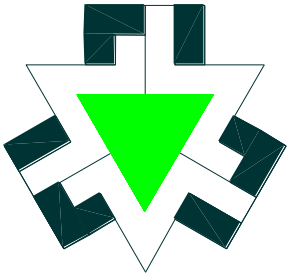

KAUKAN

AIR CONDITITIONER

空調冷卻機

INSTRUCTION HANDBOOK

操作手冊

高抗股份有限公司

KAUKAN INDUSTRIES CO.,LTD
NO. 12, LANE 412, WU-FONG ROAD,
WU-FONG, TAICHUNG, TAIWAN 413
TEL : 886-4-23334858
FAX : 886-4-23335735
E-mail : cooler@kaukan.com.tw

MODEL(型號) :_____ Serial No.:_____.

201608

KAUKAN

LIMITED WARRANTY

This product is inspected and complies with KAUKAN's quality standard.

Should the failure happen during the warranty period under normal operating condition, we will be responsible for repairing.

1. **Warranty Period**
   One year, from the date of the delivery.
2. **The following conditions exempt us from the warranty commitment:**
   a) **Mis-operation, improper use, or operator negligence.**
   b) **Non-genuine parts.**
   c) **Repair by non-authentic service crew.**
   d) **Consumable parts.**
   e) **Failure or damaged from natural affects.**
   f) **Working under the abnormal condition.**
   g) **Working beyond the working range of instruction manual specifies.**
   h) **Failure or damage derived from the main machines.**
3. **This warranty card is void without our company stamp.**
4. **This warranty card is void with non-authorized alteration in the content.**
5. **Should failure happen during operation, please inform us or the authorized agent.**
   Tel : 886-4-23334858
   Fax : 886-4-23335735
   E-mail : cooler@kaukan.com.tw

DELIVERY	

PRODUCT	MODEL	Serial Number	Warranty Period
Air Conditioner			

Stamp

KAUKAN

Read the instruction manual carefully before proceeding with start-up, operation, maintenance, or any other jobs on the machine

1. GENERALITY

KAC type industrial air conditioners are available in various size with cooling capacities rang up to 1.6kcal, computed on the following operating conditions: - air ambient temperature: +28°C.

WARNING	**The air flow loop plays an important role in heat exchanging process, as it also affect the temperature in the evaporator. In other words, the air temperature is a variable key in cooling system. We suggest the air temperature in the returning loop should be no higher than +45℃.**

1.1 Application Field

The air conditioner is designed to meet general uses in industries field applications. The recommended operation condition is : **Setting temperature: +28℃ ~ +35℃**

Air ambient temperature: 10℃ ~ +40℃

WARNING: For any other condition out of the above ranges, contact us.

1.2 Important Warnings

WARNING	**Please follow all the instructions listed in this manual. Pay attention to those safety concern and special clauses. The manufacturer will decline the claims for damage caused by improper usage or failing to follow the instruction.**

1. Only certified engineers who receive sufficient training and fully understand can operate this cooler.
2. When installing or servicing the cooler, engineer must follow all the instructions, check and conform to the specifications according to the machine labels. Take all the safety measures to prevent injure.
3. Reserve amble space for air flow and heat expelling. Do not remove, modify or bypass heat expelling devices.
4. Temperature in hydraulic circuit and electric components are with highly potential danger. Pay extra caution to when installing or servicing the unit.
5. Before inputting the main power, check and ensure that the power source (voltage/frequency) must correspond to name plate shown on the cooler unit.
6. This machine is designed for a working period of ten years, from the date of manufacture. At the end of the period, the machine has to be retired. Please refer to manual for retiring procedure. If you intend to extend the period, the cooler must go through a complete inspection by the manufacturer.
8. Failing to follow the instructions or any modification without explicit authorization will be recognized as the immediate termination of the warranty.

DANGER **Disconnect the power before every servicing on this unit.**

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2. INSTALLATION

2.1 Transportation

WARNING **Decide the method of lifting based on the weight shown on the label. The hanger/carrier should be securely stable. Tilting is prohibited .**

Upon receiving the cooling unit, check if there is any damage caused during the transportation. The unloading/carrying equipment should be with greater capacity than the cooling unit itself.
Do not tilt the cooling unit more than 30 degrees. A sudden jolt could damage the internal parts.
Avoid lifting from single point.

