# Pre-Flight Preparation

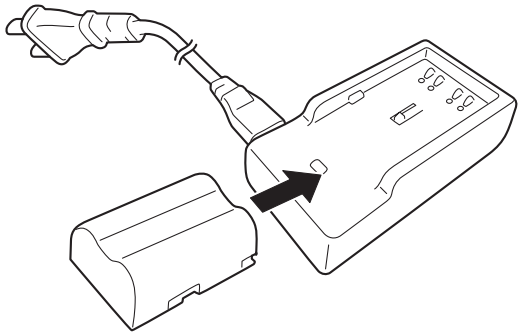
# Pre-Flight Preparation

## Day-Ahead Preparation

### Charging and replacing the flight transmitter battery

**⚠ WARNING**

**Make sure to use a fully charged battery for a flight. An insufficiently charged battery can lead to an operation failure.**



#### Charging the battery

Be sure to use the dedicated charger for charging the battery.

① Place the battery on the charger.
② Insert the power plug into the outlet. The red lamp will illuminate while charging.
③ After charging is complete, remove the battery. After the battery is fully charged, the red lamp will turn off.

Refer to the following for the battery's charging time and standard operation time.

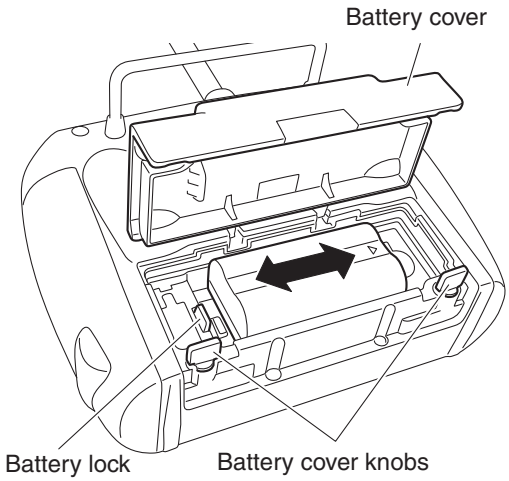
| |
|---|
| Charging temperature range: 0 to 40 °C<br>Charging time: 4 hours<br>Standard operation time: 4 hours minimum |

④ A warning lamp will indicate a warning if the battery must be replaced during flight. (See page 3-12.)

## Battery replacement

Replace the battery as follows.

① Loosen the 2 battery cover knobs behind the transmitter by turning them 90 degrees to the left.
② Open the battery cover.
③ Unlock the battery lock, slide and remove the battery to the left.
④ Insert a charged battery and slide it to the right.
⑤ Close the battery cover, and turn and tighten the battery cover knobs 90 degrees to the right.




## Battery storage

| *NOTICE* |
| --- |
| **Do not use the battery or leave it in an area exposed to direct sunlight or in other high-temperature areas such as inside a sun-scorched car.**<br>**Store it between -20 °C and 50 °C.** |

# Charging and replacing the sprayer transmitter battery (sold separately)

| *NOTICE* |
| --- |
| **Make sure to use a fully charged battery. An insufficiently charged battery can lead to a sprayer operation failure.** |

## Charging the battery

Be sure to use a dedicated charger to charge the battery. Charge it as follows.

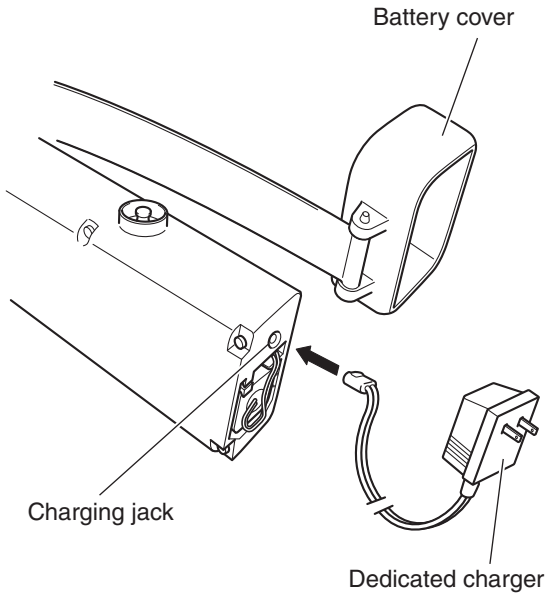
① Make sure the power switch on the transmitter is OFF.
② Remove the battery cover from the bottom.
③ Insert the charger's plug into the charging jack at the bottom of the transmitter.
④ Insert the power plug into the outlet.
⑤ The pilot lamp of the charger will illuminate, thus charging the battery.

Refer to the following for the battery's charging time and standard operation time.

| |
| --- |
| Charging temperature range: 0 to 40°C<br>Charging time: 10 hours<br>Standard operation time: 2.1 to 3.3 hours |

⑥ After charging is complete, reattach the battery cover.

| *NOTICE* |
| --- |
| **If a battery is new or has been in long storage, its operation time after the initial charge can be shorter than normal. In this case, the battery's normal performance with respect to the operation time will recover after several times of repeated charging and discharging. Please remember about this aspect during an initial use.** |



## Fuel and refueling

This product uses regular gasoline. Do not mix engine oil with gasoline.

① Have regular gasoline ready.
Use fresh gasoline purchased recently (within 1 week) from a gasoline station.

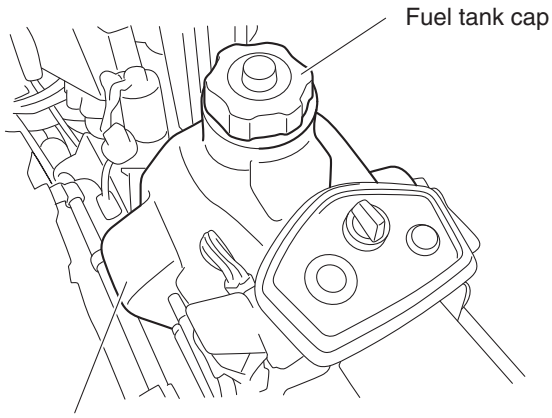
② Remove the fuel tank cap and start refueling.
Make sure the filter net is attached to the filler inlet.

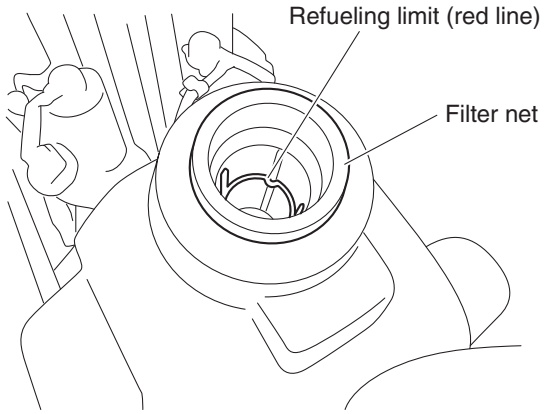
**⚠ WARNING**

- **Stop the engine before refueling and do not bring a source of fire in the vicinity.**
- **Do not pour fuel over the refueling limit (the red line marked in the filter net). Excess fuel can ooze out during flight, which is dangerous.**
- **After refueling, securely tighten the fuel tank cap.**

***NOTICE***

**The fuel can spray out of the tank during storage or transport in a vehicle with high temperature.**



# Precautions for Initial Flight Following Periodic Inspection

## Fuel

After the helicopter undergoes a test flight following the completion of a periodic inspection at the dealer, the fuel is drained from the fuel tank. This prevents the fuel from getting stale while the helicopter is being stored by the customer.
Before the customer takes the helicopter on an initial flight, fill the tank with fresh gasoline purchased recently (within 1 week) from a gasoline stand.

| *NOTICE* |
| --- |
| **Never use leftover fuel. Doing so can cause the engine to start poorly or other malfunctions.** |

## Helicopter battery

Because the tank was drained of its fuel, it will take a while for the fuel to reach the engine.
If the engine does not start within 5 seconds after the starter switch is pressed, allow the starter to rest for about 10 seconds. This is done to allow the battery voltage to recover and to cool the starter motor. Then, press the starter switch again.
If the starter motor spins weakly, replace the helicopter battery or recharge it with a dedicated charger.

| *NOTICE* |
| --- |
| **Never attempt to recharge the battery with an automobile charger or to connect it to an automobile battery through the use of booster cables. Doing so can damage the helicopter's electronic components.** |

## Initial flight procedure

A periodic inspection consists of inspecting various components of the helicopter as well as performing a completion test flight. Following a periodic inspection, an initial flight should be performed calmly, in order to "break in" the various components and to allow the operator to get accustomed to piloting.

