



# 30HXC 075-370 30GX 080-350 Screw Compressor Water-Cooled Chillers and Air-Cooled Chillers

30HXC Nominal cooling capacity 268-1290 kW  
30GX Nominal cooling capacity 262-1160 kW  
50 Hz

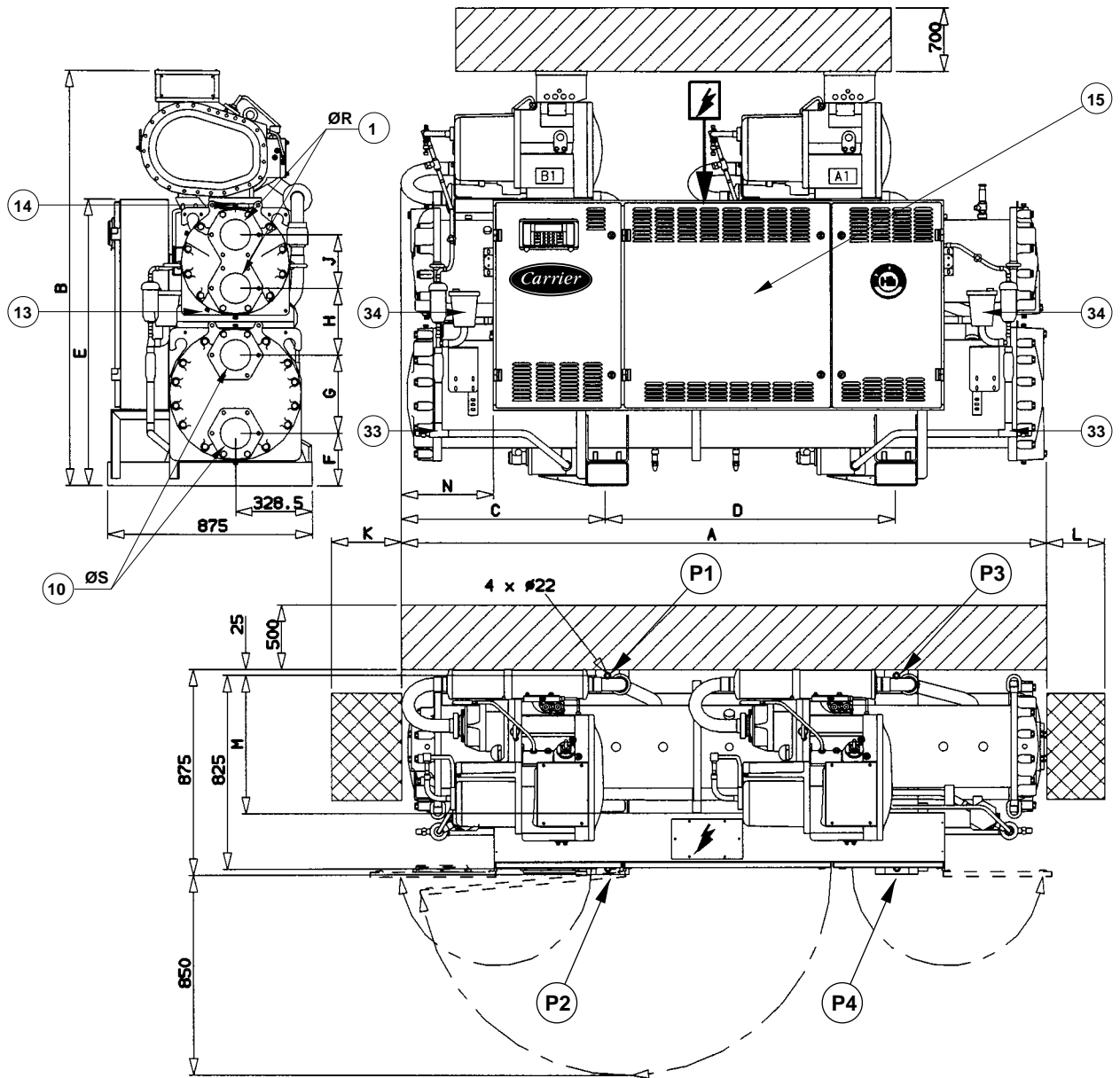


Installation, operation and maintenance instructions






# DIMENSIONS, CLEARANCES, WEIGHT DISTRIBUTION

## 30HXC 075-185



30HXC	A	B	C	D	E	F	G	H	J	K	L	M	N	ØR	ØS
075-095	2730	1775	875	1217	1220	222.5	332	268.3	265.4	2360	1000	593	279	114.3	139.7
105	2730	1825	875	1217	1220	222.5	332	276.5	300	2360	1000	593	279	139.7	139.7
115-145	3535	1775	1035	1635	1220	222.5	332	286	230	3220	1000	593	734	19.7	139.7
