

CHidROS

AIR TO WATER CHILLERS

LDA

SERIES



R410A

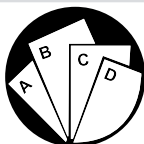
TECHNICAL MANUAL

Incorporated in this document are the following:

- Declaration of conformity
- Technical manual
- Dimensional drawing
- Wiring diagrams



ISO 9001 - Cert. n. 5205/0



Multiple instructions:
Consult the specific part



Read and understand
the instructions before
undertaking any work on
the unit

RETAIN FOR FUTURE REFERENCE

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Declaration of conformity

We declare under our own responsibility that the below equipment complies in all parts with the CEE and EN directives. The declaration of conformity is enclosed to the technical booklet enclosed with the unit.

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1. INTRODUCTION

1.1 Preliminary information

Reproduction, storage or transmission of any part of this publication in any form, without the prior written consent of the Company, is prohibited.

The unit to which these instructions refer, is designed to be used for the the purposes described and to be operated in accordance with these instructions.

The Company will not be liable for claims for damage caused to persons, animals, material goods or property caused by improper installation, adjustment and maintenance or improper use. Any use not specified in this manual is prohibited.

This document is intended to provide information only and does not form a contract with third parties.

The Company pursues a policy of constant improvement and development of its products and therefore reserves the right to change the specifications and the documentation at any time, without notice and without obligation to update existing equipment.

1.2 Aim and content of the manual

These instructions are intended to provide the information required for the selection, installation, use and maintenance of the unit.

They have been prepared in accordance with the European Union laws and with the technical standards in force at the date of issue of the instructions.

The instructions contain all the necessary information to prevent any reasonably foreseeable misuse.

1.3 How to store this manual

The manual must be kept in a suitable place with easy access for users and operators, protected from dust and damp.

The manual must always accompany the unit during the entire life cycle of the same and therefore must be transferred to any subsequent user.

1.4 Manual Update

It is recommended that the manual is updated to the latest revision available.

If updates are sent to the customer they must be added to this manual.

The latest information regarding the use of its products is available by contacting the Company.

1.5 How to use this manual



The manual is an integral part of the unit.

Users or operators must consult the manual before performing any operation and especially so when transporting, handling, installing, maintaining, or dismantling the unit in order to eliminate uncertainty and reduce risk.



In these instructions symbols have been used (described in the following paragraphs) to draw the attention of operators and users to the operations that have a higher risk and which must be performed safely.

1.6 Potential Risks

Whilst the unit has been designed to minimize any risk posed to the safety of people who will interact with it, it has not been technically possible to eliminate completely the causes of risk. It is therefore necessary to refer to the requirements and symbolism below:

LOCATION OF RISK	POTENTIAL RISK	METHOD OF INJURY	PRECAUTIONS
Thermal heat exchangers.	Small stab wounds.	Contact	Avoid any contact, use protective gloves.
Fan and fan grilles.	Cuts, eye damage, broken bones.	Insertion of sharp objects through the grid while the fans are operating.	Never put objects through the protection grilles.
Internal component: compressors and discharge pipes	Burns.	Contact	Avoid any contact, use protective gloves.
Internal component: electric cables and metallic parts	Electrocution, severe burns.	Defect in the supply cable insulation, live metallic parts.	Adequate protection of power cables, ensure correct earthing of all metal parts.
External to unit: unit enclosure	Poisoning, severe burns.	Fire due to short circuit or overheating of the supply cable external to unit.	Size cables and mains protection system in accordance with iee regulations.
Low pressure safety valve.	Poisoning, severe burns.	High evaporating pressure causing a refrigerant discharge during maintenance.	Carefully check the evaporating pressure during the maintenance operations.
High pressure safety valve.	Poisoning, severe burns, hearing loss.	Activation of the high pressure safety valve with the refrigerant circuit open.	If possible, do not open the refrigerant circuit valve; carefully check the condensing pressure; use all the personal protective equipment required by law.

1.7 General Description of Symbols Used

Safety symbols combined in accordance with ISO 3864-2:



BANNED

A black symbol inside a red circle with a red diagonal indicates an action that should not be performed.



WARNING

A black graphic symbol added to a yellow triangle with black edges indicates danger.



ACTION REQUIRED

A white symbol inserted in a blue circle indicates an action that must be done to avoid a risk.

Safety symbols combined in accordance with ISO 3864-2:



The graphic symbol "warning" is qualified with additional safety information (text or other symbols).

1.8 Safety symbols used

**GENERAL RISK**

Observe all signs placed next to the pictogram. The failure to follow directions may create a risk situation that may be injurious to the user.

**ELECTRICAL HAZARD**

Observe all signs placed next to the pictogram.

The symbol indicates components of the unit and actions described in this manual that could create an electrical hazard.

**MOVING PARTS**

The symbol indicates those moving parts of the unit that could create risk.

**HOT SURFACES**

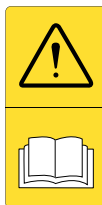
The symbol indicates those components with high surface temperature that could create risks.

**SHARP SURFACES**

The symbol indicates components or parts that could cause stab wounds.

**EARTH CONNECTION**

The symbol identifies Earthing connection points in the unit.

**READ AND UNDERSTAND THE INSTRUCTIONS**

Read and understand the instructions of the machine before any operations.

**RECOVER OR RECYCLE MATERIAL**

1.9 Limitations and prohibited use

The machine is designed and built exclusively for the uses described in “Limitations of use” of the technical manual. Any other use is prohibited because it may pose a potential risk to the health of operators and users.



The unit is not suitable for operations in environments:

- excessively dusty or potentially explosive atmospheres;
- where there are vibrations;
- where there are electromagnetic fields;
- where there are aggressive atmospheres

1.10 Unit identification

Each unit has a rating plate that provides key information regarding the machine. The rating plate may differ from the one shown below as the example is for a standard unit without accessories. For all electrical information not provided on the label, refer to the wiring diagram. A facsimile of the label is shown below:

 Manufacturer: PD322111		Via dell'Industria, 5 35020 Brugine PD Italy	 
Refrigeratore d'acqua/Water chiller Kaltwassersatz/Refroidisseur à eau	Matricola/Serial number Matrikel/Matricule	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">1LDA.090A-1A</div> <div style="border: 1px solid black; padding: 2px;">1814/120442/11</div> </div>	
Tensione-Fasi-Frequenza Voltage-Phases-Frequency Spannung-Phasen-Frequenz Tension-Phases-Fréquence	Corrente massima assorbita Max absorbed current Maximalstromverbrauch Courant maxi absorbée	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">400V/3Ph/50Hz/PE</div> <div style="border: 1px solid black; padding: 2px;">77 A</div> </div>	
Tipo refrigerante Refrigerant type Kältemittel typ Type de refrigerant	Carica refrigerante Refrigerant charge Kältemittelfüllung Charge de refrigerant	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">R410A</div> <div style="border: 1px solid black; padding: 2px;">18 KG</div> </div>	
Max press. di esercizio (alta/bassa) Max allowable press. (high/low) Max kältemit betriebsdruck (hoch/nieder) Press. maxi admissible (haut/bas)	Data di produzione Manufacturing date Erstellungsdatum Date de fabrication	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">43/25</div> <div style="border: 1px solid black; padding: 2px;">17/10/2011</div> </div>	



The product label should never be removed from the unit.

2. SAFETY

2.1 Warning re potentially hazardous toxic substances

It is recommended that the manual is updated to the latest revision available.

If updates are sent to the customer they must be added to this manual.

The latest information regarding the use of its products is available by contacting the company.

2.1.1 Identification of the Type of Refrigerant Fluid Used: R410A

- Difluoromethane (HFC-32) 50% by weight CAS No.: 000075-10-5
- Pentafluoroethane (HFC-125) 50% by weight CAS No.: 000354-33-6

2.1.2 Identification of the Type of Oil Used.

The lubricant used is polyester oil. Please refer to the information provided on the compressor data plate.



For further information regarding the characteristics of the refrigerant and oil used, refer to the safety data sheets available from the refrigerant and oil manufacturers.

Main Ecological Information Regarding the Types of refrigerants Fluids used.



ENVIRONMENTAL PROTECTION : Read the ecological information and the following instructions carefully.

2.1.3 Persistence and degradation

The refrigerants used decompose in the lower atmosphere (troposphere) relatively quickly. The decomposed products are highly dispersible and therefore have a very low concentration. They do not influence the photochemical smog which is not among the VOC volatile organic compounds (as stipulated in the guidelines to the UNECE). The constituent refrigerants of R407C (R32, R125 and R134a), do not damage the ozone layer. These substances are regulated under the Montreal Protocol (revised 1992) and regulations EC no. 2037/200 of 29 June 2000.

2.1.4 Effects of discharges

Discharges into the atmosphere of this product does not cause a long-term contamination.

2.1.5 Exposure controls and personal protection

Wear protective clothing and gloves, protect your eyes and face

2.1.6 Professional exposure limits

R410A

HFC-32 TWA 1000 ppm

HFC-125 TWA 1000 ppm

2.2 Refrigerant handling



Users and maintenance personnel must be adequately informed about the possible risks of handling potentially toxic substances. Failure to follow such instructions can cause damage to personnel or to the unit.

2.3 Prevent inhalation of high vapor concentration

Atmospheric concentrations of refrigerant must be minimized and kept to a level that is below the occupational exposure limit. Vapor is heavier than air and can form dangerous concentrations near the ground where the ventilation rate is lower. Always ensure adequate ventilation. Avoid contact with open flames and hot surfaces as this can cause toxic and irritating decomposition products to form. Avoid contact between liquid refrigerant and the eyes or skin.

2.4 Procedures to be adopted in the event of accidental release of refrigerant

Ensure suitable personal protection (especially respiratory protection) during cleaning operations.

If deemed safe, isolate the source of the leak. If the leakage is small and if adequate ventilation is provided, allow the refrigerant to evaporate. If the loss is substantial ensure that measures are taken to adequately ventilate the area.

Contain spilled material with sand, earth or other suitable absorbent material.

Do not allow the refrigerant to enter drains, sewers or basements, as pockets of vapor can form.

2.5 Main Toxicological Information Regarding the Type of refrigerant used

2.5.1 Inhalation

A high atmospheric concentration can cause anaesthetic effects with possible loss of consciousness. Prolonged exposure may lead to irregular heartbeat and cause sudden death. Higher concentrations may cause asphyxia due to the reduced oxygen content in the atmosphere.

2.5.2 Contact with skin

Splashes of nebulous liquid can produce frostbite. Probably not hazardous if absorbed through the skin. Repeated or prolonged contact may remove the skin's natural oils, with consequent dryness, cracking and dermatitis.

2.5.3 Contact with eyes

Splashes of liquid may cause frostbite.

2.5.4 Ingestion

While highly improbable, may produce frostbite.

2.6 First Aid Measures



Adhere scrupulously to the warnings and first aid procedures indicated below.

2.6.1 Inhalation

Move the person away from the source of exposure, keep him/her warm and let him/her rest. Administer oxygen if necessary. Attempt artificial respiration if breathing has stopped or shows signs of stopping. If the heart stops, perform external heart massage. Seek medical assistance.

2.6.2 Contact with skin

In case of contact with skin, wash immediately with lukewarm water. Thaw tissue using water. Remove contaminated clothing. Clothing may stick to the skin in case of frostbite. If irritation, swelling or blisters appear, seek medical assistance.

2.6.3 Contact with eyes

Rinse immediately using an eyewash or clean water, keeping eyelids open, for at least ten minutes. Seek medical assistance.

2.6.4 Ingestion

Do not induce vomiting. If the injured person is conscious, rinse his/her mouth with water and make him/her drink 200-300ml of water. Seek immediate medical assistance.

2.6.5 Further medical treatment

Treat symptoms and carry out support therapy as indicated. Do not administer adrenaline or similar sympathomimetic drugs following exposure, due to the risk of cardiac arrhythmia.

3. TECHNICAL CHARACTERISTICS

3.1 Unit description

The units are efficient, low-noise products designed for medium to large applications.

They are suitable for generating chilled water at temperatures in the region of 7°C, commonly used in applications with fan coils and/or air handling units.

The use of tandem scroll compressors results in high efficiencies (especially at part loads) and low noise levels, making them suitable for use in many applications.

Differing versions and a wide range of accessories, enable the optimal solution to be selected.

3.1.1 Frame

All units are made from hot-galvanised sheet steel, painted with polyurethane powder enamel and stoved at 180°C to provide maximum protection against corrosion. The frame is self-supporting with removable panels. All screws and rivets used are made from stainless steel. The standard colour of the units is RAL 9018.

3.1.2 Refrigerant circuit

The refrigerant utilised is R410A. The refrigerant circuit is assembled using internationally recognised brand name components with all brazing and welding being performed in accordance with ISO 97/23. Each refrigerant circuit is totally independent from the other. Failure of one circuit does not influence the other circuit. The refrigerant circuit includes: sight glass, filter drier, reversing valve (for reversible version only), one way valve (for reversible version only), liquid receiver (for reversible version only), Schraeder valves for maintenance and control and pressure safety device (for compliance with PED regulations).

Also available is an electronic expansion valve with electronic control which optimises the efficiency in part load conditions (option).

3.1.3 Compressors

The compressors utilised are scroll type. All compressors are fitted with a crankcase heater and each compressor has a klixon embedded in the motor winding for thermal overload protection. They are mounted in a separate compartment within the casing in order to isolate them from the condenser air stream. The crankcase heater is always energised when the compressor is in stand-by. Access to the compressor compartment is by removal of a front panel and, because they are isolated from the main airstream, maintenance of the compressors is possible whilst the unit is operating.

The compressors used are all in tandem configuration. This results in much higher efficiencies at part loads compared to units with independent refrigerant circuits.

3.1.4 Source heat exchanger

The source heat exchanger is made from 3/8" copper pipes and 0,1mm thick aluminium fins with the tubes being mechanically expanded into the aluminium fins in order to maximise heat transfer. Furthermore, the design guarantees a low air side pressure drop thus enabling the use of low rotation speed (and hence low noise) fans. The exchangers can be protected by a metallic filter that is available as an accessory.

3.1.5 Fans

The fans are direct drive axial type with aluminium aerofoil blades, are statically and dynamically balanced and are supplied complete with a safety fan guard complying with the requirements of EN 60335. They are fixed to the unit frame via rubber anti-vibration mountings. The electric motors used are 6 pole (about 900 rpm) in the low noise versions and 8 pole (about 750 rpm) in the extra low noise versions. The motors are fitted with integrated thermal overload protection and have a moisture protection rating of IP 54.

3.1.6 User heat exchangers

The user heat exchanger is a braze welded, plate type heat exchanger, manufactured from AISI 316 stainless steel. Models 039 to 162 have a single water side circuit and from size 190 a double circuit "cross flow" type is used. Utilisation of this type of exchanger results in a massive reduction of the refrigerant charge of the unit compared to a traditional shell-in-tube evaporator. A further advantage is a reduction in the overall dimensions of the unit. The user heat exchangers are factory insulated with flexible close cell material and can be fitted with an antifreeze heater (accessory). Each user heat exchanger is fitted with a temperature sensor on the discharge water side for antifreeze protection.

3.1.7 Electric enclosure

The enclosure is manufactured in order to comply with the requirements of the electromagnetic compatibility standards CEE 73/23 and 89/336. Access to the enclosure is achieved by removing the front panel of the unit. All LDA units have fitted as standard, a sequence relay that disables the power supply in the event that the phase sequence is incorrect (scroll compressors can be damaged if they rotate in the wrong direction). The following components are supplied as standard on all units: main switch, thermal overloads (protection of pumps and fans), compressor fuses, control circuit automatic breakers, compressor contactors, fan contactors and pump contactors. The terminal board has volt free contacts for remote ON-OFF, summer / winter change over (reversible version only) and general alarm.

3.1.8 Microprocessors

All LDA units are supplied as standard with microprocessor controls. The microprocessor controls the following functions: control of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, volt free contact for remote general alarm, alarms and operation LED's. If required (available as an option), the microprocessor can be configured in order for it to connect to a site BMS system thus enabling remote control and management. The Hidros technical department can discuss and evaluate, in conjunction with the customer, solutions using MODBUS protocols.

3.1.9 Control and protection devices

All units are supplied with the following control and protection devices: Return water temperature sensor installed on the return water line from the building, antifreeze protection sensor installed on the outlet water temperature, high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection and flow switch.

3.2 Other versions

3.2.1 Units with integrated hydraulic kit, tank & pump (A1ZZ)

The units have available, as an option, a built in hydraulic kit that includes:

Water tank in different sizes (depending on the size of the unit) factory insulated with flexible close cell material and prepared for the installation of an antifreeze kit (option) and a water pump, centrifugal type, suitable for chilled water operation. The pump is directly controlled by the microprocessor.

The water tank is installed on the hot water outlet water side in order to minimize fluctuations in the water temperature due to the compressors cycling at part load conditions.

Also provided in the hydraulic circuit are an expansion vessel, pressure relief valve and system isolating valves with fittings.

3.2.2 Units with integrated hydraulic kit, pump no tank (A1NT-A2NT)

The units have available, as an option, a built in hydraulic kit that incorporates a water pump, centrifugal type, suitable for chilled water operation. The pump is directly controlled by the microprocessor.

Also provided in the hydraulic circuit are an expansion vessel, pressure relief valve and system isolating valves with fittings.

3.2.3 Hydraulic kit version (A0NP)

The hydraulic kit includes:

Water tank with different sizes (depending on the unit model) factory insulated with flexible close cell material and prepared for the installation of antifreeze kit (option). The installation of the water tank on the water outlet water side keeps constant, for a period of time, the user water temperature when the compressors are Off, while this can not be obtained if the water tank is installed on the return water side from the system. In the hydraulic circuit are also present the expansion vessel, the safety valve and the eventual manual valves with fittings.

3.2.4 Extra low noise version (XL)

The extra low noise version is especially designed to be installed in applications where the sound level is the most important key. The units are built with a special insulation of the compressor box and oversized condensing coils. The units are also equipped with low rpm fan motors (8 poles).

3.2.5 Moto condensing unit (CN)

The Moto-condensing unit (CN versions) must be connected to the indoor unit through refrigerant lines. Moto-condensing are supplied without refrigerant charge, but with one nitrogen charge only.

3.2.6 Reversible version (HP)

The reversible versions are equipped with a reversible 4-way reversible cycle valve and are suitable for hot water production at temperatures up to 45 ° - 50 ° C. They are always supplied with liquid receiver and bi-directional thermostatic valve. The microprocessor is set to automatic defrost (enabled in harsh environments) and summer/winter commutation.

3.2.7 Free cooling and freecooling 100% versions (FC - FC100%)

If there is a requirement for the chiller to operate all year round it is possible to generate the chilled water by free cooling. The free cooling version has an extra coil through which the system water is passed if the ambient temperature is low enough to remove energy from it. This is especially useful with modern, low energy cooling systems such as high temperature fan coils, chilled beams or ceilings. If the return water temperature is, for example, 16°C, and the flow required is 12°C then it can be seen that if the ambient is below 16°C some of the cooling can be performed by free cooling. If the ambient is below 12°C most, if not all, of the cooling can be provided by free cooling. This process makes substantial energy savings and results in correctly designed water systems being among the most energy efficient available.

Free Cooling is available in 2 different versions:

FC; Standard Free Cooling capacity;

FC100; Enhanced Free Cooling capacity that is capable of providing 100% of the chiller capacity at low ambient conditions;

Free Cooling versions comprise the following components:

Thermal exchange coil: an air to water heat exchanger manufactured from copper tubes with aluminium fins. It is supplied with shut-off valves.

Microprocessor control: the "heart" of the system; By measurement of all the critical parameters, the controller ensures that the unit operates at maximum efficiency under all conditions.

3 way valve: this is an ON/OFF 3 way valve which either passes the water into the free cooling coil or sends it directly to the plate exchanger.

Low ambient pressure control: control of the condensing pressure of the refrigerant circuit in low external conditions is provided by this device. If free cooling is in operation, the fans must run at full speed for maximum effect. If there is insufficient duty from free cooling then the chiller circuit must also run but with the fans at full speed. This is likely to result in a low condensing pressure as the exchanger capacity is too large. The control therefore consists of several solenoid valves that can partialise the condenser coil into 1/3rd, 2/3rd's or full coil. This enables the heat transfer surface area to be reduced thereby maintaining the correct condensing pressure.

3.3 Accessories description

3.3.1 Low noise version (LS)

This version includes the complete acoustic insulation of the unit (compressor + heat exchangers vanes) with compressor jackets and insulating material made with high density media and the interposition of heavy bitumen layer.

3.3.2 Rubber vibration dampers (KAVG)

To be installed beneath the unit base and the ground to avoid the transmission of vibrations (and the noise) to the building.

3.3.3 Spring vibration dampers (KAVM)

To be installed beneath the unit base and the ground to avoid the transmission of vibrations (and the noise) to the building.

3.3.4 Antifreeze heater (RAEV)

This kit, used in units without a hydraulic kit, comprises a "self-heating" electric cable that is wrapped around the user and domestic hot water exchanger (SW6 Units only) and the water circuit pipework. This device is controlled by the microprocessor.

3.3.5 Antifreeze kit (only A1 versions) (RAES)

This kit, used on units fitted with a hydraulic kit, comprises a “self-heating” electric cable that is wrapped around the user and domestic hot water exchanger (SW6 Units only), the water circuit pipework and includes an armoured electric heater that is fitted inside the water tank. This device is controlled by the microprocessor.

3.3.6 Pressure gauges (MAML)

These enable the standing charge and the operating pressures to be monitored.

3.3.7 Condensing coil protection mesh with metallic filter (FAMM)

This protects the condensing coil from accidental damage and from weather events (hail). It also prevents leaves, paper and debris from collecting at the coil, thus reducing maintenance.

3.3.8 Electronic soft starter (DSSE)

The soft starter reduces the peak starting current down to maximum 40% of the nominal peak value. The device can only be installed in the factory.

3.3.9 Remote control panel (PCRL)

This panel can be mounted up to 50m (maximum) from the unit and replicates all of the control functions. It is connected using a twin cable of 2.5 mm² section.

3.3.10 RS485 serial interface card modbus protocol (INSE)

This controller card enables the controller to communicate with other devices on a BMS using Modbus protocol.

3.3.11 Condensate discharge drip tray with antifreeze heater (BRCA)

Installed under the finned heat exchanger, this is used to collect the condensate generated during the heating mode operation. It is fitted with trace heating to prevent ice formation in low ambient conditions. This accessory may only be factory fitted.

3.3.12 Electronic expansion valve (VTEE)

The electronic expansion valve enables the maximum possible efficiency to be achieved by maximising the evaporator heat exchange, minimising the reaction time to load variations and optimising the superheat. It is strongly recommended for use in systems that will experience large load variations.

3.3.13 Thermostatic Valve (VTER) (Only with CN version)

The use of this valve allows you to adjust the heating exchange at the user exchange, response times to load changes and the management of overheating granting the maximum energy efficiency possible.

3.3.14 Fan speed control (DCCF)

This device allows unit operation, in cooling mode, under low ambient temperature (below 20°C), by reducing condenser air flow and obtaining in this way permissible operating parameters. This device can be used as well to reduce unit sound level emission when ambient temperature is decreasing (i.e. during night time). Fan speed control is factory pre-set. The values must never be modified.

3.3.15 Partial heat recovery (RP00)

Made by a braised plates exchanger in steel inox AISI 316, that can recover around the 20% of the thermal load to the condenser.

3.3.16 Liquid line solenoid valve (VSLI) (Standard for HP units)

When the unit is in stand-by mode, it avoids the translation of the liquid freon toward the compressor.

3.5 Technical data

LDA ÷ LDA/HP Versions		039	045	050	060	070	080	090	110	120	130	152
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	40,2	45,3	54,6	60,9	67,6	79,3	90,1	99,4	113,0	124,6	150
Total input power ⁽¹⁾	kW	14,0	15,9	18,7	21,3	23,1	27,3	31,3	34,5	38,5	44,2	49,8
E.E.R. ⁽¹⁾	W/W	2,9	2,9	2,9	2,8	2,9	2,9	2,9	2,9	2,9	2,8	3,0
Heating capacity ⁽²⁾	kW	44,0	48,9	58,9	67,8	77,2	87,8	104,5	113,5	128,1	139,3	162,8
Total input power ⁽²⁾	kW	10,8	12,0	14,1	15,8	17,5	20,7	24,1	27,0	30,0	33,0	38,8
C.O.P. ⁽²⁾	W/W	4,1	4,0	4,2	4,3	4,4	4,2	4,3	4,2	4,3	4,2	4,2
Heating capacity ⁽³⁾	kW	43,2	48,0	57,4	66,0	75,2	85,6	101,7	110,7	125,2	136,6	159,0
Total input power ⁽³⁾	kW	13,1	14,7	17,4	19,4	21,5	24,9	29,0	32,5	36,0	40,0	46,8
C.O.P. ⁽³⁾	W/W	3,3	3,3	3,3	3,4	3,5	3,4	3,5	3,4	3,5	3,4	3,4
Max input current	A	34,6	44,6	46,6	55,6	64,6	70,6	77,9	83,9	92,4	100,9	119,1
Peak current	A	113,6	134,6	142,6	164,6	173,6	210,6	262,9	268,9	315,9	324,4	363,7
Power supply		400/3+N/50				400/3/50						
Air flow	m ³ /h	10800	10800	18800	18800	18000	17280	28080	27000	25920	25920	36000
Fans	n°x kW	2x0,5	2x0,5	2x0,69	2x0,69	2x0,69	2x0,69	3x0,69	3x0,69	3x0,69	3x0,69	4x0,69
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1	1	1
Sound power level ⁽⁴⁾	dB(A)	77	77	79	79	80	80	82	82,5	82,9	83,1	83,5
Sound pressure level ⁽⁵⁾	dB(A)	49	49	51	51	52	52	54	54,5	54,9	55,1	55,5
Water pump	kW	1,3	1,3	1,5	1,5	1,5	1,5	1,5	1,9	1,9	1,9	2,2
Water tank	lt.	180	180	300	300	300	300	500	500	500	500	500
Expansion vessel	lt.	8	8	8	18	18	18	18	18	18	18	18

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, input/output heat exchanger user 12/7°C.

(2) Heating: Ambient temperature 30/35°C, external air 7°C dry bulb, 6°C wet bulb.

(3) Heating: Ambient temperature 40/45°C, external air 7°C dry bulb, 6°C wet bulb.

(4) Sound power level in accordance with ISO 9614 (LS version).

(5) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

LDA ÷ LDA/HP Versions		162	190	210	240	260	300	320	380	430	500
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	166,8	184,9	202,2	232,4	260,6	314,7	343,0	383,7	454,0	497,0
Total input power ⁽¹⁾	kW	52,8	67,3	78,3	84,9	92,1	103,1	116,9	140,9	161,2	176,0
E.E.R. ⁽¹⁾	W/W	3,1	2,7	2,6	2,7	2,8	3,0	2,9	2,7	2,8	2,8
Heating capacity ⁽²⁾	kW	176,6	194,9	210	252,6	271,7	331,2	362,9	422,6	488,8	529,3
Total input power ⁽²⁾	kW	42,8	50,0	55,0	64,0	71,0	87,0	95,0	114,0	126,0	139,0
C.O.P. ⁽²⁾	W/W	4,1	3,9	3,8	3,9	3,8	3,8	3,8	3,7	3,9	3,8
Heating capacity ⁽³⁾	kW	173,3	190,6	206,3	246,5	266,5	323,2	355,2	412,3	476,7	519,0
Total input power ⁽³⁾	kW	51,8	59,4	66,0	77,0	85,0	105,0	114,0	135,0	151,0	168,0
C.O.P. ⁽³⁾	W/W	3,3	3,2	3,1	3,2	3,1	3,1	3,1	3,1	3,2	3,1
Max input current	A	136	160,9	172,9	194,2	211,2	253,6	287,4	325,4	376,1	426,8
Peak current	A	380,6	345,9	357,9	417,7	434,7	498,2	532	548,9	620,7	671,4
Power supply		400/3/50									
Air flow	m ³ /h	36000	48600	48600	64800	64800	97200	97200	129600	129600	129600
Fans	n°x kW	4x0,69	3x2	3x2	4x2	4x2	6x2	6x2	8x2	8x2	8x2
Compressors	n°	2	4	4	4	4	4	4	6	6	6
Refrigerant circuit	n°	1	2	2	2	2	2	2	2	2	2
Sound power level ⁽⁴⁾	dB(A)	84	86	86	89	89	90	90	91	91	91
Sound pressure level ⁽⁵⁾	dB(A)	56	58	58	61	61	62	62	63	63	63
Water pump	kW	2,2	3,0	3,0	4,0	4,0	5,5	5,5	7,5	7,5	7,5
Water tank	lt.	500	600	600	600	600	1000	1000	1000	1000	1000
Expansion vessel	lt.	18	18	18	18	18	24	24	24	24	24

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, input/output heat exchanger user 12/7°C.

