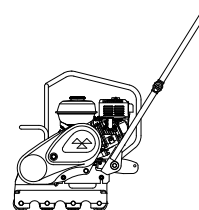




BLOCK PLATE COMPACTOR

MVB-85
MVB-85H



INSTRUCTION MANUAL

en




<http://www.mikosas.com>

Contents of "Declaration of Conformity"
Please refer the EC DECLARATION OF CONFORMITY
in this manual as well.

402-05502



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.		Takahiro Kishino, engineer R&D Division, Mikasa Sangyo Co., Ltd. Shiraoka-city, Saitama, Japan			
4) Type: Vibratory Rammers					
5) model	MVB-85	MVB-85H			
6) Equipment item number	352552, 352553, 352554, 352555	353604, 353605			
7) Serial number	For serial number, please refer it on front page.				
8) power source cont. output <max.output>	Subaru EH12- 2D 2.1kW <2.6kW>	HONDA GX120 2.1kW <2.6kW>			
9) Measured sound power level(dB)	103	104			
10) Guaranteed sound power level(dB)	105	105			
11) Operator's sound pressure level(dB)	93	95			
Hand-Arm Vibration Level Ahv (m/sec2)	8.3	8.2	Vibration Level is in comply with EU Directive2002/44/EC and the value is shown as 3 axix 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.		
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*04			
18) Place and date of the declaration		Tokyo, Japan June, 2016 Signed by:  Keiichi YOSHIDA Director, R&D Division Mikasa Sangyo Co., Ltd.			

Italian

1. DICHIARAZIONE "CE" DI CONFORMITÀ
2. Nome e indirizzo Fabbricante
3. Nome e indirizzo della persona che conserva la documentazione tecnica
4. Tipo: **Piastre vibranti**
5. Modèle
6. Codice macchina
7. Numeridi matricola
8. Potenza installata netta <resa massima>
9. Livello di potenza sonora misurato (dB)
10. Livello di potenza sonora garantito
11. Livello massimo di pressione sonora
12. Valutazione di conformità in accordo all'annesso VIII (procédure d'assurance de qualité totale)
13. Nome dell'organismo notificato
14. Rappresentante Autorizzato in Europa
15. Direttiva di riferimento
Direttiva 2000/14/CE su l'emissione acustica ambientale delle macchine ed attrezzature destinate a funzionare all'aperto
16. Dichiarazione
Le attrezzature riportate nel documento soddisfano i requisiti della Direttiva 2000/14/CE
17. Altre Direttive Comunitarie di riferimento
18. Certificato di Conformità CE No:
19. Luogo e data della dichiarazione

French

1. DECLARATION « CE » DE CONFORMITE
2. Non et adresse du Fabricant
3. Nom et adresse de la personne qui défient les documents techniques
4. Type du materiel: **Plaques vibrantes**
5. Modello
6. Numero équipement
7. Numéro de série
8. Puissance reseau <rendement maximal>
9. Niveau sonore mesure(dB)
10. Niveau sonore garanti(dB)
11. Niveau sonore maximum
12. Certification de conformite selon l'annexe VIII (procedura

Garanzia di Qualità totale)

13. Nom et adresse de l'organisme notifié
14. Mandataire dans la Communauté Européenne
15. Directive concernée
Est également conforme aux dispositions de la directive <<émission sonores des équipements utilisés à l'extérieur des bâtiments>> 2000/14/CE et aux législations nationales la transposant.
16. Déclaration
L'équipement de référence satisfait aux exigences de la Directive 2000/14/EC
17. Autres directives communautaires concernées
18. Certificate deConformite CE numero:
19. Lieu et date de la déclaration

Spanish

1. DECLARACIÓN "CE" DE CONFORMIDAD
2. Nombre y dirección del fabricante
3. Nombre y dirección de la persona que guarda la documentación técnica.
4. Tipo: **Bandejas vibrantes**
5. Modelo
6. Número de referencia del equipo
7. Numeros de serie
8. Potencia neta instlada <rendimineto maximo>
9. Nivel sonoro medido del motor (dB)
10. Nivel sonoro garantizado del motor (dB)
11. Máximo nivel sonoro de presión (dB)
12. Evaluación de la Conformidad de acuerdo al Anexo VIII (Prcedimiento de total garantía asegurada)
13. Nombre y dirección de la Entidad Notificada
14. Representante autorizado
15. Directiva relacionada
Directiva 2000/14/CE en relación a la emisión sonora en el ambiente por equipos que trabajan en espacios abiertos
16. Declaración
El equipo referido en este documento , cumple con todos los requerimientos de la Directiva 2000/14/EC
17. Otras Directivas Comunitarias relacionadas
18. Certificado de Conformidad CE N°
19. Lugar y fecha de la declaración

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1. Preface

- This operation manual describes the proper operation, basic inspection and maintenance procedures of Block Plate Compactor. Please read this operation manual before use in order to maximize the excellent performance of this machine and make your work more efficient and effective.
- After reading the manual, please keep it in a handy location for easy reference.
- For the handling the engine, please refer to the separate engine operation manual.
- For inquiries about repair parts, parts lists, service manuals, and repairs, please contact the store where you purchased the product, our sales office, or the Mikasa Parts Service Center. For parts lists, please visit our homepage at: <http://www.mikasa.com/> where you can access Mikasa WEB parts lists.

The illustrations in this manual might slightly differ in part from the machine you actually purchased due to design changes.

2. Applications, Warnings, Structure and Power Transmission

Applications

This plate compactor for surfacing of interlocking blocks used for paving sidewalks, parks and other open spaces flattens the surface irregularities by the weight of the machine and vibration. The surface flattening is done with four rolling hard rubber rolls while vibration is applied to the surface, so it is unlikely that the surface of interlocking blocks is damaged, and the machine is easy to operate. The interlocking block appropriate for this machine operation is the one having a surface area for two rolls.

Warning about incorrect applications and techniques

Do not use this machine for works other than those to flatten the surface of interlocking blocks for pavement. Do not use this machine on steep sloping land because the machine might accelerate suddenly if the operator accidentally releases his grip. You might think the flattening process goes faster if a weight is put on the machine, but do not operate the machine with a weight on it, because the weight might damage the machine, or the balance of the machine will be lost, causing the weight to fall and scatter, creating a dangerous situation. Do not operate the machine with someone sitting on it. The body will receive strong vibration, and the person will lose his balance, which might result in unexpected injury because part of the body might be caught or tramped by the roll. If the machine is operated on the surface where one of the interlocking blocks is too big or too heavy or when the road surface is sufficiently tamped, the vibration of the machine becomes big, causing the machine to get damaged earlier than normal. Also, the vibration that the operator's hands receive will increase, leading to a danger of vibration disease if the machine is operated for an extended period of time.


Structure

The upper portion of the machine consists of an engine with a centrifugal clutch attached to the output shaft, handle, belt cover and guard hook fixed to the engine on the base top. The lower portion of the machine consists of a vibrator installed to the upper front of the cast frame and a four rubber rolls attached to the bottom in such a way that they can rotate freely. The upper and lower portions of the machine are connected with four Shock Absorbed Rubber, and a V belt transmits power between the centrifugal clutch at the upper portion and the pulley of Vibrator at the lower portion. The vibrator is fixed to Eccentric Shaft where V pulley is attached in such a way that Eccentric Shaft can rotate freely by the bearing.

