



CENTRAL SYSTEM COOLING UNITS

OPERATING MANUAL

IBS Heating, Cooling, Ventilation and Contracting Inc.

Contents

<u>Title</u>	<u>Page</u>
1. INFORMATIONS	4
2. GENERAL USAGE	5
2.1 Emergency	5
2.2 Operation	5
2.3 Requirements of the Place for Installation	5
3. SAFETY WARNINGS AND INSTRUCTIONS	6
3.1 Meaning of Safety Stickers	7
4. DEFINITION AND OPERATING PRINCIPLE OF THE SYST.	7,8
5. DIAGRAMS AND THE EQUIPMENTS	9,10,11
6. APPLICATION AND USE	11
7. PACKAGING , TRANSPORTATION AND STORAGE	11
8. COMMISSIONING	12..16
8.1 Place for installation	
8.2 Assembly	
8.3 Copper pipe connections	
8.4 Electrical connections	
8.5 Leakage test	
8.6 Gas Charging	
8.7 Check before Start-up	

8.8 Start-up System	
8.9 Shut-down System	
9. INSTRUCTIONS FOR OPERATION AND MAINTENANCE	17
10. SYSTEM PROBLEMS,SOLUTIONS	17
11. DECLARATION OF INCORPORATION OF CENTRAL COOLING (CONDENSER) UNIT	18
12. WARNING	18
TABLE	19
13. SERVICES	20
14. WARRANTY	21

1. INFORMATIONS

Model / Type	
Supply	V
Phase	
Frequency	50 Hz
Total Power	kW
Refrigeration Capacity	kW (-10 / +45 °C) kw (-25/ +45 °C)
Refrigerant	
Length	mm
Width	mm
Height	mm
Weight	Kg
Serial No:	

2. GENERAL USAGE

This operating manual contains informations about installation, operation and maintenance of the central units which produced by IBS Heating, Cooling, Ventilation and Contracting Inc. This manuel must be considered as a part of the units and keep this manuel with product, read carefully before the installation. Understanding all the terms is very important for your safety If suggestions are followed,units can be used more efficient You should contact with a technician because following all suggestions makes installation more easier.

Accurate refrigerant and lubricator must be used and the operator must not activate the system without charging accurate refrigerants. The manufacturer will not be responsible for any damage that occurs due to the operation of the unit other than the intended use and under unsuitable conditions.

The manufacturer shall not accept any liability for damages and loss incurred as a result of usage, operation or applications not mentioned in this manual.

2.1 Emergency

- Cut off the voltage
- Contact with technical service
- Service department will lead you to the nearest service

2.2 Operations

- Installation, operation and maintenance works must be performed by a qualified technicians.
- When an operation is to be performed on the unit, the supply from the mains must be cut and the unit must be cooled for 10-15 minutes.

2.3 Requirements of the Place for Installation

- Make sure that dust must be cleaned.
- Make sure that the floor must be tough enough.
- Make sure that the place must be protected against flood and snowfall.
- Make sure that the unit must be installed in a place that is open to atmosphere,If it will be installed in a room or something like that place,make sure that enough airflow must be provided.
- Make sure that all precautions have been taken for the environmental safety and human health.

