

Climaveneta Data Book

WSM2\_0052\_0152\_202105\_EN



# WSM2 / WSM2-T

**0052 - 0152**  
**15,8 - 47 kW**

Fully-configurable and high-efficiency air-source reverse-cycle and cooling only rooftop unit



(The photo of the unit is purely indicative and may vary depending on the model)

- Maximum flexibility
- Minimum footprint
- High versatility
- Three different heat recoveries available



## CERTIFICATIONS

### Product certifications



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### System certifications



Climaveneta S.p.A.:

Quality System complying with the requirements of UNI EN ISO9001:2008 regulation

Environmental Management System complying with the requirements of UNI EN ISO14001:2004 regulation

## SUMMARY

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The units highlighted in this publication contain HFC R410A [GWP<sub>100</sub> 2088] fluorinated greenhouse gases.

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## 1. GREEN CERTIFICATION RELEVANT

Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., as a major player in the world HVAC market and a leading manufacturer of energy efficient, sustainable HVAC solutions, recognizes and supports the diffusion of green certification systems, as an effective way to deliver high performance buildings and improve the quality and the sustainability of the built environment.

Since the first certification system was introduced at the beginning of the 1990s, the demand for certified buildings has grown considerably, as well as the number of standards, rating and certification programs.

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To find out more about how our products contribute to enhanced green certification rating and energy performance of a building, please refer to:

<https://www.melcohit.com/GLOBAL/Company/Green-Certifications/QR%20code/>



## 2. PRODUCT PRESENTATION

The WSM2 units are packaged reverse-cycle air-to-air units specifically designed for installation in small to medium-sized spaces, such as shops, bars and service stations.

As a result of MEHITS's extensive experience in the design and development of rooftop units, these appliances are an extension of the Packaged system offering and part of its plan to rationalise the range.

According to the selected version, these units provide complete air handling and ventilation in the air-conditioned ambients, with a flexible and versatile packaged solution that optimises the system and simplifies installation.

The units can moreover be customised to adapt to different types of environments, with various different accessories available. The right unit can therefore be chosen for each system, offering a simple and reliable response to all installation requirements.

The unit is intended for outdoor installations.

### 2.2 Maximum flexibility

Maximum freedom in choosing the direction of air flows, both supply and return, means the units can be adapted to all installation contexts.

The building's constructional limits can therefore be overcome, offering a highly flexible solution.

In addition, ducting installation is much easier, as there are no restrictions in unit layout regarding the position of the supply and return duct connections.

### 2.3 Minimum footprint

For applications in small-medium areas, spaces available for unit installation are often quite limited and consequently the units themselves must be as compact as possible.

The WSM2 packaged solution is the ideal solution, as just one compact unit comprises everything needed for room air-conditioning, replacing bulkier and more expensive solutions that use separate units for chilled fluid production and air handling. Maximum care has been paid to the unit's structural design, making sure flexibility, sturdiness and complete functions can all be guaranteed in minimum dimensions.

### 2.4 High versatility

Each application has different needs, all of which require an optimum response.

The WSM2 range of units offer different selection options regarding the air treatment sections, ranging from recirculation only to mixtures of fresh outside and recirculated air, and solutions with heat recovery from the exhaust air.

As well as this, each of the different configurations can be further customised thanks to a vast selection of accessories.

### 2.5. ErP Directive



The unit meets the requirements for seasonal energy efficiency in heating mode ( $\eta_{s,h}$ ) and cooling mode ( $\eta_{s,c}$ ) pursuant to Regulation (EU) 2016/2281.

### 2.6. Eurovent Certita Certification



The WSM2 range is part of the Eurovent certification program for rooftop (RT) units. The list of certified products is available on the website [www.eurovent-certification.com](http://www.eurovent-certification.com)

### 3. MAIN CHARACTERISTICS

#### 3.1 AIR3000+ advanced controller

All units are fitted with the AIR3000+ controller, especially developed by MEHITS S.p.A. for rooftop units. It features a double control board, one for the refrigerant circuit and one for the air treatment, and a liquid crystal display (LCD) on board of all the units.

This keypad accesses a user interface with eighteen European languages available for selection by the user. This allows an interface that's specific for the country where the unit is installed, or alternatively, by setting English, completely independent for all other regions.

**Temperature control** is performed using algorithms that control available devices (compressors, hot gas reheat coil, heating devices) based on the unit configuration. Control is applied using the return air temperature probe reading, based on proportional or proportional + integral logic. As an alternative also supply temperature control is available. The temperature set point can be set directly on the controller, or managed via a remote digital or analogue contact.

**Interfacing** to commercially-available BMS systems is provided thanks to compatibility with BACnet, BACnet over-IP, Modbus, Modbus over-IP, Echelon and LonWorks protocols.

The **built-in clock** provides a daily scheduler function, organized into time bands so as to optimise unit operation, minimizing system energy consumption.

In fact, several time bands (up to 10) of different types (4) can be activated throughout the day, with each band being assigned:

- temperature set point for cooling and heating
- humidity set point
- unit operating modes: control on, off, purging, start-up.

**Ventilation**, according to unit's configuration, can be managed in the following modes:

- constant air flow;
- constant pressure;
- variable air flow.

Other available functions:

- room humidity control in cooling and heating mode;
- automatic temperature- and enthalpy-based free cooling Management;
- self-adaptive defrost management using algorithms that reduce defrost duration or prevent unnecessary or wasteful cycles;
- demand limit on compressors to reduce mains power consumption;
- set point compensation based on outside temperature, in both cooling and heating operation;
- compressor unloading, assisted by activation of outside air damper;
- Management of the heating devices as integration or substitution of the heat pump;
- Control and management of the ambient air quality with on board sensors or remote signal;
- Air flow set point management with digital or analog signal;
- Auxiliary controls available through remote contact or directly from the controller: room washing mode, running-up mode, ventilation mode, full fresh air mode.



Display and acquisition of the last 200 alarm events (user level) are also available as well as recording of operating variables in the 10 minutes prior to each alarm event (assistance level through Black Box) with display via PC. Compatibility with remote keypad (management of up to 8 units).

### 3.2 Complete range

The WSM2 range comes in 8 sizes, with six different versions available to satisfy all system requirements, being supplied with a complete set of standard components and a comprehensive selection of accessories.

All the units are with single refrigerant circuit and two tandem scroll compressors.

The units use plug fan on both the supply and return. Supply fan available static pressure, on standard units, guarantees a wide operating range.

The availability of different filtering options ensures the best response to the specific requirements of each installation: the maximum air quality can be achieved to measure, using ISO coarse 50% filtration degrees (ISO 16890 - G4 EN779) combined with plate filter, up to type ePM01-80% (ISO 16890 - F9 in accordance with EN 779: 2012).

The reverse-cycle refrigerant circuit and free cooling/free heating operation allow continuous service within the wide range of operating limits, achieved through careful sizing of the components and specific design choices.

Thanks to the standard equipment for external air high temperature, the units are suitable to work in cooling mode with high external air temperatures, for installation in hot climates.

### 3.3 Simplified installation and maintenance

The WSM2 rooftop units simplify and reduce the costs of maintenance and work on site, through:

- Sturdy and perfectly insulated structure that guarantees resistance to the elements and mechanical stress.
- Easy access to the inside sections and the components that require periodical cleaning, for fast and economical routine maintenance.
- "PLUG and PLAY" construction that ensures, once the unit has been positioned, simpler and faster electrical and air connections.
- Automatic calibration of air flow-rates, with consequent savings in technical service and greater comfort.

### 3.4 Plug fan

WSM2 units are supplied with plug fans with EC brushless motor. These fans differ from traditional centrifugal fans due to absence of the scroll and direct coupling to the motor, thus eliminating energy loss from the belt and pulley transmission. The rotor is realized with high performance composite material that enhances the efficiency and reduces the noise.



This type of technology ensures clear advantages, with installation being simplified based on the parameters set by the user, without needing any flow-rate adjustment during calibration.

In addition, fan speed adapts to the characteristics of the system even when the unit is operating, for example compensating for any variations in flow-rate due to progressive fouling of the filters. The low power consumption of these types of fans can be further reduced by applying the exclusive control logic developed by MEHITS S.p.A. All this means high operating efficiency even for the part involving the fans, traditionally a critical area in terms of running costs.

### 3.5. Energy recovery from the exhaust air

MEHITS S.p.A. has always designed efficient units with the aim of reducing energy consumption and therefore energy waste. At the same time, it is important to ensure air quality inside air-conditioned spaces: this is why suitable air change not only increases the well-being of occupants, but is also mandatory by law in the individual member states. Specific European standards were issued (for example EN 16798-1:2019), which combine aspects regarding air quality inside buildings with energy requirements. For most of the year, the air that is discharged from the indoor spaces is in better temperature-humidity conditions than the incoming air from the outside: it is therefore useful to recover energy from the exhaust air before this is discharged. To satisfy this important requirement, the WSM2 units can be configured with three different types of energy recovery on the exhaust air, so as to best adapt to the different needs and climates where they are installed.

These are:



**THERMODYNAMIC** recovery: The effect is achieved by diverting the exhaust air through the outside section of the refrigerant circuit. This increases efficiency by allowing the unit to work at a more advantageous condensing temperature than allowed by outside conditions.



**REFRIGERANT BOOSTER**: a finned coil is placed next to the exhaust air damper. This is crossed by the entire exhaust air flow, allowing all of the heat contained in the exhaust air to be recovered. The recovered energy is transferred to the refrigerant circuit, which increases the net cooling effect in the air handling coil without requiring additional compressor work.



**ROTARY** heat recovery: an enthalpy wheel rotates continuously, absorbing the heat and humidity from one of the two air flows and then transferring it to the other. This represents the highest-performance heat recovery unit, with a recovery efficiency up to 85%.

### 3.6 Variable Air Flow

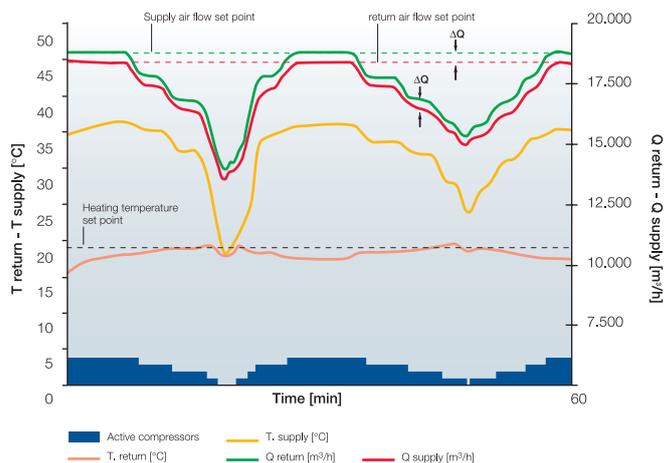
On rooftop units, that directly serve the air-conditioned environment and represent the main source of ventilation, the supply and return fans work continuously at a fixed flow-rate, in all operating conditions, even during freecooling and at part loads, which together account for the majority of operating hours.

Consequently, power consumption from fan operation on rooftop units represents over 50% of total annual unit power consumption, which is why MEHITS S.p.A. decided to develop a system for controlling fans that could reduce fan power consumption.

The most effective way to reduce power consumption is to decrease fan speed, and consequently flow-rate, whenever system operating conditions allow.

The advanced logic featured on the AIR3000+ controller and the use of plug fans with electronic speed control have allowed the **Variable Air Flow** function to be developed. This involves changing the supply and return air flow-rate based on effective demand from the system, considering the activation percentage of each device - compressors, heaters or burners, freecooling or freeheating. For example, progressive shutdown of the compressors will bring a reduction in air flow-rate, defined within the limits set by the user.

This means flow-rates are managed based on the actual conditions in the air-conditioned space, while still observing any limits defined on the components and the type of system. In addition to benefits in terms of comfort, there are also economic advantages, as reducing fan speed cuts total unit power consumption by 30% compared to the traditional fixed flow-rate solution.



Simulation on annual base, commercial area in the north of Italy

## 4. DESCRIPTION OF THE UNIT

### 4.1 Description

#### Packaged air-cooled rooftop air-conditioner with scroll compressor and R410A refrigerant

Packaged air-cooled rooftop air-conditioner, reverse-cycle (WSM2) or cooling-only (WSM2-T), for outdoor installation, for air handling, filtration and ventilation, based on the selected configuration.

The WSM2 and WSM2-T units are part of the Eurovent Certification program for rooftop (RT) units; the list of certified units is available at [www.eurovent-certification.com](http://www.eurovent-certification.com).

The units can work at full load across a very wide range of operating temperatures (for outside coil down to -15°C in heat pump mode and up to +46°C in cooling mode at full load, while at partial load up to 52°C).

#### Structure

Structure designed specifically for outdoor installation, base and load-bearing frame made from suitably thick hot galvanised and painted steel sections. The front of the unit comprising the condenser and the electrical panel is made from galvanised metal panelling, painted with polyester powder coat to ensure complete weather resistance (colour RAL 7035).

The air handling section comprises a load-bearing structure made completely from aluminium alloy, supporting sandwich panels (thickness 25 mm on the side, 42 mm bottom and top), with galvanised sheet panelling on the inside and painted galvanised sheet (colour RAL 7035) on the outside, with polyurethane foam insulation in between, average density 45 kg/m<sup>3</sup>.

The resulting structure has the following features:

1. rigidity and sturdiness;
2. continuous gasket on the closing panels in the air handling area for better tightness to air and rainwater;
3. panels closed using special handles that allow them to be opened from the left or right or removed completely, for better access to the unit;
4. the sandwich panels making up the top of the air handling area are in turn fully covered by special coiled metal panelling to prevent water infiltration; this panelling is made from galvanised and painted sheet, colour RAL 7035;
5. the electrical cables and refrigerant piping are positioned in dedicated sections, without crossing through the air handling section.

Any mixing chambers for air return, energy recovery or additional modules are always incorporated into the single packaged structure; the WSM2 unit is therefore a completely plug-and-play solution, minimising the time needed for handling and installation on site.

#### Compressors

Hermetic rotary scroll compressors, R410A refrigerant, fitted with timed crankcase heater (automatically deactivated when not needed) and a two-pole electric motor with direct starting, internally protected against excess temperature.

The compressors are housed in a condensing compartment, with the bottom surface designed to collect and drain water from defrosting, preventing ice from forming on the base.

#### Outdoor heat exchanger

Direct expansion outdoor coil for heat exchange between the refrigerant gas and the outside air, made from a coil of mechanically expanded copper tubes and corrugated aluminium.

For WSM2 reverse-cycle units, outdoor coil is equipped with a heater to prevent ice from forming after defrosting in winter operation.

#### Accessory: energy recovery from the exhaust air by thermodynamic heat transfer. (reference function AX-F)

Thermodynamic heat transfer allows efficient use of the remaining energy contained in the exhaust air, by forcing this through the outside section of the refrigerant circuit.

This consequently increases unit performance, allowing operation at a condensing/evaporating temperature that's more advantageous than the outside temperature, meaning lower power consumption and higher overall efficiency.

#### Accessory: refrigerant Booster heat exchanger (reference function HR-B)

Additional coil for heat exchange between the refrigerant gas and the exhaust air, made from a coil of mechanically expanded copper tubes and corrugated aluminium fins. The coil is installed at the air exhaust damper and is part of the main refrigerant circuit. In summer operation, this coil allows to increase the subcooling of the liquid by exploiting the favourable conditions of expelling air. In winter operation, on the other hand, the battery takes charge of part of the gas evaporation, relieving the work of external batteries, thus allowing the refrigeration circuit to work with the most advantageous disposal temperatures.

In cooling mode the booster coil is switched on whenever a compressor is working (also with a very low amount of exhaust air), while in heating mode, it operates if a compressor is working and exhaust damper is opened at least at a minimum.

#### Accessory: heat recovery with enthalpy wheel (reference function HR-E)

Energy recovery system on the exhaust air, made up of a high efficiency enthalpy wheel consisting of alternating flat and corrugated aluminium sheets, with hygroscopic treatment, so as to create a series of passageways in the opposing directions to the flows of fresh and exhaust air. The wheel is driven by an electric motor at constant speed with very low power consumption.

Both sensible and latent energy is recovered: this limits the introduction of moisture into the room during summer and increases humidity in winter.

The recovery module with the enthalpy wheel is supplied already assembled with the rooftop unit, thus commissioning time and cost are reduced. Additional filters are fitted to protect the heat exchanger from excessive fouling: in particular, class G4 filters are installed in the exhaust and fresh air flow.

#### Refrigerant circuit

The unit has one refrigerant circuit comprising, in addition to the above:

- R410A refrigerant charge
- filter-drier
- liquid flow indicator
- bi-directional electronic thermostatic expansion valve
- charge and pressure control valves
- low pressure safety valve
- high pressure switch
- double high pressure safety valve (protects the unit against explosion in the event of fire)
- non-return valve
- four-way reversing valve
- liquid receivers at condenser outlet

#### Air handling Plug fans

Supply plug fans with brushless EC motors. Three-dimensional profiled blades made of high performance composite material, optimized to enhance efficiency and reduce noise. EC brushless electric motor, directly coupled with electronic speed adjustment for the precise and continuous regulation of the air flow rate.

### Outdoor fans

Electronically commutated axial fans (EC fans).

The brushless motor, governed by a special controller, continuously adjust fans speed. In this way energy consumption is reduced and current's absorption during start-up phase is minimized, while air flow rate is adjusted continuously according to load and outdoor temperature.

### Exhaust air fan (Accessory)

If the unit is equipped with the accessory AX-F function, it is fitted with an EC fan, plug fan type (sizes 0052-0092) or axial (0102-0152) and a barometric relief damper, that are necessities to help discharge the exhaust air from the air-conditioned space, to balance the fresh air intake.

The exhaust air fan modulates its speed according to fresh air damper opening.

### Filtration

Pleated synthetic fibre pre-filter, grade isocoarse 50% (ISO 16890 - G4 EN779), 48 mm thick at the air inlet.

The filters are positioned on steel guides with easy access for routine maintenance and replacement.

Following system commissioning, the filters should be replaced to eliminate any trapped impurities.

### Accessory: return plug fan section

If the unit is fitted with CE, HR-B, or HR-E functions, similar EC plug fans (with integrated controller specifically calibrated for the fan) to those used on the supply air are fitted for the return air from the airconditioned space.

### Power and control electrical panel

Power and control electrical panel built in compliance with EN60204-1 and IEC204-1, complete with:

- Control circuit transformer
- Main door lock disconnect switch
- Power section with cables
- Fuses and contactors for compressors and fans
- Spring-loaded terminals on the control circuits
- Electrical panel for outdoor installation, with seal gaskets
- AIR3000+ microprocessor-based electronic controller
- Operator panel with LCD interface, protected from solar radiation by a painted galvanized steel panel
- Compressor crankcase heaters with timer

Unit power supply voltage: 400V~ ±10% - 50Hz.

Electric panel is supplied as standard with a flexible duct that connect supply air treatment side with the electric panel. In this way, electrical panel is cooled during summer and heated in winter time, reducing the problem of condensation on electrical device.

### AIR3000+ controller

The AIR3000+ controller offers advanced functions and algorithms. It is made up by two control boards, dedicated to the air side and the refrigerant side respectively. The keypad features functional controls and a complete LCD display that allows for the monitoring and intervention on the unit by means of a multi-level menu with selectable user's language.

It can be used to set the unit start-up and ambient washing function, as well as to set unit the operating mode (manual heating or cooling, automatic changeover).

Temperature control is based on proportional or proportional + integral logic using the return air temperature probe reading; the set point can also be adjusted based on the outside temperature, in both cooling and heating mode.

For units fitted with motorised outside air damper, the controller automatically manages free cooling operation based on the outside air temperature; optionally, free cooling can also be managed based on enthalpy.

As an option, constant air flow, variable air flow, constant pressure air control are available to manage the fans.

The controller can also integrate and automatically manage different optional heating devices (hot water coil, electric heater), hot gas post-heating (optional) and percentage of fresh air (optional via CO<sub>2</sub> or CO<sub>2</sub>+VOC probes or remote 4-20 mA signal).

Defrosts use proprietary self-adaptive logic involving monitoring of multiple operating and climate parameters.

This reduces the number and duration of defrosts, consequently increasing overall energy efficiency.

Compressor power consumption can be controlled using the demand limit function, while the unloading function is available for part-load refrigerant circuit operation in critical conditions.

Supervision is available with different options, using proprietary devices or by integration into third party systems using BACnet, BACnet over-IP, Modbus, Modbus over-IP, Echelon and Lon-Works protocols.

AIR3000+ control is available also with the new KIPLink (Keyboard In yourPocket) user interface (optional). Based on WiFi technology, it allows one to operate the unit directly from the smartphone or tablet. Using KIPLink, it is possible to turn the unit on and off, adjust the set-point, plot the main operating variables, monitor in detail the status of the refrigerant circuits, the compressors, the fans, dampers and display and reset the possible alarms.

Compatibility with remote keypad (management of up to 8 units). The timer can be used to create an operating profile with up to 4 typical days and 10 different time bands.

