# Technical manual
# **NIBE AG-AA10**
# Single split air to air heat pump


**AA10-30**


**AA10-40**
**AA10-50**

S.A.C. S.r.l.
Società a socio unico
Sede Legale: Via Varese, 90
I - 21013 Gallarate (VA)

Telefono: +39 0331 755111
Fax: +39 0331 784513

Capitale Sociale Euro 8.287.000
Codice Fiscale e R.I. Varese 08930800159

Partita IVA IT 01982420125
REA N. 221925 - Varese

## TABLE OF CONTENTS

## REVISION NOTES

| Rev. | Date | Author | Checked | Comments |
|---|---|---|---|---|
| 00 | 01/10/2014 | MDG | GV | First release. |
| 01 | 14/11/2014 | GV | MDG | Added models AG-AA10-40 and AG-AA10-50. |
| 02 | 20/01/2015 | GV | MDG | Added Scope, Packaging and Labels sections. Added exterior appearance description. Fixed CDT sensor table. |
| | | | | |
| | | | | |

# 1 Scope

This specification document is applied to the outdoor units mentioned below used for air to air heat pump to be delivered to NIBE AB.

**UNIT MODEL TABLE**

| NIBE | ARGO* | Model number |
|---|---|---|
| AG-AA10-30 1x230V | AEI1G30LT | 064161 |
| AG-AA10-40 1x230V | AEI1G40LT | 064162 |
| AG-AA10-50 1x230V | AEI1G50LT | 064163 |

* cross reference with similar ARGO models.

**DECLARATION OF CONFORMITY "CE"**

Units described in this document conform to the protection requirement of the following EC directives:

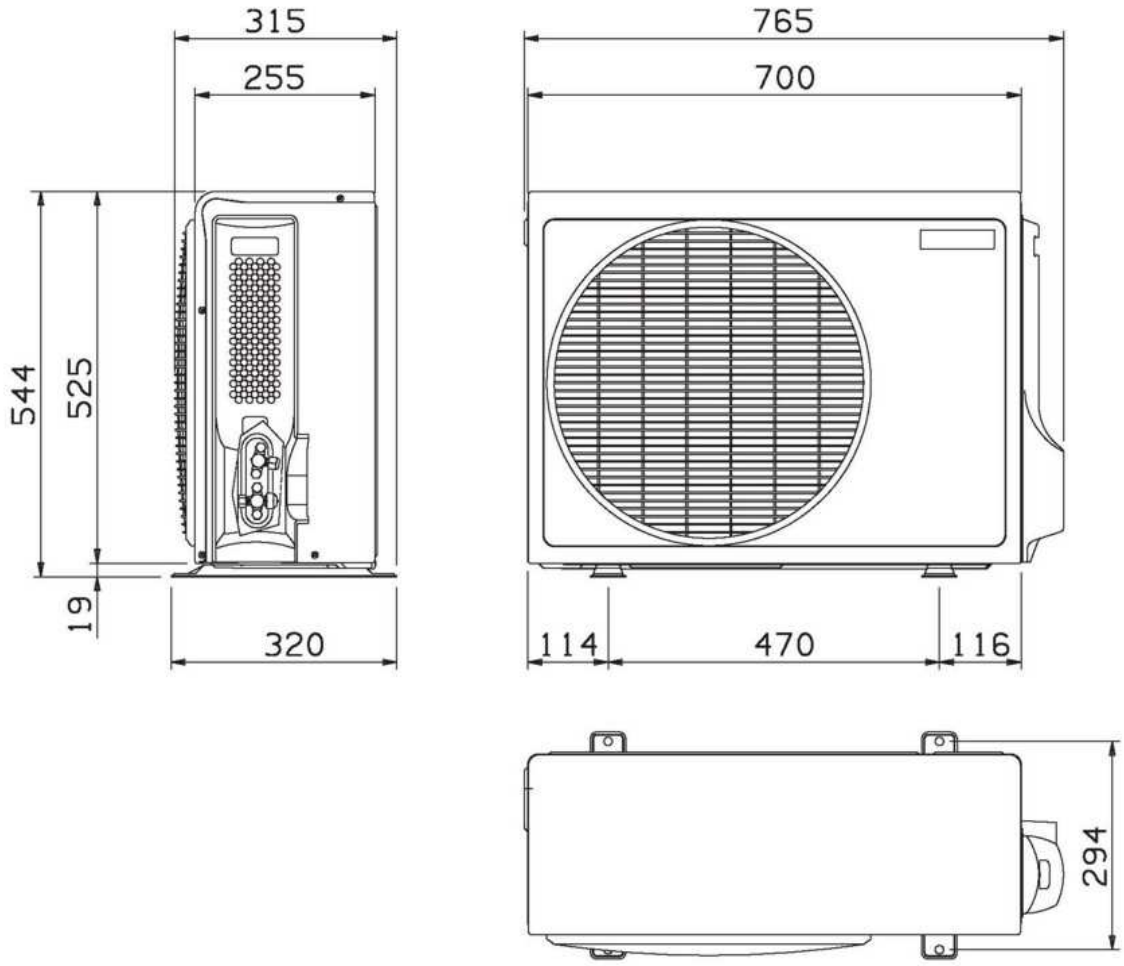
- EMC Directive 2004/108/EC
- LVD (Low Voltage Directive) 2006/95/EC
- RoHS 2 Directive 2011/65/EU

Standards:

- EN378-2:2008 + A1:2009
- EN 60335-1:2002+A11:2004+A12:2006+A13:2008+A14:2010
- EN 60335-2-40 :2003+A11:2004+A12:2009+A1:2006
- EN 55014-1:2006 + A1:2009
- EN 55014-2:1997 + A1:2001+ A2:2008
- EN 61000-3-2:2006+A1:2009+A2:2009
- EN 61000-3-3:2008
- EN 61000-3-11:2000
- EN 61000-3-12:2005

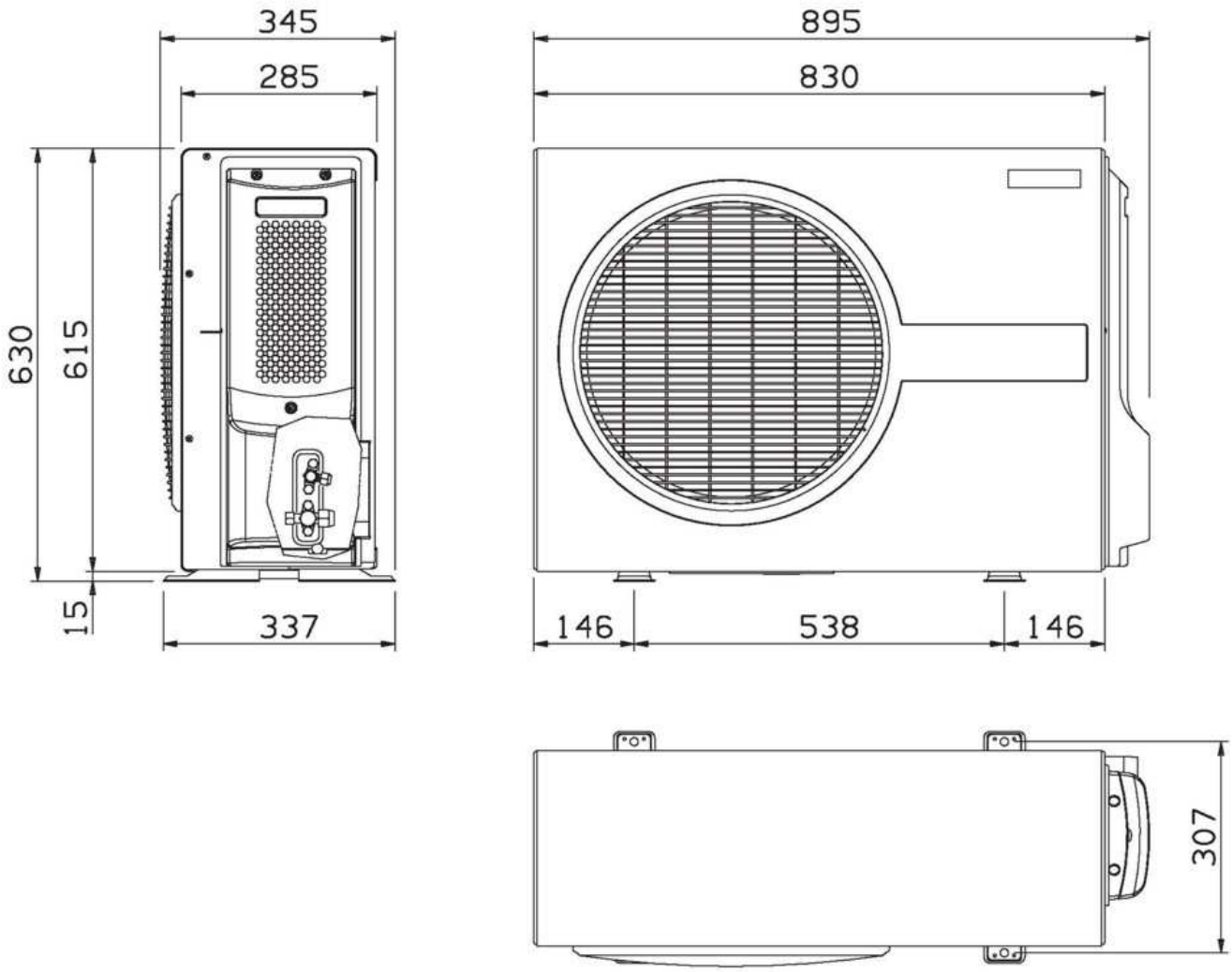
# 2 Dimensional data and exterior appearance

## AG-AA10-30




| | |
|---|---|
| Exterior appearance – color | Top/front and side/rear panel: silver (F1936)<br>Fan Guard and valve covering: gray (RAL7042) |
| Material | Panel: zinc-coated steel sheet<br>Fan guard and valve covering: polypropylene |
| Painting | 2 layers,<br>20 µ or more for electro coating (lower layer)<br>40 µ or more for polyester powder paint coating (top layer)<br>Total Coating thickness is 60 µ or more.<br>240 hrs salt spray test |

## AG-AA10-40/50




| | |
|---|---|
| Exterior appearance – color | Top/front and side panel: silver (F1936)<br>Fan Guard and valve covering: gray (RAL7042) |
| Material | Panel: zinc-coated steel sheet<br>Fan guard and valve covering: polypropylene |
| Painting | 2 layers,<br>20 µ or more for electro coating (lower layer)<br>40 µ or more for polyester powder paint coating (top layer)<br>Total Coating thickness is 60 µ or more.<br>240 hrs salt spray test |

# 3 Technical specifications

| AG-AA10-30 | | | | |
|---|---|---|---|---|
| AIR AIR | | | | |
| **COOLING** | Pdesignc | W | 2680 | **A++** |
| +35°C | SEER | | 6,11 | |
| **HEATING** | Pdesignh | W | 3030 | **A** |
| Average -10°C | SCOP | | 3,82 | |

*ERP Ecodesign - EN14825*

| **COOLING** | | | |
|---|---|---|---|
| +35°C OU / 27/19°C IU | Minimum | W | 1370 |
| | Maximum | W | 3650 |

| **HEATING** | | | |
|---|---|---|---|
| +7/6°C OU / +20°C IU | Minimum | W | 930 |
| | Maximum | W | 3880 |
| -7°C/-8°C OU / + 20° C IU | Maximum | W | 2650 |
| -10°C/-11°C OU / + 20° C IU | Maximum | W | 2350 |
| -22°C/-21°C OU / + 20° C IU | Maximum | W | 2150 |

*EN14511*

| | | |
|---|---|---|
| Power supply | V/Ph/Hz | 230/1/50 |
| Power input (max.) | W/A | 1550/6,90 |
| R410A standard refrigerant charge | kg | 0,81 |
| Compressor type | | Single Rotary |
| Fan speed | | Auto |
| Sound pressure (max.) | dB(A) | 40 |

| | | |
|---|---|---|
| Liquid pipe | mm (inch") | 6,35 (1/4") |
| Gas pipe | mm (inch") | 9,52 (3/8)" |
| Total lenght of pipes (standard load) | m | 7,5 |
| Total lenght of pipes (additional load) | m | 15 |
| Maximum lenght difference (total) | m | 10 |

| AG-AA10-40 | | | | |
|---|---|---|---|---|
| AIR AIR | | | | |
| **COOLING** | Pdesignc | W | 3670 | **A++** |
| +35°C | SEER | | 6,06 | |
| **HEATING** | Pdesignh | W | 4020 | **A** |
| Average -10°C | SCOP | | 4,01 | |

