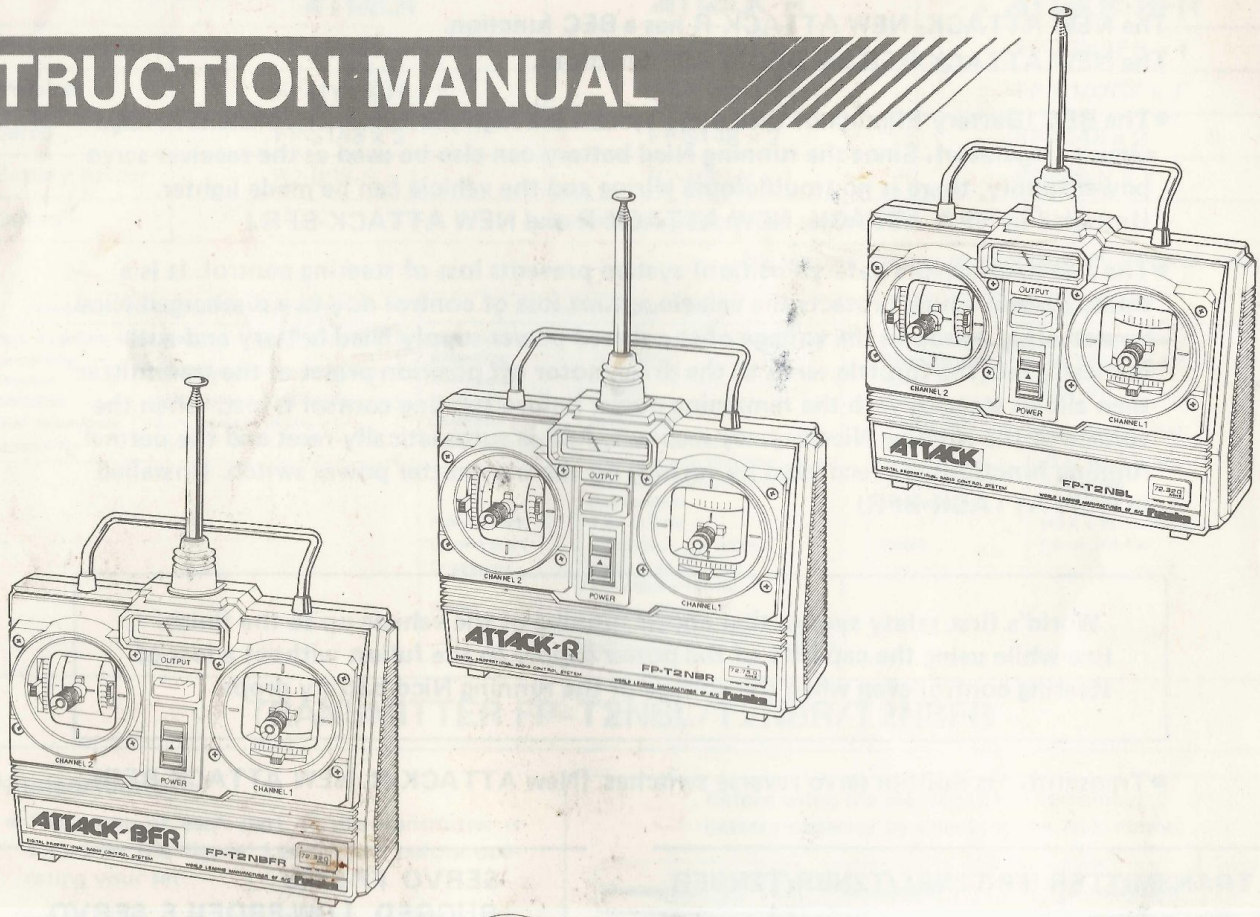
Futaba

DIGITAL PROPORTIONAL
RADIO CONTROL

INSTRUCTION MANUAL

D60904



New ATTACK BEC SYSTEM
New ATTACK-R BEC SYSTEM
New ATTACK-BFR BEC & ASP SYSTEM

- **The NEW ATTACK, NEW ATTACK-R 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.

- **The NEW ATTACK-BFR is the newest 2 channel digital proportional R/C set with a built-in ASP (Adjustable Safety Position) system, plus the functions of the NEW ATTACK.**

  It is a safety system which protects the vehicle against loss of control due to a discharged Nicd by detecting a drop in the voltage of the running Nicd battery which is a shared power supply and stops the vehicle.

