

Futaba®

DIGITAL PROPORTIONAL RADIO CONTROL

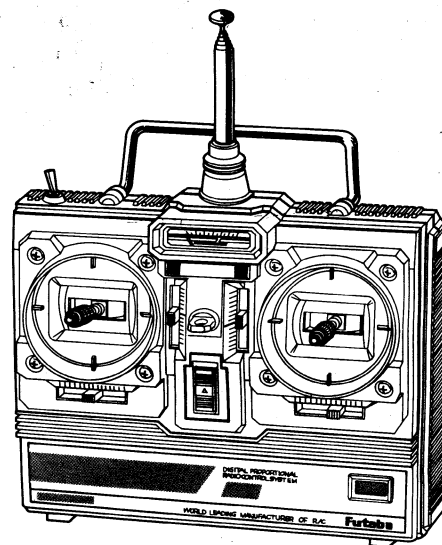
INSTRUCTION MANUAL

FP-4NBP PCM/FM
FP-4NBF FM



FUTABA CORPORATION OF AMERICA
FUTABA CORPORATION

D60659



FOR AIRCRAFT, PCM/FM 4 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-4NBP/FP-4NBF

- High resolution and fast response PCM system. (FP-4NBP)
- Servo reversing switch for each channel.
- F/S (fail safe), (FP-4NBP)
- Trainer system. (Trainer cable optional)
- Stick spring tension can be adjusted.
- Nonslip adjustable stick lever head.
- Neck strap hook.
- Easy to read transmitter battery voltage/output level meter.
- Rugged low-profile servo. (FP-S148)
- Nicad battery operation as standard.

2 SET CONTENTS AND RATINGS

(Specifications are subject to change without prior notice.)

	FP-4NBP	FP-4NBF			
Transmitter	FP-T4NBP	FP-T4NBF			
Receiver	FP-R124DP	FP-R127DF			
Servo	FP-S148(x3)				
Battery and Charger	<ul style="list-style-type: none"> ● Transmitter battery NT-8JY ● Receiver battery NR-4QB ● Charger FBC-8B(4) 				
Crystal	<ul style="list-style-type: none"> ● FM crystal set (Transmitter and Receiver) However the crystal type for dual conversion receiver is the following type. <table border="0"> <tr> <td>72MHz Band TYPE 72-10</td> <td rowspan="2">} (stated on the tab)</td> </tr> <tr> <td>50MHz Band TYPE 50-10</td> </tr> </table>		72MHz Band TYPE 72-10	} (stated on the tab)	50MHz Band TYPE 50-10
72MHz Band TYPE 72-10	} (stated on the tab)				
50MHz Band TYPE 50-10					
Others	<ul style="list-style-type: none"> ● Switch ● Extension cord ● Spare horn ● Others 				

Transmitter (FP-T4NBP/FP-T4NBF)

2 sticks 4 channels transmitter	
Transmitting frequency	: 72MHz, 50MHz band
Modulation	: FM-PCM(T4NBP) FM(T4NBF)
Power requirement	: 9.6V Nicd battery pack
Current drain	: 150mA

Receiver (FP-R124DP/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	: 17.5mA at 4.8V (R124DP) 10.0mA at 4.8V (R127DF)
Dimensions and weight	: 64.3x35.8x21.0mm, 41.0g (R124DP) 64.3x35.8x21.0mm, 40.5g (R127DF)
Receiving range	: 500m on the ground, 1000m in the air. (range differs with the surroundings)

Servo (FP-S148)