*ERP Ecodesign - EN14825*

| **COOLING** | | | |
|---|---|---|---|
| +35°C OU / 27/19°C IU | Minimum | W | 1010 |
| | Maximum | W | 4060 |

| **HEATING** | | | |
|---|---|---|---|
| +7/6°C OU / +20°C IU | Minimum | W | 910 |
| | Maximum | W | 4870 |
| -7°C/-8°C OU / + 20° C IU | Maximum | W | 3510 |
| -10°C/-11°C OU / + 20° C IU | Maximum | W | 3250 |
| -22°C/-21°C OU / + 20° C IU | Maximum | W | 2980 |

*EN14511*

| | | |
|---|---|---|
| Power supply | V/Ph/Hz | 230/1/50 |
| Power input (max.) | W/A | 1550/6,90 |
| R410A standard refrigerant charge | kg | 1,1 |
| Compressor type | | Single Rotary |
| Fan speed | | Auto |
| Sound pressure (max.) | dB(A) | 44 |

| | | |
|---|---|---|
| Liquid pipe | mm (inch") | 6,35 (1/4") |
| Gas pipe | mm (inch") | 9,52 (3/8)" |
| Total lenght of pipes (standard load) | m | 7,5 |
| Total lenght of pipes (additional load) | m | 15 |
| Maximum lenght difference (total) | m | 10 |

| | | | | |
|---|---|---|---|---|
| **AG-AA10-50** | | | | |
| **AIR AIR** | | | | |
| **COOLING** | Pdesignc | W | 5215 | **A++** |
| +35°C | SEER | | 6,74 | |
| **HEATING** | Pdesignh | W | 4070 | **A** |
| Average -10°C | SCOP | | 4,16 | |

*ERP Ecodesign - EN14825*

| **COOLING** | | | |
|---|---|---|---|
| +35°C OU / 27/19°C IU | Minimum | W | 900 |
| | Maximum | W | 5650 |

| **HEATING** | | | |
|---|---|---|---|
| +7/6°C OU / +20°C IU | Minimum | W | 1030 |
| | Maximum | W | 5290 |
| -7°C/-8°C OU / + 20° C IU | Maximum | W | 3900 |
| -10°C/-11°C OU / + 20° C IU | Maximum | W | 3300 |
| -22°C/-21°C OU / + 20° C IU | Maximum | W | 3040 |

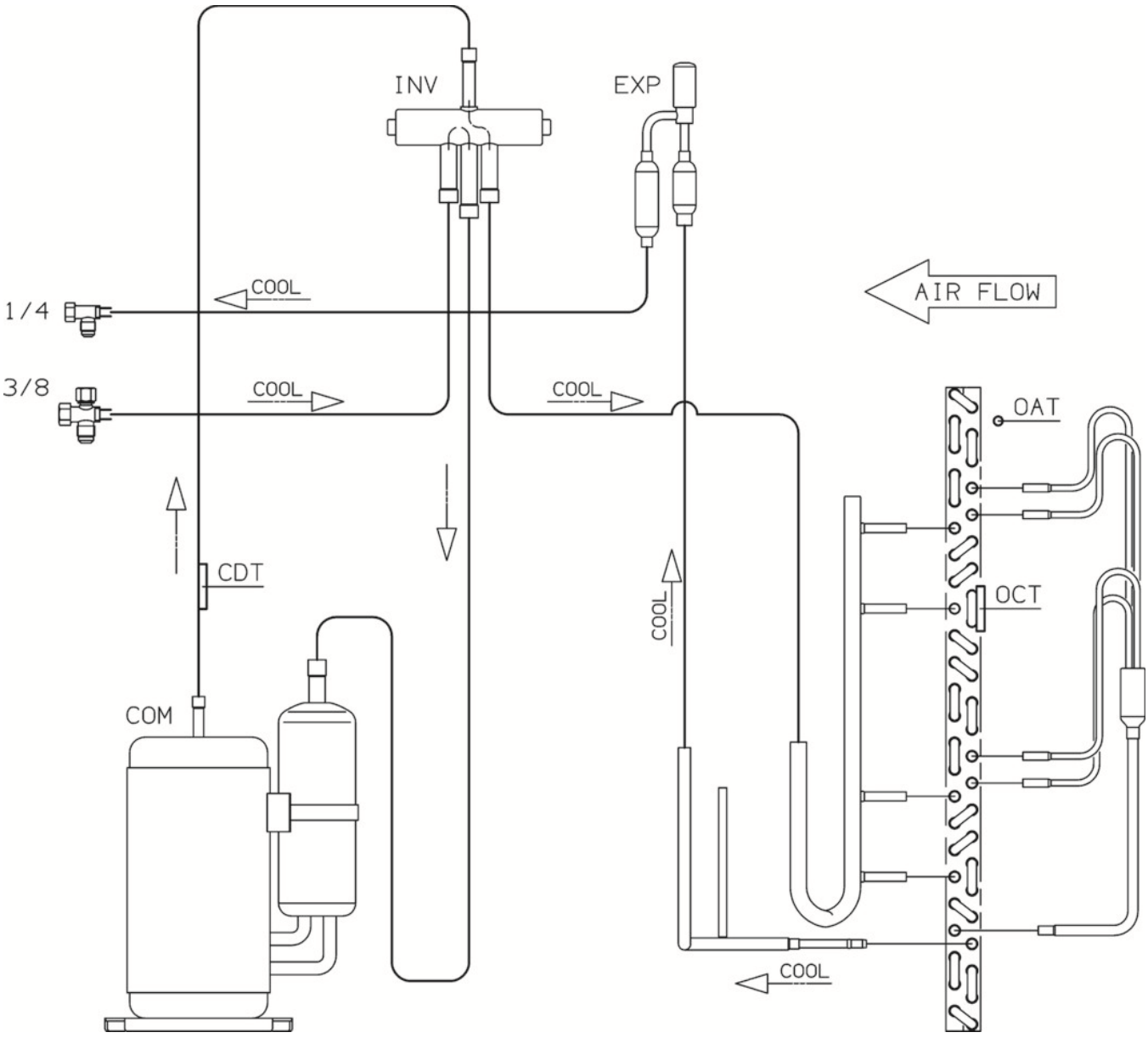
*EN14511*

| | | |
|---|---|---|
| Power supply | V/Ph/Hz | 230/1/50 |
| Power input (max.) | W/A | 1790/7,80 |
| R410A standard refrigerant charge | kg | 1,3 |
| Compressor type | | Twin Rotary |
| Fan speed | | Auto |
| Sound pressure (max.) | dB(A) | 41 |

| | | |
|---|---|---|
| Liquid pipe | mm (inch") | 6,35 (1/4") |
| Gas pipe | mm (inch") | 12,77 (1/2)" |
| Total lenght of pipes (standard load) | m | 7,5 |
| Total lenght of pipes (additional load) | m | 20 |
| Maximum lenght difference (total) | m | 10 |

# 4 Refrigerant circuit

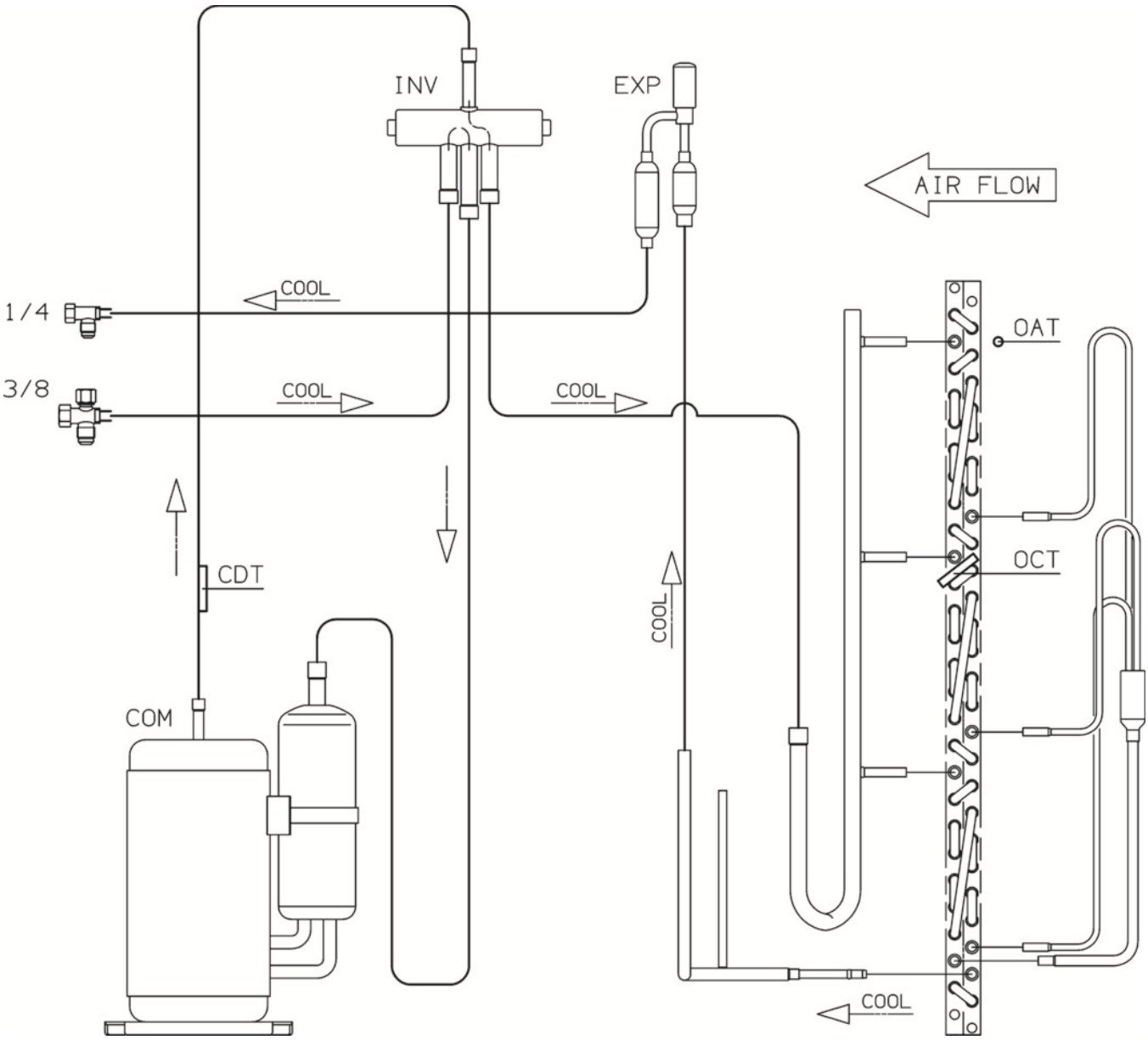
## AG-AA10-30




Note:

- In heating mode the refrigerant flow is in the opposite direction of the COOL arrows
- INV: 4-way valve
- EXP: Electronic Expansion Valve
- COM: Compressor

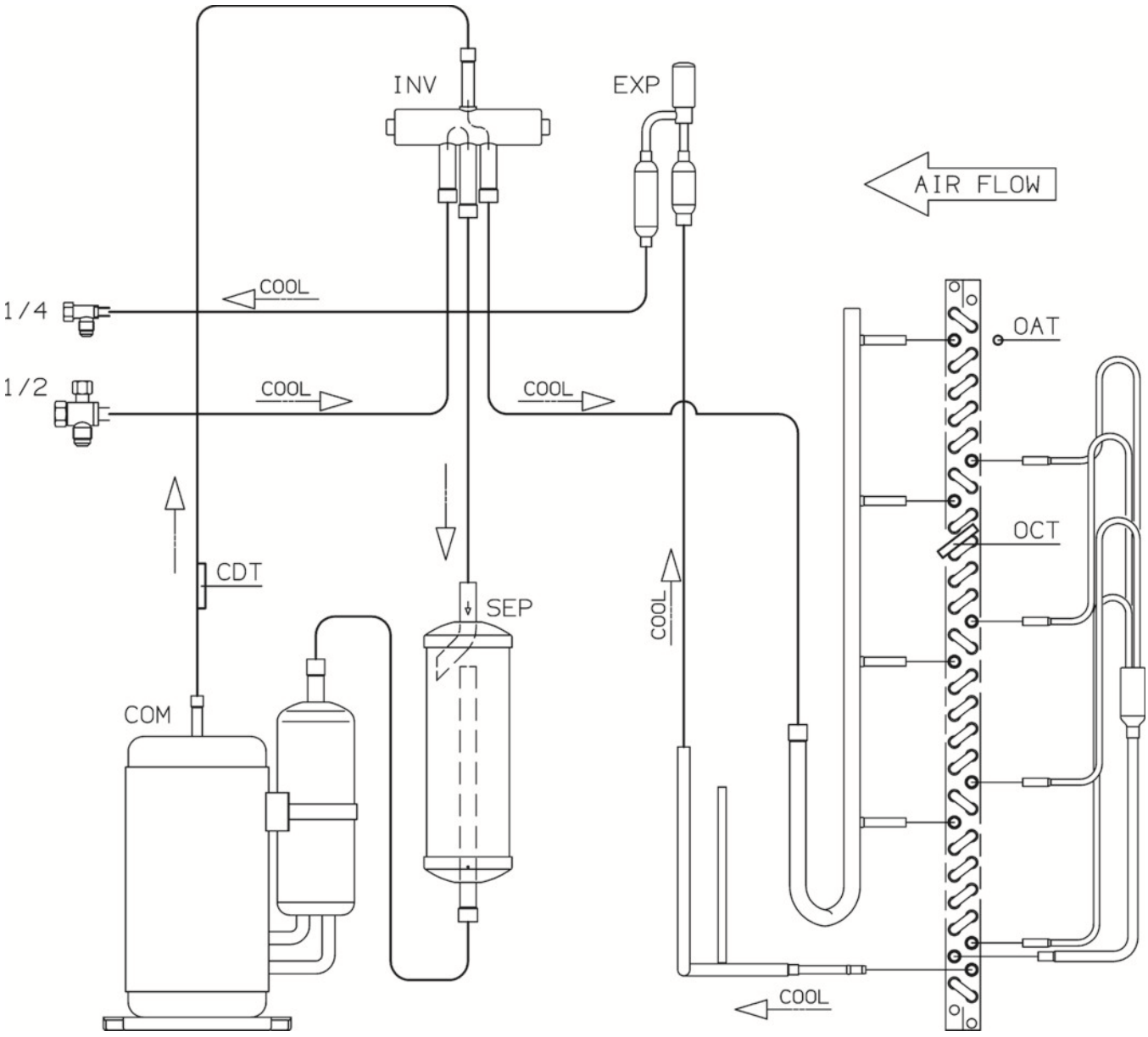
## AG-AA10-40




Note:

