



**AIR COOLED WATER CHILLERS, CONDENSING UNITS AND  
HEAT PUMPS WITH AXIAL FANS**

***LDK***

**SERIES**



**TECHNICAL MANUAL**

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**INDEX**

Declaration of conformity	page 2
Aim and contents of this manual	page 6
How to keep this manual	page 6
Graphic symbols	page 6
Safety laws	page 7
General safety guidelines	page 7
Workers' health and safety	page 8
Protective equipment	page 8
Safety signs	page 8
Technical characteristics	page 9
Technical data	page 12
LDK cooling capacity and compressors input power	page 19
LDK/HP heating capacity and compressors input power	page 20
LDK/CN cooling capacity and compressors input power	page 21
Evaporator pressure drops	page 22
Water pumps available static pressure	page 23
Free Cooling Capacity	page 24
Partial heat recovery capacity	page 25
Operation limits	page 26
Compressors capacity step controls	page 27
Corrections tables	page 27
Sound Data	page 28
Safety Device Setting	page 29
Electric data	page 29
Inspection	page 29
Lifting and handling	page 29
Location and minimum technical clearances	page 30
Hydraulic connections	page 31
LDK/FC Free cooling version	page 33
LDK / CN refrigerant connections	page 34
Refrigerant circuits	page 35
Unit display	page 40
Fan speed control	page 41
Electrical connections	page 41
Start up	page 41
Maintenance and periodic checks	page 42
Refrigerant circuit repair	page 43
Environment protection	page 43
Unit out of service	page 43
Fault finding	page 43
Dimensions	page 44

The LDK manual, contains any information that is needed for a correct use of the equipment while safeguarding operator safety, according to what indicated in the actual directives on units safety.

#### **AIM AND CONTENTS OF THIS MANUAL**

This manual provides basic information on the installation, operation and maintenance off the LDK unit. It is addressed to machine operators and it enables them to use the equipment efficiently, even if they do not have any previous specific knowledge of it. This manual describes the characteristics of the equipment at the time it is being put on the market; therefore it may not capture later technological improvements introduced by HIDROS SRL as part of its constant endeavour to enhance the performance, ergonomics, safety and functionality of its products.

#### **HOW TO KEEP THIS MANUAL**

The manual must be always with the unit it refers to. It must be stored in a safe place, away from the dust and moisture. It must be accessible to all users who shall consult it any time they are in doubt on how to operate the equipment.

HIDROS SRL reserves the right to modify its products and related manuals without necessarily updating previous versions of the reference material. The customer shall store any updated copy of the manual or parts of it delivered by the manufacturer as an attachment to this manual.

HIDROS SRL is available to give any detailed information about this manual and to give information regarding the use and the maintenance of its own units.

#### **GRAPHIC SYMBOLS**



*Indicates operations that can be dangerous for people and/or disrupts the correct operation of the equipment..*



*Indicates prohibited operations.*








*Indicates important information that the operator must follow in order to guarantee the correct operation of the equipment in complete safety*

**SAFETY LAWS**

The units single components or the complete units produced by HIDROS have been designed according to the actual CE and national Directives. For the detailed list of the project technical Directives, refer to the CE declaration enclosed.

**GENERAL SAFETY GUIDELINES**

Before beginning to operate on LDK units every user must be perfectly knowledgeable about the functions of the equipment and its controls and must have read and understood the information container in this manual.

	<p><b>It's strictly forbidden to remove and/or camper with any safety device.</b></p>
	<p><b>Any routine or not-routine maintenance operation shall be carried out when the equipment has been shut down, disconnected from electric and pneumatic power source and after its pneumatic system has been discharged.</b></p>
	<p><b>Do not put your hands or insert screwdrivers, spanners or other tools into moving parts of the equipment.</b></p>
	<p><b>The equipment supervisor and the maintenance man must receive training suitable for the performance of their tasks in safety</b></p>
	<p><b>Operators must know how to use personal protective devices and must know the accident-prevention guidelines contained in national and international laws and norms.</b></p>

**WORKERS' HEALTH AND SAFETY**

The European Community has emanated some Directives about worker's safety and health which the employers have to respect and make the others respect. For the detailed list, see the CE declaration enclosed.

- |  |   |
|--|---|
|  | <b>Do not tamper with or replace parts of the equipment without the specific consent of the manufacturer. The manufacturer shall have no responsibility whatsoever in case of unauthorised operations.</b>  |
|  | <b>Using components, expendable materials or spare parts that do not correspond to those recommended by the manufacturer and/or listed in this manual may be dangerous for the operators and/or damage the equipment</b>  |
|  | <b>The operator's workplace must be kept clean, tidy and free from objects that may hamper free movements. Appropriate lighting of the work place shall be provided so as to allow the operator to carry out the required operations safely. Poor or too strong lighting can cause risks.</b> |
|  | <b>Ensure that work places are always adequately ventilated and that aspirators are working, in good condition and in compliance with the requirements of the laws in force...</b>  |

**PERSONAL PROTECTIVE EQUIPMENT**

When operating and maintaining the LDK unit, use the following personal protective equipment.

- |  |  |  |
|--|--|--|
|  | <b>Equipment: people who make maintenance or work with the unit, must wear an equipment in accordance with the safety Directives. They must wear accident prevention shoes with anti-slip sole where the paving is slippery.</b> |  |
|  | <b>Gloves: During the cleanings and the maintenance operations, it's necessary the use of appropriate gloves. In case of gas recharge, it's compulsory the use of appropriate gloves to avoid the risk of freezing.</b>          |  |
|  |  | <b>Mask and goggles: Respiratory protection (mask) and eye protection (goggles) should be used during cleaning and maintenance operations.</b> |

**SAFETY SIGNS**

The equipment features the following safety signs, which must be complied with:

- |  |                              |
|--|------------------------------|
|  | <b>General hazard</b>        |
|  | <b>Electric shock hazard</b> |

## TECHNICAL CHARACTERISTICS

### Frame

All LDK units are made from hot-galvanised thick sheet metal, painted with polyurethane powder enamel at 180°C to ensure the best resistance against the atmospheric agents. The frame is self-supporting with removable panels. All screws and rivets for outdoor installations are in stainless steel. The colour of the units is RAL 7035.

### Refrigerant circuit

The refrigerant gas used in these units is R407C. The refrigerant circuit is made by using international primary brands components and according to ISO 97/23 concerning welding procedures. Each refrigerant circuit is totally independent from the other. Any incorrect operation of one circuit does not influence the other circuit. The refrigerant circuit includes:

- liquid line manual shut-off valve,
- sight glass,
- filter drier,
- thermal expansion valve with external equalizer,
- electric expansion valve with electronic control to optimize the efficiency in part load conditions (option),
- reverse cycle valve (for heat pump version only),
- one way valve (for heat pump version only),
- liquid receiver (for heat pump version only),
- Schrader valves for maintenance and control,
- pressure safety device (according to PED regulation).

### Compressors

The compressors are scroll type, with crankcase heater and thermal overload protection by a klixon embedded in the motor winding. They are mounted in a separate chamber in order to be separated from the air stream. The crankcase heater is always powered when the compressors are in stand-by. The inspection is possible through the frontal panel of the unit that allows the maintenance of the compressors even if the unit is working. The compressors used are all in tandem execution. This solution allows much higher efficiencies in partial loads compared to the units with independent refrigerant circuits.

### Condensers

The condensers are made of copper pipes and aluminium fins. The diameter of the copper pipes is 3/8" and the thickness of the aluminium fins is 0,1 mm. The tubes are mechanically expanded into the aluminium fins to improve the heat exchange factor. The geometry of these condensers guarantees a low air side pressure drop and then the use of low rotation (and low noise emission) fans. The condensers can be protected by a metallic filter to be installed on request.

### Fans

The fans are axial type with aerofoil blades. They are statically and dynamically balanced and supplied complete of the safety fan guard according to EN 60335. They are mounted on the unit frame by interposition of rubber vibration dampers. The electric motors are all at 6 poles (about 900 rpm) in the low noise versions, 8 poles (about 750 rpm) in the extra low noise versions. The motors are directly driven with an integrated thermal overload protection. The protection class of the motors is IP 54.

### Evaporators

The evaporators are made of AISI 316 stainless steel braze-welded plates type. From size 045 to size 152 are single water side circuit, from the size 144 they are double circuit "cross flow" type. The use of these kinds of evaporators allows a massive reduction of the refrigerant charge of the unit compared to the traditional shell-in-tube evaporators and increases the efficiency of the refrigerant cycle in partial loads. The evaporators are factory insulated with flexible close cell material and can be equipped with antifreeze heater (optional). Each evaporator is provided with a temperature sensor as antifreeze protection.



**Electric enclosure**

The electric switch board is made according to electromagnetic compatibility norms CEE 73/23 and 89/336. The accessibility to the board is possible after removing the front panel of the unit and the OFF positioning of the main switch. The moisture protection degree is IP55. In all LDK units are installed, standard, the compressors sequence relay who disables the operation of the compressor in case the power supply phase sequence is not the correct one (scroll compressors in fact, can be damaged if they rotate reverse wise). The following components are also standard installed: main switch, magnetic-thermal switches (as a protection of pumps and fans), compressors fuses, control circuit automatic breakers, compressor contactors, fan contactors, pump contactors. The terminal board is supplied with voltage free contacts for remote ON-OFF , Summer / winter change over (heat pumps only) and general alarm.

**Microprocessors**

All LDK units are supplied standard with microprocessor controls. The microprocessor controls the following functions: regulation of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, potential free contact for remote general alarm, alarms and operation leds. Upon request any microprocessor can be connected to a BMS system for the remote control and management. The technical department is available to study, together with the customer, different solutions using MODBUS; LONWORKS; BACNET or TREND protocols.

**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 plant (12°C), antifreeze protection sensor installed on the outlet water temperature (7°C), high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection, flow switch.

## OTHER VERSIONS

### Unit with integrated hydraulic circuit (A versions)

The LDK chillers can be delivered as option, with 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 antifreeze kit (option). The water tank is installed to minimize the inevitable fluctuations in the water temperature due to the compressors starts and stops.

**Water pump**, centrifugal type, is available in single or double configuration. In this case one pump is running, one pump is in stand-by. The change over can be manual (by manual selector installed in the electric box) or automatically controlled by the microprocessor (option).

In the hydraulic circuit are also present the expansion vessel, the safety valve and the manual valves with fittings.

### Heat pumps version (HP)

The heat pump versions are provided with a 4 way reverse cycle valve and are suitable to produce hot water up to a temperature of 45-50°C. They are always supplied with liquid receiver and a second thermostatic valve to optimize the efficiency of the refrigerant cycle in heating and in cooling. The microprocessor is set for automatic defrost (in case of operation in severe ambient conditions) and for summer/winter change over.

### Free cooling version (FC)

The FREE COOLING option is a system designed to grant an important energy saving, when the cooling system is operating continuously, also during the winter season (computer rooms, telephone exchange plants, etc.). The free-cooling device is using the low ambient air temperature to cool down the water in the system. In some situations the chilled water can be even produced without the work of the compressors with consequent massive reduction of electric power consumption. The FREE COOLING system is composed by the following components:

- |                                |  |
|--------------------------------|--|
| <b>Free cooling coil:</b>      | It is essentially a heat exchanger made of copper tubes and aluminium fins with bleeding valves.   |
| <b>Microprocessor control:</b> | It is the "heart" of the system; it allows the correct control of all the parameters performing the best efficiency of the system in the different ambient conditions.   |
| <b>3 way valve:</b>            | It is an ON/OFF 3 way valve that opens or closes the FREE COOLING circuit depending on the signal coming from the microprocessor control.  |
| <b>Head pressure control:</b>  | It is a device that allows the correct condensing pressure in the refrigerant circuit when the ambient conditions are low. In the units equipped with FREE COOLING system, this device is composed by solenoid valves that close some refrigerant circuits in the condensing coil in order to reduce its exchange capacity and to keep a suitable condensing pressure level. |

### Low noise version (LS)

The low noise version LS includes the complete insulation of the compressor vane with high density sound absorption material.

### 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).

### Condensing unit version (CN)

The condensing unit version is supplied without refrigerant charge (only a nitrogen charge), without evaporator and thermostatic valve. The microprocessor control is present in all units as well as the sight glass, filter drier, liquid line solenoid valve and the refrigerant lines shut off manual valves.

**WATER CHILLERS AND HEAT PUMPS  
LDK/LS (Low noise version)  
TECHNICAL DATA**

Mod.		039	045	050	060	070	080	090	110
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	Kw	37,0	45,0	52,0	58,0	64,0	78,0	90,0	104,0
Compressors input power	Kw	12,6	15,1	17,2	19,3	21,5	25,8	29,9	33,9
Water flow rate	l/h	6490	7910	9290	10320	11520	13590	15650	18400
Water pressure drops	Kpa	26,2	32,4	31,5	23,3	30,1	30,4	27,6	26,5
Heating capacity	Kw	38,5	47,0	54,5	62,0	68,0	83,0	95,0	107,0
Compressors input power	Kw	12,9	15,2	17,3	19,5	21,7	26,4	31,0	34,2
Water flow rate	l/h	6630	8085	9460	10665	11695	14275	16340	18400
Water pressure drops	Kpa	28,5	33,8	32,6	24,8	31,0	33,5	30,0	26,5
Free cooling capacity	kW	---	---	43	43	43	45	70	72
Input power	kW	---	---	1,4	1,4	1,4	1,4	2,1	2,1
Water flow rate	l/h	---	---	9290	10320	11520	13590	15650	18400
Water pressure drops	Kpa	---	---	90	96	117	131	87	85
Total input current (A version)	A	32,4	36	37,4	40,1	42,8	52,6	62,0	67,5
Total peak current	A	121,4	148,4	154,4	194,4	194,0	235,4	265,1	275,1
Maximum input current	A	39,4	45,4	49,4	54,4	59,4	69,4	81,1	91,1
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	10800	10800	18800	18800	18000	17280	28080	27000
Fans	n° x kW	2 x 0,37	2 x 0,37	2 x 0,69	2 x 0,69	2 x 0,69	2 x 0,69	3 x 0,69	3 x 0,69
Compressor	type	Scroll							
	n°	2	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1	1
Step controls	n°	2	2	2	2	2	2	2	2
Sound power level <sup>(1)</sup>	dB(A)	77	77	79	79	80	80	82	82,5
Sound pressure level <sup>(2)</sup>	dB(A)	49	49	51	51	52	52	54	54,5
Water pump (option)	Kw	1,1	1,1	1,1	1,1	1,1	1,5	1,5	2,2
Pump available pressure (option)	kPa	165	160	141	125	110	150	130	150
Water tank capacity (option)	l	180	180	300	300	300	300	530	530
Expansion vessel (option)	l	18	18	18	18	18	18	18	18
Lenght	mm	1870	1870	2608	2608	2608	2608	3608	3608
Width	mm	850	850	1105	1105	1105	1105	1105	1105
Height	mm	1406	1406	1759	1759	1759	1759	1759	1759
Weight (Standard configuration)	Kg	570	590	710	725	760	810	1070	1150
Weight (Hydraulic kit configuration)	Kg	730	750	880	895	930	980	1280	1360

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporator water temperature in/out 12/7 °C.

Heating: ambient air temperature 8,3°C DB, 6,1 °C WB ; condenser water temperature in/out 40/45 °C.

Free cooling: ambient air temperature 2°C; water inlet temperature 15°C, glycol 20%, nominal waterflow, compressors switched off.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

**WATER CHILLERS AND HEAT PUMPS  
LDK/LS (Low noise version)  
TECHNICAL DATA**

Mod.		120	130	152	162	144	164	190	210
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	115,5	128	144	160	142	156	181	206,1
Compressors input power	kW	38	42,1	46	51	47,3	51,7	59,7	67,8
Water flow rate	l/h	20640	22190	24800	27600	24600	27180	31990	36290
Water pressure drops	Kpa	29,4	30,0	31	36,3	30,8	36,0	39,6	42,7
Heating capacity	kW	120,0	132,0	147,0	160,0	150,0	165,0	189,0	217,0
Compressors input power	kW	38,5	42,9	51,0	55,0	48,1	52,8	60,6	68,4
Water flow rate	l/h	20640	22700	25000	28000	25800	28380	32510	37320
Water pressure drops	Kpa	29,4	31,3	33,0	39,0	33,8	39,2	40,9	45,1
Free cooling capacity	kW	72	72	94	94	94	94	110	115
Input power	kW	2,1	2,1	2,8	2,8	2,8	2,8	6	6
Water flow rate	l/h	20640	22190	24600	27180	24600	27180	31990	36290
Water pressure drops	Kpa	94	100	85	87	85	87	82	92
Total input current (A version)	A	76,4	85,5	94,2	101,7	96,3	104,7	126,6	144,0
Total peak current	A	322,1	333,1	336	383	290	304	351	369
Maximum input current	A	102,1	113,1	124,8	135,3	119,9	138,3	167,6	185,6
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	25920	25920	36000	34920	36000	34920	55800	55800
Fans	n° x kW	3 x 0,69	3 x 0,69	4 x 0,69	4 x 0,69	4 x 0,69	4 x 0,69	3 x 2,0	3 x 2,0
Compressor	type	Scroll							
	n°	2	2	2	2	4	4	4	4
Refrigerant circuit	n°	1	1	1	1	2	2	2	2
Step controls	n°	2	2	2	2	4	4	4	4
Sound power level <sup>(1)</sup>	dB(A)	82,9	83,1	83,5	84	83,5	84	86	86
Sound pressure level <sup>(2)</sup>	dB(A)	54,9	55,1	55,5	56	55,5	56	58	58
Water pump (option)	kW	2,2	2,2	2,2	3,0	2,2	3,0	3,0	3,0
Pump available pressure (option)	kPa	120	130	105	180	105	180	140	110
Water tank capacity (option)	l	530	530	530	530	530	530	670	670
Expansion vessel (option)	l	18	118	18	18	18	18	18	18
Lenght	mm	3608	3608	3608	3608	4108	4108	4708	4708
Width	mm	1105	1105	1105	1105	1105	1105	1105	1105
Height	mm	1759	1759	2179	2179	2179	2179	2262	2262
Weight (Standard configuration)	Kg	1200	1230	1390	1580	1650	1700	1960	2050
Weight (Hydraulic kit configuration)	Kg	1410	1440	1550	1740	1860	2000	2260	2350

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporator water temperature in/out 12/7 °C.

Heating: ambient air temperature 8,3°C DB, 6,1 °C WB ; condenser water temperature in/out 40/45 °C.

Free cooling: ambient air temperature 2°C; water inlet temperature 15°C, glycol 20%, nominal waterflow, compressors switched off.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

**WATER CHILLERS AND HEAT PUMPS  
LDK/LS (Low noise version)  
TECHNICAL DATA**

Mod.		240	260	300	320	380	430	500	
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	
Cooling capacity	kW	232	256	290	321	383	432	481	
Compressors input power	kW	76	84,2	92,4	100,6	126,4	138,7	150,9	
Water flow rate	l/h	41450	45240	49880	55200	65800	74300	82700	
Water pressure drops	Kpa	49,0	51,2	34	39	32	38	44	
Heating capacity	kW	242,0	267,0	---	---	---	---	---	
Compressors input power	kW	77,1	85,8	---	---	---	---	---	
Water flow rate	l/h	41000	44900	---	---	---	---	---	
Water pressure drops	Kpa	49,0	51,0	---	---	---	---	---	
Free cooling capacity	kW	135	135	185	185	235	245	240	
Input power	kW	8	8	12	12	16	16	16	
Water flow rate	l/h	41450	45240	49880	55200	65800	74300	82700	
Water pressure drops	Kpa	115	118	107	121	113	121	141	
Total input current (A version)	A	160,2	178,4	201,4	220	279,2	301,7	324,2	
Total peak current	A	431	453	510	534	582	641	672,5	
Maximum input current	A	211,6	233,6	262,6	287,2	362	393,5	425	
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	58800	58800	89000	88500	119000	118000	118000	
Fans	n° x kW	4 x 2,0	4 x 2,0	6 x 2	6 x 2	8 x 2	8 x 2	8 x 2	
Compressor	type	Scroll							
	n°	4	4	4	4	6	6	6	
Refrigerant circuit	n°	2	2	2	2	2	2	2	
Step controls	n°	4	4	4	4	6	6	6	
Sound power level <sup>(1)</sup>	dB(A)	89	89	90	90	91	91	91	
Sound pressure level <sup>(2)</sup>	dB(A)	61	61	62	62	63	63	63	
Water pump (option)	kW	4,0	4,0	4	5,5	7,5	7,5	7,5	
Pump available pressure (option)	kPa	170	155	160	172	210	190	160	
Water tank capacity (option)	l	670	670	670	670	670	670	670	
Expansion vessel (option)	l	18	18	25	25	50	50	50	
Lenght	mm	4708	4708	4108	4108	4708	4708	4708	
Width	mm	1105	1105	2210	2210	2210	2210	2210	
Height	mm	2262	2262	2262	2262	2262	2262	2262	
Weight (Standard configuration)	Kg	2160	2480	3150	3220	3560	3650	3750	
Weight (Hydraulic kit configuration)	Kg	2460	2780	3590	3650	4050	4130	4230	

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporator water temperature in/out 12/7 °C.

Heating: ambient air temperature 8,3°C DB, 6,1 °C WB ; condenser water temperature in/out 40/45 °C.

Free cooling: ambient air temperature 2°C; water inlet temperature 15°C, glycol 20%, nominal waterflow, compressors switched off.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

**WATER CHILLERS AND HEAT PUMPS  
LDK / XL (Extra low noise version)  
TECHNICAL DATA**

Mod.		039	045	050	060	070	080	090	110
Refrigerant		---	---	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	---	---	52	58	64	78	90	104
Compressors input power	kW	---	---	17,2	19,3	21,5	25,8	29,9	33,9
Water flow rate	l/h	---	---	9290	10320	11520	13590	15650	18400
Water pressure drops	Kpa	---	---	31,5	23,3	30,1	30,4	27,2	26,5
Heating capacity	kW	---	---	54,5	62,0	68,0	83,0	95,0	107,0
Compressors input power	kW	---	---	17,3	19,5	21,7	26,4	31,0	34,2
Water flow rate	l/h	---	---	9460	10665	11695	14275	16340	18400
Water pressure drops	Kpa	---	---	32,6	24,8	31,0	33,5	30,0	26,5
Total input current	A	---	---	37,4	40,1	42,8	52,6	62	67,5
Total peak current	A	---	---	154,4	194,4	194	235,4	265,1	275,1
Maximum input current	A	---	---	49,4	54,4	59,4	69,4	81,1	91,1
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	---	---	24000	24000	24000	24000	35000	35000
Fans	n° x kW	---	---	2 x 1,23	2 x 1,23	2 x 1,23	2 x 1,23	3 x 1,23	3 x 1,23
Compressor	type	Scroll							
	n°	---	---	2	2	2	2	2	2
Refrigerant circuit	n°	---	---	1	1	1	1	1	1
Step controls	n°	---	---	2	2	2	2	2	2
Sound power level <sup>(1)</sup>	dB(A)	---	---	76	76	78	78	79,5	79,9
Sound pressure level <sup>(2)</sup>	dB(A)	---	---	48	48	50	50	51,5	51,9
Lenght	mm	---	---	2608	2608	2608	2608	3608	3608
Width	mm	---	---	1105	1105	1105	1105	1105	1105
Height	mm	---	---	1842	1842	1842	1842	1842	1842
Weight	Kg	---	---	710	725	760	810	1070	1150

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporator water temperature in/out 12/7 °C.