① Fill the tank with fresh fuel. Set the chemical and water payload to 50 percent of a normal flight.

② Perform a pre-flight inspection.

③ Start the engine, take off, and allow it to hover for a minimum of 2 minutes at a maximum altitude of 1 meter above ground.

④ In the next stage, mainly hover at 2 to 3 meters above ground. Set the maximum flare angle at 10 degrees, the maximum flight speed to 10 km/h, and steer gently to fly for a minimum of 10 minutes. At this time, make sure there are no malfunctions in terms of helicopter vibration, noise, and the helicopter movement in response to the operation of the sticks.

⑤ When landing the helicopter for refueling, be sure to turn off the engine, and observe that the main rotor has stopped rotating. Then, open the side cover and visually inspect for coolant or oil leaks.

⑥ After a flight, perform a post-flight inspection, cleaning, and service.

# Handling the Helicopter

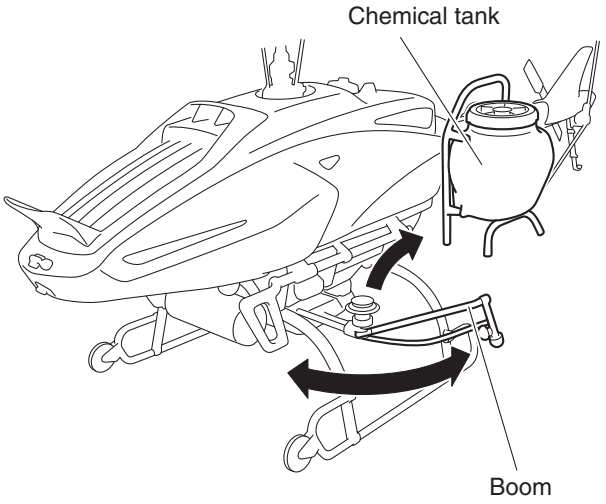
## Transporting the helicopter

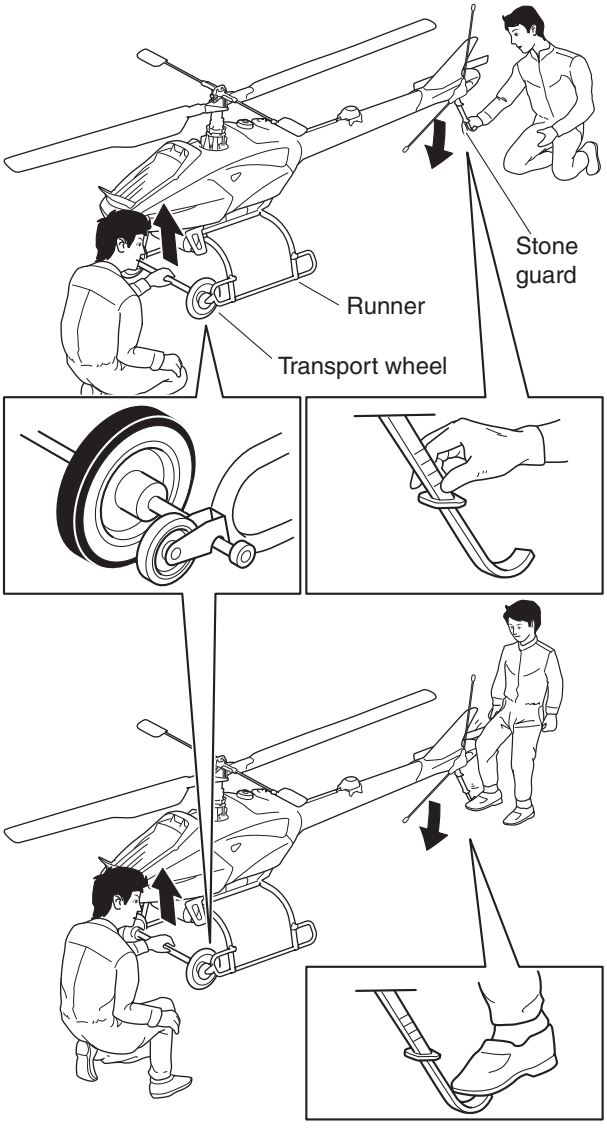
**⚠ WARNING**

- **The muffler reaches a high temperature immediately after a flight. To prevent burns, do not touch it.**
- **Be careful not to poke your eyes with the antenna or the like.**

***NOTICE***

- **Be sure to remove the chemical tank from the sprayer. If the helicopter is equipped with a liquid sprayer, fold the boom before transporting. Refer to the sprayer owner's manual for details.**
- **Make sure the main rotor blades do not come in contact with the ground or surrounding objects. Doing so will result in equipment damage.**
- **Do not hold the helicopter by the tail body, tail cover, radiator, or antenna. Doing so will result in equipment damage.**
- **Before moving the helicopter, be sure to turn the main switch OFF. Failure to do so can transmit shocking impacts to the sensors, causing the helicopter to operate unintendedly.**
- **To transport the helicopter by rolling it on the ground, be sure to attach transport wheels (sold separately).**




### Transport wheel (sold separately) installation and removal

To transport the helicopter by rolling it on the ground, attach transport wheels to the front of the runners. Installation (and removal) is performed by 2 persons as follows.

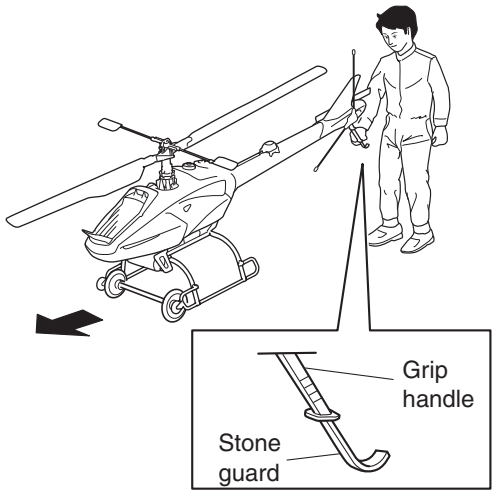
① Use your foot or hand to lower the stone guard, in order to lift the front end.

② Install (or remove) the transport wheels in the recess located between the wheel and the pipe in the front of the runner.

## Moving forward/backward

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

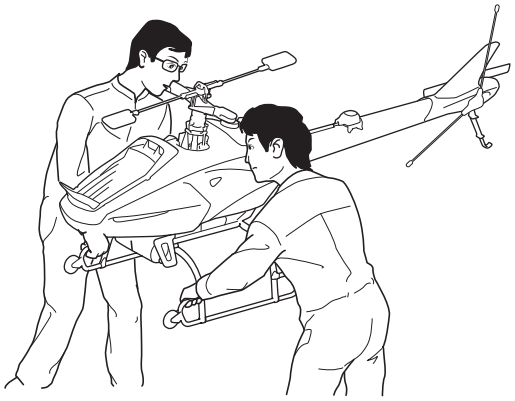
| *NOTICE* |
| --- |
| **Make sure to hold the grip handle to move the helicopter forward or backward. Do not hold the tail cover or antenna, as this could lead to equipment damage.** |




## Lifting and lowering

① 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.**<br>● **Transport carefully so as not to damage the tail rotor.** |



