



Mikasa



Vibration Roller

MRH-900

Instruction Manual

Contents of "Declaration of Conformity"

**Please refer the
EC DECLARATION OF CONFORMITY
in this manual as well.**

Thank you very much for purchasing the Mikasa MRH-900 Vibration Roller. To ensure correct operation, read this manual carefully before using our machine. After you have completed reading the manual, keep it in a safe place where you can access it at any time.

Mikasa  **MIKASA SANGYO CO., LTD.**

502-04301

1) DECLARATION OF CONFORMITY


2) Manufacturer's name and address.		Mikasa Sangyo Co., Ltd. 4-3, Sarugaku-cho 1 chome, Chiyoda-ku, Tokyo101-0064, Japan				
3) Name and address of the person who keeps the technical documentation.		Yoshiharu Nishimaki, engineer R. & D. Division, Mikasa Sangyo Co., Ltd. Shiraoka-city, Saitama, Japan				
4) Type: Walk-Behind Vibratory Rollers						
5) model	MRH-900DSY					
6) Equipment item number	553700 553701					
7) Serial number	For serial number, please refer it on front page.					
8) power source cont. output <max. output>	Yanmar L100N 6.6kW <7.4kW>					
9) Measured sound power level(dB)	105					
10) Guaranteed sound power level(dB)	106					
11) Operator's sound pressure level(dB)	88					
12) Conformity assessment according to Annex:	VIII (Full Quality Assurance procedure)					
13) Name and address of the Notified Body	Société Nationale de Certification et d'Homologation (SNCH) 11, route de Luxembourg L-5230 Sandweiler LUXEMBOURG					
14) Related Directive	Directive 2000/14/EC and, to be followed by Directive 2005/88/EC , relating to the noise emission in the environment by equipment for use outdoors.					
15) Declaration	The equipment referred in this document, fulfills with all the requirements of Directive 2000/14/EC					
16) Other related Community Directives	2006/42/EC, 2005/88/EC, 2004/108/EC, 2002/88/EC(2004/26/EC) EN500-1, EN500-4					
17) EC Conformity Certificate No:	SNCH*2000/14*2005/88*0472*03					
18) Place and date of the declaration	Tokyo, Japan August, 2015 Signed by:  Keiichi YOSHIDA Director, Product Control Division Mikasa Sangyo Co., Ltd.					

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1. PREFACE

Thank you very much for purchasing the Mikasa MRH-900 Vibration Roller. The roller employs a hydraulic pump and hydraulic motor, and comes with a travel lever that enables it to move both forward and backward at continuously variable speeds. All of which make roller compacting tasks simple for even a beginner operator. Simple handling instructions and maintenance procedures are outlined in this operation manual.

We ask that you read over the manual for the vibration roller carefully before operating it. Also, please read the engine manual provided separately.

2. FUNCTIONAL OVERVIEW

Application

The Mikasa Model MRH-900 is a powerful compacting tool capable of applying tremendous vibratory force to a soil surface via drums. Barring extremely wet soil, the vibration roller effectively compacts just about all other soils. Use it towards virtually any sediment, sand, gravel and asphalt compaction job. Its vibration and travel are independent which enable it to compact by static pressure and carry out jobs on slopes. The MRH-900 is more efficient and perfect for most compacting jobs.

It is not suited for an overly wet work site, or especially a site with a clay-like surface because its drums will slip. Its vibratory function should also not be activated on a hard, compacted surface that is harder than the compaction capabilities of the vibration roller. Failure to keep the MRH-900 out of these kinds of job conditions will seriously damage it.

Design

The top section of the machine consists of an engine, hydraulic pump, oil tank, vibration clutch, water tank and handle bar. The top section of the machine is fixed and connected to the frame at the bottom of the machine through vibration dampening rubber. The bottom section of the machine consists of a frame that supports a vibrator unit which produces vibration, and two drums, both of which are moved via a hydraulic motor.

Power transfer

The MRH-900 comes with an air-cooled single cylinder diesel engine. The centrifugal clutch is connected to the engine output shaft. The centrifugal clutch engages when the engine reaches higher speeds. The centrifugal clutch drum is linked to the pulley and V-ribbed belt that are connected to the drive shaft for the hydraulic pump used for travel and as the centrifugal clutch drum rotates its output drives the pulley and V-ribbed belt.


The hydraulic pump is run via the V-ribbed belt. As the hydraulic pump rotates, it calls hydraulic oil from the oil tank through the oil filter and generates hydraulic pressure. The oil pressure that is produced via hydraulic hoses, etc. supplies hydraulic oil to the hydraulic motor built into the drum bracket and drives the hydraulic motor.





The hydraulic motor rotates the drum which in turn impels the vehicle. Moving the travel lever mounted on the control box handle forward and backward to adjust the traveling speed and forward/reverse motion. Adjust the control cable by turning the trunnion shaft for the hydraulic pump. Operate the handle bar to steer the roller.

The vibration clutch on the opposite side of the pulley is mounted to the drive shaft for the hydraulic pump. V-pulley (1) used for vibration output is connected to the output shaft for the clutch. When the vibration lever is ON, the input/output shaft of the clutch is engaged and the V-pulley (1) is spun. Via -V-belt, this V-pulley (1) spins the V-pulley that is mounted to the pendulum shaft inside the vibrator unit between the two drums (roller wheels).

The vibration generated by the spin of the pendulum shaft is transferred to the frame side plate on both sides of the roller vehicle, drum bracket and drum to compact the ground with vibratory forces.

3. WARNING LABELS

The triangular-shaped icons in this manual and those stuck to the machine are labels that are intended as warning signs . Be safe and always heed these labels.

	Denotes a bodily hazard
 DANGER	Disregarding these instructions poses an extremely high risk of accident-related death or serious injury.
 WARNING	Disregarding these instructions poses a possible risk of accident-related death or serious injury.
 CAUTION	Disregarding these instructions may cause an injury or accident-related injury.
CAUTION	Disregarding these instructions may cause damage to equipment

4. SAFETY PRECAUTIONS

4.1 General precautions

 **WARNING**

- Do not work under following conditions.
 - If you do not feel well because of overwork or illness.
 - If you are taking any medicine.
 - If you are under the influence of alcohol.



 **CAUTION**

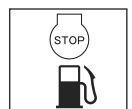
- Read this instruction manual thoroughly and handle the machine properly so you can carry out your work safely.
- For details about the engine, refer to the engine instruction manual provided separately.
- Make certain that you clearly understand the design of the vibration roller.
- Before beginning work, always make sure that you perform an inspection, periodic self-inspection, and special self-inspection.
- To work safely, always wear protective gear (use standard gear like a helmet, safety boots, etc.) and the proper work clothes.
- Always wear hearing protection such as ear defenders or ear plugs.
- Always check the vibration roller to make sure that it is normal before running it.
- The decals on the machine's chassis (operating methods, warning decals, etc.) are crucial to guaranteeing safety. Keep the body of the machine clean so that the decals can be read at all times. If a decal cannot be read, replace it with a new one.
- It is dangerous for children to touch the vibration roller. Decide carefully about how and where the machine is stored. Always be careful to remove the engine ignition key after your work is finished, and store the key in a safe location.
- Before performing any maintenance on the engine, be sure that the battery cables are unhooked.
- Mikasa does not accept any liability for accidents caused as a result of not using genuine Mikasa parts or accidents caused as a result of the machine being modified.



4.2 Precautions when adding fuel

 **DANGER**

- Be sure to work in a well ventilated area when refueling.
- Before refueling, be sure to turn the engine off and wait until it has cooled down.
- When refueling, take the machine to a flat area with no combustibles nearby and be careful not to spill any fuel. If you do spill any fuel, wipe it all up.
- Never allow open flames nearby while adding fuel. (In particular, smoking while adding fuel is strictly prohibited.)
- Adding fuel up to the top of the inlet of the fuel tank posing a risk of fuel overflow.
- When you are finished adding fuel, tighten the tank cap tightly.



4.3 Precautions for work site and ventilation

DANGER

- Do not run the engine in an unventilated area such as indoors or in a tunnel. The exhaust gas from the engine contains carbon monoxide and is very dangerous.
- Do not operate the machine near open flame.



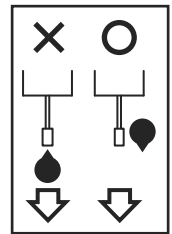
4.4 Precautions to take during operation

WARNING

- If you are away from the vibration roller such as when it is parked or stopped, always use wheel chocks.

Also, never park the vibration roller on a hill.

- Do not stop the vibration roller on soft ground. The wheel chocks may sink into the ground.
- When working or traveling, increase the engine to the designated high speed. Particularly, if the engine rpm is low or the engine stops on a hill, it may start to roll under its own weight. When using the machine on a slope, it could roll back and pin the operator. Therefore, the operator should not operate the machine directly behind the handle bar, but should operate it on either the left or right of the handle bar.
- When using the vibration roller on a side slope, be very careful as the risk of rollover is high. Also, make sure no one stands downslope of the machine.
- To make it easy for the operator to be alert when reversing the machine, the operator should stand to the left or right of the operation handle with it facing behind him/her. When standing directly behind the steering handle,
- do not operate it walking backward while you face toward the machine.
- The engine body and muffler will become hot. Do not touch the hot zones on them when operating the vibration roller.
- The machine is more likely to tip over at hazardous job sites. Take safety precautions such as making signs and protective fences.



CAUTION

- The handle bar is heavy. Exercise caution when you move it from an upright state (stored) to a working state. Always check that the lock function for the handle bar works.
- Before starting the engine, be certain to keep nearby people and obstacles away from the roller.

Check that the travel lever is in neutral, and make sure that the vibration lever is turned OFF.

- Take action to restrict access inside work zones.
- Do not operate the roller with the handle bar raised. It is difficult to keep the roller stable when operating it in this position, and it is very dangerous. When backing up the roller in particular, there is a danger of the operator being wedged between the roller and an obstacle.
- Do not touch parts that move or ones that rotate when the roller is running. Also, clothes and other items may wrap up in rotating parts. Keep these items away from rotating parts.
- Allow enough time to switch between forward and reverse, and do not accelerate and stopping suddenly except in times of emergency.
- When reversing up close an obstacle, stop about 2 meters in front of the obstacle. Back the roller safely into position and then move forward with work.
- When working at night make sure you use adequate lighting.
- If bad weather is predicted, stop any work.
- If there is a noticeable problem with the roller while it is operating, stop work immediately, and contact the owner and have them make the proper repairs.



4.5 Transport precautions



- Do not tow the roller using a car or heavy machinery.



- Decide on a supervisor in charge of loading and unloading of the roller and follow his/her instructions.
- Unload the roller on a level surface.
- To prevent the roller from falling off or rolling away, always remove its key first and then transport it.
- If the truck tray, loading ramps, or drums of the roller are dirty with oil or mud, it is extremely dangerous as the roller could slip.
Clean the roller thoroughly, and then unload it.
- Before transporting the roller, always stop the engine and drain the fuel.
- Once the roller is loaded, chock both its drums and secure it with wire ropes to prevent it from moving around.



