



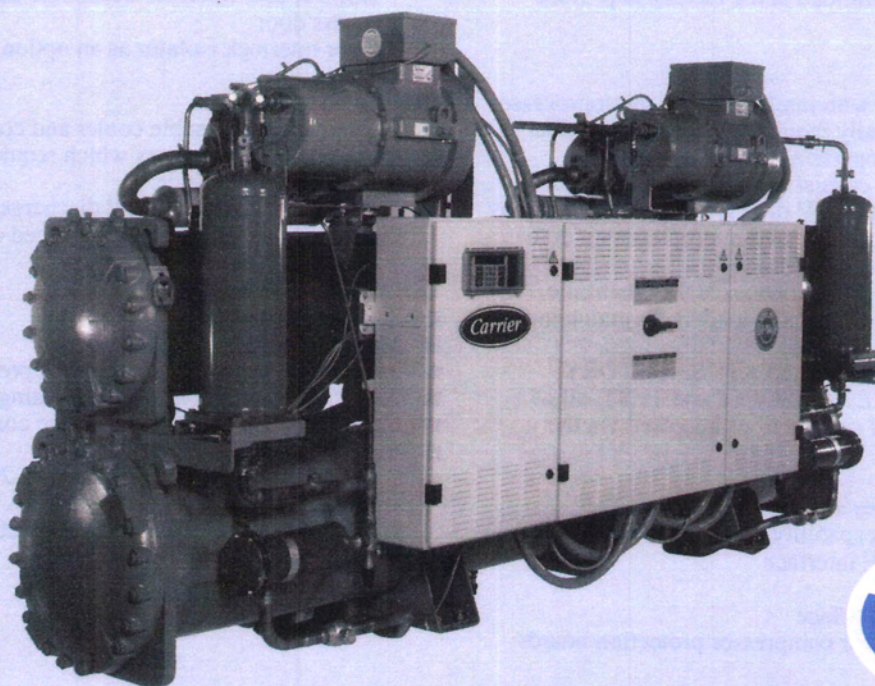
## 30HXC 075-370 Screw Compressor Water-Cooled Chillers

### QUALITY ASSURANCE



Nominal cooling capacity 259-1296 kW

## GLOBAL CHILLER



The 30HXC units are water-cooled chillers designed from the ground up to meet the needs of today and tomorrow, including:

- chlorine-free HFC-134a refrigerant,
- smooth compression using screw compressors,
- fits through a standard door with no disassembly required,
- mechanically cleanable coolers and condensers.

### Features

Quality design and construction make the 30HXC unit the preferred choice.

- Use of ozone-benign HFC-134a refrigerant which has no planned phase-out. HFC-134a is a proven non-toxic, non-flammable refrigerant which will have the highest usage of any new refrigerant.
- The 30HXC units have a quiet, low-vibration design featuring screw compressors.
- Efficiency levels of the 30HXC units exceed average industry standards, for both full- and part-load operation, thus saving on operating costs, through lower electrical consumption.
- The 30HXC controls are fully automatic. The leaving fluid temperature is directly controlled, and the entering fluid temperature is continuously monitored to detect load and flow changes. This combination provides the most precise temperature control available.
- Dual, independent refrigerant circuits provide reliable, dependable cooling, and the 30HXC units use medium-pressure HFC-134a refrigerant to minimize stress on the compressors and ensure long life.

## Easy installation

- The 30HXC has a compact design that fits through a standard door opening and requires minimal indoor space. The 30HXC is delivered as a complete package for easy installation. There are no extra controls, timers, starters, or other items to install.
- 30HXC units have a single power point and one disconnect switch (option) for sizes 075-185, and one power point and one main disconnect switch per circuit (option) for sizes 215-370. The hydraulic connections are simple and facilitated by the use of flanges for the condenser and evaporator.
- The 30HXC units are designed to ensure maximum compliance with European standard EN 60204.
- Quick start-up is assured once installation is complete, as each 30HXC unit is manufactured at an ISO 9001-listed manufacturing facility to guarantee quality. In addition, all units are tested under full load at the factory to provide reliable start-up.

