



TECHNICAL MANUAL

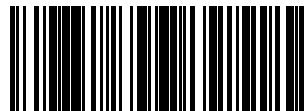
CHILLER

- EXTERNAL UNITS
- HIGH EFFICIENCY
- POWER SUPPLY 60Hz

NRL free-cooling 080-180



EN



INRLFTY.1409.4086984_04

Dear Customer,

Thank you for choosing AERMEC. It is the fruit of many years of experience and special design studies and has been made of the highest grade materials and with cutting edge technology.

In addition, all our products bear the EC mark indicating that they meet the requirements of the European Machine Directive regarding safety. The standard of quality is permanently being monitored and AERMEC products are therefore a synonym for Safety, Quality and Reliability.

The data may undergo modifications considered necessary for the improvement of the product, at any time and without the obligation for any notice thereof.

Thank you again.
AERMEC S.p.A

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Standards and directives to be followed in the design and manufacture of the unit:

STANDARD

1. UL 1995 Heating and cooling equipment
2. ANSI/NFPA Standard 70 National Electrical code (N.E.C.)
3. CSA C.22.1- C.22.2 Safety Standard Electrical Installation

SAFETY LEVEL

1. IP24

ACOUSTIC PART

1. ISO DIS 9614/2 (sound intensity method)

REFRIGERANT GAS (R410A)

This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. Maintenance and disposal operations must be only carried out by qualified staff, in compliance with existing laws.

2. CHECK LIST

1. DESCRIPTION AND CHOICE OF THE UNIT

The NRL Free-cooling series appliances are water chillers equipped with an external air cooling capacity recovery system called "free-cooling". The water free-cooling system consists in integrating and eventually completely replacing the cooling capacity delivered by the compressors through an additional water coil that exploits the low temperature of the external air to cool the system's return water.

Maximum reliability

The presence of several scroll compressors allows NRL chillers various partialisations of the cooling capacity.

OPERATING MODE:

FREE-COOLING ONLY:

when the external temperature is sufficiently low to allow water cooling inside the free-cooling coils at the desired temperature. This is the most economical mode of the unit with only the fans operating in speed modulation.

MIXED FREE-COOLING + COMPRESSORS:

the compressors operate in integration with the free-cooling when the cooling capacity recovered from the external air is no longer sufficient for the power required by the system. The higher the cooling capacity recovery with free-cooling the lower the integration is.

COMPRESSORS ONLY:

when the external air temperature is greater than the return temperature of the system water.

Models:

1. NRL "F" free-cooling

The versions can be in different set-ups at the same time in order to satisfy a wide range of plant engineering solutions:

1. "A" HIGH EFFICIENCY
2. "E" SILENCED HIGH EFFICIENCY
3. "D" WITH DESUPERHEATER

The units with desuperheater (D) are not available in the versions:

1. YD
2. XD

		Circuit								Components							
Cooling circuit	Model	F				with D											
	Resistance carter compressor	yes				yes											
	High pressure switch	yes				yes											
	Low pressure switch	no				no											
	High pressure trasducer	yes				yes											
	Low pressure trasducer	yes				yes											
	Solenoid valve of hot gas injecton	no				no											
	By-pass valve of hot gas	yes				yes											
	Exchanger (EV-EV/CN)	yes				yes											
	Exchanger (desuperheater)	no				no											
	Exchanger (glycol free)	no				no											
	Cock the liquid and discharge	yes				yes											
hydraulic circuit		Version "F 00"								800	900	1000	1250	1400	1500	1650	1800
	Water filter	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Flow switch	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Air vent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
hydraulic circuit		Version "P3...P4"								800	900	1000	1250	1400	1500	1650	1800
	Water filter	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Flow switch	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Safety valve	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Air vent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Pump	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Expansion tank	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
hydraulic circuit		Version "03...04"								800	900	1000	1250	1400	1500	1650	1800
	Water filter	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Flow switch	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Safety valve	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Air vent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Pump	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Expansion tank	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Version with DESUPERHEATER "D"																	
hydraulic circuit		Version "F with D"								200	220	250	280	300	330	360	1800
	Water filter	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Differential pressure switch	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Flow switch	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Exchanger (desuperheater)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
hydraulic circuit		Version "A with D"								200	220	250	280	300	330	360	1800
	Water filter (desuperheater)	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Differential pressure switch (desuperheater)	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Flow switch (desuperheater)	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
	Exchanger (desuperheater)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Safety valve	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Air vent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Pump	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Expansion tank	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Storage tank	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

3. CONFIGURATOR

field

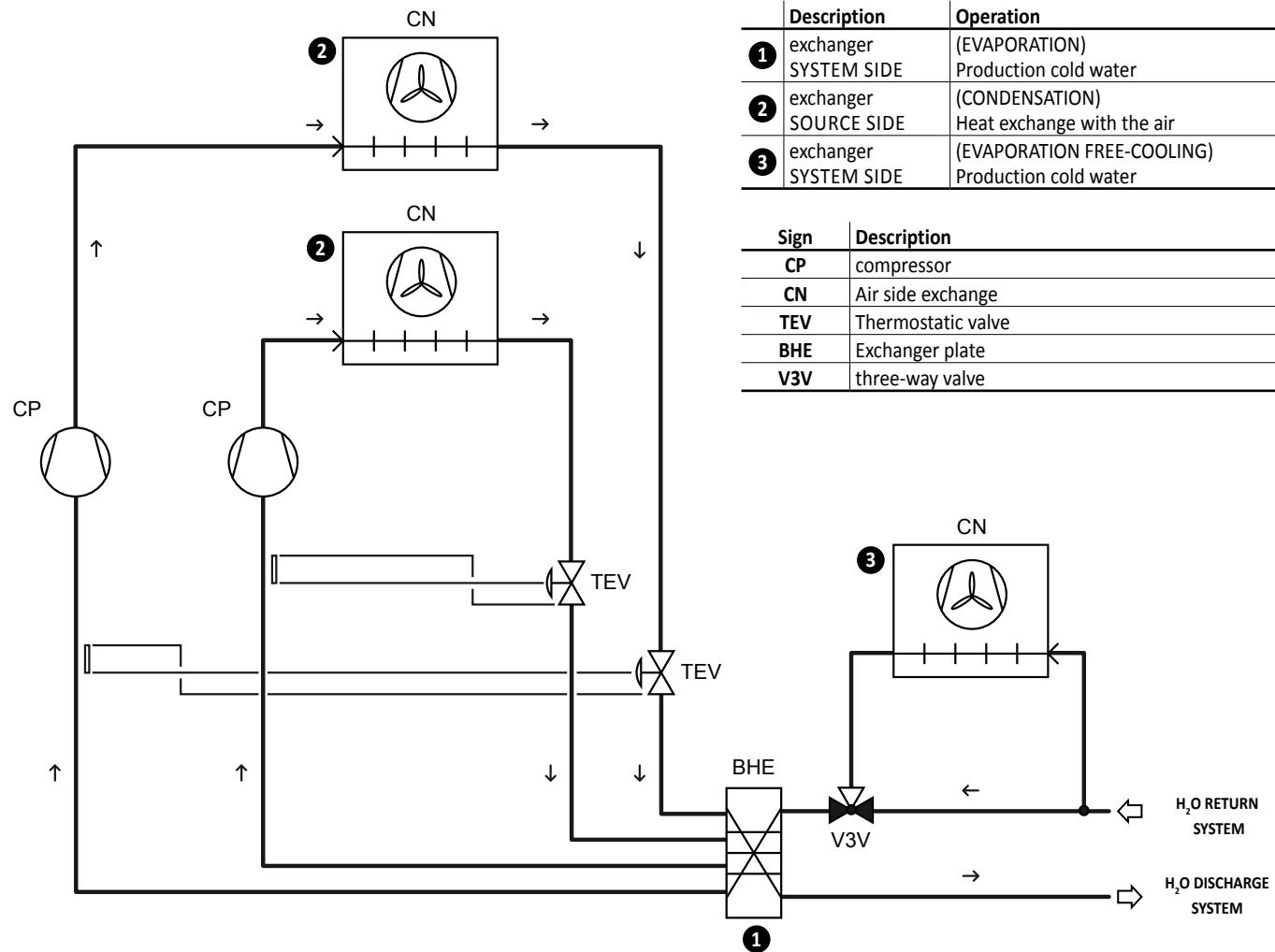
1, 2, 3	Code	NRL
4, 5, 6	Size	080 - 090 - 100 - 125 - 140 - 150 - 165 - 180
7	Compressors	
0		Standard compressor
8	Thermostatic valve	
°		Standard mechanical thermostatic valve with produced water up to 39.2°F / +4°C ⁽¹⁾
Y		Mechanical thermostatic valve with produced water from 39.2°F / +4°C to -42.8°F / -6°C ⁽¹⁾
X		Electronic thermostatic valve with produced water up to 39.2°F / +4°C ⁽¹⁾
9	Model	
F		Free-cooling
10	Heat recovery	
°		Without recovery units
D ⁽²⁾		Desuperheater
11	Version	
A		High efficiency
E ⁽²⁾		High efficiency, silenced version
12	Coils	
°		Made of aluminium
R		Made of copper
S		Tinned copper
V		Painted aluminium (epoxy paint)
13	Ventilation	
I		Fan speed modulating for condensation control
14	Power supply	
6		230V ±10%--3-60Hz available only for NRL 800 size with thermomagnetic switches ⁽²⁾
7		460V ±10%--3-60Hz with thermomagnetic switches
8		575V ±10%--3-60Hz with thermomagnetic switches
9		208V ±5% -3-60Hz with thermomagnetic switches
15, 16	Hydronic kit	
00		Without hydronic kit
03		Water storage tank and high-head single pump
04		Water storage tank, with high-head pump and reserve pump
P3		Without water storage tank, with high-head pump
P4		Without water storage tank, with high-head pump and reserve pump

⁽¹⁾ For lower temperatures, contact the office.