- Be sure to use truck ramps for unloading and loading that are strong enough, and secure the hook securely to the truck tray. Make sure the loading width of the ramps matches the width of the roller and keep the inclination of the ramps at 15 degrees.
- Place the roller into the proper position before moving it up the truck ramps. If the ramps shift even slightly out of position when loading/unloading the roller, there is a risk of the roller falling over. If this happens, return the roller to its original position and adjust the ramp(s) to the correct position, then load or unload the roller.
- As a general rule, load the roller up by running it forward and unload it by backing it down.
- **Loading and unloading the roller by crane must be done a qualified worker. Driving and slinging the crane must be done by qualified workers.**
- When you hoist the roller always do so from the designated hoisting points (hooks, etc.).
- Before hoisting check that parts on the roller are not damaged, lose or missing.
- When performing hoisting work stop the engine first.
- Use undamaged wire rope of sufficient strength.
- Avoid rapid lifting (lowering) or sudden side-to-side movement when lifting.
- Keep people and animals from underneath the suspended roller.
- Do not hoist the roller higher than necessary.



4.6 Maintenance precautions

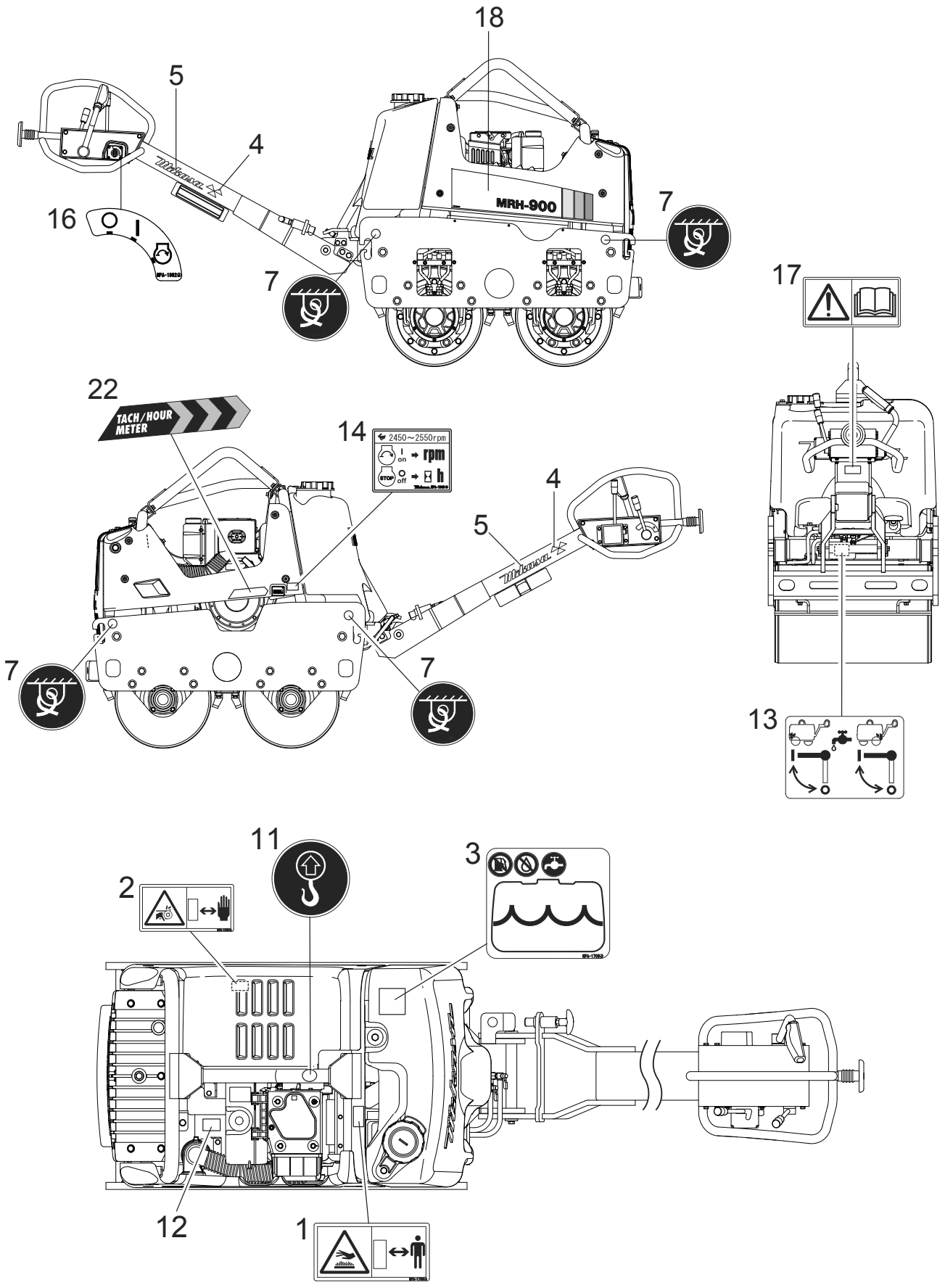


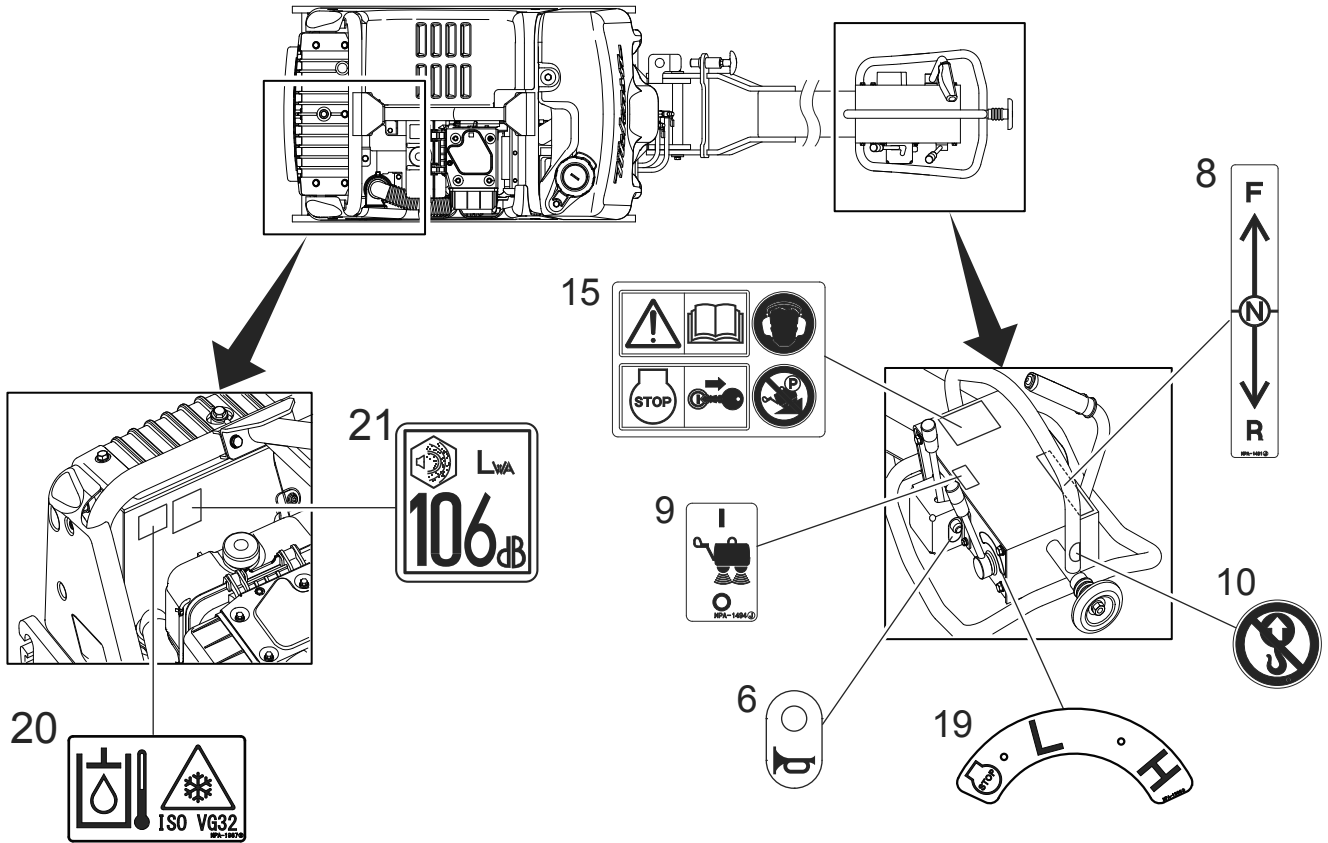
- Proper maintenance must always be done on the roller to ensure its safe operation.
As improper maintenance on the roller may lead to serious accidents, always keep the roller in excellent condition.
- Always stop engine before inspecting it and proceed with the inspection once the engine and parts are cooled down. Always wait for the engine to cool down even if you are unscrewing the radiator cap.
- When inspecting the electrical system, disconnect the negative (-) terminal for the battery.



When loosening hydraulic pipes, always release pressure within the hydraulic piping circuit first. If you remove pipes while the pressure within the circuit is high, you could be hit by a hose still under hydraulic pressure and be injured.

4.7 All label locations

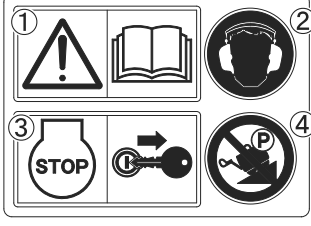
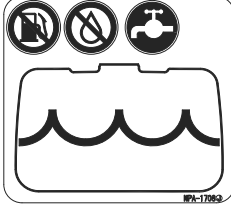

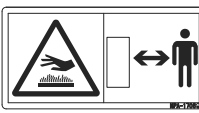

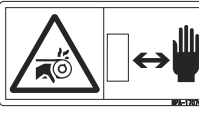

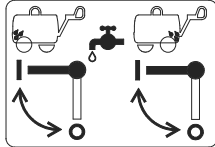
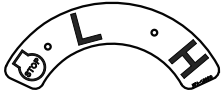
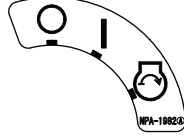








