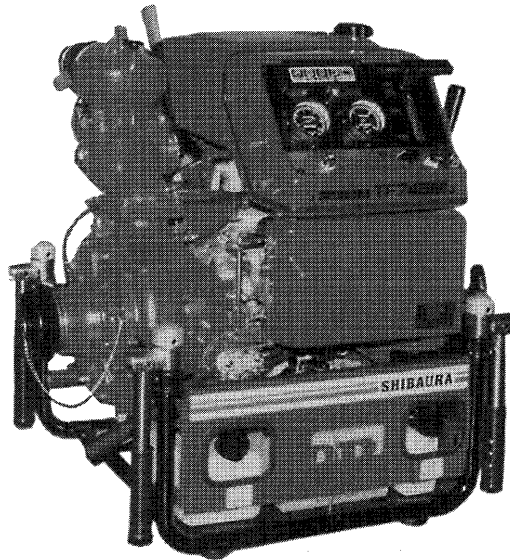


SHIBAURA

OWNER'S MANUAL

TF640M,(S) TF640MH,(SH)
TF745M TF745MH,(SH)



Please read this operation manual carefully in order to operate the Shibaura Firefighting Pump in safe and in correct manner. If the pump is operated incorrectly, any accident may result. If this manual is missing or damaged, give an order for new one to us or our agent promptly.


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For safe operation

The operation manual is a part of the machine.

Keep this manual carefully with the firefighting pump.

- In this manual,  mark indicates particularly important instructions for safe operation. You should pay attention specifically to those marked descriptions and observe such instructions.

 Danger	If the machine is operated incorrectly, there is high possibility of death or serious injury.
 Warning	If the machine is operated incorrectly, death or serious injury may result.
 Caution	If the machine is operated incorrectly, minor injury or damage of assets may result.

- Quality or performance of the machine may be improved or its components may be modified for the purpose of safety. For this reason, contents of the text in this manual or photographs or illustrations may be different from actual ones.

1. Items to be observed for safety

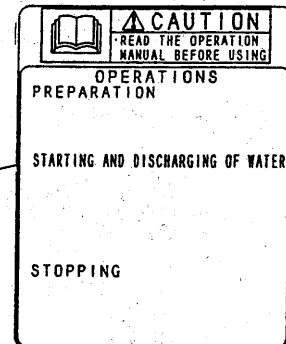
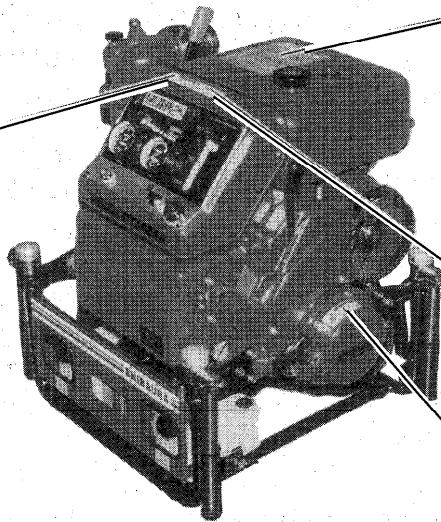
1. Warning label attaching positions

Warning labels are attached on the following positions of the fire pump. If any of them is peeled off or damaged, place an order for it specifying its part number.

Operation side



Part No. 290192390



Part No. 290192490

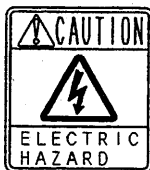


Part No. 290192380

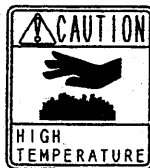


Part No. 290192430

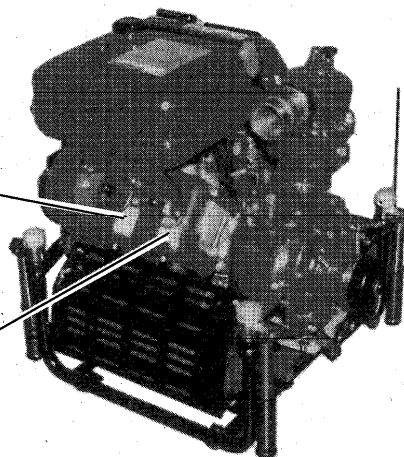
Non-operation side



Part No. 290192410



Part No. 290192400



1. Items to be observed for safety

2. Caution marks

1) General instructions

⚠ Warning

The firefighting pump should be operated only by such a man among fire officers, firemen, volunteer disaster prevention expedition team member, maintenance/inspection service men that has been specifically trained for safety operation.

<If you do not observe the instruction>

Serious accident including death may result due to incorrect operation.

⚠ Caution

Be sure to carry out periodical maintenance inspections.

< If you do not observe the instructions>

Accident due to damage of the machine or components may result or firefighting activities may be interfered.

⚠ Warning

Headband, towel around neck, necktie, or towel carrying at the waist are prohibited. Wear a helmet, shoes with creepers, and clothes without looseness.

<If you do not observe the instruction>

You may be caught by the machine, or slip and fall, and injured.

⚠ Warning

Do not operate the firefighting pump if you cannot concentrate your attention on operation as you are drunken, fatigued, sick, or under influence of drug.

<If you do not observe the instruction>

Serious accident may result.

⚠ Caution

Do not use the firefighting pump for activities other than firefighting such as civil engineering work, irrigation, water sprinkling, etc.

<If you do not observe the instruction>

You may flip some objects to injure people or damage assets around you.

⚠ Danger

Do not suck in or discharge substances other than water such as combustibles, liquid such as chemical.

<If you do not observe the instruction>

Explosion, fire, burning, or poisoning may result.

⚠ Caution

When throwing away the battery, oil, or grease, entrust a professional industrial waste disposal dealer with their disposal.

<If you do not observe the instruction>

Fire may break out, you may be burned, or environment may be polluted.

⚠ Warning

Use only genuine parts and designated attachments.

<If you do not observe the instruction>

Accident, injury, or machine failure may result.

1. Items to be observed for safety

2) Caution before operation

⚠ Warning

Install the pump more than 3 m apart from combustibles.

<If you do not observe the instruction>

Fire may be caused because of high temperature exhaust gas.

⚠ Warning

Remove dried grass and other objects which may catch fire easily before installing the pump.

<If you do not observe the instruction>

Fire may be caused by the heated muffler.

⚠ Danger

Do not bring fire close when supplying fuel.

<If you do not observe the instruction>

The fuel may catch fire and explode.

⚠ Danger

When supplying fuel, do not allow the fuel level to exceed the "F" mark.

If fuel spills, wipe away immediately and do not bring that cloth close to fire.

<If you do not observe the instruction>

The cloth may catch fire and explode.

⚠ Caution

After supplying fuel, close the fuel tank cap securely.

<If you do not observe the instruction>

The fuel may catch fire and explode.

⚠ Warning

Do not leave the pump indoors or in the tunnel or the like where is badly ventilated.

<If you do not observe the instruction>

You may get poisoned by exhaust gas.

⚠ Caution

The firefighting pump should be carried, loaded or unloaded by 4 persons.

<If you do not observe the instruction>

The pump may drop on your foot and injure, or you may get a crick in the back.

⚠ Caution

Connect the water discharge hose securely and make sure that it does not fall out.

<If you do not observe the instruction>

If the hose falls out while water is being discharged, it may injure people around it.

⚠ Caution

Avoid bending, twisting or sharp turn of the hose when installing.

<If you do not observe the instruction>

The hose may leap up and injure people around it.

1. Items to be observed for safety

3) Caution during operation

⚠ Caution

After operating the tickler or discharging the fuel from the carburetor, wipe away the spilt fuel immediately.

<If you do not observe the instruction>

The spilt fuel may catch the fire.

⚠ Caution

When starting the engine using a rope, be careful for your clothes or gloves not to be caught in.

<If you do not observe the instruction>

You may be injured.

⚠ Caution

When starting the engine using a rope, do not allow people to be within 2 m around the pump.

<If you do not observe the instruction>

They may be beaten by your elbow or the rope and injured.

⚠ Warning

Be sure to tighten the recoil starter securely during operation.

<If you do not observe the instruction>

You may be caught by the pulley or belt and get wound.

⚠ Danger

Before replenishing the fuel during operation, wait until the engine cools down enough.

<If you do not observe the instruction>

The fuel may catch fire and explode.

⚠ Caution

Open and close the water charge valve always after returning the engine speed to low speed.

Hold the nozzle at the end positively and wear the back band before charging the water.

<If you do not observe the instruction>

You may lose control of the nozzle at the end and be injured when water charging is started.

⚠ Caution

Do not direct the nozzle to other people or do not peep into it.

<If you do not observe the instruction>

You may be sent flying by high pressure and injured.

⚠ Caution

Do not touch the ignition plug or high-tension cord during operation.

<If you do not observe the instruction>

You may receive an electric shock.

⚠ Caution

Never touch the muffler and exhaust pipe during operation since they become very hot.

<If you do not observe the instruction>

You may be burnt.

