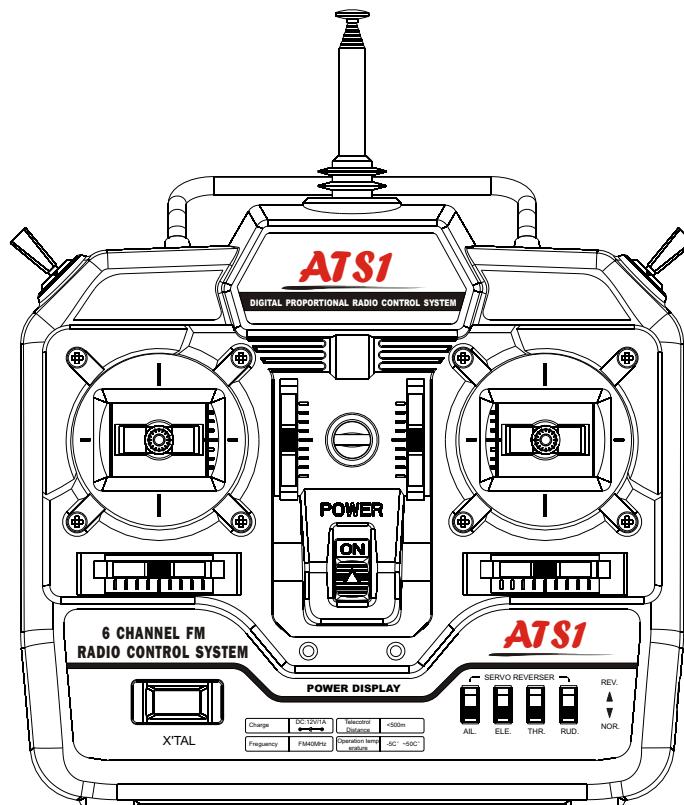


# ATS1

FM 6 CHANNELS FOR HELICOPTER

# INSTRUCTION MANUAL



**DIGITAL PROPORTIONAL RADIO CONTROL SYSTEM**

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2	.....	MEANING OF SPECIAL MARKINGS
3	.....	PRECAUTIONS DURING FLIGHT
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4	.....	NICD BATTERY CHARGING PRECAUTIONS
5	.....	NAME AND HANDLING OF EACH PART
8	.....	TRANSMITTER OPERATION AND MOVEMENT OF EACH SERVO
9	.....	ADJUSTMENTS
10	.....	NON-SLIP ADJUSTABLE LEVER HEAD
10	.....	STICK LEVER SPRING TENSION ADJUSTMENT
11	.....	CHARGING THE NICD BATTERY
12	.....	GLOSSARY

# FOR SAFETY

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 the following marks.

### Mark

### Meaning



### 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 a 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.

### CAUTION:



.....

Prohibited



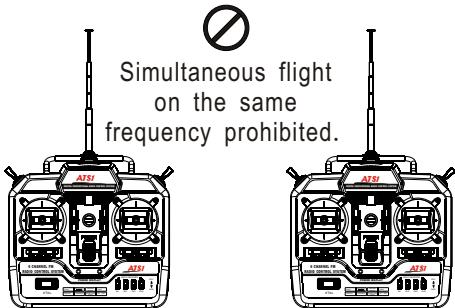
.....

Mandatory

# PRECAUTIONS DURING FLIGHT

## ⚠ WARNING

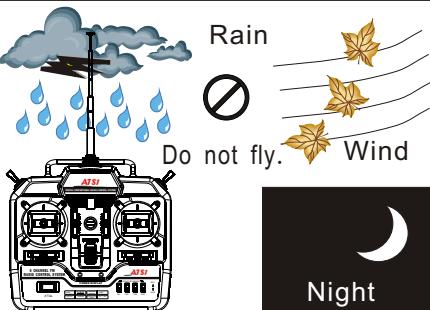
### PROHIBITED ITEMS



Do not fly simultaneously on the same frequency.

Interference may cause a crash.

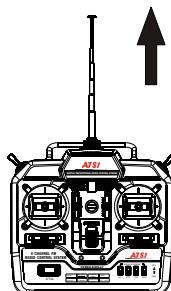
- ◆ Use of the same frequency will cause interference even if the modulation method (AM, FM, PCM) is different.



Do not fly on 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.

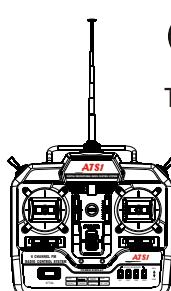
### MANDATORY ITEMS



Extend to full length.

Extend the antenna to its full length.

If the antenna is too short, the effective range of the radio waves will become shorter.



Test.

Always test 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

## PROHIBITED ITEMS

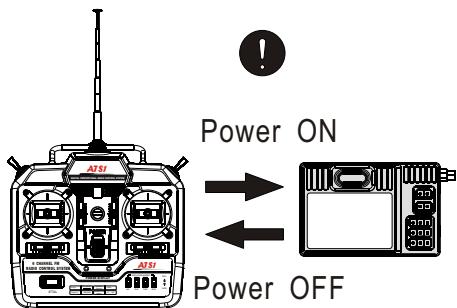
When placing the transmitter on the ground during flight preparations, be sure that the wind cannot knock it over.

If it is knocked over, the throttle stick may be pushed to full high and the engine will race and create a dangerous situation.

Do not touch the engine, motor, and FET amp during and immediately after use.

The are hot and will cause a burn.

