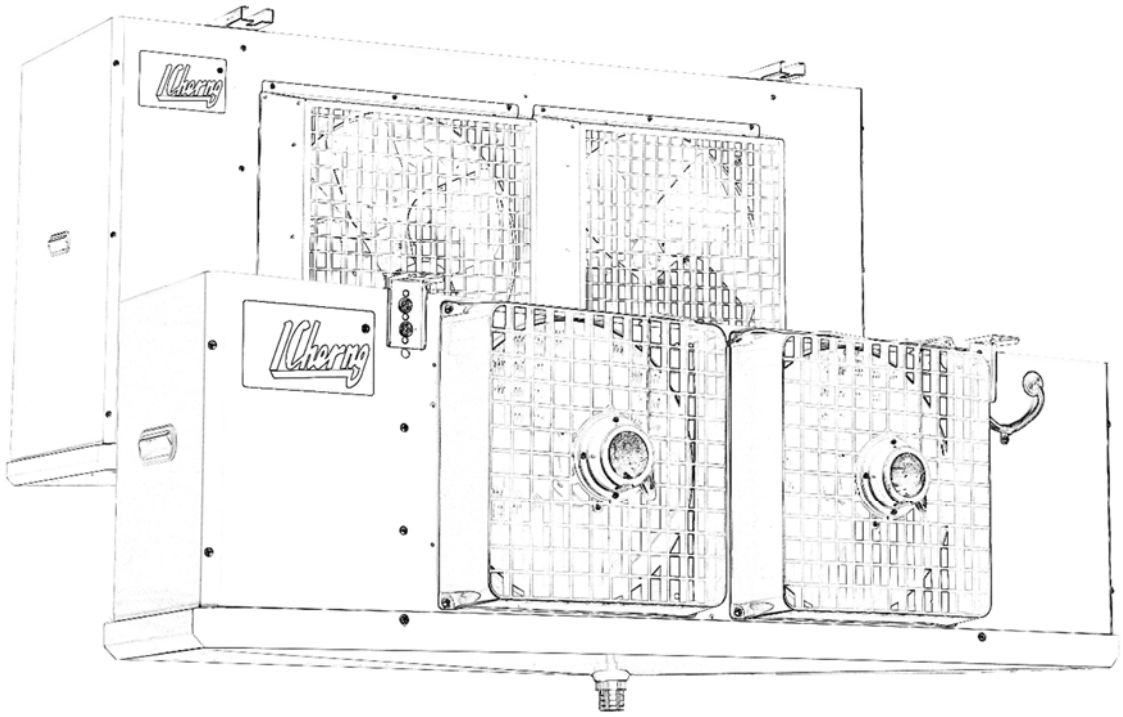
ET 系列蒸發器安裝與操作說明
ET Series User's Manual



ICherng®

Catalog 目錄

1. Check on delivery

When receive products, 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 the delivery note. If possible, take photos on damaged part and send the 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 used 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 the cooler is disconnected from system, please seal the unit cooler with dry nitrogen.

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

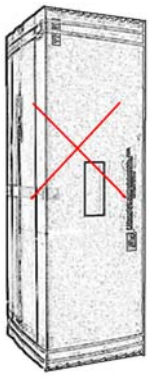
警告！勿將產品倒置或是垂直放置，否則將造成板金受損！
請勿放置任何重物於本產品上！
請勿坐或站立於本產品上！
請勿過度堆疊本產品！

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。

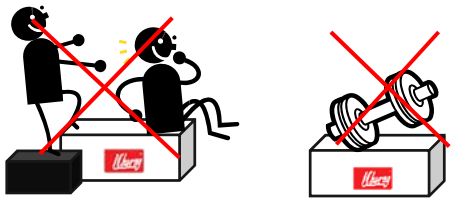
如果蒸發器已經運轉過，在某些情形下必須要將蒸發器取下或是將系統關閉一段長時間，請在儲存前將鰭片與水盤乾燥。如果蒸發器由系統拆下，請將蒸發器以乾燥氮氣封存。

Incorrect storage way could lead to the casing damage!
放置方法錯誤將導致產品箱體受損！

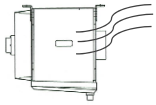
Do NOT place container upside down!
請勿將箱體倒置！



Do NOT place container vertically!
請勿將箱體垂直放置！



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！

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

Installation work must be executed by professional technician！

銳利邊緣危害！
在取出本產品或安裝本產品請戴防護手套！

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 with drain pan up. While take out the unit cooler, DO NOT put drain pan side directly on the ground. If need to put the unit cooler on the ground, please keep it upside down (drain pan side up). 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 using copper tube cutter to cut the inlet/outlet tubes before connection, do watch out the gas blowout.

All the packing materials disposal must meet local regulation.

3. 安裝

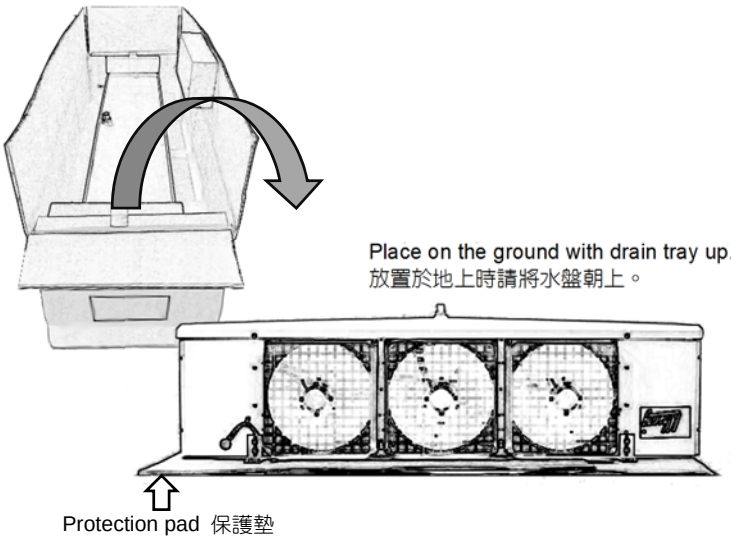
3.1 取出產品

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

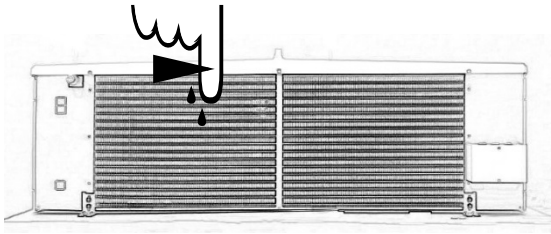
蒸發器是以水盤在上的方式包裝於紙箱中，取出蒸發器後，請勿將水盤側直接放置於地面上。如需要放置於地面上時，請維持上下倒置的狀態(水盤朝上)。為保護本產品的箱體，放置時請於下方放置一個保護墊(如瓦楞紙板)。

