

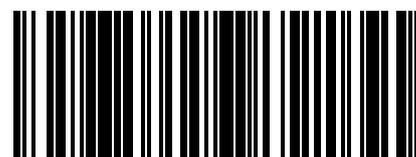


## Technical Manual

- OUTDOOR CHILLER
- MICROCHANNEL COILS
- EASY AND QUICK TO INSTALL COMPACT MODULE
- RELIABILITY AND MODULARITY

# NRV 0550

EN





Dear customer,

Thank you for choosing an AERMEC product. This product is the result of many years of experience and in-depth engineering research, and it is manufactured using top quality materials and cutting edge technologies.

In addition, the CE mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety. The quality level is under constant surveillance, and AERMEC products are therefore synonym of Safety, Quality and Reliability.

Product data may be subject to modifications deemed necessary for improving the product without the obligation to give prior notice.

Thank you once again.

AERMEC S.p.A

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**DICHIARAZIONE DI CONFORMITÀ CE / EC DECLARATION OF CONFORMITY / DECLARATION DE CONFORMITE CE  
KONFORMITÄTSEKTLÄRUNG EG / DECLARACIÓN DE CONFORMIDAD CE**

## NRV

MODEL*	
SERIAL NUMBER	
DATE	

Noi, firmatari della presente, dichiariamo sotto la nostra esclusiva responsabilità che l'insieme in oggetto così definito:  
We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:  
Nous, Signataires du présent acte, déclarons sous notre responsabilité exclusive que le groupe cité à l'objet défini de la façon suivante:  
Die Unterzeichner erklären unter eigener Verantwortung, dass die oben genannte Maschineneinheit, bestehend aus:  
Nosotros, los abajo firmantes, declaramos bajo nuestra exclusiva responsabilidad, que el conjunto en cuestión, denominado:

<b>Nome / Name / Nom / Name / Nombre</b>	<b>NRV</b>
<b>Tipo / Type / Type / Typ / Tipo</b>	<b>Outdoor chiller</b>
<b>Modello / Model / Modèle / Model / Modelo</b>	<b>0550</b>

A cui questa dichiarazione si riferisce è conforme a tutte le disposizioni pertinenti delle seguenti direttive:  
To which this declaration refers, complies with all the provisions related to the following directives:  
Auquel cette déclaration se réfère, est conforme à toutes les dispositions relatives des directives suivantes:  
Das Gerät, auf welches sich diese Erklärung bezieht, entspricht allen Verordnungen im Zusammenhang mit den folgenden Richtlinien:  
A la que esta declaración se refiere, es conforme con todas las disposiciones pertinentes de las siguientes directivas:

**Direttiva Macchine: 2006/42/CE**  
**Direttiva Compatibilità Elettromagnetica EMCD: 2014/30/UE**  
**Direttiva PED in materia di attrezzature a pressione: 2014/68/UE**  
**Direttiva RoHS sulla restrizione dell'uso di determinate sostanze pericolose nelle AEE: 2011/65/UE**  
**Direttiva ErP per la progettazione ecocompatibile: 2009/125/CE**

L'oggetto della dichiarazione di cui sopra è conforme alle pertinenti normative di armonizzazione dell'Unione:  
The above-mentioned declaration complies with the harmonised European standards:  
L'objet de la déclaration reportée ci-dessus est conforme aux normes d'harmonisation relatives de l'Union:  
Der Gegenstand der genannten Erklärung entspricht den diesbezüglichen harmonisierten Normen der europäischen Gemeinschaft:  
El objeto de la declaración de arriba es conforme con las normativas pertinentes de armonización de la Unión:

<b>CEI EN 60204-1: 2018</b>	<b>CEI EN IEC 61000-6-1: 2019</b>	<b>UNI EN 378-2: 2017</b>
<b>UNI EN ISO 12100: 2010</b>	<b>CEI EN 61000-6-3: 2007 + A1: 2013</b>	<b>UNI EN 12735-1: 2020</b>

La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante.  
La persona autorizzata a costituire il fascicolo tecnico è Luca Martin, Via Roma 996, 37040 Bevilacqua (VR) Italy.  
L'unità è conforme ai dati di progetto riportati nel fascicolo tecnico al paragrafo Definizione dell'Insieme, è in accordo con la direttiva 2014/68/UE e soddisfa la procedura di Garanzia Totale di qualità (modulo H) con certificato n. 06/270-QT3664 Rev.14 emesso dall'organismo notificato n. 1131 CEC via Pisacane 46 Legnano (MI) - Italia.  
L'elenco dei componenti critici pertinenti al numero di fabbrica sopra riferito, secondo quanto previsto dalla Direttiva 2014/68/UE, è fornito a corredo della presente Dichiarazione di Conformità (doc. "Lista componenti per Dichiarazione di Conformità").  
Dichiariamo inoltre che, al momento dell'immissione sul mercato Europeo di tale apparecchiatura precaricata da parte di Aermec S.p.A (che importa o produce nell'Unione), gli idrofluorocarburi, in essa contenuti, sono considerati nel sistema di quote dell'Unione di cui al Capo IV del regolamento UE 517/2014 in quanto sono stati immessi sul mercato da un produttore o importatore di idrofluorocarburi cui si applica l'articolo 15 del regolamento UE 517/2014.

Bevilacqua (VR)

Commercial Director  
Luigi Zucchi

This declaration of conformity has been released under the exclusive responsibility of the manufacturer.

The person authorised to compile the technical file is Luca Martin, Via Roma 996, 37040 Bevilacqua (VR) Italy.

The unit complies with the project data reported in the technical file in the Definition of the Assembly paragraph, it is in agreement with Directive 2014/68/EU and satisfies the Full quality assurance procedure (form H) with certificate no. 06/270-QT3664 Rev. 14 issued by the notified body no. 1131 CEC via Pisacane 46 Legnano (MI) - Italy.

The list of critical components relevant to the factory number shown above, in accordance with Directive 2014/68/EU, is provided together with this Declaration of Conformity (doc. "Component List for Declaration of Conformity").

We also declare that, when such equipment preloaded by Aermec SpA (which imports or produces into the Union) is placed on the European market, the hydrofluorocarbons contained therein are considered in the Union quota system referred to in Chapter IV of UE Regulation no.517/2014 as they have been placed on the market by a producer or importer of hydrofluorocarbons to which Article 15 of UE Regulation no.517/2014.

La déclaration de conformité présente est délivrée sous la responsabilité exclusive du fabricant.

La personne autorisée à constituer le dossier technique est Luca Martin, Via Roma 996, 37040 Bevilacqua (VR) Italy.

L'unité est conforme aux données du projet figurant dans le dossier technique dans le paragraphe Définition de l'assemblage, est conforme à la directive 2014/68/UE, et respecte la procédure de l'assurance complète de la qualité (module H) par le certificat n. 06/270-QT3664 Rév. 14 émis par l'organisme notifié n. 1131 CEC via Pisacane 46 Legnano (MI) - Italie.

La liste des composants critiques correspondant au numéro d'usine indiqué ci-dessus, conformément à la directive 2014/68/UE, est fournie avec la présente déclaration de conformité (doc. «Liste des composants pour la déclaration de conformité»).

Nous déclarons également que, lors de la mise sur le marché européen de cet équipement préchargé par Aermec SpA (qui importe ou produit dans l'Union), les hydrofluorocarbures qu'il contient sont pris en compte dans le système de quotas de l'Union visé à Le chapitre IV du règlement (UE) n.517/2014 car ils ont été mis sur le marché par un producteur ou un importateur d'hydrofluorocarbures auxquels l'article 15 du règlement (UE) n.517/2014.

