



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

## **1. GENERALITY**

KW type industrial chillers are available in various size with cooling capacities rang up to 26.8 kW, computed in the following operating standard conditions:

- outlet water temperature: +15°C.
- ambient temperature: +25°C.

### **WARNING**

**The water returning loop plays an important role in heat exchanging process, as it also affect the temperature in the evaporator. In other words, the water temperature is a variable key in cooling system. We suggest the temperature of the returning water should be no higher than +25°C.**

### **1.1 Operating Range**

KAUKAN oil coolers are designed to meet the demand from general industrial applications. Their recommended operation conditions are:

**Outlet water temperature: min. +5°C max. +45°C**

**Air ambient temperature: min. +10°C max. +45°C**

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

### **1.2 Important warning**

### **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 ample 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**

**Be sure to disconnect the power before every operation of servicing on this unit.**

## 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. No tilting is allowed .

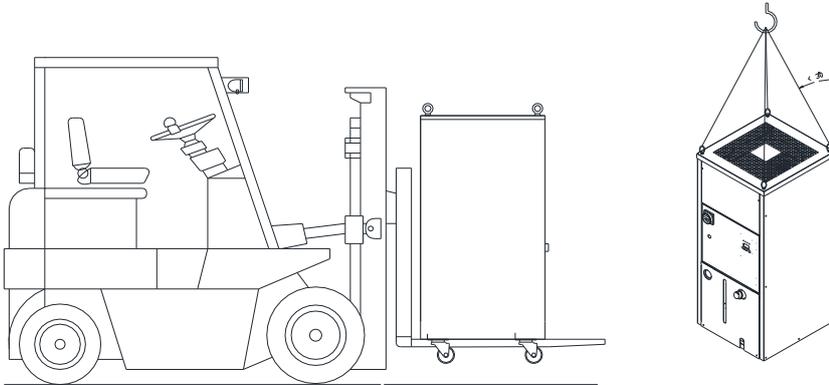
Upon receiving the cooler, check if there is any damage caused during the transportation. The unloading/carrying equipment should be with greater capacity than the cooler itself.

Do not tilt the oil cooler more than 30 degrees. A sudden jolt could damage the internal parts.

Avoid lifting from single point.

While transportation, keep attention to the balance of machine.

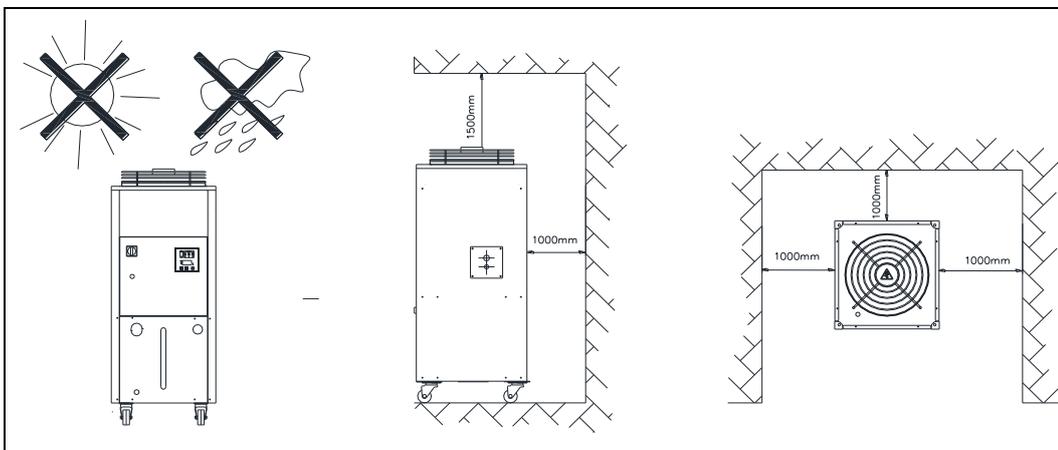
Do not lay down the unit, turn it upside down, or incline it to more than 15 degrees.



