

Futaba

DIGITAL PROPORTIONAL
RADIO CONTROL

INSTRUCTION MANUAL

FP-7FGH *w/o Invert*
FM 7 CHANNELS 4 SERVOS FOR
F3C HELICOPTER



FUTABA CORPORATION OF AMERICA
FUTABA CORPORATION

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

CONTENTS

•FEATURES	1
•CONTENTS AND RATINGS.	2
•TRANSMITTER CONTROLS	3 ~4
- Inside Rear Trimmer Panel	4
•OPERATION	5~8
•Transmitter RF module	8
•CHARGING OF TRANSMITTER AND DECEIVER Ni-Cad BATTERIES	8
•TRAINER	9
•STICK MECHANISM AND ITS ADJUSTMENT	9
•RECEIVER, SERVO, SWITCHES, AND Ni-Cad BATTERY CONNECTIONS AND USAGE PRECAUTIONS	10~11
•SPLINED HORN	12
•Futaba Digital Proportional Frequencies	12
•FP-130 EXPLODED VIEW	13
•GUARANTEE	13

• FEATURES

The FP-7FGH was specially developed for model helicopters.
Please read this manual carefully before using your new set.

Transmitter FP-T7FGH

- RF module systems allows one-touch changing of the frequency band.
- Aileron to rudder mixing is ideal for giant scale and quarter scale models and gliders.
- Servo reversing switch for each channel allows reversing of the servo direction by simply flipping a switch.
- Two kinds of dual rates on the aileron, elevator, and rudder channels. Aileron and elevator dual rate can be switched simultaneously or independently.
- Newly designed case and new open gimbal stick with adjustable tension and lever head.
- Pitch control -> rudder and throttle -> pitch control mixing.
- Throttle hold function for auto-rotation.
- High and Low pitch cab trimmer permits adjustment of the best pitch for hovering and maneuvering.
- Idle up functions used for static and dynamic aerobatics.
- Throttle High and Low ATL (Adjustable Throttle Limiter) allows simple, reliable throttle linkage hook-up.
- ATV (Adjustable Travel Volume) on AILERON, ELEVATOR & RUDDER channels allows independent adjustment of the servo left, right, up, and down throw.
- Trainer system offers an easy training of flight for beginners. FM systems are not compatible with AM systems.
- Highest quality aluminum case featuring sophisticated designs. The transmitter fits easily into your hand.
- Neck strap supplied as a standard accessory. This transmitter has numerous functions which can be easily operated when using the neck strap.

RECEIVER FP-R107M

- Pulse noise rejection circuit is invulnerable to noise.
- Small & high sensitivity 7 channel FM receiver using a specially developed high sensitivity monolithic 1C IF amplifier.

- Selective squelch circuit is unaffected by other transmitters on other bands during simultaneous multi-band flights.
- Futaba custom 1C and large capacity capacitor improve stability against power supply voltage fluctuations tremendously.
- Same antivibration metal plated pin connectors as the high-quality J Series.
- Throughhole printed circuit board is invulnerable to shock and vibration.

SERVO FP-S130

- Small, high-quality five-pole micromotor servo. High-torque 55.6 oz-in (4 kg-cm). high-speed (0.24 sec/60°), watertight.
- New indirect drive potentiometer improves vibration and shock resistance and neutral precision.
- Futaba low-power custom 1C provides high starting torque, narrow dead band, and superior trackability.
- Fiberglass reinforced PBT (polybutylene terephthalate) injection molded servo case is mechanically strong, and invulnerable to glow fuel.
- Strong polyacetal resin ultra-precision servo gear features smooth operation, precise neutral, and very little backlash.
- Thick film gold plated connector pins ensure positive contact and improved reliability against shock and vibration. The housing is polarized to prevent reverse insertion.
- Four special adjustable splined horns are available.

• CONTENTS AND RATINGS

Ratings and specifications are subject to change without prior **notice**

Model	FP-7FGH
Transmitter	FP-T7FGH x 1
Receiver	FP-R107M x 1
Servo	FP-S130x4
Switch	SWH-5 (R4-SWJ)
Ni-cdbattery	NR-4Jx 1
Accessories	Charger, extension cord, frequency flag, spare horn, neck strap, mounting screws

Transmitter FP-T7FGH

Operating system	: Two-stick, 7 channels for F3C helicopter
Transmitting frequency	: 72MHz band 27, 29, 35, 40, 72 & 53 MHz band switching possible by changing RF module.
Modulation	: FM
Power requirement	: 9.6V, 8/500mAH internal ni-cd battery.
Current drain	: 150mA

Servo FP-S130

Control system	+ pulse width control 1520uS.N
Operating angle	One side 45° or more (including trim)
Power requirement	4.8V (shared with receiver)
Current drain	6.0V/8mA (at idle)
Output torque	55.6 oz.in (4 kg-cm)
Operatingspeed	0.24 sec/60°
Dimensions	1.52x0.77x 1.36in. (38.5x 19.5 x 34.5mm)
Weight	1.48 oz (42g)

Receiver FP-R107M

Receiving frequency	27,29, 35, 40, 72 & 53MHz.
Crystal change system	Precision crystal that permits frequency change within the same band.
Intermediate frequency	455kHz
Power supply	4.8V Ni-Cad battery, shared with receiver
Current drain	15mA
Dimensions	1.69 x2.72x0.79in. (43 x 69 x 20mm)
Weight	1.9oz (54g)
Receiving range	500m on the ground, 1000m or greater in the air when used with the FP-T7FGH.

Charger FBC-2 (A)

Input voltage	120VAC,50/60Hz. 4VA
Output	Tx side 9.6V.45mA Rx side 4.8V, 45mA

Receiver and servo Ni-Cad battery NR-4J

Voltage	4.8V,4/500mAH
Dimensions	2.01 x 2.28 x 0.59in. (51 x 58 x 15mm)
Weight	3.35oz (95g)

