

6 CHANNELS

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# INSTRUCTION MANUAL

## ET106C



## PPM-FM

Digital Proportional Radio Control Systems

## TABLE OF CONTENTS




1.	CONTENTS .....	1
2.	Meaning Of Special Markings.....	2
3.	Precautions During Flight .....	3
4.	Mandatory Items.....	4
5.	Name And Handling Of Each Part .....	4-7
6.	Transmitter Operation And The Movement Of Helicopter .....	8-12
7.	Adjustments Before Flying .....	12-13
8.	Stick Lever Spring Tension Adjustment.....	14
9.	Dissection Of Transmitter .....	15-16
10.	Charging the Nicd Battery.....	16
11.	Glossary.....	17-18

To ensure safe use, observe the following precautions.

## MEANING OF SPECIAL MARKINGS

Pay special attention to the safety at the parts of this manual that are indicated by following marks.



- DANGER**  Procedures which may lead to a dangerous condition and cause death or serious injury to the user if not carried out properly.
- WARNING**  Procedures which may lead to dangerous condition or cause death or serious injury to the user if not carried out properly, or procedures where the probability of superficial injury or physical damage is high.
- CAUTION**  Procedures where the possibility of serious injury to the user is small, but there is a danger of injury, or physical damage, if not carried out properly.

**Symbol:**  **Prohibited:**  **Mandatory**

## PRECAUTIONS DURING FLIGHT

### WARNING

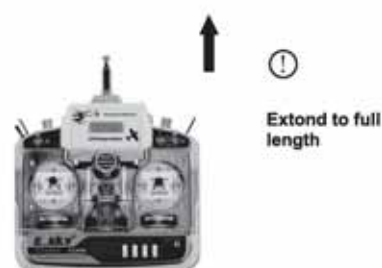
Do not fly simultaneously on the same frequency. Interference may cause a crash.\*Use of the same frequency will cause interference even if the modulation method (FM, PCM) is different.



Do not fly in rainy or windy days, or at night. Water will penetrate into the transmitter and cause faulty operation, or loss of control, and cause a crash.



Extend the antenna to its full length. If the antenna is too short, the effective range of the radiowaves will become shorter.



Always test the digital proportional R/C set before use. Any abnormality in the digital proportional R/C set, or model, may cause a crash. Before starting the engine, check that the direction of operation of each servo matches the operation of its control stick. If a servo does not move in the proper direction, or operation is abnormal, do not fly the plane.



**CAUTION!**

## MANDATORY ITEMS

When turning on the power switch

After setting the transmitter throttle stick to maximum slow:

1. Turn on the transmitter power switch
2. Then turn on the receiver power switch

When turning off the power switch

After stopping the engine,

1. turn off the receiver power switch,
2. then turn off the transmitter power switch.

\* If the power switch is turned off in the opposite order, the engine may go to full throttle unexpectedly and cause an injury.

\* Maximum slow: Direction in which the engine or motor runs at the slowest speed.



## NAME AND HANDLING OF EACH PART



Training Jack

### Training Jack

Connects the trainer cord when using the trainer function.

(EK2-0400C/EK2-0401/  
EK2-0401A)

(The trainer cord is sold separately)





H.F.M

**MODE** (35M)  
 (36M)  
 (40M)  
 (41M)  
 (72M)



Battery cover

Use when replacing the battery. Slide the cover downward while pressing the part marked "PUSH"

### SERVO REVERSER SWITCHES



The lower position is the normal side and the upper position is the reverse side.

### Charging Jack



Charging Jack

Charging jack when the transmitter was converted to nicd battery system.

### Receiver

#### CRYSTAL

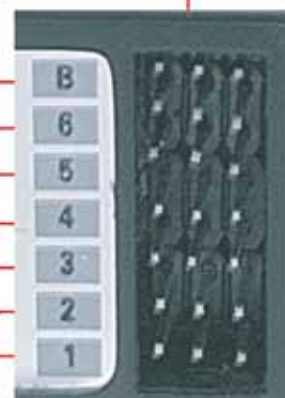
The crystal is replaced from side of the receiver.