(2) Heating: Ambient temperature 30/35°C, external air 7°C dry bulb, 6°C wet bulb.

(3) Heating: Ambient temperature 40/45°C, external air 7°C dry bulb, 6°C wet bulb.

(4) Sound power level in accordance with ISO 9614 (LS version).

(5) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

Versioni LDA /XL÷ LDA/HP/XL		060	070	080	090	110	120	130	152	162	190	210	
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	
Cooling capacity ⁽¹⁾	kW	61,3	68,4	81,0	90,7	100,5	114,8	127,0	146,5	162,5	179,8	196,4	
Total input power ⁽¹⁾	kW	21,7	23,3	27,0	31,8	34,7	38,4	43,8	51,7	57,2	67,7	79,4	
E.E.R. ⁽¹⁾	W/W	2,8	2,9	3,0	2,8	2,9	3,0	2,9	2,8	2,8	2,6	2,5	
Heating capacity ⁽²⁾	kW	68,4	78,4	89,5	105,5	115,1	130,7	142,2	158,1	171,3	189,4	203,6	
Total input power ⁽²⁾	kW	16,4	18,2	21,4	25,0	27,9	31,0	33,9	38,9	42,9	47,9	52,9	
C.O.P. ⁽²⁾	W/W	4,1	4,3	4,2	4,2	4,1	4,2	4,2	4,1	4,0	4,0	3,9	
Heating capacity ⁽³⁾	kW	66,5	76,2	87,2	102,5	112,0	127,5	139,1	155,1	168,8	186,0	201,1	
Total input power ⁽³⁾	kW	19,9	22,1	25,6	29,8	34,0	37,9	41,0	46,9	51,9	56,9	63,9	
C.O.P. ⁽³⁾	W/W	3,3	3,4	3,4	3,4	3,3	3,4	3,4	3,3	3,2	3,3	3,1	
Max input current	A	57,8	66,8	72,8	81,2	87,2	95,7	104,2	121,1	138	157,6	169,6	
Peak current	A	166,8	175,8	212,8	266,2	272,2	319,2	327,7	365,7	382,6	342,6	354,6	
Power supply		400/3/50											
Air flow	m ³ /h	20000	20000	20000	30000	30000	30000	30000	30000	30000	30000	40000	40000
Fans	n°x kW	2x0,98	2x0,98	2x0,98	3x0,98	3x0,98	3x0,98	3x0,98	3x0,98	3x0,89	4x0,89	4x0,89	
Compressors	n°	2	2	2	2	2	2	2	2	2	4	4	
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1	2	2	
Sound power level ⁽⁴⁾	dB(A)	76	78	78	79,5	79,9	80,1	80,5	81	81,3	84	84	
Sound pressure level ⁽⁵⁾	dB(A)	48	50	50	51,5	51,9	52,1	52,5	53	53,3	56	56	
Water pump	lt.	300	300	300	500	500	500	500	500	500	600	600	
Water tank	lt.	18	18	18	18	18	18	18	18	18	18	18	

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, input/output heat exchanger user 12/7°C.

(2) Heating: Ambient temperature 30/35°C, external air 7°C dry bulb, 6°C wet bulb.

(3) Heating: Ambient temperature 40/45°C, external air 7°C dry bulb, 6°C wet bulb.

(4) Sound power level in accordance with ISO 9614.

(5) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614.

LDA/FC Versions		060	070	080	090	110	120	130	152	162
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	60,3	66,8	78,5	88,8	97,9	111,1	123,0	148,1	164,6
Total input power ⁽¹⁾	kW	21,2	23,0	27,2	31,2	34,3	38,5	44,0	49,6	54,6
E.E.R. ⁽¹⁾	W/W	2,8	2,9	2,9	2,8	2,9	2,9	2,8	3,0	3,0
Free cooling capacity ⁽²⁾	kW	51,3	51,3	51,7	76,0	74,5	75,1	76,6	104,5	106,6
Total input power ⁽²⁾	kW	1,4	1,4	1,4	2,1	2,1	2,1	2,1	2,8	2,8
Water flow ⁽²⁾	m ³ /h	10,9	12,1	14,2	16,1	17,8	20,2	22,3	26,9	29,9
Max input current	A	59,09	69,42	75,42	83,7	89,7	100,2	108,7	126,9	143,8
Peak current	A	168,09	178,42	215,42	268,7	274,7	323,7	332,2	371,5	388,4
Power supply		400/3/50								
Air flow	m ³ /h	18800	18000	17280	28080	27000	25920	25920	36000	36000
Fans	n°x kW	2x0,69	2x0,69	2x0,69	3x0,69	3x0,69	3x0,69	3x0,69	4x0,69	4x0,69
Compressors	n°	2	2	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1
Sound power level ⁽³⁾	dB(A)	79	80	80	82	82,5	82,9	83,1	83,5	84
Sound pressure level ⁽⁴⁾	dB(A)	51	52	52	54	54,5	54,9	55,1	55,5	56
Water pump	kW	1,5	2,3	2,3	2,2	2,2	3,0	3,0	3,0	3,0
Water tank	lt.	300	300	300	500	500	500	500	500	500
Expansion vessel	lt.	18	18	18	18	18	18	18	18	18

LDA/FC Versions		190	210	240	260	300	320	380	430	500
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	183,2	200,7	230,1	258,1	311,6	339,2	380,2	449,6	492,3
Total input power ⁽¹⁾	kW	67,1	77,7	84,5	91,8	102,8	116,5	140,4	160,7	175,4
E.E.R. ⁽¹⁾	W/W	2,7	2,6	2,7	2,8	3,0	2,9	2,7	2,8	2,8
Free cooling capacity ⁽²⁾	kW	134,1	136,6	164,1	168,0	241,4	246,6	313,9	326,6	332,8
Total input power ⁽²⁾	kW	6,0	6,0	8,0	8,0	12,0	12,0	16,0	16,0	16,0
Water flow ⁽²⁾	m ³ /h	33,3	36,4	41,8	46,9	56,6	61,6	69,0	81,6	89,3
Max input current	A	169,28	181,28	205,5	222,5	264,9	298,7	327,9	378,6	429,3
Peak current	A	354,28	366,28	429,0	446,0	509,5	543,3	551,4	623,2	673,9
Power supply		400/3/50								
Air flow	m ³ /h	48600	48600	64800	64800	97200	97200	129600	129600	129600
Fans	n°x kW	3x2	3x2	4x2	4x2	6x2	6x2	8x2	8x2	8x2
Compressors	n°	4	4	4	4	4	4	6	6	6
Refrigerant circuit	n°	2	2	2	2	2	2	2	2	2
Sound power level ⁽³⁾	dB(A)	86	86	89	89	90	90	91	91	91
Sound pressure level ⁽⁴⁾	dB(A)	58	58	61	61	62	62	63	63	63
Water pump	kW	4,0	4,0	5,5	5,5	5,5	5,5	11,0	11,0	11,0
Water tank	lt.	600	600	600	600	1000	1000	1000	1000	1000
Expansion vessel	lt.	18	18	18	18	24	24	24	24	24

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, input/output heat exchanger user 12/7°C, glycol 20%.

(2) Free Cooling: Ambient temperature 2°C, water inlet temperature 15°C, glycol 20%, nominal water flow, compressors off.

(3) Sound power level in accordance with ISO 9614 (LS version).

(4) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

LDA/FC Versions		060	070	080	090	110	120	130
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	63,8	71,5	85,2	93,3	103,6	118,5	132,3
Total input power ⁽¹⁾	kW	22,1	23,3	26,9	32,8	35,1	38,5	43,1
E.E.R. ⁽¹⁾	W/W	2,9	3,1	3,2	2,8	2,9	3,1	3,1
Free cooling capacity ⁽²⁾	kW	81,9	86,1	92,0	113,4	119,9	127,8	133,8
Total input power ⁽²⁾	kW	4,0	4,0	4,0	6,0	6,0	6,0	6,0
Water flow ⁽²⁾	m ³ /h	11,6	13,0	15,5	16,9	18,8	21,5	24,0
Max input current	A	65,09	74,09	80,09	90,39	97,88	106,38	114,88
Peak current	A	174,09	183,09	220,09	275,39	282,88	329,88	338,38
Power supply		400/3/50						
Air flow	m ³ /h	37200	37200	37200	55800	55800	55800	55800
Fans	n°x kW	2x2	2x2	2x2	3x2	3x2	3x2	3x2
Compressors	n°	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1
Sound power level ⁽³⁾	dB(A)	79	80	80	82	82,5	82,9	83,1
Sound pressure level ⁽⁴⁾	dB(A)	51	52	52	54	54,5	54,9	55,1
Water tank	lt.	300	300	300	500	500	500	500
Expansion vessel	lt.	18	18	18	18	18	18	18

LDA/FC Versions		152	162	190	210	240	260
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	154,1	172,4	191,5	210,4	233,3	260,5
Total input power ⁽¹⁾	kW	49,6	53,9	65,1	74,6	82,7	90,7
E.E.R. ⁽¹⁾	W/W	3,1	3,2	2,9	2,8	2,8	2,9
Free cooling capacity ⁽²⁾	kW	166,0	170,2	195,8	201,9	208,1	214,2
Total input power ⁽²⁾	kW	6,0	6,0	8,0	8,0	8,0	8,0
Water flow ⁽²⁾	m ³ /h	28,0	31,3	34,8	38,2	42,4	47,3
Max input current	A	132,6	149,5	171,57	183,57	202,58	219,58
Peak current	A	377,2	394,1	356,57	368,57	426,08	443,08
Power supply		400/3/50					
Air flow	m ³ /h	55800	55800	74400	74400	74400	74400
Fans	n°x kW	3x2	3x2	4x2	4x2	4x2	4x2
Compressors	n°	2	2	4	4	4	4
Refrigerant circuit	n°	1	1	2	2	2	2
Sound power level ⁽³⁾	dB(A)	83,5	84	86	86	89	89
Sound pressure level ⁽⁴⁾	dB(A)	55,5	56	58	58	61	61
Water tank	lt.	500	500	600	600	600	600
Expansion vessel	lt.	18	18	18	18	18	18

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, input/output heat exchanger user 12/7°C, glycol 20%.

(2) Free Cooling: Ambient temperature 2°C, water inlet temperature 15°C, glycol 20%, nominal water flow, compressors off.

(3) Sound power level in accordance with ISO 9614 (LS version).

(4) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

LDA/CN Versions		039	045	050	060	070	080	090	110	120	130	152
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	41,7	46,8	57,0	63,4	71,5	83,3	98,3	110,1	124,2	134,9	164,1
Total input power ⁽¹⁾	kW	14,2	16,0	18,9	21,5	23,4	27,8	32,2	35,8	40,1	45,6	51,3
E.E.R. ⁽¹⁾	W/W	2,9	2,9	3,0	2,9	3,1	3,0	3,1	3,1	3,1	3,0	3,2
Max input current	A	34,6	44,6	46,6	55,6	64,6	70,6	77,9	83,9	92,4	100,9	119,1
Peak current	A	113,6	134,6	142,6	164,6	173,6	210,6	262,9	268,9	315,9	324,4	363,7
Power supply		400/3+N/50				400/3/50						
Air flow	m ³ /h	10800	10800	18800	18800	18000	17280	28080	27000	25920	25920	36000
Fans	n°x kW	2x0,5	2x0,5	2x0,69	2x0,69	2x0,69	2x0,69	3x0,69	3x0,69	3x0,69	3x0,69	4x0,69
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1	1	1
Sound power level ⁽³⁾	dB(A)	77	77	79	79	80	80	82	82,5	82,9	83,1	83,5
Sound pressure level ⁽⁴⁾	dB(A)	49	49	51	51	52	52	54	54,5	54,9	55,1	55,5

LDA/CN Versions		162	190	210	240	260	300	320	380	430	500
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Cooling capacity ⁽¹⁾	kW	180,5	193,8	211,6	244,6	273,6	325,5	359,3	396,4	467,0	513,7
Total input power ⁽¹⁾	kW	56,3	66,6	77,2	84,6	91,6	104,0	118,6	142,3	162,7	178,1
E.E.R. ⁽¹⁾	W/W	3,2	2,9	2,7	2,9	3,0	3,1	3,0	2,8	2,9	2,9
Max input current	A	136,0	160,9	172,9	194,2	211,2	253,6	287,4	325,4	376,1	426,8
Peak current	A	380,6	345,9	357,9	417,7	434,7	498,2	532,0	548,9	620,7	671,4
Power supply		400/3/50									
Air flow	m ³ /h	36000	55800	55800	72000	72000	97200	97200	129600	129600	129600
Fans	n°x kW	4x0,69	3x2	3x2	4x2	4x2	6x2	6x2	8x2	8x2	8x2
Compressors	n°	2	4	4	4	4	4	4	6	6	6
Refrigerant circuit	n°	1	2	2	2	2	2	2	2	2	2
Sound power level ⁽³⁾	dB(A)	84	86	86	89	89	90	90	91	91	91
Sound pressure level ⁽⁴⁾	dB(A)	56	58	58	61	61	62	62	63	63	63

Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, evaporating temperature 5°C.

(2) Sound power level in accordance with ISO 9614 (LS version).

(3) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

LDA/CN/XL Versions		060	070	080	090	110	120	130	152	162	190	210	
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	
Cooling capacity ⁽¹⁾	kW	64,4	72,6	85,4	99,1	111,6	127,0	138,2	159,5	174,8	183,9	200,9	
Total input power ⁽¹⁾	kW	21,7	23,7	27,6	32,7	36,0	39,8	45,1	53,4	58,8	68,6	80,2	
E.E.R. ⁽¹⁾	W/W	2,9	3,1	3,1	3,0	3,1	3,2	3,1	3,0	3,0	2,7	2,5	
Max input current	A	57,8	66,8	72,8	81,2	87,2	95,7	104,2	121,1	138,0	157,6	169,6	
Peak current	A	166,8	175,8	212,8	266,2	272,2	319,2	327,7	365,7	382,6	342,6	354,6	
Power supply		400/3/50											
Air flow	m ³ /h	20000	20000	20000	30000	30000	30000	30000	30000	30000	30000	40000	40000
Fans	n° x kW	2x0,98	2x0,98	2x0,98	3x0,98	3x0,98	3x0,98	3x0,98	3x0,98	3x0,98	3x0,98	4x0,98	4x0,98
Compressors	n°	2	2	2	2	2	2	2	2	2	4	4	
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1	2	2	
Sound power level ⁽³⁾	dB(A)	76	78	78	79,5	79,9	80,1	80,5	81	81,3	84	84	
Sound pressure level ⁽⁴⁾	dB(A)	48	50	50	51,5	51,9	52,1	52,5	53	53,3	56	56	

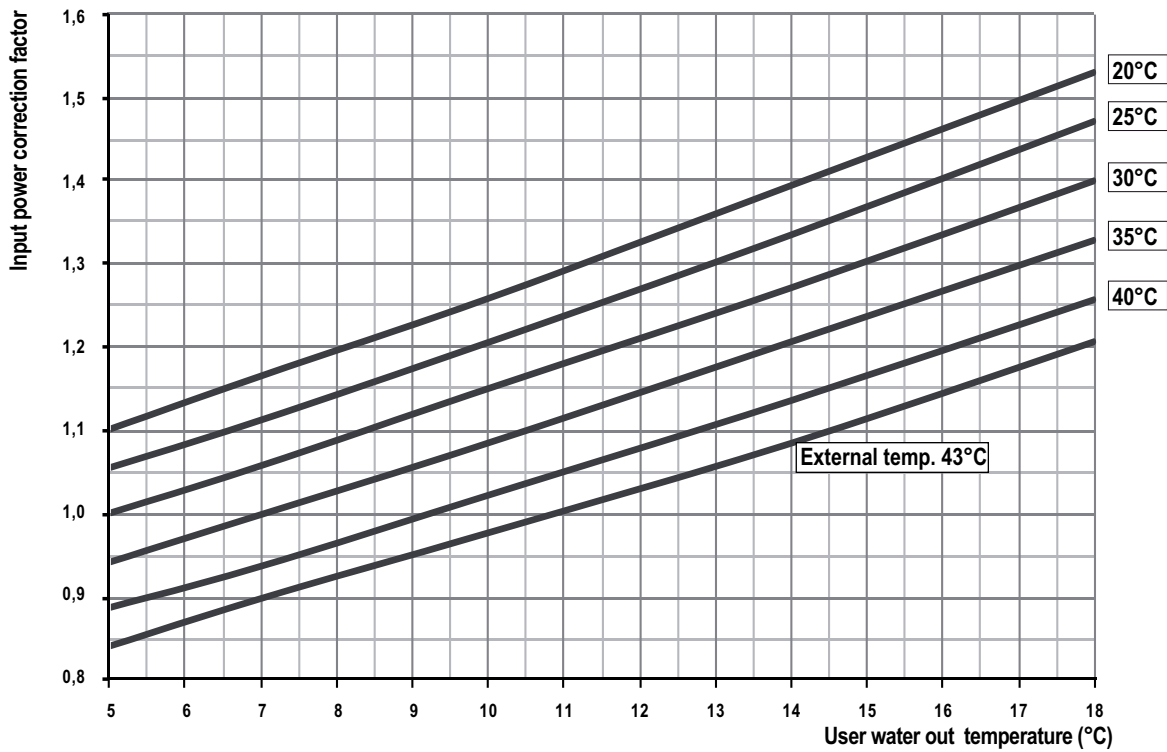
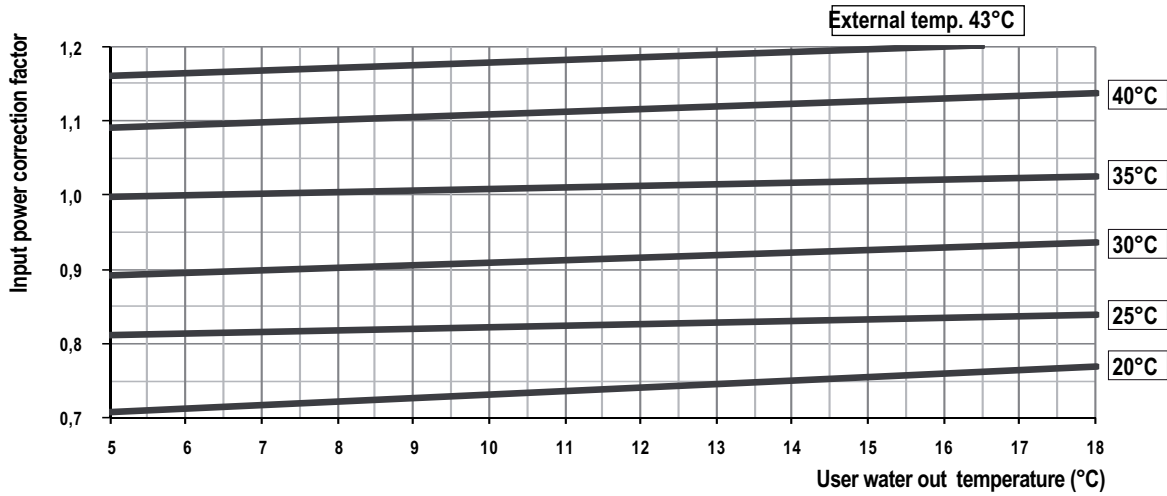
Performance refer to the following conditions:

(1) Cooling: Ambient temperature 35°C, evaporating temperature 5°C.

(2) Sound power level in accordance with ISO 9614.

(3) Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

3.4.1 LDA - Cooling capacity and compressors input power

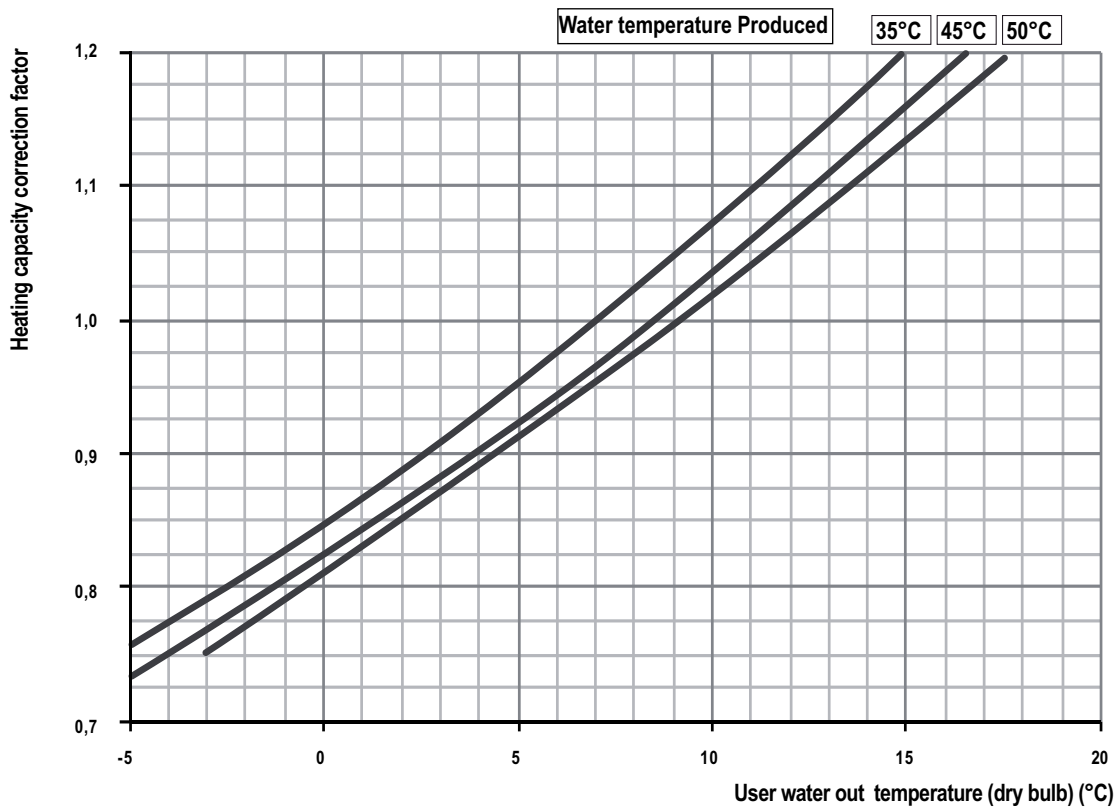
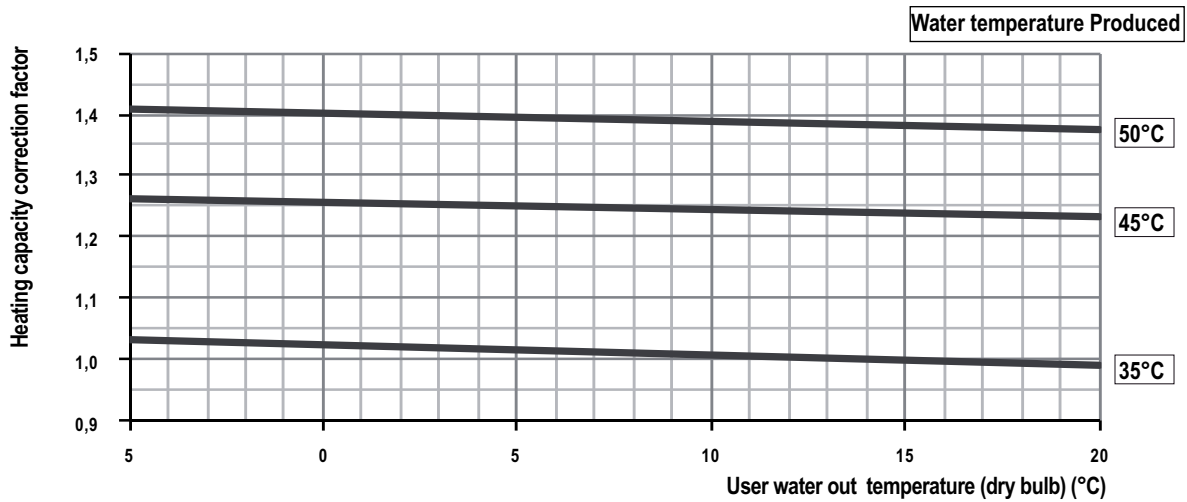


The cooling capacity of the compressor is obtained by multiplying the nominal values (PF PA), with water produced at 7 ° C, shown at page 16 and 17, for respective correction factors. For each curve, the difference between the temperature of water entering (In) and leaving (Out) the users heat exchanger is 5° C.



The data shown in the graph are generic and only intend to show the development of cooling and electrical power, in accordance with changing of working conditions. For a precise definition of the data, please refer to the Product Selection Software.

