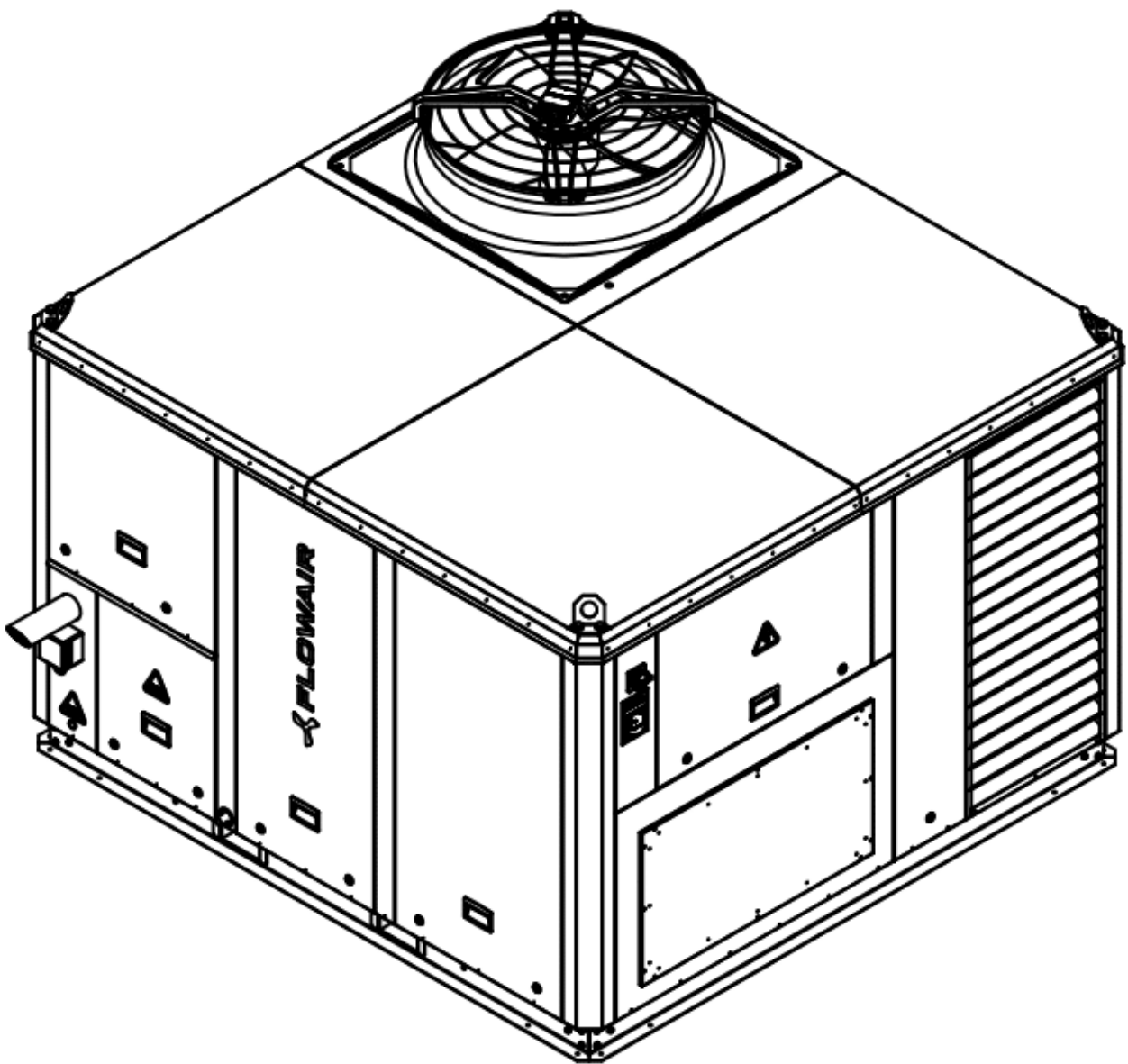


# Rooftop Cube

TECHNICAL DOCUMENTATION  
USER'S AND INSTALLATION MANUAL





Thank you for purchasing Cube unit.

This manual was published by FLOWAIR Głogowski and Brzeziński Sp. J. User's and installation manual is a set of recommendations and tips designed to show procedures, methods and remarks for proper installation, launch and operation of the unit.

**ATTENTION:** The manufacturer reserves the right to correct and change the user's manual anytime without notice, so as changes in the devices not influencing its operation.

The manual is an integral part of the device and must be delivered with it to the customer. Before installation, launch and operation of Cube device, the customer should read thoroughly this manual, especially with security section to eliminate risk of harm to the health or damage to material property. All guidelines mentioned in the manual should be applied without omitting any point. Failure to adhere to the following points may result in life-threatening due to improper transport and installation and can lead to damages to the unit or its improper operation. The manufacturer shall not be liable for deficiencies during installation and unit improper operation due to failure to comply with this manual. Meanwhile, the producer's warranty will not be applied in case of gross negligence or not complying with this manual.

**ATTENTION:** You should consult the service or manufacturer if this manual contains incomprehensible or ambiguous descriptions.

**ATTENTION:** It should be ensured that all users of unit are complied with this manual before launching it. In case of unit's transfer to another user, this manual must also be transferred.

**ATTENTION:** All activities during connecting to electrical installation must be conducted by qualified staff, having necessary attestations and certificates to work with voltage devices according to the laws of the country.

This manual is only intended to use for persons using or installing the Cube devices. Its content is legally protected and must not be copied, translated or processed (including electronic media) in total or partially without the manufacturer's written declaration of consent.

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## 1. INTRODUCTION

### 1.1. Options

Cube units can be additionally equipped with heater to increase the temperature of air at outlet. There is a water, electric or gas modulating heater and an option of a reversible heat pump paired with an electric, water or gas heater. Unit's size, together with types and optional equipment creates range described according to chart below:

Devices with a compressor system :

### Cube ① - ②③ / ④

- 1 - Nominal cooling capacity [kW]
- 2 - Heat recovery
  - R - Rotational exchanger
  - B - No heat recovery
- 3 - Type of heater
  - N - No additional heater
  - W- Water heater
  - E - Electric heater
  - G - Gas heater

Devices without a compressor system :

### Cube ①② - ③ / ④

- 1 - Heat recovery
  - R - Rotary heat exchanger
  - B - No heat recovery
- 2 - Nominal airflow [ $m^3/h \cdot 10^3$ ]
- 3 - Type of heater
  - N - No additional heater
  - W- Water heater
  - E - Electric heater
  - G - Gas heater

**ATTENTION:** Full unit's configuration is set on ordering process, led by our Sales Department or Project Support Department consultations.

## 1.2. Configuration of devices with a supply module



### DEVICE SELECTION

Cube R8 – heating and ventilation rooftop unit

Cube 20/40 – cooling, heating and ventilating rooftop unit

### SELECTION OF A HEATER IN THE ROOFTOP UNIT

N – version without a heater in the rooftop unit

W – water heat exchanger

E – electric heater

G – gas heater

HP – pompa ciepła (rewersyjny agregat sprężarkowy)

**ROOF BASE** – enable direct foundation

**ACOUSTIC SILENCERS** – reduce the noise level (standard)

**EXTENSION MODULE EX S/L** (option)

### SELECTION OF A HEATER IN THE NW MODULE

N – version without a heater in the NW module

W2 – water heat exchanger - 2-row exchanger

W3 – water heat exchanger - 3-row exchanger

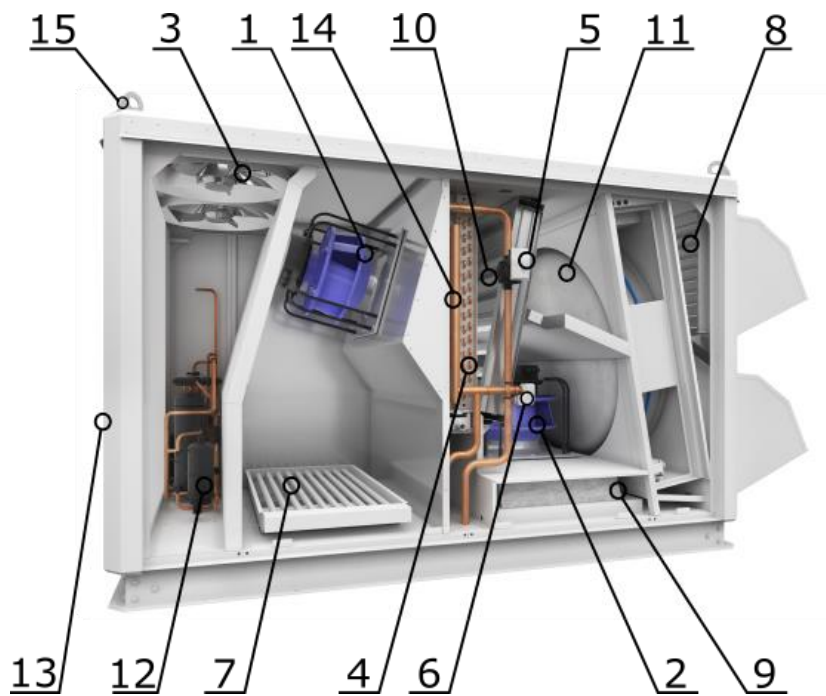
### SUPPLY MODULE

D – swirl diffuser with actuator,

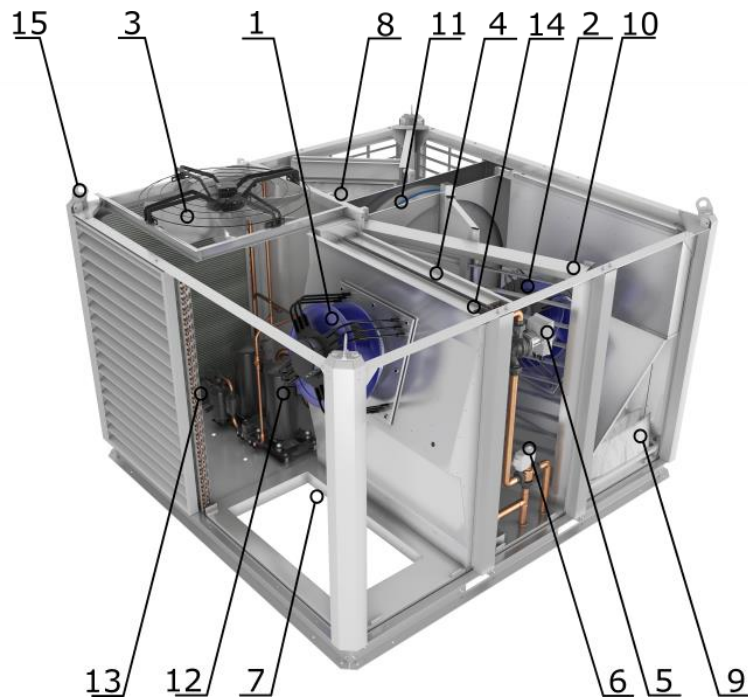
V – ventilation ducts connections

**ATTENTION:** Full unit's configuration is set on ordering process, led by our Sales Department or Project Support Department consultations.

### 1.3. General characteristics and construction Cube 20



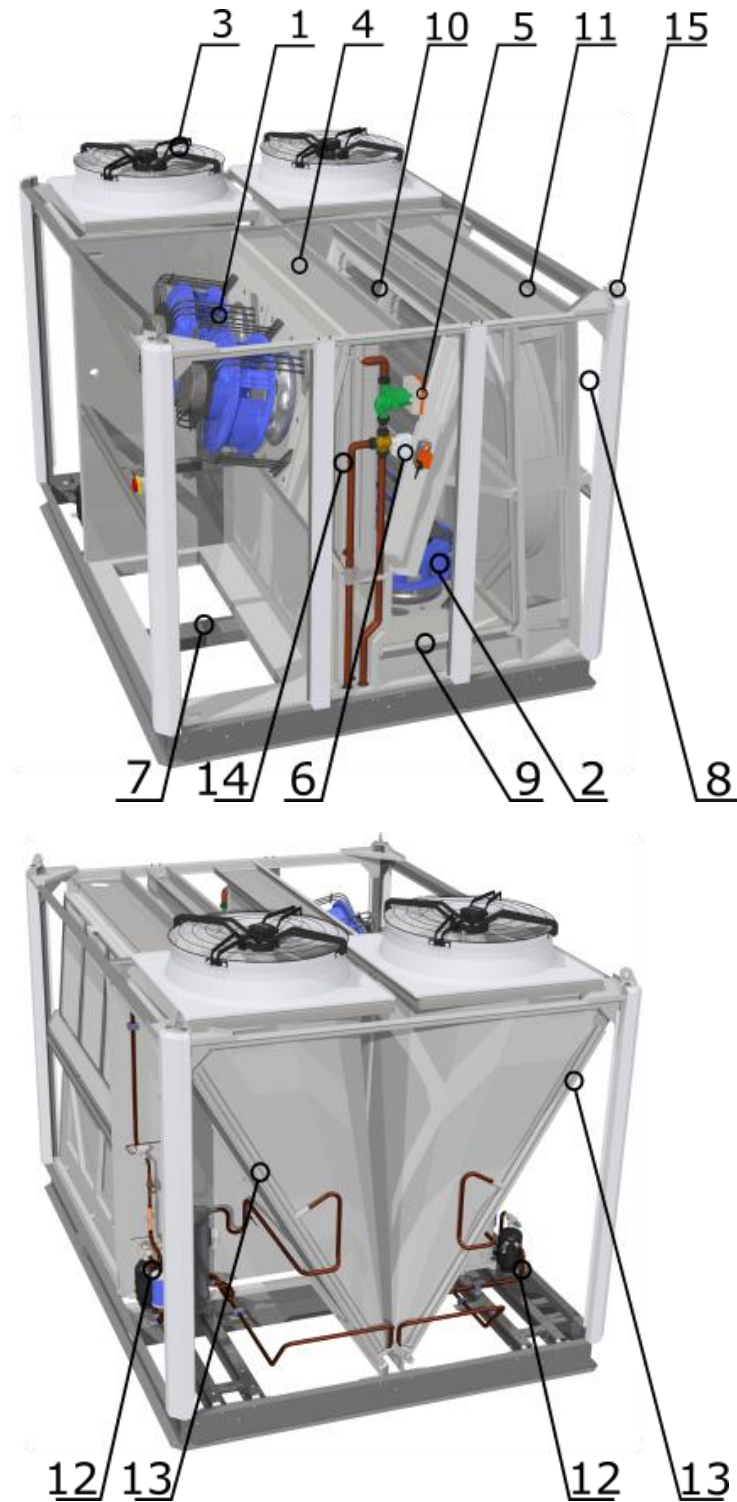
### 1.4. General characteristics and construction Cube 40



- |   |  |
|---|--|
| 1. Supply fan EC                                      | 8. Fresh air filter                          |
| 2. Exhaust fan EC                                     | 9. Exhaust filter                            |
| 3. Compressor cycle fans                              | 10. Recirculation damper (economizer)        |
| 4. Water heat exchanger (Cube – W)                    | 11. Rotary heat exchanger                    |
| 5. Circulating pump (Cube – W)                        | 12. Compressor                               |
| 6. 3- way valve (Cube – W)                            | 13. External compressor cycle heat exchanger |
| 7. Electric heater (Cube – E) / Gas heater (Cube – G) | 14. Internal compressor cycle heat exchanger |
|   | 15. Crane holders                            |



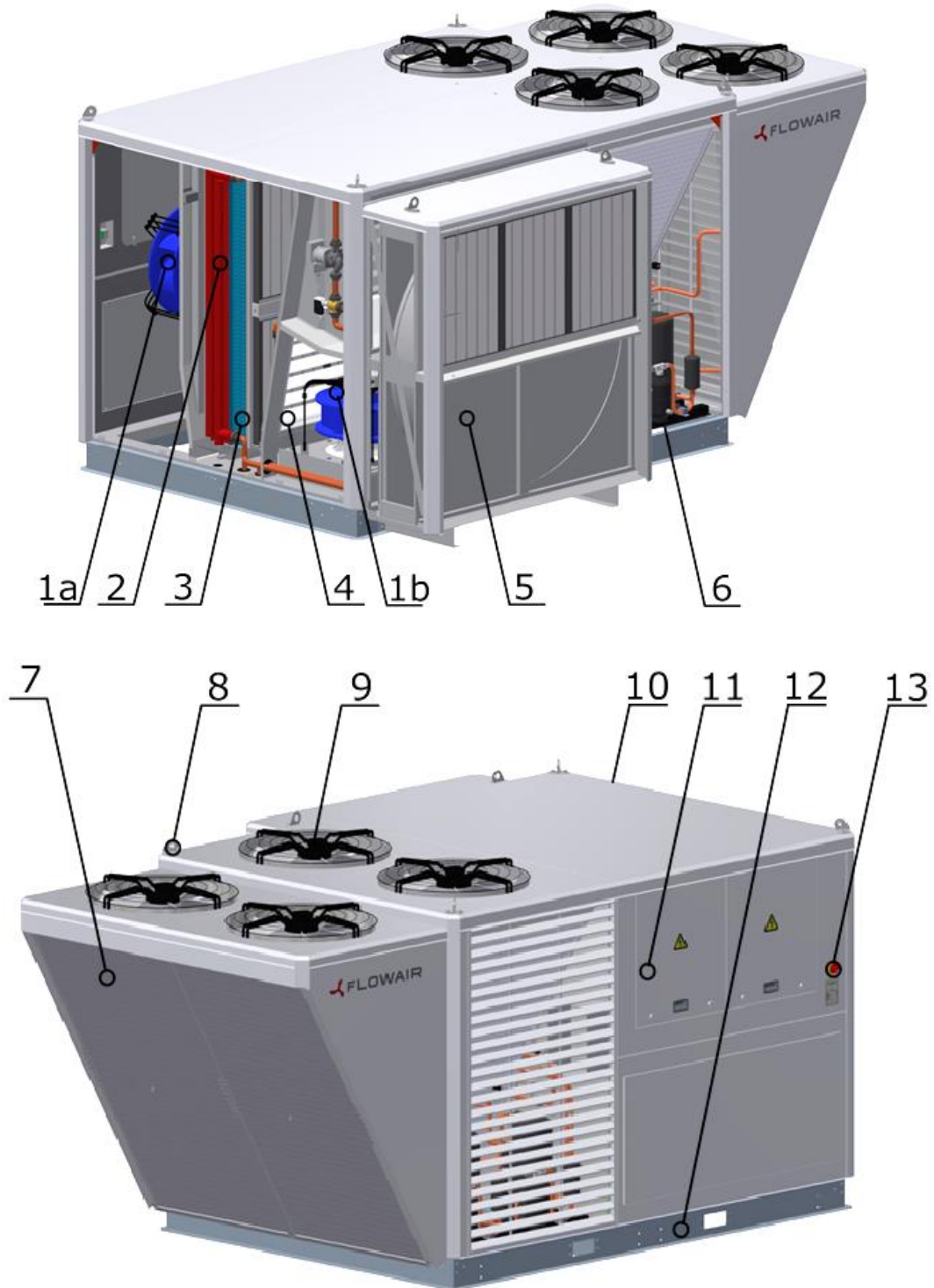
### 1.5. General characteristics and construction Cube 50– 100



1. Supply fan EC
2. Exhaust fan EC
3. Compressor cycle fans
4. Water heat exchanger (Cube – W)
5. Circulating pump (Cube – W)
6. 3- way valve (Cube – W)
7. Electric heater (Cube – E) / Gas heater (Cube – G)

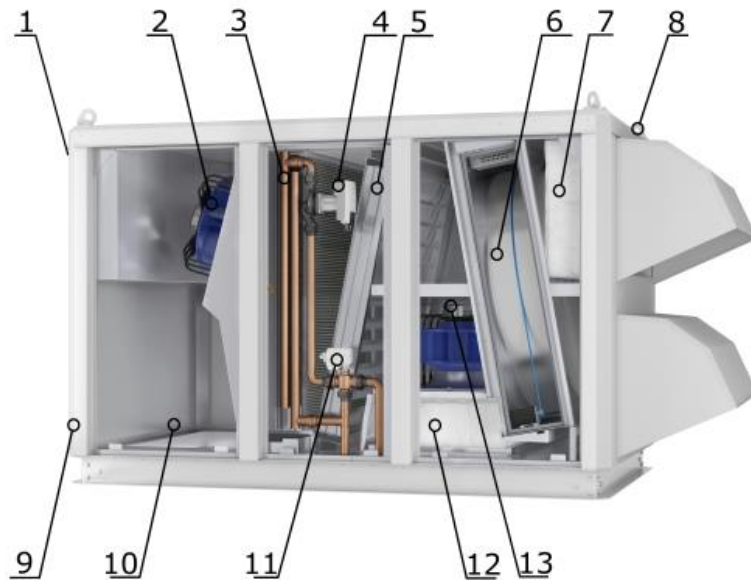
8. Fresh air filter
9. Exhaust filter
10. Recirculation damper (economizer)
11. Rotary heat exchanger
12. Compressor
13. External compressor cycle heat exchanger
14. Internal compressor cycle heat exchanger
15. Crane holders

## 1.6. General characteristics and construction Cube 120/160



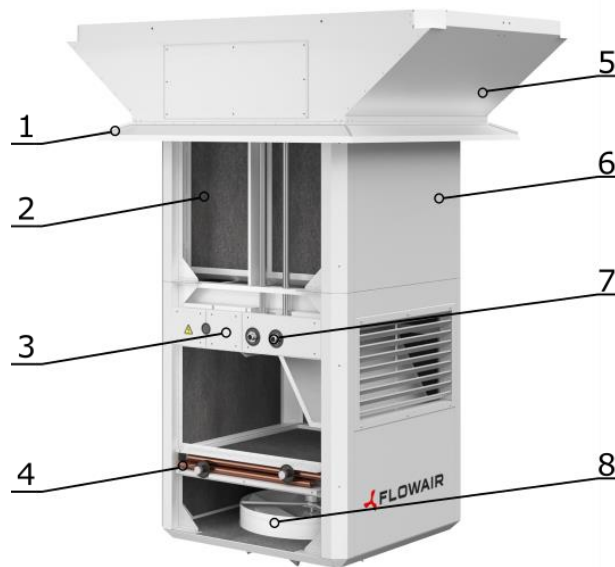
- |  |                           |
|--|---------------------------|
| 1. 1a – supply fans EC, 1b - exhaust fans EC | 8. Crane holders          |
| 2. Water heat exchanger (Cube - W)           | 9. Compressor cycle fans  |
| 3. Internal compressor cycle heat exchanger  | 10. Service access panels |
| 4. Recirculation damper (economizer)         | 11. Control box           |
| 5. Rotary heat exchanger                     | 12. Frame                 |
| 6. Compressors                               | 13. Main switch           |
| 7. External compressor cycle heat exchangers |                           |

### 1.7. General characteristics and construction Cube R8



- |  |  |
|--|--|
| 1. Maintenance switch and electric automation case | 8. Crane holders                                       |
| 2. Supply fan EC                                   | 9. Casing  |
| 3. Water heat exchanger (Cube – W)                 | 10. Electric heater (Cube – E) / Gas heater (Cube – G) |
| 4. Circulating pump (Cube – W)                     | 11. 3- way valve (Cube – W)                            |
| 5. Recirculation damper (economizer)               | 12. Exhaust filter                                     |
| 6. Rotary heat exchanger                           | 13. Exhaust fan EC                                     |
| 7. Fresh air filter                                |  |

### 1.8. General characteristics and construction supply module for Cube units.



- |   |   |
|---|---|
| 1. Roofing  | 6. Isolation  |
| 2. Acoustic silencers                             | 7. Connection of water heat exchanger with mixing cycle (option)  |
| 3. Connections                                    | 8. Possible supply module configurations  |
| 4. Water heat exchanger in the NW module (option) | <ul style="list-style-type: none"> <li>• D - swirl diffuser with actuator</li> <li>• V - ventilation ducts connections</li> </ul> |
| 5. Base   |   |

### 1.9. Cube application

The Cube unit, due to its compact construction, has all modules for full air processing like air condition and ventilation. Depending on unit's type and size, Cube can be used for air recovery ventilation, heating and cooling in buildings like:

- large industrial buildings.: production or storage halls, printeries, logistic centers,
- commercial buildings (shopping malls, supermarkets, petrol stations, car showrooms),
- public buildings such as: cinemas, theatres, gyms,
- restaurants or fast-food places.

### 1.10. Warnings concerning improper use

**ATTENTION:** It is prohibited to use Cube units for industrial vacuum caused by renovations or other construction works when dust, harsh or explosive compounds are emitted.

**ATTENTION:** It is prohibited to use Cube units for rooms' ventilation system where harsh chemicals are emitted due to buildings purposes.

### 1.11. Safety rules

**All Cube units are complied with PED 97/23/UE Directive  
Obey safety instructions under all circumstances!**



- this sign indicates a threat of loss of life or health or permanent damage to the unit



- this sign indicates the risk of electric shock

This manual contains important information about preventing possible accidents and damage to Cube units during operation. Special care should be taken during all actions with the unit and obey to this manual and all technical data. FLOWAIR shall not be responsible for any omissions and damages caused by them.



Cube units must not be used by children or adults with reduced mobility, or limited mental abilities.



Cube units must not be used by non-trained users or who are not familiar with this manual



Cube unit must be used in accordance with its intended use



All installation or service works must be done by qualified staff with proper attestations for electricity and controlled substances (cooling factors)

The unit poses threats:

- risk of electric shock
- risk of injury from rotating elements
- risk of injury from sharp edges and considerable weight
- risk of injury from compressed gas
- risk of injury from high and low temperature elements

During operations, health and safety regulations, environmental regulations and those mentioned below must be obeyed:



Prior to start operations it is essential to switch off the unit with main switch.



Prior to open casing it is essential to assure that electricity is disconnected and secured against accidental switching on by other persons.



Staff should wear suitable protective equipment (helmet, glasses, gloves, etc.)



During cooling unit operation, some of its parts heat up over 60 degrees C. Precautions shall be taken. Even after switching off the unit, high temperature may persist which can lead to skin burns.



Do not touch water exchanger radiators, condenser or vaporizer.



Do not touch electric heaters with skin under any circumstances.



Pressure monitoring, filling or emptying cooling systems must be done with existing installation and proper equipment.



Installation must be drained from any refrigerant before any dismantling or unsoldering to avoid explosion risk due to oil and refrigerant splashes.



Tampering in cooling system by abusing cables or other elements is unacceptable as it may lead to cooling system decompression and refrigerant leak to atmosphere. The direct contact with refrigerant may lead to hands or mucous membranes frostbites.



In order to comply with CE regulations, only original spare parts accepted by the manufacturer can be used.



Only refrigerant stated on manufacturer's nameplate can be used. Using other products is forbidden.



Cube's cooling system is equipped with safety system protecting against pressure increase, however containment loss can happen due to safety valve trigger or system unsealing. In such case please leave the place immediately and call the service.



After service works make sure that doors are closed.



Before unit is launched make sure that all fans and moving parts won't be interfered by any external factors.

### 1.12. Residual hazard

Despite the Cube unit was designed and tested to be fully safe during operation, there is a slight risk connected to improper use. The residual risk is connected with improper servicing by a user. By obeying the rules mentioned in points 1.5 and 1.6 a risk is limited to the lowest level, where there will be no risk of life, health or natural environment.



In case of need to launch the unit with open casing door during service mode, safety regulations regarding accident prevention must be obeyed.

### 1.13. Refrigerant

Cube's cooling system is filled with R410A – R32/125 (50/50%) refrigerants. It is a HFC group refrigerant not containing chlorine atoms, therefore it's ecological and was authorized to use with no limitation.

R410A refrigerant is non-explosive and non-toxic (PED 2nd group), however when contacted with fire, some toxic or corrosive vapors may appear because of thermal decomposition. Inhaling large amount of this factor may result in narcotic state, oedema, arrhythmias and in extreme cases – heart attacks and sensitization to adrenaline.

**ATTENTION:** R410A refrigerant, if in contact with fire can create toxic and corrosive (high moisture) hydrogen fluorine vapors.