2.2 Installation site

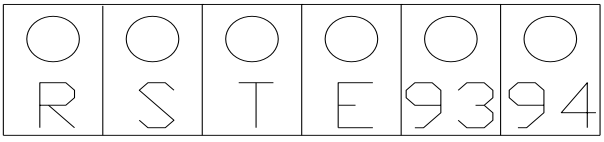
For the operation and maintenance of the KAC type air condition, it is necessary to prepare more space than the air condition dimension specified above in order to ensure an adequate air supply to the condenser. The air condition is supported by means of swiveling wheels or lacked on the machine. Please make sure that the installation place is perfection that it can withstand the weight of the oil cooler. It is recommended that the oil cooler be installed inside building or inside a room.
In winter it is best to provide some form of protection against possible damage to the internal components due freezing while the oil cooler is inoperative.

2.4 Power Wiring (see the electrical diagram on the specification manual)

WARNING **Make sure to disconnect the power supply before every operation of servicing on the unit.**

The main power supply to the cooler is achieved by means of a 4-wire cable {3 phase (R, S, T) + ground wire (E)}, passing through cable clamp and connected the terminal block. It is recommended to add a safety measure, like circuit breaker valve or automatic cut-off switch. All components must calibrate and conform to the condition in the area of installation.
The table below shows, under different voltages, with cable no longer than 15 meters, the recommended wire cross-section of the main power supply cable and current for breakers. For cables longer than 15 meters, the wire cross-section of the main power cable will need to be increased in order to prevent excessive voltage drop.

The air conditioner may feed alarm signal to NC through additional connector at terminal# 93/94. (function avail on limited models)



KAUKAN

1 PHASE AC220V

MODEL	WIRE CROSS SECTION (mm²)	AUTOMATIC BREACEK
KAC-1.5	0.75	3
KAC-2	1.25	4
KAC-3	1.25	4
KAC-4	1.25	6
KAC-6	1.25	8

WARNING	**The table above is designed based on a KAUKAN standard chiller. For special requirement, please adopt the proper power cables and breakers according to the running current shown on the test report**

3. START-UP PRODUCEDURE

3.1 Preliminary inspection

Check that:

- The main power voltage and frequency correspond to the values stamped on the chiller's name panel.
- The water pipes are rightly connected.

3.2 Starting

1. Turn on the main power to the air conditioner.
2. Set the target temperature on the panel.

WARNING	**The temperature indicated on the panel is the in-box temperature, measured by sensor probe.**

3.3 Stopping

To stop the air conditioner, please turn off the main power input.

INFORMATION	**Fail to follow the instruction will disqualify any warranty claim.**

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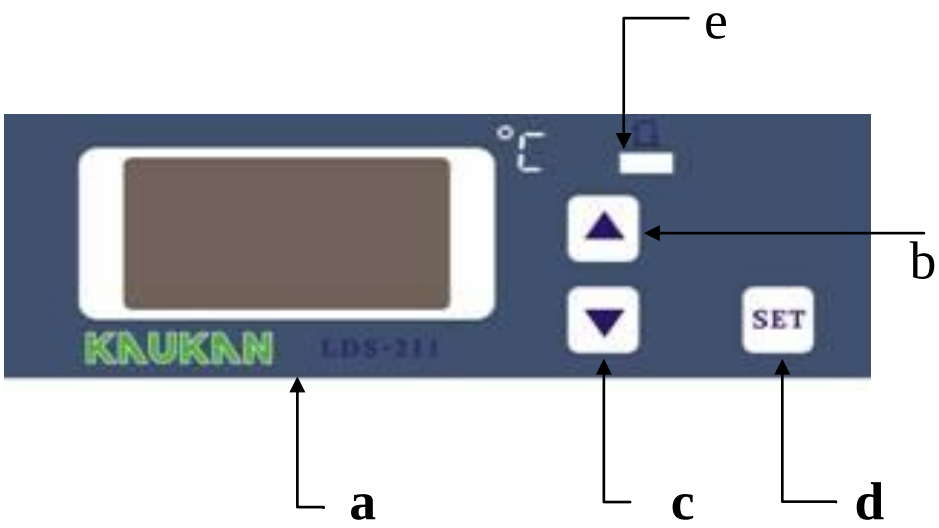
CONTROL PANEL



4.1 Description and Functions:

a) (**DISPLAY**):

1.) To show the value of electrical box temperature or setting temperature.