•TRANSMITTER CONTROLS

Names and functions of transmitter controls

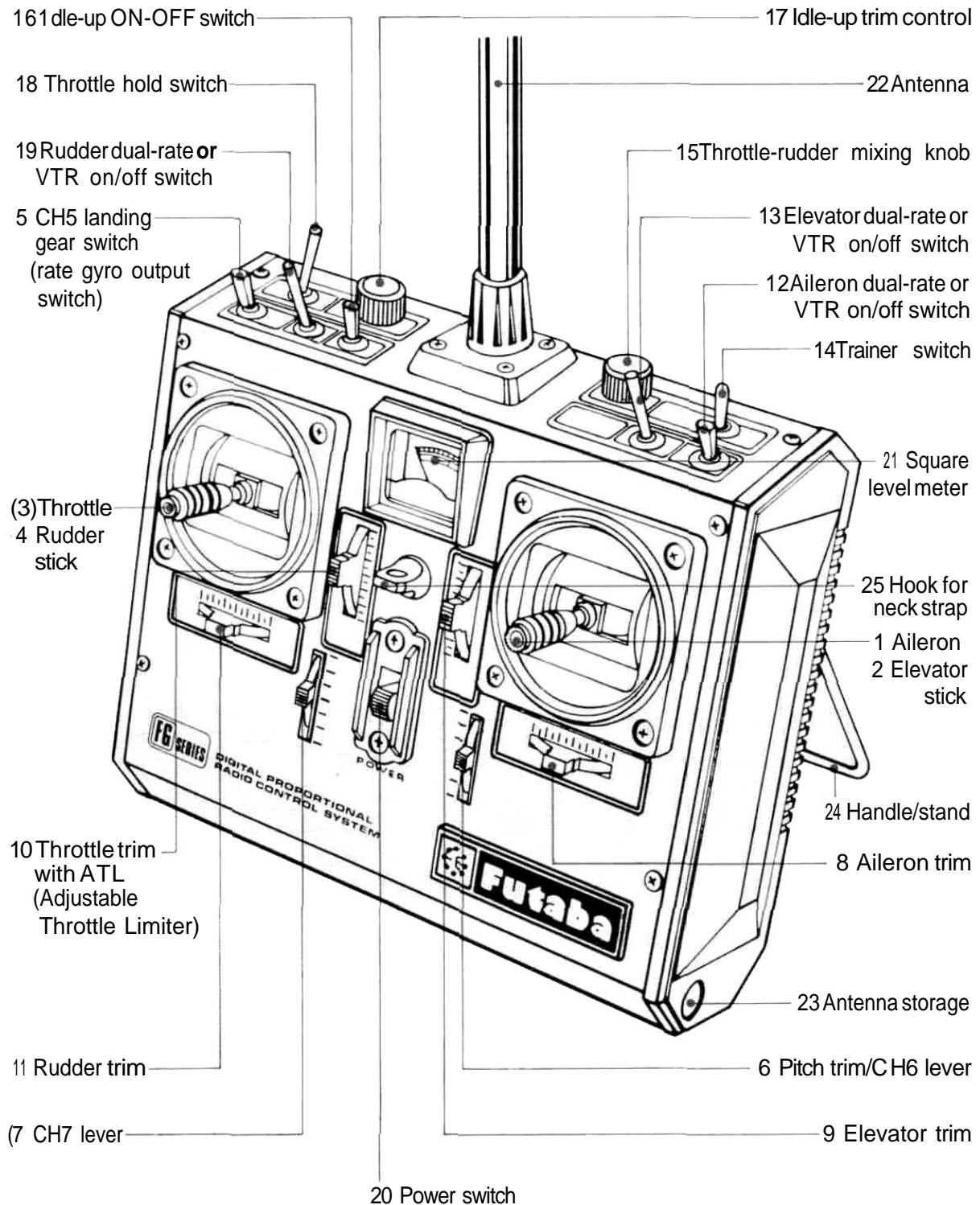
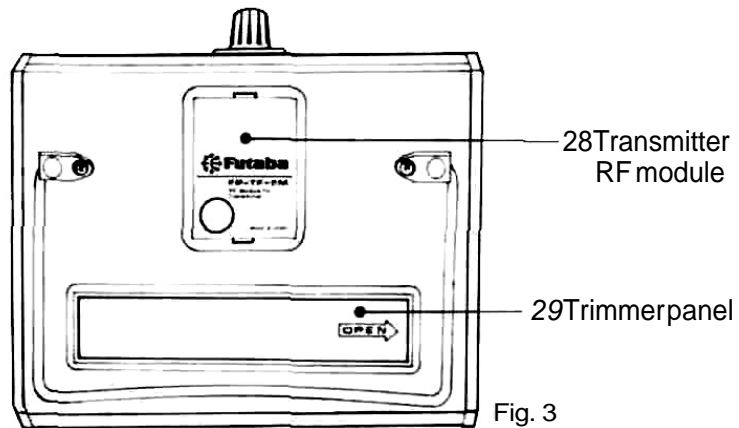
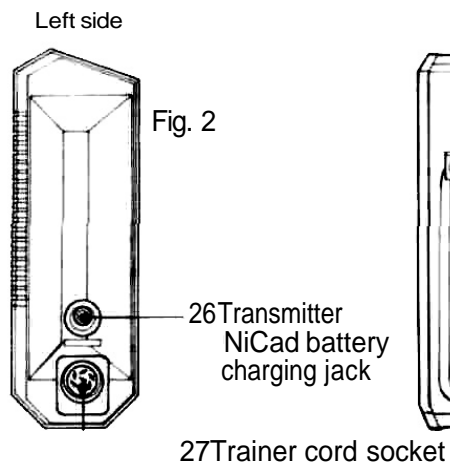
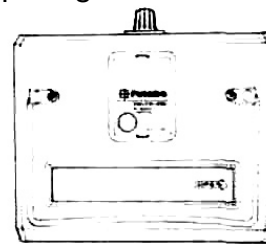


