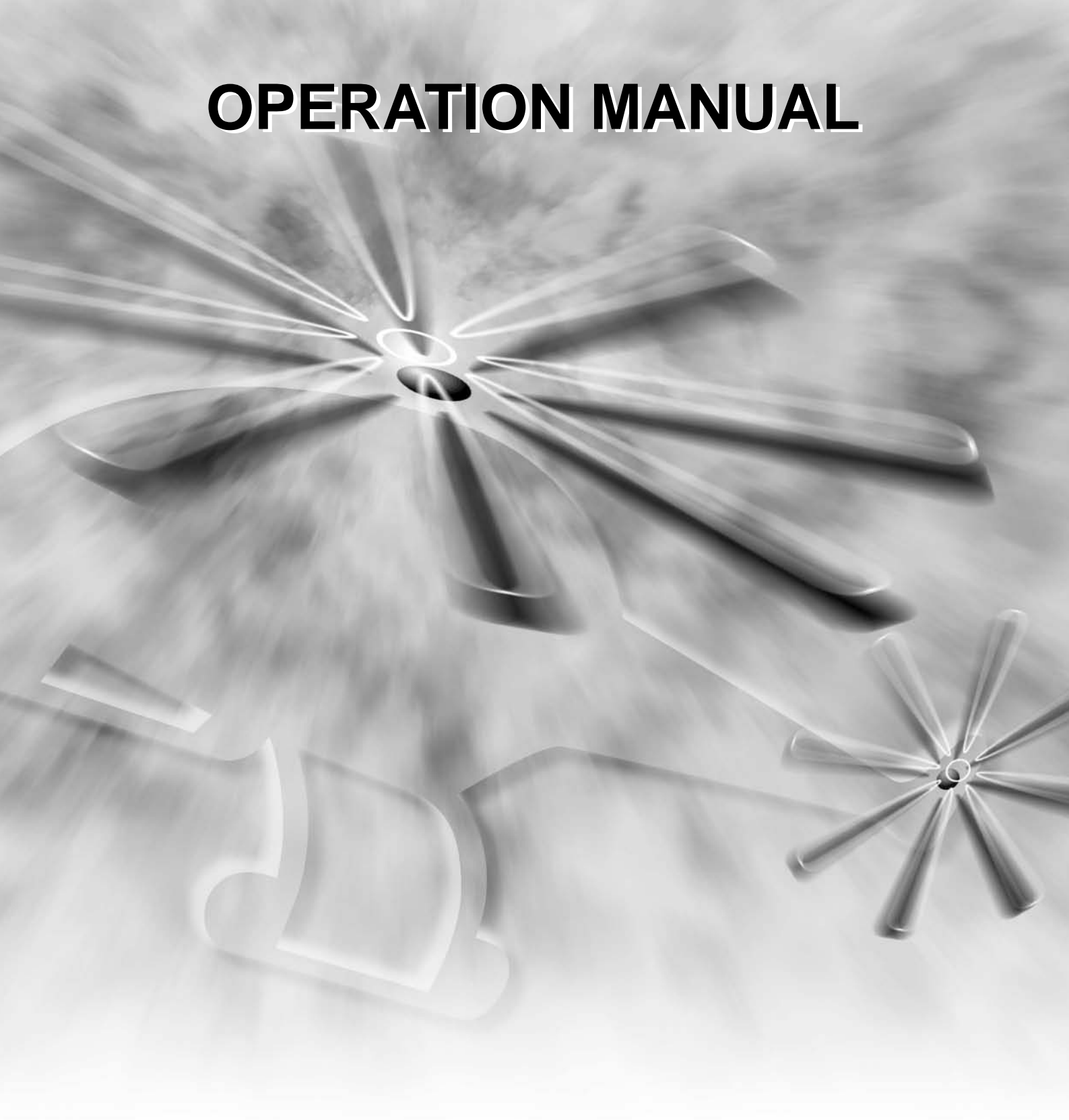
 Please read this manual before using the product.

UNMANNED HELICOPTER FOR INDUSTRIAL APPLICATIONS

RMAX *TYPE II G*
UNIT,

OPERATION MANUAL




Foreword

Thank you for using the RMAX TypeII G Unit, unmanned helicopter for industrial applications.

This operation manual describes the proper operating procedures and precautions when using this product.

Before using this product, please be sure to read this operation manual and thoroughly understand its contents.

In this manual, the warning notes, which are necessary for safe and proper operation of this product, are categorized and shown as follows. Please make sure to observe these instructions, as they all contain important information.

 DANGER
This indicates that improper operation will cause imminent danger, which could lead to serious injury or death.

 WARNING
This indicates that improper operation could lead to minor and serious injuries or death.

<i>NOTICE</i>
Indicates that improper operation could cause property damage.

TIP
Indicates proper operating procedure and tips on inspection and maintenance.



**Indicates a prohibited action.
The specific prohibited action is illustrated near the symbol.**

- After you have read this operation manual, keep it within easy access near the helicopter.
- Contact your dealer if you are lending this helicopter or transferring its ownership.
- Keep this operation manual together with the helicopter if you are lending this helicopter or transferring its ownership.
- If you have lost this operation manual, contact your dealer to request another copy.
- Contact your dealer if you have any questions or comments regarding the contents of this operation manual.
- Some diagrams and contents in this manual may differ from the actual helicopter, due to specification changes, etc.
- For information on the sprayer, see the operation manual for the sprayer.

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Pre-Flight Inspection Items	Describes the items to be checked before operating the product, including the basic operations of the transmitter and the control functions.	3
Pre-Flight Preparation and Inspection	Describes the proper procedure for transporting, preparing, and inspecting the helicopter prior to flight.	4
Flying Procedure	Describes the operation procedures, from starting to stopping the engine.	5
Post-Flight Inspection and Cleaning	Describes the proper methods for cleaning and inspecting the helicopter after a flight, in preparation for the next flight.	6
Simple Maintenance	Describes the procedures for simple inspection and maintenance that can be performed by the user.	7
Proper Management	Describes the proper methods for storing and maintaining the helicopter.	8
Troubleshooting	Describes the procedures for identifying the possible causes of a malfunction and the proper actions that must be taken. Use this section as a quick sheet for resolving problems.	9
Specifications	Gives the specifications and dimensions of the product.	10
Product Warranty and Inspection	Describes the product warranty and inspection.	11
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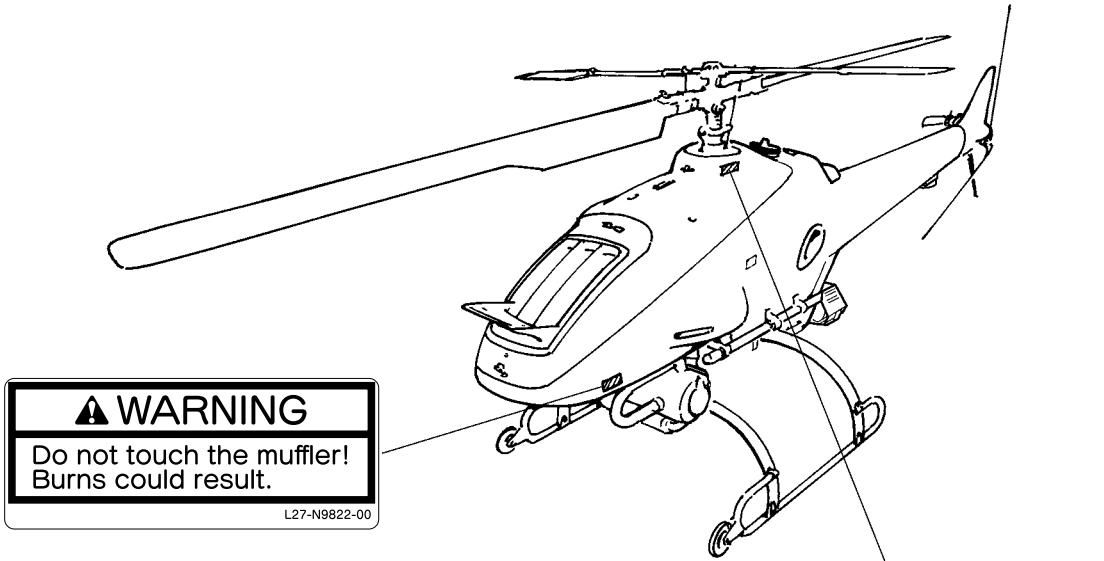
Safety Precautions

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Safety Precautions

Product Safety Label Locations

Before operating the helicopter, please read and understand the affixed product safety labels thoroughly.



⚠ WARNING
 Do not touch the muffler!
 Burns could result.
 L27-N9822-00

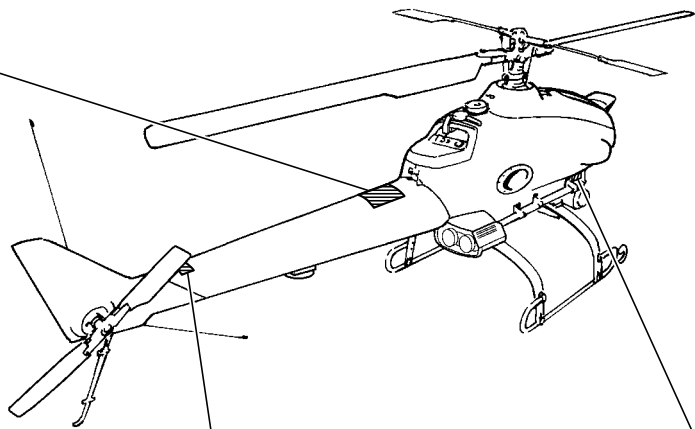
⚠ DANGER
 Never approach the helicopter
 when the main rotor is rotating!
 Death or severe injury could result.
 L27-N9811-00

⚠ WARNING

Failure to observe the following could result in death or serious injury.

- Read the owner's manual carefully before operating this helicopter.
- Carry out the pre-flight and post-flight inspections specified in the owner's manual.
- The helicopter should be operated only by a person who possesses an appropriate license.
- Before starting the engine, make sure that all persons other than the operator are at least 20 m away from the helicopter.
- When starting the engine, stand on the left side of the helicopter and start the engine according to the following procedure.
 - (1) While supporting the main rotor with your body, turn the main switch on the helicopter to START.
 - (2) While holding the throttle stick on the transmitter in its slowest position with your right thumb, press the starter switch with your left hand to start the engine.
 - (3) Continue to hold the throttle stick in its slowest position with your right thumb after the engine starts, and turn the main switch to FLIGHT with your left hand.
 - (4) Quickly move at least 20 m away from the helicopter.
- During takeoffs and flight, make sure that all persons, including the operator, are at least 20 m away from the helicopter.
- Before landing, make sure that all persons are at least 20 m away from the helicopter.
- After landing, make sure to push the STOP ENGINE switch on the transmitter to stop the engine.
- Before approaching the helicopter to supply fuel or chemicals, bleed air, or perform other procedures, make sure that the engine and main rotor have stopped completely.
- To prevent fires, stop the engine and keep away from fire, sparks, and other sources of ignition during refueling.

L27-N9821-00



⚠ WARNING
 Never approach the helicopter
 when the tail rotor is rotating!
 Severe injury could result.
 L27-N9823-00

⚠ WARNING
 Do not touch the muffler!
 Burns could result.
 L27-N9822-00

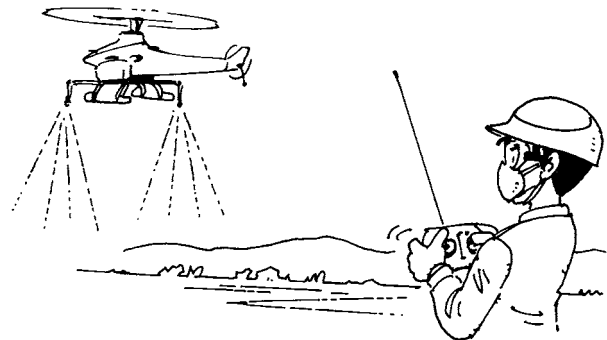
Requirement

Basic Requirements

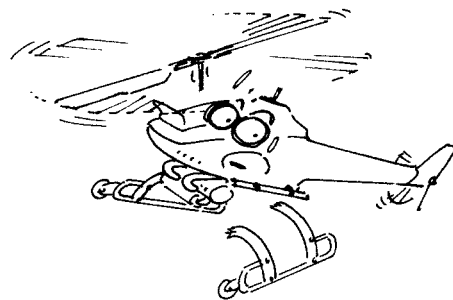
⚠ WARNING
 To ensure safe use, please make sure to read the operation manual thoroughly before use.



⚠ WARNING
 This unmanned helicopter for industrial applications has been manufactured for the purpose of aerial application of agricultural chemicals, fertilizers, and seeds. Do not use it for other applications. It could also cause unexpected accidents.



⚠ WARNING
 Do not modify the helicopter or the auxiliary devices. Do not use parts other than genuine parts. Any modification of the helicopter or use of non-genuine parts may cause unexpected accidents.



Operator Requirements

⚠ WARNING

Flying this helicopter requires a high level of skill. The helicopter should be operated only by a person who possesses an appropriate license.



⚠ WARNING

Make sure to wear a helmet during flight. To perform an aerial application, make sure to wear clothing that is appropriate for the operation. Performing a flight and an aerial application in clothing that is not appropriate for the task could cause loss of visibility, maneuvering error, or cause your foot to slip, resulting in unexpected accidents. Furthermore, it could harm your health through exposure to agricultural chemicals.



Observe the following clothing requirements:

- Wear a helmet.
- Wear goggles and a particle mask.
- Wear long-sleeved clothing with secure buttons and fasteners.
- Wear slip-proof shoes that are easy to walk with.
- Do not wear objects that could obstruct vision when there is wind, or adversely affect operation (especially towels and gloves).

⚠ WARNING

A minimum of 3 people is required for an aerial application: a navigator who has been briefed on the aerial application procedure, an assistant who readies, mixes, and supplies agricultural chemicals, and an operator. Beware that an understaffed operation could lead to an accident.

⚠ WARNING

The operation of an unmanned helicopter involves considerable mental fatigue. The operator should not fly the helicopter continuously for more than 1 hour, but should take a rest every hour. Prolonged continuous flight operation could cause the operator to lose concentration and could lead to an accident.

⚠ WARNING

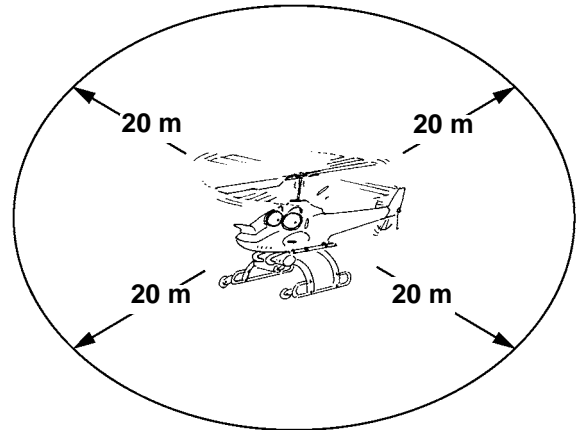
Do not fly the helicopter after drinking alcohol or taking cold medicine, or if you are in poor physical condition. Flying the helicopter in poor physical condition could cause loss of concentration, and could lead to an accident.



Helicopter Requirements

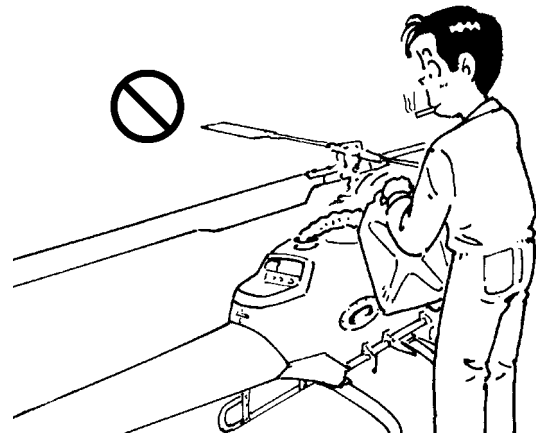
⚠ DANGER

Never approach (or allow others to approach) within 20 m of the helicopter until the main rotor has come to a complete stop and the engine has stopped. Entering within 20 m of the helicopter could cause a serious accident.



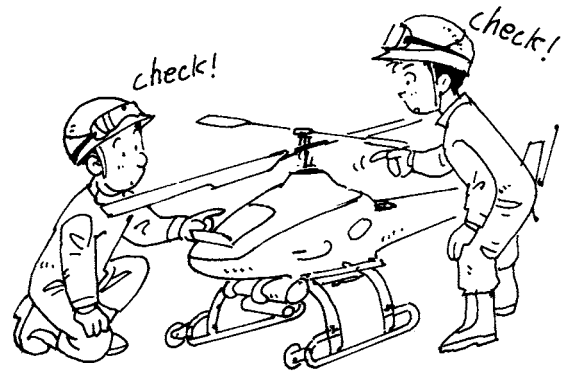
⚠ WARNING

The fuel mixture contains highly volatile gasoline that ignites easily. To prevent fires, stop the engine and keep the helicopter away from any source of sparks or fire when refueling or mixing gasoline with oil.



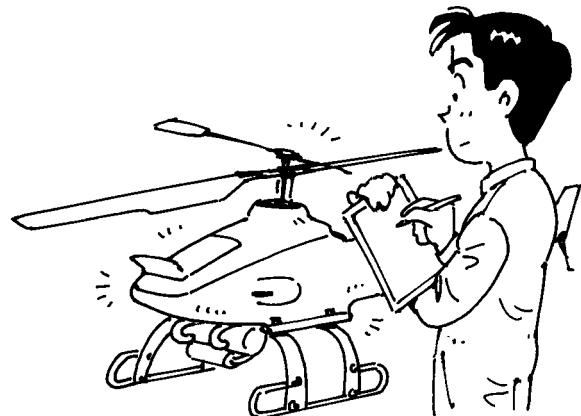
⚠ WARNING

- Make sure to have the required inspections and maintenance services performed. Failure to do so could lead to a serious accident.
- To have the helicopter serviced, contact your dealer or an authorized service facility for Yamaha unmanned helicopters for industrial applications.



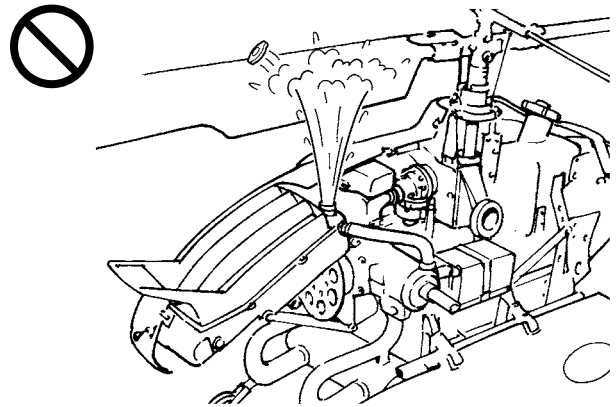
Make sure to perform the following inspections. In addition, have your dealer perform the 30-hour inspection, periodic inspection, and general inspection. (See pages P11-1 and P11-2.)

- Pre-flight inspection
- Post-flight inspection
- 30-hour inspection
- Periodic inspection
- General inspection



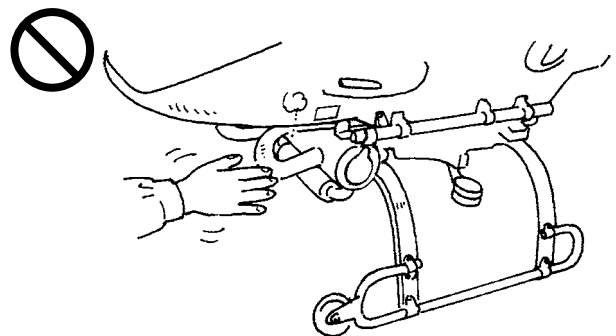
⚠ WARNING

When necessary, remove the radiator cap only after the engine has cooled down. If the radiator cap is removed before the engine has cooled down sufficiently, the scalding liquid could shoot out and cause burns.



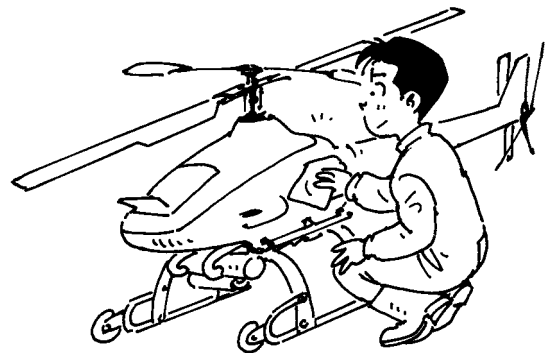
⚠ WARNING

The muffler is at a high temperature immediately after a flight. To prevent burns, do not touch it. Also, to prevent burns or fires, do not place any flammable objects near the muffler.



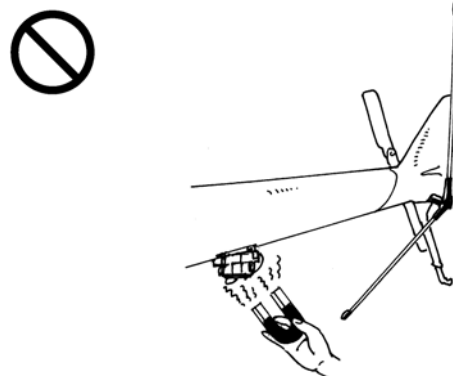
NOTICE

Although the helicopter has a drip-proof construction, it is not waterproof. The areas that can be washed by direct spraying of water are the side covers, tail body, leaves, and the runners. Do not spray water on other areas, as this could cause the helicopter or the auxiliary devices to fail or operate erroneously.



NOTICE

The gyro sensor located at the bottom of the tail body is a precision instrument that senses the earth's weak magnetic force. Therefore, do not place any magnetized objects near it, as this could cause the system to operate erroneously.

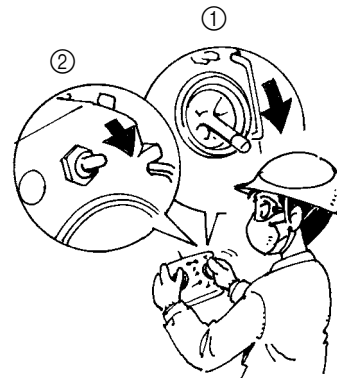
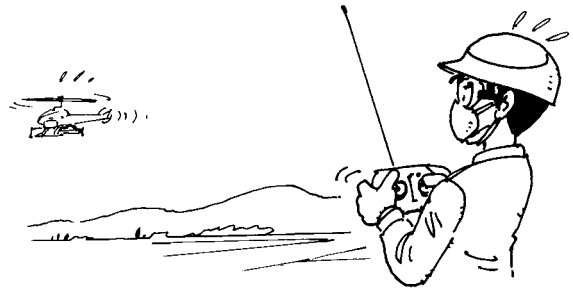


Flight Requirements

⚠ DANGER

If the helicopter cannot be maneuvered and is about to leave the flight region, make sure that the region is uninhabited, check the safety of its surroundings, and do the following to land the helicopter.