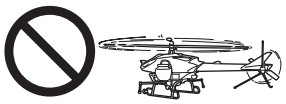
## Transporting

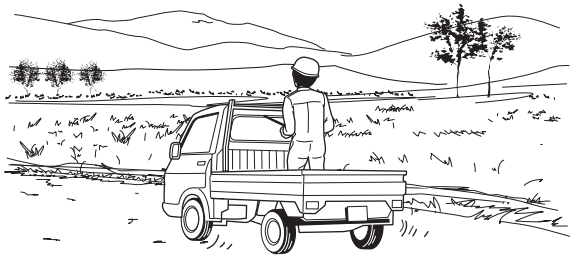
**⚠ WARNING**

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

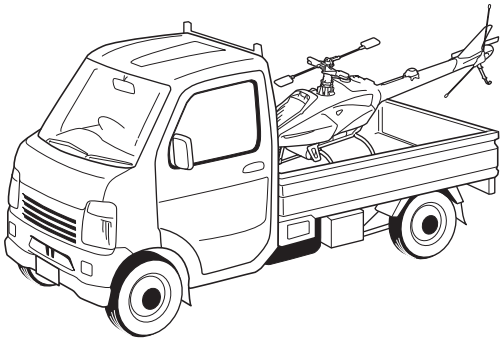
***NOTICE***

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

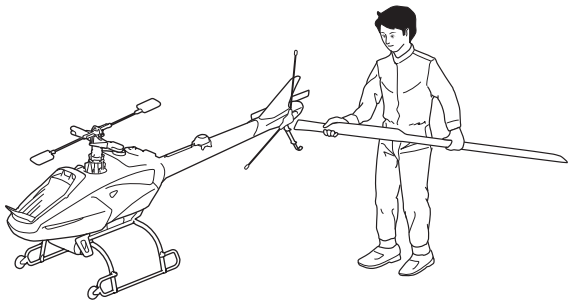




① Use a truck to transport the helicopter.

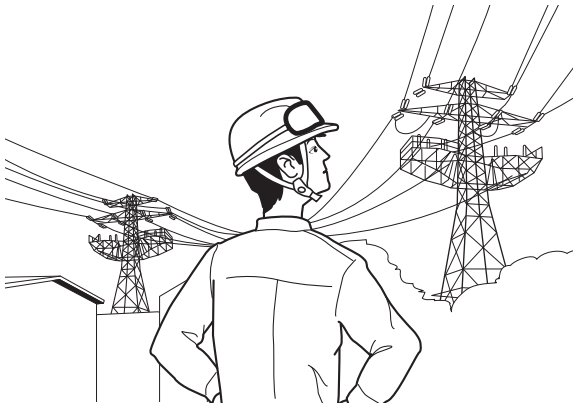


② Remove the main rotor blades before loading the helicopter on a truck bed. (Refer to page 4-12.)



## Checking radio signal interference

Because this product is operated by radio signals, the presence of radio signals with the same frequency in the vicinity will cause the signals to cross, which will adversely affect the control of the flight.
Before a flight, be sure to use a radio signal monitor, which is sold separately, 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 helicopter transmitter is turned OFF.



**⚠ WARNING**

- **The unmanned helicopter for industrial applications uses radio signals to operate. Because the helicopter can go out of control due to unexpected radio signal interference, pay particular attention to the presence of 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 an area other than an adjacent area.**

The dedicated sprayer transmitter also uses radio signals to operate the sprayer.
The sprayer could be rendered inoperable due to unexpected radio signal interference or the effects of surrounding obstacles.

## Radio signal distance test

Perform a radio signal distance test to make sure there are no malfunctions.
Before performing this test, set the transmitter power ON and the helicopter main switch ON.

① Retract the transmitter's antenna to its shortest position.

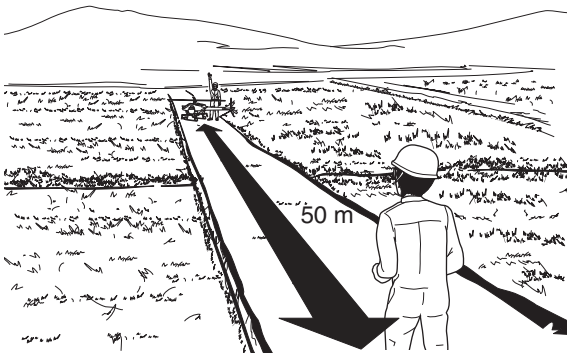
② The operator to operate the transmitter and the checker to check the helicopter should stay apart by maintaining an approximate distance of 50 meters between the helicopter and the transmitter.

③ Make sure the servos operate properly in accordance with the operation of the transmitter.

If the radio signal reaching distance is less than 50 meters, cancel the flight and contact the dealer for a repair.

**⚠ WARNING**

**If the radio signal reaching distance is too short, the failsafe mode (radio signal interference) might kick in during flight.**



# Main rotor installation and removal and tail rotor inspection

## Main rotor installation and removal

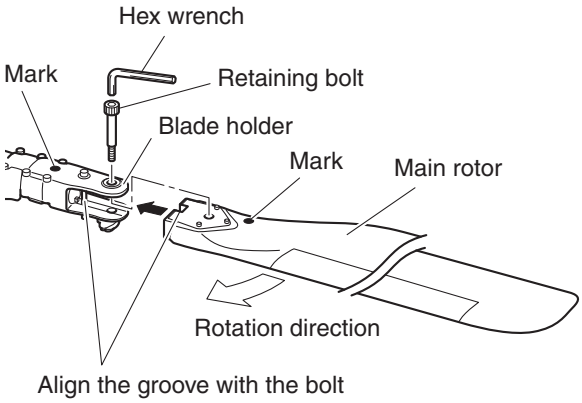
Inspect the rotor for damage or dirtiness.

## Main rotor installation

① Insert the main rotor blades into the blade holder.

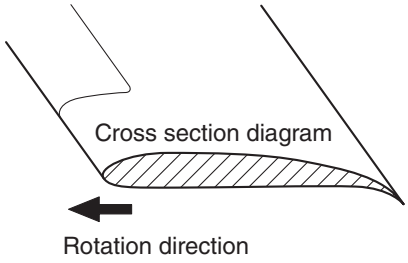
**NOTICE**

- **There are two main rotor blades: right and left. Install them by matching the color marked on 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.**
- **To prevent the top and bottom of the main rotor from being inadvertently interchanged, there is a recess in the rubber damper on the main rotor side, and a protrusion on the rubber damper on the blade holder side.**



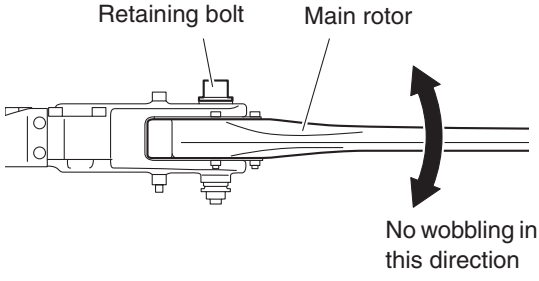

② Use an 8 mm hex wrench to tighten the retaining bolts.
Check the tightening of the retaining bolts as follows.

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

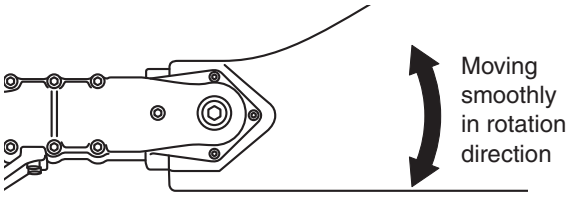



**TIP**

- **The main rotor blades are properly installed if their retaining bolts do not wobble when the blades are shaken vertically, and if they move smoothly with a small force applied in the direction of rotation.**
- **Both rotor blades should be tightened about equally.**




- 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.

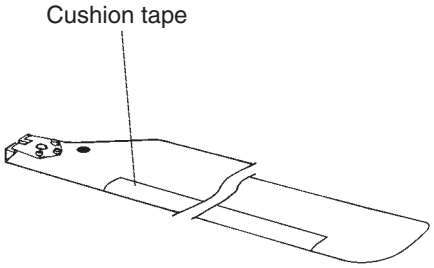


## Main rotor removal

The removal is the reverse (② → ①) of the installation.

## Main rotor inspection

- Inspect the main rotor surface for dirtiness, cracks, fissures, or chipping.
- Inspect the cushion tape for peeling or other damage.