Fig.1

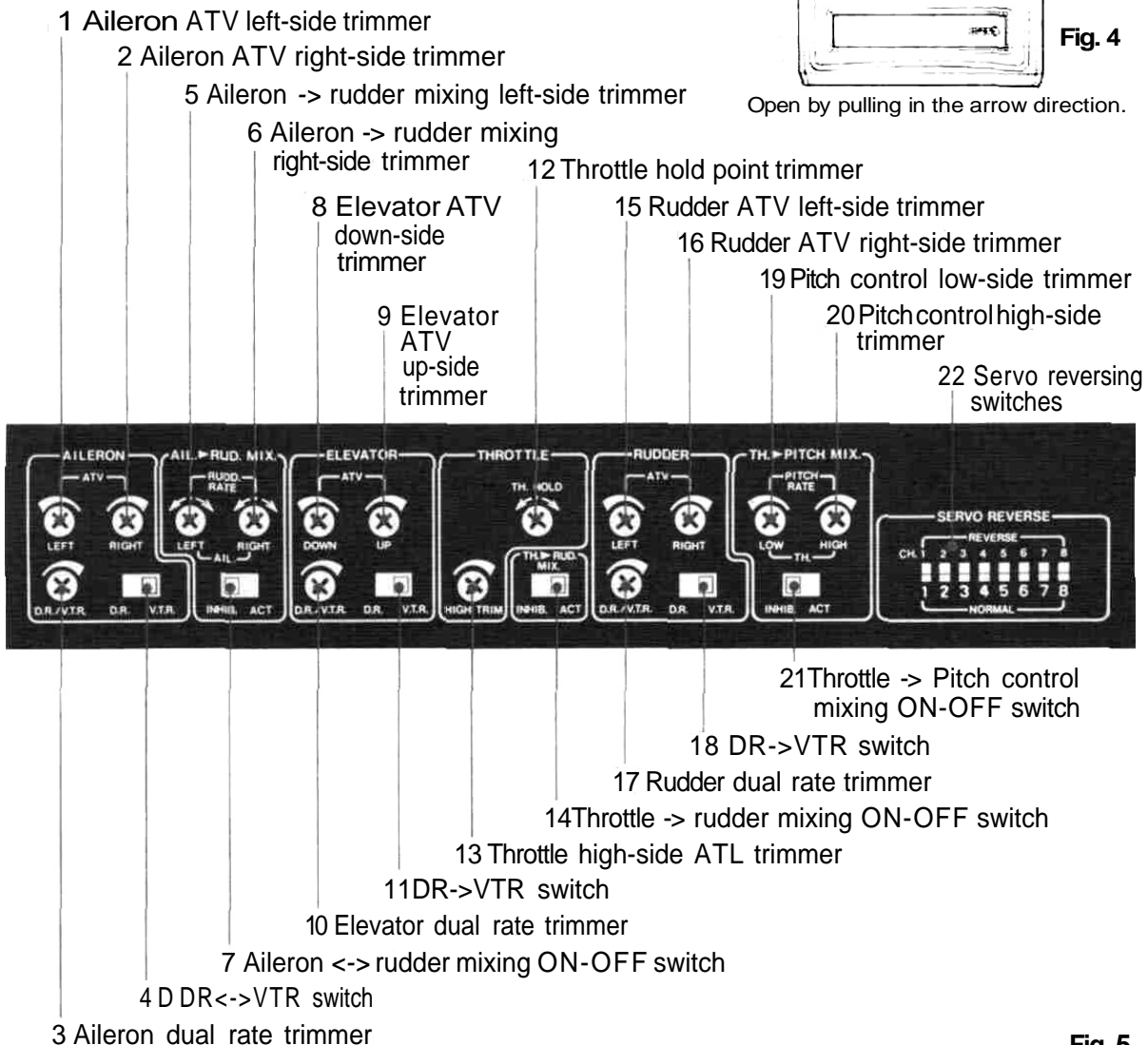


Opening the trimmer panel



Open by pulling in the arrow direction.

Inside Rear Trimmer Panel



• OPERATION

This section explains the operation of the transmitter controls when the servo reversing switches are in the normal position. When the reversing switches are in the reverse position, operation is the opposite of that described here.

CD Aileron stick Controls the ailerons.

2 Elevator stick Controls the elevators.

3 Throttle Stick Controls the throttle.

4 Rudder Stick Controls the rudders.

5 CH5 switch Switches the rate gyro output.

6 Pitch trimmer/CH6 lever Trims the propeller pitch control independently from the throttle.

(7)CH7 lever Spare channel.

8 Aileron trim lever Aileron trimmer.

9 Elevator trim lever Elevator trimmer.

10 Throttle trim lever w/ATL Adjustable travel trim lever. This lever acts as a trimmer only when the throttle stick is at the low side as shown in Fig. 6. It is very convenient because the high side of the throttle position remains unchanged even when the low side is adjusted.

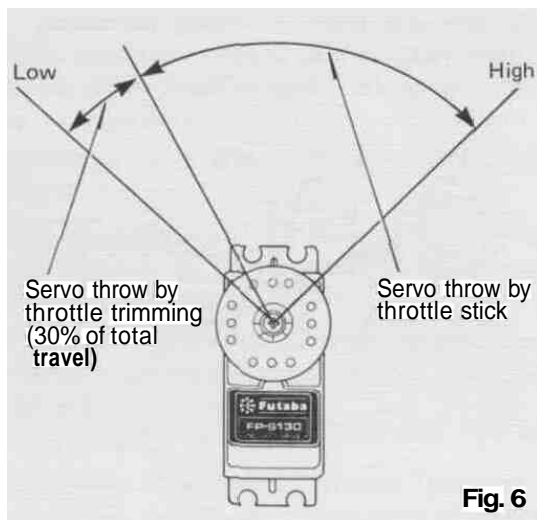


Fig. 6

11 Rudder trim lever Rudder trimmer.

12 Aileron dual rate switch Aileron dual rate ON-OFF switch. When set to the upper position, dual rate is turned on, and when set to the lower position, dual rate is turned off. At dual ON, the deflection can be set as shown in Fig. 7 with the **3** aileron dual rate trimmer located on the trimmer panel at the back of the transmitter. At dual OFF, the operating linearity can be switched as shown in Fig. 8 with the **4** VTR (Variable Trace Ratio) switch also located on the trimmer panel.

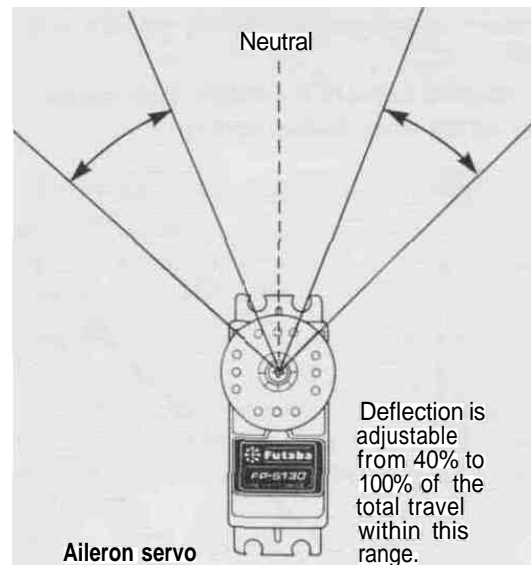


Fig. 7

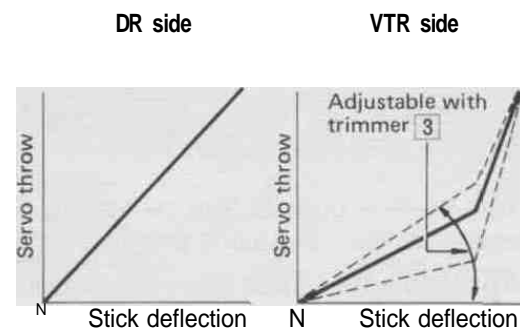


Fig. 8

***Trim lever is used for fine adjustment.**

The trim lever is used for neutral position adjustment or correction of the posture of the aircraft after installation is completed. However, after test flight, try to keep the neutral position as they are making necessary corrections with the rod adjusters, etc.

13 Elevator dual rate switch • Elevator dual rate ON-OFF switch. Similar to aileron dual rate, (dual rate ON) the elevator deflection can be adjusted with the elevator dual rate trimmer 10 and the servo operating linearity can be switched with the DR <=> VTR switch 11.

14 Trainer switch Pull on/self-off switch. The transmitter connected by the trainer cord (M-TC) operates and when it is OFF, your own transmitter only operates.

15 Throttle-rudder mixing knob Ratchet knob that sets the throttle to rudder mixing amount and direction. Mixing amount is 0 — 50%.

