Installation
Operation
Maintenance

Indoor liquid chiller with integrated hydraulic module
Water-cooled model CGWN and Condenserless model CCUN :
205 - 206 - 207 - 208 - 209 - 210 - 211 - 212 - 213 - 214 - 215
R410A

AquaStream 2 ®

CG-SVX06F-GB
Original instructions

Contents

General information

Foreword

These instructions are given as a guide to good practice in the installation, start-up, operation, and maintenance by the user, of Trane CGWN/CCUN chillers. They do not contain full service procedures necessary for the continued successful operation of this equipment. The services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company. Read this manual thoroughly before unit start-up.

Units are assembled, pressure tested, dehydrated, charged and run tested before shipment.

Warnings and cautions

Warnings and Cautions appear at appropriate sections throughout this manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

WARNING! : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION! : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or for equipment or property-damage-only accidents.

Safety recommendations

To avoid death, injury, equipment or property damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter “Installation”. Always provide a pressure regulator.

2. Disconnect the main power supply before any servicing on the unit.

3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

Reception

On arrival, inspect the unit before signing the delivery note. Specify any visible damage on the delivery note, and send a registered letter of protest to the last carrier of the goods within 7 days of delivery.

Notify the local TRANE sales office at the same time. The delivery note must be clearly signed and countersigned by the driver.

Any concealed damage shall be notified by a registered letter of protest to the last carrier of the goods within 7 days of delivery. Notify the local TRANE sales office at the same time.

Important notice: No shipping claims will be accepted by TRANE if the above mentioned procedure is not respected.

For more information, refer to the general sales conditions of your local TRANE sales office.

Note: Unit inspection in France. Delay to send registered letter in case of visible and concealed damage is only 72 hours.

General information

Warranty

Warranty is based on the general terms and conditions of the manufacturer. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions or recommendations is not covered by the warranty obligation. If the user does not conform to the rules of this manual, it may entail cancellation of warranty and liabilities by the manufacturer.

Maintenance contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Training

To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

Model Number Description

Digit 1 – Manufacturing location
E = Europe

Digit 2, 3, 4, 5 – Unit model
CGWN = Water-cooled chiller
CCUN = Condenserless water-cooled

Digit 6, 7, 8 - Unit size
205
206
207
208
209
210
211
212
213
214
215

Digit 9 – Major Design Sequence
A
B

Digit 10 – Refrigerant
A = R410A

Digit 11 – Pressure level standard
2 = PED
H = STEK

Digit 12 – Language
C = Spanish
D = German
E = English
F = French
H = Dutch
I = Italian
M = Swedish
P = Polish
R = Russian
T = Czech
U = Greek
V = Portuguese
2 = Romanian
6 = Hungarian

Digit 13 – Unit type
1 = Standard
2 = Low Noise

Digit 14 – Efficiency
1 = Standard
2 = High Efficiency

Digit 15 – Unit voltage
D = 400/50Hz/3ph

Digit 16 – Minor Design Sequence
Factory assigned

Digit 17-18 – Factory assigned

Digit 19 – Fan control
3 = With fan control: 3 stages single speed
4 = With fan control: 1 stage dual speed and 2 stages single speed electronic chart
X = Without fan control electronic charts

Digit 20-21-22 – Factory assigned

Digit 23 – Evaporator leaving water temperature
A = 15°C to 10°C Expansion valve selection for hot water
B = 10°C to 0°C Expansion valve selection for hot water
C = 4°C to -12°C Expansion valve selection for Ethylene glycol
D = 4°C to -10°C Expansion valve selection for Propylene glycol

Digit 24 – 25 – 26 – 27 – 28- 29 – 30 – Factory assigned

Digit 31 – condenser Hydraulic Module/ Pump Control
X = Without
A = With: Single pump contactor Option 10 on wiring diag.
B = With: Dual pump contactors Option 11 on wiring diag.
C = With: Double pump package Option 12 on wiring diag. - High static pressure
D = With: Double pump package Option 12 on wiring diag. - Low static pressure
E = With: Two variable speed pump package - High static pressure
F = With: Two variable speed pump package - Low static pressure

Digit 32 – 33 – Factory assigned

Model Number Description

Digit 34 - Factory test
X = No final performances test
B = Test A + Visual Inspection
E = Performance test without customer

Digit 35 – Evaporator Hydraulic module/Pump control
X = Without
A = With: Single pump contactor Option 5 on wiring diag.
B = With: Dual pump contactor Option 6 on wiring diag.
C = With: Single pump package Option 7 on wiring diag. - High static pressure
D = With: Single pump package Option 7 on wiring diag. - Low static pressure
E = With: Dual pump package Option 8 on wiring diag. - High static pressure
F = With: Dual pump package Option 8 on wiring diag. - Low static pressure Grooved pipe connection

Digit 36 – Factory assigned

Digit 37 – Special Control (Ice making/kW demand limit)
X = Without
1 = With

Digit 38 – Hot water control
X = Without
1 = With

Digit 39 – 40 Factory assigned

Digit 41 – Relay card
X = Without
1 = With

Digit 42 – 43 – Factory assigned

Digit 44 – Phase reversal protection
X = Without
1 = With

Digit 45 – 46 – 47 – 48 – Factory assigned

Digit 49 – Communication card
X = Without
1 = LCI-C
2 = PIC
4 = BCI-C

Digit 50 – 51 – 52 – Factory assigned

Digit 53 – Pressure gauges
X = Without
1 = With

Digit 54 – 55 – 56 – 57 – 58 – 59 – Factory assigned

Digit 60 – Soft starter
X = Without
1 = With

Digit 61 – 62 – 63 – 64 -65 – 66 – Factory assigned

Digit 67 – Hydraulic connections
X = Without
1 = With

Digit 68 – 69 – 70 – Factory assigned

Digit 71 – Set point and temperature display
X = Without
1 = With

Digit 72 – 73 – 74 – Factory assigned

Digit 75 – Special order
X = Without
S = With

General Data

Table 1 - General data - CGWN/CCUN R410A

Unit size		205	206	207	208	209	210	211	212	213	214	215
Standard Efficiency												
Cooling mode												
Net Capacity	(kW)	182.0	216.0	251.0	283.1	282.0	311.0	341.0	411	444	477	506
Evaporator water pressure drop	(kPa)	57.6	59.0	55.6	42	42.4	41.8	49.8	44	43	43	42
Evaporator head pressure available (6)	(kPa)	161	141	142	149	143	188	176	224	212	214	204
Condenser water pressure drop	(kPa)	59	65	61	47	47.9	52.8	63.4	64	74	73	82
Condenseur head pressure available (6)	(kPa)	151	134	138	162	150	132	117	173	161	157	143
Heating mode												
Net Capacity	(kW)	214	254.8	296.2	329.1	362.0	400.8	441.8	478.9	518.1	557.3	591.2
Evaporator water pressure drop	(kPa)	46	47	45	34	30	40	48	50	50	50	49
Evaporator head pressure available (6)	(kPa)	182	167	156	163	160	204	193	250	229	217	205
Condenser water pressure drop	(kPa)	54	60	56	44	48	51	62	57	65	65	73
Condenseur head pressure available (6)	(kPa)	157	141	159	167	158	140	124	193	182	169	156
High Efficiency												
Cooling mode												
Net Capacity	(kW)	193.0	227.0	262.0	-	-	-	-	-	-	-	-
Evaporator water pressure drop	(kPa)	26.1	35.7	36.6	-	-	-	-	-	-	-	-
Evaporator head pressure available (6)	(kPa)	188	156	160	-	-	-	-	-	-	-	-
Condenser water pressure drop	(kPa)	31	43	41	-	-	-	-	-	-	-	-
Condenseur head pressure available (6)	(kPa)	177	154	173	-	-	-	-	-	-	-	-
Heating mode												
Net Capacity	(kW)	221	262	303	-	-	-	-	-	-	-	-
Evaporator water pressure drop	(kPa)	21	28	29	-	-	-	-	-	-	-	-
Evaporator head pressure available (6)	(kPa)	203	180	170	-	-	-	-	-	-	-	-
Condenser water pressure drop	(kPa)	28	39	38	-	-	-	-	-	-	-	-
Condenseur head pressure available (6)	(kPa)	180	159	177	-	-	-	-	-	-	-	-
System Data												
Refrigerant circuit		2	2	2	2	2	2	2	2	2	2	2
Capacity steps		4	4	4	4	4	4	4	6	6	6	6
Minimum capacity	%	25	21	25	22	25	23	25	17	17	17	17
Units Amps (2) (4)												
Nominal (3)	(A)	131	146	161	182	203	219	235	262	282	303	319
Start-up Amps												
Standard unit	(A)	259	321	336	392	413	481	497	472	492	513	581
With soft starter option	(A)	195	235	250	288	309	353	369	368	388	409	453
Short circuit unit capacity	(kA)	15	15	15	15	15	15	15	15	15	15	15
Max supply cable size	(mm2)	150	150	150	150	240	240	240	240	240	240	240
Compressor												
Number		4	4	4	4	4	4	4	6	6	6	6
Type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Model		(15T+15T)	(15T+20T)	(20T+20T)	(20T+25T)	(25T+25T)	(25T+30T)	(30T+30T)	(20T+ 20T+25T)	(25T+ 20T+25T)	(25T+ 25T+25T)	(25T+ 25T+30T)
Number of speeds		1	1	1	1	1	1	1	1	1	1	1
Number of motors		1	1	1	1	1	1	1	1	1	1	1
Rated Amps (comp A/B/C) (5)	(A)	32/32	32/40	40/40	40/50	50/50	50/58	58/58	40/40/50	50/40/50	50/50/50	50/50/58
Locked rotor Amps (comp A/B/C)	(A)	160/160	160/215	215/215	215/260	260/260	260/320	320/320	215/ 215/260	260/ 215/260	260/ 260/260	260/ 260/320
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Power factor (comp A/B/C)		0,81/0,81	0,81/0,87	0,87/0,87	0,87/0,86	0,86/0,86	0,86/0,89	0,89/0,89	0,87/ 0,87/0,86	0,86/ 0,87/0,86	0,86/ 0,86/0,86	0,86/ 0,86/0,89
Sump Heater (comp A/B/C)	(W)	160/160	160/160	160/161	160/162	160/163	160/164	160/165	160/ 160/160	160/ 160/160	160/ 160/161	160/ 160/162

