



WATER CHILLERS

WDA

SERIES



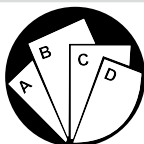
TECHNICAL MANUAL

Incorporated in this document are the following:

- Declaration of conformity
- Technical manual
- Dimensional drawing



RETAIN FOR FUTURE REFERENCE



Multiple instructions:
Consult the specific part



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

Reproduction, data storage and transmission, even partial, of this publication, in any form, without the prior written authorisation of the company, is prohibited. The company can be contacted for all inquiries regarding the use of its products.

The company follows a policy of continuous product development and improvement and reserves the right to modify specifications, equipment and instructions regarding use and maintenance at any time, without notice.

Declaration of conformity

We declare under our own responsibility that the below equipment complies in all parts with the CEE and EN directives.

The declaration of conformity is enclosed to the technical booklet enclosed with the unit. The unit contains fluorinated greenhouse gases.

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1. INTRODUCTION

1.1 Preliminary information

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

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

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

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

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

1.2 Aim and content of the manual

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

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

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

1.3 How to store this manual

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

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

1.4 Manual Update

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

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

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

1.5 How to use this manual



The manual is an integral part of the unit.



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

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

1.6 Potential Risks

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

LOCATION OF RISK	POTENTIAL RISK	METHOD OF INJURY	PRECAUTIONS
Thermal heat exchangers.	Small stab wounds.	Contact	Avoid any contact, use protective gloves.
Fan and fan grilles.	Cuts, eye damage, broken bones.	Insertion of sharp objects through the grid while the fans are operating.	Never put objects through the protection grilles.
Internal component: compressors and discharge pipes	Burns.	Contact	Avoid any contact, use protective gloves.
Internal component: electric cables and metallic parts	Electrocution, severe burns.	Defect in the supply cable insulation, live metallic parts.	Adequate protection of power cables, ensure correct earthing of all metal parts.
External to unit: unit enclosure	Poisoning, severe burns.	Fire due to short circuit or overheating of the supply cable external to unit.	Size cables and mains protection system in accordance with iee regulations.
Low pressure safety valve.	Poisoning, severe burns.	High evaporating pressure causing a refrigerant discharge during maintenance.	Carefully check the evaporating pressure during the maintenance operations. Use all personal protective equipment required by the law. PPE must also protect against gas leaks from the safety valve. The outlet of these valves is directed to avoid causing damage to persons or goods.
High pressure safety valve.	Poisoning, severe burns, hearing loss.	Activation of the high pressure safety valve with the refrigerant circuit open.	If possible, do not open the refrigerant circuit valve; carefully check the condensing pressure; use all the personal protective equipment required by law. PPE must also protect against gas leaks from the safety valve. The outlet of these valves is directed to avoid causing damage to persons or goods.
Entire unit	External fire	Fire due to natural disasters or combustions of elements nearby unit	Provide the necessary fire-fighting equipment
Entire unit	Explosion, injuries, burns, poisoning, folgoramento for natural disasters or earthquake.	Breakages, failures due to natural disasters or earthquake	Plan the necessary precautions both electrical (suitable differential magneto and electrical protection of the supply lines; greatest care during the connections of the metal parts), and mechanical (special anchors or seismic vibrations to prevent breakages or accidental falls).

1.7 General Description of Symbols Used

Safety symbols combined in accordance with ISO 3864-2:



BANNED

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



WARNING

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



ACTION REQUIRED

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

Safety symbols combined in accordance with ISO 3864-2:



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

1.8 Safety symbols used



GENERAL RISK

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



ELECTRICAL HAZARD

Observe all signs placed next to the pictogram.

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



MOVING PARTS

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



HOT SURFACES

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



SHARP SURFACES

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



EARTH CONNECTION

The symbol identifies Earthing connection points in the unit.



READ AND UNDERSTAND THE INSTRUCTIONS

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



RECOVER OR RECYCLE MATERIAL

1.9 Limitations and prohibited use

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



The unit is not suitable for operations in environments:

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

1.10 Unit identification

Each unit has a rating plate that provides key information regarding the machine.

The rating plate may differ from the one shown below as the example is for a standard unit without accessories.

For all electrical information not provided on the label, refer to the wiring diagram.

A facsimile of the label is shown below:

			
Via A. Volta, 49 47014 Meldola FC Italy		Manufacturer: PD322111	
1WDA.060H-1A Enfriadora Water chiller		229199 N° serie Serial number	
1 Categoría PED PED Category		2/2018 Fecha de fabricación Manufacturing date	
R410A Tipo refrigerante Refrigerant type	2 Grupo fluido Fluid group	2088 GWP	
C1 n/a C3 Carga refrigerante Refrigerant charge	C2 C4	- CO ₂ Equivalente CO ₂ Equivalent	
400V-3ph-50Hz Tensión-Fases-Frecuencia Voltage-Phases-Frequency		48,00 A F.L.A. (A)	29,00 kW F.L.I. (kW)
LADO BAJA PRESIÓN LOW PRESSURE SIDE		LADO ALTA PRESIÓN HIGH PRESSURE SIDE	
22,1 bar PS		41,5 bar PS	
Min -30 °C Max +130 °C Temperatura de diseño Design temperature	Min -30 °C Max +130 °C Temperatura de diseño Design temperature		
Peso Weight		 229199 Barcode	
Aparato sellado herméticamente. Hermetically sealed equipment. Contiene gases fluorados de efecto invernadero. Contains fluorinated greenhouse gasses.			



The product label should never be removed from the unit.

2. SAFETY

2.1 Warning re potentially hazardous toxic substances

2.1.1 Identification of the Type of Refrigerant Fluid Used: R410A

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

2.1.2 Identification of the Type of Oil Used.

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



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

Main Ecological Information Regarding the Types of refrigerants Fluids used.



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

2.1.3 Persistence and degradation

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

2.1.4 Effects of discharges

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

2.1.5 Exposure controls and personal protection

Wear protective clothing and gloves, protect your eyes and face

2.1.6 Professional exposure limits

R410A
HFC-32 TWA 1000 ppm
HFC-125 TWA 1000 ppm

2.2 Refrigerant handling



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

2.3 Prevent inhalation of high vapor concentration

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

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

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

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

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

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

2.5 Main Toxicological Information Regarding the Type of refrigerant used

2.5.1 Inhalation

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

2.5.2 Contact with skin

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

2.5.3 Contact with eyes

Splashes of liquid may cause frostbite.

2.5.4 Ingestion

While highly improbable, may produce frostbite.

2.6 First Aid Measures



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

2.6.1 Inhalation

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

2.6.2 Contact with skin

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

2.6.3 Contact with eyes

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

2.6.4 Ingestion

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

2.6.5 Further medical treatment

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

3. TECHNICAL CHARACTERISTICS

3.1 Unit description

Water chillers and heat pumps are efficient, low-noise products designed for medium to large applications. They are suitable for generating chilled water at temperatures in the region of 7°C, commonly used in applications with fan coils and/or air handling units. The use of tandem scroll compressors results in high efficiencies (especially at part loads) and low noise levels, making them suitable for use in many applications. Differing versions and a wide range of accessories, enable the optimal solution to be selected.

3.1.1 Frame

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

3.1.2 Refrigerant circuit

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

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

3.1.3 Compressors

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

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

3.1.4 Source heat exchangers

The source heat exchangers are braze-welded plates made with stainless steel AISI 316. Models from 039 to 162 are with single circuit, from model 190 are two-circuit cross-flow. The use of this type of heat exchanger greatly reduces the unit refrigerant charge compared to the traditional shell and tube user heat exchangers, and increases the cooling efficiency at partial loads.

3.1.5 User heat exchangers

The user heat exchangers are braze-welded plates made with stainless steel AISI 316. Models from 039 to 162 are with single circuit, from model 190 are two-circuit cross-flow. The user heat exchanger are factory insulated with flexible close cell material. Each user exchanger is protected by a temperature probe sensor as antifreeze protection.

3.1.6 Electric enclosure

The enclosure is manufactured in order to comply with the requirements of the electromagnetic compatibility standards CEE 73/23 and 89/336. Access to the enclosure is achieved by removing the front panel of the unit. All units have fitted as standard, a sequence relay that

disables the power supply in the event that the phase sequence is incorrect (scroll compressors can be damaged if they rotate in the wrong direction). The following components are supplied as standard on all units: main switch, thermal overloads (protection of pumps and fans), compressor fuses, control circuit automatic breakers, compressor contactors, fan contactors and pump contactors. The terminal board has volt free contacts for remote ON-OFF, summer / winter change over (heat pumps only) and general alarm.

3.1.7 Microprocessors

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

3.1.8 Control and protection devices

All units are supplied with the following control and protection devices: Return water temperature sensor installed on the return water line from the building (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 and flow switch.

3.2 Other versions

3.2.1 Cooling only version for low user water temperature (BT)

This version is supplied with a specific refrigerant circuit that allows the operation of the unit with user water outlet conditions between +4°C and -5°C.

3.2.2 Condenserless versions (EV)

This version includes a microprocessor control to manage both the compressor timings and alarms. It is designed to operate with refrigerant R410A but is supplied with a holding charge of nitrogen.

3.2.3 Partial heat recovery (RP)

This version is supplied with an auxiliary heat exchanger fitted in series with the unit condenser thereby enabling it to produce hot water when the unit is operating in cooling mode.

3.3 Accessories description

3.3.1 Low noise version (LS)

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

3.3.2 Partial heat recovery (RP00)

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

3.3.3 Spring vibration dampers (KAVM)

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

3.3.4 Rubber vibration dampers (KAVG)

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

3.3.5 Electronic soft starter (DSSE)

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

3.3.6 Pressure gauges (MAML)

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

3.3.7 Liquid line solenoid valve (VSLI)

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

3.3.8 Pressostatic valve kit (Cooling versions only) (VPSF)

Used to reduce the water consumption on the source heat exchanger.

3.3.9 Remote control panel (PCRL)

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

3.3.10 RS485 serial interface card modbus protocol (INSE)

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

3.3.11 Source water 2 way modulating valve (4-20 mA; 0-10 V) (V2MO)

2-way modulating valve is factory installed in the hydraulic circuit at the source side, to optimize the consumption of well water as a function of the temperature of the available water. The valve is controlled by the microprocessor control unit by modulating signal 0-10V. In the event of lack of power supply, the valve is normally closed.

3.4 Technical data

WDA		039	045	050	060	070	080	090	110	120
Cooling capacity (EN14511) ⁽¹⁾	kW	43,7	49,9	59,3	67,2	75,0	88,5	100,8	112,0	126,5
Total input power (EN14511) ⁽¹⁾	kW	10,5	12,1	15,1	16,7	17,7	20,9	23,9	26,9	30,5
EER (EN14511) ⁽¹⁾	W/W	4,16	4,12	3,92	4,02	4,23	4,23	4,21	4,16	4,14
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Peak current	A	111,0	132,0	140,0	162,0	171,0	208,0	259,0	265,0	312,0
Maximum input current	A	32,0	42,0	44,0	53,0	62,0	68,0	74,0	80,0	88,5
Compressors / Circuits	n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088
Refrigerant charge	Kg	5,0	5,0	6,0	6,0	7,0	8,0	14,0	14,0	14,0
Equivalent CO ₂ charge	t	10,4	10,4	12,5	12,5	14,6	16,7	29,2	29,2	29,2
Sound power ⁽²⁾	dB(A)	82	82	83	84	84	85	86	87	87
Sound pressure ⁽³⁾	dB(A)	66	66	67	68	68	69	69	70	70

WDA		130	152	162	190	210	240	260	300	320
Cooling capacity (EN14511) ⁽¹⁾	kW	141,1	162,4	182,5	201,6	223,9	257,6	285,7	323,5	365,2
Total input power (EN14511) ⁽¹⁾	kW	34,0	38,7	43,4	47,8	53,8	60,9	68,0	77,4	86,7
EER (EN14511) ⁽¹⁾	W/W	4,15	4,19	4,20	4,21	4,16	4,23	4,20	4,18	4,21
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Peak current	A	320,5	358,5	375,4	333,0	345,0	400,5	417,5	472,4	506,2
Maximum input current	A	97,0	113,9	130,8	148,0	160,0	177,0	194,0	227,8	261,6
Compressors / Circuits	n°/n°	2/1	2/1	2/1	4/2	4/2	4/2	4/2	4/2	4/2
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088
Refrigerant charge	Kg	14,0	18,0	18,0	30,0	30,0	34,0	34,0	36,0	36,0
Equivalent CO ₂ charge	t	29,2	37,6	37,6	62,6	62,6	71,0	71,0	75,2	75,2
Sound power ⁽²⁾	dB(A)	88	88	88	89	91	91	91	93	93
Sound pressure ⁽³⁾	dB(A)	71	71	71	72	74	74	74	76	76

Performances are referred to the following conditions:

(1) Cooling: Evaporator water temp. 12/7 °C condenser water temp. 30/35 °C.

(2) Sound power level in accordance with ISO 3744 (LS-Version).

(3) Sound pressure level at 1 mt from the unit in free field conditions in accordance with ISO 3744 (LS-Version).

WDA/EV		039	045	050	060	070	080	090	110	120
Cooling capacity ⁽⁴⁾	kW	38,8	44,3	52,4	59,3	66,0	78,9	90,4	99,7	112,8
Total input power ⁽⁴⁾	kW	13,2	15,3	19,4	21,1	22,4	25,9	29,6	33,4	37,7
Water flow	m ³ /h	6,7	7,6	9,0	10,2	11,3	13,5	15,5	17,1	19,4
Peak current	A	111,0	132,0	140,0	162,0	171,0	208,0	259,0	265,0	312,0
Max input current	A	32,0	42,0	44,0	53,0	62,0	68,0	74,0	80,0	88,5
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Sound power ⁽²⁾	dB(A)	74	74	75	76	76	77	77	78	78
Sound pressure ⁽³⁾	dB(A)	46	46	47	48	48	49	49	50	50

WDA/EV		130	152	162	190	210	240	260	300	320
Cooling capacity ⁽⁴⁾	kW	125,8	145,0	162,6	178,3	197,8	221,4	245,8	277,5	314,0
Total input power ⁽⁴⁾	kW	42,2	48,0	53,9	59,2	66,5	76,3	85,1	96,9	108,6
Water flow	m ³ /h	21,6	24,9	27,9	30,6	33,9	38,0	42,2	47,6	53,9
Peak current	A	320,5	358,5	375,4	333,0	345,0	400,5	417,5	472,4	506,2
Max input current	A	97,0	113,9	130,8	148,0	160,0	177,0	194,0	227,8	261,6
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n°	2/1	2/1	2/1	4/2	4/2	4/2	4/2	4/2	4/2
Sound power ⁽²⁾	dB(A)	79	79	79	80	82	82	82	84	84
Sound pressure ⁽³⁾	dB(A)	51	51	51	52	54	54	54	56	56

Performances are referred to the following conditions:

(4) For EV version: condensing temperature 50 °C, water temperature in/out 12/7 °C.

(2) Sound power level in accordance with ISO 3744. (LS versions).

(3) Sound pressure level at 1 mt from the unit in free field conditions in accordance with ISO 3744 (LS versions)



The refrigerant data may change without notice. It is therefore necessary to refer always to the silver label placed on the unit.

