, and JCB) is sent with the TSC. Please allow sufficient shipping time, up to 2 weeks. 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, COD $4.00, 2-Day return shipping $4.00, next day return shipping $14.00. Most repairs are shipped back out within 3 working days. Rates subject to change. Sorry, we do not repair non-TEKIN speed controls.
SEND REPAIRS TO:

Tekin, Inc.
McCall, Idaho
(208) 634-5559
www.teamtekin.com