The manufacturer declines all the responsibilities regarding inaccuracies contained in this manual, if due to printing or typing mistakes. The manufacturer reserves the right to apply changes and improvements to the products at any time without notice.
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GENERAL FEATURES

Unit description

This series of condensing units satisfies the cooling and heating requirements of residential plants of small and medium size.

All the units are suitable for outdoor installation and can be connected to a remote heat exchanger properly designed in order to transfer to the plant all the cooling (and heating for reversible units) power generated.

It is possible for example to connect direct expansion coils placed inside air handling units or remote plate heat exchangers placed inside technical rooms. In both cases the lack of outdoor hydraulic pipes eliminates the freezing problems and avoids brine solutions to be used.

The refrigerant circuit, contained in a compartment protected from the air flow to simplify the maintenance operations, is equipped with scroll compressor mounted on damper supports, axial fans with safety protection grilles, finned coil made of copper pipes and aluminium louvered fins and shut off valves on the liquid line and on the gas line. The reversible units are moreover supplied with reverse cycle valve, thermostatic expansion valve (working in heating mode) and liquid receiver.

The circuit is protected by high and low pressure switches.

All the units can be equipped with variable speed fans control that allows the units to operate with low outdoor temperatures in cooling and high outdoor temperature in heating and permits to reduce noise emissions in such operating conditions.

The low noise acoustic setting up (AS) is obtained, starting from the base setting up (AB), reducing the rotational speed of the fans and mounting sound jackets on the compressors.

All the units are supplied with an outdoor temperature sensor, already installed on the unit, in order to realize the climatic control.

All the units are provided with a phase presence and correct sequence controller device.

All the units are accurately built and individually tested in the factory.

All the units are supplied with refrigerant charge inside.

Only electric and refrigerant connections (between condensing unit and remote heat exchanger) are required for installation.

Unit identification code

The codes that identify the units and the meaning of the letters used are described below.

CMA SP 26.1 VB AB 0M5

Unit type
SR - Unit suitable for splitted plant installation operating as chiller
SP - Unit suitable for splitted plant installation operating as reversible heat pump

Unit model

Operating range
M - Medium temperature.
The unit is suitable to be installed in temperate climates.

Refrigerant type
0 - R410A

Acoustic setting up
AB - Base setting up
AS - Low noise setting up

Power supply
5 - 400 V - 3N - 50 Hz

N° compressors

Unit version
VB - Base version
**Description of components**

**External structure.** Basement, supporting structure and lateral panels are made of galvanized and painted sheet-steel (colour RAL 7035) to guarantee good resistance to atmospheric agents. Accessibility to internal parts is possible removing the frontal panel. For extraordinary maintenances also the rear panel can be removed.

The **source side heat exchanger** (2) is a finned coil realized with grooved copper pipes and aluminium fins with notched profile to increase the heat exchange coefficient. A tray is obtained in the basement to collect the condensate generated in heating mode.

The refrigerant circuit of the heat pump models contains moreover a **4 way reverse cycle valve** (3) to allow operating mode change reversing the refrigerant flow, an **expansion device** (4) for heating mode, a thermostatic expansion valve with external equalizer, that allows the unit to adjust itself to the different operating conditions keeping steady the set superheating, a solid core hermetic **filter dryer** (5) to restrain impurity and moisture residuals that could be present in the circuit and a **liquid receiver** (6) to compensate the different refrigerant charge required in heating and in cooling mode.

The refrigerant circuit of each unit contains moreover **high and low pressure switches** in order to assure the compressor to operate inside the permitted limits, **shut off ball valves** on the liquid line and on the gas line to allow maintenance operations on the unit and **pressure connections SAE 5/16" - UNF 1/2" - 20** equipped with pin, gasket and blind nut, as required for the use of R410A refrigerant (they allow the complete check of the refrigerant circuit: compressor inlet pressure, compressor outlet pressure and thermostatic expansion valve upstream pressure).