1. Items to be observed for safety

Caution

Wipe away spilt oil or oil fiown out of the vacuum pump immediately.

<If you do not observe the instruction>

You may slip and fall, and be injured.

4) Caution for inspection and service

Warning

When the battery cap is removed, do not bring fire close to it.

<If you do not observe the instruction>

The electrolyte in the battery may catch fire and explode.

Warning

The electrolyte of the battery is strong acid. Do not allow it to touch your body or clothes.

If the electrolyte remains, dilute it with water to more than 10 times and then discard.

<If you do not observe the instruction>

You may get burnt or clothes or assets may be damaged.

Caution

Before starting inspections or service, stop the engine and wait until it cools down sufficiently.

<If you do not observe the instruction>

You may be hurt or burnt and fire may occur.

Caution

When disconnecting the battery cord, remove the (-) cord first and when installing, install the (+) cord first.

<If you do not observe the instruction>

Short circuit may occur and burn you.

Warning

Remove the packing materials from the charger when charging with it.

<If you do not observe the instruction>

Fire may break out.

Caution

Install the charger at a dry and well-ventilated place where it does not get wet.

<If you do not observe the instruction>

Electric shock or fire may result.

Caution

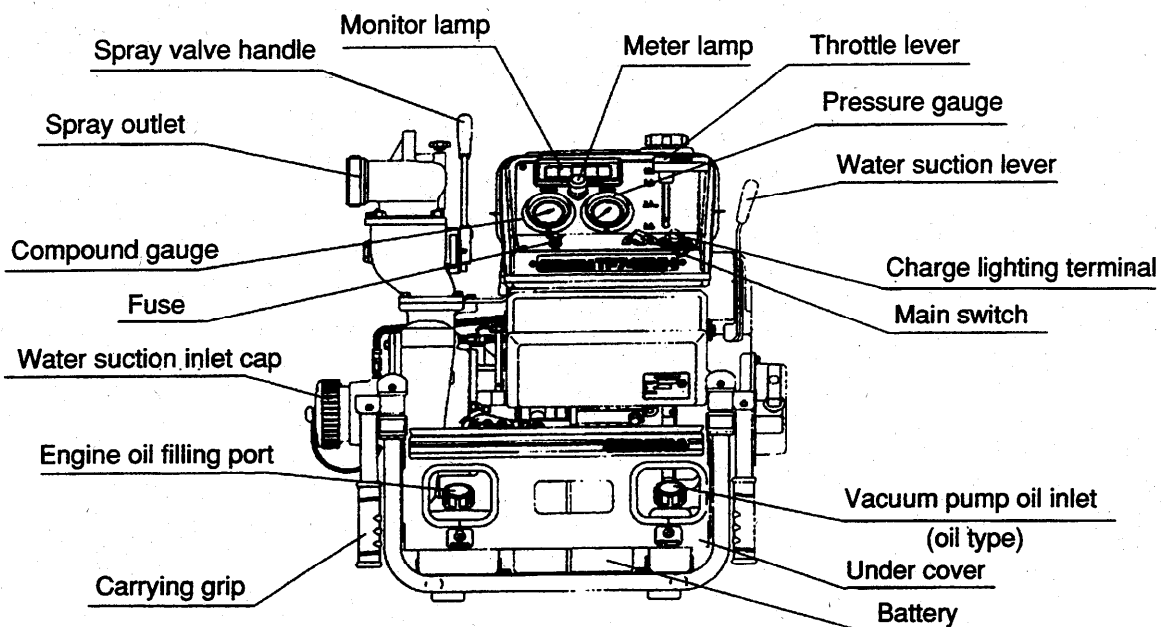
Only use a designated charger.

<If you do not observe the instruction>

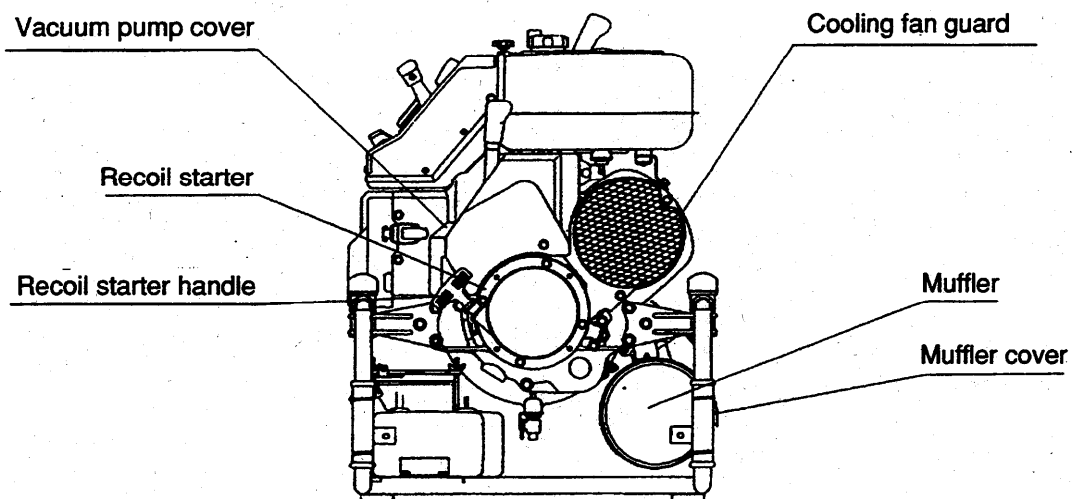
Fire may occur due to overheat or damage of the wiring by a fire.

2. Names of each part

Operation side

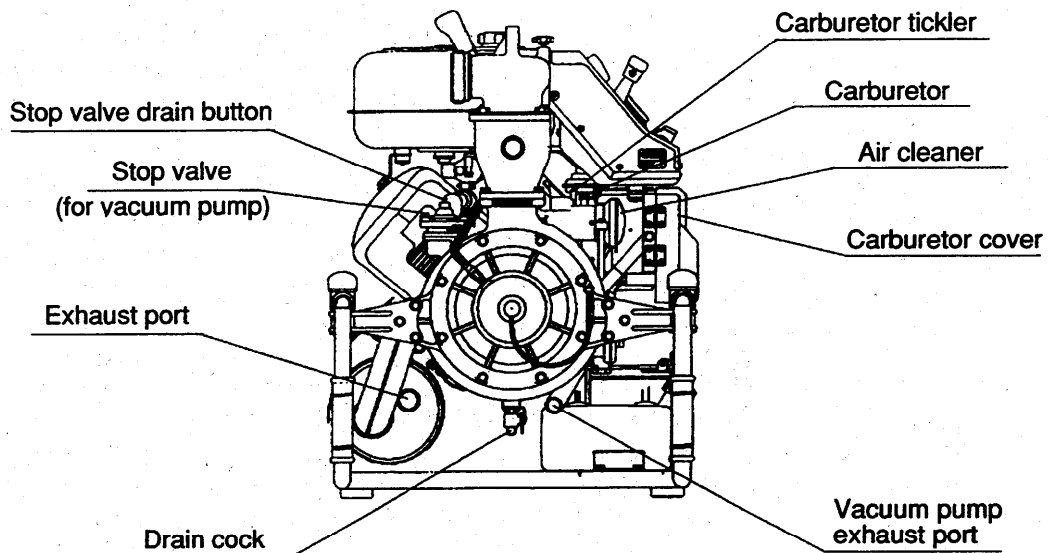


Recoil starter side

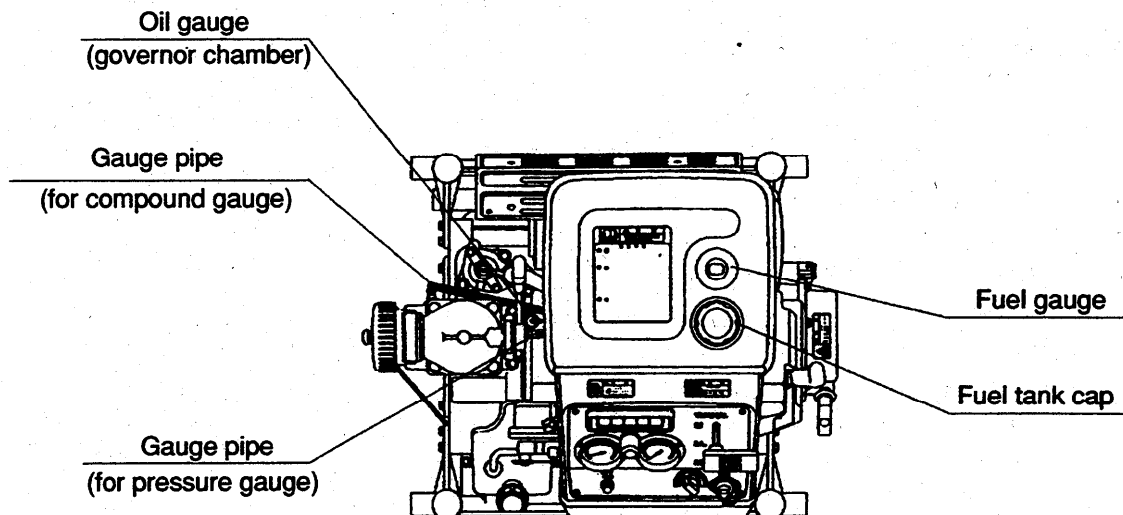


2. Name of components

Pump side



Top surface side







3. Functions of monitor lamps

On a version provided with a starter motor, it operates by setting the main switch to "Run 2". Turning on lights all of 4 lamps. If not, the battery voltage is poor or the circuit is faulty and, therefore, a repair work is required. In several seconds, all extinguish.