General Data

Unit size		205	206	207	208	209	210	211	212	213	214	215
Evaporator												
Number		1	1	1	1	1	1	1	1	1	1	1
Type		Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate
Standard Efficiency Model		DP400-74	DP400-90	DP400-114	DP400-162	DP400-186	DP400-186	DP400-206	ACH502DQ-138	ACH502DQ-150	ACH502DQ-162	ACH502DQ-174
Water volume (total)	(L)	15.6	18.9	24.0	34.1	39.2	39.2	43.4	35.9	39.0	42.1	45.2
High Efficiency Model		DP400-154	DP400-154	DP400-162	-	-	-	-	-	-	-	-
Water volume (total)	(L)	32.4	32.4	34.1	-	-	-	-	-	-	-	-
Antifreeze Heater	(W)	no	no	no	no	no	no	no	no	no	no	no
Condenser (CGWN)												
Number		1	1	1	1	1	1	1	2	2	2	2
Type		Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate
Standard Efficiency Model		DP400-90	DP400-114	DP400-134	DP400-186	DP400-206	DP400-206	DP400-222	B400T-114	B400T-114	B400T-130	B400T-130
Water volume (total)	(L)	19	24	28	39	43	43	47	23	23	26	26
High Efficiency Model		DP400-162	DP400-162	DP400-186	-	-	-	-	-	-	-	-
Water volume (total)	(L)	34.1	34.1	39.2	-	-	-	-	-	-	-	-
Antifreeze Heater	(W)	no	no	no	no	no	no	no	no	no	no	no
Condenserless Unit (CCUN)												
Discharge line diameter circuit 1 & 2		1"3/8	1"3/8	1"3/8	1"5/8	1"5/8	1"5/8	1"5/8	1"5/8	1"5/8	1"5/8	1"5/8
Liquid line diameter circuit 1 & 2		7/8	7/8	7/8	7/8	7/8	1"1/8	1"1/8	1"3/8	1"3/8	1"3/8	1"3/8
Hydraulic Module / Evaporator Side (Option high head)												
Pump Type (Single)		LRL	LRL	LRN	LRN	LRN	LRN	LRN	SIL	SIL	SIL	SIL
Model		205 - 15 / 4	205 - 15 / 4	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 14 / 7.5	206 - 14 / 7.5	208 - 16 / 11	208 - 16 / 11	208 - 16 / 11	208 - 16 / 11
Pump Type (Dual)		JRL	JRL	JRN	JRN	JRN	JRN	JRN	DIL	DIL	DIL	DIL
Model		205 - 15 / 4	205 - 15 / 4	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 14 / 7.5	206 - 14 / 7.5	208 - 16 / 11	208 - 16 / 11	208 - 16 / 11	208 - 16 / 11
Number of Pump sets		1	1	1	1	1	1	1	1	1	1	1
Motor (6)	(kW)	4.0	4.0	5.5	5.5	5.5	7.5	7.5	11.0	11.0	11.0	11.0
Rated Amps (6)	(A)	7.5	7.5	10.5	10.5	10.5	14.3	14.3	20.0	20.0	20.0	20.0
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Water strainer Ø		3"	3"	4"	4"	4"	4"	4"	4"	4"	4"	4"
Expansion tank volume	(L)	25	25	25	25	25	25	25	35	35	35	35
User volume expansion capacity (6)	(L)	3600	3600	3600	3600	3600	3600	3600	5100	5100	5100	5100
Max. water-side operating pressure,												
without hydraulic module	(kPa)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
with hydraulic module	(kPa)	400	400	400	400	400	400	400	400	400	400	400
Antifreeze heater	(W)	no	no	no	no	no	no	no	no	no	no	no
Piping		Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Hydraulic Module / Evaporator Side (Option low head)												
Pump Type (Single)		LRL	LRL	SIL	SIL	SIL	LRN	LRN	LRN	LRN	LRN	LRN
Model		205 - 13 / 2.2	205 - 13 / 2.2	206 - 12 / 4.0	206 - 12 / 4.0	206 - 12 / 4.0	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 14 / 7.5	206 - 14 / 7.5
Pump Type (Dual)		JRL	JRL	DIL	DIL	DIL	JRN	JRN	JRN	JRN	JRN	JRN
Model		205 - 13 / 2.2	205 - 13 / 2.2	206 - 12 / 4.0	206 - 12 / 4.0	206 - 12 / 4.0	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 13 / 5.5	206 - 14 / 7.5	206 - 14 / 7.5
Number of Pump sets		1	1	1	1	1	1	1	1	1	1	1
Motor (6)	(kW)	2.2	2.2	4.0	4.0	4.0	5.5	5.5	4.0	4.0	5.5	5.5
Rated Amps (6)	(A)	4.9	4.9	7.8	7.8	7.8	10.5	10.5	7.8	7.8	10.3	10.3
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Hydraulic Module / Conderser Side (Option high head)												
Pump Type		SHC	SHC	SHC	SHC	SHC	SHC	SHC	JRN	JRN	JRN	JRN
Model high head		35 - 135 / 3	35 - 135 / 3	50 - 135 / 4	50 - 135 / 4	50 - 135 / 4	50 - 135 / 4	50 - 135 / 4	206 - 14 / 7.5	206 - 14 / 7.5	206 - 14 / 7.5	206 - 14 / 7.5
Number of Pump sets		2 (in parallel)	2 (in parallel)	3 (in parallel)	4 (in parallel)	5 (in parallel)	6 (in parallel)	7 (in parallel)	2 (in parallel)	2 (in parallel)	2 (in parallel)	2 (in parallel)
Motor (6)	(kW)	3.0	3.0	4.0	4.0	4.0	4.0	4.0	7.5 (x2)	7.5 (x2)	7.5 (x2)	7.5 (x2)
Rated Amps (6)	(A)	6.2	6.2	7.4	7.4	7.4	7.4	7.4	13.8	13.8	13.8	13.8
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Water strainer Ø		4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"
Expansion tank volume	(L)	No	No	No	No	No	No	No	No	No	No	No
Max. water-side operating pressure,												
without hydraulic module	(kPa)	1000	1000	1001	1002	1003	1004	1005	1000	1000	1000	1000
with hydraulic module suction/discharge	(kPa)	400/640	400/640	400/641	400/642	400/643	400/644	400/645	1000	1000	1000	1000
Antifreeze heater	(W)	no	no	no	no	no	no	no	no	no	no	no
Piping		Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel

General Data

Unit size		205	206	207	208	209	210	211	212	213	214	215
Hydraulic Module / Conderser Side (Option low head)												
Pump Type		SHC	SHC	SHC	SHC	SHC	SHC	SHC	DIL	DIL	JRN	JRN
Model high head		20 -134 / 2.2	20 -134 / 2.2	35 - 135 / 3	35 - 135 / 3	35 - 135 / 3	35 - 135 / 3	35 - 135 / 3	206 - 12 / 4.0	206 - 12 / 4.0	206 - 13 / 5.5	206 - 13 / 5.5
Number of Pump sets		2 (in parallel)	2 (in parallel)	3 (in parallel)	4 (in parallel)	5 (in parallel)	6 (in parallel)	7 (in parallel)	8 (in parallel)	9 (in parallel)	10 (in parallel)	11 (in parallel)
Motor (6)	(kW)	2.2	2.2	3.0	3.0	3.0	3.0	3.0	4.0	4.0	5.5	5.5
Rated Amps (6)	(A)	5.0	5.0	6.2	6.2	6.2	6.2	6.2	7.8	7.8	10.3	10.3
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Unit water connection												
Chilled water	(Inch/ mm)	3″ (80)	3″ (80)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)
Type		Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic
Hot water High Head	(Inch/ mm)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	5″ (125)	5″ (125)	5″ (125)	5″ (125)
Type		Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic
Hot water Low Head	(Inch/ mm)	3″ (80)	3″ (80)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	5″ (125)	5″ (125)	5″ (125)	5″ (125)
Type		Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic
Unit water connection without pumps												
Chilled water	(Inch/ mm)	3″ (80)	3″ (80)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)
Type		Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic
Hot water	(Inch/ mm)	3″ (80)	3″ (80)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	4″ (100)	5″ (125)	5″ (125)	5″ (125)	5″ (125)
Type		Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic	Victaulic
Dimensions												
Height	(mm)	1842	1842	1842	1842	1842	1842	1842	1950	1950	1950	1950
Length (without pumps)	(mm)	2545	2545	2545	2545	2545	2545	2545	2808	2808	2808	2808
Length (with pumps)	(mm)	2545	2545	2545	2545	2545	2545	2545	3498	3498	3498	3498
Width	(mm)	880	880	880	880	880	880	880	878	878	878	878
Standard Efficiency Operating Weight (CGWN/CCUN)												
Base Unit (without pumps)	(kg)	1360 / 1260	1300 / 1170	1420 / 1270	1500 / 1280	1650 / 1420	1710 / 1480	1790 / 1550	2232 / 1879	2442 / 2070	2525 / 2120	2640 / 2180
Base Unit (with pumps)	(kg)	1360 / 1260	1300 / 1170	1420 / 1270	1500 / 1280	1650 / 1420	1710 / 1480	1790 / 1550	2128 / 1880	2337 / 2071	2420 / 2122	2500 / 2182
Evap Hyd Kit	(kg)	1450 / 1350	1390 / 1260	1590 / 1440	1670 / 1450	1820 / 1590	1880 / 1650	1960 / 1720	2618 / 2370	2827 / 2561	2910 / 2612	2990 / 2672
Evap + Cds Hyd Kit	(kg)	1520 / NA	1460 / NA	1690 / NA	1770 / NA	1920 / NA	1980 / NA	2060 / NA	2992 / NA	3201 / NA	3284 / NA	3364 / NA
Shipping Weight (CGWN/CCUN)												
Base Unit (without pumps)	(kg)	1290 / 1210	1220 / 1120	1320 / 1200	1370 / 1190	1510 / 1320	1570 / 1380	1650 / 1450	2109 / 1832	2315 / 2023	2387 / 2070	2492 / 2130
Evap Hyd Kit	(kg)	1380 / 1300	1310 / 1210	1490 / 1370	1540 / 1360	1680 / 1490	1740 / 1550	1820 / 1620	2480 / 2274	2685 / 2465	2758 / 2512	2840 / 2568
Evap + Cds Hyd Kit	(kg)	1450 / NA	1380 / NA	1590 / NA	1640 / NA	1780 / NA	1840 / NA	1920 / NA	2797 / NA	3002 / NA	3075 / NA	3157 / NA
High Efficiency Operating Weight (CGWN/CCUN)												
Base Unit (without pumps)	(kg)	1460/1330	1450/1240	1470/1250	-	-	-	-	-	-	-	-
Evap Hyd Kit	(kg)	1550/1420	1540/1330	1640/1420	-	-	-	-	-	-	-	-
Evap + Cds Hyd Kit	(kg)	1620/NA	1610/NA	1740/NA	-	-	-	-	-	-	-	-
Shipping Weight (CGWN/CCUN)												
Base Unit (without pumps)	(kg)	1360/1270	1350/1170	1340/1160	-	-	-	-	-	-	-	-
Evap Hyd Kit	(kg)	1450/1360	1440/1260	1510/1330	-	-	-	-	-	-	-	-
Evap + Cds Hyd Kit	(kg)	1520/NA	1510/NA	1610/NA	-	-	-	-	-	-	-	-
Refrigerant Charge (4) (5)												
CGWN Standard Efficiency Circuit 1 & 2	(kg)	10	11	13	17	18	18	19	22	23	24	25
CGWN High Efficiency Circuit 1 & 2	(kg)	15	15	17	-	-	-	-	-	-	-	-
CCUN		Nitrogen Charge										
Oil Charge per circuit												
Circuit 1 & 2	(l)	13.4	13.4	13.4	13.4	13.4	13.9	14.4	21.2	21.7	22.2	22.7

(1) Indicative performance at Evaporator water temperature: 12°C / 7°C - Condenser 30°C/35°C or 40°C/45°C (heating) - for detailed performances consult Order Write Up.
(2) Under 400V/3/50Hz.
(3) Max Rated Condition without Pump Package.
(4) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(5) per circuit
(6) Dual Pump Option

Installation - Mechanical

Location Requirements

Sound Considerations

The most effective form of acoustical isolation is to locate the unit away from any sound sensitive area. Structurally transmitted sound can be reduced by elastomeric vibration eliminators. Spring isolators are not recommended. Consult an acoustical engineer in critical sound applications.

Foundation

For maximum isolation effect, water lines and electrical conduit should also be isolated. Wall sleeves and rubber isolated piping hangers can be used to reduce the sound transmitted through water piping. To reduce the sound transmitted through electrical conduit, use flexible electrical conduit.

EU and Local codes on sound emissions should always be considered. Since the environment in which a sound source is located affects sound pressure, unit placement must be carefully evaluated. Consult an acoustical engineer for critical applications.

Provide rigid, non-warping mounting pads or a concrete foundation of sufficient strength and mass to support the applicable operating weight (i.e. including completed piping, and full operating charges of refrigerant, oil and water). Refer to the chapter on Unit Dimensions/ Weights for unit operating weights. Once in place, the unit must be level with 3 mm over its length and width. Trane is not responsible for equipment problems resulting from an improperly designed or constructed foundation.

Clearances

Provide enough space around the unit to allow the installation and maintenance personnel unrestricted access to all service points. Refer to submittal drawings for the unit dimensions, to provide sufficient clearance for the opening of control panel doors and unit service.

Refer to the chapter on Unit Dimensions/Weights for minimum clearances. In all cases, local codes which require additional clearances will take precedence over these recommendations.

Rigging

Refer to weights tables for typical unit lifting weights. Refer to the rigging label attached to the unit for further details.

Lifting Procedure

Refer to the lifting label affixed to the unit. Lifting beam crossbars MUST be positioned so lifting cables do not contact the sides of the unit. Adjust as necessary for even level lift.

1. Use the four rigging points which are built into the unit.
2. Slings and a spreader bar are to be provided by the rigger.
3. The minimum lifting capacity of each sling as well as the spreader bar must be equal or higher than the tabulated unit shipping weight.
4. Caution: this unit must be lifted and handled with care. Avoid shocks while handling.

Installation

Evaporator piping

Evaporator water connections are grooved. Thoroughly flush all water piping to the CGWN or CCUN units before making the final piping connections to the unit. Components and layout will vary slightly, depending on the location of connections and the water source.

CAUTION Equipment Damage!

If using an acidic commercial flushing solution, construct a temporary bypass around the unit to prevent damage to internal components of the evaporator.

CAUTION Proper Water Treatment!

The use of untreated or improperly treated water in a chiller may result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

Drainage

Locate the unit near a large capacity drain for water vessel draindown during shutdown or repair. Water piping is provided with drain connections. Refer to "Water Piping." All local and national codes apply.