### Certification

Unit compliant with the following directives and amendments:

- Machinery directive 2006/42/EC.
- Electromagnetic compatibility directive 2014/30/EC.
- Pressure equipment directive 2014/68/EU
- Low voltage directive 2014/35/EC.
- 2011/65/EU RoHS Directive (As far as applicable)
- Gas appliances directive 2016/426/EU (As far as applicable)
- Regulation (EU) 2016/2281 (implementation of directive 2009/125/EC) second Tier (ErP 2021).
- Eurovent certification ([www.eurovent-certification.com](http://www.eurovent-certification.com)) - rooftop unit program (RT)

4.2 Functions

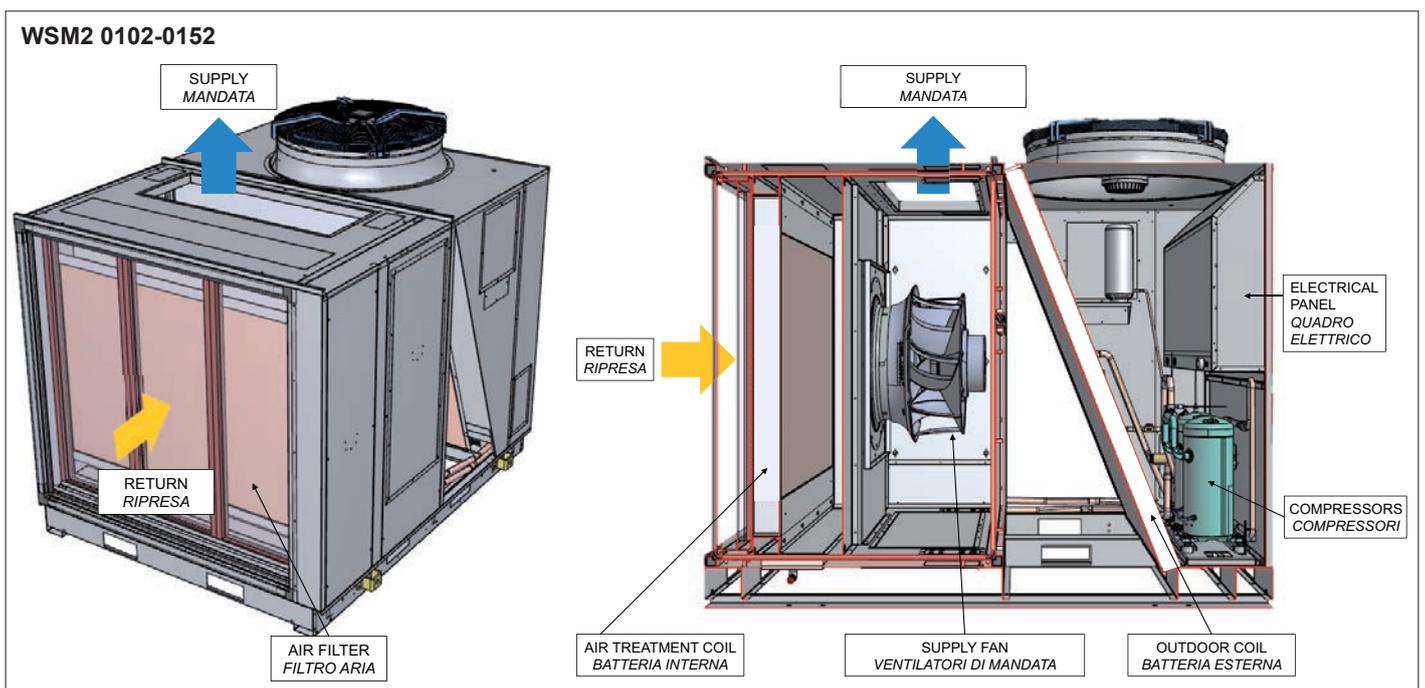
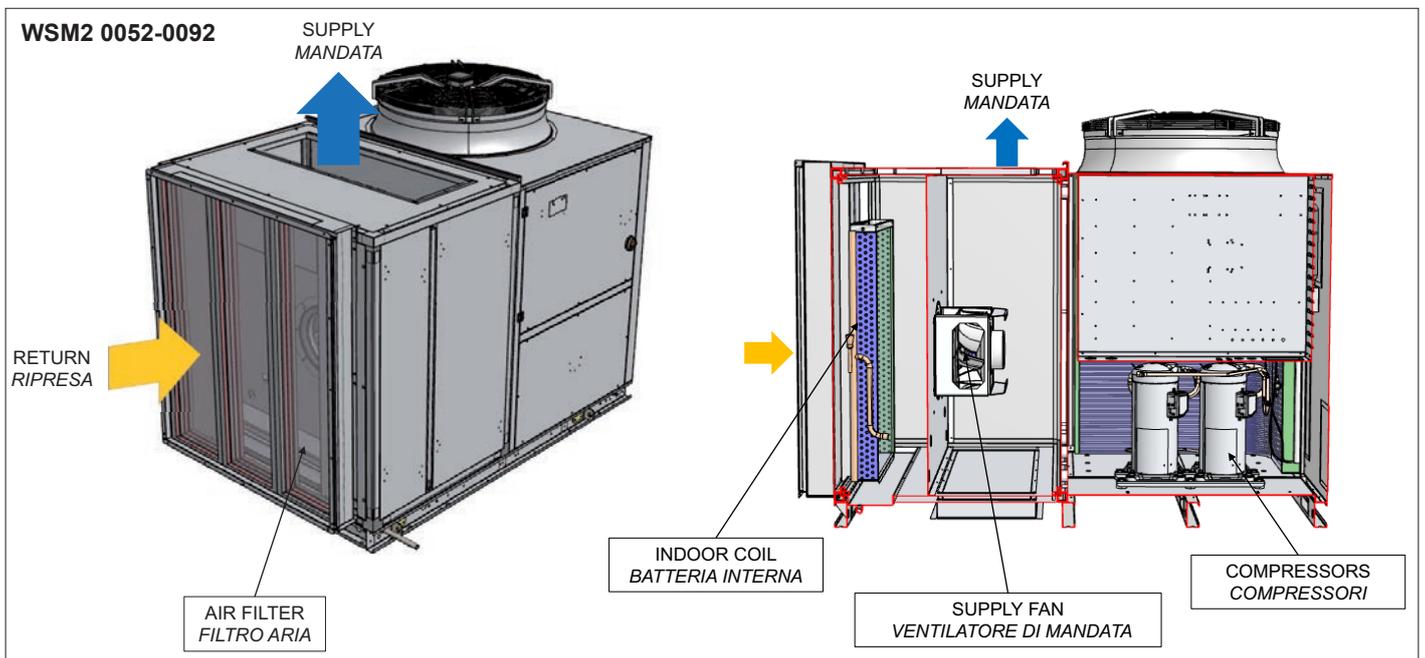
Function	Option code	Brief Description	0052	0062	0082	0092	0102	0122	0132	0152
AR	1071	AR function - Air recirculation (Basic unit)	x	x	x	x	x	x	x	x
MF	1072	Mixing and Free cooling (unit with economizer)	x	x	x	x	x	x	x	x
AX-F	1073A	Mixing and Free cooling (unit with economizer) + exhaust air fan and thermodynamic heat recovery	x	x	x	x	x	x	x	x
CE	1074A	Three dampers unit with EC return plug fan					x	x	x	x
HR-B	1075	Three dampers unit with EC return plug fan and heat recovery with refrigerant booster coil					x	x	x	x
HR-E	1079	Three dampers unit with EC return plug fan and heat recovery with enthalpic wheel					x	x	x	x

x = available

**AR function - Air recirculation (Basic unit)**

Unit developed for 100% recirculated air operation only. The unit extracts air from the ambient and inflows it back after air treatment using internal coil.

Ambient air expulsion and air renovation must be managed using systems that are separate from the rooftop unit.

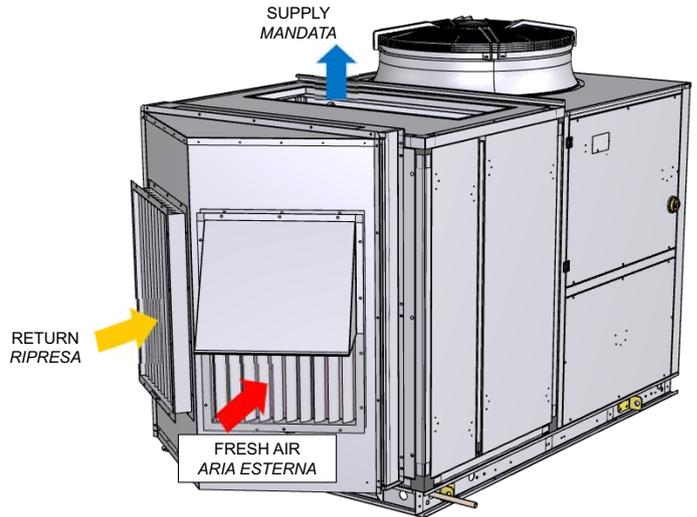
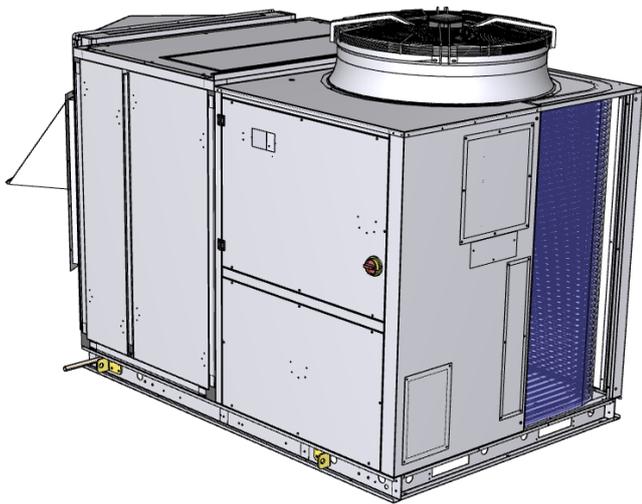


**Opt. 1072 - MF function - Mixing and Free cooling**

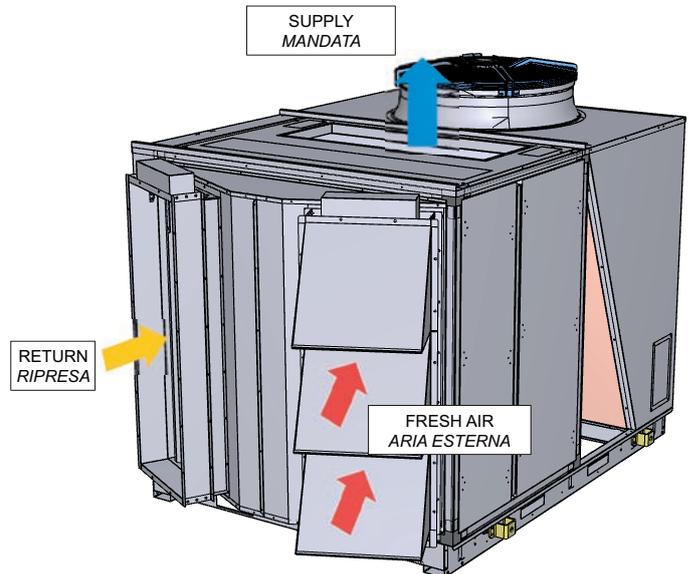
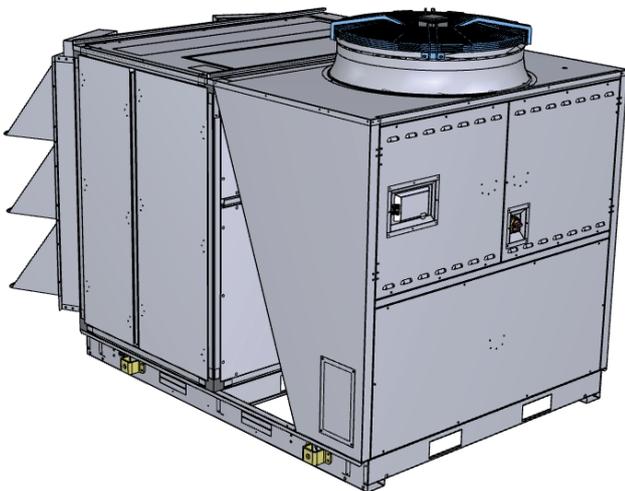
Compared to the basic version, the unit features two opposing motorised dampers managed by the unit's controller so as to allow operation with 100% recirculated air, mixtures and free cooling. This function allows the recirculated ambient air to be mixed with some fresh outside air, either at a fixed percentage set on the controller, or using an air quality probe (CO2 reading). Free cooling operation is managed by the controller, which opens the dampers so as to create a mixture of fresh outside air and recirculated air that requires less energy for the treatment,

depending on the outside temperature, indoor temperature and set point. During this function one or more cooling devices are disconnected, and are completely switched off with total free cooling operation. The supply fans guarantee rated air flow; ambient air expulsion must be managed using systems that are separate from the rooftop unit. This function should be chosen when the amount of fresh outside air to be introduced into the spaces is quite low, pressure drop in the return ducts is also low and the building is not particularly airtight (older constructions).

**WSM2 0052-0092**



**WSM2 0102-0152**



**Option 1073A - Function AX-F - Exhaust air fan + Heat Recovery Free (Mix and exhaust with heat recovery-free)**

Compared to the basic version, the unit features two opposing motorised dampers managed by the unit's controller so as to allow operation with 100% recirculated air, mixtures and free cooling.

This function allows the recirculated air taken from the rooms to be mixed with some fresh outside air, either at a fixed percentage set on the controller, or using an air quality probe (CO<sub>2</sub> reading). The allowed minimum value of fresh air cannot be lower than the 25% of the total airflow.

Free cooling operation is managed by the controller which opens the dampers, starting from a minimum ratio equal to the 25% of the total airflow and creating a mixture of fresh outside air and recirculated air that requires less energy to air-condition, based on the outside temperature, the indoor temperature and the set point.

According to the size, one or more exhaust axial fans are activated with this function, which disconnects together one or more sources until their complete exclusion in case of total Free cooling.

During the operation with all recirculated air, the exhaust axial fans are not activated and a barometric damper fitted on the exhaust air flow hermetically closes the expulsion.

When a portion of fresh outside air is required (allowed minimum value equal to the 25% of the total airflow, with lower values the unit will operate in all recirculation), the system composed by the barometric damper + the exhaust axial fans works by expelling the same portion of exhaust air. The balance of both the airflows avoids any internal over pressure in the served area.

Depending on the selected exhaust airflow, the exhaust axial fans could provide an external static pressure up to 150 Pa.

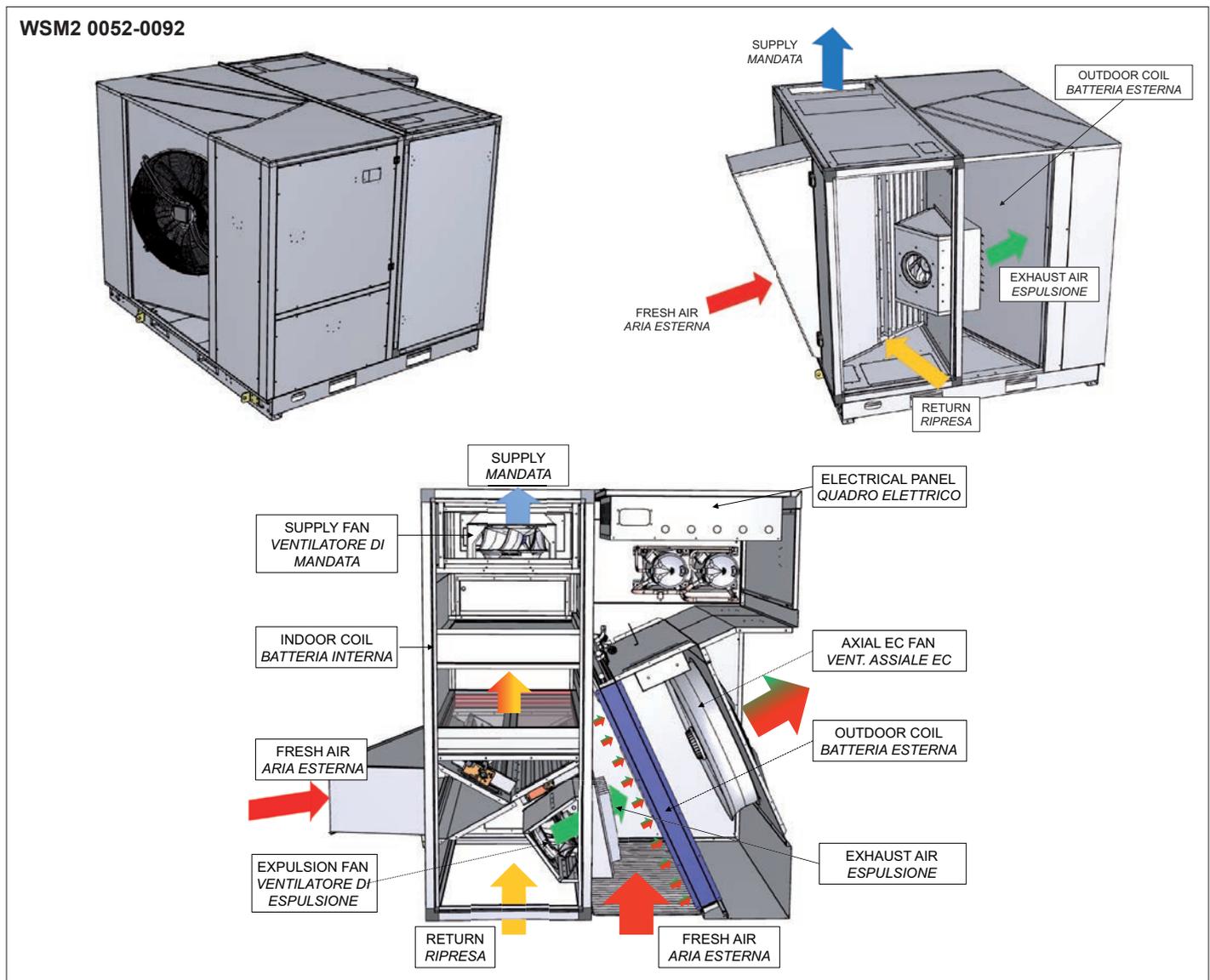
To maximize the energy efficiency, the exhaust fan(s) have brushless EC motor. The speed is adjusted continuously according to fresh air damper opening.

The supply fans guarantee the design flow-rate, and in the event of high outside air flow-rates (for example, during free cooling or free heating), they can also generate considerable overpressure in the room: in buildings with good air tightness, it is recommended to install an additional extraction system.

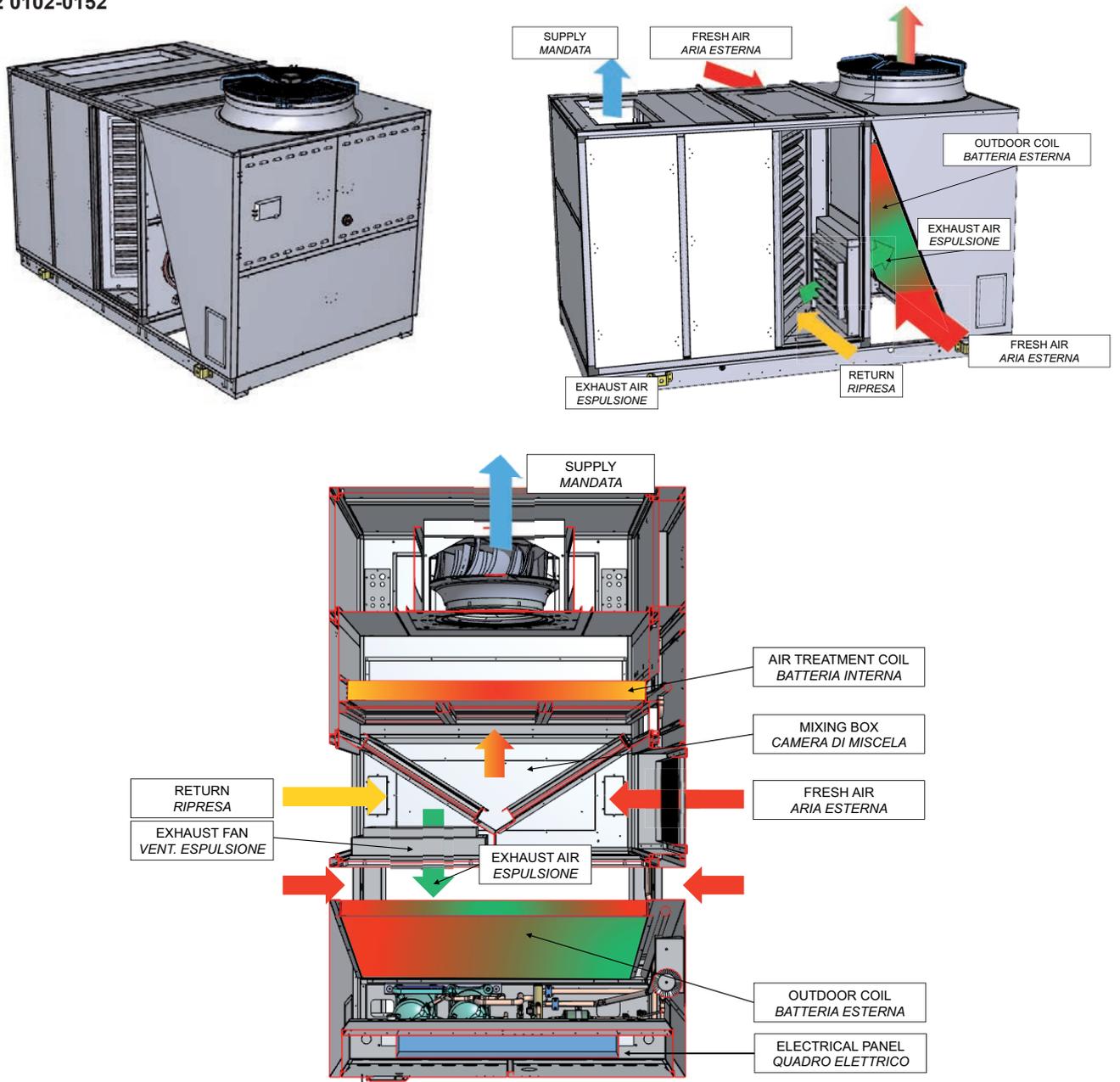
**Thermodynamic heat recovery:** it is achieved by deviating the exhaust air through the outdoor section of the refrigerant circuit; in this way, the air facing to the outdoor coil is milder than the surrounding one, granting a better working conditions to the cooling circuit (decreasing of the condensing temperature in cooling mode and increasing the evaporating temperature in heating mode).