3.4.1 Partial heat recovery

Mod.		039	045	050	060	070	080	090	110	120
Heating capacity	kW	10,8	12,3	14,7	16,5	18,3	21,5	24,5	27,3	30,9
Water flow	m ³ /h	1,9	2,1	2,6	2,9	3,2	3,8	4,3	4,8	5,4
User water pressure drops	kPa	19,2	18,6	18,7	18,7	18,5	19,6	20,3	19,8	19,5
Mod.		130	152	162	190	210	240	260	300	320
Heating capacity	kW	34,4	39,5	44,3	48,8	54,4	62,0	68,9	78,0	87,9
Water flow	m ³ /h	6,0	6,9	7,7	8,5	9,5	10,8	12,0	13,6	15,3
User water pressure drops	kPa	19,4	19,3	19,2	17,9	17,7	17,9	18,1	18,2	18,5

Performance refer to the following conditions: source heat exchanger temperature 30/35°C and water temperature 40/45°C(Dt 5°C).

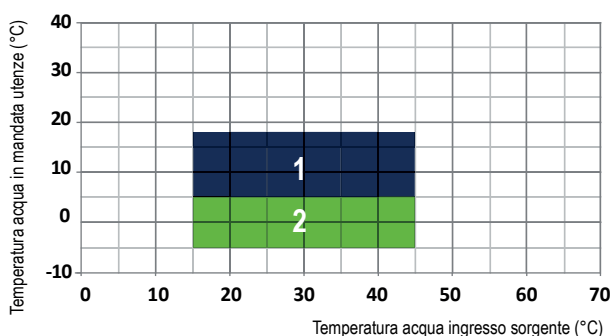
The partial heat recovery is factory mounted.

The partial heat recovery can only produce hot water simultaneously to the operation in cooling mode of the unit.

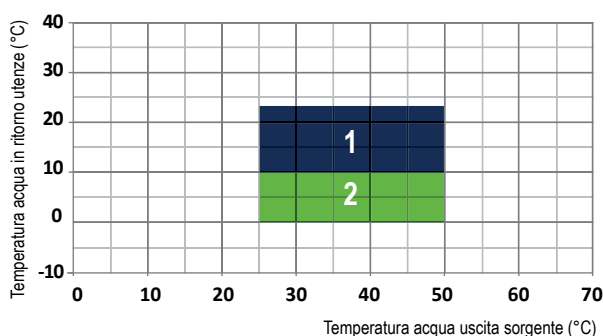


Using the partial heat recovery in the reversible versions, in heating mode, the heating capacity of the unit is significantly reduced.

3.5 Operational limits



1 All versions



2 Only BT version (working mode with glycol)

3.5.1 User heat exchanger water flow rate

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

3.5.2 User cold water temperature

The minimum user outlet water temperature allowed is 5°C: To operates below this limit the unit should need some structural modifications. In this case please contact our company. The maximum user outlet water temperature 18°C.



Units are designed and manufactured to European safety and technical standards. The units have been designed exclusively for heating and cooling. The units must be used for this specific purpose only. The Company will not be liable for claims for damage caused to persons, animals or material goods or property caused by improper installation, adjustment and maintenance or improper use. Any use not specified in this manual is prohibited.



In case of operations outside of these values, please contact the company.

3.6 Compressor capacity steps

Modello	NUMBER of COMPRESSORS					
	1	2	3	4	5	6
039	50%	50%	---	---	---	---
045	50%	50%	---	---	---	---
050	50%	50%	---	---	---	---
060	50%	50%	---	---	---	---
070	45%	55%	---	---	---	---
080	50%	50%	---	---	---	---
090	43%	57%	---	---	---	---
110	50%	50%	---	---	---	---
120	45%	55%	---	---	---	---
130	50%	50%	---	---	---	---
152	45%	55%	---	---	---	---
162	50%	50%	---	---	---	---
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	22,5%	22,5%	27,5%	27,5%	---	---
320	25%	25%	25%	25%	---	---

3.7 Correction tables

3.7.1 Operation with glycol

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

CCF: Capacity correction factor

IPCF: Input power correction factor

WFCF: Water flow correction factor

PDCF: Pressure drops correction factor

The water flow rate and pressure drop correction factors are to be applied directly to the values given without Glycol. The water flow rate correction factor is used to calculate the flow rate with the same temperature difference as that which would be obtained without Glycol. The pressure drop correction factor takes into account the different flow rate obtained from the application of the flow rate correction factor.

3.7.2 Correction tables different Δt

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

CCCP = Cooling capacity correction factor IPCF = Input power correction factor

3.7.3 Correction tables different Fouling factors

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

CCCP = Cooling capacity correction factor IPCF = Input power correction factor

3.8 Sound data

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	87,1	78,3	72,2	70,7	69,6	64,2	60,8	51,7	87,9	74	46
045	87,1	78,3	72,2	70,7	69,6	64,2	60,8	51,7	87,9	74	46
050	88,1	79,3	73,2	71,7	70,6	65,2	61,8	52,7	88,9	75	47
060	89,1	80,3	74,2	72,7	71,6	66,2	62,8	53,7	89,9	76	48
070	89,1	80,3	74,2	72,7	71,6	66,2	62,8	53,7	89,9	76	48
080	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77	49
090	90,1	81,3	75,2	73,7	72,6	67,2	63,8	54,7	90,9	77	49
110	91,1	82,3	76,2	74,7	73,6	68,2	64,8	55,7	91,9	78	50
120	91,1	82,3	76,2	74,7	73,6	68,2	64,8	55,7	91,9	78	50
130	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79	51
152	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79	51
162	92,1	83,3	77,2	75,7	74,6	69,2	65,8	56,7	92,9	79	51
190	93,1	84,3	78,2	76,7	75,6	70,2	66,8	57,7	93,9	80	52
210	95,1	86,3	80,2	78,7	77,6	72,2	68,8	59,7	95,9	82	54
240	95,1	86,3	80,2	78,7	77,6	72,2	68,8	59,7	95,9	82	54
260	95,1	86,3	80,2	78,7	77,6	72,2	68,8	59,7	95,9	82	54
300	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	97,9	84	56
320	97,1	88,3	82,2	80,7	79,6	74,2	70,8	61,7	97,9	84	56

Lw: Sound power level according to ISO 9614.

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



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

4. INSTALLATION

4.1 General safety guidelines and use of symbols



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



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



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



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

4.2. Health and safety Considerations



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



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

4.3 Personal protective equipment



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



Protective footwear.



Eye protection.



Protective gloves.



Respiratory protection.



Hearing protection.

4.4 Inspection

On delivery, the unit must be inspected for damage. The unit was checked prior to despatch and was in perfect condition. If there is damage this must be recorded on the delivery note prior to signing and the Company must be informed within 8 days of this damage. If the damage is severe a written report must be prepared and sent.

Before accepting the unit check;

- The unit has not been damaged during transport
- The delivered goods conform to the details on the delivery note.

In Case of Damage

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

4.5 Storage

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

4.5.1 Shipment

The shipment must be carried out by authorised carriers and the characteristics of the vehicle used must be such as to avoid damaging the machinery transported/to be transported, neither during loading and unloading nor during transport. If the roads to be driven are irregular, the vehicle must be fitted with special suspensions or internal walls in order not to damage the unit during the shipment.



The maximum ambient temperature for storage/shipment is +45°C and the minimum is -20°C,

4.6 Unpacking



Prior to unpacking and installing the unit, it is prudent to read this manual, note the information provided on the labels on the unit and to take all precautions required for safe working and to avoid damage. Non compliance with the warnings can create dangerous situations. Packaging could be dangerous for the operators.

It is advisable to leave packaged units during handling and remove it before the installation.

The packaging must be removed carefully to prevent any possible damage to the machine.

The materials constituting the packaging may be different in nature (wood, cardboard, nylon, etc.).

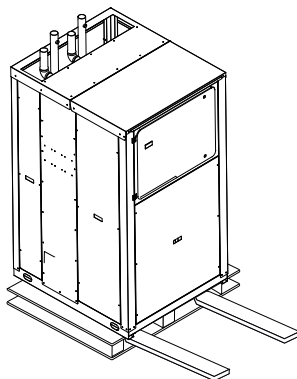


The packaging materials should be separated and sent for disposal or possible recycling to specialist waste companies.

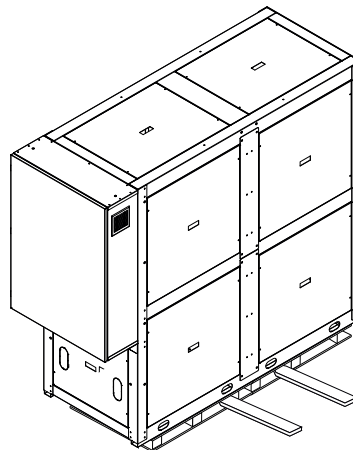
4.7 Lifting and handling

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

WDA
039-045-050-060-070-080
090-110-120-130-145-162



WDA
190-210-240
260-300-320



4.8 Location and minimum technical clearances

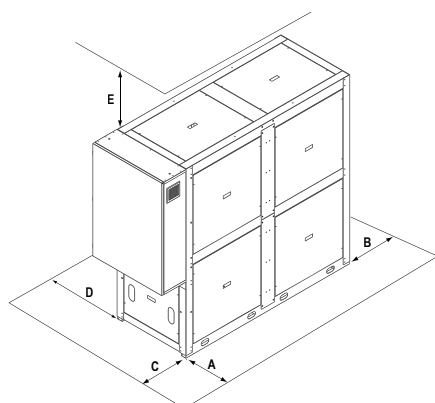
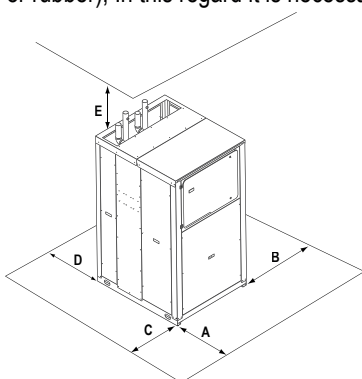


The unit has to be installed such that maintenance and repair is possible. The warranty does not cover costs for the provision of lifting apparatus, platforms or other lifting systems required to perform repairs during warranty period.



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

All models are designed and built for indoor installations, it is a good idea to create a base of support to those of the appropriate size, the units transmit to a low level of ground vibration: it is advisable to interpose between the frame base and the ground plane of vibration absorbers (spring or rubber). In this regard it is necessary to guarantee the "minimum service below.



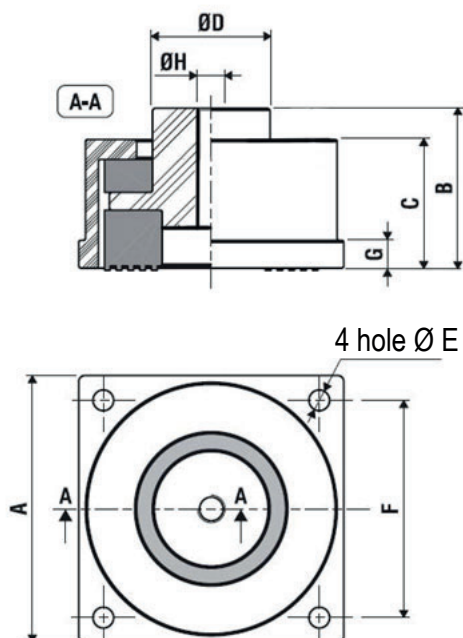
Mod.	A	B	C	D*	E
039	1000	500	600	0	500
045	1000	500	600	0	500
050	1000	500	600	0	500
060	1000	500	600	0	500
070	1000	500	600	0	500
080	1000	500	600	0	500
090	1000	500	600	0	500
110	1000	500	600	0	500
120	1000	500	600	0	500
130	1000	500	600	0	500
152	1000	500	600	0	500
162	1000	500	600	0	500

* minimum 600 mm when using hydraulic kit S1NT

Mod.	A	B	C	D	E
190	1000	500	800	1000	500
210	1000	500	800	1000	500
240	1000	500	800	1000	500
260	1000	500	800	1000	500
300	1000	500	800	1000	500
320	1000	500	800	1000	500

4.9 Installation of rubber vibration dampers (KAVG)

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



Mod.	A	B	C	ΦD	ΦE	F	G	H
WDA	80	52	43	26	6	67	10	M10

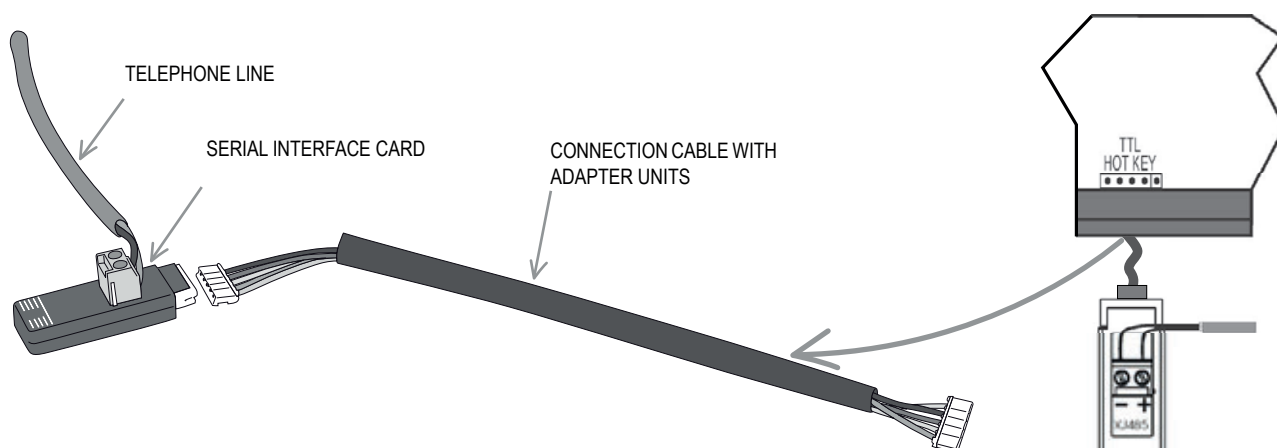
4.10 Serial interface card RS485 (INSE)

Supervision system interface serial board (MODBUS RS485 available only)

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

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

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



4.11 Source water pump installation

Recently there has been a continuous increase in installations (solution 1 at page 32) where the variable speed source water pump (inverter type) is used.

The company states that it is of fundamental importance the correct flow rate of water source in order to avoid problems of freezing of the source heat exchanger. In this regard it is noted that the source water pump should be exclusively dedicated to the heat pump and, preferably, the ON / OFF type.



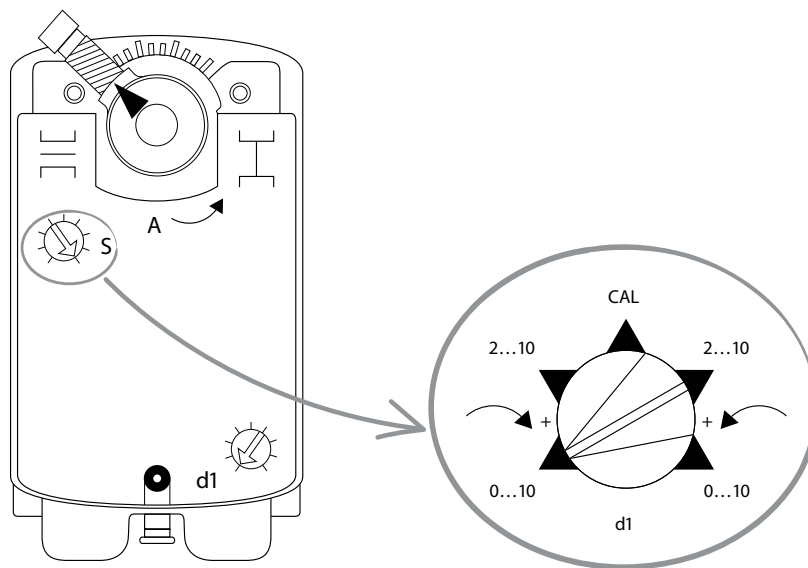
In the case of using the source water pump for other purposes (irrigation, etc..) and you need a variable speed pump (inverter type) , undertakes the installation of the modulating valve V2MO. In these cases, the pump must ensure a constant pressure at the inlet of the source circuit of the heat pump of at least 3 bars, regardless of the type and number of active users.