- ① Move the throttle stick to the slowest position.
- ② Furthermore, hold down the Engine Stop switch.

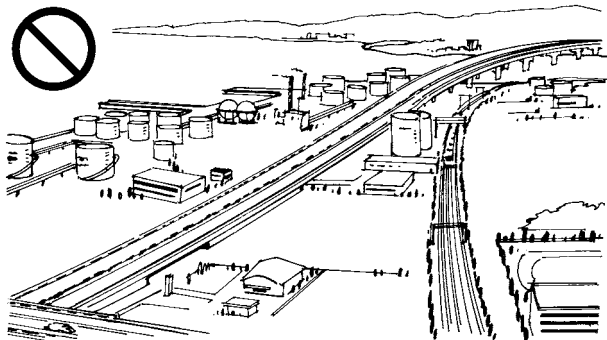
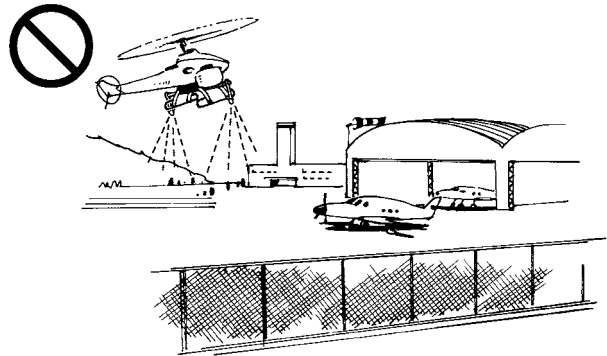


⚠ WARNING

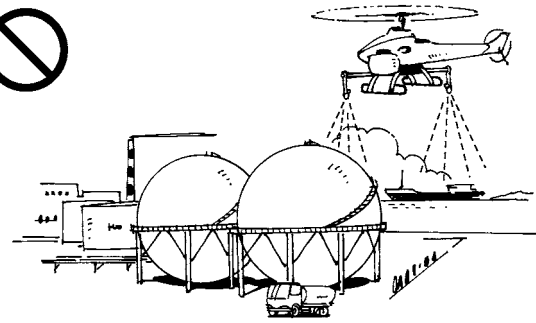
Never fly over no-fly zones. Flying over no-fly zones could lead to serious accidents and chemical injuries.

Do not fly in the following areas:

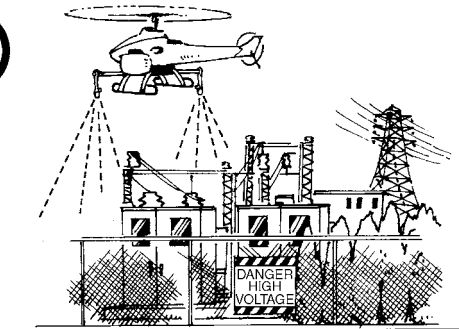
- Above or in the vicinity of airports, military facilities, heliports, or landing strips. The distance of the no-fly zone will vary at each facility. Verify with the relevant entities.
- Above or in the vicinity of heavily trafficked roads, expressways, or railroads.



- Above or in the vicinity of industrial complexes for petroleum, gas, chemicals, explosives, etc., or areas containing tanks or depositories.



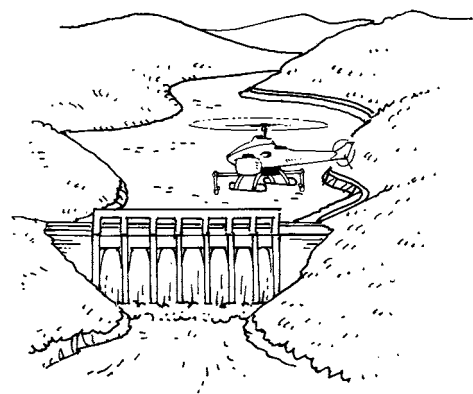
- Above or in the vicinity of power transmission lines, power plants, or transformer stations.



- Above or in the vicinity of homes and other hazardous obstacles.



- Above or in the vicinity of swimming areas, yacht harbors, fishing harbor facilities, reservoirs, or dams.



- Above or in the vicinity of areas posted with “no trespassing” or “keep out” signs.
- Above or in the vicinity of areas where flight is prohibited by police or fire departments.

⚠ WARNING

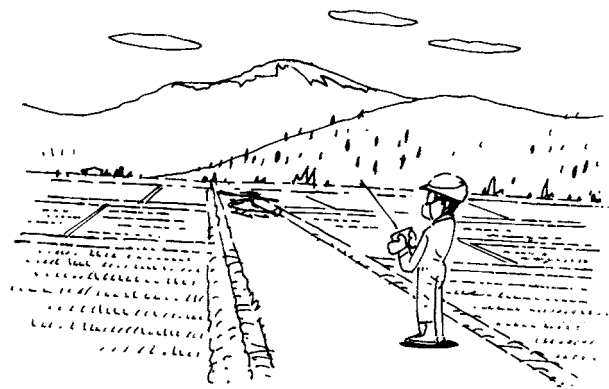
The unmanned helicopter for industrial applications is operated by way of radio signals. To prevent the helicopter from going out of control due to unexpected radio signal interference, pay careful attention to any radio signal interference before and during a flight.



⚠ WARNING

Select areas that are appropriate for takeoffs and landings, as described below. Failure to select an appropriate area could lead to an accident.

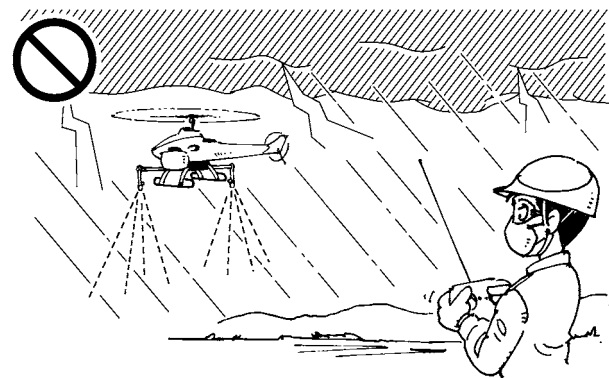
- Select flat farm roads or vacant lots with minimal foot or vehicle traffic.
- Check that there are no obstacles in the vicinity.
- Check that there are no objects that could be picked up by the wind (such as mowed grass, plastic tape, plastic bags, etc.).



⚠ WARNING

Abort the flight or aerial application if poor weather conditions exist as described below. Failure to do so could pose operation difficulties, which could lead to an accident. In addition, it could adversely affect the application and the effectiveness of the sprayed chemicals.

- Wind velocity in excess of 3 m/s at a height of 1.5 m above the ground.
- Rain, fog, or lightning in the close vicinity.

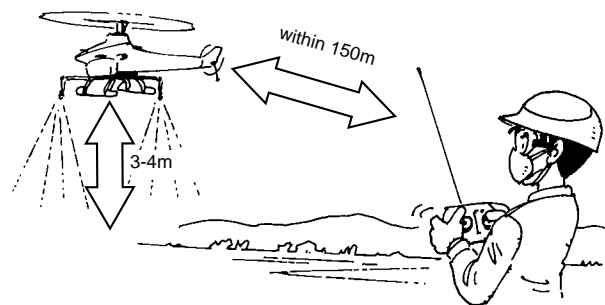


⚠ WARNING

Keep the maximum horizontal distance between the operator and the helicopter within 150 m, and the flight altitude at 3 - 4 m (from the ground or from the crop). If the distance is any greater, it will prevent the operator from monitoring the posture of the helicopter and adversely affect the signal reception conditions.

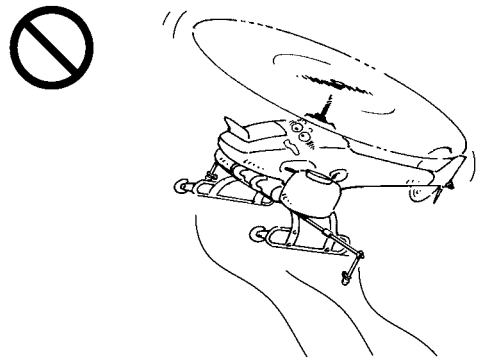
For safety, further shorten the distance if there are any obstacles in the area.

Failure to fly the helicopter within the maximum distance limit could lead to an accident.



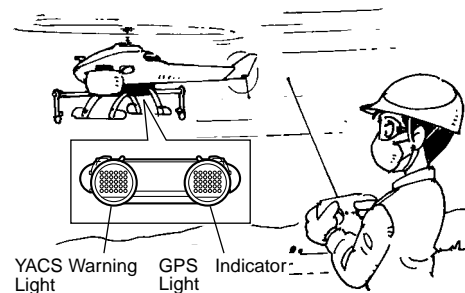
⚠ WARNING

Adjust the load to leave some margin in the payload. A takeoff with a full payload requires maximum horsepower and careful flying technique. An excess payload at this point could lead to a serious accident. Therefore, hover the helicopter to check that there is an ample margin in payload before continuing with the flight. (See page 4-10.)



⚠ WARNING

If the YACS warning light illuminates, the GPS indicator light shows an abnormal condition, the helicopter exhibits irregular behavior, or an unusual symptom occurs (such as vibration, sound, coolant leakage, or foul odor), immediately land the helicopter in a safe area. Continuing with the flight in this state could lead to an accident.



⚠ WARNING

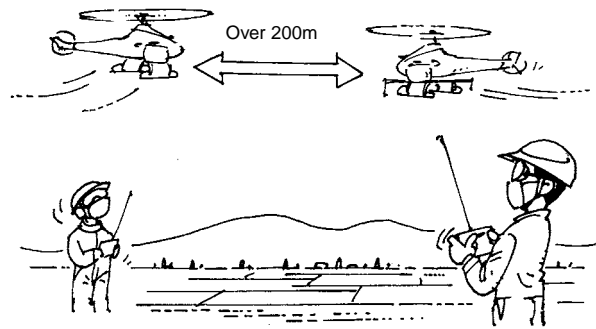
Bring the following items with you to the flying site. Failure to do so could adversely affect the flight and lead to an accident.

- Radio signal monitor
- Fire extinguisher
- First-aid kit
- Bullhorn
- Stopwatch
- Tools
- Fuel
- Helmet (for all personnel)
- Spare battery
- Transceiver
- Flight log
- Operation manual
- Certificate of Authorization
- Particle mask
- Goggles



NOTICE

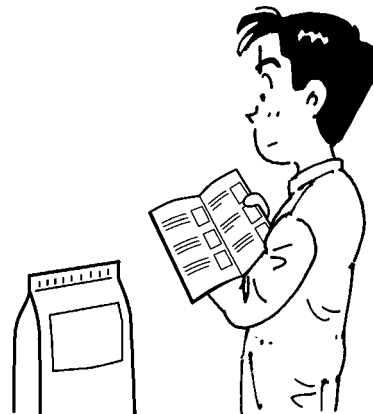
When operating 2 or more helicopters in a given area, make sure to use separate radio-wave frequencies and maintain a minimum distance of 200 m between them. If they approach within 200 m of each other, check the frequency of the other helicopter, and if it is a neighboring frequency, wait until the other helicopter passes.



Chemical Requirements

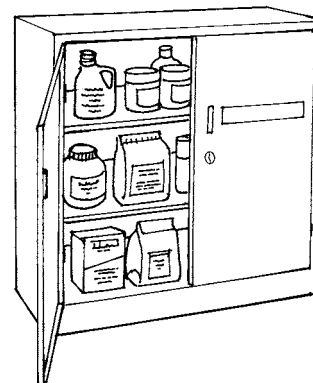
WARNING

When using chemicals, make sure to follow the instructions given on their labels. Do not use chemicals other than those that have been registered for aerial application. Failure to do so could expose animals, plants, or people to chemicals for which the operator will be required to take social responsibility.



WARNING

Control and handle chemicals strictly in accordance with their manuals. Negligent control and improper handling of chemicals could lead to chemical pollution or health hazards.



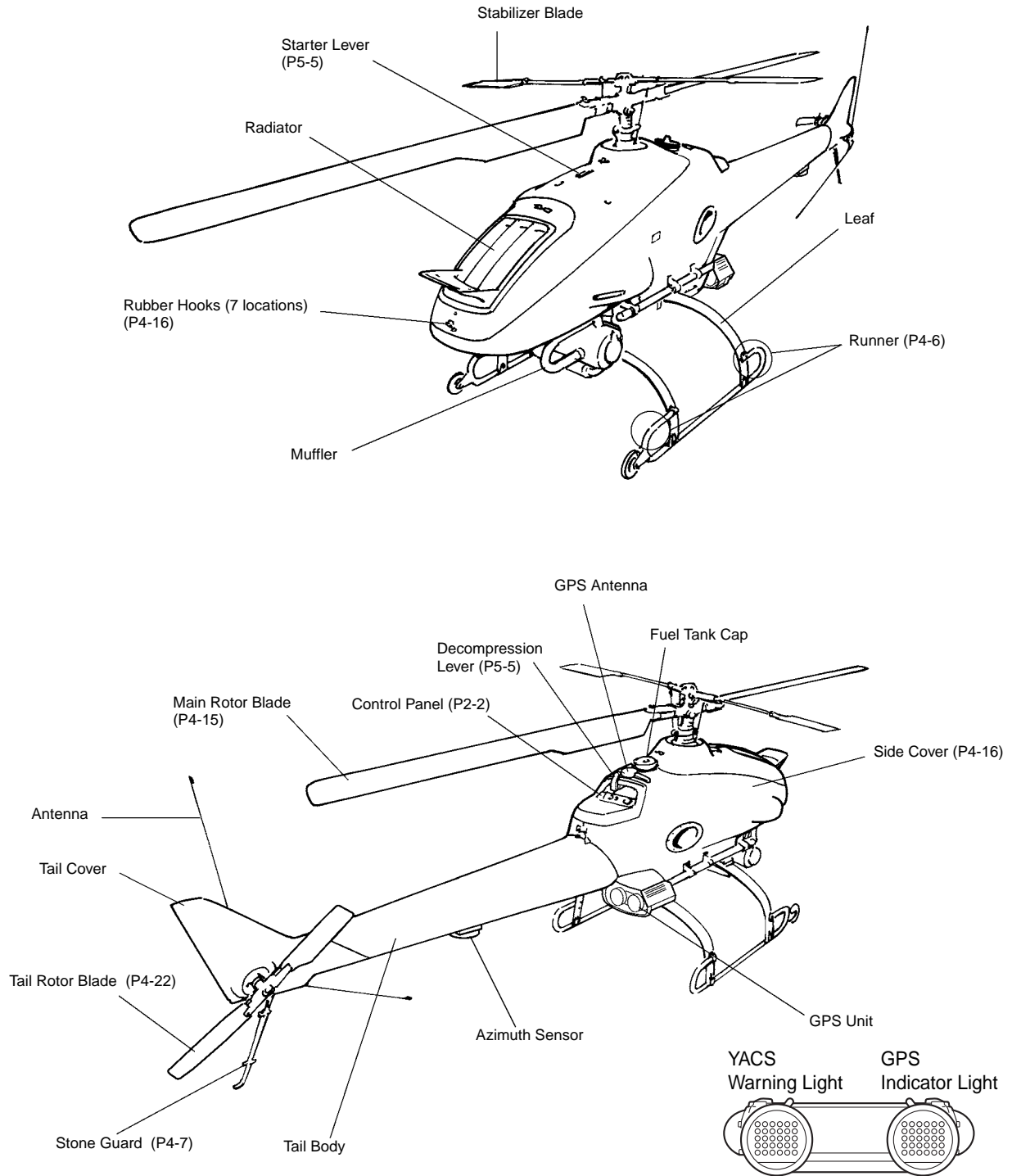
Part Names

Helicopter Exterior	2-1
Helicopter Exterior Part Names	2-1
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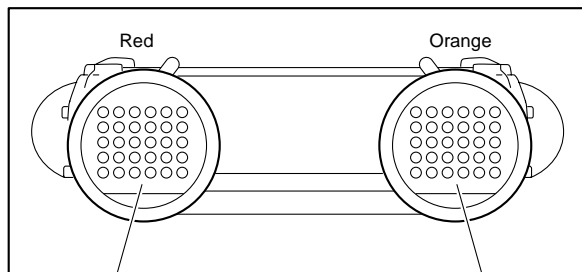
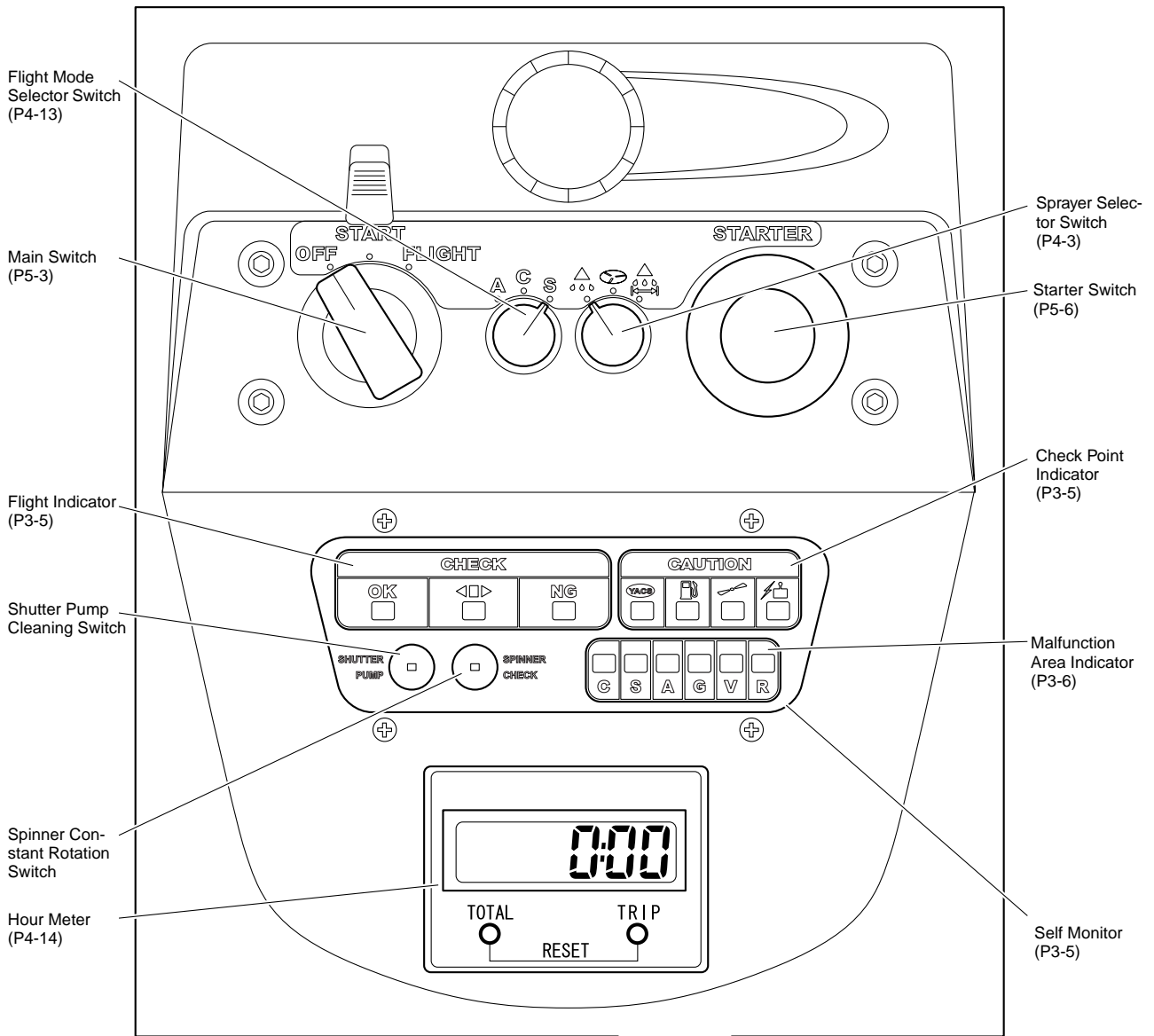
Part Names