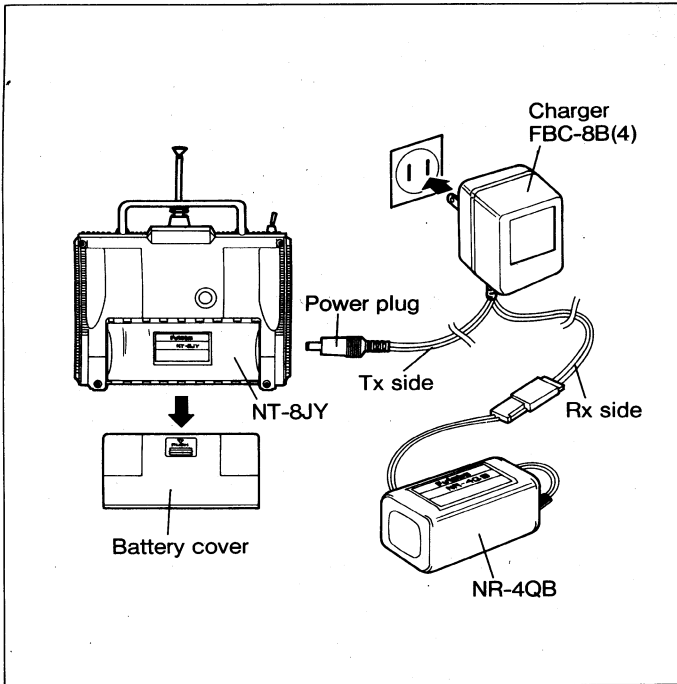
Control system	: + pulse width control
Operating angle	: Rotary system, one side 45° or greater (including trim)
Power requirement	: 4.8V or 6.0V (shared with receiver)
Current drain	: 8mA at 6V (at idle)
Output torque	: 3kg/cm
Operating speed	: 0.22sec/60°
Dimensions and weight	: 40.4x19.8x36mm 44.4g

Nicd battery (NT-8JY/NR-4QB)

Voltage	: 9.6V (NT-8JY), 4.8V (NR-4QB)
Capacity	: 500mAh
Dimensions and weight	: 28.3x50.5x28.3mm, 97g (NR-4QB)

3 BEFORE USING

■Charging the transmitter and receiver Nicd battery.



■Use the special Futaba charger.

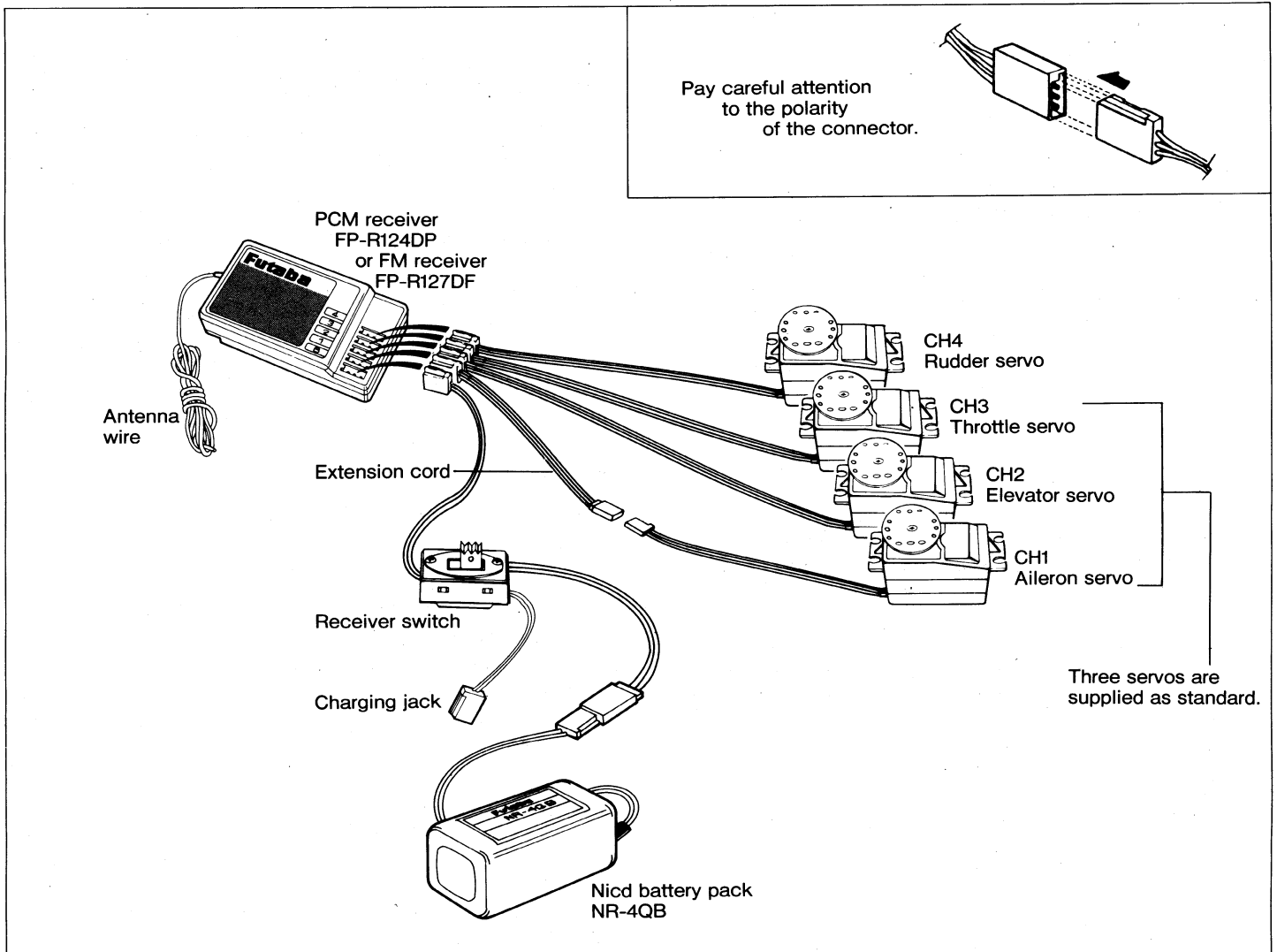
If charging in more than the specified current, the transmitter may be unreparable.

