

AL HAFEZ ENGINEERING INDUSTRIES

AIR COOLED SCREW WATER CHILLERS

Cooling Capacity 89 kw - 731 kw

Model : HIC 35 SC - HIC 280 DSC

Refrigerant R22 or any other ozone friendly refrigerant



Quality Is Our First Criteria



من منتجاتنا الأخرى

مبرد ماء طراز HAC
من (١٤.٢ - ٨٦.٦) KW



فان كويل



أبراج تبريد
من (٩ - ٧٨١) طن



إيروتيرم

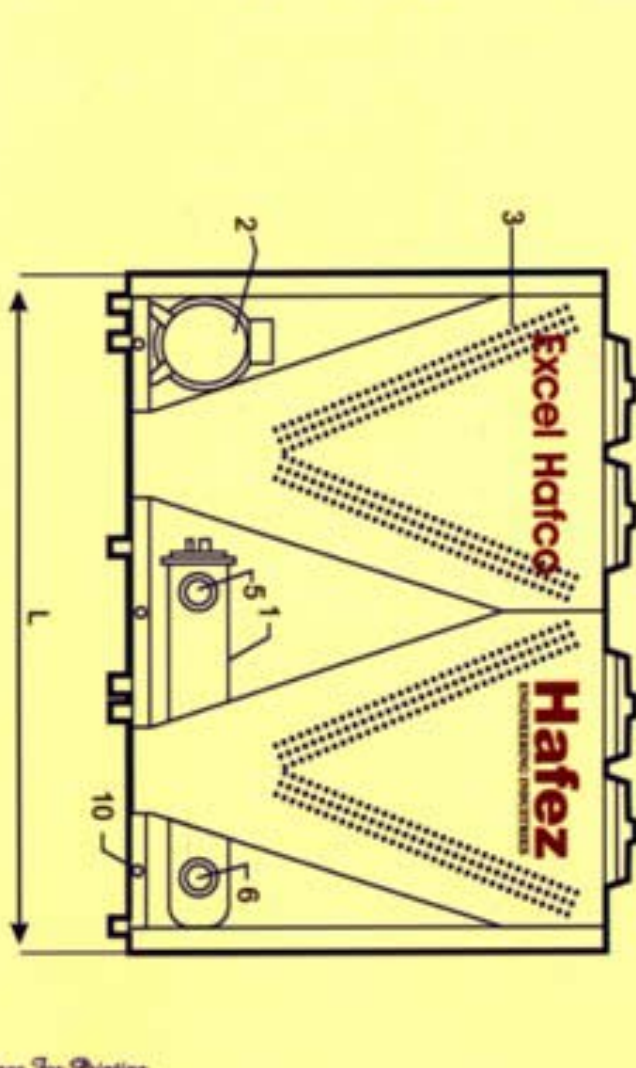
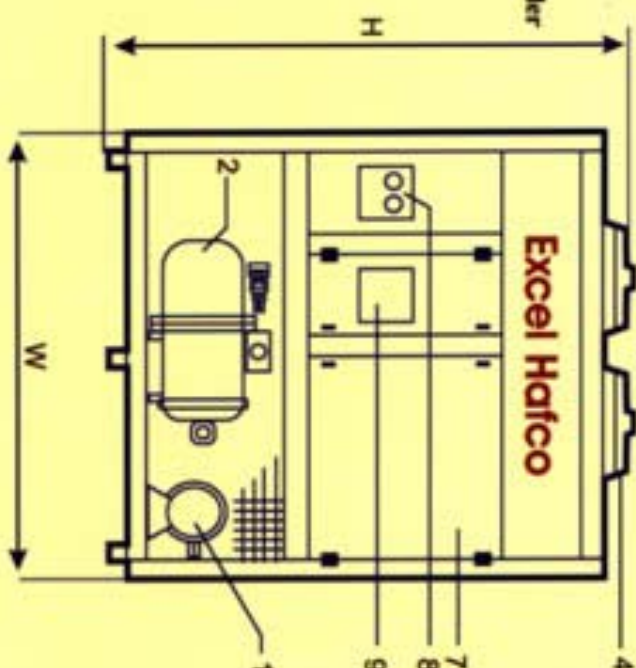
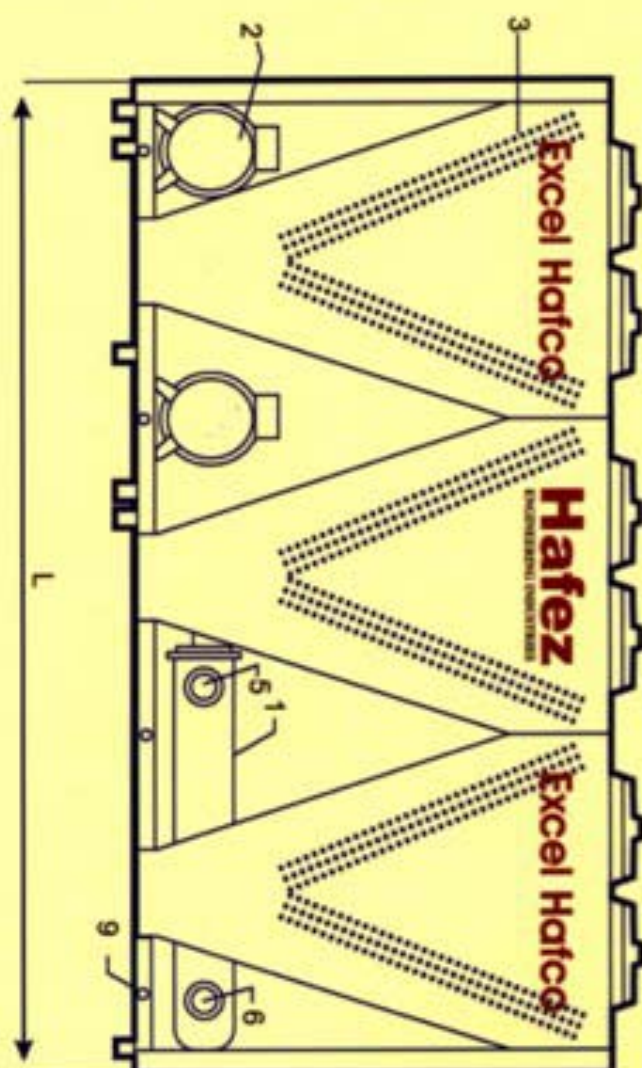
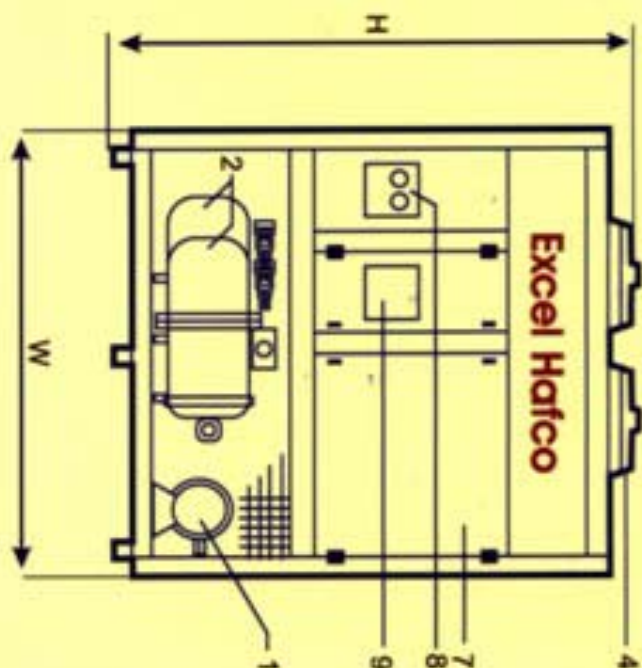


