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油壓引擎泵浦 操作手冊

SPEGM



中文 : C1~C9

中文
English
Ver.16

1. 安全預防措施



不遵守以下的注意事項和警告將引起設備損失及人員傷害。



重要事項：未滿18歲人員不得擅自操作。操作 SUN RUN 油壓設備前請先仔細閱讀並了解相關操作手冊、安全事項和警告事項。操作人員負有油壓設備週邊之人員及環境之安全責任。



警告事項：為確保避免人員傷害和設備作業損失，請確認所有油壓設備及週邊配件，使用最大壓力為 700 bar(10,000psi)。



警告事項：操作人員於使用期間為避免傷害，需全程配戴安全防護措施。



警告事項：不得使用油壓設備作為支撐重物使用。當液(油)壓缸作為負載頂昇設備時，僅可頂昇，不可用來支撐重物使用。當完成頂升作用後，需使用機械性工具來固定支撐。



警告事項：必須使用硬性物體來支撐重物。慎選能承受重物的鋼鐵或木塊來支撐荷載。不要在頂升或持壓使用中將液(油)壓缸當做墊塊使用。



危險事項：為避免人員傷害，請於操作過程中手、腳遠離液(油)油壓缸和液壓設備。



警告事項：禁止超載使用。超載使用易造成設備損害及人員損傷。液(油)壓缸設計最大使用壓力為 700 bar (10,000psi)。



危險事項：千萬不可將溢流(安全)閥的壓力值設定高於泵浦的額定壓力。超載的壓力值可能引起設備損壞及人員損傷。尤其千萬不可拆除溢流(安全)閥。



警告事項：系統操作壓力絕不可超過最低壓力元件之值最低值。系統中應加裝壓力錶藉以監測系統中的壓力並了解使用狀態。



警告事項：避免損壞油壓管。捲收油管時，避免油管強烈彎曲或打結。使用彎曲或打結油管易引起背壓。強烈彎曲或打結的油管亦易引起內部損壞或提早油管老化。



千萬不要重壓油管。劇烈的撞擊會造成油管內鋼絲網損壞。使用受損的油管可能導致油管破裂。



重要事項：千萬不要利用油管來提攜其他油壓設備(例如:小型油壓缸、泵浦..等)。



危險事項：液(油)壓設備應遠離火或熱源。高溫會軟化包裝和密封材料，導致液壓油洩漏；高溫同時也會造成油管材質與包裝變質。為確保最好狀態，不要將液(油)壓設備暴露於 65°C(150°F)高溫。在電焊場所時亦應注意防止電焊火花噴到油管。



危險事項：不要用手對油管施加壓力(包括拉或舉高) 高壓下洩漏的液壓油會穿透皮膚造成嚴重傷害。當液壓油侵入皮膚請立即就診。

1. 安全預防措施



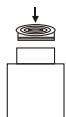
警告事項：液(油)壓缸只能在已連接好的液壓油路中使用；快速接頭尚未確實連接時禁止使用或加壓，否則高壓情況下接頭的油封及鋼珠會高速噴出造成人員傷亡。



警告事項：頂昇荷載前，請確保油壓裝置平穩。油壓缸必須放在平穩可支撐重物的基座上。若情況許可，可使用油壓缸基座來增加穩定性。千萬不可使用焊接或其他方法將油壓缸與所使用的基礎面(支撐座)連接一起。



避免荷載不直接作用在油壓缸的主軸中心上。偏心荷載易導致油壓缸和主軸受損。此外，重物亦可能因傾斜而滑落，引發潛在危險。



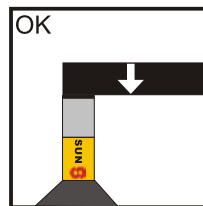
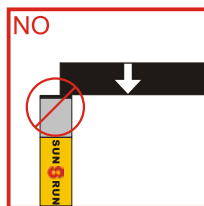
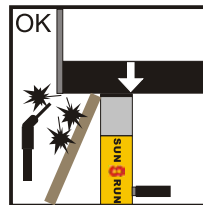
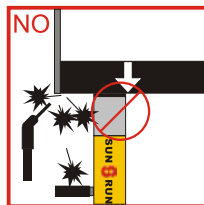
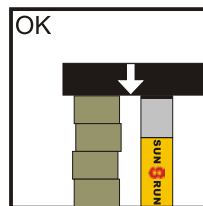
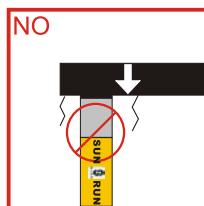
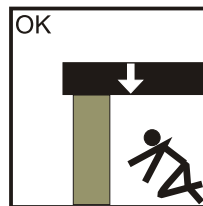
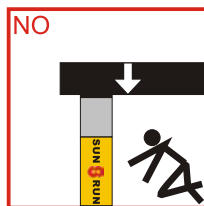
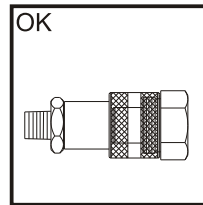
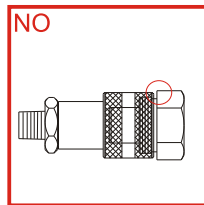
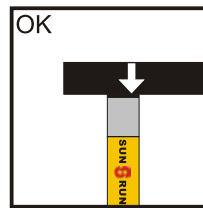
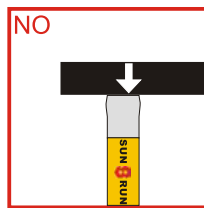
將荷載平均的分布在墊塊表面。傾斜墊塊可消除偏荷載。當無使用螺牙連接其他附件時，一定要使用墊塊以保護主軸。