4.8 List of labels

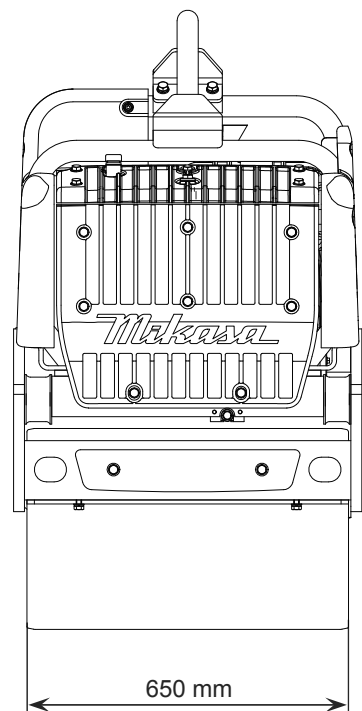
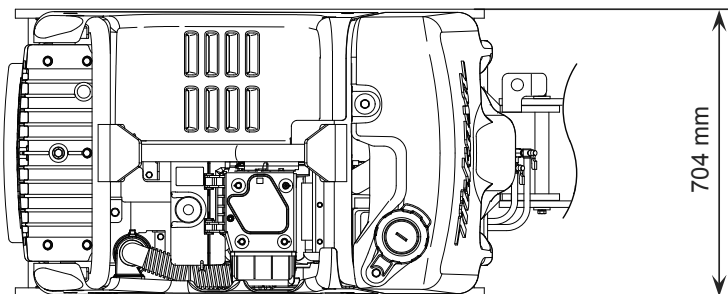
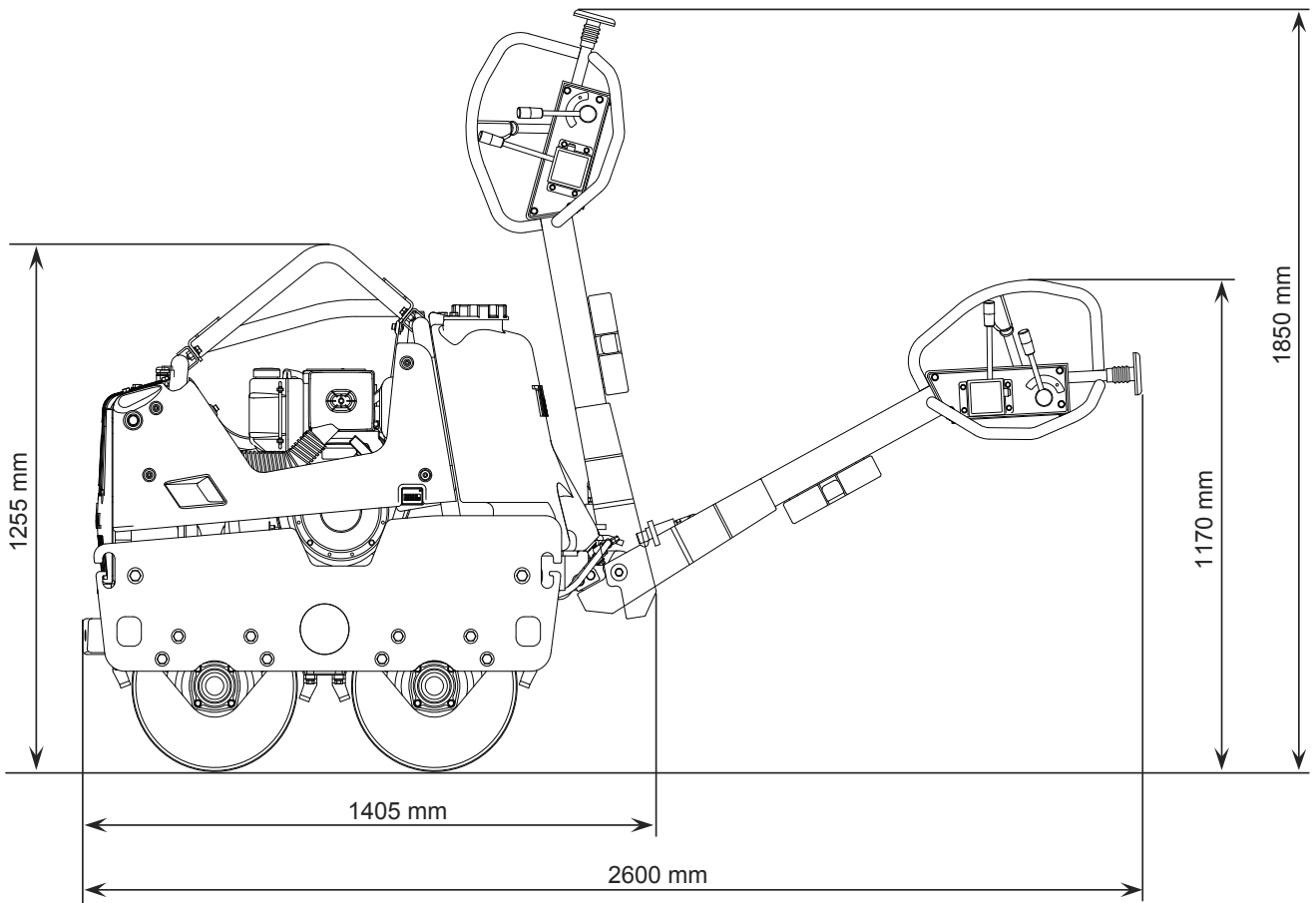
No.	Part No.	Part name	Quantity	Decal No.	Remark
1	9202-17060	Decal, Warning/Burn (Icon)	1	NPA-1706	
2	9202-17070	Decal, Warning/Entanglement hazard-rotating machinery (Icon)	1	NPA-1707	
3	9202-17080	Decal, Water tank (Icon) MRH501, 601	1	NPA-1708	
4	9202-17110	Decal, Mikasa symbol (blue, 35x70)	2	NPA-1711	
5	9202-17130	Decal, Mikasa logo (white reflective) 200 mm	2	NPA-1713	
6	9202-17140	Plate, Horn (Aluminum) MRH501, 601	1	NPA-1714	
7	9202-17170	Decal, Instruction/Tie-down point when transporting (Icon)	4	NPA-1717	
8	9202-18410	Decal, Forward-reverse/MRH	1	NPA-1841	
9	9202-18420	Decal, Vibration switch operation	1	NPA-1842	
10	9202-18440	Decal, No lift point	1	NPA-1844	
11	9202-18450	Decal, Lifting point	1	NPA-1845	
12	9202-19780	Decal, equipment No./900DSY/5 languages/CE	1	NPA-1978	
13	9202-19790	Decal, Water valve/MRH-900	1	NPA-1979	
14	9202-19800	Decal, 2500 RPM instruction	1	NPA-1980	
15	9202-19810	Decal, Warning/Instructions/Prohibited (Combined icon) 900	1	NPA-1981	
16	9202-19820	Decal, Key switch operation (3-position icon)	1	NPA-1982	
17	9202-19830	Decal, Warning/Read manual before operating (Icon)	1	NPA-1983	
18	9202-19850	Plate, Model/MRH-900 (orange cover)	1	NPA-1985	
19	9202-19860	Decal, Speed control lever operation/3-position/900	1	NPA-1986	
20	9202-19870	Decal, hydraulic oil viscosity specification (when cold)/VG32	1	NPA-1987	
21	9202-10320	Decal, EC noise LWA 106	1	NPA-1032	
22	9202-19960	Decal, Tach/Hour meter/MRH-900	1	NPA-1996	

4.9 Meaning of labels

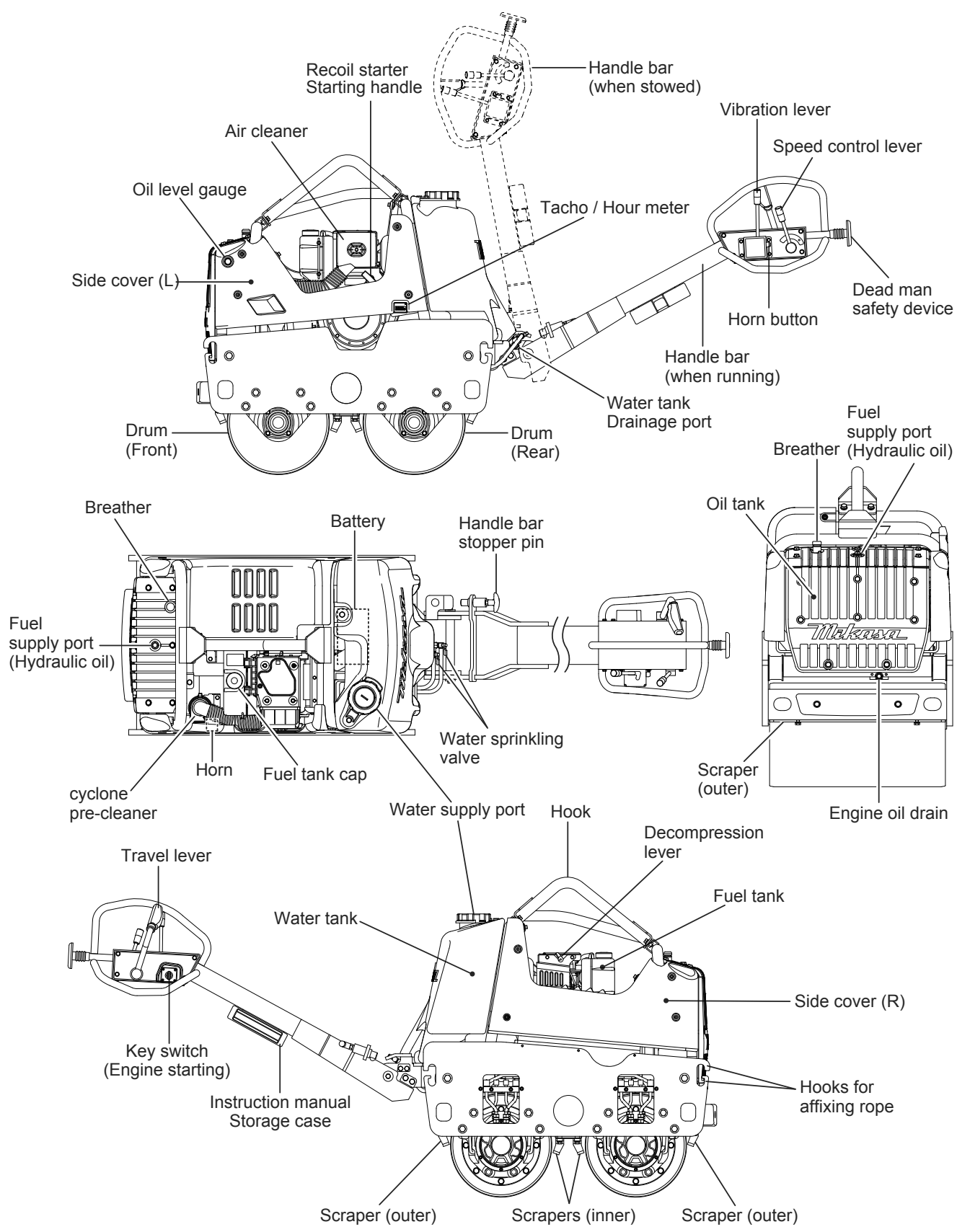
	<p>This label denotes warnings, instructions and prohibited items.</p> <p>(Top row)</p> <p>① Read the instruction manual thoroughly and operate the machine only after you understand the manual's contents clearly.</p> <p>② Wear hearing protection</p> <p>(Bottom row)</p> <p>③ When you shut down the engine always remove the key.</p> <p>④ Do not park the roller on a slope.</p>		
	<p>Water tank Water tank decal</p> <p>Always fill this tank with tap water. Do not put fuels like gasoline and oil, nor hydraulic oil and engine oil in the tank.</p>		
	<p>Forward-reverse lever operation direction</p> <p>F: Forward N: Neutral (stop) R: Reverse</p>		<p>Look out for hot parts</p> <p>Keep a safe distance away from hot parts to avoid contacting them and sustaining burns.</p>
	<p>Recommended hydraulic oil</p> <p>Hydraulic oil engineered for cold climates (ISO VG32 or equivalent)</p>		<p>Attention: Rotating parts</p> <p>Maintain a safe distance between yourself and rotating parts so your hands or clothes don't get tangled in them.</p>
	<p>Turning the vibration switch On and Off</p> <p> : ON (startup) ○ : OFF</p>		<p>Switching over water sprinkling modes (See fig. 8 on P12 and fig. 23 on P15)</p> <p>A switch that changes between the valve on the left side (for the front drum) and a valve on the right side (for the rear drum).</p> <p> : Open the valve (for watering) ○ : Close the valve</p>
	<p>Speed control lever positions</p> <p>⊞ : Stop L : Low speed (Idling) H : High speed (running)</p>		<p>Key switch positions (See fig. 13 on P13)</p> <p>○ : Stop ⊞ : Start-up : Run</p>
	<p>Designated lift point</p> <p>When lifting the roller, always lift from these points.</p>		<p>Designated tie-down point when transporting the roller</p> <p>When transporting the roller, be sure to tie-down the roller at these designated points.</p>
	<p>No-lift point</p> <p>When lifting the machine, be sure to use the points designated for lifting. Failure to use these points may cause the roller to fall.</p>		<p>Horn</p> <p>The horn.</p>

