

Rabbit FIRE FIGHTING PUMP

Instruction Manual

P456(Fi6000)
P477(Fi7000)
P556(Fi8000)



Rabbit FIRE FIGHTING PUMP



Please be sure to read this before starting to operate the product.

As for the inspection/maintenance of the product, please contact the maintenance establishment or distributor with a certified mechanic for portable fire fighting pump maintenance.

IHI Shibaura Machinery Corporation

Introduction

Thank you very much for purchasing our product, "Rabbit Fire Fighting Pump". In purpose of using "Rabbit Fire Fighting Pump" safely, please make sure to confirm the below notice firstly.

*** Please use this product only for fire-fighting operations.**

*** Among the fire station workers, members of voluntary organization for disaster prevention, members of fire defense organization for self-protection and certified mechanics for portable fire fighting pump maintenance, only a person who received educational training in terms of the safety usage manner can operate this product.**

Furthermore, as for the inspection/maintenance of the product, please contact the maintenance establishment or distributor with a certified mechanic for portable fire fighting pump maintenance. This instruction manual was prepared for the person to operate "Rabbit Portable Fire Fighting Pump" effectively and safely. For full functional operation of "Rabbit Portable Fire Fighting Pump", and, for safety operation, please be sure to read this instruction manual.

If you have inquiry or problem after having read this instruction manual, please contact the distributor where you purchased the product or contact us directly.

Table of Contents

For safety use	3
Name of parts	6
Before starting to use	7
Preparation for operation	8
Operation	10
Water delivery from a fire hydrant/ Relaying water delivery	14
Rabbit Monitor	16
Maintenance	18
Points to be careful about in cold season	22
Periodic Inspection	23
Countermeasures for trouble.....	25
Unit conversion list	28
Specifications	29
Wiring diagram	32

For safety use

Please be informed of the classification of each warning indication and meaning as below.



Danger: In case of false operation, death or serious injury could happen.










Warning: In case of false operation, death or serious injury may happen.





Caution: In case of false operation, the minor injury or material damage may happen.

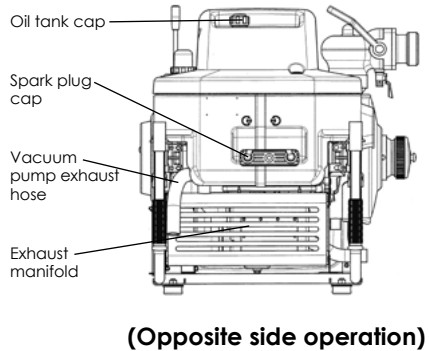
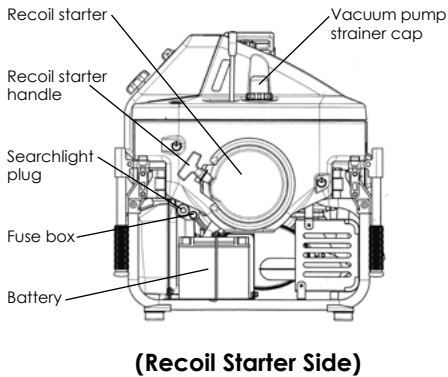
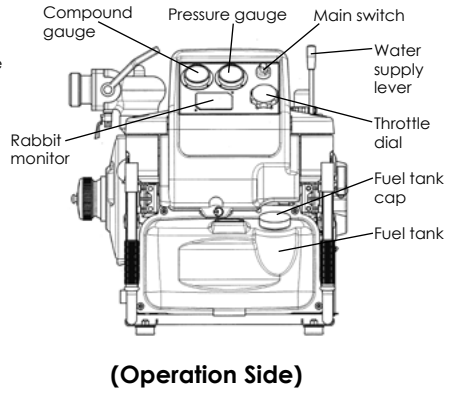
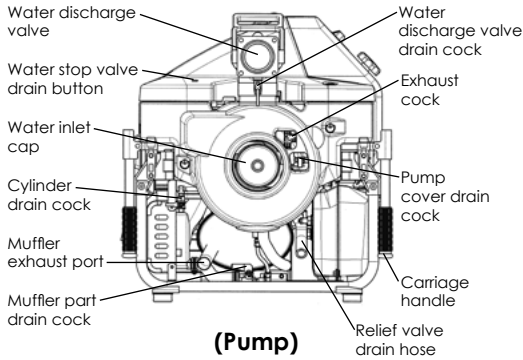
Furthermore, the below danger/risk might occur. Please strictly adhere to these instructions as well.

Risk	Rank	Parts of Risk	Points to note
Fire	Danger 	Fuel Tank (Fueling Time)	1) Keep fire away 2) For fuel feeding, halt the engine and cool it down. 3) Make sure not to spill the fuel.
	Warning 	Muffler (Carbon monoxide) Muffler (Dry grass) Battery (Ignition by gas)	1) Operate with a 3-meter distance from inflammables. 2) Do not operate on dry grass. If you need to do so, remove the dry grass under the muffler. 3) Refill the battery with proper ventilation. 4) While refilling the battery, keep fire away.
	Caution 	Fuel Tank (Fueling Time)	1) When spilt the fuel, wipe off with the rag and dispose of it carefully. 2) Make sure to screw on the fuel tank cap securely. 3) Fuel with proper ventilation

Risk	Rank	Parts of Risk	Points to note
Burn	Caution 	Muffler (Carbon monoxide) Exhaust Manifold Exhaust Port } Battery (Electrolytic solution)	1) Do not touch during high temperature. 2) Be careful not to allow electrolytic solution to touch your skin.
Rotating Part	Caution 	Recoil	1) In starting the operation with recoil, be careful not to get clothes or gloves caught in it. 2) In starting the operation with recoil, make sure that anybody/anything does not exist within a 2- meter radius.
Poison	Warning 	Muffler (Carbon monoxide)	Do not operate with poor ventilation. (Ex. Pump house, within a tunnel)
High-Pressure Water	Caution 	Nozzle, Water hose outlet	1) To prevent possible injury, do not discharge water on a person. 2) During the preparation for discharging water, do not peek into the water hose outlet or nozzle. 3) Make sure to open/close the water discharge valve at low speed. 4) Do not start the engine while the water discharge valve is open. (Excluding relaying water delivery)
Electric Shock	Warning 	Ignition plug High-tension cable Battery	1) Do not touch while operating. 2) For changing the battery, remove the battery from the negative-terminal and set up from the positive-terminal.
Cut, Being caught	Caution 	Carriage handle Water release valve	1) In operating the handle, do not touch the hinge part. 2) In operating the water discharge valve, do not put your hand or fingers into the water hose outlet.
Scattering/ Explosion of stone and others.	Caution 		1) As some extraneous materials like stones could be scattered and damage your body while discharging the water, be careful in using. 2) Do not inhale or vomit the inflammable fluid or medical fluid. There is a danger of explosion and fire.

Risk	Rank	Parts of Risk	Points to note
Disposal	Caution 		1) As for the disposal of battery or oil, consult with specialized vendors.
Slip	Caution 		1) Do not spill the oil or other fluid. Make sure to wipe out the spilt oil.