3. SAFETY WARNINGS AND INSTRUCTIONS

- Consider all the warnings for your safety.
- Take precaution and understand all the instructions carefully.
- Make sure that you are authorized Even if you have enough experience do not try to make any installation and calibration.
- High voltage exists inside the control panel.Before maintance and repairing Turn off the power at the switchboard.
- The system works under pressure,it causes high temperatures (120°-160°) at the top of the compressors and high pressure line. After system stopped wait for 15-20 minutes for any applications.
- All the equipments inside the system work with high pressure.The systems which carries high air pressure are produced with the strength materials. During the transportation and installation any damage will not be accepted.
- All products have been tested by us. Don't make any changes during the installation,maintance and repairing.
- Electric panel and circuits are intended for the use of authorised personnel only. The safety conditions are valid for our own assembly policy.If you make any changes,it can cause danger.Never don't touch to the electrical panel and make sure they are isoleted.
- In order to providing safety and minimizing conflict,all the electrical mechanism was produced with switches,contactors etc. If it doesn't work change them with the new ones.
- The mechanic parts which are under the risk are placed inside the construction,so they are all isolated from environment.While machine is working, do not open safety doors.
- Keep away from the hot parts and surfaseses of the machine. Don't stay close and don't touch those parts.If you have to do something make sure that the machines are cold enough.
- There are some warning stickers on the machine,(can be seen or not in this manuel).Please obey the rules in this areas.
- If the stickers can not be seen,please change them with the new ones.

3.1 Meaning of Safety Stickers



Attention. Means that, this is a safety warning.



High Voltage. This sign is used for warning the operators and maintenance technicians against electricity. When you see this sign, do not touch these areas without isolation. If you need to touch these areas, turn off the system and make sure it is safe.

Never clean these areas with water or oil. Always make sure that this place is isolated.



High Temperature. This sign is used for warning the operators and maintenance technicians against high temperature. Before touching these areas make sure that these places are cold enough.



Use Protective Gloves

4. DEFINITION AND OPERATING PRINCIPLE OF THE SYSTEM

In this part, definition of Central Condensing Unit will be given. Central condensing units are designed to maintain constant temperatures in certain spaces by removing heat load from multiple spaces at certain conditions. These units must be used with the evaporators. Otherwise, they can not be used alone.

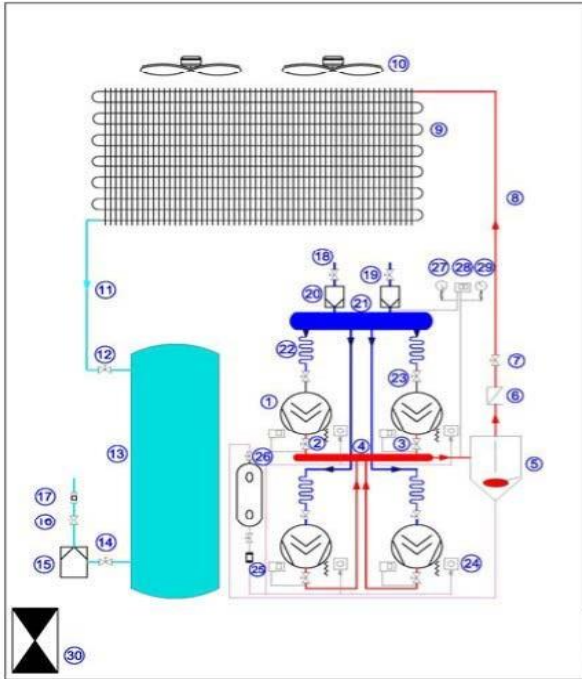
Firstly, devices must be mounted in a suitable place, then connections between Central units and evaporators must be made by using copper pipes. Make sure that all the weldings are made carefully. Otherwise, gas leaks can be seen! Now, system must be charged with suitable refrigerant, finally it is ready to use.

This units are mounted on a tough frame. Also compressors for the units are mounted in small groups. This groups consist of 2,3,4 semi hermetic scroll compressors (2HP-50HP). Central units are designed for different conditions and they can be classified as cooling, deep freezing, quickfreezing. All the mechanisms of cooling compressors, evaporator` fans, operation times etc. are controlled by a microcontroller. Electrical supply and control panel are installed on the unit with all connections. After the installation completed, system is ready to work.