A version without starter motor has no monitor check functions.

During spray, all are extinguished except that they light when operating the starter motor because the battery voltage drops.

An item for which the lamp is lit during running or spraying is faulty.

Display	Function	Operation	Remedy
 Fuel	Indicates the fuel must be added.	Lights when the fuel tank level is too low.	Pour regular fuel.
 2 cycle engine oil	Indicates 2 cycle engine oil must be added.	Lights when the oil tank level is too low, thereby stopping the engine.	Add 2 cycle engine oil.
 Vacuum pump lubricant	Indicates vacuum pump oil must be added.	Lights when the tank level is too low.	Add motor oil to the vacuum pump.
 Drain valve	Indicates the pump drain valve is open.	Lit when the pump drain valve is open.	Close the pump drain cock.

4. Handling (before use)

1. Unpacking

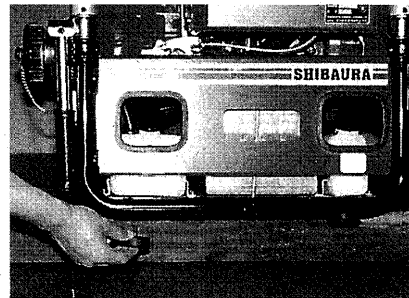
- (1) Make sure the model indicated on the front of case is an ordered one.
- (2) Cut the bands which bundle the case.
- (3) By pulling up the case, the main unit and accessories appear.
- (4) Check the contents.

A. Main unit (whether as ordered or damaged)	1
B. Battery (M, MH)	1
C. Battery electrolyte (M, MH)	1
D. Charger (M, MH)	1
E. Tool bag	1
F. Pump cover	1

A thin PVC cover is put on the machine. Be sure to remove it before running.

2. Mounting the separately sent parts

- (1) Mounting the rubber dampers.
The tool box contains 4 rubber dampers.
 - a. Raise a side of the main unit and place a wood block underneath.
 - b. Screw 2 rubber dampers onto threads under the bed clockwise all the way.
 - c. Likewise, place a wood block under the opposite side and screw on 2 rubber dampers securely.
 - d. Remove the wood blocks.
- (2) Mounting the battery (M, MH)
 - a. Peel off the sealing paper from the battery.
 - b. Fill the battery with electrolyte up to the level line.

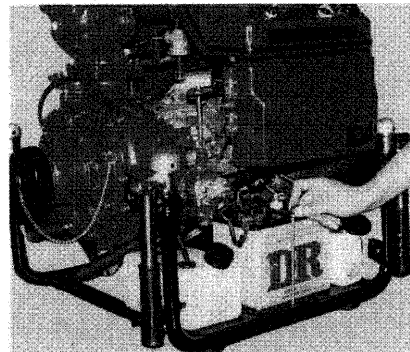


4. Handling (before use)

⚠ Warning

- The battery electrolyte is a strongly acid substance. Your body nor clothes must not be stained with it.
- Discard electrolyte which remain unused upon diluting it tenfold or further.
- Electrolyte may cause burn or damage clothes or other objects.

- c. While pulling up the under cover of the main unit, pull it off this side.
- d. Put plugs into each injection port. Remove the sensor plug from the battery cord, and screw it in the 3 rd cell from the positive terminal.
- e. Using 2 rods and 1 holder contained in the tool box, mount the battery on the bed.
- f. Mount the battery cord positive wire (red PVC tape wound on) and then negative wire (black PVC tape wound on) in this order on the battery using the attached hexagon bolts and nuts.



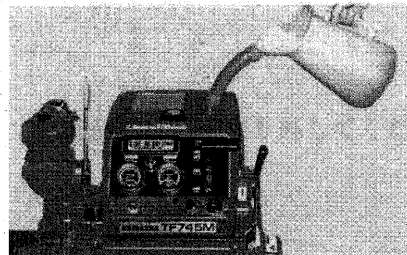
⚠ Caution

- When detaching the battery cord, remove the negative wire first. When attaching, mount the positive wire first.
- Short-circuiting may cause fire or burn.

- g. Put sensor plug wires into the wire harness. Engage the flat terminals together.
- h. Mount the under cover.
- i. Carry out charging for 2-3 hours.

3. Refilling

- (1) Pouring the fuel (tank capacity 13 L)
The fire pump is a separate filling type. Pour regular automotive fuel until the fuel gauge indicates "F". Do not pour mixed fuel.



4. Handling (before use)

⚠ Danger

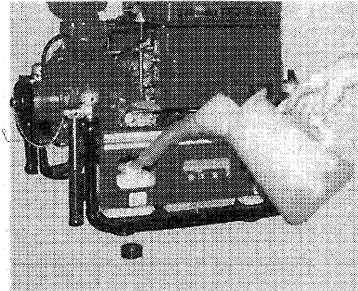
- While pouring the fuel, keep away fire.
- Do not pour the fuel beyond "F" on the fuel gauge.
- If fuel spilt, immediately wipe it off. Do not get the rag used for wiping near fire.
- There is a fear of inflammation or explosion.

⚠ Caution


- After filling the tank with fuel, securely tighten the fuel tank cap.
- There is a fear of inflammation or explosion.

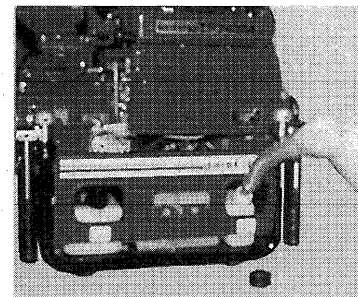
(2) Pouring the 2 cycle engine oil

The fire pump is a separate filling type. Fill the engine oil tank located underneath with 2 cycle engine oil.



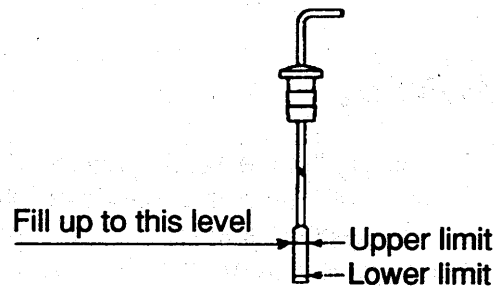
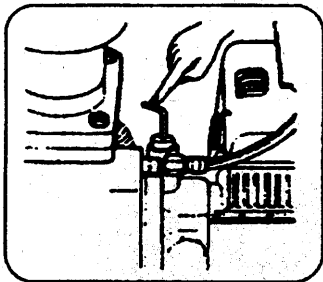
(3) Pouring the vacuum pump oil

Pour motor oil (10W30 equivalent) into the oil tank of the oil filling vacuum pump. The oil-less vacuum pump marked  need not be filled with oil.



(4) Checking the oil level in governor chamber

- For check, read the oil gauge.
- If necessary, pour motor oil (10W30 equivalent).



4. Handling (before use)

4. Installation

- 1) Install the pump on flat ground near a water source.

⚠ Warning

- The installation place must be at least 3 m away from combustible objects.
- Remove hay or other easily combustible things before installation.
- A fire may be caused by exhaust gas or muffler heat.

⚠ Warning

- Do not install the pump indoors, in tunnel or the like where the ventilation is poor.
- There is a fear of intoxication by exhaust gas.

- 2) Be sure to provide the water suction inlet of the water suction pipe with strainer and rattan basket and put the altogether at least 30 cm below the water level.
Otherwise, garbage or air may be sucked, thereby making the spraying impossible.
- 3) The water suction height must be 3 m or less, where possible. An excessive water suction height may deteriorate the pump capacity or water could not be pumped up.
- 4) Place the water suction pipe so that it rises toward the pump, and tighten it securely on the water suction inlet of the pump. Peak or valley may not feed water properly.

⚠ Caution

- Connect the spray hose securely, and make sure it does not come off.
- If it is separated while spraying water, injuries may be caused.

⚠ Caution

- The spray hose must not be folded, twisted nor abruptly bent.
- The spray hose may jump up, thereby causing injuries.

5. Fireman

- 1) The fire pump is small but is a high performance machine which produces powerful force. Wrong use may cause serious accidents including death.

4. Handling (before use)

⚠ Warning

- Only official fire brigade, fire band, autonomous calamity prevention crew, self-defense fire band, maintenance and checkup group, etc. which have received education and training concerning the safety are allowed to operate the fire pump.

2) Wear clothes suited for the operation.