- In heating mode the refrigerant flow is in the opposite direction of the COOL arrows
- INV: 4-way valve
- EXP: Electronic Expansion Valve
- COM: Compressor

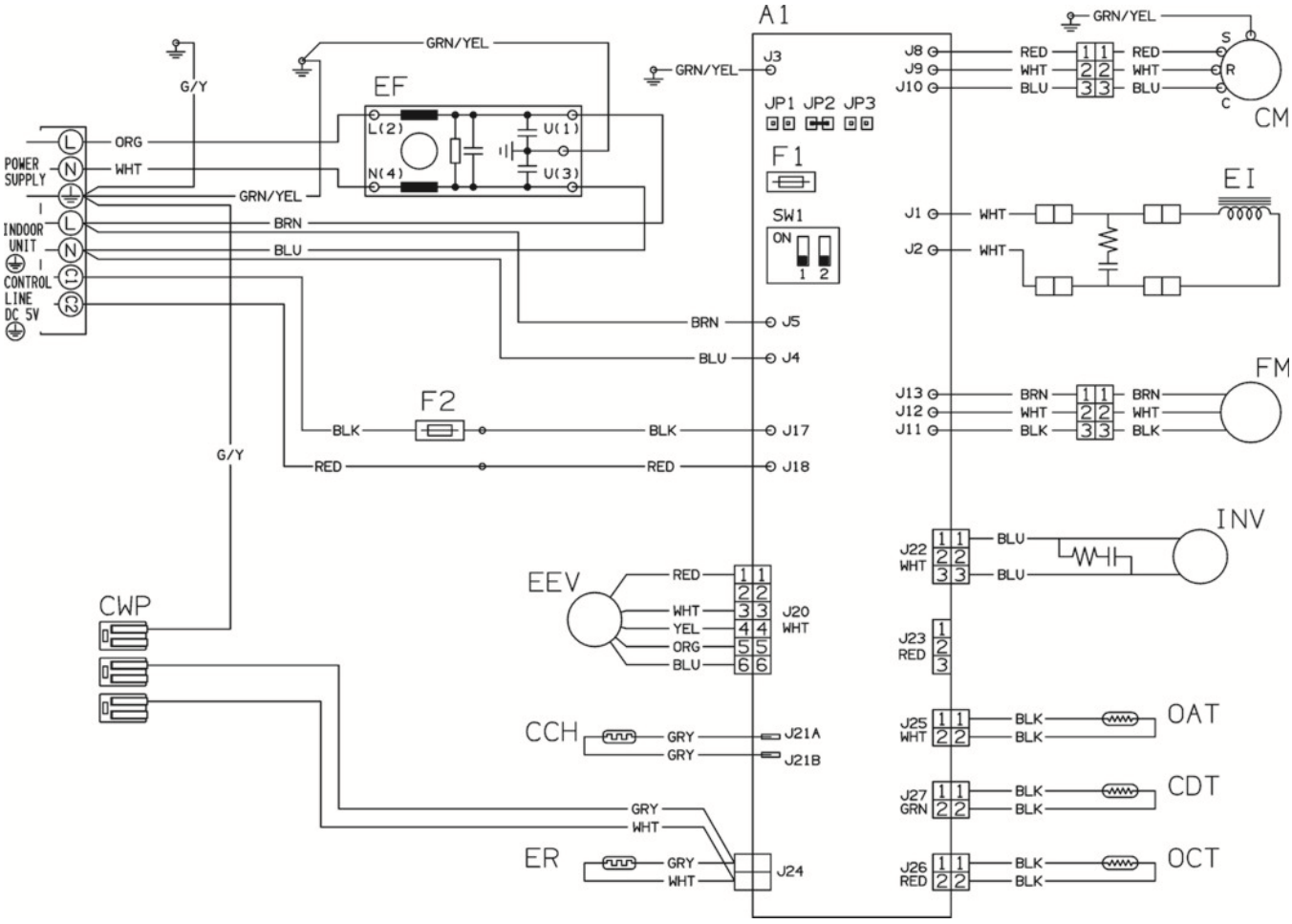
## AG-AA10-50




Note:

- In heating mode the refrigerant flow is in the opposite direction of the COOL arrows
- INV: 4-way valve
- EXP: Electronic Expansion Valve
- COM: Compressor

# 5 Electrical wiring diagram




## Legend

| | |
|---|---|
| A1 | Control pcb |
| F1 | Main fuse<br>6,3x32 - 10A / 250V |
| F2 | Comm. Fuse, RS485 bus cable<br>5x20 - 100mA / 250V |
| SW1 | Dip-switch |
| JP1/2/3 | Jumpers |
| EF | Electromagnetic Interference Filter |
| CM | Compressor |
| FM | Fan motor |
| INV | 4-way valve |

| | |
|---|---|
| OAT | Outdoor Air Sensor |
| CDT | Compressor Discharge Sensor |
| OCT | Outdoor Coil Sensor |
| EEV | Electronic Expansion Valve |
| CCH | Crankcase Heater |
| ER | Drip tray heater |
| CWP | Condensate water pipe heater |
| EI | PFC Inductor |

## Settings

Jumpers
JP1: Factory use. Default: open.
JP2: Defrost type selection. Default: closed.
JP3: Heating only option. Default: open (heating and cooling).

Dip-switch:
SW1: Factory use. Default: 1=Off, 2=Off.

Note:
Jumper and dip-switch settings can be changed only when unit is powered off.

# 6 Principle of functioning

## Heating mode

When the unit is in heating mode, the system will regulate the heating capacity delivered to the room to increase the room air temperature (RAT) to the set point (SPT) and to balance the thermal load of the room to keep the set point temperature.

The following rules apply to heat mode functioning:

- Compressor and fan start when RAT is 1°C or more below the SPT
- Compressor and fan stop if RAT is 2°C or more above the SPT, or if RAT is 1°C above the SPT for more than 1 hour

During the first 3 minutes of operation:

- Compressor and fan run at a fixed speed (2 minutes at low speed and 1 minute at intermediate speed)
- EEV is open at a fixed value

After the first 3 minutes of operation, compressor and fan speeds are regulated by:

- the thermal load calculation
- the level of protecion of the system

During heating mode, 4-way valve is active.

## Cooling mode

When the unit is in cooling mode, the system will regulate the cooling capacity delivered to the room to decrease the room air temperature (RAT) to the set point (SPT) and to balance the thermal load of the room to keep the set point temperature.

The following rules apply to cool mode functioning:

- Compressor and fan start when RAT is 1°C or more above the SPT
- Compressor and fan stop if RAT is 2°C or more below the SPT, or if RAT is 1°C below the SPT for more than 1 hour

During the first 3 minutes of operation:

- Compressor and fan run at a fixed speed (2 minutes at low speed and 1 minute at intermediate speed)
- EEV is open at a fixed value

After the first 3 minutes of operation, compressor and fan speeds are regulated by:

- the thermal load calculation
- the level of protecion of the system

During cooling mode, 4-way valve is deactivated.

## Dehumidification (dry) mode

When the unit is in dry mode, the system will operate according to the following table:

| RAT | DRY LEVEL | DESCRIPTION |
|---|---|---|
| ≥ SPT + 2°C | 0 | Unit operates normally in cooling mode. |
| < SPT + 2°C<br>≥ SPT - 1°C | 1 | Unit operates with a fixed cooling demand.<br>Indoor fan switches between very low speed and low speed every 30 seconds. |
| < SPT - 1°C<br>≥ 10°C | 2 | Unit cycles between a period of operation with a fixed cooling demand (3 minutes) and a period of non operation (9 minutes).<br>Indoor fan switches between very low speed and low speed every 30 seconds. |
| < 10°C | DRY OFF | Unit is off. |

Notes:

- When dry mode is active, the temperature of the room could decrease below the setpoint temperature if the thermal load of the room is low.
- During dry mode, 4-way valve is deactivated.

## Auto mode

When the unit is in auto mode (auto cooling or auto heating), the system will switch between heating and cooling mode to maintain the room air temperature (RAT) to the set point temperature (SPT).
The system will switch between heating and cooling mode if one of the following conditions is met:

- Cooling ⇨ Heating if at least 3 minutes have passed since the compressor was stopped and $\Delta T \leq -3$
- Cooling ⇨ Heating if at least 1 hour have passed since the compressor was stopped and $\Delta T \leq -1$
- Heating ⇨ Cooling if at least 3 minutes have passed since the compressor was stopped and $\Delta T \geq 3$
- Heating ⇨ Cooling if at least 1 hour have passed since the compressor was stopped and $\Delta T \geq 1$

where:

- $\Delta T$ = RAT – SPT

## Fan mode

When system is in fan mode:

- Compressor and fan are stopped.
- 4-way valve is deactivated
- Indoor fan runs at the selected speed

# 7 Components operation

## Compressor

The compressor runs if the following conditions are met:

- At least 3 minutes have passed since the power supply was switched on
- At least 3 minutes have passed since the compressor was stopped
- At least 6 minutes have passed since the previous compressor start
- There is no active alarm on the outdoor and indoor units
- There is no active protection
- There is a thermal load demand in the room

Compressor stops if:

- At least 3 minutes have passed since compressor start
- There is no capacity demand

or if:

- At least 3 minutes have passed since compressor start
- Protection level is too high

or if there is any alarm active.

## Fan

The fan runs only when the compressor is running and starts right after the compressor.
The fan can also run without compressor in the following conditions:

- Overheating on the outdoor heat exchanger (cooling or dry mode)
- Overheating on the power electronics

## Electronic Expansion Valve (EEV)

EEV is managed based on the system conditions to meet the maximum efficiency point of operation and to guarantee a safe operation of the system.
Every time power supply is switched on, or once per day if compressor is not running, EEV runs a reset cycle necessary to find the correct position of the valve. During this reset cycle, EEV is completely closed and then reopened to a fixed value.

## 4-way valve

4-way valve is activated when:

- System is in heating mode

4-way valve is deactivated when:

- System is in cooling, dry or fan only mode
- System is off
- Defrost is active

## Crankcase heater

Crankcase heater around the compressor is used to prevent refrigerant migration and mixing with crankcase oil when the unit is off, and to prevent condensation of refrigerant in the crankcase of the compressor. The crankcase heater keeps refrigerant at a temperature higher than the coldest part of the system.

Crankcase heater is activated if the following conditions are met:

- Compressor is stopped
- OAT il lower than 5°C
- Difference between CDT and OAT is lower than 18,5°C

When crankcase is active, it will be deactivated if one of the following condition is met:

- Compressor starts
- OAT increases above 5°C
- Difference between CDT and OAT is higher than 21,5°C

## Drip tray heater (built-in) and condensation water heater (accessory)

The drip tray heater and the condensation water heater prevent condensation freezing on the drip tray and the condensation water pipe.