16 Idle-up ON-OFF switch This switch is turned ON when pushed forward.

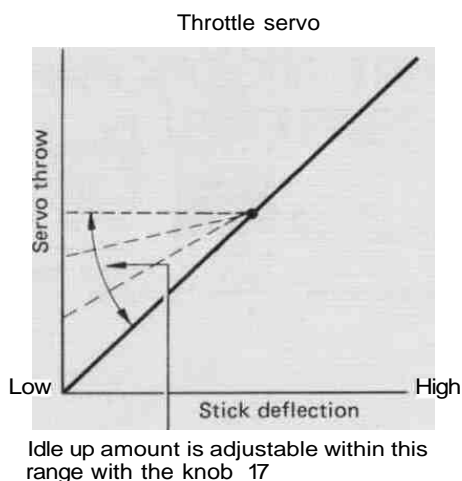


Fig. 9

17 Idle-up trim control Sets the idling speed when the 16 idle-up switch is ON.

18 Throttle hold switch When this switch is set to ON, the throttle servo stops at the position set at the 12 trimmer and only the pitch servo operates. This switch is used in auto-rotation dives. Both throttle and pitch servos mixing is performed when this switch is OFF. It is ON when pushed forward.

19 Rudder dual rate switch Rudder dual rate ON-OFF switch. Similar to aileron dual rate, at dual rate ON, the rudder deflection can be adjusted with the rudder dual rate trimmer

17 and the servo operating linearity can be switched with the DR <=> VTR switch 18. Other functions are the same as those of the aileron dual rate switch.

20 Powerswitch

21 Square level meter Level meter indicates the transmitter output power and indirectly shows power supply voltage.

22 Antenna

23 Antenna storage The opening is used for storage of the antenna while carrying the transmitter. It is located at the bottom right side of the transmitter.

24 Handle/stand

25 Hook for neck strap

26 Transmitter Ni-Cad battery charging jack

27 Trainer cord socket

28 Transmitter RF module

29 Trimmer panel

Non-slip adjustable lever head

The length of the lever head is adjusted to suit the operator.

Unlock lever head (A) and (B), by turning them in the arrow direction, set head (A) to the desired length, then relock the heads.

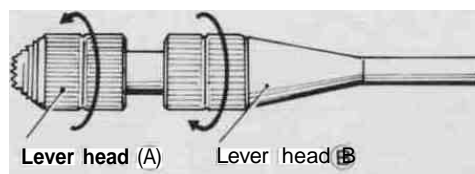


Fig. 10

Inside rear trimmer panel

1,2 Aileron ATV (Adjustable Travel volume) trimmer [2] RIGHT is for the right aileron and 1 LEFT is for the left aileron. The servo travel volume is independently adjustable to the left and right from the neutral position. Travel adjustment ranges 0 to 100%.

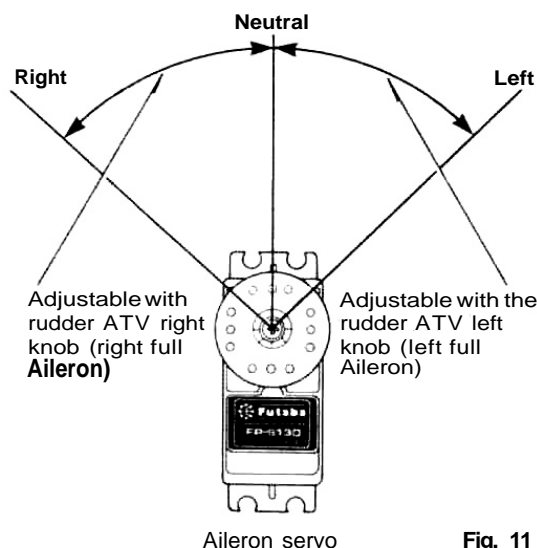


Fig. 11

3 Aileron dual-rate trimmer adjusts the aileron travel when the 12 aileron dual-rate or VTR switch ON. Travel adjustment ranges 40 to 100%.

4 DR (dual-rate) <=> VTR (Variable Trace Ratio) switch

5 6 Aileron-rudder MIX trimmer (From aileron to rudder) Adjust the mixing volume and the mixing direction of rudder. After linkage is completed adjust the MIX direction and amount with trimmers. MIX amount adjustment ranges 0—100% each, the same adjustment can be done even if the servo is reversed.

7 Aileron -> rudder mixing ON-OFF switch

8 9 Elevator ATV trimmer 9 UP is for up and 8 DOWN is for down. The adjustment range is same as the aileron ATV.

10 Elevator dual-rate trimmer adjusts the elevator travel when the 13 elevator dual-rate or VTR on/off switch is ON.

11 DR <=> VTR switch

12 Throttle hold point trimmer This trimmer sets the throttle servo stop point when the throttle hold switch 18 is set to ON. When the trimmer is turned counterclockwise, the throttle servo moves to the stow side.

13 Throttle high side ATL trimmer This trimmer adjusts only the high side of the throttle stick. It is extremely convenient when connecting the linkage, since the low side remains unchanged even when the throttle high side is adjusted with this trimmer.

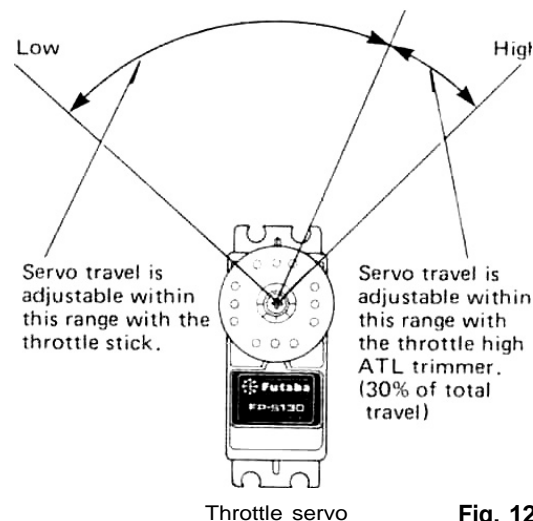


Fig. 12

14 Throttle -> Rudder mixing ON-OFF Switch This switch turns mixing from the throttle control (channel 3) to the rudder (channel 4) ON and OFF.

15 16 Rudder ATV trimmer. The adjustment range is same as the aileron ATV.

17 Rudder dual-rate trimmer Rudder dual-rate or VTR trimmer adjusts the rudder travel when the 19 rudder dual-rate or VTR on/off switch is ON.

18 DR <=> VTR switch

19,20 Pitch control trimmer The servo throw can be varied from 0 to 100% of the total. Set for optimum pitch during normal flight.