Lead



#### Output / battery connector

- B. ( Battery connector)
- 6. (Not used) (CH6)
- 5. (Not used) (CH5)
- 4. Rudder servo (CH4)
- 3. Throttle servo (CH3)
- 2. Elevator servo (CH2)
- 1. Aileron servo (CH1)



## Fig. Connection of the Control-box

**Control-box composite with receiver ,Gyro, ESC,Main/tail motor proportional mix-control.**



Fig. Connection of the control-box

1. Gain Trimmer 2. Proportion Trimmer 3. Monitor Lamp 4. Tail Motor Socket  
 5. Main Trimmer 6. Battery Plug 7. Elevator Servo 8. Aileron Servo  
 9. Pitch Servo

- 1) Turn-off your transmitter and set the throttle stick to its lowest position (power-off position)
- 2) Plug the Aileron Servo into the CH1 socket and Elevator Servo into CH2 and pitch servo into CH6.
- 3) Connect the Main Motor and the Tail Motor to the Control-Board by inserting the connector into the Main Motor Socket (5) and Tail Motor Socket (4) respectively
- 4) Battery should be connected at the last. **IMPORTANT:** Before connecting the battery, you must turn on the transmitter in order to avoid un-expected radio inference into the receiver, After flight, dis-connect the battery first and then turn off transmitter.

### Adjustment of the Control-box

- 1) Re-check the installations and connections, especially pay attention to the polarities.
- 2) Firstly set the throttle stick and its trimmer on your transmitter to the lowest position. Then, turn on the transmitter and connect the battery to the Control-Board.
- 3) Don't move or sway the Mini Heli. Wait for the Control-Board to calibrate for itself. Until the LED lights red and normally blinks for 3-5 times. Wait until the lamp lights green before flying..
- 4) Put the Mini helicopter on a smooth ground, which allows the model to slide and to turn around on the ground. Slowly push forward the throttle stick but not let the model to take off. Watch and observe if the tail rotor blades rotate in proper proportion to the main rotor blades. That is, to observe if the thrust of the tail rotor blades can counter the torque of the main rotor blades. If not, dis-connect the battery and adjust the proportion trimmer (2) to increase (+) or decrease (-) the R.P.M. of the tail rotor blades, plug in the battery and try again until the tail rotor blades can rotate

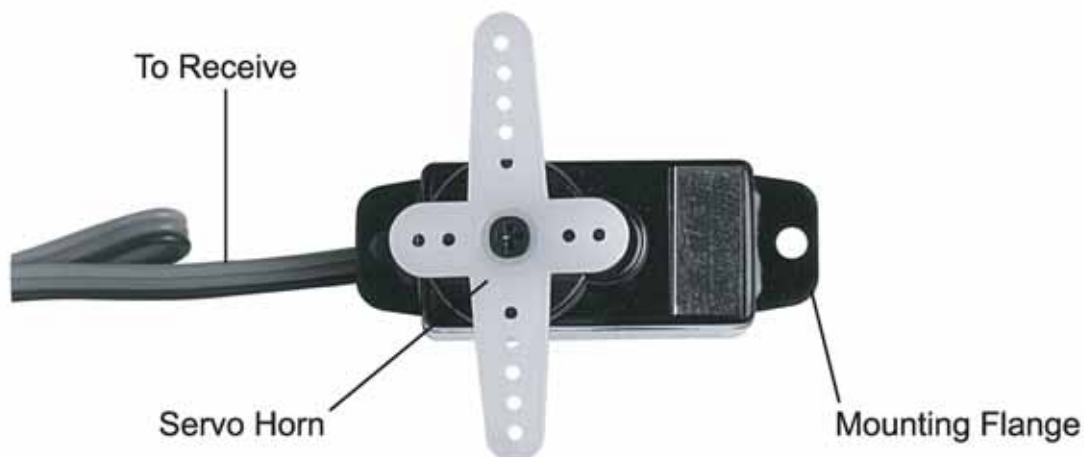
in proper proportion to the main rotor blades and the model will not turn to left or right on ground.

