



PWC Operation

1. Required when Operating a Personal Water Craft

- 1 Do not make noise.
- 2 Take care of the environment and the biogeocenosis.
- 3 Do not cause trouble for people near the beach.
- 4 A 2-stroke engine uses engine oil which is **high biodegradable**.

2. Legal Matters to be Observed when Operating a Personal Water Craft

2.1. Law for Boat's Operators

- 1 A **Personal Water Craft Operators License** is required.
- 2 Operate within navigable area described in Ship Inspection Certificate.
- 3 Operators and passengers are required wearing life jackets.
- 4 A PWC operator must be certified.

2.2.The Ships Safety Law

- 1 PWCs may navigate within **2N.M.** from shore or within a **2N.M.** radius from a **mother vessel**.
- 2 PWCs may navigate within a distance (round-trip commute) of two hours by maximum speed from the departure point.
- 3 **Nighttime navigation is prohibited**.

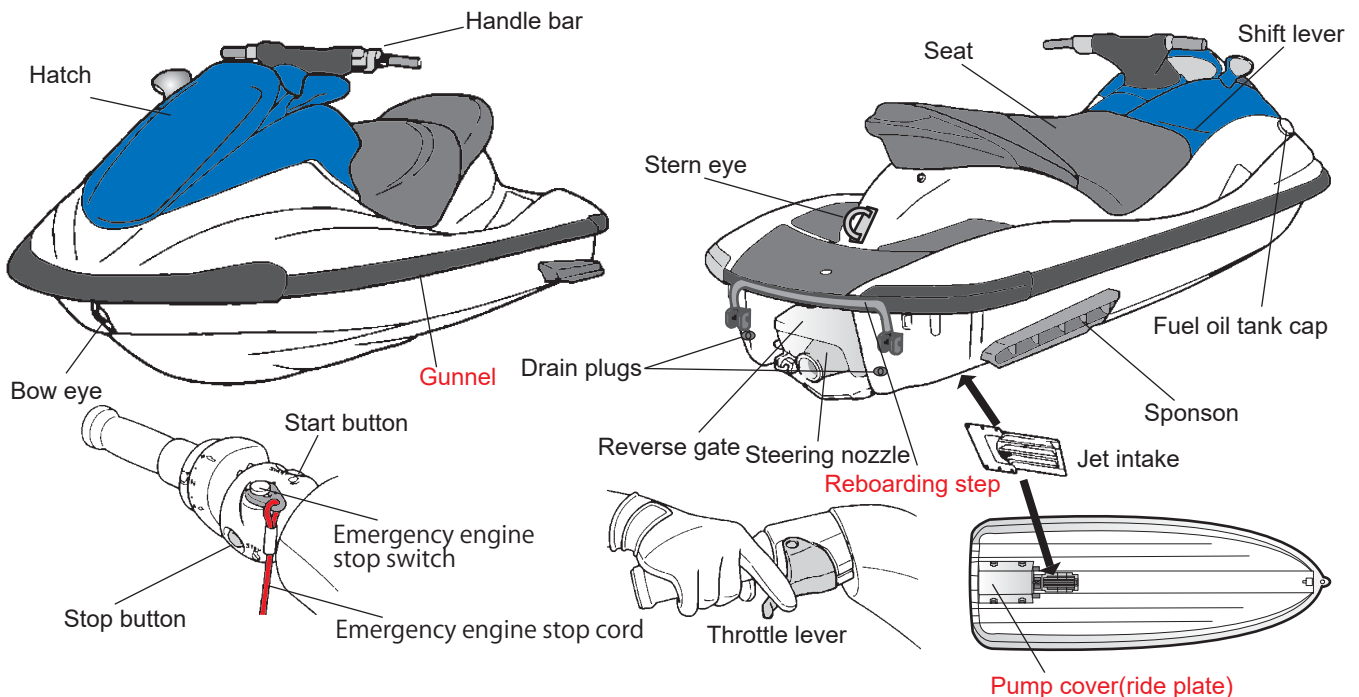
2.3.Local roules

Local regulators may specify additional regulations.The original navigable area is specified by local regulation.