■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-4QB Nicd battery pack can be used for about 10 flights when 3 servos are used.

■Receiver and servos connections.



PRECAUTIONS

- 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.

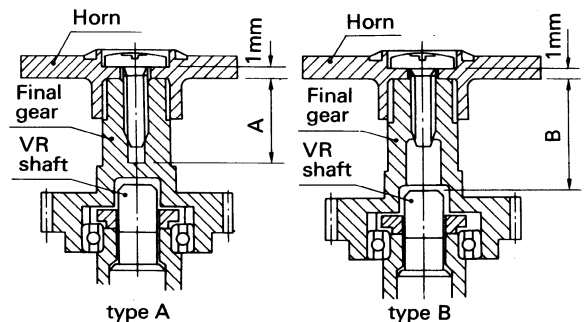
- Although the antenna appears to be too long, do not cut it or fold it back.
- Install the servos securely. Tighten the mounting screws until the rubber damper is crushed slightly. If the screws are too tight, the cushioning effect will be adversely effected.
- The crystal can be changed from the outside of the receiver case. Always use the Futaba transmitter/receiver matched crystal set to change the frequency.
- The FP-R124DP and FP-R127DF are a dual conversion receiver. These receivers require 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

Servo horn screws

Horn mounting screw size	Applicable servo	Type	Dimensions (mm)
2.6 x 6	S133, S143 series	B	5.7
	S129 series	A	7.9
2.6 x 8	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, S3001	A	8.3
2.6 x 10	S136G	A	9.0
	S131S series, S9201, S9301, S9401	A	9.0
2.6 x 12	S134 series, S3301	A	11.3



