AIRTECHNIC
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Air-Conditioning & Ventilation Components & Systems

ENERGY BOX AC-A
ENERGY BOX AC

Ceiling Type Heat / Energy Recovery Unit with Heat Pump

ΟΔΗΓΙΕΣ ΧΡΗΣΗΣ | OPERATION MANUAL

500 | 750 | 1.000 | 1.500 | 2.000 | 3.000 | 4.000

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INDEX

INTRODUCTION

Installation&Operation Manual has been prepared and given to customer as a guide for easy installation&operation units manufactured by Airtechnic. The manual contains description of the unit, components and basic informations and recommendations for proper and fail free operation. Please read the instructions and warnings given in this manual before starting installation, operation and maintenance works and keep this manual near the unit, within easy reach of service personnel.


Any damage, failure or hazard occurred because of use except this purpose is beyond the responsibility of manufacturer.


For technical service and questions, please contact with following information.

+30 211-7055500 www.airtechnic.gr/contact

WARNINGS & SAFETY INFORMATION

PROHIBITED

- This unit has to be used under proper conditions according to its technical specification and design purpose. (Otherwise responsibility belongs to practitioner)
- Unauthorized personnel must not interfere in unit and/or must not use unoriginal spare parts. (Otherwise responsibility of failure that may occur belongs to practitioner)
- Do not install this product in a refrigerated warehouse, heated swimming pool or other location where temperature and humidity are significantly different. (Failure to heed this warning may result in electrical shock or malfunctioning.)

- Do not install this product where it will be directly exposed to rain.(Failure to heed this warning may result in electrical shock or malfunctioning.)
- Do not install this product in a location where acid, alkali or organic solvent vapors, paints or other toxic gases, gases containing corrosive components or high concentrations of oily smoke are present (Failure to heed this warning may result not only in malfunctioning but also fire, power leakage and electrical shock.)
- Do not use this product outside the range of its rated voltage and control capacity.

ATTENTION

- Install this product in an environment where the temperature ranges from 0 °C to +40 °C and the relative humidity is less than 60%. If condensation is expected to form, heat up the fresh outside air by a duct heater etc.
- Select an adequately sturdy position for installing the product and install it properly and securely.
- Use the designated electrical wires for the terminal board connections and connect the wires securely so that they will not be disconnected.(Failure to ensure proper connections may result in fire.)
- When passing metal ducts through wooden buildings clad with metal laths, wire laths or metal, these ducts must be installed in such a way that they will not make electrical contact with metal laths, wire laths or metal sheets.(Power leakage can cause ignition.)
- The outside ducts must be tilted at a gradient (1/30 or more) downwards toward the outdoor area from the main unit, and properly insulated. (The entry of rain water may cause power leaks, fire or damage to household property.)
- Gloves should be worn while installation. (Failure to heed this warning may result in injury.)
- A dedicated circuit breaker must be installed at the origin of mains power supply. This circuit breaker must be provided with a means for locking (lock and key).
- The body of the unit, room control panel and cables keep away the unit 3 m. distance

- This product must not be disassembled under any circumstances. Only authorized repair technicans are qualified to conduct disassembly and repairs. (Failure to heed this warning may result in fire, electrical shock or injury.)

- Connect the product properly to the ground.(Malfunctioning or power leaks can cause electrical shock.)

- An isolator switch having minimum contact gap of 3 mm in all poles must be provided as a means of disconnecting the power supply.

NOTE: The installations,which is not available for installation and operation manual, is out of guarantee.

CHECK LIST

In the event of unit failure and pre-commissioning checks to be made are determined as follows; after checking this information, please contact our company in case failure continues.

Controls

1. **Make sure that the unit receives power and electrical grounding is made!** ☐
2. **Make sure that the electricity cables are drawn from in the correct cross section! (Please check whether there is heating on cables or not.)** ☐
3. **Please check whether the cables in unit control panel are shielded (shielded magnetic field) or not; make sure shielding is grounded. If not, please change them!** ☐
4. **Make sure that fresh air and exhaust air filters are clean and they do not block the flow of air!** ☐
5. **Make sure there is the connection of drainage on the unit, check any possible clogging in drainage line and clean if necessary!** ☐
6. **Please check whether the diameter of the air duct connection of the unit and the diameter of the spigot are the same. If the duct connection is smaller, change it with the correct one.** ☐
7. **Make sure the electrical connections of the unit are made as suggested on the unit and in this guide, check if there is incorrect connection.** ☐
8. **Make sure during the installation of the unit there is enough space for the service and if there is not enough space, re-install again.** ☐
9. **In extremely cold climate applications, frost may occur on the exchanger, apply electric heater in fresh air intake section of the unit to get the temperature to -8 °C and above.** ☐
10. **After installing the unit, make sure that it does not create an abnormal sound or vibration, if there is, make sure that rubber pads are used.** ☐

TECHNICAL SPECIFICATIONS - AC FAN

ENERGY-BOX		AC-A/ AC 500	AC-A/AC 750	AC-A/AC 1.000	AC-A/AC 1.500	AC-A/AC 2.000	AC-A/AC 3.000	AC-A/AC 4.000
Air Flow (m³/h)		500	750	1.000	1.500	2.000	3.000	4.000
External Static Pressure (Pa)		120	180	140	210	120	140	195
Max Air Flow (m³/h)[1]		650	960	1.140	1.830	2.400	3.600	4.880
Nominal Voltage (V/Hz/Ph)		230/ 50 / 1~					400/ 50 / 3~	
Cooling	Capacity (kw)[2]	2,94	3,98	6	8,05	11,34	17,31	24,92
	COP	3,88	4,1	4,66	5,81	6,07	5,64	5,41
	Total Power (kw)[3]	1,18	1,62	2,01	2,74	3,24	5,22	8,40
Heating	Capacity (kw)[2]	4,47	5,92	8,51	10,85	15,13	23,31	33,15
	COP	5,88	6,1	6,6	7,84	8,1	7,59	7,19
	Total Power (kw)[3]	0,96	1,39	1,72	2,41	2,81	4,49	7,21
Electric Heater Diameter (mm)		ø 250	ø 250	ø 300	300 x 300	400 x 400	500 x 400	550 x 450
Electric Heater (Optional) (kw)[4]		1,5	1,5	2	4	5	10	10
Unit Weight (kg)		105	110	150	200	280	410	360
Filter Type		G Sınıfı						
Refrigerant		R404A			R407C			

Summer Condition: Outdoor air 35 ˚C D.B %40 Rh & Indoor air 25 ˚C K.T. %50 Rh (evaporation 7,2 ˚C/condensation 50 ˚C)

Winter Condition: Outdoor air 0 ˚C K.T %80 rH & Indoor air 22 ˚C K.T. %40 rH (evaporation -5 ˚C/condensation 40 ˚C)

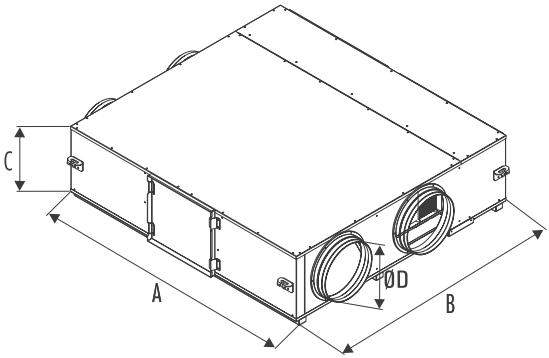
[1] External static pressure is 0 Pa.

[2] Heat exchanger capacity is added to total heating and cooling capacities.

[3] Total power is sum of compressor and fan power consumptions.

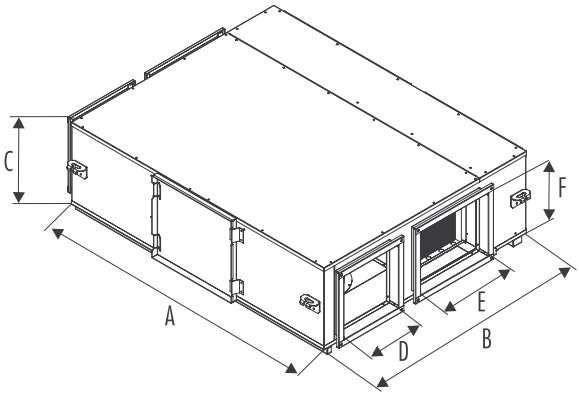
[4] Electric heaters shall be used before the fresh air inlet of the unit to preheat air where outdoor air is below -5˚C and condensation can occur. Also in humid climates return air ducts must also be insulated against condensation.

UNIT DIMENSIONS - AC FAN



ENERGY-BOX AC-A / AC	A	B	C	Ø D	S
500	1.250	1.000	381	250	600
750	1.250	1.000	381	250	600
1.000	1.400	1300	381	300	700

** All measurement values are mm.*
** The gaps of the service area values are specified as "S" on the table. ("Installation" is on page 7.)*



ENERGY-BOX AC-A / AC	A	B	C	DxF	ExF	S
1.500	1.650	1.450	440	300 x 300	600 x 300	850
2.000	2.100	1.620	587	400 x 400	550 x 400	800
3.000	2.200	1.911	587	500 x 400	800 x 400	1.050
4.000	2.200	1.911	650	550 x 450	800 x 450	1.100

** All measurement values are mm.*
** The gaps of the service area values are specified as "S" on the table. ("Installation" is on page 8.)*
** DxF: Outdoor air and indoor air connection*
ExF: Supply air and exhaust air connection

TECHNICAL SPECIFICATIONS - EC FAN

ENERGY-BOX		AC-A / AC 500 EC	AC-A / AC 750 EC	AC-A / AC 1.000 EC	AC-A / AC 1.500 EC	AC-A / AC 2.000 EC	AC-A / AC 3.000 EC	AC-A / AC 4.000 EC
Air Flow (m³/h)		500	750	1.000	1.500	2.000	3.000	4.000
External Static Pressure (Pa)		375	350	380	365	250	290	360
Max Air Flow (m³/h)[1]		800	1.100	1.350	2.060	2.500	3.850	5.450
Nominal Voltage (V/Hz/Ph)		230/ 50 / 1~					400/ 50 / 3~	
Cooling	Capacity (kw)[2]	2,94	3,98	6	8,05	11,34	17,31	24,92
	COP	3,88	4,1	4,66	5,81	6,07	5,64	5,41
	Total Power (kw)[3]	1,31	2,20	2,58	2,71	3,30	5,31	9,03
Heating	Capacity (kw)[2]	4,47	5,92	8,51	10,85	15,13	23,31	33,15
	COP	5,88	6,1	6,6	7,84	8,1	7,59	7,19
	Total Power (kw)[3]	1,10	1,97	2,29	2,38	2,87	4,58	7,84
Electric Heater Diameter (mm)		Ø 250	Ø 250	Ø 300	300 x 300	400 x 400	500 x 400	550 x 450
Electric Heater (Optional) (kw)[4]		1,5	1,5	2	4	5	10	10
Unit Weight (kg)		105	115	150	200	280	410	360
Filter Type		G Sınıfı						
Refrigerant		R404A			R407C			

Summer Condition: Outdoor air 35 ˚C D.B %40 Rh & Indoor air 25 ˚C K.T. %50 Rh (evaporation 7,2 ˚C/condensation 50 ˚C)

Winter Condition: Outdoor air 0 ˚C K.T %80 rH & Indoor air 22 ˚C K.T. %40 rH (evaporation -5 ˚C/condensation 40 ˚C)

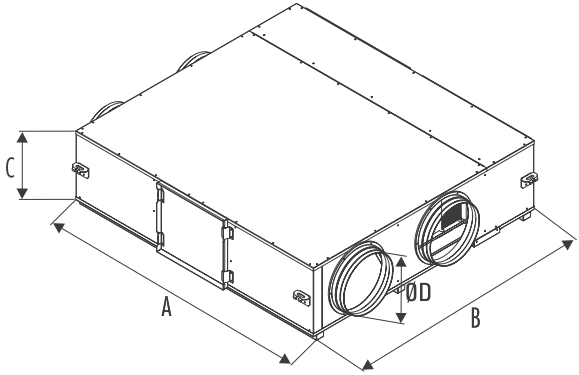
[1] External static pressure is 0 Pa.

