TECHNICAL DATA
& SERVICE MANUAL
iSeries

OUTDOOR UNIT: AEI1G 42 EMX
AEI1G 50 EMX

SPLIT SYSTEM AIR CONDITIONER

AEI1G 42-50 EMX

May 2016

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REVISION NOTES

Rev.	Date	Author	Checked	Comments
00	21/03/2016	GV	MDG	First release.
01	07/04/2016	GV	MDG	Added page numbers. Modified component replacement section to be more easy to read. Updated troubleshooting and diagnostic tables.

1 Scope

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

UNIT MODEL TABLE

COD	MODEL	
387007219	AEI1G42EMX U.E.	
387007216	AEI1G50EMX U.E.	

* cross reference with similar ARGO models.

DECLARATION OF CONFORMITY "CE"

Units described in this document conform with the following EU directives.

Relevant EU Directives:

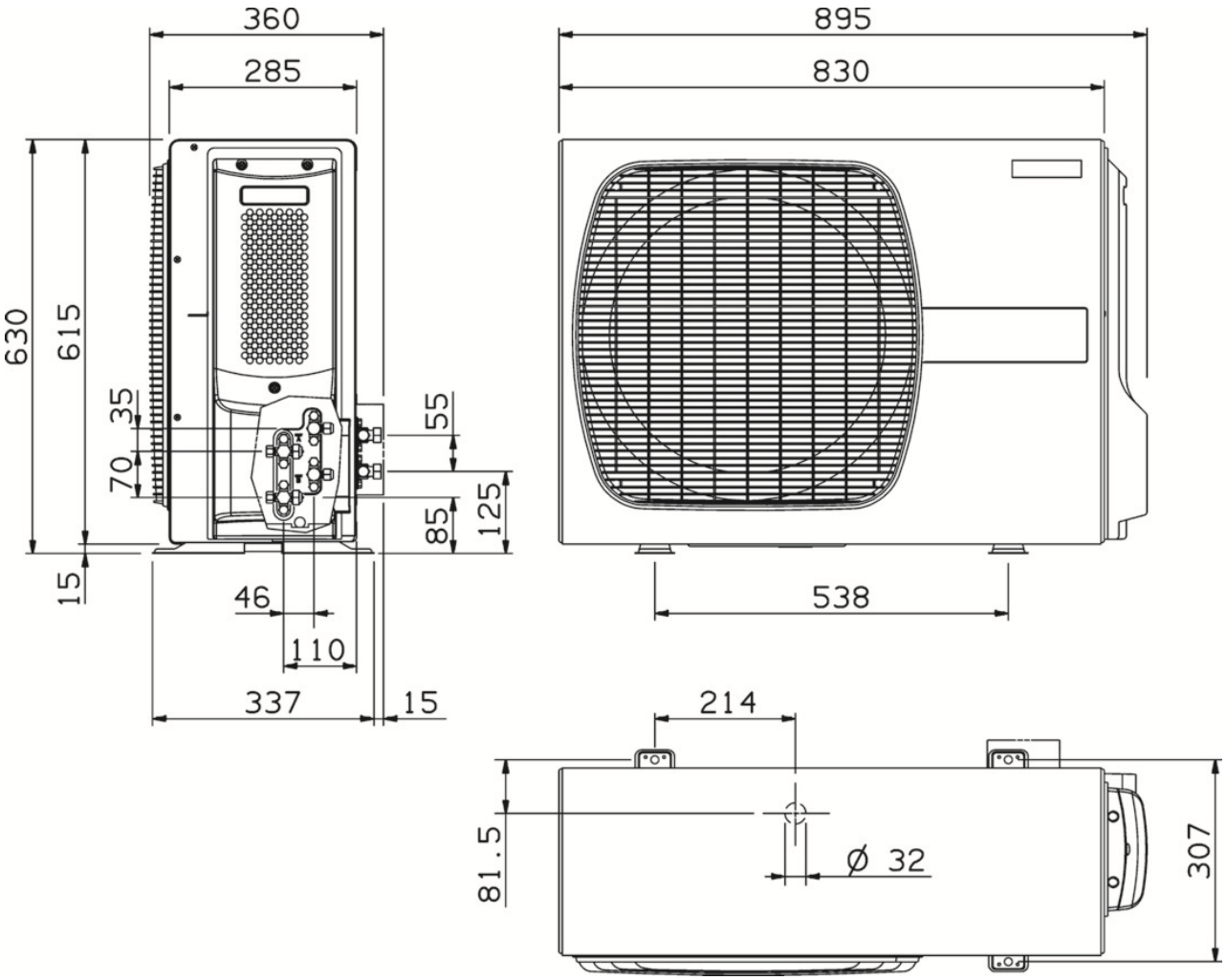
- the EMC Directive 2014/30/EU
- the Low Voltage Directive 2014/35/EU
- the Machinery Directive2006/42/EC
- the PED Directive 2014/68/EU
- the RoHS 2 directive 2011/65/UE + 2015/863/EU amending ANNEX II
- Energy Related Products (ErP) Directive 2009/125/EC

Applied Standards / Regulations:

- EN378-2:2008+A1:2009
- EN60335-1:2012
- EN60335-2-40:2003+A11:2004+A12:2005+A1:2006+A2:2009+A13:2012
- EN62233:2008
- EN55014-1:2006+A1:2009+A2:2011
- EN55014-2:1997+A1:2001+A2:2008
- EN61000-3-2:2014
- EN61000-3-3:2013
- EU Regulation no. 206/2012 concerning Ecodesign requirements for air conditioners and comfort fans
- EU Regulation no. 626/2011 concerning of Energy labelling of air conditioners

2 Dimensional data and exterior appearance

AEI1G 42-50 EMX



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

3 Technical specifications

AEI1G 42 EMX				
AIR AIR				
COOLING	Pdesignc	kW	4,3	**A++**
+35°C	SEER		6,5	
HEATING	Pdesignh	kW	3,4	**A+**
Average -10°C	SCOP		4,1	

ERP Ecodesign - EN14825

COOLING			
+35°C OU / 27/19°C IU	Maximum	kW	4,3

HEATING			
+12/11°C OU / +20°C IU	Maximum	kW	5,8
+7/6°C OU / +20°C IU	Maximum	kW	5,2
+2/1°C OU / + 20° C IU	Maximum	kW	2,8
-7/-8°C OU / + 20° C IU	Maximum	kW	3,0
-10/-11°C OU / + 20° C IU	Maximum	kW	2,9

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")	9,52 (3/8)"
Total lenght of pipes (standard load)	m	Dual 15/Mono 7,5
Total lenght of pipes (additional load)	m	Dual 30/Mono 20
Single unit lenght of pipes (standard load)	m	Dual 12
Single unit lenght of pipes (additional load)	m	Dual 25

Max height difference between unit (OU/IU)	m	10
Max height difference between unit (IU/IU)	m	5

AEI1G 50 EMX				
AIR AIR				
COOLING	Pdesignc	kW	5,4	**A++**
+35°C	SEER		6,4	
HEATING	Pdesignh	kW	4,3	**A+**
Average -10°C	SCOP		4,0	

ERP Ecodesign - EN14825

COOLING			
+35°C OU / 27/19°C IU	Maximum	kW	5,9

HEATING			
+12/11°C OU / +20°C IU	Maximum	kW	6,7
+7/6°C OU / +20°C IU	Maximum	kW	6,0
+2/1°C OU / +20°C IU	Maximum	kW	3,7
-7/-8°C OU / +20°C IU	Maximum	kW	3,9
-10/-11°C OU /+ 20°C IU	Maximum	kW	3,7