160-170	3550	1900	1195	1635	1328	306	257	340	300	3220	1000	620	804	139.7	168.3
185	3550	1900	1195	1635	1328	306	257	360	260	3220	1000	620	804	168.3	168.3

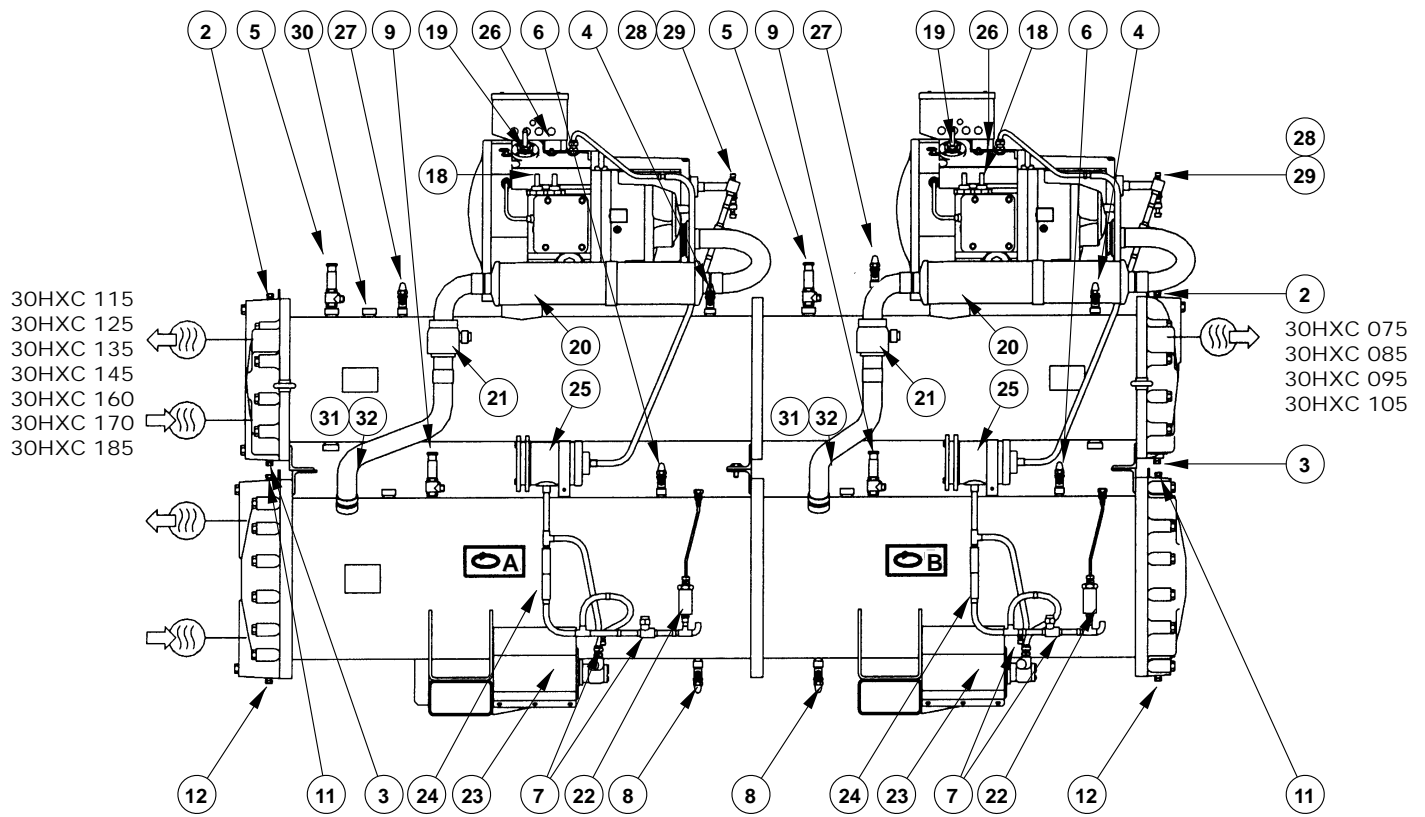
30HXC	Weight distribution at the four mounting holes (kg)				Total operating weight (kg)
	P1	P2	P3	P4	
075	703	613	634	553	2503
085	707	617	637	557	2518
095	719	627	647	567	2560
105	767	670	691	603	2731
115	795	695	716	627	2833
125	807	705	726	634	2872
135	830	726	746	654	2956
145	835	730	750	656	2971
160	922	808	818	735	3283
170	936	848	848	771	3403
185	968	876	876	797	3517