Helicopter Exterior

Helicopter Exterior Part Names

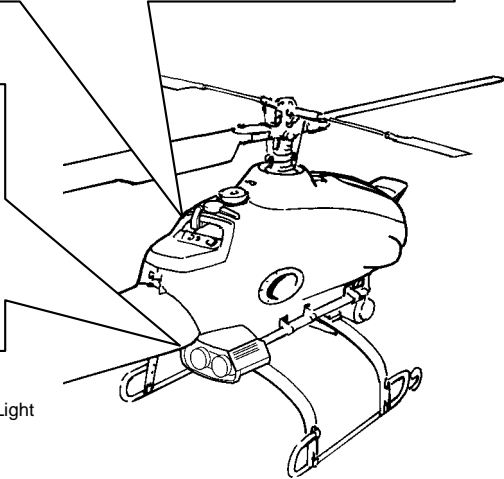


Control Panel and Warning Lights

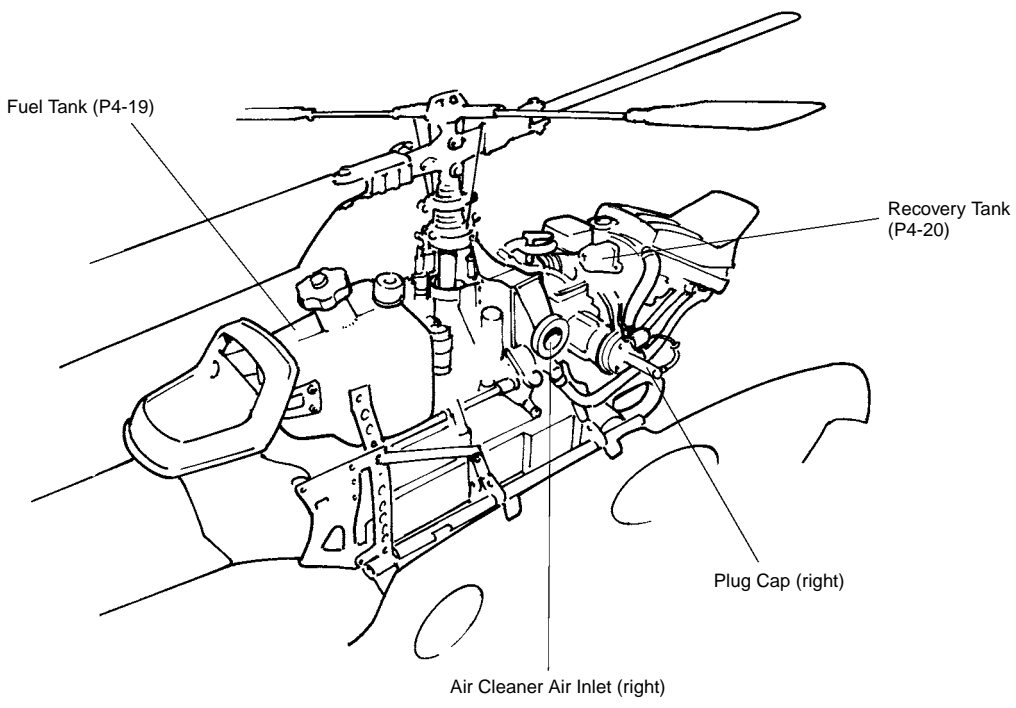
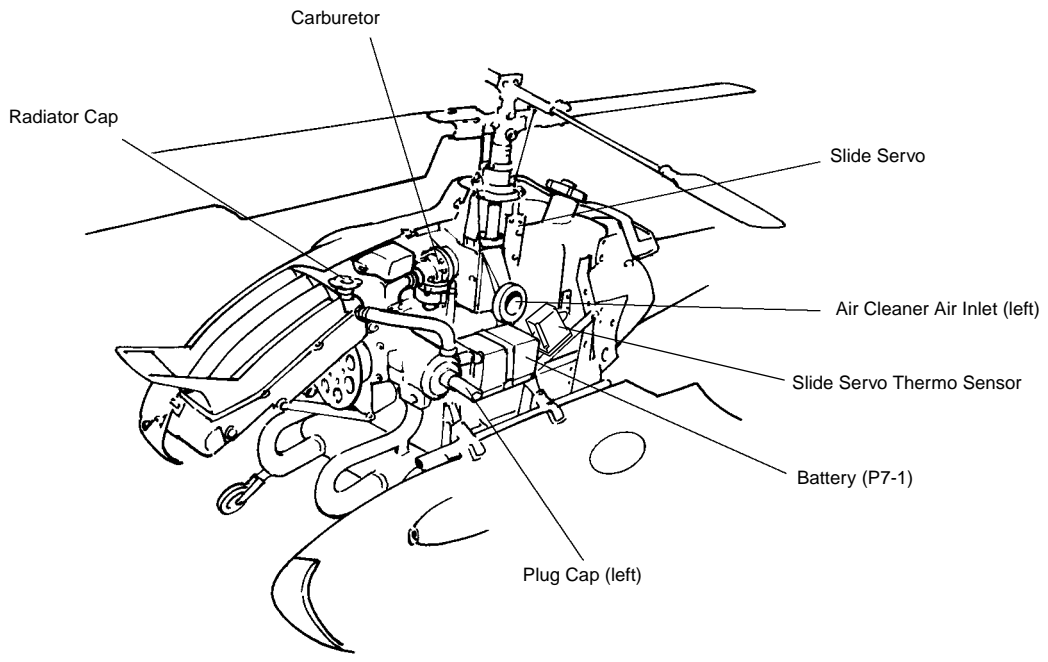


YACS Warning Light (P3-7)

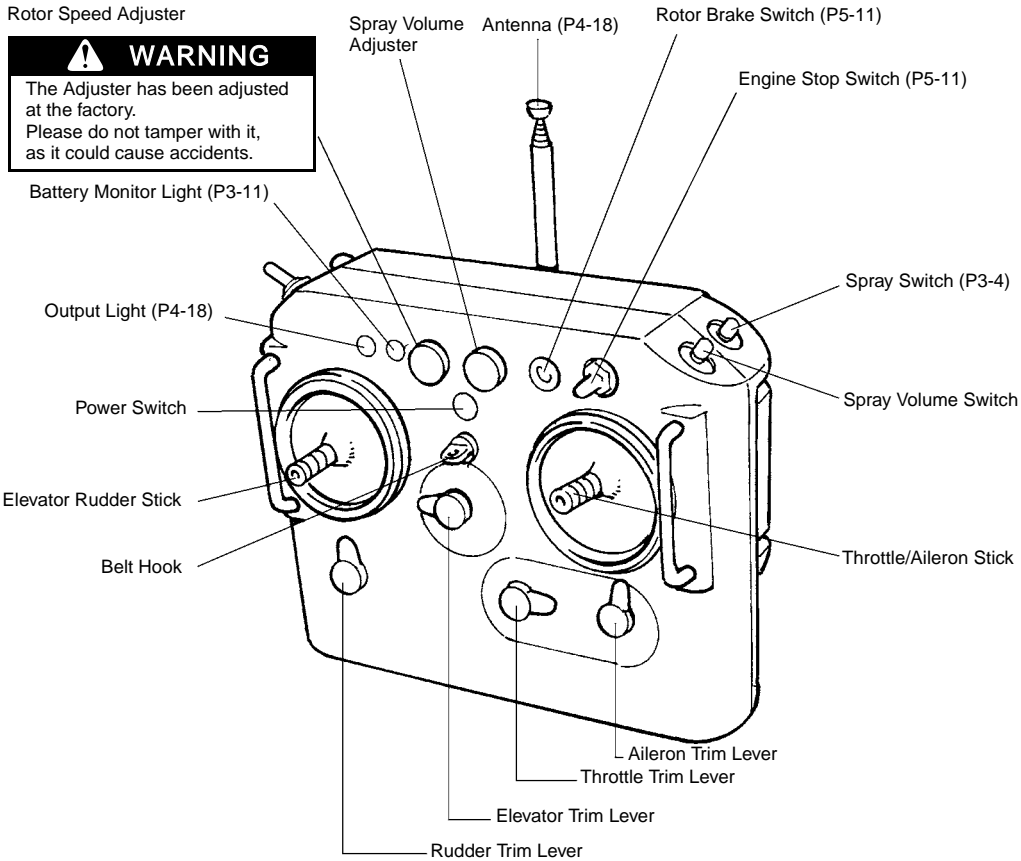
GPS Indicator Light (P3-9)



Helicopter Interior

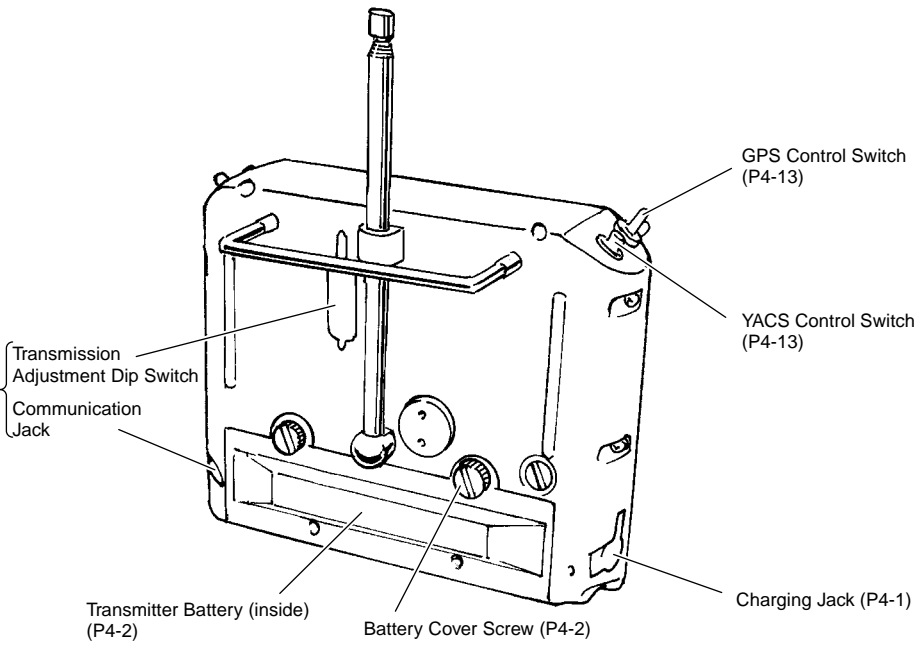


Flight Transmitter



WARNING
 The Adjuster has been adjusted at the factory. Please do not tamper with it, as it could cause accidents.

WARNING
 Do not tamper with these areas, as these are intended for changing the transmitter settings. Tampering with them could render the helicopter out of control, and could lead to an accident.



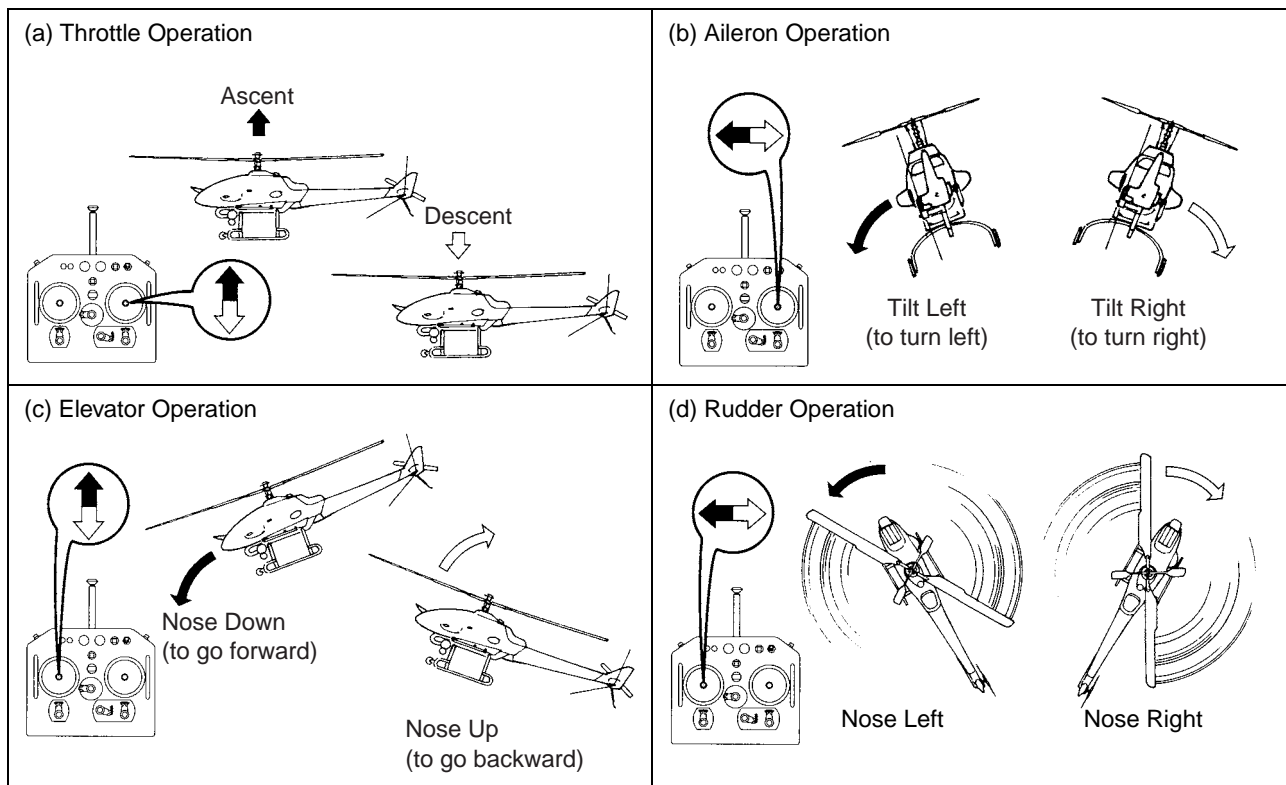
Pre-Flight Inspection Items

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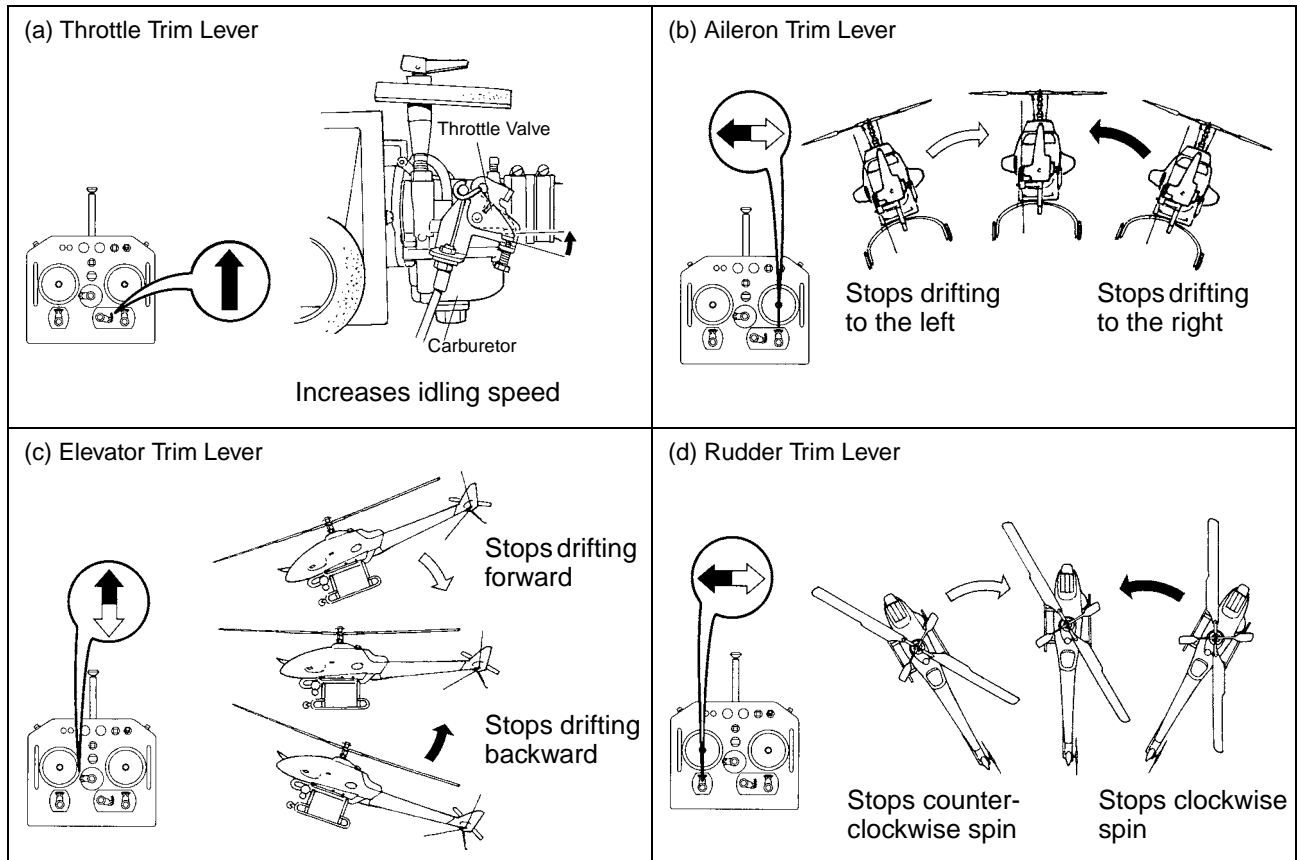
Pre-Flight Inspection Items

Basic Transmitter Operation

Basic Flight Transmitter Stick Operation and Helicopter Movement



Basic Flight Transmitter Trim Lever Operation and Helicopter Movement



TIP

- The throttle trim lever is normally at the lowest position, and the aileron, elevator, and rudder trim levers are normally at center position.
- Fine-tune these positions according to your situation. (See page 5-9.)

YACS Control Switch

In the event of a failure in the control system, the YACS control switch enables the operator to switch the control to manual mode, similar to piloted aircraft. Normally, this is kept "ON".

If the control system fails despite its various built-in safety features, calmly turn this switch OFF and land the helicopter at a safe location in manual mode.

When the YACS control switch is OFF, the buzzer in the transmitter will emit a "beep-beep" sound to inform the operator that control is in manual mode.

TIP
Turning the YACS control switch OFF switches to manual mode. Do not confuse with other switches while operating.

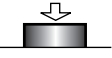

GPS Control Switch

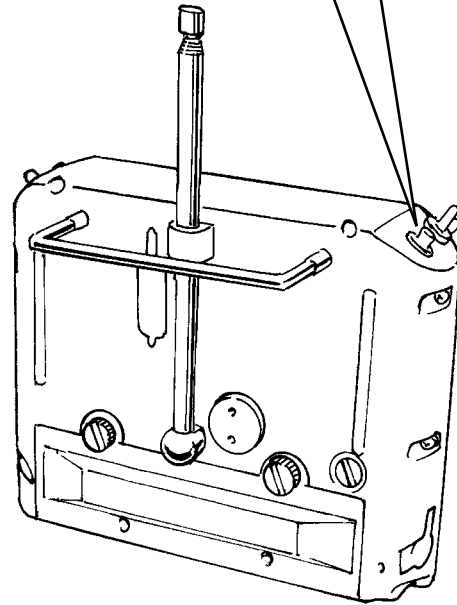
The GPS control switch is used for switching between the following modes: A ↔ AG, C ↔ CG, S ↔ SG. (See page 4-13.)



Before turning ON the GPS control switch, make sure that the outer lights of the GPS indicator are illuminated. If the GPS indicator lights are OFF or flashing, the GPS control flight mode cannot be used even when the GPS control switch is turned ON.

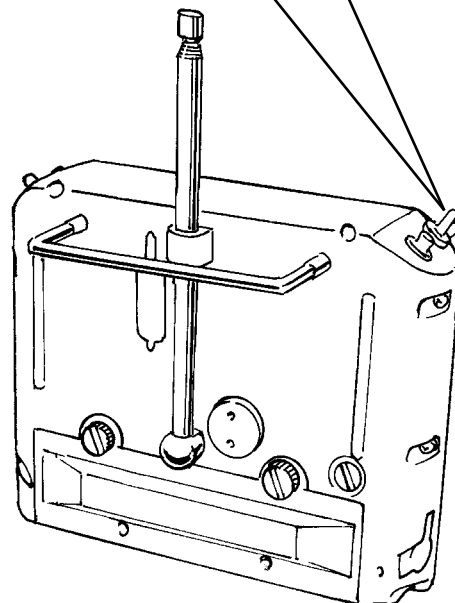
Moreover, in the situations described below, first turn OFF the switch, then turn it back ON. Otherwise, the GPS control flight mode cannot be used.

- GPS control communication has been interrupted because the helicopter has landed.
- The GPS control switch was ON even before takeoff.
- GPS control has been interrupted due to poor GPS signal reception.
- GPS control has been interrupted because it has been set to manual mode.

YACS YACS Control Switch	
Control OFF (manual)	Control ON
Push 	Release 



GPS GPS Control Switch	
Control OFF	Control ON
	



Spray Switch

The sprayer can be operated when the power switch of the flight transmitter is ON and the main switch on the helicopter is in the START or FLIGHT position.

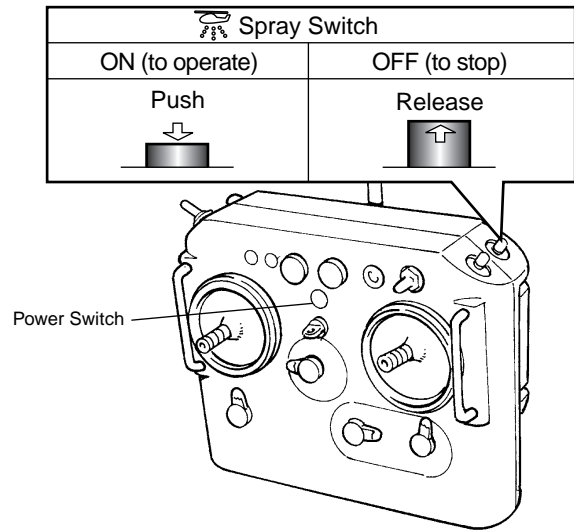
Change the spray switch settings as described below, depending on how you wish to operate the sprayer.

Using the Flight Transmitter:

Press the (ON/OFF) spray switch on the flight transmitter ON (pushed in) to operate the sprayer. Press the switch again (released) to stop the sprayer.

TIP

Pay attention to the surroundings before pressing the spray switch ON, which will discharge chemicals.

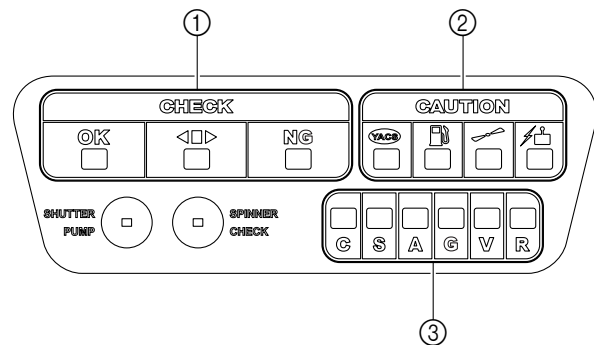


Warnings (Warning Lights and Indicators) and Actions

This product features various types of safety functions. Thoroughly familiarize yourself with these functions and the meaning of the warnings and indications before a flight, and take appropriate actions.

Self Monitor

The self monitor, which is located on the control panel, indicates the conditions of the various areas of the helicopter.



1 Flight Indicator

Indicates whether the helicopter is able to fly.

Item	Light	Meaning	Action
OK	ON	Able to fly in the YACS-controlled flight mode.	OK to fly
◀◻▶	ON	Setting YACS control and self-checking.	Wait until the configuration is complete.
		Control is in manual mode.	Turn ON the YACS control switch on the transmitter.
NG	ON	A malfunction has been discovered through a self-check.	Check the indicators 2 and 3 to identify the area of the malfunction and take appropriate actions.

2 Check Point Indicator

An indicator will illuminate if a malfunction is discovered on the helicopter while a configuration or a flight is in progress.

The malfunction areas indicated here can be handled by the user. Take appropriate actions to respond to the lights that are lit, and check that the flight indicator 1 shows "OK".

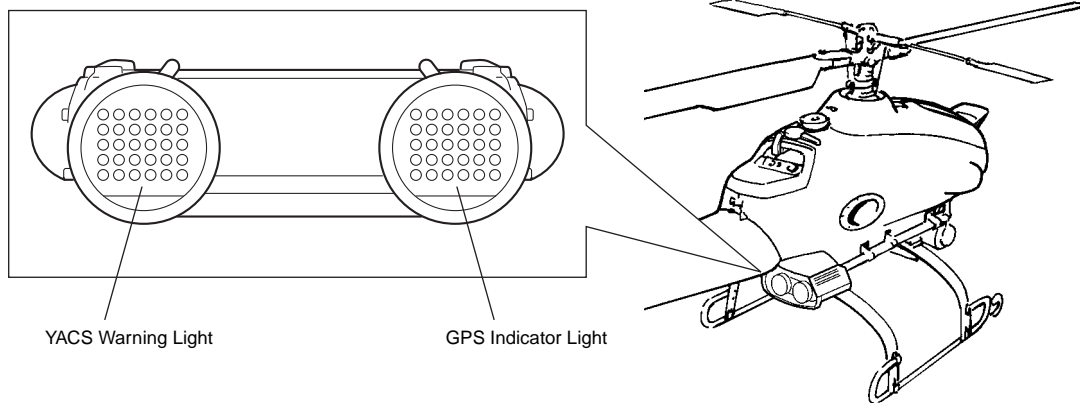
Item	Light	Meaning	Action
YACS	Flashing	Flashes approximately 3 times (10 seconds) when the main switch is switched from OFF to START.	Wait until the configuration is complete (light OFF).
Fuel	ON	The remaining fuel is below specification level.	Refuel.
Engine	ON	The engine speed has dropped due to a high-load condition caused by excessive payload or rough maneuvering, etc.	Reduce the payload, or fly the helicopter more gently.
Failsafe	ON	Because no control signals were received, the failsafe control took over.	Check whether the power switch of the transmitter is ON. Once this indicator light illuminates, it will continue to illuminate until the main switch on the helicopter is turned OFF.