警告事項：當零件出現裂痕或損壞時，應立即以**SUN RUN**零件更換。正確標準的零件可防止人員或設備損傷。**SUN RUN**零件經特別設計可完全適用並適用產品標稱的額定荷載或壓力。



重要事項：液壓設備必需由合格的液壓技工進行維修。需要修理時，請連繫就近的**SUN RUN**服務據點並使用**SUN RUN**液壓油保固方為有效。



2.規範

電泵型號選擇 :Custom build your Electric Pump:

SPEGM- 4 8 4 CW
1 2 3 4

- 1.馬達
4=4hp(3.2kw)

2.油箱 (Lx0.26=gal)
8=8L(2.1gal)
★亦可依客戶訂製

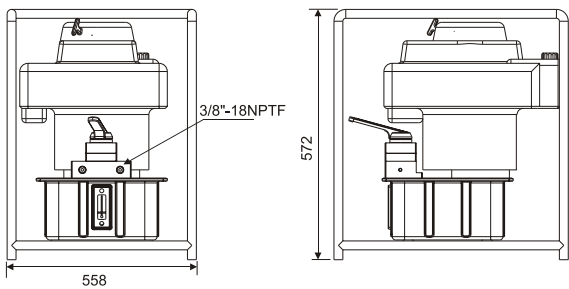
3.閥
3=手動三口方向閥
4=手動四口方向閥

4.選配
W=輪子
- 1.Motor
4=4hp(3.2kw)

2.Reservoir (Lx0.26=gal)
8=8L(2.1gal)
★User can order suitable reservoir.

3.Valve
3=Manual 3Way
4=Manual 4Way

4.Optional
W=Wheel



單位 unit (mm)

Model Number 型 號	Motor Type/ size 馬達	Flow Rate 輸出流量 (L/min)		Valve Function 閥作用	DBA at Idle and 700bar 噪音值	Weight 重量 (kg)
		1 st stage	2 nd stage			
SPEGM	Honda-4hp	5.5	0.78	Advance/Hold/ Retract	90	54

最大操作壓力: 700bar

3. 安裝說明

3.1 泵浦連接

先將油管接上泵浦出油口。使用一圈半的鐵弗龍帶(或其他螺紋密封材質)纏在油管接頭上。螺紋第一圈不可被密封帶遮住，避免密封帶脫落流入液壓系統引發危害，修剪鬆散的密封帶尾端。



警告

為確保正確操作泵浦，應避免過份彎折或鎖太緊的油管。倘若發現油管出現過份彎折或其他危害應立刻汰換。已損害的油管容易在高壓時破裂造成人員傷亡。

3.2 標準安裝 (圖1)

將油管3/8-18NPTF接頭鎖油管接口。

4. 操作事項

- 4.1 首先先確認系統內是否所有接頭皆已正確且牢固連接，無洩露。
- 4.2 檢查液壓油是否足夠，油位計必需至少在"H"位置，必要時請加入液壓油。
- 4.3 將泵浦前方的加油/通氣塞打開(如標示所示)旋轉1~2圈。

警告

泵浦動作時通氣口需隨時保持打開通氣狀態。

4.4 手動控制閥 (圖2)

四口手控閥用來設計操作雙動液壓缸
請參考圖3閥門位置

1. 下列為四口手控閥的各位置功能：
 - (A) 流向孔 "A"; 則孔 "B" 為回油流向油箱
 - (N) 中立; 孔 "A" 和孔 "B" 均為封閉狀態
 - (B) 流向孔 "B" 則孔 "A" 為回油流向油箱
2. 操作泵浦至完成工作
3. 視需要改變閥門位置

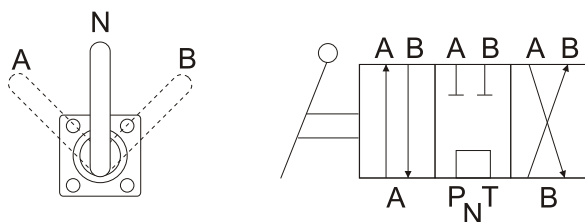


圖 2



圖1

4. 操作事項

4.5 引擎操作

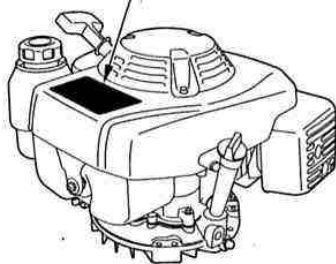
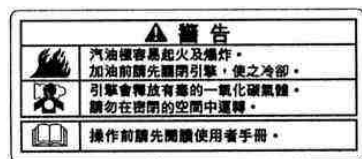
警示信息

- 理解發動機如何控制，並學會在緊急狀況下如何關停發動機。操作者操作前必須有足夠的操作技術能力。
- 禁止兒童操作發動機。使兒童和寵物遠離操作區。
- 發動機廢氣中含有有毒的一氧化碳氣體。通風不良時請勿運行發動機，禁止在室內運轉發動機。
- 在運轉過程中，發動機和排放出來的氣體很燙，因此要讓其遠離建築物和其他設備至少1米（3英尺）遠。發動機運行時應遠離可燃物，並且發動機上面請勿放置物品。