The heaters are activated if the system is in heating mode and one or more of the following conditions are met:

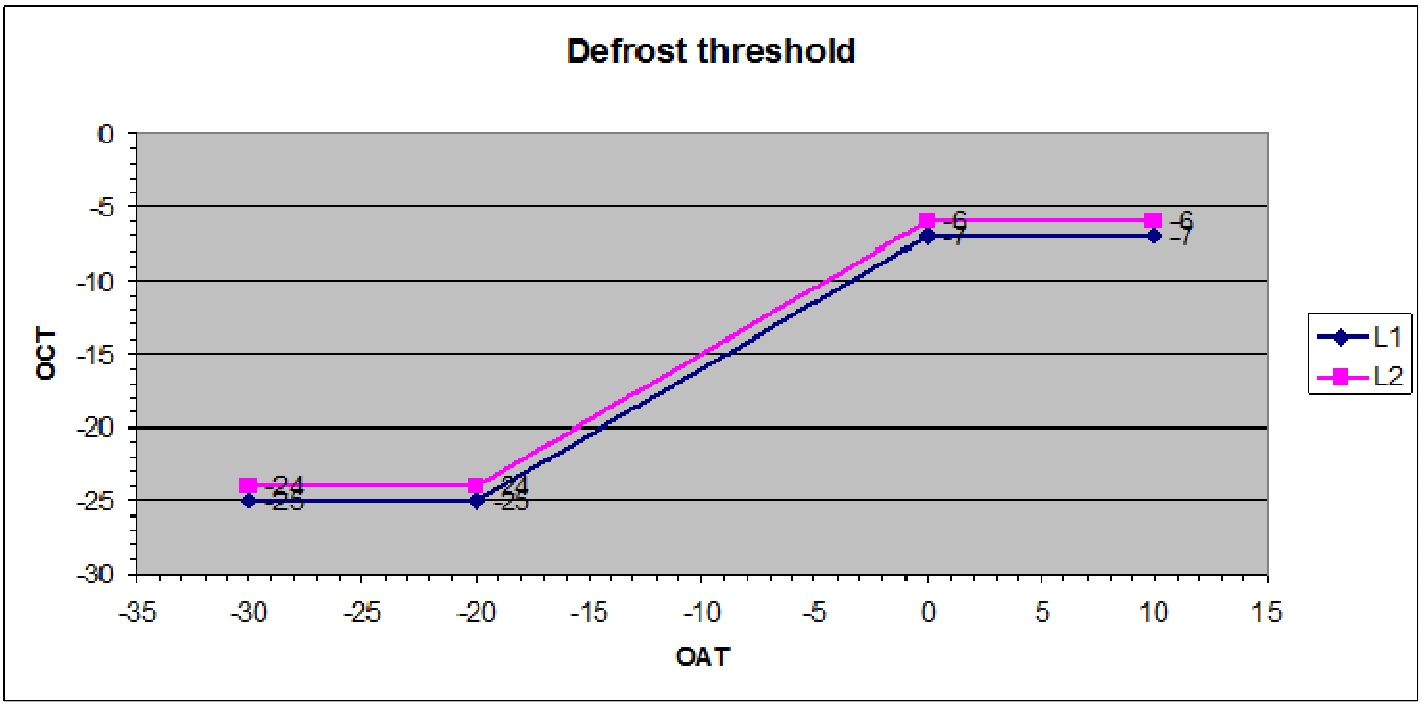
- OAT is lower than 0°C
- Defrost is active
- Less than 5 minutes have passed since last defrost

When heaters are active, they will be deactivated if all of the following conditions are met:

- OAT is higher than 2°C
- Defrost is not active and more than 5 minutes have passed since last defrost

# 8 Defrost

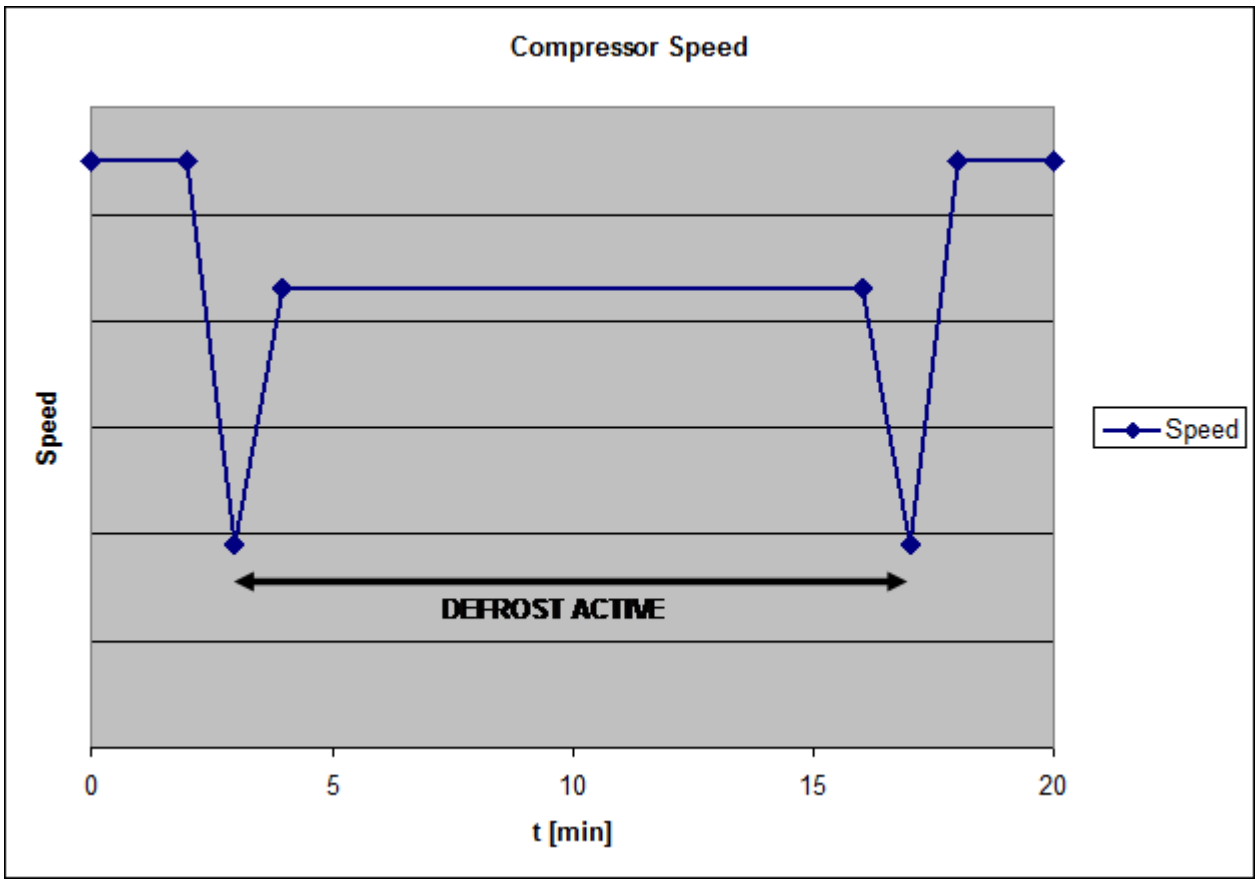
A defrost starts if one of these conditions is satisfied (see graph below):
- OCT falls below L1 line and compressor is running for at least 35 minutes without defrost
- OCT falls below L2 line and compressor is running for at least 60 minutes without defrost




A defrost ends if one of these conditions is satisfied:
- OCT rise above 14°C and defrost has been active for at least 2 minutes
- defrost has been active for 12 minutes

Removing the jumper JP2, the defrost end contitions will change according to the following:
- OCT rise above 24°C and defrost has been active for at least 5 minutes
- defrost has been active for 15 minutes

Before reversing the cycle at the beginning and at the end of the defrost, the compressor ramps down to decrease the pressure inside the circuit:




When defrost is active:

- 4-way valve is deactivated
- Compressor runs at a fixed speed (if no protection is active)
- EEV is open at a fixed value
- Fan is off

When defrost ends:

- 4-way valve is reactiavted
- EEV is opened at a fixed value for 5 minutes

# 9 Protections

The unit is equipped with an automatic system of protections. These protections, if active, will limit the speed of the compressor in order to run the system in a safe operating area.
Protections, when active, reduce the speed of the compressor linearly down to its minimum speed. If the level of protection is too high, compressor is stopped until no protection will be active.

## Overheating on outdoor unit heat exchanger

This protection checks the temperature on the outdoor coil (OCT) to avoid overheating and overpressure of the heat exchanger.
This protection is active only in cooling or dry mode and starts to limit the compressor speed when OCT is higher than 55°C.

## Overheating on indoor unit heat exchanger

This protection checks the temperature on the indoor coil (ICT) to avoid overheating and overpressure of the heat exchanger and reduces the high pressure noise inside the indoor unit.
This protection is active only in heating mode and starts to limit the compressor speed when ICT is higher than 40°C(*).
Notes:

- (*) ICT threshold may vary depending on the model of the indoor unit
- If High Power option is active, protection will start at higher values of ICT, increasing the heating capacity

## Freeze-up on indoor unit heat exchanger

This protection checks the temperature on the indoor coil (ICT) to avoid freezing of the indoor unit heat exchanger.
This protection is active only in cooling or dry mode and starts to limit the compressor speed when ICT is lower than 8°C.
Furthermore, if the unit is stopped because of this protection, in order to drip away all the condensed water on the indoor coil, it will not restart until ICT is higher than 8°C.

## Overheating on the compressor

This protection checks the compressor's discharge temperature (CDT) to avoid overheating of the compressor.
This protection is always active and starts to limit the compressor speed when CDT is higher than 90°C.

## Overheating on the power electronic

This protection checks the temperature of the electronic power module connected to the heatsink. The temperature sensor is built into the module, so there is no direct access to it.
This protection is always active and starts to limit the compressor speed when power electronic temperature is higher than 90°C.

## Over power consumption from the power supply

This protection checks the power consumption of the outdoor unit (but not of the indoor unit) to avoid an excessive power consumption than can damage the pcb and the unit.
This protection is always active and limits the compressor speed to keep the outdoor unit power consumption below 1800W.

## Overcurrent of the compressor

This protection checks the current consumption of the compressor to avoid damage to the compressor and to the pcb.
This protection is always active and limits the compressor speed to keep the current consumption of the compressor below 8A.

# 10 Component description

## AG-AA10-30/40

### Compressor

| | | | |
|---|---|---|---|
| type | HERMETIC, SINGLE ROTARY, DC INVERTER | | |
| model | 5RS102XBE01 | | |
| oil | RB68A or Freol Alpha 68M | | |
| refrigerant | R410A | | |
| motor | BRUSHLESS MOTOR | | |
| n. of poles | 6 | | |
| rated output | 700 W | | |
| winding resistance (@20 °C) | U-V: 0,858 Ω | V-W: 0,858 Ω | U-W: 0,858 Ω |
| overload protector | CS-7L 115 (WAKO ELECTRIC OR EQUIVALENCE) | | |

### Fan Motor

| | | | |
|---|---|---|---|
| model | ZW465B58 (**AA10-30**) – ZW465B57 (**AA10-40**) | | |
| motor | BRUSHLESS MOTOR | | |
| n. of poles | 8 | | |
| rated output | 20 W | | |
| rpm | variable, 200 ÷ 850 | | |
| winding resistance (@25 °C) | BRN (W) - BLK (U) : 206 Ω | WHT (V) - BLK (U) : 206 Ω | BRN (W) - WHT (V) : 206 Ω |

### 4-way Valve

| | |
|---|---|
| model | SHF-4H-23U (valve) - SHF-4-10L3 (coil) |
| coil rating | AC 220-240V 50/60Hz |
| coil resistance | 1440 Ω ± 7% at 20°C |

### Electronic Expansion Valve

| | |
|---|---|
| model | CAM-BD15EX-1 (valve) - ZCAM-MD12EX-9M-B (coil) |
| coil rating | DC 12V |
| coil resistance | 46 Ω ± 4% at 20°C |

### Crankcase Heater

| | |
|---|---|
| power | 30 W |
| resistance | 1760 Ω ± 10% at 20°C |

### Drip Tray Heater

| | |
|---|---|
| power | 75 W |
| resistance | 700 Ω ± 10% at 20°C |

# AG-AA10-50

## Compressor

| | | | |
|---|---|---|---|
| type | HERMETIC, TWIN ROTARY, DC INVERTER | | |
| model | SNB130FGBMT | | |
| oil | FV 50S | | |
| refrigerant | R410A | | |
| motor | BRUSHLESS MOTOR | | |
| n. of poles | 6 | | |
| rated output | 900 W | | |
| winding resistance (@20 °C) | U-V: 0,98 Ω | V-W: 0,98 Ω | U-W: 0,98 Ω |
| overload protector | EXTERNAL | | |