3 Malfunction Area Indicator

An indicator will illuminate or flash if a malfunction is discovered on the helicopter while a configuration or a flight is in progress.

The malfunction areas indicated here cannot be handled by the user. Contact your dealer to describe the symbol for the light that has turned ON or is flashing, and request a repair.

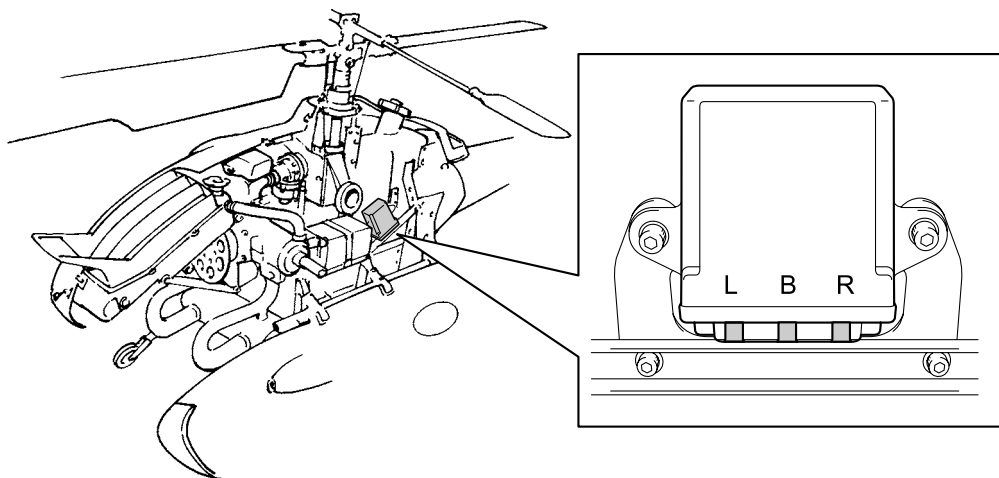
Once one of these indicator lights illuminates, it will continue to illuminate or flash until the main switch is turned OFF.



Slide servo thermo sensor

The slide servo thermo sensor indicates the temperature state of the slide servo motor.

It will flash when the temperature rises abnormally, or when a malfunction is detected in the thermo sensor.



Indication	State	Meaning	Action
ON		Normal state	
Flashing	(Alternates repeatedly between ON for 1 second and OFF for 1 second)	The slide servo temperature has risen, causing an abnormal state. The malfunction areas indicated here cannot be handled by the user.	Contact your dealer immediately to notify which LED is flashing (L/B/R), and request a repair.
Intermittent flashing	(Alternates repeatedly between 0.1 second of ON and 1.9 second of OFF)	The thermo sensor has a malfunction. The malfunction areas indicated here cannot be handled by the user.	Contact your dealer immediately to notify which LED is intermittently flashing (L/B/R), and request a repair.

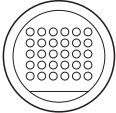


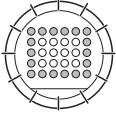
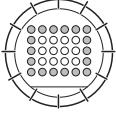

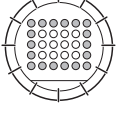
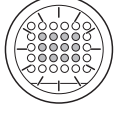

* It may be difficult to see the LED under direct sun light.

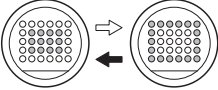


If the temperature of the slide servo has risen, the LED will return to the ON state once the temperature drops after time has passed. If the thermo sensor has a malfunction, it will continue to flash.

YACS Warning Light (red)

If a malfunction is discovered on the helicopter while the YACS control is being configured or a flight is in progress, the YACS warning light (red) illuminates or flashes in unison with the self monitor, and provides the operator a description of the warning.

If this light illuminates or flashes during a flight, calmly take the appropriate actions in accordance with the description of the warning.

Indication	Self Monitor Status	Meaning	Action
All OFF 		No malfunction	OK to fly
All ON(*1) 	“  ” flashing	YACS control is being configured.	Wait until the configuration is complete (approx. 10 sec). During this time, check for blown bulb in the YACS warning light.
	One of the malfunction area indicators illuminates	Control has been switched to manual mode due to a malfunction.	Calmly land the helicopter in a safe area, contact your dealer to report which indicator is lit on the self monitor, and request a repair.
	No display on self monitor; thermo sensor flashing	The slide servo has heated up abnormally, or the thermo sensor has a malfunction.	Calmly land the helicopter in a safe area. If there is no indication on the self monitor, take actions described on page 3-6.
Only outer lights flash (for 15 sec after starting engine) 		After the engine has started, for 15 sec.	OK to fly after flashing has stopped and all lights are OFF. (See page 5-8.)
Only outer lights flash (3 times) 	“  ” illuminating	A high load has been applied due to reasons ① to ③, causing the engine speed to drop or the rudder to move considerably in one direction. ① Excessive payload. ② Rough maneuvering ③ Effects from strong wind, etc.	① Calmly land the helicopter in a safe area and reduce the payload. (See page 4-10.) ② Operate the helicopter more gently. ③ Fly at a wind velocity of 3 m/s or less.
Only outer lights flash (Continuous flashing) 			If the lights flash more than 3 times, the stability in the rudder direction will deteriorate. Turn the OFF YACS control switch and turn it back ON to recover from this condition.
Only inner lights flash 	“  ” is ON	The remaining fuel is below specification level.	Calmly land the helicopter in a safe area and refuel. (See page 4-4.)

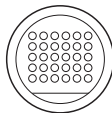
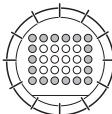
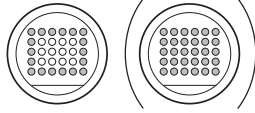
Indication	Self Monitor Status	Meaning	Action
<p>Inner and outer lights flash alternately (3 times)</p> 	<p>“” is ON</p>	<p>Because no control signals were received, the failsafe control took over.</p>	<p>Take appropriate actions in accordance with “Failsafe (Safety Function During Radio Signal Interference) Actions”. (See page 3-12.) If the helicopter responds immediately to control, calmly land it in a safe area. Then, check for radio signal interference (P4-9) and conduct a radio signal distance test (P4-25).</p>
<p>Only outer lights are ON</p> 		<p>Flight velocity has exceeded 20km/h.</p>	<p>Fly at a velocity of 20km/h or less. (See page 5-10.)</p>

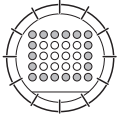
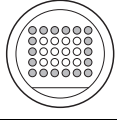
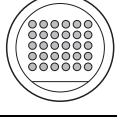
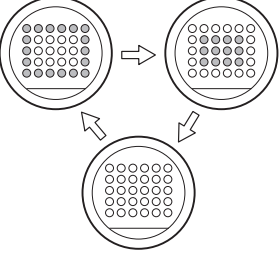
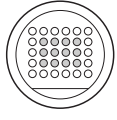
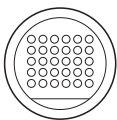
*1: The “All ON” state will take precedence over other states (i.e., when all lights are ON, no flashing will take place to indicate other concurrent states).

GPS Indicator Light (Orange)

The GPS indicator lights (orange) illuminates or flashes to inform the operator of the reception conditions of the GPS signals and the state of GPS control.

Take the appropriate actions in accordance with the description of the warning.

Condition	Indication	Meaning	Action
Before starting engine	All OFF 	Preparing GPS control settings (awaiting completion of YACS control configuration)	Wait until the completion of YACS control configuration (when all YACS warning lights turn OFF). If the outer lights do not flash after the YACS control configuration has completed, there may be an equipment failure.
	Only outer lights flash 	GPS control is being configured.	GPS control is being prepared. Fly the helicopter by using only YACS control or wait for the GPS control configuration to complete (the outer lights illuminate). If the outer lights do not illuminate after 3 minutes, the GPS signal reception might be poor. Therefore, fly the helicopter by using only YACS control.
	Only outer lights are ON (all lights illuminate with GPS control switch ON) 	GPS control configuration is complete.	The GPS control settings have been completed and the GPS control is for use. Turn the GPS control switch ON and check that all the lights are lit.

Condition	Indication	Meaning	Action
After starting engine	Only outer lights flash 	GPS signal reception is good but GPS control cannot be used due to reason ① or ②. ① Before takeoff / after landing ② Control is in manual mode	In case of reason ①, the outer lights will change from flashing to steady ON after takeoff. In case of reason ②, turn ON the YACS control switch on the transmitter.
	Only outer lights are ON 	GPS signal reception is good. GPS control is not being used.	GPS control is ready for use. To use it, turn ON the GPS control switch on the transmitter.
	All lights ON 	GPS signal reception is good. GPS control is being used.	The flight is under GPS control.
	Repeated cycle of "outer lights ON > inner lights ON > OFF". 	GPS signal reception has worsened and GPS control cannot be used.	The flight mode switches automatically to YACS control. Calmly operate the flight. When using the SG mode, the light turns ON and the brake control will be applied automatically according to speed, only in the longitudinal direction of the helicopter. (See page 3-15.) Turn OFF the GPS control switch on the transmitter to stop the flashing of the lights.
	Only inner lights are ON 	GPS control without gyro sensor	Turn the GPS control switch OFF, and fly under YACS control.
	All OFF 	GPS control cannot be used due to poor GPS signal reception.	Operate the flight under YACS control until the GPS signal reception improves (and the outer lights illuminate).

Transmitter Battery Monitor Light

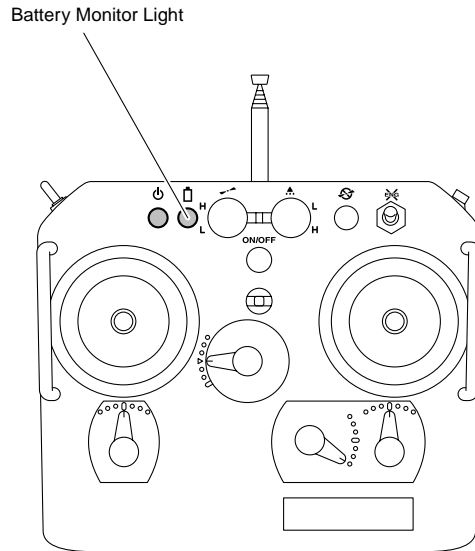
If the voltage of the transmitter battery drops below a certain level during operation, a warning buzzer (3 beeps) will sound every 2 seconds and the battery monitor light on the transmitter will flash. If you are flying the helicopter at this time, land it immediately and recharge or replace the transmitter battery.

⚠ WARNING

If the battery monitor light illuminates on the transmitter, it is a final warning indicating that the transmitter battery has been depleted. Immediately land the helicopter and replace the transmitter battery. Failure to do so could render the helicopter out of control.

The charging status of the battery can be monitored by the sound of the buzzer when the power of the transmitter is turned ON.

Beep beep beep beep	(4 times)	} Fully charged
Beep beep beep	(3 times)	
Beep beep	(2 times)	Requires charging.
Beep	(1 time)	Inoperable unless charged.



In addition, the transmitter also has the following functions to inform the operator of the transmitter status.

- | | | |
|--|---|---|
| <p>1) Beep-beep once every 2 seconds</p> | <p>The control is in manual mode because the YACS control switch is turned OFF.</p> | <p>➔ Turn ON the YACS control switch.</p> |
| <p>2) Beep-beep-beep
Beep-beep-beep
Beep-beep-beep-beep-beep-beep-beep
(3-3-7 pattern)</p> | <p>Operation may be poor due to a malfunction.</p> | <p>➔ Contact your dealer.</p> |

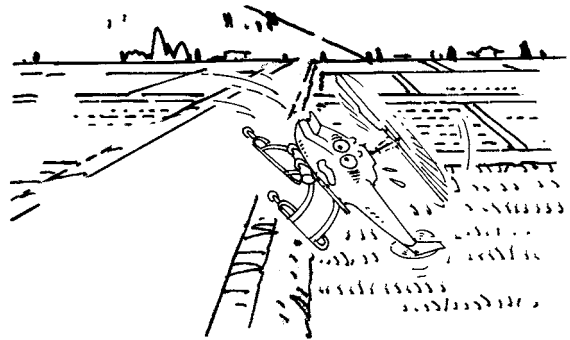
Failsafe (Safety Function During Radio Signal Interference) Actions

If the radio signals for controlling the flight do not reach the helicopter due to interference, the helicopter will be rendered out of control, which creates a dangerous situation. In case of radio signal interference, the system has a safety feature that alternately flashes the inner and outer lights of the red YACS warning lights and automatically effects the flight control described on the following pages. Thoroughly familiarize yourself with this feature to take the appropriate actions.



DANGER

During signal interference, never approach the helicopter until the main rotor has come to a complete stop and the engine has stopped. If there are any people in the area, instruct them to leave the area immediately.



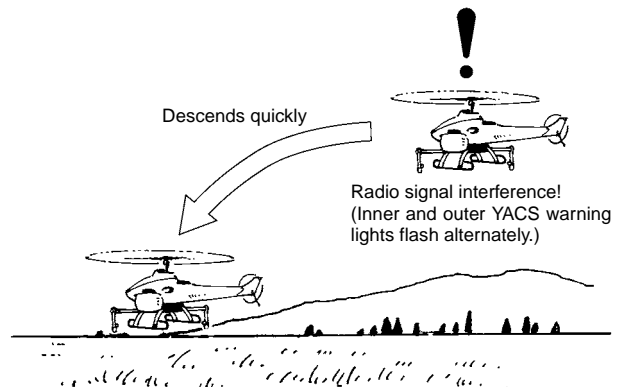
WARNING

- Do not fly any higher than 3 to 4 m (above the ground or crops). When radio signal interference occurs (i.e. when failsafe mode is engaged), the engine speed is automatically brought to idling state after 40 seconds. Flying at a higher altitude will cause the helicopter to descend abruptly.
- Make sure to follow the “Actions” instructed in the manual. Failure to do so could cause the helicopter to move unexpectedly or descend suddenly once it recovers from the radio signal interference, and could lead to an accident.
- Do not resume flying until you have verified and eliminated the cause of the radio signal interference. Otherwise, you could lose control of the helicopter again, leading to an accident. (See pages 4-9 and 4-25.)



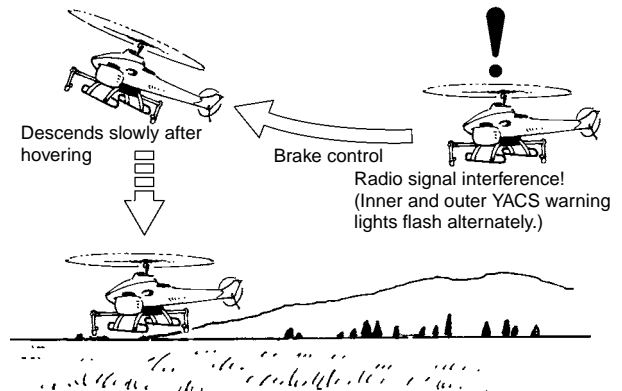
● **Poor GPS Reception (Outer Lights of GPS Indicator Light Are OFF)**

- ① In the event of radio signal interference, the inner and outer lights of the red YACS warning lights will flash alternately and the system will force the helicopter to descend quickly regardless of the flight mode. If the control radio signals recover while the helicopter is descending, the flight mode will switch automatically to operator control. For this reason, calmly move all the sticks on the transmitter to the neutral (center) position, and wait for the signals to recover.
- ② If the helicopter is forced to land because the radio signals have not recovered, the engine is brought to idle. Depending on the terrain, weather, and flight conditions, the helicopter could overturn. If the helicopter overturns, never approach the helicopter, as the engine speed might not decrease.
- ③ After a forced landing, turn the throttle to the slowest position and wait for the radio signals to recover or the engine to stop.
- ④ If the radio signals do not recover after 1 minute from the time the radio signal interference occurred, the engine will stop automatically. After the rotor has come to a complete stop, approach the helicopter and turn OFF its main switch.



● **Good GPS Reception (Outer Lights of GPS Indicator Light Are ON)**

- ① When radio signal interference occurs, the inner and outer lights of the red YACS warning lights will flash alternately, and the system will apply the brake and force the helicopter to hover regardless of the flight mode. Then, the helicopter will automatically start descending slowly. If the control radio signals recover while the helicopter is descending, the flight mode will switch automatically to operator control. For this reason, calmly move all the sticks on the transmitter to the neutral (center) position, and wait for the signals to recover.
- ② If the helicopter is forced to land because the radio signals have not recovered, the engine is brought to idle. Depending on the terrain, weather, and flight conditions, the helicopter could overturn. If the helicopter overturns, never approach the helicopter, as the engine speed might not decrease.
- ③ After a forced landing, turn the throttle to the slowest position and wait for the radio signals to recover or the engine to stop.
- ④ If the radio signals do not recover after 1 minute from the time the radio signal interference occurred, the engine will stop automatically. After the rotor has come to a complete stop, approach the helicopter and turn OFF its main switch.



Safety Features and Actions During Poor GPS Signal Reception

The GPS control operates by receiving radio signals from 4 or more satellites. It may become inoperable depending on the surroundings, terrain, weather conditions, time zone, and other reasons. If the reception of GPS signals becomes poor while operating in a GPS control flight mode (SG, CG, or AG), a safety feature will cause the outer and inner lights of the orange GPS indicator lights to flash alternately. Then, the system will automatically effect flight control or switch the flight mode as described below. Thoroughly familiarize yourself with this feature to take the appropriate actions.

● **Operating in SG mode**

As the GPS signal reception worsens, the orange GPS indicator lights will cycle through “outer lights ON > inner lights ON > OFF”, and the brake control will be applied only in the longitudinal direction of the helicopter. At this point, quickly turn OFF the GPS control switch. Because GPS control cannot be used even before the GPS control switch is turned OFF, the helicopter will operate in the slow flight mode. This flight mode is not suitable for aerial application. In addition, GPS control will not resume even if the GPS signal reception improves. When the GPS control switch is turned OFF, the GPS indicator light will turn OFF and control will switch to S mode. Therefore, operate carefully.

NOTICE

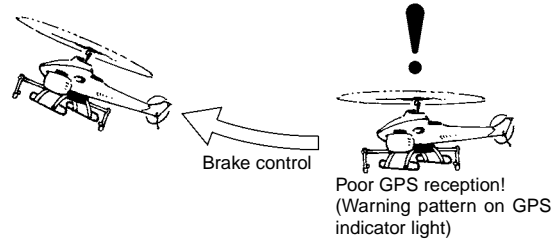
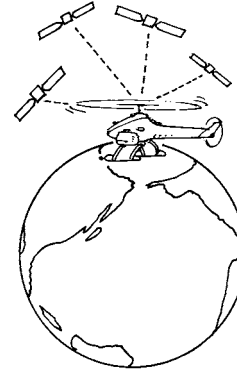
If the stick on the transmitter is moved past the neutral (center) position to stop the helicopter when it is flying forward or backward in SG mode, the automatic brake control will be applied together with the operator’s brake control if the GPS control is canceled. As a result, the nose of the helicopter will tilt up to an excessive angle.

● **Operating in CG mode**

As the GPS signal reception worsens, the orange GPS indicator lights will cycle through “outer lights ON > inner lights ON > OFF”. Control will switch automatically to C mode. At this point, quickly turn OFF the GPS control switch and operate carefully. When the GPS control switch is turned OFF, the GPS indicator light will turn OFF.

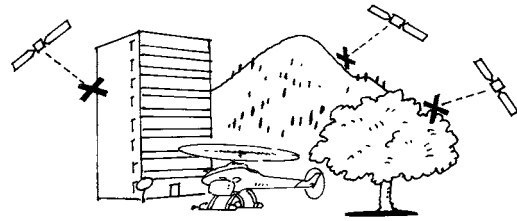
● **Operating in AG mode**

As the GPS signal reception worsens, the orange GPS indicator lights will cycle through “outer lights ON > inner lights ON > OFF”. Control will switch automatically to A mode. At this point, quickly turn OFF the GPS control switch and operate carefully. When the GPS control switch is turned OFF, the GPS indicator light will turn OFF.

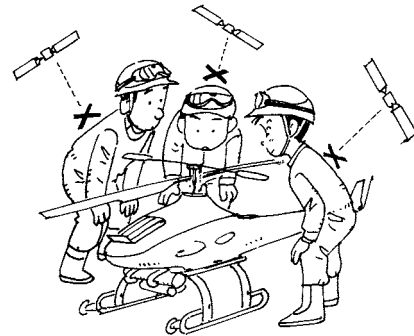


The reception of GPS radio signals can be adversely affected by conditions indicated below or due to other reasons.

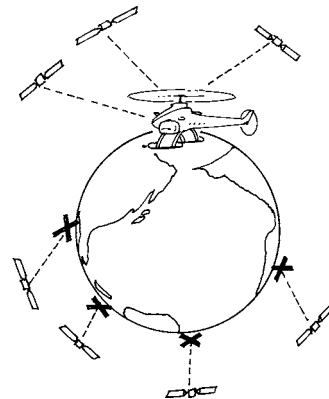
- ① Flying near obstacles such as mountains, trees, or buildings.



- ② The antenna is surrounded by people.



- ③ Fewer satellites are available during certain time slots.



Pre-Flight Preparation and Inspection

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Pre-Flight Preparation and Inspection

Preparation Up to the Day Before

Recharging and Replacing Flight Transmitter Battery

WARNING

Make sure to use a fully charged battery for the flight. Using an insufficiently charged battery could render the helicopter out of control.