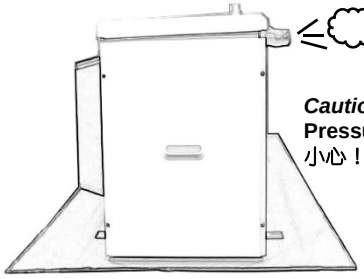
所有的蒸發器在裝運前內部皆有充填氣體維持正壓，以避免水氣進入管路內部。在連接管路前以切管刀切割出入管時，請注意管內部氣體噴出。

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! 請注意鰭片的銳利邊緣！





Caution!
Pressurized Gas Inside!
小心！內封加壓氣體！

3.2 General rules for positioning unit cooler

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

1. The distance between suction side and the wall must be greater than a diameter of fan. This will provide uniform air distribution on suction side. If unit cooler is placed too close to the wall, it will form a still place in the upper part between wall and unit cooler. This will reduce capacity of unit cooler and also lead to uneven frost distribution on coil (at low temperature application). Also reserve the work space for connecting the electric wires into terminal box.
   For low temperature application, please reserve more than 30cm at two ends for replacing heater.
2. The suction side must be away from door. Have to avoid the outdoor air being sucked directly into the unit cooler while door opened, otherwise it will accumulate heavy frost on coil surface. Thus will block air flow tunnel of unit cooler very soon.
3. Make sure there is no obstacle in front of fan(s). Must reserve space to build up better air circulation. If air flow is blocked, it could lead to a short circuit at air side that will reduce the system capacity.
4. When install multi-unit coolers system, do avoid the air flow interference between unit coolers.

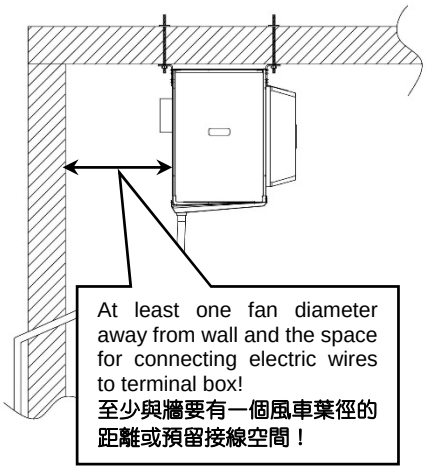
Before installation, check the position with designer or customer to find the most suitable place for the unit cooler.

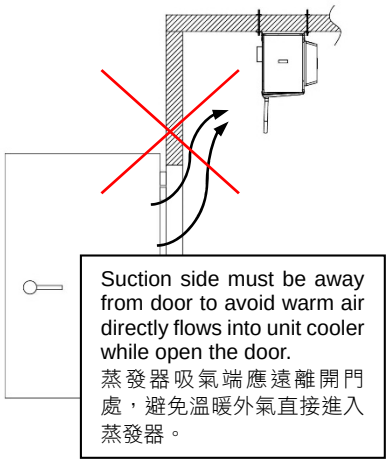
3.2 安置蒸發器的通則

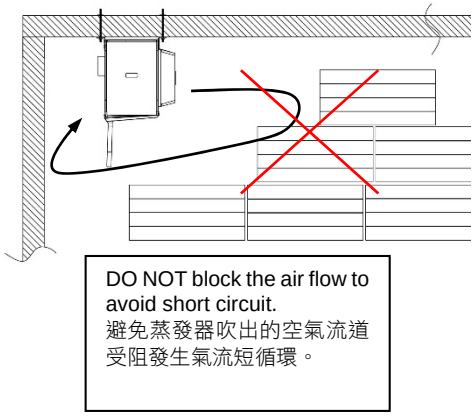
為了確保蒸發器能發揮最大的效能，必須要將蒸發器裝置在正確的位置。在選擇安裝位置時，必須要遵守以下的通則：

1. 蒸發器吸氣面與牆之間的距離至少必須要大於該蒸發器的風車葉徑，並預留連接電線到接線盒的作業空間。這樣才能確保蒸發器迎風面有均勻的氣流。如果蒸發器離牆太近，在牆與蒸發器的上方空間會形成一個氣流停滯區，將造成蒸發器的效能下降同時盤管面上也會有霜分佈不均勻的情形(低溫應用時)。**低溫應用時，左右端至少應留30cm 以利更換除霜電熱。**
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，否則將造成盤管面累積厚重的霜層，迅速造成氣流通道阻塞。
3. 確保蒸發器在使用時風車的前方無任何障礙物，並確保有足夠的預留空間形成良好的氣流循環。如果蒸發器的出風處被阻擋，氣流很可能形成短循環，降低整體系統效能。
4. 在使用多組蒸發器系統時，要注意要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。







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 abut aloft working.

a. Place 1/2" thread rods at planned positions.
b. 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 or defrosting water, not for construction!)
c. Lift the unit cooler to the position, fasten it with nuts.
d. Adjust level to make sure condensate water or defrosting water will flow to the drain line.

3.4 Drain Line

In order to drain water from drain pan, drain line should be pitched in adequate slope. If room temperature is below 2ºC, the drain line should be pitched at 100mm per 300mm. When room temperature is above 2ºC, the drain line should be pitched at 25mm per 300mm.

For frozen condition, should install drain line heater (prepared by user) and insulate the drain line to prevent water frozen in pipe. Must turn on this heater all the time. While using drain line heater, metal tube should be used in this condition.

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。

a. 於預定吊掛位置安置 1/2"牙條。
b. 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或除霜水，並非結構的一部分！)
c. 將蒸發器升高至所要安裝的位置，以螺帽固定。
d. 調整水平確保冷凝或除霜水可以順利由集水盤排到排水管。

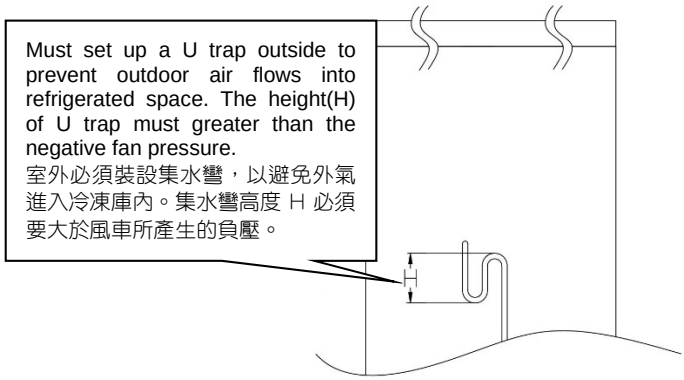
3.4 排水管

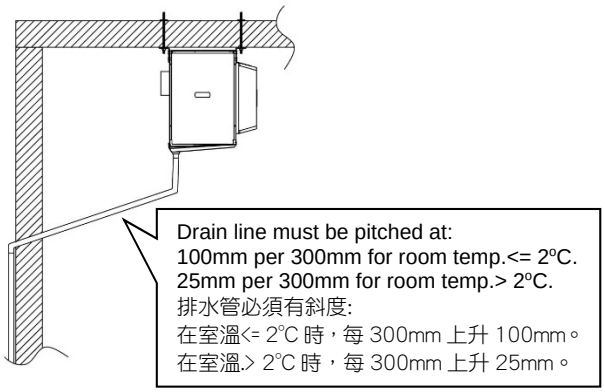
為了確保水盤的水能順利排出，排水管配置時必須要有適當的斜度。如果排水管在低於2℃的室溫時，其傾斜度應為每 300mm 升高 100mm。反之，在高於2℃的環境中，其傾斜度應為每 300mm 升高 25mm。

在有凍結的狀況時，必須要裝設排水管電熱(使用者自備)並予以保溫，避免發生管路結冰的情形。且必須保持該電熱在常開。使用排水管電熱時，務必選用金屬排水管。

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 the instruction of the 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:

a. The distance (L) between expansion valve and distributor must be as short as possible.
b. 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 refrigerant distribute well in distributor.
c. Keep connection tube between expansion valve and distributor as vertical to the 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.
d. 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.
e. 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 from affecting the function of the thermal bulb. The thermal bulb must has a good contact with refrigerant line for a quick response.
f. If the valve is brazing type, please use the wet clothing to protect valve from overheating during brazing.

