

# Futaba

DIGITAL PROPORTIONAL  
RADIO CONTROL

FP-2GS

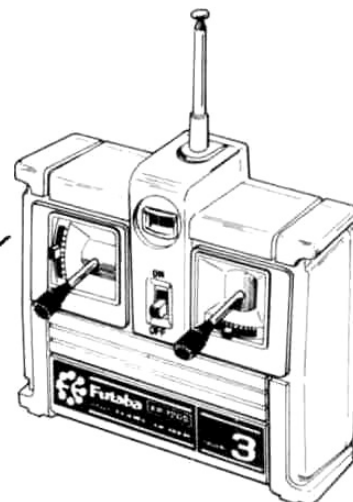
## INSTRUCTION MANUAL

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



FUTABA CORPORATION OF AMERICA  
FUTABA CORPORATION

D60431



### SPECIAL FEATURES:

#### TRANSMITTER FP-T2GS

- Contemporary styling with smooth operating gimbals for superior control.
- 500mW output.
- Battery level meter indicates the state of the battery voltage at a glance.
- Built-in antenna.

#### RECEIVER FP-R102GF

- 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.
- 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-S128

##### SMALL, RUGGED. HIGH NEUTRAL SERVO

- Skew type armature motor.  
Movement of the trimmer by even one notch is tracked by a skew type motor which displays a performance near that of a coreless motor.
- New indirect drive potentiometer improves vibration and shock resistance and neutral accuracy.
- Futaba low-power custom 1C provides extremely high torque, narrow dead band, and superior tracking.
- 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, positive neutral, and very little backlash.
- Fiberglass reinforced epoxy resin PC board with thru-the-hole plating improves servo amp vibration and shock resistance.
- Three pin connector eliminates faulty contact and improves reliability against vibration and shock. Housing has a reverse insertion prevention mechanism.
- Special grommet simplifies mounting of the servo and has an excellent cushioning effect.
- Six special adjustable splined horns.
- High 48.7 oz.in (3.5kg-cm) maximum output torque allows use in almost any model.

### SET CONTENTS AND RATINGS

(Specifications are subject to change without prior notice.)

Model number	FP-2GS
Transmitter	FP-T2GSx1
Receiver	FP-R102GFx1
Servo	FP-S128.x2
Switch, battery holder, etc.	

#### TRANSMITTER FP-T2GS.

Operating method	2 stick system
Transmitting frequency	27MHz band, 72MHz band
Modulation system	AM (amplitude modulation)
Power requirement	12V, round penlight battery x 8

#### Receiver FP-R102GF

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-T2GS (At the best radio wave condition of envi- ronment)
Power supply	4.8V to 8.4V
Current drain	7.2V/13mA, 4.8V/33mA
Dimensions	1.46x 2.19 x 0.75 in (37 x 55.5 x 19mm)
Weight	1.34 oz (38g)

#### SERVO FP-S128

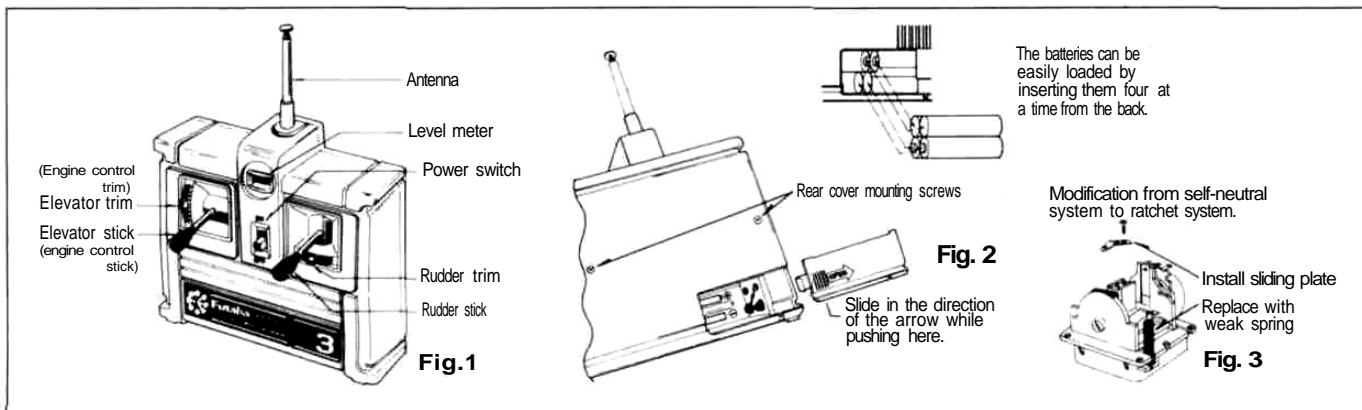
Control system	+pulse width control
Operating angle	One side 45° or more
Power requirement	4.8V-6V
Current drain (IDLE)	6.0V, 8mA (at idle)
Output torque	48.7 oz.in. (3.5 kg-cm)
Operating speed	0.24 sec/60°
Dimensions	1.6x0.8x 1.6 in. (40.5 x 20 x 40.5mm)
Weight	1.92oz. (53g)