## MANDATORY ITEMS



When turning on the power switch  
After setting the transmitter throttle stick to maximum low:

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 on the transmitter power switch,
2. then turn on the receiver 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 low: direction in which the engine or motor runs at the slowest speed.

When adjusting the digital proportional R/C set, always stop the engine, except when necessary.

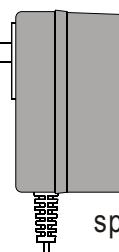
If the engine suddenly goes to high speed, it may cause an injury.

# ▲ WARNING

## NICDBATTERY CHARGING PRECAUTIONS

Charge the digital proportional R/C nicd battery with the special charger, or digital proportional R/C quick charger, sold separately.

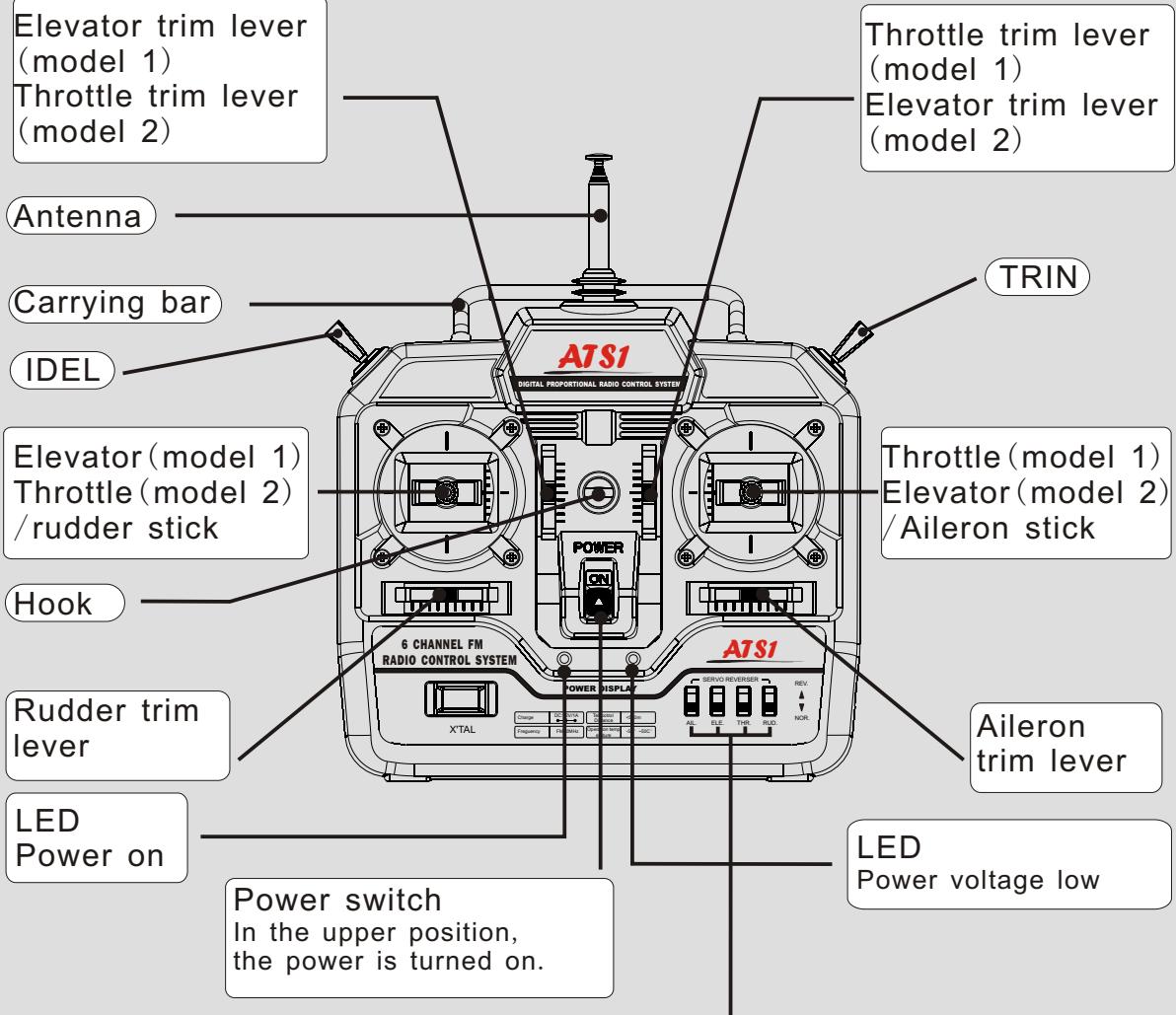
Overcharging may cause burns, fire, injury, blindness, etc. due to overheating, breakage, electrolyte leakage, etc.



Use the  
special charger

# NAME AND HANDLING OF EACH PART

## TRANSMITTER ATS1(FRONT PANEL)



### Servo reversing switches

Switches that reverse the direction of operation of the servos.  
The lower position is the normal side and the upper position is the reverse side.