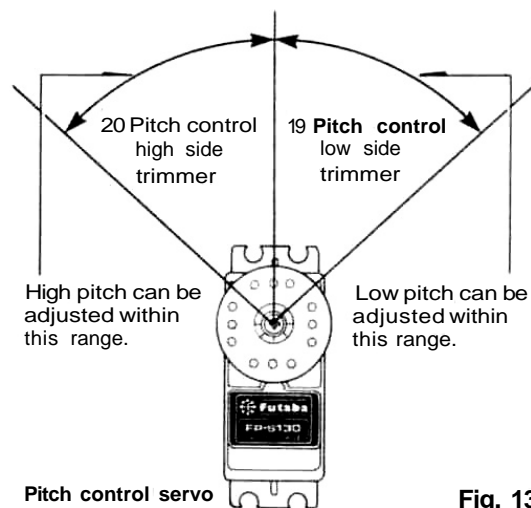


Fig. 13

21 Throttle -> Pitch control mixing ON-OFF switch This switch turns mixing from the throttle control (channel 3) to the pitch control (channel 6) ON and OFF.

22 Servo reversing switches These switches reverse the direction of the servos. It is very convenient when connecting the linkage.

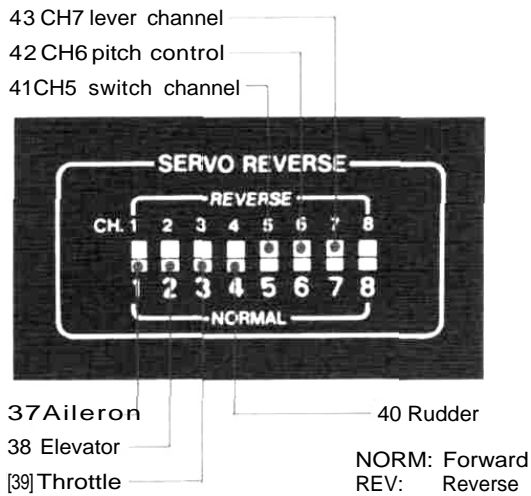


Fig. 14

Transmitter RF module

Change this module to switch to any frequency among 27, 29, 35, 40, 53 & 72 MHz bands.

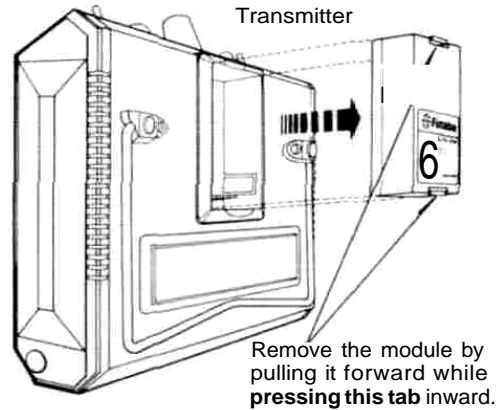


Fig. 15

CHARGING OF TRANSMITTER AND RECEIVER Ni-Cad BATTERIES:

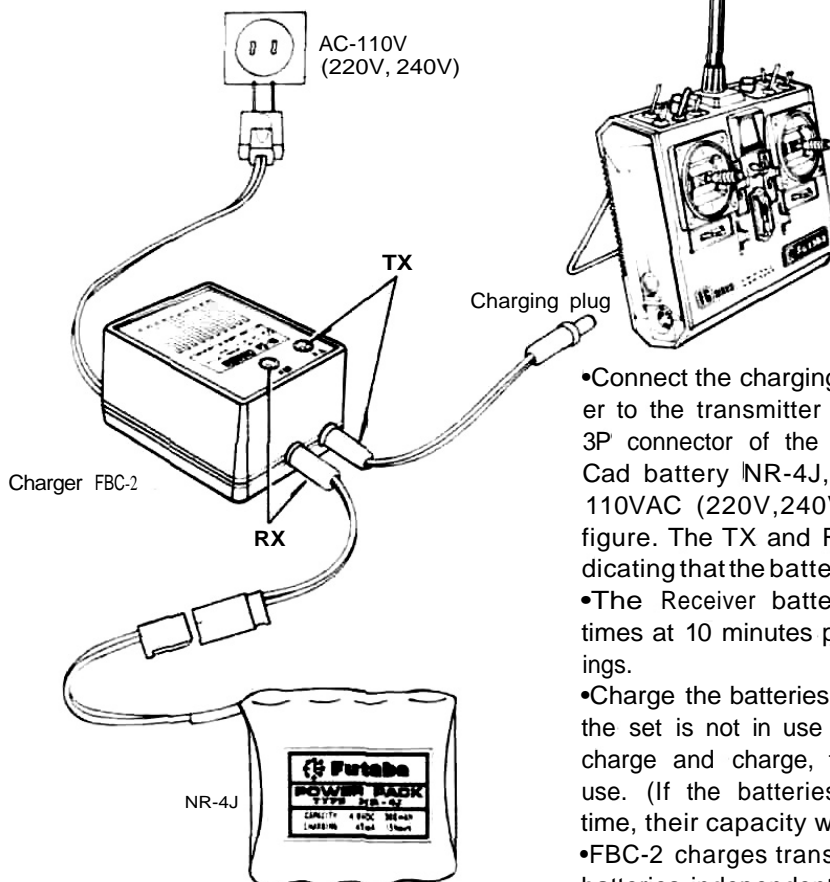


Fig. 16

Recharge the receiver and transmitter Ni-Cad batteries as shown in Fig. 16

- Connect the charging plug of the FBC-2 charger to the transmitter charging jack, connect the 3P connector of the FBC-2 to the receiver Ni-Cad battery NR-4J, and plug the FBC-2 to a 110VAC (220V, 240V) outlet as shown in this figure. The TX and RX charging LED light; indicating that the batteries are being charged.
- The Receiver battery can be used about 10 times at 10 minutes per flight between rechargings.
- Charge the batteries for about 15 hours. When the set is not in use for some time, repeat discharge and charge, two to three times before use. (If the batteries are not used for a long time, their capacity will go down).
- FBC-2 charges transmitter and receiver Ni-Cad batteries independently or simultaneously.

TRAINER

Connect the transmitters with the trainer cord (M-TC, purchased separately) as shown in Fig. When the switch is in the ON (pull) position, the student's transmitter operates and when the switch is in the OFF position, the instructor's transmitter operates. The transmitter at which the trainer switch is operated on-off becomes the instructor's.