وحدات باكيج
من (٤.٥ - ٢٦) طن



وحدات معالجة الهواء

- 1 - Evaporator
- 2 - Compressor
- 3 - Condenser
- 4 - Fan
- 5 - Water Inlet into
The Evaporator
- 6 - Water Outlet from
The Evaporator
- 7 - Electrical Panel
- 8 - Refrigerant Gauges
- 9 - Microprocessor Controller
- 10 - Point for The Lifting



INTRODUCTION

The units belonging to HICSC & HICDSC range are air cooled packaged water chillers, for outdoor installation, equipped with semihermetic screw compressors and axial fans, available in 15 sizes.

Applications for different geographical areas:

All units are designed for high outdoor temperature up to 50 °C.

Casing : Made with heavy gauge structure in galvanized steel.

The powder paint anti-corrosive treatment over the entire frame provides long lasting resistance for outdoor installation, even in aggressive environmental conditions.

Its design allow these machines to be manufactured in modular units and at same time it ensures a constant air flow through the finned coils and are made easy fore maintenance and service.

Compressor : of semihermetic screw type, equipped with a last generation built in oil separator and oil filter, both of them with an increased efficiency . Such compressors are double rotor type directly driving the male rotor, which in turn drives the females rotor . The forced lubrication system is pump free. The fully inspectable motor is suction gas cooled, peculiarity that allows to extend the limit operation range up to the worst running conditions. According to the different sizes , in order to reduce the starting current can be available with Star/ delta starting methods. The project of these units has been studied in order to increase the COP of more than 5%. These compressors allow the unit to work within a very large running limits.