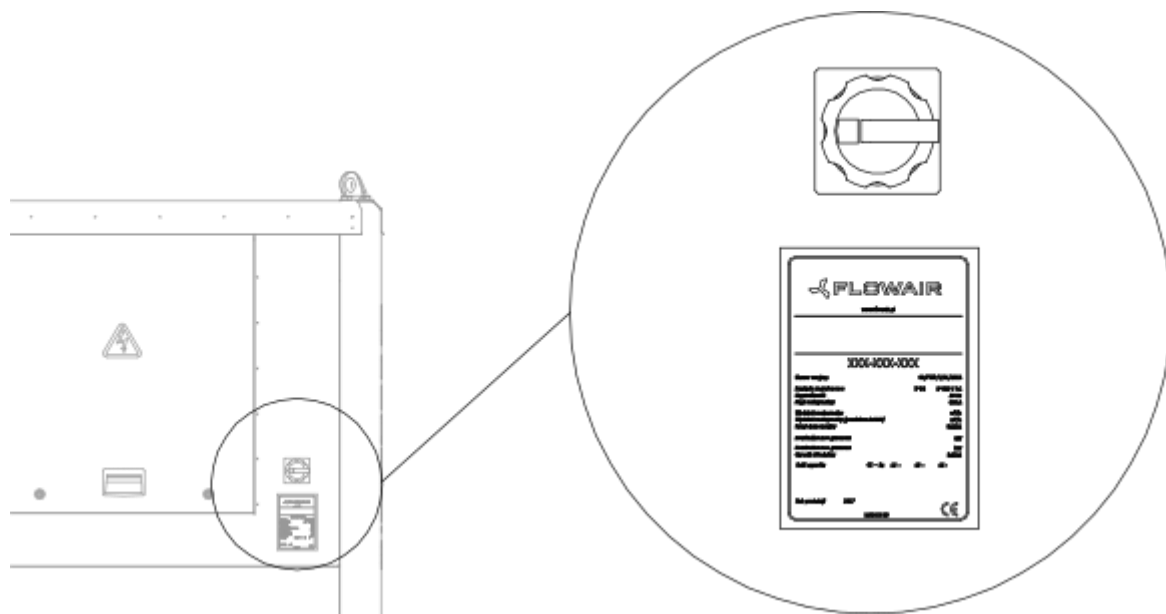
**ATTENTION:** R410A refrigerant is heavier than air (gas density 0,44kg/m3) therefore in case of leakage it can accumulate in hollows, displacing oxygen – risk of suffocation.

In case of first aid need due to injuries caused by

- Do not administer anything to a person in distress,
- Move to fresh air, administer oxygen and apply artificial respiration if necessary. Leave the victim in safe place. Call the ambulance,
- Do not administer adrenaline or any similar substances,
- In case of a frostbite sprinkle with water for at least 15 minutes. Put a sterile dressing and ask for medical help.

### 1.14. Nameplate

Each Cube unit is equipped with nameplate stuck on inspection side, under the main switch as shown in picture below:



The nameplate contains basic product information such as unit's code allowing to determine configuration, serial number, parameters and amount of refrigerant and also basic electrical and air flow parameters

## 2. REGULATIONS

**NOTE: Check whether in a given country, in accordance with applicable law, there is an obligation to register refrigeration equipment.**

### 2.1. Regulation (EC) No 842/2006 of the European Parliament and the Council

In accordance to UE Regulation 842/2006 regarding some fluorinated gases, Cube user is obliged to control them regarding leakages according to timetable once a year.

**ATTENTION:** Not complying with the regulation is an offence and is subject to administrative penalties!

### 2.2. Commission Regulation (EU) No 327/2011

#### Cooling devices:

Technical data in accordance with EU Regulation No 327/2011

	Supply fan					
	Cube 20	Cube 40	Cube 50	Cube 60	Cube 80/100	Cube 120/160
Fans quantity	1			2		
Overall efficiency	66,5%	68,4%	66,8%		70,2%	
Measurement category used to determine energy efficiency	static					
Efficiency category	A					
Efficiency grade in optimal point of energy efficiency	72,9%	73,4%	71,5%	73,4%	71,5%	73,4%
	Integrated EC controller					
Manufacturer's trademark, trade registry number, production site.	Ziehl-Abegg, NIP: 527-23-34-309, Regon 017239920, Germany					
Product's model number	ECblue					
Rotations per minute at optimal point of energy efficiency	3650 rev/min	2700 rev/min	2290 rev/min	2702 rev/min	1800 rev/min	1697 rev/min
Specific ratio	1,0					
Information essential for dismantling, recycling or removing after operation	Dismantling process should be made by a person with appropriate qualifications. Dismantling and recycling process should be done in agreement with certified waste management unit.					
Information essential for minimum environmental impact and assuring optimal operation time with regard to installation, operation and fan use	Periodic warranty inspections must be conducted as well as later maintenance inspections. Regulations mentioned in user's manual must be obeyed.					
Additional elements to determine fan's energy efficiency	N/A					

### Exhaust fan

	Cube 20	Cube 40	Cube 50	Cube 60	Cube 80/100	Cube 120/160
Fans quantity	1		2			
Overall efficiency	66,5%	70,3%	67,1%	67,1%	67,1%	66,8%
Measurement category used to determine energy efficiency	static					
Efficiency category	A					
Efficiency grade in optimal point of energy efficiency	72,9%	79,8%	71,8%	73,4%	71,8%	71,5%
	Integrated EC controller					
Manufacturer's trademark, trade registry number, production site.	Ziehl-Abegg, NIP: 527-23-34-309, Regon 017239920, Germany					
Product's model number	ECblue					
Rotations per minute at optimal point of energy efficiency	3650 rev/min	2400 rev/min	2290 rev/min	2702 rev/min	2260 rev/min	1860 rev/min
Specific ratio	1,0					
Information essential for dismantling, recycling or removing after operation	Dismantling process should be made by a person with appropriate qualifications. Dismantling and recycling process should be done in agreement with certified waste management unit.					
Information essential for minimum environmental impact and assuring optimal operation time with regard to installation, operation and fan use	Periodic warranty inspections must be conducted as well as later maintenance inspections. Regulations mentioned in user's manual must be obeyed.					
Additional elements to determine fan's energy efficiency	N/A					

### Condenser fan

	Cube 20	Cube 40	Cube 50	Cube 60	Cube 80/100	Cube 120/160
Fans quantity	1		2			
Overall efficiency	39,8%				36,8%	
Measurement category used to determine energy efficiency	static					
Efficiency category	A					
Efficiency grade in optimal point of energy efficiency	51,2%				41,5%	
	Integrated EC controller		Not included			
Manufacturer's trademark, trade registry number, production site.	ebm-papst Mulfingen GmbH & Co. KG Bachmühle 2 · D-74673 Mulfingen		Ziehl-Abegg, NIP: 527-23-34-309, Regon 017239920, Germany			
Product's model number	HyBlade		FE2owelt			
Rotations per minute at optimal point of energy efficiency	980 rev/min				900 rev/min	
Specific ratio	1,0					
Information essential for dismantling, recycling or removing after operation	Dismantling process should be made by a person with appropriate qualifications. Dismantling and recycling process should be done in agreement with certified waste management unit.					
Information essential for minimum environmental impact and assuring optimal operation time with regard to installation, operation and fan use	Periodic warranty inspections must be conducted as well as later maintenance inspections. Regulations mentioned in user's manual must be obeyed.					
Additional elements to determine fan's energy efficiency	N/A					



## Ventilation devices:

Technical data in accordance with EU Regulation No 327/2011

<b>Supply fan</b>	
	Cube R8
Fans quantity	1
Overall efficiency	68,4 %
Measurement category used to determine energy efficiency	static
Efficiency category	A
Efficiency grade in optimal point of energy efficiency	73,4 %
	Integrated EC controller
Manufacturer's trademark, trade registry number, production site.	Ziehl-Abegg, NIP: 527-23-34-309, Regon 017239920, Germany
Product's model number	ECblue
Rotations per minute at optimal point of energy efficiency	2700 rev/min
Specific ratio	1,0
Information essential for dismantling, recycling or removing after operation	Dismantling process should be made by a person with appropriate qualifications. Dismantling and recycling process should be done in agreement with certified waste management unit.
Information essential for minimum environmental impact and assuring optimal operation time with regard to installation, operation and fan use	Periodic warranty inspections must be conducted as well as later maintenance inspections. Regulations mentioned in user's manual must be obeyed.
Additional elements to determine fan's energy efficiency	N/A

<b>Exhaust fan</b>	
	Cube R8
Fans quantity	1
Overall efficiency	70,3 %
Measurement category used to determine energy efficiency	static
Efficiency category	A
Efficiency grade in optimal point of energy efficiency	79,8 %
	Integrated EC controller
Manufacturer's trademark, trade registry number, production site.	Ziehl-Abegg, NIP: 527-23-34-309, Regon 017239920, Germany
Product's model number	ECblue
Rotations per minute at optimal point of energy efficiency	2400 rev/min
Specific ratio	1,0
Information essential for dismantling, recycling or removing after operation	Dismantling process should be made by a person with appropriate qualifications. Dismantling and recycling process should be done in agreement with certified waste management unit.
Information essential for minimum environmental impact and assuring optimal operation time with regard to installation, operation and fan use	Periodic warranty inspections must be conducted as well as later maintenance inspections. Regulations mentioned in user's manual must be obeyed.
Additional elements to determine fan's energy efficiency	N/A

### 3. TECHNICAL DATA

#### 3.1. Technical parameters - cooling devices for duct installation (Cube 20 – 160)

Compressor system		Cube 20	Cube 40	Cube 50	Cube 60	Cube 80	Cube 100	Cube 120	Cube 160
Thermodynamic power - cooling <sup>(1)</sup>	kW	19,9	38,2	57,5	65,2	80,8	91,4	132,0	156,8
EER <sup>(1)</sup>	-	3,24	3,03	3,42	3,42	3,45	3,28	3,56	3,36
SEER(on) <sup>(2)</sup>	-	5,73	4,09	4,14	4,07	4,12	3,97	4,38	4,19
Energetic efficiency <sup>(3)</sup>	%	210,5	152,8	153,7	151,6	154,0	148,7	165,4	158,0
Compressor type	-	scroll, inverter	scroll, tandem	scroll	scroll	scroll	scroll	scroll, multicircuit	scroll, multicircuit
Compressors quantity	-	1	2	2	2	2	2	4	4
Circuits quantity	-	1	1	2	2	2	2	4	4
Power range	%	0 - 100	50, 100	50, 100	50, 100	50, 100	50, 100	25, 50, 75, 100	25, 50, 75, 100
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant quantity	kg	5,5	9,5	2x8,8	2x8,8	2x9,1	2x9,1	4x9,0	4x9,1

#### Efficiency

Total air flow / Fresh air	m3/h	5500	8000	14000	16000 / 15000	19000 / 17000	21000 / 17000	24000 / 20000	28000 / 20000
Minimum cooling efficiency	m3/h	3000	6000	10500	12000	13500	15750	21000	21000

#### Heat recovery

Heat recovery efficiency <sup>(4)</sup>	m3/h	>78,5	>73,1	>73,7	>73,0	>73,3	>73,3	>73,0	>73,0
Exchanger type	-	rotational							

(1) EN 14511

(2) EN14825

(3) UE 2016/2281

(4) UE 1253/2014

## General technical data – cooling devices with heat pump for duct installation (Cube 20 – 160 HP)

Compressor system - cooling		Cube 20 HP	Cube 40 HP	Cube 50 HP	Cube 60 HP	Cube 80 HP	Cube 100 HP	Cube 120 HP	Cube 160 HP
Thermodynamic power - cooling <sup>(1)</sup>	kW	19,8	38,2	56,8	64,4	79,6	90,3	130,3	154,8
EER <sup>(1)</sup>	-	3,13	2,96	3,87	3,37	3,38	3,25	3,51	3,31
SEER(on) <sup>(2)</sup>	-	5,63	4,08	4,11	4,02	4,07	3,91	4,33	4,13
Energetic efficiency <sup>(3)</sup>	%	206,7	152,4	152,6	149,6	152,1	146,3	163,1	155,6

### Compressor system - heating

Thermodynamic power – heating <sup>(1)</sup>	kW	20,2	40,9	53,9	61,4	76,5	87	126,8	152
COP <sup>(1)</sup>	-	4,05	3,63	3,76	3,76	3,91	3,85	3,8	3,75
SCOP(on) <sup>(2)</sup>	-	4,53	3,55	3,34	3,33	3,49	3,44	3,56	3,52
Energetic efficiency <sup>(3)</sup>	%	172,8	133,6	125,5	125,2	131,4	129,4	134,0	132,7
Compressor type	-	scroll, inverter	scroll, tandem	scroll	scroll	scroll	scroll	scroll, multicircuit	scroll, multicircuit
Compressors quantity	-	1	2	2	2	2	2	4	4
Circuits quantity	-	1	1	2	2	2	2	4	4
Power range	%	0-100	50, 100	50, 100	50, 100	50, 100	50, 100	25, 50, 75, 100	25, 50, 75, 100
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant quantity	kg	5,9	9,5	2x9,3	2x9,3	2x9,6	2x9,6	4x9,5	4x9,6

### Efficiency

Total air flow / Fresh air	m3/h	5500	8000	14000	16000 / 15000	19000 / 17000	21000 / 17000	24000 / 20000	28000 / 20000
Minimum cooling efficiency	m3/h	3000	6000	10500	12000	13500	15750	21000	21000

### Heat recovery

Heat recovery efficiency <sup>(4)</sup>	m3/h	>78,5	>73,1	>73,7	>73,0	>73,3	>73,3	>73,0	>73,0
Exchanger type	-	rotational							

## Construction data – cooling devices for duct installation (Cube 20 – 160)

Construction		Cube 20 (HP)	Cube 40 (HP)	Cube 50 (HP)	Cube 60 (HP)	Cube 80 (HP)	Cube 100 (HP)	Cube 120 (HP)	Cube 160 (HP)
Outlet channels connection	mm	900x500	900x500	1400x500	1400x500	1500x500	1500x500	1600x650	1600x650
Exhaust channels connection	mm	900x500	900x500	1400x500	1400x500	1500x500	1500x500	1600x500	1600x500
Filters	-	pocket Coarse 80% (~G4)			cassete Coarse 80% (~G4)				
Thermal insulation class	-	M0							
Casing / middle panel color	-	RAL 7035 /RAL 7024							
Casing	-	insulated panels with 50 mm mineral wool							
Main frame	-	steel, integrated							
Weight	kg	>650 <850	>900 <1100	>1315 <1550	>1350 <1600	>1600 <1990	>1700 <2250	>1800 <2250	>1930 <2350

(1) EN 14511

(2) EN14825

(3) UE 2016/2281

(4) UE 1253/2014

### Electrical data – cooling devices for duct installation (Cube 20 – 160)

Electrical data <sup>(1)</sup>		Cube 20 (HP)	Cube 40 (HP)	Cube 50 (HP)	Cube 60 (HP)	Cube 80 (HP)	Cube 100 (HP)	Cube 120 (HP)	Cube 160 (HP)
Max. power consumption	kW	15	25	34	39	54	59	72	100
Max. current consumption	A	27	45	63	72	92	107	135	173
Max. operating current MCC	A	22	43	31	69	79	102	129	146
Start-up current consumption LRA	A	12	129	171	186	188	242	246	255
Power supply	V/Hz	3x400/50							

**ATTENTION:** It does not apply to devices with an electric heater.

### Optional data – cooling devices for duct installation (Cube 20 – 160)

Water heat exchanger (Cube W)		Cube 20 (HP)	Cube 40 (HP)	Cube 50 (HP)	Cube 60 (HP)	Cube 80 (HP)	Cube 100 (HP)	Cube 120 (HP)	Cube 160 (HP)
Type of exchanger	-	water exchanger, 2-row							
Nominal heating power <sup>(2)</sup>	kW	55	74	111	120	158	167	182	199
Pressure drop	-	0 – built-in circulation pump							
Connection	"	GZ 1"	GZ 1"	GZ 1 1/4"	GZ 1 1/4"	GZ 1 1/4"	GZ 1 1/4"	GZ 1 1/4"	GZ 1 1/4"

#### Electric heater (Cube E)

Nominal heating power	kW	Heater is individually selected on request							
Heating degrees	-	Heater is individually selected on request							
Current consumption	A	Heater is individually selected on request							

#### Gas heater (Cube Gm)

Option	-	Gm20, Gm34	Gm20, Gm34, Gm45	Gm45, Gm65, Gm80, Gm105	Gm45, Gm65, Gm80, Gm105	Gm45, Gm65, Gm80, Gm105	Gm45, Gm65, Gm80, Gm105	Gm65, Gm80, Gm105	Gm65, Gm80, Gm105
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#### Gas heater technical data

		Gm20	Gm34	Gm45	Gm65	Gm80	Gm105
Nominal heating power	kW	18,2	33,6	40,5	62,9	80	97,2
Gas consumption (G20)	m3/h	2,01	3,69	4,44	6,88	8,68	10,58
Flue gas exhaust system	-	integrated					
Gas connection	"	GZ 3/4"	GZ 3/4"	GZ 3/4"	GZ 3/4"	GZ 3/4"	GZ 3/4"
Minimum air flow	m3/h	3000	3500	4200	6500	8200	10000

(1) It does not apply to devices with an electric heater .

(2) Heating factor's temperature 70/50°C and inlet air temperature 8°C

### 3.2. Technical parameters - ventilation devices for duct installation (Cube R8)

Air flow		Cube R8
Total air flow / Fresh air	m <sup>3</sup> /h	do 8000
External pressure drop for the 8000 m <sup>3</sup> /h air flow	m <sup>3</sup> /h	350

Heat recovery		Cube R8
Heat recovery efficiency <sup>(4)</sup>	m <sup>3</sup> /h	>73,1
Exchanger type	-	rotational

#### Construction data – ventilation devices for duct installation (Cube R8)

Construction		Cube R8
Outlet channels connection	mm	900x500
Exhaust channels connection	mm	900x500
Filters (supply/exhaust)	-	ePM2,5 65% (~F7) / ePM10 50% (~M5)
Thermal insulation class	-	M0
Casing / middle panel color	-	RAL 7035 /RAL 7024
Casing	-	insulated panels with 50 mm mineral wool
Main frame	-	steel, integrated
Weight	kg	>650 <800

#### Electrical data – ventilation devices for duct installation (Cube R8)

Electrical data <sup>(2)</sup>		Cube R8
Max. power consumption	kW	7
Max. current consumption	A	11
Power supply	V/Hz	3x400/50

**ATTENTION:** It does not apply to devices with an electric heater.

#### Optional data – ventilation devices for duct installation (Cube R8)

Water heat exchanger (Cube W)		Cube R8
Type of exchanger	-	water exchanger, 2-row
Nominal heating power <sup>(2)</sup>	kW	74
Pressure drop	-	0 – built-in circulation pump
Connection	"	GZ 1"

Electric heater (Cube E)		Cube R8
Nominal heating power	kW	Heater is individually selected on request
Heating degrees	-	Heater is individually selected on request
Current consumption	A	Heater is individually selected on request

Gas heater technical data		Gm20	Gm34	Gm45	Gm65
Nominal heating power	kW	18,2	33,6	40,5	62,9
Gas consumption (G20)	m <sup>3</sup> /h	2,01	3,69	4,44	6,88
Flue gas exhaust system	-	integrated			
Gas connection	"	GZ 3/4"	GZ 3/4"	GZ 3/4"	GZ 3/4"
Minimum air flow	m <sup>3</sup> /h	3000	3500	4200	6500

(1) UE 1253/2014

(2) it does not apply to devices with an electric heater .

(3) heating factor's temperature 70/50°C and inlet air temperature 8°C

### 3.3. Technical parameters - cooling devices for ductless installation (Cube 20 NWS; Cube 40 NWL)

<b>Compressor system</b>		<b>Cube 20 NWS</b>	<b>Cube 40 NWL</b>
Thermodynamic power - cooling <sup>(1)</sup>	kW	19,9	38,2
EER <sup>(1)</sup>	-	3,24	3,03
SEER(on) <sup>(2)</sup>	-	5,73	4,09
Energetic efficiency <sup>(3)</sup>	%	210,5	152,8
Compressor type	-	scroll, inverter	scroll, tandem
Compressors quantity	-	1	2
Circuits quantity	-	1	1
Power range	%	0 - 100	50, 100
Refrigerant		R410A	R410A
Refrigerant quantity	kg	5,7	8,6

<b>Efficiency</b>			
Total air flow / Fresh air	m3/h	5500	8000
Minimum cooling efficiency	m3/h	3000	6000

<b>Heat recovery</b>			
Heat recovery efficiency <sup>(4)</sup>	m3/h	>78,5	>73,1
Exchanger type	-	rotational	

### General technical data – cooling devices with heat pump for ductless installation (Cube 20 NWS; Cube 40 NWL)

<b>Compressor system - cooling</b>		<b>Cube 20 HP NWS</b>	<b>Cube 40 HP NWL</b>
Thermodynamic power - cooling <sup>(1)</sup>	kW	19,8	38,2
EER <sup>(1)</sup>	-	3,13	2,96
SEER(on) <sup>(2)</sup>	-	5,63	4,08
Energetic efficiency <sup>(3)</sup>	%	206,7	152,4

<b>Compressor system - heating</b>		<b>Cube 20 HP NWS</b>	<b>Cube 40 HP NWL</b>
Thermodynamic power – heating <sup>(1)</sup>	kW	20,2	40,9
COP <sup>(1)</sup>	-	4,05	3,63
SCOP(on) <sup>(2)</sup>	-	4,53	3,55
Energetic efficiency <sup>(3)</sup>	%	172,8	133,6
Compressor type	-	scroll, inverter	scroll, tandem
Compressors quantity	-	1	2
Circuits quantity		1	1
Power range	%	0 -100	50, 100
Refrigerant		R410A	R410A
Refrigerant quantity	kg	5,9	8,6

<b>Efficiency</b>			
Total air flow / Fresh air	m3/h	5500	8000
Minimum cooling efficiency	m3/h	3000	6000

<b>Heat recovery</b>			
Heat recovery efficiency <sup>(4)</sup>	m3/h	>78,5	>73,1
Exchanger type	-	rotational	

(1) EN 14511

(2) EN14825

(3) UE 2016/2281

(4) UE 1253/2014



### 3.4. Technical parameters - ventilation devices for ductless installation (Cube R8 NWS)

#### Airflow

Total air flow / Fresh air	m <sup>3</sup> /h	do 8000
External pressure drop for the 8000 m <sup>3</sup> /h air flow	m <sup>3</sup> /h	350

#### Heat recovery

Heat recovery efficiency <sup>(4)</sup>	m <sup>3</sup> /h	>73,1
Exchanger type	-	rotational

### Construction data – ventilation devices for ductless installation (Cube R8 NWS)

#### Construction

#### Cube R8

Filters (supply/exhaust)	-	ePM2,5 65% (~F7) / ePM10 50% (~M5)
Thermal insulation class	-	M0
Casing / middle panel colour	-	RAL 7035 /RAL 7024
Casing	-	insulated panels with 50 mm mineral wool
Main frame	-	steel, integrated
Weight	kg	>900 <1050

### Electrical data – ventilation devices for ductless installation (Cube R8 NWS)

#### Electrical data<sup>(2)</sup>

#### Cube R8

Max. power consumption	kW	7
Max. current consumption	A	11
Power supply	V/Hz	3x400/50

**ATTENTION:** It does not apply to devices with an electric heater.

### Optional data – ventilation devices for ductless installation (Cube R8 NWS)

#### Water heat exchanger in rooftop unit (Cube W)

#### Cube R8

Type of exchanger	-	2-row
Nominal heating power <sup>(2)</sup>	kW	74
Pressure drop	-	0 – built-in circulation pump
Connection (rooftop unit)	"	GZ 1"

#### Water heat exchanger in supply module (Cube W)

#### Cube R8

Type of exchanger	-	2-row (3-row)
Nominal heating power <sup>(2)</sup>	kW	64,1 (88,7)
Pressure drop	kPa	14
Connection ( NWS/NWL supply module)	"	GZ 1 1/4"

#### Electric heater (Cube E)

Nominal heating power	kW	Heater is individually selected on request
Heating degrees	-	Heater is individually selected on request
Current consumption	A	Heater is individually selected on request

#### Gas heater technical data

		Gm20	Gm34	Gm45	Gm65
Nominal heating power	kW	18,2	33,6	40,5	62,9
Gas consumption (G20)	m <sup>3</sup> /h	2,01	3,69	4,44	6,88
Flue gas exhaust system	-	integrated			
Gas connection	"	GZ 3/4"	GZ 3/4"	GZ 3/4"	GZ 3/4"
Minimum air flow	m <sup>3</sup> /h	3000	3500	4200	6500

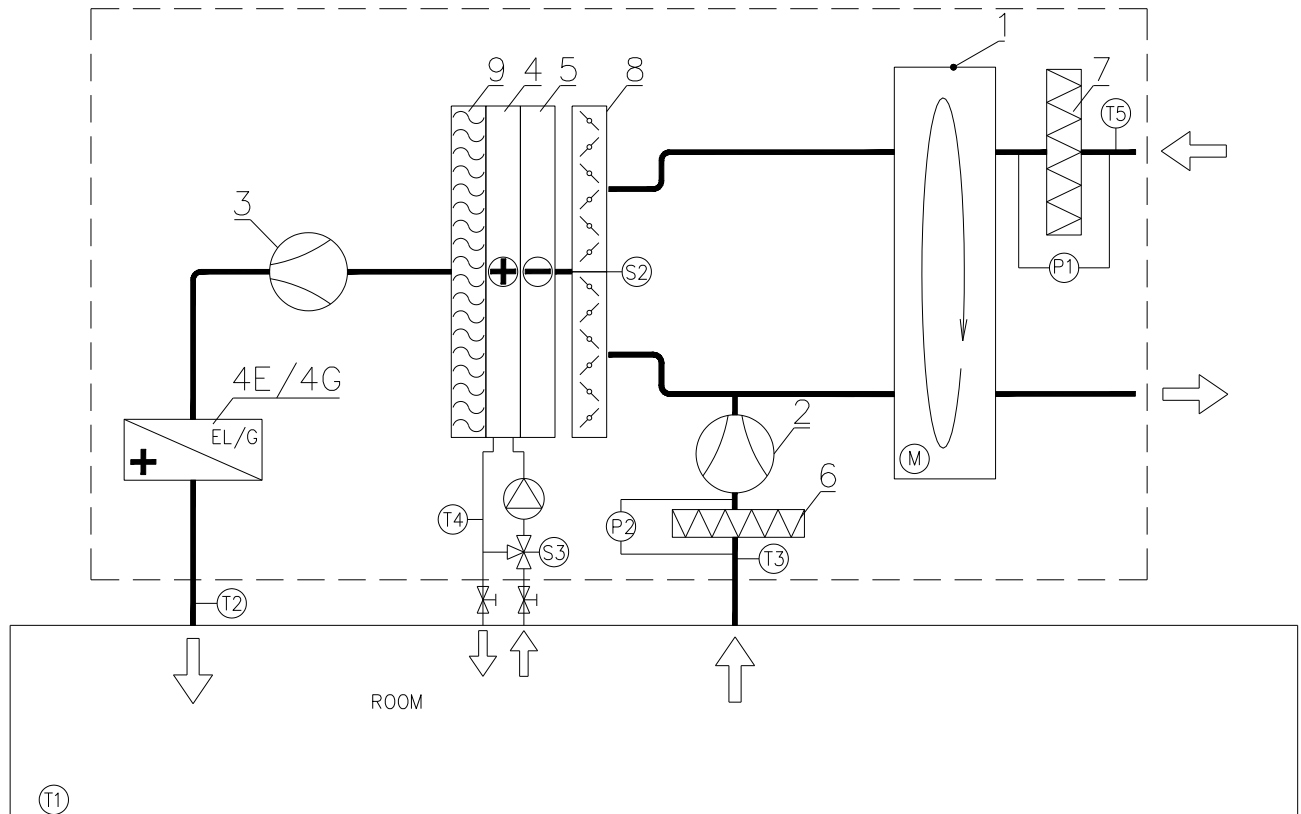
(1) UE 1253/2014

(2) it does not apply to devices with an electric heater .