Diese Konformitätserklärung wurde unter der ausschließlichen Verantwortung des Herstellers ausgestellt.

Die bevollmächtigt, die technischen Unterlagen zusammenzustellen ist Luca Martin, Via Roma 996, 37040 Bevilacqua (VR) Italy.

Die Einheit entspricht den Projektdaten, die in der technischen Datei im Abschnitt Definition der Baugruppe angegeben sind, entspricht der Richtlinie 2014/68/EU und erfüllt das Produkt die Anforderungen des Verfahrens der umfassenden Qualitätssicherung (Modul H), Zertifikat n. 06/270-QT3664 Rev. 14, ausgestellt durch benannte Stelle n. 1131 CEC Via Pisacane 46, Legnano (MI) - Italy.

Die Liste der kritischen Komponenten, die für die oben angegebene Fabriknummer gemäß der Richtlinie 2014/68/EU relevant sind, wird zusammen mit dieser Konformitätserklärung bereitgestellt (Dokument "Komponentenliste für die Konformitätserklärung").

Wir erklären außerdem, dass beim Inverkehrbringen dieser von Aermec SpA (die in der Union importiert oder produziert) vorinstallierten Ausrüstung in Europa die darin enthaltenen Fluorwasserstoffe in dem in genannten Unionsquotensystem berücksichtigt werden Kapitel IV der Verordnung (EU) n.517/2014, da sie von einem Hersteller oder Importeur von Fluorkohlenwasserstoffen in Verkehr gebracht wurden, für die Artikel 15 der Verordnung (EU) n.517/2014.

Esta declaración de conformidad se ha otorgado bajo la responsabilidad exclusiva del fabricante.

La persona facultada para elaborar el expediente técnico es Luca Martin, Via Roma 996, 37040 Bevilacqua (VR) Italy.

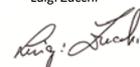
La unidad cumple con los datos del proyecto reportados en el archivo técnico en el párrafo Definición de la Asamblea, está conforme a la directiva 2014/68/UE y cumple con el procedimiento de el pleno aseguramiento de la calidad (módulo H) con certificado n. 06/270-QT3664 Rev. 14 emitido por el organismo autorizado n. 1131 CEC via Pisacane 46 Legnano (MI) - Italia.

La lista de componentes críticos relevantes para el número de fábrica que se muestra arriba, de acuerdo con la Directiva 2014/68/UE, se proporciona junto con esta Declaración de conformidad (doc. "Lista de componentes para la Declaración de conformidad").

También declaramos que, al colocar en el mercado europeo de este equipo precargado por Aermec SpA (que importa o produce en la Unión), los hidrofluorocarbonos contenidos en él se consideran en el sistema de cuotas de la Unión mencionado en El Capítulo IV del Reglamento (UE) n.517/2014 ya que han sido puestos en el mercado por un productor o importador de hidrofluorocarbonos al que se refiere el artículo 15 del Reglamento (UE) n.517/2014.

Bevilacqua (VR)

Commercial Director  
Luigi Zucchi



## PRODUCT DESCRIPTION

NRV is made up of independent 108kW modules that can be connected to each other up to a power of 970kW. Each individual module is a cooler for chilled water production to meet air conditioning requirements in residential/commercial buildings or to meet refrigeration requirements in industrial facilities.

High efficiency, energy saving, and reduced sound emissions allow this range to meet the various requirements of the market.

### ENERGY EFFICIENCY

Energy efficiency is an important requirement for new projects and redevelopment of the existing ones.

The NRV series is one of the best solution, as it guarantees high energy efficiency levels with EER values in class "A" Eurovent, calculated in compliance with European Standard EN14511.

**MAXIMUM MODULARITY AND ADAPTABILITY** With NRV, it is possible to couple up to 9 chillers designed to reduce the overall unit dimensions to a minimum. Modularity that allows you to adapt installation to the actual development needs of the system. This way the cooling capacity can be increased over time simply and affordably.

**Modularity is essential when component redundancy is required, as it allows for a safer system design and increased reliability.**

The modules are easy to install and connect to each other from a hydraulic standpoint, thanks to the connections with grooved joints.

**NRV is already equipped with a water filter, differential pressure switch and butterfly check valves, useful to cut off the hydraulic circuit for maintenance; for instance, to clean the filter.**

In the event of variable flow rate, the motorised hydronic valves can intercept one or more modules to reduce the flow rate in low heat load conditions.

### EXTENDED OPERATING RANGE

This range can work at full load with outdoor temperature up to + 50°C.

This occurs in the high efficiency versions and also, for example, in versions with silent operation. Therefore, their natural location is in urban centres, where environmental requirements are strictly related to noise.

Furthermore, versions A and U can produce water cooled to -10°C.

### STATE OF THE ART CONTROL

The controller with liquid crystal display is supplied as per standard with all the units. It has a multilingual user interface, which is available also in remote version (accessory) to be connected to the unit with serial connection.

The presence of an internal clock allows you to program the operation in time periods in order to improve the system efficiency and reduce consumption during periods of non-use.

This option (Night Mode) is perfect for night operation, since it guarantees greater acoustic comfort in the evenings, and a high efficiency in the time of greater load.

**Night Mode is standard in the unit with J inverter fan and in the E silenced version.**

**Either a DCPX or inverter fan is necessary for the High Efficiency version.**

Systems consisting of two chillers allow the unit to be adjusted via (Master/Slave), supplied as per standard. In case of several chillers through the Multichiller\_PCO. The supervision is possible thanks to different options, with proprietary devices or by integrating other systems via ModBus, Bacnet, LonWorks etc. protocols.

### Version with Desuperheater

Cooler complete with a desuperheater.

In this configuration a coolant/water heat exchanger is added on the gas flow line. The exchanger is set in series before the condenser and is appropriately sized to guarantee the recovery of part of the heat produced, for the free production of hot water at a medium-high temperature for domestic or other uses.

## CONFIGURATOR

Field	Description
1,2,3	NRV
4,5,6,7	Cuts 0550
8	<b>Scope of application</b>
°	Standard (water produced up to +4 °C)
X	Electronic thermostatic valve (produced water up to +4?)
9	<b>Model</b>
°	Cooling Only
10	<b>Heat recovery</b>
°	Without heat recovery
D	With desuperheater
11	<b>Version</b>
A	High efficiency
E	Silenced high efficiency
12	<b>Coils</b>
°	Aluminium micro-channel
O	Painted aluminium microchannel
R	Copper - Copper
S	Copper - Thinned
13	<b>Fans</b>
°	Standard
J	Inverter (1)
14	<b>Power supply</b>
°	400V/3/50Hz with magnet circuit breakers
15-16	<b>Integrated hydronic kit</b>
00	Without hydronic kit

1 The DCPX is unnecessary with the "J" inverter fan

## DESCRIPTION OF COMPONENTS

### Compressor COOLING CIRCUIT

Scroll hermetic compressors with 2-pole electric motors. All the compressors are equipped with guard resistance, inner electronic thermal protection device with centralised manual reset.

### System side heat exchanger

Braze welded AISI 316 steel plate heat exchanger. The heat exchanger is insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, it is protected against formation of ice by an electric resistance.