Power transmission

The motor used is a 4 cycle single cylinder air cooled gasoline engine. To the output shaft of the engine, a centrifugal clutch with a V pulley is installed on its upper part. When the engine revolution is increased by the throttle lever of the engine, the clutch is engaged. Then, through V belt, V pulley of the vibrator at the lower portion of the machine starts to rotate, and the engine revolution is converted to the specified revolution to rotate Eccentric Shaft to generate vibrations. The vibration generated by the vibrator is transmitted to the rubber rolls, which cause the interlocking blocks to vibrate.

3. Warning Symbols

The triangle marks () used in this manual and on the decals on the machine are warning symbols. Please follow these precautions.



Warning symbols indicating personnel hazards




Extremely hazardous. If the warning is not followed, it is likely to result in serious injury or death.



Hazardous. If the warning is not followed, it is likely to result in serious injury or death.



Potential hazard. If the warning is not followed, it may result in injury.

Precautions (without  mark) If the warning is not followed, it may result in property damage.

4. Safety Precautions


4.1 General precautions

	<ul style="list-style-type: none"> Do not operate the machine, <ul style="list-style-type: none"> If you do not feel well due to overwork or illness. If you are taking any medicine. If you are under the influence of alcohol. 	
	<ul style="list-style-type: none"> Read this manual carefully and handle the machine as described to ensure safe work. For details about the engine, refer to the separate manual for the engine. Make sure you understand the structure of the machine well. For safe work, always wear protective gear (helmets, safety shoes, ear plugs, etc.) and work in appropriate clothes. Always check the machine before your work to make sure it is in normal condition. Decals on the machine (operation method labels, warning labels, etc.) are very important for your safety. Keep the machine clean so that the decals can be read all the time. Replace a decal if it becomes illegible. Before performing maintenance work, be sure to turn the engine off. It is very dangerous if children come into close contact with the machine. Have the utmost concern about how and where to store the machine. In particular, for an engine with a cell, always remove the starter key and keep it in a designated place. Before inspection and maintenance work, stop the engine, and do your work on a flat surface area. If a cell is attached, remove the battery wiring before your work. Mikasa does not accept any responsibility for accidents caused by remodeling or rework done on the machine. 	

4.2 Refueling precautions

	<ul style="list-style-type: none"> When adding fuel, <ul style="list-style-type: none"> Make sure you work in a well ventilated location. Make sure the engine is stopped and wait until it cools down. Take the machine to a clear flat location without any combustibles nearby. Be careful not to spill the fuel. Wipe well if any spill occurs. Do not fill to the rim due to potential spillage. After adding the fuel, tightly close the tank cap. 	
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4.3 Location and Ventilation precautions

<p>⚠ DANGER</p>	<ul style="list-style-type: none"> ● Do not run the machine in an unventilated location, such as indoors or inside a tunnel. The exhaust gas from the engine contains toxic gases such as carbon monoxide and is very hazardous. ● Do not operate the machine near open flames. 	
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4.4 Precautions before starting

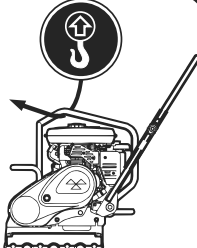
<p>⚠ CAUTION</p>	<ul style="list-style-type: none"> ● Check each part to see if it is tightened properly. Vibration causes loosening of bolts, which results in unexpected serious malfunctions of the machine. Tighten the bolts securely. 	
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4.5 Precautions during work


<p>⚠ CAUTION</p> <p>⚠ DANGER</p> <p>⚠ WARNING</p>	<ul style="list-style-type: none"> ● Before starting the machine, make sure it is safe to start by checking your surroundings for people and objects. ● Always pay attention to your footing. Work in an area where you can maintain a good balance of the machine and a safe comfortable posture. ● The engine and muffler become very hot. Do not touch immediately after the machine stops because they are still very hot. ● If you notice deterioration of machine operation during your work, stop your work immediately. ● When moving away from the machine, stop the engine and make sure that the machine is completely immobilized by chocking the rubber rolls. Stop the engine also when moving the machine to other location. ● Pay full attention to the rotating part (such as inside the belt cover) to prevent your hand or cloth from being caught. ● Work on sloping land is very dangerous. Pay full attention for safe operation of the machine when working on sloping land. ● Do not leave the machine unattended on sloping land. Serious accident might occur if the machine left unattended begins to move. 	
--	--	--

4.6 Lifting precautions




For unloading using a crane, a licensed crane operator is needed. An operator should be qualified for crane and hooking work.

<p>⚠ DANGER</p>	<ul style="list-style-type: none"> ● Before lifting, check the machine parts (especially the hook and anti-vibration rubber) for any damage and loosened or missing bolts. ● Stop the engine and shut the fuel cock while lifting. ● Use a wire rope with sufficient strength. ● For lifting, use only one point hoisting hook, and do not lift at any other part. ● When the machine is hoisted, never let people or animals come underneath. ● For safety reasons, do not lift to a height that is higher than necessary. 	
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4.7 Transportation and Storage precautions

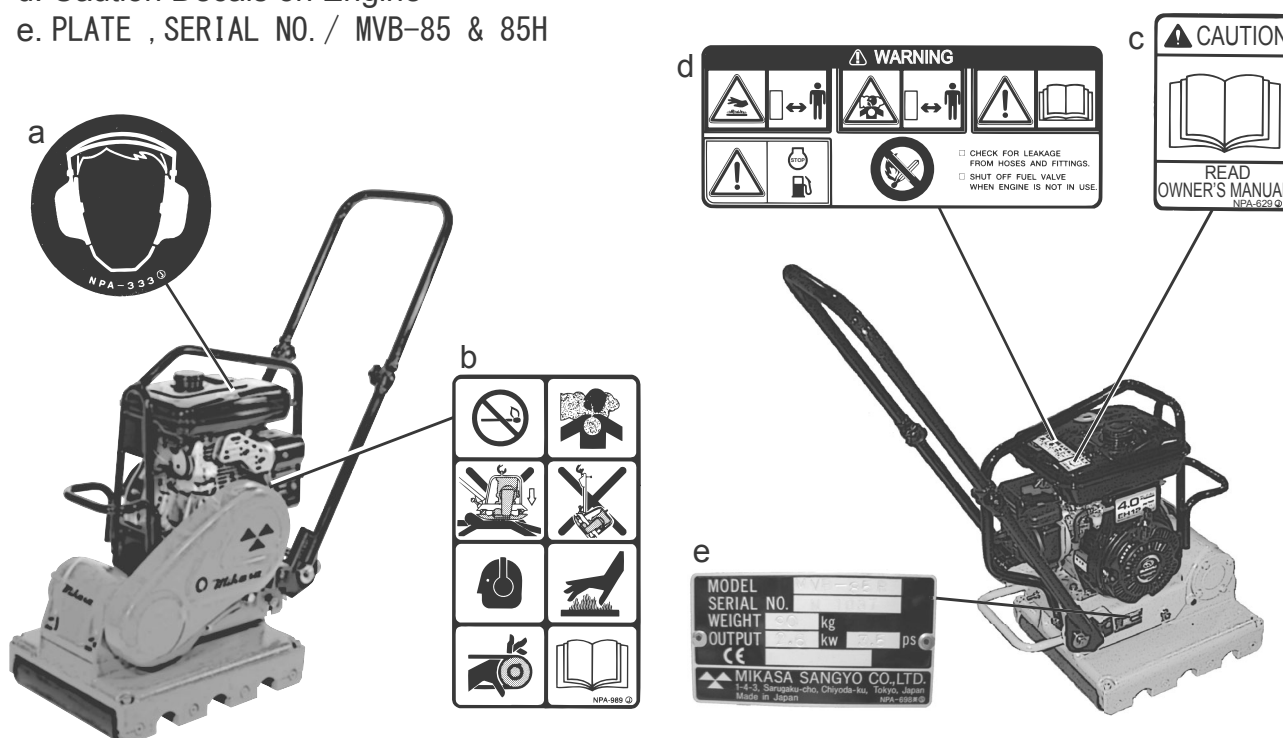
 WARNING	<ul style="list-style-type: none"> ● Stop the engine during transportation. ● Transport after the engine and the machine are cooled down. ● Always drain the fuel before transporting. ● Securely fix the machine to prevent it from moving or falling during transportation. ● When storing, chock the rubber rolls and stabilize the machine so that it is completely immobilized. 	
--	---	--