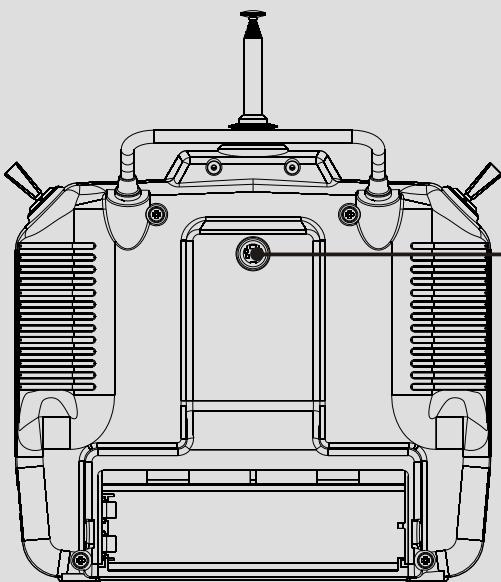
#### Channel display

AIL. : Aileron(CH1)  
ELE. : Elevator(CH2)  
THR. : throttle(CH3)  
RUD. : Rudder(CH4)

#### Operating direction display

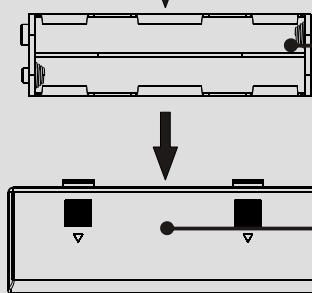
REV. : Reverse side  
NOR. : Normal

## TRANSMITTER ATS1 (BACK PANEL)



Trainer jack

Connects the trainer cord when using the trainer function.  
(The trainer cord is sold separately.)

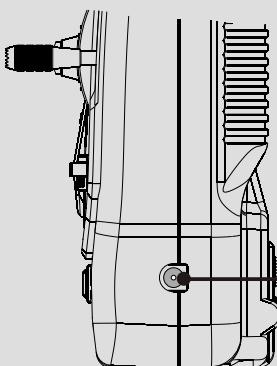


Battery Box

Battery cover

Use when replacing the battery.

## TRANSMITTER ATS1 (SIDE PANEL)



Charging jack

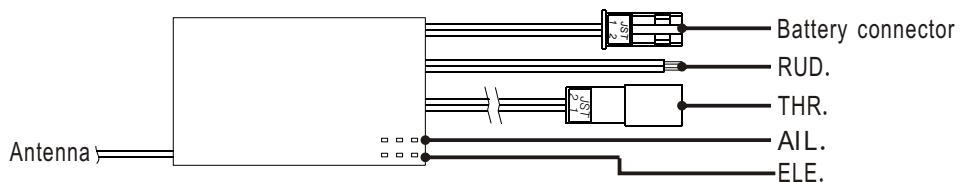
Charging jack when the transmitter was converted to nicd battery system.

# RECEIVER

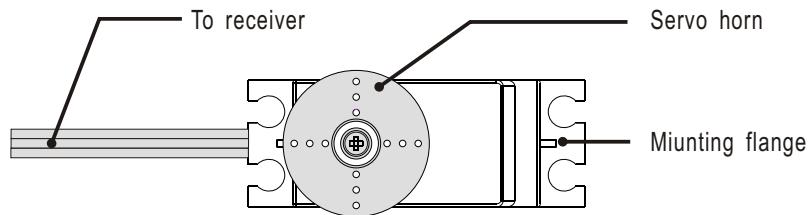
## RXF1

### Crystal

The crystal is replaced from the side of the receiver.



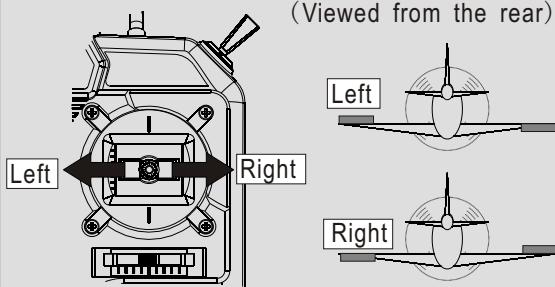
## SERVO



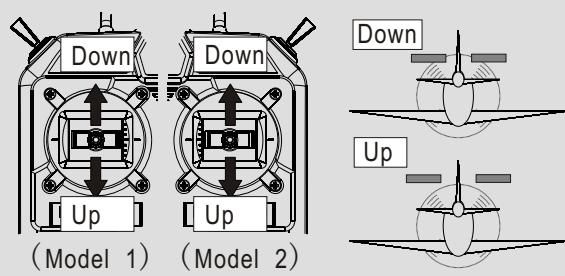
# TRANSMITTER OPERATION AND MOVEMENT OF EACH SERVO

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.)

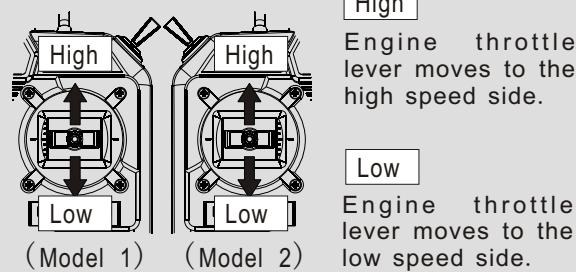
## 1. Aileron



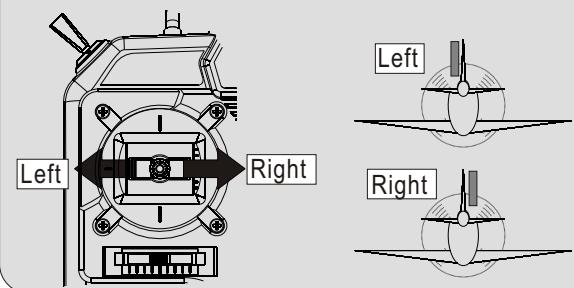
## 2. Elevator



## 3. Throttle



## 4. Rudder



## AILERON OPERATION

When the aileron stick is moved to the right, the right aileron is lowered, relative to the direction of flight, and the plane turns to the right. When the aileron stick is moved to the left, the ailerons move in the opposite direction.