The axial **fans** (7) are contained in a sheet nozzle and are equipped with a safety grille. The fans rotational speed can be modulated continuously by an inverter (option) to control the condensation pressure (in cooling) and the evaporation pressure (in heating) in order to extend the operating limits of the unit and to reduce noise emissions.

The **electrical panel.** It contains all the power, control and security components necessary to guarantee the unit to work properly. The unit is managed by a microprocessor controller to which all the electrical loads and the control devices are connected. The user interface, placed on the frontal panel, allows to view and to modify, if necessary, all the parameters of the unit.

All the units are supplied with an outdoor temperature sensor, already installed on the unit, in order to realize the climatic control.
GENERAL FEATURES

Control system
The unit is managed by a microprocessor controller to which, through a wiring board, all the electrical loads and the control devices are connected. The user interface is realized by a display and four buttons that allow to view and, if necessary, modify all the operating parameters of the unit. It’s available, as an accessory, a remote control that reports all the functionalities of the user interface placed on the unit.

The main functions available are:
- water or air temperature management (through set point adjustment)
- adaptive function
- climatic control in heating and in cooling mode (automatic set point adjustment according to outdoor air temperature)
- dynamic defrost cycle management according to outdoor air temperature
- alarm memory management and diagnostic
- fans management by means of continuous rotational speed control
- pump management
- integrative electrical heaters management in heating mode (2 step logic)
- compressor and pump operating hours recording
- serial communication through Modbus protocol
- remote stand by
- remote cooling-heating
- general alarm digital output

Options

<table>
<thead>
<tr>
<th>Soft starter</th>
<th>Reduces the compressor start current.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor power factor correction</td>
<td>Allows to reduce the phase shift between the absorbed current and the power supply voltage keeping it above the value of 0,9.</td>
</tr>
<tr>
<td>Fans control</td>
<td>Modulating control (condensation/evaporation control)</td>
</tr>
<tr>
<td></td>
<td>The fans rotational speed can be modulated continuously by an inverter to control the condensation pressure (in cooling) and the evaporation pressure (in heating) in order to extend the operating limits of the unit and to reduce noise emissions.</td>
</tr>
<tr>
<td>Electrical loads protection</td>
<td>Fuses</td>
</tr>
<tr>
<td></td>
<td>Allows to protect the electrical loads with fuses.</td>
</tr>
<tr>
<td></td>
<td>Thermal magnetic circuit breakers</td>
</tr>
<tr>
<td></td>
<td>Allows to protect the electrical loads with thermal magnetic circuit breakers simplifying the maintenance operations.</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Rubber vibration dampers</th>
<th>Allow to reduce the transmission to the unit support plane of the mechanical vibrations generated by the compressor and by the fans in their normal operating mode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil protection grille</td>
<td>Protects the external surface of the finned coil.</td>
</tr>
<tr>
<td>Remote control</td>
<td>It is suitable for wall mounting and reports all the control and visualization functions available on the user interface placed on the unit. It therefore allows the complete remote control of the unit.</td>
</tr>
<tr>
<td>Modbus serial interface on RS485</td>
<td>It allows to communicate with the unit controller and to view the operating conditions of the unit through Modbus communication protocol. The RS485 serial line ensures the signal quality up to distances of about 1200 meters (that can be extended by means of proper repeaters).</td>
</tr>
<tr>
<td>Programmer clock</td>
<td>It allows the unit to be turned on and off according to a set program, through the digital input available on the unit wiring board (remote stand by).</td>
</tr>
<tr>
<td>Phase sequence and voltage controller</td>
<td>It checks not only the presence and correct order of the power supply phases but also the voltage level on each phase and avoid the unit to operate with voltage levels outside the permitted limits.</td>
</tr>
<tr>
<td>Remote plate heat exchanger</td>
<td>Stainless steel brazed plate heat exchanger properly sized for cooling and heating operating mode supplied with thermal insulation, differential pressure switch on the water side, temperature probes (water inlet and outlet) and antifreeze electrical heater.</td>
</tr>
<tr>
<td>Liquid line (for SR units)</td>
<td>It contains a thermostatic expansion valve sized for cooling operating mode, filter dryer, liquid indicator and solenoid valve.</td>
</tr>
<tr>
<td>Liquid line (for SP units)</td>
<td>It contains a thermostatic expansion valve sized for cooling operating mode, filter dryer, liquid indicator, solenoid valve and check valve (to be installed in parallel to the expansion valve).</td>
</tr>
<tr>
<td>High and low pressure gauges</td>
<td>Allow to visualize the evaporation and the condensation pressures.</td>
</tr>
</tbody>
</table>
### TECHNICAL DATA AND PERFORMANCES

