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# 超高壓手動泵浦 操作說明

## SPHH



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中文 : C1~C7

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適合其最大操作壓力。



**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。



**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



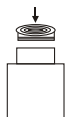
**警告事項:** 液(油)壓缸只能在已連接好的液壓油路中使用；快速接頭尚未確實連接時禁止使用或加壓，否則高壓情況下接頭的油封及鋼珠會高速噴出造成人員傷亡。



**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。



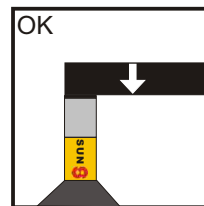
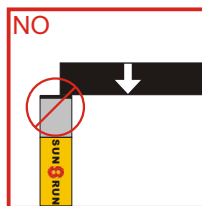
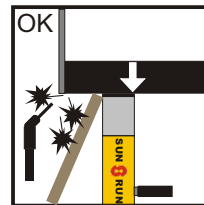
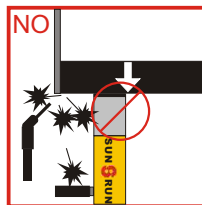
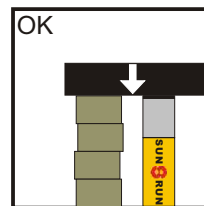
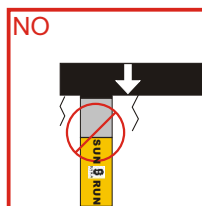
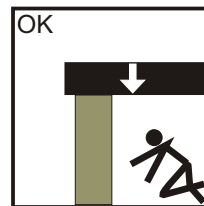
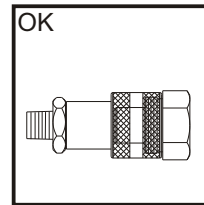
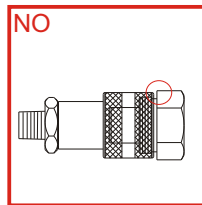
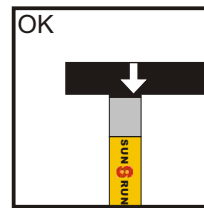
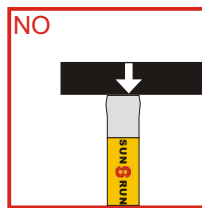
將荷載平均的分布在墊塊表面。傾斜墊塊可消除偏荷載。當無使用螺牙連接其他附件時，一定要使用墊塊以保護主軸。



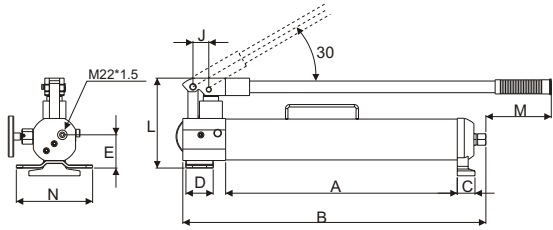
**警告事項:** 當零件出現裂痕或損壞時，應立即以**SUN RUN** 零件更換。正確標準的零件可防止人員或設備損傷。**SUN RUN**零件經特別設計可完全適用並適用產品標稱的額定荷載或壓力。



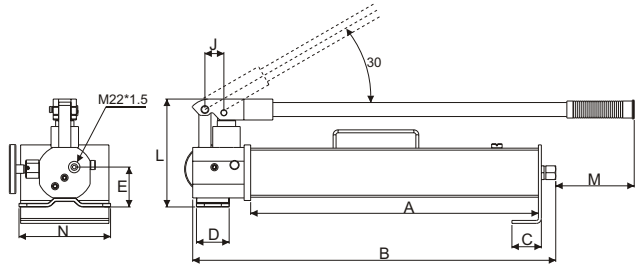
**重要事項:** 液壓設備必需由合格的液壓技工進行維修。需要修理時，請連繫就近的**SUN RUN**服務據點並使用**SUN RUN** 液壓油保固方為有效。



