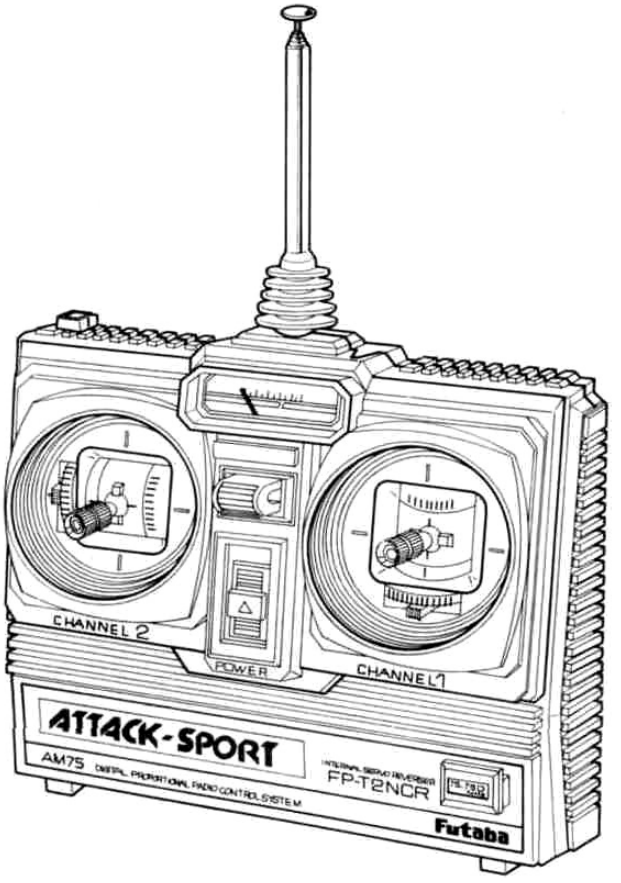
Futaba

DIGITAL PROPORTIONAL RADIO CONTROL

INSTRUCTION MANUAL

D60656



ATTACK-SPORT BEC SYSTEM

FP-2NCS/2NCR

•The ATTACK-SPORT is a high performance 2 channel digital proportional R/C set based on the acclaimed ATTACK and has a built-in BEC (Battery Eliminator Circuitry) system. Since the power receiver and servo power is supplied from the running Nicd battery, there is no troublesome wiring and the vehicle can be made lighter.

Thank you for purchasing a Futaba digital proportional radio control set.
Please read this manual carefully before using your set.

CONTENTS

FEATURES OF ATTACK-SPORT

The ATTACK-SPORT has a BEC function

- **The BEC (Battery Eliminator Circuitry) system is a high performance constant voltage circuit (regulator). Since the running Nicd battery can also be used as the receiver servo power supply, there is no troublesome wiring and the vehicle can be made lighter.**
- **Transmitter is Built-in servo reverse switches. (FP-2NCR)**

TRANSMITTER FP-T2NCS/T2NCR

- Racing specification short aluminum stick lever makes operation extremely easy.
- The stick can be changed to a ratchet system by installing an optional slider.
- Servo reverse switches (steering & throttle). Since each servo can be switched between forward and reverse from the outside of the transmitter, linkage hookup is extremely easy. (T2NCR)
- Level meter shows the state of the battery at a glance.
- Crystal can be changed from the outside. (Except 72/75 MHz in USA)

RECEIVER FP-R102JE

- Miniature and lightweight high-performance AM 2CH receiver with built-in BEC is realized by using chip parts. (20% smaller and 35% lighter than our R102GF.)
- Intermodulation interference characteristic improved substantially by using a new circuit system AIC circuit.
- Reliability is improved further by using the unique Futaba custom decoder 1C.
- Newly designed case is small and easy-to-use.
- High sensitivity design by built-in RF amp.
- High-performance built-in BEC system can handle power supply voltages up to 8.4 V.