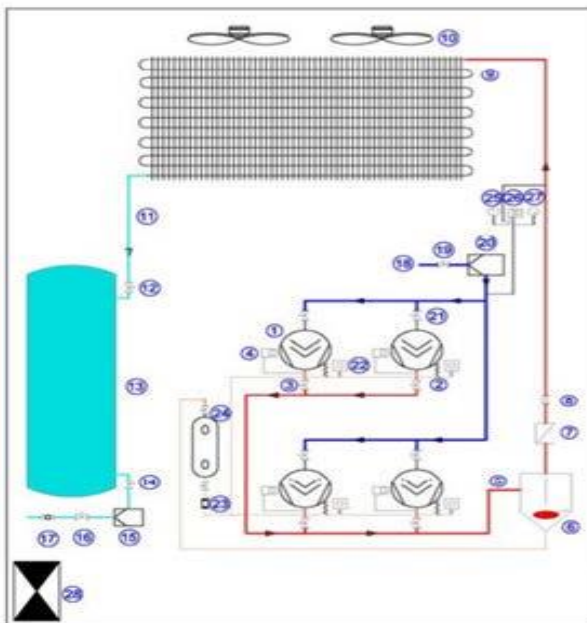
Model	Description	Temperature
IMC	W or w/o cabinet , 3or4 compressors central unit	Cool Freezing
IMC	W or w/o cabinet , 4or12 Compressors Central unit	Cool Freezing
ISC	With Condensering Unit 2or4 Compressors Central Unit	Cool Freezing
ISC	With Condensering Unit 2or6 Compressors Central Unit	Cool Freezing
IEC	Eco. Central System 2or3 Compressors Central Unit	Cool Freezing
IEC	Eco. Central System 2or3 Compressors Central Unit	Cool Freezing
IVC	2or5 Screw Compressors Central Unit	Cool Freezing QuickFreezing

The installation and operation of IMC central cooling units must be performed by a qualified cooling technician. The informations about the units, for instance; typical functions, serial numbers etc. can be found on the plate which is located on the left/right side of the machine. If somebody needs help, please indicate model and serial number.