EN14511

Power supply	V/Ph/Hz	230/1/50
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R410A standard refrigerant charge	kg	1,3
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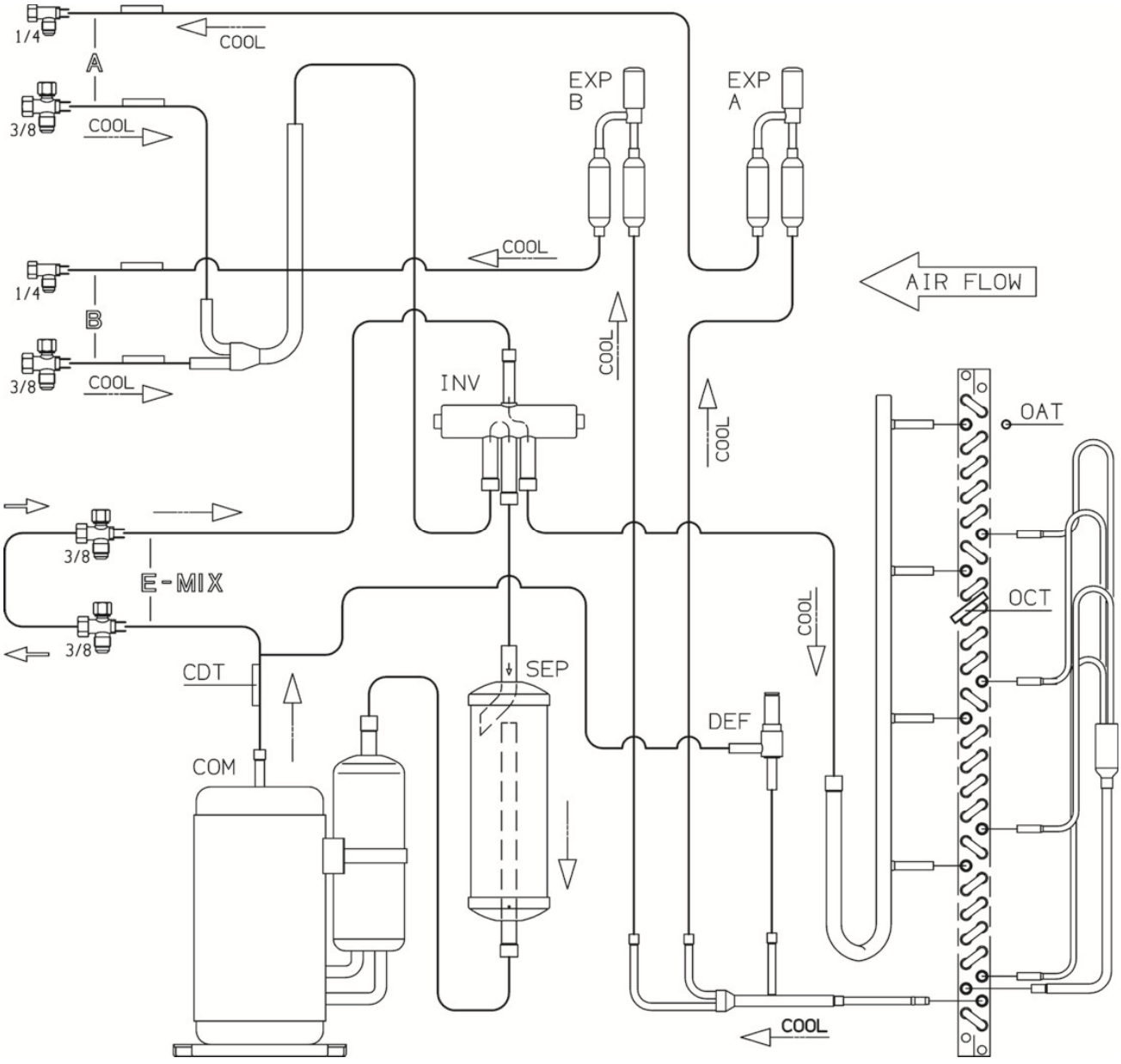
Fan speed		Auto
Sound pressure (max.)	dB(A)	41
Liquid pipe	mm (inch")	6,35 (1/4")
Gas pipe	mm (inch")	9,52 (3/8")
Total lenght of pipes (standard load)	m	Dual 15/Mono 7,5
Total lenght of pipes (additional load)	m	Dual 30/Mono 20
Single unit lenght of pipes (standard load)	m	Dual 12
Single unit lenght of pipes (additional load)	m	Dual 25
Max height difference between unit (OU/IU)	m	10
Max height difference between unit (IU/IU)	m	5

4 Refrigerant circuit

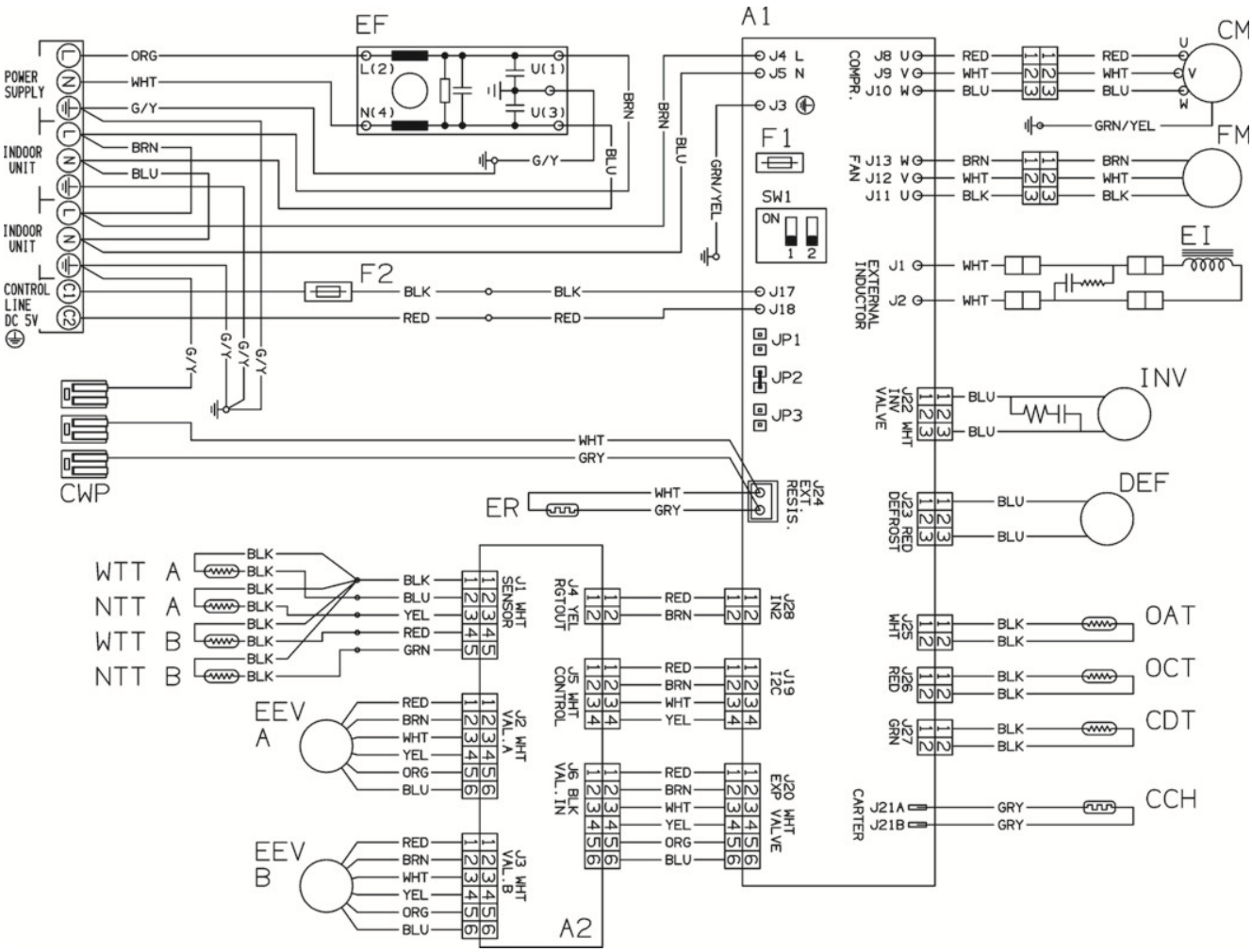
AEI1G 42-50 EMX



Note:

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

5 Electrical wiring diagram



Legend

A1 A2	Control pcb Expansion pcb
F1	Main fuse 6,3x32 - 10A / 250V
F2	Comm. Fuse, RS485 bus cable 5x20 - 100mA / 250V
SW1	Dip-switch
JP1/2/3	Jumpers
EF	Electromagnetic Interference Filter
CM	Compressor
FM	Fan motor
INV	4-way valve
DEF	Defrost 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
WTT	Wide tube sensor
NTT	Narrow tube sensor

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

OPERATING MODE SELECTION

In a sigle split configuration, the operating mode of the system (heating or cooling) corresponds to the mode selected on the indoor unit.