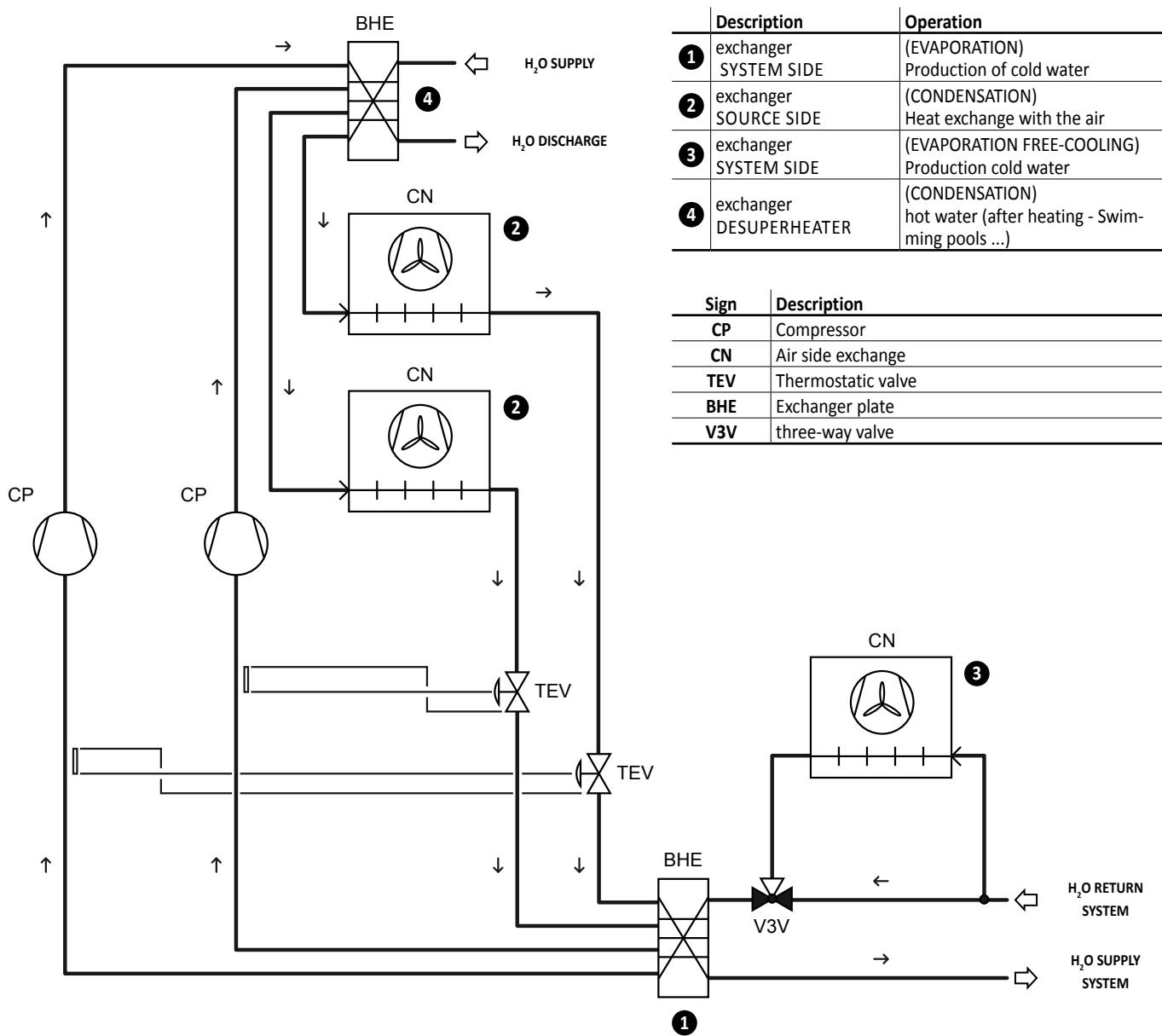
⁽²⁾ Versions available only on demand

4. PRINCIPLE OF OPERATION SCHEMES

4.1. PRODUCTION OF COLD WATER ONLY THE SYSTEM



4.2. COLD WATER PRODUCTION AND THE SYSTEM RECOVERY (DESUPERHEATER)



5. DESCRIPTION OF THE COMPONENTS

5.1. CHILLER CIRCUIT

SCROLL COMPRESSOR

High efficiency scroll-type hermetic compressors driven by a 2-pole electric motor with internal thermal protection of the electric heater casing included as standard.

HEAT EXCHANGER SYSTEM SIDE

Of the plate-type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion. Fitted, as standard, with antifreeze heater.

DESUPERHEATER

Of the plate-type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion. Fitted, as standard, with antifreeze heater.

HEAT EXCHANGER SOURCE SIDE

Scambiatore a pacco alettato realizzato con tubi in rame e alette in alluminio adeguatamente spaziate in modo da garantire il miglior rendimento nello scambio termico.

FILTER DRIER

Of the mechanical cartridge type, made of ceramics and hygroscopic material able to trap impurities and any traces of humidity in the chiller circuit.

ONE-WAY VALVE

Allows the passage of the refrigerant in just one direction.

MECHANICAL VALVE

The mechanical type valve, with outside equaliser on the evaporator outlet, modulates the gas flow to the evaporator on the basis of the thermal load, in such a way as to ensure the proper degree of overheating of the intake gas.

SOLENOID VALVE

The valve closes when the compressor turns off, preventing the flow of refrigerant gas towards the evaporator.

SIGHT GLASS

For checking the refrigerating gas load and any humidity in the refrigerating circuit.

TAPS

Present in the liquid and discharge lines, and allow to intercept the refrigerant in case of extraordinary maintenance.

5.2. FRAME AND FANS

SUPPORT FRAME

Load-bearing structure Made of hot-galvanised steel sheet of a suitable thickness, varnished with polyester powders able to resist atmospheric agents over time.

FAN UNIT

Axial fan, balanced statically and dynamically. The electric fans are protected electrically by magnet-circuit

breakers and mechanically by anti-intrusion metal grids, according to the IEC EN 60335-2-40 Standard.

5.3. HYDRAULIC CIRCUIT (standard version)

AIR-WATER HEAT EXCHANGER (FREE-COOLING)

Crossed by water for the free-cooling function. Is made of copper pipes and aluminium blades blocked through the mechanical expansion of the pipes. (High efficiency type).

WATER FILTER

Allows you to block and eliminate any impurities in the hydraulic circuits. Inside, it has a filtering mesh with holes not greater than one millimetre. It is essential for avoiding serious damage to the plate-type exchanger.

FLOW SWITCH

Controls that the water is circulating, otherwise the unit blocks.

WATER TEMPERATURE PROBE (IN-OUT)

DRAIN VALVE

Of the automatic type, assembled on the upper part of the hydraulic system; it releases any air bubbles that may be present in the system.

3-WAY VALVE

This is an electric servo-controlled ON-OFF diverting valve on the water side of the freecooling circuit controlled.

AIR VENT

Of the automatic type, assembled on the upper part of the hydraulic system; it releases any air bubbles that may be present in the system.

5.4. HYDRAULIC HYDRAULIC COMPONENTS FOR CONFIGURABLE VERSIONS

CIRCULATION PUMP (HIGH PUMP)

Depending on the characteristics of the pump chosen, it offers a useful head to overcome the pressure drops in the system.

EXPANSION TANK

Of the membrane type, with nitrogen pre-charge.

SAFETY VALVE

Calibrated to 87psi / 6bar and with ductable discharge, it releases overpressure in the event of abnormal working pressure levels.