4.8 Maintenance precautions

 WARNING	<ul style="list-style-type: none"> ● To secure safe operation, proper maintenance is required. In particular, the rolls and the parts used for lifting, if not properly maintained, might become a cause of serious accident. Pay full attention and keep the machine in good condition. ● Start maintenance work after the machine has cooled down completely. The muffler, in particular, becomes very hot, and there is a danger of burn. The engine, engine oil and vibrator also become very hot. Be careful not to get burned. 	
 CAUTION	<ul style="list-style-type: none"> ● Always stop the engine before inspection and adjustment. If you are caught in a rotating part, serious injury might occur. ● After maintenance work, check the security parts to see if they are securely installed. Special attention should be paid when checking bolts and nuts. ● If disassembly is involved in maintenance, refer to the maintenance instruction manual to make your work safe. 	

4.9 Labeling Position

- EAR PROTECTION LABEL
- Symbols Used on Warning Labels
- DECAL, CAUTION(MANUAL)
- Caution Decals on Engine
- PLATE , SERIAL NO. / MVB-85 & 85H



※ The illustration is shown for model, "MVB-85"

4.10 Descriptions of Symbols Used on Warning Labels

a. Danger of hearing damage caused by noise

- Always use ear plugs while operating the machine.

b. Symbols Used on Warning Labels

- Fire hazard**
Stop the engine when refueling. Fire may occur if a flame is near the tank fuel port.
- Danger: poisonous exhaust gas**
Carbon monoxide poisoning may occur if the exhaust gas is inhaled. Do not operate the machine in a poorly ventilated area.
- Do not go under the lifted machine.**
Do not let people or animals go under the lifted machine.
- Lifting by the handle is prohibited**
Due to a falling risk, do not lift the machine by the handle.
- Danger of hearing damage caused by noise**
Always use ear plugs while operating the machine.
- Be careful not to get burned.**
Accidental burn may occur if you touch the hot parts (engine, muffler, etc.) during operation or immediately after the machine stops.
- Be careful not to be caught in rotating parts.**
Make sure the engine is stopped when removing the belt cover during a belt change.
- Read the manual carefully.**
Always read the operation manual and have good understanding of operation before your work.

c. Read the manual carefully.

- Always read the operation manual and have good understanding of operation before your work.

d. Caution Decals on Engine

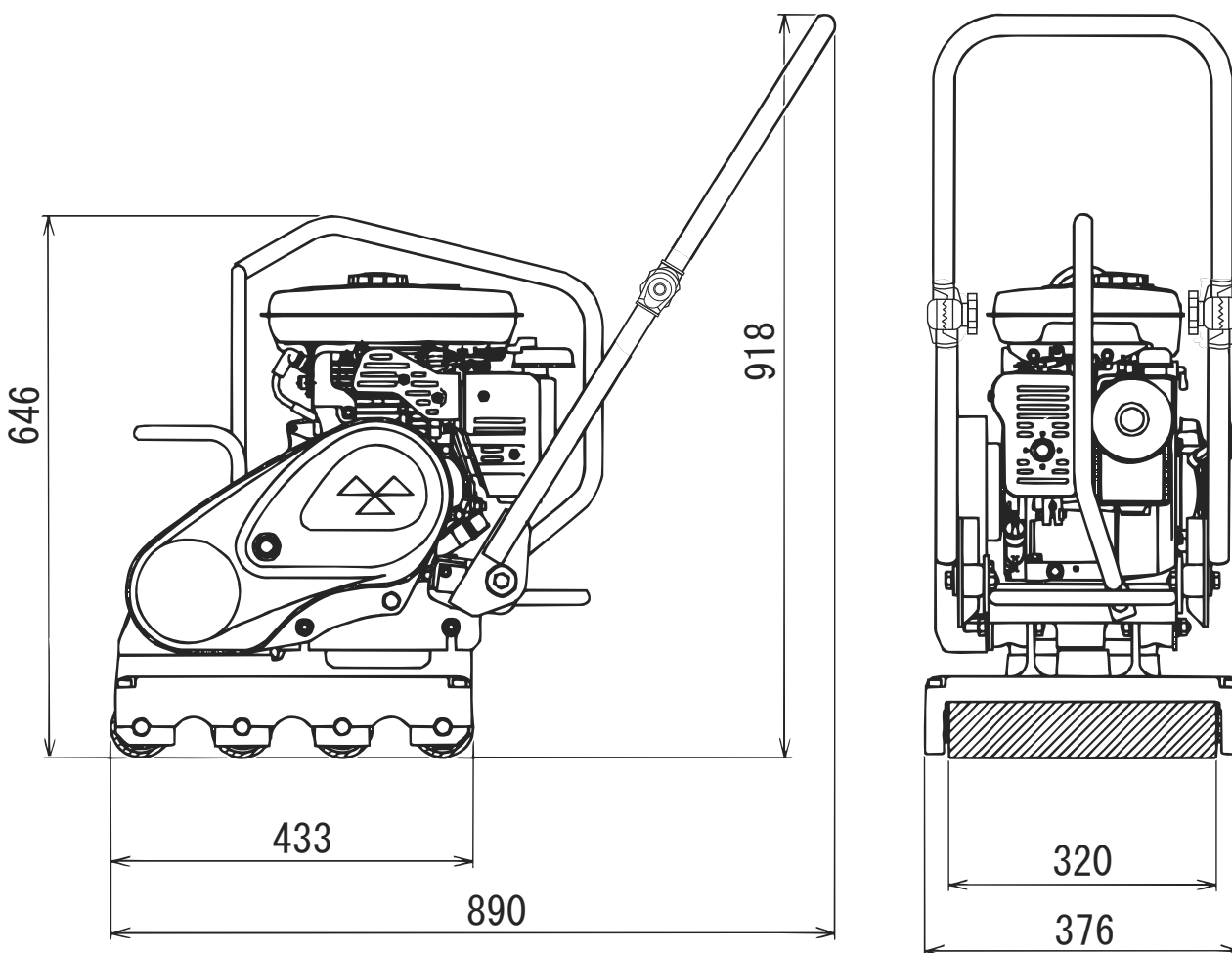
- **Fire hazard**
Stop the engine when refueling. Fire may occur if a flame is near the tank fuel port.
- **Danger: poisonous exhaust gas**
Carbon monoxide poisoning may occur if the exhaust gas is inhaled. Do not operate the machine in a poorly ventilated area.
- **Hot muffler**
Do not touch the muffler and its surrounding area
- **Fire, open flame and smoking prohibited.**

e. PLATE, SERIAL NO.