- Legend :**
-  Services clearances required
  -  Space required to remove cooler and condenser tubes
  -  Electrical supply entry

NOTE : Refer to certified dimensional drawings 99DI 075HX when designing an installation.

# MAIN COMPONENTS LOCATION





## 30HXC 075-185



ITEM	DESIGNATION
1	Cooler water inlet and outlet
2	Cooler 3/8" NPT air vent
3	Cooler 3/8" NPT water drain
4	Refrigerant charging valve
5	Cooler safety relief valve
6	Oil charging valve
7	Closing valve and oil drain
8	Refrigerant recovery valve
9	Condenser safety relief valve
10	Condenser inlet and outlet
11	Condenser 3/8" NPT air vent
12	Condenser 3/8" NPT water drain
13	Cooler entering fluid thermistor
14	Cooler leaving fluid thermistor
15	Electrical box
16	Power terminal block (see field power supply)
17	Main disconnect switch option (see field power supply)

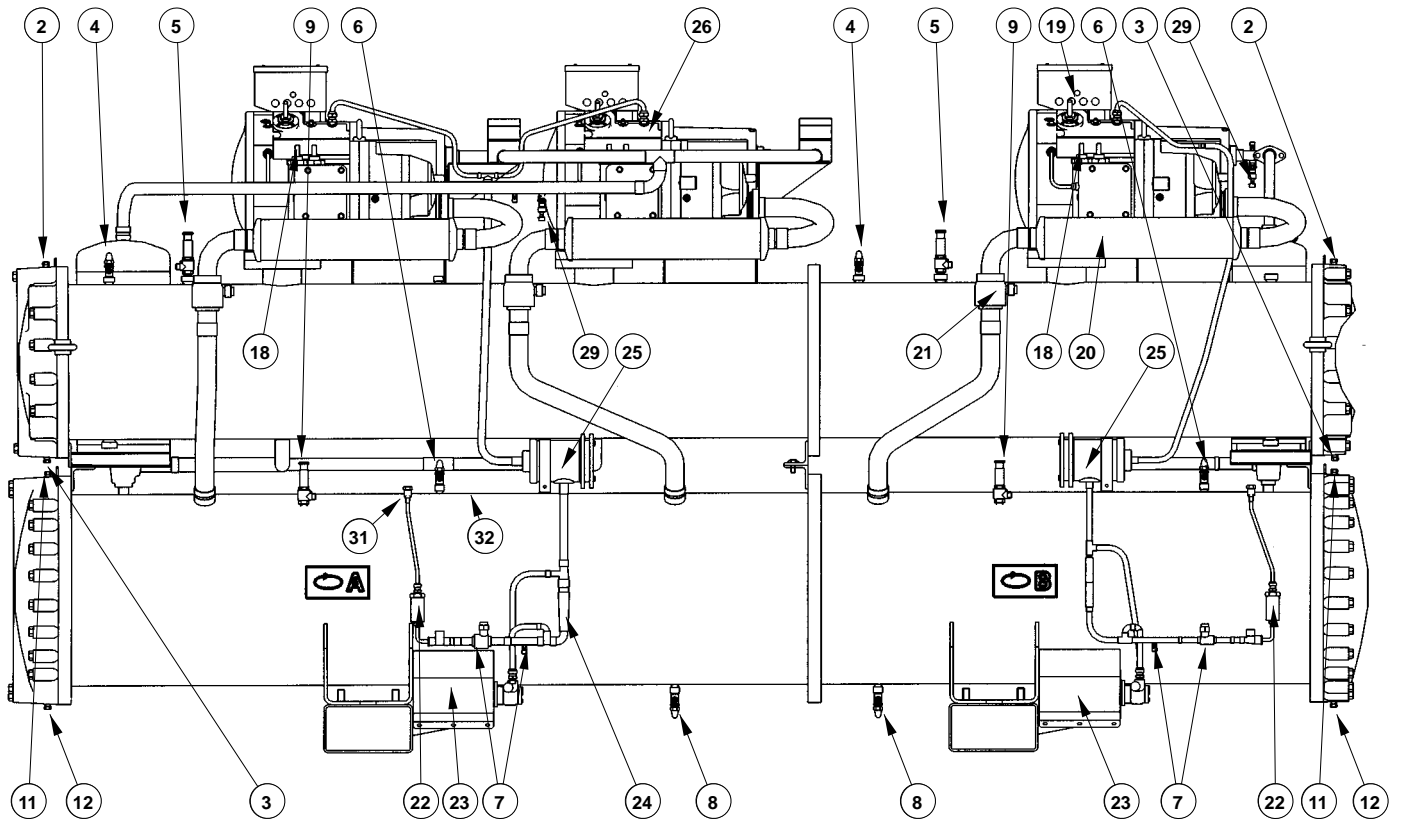
ITEM	DESIGNATION
18	Capacity loaders
19	Oil solenoid valve
20	External muffler
21	Discharge valve
22	Oil level switch
23	Prelube oil pump
24	Oil check valve
25	Oil prefilter
26	Compressor oil filter housing
27	Cooler liquid level sensor
28	Motor cooling valve
29	Economizer pressure transducer
30	Suction pressure transducer
31	Discharge pressure transducer