2.規格



SPHH -1612, 2012, 2512  
SPHH -1620, 2020, 2520



SPHH-1630, 2030, 2530

Model Number  型 號	Pump Type  泵浦類型	Usable Oil Capacity  有效油量  (cm <sup>3</sup> )	Pressure Rating  輸出壓力		Oil Displacement per Stroke  輸出油量		Piston Stroke  行程  (mm)	Dimensions(mm)  外型尺寸									Weight  重量  (kg)
			1 <sup>st</sup> stage	2 <sup>nd</sup> stage	1 <sup>st</sup> stage	2 <sup>nd</sup> stage		A	B	C	D	E	J	L	M	N	
SPHH-1612	雙 速  Two - Speed	1200	14	1600	15.5	1.2	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-2012		1200	14	2000	15.5	0.9	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-2512		1200	14	2500	15.5	0.7	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-1620		2200	14	1600	15.5	1.2	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-2020		2200	14	2000	15.5	0.9	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-2520		2200	14	2500	15.5	0.7	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-1630		3000	14	1600	15.5	1.2	16.65	440	556	45.0	50	61	29	165	120	140	13.0
SPHH-2030		3000	14	2000	15.5	0.9	16.65	440	556	45.0	50	61	29	165	120	140	13.0
SPHH-2530		3000	14	2500	15.5	0.7	16.65	440	556	45.0	50	61	29	165	120	140	13.0

### 3.操作

#### 3.1 泵浦連接

- 1.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。
- 2.泵浦上安裝壓力錶，可更安全地操作液壓系統。
- 3.將油管安裝至所使用的液壓缸或液壓工具  
**注意：**以單動液壓缸來說，可以一條油管連接液壓缸和泵浦；而雙動液壓缸則需二條油管連接液壓缸和液壓泵浦，其中一條連接泵浦的壓力出口及液壓缸壓力口，另一條油管則連接泵浦及液壓缸回油口。

#### 3.2 手動泵浦操作前準備

- 1.確認系統所有的安裝及連接是否牢固無洩漏。
- 2.確認操作前泵浦油位是否正常。可參考頁5「如何加液壓油」。

**注意：**

千萬不可加長泵浦手搖桿。加長手搖桿會造成操作運行不穩定。

**警告：**

某些情況下手搖桿會產回彈。請始終站在泵浦一側，以防止並遠離手搖桿回彈範圍。

- 3.操作手動泵浦前，務必先放鬆加油/通氣口約1/4~1圈,避免真空引起損壞。SUB RUN油壓手動泵浦之加油/通氣口具上述二種型式，並於各系列手動泵浦上均以貼紙告示

#### 3.3 如何使用雙速手動泵浦

以下說明泵浦可提供二階段流量。在無負載時，泵浦在大流量的第一階段流量運作，快速前進。當連接負載時，泵浦自動轉換至第二階段流量並產生壓力。以SPHH-1612為例，當泵浦壓力接近200psi (14bar)時，操作者必需先暫停泵浦動作並稍微抬高手搖桿直到感到緊迫壓力消失，即表示已轉換至高流量，才可再進行泵浦動作。

**注意：**

最好的操作狀態，即在第一階段大流量時使用中速來操作手搖桿；快速操作手搖桿將使泵浦吸油不足。

#### 3.4 單動操作與洩壓閥

- 1.如圖3.4順時針方向關閉洩壓閥。



圖3.4

**注意：**僅能以手動方式輕轉洩壓閥，切勿使用其他工具硬轉洩壓閥，如此會造成洩壓閥損壞。

- 2.操作泵浦手搖桿將壓力傳送至液壓系統，壓力將維持至鬆開洩壓閥。
- 3.打開洩壓閥 (逆時針旋轉) 洩除壓力, 液壓油回油至油箱。

### 3.5空氣排除

將液壓系統中的空氣排出，有助液壓缸平順地前進或回縮。(如圖 7)

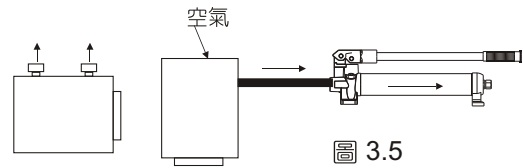


圖 3.5

#### 3.5.1 泵浦與單動液壓缸(A)

1. 打開液壓泵浦的通氣口(僅限於有通氣口的液壓泵浦)；關閉洩壓閥。
2. 泵浦位置需高於液壓缸。
3. 將液壓缸主軸向下 (倘若使用拉力液壓缸則主軸向上)。見圖3.5
4. 操作泵浦使液壓缸完全揚程 (如為拉力液壓缸則完全回縮)。見圖3.5
5. 操作洩壓閥使液壓缸回縮 (若為拉力液壓缸則揚昇).如此將空氣引入泵浦油箱內。
6. 重覆上述動作。
7. 視需要添加液壓油,見下頁。
8. 將通氣/加油口轉換至操作狀態。