3.4.2 LDA/HP - Heating capacity and compressors input power

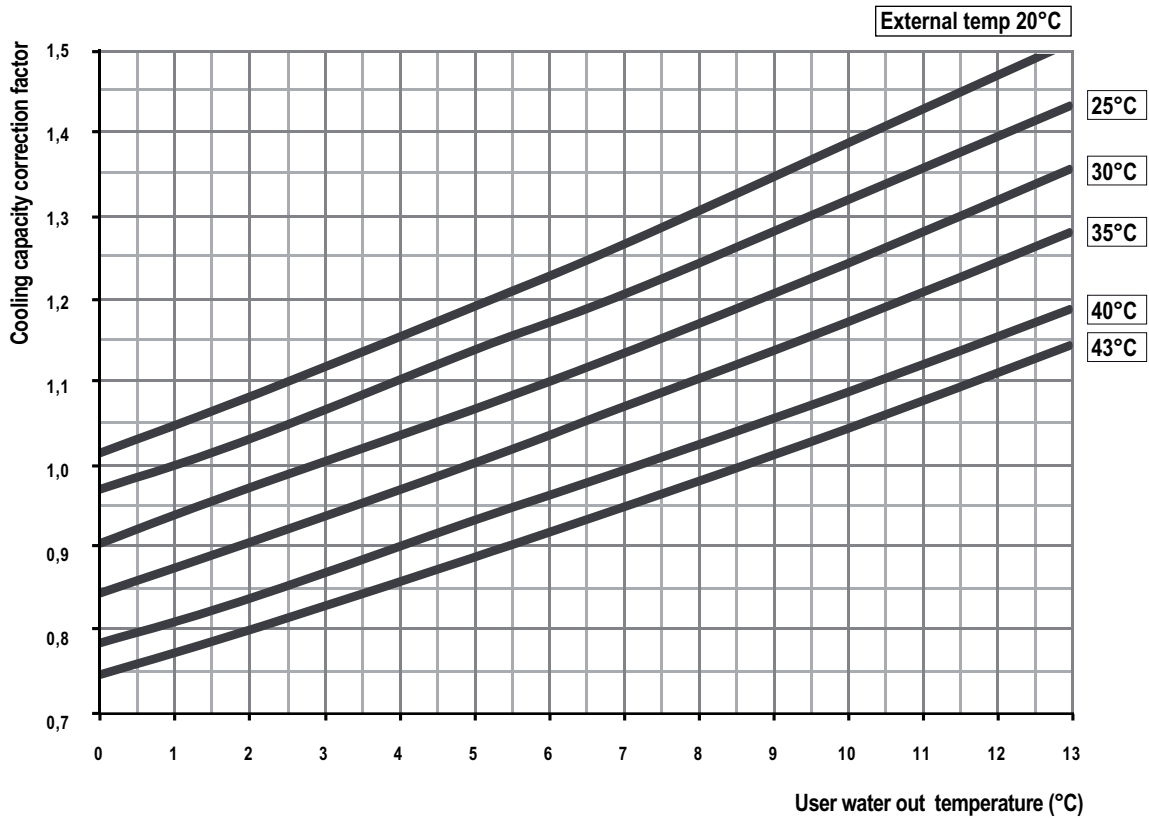
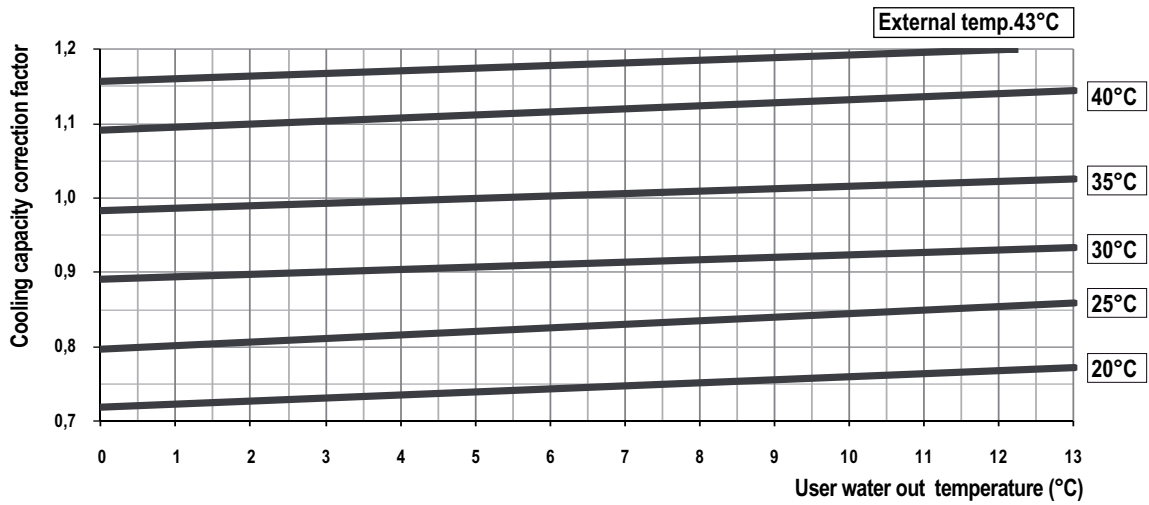


The capacity of the compressor is obtained by multiplying the nominal values (PF PA), with water produced at 7 ° C, shown at page 16 and 17, for respective correction factors. For each curve, the difference between the temperature of water entering (In)and leaving (Out) the users heat exchanger is 5° C.



The data shown in the graph are generic and only intend to show the development of cooling and electrical power, in accordance with changing of workidryng conditions. For a precise definition of the data, please refer to the Product Selection Software.

3.4.3 LDA/CN - Cooling capacity and compressors input power

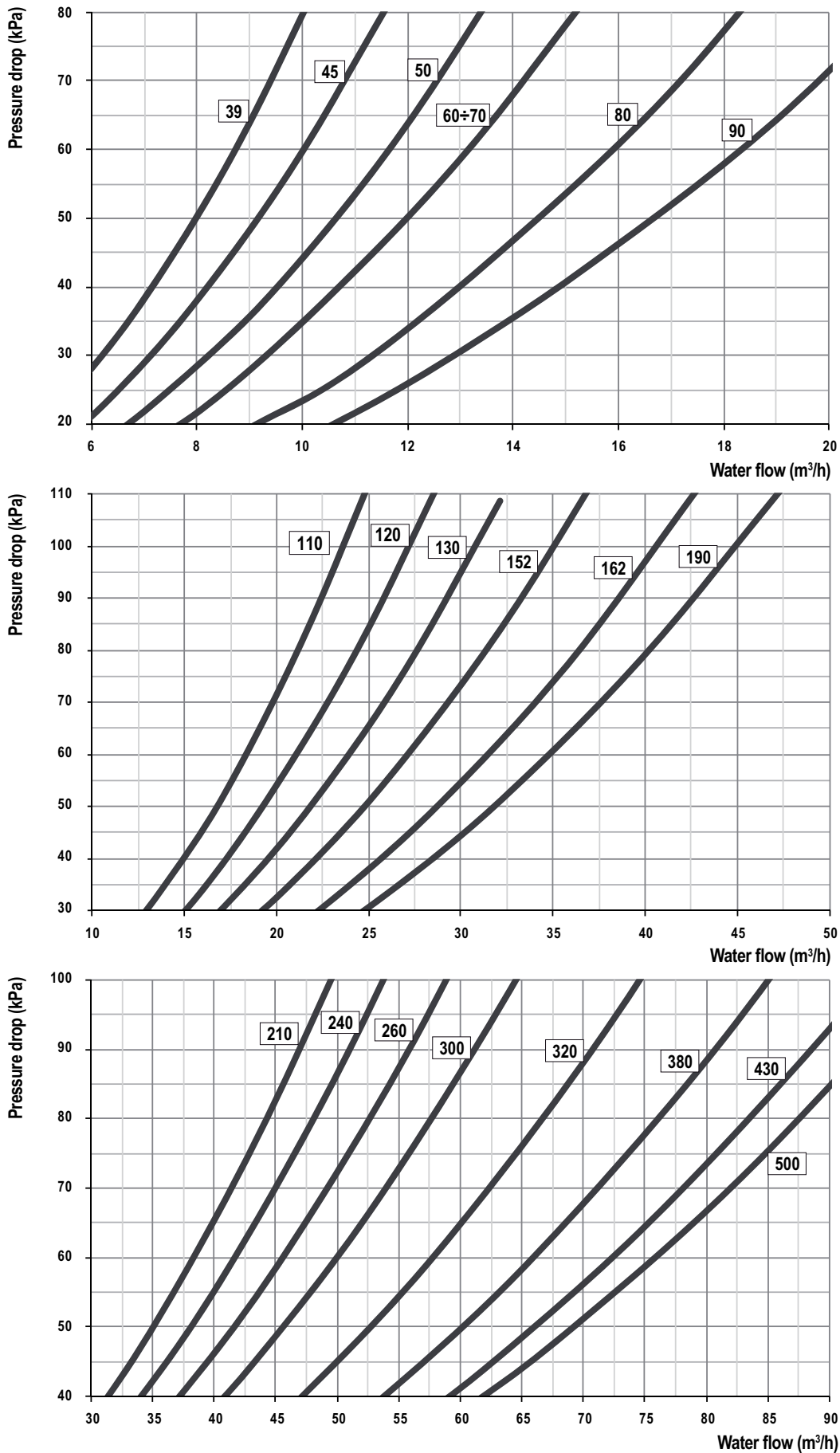


The cooling capacity of the compressor is obtained by multiplying the nominal values (PF PA), for respective correction factors.

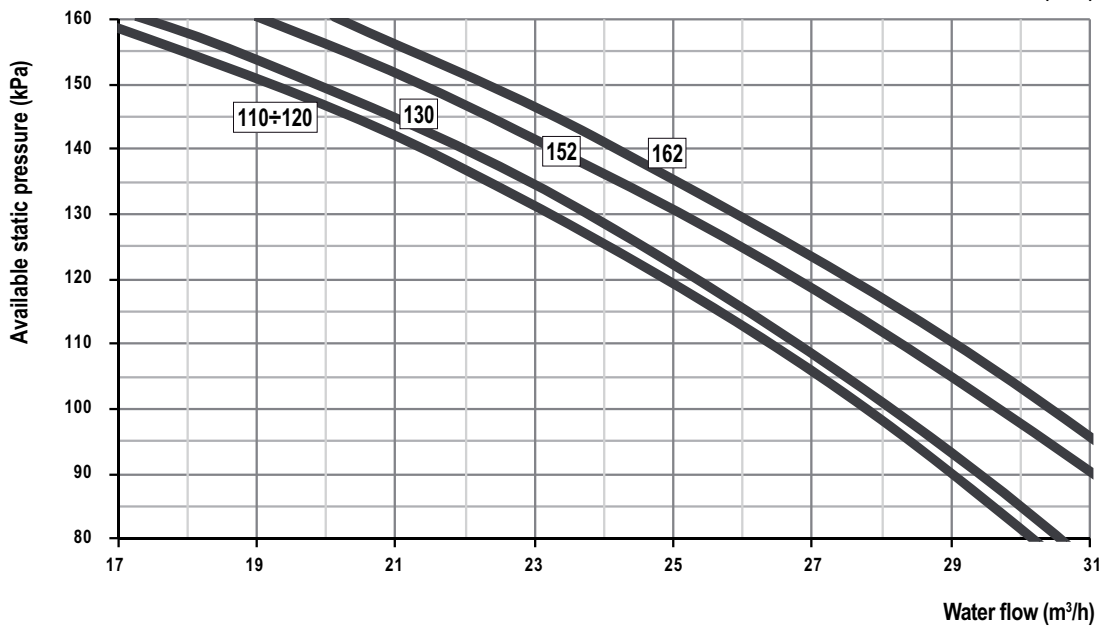
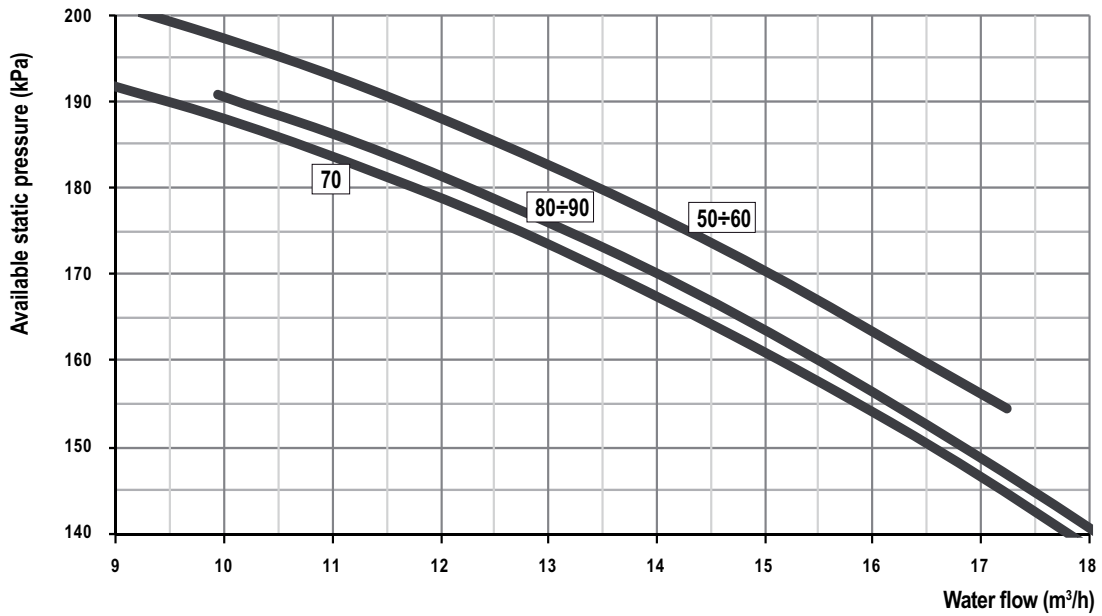
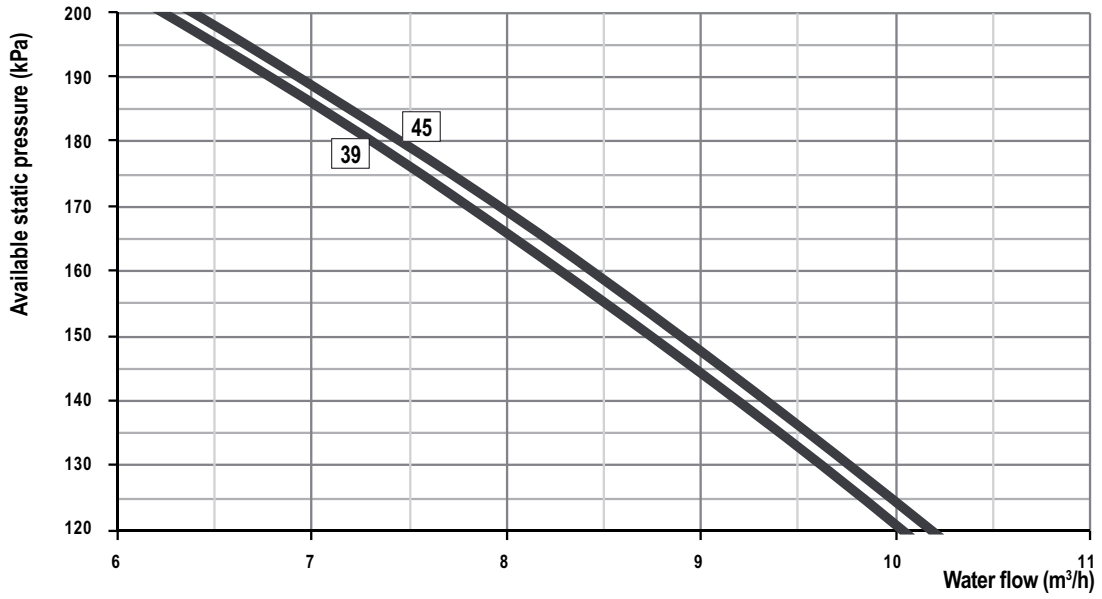


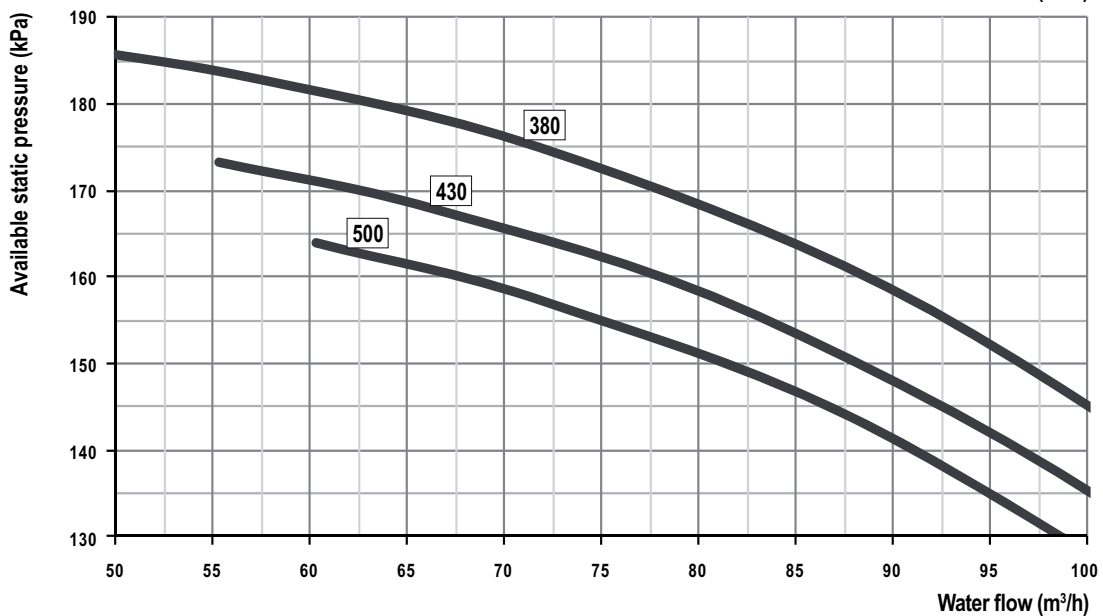
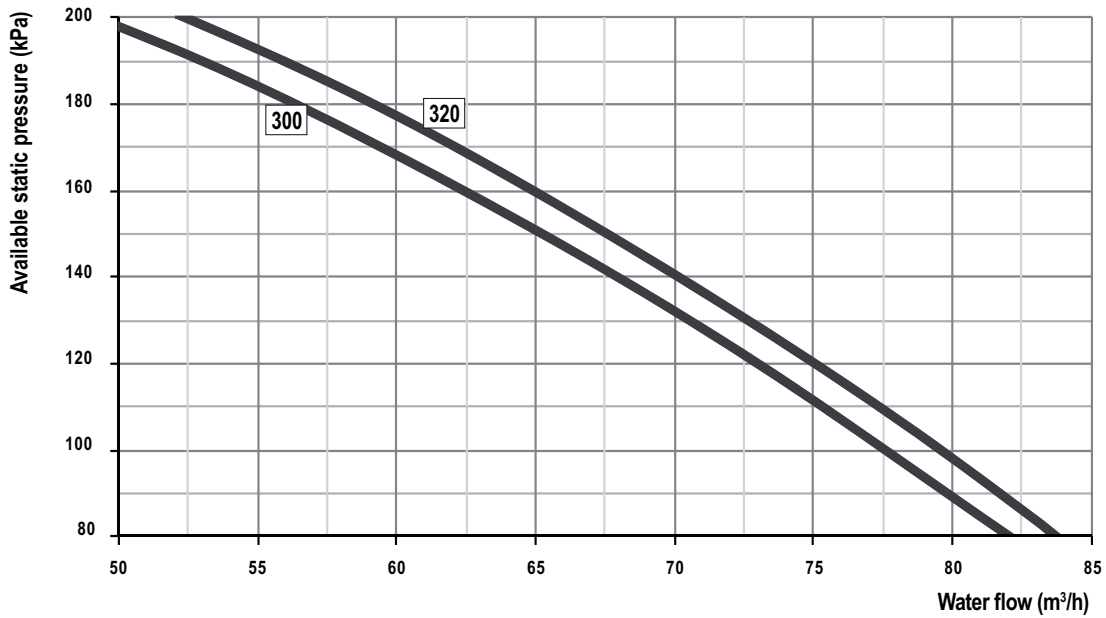
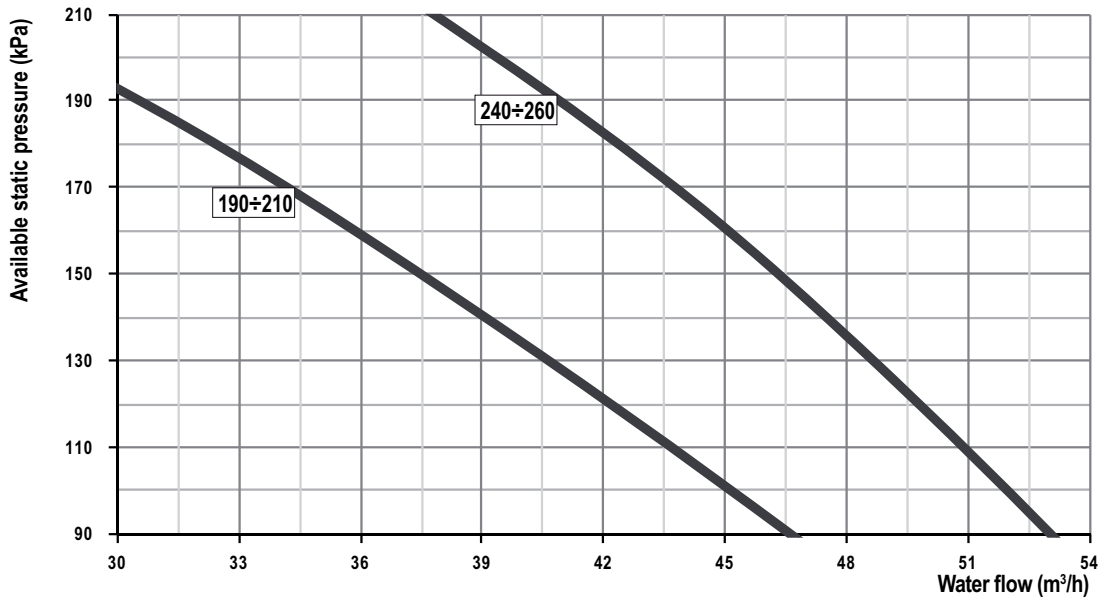
The data shown in the graph are generic and only intend to show the development of cooling and electrical power, in accordance with changing of workdryng conditions. For a precise definition of the data, please refer to the Product Selection Software.

3.4.4 User heat exchanger water pressure drops

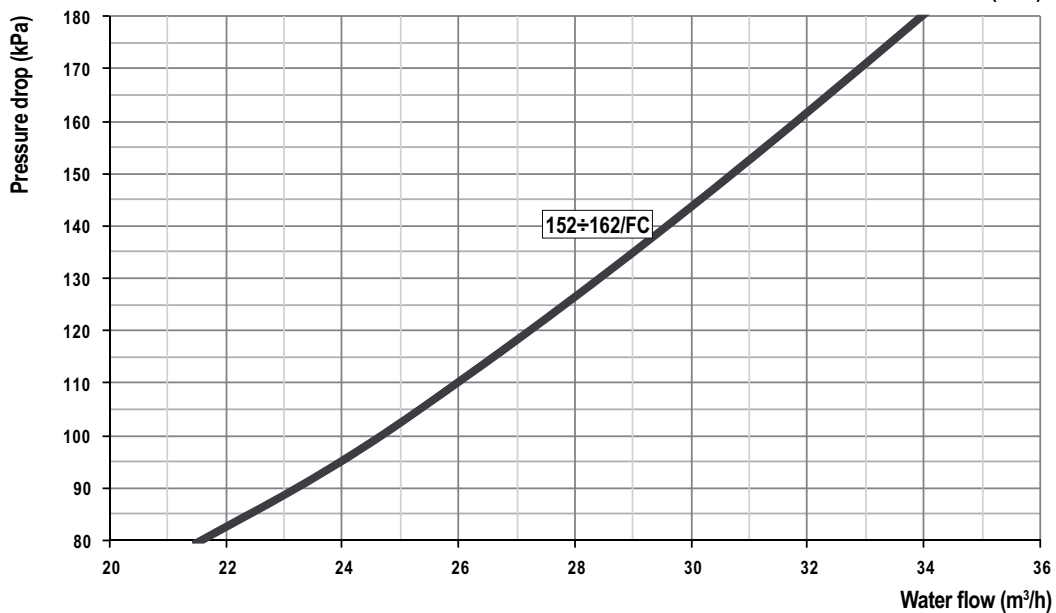
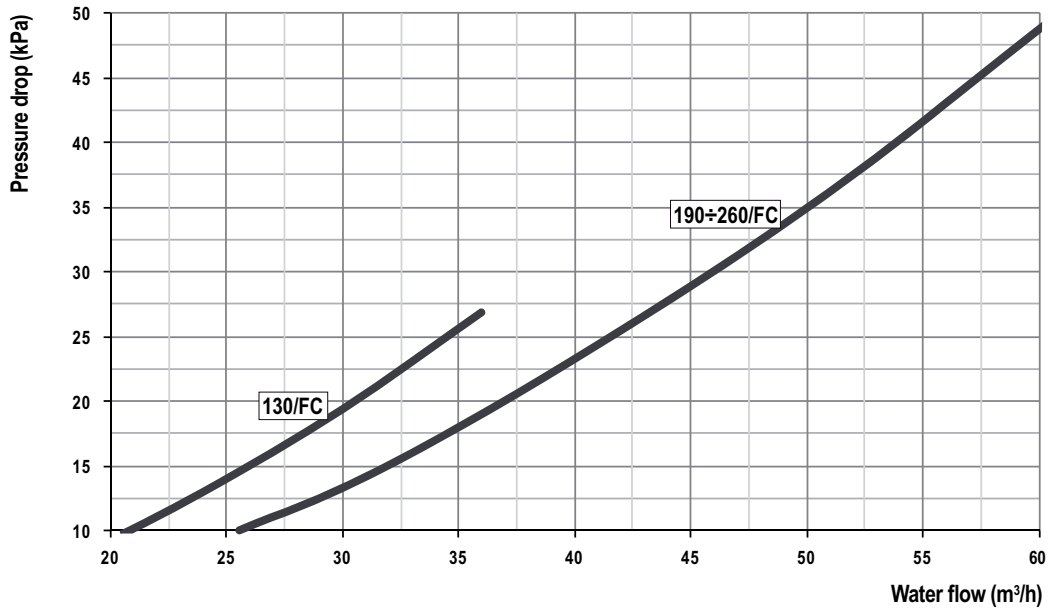
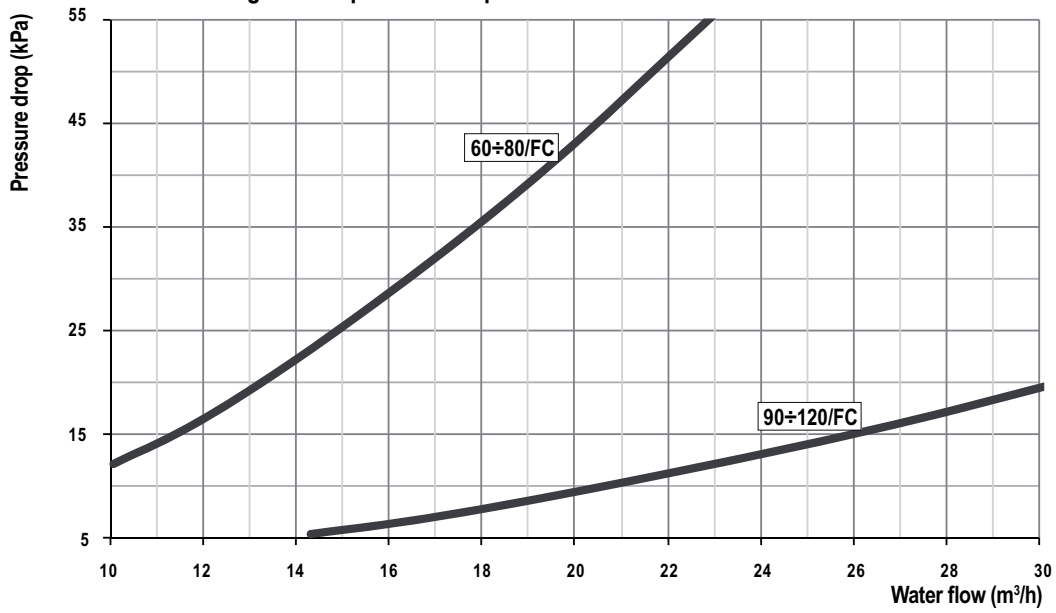