### Source side heat exchanger

Microchannels heat exchanger that guarantees higher thermal exchange yield. Circuit that optimises the liquid distribution in the coil, which is arranged with V beam geometry with open angle. The configurator has always the standard copper/aluminium coils available.

### Recovery side heat exchanger (optional)

Braze welded AISI 316 steel plate heat exchanger. The heat exchanger is insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, it is protected against formation of ice by an electric resistance.

### Dehydrator filter

Hermetic-mechanical with cartridges made of ceramic and hygroscopic material, able to withhold impurities and any traces of humidity present in the cooling circuit.

### Mechanical thermostatic valve

With external equaliser positioned at evaporator outlet, it modulates the flow of gas to the evaporator, according to the heat load, in order to ensure correct heating level of the intake gas.

### Electronic thermostatic valve

Compared to the classic thermostatic valve, the electronic thermostatic valve stands out for its best overheating regulation. This way, the evaporator is fully exploited increasing the machine yield.

Its use in applications intended for comfort provides important benefits, especially in the presence of variable loads, as it allows you to maintain maximum efficiency with any outdoor air temperature.

In industrial applications, where temperature changes are often required in relation to various environmental conditions, the electronic valve is ideal to prevent the system from continuous calibration, thus adapting the system to different load conditions, making it independent.

### Solenoid valves (3)

The valves close when the compressor switches off, blocking the flow of refrigerant gas to the evaporator, recovery and the coil.

### Liquid indicator

It is used to verify that the expansion system is powered correctly and the presence of humidity in the cooling circuit.

## STANDARD HYDRAULIC CIRCUIT

### Water filter

Equipped with steel filtering mesh, it prevents the heat-exchanger from clogging system side due to any impurity inside the circuit.

### Differential pressure switch

Positioned before and between the input and output of the heat exchanger, its task is to ensure water circulation. If triggered, it locks the unit.

### Throttle valve

Useful for cutting out the hydraulic system in case of maintenance, for example, to clean the filter.

In the event of variable flow rate, the motorised hydronic valves can intercept one or more modules to reduce the flow rate in low heat load conditions.

## COMPONENTS OF THE STRUCTURE AND FANS

### Structure

Supporting structure made of hot-dipped galvanised steel sheets, painted with polyester powders, built to guarantee easy accessibility for service and maintenance.

### Standard fan unit

Equipped with accident-prevention net, it consists of axial fans and 6-pole motor with external rotor and protection rating IP54. Moreover, the motor is equipped with inner thermal protection with automatic reset.

### Inverter fans (option)

Continuous modulation of revolution speed according to the condensation pressure, highly efficient motor for low energy consumption.

## CONTROL AND SAFETY COMPONENTS

### Manually reset high pressure switch

With fixed calibration, placed on the high pressure side of the cooling circuit, it inhibits the operation of the compressor if abnormal work pressure occurs

### Low pressure transducer

Placed on low pressure side of cooling circuit, it signals the work pressure to the control board, generating a pre-warning in case abnormal pressure occurs.

### High pressure transducer

Placed on the high pressure side of the cooling circuit, signals the work pressure to control board, generating a pre-warning in case abnormal pressure occurs

### Control and electric power board

complete with:

- - spring type control circuit terminal board,
- Circuit breakers and contactors for compressors and fans,
- terminals for REMOTE PANEL
- - evaporator pump and recovery pump control consent relay (only for versions without pump units),
- - all numbered cables.
- DOOR-LOCK ISOLATING SWITCH
- pump evaporator and pump recovery unit control consent relay (only for versions without pump units).
- Act on the opening lever of the control

3 Only with mechanical thermostatic valve

**DOOR-LOCK ISOLATING SWITCH**

THE electrical board can be accessed by disconnecting the power supply using the door-lock isolating switch lever. In order to prevent energising the unit accidentally during maintenance, the isolator switch has been provided with a safety-lock.

**Control board**

The microprocessor controls features cutting edge functions and proprietary adjustments

The keyboard is equipped with control keys and LCD display, which allows you to consult and make interventions on the unit by means of the multi-level menu, with language selection settings. It controls:

The system temperature for cooling the environments or industrial processes. The different temperatures are managed automatically according to the unit work conditions and requirements.

Management and alarm log to have always a prompt diagnosis of the unit operation.

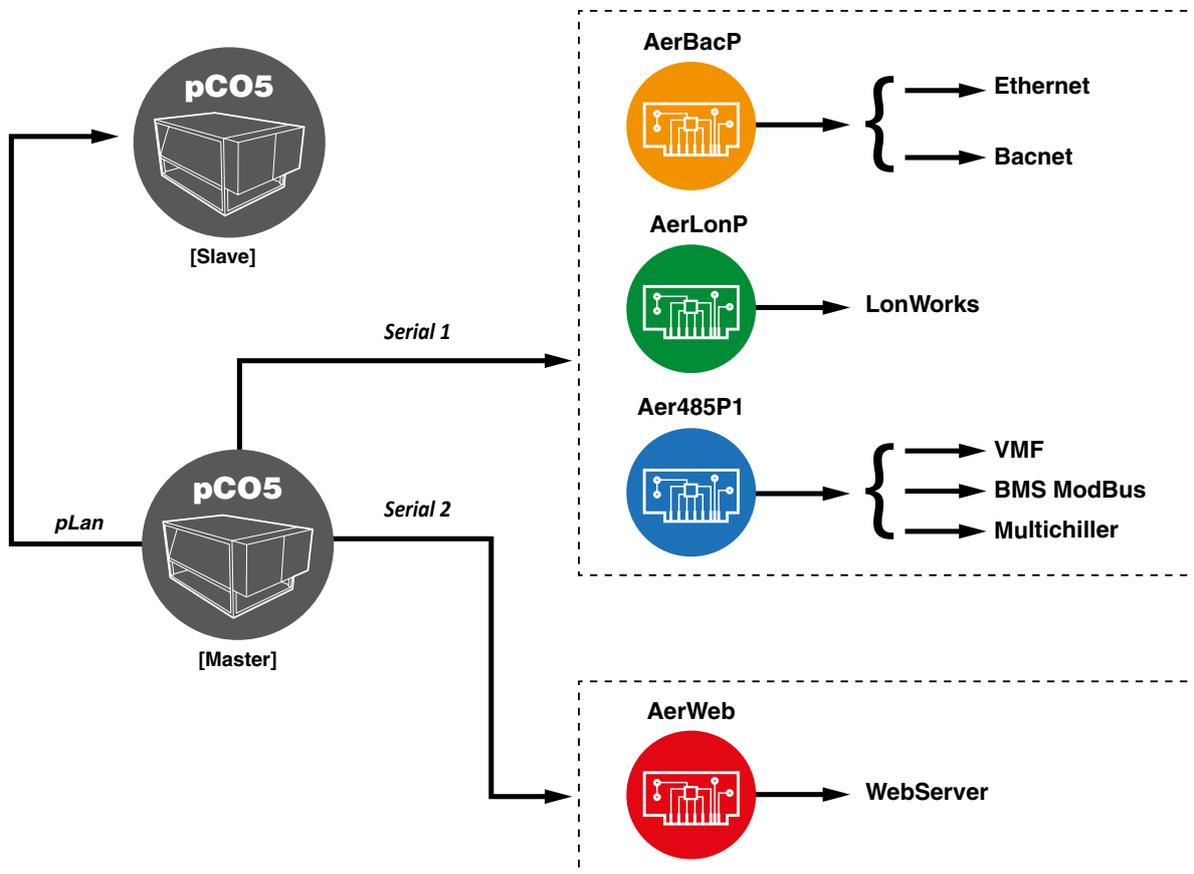
Creation of operation time periods required for efficient programming

A self-adaptive logic is used to defrost. This logic allows you to adjust the number of defrosts in order to increase efficiency.