Heating: ambient air temperature 8,3°C DB, 6,1 °C WB ; condenser water temperature in/out 40/45 °C.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

**WATER CHILLERS AND HEAT PUMPS  
LDK / XL (Extra low noise version)  
TECHNICAL DATA**

Mod.		120	130	152	162	144	164	190	210
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	115,5	128	144	160	142	156	181	206,1
Compressors input power	kW	38	42,1	46	51	47,3	51,7	59,7	67,8
Water flow rate	l/h	20640	22190	24800	27600	24600	27180	31990	36290
Water pressure drops	Kpa	29,4	30,0	31	36,3	30,8	36	39,6	42,7
Heating capacity	kW	120,0	132,0	147,0	160,0	150,0	165,0	189,0	217,0
Compressors input power	kW	38,5	42,9	51,0	55,0	48,1	52,8	60,6	68,4
Water flow rate	l/h	20640	22700	25000	28000	25800	28380	32510	37320
Water pressure drops	Kpa	29,4	31,3	33,0	39,0	33,8	39,2	40,9	45,1
Total input current	A	76,4	85,5	94,2	101,7	96,3	104,7	126,6	144
Total peak current	A	322,1	333,1	336	383	290	304	351	369
Maximum input current	A	102,1	113,1	124,8	135,3	119,9	138,3	167,6	185,6
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	33000	33000	33000	33000	33000	33000	64000	62000
Fans	n° x kW	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	4 x 1,25	4 x 1,25
Compressor	type	Scroll							
	n°	2	2	2	2	4	4	4	4
Refrigerant circuit	n°	1	1	1	1	2	2	2	2
Step controls	n°	2	2	2	2	4	4	4	4
Sound power level <sup>(1)</sup>	dB(A)	80,1	80,5	81	81,3	81	81,3	84	84
Sound pressure level <sup>(2)</sup>	dB(A)	52,1	52,5	53	53,3	53	53,3	56	56
Lenght	mm	3608	3608	3608	3608	4108	4108	4708	4708
Width	mm	1105	1105	1105	1105	1105	1105	1105	1105
Height	mm	1842	1842	2262	2262	2262	2262	2262	2262
Weight	Kg	1200	1230	1390	1580	1650	1700	1960	2050

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporator water temperature in/out 12/7 °C.

Heating: ambient air temperature 8,3°C DB, 6,1 °C WB ; condenser water temperature in/out 40/45 °C.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

**CONDENSING UNITS  
LDK / CN /LS (Low noise version)  
TECHNICAL DATA**

Mod.		039	045	050	060	070	080	090	110	120
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	Kw	43,0	52,0	61,0	67,5	75,5	90,0	103	120,5	135,5
Compressors input power	Kw	13,1	15,7	17,5	20,5	22,3	27,8	32,1	34,9	39,9
Total input current	A	29,5	33,1	34,5	37,2	39,9	49,7	57,7	62,2	71,1
Total peak current	A	116,6	143,5	150,5	190,5	195,1	228,3	256,6	267,8	292,8
Maximum input current	A	32,7	38,5	44,5	49,1	53,7	58,1	70,6	81,8	90,3
Power supply	V/Ph/Hz	400/3/50								
Airflow	m3/h	10800	10800	18800	18800	18000	17280	28080	27000	25920
Fans	n° x kW	2 x 0,37	2 x 0,37	2 x 0,69	2 x 0,69	2 x 0,69	2 x 0,69	3 x 0,69	3 x 0,69	3 x 0,69
Compressors	n°	2	2	2	2	2	2	2	2	2
Refrigerant circuit	n°	1	1	1	1	1	1	1	1	1
Step controls	n°	2	2	2	2	2	2	2	2	2
Sound power level <sup>(1)</sup>	dB(A)	77	77	79	79	80	80	82	82,5	82,9
Sound pressure level <sup>(2)</sup>	dB(A)	49	49	51	51	52	52	54	54,5	54,9
Lenght	mm	1870	1870	2608	2608	2608	2608	3608	3608	3608
Width	mm	850	850	1105	1105	1105	1105	1105	1105	1105
Height	mm	1406	1406	1759	1759	1759	1759	1759	1759	1759
Weight	Kg	545	560	690	705	740	790	1040	1120	1170

Mod.		130	152	162	144	164	190	210	240	260
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	146,0	163,0	181,7	161,5	177,5	210	239	273	297,5
Compressors input power	kW	45,2	46,4	50,5	50,9	55,6	62	73,8	79,8	90,4
Total input current	A	80,2	88,9	96,4	91,0	99,4	117,0	134,4	150,6	168,8
Total peak current	A	301,3	331	377	282,0	286,4	331,6	354,0	391,5	408,5
Maximum input current	A	98,8	119,8	130,0	111,8	116,2	145,6	168,0	189,0	206,0
Power supply	V/Ph/Hz	400/3/50								
Airflow	m3/h	25920	36000	34920	36000	34920	55800	55800	58800	58800
Fans	n° x kW	3 x 0,69	4 x 0,69	4 x 0,69	4 x 0,69	4 x 0,69	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0
Compressors	n°	2	2	2	4	4	4	4	4	4
Refrigerant circuit	n°	1	1	1	2	2	2	2	2	2
Step controls	n°	2	2	2	4	4	4	4	4	4
Sound power level <sup>(1)</sup>	dB(A)	83,1	83,5	84	83,5	84	86	86	89	89
Sound pressure level <sup>(2)</sup>	dB(A)	55,1	55,5	56	55,5	56	58	58	61	61
Lenght	mm	3608	3608	3608	4108	4108	4708	4708	4708	4708
Width	mm	1105	1105	1105	1105	1105	1105	1105	1105	1105
Height	mm	1759	2179	2179	2179	2179	2262	2262	2262	2262
Weight	Kg	1200	1300	1480	1610	1660	1910	2000	2100	2420

Performances are referred to the following conditions:

Cooling: ambient air temperature 35 °C; evaporation temperature 5 °C.

(1): Sound power level according to ISO 3746.

(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.



**CONDENSING UNITS  
LDK / CN/ XL (Extra low noise version)  
TECHNICAL DATA**

Mod.		039	045	050	060	070	080	090	110
Refrigerant		---	---	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	Kw	---	---	61,0	67,5	75,5	90,0	103	120,5
Compressors input power	Kw	---	---	17,5	20,5	22,3	27,8	32,1	34,9
Total input current	A	---	---	33,6	36,3	39,0	48,8	57,0	66,8
Total peak current	A	---	---	149,6	189,6	194,2	227,4	255,9	267,1
Maximum input current	A	---	---	43,6	48,2	52,8	57,2	69,9	81,1
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	---	---	24000	24000	24000	24000	35000	35000
Fans	n° x kW	---	---	2 x 1,23	2 x 1,23	2 x 1,23	2 x 1,23	3 x 1,23	3 x 1,23
Compressors	n°	---	---	2	2	2	2	2	2
Refrigerant circuit	n°	---	---	1	1	1	1	1	1
Step controls	n°	---	---	2	2	2	2	2	2
Sound power level <sup>(1)</sup>	dB(A)	---	---	76	76	78	78	79,5	79,9
Sound pressure level <sup>(2)</sup>	dB(A)	---	---	48	48	50	50	51,5	51,9
Lenght	mm	---	---	2608	2608	2608	2608	3608	3608
Width	mm	---	---	1105	1105	1105	1105	1105	1105
Height	mm	---	---	1842	1842	1842	1842	1842	1842
Weight	Kg	---	---	690	705	740	790	1040	1120

Mod.		120	130	152	162	144	164	190	210
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	135,5	146,0	163,0	181,7	161,5	177,5	210	239
Compressors input power	kW	39,9	45,2	46,4	50,5	50,9	55,6	62	73,8
Total input current	A	75,7	84,8	88,9	96,4	94,4	102,8	123,8	141,2
Total peak current	A	292,1	300,6	331	377	280,1	284,5	328,8	351,2
Maximum input current	A	89,6	98,1	119,8	130,0	109,9	114,3	142,8	165,2
Power supply	V/Ph/Hz	400/3/50							
Airflow	m3/h	33000	33000	33000	33000	33000	33000	64000	62000
Fans	n° x kW	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	3 x 1,23	4 x 1,25	4 x 1,25
Compressors	n°	2	2	2	2	4	4	4	4
Refrigerant circuit	n°	1	1	1	1	2	2	2	2
Step controls	n°	2	2	2	2	4	4	4	4
Sound power level <sup>(1)</sup>	dB(A)	80,1	80,5	81	81,3	81	81,3	84	84
Sound pressure level <sup>(2)</sup>	dB(A)	52,1	52,5	53	53,3	53	53,3	56	56
Lenght	mm	3608	3608	3608	3608	4108	4108	4708	4708
Width	mm	1105	1105	1105	1105	1105	1105	1105	1105
Height	mm	1842	1842	2262	2262	2262	2262	2262	2262
Weight	Kg	1170	1200	1300	1480	1610	1660	1910	2000

Performances are referred to the following conditions:

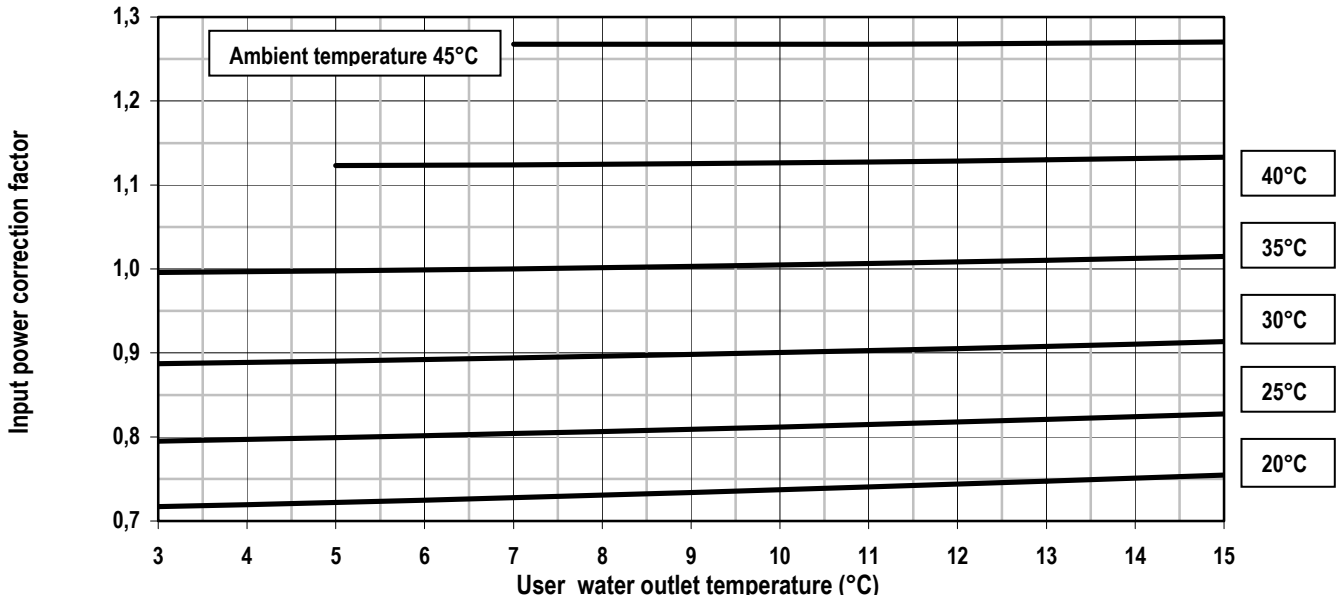
Cooling: ambient air temperature 35 °C; evaporation temperature 5 °C.

(1): Sound power level according to ISO 3746.

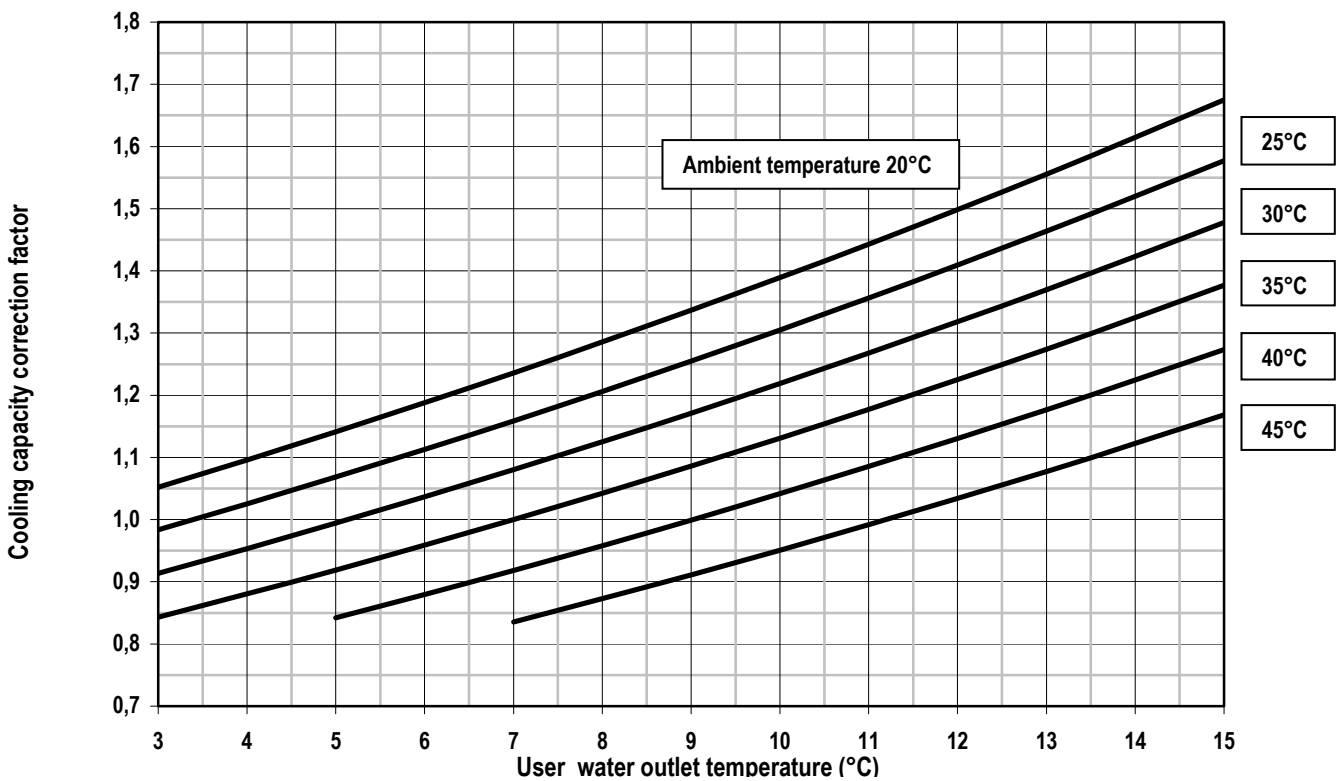
(2): Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

LDK  
COOLING CAPACITY AND COMPRESSORS INPUT POWER

PA = Compressor input power



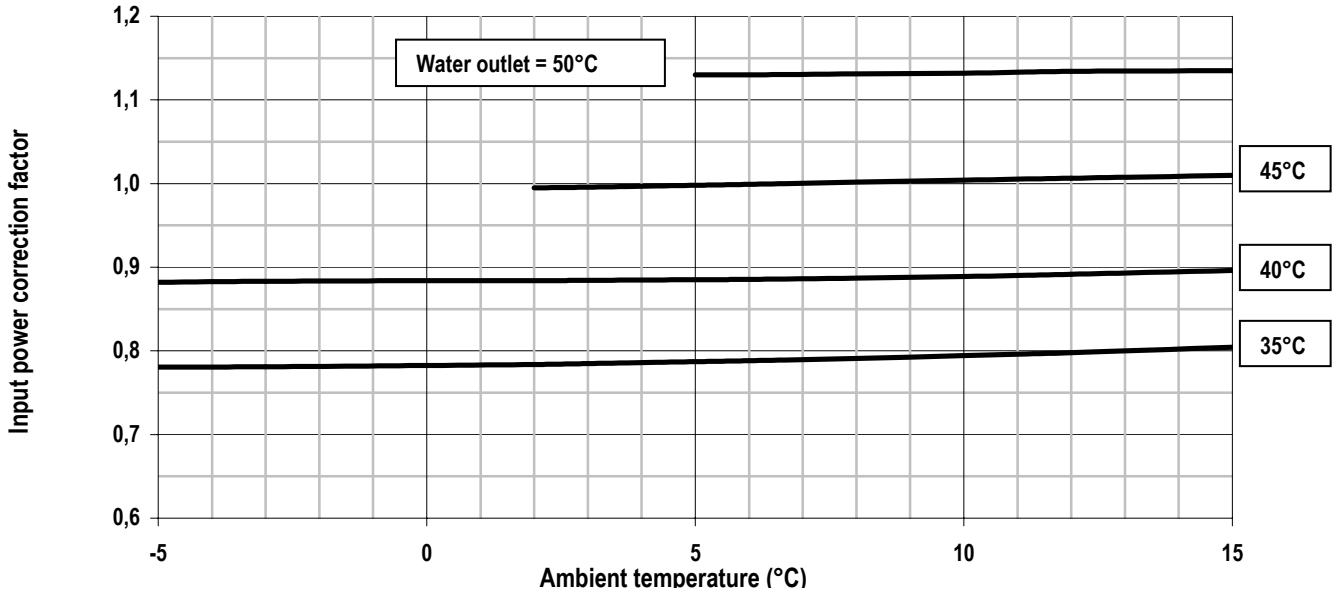
PF = Cooling capacity



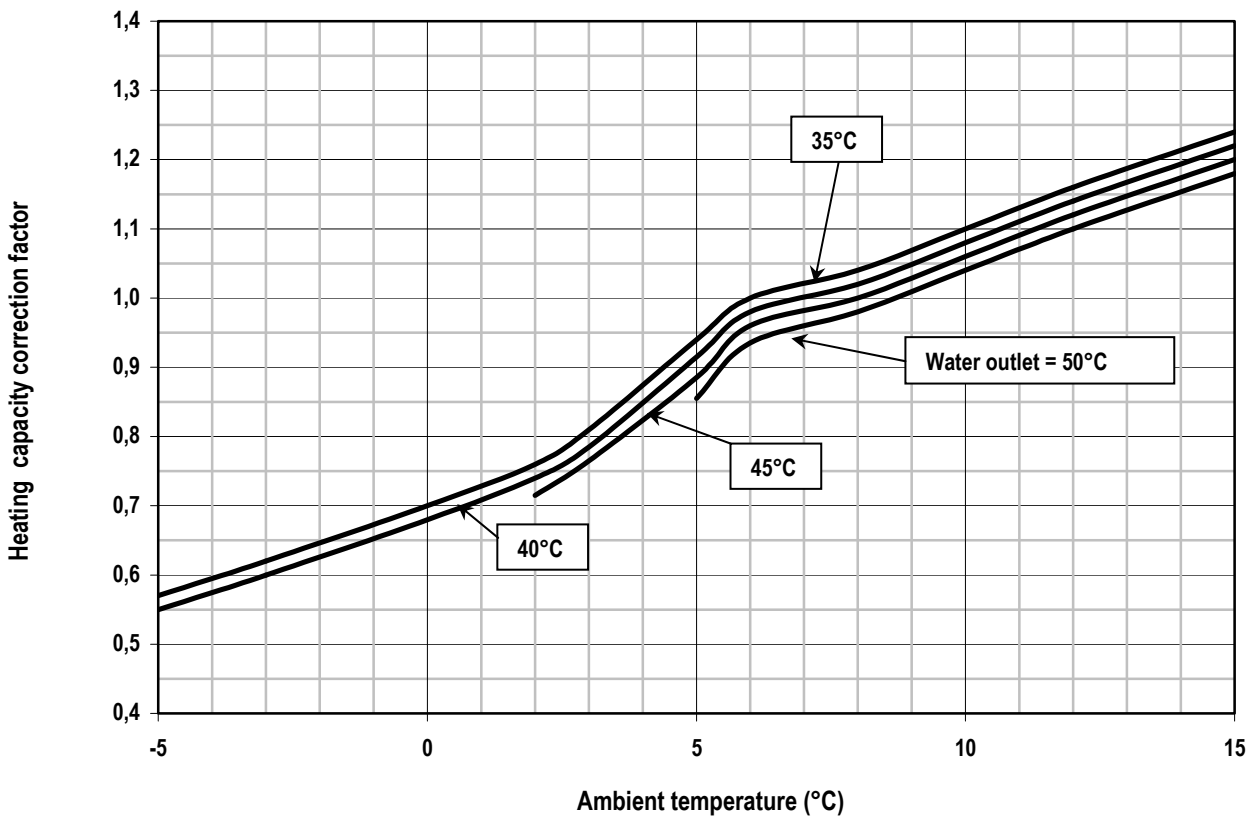
The cooling capacity and the compressors input power in different working conditions can be obtained by multiplying the nominal values (PF, PA) with their respective correction factors. The diagram above indicates the correction factors; for each curve, the relative ambient conditions, assuming that the difference between inlet and outlet cold water temperature is 5°C.