#### 3.5.2 泵浦與雙動液壓缸(B)

1. 打開液壓泵浦的通氣口(僅限於有通氣口的液壓泵浦)
2. 泵浦位置需高於液壓缸。
3. 將液壓缸水平放置，接頭朝上。如圖3.5
4. 將液壓缸完全上昇及回縮2~3次。
5. 重覆上述動作。
6. 視需要添加液壓油,見下頁。
7. 將通氣/加油口轉換至操作狀態。

## 4.維修

請使用 SUN RUN液壓油以延長泵浦使用壽命及保障您的品質安全。對於使用 Viton 和EPR油封配件是可使用在部份泵浦之中。如需提供此類維修技術資訊，請和SUN RUN 技術部門連絡。

### 4.1如何在泵浦內添加液壓油

請先檢查液面是否合於標準。

**警告:** 務必於液壓缸完全回縮狀態下才可添加(假若為拉力液壓缸則需完全揚昇) 否則系統內所含的液壓油將超過泵浦油箱所能容納的油量

- 1.打開通氣/加油蓋。
- 2.將油加至泵浦上所標識的液壓油位置。
- 3.視需要將空氣自系統內排出， 見上頁圖3.5。 . 移除空氣後再確認液面。
- 4.再將通氣/加油口調至原先位置。

**注意:** 無通氣口的液壓泵浦需設法在油箱中有一定的空氣量使能發揮正常功能。若油箱內完全充滿油，造成真空壓力將無法使液壓油流出泵浦。

### 4.2 保持油路暢通

當快速接頭無連接時，務必將防塵蓋鎖上。應使用所有的保護措施來防止髒污或異物進入液壓設備，使液壓泵浦、液壓缸或液壓閥失效。

### 4.3 如何換油

- 1.請於每12個月排放光舊的液壓油，再注入新的SUN RUN 液壓油。若使用環境屬高污染環境請常更換液壓油
- 2.打開通氣/加油口。
- 3.將舊油排光。
- 4.注入新液壓油至泵浦標識液面位置。
- 5.重新蓋好通氣/加油蓋。
- 6.妥善處理舊油。

## 5.故障排除

下列資訊可有助於解決使用疑問

問題	原因	解決
液壓缸無法前進, 前進緩慢或是突然前進	1. 泵浦液壓油太低 2. 洩壓閥呈打開狀態 3. 快速接頭未妥善連接 4. 荷重過重 5. 系統內空氣阻塞 6. 液壓缸主軸遭阻礙	1. 如頁5說明方式添加液壓油 2. 關閉洩壓閥 3. 確認所有接頭是否已鎖緊 4. 請勿超載使用 5. 請依頁6說明排出空氣 6. 確認液壓缸損害情況。請連絡液壓技術人員
液壓缸前進但無法持壓	1. 漏油或是連接不完全 2. 油封漏油 3. 泵浦內部洩漏	1. 確認所有連接接頭是否鎖緊無洩漏 2. 確認洩漏位置，連絡液壓技術人員 3. 連絡液壓技術人員
液壓缸無法回縮、部份回縮或是回縮緩慢	1. 洩壓閥呈關閉狀態 2. 泵浦液壓油過滿 3. 快速接頭鬆動 4. 系統內有空氣阻塞 5. 油管內徑太小 6. 液壓缸回縮彈簧毀損或是其他零件損壞	1. 打開洩壓閥 2. 將多餘的油倒出至泵浦標記位置即可 3. 請確認所有接頭都已完全鎖緊 4. 如圖7所示將空氣排出 5. 改換內徑較大的油管 6. 請連絡液壓技術人員





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# OPERATING INSTRUCTIONS

## High Pressure Manual Pump

### SPHH



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English : E1~E7

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.