In case of variation of the water flow to the source circuit there is a risk of freezing of the source heat exchanger. In this case the warranty expires immediately.



The activation of the modulating valve V2MO shows a selector used to vary the type of signal and the sense of rotation of the valve itself. Tampering can undermine the correct operation of the valve precluding security.



4.12 Hydraulic connections

- The water pipe-work must be installed in accordance with national and local regulation and can be made from copper, steel, galvanized steel or PVC. The Pipework must be designed to cater for the nominal water flow and the hydraulic pressure drops of the system, a maximum pressure drop of 300 Pa/m run being typical. All pipes must be insulated with closed-cell material of adequate thickness. The hydraulic piping should includes:
 - Pockets for temperature sensor to measure the temperature in the system.
- Flexible joints, to isolate the unit from the rest of the system
- Temperature and pressure gauges for maintenance and servicing operations.
- Shut-off manual valves to isolate the unit from the hydraulic circuit.
- Metallic filters to be mounted on the inlet pipe with a mesh not larger than 1 mm.
- Vent valves, expansion tank with water filling, discharge valve.



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



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



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



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

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

4.13 Chemical characteristics of the water

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

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

4.14 User circuit minimum water content



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

Model	039	045	050	060	070	080	090	110	120
Minimum water content (l)	500	600	700	750	850	1000	1200	1350	1500
Safety valve (bar)	6	6	6	6	6	6	6	6	6

Model	130	152	162	190	210	240	260	300	320
Minimum water content (l)	1700	1900	2100	1200	1350	1500	1700	1900	2100
Safety valve (bar)	6	6	6	6	6	6	6	6	6

4.15 Chemical characteristics of groundwater

Carbonic acid dissolved	(CO ₂)	< 5 mg/Kg	Gas chloride free	(Cl ₂)	< 1 mg/Kg
Hydrogen peroxide sulfur	(H ₂ S)	< 0,05 mg/Kg	Manganese	(Mn)	< 0,1 mg/Kg*
Ammonia	(NH ₃)	< 2 mg/Kg	Nitrate	(NO ₃)	< 100 mg/Kg
Chloride	(Cl)	< 100 mg/Kg	Oxygen	(O ₂)	< 2 mg/Kg*
Chloride free	(Cl)	< 0,5 mg/Kg	Sulphate	(SO ₄ ²⁻)	< 50 mg/Kg
Electrical conductivity		>50μS/cm e <600μS/cm	Sulfites	(SO ₃)	< 1 mg/Kg
Iron	(Fe)	< 0,2 mg/Kg*	pH Value		6,5 – 9,0

*An excess of these limits due to a blockage of mud in the source heat exchanger and piping.



Warranty does not cover any damage caused by corrosion, clogging and freezing if attributable to lack and / or incorrect installation of described safety devices.



The use of groundwater generally requires approval by the municipality and / or the province. Check with local authorities.



The limit values in the table may cause clogging by mud in the pipes and the heat exchanger.



The maintenance of the quality of ground water is borne by the user and / or maintenance company.



The temperature of source groundwater at the inlet of the source heat exchanger in heating mode, must not fall below 7.8 ° C to avoid freezing problems in the source circuit. The fact is average water cooling of about 3-5 ° C, resulting in temperature of the fluid outlet from the heat pump, in this case an inlet water temperature less than 7 ° C is dangerously close to the temperature of formation of ice.



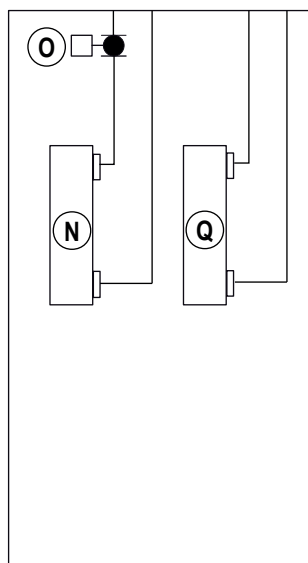
The temperature of the source groundwater at the inlet of source heat exchanger in heating mode, should never exceed 25 ° C as this may activate the control devices and safety unit. For applications with temperatures above 25 ° C groundwater temperature, please contact the company.



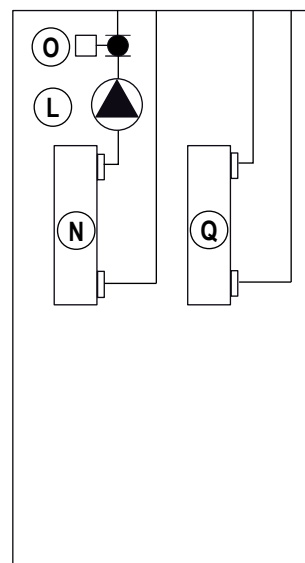
In case of installation in sites with ground water temperatures close to the above it is recommended to test for water consumption for a minimum period of 36 consecutive hours (to be made, possibly, towards the end of winter season).

4.16 Hydraulic components

WDA



WDA A1NT



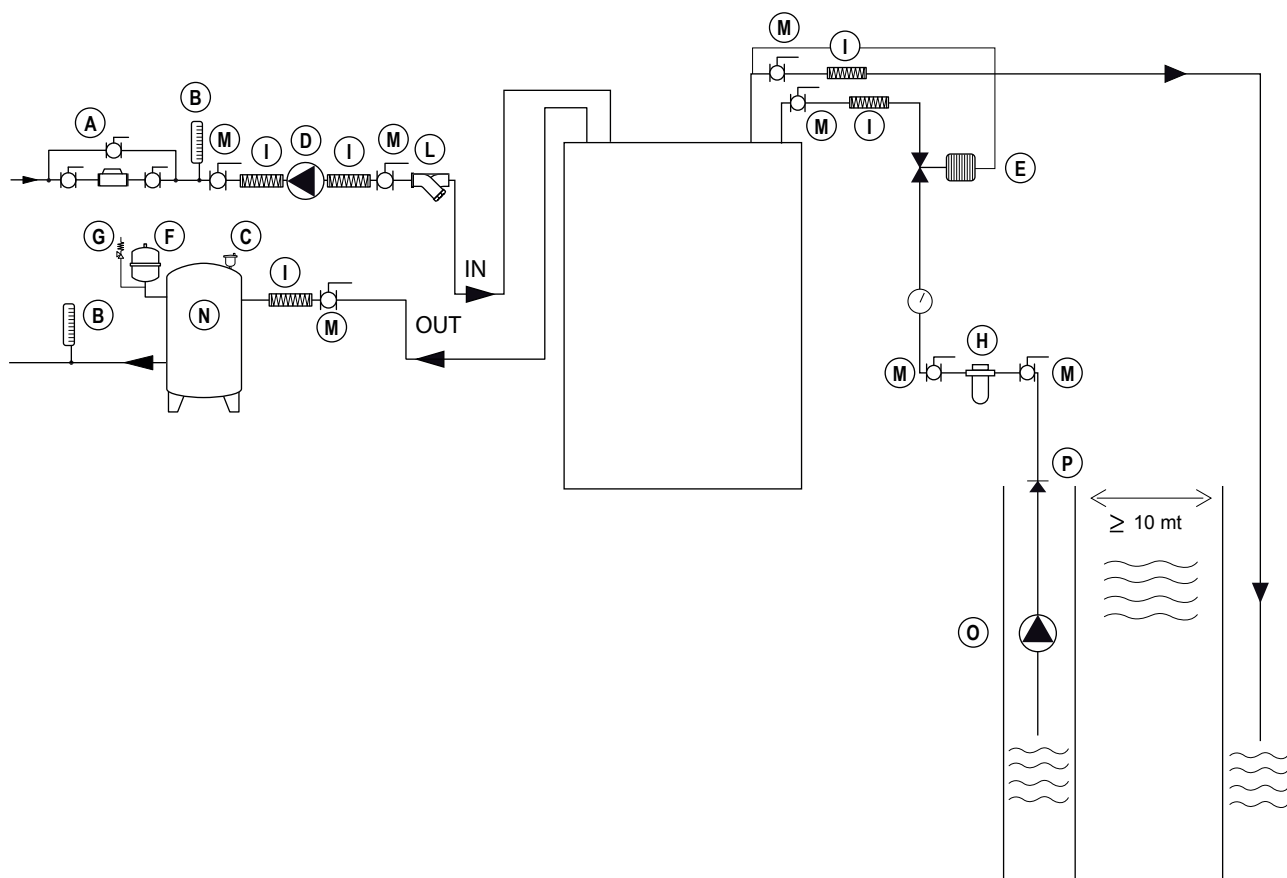
L	Water Pump	O	Flow Switch
N	User heat exchanger	Q	Source heat exchanger

The hydraulic kit includes: single centrifugal pump, suitable for hot and cooled water. The pump is directly managed by the microprocessor. In the hydraulic circuit are also present the safety valve and manual shut-off valves.



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

4.16.1 Solution 1



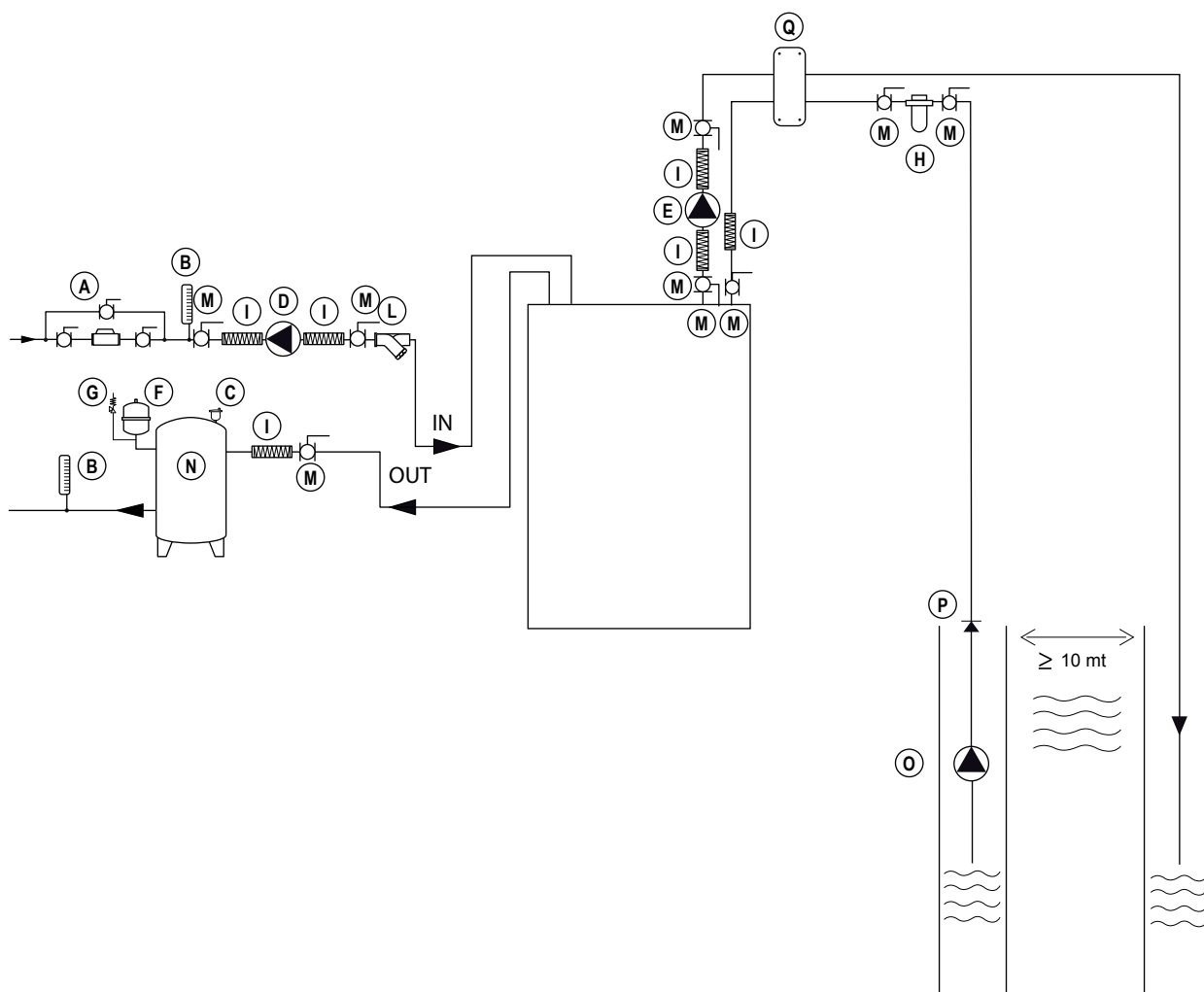
The above system is the most economical and efficient, but it can be used ONLY in cases where a water quality parameters are within the limits shown in the table. It is ALWAYS recommended to perform an accurate chemical analysis of water by a qualified technician. In the case where it is not possible to maintain control the water quality parameters listed above there has to opt for a source hydraulic circuit type 2.

A	System Filling Group	H	Source water Filter
B	Thermometer	I	Flexible Connection
C	Vent Valve	L	User water Filter
D	Circulating pump	M	Manual valve
E	Source modulating valve	N	Water tank
F	Expansion Vessel	O	Well pump
G	Safety Valve	P	Check valve



The pump (O) must be installed with the water supply side facing the unit water inlet connection.

4.16.2 Solution 2



The system above is the most secure and reliable, involves the installation of an intermediate water –water plate heat exchanger which protects the source of the heat pump from clogging, corrosion and freezing.

This hydraulic circuit is strongly recommended in those installations where it is not possible to maintain control the water quality parameters listed above. The installation of the intermediate heat exchanger lead to lower performance of the unit and requires an auxiliary pump. Please contact the Company in case of need for sizing of the intermediate heat exchanger.

A	System Filling Group	I	Flexible Connection
B	Thermometer	L	User water Filter
C	Vent Valve	M	Manual valve
D	Circulating pump	N	Water tank
E	Source pump	O	Well pump
F	Expansion Vessel	P	Check valve
G	Safety Valve	Q	Medium heat exchanger
H	Source water Filter		



The pump must be installed with the water supply side facing the unit water inlet connection.

4.17 Filling the hydraulic circuit

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

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

4.18 Emptying the installation

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



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

4.19 WDA/EV Refrigerant connections

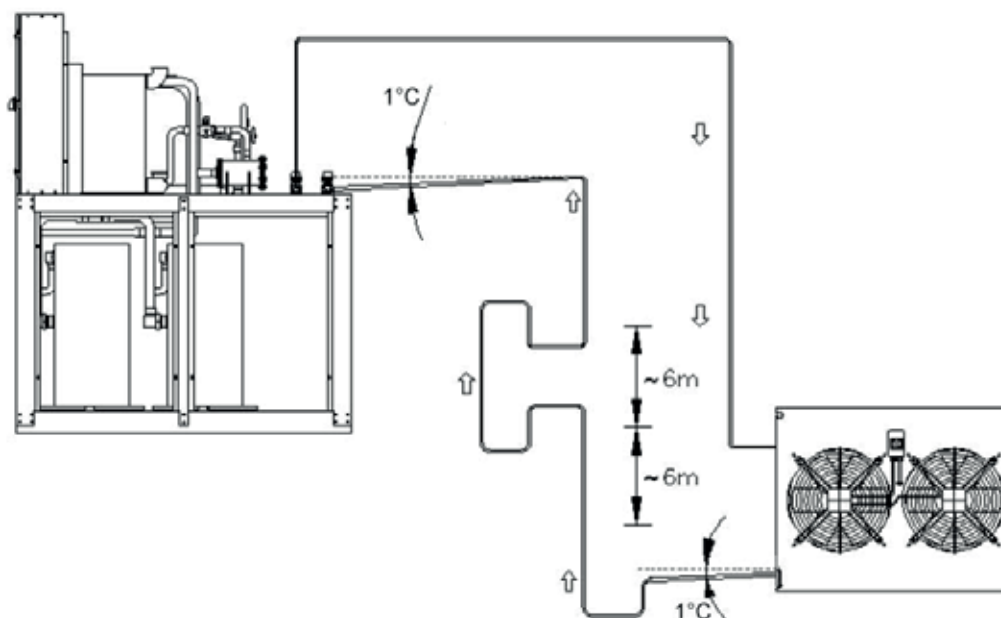
Condenserless (EV versions) must be connected to a remote condenser by refrigerant lines. The remote condenser is factory fitted with main switch and fan speed control. To arrange the refrigerant connections please read the following paragraphs. The condenserless (EV) units are supplied without refrigerant charge and filled with nitrogen. All models are supplied with microprocessor.