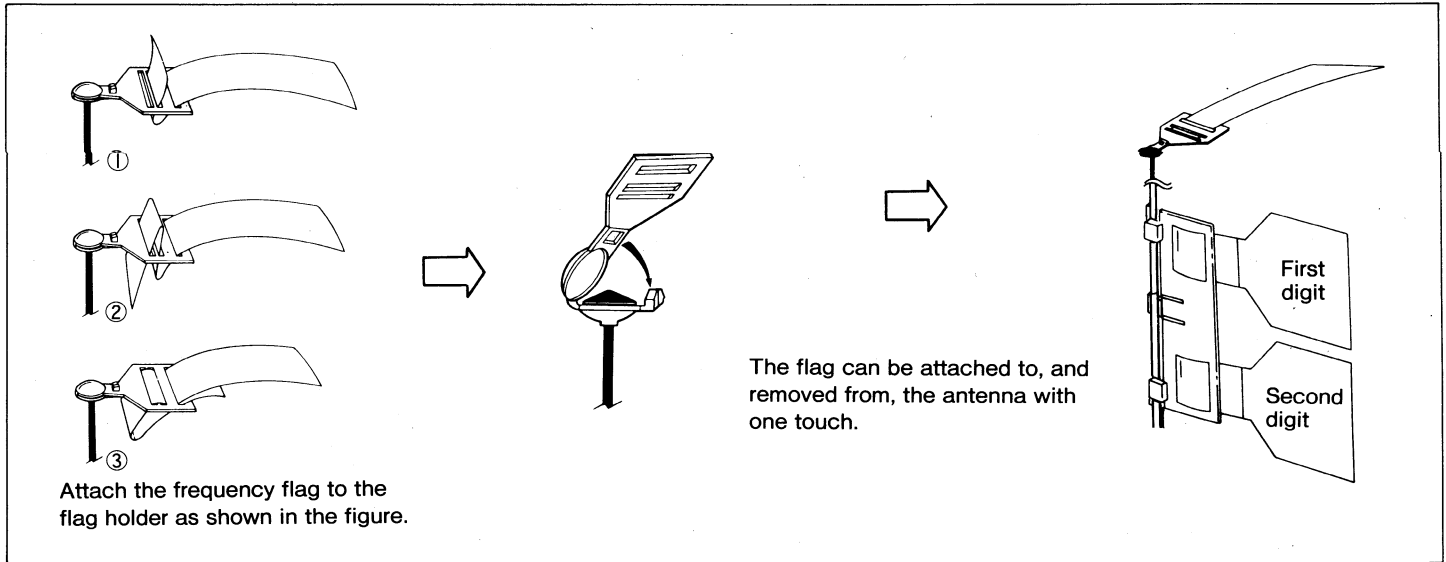
Notes

- The screws are 2.6 mm tapping screws.
- 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 (50 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 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 72MHz and 75 MHz bands in the U.S.A.