5. EXTERNAL VIEW

5.1 Dimensions



5.2 Names and locations of control equipment



6. SPECIFICATION

6.1 Body

Model			MRH-900DSY
Type of engine equipped			Yanmar L100N
Chassis dimensions	Overall length	When being operated	2600
		When stored	1405
	Overall height	When being operated	1255
		When stored	1850
	Overall width		704
Drum dimension	Drum diameter		406
	Drum width		650
Drum base		mm	540
Compaction width		mm	650
Weight *1		kg	870
Travel speed		km/h	0~3
Max. work gradient		% (deg.)	35(20)
Vibration frequency		Hz (V.P.M)	55(3300)
Centrifugal force		kN	16.8
Static line pressure	Front drum		5.4(52.5)
	Rear drum		7.6(74.4)
Dynamic line pressure	Front drum		18.6(182)
	Rear drum		20.8(204)
Water tank capacity		L	60
Oil tank capacity		L	25
Curve clearance		mm	238
Wall clearance		mm	27
Hand Arm Vibration (Ahv)		m/Sec ²	7.8

Note: *1 The weight is based on European weight standards.

(The level of fuel and water should be 1/2 the prescribed capacity, while engine oil and hydraulic oil levels should be at max.)

Remarks:

Vibration Level is in comply with EU Directive 2002/44/EC and the value is shown as 3 axis min vibration level.

Test course (Crushed gravel) is in comply with EN500-4.

The above values are subject to change in case that the machine is modified or/and the required regulations change.

6.2 Engine

Maker		Yanmar
Engine model		L100N1-REMK2
Max. output	kw (PS)	7.4 10.0
Starting system		Cell (recoil)
Max. set rpm		2500

6.3 Hydraulic pump

Maker		Poclair
Model		PMV 0-09

7. PRE-WORK CHECK POINTS

Table showing each part to check before work

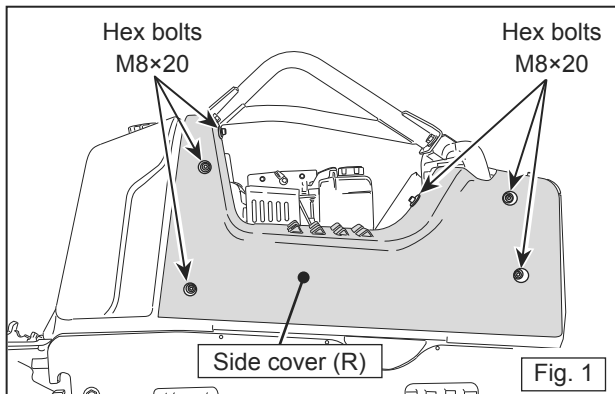
Check point	Item to check
Visual	Scratches, distortion
Hook	Missing, damage, cracks, and loose/missing bolts and nuts
Fuel tank	Leaks, oil level, dirtiness
Fuel system	Leaks
Fuel filter	Dirtiness
Engine oil	Leaks, oil level, dirtiness
Hydraulic oil tank	Leaks, oil level, dirtiness
V-belt vibrator unit	Cracks, tension
V-ribbed belt (between engine pump)	Cracks, tension
Hydraulic piping system	Leaks, looseness, cracks, wear
Sprinkler piping system	Leaks, looseness, cracks, wear
Horn	Operation check
Travel lever (linkage parts)	Missing, damage, cracks, and loose/missing bolts and nuts
Travel lever (linkage operation)	Operation check, play
Automatic stop device (Dead man safety device)	Operation check
Scrapers	Bent, damage, adjustment
Bolts, nuts	Looseness, missing

For details on inspecting each engine part, refer to the engine manual provided separately.

CAUTION

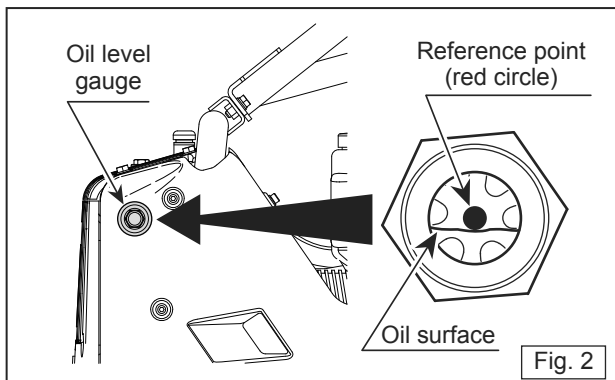
Before inspecting the engine, stop it first.

Remove the six M8x20 hex bolts that are fixed to the right side cover (R), and then remove the side cover. (Fig. 1)



7.1 Hydraulics

- Look at the oil gauge for the oil tank and make sure it reads the oil tank contains the specified amount of hydraulic oil. (gauge is midway). When shipping the roller, use Idemitsu Daphne Super Hydro 46ST (25 L) for the hydraulics. (Fig. 2)



- See page 19 about the recommended hydraulic oil.
- Check for any oil leaks from the oil tank, hydraulic pump, hydraulic motor and the joints for the hydraulic hoses.

7.2 Engine

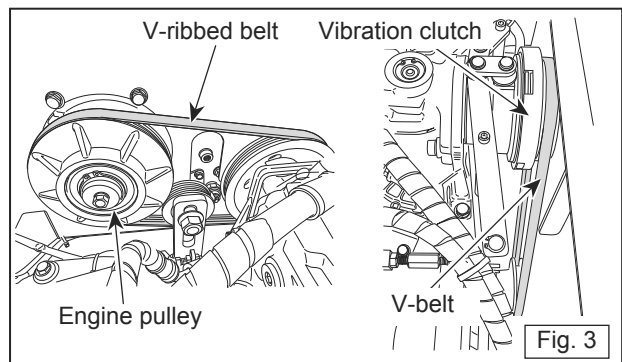
DANGER

The engine oil and cooling water become very hot so exercise extreme caution.

- Check the engine oil level. (For details, refer to the engine operation manual provided separately.)

7.3 Vibrator unit

- Remove the right side cover (R) and check the looseness of the V-belt and V-ribbed belt. If the tension is poor, vibration will be weak which will damage the belt. (Fig. 3)



WARNING

Before inspecting the belt, stop the engine first. Rotating parts pose a danger to hands and clothing as they can get tangled in them.

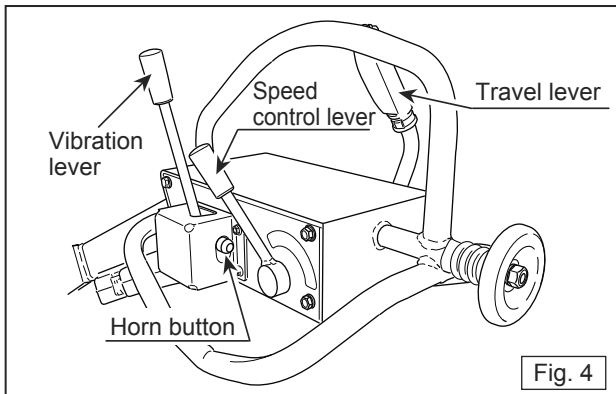
7.4 Operation

- When the steering handle is in a stowed state (standing upright), pull out the steering handle stopper and slowly tilt the steering handle down (operational state).

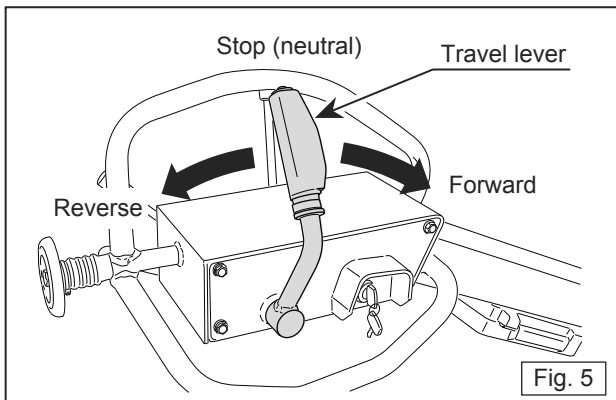
CAUTION

When you lower the steering handle (operational state), do so in wide area with no obstacles in the way. Do not lower the steering handle quickly.