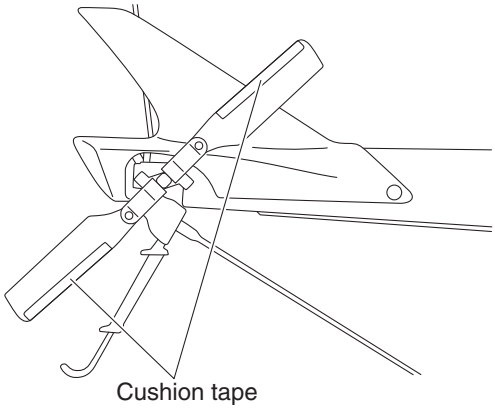



## Tail rotor inspection

- Inspect the tail rotor surface for dirtiness, cracks, fissures, or chipping.
- Inspect the cushion tape for peeling or other damage.
- Inspect that the tail rotor moves smoothly in the rotation direction.

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.**<br>● **The main rotor and the tail rotor are important components. Handle them carefully.** |



# Side cover installation and removal

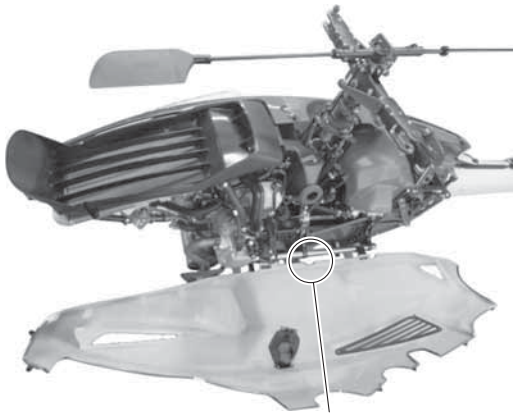
## Side cover removal

① Undo the 7 rubber hooks that are located along the top of the helicopter by lifting them as shown on the right.


② Open the side covers from side to side.

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. The side cover can break if direct force is applied to it. Open the side cover slowly so as not to scratch the side cover.** |




## Side cover installation

Reinstall the side covers in reverse order of removal.

| TIP |
| --- |
| **Reinstall the side cover by aligning the cut-out in the center of the side cover with the bracket in the center of the payload bar.** |

| *NOTICE* |
| --- |
| **Place the right and left side covers and lock them in place by engaging the 7 rubber hooks.** |

# Flying Procedure

# Flying Procedure

## Flying Precautions

### 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 paper, plastic tape, empty bags, mowed grass, etc.).**

***NOTICE***

**Do not operate the rudder extensively right before a takeoff, as this will cause the helicopter to move abruptly in the direction of the rudder after the takeoff.**

### 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.**

### 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.**

***NOTICE***

**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.**

## 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 warning 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 remove the battery in the transmitter.**

  **Failure to observe these precautions will trip the failsafe device (automatically turning the speed control ON), which will cause the engine to accelerate suddenly.**
- **Never enter the area within 20 meters of the helicopter until the main rotor has stopped completely and the engine has stopped. Also, do not allow other people to approach this area. Entering the area within 20 meters can lead to a serious accident.**

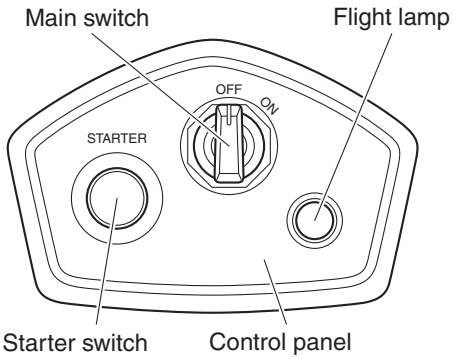
# Engine Starting

## Pre-start checks

① Check that the trim positions on the transmitter are proper, extend the antenna, and press and hold the power switch ON.
- If the amount of trim deviates greatly from the center, the buzzer will sound 3 sets of 4 beeps. When this happens, return the trim lever to its normal position.
- Be sure to charge the battery before use. Due to the nature of the lithium-ion battery, the buzzer may beep 4 times, even if the battery is not fully charged. If a low voltage warning is emitted, promptly replace or recharge the battery.

② Turn the helicopter's main switch ON.
The system performs control configurations and self checks.
Check that the flight lamps on the control panel flash regularly during configuration. Also, check that all the warning lamps on the back of the helicopter illuminate.

If there are no problems, the flight lamp on the control panel will turn off, and the warning lamp will illuminate blue, indicating that the control configuration has completed.




| *NOTICE* |
| --- |
| ● **Do not move the helicopter during configuration.** |
| ● **Configuring the control with the helicopter tilted could cause errors. Therefore, it is recommended to select a flat area for this purpose.** |

## Engine starting

① Check that the transmitter's flight switch is in the START position.

② Check that the transmitter's throttle stick is in the slowest position.

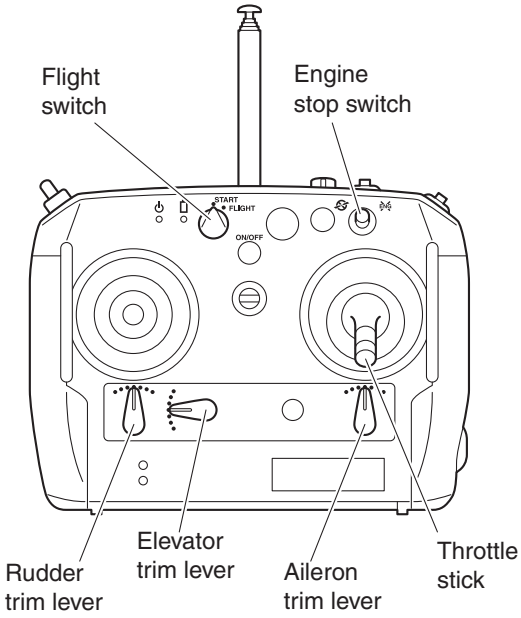
③ Check again that the elevator trim lever, rudder trim lever, and aileron trim lever are in their neutral position.

④ Press once the engine stop switch on the transmitter. The flight lamp on the control panel will illuminate, enabling the engine to start.

**⚠ WARNING**

**If the elevator trim lever, rudder trim lever, or aileron trim lever are in a position other than neutral, the helicopter might not ascend straight up during takeoff.**

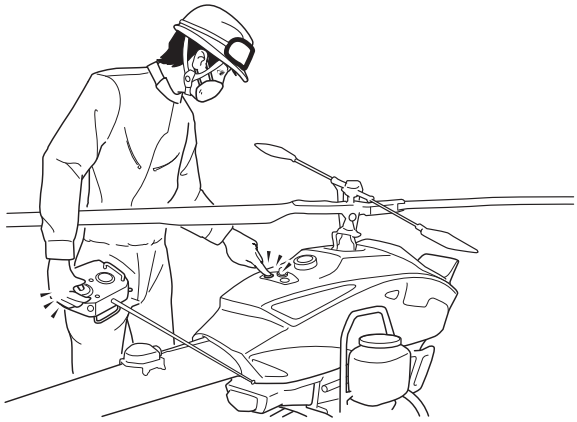
⑤ Fully check (by point and call, etc.) the surroundings for safety.