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

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FEATURES OF NEW ATTACK NEW ATTACK-R AND NEW ATTACK-BFR

The NEW ATTACK, NEW ATTACK-R has a BEC function.
The NEW ATTACK-BFR has BEC & ASP functions.

- 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. (Installed in NEW ATTACK, NEW ATTACK-R and NEW ATTACK-BFR.)
- The ASP (Adjustable Safety Position) system prevents loss of steering control. It is a safety system which protects the vehicle against loss of control due to a discharged Nicd by detecting a drop in the voltage of the shared power supply Nicd battery and automatically sets the throttle servo to the drive motor off position preset at the transmitter then allows steering with the remaining power before steering control is lost. When the voltage of the running Nicd battery recovers, ASP is automatically reset and the normal running functions are recovered by turning on the transmitter power switch. (Installed in NEW ATTACK-BFR)

World's first safety system that allows running of the vehicle up to the finish line while using the capacity of the power supply to the fullest without a loss of steering control even when the voltage of the running Nicd battery drops.

- Transmitter is Built-in servo reverse switches. (New ATTACK-R, NEW ATTACK-BFR)

TRANSMITTER FP-T2NBL/T2NBR/T2NBFR

- ASP (Adjustable Safety Position) system allows safe recovery without a loss of steering control. (T2NBFR only)
- New swivel stick system that allows selection of the stick lever operating direction over a range of 10°.
- Racing specification short aluminum stick lever makes operation extremely easy.
- New neutral lever allows setting of the neutral position of the throttle stick in two stages. Perfectly matched to the throttle position of motor and engine cars. 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. (T2NBR, T2NBFR)
- Level meter shows the state of the battery at a glance.
- Crystal can be changed from the outside. (Except 72/75 MHz)
- Hook. Optional neck strap can be used.

RECEIVER FP-R102GF/R102GR

- BEC (Battery Eliminator Circuitry) system allows sharing of the running Nicd battery and eliminates the need for a regulator and diode.
- High performance 2 channel receiver with ASP system when used with the proper transmitter. (only R102GF)
- Crystal socket uses a new type of highly reliable subminiature pins. Reliability is increased and the crystal can be changed from the outside.

SERVO FP-S148
RUGGED, LOW-PROFILE SERVO

- The FP-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 IC provides high starting torque narrow dead band, and excellent trackability.
- Fiberglass PBT (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 backlash.
- Fiberglass epoxy PO board with THRU-THE-HOLE plating improves the servo amp bivration 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

	ATTACK	ATTACK-R	ATTACK-BFR
Transmitter	FP-T2NBL x 1	FP-T2NBR x 1	FP-T2NBFR x 1
Receiver	FP-R102GR x 1	FP-R102GR x 1	FP-R102GF x 1
Servo	FP-S148 x 2	FP-S148 x 2	FP-S148 x 2
Battery holder	R2-BSS-N x 1	R2-BSS-N x 1	R2BSS-N x 1
Others	Switch, frequency flag, spare horn		

Ratings are subject to change without prior notice.

Transmitter FP-T2NBL/T2NBR T2NBFR	
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-R102GF/R102GR	
Receiving frequency	27MHz band, bands 1 to 6 72, 75MHz
Intermediate frequency	455kHz
Selectivity	3kHz/–3dB
Receiving range	550 yards (500m) on the ground when used with FP-T2NBL (At the best radio wave condition of environment)
Power supply	4.8V to 8.4V
Current drain	7.2V/13mA, 4.8V/33mA
Dimensions	1.46 x 2.19 x 0.75 in (37 x 55.5 x 19mm)
Weight	1.34 oz (38g)
	BEC & ASP functions — R102GF
	BEC functions — R102GR

SERVO FP-S148	
Control system	+pulse width control
Operating angle	One side 45° or more
Power requirement	4.8V–6V
Current drain (IDLE)	6.0V, 8mA (at idle)
Output torque	42 oz. in. (3 kg-cm)
Operating speed	0.22 sec/60°
Dimensions	1.59 x 0.77 x 1.4 in. (40.4 x 19.8 x 36 mm)
Weight	1.5 oz. (44.4 g)