LDK / HP  
HEATING CAPACITY AND COMPRESSORS INPUT POWER

PA = Compressor input power



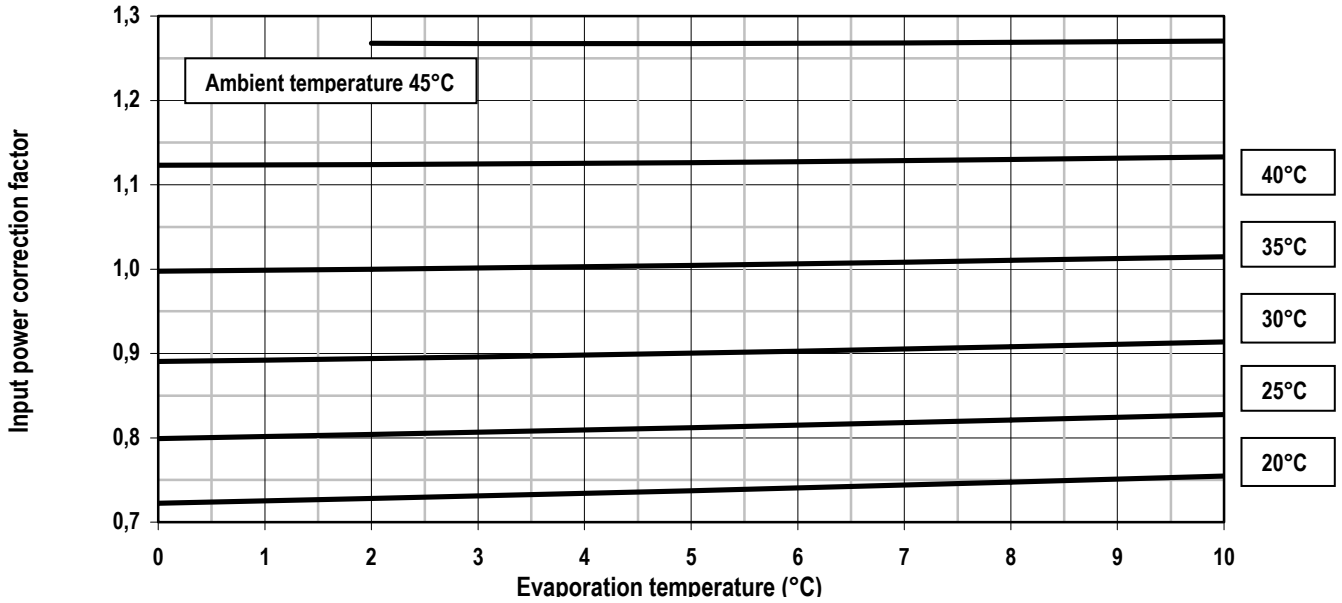
PH = Heating capacity



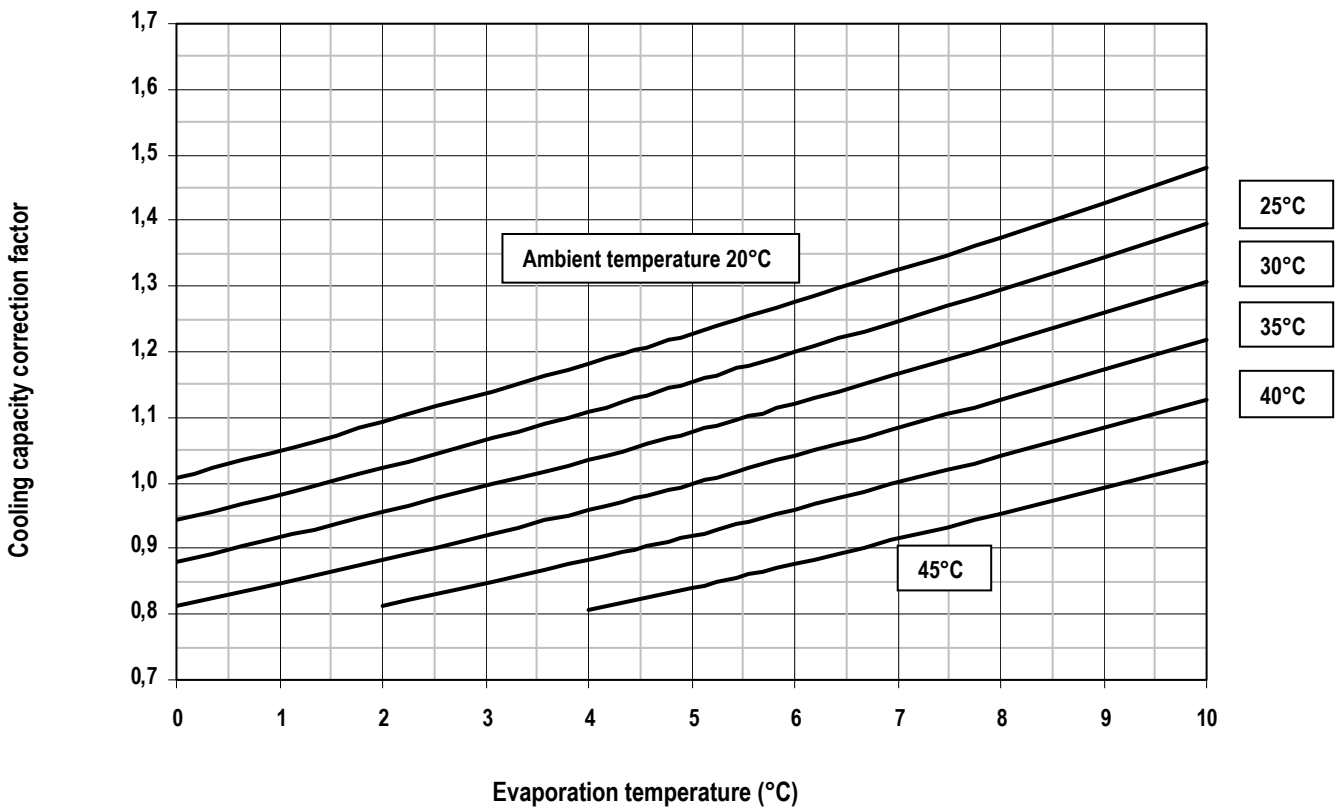
The heating capacity and the compressors input power in different working conditions can be obtained by multiplying the nominal values (PH, PA) with their respective correction factors. The diagram above indicates the correction factors; for each curve, the relative hot water temperature produced is indicated, assuming that the difference between inlet and outlet water temperature is 5°C. Capacities include the heating capacity lost due to the defrosting periods.

LDK / CN  
COOLING CAPACITY AND COMPRESSORS INPUT POWER

PA = Compressor input power

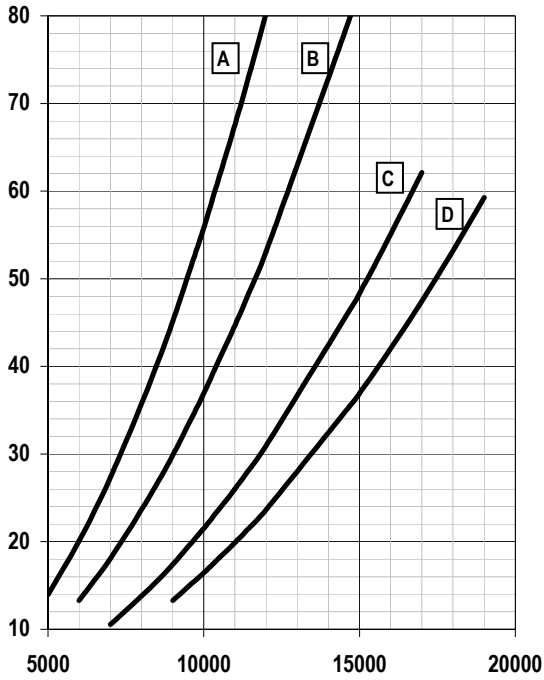


PF = Cooling capacity

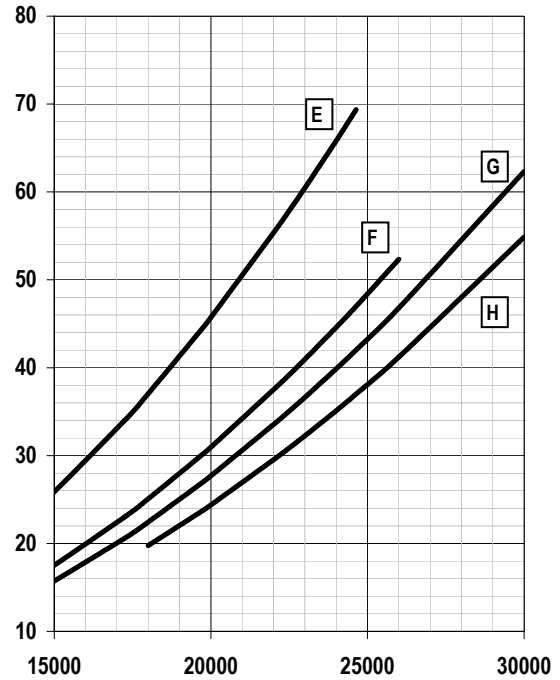


The cooling capacity and the compressors input power in different working conditions can be obtained by multiplying the nominal values (PF, PA) with their respective correction factors.

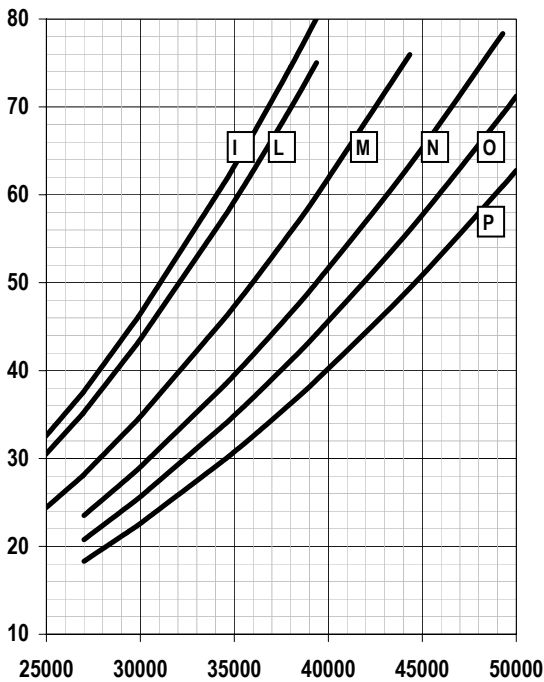
**EVAPORATOR PRESSURE DROPS**



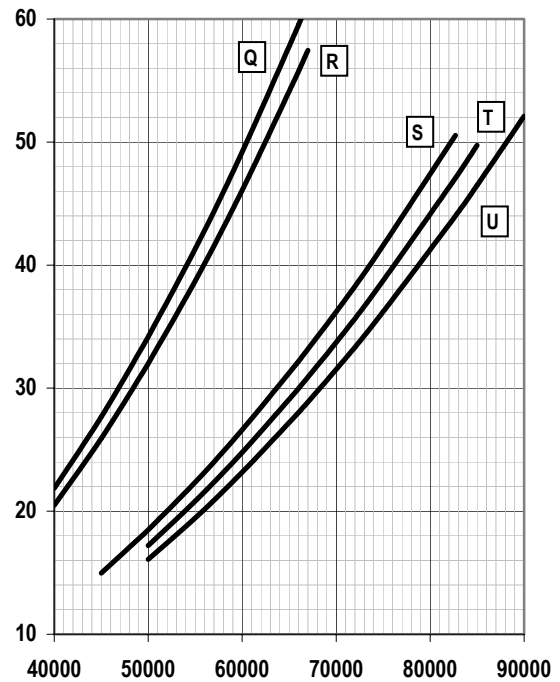
A: Ldk039-045 B: Ldk050  
C: Ldk 060-070 D: Ldk 080



E: Ldk090 F: Ldk110  
G: Ldk120 H: Ldk130

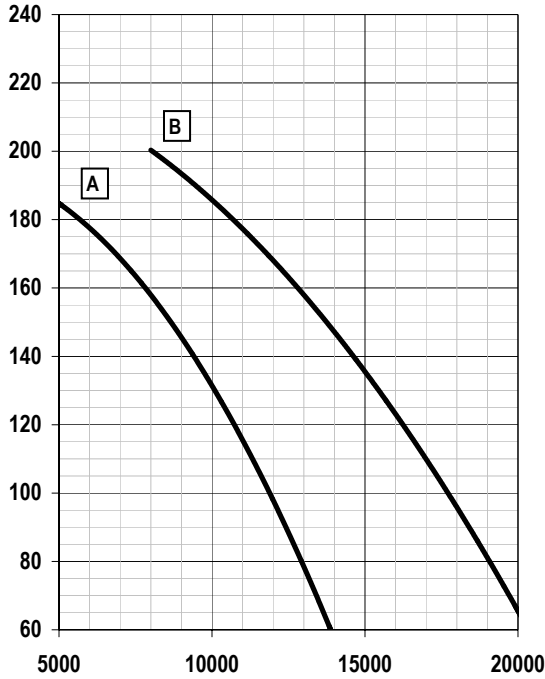


I: Ldk144, 152 L: Ldk162, 164 M: Ldk 190  
N: Ldk 210 O: Ldk240 P: Ldk260

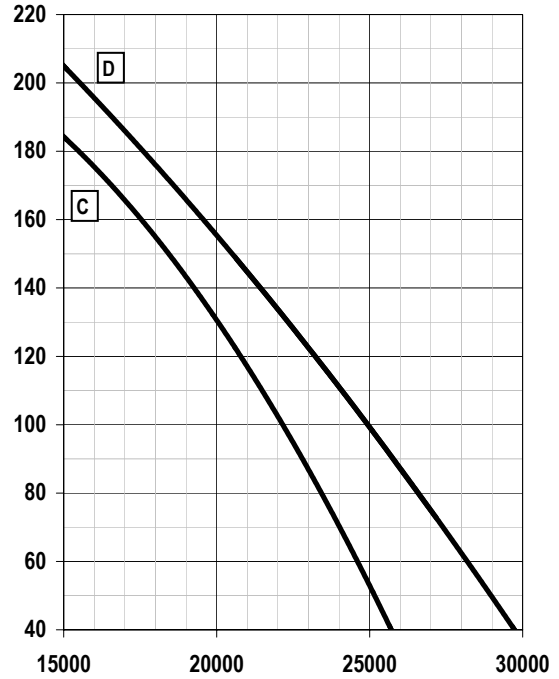


Q: Ldk300 R: Ldk320 S: Ldk380  
T: Ldk430 U: Ldk500

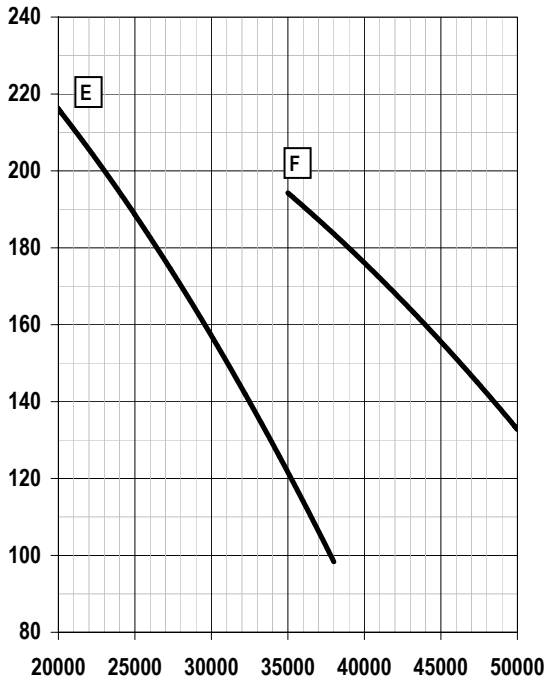
**WATER PUMPS AVAILABLE STATIC PRESSURE**



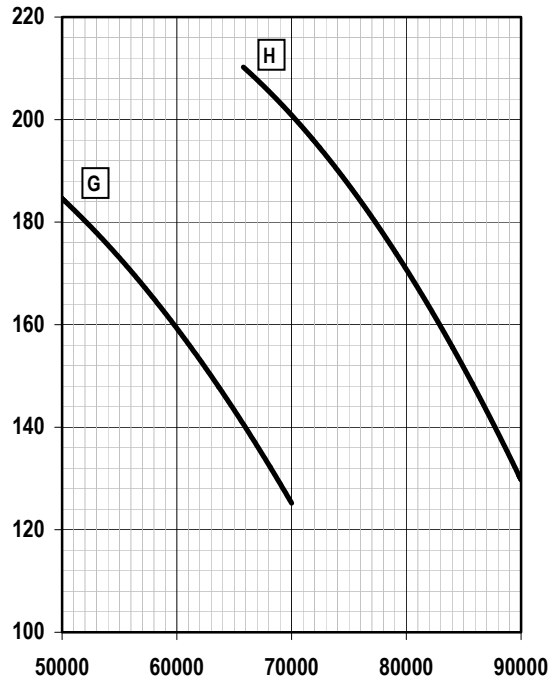
A: Ldk039,045,050,060,070  
B: Ldk080, 090



C: Ldk110, 120  
D: Ldk130, 144, 152

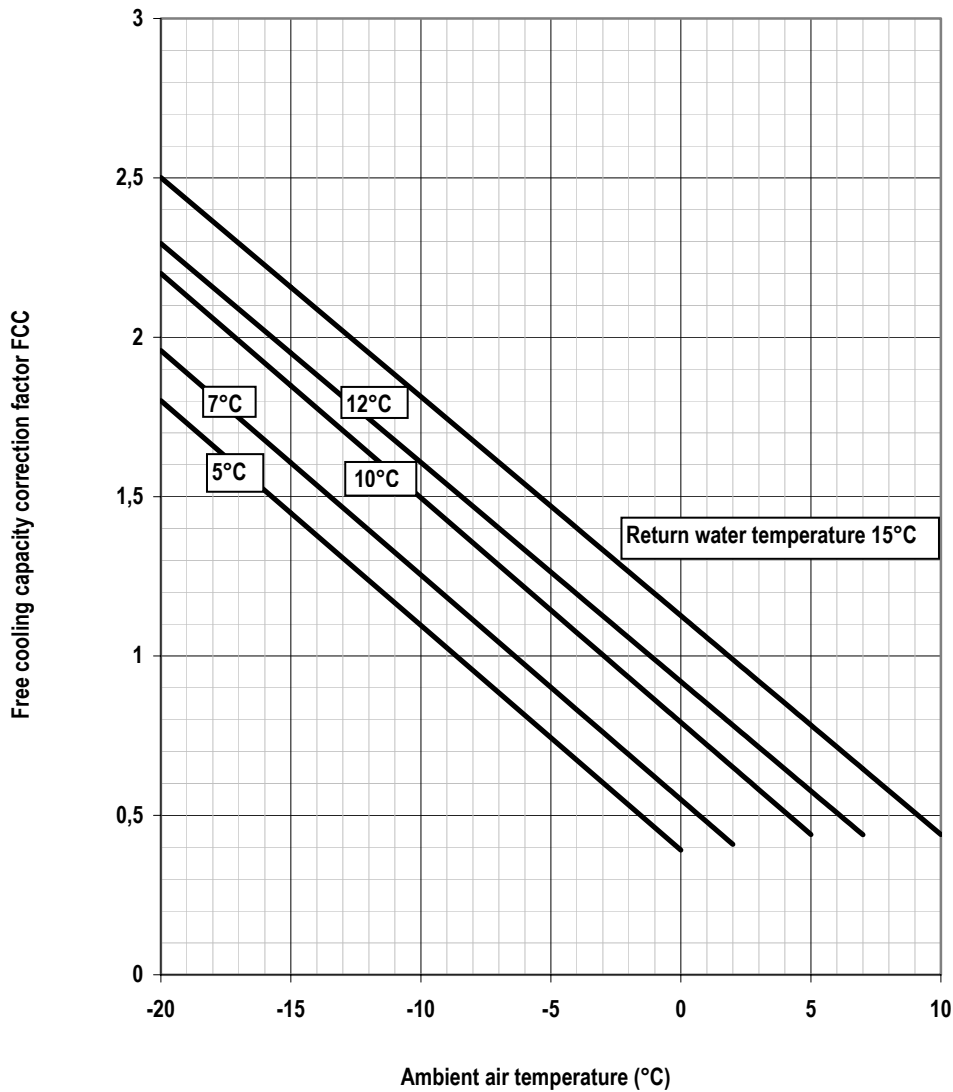


E: Ldk162, 164,190,210  
F: Ldk 240, 260



G: Ldk300, 320  
H: Ldk380, 430, 500

**FREE COOLING CAPACITY**



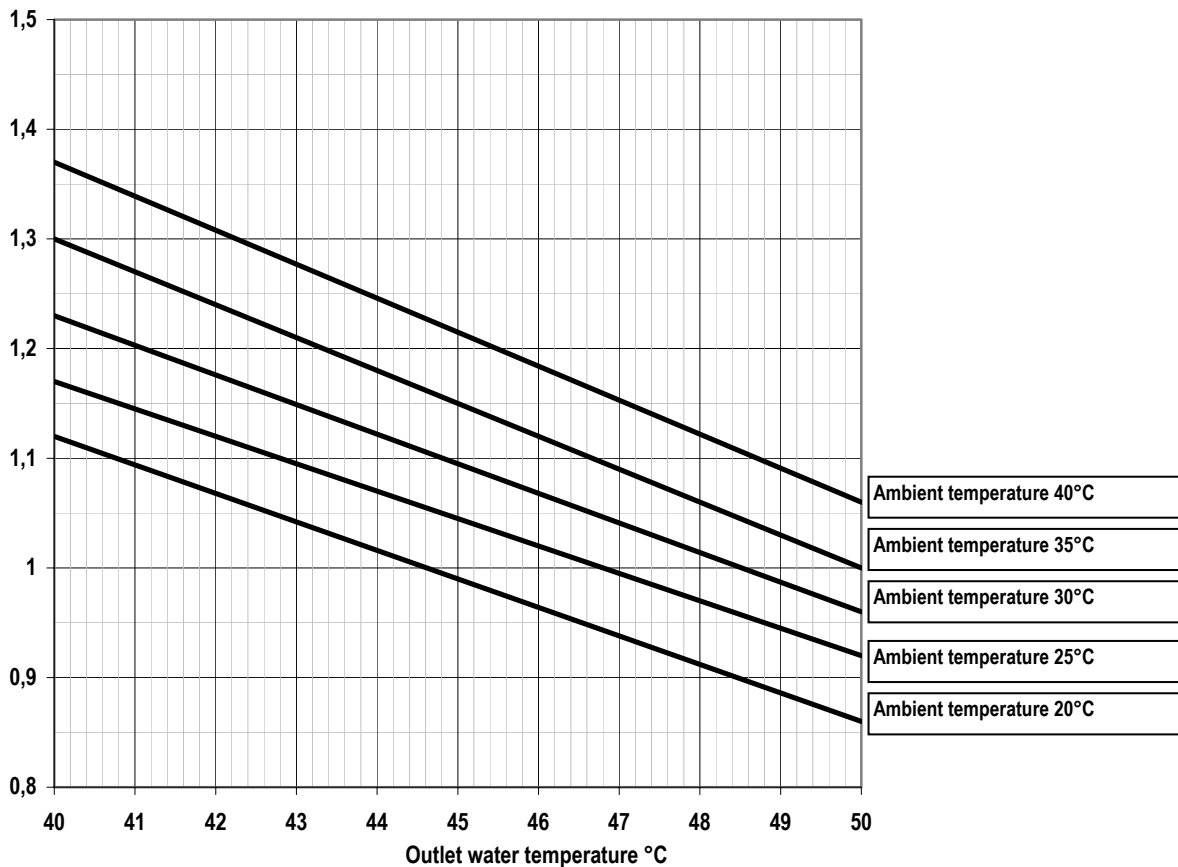
<b>Mod.</b>		<b>039</b>	<b>045</b>	<b>050</b>	<b>060</b>	<b>070</b>	<b>080</b>	<b>090</b>	<b>110</b>
Nominal Free cooling capacity	kW	---	---	43	43	43	45	70	72
<b>Mod.</b>		<b>120</b>	<b>130</b>	<b>152</b>	<b>162</b>	<b>144</b>	<b>162</b>	<b>190</b>	<b>210</b>
Nominal Free cooling capacity	kW	72	72	94	94	94	94	110	115
<b>Mod.</b>		<b>240</b>	<b>260</b>	<b>300</b>	<b>320</b>	<b>380</b>	<b>430</b>	<b>500</b>	
Nominal Free cooling capacity	kW	135	135	185	185	235	245	240	

The nominal Free Cooling capacity is obtained when all compressors are OFF, the return water temperature from the system is 15°C and the ambient temperature is 2°C. To calculate the free cooling capacity in different conditions please refer to the above diagram. The FCC factor obtained by the diagram has to be multiplied by the nominal Free cooling capacity reported in the table.