3.Characteristics of a Personal Water Craft

- 1 PWCs are easy to capsize, and easy to right. (PWCs are **Unsinkable**, but if left under water for long time, water floods the inside and it become to hard to restart the engine.)
- 2 Turning characteristics of PWCs are very strong.
- 3 PWCs turn by water jet independently of its speed.
- 4 PWCs are not able to stop completely because it has **no clutch**.

4.Structure of a Personal Water Craft

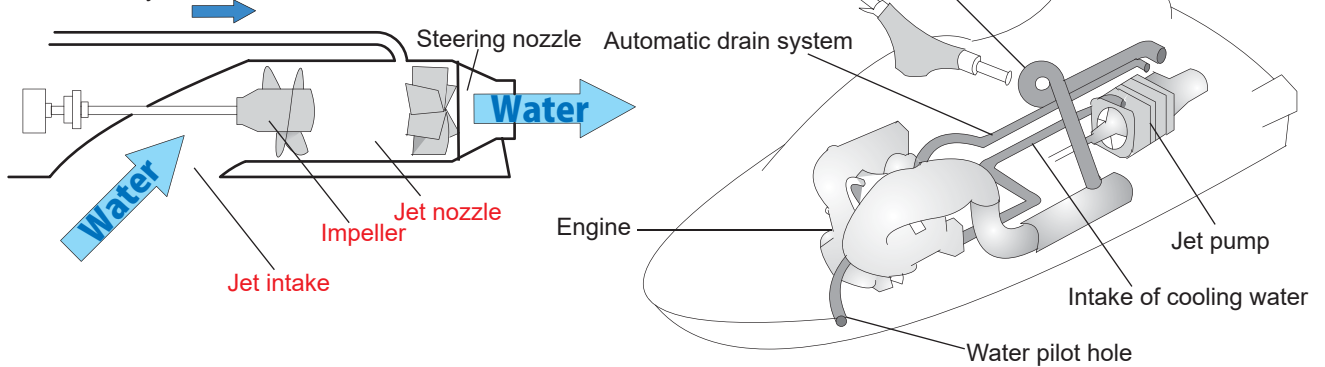


4.1.Parts

- 1 Bow eye....A fitting for a mooring rope or a towing rope
- 2 Stern eye....A fitting for a mooring rope or a towing rope
- 3 Gunnel....The joint of upper and lower part of the hull
- 4 Sponson....A projection on the side of the PWC to aide turning
- 5 Reverse gate....It reverses the water jet to allow going astern. (connected with the shift lever)
- 6 Jet intake....A water intake for the water jet and cooling water of the engine.
- 7 Steering nozzle....It moves right and left by handlebar to steer the craft.
- 8 Emergency engine stop cord....The ignition safety switch, it connects via a lanyard to operator.
- 9 Drain plugs....When grounding a personal water craft, remove it and drain water in the engine room. (Drains water from the engine compartment when the craft is removed from the water.)

4.2. Water jet system

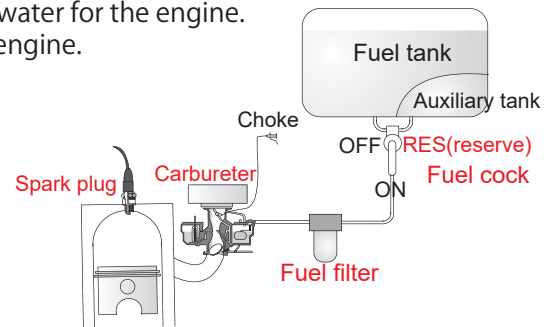
Automatic drain system



- 1 PWCs have an automatic drain systems for bilge water. (Some personal water craft have an electric bilge pump)
- 2 A portion of water taken from the **jet intake** is used as the cooling water for the engine.
- 3 Water pilot hole allows the circulation of the cooling water to the engine.

4.3. Fuel system

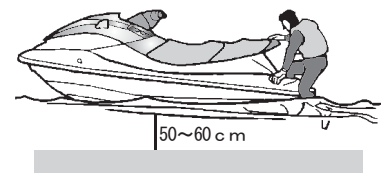
- 1 Fuel tank -- A fuel cock lever may be switched from the main tank to the auxiliary tank.
- 2 Fuel filter -- It collects trash in the fuel.
- 3 **Carburetor** -- The device which mixes **air** with **fuel**.
- 4 **Spark plug** -- The device that ignites the air-fuel mixture.