■ **ANTENNA FREQUENCY FLAG**

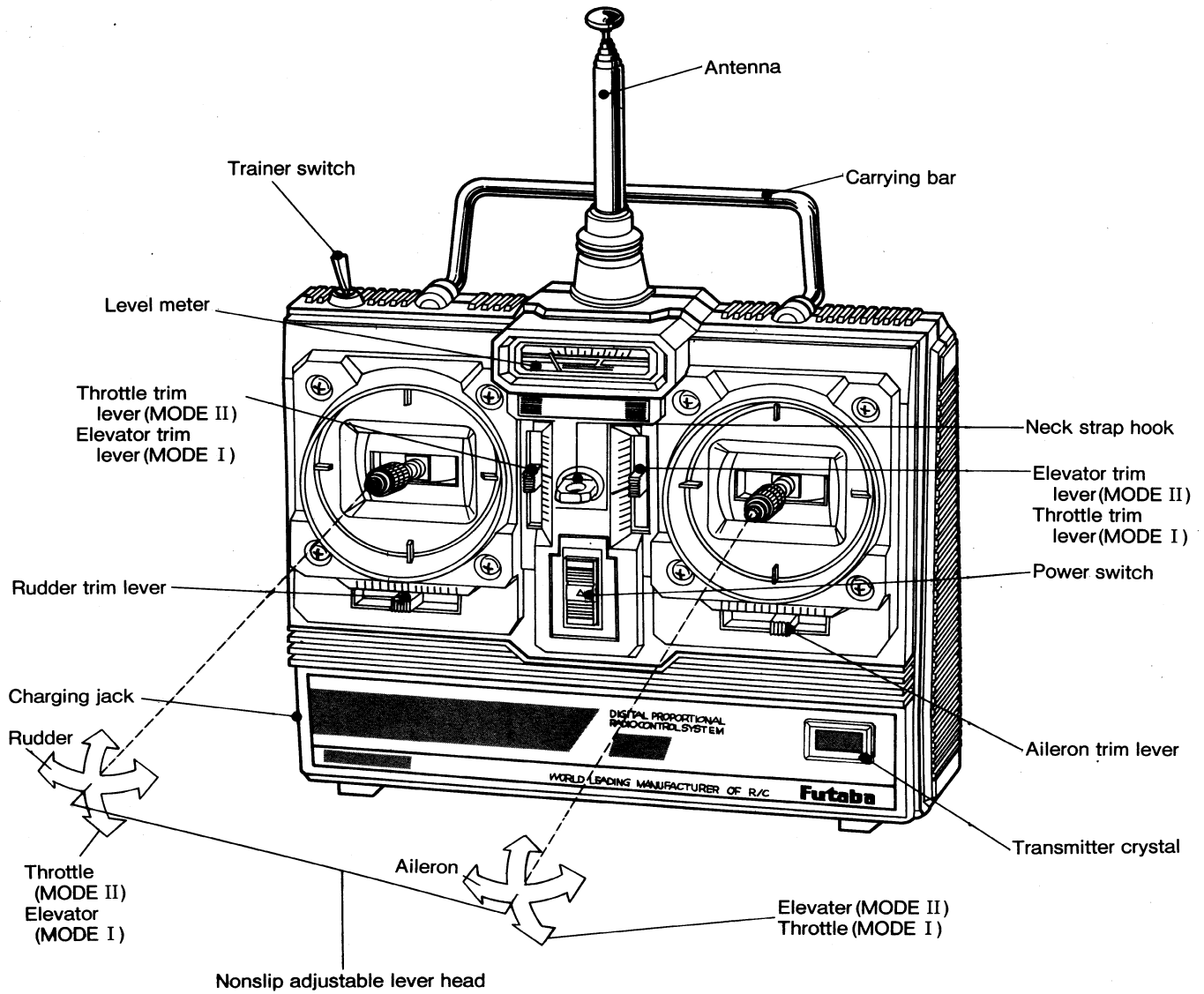


■ **Frequency Channel No. Flag Color (FOR U.S.A.)**

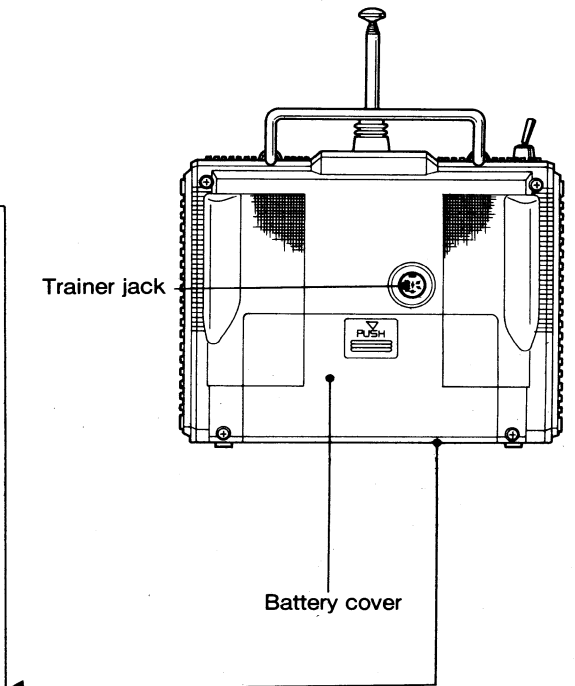
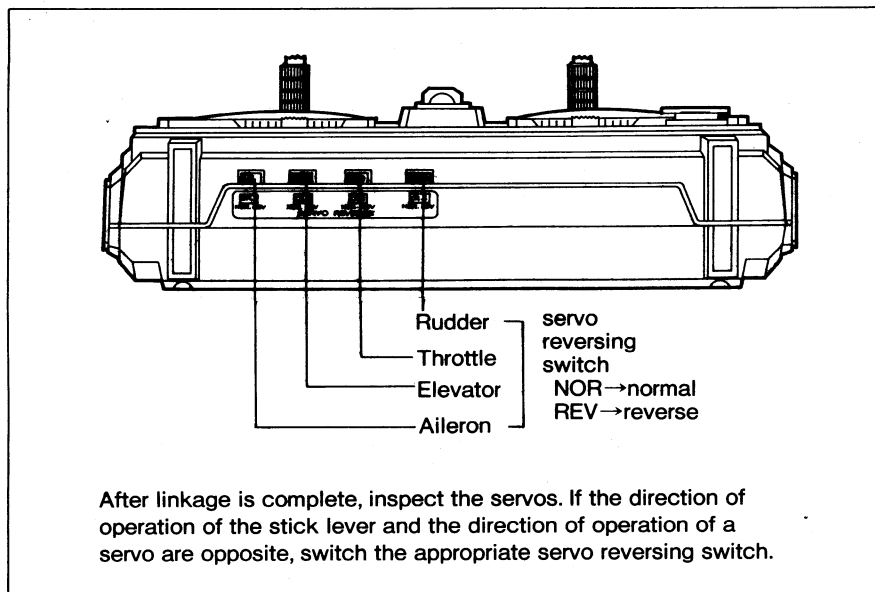
26-27MHz-Aircraft/car/boat		72MHz-Aircraft only			
	Color	72.030	12	*72.470	34
26.995	Brown	*72.070	14	72.550	38
27.045	Red	*72.110	16	72.590	40
27.095	Orange	*72.150	18	72.630	42
27.145	Yellow	*72.190	20	72.670	44
27.195	Green	*72.230	22	72.710	46
27.255	Blue	*72.270	24	72.750	48
50/53MHz-Aircraft/car/boat-Fcc		*72.310	26	72.790	50
Amature License required (2 and 3		*72.350	28	72.830	52
channels not produced on these		*72.390	30	72.870	54
frequencies.)		*72.430	32	72.910	56
Channel No.		75MHz-Car/boat only			
50.800	RC00	75.430	62	75.750	78
50.840	RC02	75.470	64	75.790	80
50.880	RC04	75.510	66	75.830	82
50.920	RC06	75.550	68	75.870	84
50.960	RC08	75.590	70	*75.910	86
	Color	*75.630	72	*75.950	88
53.100	Black-Brown	75.670	74	*75.990	90
53.200	Black-Red	75.710	76		
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, 1988