⑥ 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).**



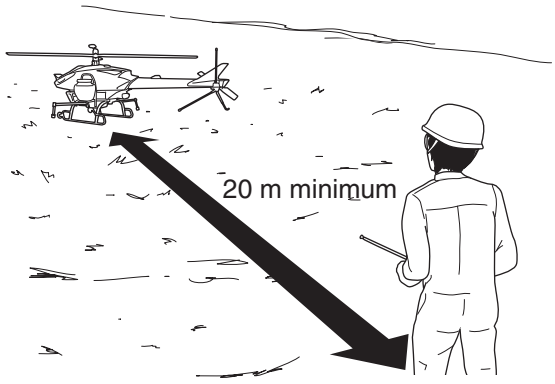
***NOTICE***

- **If the engine does not start within 5 seconds after the starter switch is pressed, allow the starter to rest for about 10 seconds. This is done 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:**
  - **The power switch of the transmitter is ON.**
  - **The transmitter's flight switch is in START position.**
  - **The throttle stick of the transmitter is in the slowest position.**
  - **The engine stop switch was pressed down previously.**

⑦ 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

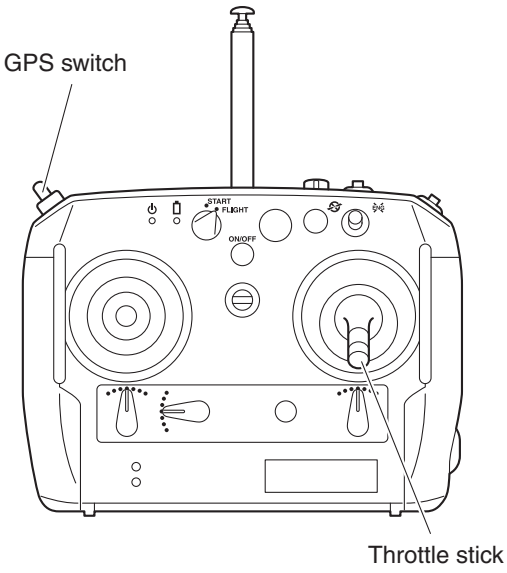
## Takeoff procedure

① To fly under speed control, turn the GPS switch ON. If the GPS switch is OFF, the flight will operate under postural control.

② Check that the throttle stick on the transmitter is in the slowest position. Then, set the flight switch to FLIGHT. The blue warning light will turn off, and the helicopter is ready to fly.

③ Gradually raise the throttle stick to enable the control to automatically increase the engine speed.

④ Slowly raise the throttle stick to take off.




**⚠ WARNING**

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

***NOTICE***

- **Do not operate the rudder extensively right before a takeoff, as this will cause the helicopter to move abruptly in the direction of the rudder after the takeoff.**
- **If speed control cannot be used due to GPS signal conditions, turn the GPS switch ON, which causes the yellow warning lamp to flash. This will render the flight to operate automatically under postural control.**

## Post-takeoff checks

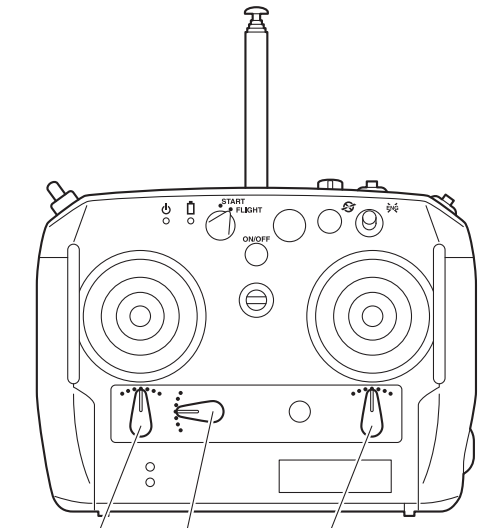
Perform the following checks:

① While the helicopter is hovering, make sure it 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.**



# Flight Modes

## Flight modes (postural control, speed control)

- This unit has 2 types of flight modes: postural control mode (GPS switch OFF) and speed control mode (GPS switch ON).
- The postural control mode is for stabilizing the posture of the helicopter, and does not stop the helicopter when the stick is in the neutral position.
- The speed control mode is for stabilizing the helicopter speed, and controls the speed during a forward or backward flight, as follows.
  - It maintains the speed at the point in time when the elevator stick is operated, causing the yellow warning lamp to illuminate. It maintains this speed even if the stick is set to the neutral position.
  - Even if the elevator stick is tilted to the maximum position, the speed will not exceed 20 km/h.
  - To stop, operate the elevator stick in the opposite direction (flare) of thrust. After the yellow warning light turns off, set the elevator stick to its neutral position. This will cause the helicopter to stop and hover.

**⚠ WARNING**

**In the speed control mode, do not continue tilting the stick to its maximum level because it is dangerous.**

# Landing and Engine Stopping

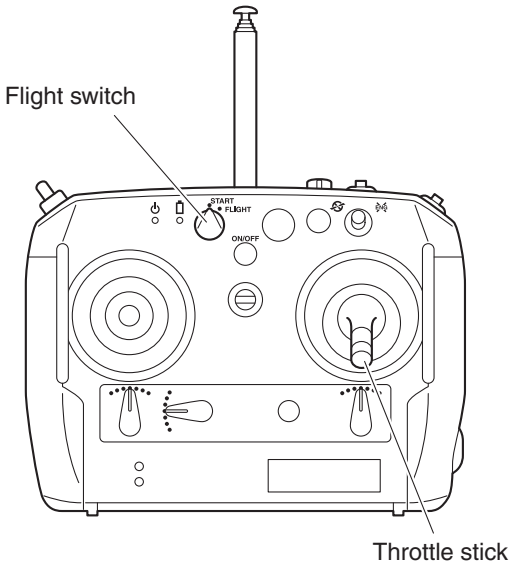
## Landing

**⚠ DANGER**

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

① After hovering the helicopter over the landing point, gradually lower the throttle stick to land it.

② The blue warning light illuminates 10 seconds after landing. To take off again without stopping the engine, set the flight switch momentarily to the START position, then to the FLIGHT position. The blue warning lamp will turn off, enabling the helicopter to fly.




## Engine stopping

① After the engine speed has dropped, press down the engine stop switch on the transmitter until the engine has come to a complete stop.

② Place the flight switch to START.

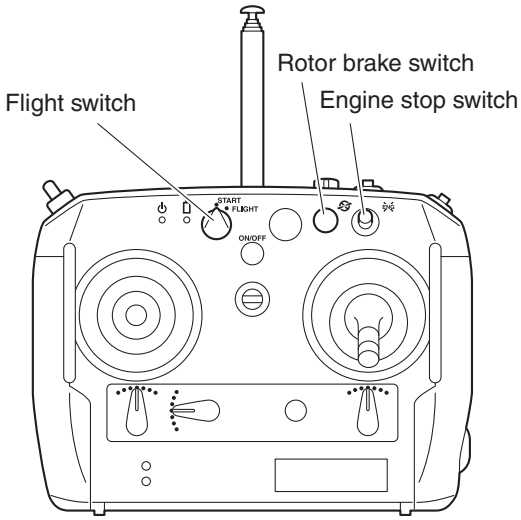
③ Press the rotor brake switch.

**⚠ DANGER**

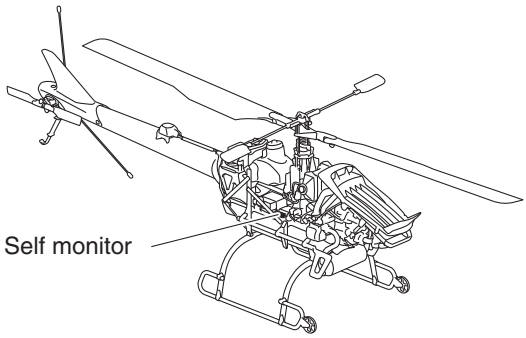
**Never enter the area within 20 m of the helicopter until the main rotor has stopped completely and the engine has stopped. Also, do not allow other people to approach this area. Entering the area within 20 m can lead to a serious accident.**

***NOTICE***

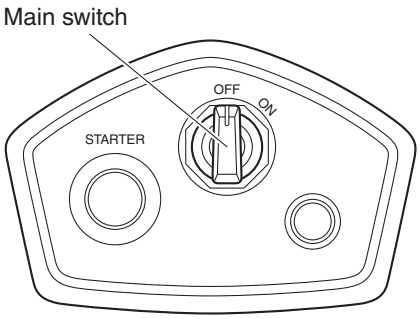
- **Do not press the engine stop switch before the engine speed has dropped.**
- **The rotor brake will not engage unless the throttle stick is in the slowest position.**
- **Use the rotor brake to stop the main rotor after the engine has stopped. Operating the stick while the rotor speed is high can cause the helicopter to tilt, which is dangerous.**



④ Before turning the main switch of the helicopter OFF, check the indications of the self monitor. If an error code appears, contact your dealer.




⑤ Turn the main switch of the helicopter OFF.