In a muli split configuration, the operating mode of the system is selected with the following rules:

Heating mode is selected if:
- all indoor units are in heating mode
- one or more indoor units are in heating mode and the others are in off mode or fan mode

Cooling mode is selected if:
- all indoor units are in cooling or dry mode
- one or more indoor units are in cooling or dry mode and the others are in off mode or fan mode

A conflict mode is generated if one or more unit are in heating mode and one or more units are in cooling or dry mode. In this case:
- if the compressor is off, all the unit will return a "wrong mode" error (see the error table of the indoor unit)
- if the compressor is running, the indoor units where the selected mode isn't in accordance with the current mode will return a "wrong mode" error (see the error table of the indoor unit)
- if the indoor units are in auto mode, the first unit that selects the mode (see "Auto mode" section) will set the system in that mode and the other indoor units will adapt to that mode, mantaining anyway their setpoint.

Heating mode

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

The following rules apply to heating mode functioning:
- Compressor and fan start when, in any of the rooms, RAT is 1°C or more below the SPT
- Compressor and fan stop when, in all rooms, RAT is 2°C or more above the SPT or when 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 of all the rooms
- the level of protecion of the system

During heating mode, 4-way valve is active.

Cooling mode

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

The following rules apply to cooling mode functioning:

- Compressor and fan start when, in any of the rooms, RAT is 1°C or more above the SPT
- Compressor and fan stop when, in all rooms, RAT is 2°C or more below the SPT or when 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 of all the rooms
- the level of protecion of the system

During cooling mode, 4-way valve is deactivated.

Dehumidification (dry) mode

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

RAT	DRY LEVEL	DESCRIPTION
≥ SPT + 2°C	0	Unit operates normally in cooling mode.
< SPT + 2°C ≥ SPT - 1°C	1	Unit operates with a fixed cooling demand. Indoor fan switches between very low speed and low speed every 30 seconds.
< SPT - 1°C ≥ 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). Indoor fan switches between very low speed and low speed every 30 seconds.
< 10°C	DRY OFF	Unit is not operating.

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 an indoor unit is in auto mode (auto cooling or auto heating), the actual mode will switch between heating and cooling mode to maintain the room air temperature (RAT) to the set point temperature (SPT).

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

where:

- $\Delta T = RAT - SPT$

Fan mode

When an indoor unit is in fan mode:

- Thermal load of the indoor unit is 0 (no heating or cooling capacity demand to the outdoor unit).
- The system operates for the other indoor units.
- If the system is in cooling mode or it is stopped, the indoor fan runs at the selected speed.
- If the system is in heating mode, the indoor fan stops to avoid overheating of the room.

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 capacity demand in the rooms

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)

EEVs are managed based on the system conditions to meet the maximum efficiency point of operation and to guarantee a safe operation of the system.

In cooling mode, EEVs of indoor units without a capacity demand will be closed.
In heating mode, EEVs of indoor unit without a capacity demand will stay open at a minimum value to allow the refrigerant to flow back to the compressor. This can cause a small heat loss in the heat ecxchanger of the off units.

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

Defrost valve

Defrost valve is used to run the hot gas byapass defrost cycle.
Defrost valve is always closed during cooling mode.
Defrost valve is normally closed in heating mode and it opens only during hot gas bypass defrost cycles. When open, part of the hot gas from the discharge of the compressor is directly injected into the outdoor heat exchanger. This will defrost the outdoor coil while keeping the system running in heating mode (no need to reverse the cycle).

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 of the following conditions is met:

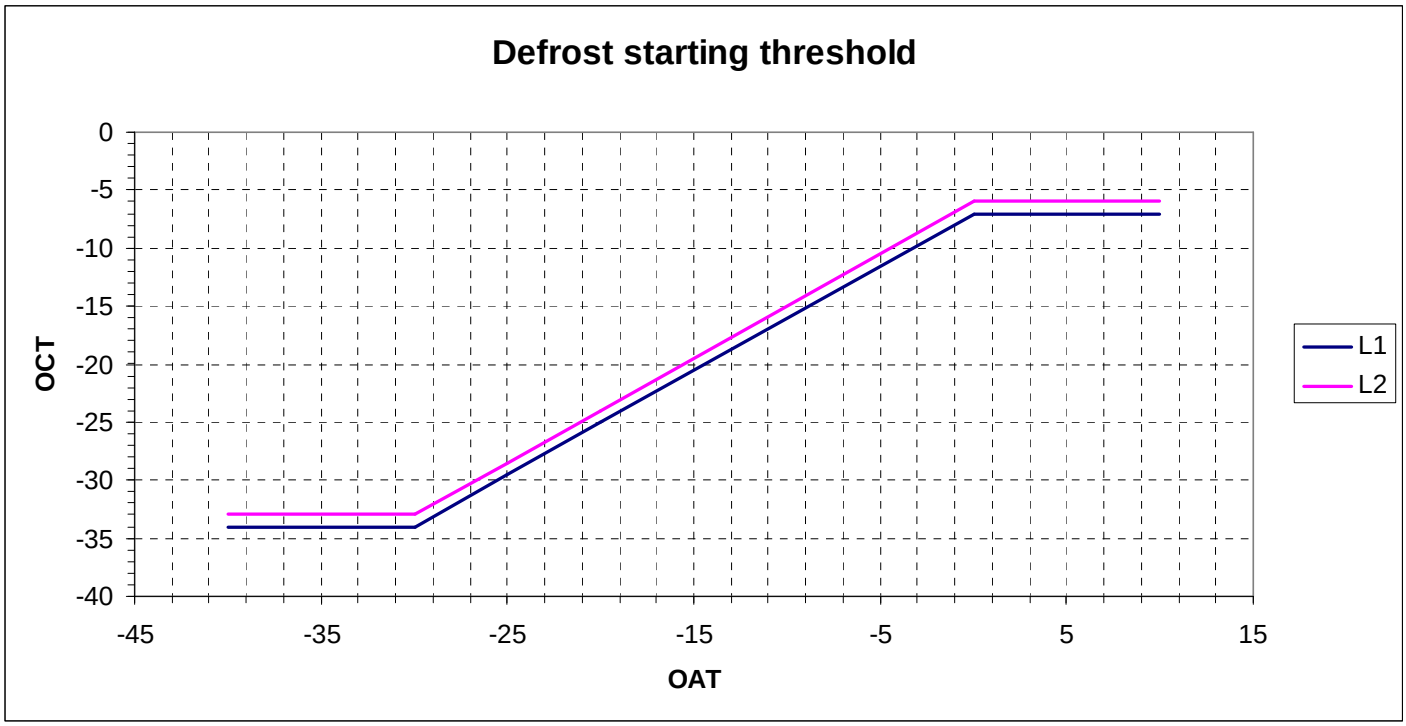
- OAT il lower than 0°C
- Defrost is active
- Less than 5 minutes have passed since last defrost

When heaters are active, they will be deactivated if one of the following condition is met:

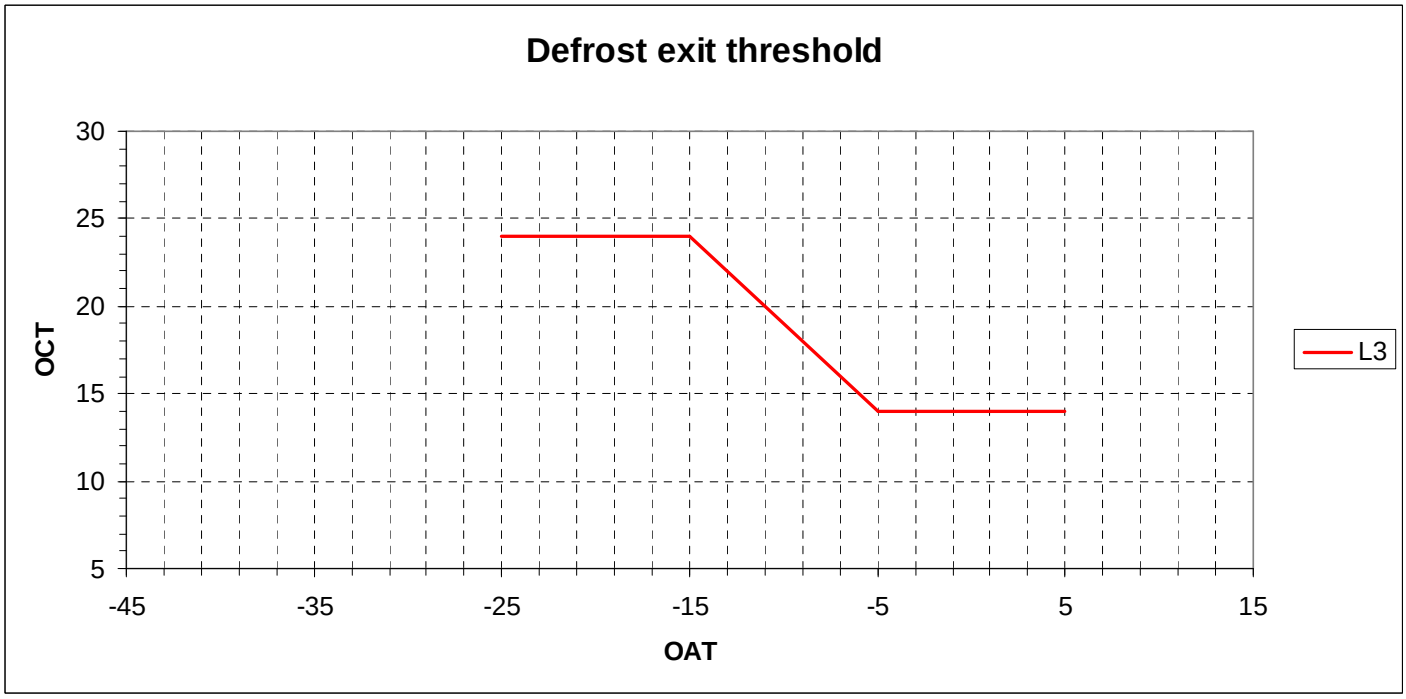
- OAT is higher than 2°C
- Defrost is not active and more than 5 minutes have passed since last defrost

8 Defrost

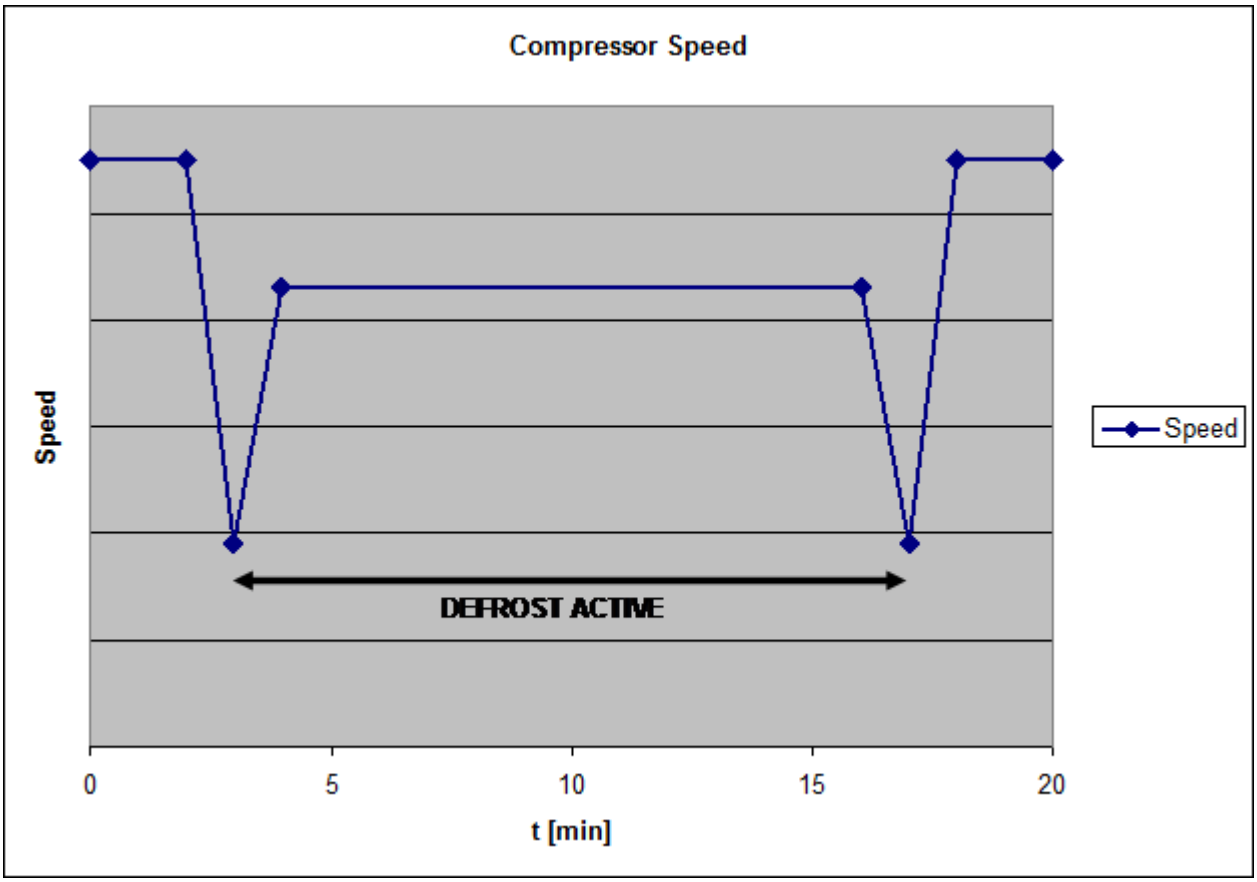
A defrost starts if one of these conditions is satisfied (see graph below):
- OCT falls below L1 line and compressor is running for at least 35 minutes without defrost
- OCT falls below L2 line and compressor is running for at least 60 minutes without defrost



The defrost ends if one of these conditions is satisfied (sse graph below):
- OCT rise above line L3 and defrost has been active for at least 2 minutes
- defrost has been active for 12 minutes (15 minutes if OAT is below -15°C)



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:



The are two possible defrost type:

- hot gas bypass defrost
- reverse cycle defrost

If jumper JP2 is closed, the unit will automatically decide which type of defrost is necessary to run.
If jumper JP2 is open, the hot gas bypass defrost is disabled and the defrost cycles will be done only with the reverse cycle method.
The hot gas bypass defrost is also disabled if OAT falls below 2°C.

When defrost is active:

- 4-way valve is deactivated (reverse cycle type) or defrost valve is opened (hot gas bypass type)
- Compressor runs at a fixed speed (if no protection is active)
- EEVs are open at a fixed value
- Fan is off

When defrost ends:

- 4-way valve is reactivated (reverse cycle type) or defrost valve is closed (hot gas bypass type)
- EEV are 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 units heat exchanger

This protection checks the temperature on the indoor coils (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 48°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 80°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.