### HANDLING THE TRANSMITTER

- The name of each part of the transmitter is given in the figure. Familiarize yourself with their operation.
- Remove the battery cover on the rear of the transmitter as illustrated in the figure, and insert 8 round penlight batteries, paying careful attention to their polarity.
- Extend the antenna fully, and set the power switch to the ON position. The pointer of the level meter should deflect to the green zone. If it fails to deflect, or deflects slowly, the polarity of the batteries is incorrect, or the batteries are faulty.
- Since the range of the radio waves will become short when the pointer of the level meter deflects to the red zone, replace the batteries when the pointer only deflects to the boundary between the green and red zones.

- The trim lever is used to fine adjust each channel. Use it for neutral adjustment and to correct the flying posture after the mechanism has been installed. After test flight, operate with the trim lever in the neutral position, as far as possible, by correcting with the rod adjuster, etc.
- Since the elevator stick employs a self-neutral system, install the sliding plate as shown in the figure when changing it to a ratchet system. Then remove the strong spring attached to the hook and replace it with the spring supplied as an accessory.

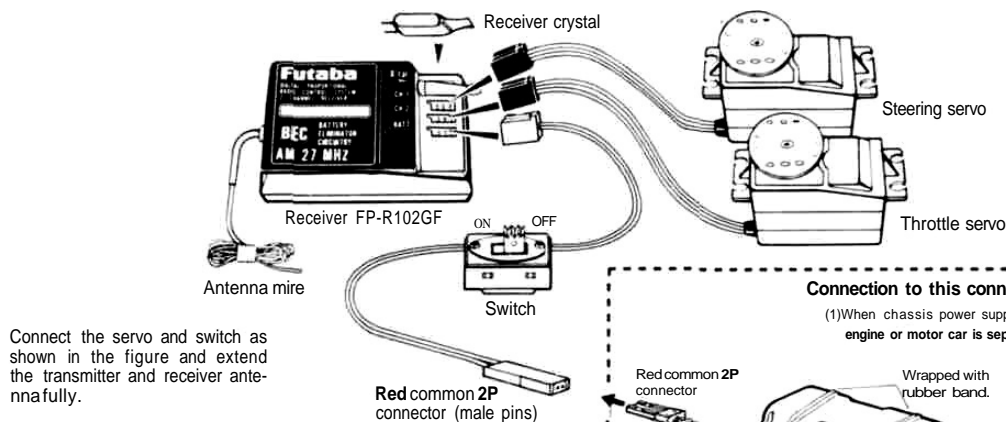
- When the transmitter is used with a tank, the direction of the stick can be changed 90 degrees by removing the four rudder stick mounting screws.
- To change the crystals, loosen the rear cover mounting screws, remove the rear cover, and then replace the crystal. The crystal is located at the left side of the printed wiring board. The transmitter crystal is marked (T) and the receiver crystal is marked (R). CAUTION: Frequency change has to be done under the supervision of FCC licensed personnel.



The **BEC** mark is displayed on the front of the receiver of **BEC (Battery Eliminator Circuitry)** system sets with a receiver with shared power supply regulator.