## Fan Motor

| | | | |
|---|---|---|---|
| model | ZW465B57 | | |
| motor | BRUSHLESS MOTOR | | |
| n. of poles | 8 | | |
| rated output | 20 W | | |
| rpm | variable, 200 ÷ 850 | | |
| winding resistance (@25 °C) | BRN (W) - BLK (U) : 206 Ω | WHT (V) - BLK (U) : 206 Ω | BRN (W) - WHT (V) : 206 Ω |

## 4-way Valve

| | |
|---|---|
| model | SHF-7K-34U (valve) - SHF-4-10L3 (coil) |
| coil rating | AC 220-240V 50/60Hz |
| coil resistance | 1440 Ω ± 7% at 20°C |

## Electronic Expansion Valve

| | |
|---|---|
| model | CAM-BD15EX-1 (valve) - ZCAM-MD12EX-9M-B (coil) |
| coil rating | DC 12V |
| coil resistance | 46 Ω ± 4% at 20°C |

## Crankcase Heater

| | |
|---|---|
| power | 30 W |
| resistance | 1760 Ω ± 10% at 20°C |

## Drip Tray Heater

| | |
|---|---|
| power | 75 W |
| resistance | 700 Ω ± 10% at 20°C |

## Sensors

OCT: Outdoor Coil Temperature. Used for:
- EEV management
- Fan management
- Protection against overheating of the heat exchanger (cooling or dry mode)
- Defrost cycle management (heating mode)

OAT: Outdoor Air Temperature. Used for:
- EEV management
- Fan management
- Defrost cycle management
- Crankcase heater management
- Base heater management

CDT: Compressor Discharge Temperature. Used for:
- EEV management
- Protection against overheating of the compressor
- Crankcase heater management

| T | OCT | | CDT | | OAT | |
|---|---|---|---|---|---|---|
| [°C] | Resistance [Kohm] | Voltage [Vdc] | Resistance [Kohm] | Voltage [Vdc] | Resistance [Kohm] | Voltage [Vdc] |
| **-40** | 351,078 | 2,442 | 351,078 | 2,470 | 349,100 | 2,442 |
| **-35** | 251,577 | 2,402 | 251,577 | 2,462 | 250,300 | 2,402 |
| **-30** | 182,451 | 2,351 | 182,451 | 2,451 | 181,600 | 2,350 |
| **-25** | 133,827 | 2,286 | 133,827 | 2,437 | 133,300 | 2,285 |
| **-20** | 99,221 | 2,206 | 99,221 | 2,419 | 98,860 | 2,205 |
| **-15** | 74,316 | 2,111 | 74,316 | 2,396 | 74,408 | 2,111 |
| **-10** | 56,202 | 2,000 | 56,202 | 2,367 | 56,050 | 1,999 |
| **-5** | 42,894 | 1,875 | 42,894 | 2,331 | 42,800 | 1,874 |
| **0** | 33,024 | 1,737 | 33,024 | 2,287 | 32,970 | 1,736 |
| **5** | 25,607 | 1,590 | 25,607 | 2,234 | 25,570 | 1,589 |
| **10** | 20,017 | 1,439 | 20,017 | 2,171 | 20,000 | 1,438 |
| **15** | 15,769 | 1,288 | 15,769 | 2,099 | 15,760 | 1,287 |
| **20** | 12,513 | 1,141 | 12,513 | 2,016 | 12,510 | 1,141 |
| **25** | 10,000 | 1,002 | 10,000 | 1,924 | 10,000 | 1,002 |
| **30** | 8,045 | 0,873 | 8,045 | 1,823 | 8,048 | 0,873 |
| **35** | 6,514 | 0,756 | 6,514 | 1,715 | 6,518 | 0,756 |
| **40** | 5,306 | 0,652 | 5,306 | 1,602 | 5,311 | 0,652 |
| **45** | 4,348 | 0,560 | 4,348 | 1,485 | 4,353 | 0,560 |
| **50** | 3,583 | 0,480 | 3,583 | 1,367 | 3,588 | 0,480 |
| **55** | 2,968 | 0,411 | 2,968 | 1,250 | 2,973 | 0,411 |
| **60** | 2,472 | 0,352 | 2,472 | 1,137 | 2,477 | 0,352 |
| **65** | 2,068 | 0,301 | 2,068 | 1,028 | 2,073 | 0,302 |
| **70** | 1,739 | 0,258 | 1,739 | 0,925 | 1,743 | 0,258 |
| **75** | 1,469 | 0,221 | 1,469 | 0,829 | 1,473 | 0,222 |
| **80** | 1,246 | 0,190 | 1,246 | 0,741 | 1,250 | 0,191 |
| **85** | 1,061 | 0,164 | 1,061 | 0,660 | 1,065 | 0,164 |
| **90** | 0,9078 | 0,141 | 0,9078 | 0,587 | 0,911 | 0,142 |
| **95** | 0,7795 | 0,122 | 0,7795 | 0,521 | 0,782 | 0,123 |
| **100** | 0,6718 | 0,106 | 0,6718 | 0,463 | 0,674 | 0,107 |

# 11 Diagnostic table

INDICATION ON OUTDOOR UNIT

✕ LED OFF ✺ LED BLINKING

| RANK | DIAGNOSIS CONTENTS | DL3 | DL4 | DL5 | DL6 | DL7 |
|---|---|---|---|---|---|---|
| 10 | -CDT PROBE DAMAGED OR NOT CONNECTED | ✕ | ✺ | ✕ | ✕ | ✕ |
| 9 | -OAT PROBE DAMAGED OR NOT CONNECTED | ✕ | ✕ | ✺ | ✕ | ✕ |
| 8 | -OCT PROBE DAMAGED OR NOT CONNECTED | ✕ | ✕ | ✕ | ✺ | ✕ |
| 7 | -COMPRESSOR OVERCURRENT | ✕ | ✕ | ✕ | ✕ | ✺ |
| 6 | -COMPRESSOR OVERTEMPERATURE | ✺ | ✺ | ✕ | ✕ | ✕ |
| 5 | -FAN OVERCURRENT | ✕ | ✺ | ✺ | ✕ | ✕ |
| 4 | -FAN OVERTEMPERATURE | ✕ | ✕ | ✺ | ✺ | ✕ |
| 3 | -FAULT ON INDOOR UNIT | ✕ | ✕ | ✕ | ✺ | ✺ |
| 2 | -COMUNICATION ERROR | ✺ | ✺ | ✺ | ✕ | ✕ |
| 1 | -PFC PROTECTION | ✕ | ✺ | ✺ | ✺ | ✕ |

When unit is working properly:

- DL3 is solid ON
- DL4 is solid ON if the indoor unit is switched ON, otherwise it's OFF

# 12 Troubleshooting

| ERROR LIST | | | | |
|---|---|---|---|---|
| **Rank** | **Meaning** | **System behaviour** | **Cause** | **Solution** |
| 1 | PFC (Power Factor Controller) protection: automatic protection against power supply disturbances and instabilities. | Compressor and fan are stopped. The system restarts automatically after 3 minutes. | Power supply surge or over voltage. | Check the quality of the power supply. |
| | | | Power supply voltage dip or interruption. | |
| | | | Power supply fast transient or burst. | |
| | | | Bad earth connection. | Check that all the earth cables are correctly connected, expecially the outdoor pcb's earth cable and the compressor's earth. |
| | | | Bad connection between outdoor and the heatsink. | Check that the outdoor pcb is properly connected to the heatsink and that the screws on the pcb are properly mounted with the right torque. Check that there is enough thermal paste between the pcb and the heatsink. |
| | | | EEV damaged. | Check the EEV functioning. A malfunctioning on the expansion valve may cause liquid flood back on the compressor. |
| | | | Outdoor pcb damaged. | Only if the error is recurrent, change the outdoor pcb. |
| 2 | Communication error between the outdoor unit and the indoor unit. | Compressor and fan are stopped after 30 seconds of missing communication. The system restarts automatically as soon as the communication is recovered. | Bad communication bus connection between outdoor and indoor unit. | Check that connections between C1 and C2 on outdoor and indoor terminal block is consistent (C1 terminals connected together, C2 terminals connected together). |
| | | | Normal cable used instead of shielded cable. | Be sure to use a shielded communication cable for serial connection. |
| | | | Wrong communication address. | Be sure to have set the correct address on every indoor unit. Follow unit specific installation instructions. |
| | | | Bad earth connections. | Check that earth cables are properly connected to every terminal. Check that the shield of the communication cable is properly connected to every terminal. Chech that all internal earth cable are properly connected. |

| | | | | |
|---|---|---|---|---|
| | | | Communication fuses blown. | Check the communication fuse on outdoor unit.<br>Check the communication fuse on indoor unit (only certain models). |
| | | | Indoor unit not powered on. | Check that the indoor unit has power supply and that the unit is working. |
| | | | Outdoor or indoor unit pcb out of order. | Check that all the pcbs are powered on.<br>Be sure that power supply has not been connected to the communication terminals.<br>Check that there are no burnt signes on the pcbs, in particular close to communication cables. |
| | | | Compressor damaged. | Check that there is no continuity between the phases of the compressor and the earth (dielectric strength). |
| 3 | Error on the indoor unit. | Compressor and fan are stopped.<br>The system restarts automatically as soon as the error on the indoor unit is solved. | An error occurred on the indoor unit. | Follow specific indoor unit troubleshooting. |
| 4 | Automatic protection against overheating on the power electronics (fan motor module). | Compressor and fan are stopped.<br>The system restarts automatically after 3 minutes. | Bad connection between the fan motor's module and the heatsink, or missing fan module's heatsink. | Check that the fan motor module is properly connected to the heatsink and that the screws on the module are properly mounted with the right torque. Check that there is enough thermal paste between the fan module and the heatsink. |
| | | | The rear of the outdoor unit is obstructed. | Remove the obstruction. |
| | | | Incorrect fan operation. | Check that fan works properly. |
| 5 | Automatic protection against fan motor overcurrent. | Compressor and fan are stopped.<br>The system restarts automatically after 3 minutes. | Fan motor disconnected. | Check the fan motor connector. |
| | | | Fan motor blocked / obstructed. | Remove the obstruction. |
| | | | Fan motor damaged. | Check if the fan motor starts. If it does not start correctly, change the fan motor. |
| | | | Outdoor pcb damaged. | Only if the error is recurrent, change the outdoor pcb. |

| | | | | |
|---|---|---|---|---|
| 6 | Automatic protection against overheating on the power electronics (compressor module). | Compressor and fan are stopped.The system restarts automatically after 3 minutes. | Bad connection between the outdoor pcb and the heatsink. | Check that the outdoor pcb is properly connected to the heatsink and that the screws on the pcb are properly mounted with the right torque. Check that there is enough thermal paste between the pcb and the heatsink. |
| | | | The rear of the outdoor unit is obstructed. | Remove the obstruction. |
| | | | Incorrect fan operation. | Check that fan works properly. |
| 7 | Automatic protection against compressor overcurrent. | Compressor and fan are stopped. The system restarts automatically after 3 minutes. | Power supply surge or under voltage. | Check the quality of the power supply. |
| | | | There is some air or moisture inside the refrigerant circuit. | Be sure to have correctly pulled the vacuum of the system. In case, pull the vacuum again and recharge the outdoor unit with the correct amount of refrigerant. |
| | | | Damaged compressor. | Check windings of the compressor. |
| | | | Bad earth connection. | Check that all the earth cables are correctly connected. |
| | | | Fan damaged. | Check that fan motors of indoors and outdoor units work properly. |
| | | | Lack of refrigerant in the refrigerant circuit. | Check the refrigerant amount in the unit, find and repair a possible leakage and recharge the unit with the correct refrigerant amount. |
| 8 | OCT (Outdoor Coil Temperature) sensor fault. | Compressor and fan are stopped. The system restarts as soon as the sensor is repaired. | Sensor out of order or disconnected (check wiring diagram). | Reconnect or replace the sensor. |
| 9 | OAT (Outdoor Air Temperature) sensor fault. | Compressor and fan are stopped. The system restarts as soon as the sensor is repaired. | Sensor out of order or disconnected (check wiring diagram). | Reconnect or replace the sensor. |
| 10 | CDT (Compressor Discharge Temperature) sensor fault. | Compressor and fan are stopped. The system restarts as soon as the sensor is repaired. | Sensor out of order or disconnected (check wiring diagram). | Reconnect or replace the sensor. |

