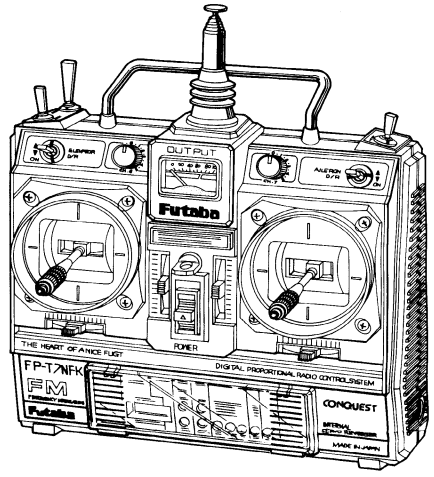
Futaba®

DIGITAL PROPORTIONAL RADIO CONTROL

INSTRUCTION MANUAL

FP-7NFK FM SYSTEM

D60494



FUTABA CORPORATION OF AMERICA
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FOR AIRCRAFT, FM 7 CHANNELS SYSTEM.

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

1 FEATURES OF FP-7NFK

- Aileron and Elevator D/R (dual rate).
- ATL (adjustable throttle limiter) for throttle.
- Servo reversing switch.
- AST (Adjustable servo throw) for aileron, elevator, and rudder.
- ATV (Adjustable travel volume) for throttle.
- Elevon mixing.
- Aileron → Rudder mixing.
- Trainer system. (Trainer cable optional)
- Stick spring tension can be adjusted.
- Nonslip adjustable stick lever head.
- Neck strap hook
- Easy to read square level meter. (transmitter battery voltage/RF indicator)
- Rugged low-profile servo. (FP-S148)
- Nicd battery operation as standard.

2 SET CONTENTS AND RATINGS

(Specifications are subject to change without prior notice.)

	FP-7NFK
Transmitter	FP-T7NFK
Receiver	FP-R127DF
Servo	FP-S148 (x4)
Battery and Charger	● Transmitter battery NT-8IB ● Receiver battery NR-4J ● Charger FBC-8B(4)
Crystal	● FM crystal set (Transmitter and Receiver) However the crystal type for dual conversion receiver is the following type. 72MHz Band TYPE 72-10 50MHz Band TYPE 50-10 (stated on the tab)
Others	● Switch ● Extension cord ● Spare horn ● Servo tray ● Neck strap ● Flag board

Transmitter (FP-T7NFK)

2 sticks 7 channels transmitter

Transmitting frequency	: 72MHz, 50MHz band
Modulation	: FM
Power requirement	: 9.6V Nicd battery pack
Current drain	: 200mA

Receiver (FP-R127DF)

Receiving frequency	: 72MHz, 50MHz band
Intermediate frequency	: 1st IF 10.7MHz, 2nd IF 455kHz
Power requirement	: 4.8V Nicd battery pack (shared with servo)
Current drain	: 10.0mA at 4.8V
Dimensions and weight	: 64.3x35.8x21.0mm, 40.5g
Receiving range	: 500m on the ground, 1000m in the air. (range differs with the surroundings)

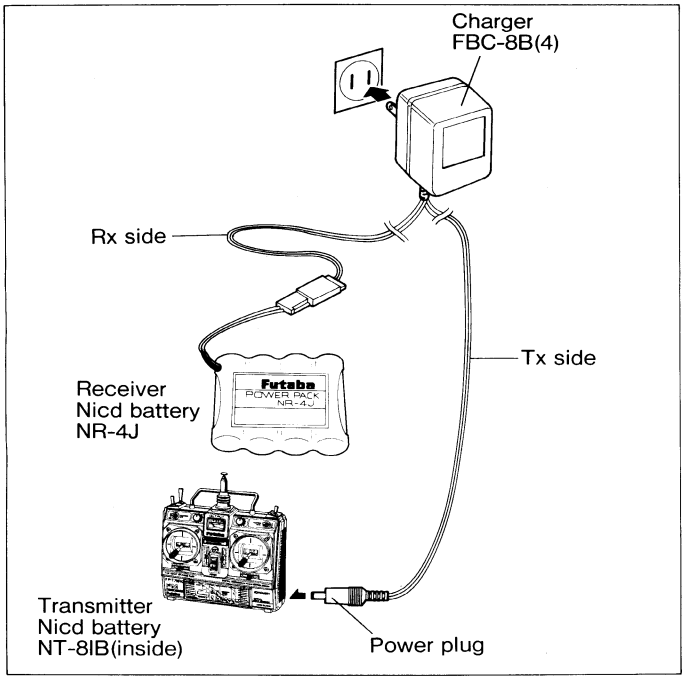
Servo (FP-S148)

Control system	: + pulse width control
Operating angle	: Rotary system, one side 45° or greater (including trim)
Power requirement	: 4.8V or 6.0V (shared with receiver)
Current drain	: 8mA at 6V (at idle)
Output torque	: 3kg·cm
Operating speed	: 0.22sec/60°
Dimensions and weight	: 40.4x19.8x36mm 44.4g

Nicd battery (NT-8IB/NR-4J)

Voltage	: 9.6V (NT-8IB), 4.8V (NR-4J)
Capacity	: 500mAh
Dimensions and weight	: 51x58x15mm, 95g (NR-4J)

■Charging the transmitter and receiver Nicd battery.