3.4.5 LDA/A1 Water pump available static pressure

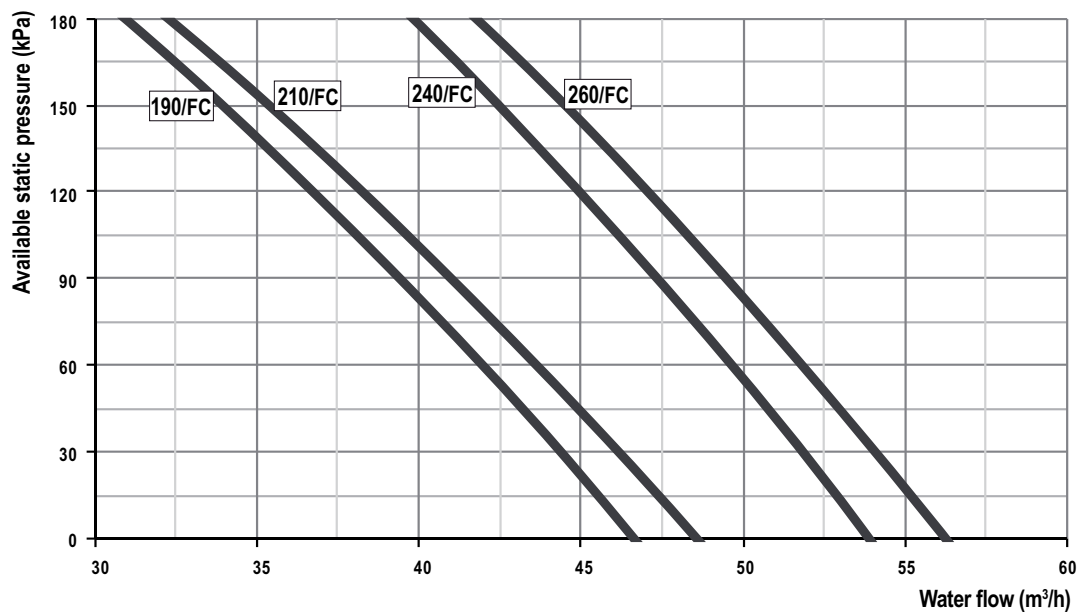
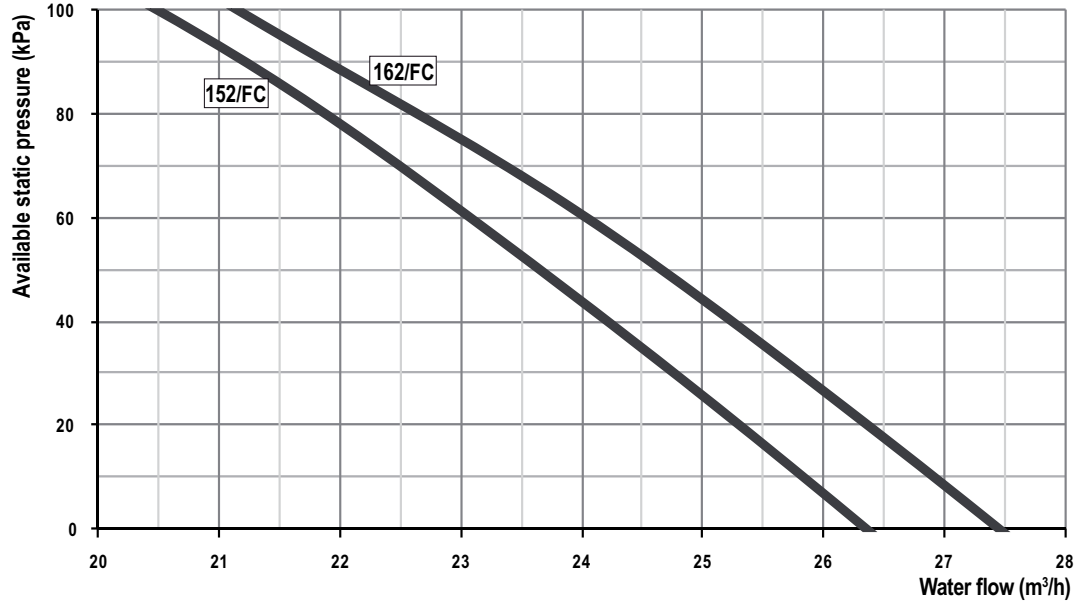
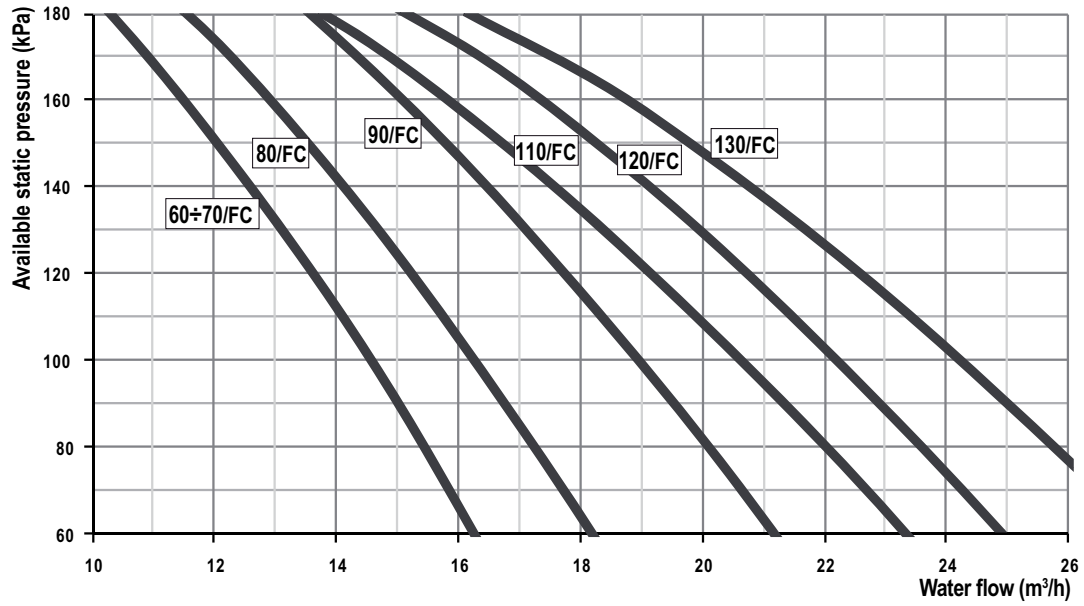




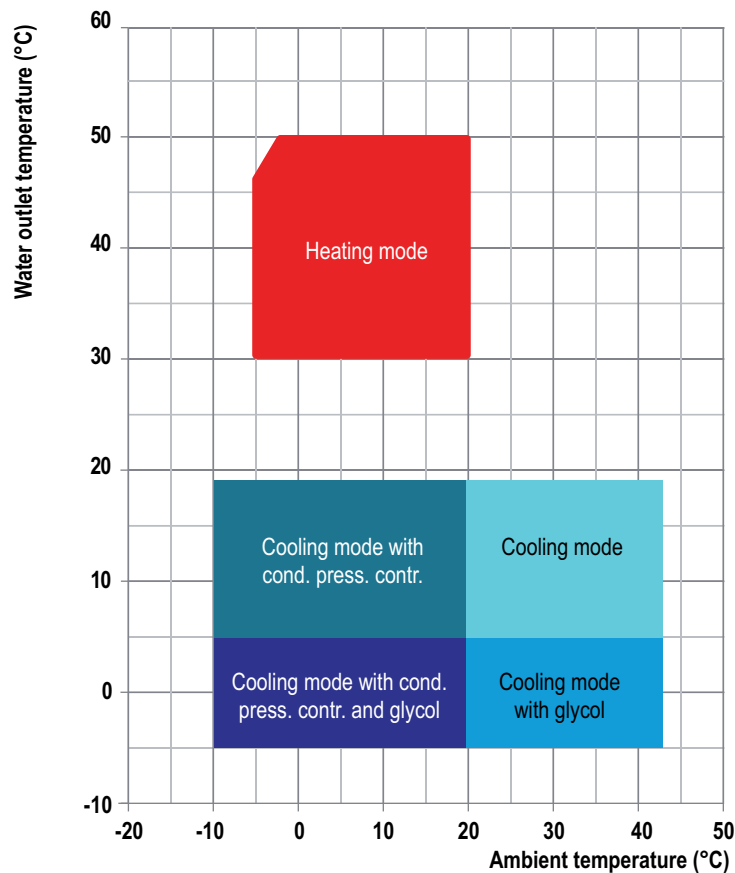
3.4.6 LDA/FC Source heat exchanger water pressure drops



3.4.7 LDA/FC Water pump available static pressure



3.5 Operational limits



3.5.1 User heat exchanger water flow rate

The nominal water flow rate provided, relates to a ΔT of 5°C. The maximum flow rate allowed is one that provides a ΔT of 3°C. Higher values may cause too high a pressure drop. The minimum water flow rate allowed is that which results in a ΔT of 8°C. Insufficient flow will result in evaporating temperatures that are too low leading to the operation of safety devices that will prevent unit operation.

3.5.2 User water temperature (Winter mode)

Once the system has reached set up, the temperature at the user exchanger cannot fall below 30 ° C, lower values may cause undesired operation of the compressor with the possibility of breakage. The maximum water temperature of the heat exchanger charges cannot exceed 50 ° C. On the contrary the action of the safety devices shut down the unit.

3.5.3 User water temperature (summer operation)

The minimum user water outlet temperature is 5°C. To operate below this limit requires modification of the unit. Should this be the case, please contact the technical support team for details.

The maximum user water outlet temperature is 18°C.

3.5.4 Ambient air temperature

The units are designed and manufactured to operate in heating mode with air temperatures from -5°C to 20°C.

In cooling mode the units can operate with air temperatures from -10°C to 43°C.



Units are designed and manufactured to European safety and technical standards. The units have been designed exclusively for heating, cooling and domestic hot water production (D.H.W.). The units must be used for this specific purpose only.

Hidros S.p.A will not be liable for claims for damage caused to persons, animals or material goods or property caused by improper installation, adjustment and maintenance or improper use. Any use not specified in this manual is prohibited.

3.6 Correction tables

3.6.1 Operation with glycol

Glycol percentage	Freezing point (°C)	CCF	IPCF	WFCF	PDCF
10	-3.2	0.985	1	1.02	1.08
20	-7.8	0.98	0.99	1.05	1.12
30	-14.1	0.97	0.98	1.09	1.22
40	-22.3	0.965	0.97	1.14	1.25
50	-33.8	0.955	0.965	1.2	1.33

CCF: Capacity correction factor

IPCF: Input power correction factor

WFCF: Water flow correction factor

PDCF: Pressure drops correction factor

The water flow rate and pressure drop correction factors are to be applied directly to the values given for operation without glycol. The water flow rate correction factor is calculated in order to maintain the same temperature difference as that which would be obtained without glycol. The pressure drop correction factor takes into account the different flow rate obtained from the application of the flow rate correction factor.

3.6.2 Correction tables different Δt

Water temperature diff.(°C)	3	5	8
CCCP	0.99	1	1.02
IPCF	0.99	1	1.01

CCCP = Cooling capacity correction factor

IPCF = Input power correction factor

3.6.3 Correction tables different Fouling factors

Fouling factor	0.00005	0.0001	0.0002
CCCP	1	0.98	0.94
IPCF	1	0.98	0.95

CCCP = Cooling capacity correction factor

IPCF = Input power correction factor

3.7 Sound data

LOW NOISE VERSION (LS)											
Mod.	Octave bands (Hz)								Lw		Lp
	63 dB	125 dB	250 dB	500 dB	1K dB	2K dB	4K dB	8K dB	dB	dB(A)	dB(A)
039	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77	49
045	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77	49
050	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79	51
060	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79	51
070	93,1	84,3	78,2	76,7	75,6	70,2	66,8	57,7	93,9	80	52
080	93,1	84,3	78,2	76,7	75,6	70,2	66,8	57,7	93,9	80	52
090	95,1	86,3	80,2	78,7	77,6	72,2	68,8	59,7	95,9	82	54
110	95,6	86,8	80,7	79,2	78,1	72,7	69,3	60,2	96,4	82,5	54,5
120	96	87,2	81,1	79,6	78,5	73,1	69,7	60,6	96,8	82,9	54,9
130	96,2	87,4	81,3	79,8	78,7	73,3	69,9	60,8	97	83,1	55,1
152	96,6	87,8	81,7	80,2	79,1	73,7	70,3	61,2	97,4	83,5	55,5
162	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	97,9	84	56
190	99,1	90,3	84,2	82,7	81,6	76,2	72,8	63,7	99,9	86	58
210	99,1	90,3	84,2	82,7	81,6	76,2	72,8	63,7	99,9	86	58
240	102,1	93,3	87,2	85,7	84,6	79,2	75,8	66,7	102,9	89	61
260	102,1	93,3	87,2	85,7	84,6	79,2	75,8	66,7	102,9	89	61
300	103,1	94,3	88,2	86,7	85,6	80,2	76,8	67,7	103,9	90	62
320	103,1	94,3	88,2	86,7	85,6	80,2	76,8	67,7	103,9	90	62
380	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91	63
430	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91	63
500	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91	63

Lw: Sound power level according to ISO 9614.

Lp: Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 9614.



The sound pressure level of the STANDARD VERSIONS without compressor jackets and compressor vane insulation is approx. 1,5 dB(A) higher than the equivalent low noise versions LS.

4. INSTALLATION

4.1 General safety guidelines and use of symbols



Before undertaking any task the operator must be fully trained in the operation of the machines to be used and their controls. They must also have read and be fully conversant with all operating instructions.



All maintenance must be performed by TRAINED personnel and be in accordance with all national and local regulations.



The installation and maintenance of the unit must comply with the local regulations in force at the time of the installation.



Avoid contact and do not insert any objects into moving parts.

4.2 Health and safety Considerations



The workplace must be kept clean, tidy and free from objects that may prevent free movement. Appropriate lighting of the work place shall be provided to allow the operator to perform the required operations safely. Poor or too strong lighting can cause risks.



Ensure that work places are always adequately ventilated and that respirators are working, in good condition and comply fully with the requirements of the current regulations.

4.3 Personal protective equipment



When operating and maintaining the unit, use the following personal protective equipment listed below as required by law.



Protective footwear.



Eye protection.



Protective gloves.



Respiratory protection.



Hearing protection.

4.4 Inspection

When installing or servicing the unit, it is necessary to strictly follow the rules reported on this manual, to conform to all the specifications of the labels on the unit, and to take any possible precautions of the case. Not observing the rules reported on this manual can create dangerous situations. After receiving the unit, immediately check its integrity. The unit left the factory in perfect conditions; any eventual damage must be questioned to the carrier and recorded on the Delivery Note before it is signed. The company must be informed, within 8 days, of the extent of the damage. The Customer should prepare a written statement of any severe damage.

Before accepting the unit check:

- The unit did not suffer any damage during transport;
- The delivered goods are conforming to what shown in the delivery note.

In Case of Damage

- List the damage on the delivery note
- Inform the Company of the extent of the damage within 8 days of receipt of the goods. After this time any claim will not be considered.
- A full written report is required for cases of severe damage.
- Take digital photographs.

4.5 Storage

Units should be stored under cover and ideally, should remain in their packaging. The tools that are supplied for opening the electrics box should be formally transferred to the person responsible for the plant.

4.6 Unpacking



Packaging could be dangerous for the operators.

It is advisable to leave packaged units during handling and remove it before the installation.
The packaging must be removed carefully to prevent any possible damage to the machine.
The materials constituting the packaging may be different in nature (wood, cardboard, nylon, etc.).



The packaging materials should be separated and sent for disposal or possible recycling to specialist waste companies.

4.7 Lifting and handling

When unloading the unit, it is strongly recommended that sudden movements are avoided in order to protect the refrigerant circuit, copper tubes or any other unit component. Units can be lifted by using a forklift or, alternatively, using belts. Take care that the method of lifting does not damage the side panels or the cover. It is important to keep the unit horizontal at all time to avoid damage to the internal components.

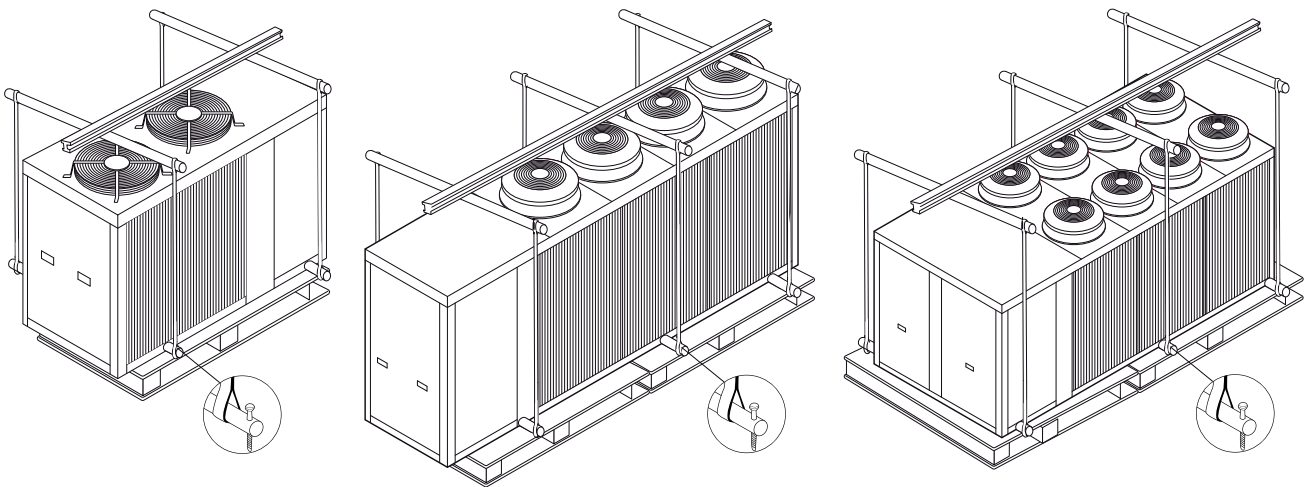


The Source heat exchangers fins are sharp. Use protection gloves.

LDA 039-045-050-060-070-080
090-110-120-130

LDA 152-162-190-210-240-260

LDA 300-320-380-430-500



4.8 Location and minimum technical clearances

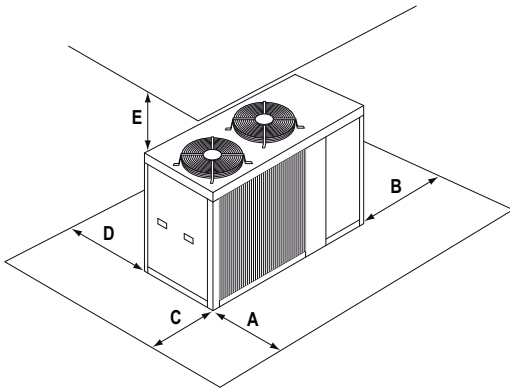


The unit has to be installed such that maintenance and repair is possible. The warranty does not cover costs for the provision of lifting apparatus, platforms or other lifting systems required to perform repairs during warranty period.

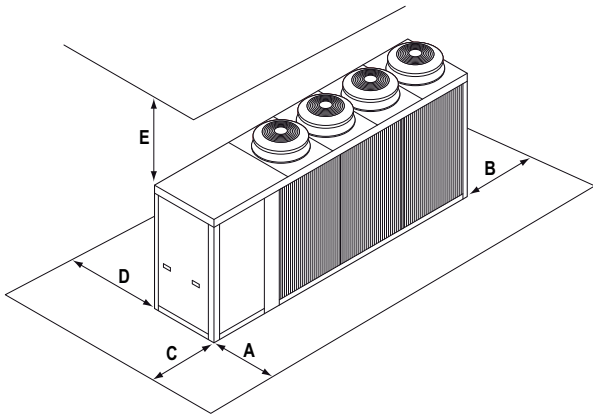


The installation site should be chosen in accordance with EN 378-1 and 378-3 standards. When choosing the installation site, all risks caused by accidental refrigerant leakage should be taken into consideration.

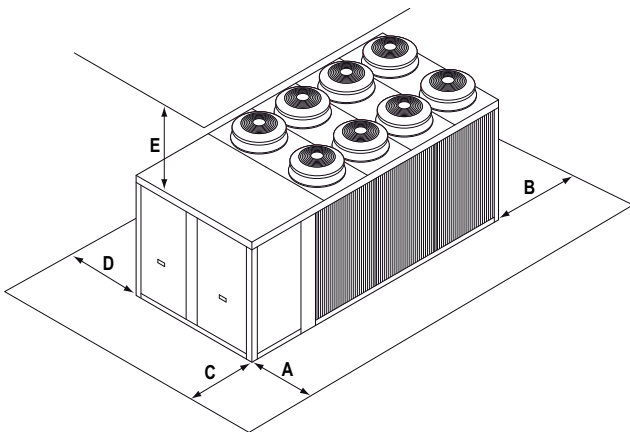
All units are designed for external installation : any overhang above the unit and location near trees, if they partially cover the unit, must be avoided in order to prevent air by-pass. It is advisable to create a proper mounting plinth, with a size similar to the unit foot-print. Unit vibration level is very low: it is advisable however, to install vibration dampers (spring or rubber) between the plinth and the unit base-frame to keep vibrations at a very low level. It is vital to ensure adequate air volume to the source fan. Re-circulation of discharge air must be avoided; failure to observe this point will result in poor performance or activation of safety controls. For these reasons it is necessary to observe the following clearances:



Mod.	A	B	C	D	E
039	1000	800	800	800	3000
045	1000	800	800	800	3000
050	1500	800	800	800	3000
060	1500	800	800	800	3000
070	1500	800	800	800	3000
080	1500	800	800	800	3000
090	1500	1000	1000	1000	3000
110	1500	1000	1000	1000	3000
120	1500	1000	1000	1000	3000
130	1500	1000	1000	1000	3000



Mod.	A	B	C	D	E
152	1500	1000	1000	1000	4000
162	1500	1000	1000	1000	4000
190	2000	1000	1000	1000	4000
210	2000	1000	1000	1000	4000
240	2000	1000	1000	1000	4000
260	2000	1000	1000	1000	4000



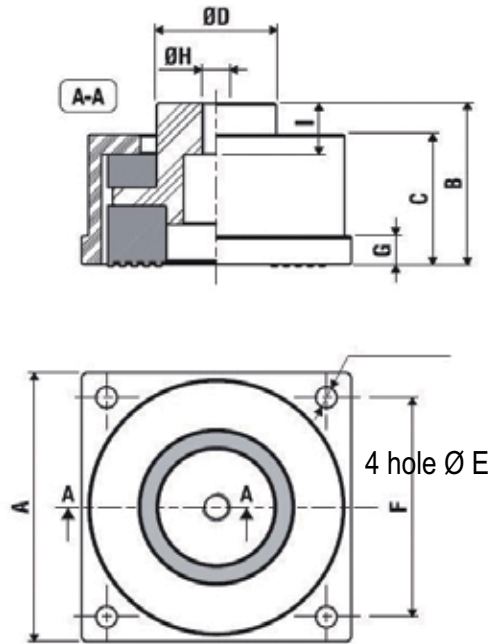
Mod.	A	B	C	D	E
300	2000	1000	2000	2000	5000
320	2000	1000	2000	2000	5000
380	2000	1000	2000	2000	5000
430	2000	1000	2000	2000	5000
500	2000	1000	2000	2000	5000



All reversible units, during defrost mode, produce condensate at the base of the source heat exchanger. If the ambient temperature is below 0°C the water may freeze, creating a thick layer of ice within the unit.

4.9 Installation of rubber vibration dampers (KAVG)

All units should be installed on vibration dampers in order to prevent the transmission of vibration to the supporting surface and reduce the noise level. Rubber vibration dampers are available as an option in the catalogue. The vibration dampers (optional) are supplied by the factory in separate packaging.



Mod.	A	B	C	ØD	ØE	F	G	H	I
LDA 039÷260	80	55	44	25	6,5	67	8	M12	41
LDA 300÷500	135	79	64	60	10,5	110	12	M14	25,5

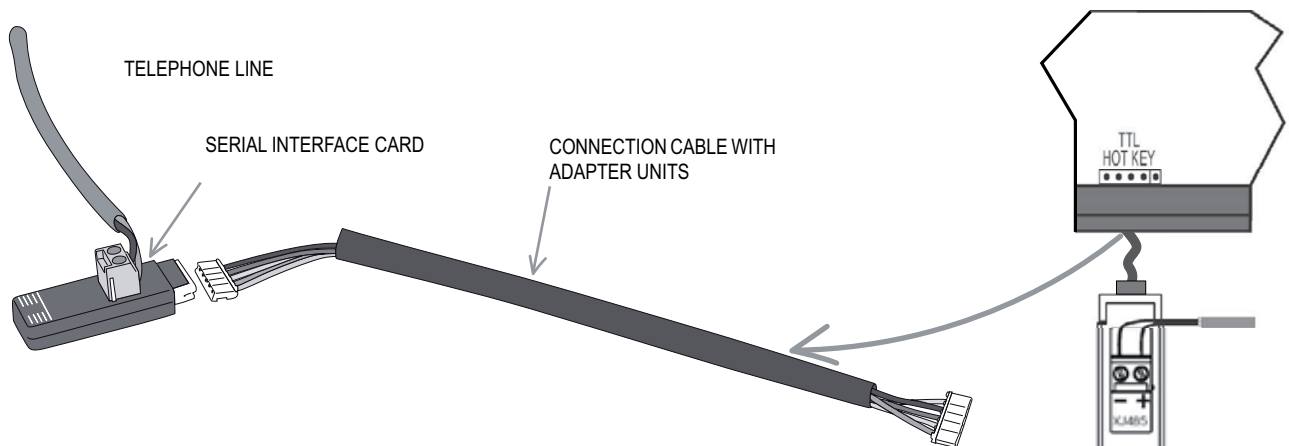
4.10 Serial interface card RS485 (INSE)

Supervision system interface serial board (MODBUS RS485 available only)

The installation of the card will allow the unit to be plugged in and connected to a system with MODBUS protocol. This system allows you to remotely monitor all parameters of the unit and change their values.

The serial interface board is normally fitted at the factory, where it is provided separately is necessary to respect the polarity of the wiring as shown in the diagram. Any reversal of polarity will result in the non-functioning unit. The supervision connectivity cable must be telephone one type 2x0, 25 mm².

The unit is configured at the factory with serial address 1. In case of using the MODBUS system, you can request the list of variables by contacting the assistance.

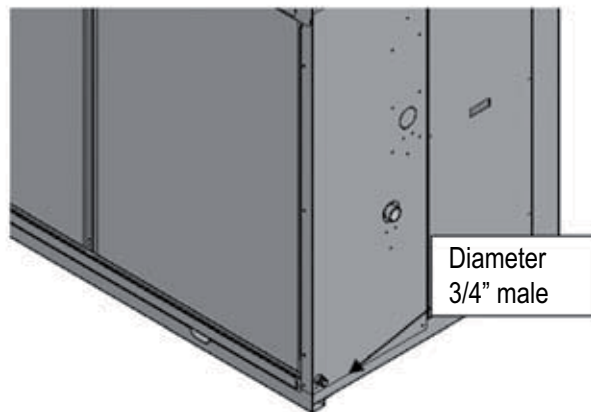


4.11 Installation of condensate drip tray (BRCA) (Only for reversible units HP)



In heating and domestic hot water mode, the unit can produce a quantity of condensate, depending upon the ambient conditions and the working hours. The standard unit has a gap between the bottom of the coil and the base frame to allow the condensate to flow through. This condensate may freeze in severe ambient conditions. The unit must therefore be installed in such a way as to prevent a slipping hazard to the user or third parties due to the presence of ice around the heat pump.

To control the discharge of the condensate generated by the heat pump, it is possible to install (as option) a drip tray that, positioned underneath the source heat exchanger (finned coil) and above the base frame, recovers all water generated by the unit when in heating and domestic hot water working mode. The drip tray is supplied with a self-heating antifreeze kit that melts the any ice present in the drip tray. The drip tray is supplied with a discharge connection that must be connected to a discharge pipe.



4.12 Hydraulic connections

The water pipe-work must be installed in accordance with national and local regulation and can be made from copper, steel, galvanized steel or PVC. The Pipework must be designed to cater for the nominal water flow and the hydraulic pressure drops of the system, a maximum pressure drop of 300 Pa/m run being typical. All pipes must be insulated with closed-cell material of adequate thickness. The hydraulic piping should includes:

- Pockets for temperature sensor to measure the temperature in the system.
- Flexible joints, to isolate the unit from the rest of the system
- Temperature and pressure gauges for maintenance and servicing operations.
- Shut-off manual valves to isolate the unit from the hydraulic circuit.
- Metallic filters to be mounted on the inlet pipe with a mesh not larger than 1 mm.
- Vent valves, expansion tank with water filling, discharge valve.



System return water must be fitted to the connection labelled: "USER WATER IN" as incorrect connection can damage the heat exchanger by freezing.



It is compulsory to install on the USER WATER IN connection, a water strainer with a mesh not larger than 1 mm. Fitting this filter is COMPULSORY and the warranty will be invalidated if it is removed. The filter must be kept clean and checked periodically.



All units are factory supplied with a flow switch; the flow switch MUST BE FITTED in the pipework connection labelled "USER WATER OUT". If the flow switch is altered, removed, or the water filter omitted on the unit, the warranty will be invalidated.