Overpower 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 11A.

10 Component description

Compressor AEI1G 42 EMX

type	HERMETIC, TWIN ROTARY, DC INVERTER		
model	SNB110FGYMT		
oil	FV 50S		
refrigerant	R410A		
motor	BRUSHLESS MOTOR		
n. of poles	6		
rated output	750W		
winding resistance (@20 °C)	U-V: 0,58 Ω	V-W: 0,58 Ω	U-W: 0,58 Ω
overload protector	EXTERNAL		

Compressor AEI1G 50 EMX

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

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

Defrost Valve

model	FDF6A-049-RK (valve) – FDF6A (coil)
coil rating	AC 220-240V 50/60Hz
coil resistance	1273 Ω ± 127Ω 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

WTT: Wide Tube Temperature. Used for:
- EEV management

NTT: Narrow Tube Temperature. Used for:
- EEV management

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

11 Diagnostic table

RANK GRADO	DIAGNOSIS CONTENTS / DESCRIZIONE	DL3	DL4	DL5	DL6	DL7
101	TEST MODE ERROR	X	☼	☼	☼	☼
100	WRONG OUTDOOR-INDOOR UNITS COMBINATION	☼	X	☼	X	☼
14	NTTB PROBE DAMAGED OR NOT CONNECTED	X	X	☼	X	☼
13	WTTB PROBE DAMAGED OR NOT CONNECTED	X	☼	X	☼	X
12	NTTA PROBE DAMAGED OR NOT CONNECTED	☼	X	☼	X	X
11	WTTA PROBE DAMAGED OR NOT CONNECTED	X	☼	X	X	X
10	CDT PROBE DAMAGED OR NOT CONNECTED	X	X	☼	X	X
9	OAT PROBE DAMAGED OR NOT CONNECTED	X	X	X	☼	X
8	OCT PROBE DAMAGED OR NOT CONNECTED	X	X	X	X	☼
7	COMPRESSOR ERROR	☼	☼	X	X	X
6	PCB OVERTEMPERATURE (COMPRESSOR MODULE)	X	☼	☼	X	X
5	FAN ERROR	X	X	☼	☼	X
4	PCB OVERTEMPERATURE (FAN MODULE)	X	X	X	☼	☼
3	PFC PROTECTION	☼	☼	☼	X	X
2	ERROR ON INDOOR UNITS	X	☼	☼	☼	X
1	COMUNICATION ERROR ON INDOOR UNIT	X	X	☼	☼	☼

When unit is working properly:

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

12 Troubleshooting

ERROR LIST				
Rank	**Meaning**	**System behaviour**	**Cause**	**Solution**
1	Communication error between the outdoor unit and all the indoor units.	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 units.	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. Check the communication fuse on indoor unit (only certain models).
			Indoor units not powered on.	Check that the indoor units have power supply and that the units are working.
			Outdoor or indoor units pcb out of order.	Check that all the pcbs are powered on. Be sure that power supply has not been connected to the communication terminals. 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).
2	Error on all the indoor units.	Compressor and fan are stopped. The system restarts automatically as soon as the error on the indoor unit is solved.	An error occurred on all the indoor units of the system.	Follow specific indoor units troubleshooting.

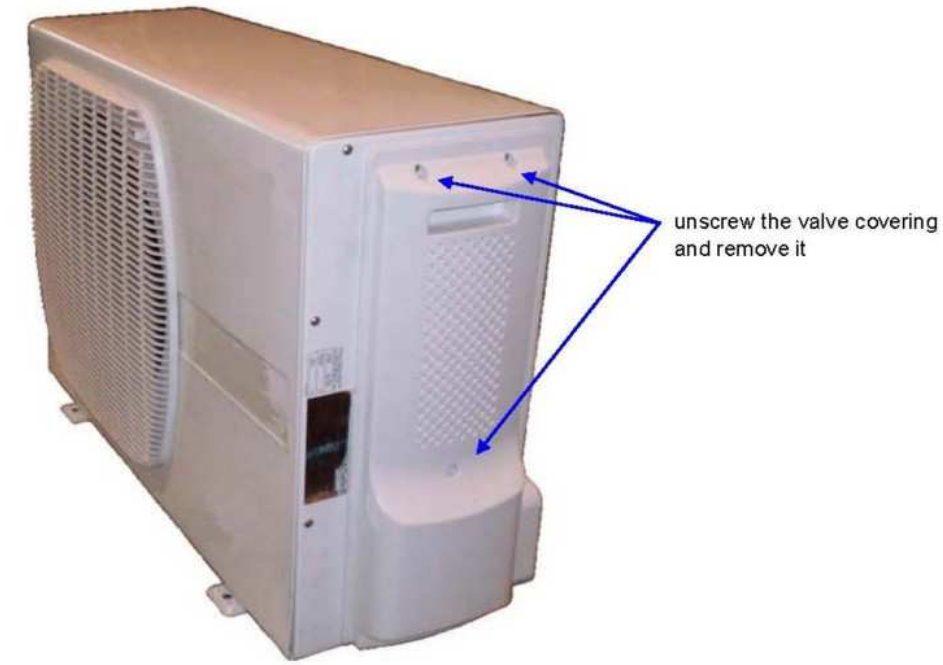
3	PFC (Power Factor Controller) protection: automatic protection against power supply disturbances and instabilities.	Compressor and fan are stopped. The system restarts automatically after 3 minutes.	Power supply surge or over voltage.	Check the quality of the power supply.
			Power supply voltage dip 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.
		Compressor and fan are stopped.	Outdoor pcb damaged, MCE microcontroller not programmed or MCE microcontroller firmware is corrupted.	If the error is permanent, change the outdoor pcb.
4	Automatic protection against overheating on the power electronics (fan motor module).	Compressor and fan are stopped. 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. 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.
11	WTT A (Wide Tube 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.
12	WTT B (Wide Tube 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	NTT A (Wide Tube 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.
14	NTT B (Wide Tube 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.
15 or 100	Wrong selection of indoor units combined with the outdoor unit.	Compressor and fan are stopped.	The selection of the indoor units connected to the outdoor unit is not allowed.	Check for the allowed combinations. Choose a correct indoor-outdoor units combination.
101	Test Mode error (at factory only).	Compressor and fan are stopped.	Unit is running the factory test mode routine.	Cycle the power supply to the normal functioning.