Systems consisting of two chillers allow the unit to be adjusted via (Master/Slave), supplied as per standard. In case of several chillers through the Multichiller\_PCO. The supervision is possible thanks to different options, with proprietary devices or by integrating other systems via ModBus, Bacnet, LonWorks etc. protocols.

A specific keyboard for wall-mounting installation (PGD1 accessory) allows the remote control of all the functions.

**Note: For further information, refer to the user manual.**



4 Standard in the silenced versions or with the desuperheater; an accessory for all other versions

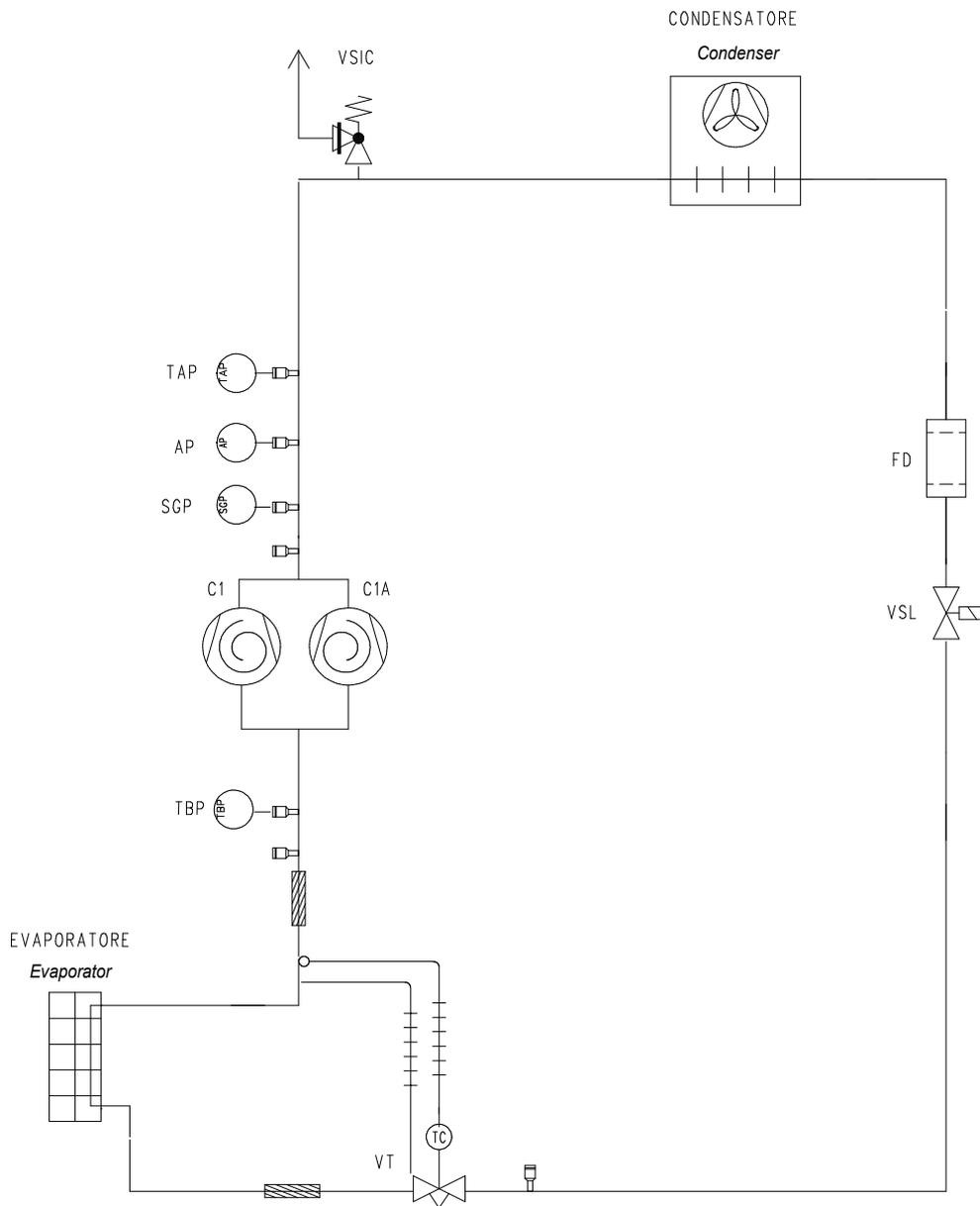
## CHECK LIST

Model	00	D (1)
<b>Components of the cooling circuit</b>		
n° 1 cooling circuits	•	
Scroll compressors	•	
Cycle reversing valve	-	
High pressure transducer	•	
Low pressure transducers	•	
High pressure switch	-	
Low pressure switch	•	
Source side heat exchangers	•	
One-way valves	•	
dehydrating filter	•	
Liquid indicator	•	
Safety valve - high pressure side	•	
Safety valve - low pressure side	-	
Flow shut-off valves	•	
Suction shut-off valves	-	
Liquid shut-off valves	•	
Economiser electronic thermostatic valve	-	
Economiser	-	
Solenoid valve	-	
By-pass solenoid valves	-	
Thermostatic valves	•	
System side heat exchanger	•	
Liquid storage tank	-	
Compressor intake liquid separator	-	
<b>Components of the hydraulic circuit</b>		
<b>system side</b>		
System side heat exchanger (plate heat exchanger)	•	
Heat exchanger electric resistance	-	
Water filter	•	
Flow Switch	-	
Differential pressure switch	•	
Safety valve	-	
Manual air vent valve	-	
Automatic air vent valve	-	
System loader	-	
Water inlet temperature probe	•	
Water outlet temperature probe	•	
Inertial storage tank	-	
1 Pump	-	
2 Pumps (twin, 1 operating, 1 in standby)	-	
One-way valves	-	
Expansion vessel	-	
Drain valve	•	
<b>system side with Desuperheater or Total Recovery</b>		
	<b>System Side</b>	<b>Desuperheater Side</b>
System side heat exchanger	•	-
Recovery side heat exchanger	-	•
Exchangers electric resistance	-	-
Water filter	•	-
Flow Switch	-	-
Differential pressure switch	•	-
Safety valve	-	-
Manual air vent valve	-	-
Automatic air vent valve	-	-
System loader	-	-
Water inlet temperature probe	•	-
Water outlet temperature probe	•	-
Inertial storage tank	-	-
1 Pump	-	-
2 Pumps (twin, 1 operating, 1 in standby)	-	-
One-way valves	-	-
Expansion vessel	-	-
Drain valve	•	-

1 Models with desuperheater

# PRINCIPLE FUNCTIONING DIAGRAMS

## NRV0550 (WITH MECHANICAL THERMOSTATIC VALVE)



SIMBOLO SYMBOL	NOME SIMBOLO NAME SYMBOL	FUNZIONE FUNCTION
	AP	pressostato di alta high pressure switch
 0.64x	BATTERIA ALETTATA AIR SIDE EXCHANGE	batteria di scambio termico a pacco alettato heat exchange coil with finned pack
	C	compressore scroll scroll compressor
	FD	filtro deidratatore dehydrator filter
	ISOL	tubazione isolata insulated piping
 0.56x	LINEE-REGOL LINES-ADJ.	linea di regolazione adjustment line
	RACC-DR_CF	Presa di pressione Pressure plug
	SGP	sonda di temperatura gas premente pressing gas temperature probe
	TAP	trasduttore di alta pressione high pressure transducer
	TBP	trasduttore di bassa pressione low pressure transducer
 0.73x	VSIC	valvola di sicurezza safety valve
	VSL	valvola solenoide solenoid valve
.....	NOME SIMBOLO NAME SYMBOL	FUNZIONE FUNCTION
 0.98x	VT	valvola termostatica thermostatic valve