Piping

A vent is provided on the top of the evaporator at the return end. Be sure to provide additional vents at high points in the piping to bleed air from the chilled water system. Install necessary pressure gauges to monitor the entering and leaving chilled water pressures.

Installation

Figure 1 - Connection of units with hydraulic module - Evaporator and condenser sides

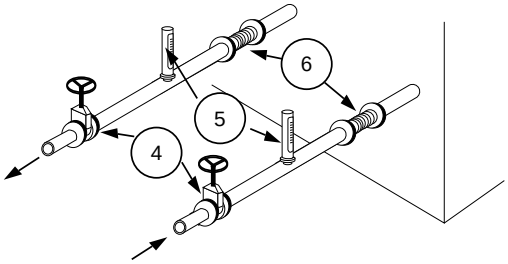
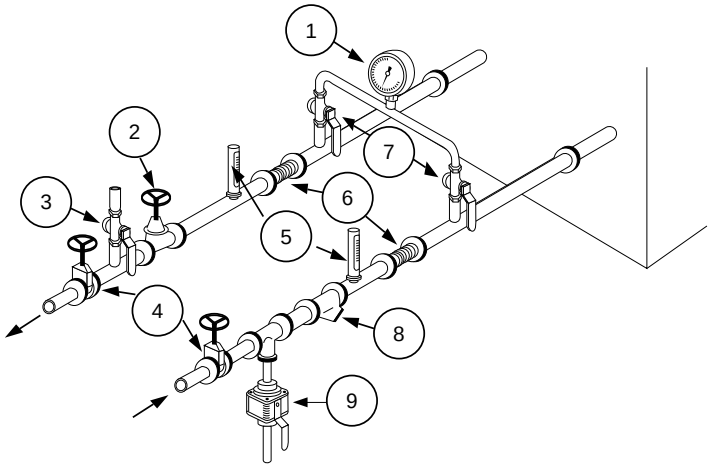


Figure 2 - Connection of units without hydraulic module - Evaporator and condenser sides



1 = Pressure gauges: show entering and leaving water pressure

2 = Balancing valve: adjusts water flow.

3 = Air purge allows to remove the air from the water circuit during fill up.

4 = Stop valves: isolate chillers and water circuiting pump during maintenance operations.

5 = Thermometers: indicate chilled water entering and leaving temperatures.

6 = Expansion compensators: avoid mechanical stress between chiller and piping installation.

7 = Stop valve located on the outlet connection: used to measure the water pressure inlet or outlet of evaporator.

8 = Strainer: avoid to get heat exchangers dirty. All installation must be equipped with efficient strainer in order that only clean water enters into exchanger.

If there is no strainer, reserve will be formulated by the Trane technician at the start-up of the unit. The strainer used must be able to stop all particles with a diameter greater than 1 mm.

9 = Draining: used as the draining the plate heat exchanger.

10 = Do not start the unit with low water volume or not enough pressurized circuit.

Note: A pressure switch device to detect lack of water is not included in the pump package. Installation of this type of device is highly recommended to avoid sealing damage due to operation of pump without enough water.

Installation

Minimal installation water content

The water volume is an important parameter because it allows a stable chilled water temperature and avoids short cycle operation of the compressors.

Parameters which influence the water temperature stability

- Water loop volume
- Load fluctuation
- Number of capacity steps
- Compressors rotation
- Dead band (adjusted on chiller controller)
- Minimum time between 2 starts of a compressor

Minimum water volume for a comfort application

For comfort application we can allow water temperature fluctuation at part load. The parameter to take into account is the minimum operating time of the compressor. In order to avoid lubrication problem on a scroll compressor it must run at least 2 minutes (120 seconds) before it stops.

The following table gives the minimal installation water content recommended according to all these parameters.

Table 2 - Minimal water content

	Confort Application			Process cooling Application		
	2°C Dead band (1)	3°C Dead band (2)	4°C Dead band (3)	2°C Dead band (1)	3°C Dead band (2)	4°C Dead band (3)
CGWN - CCUN 205	660 l	440 l	330 l	1160 l	730 l	530 l
CGWN - CCUN 206	670 l	450 l	340 l	1160 l	740 l	540 l
CGWN - CCUN 207	650 l	440 l	330 l	1100 l	710 l	520 l
CGWN - CCUN 208	880 l	580 l	440 l	1520 l	960 l	710 l
CGWN - CCUN 209	1060 l	700 l	530 l	1860 l	1170 l	860 l
CGWN - CCUN 210	1080 l	720 l	540 l	1870 l	1190 l	870 l
CGWN - CCUN 211	1260 l	840 l	630 l	2220 l	1400 l	1020 l
CGWN - CCUN 212	1260 l	840 l	630 l	2170 l	1380 l	1010 l
CGWN - CCUN 213	1050 l	700 l	530 l	1760 l	1130 l	830 l
CGWN - CCUN 214	1270 l	850 l	640 l	2150 l	1370 l	1010 l
CGWN - CCUN 215	1240 l	820 l	620 l	2060 l	1330 l	980 l

Notes
(1) Minimum water loop volume in order to obtain maximum +/- 1°C chilled water temperature fluctuation vs. Chilled water set-point
(2) Minimum water loop volume in order to obtain maximum +/- 1.5°C chilled water temperature fluctuation vs. Chilled water set-point
(3) Minimum water loop volume in order to obtain maximum +/- 2°C chilled water temperature fluctuation vs. Chilled water set-point

This table is estimated with
- Condenser : Water 30°/35°C
- Evaporator : Water 12°/7°C

Installation

Water connections

Before making any connections, make sure the labeling for entering and leaving water corresponds to the submittals. CGWN water-cooled chillers and CCUN condenserless units are available in several versions:

1) Evaporator side options
- No hydraulic control
- With pump contactors to control a remote pump (single or dual)
- With pump integrated hydraulic module, single or dual pump, low or high pressure head

2) Condenser side options
- No hydraulic control
- With pump contactors to control a remote pump (single or dual)
- With pump integrated hydraulic module, consisting of two single pumps in parallel to adjust condenser waterflow as a function of unit capacity, low or high pressure head

Typical water circuits are provided in the documentation package shipped with the unit.

CAUTION! To prevent damage to the pump's mechanical seal, it is highly recommended to install a differential pressure switch on the water loop to detect any lack of water flow.

Installation

Refrigerant line connections

Piping

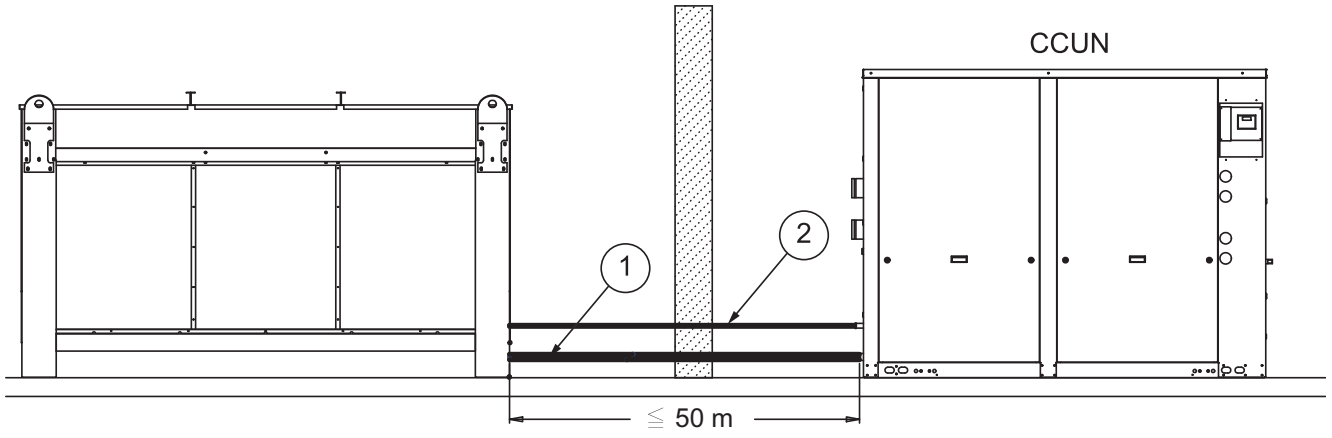
Maximum distances and refrigerant line diameters between units must be checked according to the configuration and system operating conditions (Chilled water temperature and subcooling).

Tables 3-6 provide the maximum acceptable height according to subcooling available and recommended diameters for discharge liquid lines when CCUN condenserless chillers are connected to remote condensers.

The model CCUN is part of the installation which is protected at 44.5 bar for R410A.

The party in charge of the supply of the condenser and of its refrigerant piping is responsible of implementing all the required protections to comply with the PED requirements for the design pressure of the condenser installed. Please refer to the document PROD-SVX01_-xx delivered with this chiller to check all the mandatory conformity requirements of the Pressure Equipment and Machinery directives for this installation.

Figure 3 - Installation configuration - CCUN and remote condenser at the same level



1: Discharge line
2: Liquid line

Installation

***Table 3** - Recommended discharge line diameters for horizontal risers (Circuit 1)*

		Leaving chilled water temperature (°C)													
	Unit size	**-12**	**-10**	**-8**	**-6**	**-4**	**-2**	**0**	**2**	**4**	**6**	**8**	**10**	**12**	**14**
CCUN	205			7/8″				1″1/8						1″3/8	
CCUN	206		7/8″					1″1/8					1″3/8		
CCUN	207		7/8″					1″1/8					1″3/8		
CCUN	208			1″1/8						1″3/8					1″5/8
CCUN	209			1″1/8						1″3/8					1″5/8
CCUN	210			1″1/8					1″3/8					1″5/8	
CCUN	211			1″1/8					1″3/8					1″5/8	
CCUN	212			1″5/8						2″1/8					
CCUN	213			1″5/8						2″1/8					
CCUN	214		1″5/8					2″1/8					2″5/8		
CCUN	215		1″5/8					2″1/8					2″5/8		

***Table 4** - Recommended discharge line diameters for horizontal risers (Circuit 2)*

		Leaving chilled water temperature (°C)													
	Unit size	**-12**	**-10**	**-8**	**-6**	**-4**	**-2**	**0**	**2**	**4**	**6**	**8**	**10**	**12**	**14**
CCUN	205			7/8″				1″1/8						1″3/8	
CCUN	206		7/8″					1″1/8					1″3/8		
CCUN	207		7/8″					1″1/8					1″3/8		
CCUN	208			1″1/8						1″3/8					1″5/8
CCUN	209			1″1/8						1″3/8					1″5/8
CCUN	210			1″1/8					1″3/8					1″5/8	
CCUN	211			1″1/8					1″3/8					1″5/8	
CCUN	212		1″3/8				1″5/8					2″1/8			
CCUN	213			1″5/8						2″1/8					
CCUN	214			1″5/8						2″1/8					
CCUN	215		1″5/8					2″1/8					2″5/8		

Installation

Table 5 - Recommended liquid line diameters for vertical or horizontal risers (Circuit 1)

		Leaving chilled water temperature (°C)													
	Unit size	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	14
CCUN	205	5/8″						7/8″						1″1/8	
CCUN	206	5/8″			7/8″					1″1/8					
CCUN	207	5/8″			7/8″					1″1/8					
CCUN	208	7/8″					1″1/8						1″3/8		
CCUN	209	7/8″					1″1/8						1″3/8		
CCUN	210	7/8″				1″1/8				1″3/8					
CCUN	211	7/8″				1″1/8				1″3/8					
CCUN	212	1″1/8					1″3/8						1″5/8		
CCUN	213	1″1/8					1″3/8						1″5/8		
CCUN	214	1″1/8				1″3/8						1″5/8			
CCUN	215	1″1/8				1″3/8						1″5/8			

Table 6 - Recommended liquid line diameters for vertical or horizontal risers (Circuit 2)

		Leaving chilled water temperature (°C)													
	Unit size	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	14
CCUN	205	5/8″						7/8″						1″1/8	
CCUN	206	5/8″			7/8″					1″1/8					
CCUN	207	5/8″			7/8″					1″1/8					
CCUN	208	7/8″					1″1/8						1″3/8		
CCUN	209	7/8″					1″1/8						1″3/8		
CCUN	210	7/8″				1″1/8				1″3/8					
CCUN	211	7/8″				1″1/8				1″3/8					
CCUN	212	1″1/8						1″3/8							
CCUN	213	1″1/8					1″3/8						1″5/8		
CCUN	214	1″1/8					1″3/8						1″5/8		
CCUN	215	1″1/8			1″3/8						1″5/8				

Installation

Insulation

Insulate refrigerant lines from building itself to avoid transmission to building structure of vibrations normally caused by pipework. Also avoid bypassing the unit's damping system by fixing the refrigerant lines or the electrical ducts very rigidly. Vibrations may propagate into building structure through rigidly fixed refrigerant lines.