In both cases, the result is an increasing of the cooling/heating capacity and a reduced power absorbed by compressor(s).

This type of unit finds application in all those environments of the small medium commercial, characterized by structures with medium air-tightness such as supermarkets, shops and service stations, allowing with a single unit to meet the building's thermal needs and renewal air.



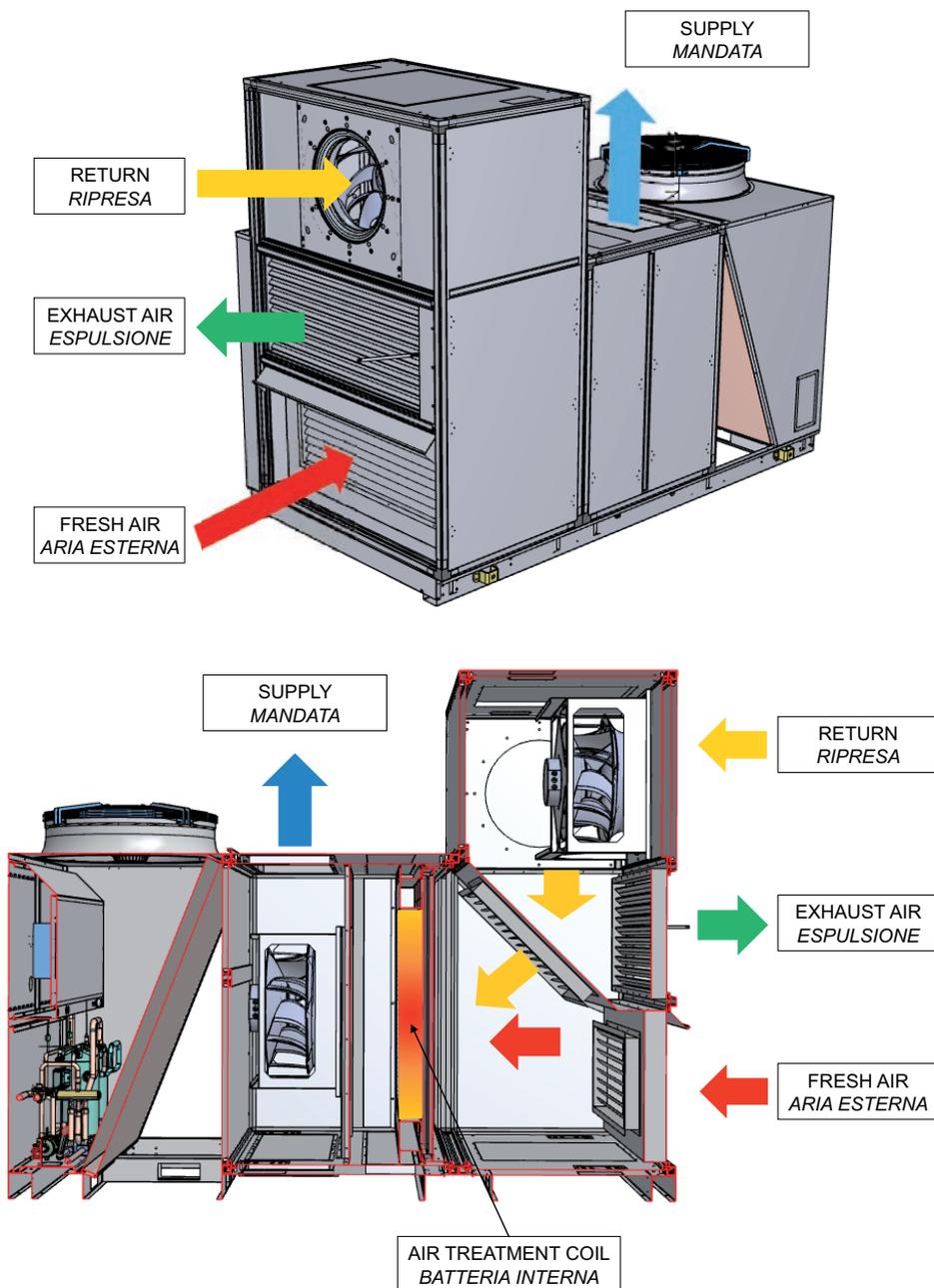
WSM2 0102-0152



**Opt. 1074A - CE function - Centrifugal extraction/expulsion**  
 Unit with three motorised dampers managed by the unit's controller for operation with 100% recirculated air, mixing, free cooling and air extraction/expulsion. This function allows the recirculated ambient air to be mixed with some fresh outside air, either at a fixed percentage set on the controller, or using an air quality probe (CO<sub>2</sub> reading).

Free cooling operation is managed by the controller, which opens the dampers so as to create a mixture of fresh outside air and recirculated air that requires less energy for the treatment, depending on the outside temperature, indoor temperature and set point. During this function one or more cooling devices are disconnected, and are completely switched off with total free cooling operation.

The supply fans guarantee rated air flow, the return fans (also EC plug fans) draw in air from air-conditioned rooms and discharge the excess exhaust air.

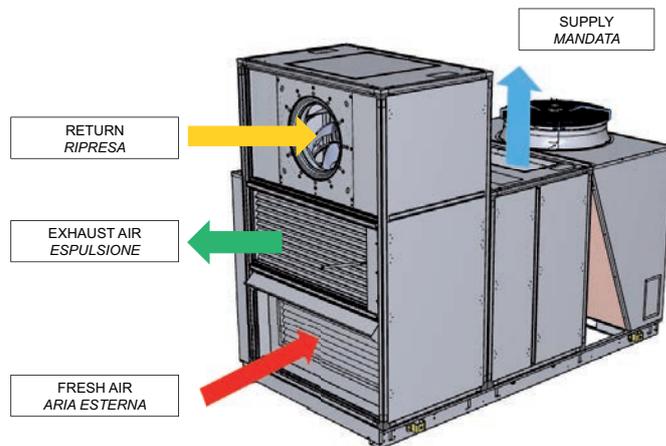


**Opt. 1075 - HR-B Function - Return air fan and Refrigerant Booster heat recovery**

The WSM2/HR-B units are fitted with the exclusive Refrigerant Booster heat recovery system, which completely recovers heat from the exhaust air.

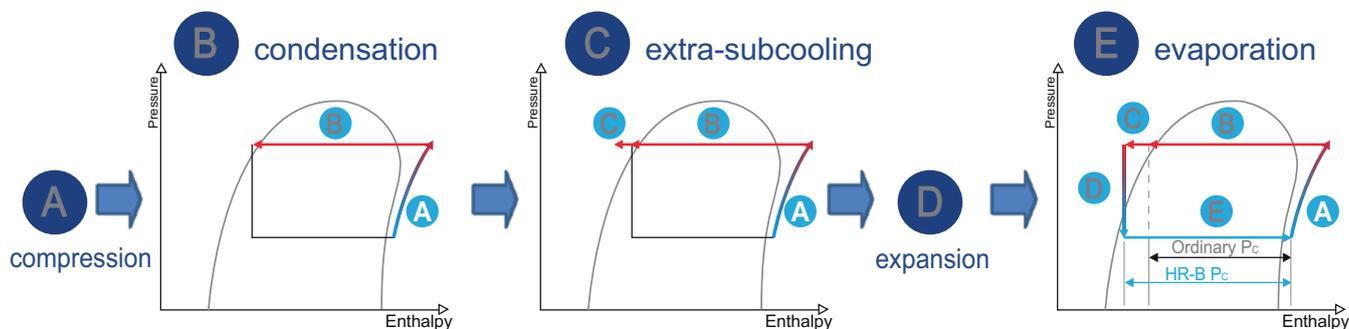
This recovered energy is transferred to the refrigerant circuit, which increases the capacity of the air handling coil without increasing compressor workload.

The recovery unit uses a finned coil installed at the air exhaust damper. The latter handles the entire air flow with uniform distribution.

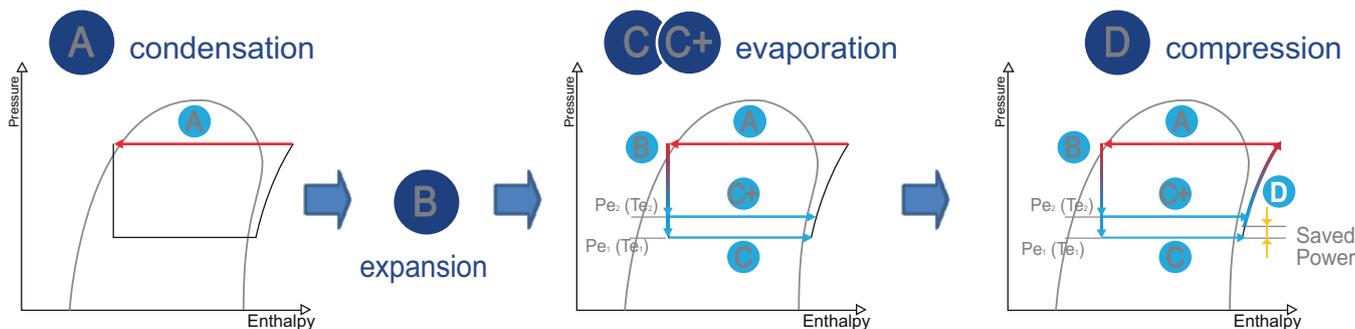


**Thermodynamic principle**

The refrigerant booster heat recovery system allows for the complete and precise recovery of the energy from the exhaust air. In cooling mode, the favourable conditions of the exhaust air can be exploited to increase liquid subcooling (C) and therefore increase the cooling capacity (Pc) of the unit (E).



In winter mode evaporation phase is divided between external and booster coil. The favourable conditions of the exhaust air can be exploited to evaporate a certain amount of refrigerant with an higher temperature (C+) and therefore increase unit efficiency.



**Benefits**

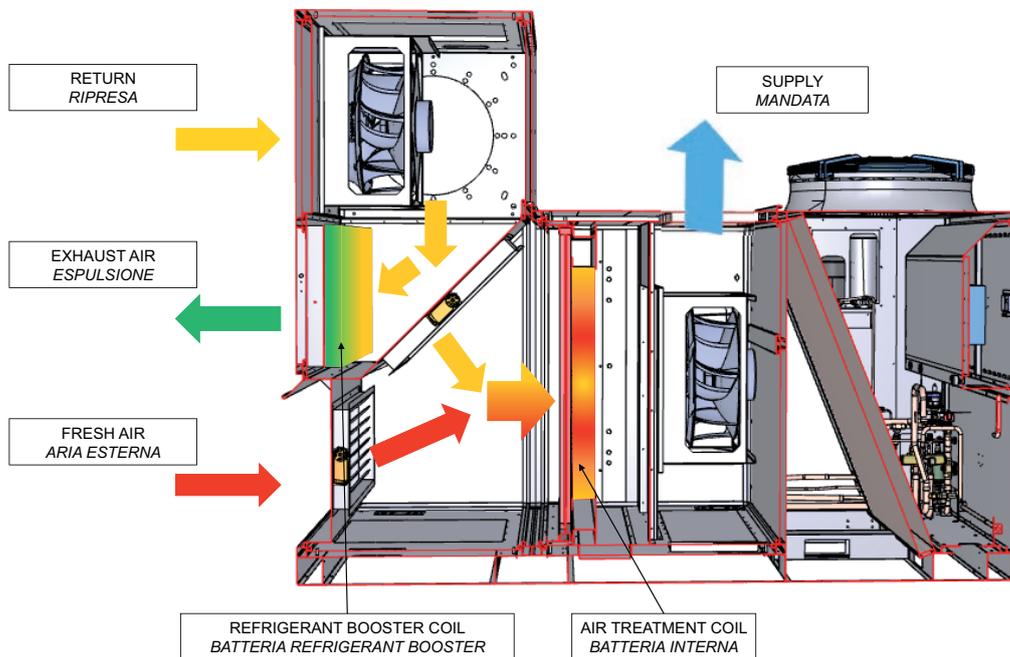
- Complete and precise recovery of the energy contained in the exhaust air, ensured by perfect distribution across the heat recovery coil without mixing with outside air.
- Increased cooling and heating capacity delivered by the entire unit.
- The additional heat exchanger coil in the refrigerant circuit means an overall reduction in compressor power consumption
- Complete separation of the air flows
- Additional air pressure drop is limited solely to the exhaust air flow.
- Ideal solution for Mediterranean climates with mild winters, as the energy in the exhaust air can also be exploited in conditions that traditional air/air heat recovery units would otherwise not allow.
- It starts to operate with a very low amount of exhaust air.

### Technical solution

Compared to the basic version (AR), the HR-B function features a mixing chamber with three dampers, a section containing the EC plug fans for the return air, and the Refrigerant Booster recovery coil located near the exhaust air damper.

The return air fans can overcome considerable pressure drop in the duct (even higher than 250 Pa) with high air flow-rates,

for precise control of overpressure in the air-conditioned space. This function is useful in new buildings with high air change requirements (such as cinemas, theatres, auditoriums, exhibition centres and shopping centres).

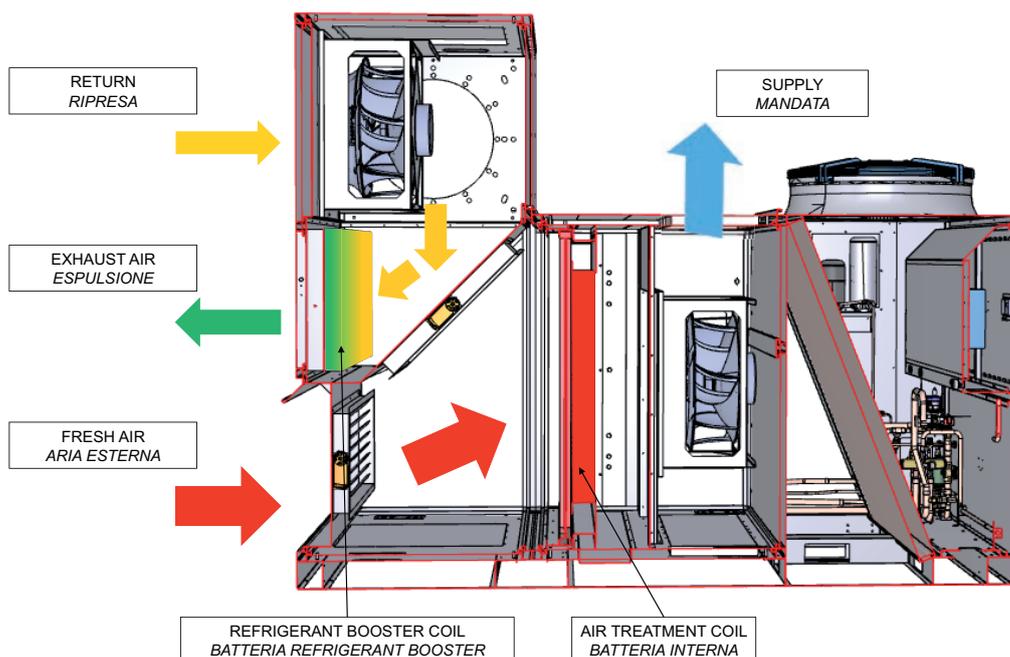


### Free cooling operation

The unit controller manages the opening of the dampers so as to create a mixture between fresh and recirculated air and save energy, based on the outside air temperature, room temperature and set point. In free cooling mode, the unit works by delivering 100% outside air into the room.

One or more cooling devices (compressors) are deactivated, and are completely switched off with free cooling operation only (i.e.

when the set point can be reached solely by the introduction of outside air into the room); vice-versa, if the outside air alone is not sufficient to reach the desired set point, the compressors are switched on. When operating, the refrigerant circuit continues to exploit the Refrigerant Booster effect, maximising efficiency and reducing compressor running time.



**Opt. 1079 - HR-E function - Return air fan and heat recovery with enthalpy wheel**

An enthalpy wheel is the most efficient form of heat recovery, with efficiency between 60% and 90% depending on operating conditions, allowing compliance with standards in force regarding energy savings.

The enthalpy wheel is made from an alternating sequence of flat and corrugated aluminium plates that create a very high heat exchange surface area in relation to the volume, achieving benefits also in terms of the space occupied inside the unit. The hygroscopic treatment that the aluminium plates undergo allows recovery of both latent heat and sensible heat, reducing the introduction of moisture in summer and minimising if not totally eliminating the need for humidifiers in winter, significantly increasing overall unit performance.

**Operating principle**

On a rotary heat recovery unit, heat exchange occurs through accumulation of heat in the wheel. Heat is transferred to the heat-absorbing material from the exhaust air in one half of the rotation. The heat is then given up to the fresh outside air in the other half of the rotation. As the wheel rotates, the parts that absorb and give up heat are continuously inverted.

The wheel is driven by a fixed-speed motor.

**Benefits:**

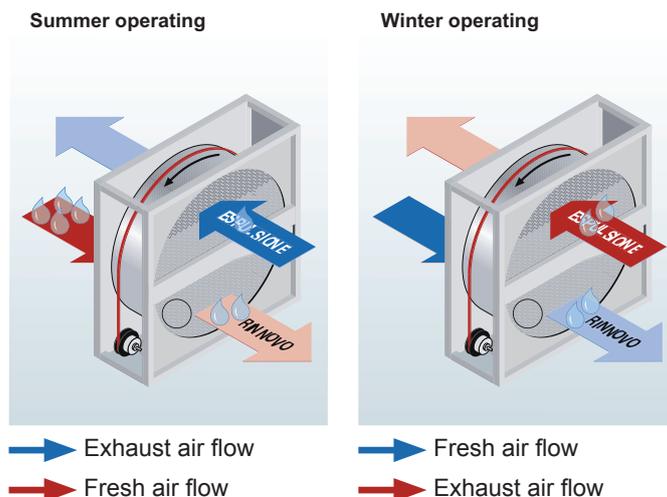
- High heat recovery efficiency
- Recovery of latent heat
- Optimum performance in extreme climates
- Extends unit operating limits
- Suitable for operation with high outside air flow-rates (even 100% in some sizes/versions)

**Technical solution**

Compared to the CE version, the HR-E function uses an enthalpy wheel to recover sensible and latent heat between the fresh outside air and exhaust air.

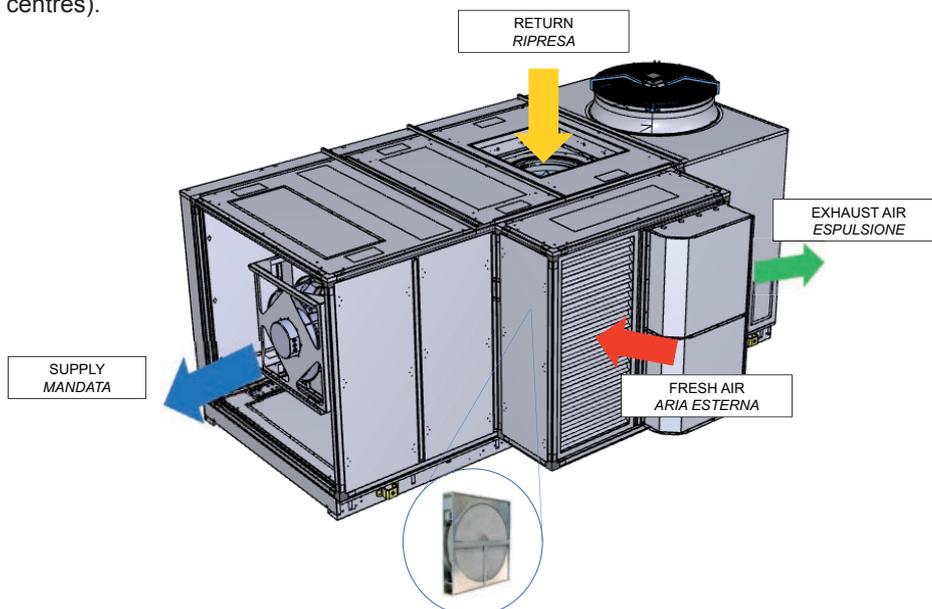
The heat recovery unit is installed inside the three-damper mixing chamber, located upstream of the air handling coil and that also contains the return fans (EC plug fans).

This function is useful in new buildings with high air change requirements (such as cinemas, theatres, auditoriums, exhibition centres and shopping centres).



Additional filters are fitted to protect the heat exchanger from excessive fouling: in particular, class G4 filters are installed in the outside and exhaust air flow.

The recovery module with the enthalpy wheel is supplied already assembled with the rooftop unit (only deflector has to be assembled on site).



### Free cooling operation

This function is enabled when the temperature or enthalpy (optional) conditions of the outside air allow.

The unit controller manages the opening of the dampers so as to create a mixture between fresh and recirculated air and save energy, based on the outside air temperature, room temperature and set point. In free cooling mode, the unit works by delivering 100% outside air into the room.

In this operating mode, the unit stops the enthalpy wheel, so as to avoid heat exchange with the exhaust air when this is not useful.

### 4.2 Remote keypad

The unit's display is located on the electrical panel door and is connected directly to the AIR3000+ controller.

The unit can also be connected to a remote keypad, choosing between different configurations.

Code C9261063. Remote keypad kit up to 200 m (K200), being the distance between the last unit and the remote keypad. The kit includes a second keypad/display and two "T" junction boards: one to be fitted near the controller, the other near the remote keypad.