## ACCESSORIES

- AER485P1:** RS-485 interface for supervision systems with MODBUS protocol.  
**AERBACP:** Ethernet communication Interface for protocols Bacnet/IP, Modbus TCP/IP, SNMP  
**DCPX:** Device for condensation temperature control, with continuous speed modulation of fans by using a pressure transducer.  
**GPNY\_BACK:** kit with 1 anti-intrusion grid for the short side of the unit.  
**GPNYB\_SIDE:** kit with 2 anti-intrusion grids for the long side of the unit.  
**MULTICHILLER\_EVO:** Control, switch-on and switch-off system of the single chillers where multiple units are installed in parallel, always ensuring constant flow rate to the evaporators.  
**PGD1:** Allows you to control the unit at a distance.

## FACTORY FITTED ACCESSORIES

- DRE:** Electronic device for peak current reduction.  
**KNYB:** Pair of caps with grooved joints assembled on the unit manifold.  
**KREC:** Accessory kit to remote the electric power supply input to the back  
**RIF:** Power factor correction. Connected in parallel to the motor allowing about 10% reduction of input current.

## COMPATIBILITY WITH VMF SYSTEM

For more information about VMF system, refer to the dedicated documentation.

## COMPATIBILITY OF ACCESSORIES

### Accessories

Model	Ver	0550
AER485P1	A,E	•
AERBACP	A,E	•
DCPX	A	•
GPNYB_SIDE	A,E	•
GPNY_BACK	A,E	•
MULTICHILLER_EVO	A,E	•
PGD1	A,E	•

### DRE: electronic device for peak current reduction

Ver	0550
A,E	DRE (1)

(1) Contact the factory

A grey background indicates the accessory must be assembled in the factory

### KNYB: Pair of caps with grooved joints assembled on the unit manifold

Ver	0550
A,E	KNYB

A grey background indicates the accessory must be assembled in the factory

### KREC: kit to remote the electric power supply input to the back

Ver	0550
A,E	KREC

A grey background indicates the accessory must be assembled in the factory

### RIF: Power factor correction

Ver	0550
A,E	RIF (1)

(1) Contact the factory

A grey background indicates the accessory must be assembled in the factory

## SELECTION CRITERIA OF THE HEAT EXCHANGERS ACCORDING TO THE PLACE OF INSTALLATION OF THE UNIT

The guide provides advice for applications. Although recommendations are given, all the details about the real world application of our products cannot be fully covered in this document.

For these reasons, this section contains the basic warnings and precautions to be taken into account in general, it being understood that:

- The final choice of the type of exchanger according to the place of installation is left to the client (or to the professional appointed by him).
- In any case, it is recommended to wash the coils with adequate frequency (a maximum time interval of three months is recommended, shorter in conditions of particularly dirty and aggressive atmospheres) to preserve their condition and ensure the proper functioning of the unit.

Potentially corrosive outdoor environments include areas near coasts, industrial sites, densely populated urban areas, certain rural areas or a combination of these environments. Other factors, including the presence of effluent gas, sewage vents or open sewage systems and the exhaust of diesel engines can all be harmful for the microchannel coil.

The purpose of this application guide is to provide general information on the mechanisms of corrosion and corrosive environments.

### SEA COAST ENVIRONMENTS

Coastal or marine environments are characterized by the abundance of sodium chloride (salt) which is carried by sea spray, mist, or fog. Most importantly, this salt water can be carried more than several miles by ocean breezes and tidal currents. It's not uncommon to experience salt-water contamination as far as 10km from the coast.

For this reason, it may be necessary to protect the exchangers from electrolytes of marine origin through the appropriate choice of materials and / or appropriate protective treatment.

### INDUSTRIAL ENVIRONMENTS

Industrial applications are associated with several different conditions that can potentially produce a variety of atmospheric emissions.

Contaminants from sulphur and nitrogen oxides are most often linked to high-density urban environments. The combustion of coal oils and fuel oils releases sulphur oxides ( $SO_2$ ,  $SO_3$ ) and nitrogen oxides ( $NO_x$ ) into the atmosphere. These gases accumulate in the atmosphere and return to the ground as acid rain or low pH dew.

Industrial emissions are not only potentially corrosive: many industrial dust particles can be loaded with harmful components such as metal oxides, chlorides, sulphates, sulfuric acid, carbon and carbon compounds.

In the presence of oxygen, water or high humidity environments, these particles can be extremely corrosive and in several forms, including general and localised corrosion, such as pitting and anthill.

### MIX OF SEASIDE AND INDUSTRIAL ENVIRONMENTS

Sea mist loaded with salt, associated with the harmful emissions of an industrial environment, poses a serious risk.

The combined effects of the salt loaded mist and industrial emissions accelerate corrosion.

Within the manufacturing plants, corrosive gas may result from the processing of chemicals or by the typical industrial processes used in manufacturing.

Potential sources of risk to be considered are open sewage systems, exhaust vents, diesel engine exhaust, emissions from heavy traffic, landfills, aircraft

and ocean-going ship engine exhaust, industrial production, chemical treatment facilities (cooling towers in the vicinity) and fossil fuel power plants.

### URBAN ENVIRONMENTS

Densely populated areas generally have high levels of emissions of motor vehicles and increases in diesel use for heating buildings.

Both conditions elevate sulfur oxide ( $SO_x$ ) and nitrogen oxide ( $NO_x$ ) concentrations.

Corrosive atmospheres may even occur in some closed areas, such as facilities with swimming pools and water treatment systems.

It is advisable to pay particular attention to the positioning of the units if it occurs in the immediate vicinity of these places, and to avoid that they are installed in the vicinity of outlets for the expulsion of air coming from them, or in any case exposed to such atmospheres.

Corrosion severity in this environment is a function of the pollution levels, which in turn depend on several factors including population density in the area.

Any equipment installed in locations immediately adjacent to diesel engine exhausts, incinerator flues, fuel-fired boiler flues, or areas exposed to fossil fuel emissions shall be considered subject to the same measures as an industrial application.

### RURAL ENVIRONMENTS

Rural environments may contain high levels of pollution from ammonia and nitrogen products from animal excrements, fertilizers and high concentration of diesel engine exhaust. The approach to these environments must be entirely similar to that of industrial environments.

Local weather conditions have a major role in the concentration or dispersion of outdoor gaseous contaminants.

Thermal inversions can trap pollutants, thereby producing serious air pollution problems.

### ADDITIONAL TIPS

Although each of the above corrosive environments can be detrimental to the life of the heat exchanger, several additional factors must be considered before choosing the final design.

The local climate surrounding the site of application may be influenced by the presence of:

- wind
- dust
- road salts
- swimming pools
- diesel engines discharge / traffic
- Localised mist
- cleaning agents for domestic use
- Sewage system outlets
- many other separate contaminants

Even within 3-5 km from these particular local climates a normal environment with moderate characteristics can be classified as an environment that requires preventive corrosion measures. When these factors are directly and immediately part of the environment, their influence is further aggravating.