⚠ Warning

- Headband, neckerchief, necktie, waist towel, etc. are inhibited. Wear helmet and anti-skid shoes. The clothing must not be too ample.
- There is a fear of being caught by machine, slipping or tipping, thereby causing injuries.

3) Do not proceed to operation when the physical conditions are poor.

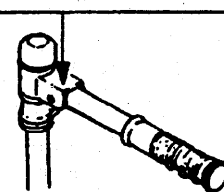
⚠ Warning

- Do not operate nor handle the machine if you cannot perform the operation attentively on account of drunkenness, overwork, disease, narcotism, etc.
- There is a fear of serious accidents.

6. Carrying

The angle of carrying grip can be changed by 90 degrees. Turn it so as to be easy to carry.

Press to turn 90°



⚠ Caution

- When holding the carrying grip, do not touch the bend.
- A finger may be pinched and wounded.

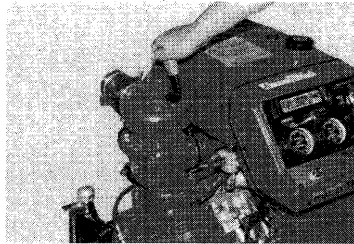
⚠ Caution

- The fire pump must be carried or unloaded by 4 persons.
- There is a fear of injury by dropping on foot, or suffering from lumbago.

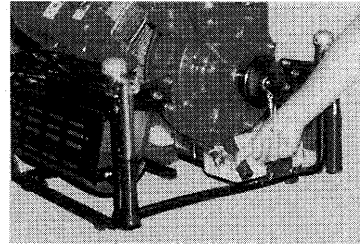
4. Handling (operation method)

1. Starting

- Before starting the engine, close the spray valve and pump drain cock.



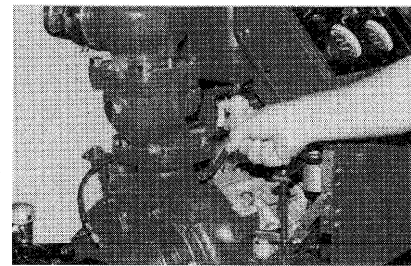
Spray valve



Pump drain cock

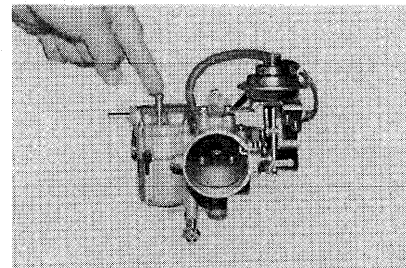
1) Open the fuel cock (1).

- Throw the fuel cock lever directly downward to "Open" to open the fuel cock.



2) When it is cold, use the carburetor tickler.

- If it is hard to start with the auto choke only when it is cold, press the carburetor tickler for 2-3 seconds.
- Do not use it while the engine is still warm after the end of running. If used, excessive fuel will make starting hard.
- If the engine is hard to start on account of an abused tickler, close the fuel cock and discharge fuel through the carburetor drain cock.



Carburetor

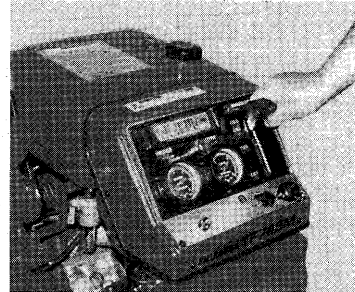
⚠ Caution

- Wipe off spilt fuel immediately after the tickler is operated or fuel is discharged from the carburetor.
- There is a fear of inflammation or fire.

4. Handling (operation method)

3) Position of throttle lever

Set the throttle lever (2) to "Start".



4) Turn the main switch (3) clockwise all the way to start the starter motor, thereby starting the engine.

- After starting, select "Run 2".
- Running at "Run 2" charges the battery via the charger circuit built in the fire pump.

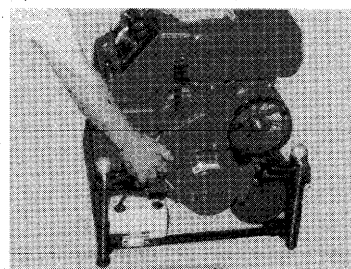


*** In case of running without the battery,**

- Select "Run 1".
- In case of running at "Run 2", panel lamp burnout, etc. may occur.

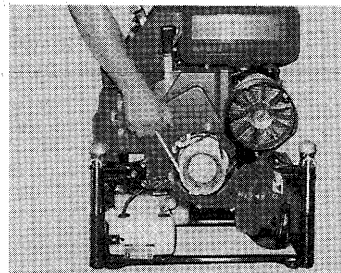
5) Use of recoil starter

- Strongly pull the handle of recoil starter.



*** If the rope of recoil starter is cut**

Disengage the lock of recoil starter, open the recoil starter, wind the furnished start rope on the recoil pulley, and strongly pull it.



4. Handling (operation method)

⚠ Caution

- When starting by the recoil starter rope, take care so that clothing or glove will not be caught.
- There is a fear of injury.

⚠ Caution

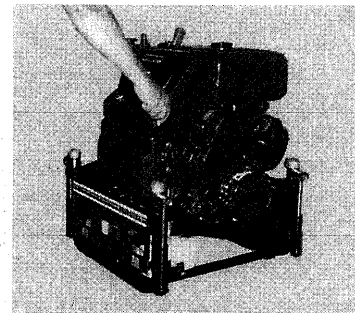
- Before starting by the recoil starter rope, keep persons at least 2 m away.
- There is a fear of injury by hitting via elbow or rope.

⚠ Warning

- During the run, the recoil starter must be closed.
- There is a fear of being caught by the pulley or belt or suffering from a trauma.

2. Water suction

- 1) Set the throttle handle (2) to "Water suction".
 - 2) Pull the water suction handle (5) this side, and operate the vacuum pump for water suction.
- Immediately after the pressure gauge has swung, return the water suction handle.



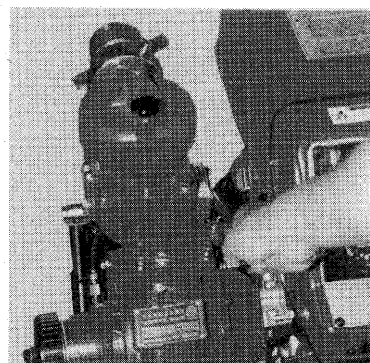
⚠ CAUTION (lubrication type vacuum pump)

- Immediately wipe off oil spilt or discharged from the vacuum pump.
- There is a fear of slipping or tipping, thereby causing an injury.

4. Handling (operation method)

3. Spraying

- 1) Gradually open the spray valve handle (6) toward "→ Open" until held back.
 - While communicating with the forward man according to the site circumstances of fire, adjust the pressure by throttle lever (2).
 - The pressure gauge and compound gauge must be within the blue zone.
- 2) Use of safety nozzle
 - If the lance nozzle is not put when spraying water for embers extinction or water change in tank, for example, a cavitation may occur, thereby breaking the engine or pump.
 - Be sure to mount the furnished safety nozzle on the intermediate coupling for spray.
- 3) If long time spray has caused an overcharge or before running with the battery detached, set the main switch to "Run 1". If the main switch is set at "Run 1", the monitor lamp and meter lamps are not lit but the search light is lit.



⚠ Caution

- Be sure to return the engine to low speed before opening or closing the spray valve.
- Hold the lance nozzle securely, and wear the back band before spray.
- There is a fear of injury by swing of the lance nozzle.

⚠ Caution

- Do not spray water to persons, nor peep in the nozzle.
- There is a fear of injury by sway via pressurized water.

4. Handling (operation method)

⚠ Caution

- While running, do not touch the spark plugs nor high voltage cord.
- There is a fear of electric shock.

⚠ Caution

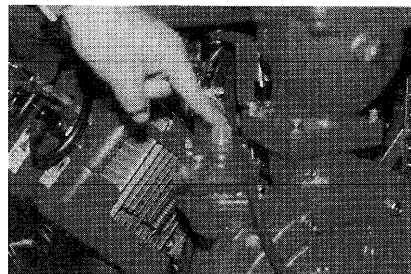
- During and immediately after the running, the muffler and exhaust pipe are hot. Never touch them.
- There is a fear of burn.

4. Shutdown

- 1) Set the throttle lever (2) to "Low speed".
 - If the engine is hot, idle it for about 1 minute to allow it to cool down.
- 2) Set the spray valve handle (6) to " → Close" to close it.
- 3) Set the main switch (3) to "Stop".
 - On a version without starter motor, press the stop switch (3) until the engine stops.

5. Draining

- If water remaining in the fire pump is left as it is, rust may be produced or cracks by freezing may occur when cold. Be sure to drain the fire pump before storing it.
- 1) After sea water or contaminated water was used, be sure to spray pure water for at least 5 minutes.
 - 2) Open and close the spray valve handle.
 - 3) Open the pump drain cock.
 - 4) Press the drain button of the stop valve.
 - 5) Close the drain cock of pump.
 - 6) Screw in the water suction port cap.