Recharging the Battery

Make sure to use the dedicated battery recharger for the transmitter, and recharge the battery as follows:

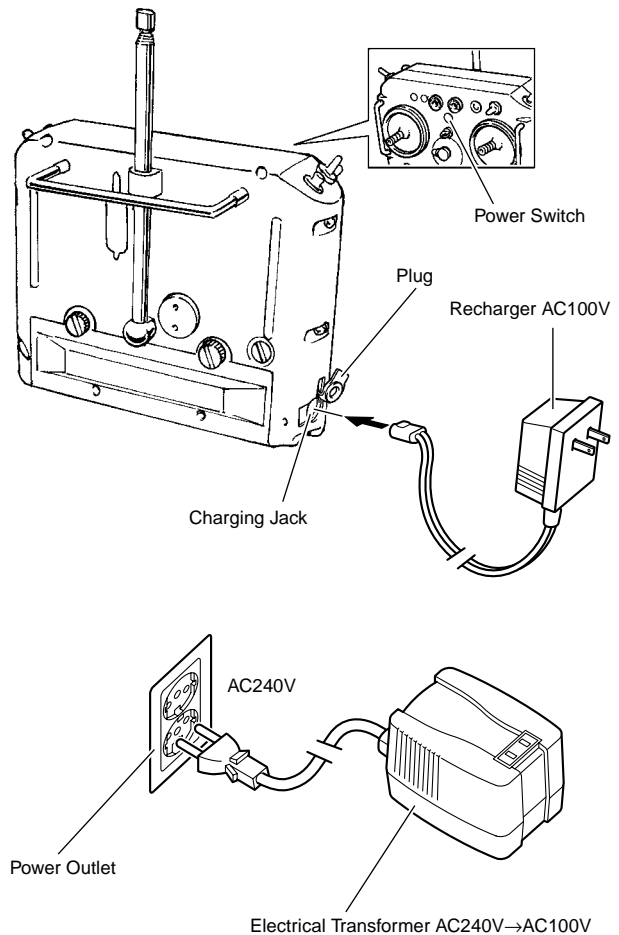
- ① Check that the power switch for the transmitter is turned OFF.
- ② Remove the plug from the charging jack.
- ③ Insert the recharger plug into the charging jack on the back of the transmitter.
- ④ Insert the power cord for the electrical transformer (AC 240V → AC 100V) into a power outlet.
- ⑤ Insert the recharger into the electrical transformer.
- ⑥ The pilot lamp on the recharger illuminates to indicate that the battery is being recharged. The charging temperature range, recharging time, and duration of use of the battery are as follows.

Charging temperature range: 0-40 °C
Recharging time: 14-16 hours
Duration of use: 2.1-3.3 hours

- ⑦ After the battery has been recharged, make sure to install the plug into the charging jack.
- ⑧ The battery monitor function indicates the battery's charge status and will alert the operator during flight if the battery must be replaced. (See page P3-11.)

NOTICE

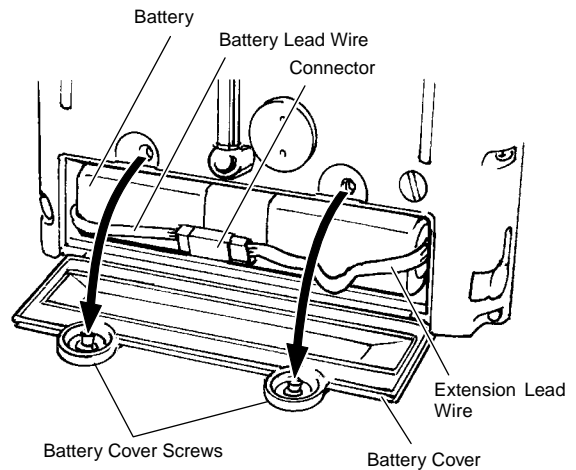
The dedicated recharger has been designed for use with AC 100V power outlets. If the recharger is mistakenly connected directly to an AC 240V power outlet, the recharger and the transmitter could be damaged. Therefore, use an electrical transformer (AC 240V → AC 100V) that conforms to Australian standards when recharging the battery.



Replacing the Battery

Replace the battery as follows:

- ① Loosen the 2 retaining screws for the battery cover on the back of the transmitter.
- ② Open the battery cover.
- ③ Unplug the connector that connects the battery lead wire and the extension lead wire.
- ④ Pull out the battery.
- ⑤ Insert the charged battery in such a way that its lead wire is on your left hand side.
- ⑥ Connect the battery lead wire and the extension lead wire.
- ⑦ Leave some slack in the extension lead wire.
- ⑧ Close the battery cover, being careful not to pinch the battery lead wire or the extension lead wire.

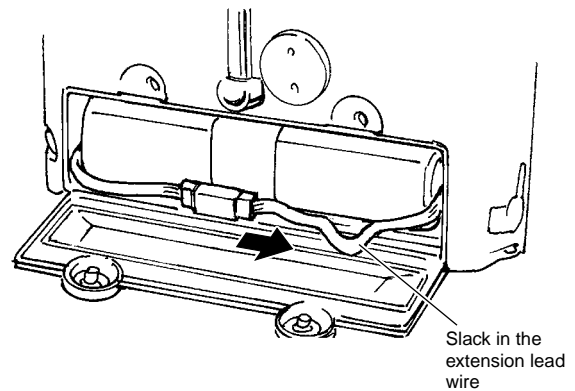


⚠ WARNING

Do not grip the battery unit and pull it out. This could break the battery lead wire.

TIP

- Orient the connector to match up the colors of the wires.
- Do not remove the connector between the flight transmitter and the extension lead wire.
- After replacing the battery, turn ON the power of the flight transmitter, and gently jiggle the wires (connector) to make sure there is no break in the current.
- Batteries are consumables, and their duration of use decreases with each recharge cycle.
- The battery and the extension lead wire should be replaced once a year. To protect the environment, take the old battery to your dealer to ensure proper recycling.
- If rust forms on any part of the connectors, consult with your dealer, as it could lead to poor connection.





Storing the Battery

TIP

Especially during long-term storage (1 month or more), be sure to disconnect the battery connector. In addition, store the battery in a location with a temperature of -20 to 30 °C.

Selecting and Setting the Sprayer

- ① Turn the sprayer selector switch to select the sprayer function.
 - Turn the switch to “” to operate the liquid sprayer.
 - To use the speed-dependent feature of the liquid sprayer, turn the switch to “”.

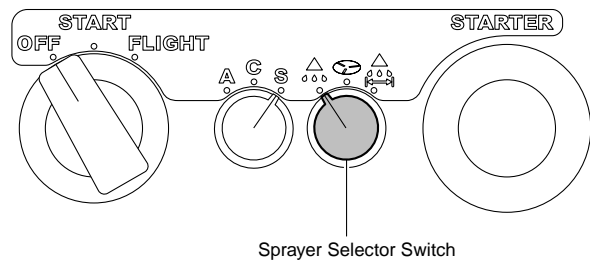
TIP

- The sprayer selector switch cannot be operated during a flight.
- The speed-dependent feature is enabled only when the GPS signal reception is good, regardless of the position of the GPS control switch on the flight transmitter.

- ② Adjust the settings of the sprayer. For details, see the operation manual for the sprayer.

TIP

Currently, the granular sprayer is not exported.



Preparing Fuel and Refueling

This product uses a fuel mixture consisting of regular gasoline and a specified type of 2-cycle engine oil (hereafter referred to as "mixing oil").

- ① Prepare fuel by mixing gasoline with oil. However, do not use gasoline that is blended with ethanol.

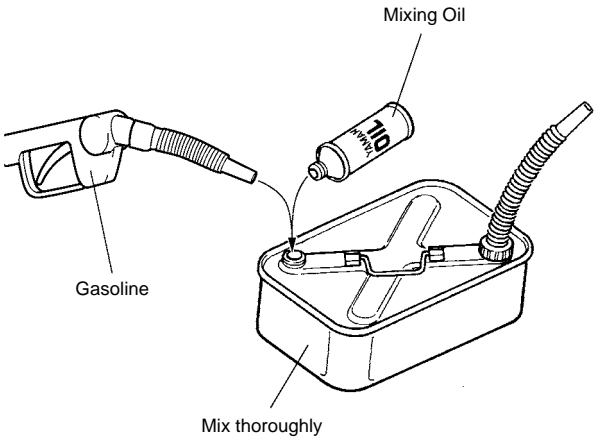
Specified mixing oil:
Yamaha-specified oil
Mixing ratio:
Gasoline:mixing oil = 50:1

⚠ WARNING
To prevent fire, mix fuel in a well-ventilated area, away from any source of sparks or fire.

TIP

- Observe the correct mixing ratio of gasoline and oil, and mix them thoroughly before use.
- Once the fuel is mixed, used it as soon as possible. If the fuel is left unused for a long period, the oil could separate. It is best to prepare just enough fuel mixture to be used in 1 day.
- To facilitate mixing, pour the oil into a container before pouring in the gasoline.
- Volume of gasoline and oil:

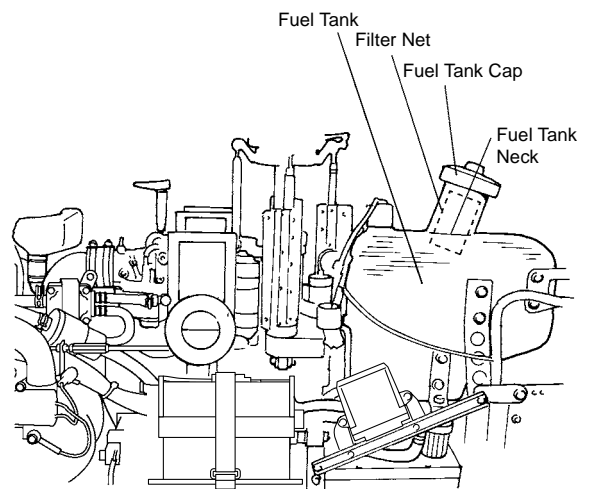
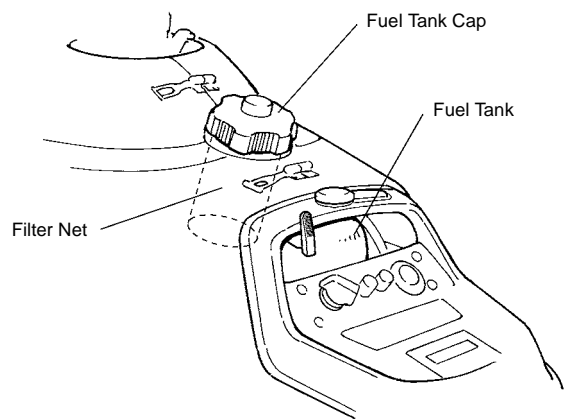
Gasoline	Oil
5 ℓ	100 m ℓ
10 ℓ	200 m ℓ
15 ℓ	300 m ℓ
20 ℓ	400 m ℓ
25 ℓ	500 m ℓ
30 ℓ	600 m ℓ



- ② Remove the fuel tank cap and refuel. Make sure that a filter net is installed in the filler inlet.

⚠ WARNING

- Stop the engine, and make sure there are no sources of sparks or fire before refueling.
- Do not pour the fuel past the refueling limit (up to the neck of the fuel tank). This is dangerous, as the fuel may drip out during a flight.
- After refueling, securely tighten the fuel tank cap.



Preparation on the Day of Flight

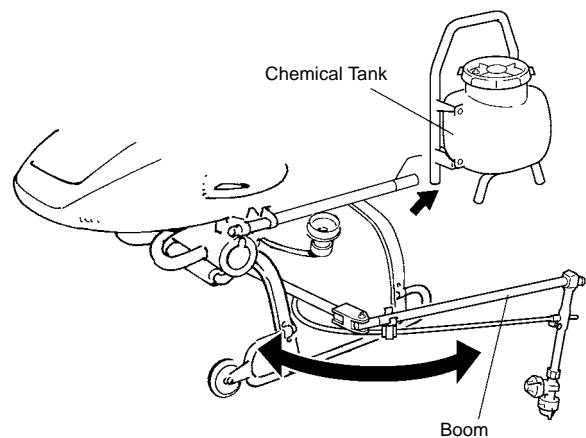
Transporting Procedure

WARNING

- To prevent burns, do not touch the muffler, which could be very hot after a flight.
- Exercise caution to avoid poking your eyes with the antenna or the like.

NOTICE

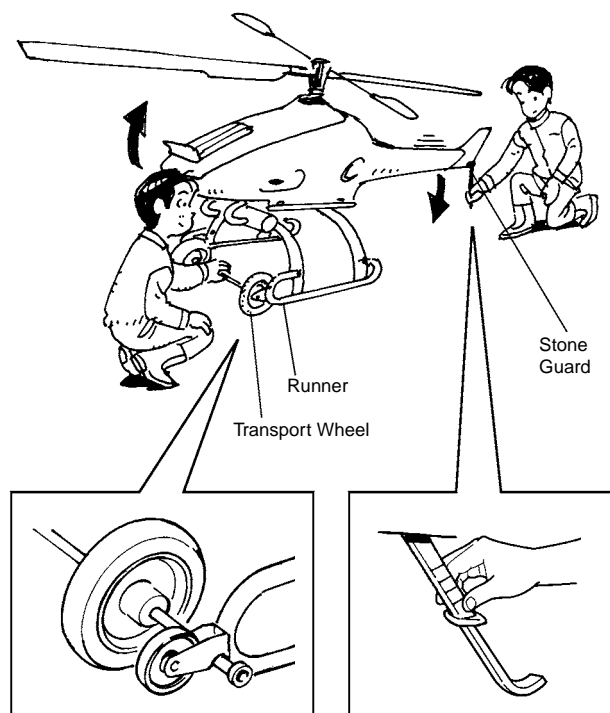
- Make sure to remove the chemical tank for the sprayer. If a liquid sprayer is installed, fold the boom before transporting the helicopter. See the operation manual of the sprayer for details.
- Do not allow the main rotor blade to come in contact with the ground or with any objects in the area, as this could lead to equipment damage.
- Do not hold the helicopter by the tail body, tail cover, radiator, or antenna, as this could lead to equipment damage.
- Make sure to turn OFF the main switch before moving the helicopter. Otherwise, the shocks from the movement will transfer onto the sensors, and could cause the helicopter to operate erroneously.
- To transport the helicopter by rolling it on the ground, attach the transport wheels (sold separately).



Installing and Removing Transport Wheels (sold separately)

To transport the helicopter by rolling it on the ground, transport wheels must be attached to the front of the runners. The installation (or removal) of the wheels is done by 2 persons as follows:

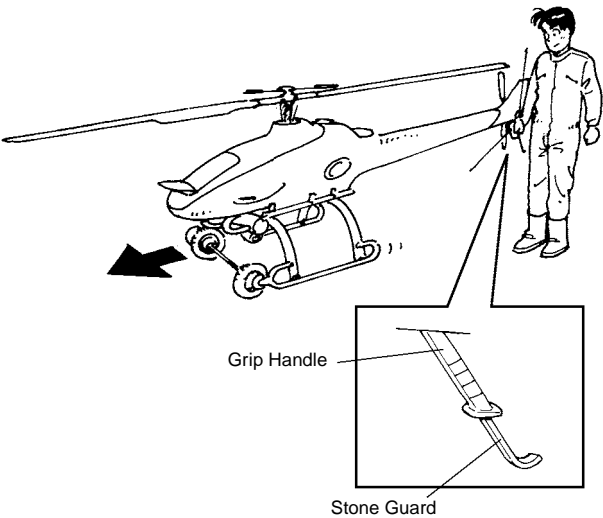
- ① Use your hand to lower the stone guard to raise the front end.
- ② Install (or remove) the transport wheels in the recess located between the wheel and pipe in the front of the runner.



Moving Forward or Backward

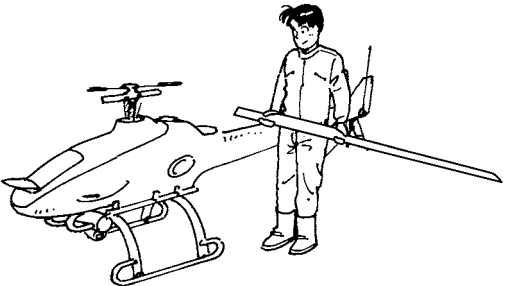
Lift the tail by holding the grip handle of the stone guard to move the helicopter forward (or backward).

NOTICE
Make sure to hold the grip handle to move the helicopter forward or backward. Do not hold the tail cover or antenna, as this could lead to equipment damage.



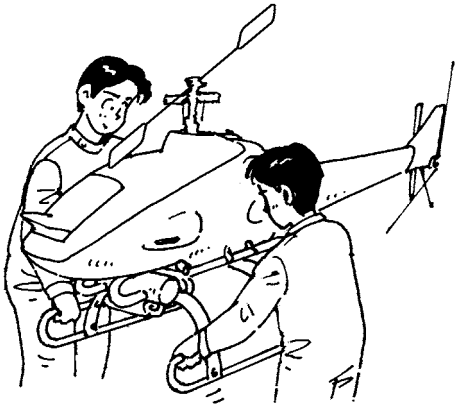
Lifting and Lowering

① Remove the main rotor blades before loading the helicopter on a truck bed. (See page 4-15.)



② Make sure that 2 persons or more lift the helicopter, with each person holding the runner as shown.

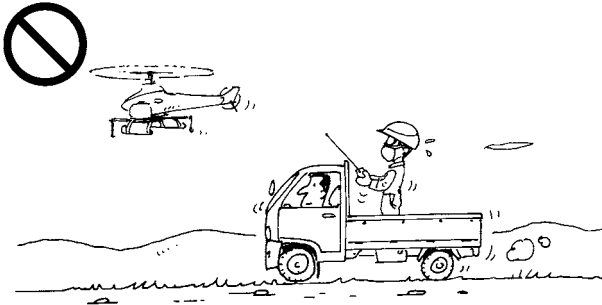
NOTICE
● Do not hold the helicopter by the exhaust pipe of the muffler or the bar for attaching the sprayer tank, as this could lead to equipment damage.
● Transport carefully so as not to damage the tail rotor.



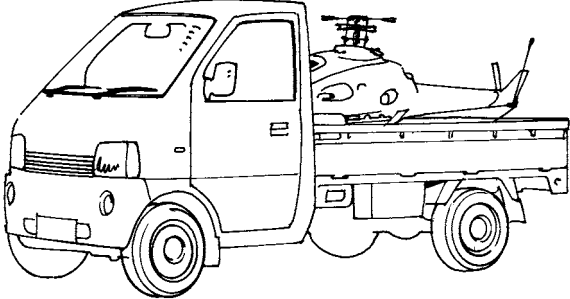
Transporting

WARNING
Use a truck to transport the helicopter.
Do not attempt to fly the helicopter to another site, as this could lead to an accident.

NOTICE
Make sure to remove the main rotor blades before transporting the helicopter.



① Use a truck to transport the helicopter.



Radio Signal Interference Inspection

Because this product is operated by wireless radio signals, the presence of radio signals with the same or neighboring frequency in the vicinity will cause the signals to cross, which will adversely affect the control of the flight. Before a flight, use the supplied radio signal monitor to check the radio frequencies that are being transmitted in the area. (See the operation manual of the radio signal monitor for its operation procedure.)

During monitoring, make sure the power switch for the flight transmitter is turned OFF.

⚠ WARNING

- The unmanned helicopter for industrial applications is operated by way of radio signals. To prevent the helicopter from going out of control due to unexpected radio signal interference, pay careful attention to any radio signal interference before and during a flight.
- Cancel the flight if you detect the same frequency that you will be using in the vicinity. Otherwise, the radio signal interference could render the helicopter out of control, and could lead to serious accidents.
- Check for radio signal interference regularly, including during breaks between flights.
- Check for radio signal interference each time you move to another area.



Payload Inspection

The actual payload of this helicopter varies considerably according to its operating conditions (weather, temperature, humidity, terrain, obstacles, etc.) and flying methods, as well as the helicopter's individual differences.

Use the graph on the following page as a rule of thumb for adjusting the payload with some margin to ensure a safe aerial application flight.



WARNING

Adjust the load to leave some margin in the payload.

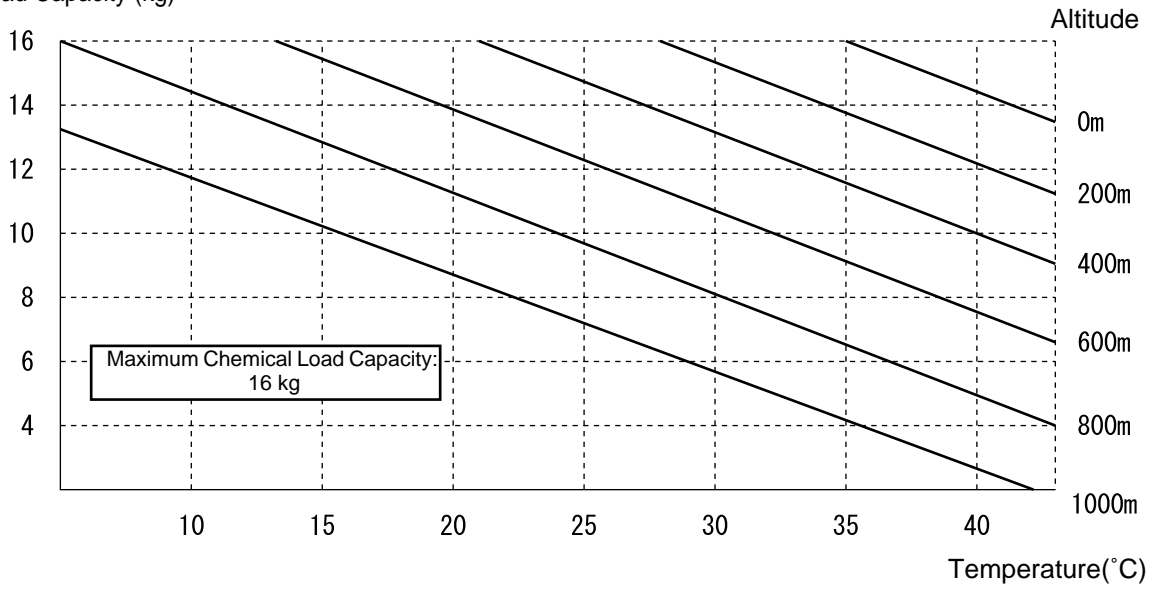
A takeoff with the maximum payload requires maximum horsepower and careful flying technique. An excess payload at this point could lead to a serious accident. Make sure to observe the following:

- **Refer to the payload graph and check the payload that meets your requirements.**
- **Check the payload margin by hovering.**
- **If the low speed warning flashes on the YACS warning light, this means there is not enough payload margin. Remove the chemical tank on the right side before performing the flight.**
- **If the position of the throttle stick immediately after takeoff is clearly high, this means that there is not enough payload margin. Remove the chemical tank on the right side before performing the flight.**

NOTICE

- **If the engine is cold or when flying for the first time after a periodic inspection, as a guide, adjust the payload to about half of the capacity.**
- **Contamination of the main rotor blades by pollen, etc., will cause the payload capacity to decrease. Clean it during breaks.**
- **If the cushion tape has a peel or a damage, it can cause the payload capacity to decrease. Cancel the flight and request a repair by your dealer. (See page 4-22.)**

Chemical Load Capacity (kg)



TIP

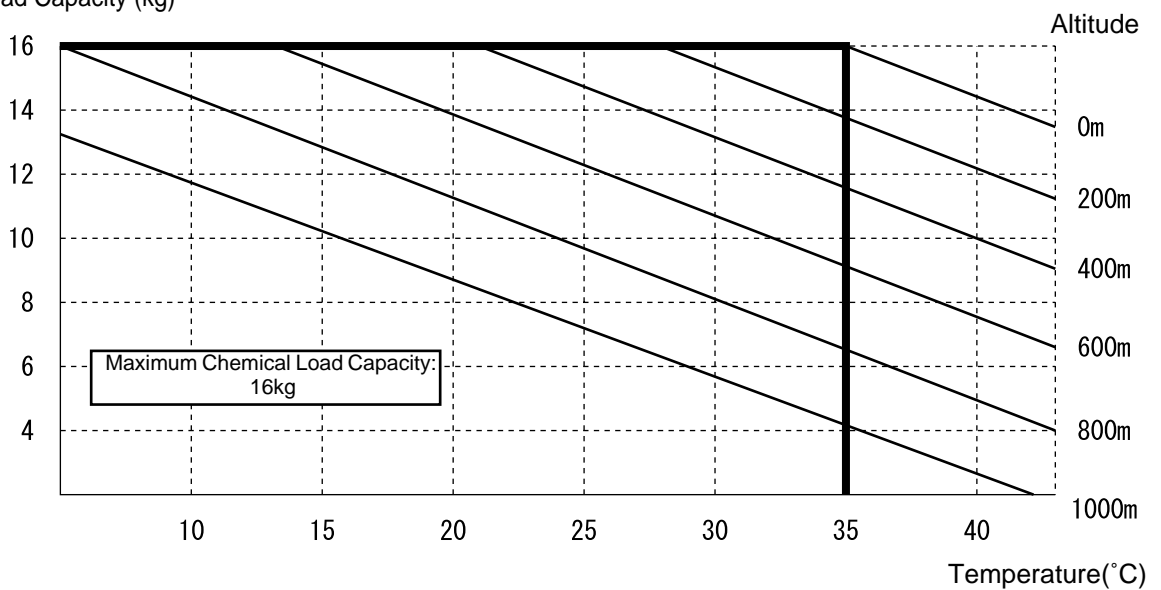
This graph is not intended to guarantee the payload performance of the helicopter. The actual payload values could differ from this graph, depending on the helicopter's conditions, operation conditions, humidity, oxygen concentration, and other factors.