Only in the absence of potentially risky situations such as those indicated above can an environment be considered moderate.

Application	Tip
Severe environments	Coils with suitable protection
Moderate environments	Standard coil <sup>®</sup>

## BASIC PRINCIPLES ON MICROCHANNEL COIL CORROSION

The main material in Aermec heat exchangers is aluminium. Aluminum is a very reactive metal, which is easily oxidized on its surface. As long as this hard layer of aluminum oxide remains intact, the aluminum at the base will remain resistant to corrosion (unlike other materials, such as steel, where the oxide layer peels off the surface and flakes off, allowing the constant attack of the underlying metal). However, aggressive environments can damage the oxide layer, which may not regenerate as quickly as necessary to provide the product with sufficient protection. These harsh environments are typified by very high or very low pH levels. Normally, aluminum's protective oxide layer is generally stable in the pH range of 4.5 to 8.5; the lack of exposure to excessively acidic or basic pH conditions is not in itself sufficient to exclude the need for appropriate protective treatments on the batteries. The presence of salt (associated with marine environments) as well as the presence of other aggressive substances can in fact induce widespread or localized galvanic corrosion (pitting or anthill corrosion).

### OTHER RISK FACTORS FOR CORROSION

The principal cause of corrosion is elevated humidity and/or temperatures in the presence of contaminant gases. These conditions alone, or in combination, accelerate the natural corrosion process in metals.

#### Humidity

Moisture in air can be considered the lifeblood of galvanic corrosion. A galvanic corrosion cell requires an electrolyte or current carrying media, to reach a dynamic state. The electrolyte can be water or any water-soluble substance with good conducting properties. Moisture in the air is one such electrolyte. Humid air contaminated with corrosive gasses further accelerates the corrosion rate as the air's current carrying potential increases.

#### Temperature

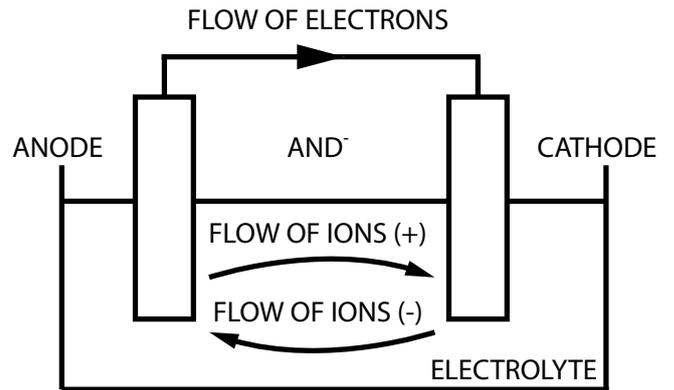
Chemical reactions generally depend on the temperature, for reactions that involve corrosion of aluminum by an increase in temperature, faster reaction frequencies usually arise.

#### Corrosive gases

Not all gases cause corrosion. Specifically, we are concerned with three types of gases:

- Acidic gases, such as hydrogen sulfide, sulfur oxides, chlorides, hydrogen fluoride (HF) and nitrogen oxides;
- Caustic gases, such as ammonia;
- Oxidizing gases, such as ozone

■ Of the gases that can cause corrosion, the acidic gases are typically the most harmful.



## CLEANING MICRO-CHANNEL COIL

Keeping the surfaces of the microchannel coils clean is essential to ensure the correct operation of the unit and to avoid punctures on the coil with the consequent loss of refrigerant gas which would lead to the replacement of the coil itself.

**⚠ WARNING** Damage to the coil due to neglect or lack of or poor cleaning is not covered by the warranty.

Dirt, grease, oil, and other foreign material must be removed periodically from the surface of the battery according to the following recommendations.

#### Required elements:

- Personal protective equipment
- Hot water
- High-pressure washing

#### Procedure:

Use a high-pressure washer with a large cast and enough force to remove all foreign material, proceed with care to avoid damage and possible wear of the louvers.

Lastly, also rinse the carpentry and the fans thoroughly to be sure that all impurities have been removed.

■ Aermec assume no liability for the completeness of the information contained in this document.

## OPERATING RANGE

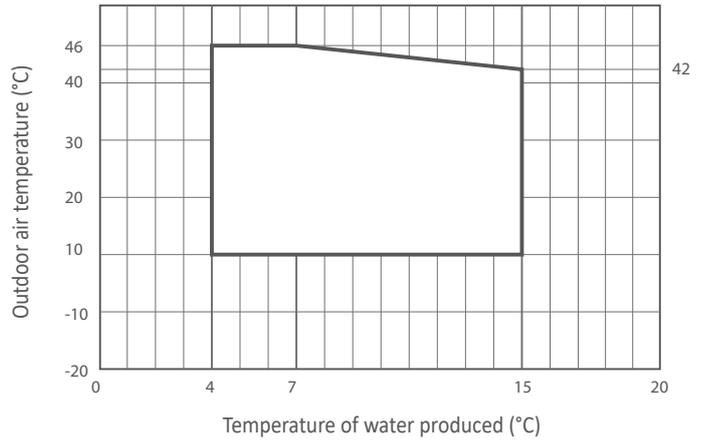
The units, in standard configuration, are not suitable for installation in salty environment.

The values indicated in the table refer to the min. and max. limits of the unit. For further information, refer to the tables of yields and consumptions different from the nominal ones. For operating limits, please refer to the diagrams, valid for  $\Delta T = 5^\circ\text{C}$ .

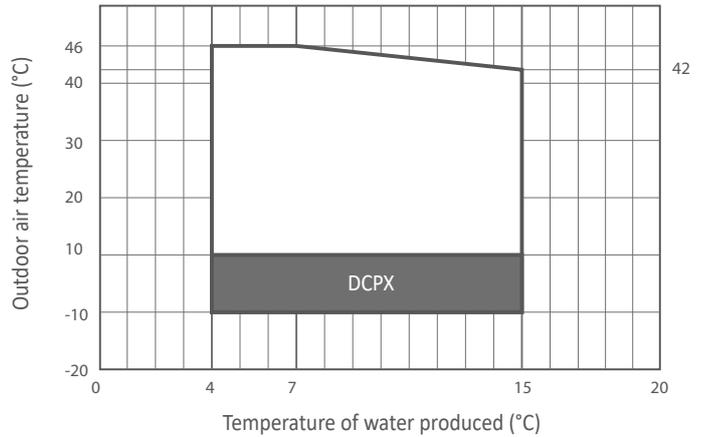
If the unit operates beyond the operational limits, we recommend you first contact our technical-sales service.