5. Operation

5.1. Riding

1. Climb onto a personal water craft **in waist-deep water**.
(A personal water craft may suck in trash from the jet intake when starting the engine on the sea bottom.)
2. Climb onto the PWC from the **stern**, one by one.
3. Rock the hull to remove sand and stone from the jet intake.
4. When finishing a run, stop the engine at **depth of 50~60cm**.
5. Get off from the **stern**, one by one.
6. When getting off in water, stop the engine for safety.

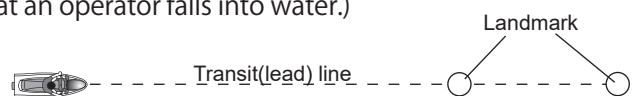


5.2. Posture when operating the sitting type personal water craft

1. Hug the seat with your knees.
2. Keep your body flexible and try to absorb impacts.
3. Do not stoop extremely while driving.

5.3. Controllability of personal water craft

1. A personal water craft has no rudder, it is impossible to turn without water running through the impeller.
2. Do not apply by astern propulsion **as a brake at high speed** (like a power-boat).
3. The reverse gate will be broken down and there is danger that an operator falls into water.)
4. Turn the handlebar by **weight shift** and **throttle control**.
5. Choose a distant landmark, and navigate using a transit line.



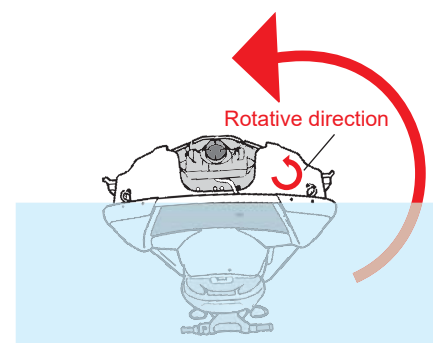
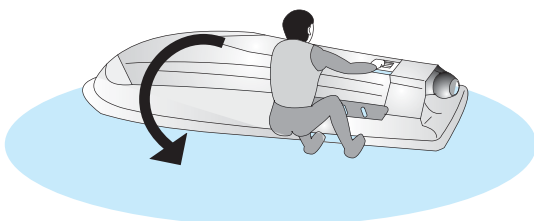
6. Avoidance of Danger / The Way to Replace when Capsizing

6.1. Avoidance of Danger

Turn the handlebar with **weight shift** and **opening the throttle up**. (A PWC cannot change direction without thrust)

6.2. The Way to Replace when Capsizing

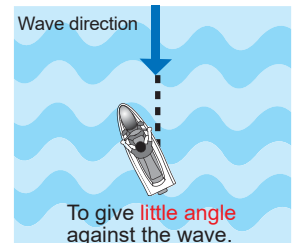
1. After making sure that engine is stopped, swim to the stern of the personal water craft.
2. If there is a warning label on the stern of a capsized PWC, it should be righted **in the direction indicated** on the label.
3. Step on the gunnel while holding jet intake and turn it up at once.
4. Before the personal water craft is completely turned, kick away it.



7. Riding in Rough Water / Towing

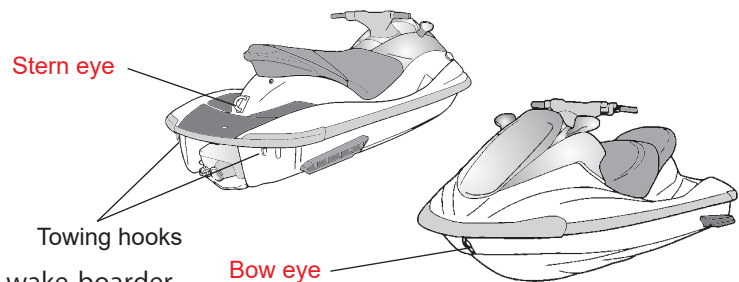
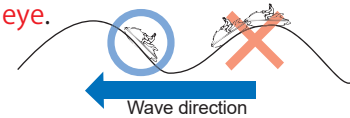
7.1. Riding in rough water

1. Keep your body flexible and try to absorb the impact of waves.
2. Navigating against waves is controllable.
3. There is the danger of being swallowed up by wave action near the shore.
4. It is hard to be seen in waves.
5. When a PWC navigates in following sea, it becomes unstable. (The PWC will navigate best on **the back surface of wave.**)