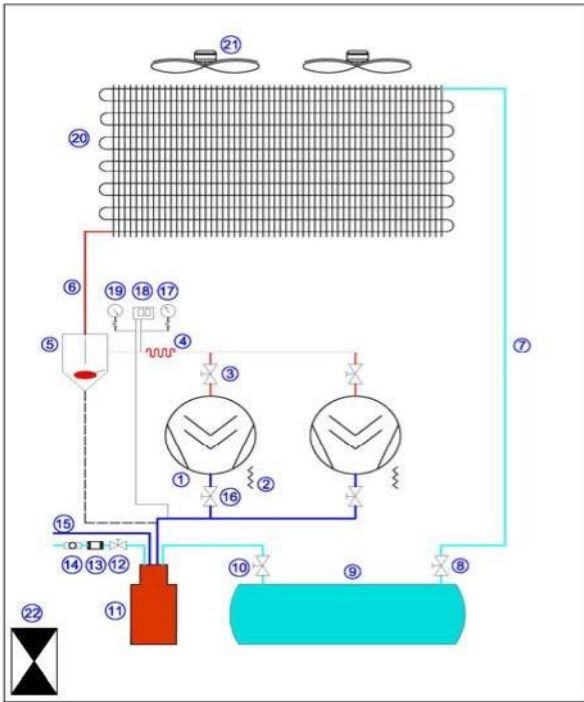
5- DIAGRAMS AND THE EQUIPMENTS



1st Diagram- Semi Hermetik Central System

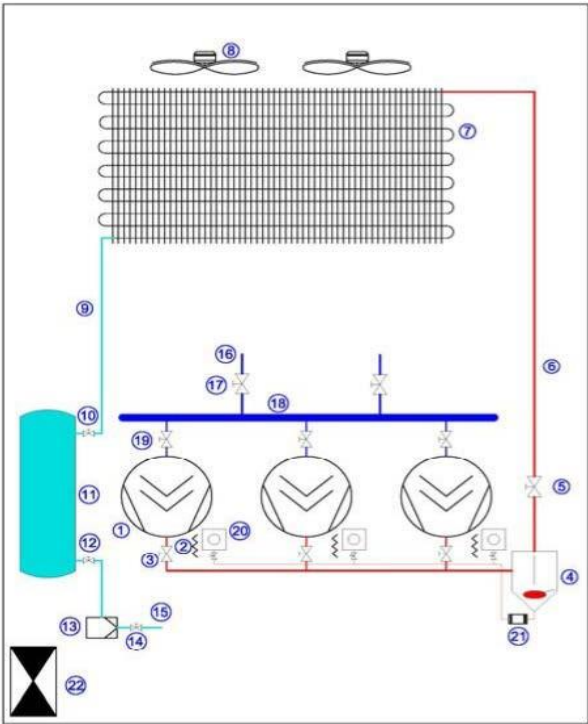


2nd Diagram- Scroll Central Systems



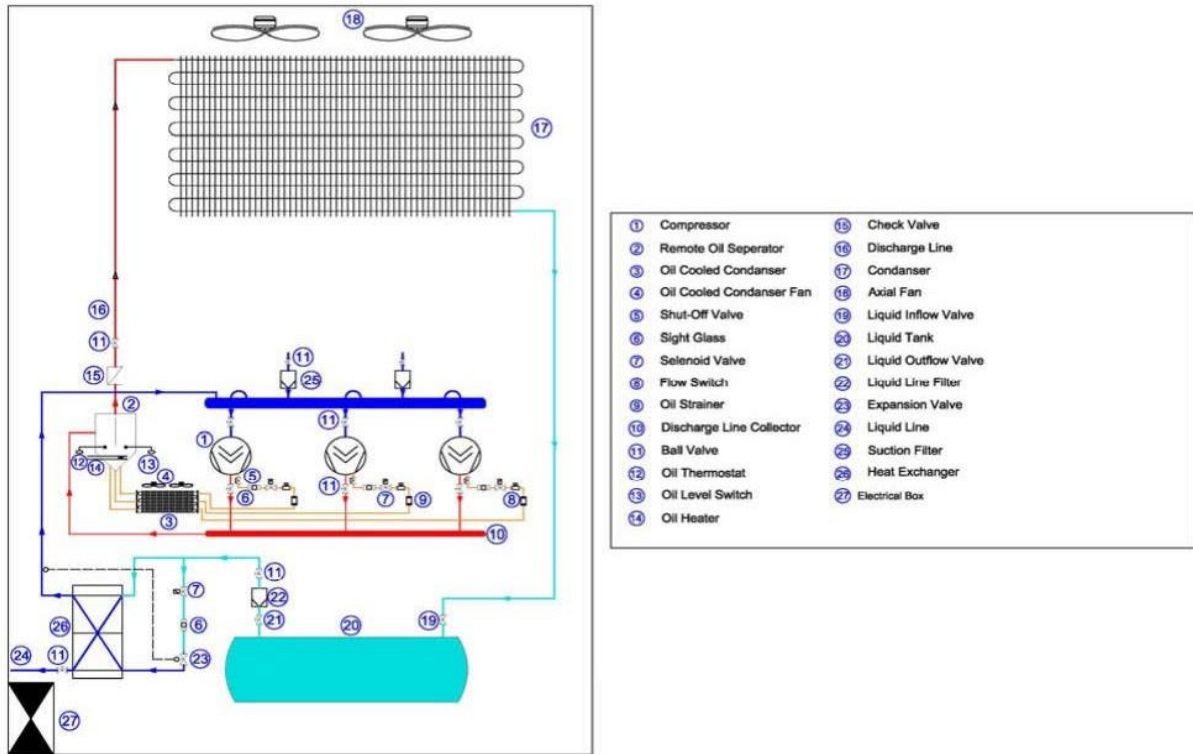
- | | |
|-------------------------------------|---------------------------|
| ① Compressor | ⑮ Suction Line |
| ② Crankcase Heater | ⑯ Suction Line Valve |
| ③ Discharge Line Valve | ⑰ High Pressure Manometer |
| ④ Discharge Line Vibration Absorber | ⑱ Pressure Control |
| ⑤ Oil Separator | ⑲ Low Pressure Manometer |
| ⑥ Discharge Line | ⑳ Condenser |
| ⑦ Condenser Return Line | ㉑ Axial Fan |
| ⑸ Liquid tank inflow valve | ㉒ Electrical Box |
| ⑹ Liquid Tank | |
| ⑩ Liquid Tank Inflow Valve | |
| ⑪ Suction Line Accumulators | |
| ⑫ Liquid Line Service Valve | |
| ⑬ Filter | |
| ⑭ Gas Flow Gauge | |