STORAGE TANK

In order to reduce the thermal dispersion and eliminate the phenomenon of the formation of condensation, it is insulated with polyurethane material of a suitable thickness.

5.4.1. WATER FEATURES

PH	6-8
Electric conductivity	less than 200 mV/cm (77°F / 25°C)
Chloride ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0.3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
ammonia ions	none
Silicone ions	less than 30 ppm

5.5. SAFETY AND CONTROL COMPONENTS

HIGHT PRESSURE SWITCH

With fixed calibration, placed on the high pressure side of the chiller circuit, it shuts down compressor operation in the case of abnormal operating pressure.

HIGH PRESSURE TRASDUCER

Placed on the high pressure side of the chiller circuit, it communicates to the control card the operating pressure, sending a pre-alarm in case of abnormal pressure.

REFRIGERANT CIRCUIT SAFETY VALVE

This intervenes by releasing overpressure in the event of abnormal working pressure levels.

- Calibrated at 653psi / 45bar on the HP branch
- Calibrated at 435psi / 30bar on the BP branch

LOW PRESSURE TRANSDUCER

Allows displaying, on the microprocessor board display, the value of the compressor's suction pressure (one per circuit) on the low-pressure side of the cooling circuit

DCPX_UL CONDENSATION PRESSURE CONTROLLER

This accessory allows correct functioning when external temperatures drop below 50 °F / 10°C (up to 14 °F / -10°C). It consists of an adjustment circuit board that varies the number of fan revs according to the condensation pressure, read by the high pressure transducer, in order to keep it sufficiently high for correct unit functioning.

EVAPORATOR ANTIFREEZE HEATING ELEMENT

Its operation is commanded by the antifreeze probe located in the plate evaporator. It is activated when the water temperature is +3°C, and deactivated when the water temperature is +5°C. The dedicated software in the regulation card manages the heater.

5.6. ELECTRICAL COMPONENTS

Electric board in compliance with standards EN 60204-1/IEC 204-1, complete with:

- door lock main isolating switch,
- fuses and contactors for compressors and fans,
- terminals for REMOTE PANEL,
- spring type control circuit terminal board,
- outdoor electric board with double door and gaskets,
- electronic controller,
- evaporator pump and recovery pump control consent relay

- all numbered cables.

DOOR LOCK KNIFE SWITCH

It is possible to access the electrical panel by disconnecting the voltage, then using the opening lever of the panel itself. This lever can be blocked with one or more padlocks during maintenance, in order to prevent the machine being powered up accidentally.

REMOTE CONTROL PANEL (PR3)

This allows the chiller command operations to be given from a distance.

CONTROL KEYPAD

Provides full control functions. For a detailed description refer to the user manual.

Electronic regulation

GR3

- Consisting of a management/control card and a visualisation card.
- Functions carried out:
 - adjustment of water temperature at evaporator inlet, with thermostat control for up to 4 levels and integral-proportional fan speed control (with DCPX_UL);
 - compressor start-up delay;
 - compressor sequence rotation;
 - count of compressor work hours;
 - start/stop;
 - reset;
 - permanent alarms memory;
 - autostart after voltage drop;
 - multi-lingual messages;
 - operation with local or remote control.

Machine status display:

1. alarms sumary;
2. ON/OFF compressors.

Display of the following parameters

1. water inlet temperature;
2. accumulator temperature;
3. water outlet temperature;
4. ΔT ;
5. high pressure;
6. low pressure;
7. waiting time for restart;
8. alarms visualisation.

For further information, refer to the user manual.

6. ACCESSORIES

6.1. MECHANICAL ACCESSORIES

AVX

Group of anti-vibration, to be installed under the base.

GP

Protection grille, protects the external coil from accidental knocks.

6.2. ELECTRICAL ACCESSORIES

AERWEB300

Accessory AERWEB allows remote control of a chiller through a common PC and an ethernet connection over a common browser; 4 versions available:

- **AERWEB300-6:** Web server to monitor and remote control max. 6 units in RS485 network;

- **AERWEB300-18:** Web server to monitor and remote control max. 18 units in RS485 network;

AERWEB300-6G: Web server to monitor and remote control max. 6 units in RS485 network with integrated GPRS modem;

AERWEB300-18G: Web server to monitor and remote control max. 18 units in RS485 network with integrated GPRS modem;

DRE

It allows the reduction of peak power necessary for the machine during start-up phase.

Accessories can only be fitted in the factory.

DUALCHILLER

Simplified control system to switch on and off, and command, two chillers (using Aermec GR3 command) in a single system, as if they were a single unit.

MULTICHILLER

Control system to switch the individual chillers on and off, and command them, in a system in which several

units are installed in parallel, always ensuring a constant delivery to the evaporators.

PGS:

Daily/Weekly Programmer. Allows you to programme two time bands per day (two switch on/off cycles) and to have differentiated programming for each day of the week.

PRM1-PRM2 FACTORY FITTED ACCESSORY.

It is a manual pressure switch electrically wired in series with the existing automatic high pressure switch on the compressor discharge pipe.

AER485

RS-485 interface for supervision systems with MODBUS protocol.

FOR MORE INFORMATION PLEASE CONTACT US

NRL VERSION	NRL0800°F°A°°	NRL0900°F°A°°	NRL1000°F°A°°	NRL1250°F°A°°	NRL1400°F°A°°	NRL1500°F°A°°	NRL1650°F°A°°	NRL1800°F°A°°
AVX 00	AVX 739	AVX 739	AVX 745	AVX 748	AVX 752	AVX 757	AVX 761	AVX 766
AVX P3 / P4	AVX 741	AVX 744	AVX 747	AVX 750	AVX 754	AVX 758	AVX 763	AVX 763
AVX 03 / 04	AVX 740	AVX 743	AVX 746	AVX 749	AVX 753	AVX 753	AVX 762	AVX 762
GP	GP260	GP260	GP260	GP350	GP350	GP350	GP500	GP500

7. TECHNICAL DATA vers. F (CHILLER /FREE COOLING MODE)

	800	900	1000	1250	1400	1500	1650	1800
CHILLER MODE								
Cooling capacity	Alls	Tons	50.19	56.41	62.80	81.92	86.99	103.40
Total power input	Alls	kW	69.78	86.22	102.33	126.92	142.49	214.18
Total power input with HIGH - PUMP	Alls	kW	72.78	90.22	106.33	132.42	147.99	221.68
Water flow rate	Alls	gpm	120	135	151	196	208	248
Total pressure drop	Alls	psi	10	11	12	13	13	14
Useful head with HIGH - PUMP	Alls	psi	24	29	24	26	24	27
FREE COOLING MODE								
Cooling capacity	Alls	Tons	33,71	38,19	43,39	49,28	55,87	65,17
Total power input	Alls	kW	8,76	8,86	8,86	13,11	13,29	13,29
Water flow rate	Alls	gpm	120	135	151	196	209	248
Total pressure drop	Alls	psi	13	16	16	17	18	20
Useful head with HIGH - PUMP	Alls	psi	21	25	20	21	19	22
ENERGY INDICES								
EER (Chiller mode)	BTU/Wat		8,64	7,86	7,37	7,75	7,33	5,80
EER (Free cooling mode)	BTU/Wat		46,23	51,75	58,80	45,15	50,50	58,90
IPLV	BTU/Wat		10.62	10.38	10.35	10.52	10.45	9.94
PROTECTION RATING								
IP			24	24	24	24	24	24
SCROLL COMPRESSORS								
Quantity / circuits	n°/n°		4/2	4/2	4/2	4/2	4/2	5/2
HEAT EXCHANGER SYSTEM SIDE								
Exchanger capacity	gal		3,4	3,7	4,4	5,3	5,9	7,0
Water connections	inch		3"	3"	3"	4"	4"	4"
HYDRONIC GROUP SYSTEM SIDE								
Total power input with HIGH - PUMP	Alls	kW	72.78	90.22	106.33	132.42	147.99	221.68
STORAGE TANK								
Buffer tank capacity	n°/gal		1 x 185	1 x 185	1 x 185	1 x 185	1 x 185	1 x 185
EXPANSION TANK								
Expansion tank	n°/gal		2 x 7	2 x 7	2 x 7	2 x 7	2 x 7	2 x 7
Expansion tank calibration	psi		21.75	21.75	21.75	21.75	21.75	21.75
HIGH HEAD PUMP								
Pump power input		kW	3,0	4,00	4,00	5,50	5,50	7,50
Pump input current	230V	A	10,40	-	-	-	-	-
	460V		4,94	6,20	6,20	8,43	8,43	11,48
	575V		3,95	4,98	4,98	6,74	6,74	9,18
SAFETY VALVE								
Safety valve calibration	psi		87	87	87	87	87	87
FAN MOTORS								
Quantity	n°		4	4	4	6	6	8
Air flow	CFM		48380	47436	47436	70564	68912	68912
Fan input current	230V	A	26,0	-	-	-	-	-
	460V	A	15,2	15,2	15,2	22,8	22,8	30,4
	575V	A	13,28	13,28	13,28	19,92	19,92	26,56
Fan power input	460V	kW	8,0	8,0	8,0	12,0	12,0	16,0
	575V	kW	8,72	8,72	8,72	13,08	13,08	17,44
SOUND DATA								
Sound pressure	dB(A)		57	57	58	61	62	63
Sound power	dB(A)		89	89	90	93	94	95
CHARGE (The data reported can be changed at any time if deemed necessary from Aermec)								
R410A Gas refrigerant		kg / lib	34,0 / 74,96	35,0 / 76,16	35,0 / 76,16	45,0 / 99,21	45,0 / 99,21	48,0 / 105,82
		kg / lib	34,0 / 74,96	36,0 / 79,37	35,0 / 76,16	47,0 / 103,62	47,0 / 103,62	48,0 / 105,82
Oil		kg / lib	6,4 / 14,11	6,4 / 14,11	12,0 / 26,46	12,0 / 26,46	12,0 / 26,46	18,0 / 39,68
		kg / lib	6,4 / 14,11	12,0 / 26,46	12,0 / 26,46	12,0 / 26,46	18,0 / 39,68	18,0 / 39,68
DIMENSION								
Height	in		96	96	96	96	96	96
COOLING ΔAHRI STANDARD CONDITIONS								
Outlet water temperature	6.7°C / 44,6 °F							
Flow rate	0.043l/s per kW							
External temperature	35°C / 95 °F							
(1) data refered to no pump version								
AHRI CONDITIONS: LEAVING WATER 6.7°C / 44.6°F FLOW RATE 0.043 L/S PER KW (FULL LOAD)								
Load 100% air								
Load 75% air								
Load 50% air								
Load 25% air								