2.) To show the parameter item and value.

b) (▲) button:

1.) To enter the temperature setting mode (press and hold for 3 seconds, display shows "**888**")

2.) To input the setting value incrementally.

c) (▼) button:

1.) To enter the temperature setting mode (press and hold for 3 seconds, display shows "**888**")

2.) To input the setting value decrementally.

d) (**SET**) botton:

1.) To enter the temperature setting mode (press and hold for 3 seconds).

2.) To store the setting value (temperature or parameter).

e) ( ) indicator lamp (blue):

Light is on when compressor is working.

4.2 Setting temperature

After setting the temperature, it takes eight seconds for the control unit to confirm and activate the setting.

1.) Turn on the main power, the display shows "PON" and flashes 3 times, then the air condition starts working.

2.) Press (**SET**) and hold for 3 seconds, the display will show "**888**" and flash 3 times.

3.) Press (▲) or (▼), then display shows "**ts**".

4.) Pressing (**SET**) again to go into the setting mode.

5.) Press (▲) or (▼) to set the temperature value.

6.) After setting the target temperature, press (**SET**) to store the modified temperature and return to the normal operation of instruction.

WARNING	**Only certified engineers are allowed to operate the parameter setting. Consult your agent before operation.**

4. GENERAL INFORMATION

5.1 Efficient Cooling:

To maximize the cooling efficiency, the working condition must be:

a) With low ambient temperature

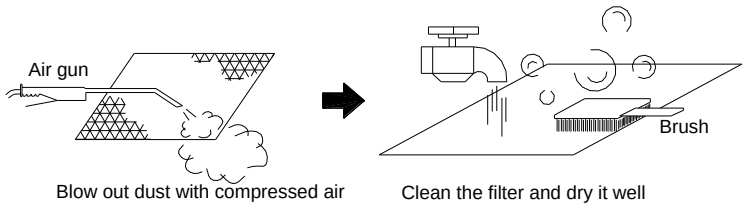
b) With sufficient air flow

5.2 Air filters

The air filter keeps the cooler interior and the condenser fins from dirt. It also helps to ensure the cooling efficiency and to prolong the machine lifetime.

We strongly suggest you clean the filter regularly and change it when necessary.

Never run the chiller without air filter.



5. SERVICE & MAINTENANCE

DANGER	**Disconnect the main power supply before every operation of servicing on the air conditioner/ cooling unit.**

Compressor discharge pipe [copper tube with heat insulation] can be extremely hot. Be cautious when operating around.

WARNING	**All operations described in this chapter MUST BE DONE BY WELL-TRAINED ENGINEERS ONLY. Any mis-operation or improper practice/setting could lead** to a severe damage to the cooler and injuries to operators. **After service and maintenance, restore and tighten all the covers.**

6.1 Weekly service

Clean the air filter and condenser.

6.2 Monthly service

1. Clean the air filter and condenser.
2. Check the wirings, and motor running condition.
3. Check all screws/bolts/hose clamps…etc, retighten if necessary.
4. Check if there is any leakage (oil mark). Call the service engineer when you find any.

6.3 Checking Refrigerant leakage

Fill in the system ONLY with anhydrous nitrogen, using a 15-bar gas bottle with a pressure reducing valve. Apply bubble water to check the leakage. If a leakage is detected, discharge the circuit. Then wield with proper alloys to repair the leakage.

DANGER	**NEVER USE OXYGEN. EXPLOSIONS MAY OCCUR.**

6.4 Repairing the Refrigerant circuit [only by a certified engineer]

I n case of a repairing need in refrigerant circuit, you must follow the instructions:

- Check the refrigerant circuit. Fix the leakage if there is any.
- Vacuum and dry the refrigerant circuit.
- Fill in the correct type of refrigerant.