# 13 Component replacement

## AG-AA10-30

**FRONT AND REAR PANEL**

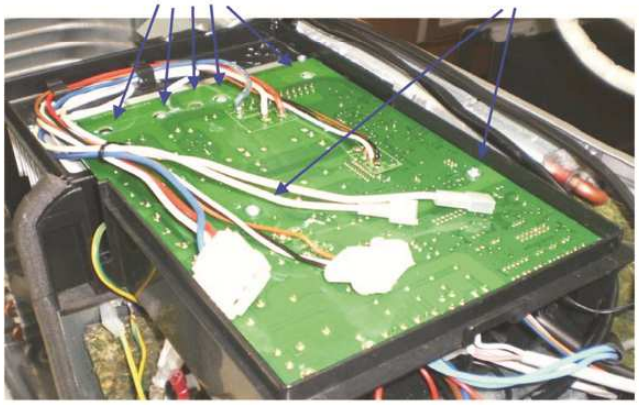
# AG-AA10-30/40/50

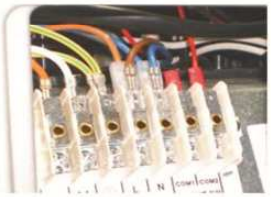
**CONTROL BOARD** (remove the front panel)

unhook the spring hook
and lift the cover

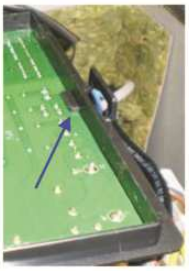
disconnect the connection cable
(fan motor, compressor, inductor and ground)

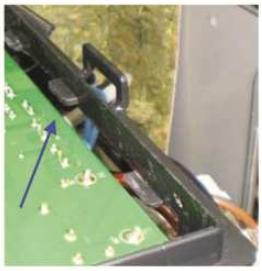
unscrew the 5 screw from the heatsink and the 2 screw from the plastic box





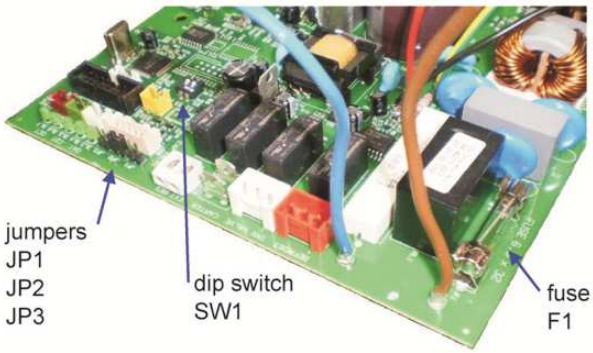
disconnect the
blu/brown and
black/red cable from
the terminal plate





slide the pcb from the hook and lift it

disconnect all the cable from the pcb
and extract the pcb from the box



## AG-AA10-30

**COMPRESSOR** (remove the front and the rear panel)

disengage the insulation panel
from the rear and the front side
and lift it

release the 2 string of the
body compressor insulation
and remove it

unhooking the spring
of the compressor heater
and remove it

remove the putty from the cable gate,
unscrew the flange nut and remove the terminal cover

disconnect the cable
and remove the gasket

unscrew the 3 flange nut

drain the cooling circuit and ensure that
no refrigerant remains before you continue

disconnect the pipes for suction and hot gas

remove the compressor from the bolts

## AG-AA10-30

**EXPANSION VALV E** (remove the front and the rear panel)

disengage the insulation panel from the rear and the front side and lift it

remove the coil the valve body

remove the putty from the valve pipes and from the filter

drain the cooling circuit and ensure that no refrigerant remains before you continue

disconnect the pipes from the filter

## AG-AA10-30

**FAN MOTOR** (remove the front panel)

unscrew the nut and remove fan

disconnect the connector of cable

unscrew the screw of plastic box

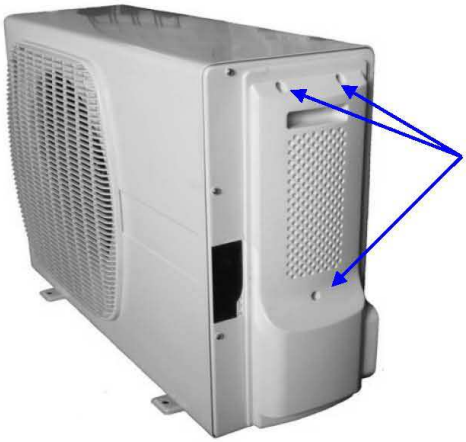
open the metal clamp

lift the plastic box and release the cable

unscrew the 4 screw of motor body
and remove it

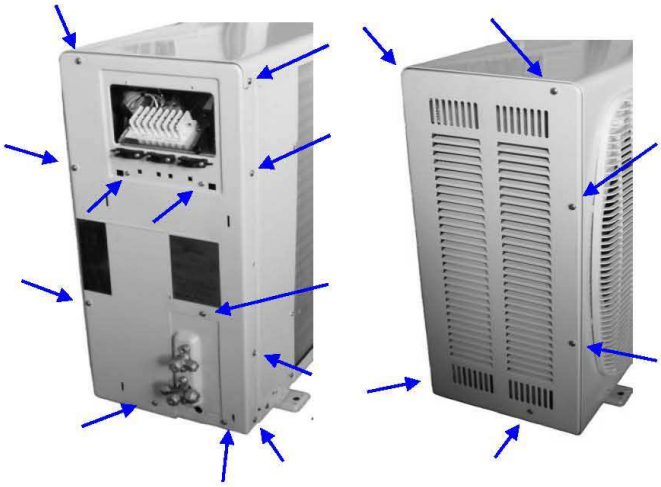
# AG-AA10-40/50

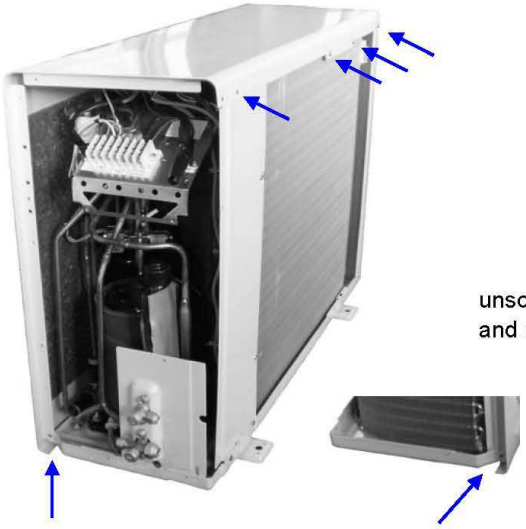
## FRONT, RIGHT, LEFT AND REAR PANEL



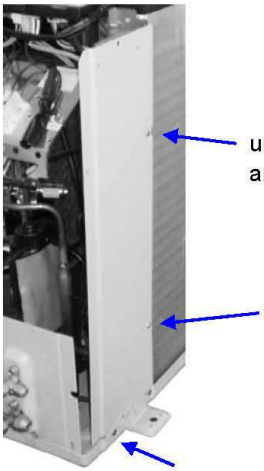
unscrew
the valve covering
and remove it

unscrew
the right and the left panel
and remove it





unscrew the front panel
and remove it

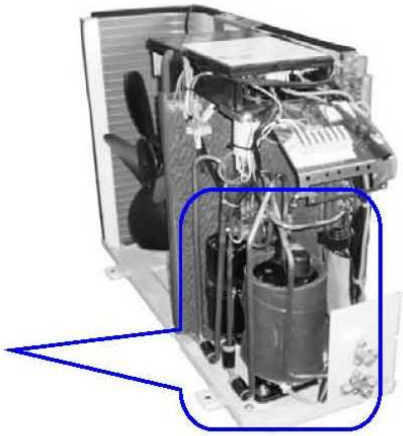


unscrew the rear panel
and remove it

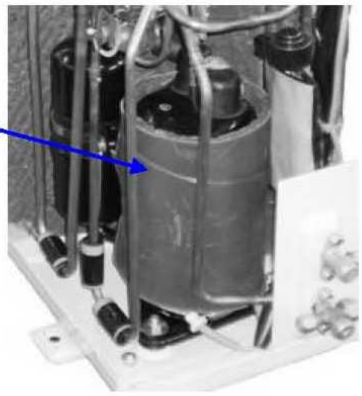
# AG-AA10-40/50

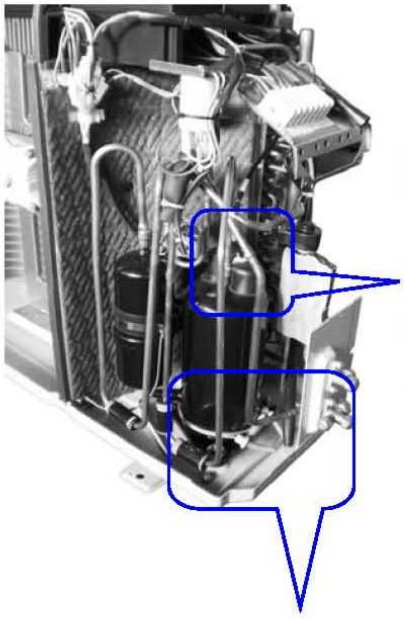
## COMPRESSOR

(remove the right, the left, the front and the rear panel)



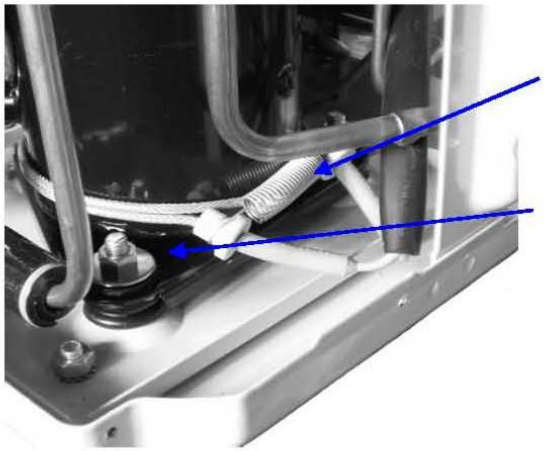
release the 2 string of the body compressor insulation and remove it





remove the putty from the cable gate, unscrew the flange nut and remove the terminal cover

disconnect the cable and remove the gasket



unhooking the spring of the compressor heater and remove it

unscrew the 3 flange nut

drain the cooling circuit and ensure that no refrigerant remains before you continue

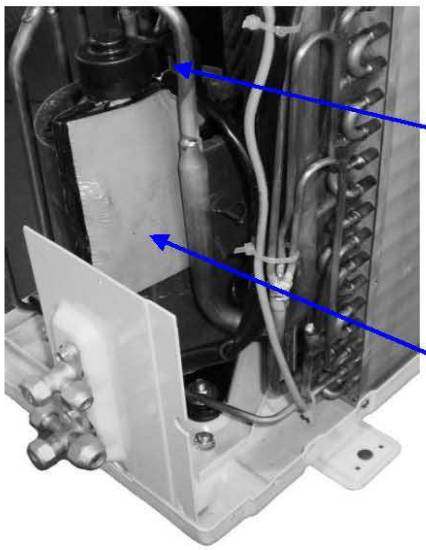
disconnect the pipes for suction and hot gas

remove the compressor from the bolts

## AG-AA10-40/50

### EXPANSION VALVE

(remove the right, the left, the front and the rear panel)



remove the coil
from the valve body

remove the vib.ins. from the valve pipes and from the filter

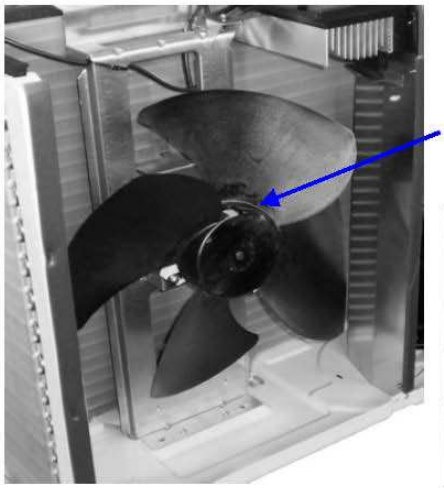
drain the cooling circuit and ensure that
no refrigerant remains before you continue

disconnect the pipes from the filter

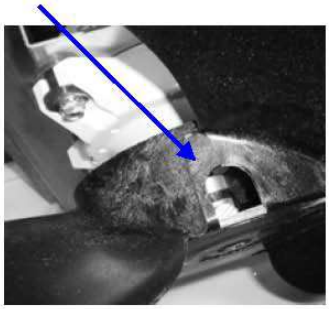
## AG-AA10-40/50

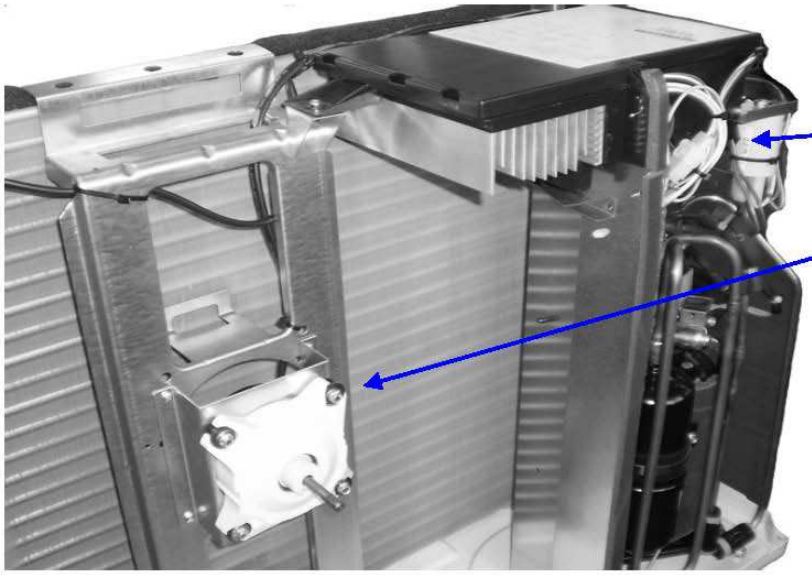
### FAN MOTOR

(remove the right, the left and the front panel)



