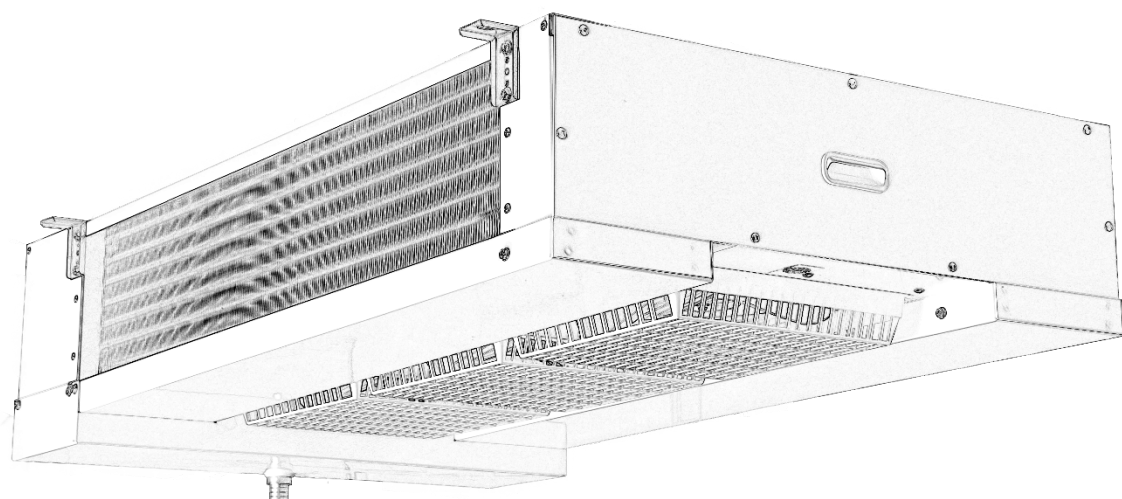


HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual



ICherng®

Catalog 目錄

| | |
|--|----|
| 1. Check on delivery 收貨檢查 | 1 |
| 2. Storage 儲存..... | 1 |
| 3. Installation 安裝..... | 2 |
| 3.1 Unpacking 取出產品 | 2 |
| 3.2 General rules for positioning unit cooler 安置蒸發器的通則 | 3 |
| 3.3 Locate 定位 | 4 |
| 3.4 Drain Line 排水管 | 4 |
| 3.5 Expansion valve installation 膨脹閥的安裝..... | 5 |
| 3.6 Refrigerant Piping 冷媒配管 | 6 |
| 3.7 Wiring 電路接線..... | 7 |
| 4. Test running and adjustment 試車與調整 | 7 |
| 4.1 Before start up 啟動前檢查..... | 7 |
| 4.2 Check and adjust while running 運轉時的檢查與調整 | 8 |
| 5. Maintenance 保養..... | 8 |
| 6. Trouble shooting 故障排除 | 10 |

HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual

1. Check on delivery

When receive the product, please check if there is any damage on packing or product due to shipping. And the content is the same as packing list. If there is any damage, please describe defect(s) on delivery note. If possible, take photos on damaged part and send photos and damage description to your local agent. In order to protect your right and interests, please inform your local agent within 3 days.

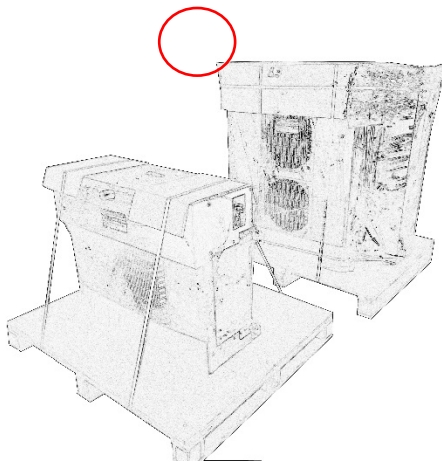
2. Storage

Warning! Do not place the container upside down or vertically. Incorrect storage way could lead to casing damage!

**Never place any heavy goods on this product!
Never sit or stand on the container!
Never overstock the containers!**

Store product in cool and dry place. If corrugated cardboard gets wet, please remove the wet corrugated cardboard as soon as possible! The wet corrugated cardboard might produce corrosive compounds which are aggressive to heat exchanger materials!

If this unit cooler has been run for a while, for some reason has to unload the unit or shut down the whole system for a long time, please dry the fin surface and drain pan before storage. If cooler is disconnected from system, please seal the unit cooler with dry nitrogen.