■Use the special Futaba charger.

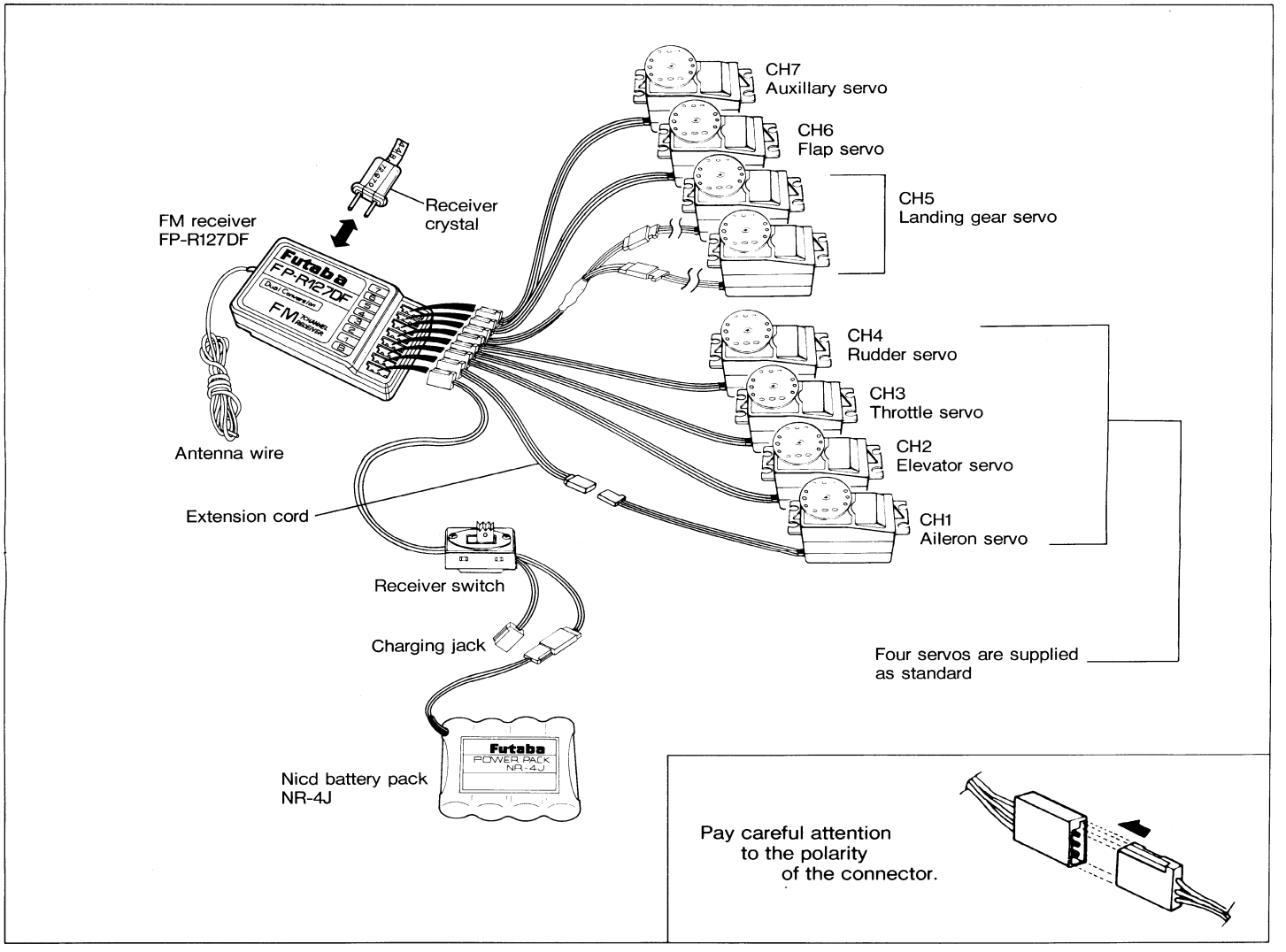
If charging in more than the specified current, the transmitter may be unrepairable.