unscrew the screw
and remove fan



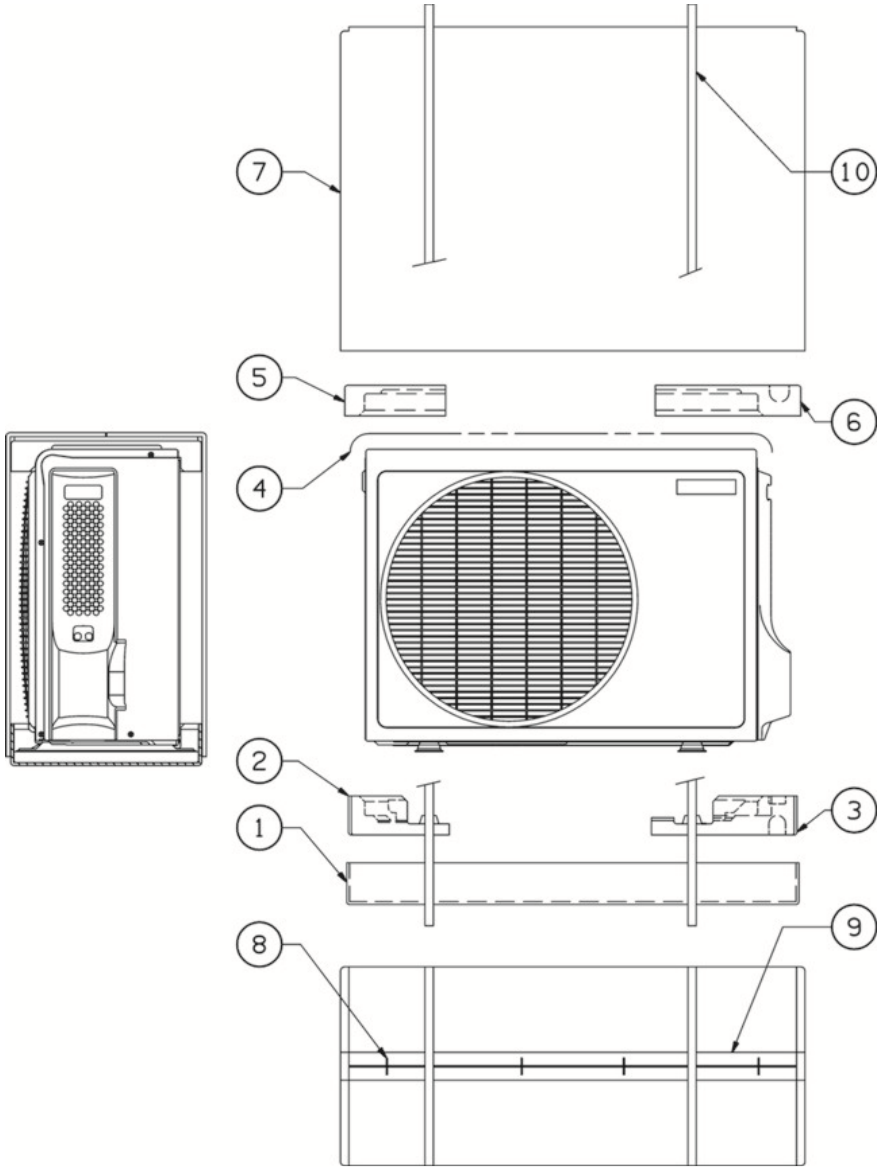


disconnect the connector of cable

unscrew the 4 screw of motor body
and remove it

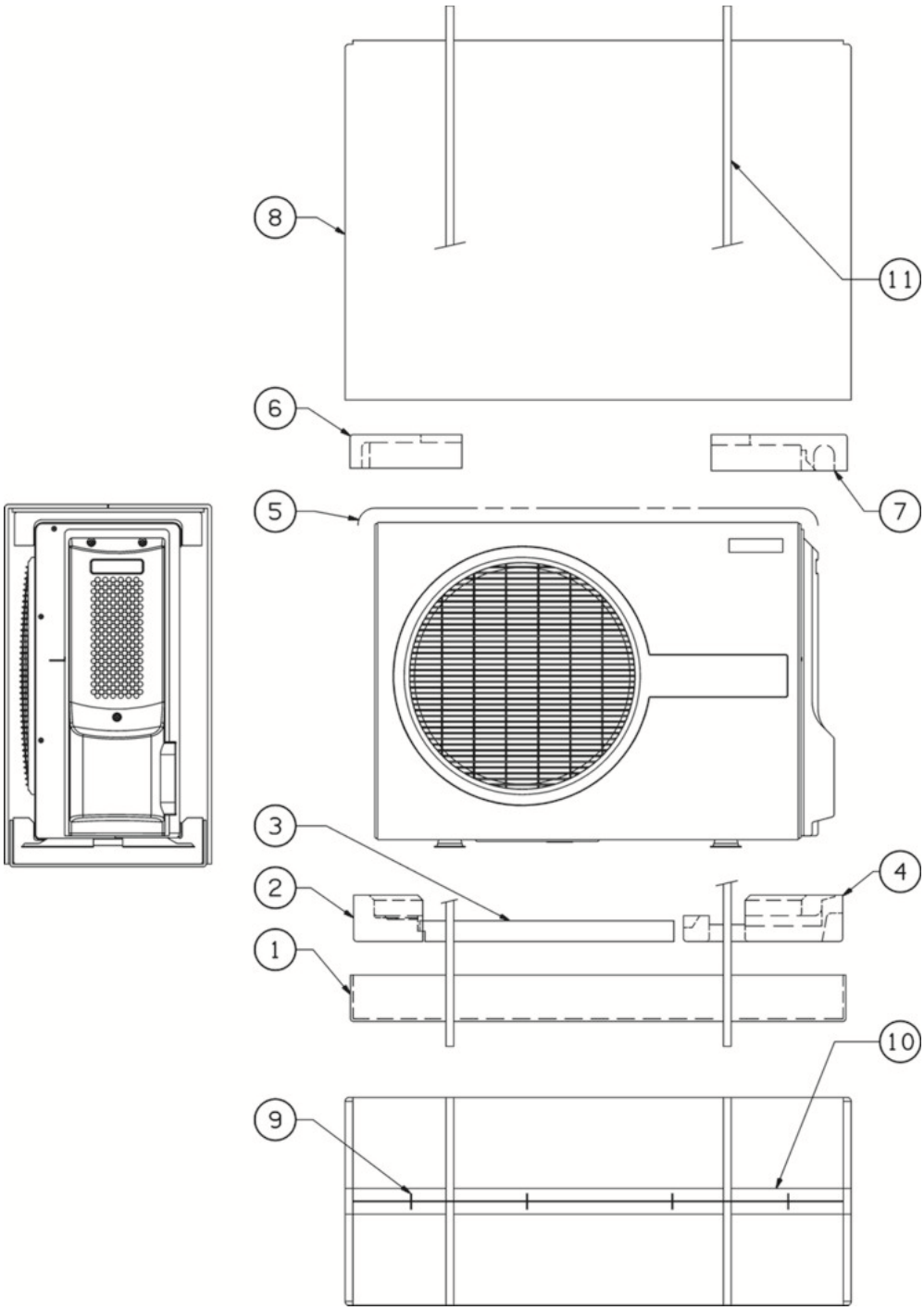
# 14 Packaging

## AG-AA10-30




1: bottom carton box
2: lower left PS shield
3: lower right PS shield
4: polietylene sheet
5: upper left PS shield
6: upper right PS shield
7: carton box
8: staple
9: scotch tape
10: PP band

## AG-AA10-40/50

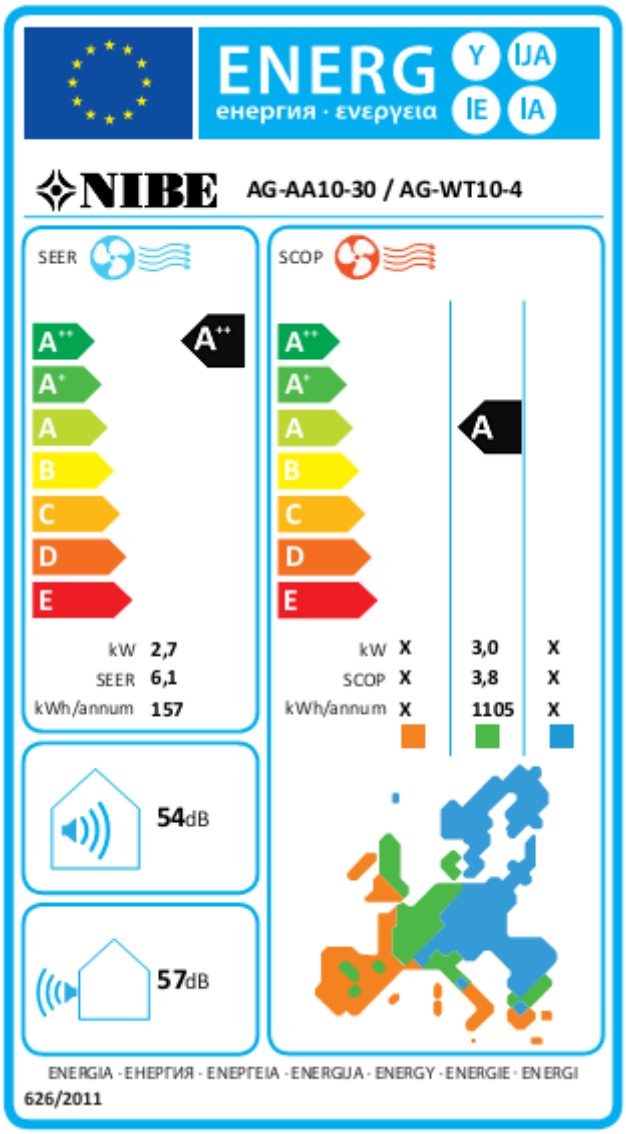



1: bottom carton box
2: lower left PS shield
3: lower PS shield
4: lower right PS shield
5: polietylene sheet
6: upper left PS shield
7: upper right PS shield
8: carton box
9: staple
10: scotch tape
11: PP band