Do place container vertically!
請將箱體垂直放置！

1. 收貨檢查

當收到產品時，請檢查產品包裝與產品本身是否有運輸損傷。並請核對產品與送貨單內容是否符合。如果任何損傷，請於送貨單上註明損害情形。可能的話請將受損的部分拍照，並將照片與損害說明傳送到當地經銷商。為了確保您的權益，務請於到貨 3 天內通知您的經銷商。

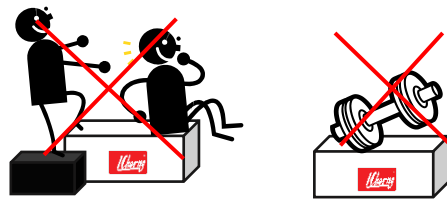
2. 儲存

警告！勿將產品倒置或是水平放置，否則將造成板金受損！

**請勿放置任何重物於本產品上！
請勿坐或站立於本產品上！
請勿過度堆疊本產品！**

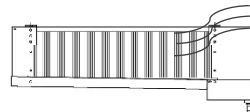
請將產品放置於涼爽乾燥的位置。如果瓦楞紙包裝潮濕，請迅速將受潮的瓦楞紙板移除。潮濕的瓦楞紙可能會產生有腐蝕性的物質，對熱交換器的材質造成損壞。

如果蒸發器已經運轉過，在某些情形下必須要將蒸發器取下或是將系統關閉一段長時間，請在儲存前將鰭片與水盤乾燥。如果蒸發器由系統拆下，請將蒸發器以乾燥氮氣封存。



Do NOT sit or stand or place any heavy goods on the container!


請勿坐或站立或放置任何重物於本產品上！




Dry up unit cooler before storage or shut down for a long time if it has been run.
如系統已經運轉過，在儲存或要長時間停機前，請先乾燥！

HCT 系列蒸發器安裝與操作說明


HCT Series User's Manual




Sharp edges hazard !
Please wear protection gloves while unpacking and installing this product!



銳利邊緣危害！
在取出本產品或安裝本產品請戴防護手套！



Installation work must be executed by professional technician !



本產品的安裝作業僅能由專業作業人員執行！

3. Installation

3.1 Unpacking

Caution! Fins are very sharp, please be very careful while taking out the unit cooler. Do wear the protection gloves through the installation work.

Unit cooler is packed in vertical way. While take out the unit cooler from pallet, **DO NOT** put drain pan side or ceiling directly on the ground to prevent the drain pan and connection tubes from damage. If needed to put unit cooler on the ground temporarily, please place unit cooler with drain pan side up on blocks. Blocks must be higher than out part of connection tubes to avoid tube damage. Please place a protection pad (ex. corrugated cardboard) under the unit cooler to protect casing.

Before shipping, all unit coolers have been pressurized inside to block moisture. While releasing gas via service valve before connection, do watch out the gas blowout.

All packing materials disposal must meet local regulation.

3. 安裝

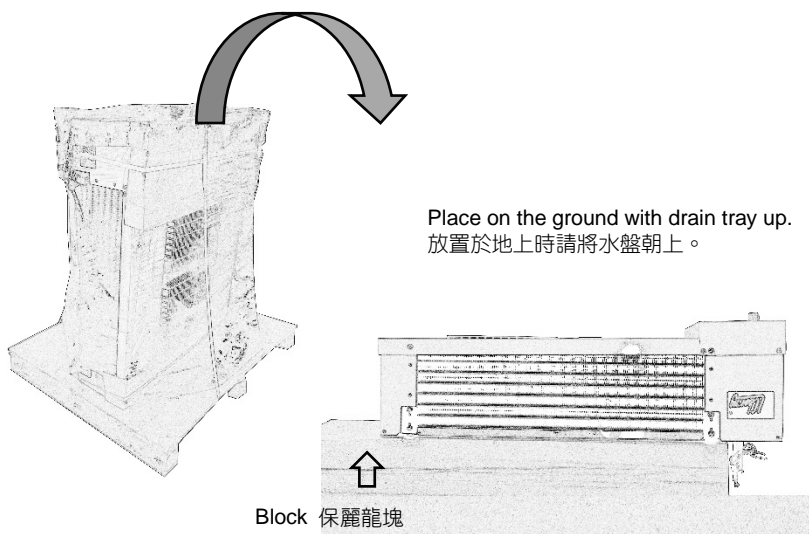
3.1 取出產品

小心！蒸發器的鱗片相當銳利，在由包裝箱取出本產品時請特別小心。安裝過程中請戴防護手套。

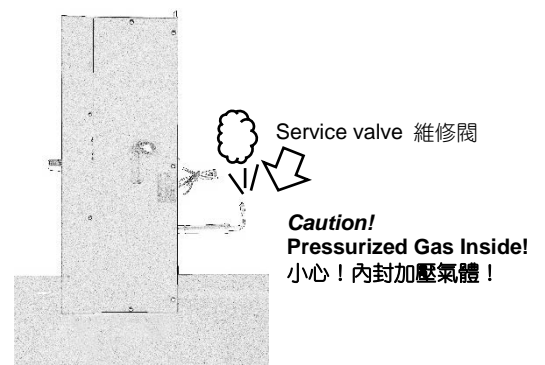
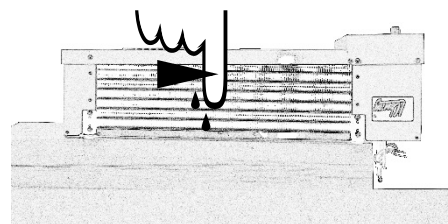
蒸發器是以垂直方式包裝於棧板上，取出蒸發器後，請勿將水盤側或上板側直接放置於地面上。避免水盤與出入管受損。如需要放置於地面上時，請以上下倒置的狀態(水盤朝上)放置於木塊上。木塊高度必須要高於出入管以避免管路受損。為保護本產品的箱體，放置時請於下方放置一個保護墊(如瓦楞紙板)。