Parts and Components

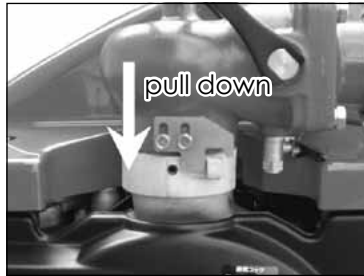


Before starting to use

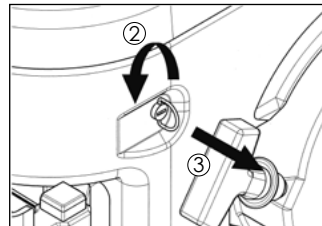
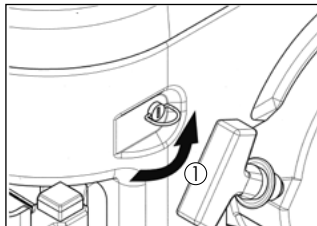
Warning



- (1) Make sure that all standard equipment/accessories are included in the package.
(→ p.29 - p.31 "Specifications")
- (2) Pour electrolytic solution into the battery.
(→p.21 " How to handle the battery and charger")
("M" Specifications does not require this procedure)
- (3) Connect the battery. Firstly, remove cover on the operation side and then connect the battery with positive terminal and negative terminal in that order.
("M" Specifications does not require this procedure)
- (4) If you need to fix the water discharge valve toward the operation side, loosen the fixing bolt of water discharge valve stopper temporarily and then pull down the stopper.



- (5) If needed, take the below procedure to remove/attach the cover.
 - 1) Put the ring part of fastener in standing position.
 - 2) Rotate the ring with a quarter-turn to the left.
 - 3) Make sure that the fastener is loosened and remove the cover.
There are three fasteners in each cover. To remove the cover, loosen the rest of fasteners with above procedure.
* Take an opposite procedure to attach the cover.



Preparation for operation

1. Put in fuel.

Danger



Put regular unleaded gasoline into the fuel tank. (Due to the oil injection system, no mixing with 2-cycle engine oil is needed.)

Tank capacity: 11 L

You can confirm the amount of fuel with the gauge on the tank.

(Notice)

1. Do not put in the fuel fully to the brim.
2. In case of fuel in stock for a long time, which causes an irritating smell or impurity, replace it with new fuel immediately.



2. Put in oil.

Caution



Put in special oil for 2-cycle engine.

Tank capacity: 1.2 L

(Notice)

1. Do not put in oil fully to the brim.



3. Set up the pump.

Caution Please be warned on the following things.



- (1) When moving the pump, carry it holding the carriage handle properly.
- (2) As the muffler is positioned in the bottom part, do not put the pump on something such as dry grass.

Warning



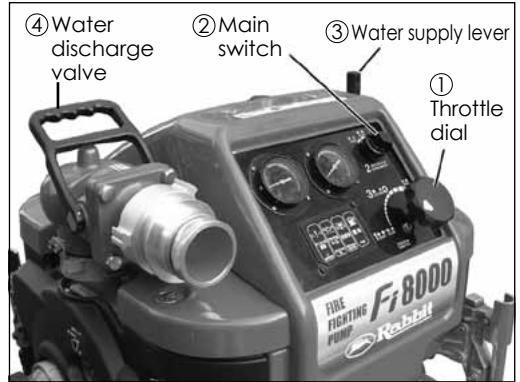
- (3) In suctioning water, position the pump closely to the water surface as much as possible for less difference of altitude between pump and water. Furthermore, set the pump horizontally level as much as possible.
- (4) To avoid the air pocket in the suction pipe, elevate the pipe toward the pump side.
- (5) Attach the strainer and basket on the nozzle of suction pipe and, in case of vacuuming the dirt, spread the mat under the basket.
- (6) To avoid vacuuming air, set the basket 30cm under the water.
- (7) Get the drainage hose straight without folding or buckling.

4. Make sure to close the water discharge valve, pump cover, cylinder and muffler part drain cock. Then, open the exhaust cock.

Operation

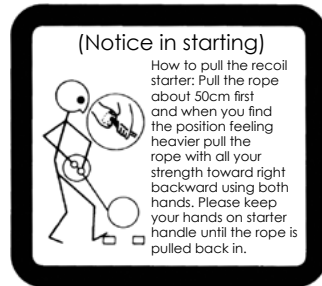
1. Starting

- (1) Make sure that the throttle dial ① is set at the position of "Starting/Low Speed".
- (2) Set the main switch to ② "Operation". When starter motor starts to operate, turn the ② switch further to "Starting". When the recoil starts to operate, pull the recoil starter handle as suggested in the below "Notice in Starting".
- (3) The engine then starts.



(Notice)

1. Over fueling might cause difficulty in engine starting. In that case, please refer to Trouble Countermeasure on p.25.
2. In purpose of controlling the pulling power of recoil starter handle, the decompression system has been installed. When you pull the recoil starter handle lightly and hear the whoosh sound, it means the decompression system is working properly. If you cannot hear the whoosh sound, press the clear button on the upper side of decompression system.
3. Do not pull the recoil starter rope fully out.
4. Do not start/halt engine repeatedly without delivering water. There would be a possible explosion (after-fire explosion) in muffler caused by fuel air mixture of imperfect combustion.



2. Water Delivery/ Water Discharge

- (1) After engine starts, set the throttle dial ① at the position of "water delivery" and pull the water delivery lever ③ toward "water delivery" to start the operation of vacuum pump.
- (2) After confirming that the water is discharged from the exhaust hose of vacuum pump continually, return the water delivery lever to the direction of "water discharge" immediately. If suction hose has unevenness, there would be an air pocket. At that time, please operate the water delivery lever 1-2 seconds longer than usual.
- (3) After confirming the safety of nozzle, open water discharge valve ④ slowly while keeping throttle dial at the position of "starting/water delivery". After water discharge started, make an adjustment of throttle dial for appropriate water discharging pressure.

(Notice)

1. In case of higher pump position for water suctioning, do not open the water discharge valve suddenly. The water being suctioned would be flowing out, which might prevent the water discharge. Furthermore, the higher water suctioning position might cause cavitation and, in that case, set throttle dial to low speed as much as possible.
2. In case of operating the vacuum pump by water delivery lever, keep the operation time to no more than 30 seconds.
3. The engine gets cooled down by delivering water. When operating the engine without delivering water (dry running), set throttle dial to low speed and keep the operating time to no more than 2 minutes. This fire fighting pump is equipped with safety device to halt the engine in detecting the rising of cooling water temperature, however the dry running without any cooling water might cause the false operation of safety device while keeping throttle dial at the position of medium-high speed. Please strictly adhere to the instruction mentioned above. (→P.12 "For longer dry-running")
4. In purpose of operating the pump with tightly closed water discharge valve after water delivery, this fire fighting pump is equipped with the relief valve to drain the heated water in the pump. However, if throttle dial would be set at the position of medium-high speed while operating with closed water discharge valve, the water temperature could rise faster than the draining heated water, which might cause the water to flow out. While operating with closed water discharge valve, make sure to set throttle dial to the position of low speed. Furthermore, when relaying water delivery or setting throttle dial to full toward "high speed", the pump pressure is getting higher than usual, which might cause the draining of water from relief valve drain hose.