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

Please, contact the Company for any information or before to install the unit beyond the limit described.

4.19.1 WDA/EV Unit: source heat exchanger installed at a lower level than the compressors

- On the rising vertical pipes, oil traps should be fitted every 6 metres to allow oil circulation in the system;
- On horizontal pipelines a minimum 1% slope should be allowed in order to drain oil in the proper flow direction.
- The refrigerant line diameters can be obtained by the refrigerant circuit, depending on the selected size and the distance between the indoor and the outdoor unit.



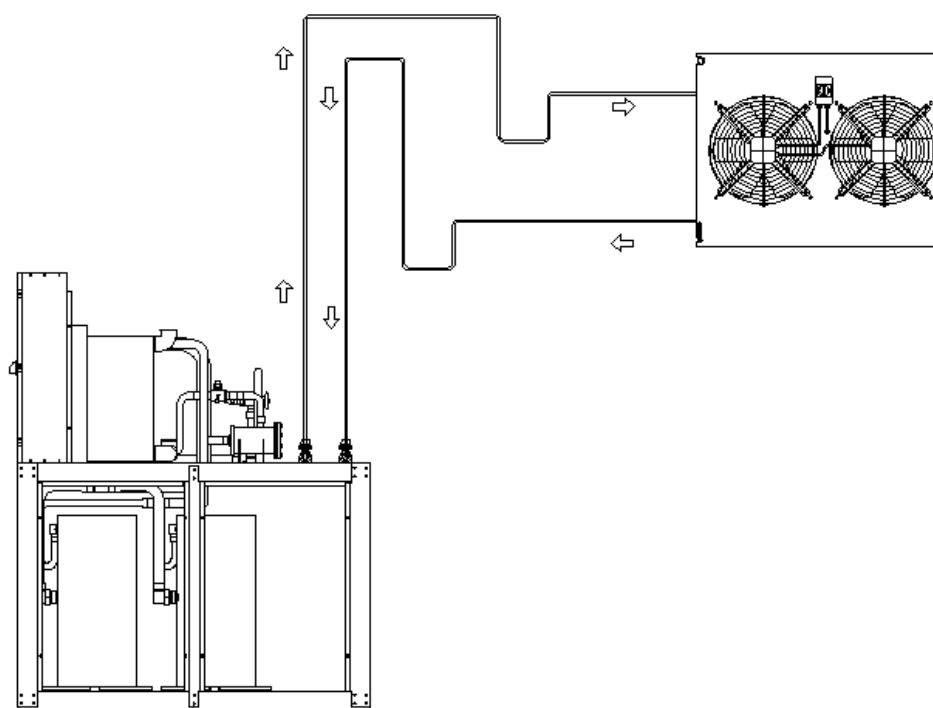
Refrigerant line diameters for "EV" versions

Distance [m]	10		20		30	
Mod.	gas [mm]	Liquid [mm]	gas [mm]	Liquid [mm]	gas [mm]	Liquid [mm]
039	22	18	22	18	28	18
045	22	18	28	18	28	22
050	22	22	28	22	28	22
060	28	22	28	22	28	22
070	28	22	28	22	28	28
080	28	28	28	28	35	28
090	28	28	35	28	35	28
110	35	28	35	28	35	28
120	35	28	35	28	35	28
130	35	35	35	35	35	35
152	35	35	35	35	42	35
162	35	35	42	35	42	35

Distance [m]	10		20		30	
Mod.	gas [mm]	liquid [mm]	gas [mm]	liquid [mm]	gas [mm]	liquid [mm]
190	2x28	2x28	2x35	2x28	2x35	2x28
210	2x35	2x28	2x35	2x28	2x35	2x28
240	2x35	2x28	2x35	2x28	2x35	2x28
260	2x35	2x35	2x35	2x35	2x35	2x35
300	2x35	2x35	2x35	2x35	2x42	2x35
320	2x35	2x35	2x42	2x35	2x42	2x35

4.19.2 WDA/EV units: source heat exchanger installed at a higher level than the compressors

- Install a collection pit on discharge and return line so that liquid refrigerant, when the system is not running, can be collected by this pit, avoiding its return to compressor heads, and possible failure;
- On horizontal pipelines a minimum 1% slope should be allowed in order to drain oil in the proper flow direction.



Refrigerant charge for liquid line

Liquid line diameter mm	Refrigerant charge g/m	Liquid line diameter mm	Refrigerant charge g/m
18	200	22	290
28	500	35	810

Cooling capacity correction factors

Mod.	Refr. Line 0 mt.	Refr. Line 10 mt.	Refr. Line 20 mt.	Refr. Line 30 mt.
WDA / EV	1	0,98	0,96	0,95

4.20 Electric connections: preliminary safety information

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



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



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



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



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



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



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



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



Make all connections to ground provided by law and legislation.



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



FROST PROTECTION

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

4.21 Electric data



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



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

Model		039	045	050	060	070	080	090	110	120
Power supply	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Control board	V/~ /Hz	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V
Auxiliary circuit	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	10	16	16	16	25	25	35	50	50
PE section	mm ²	10	16	16	16	25	25	25	25	25

Model		130	152	162	190	210	240	260	300	320
Power supply	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Control board	V/~ /Hz	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V
Auxiliary circuit	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	70	70	95	120	150	150	150	185	240
PE section	mm ²	35	24	50	70	95	95	95	95	120



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

4.22 Electric connections

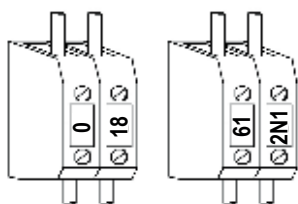


The numbering of the terminals may change without notice. For their connection is mandatory to refer to the wiring diagram supplied along with the unit.

4.22.1 Remote wiring connections (compulsory)

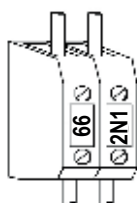
All terminals referred to in the explanations below will be found on the terminal board inside the electrical box. All electric connections mentioned below have to be made by the installer, on site.

Modd 039÷162 Modd 190÷320



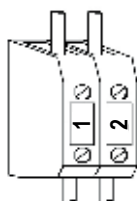
USER CIRCUIT WATER PUMP

If the pump is factory supplied and fitted (A version) it will already be connected otherwise, connect to terminals 0 and 18 (Modd 039÷162); 61 and 2N1 (Modd 190÷320); maximum input current 3A. In standard configuration, the unit microprocessor controller switches off the user water pump when the set point is reached or if the unit is in standby. This strategy is suitable if the unit is heating a buffer store from which a secondary circuit is taken and provides a substantial reduction of energy use.



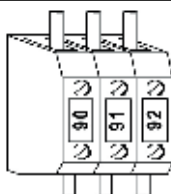
PUMP SOURCE (190 ÷ 320)

Must be connected to terminals 66 and 2N1, with maximum current of 3A. In standard configuration, the unit microprocessor control turns off the user water pump when set point is reached. This solution allows a significant reduction in electrical power consumption when the set point is reached or the unit is in standby.



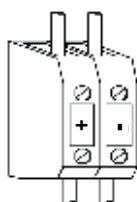
REMOTE ON / OFF

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



REMOTE GENERAL ALARM

For remote display of a general alarm, connect the visual or audible device between terminals 90-91-92.
Contacts 90/91 NC (Normally closed)
Contacts 91/92 NO (Normally opened)

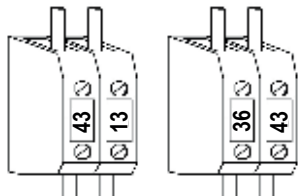


REMOTE CONTROL PANEL

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

4.22.2 Remote wiring connections (optional)

Modd 039÷162 Modd 190÷320

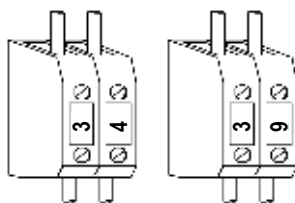


REMOTE SUMMER / WINTER CHANGE OVER

To remotely switch the unit from heating to cooling, the cable jumper connected across terminals 43 and 13 for models 039÷162 and across terminals 36 and 43 for models 190 ÷320 must be replaced with a switch.
Contact closed, unit in Winter mode,
Contact open, unit Summer mode.

4.22.3 Factory fitted wiring connections

Modd 039÷162 Modd 190÷320

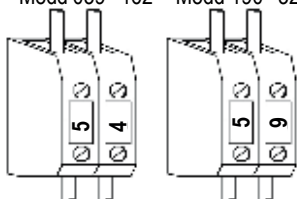


USER CIRCUIT WATER INLET SENSOR (BTI)

It is used to measure the return water temperature from the user circuit. The sensor is connected to terminals 3 and 4 (Modd 039÷162); or 3 and 9 (Modd 190÷320).

The standard working mode has the user pump switched off during stand-by periods (Compressors Off). The sensor must be placed in an appropriate position in order to measure the temperature of the secondary circuit (See Par. 4.23). Incorrect positioning of the user water sensor can adversely affect the operation of the heat pump. The remote sensor is supplied loose with the unit (it is present inside the electric box) and it is supplied with a 3 mt. cable length. If this is too short, it is possible to increase the length by using cable of diameter 0.5 mm² up to a maximum distance of 50 meters.

Modd 039÷162 Modd 190÷320



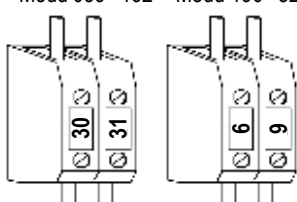
USER CIRCUIT WATER OUTLET SENSOR (BTO)

This is used to measure the outlet user temperature; it is also used as antifreeze protection in cooling mode;

Modd 039÷162: it is connected to the terminals 5 and 4.

Modd 190÷320: it is connected to the terminals 5 and 9.

Modd 039÷162 Modd 190÷320



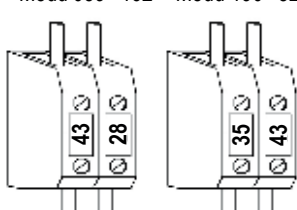
SOURCE WATER TEMPERATURE (BCO)

This is used to measure the outlet source water temperature from the unit; it is also used as antifreeze sensor in heating mode.

Modd 039÷162: it is connected to the terminals 30 and 31.

Modd 190÷320: it is connected to the terminals 6 and 9.

Modd 039÷162 Modd 190÷320



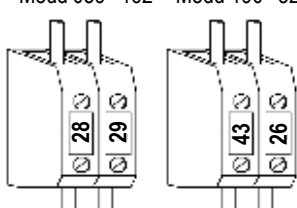
USER CIRCUIT FLOW SWITCH (SFW1)

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

Modd 039÷162: to the terminals 43 and 28.

Modd 190÷320: to the terminals 35 and 43.

Modd 039÷162 Modd 190÷320

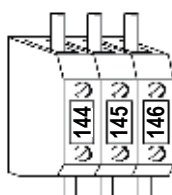


SOURCE CIRCUIT FLOW SWITCH (OPTIONAL)

In case is required, must be connected to:

Modd 039 ÷162 terminals 28 and 29

Modd 190 ÷320 terminals 43 and 26



SOURCE WATER 2 WAY MODULATING VALVE (VM20) (OPTIONAL)

This is used to optimize the water consumption of the source heat exchanger.

144 Valve Supply

145 Valve Supply

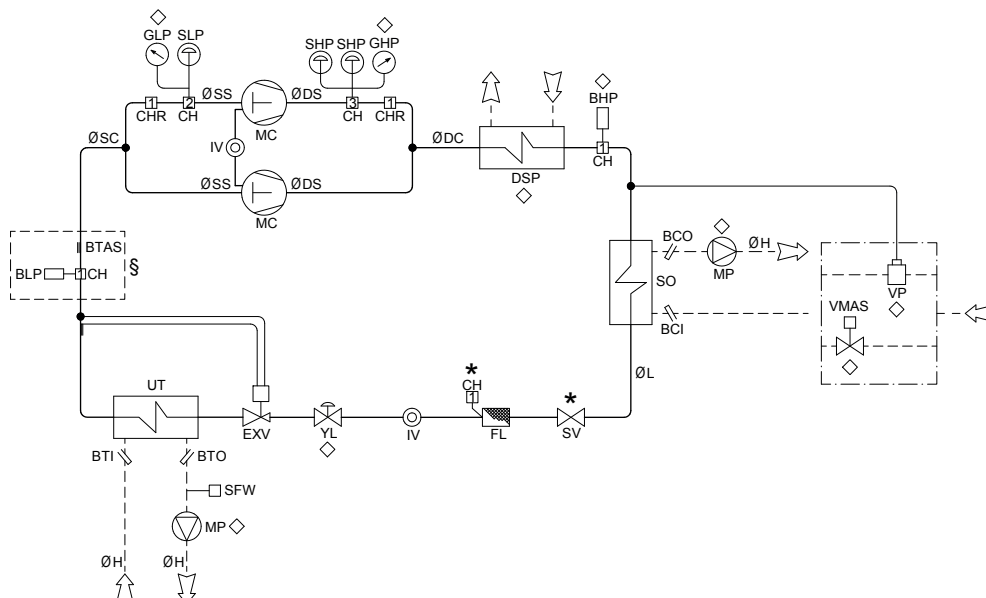
146 Signal 0-10V

4.24 Refrigerant circuit layout

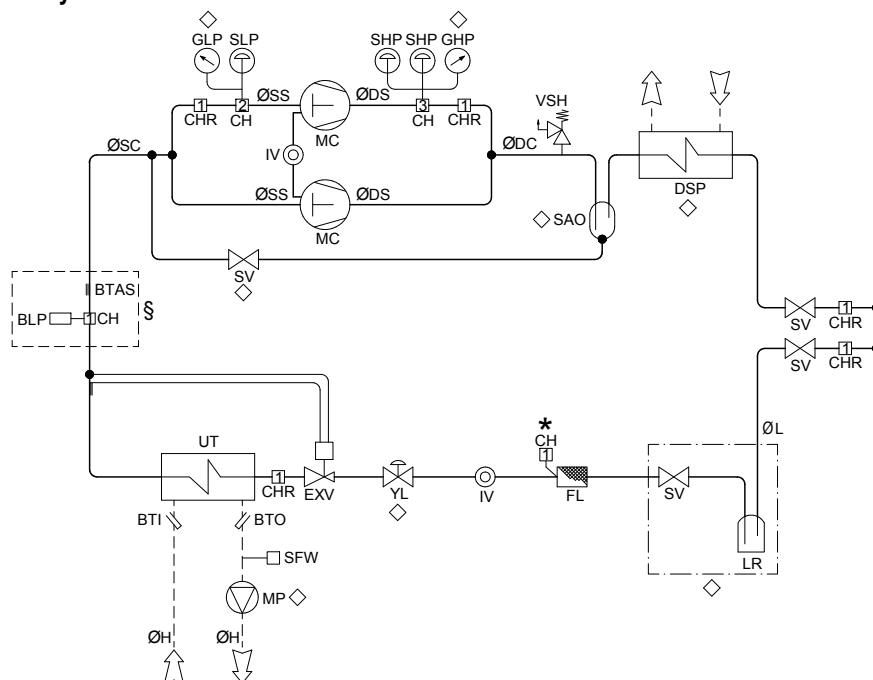
4.23.1 Legend

BCI	Source water input probe	LR	Liquid receiver
BCO	Source water output probe	MC	Compressor
BHP	High pressure transducer	SFW	Water flow switch
BTI	User water input probe	SHP	High pressure pressostat
BTO	User water output probe	SLP	Low-high pressure switch
CH	Charging plug	SO	Source side
CHR	Charging plug 5/16 (r410)	SV	Shut off valve
CN	Source exchanger	UT	User side
DSP	Desuperheater	VMAS	Source water modulating valve
EXV	Termostatic valve	VP	Pressostatic valve
FL	Liquid line filter	VR	Check valve
GHP	High pressure gauge	VRV	Reverse cycle valve
GLP	Low pressure gauge	VSH	High pressure safety valve
IV	Moisture indicator sight glass	YL	Liquid solenoid valve

4.23.2 Refrigerant circuit layout WDA



4.23.3 Refrigerant circuit layout WDA/EV



5. UNIT START UP

5.1 Preliminary checks

Before starting the unit the checks detailed in this manual of the electric supply and connections (par. 4.20), the hydraulic system (par. 4.11) and the refrigerant circuit (par. 5.1.4), should be performed.