To level the plane, the aileron stick must be moved in the opposite direction.

When the aileron stick is tilted and held, the plane will roll.

## ELEVATOR OPERATION

When the elevator stick is pulled back, the tail elevator is raised and the tail of the plane is forced down, the air flow applied to the wings is changed the lifting force is increased, and the plane climbs (UP operation). When the elevator stick is pushed forward, the elevator is lowered, the tail of the plane is forced up, the air flow applied to the wings is changed, the lifting force is decreased, and the plane dives (DOWN operation).

## THROTTLE OPERATION

When the throttle stick is pulled back, the engine throttle lever arm moves to the SLOW (low speed) side. When the throttle stick is pushed forward, the throttle lever arm moves to the HIGH (high speed) side.

## RUDDER OPERATION

When the rudder stick is moved to the right, the rudder moves to the right, relative to the direction of flight. When the rudder stick is moved to the left, the rudder moves to the left and the nose points to the left and the direction of travel of the plane changes.

# ADJUSTMENTS

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 hit instruction manual. Be sure that the center of gravity is at the prescribed position.

## ADJUSTMENT PROCEDURE

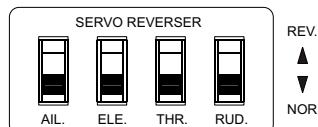
Before making any adjustments, set all the SERVO REVERSER switches on the front of the transmitter to the lower (NOR) position. (Switch the switches with a small screwdriver, etc.)

Turn on the transmitter and receiver power switches and make the following adjustments.

1. Check the direction of operation of each servo.
3. Check the engine throttle (speed adjustment) linkage.

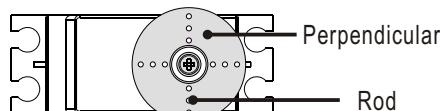
If a servo operates in the wrong direction, switch its SERVO REVERSER switch. (The direction of operation can be changed without changing the linkage.)

◆ Note that the direction of the aileron servo is easily mistaken.



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.

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) and is closed fully when the throttle stick and throttle trim are set for maximum slow (backward position and lower position, respectively).

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

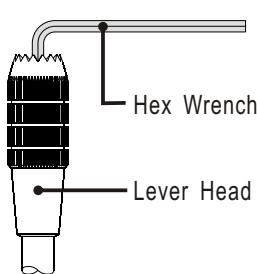
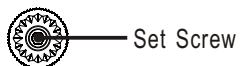
◆ Before flight, adjust the aircraft in accordance with the kit and engine instruction manuals.

5. Fly the plane and trim each servo.

# USING OTHER FUNCTIONS

## NON-SLIP ADJUSTABLE LEVER HEAD

The length of the stick lever head can be adjusted.

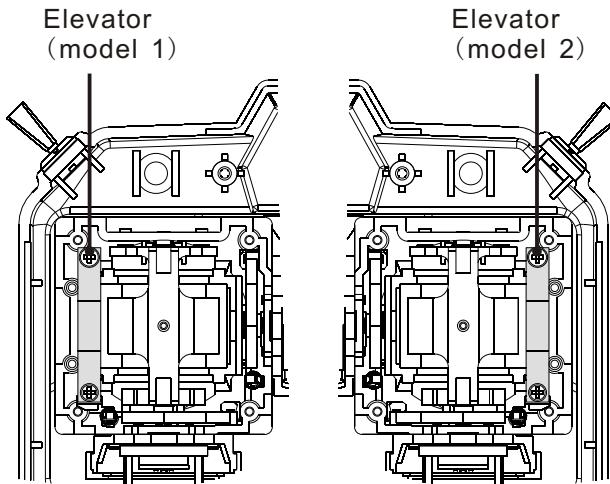


- 1 Unscrew the set screw with hex wrench.
- 2 Adjust the Lever head to the most comfortable length.
- 3 Lock the set screw.

## STICK LEVER SPRING TENSION ADJUSTMENT

The stick spring strength can be adjusted.

The operating feel of the throttle sticks can be individually adjusted.



- 1 Remove the six transmitter rear case screws and remove the rear case.
- 2 Adjust the spring by turning the screw of the channel you want to adjust.
- 3 Close the rear case and tighten the six screws.

## CHARGING THE NICD BATTERY

### ⚠ WARNING

Never plug the special charger into an AC outlet other than specified.

If the charger is plugged into an AC outlet other than specified, overheating, sparking, etc, may cause burns, fire, etc.

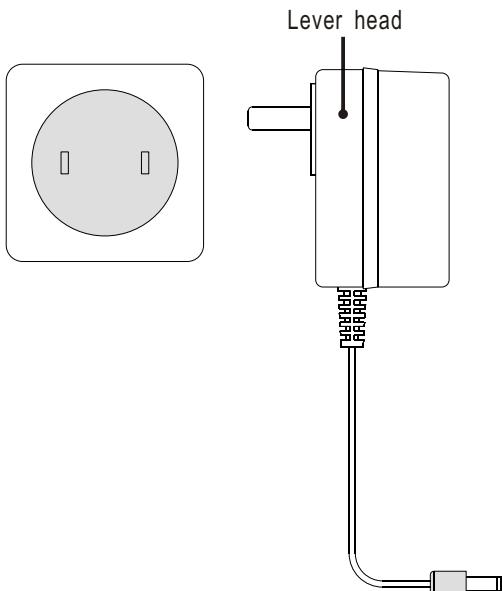
Use the special charger, or digital proportional R/C quick charger, separately to charge the digital proportional R/C nicd battery.