TRANSMITTER FP-T2NBL/T2NBR/T2NBFR

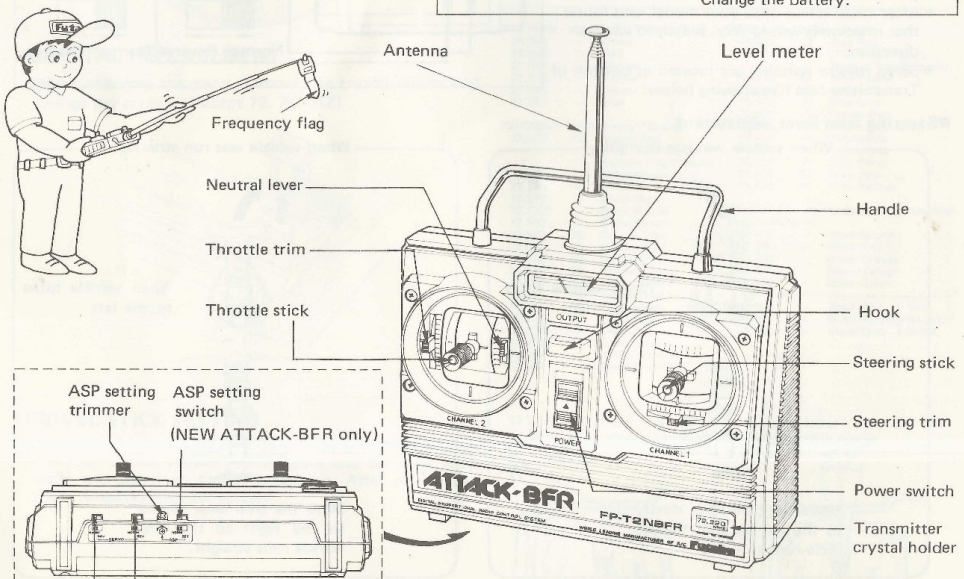
- **Nomenclature**
  - The name of each part of the transmitter is shown in the figure. Learn them before operating your set.

  When running the vehicle, extend the antenna fully.

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

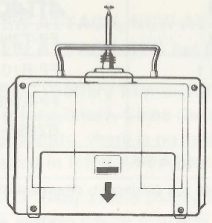
Good — Caution — No good

Change the battery.

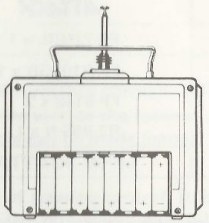


■LOADING THE PENLIGHT BATTERIES

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

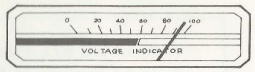


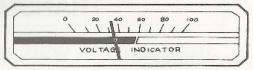
Remove the cover by pushing here and sliding down.



Load the eight pen-light batteries while paying careful attention to their polarity.

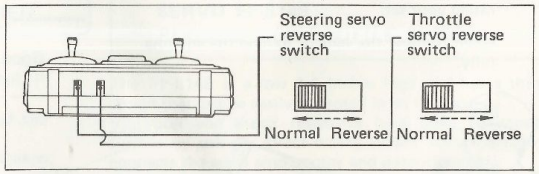
- Extend the antenna fully and set the power switch to ON. The level meter pointer should deflect to the silver zone. If the pointer does not move, or moves very little, check for poor battery contact, incorrect battery polarity, or faulty batteries.
- If the pointer of the level meter deflects to the 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.





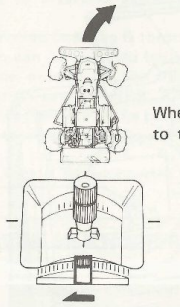
■Servo reverse switches (NEW ATTACK-R, NEW ATTACK-BFR)

- 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

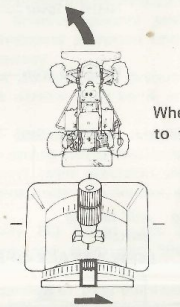
When vehicle was run straight.



When vehicle turns to the right

Move the trim lever slowly to the left so that the vehicle runs straight.

When vehicle was run straight



When vehicle turns to the left

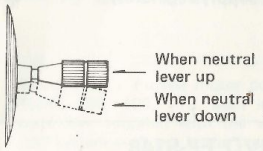
Move the trim lever slowly to the right so that the vehicle runs straight.