■The charging time is 15 hours.

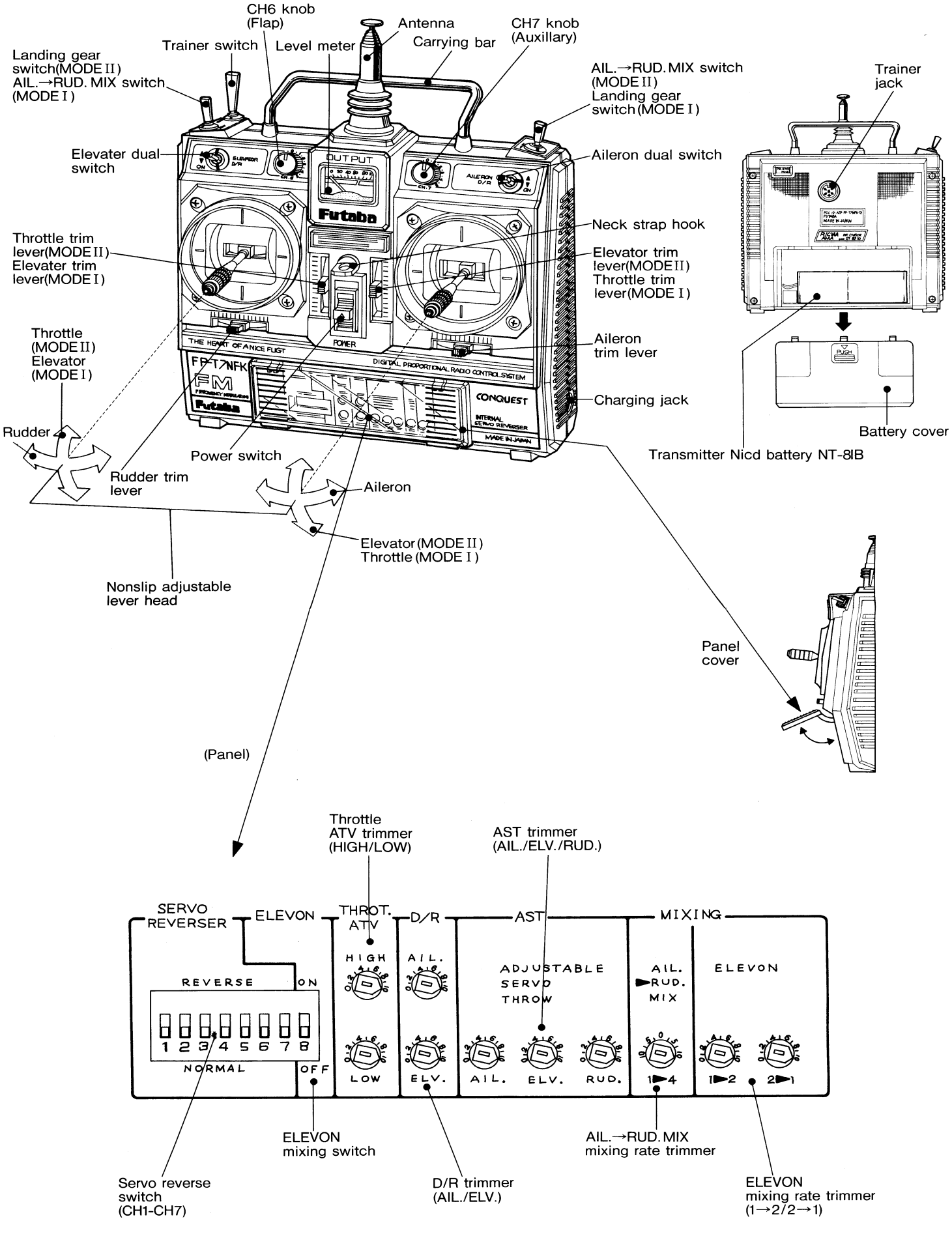
However when the battery was not used for some time, charge and discharge it 2-3 times. Otherwise, the battery will not be charged even after the specified charging time.

A fully-charged transmitter battery can be used for about 10 flights of 10 minutes each. The airborne NR-4J Nicd battery pack can be used for about 8 flights when 4 servos are used.

■Receiver and servos connections.