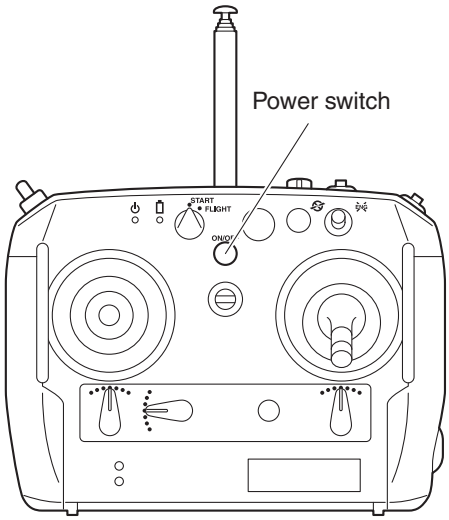

⑥ Press and hold the power switch on the transmitter to turn it OFF.

**⚠ WARNING**

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

- **Do not turn OFF the power switch of the transmitter.**
- **Do not remove 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.**

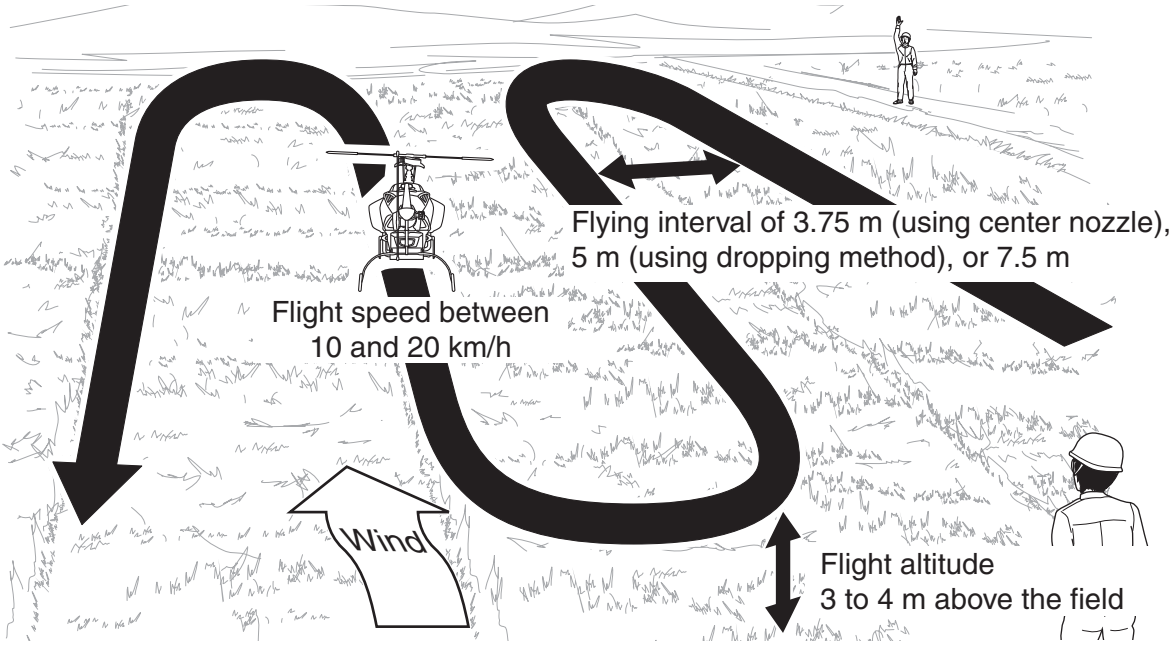


## General aerial application pattern

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 above the field
- Flight speed: 10 to 20 km/h
- Flying interval: 3.75 m (using center nozzle), 5 m (using dropping method), or 7.5 m
- Wind velocity: 3 m/s maximum




**⚠ DANGER**

**When refueling, never enter the area within 20 m of the helicopter until the main rotor has stopped completely and the engine has stopped. Also, do not allow other people to approach this area. Entering the area within 20 m can lead to a serious accident.**

***NOTICE***

**When GPS signal reception is favorable, if the flight speed in the postural control mode exceeds 20 km/h, the red warning lamp will illuminate (speed indication function). Therefore, keep the flight speed low so that this lamp will not illuminate.**

# Post-Flight Cleaning and Servicing

## Post-Flight Cleaning and Servicing

Agricultural chemicals, dust, dead bugs, and pollen could adhere to the helicopter after an aerial application. If they remain stuck to the helicopter, they will cause a chemical reaction, which will lead to rust, insufficient lubrication, sealant deterioration, and discoloring.
To prevent these problems, use the methods described below to clean and service the helicopter after a flight, in preparation for the next flight. While cleaning, check all areas of the helicopter for any damage, abnormal wear, loose fasteners, etc.

**⚠ WARNING**

**The helicopter is very hot immediately after a flight. Therefore, to prevent burns, clean it only after its temperature has lowered sufficiently.**

***NOTICE***

**Washing the helicopter with water will cause a sudden change in temperature, which could create problems in electrical parts. Therefore, clean it only after its temperature has lowered sufficiently.**

### Washable areas

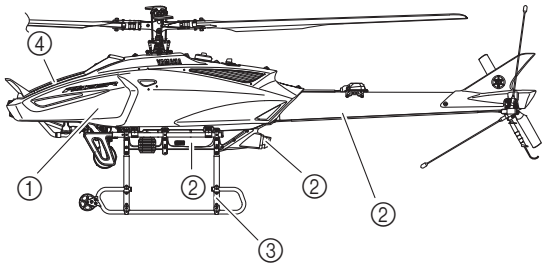
- The helicopter may be washed by directly spraying with a tap water hose.
  Do not use a high-pressure cleaner as it could enter the internal electronic components.

① Side covers
They may be washed only after they have been removed from the helicopter.
Do not wash them in the installed state because the water could splash on other parts.

② Tail body, warning lamp, frame, undercover

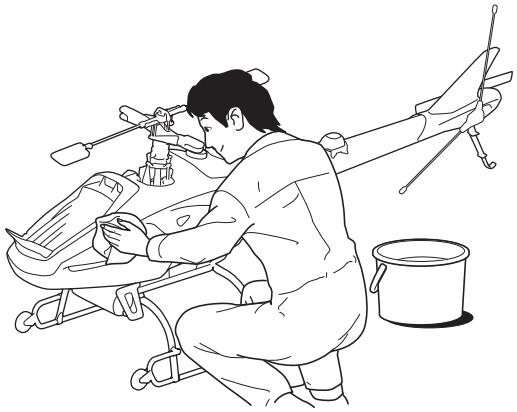
③ Leaves and runners

④ Radiator
Clean it by using caution not to damage the fins.
Do not spray high-pressure water from below.




***NOTICE***

**Do not use a high-temperature, high-pressure cleaner to clean areas 1 to 4 above, as it could damage the film and paint on the surface.**
**After cleaning the washable areas of the helicopter with water, use a soft, moist cloth that has been wrung to wipe the moisture off the surface.**



## Non-washable areas

- Use a soft, moist cloth that has been wrung to wipe the dirty areas on the following parts.