所有的蒸發器在裝運前內部皆有充填氣體維持正壓，以避免水氣進入管路內部。在連接管路前由維修閥將氣體釋放，請注意管內部氣體噴出。

所有包裝素材的拋棄必須依照當地廢棄物處理法規辦理。



Sharp Edges Hazard! 小心銳利邊緣傷害!
Be careful of sharp Fin edges! 請注意鱗片的銳利邊緣！



3.2 Positioning unit cooler

In order to reach the best performance of your unit cooler, you must install unit cooler in a correct place. The following general rules must be obeyed while selecting the position for unit cooler:

1. Distance between suction side and obstacle(s) below must be greater than the height of unit cooler. This will provide enough entering space for air flow. Distance between air out side and wall or another unit cooler should be at least 3 meters.
2. The suction side of unit cooler must be away from door. Have to avoid outdoor air being sucked directly into the unit cooler while door opened, otherwise it will increase cooling load.
3. When install multi-unit coolers system, do avoid air flow interference between unit coolers.

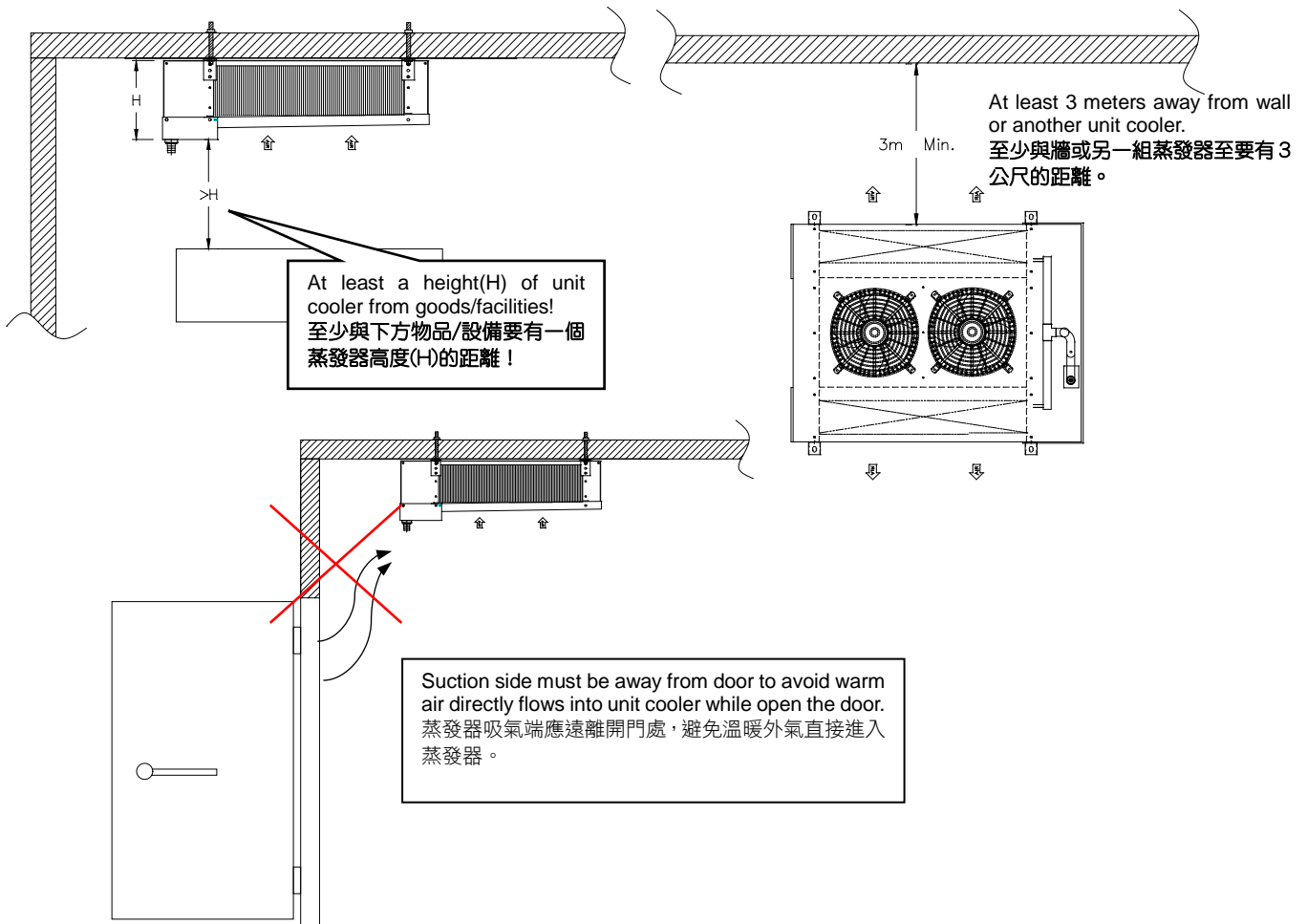
Before installation, check the position with designer or customer to find the most suitable place for unit coolers.