SERVO FP-S148
RUGGED, LOW-PROFILE SERVO

- The PP-S148 is a low 1.4 inches high and has a thin design that can be easily mounted in all models.
- Vibration and shock resistance have been improved further by using a direct wiring system which directly connects the servo amp, motor and potentiometer.
- The height of the servo has been reduced and high torque, high speed, and smooth movement equal to that of the coreless servo have been realized by using a new small, high-performance motor. (Output torque 42 oz-in <3kg, cm), operating speed 0.22 sec/60°).
- New indirect drive/completely sealed potentiometer substantially improves vibration and shock resistance, and neutral accuracy.
- Unique Futaba power-saving custom 1C provides high starting torque narrow dead band, and excellent track-ability.
- Fiberglass P8T (polybutylene terephthalate) servo case is mechanically strong and is invulnerable to glow fuel.
- Strong polyacetyl resin precision servo gear featuring smooth operation, accurate neutral, and minimal back-lash.
- Fiberglass epoxy PC board with THRU-THE-HOLE plating improves the servo amp vibration and shock resistance.
- Thick plated connector pins eliminate the problem of faulty contact, improve reliability against shock and vibration, and prevent reverse insertion.
- Special pad grommets simplify mounting of the servo, and are extremely vibration-resistant.
- Six kind of special adjustable horns are available.
- High 42 oz-in (3kg-cm) output torque is perfect for almost all models.

CONTENTS AND RATINGS

	FP-2NCS	FP-2NCR
Transmitter	FP-T2NCS x 1	FP-T2NCR x 1
Receiver	FP-R102JE x 1	FP-R102JE x 1
Servo	FP-S148x 2	FP-S148 x 2
Others	Switch, frequency flag, etc.	

Specifications **are subject to change without prior notice.**

Transmitter FP.T2NCS/T2NCR	
Operating system	2 stick
Transmitting frequency	27MHz bands 1 to 6.72, 75MHz
Modulation	AM (Amplitude Modulation)
Power requirement	12 0V. penlight battery x 8
Current drain	170mA

Receiver FP-R102JE	
Receiving frequency	27 MHz and 72/75 MHz band
Intermediate frequency	455 kHz
Power requirement	4.8 V to 8.4 V (BEC built-in)
Current drain	8.4V/12mA,4.8V/33mA (no signal)
Dimensions	1.23x 1.87 x 0.78 in 133x47.4 x 19.8mm)
Weight	0.88 oz 125 g)
Range	300 m on the ground with FP-T2NCS T2NCR (At the best radio wave condition of environment) -

SERVO FP-S148	
Control system	+pulse width control
Operating angle	One side 45° or more
Powar requirement	4.8V-6V
Current drain (IDLE)	6.0V, 8mA (at idle)
Output torques	42 oz. in. (3 kg cm)
Operating sp—ed	0.22 *sec/60°*
Dimensions	1 .59x0.77 x 1.4 in. (40.4 x 19.8 x 36 mm)
Weight	1.5 oz.(44.4g)

TRANSMITTER FP-T2NCS/T2NCR

• Nomenclature

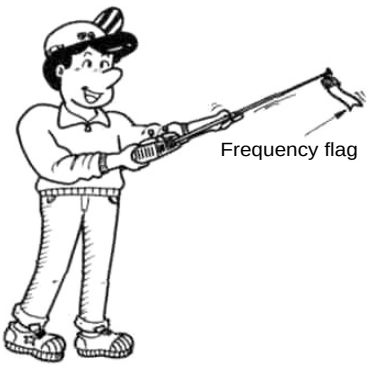
•The name of each part of the transmitter is shown in the figure. Learn them before operating your set.

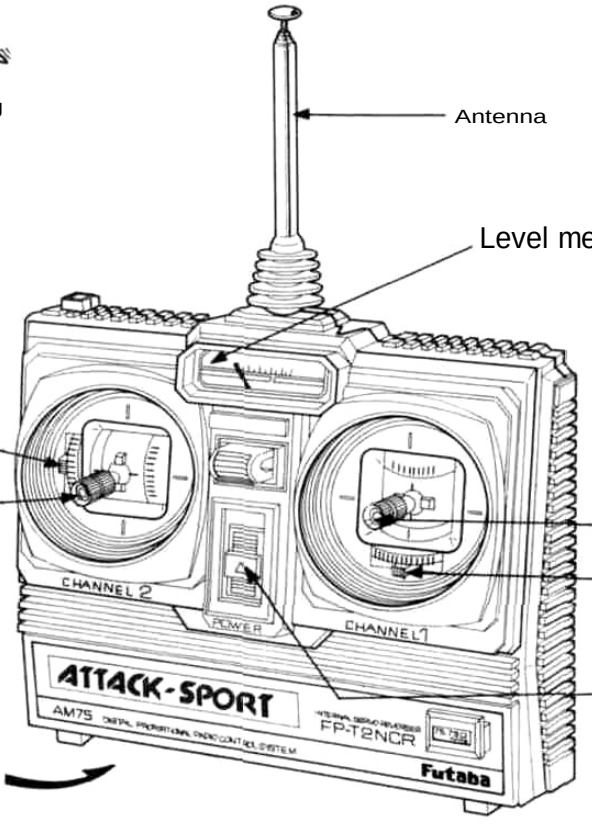
When running the vehicle, extend the antenna fully.