5. For smooth water discharge, this fire fighting pump is equipped with the air bleeding device which can bleed the air from the cooling water pipe while delivering the water. No problem in using the pure water, however, the operation surrounded by the earth and sand might cause the problem in clogging up the air bleeding device. In that case, the below conditions occur.

- i) Vacuum pump does not work for sucking water.
- ii) While discharging the water, water continuously drained from the exhaust tube of air bleeding device.
- iii) Water flows out.

For above conditions, close the exhaust cock for the normal operation. After completing the operation, clean up inside of the air bleeding device.

6. As required pump pressure varies from the number of hose extension, caliber of nozzle, height of sending water and double-line water discharge, decide your pump pressure in accordance with the water discharging pressure of nozzle.

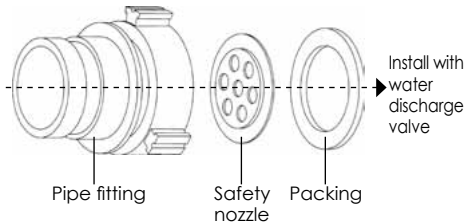
Caution



7. Please be advised that excessive water discharging pressure or sudden opening/closing of water discharge valve may cause the water pipe to fling around.

8. In case of water delivery/relaying water delivery from water hydrant, please refer to p.14 "Water supply from a fire hydrant/ Relaying water supply".

9. In case of operating without using the nozzle for bailing out the water from the tank or sending the water to relay tank, as well as, in case of operating with the two-line water discharge, make sure to install the safety nozzle between the pipe fitting and water discharge valve.



3. Suspension of water discharge

- (1) If you need to suspend the water discharge for replacement of nozzle or adjoining hose, set throttle dial at a position of "low speed" and set the water discharge valve to "full close".
- (2) If you need to suspend the operation in keeping the water pipe as it is, set the throttle dial at the position to "low speed", while keeping the water delivery lever at the position of water discharge. In this case, as non-return valve works to prevent the water flowing, please start the engine and open the water discharge valve to discharge the water. (However, make sure to restart within 3 minutes).

4. Stop

- (1) Set throttle dial to the full toward "low speed" and "close" the water discharge valve.
- (2) When you set the main switch to "stop", the engine stops.

(Notice)

Without setting the throttle dial to the position of "low speed", do not stop the engine under the operational condition with medium-high speed. There might be a risk of after-fire.

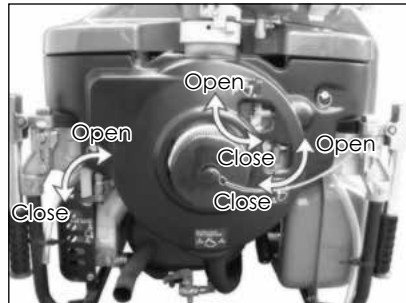
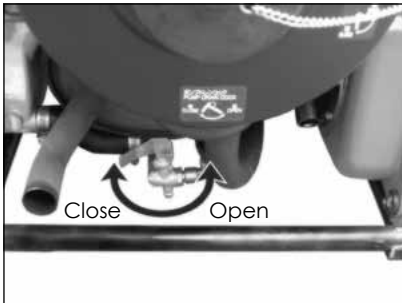
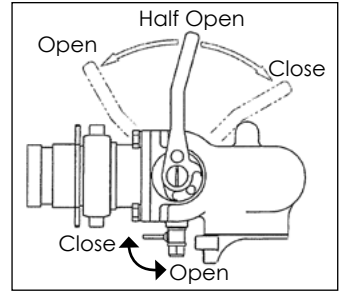
5. For longer dry running.

Storing the cooling water in cylinder allows the dry running with idling condition for several minutes. If you want to operate in this way, leave the water when draining water after the operation while keeping the cylinder drain cock closed.

Furthermore, when operating in this way during the cold season, make sure to put the antifreeze into the cylinder. (→P.22 "Point to be careful about in cold season").

6. Safekeeping

- (1) Make the water discharge valve "half open" and then open each drain cock of water discharge valve, pump cover, cylinder and muffler part. Push the button of water stop valve drain to drain completely. After draining, make sure to close them.
- (2) After removing the suction hose, restart the engine. After operating the vacuum pump for 2-3 seconds to remove the water in the vacuum pump, stop the engine again.
- (3) Install water inlet cap and cover the pump for safekeeping.



(Notice)

- (1) Incomplete draining may cause damage or corrosion by freezing.
- (2) In case of using the muddy water or ocean water, rinse out impurities in the pump with pure water. After that, make sure to drain water in each part.
- (3) Keep the pump housing free from moisture.
- (4) Make water discharge operation at high speed of throttle dial for 5-10 minutes once a month.
- (5) During the safekeeping, keep on charging of electricity with accessory automatic battery charger. (→ P.21 "How to handle battery and charger")
- (6) Make sure the water has been drained completely before the safekeeping.
During the cold season, put the antifreeze into the pump.
(→ p.22 "Point to be careful about in cold season").

Water delivery from a fire hydrant/ Relaying water delivery

1. Water delivery from a fire hydrant

(1) The capability of water delivery from a fire hydrant

In case of water delivery from a fire hydrant, make sure the fire hydrant can provide enough water for water discharge.

As the capability of water delivery from a fire hydrant depends on the plug caliber, piping condition and initial water pressure, it is required to examine the reciprocal influence of those factors. If the fire hydrant has high initial water pressure, for example, but its plug caliber is small, the capability of water delivery is not enough. On the contrary, even if the water pressure is low but its plug caliber is big, it has enough capability to deliver water.

(2) How to deliver water.

(a) As high water delivery pressure might damage the suction pipe when delivering water into the pump, use the hose and connect with metal fitting joint as a general rule.

(b) As water source of a fire hydrant might contain the extraneous materials such as dirt or small stones, remove them in opening the valve and discharging the water before connecting the hose.

(c) Fully open/close the valve of a fire hydrant as a general rule and make adjustment of open degree only if the water delivery pressure is especially high.

(d) Open the water discharge valve and confirm the compound pressure gauge before starting the pump engine.

(e) After the engine starts, regulate the throttle to let the pressure of compound pressure gauge to be more than 0.05Mpa.

2. Relaying water delivery

In case of the wood fire or urban fire with a remote water source, relaying water delivery connecting more pumps in series would be applied. During the relaying water delivery, the pump set by the water source (parent pump) and the pump set on the other side (child pump) need to be operated together and you should know various points to make note of beside the normal operation.

(1) How to operate

- ① Operate the parent pump in normal procedure. However, keep sending pressure more than 0.3MPa.
- ② Open the water discharge valve of child pump beforehand. When the water sent from the parent pump arrives, confirm the pressure gauge and make a decision to start the operation.
- ③ In operating the child pump, handle the throttle gradually. Furthermore, manage the compound pressure not to be under 0.05 MPa, and the pressure gauge not to be over 1.0MPa.
- ④ In completing sending water from the parent pump, stop the engine of child pump first. Furthermore, do not close the water discharge valve until water delivery from parent pump stops.