		800	900	1000	1250	1400	1500	1650	1800
Width	in	87	87	87	87	87	87	87	87
Depth	in	134	134	134	167	167	167	226	226
Weight when empty	kg	2370	2500	2640	3230	3370	3480	4240	4480
	lb	5226	5513	5821	7122	7431	7673	9349	9878

ELECTRICAL DATA MODELS WITHOUT PUMP + "" ON/OFF FAN

	230V	A	216.10	-	-	-	-	-	-
Total input current	460V	A	110.20	131.20	151.90	193.00	212.90	240.90	256.20
	575V	A	90.00	106.30	122.40	156.10	172.00	202.50	206.60

Alimentation 208/3/60Hz

MODELS WITHOUT PUMP	LRA	A	537,3	720,4	756,7	905,8	954,5	972,8	1054,7	1091,3
	MCA	A	267,0	307,8	344,1	407,3	462,1	510,9	562,4	592,9
	MOP	A	322,8	381,7	418,0	492,6	571,8	620,5	672,0	678,1
	Recom FUSE	A	300	350	400	450	500	600	600	600
MODELS WITH LOW PUMP	LRA	A	547,3	733,6	769,9	924,2	972,9	994,8	1076,7	1113,3
	MCA	A	277,0	321,0	357,3	425,7	480,5	532,9	584,4	614,9
	MOP calc	A	332,8	394,9	431,2	511,0	590,2	642,5	694,0	700,1
	Recom FUSE	A	300	350	400	500	500	600	600	700

ELECTRICAL DATA MODELS WITHOUT PUMP + "I" EC INVERTER FAN

Alimentation 230/3/60Hz

MODELS WITHOUT PUMP	LRA	A	537,3	720,4	756,7	905,8	954,5	972,8	1054,7	1091,3
	MCA	A	267,0	307,8	344,1	407,3	462,1	510,9	562,4	592,9
	MOP	A	322,8	381,7	418,0	492,6	571,8	620,5	672,0	678,1
	Recom FUSE	A	300	350	400	450	500	600	600	600
MODELS WITH LOW PUMP	LRA	A	547,3	733,6	769,9	924,2	972,9	994,8	1076,7	1113,3
	MCA	A	277,0	321,0	357,3	425,7	480,5	532,9	584,4	614,9
	MOP calc	A	332,8	394,9	431,2	511,0	590,2	642,5	694,0	700,1
	Recom FUSE	A	300	350	400	500	500	600	600	700

Alimentation 460/3/60Hz

MODELS WITHOUT PUMP	LRA	A	276,9	327,1	336,3	425,6	476,1	501,3	525,9	517,2
	MCA	A	130,8	140,2	149,4	206,0	234,2	259,4	284,0	297,6
	MOP	A	157,1	170,6	179,9	247,9	288,7	313,9	338,5	339,5
	Recom FUSE	A	150	150	175	250	250	300	300	300
MODELS WITH LOW PUMP	LRA	A	281,9	333,7	342,9	434,8	485,3	512,3	536,9	528,2
	MCA	A	135,8	146,8	156,0	215,2	243,4	270,4	295,0	308,6
	MOP calc	A	162,1	177,2	186,5	257,1	297,9	324,9	349,5	350,5
	Recom FUSE	A	150	175	175	250	250	300	300	350

Alimentation 575/3/60Hz

MODELS WITHOUT PUMP	LRA	A	218,4	267,3	269,8	364,5	380,1	409,3	421,0	440,2
	MCA	A	116,1	118,1	120,6	169,9	202,8	232,0	243,7	245,6
	MOP	A	139,8	142,7	145,2	204,6	252,1	281,4	293,1	280,4
	Recom FUSE	A	125	125	125	200	250	250	250	250
MODELS WITH LOW PUMP	LRA	A	222,4	272,6	275,1	371,8	387,4	418,1	429,8	449,0
	MCA	A	120,1	123,4	125,9	177,2	210,1	240,8	252,5	254,4
	MOP	A	143,8	148,0	150,5	212,0	259,5	290,2	301,9	289,2
	Recom FUSE	A	125	125	150	200	250	250	300	250

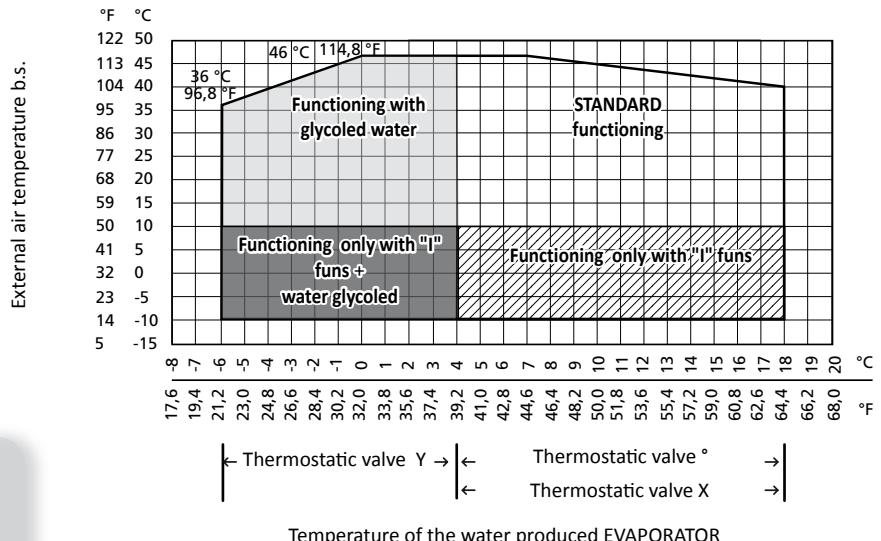
8. TECNICAL DATA IDRONIC KIT

Model		800	900	1000	1250	1400	1500	1650	1800
ENERGY INDICES									
EER	BTU/Wat	46,23	51,75	58,80	45,15	50,50	58,90	51,27	58,21
PROTECTION RATING									
IP		24	24	24	24	24	24	24	24
ELECTRICAL DATA									
Total input current ⁽¹⁾	230V	A	26.0	-	-	-	-	-	-
	460V	A	15.2	15.2	15.2	22,8	22,8	30,4	30,4
	575V	A	13.3	13.3	13.3	19,9	19,9	26,6	26,6
SOUND DATA									
Sound pressure	dB(A)	57	57	58	61	62	62	63	63
Sound power	dB(A)	89	89	90	93	94	94	95	95

9. OPERATING LIMITS

The devices in their standard configurations are not suitable for installation in salty environments. For the operating limits, refer to diagram, valid for AHRI standard conditions.

Wind breaks should be implemented if the unit is installed in particularly windy areas, to prevent a malfunction of the unit.