- Product Model Name, Body Number, weight, the engine output, CE mark are written.

5. Appearance

5.1 Overall Dimension

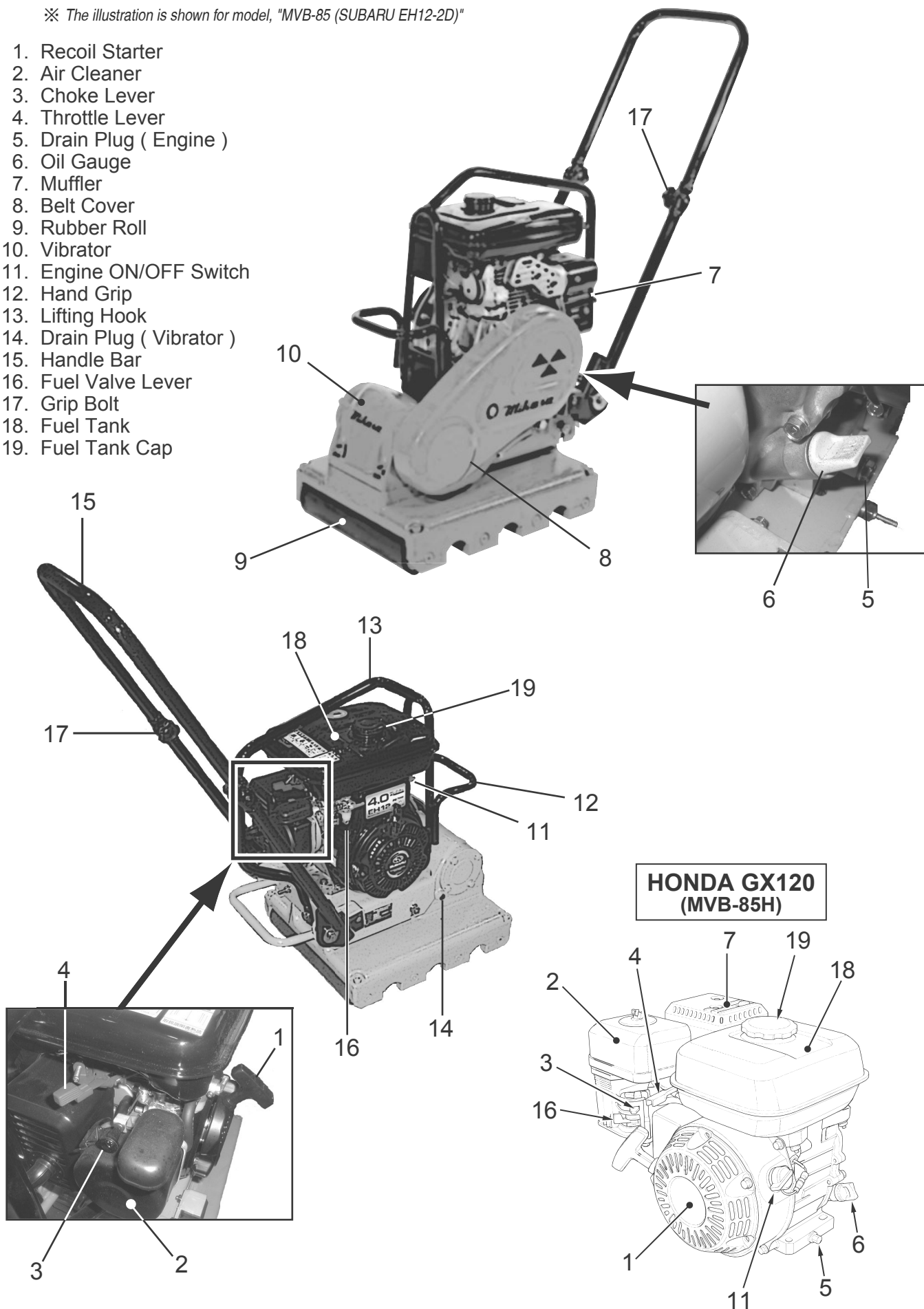


※ The illustration is shown for model, "MVB-85"

5.2 Control Unit Positions and Names

※ The illustration is shown for model, "MVB-85 (SUBARU EH12-2D)"

1. Recoil Starter
2. Air Cleaner
3. Choke Lever
4. Throttle Lever
5. Drain Plug (Engine)
6. Oil Gauge
7. Muffler
8. Belt Cover
9. Rubber Roll
10. Vibrator
11. Engine ON/OFF Switch
12. Hand Grip
13. Lifting Hook
14. Drain Plug (Vibrator)
15. Handle Bar
16. Fuel Valve Lever
17. Grip Bolt
18. Fuel Tank
19. Fuel Tank Cap



6. Specifications

6.1 Machine specifications

Model	MVB-85	MVB-85H
Overall length	890 mm	
Overall width	376 mm	
Overall height	918 mm	
Rubber roll diameter	73 mm	
Rubber roll width	320 mm	
Number of rubber rolls	4	
Vibration system	One axis prejudiced mind pendulum type	
Vibrating frequency	93 Hz (5600 V.P.M.)	
Centrifugal force	10.1 kN (1030 kgf)	
Volume of vibrator oil	0.14 L (140 cc)	
Engine setup	3600 m ⁻¹ (3600 r.p.m.)	
Weight	92 kg	90 kg

6.2 Engine specifications

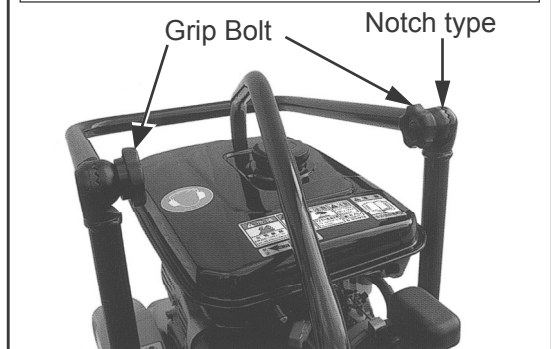
Engine make	SUBARU	HONDA
Engine model	EH12-2D	GX120UT2-SM12
Engine type	Air-cooled, 4 cycle gasoline engine	Air-cooled, 4 cycle gasoline engine
Displacement	121 cc	118 cc
Max. output	2.6 kW / 3600m ⁻¹ (3.5 PS / 3600 r.p.m.)	2.6 kW / 3600m ⁻¹ (3.5 PS / 3600 r.p.m.)
Cooling system	Forced air-cooling	Forced air-cooling
Lubricating oil type	SAE 10W-30 (Winter 10W-10)	SAE 10W-30
Lubricant capacity	0.6 L (600 cc)	0.56 L (560 cc)
Fuel tank capacity	3.6 L (3600 cc)	2.0 L (2000 cc)
Spark plug	NGK BR6ES	NGK BPR6ES

※ The unit uses an SI unit according to the revision of regulations measurement.

※ The value in parenthesis indicates the one in the conventional unit.

7. Inspection Before Operation

Fix the collapsible handle at a certain position. When fixing, make sure the grip bolts are not loosened.



⚠ DANGER

Conduct inspection while the engine is stopped. If you get caught in the rotating parts, you may suffer serious damage. Conduct inspection after making this machine level and checking that the body does not move.

★ Refer to the "Regular Check and Adjustments" on page 11 for the inspection points before starting operation.