## RECEIVER FP-R102GF AND SERVO FP-S128

Fig. 4



The Futaba BEC (Battery Eliminator Circuitry) system and **BEC** & **ASP (Adjustable Safety Position)** system can also use a common power supply with the conventional four penlight batteries system (separate power supply).

### 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.

**Connection to this connector**

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

(75MHz-OPTIONAL)

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

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

(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

•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 FP-2GS (FP-R102GF)

When using a Futaba motor control amp instead of the speed controller supplied with the vehicle, turn off the ASP (Adjustable Safety Position) system as shown in the figure.

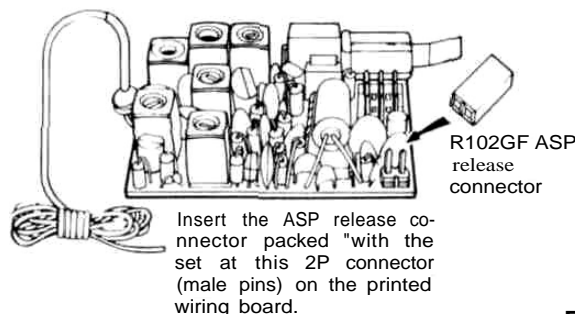


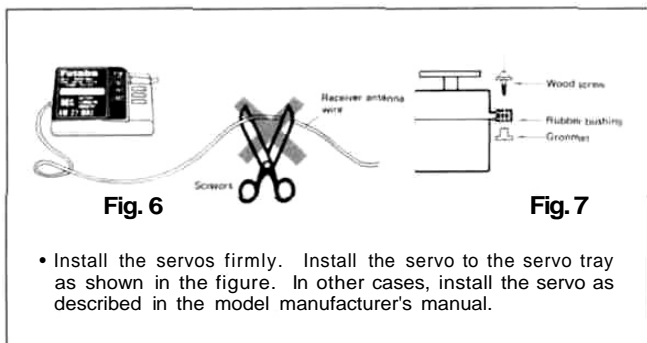
Fig. 5

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

- 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.

#### REPAIR SERVICE

- When requesting repair of trouble that has occurred suddenly or 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.



- 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.

#### WORLD SALES & SERVICE FACILITIES

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

**Argentine:** MODELISMO AE RONAUTICO 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: 02-91-0101

**England:** RIPMAX LIMITED, LONDON  
TEL: 01-8048272

**Finland:** NORETRON KY. HELSINKI  
TEL: 90-488880

**Greece:** C. & G. MACR1YIANNIS CO., PIRAEUS  
TEL: 021-3604391 • or 021-41 76191

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

**Italy:** RADIOSISTEMI SRL, Carrara  
TLX: 500494 FORTIMI  
FAX: 0039-585-52247

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

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

**Norway:** HARALD LYCHE CO. A/S, Drammen  
TEL: (03) 8339 70

**Singapore:** SINGAPORE HOBBY SUPPLIES  
TEL: 533-0337

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

**Spain:** HOBBY & TOY INTERNATIONAL,  
VALENCIA TEL: (96) 357 23 93

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

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

**W.Germany:** ROBBE MODELLSPORT GMBH,  
GREBENHAIM TEL: 06644-870

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

Frequency Channel No.	Flag Color	75MHz Car & Boat only	75.430	62	Blue-Red (Top Flag/Ribbon Bottom Flag/Ribbon)
2627MHz • Aircraft/Car/Boat					
26995	Brown				
27045	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			
			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
			53.700	-	Black/Purple
			53.800	-	Black/Grey
					Not generally in use

FOR OTHER MARKETS. FOLLOWING FREQUENCIES ARE AVAILABLE.