[2] Heat exchanger capacity is added to total heating and cooling capacities.

[3] Total power is sum of compressor and fan power consumptions.

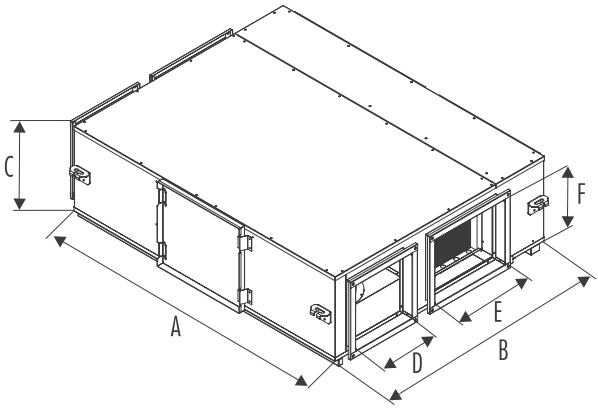
[4] Electric heaters shall be used before the fresh air inlet of the unit to preheat air where outdoor air is below -5˚C and condensation can occur. Also in humid climates return air ducts must also be insulated against condensation.

UNIT DIMENSIONS - EC FAN



ENERGY-BOX AC / AC-A	A	B	C	Ø D	S
500	1.250	1.000	381	250	600
750	1.250	1.000	416	250	600
1.000	1.400	1.300	416	300	700

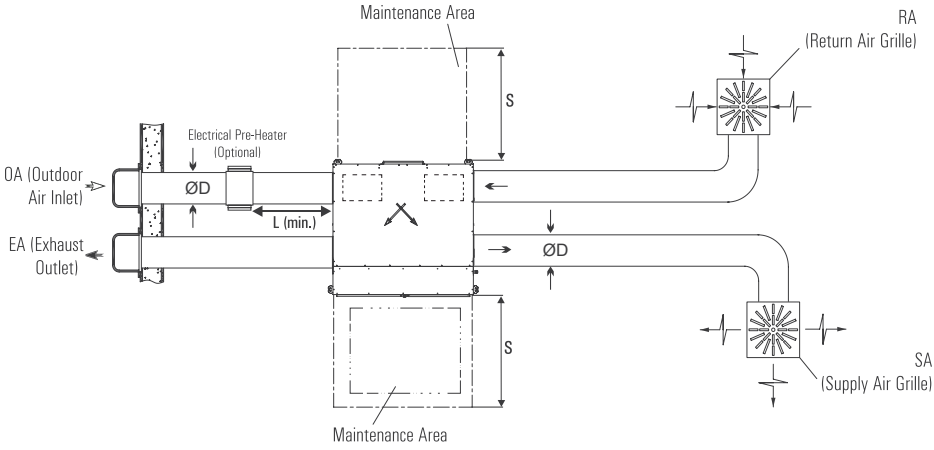
** All measurement values are mm.*
** The gaps of the service area values are specified as "S" on the table. ("Installation" is on page 10.)*



ENERGY-BOX AC-A / AC EC	A	B	C	DxF	ExF	S
1.500	1.650	1.450	475	300 x 300	600 x 300	850
2.000	2.100	1.620	622	400 x 400	550 x 400	800
3.000	2.200	1.911	622	500 x 400	800 x 400	1.050
4.000	2.200	1.911	685	550 x 450	800 x 450	1.100

** All measurement values are mm.*
** The gaps of the service area values are specified as "S" on the table. ("Installation" is on page 10.)*
** DxF: Outdoor air and indoor air connection*
ExF: Supply air and exhaust air connection

INSTALLATION



NOT: * Top view
* Fan access panels are under the unit.
* The gaps of the maintenance area are specified as “S” on the technical picture. (”Unit Dimension” is on page 5 and 7.)
* L: For circular air duct L=2 x ød
For rectangular air duct L=Duct diagonal length

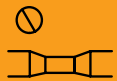
WARNING
Check these warnings before installation.

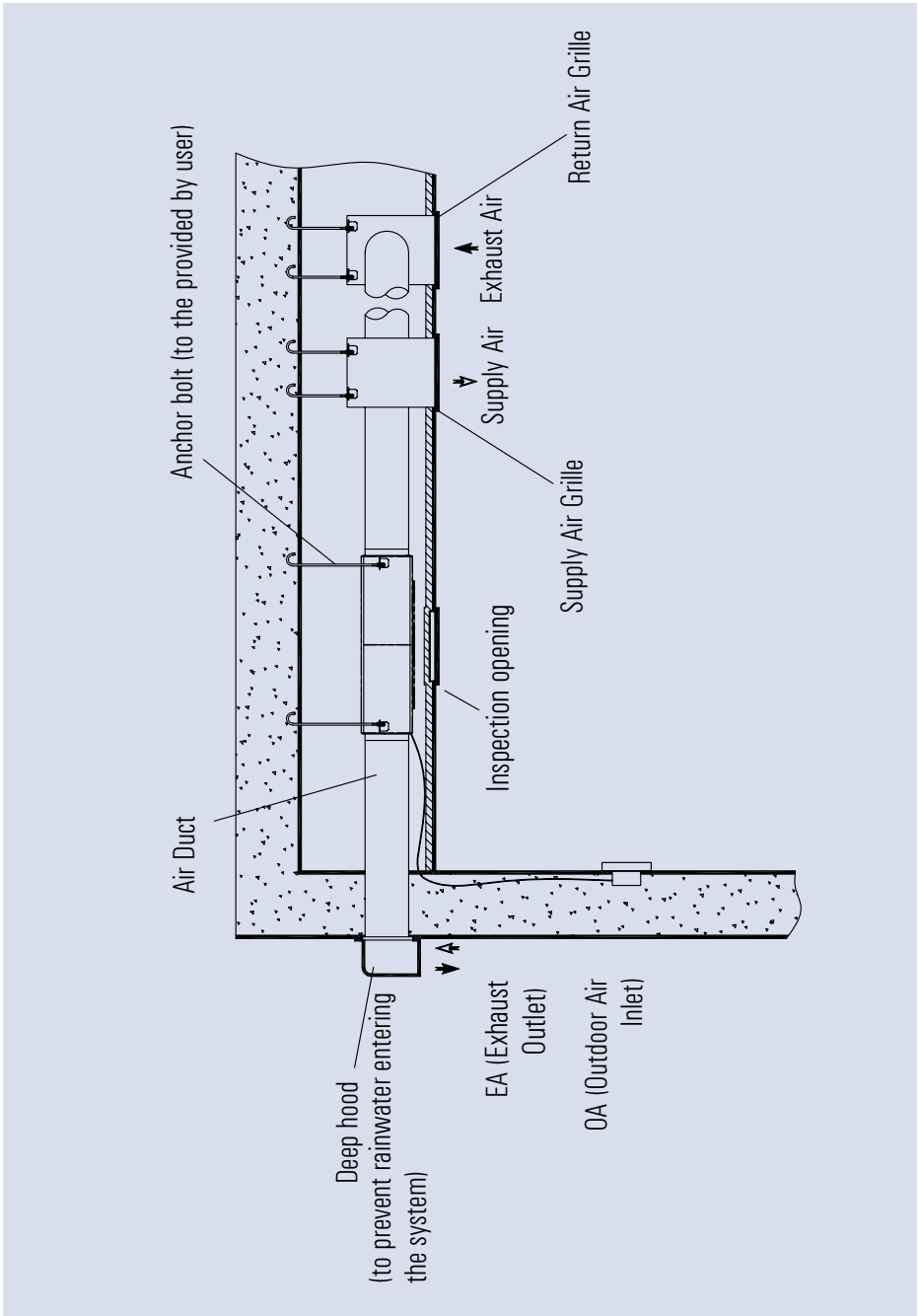
Extremely Sharp Bends

Multiple Bends

Bends right next to the outlet

Extreme Reduction in the diameter of the connected ducts





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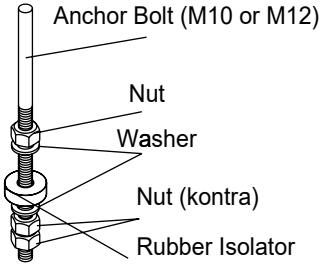
PREPARING THE SLING BOLTS

Hang the suspension braket on the anchor bolts and adjust in such a way that the unit is installed horizontally. Tighten up securely using double nuts in order to prevent looseness.

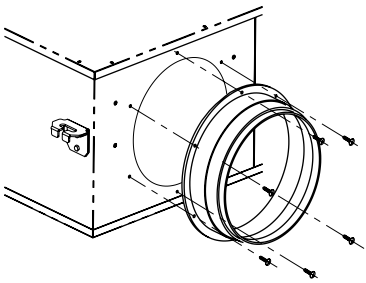
WARNING
Check the stability of sling bolts during the installation.



ATTACHING THE DUCT CONNECTION FLANGES

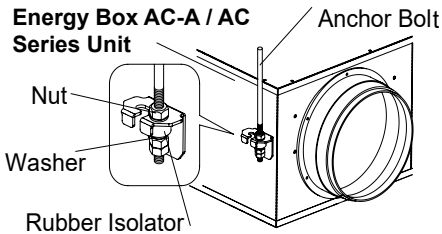
If the duct connection flanges are not connected to the unit, use the screws that can be found in the installation package to connect the flanges to the unit as the figure on the left.

WARNING
Before attaching the duct connection flanges, check that no foreign matter has found.



INSTALLATION OF THE UNIT

Hang the unit on the anchor bolts and adjust in such a way that the unit is installed horizontally. Tighten up securely using double nuts in order to prevent looseness.