**PARTIAL HEAT RECOVERY CAPACITY**

Mod.		039	045	050	060	070	080	090	110
Partial heat recovery nominal capacity	kW	9,5	12,8	13,0	15,0	15,3	18,5	21,5	24,8
Water flow	l/h	1635	2200	2240	2580	2630	3190	3700	4270
Water pressure drops	kPa	10	14	11	15	16	18	11	15
Mod.		120	130	152	162	144	162	190	210
Partial heat recovery nominal capacity	kW	27,5	30,0	34,0	37,0	34,0	37,0	43,0	49,0
Water flow	l/h	4730	5160	5850	6360	5850	6360	7400	8430
Water pressure drops	kPa	13	18	18	25	18	25	11	15
Mod.		240	260	300	320	380	430	500	
Partial heat recovery nominal capacity	kW	55,0	61,5	69,0	76,0	91,5	102,8	114	
Water flow	l/h	9460	10570	11850	13000	15750	17700	19600	
Water pressure drops	kPa	19	25	20	25	25	29	35	

The nominal value refers to an ambient temperature 35°C and outlet water temperature 50°C (Dt 5°C).



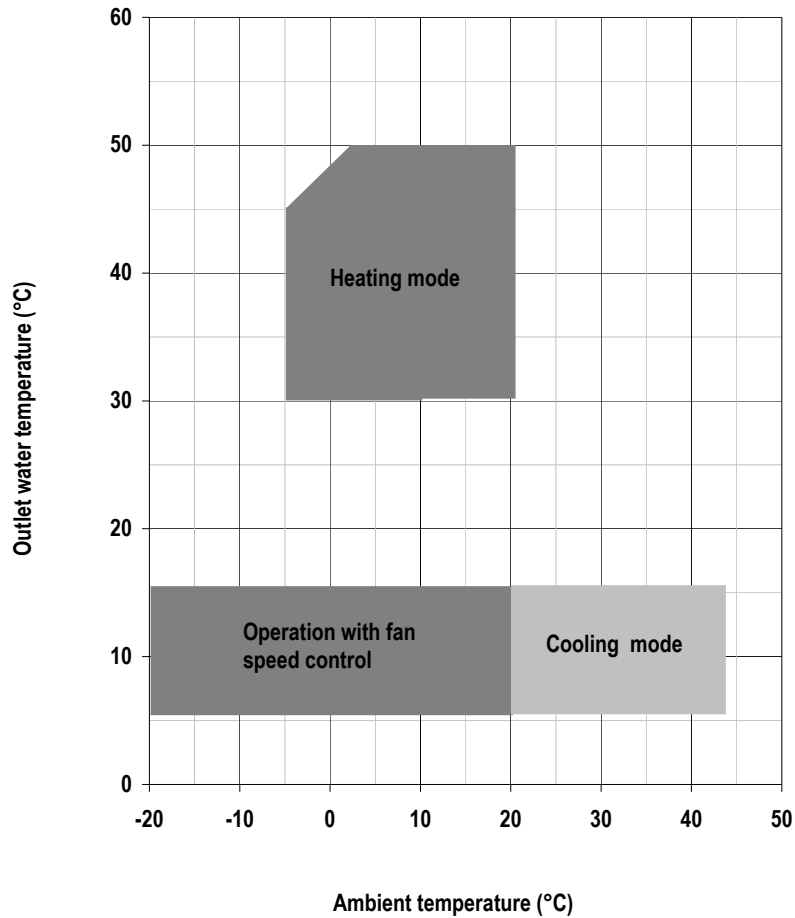
The heat recovery capacity in different conditions can be obtained multiplying the nominal capacity (See above), by the correction factor indicated in the table.



**WARNING:** Partial heat recovery can only operates in cooling mode; in case of heat pump version in heating mode it is necessary to isolate the heat recovery, otherwise the unit can be damaged. The warranty will not be valid in case the heat recovery is not isolated.



**OPERATION LIMITS**



**Evaporator water flow rate**

The nominal water flow rate given by HIDROS is referred to a  $Dt$  of 5 °C. Maximum flow rate allowed is the one that presents a  $Dt$  of 3 °C: higher values may cause too high pressure drop. The minimum water flow rate allowed is the one presenting a  $Dt$  of 8 °C. Insufficient values cause too low evaporating temperatures with the action of safety devices which would stop the unit.

**Chilled water temperature (summer operation)**

The minimum temperature allowed at the evaporator outlet is 5 °C. To work below this limit, the unit should need some structural modifications. In this case contact our company. The maximum temperature allowed at the evaporator inlet is 20 °C.

**Hot water temperature (winter operation)**

Once the system is on temperature, water temperature at the condenser inlet does not have to be less than 25 °C: lower values could cause incorrect working operation of the compressor and compressor failure may occur. The maximum water temperature at the condenser outlet does not have to exceed 50 °C.

**Ambient air temperature**

The units are designed and manufactured to operate, in cooling, with ambient air temperature included in range of 20 to 43 °C. If a fan speed control is installed then the minimum ambient air temperature is -20°C. In winter operation (heat pump cycle) from -5°C to 20°C.

**COMPRESSORS CAPACITY STEP CONTROLS**

Mod.	Number of compressors					
	1	2	3	4	5	6
039	50%	50%				
045	50%	50%				
050	50%	50%				
060	44%	56%				
070	50%	50%				
080	50%	50%				
090	43%	57%				
110	50%	50%				
120	45%	55%				
130	50%	50%				
152	45%	55%				
162	50%	50%				
144	22,5%	22,5%	27,5%	27,5%		
164	25%	25%	25%	25%		
190	21,5%	21,5%	28,5%	28,5%		
210	25%	25%	25%	25%		
240	22,5%	22,5%	27,5%	27,5%		
260	25%	25%	25%	25%		
300	22%	22%	28%	28%		
320	25%	25%	25%	25%		
380	16,66%	16,66%	16,66%	16,66%	16,66%	16,66%
430	14,66%	14,66%	14,66%	18,66%	18,66%	18,66%
500	16,66%	16,66%	16,66%	16,66%	16,66%	16,66%

**CORRECTION TABLES Operation with glycol**

Glicol 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.

**CORRECTION TABLES Different Fouling factors**

Fouling factor	0,00005	0,0001	0,0002
CCF	1	0,98	0,94
IPCF	1	0,98	0,95

- CCF =** Cooling capacity correction factor.
- IPCF =** Input power correction factor.

SOUND DATA



**WARNING:** The sound pressure level of the standard versions without compressors vane insulation is approx. 1,5 dB(A) higher than the equivalent low noise versions LS.

SOUND LEVELS LOW NOISE VERSION (LS)											
Mod.	Octave bands (Hz)								Lw		Lp
	63	125	250	500	1K	2K	4K	8K	dB	dB(A)	dB(A)
	dB	dB	dB	dB	dB	dB	dB	dB			
039/LS	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77,0	49
045/LS	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77,0	49
050/LS	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79,0	51
060/LS	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79,0	51
070/LS	93,1	84,3	78,2	76,7	75,6	70,2	66,8	57,7	93,9	80,0	52
080/LS	93,1	84,3	78,2	76,7	75,6	70,2	66,8	57,7	93,9	80,0	52
090/LS	95,1	86,3	80,2	78,7	77,6	72,2	68,8	59,7	95,9	82,0	54
110/LS	95,6	86,8	80,7	79,2	78,1	72,7	69,3	60,2	96,4	82,5	54,5
120/LS	96,0	87,2	81,1	79,6	78,5	73,1	69,7	60,6	96,8	82,9	54,9
130/LS	96,2	87,4	81,3	79,8	78,7	73,3	69,9	60,8	97,0	83,1	55,1
152/LS	96,6	87,8	81,7	80,2	79,1	73,7	70,3	61,2	97,4	83,5	55,5
162/LS	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	98,0	84,0	56
144/LS	96,6	87,8	81,7	80,2	79,1	73,7	70,3	61,2	97,4	83,5	55,5
164/LS	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	98,0	84,0	56
190/LS	99,1	90,3	84,2	82,7	81,6	76,2	72,8	63,7	99,9	86,0	58
210/LS	99,1	90,3	84,2	82,7	81,6	76,2	72,8	63,7	99,9	86,0	58
240/LS	102,1	93,3	87,2	85,7	84,6	79,2	75,8	66,7	102,9	89,0	61
260/LS	102,1	93,3	87,2	85,7	84,6	79,2	75,8	66,7	102,9	89,0	61
300/LS	103,1	94,3	88,2	86,7	85,6	80,2	76,8	67,7	103,9	90,0	62
320/LS	103,1	94,3	88,2	86,7	85,6	80,2	76,8	67,7	103,9	90,0	62
380/LS	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91,0	63
430/LS	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91,0	63
500/LS	104,1	95,3	89,2	87,7	86,6	81,2	77,8	68,7	104,9	91,0	63

SOUND LEVELS EXTRA LOW NOISE VERSION (XL)											
Mod.	Octave bands (Hz)								Lw		Lp
	63	125	250	500	1K	2K	4K	8K	Db	dB(A)	dB(A)
	dB	dB	dB	dB	dB	dB	dB	dB			
039/XL	Not available										
045/XL	Not available										
050/XL	89,1	80,3	74,2	72,7	71,6	66,2	62,8	53,7	89,9	76,0	48
060/XL	89,1	80,3	74,2	72,7	71,6	66,2	62,8	53,7	89,9	76,0	48
070/XL	91,1	82,3	76,2	74,7	73,6	68,2	64,8	55,7	91,9	78,0	50
080/XL	91,1	82,3	76,2	74,7	73,6	68,2	64,8	55,7	91,9	78,0	50
090/XL	92,6	83,8	77,7	76,2	75,1	69,7	66,3	57,2	93,4	79,5	51,5
110/XL	93,0	84,2	78,1	76,6	75,5	70,1	66,7	57,6	93,8	79,9	51,9
120/XL	93,2	84,4	78,3	76,8	75,7	70,3	66,9	57,8	94,0	80,1	52,1
130/XL	93,6	84,8	78,7	77,2	76,1	70,7	67,3	58,2	94,4	80,5	52,5
152/XL	94,1	85,3	79,2	77,7	76,6	71,2	67,8	58,7	95,0	81,0	53
162/XL	94,4	85,6	79,5	78,0	76,9	71,5	68,1	59,0	95,3	81,3	53,3
144/XL	94,1	85,3	79,2	77,7	76,6	71,2	67,8	58,7	95,0	81,0	53
164/XL	94,4	85,6	79,5	78,0	76,9	71,5	68,1	59,0	95,3	81,3	53,3
190/XL	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	98,0	84,0	56
210/XL	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	98,0	84,0	56
240/XL	Not available										
260/XL	Not available										
300/XL	Not available										
320/XL	Not available										
380/XL	Not available										
430/XL	Not available										
500/XL	Not available										

Lw: Sound power level according to ISO 3746.

Lp: Sound pressure level measured at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

### SAFETY DEVICE SETTING

Device		Capacity Steps		Capacity steps		Reset Type
		2		4		
		Set-point	Differential	Set point	Differential	
Control thermostat (summer)	°C	10	2	9	3	...
Control thermostat (winter)	°C	42	2	43	3	...
Anti-freeze thermostat	°C	4	6	4	6	MANUAL
Electric heater thermostat	°C	4	6	4	6	MANUAL
High pressure switch	Bar	28	7	28	7	MANUAL
Low pressure switch	Bar	0,7	1	0,7	1	MANUAL
Water safety valve (Optional)	Bar	6	...	6	...	...

### ELECTRIC DATA

Power supply	V/~/Hz	400 / 3 / 50	Control board	V/~/Hz	24 / 1 / 50
Auxiliary circuit	V/~/Hz	230 / 1 / 50	Fans power supply	V/~/Hz	400 / 3 / 50

Electric data may change for updating. It is therefore necessary to refer always to the wiring diagram inside the units.



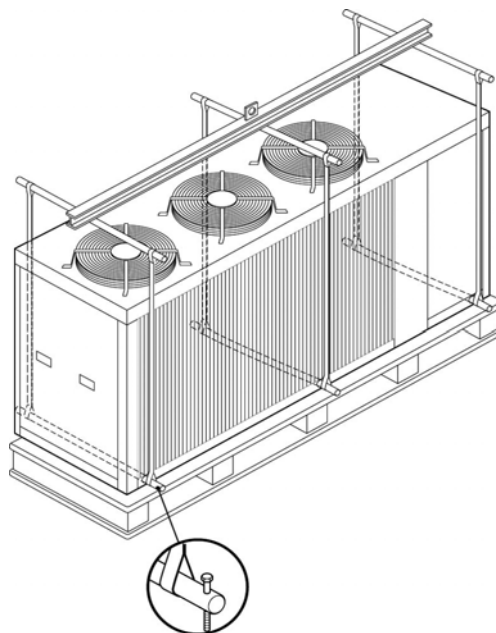
**WARNING: All this operation described in next chapters MUST BE DONE BY TRAINED PEOPLE ONLY. Before every operation of servicing on the unit, be sure that the electric supply is disconnected.**

### 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 condition; any eventual damage must be questioned to the carrier and recorded on the Delivery Note before it is signed. HIDROS must be informed, within 8 days, of the extent of the damage. The Customer should prepare a written statement of any severe damage.

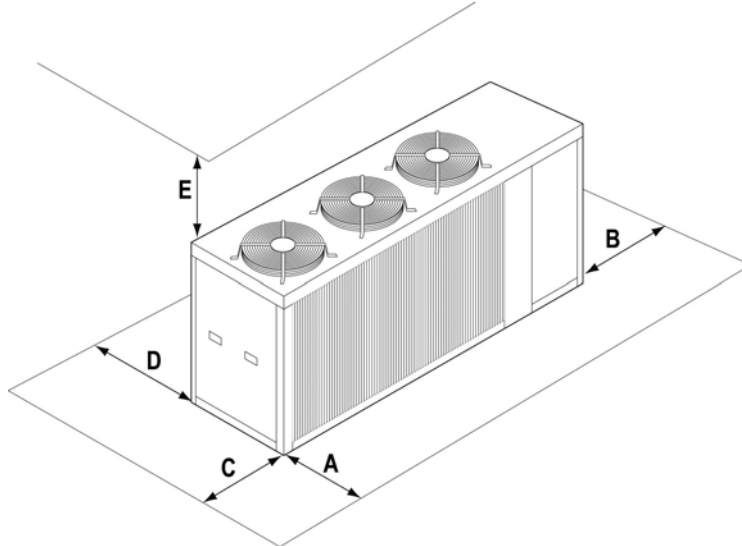
### LIFTING AND HANDLING

When unloading the unit, it is highly recommended to avoid any sudden move in order to protect refrigerant circuit, copper tubes or any other unit component. Units can be lifted by using a forklift or, in alternative, using belts, being sure that the method of lifting does not damage the lateral panels and the cover. It is important to keep the unit horizontal at all time to avoid damages to the internal components.

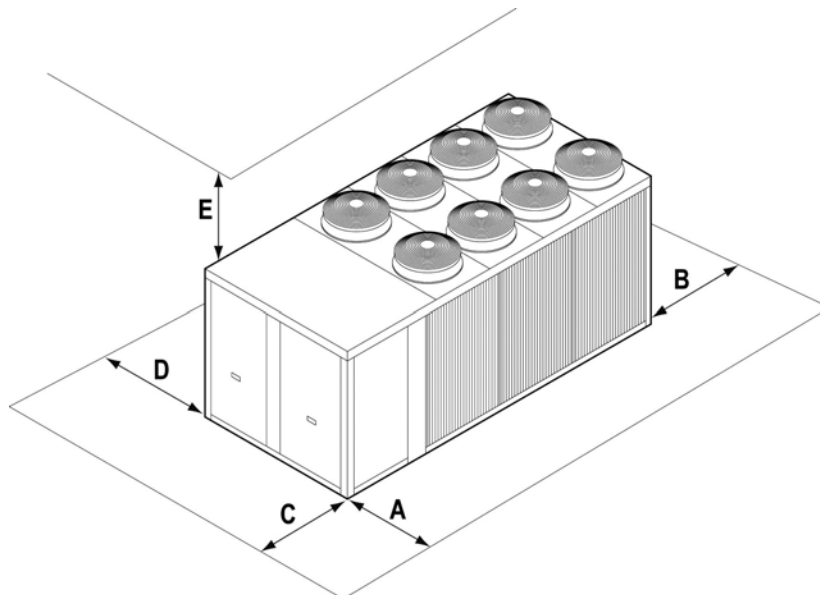


**LOCATION AND MINIMUM TECHNICAL CLEARANCES**

LDK units are designed for external installation: any cover over the unit and location near trees (even if they partially cover the unit) must be avoided in order to prevent air by-pass. It is advisable to create a proper basement, with a size similar to unit foot-print. Unit vibration level is very low: it is advisable however, to fit a rigid rubber band between basement and unit base-frame. If it is the case, it is possible to install anti-vibration mounts (spring or rubber), to keep vibrations at a very low level. Absolute care must be taken to ensure adequate air volume to the condenser. Re-circulation of discharge air must be avoided; not observing 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
039-045	1000	800	800	800	3000
050-060-070-080	1500	800	800	800	3000
090-110-120-130	1500	1000	1000	1000	3000
152-162-144-164	1500	1000	1000	1000	4000
190-210-240-260	2000	1000	1000	1000	4000



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



**WARNING:** The equipment should be installed so that maintenance and/or repair services be possible. The warranty does not cover costs due to lifting apparatus and platforms or other lifting systems required by the warranty interventions.



**WARNING:** All the maintenance operation must be done by **TRAINED PEOPLE** only.



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



**WARNING:** Inside the unit some moving components are present. Be very careful when operating in their surroundings even if the electric supply is disconnected.



**WARNING:** The top shell and discharge line of compressor are usually at high temperature level. Be very careful when operating in their surroundings.

**WARNING:** Aluminium coil fins are very sharp and can cause serious wounds. Be very careful when operating in their surroundings



**WARNING:** After servicing operation close the unit with cover panels, fixing them with locking screws

### HYDRAULIC CONNECTIONS

Unit water pipe-work must be installed in accordance with national and local regulation, pipes can be made either in steel , galvanized steel or PVC. Pipes have to be designed depending on the nominal waterflow and the hydraulic pressure drops of the system. All pipes must be insulated with closed-cell material of adequate thickness. The chiller has to be connected to the piping by using flexible joints. Piping should include:

- Temperature and pressure gauges for the ordinary maintenance or servicing operations.
- Shut-off manual valves to separate 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.



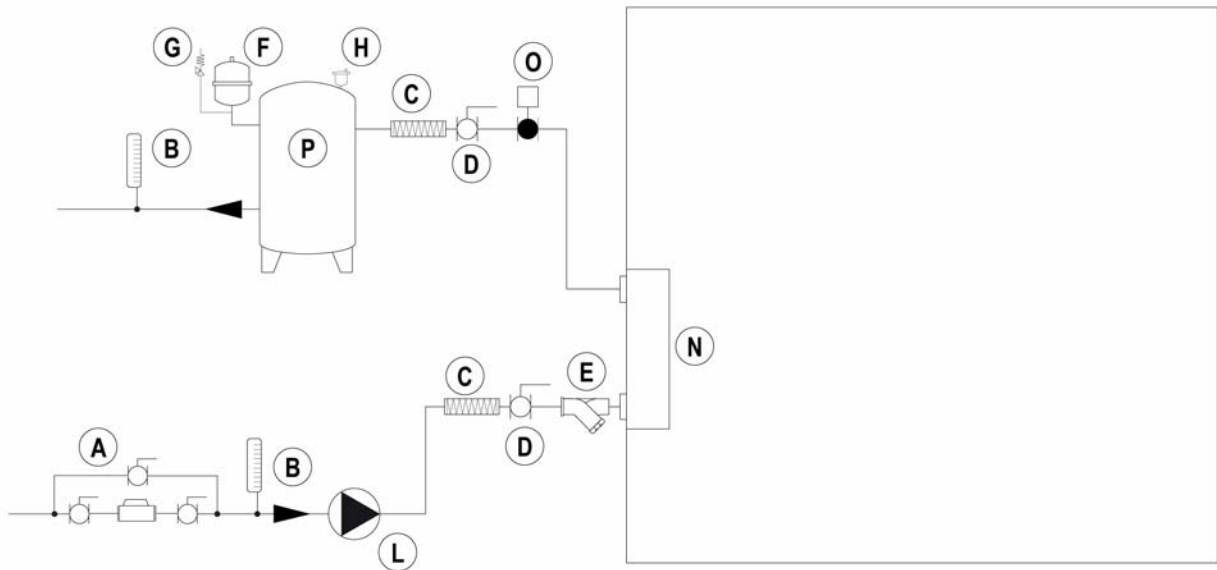
**WARNING:** Unit water inlet must be in correspondence with the connection labelled: "USER WATER IN", otherwise the heat exchangers may freeze.

**WARNING:** It is compulsory to install on the USER WATER IN connection a metallic filter with a mesh not larger than 1 mm. The presence of the filter is to be considered mandatory, the warranty will no longer be valid if it is removed. The filter must be kept clean, so make sure it is clean after the unit has been installed, and then check it periodically.