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

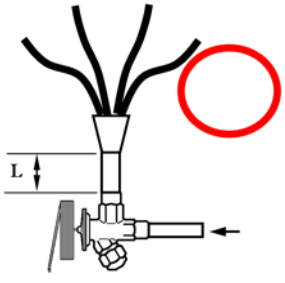
3.5 膨脹閥的安裝

請依照膨脹閥製造商的說明選擇合用的膨脹閥。

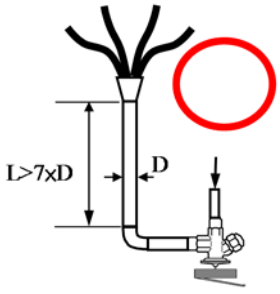
為了確保膨脹閥正常動作並獲得平穩的冷媒流量，請依照以下準則裝配膨脹閥。

a. 膨脹閥與分佈器間的距離(L)越短越好。
b. 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。
c. 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。
d. 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。
e. 使用感溫式膨脹閥時，感溫胞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胞的溫度感應。為了獲得迅速的反應，感溫胞必須與冷媒管有良好的接觸，利用高熱傳導材質將感溫胞與冷媒管固定。
f. 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。

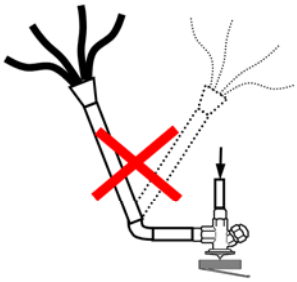
注意：如使用可更換芯號的膨脹閥，在安裝前要確認膨脹閥的芯號與冷媒種類對應是否正確！



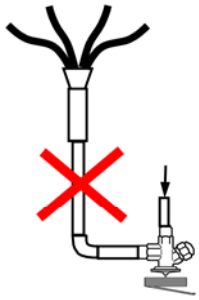
L distance is as short as possible.
L距離越短越好。



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

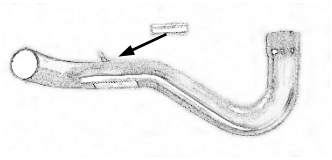


Connection tube between valve and distributor must be kept vertically.
閥與分佈器間的接管必須保持垂直。

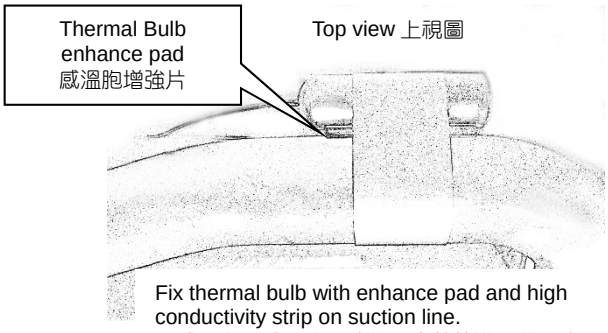


No diameter change in this connection line.
接管不可有管徑變化情形。

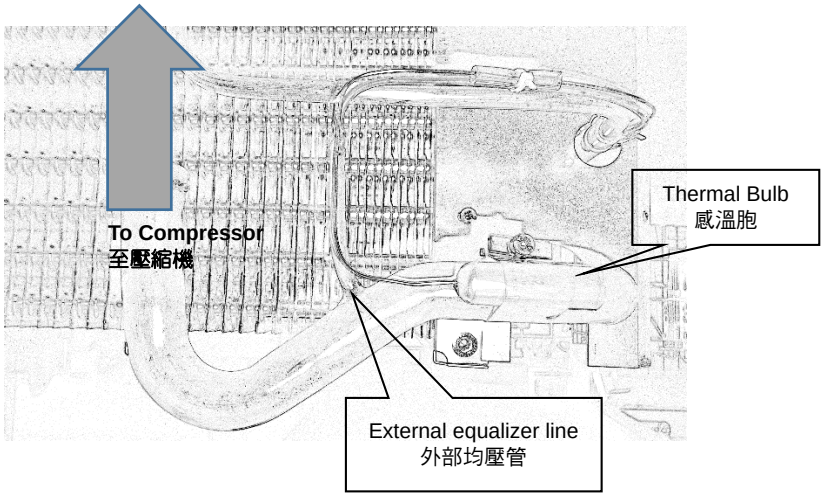
Thermal bulb enhance pad (Taped on oil trap)
感溫胞增強片(附在吸氣管集油彎上)



Suction line oil trap and thermal bulb enhance pad (come with unit cooler)
吸氣管集油彎與感溫胞增強片(隨蒸發器附送)



Fix thermal bulb with enhance pad and high conductivity strip on suction line.
將感溫胞以感溫胞增強片和高熱傳導束帶固定於吸氣管上



Place thermal bulb in front of external equalizer line to avoid liquid from external equalizer line interfering temperature detection of thermal bulb.
將感溫胞配置於外部均壓管的前方以避免由均壓管過來的液態冷媒影響到感溫胞的感應。

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 the 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 6~7ºC, adjust the super heat around 2.8~3.5 ºC. For temperature difference between evaporating and room temperature at 8ºC, adjust the super heat around 5 ºC.

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, raising tube must with 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.**

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℃T.D.的系統調整到 2.8～3.3℃的過熱，在 8℃T.D.的系統 調整到 5℃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。

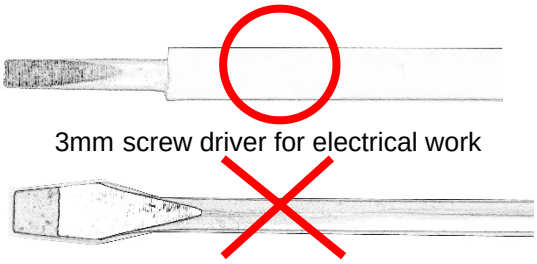
a. In order to prevent moisture entering unit cooler, the unit cooler is sealed with pressurized dry gas. Before brazing connection tube, use copper tube cutter to cut a slit for exhausting sealed gas. **Be careful for the ejected gas or tube scraps. Wear personal safety protecting equipment while working.**
b. When the unit cooler reaches to the zero pressure status, deburr the tube ends and expand tube end 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 required vacuum level. It's very important for steady system operating.