13 Component replacement

FRONT, RIGHT, LEFT AND REAR PANEL

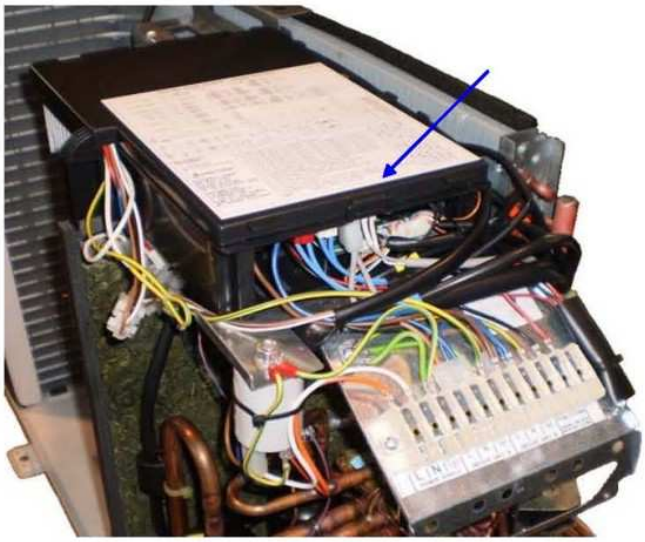


unscrew the right and the left panel
and remove it

unscrew the front panel
and remove it

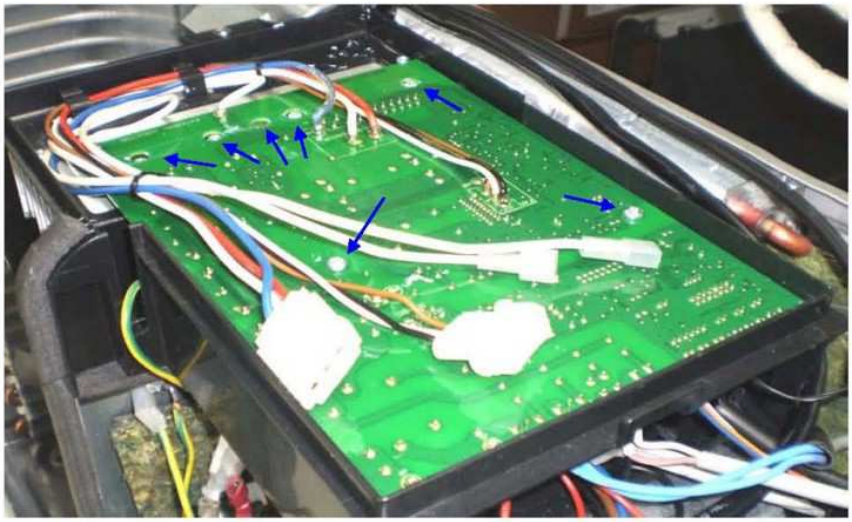
unscrew the emix valve covering
and the rear panel
remove its

CONTROL AND EXPANSION BOARD
(remove the right, the left, the front and the rear panel)

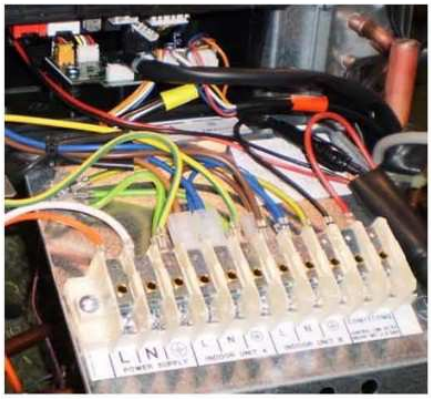


unhook the spring hook
and lift the cover

disconnect the connection cable
(fan motor, compressor, inductor, 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

disconnect all the cable from the ctrl pcb

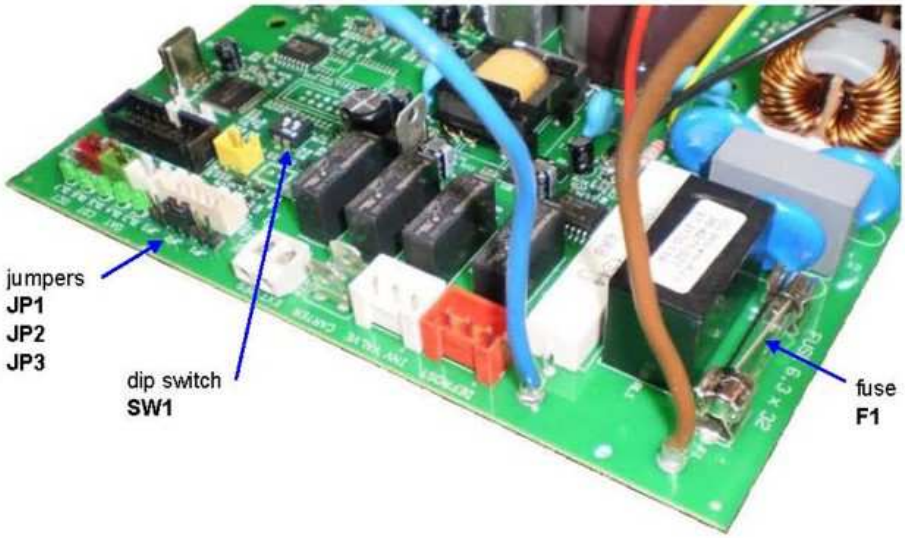
slide the ctrl pcb
from the hook and lift it

extract the ctrl pcb
from the box

disconnect all the cable
from the expansion pcb

unscrew the 2 screw
from the plastic box

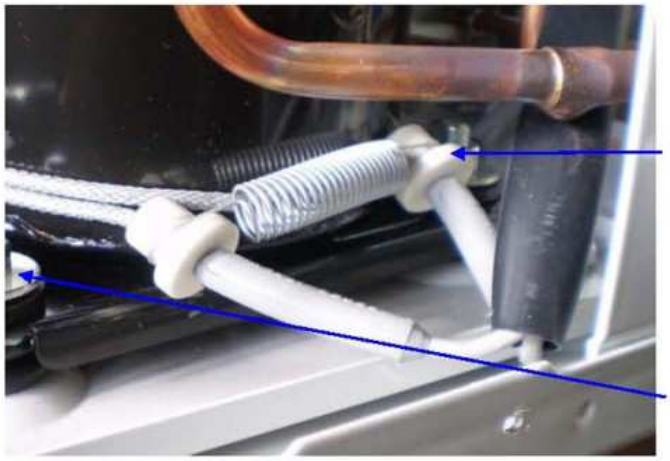
extract the expansion pcb



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

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

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



unhooking the spring
of the compressor heater
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