4. Handling (operation method)

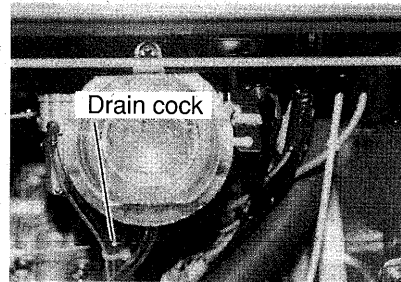
- 7) Start the engine, and pull the water suction handle for about 5 seconds.
- 8) Stop the engine.
- 9) Open the drain cock of the pump, vent it to atmosphere, and close it again.

* Unless it is vented, the rubber of each valve may be deformed, thereby shortening the life.

6. Storing

The fire pump is stored by far longer than operated. Unless it is correctly stored, it will not function when using next time or its life will be shortened.

- 1) Environment
Store the pump in a dry place which is not hot and is not exposed to dust or direct sunshine.
- 2) Fill it with fuel, lubricating oil, cooling water, etc. up to specified levels.
- 3) Drain the fuel from the carburetor through the drain cock located on the bottom.



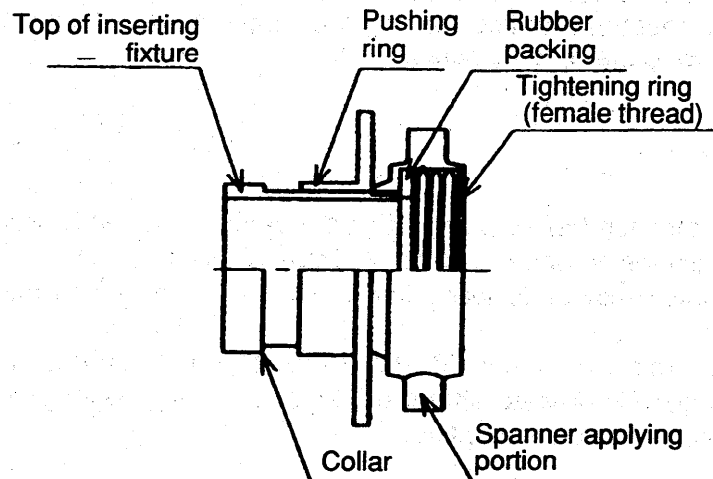
⚠ Caution

- Wipe off spilt fuel immediately after the tickler is operated or fuel is discharged from the carburetor.
- There is a fear of inflammation or fire.

- 4) Put the pump cover.

4. Handling (operation method)

7. Connecting a hose



⚠ Warning

- Engage the fixture until a click sound is heard. Holding the receiving fixture, pull the put-on fixture to make sure the claws are engaged with the flange.
- Securely tighten the threaded fixture until the packing of receiving fixture (internal threads) will completely be in touch with the put-on fixture (external threads).
- While in use (spray), never touch the pushing ring of the put-on fixture. If the pushing ring is pushed in while feeding, the fixture will leave, thereby causing a human accident.

4. Handling (relay spraying)

If the water source is far away in case of forest fire or city fire, more than two pump must be used for a relay spray. For a relay spray for which pumps are away from each other, judgment of circumstances based on sophisticated knowledge and organization force based on routine training are required. The following explains an operation method for general relay spray.

1. Installation

- a) Determine the number of pumps to be installed and place according to the number of extension hoses and height from the water source.
- b) Screw an intermediate coupling into the water suction port for connecting a spray hose.
- c) Mount a double port valve on the intermediate coupling of spray valve. Unless the hose is drained after the end of spray, the water pressure may not allow to detach the hose coupling.

2. Running

- a) Feed the source pump first.
- b) Open the spray valve handle of 2nd pump and subsequent.
- c) Spray water at a status where the reading of compound gauge and pressure gauge is within the blue or yellow zone. (Compound gauge of pumps beyond 2nd pump must not be lower than 0.05 MPa.)
- d) Before stopping a spray, successively idle the end pump and preceding ones.

Caution

If the lance nozzle or spray outlet valve is closed while spraying, the pump pressure will rise excessively, whereby the pumps or hoses may break.

4. Handling (operation method at cold climate in winter)

1. Before starting the engine

- 1) When cold, the battery capacity drops considerably. Make it a rule to charge it periodically.
- 2) Slowly pull the rope of recoil starter to see whether the pump rotates or not.
 - If it does not rotate, pour warm water through the water suction inlet of pump or thaw it in a warm room.
- 3) Turn the vacuum pump belt by hand to see whether the vacuum pump rotates or not.
 - If it does not rotate, blow warm air on the vacuum pump exterior or thaw it in a warm room.

⚠ Danger

- Never use a fire for thawing.
- There is a fear of inflammation or explosion.

2. Starting

- 1) When cold, press the tickler for several seconds.
- 2) Immediately after starting, the running may be poor. Idle the engine for 1-2 minutes until it warms up.

3. Treatment after end of spraying

- 1) Drain the pump. (See 4. Handling (operation method), 5. Draining.)
- 2) Close the water suction inlet cap.
- 3) Start the engine.
- 4) Interconnect the pump drain cock and anti-freeze mixture vessel by a hose. Pulling the water suction handle, open the drain cock of pump to aspire the anti-freeze mixture. (For the concentration, see 5. Periodic checkup, 3) Freezing concentration of cooling fluid.)

4. Handling (operation method at cold climate in winter)

- 5) When anti-freeze mixture has come out from the exhaust pipe of the vacuum pump, return the water suction handle and close the drain cock of pump.
- 6) Fill the hoses, fixtures, etc. also with anti-freeze mixture.

Caution: Do not use alcohol or the like because it deteriorates the rubber seals.

5. Periodic checkup

1. Periodic checkup table

Item	Every running	Every month	Every 6 months	Every year
Adding fuel	●			
Adding 2 cycle engine oil	●			
Adding vacuum pump oil	●			
Eliminating dust, etc.	●			
Checking battery level and recharging		●		
Cleaning fuel cock filter			●	
Changing fuel in tank			●	
Cleaning vacuum pump tank (oil)				●
Cleaning spark plugs			●	
Checking V belt (vacuum pump and fan)			●	
Starting and vacuum test		●		
Water suction and spray test		●		

Caution: The above table indicates checkup frequency under normal operating conditions. Under particular conditions, carry out checkup regardless of the above.

Caution

- Be sure to perform periodic checkup.
- There is a fear of accidents or inconvenience in fire fighting due to breakage, etc.

5. Periodic checkup

2. Checkup method

- In order that the fire pump can be kept safe and exhibit its functions fully, its periodic checkup is indispensable. Check it correctly and safely by the following method.

Caution

- Before starting checkup and maintenance, stop the engine and allow it to cool down sufficiently.
- There is a fear of injury, burn or fire.

1) Checking and charging the battery

a. Mounting and dismounting the battery

Caution

- When detaching the battery cord, remove the negative wire first. When attaching, mount the positive wire first.
- Short-circuiting may cause fire or burn.

b. Checking the electrolyte

- The battery electrolyte reduces by chemical reaction and evaporation. If the level is below the level line, add distilled water.

Warning

- The battery electrolyte is a strongly acid substance. Your body nor clothes must not be stained with it.
- Discard electrolyte which remain unused upon diluting it tenfold or further.
- Electrolyte may cause burn or damage clothes or other objects.

c. Recharging

- Even if the battery is not used, its charge decreases every day by self-discharge. Recharging is required to make up for self-discharge and consumption by the starter motor, lamps, etc.

Caution

- For charging, do not use other than a designated charger.
- Overheat or wire burnout may cause a fire.

5. Periodic checkup

Warning

- When the battery cap is removed, do not get a fire near it.
- There is a fear of inflammation or explosion.

d. Replacement period

- The performance of battery abruptly drops after 2 years even if it is handled correctly. Replacing it earlier is recommended.

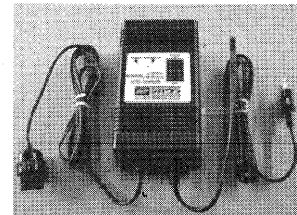
Caution

- Entrust discarding of battery, oil, etc. to an agent specialized in treatment of industrial wastes.
- There is a fear of fire, burn or environmental pollution.

2) Handling of Shibaura full-automatic charge

a. Unpacking

Take out the charger from the box



Warning

- Remove packaging materials from the charger when charging with it.
- If not, a fire may be caused.

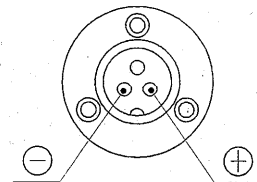
b. Place of installation

Caution

- Install the charger at a dry and well ventilated place where the battery does not get well.
- If not, electric shock or fire may result.

c. Battery Charger Operating Manual

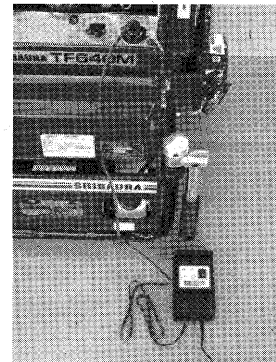
- ① Turn off every current consumer which is connected to the Battery and Pump.
- ② Make sure power switch on the Battery Charger is OFF.
- ③ Plug the connector of Battery Charger into AC 220V outlet.
- ④ Plug the Battery Charger cord into the pump socket.