3.7 Wiring

Wiring work must be executed by professional technician and follow the related electric codes!

a. Use correct tool for wiring.
b. Please select the correct electrical wire based on rating current specified on connection diagram. (Connection diagram is on the back of terminal box cover.)
c. Connect fan motor to power source, check if rotation direction is correct.
d. If model comes with defrosting heaters, wire the heaters as illustrated on wiring diagram.
e. For safety reason, be sure to ground unit cooler.

BE SURE TO GROUND UNIT COOLER!

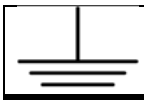


a. 為確保蒸發器管路內部保持乾燥，出廠前內部會充填乾燥氣體。焊接前，請用切管刀小心將銅管切開一個小縫，讓蒸發器內部氣體排出。**注意! 切管時應注意噴出氣體或銅管碎屑，工作時請穿戴個人安全防護裝備。**
b. 當蒸發器達到零壓力後，開始進行銅管切口去毛邊與擴口準備焊接。為維持管內的潔淨，焊接前請先以氮氣掃除原管內的氧氣，焊接時請以微量氮氣充入管內進行焊接，以避免管內氧化！
c. 當連接完成所有的管路後，進行測漏與抽真空。確認系統無洩漏且達到所需要的真空度。此對於日後系統穩定運轉是十分重要。

3.7 電路接線

電路接線工作必須由專業技術人員並依照國家電工相關法規執行！

a. 請使用正確的工具進行接線。
b. 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。)
c. 將馬達與電源接妥，並測試馬達轉向是否正確。
d. 如果為除霜電熱機種，請依照接線圖確實接線。
e. 為了安全起見，務必將蒸發器接地。

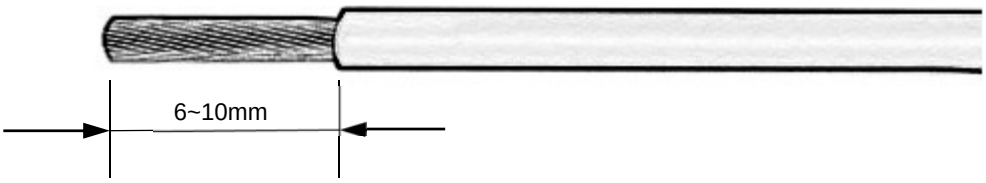


務必將蒸發器接地！

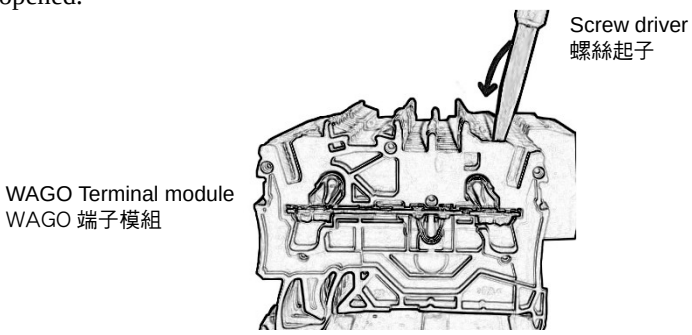
Do select the correct screw driver for connecting wire to terminals!
請選擇正確的工具以利連接電線的端子！

How to connect wire to WAGO* terminal modules 如何連接電線到 WAGO*端子模組

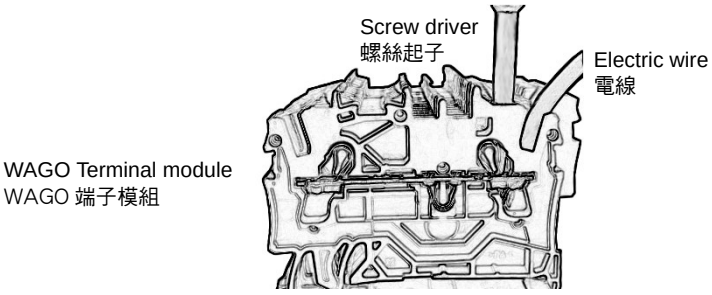
1. Strip wire to suitable length (6~10mm). 1.將電線剝線約 6~10mm。



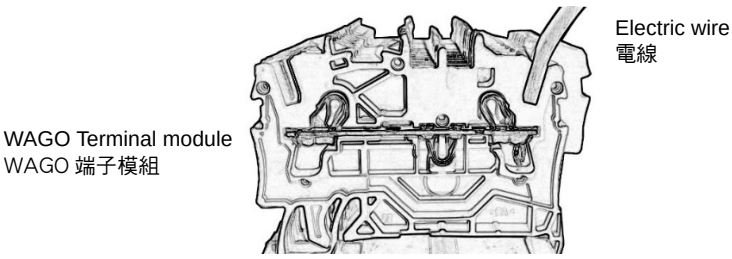
2. Use the flat screw driver insert into the clamp releasing hole. While screw driver inserted the clamp inside is opened. 2.利用扁平的螺絲起子插入電線夾持釋放孔，使內部彈簧夾開啟。



3. Insert the electric wire into the connection hole. 3.將電源線插入連接孔。



4. Remove screw driver, the wire is clamped. Check the wire if clamped firmly. 4.移離螺絲起子，電線即被夾緊。檢查電線是否被夾緊。

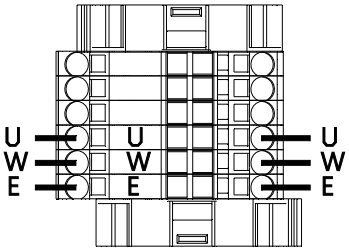


*WAGO is a trade mark of WAGO company. *WAGO 為德國 WAGO 公司的商標。

Wiring diagrams 接線圖

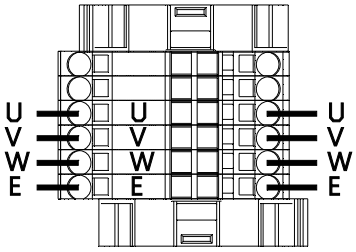
A. High temperature models(without heater) 冷藏系列(無電熱)

Single phase connection 單相接線



U,W/U,V,W: power source for fan motor
E: for Grounding
4x: reserved for solenoid valve

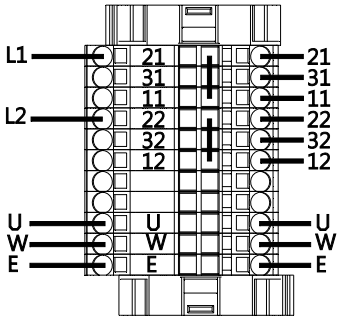
Three phase connection 三相接線



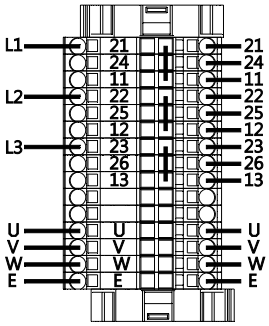
U,W/U,V,W 風車馬達電源
E 接地
4x:電磁閥預留接點

B. Low temperature models(with heater) 冷凍系列(有電熱)

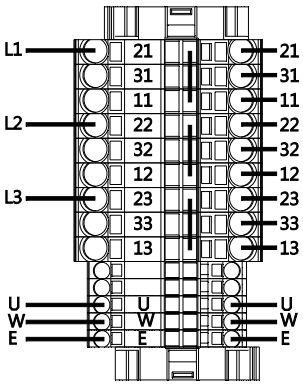
Both motor and heater are in single phase connection 馬達與電熱皆單相接線