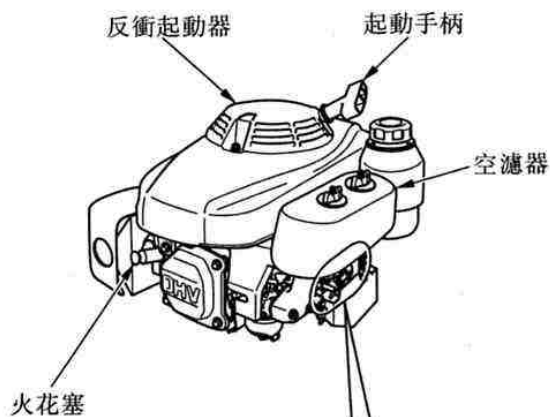
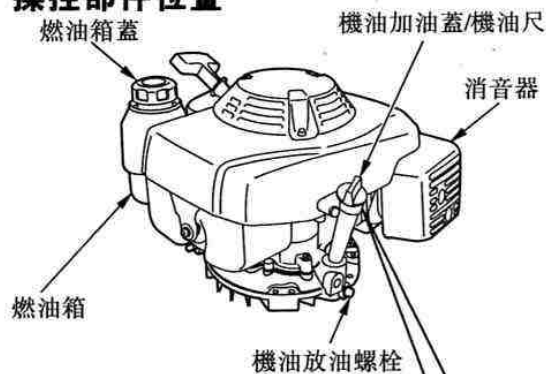
警示標籤位置

警示標籤會告知您潛在的危險。請仔細閱讀。

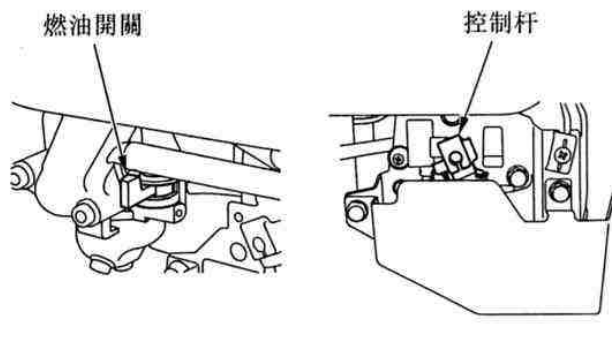
如果警示標籤脫落或看不清楚，請聯系本田經銷商進行更換。



操控部件位置



發動機控制件



4. 操作事項

4.5 引擎操作

操作

安全操作注意事項

警告

一氧化碳氣體有毒，吸入會導致失去知覺甚至死亡。

避免進入任何有可能讓你吸入一氧化碳的區域。

閱讀搭載此發動機的設備說明書，了解發動機起動、關停及運轉的安全提示。

控制杆

控制杆控制發動機的開關（無飛輪制動）以及阻風門、節氣門。

OFF（關閉）—通過關閉點火系統而停機。控制杆其它位置，則是讓點火系統接通。

MIN（最小）—使發動機怠速運行。

MAX（最大）—使熱機重新起動并使發動機達到最大速度。

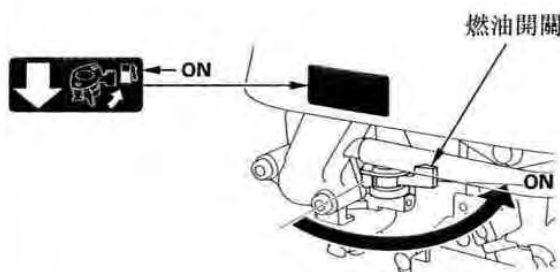
CHOKE（阻風門）—加濃空氣燃油混合氣體，適用起動冷機。

這裏所示的控制杆與搭載設備上的遠程控制杆連接。請參見設備制造商所提供的使用說明書。



起動發動機

1. 將燃油開關移到“ON”的位置。



2. 起動冷機時，將控制杆移到阻風門位置。

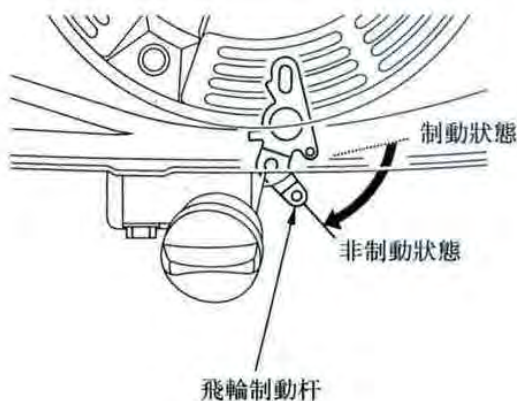


起動熱機時，將控制杆移到“MAX”位置。

這裏所示的控制杆與搭載設備上的遠程控制杆連接，請參見設備制造商所提供的使用說明書。

3. 配有飛輪制動型：

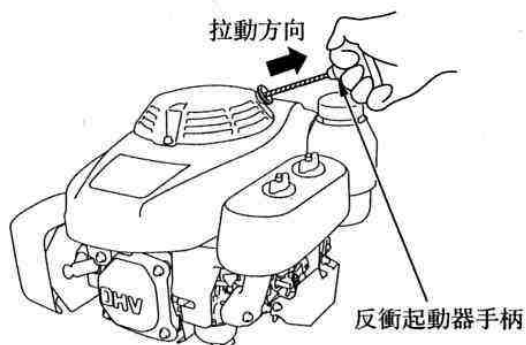
將飛輪制動杆移到“RELEASED”位置，發動機開關（與飛輪制動杆相連）就處於開啓狀態，此時飛輪處於非制動狀態。



4. 操作事項

4.5 引擎操作

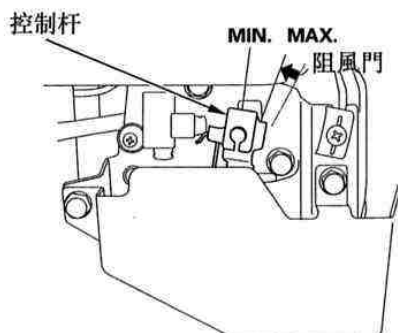
4. 如圖所示，輕拉反衝起動器手柄直到感到阻力，然後用力快速一拉，輕輕放回反衝起動器手柄。