#### Technical data

<table>
<thead>
<tr>
<th>Frame</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>19.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 - 3N - 50</td>
<td>400 - 3N - 50</td>
</tr>
</tbody>
</table>

#### Refrigerant

| Type | R410A | R410A | R410A | R410A | R410A | R410A |

#### Compressor

| Type | scroll | scroll | scroll | scroll | scroll | scroll |
| Quantity | 1 | 1 | 1 | 1 | 1 | 1 |
| Power steps | 0 - 100 | 0 - 100 | 0 - 100 | 0 - 100 | 0 - 100 | 0 - 100 |
| Oil charge | 2.51 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 |

#### Source side heat exchanger

| Type | finned coil | finned coil | finned coil | finned coil | finned coil | finned coil |
| Quantity | 1 | 1 | 1 | 1 | 1 | 1 |
| Frontal surface | 1.45 | 1.45 | 1.45 | 1.75 | 1.75 | 1.75 |

#### Fans

| Type | axial | axial | axial | axial | axial | axial |
| Quantity | 1 | 1 | 1 | 1 | 1 | 1 |
| Diameter | 630 | 630 | 630 | 800 | 800 | 800 |
| Maximum rotational speed | 900 | 900 | 900 | 900 | 900 | 900 |
| Total installed power | 0.6 | 0.6 | 0.6 | 1.8 | 1.8 | 1.8 |
## TECHNICAL DATA AND PERFORMANCES

### NOMINAL performances - Base setting up (AB)

<table>
<thead>
<tr>
<th>Frame</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>19.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 - 3N - 50</td>
<td>400 - 3N - 50</td>
</tr>
</tbody>
</table>

#### Cooling A35E5
- (source: air in 35°C d.b. / plant: evaporation temperature 5°C)
  - Cooling capacity:
    - SR: 21.6 kW
    - SP: 21.2 kW
  - Power input:
    - SR: 6.79 kW
    - SP: 6.72 kW
  - EER:
    - SR: 3.18
    - SP: 3.15

#### Heating A7C45
- (source: air in 7°C d.b. 6°C w.b. / plant: condensation temperature 45°C)
  - Heating capacity:
    - SR: 22.2 kW
    - SP: 20.1 kW
  - Power input:
    - SR: 5.92 kW
    - SP: 6.72 kW
  - COP:
    - SR: 3.75
    - SP: 2.99

#### Heating A7C50
- (source: air in 7°C d.b. 6°C w.b. / plant: condensation temperature 50°C)
  - Heating capacity:
    - SR: 21.0 kW
    - SP: 19.0 kW
  - Power input:
    - SR: 5.68 kW
    - SP: 6.45 kW
  - COP:
    - SR: 3.69
    - SP: 2.94

---

### NOMINAL performances - Low noise setting up (AS)

<table>
<thead>
<tr>
<th>Frame</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>19.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 - 3N - 50</td>
<td>400 - 3N - 50</td>
</tr>
</tbody>
</table>

#### Cooling A35E5
- (source: air in 35°C d.b. / plant: evaporation temperature 5°C)
  - Cooling capacity:
    - SR: 20.7 kW
    - SP: 20.3 kW
  - Power input:
    - SR: 7.33 kW
    - SP: 7.26 kW
  - EER:
    - SR: 2.83
    - SP: 2.80