5) then, fly the Mini Heli in different directions to test the effectiveness of the gyro. You can adjust the GAIN Trimmer (1) to increase(+) or decrease (-) the gyro gain. For a beginner, it is desired that increase the gyro gain to hence the effectiveness of the tail so that the helicopter will be more directionally stable. But, for a sporter or an expert pilot, it is desired to decrease the gyro gain in order to make the helicopter more responsive to control.

## Caution

- 1) before adjusting the Gain Trimmer(1) and/or the Proportion Trimmer(2). You must disconnect the battery first.
- 2) If the monitor lamp LED lights red but not twinkles, it indicates that the throttle stick is not set to the lowest position. Please set it to the lowest position for the Control-Box to calibrate itself.
- 3) If the LED twinkles red or green, it denotes that your transmitter is not turned on. Or, you are using a wrong Tx crystal in the transmitter, please check or replace the crystal Tx.
- 4) The Control-Board can be only used on Mini helicopter. It is not designed for other type of model airplanes.
- 5) Should the helicopter crash, immediately set the throttle stick and its trimmer to the lowest position, dis-connect the battery first and then turn off your transmitter to avoid damage of the helicopter and/or the Control-Board

## SERVO





## TRANSMITTER OPERATION AND THE MOVEMENT OF HELICOPTER

Before making any adjustments, learn the operation of the transmitter and the movement of each servo. (in the following descriptions, the transmitter is assumed to be in the standby state.)

### Model 1 (right throttle)



When the aileron stick is moved to the left, the swashplate should also tilt to the left, the helicopter moves to the left.



When the aileron stick is moved to the right, the swashplate should also tilt to the right, the helicopter moves to the right.



When the throttle stick is pushed up, the electric motor and pitch (main rotor) increase, as a result, helicopter lifts up.



When the throttle stick is pulled back, the electric motor and pitch (main rotor) decrease. As a result, helicopter decreases.



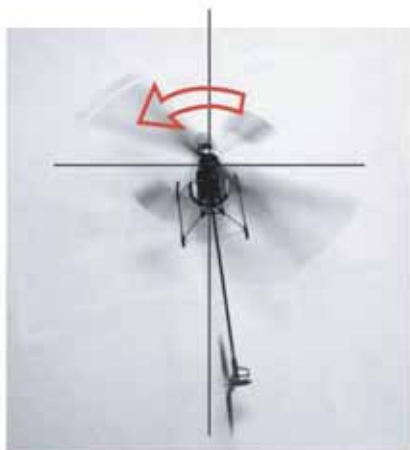
When the elevator stick is pushed forward, the nose of helicopter will down ward, as a result the helicopter moves forward and decreases with airspeed.



When the elevator stick is pulled back, leading the nose of the helicopter upward, then the helicopter moves backward and increases with airspeed



When the rudder stick is moved to the right, the tail of helicopter moves to the left and the fly direction of helicopter should turn to right. Please pay attention to the nose direction of helicopter.



When the rudder stick is moved to the left, the tail of helicopter moves to the right and the fly direction of helicopter should be turn to the left, please pay attention to the nose direction of helicopter.

## Model 2 (left throttle)



When the aileron stick is moved to the left, the swashplate should also tilt to the left, leading the helicopter moves to the left.



When the aileron stick is moved to the right, the swashplate should also tilt to the right, leading the helicopter moves to the right.



When the throttle stick is pushed up, the electric motor and pitch (main rotor) increase a result helicopter lifts up



When the throttle stick is pulled back, leading the electric motor and pitch (main rotor) decrease. As a result, helicopter decreases.





When the elevator stick is pushed forward, leading the nose of helicopter downward, the helicopter moves forward and decreases with airspeed.



When the elevator stick is pulled back, leading the nose of helicopter upward, the helicopter moves backward and increases with airspeed.

**\* The rudder stick operation for Model 2 same as above Model 1.**

### ADJUSTMENTS BEFORE FLYING

The operating direction, neutral position, and steering angle of each servo are adjusted.

#### **Caution**



The basic linkage and adjustments of the fuselage conform to the fuselage design drawings and kit instruction manual. Be sure that the center of gravity is at the prescribed position

## Adjustment Procedure

Before making any adjustments, set all the SERVO REVERSER switches on the front of transmitter to the lower (NOR) position.

