

C. 3 pieces of Springs which was degreased and cleaned are put in the Shaft (Photo 60) and fix the special jig of Spring Press Holder positioning the upper part into the Spring and lower part in the bump between Accumulator Case and Accumulator Tube firmly. (Photo 61)

! NOTE

Pay attention of your finger(s) not to be pinched by Springs and special jig.



Photo 60



Photo 61

D. Adjusting the balance of either side of Spring, screw up the both bolts one after the other until the Spring Holder becomes free from Outer Spring strength (Photo 62), and press down the Outer Spring until the screw thread portion of Cylinder is bulged. (Photo 63)

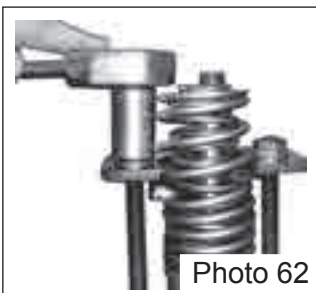


Photo 62



Photo 63

E. Prepare Special Jig for disassembling and assembling (Photo 53).

Set Special Jig in the correct position to meet the pins on Special Jig and holes on Spring Holder and screw it up. (Photo 64)

CAUTION

Pay attention to fix the Spring Holder because of pressure from Inner Springs.



Photo 64

F. Loosen each Bolt of the Special Jig (Photo 65) and take off from Hand Pump Accumulator.



Photo 65

Tightening torque of Spring Holder is 200kgf · cm

6. PERIODICAL INSPECTION AND MAINTENANCE WORK

! Note: Inspection or maintenance service should be conducted on hard and level ground. Be sure to have engine shutdown before starting such inspection or service work.

1. Inspection and maintenance chart:

To enable the use of machine always in its top condition, be sure to conduct maintenance inspection in accordance with the chart below:

Machine Inspection:

	Item	Hours of Operation
Pre-start up inspection:	Loosened or missing screws	8 Hours (Daily)
	Damage of parts or components	Ditto
	Function of control system components	Ditto
	Leakage in hydraulic system piping	Ditto
	Vibrator oil – Check	Every 100 hours
	Vibrator oil – Replacement	Every 300 hours
	Hydraulic oil – Check	Every 100 hours
	Hydraulic oil – Replacement	At first 200 hours; every 1,000 hours thereafter
	V-belt (Clutch) – Inspection	Every 200 hours
	Battery – Inspection	Every 100 hours

Engine Inspection (See Engine Instruction Manual for detail)

Item	Hours of Operation
Oil and/or fuel leakage	Every 8 hours (Daily)
Tightness of fasteners	Ditto
Engine oil – Check and replenishment	Ditto (Replenish to specified level when insufficient)
Engine oil – Replacement	At first 20 hours; every 100 hour thereafter
Air cleaner – Clean	Every 50 hours

Oil application table

	Quality	Temperature (°C)													
		-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
Engine oil	For diesel CE/CF class	SAE 5W- 20/5W- 30													
	SAE10W-40	SAE 10W-30													
	OR	SAE 20W-40													
	SAE15W-40	SAE15W-40													
		SAE 10W-40													
Vibrator oil	Engine oil SAE 10W-30	SAE 10W-30													
Hydraulic oil	Hydraulic oil ISO VG32	ISO VG32													
	ISO VG46	ISO VG45													

! NOTE: Above intervals are for normal operating circumstances. Shorten it or improve the substance of service according to requirement.

! NOTE: Fuel piping should be replaced in every 2 years

2. Inspection of the fuel and oil leakage:

Check if any oil leakage from the hand pump, hydraulic oil piping or hose.

Check loosen hose, joint part if any by a spanner.

3. Replacing engine oil:

Replace engine oil after first 20 hours and in every 100 hours of operation thereafter. It is easier to drain oil when engine is warm after its operation (For detail, see engine supplier's manual).

4. Cleaning the air cleaner:

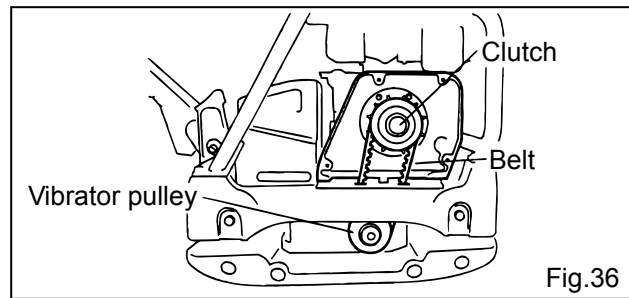
Air cleaner element should be cleaned, as it becomes dirtier not merely engine starting difficulty, lack of power or operating deficiency will result in but useful life of the engine itself will be shortened (For detail, see engine supplier's manual).