## Controls

- The units are equipped with intelligent PIC microprocessor controls which continually monitor and optimize chiller efficiency in line with operating condition changes. The basic PIC controls consist of a processor module (PSIO-2), I/O boards, an EXV driver, a keypad and display module (HSIO II), and a dedicated microprocessor compressor protection board (CPM). The capacity control algorithm controls the electronic expansion valve, compressors and loaders, to maintain the leaving water setpoint.
- There are six major functions: STATUS, HISTORY, SCHEDULE, SERVICE, SETPOINT and TEST, all of which have a variety of subfunctions accessed via the HSIO II or remotely. Features include:
  - Diagnostic capabilities/service history
  - Variable water flow capability
  - LOCAL or REMOTE interface
  - BMS/CCN compatible
  - Optional enhanced interface
- Dedicated microprocessor compressor protection boards provide:
  - Protection and monitoring features
  - Control and output features
  - Diagnostic communication ability via the PSIO, for example of compressor alarms.
- Protection and monitoring features include:
  - Locked rotor and overcurrent protection
  - No current detection
  - Reverse rotation protection
  - Ground fault and unbalanced voltage detection
  - Unbalanced current
  - Phase loss voltage protection
  - Phase loss current protection
  - Winding temperature safety device
  - High pressure switch

- Compressor contactor failure.

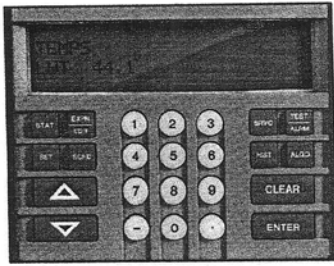
- The control cabinets are designed and fully tested to meet EUROPEAN COMMUNITY DIRECTIVES, (CE marked) for:
  - Electromagnetic compatibility
  - Low voltage equipmentServiceability and convenience have been "designed-in", for example:
  - Control transformer is fitted as standard
  - Single-point mains power connection
  - All components are mounted using connectors to facilitate fast servicing and replacement
  - Components are indelibly labelled and numbered according to wiring diagrams
  - All components are mounted on an orange backplate/board to distinguish them and to avoid mounting on the rear of the control box.
  - HSIO II user interface accessible through a dedicated access door
  - Door interlock isolator as an option.

## Simple to service

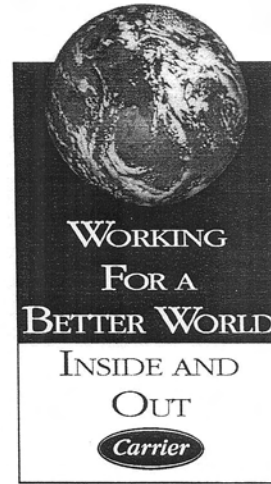
- Mechanically cleanable cooler and condenser.
- Twin-screw compressors which require minimum routine service or maintenance.
- Easily accessed suction and discharge pressure and temperature information using enhanced display module.