Instructor transmitter
(Power switch ON and transmitter operating)

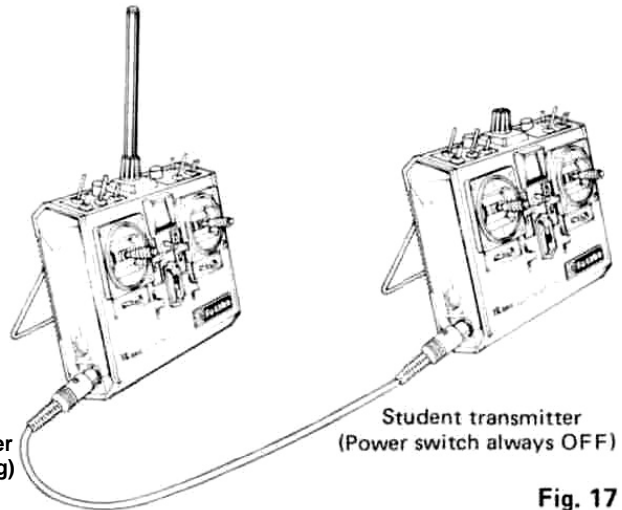


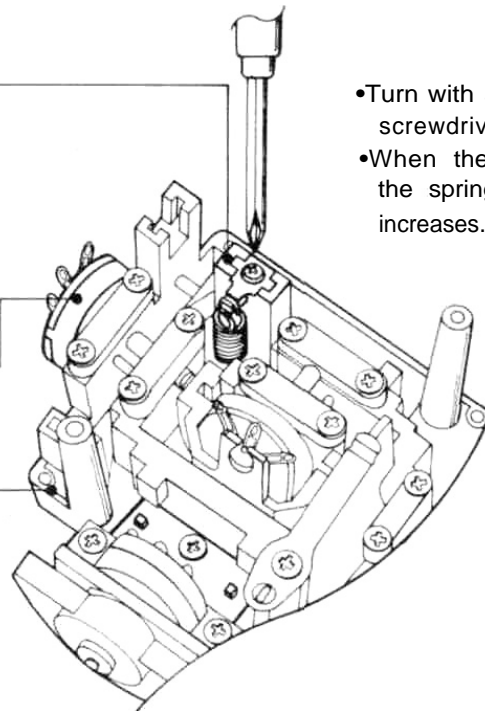
Fig. 17

STICK MECHANISM AND ITS ADJUSTMENT

- The new gimbal is open. This one has been used only for the most expensive radio controls. It also has the built-in tension adjustment mechanism on open gimbal for the first time. You can adjust tension of spring for your best stick feeling.

- CP variable resistor improved the neutral characteristics and resolution tremendously.

- All molded parts made of high-grade polycarbonate that virtually eliminates the effects of temperature and humidity.

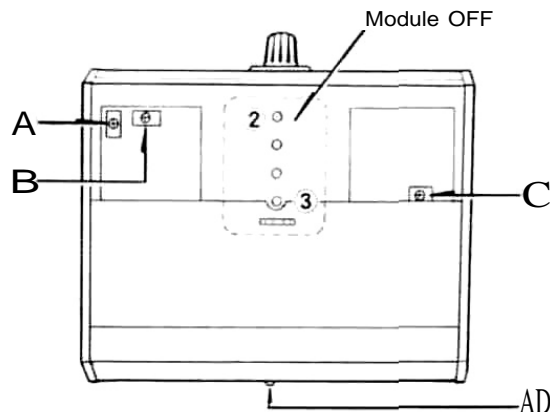


- Turn with a Phillips screwdriver.
- When the core rises, the spring tension increases.

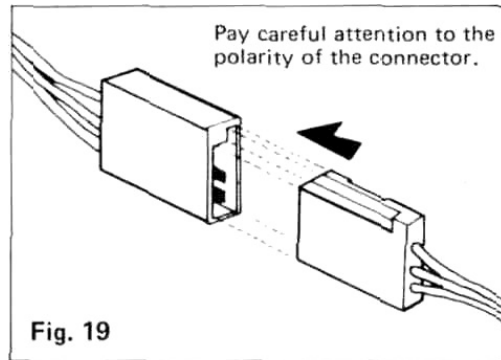
9

Fig. 18

- 1 To adjust spring tension, remove case back. Loosen and remove screw 1 & 2. Lift off case back from bottom side first.
- 2 Adjust spring tension with Phillips screw driver at opening A, B, C for MODE II transmitters.