- 7-1 Clean each part of the machine well to maintain dirt and dust-free condition. Pay special attention to the soil adhered to the bottom of the vibrating plate, engine cooling air inlet, and the carburetor and air cleaner area to keep those parts clean.
- 7-2 Check each part for any looseness of bolts. Vibration causes bolts & nuts to loosen, which might result in unexpected accident or malfunction.
- 7-3 Inspect the guard hook, belt cover and anti-vibration rubber, as well as to check the function of speed adjustment wire and speed adjusting lever.
- 7-4 Check V-belt tension. The belt should have about 10 – 15mm of flexibility when pushed strongly with a finger at the mid-point between the axes. If V-belt is loosened, power is not transmitted well, which reduces compacting force and shortens the life of V-belt. In addition, the generated compaction force will lead to irregular vibrations when the engine revolutions are increased, and may result in a machine failure.
- 7-5 Set the engine on a level surface to check the oil level. If the oil level is low, add oil. Use the following engine oil.
Quality: Gasoline engine oil, Grade SE or above
Viscosity: SAE No. 30 at 20°C and above (summer) SAE10W-30

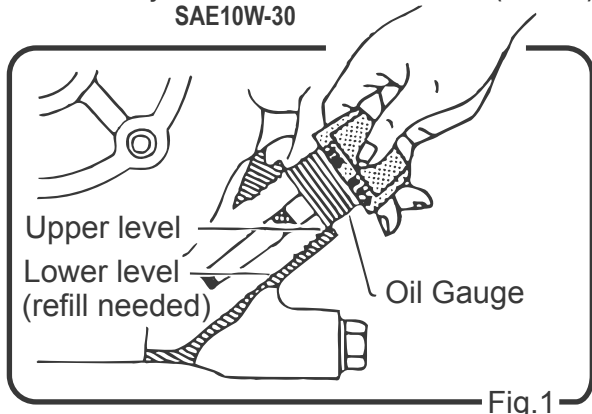


Fig.1

Temperature	Use oil
More than 25°C	SAE#30
10 ~ 25 °C	SAE#30, #20
10 ~ 0 °C	SAE#20
Less than 0 °C	SAE#10

- 7-6 Set the machine on a level surface, then remove the oil gauge of the vibrator. Check the oil gauge to see if the oil is at the specified level. Use engine oil SAE10W-30 as lubrication oil.
 Recommended oil quantity is 140cc.
 Remove the oil plug in Vibrator Assembly and check the oil level. Make sure the oil quantity is set at level of plug hole for checking. Every month or every 200 hours of operation, replace the oil.

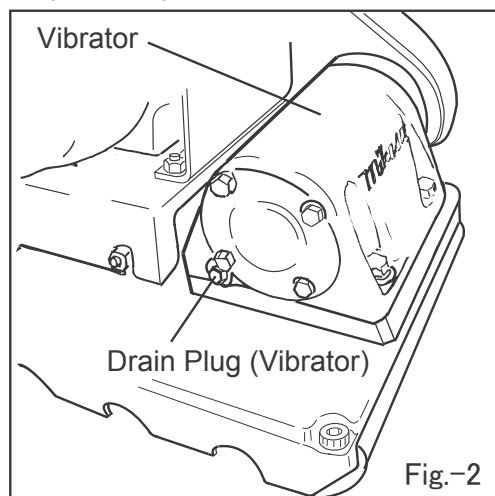


Fig.-2

- 7-7 A regular grade gasoline oil should be used in the engine. When filling the fuel tank, make sure the fuel filter is used.

⚠ DANGER

Never refuel this machine while leaving the engine running. There is danger of fire.

⚠ DANGER

Never smoke, or put other flames close to this machine while refueling. Serious hazards such as burns and fire may result.

⚠ DANGER

Choose a place free from flammable substances for refueling. Be careful not to spill fuel. In case fuel should be spilled, wipe off the spilled fuel completely.

⚠ CAUTION

Prevent oil and gasoline from getting on the rubber rolls and Shock Absorbed Rubber. Oil and gasoline cause rubber to swell and deteriorate. If contaminated with oil or gasoline, immediately clean the rubber.



8. Operation

8.1 Starting



The engine exhaust gas contains carbon dioxide and is very dangerous.
Do not use this machine where ventilation is poor.

- 8-1-1 Turn the lever of the fuel cock downward and feed fuel. (Figs.3)

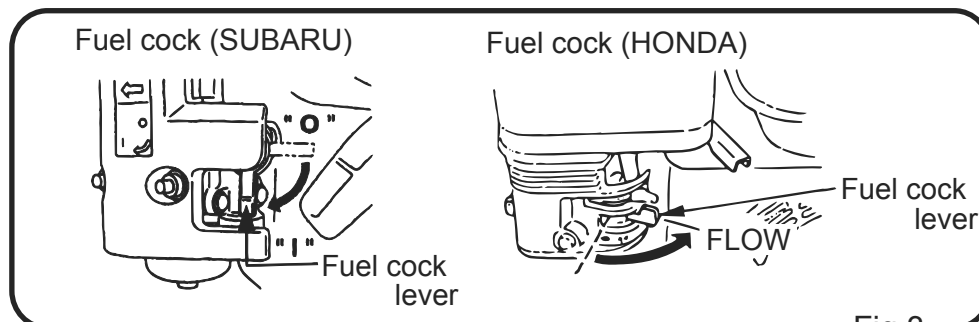


Fig.3

- 8-1-2 Turn the stop switch to "ON (I)" position. (Fig.4)

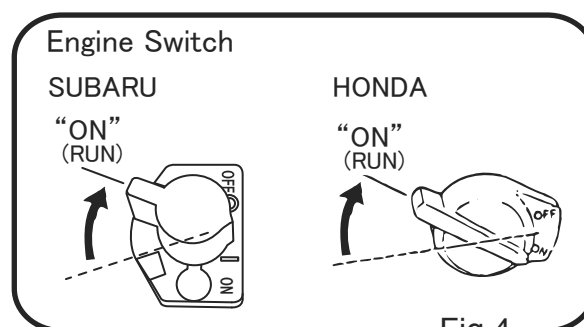


Fig.4

- 8-1-3 Open the speed control lever half. (Fig.5)

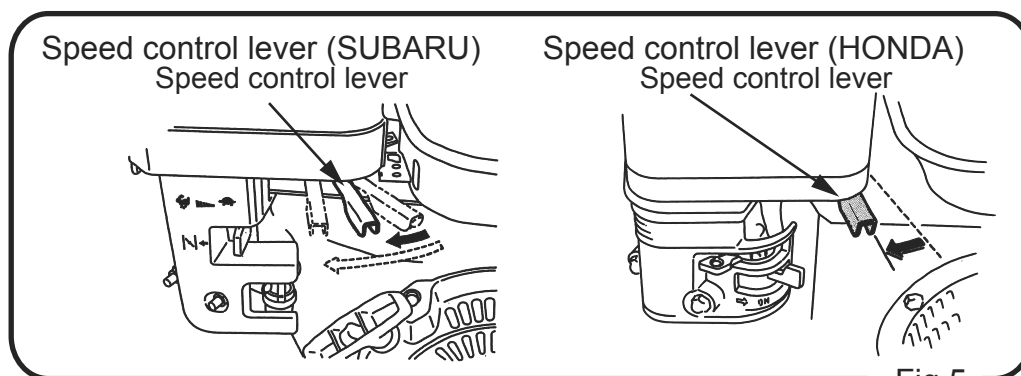


Fig.5

- 8-1-4 When it is cold or the engine does not start easily, close the choke lever. (Fig. 6)