### 2.2 Installation site

It is necessary to reserve a space bigger than the cooler dimension, as to ensure a sufficient air supply. If the oil cooler is located on a carrier, please make sure the carrier is strong enough to withstand the weight of the oil cooler. Please also ensure a free and ample air flow around the oil cooler.

It is recommended that the chiller be installed inside building or inside a room.



When the cooler is not in operation in winter time, provide necessary protection against possible damage from the low temperature to the internal components. [keep the pump running or drain out all the fluid .]

## 2.3 Piping

### WARNING

**Use rustproof and durable material for piping.**

The inlet and outlet water connections are at the back of the chiller, location varied by models.

It is highly recommended to apply a mechanical filter before the inlet. The filter should be removable for an easy inspection or service.

The cooling oil loop must be perfectly sealed and watertight. And the looping system should conform to conventional standards for pumping system, in particular:

1. Piping must withstand pressure up to 10 bar, with proper diameter as to reduce pressure drops;
2. Pipes must be in high insulation and anti-condensation material, with at least 20 mm thickness;
3. To prevent leaking resulted from vibration, use flexible pipes. The piping between systems should be in parallel;
4. Fit automatic air-vent valves at the topmost points of the system and discharge valves at the lowest point;

## 2.4 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 ~ (L1, L2, L3) + ground wire (PE)}, 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.

#### 3 PHASE; AC220V

MODEL	WIRE CROSS SECTION (mm <sup>2</sup> )	AUTOMATIC BREAKER
KW-4	0.75	7
KW-6	1.25	8
KW-8	1.25	8.25
KW-12	2	12
KW-18	2	12
KW-2K	2	15
KW-3K	3.5	20
KW-5K	5.5	30

#### 3 PHASE; AC-380V~400V

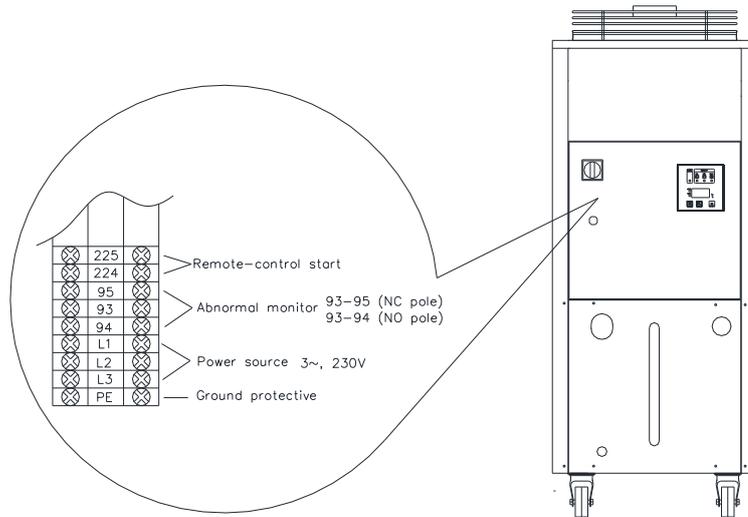
MODEL	WIRE CROSS SECTION (mm <sup>2</sup> )	AUTOMATIC BREAKER
KW-4	0.75	6
KW-6	1.25	6.75
KW-8	1.25	7
KW-12	1.25	7

<b>KW-18</b>	<b>1.25</b>	<b>7.5</b>
<b>KW-2K</b>	<b>1.25</b>	<b>8.25</b>
<b>KW-3K</b>	<b>2</b>	<b>12</b>
<b>KW-5K</b>	<b>2</b>	<b>17</b>

## 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

**Central Alarm System:** KW type chiller equips an auxiliary alarm function, which may be expressed as a sound or visible signal, or connected to central control system. The connection is performed through 3 points [#93, 94, 95 see the electrical drawing]

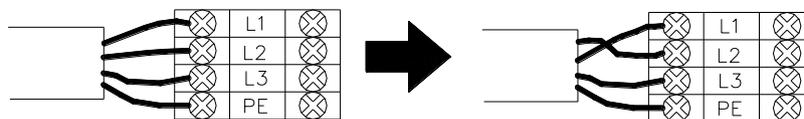


## 2.5 Reverse Phase

### WARNING

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

When the main power is connected, an alarm (E01) shown on the control panel indicates a reverse phase. Change and reconnect the wires of any 2 wires of main power cable.