(3) heating factor's temperature 70/50°C and inlet air temperature 8°C



### 3.5. Cube 20 – 100 flow chart – ventilation part

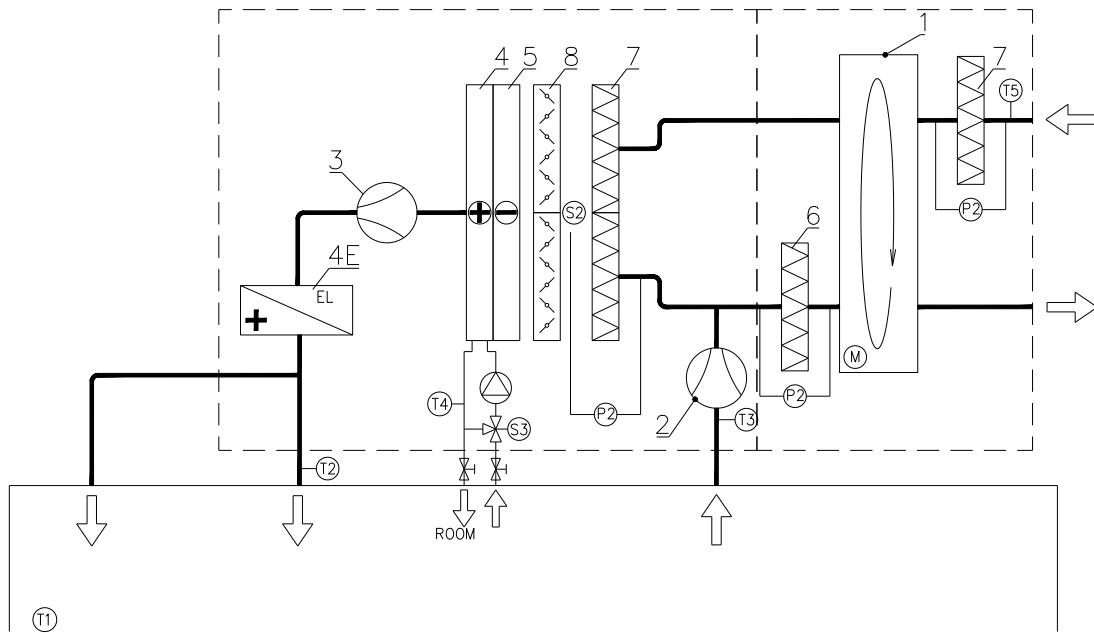


- |  |   |
|--|---|
| 1 – rotational exchanger                                 | T1 – room temperature sensor (option)                       |
| 2 – exhaust fan  | T2 – inlet temperature sensor                               |
| 3 – supply fan   | T3 – outlet temperature sensor                              |
| 4 – water heater (Cube – W)                              | T4 – water exchanger's spigot temperature sensor (Cube - W) |
| 4E/4G – electric heater (Cube -E)/ gas heater (Cube – G) | T5 – fresh air inlet temperature sensor                     |
| 5 – cooling module or water pump inner exchanger         | P1 – outside air filter's switch                            |
| 6 – outlet air filter                                    | P2 – inside air filter's switch                             |
| 7 – fresh air filter                                     | S2 – recirculation damper actuator                          |
| 8 – recirculation damper (economizer)                    | S3 – fan heater's 3-way valve actuator (Cube – W)           |
| 9 – droplet eliminator (Cube-N/E/G)                      |   |

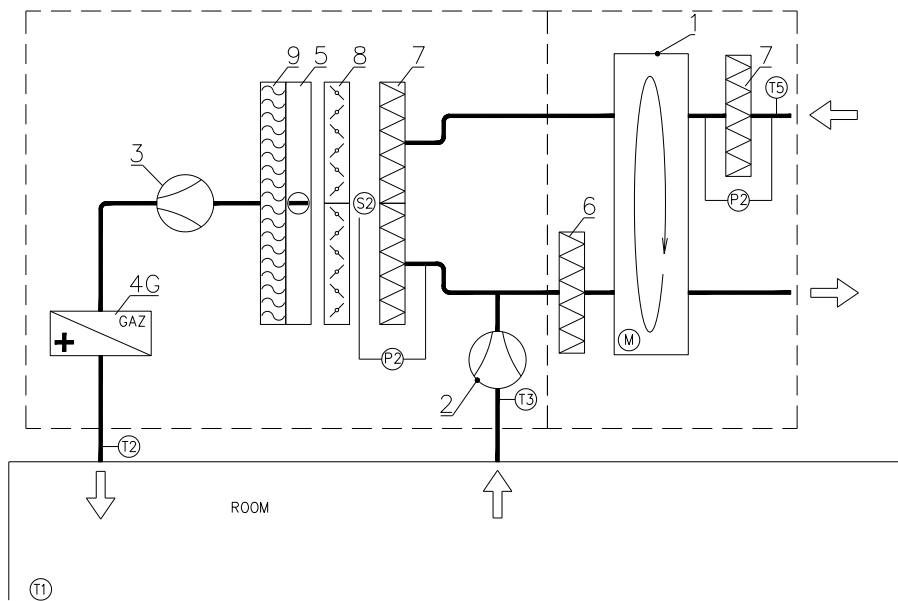
**ATTENTION:** It is necessary to connect the supply temperature sensor. The sensor should be located in the supply air duct at the minimum distance of 1.5m from the Cube. The sensor is delivered with the device and is located in the control cabinet. For devices equipped with the NW supply module, the sensor is factory-fitted in the supply module.

### 3.6. Cube 120/160 flow chart – ventilation part

Flow chart Cube 120 / 160 with fan or electric heater



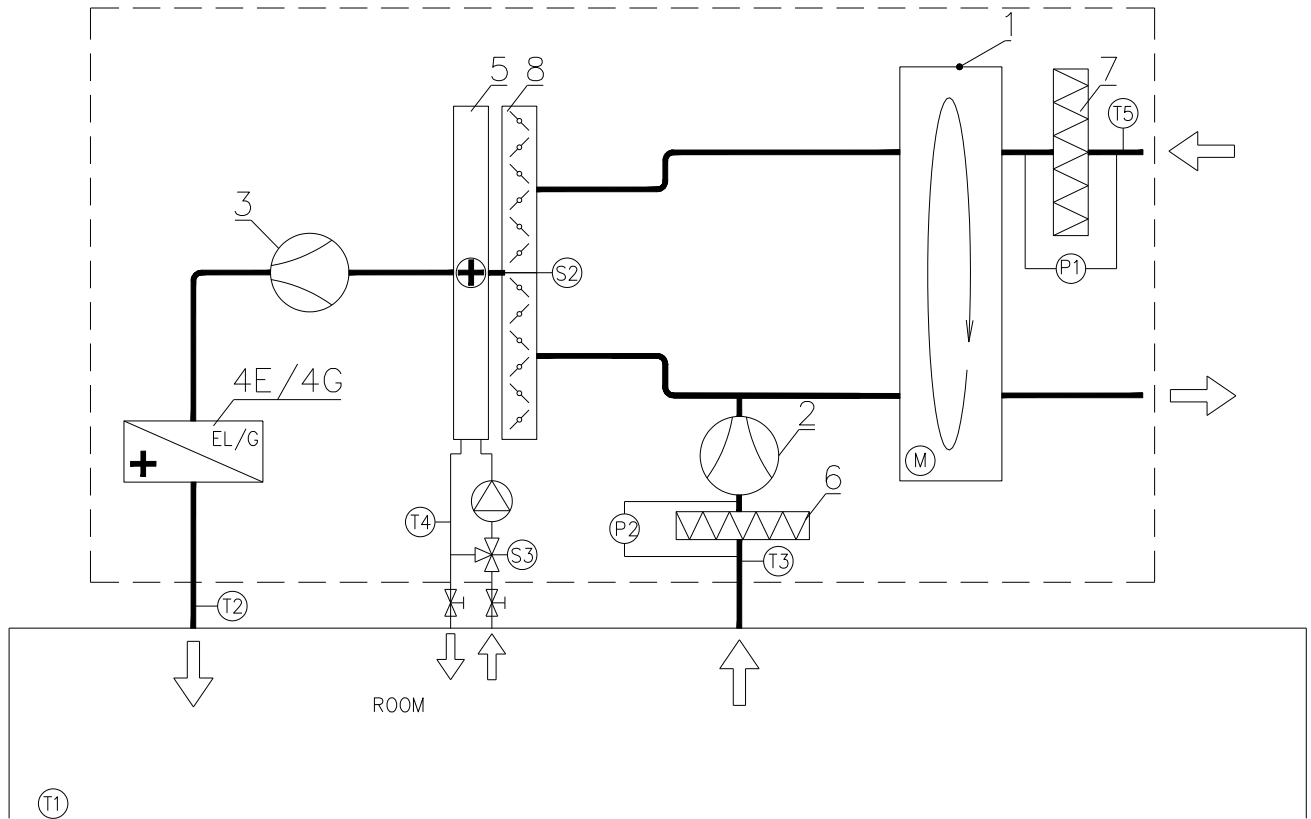
Flow chart Cube 120 / 160 with fan or gas heater



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1 – rotational exchanger</li> <li>2 – exhaust fan</li> <li>3 – supply fan</li> <li>4 – water heater (Cube – W)</li> <li>4E – electric heater (Cube -E)</li> <li>4G – gas heater (Cube – G)</li> <li>5 – cooling module or water pump inner exchanger</li> <li>6 – outlet air filter</li> <li>7 – fresh air filter</li> <li>8 – recirculation damper (economizer)</li> <li>9 – droplet eliminator</li> </ul> | <ul style="list-style-type: none"> <li>T1 – room temperature sensor (option)</li> <li>T2 – inlet temperature sensor</li> <li>T3 – outlet temperature sensor</li> <li>T4 – water exchanger's spigot temperature sensor (Cube - W)</li> <li>T5 – fresh air inlet temperature sensor</li> <li>P1 – outside air filter's switch</li> <li>P2 – inside air filter's switch</li> <li>S2 – recirculation damper actuator</li> <li>S3 – fan heater's 3-way valve actuator (Cube – W)</li> </ul> |
|--|--|

**ATTENTION:** It is necessary to connect the supply temperature sensor. The sensor should be located in the supply air duct at the minimum distance of 1.5m from the Cube. The sensor is delivered with the device and is located in the control cabinet. For devices equipped with the NW supply module, the sensor is factory-fitted in the supply module.

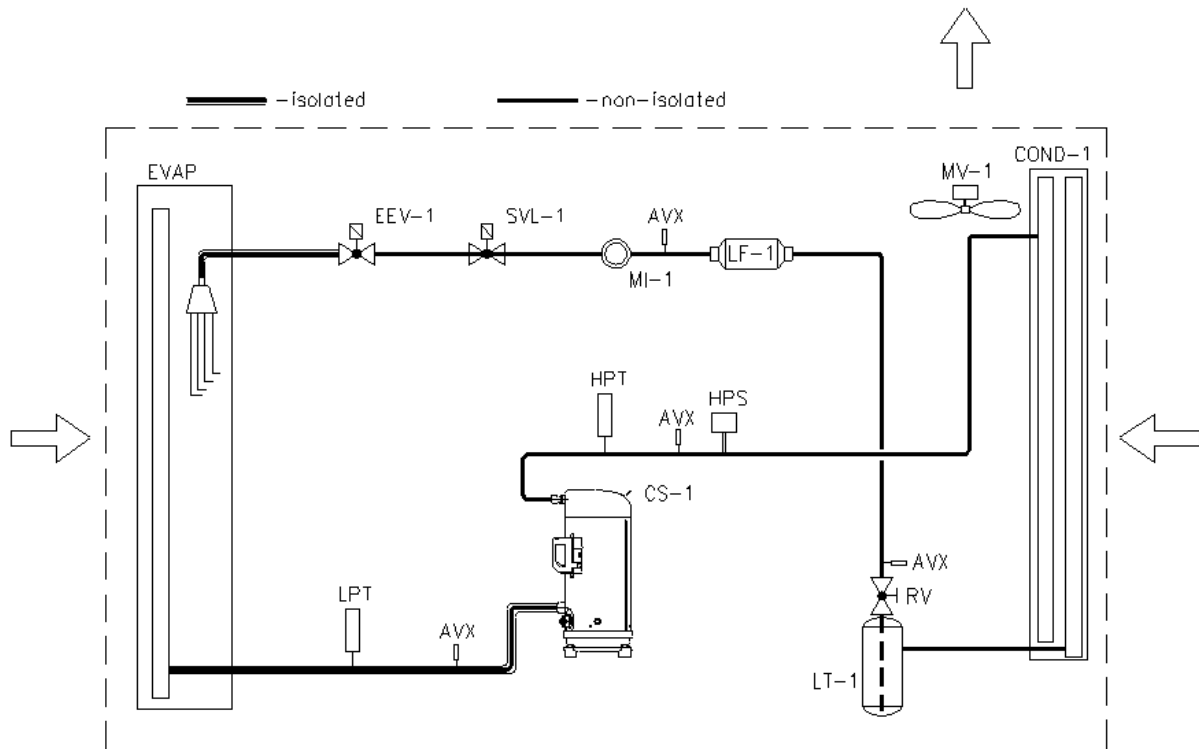
### 3.7. Cube R8 flow chart – ventilation part



- 1 – rotational exchanger
- 2 – exhaust fan
- 3 – supply fan
- 4E/4G – electric heater (Cube -E)/ gas heater (Cube – G)
- 5 – water heater (Cube – W)
- 6 – outlet air filter
- 7 – fresh air filter
- 8 – recirculation damper (economizer)
- T1 – room temperature sensor (option)
- T2 – inlet temperature sensor
- T3 – outlet temperature sensor
- T4 – water exchanger's spigot temperature sensor (Cube - W)
- T5 – fresh air inlet temperature sensor
- P1 – outside air filter's switch
- P2 – inside air filter's switch
- S2 – recirculation damper actuator
- S3 – fan heater's 3-way valve actuator (Cube – W)

**ATTENTION:** It is necessary to connect the supply temperature sensor. The sensor should be located in the supply air duct at the minimum distance of 1.5m from the Cube. The sensor is delivered with the device and is located in the control cabinet. For devices equipped with the NW supply module, the sensor is factory-fitted in the supply module.

### 3.8. Cube 20 charts – cooling module



CS-1 – air conditioning scroll compressor

EVAP – inner exchanger / vaporizer

COND-1 – inner exchanger/condenser

EEV-1 – electronic expansion valve

SVL-1 – electromagnetic valve

MI-1 – moisture indicator

LF-1 – drier filter

LT-1 – liquid tank

SV-1 – safety valve 45bar

RV – rotalock valve

MV-1 – outside exchanger fan

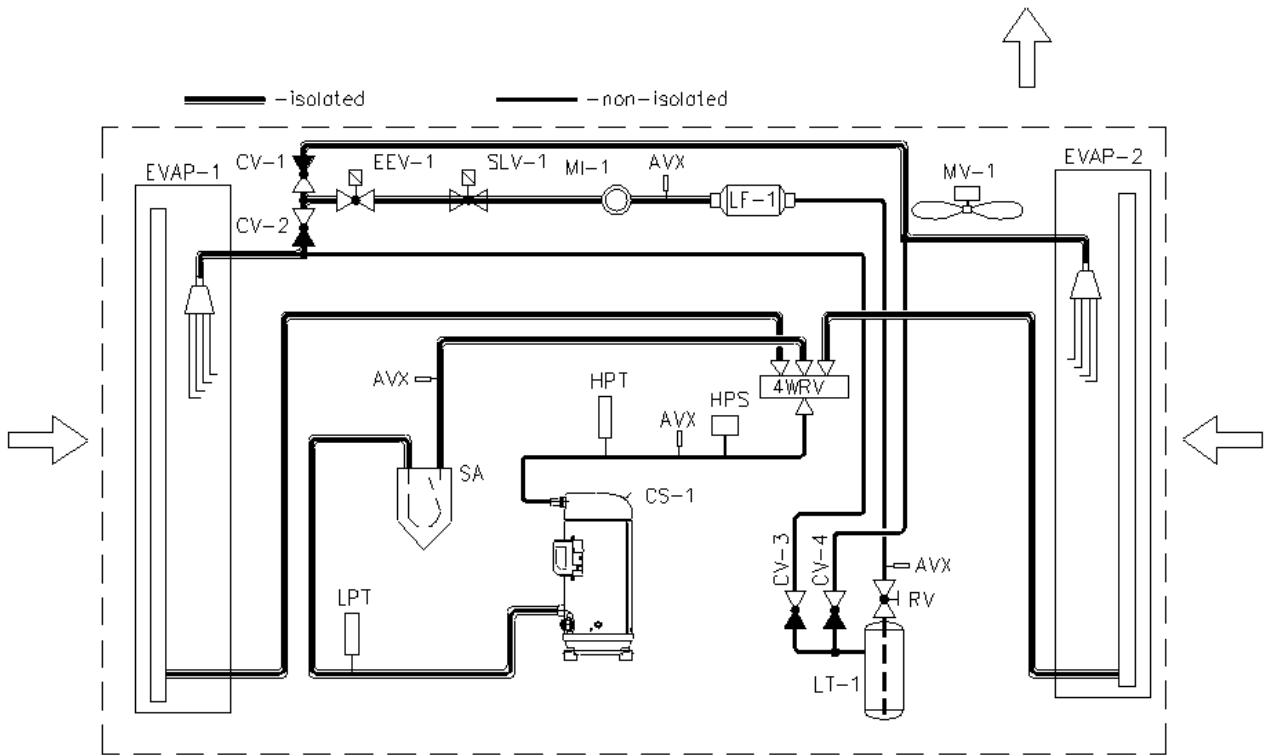
HPS – high pressure switch

HPT – high pressure sensor

LPT – low pressure sensor

AVX – 1/4SAE service valve 45bar

### 3.9. Cube 20 HP charts – heat pump module



CS-1/2– air conditioning scroll compressor

EVAP-1 – inner exchanger / vaporizer

EVAP-2– outside exchanger / vaporizer

TEV-1– thermostatic expansion valve

EEV-1 – electronic expansion valve

SVL-1– electromagnetic valve

MI-1– moisture indicator

LF-1– drier filter

4WRV-1 – 4-way reverse valve

SA – liquid separator

LT-1– liquid tank

SV-1– safety valve 45bar

RV – rotalock valve

MV-1– outside exchanger fan

HPS – high pressure switch

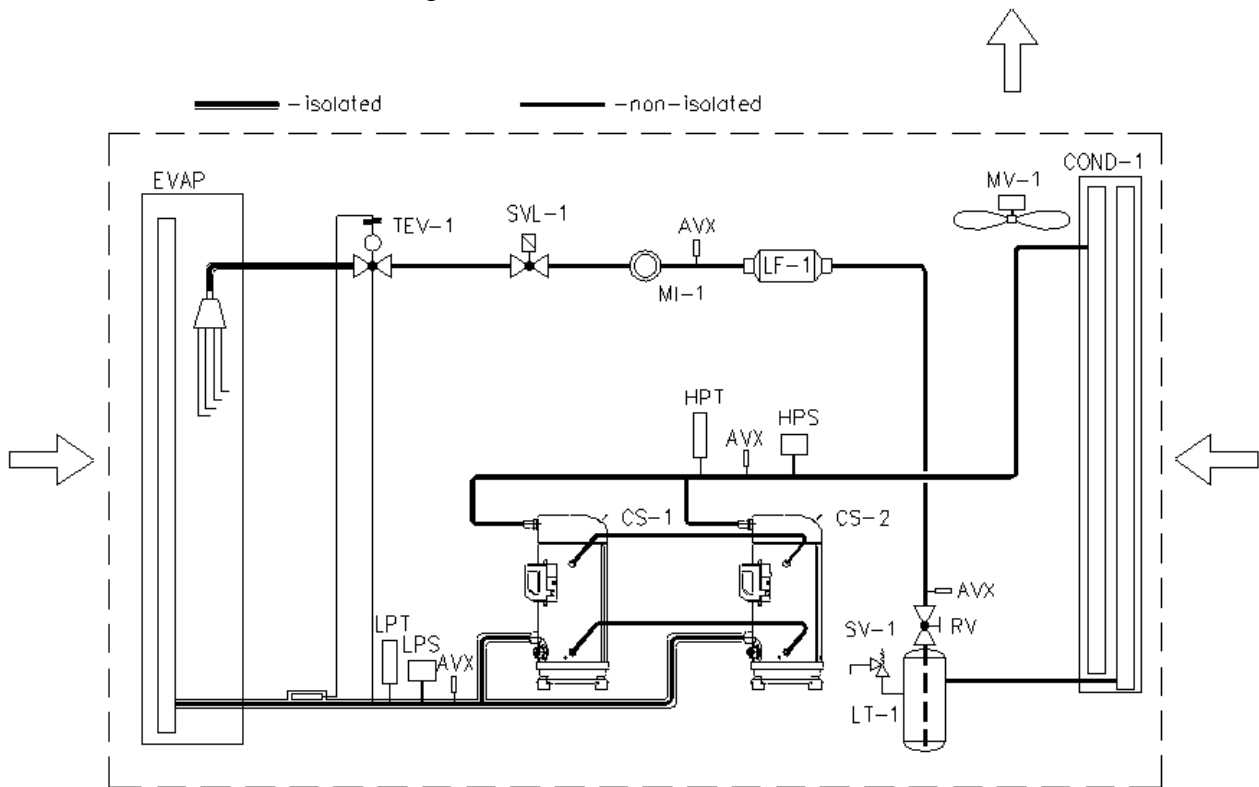
LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar

CV-1/CV-2 – check valve

### 3.10. Cube 40 charts – cooling module



CS-1/2 – air conditioning scroll compressor

EVAP – inner exchanger / vaporizer

COND-1 – inner exchanger/condenser

TEV-1 – thermostatic expansion valve

SVL-1 – electromagnetic valve

MI-1 – moisture indicator

LF-1 – drier filter

LT-1 – liquid tank

SV-1 – safety valve 45bar

RV – rotalock valve

MV-1 – outside exchanger fan

HPS – high pressure switch

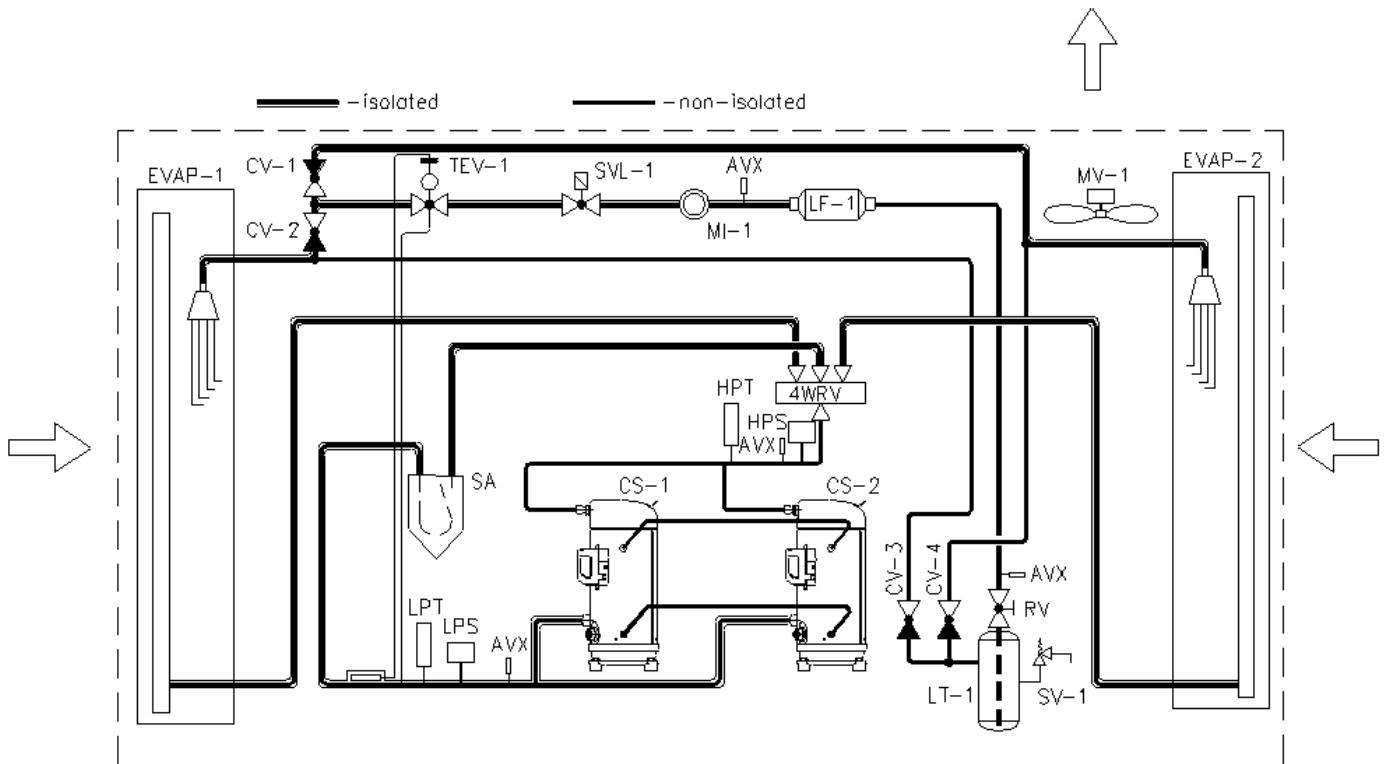
LPS – low pressure switch

LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar

### 3.11. Cube 40 HP charts – heat pump module



CS-1/2– air conditioning scroll compressor

EVAP-1 – inner exchanger / vaporizer

EVAP-2– outside exchanger / vaporizer

TEV-1– thermostatic expansion valve

SVL-1– electromagnetic valve

MI-1– moisture indicator

LF-1– drier filter

4WRV-1 – 4-way reverse valve

SA – liquid separator

LT-1– liquid tank

SV-1– safety valve 45bar

RV – rotalock valve

MV-1– outside exchanger fan

HPS – high pressure switch

LPS – low pressure switch

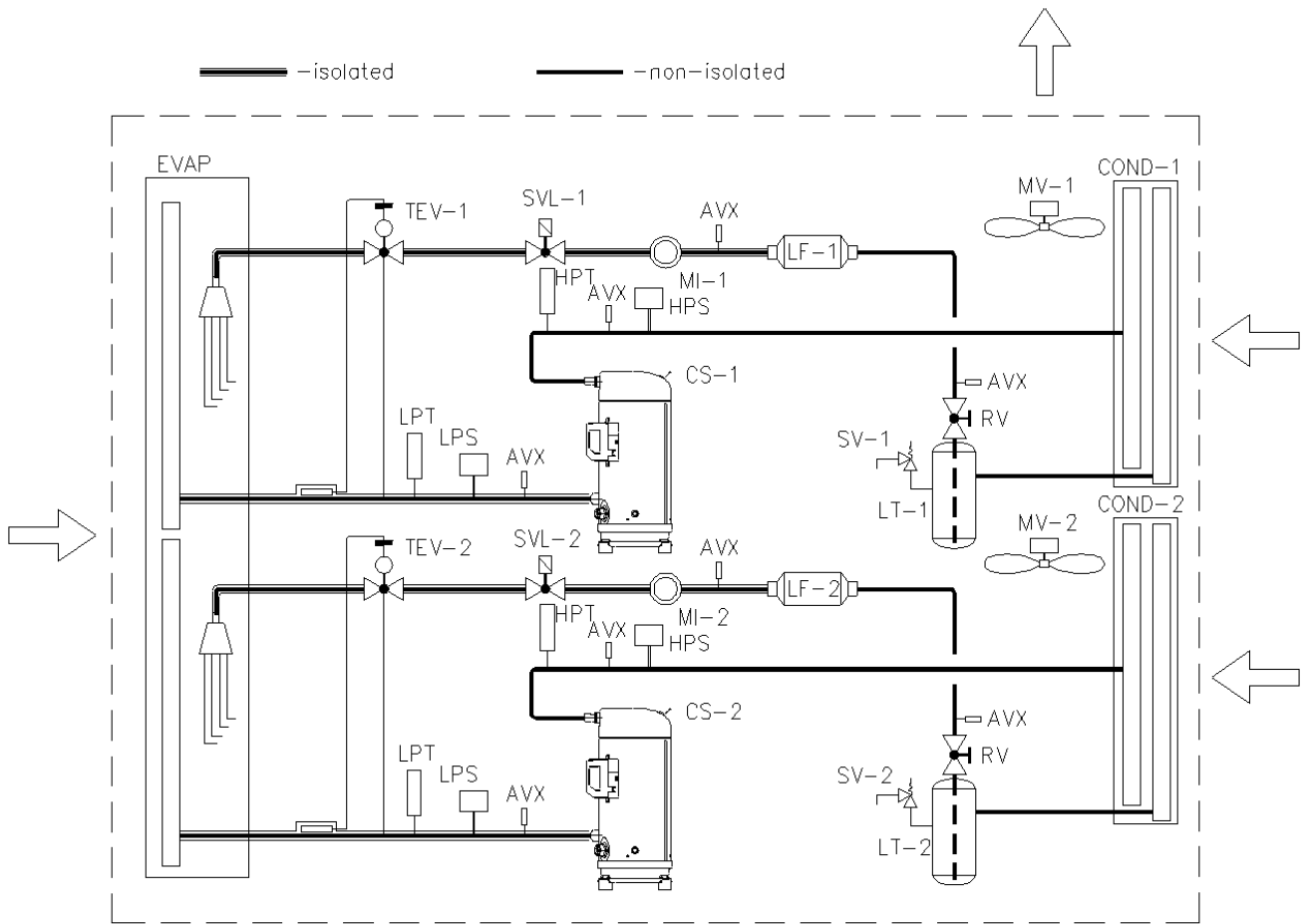
LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar

CV-1– check valve

### 3.12. Cube 50-100 charts – cooling module



CS-1/2 – air conditioning scroll compressor

EVAP – inner exchanger / vaporizer

COND-1/2 – inner exchanger/condenser

TEV-1/2 – thermostatic expansion valve

SVL-1/2 – electromagnetic valve

MI-1/2 – moisture indicator

LF-1/2 – drier filter

LT-1/2 – liquid tank

SV-1/2 – safety valve 45bar

RV – rotalock valve

MV-1/2 – outside exchanger fan

HPS – high pressure switch

LPS – low pressure switch

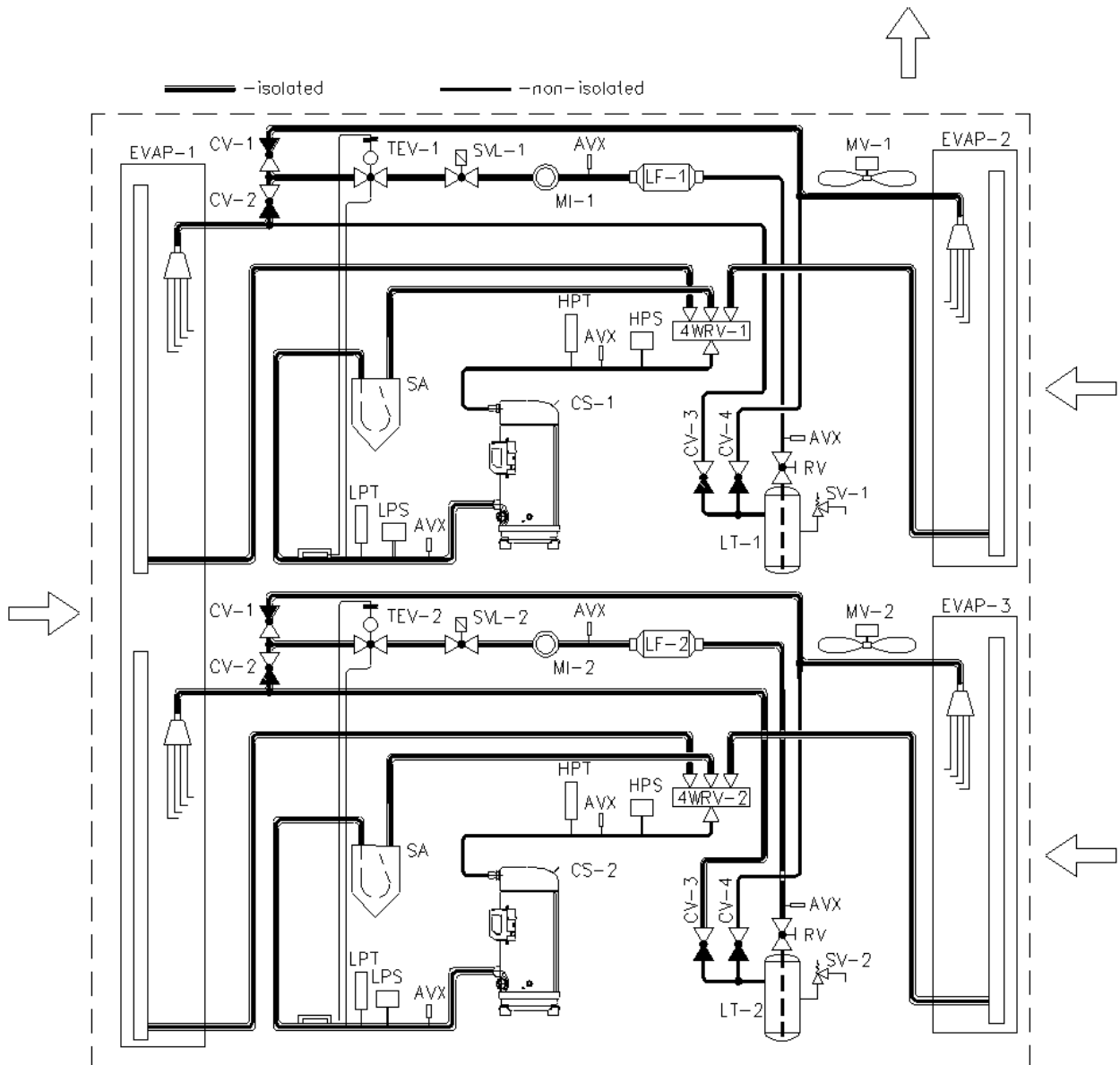
LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar



### 3.13. Cube 50-100 HP charts – heat pump module



CS-1/2– air conditioning scroll compressor

EVAP-1 – inner exchanger / vaporizer

EVAP-2/3– outside exchanger / vaporizer

TEV-1/2– thermostatic expansion valve

SVL-1/2– electromagnetic valve

MI-1/2– moisture indicator

LF-1/2– drier filter

4WRV-1 – 4-way reverse valve

SA – liquid separator

LT-1/2– liquid tank

SV-1/2– safety valve 45bar

RV – rotalock valve

MV-1/2– outside exchanger fan

HPS – high pressure switch

LPS – low pressure switch

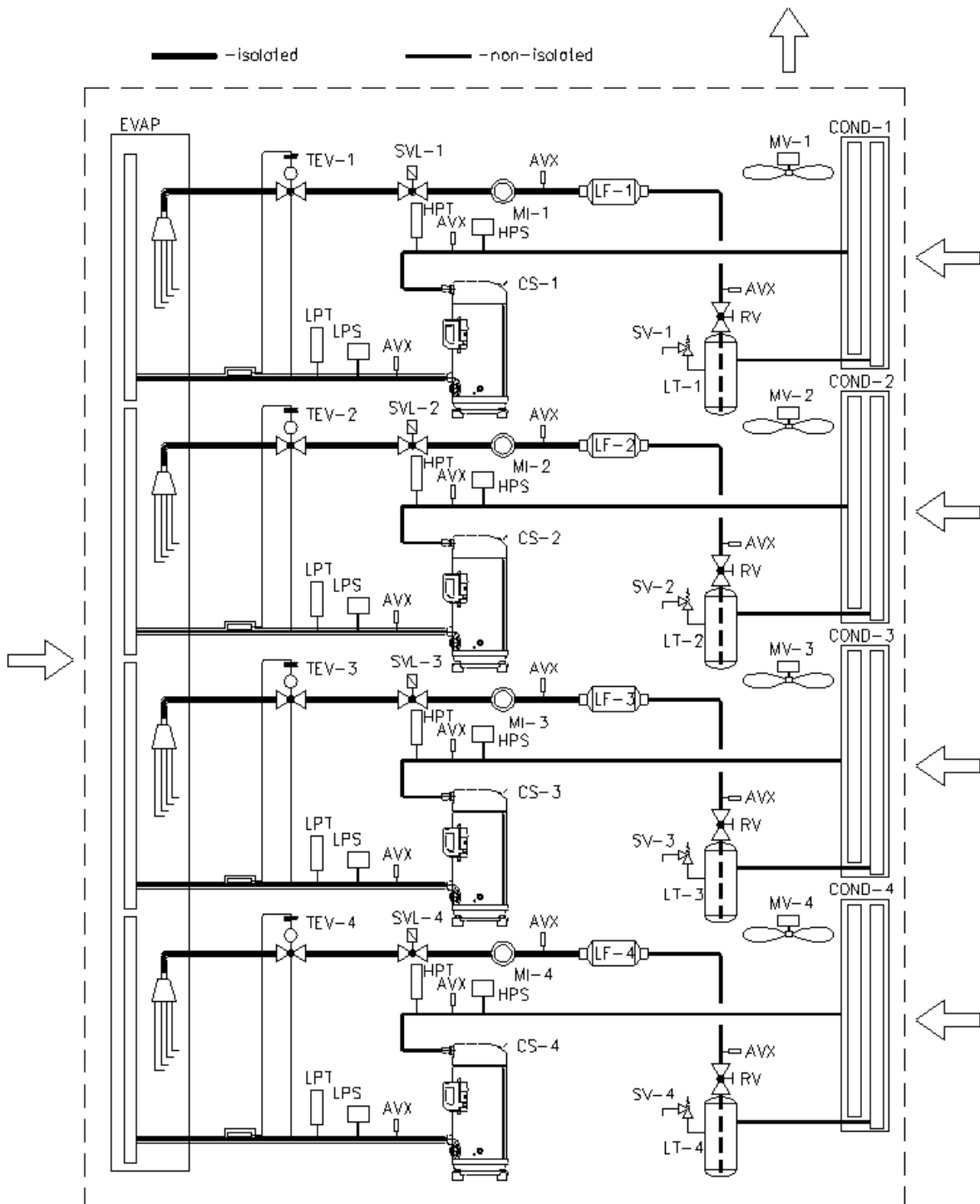
LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar

CV-1/CV-2 – check valve

### 3.14. Cube 120/160 charts – cooling module



CS-1/2/3/4 – air conditioning scroll compressor

EVAP – inner exchanger / vaporizer

COND-1/2/3/4 – inner exchanger/condenser

TEV-1/2/3/4 – thermostatic expansion valve

SVL-1/2/3/4 – electromagnetic valve

MI-1/2/3/4 – moisture indicator

LF-1/2/3/4 – drier filter

LT-1/2/3/4 – liquid tank

SV-1/2/3/4 – safety valve 45bar

RV – rotalock valve

MV-1/2/3/4 – outside exchanger fan

HPS – high pressure switch

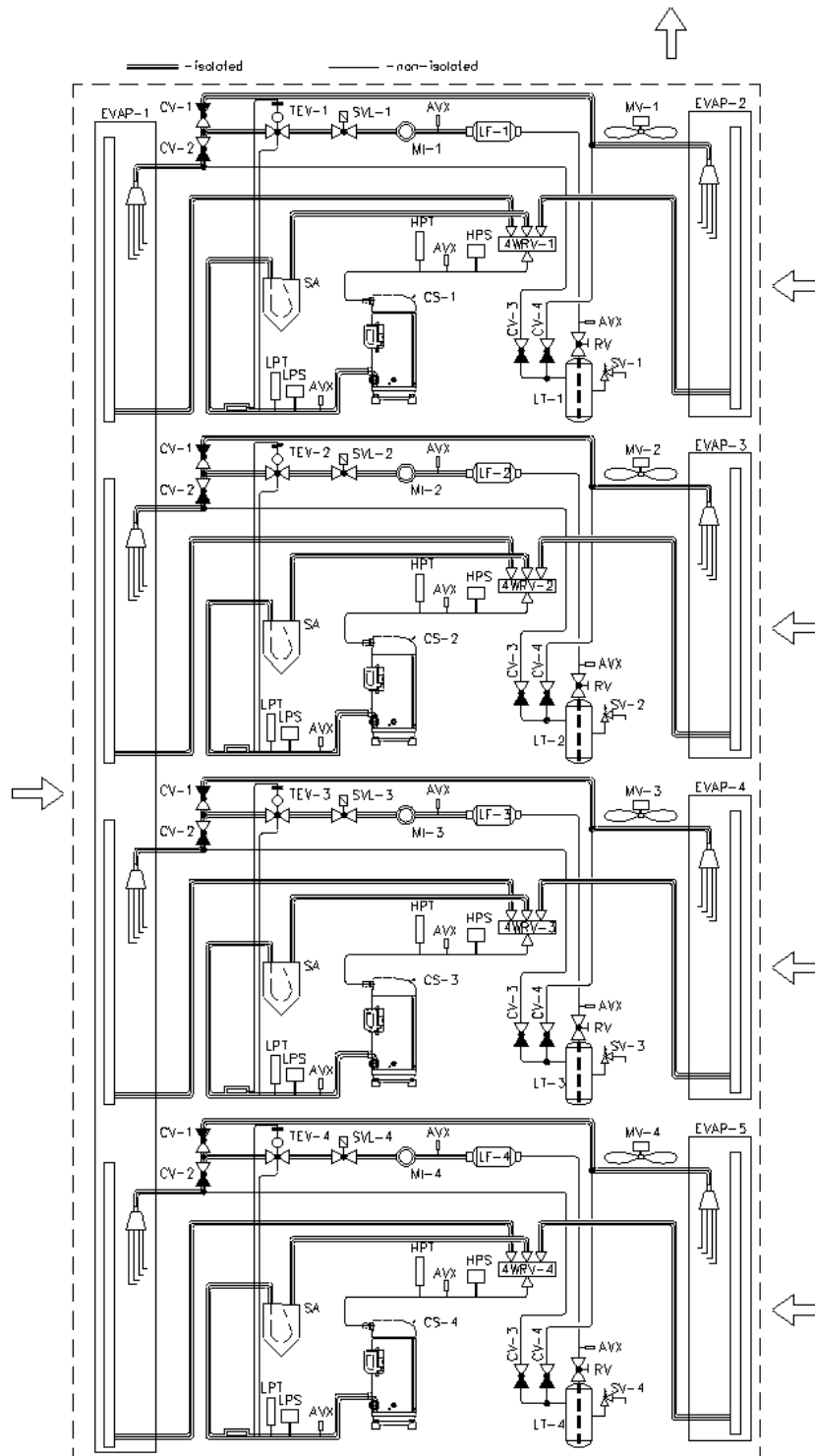
LPS – low pressure switch

LPT – low pressure sensor

HPT – high pressure sensor

AVX – 1/4SAE service valve 45bar

### 3.15. Cube 120/160 HP charts – heat pump module



CS-1/2/3/4 – air conditioning scroll compressor  
 EVAP-1 – inner exchanger / vaporizer  
 EVAP-2/3/4/5 – outside exchanger / vaporizer  
 TEV-1/2/3/4 – thermostatic expansion valve  
 SVL-1/2/3/4 – electromagnetic valve  
 MI-1/2/3/4 – moisture indicator  
 LF-1/2/3/4 – drier filter  
 4WRV-1/2/3/4 – 4-way reverse valve  
 SA – liquid separator  
 LT-1/2/3/4 – liquid tank

SV-1/2/3/4 – safety valve 45bar  
 RV – rotalock valve  
 MV-1/2/3/4 – outside exchanger fan  
 HPS – high pressure switch  
 LPS – low pressure switch  
 LPT – low pressure sensor  
 HPT – high pressure sensor  
 AVX – service valve 45bar  
 CV-1/2/3/4 – check valve

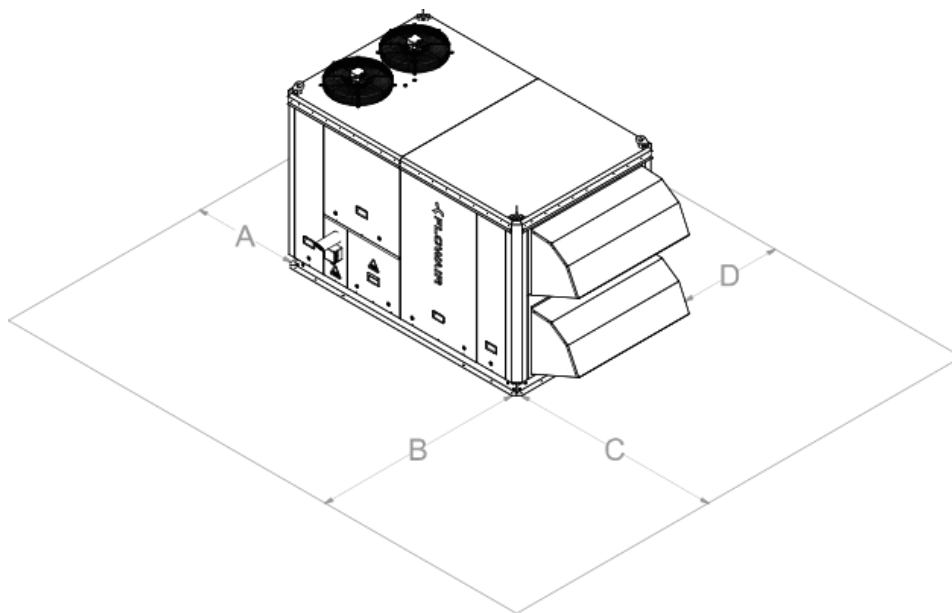
### 3.16. Service distances

Unit's construction requires access from every side according to below directives. It allows service access to ventilation part, condenser and also heat recovery unit. Please pay attention during unit's installation to ensure more distance at inspection side.

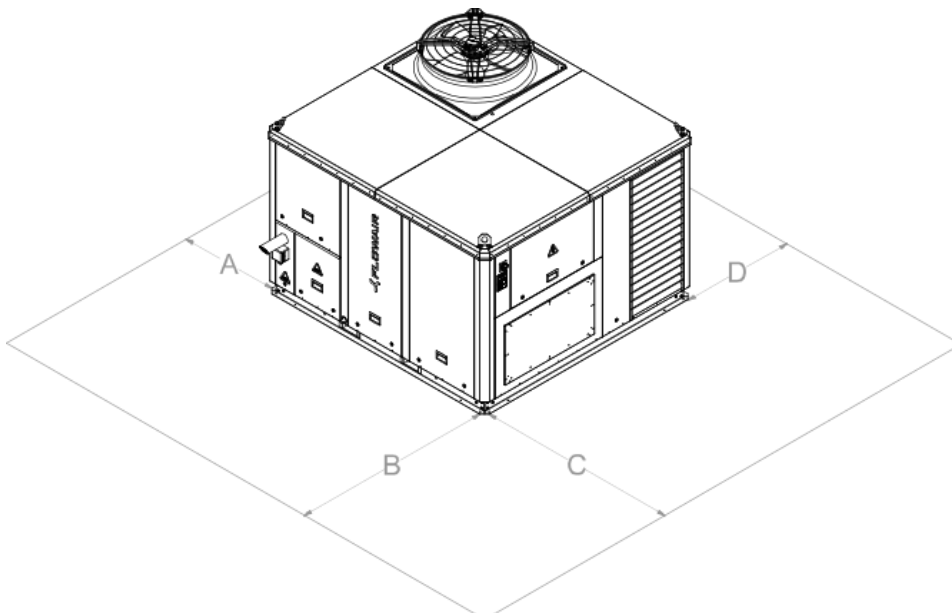
**ATTENTION:** The dimensions given are only minimal ones, necessary for any service works and do not reflect the distance between unit's inlet and outlet and buildings determined by law regulation in certain country.

**ATTENTION:** If the device is installed on a flat roof (<5%) at a height of more than 50 cm, safe service access to the device must be ensured through the use of a service platform.

#### Cube 20



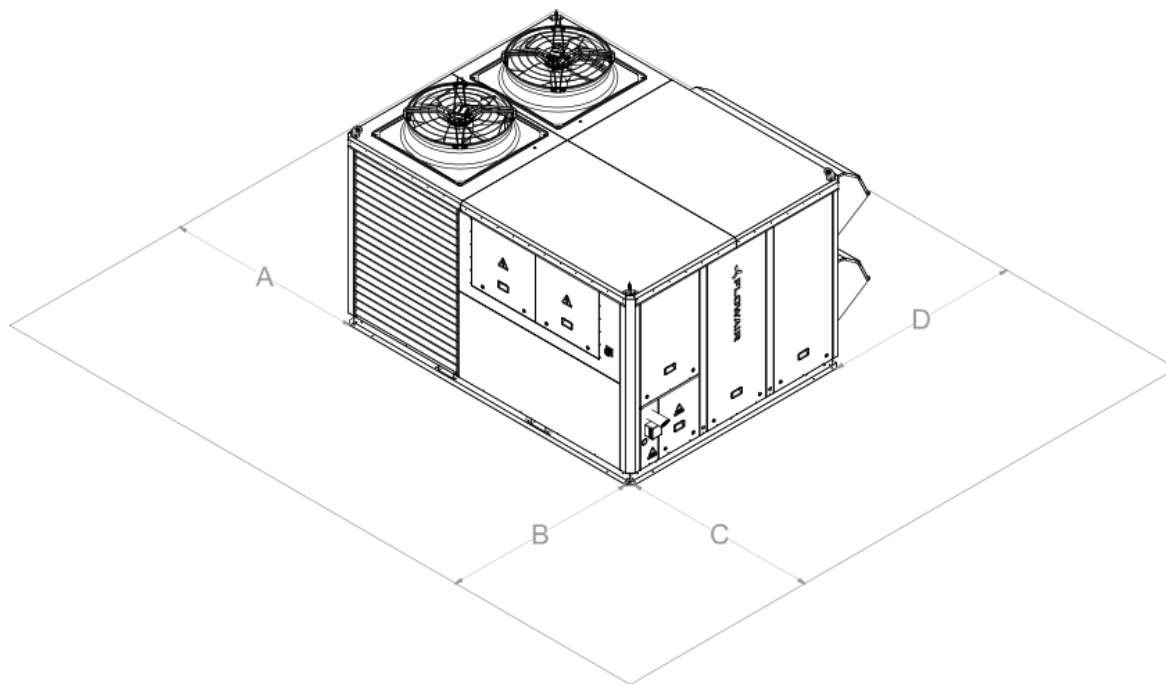
#### Cube 40



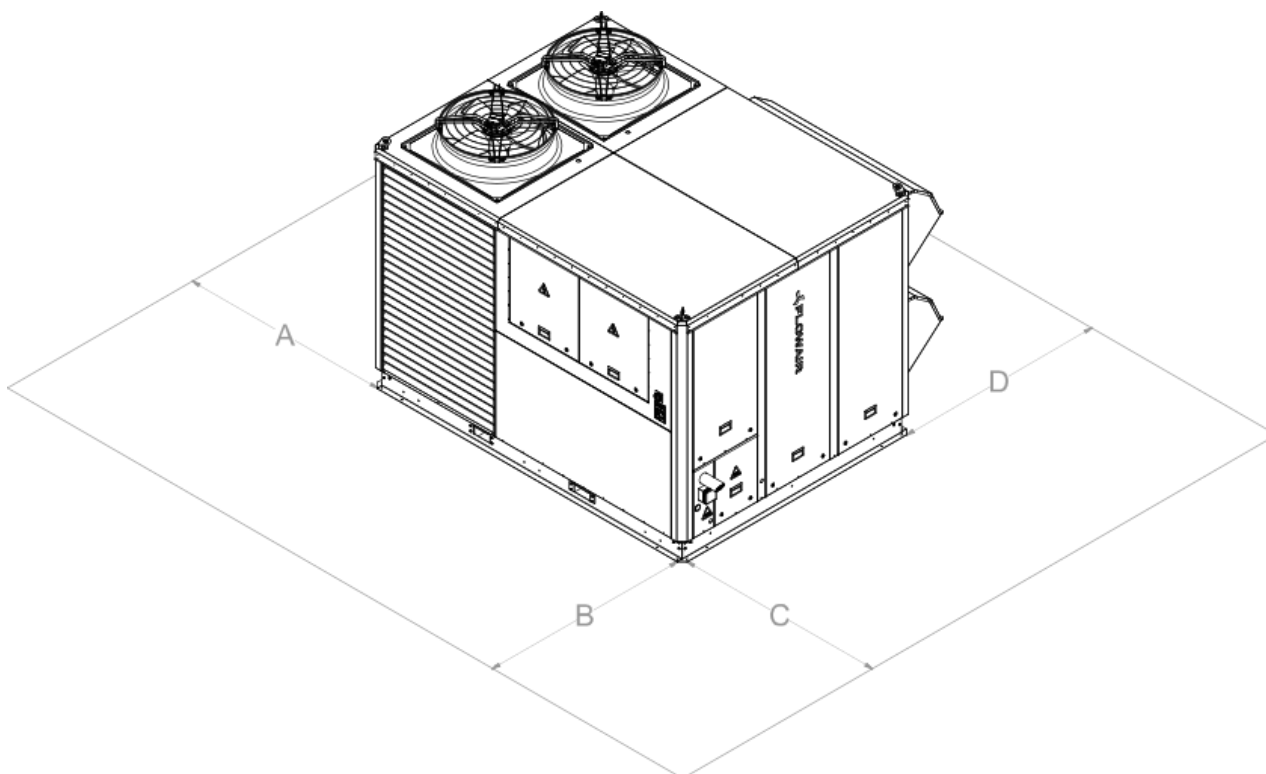
**Minimal required service distance for Cube 20 / Cube 40**

A	min. 1,5 m
B	min. 1,5 m
C	min. 1,5 m
D	min. 1,5 m

**Cube 50/60**



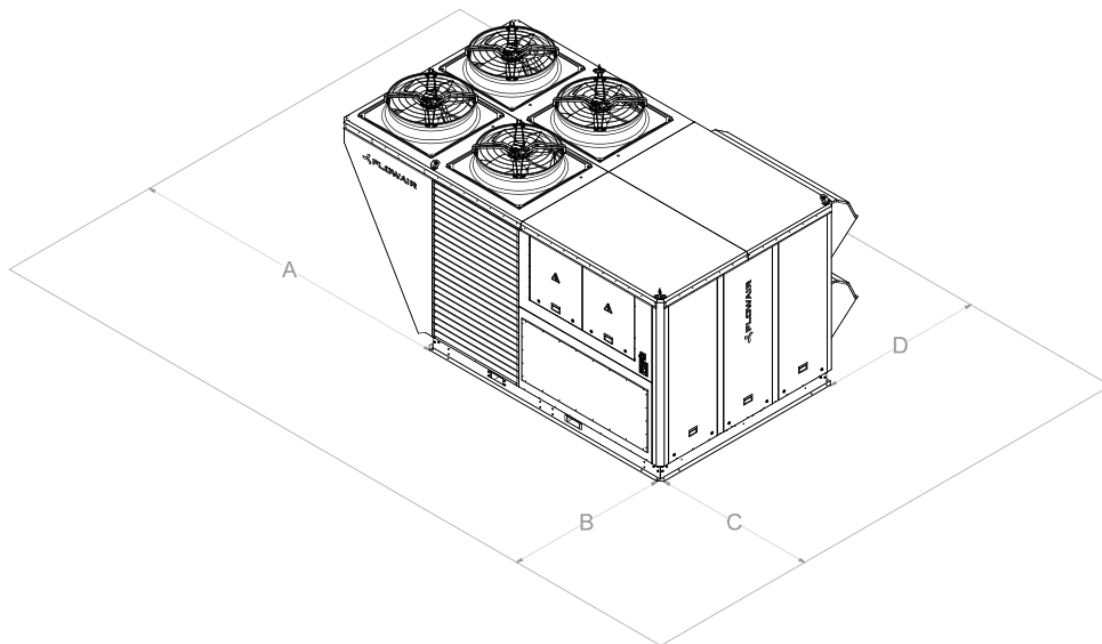
**Cube 80/100 / Cube 80/100 L**



Minimal required service distance for Cube 50 - 100		
A		min. 1,0 m
B		min. 1,5 m
C		min. 2,0 m
D		min. 2,0 m

**ATTENTION :** For the Cube 80/100 L version with external heat recovery, measure "D" from the front of the heat recovery module.