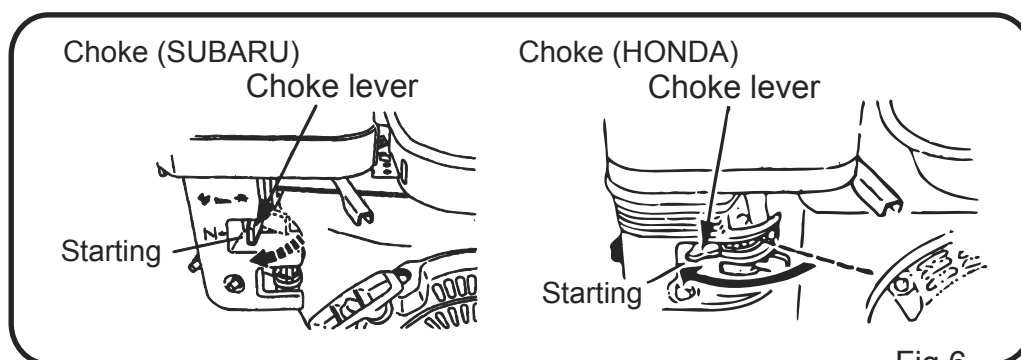


Fig.6

- 8-1-5 Grip the starting knob of the recoil starter. When you pull the rope a little, you will feel some resistance. Then pull it at a stroke. Be careful not to pull the rope too strongly, or the rope may break or come off. (Fig.7)

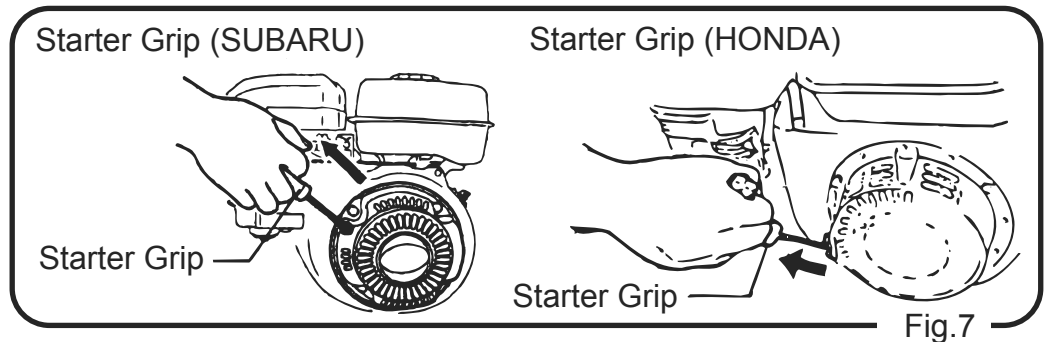


Fig.7

- 8-1-6 When the engine has started, return the speed control lever to the low speed position immediately. Listening to the sound of the explosion, return the choke lever gradually to the fully open condition. (Fig.8)

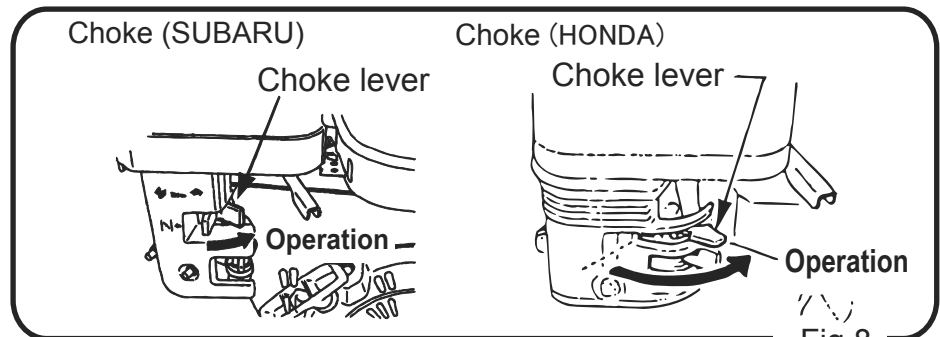


Fig.8

After the start, be sure to conduct the warm-up operation at low speed for 2-5 minutes. This is particularly important when it is cold. During this time, check for any abnormalities such as gas leakage.

- **Note:**
If you leave the speed control lever half-open, the centrifugal clutch turns into a slipped state. This may cause a failure of the centrifugal clutch, and also cause abnormal vibration of this machine, which is very dangerous. So, as soon as the engine has started, return the speed control lever to the low-speed position.

8.2 Operation

- 8-2-1 If you open the speed control lever at a stroke, this machine starts vibration. If you open it slowly, the clutch may slip, so open the speed control lever at a stroke without hesitation. (Fig. 5)
- 8-2-2 Push the handlebar, and pull it. And repeat forward travel and the reverse travel of the machine. And flatten interlocking block.
- 8-2-3 When you stop the operation, return the speed control lever at a stroke.

⚠ DANGER

- When you use machine on inclined area, various risk is accompanied. When you cannot get safety, never use it.
- Do not ride a weight on the machine. The machine loses the balance and there is fear a weight drops, and be damaged.

⚠ DANGER

- Do not operate the machine with someone sitting on it. The body will receive strong vibration, and the person will lose his balance, which might result in unexpected injury because part of the body might be caught or tramped by the roll.
- If the machine is operated on the surface where one of the interlocking blocks is too big or too heavy or when the road surface is sufficiently tamped, the vibration of the machine becomes big, causing the machine to get damaged earlier than normal. Also, the vibration that the operator's hands receive will increase, leading to a danger of vibration disease if the machine is operated for an extended period of time.

9. Stopping the machine

- 9-1 When you finish the work and stop the engine, return the speed control lever to the low speed position, and keep the engine running at low speed for 3-5 minutes. When the temperature of the engine has decreased, stop the engine.

CAUTION

If you stop the engine while it is still hot, this machine will be affected adversely, causing, for example, burning of the oil film on the inner wall of the cylinder, which may accelerate wear of the inner wall of the cylinder. This may result in a shorter life of this machine, or cause unexpected failure.

- 9-2 Turn the engine switch to the OFF position, then the engine stops. (Fig. 9)

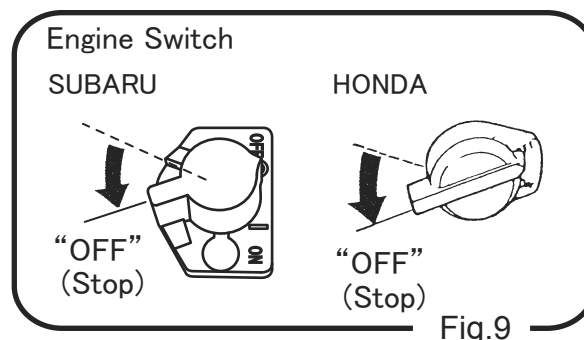


Fig.9

- 9-3 Close the lever of the fuel cock. (Fig. 10)

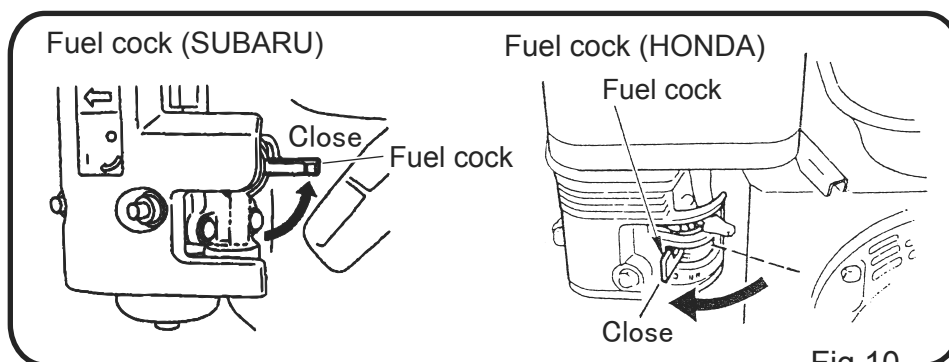


Fig.10

WARNING

- Before moving away from the machine, be sure to turn the engine off, and do a ring stopper.
- Do not leave machine in the inclined area. There is danger to cause a serious accident when machine begins to move by any chance.