Over changing will cause burns, fire, injury, or blindness due to overheating, breakage, electrolyte, etc.

### ⚠ CAUTION

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

## CHARGING THE NICD BATTERY



TO transmitter changing jack.

(Nicd battery system only)

The transmitter and receiver nicd batteries can be charged simultaneously or independently.

- 1 Connect the charger transmitter connector to the transmitter charging jack.
- 2 Connect the charger to a suitable AC outlet.
- 3 Check that charging LED light.
- 4 At the end of charging, disconnect the charger from the AC outlet.

# GLOSSARY

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

## **Aileron (AIL.)**

Control surface at the left and right sides of 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 (ELE.)**

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

## **Normal (NOR.)**

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.

## **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.

ATS1

**ATF1**

**FM 4 CHANNELS FOR HELICOPTER**

# **INSTRUCTION MANUAL**



**DIGITAL PROPORTIONAL RADIO CONTROL SYSTEM**

# TABLE OF CONTENTS

2	.....	MEANING OF SPECIAL MARKINGS
3	.....	PRECAUTIONS DURING FLIGHT
4	.....	MANDATORY ITEMS
4	.....	NICD BATTERY CHARGING PRECAUTIONS
5	.....	NAME AND HANDLING OF EACH PART
8	.....	TRANSMITTER OPERATION AND MOVEMENT OF EACH SERVO
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10	.....	NON-SLIP ADJUSTABLE LEVER HEAD
10	.....	STICK LEVER SPRING TENSION ADJUSTMENT
11	.....	CHARGING THE NICD BATTERY
12	.....	GLOSSARY

# FOR SAFETY

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 the following marks.

### Mark

### Meaning



## DANGER

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## WARNING

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## 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.

CAUTION:



.....

Prohibited



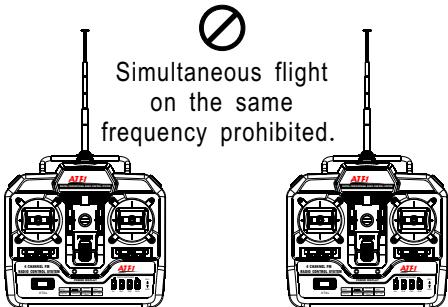
.....

Mandatory

# PRECAUTIONS DURING FLIGHT

## ⚠ WARNING

### PROHIBITED ITEMS

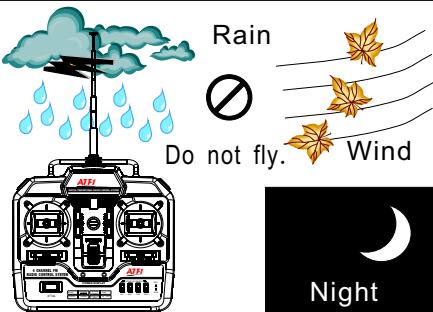


Simultaneous flight  
on the same  
frequency prohibited.

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 (AM, FM, PCM) is different.

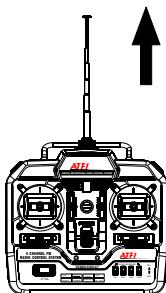


Rain  
Do not fly. Wind

Do not fly on 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.

### MANDATORY ITEMS

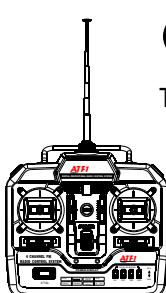


Extend to  
full length.



Extend the antenna to its full length.

If the antenna is too short, the effective range of the radio waves will become shorter.



Test.

Always test 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

## PROHIBITED ITEMS

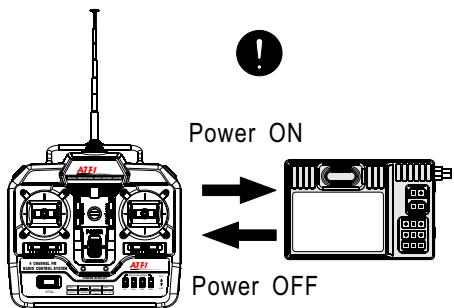
When placing the transmitter on the ground during flight preparations, be sure that the wind cannot knock it over.

If it is knocked over, the throttle stick may be pushed to full high and the engine will race and create a dangerous situation.

Do not touch the engine, motor, and FET amp during and immediately after use.

The are hot and will cause a burn.

## MANDATORY ITEMS



When turning on the power switch  
After setting the transmitter throttle stick to maximum low:

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 on the transmitter power switch,
2. then turn on the receiver 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 low: direction in which the engine or motor runs at the slowest speed.

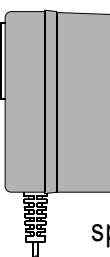
When adjusting the digital proportional R/C set, always stop the engine, except when necessary.

If the engine suddenly goes to high speed, it may cause an injury.