(2) Point that requires attention

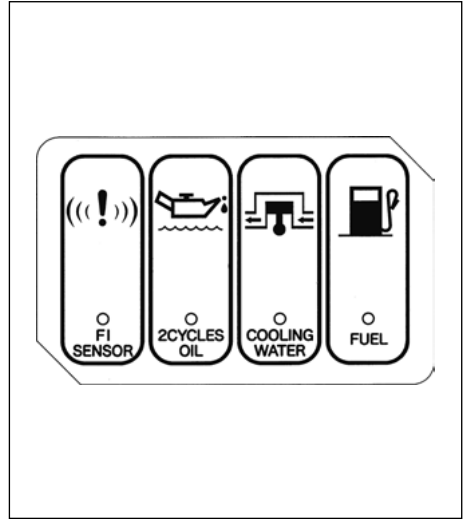
- (a) Do not definitely close the water discharge valve of child pump while sending the water from the parent pump. Due to the shock (water hammer) and high pressure caused by the sudden change of water flow channel, an accident such as damage of pump might occur.

Rabbit Monitor






Rabbit monitor on the operation panel allows integrated control for operational condition of pump. With the warning display or emergency shutdown function in case of abnormal condition, you can use the pump safely.

1. How to check the Monitor Operation







In setting the main switch to "Operation", LED lights on monitor except "FI Sensor" turn on for 3 seconds. (As for "M" specifications, light turns on after starting engine and increasing the engine speed.) As no light means something is abnormal, please contact the maintenance establishment or distributor for inspection/maintenance.



2. Monitor Display and Countermeasures

Display	Monitor Operation	Countermeasures
 Fuel	When the fuel is almost depleted, LED turns on.	 Put the gasoline into the fuel tank.
 2-Cycle Oil	When the oil is not enough, the engine stops to prevent the burning out and LED turns on.	"Stop" the main switch, refill the oil in the oil tank and restart the engine.
 Cooling Water	When the water temperature of cooling water gets higher, the engine stops to prevent overheat and LED turns on. (Note.1)	Temperature of cooling water gets higher. Examine the cause and eliminate it. You can restart the engine, however if the cause is not eliminated, the engine stops again 15 seconds after restarting. (Note 2)
 FI Sensor	Abnormal condition for any of TPS, WTS, ATS and APS is confirmed, the light turns on. Furthermore, if a connector linked with Injector/ignition coil is disengaged, the light turns on. The lighting condition is suggested in annexed sheet 1.	Besides emergency, stop the engine and contact the maintenance establishment or distributor for inspection/maintenance.

Annexed sheet 1

Name of Sensor		Lighting Image
TPS (Throttle Position Sensor)	7- times consecutive flashing light	
WTS (Water Temperature Sensor)	6- times consecutive flashing light	
ATS (Air temperature Sensor)	5- times consecutive flashing light	
APS (Air Pressure Sensor)	4- times consecutive flashing light	
Disengaged connector for injector wiring	2- times consecutive flashing light	
Disengaged connector for ignition coil wiring	1-time plus 2-times reciprocal flashing light	

(Notice)

(1) During the dry running without cooling water, the monitor might not work properly.

Please follow the direction in this manual for dry running. (→P11. (Notice) 3)

(2) Without eliminating the cause, do not repeat the restarting.

(3) Inspect each part practically at periodic inspection time, not only rely on Rabbit Monitor.

3. Auto Power-off Function

This product is equipped with Auto Power-off Function to prevent the waste of battery.

While leaving the main switch to "Operation" without any operation for 30 minutes, the product is automatically turned off at the condition of "Stop". In case of starting the operation from the above condition, turn the main switch to the position of "Stop" once and then start it again. (→P10. Operation)

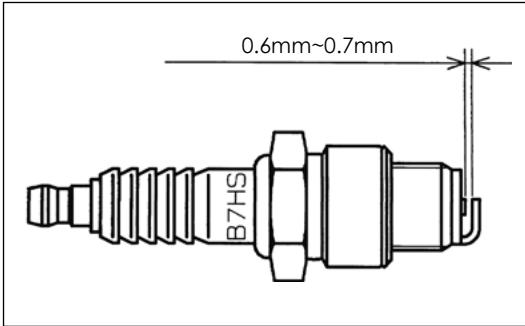
Maintenance

Engine and related parts

1. Ignition Plug

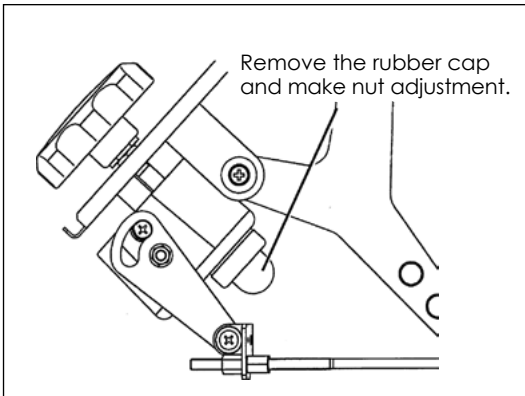
Clean up the electrode portion smudged by exhaust gas or carbon.

- Applicable Spark Plug : NGK B7HS
- Gap: 0.6 – 0.7mm



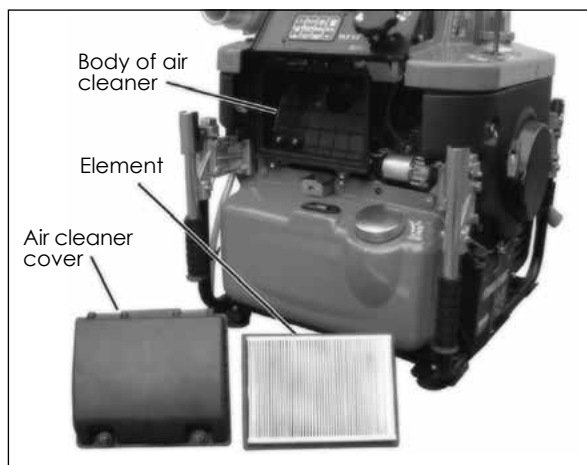
2. Throttle Dial

Control force of the throttle dial is possible with fine adjustment by the adjusting nut in the base part of throttle dial.



3. Air Cleaner

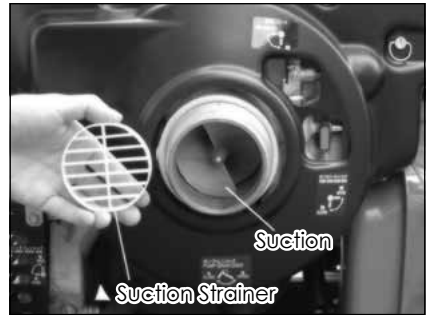
Danger Remove the element from the air cleaner box and confirm if it is dirty. If dirty, blow off the dust or rubbish by air, or replace with new element.



Pump and related parts

1. Suction Strainer

After using the pump in the place with algae, remove the algae from the strainer.

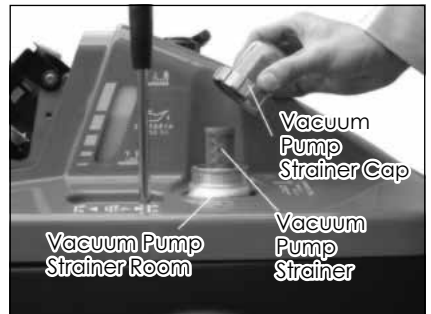


2. Vacuum Pump Strainer

After using the pump in the place with earth and sand, remove the strainer cap and clean it up.