5. Checking and replacing V-belt and clutch:

a. Checking the V-belt (See Fig.36)

In every 200 hours of operation, with the belt cover (upper) removed, check the tension of V-belt. The tension is normal if the bend is about 10mm when the belt is pressed with our finger at midway between the pulleys.

When the belt is slackened, transmission of engine rotation will be deficient, resulting in poor compaction and accelerated wear of the belt.

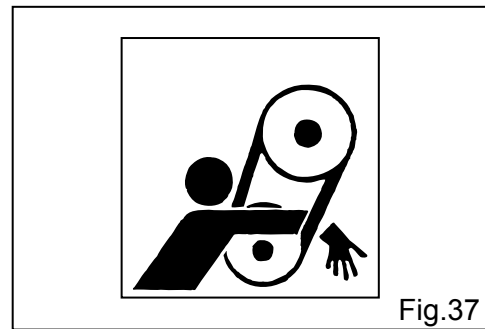


b. V-belt replacing procedure:

V-belt removal

With upper and lower belt covers removed, engage offset wrench (19mm) to vibrator pulley tightening bolt (lower). Hook a piece of cloth at left side midway of the V-belt and pull it back forcibly while rotating the wrench clockwise until the belt comes off.

V-belt reinstallation



Engage the V-belt to vibrator pulley at the bottom and press the V-belt against left side of the upper clutch. Same as in the case of removal, rotate the offset wrench clockwise until the belt is installed.

! NOTE: There is a risk for injury. Use sufficient care for your hand not to be caught between the belt and clutch. Use glove for protection.

c. Checking the clutch:

Check the clutch simultaneously when you check V-belt. With the belt cover removed, visually check the outer drum of clutch for seizure, V-groove for wear or damage. Clean the V-groove as necessary.

Wear of lining and shoe should be checked through operation.

Worn shoe reduces transmission efficiency of engine rotation, causing a slip to occur.

d. Replacing the clutch:

- Remove V-belt (See above for the procedure).
- Remove bolt at the engine power output shaft end by giving a shock to a wrench (tap on with hammer) engaged to it and turning it counterclockwise.
- Pull out the clutch by means of pulley puller.
- Reinstall the clutch with above procedure reversed. Turn-in the bolt securely by giving a shock to the wrench in use.

! NOTE: If vibration is weakened during operation or vibration does not occur in spite of engine running, conduct the check of V-belt and clutch regardless of maintenance interval of 200 hours.

6. Checking the vibrator oil (See Fig.38)

In every 100 hours of operation, position the machine horizontally and remove the vibrator oil level check plug (use 14mm wrench) to see oil is up to the port.

In every 300 hours of operation, change the vibrator oil. Drain oil through level check plug hole with the machine inclined by inserting a sleeper or the like under the opposite side of compaction plate.

※ Lubrication oil to use: Engine oil 10W-30.
Oil Capacities: 0.6 Liter

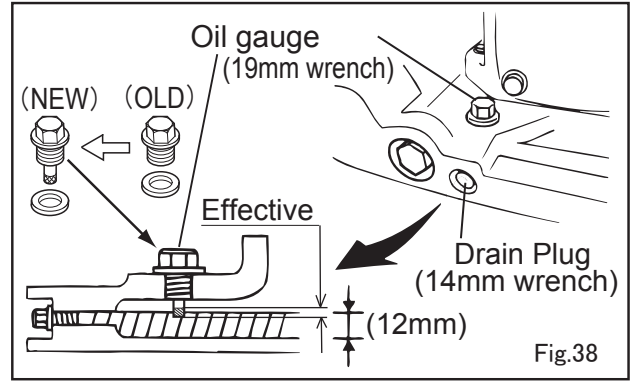


Fig.38

! NOTE: To prevent dust from entering, clean the port before proceeding with the vibrator oil check.

! NOTE: In case any leakage from vibrator should be detected, check vibrator oil frequently.

7. Checking the hydraulic oil (See Fig.39):

a. Check the hydraulic oil in every 100 hours of operation.