ATTENTION
When the unit is installed in particularly
windy areas, we recommend installing
wind barriers if wind speed exceeds 2.5
m/s"

9.1. DESIGN SPECIFICATIONS

REFRIGERANT SIDE		High pressure side	Low pressure side
Acceptable maximum pressure	bar/PSI	45/653	30/435
Acceptable maximum temperature	°C / °F	120 / 248	51 / 131
Acceptable minimum temperature	°C / °F	-30 / -22	-30 / -22

WATER SIDE		
Acceptable maximum pressure	bar/PSI	6/87

Hydraulic circuit safety valve (only in version with storage tank or with pump)

Calibrated at 6/87 bar/PSI and with piped discharge, which intervenes by discharging overpressure if abnormal work pressure occur.



ATTENTION
The units, in standard configuration,
are not suitable for installation in salty
environments.
If the unit is to function beyond the
operational limits, we recommend you
first contact our technical-sales service

Note:

1 N8 In summer mode the unit can be started with external air 46°C/ 114.8°F and water inlet 35°C/95°F. In winter mode the unit can be started with external air -15°C/5 °F and water inlet 10°C/50°F. Operate in such conditions is permitted

only for a short time and to bring the system up to temperature. To reduce the time of this operation, it is recommended to install a three-way valve that allows bypassing water from the system utilities, until the conditions

that allow the unit to work within the permitted operation limits are achieved.

10. CORRECTION FACTORS

10.1. INPUT POWER AND COOLING CAPACITY "HIGH EFFICIENCY VERSION"

The refrigerating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (P_f , P_a) by the respective correction coefficients (C_f , C_a).

The following diagrams allow you to obtain the correction coefficients to be used for the various versions of the devices, in cold mode; next to each curve you can see the outside air temperature to which it refers.

KEY

C_f : correction coefficient of the cooling capacity.

C_a : correction coefficient of the input power.



ATTENTION FOR Δt DIFFERENT FROM 10.01°F / 5.56°C

Tab. 9.2 is used for the correction factors of the cooling capacity and input power of the water consumption. To take into account the soiling of the exchanger, apply the relative fouling factors, Tab. 9.3

10.3.1. FREECOOLING CORRECTIVE COEFFICIENTS

The maximum cooling capacity yielded when functioning is completely in free-cooling mode, i.e. all compressors are off, is obtained by multiplying the cooling capacity nominal value (P_f) given in the Technical Data by the respective corrective coefficient, which is obtained from the following diagram on the basis of the temperature of the water produced and the temperature of the external air.

These values refer to the fans in full rev conditions (maximum input power). If the power yielded should result in excess, a modulation will intervene on the number of revs.

10.2. FOR Δt DIFFERENT FROM THE RATED VALUE

The performances given by the technical data refer to AHRI standard conditions: flow rate 0.043l/s per kW (Δt 10.01°F / 5.56°C).

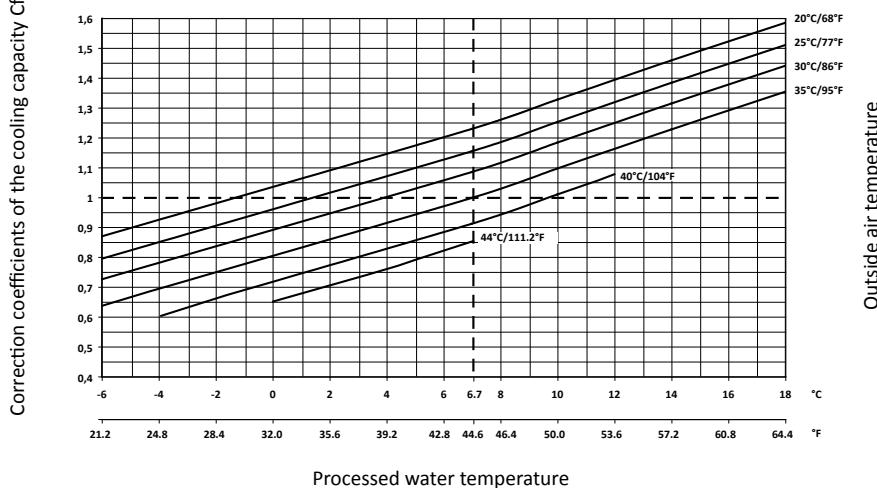
Use table to obtain the corrective factors of the cooling capacity and input power different than Δt 10.01°F / 5.56°C .

10.3. FOULING FACTORS

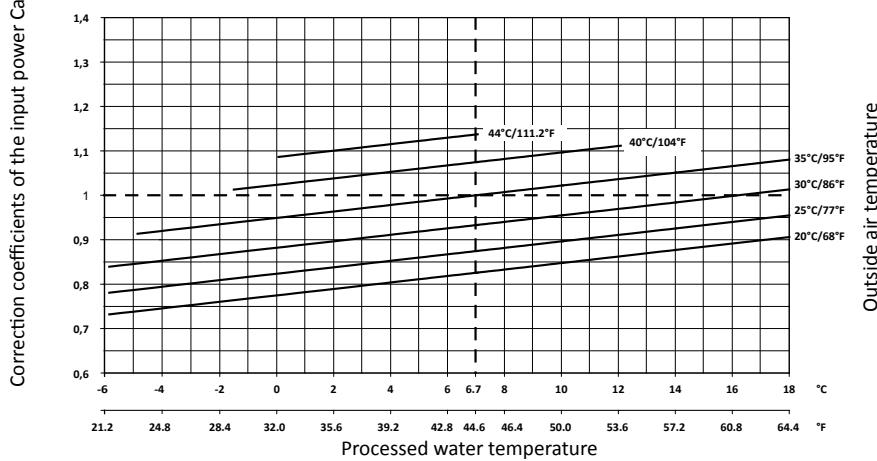
The performance levels given by the technical data refer to conditions with clean tubes, with a fouling factor = 1.

For other fouling factor values, multiply the data of performance table by the coefficients given.