3.2 蒸發器的安裝位置

為了確保蒸發器能發揮最大的效能，必須要將蒸發器裝置在正確的位置。在選擇安裝位置時，必須要遵守以下的通則：

1. 蒸發器吸氣面與下方障礙物之間的距離至少必須要大於該蒸發器的高度，確保有足夠的進氣空間。出風側與牆或其他蒸發器間的距離至少要有 3 公尺以上的距離。
2. 吸氣面應遠離門，必須避免門開啟時外界溫暖的空氣直接被蒸發器吸入，否則將造成冷凍負載的增加。
3. 在使用多組蒸發器系統時，要注意避免蒸發器之間的氣流互相干擾，造成系統效能無法如預期設計。

在安裝前務必與系統設計者和使用者確認位置，以獲得蒸發器的最佳安裝位置。



HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual



Caution !

Aloft working must be executed under local safety regulation!



注意！

高空作業必須依照當地安全法規執行！

3.3 Locate

Before working, **MUST CHECK every safety facility** and should follow local regulation about aloft work.

- Place 1/2" thread rods at planned positions.
- If lift the unit cooler by forklift, do place the unit cooler on pallet and fix it well with soft pad. **DO NOT PRESS** the drain pan. (Drain pan is to collect condensate water, not for structure purpose!)
- Lift the unit cooler to correct position, fasten it with nuts.
- Adjust level to make sure condensate water will flow into the drain line.

3.4 Drain Line

In order to drain water from drain pan, drain line should be pitched in adequate slope. The drain line should be pitched at 25mm per 300mm.

The drain line should be insulated and sealed where it passes through the wall.

In order to prevent outdoor air coming from drain line, must have a trap outside. The height of U trap must be greater than the negative fan pressure.

3.3 定位

在作業前必須要檢查每一項安全措施同時必須依照當地高空作業法規執行。

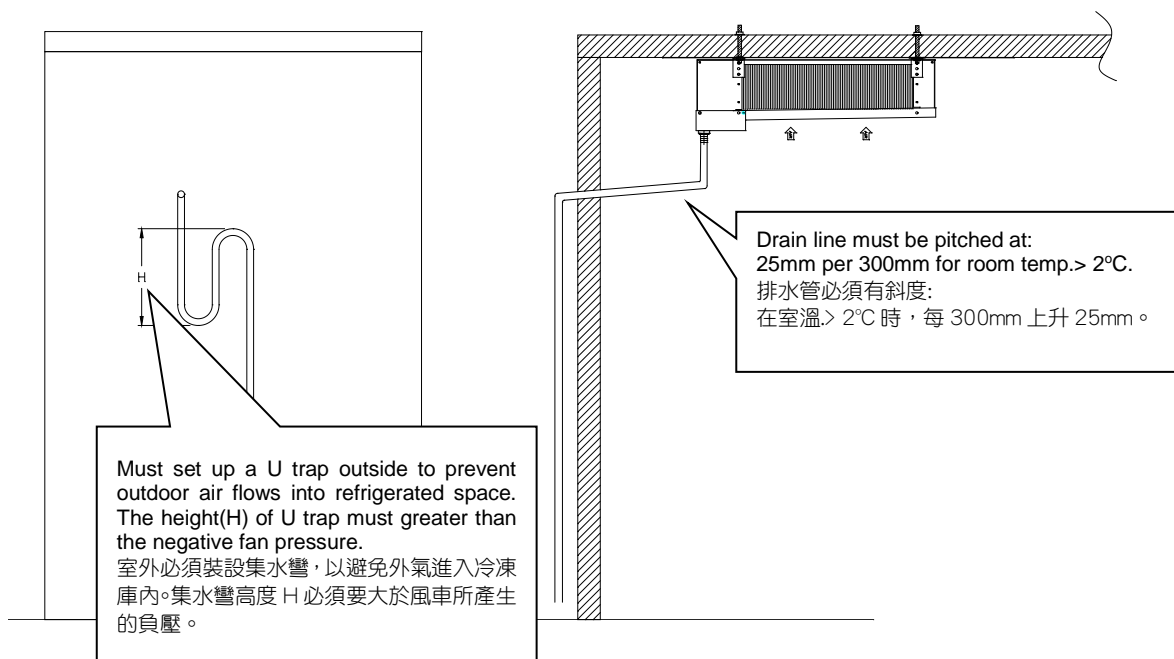
- 於預定吊掛位置安置 1/2" 牙條。
- 如果使用堆高機進行吊掛蒸發器時，將蒸發器底部以軟布或保麗龍保護固定於棧板上。**注意！請勿壓傷集水盤！**(集水盤僅用來收集冷凝水，並非結構的一部分！)
- 將蒸發器升高至所要安裝的位置，以螺帽固定。
- 調整水平確保冷凝水可以順利由集水盤排到排水管。