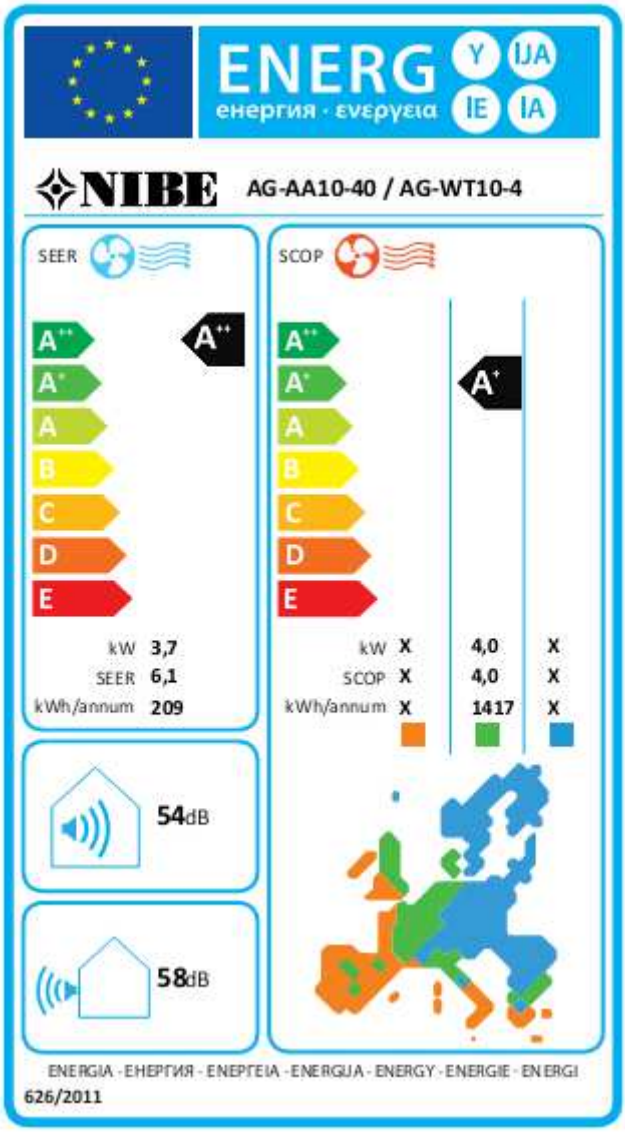
# 15 Labels

## Energy labels

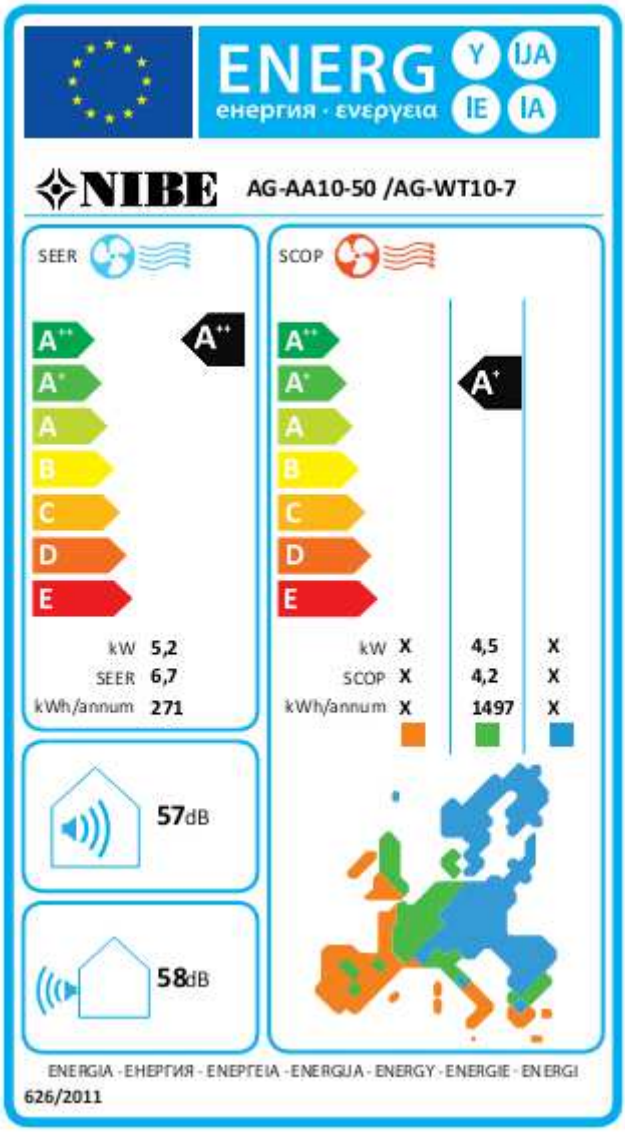
### AG-AA10-30



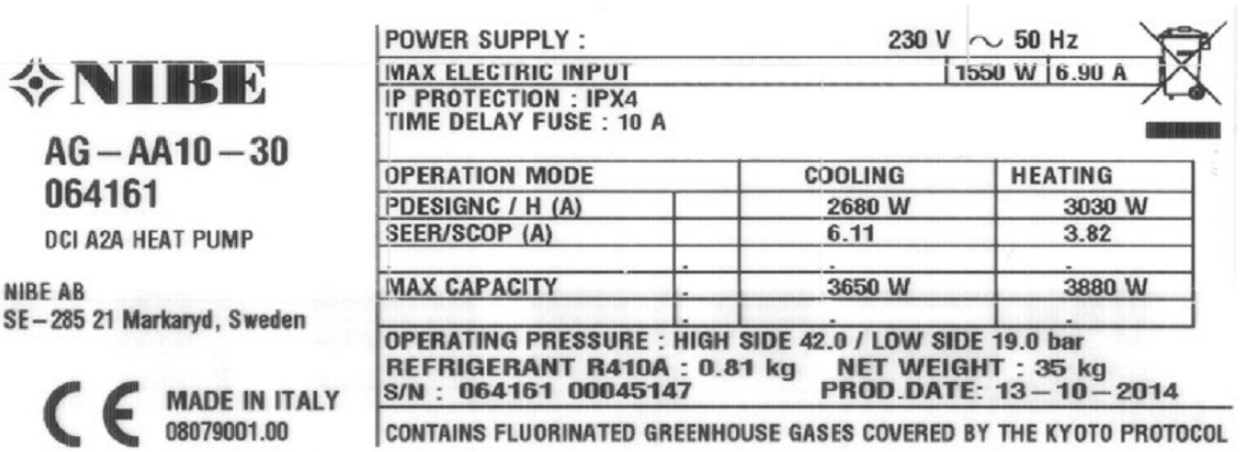
## AG-AA10-40


ENERG
енергия · ενεργεια
NIBE
AG-AA10-40 / AG-WT10-4
SEER
A++
A+
A
B
C
D
E
kW 3,7
SEER 6,1
kWh/annum 209
SCOP
A++
A+
A
B
C
D
E
kW X 4,0 X
SCOP X 4,0 X
kWh/annum X 1417 X
54dB
58dB
ENERGIA · ЕНЕРГИЯ · ΕΝΕΡΓΕΙΑ · ENERGIJA · ENERGY · ENERGIE · ENERGI
626/2011

## AG-AA10-50


ENERG
енергия · ενεργεια
NIBE
AG-AA10-50 /AG-WT10-7
SEER
A++
A+
A
B
C
D
E
kW 5,2
SEER 6,7
kWh/annum 271
SCOP
A++
A+
A
B
C
D
E
kW X 4,5 X
SCOP X 4,2 X
kWh/annum X 1497 X
57dB
58dB
ENERGIA · ЕНЕРГИЯ · ΕΝΕΡΓΕΙΑ · ENERGIJA · ENERGY · ENERGIE · ENERGI
626/2011

# Rating labels

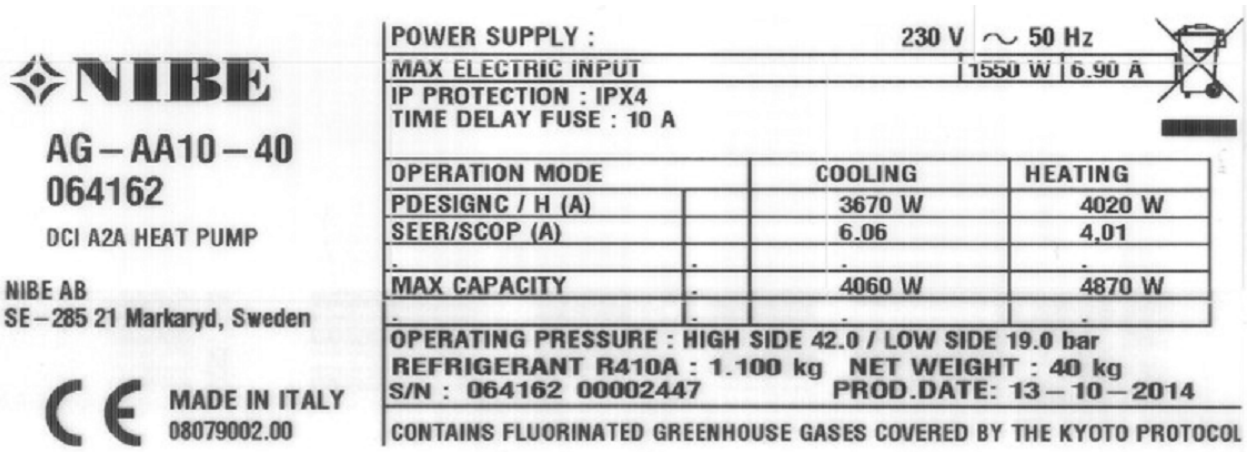


NIBE
AG – AA10 – 30
064161
DCI A2A HEAT PUMP
NIBE AB
SE – 285 21 Markaryd, Sweden
CE MADE IN ITALY
08079001.00

POWER SUPPLY : 230 V ~ 50 Hz
MAX ELECTRIC INPUT 1550 W 6.90 A
IP PROTECTION : IPX4
TIME DELAY FUSE : 10 A

| OPERATION MODE | COOLING | HEATING |
|---|---|---|
| PDESIGNC / H (A) | 2680 W | 3030 W |
| SEER/SCOP (A) | 6.11 | 3.82 |
| . | . | . |
| MAX CAPACITY | 3650 W | 3880 W |
| . | . | . |

OPERATING PRESSURE : HIGH SIDE 42.0 / LOW SIDE 19.0 bar
REFRIGERANT R410A : 0.81 kg NET WEIGHT : 35 kg
S/N : 064161 00045147 PROD.DATE: 13 – 10 – 2014
CONTAINS FLUORINATED GREENHOUSE GASES COVERED BY THE KYOTO PROTOCOL

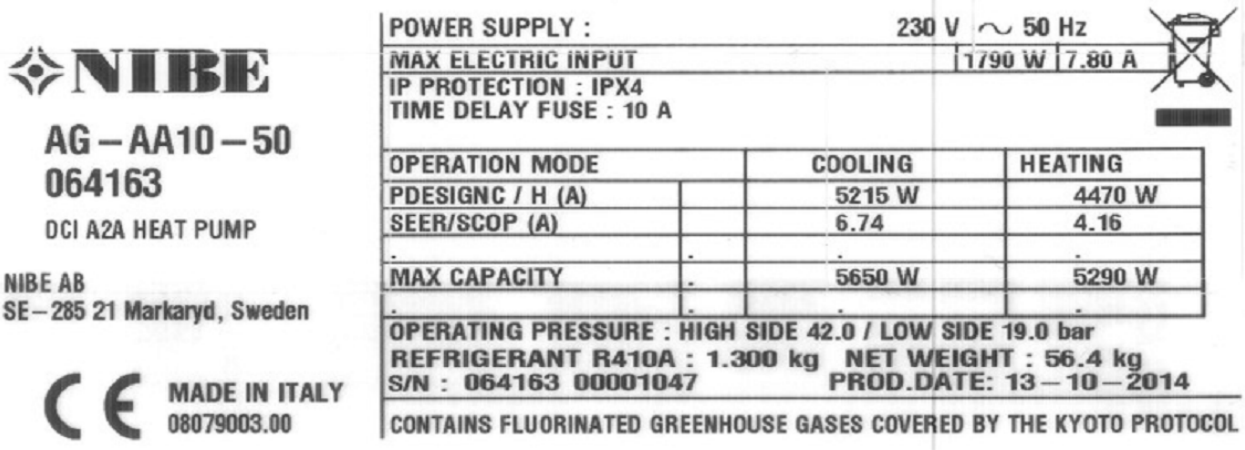


NIBE
AG – AA10 – 40
064162
DCI A2A HEAT PUMP
NIBE AB
SE – 285 21 Markaryd, Sweden
CE MADE IN ITALY
08079002.00

POWER SUPPLY : 230 V ~ 50 Hz
MAX ELECTRIC INPUT 1550 W 6.90 A
IP PROTECTION : IPX4
TIME DELAY FUSE : 10 A

| OPERATION MODE | COOLING | HEATING |
|---|---|---|
| PDESIGNC / H (A) | 3670 W | 4020 W |
| SEER/SCOP (A) | 6.06 | 4,01 |
| . | . | . |
| MAX CAPACITY | 4060 W | 4870 W |
| . | . | . |

OPERATING PRESSURE : HIGH SIDE 42.0 / LOW SIDE 19.0 bar
REFRIGERANT R410A : 1.100 kg NET WEIGHT : 40 kg
S/N : 064162 00002447 PROD.DATE: 13 – 10 – 2014
CONTAINS FLUORINATED GREENHOUSE GASES COVERED BY THE KYOTO PROTOCOL



NIBE
AG – AA10 – 50
064163
DCI A2A HEAT PUMP
NIBE AB
SE – 285 21 Markaryd, Sweden
CE MADE IN ITALY
08079003.00

POWER SUPPLY : 230 V ~ 50 Hz
MAX ELECTRIC INPUT 1790 W 7.80 A
IP PROTECTION : IPX4
TIME DELAY FUSE : 10 A

| OPERATION MODE | COOLING | HEATING |
|---|---|---|
| PDESIGNC / H (A) | 5215 W | 4470 W |
| SEER/SCOP (A) | 6.74 | 4.16 |
| . | . | . |
| MAX CAPACITY | 5650 W | 5290 W |
| . | . | . |

OPERATING PRESSURE : HIGH SIDE 42.0 / LOW SIDE 19.0 bar
REFRIGERANT R410A : 1.300 kg NET WEIGHT : 56.4 kg
S/N : 064163 00001047 PROD.DATE: 13 – 10 – 2014
CONTAINS FLUORINATED GREENHOUSE GASES COVERED BY THE KYOTO PROTOCOL