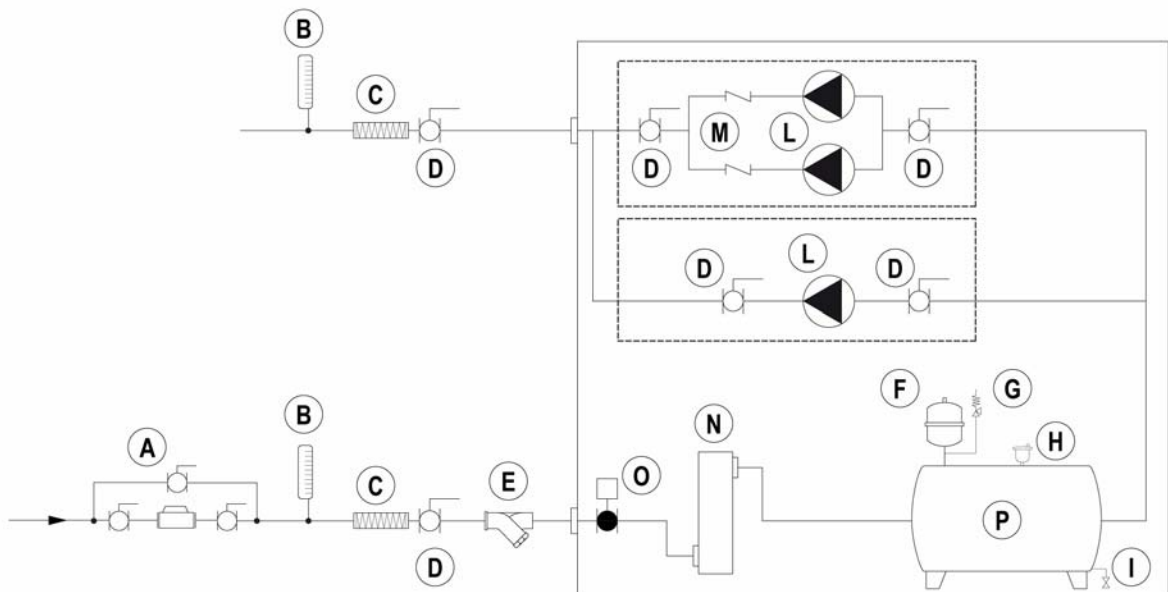


**WARNING:** All units are factory supplied with the flow switch ( it is factory installed in the "A" versions, supplied loose in the standard versions). The flow switch **MUST BE INSTALLED** on the water outlet connection (labelled USER WATER OUT); If the flow switch is altered, removed, or the water filter should not be present on the unit, the warranty will be invalidated. Please refer to the wiring diagram for flow switch electric connections.

**Basic version hydraulic components**



**“A” version hydraulic components**



- |          |                             |          |                                  |
|----------|-----------------------------|----------|----------------------------------|
| <b>A</b> | <b>System filling group</b> | <b>H</b> | <b>Vent valve</b>                |
| <b>B</b> | <b>Thermometer</b>          | <b>I</b> | <b>Water tank Drainage valve</b> |
| <b>C</b> | <b>Flexible connection</b>  | <b>L</b> | <b>Water pump</b>                |
| <b>D</b> | <b>Ball shut-off valve</b>  | <b>M</b> | <b>One way valve</b>             |
| <b>E</b> | <b>Water strainer</b>       | <b>N</b> | <b>Evaporator</b>                |
| <b>F</b> | <b>Expansion vessel</b>     | <b>O</b> | <b>Flow switch</b>               |
| <b>G</b> | <b>Safety valve</b>         | <b>P</b> | <b>Water tank</b>                |

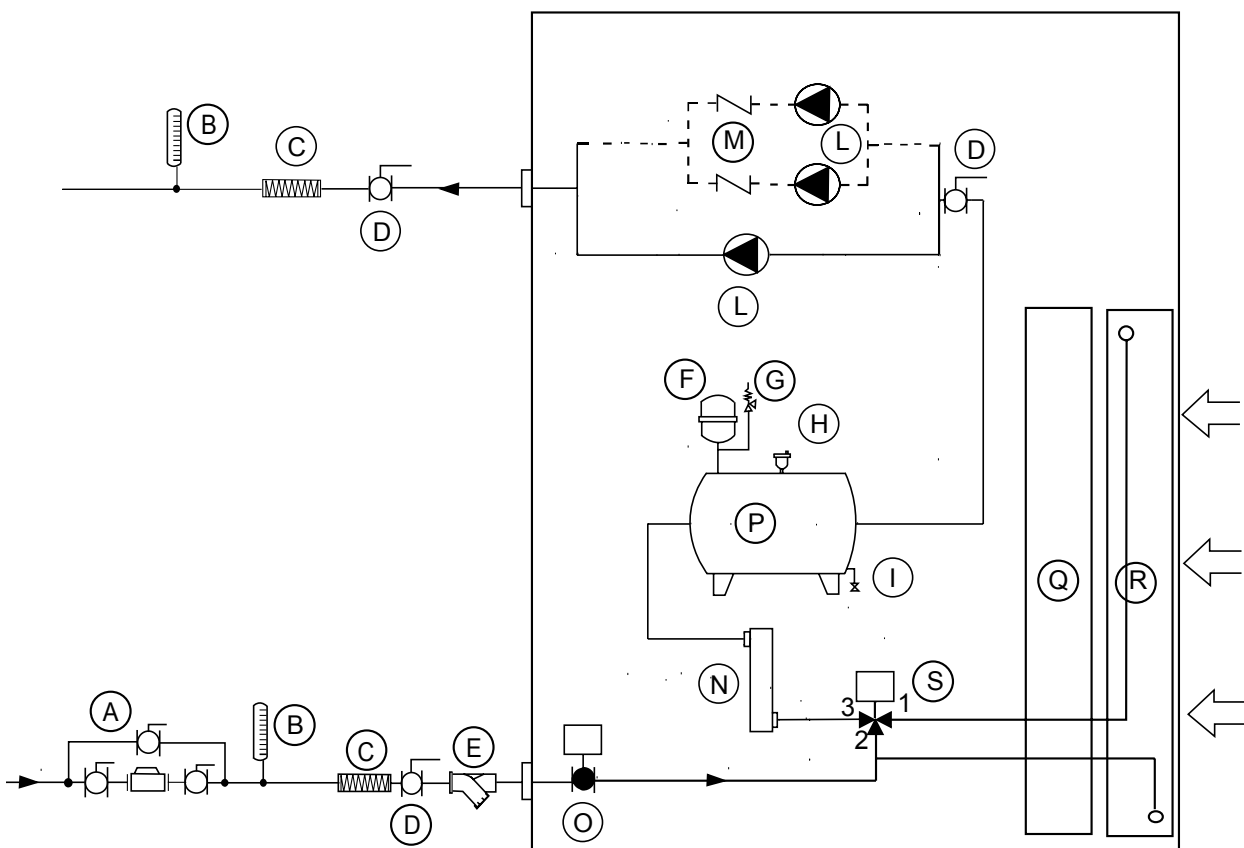
**LDK / FC FREE COOLING VERSION**

The free cooling versions can operate in 3 different working modes. The free-cooling coil is installed in series with the water chiller evaporator; the 3 way valve controls the water flow through the coil. When the ambient temperature is lower than the return water temperature the microprocessor allows the water flow to pass through the free-cooling coil first, then through the evaporator.

**Cooling mode (Summer operation)** Ambient temperature is higher than the return water temperature. In this case, the ambient conditions are not suitable to allow Free Cooling operation; the 3 way valve is closed and the water flow passes to the evaporator where it is cooled. The compressors, fans, and the water pump are activated; the unit operates like a normal liquid cooler.

**Free cooling mode (Winter operation)** Ambient temperature is much lower than the return water temperature. In this case, the ambient conditions are suitable to allow Free Cooling operation; the 3 way valve opens and the water flow passes into the free cooling coil where the ambient conditions are sufficient to give the total required load. In this case the pump and the fans are in operation, while the compressors are stopped. In this case, the free cooling system works in substitution of the water chiller.

**Cooling mode + Free cooling (Mid-season operation)** Ambient temperature is lower than the return water temperature. In this case, the ambient conditions are suitable to allow Free Cooling operation; the 3 way valve opens and water flow passes into the free cooling coil although the ambient conditions are not sufficiently low to give the total required load. The microprocessor control then, activates the compressors (Pump and fans are already in operation) to satisfy the required load. In this case the free cooling system works in integration of the water chiller. In such conditions also the head pressure control device is activated.



- A System filling group
- B Thermometer
- C Flexible connection
- D Ball shut-off valve
- E Water strainer
- F Expansion vessel
- G Safety valve
- H Vent valve
- I Water tank Drainage valve

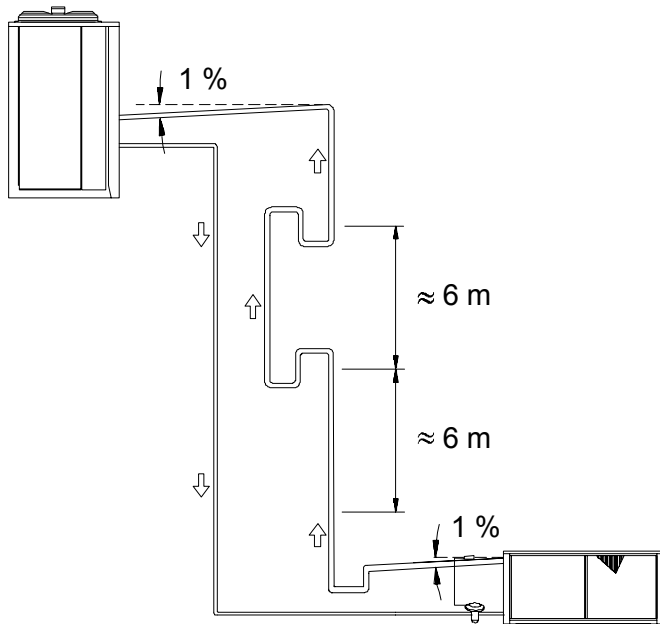
- L Water pump
- M One way valve
- N Evaporator
- O Flow switch
- P Water tank
- Q Condensing coil
- R Free cooling coil
- S 3 Way valve



**LDK / CN REFRIGERANT CONNECTIONS**

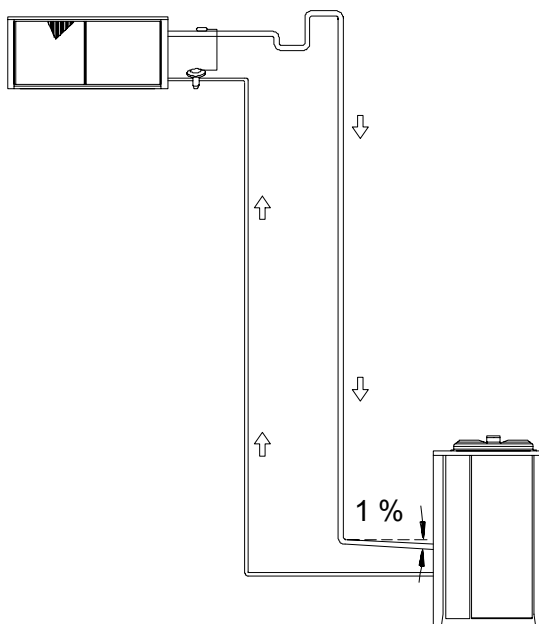
Condensing unit (CN versions) must be connected to the indoor unit by refrigerant lines. The condensing units are supplied without refrigerant charge and filled with nitrogen. All models are supplied with microprocessor control.

On split-system applications, piping layout is determined by sections location and building structure. Piping should be as shorter as possible in order to reduce pressure drops in refrigerant circuit and the refrigerant charge in the system. Maximum admitted pipe length is 30 meters.



**Motocondensing unit installed at a higher level than the evaporation section:**

- a) On the rising vertical pipes, oil traps should be fitted every 6 metres to allow oil circulation in the system;
- b) Install a collection pit immediately downstream from the bulb of the thermostatic valve;
- c) On horizontal suction pipelines a minimum 1% slope should be allowed in order to let the oil easily come back to compressor. Pipelines diameter can be read in Table II depending on the unit size and the length of refrigerant pipelines.



**Motocondensing unit installed at a lower level than the evaporation section:**

- a) Install a liquid trap on suction line at the evaporator outlet whit the same height of the evaporator so that liquid refrigerant, when the system is not running, will not fall into compressor;
- b) Install a collection pit immediately downstream from the bulb of the thermostatic valve so that liquid refrigerant, when the system is not running, can be collected by this pit. In this way, when the compressor is turned on, the rapid evaporation of the coolant fluid in the pit, will not affect the bulb of the thermostatic valve;
- c) On horizontal suction pipelines a minimum 1% slope should be allowed in order to let the oil easily come back to compressor.

**Refrigerant line diameters for "CN" versions**

Distance [m]	10		20		30	
	Suction [mm]	Liquid [mm]	Suction [mm]	Liquid [mm]	Suction [mm]	Liquid [mm]
039	35	18	35	18	35	18
045	35	22	42	22	42	22
050	35	22	42	22	42	22
060	42	22	42	22	42	22
070	42	28	42	28	54	28
080	42	28	42	28	54	28
090	54	28	54	28	54	28
110	54	28	54	28	54	28
120	54	35	54	35	54	35
130	54	35	67	35	67	35
152	54	35	67	35	67	35
162	54	35	67	35	67	35
144	42	28	42	28	54	28
164	42	28	42	28	54	28
190	54	28	54	28	54	28
210	54	28	54	28	54	28
240	54	35	54	35	67	35
260	54	35	67	35	67	35
300	Contact the company					
320						
380						
430						
500						

**Refrigerant charge for liquid line**

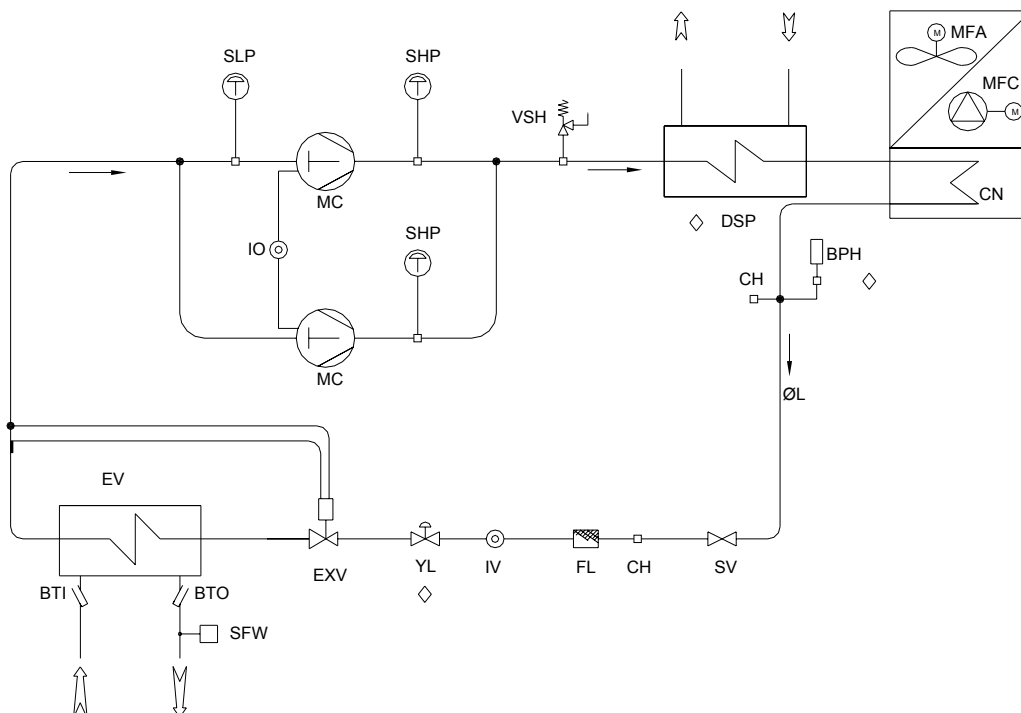
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
18 mm	220	28 mm	590
22 mm	360	35 mm	890

**Cooling capacity correction factors**

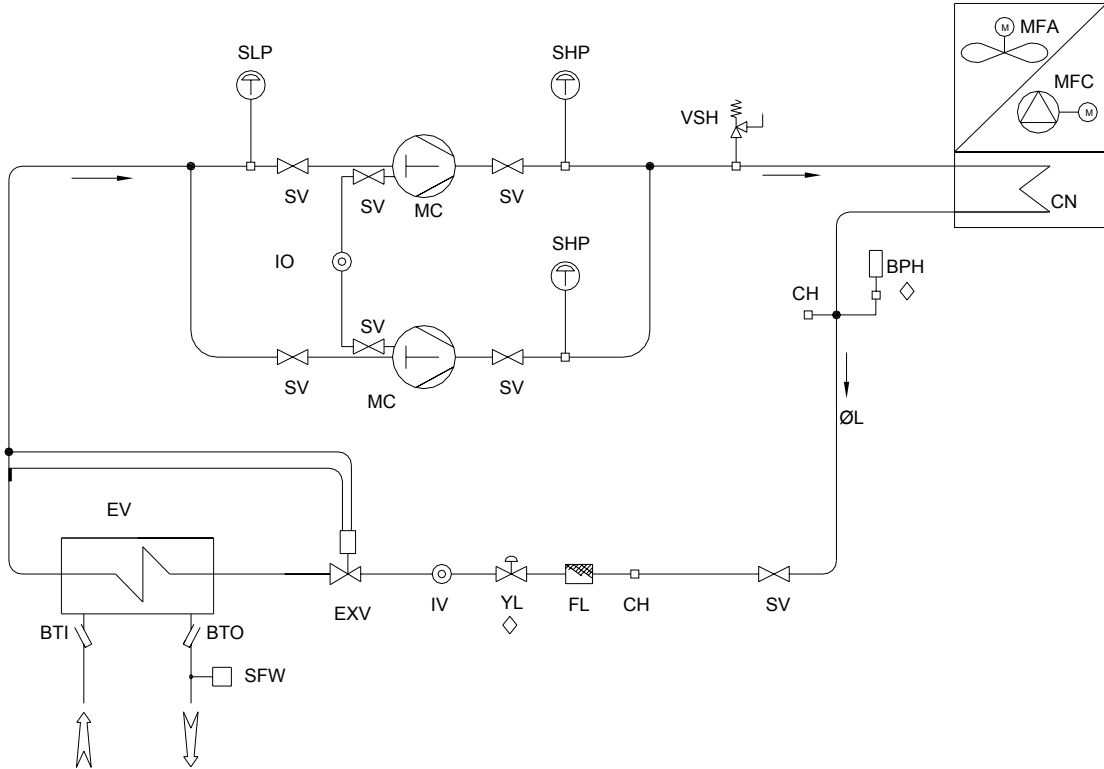
Mod.	Refr. Line 0 mt.	Refr. Line = 10 mt.	Refr. Line 20 mt.	Refr. Line 30 mt.
LDK / CN	1	0,98	0,96	0,95