3.4 排水管

為了確保水盤的水能順利排出，排水管配置時必須要有適當的斜度。如果排水管傾斜度應為每 300mm 升高 25mm。

穿過庫體的排水管應做保溫及密封。

為避免外氣經由排水管進入，在外側的排水管應做適當的集水彎。集水彎高度必須高於風車所產生的負壓。



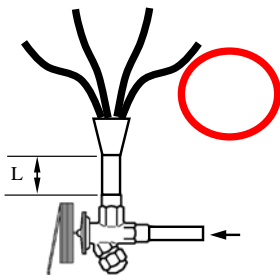
3.5 Expansion valve installation

Please follow instruction from expansion valve maker to select a suitable expansion valve.

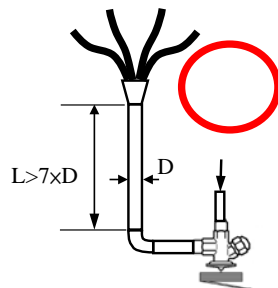
In order to make sure the expansion valve function well and to get smooth refrigerant flow, please do follow the rules described below:

- The distance (L) between expansion valve and distributor is as short as possible.
- If there is a turn between expansion valve and distributor, there should be a straight tube (L) longer than 7 times of the tube diameter before entering distributor. Thus will keep the refrigerant distribute well in distributor.
- Keep connection tube between expansion valve and distributor as vertical to ceiling of unit cooler as possible. Do not incline the tube to avoid the separation of vapor and liquid refrigerant that will cause bad flow distribution in coil.
- Don't change tube from small to a bigger diameter one suddenly before entering distributor. Any sudden enlargement in this connection tube will cause refrigerant flash. It will reduce capacity because of the flash gas blocks refrigerant flow.
- The thermal bulb of thermal expansion valve must be placed at the upstream of external equalizer line connection on suction line. This will avert liquid refrigerant drops from equalizer line affecting the function of the thermal bulb. The thermal bulb must has a good contact with refrigerant line for a quick response.
- If the valve is brazing type, please use wet clothing to protect valve from overheating during brazing.

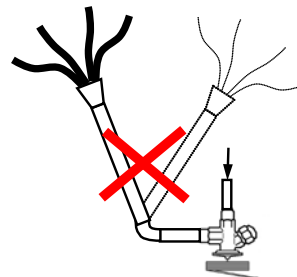
Warning! If use a interchangeable orifice type, make sure the orifice is correct before install.



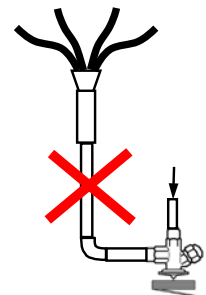
L distance is as short as possible.
L距離越短越好。



L must be greater than 7 times of Tube diameter after a turning.
管路轉彎後L距離至少要大於7倍管徑。



Connection tube between valve and distributor must be kept vertically.
閥與分佈器間的接管必須保持垂直。



No diameter change in this connection line.
接管不可有管徑變化情形。

3.5 膨脹閥的安裝

請依照膨脹閥製造商的說明選擇合用的膨脹閥。

為了確保膨脹閥正常動作並獲得平穩的冷媒流量，請依照以下準則裝配膨脹閥。

- 膨脹閥與分佈器間的距離(L)越短越好。
- 如果膨脹閥與分佈器間管路有轉彎時，在進入分佈器之前至少有一個直管段(L)，其長度至少要為7倍的管徑。如此才能確保冷媒在分佈器內均勻分布。
- 確保膨脹閥與分佈器間的管路要垂直於蒸發器的上板，不要將管路傾斜以避免冷媒液氣分離造成分佈不平均。
- 在進入分佈器前的配管管徑不可突然由小變大，否則將發生冷媒閃變。一旦發生閃變將會阻擋冷媒流量造成系統能力下降。
- 使用感溫式膨脹閥時，感溫泡必須位於外均壓管的上游處。如此才能避免由外均壓管流過來的冷媒液滴影響到感溫泡的溫度感應。為了獲得迅速的反應，感溫泡必須與冷媒管有良好的接觸，利用高熱傳導材質將感溫泡與冷媒管固定。
- 如果膨脹閥屬於焊接式，焊接時請以濕布保護膨脹閥避免過熱。

注意：如使用可更換芯號的膨脹閥，在安裝前要確認膨脹閥的芯號與冷媒種類對應是否正確！

HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual

When installation job is done, the expansion valve should be set to correct super heat in test running. For the best performance of unit cooler and preventing liquid compressed in compressor, the super heat adjustment must be executed at the lowest evaporating temperature of system design value. For temperature difference between evaporating and room temperature at 6~7°C, adjust the super heat around 2.8~3.5°C. For temperature difference between evaporating and room temperature at 8°C, adjust the super heat around 5°C.