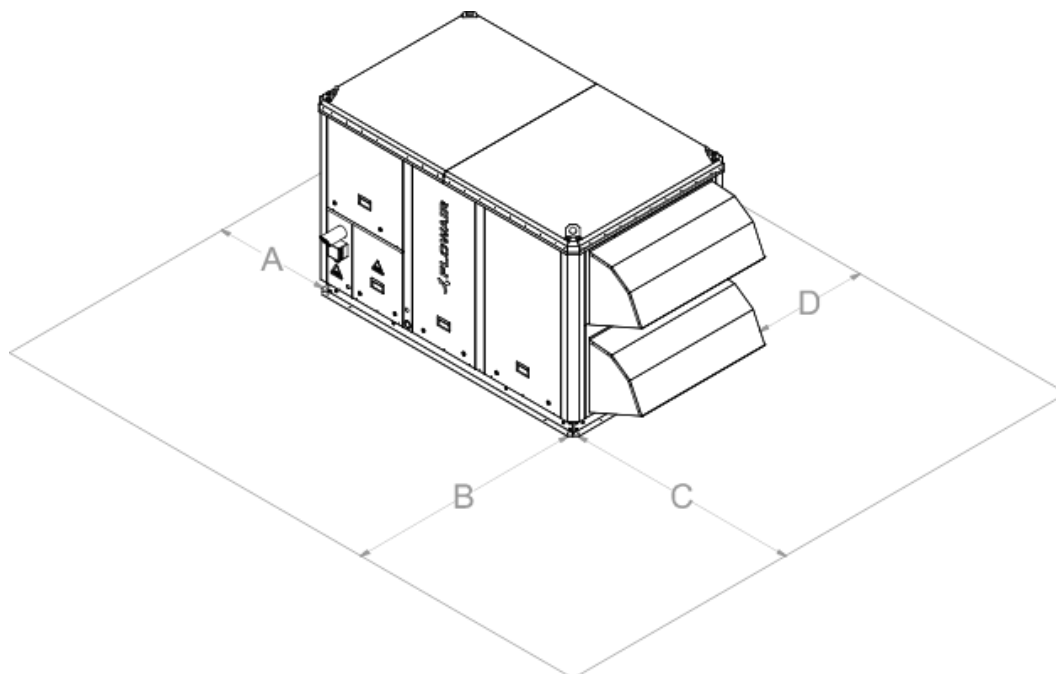
**Cube 80/100 / Cube 80/100**



Minimal required service distance for Cube 120 / 160	
A	min. 3,0 m (odległość mierzona od ramy urządzenia)
B	min. 1,5 m
C	min. 2,0 m
D	min. 2,0 m

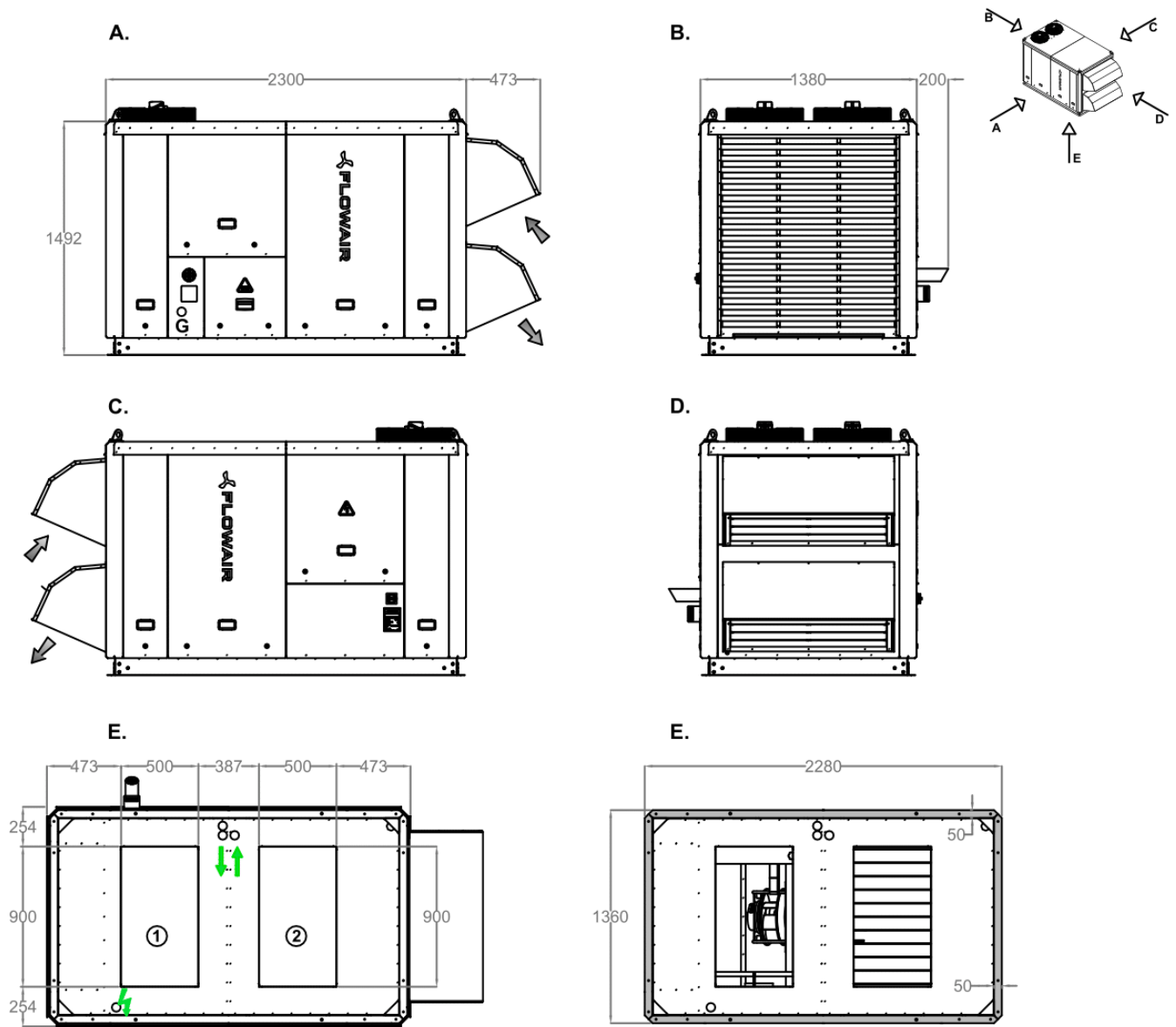
**ATTENTION:** For the Cube 120/160 R version with external heat recovery, measure "D" from the front of the heat recovery module.

**Cube R8**



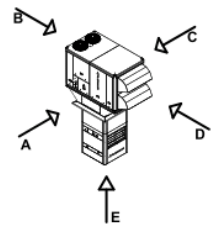
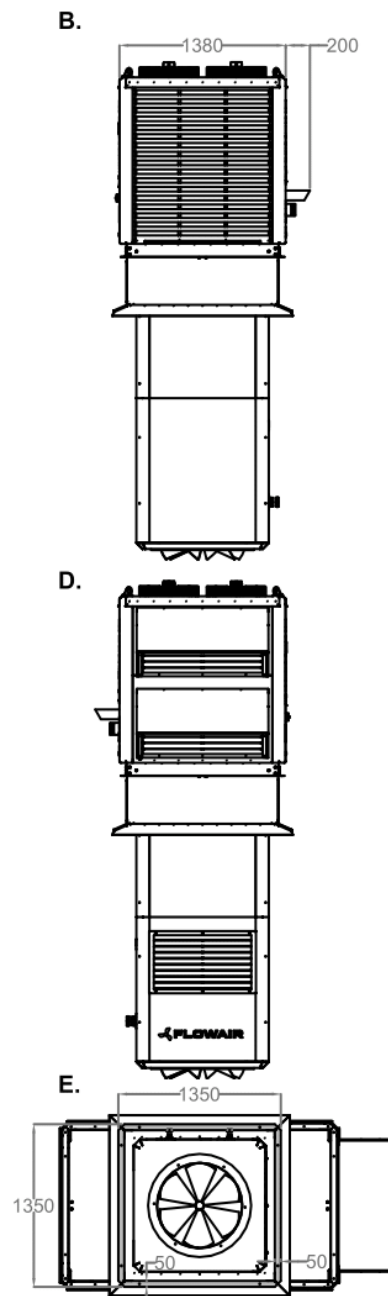
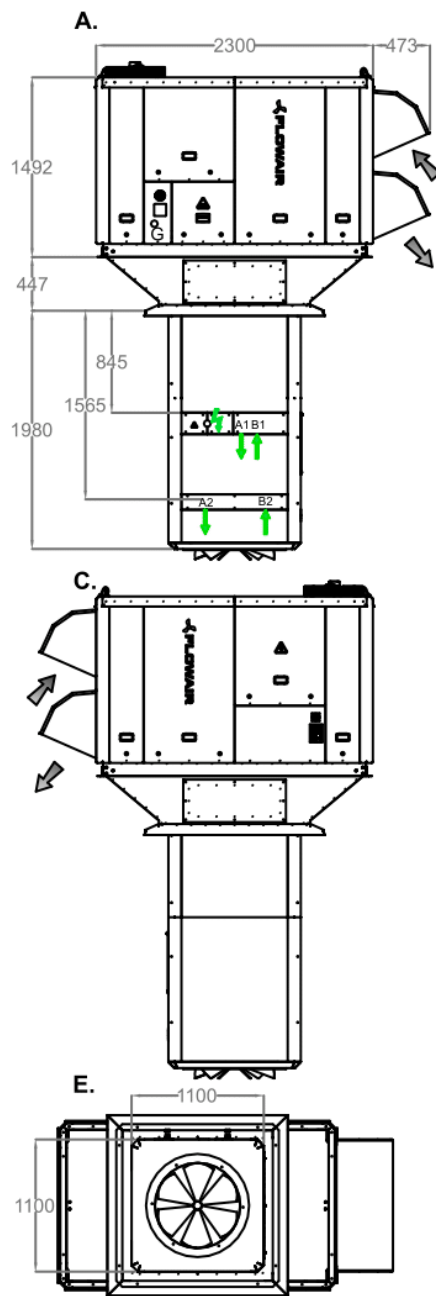
Minimal required service distance for Cube R8	
A	min. 1,0 m
B	min. 1,5 m
C	min. 1,5 m
D	min. 1,5 m

### 3.17. Dimensions Cube 20



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- ↕↕ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

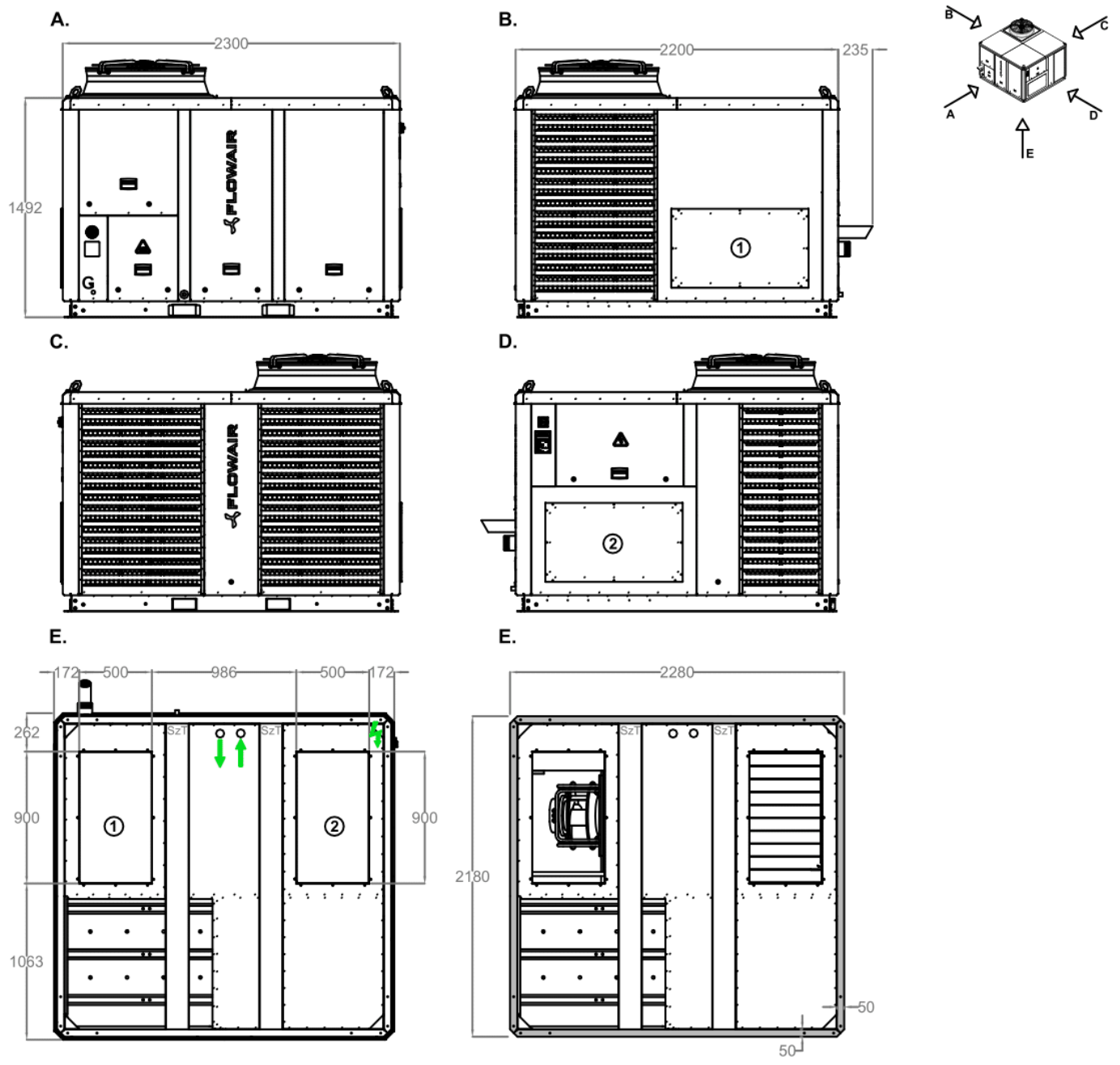
### 3.18. Dimensions Cube 20 NWS



- G - gas connection
- ↕ ↕ ↕ - A1/ B1 – return flow from / supply flow to the rooftop unit's water heat exchanger
- ↕ ↕ ↕ - A2/ B2- return flow from / supply flow to the supply module's water heat exchanger
- ⚡ - electrical connection



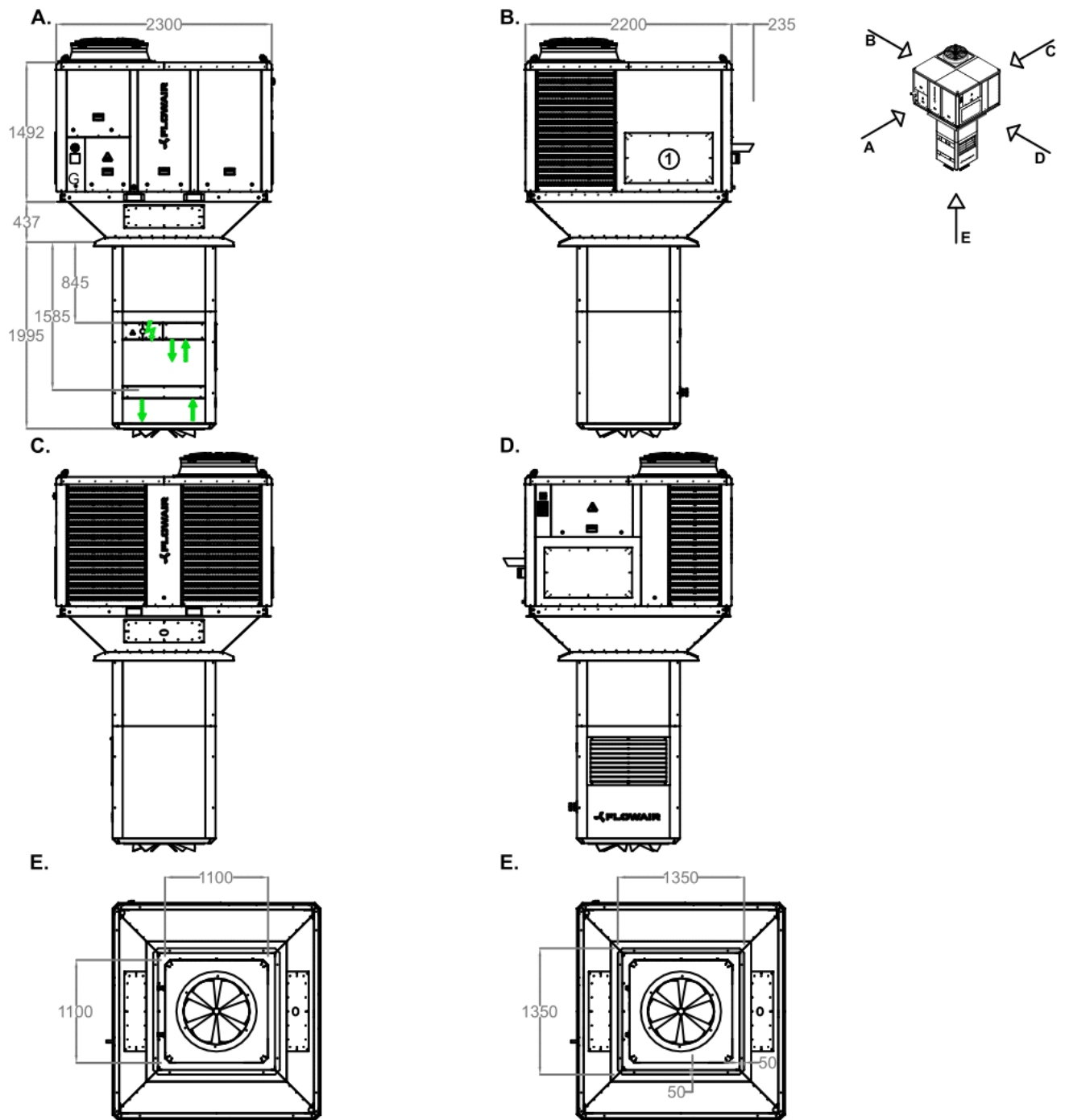
### 3.19. Dimensions Cube 40



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ⬇️⬆️ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION:** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

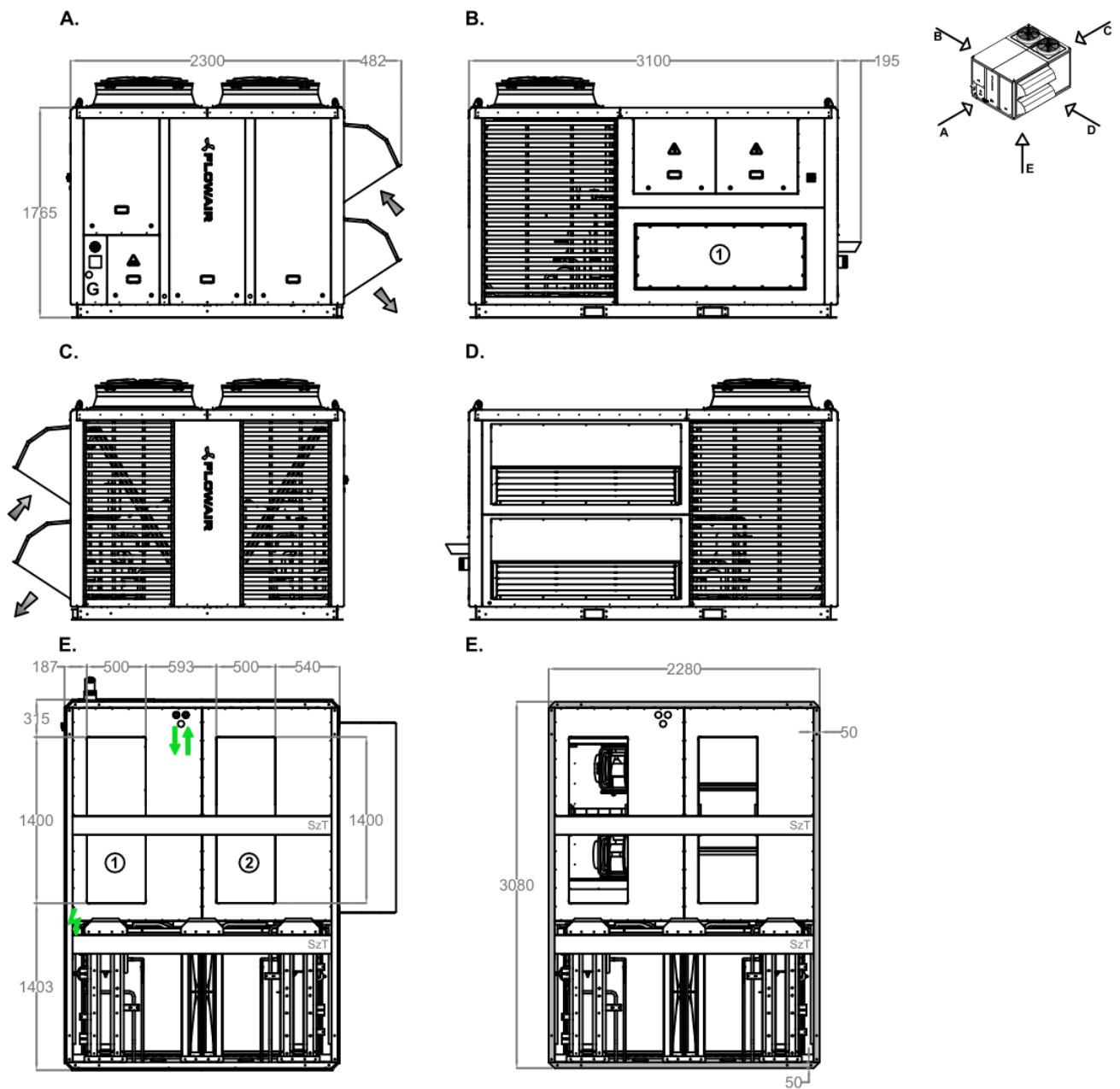
### 3.20. Dimensions Cube 40 NWL



- 1 - supply duct connection
- G - gas connection
- ↕ ↕ - A1/ B1 – return flow from / supply flow to the rooftop unit's water heat exchanger
- ↕ ↕ - A2/ B2 - return flow from / supply flow to the supply module's water heat exchanger
- ⚡ - electrical connection

**ATTENTION:** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

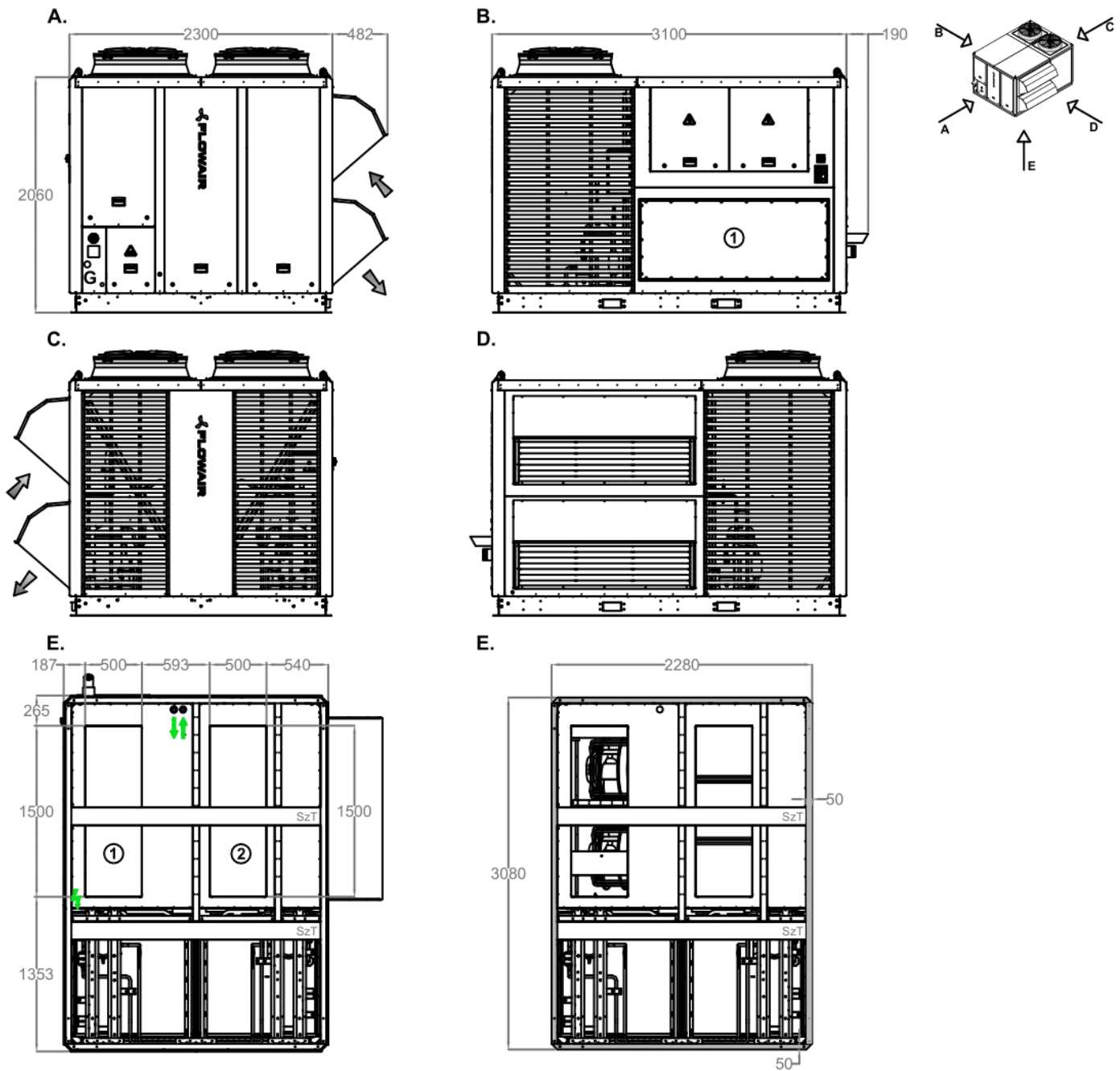
### 3.21. Dimensions Cube 50/60



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ↕ ↕ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION :** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

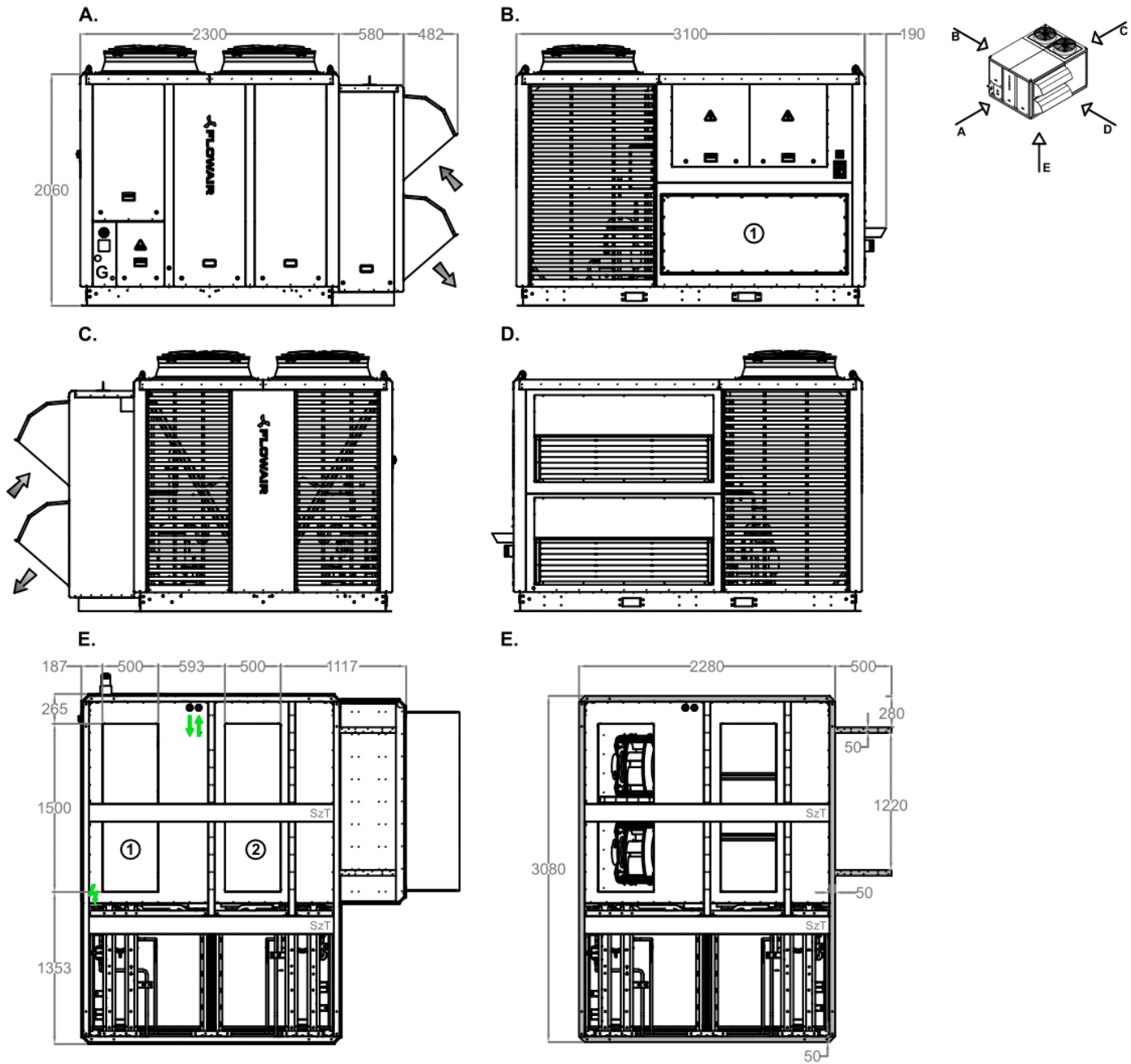
### 3.2.2. Dimensions Cube 80/100



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ↕ ↕ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION :** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