## Options

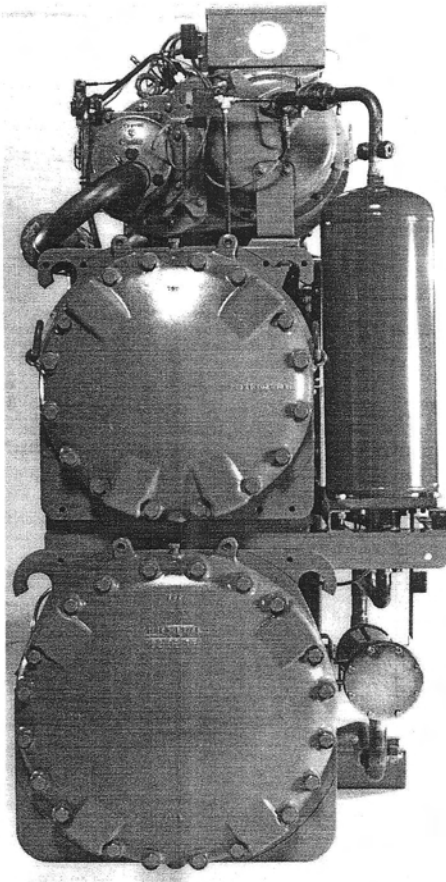
- Star delta start.
- Main disconnect switch.
- 21 bar maximum cooler operating pressure water side.
- 21 bar maximum condenser operating pressure water side.
- Cooler and condenser water pump control pack.
- Remote control module:
  - electrical demand limit control (4-20 mA signal)
  - evaporator setpoint reset (4-20 mA signal)
  - condenser water valve control (4-20 mA signal).
- IP54 protection.
- Fewer evaporator passes.
- One-pass condenser.



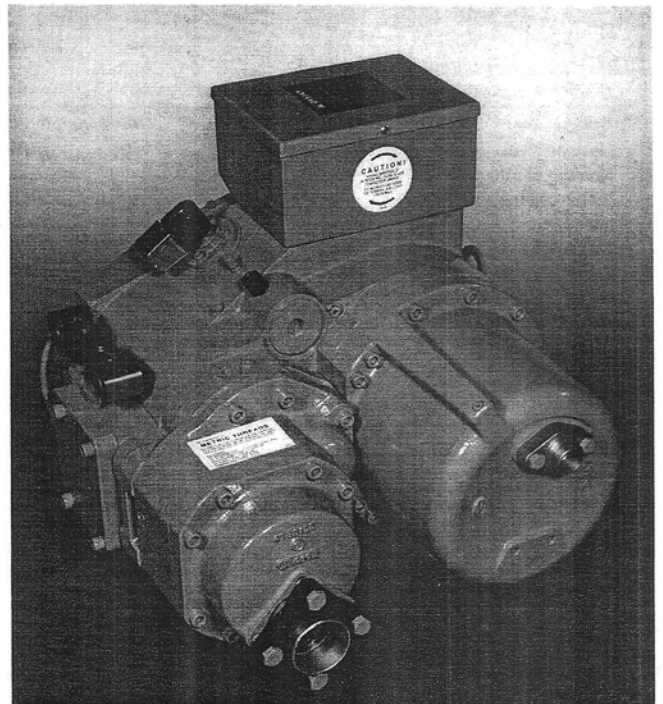
The 30HXC enhanced 2-line, 24-character display makes service diagnostics easier



CARRIER's environmental leadership



The 30HXC fits through a standard doorway, minimizing installation costs.