32	Discharge temperature thermistor
33	Liquid valve
34	Electronic expansion valve

### Legend:

-  Circuit A
-  Circuit B
-  Water inlet (flanges supplied)
-  Water outlet (flanges supplied)

# MAIN COMPONENTS LOCATION (CONT.)

## 30HXC 215-280



ITEM	DESIGNATION
1	Cooler water inlet and outlet
2	Cooler 3/8" NPT air vent
3	Cooler 3/8" NPT water drain
4	Refrigerant charging valve
5	Cooler safety relief valve
6	Oil charging valve
7	Closing valve and oil drain
8	Refrigerant recovery valve
9	Condenser safety relief valve
10	Condenser inlet and outlet
11	Condenser 3/8" NPT air vent
12	Condenser 3/8" NPT water drain
13	Cooler entering fluid thermistor
14	Cooler leaving fluid thermistor
15	Electrical box
16	Power terminal block (see field power supply)
17	Main disconnect switch option (see field power supply)

ITEM	DESIGNATION
18	Capacity loaders
19	Oil solenoid valve
20	External muffler
21	Discharge valve
22	Oil level switch
23	Prelube oil pump
24	Oil check valve
25	Oil prefilter
26	Compressor oil filter housing
27	Cooler liquid level sensor
28	Motor cooling valve
29	Economizer pressure transducer
30	Suction pressure transducer
31	Discharge pressure transducer
32	Discharge temperature thermistor
33	Liquid valve
34	Economizer