4 FUNCTION AND SETTING METHOD



■ Servo reversing switches (CH1~CH4)



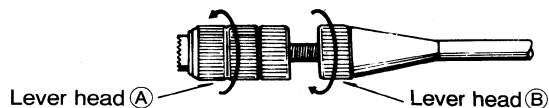
■ F/S (fail safe) — (FP-4NBP)

F/S (fail safe) function

The F/S function holds all servos in their current position except for throttle which will move to a low side when the receiver is under heavy interference or loss of transmitter signal.

■ Non-slip adjustable lever head adjustment

The length of the lever head can be changed.

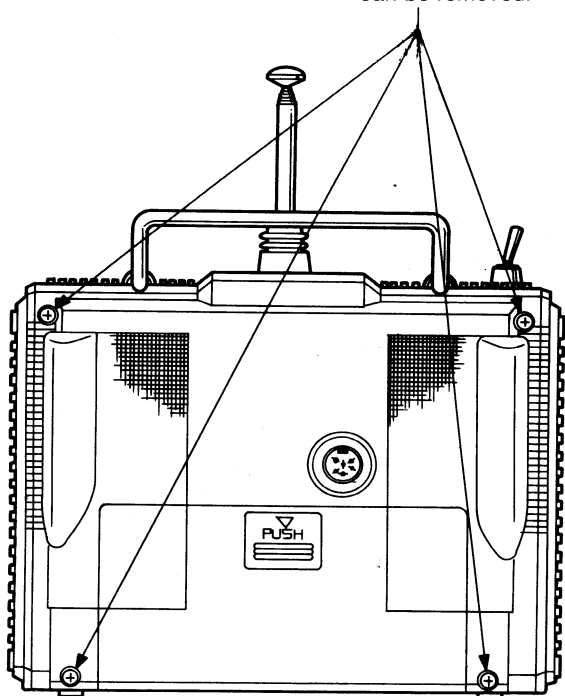


Unlock lever heads A and B by turning them in opposite directions as shown by the arrows and adjust the stick to the most comfortable length.