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

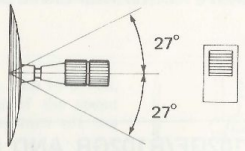
The throttle trim lever is used to fine adjust the speed controller stop position, etc.

■THROTTLE STICK NEUTRAL LEVER OPERATION

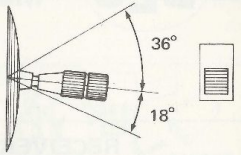
- The neutral position of the throttle stick (engine control stick) at the left side can be selected in two stages by moving the neutral lever as shown in the figure.



If the neutral lever is moved, the neutral position of the stick lever can be adjusted in two steps as shown in the figure.



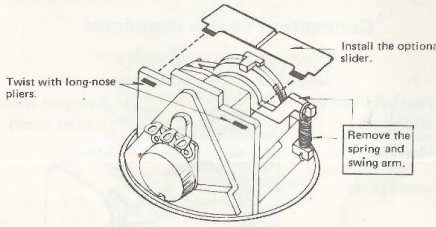
When the neutral lever is up, the throttle stick can be adjusted to a total of 54°, 27° up and 27° down, from the neutral position. This position is best for electric cars and other models with which the center of the speed controller is the neutral position.



When the neutral lever is down, the throttle stick can be adjusted to a total of 54°, 36° up and 18° down (2-to-1), from the neutral position. This position is best for engine-drive cars or other models with which the speed controller neutral position is offset.

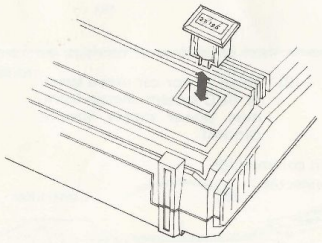
■CHANGING THE THROTTLE STICK FROM A SELF-NEUTRAL SYSTEM TO A RATCHET SYSTEM

- 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

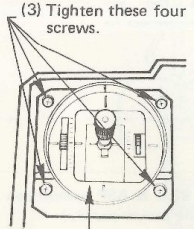
- When changing the band, remove the crystal holder and change the crystal. (Except 72. 75MHZ)



■SWIVEL STICK SETTING

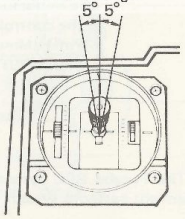
- To adjust the operating direction of the stick lever, loosen the four screws shown in the figure and turn the stick body and set it to the best position. After setting the stick, retighten the four screws.

(1) Loosen these four screws.
(3) Tighten these four screws.



(2) Select the angle by turning the stick body.

Stick lever can be set within this range.



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

- The frequency of Futaba digital proportional sets can be changed among bands (1) ~ (6) on the 27MHz band only.
- However, a 27MHz band set cannot be changed to 72MHz band, and vice versa.
- Therefore, always, attach the correct frequency flag to the end of the transmitter antenna. Each frequency band has its own designated color, as stated above. The frequency flag is intended for identification purposes.
- Also change the frequency flag when frequency is changed.
- Futaba paired crystals are precisely matched. Always use a Futaba crystal set (transmitter, receiver) when changing the frequency.
- It is illegal to change crystals of transmitter on the 72-75 MHz bands in the U.S.A.