WARNING	**If the system should be discharged, collect the entire refrigerant with proper instruments.**

6.5 Filling up the gas into refrigerant circuit

a) Use tube with 1/4 SAE terminals to connect refrigerant gas bottle to the compressor. Release a little refrigerant gas first in order to evacuate the air in the connecting piping.

b) Before filling refrigerant into the system, if there is a solenoid valve control (220V A/C), please activate the solenoid valve (SEV).

c) Reverse the refrigerant gas bottle. Feed into the circuit with liquid refrigerant until 75% of required amount [indicated on the name plate]

d) Turn on the oil cooler and activate the compressor. Connect the refrigerant gas bottle to the compressor suction line charging valve and complete the filling by keeping the refrigerant bottle in normal vertical position, until no bubble appears on the liquid level visor.

6.6 Environment protection

No matter what type of refrigerant your cooler carries, it is forbidden to release it into the atmosphere. For this reason, you should follow the regulation to recycle the cooler the end of the operating life.

WARNING	**A particular care is recommend during service operations in order to reduce as much as possible any refrigerant loss.**

7. RETIRING THE OIL COOLER

Once the cooler reaches its life time and is ready for retirement, please follow the following procedures:

- The refrigerant has to be collected by trained people and sent to proper collecting center.
- The lubricants and oils have to be collected and sent to proper collecting center.
- The frame and components have to be disassembled and sorted, particularly copper and aluminum, and then recycled accordingly.

Please help to recycle and reuse for a better environmental.

KAUKAN

製品保證書

此製品是高抗公司在嚴密品管之下所生產 .保固期間內,萬一發生故障,本公司將負起保固維修之責任.

1..保固期間

從購買交貨起一年內,在正常使用損壞者,本公司將免費負起修理之責. 以本機身上銘牌記載日期為計算依據.

2..在保固期間內,發生下列事項,本公司修理將收費.

a) 因使用不當,不注意而故障.

b) 使用非本公司產品或非經本公司修理,而自行改造所引起之故障.

c) 消耗品.

d) 天災所引起之故障損壞.

e)在異常環境使用所引起之故障.

f) 超出本機所須可之使用範圍之外使用.

g) 由於其它機械故障,以致引起本冷卻機在使用中所產生之二次故障.

3..本保証書,未加蓋本公司印章,視為無效.

4..本保証書塗改無效,如有遺失不再補發,敬請妥為保存.

5..使用中萬一故障,請通知本公司或代理商.

Tel : 886-4-23334858

Fax : 886-4-23335735

E-mail : **cooler@kaukan.com.tw**

出廠日期	

產品名稱	型 號	序 號	保固期限
空調冷卻機			

公司印章

KNUKNN

在開始使用, 進行操作, 常規保養, 或者機器上的任何其他工作前, 請仔細閱讀說明書。

1. 概 論

本公司生產的各種工業冷卻器類型, 在下面的操作標準的條件方面計算, 最高冷卻容量可達到 1.6 千卡： 空調冷卻器： 環境溫度: 攝氏 28 度.

警 告	**要充份發揮熱交換之功能, 冷卻過程的空氣溫度特別重要. 因為空氣溫度是製冷或冷卻的一個重要變量, 它會影響蒸發器中的溫度變化. 因此冷卻過程的空氣溫度不要超過攝氏 40 度.**

1-1 使用範圍

本冷卻器設計為工業領域應用的冷卻, 推薦的操作範圍如下面:

設定溫度 : 最低. +28℃ 最高. +35℃

環境溫度 : 最低. +10℃ 最高. +40℃

警告: 若超出上面所述範圍的任何其他條件, 請與我們接觸**.**

1-2 重要的警告

警 告	**遵守手冊中的忠告，特別是那些涉及安全的特別事項． 對於未能依安全指示操作所造成的損害，製造商將不負擔所有責任．**

1. 操作／維修冷卻器的人員, 必須有受過訓練並清楚了解冷卻器使用方式.
2. 當安裝或操作冷卻器, 必要嚴格遵守使用手冊上的規定. 所使用的零配件需符合冷卻器上標示的所有規格, 並採取所有必要的防範措施.
3. 絕不阻礙通風和熱的發散. 機台的散熱裝置不能移走, 修改或者避開.
4. 當安裝或維修冷卻器時, 冷卻器中的高溫迴路和電氣設備可能會引起危險, 必須小心注意.
5. 在連結電源時, 必須確認使用電源(電壓,頻率)和銘牌標示相符合.
6. 本冷卻器使用年限為 10 年, 從製造日期(在銘牌上)開始算起．在使用期限屆滿，本冷卻器必需銷毀．若需繼續使用，必須請本公司或本公司授權人員透過檢查來確定．當你們決定銷毀這個機器時, 請查詢那些零件可能具有危險部分.
7. 未能嚴格地遵守手冊上的規則, 或任何沒有得到本公司明確的授權而所做的修改，將視為保固契約的即刻終止.