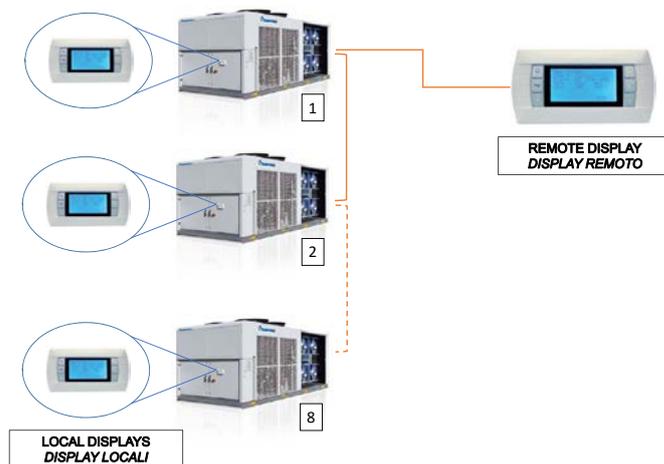
Code C9261064. Remote keypad kit up to 500 m (K500), being the distance between the last unit and the remote keypad. The kit includes a second keypad/display and two "T" junction boards: one to be fitted near the first controller in the LAN, the other near the remote keypad. The kit also includes an AC/DC power supply for the remote keypad, to be placed near the keypad.

The maximum length possible is 500 m.

The same remote keypad can display up to 8 rooftop units, exploiting the LAN connection between the units.

After having correctly completed the connections, the remote keypad can switch from interfacing to one unit to the next, following the procedure shown in the user manual.

One or more cooling devices (compressors) are deactivated, and are completely switched off with free cooling operation only (i.e. when the set point can be reached solely by the introduction of outside air into the room); vice-versa, if the outside air alone is not sufficient to reach the desired set point, the compressors are switched on.



**Option B901: Touch Room Thermostat - Air3000touch+**

It is an additional display to control rooftop unit, to be installed in the air-conditioned space.

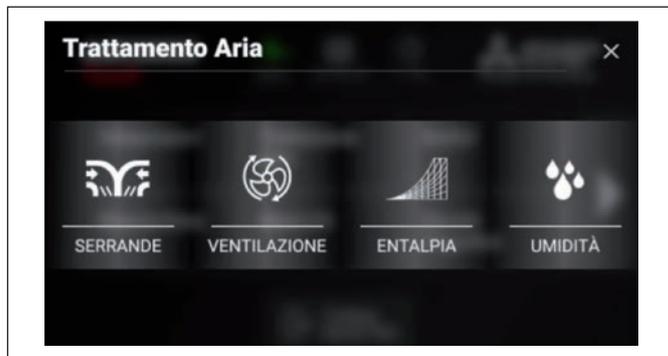
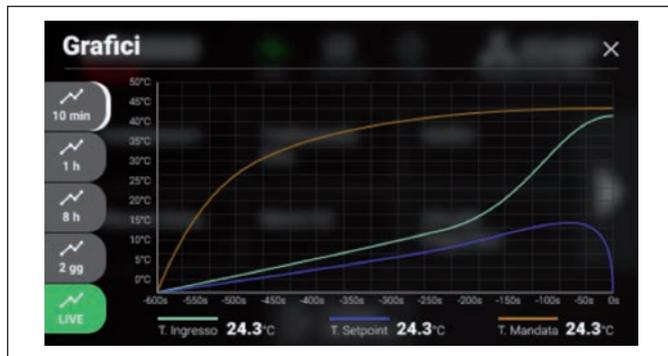
It reports all functions that are already available through the compact display fitted in the unit, adding:

- Ready to be installed inside the air conditioned space;
- Colour Touch screen 4,3" display;
- Temperature and humidity probes;
- User-friendly;
- It can be installed in a public space, since all menu is protected by a password;
- Multi-language menu.

AIR3000touch+ is connected to the rooftop unit via an AWG 20-22 cable (max distance 500m), and it is supplied loose together with the rooftop unit.

Power supply 24 Vdc comes as standard and the max distance between Air3000touch+ and the power supply is 300m.

The kit allows two possible installation: Wall surface mounted (with a wall box) or Wall mounted (flush-mounted wall installation).



**Option 1441: Kiplink - Air3000link+**

Based on the Wi-Fi technology, KIPLink allows to operate on the unit directly from his mobile device (smartphone, tablet, notebook) thanks to the MEHITS app.

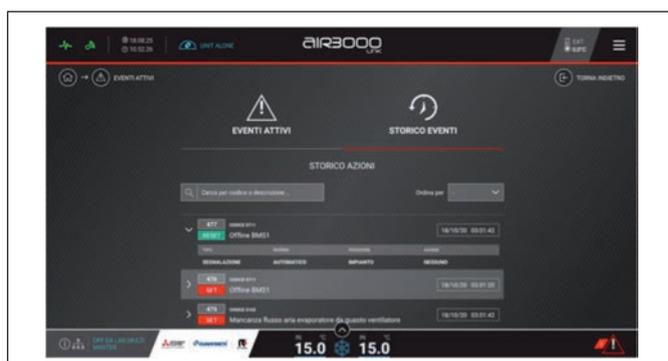
It allows Monitor each component while moving around the unit for maintenance, view and change all parameters with easy-to-understand screenshots and dedicated tooltips and Get devoted "help" message for alarm reset and trouble shooting.

It monitors the immediate labor status of the compressors, heat exchangers, cooling circuits, air dampers, CO<sub>2</sub> probes, etc..., and view the real-time graphs of the key operating variable trends.

It has a data logger function, allowing to:

- View the real-time graphs of the key operating variable trends
- Enhance diagnostics with data and graphs of 10 minutes before and after each alarm
- Download all the data for detailed analysis

It also possible to connect the Kiplink hardware via its ethernet port to LAN of the building, in order to monitor the unit from a LAN device (as a PC, laptop or mobile phone) with a simple web browser connected to the IP address of the Kiplink.



## 5. ACCESSORIES

CODE	ACCESSORY NAME	DESCRIPTION	ADVANTAGES
1062	Unit ErP 2021 Compliant	This indicates that the unit complies with the minimum seasonal energy efficiency requirements for space heating and cooling specified in EU regulation 2016/2281	The unit fully respect the compatibility directives required for the CE mark, including new efficiency limits in force since January 1st, 2021
2070	Supply air	The supply air flow direction can be chosen among lateral (right), from the bottom the rear or the top. Check compatibility with some accesories and functions on the table reported in this technical bulletin. The reference point is always referred by looking at the unit from the electrical panel	The installation of the unit and the ducts are significantly simplified.
2060	Return air	The return air flow direction can be chosen among lateral (left), from the bottom, the rear or the top. Check compatibility with some accesories and functions on the table reported in this technical bulletin. The reference point is always referred by looking at the unit from the electrical panel	The installation of the unit and the ducts are significantly simplified.
2411	Remote phase-sequence control	Relay for controlling the phasesequence of mains.	Protects loads against faults due to incorrect connection of the electric line.
3412	Automatic circuit breakers	Over-current switch on the major electrical loads.	In case of overcurrent allows resetting of the switch without the replacement of relative fuses.
3301	Power factor correction	Capacitors on the compressors' power inlet line. For the combination with option 1511 (soft start), contact the office.	The unit's average cos(phi) increases from an average value of 0,87 to a value (average) of 0,92. For unit size 0052 it's not available, while for unit size 0092-0102 it's not necessary since cos(phi) is greater than 0,92.
4181	ModBUS connectivity	Interface module for ModBUS protocols	Allows integration with BMS operating with ModBUS protocol
4182	Echelon connectivity	Interface module for Echelon systems	Allows integration with BMS operating with LonWorks protocol
4184	BACnet connectivity	Interface module for BACnet protocols	Allows integration with BMS operating with BACnet protocol
4185	BACnet OVER IP connectivity	Interface module for BACnet OVER-IP protocols	Allows to interconnect BACnet devices over Internet protocol within wide-area networks
4188	Modbus TCP/IP connectivity	Interface module for Modbus OVER-IP protocols	Allows to interconnect Modbus devices over Internet protocol within wide-area networks
865	EC Axial Outdoor fans	Electronically commutated fans (EC fans). The brushless motor, governed by a special controller, continuously adjust fans' speed.	Reduced energy consumption and minimized current's absorption during start-up phase. The noise reduces proportionally to the unit's partialization.
1511	Soft start	Electronic device adopted to manage the inrush current. For the combination with option 3301 (compressor phase-shifting) contact the office.	Break down of the inrush current compared to the direct motor start, lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting, favourable sizing for the electrical system.
B481	Public spaces safety pack	The package includes some accessories to detect the presence of smoke inside the unit. Among other things, they comply with the French ERP regulation. The accessories included are: - D.A.D. (NF S 61961 certified) - Smoke detector (NF S 61961 certified) - Spring return dampers (if foreseen by the chosen function of the unit) - smoke alarm management according to ERP standard - If there are electric heaters, they will be equipped with an automatic reset thermostat set at 90 ° C and a manual reset thermostat set at 120 ° C.	It's necessary to satisfy the specifications required by the ERP regulation (établissements recevant du public)
B830	Fans blade material	It is possible to choose the type of material of the supply or supply and return fans blades (if present)	It's necessary to satisfy the specifications required by the ERP regulation (établissements recevant du public)

CODE	ACCESSORY NAME	DESCRIPTION	ADVANTAGES
4250	Supply fan uprated motor	Increment of the motor electrical power of the supply fans	Increment of the static available pressure at the supply fans outlet
1861	Constant air flow regulation + Vair	The unit can manage the air flow set point, both on supply and return, according to the actual load of the resources.	The reduction of the air flow according to the actual load of the system allows to achieve considerable savings and to increase the efficiency.
1862	Constant air flow regulation	Air fan speed is regulated in order to maintain constant air flow value.	As pressure drop varies, the fans adjust the speed so as to maintain flow-rate at the design value for the system, regardless of how dirty the filters are. We recommend to select this option together with Filters differential pressure switch.
1863	Constant pressure regulation	Air fan speed is regulated in order to maintain constant static available pressure value.	Fan speed is controlled in such a way as to maintain a constant available static pressure in the system's air distribution plenum. This is useful for variable air volume (VAV) air distribution systems.
1864	Fixed speed 0-10V	Air fan speed is maintained constant at a fixed value set on display	The fan speed can be set directly in the controller in order to reduce start up procedure.
4411	Supply fans double set point	It is possible to choose a second supply fan set point value, different from that normally set and choose with whom to work via a digital input (set point = could be a fixed air flow or a static pressure or a fixed speed, according to what has been chosen among options 1862-1863-1864). This option is not available with Vair option (1861)	
4413	Supply fans continuous set point variation	Supply fan set point variation is managed through analog input; the set point varies between a minimum and a maximum values previously fixed via unit display (set point = could be a fixed air flow or a static pressure, according to what has been chosen among options 1862-1863-1864). This option is not available with Vair option (1861)	
4141	CO <sub>2</sub> air quality probe	Used to manage air quality inside the building. The signal is processed by the control unit in order to adjust the external air intake	Automatic management of the fresh air flow-rate allows outside air to be handled only when needed, guaranteeing compliance with relevant standards and occupant comfort.
4142	External forcing 4-20 mA	Remote forcing with 4-20 mA signal to manage the dampers for air renewal	
4143	CO <sub>2</sub> +VOC air quality probe	Probe for managing the air quality inside the building. The signal processed by the controller allows you to adjust the flow of fresh air. The probe allows to measure both the concentration of CO <sub>2</sub> (therefore indirectly the crowding of the environment) and the pollution generated by volatile organic compounds, the cause of the so-called indoor pollution: the higher value between the two commands the opening of the external air shutter .	Automatic management of the fresh air flow-rate allows outside air to be handled only when needed, guaranteeing compliance with relevant standards and occupant comfort.
B851	AKN Sanitizing system	It is a sanitizing system that allows a photocatalytic oxidation process, thanks to the combination of: - a special UV-C lamp - a catalyst honeycomb structure with titanium dioxide (TiO <sub>2</sub> ). - The natural water vapor contained in the air (relative humidity greater than 20%)	The process generates ions: hydroxyl radical (-OH) and hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> ) in quantities not exceeding 0.02 PPM, that released into the air flow allow a particularly effective action in the reduction of the microbial load airborne (such as bacteria, molds, allergens, odors, organic and volatile compounds, ultra-fine powders). Moreover, the ions transported by the air are then deposited in the air-conditioned space, contributing to the sanitization of the surfaces with which they come into contact (Active system)
B861 ÷ B864	Prefilters	In the standard units there is a 55% isocorse class filter (ISO 16890 - G4 according to EN779). Pre-filters of different efficiency are available (M6 and F7 according to EN779)	It guarantees a pre-filtering of the air in order to reduce fouling of the high efficiency filter.
2525	High efficiency panel filters, ePM10-75% (ISO16890) - M6 (EN779)	Available in addition to standard filters, they are classified as ePM10-75% (ISO16890) - M6 (EN779) efficiency, made of fibreglass paper and are Class 1 fire resistant. The large inspection panels and steel guides make them easy to remove for cleaning or replacement.	Mounted on the treatment coil inlet, they ensure that the air effectively introduced into the room is filtered.

CODE	ACCESSORY NAME	DESCRIPTION	ADVANTAGES
2526	High efficiency panel filters, ePM01-50% (ISO16890) - F7 (EN779)	Available in addition to standard filters, they are classified as ePM01-50% (ISO16890) - F7 (EN779) efficiency, made of fibreglass paper and are Class 1 fire resistant. The large inspection panels and steel guides make them easy to remove for cleaning or replacement.	Mounted on the treatment coil inlet, they ensure that the air effectively introduced into the room is filtered.
2527	High efficiency panel filters, ePM01-70% (ISO16890) - F8 (EN779)	Available in addition to standard filters, they are classified as ePM01-70% (ISO16890) - F8 (EN779) efficiency, made of fibreglass paper and are Class 1 fire resistant. The large inspection panels and steel guides make them easy to remove for cleaning or replacement.	Mounted on the treatment coil inlet, they ensure that the air effectively introduced into the room is filtered.
2528	High efficiency plate filters, ePM01-80% (ISO16890) - F9 (EN779)	Available in addition to standard filters, they are classified as ePM01-80% (ISO16890) - F9 (EN779) efficiency, made of fibreglass paper and are Class 1 fire resistant. The large inspection panels and steel guides make them easy to remove for cleaning or replacement.	Mounted on the treatment coil inlet, they ensure that the air effectively introduced into the room is filtered.
1852	Filters differential pressure switch	Differential air pressure switch to detect filters' obstruction, with warning	
1461	Hot gas coil with ON/OFF management	Condensing finned coil, installed downstream the treatment coil, fed by hot gas coming from the compressor's supply, with on-off management. For a correct functioning, this option has to be chosen with option dehumidification (opt. 4133-4135-4137)	The hot gas post-heating adjusts supply air temperature during dehumidification phases.
1466	Electric heater management	Option for Electric heater management, that are placed after direct expansion coil. For electric heater capacities, refer to 1312 ÷ 1318.	The electrical heating coil is a heating source which can be used as integration in heat pump working. Furthermore it can be used during defrosting cycles.
1467	2 Rows Water (heating) coil	Water heating coil installed after the internal treatment coil	The coil can be used as a heating source or as integration in heat pump working. Antifreeze function trough opening of the three way valve.
1468	3 Rows Water (heating) coil	Water heating coil installed after the internal treatment coil	The coil can be used as a heating source or as integration in heat pump working. Antifreeze function trough opening of the three way valve.
1341	2 way valve V2V	Modulating mixing valve installed downstream the water heating coil, with modulating drive. This option can be chosen only with water heating coil (opt. 1467 or 1468)	
1342	3 way valve V3V	Modulating mixing valve installed close to the water heating coil, with modulating drive. This option can be chosen only with water heating coil (opt. 1467 or 1468)	
1345	Water coil control continuous signal	It's a continuous signal from controller to manage an external water valve actuator that controls hot water coil flow. This option can be chosen only with water heating coil (opt. 1467 or 1468)	
1312 ÷ 1318	Electrical heating coil	Electrical heater installed after the internal treatment coil. This option can be chosen only with electric heater management (opt. 1466)	The electrical heating coil is a heating source which can be used as integration in heat pump working. Furthermore it can be used during defrosting cycles.
4131	Ambient humidity probe	Probe to measure relative humidity percentage in the ambient, intalled on the return	
4132	Enthalpic Free cooling	Function managed by temperature and humidity probes, installed in a position allowing them to check and compare the energy status of both the ambient and the external air. The control manages the opening/closing of the dampers in order to exploit more favourable external conditions.	During Free cooling functioning, the resources are progressively disconnected, till complete switch off, keeping the required termo-hygrometric ambient condition, thanks to the external favourable conditions

CODE	ACCESSORY NAME	DESCRIPTION	ADVANTAGES
4133	Dehumidification	Thanks to a humidity probe, this function reduces during cooling mode the excess of humidity of the indoor air	Enthalpic control to maintain the ambient humidity to wellbeing values. It's recommended to use hot resource to post-heating supply air temperature during dehumidification phases.
4134	Signal for humidifier	The unit provides a signal for driving a humidifier, thanks to the reading of the humidity probe placed on reurn side.	It increases humidity in the air conditioned space. It acts only in heating mode. Contact the headquarter for special execution For unit size 0052-0092 this option is not possibile with Kiplink (opt. 1441)
4309A	Continuous signal for humidifier control	The unit provides an analogic signal for driving a humidifier, thanks to the reading of the humidity probe placed on reurn side.	It increases humidity in the air conditioned space. It acts only in heating mode. Contact the headquarter for special execution. For unit size 0052-0092 this option is not possibile with Kiplink (opt. 1441)
881	Cu/Cu condensing coils	Air-refrigerant heat exchanger with copper fins and tubes.	Recommended for applications in corrosive atmospheres
883	Condensing coils with epoxy-coated fins	Painted air-refrigerant heat exchanger.	Recommended for applications in medium level pollution atmospheres.
884	Condensing coils with Electrofin treatment	The outdoor coil is trated with a factory-applied electro-deposition coating process that guarantees complete heat exchanger coverage	Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.
895	Condensing coils with Fin Guard Silver treatment	Air-refrigerant heat exchanger with epoxidic treatment on coils and fins.	Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.
2032	Welded mesh protection coil	Welded mesh protection coil	These grills protect outside coil and part of the refrigerant circuit against the intrusion of solid bodies with medium large dimensions.
971	Cu/Cu internal coil	Internal air treatment coil with copper fins and tubes. Remark: this accessory is applied only to the main air treatment coil; please contact the headquarter if you need the same accessory applied ot other optional coils (such as hot gas coil or hot water coil).	Recommended for applications in corrosive atmospheres
974	Internal coil with Fin Guard Silver treatment	Internal air treatment coil with epoxidic treatment on coils and fins. Remark: this accessory is applied only to the main air treatment coil; please contact the headquarter if you need the same accessory applied to other optional coils (such as hot gas coil or hot water coil).	Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.
975	Internal coil with prepainted fins	Internal air treatment coil with prepainted fins. Remark: this accessory is applied only to the main air treatment coil; please contact the headquarter if you need the same accessory applied to other optional coils (such as hot gas coil or hot water coil).	Recommended for applications in medium level pollution atmospheres.
976	Internal coil with Electrofin treatment	The indoor coil is trated with a factory-applied electro-deposition coating process that guarantees complete heat exchanger coverage. Remark: this accessory is applied only to the main air treatment coil; please contact the headquarter if you need the same accessory applied to other optional coils (such as hot gas coil or hot water coil).	Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.
1441	Kiplink + compact Keyboard	The unit is supplied with the Compact keyboard, with LCD display and buttons. In addition, there is KIPLink, the innovative user interface based on WiFi technology, which also allows you to reach the unit via LAN.	It is possible to control the unit in real time through the mehits app, within the Wi-Fi range or through the building's LAN network.
B901	Display AIR 3000 TOUCH+ 4,3" (Display 4,3" supplied loose)	It is an additional display to control rooftop unit, to be installed in the air-conditioned space. It reports all functions that are already available through the compact display fitted in the unit, adding: - Ready to be installed inside the air conditioned space - Colour Touch screen 4,3" display - Temperature and humidity probes - User-friendly - It can be installed in a public space, since all menu is protected by a password - Multi-language menu	It's supplied loose together with the rooftop unit.

CODE	ACCESSORY NAME	DESCRIPTION	ADVANTAGES
3433	Leakage detection system	An alarm appears on the unit display and via the serial bus if the gas charge drops by more than 20% compared to the original charge set in the factory. The detection takes place by measuring the unit overheat and the degree of opening of the electronic thermostatic valve.	This accessory allows to detect refrigerant leakage that may occurs in any part of the refrigerant circuit. It's necessary to have opt. 1922 (electronic expansion valve)
381	Numbered wiring on electric board	During the execution of the electrical panel, in addition to identifying the individual inputs and outputs, electric cables are labeled for easier recognition.	Increase the usability of the electrical panel during maintenance.
382	PWR wirings according to UK request	Power cables with coloring according to the U.K. standards.	
3591	Fans operating signal	Auxiliary contacts providing a voltage free signal	Allows remote signalling of fans' activation or remote control of any auxiliary loads.
3601	Compressors' on/off signal	Auxiliary contacts providing a voltage free signal	Allows remote signalling of compressor's activation or remote control of any auxiliary loads.
4121	Forced shut down	Digital inlet to switch off the unit from remote	
4161	Remote summer winter switch	Digital inlet to switch the unit operating mode from cooling to heating and viceversa	
4162	Automatic summer/winter switch	The unit changes its operating mode from cooling to heating according to outdoor and indoor air temperature	
6171	Input remote demand limit	Digital input (voltage free) to enable demand limit function	It permits to limit the unit's power absorption for safety reasons or in temporary situation.
4111	Remote forcing for air extraction	Digital input that manage the closing of the recirculation damper, the opening of the outlet and inlet dampers, the switching off of the compressors and the start of the supply and return fans. Not available for AR, MF and AX/AX-F function	Digital input for extraction of the air in case of smoke, with alarm.
4172	Remote room washing	Digital input for the complete renewal of air in the empty room. Extraction and expulsion of the ambient air, introduction of renewal external air with switched off compressors. Not available for AR, MF and AX/AX-F function	Renewal of ambient air when the room has not been used for a long time or whenever all the ambient air requires rapid changing.
4173	Washing and running up	Function to be activated when the room is empty, first washing of the air in the room and then start-up in total air recirculation. Not available for AR, MF and AX/AX-F function	
4381	Full fresh air	This digital input allows to work full fresh air. Not available for AR function.	
4391	Total recirculation	This digital input allows to work in total recirculation. Not available for AR function.	
7001	Only fan mode auxiliary input	Digital input that allows to work in ventilation only (neither the hot resources or the compressors are switched on)	
4442	Double set point return temperature	It is possible to choose a second temperature set point value, different from that normally set and choose with whom to work via a digital input	
4444	Continuous set point return temperature	Return temperature set point variation is managed through analog input; the set point varies between a minimum and a maximum values previously fixed via unit display	
4271	Ambient air probe	Return air temperature probe supplied loose for ambient installation	
4272	Return air probe	Return air temperature probe supplied loose for return duct installation	
2101	Rubber anti vibration device	Devices to reduce vibrations to unit's support. Not available for HR-E function	
9966	Nylon packing	In addition to standard packing (opt. 9970), all the rooftop unit is wrapped with a nylon layer	
9970	Standard packing	The unit is supplied with plastic infills on the delivery and return of the treated air. Also lifting eye-plates are supplied as standard.	