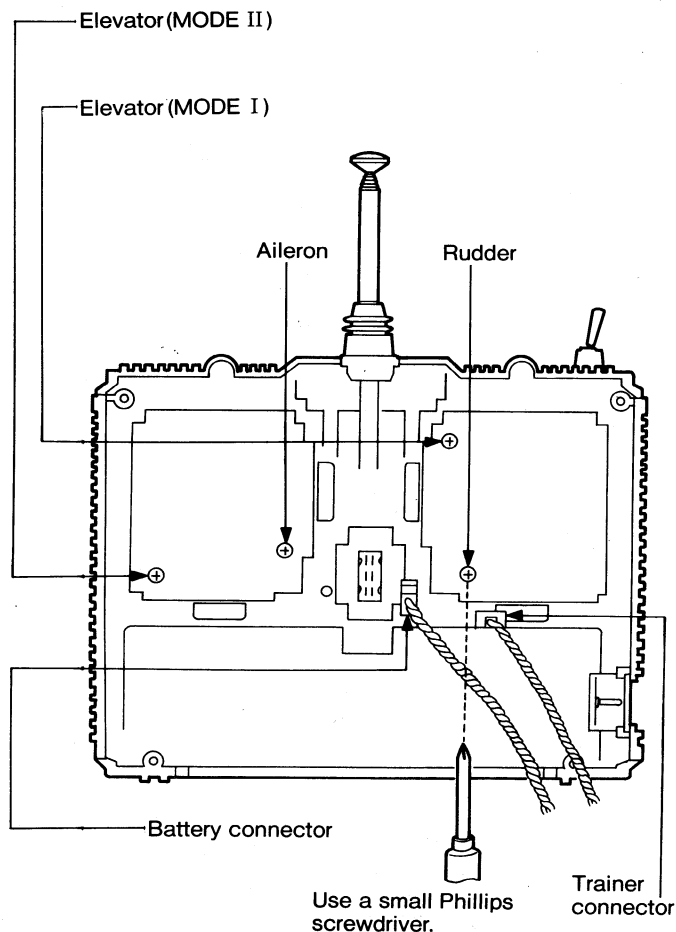
■ Stick lever tension adjustment

The tension of the stick lever spring can be adjusted.

When these screws are removed, the back cover can be removed.



- The tension of the spring can be adjusted by removing the transmitter back cover and turning the screw for each stick. Set the springs for the best stick feel.

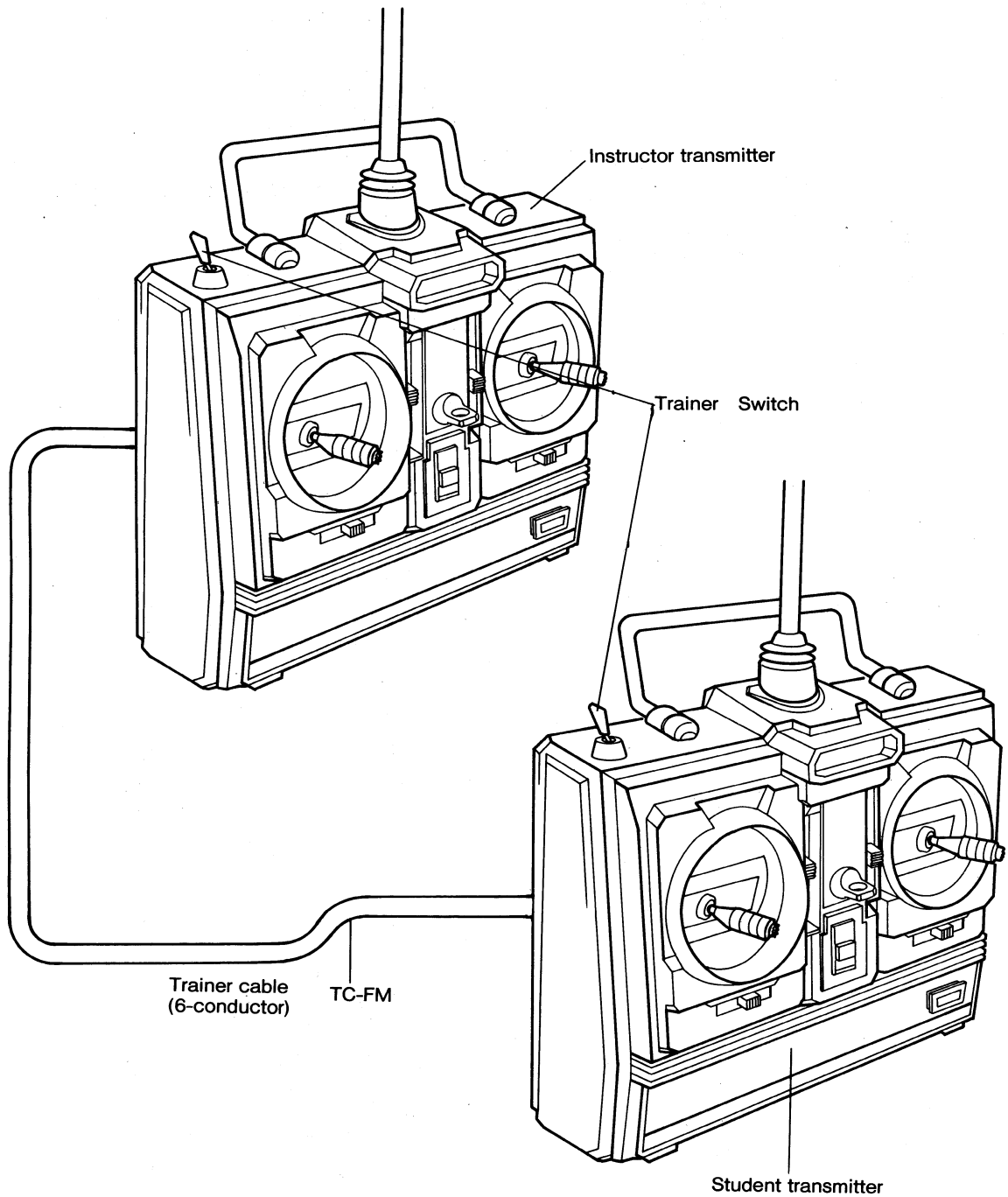


Caution:

Do not pull the Nicd battery connector and trainer connector when the back cover is removed. The power switch and P.C.B. may be damaged if the battery connector and trainer connector is strongly pulled.