重要事項

不要突然放開反衝起動器手柄讓其彈回而撞擊發動機，應慢慢順着起動拉繩的回彈力方向放回。

5. 如果起動時使用了將控制杆移到“CHOKE”位置時，在發動機預熱後，再將控制杆逐漸移動至“MAX”或“MIN”位置。



這裏所示的控制杆與搭載設備上的遠程控制杆連接，請參見設備制造商所提供的使用說明書。

6. 飛輪制動型：保持飛輪制動杆處於非制動狀態。如果飛輪制動杆處於制動狀態位置時，發動機就將停機。

設置發動機速度

將控制杆移到適當位置以獲得所需的發動機速度。



這裏所示的控制杆與搭載設備上的遠程控制杆連接，請參見設備制造商所提供的使用說明書。

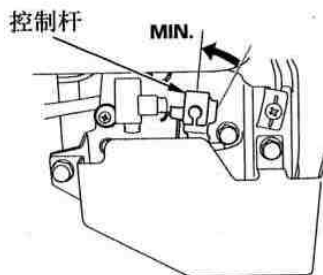
4. 操作事項

4.5 引擎操作

關停發動機

如果需要緊急關停發動機，直接將控制杆移到“OFF”位置。但在一般情況下，則按以下步驟：

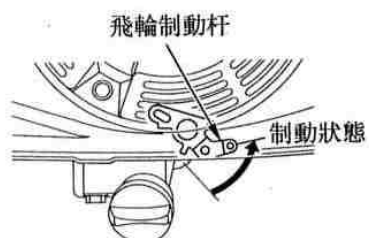
1. 將控制杆移到“MIN”位置。



這裏所示的控制杆與搭載設備上的遠程控制杆連接，請參見設備制造商所提供的使用說明書。

2. 配有飛輪制動型

將飛輪制動杆移至制動位置，飛輪制動杆通過與發動機開關相連，此時發動機開關處於停機位置，進而發動機停止運行。



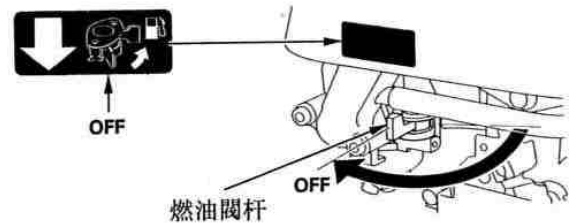
3. 未配飛輪制動型：

將控制杆移到“OFF”位置，發動機停止運轉。

控制杆與發動機開關相連，此時，發動機開關也隨之處于停機位置。



4. 將燃油開關移到“OFF”的位置。



5. 疑難排除

問題	原因 / 解決方法
馬達無法啟動	先確認電源線是否正確。確認斷路器運行迴路是否正常。檢查所有線路是否正常。確認馬達電容器是否正常。確認電源是否相符，延長線的使用是否荷載。
操作時有雜音	1.系統內有空氣 2.檢查液壓油是否超過正常液面 3.檢查所有空氣可能進入的接觸點
泵浦內的液壓油過熱	1.液壓油黏性過高 2.檢查上壓板在高壓時的洩漏量。 (軸心有洩漏) 3.液面太低。將液壓油加到正常液面或是更換較大的油桶滿足使用油量。
泵浦在運轉但無法輸出液壓油	1.泵浦不是第一次使用。暖機幾分鐘後，然後稍微左右搖晃一下。 2.確認外部調壓閥是否正確，再確認內部釋放閥是否正常。 3.O型環損壞。請尋找就近的油壓服務中心維修。 4.控制閥損壞 (逐步檢修)。

出廠證明暨保固書

產品名稱：

型 號：

序 號：

出廠日期： / /

保固期間： / / ~ / /

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OPERATING INSTRUCTIONS HYDRAULIC GASOLINE PUMP **SPEGM**



English : E1~E12

中文
English
Ver.16

1. SAFETY PRECAUTIONS



Fail to comply with the following cautions and warnings could cause equipment damage and personal injury.



IMPORTANT : Minimum age of the operator must be 18 years. The operator must have read and understood all instructions, safety issues, cautions and warnings before starting to operate the SUN RUN equipment. The operator is responsible for this activity towards other persons.



WARNING : To avoid personal injury and possible equipment damage, make sure all hydraulic components withstand the maximum pressure of 700 bar(10,000psi).



WARNING: Always wear safety glasses. The operator must take precaution against injury due to failure of the tool or workpiece.



WARNING: Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be blocked mechanically.



WARNING: USE ONLY RIGID PIECES TO HOLD LOAD. Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application.



DANGER: To avoid personal injury keep hands and feet away from cylinder and workpiece during operation.



WARNING : Do not overload equipment. Overloading causes equipment failure and possible personal injury. The cylinders are designed for a max. Pressure of 700 bar (10,000psi).



DANGER: NEVER set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury. Do not remove relief valve.



WARNING : The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.



CAUTION: Avoid sharp bends and kinks that will cause severe back-up pressure in hoses. Bends and kinks lead to premature hose failure.



DO NOT drop heavy objects on hose. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.



IMPORTANT: Do not lift hydraulic equipment by the hoses or couplers. Use the carrying handle or other means of safe transport.



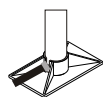
CAUTION : KEEP HYDRAULIC EQUIPMENT AWAY FROM FLAMES AND HEAT. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C(150°F) or higher. Protect hoses and cylinders from weld spatter.



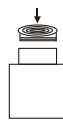
DANGER: Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin causing serious injury. If oil is injected under the skin, see a doctor immediately.