Pressure tests and leak detection

WARNING! During operations, take the following precaution:

1. Neither oxygen nor acethylene should be used instead of refrigerant and nitrogen to detect leaks, otherwise a violent explosion may occur.
2. Always use valves and manometers to check the test pressure in system. Excessive pressure may either cause pipes to rupture, damage unit, or cause an explosion, causing possible physical injury. Carry out liquid line and hot gas pressure tests in accordance with current standards.

CAUTION: Do not go more than 0.7 bar above the high pressure switch setpoint. Introduce enough refrigerant into circuit for 85 to 100 kPa pressure, pump-injecting dry nitrogen, and raise pressure to 100 kPa. Search possible leaks using detector. This operation should be carried out great care throughout the system. If leaks are detected, reduce system pressure, and repair defective component. Repeat test process, to check that the repair can withstand rated pressure.

Refrigerant charge

CCUN units are delivered with a nitrogen holding charge and isolating valves. After system pressure and vacuum testing, fill up unit with refrigerant according to the diameter and the length of the refrigerant piping work up to obtain the correct subcooling temperature:

Δt subcooling = 5°C for a liquid temperature of 40°C.

Warning: When connecting CCUN liquid and discharge lines , ensure that the copper end pipes between the stop valve and the end end of the piping are not under pressure using a 1/4 SAE.

Oil charge - CCUN

Above 60 kg of refrigerant charge per circuit, special care to the oil level on compressor is required. The operating oil level shall remain above half of the oil sight glass. See the unit nameplate for oil charges. The oil level can only be evaluated after 10 minutes OFF time of both compressors of the circuit. See sticker for the oil level located on the compressor next to the oil sight glass. See Compressor oil level at oil equalization line figures at the end of "General startup" chapter.

Note: The oil quantity necessary for the split system has also to be adjusted according to the diameter and the length of the refrigerant piping work.

CAUTION: Use exclusively POE oil recommended by TRANE

Important note:

These operations have to be performed by a specialist. The results have to be written on a start up record by the Trane engineer or the client's specialist who has performed this start up. The quantity of refrigerant and oil added are at the client's charges.

Installation

High pressure

The remote condenser must have a service pressure equal to or higher than the high service pressure.

Note: CCUN is only one component of a complete installation. It includes its own high pressure protection set at 44.5 bar for R410A units.

The party in charge of the supply of the condenser and of its refrigerant piping is responsible of implementing all the required protections to comply with the PED requirements for the design pressure of the condenser installed.

Please refer to the document PROD-SVX01_-xx delivered with this chiller to check all the mandatory conformity requirements of the Pressure Equipment and Machinery directives for this installation.

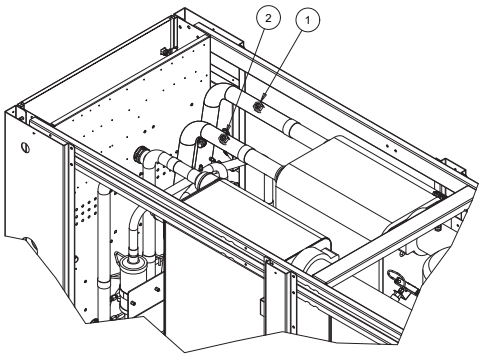
Pressure relief valve - CCUN

Above the maximum system refrigerant charge, it is recommended to install a pressure relief valve. See figures below for installation. Depending upon the liquid line diameter selected in the "Recommended liquid line diameters" table, find the predicted maximum liquid line length of installation without pressure relief valve installed. The recommended pressure relief valve setting is 29 bar and shall be installed on the low pressure side of the refrigerant circuit.

Table 7 - Recommended liquid line diameters with pressure relief valve - CCUN

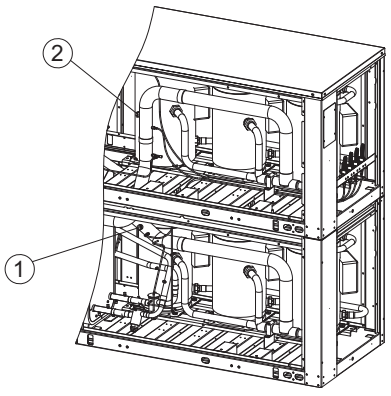
Unit size	Unit efficiency model	Circuit	Maximum system refrigerant charge without pressure relief valve (kg)	Liquid line diameter	Maximum length without pressure relief valve (m)	Liquid line diameter	Maximum length without pressure relief valve (m)
205	Standard	1 & 2	62	1"1/8	76	7/8"	120
	High	1 & 2	69	1"1/8	90	7/8"	142
206	Standard	1 & 2	63	1"1/8	71	7/8"	113
	High	1 & 2	69	1"1/8	83	7/8"	131
207	Standard	1 & 2	65	1"1/8	69	7/8"	108
	High	1 & 2	70	1"1/8	79	7/8"	125
208	Standard	1 & 2	71	1"1/8	73	7/8"	115
209	Standard	1 & 2	74	1"1/8	74	7/8"	116
210	Standard	1 & 2	76	1"3/8	45	1"1/8	70
211	Standard	1 & 2	79	1"3/8	44	1"1/8	69
212	Standard	1	93	1"3/8	43	1"1/8	66
	Standard	2	93	1"3/8	43	1"1/8	66
213	Standard	1	94	1"5/8	28	1"1/8	60
	Standard	2	94	1"5/8	28	1"1/8	60
214	Standard	1	95	1"5/8	25	1"1/8	55
	Standard	2	95	1"5/8	25	1"1/8	55
215	Standard	1	98	1"5/8	24	1"1/8	52
	Standard	2	98	1"5/8	24	1"1/8	52

Figure 5 - Installing pressure relief valve (205-211)



1 = Connection for pressure relief valve circuit 1
2 = Connection for pressure relief valve circuit 2

Figure 6 - Installing pressure relief valve (212-215)



1 = Connection for pressure relief valve circuit 1
2 = Connection for pressure relief valve circuit 2

Installation

Winter freeze protection

During negative ambient air temperature chilled water piping must be fully insulated. Ensure that all safeties are taken to prevent frost damage during negative ambient air temperature. The following systems can be used:

1. Electrical heater mounted on all water piping exposed to negative temperatures.
2. Start chilled water pump during negative ambient air temperature.
3. Add ethylene glycol in the chilled water.
4. Drain water-circuit, however be aware of corrosion process when drained.

Note

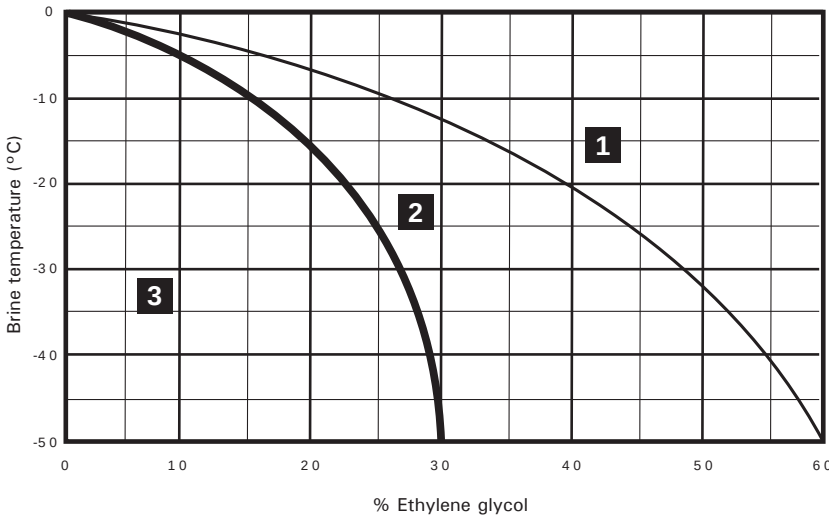
If machinery room can be exposed to temperature below 0°C, systems 2, 3 and 4 must be used.

CAUTION:

- There is a risk of freeze-up of the evaporator circuit due to internal refrigerant migration if the condenser circuit is maintained at a low temperature (below 0°C) for a long period during the cold season. If necessary, provide isolation valves on the condenser water circuit (CGWN). CCUN is protected against refrigeration migration by a liquid solenoid valve.
- When using the freeze protection by pump activation during the cold season, water must be able to circulate freely.
  Check that no closure valve on other device might block waterflow.

Loading concentrated glycol in the water loop at the suction side of the pump is prohibited. It can severely damage the mechanical seal of the pump and consequently generate potential water leaks.

Figure 7 - Freezing point versus ethylene glycol percentage



1. Liquid
2. Freezing without burst effect
3. Freezing with burst effect

Installation

Electrical connections

CAUTION:

1. The greatest care should be taken when cutting through passages and installing electric wiring. Under no circumstances should chips of metal or cuttings of copper or isolating material fall into the starter panel or electric components. Relays, contactors, terminals and control wiring should be covered and protected before power supplies are connected.
2. Install power supply cabling as shown in wiring diagram. Adequate cable gland should be chosen, ensuring no foreign bodies enter the electrical housing or components.

CAUTION:

1. Cabling must comply with local standards. The type and location of fuses must also comply with standards. As a safety measure, fuses should be visibly installed, close to the unit.
2. CAUTION! To avoid corrosion, overheating or general damage, at terminal connections, unit is designed for copper conductors only. In case of aluminum conductors an intermediate connection box must be added. In case of aluminum cable bi material connecting device is mandatory. Cable routing inside control panel should be made case by case by installer.

Soft starter recommended setting

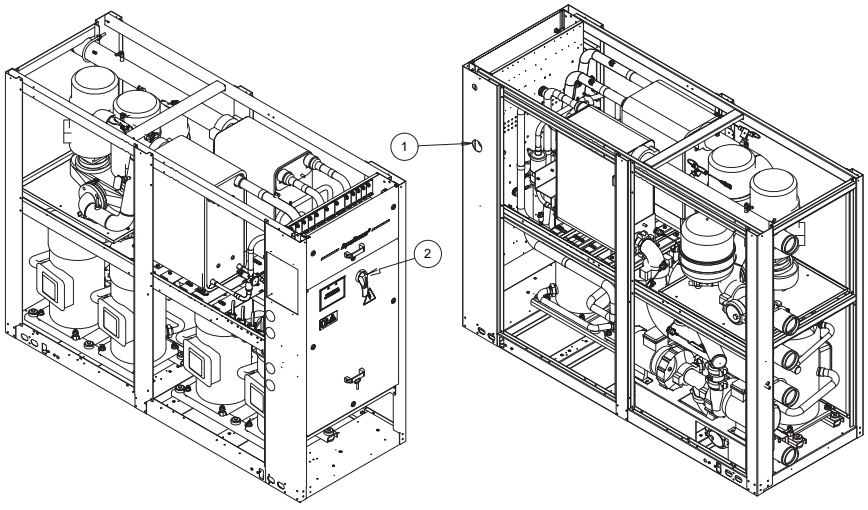
Acceleration time: 0.5 seconds full speed

Start-up torque: 50%

Deceleration time: 0 seconds

Use adjustment setting button.