With the handle positioned vertically (stowed position), remove breather plug at the top of hydraulic hand pump and check the oil for proper level (To OIL LEVEL mark)

b. Replacing the hydraulic oil:

Change the oil at first 200 hours and in every 1,000 hours of operation thereafter.

! NOTE: Be careful not to allow any dust to enter the hand pump during the work.

① With the plug cap taken off the hand pump, remove breather plug (with 24mm wrench) before disconnecting hydraulic hose which has entered vibrator cylinder at the vibrator side, and with the travel lever placed in forward position, drain the hydraulic oil.

② After draining hydraulic oil, reinstall the hydraulic hose to vibrator.

③ Feed hydraulic oil through breather plug of the hand pump.

Hydraulic oil capacity: 0.55 Liter

④ Shortly after removing breather plug at the vibrator cylinder, oil starts to flow out of the plug hole. Wait until aeration disappears before replacing the plug. Tighten it securely. (See Fig.40)

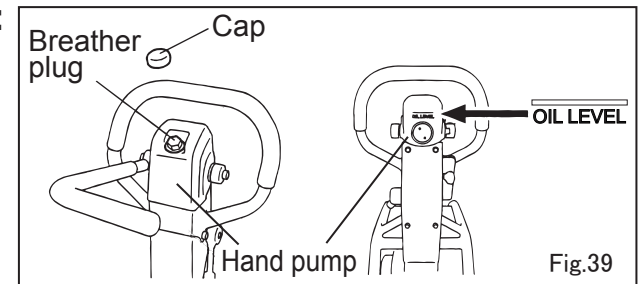


Fig.39

⑤ Then release the rope from the travel lever and move the lever forward and reverse several dozen times (until air bubble not be found).

Stay the lever at the reverse position for 10 seconds every time.

(Because the check valve is opened at the maximum reverse position and air bubble will come out from the oil tank of the hand pump).

If the accumulator moves 2 - 3cm when move the lever to forward side, air bleeding is finished.

In case the air bleeding is insufficient, repeat the procedure of above 4 and 5.

⑥ Install breather plug to hand pump and fit the plug cap. Breather plug should be reinstalled only after making sure that hydraulic oil in the pump is up to OIL LEVEL.

Hydraulic oil to use: Shell Tellus Oil #46 or its equivalent

! NOTE: Be sure to fill the hydraulic oil exactly to the OIL LEVEL.

Excessive filling causes oil to gush out of the breather.

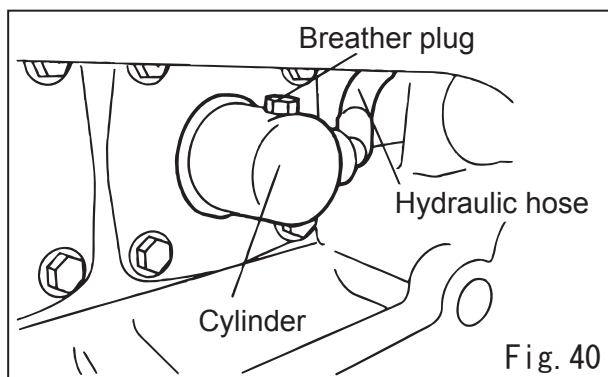


Fig. 40

8. Checking the battery:

The battery installed is of maintenance-free type and replenishment with electrolyte is not needed.

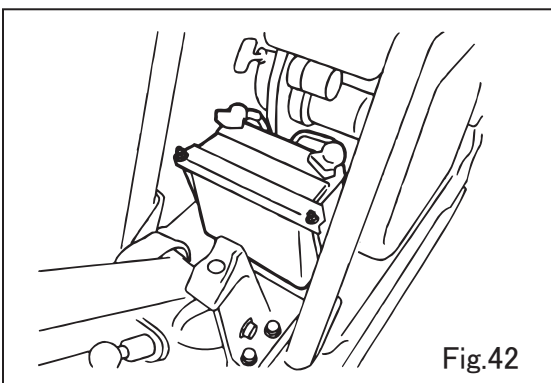
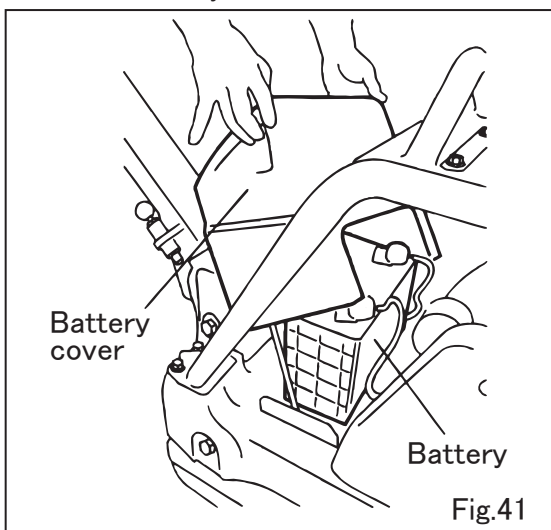
If voltage drops, replace with new battery because rapid charging is not possible.