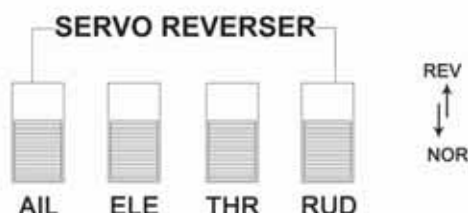
(Switch the switches with a small screwdriver, etc.)

Turn on the transmitter and receiver power switch, then make the following adjustments:

### 1. Check the direction of operation of each servo

If a servo operates in the wrong direction, switch its SERVO REVERSER switch. (The direction of operation can be changed without changing the linkage.)

\*Note that the direction of the aileron servo is made easily mistakes.



**channels display**

**AIL:**Aileron(channel 1)

**ELE:**Elevator(channel 2)

**THR:**Throttle(channel 3)

**RUD:**Rudder servo(channel 4)

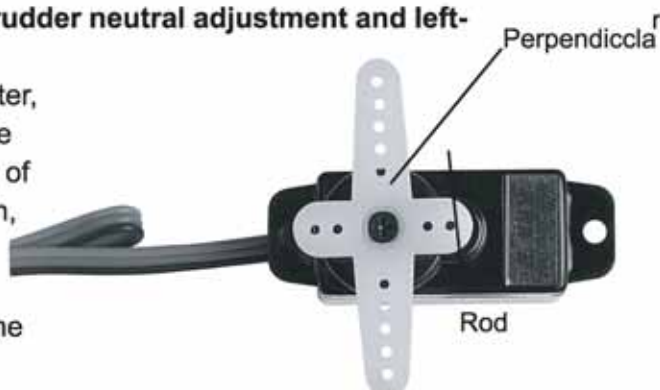
**Rudder operating display**

**REV:**Reverse

**NOR:**normal

### 2. Check the aileron, elevator, and rudder neutral adjustment and left-right (up-down) throw.

Check that when trimmed to the center, the servo horn is perpendicular to the servo and check the neutral position of the fuselage control surfaces (aileron, elevator, rudder, etc.). if the neutral position has changed, reset it by adjusting the length of the rod with the linkage rod adjuster.



**When the throw is unsuitable (different from steering angle specified by the kit instruction manual), adjust it by changing the servo horn and each control surface horn rod.**

### 3. Check the engine throttle (speed adjustment) linkage.

Change the servo horn installation position and hole position so that the throttle is opened fully when the throttle stick is set to HIGH (forward position and higher position respectively) and is closed fully when the throttle stick and throttle trim are set to maximum slow (backward position and lower position respectively).