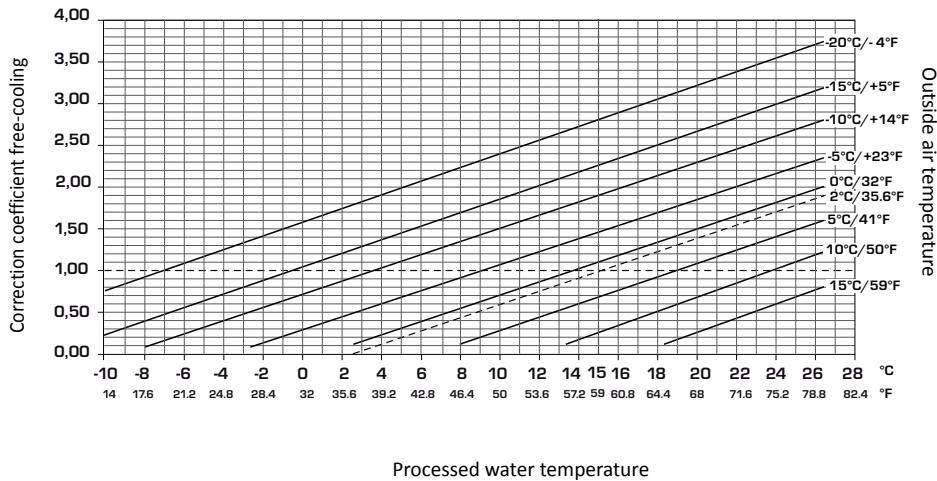
CORRECTION COEFFICIENTS OF THE COOLING CAPACITY



CORRECTION COEFFICIENTS OF THE INPUT POWER IN COOLING MODE



POWER CORRECTION COEFFICIENTS REFRIGERATOR FUNCTIONING ONLY FREE-COOLING



Processed water temperature

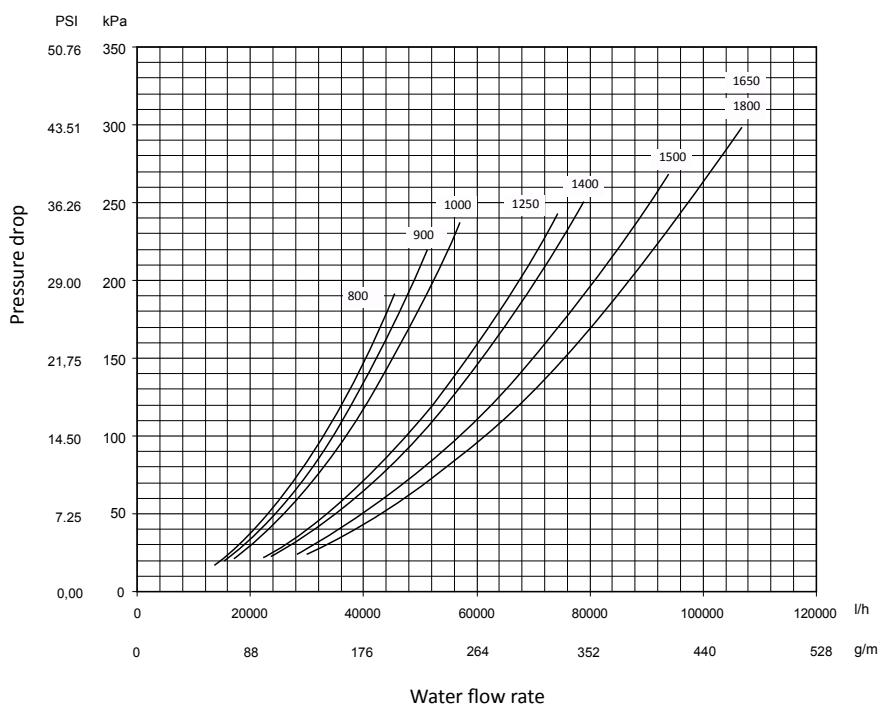
Δt DIFFERENT FROM THE RATED VALUE (Δt 5°C - 10.01°F)	$3^\circ\text{C}/5.40^\circ\text{F}$	$5.56^\circ\text{C}/10.01^\circ\text{F}$	$8^\circ\text{C}/14.40^\circ\text{F}$	$10^\circ\text{C}/18^\circ\text{F}$
Cooling capacity correction factors	0,99	1	1,02	1,03
Input power correction factors	0,99	1	1,01	1,02

FOULING FACTOR [K*M2]/[KW]	0.018	0.05	0.1
Cooling capacity correction factors	1	0.987	0.967
Input power correction factors			

11. TOTAL PRESSURE DROPS

11.1. CHILLER FUNCTION PRESSURE DROP

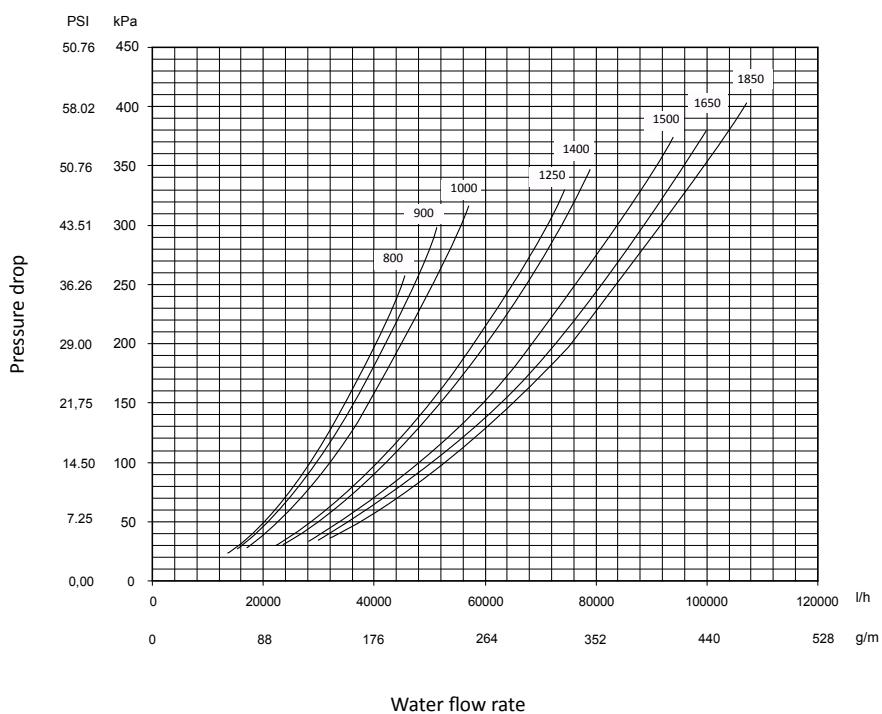
Inlet temperature	53.6°F
Outlet temperature	44.6°F
Outside air temperature	95°F
Average water temperature	50°F
For temperatures other than 50 ° F to use the table of correction factors	



Average water temperature °F / °C	41 / 5	50 / 10	59 / 15	68 / 20	86 / 30	104 / 40	122 / 50
Coefficients	1,02	1	0,98	0,97	0,95	0,93	0,91

11.2. FREE-COOLING FUNCTION PRESSURE DROP

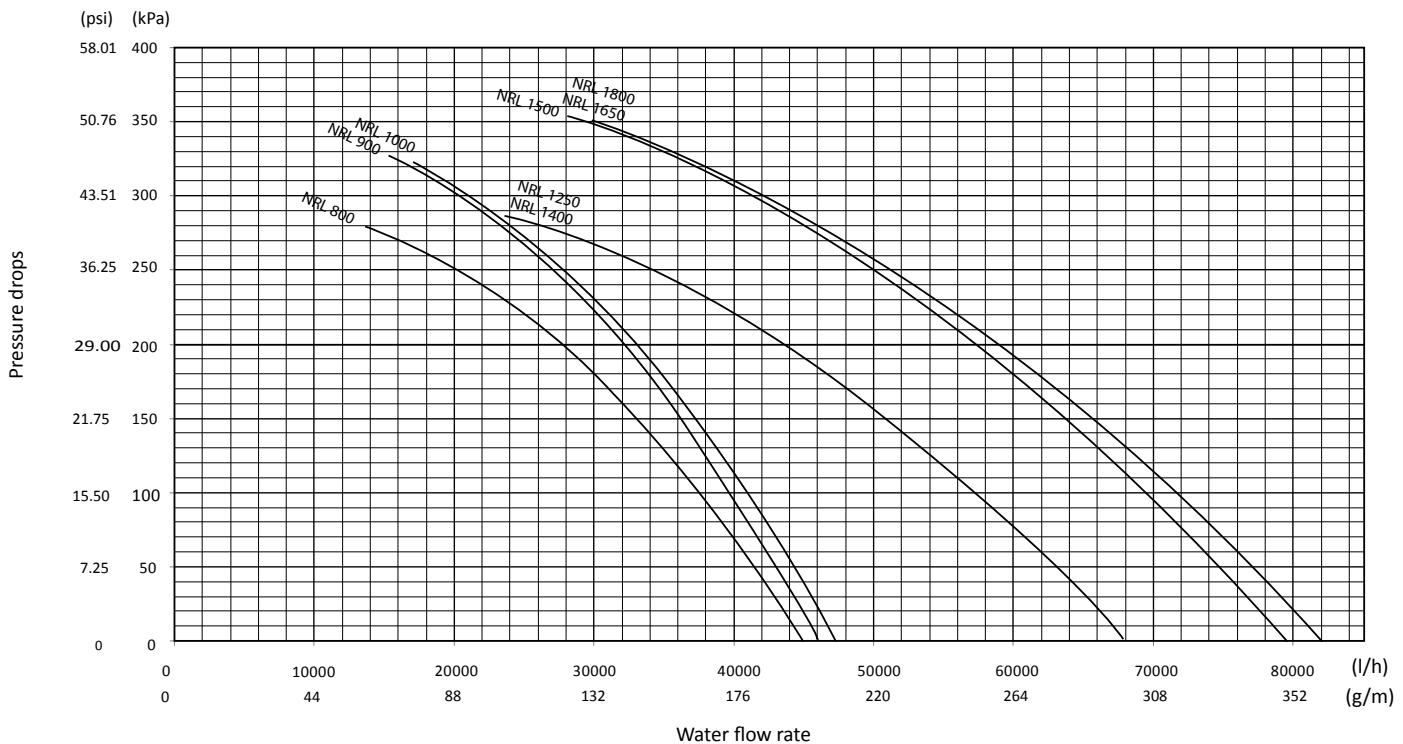
Inlet water temperature	15°C / 59°F
Outside air temperature	2°C / 35.6°F
Rated water flow	
Compressors off	