The water flow through the heat exchangers of the unit should not be fall below Δt 8°C measured at the following conditions:

Heating mode: 7°C Dry bulb ambient temperature	35°C water outlet temperature
Cooling mode: 35°C dry bulb ambient temperature	7°C water outlet temperature

4.13 Chemical characteristics of the water

The system is to be filled with clean water and vented after a full flushing operation has been performed; the water should have the following characteristics :

PH	6-8	Total Hardness	Lower Than 50 ppm
Electric conductivity	Lower Than 200 mV/cm (25°C)	Sulphur ion	None
Chlorine ions	Lower Than 50 ppm	Ammonia ion	None
Sulphuric acid ions	Lower Than 50 ppm	Silicon ion	Lower Than 30 ppm
Total Iron	Lower Than 0.3 ppm		

4.14 User circuit minimum water content



Air-to-water chillers require a minimum water content in the user hydraulic circuit to guarantee correct operation and to avoid excessive cycling of the compressors that can reduce the working life of the unit.

Model	39	45	50	60	70	80	90	110	120	130
Minimum water content (l)	300	300	350	450	500	600	650	800	900	950
Safety valve (bar)	6	6	6	6	6	6	6	6	6	6
Tank water content (solo versioni A1) (l)	180	180	180	300	300	300	500	500	500	500

Model	152	162	190	210	240	260	300	320	380	430	500
Minimum water content (l)	1100	1200	700	800	900	950	1000	1200	950	1000	1200
Safety valve (bar)	6	6	6	6	6	6	6	6	6	6	6
Tank water content (solo versioni A1) (l)	500	500	600	600	600	600	1000	1000	1000	1000	1000

4.15 Expansion tank technical data

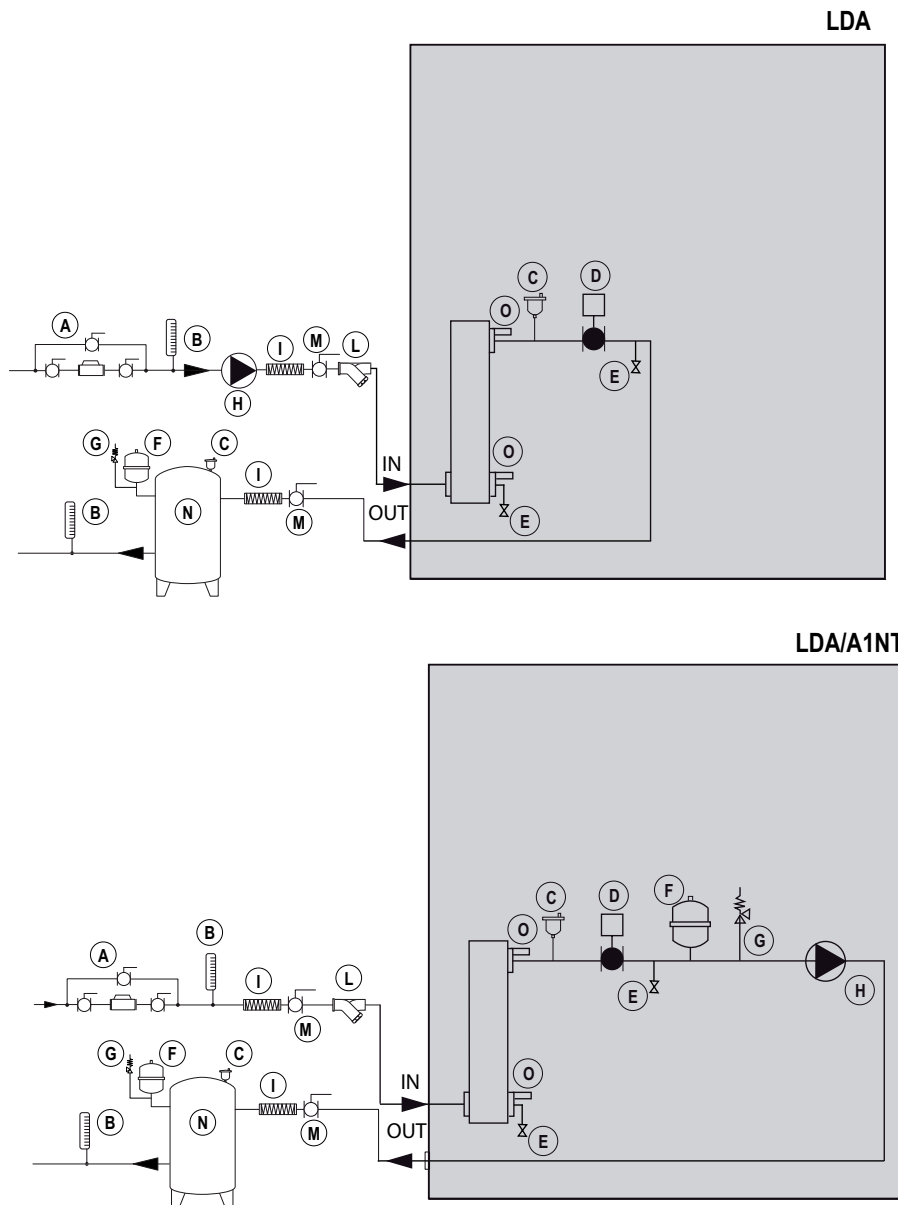


The expansion vessel supplied with the units (Version A and ANT only) is sized for the water content of the unit only. Any additional expansion vessel should be sized by the installer depending on the layout of the system.

Model	39	45	50	60	70	80	90	110	120	130
Capacity (l)	8	8	8	18	18	18	18	18	18	18
Pre-charging (bar)	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Maximum expansion tank pressure (bar)	10	10	8	8	8	8	8	8	8	8

Model	152	162	190	210	240	260	300	320	380	430	500
Capacity (l)	18	18	18	18	18	18	24	24	24	24	24
Pre-charging (bar)	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Maximum expansion tank pressure (bar)	8	8	8	8	8	8	8	8	8	8	8

4.16 Hydraulic components



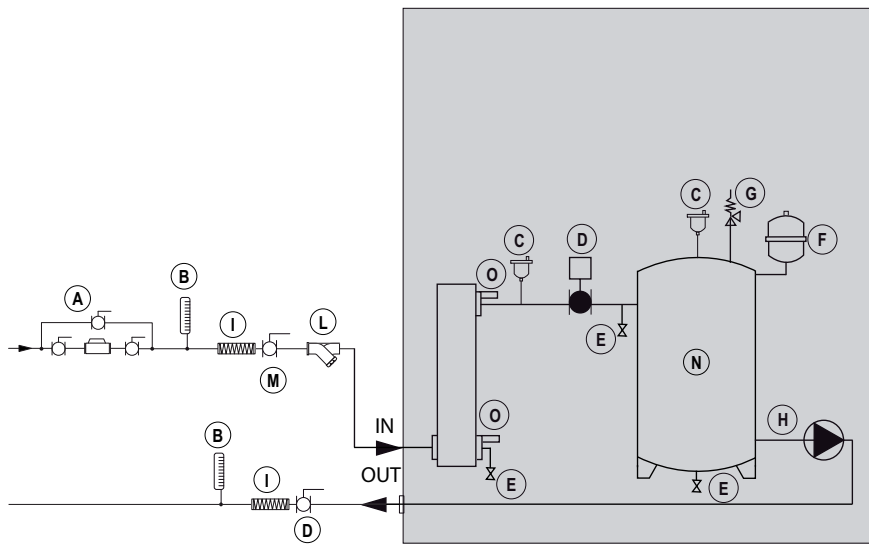
A	System Filling Group	H	Water Pump
B	Thermometer	I	Flexible Connection
C	Vent Valve	L	Water Strainer
D	Flow Switch	M	Ball Shut-off Valve
E	Drainage valve	N	Water tank
F	Expansion Vessel	O	Temperature water sensor
G	Safety Valve		

Note: Components shown inside the grey box are factory fitted; components outside the grey box have to be supplied and fitted by the installer.

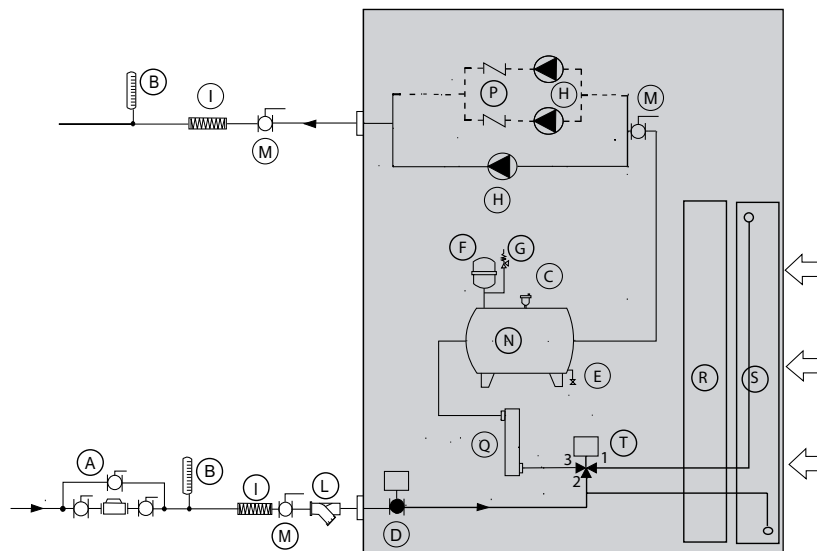


If the unit is supplied without a pump, the pump must be installed with the supply side toward the water inlet connection of the unit.

LDA/A1



LDA/FC



A	System Filling Group	L	Water Strainer
B	Thermometer	M	Ball Shut-off Valve
C	Vent Valve	N	Water tank
D	Flow Switch	O	Temperature water sensor
E	Drainage valve	P	Check Valve
F	Expansion Vessel	Q	Exchanger user
G	Safety Valve	R	Source heat exchanger
H	Water Pump	S	Free cooling coil
I	Flexible Connection	T	3 way valve

Note: Components shown inside the grey box are factory fitted; components outside the grey box have to be supplied and fitted by the installer.



If the unit is supplied without a pump, the pump must be installed with the supply side toward the water inlet connection of the unit.

4.17 Filling the hydraulic circuit

- Before filling, check that the system drain valve is closed.
- Open all pipework, heat pump and terminal unit air vents.
- Open the shut off valves.
- Begin filling, slowly opening the water valve in the filling group outside the unit.
- When water begins to leak out of the terminal unit air vents, close them and continue filling until the pressure gauge indicates a pressure of 1.5 bar.

The installation should be filled to a pressure of between 1 and 2 bars. It is recommended that this operation be repeated after the unit has been operating for a number of hours (due to the presence of air bubbles in the system). The pressure of the installation should be checked regularly and if it drops below 1 bar, the water content should be topped-up. If frequent top-ups are required, check all connections for leaks.

4.18 Emptying the installation

- Before emptying, place the mains switch in the "Off" position.
- Make sure the filling group valve is closed.
- Open the drainage valve outside the unit and all the installation and terminal air vent valves.



If the fluid in the circuit contains anti-freeze, it **MUST** not be allowed to run away to drain. It must be collected for possible re-cycling or for correct disposal.

4.19 LDA / CN Condensing units refrigerant connections

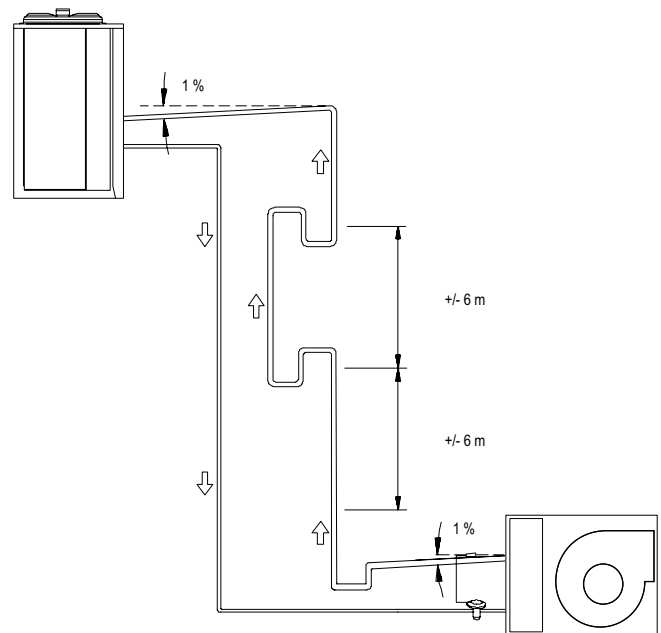
Condensing unit (CN versions) must be connected to the indoor unit by refrigerant lines. The condensing units are supplied without refrigerant charge (R410A) but with a holding charge of nitrogen.

4.19.1 Piping layout and max distance between the sections

On split-system applications, the piping layout is determined by the location of the indoor and outdoor units and by the building structure. Pipe runs should be minimised in order to reduce the pressure drops in the refrigerant circuit and the refrigerant charge required. The maximum allowable pipe length is 30 meters. Should your requirements exceed the limits described above, please contact our application engineers who will be delighted to assist.

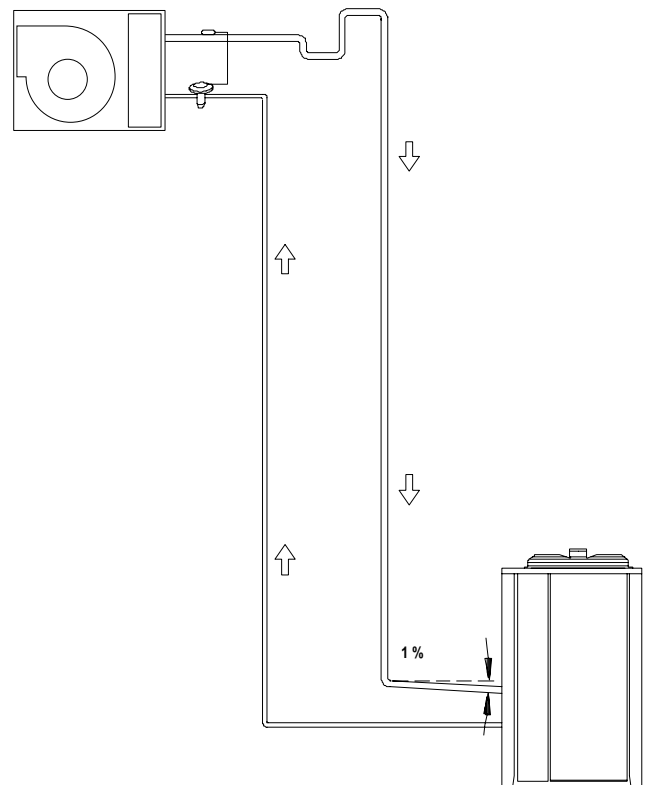
4.19.2 Outdoor unit installed at a higher level than the indoor unit

On the rising vertical pipes, oil traps should be fitted every 6 metres to ensure that the oil does not run back to the compressor by gravity and that it continues to circulate in the correct direction. On horizontal suction pipelines a minimum of 1% slope in the direction of flow should be provided in order to ensure the oil flow back to the compressor. Required pipeline diameters for various unit sizes and pipe run lengths can be found in Table.



4.19.3 Outdoor unit installed at a lower level than the indoor unit

Install a liquid trap on the suction line at the evaporator outlet and at the same height in order that liquid refrigerant, when the system is off, will not fall back to the compressor. Locate this trap down-stream from the bulb of the thermostatic valve to ensure that when the compressor is restarted, the rapid evaporation of the refrigerant liquid fluid in the trap will not affect the bulb of the thermostatic valve. On horizontal suction pipelines a minimum of 1% slope in the direction of flow should be provided in order to ensure the oil flow back to the compressor.



4.20 Refrigerant line diameters

Refrigerant line diameters for CN versions						
Max distance (m)	10		20		30	
Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)
039	35	18	35	18	35	18
045	35	18	35	18	35	22
050	35	18	35	22	35	22
060	42	22	42	22	42	22
070	42	22	42	22	42	22
080	42	22	42	22	42	28
090	42	28	42	28	42	28
110	42	28	42	28	54	28
120	54	28	54	28	54	28
130	54	28	54	28	54	28
152	54	28	54	28	54	35
162	54	35	54	35	54	35
190	2x42	2x28	2x42	2x28	2x42	2x28
210	2x42	2x28	2x42	2x28	2x54	2x28
240	2x54	2x28	2x54	2x28	2x54	2x28
260	2x54	2x28	2x54	2x28	2x54	2x28
300						
320						
380						
430						
500						

Contact the company

Refrigerant charge for liquid line			
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
18	190	22	270
28	470	35	760

Cooling capacity correction factors				
Mod.	Refr. Line 0 (m)	Refr. Line 10 (m)	Refr. Line 20 (m)	Refr. Line 30 (m)
LDA/CN	1	0,98	0,96	0,95

4.20 Electric connections: preliminary safety information

The electric panel is located inside the unit at the top of the technical compartment where the various components of the refrigerant circuit are also to be found. To access the electrical board, remove the front panel of the unit:



Power connections must be made in accordance to the wiring diagram enclosed with the unit and in accordance to the norms in force.



Make sure the power supply upstream of the unit is (blocked with a switch). Check that the main switch handle is padlocked and it is applied on the handle a visible sign of warning not to operate.



It must be verified that electric supply is corresponding to the unit electric nominal data (tension, phases, frequency) reported on the label in the front panel of the unit.



Power cable and line protection must be sized according to the specification reported on the form of the wiring diagram enclosed with the unit.



The cable section must be commensurate with the calibration of the system-side protection and must take into account all the factors that may influence (temperature, type of insulation, length, etc.).



Power supply must respect the reported tolerances and limits: If those tolerances should not be respected, the warranty will be invalidated.



Flow switches must be connected following the indication reported in the wiring diagram. Never bridge flow switches connections in the terminal board. Guarantee will be invalidated if connections are altered or not properly made.



Make all connections to ground provided by law and legislation.



Before any service operation on the unit, be sure that the electric supply is disconnected.



FROST PROTECTION

If opened, the main switch cuts the power off to any electric heater and antifreeze device supplied with the unit, including the compressor crankcase heaters. The main switch should only be disconnected for cleaning, maintenance or unit repair.

4.21 Electric data



The electrical data reported below refer to the standard unit without accessories.
In all other cases refer to the data reported in the attached electrical wiring diagrams.



The line voltage fluctuations can not be more than $\pm 10\%$ of the nominal value, while the voltage unbalance between one phase and another can not exceed 1%, according to EN60204. If those tolerances should not be respected, please contact our Company.

Model		039	045	050	060	070	080	090
Power supply	V/~Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50
Control board	V/~Hz	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50
Auxiliary circuit	V/~Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Fans power supply	V/~Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	10	16	16	25	25	35	35
PE section	mm ²	10	16	16	16	16	16	16

Model		110	120	130	152	162	190	210
Power supply	V/~Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Control board	V/~Hz	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50
Auxiliary circuit	V/~Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Fans power supply	V/~Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	50	70	70	70	95	120	120
PE section	mm ²	25	35	35	35	50	70	70

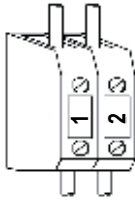
Model		240	260	300	320	380	430	500
Power supply	V/~Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Control board	V/~Hz	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50	24/1/50
Auxiliary circuit	V/~Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Fans power supply	V/~Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	150	150	240	240	2x120	2x120	2x150
PE section	mm ²	95	95	120	120	120	120	150

Electric data may change for updating without notice. It is therefore necessary to refer always to the wiring diagram present in the units.

4.23 Electric connections

4.23.1 Remote wiring connections

All terminals referred to in the explanations below will be found on the terminal board inside the electrical box. All electric connections mentioned below have to be made by the installer, on site.

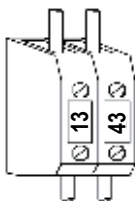


REMOTE ON / OFF (Modd. 039 ÷ 500)

To switch the unit on or off remotely, the cable jumper connected across terminals 1 and 2 must be replaced with a switch.

Contact closed, unit ON,

Contact open, unit OFF.

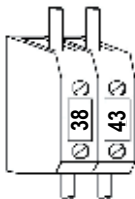


REMOTE SUMMER / WINTER CHANGE OVER (Modd. 039 ÷ 162)

To remotely switch the unit from heating to cooling, the cable jumper connected across terminals 13 and 43 must be replaced with a switch.

Contact closed, unit in Winter mode,

Contact open, unit Summer mode.

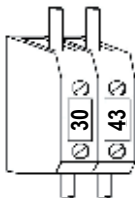


REMOTE SUMMER / WINTER CHANGE OVER (Modd. 190 ÷ 260)

To remotely switch the unit from heating to cooling, the cable jumper connected across terminals 38 and 43 must be replaced with a switch.

Contact closed, unit in Winter mode,

Contact open, unit Summer mode.

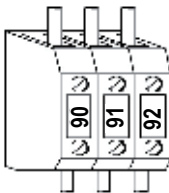


REMOTE SUMMER / WINTER CHANGE OVER (Modd. 300 ÷ 500)

To remotely switch the unit from heating to cooling, the cable jumper connected across terminals 30 and 43 must be replaced with a switch.

Contact closed, unit in Winter mode,

Contact open, unit Summer mode.

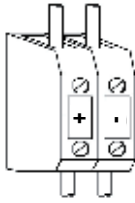


REMOTE GENERAL ALARM (Modd. 039 ÷ 500)

For remote display of a general alarm, connect the visual or audible device between terminals 90-91-92.

Contacts 90/91 NC (Normally closed)

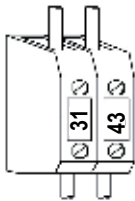
Contacts 91/92 NO (Normally opened)

**REMOTE CONTROL PANEL (Modd. 039 ÷ 500)**

The remote control panel replicates all of the functions on the main controller panel and can be connected up to a maximum distance of 50 meters from the unit. The panel has to be connected to the unit by 2 wires having diameter 0.75 mm². The power supply cables must be separated from the remote control panel wires, in order to avoid interference. The control panel has to be connected to the terminals + and -. The control panel cannot be installed in an area subject to excessive vibration, corrosive gases, is a dirty environment or has a high humidity level. The ventilation openings must not be blocked.

**USER CIRCUIT FLOW SWITCH (SFW1) (Modd. 039 ÷ 162)**

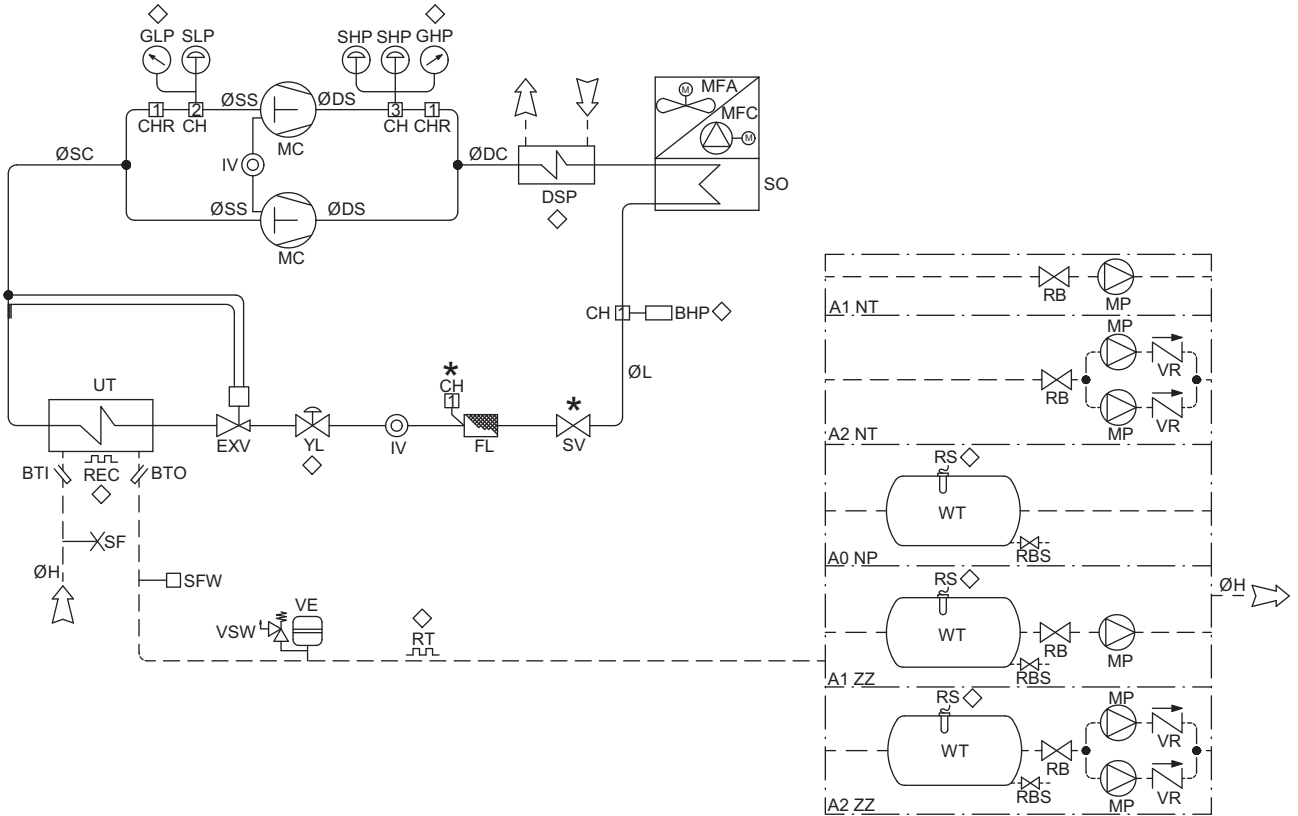
This is used to protect the unit if there is a low water flow rate in the user circuit. It is factory fitted across terminals 36 and 43.

**USER CIRCUIT FLOW SWITCH (SFW1) (Modd. 190 ÷ 500)**

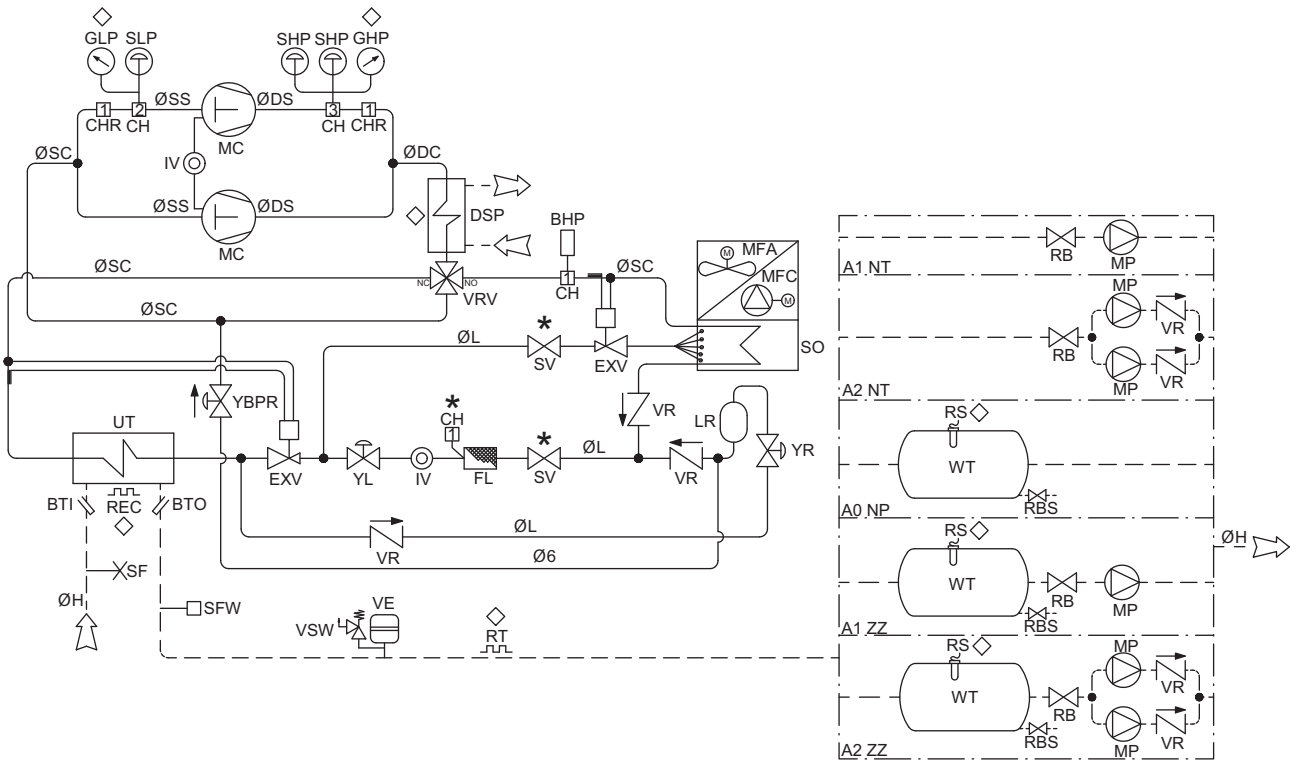
This is used to protect the unit if there is a low water flow rate in the user circuit. It is factory fitted across terminals 31 and 43.