CARRIER Power<sup>3</sup> twin-screw compressor

# Physical data

<b>30HXC</b>		<b>075</b>	<b>085</b>	<b>095</b>	<b>105</b>	<b>115</b>	<b>125</b>	<b>135</b>	<b>145</b>	<b>160</b>	<b>170</b>	<b>185</b>
<b>Gross nominal cooling capacity*</b>	kW	258.9	308.0	339.6	376.4	412.5	443.4	484.9	537.0	576.9	584.3	643.5
<b>Operating weight</b>	kg	2503	2518	2560	2731	2833	2872	2956	2971	3283	3403	3517
<b>Refrigerant</b>		HFC-134a										
<b>Total refrigerant charge</b>	kg	63	70	78	90	96	104	117	126	139	142	155
<b>Compressor</b>		Semi-hermetic twin screw										
Quantity, circuit A		1	1	1	1	1	1	1	1	1	1	1
Quantity, circuit B		1	1	1	1	1	1	1	1	1	1	1
Economizer		No	No	No	No	No	No	No	No	No	Yes	Yes
Number of capacity steps		6	6	6	6	6	6	6	6	6	6	6
Minimum capacity	%	20	20	20	20	20	20	20	20	20	20	20
<b>Cooler</b>		One shell & tube cooler with enhanced copper tubes										
Net water volume	l	65	65	73	87	81	81	91	91	109	109	127
Number of refrigerant circuits		2	2	2	2	2	2	2	2	2	2	2
Water connections	in	Factory supplied flat flange to be site welded										
Inlet & outlet diameter		4	4	4	5	5	5	5	5	5	5	6
Air vent diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Water drain diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Maximum operating pressure water side	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
<b>Condenser</b>		One shell & tube condenser with enhanced copper tubes										
Net water volume	l	67	67	67	74	89	96	110	110	132	136	145
Number of refrigerant circuits		2	2	2	2	2	2	2	2	2	2	2
Water connections	in	Factory supplied flat flange to be site welded										
Inlet & outlet diameter		5	5	5	5	5	5	5	5	6	6	6
Air vent diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Water drain diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Maximum operating pressure water side	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

<b>30HXC</b>		<b>215</b>	<b>250</b>	<b>265</b>	<b>280</b>	<b>300</b>	<b>315</b>	<b>340</b>	<b>370</b>
<b>Gross nominal cooling capacity*</b>	kW	796.2	851.0	911.3	962.7	1022.6	1104.0	1183.1	1295.9
<b>Operating weight</b>	kg	4730	4996	5021	5046	5890	6070	6115	6165
<b>Refrigerant</b>		HFC-134a							
<b>Total refrigerant charge</b>	kg	176	200	212	224	240	252	272	296
<b>Compressor</b>		Semi-hermetic twin screw							
Quantity, circuit A		2	2	2	2	2	2	2	2
Quantity, circuit B		1	1	1	1	2	2	2	2
Economizer		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of capacity steps		8	8	8	8	10	10	10	10
Minimum capacity	%	15	15	15	15	10	10	10	10
<b>Cooler</b>		One shell & tube cooler with enhanced copper tubes							
Net water volume	l	165	181	181	181	203	229	229	229
Number of refrigerant circuits		2	2	2	2	2	2	2	2
Water connections	in	Factory supplied flat flange to be site welded							
Inlet & outlet diameter		6	6	6	6	8	8	8	8
Air vent diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Water drain diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Maximum operating pressure water side	kPa	1000	1000	1000	1000	1000	1000	1000	1000
<b>Condenser</b>		One shell & tube condenser with enhanced copper tubes							
Net water volume	l	208	208	208	208	231	251	251	251
Number of refrigerant circuits		2	2	2	2	2	2	2	2
Water connections	in	Factory supplied flat flange to be site welded							
Inlet & outlet diameter		6	6	6	6	8	8	8	8
Air vent diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Water drain diameter (on water box)		3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT
Maximum operating pressure water side	kPa	1000	1000	1000	1000	1000	1000	1000	1000

**Legend:**

\* Eurovent conditions:  
Evaporator entering/leaving water temperature 12°C and 7°C, condenser entering/leaving water temperature 30°C and 35°C.

# Electrical data

30HXC		075	085	095	105	115	125	135	145	160	170	185
<b>Mains power supply</b>												
Nominal voltage	V-ph-Hz	400-3-50										
Voltage range	%	± 10										
<b>Control circuit voltage*</b>												
	V-ph-Hz	230-1-50										
Nominal power input	kW	56.5	63.5	70.7	79.5	85.0	93.0	103.1	117.7	125.3	124.3	135.8
Nominal operating current**	A	96.5	108.0	120.2	134.8	143.9	154.0	171.3	195.2	207.1	206.0	225.4
Maximum operating current***	A	142	157	175	195	210	228	255	275	302	300	330
Maximum starting current	A											
Across the line start****		415	494	577	676	691	709	819	839	866	992	1021
Optional star-delta start****		180	205	231	262	277	295	330	350	377	406	435