① Control panel

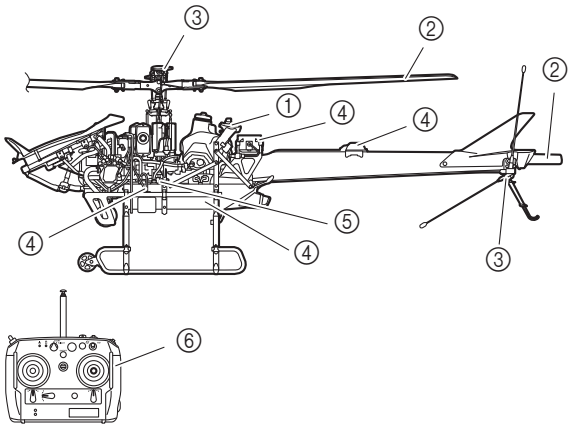
② Main and tail rotors

③ Main and tail rotor head areas

④ Servos and electrical parts

⑤ Frame top

⑥ Transmitters (flight and sprayer)




## Sprayer cleaning

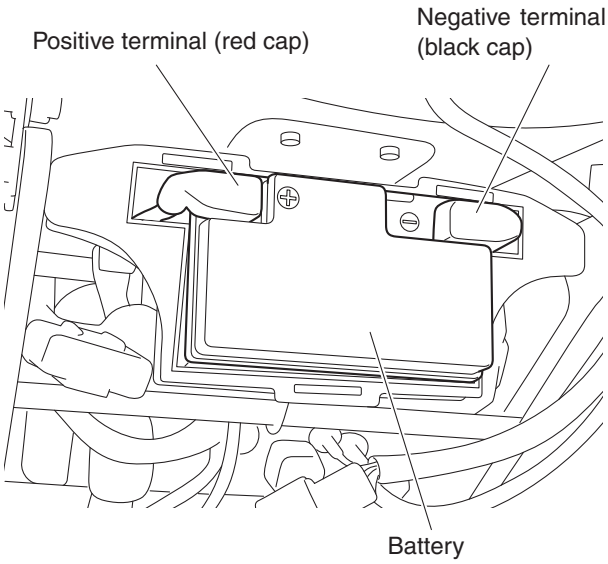
| TIP |
| --- |
| **For details on the cleaning method of the sprayer, see the operation manual of the sprayer.** |

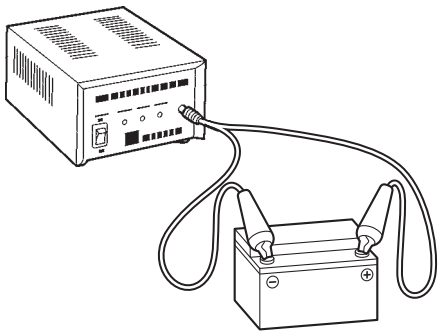
# Simple Maintenance

# Simple Maintenance

## Battery Recharging Procedure

This helicopter uses a sealed battery.
It is not necessary to refill or inspect the battery fluid.
To inquire about the proper recharging procedure or any problems with the battery, contact your dealer.



**⚠ WARNING**

**The battery produces flammable gas (hydrogen gas). Mishandling it could lead to an explosion resulting in injuries. Make sure to observe the following:**

- **Fire is strictly prohibited. Do not short a circuit, cause a spark, or let any fire such as cigarettes come near. This could cause an explosion.**
- **Do not connect to the battery terminals in the wrong order. Doing so could cause a fire.**
- **Recharge in a well ventilated place.**
- **Place the battery upright for recharging.**
- **Keep gasoline, oil, or organic solvent from getting on the battery, as this could cause the battery case to crack.**
- **Do not drop it or apply any other strong impact.**
- **The battery fluid is diluted sulfuric acid. Contact with the skin, eye, or clothing could lead to a serious injury.**
- **Keep out of reach of children.**

**First Aid**

- **In the unlikely event that the battery fluid gets on the skin, clothing, etc., immediately rinse with copious amounts of water.**
- **If it enters the eye, immediately rinse it with copious amounts of water, and seek medical attention.**

***NOTICE***

- **This is a sealed 12 V battery.**
- **This battery has been filled with fluid and charged. No fluid level inspection or refilling is necessary.**
- **For recharging, use the dedicated sealed battery charger (sold separately). Contact your dealer for details.**
- **If the battery is to be left unused for a long time, remove the battery from the helicopter, and recharge every 3 months.**
- **When replacing the battery, contact your dealer, and make sure to use a genuine battery.**

## Battery Removal

Remove the battery only after consulting your dealer.

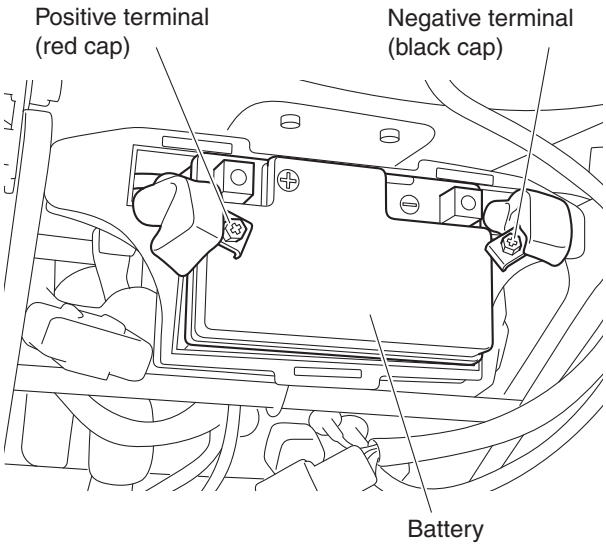
① Be sure to turn the main switch of the control panel OFF.

② Remove the undercover (do not disconnect the warning lamp wiring).

③ Remove the battery box cover.

④ Disconnect the battery's negative terminal, and positive terminal, in that order (as shown on the right).

⑤ Remove the battery from the helicopter.




| *NOTICE* |
| --- |
| **The proper procedure for removing the battery is to first disconnect the negative terminal, followed by the positive terminal. Reversing this order can cause a short circuit in the battery.** |

## Battery Reinstallation

Reinstall the battery in reverse order of removal.

| TIP |
| --- |
| **Batteries are consumables.** |

| *NOTICE* |
| --- |
| ● **Do not interchange the cables to the positive and negative terminals of the battery. Doing so can cause a fire or malfunction.**<br>● **The proper procedure for reinstalling the battery is to first connect the positive terminal, followed by the negative terminal. Reversing this order can cause a short circuit in the battery.** |

# Pre- and Post-flight Inspection

To ensure safe and efficient operation of the product, make sure the operator performs the pre- and post-flight inspections. In addition, record the results in the flight inspection log.
In preparation for the next flight, inspect the helicopter after a flight and make sure each area is free of problems.

**⚠ WARNING**

- **To prevent injury, make sure the engine is stopped before performing an inspection.**
- **The helicopter is very hot immediately after a flight. To prevent burns, allow the temperature of the helicopter to lower sufficiently before performing an inspection.**

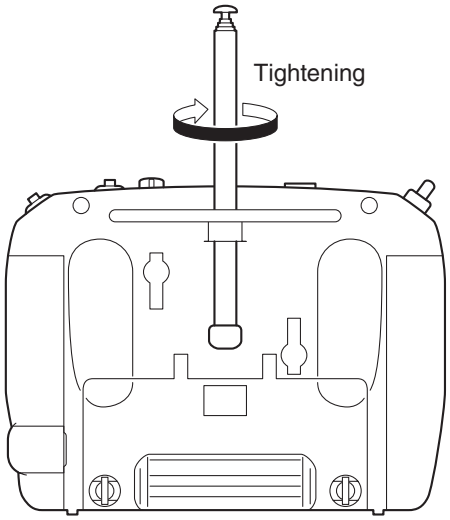
| | Inspection Areas | Inspection Items | Flight | | Remarks |
|---|---|---|---|---|---|
| | | | Front | Rear | |
| ① | Transmitter | Battery state-of-charge, operation, antenna installation condition, trim position | ○ | | |
| ② | Fuel system | Inspect the fuel level and check for any dust in the tank and filter, any leaks from piping, cracks, deformation, and installation. | ○ | ○ | |
| ③ | Coolant and oil | Inspect the coolant level, oil level, and check for any leaks from piping, cracks, deformation, and installation. | ○ | ○ | |
| ④ | Main head area | Inspect the main rotor for cracks, deformation, and chipping, peeling of cushion tape, rod installation and movement, drag bolt and nut conditions. | ○ | ○ | |
| ⑤ | Tail area | Inspect the tail rotor for cracks, deformation, and chipping, peeling of cushion tape, rod installation and movement, tail rotor movement in direction of the drag, rubber damper wear, and damage. | ○ | ○ | |
| ⑥ | Drive shaft | Inspect for cracks, deformation, installation, wobble, and operation. | ○ | ○ | |
| ⑦ | Servos (throttle and rudder), slide servo | Installation (servo body, connector), wobble, operation | ○ | ○ | |
| ⑧ | Self monitor | Hour meter indications, whether error codes are displayed | ○ | ○ | |
| ⑨ | Radio signal distance test | Radio signal reach distance (50 m with antenna at shortest height) | ○ | | |
| ⑩ | Electrical system | Inspect for cracks, deformation, installation, damage, connector connection, control unit damper, spark plug cap installation. | ○ | ○ | |
| ⑪ | Helicopter antenna | Installation condition, and rust | ○ | ○ | |

# 1. Transmitter inspection (before)

Inspect the flight transmitter battery state-of-charge, operation, and antenna conditions.