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

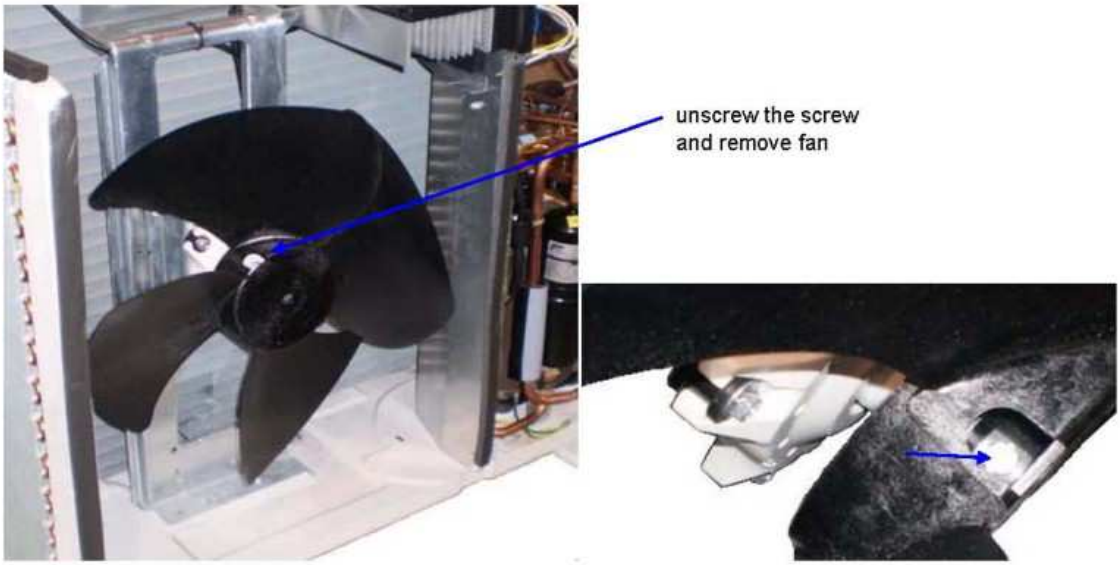
remove the coil
from the valve body

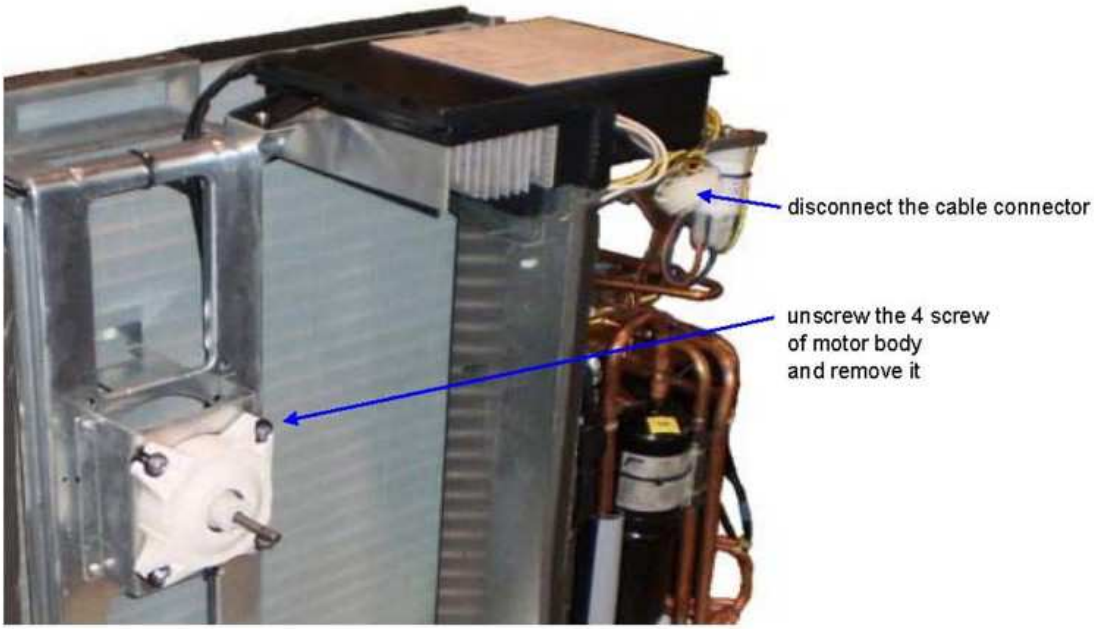
remove the vibration insulation
from the valve pipes

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

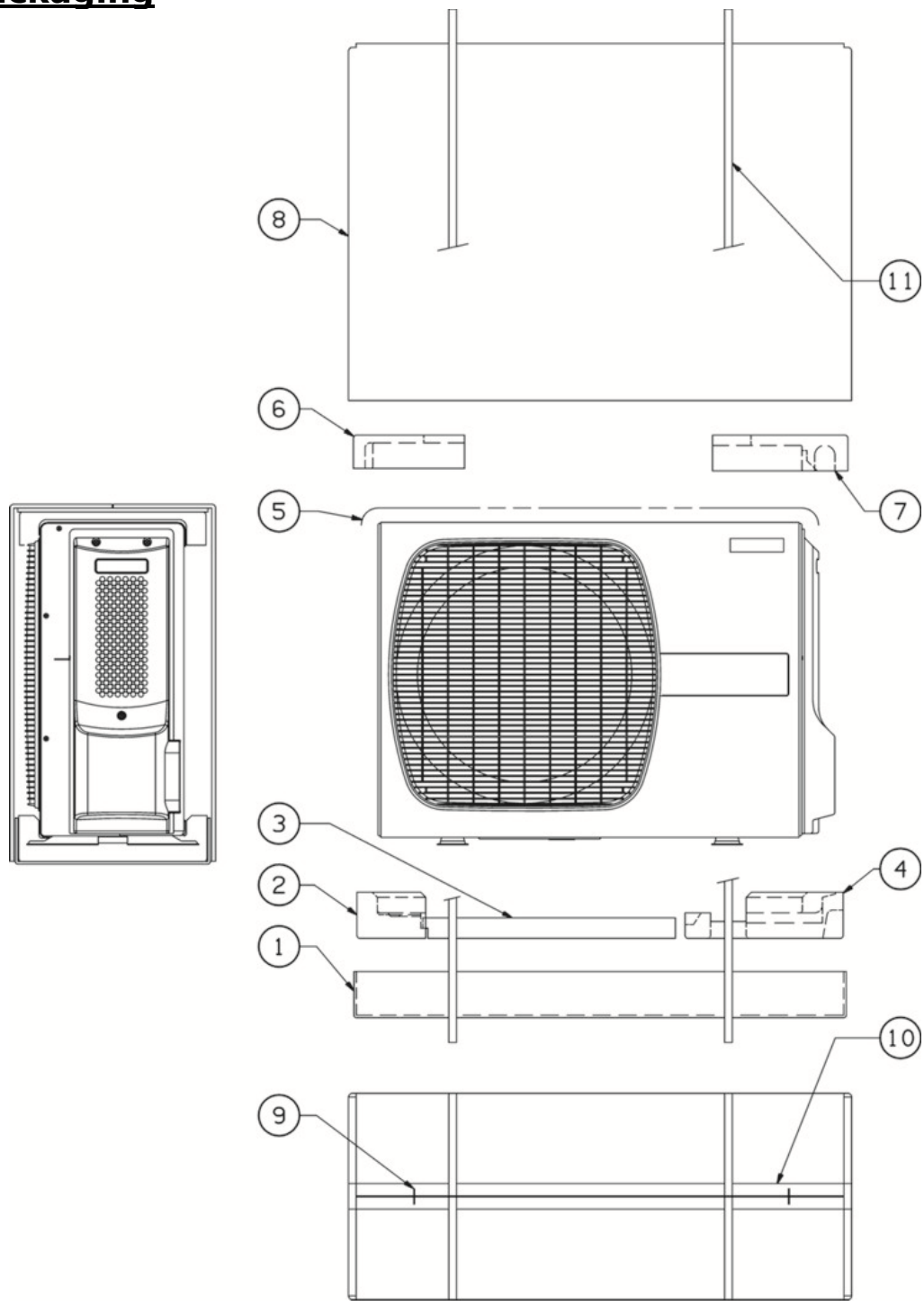
disconnect the pipes
from the filter

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





14 Packaging

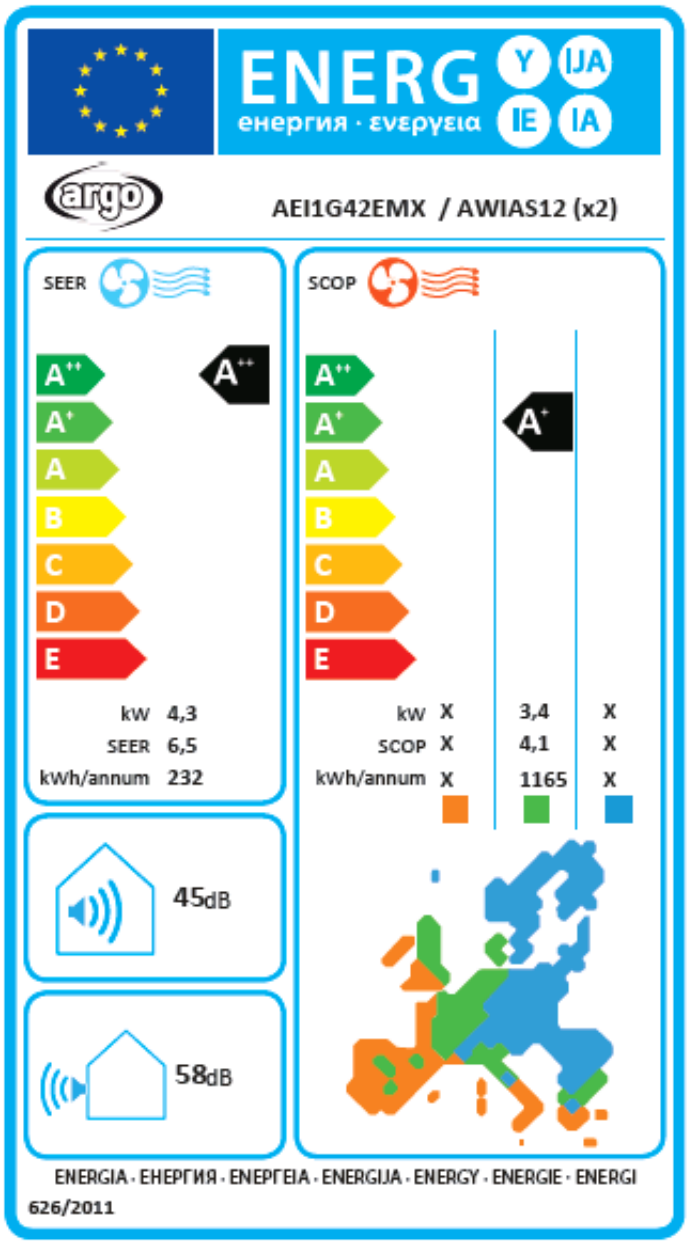


1: bottom carton box
2: lower left PS shield
3: lower PS shield
4: lower right PS shield
5: polietylene sheet
6: upper left PS shield
7: upper right PS shield
8: carton box
9: staple
10: scotch tape
11: PP band