	FP 2GS	
	AM	FM
27MHz Band	O	X
29MHz Band	O	X
35MHz Band	O	X
40MHz Band	O	X
53/60MHz Band	X	X
72/75MHz Band	O	X

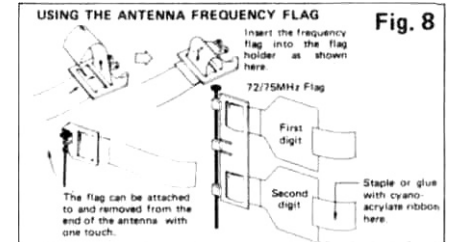
The authorized frequencies on each countries are as follows:

England . . . . . 27 & 35MHz AM and FM  
 Sweden. . . . . 27 & 35MHz AM and FM  
 Scandinavian countries . . . 27, 35 and 40MHz AM/FM  
 Australia . . . . . 29MHz  
 U.S.A. . . . . 27 & 72MHz (amonly)

- 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 in the left. 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.



## FP-S128

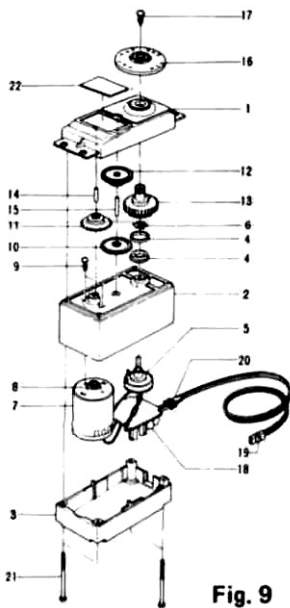


Fig. 9

No.	Part Name	Part No.
1.	Upper case	
2.	Middle case	FCS-28
3.	Bottom case	
4.	Metal bearing	S04134
5.	Potentiometer	.39995
6.	VR drive plate	S02753
7.	Motor	S91212
8.	Motor pinion	S02461
9.	Motor mounting screw 2 x 3	J60002
10.	1st gear	
11.	2nd gear	FGS-28
12.	3rd gear	
13.	Final gear	
14.	Intermediate shaft	S02495
15.	2nd shaft	S02494
16.	Servo horn D	FSH-6W
17.	Horn mounting screw 2.6 x 8	FSH-4I
18.	Printed wiring board	AS 1202
19.	S128...3PBWRB300	FPC-8M
20.	Lead wire packing	S90045
21.	Case mounting screw	J50400
22.	Nameplate	S80700

## • 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;  $360/25=14.4^\circ$

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:

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

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  $14.4^\circ$ . 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  $60^\circ - (14.4 \times 4) = 2.4^\circ$ .

Arm 3 shift  $4.8^\circ$  to the right, arm 6 shifts  $2.4^\circ$  to the left, and arm 4 shifts  $7.2^\circ$  to the right and left.

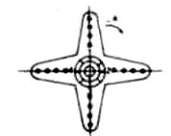
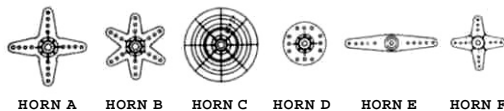


Fig. 10

The following splined horns are optional.



HORN A HORN B HORN C HORN D HORN E HORN F

- Furnished swing arm B is convenient when the neutral position of the swing lever is shifted approximately 1/3 as shown in Fig. 11.

- Open the rear cover of the transmitter, and replace as shown in Fig. 13

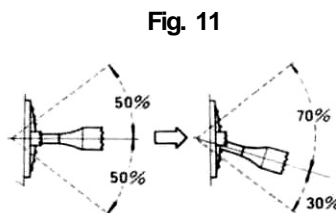


Fig. 11

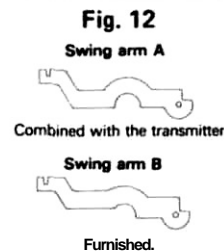


Fig. 12

Swing arm A

Combined with the transmitter.

Swing arm B

Furnished.

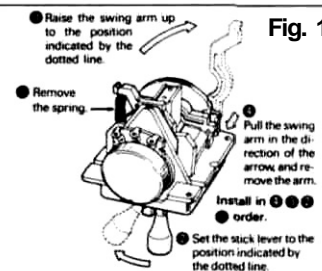


Fig. 13

- Raise the swing arm up to the position indicated by the dotted line.
- Remove the spring.
- Pull the swing arm in the direction of the arrow, and remove the arm.
- Install in order.
- Set the stick lever to the position indicated by the dotted line.



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