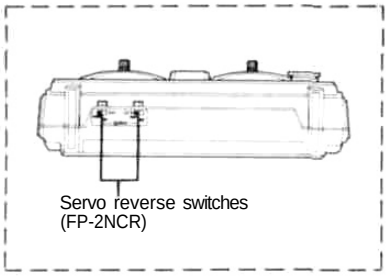
Before using the set, check the remaining battery capacity by checking the level meter.

Good Caution No good

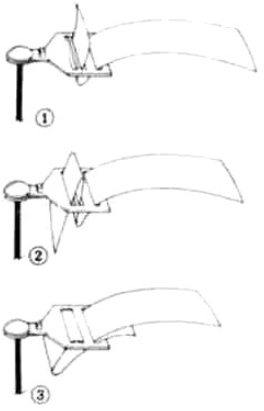
Change the battery.



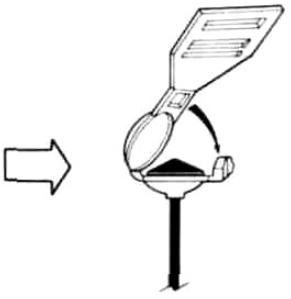




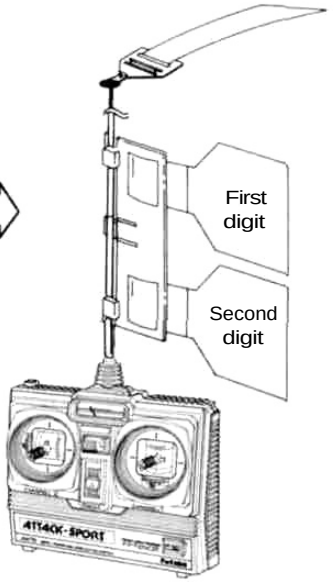
•USING THE FREQUENCY FLAG



Attach the frequency flag to the flag holder as shown in the figure.

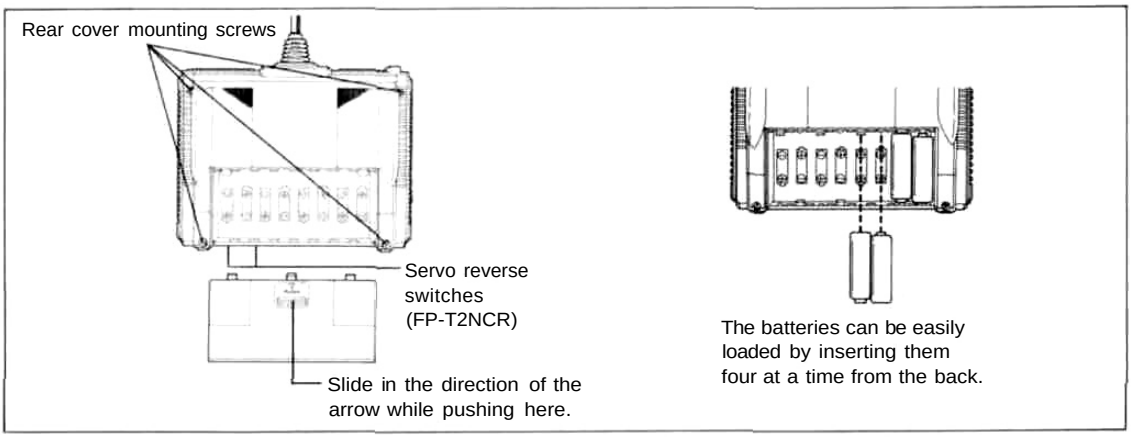


The flag can be attached to and removed from, the antenna with one touch.

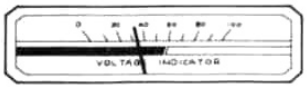


•LOADING THE PENLIGHT BATTERIES

• Remove the battery cover at the rear and insert eight penlight batteries in the correct polarity.