a. Removing the battery: (Fig.41,42)

1. With two M8 nuts removed, take off the battery cover.
2. Disconnect the battery terminals, starting with (-) terminal.
For installation, start with (+) terminal and connect (-) terminal lastly.

! NOTE: When removing cables, use care not to allow short circuiting between (+) and (-) terminals.

3. Take out the battery from the machine.



b. Checking and cleaning the battery:

1. Check the battery for crack or any other damage.
2. Check the terminals for decay.
If decayed, polish it with wire brush or emery paper, before coating the terminals with grease.
3. Clean the externals of battery.
4. Check and clean the battery stowing space of the machine.

Check vibration isolating mattress as well and replace as necessary.

9. When battery runs out

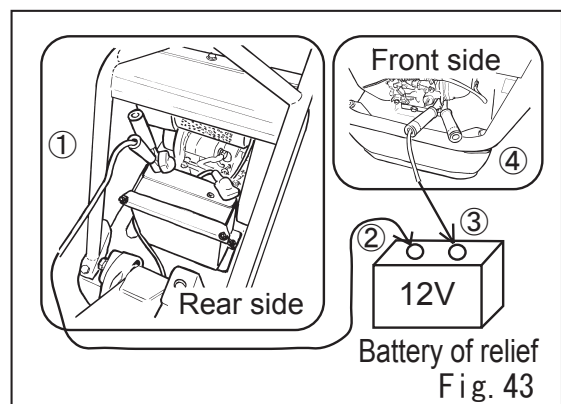
In case starter does not run, or runs slowly or engine does not start shortly, it is one of reason of the battery power shortage.

How to tentatively solve this situation

- A. Try to start engine with recoil starter
- B. In case the recoil starter can not be used because of breakage, try to start engine connecting the booster cable from the car battery. But car battery should be 12V.

Connecting procedure of the booster cable ;

- ① (+) battery terminal at Vibrator
- ② (+) battery terminal of the car
- ③ (-) battery terminal of the car
- ④ connect instructed place on (earth)



! Warning:

As for connection of ④ booster cable, don't connect this booster cable to the (-) battery terminal of the machine in order to avoid any spark in between a booster cable & (-) battery terminal and also avoid possible explosion of the combustible gas which is generated from the battery liquid.

When handle the booster cable, never touch booster end of (+) and (-).

It causes spark and combustible gas will be generated from the battery and possible be burst.

Never put fire close to the battery.

- C. Disconnection of the booster cable should be conducted with the connecting procedures reversed.

! Warning:

During battery recharging, keep away from the battery.