3.6 Refrigerant Piping

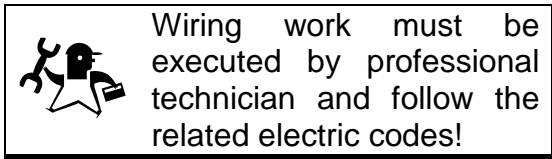
- * **Refrigerant piping must be done by professional technician and follow the national codes.**
 - * **If the suction line has to raise up over the unit cooler, the raising tube must connect an oil trap to make sure good oil return**
 - * **Horizontal suction line should pitch down from unit cooler to compressor. Suction line should be insulated to prevent condensate water.**
 - * **Refrigerant line should be as short as possible to reduce pressure drop.**
- a. In order to prevent moisture entering unit cooler, the unit cooler is sealed with pressurized dry gas. Before brazing the tube, open service valve for exhausting sealed gas. **Be careful for the ejected gas. Take personal safety protecting equipment while working.**
 - b. When the unit cooler reaches to the zero pressure status, deburr the tube ends and expand the tube for brazing. For the good cleanness inside the system, use dry nitrogen to purge the oxygen out. This will prevent forming oxide inside during brazing.
 - c. When finish connecting all the components, perform leak test and vacuuming. Make sure there is no leak and reach the vacuum level required. It's important for steady system operating.

在安裝完成後，膨脹閥必需要調整達到系統所要的過熱度。為獲得完整的蒸發器能力，在系統操作的最低蒸發溫度下將膨脹閥調整適當的過熱度。建議在 6~7°C T.D.的系統調整到 2.8~3.3°C 的過熱，在 8°C T.D.的系統 調整到 5°C 的過熱。

3.6 冷媒配管

- ※配管必須符合國家相關法規與系統實際操作需求。並由專業技術人員執行。
 - ※如果吸氣管必須要拉高超過蒸發器組的連接位置時，升管的底部必須要接一個集油彎，解決回油問題。
 - ※水平的吸氣回管應由蒸發器斜向壓縮機。吸氣管應做適當的保溫，避免產生冷凝水。
 - ※冷媒管路盡可能保持短，以降低管路壓損。
- a. 為確保蒸發器管路內部保持乾燥，出廠前內部會充填乾燥氣體。焊接前，請小心開啟維修閥，讓蒸發器內部氣體排出。注意!釋氣時應注意噴出氣體，工作時請穿戴個人安全防護裝備。
 - b. 當蒸發器達到零壓力後，開始進行銅管切口去毛邊與擴口準備焊接。為維持管內的潔淨，焊接前請先以氮氣掃除原管內的氧氣，焊接時請以微量氮氣充入管內進行焊接，以避免管內氧化!
 - c. 當連接完成所有的管路後，進行測漏與抽真空。確認系統無洩漏且達到所需要的真空度。此對於日後系統穩定運轉是十分重要。

3.7 Wiring



- Use the correct tool for wiring.
- Please select the correct electrical wire based on the rating current specified on the connection diagram. (Connection diagram is on the back of terminal box cover.)
- Connect fan motor(s) to power source, check if the rotation direction is correct.
- For safety reason, be sure to ground unit cooler.



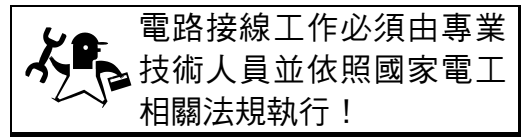
4. Test running and adjustment

4.1 Before start up

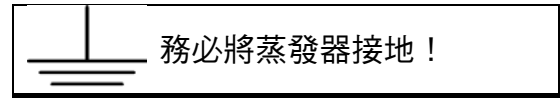
Before setting system into working, the following check list must be examined very carefully:

- Check fan support(s) is/are fastened firmly. All the screws are fixed. There is no loose part before running.
- Check the level of unit cooler is correct.
- Check all electric wirings are correctly connected and fastened tightly.
- Check the power source is correct. And the fan is in right rotation direction.
- Check the refrigerant piping is connected and all valves are in their positions. System is filled up suitable refrigerant quantity.
- If use the thermal expansion valve, please make sure the thermal bulb is well strapped. Insulate the thermal bulb from being affected by surrounding temperature.

3.7 電路接線



- 請使用正確的工具進行接線。
- 請依照接線圖上所標示的額定運轉電流選擇適當的電線規格。(接線圖位於端子盒蓋背面。)
- 將馬達與電源接妥，並測試馬達轉向是否正確。
- 為了安全起見，務必將蒸發器接地。



4. 試車與調整

4.1 啟動前檢查

在啟動系統之前，請仔細確認以下相關事項：

- 確認風車支架是否被牢固鎖定，所有的螺絲已被旋緊。運轉前確認無其他鬆動零件。
- 檢查蒸發器的水平是否正確。
- 檢查所有電線是否正確連接且已鎖緊。
- 檢查供電電源是否正常，確認風扇轉向正確。
- 確認冷媒管路已連接妥當，所有的閥都在正確的位置。系統已充填適當的冷媒量。
- 如使用感溫膨脹閥，檢查感溫泡是否正確固定。感溫泡需進行保溫以免周圍的溫度影響到感溫泡的感應。

HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual

4.2 Check and adjust while running

In order to keep system in steady running, must adjust well in test running, the following check list must be examined and adjusted with patience.