<b>CODE</b>	<b>ACCESSORY NAME</b>	<b>DESCRIPTION</b>	<b>ADVANTAGES</b>
9979	Container packing	In addition to nylon packing (opt. 9966), with container packing the unit is provided with handling devices to load it on a container (metal slides, front handling bar).	
9996	Container slides	In addition to standard packing (opt. 9970), the unit is provided with handling devices to load it on a container (metal slides, front handling bar).	

## 6. GENERAL TECHNICAL SPECIFICATIONS

WSM2 /AR - Standard unit										
SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>Cooling (Gross Value)</b>										
Cooling capacity	(1)	kW	15,8	18,0	20,9	27,4	33,2	37,3	42,9	46,7
Sensible capacity	(1)	kW	11,8	14,2	16,9	22,0	28,6	32,5	37,3	40,8
Total power consumption	(1)	kW	4,8	5,9	7,0	10,1	10,6	12,8	15,1	16,2
EER	(1)	-	3,30	3,00	3,00	2,70	3,13	2,91	2,84	2,88
<b>Heating (Gross Value)</b>										
Heating capacity	(2)	kW	15,9	18,9	22,2	27,7	32,5	36,9	41,8	46,7
Total power consumption	(2)	kW	5,4	5,7	6,4	9,4	9,9	11,2	12,4	13,4
COP	(2)	-	2,90	3,30	3,50	3,00	3,28	3,29	3,37	3,49
<b>Supply fans</b>										
Type			Radial fan (plug fan)							
			EC motor with built-in controller							
Number		n°	1	1	1	1	1	1	1	1
Supply air flow-rate		m³/h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250	250	250	250	250
<b>Outdoor fans</b>										
Type			Axial EC fan φ 800mm							
Number		n°	1	1	1	1	1	1	1	1
External air flow-rate		m³/h	14500	15500	16000	15000	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95	1,95	1,95	1,95	1,95
<b>Compressors</b>										
No. compressors		n°	2	2	2	2	2	2	2	2
No. Circuits		n°	1	1	1	1	1	1	1	1
Number of capacity		n°	2	2	2	2	2	2	2	2
Refrigerant charge	(8)	kg	2	3	4	5	8	9	10	11
Refrigerant			R410A							
<b>Sound power</b>										
Global - Heating	(4)	dB(A)	76	79	78	80	80	81	85	85
Global - Cooling	(4)	dB(A)	76	79	78	80	79	79	83	83
<b>Weights and dimensions</b>										
Length		mm	2.055				2.000			
Width		mm	1.355				1.600			
Height		mm	1.640				1.837			
Standard unit operating weight	(5)	kg	520	540	570	590	700	730	730	740

**Notes:**

(1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 0%.

(2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 0%.

(3) ESP for standard configuration (optional accessories not included/calculated).

(4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World

(5) Unit in standard configuration/execution, without optional accessories.

(8) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label

## GENERAL TECHNICAL SPECIFICATIONS

WSM2 /MF										
SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>Cooling (Gross Value)</b>										
Cooling capacity	(1)	kW	16,9	19,3	22,3	29,3	35,6	39,8	45,8	49,7
Sensible capacity	(1)	kW	12,0	14,4	17,2	22,2	29,4	33,3	38,2	41,7
Total power consumption	(1)	kW	4,8	6,0	7,1	10,2	10,6	13,0	15,3	16,4
EER	(1)	-	3,50	3,20	3,20	2,90	3,36	3,06	2,99	3,03
<b>Heating (Gross Value)</b>										
Heating capacity	(2)	kW	16,1	19,1	22,4	28,0	32,9	36,8	41,7	47,3
Total power consumption	(2)	kW	5,0	5,3	6,0	8,8	9,4	10,5	11,7	12,7
COP	(2)	-	3,20	3,60	3,70	3,20	3,51	3,50	3,56	3,72
<b>Supply fans</b>										
Type			Radial fan (plug fan)							
			EC motor with built-in controller							
Number		n°	1	1	1	1	1	1	1	1
Supply air flow-rate		m³/h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250	250	250	250	250
<b>Outdoor fans</b>										
Type			Axial EC fan φ 800mm							
Number		n°	1	1	1	1	1	1	1	1
External air flow-rate		m³/h	14500	15500	16000	15000	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95	1,95	1,95	1,95	1,95
<b>Compressors</b>										
No. compressors		n°	2	2	2	2	2	2	2	2
No. Circuits		n°	1	1	1	1	1	1	1	1
Number of capacity		n°	2	2	2	2	2	2	2	2
Refrigerant charge	(8)	kg	2	3	4	5	8	9	10	11
Refrigerant			R410A							
<b>Sound power</b>										
Global - Heating	(4)	dB(A)	76	76	78	80	80	81	85	85
Global - Cooling	(4)	dB(A)	76	76	78	80	79	79	83	83
<b>Weights and dimensions</b>										
Length	(7)	mm	2.430				2.380			
Width		mm	1.355				1.600			
Height		mm	1.640				1.837			
Standard unit operating weight	(5)	kg	550	570	600	620	760	790	790	800

**Notes:**

(1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 30%.

(2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 30%.

(3) ESP for standard configuration (optional accessories not included/calculated).

(4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World.

(5) The weight shown refers to the unit including any accessory batteries.

(7) The dimension does not include hoods and the thickness of the pre-filter for fresh air if present.

(8) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label.

## GENERAL TECHNICAL SPECIFICATIONS

WSM2 /AX-F										
SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>Cooling (Gross Value)</b>										
Cooling capacity	(1)	kW	17,2	19,6	22,7	29,9	36,2	40,6	46,7	50,9
Sensible capacity	(1)	kW	12	14,4	17,3	22,3	29,6	33,6	38,6	42,2
Total power consumption	(1)	kW	4,92	6,17	7,26	10,4	10,8	13,2	15,6	16,7
EER	(1)	-	3,5	3,2	3,1	2,9	3,35	3,08	2,99	3,05
<b>Heating (Gross Value)</b>										
Heating capacity	(2)	kW	16,3	19,5	22,9	28,7	33,7	37,7	42,9	49,1
Total power consumption	(2)	kW	5,13	5,45	6,3	9,14	9,62	10,9	12,1	13,3
COP	(2)	-	3,2	3,6	3,6	3,1	3,5	3,46	3,55	3,69
<b>Supply fans</b>										
Type			Radial fan (plug fan)							
			EC motor with built-in controller							
Number		n°	1	1	1	1	1	1	1	1
Supply air flow-rate		m³/h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250	250	250	250	250
<b>Outdoor fans</b>										
Type			Axial EC fan φ 800mm							
Number		n°	1	1	1	1	1	1	1	1
External air flow-rate		m³/h	14500	15500	16000	15000	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95	1,95	1,95	1,95	1,95
<b>Compressors</b>										
No. compressors		n°	2	2	2	2	2	2	2	2
No. Circuits		n°	1	1	1	1	1	1	1	1
Number of capacity		n°	2	2	2	2	2	2	2	2
Refrigerant charge	(8)	kg	2	3	4	5	8	9	9	10
Refrigerant			R410A							
<b>Exhaust fan(s)</b>										
Type			Radial fan (plug fan)				Axial fan			
			EC motor with built-in controller							
Number		n°	1	1	1	1	1	1	1	1
Exhaust air flow rate		m³/h	875	1.225	1.575	1.925	2.205	2.555	2.940	3.325
Available external static pressure	(3)	Pa	370	370	370	370	123	145	160	164
<b>Sound power</b>										
Global - Heating	(4)	dB(A)	81	82	82	84	82	84	87	88
Global - Cooling	(4)	dB(A)	81	82	82	84	81	83	86	87
<b>Weights and dimensions</b>										
Length		mm	2.000				2.670			
Width	(7)	mm	1.755				1.600			
Height		mm	1.595				1.837			
Standard unit operating weight	(5)	kg	570	590	610	630	830	860	860	870

**Notes:**

- (1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 35%.
- (2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 35%.
- (3) ESP for standard configuration (optional accessories not included/calculated).
- (4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World.
- (5) Unit in standard configuration/execution, without optional accessories.
- (7) The dimension does not include hoods and the thickness of the pre-filter for fresh air if present.
- (8) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label

## GENERAL TECHNICAL SPECIFICATIONS

WSM2 /CE						
SIZE			0102	0122	0132	0152
<b>Cooling (Gross Value)</b>						
Cooling capacity	(1)	kW	35,6	39,8	45,8	49,7
Sensible capacity	(1)	kW	29,4	33,3	38,2	41,7
Total power consumption	(1)	kW	10,6	13,0	15,3	16,4
EER	(1)	-	3,36	3,06	2,99	3,03
<b>Heating (Gross Value)</b>						
Heating capacity	(2)	kW	32,9	36,8	41,7	47,3
Total power consumption	(2)	kW	9,4	10,5	11,7	12,7
COP	(2)	-	3,51	3,50	3,56	3,72
<b>Supply fans</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Supply air flow-rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Outdoor fans</b>						
Type			Axial EC φ 800mm			
Number		n°	1	1	1	1
External air flow-rate		m³/h	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95
<b>Compressors</b>						
No. compressors		n°	2	2	2	2
No. Circuits		n°	1	1	1	1
Number of capacity		n°	2	2	2	2
Refrigerant charge	(8)	kg	8	9	9	10
Refrigerant			R410A			
<b>Return fan(s)</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Exhaust air flow rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Sound power</b>						
Global - Heating	(4)	dB(A)	80	81	85	85
Global - Cooling	(4)	dB(A)	79	79	83	83
<b>Weights and dimensions</b>						
Length		mm	2.960			
Width	(7)	mm	1.600			
Height		mm	2.396			
Standard unit operating weight	(5)	kg	1.040	1.070	1.070	1.090

**Notes:**

- (1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 30%.
- (2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 30%.
- (3) ESP for standard configuration (optional accessories not included/calculated).
- (4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World.
- (5) Unit in standard configuration/execution, without optional accessories.
- (7) The dimension does not include hoods and the thickness of the pre-filter for fresh air if present.
- (8) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label

## GENERAL TECHNICAL SPECIFICATIONS

<b>WSM2 /HR-B</b>						
<b>SIZE</b>			<b>0102</b>	<b>0122</b>	<b>0132</b>	<b>0152</b>
<b>Cooling (Gross Value)</b>						
<b>Cooling capacity</b>	(1)	<b>kW</b>	<b>38,9</b>	<b>43,6</b>	<b>50,1</b>	<b>54,6</b>
Sensible capacity	(1)	kW	30,9	35,1	40,3	44,0
Total power consumption	(1)	kW	11,4	13,9	16,5	17,3
EER	(1)	-	3,41	3,14	3,04	3,16
<b>Heating (Gross Value)</b>						
<b>Heating capacity</b>	(2)	<b>kW</b>	<b>36,2</b>	<b>40,5</b>	<b>46,1</b>	<b>52,5</b>
Total power consumption	(2)	kW	10,5	11,9	13,4	14,3
COP	(2)	-	3,44	3,39	3,43	3,68
<b>Supply fans</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Supply air flow-rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Outdoor fans</b>						
Type			Axial EC fan φ 800mm			
Number		n°	1	1	1	1
External air flow-rate		m³/h	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95
<b>Compressors</b>						
No. compressors		n°	2	2	2	2
No. Circuits		n°	1	1	1	1
Number of capacity		n°	2	2	2	2
Refrigerant charge	(8)	kg	15	16	18	19
Refrigerant			R410A			
<b>Return fan(s)</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Exhaust air flow rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Sound power</b>						
Global - Heating	(4)	dB(A)	80	81	85	85
Global - Cooling	(4)	dB(A)	79	79	83	83
<b>Weights and dimensions</b>						
Length		mm	2.960			
Width	(7)	mm	1.600			
Height		mm	2.396			
Standard unit operating weight	(5)	kg	1.050	1.090	1.090	1.100

**Notes:**

- (1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 30%.
- (2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 30%.
- (3) ESP for standard configuration (optional accessories not included/calculated).
- (4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World.
- (5) Unit in standard configuration/execution, without optional accessories.
- (7) The dimension does not include hoods and the thickness of the pre-filter for fresh air if present.
- (8) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label

## GENERAL TECHNICAL SPECIFICATIONS

WSM2 /HR-E						
SIZE			0102	0122	0132	0152
<b>Cooling (Gross Value)</b>						
Cooling capacity	(1)	kW	44,9	50,5	57,7	63,0
Sensible capacity	(1)	kW	32,4	36,9	42,2	46,3
Total power consumption	(1)	kW	11,6	14,1	16,7	17,6
EER	(1)	-	3,87	3,58	3,46	3,58
<b>Heating (Gross Value)</b>						
Heating capacity	(2)	kW	40,6	46,0	52,2	58,4
Total power consumption	(2)	kW	10,8	12,2	13,8	14,5
COP	(2)	-	3,77	3,76	3,79	4,02
<b>Supply fans</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Supply air flow-rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Outdoor fans</b>						
Type			Axial EC fan φ 800mm			
Number		n°	1	1	1	1
External air flow-rate		m³/h	21000	21000	21000	21000
Nominal installed power		kW	1,95	1,95	1,95	1,95
<b>Compressors</b>						
No. compressors		n°	2	2	2	2
No. Circuits		n°	1	1	1	1
Number of capacity		n°	2	2	2	2
Refrigerant charge	(7)	kg	8	9	9	10
Refrigerant			R410A			
<b>Return fan(s)</b>						
Type			Radial fan (plug fan)			
			EC motor with built-in controller			
Number		n°	1	1	1	1
Exhaust air flow rate		m³/h	6.300	7.300	8.400	9.500
Available external static pressure	(3)	Pa	250	250	250	250
<b>Sound power</b>						
Global - Heating	(4)	dB(A)	80	81	85	85
Global - Cooling	(4)	dB(A)	79	79	83	83
<b>Weights and dimensions</b>						
Length		mm	3.600			
Width	(7)	mm	2.400			
Height		mm	1.837			
Standard unit operating weight	(5)	kg	1.210	1.240	1.240	1.250

**Notes:**

- (1) Cooling: Outdoor 35°C 50% R.H. / Indoor 27°C 47% R.H. / Mix 30%.
- (2) Heating: Outdoor 7°C 87% R.H. / Indoor 20°C 50% R.H. / Mix 30%.
- (3) ESP for standard configuration (optional accessories not included/calculated).
- (4) Sound power on the basis of measurements made in compliance with ISO 3744. For complete sound data consult Elca World.
- (5) Unit in standard configuration/execution, without optional accessories.
- (7) The refrigerant charge is the result of a theoretical calculation and could be different from the actual amount of refrigerant which is charged in the unit and on the label

**TECHNICAL DATA SEASONAL EFFICIENCY IN HEATING (EN14825:2018 VALUE) - WSM2**

SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>WEATHER CONDITIONS - AVERAGE (1)</b>										
Definition	Symbol									
Air flow		m <sup>3</sup> /h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Design heating load	P <sub>design,h</sub>	kW	13,0	15,4	17,8	22,6	24,6	28,1	31,7	35,2
Reference design temperature	T <sub>design,h</sub>	°C	-10,0	-10,0	-10,0	-10,0	-10,0	-10,0	-10,0	-10,0
Bivalent temperature	T <sub>biv</sub>	°C	-5,5	-5,5	-5,5	-5,5	-6,0	-6,0	-6,0	-6,0
Seasonal coefficient of performance	SCOP		3,63	3,53	3,59	3,52	3,69	3,68	3,64	3,68
Seasonal space heating energy efficiency	η <sub>s,h</sub>	%	142,20	138,20	140,60	137,80	144,60	144,20	142,60	144,20

(1) Indoor conditions: 20°C d.b. - 15°C w.b.  
Type of calculation with fixed flow

**TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (EN14825:2018 VALUE) - WSM2**

SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>WEATHER CONDITIONS - AVERAGE (2)</b>										
Definition	Symbol									
Air flow		m <sup>3</sup> /h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Design cooling load	P <sub>design,c</sub>	kW	15,8	18,1	21,0	27,6	33,7	37,9	43,5	47,7
Reference design temperature	T <sub>design,c</sub>	°C	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0
Seasonal coefficient of performance	SEER		4,46	4,19	4,34	4,07	4,89	4,33	4,14	4,27
Seasonal space cooling energy efficiency	η <sub>s,c</sub>	%	175,40	164,60	170,60	159,80	192,60	170,20	162,60	167,80

(2) Indoor conditions: 27°C d.b. - 19°C w.b.  
Type of calculation with fixed flow

**TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (EN14825:2018 VALUE) - WSM2-T**

SIZE			0052	0062	0082	0092	0102	0122	0132	0152
<b>WEATHER CONDITIONS - AVERAGE (2)</b>										
Definition	Symbol									
Air flow		m <sup>3</sup> /h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Design cooling load	P <sub>design,c</sub>	kW	15,9	18,2	21,1	27,7	33,7	37,9	43,5	47,7
Reference design temperature	T <sub>design,c</sub>	°C	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0
Seasonal coefficient of performance	SEER		4,47	4,2	4,38	4,12	4,89	4,33	4,14	4,27
Seasonal space cooling energy efficiency	η <sub>s,c</sub>	%	175,80	165,00	172,20	161,80	192,60	170,20	162,60	167,80

(2) Indoor conditions: 27°C d.b. - 19°C w.b.  
Type of calculation with fixed flow

**GLOBAL SEASONAL EFFICIENCY (EU 2016:2281) - WSM2**

SIZE		0052	0062	0082	0092	0102	0122	0132	0152
ErP Tier Achieved (Cooling & Heating)	ErP Tier	2021	2021	2021	2021	2021	2021	2021	2021

**GLOBAL SEASONAL EFFICIENCY (EU 2016:2281) - WSM2-T**

SIZE		0052	0062	0082	0092	0102	0122	0132	0152
ErP Tier Achieved (Cooling & Heating)	ErP Tier	2021	2021	2021	2021	2021	2021	2021	2021

## EUROVENT CERTIFICATION PROGRAM

MEHITS S.p.A., in order to ensure greater transparency in relation to its rooftop units, has chosen have the performance of its units certified by a third party, Eurovent Certita Certification, a body recognised both in Europe and internationally ([www.eurovent-certification.com](http://www.eurovent-certification.com)).

The performance values certified in the third-party laboratory are declared in accordance with the following regulations:

**EN 14511** “Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling”. (2018 update)

**EN 14825** “Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling. Testing and rating at part-load conditions and calculation of seasonal performance” (2018 update)

**EN 12102** “Air conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors for space heating and cooling - Measurement of airborne noise – Determination of the sound power level”.

The main certified values are shown below.