WARNING
1. **Connect the drainage line with downward slope.**
2. **Water condensed in the exchanger and coils should be discharged by connecting the 1 pieces of ½" diameter drain hose to the drain outlet under the unit.**
3. **The applications which can prevent the flow of water in the drainage line should be avoided.**
4. **The drainage line shall never be moved to an upper level than the drain pan.**

SELECTION OF ELECTRICAL CABLE CROSS-SECTION (energy BOX AC-A / AC)

ENERGY-BOX AC-A / AC	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section(mm²) for 50M and PF=0,8
500	230	1,23	6,68	2 x 16	1,5
750	230	1,7	9,23	2 x 16	1,5
1.000	230	2,07	11,25	2 x 20	1,5
1.500	230	2,93	15,92	2 x 20	2,5
2.000	230	3,54	19,23	2 x 25	2,5
*3.000	400	Comp. 4,9 kW / Fan 1,36 kW	Comp. 8,85 A / Fan 7,39 A	3 x 20	1,5
*4.000	400	Comp. 7,45 kW / Fan 2,6 kW	Comp. 13,45 A / Fan 14,13 A	3 x 32	4

** Compressor 400V and fan 230V for ENERGY-BOX AC-A/ENERGY-BOX AC 3.000 and 4.000 unit models.*

CABLE CROSS-SECTION FORMULAS

1

$$I\ current = \frac{P}{U.CosQ}$$

I cable > I current

2

$$\%e = \frac{100.P.L}{k.S.U^2}\ ,\ S = \frac{100.P.L}{k.\%e.U^2}$$

%e = %3

3

I cable > I fuse ≥ I current
Cable Cross-Section S=Max (S1, S2, S3, 1,5 mm²)

** It is suitable for units with 230V supply voltage.*

P: Power
I: Current
U: Voltage
S: Conductor cross section

k: Conductor coefficient
L: Conductor length
%e: The voltage drop

EXAMPLE OF CABLE CROSS-SECTION CALCULATION

P: 1,23 kW **U:** 230 V **PF: CosQ**: 0,8
L: 50 m **%e:** %3 **k:** 56 m/Ω

1

$$I\ current = \frac{1.230\ W}{230.0,8} = 6,68\ A$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated “I current” value.
S1 = 0,5 mm²

2

%e = %3

$$S = \frac{100.1.230.50}{56.3.230^2} = 0,76\ mm^2$$

S2 ≥ 0,69 ≥ 0,75 mm²
S2 = 0,75 mm²

3

I cable > I fuse ≥ I current
I cable > 10 A > 6,68 A
“I fuse”, which will be higher than “I current”, is selected.The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.
I cable =12 A
S3 = 0,5 mm²
Cable cross-section
S=Max (S1, S2, S3, 1,5 mm²)
S=Max (0,5, 0,75, 0,5, 1,5)
S=1,5 mm²

** It must be considered the above information for compressor calculation in ENERGY-BOX AC-A / AC 3.000 and 4.000 unit models.*

CABLE CROSS-SECTION FORMULAS

1

$$I\,current = \frac{P}{\sqrt{3}.U.CosQ}$$

I cable > I current

2

$$\%e = \frac{100.P.L}{k.S.U^2}\,,\; S = \frac{100.P.L}{k.\%e.U^2}$$

%e = %3

3

I cable > I fuse ≥ I current
Cable Cross-Section
S = Max (S1, S2, S3, 1,5 mm²)

** It is suitable for units with 230V supply voltage.*

P: Power
I: Current
U: Voltage
S: Conductor cross section
k: Conductor coefficient
L: Conductor length
%e: The voltage drop

EXAMPLE OF CABLE CROSS-SECTION CALCULATION

P: 4,9 kW **U: 400** V **PF: CosQ**: 0,8
L: 50 m **%e:** %3 **k:** 56 m/Ω

1

$$I\,current = \frac{4900\ W}{\sqrt{3}.400.0,8} = 6,68\ A$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated “I current” value.
S1 = 0,5 mm²

2

%e = %3

$$S = \frac{100.4900.50}{56.3.400^2}$$

S2 ≥ 0,91 mm²
S2 = 1 mm²

3

I cable > I fuse ≥ I current
I cable > 10 A ≥ 8,85 A
The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.

I cable =15 A
S3 = 0,75 mm²
Cable cross-section
S=Max (S1, S2, S3, 1,5 mm²)
S=Max (0,5, 1, 0,75, 1,5)
S=1,5 mm²

** It must be considered the above information for compressor calculation in ENERGY-BOX AC-A/ENERGY-BOX AC 3.000 and 4.000 unit models.*

CABLE CROSS-SECTION FORMULAS

1

$$I\ current = \frac{P}{U.CosQ}$$

I cable > I current

2

$$\%e = \frac{100.P.L}{k.S.U^2}\ ,\ S = \frac{100.P.L}{k.\%e.U^2}$$

%e = %3

3

I cable > I fuse ≥ I current
Cable Cross-Section
S=Max (S1, S2, S3, 1,5 mm²)

** It is suitable for units with 230V supply voltage.*

P: Power
I: Current
U: Voltage
S: Conductor cross section
k: Conductor coefficient
L: Conductor length
%e: The voltage drop

EXAMPLE OF CABLE CROSS-SECTION CALCULATION

P: 1,36 kW **U:** 230 V **PF: CosQ**: 0,8
L: 50 m **%e:** %3 **k:** 56 m/Ω

1

$$I\ current = \frac{1360\ W}{230.0,8} = 7,39\ A$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated “I current” value.
S1 = 0,5 mm²

2

%e = %3

$$S = \frac{100.1360.50}{56.3.400^2} = 0,76\ mm^2$$

S2 ≥ 0,76 mm² > 1 mm²
S2 = 1 mm

3

I cable > I fuse ≥ I current
I cable > 10 A ≥ 7,39 A
“I fuse” which will be higher than “I current”, is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.

I cable =12 A
S3 = 0,5 mm²
Cable cross-section
S=Max (S1, S2, S3, 1,5 mm²)
S=Max (0,5, 1, 0,5, 1,5)
S=1,5 mm²

** It must be considered the above information for compressor calculation in ENERGY-BOX AC-A/ENERGY-BOX AC 3.000 and 4.000 unit models.*

I cable > I fuse ≥ I current (I fan + I comp.)
I cable > 20 A ≥16,24 A
“I fuse”, which will be higher than “I current”, is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value

I cable = 24 A
S3 = 1,5 mm²

** It must be considered the above information for fan and compressor calculation in ENERGY-BOX AC-A/ ENERGY-BOX AC 3.000 and 4.000 unit models.*

SELECTION OF ELECTRICAL CABLE CROSS-SECTION (energy BOX AC-A EC / AC EC)

ENERGY-BOX AC-A EC / AC EC	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm²) for 50 M and PF = 0,8
500	230	1,37	7,44	2 x 16	1,5
750		2,29	12,44		
1.000		2,64	14,34	2 x 20	
1.500		2,9	15,76		
2.000		3,57	19,4	2 x 25	2,5
*3.000	400	Comp. 4,9 kW / Fan 1,5 kW	Comp. 8,85 A / Fan 8,15 A	3 x 25	
4.000		10,68	19,29		

** Compressor 400V and fan 230V for ENERGY-BOX AC-A EC/ENERGY-BOX AC EC 3.000 unit models.*

CABLE CROSS-SECTION FORMULAS

1

$$I\ current = \frac{P}{U.Cos\varphi}$$

I cable > I current

2

$$\%e = \frac{100.P.L}{k.S.U^2}\ ,\ S = \frac{100.P.L}{k.\%e.U^2}$$

%e = %3

3

I cable > I fuse ≥ I current
Cable Cross-Section
S = Max (S1, S2, S3, 1,5 mm²)

** It is suitable for units with 230 V supply voltage.*

P: Power
I: Current
U: Voltage
S: Conductor cross section
k: Conductor coefficient
L: Conductor length
%e: The voltage drop

EXAMPLE OF CABLE CROSS-SECTION CALCULATION

P: 1,37 kW **U:** 230 V **PF: CosQ**: 0,8
L: 50 m **%e:** %3 **k:** 56 m/Ω

1

$$I\ current = \frac{1370\ W}{230.0,8} = 7,44\ A$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated “I current” value.
S1 = 0,5 mm²

2

%e = %3

$$S = \frac{100.1370.50}{56.3.230^2} = 0,77\ mm^2$$

S2 ≥ 0,77 mm² > 1 mm²
S2 = 1 mm²

3

I cable > I fuse ≥ I current
I cable > 10 A ≥ 7,44 A
“I fuse” which will be higher than “I current”, is selected.
The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.
I cable = 12 A
S3 = 0,5 mm²
Cable cross-section
S=Max (S1, S2, S3, 1,5 mm²)
S=Max (0,5, 1, 0,75, 1,5)
S=1,5 mm²

** It must be considered the above information for fan and compressor calculation in ENERGY-BOX AC-A EC/ ENERGY-BOX AC EC 500, 750, 1.000, 1.500, 2.000 unit models.*

CABLE CROSS-SECTION FORMULAS

1

$$I\,current = \frac{P}{\sqrt{3}.U.CosQ}$$

I cable > I current

2

$$\%e = \frac{100.P.L}{k.S.U^2}\ ,\ S = \frac{100.P.L}{k.\%e.U^2}$$

%e = %3

3

I cable > I fuse ≥ I current
Cable Cross-Section
S = Max (S1, S2, S3, 1,5 mm²)

** It is suitable for units with 400 V supply voltage.*

P: Power
I: Current
U: Voltage
S: Conductor cross section
k: Conductor coefficient
L: Conductor length
%e: The voltage drop

EXAMPLE OF CABLE CROSS-SECTION CALCULATION

P: 10,68 kW **U:** 400 V **PF: CosQ**: 0,8
L: 50 m **%e:** %3 **k:** 56 m/Ω

1

$$I\ current = \frac{10680\ W}{\sqrt{3}.400.0,8} = 19,29\ A$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated “I current” value.
S1 = 1,5 mm²

2

%e = %3

$$S = \frac{100.10680.50}{56.3.400^2}$$

S2 ≥ 1,98 mm²
S2 = 2,5 mm²

3

I cable > I fuse ≥ I current
I cable > 25 A ≥ 19,29 A
“I fuse”, which will be higher than “I current”, is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.

I cable = 32 A
S3 = 2,5 mm²
Cable cross-section S = Max (S1, S2, S3, 1,5 mm²)
S = Max (1,5, 2,5, 2,5, 1,5)
S = 2,5 mm²

** It must be considered the above information for fan calculation in ENERGY-BOX AC-A EC/ENERGY-BOX AC EC 3.000 and 4.000 unit models.*

I cable > I fuse ≥ I current (I fan + I comp.)
I cable > 25 A ≥17 A
“I fuse”, which will be higher than “I current”, is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected “I fuse” value.