4.24 Refrigerant circuit layout

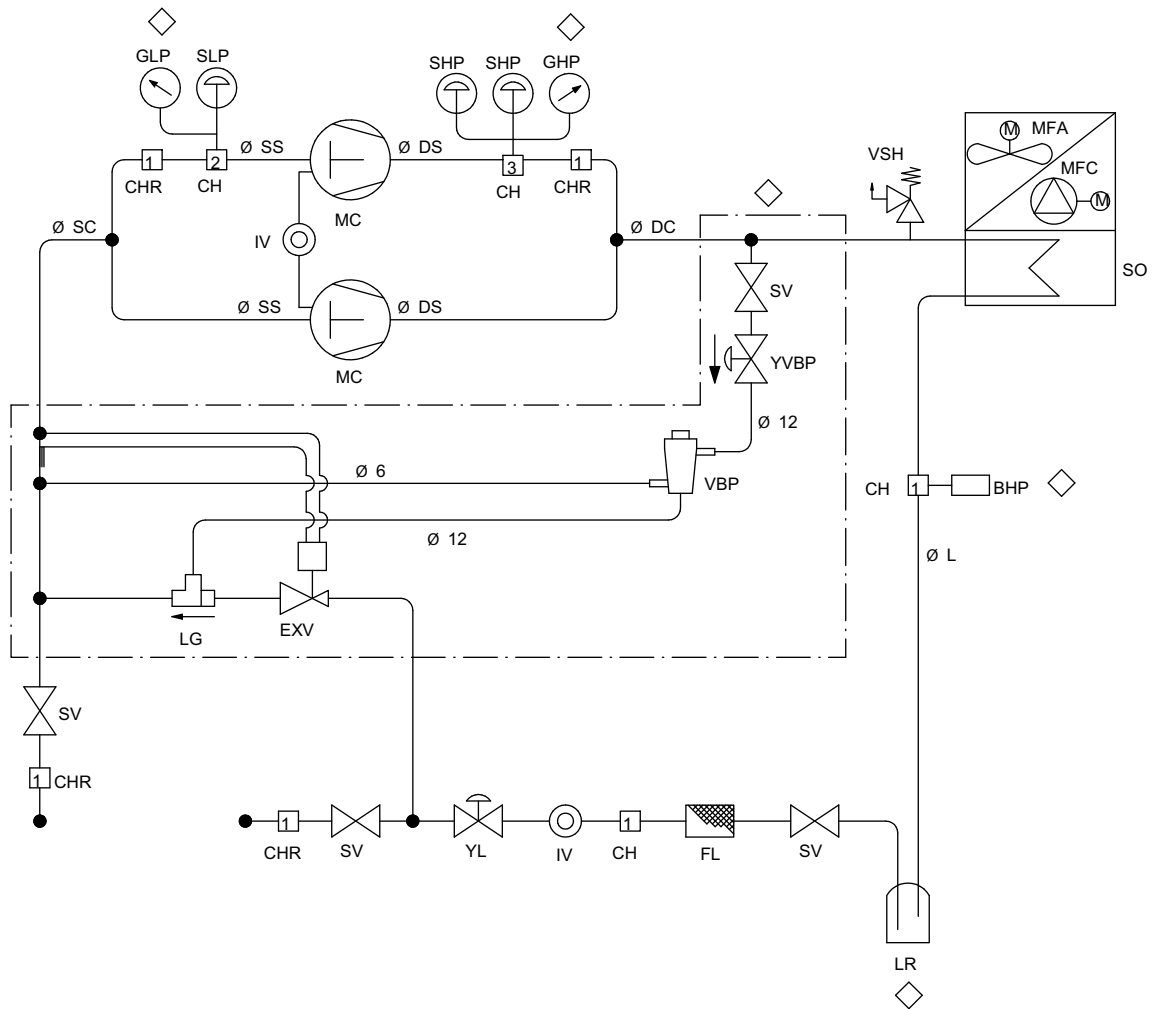
4.24.1 Refrigerant circuit layout standard version



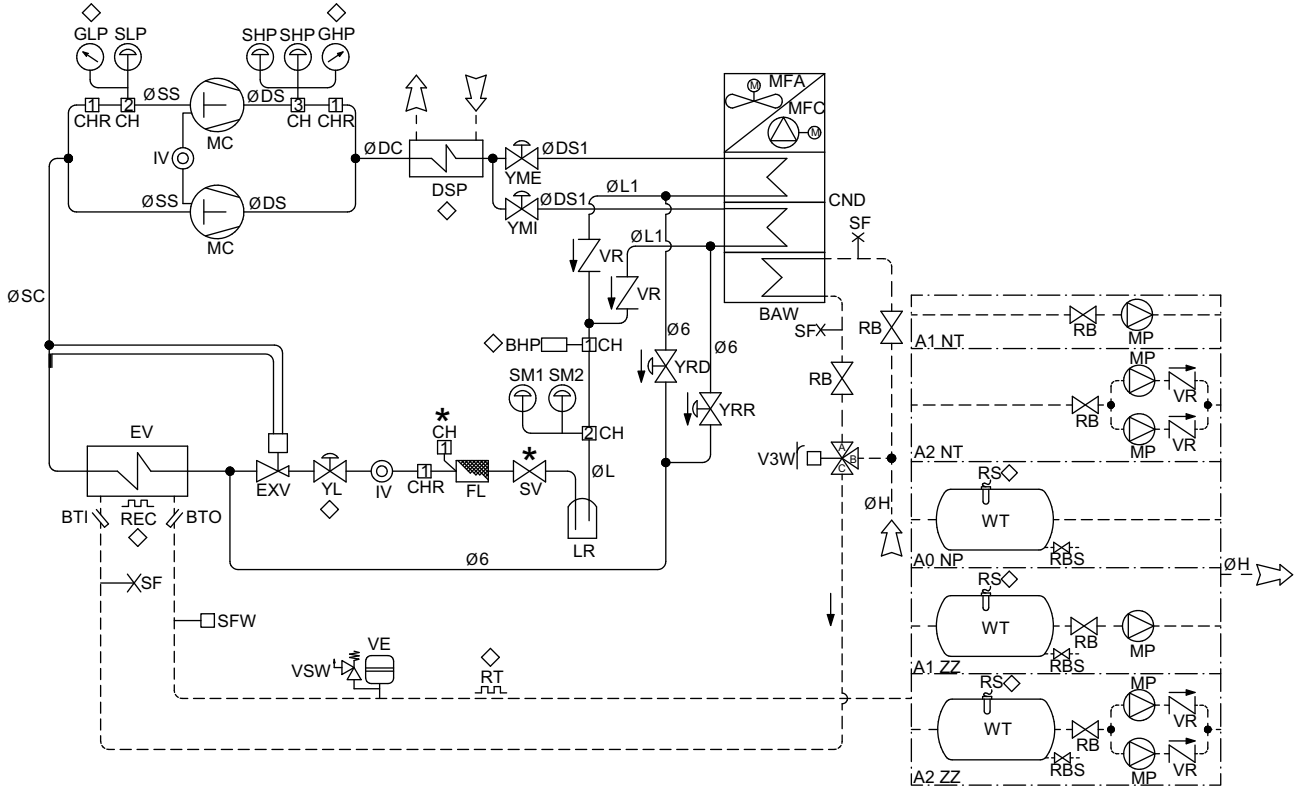
4.24.2 Refrigerant circuit layout HP version



4.24.3 Refrigerant circuit layout CN version



4.24.4 Refrigerant circuit layout FC version



A0NP	Water tank without pumps	REC	Exchangers heating
A1NT	One pump without water tank	RS	Tank resistance
A1ZZ	One pump with water tank	RT	Pipes resistance
A2NT	Two pumps without water tank	SFW	Water flow switch
A2ZZ	Two pump with water tank	SHP	High pressure pressostat
BAW	Water coil	SLP	Low-high pressure switch
BHP	High pressure transducer	SM1	Capacity presswitch level 1
BTI	User water input probe	SM2	Capacity presswitch level 2
BTO	User water output probe	SO	Source side
CHR	Charging plug 5/16 sae (r410)	SV	Shut off valve
CHR	Charging plug 5/16 sae (r410)	UT	User side
CND	Condenser	V3W	3-Way water valve
DSP	Desuperheater	VBP	Hot gas by-pass valve
EXV	Thermostatic valve	VE	Expansion vessel
EXV	Thermostatic valve	VRV	Reverse cycle valve
FL	Liquid line filter	VRV	Reverse cycle valve
GHP	High pressure gauge	VSH	High pressure safety valve
GLP	Low pressure gauge	VSW	Water safety valve
IV	Moisture indicator sight glass	WT	Water tank
LG	Liquid gas distributor	YL	Liquid solenoid valve
LR	Liquid receiver	YME	Solenoid valve for external condenser
MC	Compressor	YMI	Solenoid valve for internal condenser
MFA	Axial fan	YR	Riceiver solenoid valve
MFC	Centrifugal fan	YRD	Internal condenser drain solenoid
MP	Pompa	YRR	External condenser drain solenoid
RBS	Discharge valve	YVBP	Hot gas by-pass solenoid valve

5. UNIT START UP

5.1 Preliminary checks

Before starting the unit the checks detailed in this manual of the electric supply and connections (par. 4.21), the hydraulic system (par. 4.12) and the refrigerant circuit (par. 4.19), should be performed.



Start-up operations must be performed in accordance with the instructions detailed in the previous paragraphs.



If it is required to switch the unit on and off, never do this using the main isolator: this should only be used to disconnect the unit from the power supply when the unit is to be permanently off. Isolation will result in no supply for the crankcase heater and on start up the compressor could be seriously damaged.

5.1.1 Before start-up



Damage can occur during shipment or installation. It is recommended that a detailed check is made, before the installation of the unit, for possible refrigerant leakages caused by breakage of capillaries, pressure switch connections, tampering of the refrigerant pipework, vibration during transport or general abuse suffered by the unit.

- Verify that the unit is installed in a workmanlike manner and in accordance with the guidelines in this manual.
- Check that all power cables are properly connected and all terminals are correctly fixed.
- The operating voltage between phases R S T is the one shown on the unit labels.
- Check that the unit is connected to the system earth.
- Check that there is no refrigerant leakage.
- Check for oil stains, sign of a possible leak.
- Check that the refrigerant circuit shows the correct standing pressure on the pressure gauges (if present) otherwise use external ones.
- Check that the Schrader port caps are the correct type and are tightly closed.
- Check that crankcase heaters are powered correctly (if present).
- Check that all water connections are properly installed and all indications on unit labels are observed.
- The system must be flushed, filled and vented in order to eliminate any air.
- Check that the water temperatures are within the operation limits reported in the manual.
- Before start up check that all panels are replaced in the proper position and locked with fastening screws.



Do not modify internal wiring of the unit as this will immediately invalidate the warranty.



Crankcase heaters must be powered at least 12 hours before start up (pre-heating period) To do this, isolate the compressor(s), fans and pump(s) in the electrics box and then switch on the main isolator (heaters are automatically supplied when the main switch is closed). The crankcase heaters are working properly if, after several minutes, the compressor crankcase temperature is about 10÷15°C higher than ambient temperature.



During the 12 hours pre-heating period it is also important to check that the label OFF is shown on the display or that the unit is on stand-by mode. If there is an accidental start-up before the 12 hours pre-heating period has elapsed, the compressors could be seriously damaged and therefore the warranty will immediately terminate .

5.1.2 Safety device setting

Device		Set-point	Differential	Reset
Control thermostat (Heating mode)	°C	30	2	----
Control thermostat (Cooling mode)	°C	12	2	----
Anti-freeze thermostat	°C	4	4	MANUAL
High pressure switch	Bar	30	7	Automatic for 3 times (than manual)
Low pressure switch	Bar	0.7	1.5	
Water safety valve (Present in A versions only)	Bar	6		Automatic



If the unit is required for heating/cooling only the internal parameter of the microprocessor FS1 has to be modified from 2 to 1 in order to avoid configuration alarms. Please contact the company for support.

5.1.3 Controls during unit operation

- Check the rotation of the fans . If the rotation is incorrect, disconnect the main switch and change over any two phases of the incoming main supply to reverse motor rotation (only for units with three-phase fan motors).
- Check that user water inlet temperature is close to the set point of the control thermostat.
- For "A" version units (units with pumps and storage tank) if the pump is noisy, slowly close discharge shut-off valve until the noise is reduced to normal levels. This can occur when the system pressure drop substantially lower than the pump available pressure.

5.1.4 Refrigerant charge checking

- After several hours of operation, check that the sight glass has a green colour core: if the core is yellow moisture is present in the circuit. In this event it is necessary for dehydration of the circuit to take place. This must be performed by qualified people only. Check that there are no continuous vapour bubbles present at the sight glass . This would indicate a shortage of refrigerant. A few vapour bubbles are acceptable.
- Several minutes after start up and operating in cooling mode, check that condensing temperature is approximately 15 °C higher than the ambient air temperature.
- On cooling mode, check that the evaporation temperature is about 5 °C lower than the user water outlet temperature.
- On cooling mode check that the refrigerant superheat on the user heat exchanger is about 5-7 °C
- On cooling mode check that the refrigerant sub-cooling on the source heat exchanger is about 5-7 °C.

5.2 Description of the control panel (Modd. 039 ÷ 162)



5.2.1 Display icons

The instrument display is divided into three zones:

Left zone: the display shows the icons.

Top right zone: the display shows the inlet water temperature.

Bottom right zone: The display shows the temperature of water utilities in output or, in the version with condensation control, the pressure of evaporation / condensation.

Icon	Meaning	Icon	Meaning
°C	Celsius degrees		Electric heaters activated
bar	Bar		User water pump
	Compressor 1	Flow!	Water flow alarm
	Compressor 2		External fan
	General Alarm		

5.2.2 Key function

	M makes it possible to enter the functions menu
	SET makes it possible to display or modify the set points . Selects a parameter or confirms a value in programming mode.
	In standard mode allows the display of the different temperatures 1 click: Bottom line displays Pb1 : User inlet water temperature 2 clicks: Bottom line displays Pb2 : User outlet water temperature 3 clicks: Bottom line displays Pb3 : refrigerant pressure (high pressure in cooling, low pressure in heating mode) 4 clicks: Bottom line displays Pb4 : Finned coil temperature (not used) In programming mode it allows the user to scroll through the parameter codes or to increase values.
	In standard mode it allows the display of the different temperatures in the opposite way to the above arrow. In programming mode it allows the user to scroll through the parameter codes or to decrease values.
	If pressed down for 5 seconds, it makes it possible to switch the unit on or off in chiller mode. Each time this function is activated, the green led positioned just above the button will be switched ON .
	If pressed down for 5 seconds, it makes it possible to switch the unit on or off in heating mode. Each time this function is activated, the green led positioned just above the button will be switched ON .

5.3 Remote control panel (Modd. 039 ÷ 162)



5.3.1 Display icons

Icon	Meaning	Icon	Meaning
°C	Celsius degrees		Electric heaters activated
bar	Bar		User water pump
	Compressor 1	Flow!	Water flow alarm
	Compressor 2		External fan
	General Alarm		

5.3.2 Key function

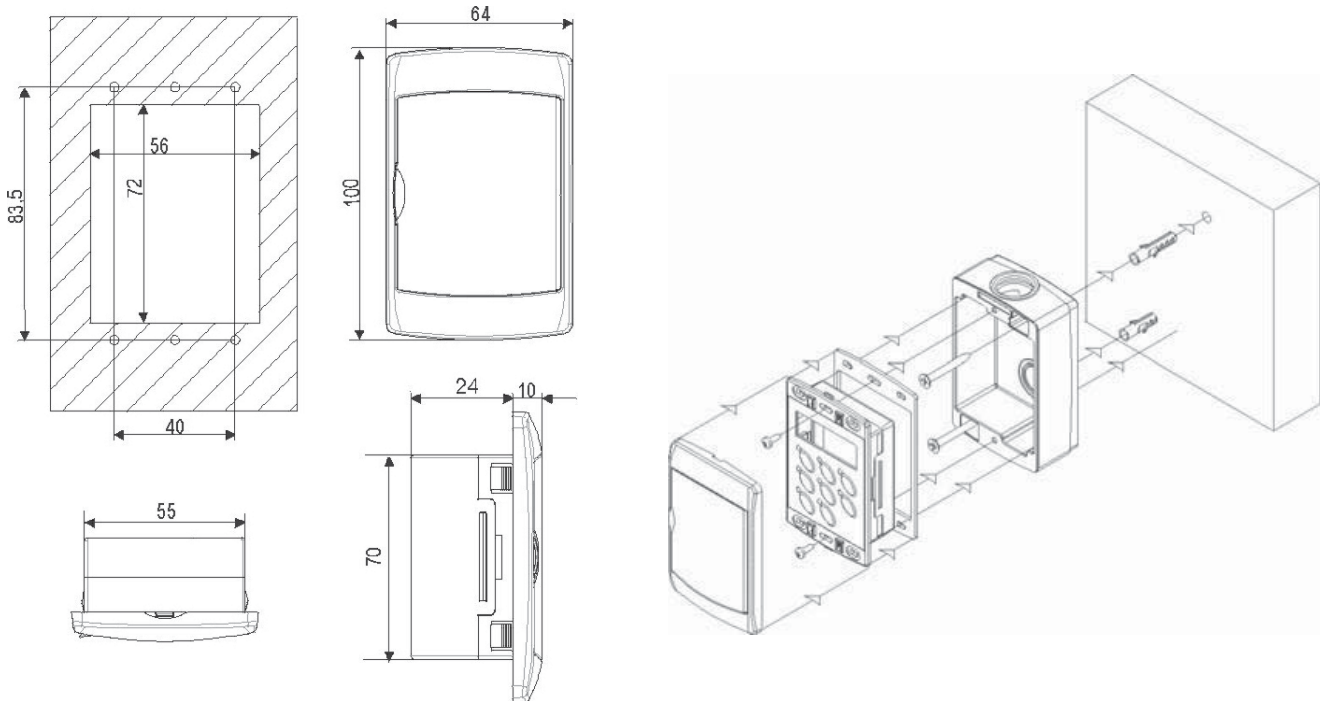
	M makes it possible to enter the functions menu
	SET makes it possible to display or modify the set points . Selects a parameter or confirms a value in programming mode.
	<p>In standard mode allows the display of the different temperatures</p> <p>1 click: Bottom line displays Pb1: User inlet water temperature</p> <p>2 clicks: Bottom line displays Pb2: User outlet water temperature</p> <p>3 clicks: Bottom line displays Pb3: refrigerant pressure (high pressure in cooling, low pressure in heating mode)</p> <p>4 clicks: Bottom line displays Pb4: Finned coil temperature (not used)</p> <p>In programming mode it allows the user to scroll through the parameter codes or to increase values.</p>
	In standard mode it allows the display of the different temperatures in the opposite way to the above arrow. In programming mode it allows the user to scroll through the parameter codes or to decrease values.
	If pressed down for 5 seconds, it makes it possible to switch the unit on or off in chiller mode. Each time this function is activated, the green led positioned just above the button will be switched ON .
	If pressed down for 5 seconds, it makes it possible to switch the unit on or off in heating mode. Each time this function is activated, the green led positioned just above the button will be switched ON .

In case of lack of communication between the instrument and the terminal remote display the top view **noL** (no link).

5.3.3 Installation

The remote control panel is mounted on a panel with 72x56 mm cut-out, fixed with screw.

To obtain IP65 protection for the panel, use the rubber gasket RGW-V (optional). For wall mounting use the V-KIT plastic adapter as illustrated in the picture.



Electric data can be updated without notice. It is therefore necessary to always refer to the wiring diagram provided in the unit.



If there is damage to the remote control or there is a faulty connection, failure of communication will be indicated in the display with the message "noL" (no link).

5.4 Description of the control panel (Modd. 190 ÷ 500)



Display

The instrument display is divided into three zones:

Top left zone: the display shows the inlet water temperature,

Bottom left zone: the display shows the pressure of the unit,

Right zone: icons.

5.4.1 Display icons

Icon	Meaning	Icon	Meaning
°C	Celsius degrees		Electric heaters activated
bar	Bar		User water pump
	Compressor 1	Flow!	Water flow alarm
	Compressor 2		External fan
	General Alarm		

5.4.2 Key function



M makes it possible to enter the functions menu



SET makes it possible to display or modify the set points . Selects a parameter or confirms a value in programming mode.



In standard mode allows the display of the different temperatures

1 click: Bottom line displays **EIN**: User inlet water temperature.

2 clicks: Bottom line displays **EOUT**: User outlet water temperature

3 clicks: Bottom line displays **DEF1**: Finned coil temperature (press **SET** to show **DEF2**).

4 clicks: Bottom line displays **CDP1**: refrigerant pressure (high pressure in cooling, low pressure in heating mode) (press **SET** to show **CDP2**) .

In programming mode allows to scroll through the parameter codes or increases the values.



In standard mode allows the display of the different temperatures in opposite way of the above arrow.

In programming mode allows to scroll through the parameter codes or increases the values



If press ed down for 5 seconds, it makes it possible to switch the unit on or off in chiller mode. Each time this function is activated, the green led positioned just above the button will be switched **ON**.









If press ed down for 5 seconds, it makes it possible to switch the unit on or off in heating mode. Each time this function is activated, the green led positioned just above the button will be switched **ON**.

5.5 Remote control panel (Modd. 190 ÷ 500)



5.5.1 Display icons

Icon	Meaning	Icon	Meaning
°C	Celsius degrees		Electric heaters activated
bar	Bar		User water pump
	Compressor 1	Flow!	Water flow alarm
	Compressor 2		External fan
	General Alarm		

5.5.2 Key function



M makes it possible to enter the functions menu



SET makes it possible to display or modify the set points . Selects a parameter or confirms a value in programming mode.



In standard mode allows the display of the different temperatures

1 click: Bottom line displays **EIN**: User inlet water temperature.

2 clicks: Bottom line displays **EOUT**: User outlet water temperature

3 clicks: Bottom line displays **DEF1**: Finned coil temperature (press **SET** to show **DEF2**).

4 clicks: Bottom line displays **CDP1**: refrigerant pressure (high pressure in cooling, low pressure in heating mode) (press **SET** to show **CDP2**) .

In programming mode allows to scroll through the parameter codes or increases the values.



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If pressed down for 5 seconds, it makes it possible to switch the unit on or off in chiller mode. Each time this function is activated, the green led positioned just above the button will be switched **ON**.



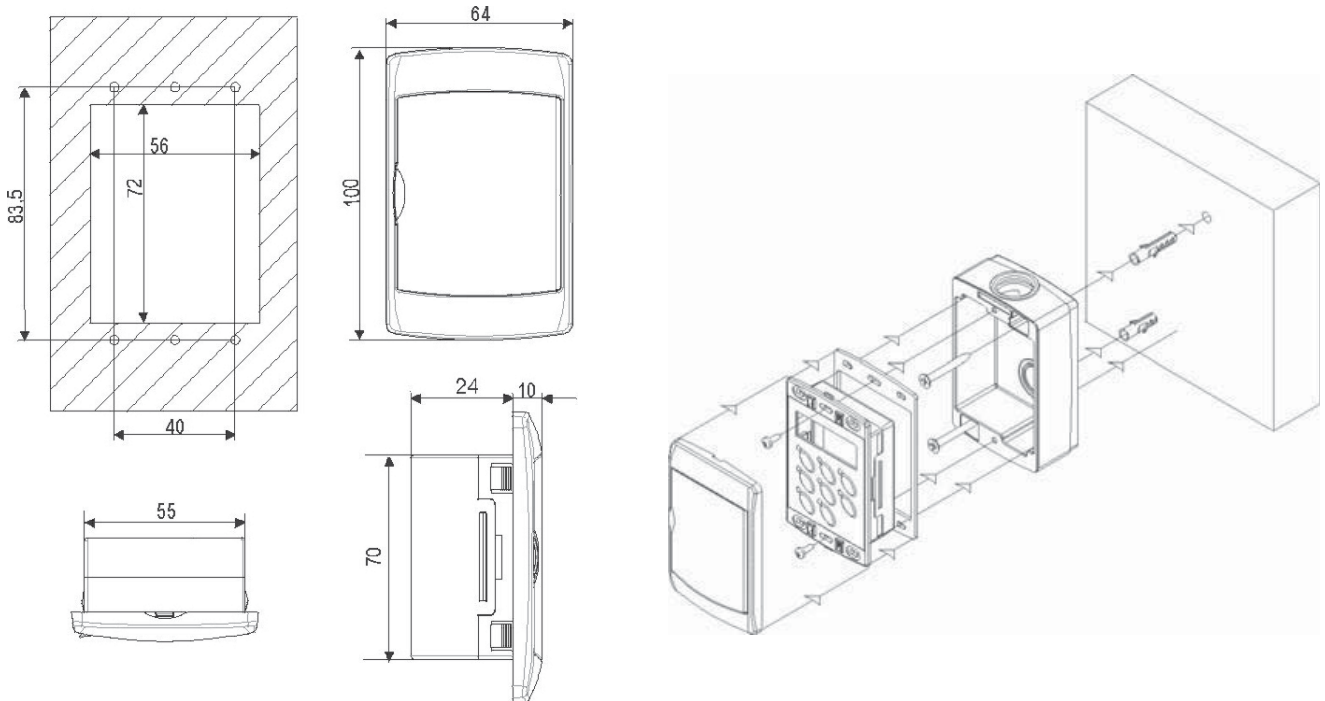
If pressed down for 5 seconds, it makes it possible to switch the unit on or off in heating mode. Each time this function is activated, the green led positioned just above the button will be switched **ON**.

In case of lack of communication between the instrument and the terminal remote display the top view **noL** (no link).

5.5.3 Installation

The remote control panel is mounted on a panel with 72x56 mm cut-out, fixed with screw.

To obtain IP65 protection for the panel, use the rubber gasket RGW-V (optional). For wall mounting use the V-KIT plastic adapter as illustrated in the picture.



Electric data can be updated without notice. It is therefore necessary to always refer to the wiring diagram provided in the unit.

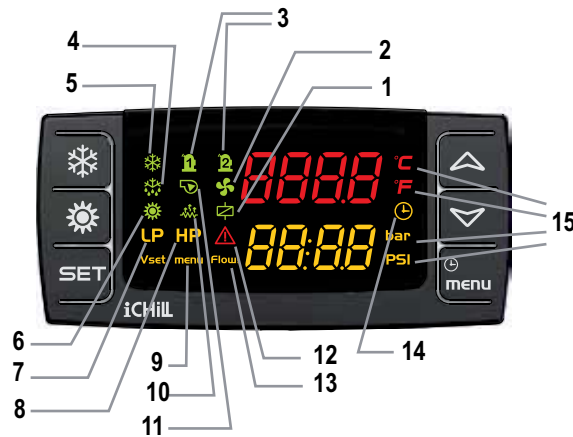


If there is damage to the remote control or there is a faulty connection, failure of communication will be indicated in the display with the message "noL" (no link).