<b>WSM2</b>									
<b>SIZE</b>		<b>0052</b>	<b>0062</b>	<b>0082</b>	<b>0092</b>	<b>0102</b>	<b>0122</b>	<b>0132</b>	<b>0152</b>
Nominal airflow rate (indoor)	m <sup>3</sup> /h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
External Static Pressure	Pa	50	50	62	62	150	150	150	200
Cooling capacity (EN14511)	kW	15,8	18,1	21,0	27,6	33,7	37,9	43,5	47,7
EER (EN 14511)		3,48	3,22	3,20	2,87	3,42	3,16	3,08	3,18
Seasonal Energy Efficiency (cooling) according to EN14825, η <sub>s,c</sub>		175,40	164,60	170,60	159,80	192,60	170,20	162,60	167,80
SEER Class		B	B	B	B	A	B	B	B
Heating capacity (EN14511)	kW	16,1	18,9	22,1	27,6	32,0	36,3	41,1	45,7
COP (EN 14511)		3,42	3,55	3,71	3,10	3,48	3,50	3,58	3,72
Seasonal Energy Efficiency (heating) according to EN14825, η <sub>s,h</sub>		142,20	138,20	140,60	137,80	144,60	144,20	142,60	144,20
SCOP Class		A	B	B	B	A	A	A	A
Sound power level (LWO - environment)	dB(A)	76	79	78	80	79	79	83	83
Sound power level (LWI - duct)	dB(A)	76	84	79	84	77	81	86	82

<b>WSM2-T</b>									
<b>SIZE</b>		<b>0052</b>	<b>0062</b>	<b>0082</b>	<b>0092</b>	<b>0102</b>	<b>0122</b>	<b>0132</b>	<b>0152</b>
Nominal airflow rate (indoor)	m <sup>3</sup> /h	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
External Static Pressure	Pa	100	100	124	124	150	150	150	200
Cooling capacity (EN14511)	kW	15,90	18,20	21,10	27,70	33,70	37,90	43,50	47,70
Energy Efficiency Ratio (EN14511)		3,49	3,24	3,23	2,89	3,42	3,16	3,08	3,18
Seasonal Energy Efficiency (cooling) according to EN14825, η <sub>s,c</sub>		175,80	165,00	172,20	161,80	192,60	170,20	162,60	167,80
SEER Class		B	B	B	B	A	B	B	B
Sound power level (LWO - environment)	dB(A)	76	79	78	80	79	79	83	83
Sound power level (LWI - duct)	dB(A)	76	85	80	84	77	81	86	82

Check ongoing validity of certificate and data update on: [www.eurovent-certification.com](http://www.eurovent-certification.com)

COMBINATION ACCESSORIES

WSM2 0052÷0092																	
ACCESSORIES CONFIGURATION				SUPPLY (*)						RETURN (*)							
Function	Accessories		Possible?	DIRECTION	TOP	RIGHT	LEFT	FRONT	REAR	BOTTOM	TOP	RIGHT	LEFT	FRONT	REAR	BOTTOM	
	List price code	Description		LIST PRICE CODE	2075	2076	2077	2079	2073	2072	2067	2062	2065	2066	2061	2063	
AR	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	NO	NO	OK	OK	OK	NO	NO	OK	NO	NO	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
MF	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	NO	NO	OK	OK	OK	OK	NO	NO	OK	OK	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
AX-F	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	NO	OK	NO	NO	OK	OK	NO	NO	OK	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															

WSM2 0102÷0152																	
ACCESSORIES CONFIGURATION				SUPPLY (*)						RETURN (*)							
Function	Accessories		Possible?	DIRECTION	TOP	RIGHT	LEFT	FRONT	REAR	BOTTOM	TOP	RIGHT	LEFT	FRONT	REAR	BOTTOM	
	List price code	Description		LIST PRICE CODE	2075	2076	2077	2079	2073	2072	2067	2062	2065	2066	2061	2063	
AR	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	NO	OK	NO	NO	NO	NO	OK	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
MF	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	NO	OK	OK	OK	OK	NO	NO	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
AX-F	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	OK	OK	NO	OK	OK	NO	NO	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
CE	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	NO	OK	OK	OK	OK	NO	OK	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
HR-B	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	NO	OK	OK	OK	OK	NO	OK	NO	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															
HR-E	1467	HOT WATER COIL 2 ROWS	ONLY ONE		OK	OK	OK	NO	OK	OK	OK	OK	NO	NO	NO	OK	
	1468	HOT WATER COIL 3 ROWS															
	1466 + EL. HEATER POWER CODE	ELECTRIC HEATER															
	1461	HOT GAS COIL															

(\*): Air flow directions point of view is in front of the electric board

OK = Possible  
NO = Not possible

**SUPPLY FAN(S) (For all functions)**

Size		0052	0062	0082	0092	0102	0122	0132	0152
Minimum air flow	[m <sup>3</sup> /h]	2.000	2.800	3.600	4.400	5.000	5.800	6.700	7.600
Nominal air flow	[m <sup>3</sup> /h]	2.500	3.500	4.500	5.500	6.300	7.300	8.400	9.500
Maximum air flow	[m <sup>3</sup> /h]	3.000	4.200	5.200	6.270	7.000	8.800	10.100	11.400

Option code	Type	SIZE	0052	0062	0082	0092	0102	0122	0132	0152
4250	EC PLUG FAN, standard	F.L.I.	1,2	1,2	1,5	1,5	2,0	2,0	3,7	3,5
		F.L.A.	9,0	9,0	9,0	9,0	3,0	3,0	5,6	5,4
	Number	Nr.	1	1	1	1	1	1	1	1
4251	EC PLUG FAN, higher rating (MM1)	F.L.I.	1,5	1,5	2,5	2,5	3,7	3,7	n.a.	n.a.
		F.L.A.	9,0	9,0	18,0	18,0	5,6	5,6	n.a.	n.a.
	Number	Nr.	1	1	1	1	1	1	n.a.	n.a.
4252	EC PLUG FAN, higher rating (MM2)	F.L.I.	-	-	-	-	5,4	5,4	5,4	5,4
		F.L.A.	-	-	-	-	8,6	8,6	8,6	8,6
	Number	Nr.	-	-	-	-	1	1	1	1

The electrical data shown are total values.

FLI Power consumption in max. admissible conditions. [kW]

FLA Current draw in max. admissible conditions. [A]

- = not available

Unit in the standard configuration, without accessories

Limit flow-rate to ensure a maximum coil flow-through speed of 2.7 m/s

For detailed specifications, consult Elca World

**EXTRACTION FAN(S) (For AX-F functions)**

Type	SIZE	0052	0062	0082	0092	0102	0122	0132	0152
Fan type		EC plug fan				EC axial fan			
Electrical data	F.L.I.	2,0				1,4			
	F.L.A.	3,3				1,9			
Nominal diameter fan	mm	250				450			
Number	Nr.	1				1			

The electrical data shown are total values.

FLI Power consumption in max. admissible conditions. [kW]

FLA Current draw in max. admissible conditions. [A]

Unit in the standard configuration, without accessories

For detailed specifications, consult Elca World

**RETURN FAN(S) (For CE, HR-B, HR-E functions)**

Size		0102	0122	0132	0152
Minimum air flow	[m <sup>3</sup> /h]	2.520	2.920	3.360	3.800
Nominal air flow	[m <sup>3</sup> /h]	6.300	7.300	8.400	9.500
Maximum air flow	[m <sup>3</sup> /h]	7.000	8.800	10.100	11.400

Option code	Type	SIZE	0102	0122	0132	0152
4250	EC PLUG FAN, standard	F.L.I.	2,0	2,0	2,0	2,0
		F.L.A.	3,0	3,0	3,0	3,0
	Number	Nr.	1	1	1	1
4251	EC PLUG FAN, higher rating (MM1)	F.L.I.	3,7	3,7	3,5	3,7
		F.L.A.	5,6	5,6	5,4	5,7
	Number	Nr.	1	1	1	1

The electrical data shown are total values.

FLI Power consumption in max. admissible conditions. [kW]

FLA Current draw in max. admissible conditions. [A]

n.a. = not available

Unit in the standard configuration, without accessories

Limit flow-rate to ensure a maximum coil flow-through speed of 2.7 m/s

For detailed specifications, consult Elca World

## ELECTRICAL DATA

AR and MF functions														
Size	Compressors			Supply fan(s)			Outdoor fan(s)			Auxiliary		Total		
	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	S.A.
		[kW]	[A]		[kW]	[A]		[kW]	[A]					
0052	2	7	13	1	1,15	1,90	1	1,95	3,30	0,50	1,25	10	19	51
0062	2	8	14	1	1,15	1,90	1	1,95	3,30	0,50	1,25	11	20	60
0082	2	9	16	1	1,50	2,40	1	1,95	3,30	0,50	1,25	13	23	57
0092	2	11	21	1	1,50	2,40	1	1,95	3,30	0,50	1,25	15	28	69
0102	2	12	22	1	1,96	3,00	1	1,95	3,30	0,50	1,25	17	30	86
0122	2	14	30	1	1,96	3,00	1	1,95	3,30	0,50	1,25	18	38	98
0132	2	17	29	1	3,65	5,60	1	1,95	3,30	0,50	1,25	23	39	125
0152	2	18	29	1	3,50	5,40	1	1,95	3,30	0,50	1,25	24	39	119

AX-F function																	
Size	Compressors			Supply fan(s)			Exhaust fan(s)			Outdoor fan(s)			Auxiliary		Total		
	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	S.A.
		[kW]	[A]		[kW]	[A]		[kW]	[A]		[kW]	[A]					
0052	2	7	13	1	1,15	1,90	1	0,44	1,93	1	1,95	3,30	0,50	1,25	11	21	53
0062	2	8	14	1	1,15	1,90	1	0,44	1,93	1	1,95	3,30	0,50	1,25	12	22	62
0082	2	9	16	1	1,50	2,40	1	0,44	1,93	1	1,95	3,30	0,50	1,25	13	25	59
0092	2	11	21	1	1,50	2,40	1	0,44	1,93	1	1,95	3,30	0,50	1,25	16	29	71
0102	2	12	22	1	1,96	3,00	1	1,40	1,90	1	1,95	3,30	0,50	1,25	18	31	88
0122	2	14	30	1	1,96	3,00	1	1,40	1,90	1	1,95	3,30	0,50	1,25	20	39	100
0132	2	17	29	1	3,65	5,60	1	1,40	1,90	1	1,95	3,30	0,50	1,25	24	41	127
0152	2	18	29	1	3,50	5,40	1	1,40	1,90	1	1,95	3,30	0,50	1,25	25	41	121

CE, HR-B & HR-E functions																		
Size	Compressors			Supply fan(s)			Return fan(s)			Outdoor fan(s)			Auxiliary		Total			
	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	No.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	S.A.	
		[kW]	[A]		[kW]	[A]		[kW]	[A]		[kW]	[A]						[kW]
0102	2	12	20	1	1,96	3,00	1	1,96	3,00	1	1,95	3,30	0,50	1,25	18	31	89	
0122	2	15	24	1	1,96	3,00	1	1,96	3,00	1	1,95	3,30	0,50	1,25	21	35	101	
0132	2	17	29	1	3,65	5,60	1	1,96	3,00	1	1,95	3,30	0,50	1,25	25	42	128	
0152	2	18	29	1	3,50	5,40	1	1,96	3,00	1	1,95	3,30	0,50	1,25	26	42	122	

## NOTE:

Data refer to standard unit

F.L.I. Absorbed power at max. permissible conditions

F.L.A. Absorbed current at max. permissible conditions

L.R.A. Compressor lock rotor current

S.A. Peak current of unit with standard motors

Electrical power input:

- 400/3/50 WITHOUT NEUTRAL

- Permissible voltage variation 10%

- Maximum unbalance between phase voltages 3%

## STANDARD COMPRESSORS

Size	Type	CIRCUIT 1				
		No.	Connection	F.L.I.	F.L.A.	L.R.A.
				[kW]	[A]	[A]
0052	scroll	2	tandem	3	7	45
0062	scroll	2	tandem	4	7	54
0082	scroll	2	tandem	4	8	50
0092	scroll	2	tandem	6	10	62
0102	scroll	2	tandem	6	11	78
0122	scroll	2	tandem	7	15	90
0132	scroll	2	tandem	8	14	115
0152	scroll	2	tandem	9	14	109

Electrical data refer to the individual component.

FLI Power consumption in max. admissible conditions.

FLA Current draw in max. admissible conditions.

LRA Locked rotor current

**HEATING WATER COIL (Accessory)**

Heating water coil performances (water 80 - 60 °C)

		SIZE	0052	0062	0082	0092	0102	0122	0132	0152
2-ROWS COIL (opt. 1467)	Airflow	[m³/h]	2500	3500	4500	5500	6300	7300	8400	9500
	Rated thermal power	[kW]	26,1	24,1	28,0	34,5	41,0	48,9	53,4	61,7
	Rated flowrate	[m³/h]	1,15	1,0	1,2	1,5	1,8	2,2	2,3	2,7
	Rated pressure drops water side	[kPa]	5	9	11	11	37	34	39	37
	Water contentent	[dm³]	3,4	3,4	3,4	4,3	5	6	7	8
3-ROWS COIL (opt. 1468)	Rated thermal power	[kW]	30,3	32,5	38,1	48,1	56,2	65,9	76,2	83,0
	Rated flowrate	[m³/h]	1,3	1,44	1,69	2,12	2,47	2,89	3,35	3,63
	Rated pressure drops water side	[kPa]	9	7	10	9	52	50	49	56
	Water contentent	[dm³]	5	5	5	6,4	8	9	10	12

Nominal heating capacity, entering air temperature 20°C, to the capacity indicated and IN/OUT water temperature 80/60°C

**INLET/OUTLET WATER CONNECTIONS SIDE**

FUNCTION	SIZES	
	0052÷0092	0102÷0152
AR	Rear	Left
MF	Rear	Left
AX-F	Right	Left
CE		Left
HR-B		Left
HR-E		Left

Remark: the reference is from the front of the electrical panel.

**THREE-WAY WATER VALVES (accessory)**

		SIZE	0052	0062	0082	0092	0102	0122	0132	0152
2-ROWS COIL	k <sub>vs</sub> valve	[m³/h]	4			6,3	4			
	DN - Nominal diameter	[mm]	15			20	15			
3-ROWS COIL	k <sub>vs</sub> valve	[m³/h]	6,3			10	4			6,3
	DN - Nominal diameter	[mm]	20			25	15			20
Type of actuator			0-10 V proportional control (managed by AIR3000+ controller)							
Type of valve connection			Threaded connections							

**ELECTRICAL HEATING COIL (Accessory)**

Combinations units / electrical heating coil

ELECTRICAL HEATING COIL	Thermal power [kW]	Absorbed current [A]	SIZES & POWER STEPS							
			0052	0062	0082	0092	0102	0122	0132	0152
6	6	9	0-100%	0-100%	0-100%	0-100%				
9	9	13	0-100%	0-100%	0-100%	0-100%	0-50-100%	0-50-100%		
12	12	17	0-100%	0-100%	0-100%	0-100%	0-50-100%	0-50-100%	0-50-100%	0-50-100%
18	18	26			0-100%	0-100%	0-50-100%	0-50-100%	0-50-100%	0-50-100%
24	24	35							0-50-100%	0-50-100%

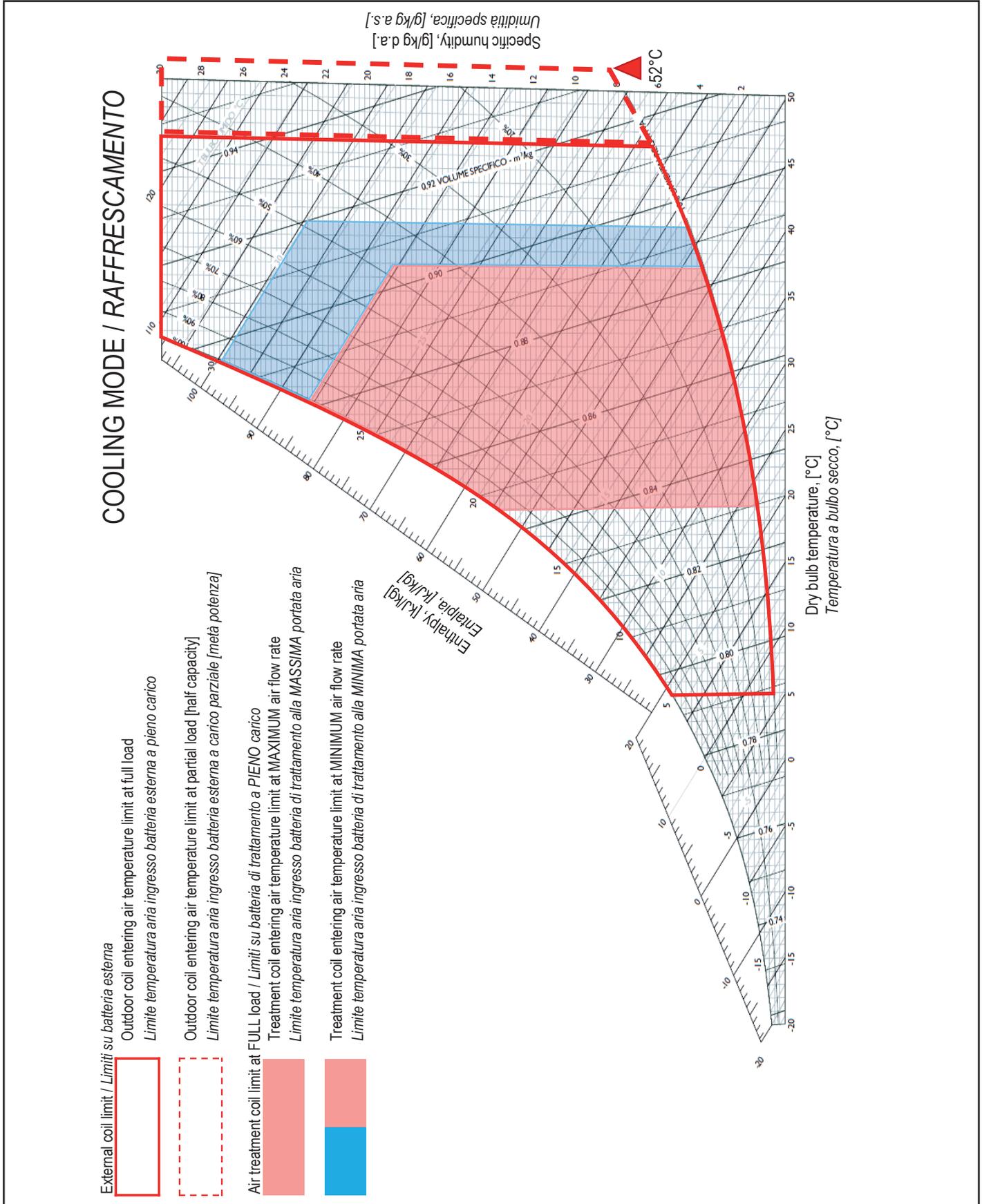
Three-phase power supply with star connection, no neutral

7. OPERATING LIMITS

OPERATING LIMITS CALCULATED IN THE FOLLOWING CONDITIONS:

- Unit correctly installed and used
- Operating in stable conditions

**WARNING:** For detailed working limits, please refer to ElcaWorld selection software



HEATING MODE / RISCALDAMENTO

External coil limit / Limiti su batteria esterna

Outdoor coil entering air temperature limit at full load

Limite temperatura aria ingresso batteria esterna a pieno carico

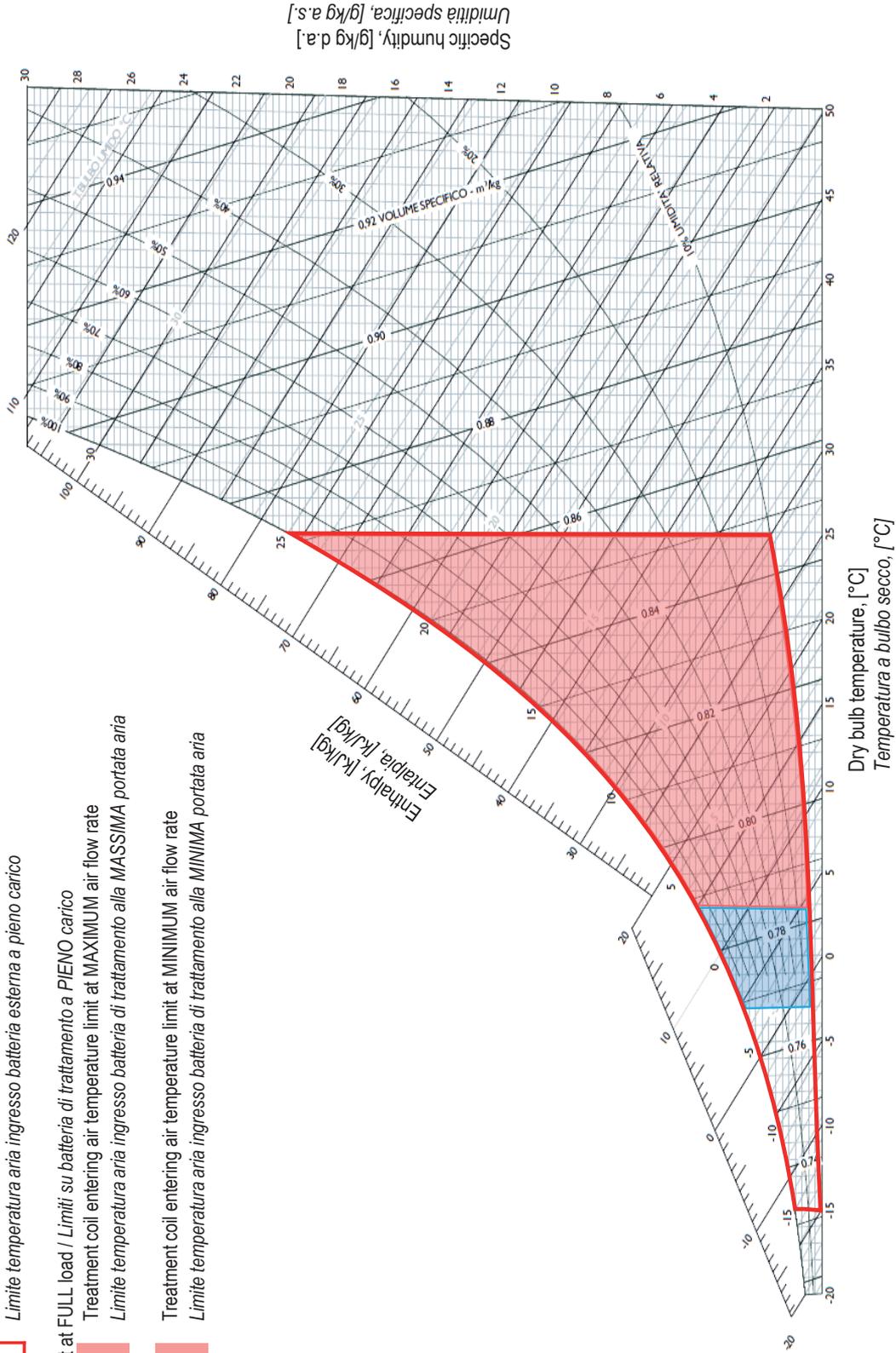
Air treatment coil limit at FULL load / Limiti su batteria di trattamento a PIENO carico

Treatment coil entering air temperature limit at MAXIMUM air flow rate

Limite temperatura aria ingresso batteria di trattamento alla MASSIMA portata aria

Treatment coil entering air temperature limit at MINIMUM air flow rate

Limite temperatura aria ingresso batteria di trattamento alla MINIMA portata aria



Dry bulb temperature, [°C]  
Temperatura a bulbo secco, [°C]

**UNIT PERFORMANCE IN COOLING MODE WITH OUTDOOR TEMPERATURE ABOVE 46°C**

Unit can work with outdoor temperature above 46°C, up to 52°C, in cooling mode, at partial load (means half compressors are working) if the air facing to the indoor coil is included between 19°C and 32°C d.b., with whatever airflow rate.