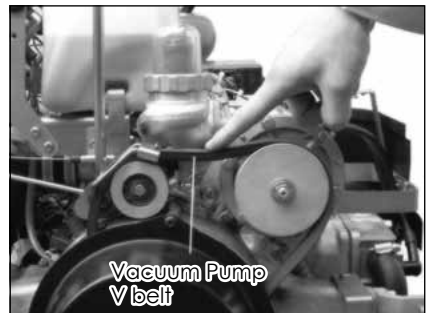
(Notice)

Attach the vacuum pump strainer with its open-hole side down.



3. Adjustment or replacement of vacuum pump driving V belt

- (1) When the belt rotates without fitting, make adjustment in pushing the belt.
- (2) When the belt starts to stretch, make adjustment the tension pulley position to a certain extent. If the above procedure does not work, or the belt is damaged, please replace with new belt. (Applicable belt: A-28 V belt)



4. How to handle the battery and charger

(1) Battery

The accessory battery is a sealed battery. After pouring the electrolytic solution into the battery, you can use it as it is, however charge the battery if the battery is not enough for starting the engine during the cold season in wintertime. In handling the battery, make sure to read the instruction manual attached to the battery.

(Notice)

1. Make sure to wire properly with positive terminal (red ⊕) and negative terminal (black ⊖).
2. Connect the battery with positive terminal first and remove the battery with negative terminal first.
3. The recommendable battery for this product is as below;
 - GS Yuasa Battery YTX 2 –BS
 - Nihon Blade NBC20L – BS

When using other battery besides above recommended ones, there might be a problem with compatibility.

(2) Safekeeping of battery

Warning



① As the electrolytic solution is diluted sulfuric acid, it is very dangerous if you let it touch your body. In pouring it into the battery, follow the instruction manual attached to the electrolytic solution.

② As the battery is self-discharging electricity, battery charging is needed for the amount consumed by self-discharge and self-starter.

③ The accessory battery charger is an automatic battery charger. The normal charge and compensation charge (compensating charge for self-discharge amount) are automatically switched.

Caution



④ This battery has a structure not allowing the electrolyte level inspection/compensation of liquid. Do not compensate the liquid after removing the seal, which causes trouble.

(3) How to charge the battery

Warning



① Remove the dust from the battery and clean the battery terminals.

② Connect the output plug to the power point of this fire fighting pump. In turning on the power switch, the power lamp (red) starts to flash and battery starts.

③ When the completion lamp (green) starts and the power lamp (red) lights up, the battery charge is completed. The charge turns to be the condition of compensation charge.

The condition of charging

○ : lighting

		Power lamp (red)	Completion lamp (green)
Non-Charging			
Normal Charging	Less than 80%	○	
	80% or more	○	○
Compensation Charging			○

(Notice)

1. The excess electric current caused by the reverse flow of battery lets the breaker activate. Furthermore, operation of self-starter motor during the charging also might let the breaker activate. Eliminate the cause and push the breaker to the normal position.
2. The life of the battery is approximately 2 years.

Points to be careful about in cold season

1. Notice for housing/safekeeping

- (1) Choose the good quality fuel. (Higher quality gasoline has higher volatility that makes it easier to start the operation.)
- (2) Keep the body of pump, vacuum pump and muffler free from freezing. After using the pump, remove the water and handle with antifreeze solution or alcohol. If needed, take measure for warming.
- (3) Always have antifreeze solution available.
- (4) Make sure the vacuum pump is rotating, and in case of being frozen by any chance, apply heat by pouring the hot water.
- (5) Maintain the battery frequently.

Blending Ratio		Freezing Point
Antifreeze Solution (%)	Water (%)	°C
10	90	-4
20	80	-10
30	70	-17
40	60	-27
50	50	-39

2. How to put the antifreeze solution

- (1) After draining the water completely from the drain cock of each part, tighten the pump cover cap and close the drain cocks of water discharge valve, pump cover, cylinder and muffler part as well as water discharge valve. Attach the tube on the drain port of the muffler part drain cock and then put the opposite side into the antifreeze solution.
- (2) After engine starts, position the water delivery lever to "water delivery" and operate the vacuum pump for 5 seconds. If the compound gauge suggests the sufficient negative pressure, return the water delivery lever to "water discharge" and stop the engine. If the compound gauge does not suggest the negative pressure, make sure that the pump cover cap, drain cock and other necessary parts are properly closed and then try the above procedure (2) again.
- (3) In opening the muffler part drain cock, it starts to suck the antifreeze solution. Let it suck up to 5 L and, if it stops to suck, close the cock.
- (4) Restart the engine and spread the solution throughout the pump in operating for 5 seconds. Set the water delivery lever to "water delivery" and antifreeze solution drains from the vacuum pump exhaust pipe, return the water delivery lever to "discharge water" and stop the engine.
- (5) Open each drain cock to remove the antifreeze solution. (For longer dry running, do not remove the antifreeze solution from cylinder cock. (→P.12 "For longer dry running")

(Notice)

1. In cold season, the vacuum pump might be freezing even in operating time. If such an accident might possibly happen, remove the vacuum pump strainer cap and pour 10 ml of the antifreeze solution. Start the engine and pull down the water delivery lever to spread the antifreeze solution inside of the vacuum pump as well.

3. How to deal with the accessories

- (1) Dry the cloth hose and metal parts well after using.
- (2) Pour hot water on the frozen cloth hose.

Periodic inspection

To maintain the full performance of Rabbit Portable Fire Fighting Pump, please take a periodic inspection by the certified mechanic for portable fire fighting pump maintenance every six months.

Some parts used for the portable fire pump deteriorates its function due to the time degradation, even if you cannot find the problem on the surface. Make sure to replace such a part referring to the below chart in taking the periodic inspection.

- Periodic replacement parts

Name of part	Estimated time for replacement
Spark Plug	Every year
Fuel Pipe	Every 2 years
Battery	Every 2 years
Oil Pipe	Every 3 years
Oil Filter	Every 3 years
Vacuum pump driving V belt	Every 3 years
Other rubber parts	Every 2 years

- Periodic replacement items

Periodic replacement items	Estimated time for replacement
Fuel	Every 6 months
Governor Oil	Operation time: 50 hours/year

< How to check the governor oil >

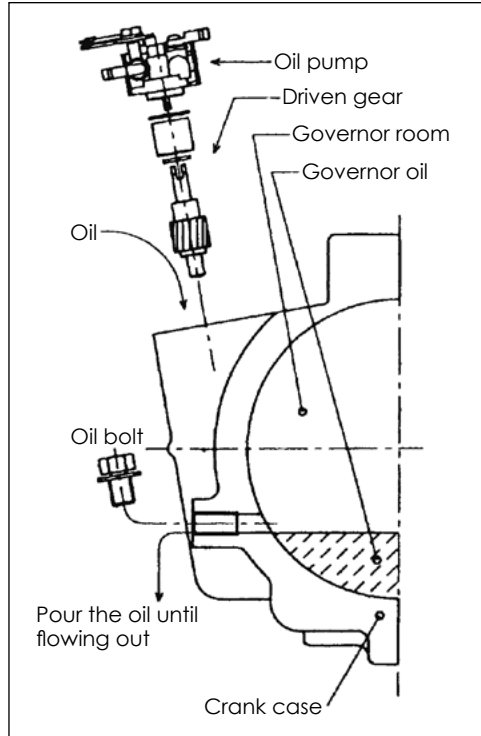
Remove the oil pump and pour the oil into the bolt port until the oil flows out suggested in the right picture.