I cable = 32 A
S3 = 2,5 mm²

** It must be considered the above information for fan and compressor calculation in ENERGY-BOX AC-A/ ENERGY-BOX AC 3.000 and 4.000 unit models.*

ELECTRICAL CONNECTION

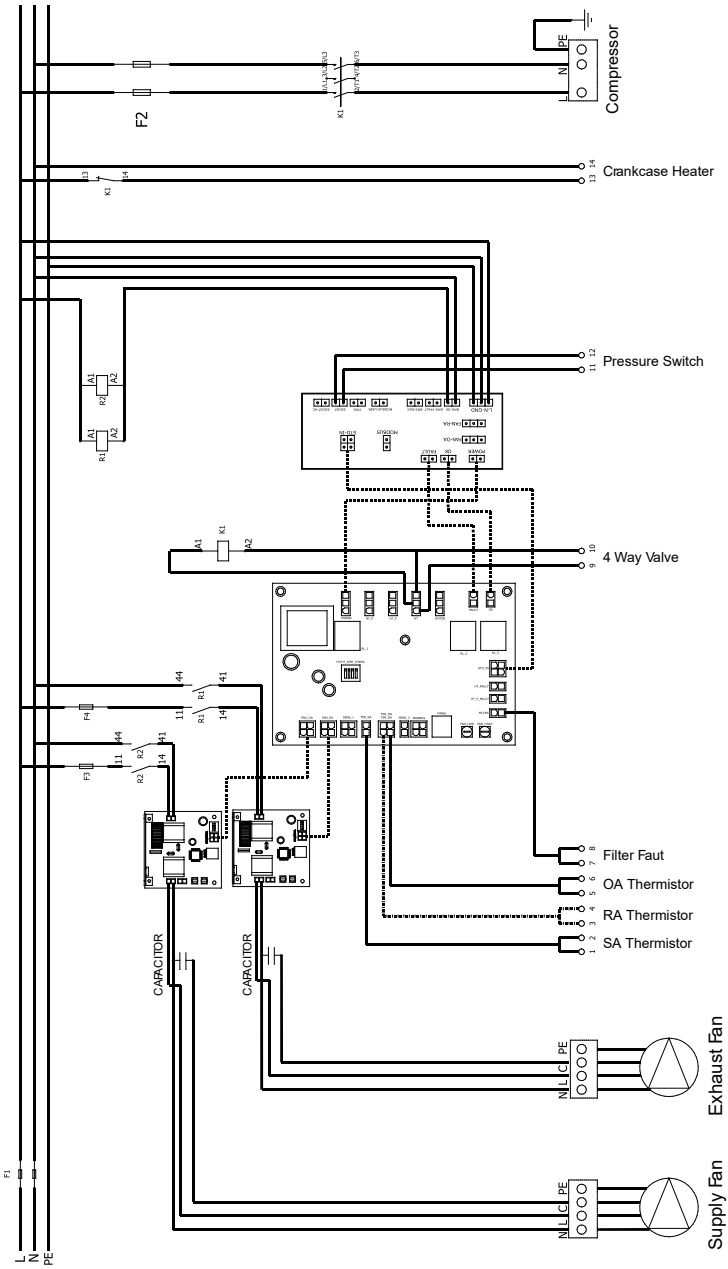
System Connection

1- Cut the gaskets in cable connection hole from the center.
2- Pass the on/off switch cables through the cable connection hole.
3- Connect the main power cable and ground wires to the terminals in the junction box.
4- Use cable tie to hold the cables tightly.
5- After making cable connections, insulate the cable connection hole against entering water and impurity.

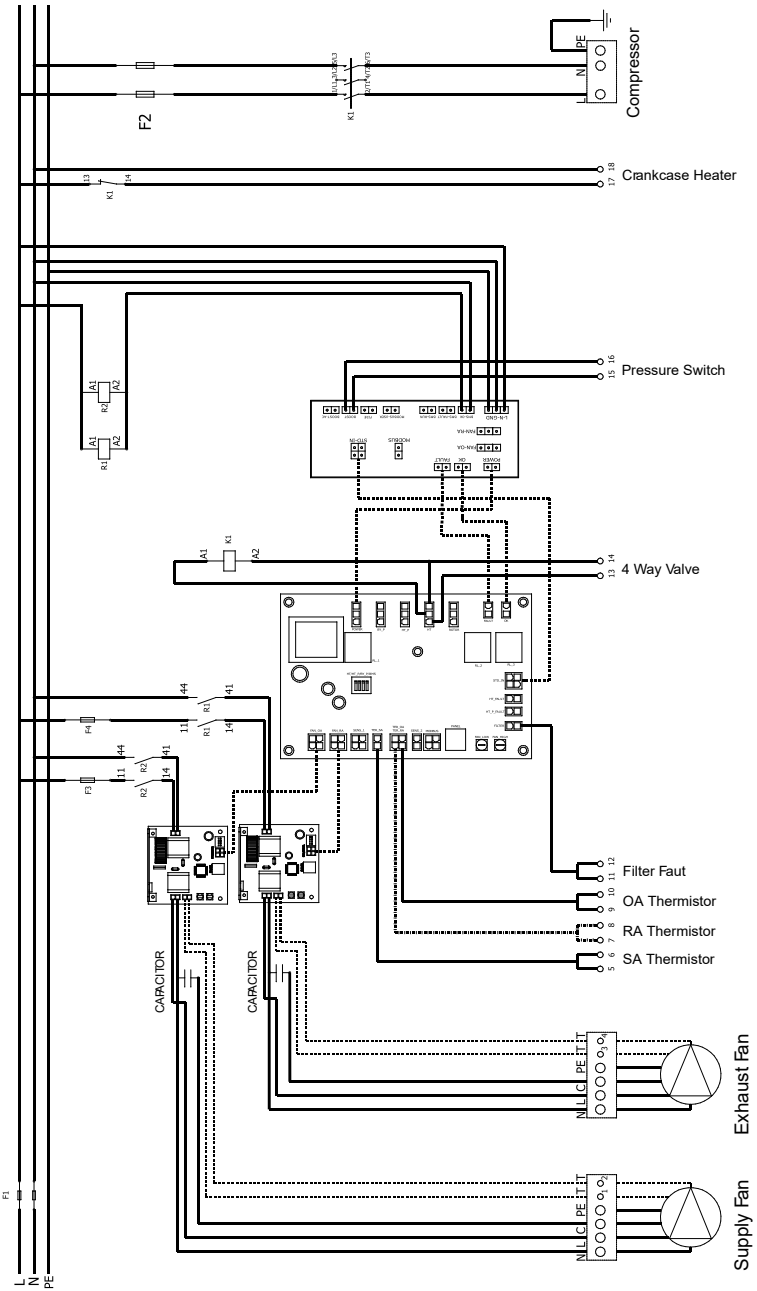
Considerations During Electricity Network Connection

1- Electrical connection must be done by an authorized personnel.
2- Drain pipe connection should be done before making the electrical connection and please start electrical installation after being sure that insulation is ensured.
3- All kinds of safety measures should be taken by the technician during installation.
4- Electrical wiring must be done according to the specified electrical diagram. Any electrical connection which is made by the factory should not be changed.
5- Cables to be used during network connection must conform to the specified standards and should be connected to a grounded power supply.
6- A circuit breaker should be placed between the unit and network. Circuit breaker must be selected according to the total power and current value specified on+ the nameplate.
7- Over current protection is recommended for the units.

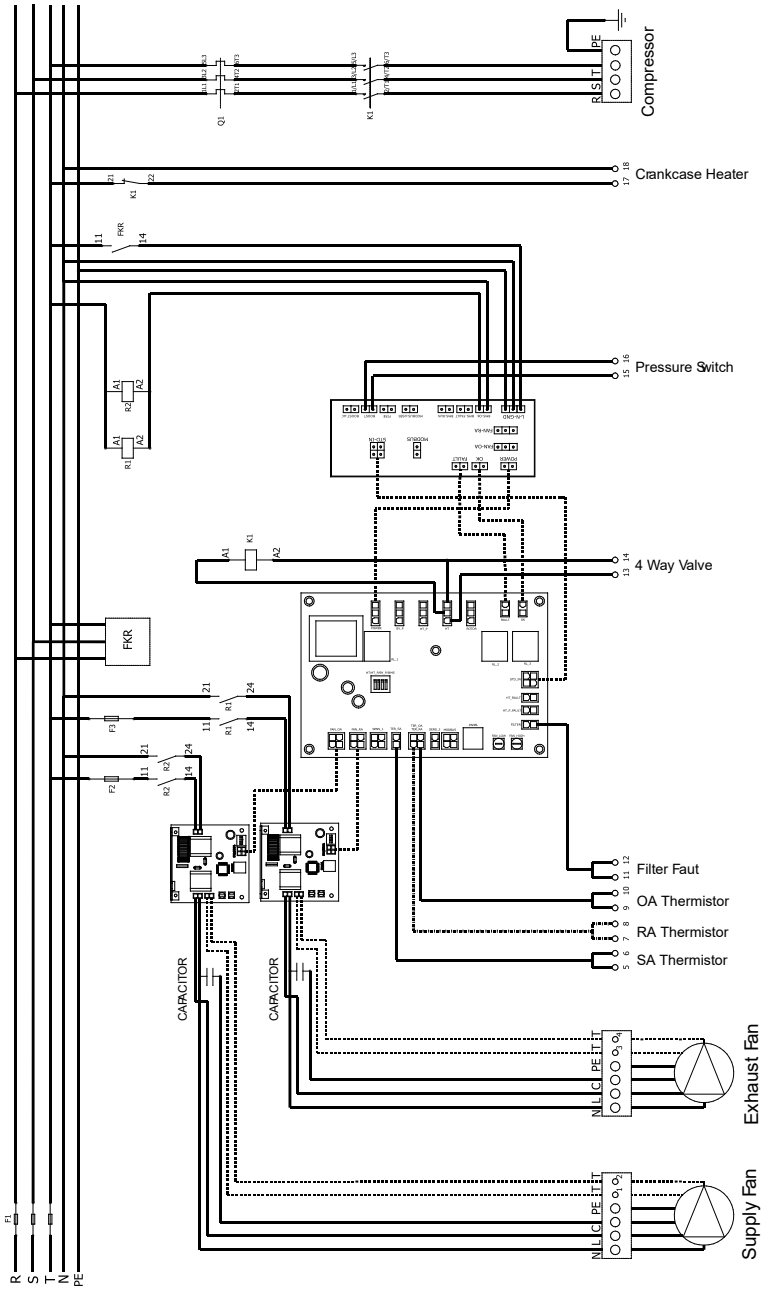
Wiring Diagram With ***AIRTECHNIC*** DX Control Card For ENERGY-BOX AC-A / AC-500/750/1.000