**Legend :**

 Circuit A

 Circuit B

PHYSICAL DATA

30HXC

30HXC		075	085	095	105	115	125	135	145	160	170	185
Nominal gross cooling capacity*	kW	268	295	346	373	404	439	485	519	550	593	639
Operating weight**	kg	2503	2518	2560	2731	2833	2872	2956	2971	3283	3403	3517
Refrigerant		HFC-134a										
Refrigerant charge CKT A/CKT B	kg	See unit nameplate										
Oil		Polyolester oil CARRIER SPEC : PP 47-32										
Oil charge CKT A/CKT B	l	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20
Compressor		Semi-hermetic twin screw										
Ckt A (nominal capacity compressor A1)	Tons	39	46	56	66	66	66	80	80	80	66	80
Ckt B (nominal capacity compressor B1)	Tons	39	39	39	39	46	56	56	66	80	80	80
Economizer		No	No	No	No	No	No	No	No	No	Yes	Yes
Capacity steps	No.	6	6	6	6	6	6	6	6	6	6	6
Minimum capacity	%	20	20	20	20	20	20	20	20	20	20	20
Cooler		One shell & tube cooler with enhanced copper tubes										
Net water volume	l	65	65	73	87	81	81	91	91	109	109	127
Refrigerant circuits	No.	2	2	2	2	2	2	2	2	2	2	2
Water connection		Factory supplied flat flange to be site welded										
Inlet & outlet diameter	inches	4	4	4	5	5	5	5	5	5	5	6
Air vent diameter (on water box)	inches	3/8" NPT										
Water drain diameter (on water box)	inches	3/8" NPT										
Maximum operating pressure water side	kPa	1000										
Condenser		One shell & tube condenser with enhanced copper tubes										
Net water volume	l	67	67	67	74	89	96	110	110	132	136	145
Refrigerant circuits	No.	2	2	2	2	2	2	2	2	2	2	2
Water connection		Factory supplied flat flange to be site welded										
Inlet & outlet diameter	inches	5	5	5	5	5	5	5	5	6	6	6
Air vent diameter (on water box)	inches	3/8" NPT										
Water drain diameter (on water box)	inches	3/8" NPT										
Maximum operating pressure water side	kPa	1000										

30HXC		215	250	265	280	300	315	340	370			
Nominal gross cooling capacity*	kW	757	879	921	965	1054	1140	1195	1290			
Operating weight**	kg	4730	4996	5021	5046	5890	6070	6115	6165			
Refrigerant		HFC-134a										
Refrigerant charge CKT A/CKT B	kg	See unit nameplate										
Oil		Polyolester oil CARRIER SPEC : PP 47-32										
Oil charge CKT A/CKT B	l	40/20	40/20	40/20	40/20	40/40	40/40	40/40	40/40			
Compressor		Semi-hermetic twin screw										
Ckt A (nominal capacity compressor A1)	Tons	80/56	50/56	50/66	80/80	56/66	56/80	66/80	80/80			
Ckt B (nominal capacity compressor B1)	Tons	80	80	80	80	66/66	56/80	66/80	80/80			
Economizer		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Capacity steps	No.	8	8	8	8	10	10	10	10			
Minimum capacity	%	15	15	15	15	10	10	10	10			
Cooler		One shell & tube cooler with enhanced copper tubes										
Net water volume	l	165	181	181	181	203	229	229	229			
Refrigerant circuits	No.	2	2	2	2	2	2	2	2			
Water connection		Factory supplied flat flange to be site welded										
Inlet & outlet diameter	inches	6	6	6	6	8	8	8	8			
Air vent diameter (on water box)	inches	3/8" NPT										
Water drain diameter (on water box)	inches	3/8" NPT										
Maximum operating pressure water side	kPa	1000										
Condenser		One shell & tube condenser with enhanced copper tubes										
Net water volume	l	208	208	208	208	231	251	251	251			
Refrigerant circuits	No.	2	2	2	2	2	2	2	2			
Water connection		Factory supplied flat flange to be site welded										
Inlet & outlet diameter	inches	6	6	6	6	8	8	8	8			
Air vent diameter (on water box)	inches	3/8" NPT										
Water drain diameter (on water box)	inches	3/8" NPT										
Maximum operating pressure water side	kPa	1000										

Legend :

- \* Eurovent conditions :  
Evaporator entering/leaving water temperature 12°C and 7°C,  
Condenser entering/leaving water temperature 30°C and 35°C.
- \*\* Weight includes weight of water or brine and refrigerant.