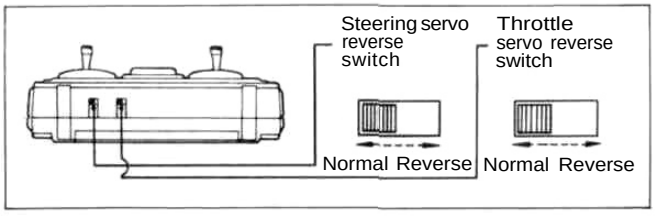


• Extend the antenna fully and set the power switch to ON.
The level meter pointer should deflect to the silver zone. If the pointer does not move, or moves very little, check for poor battery contact, incorrect battery polarity, or faulty batteries.
• If the pointer of the level meter deflects to the red zone, the range of the radio waves will become short. When the pointer drops to the boundary between the silver and red zones, change the batteries.
•The trim levers are used to fine adjust the steering angle. They are used to adjust the neutral position and for correcting the running posture after the mechanism is mounted. After test running, make corrections with the rod adjuster, etc. and operate the set with the trim levers in the neutral position as much as possible.

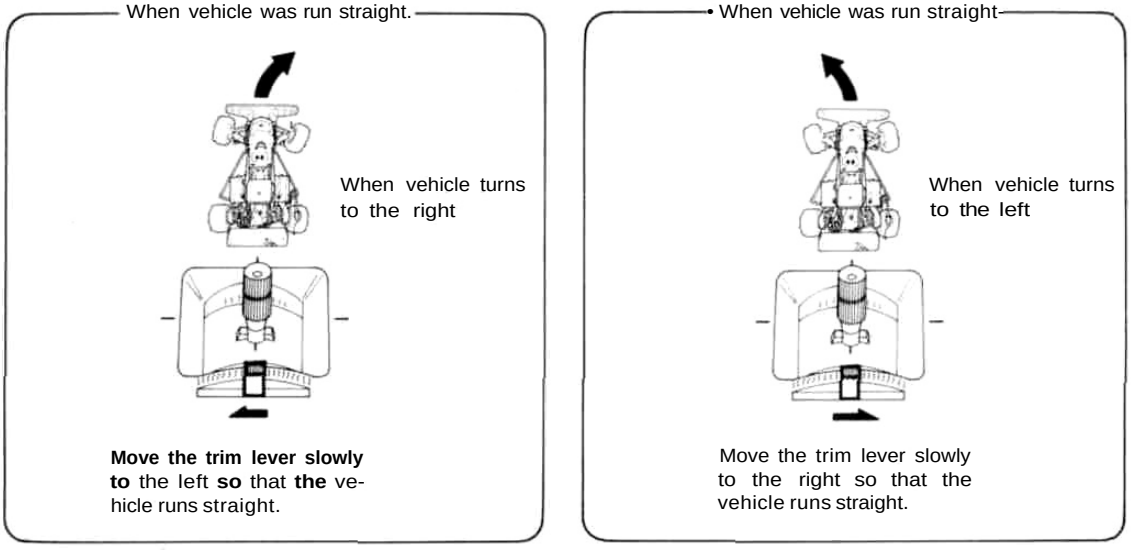


•SERVO REVERSE SWITCHES (FP-2NCR)

•This switch makes servo rotation to another-direction.
• After fixed servos onto your model, and found that rotation is wrong-way, switch to another direction.
•Servo reverse switches are located at bottom of Transmitter case like drawing below:



•STEERING TRIM LEVER ADJUSTMENT

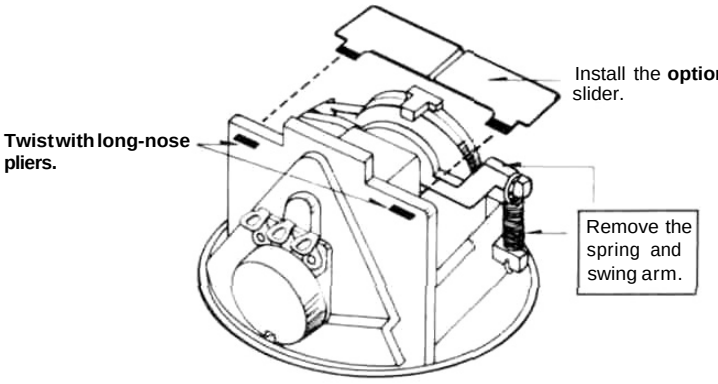


*Adjust the trim lever so that the vehicle runs straight on a smooth road.

The throttle trim lever is used to fine adjust the speed controller stop position, etc.