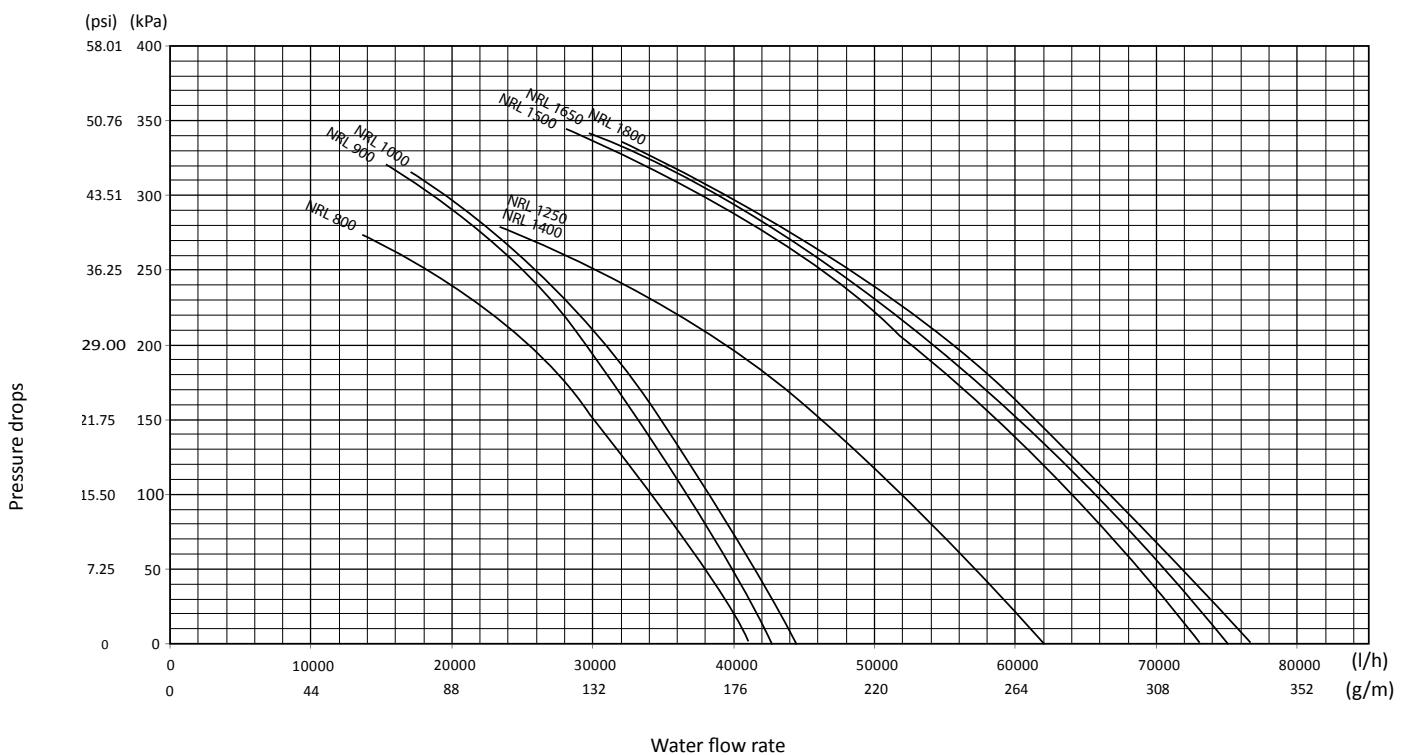
Average water temperature °F / °C	41 / 5	50 / 10	59 / 15	68 / 20	86 / 30	104 / 40	122 / 50
Coefficients	1,02	1	0,98	0,97	0,95	0,93	0,91

12. USEFUL HEADS

12.1. CHILLER FUNCTION USEFUL HEADS



12.2. FREE-COOLING FUNCTION USEFUL HEADS



13. ETHYLENE GLYCOL SOLUTIONS

COOLING MODE

CORRECTION FACTOR WITH ETHYLENE GLYCOL											
Freezing Point	°C	0	-3,63	-6,10	-8,93	-12,11	-15,74	-19,94	-24,79	-30,44	-37,10
Percent ethylene glycol	%	0	10	15	20	25	30	35	40	45	50
Qwc	-	1,000	1,033	1,040	1,049	1,060	1,072	1,086	1,102	1,120	1,141
Pc	-	1,000	0,990	0,985	0,980	0,975	0,970	0,965	0,960	0,955	0,950
Pa	-	1,000	0,996	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980
Dp	-	1,000	1,109	1,157	1,209	1,268	1,336	1,414	1,505	1,609	1,728

Average water temperature = 9,5 °C

Qwc: Corrective factor of flow rates (middle water temperatur 9,5°C)

Qwh: Corrective factor of flow rates (middle water temperatur 42,5°C)

Pc: Corrective factor of cooling capacity

Ph: Corrective factor of heating capacity

Pa: Corrective factor of imput power

Dp: Corrective factor of pressure drop

PROPYLENIC GLYCOL

COOLING MODE

CORRECTION FACTOR WITH PROPYLENIC GLYCOL											
Freezing Point	°C	0									
Percent propylenic glycol	%	0	10	15	20	25	30	35	40	45	50
Qwc	-	1,000	1,007	1,006	1,007	1,010	1,015	1,022	1,032	1,044	1,058
Pc	-	1,000	0,985	0,978	0,970	0,963	0,955	0,947	0,939	0,932	0,924
Pa	-	1,000	0,996	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980
Dp	-	1,000	1,082	1,102	1,143	1,201	1,271	1,351	1,435	1,520	1,602

Average water temperature = 9,5 °C

Qwc: Corrective factor of flow rates (middle water temperatur 9,5°C)

Qwh: Corrective factor of flow rates (middle water temperatur 42,5°C)

Pc: Corrective factor of cooling capacity

Ph: Corrective factor of heating capacity

Pa: Corrective factor of imput power

Dp: Corrective factor of pressure drop

14. EXPANSION TANK CALIBRATION

The standard pressure value for pre-charging the expansion tank is 1.5 bar, and the volume is 25 litres. Maximum value 6 bar.

The tank must be calibrated according to the maximum difference in height (H) of the device (see figure) according to the formula:

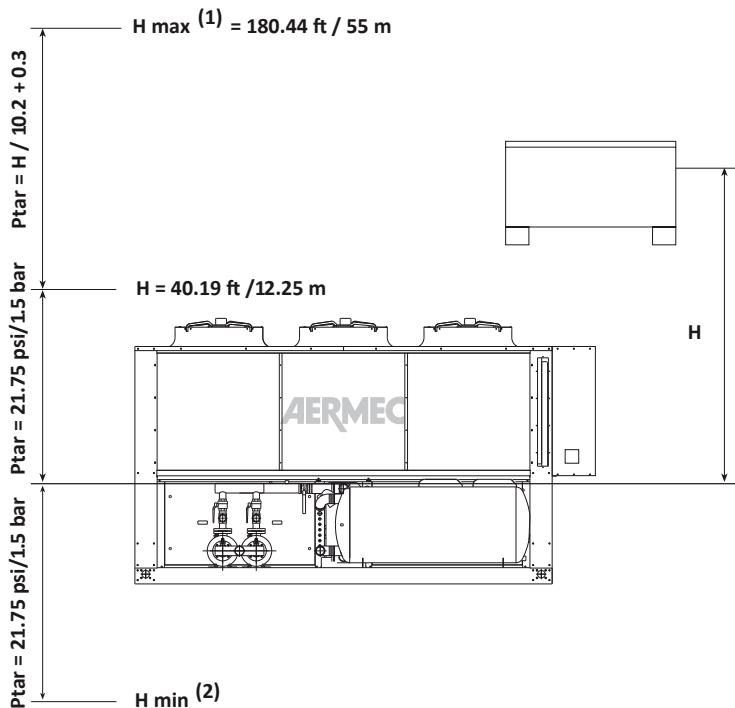
$$p(\text{calibration}) [\text{bar}] = H [\text{m}] / 10.2 + 0.3$$

For example, if the level difference H is 20m, the calibration value of the tank will be 2.3 bar.

If the calibration value obtained from the calculation is lower than 1.5 bar (i.e. for $H < 12.25$), maintain the standard calibration.

KEY:

- (1) Check that the highest user does not exceed a level difference of 180.45ft
- (2) Check that the lowest user can sustain the global pressure acting at that point



KEY:

- (1) Check that the highest user does not exceed a level difference of 55 metres.
- (2) Check that the lowest user can sustain the global pressure acting at that point.

15. MINIMUM WATER CONTENT

NRL	n° Compresseur	(1) l/KW	(2) l/KW
0800	4	4	8
0900			
1000		4	8
1250			
1400	5	4	8
1500			
1650		4	8
1800	6		

Key:

(1)	Minimum water content
(2)	Minimum water content in the case of process applications or applications with low outside temperatures and low load.
(2)	Regulation on the temperature outlet water. project Δt less than 5°C.



1. ATTENTION

- It is recommended to design systems with highwater content (minimum recommended values shown in table), to limit:
2. The hourly number of inversions betweenfunctioning modes.
 3. Decrease in water temperature during winter defrost cycles.