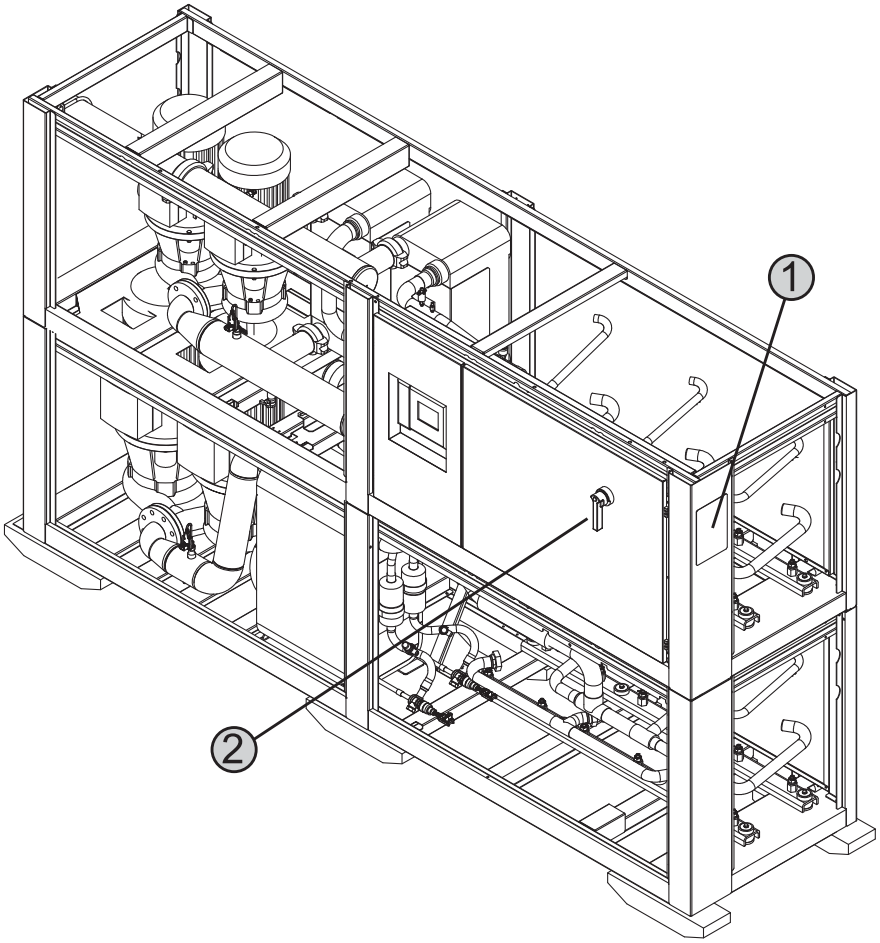
Figure 8 - CGWN and CCUN main power supply connection (1) (205-211)



1 = Power cable inlet
2 = Disconnect switch
(1) shown here : CGWN. Components in same location on CCUN.

Installation

Figure 9 - CGWN and CCUN main power supply connection (1) (212-215)



1 = Power cable inlet
2 = Disconnect switch
(1) shown here : CGWN. Components in same location on CCUN.

Installation

When ordered, the outdoor air temperature sensor and associated electronics are factory-mounted and wired in the control panel of the chiller. This sensor has to be installed outdoors to allow for proper operation of the chiller. The wiring of the sensor has to be performed with a 2 wires cable of 0.75 to 1.5 mm² type H05WWF or equivalent. The maximum length of this cable is 305 m. (see Figure 10). The IPC bus is factory-wired.

Figure 10 - Outdoor ambient air sensor connection (self-thread screw)

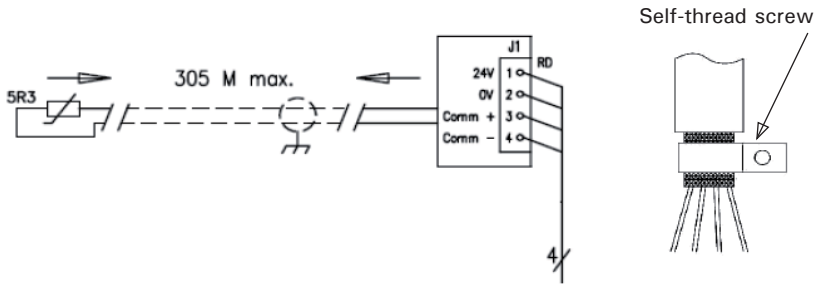
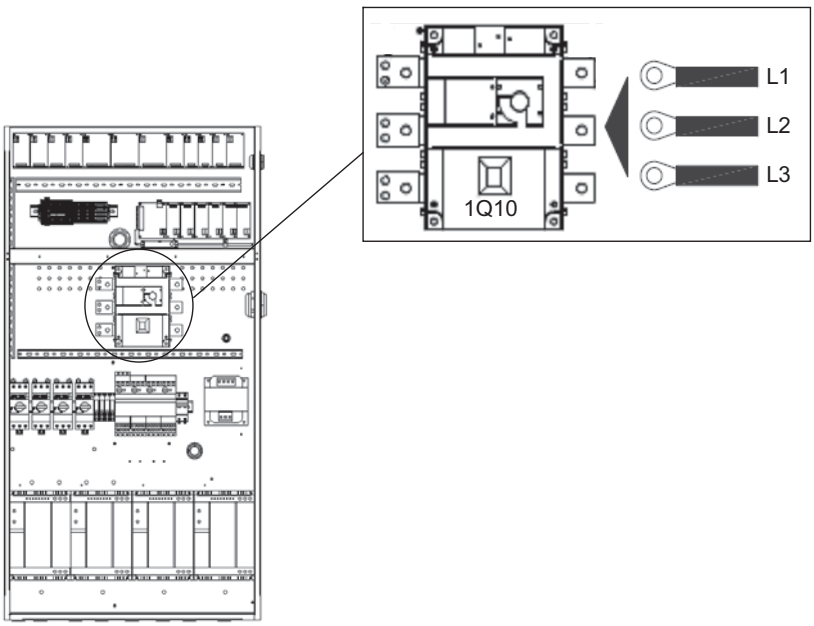
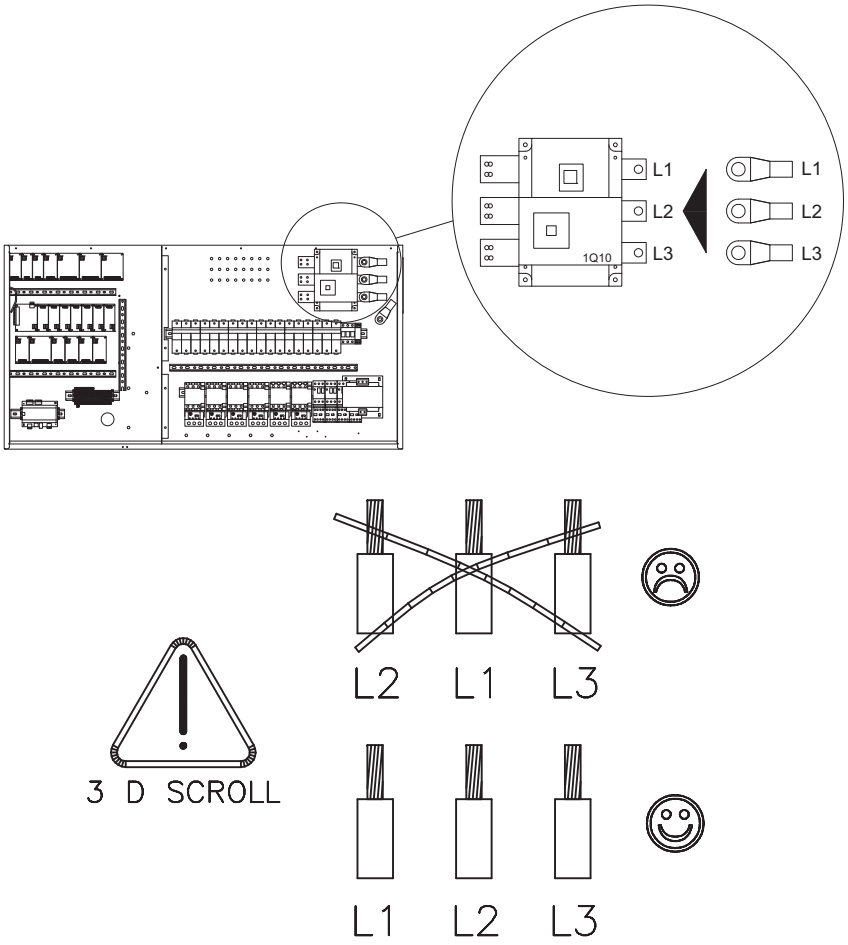


Figure 11 - CGWN and CCUN main power supply connection (205-211)



Installation

Figure 12 - CGWN and CCUN main power supply connection (212-215)



Note: Check phase rotation prior to start compressor and make sure phase order is correct. Failure to do so may result on compressor damage.

Installation

Interconnection between CCUN and Remote Condenser

The CCUN has the capability to control the fan staging of the remote condenser if the option is taken. Each refrigerant circuit can control from one up to 6 fans per circuit using a 4 output relays (10A/250VAC/ AC1/SPDT) card option provided in the control box of the CCUN. The external wiring to the remote condenser shall be connected directly to the terminal block for the optional fan relay cards.

CAUTION:

Power supply to the outdoor fan relays shall not be provided from the CCUN unless special care to the Voltage and to the power consumption was evaluated.

Table 8 - Control output relays

Output relay	Fan 1		Fan 2	Fan 3	Fan 4	Fan 5	Fan 6	Fan Option
	Low Speed	High Speed			Single speed			
2								Two fan speed first fan
	1&4		3					Single speed only fans
3	1	2	3	4				Two fan speed first fan
	1		3	4				Single speed only fans
4	1	2	3	4	4			Two fan speed first fan
	1		3	4	4			Single speed only fans
5	1	2	3	4	4	4		Two fan speed first fan
	1		3	4	4	4		Single speed only fans
6	1	2	3	3	4	4	4	Two fan speed first fan
	1		3	3	4	4	4	Single speed only fans

Table 9 - Fan staging - Example : 4 fans per circuit, single speed

Stage	Number of Fans	Standard - 4 fans per circuit Relays Energized				Capacity [%]
		1	2	3	4	
0	0	0	0	0	0	0.00
1	1	1	0	0	0	25.00
2	2	1	0	1	0	50.00
3	3	0	0	1	1	75.00
4	4	1	0	1	1	100.00

Table 10 - Fan staging - Example : 4 fans per circuit with first fan 2-speed

Stage	Number of Fans	Low Ambient 2 Speed 4 fans per circuit Relays Energized				Capacity [%]
		1	2	3	4	
0	0	0	0	0	0	0.00
1	0.5	1	0	0	0	12.50
2	1	0	0	1	0	25.00
3	1.5	1	0	1	0	37.50
4	2	0	0	0	1	50.00
5	2.5	1	0	0	1	62.50
6	3	0	0	1	1	75.00
7	3.5	1	0	1	1	87.50
8	4	0	1	1	1	100.00

Installation

Operating range

CAUTION: Maximum operating time for low condensing water outlet is 1 minute. The compressor shall become noisy.

The envelope represents the operating range in which the unit will work without control limitation. To keep the unit operating in this envelope, be careful to adjust setpoints inside with a clearance equal to half the dead band.

Check also compressor suction superheat for being close to 5 or 6°C for low chilled leaving water temperature to minimize compressor discharge temperature. For very high leaving condensing water temperature above 55°C, the refrigerant charge can be minimized by 20%.

Figure 13 – CGWN operating limits

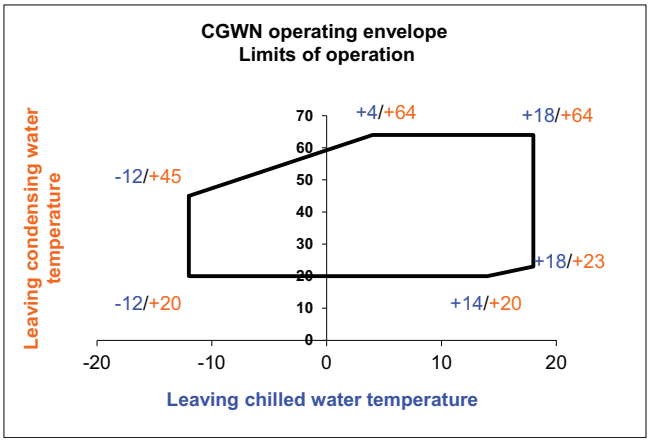
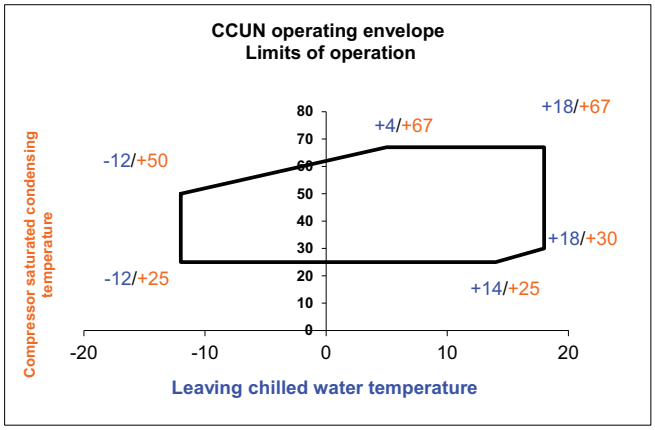


Figure 14 – CCUN operating limits



Note: CGWN 205 to 211 have a maximum condenser leaving water temperature of 60°C.

Installation

Preparation for start-up

Carry out all operations on check list so that the unit is correctly installed and ready to operate. The installer must check all the following points before calling in the Trane Servicing Department to put the equipment into service:

- Check position of the unit
- Check unit is level
- Check type and position of the rubber pads
- Check clearance required for maintenance (Refer to certified drawings)
- Check clearance around condenser access if split installation (CCUN + remote condenser - Refer to certified drawings)
- Chilled water circuit ready to operate, filled with water, pressure test carried out and air purged

CAUTION! It is prohibited to start the water pumps when the water loop is not filled with water. Doing this can severely damage the mechanical seal of the pump.