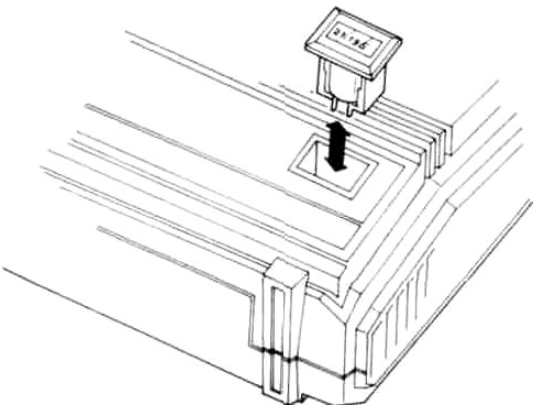
•CHANGING THE THROTTLE STICK FROM A SELF-NEUTRAL SYSTEM TO A RATCHET SYSTEM

•When changing the throttle stick from a self-neutral system to a ratchet system, install the optional slider. Then, remove the spring and swing arm.



•CRYSTAL REPLACEMENT

• **When changing the band, remove the crystal holder and change the crystal. (Except 72.75 MHz in USA)**



•Futaba Digital Proportional Frequencies (FOR U.S.A.)

•The frequency of Futaba digital proportional sets can be changed within their own band. There are 4 different bands for you to choose from (27 MHz, 50—53 MHz, 72 MHz, and 75 MHz.) Please see chart listed below for specific frequency and its intended use. Please note there are specific frequencies allocated for aircraft **only** and surface only use.

•The frequency can be changed within the same BAND by using a precisely matched pair of Futaba crystals. However, Futaba recommends that you return your system to our factory service department for frequency changing, as turning may be necessary for proper operation. Changing frequency from one band to another is NOT possible.

•Always change frequency flag when frequency is changed. The frequency flag is to be attached to the top of antenna and the channel designation to the base. (See Drawing)

• It is illegal to change crystals of **72—75** MHz bands in the **U.S.A.**

Frequency Channel No. Flag Color

26–27 MHz – Aircraft/car/boat

	Color
26.995	Brown
27.045	Red
27.095	Orange
27.145	Yellow
27.195	Green
27.255	Blue

50/53 MHz – Aircraft/car/boat – Fcc Amatuer License required

Channel No.	Color
50.800	RC00
50.840	RC02
50.880	RC04
50.920	RC06
50.960	*RC08*
	Color
53.100	Black-Brown
53.200	Black-Red
53.300	Black-Orange
53.400	Black-Yellow
53.500	Black-Green
53.600	Black-Blue
53.700	Black-Violet
53.800	Black-Gray

72 MHz – Aircraft only

72.030	12	*72.470	34
*72.070	14	72.550	38
*72.110	16	72.590	40
*72.150	18	72.630	42
*72.190	20	72.670	44
*72.230	22	72.710	46
*72.270	24	72.750	48
*72.310	26	72.790	50
*72.350	28	72.830	52
*72.390	30	72.870	54
*72.430	32	72.910	56

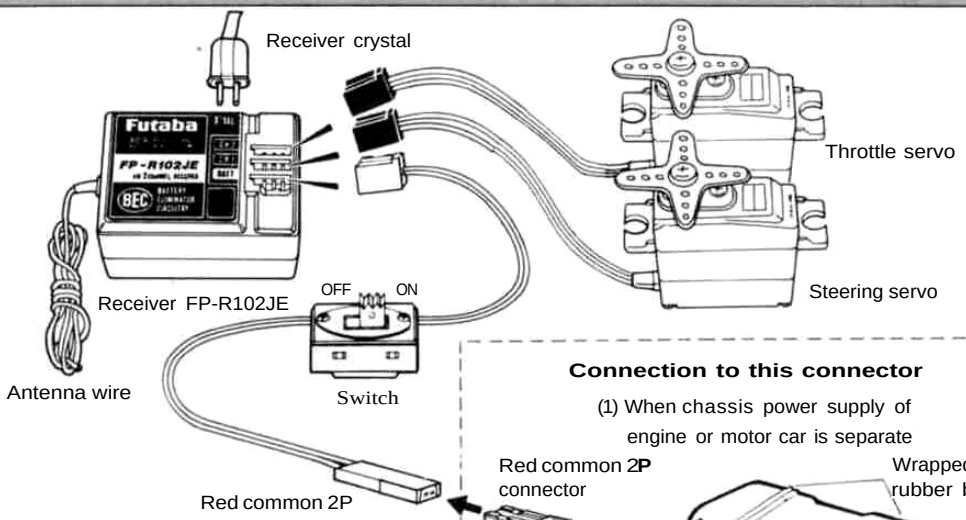
75 MHz – Car/Boat only

75.430	62	75.750	78
75.470	64	75.790	80
75.510	*66*	*75.830*	*82*
75.550	68	75.870	84
75.590	70	*75.910	86
*75.630	72	*75.950	88
75.670	74	*75.990	90
75.710	76		

* Effective JAN 1, 1988

The BEC mark is displayed on the front of the receiver of BEC system sets with a receiver with shared power supply regulator.