Both motor and heater are in three phase connection 馬達與電熱皆三相接線



Motor in single phase and heater in three phase connection 馬達單相接線，電熱三相接線



Lx: power source for heaters
U,W/U,V,W: power source for fan motor
E : for Grounding
1x: fan guard heater
2x: defrost heater(/with drain pan heater)
3x: drain pan heater
4x: reserved for solenoid valve
1,2: reserved for drain line heater

Lx: 電熱電源接線
U,W/U,V,W: 風車馬達電源
E : 接地
1x: 風車框電熱
2x: 除霜電熱(/與水盤電熱)
3x: 水盤電熱
4X: 電磁閥預留接點
1,2: 排水管電熱預留接點

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 the electric wirings are correctly connected and fastened tightly.
- ☑ Check the power source is correct. And fan(s) is/are in right rotation direction.
- ☑ Check the refrigerant piping is connected and all valves are in right positions. System is filled up suitable refrigerant quantity.
- ☑ If use thermal expansion valve, please make sure thermal bulb is well strapped. Insulate the thermal bulb from being affected by surrounding temperature.

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 vale 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.

*For low temperature application, 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.

*Check defrosting control is OK. Optimum defrosting time must clear all the frost accumulated on unit cooler. Also check fail safe action works normally. Check the current of heaters, it should match with the value on label.

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，檢查感溫胞是否正確固定。感溫胞需進行保溫以免周圍的溫度影響到感溫胞的感應。

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開關關，檢查感溫胞的安裝是否正確，並將感溫胞予以保溫。

*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。

*低溫機種必須檢查結霜是否正常。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。

*檢查除霜控制是否正常，最佳的除霜時間必須要確保蒸發器的盤面上無霜殘留。並檢查除霜異常中止動作是否正常。檢查除霜電流是否與標示相符。

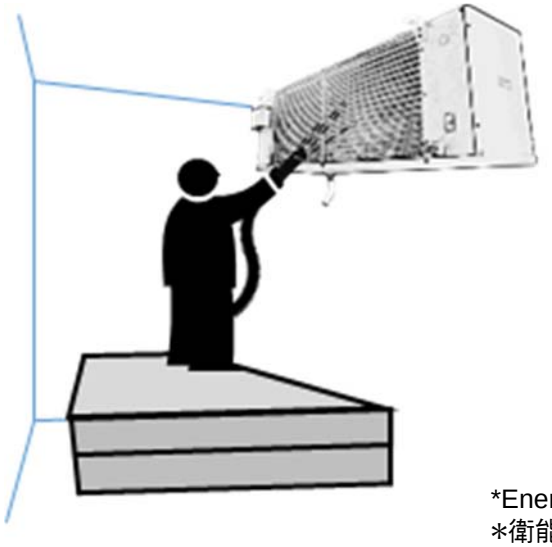
5. Maintenance

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 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 fins. If needed, use neutral detergent to clean the coil. Must rinse the coil till no residence 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.
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.



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。
f. 檢查所有的螺絲與螺栓，如果有鬆脫的部分請鎖緊。
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。

Clean the coil to retain capacity.
清潔盤管以確保性能!

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

6. Trouble shooting

Symptoms	Possible causes	Correction
No condensate water or frost	1. Super heat is too high. 2. Insufficient refrigerant. 3. Room humidity is too low.	1. Adjust super heat to correct value. 2. Add refrigerant. 3. Check design point.
Fan speed is too low	1. Motor is out of order. 2. Incorrect power source. 3. Air tunnel blocked by ice.	1. Replace a new one. 2. Check the power source and fix it. 3. Move the ice, check defrosting system.
Fan does not run	1. Defrosting is on. 2. Control component(s) broken. 3. Motor is out of order. 4. Stuck.	1. Wait till defrosting ends 2. Check the control circuit, replace the broken component(s). 3. Replace a new one. 4. Remove obstacle(s).
Ice built up at the bottom of coil	1. Outdoor air from drain line. 2. Drain line is blocked. 3. Insufficient distance between wall and unit cooler. 4. Drain pan heater(s) or heater(s) at bottom part is(are) broken. 5. Drain line heater is off or out of order 6. Defrosting time or cycle number is not enough.	1. Check height of drain line U trap is enough. 2. Clear the drain line. 3. Change the position of unit cooler. 4. Replace defective heater(s). 5. Check the drain line heater, it should be always on. If broken, replace a new one. 6. Extend the defrosting time or increase defrosting cycle number.
Uneven frost distribution	1. The entering refrigerant line after expansion valve is not vertical. 2. Distributor is clogged. 3. Defective heater. 4. Defrosting time or cycle number is not enough.	1. Keep the line as vertical as possible. 2. Clean or change the distributor. 3. Replace a new one. 4. Extend the defrosting time or increase defrosting cycle number.
Frost accumulated on ceiling around the unit cooler	1. Defrosting time is too long. 2. Defrosting control is out of order. 3. Incorrect power of heater. 4. Air leaking.	1. Reduce the defrosting time. 2. Check the defrosting control. 3. Change to correct heater. 4. Seal the leakage.

6. 故障排除

現象	可能原因	處理方法
沒有冷凝水或霜	1. 過熱度太大 2. 冷媒不足 3. 庫內溼度過低	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	1. 馬達故障 2. 供應電源不正確 3. 風道被冰阻塞	1. 更換新馬達。 2. 檢查電源並予以修正。 3. 清除結冰，並檢查除霜系統。
風扇不運轉	1. 除霜中 2. 控制元件故障 3. 馬達故障 4. 扇葉卡住	1. 等除霜終了。 2. 檢查控制迴路並更換損壞零件。 3. 更換新馬達。 4. 移除障礙物。
盤管底部結冰	1. 外氣由排水管進入 2. 排水管阻塞 3. 回風面與牆壁間的空間不足 4. 排水盤電熱或盤管底部電熱故障 5. 排水管電熱故障 6. 除霜時間或次數不足.	1. 檢查排水管 U 集水彎高度是否足夠。 2. 清潔排水管。 3. 變更蒸發器安裝位置。 4. 更換故障電熱。 5. 檢查排水管電熱，此電熱必須永遠維持加熱狀態，如故障請換新。 6. 延長除霜時間或增加次數。
霜分佈不均	1. 膨脹閥到蒸發器間管路歪斜 2. 分佈器阻塞 3. 電熱故障 4. 除霜時間或次數不足	1. 儘可能將該管路保持垂直。 2. 清潔或更換分佈器。 3. 更換故障電熱。 4. 延長除霜時間或增加次數。
霜聚集在蒸發器週遭的天花板	1. 除霜時間過久 2. 除霜控制故障 3. 電熱瓦數錯誤 4. 外氣滲入	1. 減少除霜時間。 2. 檢查除霜控制。 3. 更換正確瓦數電熱。 4. 密封洩漏處。

Replacing fan set (for 12" fan size series)　　風車組更換(12"扇葉系列)

Caution！
Please do DISCONNECT the main power line before replacing fan set!
Aloft working must be executed under local safety regulation!
Wiring work must be executed by professional technician and follow the related electric codes!