30HXC		215	250	265	280	300	315	340	370
<b>Mains power supply</b>									
Nominal voltage	V-ph-Hz	400-3-50							
Voltage range	%	± 10							
<b>Control circuit voltage*</b>									
	V-ph-Hz	230-1-50							
Nominal power input	kW	168.1	182.0	192.0	203.4	208.6	223.0	224.4	269.0
Nominal operating current**	A	281.2	298.0	320.9	335.4	351.2	372.1	409.7	444.5
Maximum operating current***	A								
Circuit A		255	278	300	330	248	278	300	330
Circuit B		151	165	165	165	271	278	300	330
Maximum starting current	A								
Across the line start****		970	1134	1156	1186	1099	1247	1292	1350
Optional star-delta start****		481	548	570	600	610	661	706	764

**Legend:**

- \* Control power circuit is supplied through factory-installed transformer
- \*\* Current drawn at cooler entering/leaving temperature 12°C/7°C, condenser entering/leaving temperature 30°C/35°C and at 400 V nominal voltage
- \*\*\* Maximum current drawn by compressors at full load and at minimum voltage of 360 V
- \*\*\*\* Maximum instantaneous starting current

**Electrical data notes:**

- 30HXC 075 to 185 units have a single power connection point, units 30HXC 215 to 370 have two power connection points.
- The control box incorporates the following standard features:
  - Starters for each compressor
  - Control devices
- Field connections:
  - All connections to the system and electrical installation must be in full accordance with all applicable European directives.
- The Carrier 30HXC units are designed to ensure conformance with these directives. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components - part 1: general regulations) are specifically taken into account, when designing the electrical equipment.

**NOTES:**

- Generally the recommendations of IEC 364 are accepted as compliance with these requirements of the installation directives. Conformance with EN 60204 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.

1. The operating environment for 30HXC chillers is specified below:

- a. Environment - Environment as classified in IEC 364 § 3:
  - ambient temperature range: + 6°C to + 40°C, class AA4
  - humidity range (non condensing)
    - 50% relative humidity at 40°C
    - 90% relative humidity at 20°C
  - altitude: ≤ 2000 m
  - indoor installation
    - presence of water: class AD2 (possibility of water droplets)
    - Presence of hard solids: class AE2 (no significant dust present)
    - Presence of corrosive and polluting substances, class AF1 (negligible)
    - Vibration and shock: class AG2, AH2
- b. Competence of personnel: class BA4\* (trained personnel - IEC 364).
2. Power supply frequency variation: ± 2 Hz
3. The neutral line (N) must not be directly connected to the unit (if necessary use a transformer)
4. Overcurrent protection of the power supply conductors is not provided with the unit.
5. The factory-installed circuit breaker (if ordered) is of type "a" (EN60204-1 § 5.3.2).

**NOTE:**

If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.

\* The required protection level for this class is IP21B (according to reference document)

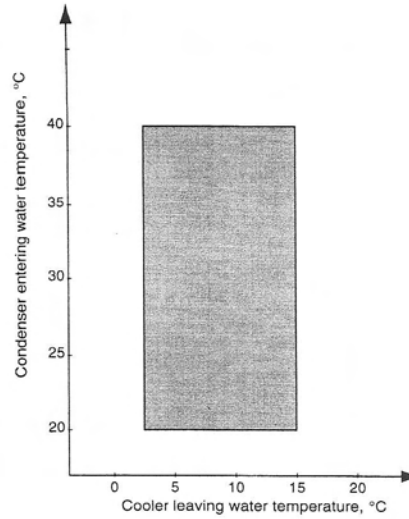
### Condenser water flow rates

30HXC	Minimum flow rate, l/s*		Maximum flow rate, l/s**
	Closed loop	Open loop	
075-095	2.5	7.5	29.9
105	2.9	8.8	35.0
115	3.1	9.3	37.2
125	3.2	9.7	38.8
135-145	3.8	11.4	45.6
160	4.6	13.8	55.3
170	4.9	14.9	59.8
185	5.3	16.0	64.0
215-280	7.2	21.5	86.2
300-370	7.9	23.6	94.5

\* Based on a velocity of 0.3 m/s in a closed loop, and 0.9 m/s in an open loop.