It's possible to assess unit cooling performances (total cooling capacity, sensible cooling capacity and compressor(s) power input ) thanks to the graphs below.

**Instructions:**

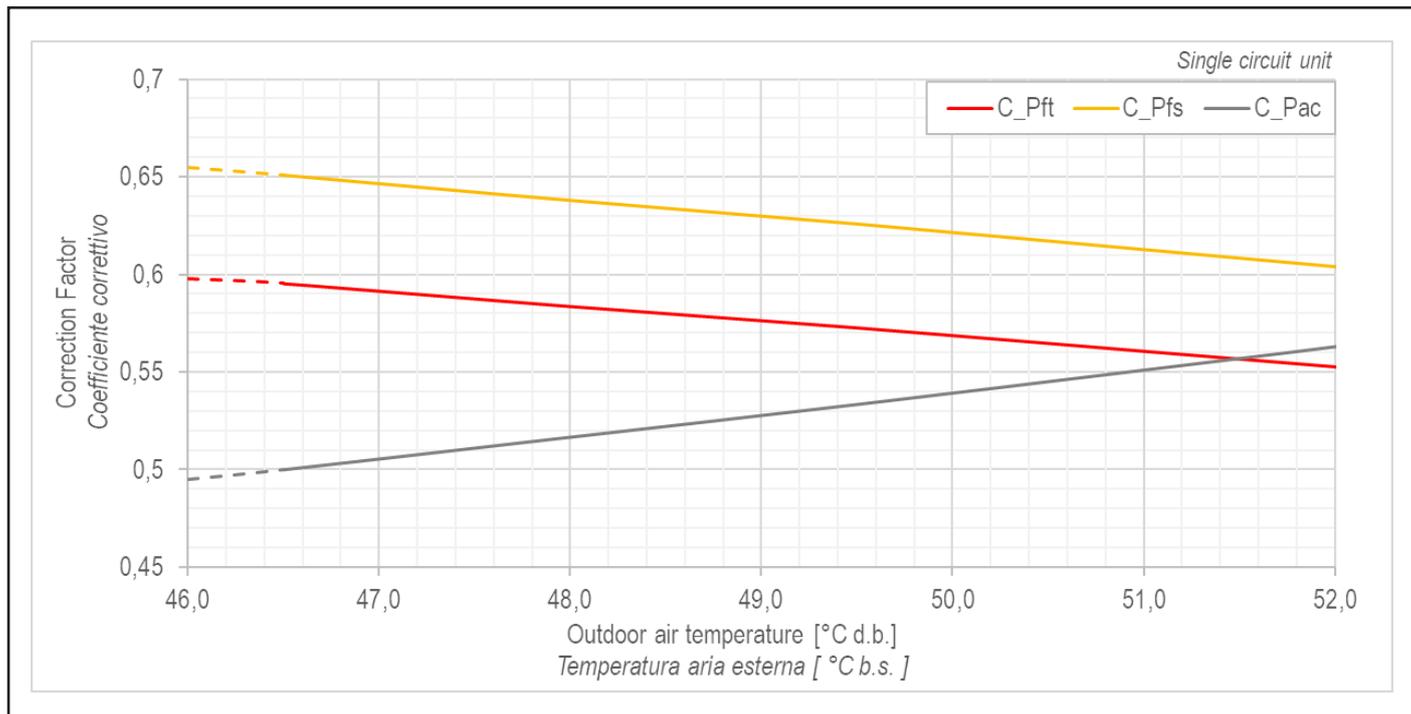
- with ElcaWorld, calculate unit performances at your desired working conditions, but with 46°C outdoor air temperature;
- to correct those cooling performance (total and sensible) and the compressor power input, use the graph below, where correction factors are reported (ordered) in function of outdoor temperature (abscissa).

**Key**

C\_Pft = corr. Factor for total cooling capacity gross

C\_Pfs = corr. Factor for sensible cooling capacity gross

C\_Pac = corr. Factor for compressor power input



### 8. DIMENSIONAL DRAWINGS

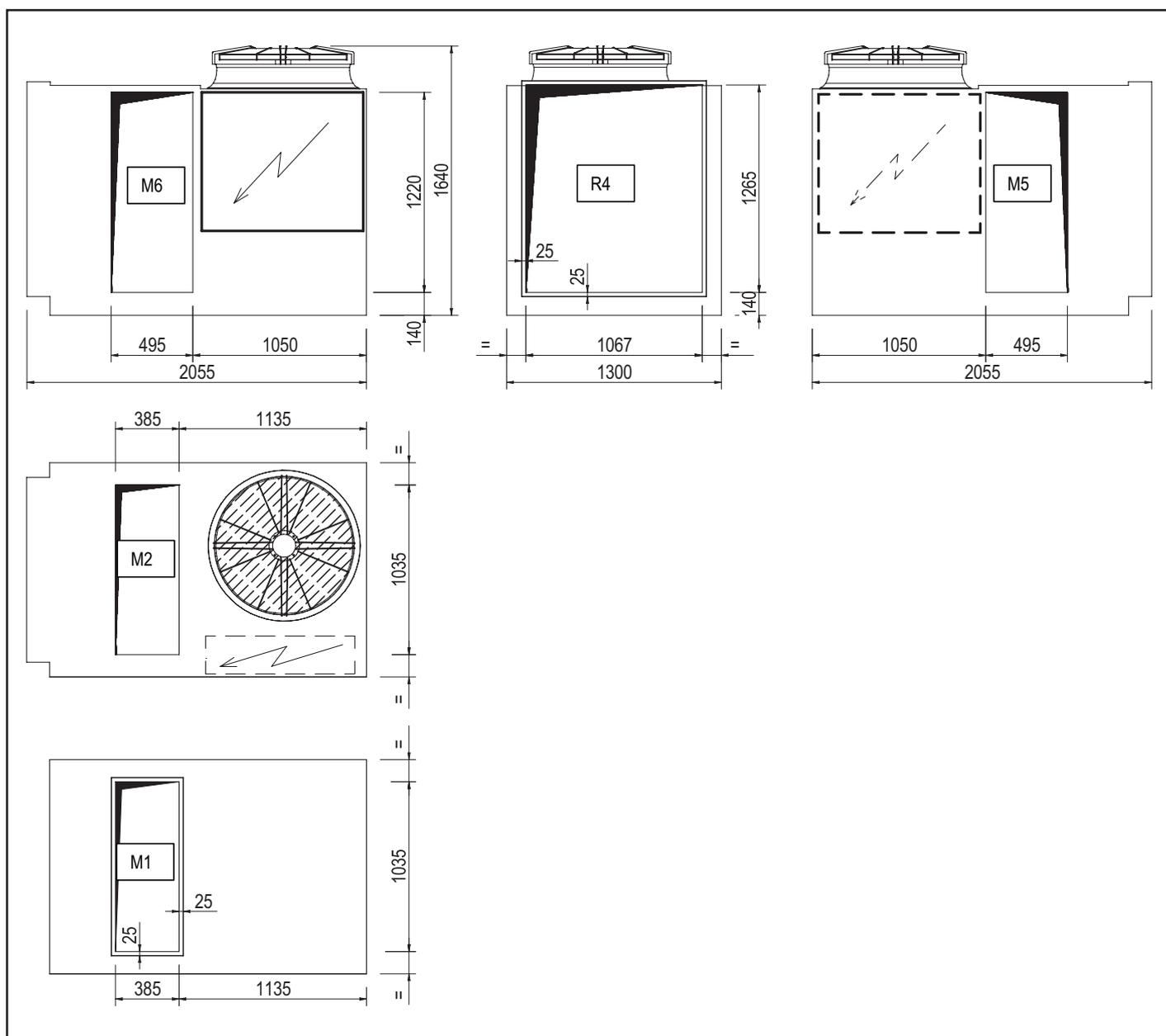
The reference of the supply and return air flow directions is from the front of the electrical panel.

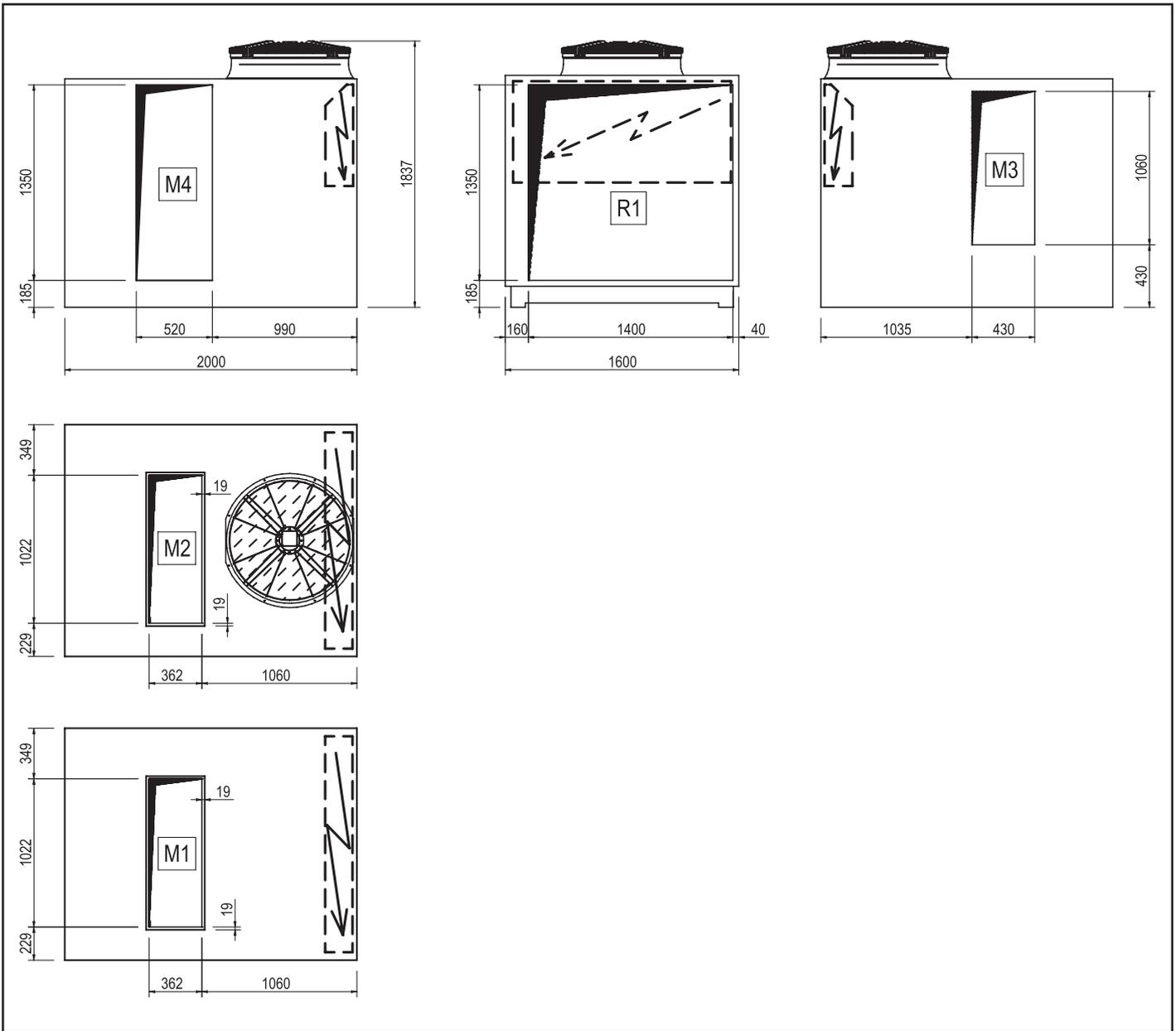
**Remarks:** for installation purposes, please refer to the documentation sent after the purchase-contract. This technical data should be considered as indicative. Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A. may modify them at any moment. Data valid for standard units without any additional option.

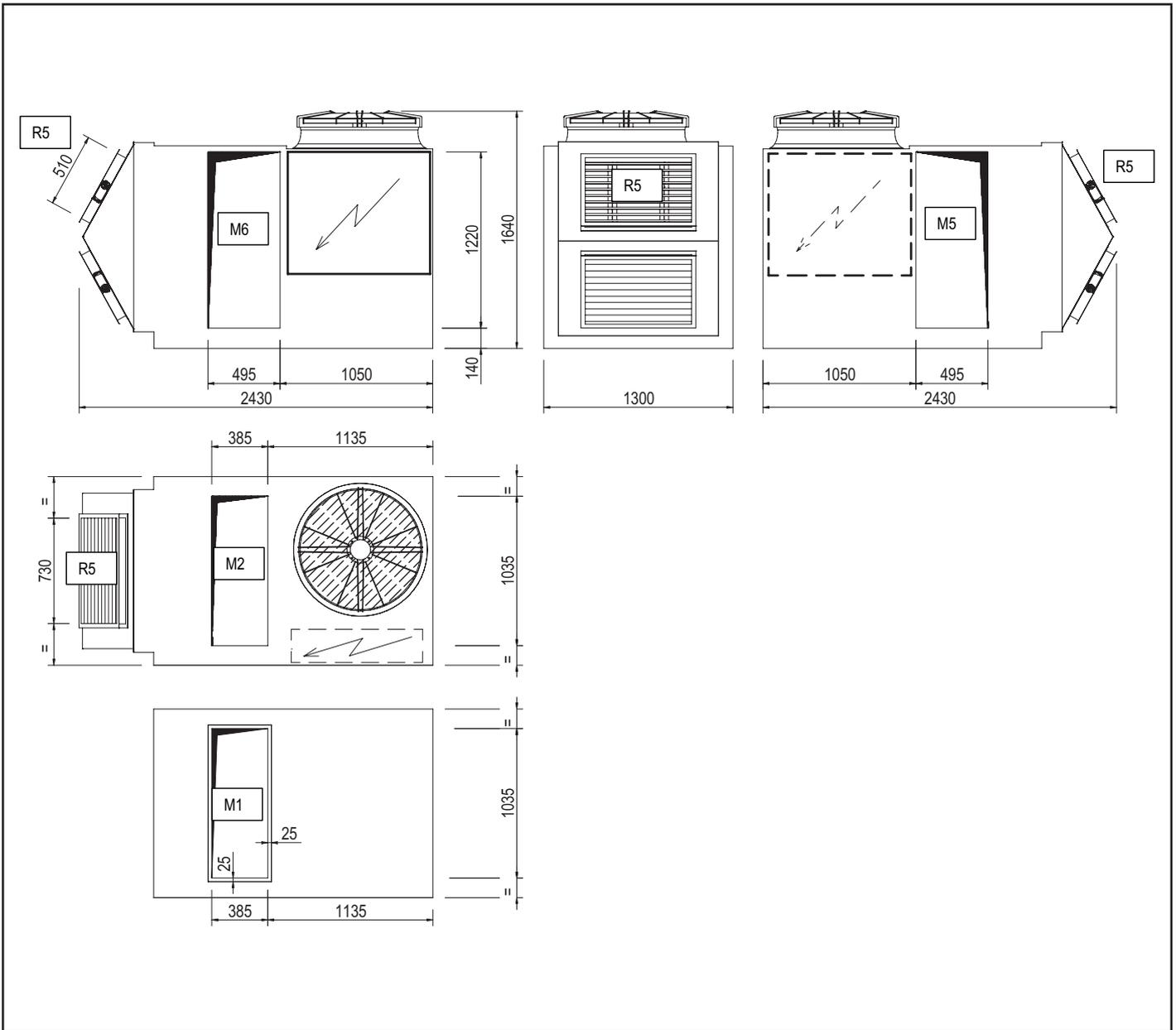
Legend symbols		
SUPPLY AIR DIRECTION		
CODE (price list)	DESCRIPTION	CODE (draw)
2072	BOTTOM SIDE SUPPLY AIR	M1
2075	TOP SIDE SUPPLY AIR	M2
2076	RIGHT SIDE SUPPLY AIR	M3
2077	LEFT SIDE RETURN AIR	M4
2073	REAR SIDE SUPPLY AIR	M5
2079	FRONT SIDE SUPPLY AIR	M6

Legend symbols		
RETURN AIR DIRECTION		
CODE (price list)	DESCRIPTION	CODE (draw)
2061	REAR SIDE RETURN AIR	R1
2062	RIGHT SIDE RETURN AIR	R2
2063	BOTTOM SIDE RETURN AIR	R3
2065	LEFT SIDE RETURN AIR	R4
2067	TOP SIDE RETURN AIR	R5
2066	FRONT SIDE RETURN AIR	R6