Mobile oil for vehicle SAE #30 / #20 (winter season)

Regulated amount: 50 ml.

(Notice)

Please apply the appropriate lubrication oil such as SAE5W30 or SAE10W30 in the cold place during the winter season.



Countermeasures for Trouble

* As for the inspection/maintenance described with square brackets ([]) in the countermeasure column below, please contact the maintenance establishment or distributor with a certified mechanic for portable fire fighting pump maintenance.

Engine Part

Condition		Cause/Countermeasure	
Starting Trouble	Fuel System	Excessive Fuel Suction	[Rotate a starter motor while fully opening the throttle body valve] * When engine starts, the high speed running might occur.
		Fuel Trouble	<ul style="list-style-type: none"> • When the fuel emits a foul smell, replace with new fuel. • When the water gets mixed in the fuel, remove the water or replace the fuel. • When the fuel in the tank is running out, refill the fuel.
		Parts Trouble	<ul style="list-style-type: none"> • [When the injector gets clogged with extraneous matter, replace it.] • [When the fuel pump gets clogged with extraneous matter, replace it.] • [When the fuel pump is out of order, replace it.] • [When the connection of the fuel system is incomplete, connect it properly.] • [When the fuel pipe gets twisted or gets caught by something, eliminate the cause.]
	Electrical system	Spark Plug	<ul style="list-style-type: none"> • When the spark plug loosens, tighten it properly. • When the electrode is dirty, clean and close it properly. • The electrode gap becomes more than 0.7mm, make adjustment or replace it. • When you find other damage, replace it.
		Magneto related Troubles	<ul style="list-style-type: none"> • [In case of trouble with the flywheel magneto, replace it.] • [In case of trouble with ignition coil, replace it.] • [In case of trouble with ECU, replace it.]
		Wiring and others	<ul style="list-style-type: none"> • When the cable wiring connection gets loose or disconnected, connect it properly. • When the fuse blows, replace it. • When the voltage pressure is low, charge the battery or replace the voltage. (Only for "S" Specifications) • When the battery terminal gets loose, tighten it properly. (Only for "S" Specifications) • When the overheat protection device is activating, eliminate the cause for proper operation.
	Decompression	<ul style="list-style-type: none"> • When the decompression becomes loose, tighten it properly. • When the recoil is too heavy to pull, push the decompression. 	

Countermeasures for Trouble

Engine Part

Condition		Cause/Countermeasure	
Disorder of Rotating	Excess Fuel / Improper Fuel	→ Refer to "Starting Trouble/Electrical System"	
	Shortage of Fuel Suction	When the air hole of fuel tank cap or fuel channel gets clogged, clean or replace it.	
	Electrical system	Each Sensor	When "F1 Sensor" LED of Rabbit Monitor turns on, eliminate the cause. (→P.16 "Rabbit Monitor")
		Spark Plug	(→ Refer to "Starting Trouble/Electrical System")
Abnormal Sound	Worn Parts	[When the cylinder, piston or piston ring is worn, repair or replace them.]	
	Knocking	When the cylinder is knocking due to the heat caused by the cooling system trouble, eliminate the cooling system trouble.	
	One-engine operation	→ Refer to "Starting Trouble/Electrical System"	
Abnormal Heating of Cylinder Head		[When the carbon is deposited in the cylinder head or piston head excessively, clean it.]	
		[When the inside of muffler or exhaust port gets clogged, eliminate the clogging or replace it.]	
		[When the cooling water channel gets clogged with extraneous matter, clean or replace it.]	
		[When the fuel is not adequate, repair it or replace the parts. → Refer to "Starting Trouble/Fuel system"]	
		[When the ignition time is not adequate, repair it or replace the parts. → Refer to "Starting Trouble/Electrical system"]	

Pump Part

Condition		Cause/Countermeasure
No Suctioning	Compound Pressure Gauge shows Negative Pressure	When the difference of altitude between pump and water surface is more than 9m, make it less as much as possible.
		When the strainer, basket, inside of suction pipe and suction port strainer gets clogged with extraneous matter, please remove the extraneous matter.
		When the air pocket occurs in the suction pipe, make sure the suction pipe is duly attached.
	Compound Pressure Gauge does not show Negative Pressure	When the water discharge valve, pump cover, cylinder and muffler drain cock is open, close it.
		When the strainer cap of vacuum pump becomes loose, close it properly.
		When the strainer of vacuum pump gets clogged with the extraneous matter, remove the extraneous matter and close it properly.
		When the driving V belt is expanded, make an adjustment. Or, when it is cut, replace it. → P.20 "Maintenance/Adjustment or replacement of vacuum pump driving V belt"
		When the suction pipe becomes loose, close it properly.
		When the suction part is not submerged properly, submerge it properly.
		[In case of leakage in the sealed part of the pump or pipe, eliminate the leakage.]
[In case of the damage of vacuum pump, repair or replace it.]		
No Discharging Water	Pump	When the nozzle caliber is too big, make it smaller.
		When the strainer of suction pipe, basket, inside of suction pipe or suction port strainer gets clogged, remove the extraneous matter. → Refer to "No Suctioning"
	Engine	[In case of engine trouble, make adjustment or repair it.] → "Engine Part "Disorder of Rotating"
No Pump Rotating	Pump	[When the extraneous matter gets mixed in the labyrinth part, remove it]
		When the pump gets frozen, defrost and operate it. →P.22 "Points to be careful about in cold season"
	Engine	[When the engine is burned out, repair it.]

Unit conversion list

Unit Name	Old Indication	New Indication
Speed of rotation	Rotation Rate (rpm)	Rotation Speed (rpm)
Pressure	Kgf/ cm ²	Mpa
Mass	Weight kgf	Mass (kg)
Capacity	ℓ	l, L
Consumption	cc/min	ml/min.
The degree of vacuum	mmHg	- MPa
Displacement	cc	ml
Generating Power	PS	kW

- 1 kgf/cm² ≈ 0.098MPa
- 760 mmHg ≈ - 0.1013MPa
- 1 PS ≈ 0.735kW
- 1 cc = 1 ml

Specifications

P456 (Fi6000)