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



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

5.1.1 Before start-up



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

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



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



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



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

5.1.2 Safety device setting

Device		Set-point	Differential	Reset
Control thermostat (Cooling mode)	°C	23	2	-----
Anti-freeze thermostat	°C	4	4	MANUAL
High pressure switch	Bar	30	7	Automatic for 3 times (than manual)
Low pressure switch	Bar	0.7	1.5	
Water safety valve (Present in A versions only)	Bar	6	--	Automatic



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

5.1.3 Controls during unit operation

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

5.1.4 Refrigerant charge checking

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

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



5.2.1 Display Icons

The instrument display is divided into three zones:

Left zone: the display shows the icons.

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

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

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

5.2.2 Key function

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

5.3 Remote control panel (Modd. 039 ÷ 162)



5.3.1 Display Icons

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

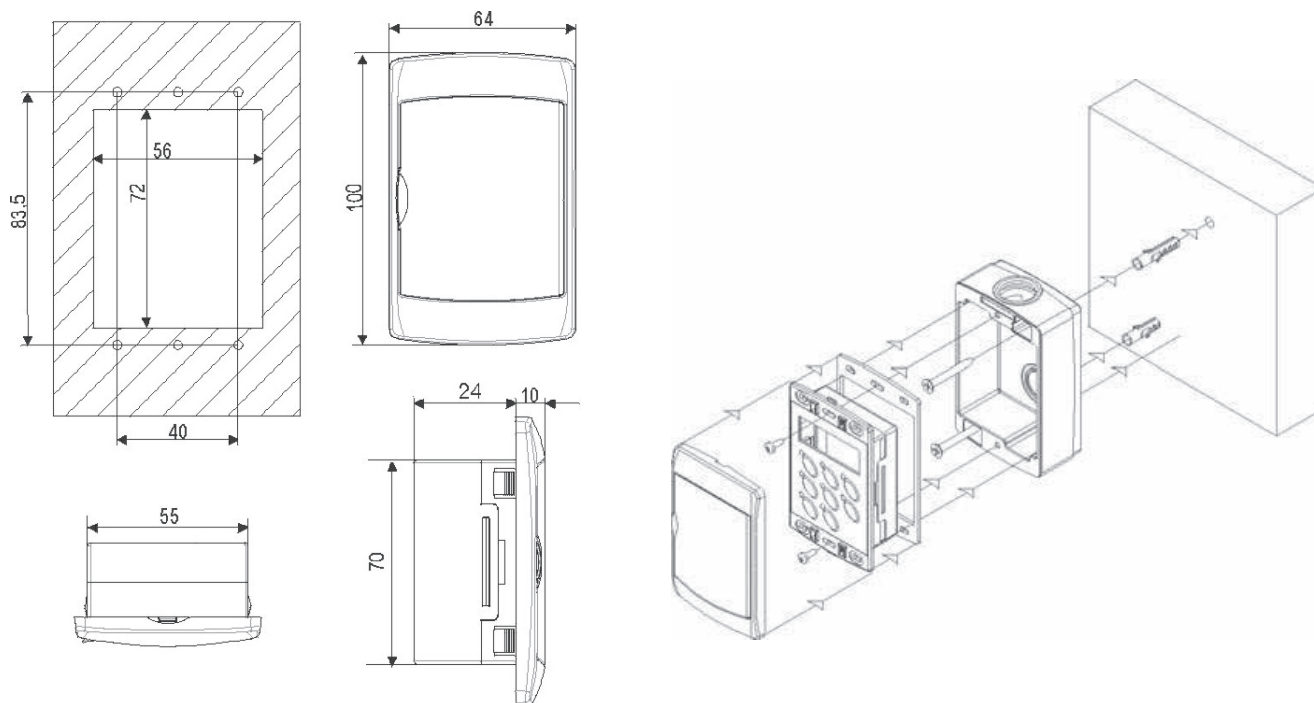
5.3.2 Key function

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

5.3.3 Installation

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

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



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



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

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



Display

The instrument display is divided into three zones:

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

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

Right zone: icons.

5.4.1 Display icons

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

5.4.2 Key function



M makes it possible to enter the functions menu



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



In standard mode allows the display of the different temperatures

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

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

3 clicks: Bottom line displays **ET**: Temperatura ambiente (non usata).

4 clicks: La riga in basso visualizza **DEF1**: Finned coil temperature (press SET to show DEF2).

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

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



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

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



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



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

5.5 Remote control panel (Modd. 190 ÷ 500)



5.5.1 Display icons

Icon	Meaning	Icon	Meaning
°C	Gradi Celsius		Attivazione resistenze elettriche
bar	Bar		Pompa acqua utenza
	Compressore 1	Flow!	Allarme flussostato
	Compressore 2		Ventilatore sorgente
	Allarme Generale		

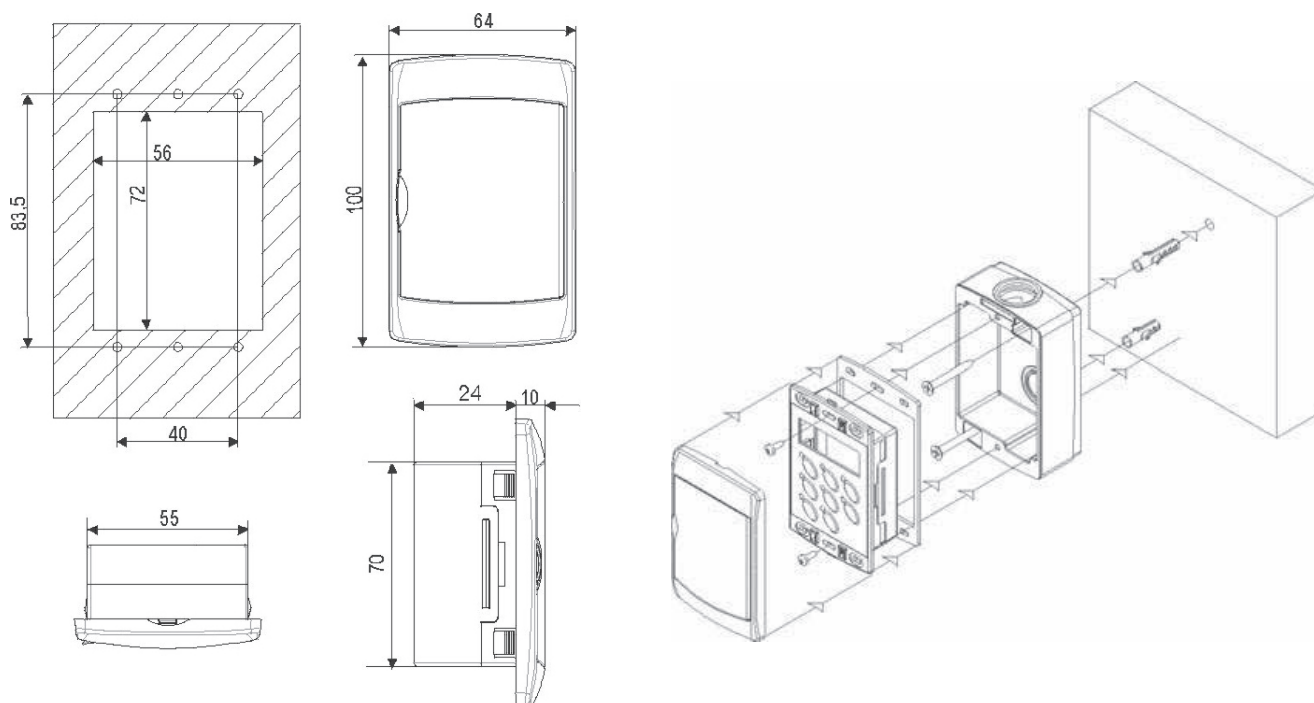
5.5.2 Key function

	M makes it possible to enter the functions menu
	SET makes it possible to display or modify the set points . Selects a parameter or confirms a value in programming mode.
	In standard mode allows the display of the different temperatures 1 click: Bottom line displays EIN: User inlet water temperature. 2 clicks: Bottom line displays EOUT: User outlet water temperature 3 clicks: Bottom line displays ET: Temperatura ambiente (non usata). 4 clicks: La riga in basso visualizza DEF1: Finned coil temperature (press SET to show DEF2). 4 clicks: Bottom line displays CDP1: refrigerant pressure (high pressure in cooling, low pressure in heating mode) (press SET to show CDP2) . In programming mode allows to scroll through the parameter codes or increases the values.
	In standard mode allows the display of the different temperatures in opposite way of the above arrow. In programming mode allows to scroll through the parameter codes or increases the values
	If press ed down for 5 seconds, it makes it possible to switch the unit on or off in chiller mode. Each time this function is activated, the green led positioned just above the button will be switched ON.
	If press ed down for 5 seconds, it makes it possible to switch the unit on or off in heating mode. Each time this function is activated, the green led positioned just above the button will be switched ON.

5.5.3 Installation

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

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



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

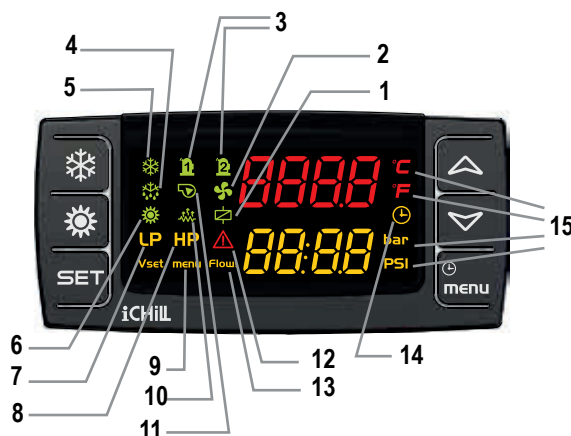


If there is damage to the remote control or there is a faulty connection, failure of communication will be indicated in the display with the message "noL" (no link).

6. USE (Modd. 039 ÷ 162)

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

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



Legend

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

6.1.1 Cooling mode

To start the unit in heating mode, press the  key. The snowflake icon is on.

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

6.2 Stop (Modd. 039 ÷ 162)

6.2.1 Cooling mode

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

6.3 Stand-by (Modd. 039 ÷ 162)

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



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

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



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



The complete display of the 3 set points (heating, domestic hot water, cooling) is ONLY available when the unit is in stand-by mode. It is suggested to put the unit in stand by when modifying set points. If the unit is not in stand-by, the only editable parameters are the ones related to the operation mode of the unit (eg. In heating mode it is only possible to change the heating and domestic hot water set points, in cooling mode it is only possible to change the cooling and domestic hot water set points.)



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

SEtH Heating set point

SEtC Cooling set point.

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

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

Then press the **SET** key to memorise the parameter and exit.



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

6.4.1 Adjustable parameters

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

Label	Function	Adjustment limit	Default value
SEt C	Cooling set-point	10÷23°C	12°C
SD02	Set point compensation	0÷15°C	10°C
PAS	Password	(Contact the company)	



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

6.5 Parameters list (Modd. 039 ÷ 162)

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

Scroll the list of the parameters using the ,  keys, then press the  key to display the required one.

In this menu it is only possible to display the parameters, it is not possible to change any value. The parameter list is:

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

6.6 Acoustic signal silencing (Modd. 039 ÷ 162)

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

6.7 Alarm Reset (Modd. 039 ÷ 162)

Press the  key (the menu **ALrM** appears at the bottom right of the display). Press the  key to display the alarm event.

In case of multiple alarms use the using the ,  keys, to scroll through the list of the active alarms.
There are two types of alarms:

Reset alarms:

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

Non reset alarm:

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

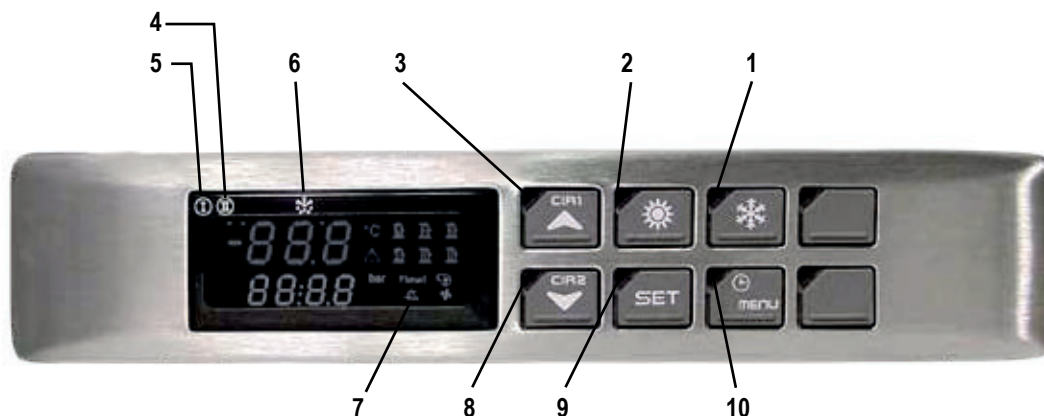
6.8 Display alarm history (Modd. 039 ÷ 162)

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

7. USE (Modd. 190 ÷ 500)

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

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



Legend

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

7.1.1 Cooling mode

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

7.1.2 Heating mode

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

7.2 Stop (Modd. 190 ÷ 500)

7.2.1 Cooling mode:

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

7.3 Stand-by (Modd. 190 ÷ 500)

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



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

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



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



The complete display of the 3 set points (heating, domestic hot water, cooling) is ONLY available when the unit is in stand-by mode. It is suggested to put the unit in stand by when modifying set points. If the unit is not in stand-by, the only editable parameters are the ones related to the operation mode of the unit (eg. In heating mode it is only possible to change the heating and domestic hot water set points, in cooling mode it is only possible to change the cooling and domestic hot water set points.)



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

SEtH Heating set point

SEtC Cooling set point.