**REFRIGERANT CIRCUITS**

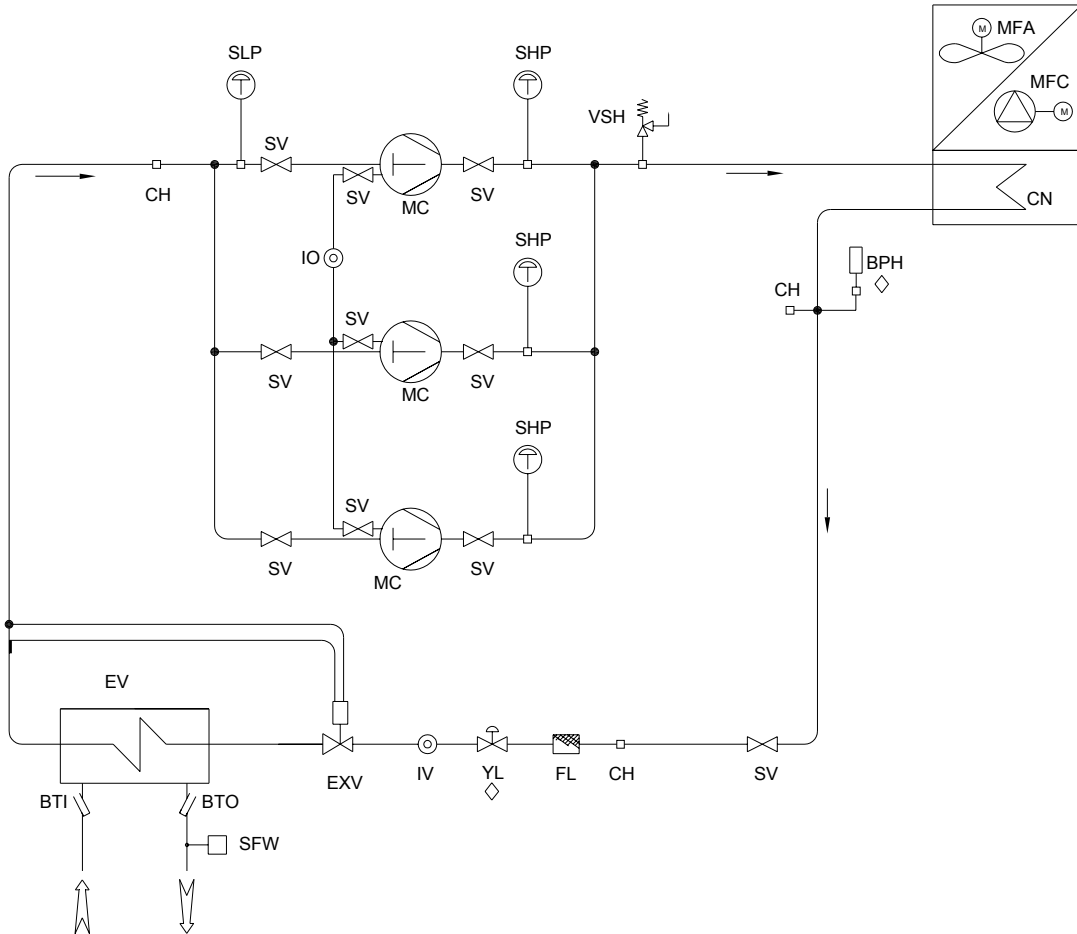
**REFRIGERANT CIRCUIT LDK039 – 260**



**REFRIGERANT CIRCUIT LDK300 – 320**

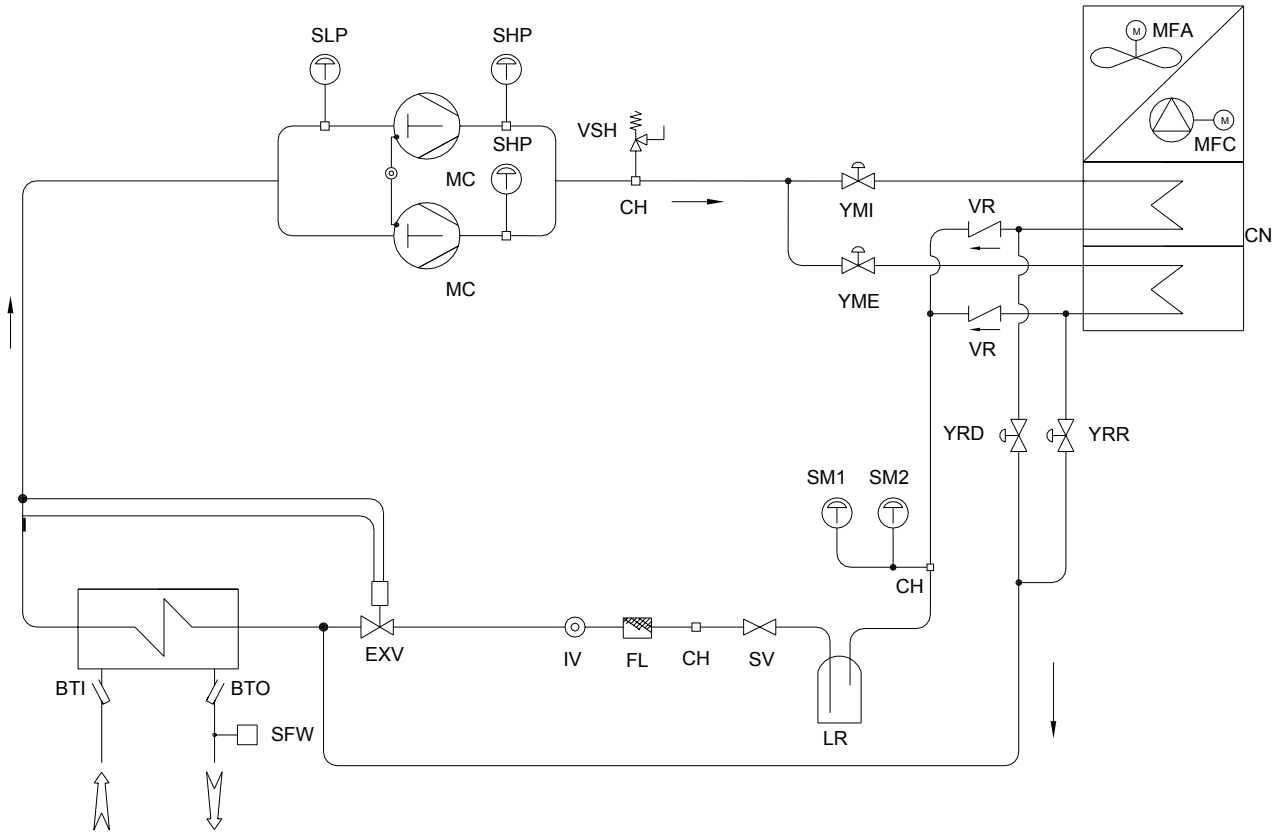


**REFRIGERANT CIRCUIT LDK380 – 500**

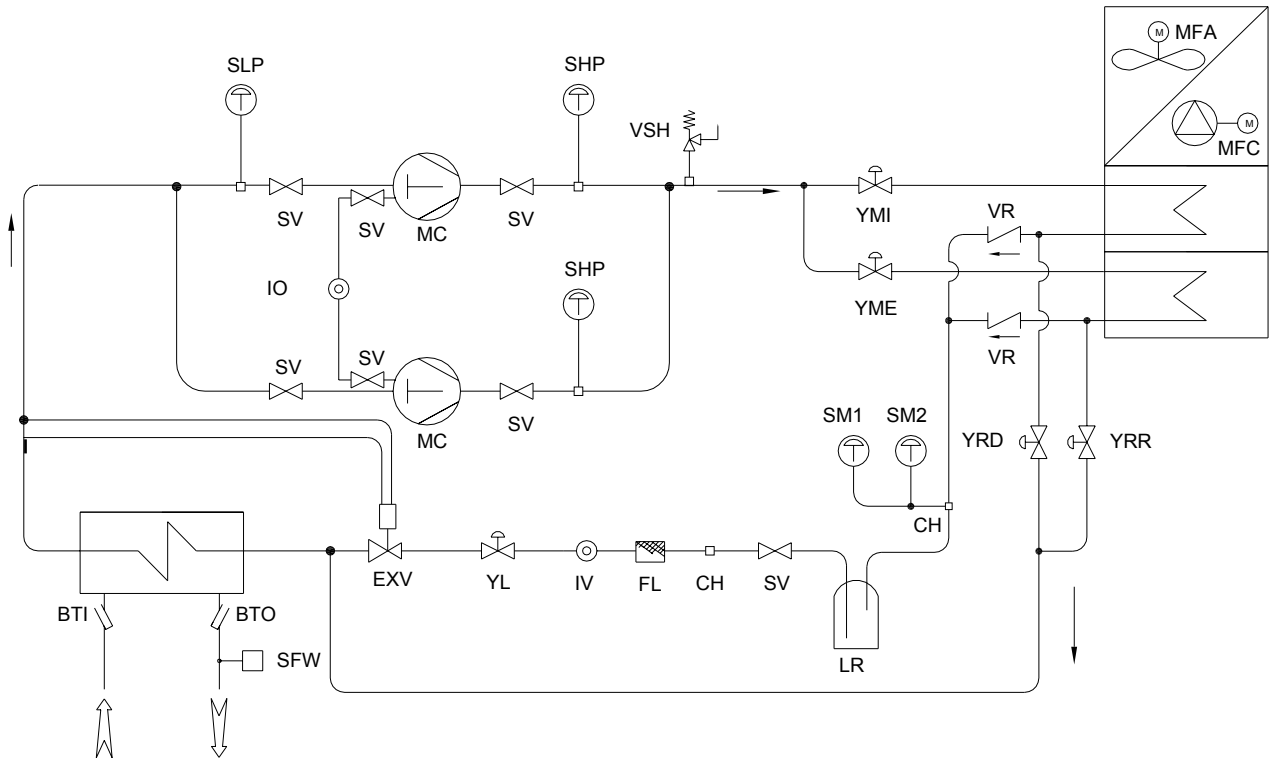




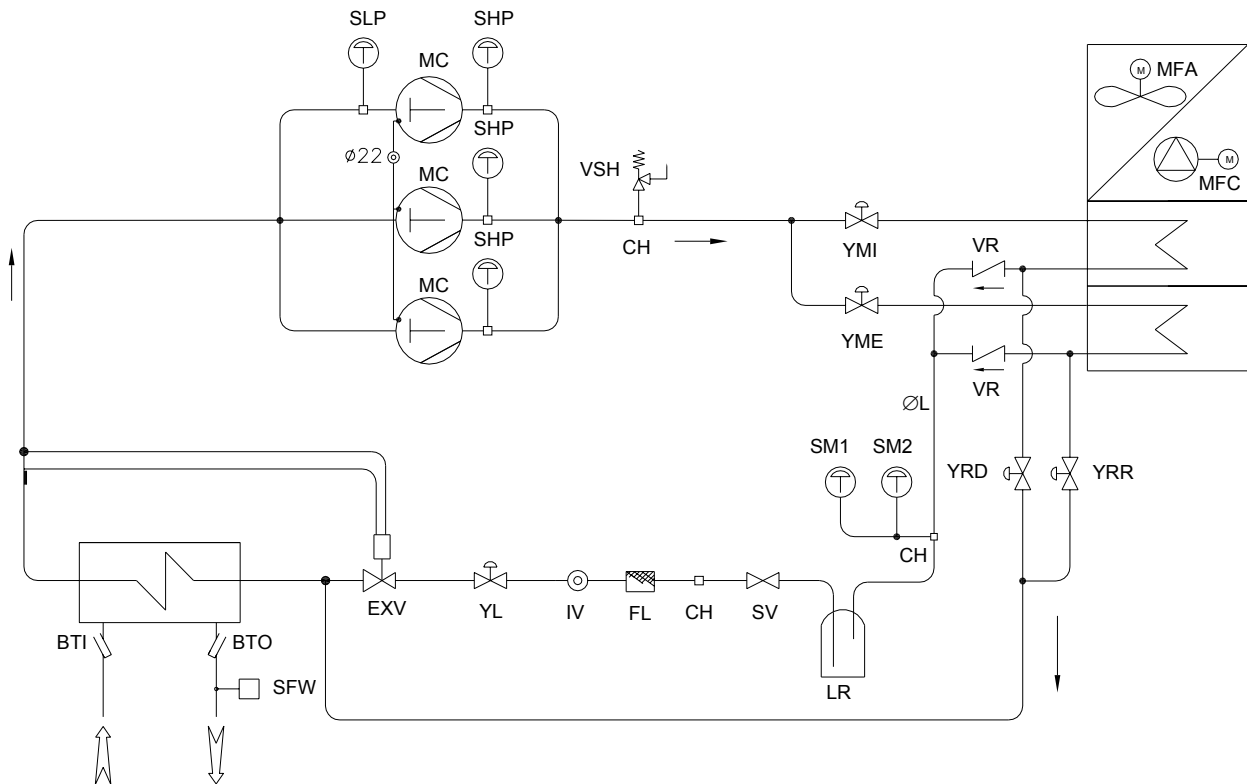
**REFRIGERANT CIRCUIT LDK039/FC - 260/FC**



**REFRIGERANT CIRCUIT LDK300/FC - 320/FC**



**REFRIGERANT CIRCUIT LDK380/FC - 500/FC**



BPH	High pressure transducer	SFW	Flow switch
BTI	Water inlet sensor	SHP	High pressure switch
BTO	Water outlet sensor	SLP	Low pressure switch
CH	Pressure plug	SM	Free cooling condensing pressure switches
CND	Condenser	SV	Manual valve
DSP	Partial heat recovery	VBP	Hot gas By-pass valve
EV	Evaporator	VR	One way valve
EXV	Expansion valve	VRL	One way valve
FL	Liquid line filter	VRV	4 way Reverse cycle valve
IO	Oil sight glass	VSH	Safety valve
IV	Refrigerant sight glass	YL	Solenoid valve
LG	Hot gas Injection valve	YME	Free cooling solenoid valve
LR	Liquid receiver	YMI	Free cooling solenoid valve
MC	Compressor	YRD	Free cooling solenoid valve
MFA	Axial fan	YRR	Free cooling solenoid valve
MFC	Centrifugal fan	◇	Option

UNIT DISPLAY

MODELS 039÷162



MODELS 144 ÷500



FREE COOLING VERSIONS (All sizes)



### FAN SPEED CONTROL (optional)

If unit operation below 20 °C is required, fan speed control must be present in the unit. This device will allow unit operation under low ambient temperature, 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).



**WARNING: Fan speed control is factory pre-set. The values must never be modified**

### ELECTRICAL CONNECTIONS

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 connections must be made in accordance to the wiring diagram enclosed with the unit and in accordance to the norms in force. Power cable and line protection must be sized according to the specification reported on the form of the wiring diagram enclosed with the unit.



**WARNING: The line voltage fluctuations can not be more than  $\pm 5\%$  of the nominal value, while the voltage unbalance between one phase and another can not exceed 2%. If those tolerances should not be respected, please contact our Company.**



**WARNING: Electric supply must be in the limits shown: in the opposite case warranty will terminate immediately. Before every operation on the electric section, be sure that the electric supply is disconnected.**

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

### START UP

#### Before start-up

- Check that all power cables are properly connected and all terminals are hardly fixed.
- The voltage at the phase R S T is the one shown in the unit labels.
- Check that there is not any refrigerant leakage.
- Check that crankcase heaters are powered correctly.
- Check that all water connections are properly installed and all indications on unit labels are observed.
- The system must be bleed off in order to eliminate any air.
- Before proceeding to start up check that all the cover panels are re-located in the proper position and locked with fastening screws.



**WARNING: Crankcase heaters must be powered at least 12 hours before start up by closing the main switch (heaters are automatically supplied when main switch is closed). The crankcase heaters are working properly if after some minutes the compressor crankcase temperature is about 10÷15°C higher than ambient temperature**

#### Start up

Please refer to the microprocessor manual enclosed with the unit.

#### If the unit should not start:

- Check that the control thermostat is set to the correct value.



**WARNING: Do not modify internal wiring of the unit otherwise warranty will terminate immediately.**

**WARNING: for heat pump versions, the summer/winter operation must be selected at the beginning of the related season. Frequent change over of the seasonal operation mode must be avoided in order to prevent severe damage to compressors.**



**Controls during unit operation**

- Check the fans rotation. If the rotation is incorrect, disconnect the main switch and change over any two phases of the incoming main supply to reverse motor rotation:
- Check that water temperature at evaporator inlet is near to the set point of the control thermostat.
- For “A” version units (units with pumps and storage tank) if the motor driven pump should be noisy, slowly close discharge shut-off valve until normal working conditions are restored. This trouble may occur when system pressure drop is quite different from pump available pressure.

**Refrigerant charge checking**

- After few hours the unit is working, check that sight glass shows a green colour core: if the core is yellow moisture would be present in the circuit. In this case it is necessary circuit dehydration to be carried out by qualified people only. Check that at the sight glass there is no continuous vapour bubbles presence. In this case additional refrigerant charge could be required. It is however allowed the presence of few vapour bubbles.
- Few minutes after the start up, working on summer operating mode (cooling), check that condensing temperature, is approximately 15 °C higher than condenser inlet air temperature. Check moreover that evaporation temperature is about 5 °C lower than the evaporator outlet temperature.
- Check that refrigerant superheat on the evaporator is about 5-7 °C
- Check if refrigerant sub-cooling on the condenser is about 5-7 °C.

**Unit switch OFF**

Please refer to the microprocessor manual enclosed with the unit.



**WARNING: Never switch off the unit (for temporary stop), by opening the main switch: this component should be used only to disconnect the unit from power supply when the current is not passing through, i.e. when the unit is in OFF mode. Moreover, with no supply to crankcase heater, at the unit start up, compressor could be seriously damaged.**

**MAINTENANCE AND PERIODIC CHECKS**



**WARNING: All operations described in this chapter MUST BE DONE BY TRAINED PEOPLE ONLY. Before every operation of servicing on the unit, be sure that the electric supply is disconnected. The top shell and discharge line of compressor are usually at high temperature level. Be very careful when operating in their surroundings. Aluminium coil fins are very sharp and can cause serious wounds. Be very careful when operating in their surroundings. After servicing operation close the unit with cover panels, fixing them with locking screws.**

It is a good rule to carry on periodic checks in order to verify the correct operation of the unit.

- Check that safety and control devices work correctly as previously described (monthly).
- Check all the terminals on the electric board and on the compressor are properly fixed. Periodic cleaning of the sliding terminals of the contactors should be done.
- Verify refrigerant charge checking sight glass (monthly).
- Check there is no oil leakage from compressor (monthly).
- Check there is no water leakage in the hydraulic system (monthly).
- If the unit is to be expected to be stopped for a long period, unit hydraulic circuit should be emptied from all the tubes and heat exchanger. This operation is compulsory if, during seasonal stop, ambient temperature is expected to go down below the freezing point of employed mixture (typical seasonal operation).
- Check flow switch proper working (monthly).
- Check compressor crankcase heater proper supply and functioning (monthly).
- Clean metallic filters on water pipings (monthly).
- Clean finned coils metallic filters with compressed air in the opposite direction of the air flow. If filters should be fully clogged, clean them with a water jet (monthly).
- -Check mounting of fan blades and their balancing (every 4 months).
- Check the colour of the sight glass core (green=no moisture, yellow=moisture present): if it has a yellow colour, change the refrigerant filter (every 4 months).

### REFRIGERANT CIRCUIT REPAIR

**In the case that refrigerant circuit should be discharged, all the refrigerant must be recovered with proper machines.** The system must be charged with nitrogen, using a gas bottle with a pressure reducing valve, until 15 bar pressure is reached. Any eventual leakage must be searched with a bubble leak finder. In case bubbles appear discharge the circuit before welding with proper alloys.



**WARNING: Never use oxygen instead of nitrogen: explosions may occur.**

### ENVIRONMENT PROTECTION

According to European norms dealing with the use of depleting stratospheric ozone substances, it is forbidden to release refrigerants fluids in the atmosphere. They must be redelivered to the seller or to proper gathering points at the end of their operating life. Refrigerant R407C is mentioned among controlled substances and for this reason it must be subjected to said norms. **A particular care is recommended during service operations in order to reduce as much as possible any refrigerant loss.**

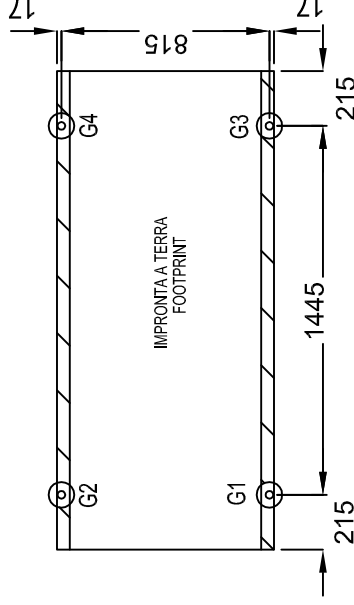
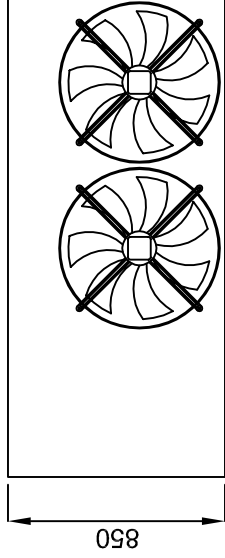
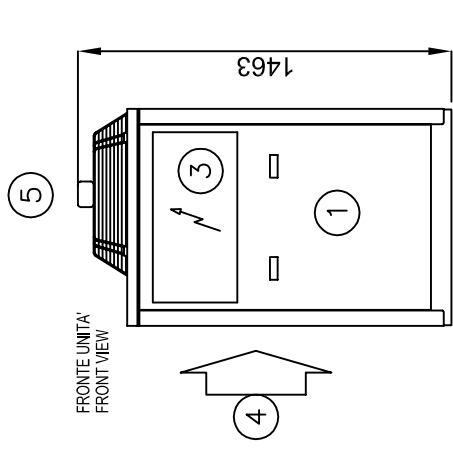
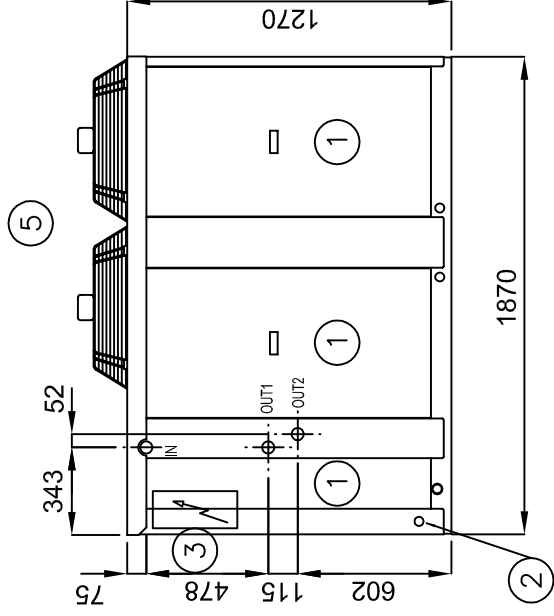
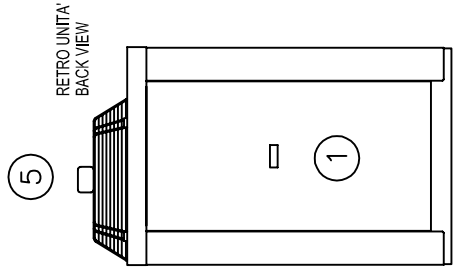
### UNIT OUT OF SERVICE

Once the unit is arrived at the end of its life and needs to be removed or replaced, the following operations are recommended:

- the unit refrigerant has to be recovered by trained people and sent to proper collecting centre;
- compressor lubricating oil has to be recovered and sent to proper collecting centre;
- the frame and various components, if not usable any longer, have to be dismantled and divided according to their nature; particularly copper and aluminium, which are present in conspicuous quantity in the unit. These operations allow easy material recover and recycling process, reducing environmental impact.

### FAULT FINDING

Please refer to the unit microprocessor manual.