10 Transportation

⚠ WARNING

- Make sure there is no breakage of guard frame and anti-vibration rubber nor loosened or missing bolts.
- Always stop the engine when lifting.
- Use an intact wire rope without any deformation with sufficient strength.
- Slowly lift upward without applying any impact. Never let people or animals go under the lifted machine.
- For safety reasons, do not lift to a height that is higher than necessary.

10.1 Loading and Unloading

For loading and unloading using a crane, an operator qualified for cranes and hooking works is needed.

- 1 Use a crane for loading and unloading the machine.
- 2 Designate a person to guide the loading and unloading, and always work under the instruction of that person.
- 3 When lifting, always use a special hook on the guard frame. (Fig. 18)
Never lift by using the hook on the handle.

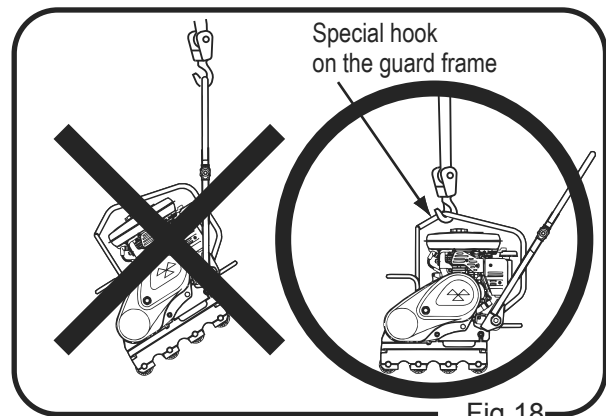


Fig.18

10.2 Transportation precautions

⚠ WARNING

- Stop the engine when the machine is transported.
- Always drain the fuel before transportation.
- Fix the machine securely to prevent the machine from moving or falling.

11 Storage

- 1 Wash with water to remove any dust and dirt from all parts of the machine.
- 2 Store in a dry area away from direct sunlight after putting the cover over the machine to prevent dust and dirt buildup.

(When storing this machine for an extended period of time)

- 3 Drain the fuel from the fuel tank, fuel pipe, and carburetor completely.
- 4 Conduct fueling and replenishment/change of oil without omission. Remove the spark plug, put a few drops of engine oil into the cylinder, and rotate the engine manually for spreading the oil inside sufficiently.
- 5 Securely cover the air cleaner and muffler air inlets and exhaust port.
- 6 Do not leave the machine outdoors. Keep it indoors.
- 7 Do not store this machine by laying it on its side (or backward).

⚠ WARNING

- When doing maintenance work or when storing, place the machine on a horizontal surface and make sure the machine is immobilized by using chocks if necessary.
- Before moving away from the machine, be sure to turn the engine off, and do a ring stopper.

Note: Prevent oil and gasoline from getting on the rubber rolls and anti-vibration rubber. Oil and gasoline cause rubber to swell and deteriorate. If contaminated with oil or gasoline, immediately clean the rubber.

12. Regular Check and Adjustments

12.1 Inspection and maintenance schedule table

Check frequency	Check parts	Check items	Oils
Daily (before starting)	Appearance	Flaw, deformation	
	Fuel tank	Leakage	
	Fuel system	Leakage	
	Engine oil	Leakage, oil level, dirt	Engine oil
	Shock absorber	Crack, damage, wear	
	Vibrator oil	Leakage	Engine oil
	Air cleaner	Dust on sponge	
	Guard frame	Breakage, flaw, loosened or missing bolts and nuts	
	Back and forth motion lever operation	Operation check, play	
	Bolts and nuts	Looseness, missing	
Every 20 hours	Engine oil	Replace only after the first 20 hours	Engine oil
	Engine oil filter (Diesel)	Replace only after the first 20 hours	
Every 100 hours	Engine oil	Change	Engine oil
	Engine oil filter	Washing	
	Vibrator oil	Leakage, oil level, dirt	Engine oil
Every 200 hours	V-belt for vibrator	Flaw, tension	
	Clutch	Dirt, flaw, wear	
Every 300 hours	Vibrator oil	Change	Engine oil
	Fuel filter	Change	
	Engine oil filter (Diesel)	Change	
Every 2 years	Fuel pipes	Change	
Irregular	Air cleaner element	Change	

For details about the check and maintenance of the engine, please refer to the attached engine operation manual.

Caution:

The above table shows the check frequency for standard condition.

The check frequency may vary depending on the condition in which the machine is used.

For check of bolt and nut looseness and tightening, please see the following tightening torque list.

Tightening torque list (unit: kgf-cm, 1kgf-cm=9.80665N-cm)

		Thread diameter							
		6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm
Material	4T(SS41)	70	150	300	500	750	1,100	1,400	2,000
	6-8T(S45C)	100	250	500	800	1,300	2,000	2,700	3,800
	11T(SCM3)	150	400	800	1,200	2,000	2,900	4,200	5,600
	When the mating material is aluminum.	100	300~350	650~700	(Bolts used on the machine are all right-hand thread.)				

12.2 Changing the engine oil

Perform the first engine oil change after 20 hours of operation, then change at every 100 hours.

12.3 Cleaning the air cleaner

When the air cleaner element becomes dirty, the engine does not start smoothly, and sufficient output cannot be obtained. Machine operation will be affected and the engine life will be shortened greatly. Do not forget to clean the element. (For details, please see the separate engine operation manual.) If the element cannot be cleaned, replace it with a new one.

12.4 Checking/changing V-belt and Clutch

1 Checking V-belt

Remove the belt cover and check that V-belt is properly stretched every 200 hours. Press on the portion midway between the two shafts with your fingers strongly. The belt is properly stretched if that portion bows by about 10-15 mm.

2 Checking the clutch

Inspect the clutch concurrently with the inspection of V-belt. Check visually for burning of each clutch-shoe. Check for wear the lining shoe or the like in the operation check. If the shoe wears, power transmission is not performed properly and the clutch slips. Check wear of and damage to the V-groove. If the V-groove is stained, clean it thoroughly.

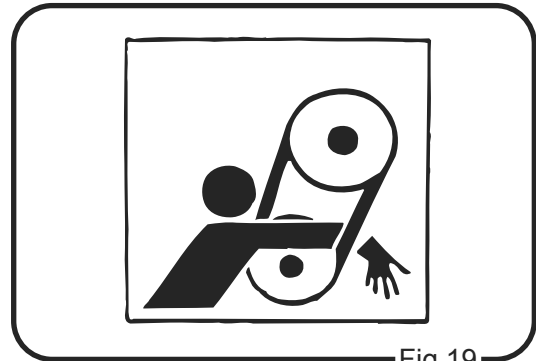


Fig.19



Always stop the engine before inspection and adjustment. If you are caught in a rotating part, serious injury might occur.