- Chilled water circuit must be rinsed
- Check the presence of water strainer ahead of evaporator
- The strainers must be cleaned after 2 hours of pumps operation
- Check the thermometers and manometers position
- Check chilled water pumps interconnection to control panel
- Ensure that the isolation resistance of all power supply terminals to ground complies with standards and regulations in force
- Check that unit voltage and frequency supplied match rated input voltage and frequency
- Check that all electrical connections are clean and sound
- Check that main power supply switch is sound
- Check Ethylene glycol or Propylene glycol concentration in the chilled water circuit
- Water flow control checking: decrease the water flow and check the electrical contact in the control panel
- Check chilled water pressure drop through evaporator (unit without hydraulic module) or unit available pressure (unit with hydraulic module) are in accordance with the Trane order write-up.
- On start-up of each motor in the system, check the direction of rotation and operation of all the components they drive
- Check that there is sufficient demand for cooling on the day of start-up (around 50% of nominal load)

General Start-up

Start-up

Follow the instructions below to correctly start-up the unit.

Installation and chiller inspection

- Ensure that all the operations above (start-up preparation), are followed
- Follow the instruction stuck inside the electrical cabinet
- Put the plexiglass supplied by Trane in front of the power terminal
- Ensure all water and refrigerant valves are in service positions
- Ensure that the unit is not damaged
- Ensure that sensors are properly installed in their bulb-wells and submerged in heat conducting product
- Check fixing of capillary tubes (protection from vibration and from wear) and ensure that they are not damaged
- Reset all manually set control devices
- Check refrigerating circuits tightness

Checking and setting

Compressors:

- Check oil level at rest. The level should reach at least the minimum oil level on the indicator located on oil equalization line (see Compressor oil level at oil equalization line figures at the end of "General startup" chapter) when the compressors have been OFF for 3 minutes for a packaged unit (CGWN) and after 10 minutes OFF time for a split unit (CCUN with remote condenser). See the "Compressor oil level at oil equalization line for correct level.
- Check fixing of capillary tubes (protection from vibration and from wear) and ensure that they are not damaged
- Reset all manually set control devices
- Check refrigerating circuits tightness
- Check electrical terminals tightening of the motors and in the control panel
- Check the isolation of the motors, using a 500V DC megohmeter which meets manufacturer's specifications (minimum value 2 megohms)
- Check the direction of the rotation using phasemeter

CAUTION! Improper power phasing may result in equipment damage due to reverse rotation.

General Start-up

Electrical power wiring:
- Check all the electrical terminals are tight
- Set-up compressors overload relays
- Set-up fan-motors overload relays

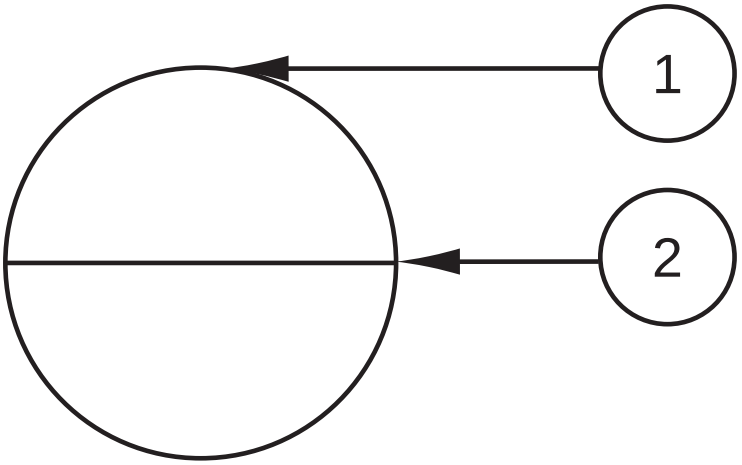
Electrical control wiring:
- Check all the electrical terminals are tight
- Check all the pressostats
- Check and set-up the TRACER CH530 control module
- Test and start-up without the electrical power

Condenser:
- Check setting of the safety pressure valve
- Check the insulation of the motors using a 500V DC megohmeter which meets manufacturer's specifications (minimum value 2 megohms)

Operating parameters statement
- Switch on main power supply switch
- Start the water pump(s) and check there is no cavitation
- Start-up the unit following procedure described in the CGWN-CCUN User Manual. The unit and the chilled water pumps contactor must be connected together.

After unit start up, leave in operation for at least 15 minutes, to ensure pressures are stabilized. Then check:
- voltage
- compressors currents
- leaving and return chilled water temperature
- suction temperature and pressure
- ambient air temperature
- blowing air temperature
- discharge pressure and temperature
- liquid refrigerant temperature and pressure

***Figure 15** - Compressor oil level at oil equalization line*



1. Max. oil level
2. Min. oil level

General Start-up

Operating parameters:

- chilled water pressure drop through evaporator (if no hydraulic module is installed) or unit available pressure. It must be in accordance with Trane order write-up.
- superheat: difference between suction temperature and dew point temperature. Normal superheat should be within 5 and 7 °C.
- sub-cooling: difference between liquid temperature and bubble point temperature. Normal subcooling should be within 2 and 10°C.
- Condenser approach: difference between dew point temperature in high pressure and condenser air inlet temperature. Normal value on standard unit, should be 15 to 23°C at full load.
- Evaporator approach: difference between outlet water temperature and dew point temperature in low pressure. Normal value on standard unit, without Ethylene glycol in chilled water, should be between 2 and 5°C.

Final check

When the unit is operating correctly:

- Check that the unit is clean and clear of any debris, tools, etc.
- Ensure all valves are in operating position.
- Close control and starter panel doors and check panels fixation.

CAUTION

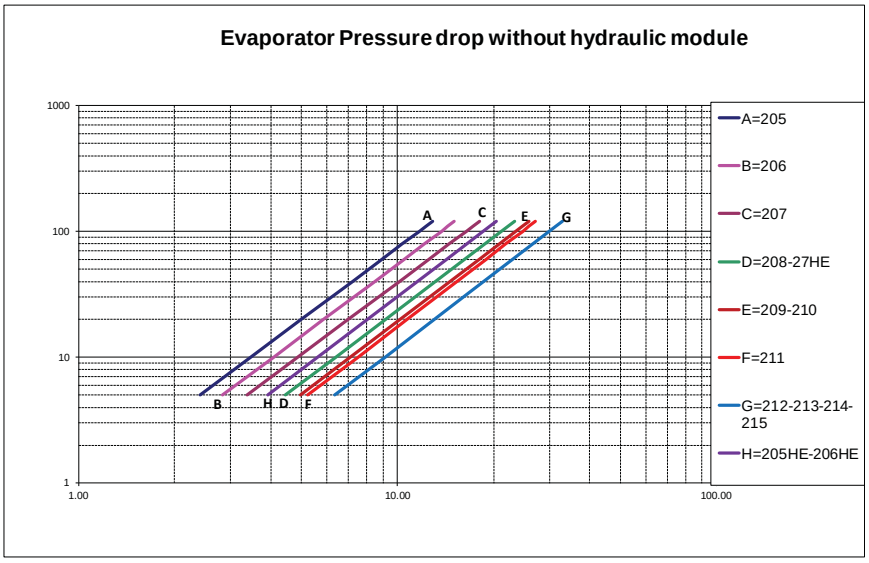
For the warranty to apply, any start-up carried out directly by the customer must be recorded in a detailed report, which must be sent as soon as possible to your local Trane office.

- Do not start-up a motor whose insulation resistance is less than 2 megohms
- Phase imbalance should not be greater than 2%.
- The voltage supplied to motors should be within 10% of the rated voltage on the compressor nameplate.
- Excessive emulsion of the oil in the compressor shows that refrigerant is present in the oil and the result will be that compressor is not lubricated enough. Shut down compressor and wait for 60 minutes for the sump heaters to heat oil and start again. Should this not work, consult Trane technician.
- Excess oil in compressor can damage the compressor. Before adding oil, consult Trane technician. Use only products recommended by Trane.
- The compressors must operate in a single direction of rotation. If refrigerant high pressure remains stable in the 30 seconds after compressor start-up, immediately shut down unit and check the direction of rotation using phasemeter.

WARNING!

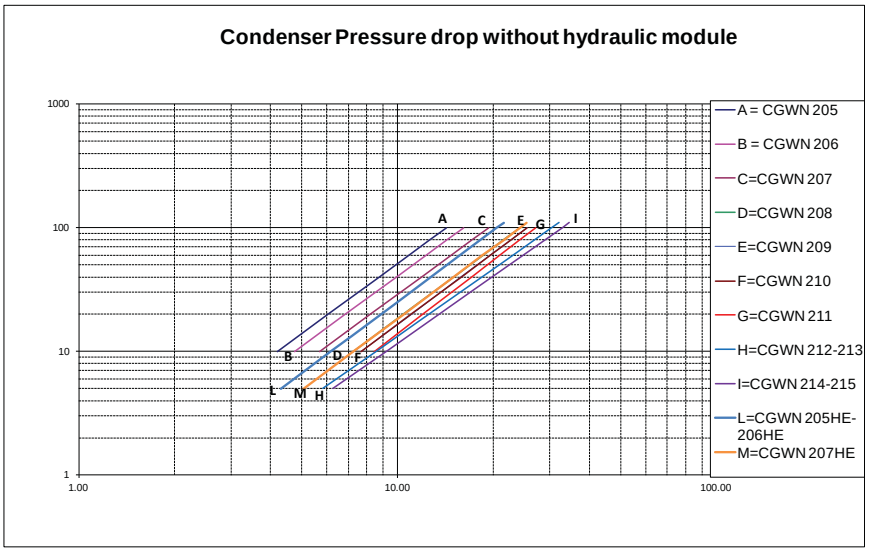
The chilled water circuit may be under pressure. Bring down this pressure before opening up the system to rinse out or fill up the water circuit. Failure to comply with this instruction may cause accidental injury to maintenance personnel. If a cleaning solution is used in the chilled water circuit, the chiller must be isolated from the water circuit to avoid all the damage risks of the chiller and evaporator water pipes.

Figure 16 - Standard and High Efficiency units evaporator pressure drop



EWFR : Evaporator Waterflow Rate
EWPD : Evaporator Water Pressure Drop

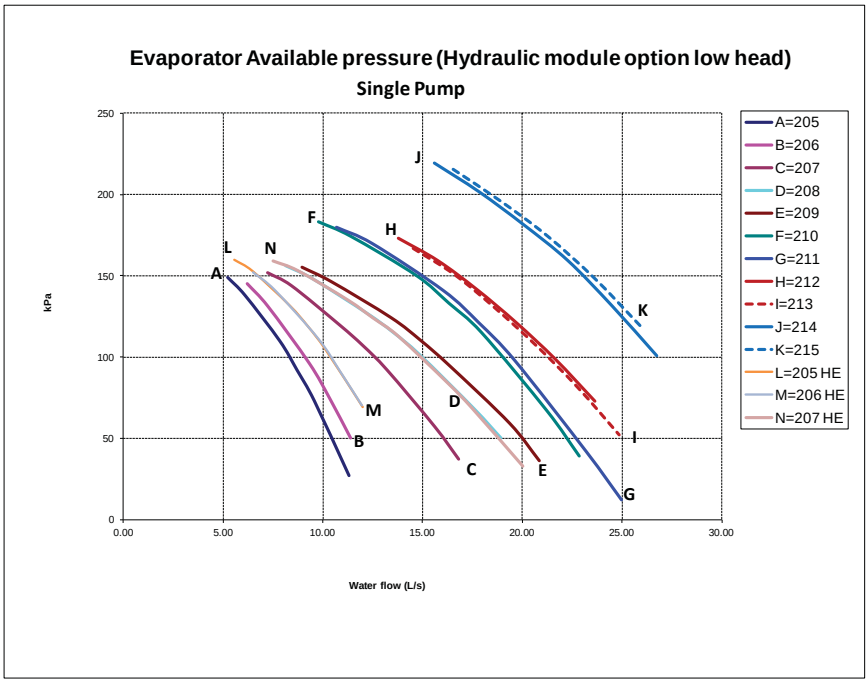
Figure 17 - Standard units condenser pressure drop