## ELECTRICAL DATA

### 30HXC

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										
Control circuit voltage*	V-ph-Hz	230-1-50										
Nominal unit power input**	kW	62.1	68	80.5	86.4	90.6	98.4	108.7	117.9	124	133	144.3
Nominal operating current**	A	87	96	122	133	139	165	178	189	203	206	239
Maximum operating current***	A	142	157	175	195	210	228	255	275	302	300	330
Maximum starting current Across the line start****	A	415	494	577	676	691	709	819	839	866	992	1021
Optional star delta start****	A	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							
Control circuit voltage*	V-ph-Hz	230-1-50							
Nominal unit power input**	kW	171.8	192.3	204	216.3	229.2	246.5	263.1	289.2
Nominal operating current**	A	308.0	327.9	342.5	360.3	398.5	416.2	443.3	480.9
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 Across the line start****	A	970	1134	1156	1186	1099	1247	1292	1350
Optional star delta start****	A	481	548	570	600	610	661	706	764

**Legend :**

\* Control power circuit is supplied through factory installed transformer

\*\* Unit power input kW and current drawn at cooler entering/leaving temperature 12°C/7°C, condenser entering/leaving temperature 30°C/35°C and at 400 Volts nominal voltage

\*\*\* Maximum current drawn by compressors at full load and at minimum voltage 360 Volts

\*\*\*\* Maximum instantaneous starting current (maximum operating current of the smallest compressor + locked rotor amps of the largest compressor)

### Compressor

PART NUMBER	Tons	LRA (Y)	LRA (Delta)	MHA
O6NW 1146 S7 N	39	109	344	71
O6NW 1174 S7 N	46	134	423	86
O6NW 1209 S7 N	56	160	506	104
O6NW 1250 S7 N	66	191	605	124
O6NW 1300 S5 N	80	226	715	151
O6NW 1209 S7 E	56	191	605	113
O6NW 1250 S7 E	66	226	715	136
O6NW 1300 S5 E	80	270	856	165

**Legend :**

**LRA (Y)** Locked Rotor Amps with optional star delta start

**LRA (Delta)** Locked Rotor Amps with standard across the line start

**MHA** Compressor Must Hold Amps (Maximum Operating Current at 360 V)

**O6NW** Water-cooled condensing compressor

**N** Non Economized compressor

**E** Economized compressor

## APPLICATION DATA

### Unit operating range

Cooler		Minimum	Maximum
Cooler entering water temperature	°C	6.8*	21
Cooler leaving water temperature	°C	4**	15
Condenser (water-cooled)		Minimum	Maximum
Condenser entering water temperature	°C	20***	42
Condenser leaving water temperature	°C	23	45
Condenser (air-cooled)		Minimum	Maximum
Outdoor ambient operating temperature	°C	0	45

#### Notes :

\* For application requiring operation at less than 6.8°C, contact Carrier s.a. for unit selection using the Carrier electronic catalog.

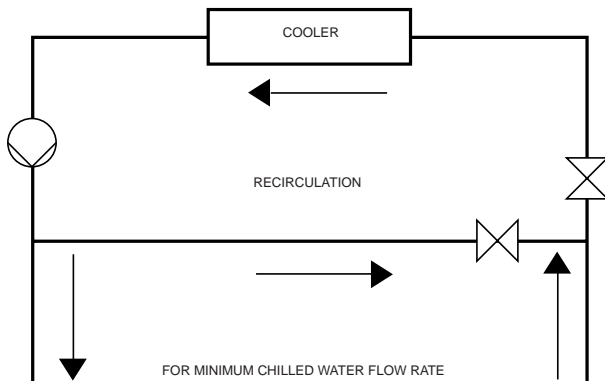
\*\* For application requiring operation at less than 4°C, the units require the use of antifreeze.