**⚠ WARNING**

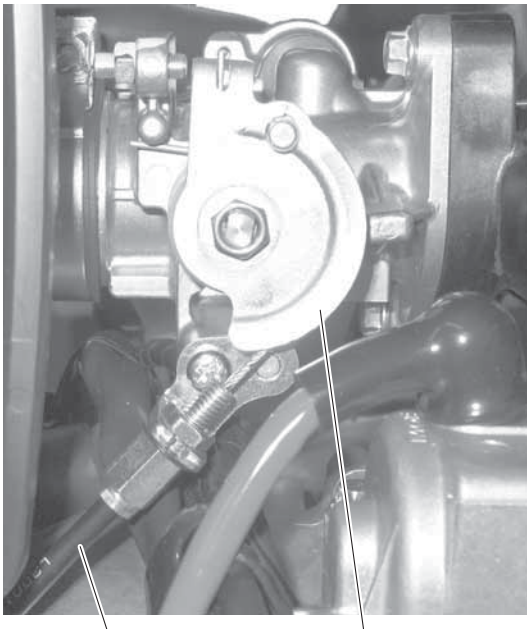
**If the transmitter has a malfunction or the battery state-of-charge is low, the transmitter will be unable to send radio signals during a flight.**




① Perform inspection with the transmitter's power turned OFF.
- Check that the sticks move smoothly.
- Check that the trim positions have not deviated significantly.
- Check that the antenna is securely attached to the transmitter body.

② Perform inspection with the helicopter's and transmitter's power turned ON.
- Check the state-of-charge of the battery in the transmitter.
- Check that the self monitor on the electrical box does not show any errors.
- Move the rudder servo and check that it moves smoothly.
- Move the slide servo, check that the servo moves smoothly, and that the linkage moves without catching.
- Operate the throttle and check that the throttle body pulley moves smoothly.
- With the antenna retracted to its shortest height, operate the transmitter from a distance of 50 m, and check that the servos operate as intended.

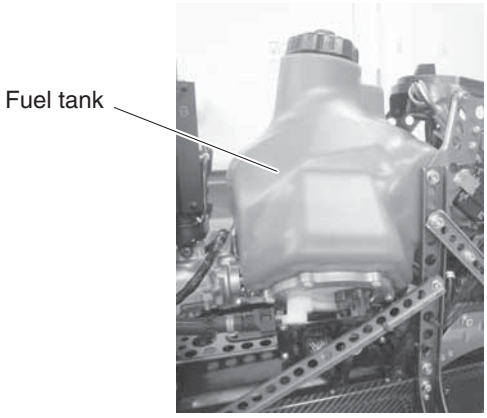
* Check the throttle valve movement by way of the pulley movement.



## 2. Fuel inspection (before and after)

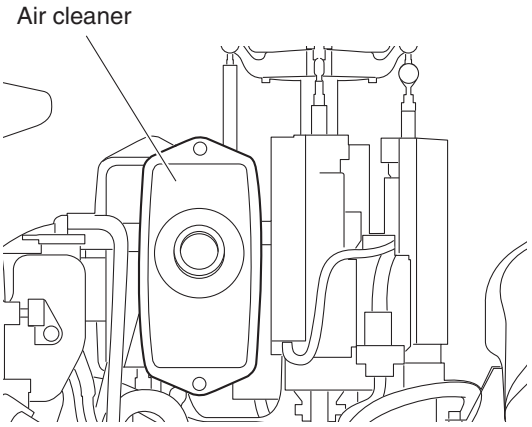
Inspect the fuel level and check for any leaks.
Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

- Check the fuel tank for deformation or fuel leaks.
- Check that there is no dust inside the fuel tank.
- Check the fuel hose for wear, abrasion, or fuel leaks.




- Inspect the air cleaner element for dirtiness.

| *NOTICE* |
| --- |
| **A dirty (or clogged) air cleaner element can lower engine performance.** |



# 3. Coolant and oil inspection (before and after)

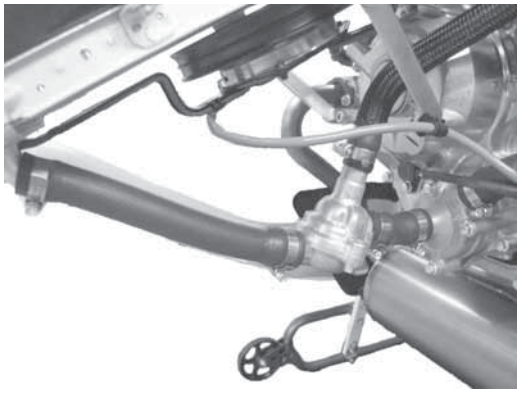
Inspect the coolant level, leakage, and oil leakage. Before performing this inspection, turn OFF both the main switch for the helicopter and the power switch for the transmitter.

**TIP**

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

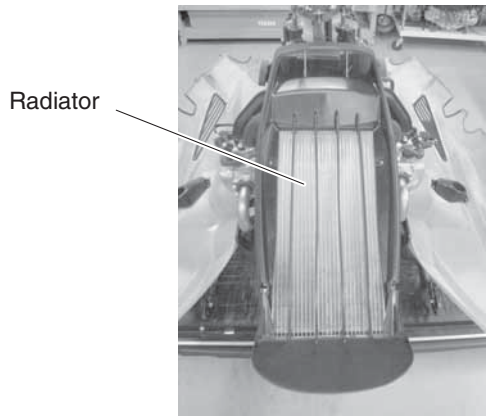
***NOTICE***

- **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.**



① Coolant piping
- Check the pipes and hoses for wear or abrasion.
- Check the pipe and hose connections for coolant leaks.

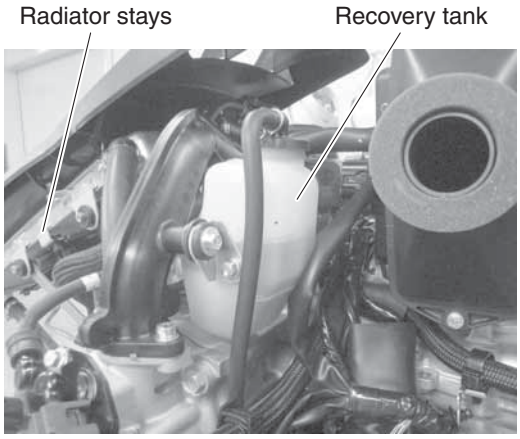
② Radiator
- Check the radiator body and radiator stays for any deformation.
- Check the radiator cover for cracks or looseness.
- Check that the coolant level in the recovery tank is appropriate.



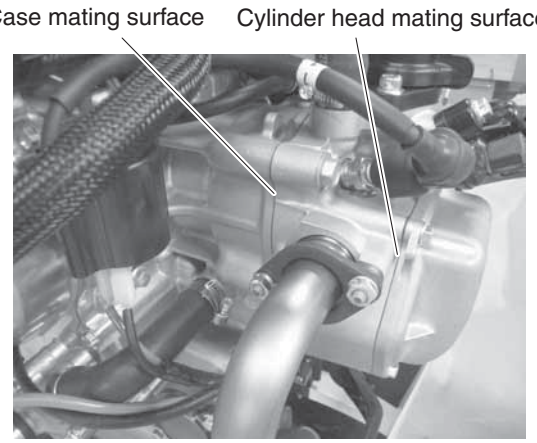

**⚠ WARNING**

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

- Check the pipe and hose connections for coolant leaks.



③ Cylinder
- Check that there is no oil leakage at the mating surfaces of the case.
- Check that there is no oil leakage at the cylinder head mating surface.




④ Clutch and transmission case
- Check that there is no oil or coolant leakage.