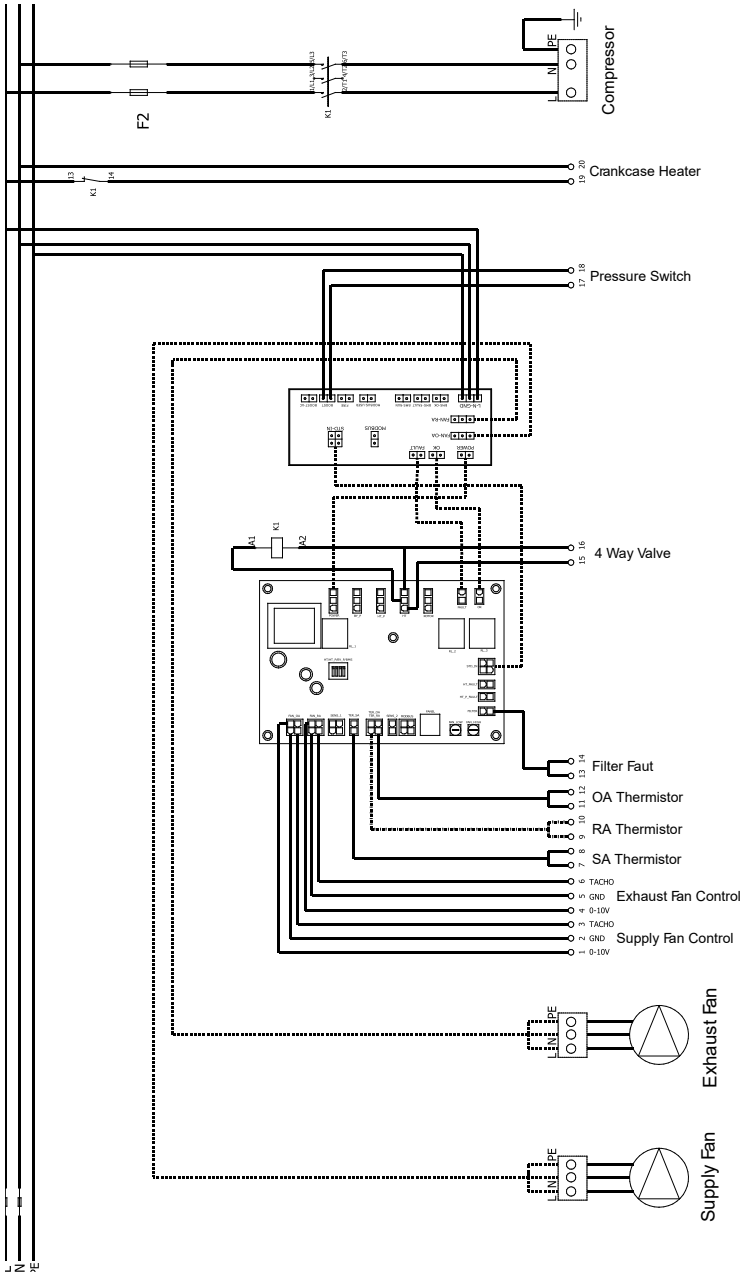
Wiring Diagram With ***AIRTECHNIC*** DX Control Card For ENERGY-BOX AC-A / AC-500/750/1.000 Units



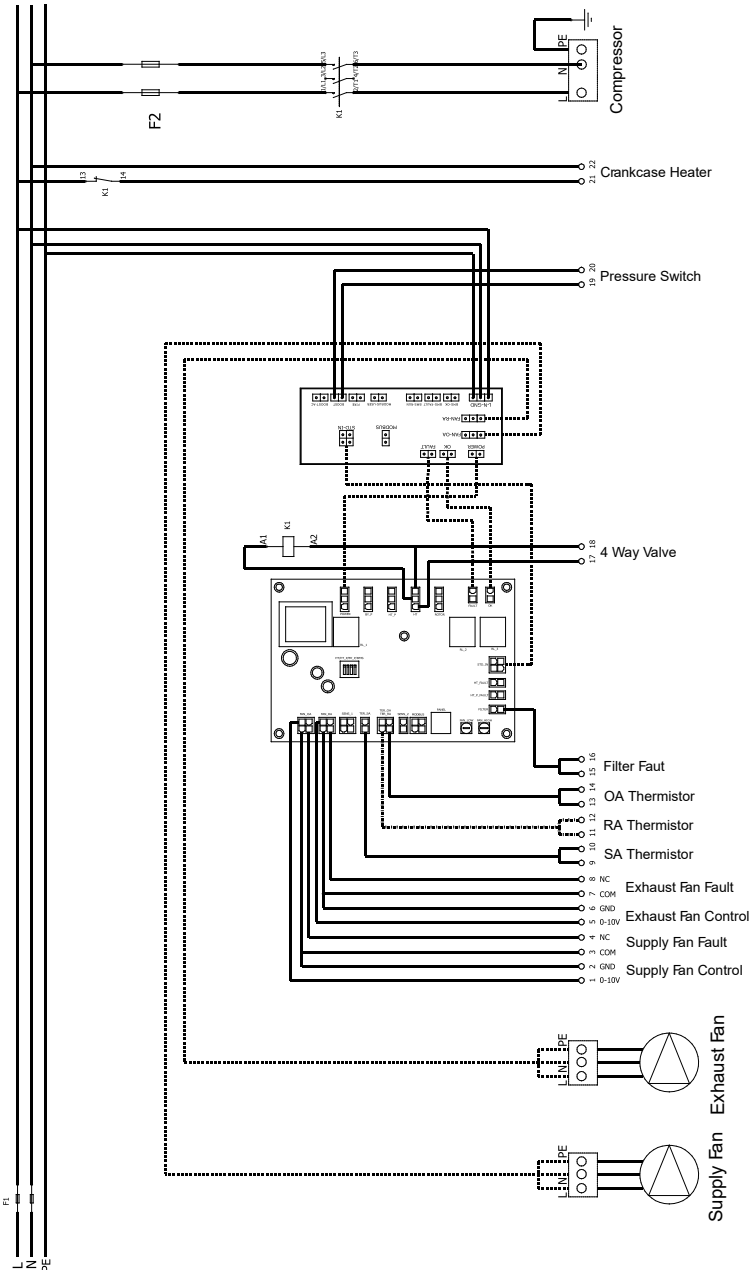
Wiring Diagram With ***AIRTECHNIC*** DX Control Card For ENERGY-BOX AC-A/ AC-3.000/4.000 Units



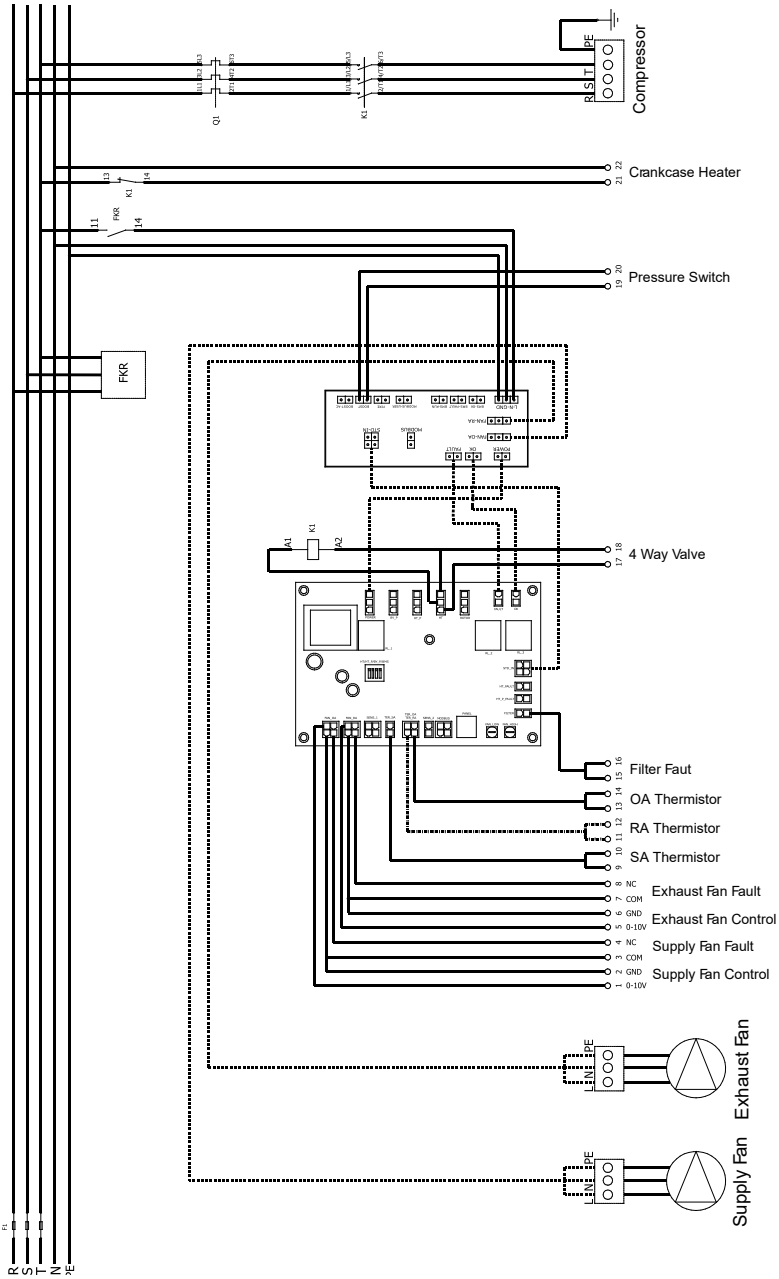
Wiring Diagram With *AIRTECHNIC* DX Control Card For ENERGY-BOX AC-A / AC-500 EC Unit



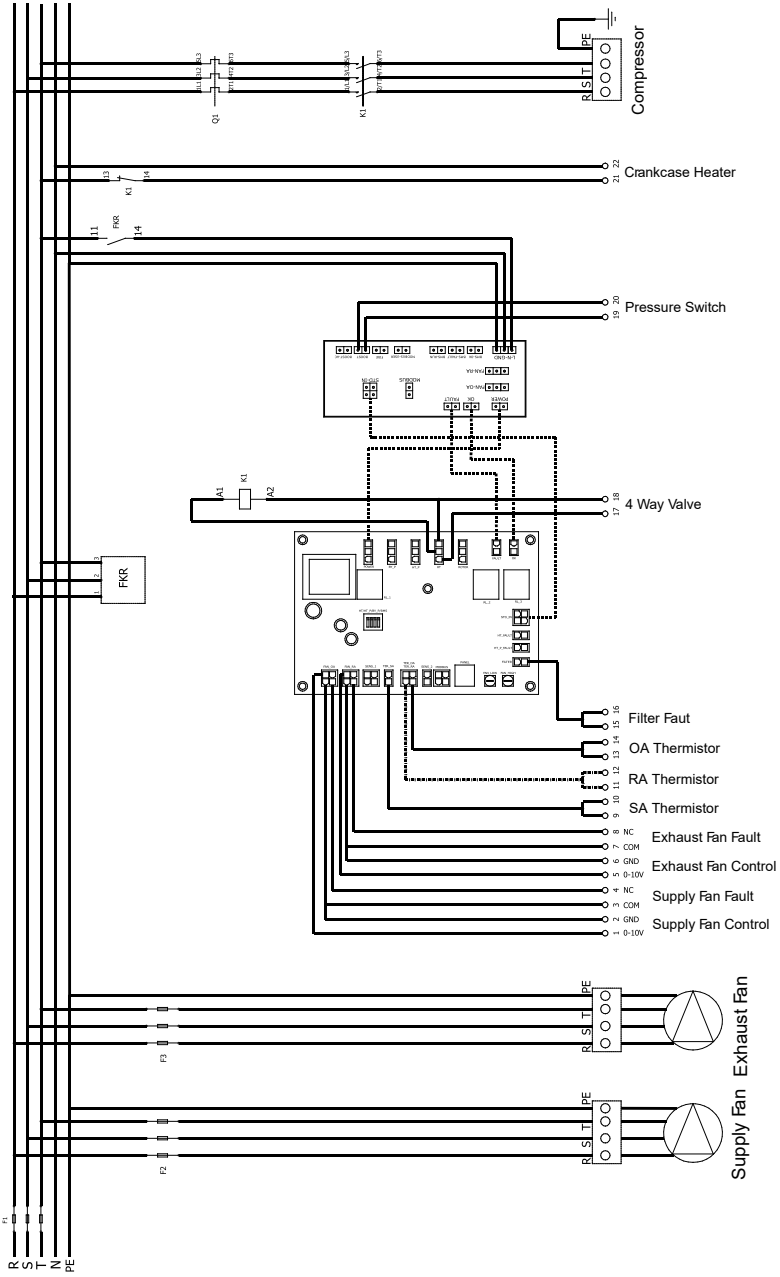
Wiring Diagram With *AIRTECHNIC* DX Control Card For ENERGY-BOX AC-A / AC-750 EC/1.000 EC/1.500 EC/2.000 EC Units