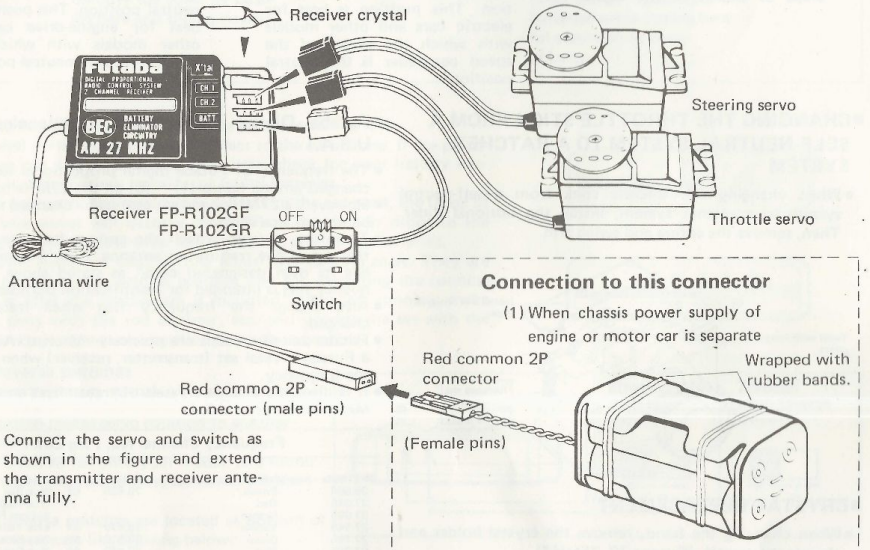
Frequency Channel No. Flag Color

26-27MHz - Aircraft/Car/Boat		
26.995	–	Brown
27.045	–	Red
27.095	–	Orange
27.145	–	Yellow
27.195	–	Green
27.255	–	Blue
72/75MHz - Aircraft only *Shared		
72.030	12	Brown-Red (Top Flag/Ribbon-Bottom Flag/Ribbon)
72.080	–	White/Brown
72.160*	–	White/Blue
72.240	–	White/Red
72.320*	–	White/Purple
72.400	–	White/Orange
72.550	38	Orange-Grey
72.590	40	Yellow-Black
72.630	42	Yellow-Red
72.670	44	Yellow-Yellow
72.710	46	Yellow-Blue
72.750	48	Yellow-Grey
72.790	50	Green-Black
72.830	52	Green-Red
72.870	54	Green-Yellow
72.910	56	Green-Blue
72.960*	–	White/Yellow
75.640	–	White/Green
75MHz - Car & Boat only		
75.430	62	Blue-Red (Top Flag/Ribbon-Bottom Flag/Robbon)
75.470	64	Blue-Yellow
75.510	66	Blue-Blue
75.550	68	Blue-Gray
75.590	70	Purple-Black
75.670	74	Purple-Yellow
75.710	76	Purple-Blue
75.750	78	Purple-Gray
75.790	80	Grey-Black
75.830	82	Grey-Red
75.870	84	Grey-Yellow
53MHz - Aircraft/Car/Boat - FCC Amatuer License Required		
53.100	–	Black/Brown
53.200	–	Black/Red
53.300	–	Black/Orange
53.400	–	Black/Yellow
53.500	–	Black/Green
53.600	–	Black/Blue (Not generally in use)
53.700	–	Black/Purple (Not generally in use)
53.800	–	Black/Grey (Not generally in use)

BEC

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-R102GF/R102GR AND SERVO FP-S148

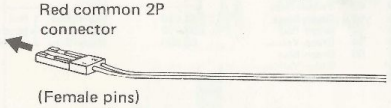


Connect the servo and switch as shown in the figure and extend the transmitter and receiver antenna fully.

Connection to this connector

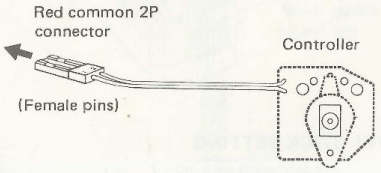
(1) When chassis power supply of engine or motor car is separate

(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)



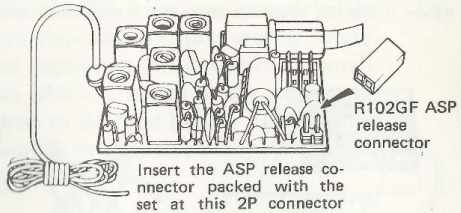
Connect to the red common 2P connector of the controller.

The Futaba BEC system and BEC & ASP 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.

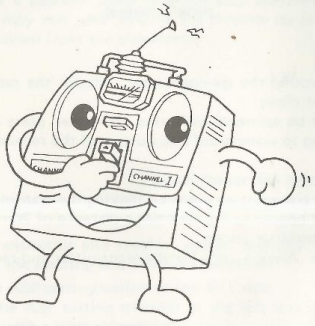
TO BUYERS OF THE NEW ATTACK-BFR (FP-R102GF)

When using a Futaba motor control amp (MC-106, 106B, 108, 109, 110, etc.) instead of the speed controller supplied with the vehicle, turn off the ASP system as shown in the figure.