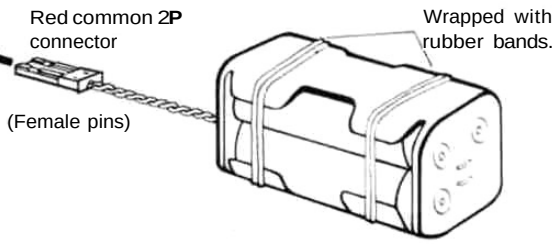
RECEIVER FP-R102JE AND SERVO FP-S148



Connect the servo and switch as shown in the figure and extend the transmitter and receiver antennafully.

Connection to this connector

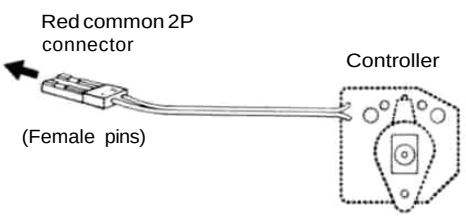
(1) When chassis power supply of engine or motor car is separate



(3) When motor car uses an ordinary common power supply chassis

Buy the red common 2P connector from the kit manufacturer and connect to the controller.
Pin 1: Minus
Pin 2: Plus

(2) When motor car uses a special BEC system chassis (common power supply specifications)

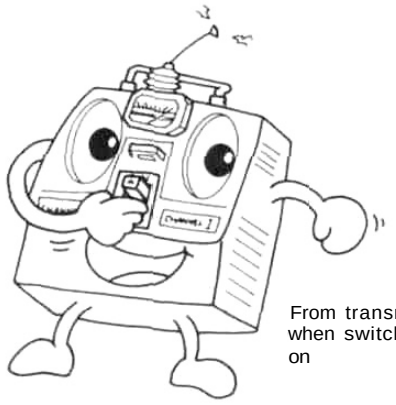


Connect to the red common 2P connector of the controller.

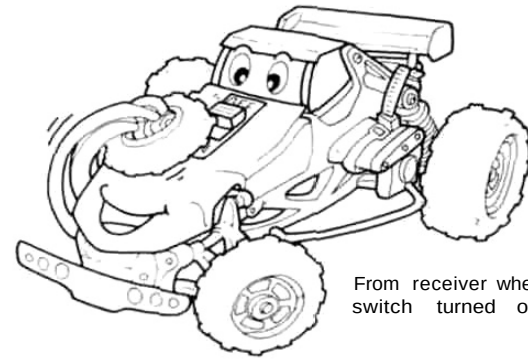
The Futaba BEC system can also use a common power supply with the conventional four penlight batteries system (separate power supply).

- A common power supply regulator and diode may also be supplied with the speed controller, depending on the vehicle kit. Since they cause a voltage drop, always remove them.

•Set the transmitter power switch to ON, then set the receiver power switch to ON. The servos stop near the neutral position. Operate the transmitter sticks and check if each servo faithfully follows operation of the sticks.

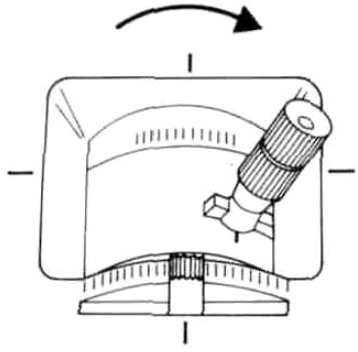


From transmitter when switch turned on

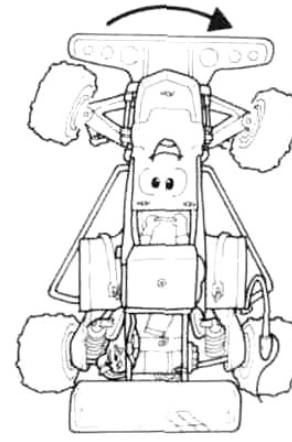


From receiver when switch turned off

• Connect the pushrod to each servo horn, then check if the direction of travel of each servo matches the transmitter Operation.