6. USE (Modd. 039 ÷ 162)

6.1 Switch the unit on (Modd. 039 ÷ 162)

In order to power the unit, turn the main switch to the ON position. The display shows the User inlet water temperature.



Legend

1	Icon on if the open collector outlet is active.	9	Function menu active.
2	Icon ON (accesso): if the fans are running.	10	Integrative user circuit heaters activated.
3	Icon On if the compressor is turned on; Icon blinking if the compressor is in the ignition timing.	11	Icon on if at least one of the 2 water pumps (pump evaporator or pump condenser) is on.
4	Icon blinking: Defrost cycle timeout activated; Led ON: Defrost cycle activated.	12	Icon blinking on alarm.
5	Icon ON: Unit in cooling mode.	13	Icon blinking if the digital input of the flow switch is active (both pump ON and pump OFF).
6	Icon ON: Unit in heating mode.	14	Icon on when the bottom display show current time, the hours of operation of the loads, etc.
7	Icon blinking if low pressure alarm is active.	15	Icon on when the display show a temperature or a pressure.
8	Icon blinking if high pressure alarm is active.		

6.1.1 Cooling mode

To start the unit in heating mode, press the key. The snowflake icon is on. If requested, the compressor safety delay countdown starts and the compressor icon flashes. The water pump will be activated after few seconds and then, once the compressor countdown has finished, the compressor starts and the icon remains on. The display shows the user water inlet temperature.

6.1.2 Modalità riscaldamento

To start the unit in heating mode, press the key. The sun icon is on. If requested, the compressor safety delay countdown starts and the compressor icon flashes. The water pump will be activated after few seconds and then, once the compressor countdown has finished, the compressor starts and the icon remains on. The display shows the user water inlet temperature.

6.2 Stop (Modd. 039 ÷ 162)

6.2.1 Cooling mode

To stop the unit in cooling mode, press the key. The LED switches off. The unit goes into stand-by mode.

6.2.2 Heating mode

To stop the unit in heating mode, press the key. The LED switches off. The unit goes into stand-by mode.

6.3 Stand-by (Modd. 039 ÷ 162)

When the unit is switched off from the keyboard or the remote panel, it goes into standby mode. In this mode, the microprocessor control displays the sensor readings and is also able to manage alarm situations. The only visible signal on the display is the green led of circuit1 and the water temperatures. If the unit is switched off from remote ON/OFF the label OFF is displayed.



If it is required to switch the unit on and off, never do this using the main isolator: this should only be used to disconnect the unit from the power supply when the unit is to be permanently off. Isolation will result in no supply for the crankcase heater and on start up the compressor could be seriously damaged.

6.4 How to change the set points (Modd. 039 ÷ 162)



When modifying or varying the machine's operating parameters, make sure that you do not create situations that conflict with the other set parameters.



The complete display of the 2 set points (heating, cooling) is ONLY available when the unit is in stand-by mode. It is suggested to put the unit in stand by when modifying set points. If the unit is not in stand-by, the only editable parameters are the ones related to the operation mode of the unit (eg. In heating mode it is only possible to change the heating and set points, in cooling mode it is only possible to change the cooling and set points.)



Select the required set point using the Press the key . The label appears at the bottom of the display:

SEtH Heating set point

SEtC Cooling set point.

To set the required set-points press again the for 3 seconds.

The current value flashes at the top and can be modified using the , keys we can modify the parameter.

Then press the key to memorise the parameter and exit.



All set points are intended as return temperature from the plant. For example: if hot water at 45°C is required and the Δt is 5°C, then the set point will be 40°C. If the Δt is 8°C, then the set point has to be set at 37°C. If, for example, cold water is required at 15°C and the Δt is 5°C, then the set point will be 20°C. If the Δt is 8°C, then the set point has to be set at 23°C.

6.4.1 Adjustable parameters


The adjustable set points that can be modified by the end user are:




Label	Function	Adjustment limit	Default value
SEt H	Heating set-point	20÷55°C	40°C
SEt C	Cooling set-point	10÷23°C	12°C
PAS	Password	(Contact the company)	




The units are supplied with a very sophisticated control system with many other parameters that are not adjustable by the end user; these parameters are protected by a manufacturer password.

6.5 Parameters list (Modd. 039 ÷ 162)

By pressing the  key the user has the possibility to display many parameters.





Scroll the list of the parameters using the ,  keys, then press the  key to display the required one. In this menu it is only possible to display the parameters, it is not possible to change any value. The parameter list is:

Display	List	Symbol	Meaning
ALrM	Alarm List	ALrM	See following paragraph
ALOG	Alarm history	ALOG	See following paragraph
HouR	Main components working hours	C1HR	Working hours compressor 1
		C2HR	Working hours compressor 2 (only models with 2 compressors)
		PFHR	Working hours user water pump
PCHR	Working hours domestic hot water pump		
DEF	(Not used)	dF1	Countdown (in seconds) to the next defrost cycle; the countdown is active if the defrost led  is blinking. In case the defrost led is off the defrost cycle is not required. During the defrost cycle the defrost led is ON.

6.6 Acoustic signal silencing (Modd. 039 ÷ 162)

Pressing and releasing one of the keys; the buzzer is switched off, even if the alarm condition remains in place.

6.7 Alarm reset (Modd. 039 ÷ 162)

Press the  key (the menu ALrM appears at the bottom right of the display). Press the  key to display the alarm event. In case of multiple alarms use the ,  keys, to scroll through the list of the active alarms.

There are two types of alarms:




Reset alarms:




RST label appears on the upper part of the display. In this case press the  key to reset.

Non reset alarms:

nO label appears on the upper part of the display. In this case the alarm is permanent; contact technical support.

6.8 Display alarm history (Modd. 039 ÷ 162)

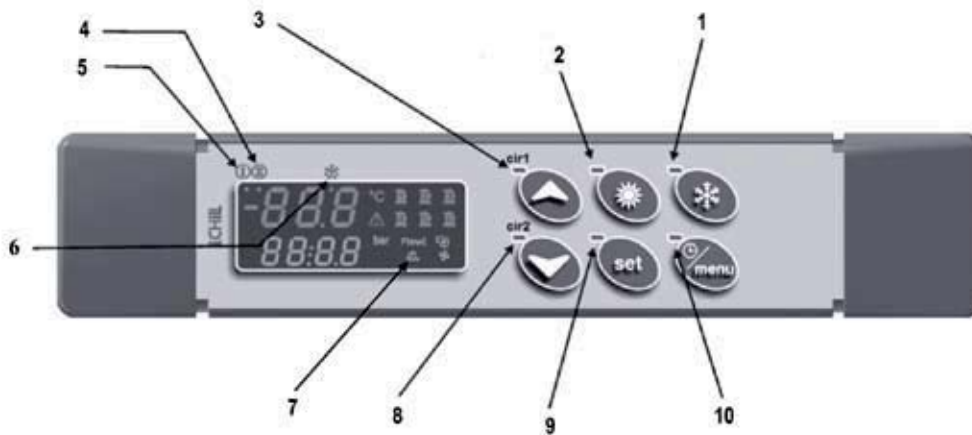
Press the  key, then the ,  keys, to scroll through the menus, when **ALOG** label appears in the bottom part of the display,

press . To scroll the list of alarms use the ,  keys.

7. USE (Modd. 190 ÷ 500)

7.1 Switch the unit on (Modd. 190 ÷ 500)


In order to power the unit, turn the main switch to the ON position. The display shows the User inlet water temperature.



Legend

1	Led ON: Unit in cooling mode	6	Led blinking: Defrost cycle timeout activated; Led ON: Defrost cycle activated.
2	Led ON: Unit in heating mode.	7	Led ON: Integrative user circuit heaters activated; Led OFF: Integrative heaters not in operation.
3	Led ON: Refrigerant circuit 1 activated; When led cir1 and led cir2 are blinking at the same time it means we are entering in the programming mode.	8	Led ON: Refrigerant circuit 2 activated; When led cir1 and led cir2 are blinking at the same time indicates entering the programming mode.
4	Led ON: Auxiliary outputs (Not used).	9	Led blinking: Energy saving function activated.
5	Led ON: Auxiliary outputs (Not used).	10	Led ON: Menu function activated.

7.1.1 Cooling mode

To start the unit in the cooling mode, press the  key. The green led is on. If requested, the compressor safety delay countdown starts and the compressor icon flashes. The water pump will be activated after few seconds, and then, once the compressor countdown has finished, the compressor starts and the icon remains on. The display shows the user water inlet temperature.


7.1.2 Heating

To start the unit in the cooling mode, press the  key. The green led is on.


If requested, the compressor safety delay countdown starts and the compressor icon flashes. The water pump will be activated after few seconds and then, once the compressor countdown has finished, the compressor starts and the icon remains on. The display shows the user water inlet temperature.

7.2 Stop (Modd. 190 ÷ 500)

7.2.1 Cooling mode

To stop the unit in cooling mode, press the  key. The LED switches off. The unit goes into stand-by mode.

7.2.2 Heating mode

To stop the unit in cooling mode, press the  key. The LED switches off. The unit goes into stand-by mode.

7.3 Stand-by (Modd. 190 ÷ 500)

When the unit is switched off from the keyboard or the remote panel, it goes into standby mode. In this mode, the microprocessor control displays the sensor readings and is also able to manage alarm situations. The only visible signal on the display is the green led of circuit1 and the water temperatures. If the unit is switched off from remote ON/OFF the label OFF is displayed.



If it is required to switch the unit on and off, never do this using the main isolator: this should only be used to disconnect the unit from the power supply when the unit is to be permanently off. Isolation will result in no supply for the crankcase heater and on start up the compressor could be seriously damaged.

7.4 How to change the set points (Modd. 190 ÷ 500)



When modifying or varying the machine's operating parameters, make sure that you do not create situations that conflict with the other set parameters.



The complete display of the 2 set points (heating, cooling) is ONLY available when the unit is in stand-by mode. It is suggested to put the unit in stand by when modifying set points. If the unit is not in stand-by, the only editable parameters are the ones related to the operation mode of the unit (eg. In heating mode it is only possible to change the heating set points, in cooling mode it is only possible to change the cooling set points.)



Select the required set point using the Press the . The label appears at the bottom of the display:

SEtH Heating set point

SEtC Cooling set point.

To set the required set-points press again the for 3 seconds. The current value flashes at the top and can be modified using the , keys we can modify the parameter. Then press the key to memorise the parameter and exit.



All set points are intended as return temperature from the plant. For example: if hot water at 45°C is required and the Δt is 5°C, than the set point will be 40°C. If the Δt is 8°C, then the set point has to be set at 37°C. If, for example, cold water is required at 15°C and the Δt is 5°C, then the set point will be 20°C. If the Δt is 8°C, then the set point has to be set at 23°C.

7.4.1 Adjustable parameters





The adjustable set points that can be modified by the end user are:

Label	Function	Adjustment limit	Default value
SEt H	Heating set-point	20÷55°C	40°C
SEt C	Cooling set-point	20÷55°C	12°C
PAS	Password	0÷15°C	10°C
(Contact the company)			




The units are supplied with a very sophisticated control system with many other parameters that are not adjustable by the end user; these parameters are protected by a manufacturer password.

7.5 Parameters list (Modd. 190 ÷ 500)

By pressing the  key the user has the possibility to display many parameters. Scroll the list of the parameters using the   keys, then press the  key to display the required one. In this menu it is only possible to display the parameters, it is not possible to change any value.





The parameter list is:

Display	List	Symbol	Meaning
ALrM	Alarm List	ALrM	See following paragraph
ALOG	Alarm history	ALOG	See following paragraph
UPL	Uploading parameter list from hotkey	UPL	(Not used)
CrEn	Enable to stop one refrigerant circuit	CrEn	(Not used)
COEn	Enable to stop one compressor	COEn	(Not used)
HouR	Main components working hours	CO1H CO2H EP1H	Working hours compressor 1 Working hours compressor 2 (only models with 2 compressors) Working hours user water pump
COSn	Compressors start up	CO1E CO2E	Number of start up compressor 1 Number of start up compressor 2
Cond	Fans Proportional output	Cnd1	Source fan output voltage
Pout	Auxiliary proportion output 0-10V	Pout1 Pout2 Pout3 Pout4	(Not used) (Not used) (Not used) (Not used)
dF	Defrost parameter	dF1	Countdown (in seconds) to the next defrost cycle; the countdown is active if the defrost led  is blinking. In case the defrost led is off the defrost cycle is not required. During the defrost cycle the defrost led is ON.


7.6 Acoustic signal silencing

Pressing and releasing one of the keys; the buzzer is switched off, even if the alarm condition remains in place.







7.7 Alarm reset

Press the  key (the menu AlrM appears at the bottom right of the display). Press the  key to display the alarm event. In case of multiple alarms use the using the   keys, to scroll through the list of the active alarms.

There are two types of alarms:

Reset alarms: RST label appears on the upper part of the display. In this case press the  key to reset.
Non reset alarms: nO label appears on the upper part of the display. In this case the alarm is permanent; contact the company service.

7.8 Display alarm history

Press the  key, then the   keys, to scroll through the menus, when ALOG label appears in the bottom part of the display, press . To scroll the list of alarms use the   keys.

8. MAINTENANCE OF THE UNIT

8.1 General warnings

Maintenance can:

- Keep the equipment operating efficiently
- Prevent failures
- Increase the equipment life



It is advisable to maintain a record book for the unit which details all operations performed on the unit as this will facilitate troubleshooting.



Maintenance must be performed in compliance with all requirements of the previous paragraphs.



Use personal protective equipment required by regulations as compressor casings and discharge pipes are at high temperatures. Coil fins are sharp and present a cutting hazard.



If the unit is not to be used during the winter period, the water contained in the pipes may freeze and cause serious damage. In this event, fully drain the water from the pipes, checking that all parts of the circuit are empty including any internal or external traps and siphons.

8.2 Drive access

Access to the unit once installed, should only be possible to authorized operators and technicians. The owner of the equipment is the company legal representative, entity or person owns the property where the machine is installed.

They are fully responsible for all safety rules given in this manual and regulations. If it is not possible to prevent access to the machine by outsiders, a fenced area around the machine at least 1.5 meters away from external surfaces in which operators and technicians only can operate, must be provided.

8.3 Periodical checks



The start-up operations should be performed in compliance with all requirements of the previous paragraphs.



All of the operations described in this chapter **MUST BE PERFORMED BY TRAINED PERSONNEL ONLY**. Before commencing service work on the unit ensure that the electric supply is disconnected. The top case and discharge line of compressor are usually at high temperature. Care must be taken when working in their surroundings. Aluminium coil fins are very sharp and can cause serious wounds. Care must be taken when working in their surroundings. After servicing, replace the cover panels, fixing them with locking screws.

8.3.1 Every 6 months:

It is advisable to perform periodic checks in order to verify the correct working of the unit.

- Check that safety and control devices work correctly as previously described.
- Check all the terminals on the electric board and on the compressor are properly fixed.
- Check and clean the sliding terminals of the contactors.
- Check for water leaks in the hydraulic system.
- Check correct operation of the flow switch and clean the strainers on the pipework.
- Check the compressor crankcase heater has the proper supply and is functioning correctly.
- Check the state of the finned coil, removing any debris or leaves. If possible, use compressed air to blow through in the opposite direction to the airflow. If the coil is heavily clogged, clean it with a low pressure washer, taking care to avoid damaging the aluminium fins.
- Check the state of the finned coils metallic filters (Optional), removing any debris or leaves. If possible, use compressed air to blow through in the opposite direction to the airflow. If the coil is heavily clogged, clean it with a low pressure washer, taking care to avoid damaging the aluminium fins.
- Check mounting of fan blades and their balancing.
- Check the colour of the sight glass core (green=no moisture, yellow=moisture present): if it has a yellow colour, change the refrigerant filter.

8.3.2 End of seasons or unit switched off:

If the unit is to be left out of commission for a long period, the hydraulic circuit should be drained down. This operation is compulsory if the ambient temperature is expected to drop below the freezing point of the fluid in the circuit (water or Glycol mix).

8.4 Refrigerant circuit repair



If the refrigerant circuit is to be emptied, all the refrigerant must be recovered using the correct equipment.

For leak detection, the system should be charged with nitrogen using a gas bottle with a pressure reducing valve, until 15 bar pressure is reached. Any leakage is detected using a bubble leak finder. If bubbles appear discharge the nitrogen from the circuit before brazing using the proper alloys.



Never use oxygen instead of nitrogen: explosions may occur.

Site assembled refrigerant circuits must be assembled and maintained carefully, in order to prevent malfunctions.

Therefore:

- Avoid oil replenishment with products that are different from that specified and that are pre-loaded into the compressor.
- In the event of a gas leakage on machines using refrigerant R410A, even if it is only a partial leak, do not top up. The entire charge must be recovered, the leak repaired and a new refrigerant charge weighed in to the circuit.
- When replacing any part of the refrigerant circuit, do not leave it exposed for more than 15 minutes.
- It is important when replacing a compressor that the task be completed within the time specified above after removing the rubber sealing caps.
- When replacing the compressor following a burn out, it is advisable to wash the cooling system with appropriate products including a filter for acid.
- When under vacuum do not switch on the compressor.

9. DECOMMISSIONING

9.1 Disconnect the unit



All decommissioning operations must be performed by authorized personnel in accordance with the national legislation in force in the country where the unit is located.

- Avoid spills or leaks into the environment.
- Before disconnecting the machine please recover:
 - the refrigerant gas;
 - Glycol mixture in the hydraulic circuit;
 - the compressor lubricating oil.

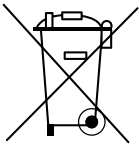
Before decommissioning the machine can be stored outdoors, providing that it has the electrical box, refrigerant circuit and hydraulic circuit intact and closed.

9.2 Disposal, recovery and recycling

The frame and components, if unusable, should be taken apart and sorted by type, especially copper and aluminum that are present in large quantities in the machine.

All materials must be recovered or disposed in accordance with national regulations.

9.3 RAEE Directive (only UE)



- The RAEE Directive requires that the disposal and recycling of electrical and electronic equipment must be handled through a special collection, in appropriate centers, separate from that used for the disposal of mixed urban waste.
- The user has the obligation not to dispose of the equipment at the end of the useful life as municipal waste, but to send it to a special collection center.
- The units covered by the RAEE Directive are marked with the symbol shown above.
- The potential effects on the environment and human health are detailed in this manual.
- Additional information can be obtained from the manufacturer.

10. DIAGNOSIS AND TROUBLESHOOTING

10.1 Fault finding

All units are checked and tested at the factory before shipment, however, during operation an anomaly or failure can occur.



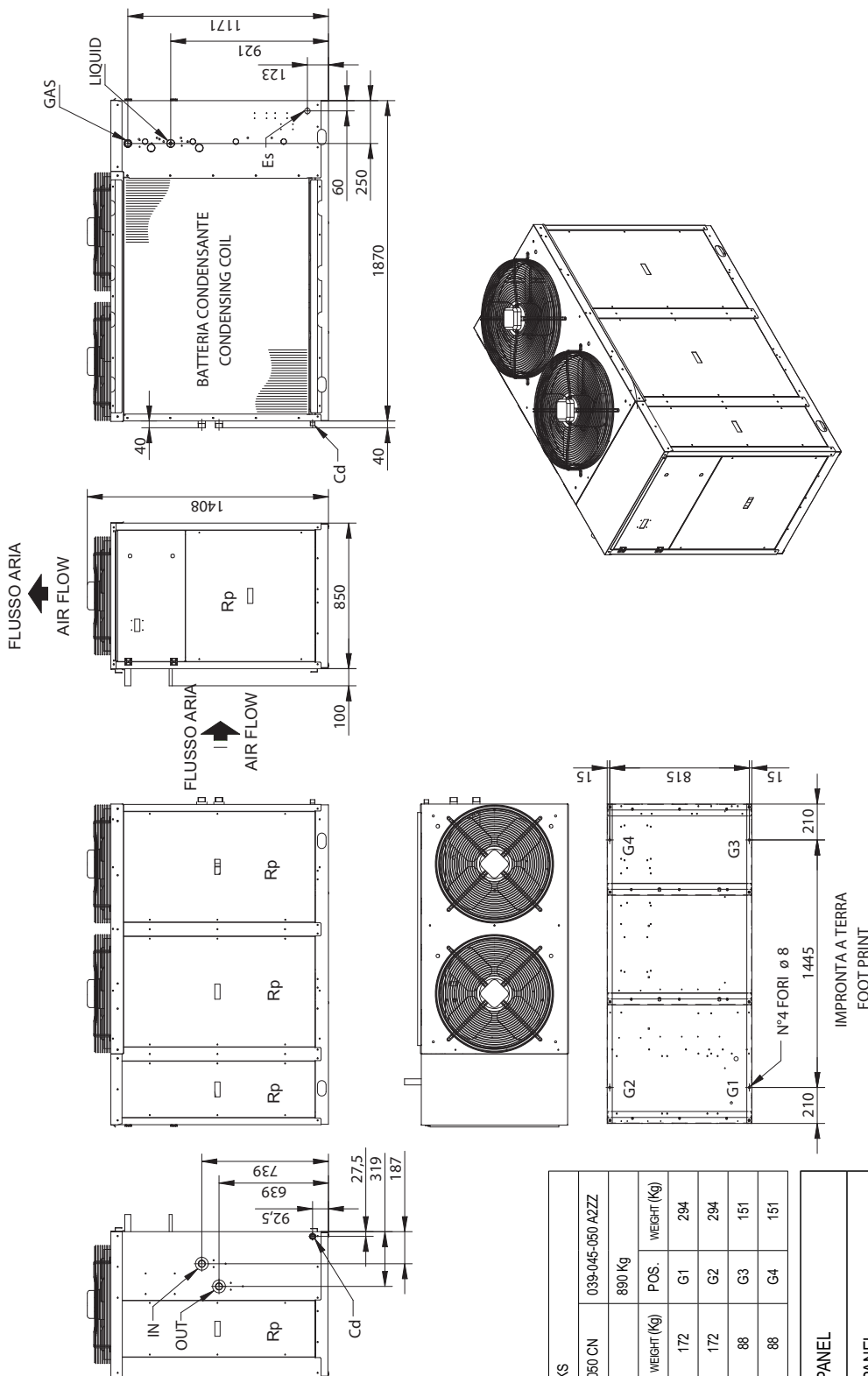
BE SURE TO RESET AN ALARM ONLY AFTER YOU HAVE REMOVED THE CAUSE OF THE FAULT; REPEATED RESET MAY RESULT IN IRREVOCABLE DAMAGE TO THE UNIT.

Code	Alarm Description	Cause	Solution
ACF1	Configuration alarm	Wrong configuration of microprocessor control system.	Contact the company.
ACF2	Configuration alarm		
ACF3	Configuration alarm		
ACF4	Configuration alarm		
ACF5	Configuration alarm		
ACF6	Configuration alarm		
ACF7	Configuration alarm		
ACF8	Configuration alarm		
ACF9	Configuration alarm		
AEE	Eeprom alarm	Severe hardware damage in the microprocessor control system.	Switch OFF the unit and, after few second switch ON the unit; if the alarm appears again contact the service.
AEFL	User water flow switch alarm	Presence of air or dirtiness in the user hydraulic system.	Bleed carefully the user hydraulic system or check and clean the water strainer.
AEUn	Compressor unloading alarm (only units with 2 compressors)	User water temperature is too high.	
AP1	Alarm user inlet water temperature sensor	Wrong electrical connection, Sensor defect.	Check the electrical connection of the sensor to the terminal board, if correct call the service to replace the sensor.
AP2	Alarm user outlet water temperature sensor		
AP3	Alarm pressure transducer		
AP4	Alarm finned coil sensor / defrost sensor		

Code	Alarm Description	Cause	Solution
AP7	Alarm ambient sensor	Wrong electrical connection, Sensor defect.	Check the electrical connection of the sensor to the terminal board, if correct call the service to replace the sensor.
AP8	Not used		
AP9	Not used		
AtE1	Not used		
AtE2	Not used		
B1 HP B2 HP	High pressure switch circuit 1/2	In heating mode: Insufficient user circuit water flow; Insufficient domestic hot water circuit water flow. In cooling mode: Insufficient air flow at the source fan; Insufficient domestic hot water circuit water flow.	Restore the correct user water flow. Restore the correct air flow at the source fan.
b1AC	Anti-freeze alarm circuit 1 (cooling mode)	Too low water temperature	Check user temperature set point; Check user water flow.
b1AH	Anti-freeze alarm circuit 1 (heating mode)	Too low water temperature	Check user temperature set point.
b1dF	Wrong defrost circuit 1 (maximum time admitted)	Defrost time too long; Outside temperature outside the working limits; Refrigerant charge leakage.	Check defrost set point; Restore normal working conditions; Find leakage and repair.
b1hP b2hP	High pressure transducer alarm circuit 1/2	Transducer defect	Replace the faulty transducer.
B1LP B2LP	Low pressure switch circuit 1/2	Refrigerant charge leakage.	Find leakage and repair.
b1IP b2IP	Low pressure transducer alarm circuit 1/2	Transducer defect	Replace the faulty transducer.
b1tF	Overload source fan alarm	Fan input current outside operation limits.	Check the proper operation of the source fan and, in case replace it.
C1tr	Compressor 1 overload	Compressor 1 input current outside operation limits.	Replace the compressor.
C2tr	Compressor 2 overload	Compressor 2 input current outside operation limits.	Replace the compressor.
C3tr	Compressor 3 overload	Compressor 3 input current outside operation limits.	Replace the compressor.
C4tr	Compressor 4 overload	Compressor 4 input current outside operation limits.	Replace the compressor.
C5tr	Compressor 5 overload	Compressor 5 input current outside operation limits.	Replace the compressor.
C6tr	Compressor 6 overload	Compressor 6 input current outside operation limits.	Replace the compressor.