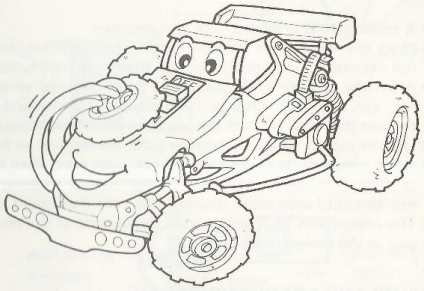


Insert the ASP release connector packed with the set at this 2P connector (male pins) on the printed wiring board.

● 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.

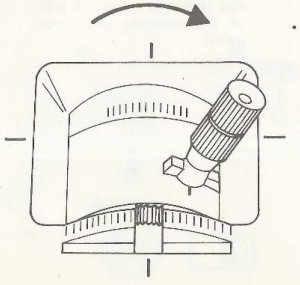


From transmitter when switch turned on

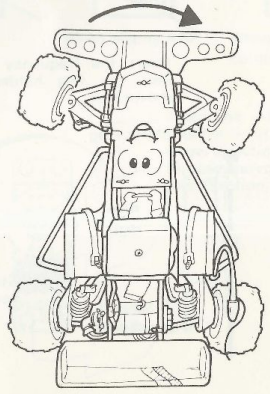


From receiver when switch turned off

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

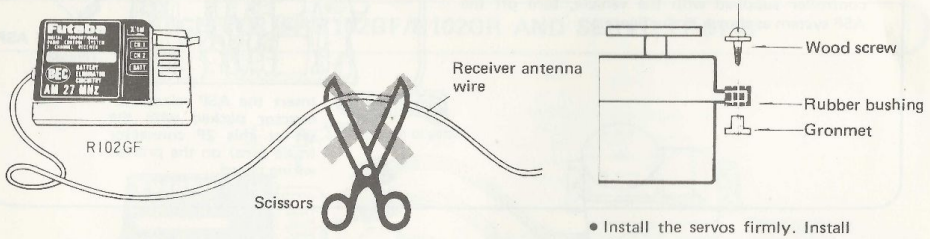


When transmitter stick lever set to the right



Vehicle also steers to the right

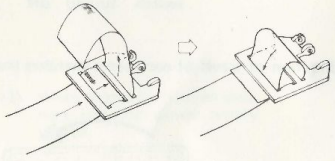
- Operate each servo over its full travel and check if the pushrod binds or is too loose. Applying unreasonable force to the servo horn will adversely affect the servo and quickly drain the battery. Be especially careful when using 8.4V.
- Always make the full stroke (including trim) of the servo horns 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.



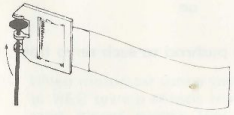
- Install the servos firmly. Install the servo to the servo tray as shown in the figure. In other cases, install the servo as described in the model manufacturer's manual.

- 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. Always use a Futaba transmitter and receiver crystal pair as the replacement crystals.

■USING THE FREQUENCY FLAG

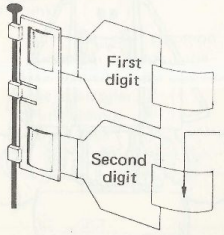


Insert the frequency flag into the flag holder as shown here.



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

72/75MHz Flag



Staple or glue with cyanoacrylate ribbon here.

- The hook is for the optional neck strap. It is convenient when hanging the transmitter from your neck.

The Futaba ASP system is the world's first runaway prevention system.

The BEC system that makes it easy even for beginners to lighten the vehicle by means of a shared power supply is already well known. The unique Futaba ASP system is built into the BF series was completed by advancing this BEC system one more step and pursuing greater safety. ASP detects a drop in the voltage and moves the throttle servo automatically to the drive motor off position which is preset at the transmitter before steering control is lost by a drop in the Nicd battery voltage while the vehicle is running. It is also the world's first revolutionary system that allows steering operation with the remaining power.

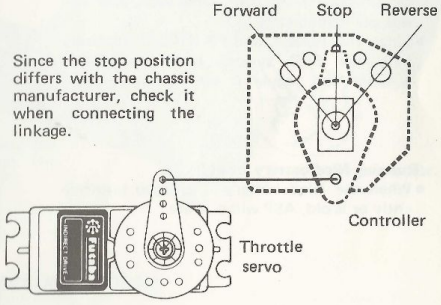
(Patent pending)

■ASP setting (NEW ATTACK-BFR only)

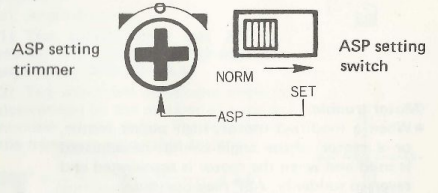
Before running, set ASP to the controller stop position.