16. PARTLOAD

COOLING (AHRI CONDITIONS)

Inlet temperature	53,60 °F
Outlet temperature	44,6 °F
Δt	10,01 °F
External temperature	95 °F

Power steps

COOLING CAPACITY %	1°	2°	3°	4°	5°	6°
800	25	50	75	100	-	-
900	27	53	77	100	-	-
1000	25	50	75	100	-	-
1250	25	50	75	100	-	-
1400	23	44	63	82	100	-
1500	17	34	50	67	84	100
1650	19	37	55	71	86	100
1800	17	34	50	67	84	100
POWER SUPPLY %	1°	2°	3°	4°	5°	6°
800	21	44	71	100	-	-
900	23	47	73	100	-	-
1000	21	44	71	100	-	-
1250	21	44	71	100	-	-
1400	18	37	56	77	100	-
1500	12	26	41	59	79	100
1650	14	29	46	63	81	100
1800	12	26	41	59	79	100

17. SOUND DATA

Sound power

Aermec determines the sound power value on the basis of measurements taken in accordance with standard 9614-2, in compliance with the Eurovent certification.

Sound pressure

Sound pressure in free field, on a reflecting plane (directional factor Q=2), in accordance with standard ISO 3744.

NRL	Total sound levels			Octave band[Hz]						
	Pow. dB(A)	Pressure		125	250	500	1000	2000	4000	8000
		[dB(A)] 10 m	[dB(A)] 1 m	Sound power by central band frequency [dB(A)]						
800FA	89	57	69	83,4	78,9	81,3	83,0	77,7	73,0	62,9
900FA	89	57	69	83,4	78,9	81,3	83,0	77,7	73,0	62,9
1000FA	90	58	70	82,9	79,4	82,6	83,9	81,3	77,1	66,9
1250FA	93	61	73	85,1	86,9	86,3	87,5	85,4	79,0	66,1
1400FA	94	62	74	87,9	84,4	85,8	90,0	83,2	75,0	65,9
1500FA	94	62	74	88,9	83,4	85,8	88,0	83,2	75,5	66,9
1650FA	95	63	75	87,9	86,9	88,3	90,0	85,2	77,0	67,9
1800FA	95	63	75	86,9	87,4	88,3	90,5	84,2	75,0	66,9
800FE	82	50	62	79,9	70,9	73,3	75,0	69,7	65,5	57,4
900FE	82	50	62	79,9	70,9	73,3	75,0	69,7	65,5	57,4
1000FE	83	51	63	80,9	71,9	74,3	76,0	70,7	66,5	58,4
1250FE	87	55	67	80,9	80,9	78,8	81,0	79,7	72,5	62,4
1400FE	88	56	68	84,4	76,9	79,8	82,0	76,7	67,5	59,4
1500FE	88	56	68	85,4	75,9	78,3	78,5	75,7	66,5	58,4
1650FE	89	57	69	85,4	77,9	78,8	82,5	80,7	70,5	63,4
1800FE	89	57	69	84,4	79,4	79,1	83,5	80,2	70,5	62,8

18. CONTROL AND SAFETY PARAMETERS CALIBRATION

COOLING SET						min	Max.	default
Water inlet temperature in cooling mode						-10°C/14°F	20°C/68°F	7°C/44.6°C
ANTI-FREEZE INTERVENTION						min	Max.	default
Anti-freeze alarm intervention temperature on EV side						-15°C/5°F	4°C/39.2°F	3°C/37.4°F
TOTAL DIFFERENTIAL						min	Max.	default
Proportional temperature band within which the compressors are activated and deactivated						3°C/5.4	10°C/10	5°C/18
	800	900	1000	1250	1400	1500	1650	1800
HIGH PRESSURE SWITCH WITH MANUAL RESET								
PA	psi	40	40	40	40	40	40	40
	bar	580	580	580	580	580	580	580
HIGH PRESSURE TRANSDUCER								
TAP	psi	39	39	39	39	39	39	39
	bar	566	566	566	566	566	566	566
LOW PRESSURE TRANSDUCER								
TBP	psi	2	2	2	2	2	2	2
	bar	29	29	29	29	29	29	29
CHILLER CIRCUIT SAFETY VALVE								
AP	psi	45	45	45	45	45	45	45
	bar	653	653	653	653	653	653	653

18.6. COMPRESSOR THERMOMAGNETIC (208V-3-60HZ)

COMPRESSOR THERMOMAGNETIC		Circuit	800
MTC1	A	1	59
MTC1A	A		59
MTC1B	A		-
MTC2	A	2	59
MTC2A	A		59
MTC2B	A		-

18.5. COMPRESSOR THERMOMAGNETIC (230V-3-60HZ)

COMPRESSOR THERMOMAGNETIC		Circuit	800
MTC1	A	1	59
MTC1A	A		59
MTC1B	A		-
MTC2	A	2	59
MTC2A	A		59
MTC2B	A		-

18.1. COMPRESSOR THERMOMAGNETIC (460V-3-60HZ)

COMPRESSOR THERMOMAGNETIC		Circuit	800	900	1000	1250	1400	1500	1650	1800
MTC1	A	1	30.4	30.4	40.5	51.5	51.5	40.5	40.5	51.5
MTC1A	A		30.4	30.4	40.5	51.5	51.5	40.5	40.5	51.5
MTC1B	A		-	-	-	-	40.5	40.5	40.5	51.5
MTC2	A	2	30.4	40.5	40.5	51.5	40.5	40.5	51.5	51.5
MTC2A	A		30.4	40.5	40.5	51.5	40.5	40.5	51.5	51.5
MTC2B	A		-	-	-	-	-	40.5	51.5	51.5

18.2. COMPRESSOR THERMOMAGNETIC (575V-3-60HZ)

COMPRESSOR THERMOMAGNETIC		Circuit	800	900	1000	1250	1400	1500	1650	1800
MTC1	A	1	27.5	27.5	32.3	41.7	41.7	32.3	32.3	41.7
MTC1A	A		27.5	27.5	32.3	41.7	41.7	32.3	32.3	41.7
MTC1B	A		-	-	-	-	32.3	32.3	32.3	41.7
MTC2	A	2	27.5	32.3	32.3	41.7	32.3	32.3	41.7	41.7
MTC2A	A		27.5	32.3	32.3	41.7	32.3	32.3	41.7	41.7
MTC2B	A		-	-	-	-	-	32.3	41.7	41.7

18.3. PUMP THERMOMAGNETIC (03-P3)

COMPRESSOR THERMOMAGNETIC		Power supply	800	900	1000	1250	1400	1500	1650	1800
MP1	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4
MP2	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4

18.4. PUMP THERMOMAGNETIC (04-P4)

COMPRESSOR THERMOMAGNETIC		Power supply	800	900	1000	1250	1400	1500	1650	1800
MP1	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4
MP1A	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4
MP2	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4
MP2A	A	208V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	230V-3-60Hz	14.5	-	-	-	-	-	-	-
	A	460V-3-60Hz	7.2	9.7	9.7	9.7	13.2	13.3	19.5	19.5
	A	575V-3-60Hz	5.8	7.7	7.7	7.7	10.6	10.6	15.4	15.4

18.10. FAN UNITS THERMOMAGNETIC (208V-3-60HZ)

COMPRESSOR		800
THERMOMAGNETIC		
MTV1	A	7.2
MTV1A	A	7.2
MTV1B	A	-
MTV1C	A	-
MTV2	A	7.2
MTV2A	A	7.2
MTV2B	A	-
MTV2C	A	-

18.7. FAN UNITS THERMOMAGNETIC (230V-3-60HZ)

COMPRESSOR		800
THERMOMAGNETIC		
MTV1	A	7.2
MTV1A	A	7.2
MTV1B	A	-
MTV1C	A	-
MTV2	A	7.2
MTV2A	A	7.2
MTV2B	A	-
MTV2C	A	-

18.8. FAN UNITS THERMOMAGNETIC (460V-3-60HZ)

COMPRESSOR		800	900	1000	1250	1400	1500	1650	1800
THERMOMAGNETIC									
MTV1	A	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
MTV1A	A	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
MTV1B	A	-	-	-	4.2	4.2	4.2	4.2	4.2
MTV1C	A	-	-	-	4.2	4.2	4.2	4.2	4.2
MTV2	A	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
MTV2A	A	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
MTV2B	A	-	-	-	4.2	4.2	4.2	4.2	4.2
MTV2C	A	-	-	-	4.2	4.2	4.2	4.2	4.2

18.9. FAN UNITS THERMOMAGNETIC (575V-3-60HZ)

COMPRESSOR		800	900	1000	1250	1400	1500	1650	1800
THERMOMAGNETIC									
MTV1	A	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
MTV1A	A	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
MTV1B	A	-	-	-	3.7	3.7	3.7	3.7	3.7
MTV1C	A	-	-	-	3.7	3.7	3.7	3.7	3.7
MTV2	A	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
MTV2A	A	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
MTV2B	A	-	-	-	3.7	3.7	3.7	3.7	3.7
MTV2C	A	-	-	-	3.7	3.7	3.7	3.7	3.7



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