# ▲ WARNING

## NICDBATTERY CHARGING PRECAUTIONS

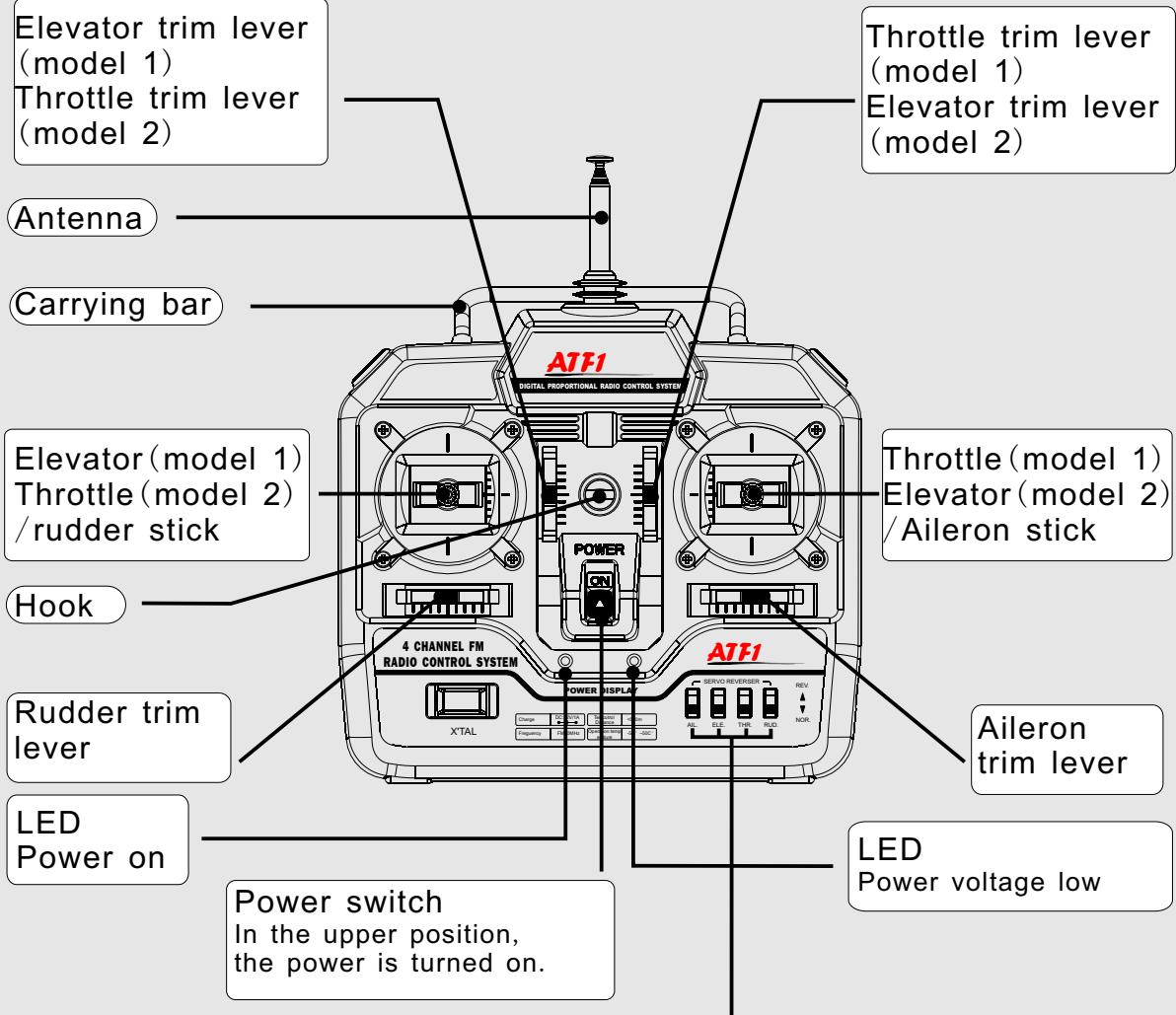
Charge the digital proportional R/C nicd battery with the special charger, or digital proportional R/C quick charger, sold separately.



Use the special charger

# NAME AND HANDLING OF EACH PART

## TRANSMITTER ATF1(FRONT PANEL)



### Servo reversing switches

Switches that reverse the direction of operation of the servos.  
The lower position is the normal side and the upper position is the reverse side.

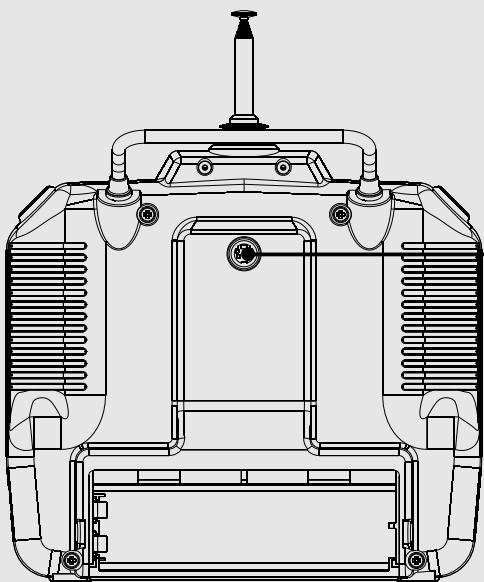
#### Channel display

AIL. : Aileron(CH1)  
ELE. : Elevator(CH2)  
THR. : throttle(CH3)  
RUD. : Rudder(CH4)

#### Operating direction display

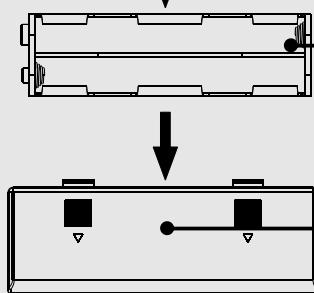
REV. : Reverse side  
NOR. : Normal

## TRANSMITTER ATF1 (BACK PANEL)

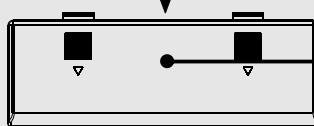


**Trainer jack**

Connects the trainer cord when using the trainer function.  
(The trainer cord is sold separately.)