#### Heating A7C45
- (source: air in 7°C d.b. 6°C w.b. / plant: condensation temperature 45°C)
  - Heating capacity:
    - SR: 21.0 kW
    - SP: 21.0 kW
  - Power input:
    - SR: 5.68 kW
    - SP: 5.68 kW
  - COP:
    - SR: 3.69
    - SP: 3.67

#### Heating A7C50
- (source: air in 7°C d.b. 6°C w.b. / plant: condensation temperature 50°C)
  - Heating capacity:
    - SR: 19.0 kW
    - SP: 19.0 kW
  - Power input:
    - SR: 6.45 kW
    - SP: 6.45 kW
  - COP:
    - SR: 2.94
    - SP: 2.94

---

Data declared with superheating and subcooling equal to 5°C. The values are referred to units without options and accessories.
The graphs allow to get the corrective factors to be applied to the nominal performances in order to obtain the real performances in the selected operating conditions.

The reference nominal condition is:

**A35E5**

source: air in 35°C d.b.
plant: evaporation temperature 5°C

Evaporation temperature
plant side:
A = 22°C
B = 16°C
C = 10°C
D = 5°C
HEATING performances

The graphs allow to get the corrective factors to be applied to the nominal performances in order to obtain the real performances in the selected operating conditions.

The reference nominal condition is:

**A7W50**
- source: air in 7°C d.b. 6°C w.b.
- plant: condensation temperature 50°C

Outlet temperature
- plant side:
  - A = 60°C
  - B = 50°C
  - C = 40°C
  - D = 30°C
Operating limits

The graphs reported below show the operating area inside which the correct working of the unit is guaranteed.

### COOLING

![Cooling Graph](image-url)

- **Inlet air temperature d.b. [°C]**
- **Evaporation temperature - plant side [°C]**

- **Modulating fans control**
- **(condensation control)**

### HEATING

![Heating Graph](image-url)

- **Inlet air temperature d.b. [°C]**
- **Condensation temperature - plant side [°C]**

### Table

<table>
<thead>
<tr>
<th></th>
<th>Superheating</th>
<th>Subcooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum value</td>
<td>10°C</td>
<td>8°C</td>
</tr>
<tr>
<td>Minimum value</td>
<td>3°C</td>
<td>2°C</td>
</tr>
</tbody>
</table>
## TECHNICAL DATA AND PERFORMANCES

### Electrical data

<table>
<thead>
<tr>
<th>Frame</th>
<th>19.1</th>
<th>22.1</th>
<th>26.1</th>
<th>30.1</th>
<th>35.1</th>
<th>40.1</th>
<th>U.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>400-3N-50</td>
<td>400-3N-50</td>
<td>400-3N-50</td>
<td>400-3N-50</td>
<td>400-3N-50</td>
<td>400-3N-50</td>
<td>V-ph-Hz</td>
</tr>
<tr>
<td>F.L.A. Maximum total current input</td>
<td>18.8</td>
<td>20.8</td>
<td>22.9</td>
<td>25.9</td>
<td>29.9</td>
<td>34.0</td>
<td>A</td>
</tr>
<tr>
<td>F.L.I. Maximum total power input</td>
<td>10.8</td>
<td>12.1</td>
<td>13.4</td>
<td>15.8</td>
<td>18.4</td>
<td>21.0</td>
<td>kW</td>
</tr>
<tr>
<td>M.I.C. Maximum total start current</td>
<td>55</td>
<td>64</td>
<td>68</td>
<td>73</td>
<td>82</td>
<td>102</td>
<td>A</td>
</tr>
<tr>
<td>Maximum total start current with soft starter (option)</td>
<td>98</td>
<td>114</td>
<td>121</td>
<td>129</td>
<td>144</td>
<td>178</td>
<td>A</td>
</tr>
</tbody>
</table>