注意！
在更換風車組之前必須要將總電源關閉!
高空作業必須依照當地安全法規執行！
電路接線工作必須由專業技術人員並依照國家電工相關法規執行！

If fan is out of order, please follow the procedure listed below.　　如果風車故障時，請依照下述程序執行:

1. For security reason, TURN OFF SYSTEM and DISCONNECT the main power line before replacing fan.
   為確保安全，在更換風車組之前先將系統關閉並將主電源斷電。

2. The power supply line goes up to ceiling of unit cooler. Before dismounting the integral fan set, please find the power line on the fan guard.
   風車的電源供應線是向上走到蒸發器的上板，在卸下一體式風車組之前，請由導風罩上找到電源線。

3. Reserve suitable length of power line, then cut the power line.
   預留適當長度的電源線，將電線剪斷。

4. Remove four M5 screws of fan guard. Take the whole fan set down.
   將導風罩的四個固定螺絲卸下，將整組風車組拆下。

5. Change new fan set or replace broken motor only, fasten the fan set back on unit cooler. Drain hole of motor must face down!
   更換整組風車組或更換故障的馬達，再將風扇組鎖回蒸發器。注意馬達洩水孔必須朝下！

6. Cut the power line to suitable length, reconnect the power line. Use the cable ties to fix the power line on fan guard grid.
   將電源線剪短至適當長度,重連接電源線。使用束線帶將電源線固定在導風罩格網上。

Be careful, do not reserve long power line inside the fan guard to avoid interference with fan blades. Do remember to make the power line down first then up to motor. This will avoid the condensate water flowing into motor via power line.
注意，不要預留過長的電源線在導風罩內，以免造成與扇葉的干涉。請務必使電源線先向下再向上進入馬達，避免冷凝水沿線進入馬達。

7. Reconnect the main power, turn on the system.
   主電源送電，開啟系統。


Cut the power line near by motor.
剪斷靠近馬達電源線。


Unscrew 4 screws.
卸下 4 個固定螺絲。.


Reconnect power line and tie it on fan guard.
重接電源線並將電線固定於導風罩上。


Power line must be directed down first then up to motor.
電源線必須先向下再向上進入馬達。

Memo 備忘

Appendix 1

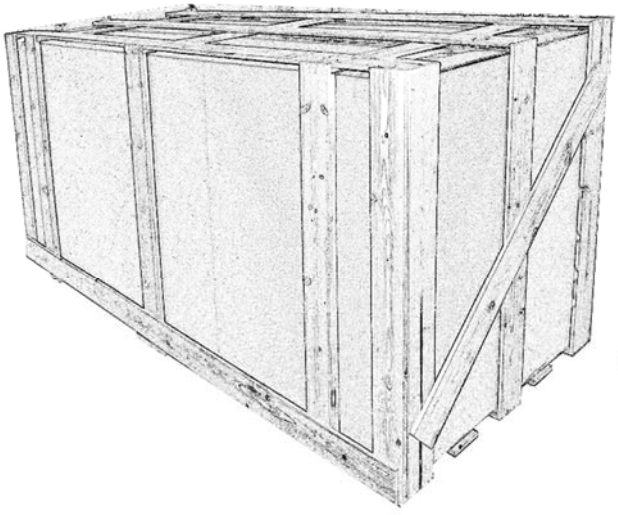
Stacking limitation (Outside Taiwan)

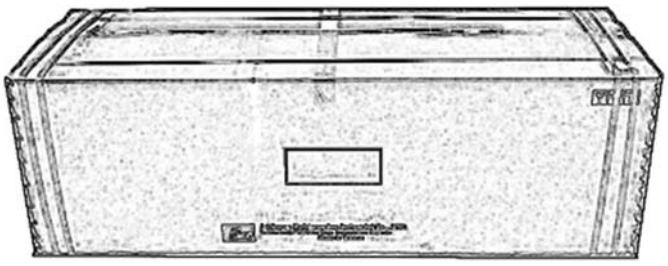
Models Series	Max. stocking Qty.
ET043/058/072	4
ET090/120/150	4
ET168/210	4
ET226/282	4
ET300	4
ET216/324	3
ET336	2
ET338/508	3
ET420	2
ET450	3
ET499	2
ET504	2
ET338/508	3
ET625	2
ET750	2

附錄 1

堆疊限制 (台灣本島使用)

系列機種	最大堆疊數量
ET043/058/072	3
ET090/120/150	3
ET168/210	3
ET226/282	3
ET300	3
ET216/324	2
ET336	2
ET338/508	2
ET420	2
ET450	2
ET499	2
ET504	2
ET338/508	2
ET625	2
ET750	2





Appendix 2 Replacement Parts 替換零件表

For High Temperature Application 冷藏用

Model No. 型號	Fan Set 風車組	Fan Guard 導風罩	Model No. 型號	Fan Set 風車組	Fan Guard 導風罩
ET043W1FX2	AASVH	--	ET324WBHX2	AARSM	--
ET058W1FX2	AASVH	--	ET336W2JX2	AASLK	AAHGP
ET072W1FX2	AASVH	--	ET336W2JX3	AAHXS	AAHGP
ET090W2FX2	AASVH	--	ET338W3HX2	AAHWO	--
ET108W1HX2	AAHWO	--	ET338W3HX3	AAHWQ	--
ET120W2FX2	AASVH	--	ET420W2JX2	AASLK	AAHGP
ET150S2FX2	AASVH	--	ET420W2JX3	AAHXS	AAHGP
ET150W2FX2	AASVH	--	ET450W4HX2	AAHWO	--
ET162W1HX2	AAHWO	--	ET499W3JX2	AASLK	AAHGP
ET168W3FX2	AASVH	--	ET499W3JX3	AAHXS	AAHGP
ET210W3FX2	AASVH	--	ET504W2JX2	AASLK	AAHGP
ET216W2HX2	AAHWO	--	ET504W2JX3	AAHXS	AAHGP
ET216WBHX2	AARSM	--	ET625W3JX2	AASLK	AAHGP
ET226W4FX2	AASVH	--	ET625W3JX3	AAHXS	AAHGP
ET282W4FX2	AASVH	--	ET750W3JX2	AASLK	AAHGP
ET300W5FX2	AASVH	--	ET750W3JX3	AAHXS	AAHGP
ET324W2HX2	AAHWO	--			