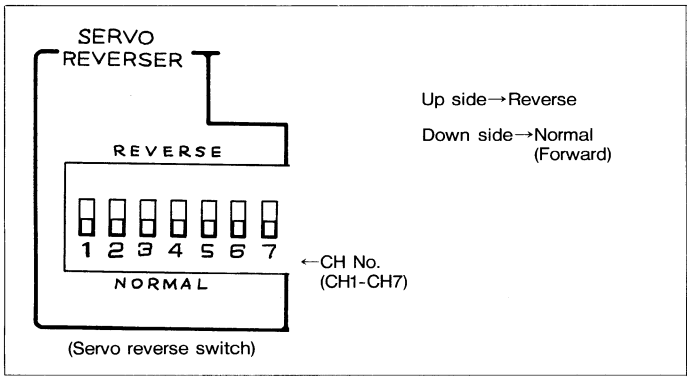


4 FUNCTION AND SETTING METHOD



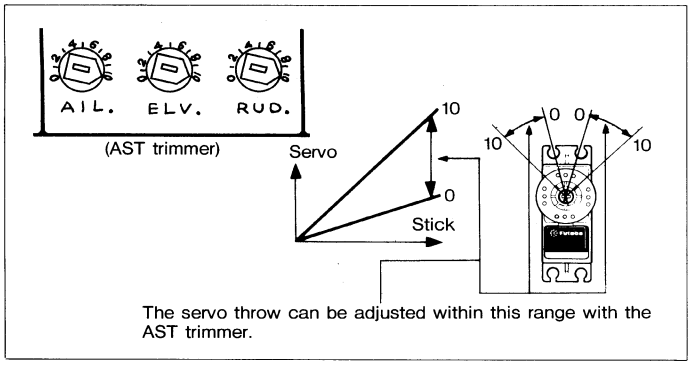
■SERVO REVERSER·····(CH1-CH7)

This function is used to change the direction of servo operation in relation to control stick, switch, or knob movement.



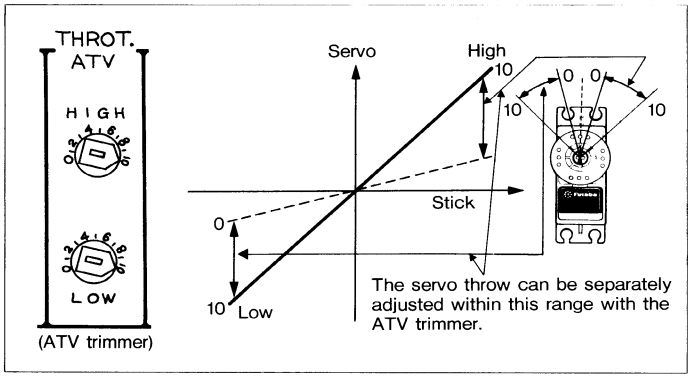
■AST(Adjustable servo throw)·····(CH1, CH2, CH4)

This function is used to adjust servo travel limit.



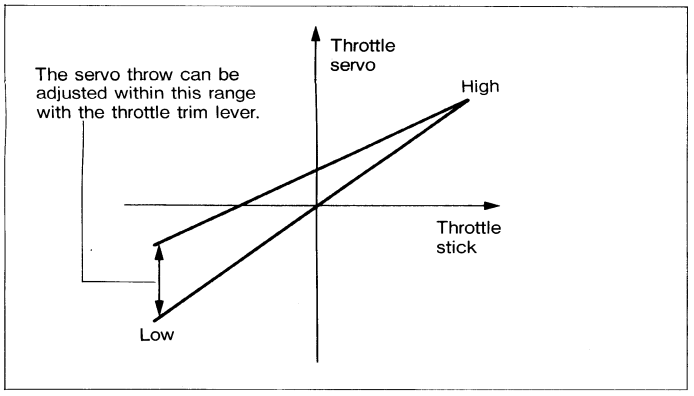
■THROT. ATV(Throttle adjustable travel volume)·····(CH3)

This function is used to adjust servo travel limits. Servo travel can be adjusted independently in each direction from neutral.



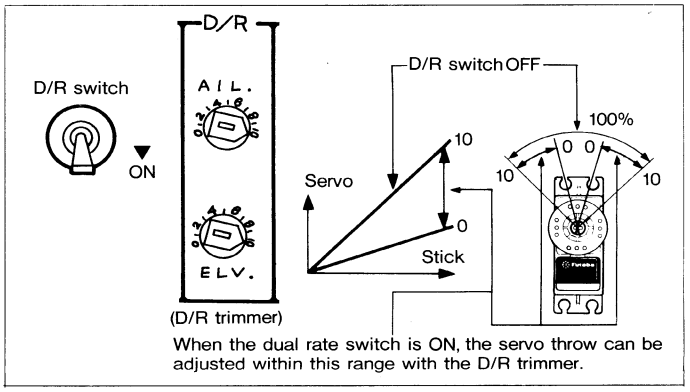
■ATL(Adjustable throttle limiter)·····(CH3)

This function is used to shift the idle position of the throttle servo.