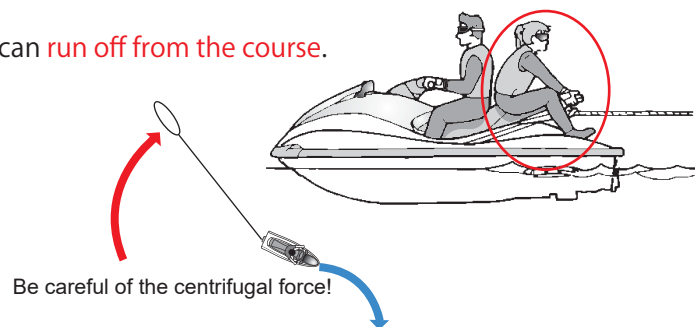
7.2. Towing another personal water craft

1. A towing rope should be tied to a stern eye or towing hooks of the towing craft.
2. The rope of the personal water craft being towed should be tied to the **bow eye.**
3. There is a possibility that cooling water will flow back into the engine when towed at high speed
4. Do not tow a PWC without an operator aboard, otherwise there is the danger of capsizing.



7.3. Towing play (banana boat, biscuit, etc)

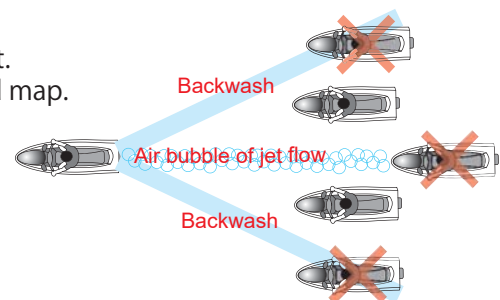
1. Set a watch person to watch the water-skier or wake-boarder.
2. Set signals between them.
3. When a personal water craft is turning, the skier can **run off from the course.**



8. Touring / Riding at a River

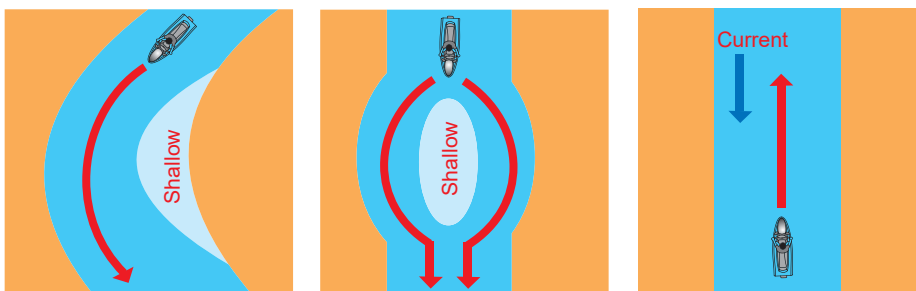
8.1. Touring

1. You should go with other personal water crafts or an escort boat.
2. Study the waters and check where the gas stations are by a road map.
3. Do not follow right after another personal water craft.
4. Prepare communication devices between vessels.



8.2. Riding at a river

1. The **inner part of a river bend is shallower** than the outer part of the bend.
2. The central part of where the river widens is shallow.
3. Be aware that there are many floating objects (trash) on a river after heavy rains.
4. Be aware that irregular waves occur at the confluence of two rivers and at **swash.**
5. A PWC can navigate with control **against current.**



9. Inspection before Departure

9.1.Hull

1. Check for cracks in the hull.
2. Aperture and movable parts
3. **Drain plugs** is fastened tightly.
4. **Jet intake**

9.2.Engine

1. Remove seats for **ventilation in the engine room**.
2. Vent gas from the fuel tank cap.
3. Open the fuel cock and check the amount of fuel.
4. Check the fuel filter, a sedimentation apparatus (oily water separator)
5. Check the quantity and quality of engine oil.
6. Check the battery (installation, loose wiring at post, battery fluid level)

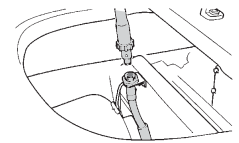
9.3.Legally Required Equipment and Documents

1. Mooring ropes
2. Life jacket
3. Sound signal apparatus (whistle)
4. Hand flare
5. Ship inspection certificate, Record of marine boards of inspection, Intermediate inspection completion card

10.Maintenance

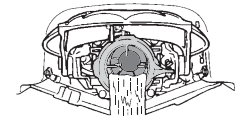
10.1.Hull

1. Wash sand and sea water from the hull.
2. Rustproof the metal parts.
3. Remove the **drain plug** and drain water in the engine room.
4. Remove the grandrelle trash at the **jet intake**.