1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 1 1/4"
OUT1	USCITA ACQUA UTENTE USER WATER OUTLET R 1 1/4"
OUT2	USCITA ACQUA UTENTE USER WATER OUTLET UNITS R 1 1/4"

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE

Denominazione/Denomination  
**SCHEMA DIMENSIONALE REFRIGERATORE LDK 039 - 045**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 039 - 045**

Disegno/Drawing <b>SD.1LDK.0065</b>	Rev. <b>A</b>	Data/Date <b>03/10/06</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:30</b>	Form. <b>A4</b>	Visto/Checked by <b>MARCATO F.</b>
Sost. il dis./Replace draw.			Dis./Draftsman		Ordine-Order	

Descrizione modifica/Review description

Visto/Checked by

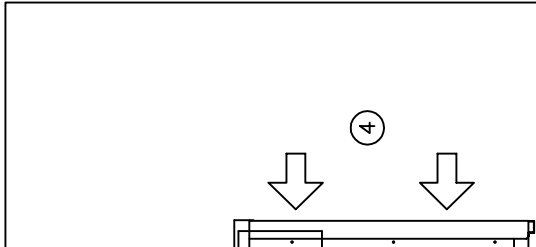
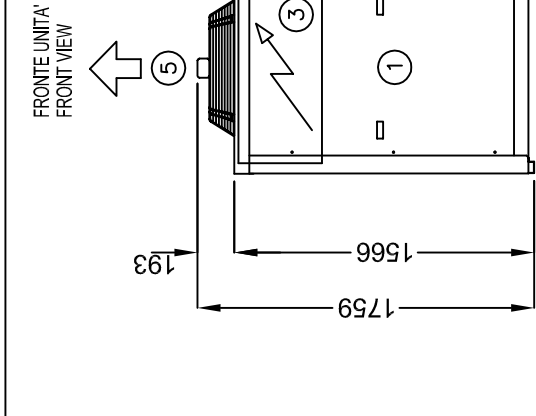
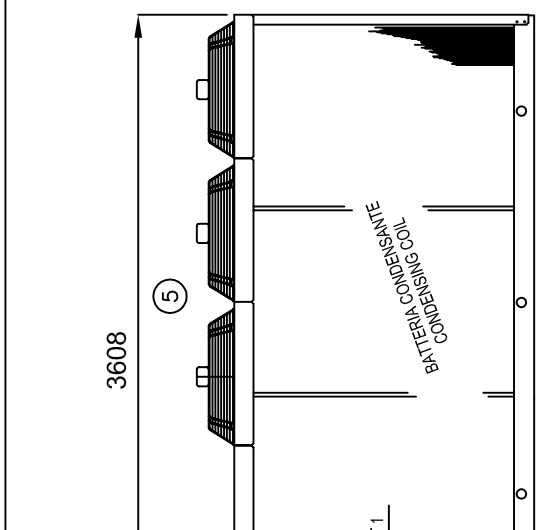
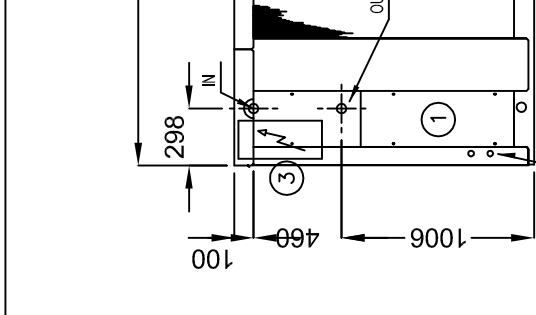
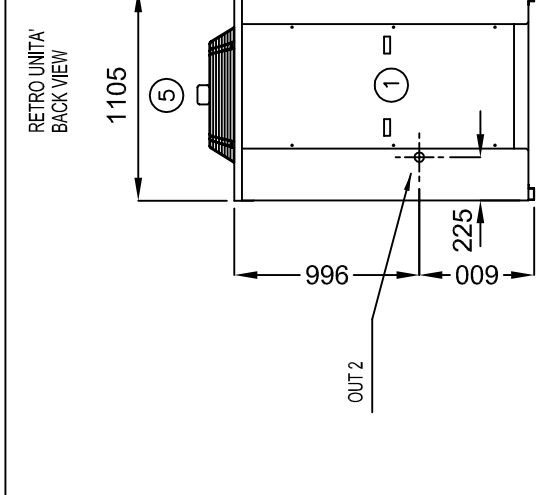
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Data/Date

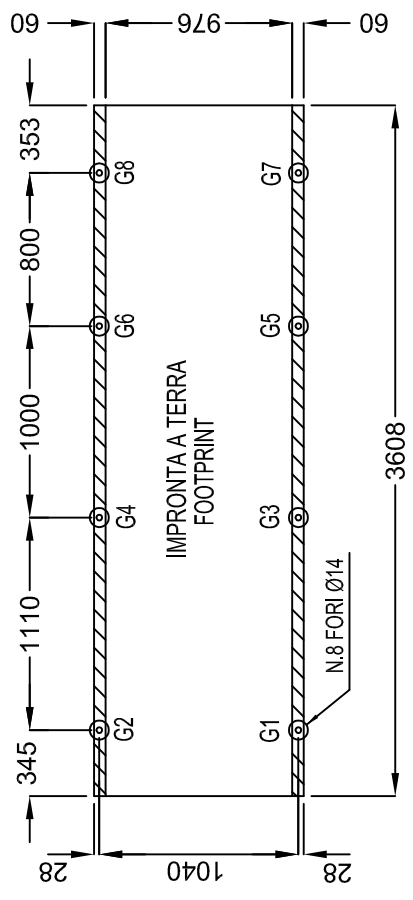
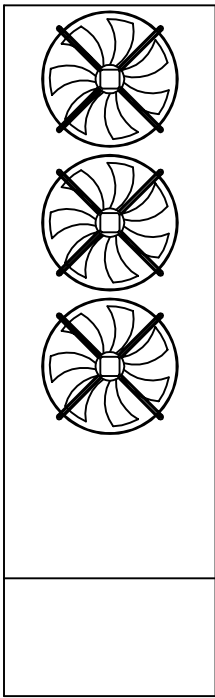
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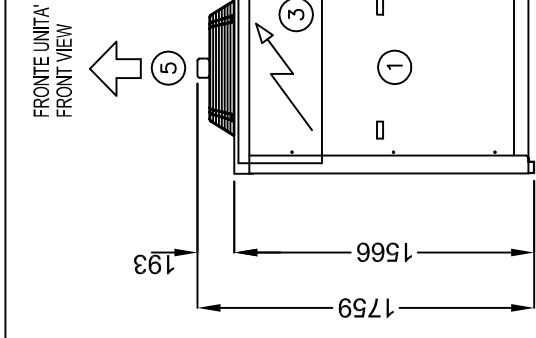
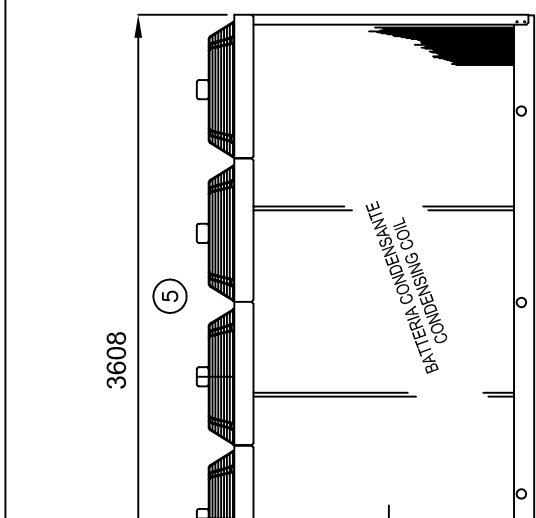
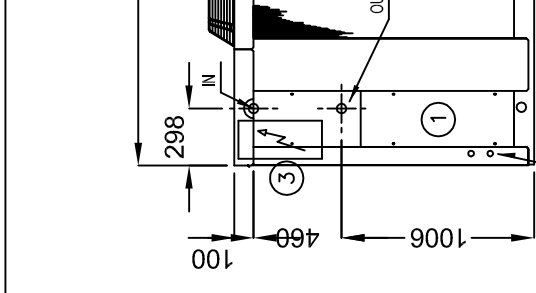
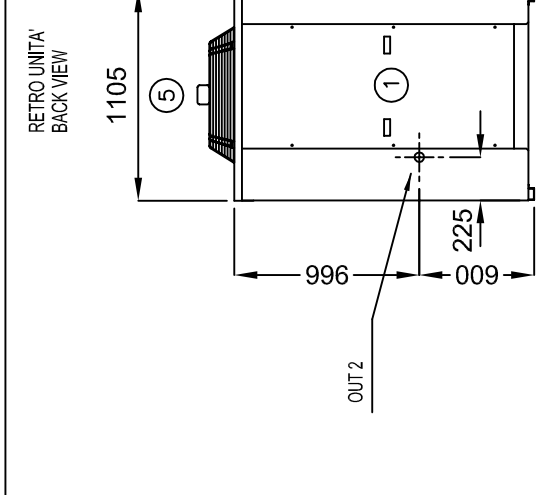
1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2"



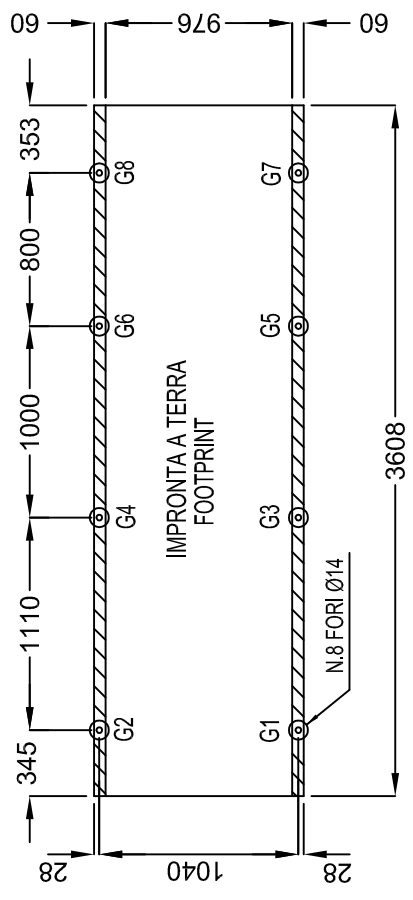
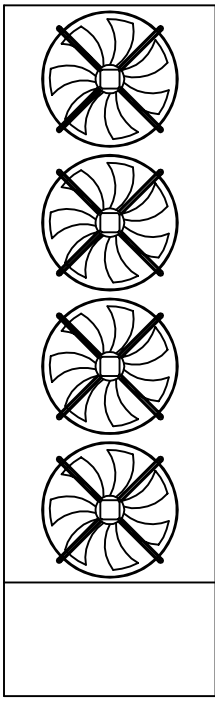
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Sost. il dis./Replace draw.		Sost. dal dis./Replaced by draw.		Dis./Draftsman		Ordine-Order				

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE

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1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2"

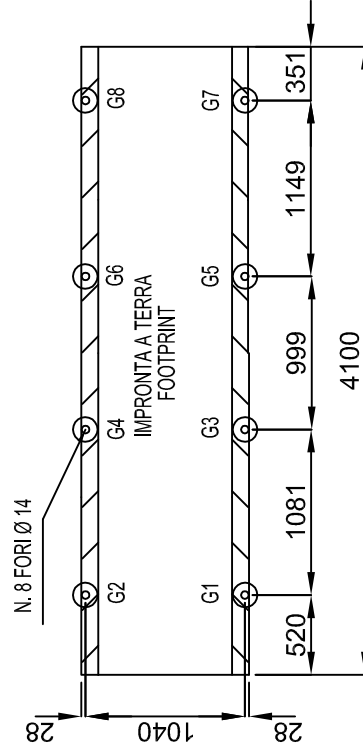
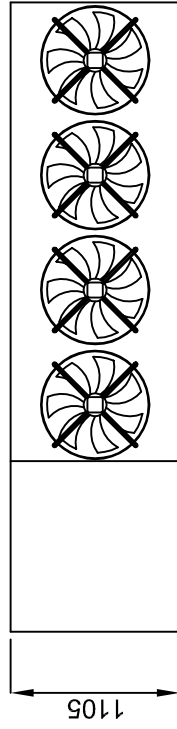
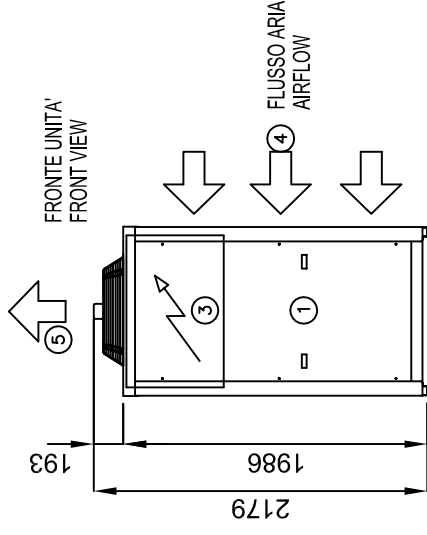
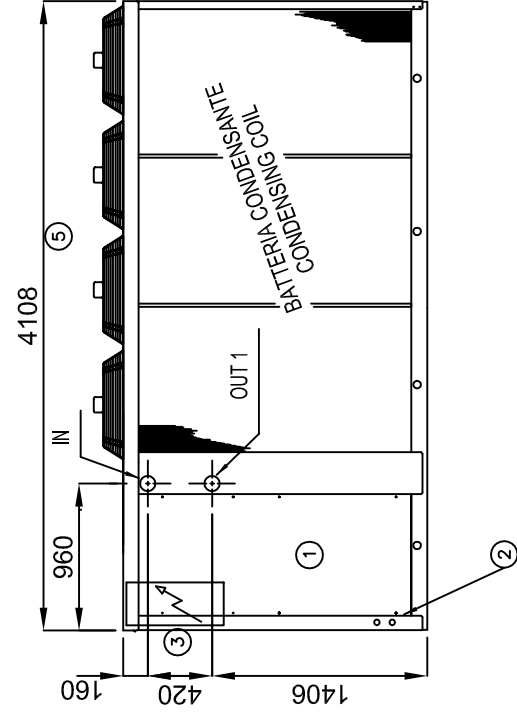
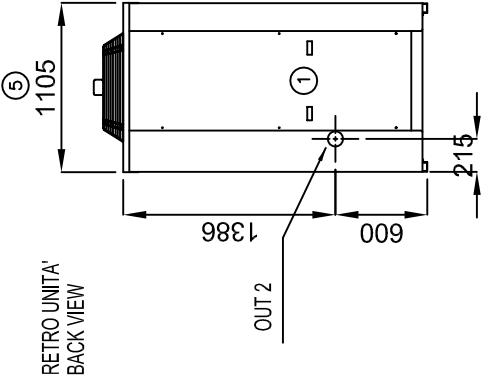


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Disegno/Drawing <b>SD.1LDK.0040</b>	Rev. <b>A</b>	Data/Date <b>13/09/06</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:40</b>	Dis./Draftsman <b>MARCATO F.</b>
Sost. il dis./Replace draw.		Sost. dal dis./Replaced by draw.		Ordine-Order	

Descrizione modifica/Review description

◇ OPZIONALE/OPTIONAL  
○ SOLO SU TAGLIE/ONLY ON SIZE

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1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R2 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2 1/2"

Denominazione/Denomination <b>SCHEMA DIMENSIONALE REFRIGERATORE LDK 144 - 164</b> <b>WATER CHILLER DIMENSIONAL DRAWING LDK 144 - 164</b>		Form. <b>A4</b>	Visto/Checked by <b>MARCATO F.</b>
Disegno/Drawing <b>SD.1LDK.0045</b>	Rev. <b>A</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:50</b>
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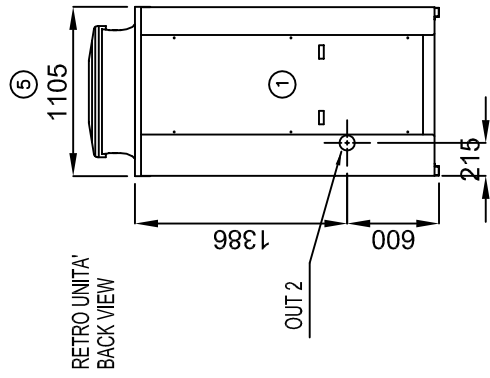
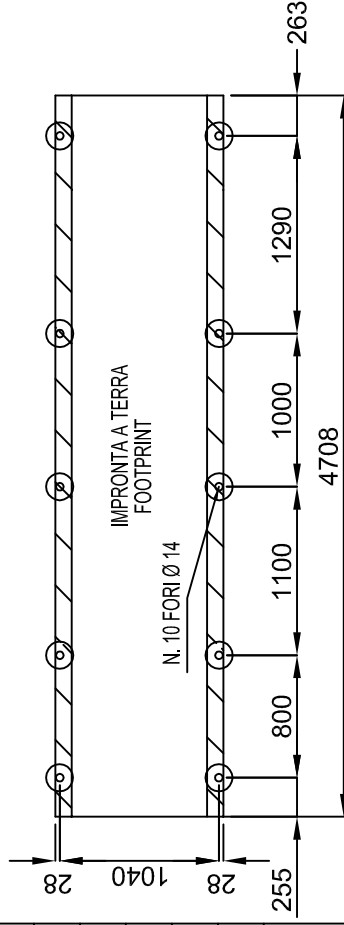
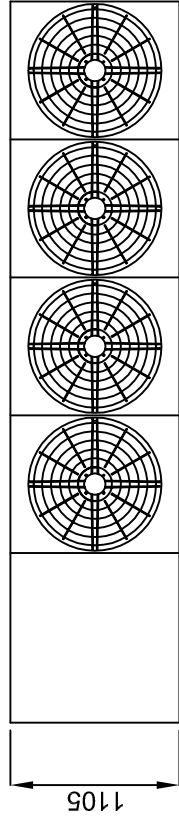
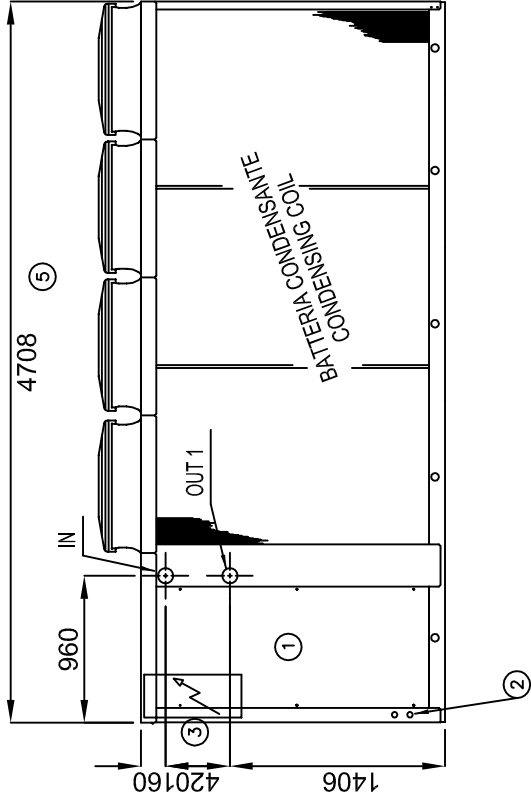
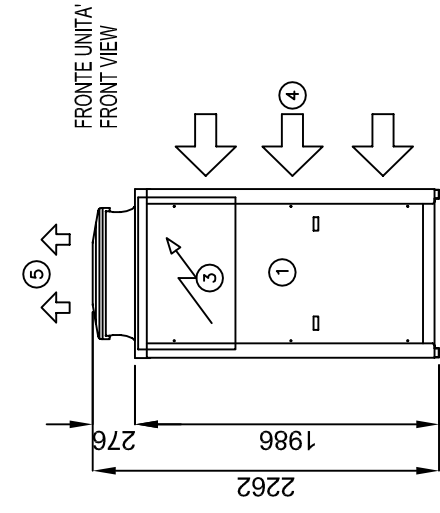
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- SOLO SU TAGLIE/ONLY ON SIZE

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Descrizione modifica/Review description

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2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 2 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2 1/2"

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE



Denominazione/Denomination

**SCHEMA DIMENSIONALE REFRIGERATORE LDK 190 - 210 XL  
WATER CHILLER DIMENSIONAL DRAWING LDK 190 - 210 XL**

Disegno/Drawing <b>SD.1LDK.0025</b>	Rev. <b>A</b>	Data/Date <b>13/09/06</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:50</b>	Form. <b>A4</b>	Visto/Checked by [Signature]
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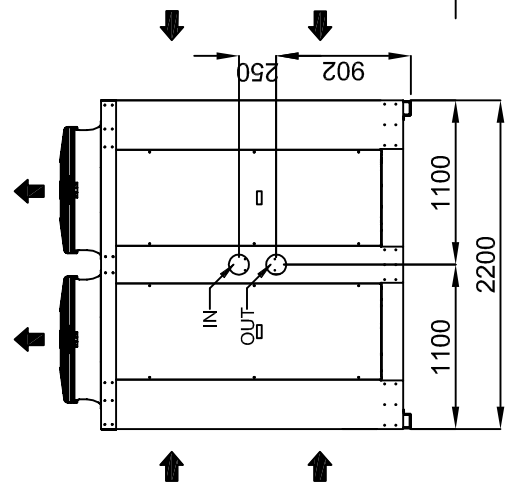
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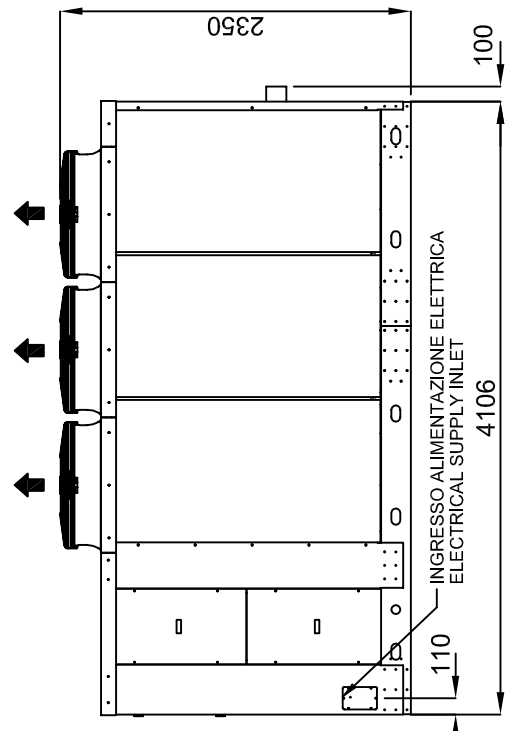


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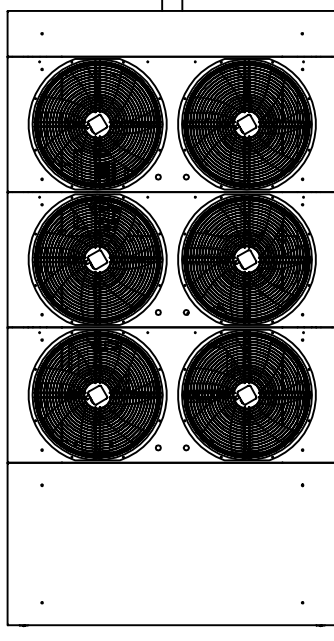
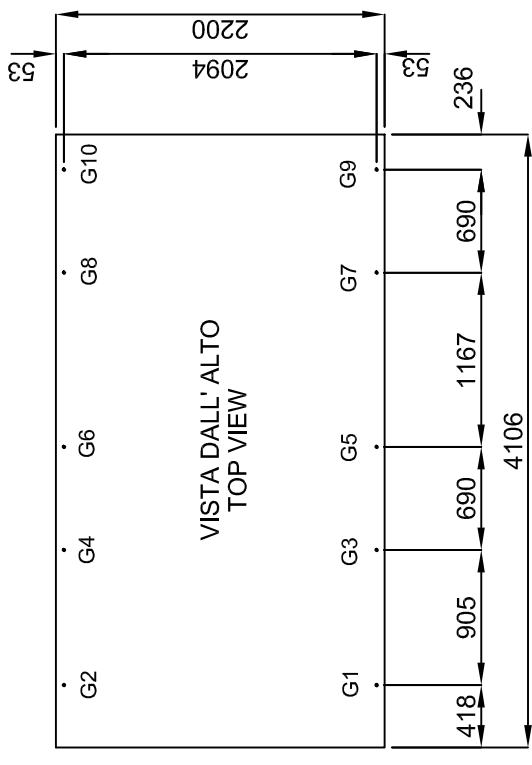
RETRO UNITA'  
BACK VIEW