Wiring Diagram With ***AIRTECHNIC*** DX Control Card For ENERGY-BOX AC-A/ AC-3.000 EC Unit



Wiring Diagram With ***AIRTECHNIC*** DX Control Card For ENERGY-BOX AC-A / AC-4.000 EC Unit



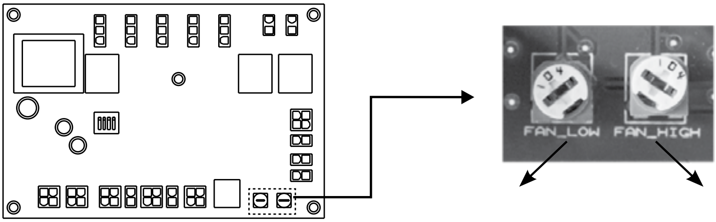
CONTROL-DX

Operation	Description	Basic Panel	Pro Panel
Fan Speed Control	3 steps fan speed control of supply and exhaust fan is available.	3 steps (2 fans) (High/Med/Low)	
Boost Function	**It is used for increasing fan speed:** **Alternative-1:** Via boost button on the control board **Alternative-2:** Via dry contact or light power input (230V) (like kitchen light, bathroom light etc.) on PCB board.	Standard	Standard
Filter Function	**There are 2 alternatives to control filters:** **Alternative-1:** It records run time of the unit and when set time expires, control board gives an alert for filter change. **Alternative-2:** Filter change time can be controlled with pressure switch mechanically. With this method, when filter needs to be changed control board gives an alert .	Standard Optional	Standard Optional
By-Pass Function*	Filtered fresh air is supplied indoor without passing in heat exchanger.	Optional	Optional
Sensor (VOD)	Fans are running continuously in accordance with CO_2 sensor, air quality sensor or humidity sensor.	----------	Optional
Frost Protection Function	Where outdoor air is too low, this function is a protection method to prevent heat exchanger from freezing.	Standard	Standard
Pre-Heater Function	Where outdoor air is too low, fresh air is heated by a pre-heater before it enters into the unit. This function is a protection method to prevent heat exchanger from freezing.	Optional	Optional
External Control (BMS) Function	IN: Unit can be on/off via control board. OUT 1: Information of “unit status”. OUT 2: Information of “fault”.	Standard	Standard
Modbus Function	It controls all functions of unit via PC or central automation board.	Standard	Standard
Weekly Timer Function	Unit can be programmed to operate on certain periods of the week.	----------	Standard
Log Function	All possible working options of the unit can be recorded.	----------	Standard
Fire Function	It is used for changing working status of the unit in case of fire	Standard	Standard
Warnings	- Filter change - Fan Fault - Pre-Heater Fault - Heater Fault	Standard (Display error code	Standard (Display error code
Child-Proof Protection Function	It is used to lock the keypad.	Standard	Standard

*Note: * This function is standard in some units.*

Fan Speed Control Function:

Control board has 4 different fan speeds: “low”, “medium”, “high”, “boost”. These fan speeds are set to specific values by default. The maximum fan speed is “boost”. If it is desired to change fan speeds, “low” and “high” set values can be changed by potentiometers on control board. Control board automatically set the value of “medium” by averaging “high” and “low” values.



Potentiometer “Low” **Potentiometer “High”**

Note: If “low” is set to the highest and “high” is set to the lowest value, unit continues to run according to default settings. Factory setting values can be changed by Pro Panel.

Filter Function

This function controls filter change time. There are 2 alternatives to control filters:

1. It records run time of the unit. Filter change time is set a particular run time by factory settings. When set time expires, control board gives an alert (red warning light flashes) for filter change. After filter cleaning is done, filter setting time can be reset by pressing simultaneously ⊖ and ⏻ on Basic Panel, hold ▽ and ▢ during reset time that appears on screen. When countdown is over, press ⏻ on Pro Panel.

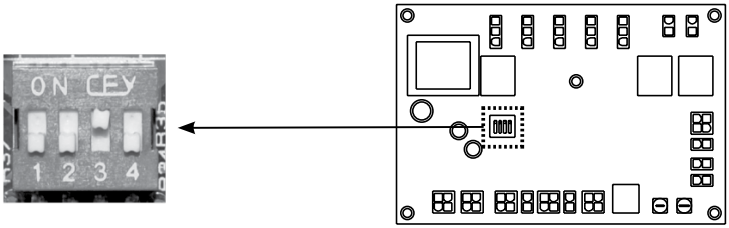
Note: Default run time set value is changeable on Pro Panel.

2. Filter change time can be controlled by pressure switch mechanically. With this method, when filter needs to be changed, control board gives an alert (red warning light flashes). After changing/cleaning is completed, warning light goes off automatically.

By-pass Function (Optional)

By-pass function only exists on units which have by-pass module. It is used when filtered fresh air is desired to be supplied to indoor without passing through heat exchanger (transition seasons). Control board decides whether by-pass module will be opened or not by controlling outdoor air temperature, return air temperature and set temperature values.

Note: To activate this function, turn “dip switch 3” on.



Frost Protection Function

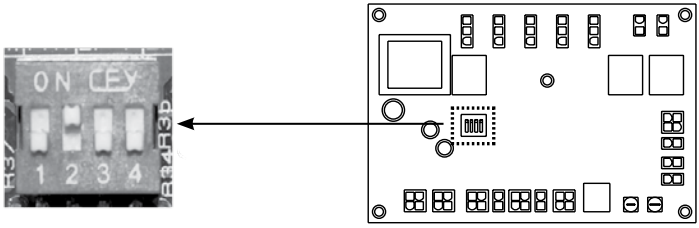
Condensation occurs inside the unit where outdoor air temperature is below 0°C. Heat exchanger can be damaged if condensation water freezes inside. Control board changes fan speed periodically to protect freezing.

Note: This function is active when outdoor air temperature is below -3°C. Set temperature value is changeable on Pro Panel.

Pre-Heater Function (Optional)

This function helps to protect unit from freezeing where outdoor air temperature is too low. It runs due to outdoor air temperature. 1 step electric heater can be controlled.

Note 1: To activate this function, turn “dip switch 2” on.



Note 2: This function is active when outdoor air temperature is below 0°C. Set temperature value is changeable on Pro Panel.

Boost Function

This function is used when large amount of exhaust and fresh air is needed (at the time of using kitchen/bathroom/wc, etc.) while ventilation is still going on. There are 2 boost functions on controller. One of them is on control panel, the other one is on control board:

1. "Boost" function is activated by pressing on Basic Panel and on Pro Panel for 3 seconds. After unit runs at boost speed (maximum speed) and during boost time (15 minutes) , it begins to run at the speed value that is set before boost function is activated.
2. There is one dry contact relay input and one 230V input on control board. If one of these inputs is activated, unit begins to run at "boost" speed. When activated input is passive again, unit begins to run at the speed value that is set before boost function is activated.

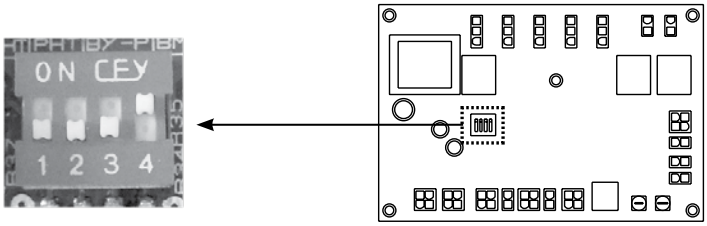
Note 1: Boost speed and boost time are changeable on Pro Panel.

Note 2: During operating at boost function on Basic Panel, "high" (H), "medium" (M) and "low" (L) speed leds are on at the same time.

BMS Function

BMS Function makes the unit to be monitored on a central automation system.

1. Dry contact outputs: There are 2 dry contact outputs. Working status and failure status of the unit can be monitored.
2. Dry contact input: Operation of the unit (on/off) can be done by dry contact input. When this function is active, you can't turn on/off the unit on control panel. To activate this function, turn "dip switch 4" on.



Modbus Function

Modbus function helps to monitor the unit and change all possible functions on a central automation system.

Weekly Timer Function

Weekly timer function is available on Pro Panel. Unit can be programmed to operate automatically on certain periods of the week. Three options are available:

1. 5+0: Active for 5 weekdays, off on weekends
2. 5+1: Active on 5 weekdays and saturday, off on sunday
3. 5+2: Active for all days of the week

Log Function

Log Function is available on Pro Panel. It records all the activity of the unit as date and hour.

Fire Function

There is a dry contact relay on the control board. The fire function is activated in case of on fire, if the dry contact relay is attached to fire system.

Note: In case of fire, the unit is closed on Basic Panel. Different scenarios can be selected on Pro Panel.

Warnings

There are three types of warnings on Basic Panel:

1. If red warning signal lights continuously, it means fan failure or outdoor air thermistor failure. (Unit is not working)

2. If red warning signal and fan speed led lights simultaneously, it means failure of components. (Only fans are running)

3. If red warning signal flashes, it is an alarm of dirty filter.

Screen failure code is “ERR” on Pro Panel. (See failure code list)

Note: After troubleshooting, press on Basic Panel and on Pro Panel for 3 seconds.

Child Proof Protection Function

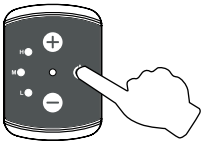
It is used to lock the keypad. (See use of keypad)

Note: Child proof protection is available on Pro Panel. This function will be activated if any button isn’t pressed for 10 seconds.