15 Labels

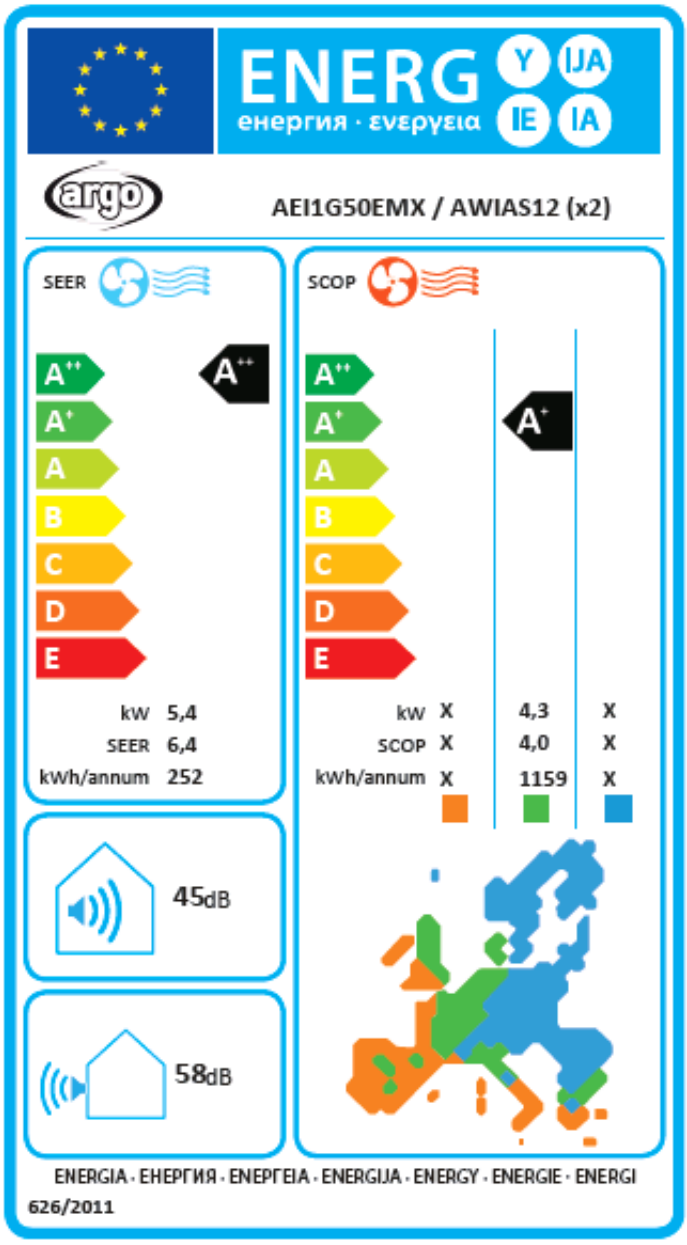
Energy labels

AEI1G 42 EMX

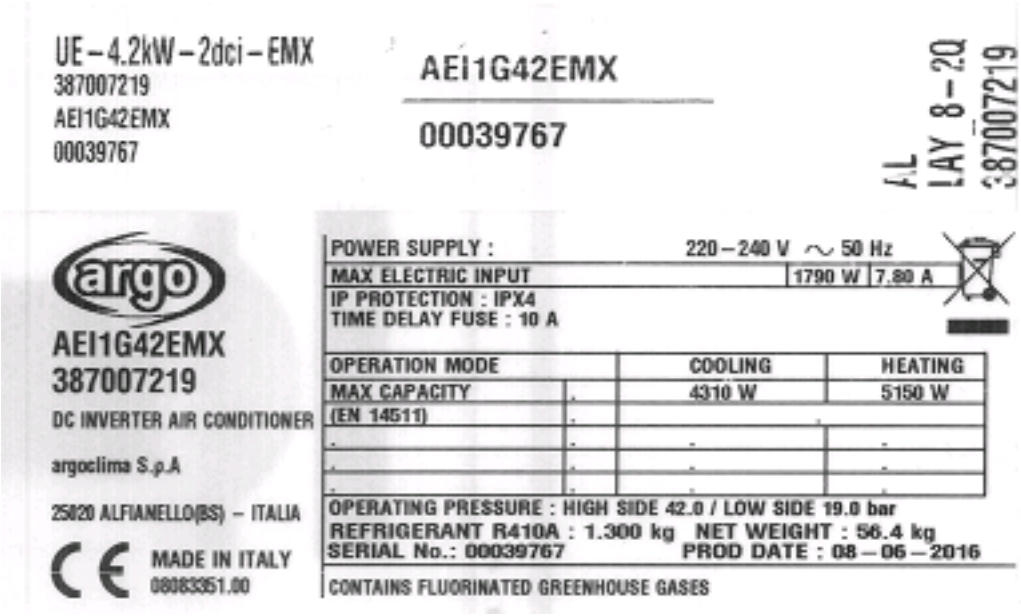


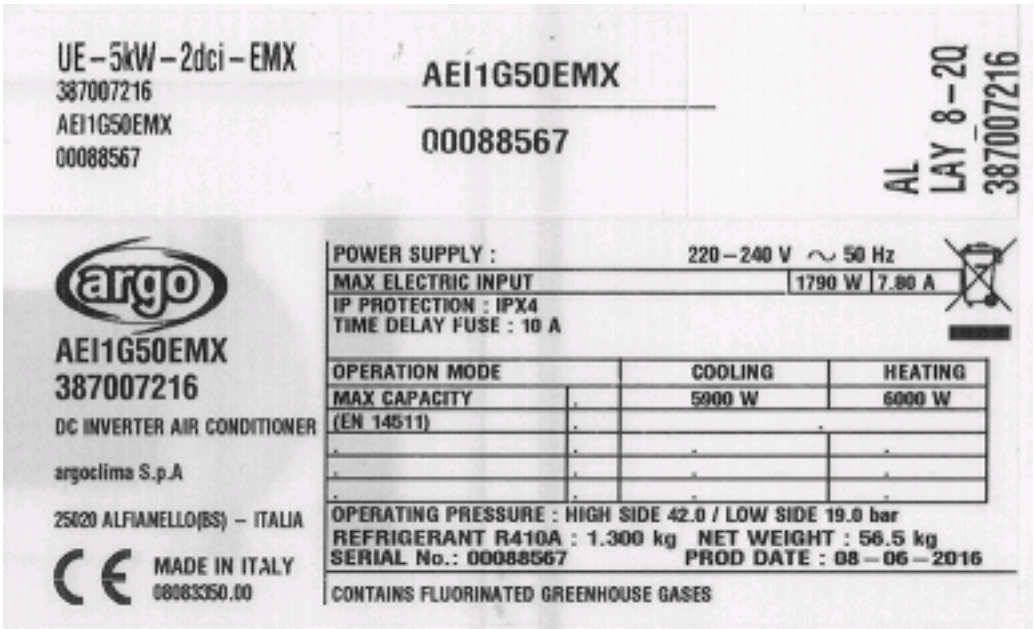
Energy labels

AEI1G 50 EMX



Rating labels





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