■ Trainer function (Trainer cable optional)

1. Connection to transmitter.



- 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.

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.

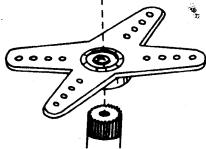
3. Operating at the student side

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

■ SPLINED HORNS

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

a) Angle divisions

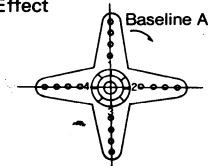


- 1) The splined horn has 25 segments. The amount of change per segment is; $360 \div 25 = 14.4^\circ$
- 2) The minimum adjustable angle is determined by the number of arms or number of the holes center line. For four arms, the minimum adjustable angle is.

$$360^\circ \div (25 \times 4) = 3.6^\circ$$

Number of divisions

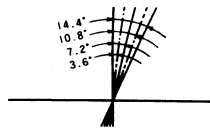
b) Effect



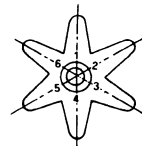
To shift the holes center line to the right (clockwise) relative to baseline A, shift arm 2 to the position of arm 1 and set it to the position closest to baseline A.

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

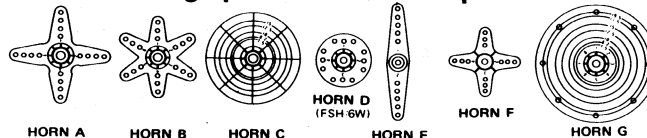
To shift by the same angle in the opposite direction, use the opposite arm number.



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



The following splined horns are optional.



HORN A
(FSH-6X)

HORN B
(FSH-6S)

HORN C
(FSH-6R)

HORN D
(FSH-6W)

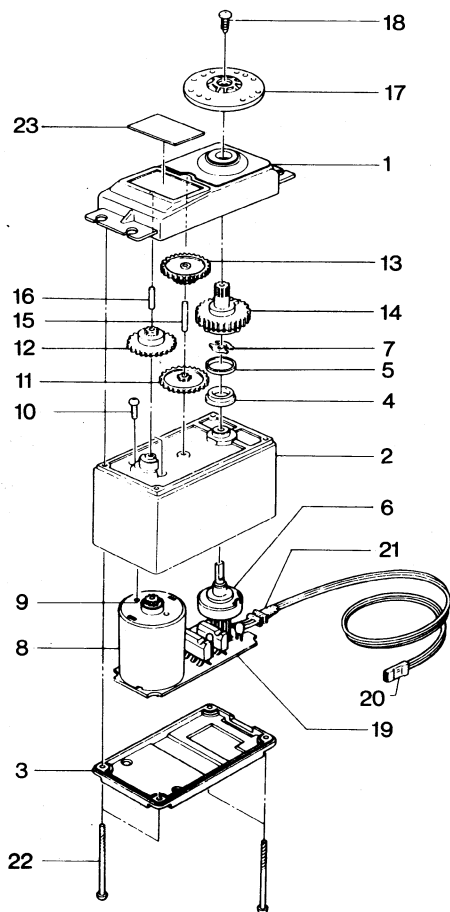
HORN E

HORN F

HORN G

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-41
19	Printed wiring board	AS1157
20	3PB-WRB300G	AT2453
21	w/gum bush	S90045
22	Pan head truss screw	S50360
23	Nameplate	S60099



FUTABA CORPORATION OF AMERICA

4 Studebaker, Irvine California 92718, U.S.A.

Phone: 714-455-9888 Telex: 23-0691227 Facsimile: 714-455-9899

FUTABA CORPORATION

Tokyo Office: INAGAKI BLDG., 3F 1-21-3, Kanda sudacho, Chiyoda-ku, Tokyo, Japan.

Phone: (03)255-6811 Facsimile: (03)255-6880