Standards	Portable Fire Fighting Pump B – 3 grade		Registration Number	P175F001		
Engine			Pump			
Model	EP556		Model	P456		
Section	S	M	Section	S	M	
Type	Water Cooling 2-cycle F2 Gasoline Engine		Type	High Pressure 1st Stage Turbine Pump		
Cylinder (mm) (number-inside diameter x stroke)	2-76 x 70		Suctioning Caliber (mm)	75 (Screw type couplings for fire hoses JIS B 9912)		
Total Displacement (mL)	635					
Rated Output (kW/rpm)	32/5100		Discharging Caliber (mm)	65 (Screw type couplings for fire hoses JIS B 9912)		
Cooling System	Forced-air cooling system					
Ignition System	C.D.I. Magneto Ignition		Function	Rated Pressure (MPa)	0.55	
Ignition Plug	NGK B7HS			Rated Discharge (m3/min)	1.26	
Fuel Supplying System	Electronically-controlled fuel injection			Rated Nozzle (mm)	ø28.5	
Fuel Type	Regular Unleaded Gasoline			High Pressure (MPa)	0.80	
Fuel Tank Capacity (L)	11			High Pressure Discharge (m3/min.)	0.94	
Lubrication System	Oil Injection System			High Pressure Nozzle (mm)	ø22.5	
Lubrication Oil	Special oil for 2-cycle Engine			Standard Rotation Speed (rpm)	5100 Governor Set	
Oil Tank Capacity (L)	1.2			Seal for Pump Room	Mechanical Unit Seal	
Starting System	Starter Motor System/ Recoil System	Recoil System	Vacuum Pump	Water Suctioning System	DAN system	
Charging Capacity	13-17.5	-		Type	4-wing Eccentric Rotary (with Peek Material, Large Strainer)	
Speed Governing System	Centrifugal weight system/ Electric over-rotating protection			Oiling System	No-oil-supply system	
Rotating Direction	Left (from output side)			Degree of Vacuum	9m for Suctioning heights (Over -0.0085MPa)	
Light (V-W)	12-3x 2 (meter lamp) 12-180 (search light)		Dimension (mm) (length x width x height)	681 x 635 x 708		
Battery	12V16Ah (Sealed)	-	Dry Weight (kg)	Approx. 92	Approx. 84	

Standard Equipments

Name	Number	Name	Number	Name	Number
Medium pipe fitting	1	Battery (S)	1	Suction Strainer	1

Accessories

Name	Number	Name	Number	Name	Number	Name	Number
Disassembling tools kit	1	Automatic Battery Charger (S)	1	Safety Nozzle	1	Instruction Manual	1
Pump Cover	1	Spark Plug	1	Fuse (S)	1		

Specifications

P477 (Fi7000)

Standards	Portable Fire Fighting Pump B – 3 grade		Registration Number	P175E001		
Engine			Pump			
Model	EP556		Model	P477		
Section	S	M	Section	S	M	
Type	Water Cooling 2-cycle F2 Gasoline Engine		Type	High Pressure 1st Stage Turbine Pump		
Cylinder (mm) (number-inside diameter x stroke)	2-76 x 70		Suctioning Caliber (mm)	75 (Screw type couplings for fire hoses JIS B 9912)		
Total Displacement (mL)	635					
Rated Output (kW/rpm)	32/5100		Discharging Caliber (mm)	65 (Screw type couplings for fire hoses JIS B 9912)		
Cooling System	Forced-air cooling system					
Ignition System	C.D.I. Magneto Ignition		Function	Rated Pressure (MPa)	0.55	
Ignition Plug	NGK B7HS			Rated Discharge (m3/min)	1.44	
Fuel Supplying System	Electronically-controlled fuel injection			Rated Nozzle (mm)	Ø30.5	
Fuel Type	Regular Unleaded Gasoline			High Pressure (MPa)	0.80	
Fuel Tank Capacity (L)	11			High Pressure Discharge (m3/min.)	1.17	
Lubrication System	Oil Injection System			High Pressure Nozzle (mm)	ø25.0	
Lubrication Oil	Special oil for 2-cycle Engine			Standard Rotation Speed (rpm)	5100 Governor Set	
Oil Tank Capacity (L)	1.2			Seal for Pump Room	Mechanical Unit Seal	
Starting System	Starter Motor System/ Recoil System	Recoil System	Vacuum Pump	Water Suctioning System	DAN system	
Charging Capacity	13-17.5	-		Type	4-wing Eccentric Rotary (with Peek Material, Large Strainer)	
Speed Governing System	Centrifugal weight system/ Electric over-rotating protection			Oiling System	No-oil-supply system	
Rotating Direction	Left (from output side)			Degree of Vacuum	9m for Suctioning heights (Over -0.0085MPa)	
Light (V-W)	12-3x 2 (meter lamp) 12-180 (search light)		Dimension (mm) (length x width x height)	681 x 635 x 708		
Battery	12V16Ah (Sealed)	-	Dry Weight (kg)	Approx. 92	Approx. 84	

Standard Equipments

Name	Number	Name	Number	Name	Number
Medium pipe fitting	1	Battery (S)	1	Suction Strainer	1

Accessories

Name	Number	Name	Number	Name	Number	Name	Number
Disassembling tools kit	1	Automatic Battery Charger (S)	1	Safety Nozzle	1	Instruction Manual	1
Pump Cover	1	Spark Plug	1	Fuse (S)	1		

P556 (Fi8000)

Standards	Portable Fire Fighting Pump B – 2 grade		Registration Number	P175F001	
Engine			Pump		
Model	EP556		Model	P556	
Section	S	M	Section	S	M
Type	Water Cooling 2-cycle F2 Gasoline Engine		Type	High Pressure 1st Stage Turbine Pump	
Cylinder (mm) (number-inside diameter x stroke)	2-76 x 70		Suctioning Caliber (mm)	75 (Screw type couplings for fire hoses JIS B 9912)	
Total Displacement (mL)	635			Discharging Caliber (mm)	65 (Screw type couplings for fire hoses JIS B 9912)
Rated Output (kW/rpm)	32/5100		Function		Rated Pressure (MPa)
Cooling System	Forced-air cooling system			Rated Discharge (m3/min)	1.32
Ignition System	C.D.I. Magneto Ignition			Rated Nozzle (mm)	Ø27.5
Ignition Plug	NGK B7HS			High Pressure (MPa)	1.00
Fuel Supplying System	Electronically-controlled fuel injection			High Pressure Discharge (m3/min.)	0.92
Fuel Type	Regular Unleaded Gasoline			High Pressure Nozzle (mm)	ø21.0
Fuel Tank Capacity (L)	11			Standard Rotation Speed (rpm)	5100 Governor Set
Lubrication System	Oil Injection System			Seal for Pump Room	Mechanical Unit Seal
Lubrication Oil	Special oil for 2-cycle Engine		Vacuum Pump	Water Suctioning System	DAN system
Oil Tank Capacity (L)	1.2			Type	4-wing Eccentric Rotary (with Peek Material, Large Strainer)
Starting System	Starter Motor System/ Recoil System	Recoil System		Oiling System	No-oil-supply system
Charging Capacity	13-17.5	-		Degree of Vacuum	9m for Suctioning heights (Over -0.0085MPa)
Speed Governing System	Centrifugal weight system/ Electric over-rotating protection		Dimension (mm) (length x width x height)	681 x 635 x 708	
Rotating Direction	Left (from output side)		Dry Weight (kg)	Approx. 92	Approx. 84
Light (V-W)	12-3x 2 (meter lamp) 12-180 (search light)				
Battery	12V16Ah (Sealed)	-			

Standard Equipments

Name	Number	Name	Number	Name	Number
Medium pipe fitting	1	Battery (S)	1	Suction Strainer	1