**WARNING:** Always wear safety glasses. The operator must take precaution against injury due to failure 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 cause equipment failure and possible personal injury.



**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.

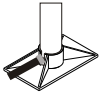


**DANGER:** Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin causing serious injury. If oil is injected under the skin, see a doctor immediately.

## 1. SAFETY PRECAUTIONS



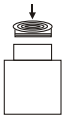
**WARNING:** Never pressurize uncoupled couplers. Only use hydraulic equipment in a coupled system.



**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.



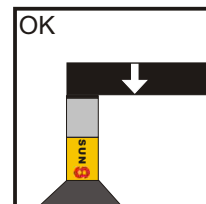
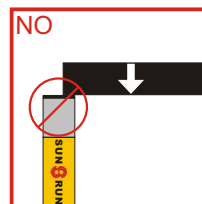
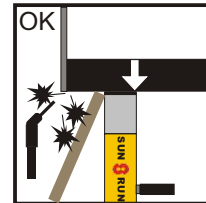
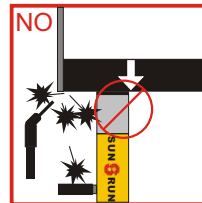
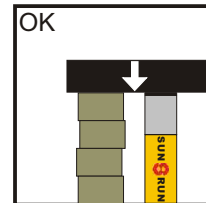
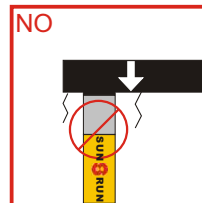
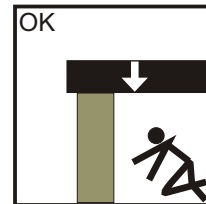
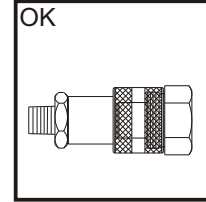
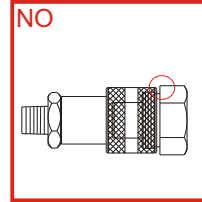
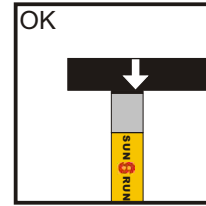
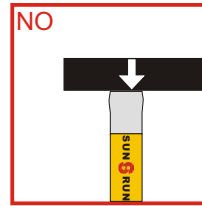
Distribute the load evenly across the entire saddle surface. Always use a saddle to protect the plunger.



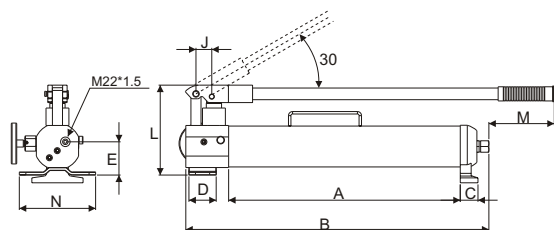
**WARNING:** Immediately replace worn or damaged parts with genuine SUN RUN parts. SUN RUN parts are designed to fit properly and withstand rated loads.