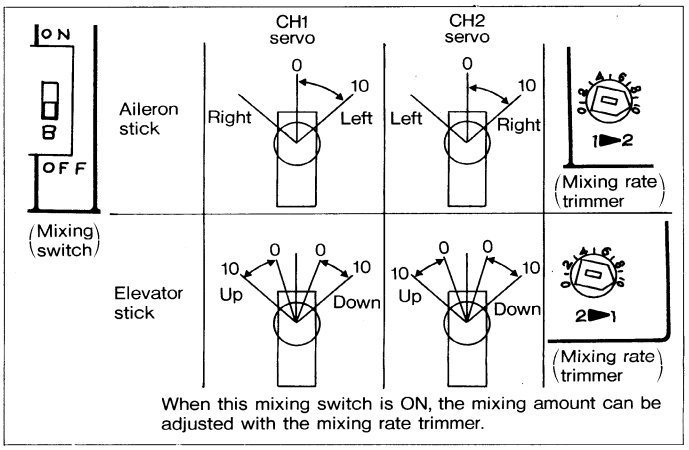
■D/R(Dual rate)·····(CH1, CH2)

This function allows the modeler to switch servo travel limits during flight, thus varying the control sensitivity for different flight conditions or maneuvers.



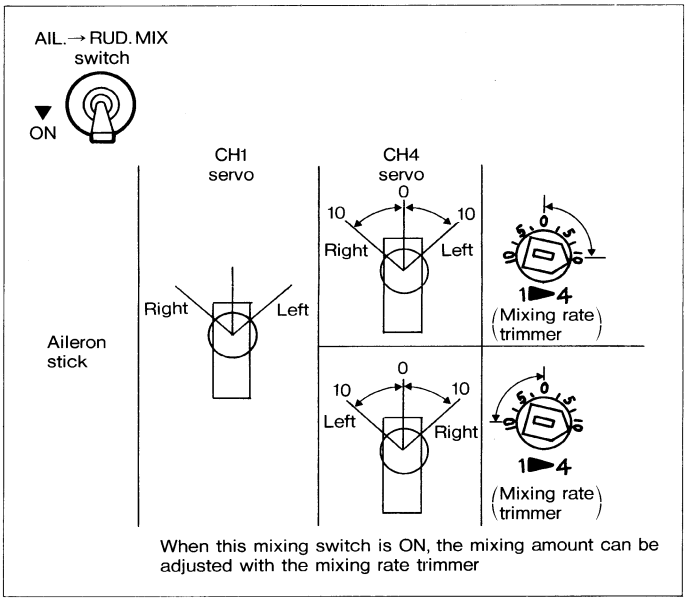
■ELEVON·····(CH1→CH2, CH2→CH1)

This mixing can be used with delta wing, tail-less aircraft, flying discs, etc.. When this mixing switch is ON the aileron and elevator functions are mixed together. Each stick can affect both the aileron servo and the elevator servo.



■AIL.→RUD. MIX·····(CH1→CH4)

Large high wing aircraft may require the use of both the aileron and the rudder to make it turn properly during flight. When this mixing switch is ON the two functions are mixed together. The aileron stick can affect both the aileron servo and the rudder servo.



■CH6 and 7 control knobs

Rotating the knob from the center position to the left or right stops will cause the servo to travel to it's left or right limit.
(Relative direction is dependant on the servo reverse switch setting.)