5. Periodic checkup

- ⑤ Turn on the power of the Battery Charger.
POWER LED (RED) will turn on, and will start charging automatically.
- ⑥ CHARGE UP LED (GREEN) will turn on if the battery has reached more than 80 percent charge level.
Once the battery has reached full charge, it will maintain the battery at full charge (GREEN LED).
- ⑦ To stop charging battery, turn off the power before unplugging the connector and cord.

	POWER LED (RED)	POWER LED (GREEN)
POWER OFF	—	—
CHARGING	ON	—
80% CHARGED	ON	ON
FULL CHARGED	—	ON



d. Battery Charger safety function

Safety Function shutdown the circuit when the Battery Charger detects the unusual power current.

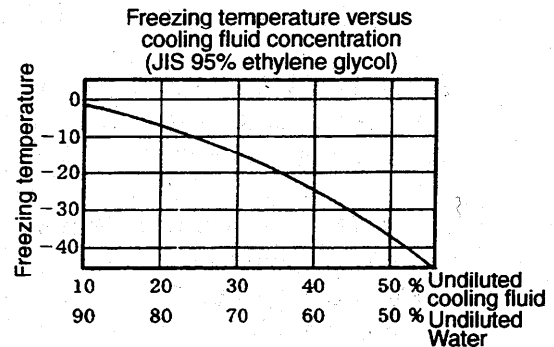
e. Troubleshooting

CASE	CAUSE	SOLUTION
POWER LED (RED) will not turn on	Improper connection of power connector	Connect the plug firmly
POWER LED (GREEN) will not turn on	Improper connection of Battery Charger cord	Connect the cord firmly
	Breaker trip	Get rid of the cause of the breaker trip, then press the knob to recover battery.
	Over discharged battery	Recharge the battery. Replace the battery if you can not recharge.
POWER LED (GREEN) turn on too soon	Battery wear out	Replace the battery with a new one

5. Periodic checkup

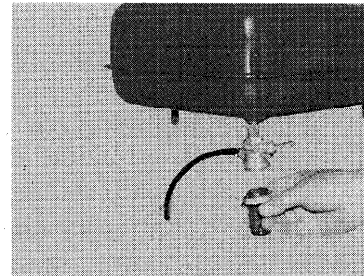
3) Freezing temperature versus cooling fluid concentration

The temperature at which the cooling fluid freezes depends on the mixture ratio with water. Adjust it according to lowest temperature of a district where the pump is used. It is factory adjusted to 45% (-30°C).



4) Cleaning the fuel cock filter

- Close the fuel cock.
- Loosen the ring nut by pliers, etc.
- Wipe off dust from the cup by rag, etc.
- Remove the filter from the fuel cock, and wash it with gasoline.
- Remount it securely. Be sure to open the fuel cock, and carefully check whether it leaks or not.
- Close the fuel cock.



5) Changing the fuel in fuel tank

If fuel is kept for a long time, its quality may deteriorate, its starting ability may degrade, the carburetor may be clogged with solids, or a corrosion may occur. There is no such inconvenience in case of refilling upon consumption of more than half the fuel. If refilling is small, change the fuel with new one every 6 months.

⚠ Caution

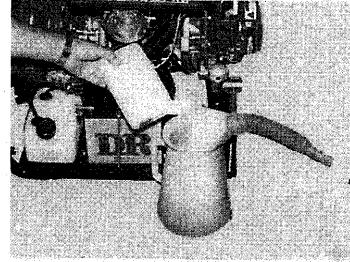
- While adding fuel, do not get a fire near it.
- There is a fear of inflammation or explosion.

5. Periodic checkup

6) Cleaning the vacuum pump lubricant tank

Peep into the refilling port of the vacuum pump lubricant tank and, if contaminants are accumulated on the bottom, clean it.

- Loosen 2 set bolts for the tank.
- Clean the tank interior.
- Remount the tank.
- Fill it with oil or cooling fluid up to a specified level.



7) Cleaning the spark plugs

Use the spark plugs specified for a particular model.

Clean the spark plugs contaminated with exhaust gas or carbon.

- Stop the engine and allow it to sufficiently cool down beforehand.
- Remove the plug caps and, using the box spanner for spark plug, remove the spark plugs.

Model	Spark plug
TF745 M, NH	NGK B8HV
TF640 M, S, MH, SH	

⚠ Caution

- While running, do not touch the spark plugs or high voltage cords.
- There is a fear of electric shock.

- Clean the spark plug exterior, interior and electrode.
- Adjust the spark gap as illustrated on the right.
- Tighten the plugs on the cylinder head and push on their caps.

Gap of electrodes of ignition plug

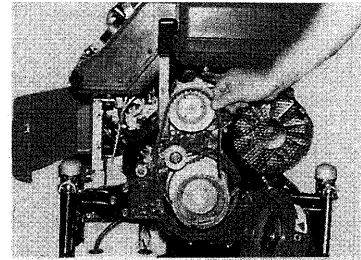


5. Periodic checkup

8) Checking the vacuum pump belt

If the vacuum pump belt is elongated, worn or cracked, replace it.

- a. Open the recoil starter.
- b. Remove the plastic cover from the vacuum pump side.
- c. Take out the belt from the pulley groove.
- d. Put a new belt into the pulley groove.
- e. Remount the cover.



9) Vacuum test

Even at the time of routine checkup by which the following spray test is unavailable, be sure to carry out a vacuum test. If the vacuum performance is poor or if there is a vacuum leakage, the water suction may be impossible or water may lose its force while spraying water at a spraying site.

- a. Make sure a rubber packing is located in the water suction inlet cap, and tighten it securely.
- b. Close the drain cock of pump.
- c. Start the engine, pull the water suction lever this side, and operate the vacuum pump.
- d. When the vacuum reading on the compound gauge is between -0.06 and -0.08 MPa, return the water suction lever and stop the engine.
- e. Leave this status for 1 minute. If the reading remains unchanged, the result is normal.
 - * If there is a change, ask a local sales agent for repair.
- f. Open the drain cock of pump, vent it to atmosphere, and then close the drain cock.
- g. Check whether the consumption of vacuum pump oil during vacuum pump operation or cooling fluid is normal.

5. Periodic checkup

10) Spray test

Spray water and then check whether there is any anomaly or not.

- a. Whether unusual sound is produced.
- b. Whether water flow discontinues.
- c. Whether water suction is too slow.
- d. Whether there is leakage.
- e. Whether starting ability is normal.
- f. Whether any part is loose.
- g. Whether fuel spills.
- h. Others.

If any anomaly is recognized, take an appropriate action referring to "6. Trouble shooting table".

6. Trouble shooting table

For preventing the fire pump from troubles, routine checkup and maintenance are important. Let us locate any trouble at an early stage and remedy it immediately. For a trouble which is not easy to remove or not mentioned below, contact the sales agent specifying the model and serial number.

1. Engine area

Symptom		Cause	Remedy
Hard to start	Fuel does not flow to carburetor	1. Strainer or fuel pipe is clogged 2. Needle valve sticks 3. Short of fuel	1. Clean 2. Ditto 3. Refill
	Fuel does not flow to combustion chamber (check upon removing spark plug)	1. Choke does not close (auto choke) 2. Cranking speed is low (battery provided) 3. Carburetor (needle valve, jet) is clogged	1. Repair or adjust 2. Recharge battery 3. Clean
	Fuel flows to combustion chamber but engine does not start	1. Overflow (excessive fuel) 2. Tickler is abused (excessive fuel) 3. Choke is closed all the way (auto choke) 4. Fuel is not volatile (old) 5. Fuel is mixed with moisture 6. Lubricating oil is excessive	1. Check and adjust carburetor 2. Discharge oil upon removing crankcase seal plug 3. Replace diaphragm or clean pipe 4. Replace 5. Eliminate moisture 6. Adjust properly
	Fuel system is abnormal	1. Fuel strainer screen is clogged 2. Carburetor valve seat is clogged 3. Improperly adjusted or clogged carburetor slow system 4. Carburetor is not tightened securely	1. Clean 2. Ditto 3. Adjust or clean 4. Retighten
	Sparks are poor	1. Spark plug is broken or contaminated, or gap is improper 2. Leakage from high voltage cord 3. Leakage from plug cap 4. Ignition coil is faulty 5. CDI unit is faulty 6. Starter motor does not rotate properly	1. Replace plug or adjust its gap 2. Replace 3. Ditto 4. Ditto 5. Ditto 6. Recharge battery
	No sparks are produced	1. Ground wire is short-circuited 2. Spark plug is broken or contaminated 3. Spark plug gap is improper 4. Ignition coil is faulty 5. CDI unit is faulty 6. Wiring is not connected properly or is open-circuited 7. Main switch is faulty	1. Repair short-circuited part 2. Replace 3. Replace plug or adjust its gap 4. Replace 5. Ditto 6. Review and adjust connections 7. Replace