- *Check oil level, if too low add adequate oil to standard oil level. If system is equipped with high pressure side oil separator, there is no oil return at high temperature but oil returns at low temperature. Do check the capacity of oil separator if it is too small.
- *Check if expansion valve functions well, if superheat is too high, that will reduce the refrigerant circulated quantity. The system capacity will be constrained. Low or no super heat will have risk of liquid compressing in compressor. If the expansion valve is hunting, check installation of thermal bulb and insulate thermal bulb.
- *Check sight glass of liquid line. The liquid must be full at the rating operation.
- *Check drain line, make sure condensate water could be drained out from drain pan.
- *Check the distribution of frost. Frost must be very uniform on suction face of unit cooler. If frost distribution is uneven, make sure the distance between wall and suction face is enough and also check the entering refrigerant line is vertical. Do prevent outdoor air coming from the drain line.

5. Maintenance

In order to keep unit cooler in a good condition, you have to check the unit cooler periodically. The following items must be done for check.

- a. Clean the fins periodically for retaining performance. Use clean water to wash fins. Water pressure must be lower than 4 bars. Be careful not to damage the fins, otherwise it will block air flow. Use fin comb to straighten the damaged fin. If needed, use neutral detergent to clean the coil. Must rinse the coil till no residue left.
- **If unit cooler is coated with EnergyGuard, please follow instruction of EnergyGuard!****
- b. Clean drain pan and drain line to avoid clogging.
 - c. Clean fan blades and air streamer fan guard. If fan blades are damaged or bent, replace with new ones.
 - d. Check every electrical connection is fastened. Also check if there is any current leakage, find out the problem and fix it.
 - e. Check fan motor if there is any noise. If so, fix it or replace it.

4.2 運轉時的檢查與調整

為確保系統能穩定運轉，試車時必須要仔細調校，以下的檢查項目在試車過程中必須要耐心觀察與調整。

- *檢查油位，如果油位過低加入適量的冷凍油至標準油位。如果系統裝有高壓側油分離器，在高溫段不回油低溫段才回油的情形，請檢查油分離器的能力是否過小。
- *檢查膨脹閥的動作是否正常，如果過熱度太大，則將降低冷媒的流量導致系統能力受限。如果過熱度太小將造成液壓縮的危險。如果膨脹閥不斷的開關關，檢查感溫泡的安裝是否正確，並將感溫泡予以保溫。
- *檢查液管的視窗，在額定運轉時視窗必須呈現滿溢情形。
- *檢查排水管是否順暢，冷凝水必須很容易由排水盤排出。
- *檢查結霜是否正常。霜必須要均勻分佈在蒸發器的回風面，如果分佈不均，請檢查牆壁與回風面的距離是否足夠，進入蒸發器的冷媒管是否垂直。避免外氣由排水管進入。