CWFR : Condenser Waterflow Rate
CWPD : Condenser Water Pressure Drop

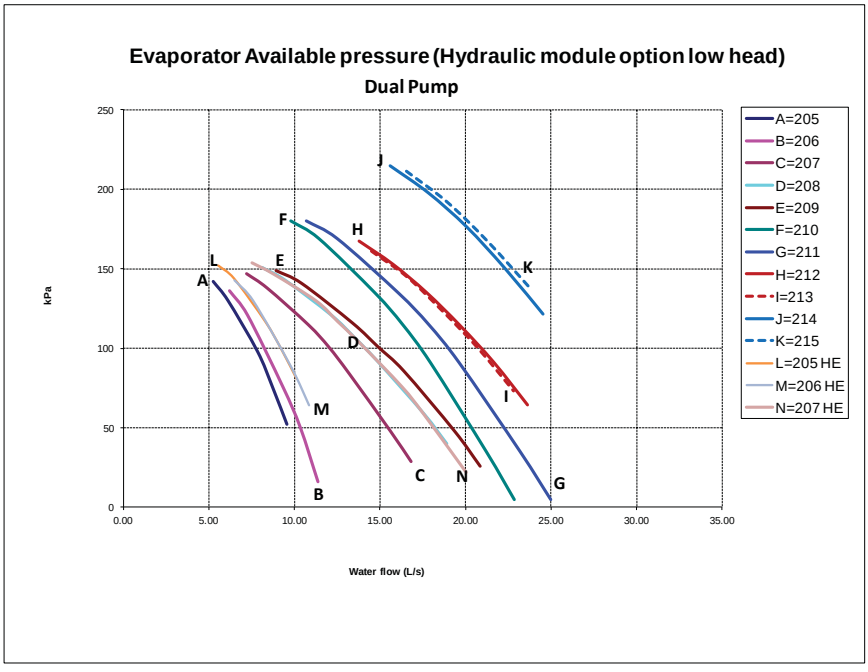
General Start-up

Figure 18 - Chiller available pressure - Evaporator side - Standard and High Efficiency units - Low head pressure - Single pump



EWFR : Evaporator Waterflow Rate
EWPD : Evaporator Water Pressure Drop

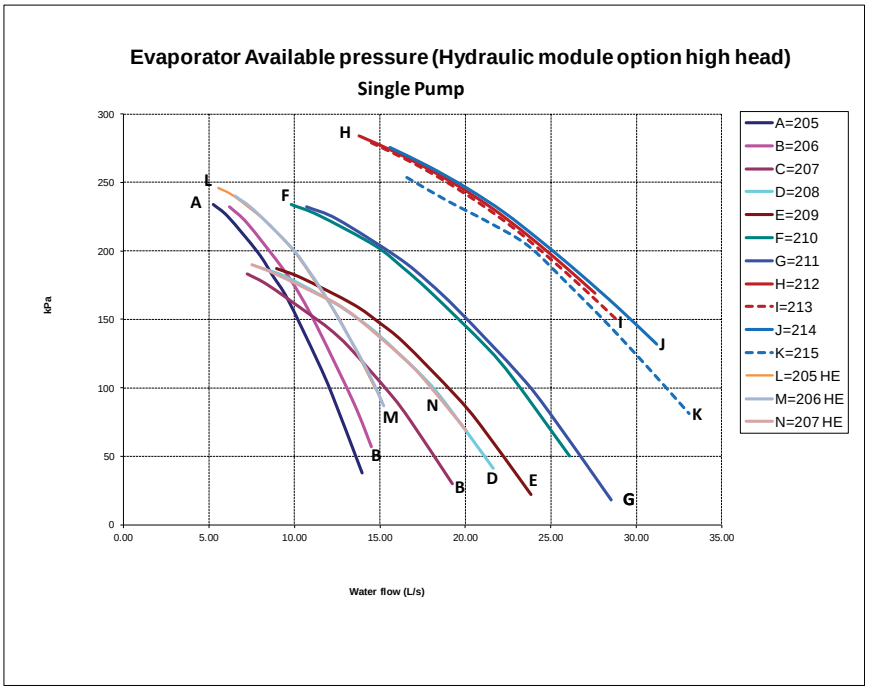
Figure 19 - Chiller available pressure - Evaporator side - Standard and High Efficiency units - Low head pressure - Dual pump



EWFR : Evaporator Waterflow Rate
EWPD : Evaporator Water Pressure Drop

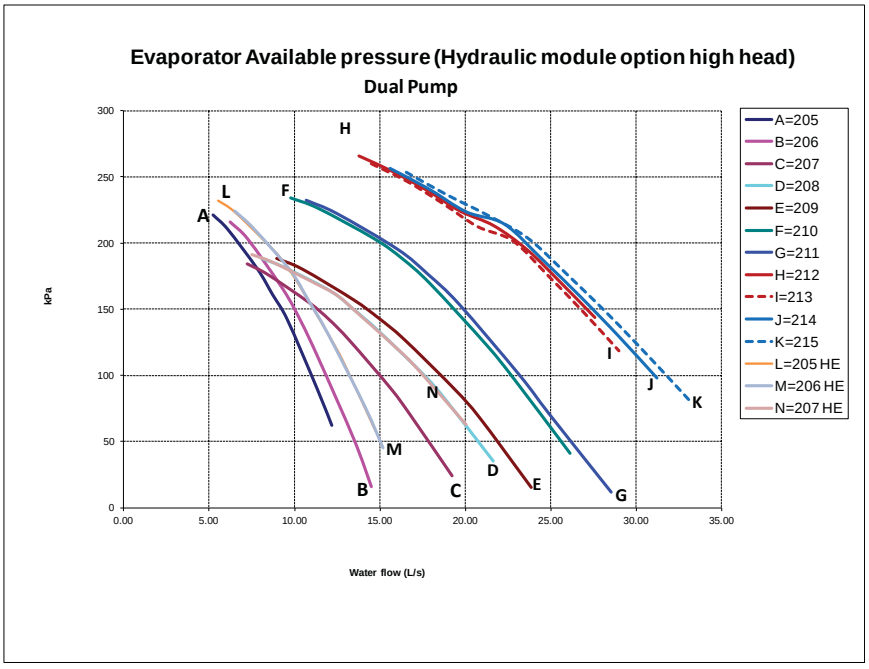
General Start-up

Figure 20 - Chiller available pressure - evaporator side - Standard and High Efficiency units - High head pressure - Single pump



EWFR : Evaporator Waterflow Rate
EWPD : Evaporator Water Pressure Drop

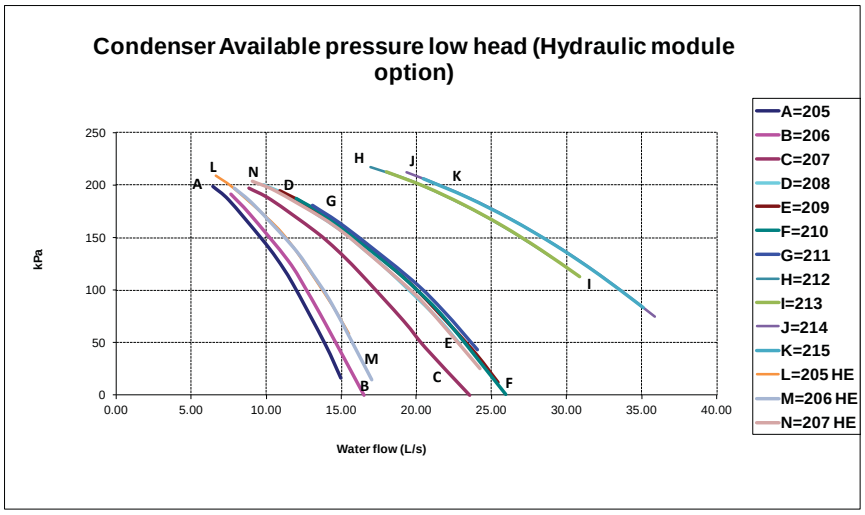
Figure 21 - Chiller available pressure - evaporator side - Standard and High Efficiency units - High head pressure - Dual pump



EWFR : Evaporator Waterflow Rate
EWPD : Evaporator Water Pressure Drop

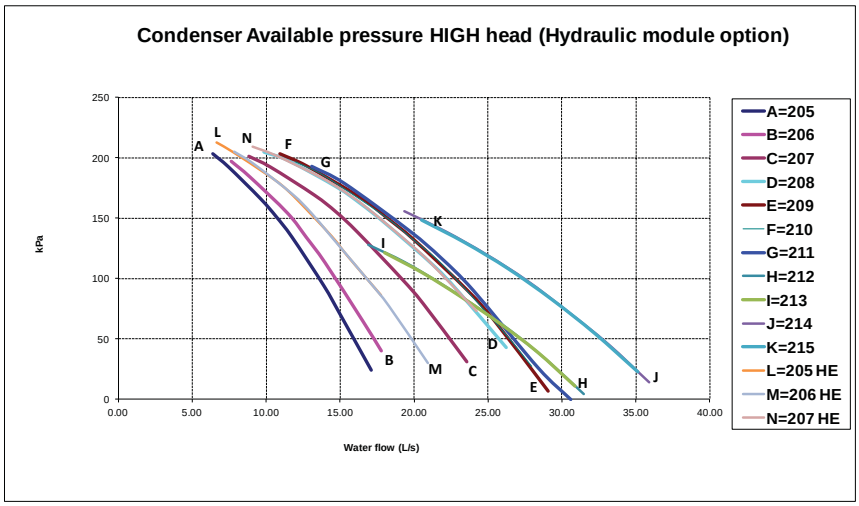
General Start-up

Figure 22 - Chiller available pressure - condenser side - Standard and High Efficiency units - Low head pressure



CWFR : Condenser Waterflow Rate
CWPD : Condenser Water Pressure Drop
Note: Pumps remain the same when variable speed drive option is selected.

Figure 23 - Chiller available pressure - condenser side - Standard and High Efficiency units - High head pressure

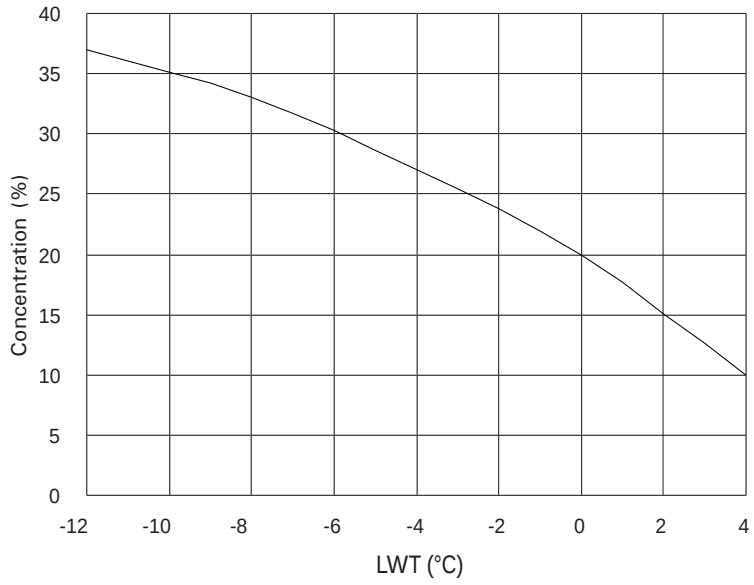


CWFR : Condenser Waterflow Rate
CWPD : Condenser Water Pressure Drop
Note: Pumps remain the same when variable speed drive option is selected.

General Start-up

When ethylene glycol is added in the chilled water circuit the following glycol concentration has to be taken in account.

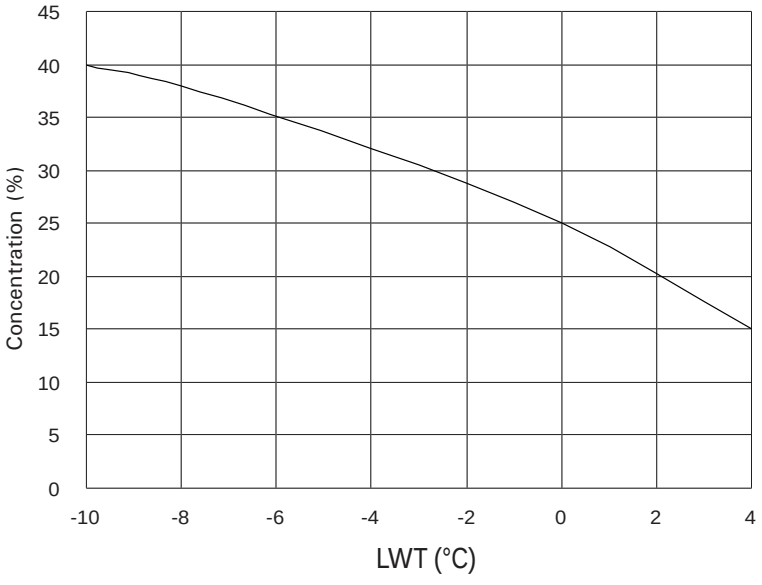
Figure 24** - **Ethylene Glycol recommended concentration



LWT: Lowest water temperature

CAUTION! Loading concentrated glycol in the water loop at the suction side of the pump is prohibited. It can severely damage the mechanical seal of the pump and consequently generate potential water leaks.