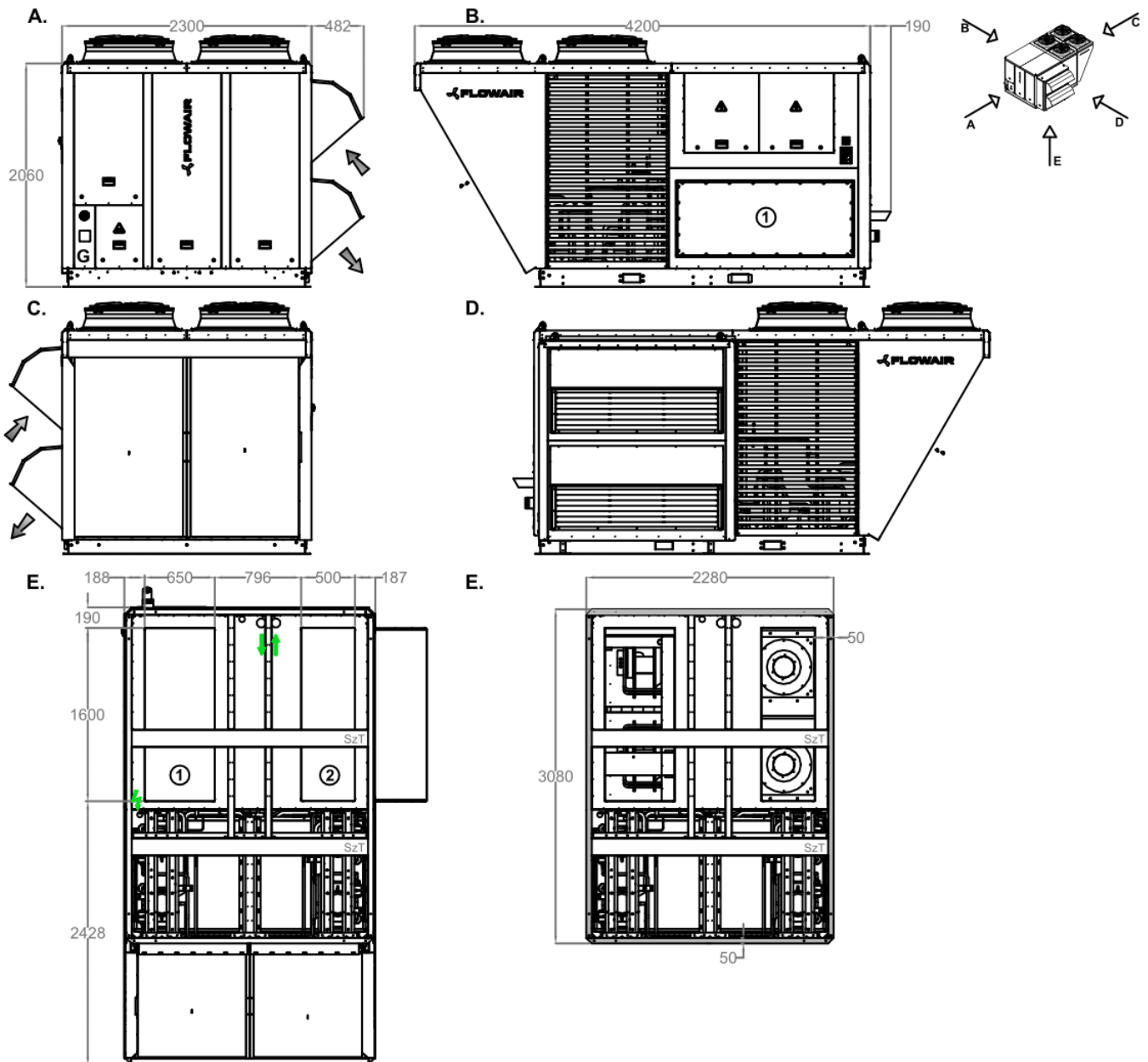
### 3.23. Dimensions Cube 80/100 L



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ↕ ↗ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION :** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

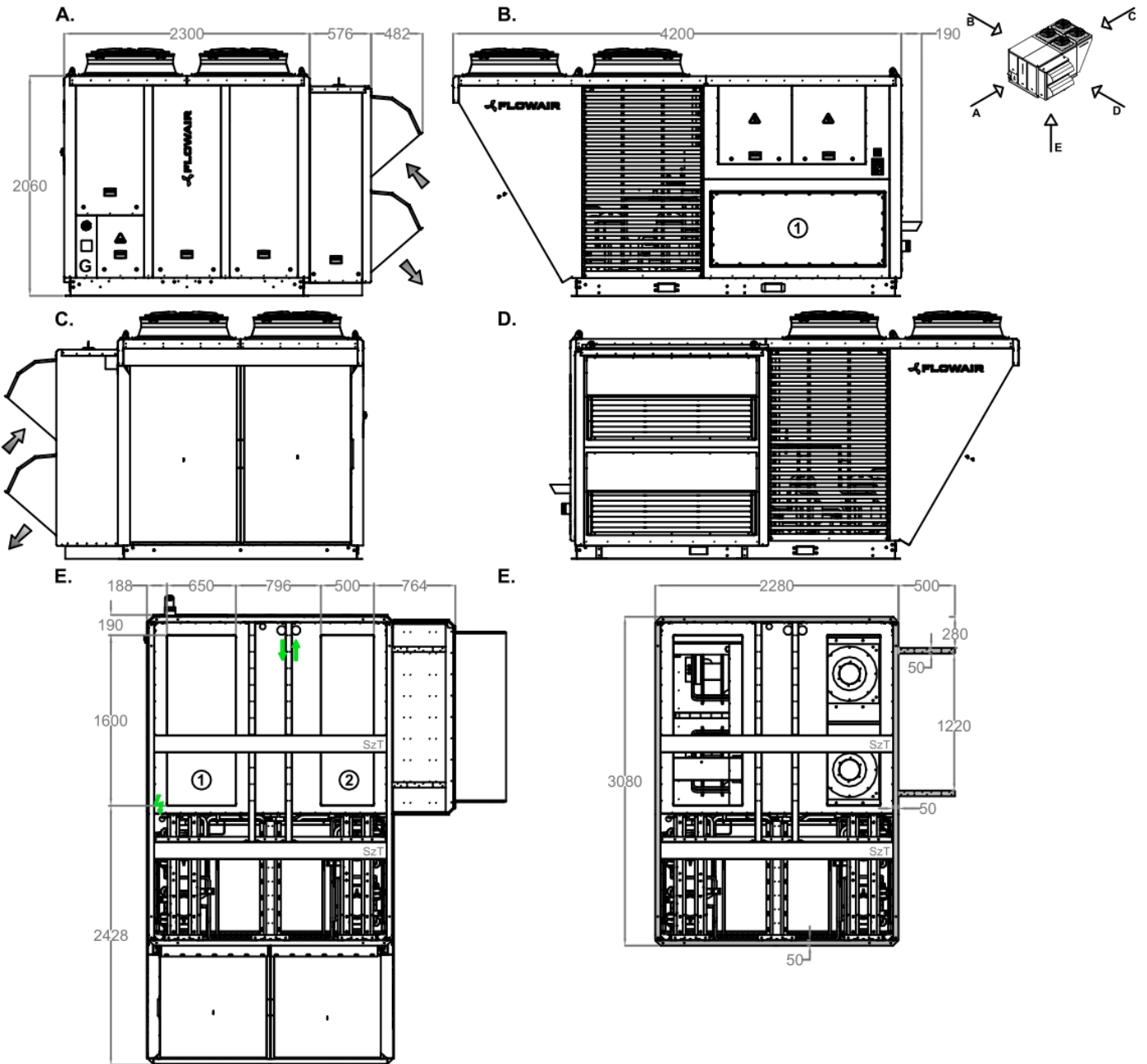
### 3.24. Dimensions Cube 120/160 B



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ↕ ↗ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION:** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

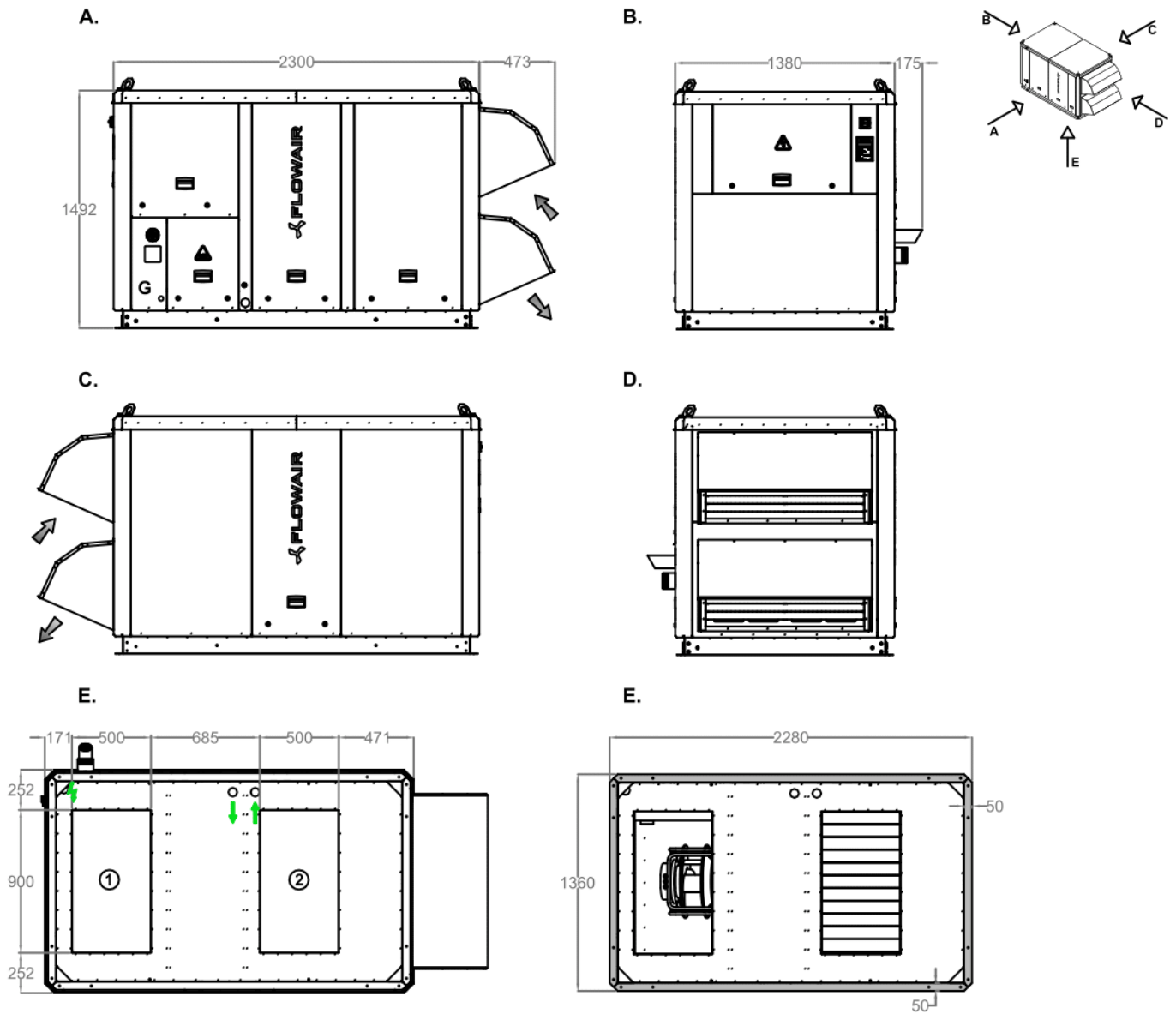
### 3.25. Dimensions 120/160 R



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- SzT - transport rails (to be removed after device installation)
- ⚡ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection

**ATTENTION :** For appliances with an integrated gas heater, the supply air duct can only be connected at the bottom.

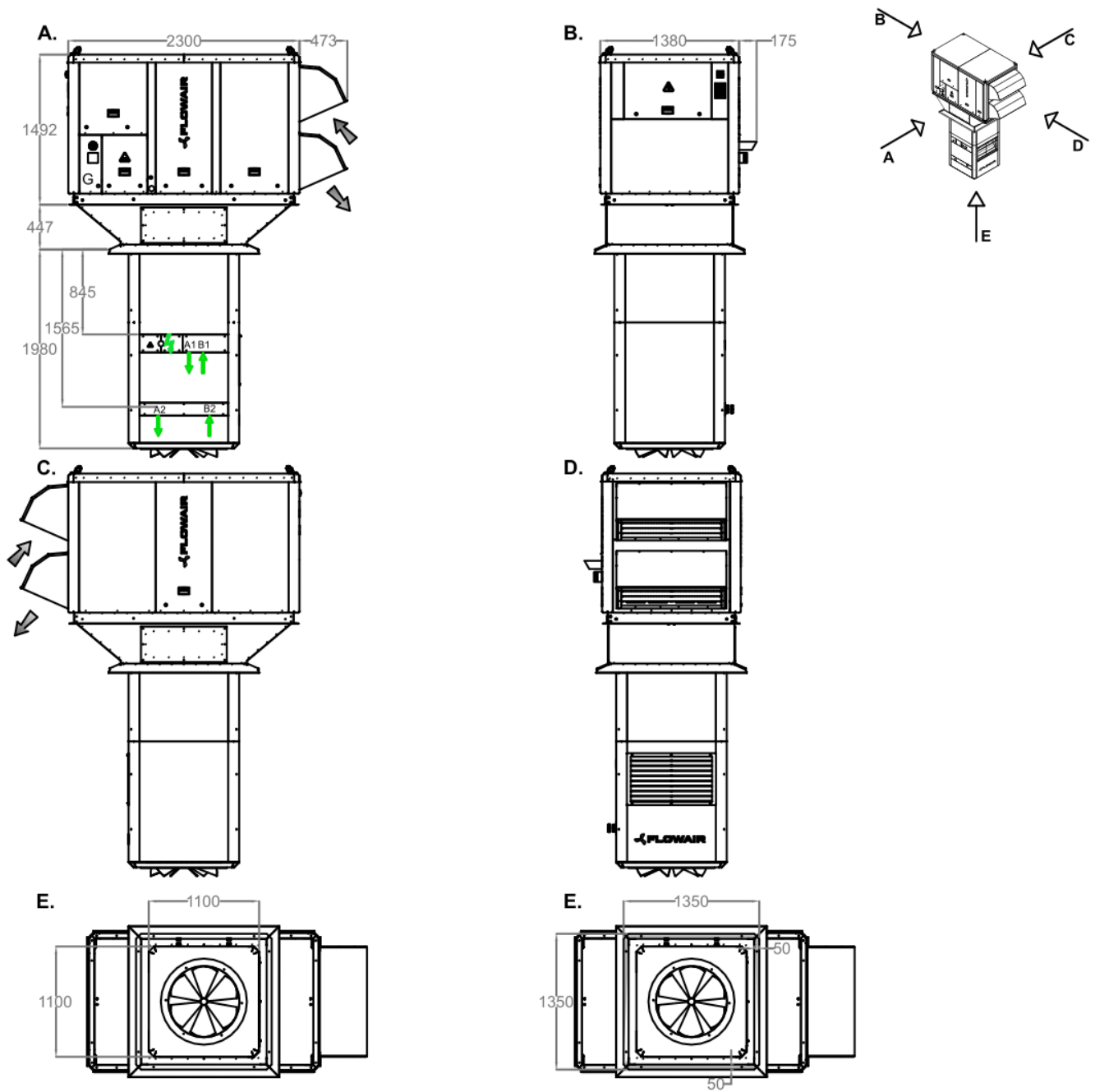
### 3.26. Dimensions Cube R8



- 1 - supply duct connection
- 2 - exhaust duct connection
- G - gas connection
- ↕ ↗ - return flow from / supply flow to the rooftop unit's water heat exchanger
- ⚡ - electrical connection



### 3.27. Dimensions Cube R8 NWS



- G - gas connection
- ↕ ↕ - A1/ B1 – return flow from / supply flow to the rooftop unit's water heat exchanger
- ↕ ↕ - A2/ B2 - return flow from / supply flow to the supply module's water heat exchanger
- ⚡ - electrical connection

## 4. TRANSPORT

An integrated frame with handles for forklift or integrated handles to lift unit on ropes is used for transport the Cube units.

### Please follow below regulations during transport:

- Before unloading the transport, complete the handover protocol.
- Please check parcel completion and unit state immediately after delivery. In case of any irregularities a damage protocol should be written down. This can help claiming indemnities from shipping company later.
- Unloading should be done with forklift (using frame handles or palette where unit is mounted) or a lift (using handles on unit's casing).
- During transport or storage, the unit must stand on integrated frame. Leaving unit in different way may lead to its damage.
- After unloading, during waiting for installation, a cover protecting from external factors must be used.

**ATTENTION:** The manufacturer is not responsible for damages caused by not following the guidelines written in the manual or for transport irregularities.

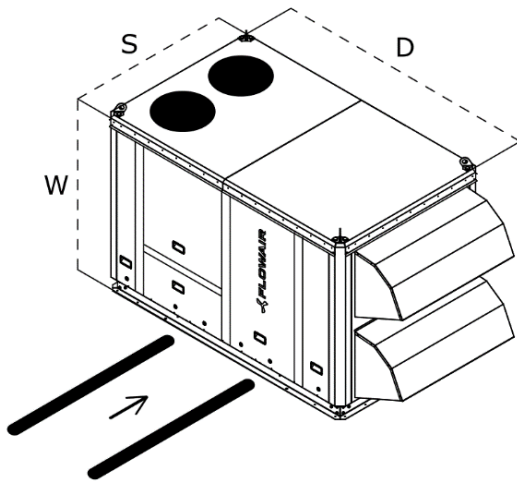
### 4.1. Horizontal transport

Cube units are prepared for transport using forklift; equipped with transport rails gives the opportunity for loading or unloading without additional support or transport equipment.

**ATTENTION:** Because of unit's weight and front-end center of gravity, the size of the forklift and length of truck forks must be adapted to unit's dimension. Pay special attention to the length of truck forks, which should have at least  $\frac{3}{4}$  depth of transport rail. Shorter truck forks application may result in damage to the unit or accident what the manufacturer is not responsible for.

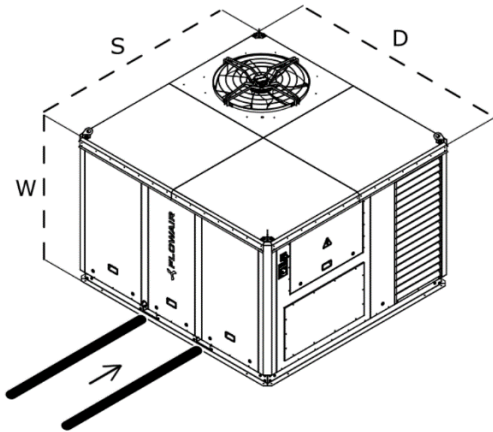
**ATTENTION:** Before installing the device, remove the transport rails by unscrewing the 4 M8 screws.

### 4.2. Transport dimensions Cube 20



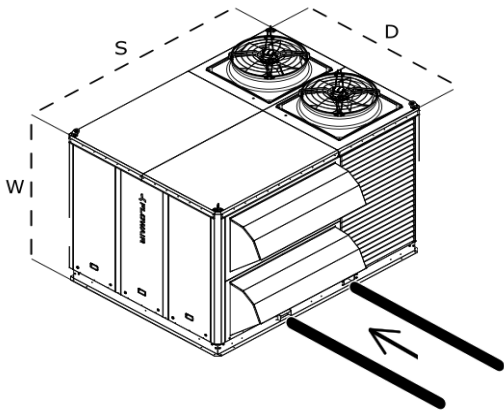
- W (Cube / + blocks / + space) - 1492 / 1592 / 1692 mm
- S (Cube / + styro / + space) - 1380 / 1480 / 1580 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers- 473 mm (transport inside)
- Length of the forks – min. 1500 mm
- Weight- up to 850 kg

### 4.3. Transport dimensions Cube 40



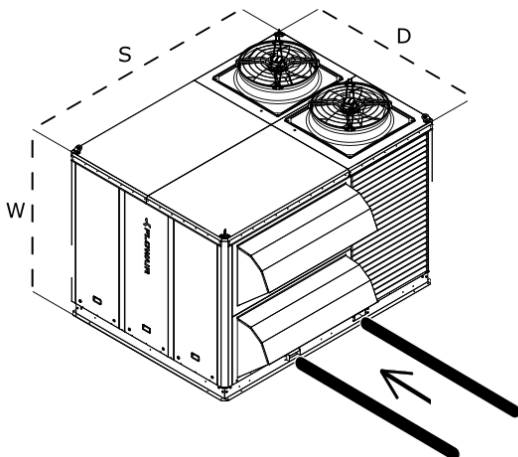
- W (Cube / + space) - 1742 / 1842 mm
- S (Cube / + styro / + space) - 2200 / 2300 / 2400 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers– not applicable
- Length of the forks – min. 2300 mm
- Weight – up to 1100 kg

### 4.4. Transport dimensions Cube 50/60



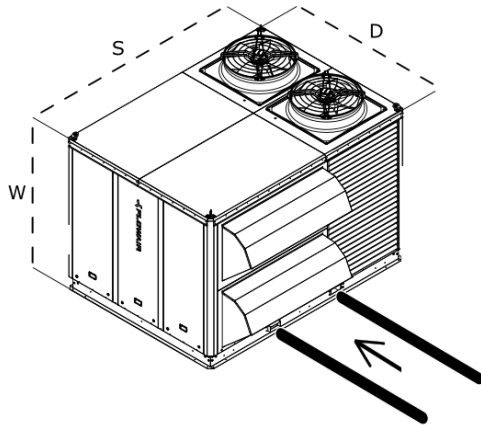
- W (Cube / + space) - 1790 / 1890 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers– 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Weight – Cube 50 – up to 1600 kg, Cube 60 – up to 1650 kg

### 4.5. Transport dimensions Cube 80/100

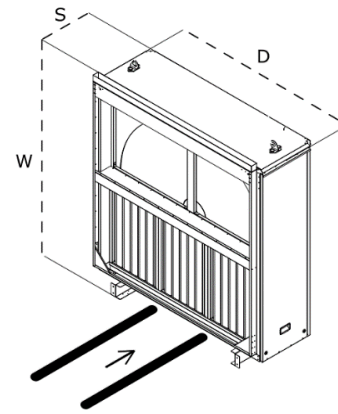


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers– 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Weight – Cube 80 - up to 1990 kg, Cube 100 – up to 2250 kg

#### 4.6. Transport dimensions Cube 80/100 L

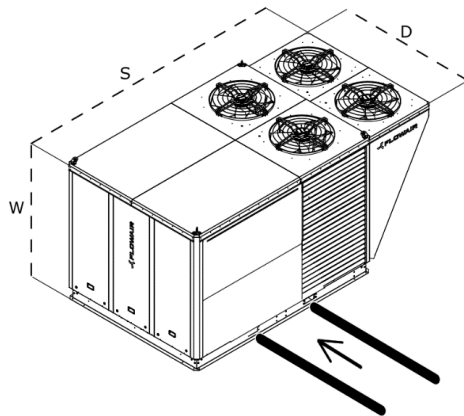


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers- 482 mm (transport inside)
- Length of the forks - min. 2400 mm
- Weight - Cube 80 - up to 1990 kg, Cube 100 - up to 2250 kg



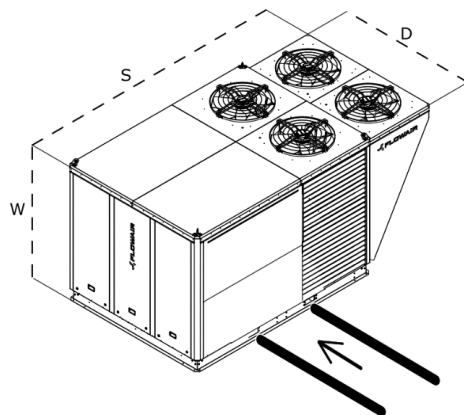
- W (module L / + space) - 2310 / 2410 mm
- S (module L / + styro / + space) - 573 / 673 / 773 mm
- D (module L / + styro / + space) - 2300 / 2400 / 2500 mm
- Length of the forks - min. 2400 mm
- Weight - up to 350 kg

#### 4.7. Transport dimensions Cube 120/160 B

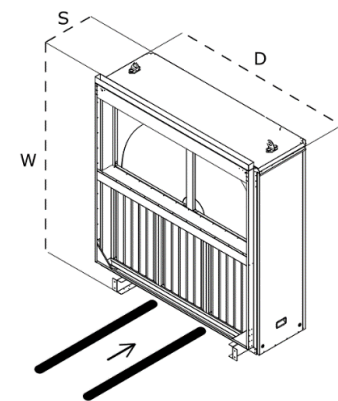


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 4200 / 4300 / 4400 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers- 482 mm (transport inside)
- Length of the forks - min. 2400 mm
- Weight - Cube 120 - up to 2250 kg, Cube 160 - up to 2350 kg

#### 4.8. Transport dimensions Cube 120/160 R

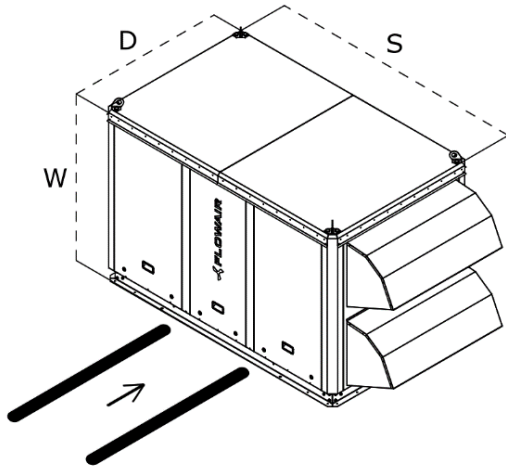


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 4200 / 4300 / 4400 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers- 482 mm (transport inside)
- Length of the forks - min. 2400 mm
- Weight- Cube 120 - up to 2250 kg, Cube 160 - up to 2350 kg



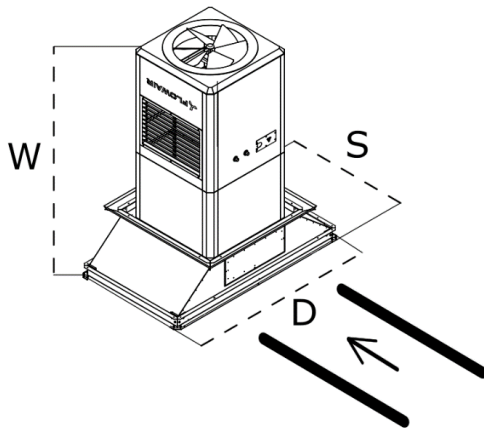
- W (module L / + space) - 2310 / 2410 mm
- S (module L / + styro / + space) - 573 / 673 / 773 mm
- D (module L / + styro / + space) - 2300 / 2400 / 2500 mm
- Length of the forks - min. 2400 mm
- Weight - up to 350 kg

#### 4.9. Transport dimensions Cube R8



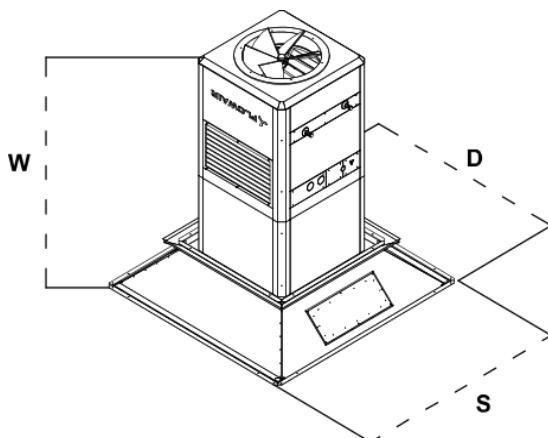
- W (Cube / + blocks / + space) - 1492 / 1592 / 1692 mm
- S (Cube / + styro / + space) - 1380 / 1480 / 1580 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers- 473 mm (transport inside)
- Length of the forks – min. 1500 mm
- Weight – up to 800 kg

#### 4.10. Transport dimensions NWS module (Cube 20/R8 NWS)



- W (NW / + palette / + sapce) - 2584 / 2684 / 2784 mm
- S (NW / + styro / + space) - 1380 / 1480 / 1580 mm
- D (NW / + styro / + space) - 2300 / 2400/ 2500 mm
- Length of the forks – min. 1500 mm
- Weight – up to 200 kg

#### 4.11. Transport dimensions NWL module (Cube 40 NWL)



- W (NW / + nblocks/ + space) - 2584 / 2684 / 2784 mm
- S (NW / + styro / + space) - 2300 / 2400/ 2500 mm
- D (NW / + styro / + space) - 2300 / 2400/ 2500 mm
- Length of the forks – min. 1500 mm
- Weight- up to 200 kg

#### 4.12. Lifting information

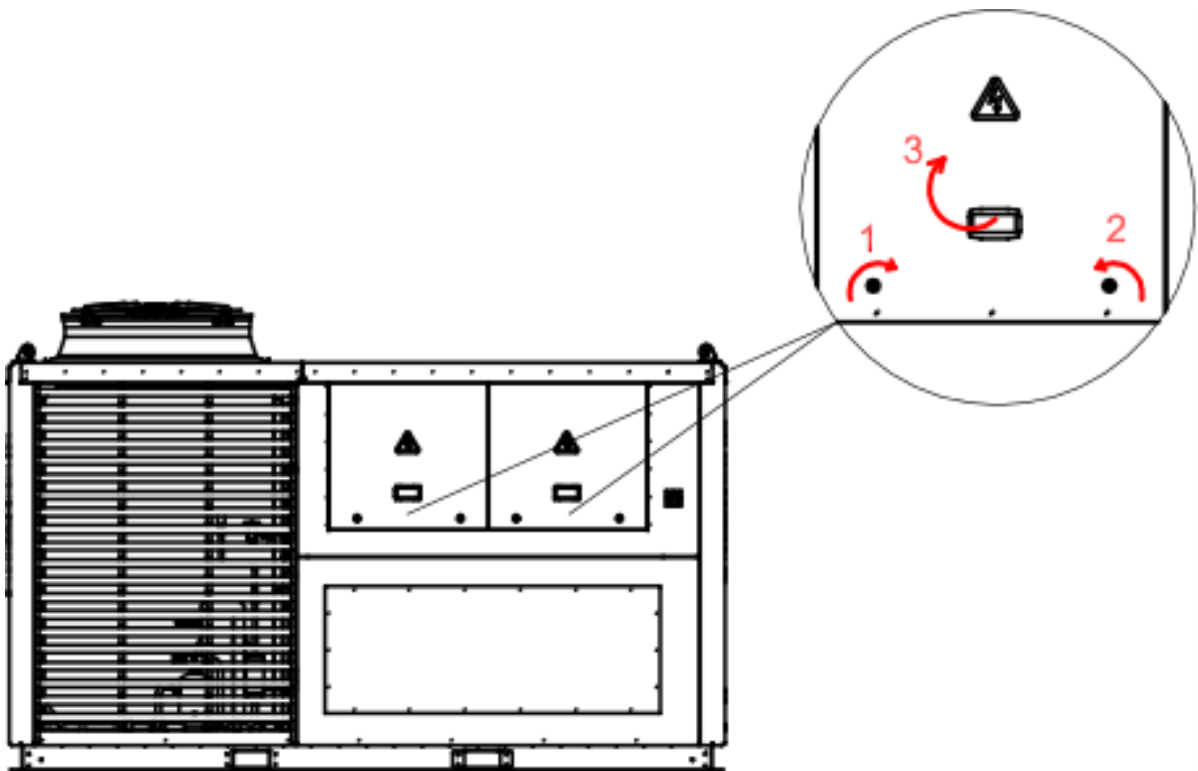
**When lifting the Cube and the heat recovery module, follow these rules:**

- Make sure that the ropes are properly attached to all holders,
- Always kift the device and the heat recovery module separately,
- Make sure that the device is level during lifting,
- Be especially careful when removing from the truck, so as not to damage the device by hitting the trailer elements,
- Be careful not to hit the device with any other objects,
- Do not lift the device at excessive speed,
- Do not change direction abruptly,
- Be especially careful when setting the device on a structural frame or a roof base.