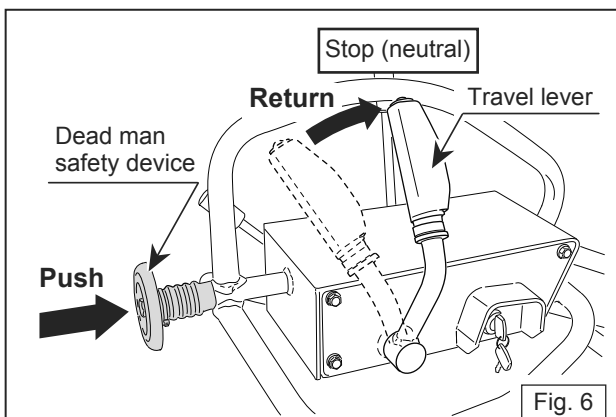
- Make sure all levers and wires (travel, vibration and speed control) work well. Also, press the horn button to check if it sounds off normally. (Fig. 4)



- The travel lever has three modes (forward, neutral, reverse). Move the travel lever forward and backward to make the roller move forward and backward, and stop it in "Neutral". Letting go of the travel lever makes the lever automatically return to "Neutral". (Fig. 5)



- Move the travel lever backward, then push the dead man safety device and check that the travel lever returns to "Neutral". (Fig. 6)

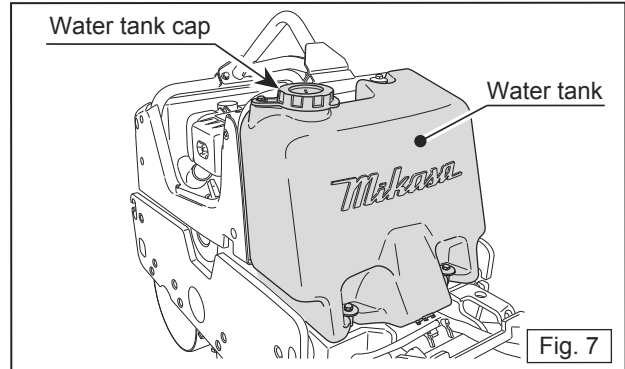


7.5 Water sprinkling

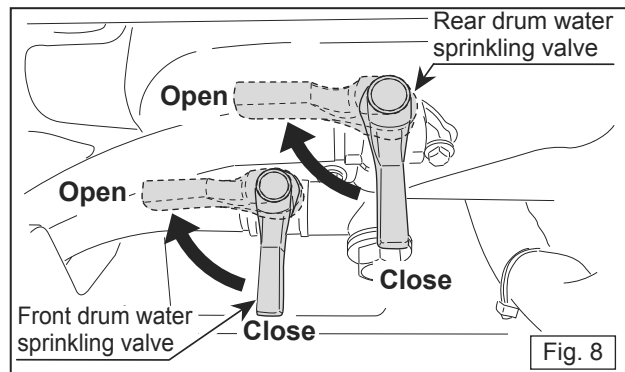
- When performing water sprinkling work, place water in the water tank located at the rear of the roller. (Fig. 7)

CAUTION

- Do not confuse the water tank with the oil tank.
- Always use tap water.

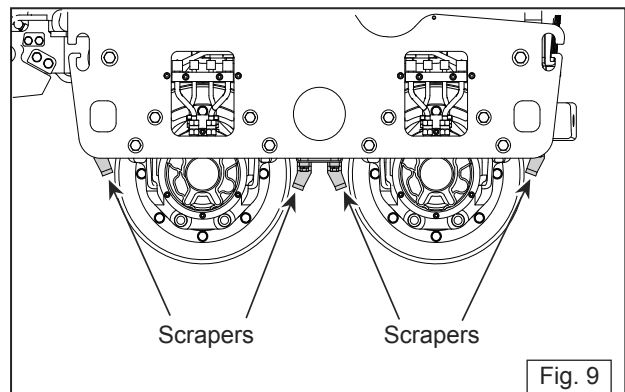


- Open the water valve for the front and rear drum to check if water flows properly. (Fig. 8)



7.6 Scrapers

- If the scraper is clogged with mud, wash it and check it for any damage. (Fig. 9)
- Adjust the gap (around 3 mm) between the drum and scraper as necessary. (Fig. 9)



7.7 Others

- Check for any loose bolts, nuts and other kinds of screws on the chassis components (including the engine).

8. RUNNING

8.1 Start-up

Common recoil starter and cell starter method

1. Move the speed control lever to "Low: L (Idling)". (Fig. 10)

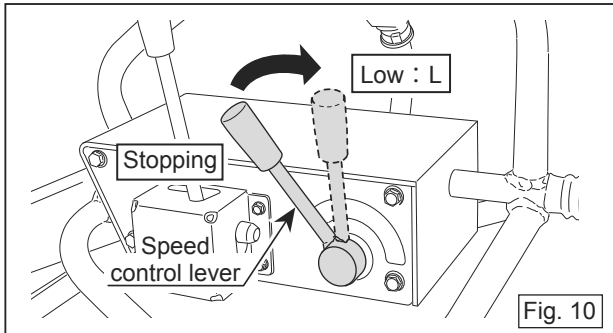


Fig. 10

2. Place the travel lever in "Neutral" and shift down the vibration lever to OFF. (Fig. 11)

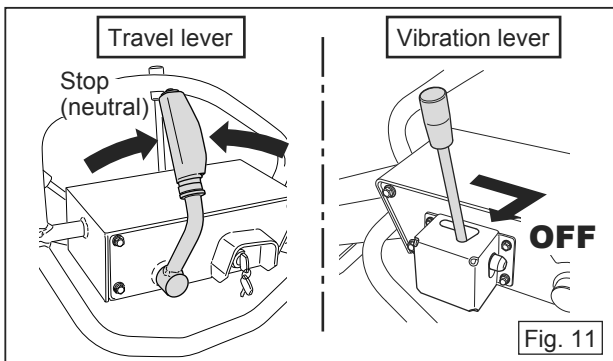


Fig. 11

3. Open the fuel valve. (Fig. 12)

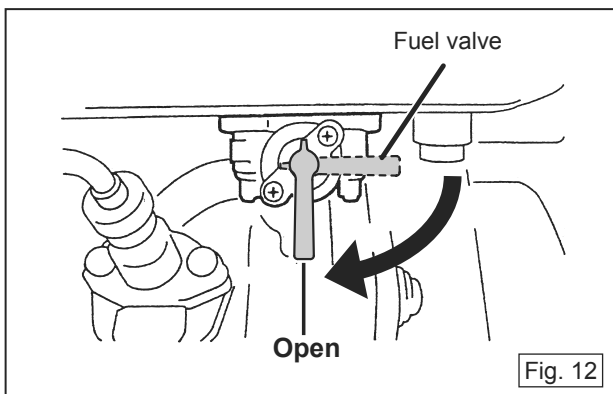


Fig. 12

4. Insert the key into the key switch and turn the key switch to "Run". (Fig. 13)

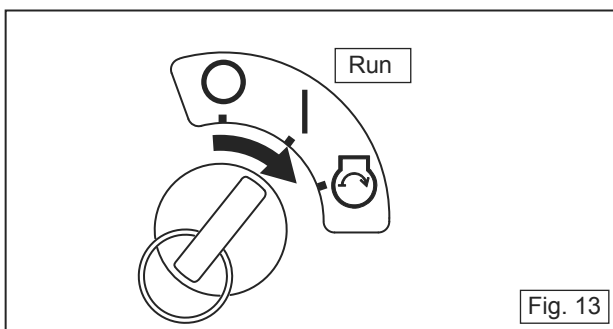
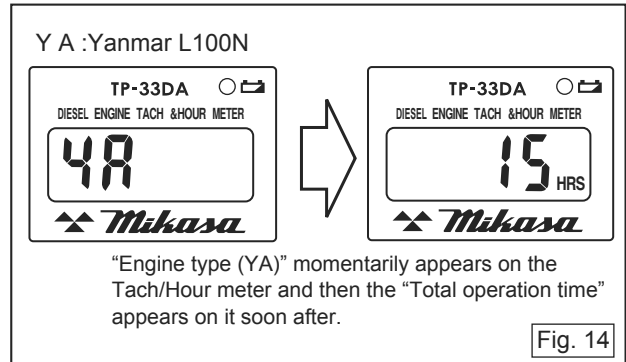


Fig. 13

5. When in the run position, the buzzer begins to sound. "Engine type (YA)" momentarily appears on the Tach/Hour meter and then the "Total operation time" appears on it soon after. (Fig. 14)



"Engine type (YA)" momentarily appears on the Tach/Hour meter and then the "Total operation time" appears on it soon after.

Fig. 14

Recoil starter method

6. Grab the starting handle for the recoil starter and pull it slowly until you feel some resistance. (Fig. 15)

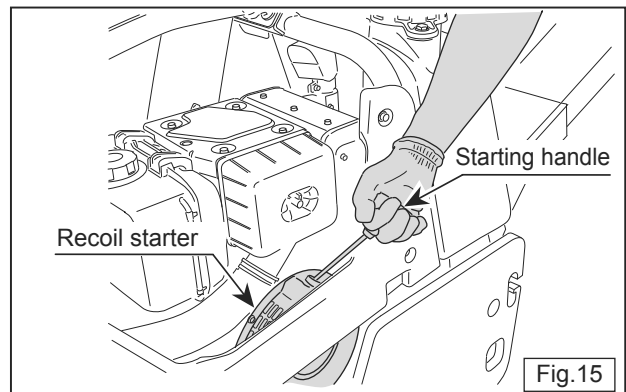


Fig. 15

7. Push down the engine decompression lever to the start position. (Fig. 16)

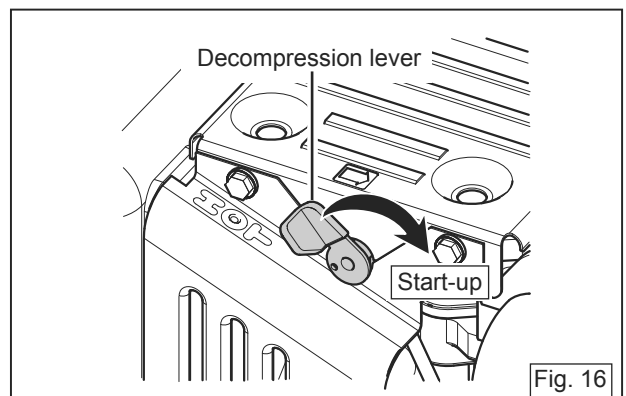


Fig. 16

8. Pull the starting handle back hard and fast. Be aware that if you pull too hard on the rope it may snap. Pull on the starting handle keeping its rope taut and slowly bring the starting handle back to the recoil starter body without letting go of it. (Fig. 17)

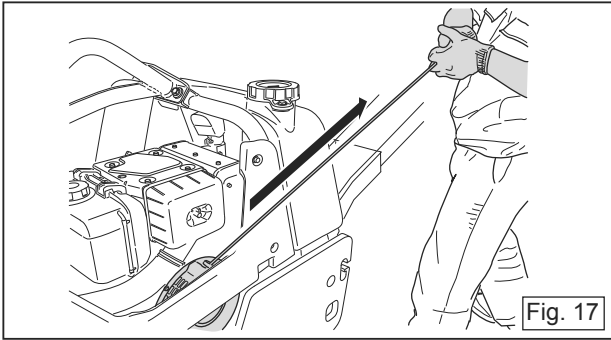


Fig. 17

9. If the engine starts, the “Engine RPM” will appear on the Tach/Hour meter. (Fig. 18) Also, once the engine speed increases, the buzzer will cease sounding.

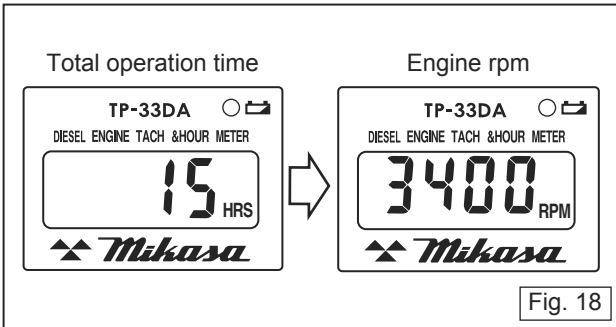


Fig. 18

10. Warm up the engine for approximately 3 to 10 minutes after starting it. Always warm up the engine especially in cold climates. The buzzer sound at engine start-up serves as a feature that warns of the status of the engine oil level. If the buzzer does not stop sounding after you start the engine, stop the engine immediately and check the engine oil level.