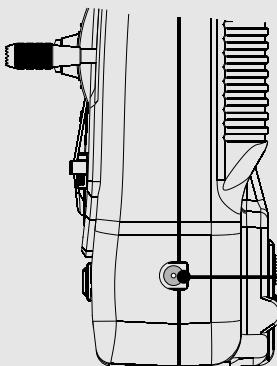
**Carrying bar**



**Battery cover**

Use when replacing the battery.

## TRANSMITTER ATF1 (SIDE PANEL)



**Charging jack**

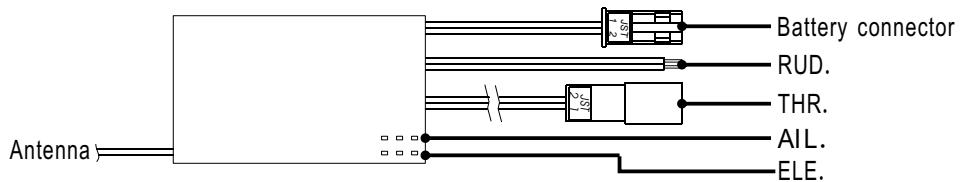
Charging jack when the transmitter was converted to nicd battery system.

# RECEIVER

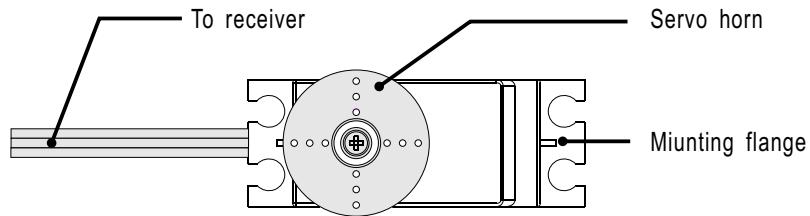
## RXF1

### Crystal

The crystal is replaced from the side of the receiver.



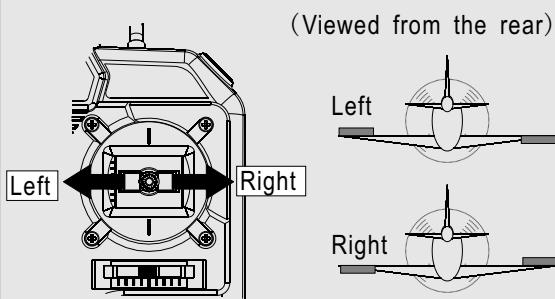
## SERVO



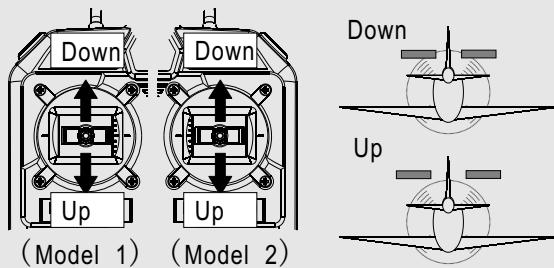
# TRANSMITTER OPERATION AND MOVEMENT OF EACH SERVO

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.)

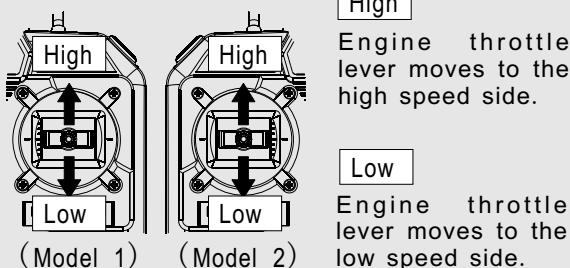
## 1. Aileron



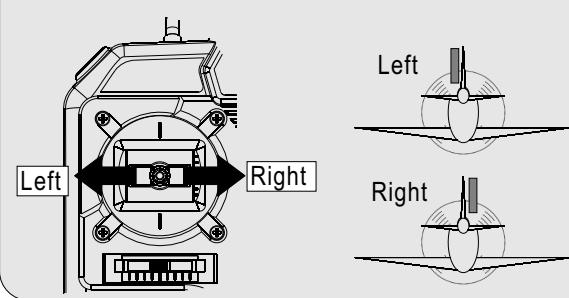
## 2. Elevator



## 3. Throttle



## 4. Rudder



## AILERON OPERATION

When the aileron stick is moved to the right, the right aileron is lowered, relative to the direction of flight, and the plane turns to the right. When the aileron stick is moved to the left, the ailerons move in the opposite direction.

To level the plane, the aileron stick must be moved in the opposite direction.

When the aileron stick is tilted and held, the plane will roll.

## ELEVATOR OPERATION

When the elevator stick is pulled back, the tail elevator is raised and the tail of the plane is forced down, the air flow applied to the wings is changed the lifting force is increased, and the plane climbs (UP operation). When the elevator stick is pushed forward, the elevator is lowered, the tail of the plane is forced up, the air flow applied to the wings is changed, the lifting force is decreased, and the plane dives (DOWN operation).

## THROTTLE OPERATION

When the throttle stick is pulled back, the engine throttle lever arm moves to the SLOW (low speed) side. When the throttle stick is pushed forward, the throttle lever arm moves to the HIGH (high speed) side.