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



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

7.4.1 Adjustable parameters

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

Label	Function	Adjustment limit	Default value
SEt C	Cooling set-point	20÷55°C	12°C
SD02	Set point compensation	0÷15°C	10°C
PAS	Password	(Contact the company)	



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

7.5 Parameters list (Modd. 190 ÷ 500)

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

The parameter list is:

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

7.6 Acoustic signal silencing (Modd. 190 ÷ 500)

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

7.7 Alarm Reset (Modd. 190 ÷ 500)

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

There are two types of alarms:

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

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

7.8 Display alarm history (Modd. 190 ÷ 500)

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

8. MAINTENANCE OF THE UNIT

8.1 General warnings



Starting from 01/01/2016 the new European Regulation 517_2014, "Obligations concerning the containment, use, recovery and destruction of fluorinated greenhouse gases used in stationary refrigeration, air conditioning and heat pumps", became effective. This unit is subject to the following regulatory obligations, which have to be fulfilled by all operators:

- (a) Keeping the equipment records
- (b) Correct installation, maintenance and repair of equipment
- (c) Leakage control
- (d) Refrigerant recovery and disposal management
- (e) Presentation to the Ministry of the Environment of the annual declaration concerning the atmospheric emissions of fluorinated greenhouse gases.

Maintenance will:

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



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



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



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



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



If it is necessary to replace a component of the machine, both for ordinary and extraordinary maintenance, this component must have the same or higher characteristics than those present. The same or higher performances or thicknesses are meant for the characteristics, which do not compromise the safety, the use, the handling, the storage, the pressures and the temperatures of use of the machine provided by the manufacturer.



The taps in the machine must always be in open position before starting. If it is necessary to disconnect the refrigeration circuit by closing the taps, it is necessary to take precautions to prevent the unit from starting up, even accidentally, and to indicate that the taps have been properly closed with special signs, both on the tap and in the electrical panel. In any case, the taps must remain closed as less as possible.

8.2 Drive access

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

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

8.3 Scheduled maintenance

The owner must make sure that the unit is periodically inspected, also on-site, adequately maintained, according to the type, size, age and use of the system, and to the indications contained in the Manual.

Servicing during the unit's operating lifetime and, in particular, scheduled leak detection, on-site inspections and check-ups of safety equipment, must be carried out as provided by local laws and regulations in force.



If leak detection instruments are installed on the system, they must be inspected at least once a year, to make sure that they work properly.

During its operating life, the unit shall be inspected and verified in accordance with applicable local laws and regulations. In particular, when there are no stricter specifications, the indications given in the following table (see EN 378-4, Annex D) must be followed, with reference to the situations described.

CASE	Visual Inspection	Pressure Test	Search for leaks
A	X	X	X
B	X	X	X
C	X		X
D	X		X

A	Inspection after an intervention with possible effects on the mechanical strength or after use change or in case the machine has not being working for more than two years. Replace all the components which are not suitable any more. Do not carry out checks at a higher pressure than the one indicated in the project.
B	Inspection after a repair, or significant adjustment of the system, or its components. The check may be limited to the interested parts, but if a leakage of refrigerant is detected, a leakage search must be carried out on the entire system.
C	Inspection after installation in a different position than the original one. Refer to point A when mechanical strength could have been affected by the change.
D	Leak search, following a well-founded suspicion of refrigerant leakage. It is recommended examined the system for leakage, either directly (use of leak detection systems) or indirectly (deduction of leakage based on analysis of operating parameters), focusing on the parts most prone to leakage (e.g. joints).



If a defect is detected that compromises the reliable operation of the unit, the unit cannot be re-started until it has been repaired.

8.4 Periodical and start-up checks



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



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

8.4.1 Electrical system and adjustment

Action to be performed	Frequency					
	Monthly	Every 2 months	Every 6 months	Every year	Every 5 years	As necessary
Check that the unit works properly and that there are no active warnings	X					
Visually inspect the unit	X					
Check noise and vibration level of the unit				X		
Check operation of safety features and of interlocks				X		
Check the unit's performance				X		
Check the current draws of the different parts (compressors, fans, pumps, etc.)				X		
Check the supply voltage of the unit			X			
Check tightness of cables in their clamps			X			
Check the integrity of the insulating coating of power cables				X		
Check the conditions and functioning of the counters				X		
Check functioning of the microprocessor and of the display			X			
Clean the electrical and electronic components of any dust				X		
Check functioning and calibration of probes and transducers				X		

8.4.2 Condensing coils and fans

Action to be performed	Frequency					
	Monthly	Every 2 months	Every 6 months	Every year	Every 5 years	As necessary
Visually inspect the coil	X					
Clean finned coils ⁽¹⁾			X			
Check the water flow and/or any leaks	X					
Check that the flow switch is working properly			X			
Clean the metal filter on the water line ⁽³⁾			X			
Check noise and vibration level of the fans				X		
Check the supply voltage of the fans			X			
Check the fans' electrical connections				X		
Check functioning and calibration of the fans' speed adjustment system (if present)				X		
Check 4-way valve operation (if present)				X		
Check air presence in the hydraulic circuit	X					
Check color of moisture indicator on liquid line				X		
Check for freon leaks ⁽²⁾						X



⁽¹⁾ If the unit is installed in strongly windy areas, near coasts or deserts or in areas subjects to wind and/or sand storms, or near airports, industries or in places with high levels of air pollution in general inspect the unit more frequently (**every three months or more**) to check the real condition of the surface protection. follow the instructions given in the paragraph "Cleaning the microchannel condensing coils".



⁽²⁾ In order to carry out operations on the refrigerant, it is necessary to observe the European Regulation 517_2014, "Obligations regarding the containment, use, recovery and destruction of fluorinated greenhouse gases used in stationary refrigeration, air conditioning and heat pump equipment".



⁽³⁾ It can be carried out with a higher frequency (also weekly) depending on the Δt .

8.4.3 Compressors

Action to be performed	Frequency					
	Monthly	Every 2 months	Every 6 months	Every year	Every 5 years	As necessary
Visually inspect compressors				X		
Check noise and vibration level of the compressors				X		
Check the supply voltage of the compressors			X			
Check the compressors' electrical connections				X		
Verificare il livello dell'olio nei compressori tramite apposita spia			X			
Check that the crankcase heaters are powered and working properly				X		
Check the conditions of the compressors' power cables and their tightness in the clamps			X			



Daily and monthly works may be carried out directly by the Owner of the system. All other works must be performed by authorised and trained personnel.



Any kind of cleaning whatsoever is forbidden before disconnecting the device from power supply by turning the master switch to the OFF position. It is forbidden to touch the device while barefooted or with wet or damp body parts.



Works on the cooling line must be carried out by qualified and trained technicians, as provided by local laws and regulations in force.



Before the start-up it is necessary to carry out all the operations described in the previous tables and make the necessary checks provided by the pre-start control module (valid for the Italian market) to be requested to the service.

8.5 Refrigerant circuit repair



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

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



Never use oxygen instead of nitrogen: explosions may occur.

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

Therefore:

- Avoid oil replenishment with products that are different from that specified and that are pre-loaded into the compressor.
- In the event of a gas leakage on machines using refrigerant R407C, even if it is only a partial leak, do not top up. The entire charge must be recovered, the leak repaired and a new refrigerant charge weighed in to the circuit.
- When replacing any part of the refrigerant circuit, do not leave it exposed for more than 15 minutes.
- It is important when replacing a compressor that the task be completed within the time specified above after removing the rubber sealing caps.
- When replacing the compressor following a burn out, it is advisable to wash the cooling system with appropriate products including a filter for acid.
- When under vacuum do not switch on the compressor.

9. DECOMMISSIONING

9.1 Disconnect the unit



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

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

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

9.2 Disposal, recovery and recycling

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

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

9.3 RAEE Directive (only UE)



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

10. DIAGNOSIS AND TROUBLESHOOTING (Modd. 039 ÷ 162)

10.1 Fault finding (Modd. 039 ÷ 162)

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



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

Code	Alarm Description	Cause	Solution
P1	Alarm Sensor PB1	Wrong electrical connections. Sensor defect.	Check the electrical connection of the sensor to the terminal board, if correct call the service to replace the sensor.
P2	Alarm Sensor PB2		
P3	Alarm Sensor PB3		
P4	Alarm Sensor PB4		
A01	High pressure switch alarm.	In heating mode: Insufficient user circuit water flow; In cooling mode: Insufficient air flow at the source fan.	Restore the correct circuit water flow. Restore the correct air flow at the source fan.
A02	Low pressure switch alarm.	Refrigerant charge leakage.	Find leakage and repair.
A05	High pressure alarm.	Transducer defect.	Replace the faulty transducer.
A06	Low pressure alarm.	Refrigerant charge leakage.	Find leakage and repair.
A07	Anti-freeze alarm from analog input.	Too low water temperature.	Check user temperature set point. Check user water flow.
A08	User heat exchanger flow switch alarm. (air/water water/water unit)	Presence of air or dirtiness in the user hydraulic system.	Bleed carefully the user hydraulic system or check and clean the water service.
A09	Compressor 1 overload.	Compressor input current outside operation limits.	Replace the compressor.
A10	Compressor 2 overload.		
A11	Overload source fan alarm.	Fan input current outside operation limits.	Check the proper operation of the source fan and, in case, replace it.
A12	Error alarm in defrosting.	Defrost time too long. Outside temperature outside the working limits. Refrigerant charge leakage.	Check defrost set point. Restore normal working conditions. Find leakage and repair.
EE	EEPROM Alarm	Severe hardware damage in the microprocessor control system.	Switch the unit OFF and, after few seconds switch the unit ON; if the alarm appears again contact the service.

11. DIAGNOSIS AND TROUBLESHOOTING (Modd. 190 ÷ 500)

11.1 Fault finding (Modd. 190 ÷ 500)

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



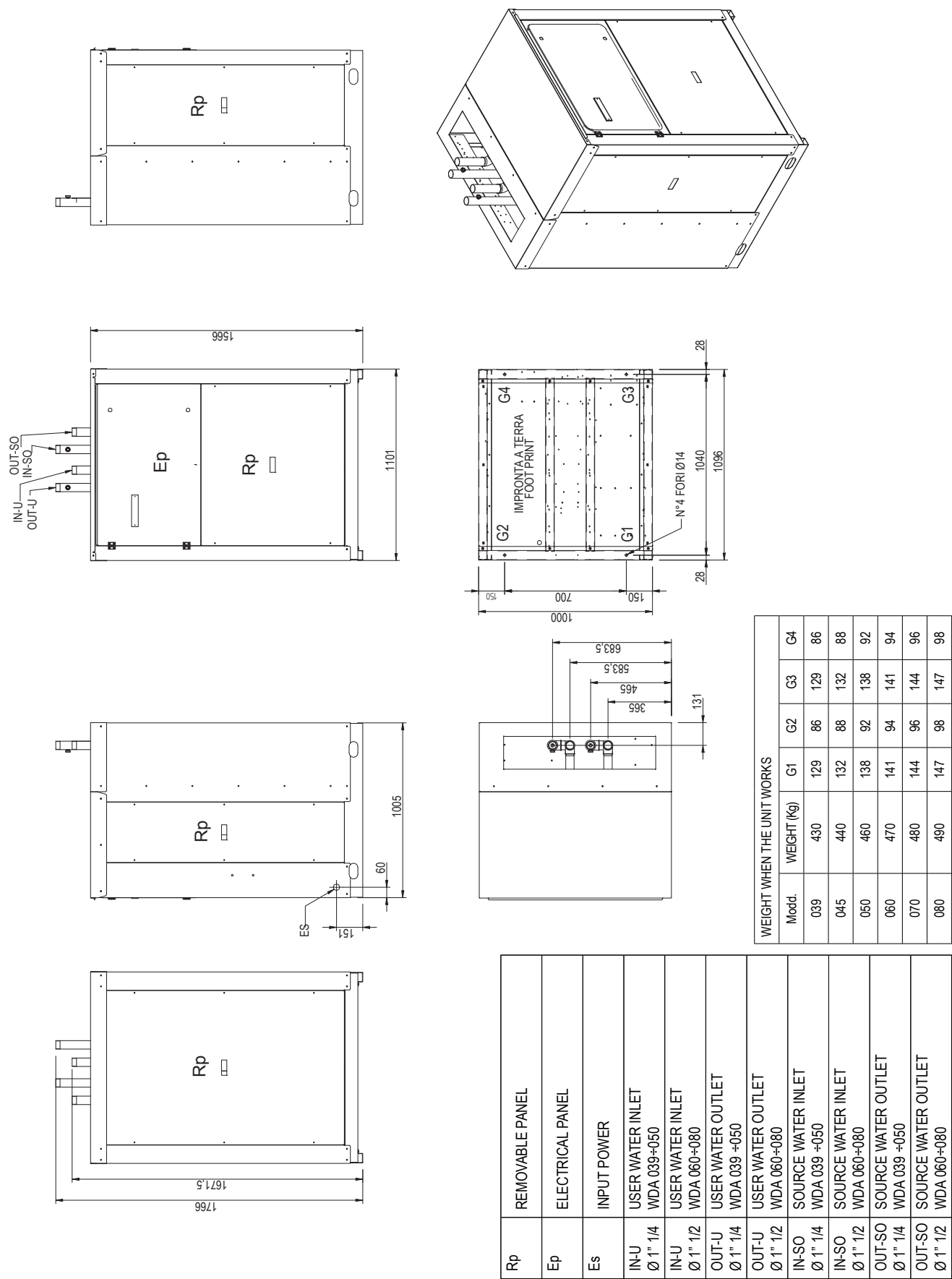
BE SURE TO RESET AN ALARM ONLY AFTER YOU HAVE REMOVED THE CAUSE OF THE FAULT; REPEATED RESET MAY RESULT IN IRREVOCABLE DAMAGE TO THE UNIT.