Fan Set Assembly 風車組

Fan Set 風車組	Motor 馬達	Fan Blade 扇葉	Motor Support 馬達網架
AASVH	AASEK	AASEQ	AASDW
AAHWO	AAROK	AADUN	AAHEX
AARSM	AAROK	AARPT	AAHEX
AASLK	AASUR	AAHAT	AAHJZ
AAHXS	AARUZ	AAHAT	AAHJZ
AAHWQ	AARVL	AADUN	AAHEX

For Low Temperature Application 冷凍用

Model No. 型號	Fan Set 風車組	Fan Guard 導風罩	Model No. 型號	Fan Set 風車組	Fan Guard 導風罩
ET043W1FU2	AASVH	--	ET324W2HV2	AAHWO	--
ET058W1FU2	AASVH	--	ET324W2HW2	AAHWO	--
ET072W1FU2	AASVH	--	ET324W2HW3	AAHWQ	--
ET090W2FU2	AASVH	--	ET324WBHU2	AARSM	--
ET090W2FUB	AASVH	--	ET324WBHW3	AASEH	--
ET090W2FV2	AASVH	--	ET336W2JU2	AASLK	AAHGP
ET108W1HU2	AAHWO	--	ET336W2JV2	AASLK	AAHGP
ET108WAHU2	AARSM	--	ET336W2JW3	AAHXS	AAHGP
ET120W2FU2	AASVH	--	ET338W3HU2	AAHWO	--
ET120W2FUB	AASVH	--	ET338W3HV2	AAHWO	--
ET120W2FW3	AARQH	--	ET338WCHU2	AARSM	--
ET150W2FU2	AASVH	--	ET420W2JU2	AASLK	AAHGP
ET150W2FUB	AASVH	--	ET420W2JV2	AASLK	AAHGP
ET150W2FW3	AARQH	--	ET420W2JW3	AAHXS	AAHGP
ET162W1HU2	AAHWO	--	ET450W4HU2	AAHWO	--
ET168W3FU2	AASVH	--	ET499W3JU2	AASLK	AAHGP
ET210W3FU2	AASVH	--	ET499W3JV2	AASLK	AAHGP
ET210W3FV2	AASVH	--	ET499W3JW3	AAHXS	AAHGP
ET216W2HU2	AAHWO	--	ET504W2JU2	AASLK	AAHGP
ET216W2HV2	AAHWO	--	ET504W2JV2	AASLK	AAHGP
ET216WBHU2	AARSM	--	ET504W2JW3	AAHXS	AAHGP
ET226W4FU2	AASVH	--	ET508W3HU2	AAHWO	--
ET226W4FV2	AASVH	--	ET625W3JU2	AASLK	AAHGP
ET226W4FW3	AARQH	--	ET625W3JV2	AASLK	AAHGP
ET282W4FU2	AASVH	--	ET625W3JW3	AAHXS	AAHGP
ET282W4FVB	AASVH	--	ET750W3JU2	AASLK	AAHGP
ET300W5FU2	AASVH	--	ET750W3JV2	AASLK	AAHGP
ET300W5FW3	AARQH	--	ET750W3JW3	AAHXS	AAHGP
ET324W2HU2	AAHWO	--			

Fan Set Assembly 風車組

Fan Set 風車組	Motor 馬達	Fan Blade 扇葉	Motor Support 馬達網架	Fan Set 風車組	Motor 馬達	Fan Blade 扇葉	Motor Support 馬達網架
AASVH	AASEK	AASEQ	AASDW	AARSM	AAROK	AARPT	AAHEX
AAHWO	AAROK	AADUN	AAHEX	AASEH	AARVL	AARPT	AAHEX
AAHWQ	AARVL	AADUN	AAHEX	AASLK	AASUR	AAHAT	AAHJZ
AAHXS	AARUZ	AAHAT	AAHJZ	AASVH	AASEK	AASEQ	AASDW
AARQH	AARYO	AASEQ	AASDW				

For Low Temperature Application 冷凍用

Defrosting Heater 除霜電熱

Model No. 型號	Defrosting Heater 除霜電熱	L Shape Fixing Plate L 型固定板	Heater clamp 電熱夾	Model No. 型號	Defrosting Heater 除霜電熱	L Shape Fixing Plate L 型固定板	Heater clamp 電熱夾
ET043W1FU2	AASVU	AASZZ	AARJL	ET324W2HV2	AASYP	AACQC	AARJL
ET058W1FU2	AASVU	AASZZ	AARJL	ET324W2HW2	AASYP	AACQC	AARJL
ET072W1FU2	AASVU	AASZZ	AARJL	ET324W2HW3	AASYP	AACQC	AARJL
ET090W2FU2	AATFM	AASZZ	AARJL	ET324WBHU2	AASYP	AACQC	AARJL
ET090W2FUB	AATFM	AASZZ	AARJL	ET324WBHW3	AASYP	AACQC	AARJL
ET090W2FV2	AATFM	AASZZ	AARJL	ET336W2JU2	AARUO	AACQC	AARJL
ET108W1HU2	AARUL	AACQC	AARJL	ET336W2JV2	AARUO	AACQC	AARJL
ET108WAHU2	AARUL	AACQC	AARJL	ET336W2JW3	AARUO	AACQC	AARJL
ET120W2FU2	AATFM	AASZZ	AARJL	ET338W3HU2	AARUQ	AACQC	AARJL
ET120W2FUB	AATFM	AASZZ	AARJL	ET338W3HV2	AARUQ	AACQC	AARJL
ET120W2FW3	AATFM	AASZZ	AARJL	ET338WCHU2	AARUQ	AACQC	AARJL
ET150W2FU2	AATFM	AASZZ	AARJL	ET420W2JU2	AARUO	AACQC	AARJL
ET150W2FUB	AATFM	AASZZ	AARJL	ET420W2JV2	AARUO	AACQC	AARJL
ET150W2FW3	AATFM	AASZZ	AARJL	ET420W2JW3	AARUO	AACQC	AARJL
ET162W1HU2	AARUL	AACQC	AARJL	ET450W4HU2	AASDR	AACQC	AARJL
ET168W3FU2	AARUO	AACQC	AARJL	ET499W3JU2	AATFU	AACQC	AARJL
ET210W3FU2	AARUO	AACQC	AARJL	ET499W3JV2	AATFU	AACQC	AARJL
ET210W3FV2	AARUO	AACQC	AARJL	ET499W3JW3	AATFU	AACQC	AARJL
ET216W2HU2	AASYP	AACQC	AARJL	ET504W2JU2	AARUO	AACQC	AARJL
ET216W2HV2	AASYP	AACQC	AARJL	ET504W2JV2	AARUO	AACQC	AARJL
ET216WBHU2	AASYP	AACQC	AARJL	ET504W2JW3	AARUO	AACQC	AARJL
ET226W4FU2	AARUQ	AACQC	AARJL	ET508W3HU2	AARUQ	AACQC	AARJL
ET226W4FV2	AARUQ	AACQC	AARJL	ET625W3JU2	AATFU	AACQC	AARJL
ET226W4FW3	AARUQ	AACQC	AARJL	ET625W3JV2	AATFU	AACQC	AARJL
ET282W4FU2	AARUQ	AACQC	AARJL	ET625W3JW3	AATFU	AACQC	AARJL
ET282W4FVB	AARUQ	AACQC	AARJL	ET750W3JU2	AATFU	AACQC	AARJL
ET300W5FU2	AASDR	AACQC	AARJL	ET750W3JV2	AATFU	AACQC	AARJL
ET300W5FW3	AASDR	AACQC	AARJL	ET750W3JW3	AATFU	AACQC	AARJL
ET324W2HU2	AASYP	AACQC	AARJL				