**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.

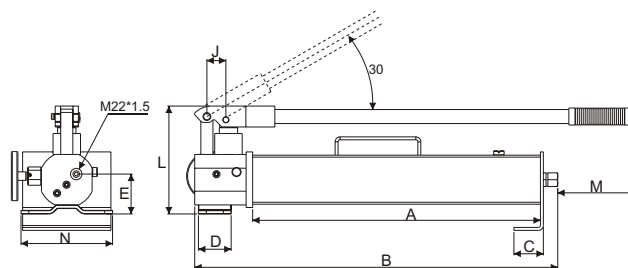


## 2.SPECIFICATIONS



SPHH -1612, 2012, 2512

SPHH -1620, 2020, 2520



SPHH-1630, 2030, 2530

Model Number	Pump Type	Usable Oil Capacity	Pressure Rating		Oil Displacement per Stroke		Piston Stroke	Dimensions(mm)									Weight
			1 <sup>st</sup> stage	2 <sup>nd</sup> stage	1 <sup>st</sup> stage	2 <sup>nd</sup> stage											
		(cm³)	(bar)		(cm³)		(mm)	A	B	C	D	E	J	L	M	N	(kg)
SPHH-1612	Two - Speed	1200	14	1600	15.5	1.2	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-2012		1200	14	2000	15.5	0.9	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-2512		1200	14	2500	15.5	0.7	16.65	425	556	32.5	50	61	29	165	120	140	9.0
SPHH-1620		2200	14	1600	15.5	1.2	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-2020		2200	14	2000	15.5	0.9	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-2520		2200	14	2500	15.5	0.7	16.65	425	556	32.5	50	61	29	165	120	140	11.0
SPHH-1630		3000	14	1600	15.5	1.2	16.65	440	556	45.0	50	61	29	165	120	140	13.0
SPHH-2030		3000	14	2000	15.5	0.9	16.65	440	556	45.0	50	61	29	165	120	140	13.0
SPHH-2530		3000	14	2500	15.5	0.7	16.65	440	556	45.0	50	61	29	165	120	140	13.0

### 3.OPERATION

#### 3.1Connecting the Pump

- 1.Thread hose into pump outlet. Use 1-1/2 wraps of Teflon tape (or suitable thread sealant) on hose fitting, leaving the first complete thread free of tape to ensure that tape does not shed into hydraulic system, causing damage. Trim loose ends.
- 2.Install a pressure gauge in-line from the pump for added safety and better control.
- 3.Connect the hose(s) to your cylinder or tool.

**Note :** For single-acting cylinders, connect one hoses from the pump to the cylinder. For double-acting cylinders, connect two hoses. Connect one hose from the pressure port of the pump to the pressure port of the cylinder. Connect another hose from the retract port of the pump to the retract port of the cylinder.

#### 3.2 Before Using the Pump

- 1.Check all system fitting and connections to be sure they are tight and leak free.
- 2.Check oil level in reservoir before operating pump. See "Adding Oil to the Pump" on page 4.

**CAUTION:**

**NEVER** add extensions to pump handle. Extensions cause unstable pump operation,

**WARNING:**

**IN** certain situations the pump handle can "kick back". Always keep your body to the side of the pump, away from the line of force of the handle.

#### 3.3 Using Two-Speed Pumps

These pumps provide 2-stage flow. Under no-load, the pump operates in the high flow first stage for rapid advance. When the load is contacted, the pump automatically shifts to the second stage for building pressure. For **SP-462** or **SP-464** models, when pump pressure reaches approximately 200psi (14bar), you must momentarily stop pumping and raise the handle to shift to the high pressure stage.

**NOTE:**

For best performance, operate pump handle at moderate speed during the high flow first stage. Rapid handle speed in the first stage will prevent the pump from delivering full volume of oil.

#### 3.4 Single-Acting Applications with Release Valve

- 1.Close release valve by turning clockwise ,as shown in Figure 3.4



Figure 3.4

**CAUTION:** Close release valve finger tight **ONLY**. Using tools on release valve can damage it and cause the pump to malfunction.

2. Operate pump handle to deliver hydraulic power to system. Pressure will be maintained until release valve is opened.
- 3.Open release valve (turn counter-clockwise) to release pressure, allowing oil to flow back to the reservoir.

### 3.5 AIR REMOVE

Removing air from the hydraulic system will help the cylinder to advance and retract smoothly .(Figure 3.5)

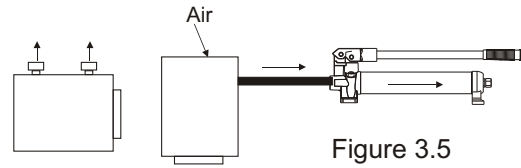


Figure 3.5

#### 3.5.1 Pump with single-acting cylinder (A)

- 1.Vent pump reservoir (for vented pumps only) and close release valve.
- 2.Position pump at higher elevation than cylinder.
- 3.Position cylinder with the plunger end down (up if using pull cylinder). See Figure 3.5.
- 4.Operate pump to fully extend the cylinder (retract if using pull cylinder). See Figure 3.5.
- 5.Open release valve to retract cylinder (extend if a pull cylinder).This will force the trapped air to move up to the pump reservoir.
- 6.Repeat the above steps as necessary.
- 7.Add oil if necessary. See page 6
- 8.Return vent/fill cap to operating position.