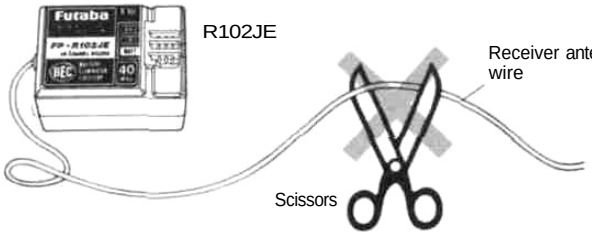


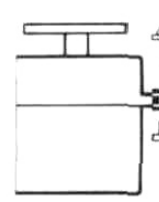
When transmitter stick lever set to the right



Vehicle also steers to the right

• **Operate each servo over its full travel and check if the pushrod binds or is too loose. Applying unreasonable force to** the servo horn will adversely affect the servo and quickly drain the battery. Be especially careful when using **8.4V.**
•Always make the full stroke (including trim) of the servo horns somewhat larger than the full travel. Adjust the servo horns **so that they move smoothly even when the trim lever and stick are operated simultaneously in the same** direction.
• Be alert for noise.
Always solder a noise killing capacitor to the running motor. If metal parts touch each other due to vibration, noise will be generated and cause the receiver servos to operate erroneously. We recommend the use of noiseless parts.
➨ Even though the receiver antenna wire is long, do not cut or bundle it. The range of the radiowaves will be shortened.





• Install the servos firmly. Install the servo to the servo tray as shown in the figure. In other cases, install the servo as described in the model manufacturer's manual.

• A spare horn is provided. Use it as required.
•Wrap the receiver in sponge rubber and wrap rubber bands around the sponge rubber. Mount the receiver so it is not exposed to vibration, does not touch the frame, and does not move.
•When the receiver is installed on a board or used where it may be splashed with mud and water, place it in a plastic bag, etc. and wrap a rubber band around the open end of the bag to waterproof and dustproof the receiver. After use, remove the receiver from the bag to prevent condensation.
• Use the rubber bands wrapped around the receiver to hold the servo and switch leads.
•After mounting is complete, recheck each part, then check the transmitting range by making the transmitter antenna as short as possible and extending the receiver antenna fully and operating the set from a distance of 20m to 30m. The movement of each servo should follow the movement of the transmitter sticks.
• The crystal can be changed from the outside of the receiver case. (Except 72/75MHz in U.S.A) Always use a Futaba transmitter and receiver crystal pair as the replacement crystals.

GUARANTEE

Your NEW FUTABA Digital Proportional **R/C Sys-** tern is guaranteed against defects in workmanship and material for 180 days from the date of purchase when the attached registration card is returned to us within ten days of purchase.
This Guarantee is null and void if the R/C system has been improperly handled, damaged in a crash, or tampered with and does not cover the replacement of plastic housings or electronic components damaged due to the use of improper voltages.
When service is required, please take your equipment to your local authorized service station or ship it directly to us. All postage, shipping, and insurance charges must be paid by the user.

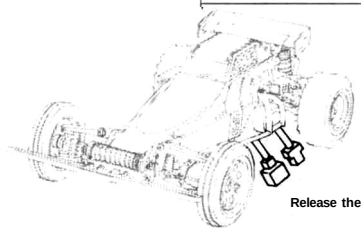
REPAIR SERVICE

- When requesting repair of trouble that has occurred suddenly of from long use, describe the trouble symptoms in as much detail as possible. This will facilitate detection of the trouble point and shorten the repair period greatly.
- Defects caused by faulty materials or workmanship will be corrected free of charge.
- This limited warranty is null and void if the set has been tampered with or disassembled. Refer to warranty statement for details.

•WHEN VEHICLE WILL NOT BE USED

Be sure and release the connector of running Nicd battery except when you are on the way to the starting line.

When not using **the** connector, set **the** switch to OFF.



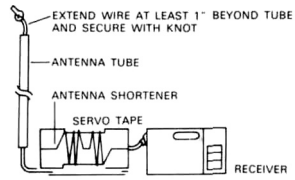
Release the connector.