**ATTENTION:** The manufacturer is not responsible for damages caused by not following the guidelines written in the manual or for transport irregularities.

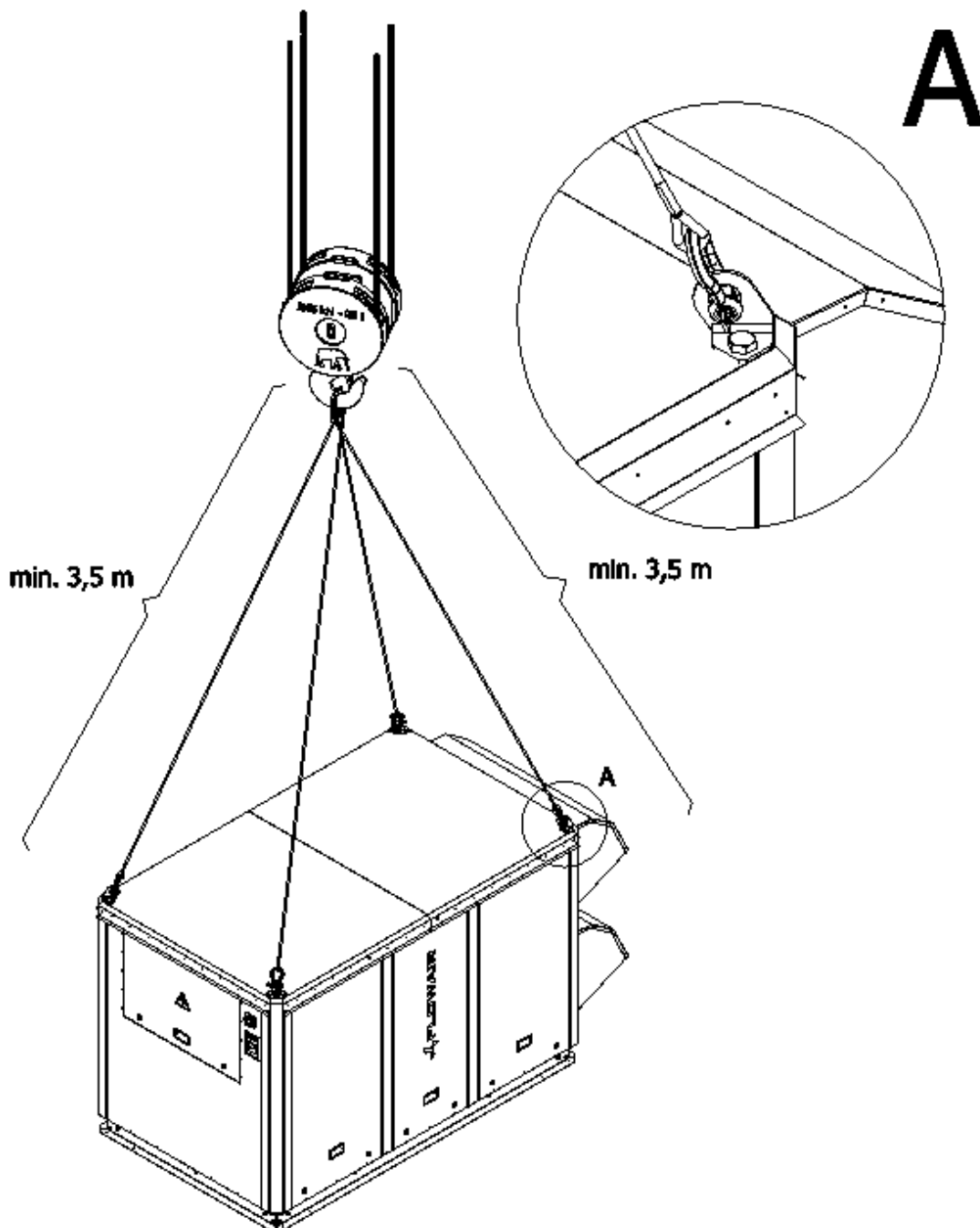
**ATTENTION:** Do not stand under the device during lifting.

**ATTENTION:** Before lifting, check that the locks on all service panels are closed and verify by pulling the handles.



#### 4.13. Lifting Cube 20

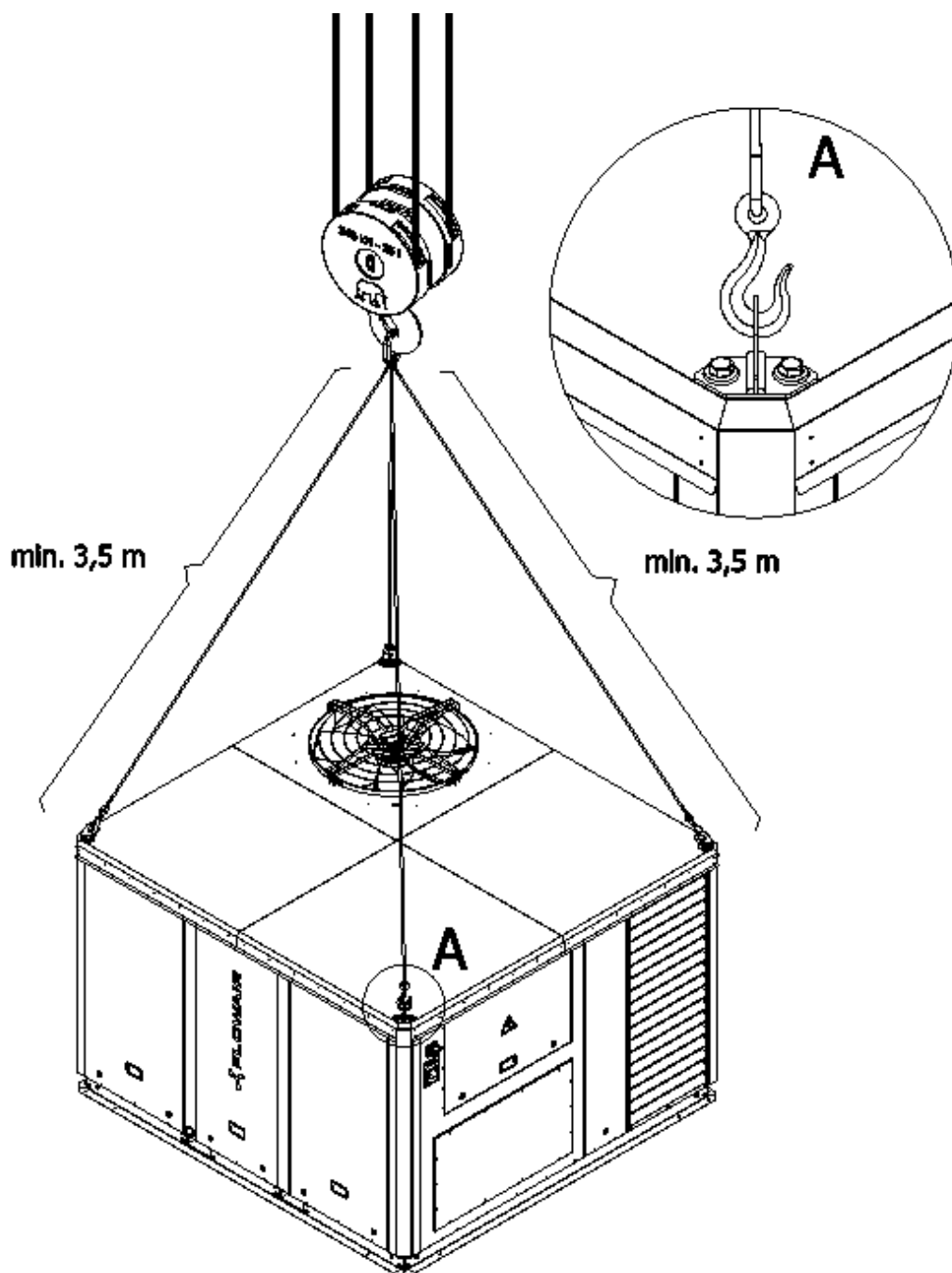
All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.



**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

#### 4.14. Lifting Cube 40

All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.

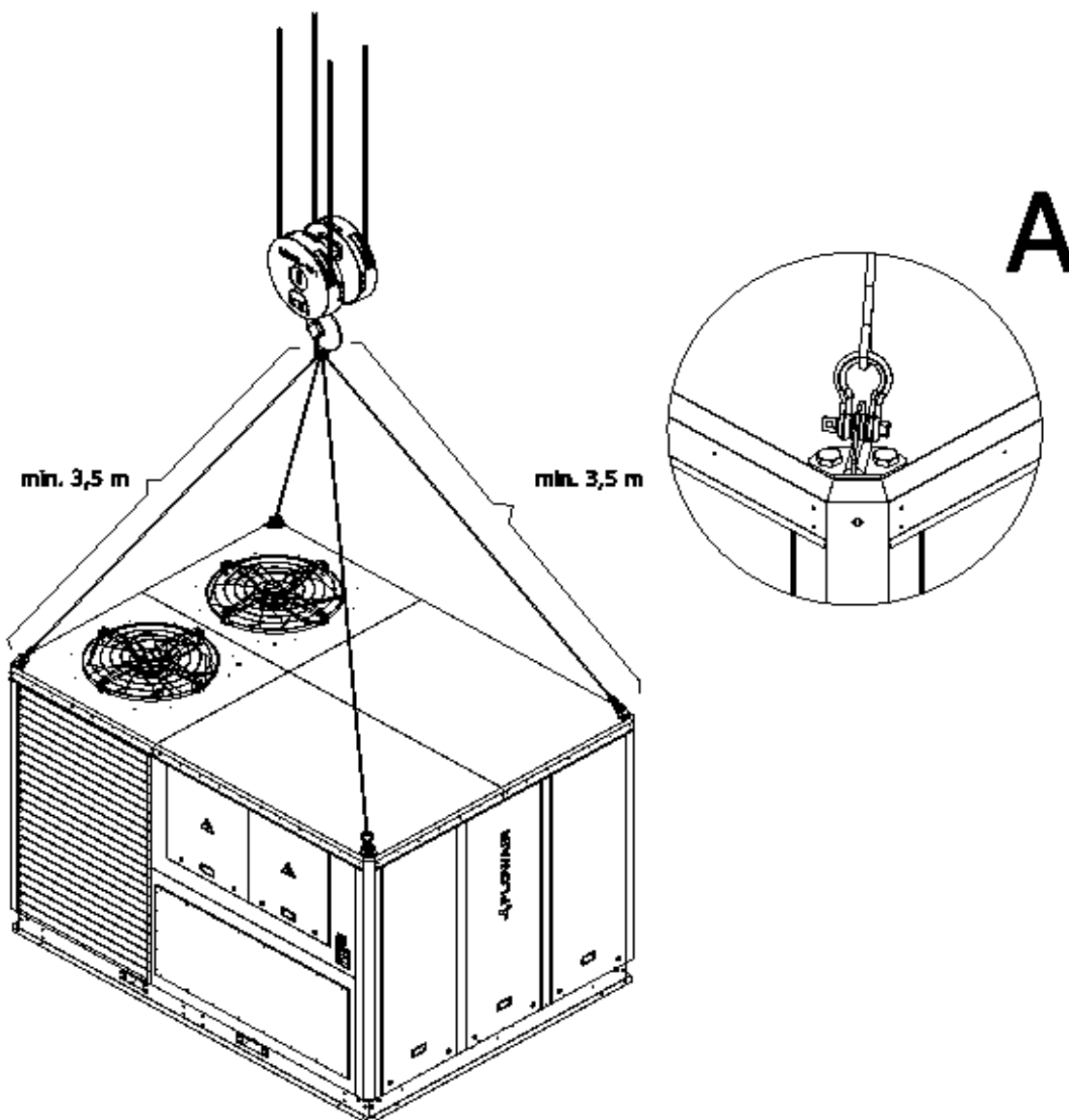


**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.



#### 4.15. Lifting Cube 50/60

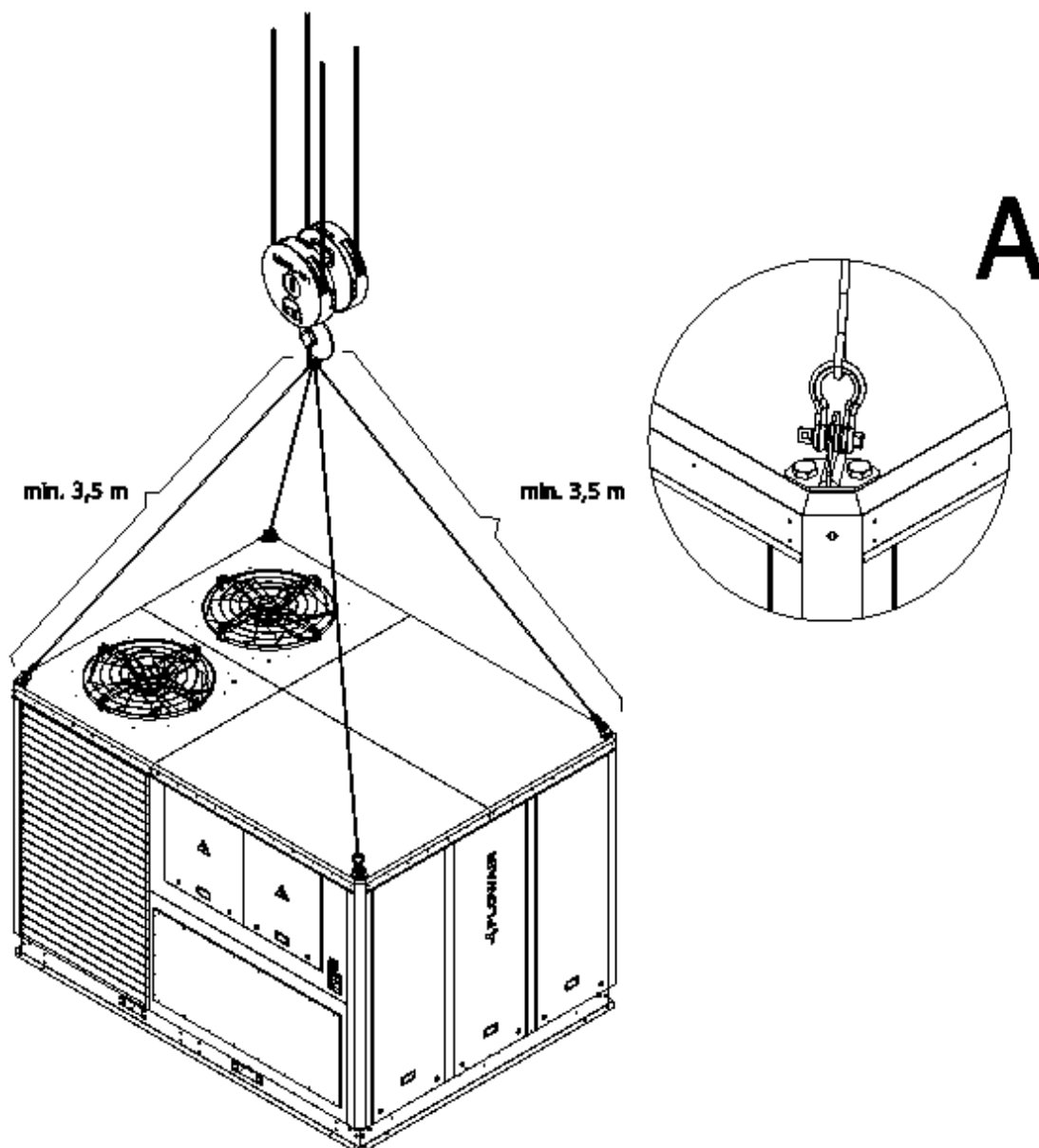
All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.



**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

#### 4.16. Lifting Cube 80/100

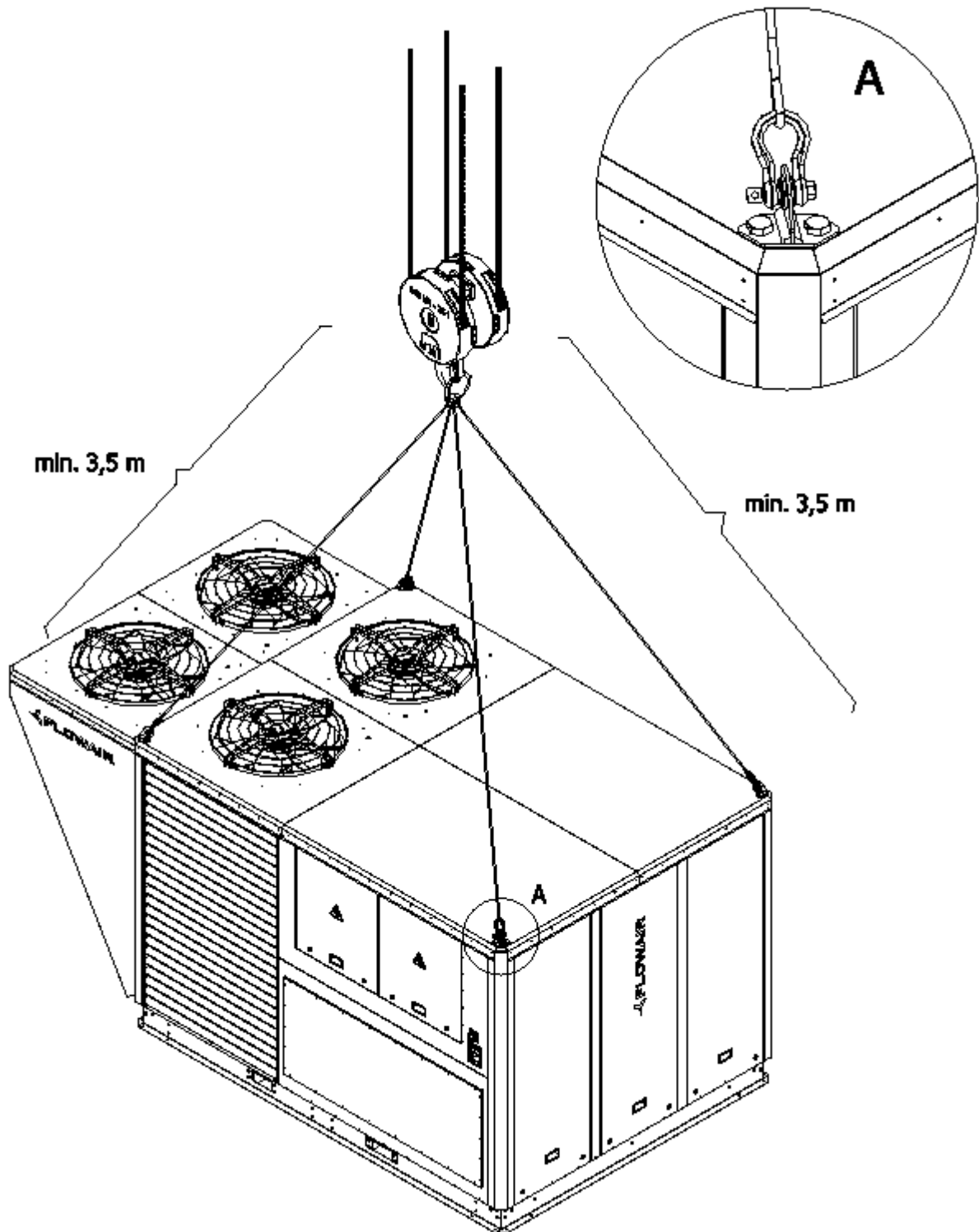
All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.



**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

#### 4.17. Lifting Cube 120/160

All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below. To attach the ropes to the integrated mounting brackets for devices using, 4 standard shackles with a culvert with a 16 mm diameter shank should be taken.

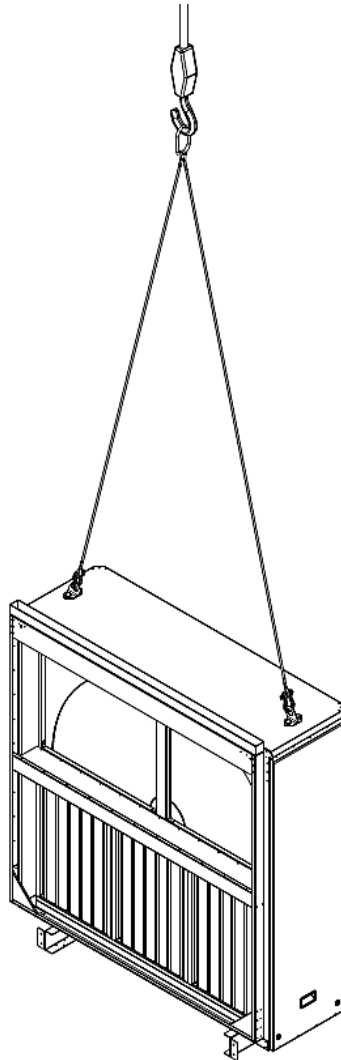


**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

**ATTENTION:** The Cube 120/160 cannot be raised with the heat recovery module attached. Installation of the heat recovery module to the Cube 120/160 device should be done on the roof, after mounting the Cube 120/160 device. Installation is carried out in accordance with the guidelines presented later in this manual.

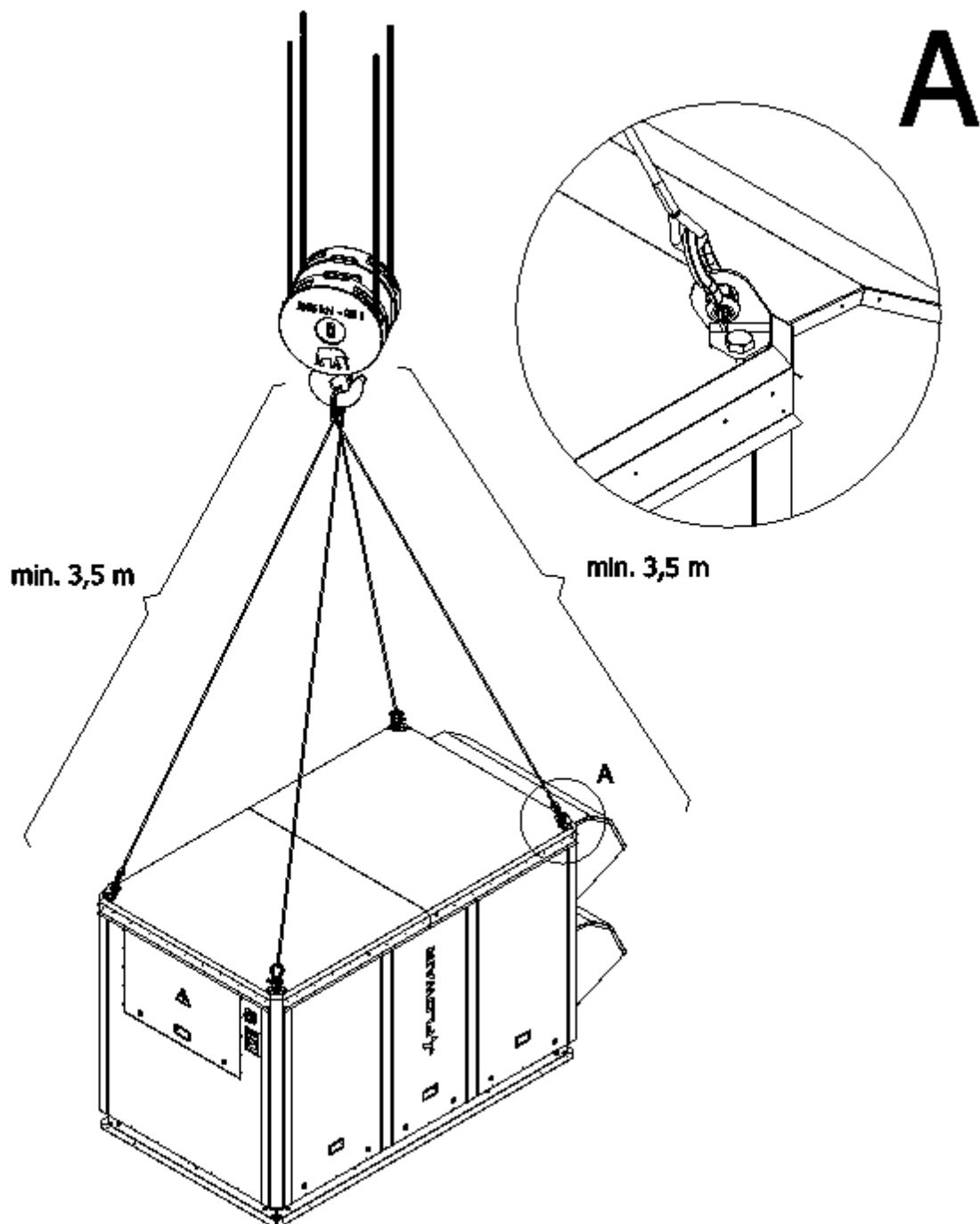
#### 4.18. Lifting the heat recovery module

Due to the size, the module containing the heat recovery exchanger must be transported disconnected from the device. The module is equipped with lifting eyes with ropes located in the upper part of the housing. No shackles are required to lift the heat recovery module.



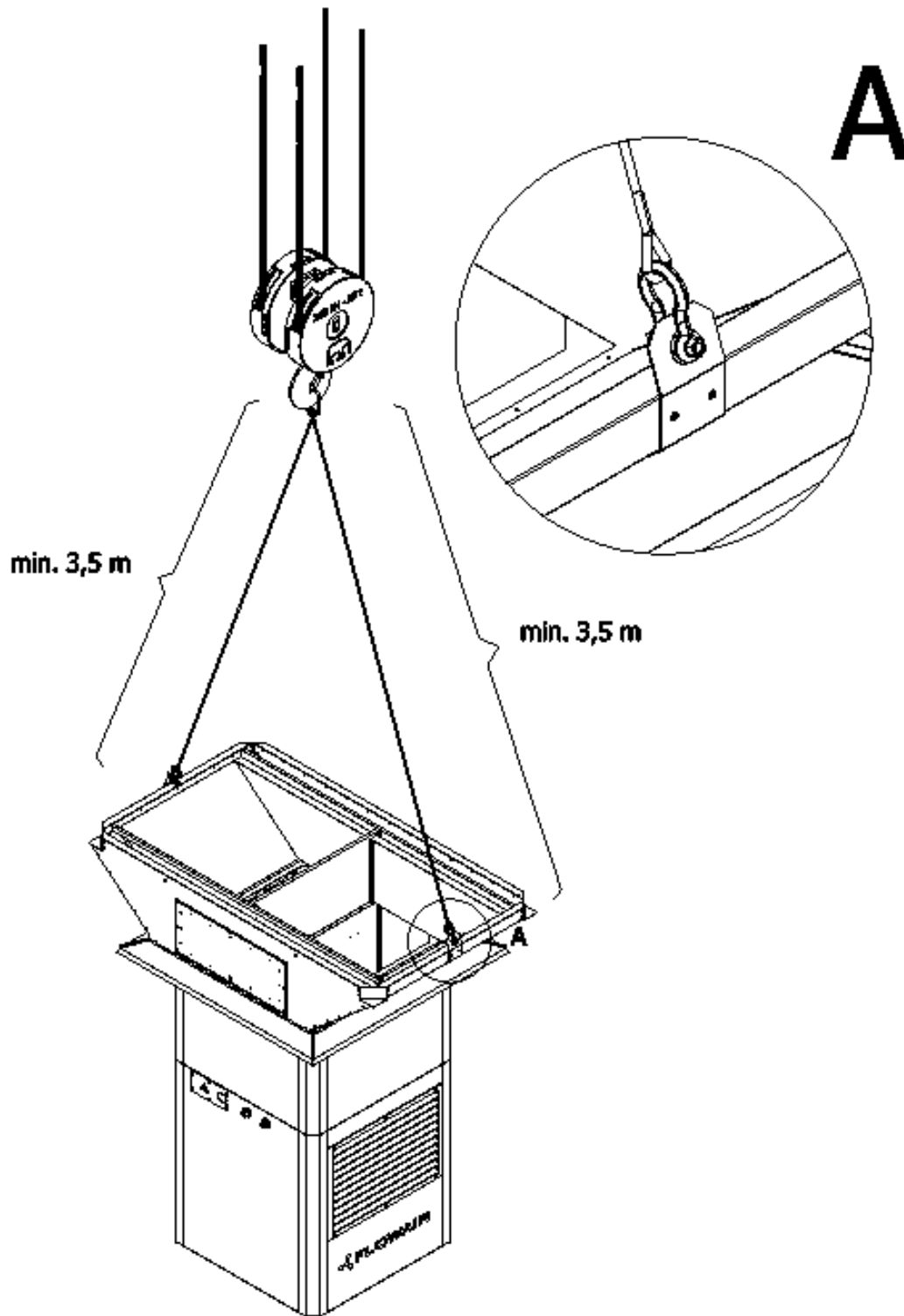
**ATTENTION:** The Cube units cannot be raised with the heat recovery module attached.