#### 3.5.2 Pump with Double-acting cylinder (B)

- 1.Vent pump reservoir(for vented pump only).
- 2.Position pump at higher elevation than cylinder.
- 3.Put cylinder in horizontal position with ports up. See Figure3.5.
- 4.Fully advance and retract the cylinder 2 to 3 times.
- 5.Repeat the above steps as necessary.
- 6.Add oil if necessary. See page 6.
- 7.Return vent/fill cap to operating position.

## 4.MAINTENANCE

Use only SUN RUN hydraulic oil with these pumps to promote long pump life and to protect your warranty. Viton and EPR seal kits are available for some hand pump. Contact your SUN RUN representative for more information on these products and their applications.

### 4.1 Adding oil to the pump

Check oil level regularly.

**WARNING:** Always add oil with cylinders fully retracted (extended if pull cylinders) or the system will contain more oil than reservoir can hold.

- 1.Remove vent/fill cap from reservoir.
- 2.Fill reservoir only to level mark shown on pump.
- 3.Remove air from system if necessary. See Figure 7. Recheck oil level after removing air.
- 4.Return vent/fill cap to proper position.

**NOTE:** Non-vented hand pump s require air in the reservoir to function properly. If the reservoir is completely filled, a vacuum will form preventing oil from flowing out of the pump.

### 4.2 Keeping oil lines clean

When coupler halves are disconnected, always screw on dust caps. Use every precaution to guard unit against entrance of dirt because foreign matter may cause pump, cylinder, or valve failure.

### 4.3 Changing the oil

- 1.Drain all oil and refill with clean SUN RUN oil every 12 months. If pump is used in dirty environments, change the oil more often.
- 2.Remove vent/fill cap or plug from reservoir.
- 3.Tilt pump to drain out old oil.
- 4.Fill reservoir only to level mark shown on pump.
- 5.Replace the vent/fill cap or plug.
- 6.Dispose of used oil properly.

## 5.TROUBLESHOOTING GUIDE

The following information is intended as an aid in determining if a problem exists.

PROBLEM	CAUSE	SOLUTION
Cylinder does not advance, advances slowly, or advances in spurts.	<ol style="list-style-type: none"> <li>1.Oil level in pump reservoir is low</li> <li>2.Release valve open</li> <li>3.Loose hydraulic coupler</li> <li>4.Load is too heavy</li> <li>5.Air trapped in system</li> <li>6.Cylinder plunger binding</li> </ol>	<ol style="list-style-type: none"> <li>1.Add oil according to the Maintenance instructions on page5.</li> <li>2.Close the release valve.</li> <li>3.Check that all couplers are fully tightened.</li> <li>4.Do not attempt to lift more than rated tonnage.</li> <li>5.Remove air according to the instructions on page 6.</li> <li>6.Check for damage to cylinder. Have cylinder serviced by a qualified hydraulic technician.</li> </ol>
Cylinder advances, but does not hold pressure.	<ol style="list-style-type: none"> <li>1.Leaking connection</li> <li>2.Leaking seals</li> <li>3.Internal leakage in pump</li> </ol>	<ol style="list-style-type: none"> <li>1.Check that all connects are tight and leak free.</li> <li>2.Locate leak(s) and have equipment serviced by a qualified hydraulic technician.</li> <li>3.Have pump serviced by a qualified hydraulic technician.</li> </ol>
Cylinder does not retract, retracts part way, or retracts more slowly than normal	<ol style="list-style-type: none"> <li>1.Release valve closed</li> <li>2.Pump reservoir is over-filled</li> <li>3.Loose hydraulic coupler</li> <li>4.Air trapped in system</li> <li>5.Hose I.D too narrow</li> <li>6.Cylinder retraction spring broken or other cylinder damage</li> </ol>	<ol style="list-style-type: none"> <li>1.Open release valve.</li> <li>2.Drain oil level to full mark. See 7.1 instructions for adding oil.</li> <li>3.Check that all couplers are fully tightened.</li> <li>4.Remove air according to the instructions on Figure 7.</li> <li>5.Use larger diameter hydraulic hose.</li> <li>6.Have cylinder serviced by a qualified hydraulic technician.</li> </ol>