危 險	**在做任何維修之前, 確定其供應之主電源是關閉狀態.**

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2. 安裝注意事項

2-1 運送注意事項

警　告

請先確認冷卻器之重量(在銘牌上)，再決定運送或搬運方式．移動過程中，必須確保冷卻機的穩定，鏈條和吊索不可鬆脫或滑落，冷卻器也不可以傾翻．

當收到這個冷卻器時, 請檢查外觀的零件和內部的零件是否有任何損害．

請選擇比冷卻器更大裝載容量的載具(電梯或貨車)，及使用適當的搬運裝備. 决不可使冷卻器傾斜超過30度, 及防止冷卻器受到突然震搖而損壞內部的零件.

避免由任何單一零件點提起整台冷卻機..

2-2 安裝地點注意事項

冷卻器的操作和保養, 請預留準備比冷卻器規定尺寸更大空間, 以確保冷凝器有充分空氣循環供應．

冷卻器若是安裝固定在所配合之載具上, 請確認這個安裝地方是能夠支撐冷卻器的重量. 並確認安裝地方在室內通風處．

在冬天當冷卻器不用時, 請提供適當的保護, 以降低內部零件結冰而造成可能損害.

2-3 電源連結注意事項 (請查閱規格書上之電路圖)

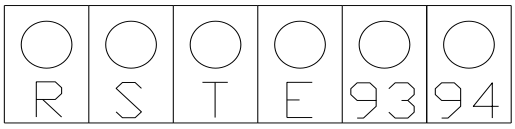
警　告

在做任何維修之前，確定其主供應電源之是關閉狀態

冷卻器的主要動力供應為使用含 4 條電線的電纜{ 3 相 （R , S , T) + 接地電線 （E) } 經過緊固接頭和連接端子台. 在進入冷卻器之前, 加裝保護開關, 如馬達迴路保護開關或電源過載保護開關, 這些安全裝置應該校準並符合在冷卻器安裝的地區額定使用電流.

下面表格所示, 為使用不同電壓(電纜線長度不超過 15 米), 所使用電線橫截面, 及馬達迴路保護開關或電源過載保護開關之額定使用電流. 如纜線長度超過 15 米, 必須增加主要動力電纜的電線橫截面, 以防止額外壓降. 壓降.

冷卻器會因客戶需求, 提供 NC 故障接點, 以顯示該冷卻器是否正常運轉. 其接點標示為 93,94.



單相 AC220 伏特 ：

型 式	電線橫截面 (mm²)	保護開關之額定使用電流
KAC-1.5	**0.75**	**3**
KAC-2	**1.25**	**4**
KAC-3	**1.25**	**4**
KAC-4	**1.25**	**6**
KAC-6	**1.25**	**8**

警　告	以上表格所示，為標準冷卻器所應使用之電纜線橫截面及保護開關之額定使用電流，若有特殊設計，請查閱測試表上之運轉電流，來選所適用之電纜線及保護開關.

3.起始運轉須知

3-1 預備的檢查

檢查如下:

- 確認使用主要電源(電壓,頻率)和銘牌標示相符合.
- 確認排液管路連接正確.
- 如果安裝任何閥座，確認閥座在開啟位置.

3-2 啟動

- 直接輸入電源啟動.
- 在面板上設定所需求之溫度，在定溫模式下直接設定所需求之箱內冷卻溫度.

警　告	在面板上表明的溫度是箱內冷卻溫度，由溫度探測計測量得之.

3-3 關機

- 直接切斷輸入電源來關閉冷卻器.