Code	Alarm Description	Cause	Solution
ACF1	Configuration alarm	Wrong configuration of microprocessor control system.	Contact the company.
ACF2	Configuration alarm		
ACF3	Configuration alarm		
ACF4	Configuration alarm		
ACF5	Configuration alarm		
ACF6	Configuration alarm		
ACF7	Configuration alarm		
ACF8	Configuration alarm		
ACF9	Configuration alarm		
AEE	Eeprom alarm	Serious hardware damage in the microprocessor control system.	Switch OFF the unit and, after few second switch ON the unit; if the alarm appears again contact the service.
AEFL	User water flow switch alarm	Presence of air or dirt in the user hydraulic system.	Bleed carefully the user hydraulic system or check and clean the water strainer.
AEU _n	Compressor unloading alarm (only units with 2 compressors)	User water temperature is too high.	
AP1	Alarm user inlet water temperature sensor	Wrong electrical connection, Sensor defect.	Check the electrical connection of the sensor to the terminal board, if correct the sensor must be replaced .
AP2	Alarm user outlet water temperature sensor		
AP3	Alarm pressure transducer		
AP4	Alarm finned coil sensor / defrost sensor		
AP5	Not used		
AP6	Not used		

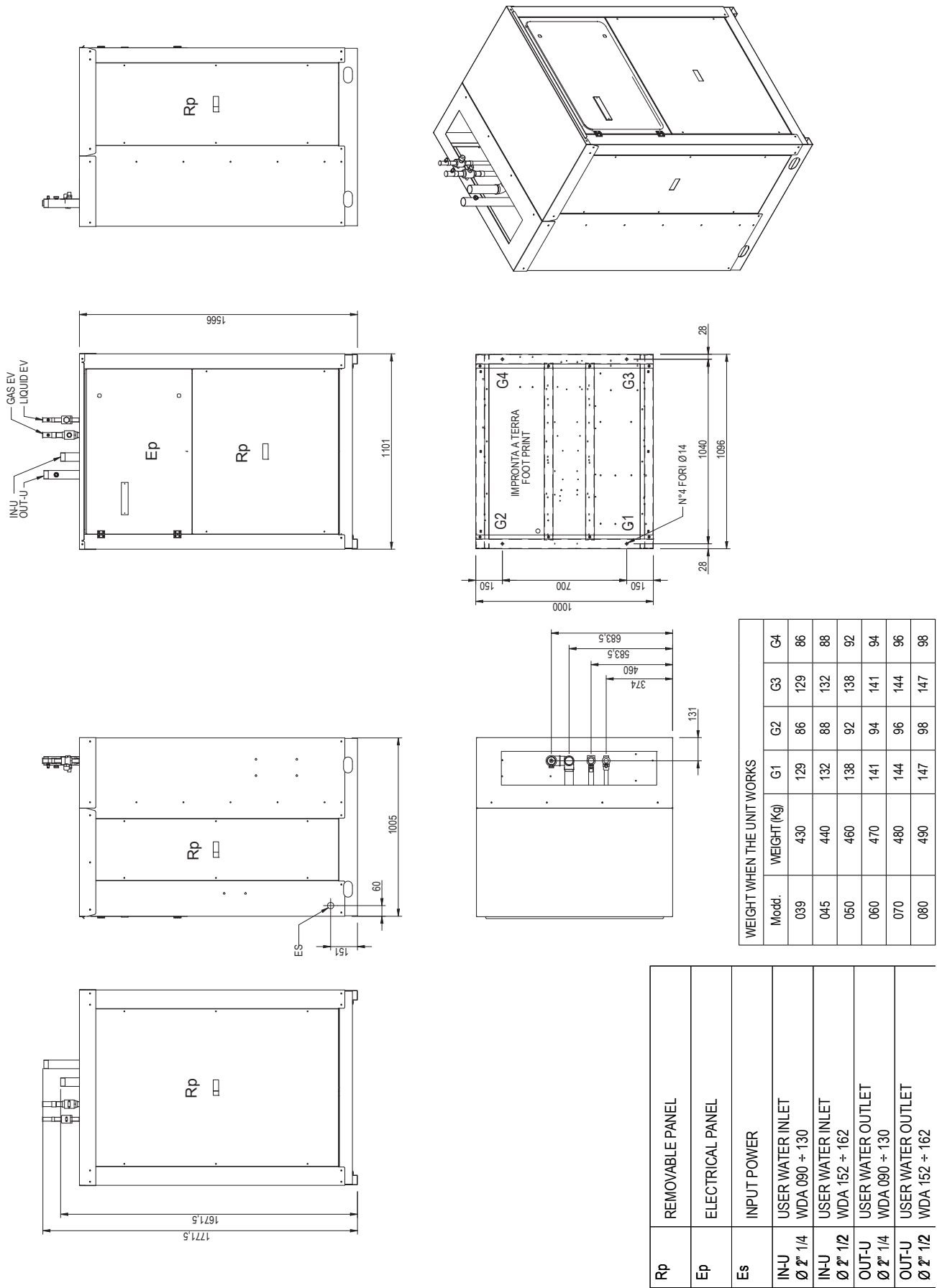
Problem	Sintomo	Causa	Rimedio
AP7	Not used	Wrong electrical connection, Sensor defect.	Check the electrical connection of the sensor to the terminal board, if correct the sensor must be replaced .
AP8	Not used		
AP9	Not used		
AtE1	Not used		
AtE2	Not used		
B1 HP	High pressure switch circuit 1	In heating mode: Insufficient user circuit water flow; Insufficient domestic hot water circuit water flow.	Restore correct user water flow.
		In cooling mode: Insufficient air flow at the source fan; Insufficient domestic hot water circuit water flow.	Restore correct source fan air flow.
b1AC	Anti-freeze alarm circuit 1 (cooling mode)	Too low water temperature	Check user temperature set point; Check user water flow.
b1AH	Anti-freeze alarm circuit 1 (heating mode)	Too low water temperature	Check user temperature set point.
b1dF	Wrong defrost circuit 1 (maximum time admitted)	Defrost time too long; Outside temperature outside the working limits; Refrigerant charge leakage.	Check defrost set point; Restore normal working conditions; Find leakage and repair.
b1hP	High pressure transducer alarm circuit 1	Transducer defect	Replace the faulty transducer.
B1LP	Low pressure switch circuit 1	Refrigerant charge leakage.	Find leakage and repair.
b1IP	Low pressure transducer alarm circuit 1	Transducer defect	Replace the faulty transducer
b1tF	Overload source fan alarm	Fan input current outside operation limits.	Check the proper operation of the source fan and, in case replace it.
C1tr	Compressor 1 overload	Compressor 1 input current outside operation limits.	Contact the Company
C2tr	Compressor 2 overload	Compressor 2 input current outside operation limits.	Contact the Company
C3tr	Compressor 3 overload	Compressor 3 input current outside operation limits.	Contact the Company
C4tr	Compressor 4 overload	Compressor 4 input current outside operation limits.	Contact the Company
C5tr	Compressor 5 overload	Compressor 5 input current outside operation limits.	Contact the Company
C6tr	Compressor 6 overload	Compressor 6 input current outside operation limits.	Contact the Company
C1dS	Compressor 1 disable from remote control panel (only units with 2 compressors)		
C2dS	Compressor 2 disable from remote control panel (only units with 2 compressors)		

12.DIMENSIONAL DRAWINGS

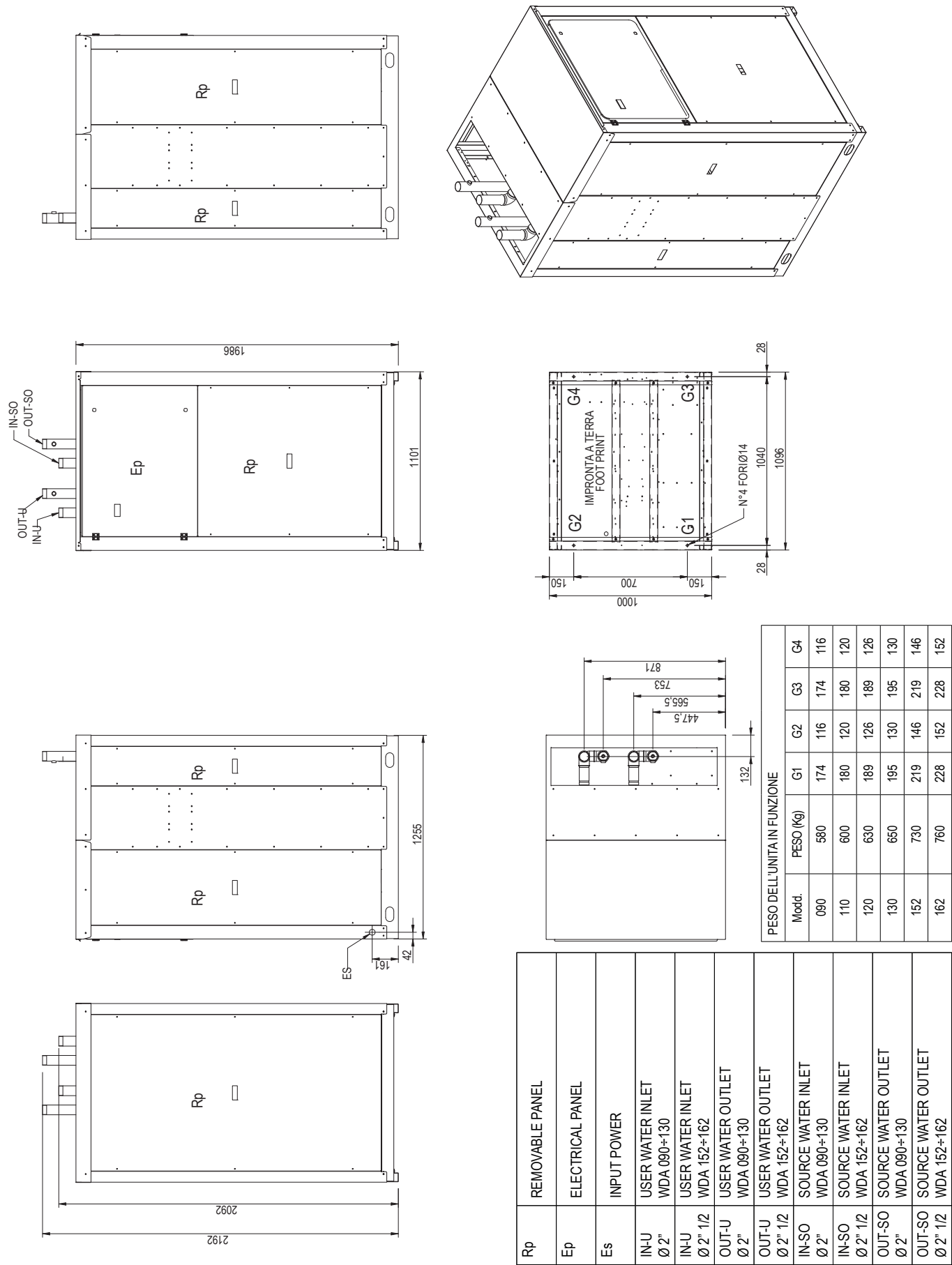
Dimensional drawings WDA 039 - 045 - 050 - 060 - 070 - 080



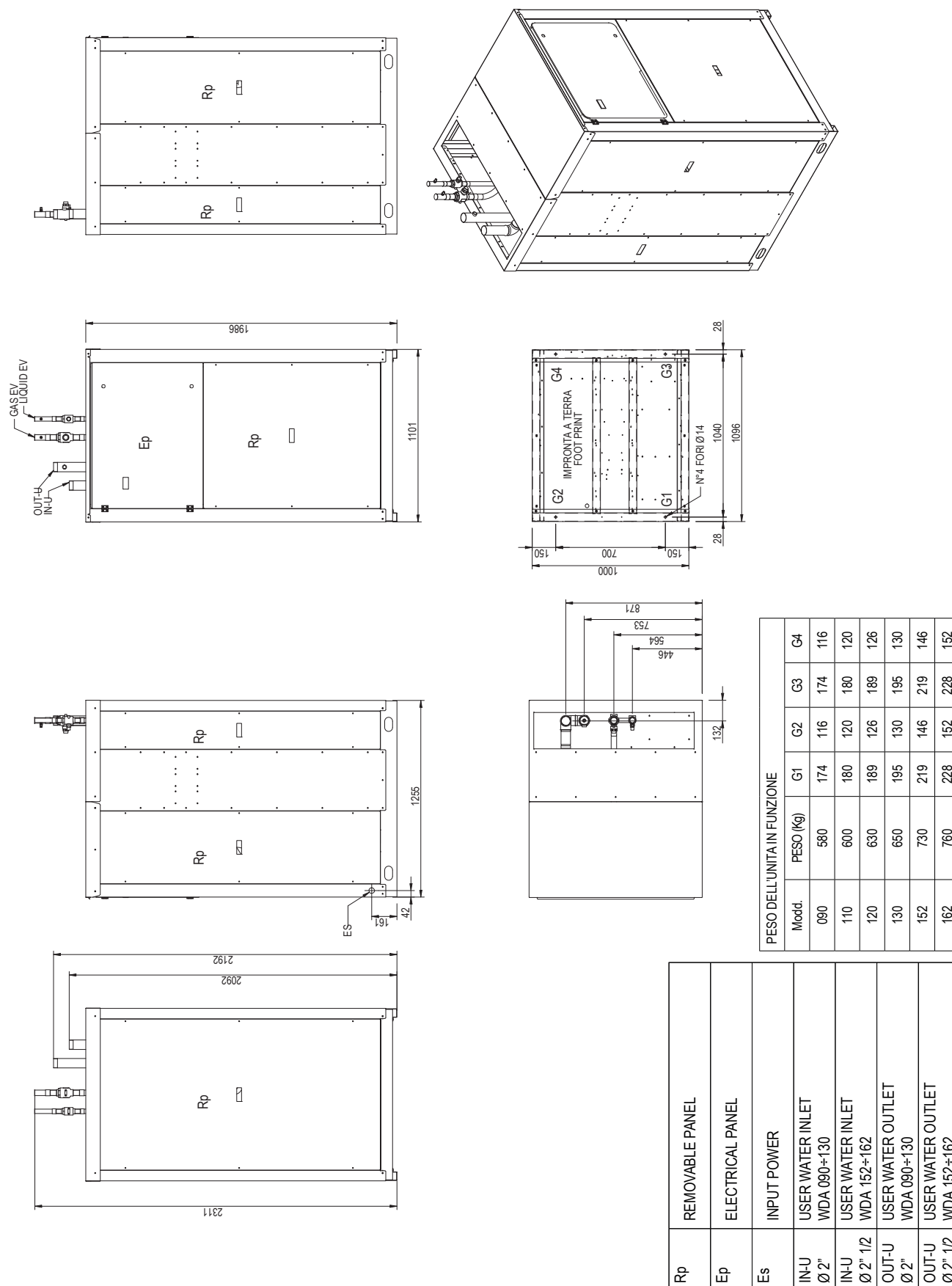
Dimensional drawings WDA/EV 039 - 045 - 050 - 060 - 070 - 080



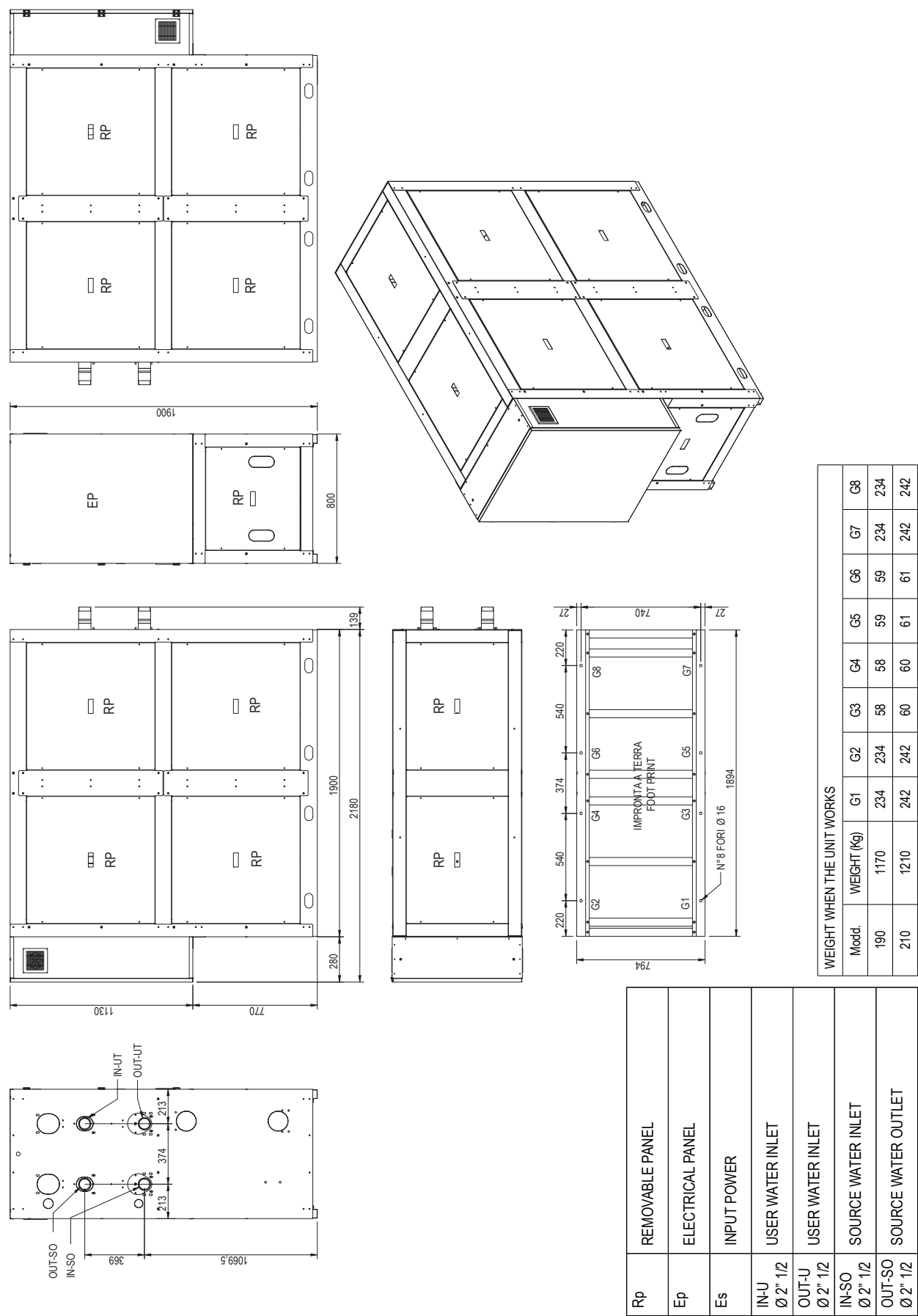
Dimensional drawings WDA 090 - 110 - 120 - 130 - 152 - 162