1. SAFETY PRECAUTIONS

 **WARNING:** Never pressurize uncoupled couplers. Only use hydraulic equipment in a coupled system.

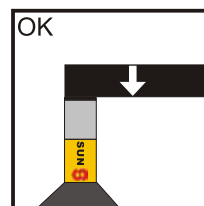
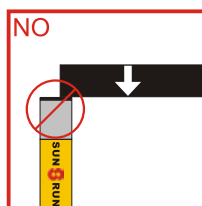
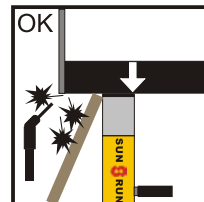
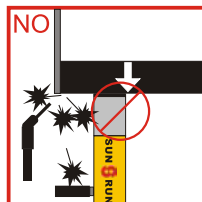
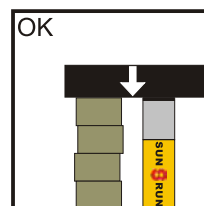
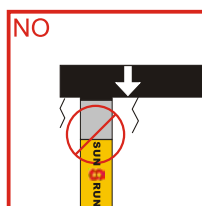
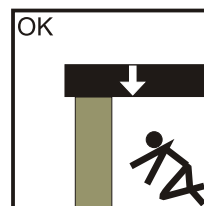
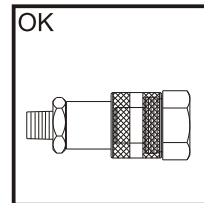
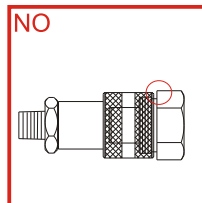
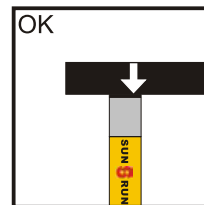
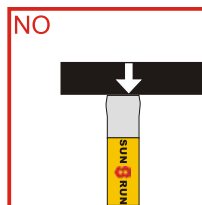
 **WARNING: BE SURE SETUP IS STABLE BEFORE LIFTING LOAD.** Cylinders should be placed on a flat surface that can support the load. Where applicable, use a cylinder base for added stability. Do not weld or otherwise modify the cylinder to attach a base or other support.

 **Avoid** situations where loads are not directly centered on the cylinder plunger. Off-center loads produce considerable strain on cylinder and plungers. In addition, the load may slip or fall, causing potentially dangerous results.

 Distribute the load evenly across the entire saddle surface. Always use a saddle to protect the plunger.

 **WARNING:** Immediately replace worn or damaged parts with genuine SUN RUN parts. SUN RUN parts are designed to fit properly and withstand rated loads.

 **IMPORTANT:** Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the SUN RUN Service Center in your area. To protect your warranty, use only SUN RUN oil.



2.SPECIFICATIONS

電泵型號選擇 :Custom build your Electric Pump:

SPEGM- 4 8 4 CW
1 2 3 4

- 1.馬達
4=4hp(3.2kw)

2.油箱 (Lx0.26=gal)
8=8L(2.1gal)
★亦可依客戶訂製

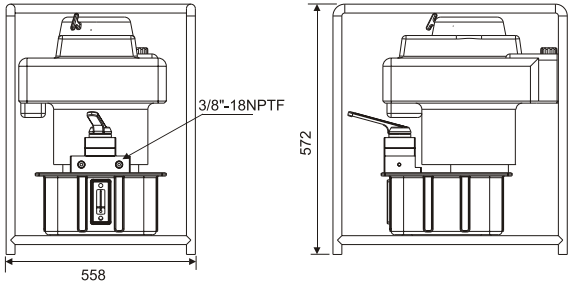
3.閥
3=手動三口方向閥
4=手動四口方向閥

4.選配
W=輪子
- 1.Motor
4=4hp(3.2kw)

2.Reservoir (Lx0.26=gal)
8=8L(2.1gal)
★User can order suitable reservoir.

3.Valve
3=Manual 3Way
4=Manual 4Way

4.Optional
W=Wheel



單位 unit (mm)

Model Number 型 號	Motor Type/ size 馬達	Flow Rate 輸出流量 (L/min)		Valve Function 閥作用	DBA at Idle and 700bar 噪音值	Weight 重量 (kg)
		1 st stage	2 nd stage			
SPEGM	Honda-4hp	5.5	0.78	Advance/Hold/ Retract	90	54

Max. Operating pressure: 700bar

3.INSTALLATION

3.1 Hydraulic Connect

Use 1-1/2 wraps of teflon tape (or suitable thread sealant) on all threads, leaving the first complete thread free of tape to ensure that the tape does not shed into the hydraulic system, causing damage. Trim loose end.



WARNING

To ensure proper operation, avoid kinking or tightly bending hose. If a hose becomes kinked or otherwise damaged, it must be replaced. Damaged hoses may rupture at high pressure, causing personal injury.

3.2 Standard install (Fig. 1)

- 1.Install 0-10,000psi(700bar) pressure gauge with 1/4"NPT port of gauge accessory.
- 2.Then connect 3/8-18NPTF with 10,000psi(700bar)hydraulic hose.

4.OPERATION

- 4.1 Check all system fittings and connections to be sure they are tight and leak free.
- 4.2 Check the fluid level and add fluid, if necessary.
- 4.3 Open the Oil / Air vent ,reference Fig.1 by turning it 1 or 2 complete turns.

CAUTION

The vent plug must be open whenever the pump is running

4.4 Manual Control Valve (Fig.2)

Pumps with 4-way control valves are designed to operate double-acting cylinders. See Figure 3 for valve positions.