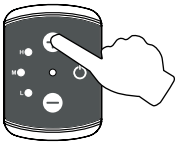
Sensor (VOD) (Optional)

Sensor (VOD) function is available on Pro Panel. It runs with CO_2 sensor, air quality sensor or humidity sensor. Speed of fans changes automatically according to the information coming from these sensors.

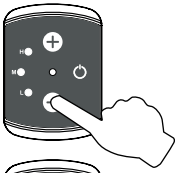
Basic Panel Control Functions



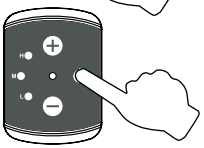
1.ON/OFF: Press for 3 seconds.



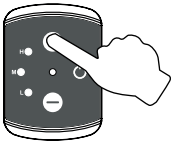
2. Press to increase fan speed.



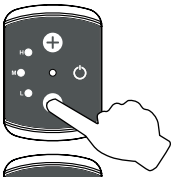
3. Press to decrease fan speed.



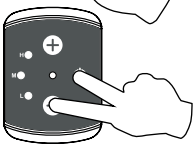
4. Press to activate “boost” function.



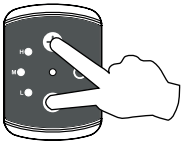
5. Single Fan Mode (OA): If you press for 3 seconds, RA fan will be off and OA fan will continue to run. At which step the fan is running, light of that fan speed starts to flash. To deactivate this mode, press or for 3 seconds.



6. Single Fan Mode (RA): If you press for 3 seconds, OA fan will be off and RA fan will continue to run. At which step the fan is running, light of that fan speed starts to flash. To deactivate this mode, press or for 3 seconds.



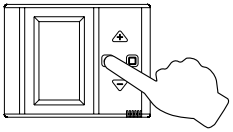
7. To reset the duration of filter contamination depending time, press and .



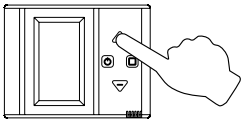
8. Child Proof Protection: To activate this function, press and for 3 seconds. When child proof protection is active, keypad is locked and buttons do not work. To deactivate this function press and for 3 seconds.

Pro Panel Control Functions

WARNING
Please connect the Pro Panel when unit is off.

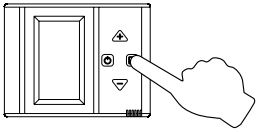


1. ON / OFF: Press ⏻ for 3 seconds.



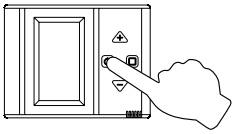
2. Press ▲ or ▼ to switch to screens in between.

- Press ▲ to switch to next screen.
- Press to ▼ switch to previous screen.

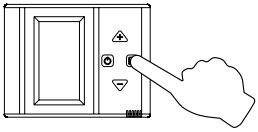


3. Press ▣ to change any value on screen.

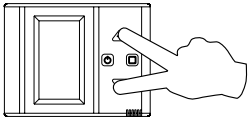
- Press to increase existing value +1
- Press to decrease existing value -1



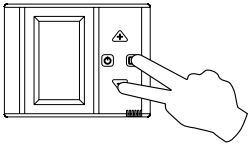
4. Press ⏻ to exit existing menu.



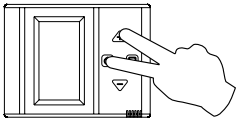
5. Press ▣ to activate “boost” function.



6. Child Lock: To activate this function, press ▲ and for ▼ 3 seconds. When child proof protection is active, keypad is locked and buttons do not work. To deactivate this function press ▲ and ▼ for 3 seconds.

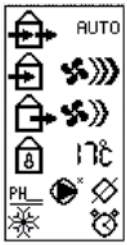
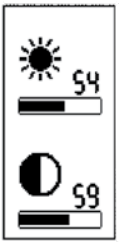


7. To reset the duration of filter contamination depending time, ▣ press and ▼.
Hold the buttons during reset time that appears on screen. When countdown is over, press ⏻.



8. Press ⏻ and ▲ simultaneously to adjust screen brightness and contrast.

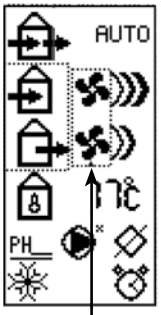
Pro Panel Screen

1. Screen	2. Screen	3. Screen	4. Screen
Screen Brightness	Timer	Company Introduction	Screen Brightness and Contrast Setting
			

1.Screen Symbols (Main Screen)

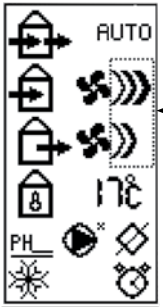
	Standard mode
	Single fan mode (only exhaust fan is running.)
	Single fan mode (only supply fan is running.)
	VOD (Auto) mode

	Supply fan
	Exhaust fan

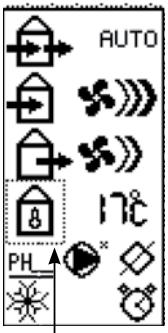


	Fan is off
	Fan is on

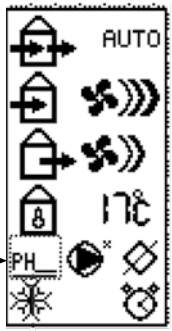
Air Conditioning Mode	
AUTO	Automatic
HEAT	Heating
COOL	Cooling
FAN	Ventilation



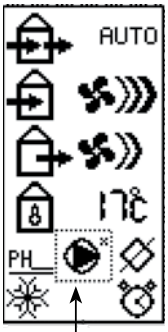
	Fan speed: High
	Fan speed: Med
	Fan speed: Low
B	Fan speed: Boost
A	Fan speed: Auto (If unit is on VOD mode.)



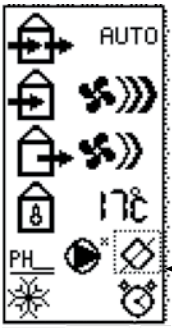
	Outdoor air temperature
	Indoor air temperature
S	Set temperature



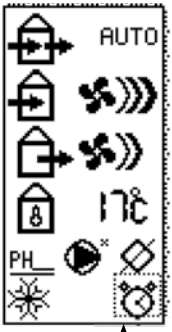
	There is no pre-heater.
PH	Pre-heater is off.
PH	Pre-heater is on.



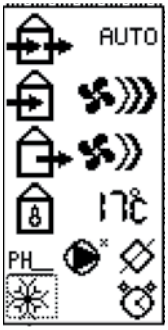
	Compressor is off. (Cooling mode)
	Compressor is on. (Cooling mode)
	Compressor is off. (Heating mode)
	Compressor is on. (Heating mode)



	There is no by-pass.
	By-pass is off.
	By-pass is on.



	BMS and TIMER is not adjusted.
BMS	BMS is on.
	TIMER is on.



	No failure, freezing scenario is off.
ERR	During a failure situation, the code “ERR” and its code will be seen on screen.
FILTER	Filter dirty
	Freezing scenario is on.
	Defrost scenario is on.

2.Screen Symbols (Timer)

Start-up time of unit

Shut down time of unit

Time hh.mm.ss

Date yy.mm.dd

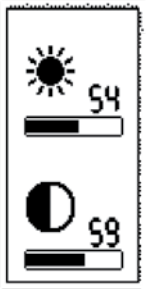
___	TIMER is off
S+0	TIMER is on: 5 weekdays
S+1	TIMER is on: Weekdays+Saturdays
S+2	TIMER is on: All days

3.Screen Symbols (Company Introduction)

Company logo and internet address

Pro panel software version

4.Screen Symbols (Screen Brightness and Contrast Setting)



Screen brightness value

Screen contrast value

Error Code List

Register 25 Value	Pro Panel Screen Code	Description
0	-----	Unit is working normally.
1	ERR 1	Fire alarm
2	ERR 2	Heater alarm
3	ERR 3	Supply fan failure (OA)
4	ERR 4	Exhaust fan failure (RA
5	ERR 5	Outdoor air temperature sensor failure (OA)
6	ERR 6	Return air temperature sensor failure (RA)
7	ERR 7	Pro Panel sensor failure (P)
8	ERR 8	Supply air temperature sensor failure (SA)
9	ERR 9	Sensor-1 failure
10	ERR 10	Sensor-2 failure
11	ERR 11*	Gas pressure fault
12	ERR 12	Alarm of dirty filter
13	ERR 13*	Gas pressure fault (gas circuit get blocked)
14	ERR 14*	Reset option is active.
15	ERR 15**	Pro Panel communication error

Note: * This is only available for DX units.
**This is only available for Pro Panel.

Modbus Connection

1. Introduction

This document includes the protocol of Modbus communication that is used with ***AIRTECHNIC*** and ***AIRTECHNIC***-DX control boards.

2. Properties

Control board uses Modbus RTU protocol via RS485 connection. The unit works as Slave and the information can be taken from an external Master module.

Connection information of the unit is listed as below:
Connection Type: **Modbus RTU Slave**
Standard Address: **1**
Link speed: **9600**
Party:**None**
Data Bits: **8**
Stop Bit: **1**

3. Physical Connection

Communication network is showed below. Control board can be connected to RS485 on which is connected more than one unit.Address conflicts on this line should be removed and necessary software settings should be done for data communication.

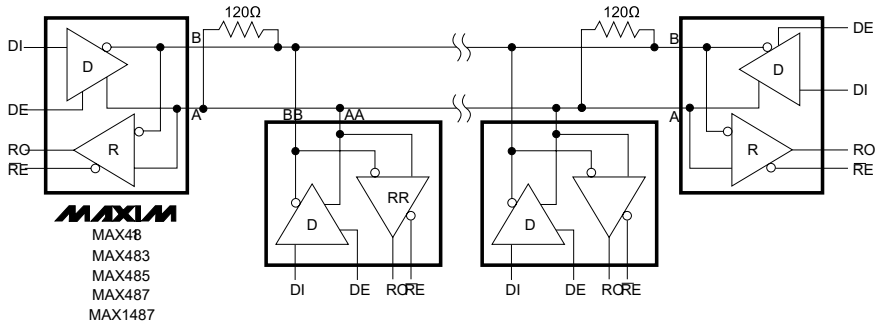


Fig. 2,1 RS485 Wiring Example

If the line is too long or if any communication problem occurs, 120 Ohm resistance should be added at the beginning and end of the line as shown on schema.

4. Modbus Functions

Communication package **(Table 3,1)** is the same for each function. First address information of relevant module is sent on package.

Table 3,1 Modbus package type

Address Information	Function Code	Data	Failure Control (CRC16)

Control board supports only two of standard functions of Modbus. These codes are 03 register reading **(Table 3,2)** and 06 register writing **(Table 3,3)**. In the example below **(Table 3,2)**, master wants to know the 16 bit data on 2nd register. Corresponding response value of control board is shown on the table below. In the second example **(Table 3,3)**, master wants to write the 16 bit data on 2nd register and it is reported to control board that the data was written.