CAUTION

- Move the key switch to “Run” when starting the engine with the recoil starter.
- Pull the starting handle for the starter until its rope is fully stretched.
- After the engine starts, with the starting handle and its rope taut, slowly let the starting handle reel in without letting go of it. If you let go of the starting handle when its rope is drawn out, the rope will suddenly snap back and damage the recoil starter and engine.
- When the engine is running never turn the key switch over to “Start”.

**Cell starter method
(continued from Step “5” on page 13)**

6. Turn the key over to “Start”. Operate the cell starter to start the engine. After the engine starts gently take your hand off the key. (Fig. 19)

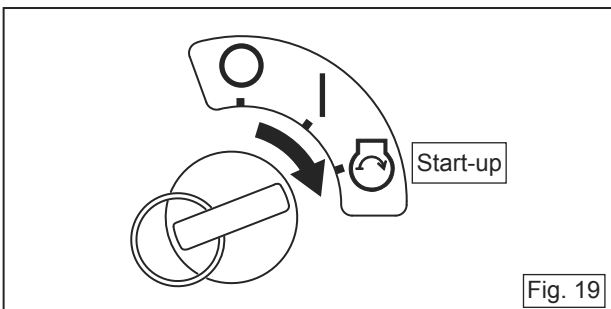


Fig. 19

7. If the engine starts, the “Engine RPM” will appear on the Tach/Hour meter. (Fig. 18) Once the engine speed increases, the buzzer stops. The engine comes with a safety starter switch. If the travel lever is not in the stop position, the cell starter will not work.

CAUTION

- If the engine fails to start even after you operate the key switch, do not operate the cell starter (start-up position) for more than 5 seconds.
- When the engine is running never turn the key switch over to “Start”.

8. Warm up the engine for approximately 3 to 10 minutes after starting it. Always warm up the engine especially in cold climates.

CAUTION

The buzzer sound at engine start-up serves as a feature that warns of the status of the engine oil level. If the buzzer does not stop sounding after you start the engine, stop the engine immediately and check the engine oil level.

WARNING

After the engine is started, be very careful not to get your hands or clothes caught in rotating parts. Catching them in any rotating part poses a risk of serious injury.

8.2 Traveling

1. When traveling with the roller, move the speed control lever to “High: H (operation)”. (Fig. 20)

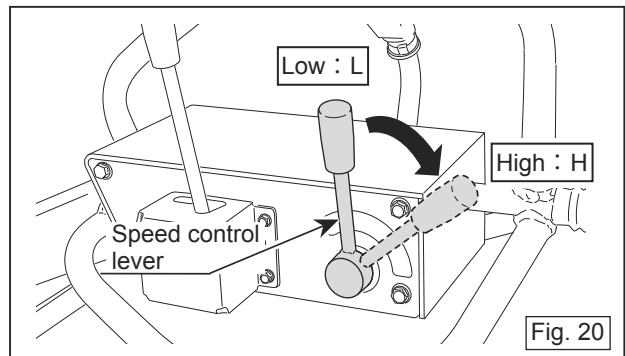
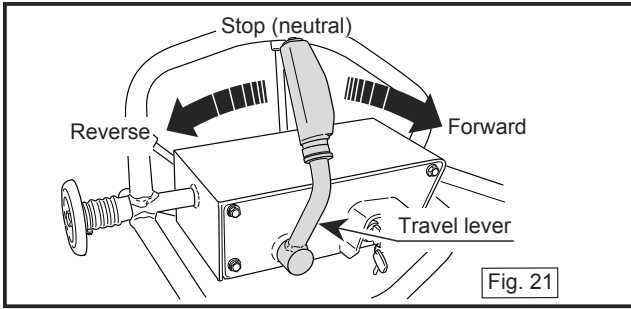


Fig. 20

2. Push the travel lever forward to move the roller slowly forward. To increase the travel speed, push the travel lever further forward. Travel speed can be varied depending on how you move the lever (both forward and reverse). Pull the travel lever toward you to make the roller go in the reverse direction. (Fig. 21)

CAUTION

This roller is outfitted with an automatic hydraulic braking system. Consequently, if the engine is not at full throttle when traveling with the roller, the brakes engage and prevent the roller from moving forward and backward. Do not shift the lever from forward to reverse (or reverse to forward) in one motion.

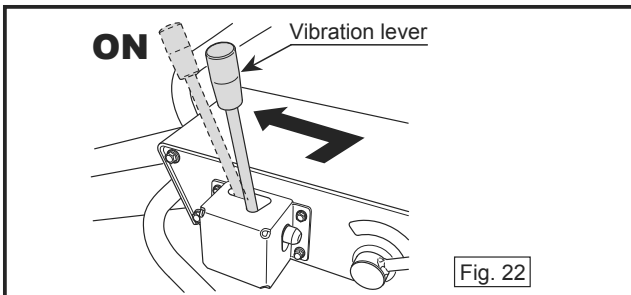


CAUTION

- Always work with the engine rpm at full throttle. If you work at low engine rpm, it can damage hydraulic equipment, hoses and so forth.
- Do not decrease the engine rpm when traveling forward and reverse. Doing so may cause the roller to breakdown.
- When shifting the travel lever from forward to reverse (or reverse to forward), be sure to stop the lever at the neutral position first. Do not shift the lever from forward to reverse (or reverse to forward) in one motion.

8.3 Vibration

- Toggle the vibration lever from OFF to ON to initiate vibration. (Fig. 22)

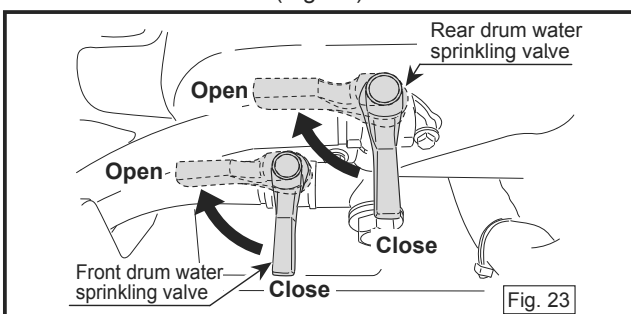


CAUTION

- Do not operate the vibration lever at half-clutch. This could cause the clutch to burnout or fail.
- Do not vibrate when the travel lever is in the stopped (neutral) position. Do not start vibration on an area that is thoroughly compacted or on a paved road as it could damage the vibration roller and the surface of the road.

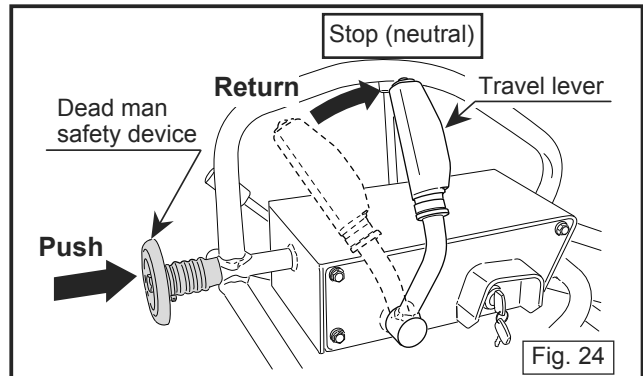
8.4 Water sprinkling

- Before performing watering work, open the water valve. There are two water valves, one for the front drum and one for the back drum. (Fig. 23)



8.5 Dead man safety device

- As a safety precaution, the Vibration Roller comes with a dead-man safety device that is used when the operator gets caught between the machine and an obstacle when the machine is traveling in reverse. If the dead-man safety device is pressed, it makes the travel lever return to the neutral position. (Fig. 24)

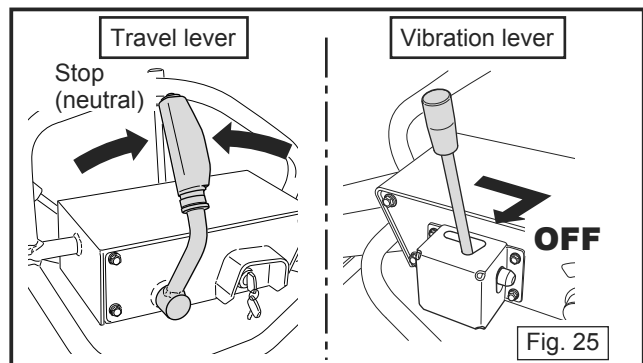


WARNING

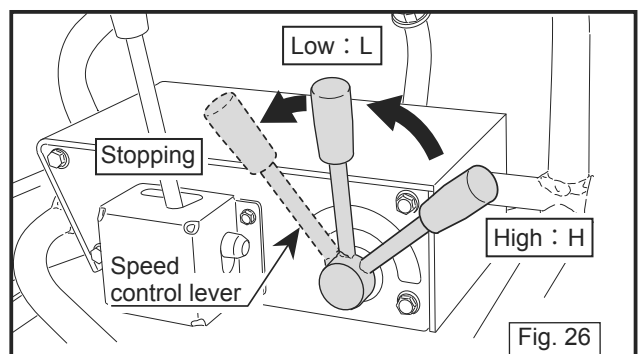
Do not release the travel lever except when switching between forward, reverse and neutral. The dead-man safety device may not function properly when it is caught between an obstacle.

8.6 Stopping

1. Turn the vibration lever OFF and return the travel lever to the stop (neutral) position. (Fig. 25)



2. Check that vibration has stopped and then move the speed control lever to "Low: L (idling)." (Fig. 26) After the engine speed becomes stable at low speed, move the speed control lever forward to "Stop" to stop the engine.



3. Once the engine stops turn the key switch to the stop position. (Fig. 27) The buzzer sound will stop when in the stop position.

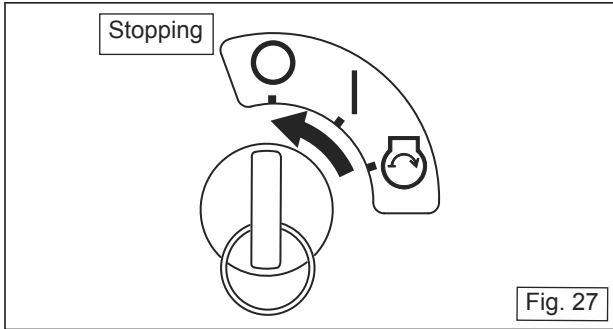


Fig. 27

4. After you stop the roller, close its fuel valve. (Fig. 28)

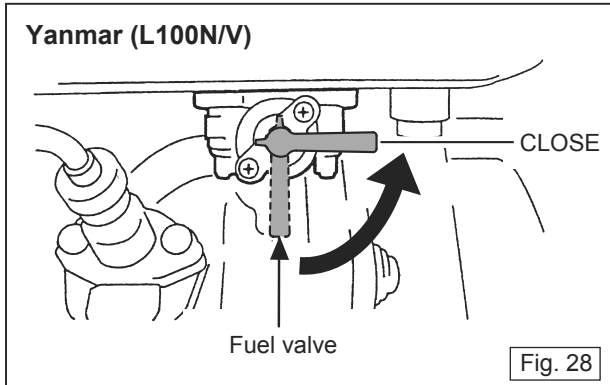


Fig. 28

8.7 Parking

- The roller will automatically engage its brakes when its engine is stopped or at slow speed. (Automatic hydraulic brake system)
- If you are away from the machine, take out its key and store it in its designated area.
- If you park the roller, be sure to chock its drums.