- 1.Position lever on 4 way valve to select function as follows:
 - (A) Flow to port "A"; port "B" returns flow to the reservoir
 - (N) Neutral ; port "A" and "B" are blocked
 - (B) Flow to port "B" port "A" returns flow to the reservoir
- 2.Operate pump to perform work.
- 3.change valve positions as needed.

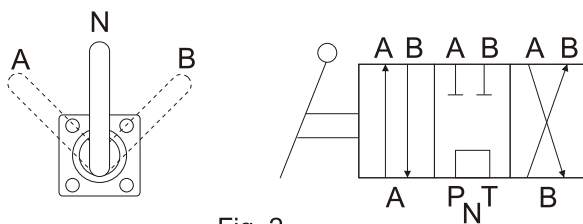


Fig. 2

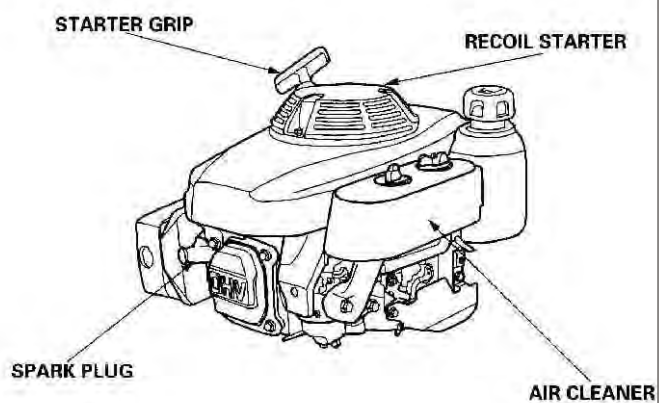
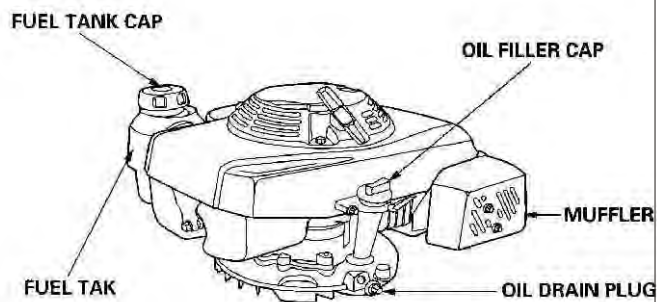


Fig.1

4.OPERATION

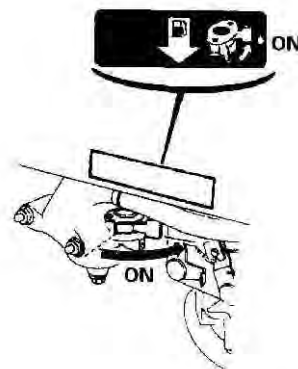
4.5 Engine Manual

2 COMPONENT IDENTIFICATION



4 STARTING THE ENGINE

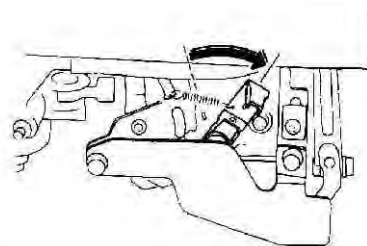
1. Turn the fuel valve to the ON position.



2. Move the control lever to the CHOKE position.

NOTE:

Do not use the choke if the engine is warm or the air temperature is high.

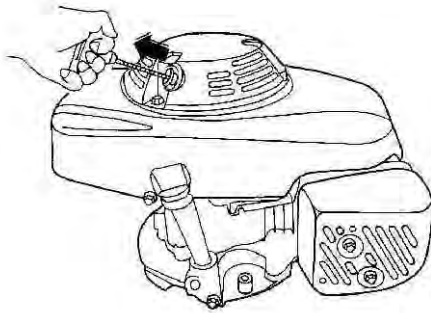


4.OPERATION

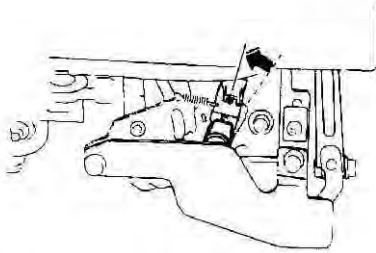
3. Pull the starter grip lightly until resistance is felt, then pull briskly.

CAUTION:

Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

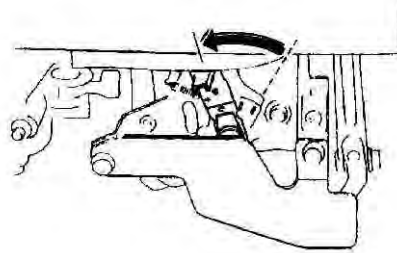


4. When engine warms up, move the control lever to FAST or SLOW.

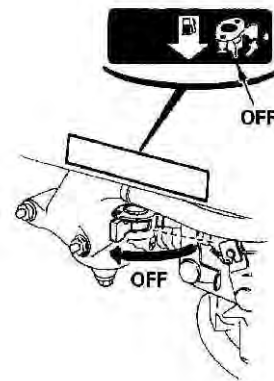


5 STOPPING THE ENGINE

1. Move the control lever to the STOP position.



2. Turn the fuel valve to the OFF position.



4.OPERATION

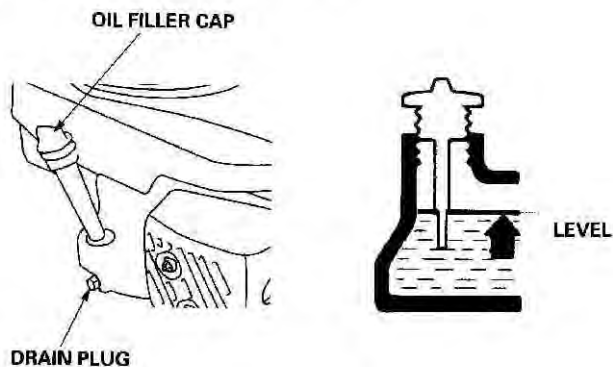
1. Oil change

Drain the oil while the engine is still warm to assure rapid and complete draining.