11.DIMENSIONAL DRAWINGS

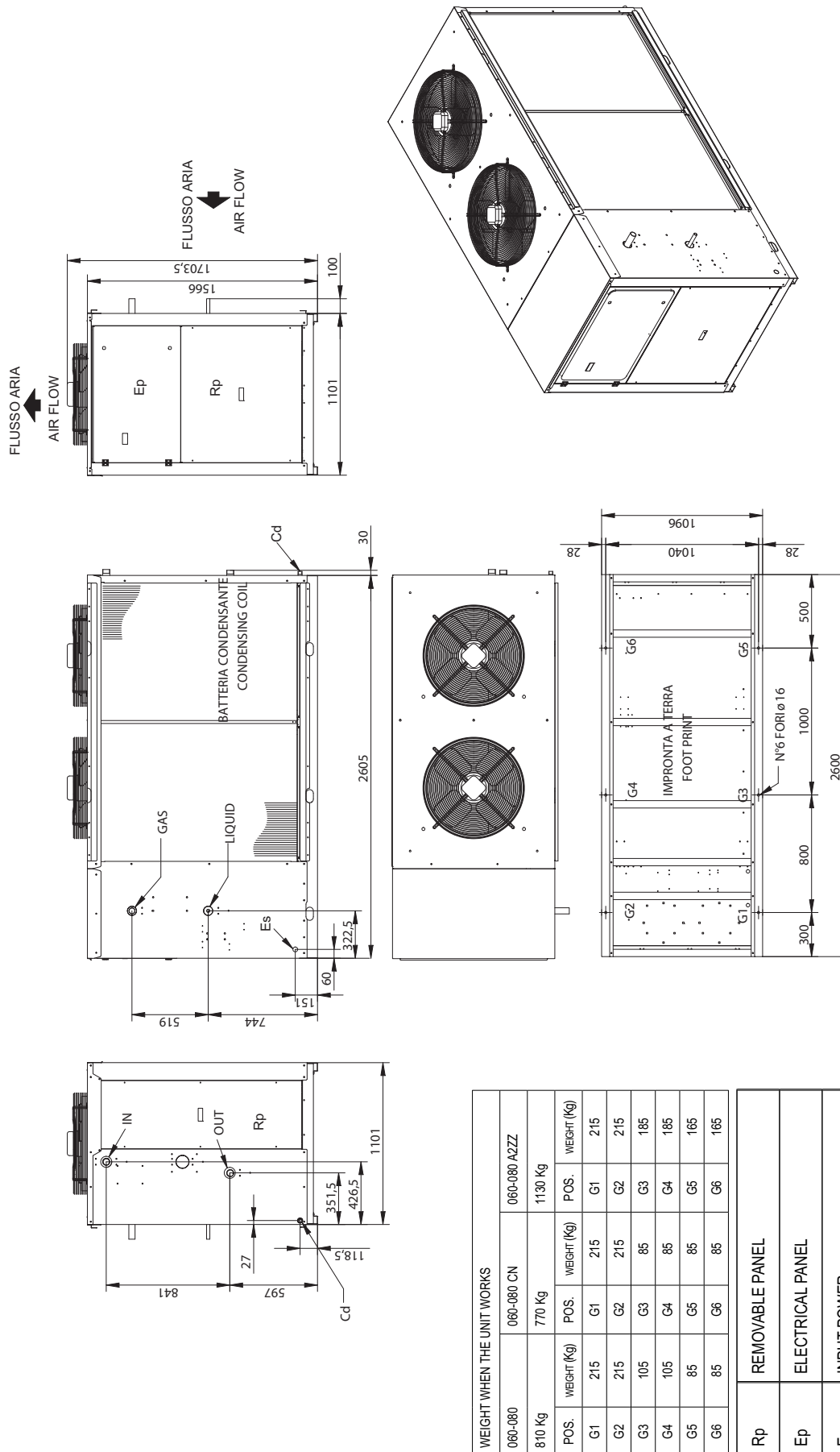
Dimensional drawings LDA 039 - 045 - 050



WEIGHT WHEN THE UNIT WORKS			
039-045-050	039-045-050 CN	039-045-050 A2ZZ	
570 Kg	520 Kg	890 Kg	
POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)
G1	185	G1	294
G2	185	G2	294
G3	100	G3	151
G4	100	G4	151

Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
Cd	DRAIN
IN Ø 1" 1/4	WATER INLET
OUT Ø 1" 1/4	WATER OUT
LIQUID Ø 18	ONLY CN VERSION
GAS Ø 35	ONLY CN VERSION

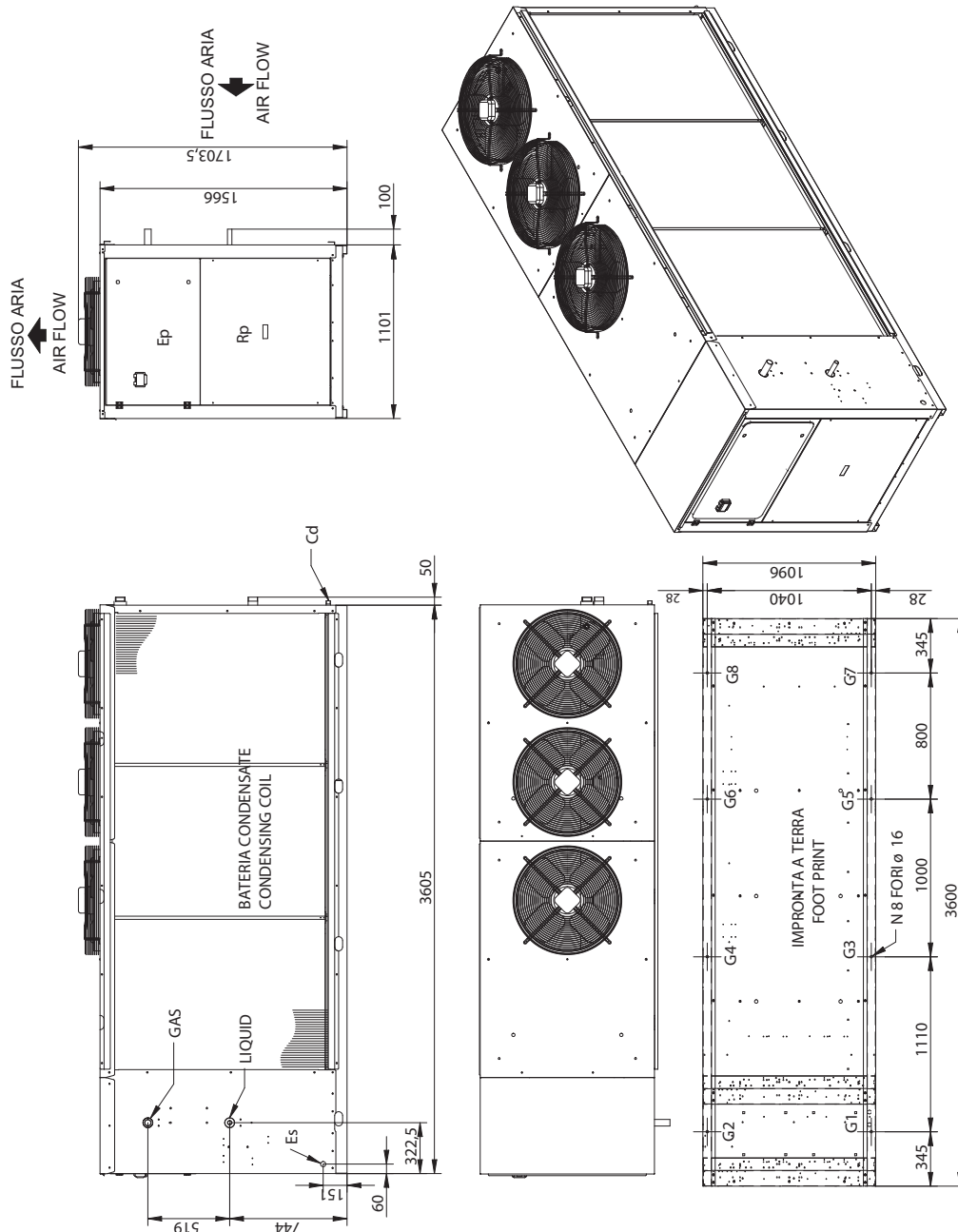
Dimensional drawings LDA 060 - 070 - 080



WEIGHT WHEN THE UNIT WORKS			
060-080	060-080 CN	060-080 AZZZ	
810 Kg	770 Kg	1130 Kg	
POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)
G1	215	G1	215
G2	215	G2	215
G3	105	G3	185
G4	105	G4	185
G5	85	G5	165
G6	85	G6	165

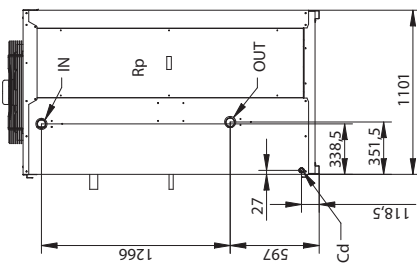
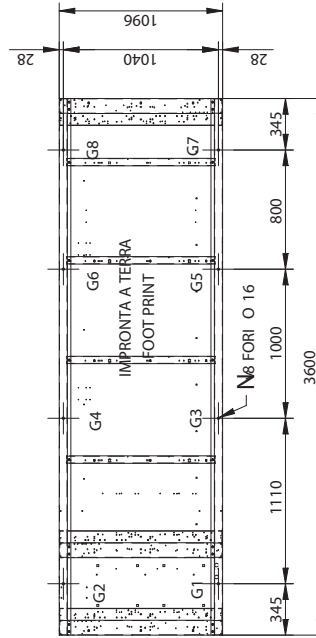
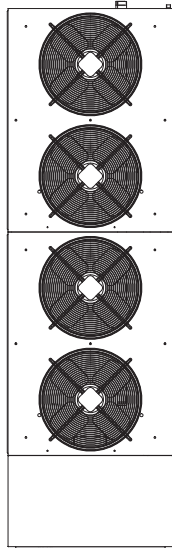
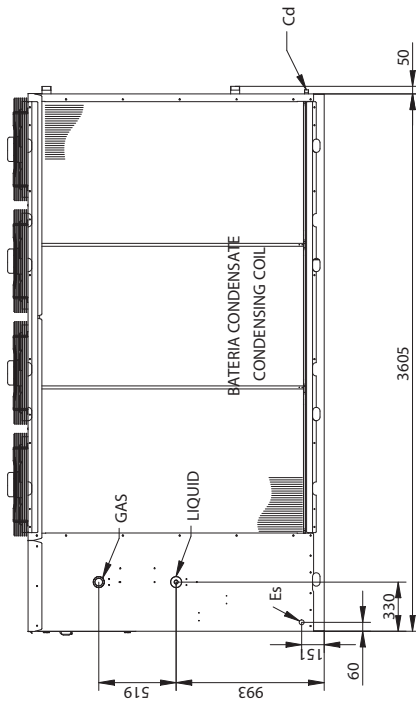
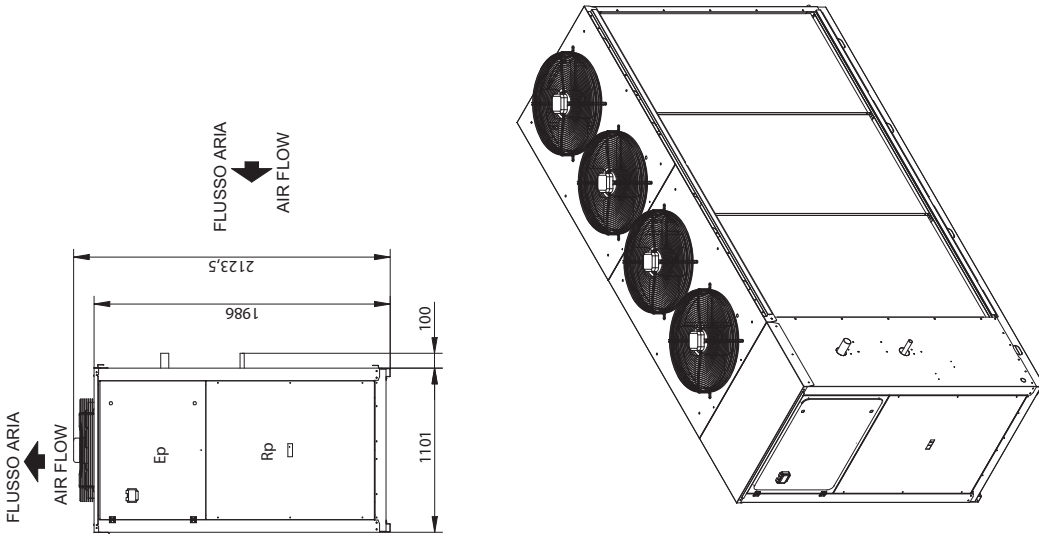
Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
Cd	DRAIN
IN Ø 1" 1/2	WATER INLET
OUT Ø 1" 1/2	WATER OUT
LIQUID Ø 22	ONLY CN VERSION
GAS Ø 42	ONLY CN VERSION

Dimensional drawings LDA 090 - 110 - 120 - 130



WEIGHT WHEN THE UNIT WORKS		090-110-120-130 CN		090-110-120-130 A2ZZ	
090-110-120-130	1230 Kg	1180 Kg	1750 Kg	1750 Kg	
POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)
G1	237	G1	212	G1	237
G2	237	G2	212	G2	237
G3	126	G3	126	G3	233
G4	126	G4	126	G4	233
G5	126	G5	126	G5	233
G6	126	G6	126	G6	233
G7	126	G7	126	G7	172
G8	126	G8	126	G8	172
Rp	REMOVABLE PANEL				
Ep	ELECTRICAL PANEL				
Es	INPUT POWER				
Cd	DRAIN				
IN Ø 2"	WATER INLET				
OUT Ø 2"	WATER OUT				
LIQUID Ø 28	ONLY CN VERSION				
GAS Ø 42	ONLY CN VERSION				

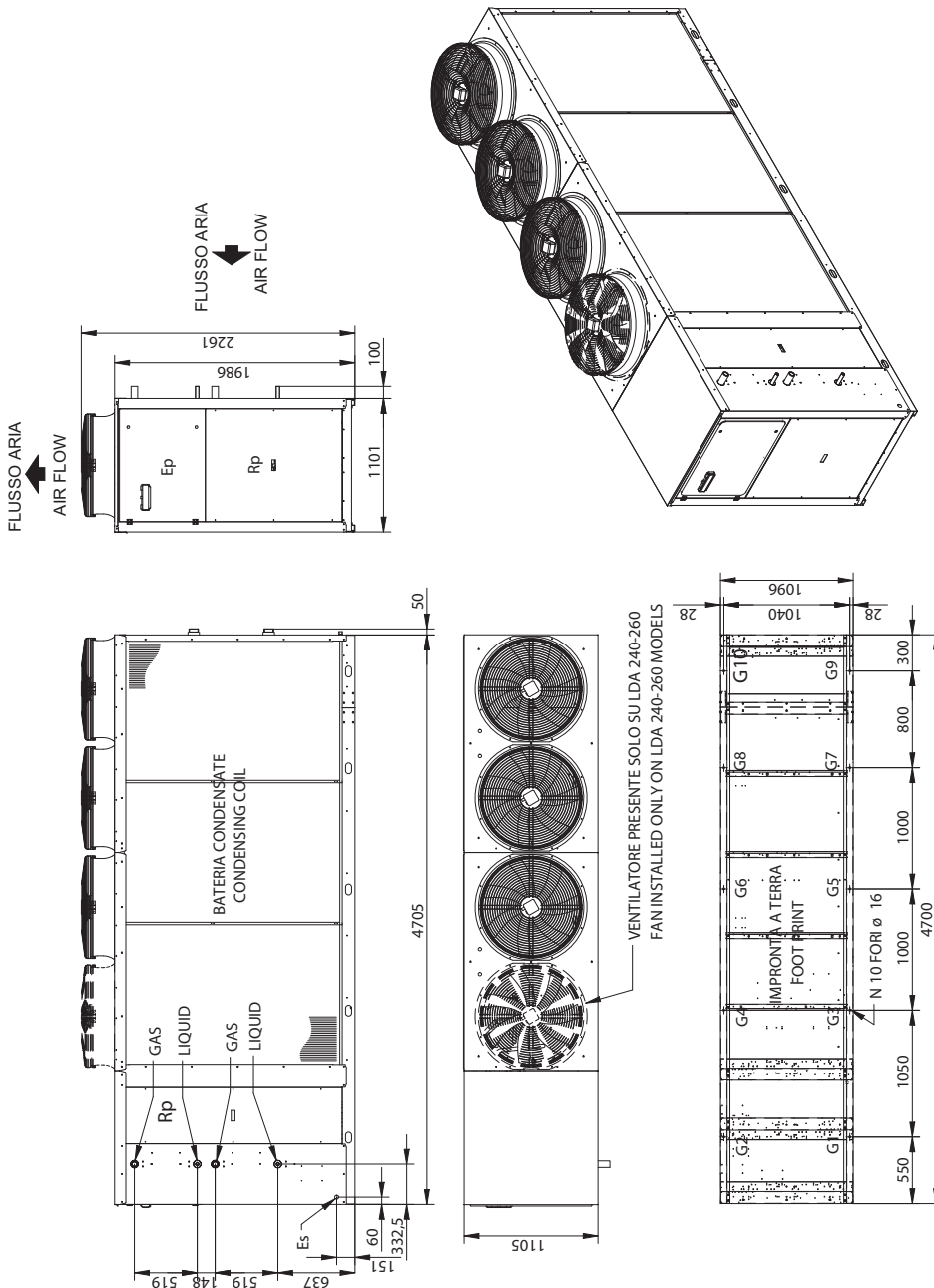
Dimensional drawings LDA 152 - 162



WEIGHT WHEN THE UNIT WORKS			
152-162	152-162 CN	152-162 A2ZZ	
1580 Kg	1510 Kg	2100 Kg	
POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)
G1	286	G1	286
G2	286	G2	286
G3	168	G3	168
G4	168	G4	168
G5	168	G5	168
G6	168	G6	168
G7	168	G7	168
G8	168	G8	168

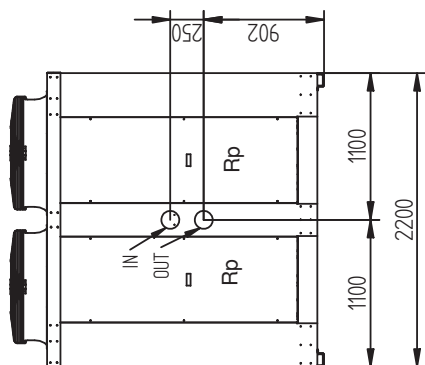
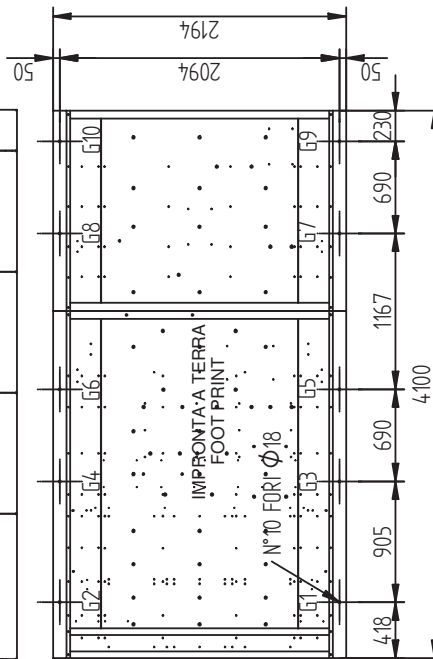
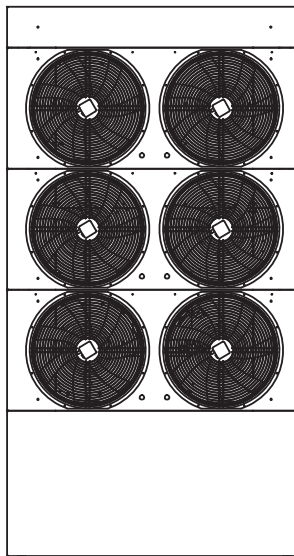
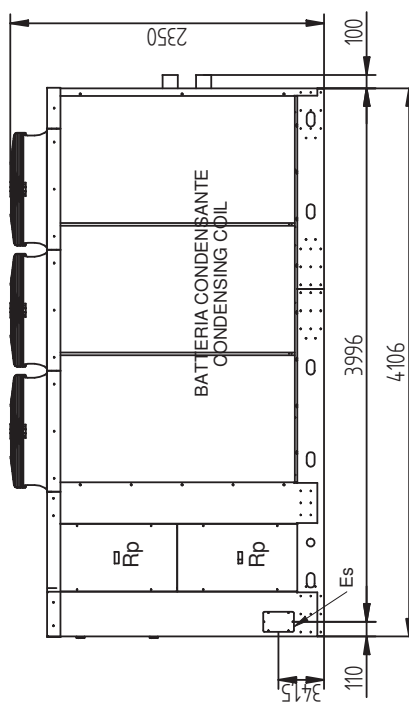
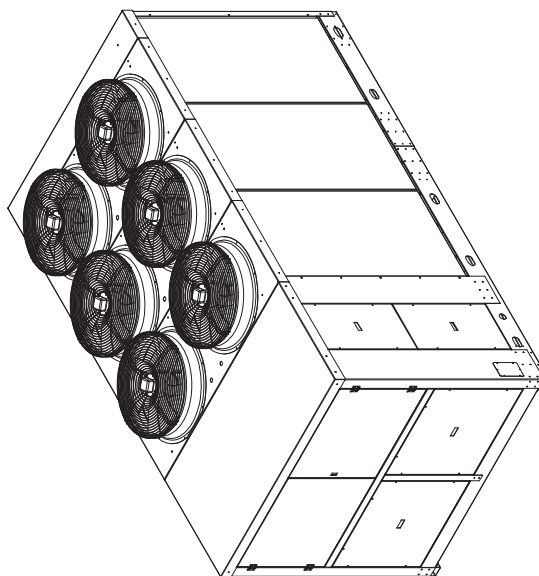
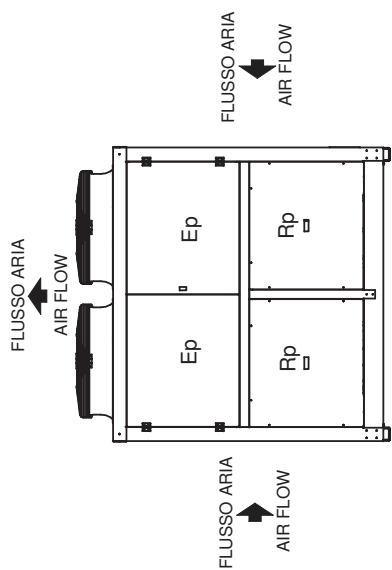
Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
Cd	DRAIN
IN Ø 2" 1/2	WATER INLET
OUT Ø 2" 1/2	WATER OUT
LIQUID Ø 28	ONLY CN VERSION
GAS Ø 54	ONLY CN VERSION

Dimensional drawings LDA 190 - 210 - 240 - 260



WEIGHT WHEN THE UNIT WORKS			
190-210-240-260		190-210-240-260 CN	190-210-240-260 AZZZ
2480 Kg		2390 Kg	3000 Kg
POS.	WEIGHT (Kg)	POS.	WEIGHT (Kg)
G1	320	G1	320
G2	320	G2	320
G3	320	G3	275
G4	320	G4	275
G5	200	G5	200
G6	200	G6	200
G7	200	G7	200
G8	200	G8	200
G9	200	G9	200
G10	200	G10	200
Rp	REMOVABLE PANEL		
Ep	ELECTRICAL PANEL		
Es	INPUT POWER		
Cd	DRAIN		
IN Ø 2" 1/2	WATER INLET		
OUT Ø 2" 1/2	WATER OUT		
LIQUID Ø 28	ONLY CN VERSION		
GAS Ø 54	ONLY CN VERSION		

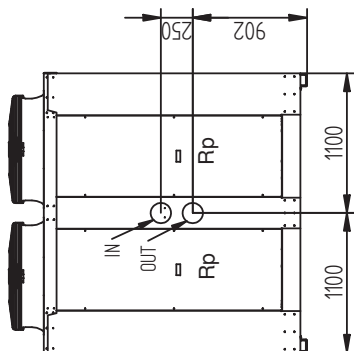
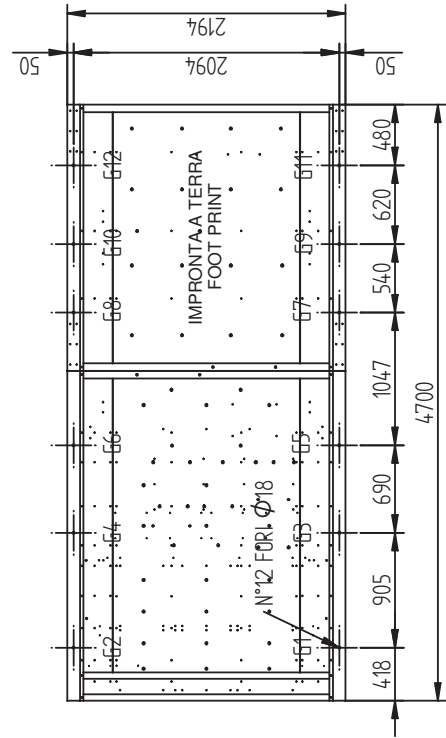
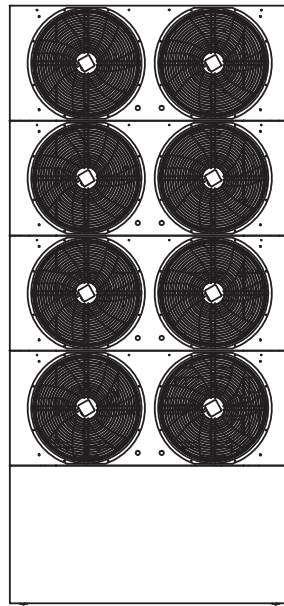
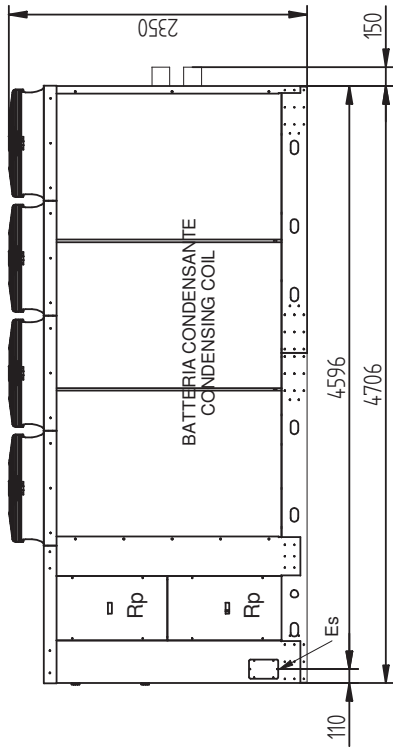
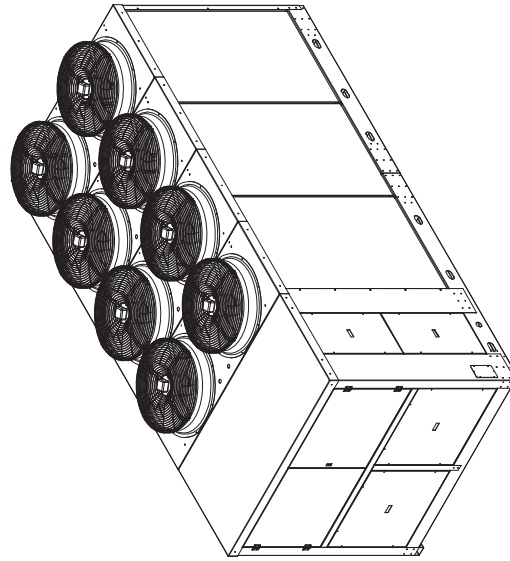
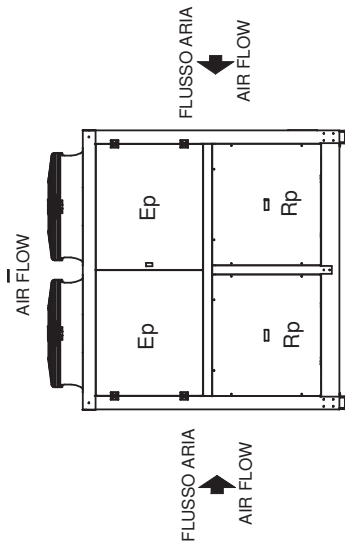
Dimensional drawings LDA 300 - 320



WEIGHT WHEN THE UNIT WORKS			
300-320	300-320 CN	300-320 AZZZ	
3670 Kg	3530 Kg	4430 Kg	
POS.	WEIGHT (kg)	POS.	WEIGHT (kg)
G1	450	G1	535
G2	450	G2	535
G3	450	G3	535
G4	450	G4	535
G5	330	G5	407
G6	330	G6	407
G7	303	G7	369
G8	303	G8	369
G9	303	G9	369
G10	303	G10	369

Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
Cd	DRAIN
IN Ø 4" VIC	WATER INLET
OUT Ø 4" VIC	WATER OUT

Dimensional drawings LDA 380 - 430 - 500



WEIGHT WHEN THE UNIT WORKS		380-430-500 A2ZZ	
POS.	WEIGHT (kg)	POS.	WEIGHT (kg)
G1	466	G1	466
G2	466	G2	466
G3	466	G3	466
G4	466	G4	466
G5	349	G5	349
G6	349	G6	349
G7	198	G7	376
G8	198	G8	376
G9	198	G9	376
G10	198	G10	376
G11	198	G11	376
G12	198	G12	376

Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
Cd	DRAIN
IN Ø 5" VIC	WATER INLET
OUT Ø 5" VIC	WATER OUT



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Technical data shown in this booklet are not binding.

HIDROS S.p.A. shall have the right to introduce at any time whatever modifications necessary to the improvement of the product.