3rd Diagram-Minipack Scroll Central Systems



- | | |
|--------------------------------|------------------------------|
| ① Compressor | ⑮ Liquid Line |
| ② Crankcase Heater | ⑯ Suction Line |
| ③ Discharge Line Valve | ⑰ Suction Line Service Valve |
| ④ Oil Separator | ⑱ Suction Line Collector |
| ⑤ Discharge Line Service Valve | ⑲ Suction Line Valve |
| ⑥ Discharge Line | ㉑ Oil Level Regulator |
| ⑦ Condenser | ㉒ Filter |
| ⑸ Axial Fan | ㉒ Electrical Box |
| ⑩ Condenser Return Line | |
| ⑩ Liquid Tank Inflow Valve | |
| ⑪ Liquid Tank | |
| ⑫ Liquid Tank Outflow Valve | |
| ⑬ Dehydrator | |
| ⑭ Liquid Line Service Valve | |

4th Diagram-Economic Central Systems



5th Diagram- Screw Central Systems

6- APPLICATIONS AND USE

Central condensing units which produced by IBS Heating, Cooling, Ventilation and Contracting Inc. are used for heat transfer in fridges,cold rooms,supermarkets,cabinets,etc. The units must not be used for out of their own purposes.Otherwise,any damages will not be accepted from the producer.

7- PACKAGING,TRANSPORT and STORAGE

All the units that we are produced were packaged carefully.This is a special packaging method against surface scratching and impact. All the units must be carried vertically and while carrying, never put the units over and over and make sure that they must not be fall over during the tranportation.

Don`t forget, you never need any installation for central systems. The units will come ready-to-use. You only need that, the electrical connections and weldings between central unit and evaporators must be made.Also system must be charged with the suitable refrigerant.

While the units are lifting, the rope must be connected to the eyelets on the lower part of the unit with lifting lugs, and lug bolts must be tightened.

The units must be placed vertically on a smooth surface and make sure that temperature must be between -25 and +60. Otherwise, corrosion will be seen. One of the other important things is that, since the units have an electrical panel they must be protected from the flood. Never put the units over and over and always put them vertically.

The manufacturer shall not be liable for damages incurred as a result of handling, transport and storage of the units in any way.

8- COMMISSIONING

For validity of the warranty, the central cooling units must be installed and started up by an experienced qualified technician. Obey the rules and do not change the set pressure values, safety switches and cables. Do not operate the units at ambient temperatures below -30°C and above 48°C without taking necessary precautions (refer to the manufacturer for precautions). Follow the installation, start-up and maintenance instructions. Get acquainted with the information provided in the operation manual. Refer to the manufacturer for further information. For ensuring the desired efficiency and safe operation of condensing units, make sure to apply the following rules when choosing the place of installation.

Before the installation;

Check all the products for any damages during the transportation. For the installation, qualified workers and the spare parts must be used.

8.1-Place for Installation

All the units must be installed with some spaces because of repair and maintenance. Installation must be made by authorized personnel only due to the high voltage in the electrical panel, high pressure line and high temperature at the top of the compressors. Generally, there must be a security cordon around the units. For further information please check the safety regulations.