1. Remove the oil filler cap and drain plug to drain the oil.
2. Install the drain plug, and tighten it securely.
3. Refill with the recommended oil (see page 4) and check the oil level.
4. Install the oil filler cap.

ENGINE OIL CAPACITY.

GXV160: 0.65 ℓ (0.69 US qt, 0.57 Imp qt)



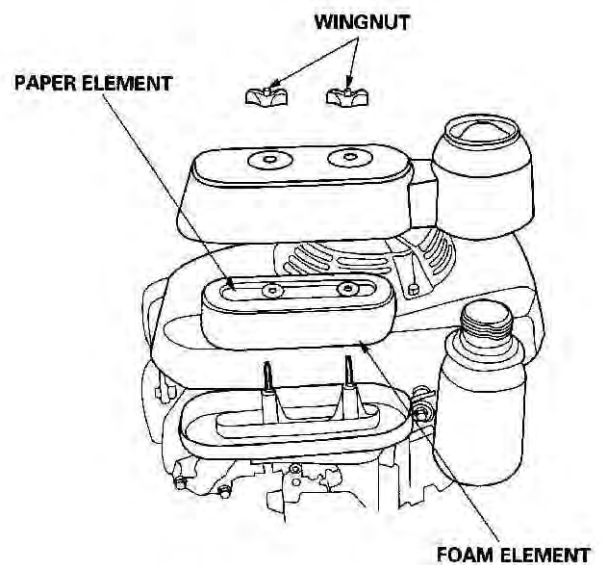
CAUTION:

Used motor oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

NOTE:

Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take it in a sealed container to your local service station for reclamation. Do not throw it in the trash or pour it on the ground.

3. Paper element: Tap the element lightly several times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers. Replace the paper element if it is excessively dirty.



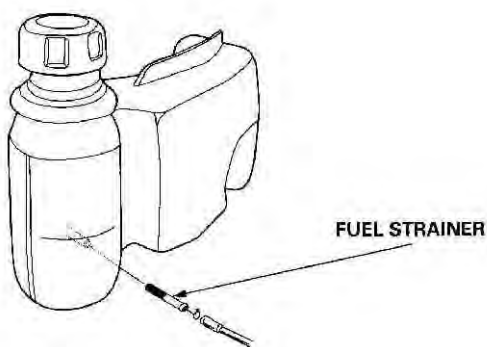
4.OPERATION

3. Clean fuel strainer

▲WARNING

- Gasoline is extremely flammable and is explosive under certain conditions.
Do not smoke or allow flames or sparks in the area.

Remove the fuel strainer from the fuel tank and fuel line.
Clean the fuel strainer. (Remove dirt which has accumulated on the mesh, and check that the mesh is not broken anywhere.)
Reinstall the fuel strainer and fuel line.



4. Spark plug service

Recommended spark plug:

BPR5ES
W16EPR-U

CAUTION:

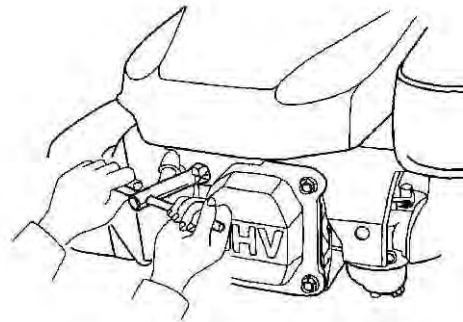
Never use a spark plug of incorrect heat range.

To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Remove the spark plug cap and use a spark plug wrench to remove the plug.

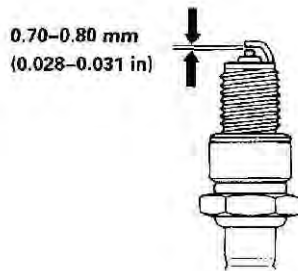
▲WARNING

If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.

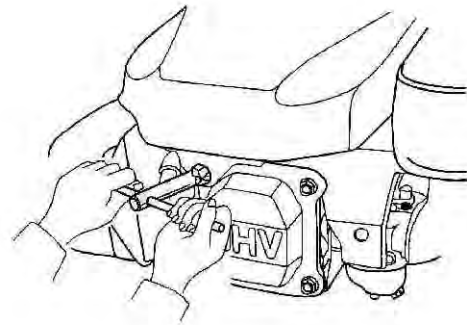


4.OPERATION

2. Visually inspect the spark plug. Discard the spark plug if there is apparent wear, or if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler gauge. Correct as necessary by bending the side electrode.
The gap should be:
0.70–0.80 mm (0.028–0.031 in)



4. Check that the spark plug washer is in good condition and thread the spark plug in by hand to prevent cross-threading.
5. After the spark plug is seated, tighten with a spark plug wrench to compress the washer.



NOTE:

When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer. When reinstalling a used spark plug, tighten 1/8–1/4 turn after the spark plug seats to compress the washer.

CAUTION:

The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

4.OPERATION

5. Spark arrester maintenance (optional part)

▲WARNING

If the engine has been running, the muffler will be very hot. Allow it to cool before proceeding.

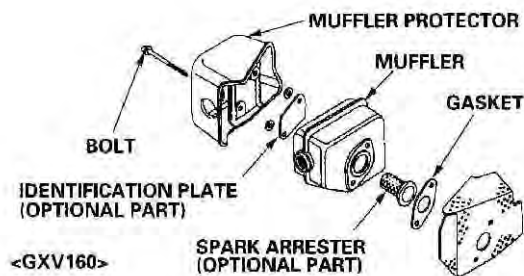
CAUTION:

The spark arrester must be serviced every 100 hours to maintain its efficiency.