注　意	如果無法遵守這些操作指導，將使冷卻機的保固失效

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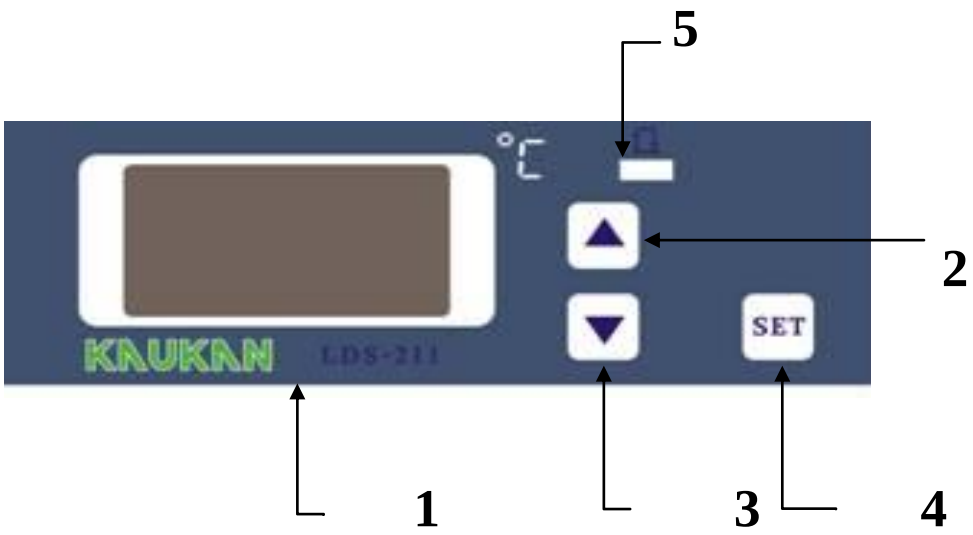
4. 面板上的名稱, 功能和操作



4-1 面板上的名稱,功能

1. 顯示面板(綠色):
   a. 顯示箱內溫度.
   b. 顯示設定參數項目及參數值.
2. **(▲)** 按鈕:
   a. 可向上選擇所要數值.
   b. 可用來進入室溫溫度設定模式. 長按 3 秒直到面板顯示“888”
3. **(▼)** 按鈕:
   a. 可向下選擇所要數值.
   b. 可用來進入溫度設定模式. 長按 3 秒直到面板顯示“888”
4. **(SET)** 按鈕:
   a. 可用來當作進入參數設定及溫度設定項目, 且確認所設定之溫度值.
5. ( ) 指示燈:
   a. 顯示壓縮機是否運轉.

警 告 **在與合格認證的工程師討論及確認後, 才可改變參數.**
有關相關參數定義, 請詳閱規格書,.

4-2 溫度設定

1. 輸入電源, 顯示面板會顯示“Pon”並且閃爍 3 次後, 冷卻器進入運轉.
2. 長按壓“**SET**”鍵 3 秒後， 顯示「**888**」閃爍五次後進入第一組參數“**ts**”,
3. 當顯示面板顯示“**ts**”, 再按設定鍵“SET”一次, 顯示面板會顯示數值, 此時可使用設定鍵(▲) or (▼)來選擇所需求之溫度數值設定溫度.
4. 完成設定溫度後, 再按“**SET**”一次, 來確認所設定之冷卻溫度, 並且離開冷卻溫度設定模式.

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5. 一般性信息

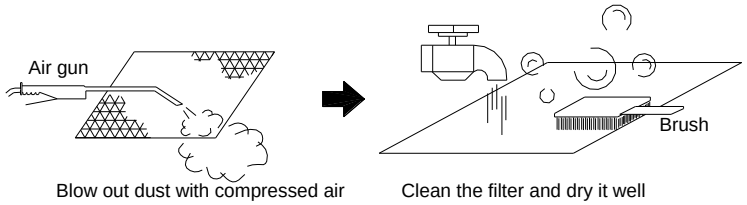
5-1 冷卻能力之效率

若是遵守下列情況,將可使冷卻機發揮最大冷卻能力:

- 較低的環境溫度.
- 良好的通風環境.

5-2 空氣過濾網

空氣過濾網能保持冷卻器的內部之冷凝器散熱片清潔, 並確保散熱片維持散熱效率和延長使用年限.
因此絕對需要定期清理空氣過濾網, 如果有任何損壞請立即更換.
在冷卻器操作期間絕對要安裝空氣過濾網.