### 3. START-UP PROCEDURE

#### 3.1 Preliminary inspection

Check that:

- The main power voltage and frequency correspond to the values stamped on the chiller's name plate.
- The water pipes are rightly and securely connected.
- The on-off valves (if installed) are opened.

#### 3.2 Filling Water Tank

Follow the standard procedures below to fill in water:

- 1) Remove the water cap (with **SUPPLY** label), which is located on top of the chiller.
- 2) Fill in the water. The water level should not exceed the limit of the gauge.
- 3) Place back the water cap.

#### 3.3 Starting

1. Turn on the main power by the main switch (TS) or remote control.
2. Set the desired temperature on the panel.

#### **WARNING**

**The temperature indicated on the panel is the fluid temperature, measured by "R2" probe.**

- a) Press (▲) or (▼) once and hold until it starts blinking
- b) Press (▲) or (▼) button to set the value you want.
- c) After setting the desired temperature, press "ON/OFF" button to store the setting and return to the normal operation.

Also you can check the temperature of fluid or setting value by pressing the (ON/OFF) button. When you press (ON/OFF) button, the light will indicate the position of (LIQUID) or (ROOM). It shows the liquid temperature when the (LIQUID) light is on. It shows the setting value of desired temperature when the (ROOM) light is on.

If a lower temperature is required, it will be necessary to add glycol antifreeze fluid to the water, please refer to the instruction in CH 5.3.

KW type chillers equip a flow switch (FLS) on the pipes from process. This switch controls the pump (PM) and the compressor (CM).

#### **WARNING**

**In the beginning of the first run, the flow switch (FLS) might temporarily fail due to air bubbles into the circuit. Release all air from the circuit.**

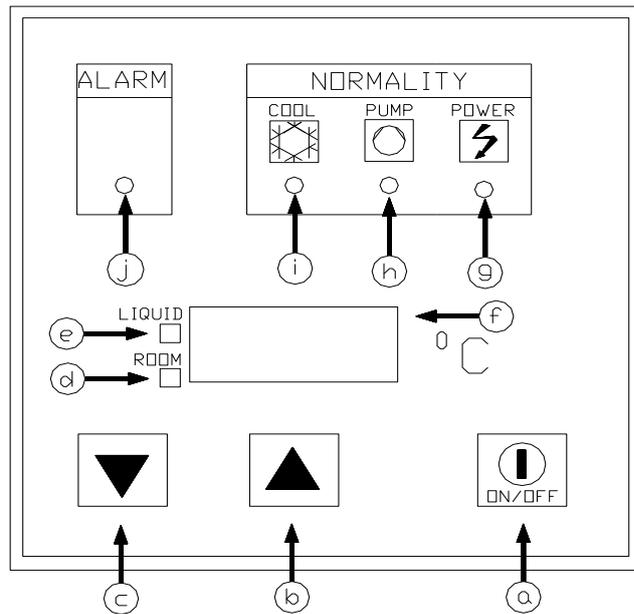
#### 3.4 Stopping

To stop the chiller, switch off by main switch (TS)

#### **INFORMATION**

**Fail to follow the instruction will be disqualified for any warranty claim.**

## 4. CONTROL PANEL



### 4.1 Description & Function

a) **(ON/OFF)** button:

- 1.) To start or to stop the cooler in the TEST model [only applicable to manufacturer].
- 2.) To show fluid or desired temperature.
- 3.) To store the setting of temperature or parameter.
- 4.) To select the parameter item in parameter setting mode.

b) **(▲)** button:

- 1.) To set the value incrementally.
- 2.) To enter the setting mode for oil temperature (press and hold for 5 sec).
- 3.) To enter the setting mode for parameter. (when first turn on the main power, and the display panel shows “on”, press and hold for 5 sec)

c) **(▼)** button:

- 1.) To set the value decrementally.
- 2.) To enter the temperature setting mode (press and hold for 5 sec).
- 3.) To enter the parameter setting mode (when first turn on the main power, and the display panel shows “on”, press and hold for 5 sec)

d) **(ROOM)** indicator (green):

Press the **(ON/OFF)** button. When **(ROOM)** indicator is on, the value shown on the display refers to the setting value of desired temperature .

e) **(LIQUID)** indicator (green):

Press the **(ON/OFF)** button. When **(LIQUID)** indicator is on, the value shown on the display refers to the fluid temperature .

f) **(DISPLAY)** (orange):

- 1.) To show the value of fluid temperature or desired temperature.
- 2.) To show the alarm code.



3.) To show the parameter value or item.

g) (**POWER**) indicator (green):

The indicator is on, it indicates a normal main power supplied.

h) (**PUMP**) indicator (green):

When the indicator is on, it indicates a normal water pump operation.

i) (**COOL**) indicator (green):

When the light is on, it indicates a normal compressor operation.

j) (**ALARM**) indicator lamp (red):

When the indicator light is on, it indicates an error in the operation. Please see the display panel for the error code.

## 4.2 *Setting parameter*

To set parameter:

1) 1) When you first turn on the main power, and the display shows “**on**”, press (**▲**) or (**▼**) once and hold for 5 sec.

You are in the parameter setting mode when the display shows (**par**).

2) Pressing the (**▲**) or (**▼**) once more to go into the parameter item [the display will show such as (P01)].

3) Select the parameter item by pressing (**▲**) or (**▼**) button.

4) Press (**ON/OFF**) button to go into the parameter item. The display will then show the parameter value.

5) Set the parameter value by pressing (**▲**) or (**▼**) button.

6) Press (**ON/OFF**) button to store the setting value.

7) Turn off the main power to leave the parameter setting mode.

### **WARNING**

**Before you modify the parameter, make sure to consult a certified engineer.**

For the meaning of parameters, please refer to the enclosed instruction manual of the instrument.

## 5. GENERAL INFORMATION

### 5.1 *Cooling Efficiency*

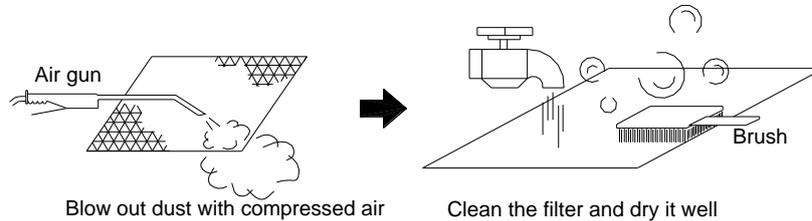
High cooling efficiency can be achieved if with :

- As high as possible water temperature, under the machinery requirements permit.
- A sufficient water flow (by proper pipe).
- Lower working environment.
- Sufficient and free air flow.

## 5.2 Air Filters

The air filter keeps the cooler interior and the condenser fins clean. 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.

## 5.3 Antifreeze In The Cooling Circuit

If the chiller is working with water temperature below  $+5^{\circ}\text{C}$ , or if the ambient temperature is below  $0^{\circ}\text{C}$ , it is necessary to add some quantity of pure glycol as anti-freezer.