\*\*\* Water-cooled units (30HXC) operating at less than 20°C for condenser entering water require the use of head pressure control with analogue water valves (see head pressure control paragraph).

### Minimum chilled water flow

The minimum chilled water flow (maximum chilled water temperature difference) is shown in the table below. If the flow is less than this (a high temperature difference) three solutions are possible :

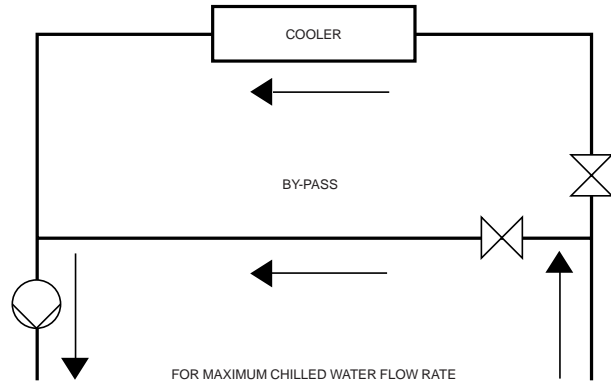
- Check for availability of a non-standard evaporator (plus one pass) which will allow a lower water flow rate (contact factory).
- The evaporator flow can be recirculated as shown in the diagram. The temperature of the mixture leaving the evaporator must never be less than 2.8 K lower than the chilled water entering temperature.
- Link several chillers in series with each making a contribution to the total temperature difference.



### Maximum chilled water flow

The maximum chilled water flow ( $> 0.09$  l/s per kW or  $< 2.8$  K temperature difference) is limited by the maximum permitted pressure drop in the evaporator. It is provided in the following table :

- Select a non-standard evaporator with one water pass less which will allow a higher maximum water flow rate.
- Bypass the evaporator as shown in the diagram to obtain a higher temperature difference with a lower evaporator flow rate.



## Cooler flow rate (l/s)

30HXC	Min.*	Max.**
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

30GX	Min.*	Max.**
080-090	5.8	21.0
105-115	6.3	26.5
125-135	7.4	31.8
150	9.1	36.0
160-175	10.8	41.9
205	12.4	46.0
225	14.5	54.0
250-265	16.5	60.0
280-300	18.0	66.0
325-350	21.0	72.0

\* Based on a water velocity of 0.9 m/s.

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

## Condenser flow rate (l/s)

30HXC	Min.*		Max.**
	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 water 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.

## Variable flow evaporator

Variable evaporator flow can be used in standard 30HXC and 30GX chillers. The chillers maintain a constant leaving water temperature under all flow conditions. For this to happen, the minimum flow rate must be higher than the minimum flow given in the table of permissible flow rates and must not vary by more than 10% per minute.

If the flow rate changes more rapidly, the system should contain a minimum of 6.5 liters of water per kW instead of 3.25 l/kW.

## System minimum water volume

Whichever the system, the water loop minimum capacity is given by the formula :

$$\text{Capacity} = \text{Cap (kW)} \times \text{N Liters}$$

Application	N
Normal air conditioning	3.25
Process type cooling	6.5

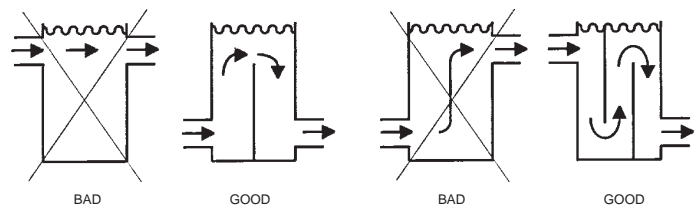
Where Cap is the nominal system cooling capacity (kW) at the nominal operating conditions of the installation.

This volume is necessary for stable operation and accurate temperature control.

It is often necessary to add a buffer water tank to the circuit in order to achieve the required volume. The tank must itself be internally baffled in order to ensure proper mixing of the liquid (water or brine). Refer to the examples below.