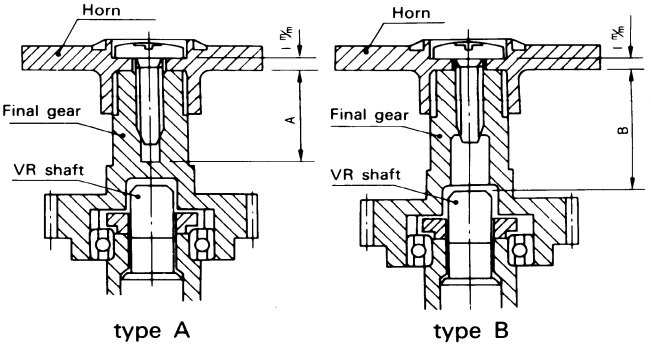
- Connect the receiver, servos, switches and battery as shown in the figure. Extend the transmitter and receiver antennas to their full length.
- Turn on the transmitter power switch, then turn on the receiver power switch.
  The servos will go to their neutral position. Move the transmitter sticks one at a time to check that each servo follows its control stick movement.
- Connect the pushrods to the servos and check that the direction of travel of each servo matches the direction of movement of its control stick. If a servo does not move in the proper direction, switch its direction with the servo reversing function.
- Operate each servo horn over its full stroke and check that the pushrod does not bind or is not too loose. Unreasonable force applied to the servo horn will adversely affect the servo and drain the battery pack very quickly. Make the travel of each control mechanism somewhat larger than the full stroke (including trim) of the servo horn. 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.
  This set is noise-resistant, but not completely immune to noise. The use of noiseless parts is recommended.
- When installing the switch harness, cut a rectangular hole slightly larger than the full stroke of the switch and install the switch so that it moves smoothly from ON to OFF. Also do this when the switch is installed inside the fuselage and is turned on and off from the outside with a piece of wire.
  Install the switch where it will not be exposed to engine oil or dust and dirt.
- Although the antenna appears to be too long, do not cut it or fold it back.
- Install the servos securely. Tighten the mounting screws until the rubber damper is crushed slightly. If the screws are too tight, the cushioning effect will be adversely effected.
- The crystal can be changed from the outside of the receiver case.
- The FP-R127DF is a dual conversion receiver. This receiver requires a special crystal so please order the correct crystal set.
- Spare servo horns are supplied. Use them as needed.
- Use extension cords matched to the model.
- Wrap the receiver in sponge rubber. Place it inside a waterproof plastic bag and secure the end of the bag with a rubber band. Do the same with the airborne battery pack.
- Use the rubber bands wrapped around the receiver to hold the servo and switch leads.
- After installation and checking are complete, perform a range check by collapsing the transmitter antenna and extending the receiver antenna to its full length and operating the transmitter from a distance of 20 to 30 meters from the receiver. The servos should operate normally at this distance.

*Differs with the weather and surroundings.

■SERVO HORN MOUNTING SCREW PRECAUTIONS

Horn mounting screws table

Horn mounting screw		Applicable servo	Type	Dimensions (m/m)
Dimensions	Screw type			
2.6x6	tapping	S133, S143 series	B	5.7
2.6x8	tapping	S129 series S130 series, S9101, S5101	A	7.9
		S128 series	B	11.9
		S132 series	B	7.3
		S135 series, S9601	B	8.7
		S138 series	B	9.9
		S148 series	B	10.5
2.6x10	tapping	S131S series, S136G S9201, S9301, S9401	A	9.0
2.6x12	tapping	S134 series, S3301	A	11.3
2.6x5	machine	S3002	B	10.0
		S3302	A	5.0
		S5102	A	5.5
		S9302	A	9.0



type A type B

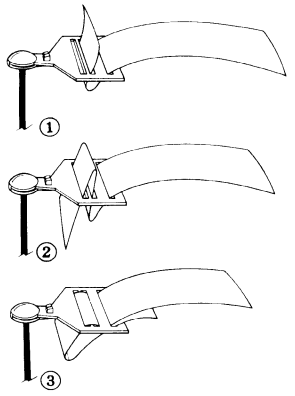
Note

- If screws longer than necessary are used, the final gear may be broken or the potentiometer may be damaged or may fall out.

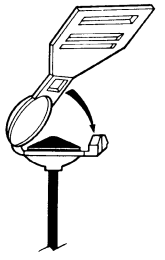
■Digital Proportional Frequencies (FOR U.S.A.)

- The frequency of Futaba digital proportional sets can be changed within their own band. There are 2 different bands for you to choose from (27 MHz and 72-75 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 tuning 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 on 72-75 MHz bands in the U.S.A. unless performed by a licensed technician.

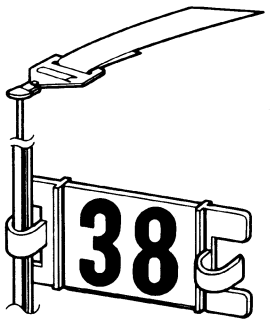
■Antena Frequency Flag



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.



①Stick the channel No. sticker on the flag board.
②Attach the flag board to the antenna as shown in the figure.

■Frequency, Channel No., Flag Color (FOR U.S.A.)

26-27MHz-Aircraft/car/boat

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

50/53MHz-Aircraft/car/boat-Fcc Amature Licence required (2 and 3 channels not produced on these frequencies.)