6. Trouble shooting table

Symptom		Cause	Remedy
Unsmooth starting	Compression is poor	<ol style="list-style-type: none"> 1. Piston is worn or seized 2. Piston ring is seized or broken 3. Oil seal is worn or broken 4. Lubricating oil falls short 5. Cylinder head gasket is broken 	<ol style="list-style-type: none"> 1. Replace or correct 2. Replace 3. Ditto 4. Refill properly 5. Replace
	Mechanical sound	<ol style="list-style-type: none"> 1. Flywheel is loose 2. Skirt is hit by on account of worn piston 3. Internal contact of armature plate 4. Foreign matter in crankcase 5. Impeller hits foreign matter or is in contact with casing 6. Loosening 	<ol style="list-style-type: none"> 1. Retighten 2. Replace piston 3. Reassemble 4. Eliminate foreign matter 5. Eliminate foreign matter or correctly reassemble 6. Retighten
Running malfunction	Unusual sound	<ol style="list-style-type: none"> 1. Fuel falls short (main jet clogged or wrong diameter part used) 2. Overload 3. Speed too low or high 4. Spark plug is wrong 	<ol style="list-style-type: none"> 1. Clean or replace 2. Change nozzle diameter or use safety nozzle 3. Adjust to proper speed 4. Replace with right spark plug
	Knock sound (fuel system anomaly)	<ol style="list-style-type: none"> 1. Fuel falls short (main jet clogged or wrong diameter part used) 2. Overload 3. Speed too low or high 4. Spark plug is wrong 	<ol style="list-style-type: none"> 1. Clean or replace 2. Change nozzle diameter or use safety nozzle 3. Adjust to proper speed 4. Replace with right spark plug
	Fuel system anomaly (misfire, hunting)	<ol style="list-style-type: none"> 1. Carburetor main jet clogged or maladjusted 2. Carburetor strainer clogged 3. Overflow 4. Carburetor mounted improperly 	<ol style="list-style-type: none"> 1. Clean or replace 2. Clean 3. Check and adjust carburetor 4. Correct mounting surface or replace carburetor
	Unsmooth rotation	<ol style="list-style-type: none"> 1. Governor maladjusted 2. Governor actuating part worn 3. Fly weight caulked poorly 4. Governor arm tightened poorly 5. Governor spring tension poor 6. Governor lever link hole is worn or there is too much play 	<ol style="list-style-type: none"> 1. Adjust 2. Replace 3. Correct or replace 4. Readjust and retighten 5. Replace 6. Replace or correct
	Cooling system anomaly	<ol style="list-style-type: none"> 1. Shutoff operation is excessive 2. Strainer is clogged 3. Cooling air is poor 	<ol style="list-style-type: none"> 1. Spray water from time to time 2. Clean 3. Ensure ventilation

6. Trouble shooting table

2. Pump area

Symptom		Cause	Remedy
Water suction improper	Vacuum not obtained	Pump proper is abnormal	<ol style="list-style-type: none"> 1. Air is sucked because suction pipe is not tightened properly 2. Air is sucked from top end of suction pipe 3. Drain cock is left open 4. Mechanical seal is faulty 5. Spray valve is clogged with contaminants or its sealing is faulty 6. Casing rubber packing is faulty 7. Casing is not tightened properly
		Does not rotate	<ol style="list-style-type: none"> 1. Vacuum pump is broken 2. Locked by foreign matter or frozen inside 3. V belt slipping or broken
		Rotates	<ol style="list-style-type: none"> 1. Vacuum pipe clogged or not tightened properly 2. Vacuum pump worn 3. Vacuum pump lubricant falls short
	Deterioration of suction function	Vacuum leakage (water flow discontinues at engine stop)	<ol style="list-style-type: none"> 1. Air is sucked on account of poor tightening of suction pipe 2. Mechanical seal is faulty 3. Oil seal is faulty 4. Vacuum pump cock leaks 5. Casing rubber packing is faulty 6. Spray valve rubber is worn or clogged with contaminants 7. Pressure gauge or compound gauge pipe is broken or not tightened securely 8. Vacuum pump handle position is improper
		No vacuum leakage	<ol style="list-style-type: none"> 1. Vacuum pump inside is damaged or worn 2. Vacuum pump operation time is short 3. Engine speed is low 4. V belt slips 5. Vacuum pipe or strainer is clogged 6. Suction strainer is clogged 7. Suction head is large 8. Vacuum pump oil falls short
	Poor spray	Engine is abnormal	<ol style="list-style-type: none"> 1. Output is poor 2. Throttle is maladjusted 3. Overload 4. Overheat
		Pump proper is abnormal	<ol style="list-style-type: none"> 1. Suction pipe strainer is clogged with contaminants 2. Impeller or casing is clogged with foreign matters 3. Suction head is large 4. Pressure gauge is faulty 5. Air is sucked from suction pipe 6. Inducer or impeller is loose 7. Frozen inside 8. Foreign matters are in casing

6. Trouble shooting table

3. Electric

Condition		Cause	Remedy
Starting poor	Starter motor does not rotate	<ol style="list-style-type: none"> 1. Battery capacity is poor 2. Magnet switch malfunctions 3. Start switch is faulty 4. Grounding is faulty 5. Fuse is blown 	<ol style="list-style-type: none"> 1. Recharge 2. Ditto 3. Check or replace wiring 4. Correct 5. Replace
Battery faulty	Battery is discharged soon	<ol style="list-style-type: none"> 1. Battery is deteriorated 2. Wiring is short-circuited 3. Charging is poor 4. Switch operation is wrong 	<ol style="list-style-type: none"> 1. Replace 2. Repair sort-circuited part 3. Recharge 4. Operate properly
Wiring faulty	Wiring is burnt	<ol style="list-style-type: none"> 1. Battery is connected reversely 2. Connected is short-circuited 3. Fuse is blown 	<ol style="list-style-type: none"> 1. Connect correctly 2. Correct 3. Replace
	Lamp does not light	<ol style="list-style-type: none"> 1. Grounding is faulty 2. Connection is faulty 3. Lamp is burnt out 	<ol style="list-style-type: none"> 1. Correct 2. Ditto 3. Replace
Lamp faulty	Lamp burns out	<ol style="list-style-type: none"> 1. Operation is improper 2. Rectifier is faulty 	<ol style="list-style-type: none"> 1. Turn off and then correct 2. Replace
OK monitor faulty	Fuel indicator lamp is faulty	<ol style="list-style-type: none"> 1. Monitor PCB is broken 2. Fuel sensor is faulty 3. Wiring is faulty or open-circuited 4. Grounding is faulty 	<ol style="list-style-type: none"> 1. Replace 2. Replace 3. Correct or replace 4. Correct ground wire
	Battery level warning lamp is faulty	<ol style="list-style-type: none"> 1. Battery capacity is poor 2. Electrolyte level is low 3. Sensor is faulty 4. Wiring is faulty or open-circuited 5. Grounding is faulty 	<ol style="list-style-type: none"> 1. Recharge 2. Refill 3. Replace 4. Correct or replace 5. Correct ground wire
	Vacuum pump lubricant or operation warning lamp is faulty	<ol style="list-style-type: none"> 1. Switch is faulty 2. Sensor is faulty 3. Wiring is faulty or open-circuited 4. Grounding is faulty 	<ol style="list-style-type: none"> 1. Replace 2. Replace 3. Correct or replace 4. Correct ground wire
	2 cycle engine oil refill indicator lamp is faulty	<ol style="list-style-type: none"> 1. Switch is faulty 2. Wiring is faulty or open-circuited 3. Grounding is faulty 	<ol style="list-style-type: none"> 1. Replace 2. Correct or replace 3. Correct ground wire