! DANGER

- **Never park or stop the roller on a slope as it is dangerous to do so.**
- **Choose the best drum chock appropriate to the conditions of the road surface.**

9. MAINTENANCE AND STORAGE

9.1 Maintenance

- Wash parts until free of debris and mud.
- If the rollers and scrapers in particular are clogged with mud, carefully wash it off as it produces resistance when the vibration roller is running.

! CAUTION

When cleaning the roller with a high-pressure washer, make sure water from the muffler and air cleaner of the engine does not get inside the engine. If water gets into the cylinders inside the engine, it may cause water hammer phenomenon.

- Completely drain the water in the water tank from the drain port. Wash out the water tank if it is dirty.
- An air breather is attached to the oil tank. A cover is placed over the oil tank to prevent water from entering into it. Be sure not to lose the cover when you are doing high pressure washing. (Fig. 29)

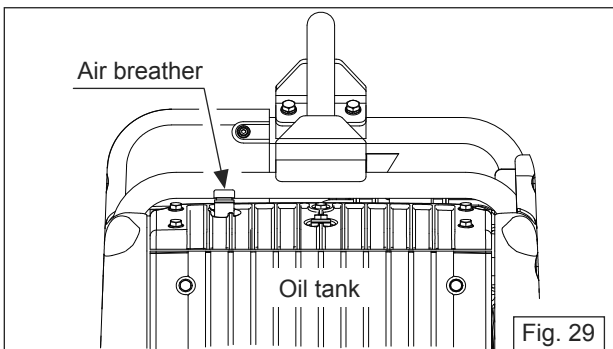


Fig. 29

9.2 Storage

- **When storing the roller over a short term**
Cover it to prevent debris and dust from getting on it, and store it indoors in low humidity away from direct sunlight.
- **When storing over a long term**
Remove the fuel from the fuel tank. Also, remove any remaining fuel from the fuel filter.

For more information on the storage procedures for the engine, refer to the engine manual provided separately.

- Firmly cover the intake and exhaust ports of the air cleaner and muffler. If water gets inside the engine, it can cause water hammer phenomenon.
- Do not leave the roller outdoors, store it indoors.
- Disconnect the (-) battery ground cable.
- The battery will self-discharge. Charge it following a long-term storage before you use it. If the battery cannot be charged, replace it with a new one.

Water hammer

When water gets into the cylinders of a diesel engine, it cannot be compressed like air and so it produces impacts and high water pressure inside the cylinder which damage the internal parts of the engine. This phenomenon is called a water hammer.

10. PERIODIC INSPECTION AND ADJUSTMENTS

10.1 Inspection schedule for each part

Inspection period	Check points	Item to check	Oil types
Daily	Sprinkler piping system	Leaks, looseness, cracks, wear	
	Visual	Scratches, distortion	
	Fuel tank	Leaks, oil level, dirtiness	Diesel or gasoline
	Hook	Missing, damage, cracks, and loose/missing bolts and nuts	
	Fuel system	Leaks	
	Fuel filter	Dirtiness	
	Engine oil	Leaks, oil level, dirtiness	Engine oil
	Hydraulic oil tank	Leaks, oil level, dirtiness	Hydraulic oil
	V-belt vibrator unit	Cracks, tension	
	Hydraulic piping system	Leaks, looseness, cracks, wear	Hydraulic oil
	Horn	Operation inspection	
	Travel lever (linkage parts)	Missing, damage, cracks, and loose/missing bolts and nuts	
	Travel lever (linkage operation)	Operation check, play	
	Dead man safety device	Operation inspection	
	Scrapers	Bent, damage, adjustment	
	Bolts, nuts	Looseness, missing	
50 hours	Engine oil	Initially-Replace after 50 hours of operation	Engine oil
	Air cleaner element	Initially- Wash after 50 hours of operation	
	Hydraulic oil filter	Initially- Replace after 50 hours of operation	
	Wiring	Inspection	
Every 50 hours	Travel and speed control lever system parts	Greasing	Grease
	Lever system parts for hydraulic pump	Greasing	Grease
	Dead man safety device	Operation inspection, lubricate	Grease
	Steering handle stopper	Operation inspection, lubricate	Grease
Every 100 hours	Engine oil	Replace	Engine oil
	Battery terminal	Clean	
	Air cleaner element	Clean	
Every 300 hours	Hydraulic oil filter	Replace	Engine oil
Every 450 hours	Fuel filter element	Replace	
	Deposits within the fuel tank	Remove	
Every 800 hours	Valve clearance (engine)	Adjust	
1000 hours	Hydraulic oil	Replace	Hydraulic oil
1500 hours	Spray nozzle (engine)	Inspection, cleaning	
2000 hours	Injection pump (engine)	Inspection	
1 years	Air cleaner element	Replace	
2 years	Battery	Replace	
Unscheduled	Hydraulic hose	Replace	
	Vibration clutch	Replace	

Refer the engine instruction manual provided for details on the inspection and maintenance of the engine.

10.2 Engine



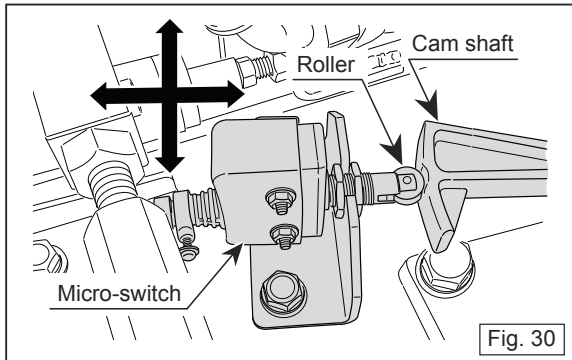
Before inspecting/adjusting the engine, stop it first.

Follow the engine manual provided separately for daily inspection, routine maintenance, and simple adjustments and maintenance of the engine.

10.3 Micro-switch adjustment

The roller comes with a micro-switch which enables the engine to be started when the travel lever is in the stop position (neutral) in order to prevent the roller from running out of control when it is started.

- The micro-switch is in neutral when the roller at the end of the micro switch fits into the recessed cavity on the cam shaft for the lever (hydraulic pump). (Fig. 30)
- Adjust the position of the micro-switch so that the engine does not start when the travel lever is leans to the forward side and reverse side.



- Once you finished the adjustments, apply a thin coat of grease on the micro-switch roller bearing.

10.4 Battery handling

CAUTION

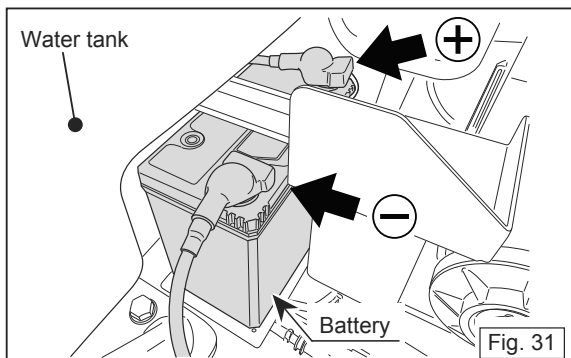
Check that the battery is securely fastened in the bracket.

• Battery maintenance

Loose and corroded terminals may cause poor contact. Whenever there is white powder on a terminal, clean the terminal with warm water and apply a coat of grease to it. Also, when a terminal exhibits significant corrosion, replace the battery with a new one.

• Removing and mounting the battery

When removing cable, disconnect the negative (-) terminal first. When installing cable connect positive (+) terminal first and the negative (-) terminal last. (Fig. 31)



CAUTION

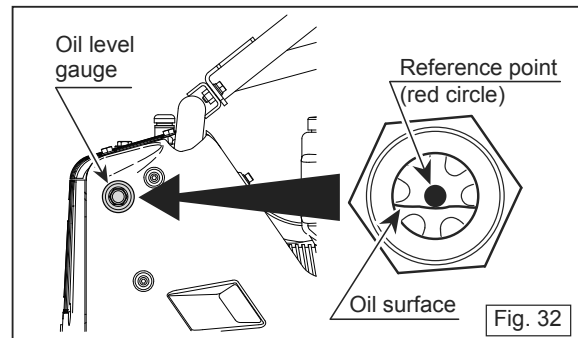
When handling the battery, never let the (+) cable (cord) and (-) terminal touch (short). Also, be careful not to connect (+) and (-) terminals in reverse, doing so will damage the electronic components.

10.5 Inspection and maintenance of hydraulic systems

• Inspection

- Check the hydraulic pump and hydraulic motor for any damage.
- Check that no hoses and pipes are loose, or check that there are no areas leaking oil.
- Check whether the oil tank contains the specified amount of hydraulic oil, and whether or not the hydraulic oil has turned milky white. (Fig. 32)

The hydraulic oil turns milky white when the hydraulic pump has taken in moisture. Put in the specified amount of hydraulic oil and retighten the pipes. Since it has contaminated by water when the hydraulic oil is emulsified, please replace the hydraulic oil.

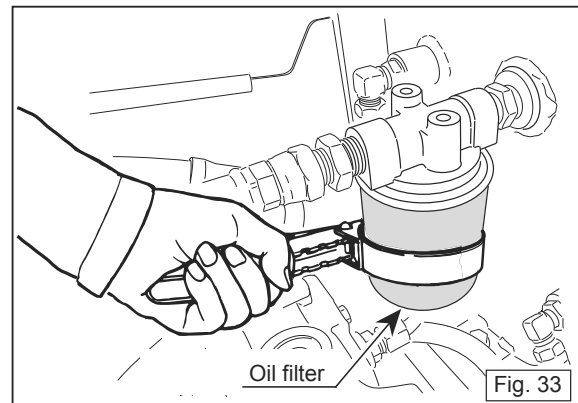


• Maintenance

- Replacing the hydraulic oil filter (Fig. 33)

First time : after 50 hours

Thereafter : Replace every 300



CAUTION

Use only genuine Mikasa replacement oil filters (10 μ filter paper).

- Replacing the hydraulic oil Change the hydraulic oil every 1,000 to 1,500 hours of operation depending on operating load conditions. Remove the drain plug for the oil tank (oil drain port) and drain the old hydraulic oil. Refill the oil tank with the specified amount of hydraulic oil (25L). When refilling the tank, be careful not to let foreign matter like dust and debris enter the tank.

CAUTION

Treatment of the used hydraulic oil (waste oil) should be done in accordance with the waste disposal procedures of each municipality.

Recommended hydraulic oil

Viscosity ISO VG32 or equivalent Cold climates
ISO VG46 or 56 or equivalents
General and warm climates

(Contains Idemitsu Daphne super hydro-46ST when shipped

from the factory.)