For Low Temperature Application 冷凍用

Drain Pan Heater 水盤電熱

Model No. 型號	Drain Pain heater 排水盤電熱	160mm fixture 固定夾	300mm fixture 固定夾	Model No. 型號	Drain Pain heater 排水盤電熱	160mm fixture 固定夾	300mm fixture 固定夾
ET043W1FU2	AASVU	AARJM	--	ET324W2HV2	AACUI	AARJM	--
ET058W1FU2	AASVU	AARJM	--	ET324W2HW2	AASYP	AARJM	--
ET072W1FU2	AASVU	AARJM	--	ET324W2HW3	AASYP	AARJM	--
ET090W2FU2	AATFM	AARJM	--	ET324WBHU2	AACUI	AARJM	--
ET090W2FUB	AATFM	AARJM	--	ET324WBHW3	AASYP	AARJM	--
ET090W2FV2	AATFM	AARJM	--	ET336W2JU2	AASGO	AARJM	--
ET108W1HU2	AACTG	--	AARLG	ET336W2JV2	AASGO	AARJM	--
ET108WAHU2	AACTG	--	AARLG	ET336W2JW3	AARUO	AARJM	--
ET120W2FU2	AATFM	AARJM	--	ET338W3HU2	AASGQ	AARJM	AARLG
ET120W2FUB	AATFM	AARJM	--	ET338W3HV2	AASGQ	AARJM	AARLG
ET120W2FW3	AATFM	AARJM	--	ET338WCHU2	AASGQ	AARJM	AARLG
ET150W2FU2	AATFM	AARJM	--	ET420W2JU2	AASGO	AARJM	--
ET150W2FUB	AATFM	AARJM	--	ET420W2JV2	AASGO	AARJM	--
ET150W2FW3	AATFM	AARJM	--	ET420W2JW3	AARUO	AARJM	--
ET162W1HU2	AACTG	--	AARLG	ET450W4HU2	AASDS	AARJM	AARLG
ET168W3FU2	AARUO	AARJM	--	ET499W3JU2	AATAC	AARJM	AARLG
ET210W3FU2	AARUO	AARJM	--	ET499W3JV2	AATAC	AARJM	AARLG
ET210W3FV2	AARUO	AARJM	--	ET499W3JW3	AATFU	AARJM	AARLG
ET216W2HU2	AACUI	AARJM	--	ET504W2JU2	AASGO	AARJM	--
ET216W2HV2	AACUI	AARJM	--	ET504W2JV2	AASGO	AARJM	--
ET216WBHU2	AACUI	AARJM	--	ET504W2JW3	AARUO	AARJM	--
ET226W4FU2	AARUQ	AARJM	--	ET508W3HU2	AASGQ	AARJM	AARLG
ET226W4FV2	AARUQ	AARJM	AARLG	ET625W3JU2	AATAC	AARJM	AARLG
ET226W4FW3	AARUQ	AARJM	AARLG	ET625W3JV2	AATAC	AARJM	AARLG
ET282W4FU2	AARUQ	AARJM	AARLG	ET625W3JW3	AATFU	AARJM	AARLG
ET282W4FVB	AARUQ	AARJM	AARLG	ET750W3JU2	AATAC	AARJM	AARLG
ET300W5FU2	AASDR	AARJM	AARLG	ET750W3JV2	AATAC	AARJM	AARLG
ET300W5FW3	AASDR	AARJM	AARLG	ET750W3JW3	AATFU	AARJM	AARLG
ET324W2HU2	AACUI	AARJM	--				

For Low Temperature Application 冷凍用

Fan Guard Heater 風車框電熱

Model No. 型號	Fan Guard Heater 風車框電熱	Heater Fixture 電熱固定	Model No. 型號	Fan Guard Heater 風車框電熱	Heater Fixture 電熱固定
ET043W1FU2	AACSL	AACPZ	ET324W2HV2	AASHE	AACPZ
ET058W1FU2	AACSL	AACPZ	ET324W2HW2	AASFP	AACPZ
ET072W1FU2	AACSL	AACPZ	ET324W2HW3	AASFP	AACPZ
ET090W2FU2	AACSL	AACPZ	ET324WBHU2	AASHE	AACPZ
ET090W2FUB	--	--	ET324WBHW3	AASFP	AACPZ
ET090W2FV2	AACSL	AACPZ	ET336W2JU2	AARTP	AACPZ
ET108W1HU2	AASHE	AACPZ	ET336W2JV2	AARTP	AACPZ
ET108WAHU2	AASHE	AACPZ	ET336W2JW3	AARTQ	AACPZ
ET120W2FU2	AACSL	AACPZ	ET338W3HU2	AASHE	AACPZ
ET120W2FUB	--	--	ET338W3HV2	AASHE	AACPZ
ET120W2FW3	AACSL	AACPZ	ET338WCHU2	AASHE	AACPZ
ET150W2FU2	AACSL	AACPZ	ET420W2JU2	AARTP	AACPZ
ET150W2FUB	--	--	ET420W2JV2	AARTP	AACPZ
ET150W2FW3	AACSL	AACPZ	ET420W2JW3	AARTQ	AACPZ
ET162W1HU2	AASHE	AACPZ	ET450W4HU2	AASHE	AACPZ
ET168W3FU2	AACSL	AACPZ	ET499W3JU2	AARTP	AACPZ
ET210W3FU2	AACSL	AACPZ	ET499W3JV2	AARTP	AACPZ
ET210W3FV2	AACSL	AACPZ	ET499W3JW3	AARTQ	AACPZ
ET216W2HU2	AASHE	AACPZ	ET504W2JU2	AARTP	AACPZ
ET216W2HV2	AASHE	AACPZ	ET504W2JV2	AARTP	AACPZ
ET216WBHU2	AASHE	AACPZ	ET504W2JW3	AARTQ	AACPZ
ET226W4FU2	AACSL	AACPZ	ET508W3HU2	AASHE	AACPZ
ET226W4FV2	AACSL	AACPZ	ET625W3JU2	AARTP	AACPZ
ET226W4FW3	AACSL	AACPZ	ET625W3JV2	AARTP	AACPZ
ET282W4FU2	AACSL	AACPZ	ET625W3JW3	AARTQ	AACPZ
ET282W4FVB	--	--	ET750W3JU2	AARTP	AACPZ
ET300W5FU2	AACSL	AACPZ	ET750W3JV2	AARTP	AACPZ
ET300W5FW3	AACSL	AACPZ	ET750W3JW3	AARTQ	AACPZ
ET324W2HU2	AASHE	AACPZ			

Version 2014.11.0.1　Subject to change without notice!　資料變更恕不另行通知！

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