How to Read the Payload Graph

(Example)

Reference value for payload in an agricultural field at temperature 35 °C, altitude 0 m: 16 kg

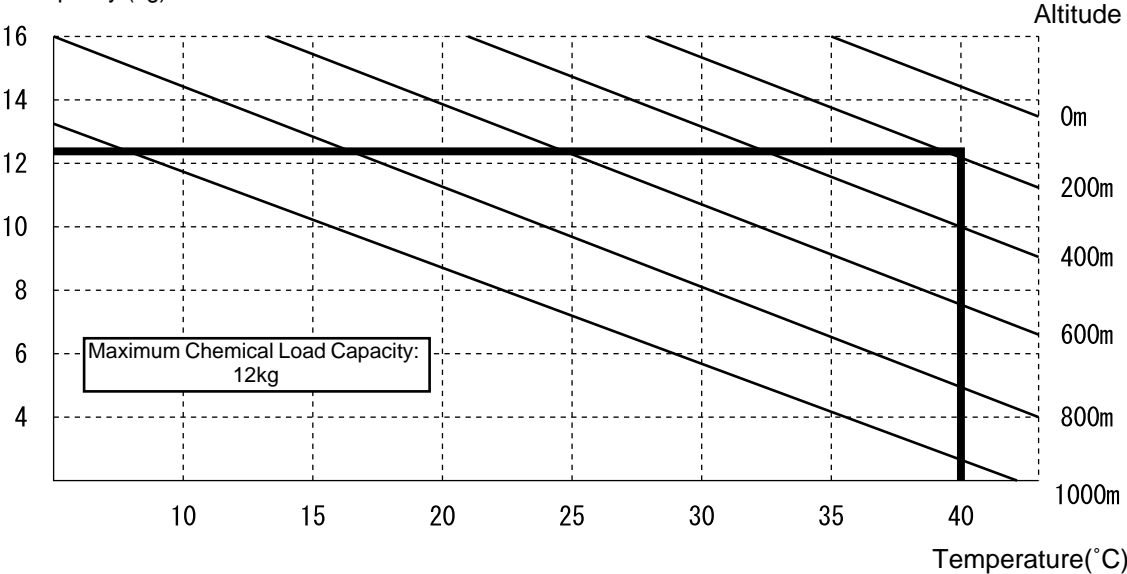
Chemical Load Capacity (kg)



(Example)

Reference value for payload in an agricultural field at temperature 40 °C, altitude 200 m: Approx. 12 kg

Chemical Load Capacity (kg)



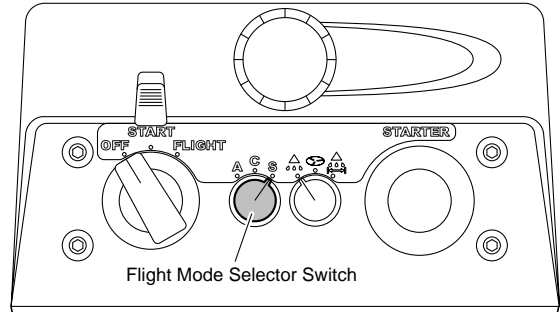
Selecting the Flight Mode

Before a flight, turn the “flight mode selector switch” to the flight mode that you wish to use.

- To use the A or AG mode, turn the switch to “A”.
- To use the C or CG mode, turn the switch to “C”.
- To use the S or SG mode, turn the switch to “S”.

TIP

Do not operate the flight mode selector switch during a flight.



		YACS Control Switch		YACS control switch ON + GPS control switch ON
Flight Mode Selector Switch	“OFF” Push 	“ON” Release 		
S 	Manual Mode Control support is unavailable in this mode. Use this in emergencies only.	S Mode Compared to the C mode, the S mode provides greater control support to ensure safety of the helicopter.	SG Mode Move the stick only as much as you wish to fly, and release it to stop the movement. Thus, this mode allows you to operate with peace of mind. It can be used only for flying forward or backward.	
C 		C Mode This standard flight mode uses the YACS control to balance the helicopter’s stability and flying comfort.	CG Mode In addition to the flying characteristics of the C mode, this mode provides hovering stability through GPS control.	
A 		A Mode This mode has less control support than the C mode, allowing the operator to assume more control.	AG Mode In addition to the flying characteristics of the A mode, this mode provides hovering stability that is lower than the CG mode.	

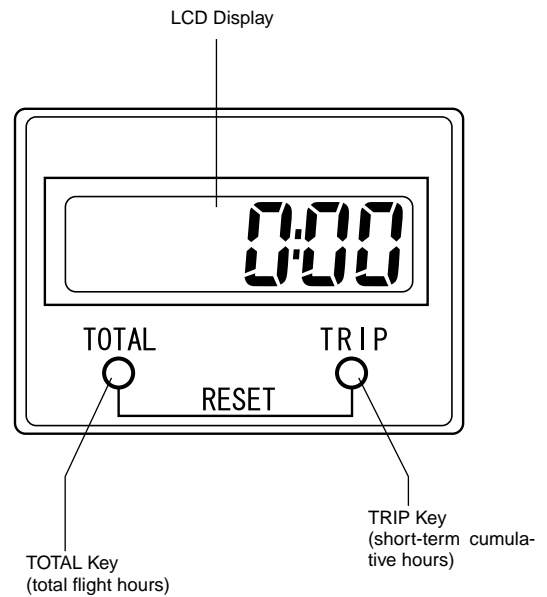
Displaying and Recording Flight Hours

The hour meter on the control panel displays and records the engine's flight hours.

- ① **TOTAL:** Displaying the total flight hours
Press the TOTAL key to display the helicopter's total flight hours, which can serve as guidelines for changing oil or performing periodic inspections.
- ② **TRIP:** Displaying the day's flight hours
Press the TRIP key to display the logged flight hours since the last time it was reset.
- ③ **TRIP:** Resetting the day's flight hours
After the number of TRIP hours appears on the display, simultaneously press the TOTAL and TRIP keys to reset the number of hours to "0".

TIP

Make sure to enter the flight hours in the flight inspection log.

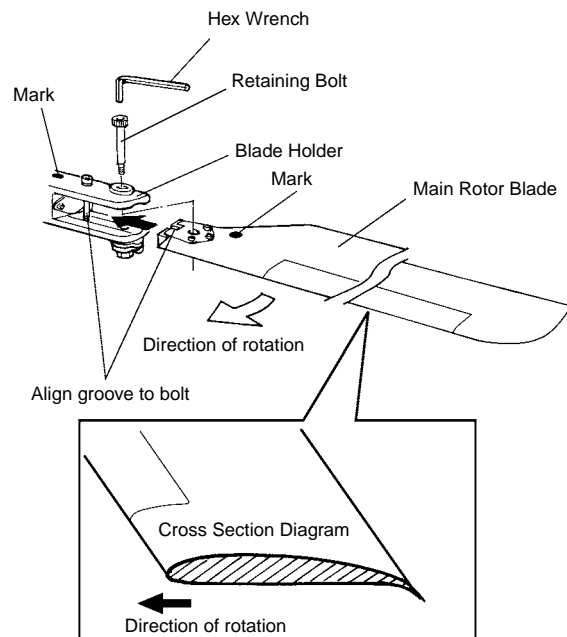


Installing and Removing Main Rotor Blades

How to Install Main Rotor Blades

- ① Insert the main rotor blades into the main blade holder.

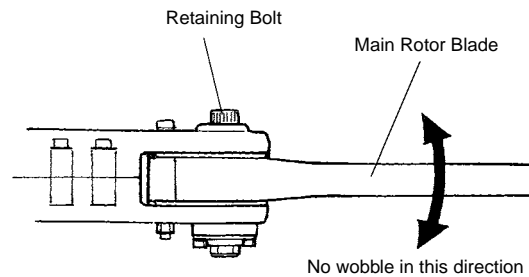
NOTICE
<ul style="list-style-type: none"> ● There are two main rotor blades: right and left. Install them by matching the color of the mark of the respective main rotor blade to the blade holder. ● Each main rotor blade has a top and bottom. Install it so that its leading edge is oriented in the direction of rotation as shown in the cross section diagram. ● Check that the main rotor blades are free of debris such as pollen or bugs before installing them.



- ② Use an 8mm hex wrench to tighten the retaining bolts. Check the tightening of the retaining bolts as follows:

- Tighten each retaining bolt until it comes to a stop. Then, back it out between 45° to 90°. Make sure it is not tightened or loosened excessively, which could cause vibrations.

TIP
<ul style="list-style-type: none"> ● The main rotor blades are properly installed if their retaining bolts do not wobble when the blades are moved vertically, and if they move smoothly in the direction of rotation when a small force is applied. ● Tighten both rotor blades to approximately the same amount of torque.



- Check that the main rotor blades move smoothly by moving them slightly in the direction of rotation. They are designed to stop by coming in contact with rubber stops if they are moved extensively.

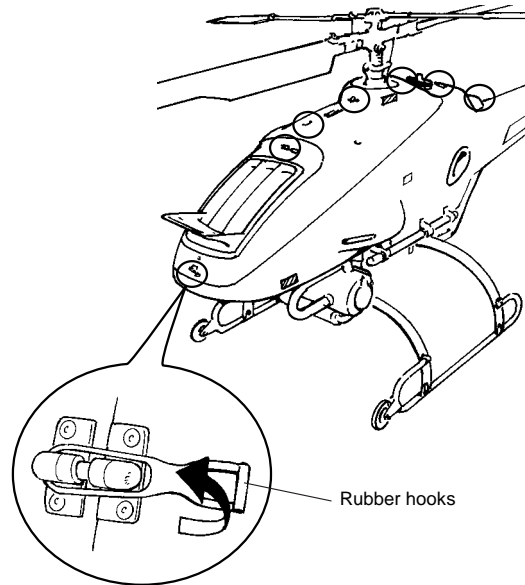
How to Remove Main Rotor Blades

Remove the main rotor blades in reverse order of installation.

Installing and Removing Side Covers

How to Remove Side Covers

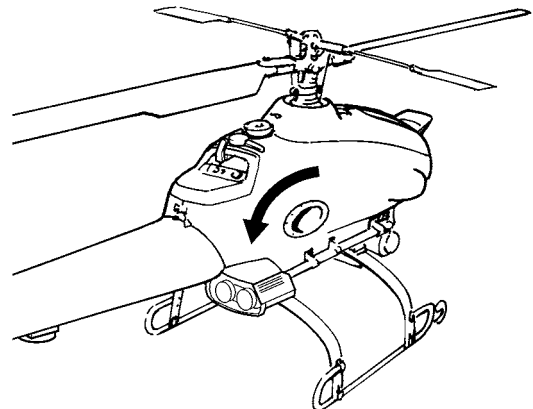
- ① Undo the 7 rubber hooks that are located along the top of the helicopter by lifting them towards the left.



- ② Open the side covers from side to side.

TIP

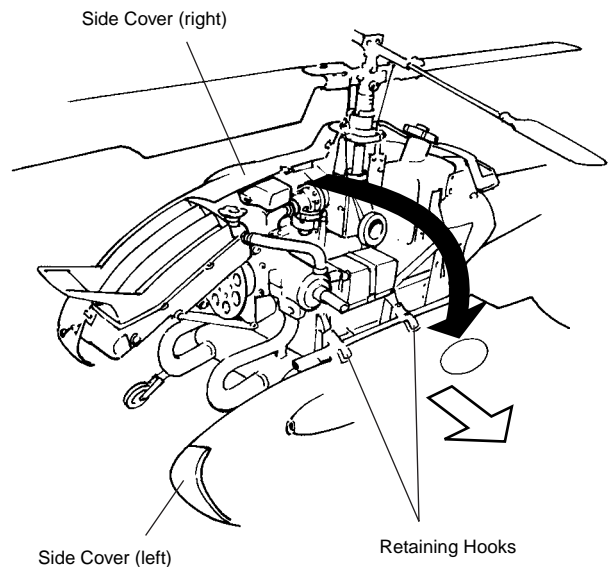
- Tilt the sprayer antenna towards the rear before opening the right side cover.
- Make sure the side cover does not get caught on the starter lever or the fuel tank cap.



- ③ To completely remove a side cover after it is open, hold the retaining hooks to pull the side cover sideways and remove it from the frame.

NOTICE

Do not hold a side cover during removal, as this could lead to damage.



How to Reinstall Side Covers

Reinstall the side covers in reverse order of removal.

TIP

- Place the right and left side covers and lock them in place by engaging the 7 rubber hooks.
- After the right side cover is closed, return the sprayer antenna to its original position.

Pre-flight Inspection

To ensure safe and efficient operation of the helicopter, make sure the operator performs the pre-flight inspection. In addition, enter the results in the flight inspection log.

WARNING
To prevent injury, make sure the engine is stopped before performing an inspection.

	Inspection Point	Inspection Items	Flight	
			Pre	Post
1	Transmitter	<ul style="list-style-type: none"> • Battery Level • Operation • Antenna installation 	<input type="radio"/>	
2	Fuel	<ul style="list-style-type: none"> • Level • Leakage 	<input type="radio"/>	<input type="radio"/>
3	Coolant, oil	<ul style="list-style-type: none"> • Level • Leakage 	<input type="radio"/>	<input type="radio"/>
4	Rotor blades	<ul style="list-style-type: none"> • Dirtiness, damage • Movement 	<input type="radio"/>	<input type="radio"/>
	Air cleaner	<ul style="list-style-type: none"> • Dirtiness 		<input type="radio"/>
5	Servo, linkage (rudder, throttle)	<ul style="list-style-type: none"> • Operation • Wobble 	<input type="radio"/>	<input type="radio"/>
6	Self monitor	<ul style="list-style-type: none"> • States of lighting 	<input type="radio"/>	<input type="radio"/>
7	Radio signal distance test	<ul style="list-style-type: none"> • Radio signal reach 	<input type="radio"/>	
8	Tail rotor drive belt	<ul style="list-style-type: none"> • Tension • Abnormal noise • Wear, damage • Refuel 	<input type="radio"/>	<input type="radio"/>
	GPS system	<ul style="list-style-type: none"> • States of lighting 	<input type="radio"/>	
	Antenna	<ul style="list-style-type: none"> • Installation state • Rust 		<input type="radio"/>

Transmitter Inspection

Inspect the flight transmitter battery level, operation, and antenna conditions.



WARNING

If the transmitter has a malfunction or the battery level is low, the transmitter will be unable to send radio signals during a flight.

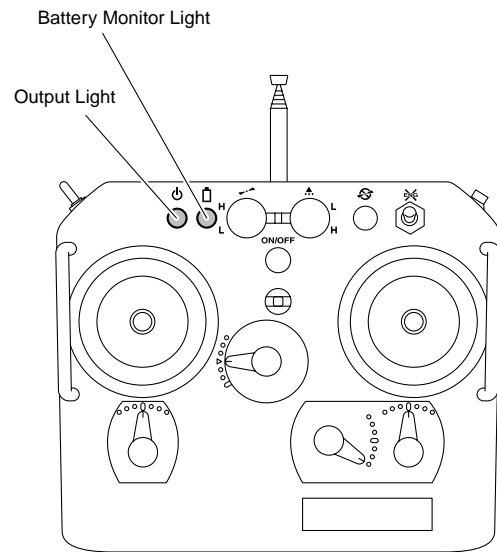
① Battery Level Inspection

With the main switch on the helicopter turned OFF, turn the power to the transmitter ON to perform the following inspections:

- Check that the output light is ON.
- Listen to the buzzer for the number of beeps that indicates the battery level.

Beep beep beep beep	(4 times)	} Fully charged
Beep beep beep	(3 times)	
Beep beep	(2 times)	Requires charging.
Beep	(1 time)	Inoperable unless charged.

- Check that the battery monitor light is not illuminated.
This light operates in unison with the number of beeps of the buzzer. It flashes when the battery level is low. Afterwards, it will illuminate to warn the operator. This condition indicates that the battery level is almost empty, and it should be replaced with a fully charged battery.



② Transmitter Operation Inspection

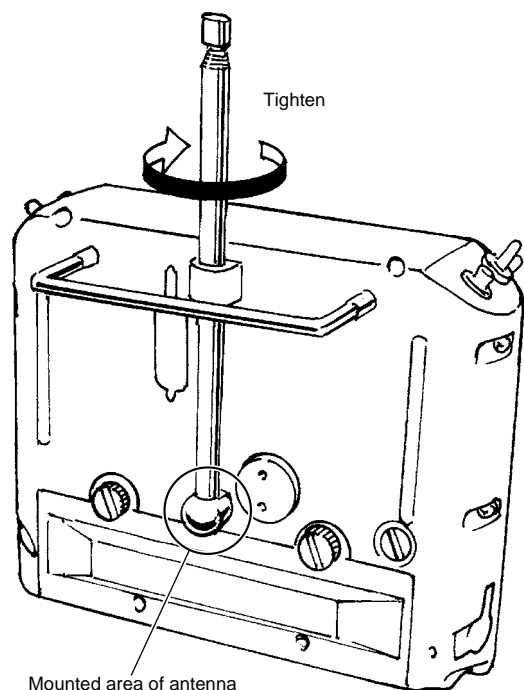
When the power of the transmitter is turned ON, apart from the buzzer sounding to indicate the battery level, if the buzzer beeps in a 3-3-7 pattern or the output light does not illuminate, the transmitter may be malfunctioning. If this occurs, cancel the flight and request a repair by your dealer.

③ Antenna Inspection

Inspect the antenna to make sure it is not loose in the area where it is mounted to the transmitter. Extend the antenna and inspect it for looseness or rust.

If the antenna is loose in the area where it is mounted, tighten the antenna.

If the antenna is loose or rusted, replace the antenna.



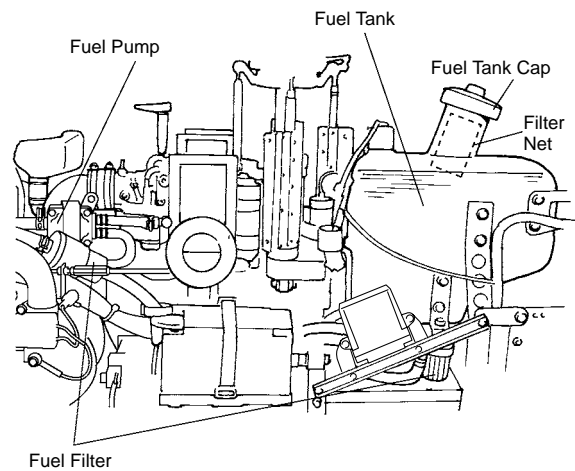
Fuel Inspection

Inspect the fuel level and check for any leaks.

Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

① Fuel Level

Visually check the fuel level in the fuel tank. During refueling, do not remove the filter net.



② Fuel Leak

Inspect the following areas to make sure there are no fuel leaks:

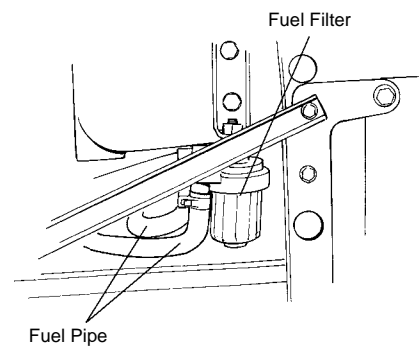
- Fuel Tank
- Fuel Tank Cap
- Fuel Filter
- Fuel Pump
- Fuel Lines

If you discover a fuel leak, immediately cancel the flight and request a repair by your dealer.



WARNING

- To prevent fires, stop the engine and keep the helicopter away from any source of sparks or fire during refueling.
- Fuel leakage could lead to a fire.



Coolant and Oil Inspections

Inspect the coolant level and check for any coolant or oil leakage.

Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

① Recovery Tank

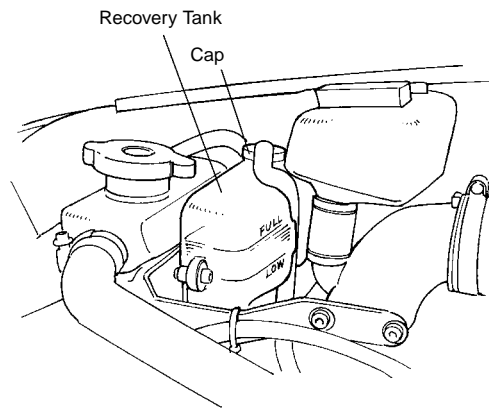
Inspect the tank cap for any coolant leakage. Also, check the coolant level.

The standard coolant level is between the FULL and LOW marks indicated on the recovery tank.

Coolant Preparation

Coolant: Dealer-specified coolant

Mixing ratio: Dealer-specified ratio



⚠ WARNING

Coolant is toxic, therefore use caution when handling it.