### Noise levels

#### Base setting up (AB)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sound power levels [dB] by octave bands [Hz]</th>
<th>Sound power level</th>
<th>Sound pressure level at 1 metre</th>
<th>Sound pressure level at 5 metres</th>
<th>Sound pressure level at 10 metres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
<td>125</td>
<td>250</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>19.1</td>
<td>82.4</td>
<td>83.6</td>
<td>80.2</td>
<td>74.8</td>
<td>71.0</td>
</tr>
<tr>
<td>22.1</td>
<td>82.6</td>
<td>83.8</td>
<td>80.4</td>
<td>75.0</td>
<td>71.2</td>
</tr>
<tr>
<td>26.1</td>
<td>83.5</td>
<td>84.7</td>
<td>81.3</td>
<td>75.9</td>
<td>72.1</td>
</tr>
<tr>
<td>30.1</td>
<td>88.2</td>
<td>83.4</td>
<td>80.0</td>
<td>78.2</td>
<td>76.5</td>
</tr>
<tr>
<td>35.1</td>
<td>88.6</td>
<td>83.8</td>
<td>80.4</td>
<td>78.6</td>
<td>76.9</td>
</tr>
<tr>
<td>40.1</td>
<td>88.9</td>
<td>84.1</td>
<td>80.7</td>
<td>78.9</td>
<td>77.2</td>
</tr>
</tbody>
</table>

#### Low noise setting up (AS)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sound power levels [dB] by octave bands [Hz]</th>
<th>Sound power level</th>
<th>Sound pressure level at 1 metre</th>
<th>Sound pressure level at 5 metres</th>
<th>Sound pressure level at 10 metres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
<td>125</td>
<td>250</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>19.1</td>
<td>80.3</td>
<td>81.5</td>
<td>78.1</td>
<td>71.7</td>
<td>66.9</td>
</tr>
<tr>
<td>22.1</td>
<td>80.5</td>
<td>81.7</td>
<td>78.3</td>
<td>71.9</td>
<td>67.1</td>
</tr>
<tr>
<td>26.1</td>
<td>81.4</td>
<td>82.6</td>
<td>79.2</td>
<td>72.8</td>
<td>68.0</td>
</tr>
<tr>
<td>30.1</td>
<td>86.9</td>
<td>82.1</td>
<td>78.7</td>
<td>75.9</td>
<td>73.2</td>
</tr>
<tr>
<td>35.1</td>
<td>87.5</td>
<td>82.7</td>
<td>79.3</td>
<td>76.5</td>
<td>73.8</td>
</tr>
<tr>
<td>40.1</td>
<td>87.9</td>
<td>83.1</td>
<td>79.7</td>
<td>76.9</td>
<td>74.2</td>
</tr>
</tbody>
</table>

### Reference conditions

Performances referred to units operating in cooling mode at nominal conditions A35E5.
Unit placed in free field on reflecting surface (directional factor equal to 2).
The sound power level is measured according to ISO 3744 standard.
The sound pressure level is calculated according to ISO 3744 and is referred to a distance of 1/5/10 metres from the external surface of the unit.

### Weights

<table>
<thead>
<tr>
<th>Frame</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>19.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Unit without options</td>
<td>205</td>
<td>208</td>
</tr>
</tbody>
</table>

**Components weights**

- Unit without options: 221, 224, 239, 257, 277, 279 kg
Overall dimensions

Respect the free area around the unit as shown in the figure in order to guarantee a good accessibility and facilitate maintenance and control operations.

<table>
<thead>
<tr>
<th>Frame</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>19.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Liquid line</td>
<td>1</td>
<td>5/8”</td>
</tr>
<tr>
<td>Gas line</td>
<td>2</td>
<td>1” 1/8</td>
</tr>
<tr>
<td>D</td>
<td>1494</td>
<td>1704</td>
</tr>
<tr>
<td>E</td>
<td>728</td>
<td>938</td>
</tr>
</tbody>
</table>

Minimum operating area

A 400 mm
B 600 mm
C 200 mm