	Channel No.
50.800	RC00
*50.820	RC01
50.840	RC02
*50.860	RC03
50.880	RC04
*50.900	RC05
50.920	RC06
*50.940	RC07
50.960	RC08
*50.980	RC09

	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

*Effective JAN 1. 1991

72MHz-Aircraft only

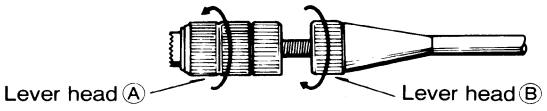
*72.010	11	*72.410	31	*72.810	51
72.030	12	72.430	32	72.830	52
*72.050	13	*72.450	33	*72.850	53
72.070	14	72.470	34	72.870	54
*72.090	15	*72.490	35	*72.890	55
72.110	16	*72.510	36	72.910	56
*72.130	17	*72.530	37	*72.930	57
72.150	18	72.550	38	*72.950	58
*72.170	19	*72.570	39	*72.970	59
72.190	20	72.590	40	*72.990	60
*72.210	21	*72.610	41		
72.230	22	72.630	42		
*72.250	23	*72.650	43		
72.270	24	72.670	44		
*72.290	25	*72.690	45		
72.310	26	72.710	46		
*72.330	27	*72.730	47		
72.350	28	72.750	48		
*72.370	29	*72.770	49		
72.390	30	72.790	50		

75MHz-Car/boat only

*75.410	61	*75.610	71	*75.810	81
75.430	62	75.630	72	75.830	82
*75.450	63	*75.650	73	*75.850	83
75.470	64	75.670	74	75.870	84
*75.490	65	*75.690	75	*75.890	85
75.510	66	75.710	76	75.910	86
*75.530	67	*75.730	77	*75.930	87
75.550	68	75.750	78	75.950	88
*75.570	69	*75.770	79	*75.970	89
75.590	70	75.790	80	75.990	90

■Non-slip adjustable lever head adjustment

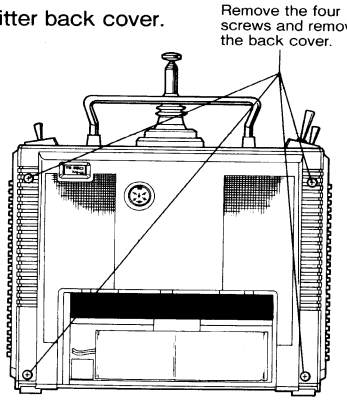
The length of the lever head can be changed.



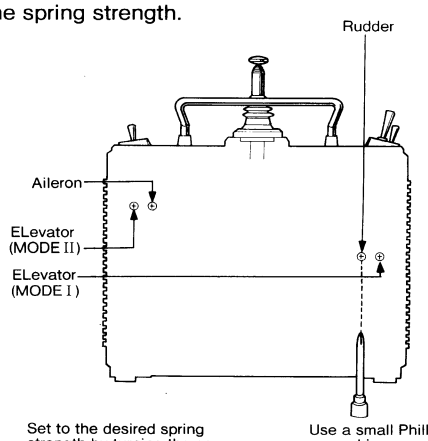
Unlock lever heads Ⓐ and Ⓑ by turning them in opposite directions as shown by the arrows and adjust the stick to the most comfortable length.