When the vibration weakens during operation, or this machine does not vibrate at all though the engine rotates normally, conduct the inspection or change of the V-belt and clutch without regard to the regular inspection of every 200 hours.

12.5 Inspection and Change of vibrator oil

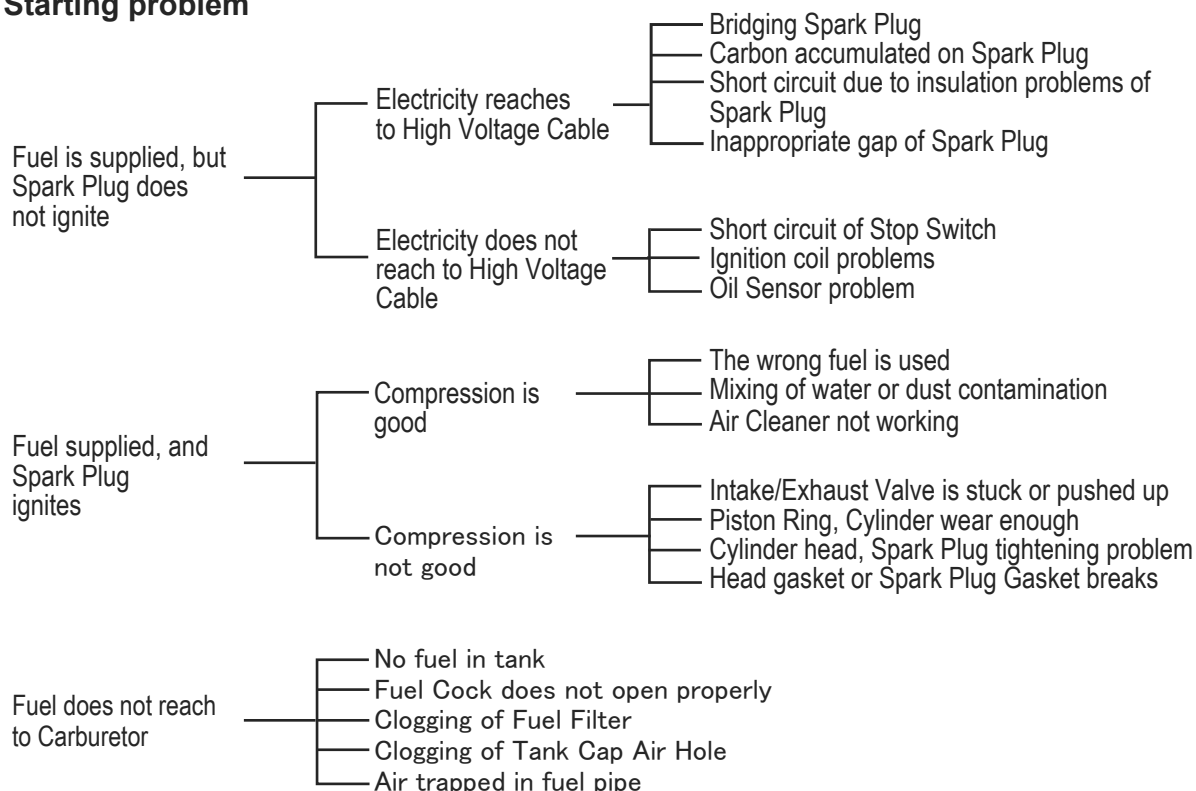
Make this machine level, and remove the oil level plug off the vibrator. Check that vibrator oil is provided up to the mouth level. The oil level plug is on the right side of the vibrator case (opposite to the belt side). (Refer to Fig.1 on page 10.)

Use the engine oil #10W-30 for vibrator oil. Refer to page 7 for the amount. Drain the vibrator oil completely by removing the plug and tilting the body once a month or every 200 hours' operation. Replace with new oil.

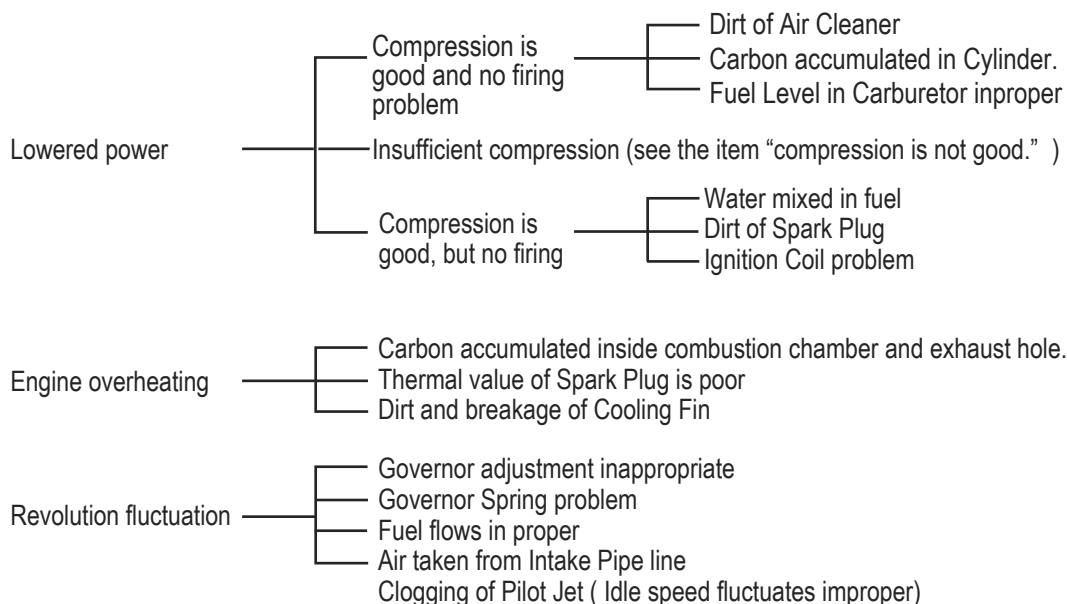
13. Trouble shooting

1. Gasoline engine

(1) Starting problem



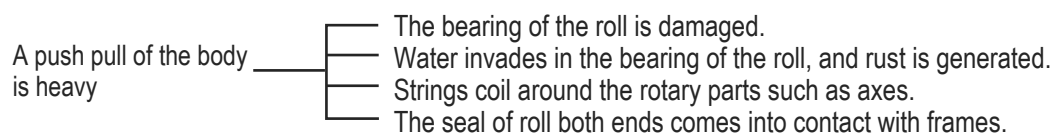
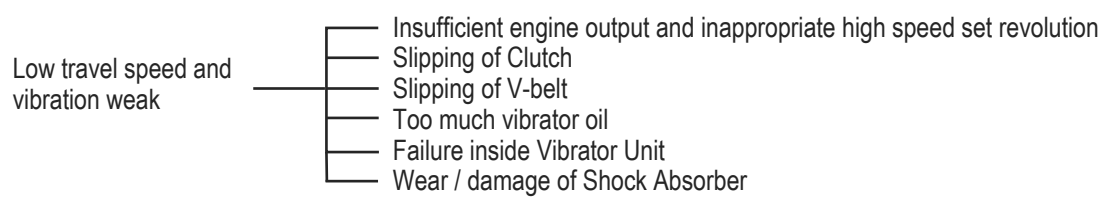
(2) Operation problem



(3) Recoil Starter does not work well

- Clogging of dust from rotating part
- Weakening of Spiral Spring

2. Main body



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