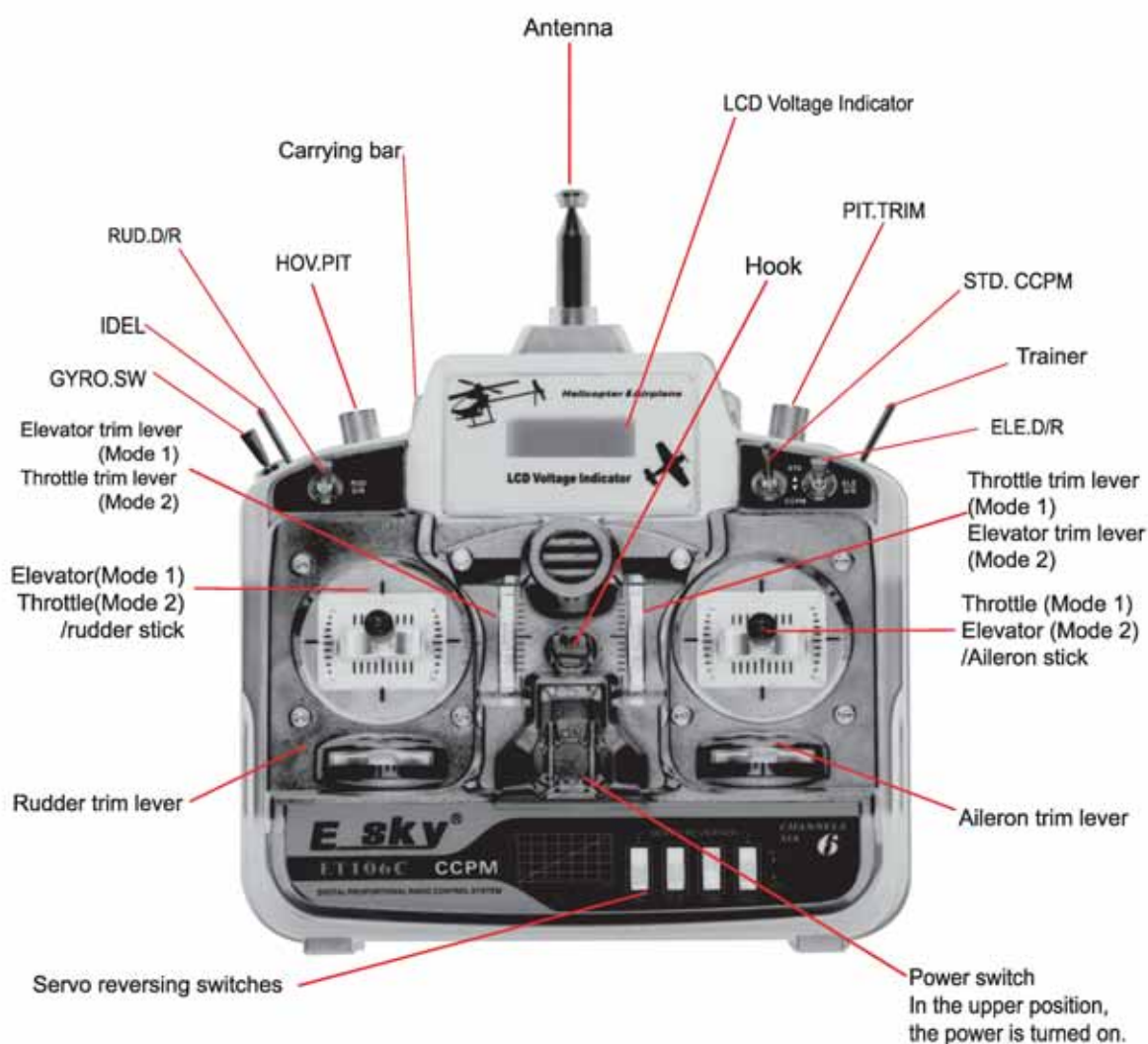
### 4. After all the linkages have been connected, recheck the operating direction, throw, ect.

\* Before flight, adjust the aircraft in accordance with the kit and engine instruction manuals.

### 5. Fly the plane and trim each servo.

## STICK LEVER SPRING TENSION ADJUSTMENT

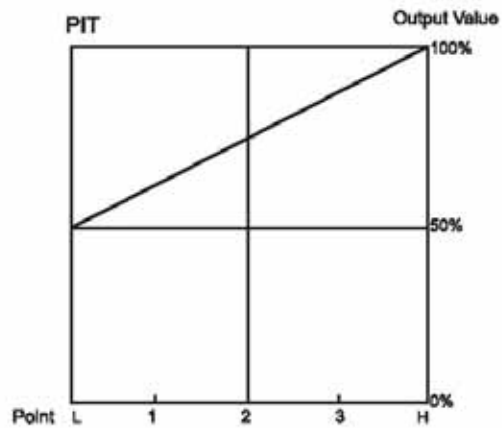
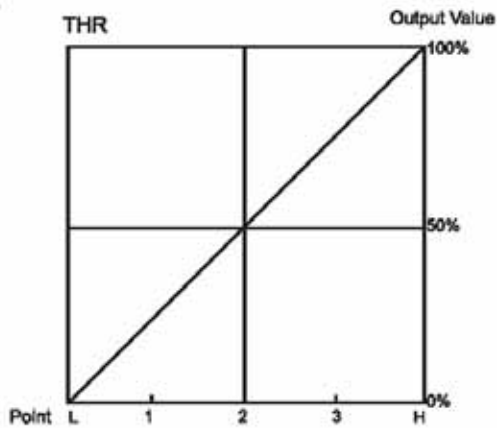
### ET106C