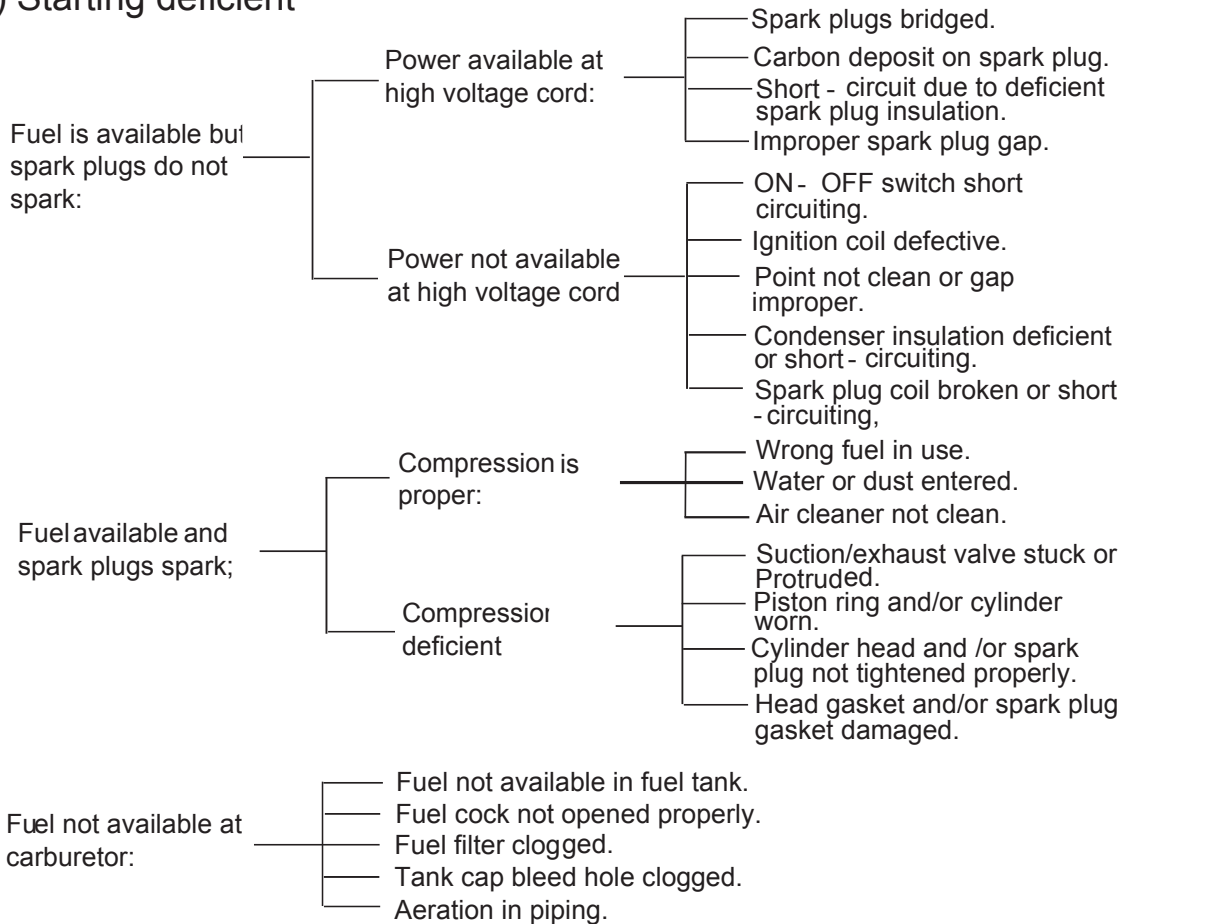
There will be the possibility of coming out the battery liquid which is containing the dilute sulfuric acid and it is danger to have such liquid into eye or on the bear skin.

In case it happens, wash it off with plenty of water and check with the doctor.

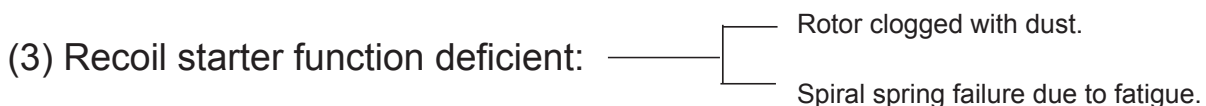
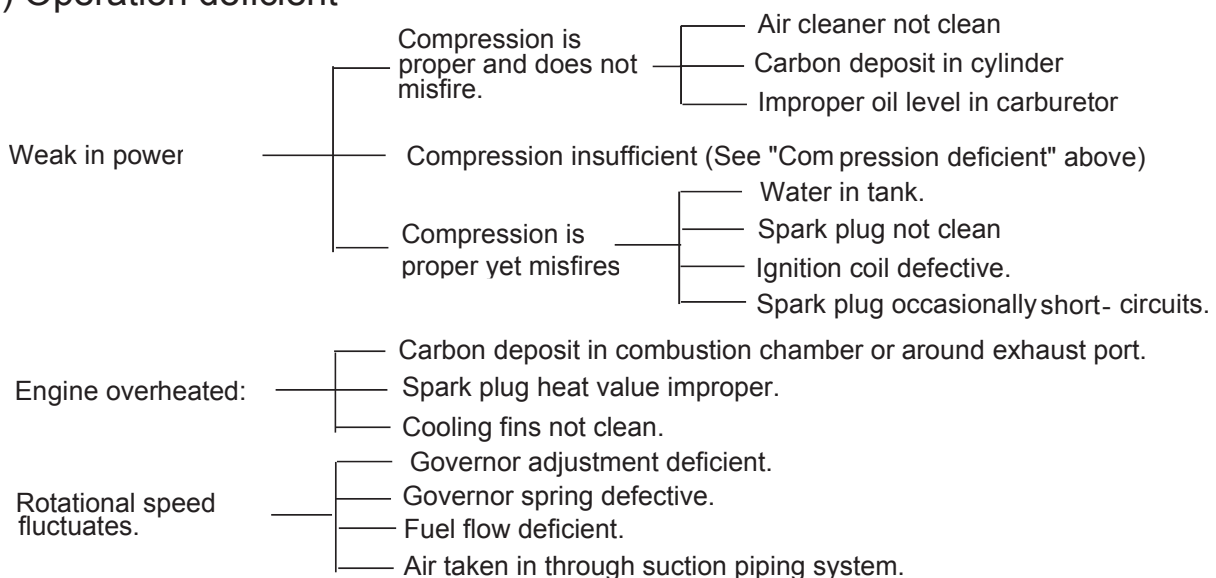
7. TROUBLE SHOOTING