Table 3,2 Function 03 Transfer Package Example

Master Transfer				
Address Information	Function Code	Register ID	Data Length	Failure Control
0 x 01	0 x 03	0 x 00,0 x 02	0 x 00,0 x 01	0 x 25,0 x CA

Response of Control Board				
Address Information	Function Code	Register ID	Data Length	Failure Control
0 x 01	0 x 03	0 x 00	0 x 07,0 x FF	0 x FA,0 x 34

Table 3,3 Function 06 Transfer Package Example

Master Transfer				
Address Information	Function Code	Register ID	Data Length	Failure Control
0 x 01	0 x 06	0 x 00,0 x 02	0 x 0C,0 x 00	0 x 2D,0 x 0A

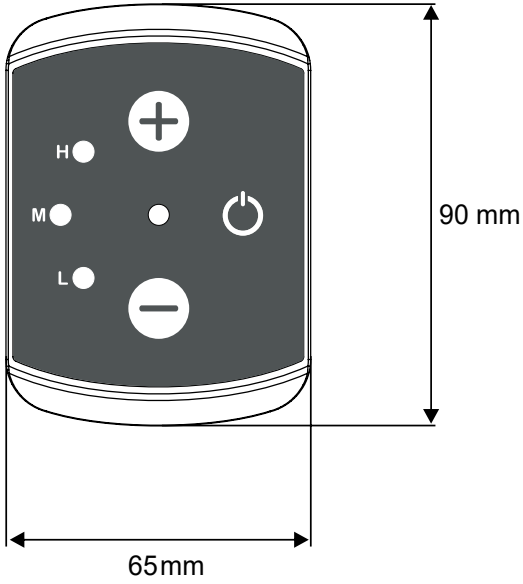
Response of Control Board				
Address Information	Function Code	Register ID	Data Length	Failure Control
0 x 01	0 x 06	0 x 00,0 x 02	0 x 0C,0 x 00	0 x 2D,0 x 0A

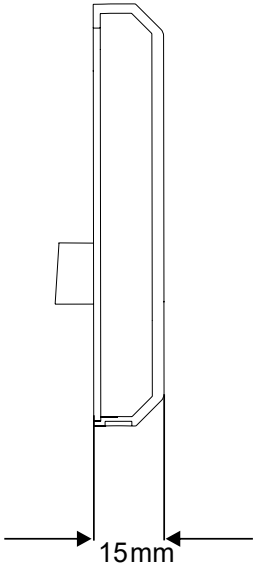
Modbus Register List

ID	Name	Multiplier	Access	Unit	Limit	Valid	Explanation
0	Version of program	1	r	-	-	-	Version of installed program [MMYY]
1	Unit On / Off	1	rw	-	[0,1]	-	0-Stop,1-Start
6	Speed of supply fan	1	r	rpm	-	-	
7	Speed of exhaust fan	1	r	rpm	-	-	
11	Outdoor air temperature	0.1	r	ºC	-	-	TerOA
12	Return air temperature	0.1	r	ºC	-	-	TerRA
13	Supply air temperature	0.1	r	ºC	-	-	TerSA
14	Pro panel temperature	0.1	rw	ºC	[-40,80]	-	TerP
15	Sensor-1 input	0.01	r	%	-	-	-
16	Sensor-2 input	0.01	r	%	-	-	-
25	Alarm code	1	r	-	-	-	Failure Code
36	Rotor status	1	r	-	[0,1]	-	0-Off 1-On
37	By-pass status	1	r	-	[0,1]	-	0-Off 1-On
38	Pre-heater status	1	r	-	[0,1]	-	0-Off 1-On
39	After heater 1st stage status (Status of compressor for DX unit.)	1	r	-	[0,1]	-	0-Off 1-On
40	After heater 2nd stage status (Status of four-way for DX unit.)	1	r	-	[0,1]	-	0-Off 1-On
50	Mode selection	1	rw	-	[0,3]	0	0-Standard,1-Only exhaust fan,2-Only supply fan, 3-VOD
51	Modbus address	1	rw	-	[1,254]	1	
52	Supply fan velocity stage	1	rw	-	[0,2]	0	0-low, 1-med, 2-high
53	Exhaust fan velocity stage	1	rw	-	[0,2]	0	0-low, 1-med, 2-high
56	Temperature set point	1	rw	ºC	[18,28]	22	
89**	DX running mode	1	rw	-	[0,2]	0	0- Automatic, 1- Cooling, 2- Heating
101*	Pro-Panel modbus address	1	rw	-	[1,254]	1	

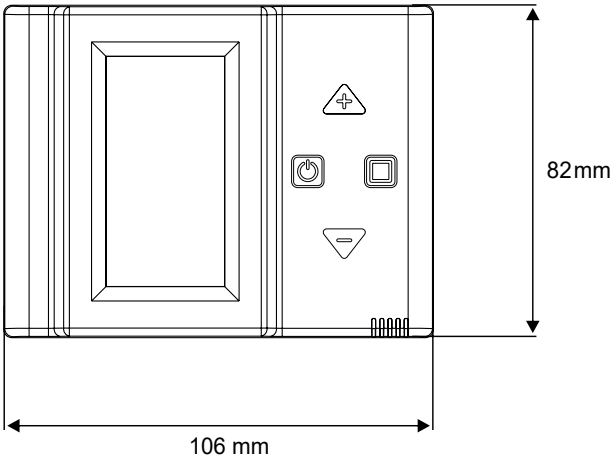
** Pro-Panel register values*
*** DX unit register values*

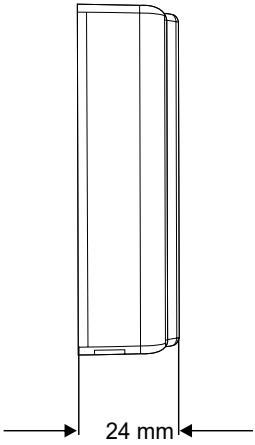
Basic Panel Dimensions





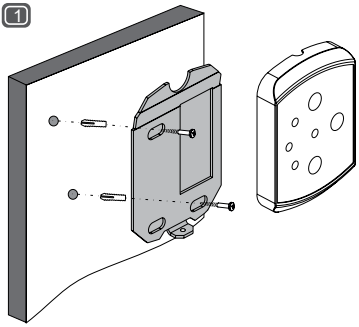
Pro Panel Dimensions





Basic Panel Installation

1



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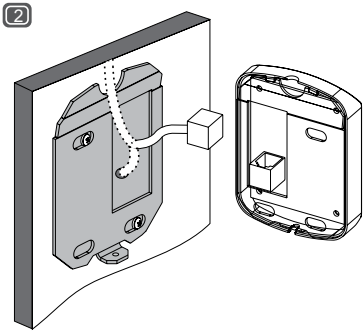

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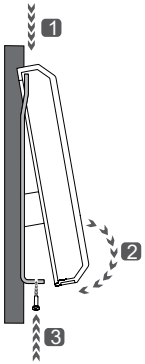
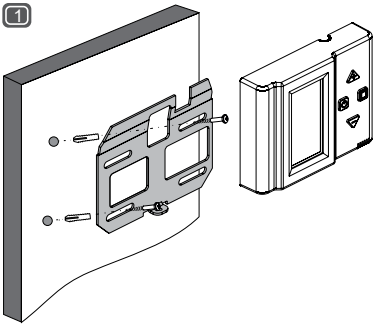


Pro Panel Installation

1



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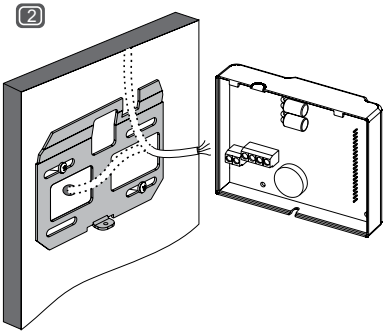

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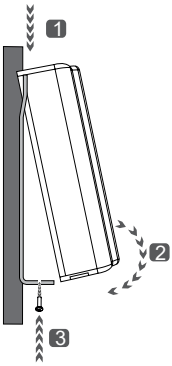


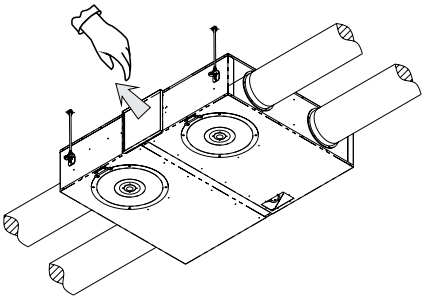
MAINTENANCE

• Turn off all the power switches before the maintenance is performed.
• Do not operate the system without the air filter to protect the components of the unit against being clogged.
• Clean up the air filter more than once in a year.
• Clean up the heat exchanger more than once per year.

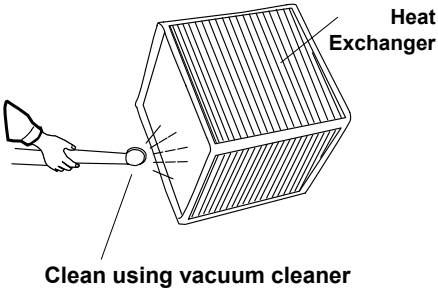
Heat Exchanger Cleaning

Step 1: Remove the exchanger's service cover, then remove the heat exchanger out from the main unit.

Note: The maximum weight of heat exchanger is 22 kg.

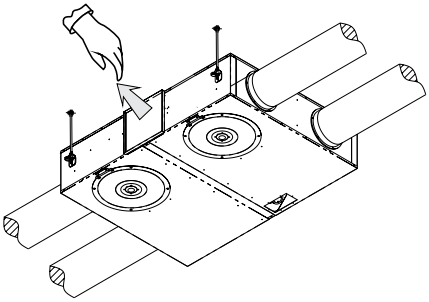


Step 2: Cellulosic heat exchanger can be cleaned by using vacuum. Aluminium heat exchanger can be cleaned by hot water or steam. Leave to dry after cleaning heat exchanger. Connect the unit after making sure that the heat exchanger has dried.

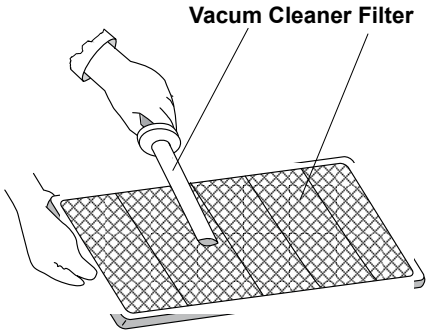


Air Filter Cleaning

Step 1: Open the filter service cover. Remove the air filters from the unit.



Step 2: Use a vacuum cleaner to suck up the dust from the air filter. If necessary, use warm water with addition a house detergent to remove the persistent dirt. Leave to dry after cleaning the air filter. Connect the unit after making sure that the filter has dried.



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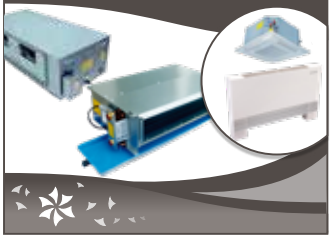
FAN COIL UNITS



ΑΝΕΜΙΣΤΗΡΕΣ & FAN SECTIONS

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ΦΙΛΤΡΑ

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