- If it enters your eye, flush it thoroughly with water, and seek medical attention.
- If it contacts your skin or clothing, promptly rinse with water and wash with soap water.
- If swallowed, induce vomiting and seek medical attention.

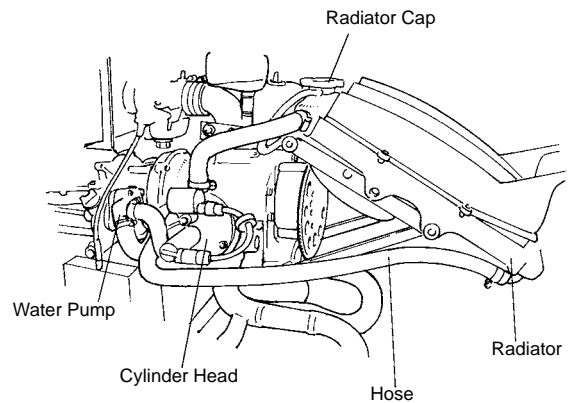
NOTICE

Use tap water, instead of well water or natural water that contains sodium.

② Water Pump

Inspect the mating surface of the housing cover, rubber hoses, and rubber hose connections for any coolant leakage.

During the initial stage of helicopter operation, the water pump may leak a small amount of coolant (10 to 20cc could leak from the drain hole at the bottom of the water pump, onto the absorbent pad provided on the frame). This normal condition occurs while the internal seal is being broken in. It will eventually stop with continued operation of the helicopter.



③ Radiator

Inspect the radiator cap and the rubber hose connections for any coolant leakage.

⚠ WARNING

When necessary, remove the radiator cap only after the engine has cooled down. If the radiator cap is removed immediately after the engine has been stopped, when the coolant is extremely hot, the scalding liquid could shoot out and cause burns.

④ Engine

Inspect the mating surface of the cylinder body and the oil seal for any oil leakage, and the cylinder head for any coolant leakage.

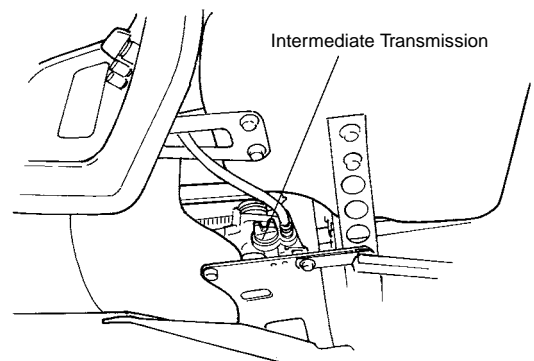
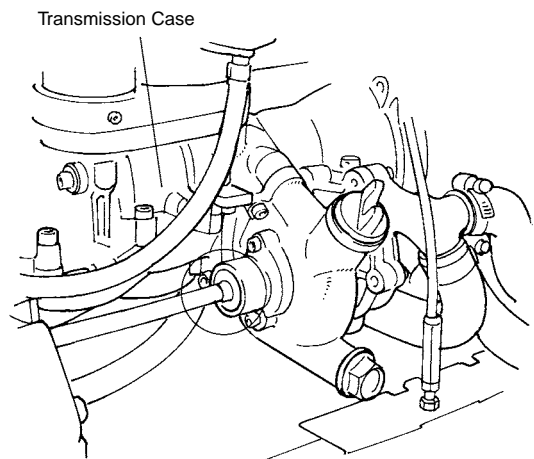
⑤ Transmission and Intermediate Transmission

Inspect the mating surface of the transmission case and the oil seal for any oil leakage.

A slight stain of coolant or oil does not indicate an abnormal condition. However, if the coolant or oil is leaking in a dripping manner, cancel the flight and request a repair by your dealer.

NOTICE

- **Coolant leakage will adversely affect the cooling performance of the helicopter and cause it to overheat.**
- **Oil leakage will reduce the internal lubrication of the transmission and damage the gears and bearings.**



Rotor Blade Inspection

Inspect the rotor blades for damage, dirtiness, and movement.

Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

① Main Rotor Blades

- Inspect the main rotor blades' surfaces for dirtiness, fissures, cracks, or chips.
- Inspect the cushion tape for peeling or damage.
- After the main rotor blades have been installed, inspect them to make sure they rotate smoothly in both directions. (See page 4-15.)

② Tail Rotor Blades

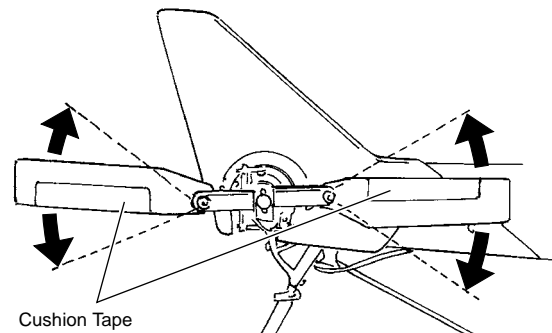
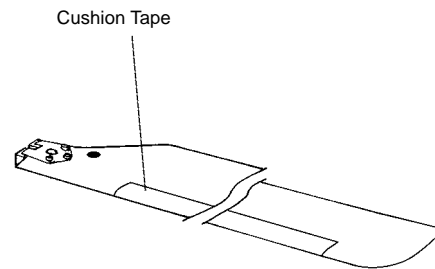
- Inspect the tail rotor blades' surfaces for dirtiness, fissures, cracks, or chips.
- Inspect the cushion tape for peeling or damage.
- Inspect the tail rotor blades to make sure they rotate smoothly in both directions.

If a rotor blade's surface is dirty, use household detergent on a soft cloth, wring the cloth, and use it to wipe the rotor blade's surface.

If the rotor blade is damaged, cancel the flight and request a repair by your dealer.

NOTICE

If a main or tail rotor blade does not move smoothly or is damaged, it could generate noise or vibration.



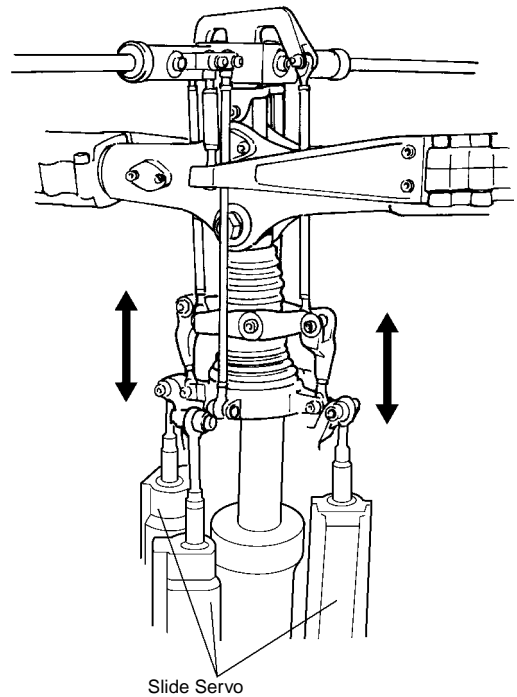
Servo and Linkage Inspection

Inspect the servos and linkages for proper operation.

Before performing this inspection, turn the power switch for the transmitter to ON and the main switch for the helicopter to START.

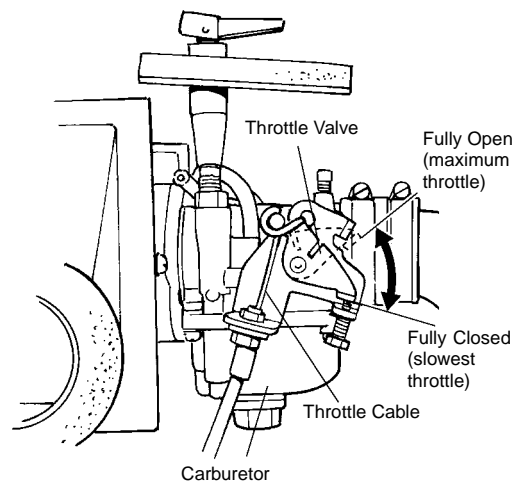
① Slide Servo and Linkage Inspection

Inspect the servos and linkages to make sure they smoothly follow the movements of the throttle, elevator, and aileron sticks when the sticks are moved slowly up-and-down and side-to-side. Also, make sure the linkages do not wobble.



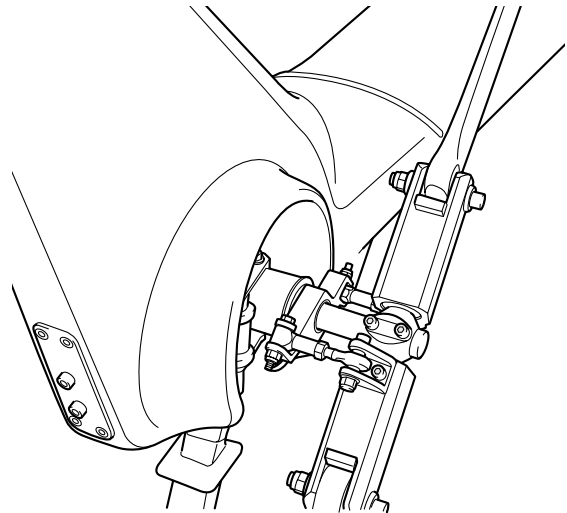
② Throttle Inspection


- Throttle fully open and fully closed
 - Move the throttle stick to its maximum position and check that the throttle valve in the carburetor moves to the fully open position.
 - Move the throttle stick to the slowest position and check that the throttle valve in the carburetor moves to the fully closed position. Keep the throttle trim lever in the lowest position.
- Throttle cable movement and play
 - Slowly move the throttle stick up and down and check that the throttle cable moves smoothly without catching.
 - Check that the throttle cable has a slight play when the throttle valve is in the fully closed position.



- ③ Rudder Servo and Linkage Inspection
 Move the throttle and the rudder sticks up-and-down and side-to-side and check that the servo and the linkage smoothly follow the movement of the sticks. Also, check that the linkage does not wobble.

If any of the servos operate abnormally or the linkages wobble, cancel the flight and request a repair by your dealer.

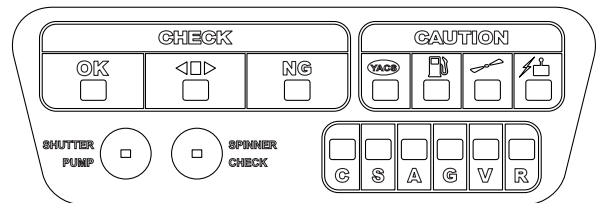


 WARNING
<ul style="list-style-type: none"> ● If the servos operate abnormally or the linkages wobble, they could adversely affect the control of the helicopter. ● If the throttle operates abnormally, it could adversely affect engine control, which could cause the helicopter to go out of control.

Self Monitor Inspection


Inspect the illumination of the indicator lights on the self monitor for proper operation.

- ① With the power for the transmitter turned ON, turn the main switch on the helicopter to START, and check that all lights illuminate for 2 seconds.
- ② After the YACS control has completed configuration, check the illumination of the indicator lights.
- Check that the “OK” flight indicator light illuminates.
 - Check that the check point indicator lights do not illuminate.
 - Check that the malfunction area indicator lights do not illuminate.



If there is a problem with the illumination of the flight indicators or check point indicators, take the appropriate actions in accordance with the table on page 3-5.

If a malfunction area indicator light illuminates, cancel the flight and request a repair by your dealer.

 WARNING
<p>Take the appropriate actions in accordance with the indicator lights. By ignoring the lights and continuing to fly, you will lose control of the helicopter and cause a serious accident.</p>

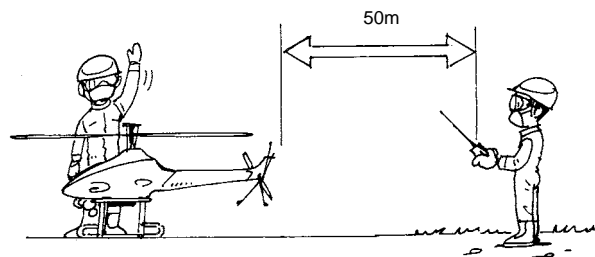
Radio Signal Distance Test

Conduct a radio signal distance test to inspect that the system is operating normally.

Before performing this inspection, turn the power switch for the transmitter to ON and the main switch for the helicopter to START.

- ① Retract the antenna of the transmitter to its shortest length.
- ② Have one person operate the transmitter while another person checks the helicopter, with an approximate distance of 50 m between the two.
- ③ Operate the transmitter and check that the servos operate accordingly. Make sure the “⚡” light of the check point indicator is not lit.

If the reach of the radio signals is less than 50 m, cancel the flight and request your dealer for repair.



WARNING

If the reach of the radio signals is too short, radio signal interference could render the helicopter out of control during flight.

Tail Rotor Drive Belt Inspection

Inspect the condition of the tail rotor drive belt and apply lubricant to the belt.

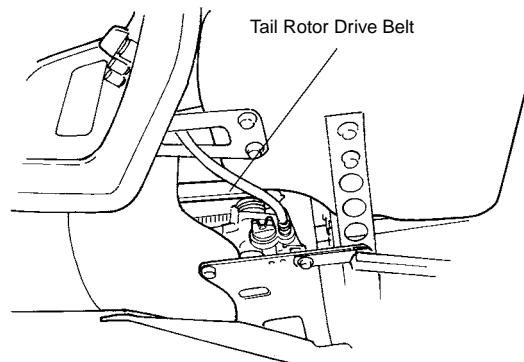
Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

- ① Inspect for looseness in the tension of the belt.
- ② Check that the belt is free of damage, abnormal wear, and noise during operation.
- ③ Apply a sufficient amount of the dealer-specified lubricant to the belt.

If there is a problem with the belt, cancel the flight and request your dealer for repair.

WARNING

If there is a problem with the tail rotor belt, it could adversely affect the actuation of the tail rotor, which could cause the helicopter to go out of control.



GPS System Inspection

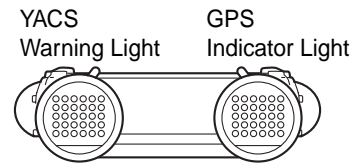
Inspect to make sure the GPS system is operating normally.

Before performing this inspection, turn the power switch for the transmitter to ON and the main switch for the helicopter to START.

Inspect the illumination of the GPS indicator light by referring to the table on 3-9 - 3-10.

If the light flashes for 3 minutes or more after the YACS control has completed configuration, this means the reception of the GPS signals may be poor. In this case, operate the flight only under YACS control. If the GPS indicator light does neither illuminate nor flash, the GPS system may have failed. In this case, request your dealer for repair.

If the power for the flight transmitter is OFF, the light will stop illuminating in 1 minute, but this condition is normal. Turn the power for the flight transmitter ON.



Flying Procedure

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Flying Procedure

Flying Precautions

This section summarizes the precautions for a series of operations from takeoff to landing, as well as for handling the helicopter. Some of the contents may overlap the instructions given at the Academy.

DANGER

Never approach (or allow others to approach) within 20 m of the helicopter until the main rotor has come to a complete stop and the engine has stopped. Entering within 20 m of the helicopter could cause a serious accident.

Preparation - Takeoff

WARNING

- Do not take off or land on sloping terrain, as this could cause the helicopter to overturn, or adversely affect its control. As a rule, the helicopter should take off and land on a level surface. Make sure to select an appropriate location before commencing a flight.
- Select areas that are appropriate for takeoffs and landings, as described below. Failure to select an appropriate area could lead to an accident.
 - Select flat farm roads or vacant lots with minimal foot or vehicle traffic.
 - Check that there are no obstacles in the vicinity.
 - Check that there are no objects that could get picked up by the wind (such as mowed grass, plastic tape, plastic bags, etc.).

TIP

- Do not operate the throttle stick while the outer YACS warning light is flashing. The engine will stop if the throttle stick is moved far up.
- Do not operate the rudder excessively right before a takeoff, as this will cause the helicopter to move abruptly in the direction of the rudder after the takeoff.
- During takeoff, do not turn ON the GPS control switch, as this could cause the helicopter to not ascend straight up.

Takeoff - Hovering

WARNING

- Do not operate the sticks abruptly as this could cause the helicopter to lose balance and lead to an accident.
- For the first flight of the day, allow the helicopter to hover for 1 or 2 minutes while the engine warms up, and check that the helicopter operates normally. Failure to do so will prevent the engine from attaining the proper power, which could lead to an accident.

TIP

After takeoff, turn the GPS control switch ON while hovering. If this switch was ON during takeoff, turn it OFF while hovering, and turn it back ON.

Hovering - Flying

WARNING

- Adjust the load to leave some margin in the payload. A takeoff with the maximum payload requires maximum horsepower and careful flying technique. An excess payload at this point could lead to a serious accident. Therefore, hover the helicopter to check that there is an ample margin in payload before continuing with the flight.
- Keep the distance between the operator and the helicopter within 150 m, and the flight altitude at 3 - 4 m (from the ground or from the crop). If the distance is any greater, it will prevent the operator from monitoring the posture of the helicopter and adversely affect the signal reception conditions. For safety, further shorten the distance if there are any obstacles in the area. Failure to fly the helicopter within the maximum distance limit could lead to an accident.

TIP

- Do not turn continuously while banking in one direction for more than 10 seconds, as this will cause the helicopter to drift as if the trim has shifted.
- Do not turn in the SG mode. Because the operation method for this mode is different from other modes, the helicopter could make an unexpected movement.

Flying - Landing

WARNING

- Do not lower the throttle stick to the slowest position during a flight, as this could disrupt the engine speed control and cause the helicopter to descend abruptly.
- If the YACS warning light or the GPS indicator light shows an abnormal condition, the helicopter exhibits irregular behavior, or an unusual symptom occurs (such as vibration, sound, coolant leakage, or foul odor), immediately land the helicopter in a safe area. Continuing with the flight in this state could lead to an accident.
- Do not press the Engine Stop switch during a flight, as this will stop the engine and cause the helicopter to descend abruptly. However, to force the helicopter to land in case of an emergency, press the switch after making sure that it is safe to do so.
- Abort the flight or aerial application if poor weather conditions exist as described below. Failure to do so could pose operation difficulties, which could lead to an accident. In addition, it could adversely affect the application and the effectiveness of the sprayed chemicals.
 - Wind velocity in excess of 3 m per second at a height of 1.5 m above the ground.
 - Rain, fog, or lightning in the close vicinity.
- Observe the following until the engine has come to a complete stop after landing:
 - Do not turn OFF the power of the flight transmitter.
 - Do not take remove or replace the battery in the transmitter.
 Failure to observe these precautions will trip the failsafe device (speed control turns ON automatically), which will cause the engine to accelerate suddenly.

TIP

During a takeoff or landing, if the engine speed does not decrease even if the throttle stick is lowered to the slowest position, calmly turn the YACS control switch OFF. This symptom could occur if a takeoff operation is aborted or if there are a considerable number of landing shocks when the helicopter lands.

Engine Starting

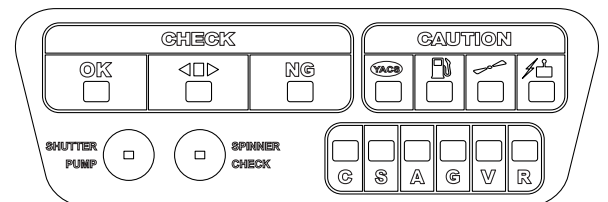
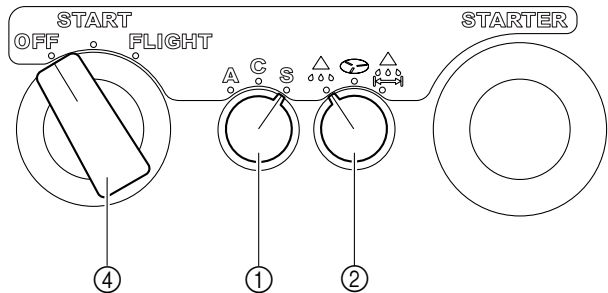
Pre-start Checks

- ① Check that the flight mode selector switch on the helicopter is set to the position that you have selected.
 - To use the A or AG mode, turn the switch to "A".
 - To use the C or CG mode, turn the switch to "C".
 - To use the S or SG mode, turn the switch to "S".

See page 4-13 for a detailed description of the flight modes.

- ② Check that the sprayer selector switch is set to the position of the sprayer that you will be using.
 - When using the liquid sprayer, turn the switch to "△" or "△△".
- ③ Extend the antenna of the transmitter and turn the power switch ON.
 - Check the battery level (the buzzer should beep a minimum of 3 times).
 - Check that the YACS control switch is ON and the GPS control switch is OFF.

- ④ Turn the main switch on the helicopter to START.
 - Check that all the lights on the self monitor illuminate for 2 seconds.
 - Check all of the lights of the temperature sensor monitoring LED.

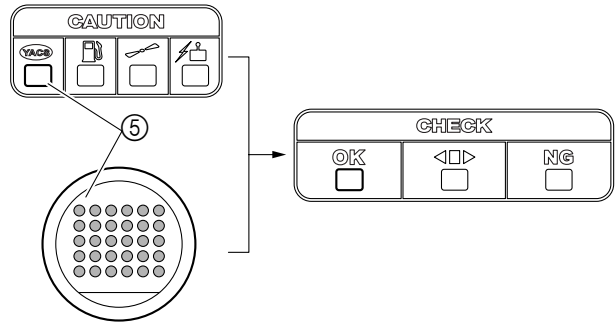


TIP

Currently, the granular sprayer is not exported.

- ⑤ The SETTING light on the check point indicator flashes approximately 3 times (for 10 seconds), and the system performs YACS control configuration and self checks.

Check that all the red YACS warning lights on the back of the helicopter illuminate during configuration.

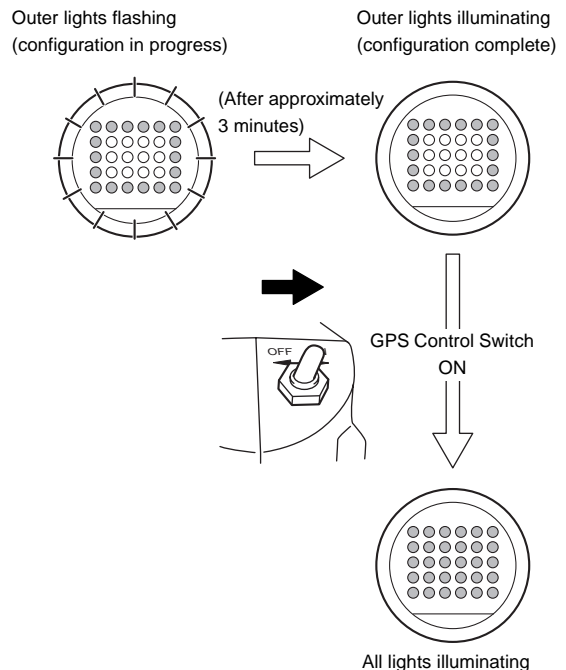


TIP

- Do not move the helicopter while the “◁□▷” light is flashing.
- Configuring the YACS control with the helicopter tilted could cause errors. Therefore, it is recommended to select a flat area for this purpose.
- If the “NG” light illuminates on the flight indicator, first turn the main switch OFF; then, turn it to START. If the “NG” light illuminates again or if the “◁□▷” light continues to flash, contact your dealer for repair.