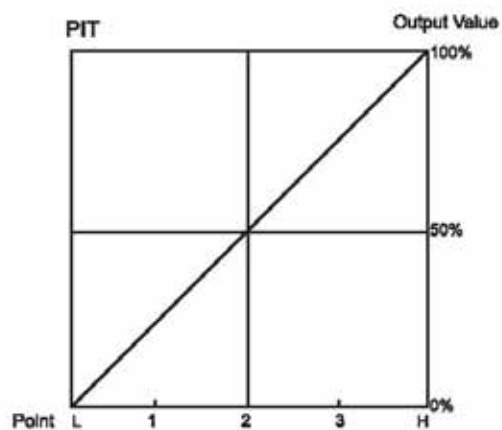
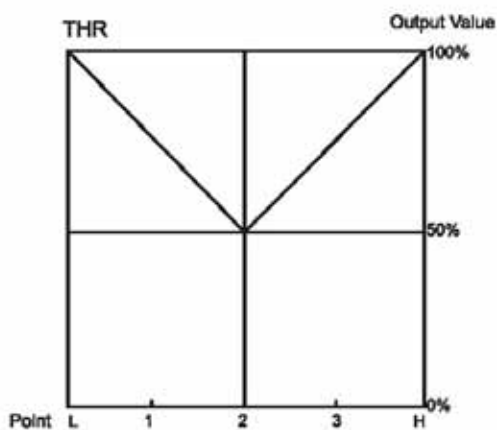
This is a slap-up 6channels transmitter, which is made of LCD voltage indicator which will display battery voltage more clear. It is special use for ESKY Hobby be CP1, CP2 electric helicopter.

## THROTTLE / PITCH CURVE EXAMPLES

### NOR

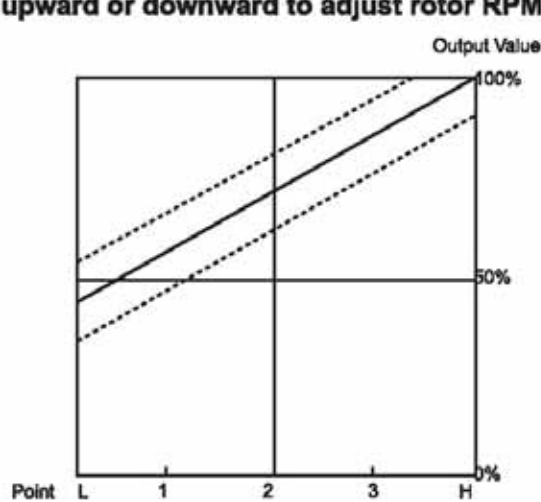


### IDEL UP

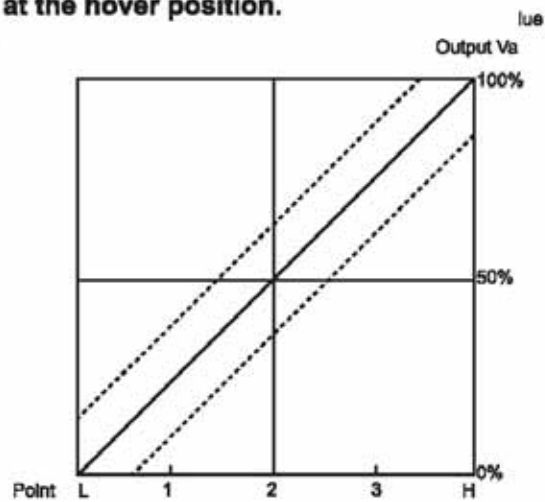


### HOVERING PITCH KNOB

The hovering pitch knob function is to shift either the center point of curve either upward or downward to adjust rotor RPM at the hover position.