### NOTE

**The compressor must not restart more than 6 times in an hour.**





## Flow controllers

### Cooler flow switch and chilled water pump interlock

#### **IMPORTANT**

*It is mandatory to install cooler flow switch and also to connect chilled water pump interlock on 30HXC and 30GX units using flooded cooler. Failure to this instruction will void Carrier guarantee.*

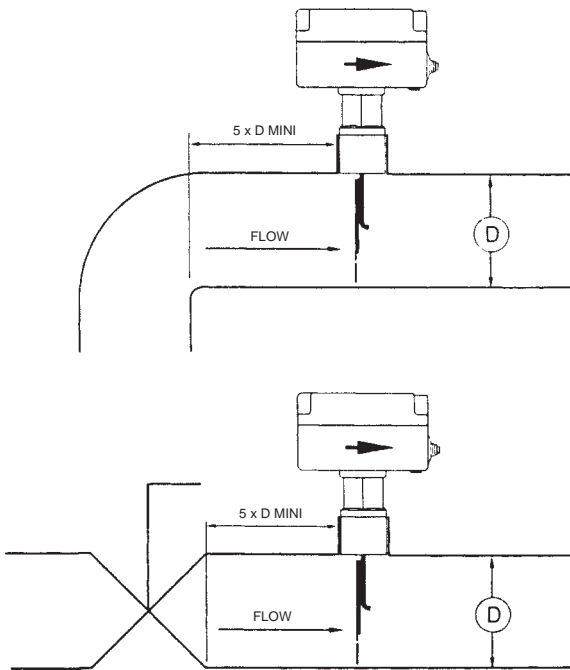
The cooler flow switch controller is factory supplied and wired on 30HXC and 30GX units.

Follow the manufacturer instruction for installation.

The flow switch may be mounted in a horizontal pipe or a vertical pipe with upward liquid flow. It should not be used when liquid flow is downwards.

Mount in a section of pipe where there is a straight run of at least five pipe diameters on each side of the flow switch. Do not locate adjacent to valves, elbows or orifices. The paddle must never touch the pipe or any restriction in the pipe. Screw the flow switch in position so the flat part of the paddle is at right angles to the flow. The arrows on the cover and in the bottom, inside the case, must point in the direction of the flow. The switch should be mounted so that the terminals are accessible for easy wiring.

Terminals 34 and 35 are provided for field installation of a chilled water pump interlock (auxiliary contact of chilled water pump contactor).



### Condenser flow switch (30HXC)

The condenser flow switch controller is a field installed device. It is configurable from the HSIO II when <2> <SRVC> is entered.

## INSTALLATION

### Check equipment received

- Inspect the unit for damage or missing parts. If damage is detected, or if shipment is incomplete, immediately file a claim with the shipping company.
- Confirm that the unit received is the one ordered. Compare the nameplate data with the order.
- Confirm that all accessories ordered for on-site installation have been delivered, and are complete and undamaged.
- Do not store units in an area exposed to weather because of sensitive control mechanism and electronic devices.

### Moving and siting the unit

#### Moving

Do not remove skids, pallets or protective packaging until the unit is in its final position. Move the chiller using tubes or rollers, or lift it, using slings of the correct capacity.

#### CAUTION (30HXC)

*Only use slings at the designated lifting points which are marked on the unit, on the top of the cooler heat exchanger. Rigging from the bottom of the heat exchanger will cause the unit to be lifted unsafely. Personal injury or damage to the unit may occur. Follow the rigging instruction given on the certified dimensional drawing supplied with the unit.*

#### Siting

Always refer to the chapter "Dimensions and clearances" to confirm that there is adequate space for all connections and service operation. For the center of gravity coordinates, the position of the unit mounting holes, and the weight distribution points, refer to the certified dimensional drawing supplied with the unit.

We recommend that these chillers be installed either in a basement or at ground level. If one is to be installed above ground level, first check that the permissible floor loading is adequate and that the floor is strong enough and level. If necessary, strengthen and level the floor.

With the chiller in its final location remove the skids, and other devices used to aid in moving it. Level the unit using a spirit level, and bolt the unit to the floor or plinth. Operation of these units may be impaired if they are not level and not securely fixed to their mountings. If required use isolation pads under the unit to aid in vibration isolation.