\*\* Based on a water velocity of 3.6 m/s.

### Unit operating and start-up range



#### Notes:

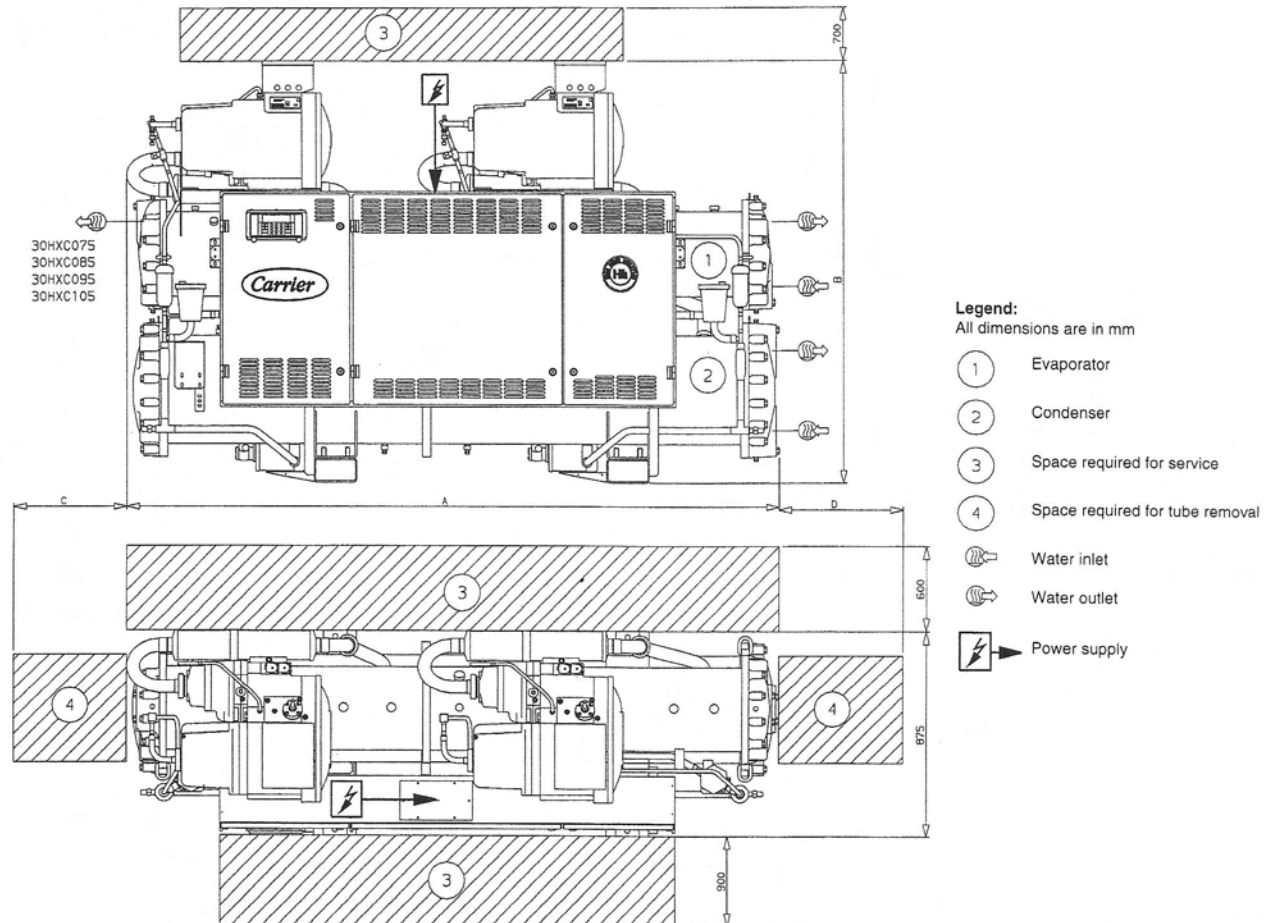
1. Cooler and condenser  $\Delta T = 5$  K
2. For start-up with a condenser entering water temperature below 20°C, a 3-way valve is mandatory to maintain proper condensing temperature (3-way valve, 4-20 mA control available with option 128).
3. Maximum condenser leaving temperature 45°C.