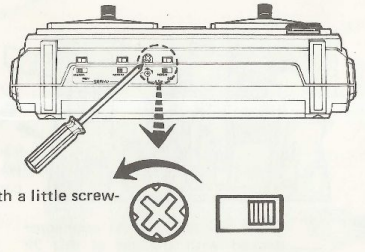
- If the controller is not set to the stop position, when the running Nicd battery voltage drops, the throttle servo may stop at a position other than the stop position and the vehicle may run wild because the throttle servo cannot be controlled from the transmitter.

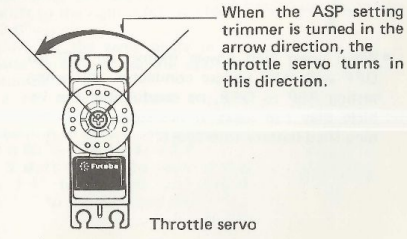
Since the stop position differs with the chassis manufacturer, check it when connecting the linkage.



1. Set the transmitter and receiver power switches to on and check the steering and throttle operations.
2. a) Set the ASP setting switch to the SET side.
   b) Turn the ASP setting trimmer at the left side of the switch with a little screwdriver.
   c) Since this moves the throttle servo, set so that it stops at the stop position of the connected controller.
3. Then complete adjustment by setting the ASP setting switch to the NORM side. (If the switch is not switched to the NORM side, the throttle servo will not be controlled by the throttle stick.)





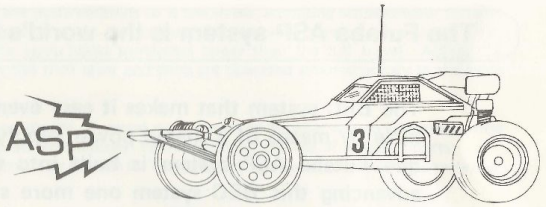


- When the Nicd battery voltage drops, the throttle servo is moved to the preset position and the drive motor is stopped automatically.

■STARTING

When the ASP operates and the vehicle stops as soon as it starts to run, there is trouble somewhere.

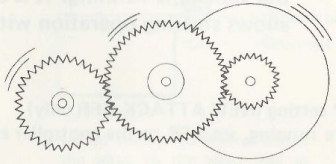
- Since the vehicle, running Nicd battery, motor, etc. is abnormal when ASP was operated, check again.



■IF ASP OPERATES

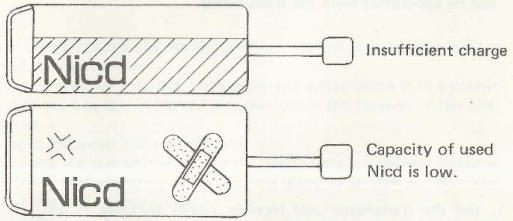
〈Vehicle trouble〉

- If something gets caught in the gears or the tires do not rotate smoothly and an over-current flows in the motor, ASP may operate. When using the common power supply diode and regulator with a vehicle without BEC specifications, release ASP. Otherwise, ASP will operate immediately.
- Since the Futaba and FP-R102GF receivers have the BEC system built into them, a diode and regulator are not connected.



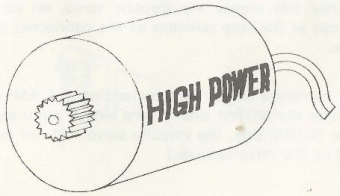
〈Running Nicd battery trouble〉

- When the Nicd battery is charged insufficiently or is old, ASP will operate.

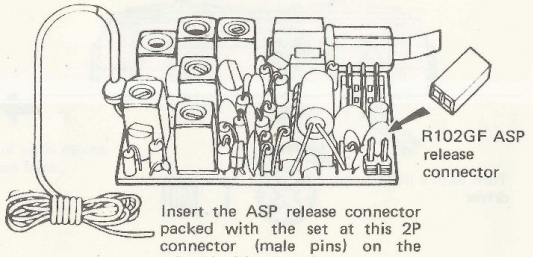


〈Motor trouble〉

- When a modified motor, high power motor, or a motor whose angle cannot be adjusted is used and when the motor is accelerated and reversed suddenly, ASP may operate.