10.2.Engine

1. Flush the **cooling system**.
2. Remove the battery cables.
3. Close the fuel cock and fill the tank.



10.3.A way to flush the cooling system

1. Connect a water hose to the water inlet of the cooling system.
2. **Start the engine at first**.
3. Turn on a water faucet and flush for approximately 5 minutes with the engine idling.
4. Turn off a water faucet and expel the cooling water in the engine by opening the throttle up.
5. **Stop the engine**

11.Engine Trouble

11.1.A starter does not run.

1. The battery's capacity is low.
2. Loose **battery terminal connectors**.
3. The cord of the ignition safety switch is disconnected.

11.2.A engine does not start. / Stalled engine

1. No fuel
2. The fuel filter is clogged.
3. **The spark plug** is fouled.
4. The fuel cock is at "OFF" position.

11.3.A personal water craft does not increase speed.

1. Water may be mixed in the fuel.
2. **The spark plug** is fouled.
3. Cooked engine (over heat)
4. The impeller in the jet pump is damaged.
5. **Clogging of the jet intake** or the jet pump.
6. Sucking the air from the jet intake

11.4.Abnormal vibration / Abnormal noise

1. The PWC sucks in trash from the jet intake or the impeller is damaged.
2. First, **reduce engine speed**.
3. Take measures after stopping the engine corresponding to the conditions.

11.5.Burnt odor

1. Cooked engine (over heat)
2. First, **reduce engine speed**.
3. Take measures after stopping the engine corresponding to the conditions.

12. Prevention of Accidents / Measures after the Accident

12.1. Collision

1. Stop the engine.
2. Top priority is given to lifesaving.
3. Do not pull the personal water craft away from another vessel without confirming the breakage situation. (There is danger that it may be flooded from a broken part.)

12.2. Run aground

1. Stop the engine.
2. Do not go astern. (The water inlet may suck in trash from the jet intake.)

12.3. Engine failure

When an abnormal noise and a nasty smell is noticed, reduce engine speed at first.

12.4. Driftage

1. Driftwood on the water surface may be difficult to see at a distance.
2. There may be much trash at the mouth of a river after a heavy rain and the intersection between two currents.

12.5. Being adrift

1. Resist physical movement to prevent loss of physical strength.
2. Put up a distress signal when another vessel is sighted.

12.6. Flood

1. Turn the flooded part to leeward.
2. Drain the water with a bilge pump.
3. When drainage isn't enough, run aground on a flat sand area.

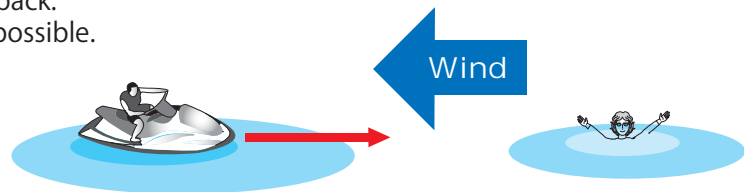
13. Life Saving / Handling of Lifesaving Equipment

13.1. Life Saving

1. Go to rescue from the direction which is easy to navigate. (It will be easy to control if it generally goes from leeward.)
2. Stop the engine and pull him (her) up from the stern.
3. Call ashore for medical help.

13.2. Lifesaving equipment

1. When required, it prepares so that it can be used immediately.
2. Use properly fitted life vest.
3. Carry a mobile phone in a waterproofing pack.
4. When using a red flare, raise it as high as possible.



Distance and Speed

1. Latitude and Longitude

1. Latitude.....Latitude starts at 0° at the equator and extends 90 degrees south and north.
2. Longitude.....Longitude starts at 0° at the Greenwich meridian and extends 180 degrees east and west.
3. 1°(degree) is 60'(minutes)

2. Distance and speed

1. One minute of latitude is one Nautical Mile (1,852m)
2. One knot is 1 N.M./hour
3. 1knot \approx 1,852km/h(0.5m/s)