## RUDDER OPERATION

When the rudder stick is moved to the right, the rudder moves to the right, relative to the direction of flight. When the rudder stick is moved to the left, the rudder moves to the left and the nose points to the left and the direction of travel of the plane changes.

# ADJUSTMENTS

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

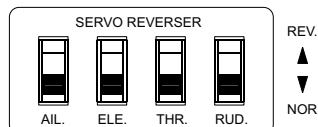
Before making any adjustments, set all the SERVO REVERSER switches on the front of the transmitter to the lower (NOR) position. (Switch the switches with a small screwdriver, etc.)

Turn on the transmitter and receiver power switches and make the following adjustments.

1. Check the direction of operation of each servo.
3. Check the engine throttle (speed adjustment) linkage.

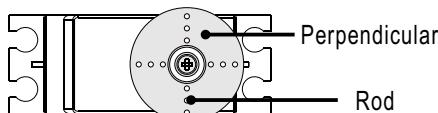
If a servo operates in the wrong direction, switch its SERVO REVERSER switch. (The direction of operation can be changed without changing the linkage.)

◆ Note that the direction of the aileron servo is easily mistaken.



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.

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) and is closed fully when the throttle stick and throttle trim are set for maximum slow (backward position and lower position, respectively).

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

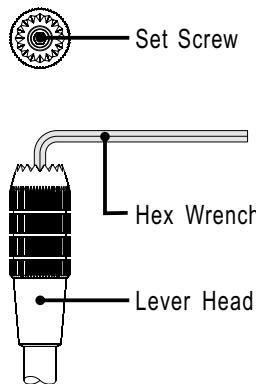
◆ Before flight, adjust the aircraft in accordance with the kit and engine instruction manuals.

5. Fly the plane and trim each servo.

# USING OTHER FUNCTIONS

## NON-SLIP ADJUSTABLE LEVER HEAD

The length of the stick lever head can be adjusted.

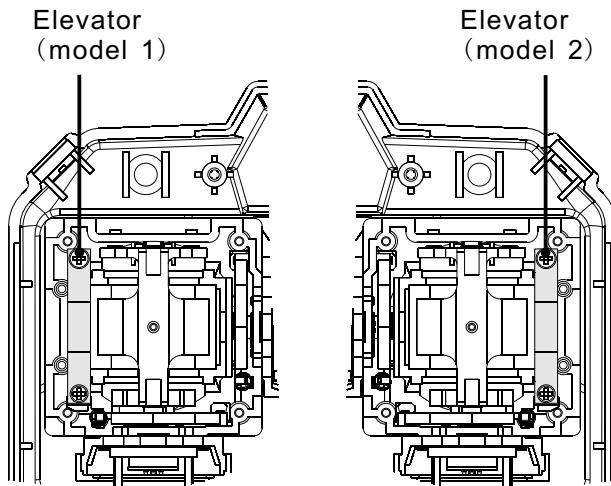


- 1 Unscrew the set screw with hex wrench.
- 2 Adjust the Lever head to the most comfortable length.
- 3 Lock the set screw.

## STICK LEVER SPRING TENSION ADJUSTMENT

The stick spring strength can be adjusted.

The operating feel of the throttle sticks can be individually adjusted.



- 1 Remove the six transmitter rear case screws and remove the rear case.
- 2 Adjust the spring strength by turning the screw of the channel you want to adjust.
- 3 Close the rear case and tighten the six screws.

## CHARGING THE NICD BATTERY

### ⚠ WARNING

Never plug the special charger into an AC outlet other than specified.

If the charger is plugged into an AC outlet other than specified, overheating, sparking, etc, may cause burns, fire, etc.

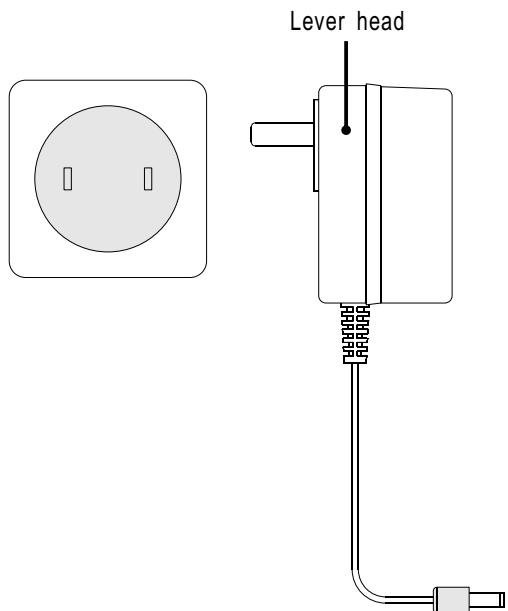
Use the special charger, or digital proportional R/C quick charger, separately to charge the digital proportional R/C nicd battery.

Over changing will cause burns, fire, injury, or blindness due to overheating, breakage, electrolyte, etc.

### ⚠ CAUTION

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

## CHARGING THE NICD BATTERY



TO transmitter changing jack.

(Nicd battery system only)

The transmitter and receiver nicd batteries can be charged simultaneously or independently.

- 1 Connect the charger transmitter connector to the transmitter charging jack .
- 2 Connect the charger to a suitable AC outlet.
- 3 Check that charging LED light.
- 4 At the end of charging, disconnect the charger from the AC outlet.

# GLOSSARY

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

## **Aileron (AIL.)**

Control surface at the left and right sides of 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 (ELE.)**

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

## **Normal (NOR.)**

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.

## **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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