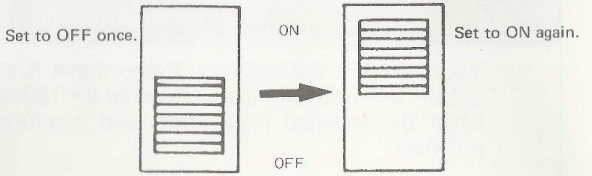
- When using high power motor, set ASP to OFF with ASP release connector. But when setting ASP to OFF, be careful that the vehicle may run away if the capacity of running Nicd battery runs short.



Insert the ASP release connector packed with the set at this 2P connector (male pins) on the printed wiring board.

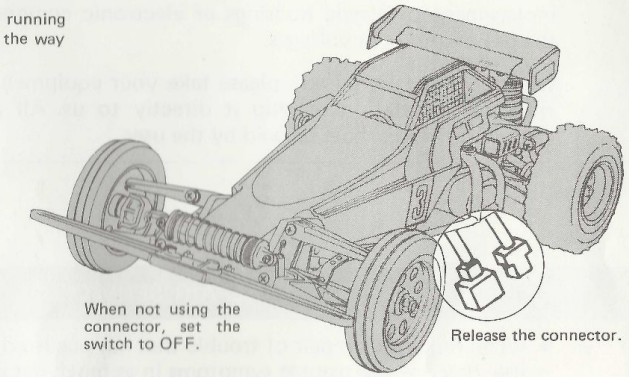
■IF ASP OPERATES

- If ASP system operates and the vehicle stops, set the transmitter power switch to OFF once and set it to ON again. Then ASP system stops working and you can start again.
- Restart running time depends on the variety and condition of vehicle, motor, and battery. Be careful about that.

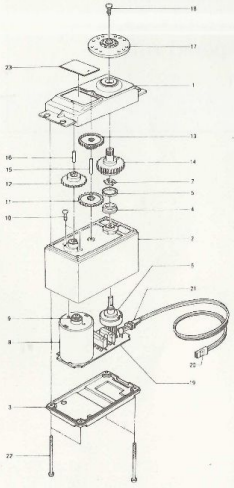


■WHEN VEHICLE WILL NOT BE USED

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

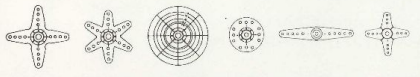


FP-S148

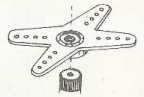


No.	Part name	Part No.
1.	Upper case	FCS-48
2.	Middle case	FCS-48
3.	Bottom case	FCS-48
4.	Metal bearing	S04137
5.	Metal bearing	S04136
6.	Potentiometer	I39668
7.	Potentiometer drive plate	S02753
8.	Motor	S91239
9.	Motor pinion	S02461
10.	Screw	J50002
11.	1st gear	FGS-48
12.	2nd gear	FGS-48
13.	3rd gear	FGS-48
14.	Final gear	FGS-48
15.	Intermediate shaft	S02495
16.	2nd shaft	S02494
17.	Servo horn D	FSH-6W
18.	Binding head tapping screw 2.6 x 8	FSH-4I
19.	Printed wiring board S148	AS1157
	Printed wiring board S48	AS1157
20.	S148···3PB-WRB300G	AT2453
	S48·····with 3PC cord	AS2010
21.	w/gum bush	S90045
22.	Pan head truss screw	S50360
23.	Nameplate S148	S60099
	Nameplate S48	S60098

The following splined horns are optional.



■ SPLINED HORNS



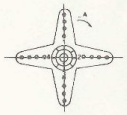
This horn permits shifting of the servo neutral position at the servo horn. Setting and shifting the neutral position

a) Angle divisions

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:

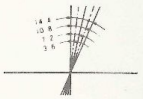
$$360^\circ \div \frac{(25 \times 4)}{\text{Number of divisions}} = 3.6^\circ$$



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.

[Example] For a four arm horn, the 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 arm 4 shifts 7.2° to the right and left.

GUARANTEE

Your NEW FUTABA Digital Proportional R/C system 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.

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