Never install the units between the buildings, in front of the windows, etc. because of the noise level. Fix all the units on a flat and tough floor because of the weight of the units. In order to prevent noise level and vibration do not mount the units on the floor directly. Chock must be used.

- Make sure that the Condensing units are kept away from heat sources and air conditioning must be provided.
- Make sure that the place allows the heat generated by the unit to be transferred without interruption to air circulation.
- Input and output surfaces on the units must be clear.
- The units must be protected from corrosion, radiation, etc.

- The distance between evaporators and the central units must not reach to 10 meters (horizontally), by the way total distance between vertical and horizontal copper pipe lines must not reach 25 meters. Choose a place for the units by considering this conditions.

8.2 Assembly

Weight of the units must be considered during the assembly. So, the floor must be strength enough and the units must be mounted vertically. By the way all the products are produced with the low noise level and vibrations must be prevented. The pipes must have enough elasticity, vibration must not be transferred.

8.3 Copper and Pipe Connections

After the units are mounted to the right place, pipe connections must be made. To get the maximum efficiency, copper connection must be made carefully. All the ASHARE rules must be followed. Copper pipe design and mounting will be made by customer. The following rules must be considered to select correct pipe diameter.

- The following considerations must be taken into consideration in selecting the pipe diameters.
- Pressure drop in suction, pressure and liquid lines due to friction losses;
- Fluid velocities in suction, pressure and liquid lines for oil return;
- Pressure drop in vertical climbs in liquid line;
- All horizontal return lines must have 2% gradient to facilitate oil return to compressor in the direction of flow;
- All suction line shall have oil trap at every 1 meter or higher vertical elevations at upper and lower sections;
- In suction lines with 7.5 m or higher elevations, an oil trap shall be used at every 5 meters.

The ICU condensing units are charged with the nitrogen in order to get best quality. Following some rules is going to make your product's durable.

- Soldering works are performed under dry nitrogen.
- Copper pipes must not be contacted with any other things.
- If the copper parts are contact with a surface during the vibrations, they must be protected with the isolation.

8.4 Electrical Connections

EN 60204-1 standards must be followed when the electrical connections are made.

- IMC condenser units shall have the suitable power supply, which is 400 V 50 Hz, as indicated on rating plate affixed onto the unit.
- Make sure that proper earthing has been made.
- Make sure that the main supply cables and connections are properly secured to the power panel.
- Make sure that the supply line voltage remains within ± 10 of the parameter which is indicated in the rating plate. The machine must be protected against fluctuations beyond these limits.
- The ampere rating of the main switch feeding IMC condenser units shall be larger than ampere rating on the rating plate of the unit.
- The main supply cabling cable sections shall be determined by considering the distance between the electrical control panel and the unit and calculating any voltage drop.

8.5 Leakage Test (NITROGEN)

After all copper piping and electrical connections are made, a leakage test shall be performed before the system is started up. Before charging gas to the system, make sure that no leakage exists.

*To apply pressure to the system, utilise nitrogen or carbon dioxide gas. **Never use oxygen or acetylene gas for applying pressure.** These gases cause large and dangerous explosions.*

- Make sure that necessary precautions are taken to protect the safety and control elements that may be damaged by the application of pressure during the test.
- Make sure that all solenoid valves and valves in the system are turned to open position.
- Make sure that a pressure of maximum 15 bars in the suction line and 25 bar in pressure and liquid lines are applied and that all tapered and soldered joints are checked against leakage.
- Make sure that nitrogen with pressure is left in the system for a while (preferably not less than 24 hours). If no pressure drop is detected, this will indicate that there is no leakage. Then nitrogen may be discharged from the system.
- Make sure that after the completion of the nitrogen test, the system is

connected to a vacuum pump.