Thanks to the very small number of moving parts. Comparing with the reciprocating compressors, these compressors require a reduced maintenance and service.

Technical Specifications:

Their special features such as compactness, low sound , completely lack of vibrations and pulses (that make unnecessary the fitting of spring antivibration mounts beneath the compressors as well as he flexible connections on both the discharge and suction lines) allow to reduce the discharge line stress and maintenance . The NOISE LEVEL IS VERY LOW and its peak is concentrated at high frequencies, so that it is very easy to cut, allowing these compressors to be suitable for installations where the noise factor is essential.

As standard they are equipped with:

- ◆ Suction and discharge service valves.
- ◆ Capacity control with more unloading steps.
- ◆ Rotation check.
- ◆ Unloaded start.
- ◆ Carter electric heater.

- ◆ Check valve on discharge line.
- ◆ Over pressure safety relief value.

Additional unloading steps are available on request. The compressor stop procedure is carried out by unloading the compressors itself and then stopping it through the pump down. In order to allow them to run even at the limit conditions, the compressors are equipped, as standard with a liquid injection system.

Fans : are direct drive propeller type, with blades statically and dynamically balanced.

The electric motors are closed type with external rotor, equipped with built-in thermal overload and suitable for outdoor installation.

Winding in B class of protection , internal protection according to VDE 0730, suitable for a temperature operating range from 50 to + 100 °C. They are suitable for:

- ◆ Variable speed control by means of additional electronic card (chiller units on request).

Evaporator: direct expansion shell and tube type. The steel shell is complete with flanged water connections and externally insulated with closed cell anticondensation neoprene layer.

The U bended inner copper tubes are mechanically expanded into the steel tube-plate and complete with water baffles in order to improve the thermal exchange.

The evaporator is protected against freezing through an antifreeze protection electric heater controlled by a thermostat, fitted around the external of the shell beneath the insulation and it is supplied complete with deferential pressure switch against water flow lack.

Condenser: coils with seamless copper tubes expanded into aluminum corrugated fins. They are of high efficiency type, complete with subcooling circuit which allows an increase of cooling capacity without an increase of the power input.

Refrigerant Circuit: The units are equipped with independent refrigerant circuit entirely constructed with cooper tubes. Each supplied by its own compressor. Each circuit includes:

- ◆ Expansion valve with external equalizer.
- ◆ Filter dryer with replaceable cartridge.
- ◆ Sight glass.
- ◆ Liquid line solenoid valve.
- ◆ Liquid line shut-off valve.
- ◆ High pressure switch.
- ◆ Low pressure switch.
- ◆ High/low pressure gauges.(glycerin type).

Electric panel: complying with CEI 44-5/EC 204-2 is housed in steel painted and seal tight box, IP 55 protected. Complete with opening door safety locked main switch, complete with:

- ◆ Main switch.



All versions are controlled through microprocessor thermologic that is projected in order to develop, in local network, the high speed connection to the control boards. This control of last generation, allows a bigger number of control boards to be connected in network, in order to allow the control of these units that are equipped with more refrigerant circuits. Furthermore the access to the control boards of the different circuits is obtained through the INFO button and in case of alarm, the terminal device connects directly to the affected board.

The controller offers a lot of advantages such as:

- ♦ Alphanumeric terminal with the possibility to change eeprom and language.
- ♦ Extremely easy parameters setting procedures.
- ♦ Alarms codes and signals.
- ♦ Easy display of the complete range of parameters.
- ♦ Key pad with graphic symbol of easy comprehension.

By means of the keyboard and liquid crystal display fitted on the front door of the electric box, it is possible to store, modify and read the set parameters and the operational conditions as well, such as:

- ♦ Chilled water temperature control and relevant differential.
- ♦ Cooling capacity regulation of proportional type. According to the evaporator entering water temperature.
- ♦ Antifreeze temperature and adjustable differential set point.
- ♦ Condensing pressure for the variable fan speed control.
- ♦ Compressor start-short cycling to limit the starts per hour.
- ♦ Compressor running time balance.
- ♦ Timing to anticipate and delay the water pump operation in connection with the start and stop of unit.
- ♦ Operation overtime for compressor and unit maintenance.
- ♦ Control of high condensing pressure in case of high ambient temperature by going to lower step.

On request, the microprocessor can be suitable for connecting to a supervisor system control:

- ♦ Local unit control.
- ♦ Remote unit control.
- ♦ Interface with BMS.