• RECEIVER, SERVO, SWITCHES, AND Ni-Cad BATTERY CONNECTIONS AND USAGE PRECAUTIONS



10

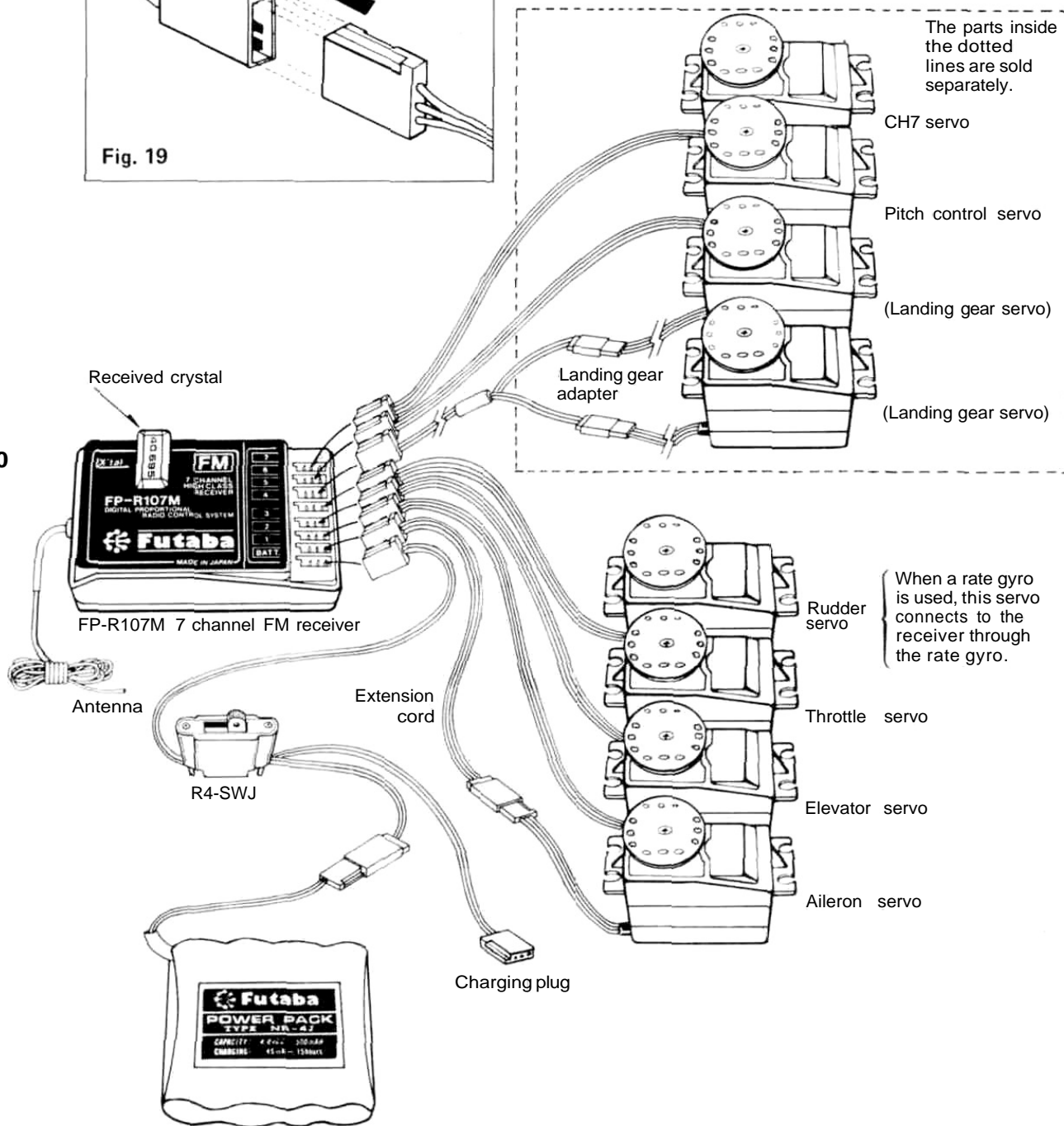


Fig. 20

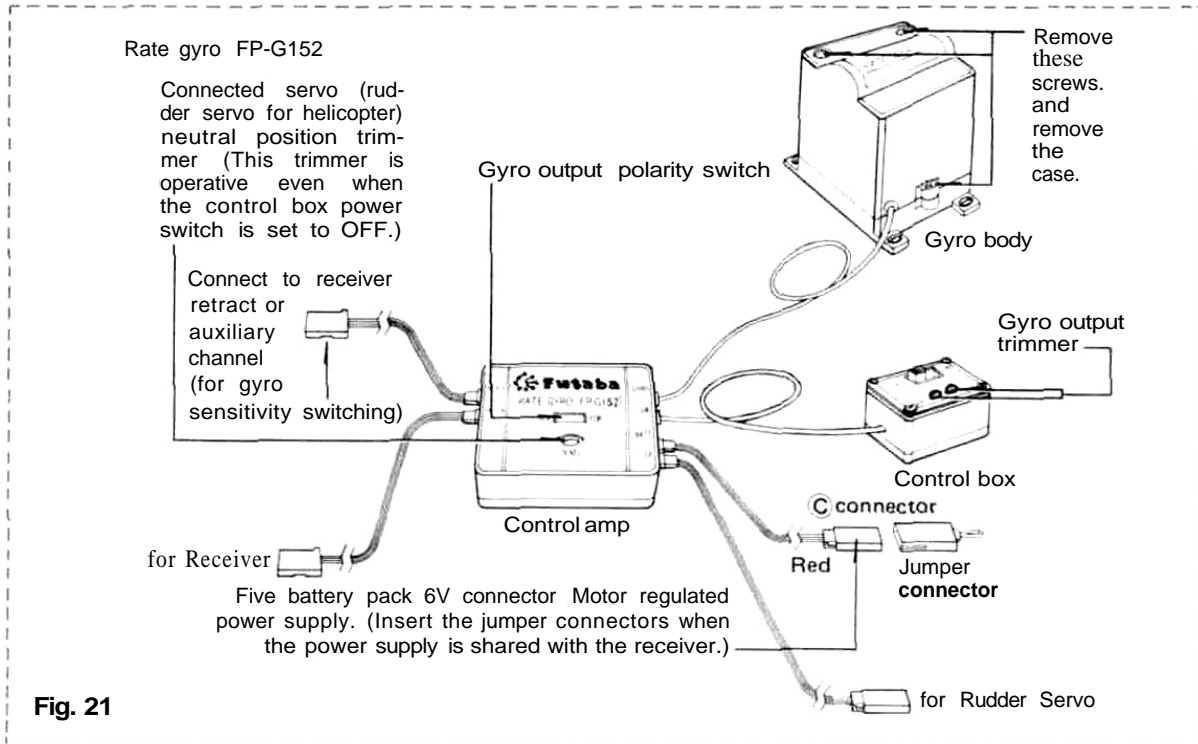


Fig. 21

- Connect the servos and switches firmly as shown in Fig. 20. Then extend the transmitter and receiver antennas fully.
- 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 the corresponding servos faithfully follow operation of the sticks.
- After setting the pushrods at the servo horns, check that the direction of operation of the transmitter sticks and the direction of operation of the rudders are the same.
- Operate each servo horn over its entire operating range 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 batteries. Always make the operating width of each rudder somewhat larger than the full stroke (including trim) of the servo horn. Adjust the servo horns so that operate smoothly even when the trim lever and stick lever are operated simultaneously in the same direction.
- Be alert for noise.
If engine vibration causes metal parts to touch, noise will be produced and the receiver and servos may operate incorrectly. We recommend the use of noiseless parts.
- When installing the switch, cut a rectangular hole somewhat larger than the full stroke of the

- switch and install the switch so it moves smoothly from ON to OFF. When the switch is mounted inside the fuselage and is turned ON-OFF with wire, install the switch mount as described above. Install the switch where it will not come into direct contact with engine oil, dust, etc.
- Even though the receiver antenna is long, do not cut or bundle it.
- The servos, Ni-Cad battery, switches, extension cords, and crystals of FP-7FGH are the same as those of the high-quality J Series. The crystals are extremely precise and are identified by color (red and green). Use Tx and Rx crystals of the same color.
- A spare horn is supplied. Use it as needed.
- Wrap the receiver in sponge rubber. Place the receiver in a plastic bag and wrap a rubber band around the open end of the bag to waterproof and dustproof the receiver. Do the same with the receiver/servobattery.
- Use the rubber bands wrapped around the receiver to hold the servo and switch leads.
- After mounting is complete, recheck each part, then make the transmitter antenna as short as possible, extend the receiver antenna fully, and operate the set from a distance of 20m to 30m. The movement of each rudder (servo) should faithfully follow the operation of each stick of the transmitter.

SPLINED HORN

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

a) Angle divisions

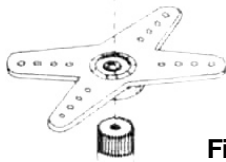
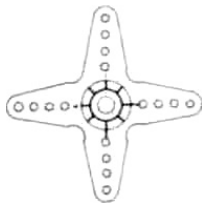


Fig. 22

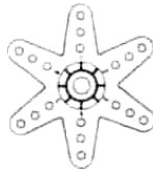
1) The splined horn has 25 segments. The amount of change per segment is; $360 \div 25 = 14.4^\circ$

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

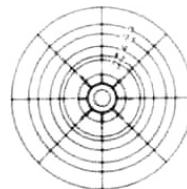
$$360^\circ \div \frac{(25 \times 4)}{\text{Number of divisions}} = 3.6^\circ$$



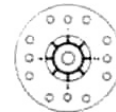
horn A
(FSH-6X)



horn B
(FSH-6S)



horn C
(FSH-6R)



horn D
(FSH-6W)

Fig. 26

b) Effect

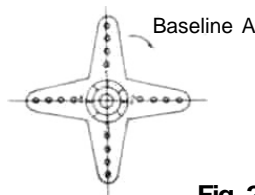


Fig. 23

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.