Idemitsu Daphne Super Hydro 46ST

viscosity : ISO VG46

Fluid temp. : -42.5°C

Viscosity index : 154



If you use VG46 (factory-shipped) in cold climates, it will damage hydraulic equipment, and after start-up, the brakes will not release and the machine will not move forward and backward.

10.6 Cleaning the air cleaner

• Engine side air cleaner

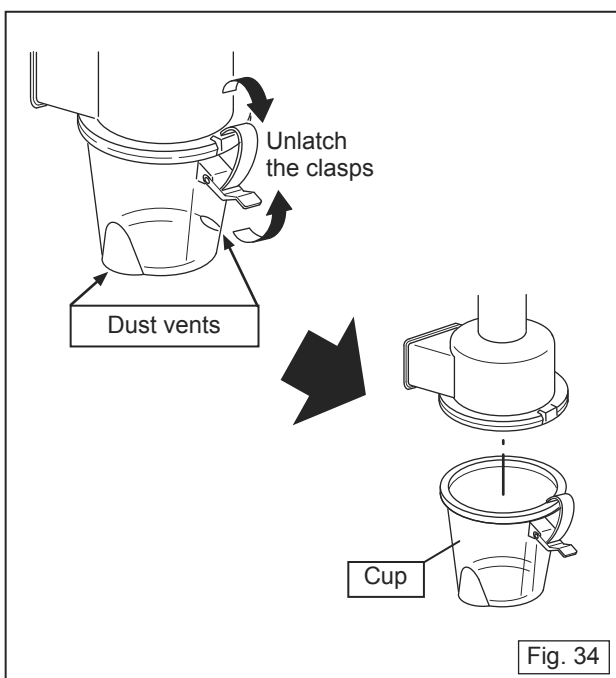
If the air cleaner element is extremely dirty, it will not only cause engine start-up failure, poor engine output and operational difficulties, but it will drastically shorten the life of the engine. Always keep the element clean. If the element cannot be freed of dirt, replace it with a new one. (For details, refer to the engine operation manual provided separately.)

• Body side cyclone pre-cleaner

If the dust vents on the cup are clogged, the cyclone effect will not occur and the element will become dirty easily. When the vents are dirty wash them.

1. How to clean the cup.

Unlatch the clasps and take out the cup. (Fig. 34)



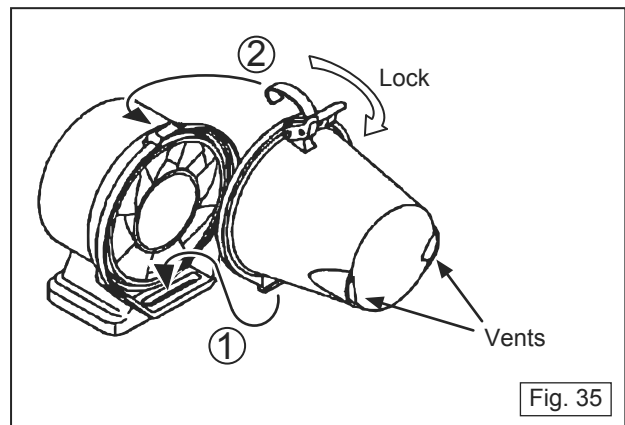
When you unlatch the clasps, be careful not to injure yourself.

2. Wash with a mild detergent and water.

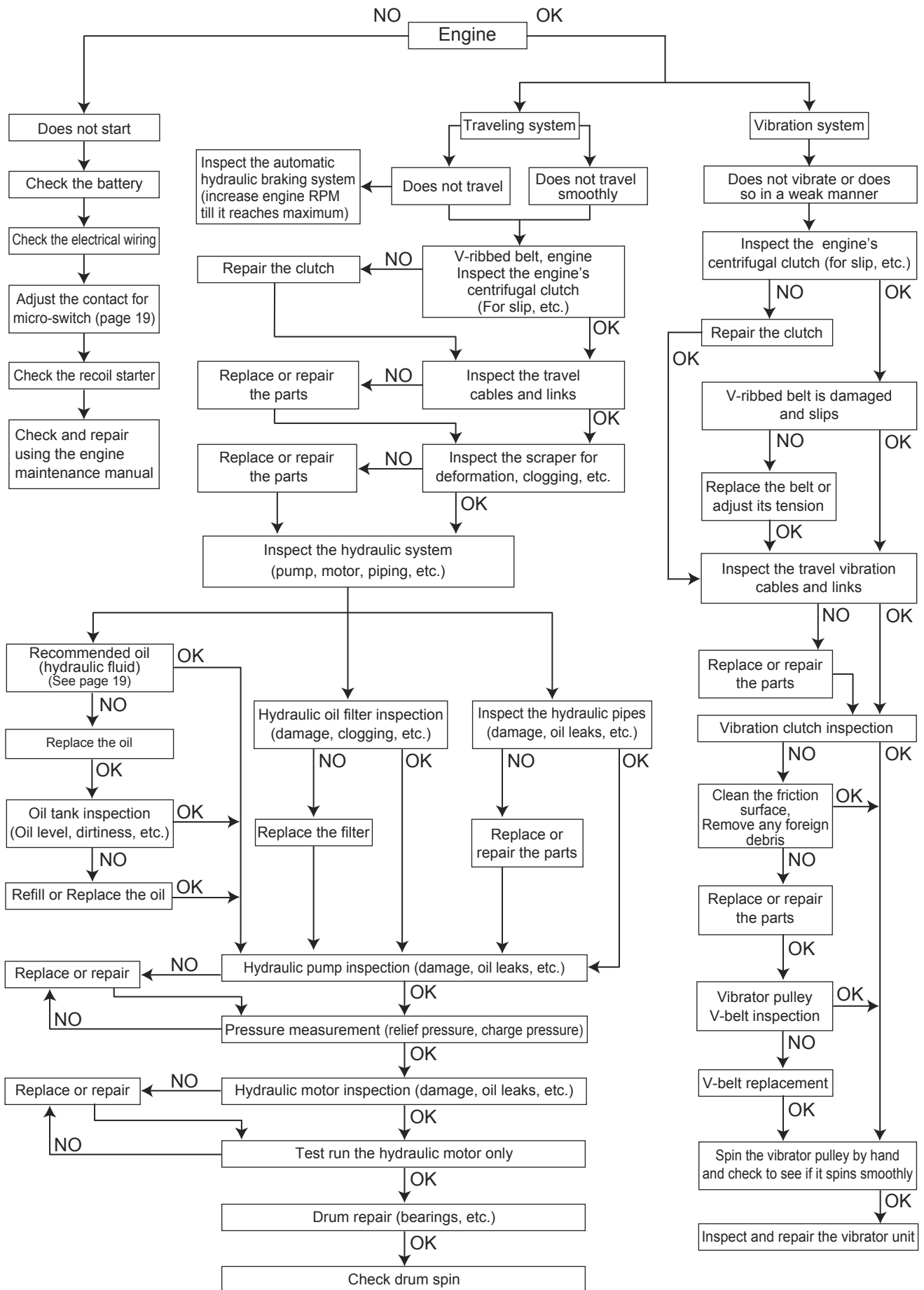


Never use thinner or other organic solvents for cleaning as they can deform and damage the cup.

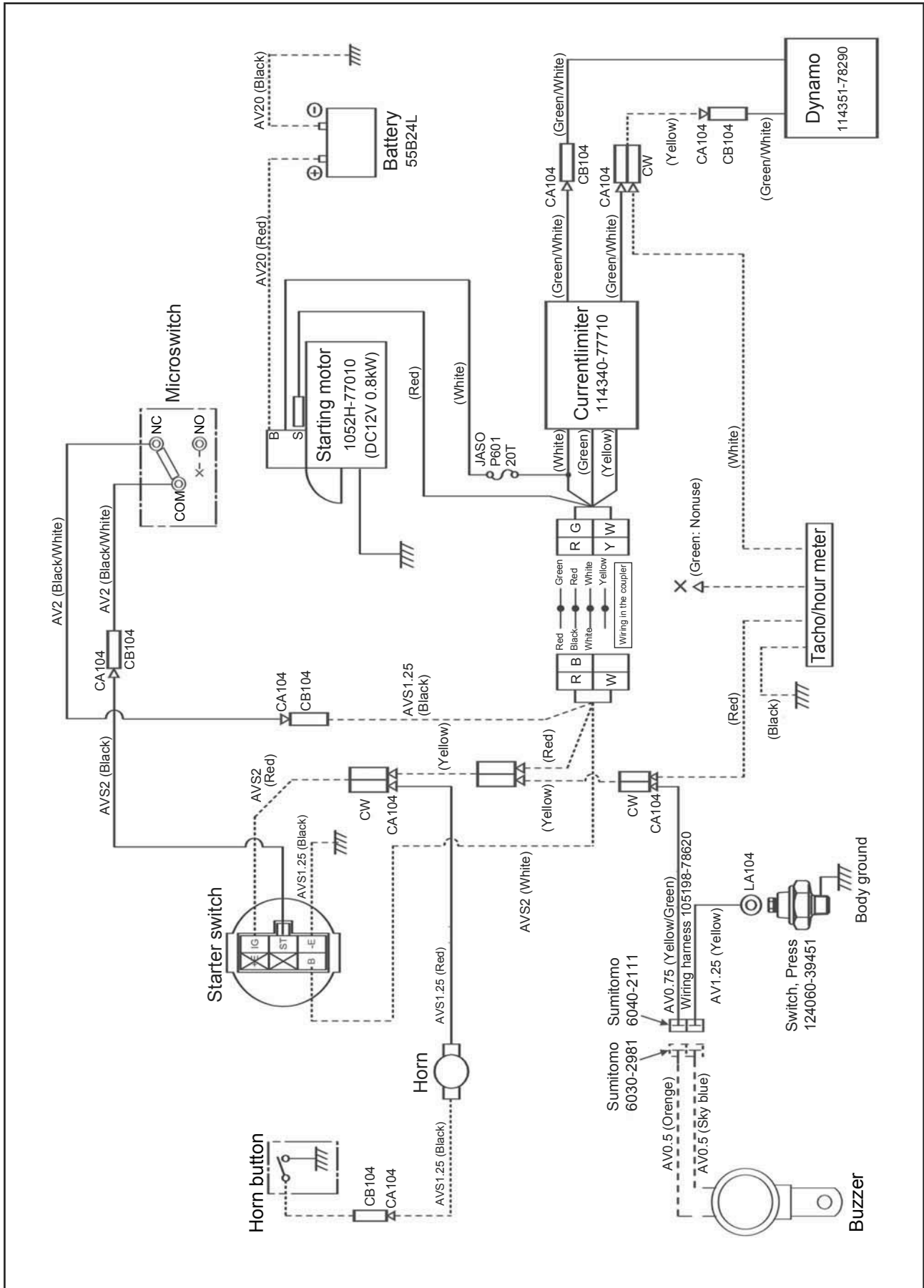
3. After it is cleaned, firmly insert the each hook ①, ② into their guide holes in the reverse order from which they were unhooked. (Fig. 35)



11. TROUBLESHOOTING



12. WIRING DIAGRAM





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