1. Gasoline Engine

(1) Starting deficient



(2) Operation deficient



2. Diesel Engine

(1) Starting deficient

(A) Due to deficient compression

No compression available at all — Suction/exhaust valve protruded

Hardly any compression or very little compression available. —
— Seat contact deficient.
— Piston cylinder worn.
— Cylinder worn.
— Improper setting between cylinder and cylinder head.
— Nozzle seat loosened.

(B) Improper fuel injection into combustion

Fuel flow is too low or not available. —
— Bleeder hole in tank cap clogged.
— Fuel strainer passage blocked or strainer clogged.
— Fuel strainer cock closed.
— Aeration in the piping. (Occurs particularly when tank is emptied)

Fuel not injected into chamber. —
— Injection pump barrel or plunger clogged.
— Nozzle hole clogged.
— Nozzle needle clogged.

No fuel available in fuel tank.
Water or trash in the fuel.

(C) Fuel and compression are normal yet engine does not start.

Does not reach starting rotational speed. —
— Starting procedure improper.
— Engine oil viscosity too high or deterioration excessive.
— Aeration in piping.

(2) Insufficient output and deficient operation

Insufficient compression. — See “deficient compression”

Engine overheated and black smoke exhausted. —
— Cooling fins deficient.
— Water entered fuel filter.
— Carbon deposit inside combustion chamber or exhaust hole.
— Smoke setting improper.
— Over loading.
— Injection timing improper.
— Nozzle blocked.

Rotational speed fluctuates. —
— Improper contact between governor fork and sleeve.
— Governor spring deficient.
— Fly plate or sliding part worn and malfunction.

Engine speed does not increase. —
— Valve open /close timing improper.
— Exhaust hole or muffler clogged.
— Over loading.

Misfire accompanying white smoke. (at no-load) —
— Piston, cylinder or ring worn.
— Nozzle hole blocked.
— Piston cylinder stuck.
— Piston ring installation reversed. (Upper and lower.)
— Injection timing deficient.
— Valve open/close timing deficient.
— Injection pump joint loosened.

Fuel consumption too high.
(Black smoke exhausted) ————

- Leakage from fuel route.
- Air cleaner element clogged.
- Fuel improper with foreign matter entered or the like.
- Over loading.

Sliding part extremely worn or piston ring stuck. ————

- Improper oil in use.
- Oil replacement neglected.
- Air cleaner element damaged or its cleaning neglected.

Suddenly stopped
accompanying abnormal sound. ———— Piston or rod seizure or damage.

Lubricant diluted with
volume increasing. ———— Injection pump plunger barrel worn.

Engine does not stop
even with fuel supply
discontinued.(or overruns) ————

- Excessive oil.
- Governor system installation improper.
- Injection pump rack came off.

3.Machine

Travel speed slow
and vibration weak. ————

- Engine output deficient and high speed revolution setting improper
- Clutch slips.
- V-belts slips.
- Excessive oil in vibrator.
- Defect in vibrator internals.

Travels forward or
reverse but
impossible to
switch direction. ————

- Reversing parts defective.
- Reversing lever installation deficient
- Oil hose broken.
- Aeration in hydraulic oil for reversing system.
- Check valve in hand pump clogged with dust.
- Piston bearing in cylinder defective.