### Cooler water flow rates

30HXC	Minimum flow rate, l/s	Maximum flow rate, l/s
075-085	6.6	26.2
095	6.7	27.0
105	9.1	36.2
115-125	9.3	37.0
135-145	11.2	44.7
160-170	14.1	56.3
185	16.4	65.5
215	17.0	67.9
250-280	21.0	84.0
300	22.2	88.7
315-370	26.8	107.2

## Dimensions/clearances

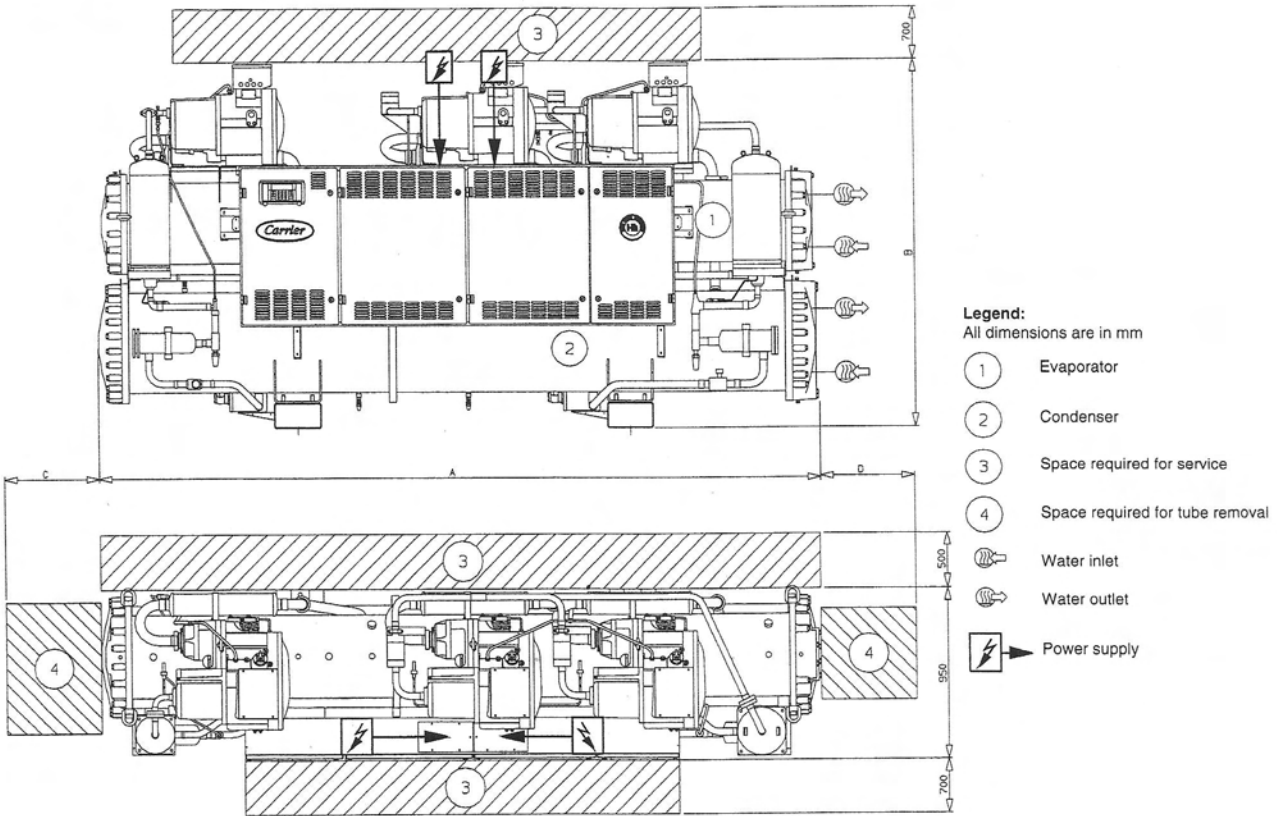
### 30HXC 075-185



30HXC	A	B	C	D
075-095	2730	1775	2360	1000
105	2730	1825	2360	1000
115-145	3535	1775	3220	1000
160-185	3550	1900	3220	1000

NOTE: Certified dimensional drawings available on request.

**30HXC 215-370**



30HXC	A	B	C	D
215-280	3995	2015	3620	1000
300-370	4488	2068	4120	1000

NOTE: Certified dimensional drawings available on request.

# Technical description

Water-cooled packaged liquid chiller for indoor installation, equipped with numerical control and electronic expansion valves, and operating with chlorine-free refrigerant HFC-134a.

## Quality assurance

Designed and manufactured in a factory accredited to Quality Assurance Standard ISO 9001. Performances in accordance with EUROVENT recommendations.

## Chassis

Brazed-steel or bolted chassis, with polyester-powder paint finish, electrostatically applied and oven baked before assembly. Colour dark grey (RAL 7037).

## Compressors

Semi-hermetic twin-screw compressors with internal muffler and check valve.  
Each compressor is equipped with a discharge shutoff valve.

## Cooler

Multi-tube evaporator with 2 independant refrigerant circuits, internally-enhanced, seamless copper tubes, expanded into tube sheets.  
Thermal insulation of the shell and end covers using 19 mm closed-cell polyurethane.  
Mechanically cleanable shell and tube type with removable heads.

## Condensers

Multi-tube condenser with 2 independant refrigerant circuits, internally-enhanced, seamless copper tubes, expanded into tube sheets.  