1. Loosen the two 6 mm nuts and remove the muffler protector, identification plate, muffler and gasket.
2. Remove the spark arrester from the muffler. (Taking care not to damage the wire mesh.)

NOTE:

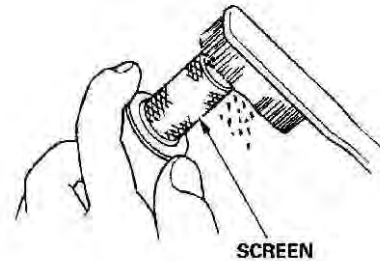
Check for carbon deposits around the exhaust port and the spark arrester, and clean if necessary.



3. Use a brush to remove carbon deposits from the spark arrester screen.

CAUTION:

Be careful not to damage the spark arrester screen.



NOTE:

The spark arrester must be free of breaks and holes. Replace, if necessary.

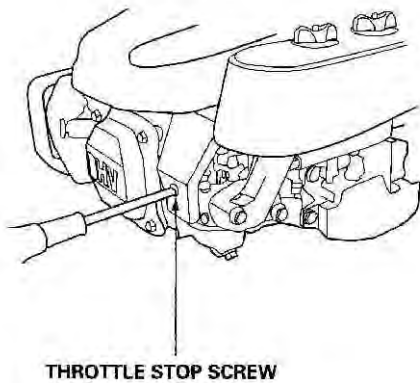
4. Install the spark arrester and the muffler in the reverse order of disassembly.

4.OPERATION

6. Carburetor idle speed adjustment

1. Start the engine and allow it to warm up to normal operating temperature.
2. With the engine idling, turn the throttle stop screw to obtain the standard idle speed.

Standard idle speed: GXV160; $1,700 \pm 150$ rpm.



THROTTLE STOP SCREW

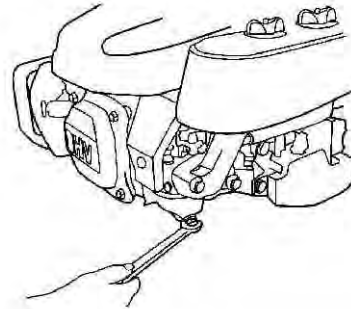
7 TRANSPORTING/STORAGE

⚠WARNING

When transporting the engine, turn the fuel valve OFF and keep the engine level to prevent fuel spillage. Fuel vapor or spilled fuel may ignite.

Before storing the unit for an extended period;

1. Be sure the storage area is free of excessive humidity and dust.
2. Drain the fuel tank and carburetor into a suitable gasoline container;
 - A. Remove the fuel tube and drain the fuel tank.
 - B. Loosen the carburetor drain bolt to drain the carburetor.
 - C. Retighten the drain bolt, connect the fuel tube and turn the fuel valve OFF.

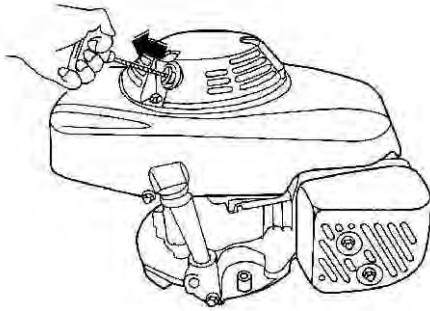


⚠WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.

4.OPERATION

3. Change the engine oil (page 14).
4. Pull the starter rope until it becomes hard to pull. This closes the valves, and protects them from dust and corrosion.



5. Coat areas that may rust with a light film of oil. Cover the engine and store it on a level surface in a dry, dust free area.

8 TROUBLESHOOTING

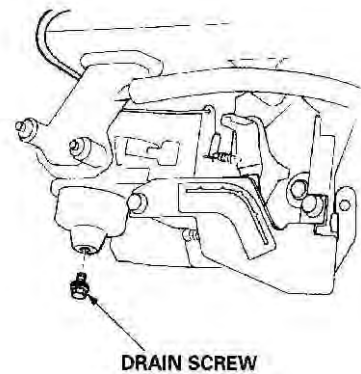
When the engine will not start:

1. Is the fuel valve ON?
2. Is there fuel in the fuel tank?
3. Is gasoline reaching the carburetor?

To check, loosen the drain screw (optional) with the fuel valve ON.

▲WARNING

If any fuel is spilled, make sure the area is dry before testing the spark plug or starting the engine. Spilled fuel or fuel vapor may ignite.



5.TROUBLESHOOTING GUIDE

Problem	Cause/ Solution
Motor will not start	Be sure power cord is not damaged. Check for tripped circuit breaker-- be sure breaker is of adequate size. Have qualified electrician inspect for loose or faulty wiring. Have motor checked for defective motor capacitor. Be sure electrical supply and extension cords are adequate.
Noisy Operation	1.Air in system. 2.Be sure the oil reservoir is filled to normal level. 3.Check all points where air might leak into system.
Pump oil is over heating	1.Oil viscosity too high. 2.Check for high-pressure leakage on upper pressure plate.(Leaking at plug.) 3.Oil level is low. Fill reservoir to normal level , or refit the pump with larger reservoir.
Pump runs but will not pump oil	1.Pump is not primed. Run pump a few minutes tipping from side to side. 2.Check to make sure that externally adjustable relief valve set properly. Check internal relief valve. 3.Damaged O-ring. Take to nearest authorized service center for repair. 4.Defective control valve. (Troubleshoot separately).