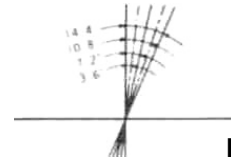


Fig. 24

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

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.

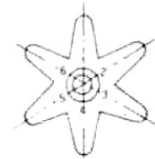


Fig. 25

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 72-75MHz 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

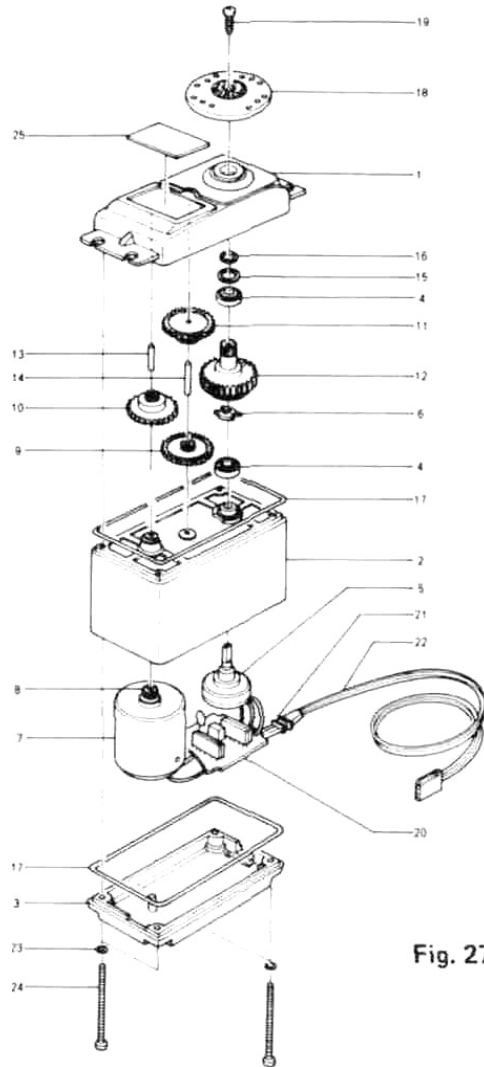
75MHz- Car & Boat only

75.430	62	Blue-Red
		(Top Flag/Ribbon- Bottom Flag/Ribbon)
75.470	64	Blue-Yellow
75.510	66	Blue-Blue
75.550	68	Blue-Grey
75.590	70	Purple-Black
75.670	74	Purple-Yellow
75.710	76	Purple-Blue
75.750	78	Purple-Grey
75.790	80	Grey-Black
75.830	82	Grey-Red
75.870	84	Grey-Yellow

53MHz Aircraft/Car/Boat - FCC Amateur

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	
53.800	—	Black/Grey	

FP-130 EXPLODED VIEW



No.	Part Name	Part No.
1.	Upper case	FCS 30
2.	Middle case	FCS-30
3.	Bottom case	FCS 30
4.	Ball bearing	S04130
5.	Potentiometer	139995
6.	VR drive plate	S02753
7.	Motor	S91243
8.	Motor pinion	S02461
9.	1st gear	FGS30
10.	2nd gear	FGS-30
11.	3rd gear	FGS 30
12.	Final gear	FGS-30
13.	2nd shaft	S02481
14.	Intermediate shaft	S02480
15.	Spacer washer 0.3T	S02486
16.	Seal ring	S90415
17.	O-ring	S90426
18.	Servo horn D	FSH-6W
19.	Horn mounting screw	FSH-41
20.	Printed wiring board S130	AS1220
21.	Lead wire packing	S90045
22.	S130 3PB-WRB-300	FPC-8M
23.	Screw O-ring	S90410
24.	Case mounting screw	J50085
25.	S130 Nameplate	S60101

Fig. 27

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 changes must be paid by the user.

This guarantee only applies to the continental U.S.A., Hawaii, and Alaska.

FACTORY REPAIR SERVICE

To insure prompt service, please follow the instructions given below.

1. **Charge** the batteries for at least 18 hours prior to shipment
2. Return the system only Not your complete installation Remove the servos from their mounts and remove the foam padding from the receiver.
3. Plugs or other modifications which interfere with factory test procedures will be returned to factory standard at your expense.
4. Carefully pack all components individually, using sufficient packing material to prevent damage during shipment.
5. Include a brief but thorough explanation of all problems and service required and tape it to the back of the transmitter Place a label describing the function of the servo on each servo
6. **Be sure to Include your full address and tel. No., zip code inside the box as well as on the outside.**
7. Include a packing list of all items being returned, and double check to make sure that all items **are packed.**
8. Upon receipt of your equipment at the Futaba factory, an estimate of the cost of repair (over \$25.00 only) will be sent to you. Your equipment will then be repaired and returned to you upon receipt of payment or C.O.D. (cash).

This factory repair service applies only to the continental U.S.A., Hawaii, and Alaska.

WORLD SALES & SERVICE FACILITIES:

Australia: FUTABA SALES AUSTRALIA PTY. LTD.,
MELBOURNE TEL: 211-4788

Argentina: MODELISMO AERONAUTICO DEGA SRL.
BUENOS AIRES TEL: 393-2299

Canada: UDISCO LTD., MONTREAL TEL: 481-8109

Chile: HOBBY LANDIA, SANTIAGO TEL: 743957

Denmark: FUTABA IMPORT DENMARK, COPENHAGEN
TEL: 02-91 01 01

England: RIPMAX LIMITED, LONDON TEL: 01-8048272

Finland: NORES OY, HELSINKI TEL: 90-520311

Greece: C.&G. MACRIYIANNIS CO., PIRAEUS
TEL: 021-4176191

Hong Kong: RADAR CO. LTD. TEL: 3-680507

Italy: R.C.S. RADIO CONTROL SYSTEM, CREMONA
TEL: 0372-20588

Lebanon: KHAIRALLAH MODEL CRAFT, BEIRUT
TEL: 326-681

New Zealand: AMALGAMATED WIRELESS (AUSTRALIA)
N.Z. LTD., WELLINGTON TEL: 58-979

Norway: MODEL HOBBY A/S, OSLO TEL: 442015

Singapore: SINGAPORE HOBBY SUPPLIES TEL: 430337

South Africa: REDIPAK (PTY.) LTD., JOHANNESBURG
TEL: 21-1511

Spain: HOBBY & TOY INTERNATIONAL, LAS PALMAS
TEL: 21-6930

Sweden: RADIO CONTROL CENTER, JONKOPING
TEL: 036-145360

U.S.A.: FUTABA CORPORATION OF AMERICA,
CALIFORNIA TEL: 213-537-9610

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