Accessories

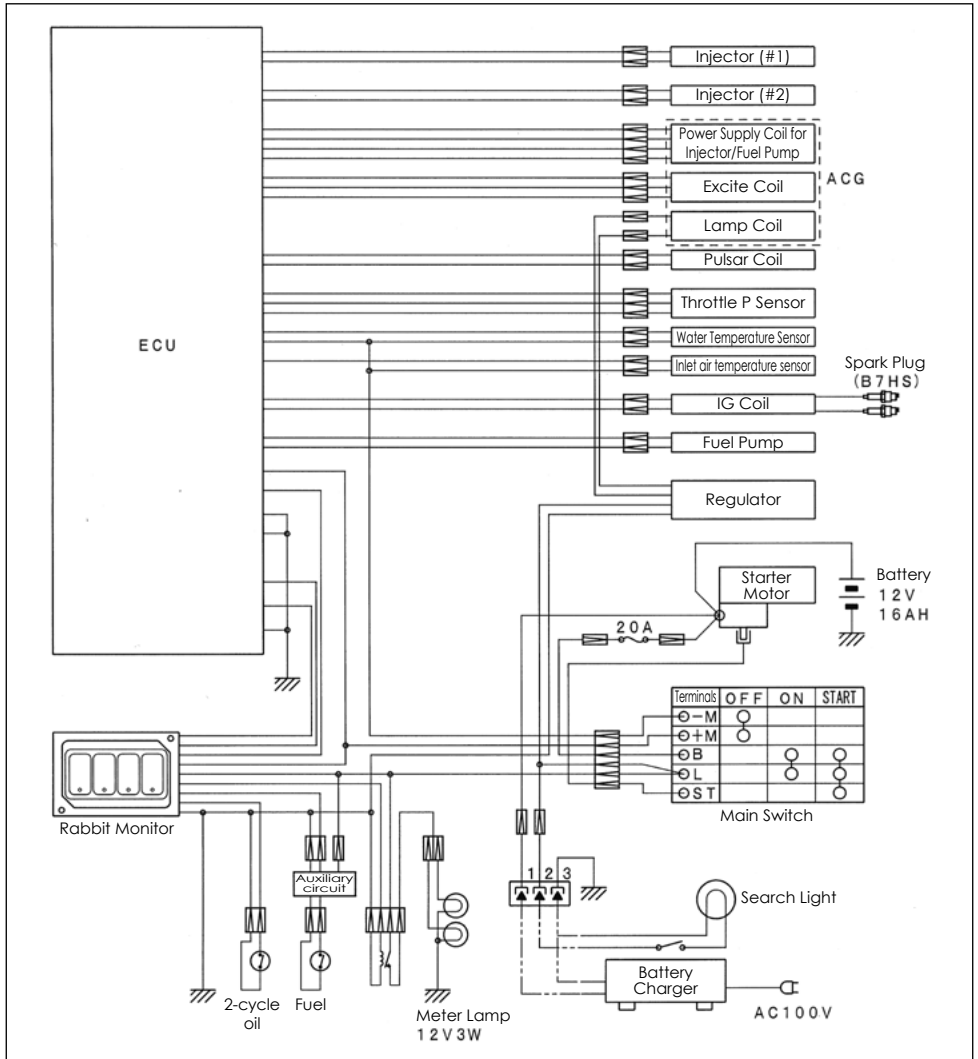
Name	Number	Name	Number	Name	Number	Name	Number
Disassembling tools kit	1	Automatic Battery Charger (S)	1	Safety Nozzle	1	Instruction Manual	1
Pump Cover	1	Spark Plug	1	Fuse (S)	1		

Wiring Diagram

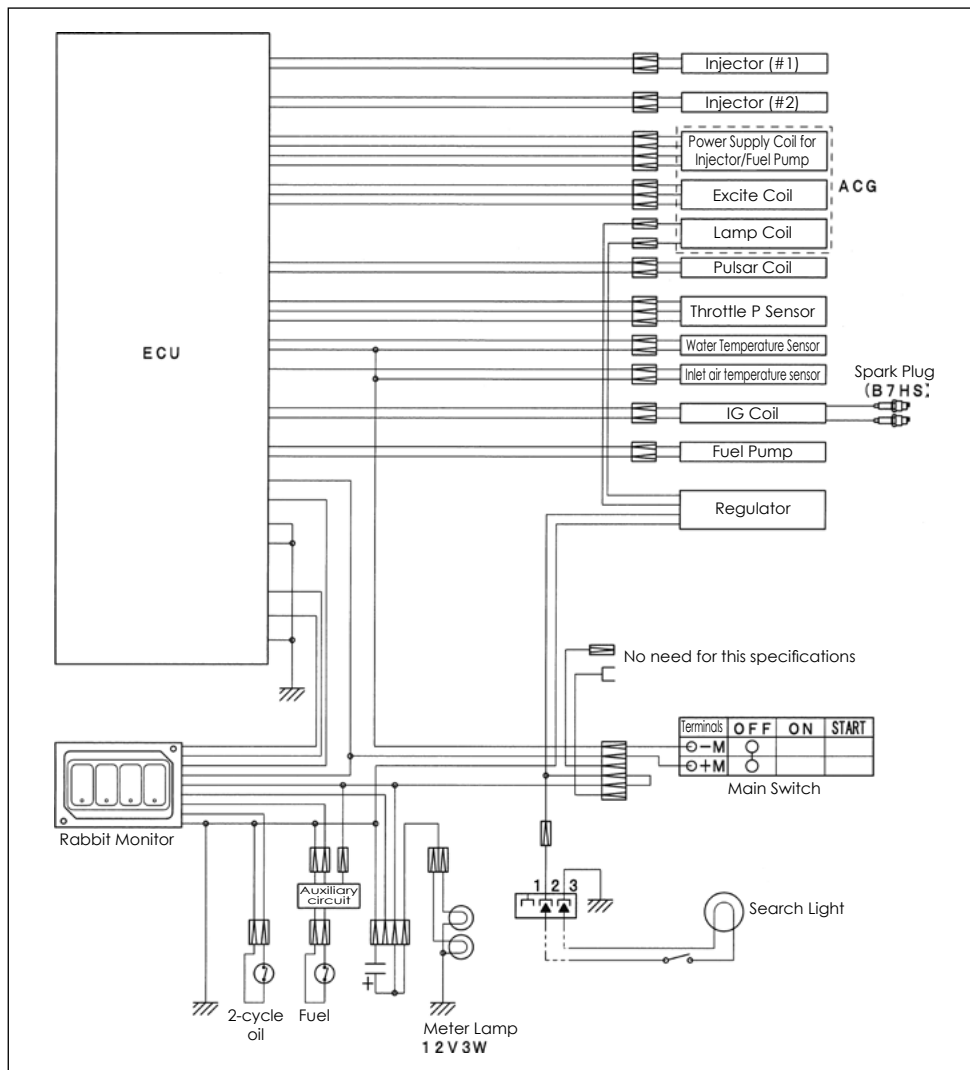
(S) Wiring Diagram

(Notice)

1. As for the fuse, make sure to wire properly with positive-terminal and negative-terminal of battery.
2. Start with positive-terminal first for installing the battery, and start with negative-terminal for removing.



(M) Wiring Diagram



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