Mechanically cleanable shell and tube type with removable heads.

## Refrigerant circuits

Each refrigerant circuit includes one or two compressors, oil separator, replaceable core filter drier, combined moisture indicator and sightglass, discharge and liquid shutoff valves, expansion valve, refrigerant economizer (30HXC 170-370 except 30HXC 215).

## Control box power and control wiring

Galvanized sheet steel, polyester paint finish, colour light grey (RAL 7035), with hinged access doors, containing: compressor fuses and contactor, control circuit transformer, 3-phase power supply terminals. Inside of control box painted in orange, control circuit cables and electrical components numbered.

## Numeric control accessible without opening the control box, offers:

- PID control of leaving water temperature with return temperature compensation for control of compressors and electronic expansion valves.
- Protection against abnormal operating conditions, high or low refrigerant pressure, low suction temperature, insufficient chilled water flow, compressor reverse rotation, low oil pressure, voltage imbalance, ground current, thermal overload, electrical overload, loss of phase, etc.
- Communication: Unit controls include a 2-line, 24-character per line diagnostic display. Display module is capable of displaying setpoints, time, system status (including temperatures, pressures, and percent loading), and any alarms or alert conditions.  
Remote control: start/stop, dual setpoint, setpoint adjustment, demand limit control, general fault reporting.  
The controls can be interfaced with the Carrier Comfort Network (CCN) if desired.



Order No. 13179-20, August 1997. Supersedes order No. 13179-20, April 1997.  
Manufacturer reserves the right to change any product specifications without notice.

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