The recommended mixing ratios are as follows:

10% for water temperature down to  $+3^{\circ}\text{C}$  or for ambient temperature down to  $-2^{\circ}\text{C}$

15% for water temperature down to  $0^{\circ}\text{C}$  or for ambient temperature down to  $-5^{\circ}\text{C}$

20% for water temperature down to  $-3^{\circ}\text{C}$  or for ambient temperature down to  $-8^{\circ}\text{C}$

25% for water temperature down to  $-6^{\circ}\text{C}$  or for ambient temperature down to  $-11^{\circ}\text{C}$

When calculating the quantity of glycol to be added, you should also consider the capacity of the water tank and the piping loop. You can refer to the table below to estimate the capacity of piping loop, giving the piping in various diameters.

DIAMETER	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
LITRES	0.22	0.38	0.61	1.05	1.41	2.26	3.77	5.2	8.7

## 6. TROUBLE SHOOTING

Check the table below for description of error codes. When you contact us or agent, please provide the following information: (1) Model [on the nameplate], (2) condition of the cooler [as much detail as possible].

Item	Condition	Cause	Remedy
1	The main power is detected, but no light is on.	<ol style="list-style-type: none"> <li>1) PCB is damaged.</li> <li>2) The fuse (A1) on the power supply (SMCC-233) is broken.</li> <li>3) The power supply (SMCC-233) is broken.</li> <li>4) The transformer is damaged [No DC 10V detected on (30A, 31A)]</li> </ol>	<ol style="list-style-type: none"> <li>1) Replace the PCB.</li> <li>2) Replace the fuse (1.5 A).</li> <li>3) Replace the power supply (SMCC-223).</li> <li>4) Replace the transformer.</li> </ol>
2	Alarm light is on, the display shows (E01)..	<ol style="list-style-type: none"> <li>1) Main power is connecting to the reverse phase.</li> <li>2) Missing one phase on the main power [1 of the 3 phases].</li> <li>3) Main power is out of working rang by <math>\pm 10 \%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>1) Invert any two phases from the cable.</li> <li>2) Make sure the main power is normal and check cable is securely connected to the terminal block.</li> <li>3) Check the main power input.</li> </ol>
3	Alarm light is on, the display shows (E02).	<ol style="list-style-type: none"> <li>1) Pump motor overloads and triggers breaker thermal relay [QFP].</li> <li>2) Unable to reset the thermal relay (QFP).</li> <li>3) Pump motor fails (Check the resistance with ground on U2, V2, and W2. Refer to test report for the standard].</li> </ol>	<ol style="list-style-type: none"> <li>1) Reset the thermal relay (QFP). Compare the current adsorption of the motor with the setting of the thermal relay (QFP) after reset. Refer to the test report for the setting values.</li> <li>2) Replace the thermal relay (QFP).</li> <li>3) Replace the motor</li> </ol>
3	Alarm light is on, the display shows (E03).	<ol style="list-style-type: none"> <li>1) Compressor overloads and triggers thermal relay [QFC].</li> <li>2) Unable to reset the thermal relay (QFC).</li> <li>3) Compressor fails. [Check the resistance on the U1, V1, and W1 with ground. Refer to the test report for standard].</li> </ol>	<ol style="list-style-type: none"> <li>1) Reset the thermal relay (QFC). Compare the current adsorption of the motor with the setting of the thermal relay (QFC) after reset. Refer to the test report for the setting values.</li> <li>2) Replace the thermal relay (QFC).</li> <li>3) Replace the compressor.</li> </ol>