In case of break down, different fault diagnostic codes can be displayed showing the nature of the problem. The main safety parameters are:

- ♦ High pressure switch.
- ♦ Low pressure switch.
- ♦ Antifreeze protection.
- ♦ Compressors thermic protection.
- ♦ Fan motors thermic protection.
- ♦ Lack or insufficient water flow across the evaporator.
- ♦ Overtime for compressor and unit maintenance.
- ♦ Self diagnosis with immediate faulty code.

The controller can be also equipped with a clock card (available as accessory on request) that allows to store the last 1600 alarms occurred on the unit. For each alarm will be possible to store:

- ♦ Alarm code occurred.
- ♦ Date and hour of the alarm.
- ♦ Set point regulation.
- ♦ Regulation band.
- ♦ Inlet temperature.
- ♦ Outlet temperature.

Use of Antifreeze Solution

Use of ethylene glycol is a must in case it is not foreseen the water discharge from the hydraulic system during the winter stop or whenever the unit has to supply chilled water at temperatures lower than 4°C. The addition of glycol changes the physical properties of the water and consequently the unit performances.

The proper glycol percentage to be put into the system can be obtained from the hardest operation conditions chosen among those hereunder detailed.

Table 'A' HICSC HICDSC

Design air temperature C°	2	0	-3	-6	-10	-15	-20
% glycol in weight	10	15	20	25	30	52	40
Freezing temperature C°	-5	-7	-10	-13	-16	-20	-25

Model With One Compressor HIC 35SC - HIC 140SC

Model Specification	HIC 35SC	HIC 50SC	HIC 60DSC	HIC 70SC	HIC 802SC	HIC 110SC	HIC 140SC
Cooling Capacity (KW)							
Ambient 35C	89	120	152	172	232	292	366
Ambient 46C	76	103	130	146	198	249	312
No of Compressor	1	1	1	1	1	1	1
Possible Steps	0-33-66-100	0-33-66-100	0-25-50-100	0-25-50-75-100	0-25-50-75-100	0-25-50-75-100	0-25-50-75-100
Compressor Disp(m3/hr)	98	137	172	193	275	320	407
C.O.P	3.6	3.5	3.6	3.7	3.9	3.9	3.8
Compressor Input Power @ 4/50°(kw)	27.3	36.7	46.3	51	68.3	83.1	107
Max Current AMP	68	87	109	122	157	215	275
Air Flow Across Condenser (m3/hr)	29,000	59,000	59,000	59,000	78,000	88,000	175,000
Nominal Water Flow (L/hr)	15,300	20,600	26,100	29,600	40,000	50,200	63,000
Pressure Drop ΔP(m)	4	4	4	4	4	5	5
Power Supply	380 - 415V - (3 Phase) 3/50Hz (YΔ)						
H / W / L (cm)	2210/2200/1760		2210/2200/3400		2210/2200/5040		

Model With Two Compressor HIC 70DSC - HIC 280DSC

Model Specification	HIC 70DSC	HIC 100DSC	HIC 120DSC	HIC 140DSC	HIC 160DSC	HIC 220DSC	HIC 280DSC
Cooling Capacity (KW)							
Ambient 35C	178	240	304	343	464	584	731
Ambient 46C	152	205	260	293	396	498	624
No of Compressor	2	2	2	2	2	2	2
Possible Steps	0-16.5-33-49.5-66-82.5-100	0-16.5-33-49.5-66-82.5-100	0-12.5-25-37.5-50-62.5-75-87.5-100	0-12.5-25-37.5-50-62.5-75-87.5-100	0-12.5-25-37.5-50-62.5-75-87.5-100	0-12.5-25-37.5-50-62.5-75-87.5-100	0-12.5-25-37.5-50-62.5-75-87.5-100
Compressor Disp(m3/hr)	196	274	344	386	514	640	814
C.O.P	3.6	3.5	3.7	3.7	3.9	3.9	3.8
Compressor Input Power @ 4/50°	50	73.4	92.6	102	136.6	166.2	214
Max Current AMP	68×2	2×87	2×109	2×122	2×157	2×215	2×275
Air Flow Across Condenser (m3/hr)	60,000	118,000	118,000	118,000	155,000	350,000	175,000
Nominal Water Flow (L/hr)	30,600	41,300	52,300	59,000	79,800	100,400	125,700
Pressure Drop ΔP(m)	4	4	4	4	4	5	5
Power Supply	380 - 415V - (3 Phase) 3/50Hz (YΔ)						
H / W / L (cm)	2210/2200/3400		2210/2200/6800			2210/2200/6800	2210/2200/1080