**Note:** *If the unit is installed in particularly windy areas, you must provide a windbreak to prevent unit malfunctions. It should be installed if wind speed is above 2.5 m/s*

### Operating range of version A

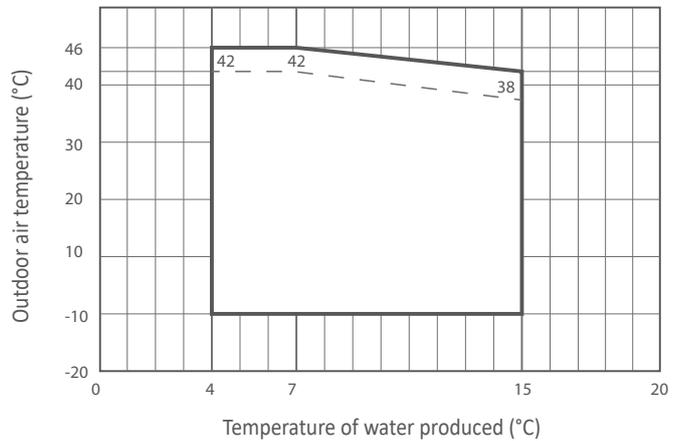


### Operating range of version A with accessory DCPX



### Operating range of version E or any configured unit with fan Inverter J

--- Silenced operating range



The DCPX is standard in Silenced versions "E" and not used with Inverter fan J

LIMIT

## PERFORMANCE SPECIFICATIONS

Size	Notes	ver.		0550
<b>Performance in cooling mode</b>				
Cooling capacity	(1)	A	kW	108.1
	(1)	E	kW	103.5
Input power		A	kW	34.9
		E	kW	36.3
EER		A	W/W	3.10
		E	W/W	2.85
ESEER		A	W/W	4.10
		E	W/W	4.06
Water flow heat exchanger		°	l/h	18646
		L	l/h	17862
Head drops		°	kPa	32
		L	kPa	30
<b>Energy efficient</b>				
Eurovent Class		A		A
		E		C

### data 14511:2013 (Eurovent)

1 Evaporator water temperature (in/out) 12°C/7°C; Outdoor air temperature 35°C

## GENERAL SPECIFICATIONS

Size	Notes	ver.		0550
<b>Compressor</b>				
Type				scroll
Number			no.	2
Number of steps			no.	50%
Number of circuits			no.	1
Minimum step			%	
Type of refrigerant				R410A
Refrigerant load		A	kg	12.5
		E	kg	12.5
Oil type				
Oil load		A	kg	9.34
		E	kg	9.34
<b>System side heat exchanger</b>				
Type				plates
Number			no.	1
Resistance			no./W	-
<b>Connections with Grooved Joints</b>				
Diameter		A	Ø (in/out)	6"
		E	Ø (in/out)	6"
<b>Desuperheater Heat Exchanger</b>				
Type				plates
Number			no.	1
Resistance			no./W	
Connection type				
Connection diameter			Ø (in/out)	
<b>Standard Fans</b>				
Type				Axial
Number		A/E	no.	2
Air flow rate		A	m³/h	32000
		E	m³/h	24000
Useful static pressure			Pa	-
<b>Inverter Fans "J"</b>				
Type				Axial
Number		A/E	no.	2
Air flow rate		A	m³/h	32000
		E	m³/h	24000
Useful static pressure			Pa	-
<b>Sound data</b>				
Sound Power Level		A	dB(A)	85
		E	dB(A)	82
Sound Pressure Level		A	dB(A)	53
		E	dB(A)	50

**Sound power level (calculated when cold)** Aermec determines sound power values in agreement with the Standard UNI EN ISO 9614-2, in compliance with that requested by Eurovent certification. **Sound pressure level**, at a distance of 10 m, for units in open field conditions on a reflective surface; non-binding value obtained from the sound power level

## ELECTRICAL DATA

<i>Size</i>	<i>Notes</i>	<i>ver.</i>		0550
<i>Electrical data</i>				
<b>Power supply</b>			<b>V/ph/Hz</b>	<b>400V/3/50Hz</b>
Total input current when cold	(1)	A/E	A	62
Maximum current (FLA)	(1)	A/E	A	96
Peak current (LRA)	(1)	A/E	A	281

## DIMENSIONS AND WEIGHTS

<i>Size</i>	<i>Notes</i>	<i>ver.</i>		0550
<i>Electrical data</i>				
<b>Standard unit</b>				
Height		A	mm	2480
		E	mm	2480
Width		A	mm	2200
		E	mm	2200
Length		A	mm	1190
		E	mm	1190
Vacuum weight		A	kg	1105
		E	kg	1105

1 Data represents standard units without accessories. For more details, refer to the breeding programme.

## YIELDS AND ABSORPTION DIFFERENT THAN NOMINAL

### COOLING MODE VERSIONS °

0550A																
TA d.b.	10	25	35	46	10	25	35	46	10	25	35	46	10	25	35	46
TW (out)	4				7				10				15			
Glycol	10%				0.00%				0.00%				0.00%			
Pc	123.2	109.1	98.0	84.7	135.9	120.3	108.1	93.3	147.7	130.8	117.6	-	168.7	149.6	134.7	-
Pe	22.3	28.3	33.8	41.3	23.2	29.3	34.9	42.6	24.2	30.4	36.0	-	26.2	32.3	38.1	-
EER	5.52	3.85	2.90	2.05	5.85	4.10	3.10	2.19	6.09	4.31	3.27	-	6.43	4.63	3.54	-
Qn	22441	19854	17830	15388	23461	20754	18638	16104	25550	22609	20315	-	29257	25921	23325	-
ΔP	49	39	31	23	51	40	32	24	61	48	38	-	80	63	51	-

0550E																
TA d.b.	10	25	35	46	10	25	35	46	10	25	35	46	10	25	35	46
TW (out)	4				7				10				15			
Glycol	10%				0.00%				0.00%				0.00%			
Pc	118.5	104.0	93.1	84.7	131.6	115.5	103.5	93.5	144.0	126.3	113.5	-	165.6	145.5	131.1	-
Pe	23.9	29.7	35.2	42.5	24.8	30.7	36.3	43.7	25.7	31.7	37.4	-	27.5	33.7	39.5	-
EER	4.95	3.50	2.64	1.99	5.31	3.76	2.85	2.14	5.61	3.98	3.04	-	6.03	4.31	3.32	-
Qn	21579	18925	16933	15391	22718	19919	17855	16139	24891	21827	19602	-	28723	25203	22701	-
ΔP	46	35	28	23	48	37	30	24	58	44	36	-	77	59	48	-

#### Data 14511:2013

TA b.s.	Inlet water temperature with dry bulb (°C)
TW(out)	Temperature of the water produced °C
Glycol	Ethylene glycol percentage (%)
PC	Cooling capacity [kW]
Pe	Input power (kW)
Qn	Water flow rate [l/h]
ΔP	Pressure drop to the exchanger (kPa)
-	Conditions outside the operating range

Capacities and pressure drops in the heat exchangers calculated with ΔT 5 °C

#### Note

For operating conditions different to those declared refer to the selection program available on [www.aermec.com](http://www.aermec.com)

## PRESSURE DROPS

The water flow rate is calculated with the following formula:

$$Q = P_c \times 860 / \Delta T.$$

Q Water flow rate (l/h)

Pc Cooling capacity (kW)

ΔT Water heat drop (°C)

Pressure drops are calculated with the following formula:

$$\Delta p = K \times (Q)^2$$

Δp Pressure drops (kPa)

Coefficient for the various sizes and versions

Q Water flow rate (l/h)

Versions without hydronic kit "00" only plate heat exchanger								
Mod.	Ver.	System side heat exchanger				Desuperheater		
		K	Q min l/h	Q max l/h	CAU dm <sup>3</sup>	K	Q min l/h	Q max l/h
0550	A	9,31318E-08	9300	26000				
0550	E	9,31318E-08	9300	26000				

K	Coefficient for various sizes and versions
Q min	Minimum water flow rate to the exchanger
Q max	Maximum water flow rate to the exchanger
CAU	Unit water content

## WATER SYSTEM CONTENT

### MINIMUM WATER CONTENT IN THE SYSTEM

For correct unit operation, there must be a suitable amount of water in the system. A sufficient quantity of water not only ensures machine stability, but also helps avoid a high number of hourly compressor start-ups.