6. 一般保養, 維護

危 險	在冷卻器上作任何保養, 維護及維修前, 必須斷開主要電源供應. 壓縮機下排液管子,[有熱絕緣體的銅管] 會產生高溫情形, 因此在它的周遭中操作時要小心.

警 告	所有在操作手冊上的方法及要點, 都必須要由有受過專業訓練的人員來操作, 任何錯誤及不當的操作或設定, 將會對冷卻器造成損壞, 甚至會造成人員的受傷.
當完成任何的保養及維修, 請將所有拆下的安全護蓋復原及鎖緊.	

6-1 每週保養注意事項

檢查空氣過濾網和冷凝器是否骯髒, 並清潔之.

6-2 每月保養注意事項

1. 檢查空氣過濾網和冷凝器是否骯髒, 並清潔之(使用空氣槍及清水清洗空氣過濾網, 使用空氣槍清潔冷凝器.)
2. 檢查所有電線: 核實所有馬達目前運轉情形, 並檢查所有螺絲是否旋緊.
3. 檢查所有機械部分: 清潔冷卻機內部, 並檢查所有零件上的螺絲和排液管路管束是否繃緊.
4. 檢查冷媒系統回路: 如果任何氣體滲漏, 在滲漏處會有油的蹤跡.
5. 檢查冷媒系統回路上是否有油滲漏.

6-3 冷媒系統維修注意事項 [必須由具有冷卻專業能力之技師操作]

萬一需要維修冷媒系統, 必須遵守下列規定:

- 查是否有滲漏處, 並同修補之.
- 將淨空冷媒系統回路中所有空氣, 並確保絕對的真空及乾燥.
- 裝填新的冷媒. (注意冷卻器所使用之冷媒類形).

警 告 **在維修冷卻器時, 務必使用冷媒回收設備, 來回收所排放之冷媒,**

6-4 冷媒滲漏檢查方式

使用至少具有 15 bar 壓力的無水氮氣之氣體瓶子來裝填無水氮氣至冷媒系統, 並在充滿系統後, 使用肥皂水來塗抹任何可能滲漏處, 若發現起泡或者泡沫, 表示有滲漏. 在這種情況下, 排放無水氮氣後, 使用適當的合金焊接, 修補所發現之滲漏處.

危 險 **絕對不可使用氧氣或其他易燃氣體, 以免引起爆炸.**

6-5 冷媒系統之冷媒裝填方式

- 使用冷媒充填管(1/4 SAE 母接頭), 一端連結至壓縮機上冷媒填充接頭(1/4 SAE 公接頭), 另一端連結至冷媒充填氣體瓶子. 在充填冷媒之前, 請先鬆開氣瓶一些, 來排除管內之空氣, 讓冷媒充滿連接的充填管後, 再鎖緊接頭.
- 當要重新充填冷媒時, 若有冷卻機有安裝電磁閥, 請先開啟.
- 將冷媒充填氣體瓶上下顛倒後再充填冷媒. 在充填冷卻器所需求冷媒量(可查閱在銘牌上)的 75%後, 先暫停充填冷媒.
- 啟動冷卻器, 在壓縮機運轉時, 再補充不足之冷媒. 請利用冷媒壓力表之高低壓變化, 來判斷冷媒是否足夠, 在高壓部份在 16~20 bar, 在低壓部份在 4~6 bar 為正常.

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6-6 環保注意事項

- 冷卻器不論使用何種型號之冷媒, 都應控制不排放到環境中.
- 在冷卻器使用年限終結時, 應注意回收注意事項.

7. 冷卻器使用年限終結時注意事項

一旦冷卻器到達使用年限終結時, 需要移走時, 請遵守下面的注意事項:

- 冷媒部份, 必須由專業的技師們, 回收和送到恰當收集中心.
- 把壓縮機中的潤滑油, 及冷卻器所冷卻的油, 必須回收和送到恰當收集中心.
- 請將無用的框架和各個組成零件部分拆除和細分, 再符合他們的性質作回收; 特別是在冷卻器中佔有顯著數量的銅和鋁.

請回收和再利用這些操作材料, 以減少對環境衝擊.