If there are no problems, the “OK” light of the flight indicator will illuminate, indicating that the YACS control configuration has completed.

- ⑥ After the YACS control configuration has completed and the YACS warning light has turned OFF, the outer lights of the GPS indicator will flash and the GPS control configuration will start.
 - The outer GPS indicator lights will flash while GPS control is being configured.
 - The outer GPS indicator lights will change from flashing to constant illumination when the GPS control configuration has completed (which take about 3 minutes).
 - After the lights illuminate, turn ON the GPS control switch on the transmitter. Then, check that all the GPS indicator lights illuminate.
 - After checking that all lights illuminate, turn OFF the GPS control switch.



TIP

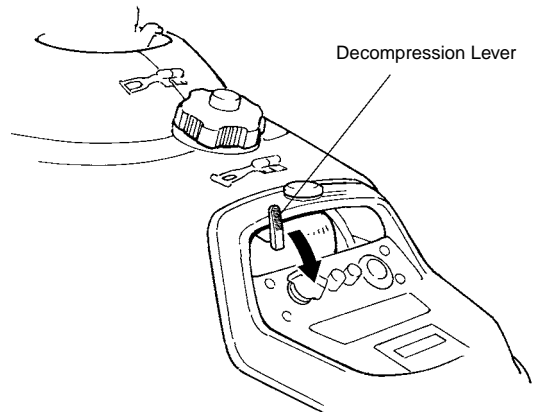
- Step ⑤ completes the pre-start checks if you will not be using GPS control or if you will be using it later during the flight.
- The length of time it takes to complete the GPS control configuration varies according to GPS signal reception. If it takes too long (the lights do not illuminate after 3 minutes), you will not be able to use GPS control in the AG, CG, or SG mode. Operate the helicopter under YACS control until the signal reception improves, which will be indicated by the illumination of the outer lights.

Engine Starting

- ① Pull and tilt the decompression lever on the control panel.

TIP

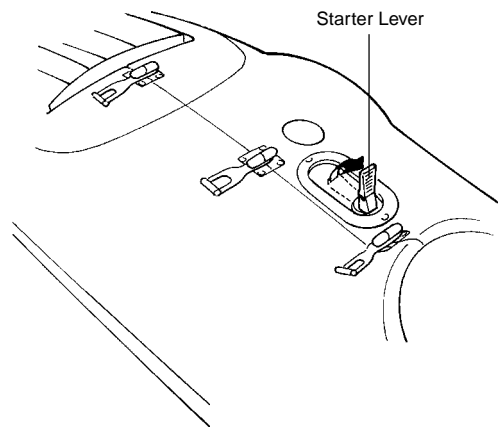
Attempting to start the engine without operating the decompression lever could cause the engine not to start or accelerate the wear of the battery and the starter motor.



- ② Pull and raise the starter lever on the side cover as needed.

TIP

- Use the starter lever if the engine is cold.
- Do not use the starter lever if the engine is warm, such as restarting after a flight.



- ③ Check that the elevator trim lever, rudder trim lever, and aileron trim lever are in center position.



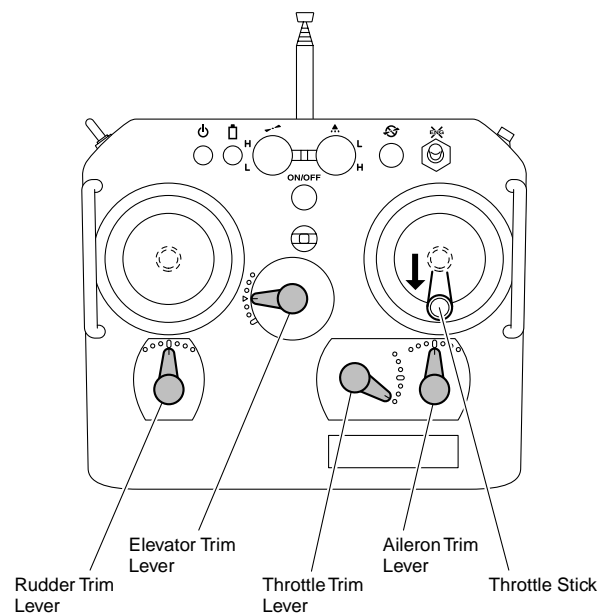
WARNING

If the elevator trim lever, rudder trim lever, and aileron trim lever are not in center position, the helicopter might not ascend straight up at takeoff.

- ④ Make sure the throttle stick on the transmitter is in its slowest position.

TIP

At this time, keep the throttle trim lever set to the lowest position.



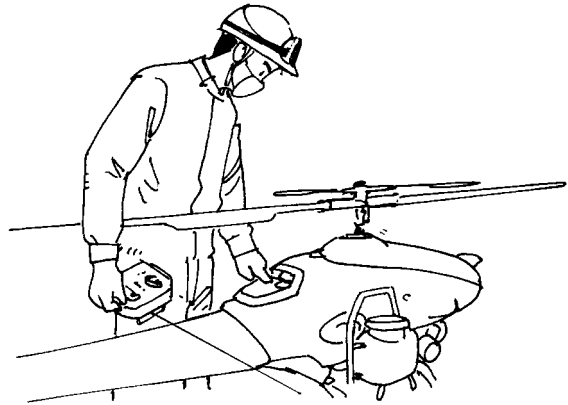
- ⑤ Stand on the left side of the helicopter, and while securely supporting the main rotor, keep the throttle stick at the slowest position with your right thumb, and press the starter switch with your left hand.

⚠ WARNING

Support the main rotor with your body as shown in the illustration. Otherwise, the rotor could strike and injure you if the helicopter is improperly adjusted (such as the idle speed being too high or the clutch being engaged).

TIP

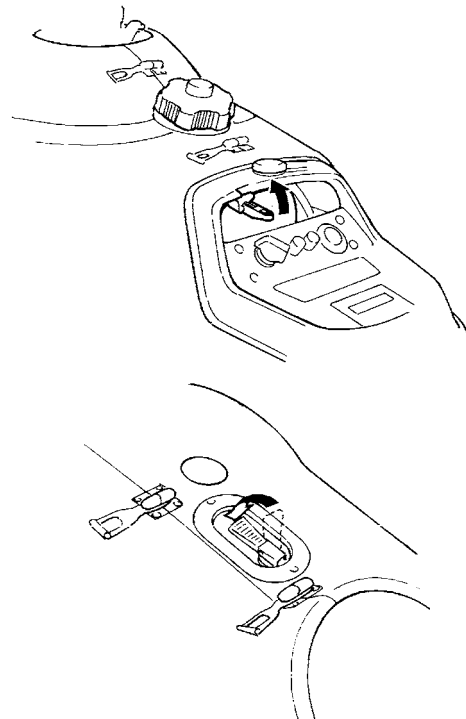
- If the engine does not start within 5 seconds after pressing the starter switch, wait about 10 seconds to allow the battery voltage to recover. Then, press the starter switch again.
- The safety device will trip and prevent the starter motor from operating if any of the following conditions have not been met:
 - Main switch is in the START position.
 - The power switch of transmitter is ON.
 - The throttle stick of the transmitter is in the slowest position.



- ⑥ After the engine has started, return the decompression lever and the starter lever to their original position.

⚠ WARNING

- Failure to return the decompression lever to its original position will decrease engine performance, which could lead to an accident.
- Failure to return the starter lever will prevent the engine speed from increasing, cause the spark plugs to become fouled, the engine to stop during flight, and lead to an accident.



- ⑦ After the engine speed has stabilized, turn the main switch to the FLIGHT position.

⚠ DANGER

- Before turning the main switch to FLIGHT, check again that the throttle stick on the transmitter is in its slowest position. If the throttle stick is raised, the main rotor or the tail rotor could spin and cause a serious accident.
- The safety device will trip when the main switch is in the START position, preventing the engine speed from increasing above a predetermined value. If you hear an abnormal sound from the engine, do not turn the main switch to the FLIGHT position. Instead, turn it OFF and check the areas that are possibly affected.

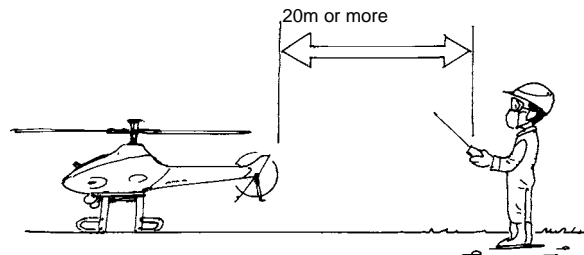
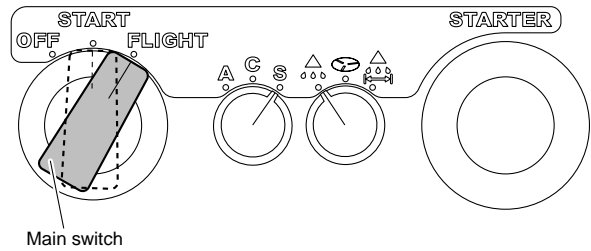
NOTICE

Leaving the engine idling for more than 1 minute could stain the spark plug, or decrease the cooling performance of the engine.

- ⑧ While making sure that the throttle stick does not rise, quickly walk away from the helicopter, to a minimum distance of 20 m.

⚠ DANGER

Never turn your gaze away from the helicopter when walking away from it.



Takeoff Precautions and Checks

Takeoff Procedure

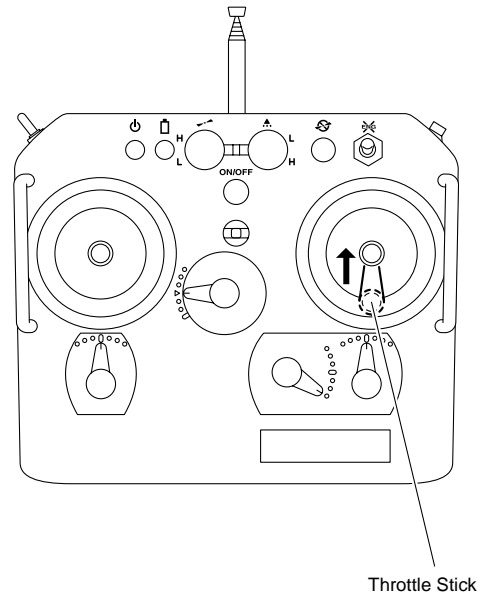
- ① Start the takeoff operation after the outer YACS warning lights have finished flashing, and all lights are OFF.
- ② Gradually raise the throttle stick to enable the control to automatically increase the engine speed.
- ③ Slowly move the throttle stick up to take off.

⚠ WARNING

Do not operate the sticks abruptly as this could cause the helicopter to lose balance and lead to an accident.

TIP

- If the throttle stick is moved far up while the outer YACS warning lights are flashing, the engine will stop.
- Do not operate the rudder excessively right before a takeoff, as this will cause the tail to move abruptly in the direction of the rudder during a takeoff.
- During takeoff, do not turn ON the GPS control switch, as this could cause the helicopter to not ascend straight up.



Post-Takeoff Checks

Perform the following checks:

- ① While the helicopter is hovering, make sure the helicopter behaves normally in response to the operations of the sticks.
- ② When the sticks are kept still in their neutral position while the helicopter is hovering, the helicopter will drift front-and-back and side-to-side, depending on wind conditions. If the helicopter drifts constantly in one direction, land it in a safe area to make fine adjustments at the trim lever of the transmitter.

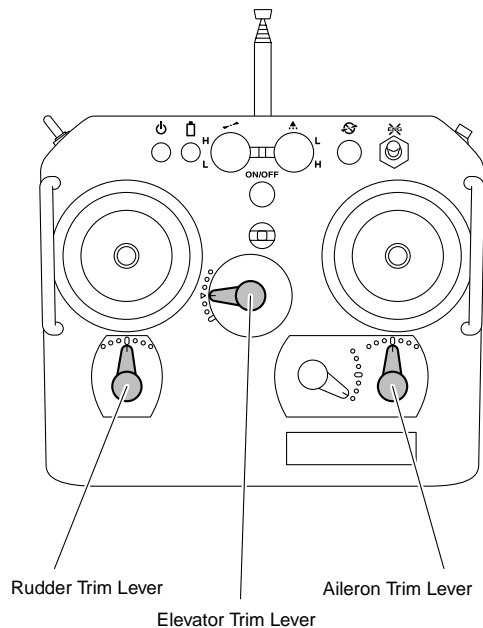


WARNING

For the first flight of the day, allow the helicopter to hover for 1 or 2 minutes while the engine warms up, and check that the helicopter operates normally. Failure to do so will prevent the engine from attaining the proper power, which could lead to an accident.

TIP

After takeoff, turn the GPS control switch ON while hovering. If this switch was ON during takeoff, turn it OFF while hovering, and turn it back ON.

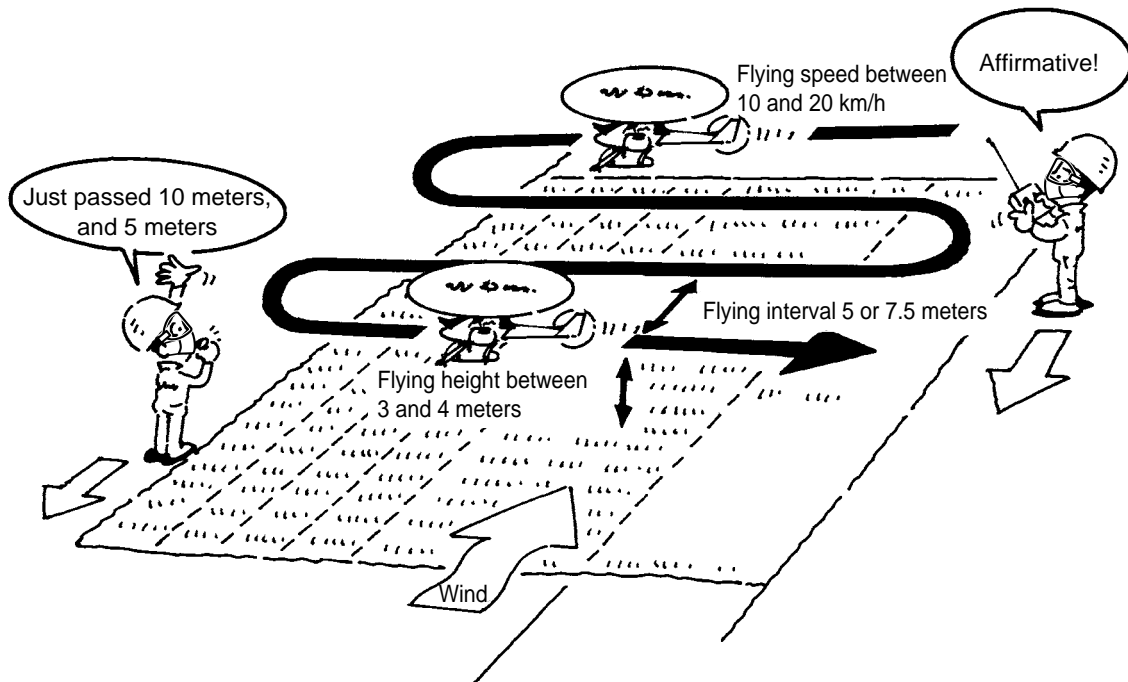


General Aerial Application Pattern

When operating an unmanned helicopter for the purpose of spraying agricultural chemicals, ensure safe operation, as well as the safety of humans, animals, agricultural products, and the environment during aerial application.

Example: Disease and pest control of a rice paddy

- Flight altitude: 3 to 4 m
- Flying speed: 10 to 20 km/h
- Flying interval: 5 or 7.5 m
- Wind velocity: 3 m/s maximum



⚠ DANGER

When performing tasks such as refueling, never approach (or allow others to approach) within 20 m of the helicopter until the main rotor has come to a complete stop and the engine has stopped. Entering within 20 m of the helicopter could cause a serious accident.

TIP

If the GPS signal reception is good, the outer YACS warning lights will illuminate if the flying velocity exceeds 20 km, regardless of the state of the GPS control switch on the flight transmitter (Velocity display function). Control the flight velocity so that the outer YACS warning lights do not illuminate.

Landing and Engine Stopping

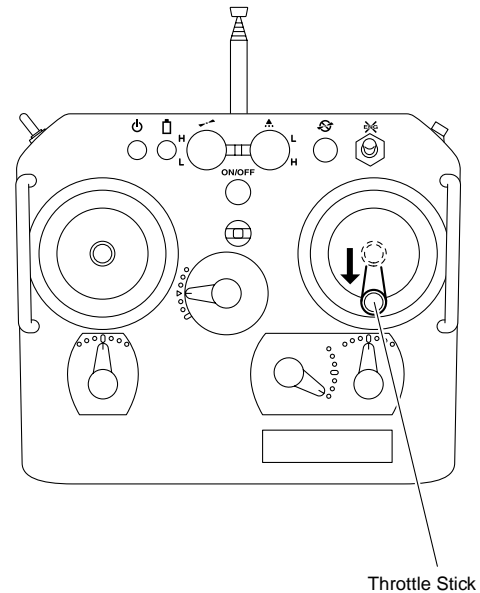
Landing

⚠ DANGER
Never allow anyone to approach within 20 m of the helicopter.

After hovering the helicopter over the landing point, gradually lower the throttle stick to land it.

After landing, turns the GPS control switch OFF.

TIP
If the engine speed does not lower within 3 seconds after landing, turn the YACS control switch OFF. This will lower the engine speed to idle.



Engine Stopping

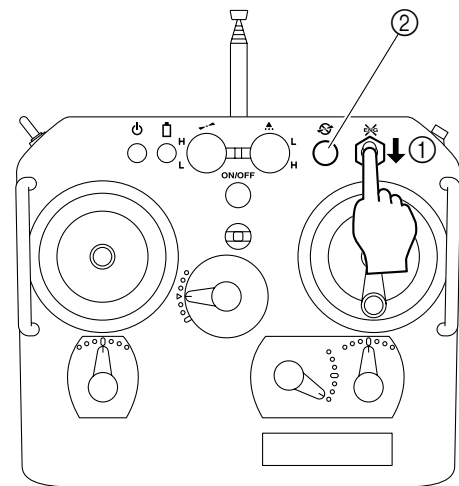
- ① After the engine speed has lowered, press down the Engine Stop switch on the transmitter until the engine comes to a complete stop.
- ② Press the Rotor Brake switch.

⚠ DANGER
Never approach (or allow others to approach) within 20 m of the helicopter until the main rotor has come to a complete stop and the engine has stopped. Entering within 20 m of the helicopter could cause a serious accident.

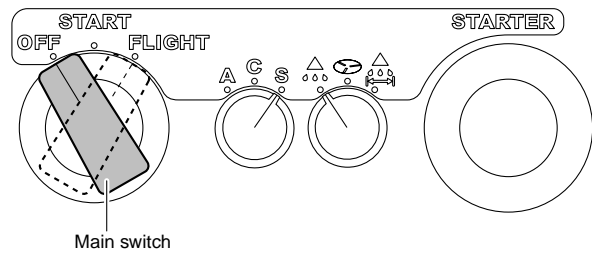
TIP

- Do not press the Engine Stop switch before the engine speed has dropped.
- The rotor brake will not apply unless the throttle stick is placed in the slowest position.

- ③ Before turning OFF the main switch of the helicopter, check the self monitor's check point indicator and the malfunction area indicator lights for any illumination or flashing.



- ④ Turn OFF the main switch of the helicopter.



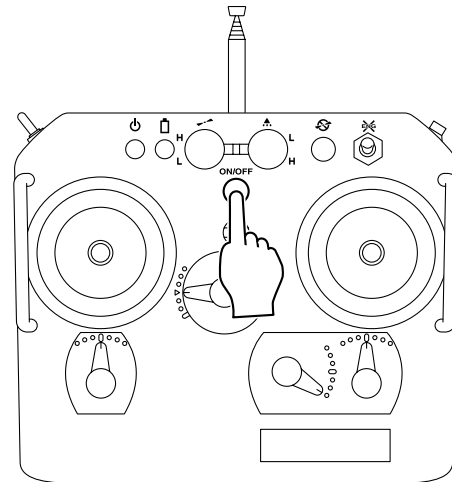
- ⑤ Turn OFF the power switch on the transmitter.

⚠ WARNING

Observe the following until the engine has come to a complete stop:

- Do not turn OFF the power of the flight transmitter.
- Do not take the battery out of the transmitter.

Failure to observe these precautions will trip the failsafe device (speed control turns ON automatically), which will cause the engine to accelerate suddenly.



Precautions for First Flight After Periodic Inspection

Fuel

After your dealer performs the complete inspection flight for the periodic inspection, the fuels are drained from the fuel tank and the carburetor, to prevent the fuel from becoming old during your storage.

When flying for the first time, create a mixed fuel with fresh gasoline purchased at a gasoline station shortly before flying (within 1 week), and refuel to maximum capacity.

NOTICE

Never use leftover fuel as it could cause the engine to stop or operate poorly.

Onboard Battery

Since the fuel has been drained, it will take a while before the fuel circulates into the carburetor.

If the engine does not start within 5 seconds after pressing the starter switch, wait about 10 seconds to allow the battery voltage to recover and the starter motor to cool down. Then, press the starter switch again.

If the rotation of the starter motor is weak, replace the onboard battery, or have your dealer recharge it with the dedicated recharger.

NOTICE

Never charge with a recharger for car batteries, or connect to a car battery using a jumper cable. The electronics (computers) in the helicopter could malfunction.

First Flight Procedure

In the periodic inspection, various parts of the helicopter are inspected, and a complete inspection flight is performed. However, when flying for the first time after a periodic inspection, at a practice session, for example, fly the helicopter gently as a means for the operator to familiarize himself with the various areas of the helicopter as well as its maneuverability.

- ① Fill up the tank with fresh fuel. Keep the chemical and water load to one half of the normal load.
- ② Perform pre-flight inspection.
- ③ After the engine starts, take off and hover no higher than 1 m above the ground for 2 minutes or longer.
- ④ Next, while hovering 2 to 3 m above the ground, fly gently with flare angle of 10 degrees or less, at a flight velocity of 10 km/h or less, for 10 minutes or longer. During this time, make sure that there is no vibration in the helicopter, abnormal sound, or other abnormal behavior in response to the various stick operations.
- ⑤ When landing for tasks such as refueling, always wait until the engine has stopped, and the main rotor has stopped rotating, then open the side cover to visually check the coolant and oil leakage.
- ⑥ After the flight, perform post-flight inspection, cleaning and servicing tasks.