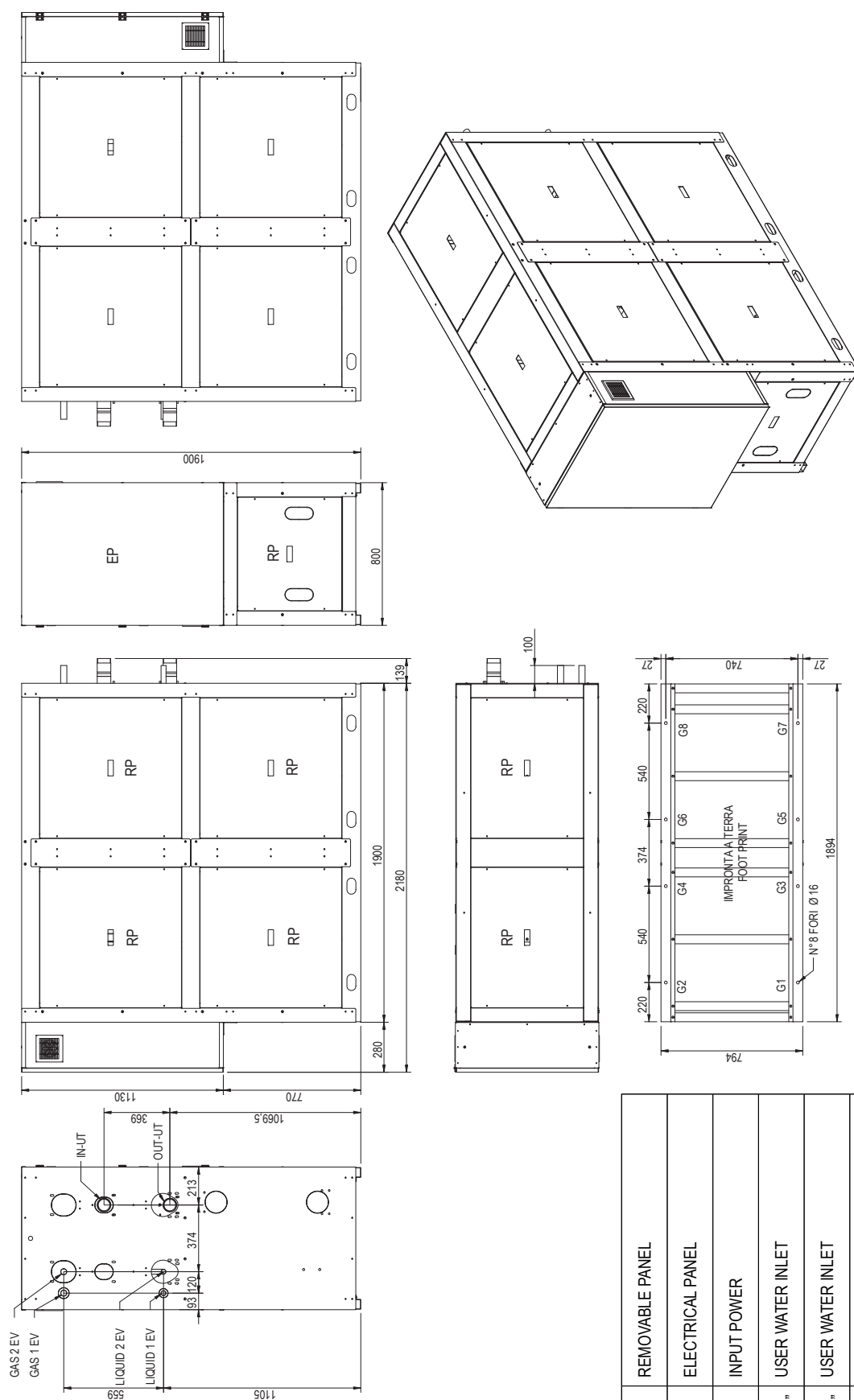
Dimensional drawings WDA/EV 090 - 110 - 120 - 130 - 152 - 162



Dimensional drawings WDA 190 - 210

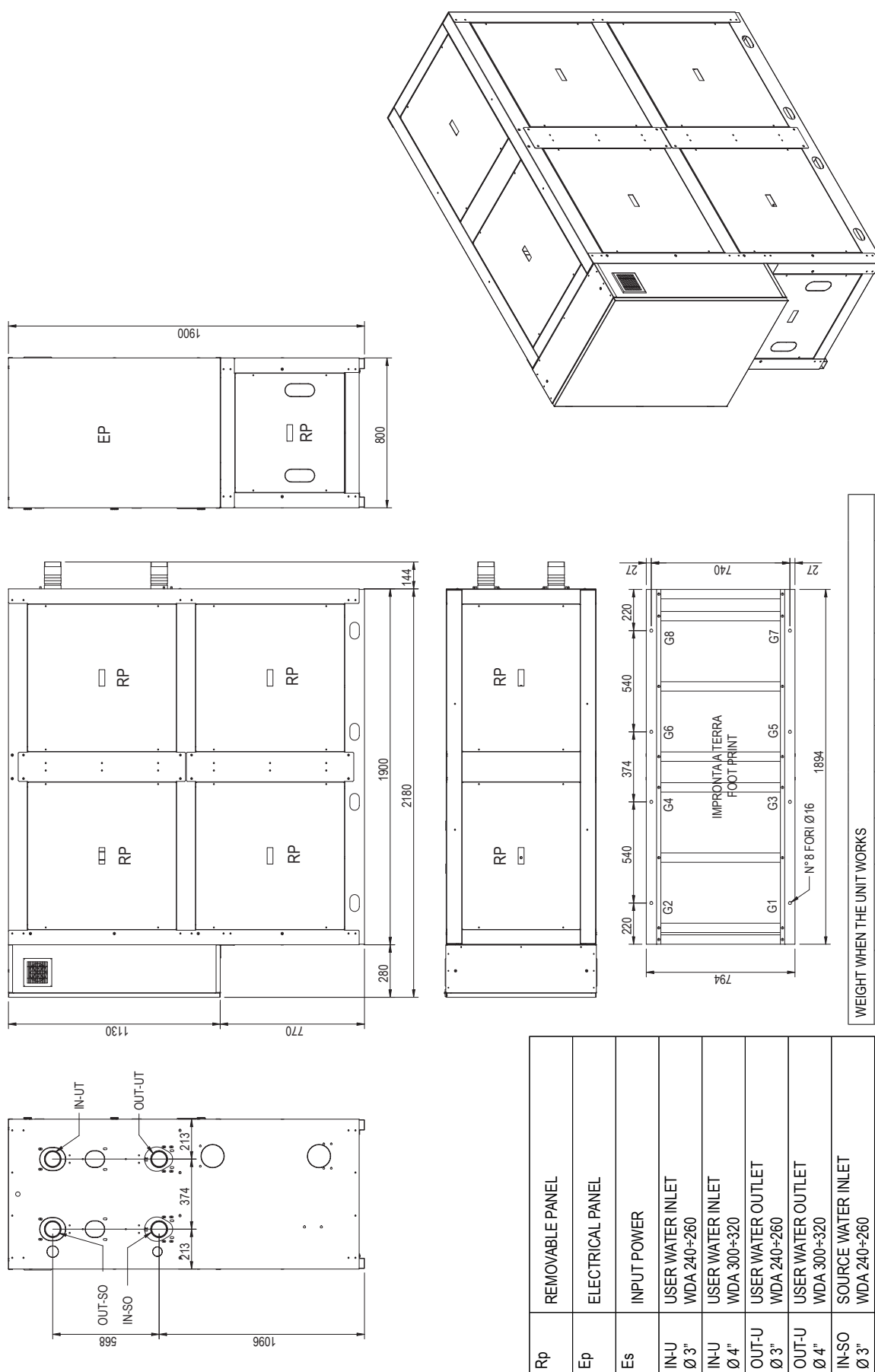


Dimensional drawings WDA/EV 190 - 210



WEIGHT WHEN THE UNIT WORKS									
Mod.	190	210	1170	1210	234	242	242	60	61
W8	234	242	242	242	58	60	59	59	61
G8	234	242	242	242	58	60	59	59	61

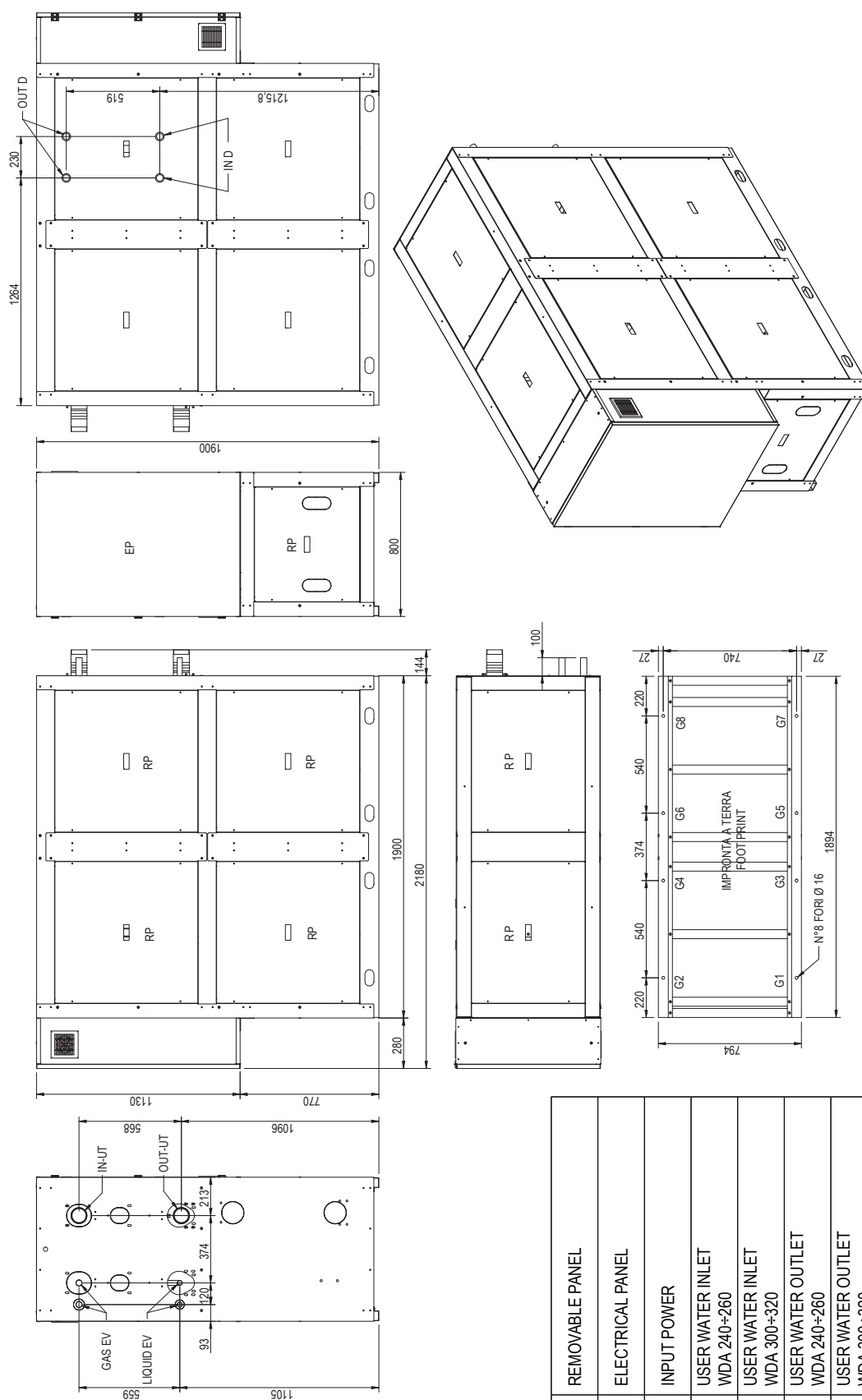
Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
IN-U Ø 2 1/2"	USER WATER INLET
OUT-U Ø 2 1/2"	USER WATER INLET
IN-SO Ø 2 1/2"	SOURCE WATER INLET
OUT-SO Ø 2 1/2"	SOURCE WATER OUTLET
IN-D Ø 1 1/2"	WATER INLET DESUPERHEATER
OUT-D Ø 1 1/2"	WATER OUTLET DESUPERHEATER



WEIGHT WHEN THE UNIT WORKS									
Modd.	WEIGHT (Kg)	G1	G2	G3	G4	G5	G6	G7	G8
240	1270	254	254	63	63	64	64	254	254
260	1320	264	264	66	66	66	66	264	264
300	1390	278	278	69	69	70	70	278	278
320	1430	286	286	71	71	72	72	286	286

Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
IN-U Ø 3"	USER WATER INLET WDA 240÷260
IN-U Ø 4"	USER WATER INLET WDA 300÷320
OUT-U Ø 3"	USER WATER OUTLET WDA 240÷260
OUT-U Ø 4"	USER WATER OUTLET WDA 300÷320
IN-SO Ø 3"	SOURCE WATER INLET WDA 240÷260
IN-SO Ø 4"	SOURCE WATER INLET WDA 300÷320
OUT-SO Ø 3"	SOURCE WATER OUTLET WDA 240÷260
OUT-SO Ø 4"	SOURCE WATER OUTLET WDA 300÷320

Dimensional drawings WDA/EV 240 - 260 - 300 - 320



WEIGHT WHEN THE UNIT WORKS		G1	G2	G3	G4	G5	G6	G7	G8
Modd.	WEIGHT (kg)								
240	1270	254	254	63	63	64	64	254	254
260	1320	264	264	66	66	66	66	264	264
300	1390	278	278	69	69	70	70	278	278
320	1430	286	286	71	71	72	72	286	286

Rp	REMOVABLE PANEL
Ep	ELECTRICAL PANEL
Es	INPUT POWER
IN-U Ø 3"	USER WATER INLET WDA 240÷260
IN-U Ø 4"	USER WATER INLET WDA 300÷320
OUT-U Ø 3"	USER WATER OUTLET WDA 240÷260
OUT-U Ø 4"	USER WATER OUTLET WDA 300÷320
IN-SO Ø 3"	SOURCE WATER INLET WDA 240÷260
IN-SO Ø 4"	SOURCE WATER INLET WDA 300÷320
OUT-SO Ø 3"	SOURCE WATER OUTLET WDA 240÷260
OUT-SO Ø 4"	SOURCE WATER OUTLET WDA 300÷320



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Technical data shown in this booklet are not binding.

The Company shall have the right to introduce at any time whatever modifications necessary to the improvement of the product.
The reference languages for the whole documentation are Italian and English. The other languages are to be considered only as guidelines.