Does not travel
either forward nor
reverse. ————

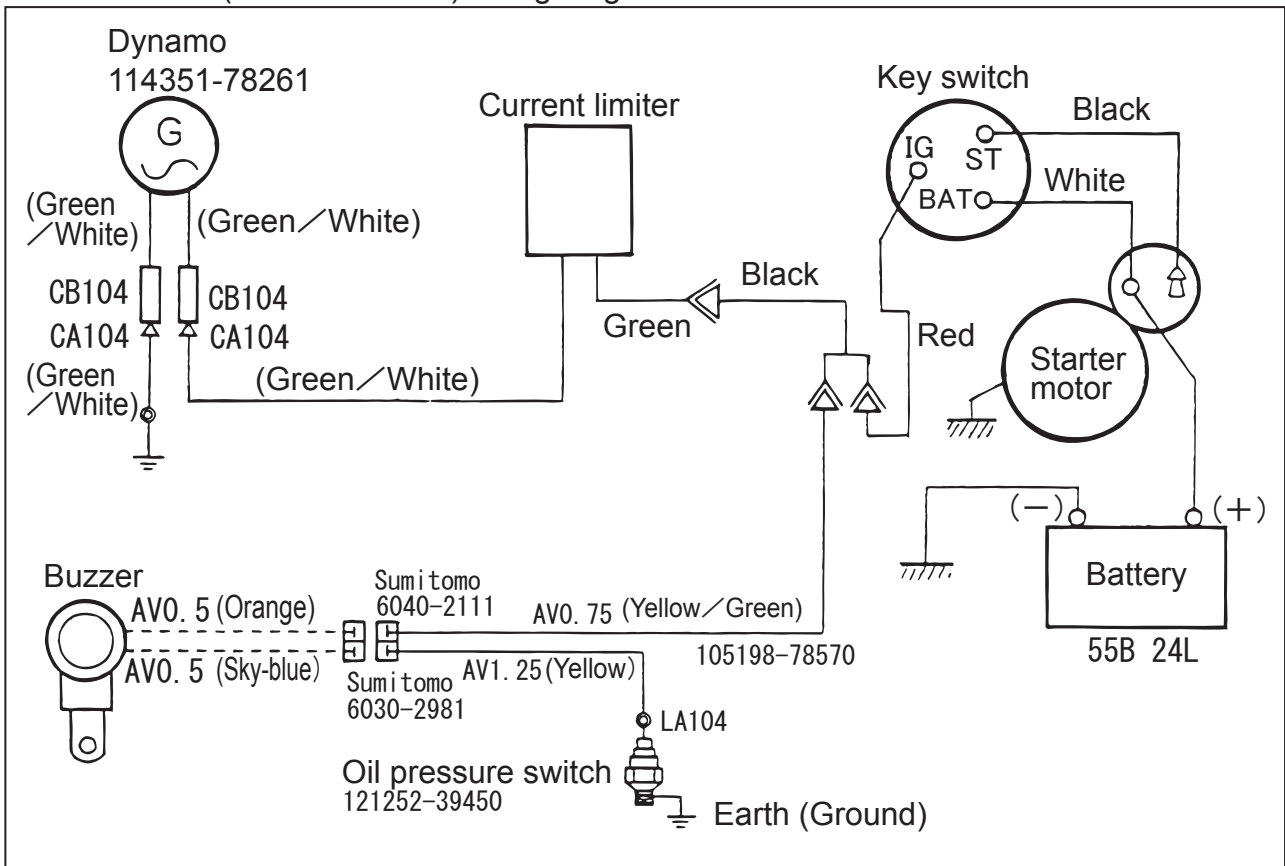
- V-belt disengaged or slips.
- Clutch slips.
- Vibrator locked.
- Piston bearing in cylinder defective.

Travel lever
operating
resistance great. ————

- Gall of hand pump piston.
- Gall of vibrator cylinder piston.

8. WIRING DIAGRAM

MVH-306DS(YANMAR L70A)Wiring diagram



•Key switch actuation

Terminal Position	BAT	IG	ST
0			
1	○ — ○		
2	○ — ○ — ○		

memo

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memo

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MIKASA SANGYO CO.,LTD.

HEAD OFFICE

NO. 4-3. 1-CHOME, SARUGAKU-CHO, CHIYODA-KU
TOKYO, JAPAN