5. 保養

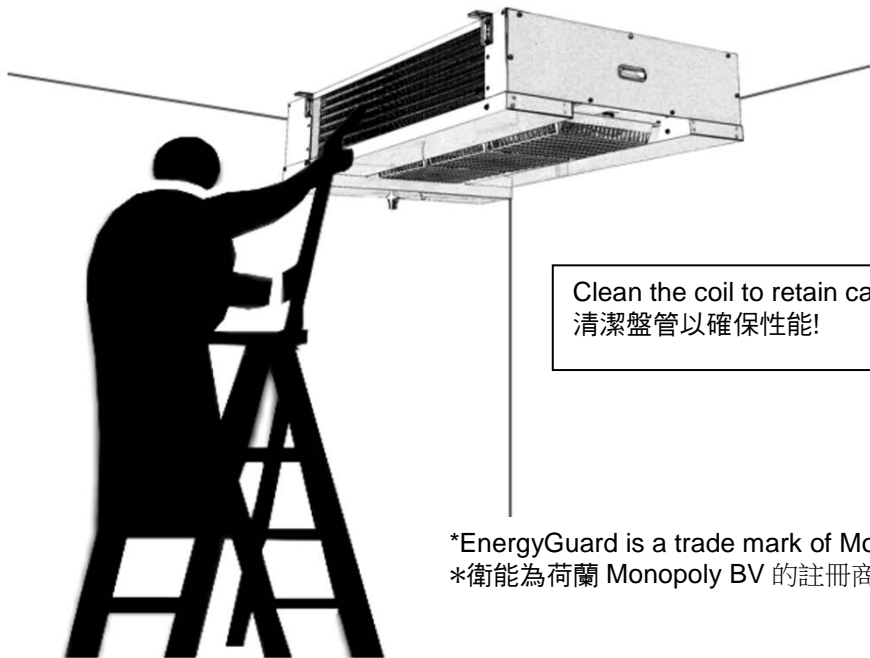
為確保蒸發器維持良好的運轉狀態，請定期檢查並保養蒸發器。

- a. 定期清潔鰭片確保熱傳效能的維持。使用清水清潔鰭片，水的壓力必須要低於 4 bar。清潔時要注意不可以損壞鰭片，以免阻擋氣流通道。使用鰭片梳將傾倒的鰭片梳直。必要時使用中性清潔劑清洗盤管，清洗後務必潤洗乾淨至無殘留物留在熱交換器上。
**** 如果蒸發器已進行衛能防蝕處理，請依照衛能保養說明進行清潔！ ****
- b. 清潔排水盤與排水管避免發生阻塞。
- c. 清潔扇葉與導風罩。如果扇葉受損或彎曲請更換新的扇葉。
- d. 檢查電氣接點是否鬆脫，鎖緊鬆脫的部分。同時檢查是否有漏電的情形，如有請找出原因並予以修復。
- e. 檢查風扇馬達是否有異音，如有請修復或是更換馬達。

HCT 系列蒸發器安裝與操作說明

HCT Series User's Manual

- f. Check every screw and bolt, if there is any loose part, fasten it.
 - g. Check tubes and brazed parts of unit cooler if there is any stain or spot. If there is any corrosion happened, do remove the aggressive material(s), and check if there is any leak.
 - h. If equipped with air filter, clean the filter to avoid air flow blocked.
- f. 檢查所有的螺絲與螺栓，如果有鬆脫部分請鎖緊。
 - g. 檢查蒸發器的管路與焊接點是否有銹點與污斑。如果發生鏽蝕情形，請將腐蝕性物質移離，並檢查系統是否洩漏。
 - h. 如果裝有濾網，請清潔濾網以避免氣流受阻。



*EnergyGuard is a trade mark of Monopoly BV, Holland
*衛能為荷蘭 Monopoly BV 的註冊商標!

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HCT Series User's Manual

1. Trouble shooting

| Symptoms | Possible causes | Correction |
|-------------------------------|---|---|
| No condensate water or frost | <ol style="list-style-type: none"> 1. Super heat is too high. 2. Insufficient refrigerant. 3. Room humidity is too low. | <ol style="list-style-type: none"> 1. Adjust super heat to correct value. 2. Add refrigerant. 3. Check design point. |
| Fan speed is too low | <ol style="list-style-type: none"> 1. Motor is out of order. 2. Incorrect power source. | <ol style="list-style-type: none"> 1. Replace a new one. 2. Check the power source and fix it. |
| Fan does not run | <ol style="list-style-type: none"> 1. Control component(s) broken. 2. Motor is out of order. 3. Stuck. | <ol style="list-style-type: none"> 1. Check the control circuit, replace the broken component(s). 2. Replace a new one. 3. Remove obstacle(s). |
| Uneven frost distribution | <ol style="list-style-type: none"> 1. The entering refrigerant line after expansion valve is not vertical. 2. Distributor is clogged. | <ol style="list-style-type: none"> 1. Keep the line as vertical as possible. 2. Clean or change the distributor. |
| Fan is running but no air out | <ol style="list-style-type: none"> 1. The filter is contaminated or blocked. | <ol style="list-style-type: none"> 1. Clean or change the filter. |

6. 故障排除

| 現象 | 可能原因 | 處理方法 |
|----------|--|---|
| 沒有冷凝水或霜 | <ol style="list-style-type: none"> 1. 過熱度太大 2. 冷媒不足 3. 庫內溼度過低 | <ol style="list-style-type: none"> 1. 調整過熱度到正確值。 2. 添加冷媒。 3. 檢查設計點。 |
| 風扇轉速太慢 | <ol style="list-style-type: none"> 1. 馬達故障 2. 供應電源不正確 | <ol style="list-style-type: none"> 1. 更換新馬達。 2. 檢查電源並予以修正。 |
| 風扇不運轉 | <ol style="list-style-type: none"> 1. 控制元件故障 2. 馬達故障 3. 扇葉卡住 | <ol style="list-style-type: none"> 1. 檢查控制迴路並更換損壞零件。 2. 更換新馬達。 3. 移除障礙物。 |
| 霜分佈不均 | <ol style="list-style-type: none"> 1. 膨脹閥到蒸發器間管路歪斜 2. 分佈器阻塞 | <ol style="list-style-type: none"> 1. 儘可能將該管路保持垂直。 2. 清潔或更換分佈器。 |
| 風扇運轉但無風量 | <ol style="list-style-type: none"> 1. 過濾網髒污或阻塞 | <ol style="list-style-type: none"> 1. 清潔或更換濾網。 |

Memo 備忘

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I-Cherng Refrigeration Industrial Co., Ltd.

一丞冷凍工業股份有限公司

Heat Exchanger Taiwan 熱交換器 台灣製造

No.12 Chu Kuang 1st St., Daliao Dist.,

Kaohsiung City, 83164, Taiwan

台灣高雄市大寮區莒光一街 12 號

Tel:07-7873666 Fax:07-7872999

Website: www.icherng.com.tw

Email: icherng.com@msa.hinet.net