Figure 25** - **Propylene Glycol recommended concentration



LWT: Lowest water temperature

General Start-up

In case of application with negative temperature at the evaporator, combination of simultaneous usage of glycol both in evaporator and condenser, or usage of another type of fluid: please contact your local Trane sales representative. A relief valve is located at pump suction limiting water circuit pressure at 3 bar. Nitrogen pressure inside of the expansion tank must be equal to the geometric height of the installation + 0.5 bar (in order to avoid air entering in the water circuit). Expansion tank must be inflated with nitrogen. Pressure must be checked yearly. For a good pump operation, pump suction pressure must be between 0.5 and 2.5 bar when pump runs.

Operation

Installation checklist

This list must be checked off by the installer to ensure correct installation before the unit start up.

UNIT POSITION

☐ Check clearance around condenser

☐ Check clearance required for maintenance access

☐ Check type and position of rubbers pads

☐ Check unit is level

CHILLED WATER CIRCUIT

☐ Check thermometers and manometers presence and position

☐ Check water flow rate balancing valve presence and position

☐ Check presence of strainer ahead of evaporator

☐ Check presence of air-purge valve

☐ Check rinsing and filling of chilled water pipes

☐ Check water pump(s) contactor interconnected to control panel

☐ Check water flow

☐ Check chilled water pressure drop or unit available pressure (units with hydraulic module)

☐ Check for leaks in chilled water pipes

ELECTRICAL EQUIPMENT

☐ Check installation and rating of mains power switch/fuses

☐ Check electrical connections complied with specification

☐ Check that electrical connections are in accordance with information on manufacturer's identification plate

☐ Check direction of rotation using phasemeter

Comments

.....

.....

.....

.....

.....

Signature:.....Name:.....

Order N°: .....

Work site: .....

Please return to your local Trane Service Office

Operation

Control and unit operation

The control is through the TRACER CH530 control module.

- Check the chilled water pump(s) operate(s)
- Start up the unit following procedure described in the CGWN-CCUN User Manual. The unit will operate correctly when there is sufficient water flow. The compressors will start up if the evaporator water leaving temperature is above the control module setpoint.

Weekly start up

- Check the chilled water pump(s) operates
- Start up the unit following procedure described in the User Guide.

Weekend shutdown

- If the unit needs to be shut down for a short period of time, stop the unit following procedure described in the CGWN-CCUN User Manual (See “Clock” menu)
- If the unit is shut down for a longer period, see under “Seasonal shutdown”, below.
- Ensure that all safety precautions are taken to prevent frost damages during negative ambient temperature.
- Do not put the general disconnect switches to off, except if the unit is drained.

Trane does not recommend draining the unit, due to the fact that it increases tube corrosion.

Seasonal shutdown

- Check water flows and interlocks.
- Check glycol concentration in the chilled water circuit if glycol presence is required
- Carry out leak test.
- Carry out oil analysis
- Record operating pressures, temperatures, amperages and voltage.
- Check operation of machines/ compare conditions of operation against original commissioning data.
- Stop the unit following procedure described in the CGWN-CCUN User Manual.
- Ensure that all safety precautions are taken to prevent frost damages during negative ambient temperature.
- Fill out the visit log sheet and review with the operator
- Do not put the general disconnect switch to off, except if the unit is drained.

Trane does not recommend draining the unit, due to the fact that it increases tube corrosion.

Operation

Seasonal start-up

- Check water flows and interlocks.
- Check Ethylene glycol concentration in the chilled water circuit if glycol presence is required
- Check operational set points and performance
- Calibrate controls
- Check operation of all safety devices
- Inspect contacts and tighten terminals
- Megger the motor compressor windings
- Record operating pressures, temperatures, amperages and voltage
- Carry out leak test
- Check configuration of unit control module
- Change the oil as required based upon results of the oil analysis made during seasonal shutdown.

Get the 8 condition measurements at the same time, on each circuit.

- HP
- LP
- Suction temperature
- Discharge temperature
- Liquid temperature
- Water entering temperature
- Water leaving temperature
- Outdoor ambient temperature

Then calculate the sub-cooling and superheat. No diagnosis can be accurate with one of these records missing.

- Check operation of machines/ compare conditions of operation against original commissioning data.
- Fill out the visit log sheet and review with the operator

Maintenance

Maintenance Instructions

The following maintenance instructions are part of maintenance operations required for this equipment. A qualified technician is needed for regular maintenance as part of a regular maintenance contract.

Carry out all operations as required by schedule. This will ensure long unit service life and reduce the possibility of serious and costly breakdown. Keep service records up to date, showing monthly information on unit operations. These records can be of great help to maintenance personnel diagnostics. Similarly, if machine operator keeps a log of changes in unit operating conditions, problems can be identified and solutions found before more serious problems arise.

Inspection visit after the first 500 hours of operation from unit start up

- Carry out oil analysis
- Carry out leak test
- Inspect contacts and tighten terminals
- Record operating pressures, temperatures, amperages and voltage
- Check operation of machines/ compare conditions of operation against original commissioning data
- Fill out inspection visit log sheet and review with the operator
- Check and clean the strainer
- Check Rotalock Compressor equalization tightness with a torque wrench set at 170-180 N.m

Note: For medium to highly critical applications, a monthly preventive visit is recommended.

Monthly preventive visit

- Carry out leak test
- Oil test of acidity
- Check Ethylene glycol concentration in the chilled water circuit if glycol presence is required
- Inspect contacts and tighten terminals
- Record operating pressures, temperatures, amperages and voltage
- Check operation of machines/ compare conditions of operation against original commissioning data
- Fill out visit log sheet and review with the operator
- Check and clean the strainer

Maintenance

Annual preventive visit

- Check water flows and interlocks
- Check expansion tank pressure
- Check glycol concentration in the chilled water circuit if glycol presence is required
- Check operational set points and performance
- Calibrate controls and pressure transducer
- Check operation of all safety devices
- Inspect contacts and tighten terminals
- Megger the motor compressor windings
- Record operating pressures, temperatures, amperages and voltage
- Carry out leak test
- Check configuration of unit control module
- Carry out oil analysis
- Change the oil as required based upon results of the oil analysis
- Check operation of machines/ compare conditions of operation against original commissioning data
- Fill out the annual start up visit log sheet and review with the operator
- Check and clean the strainer

CAUTION:

- Please refer to specific Trane documentation on oil, available from your nearest Trane office. Oils recommended by Trane have been exhaustively tested in Trane laboratories to the specific requirement of Trane chiller and hence the user's requirements.

Any use of oils not meeting specifications recommended by Trane is the responsibility of the user only, who thereby is liable to warranty loss.

- Oil analysis and oil test acidity must be carried out by a qualified technician. Poor interpretation of results may cause unit operating problems. Also, oil analysis must follow the correct procedures, to avoid accidental injury to maintenance personnel.
- If the condensers are dirty, (Remote condensers) clean them with a soft brush and water. If the coils are too dirty, consult a cleaning professional. Never use high pressure water to clean condenser coils.
- Contact Trane Service for information on maintenance contracts.

WARNING:

Switch off unit main power supply before to any intervention. Failure to follow this safety instruction can lead to injury or death of the maintenance personnel and may also damage equipment.

CAUTION: Never use steam or hot water above 60°C to clean condenser coils (Remote condensers). The resulting increasing pressure could cause refrigerant loss through the safety valve.

Maintenance

Troubleshooting guide

These are simple diagnostic hints, not a comprehensive analysis of the Scroll compressor refrigeration system.

The aim is to give operators simple instructions on basic unit processes so that they have the technical knowledge to identify and bring defective operations to the notice of qualified technician. If there is a breakdown, the Trane Service office should be contacted for confirmation and assistance.

Problems symptoms	Problem causes	Action recommended
A) The compressor does not start up		
Compressor terminals are live but motor does not start.	Motor burned out.	Replace compressor
Contactor motor not operational.	Coil burned out or broken contacts.	Repair or replace.
No current ahead of motor contactor.	a) Power cut. b) Main power supply switched off.	Check fuses and connection. See why system tripped. If system is operational, switch on main power supply.
Current ahead of fuse, but not on contactor side.	Fuse blown.	Check motor insulation. Replace fuse.
Low voltage reading on voltameter.	Voltage too low.	Contact power Supply Utility.
Starter coil not excited.	Regulation circuit open.	Locate regulation device which has tripped out and see why. See instructions concerning this device.
Compressor does not run. Compressor motor “groans”. High pressure switch tripped to contacts open on high pressure. Discharge pressure too high.	Compressor sticking (damaged or sticking components). Discharge pressure too high Shut down by thermal overload due to discharge temperature or motor thermal overload	See “Discharge pressure too high”. Wait 30 minutes until auto reset of compressor mounted protection. Check superheat versus suction pressure or water temperatures of operation.
B) Compressor stops **High pressure switch tripped.**		
Over current thermal relay tripped. Motor temperature thermostat tripped. Anti-freeze security tripped.	Discharge pressure too high. a) Voltage too low. b) Cooling demand too high, or condensing temperature too high. Not enough cooling fluid. Water flow to evaporator too low.	See instructions for “discharge pressure high”. a) Contact Power Supply Utility. b) See instruction “discharge pressure too high”. Repair leak. Add refrigerant. Check water flow rate, and flow switch contact in water
C) Compressor stops just after its start		
Suction pressure too low. Filter drier iced up.	Filter drier clogged.	Replace filter drier.
D) The compressor keeps running without stopping		
Temperature too high in areas requiring air-conditioning.	Excess load on cooling system.	Check thermal insulation and air-tightness of areas requiring air-conditioning.
Chilled water temperature output too high.	Excess cooling demand on system.	Check thermal insulation and air-tightness of areas requiring air-conditioning.
E) Loss of oil in compressor		
Oil level too low in indicator.	Not enough oil.	Contact Trane office before to order oil
Gradual fall in oil level.	Filter drier clogged.	Replace filter drier.
Suction line too cold. Compressor noisy	Liquid flows back to compressor.	Adjust superheat and check bulb fixing of the expansion valve.

Maintenance

F) Compressor noisy		
Compressor knocks.	Components broken in compressor.	Change compressor.
Suction duct abnormally cold.	a) Uneven liquid flow. b) Expansion valve locked in open position.	a) Check superheat setting and fixing of expansion valve bulb. b) Repair or replace.
G) Insufficient cooling capacity		
Thermostatic expansion valve “whistles”.	Not enough refrigerant.	Check refrigerant circuit tightness and add refrigerant.
Excess pressure drops through filter drier	Drier filter clogged.	Replace.
Excessive superheat.	Superheat not properly adjusted.	Check adjustment of superheat and adjust thermostatic expansion valve.
Insufficient water flow.	Chilled water pipes obstructed.	Clean pipes and strainer.
H) Discharge pressure too high		
Condenser abnormally hot.	Presence of uncondensable liquids in system, or excess refrigerant.	Purge uncondensable fluids and drain off excess refrigerant.
Chilled water leaving temperature too high.	Overload on cooling system.	Reduce load on system. Reduce water flow if necessary.
Condenser air output too hot.	Reduced air flow. Air intake temperature higher than specified for unit	Clean or replace air filters. Clean coil. Check operation of fan motors.
I) Suction pressure too high		
Compressor operates continuously. Suction duct abnormally cold. Refrigerant flows back to compressor.	Excess cooling demand on evaporator a) Expansion valve too far open. b) Expansion valve locked in open position.	Check system. a) Check for superheat and check that expansion valve bulb is secure. b) Replace.
J) Suction pressure too low		
Excessive pressure drop through filter drier. Refrigerant does not flow through thermostatic expansion valve.	Filter drier clogged. Expansion valve bulb has lost its refrigerant.	Replace the filter drier. Replace the bulb.
Loss of power.	Expansion valve obstructed.	Replace.
Superheat too low.	Excessive pressure drops through evaporator.	Check adjustment of superheat and adjust thermostatic expansion valve.
K) Insufficient cooling capacity		
Low pressure drops through evaporator	Low water flow rate.	Check water flow rate. Check state of strainer, check for obstruction in chilled water pipes. Check pressure switch contact in water.

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CG-SVX06F-GB May 2016
Supersedes CG-SVX06E-E4_1111

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