To calculate it, use the formula: Unit rated cooling capacity (kW) x table value (l/kW) = Minimum system content (l).

Minimum system water content	ver	u.m.	0550
For air conditioning systems	A	m <sup>3</sup>	0.76
	E	m <sup>3</sup>	
For systems with process water	A	m <sup>3</sup>	
	E	m <sup>3</sup>	

**Note:** the water content referred to in the tables corresponds to the amount of water effectively useful for inertial purposes; this value does not necessarily coincide with the entire system water content, and must be calculated on the basis of the system layout and operating modes.

**A example** is given below, but it does not cover a possible situation.

Example: for a chiller/heat pump equipped with a primary and a secondary circuit, and in which the zone pumps of the secondary circuit could (even occasionally) be turned off, only the water content of the primary circuit has value of useful water content for the counting purposes.

If you are in any doubt, please refer to the relevant technical documentation or contact the AERMEC Technical-Commercial Service.



**ATTENTION** It is recommended to design systems with high water content (minimum recommended values shown in tab), in order to limit:

- Number of peaks made by the compressors
- The reduction of water temperature during defrosting cycles in the winter period for heat pumps.

### WATER CHARACTERISTICS

System: Chiller with plate heat exchanger	
PH	7.5-9
Electric conductivity	10-500µS/cm
Total hardness	4.5-8.5°dH
Temperature	< 65°C
Oxygen content	< 0.1 ppm
Max. glycol amount	50%
Phosphates (PO4)	< 2ppm
Manganese (Mn)	< 0.05 ppm
Iron (Fe)	< 0.3 ppm
Alkalinity (HCO3)	70 - 300 ppm
Chloride ions (Cl-)	< 50 ppm
Sulphate ions (SO4)	< 50 ppm
Sulphide ion (S)	none
Ammonium ions (NH4)	none
Silica (SiO2)	< 30ppm

**⚠** It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components). This phenomenon can trigger corrosion processes and subsequent drilling of the heat exchanger and pipes.

## CORRECTIVE FACTORS

		Corrective factors for Average water temperatures different from the nominal														
System side heat exchanger		Operation in cooling mode							Heating mode							
Average water temperatures	(°C)	5	10	15	20	30	40	50	23	28	33	38	43	48	53	58
Corrective factor		1.02	1	0.98	0.97	0.95	0.93	0.91	1.04	1.03	1.02	1.01	1	0.99	0.98	0.97

## DIRT

		Deposit corrective factors [K*M2]/[W]				
Cooling capacity correction factors		0.00005			0.0001	0.0002
Input power correction factors		1			0.98	0.94
		1			0.98	0.95

## GLYCOL

		Corrective factors ETHYLENE GLYCOL - COLD OPERATION									
Freezing Point	°C	0	-3.63	-6.10	-8.93	-12.11	-15.74	-19.94	-24.79	-30.44	-37.10
Ethylene glycol percentage	%	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
Pe	-	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

		Corrective factors PROPYLENE GLYCOL - COLD OPERATION									
Freezing Point	°C	0	-3.43	-5.30	-7.44	-9.98	-13.08	-16.86	-21.47	-27.04	-33.72
Ethylene glycol percentage	%	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
Pe	-	1	0.996	0.994	0.992	0.99	0.988	0.986	0.984	0.982	0.98
Dp	-	1	1.082	1.102	1.143	1.201	1.271	1.351	1.435	1.52	1.602

- Qwc** Water flow rate corrective factor (average water temperature 9.5°C)  
**Pc** Cooling capacity corrective factor  
**Pe** Input power corrective factor  
**Dp** Pressure drops corrective factor

## SOUND DATA

Sound power levels on the basis of measurements taken in accordance with ISO 9614 in compliance with EUROVENT certification (Eurovent 8/1 sound tests). This certification refers to the Sound Power in dB(A) which is therefore the only acoustic data to be considered binding.

Unit	Vers.	Notes	Total sound levels			Octave band (Hz)						
			Pow. dB(A)	Pres. 10 m dB(A)	Pres. 1 m dB(A)	125	250	500	1000	2000	4000	8000
NRV0550	A		85	53	66.9	69.2	72.4	76.5	80.1	80.1	76.0	63.8
NRV0550	E	(1)	82	50	63.9	63.3	71.0	73.7	76.4	76.9	72.8	60.6

### data 14511:2013 (Eurovent)

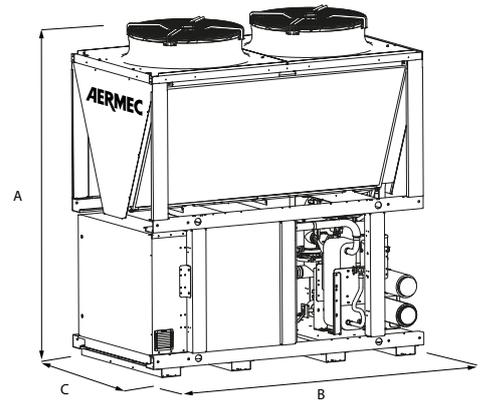
Evaporator water temperature (in/out) 12°C/7°C; Outdoor air temperature 35°C; Standard fans

1 Versions with DCPX as standard

## DIMENSIONS

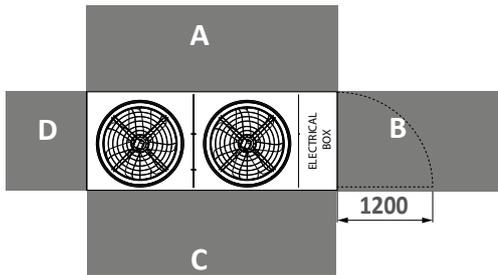
NRV		Vers.		0550
Height	(mm)	A	all	2480
Width	(mm)	B	all	2200
Depth	(mm)	C	all	1190
Weight*	(kg)	all		1105

\* Standard unit weight without accessories

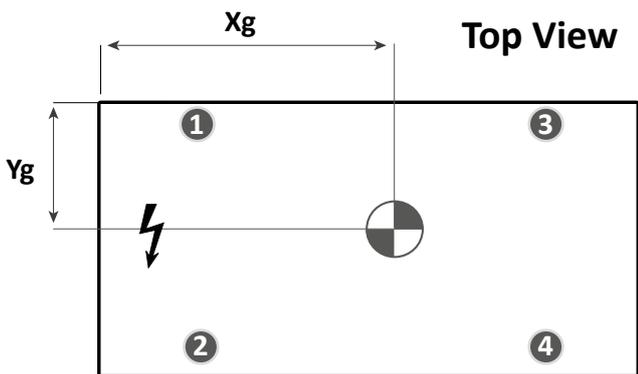


## MINIMUM TECHNICAL SPACES AND WEIGHT DISTRIBUTION

					MINIMUM TECHNICAL SPACES				
	V-blok	Fans			A	B	C	D	↑
	no.	no.			mm	mm	mm	mm	mm
0550	1	2			0	1500	0	2000	3000



\* Consider more space at the moment of installation



Model	Version	Module	kit	Weight (kg)	Barycentre (mm)		Distribution of weights on the supports (%)			
					Hydro.	Empty	1	2	3	4
NRV	0550	00	00	1105*	XG1	XY1	26.9	24.0	26.0	23.2



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