NOR Pitch



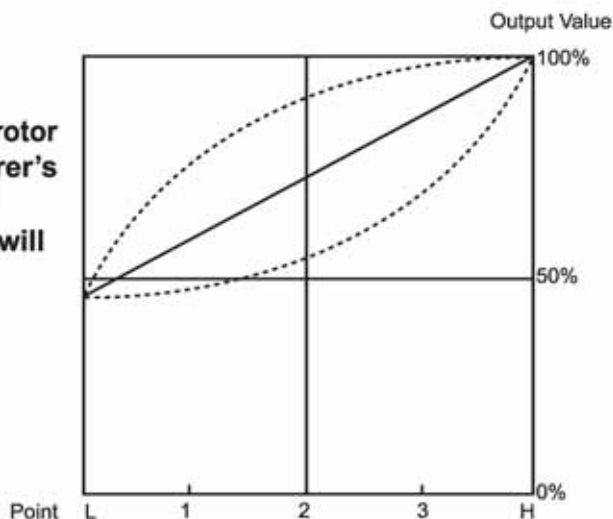
3D Pitch



## PITCH TRIM KNOB

The pitch trim knob is a trimmer for the pitch channel. This knob should be set to 0, and all changes upward or downward should be made from this neutral point.

This function is used to adjust the main rotor speed (RPM) to stay within manufacturer's specifications. If the pitch curve is set properly, only small trim adjustments will be required.



## CHARGING THE DICD BATTERY

### WARNING!

Never plug the special charger into an AC outlet other than specified, if the charger is plugged into an AC other than specified, overheating, sparking, etc, may cause burns, fire, etc.

Use the special charger, or digital proportional R/C quick charger, separately to charge the digital proportional R/C nicd battery.

Overcharging will cause burns, fire, injury, or blindness due to overheating, breakage, electrolyte leakage, etc.

### CAUTION!

When not using the nicd battery charger, disconnect it from the AC outlet.

1. Connect the charger connector to the transmitter charging jack and the charger receiver connector to the receiver servo nicd battery.
2. Connect the charger to a 110V AC outlet.
3. Check that the charging LED light.
4. At the end of charging, disconnect the charger from the AC outlet

To transmitter  
Charging jack  
(Nid battery  
system only)



## GLOSSARY

The following defines the symbols and terms are used in this instruction manual.

### **AILERON (Ail.)**

Control surface at the left and right sides the main wing of an aircraft. It usually controls turning of the aircraft.

### **CHANNEL**

Represents the number of control systems. It can also represent the number of servos that are operated.

### **DOWN**

Means down elevator, it is the direction in which the trailing edge of the elevator is pointing down.

### **ELEVATOR (EVE.)**

Control surface that moves up and down the horizontal stabilizer of an aircraft. It usually controls up and down.

### **LINKAGE**

Mechanism that connects the servos and the fuselage control surfaces.

### **MODULATION METHOD**

Two modulation methods are used with radio control: AM (amplitude Modulation) and FM (Frequency Modulation). Radio sets for aircraft mainly use FM. Another method that encodes and transmits the modulated signals is called "PCM".

### **NEUTRAL**

Means the neutral position. It is the state in which a transmitter stick returns to the center when not operated.

### **NORMAL (NOR.)**

For the servo reversing function, it is the normal side. The opposite side is the reverse side.

### **PROPORTIONAL**

Because today's radio control sets control servos in proportion to stick operation, radio control equipment is called proportional.

### **RUDDER (RUD.)**

Tail control surface that controls the direction of the aircraft.

### **REVERSE (REV.)**

With the servo reversing function, this is used to mean the reverse side. The opposite side is the normal side.

### **ROD**

A bar that connects the servos and the fuselage control surfaces.

### **SERVO HORN**

A part that is installed to the shaft of a servo and changes the rotating motion of the servo to linear motion and transmits the linear motion to a rod. Servo horns come in various shapes.

### **SERVO MOUNT**

Fuselage base for installing a servo to the fuselage.

### **STICK**

Rod for operating the transmitter.

### **THROTTLE (THR.)**

Part that controls the air mixture at the engine intake. When opened (throttle high side), a large air mixture is sucked in and the engine speed increases. When closed (throttle low side), the engine speed decreases.

### **TRIM**

A device that fine adjusts the neutral point of each servo for safe flying. It is a mechanism that corrects bad tendencies of the aircraft.

### **UP**

Means up elevator. Direction in which the trailing edge of the elevator is pointing up.

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