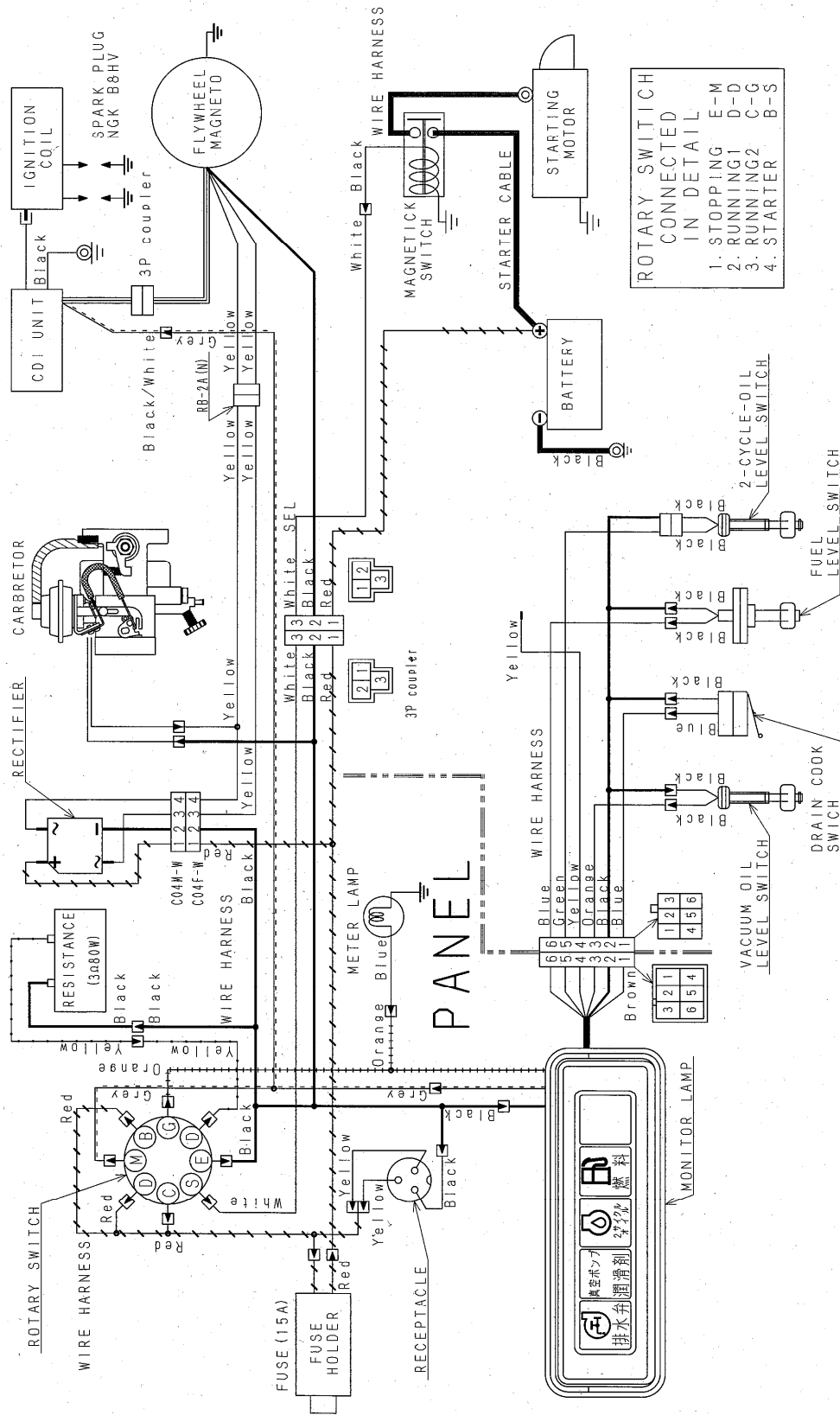
7. Specifications

1. Fire pump			
Model		TF745M	TF640M(S)
		TF745MH	TF640MH(SH)
Class		B-2	B-3
Long × wide × high(mm)		737 × 572 × 765	
Mass (kg)		90	90 (80)
			90 (80)
Type	Oil type vacuum pump	○	○
	Oil-less vacuum pump	○	○
2. Pump			
Method		High-pressure 1-stage turbine pump (with inducer)	
Spray rate (m³/min)		Normal 1.00	Normal 1.21
		High pressure 0.64	High pressure 0.99
Pump pressure (MPa)		Normal 0.70	Normal 0.55
		High pressure 1.00	High pressure 0.80
Nozzle diameter (mm)		Normal 24.0	Normal 28.0
		High pressure 17.5	High pressure 22.0
Speed of revolution (rpm)		5450	5300
Suction inlet		Nominal 75 mm, fire engine threads	
Spray outlet		Nominal 65 mm, fire engine threads (with Machino intermediate fixture)	
3. Vacuum pump			
Method	Lubrication type	Vacuum pump (M, S): 4-vane eccentric-rotary type	
	No-lubrication type	Oil-less vacuum pump (MH, SH): 4-vane eccentric-rotary type	
Maximum suction height (m)		Approx. 9 (-0.085 MPa)	
Drive method		V belt clutch type	

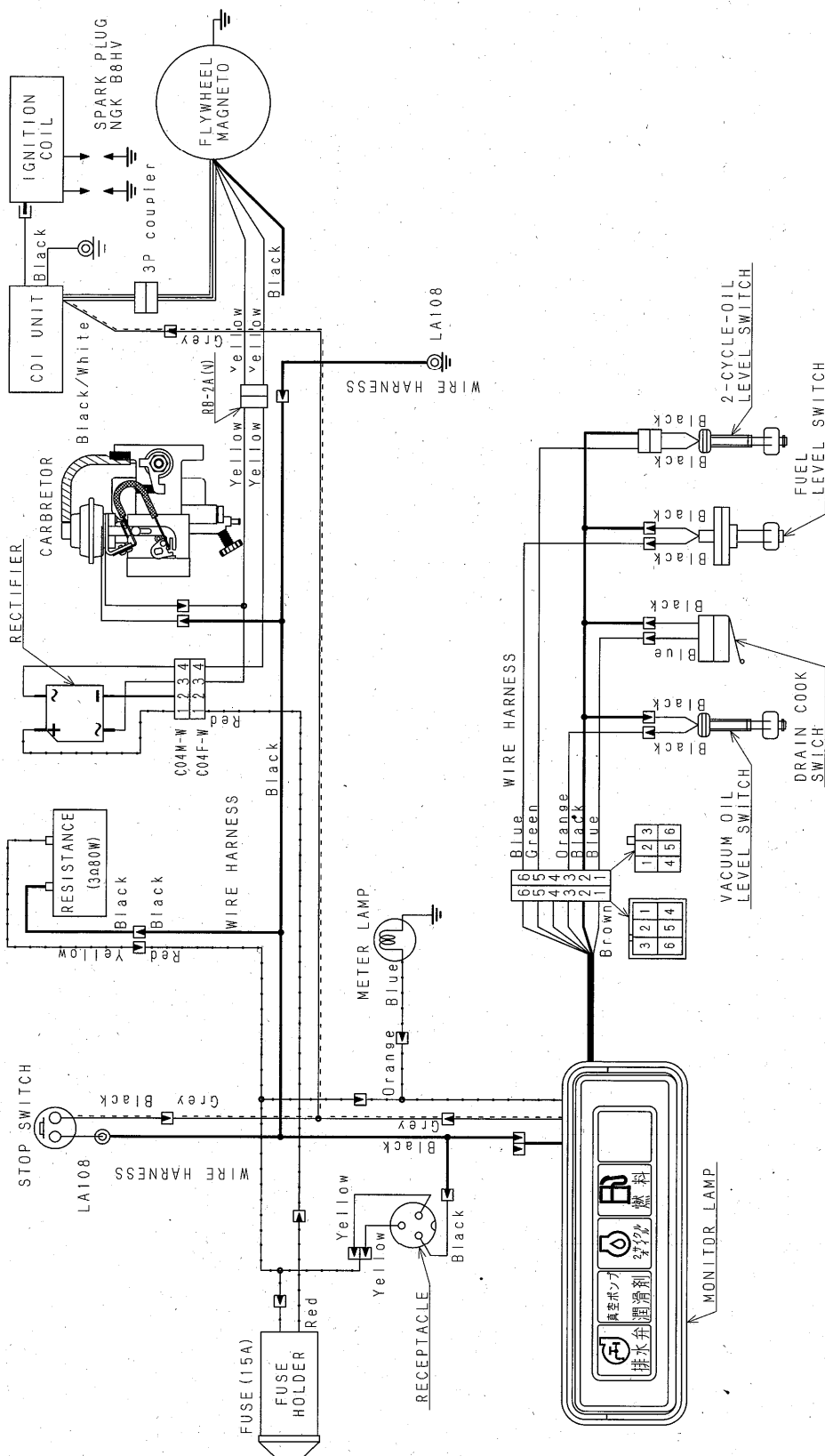
7. Specifications

4. Engine		
Fire pump model	TF745	TF640
Method	Tilted air-cooled 2-cycle 2-cylinder type	
Model name	E440C	
Bore × stroke × number	68mm × 60mm × 2	
Displacement (mL)	436	
Authorized output (kW)	22.8	22.8
Cooling method	Forced air cooling	
Lubrication method	Separate lubrication	
Lubricating oil	For 2 cycle engine	
Starting method	Starter motor type (with starter motor), recoil starter type, rope type	
Fuel	Regular automotive fuel	
Ignition method	No-contact magneto (CD ignition type)	
Spark plug	NGK B8HV	
Charge capacity (V/W)	12 / 75	
Fuel consumption (L/h)	14	
Fuel tank capacity (L)	13	
5. Accessories		
Battery	12 V—15.3 AH	1 pc
Battery electrolyte	Poly-tank	1 pc
Charger	12 V charger	1 pc
Tool bag	Tool kit, 1 instruction manual, 4 rubber feet, battery mounting kit	
Pump cover	1	
6. Optional parts		
Search light lamp	12 V—35 W	1 pc
Search light stand	1 tripod	

8. Wiring diagram (With self-starting motor)



8. Wiring diagram (Without self-starting motor)





IHI Shibaura Machinery Corporation

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