■Stick lever tension adjustment

1. Remove the transmitter back cover.

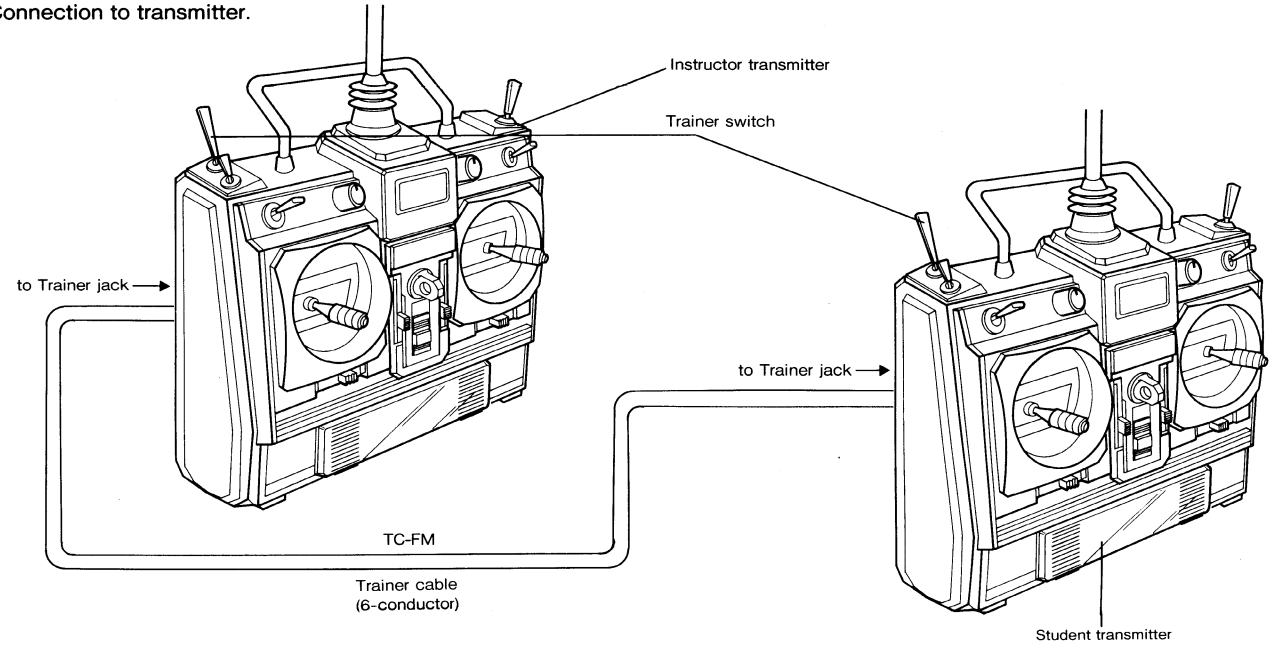


2. Adjust the spring strength.



■Trainer function (Trainer cable optional)

1. Connection to transmitter.



2. Operating at the instructor side
Operation is possible by turning on the instructor transmitter power switch.
At this time turn off the trainer switch.

3. Operating at the student side
Operation is possible at the student transmitter while the trainer switch at the instructor side is held in the ON state.

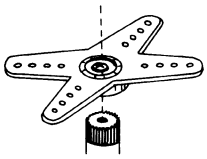
[Note]

- Operation is impossible if the instructor transmitter modulation mode and student transmitter modulation mode is different.
- Always turn off the student transmitter power switch. Do not operate the trainer switch either.
- Use the functions of the other two transmitters with the same setting.
- Extend the instructor transmitter antenna.

■SPLINED HORNS

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

a) Angle divisions



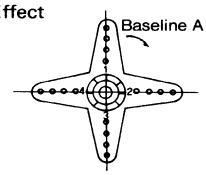
1) The splined horn has 25 segments. The amount of change per segment is; $360 \div 25 = 14.4°$

2) The minimum adjustable angle is determined by the number of arms or number of the holes center line. For four arms, the minimum adjustable angle is;

$360° \div (25 \times 4) = 3.6°$

Number of divisions

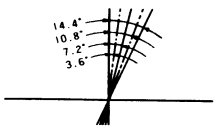
b) Effect



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 closest to baseline A.

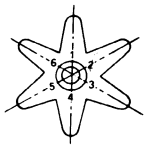
[Example] For a four arm horn, the angular shift per segment is 14.4°. The shift to the right is $90° - (14.4 \times 6) = 3.6°$

To shift by the same angle in the opposite direction, use the opposite arm number.

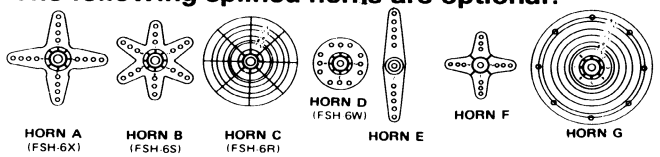


For a six arm horn, turn the arm counterclockwise and set arm 2 to the position of arm 1. The adjustable angle is $60° - (14.4 \times 4) = 2.4°$.

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.

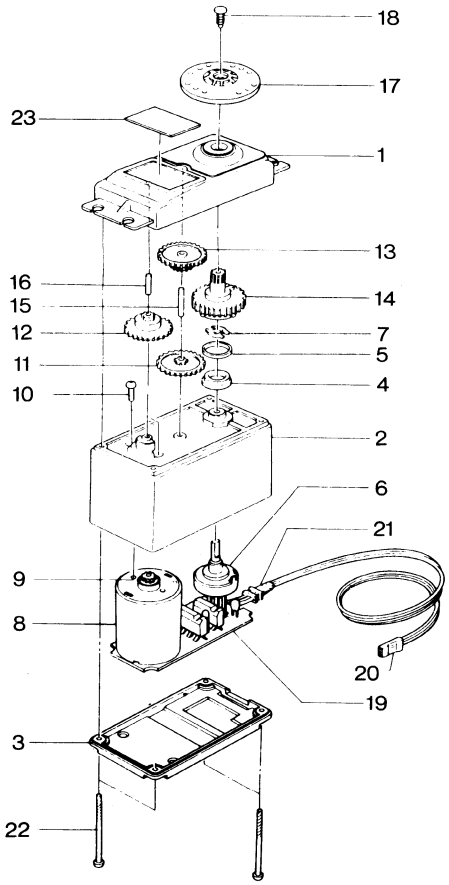


The following splined horns are optional.



5 SERVO EXPLODED VIEW

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	AS1157
20	3PB-WRB300G	AT2453
21	w/gum bush	S90045
22	Pan head truss screw	S50360
23	Nameplate	S60099

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