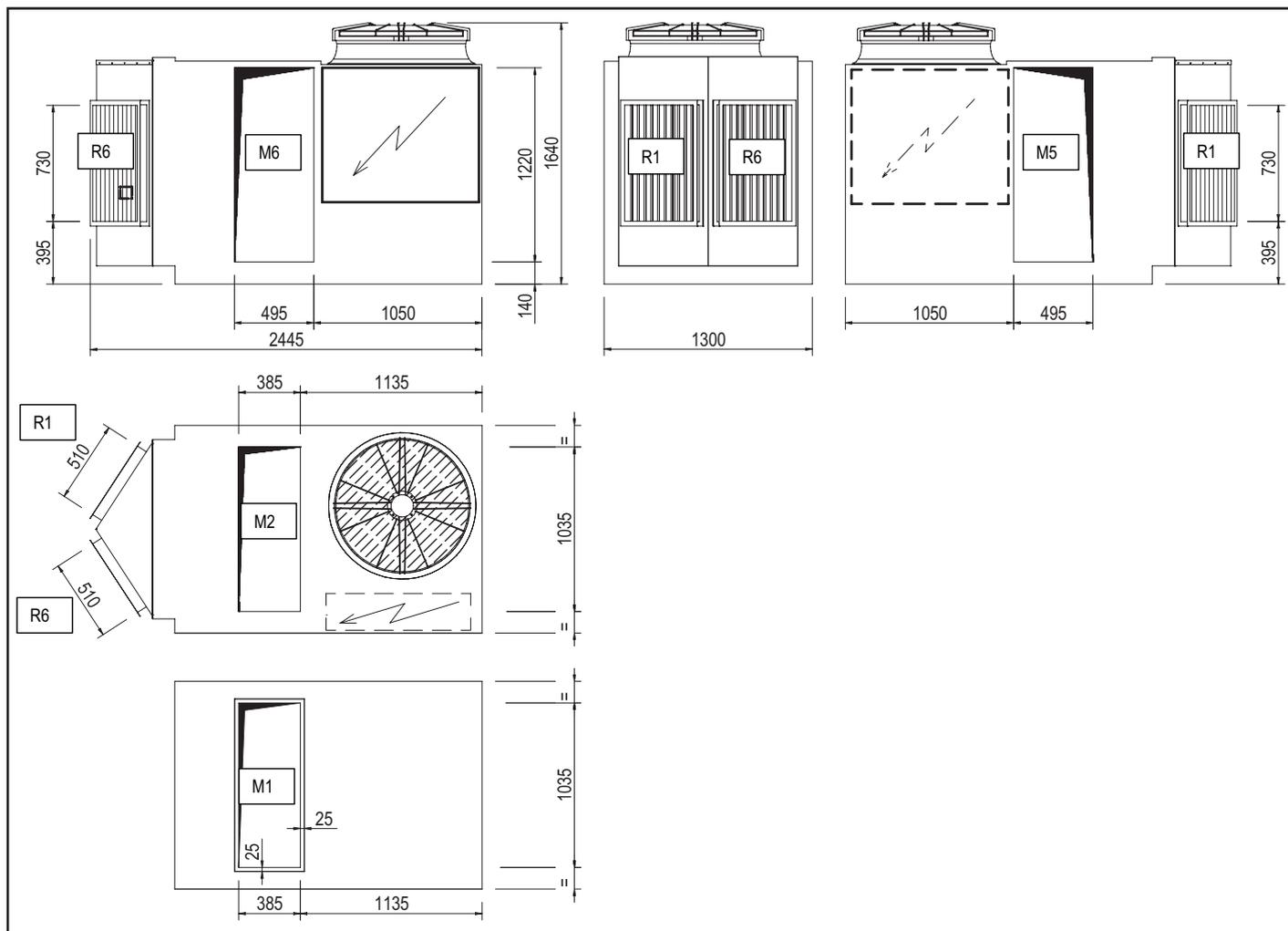
WSM2 /AR 0052-0092



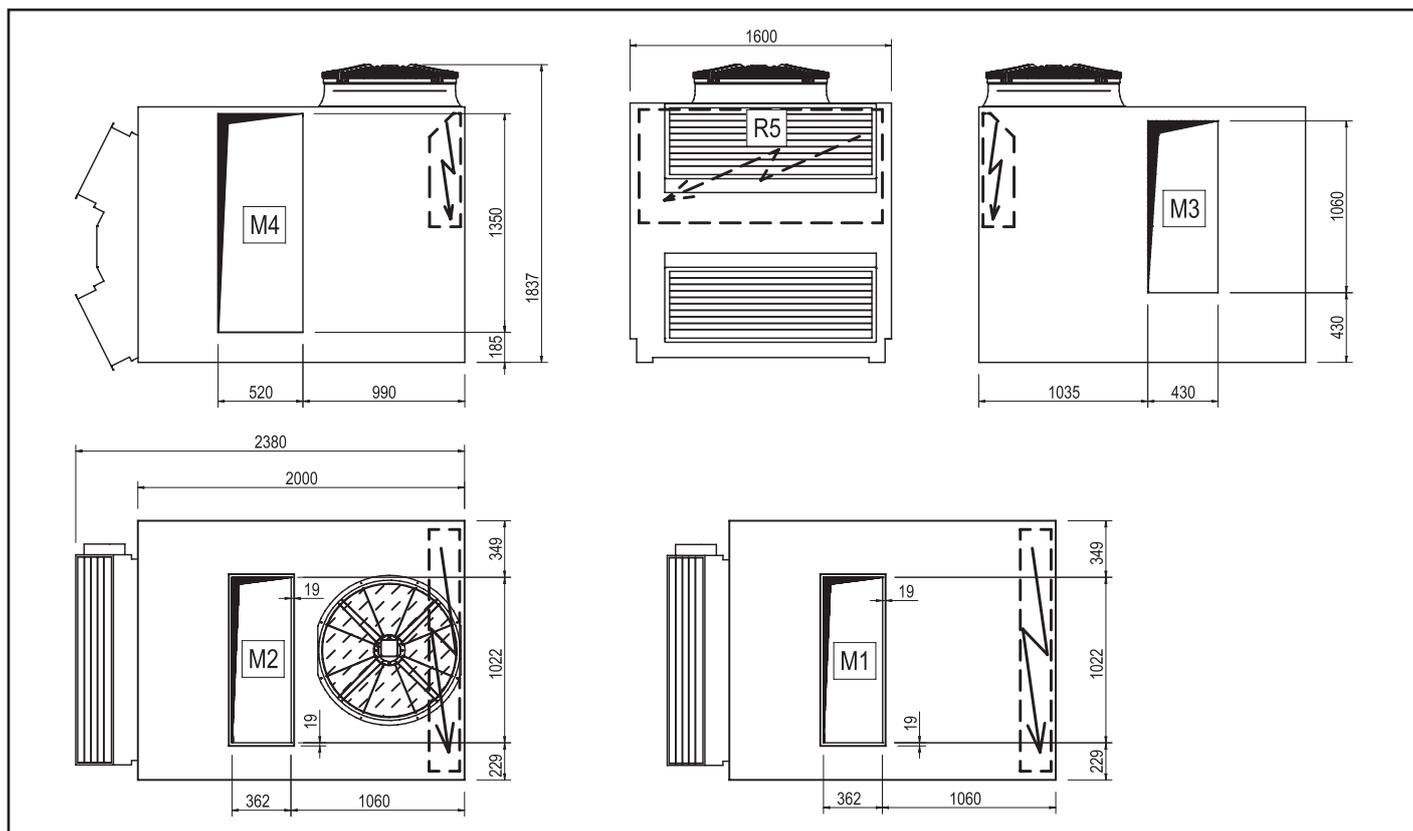


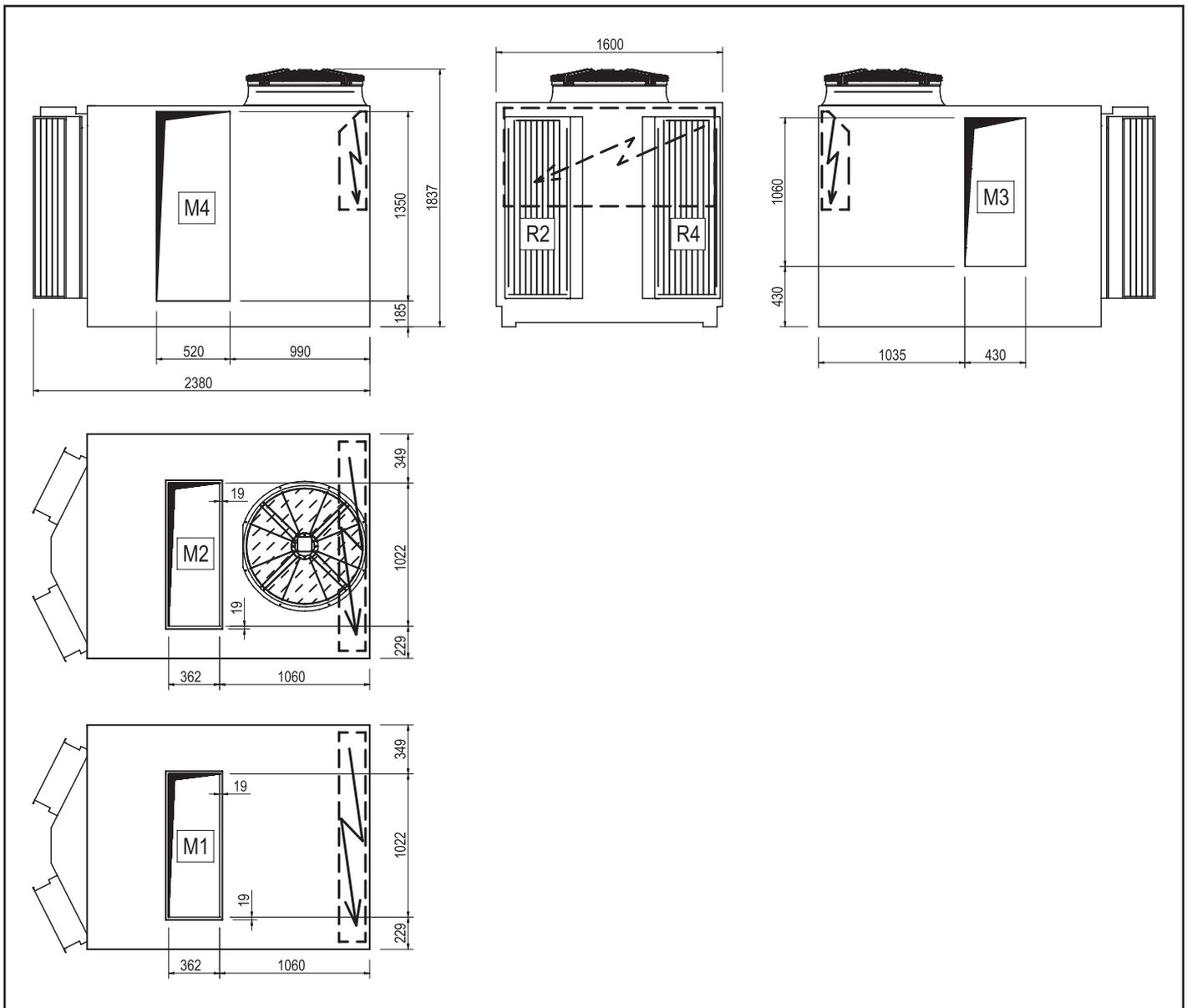


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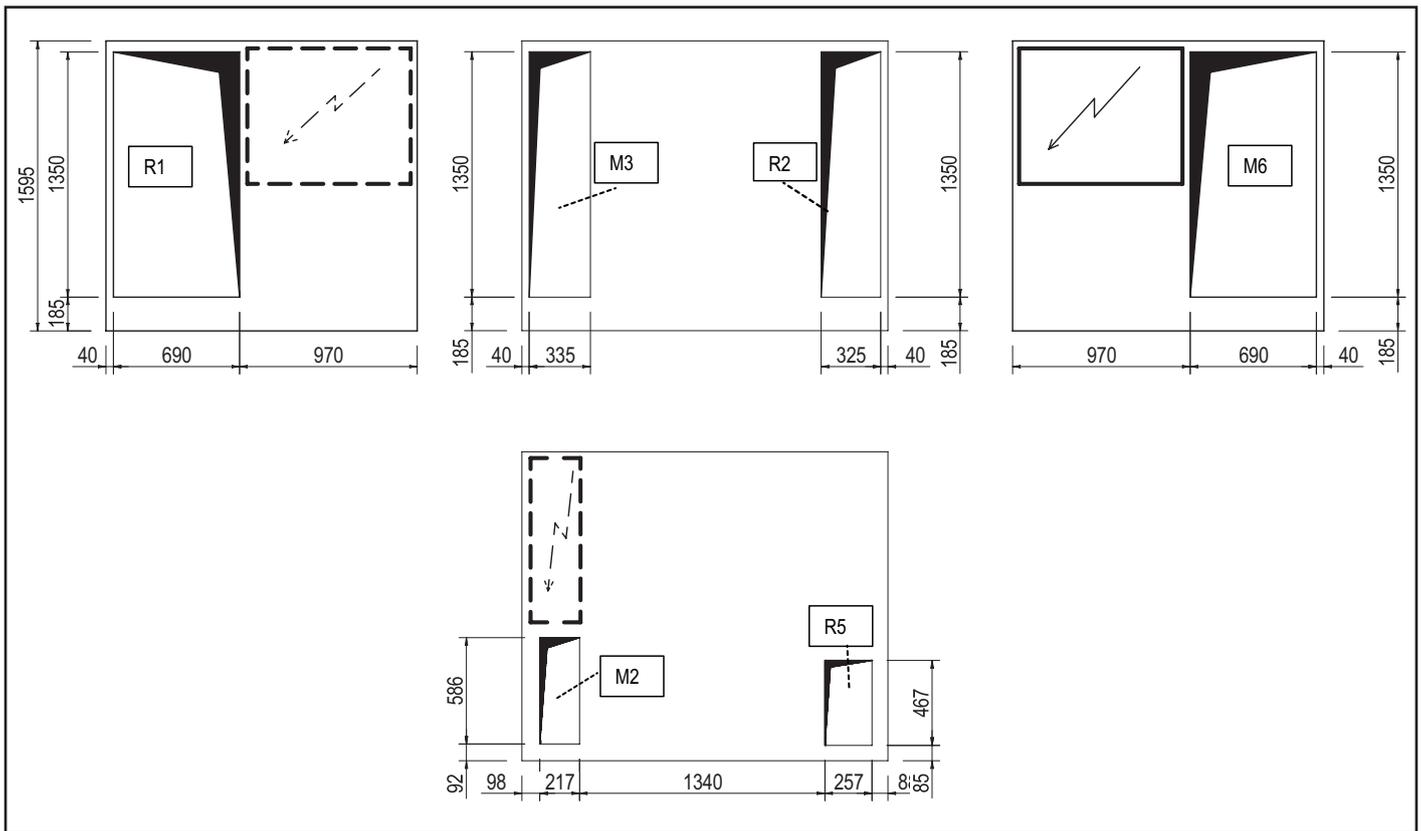


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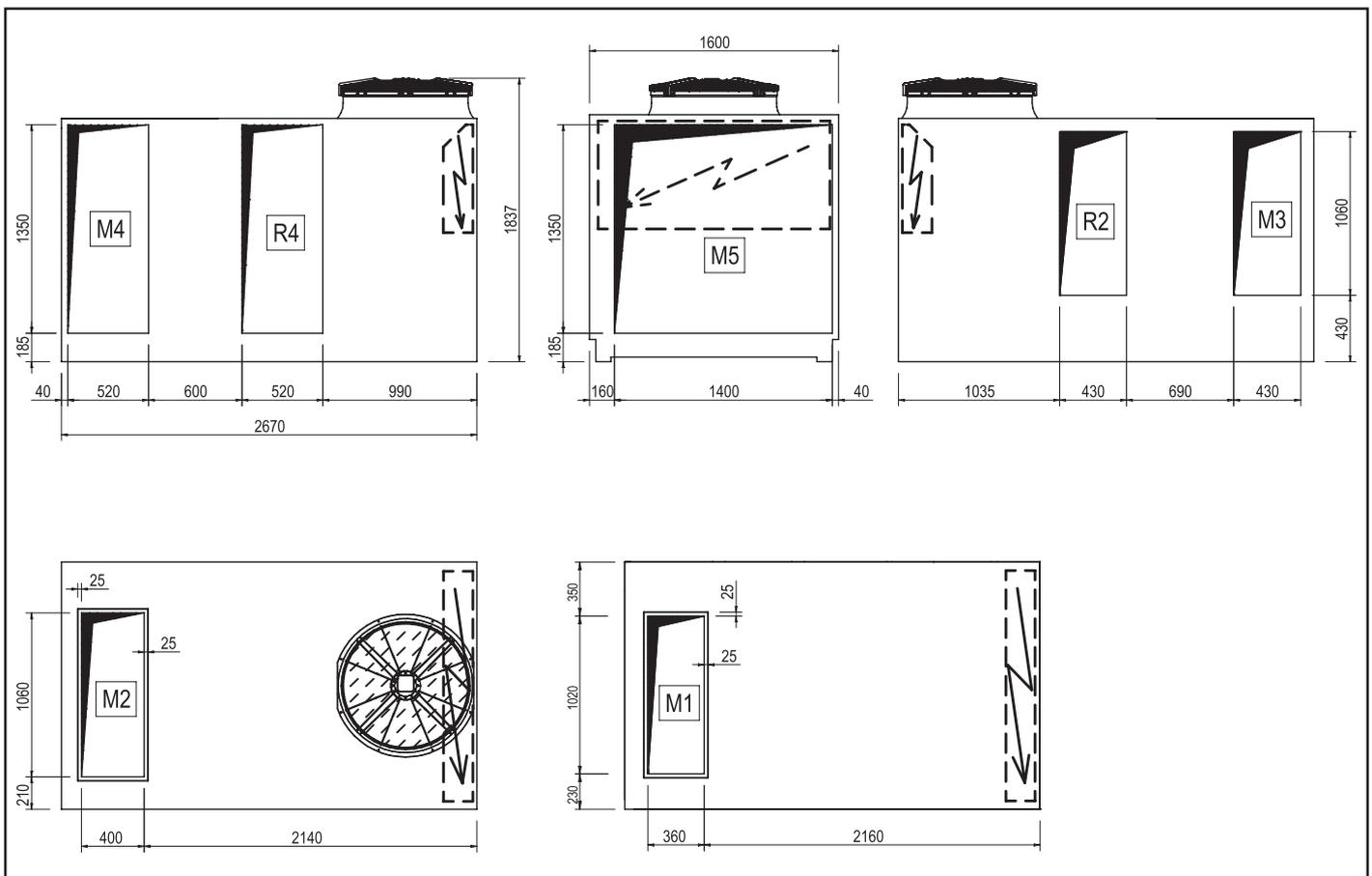




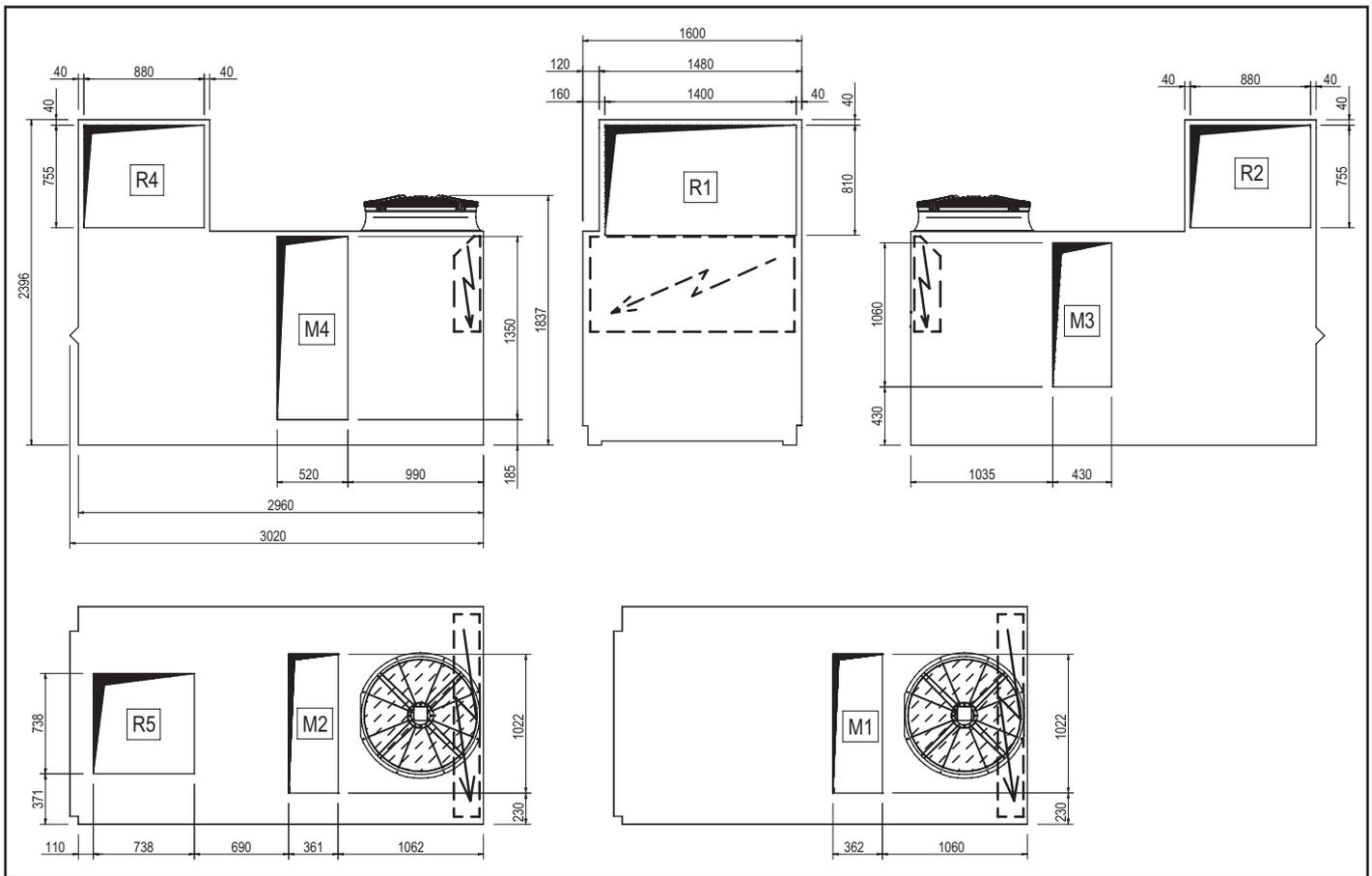
WSM2 /AX-F 0052-0092



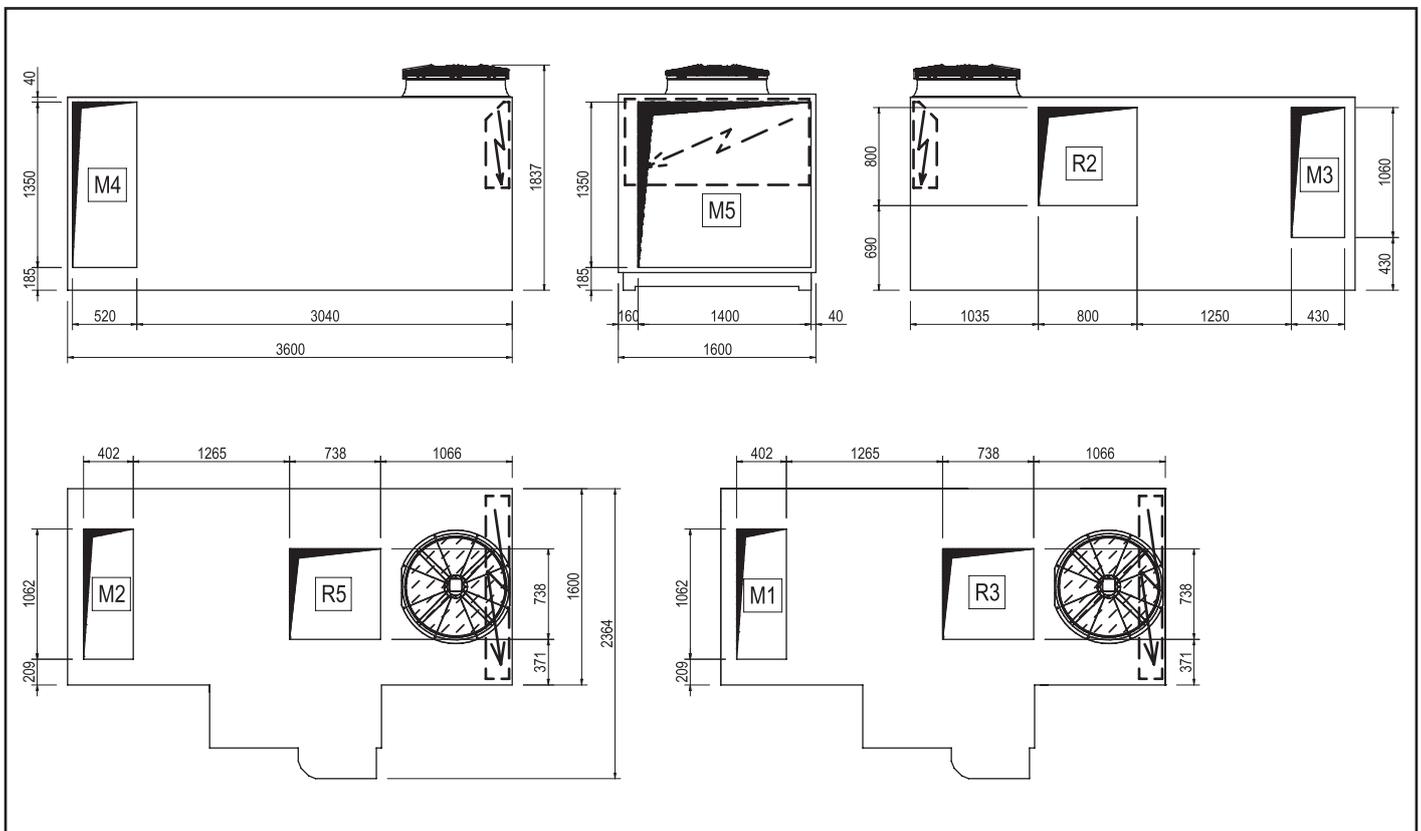
WSM2 /AX-F 0102-0152



WSM2 /CE, /HR-B 0102-0152



WSM2 /HR-E 0102-0152





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