- Vacuum the whole system until 755 mm HgS vacuum is obtained. When 755 mm HgS vacuum is obtained, close the vacuum pump. Allow minimum 12 hours and if no rise in vacuum manometer is observed, this will mean that there is no leakage in the system.
- After the vacuum process, the system may be charged via the liquid line (check for the right refrigerant gas with the machine rating plate)

NEVER OPERATE THE COMPRESSORS WHILE THE SYSTEM IS UNDER VACUUM.

8.6 Gas Charging

- All the system valves and solenoids must be opened.
- Charge the system only with appropriate refrigerant gas (see rating plate).

- If cooling fluid is a mixture, then to prevent any variation in mixture ratios, charge the gas only in liquid state.

- Slowly charge the cooling circuit until 4-5 bar pressure is reached with refrigerant R404A,R448A,R449A,R452A,R507A, 2 bar in case of refrigerant R-134a.

- Charge the remaining gas with the system running until the latter reaches the nominal working conditions. Before powering up the installation, please refer to “Check before start-up”.

8.7 Check Before Start-up

- Check that power unit voltage coincides with the condenser unit (fans) voltage.
- Check the calibration of the electrical protective devices.
- Check that service valves are fully open.
- Check that the crank case heater is operating.
- Check that fans on the unit rotate freely.
- Check condenser fins are clean and there is no obstruction to free flow of air.
- Check that there is no defect in the installation.

8.8 Start up the System

- Turn on the switch on the control panels of all evaporators connected to the central cooling unit.
- Check the temperature setting value on the evaporator control panel. Make sure that the solenoid valves are in open position.
- Turn on the main switch of the mains supply on the main distribution panel. Turn on the main safety switch on the control panel.
- Turn on the pako switches (only three phase fans have pako switches) on the IMC unit control panel for fans. Then turn on the compressor pako switch again on the control panel in 30 second intervals. The condenser fans and cooling compressors shall switch on or off the compressor and fan automatically depending on the system requirement and under commands from the microprocessor at the control panel.
- Check the high and low pressure values of the system by means of a manometer.
- Check overheating is present in the cooling compressor inside the condenser unit.
- Check the compressor oil level at the gauge on the carter of the compressor.
- Perform a general check on the installation; make sure the installation is functioning smoothly.

8.9 Shut Down the System

In case of an emergency, turn off the safety switch on the control panel. If it is not an emergency, then first turn off the compressor pako switches leaving short intervals and secondly, turn off the pako switch of the fans.

9. INSTRUCTIONS FOR OPERATION AND MAINTENANCE

- Clean the condenser fins inside the **IMC** condenser unit once a month. If condenser unit is in dusty and dirty surroundings, perform this cleaning more often. This period may be once a week. If you cannot clean the fins, you should notify the service at once. They shall do the cleaning using pressurized water and chemicals gentle on the condenser material.
- Do not use chemicals to clean the condenser fins on your own. They may damage your condenser chemically.
- Any unusual noise or sound emitted from the machine while it is operating may be indications of an upcoming problem. Continuing with the operation of the machine in this state may cause irreversible damage to the machine.
- If your unit starts and stops in frequent intervals without providing adequate time to cool down, then do contact with an authorised service. The problem may be caused by the lack of refrigerant gas. The leaking section must be found and isolated and additional refrigerant gas must be charged.
- Perform leakage test and checks annually or according to the regulations of the country.
- Check regularly
 - o Settings of safety and control device,
 - o State of electricity and cooling connections (safety, corrosion...),
 - o Working conditions,
 - o Stability of the unit on its supports,
 - o Operation of crank case heater,
 - o Oil balancing system, oil level and conditions of the oil.

10- SYSTEM PROBLEMS, SOLUTIONS

You are going to find out a table about the problems and solutions. The table is going to give you some ideas about the problems and solutions keep them in your mind and use them all if it is necessary. Otherwise there can be some problems that you can't solve them, they must be solved by authorized personal only. Then call the service department.