Item	Condition	Cause	Remedy
4	Alarm light is on, the display shows (E04).	<ol style="list-style-type: none"> <li>1) Operating temperature exceeds range (over + 45°C).</li> <li>2) The air filter is dirty.</li> <li>3) The condenser is clogged.</li> <li>4) The refrigerant pressure switch (S63H) is damaged. (Check #13, 16. When the main power is off, the resistance should be 0)</li> </ol>	<ol style="list-style-type: none"> <li>1) Pressing the reset button (red) after the air temperature goes below + 45°C.</li> <li>2) Clean the filter, then reset.</li> <li>3) Clean the condenser, then press reset.</li> <li>4) Replace the switch.</li> </ol>
5	Alarm light is on, the display shows (E07).	<ol style="list-style-type: none"> <li>1) Low refrigerant level (possible leakage).</li> <li>2) The refrigerant pressure switch (S63I) is mal-functional [check #16, 19 in the S63L. When the main power is off, the resistance should be 0.]</li> </ol>	<ol style="list-style-type: none"> <li>1) Check the refrigerant pressure. Fix the leakage if there is any. As a certified engineer to refill the refrigerant.</li> <li>2) Replaced the switch.</li> </ol>
6	Alarm light is on, the display shows (E08).	<ol style="list-style-type: none"> <li>1) The oil circuit is clogged or the piping is loose.</li> <li>2) The oil flowing switch (FL) is mal-functional [check #19, 20 in the FL. When the main power is off, the resistance should be 0.]</li> </ol>	<ol style="list-style-type: none"> <li>1) Clean the water circuit or tighten the loose piping.</li> <li>2) Replace the switch</li> </ol>
7	Alarm light is on, the display shows (E09).	The fluid sensor is mal-functional.	Replace the sensor.
8	Alarm light is on, the display shows (E11).	Fluid temperature goes over + 45 °C.	Consult with a certified engineer for a cooler with bigger cooling capacity.
9	Alarm light is on, the display shows (E12).	Water temperature does not decrease 1°C during two hours while the compressor operating.	<p>Check the refrigerant level.</p> <p>Consult with a certified engineer for a cooler with bigger cooling capacity.</p>

## WARNING

**Before adding the refrigerant, you must consult a certified engineer and be sure to use the correct type of refrigerant (shown on the nameplate).**

## 7. SERVICE & MAINTENANCE

### **DANGER**

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

Compressor discharge pipe [copper tube with insulation] can be dangerous with high temperature. Be very careful 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.

### **7.1 Weekly Service**

Check the water level. Fix the leakage if there is any.

### **7.2 Monthly Service**

1. Check the air filter and condenser. Clean or replace if needed.
2. Check the electric wiring. Inspect the motor running conditions. Check and re-tighten all screws.
3. Check the mechanical parts: Clean the interior of the chiller. Check and re-tighten all screws and hose clamps. Fix the oil leakage if there is any.
4. Check the refrigerant circuit: in the event of any gas leakage, traces of oil will be found.
5. Check if there is any oil leakage in the gas circuit.

If the chiller has to be stopped for a long period, you **MUST** empty water from all the pipes, tank and heat exchanger. Failing to do so can result to a severe damage to the cooler.

Before re-starting the chiller after the long stop, we advise you check the pump impeller first.

Use a screwdriver to rotate the pump-motor shaft. If rotation does not go freely or smoothly, manually repeat the rotation to eliminate the resistance by slipping the impeller on the case. If after few trials the resistance does not disappear, we suggest you disassemble the pump and clean it or replace with a new one.

### **7.3 Repairing the Refrigerant circuit [only by a certified engineer]**

In 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, recycle the refrigerant with proper instruments.



#### 7.4 *Check 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 weld with proper alloys to repair the leakage.

**DANGER**

**NEVER use oxygen. EXPLOSIONS MAY OCCUR.**

#### 7.5 *Fill Up The Refrigerant*

- 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.
- Before filling refrigerant into the system, if there is a solenoid valve control (220V A/C), please activate the solenoid valve (SEV).
- Reverse the refrigerant gas bottle. Feed into the circuit with liquid refrigerant until 75% of required amount [indicated on the name plate]
- 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.

#### 7.6 *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 recommended during service operation in order to reduce the refrigerant loss as much as possible.**

## 8. RETIRING THE CHILLER

Must follow the location law to do the retiring.

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.