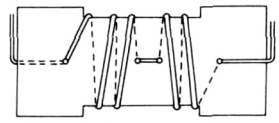
To obtain the best possible range (car to transmitter distance) and reduce the possibility of interference, please observe these antenna routing instructions.
Failure to follow these guidelines can result in **loss of** control or limited range

1) NEVER cut your receiver's antenna wire. Your system has been precisely tuned to the full length of the stock antenna.

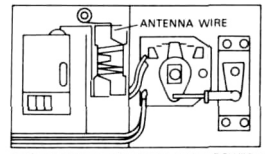
2) Excess antenna wire should NOT be tightly coiled. To safely store the excess wire make an antenna shortener from a small piece of stiff cardboard. This will provide maximum reception and prevent tangling and breakage of the wire.

3) When routing the antenna wire to the antenna tube keep the wire away from battery and speed control wiring. The high power of the NiCd battery creates electrical "noise" which can cause interference.





ANTENNA SHORTENER TEMPLATE

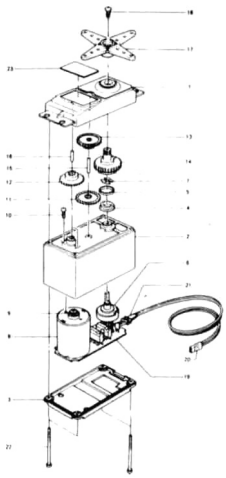


KEEP ANTENNA WIRE AWAY FROM POWER WIRES

SNOW IS WATER

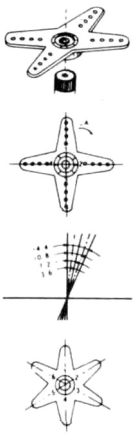
Remember that operating your FX10 on snow or in wet areas is not recommended. Melted snow becomes water which will damage or short out your system's electronics._____

FP-S148



No.	Part name	Part No.
1.	Upper case	FCS-48
2.	Middle case	FCS-48
3.	Bottom case	FCS-48
4.	Metal bearing	S04137
5.	Metal bearing	S04136
6.	Potentiometer	I 39668
8.	Motor	S91259
9.	Motor pinion	802461
10.	Screw	J50002
11.	1st gear	FOS-48
12.	2nd gear	FGS-48
13.	3rd gear	FGS-48
14.	Final gear	FGS-48
15.	Intermediate shaft	S02495
16.	2nd shaft	S02494
17.	Servo horn A	FSH-6X
18.	Binding head tapping screw 2.6 x8	FSH-4I
19.	Printed wiring board S148	AS1157
20.	S148 3PB-WRB300G	AT2453
21.	w gum bush	S90045
22.	Pan head truss screw	S50360
23.	Nameplate S148	S60099

•SPLINED HORNS



This horn permits shifting of the servo neutral position at the servo horn. Setting and shifting the neutral position

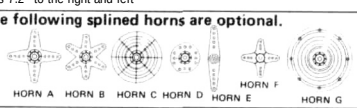
1) The splined horn has **25** segments. The amount of change per segment is; 360-25=14.4°
2) The minimum adjustable angle is determined by the number of arms or number of the holes. For four arms, the minimum adjustable angle is:

$$360^\circ \div \frac{(25 \times 4)}{\text{Number of divisions}} = 3.6^\circ$$

b) Effect
To shift the holes center line to the right (clockwise) relative to baseline A, shift arm 2 to the position of arm 1 and set it to the position closet to baseline A.

angular shift per segment is 14.4°. The shift to the right is 90° - (14.4 x 6) = 3.6°
To shift by the same angle in the opposite direction, use the opposite arm number.
For a six arm horn, turn the arm counterclockwise and set arm 2 to the position of arm 1. The adjustable angle is 60° - (14.4 x 4) =2.4°.
Arm 3 shift 4.8° to the right, arm 6 shifts 2.4° to the left, and aim 4 shifts 7.2° to the right and left

The following splined horns are optional.



FUTABA CORPORATION OF AMERICA
4 Studebaker, Irvine California 92718, I .S.A.
Phone:714-455-9888 Telex: 23-0691227 Facsimile: 714-455-9899

FUTABA (EUROPE) GmbH
Am Seestern 24, D-4000, Dusseldorf 11, W. Germany.
Phone:021 1-5287-0 Faesimile:0211-593133

FUTABA CORPORATION
Tokyo Office: INAGAKI BLDG., 3F 1-21-3, Kanda sudacho, Chiyoda-ku, Tokyo, Japan.
Phone: (03)255-681 1 Facsimile: (03)255-6880