FRONTE UNITA'  
FRONT VIEW



PESO (Kg) WEIGH (Kg)	POSIZIONE POSITION
589	G1
490	G2
589	G3
490	G4
325	G5
312	G6
266	G7
245	G8
198	G9
198	G10



MODELLO / MODEL	INGRESSO ACQUA UTENTE USER WATER INLET	USCITA ACQUA UTENTE USER WATER OUTLET
LDK 300	4" VICTAULIC	4" VICTAULIC

Peso dell'unità in funzione (Kg) **3702**  
Weight of the unit in operation (Kg)

Denominazione/Denomination  
**SCHEMA DIMENSIONALE REF. LDK 300**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 300**

Disegno/Drawing	Rev.	Data/Date	Foglio Sheet	Scala/Scale	Form.
SD.1LDK.0300	A	19/05/09	N. 1 di 1	1:50	A4

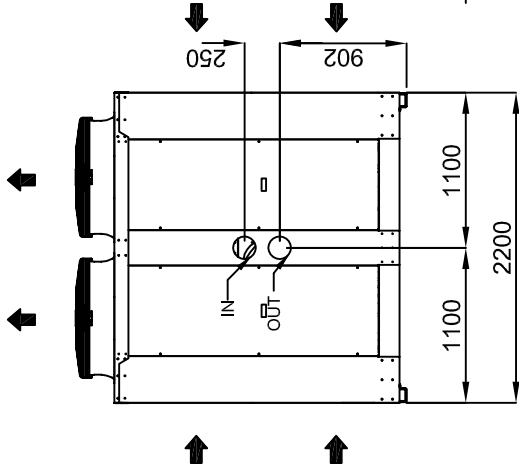
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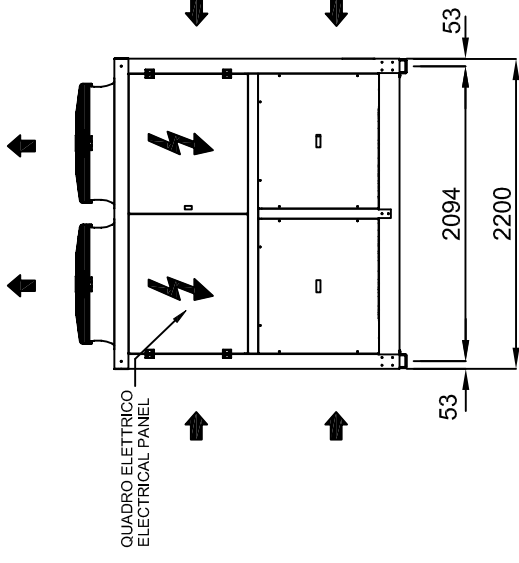
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Descrizione modifica/Review description

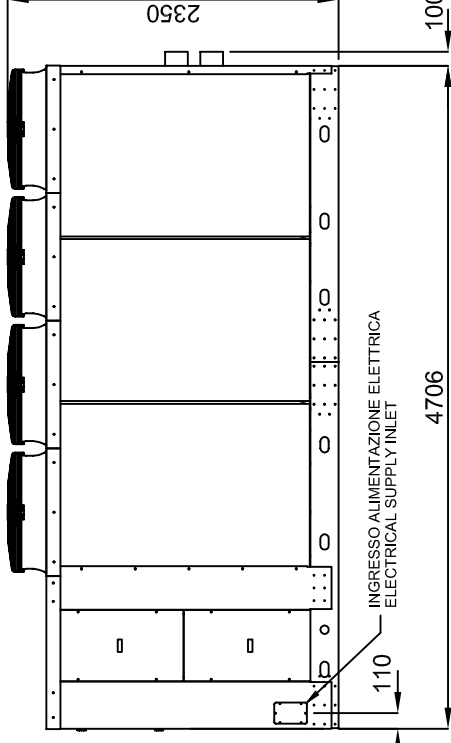
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BACK VIEW



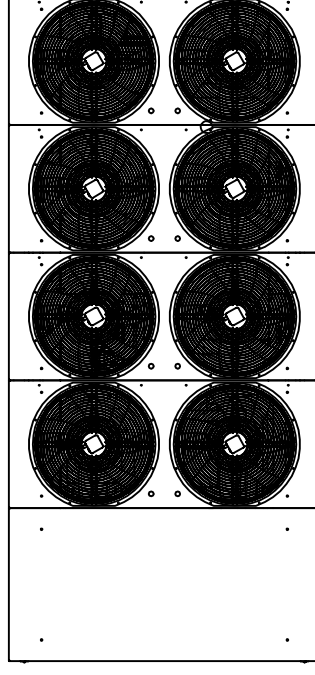
FRONTE UNITA'  
FRONT VIEW



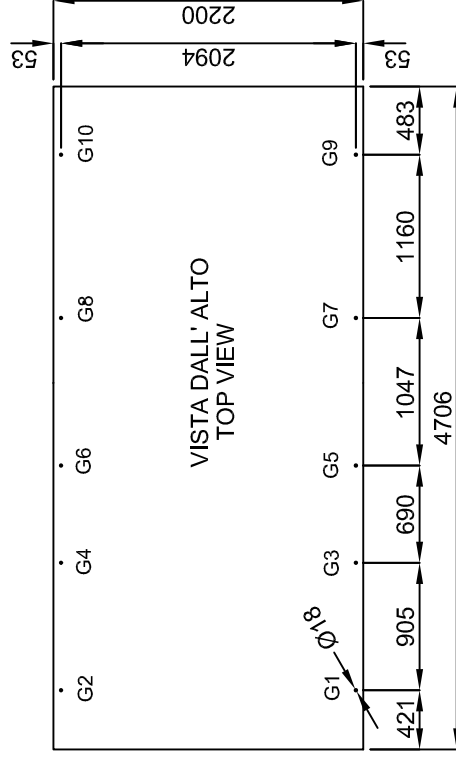
FRONT VIEW



PESO (Kg) WEIGH (Kg)	POSIZIONE POSITION
535	G1
535	G2
535	G3
535	G4
407	G5
407	G6
369	G7
369	G8
369	G9
369	G10



VISTA DALL'ALTO  
TOP VIEW



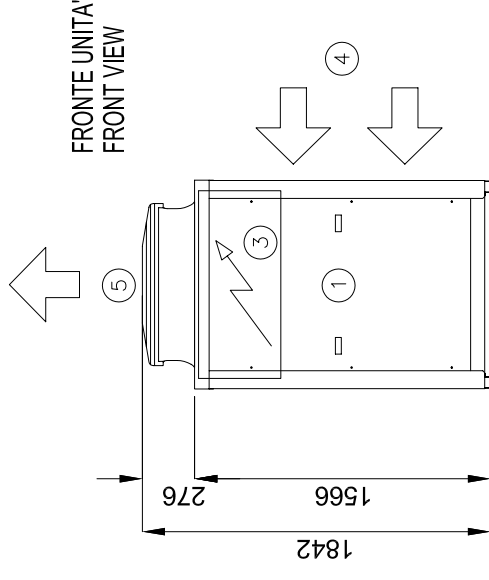
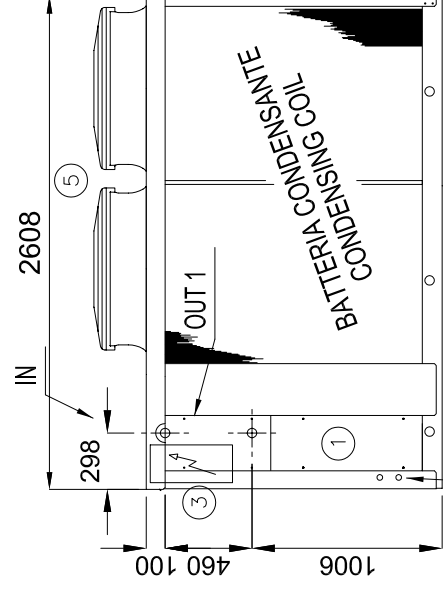
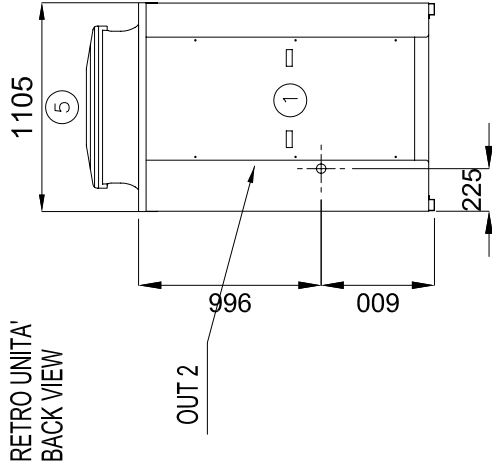
Peso dell'unità in funzione (Kg) **4430**  
Weight of the unit in operation (Kg)

MODELLO / MODEL	INGRESSO ACQUA UTENTE USER WATER INLET	USCITA ACQUA UTENTE USER WATER OUTLET
LDK 380-430-500	5" VICTAULIC	5" VICTAULIC

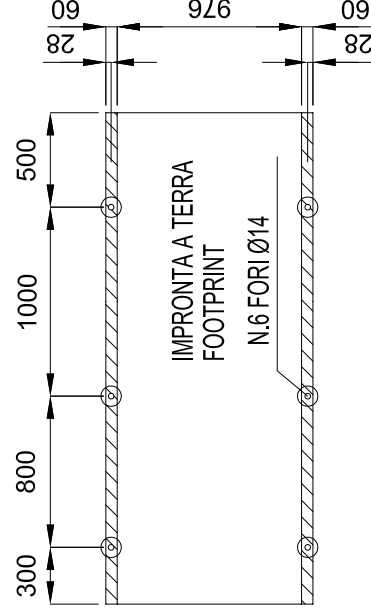
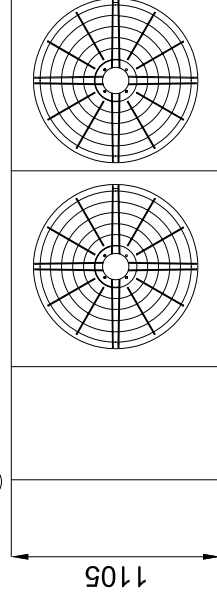
Denominazione/Denomination  
**SCHEMA DIMENSIONALE REF. LDK 380-430-500**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 380-430-500**

Disegno/Drawing <b>SD.1LDK.0300</b>	Rev. <b>A</b>	Data/Date <b>19/05/09</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:50</b>	Form. <b>A4</b>
Sost. il dis./Replace draw.			Sost. dal dis./Replaced by draw.		Visto/Checked by
					Ordine-Order

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE



1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 1 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 1 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 1 1/2"



Descrizione modifica/Review description

Visto/Checked by

Dis./Draftsman

Data/Date

Rev

REV

Denominazione/Denomination

SCHEMA DIMENSIONALE REFRIGERATORE LDK 050-060-070-080 XL  
WATER CHILLER DIMENSIONAL DRAWING LDK 050-060-070-080 XL

Disegno/Drawing

SD.1LDK.0010

Rev.

A

Data/Date

13/09/06

Foglio

Sheet

Form.

A4

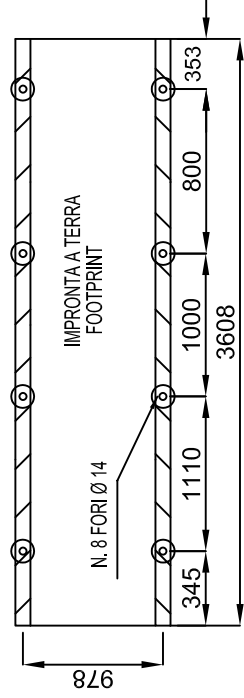
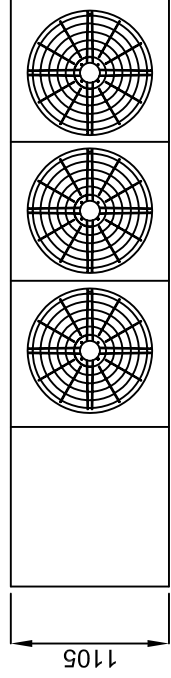
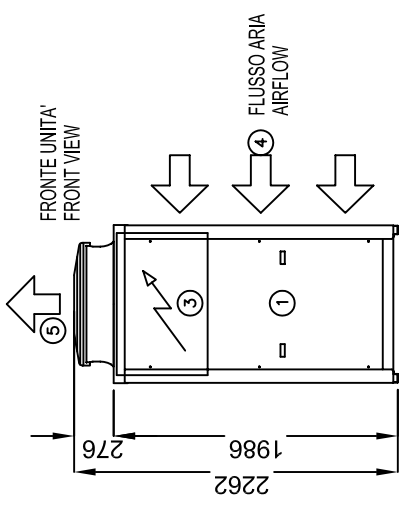
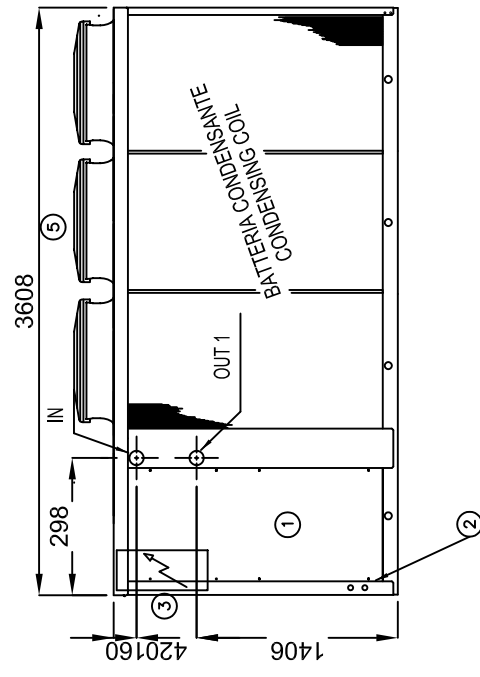
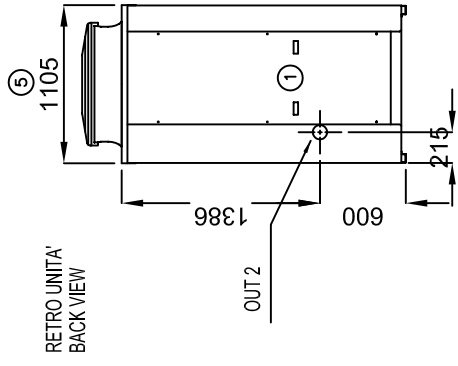


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Ordine-Order

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE





1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R2 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R2 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R2 1/2"

Descrizione modifica/Review description

Denominazione/Denomination

**SCHEMA DIMENSIONALE REFRIGERATORE LDK 152 - 162 XL**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 152 - 162 XL**

Disegno/Drawing  
**SD.1LDK.0020**

Rev. **A**

Foglio Sheet N. 1 di 1

Data/Date

Scala/Scale  
**1:50**

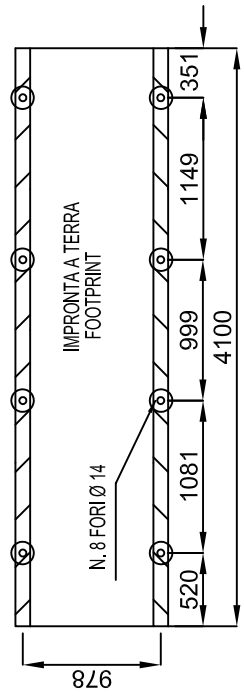
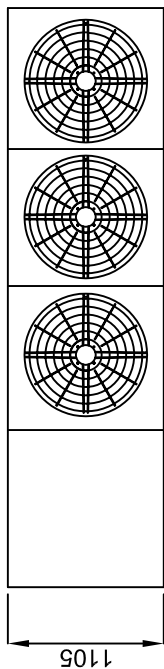
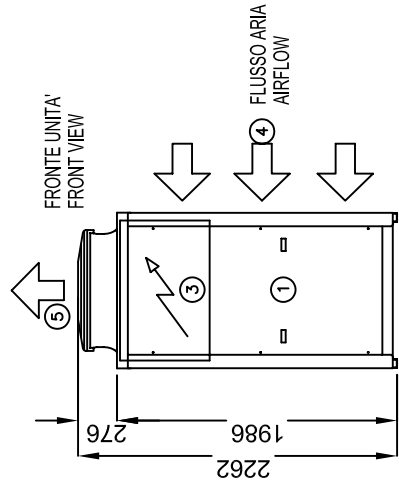
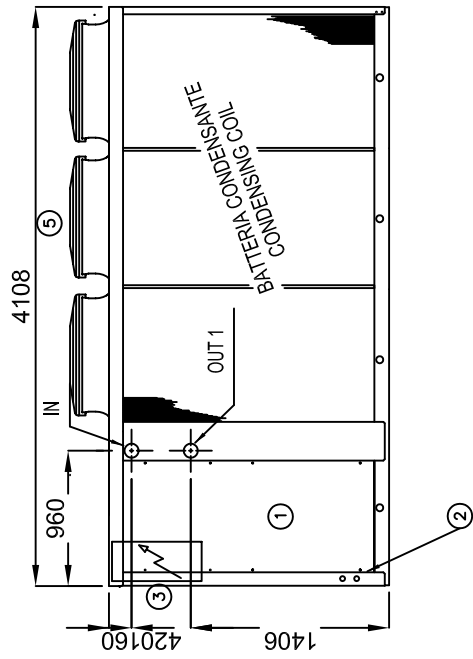
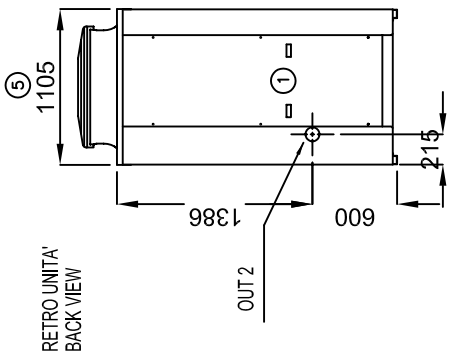
Form. **A4**

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE

**REV.**

Sost. il dis./Replace draw. Dis./Draftsman

Visto/Checked by Ordine-Order



1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R2 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2 1/2"

Denominazione/Denomination  
**SCHEMA DIMENSIONALE REFRIGERATORE LDK 144 - 164 XL**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 144 - 164 XL**

Disegno/Drawing <b>SD.1LDK.0020</b>	Rev. <b>A</b>	Data/Date <b>13/09/06</b>	Foglio Sheet N. <u>1</u> di <u>1</u>	Scala/Scale <b>1:50</b>	Form. <b>A4</b>	
Sost. il dis./Replace draw.						Sost. dal dis./Replaced by draw.
						Dis./Draftsman
						Visto/Checked by
						Ordine-Order

- ◇ OPZIONALE/OPTIONAL
- SOLO SU TAGLIE/ONLY ON SIZE

**REV.**

Descrizione modifica/Review description

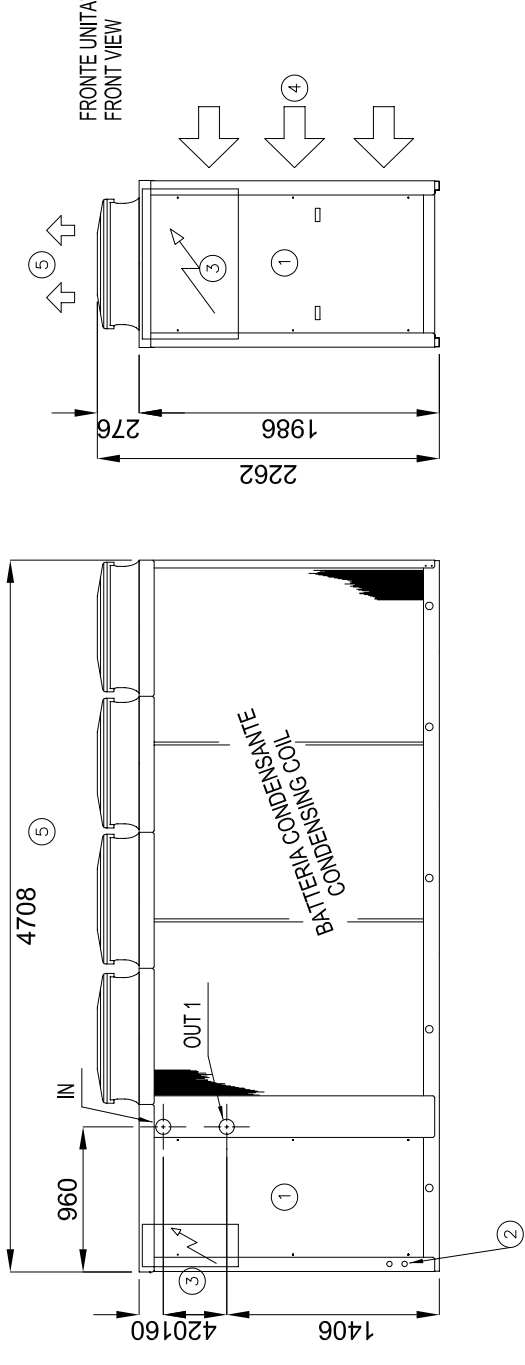
Disegno/Drawing	SD.1LDK.0025
Rev.	A
Data/Date	13/09/06
Foglio Sheet N. 1 di 1	1 of 1
Scala/Scale	1:50
Form.	A4

Denominazione/Denomination  
**SCHEMA DIMENSIONALE REFRIGERATORE LDK 190 - 210 XL**  
**WATER CHILLER DIMENSIONAL DRAWING LDK 190 - 210 XL**

◇ OPZIONALE/OPTIONAL  
 ○ SOLO SU TAGLIE/ONLY ON SIZE

Visto/Checked by  
 Dis./Draftsman  
 Ordine-Order

1	PANNELLI DI ISPEZIONE INSPECTION PANEL
2	INGRESSO ALIMENTAZIONE ELETTRICA POWER SUPPLY INLET
3	QUADRO ELETTRICO ELECTRICAL BOX
4	ASPIRAZIONE SUCTION
5	MANDATA AIR OUTLET
IN	INGRESSO ACQUA UTENTE USER WATER INLET R 2 1/2"
OUT1	USCITA ACQUA UTENTE LDK USER WATER OUTLET LDK R 2 1/2"
OUT2	USCITA ACQUA UTENTE VERSIONI LDK / A USER WATER OUTLET UNITS LDK / A R 2 1/2"



Descrizione modiffica/Review description



HIDROS srl  
Via dell'Industria 5  
35020 Brugine (Pd)  
Tel. +390-49-9731022  
Fax. +390-49-5806928  
**Info@hidros.it**  
[www.hidros.it](http://www.hidros.it)

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