11- DECLARATION OF INCORPORATION OF CENTRAL COOLING (CONDENSER) UNIT

Only the operators with proper qualifications are allowed to work on the unit. This product is a defined part to be included in the facilities according to the European Directive 98/37/EC. IMC central condensing unit shall not be operated unless the facility it is incorporated is determined or declared to be in compliance with the laws in force. For this reason this product is not subject to 98/37/EC.

12-WARNING

These Terms and Conditions May Change. **IBS Heating, Cooling, Ventilation and Contracting Inc.** reserves the right to update or modify these Terms and Conditions at any time without prior notice.

All the products must be operated up to maximum high pressure level once a year and safety equipments and leakage must be controlled.

All damages must be repaired by authorized personal only. Otherwise, the manufacturer does not take any responsibility about the products.

Read this document carefully and obey the rules. Unless, IBS Heating, Cooling, Ventilation and Contracting Inc. will not take any responsibility for any damage.

PROBLEM	CAUSE	SOLUTION
The units are not working	No electricity	External power supplier can be
	Power supply voltage is not working within the limits.	Do not operate the unit if experiencing voltage fluctuations
	Circuit was stopped by main switch.	Check the ampere rating of your switch and change if necessary
	On/off switch is in off position.	Turn on the switch.
	Thermostat settings are too high	Check the thermostat settings.
The units are not working	Thermic Errors	1-Check the compressor temperature If too hot, leave it to cool down. 2-Check the electric connections. 3-Check the operation of fans on the
	HBP and LBP switches cut off the power.	1- Check the switch setting values. 2- Check the operation of the fans on the unit.
Compressor starts and stops in short intervals	LBP pressure switch setting is set lower than the specified one.	Set the cut-off value to 1 bar, and differential to 0,7 bar.
	Evaporator fans are not working.	Fans must run.
	Ice accumulated on evaporator fins	Check the defrosting period and timing from the evaporator control panel Clean the ice accumulated on the fins.
	Temperature differential setting value is set lower than the specified	Set the differential value to 2.
Compressor is working ceaselessly	Thermostat can be set to a very low level.	Set the thermostat to a suitable level
	Refrigerant fluid is not sufficient.	Report to the nearest service
	Evaporator works under to too	Check the installation
	Electrical contactors for compressors can be stuck	Change the defective contactors and check and follow the voltage values

CERTIFICATE OF WARRANTY

Serial number :.....

Invoice date-Number :...../...../20..... -

- 1- Warranty period which is 2 (two years) commences on the date of invoice.
- 2- The product including all components is under warranty of our firm.
- 3- If the product breaks down in the warranty period, the duration spent in the service shall be added to the warranty period. The period of service is 30 working days maximum. This period commences at the time when the defect is conveyed to the service station or to the manufacturer in absence of a service station.
- 4- If the product breaks down in the warranty period due to a fault of material or production, the customer shall not be charged for any workmanship or parts replaced or otherwise.

Conditions beyond the coverage of warranty are as follows.

- Defects caused by faulty operation
- Defects caused by the lack of providing due maintenance.
- Defects caused by service and maintenance performed by an unauthorised person.
- Defects caused by operation with a non-allowed power supply (voltage, frequency variations, harmonic currents etc.).
- Defects caused by insisting on the operation of a malfunctioning unit.
- Changing of the settings and safety values of the unit (elements of automatic control, thermostats, microprocessor setting values) without consulting İBS Ltd.Şti or an authorized service centre.
- Operation of devices in too hot and/or too dirty, dusty, humid and closed environments without taking due precautions.
- Defects as a result of causes above are excluded by our warranty.

Seller : IBS Heating, Cooling, Ventilation and Contracting Inc

Address : Dudullu Organize Sanayi Bölgesi 2.Cadde No:39

Ümraniye/İSTANBUL

Tel / Tele fax : 0216 466 04 05 Pbx / 0216 466 05 70

E-mail : info@ibs.info.tr

Seal / Sign :