4.19. Lifting Cube R8



**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

#### 4.20. Lifting NWS module (Cube 20/R8)

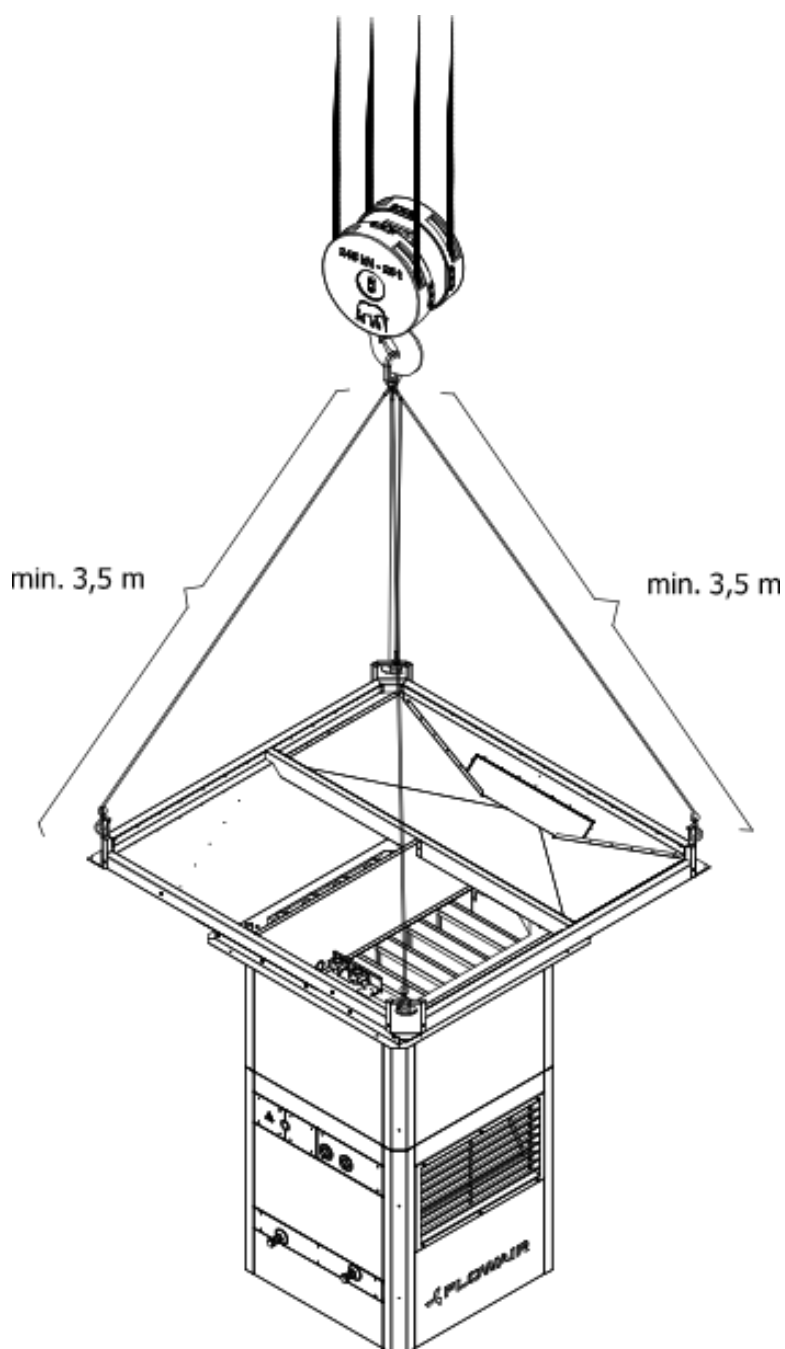


**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

**ATTENTION:** The polystyrene cover should not be removed before turning over NWS supply module.

**ATTENTION:** The NWS supply module is delivered to the place of delivery upside down. To position the device, carefully rotate the supply air module so as not to damage the casing. Use the polystyrene cover to protect the NWS supply module while turning.

#### 4.21. Lifting NWL module (Cube 40 NWL)



**ATTENTION:** Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this recommendation may result in damage to unit or even mounting breach.

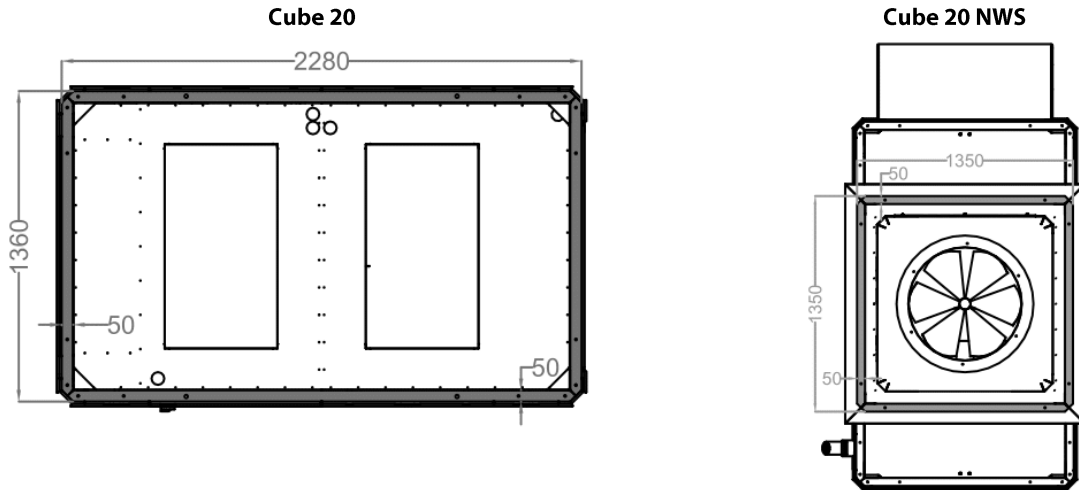
**ATTENTION:** The polystyrene cover should not be removed before turning over NWL supply module.

**ATTENTION:** The NWL supply module is delivered to the place of delivery upside down. To position the device, carefully rotate the supply air module so as not to damage the casing. Use the polystyrene cover to protect the NWL supply module while turning.

## 5. FOUNDATION

### 5.1. Foundation Cube 20 (NWS)

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.

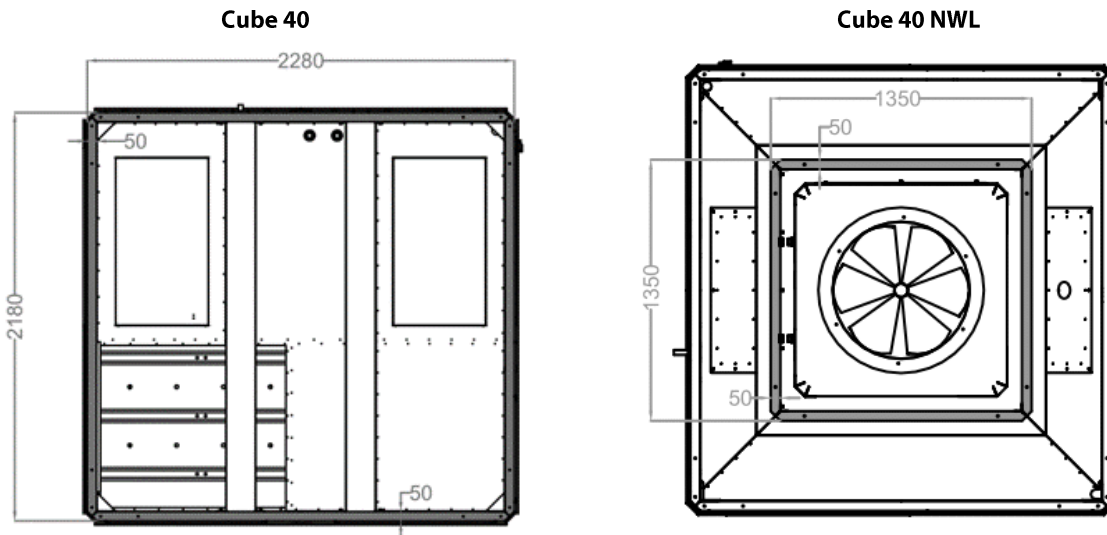


**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.

### 5.2. Foundation Cube 40 (NWL)

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.



**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

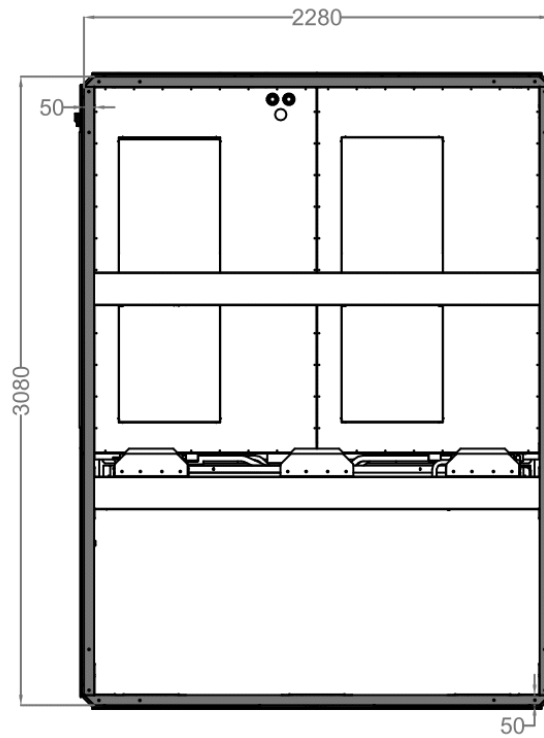
**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.



### 5.3. Foundation Cube 50/60

The unit is equipped with transport rail, which allows to use forklifts for transport, loading and unloading. When the unit is installed on site, a rail must be dismantled by unfastening 4 M8 screws situated near the rail from the electric box side and by pulling it out. Doing so will allow canals installation on the bottom of the unit.

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.



**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

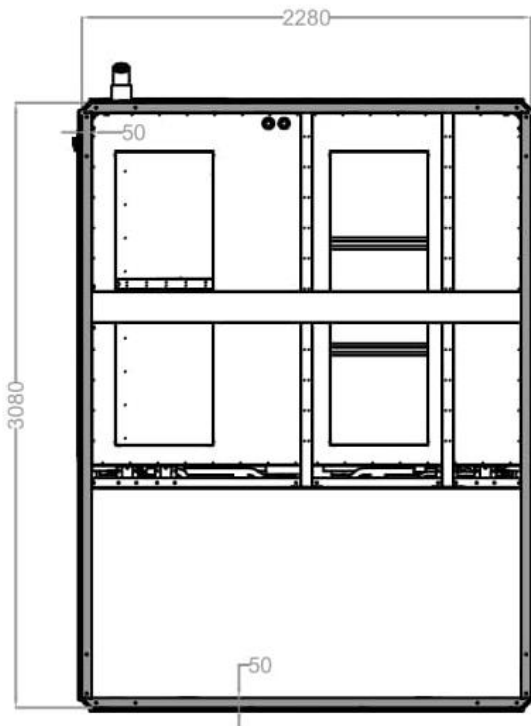
**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.

#### 5.4. Foundation Cube 80/100

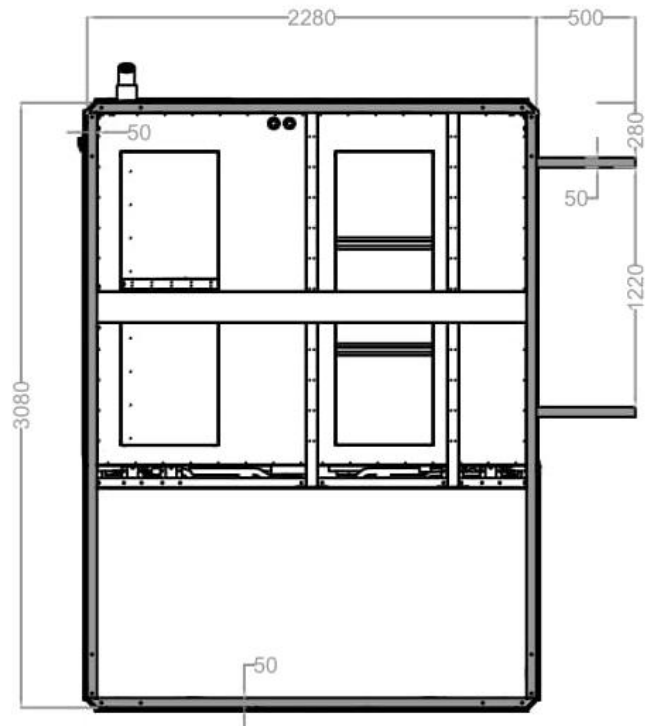
The unit is equipped with transport rail, which allows to use forklifts for transport, loading and unloading. When the unit is installed on site, a rail must be dismantled by unfastening 4 M8 screws situated near the rail from the electric box side and by pulling it out. Doing so will allow canals installation on the bottom of the unit.

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.

**Cube 80 / Cube 100**



**Cube 80 L / Cube 100 L**



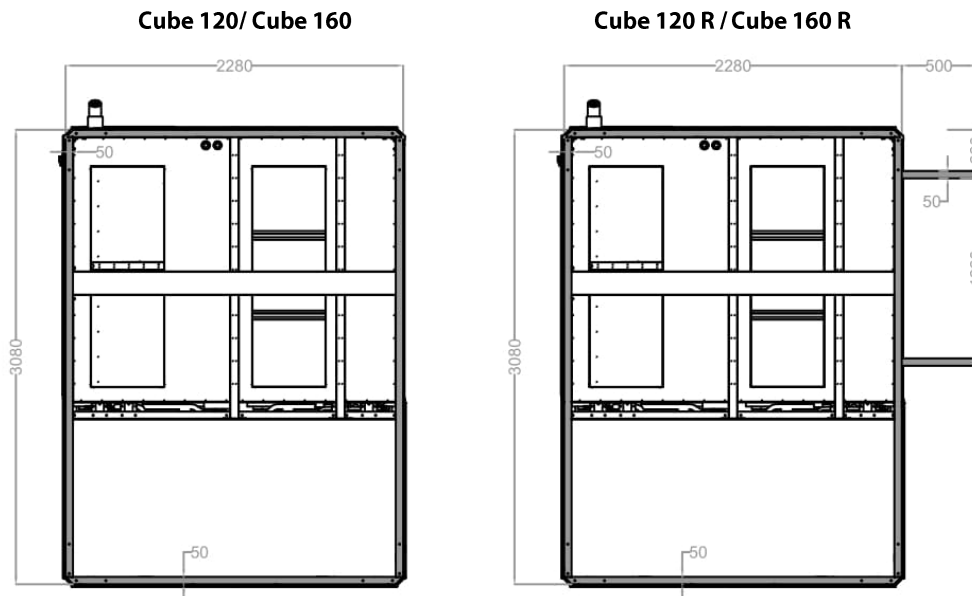
**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.

### 5.5. Foundation Cube 120/160

The unit is equipped with transport rail, which allows to use forklifts for transport, loading and unloading. When the unit is installed on site, a rail must be dismantled by unfastening 4 M8 screws situated near the rail from the electric box side and by pulling it out. Doing so will allow canals installation on the bottom of the unit.

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.

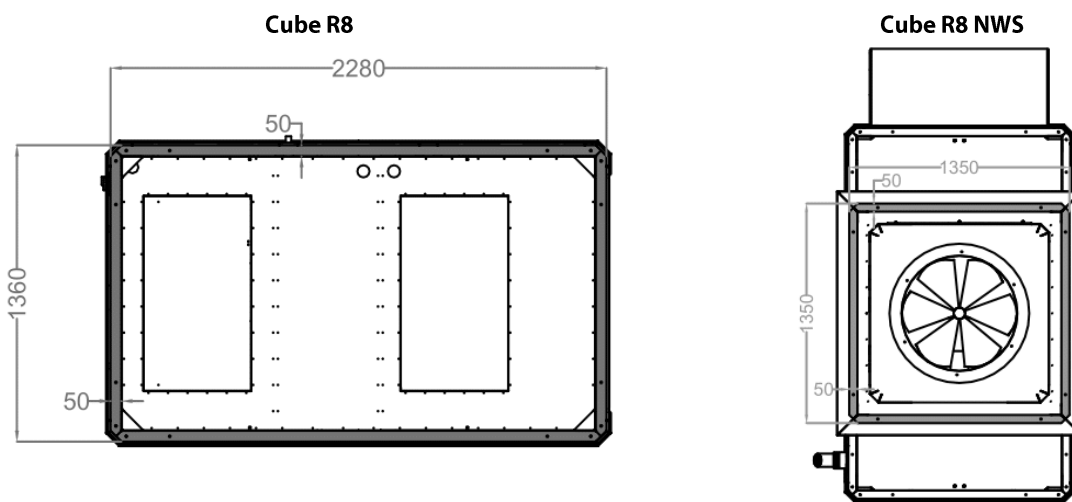


**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.

### 5.6. Posadowienie Cube R8 (NWS)

Cube units are built on self-supporting frame, which should be installed on brackets or frames connected to the roof, according to construction law in specific country and must be ousted from roof slope to a height determined by this law. The manufacturer determines unit's installation on the unit's contour in accordance with frame dimensions listed below. Installing on a supported frame on two longer sides of unit's frame.



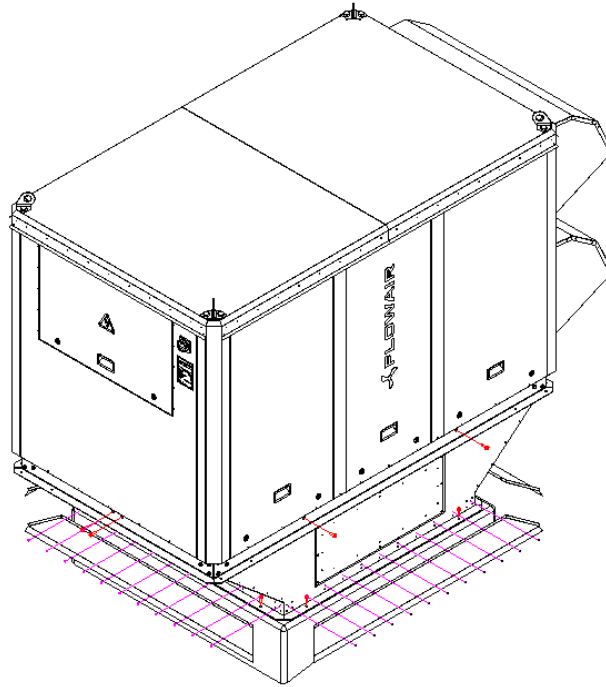
**ATTENTION:** Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.

**ATTENTION:** Install unit in such way that inlet and exhaust are not directed to windward.

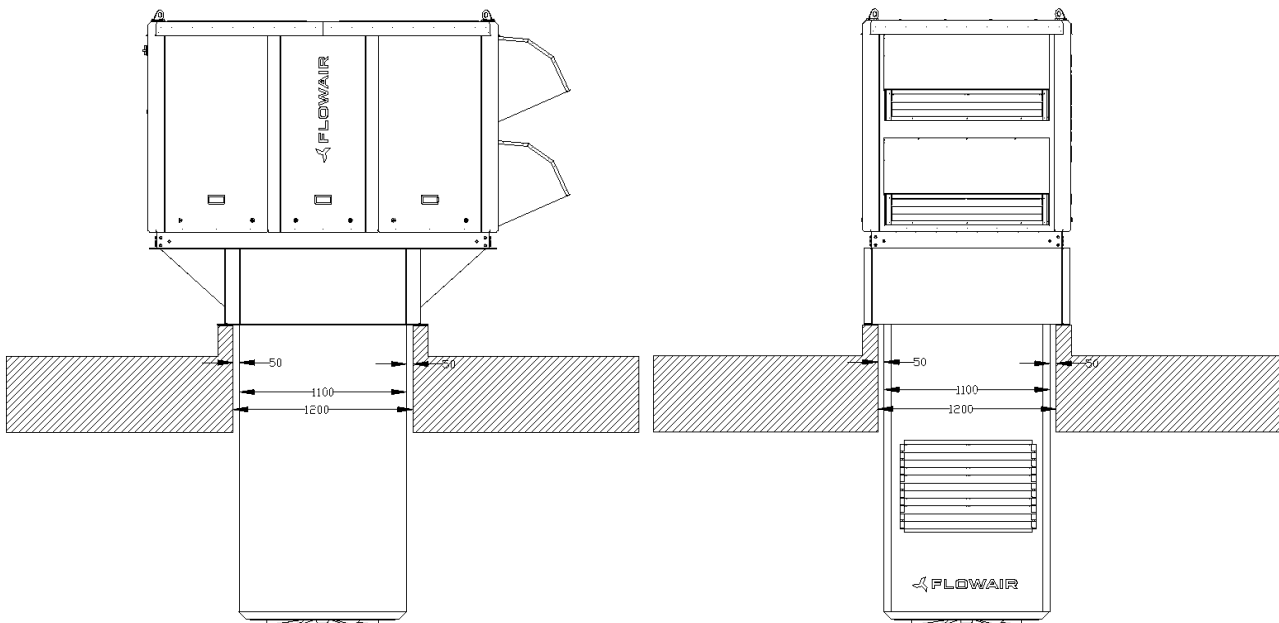
### 5.7. NWS instalation (Cube 20/R8 NWS)

For the Cube 20 / R8 NWS, as additional accessories there is a base that serves as a roof transition and an adapter for the swirl diffuser. The base supporting frame, under which the substructures shown in the drawing below should be designed.

**ATTENTION:** The Cube unit is attached to the base A using the assembly screws provided in the kit, in the places marked in the drawing below.

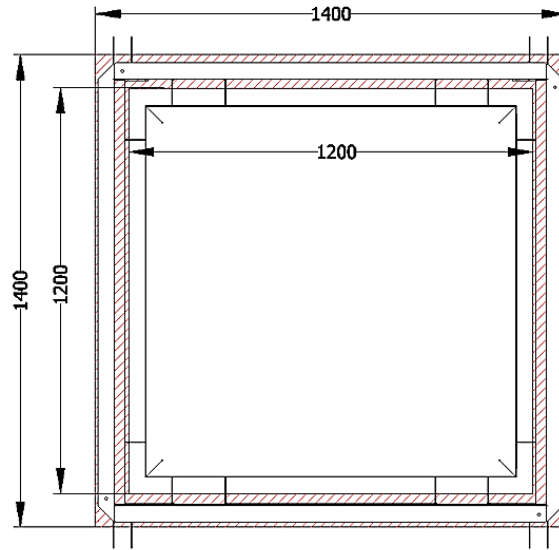


### 5.8. Roof crossing NWS (Cube 20/R8 NWS)

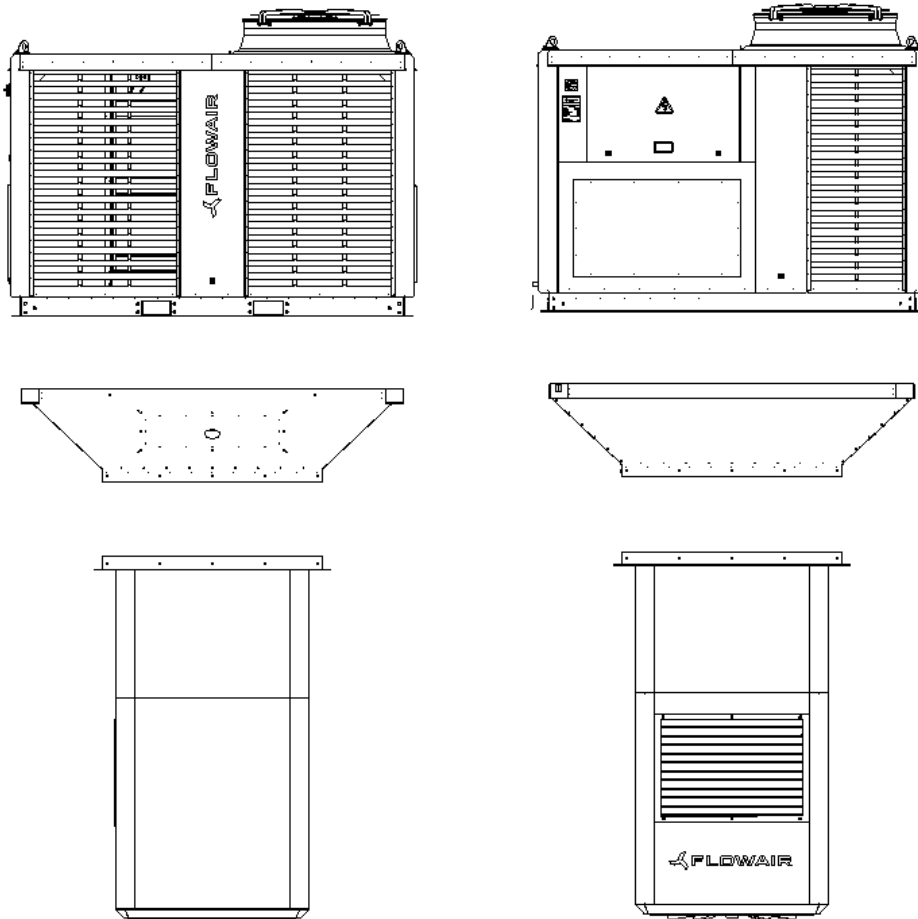


**ATTENTION:** Device should be attached to the frame in a way that prevents any movement. It is recommended to use rubber spacers between the device and the mounting frame.

A hole in the roof should be made in order to mount the roof base duct with the diffuser. The hole should be made in accordance with the guidelines contained in the drawing below.



### 5.9. NWL installation (Cube 40 NWL)

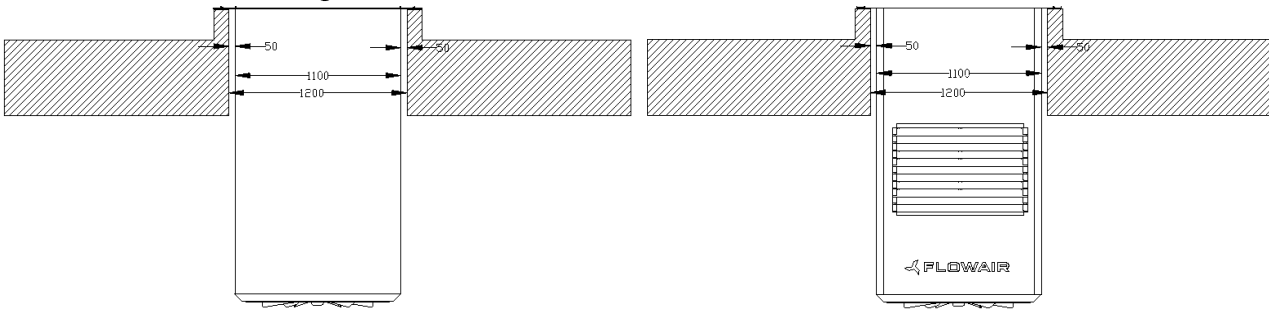


**ATTENTION:** Unit should be mounted to the frame in such way as to ensure no movement of unit. Using rubber pads between unit and frame is highly advisable.

**ATTENTION:** Install unit in such way that inlet and exhaust are not directed windward.

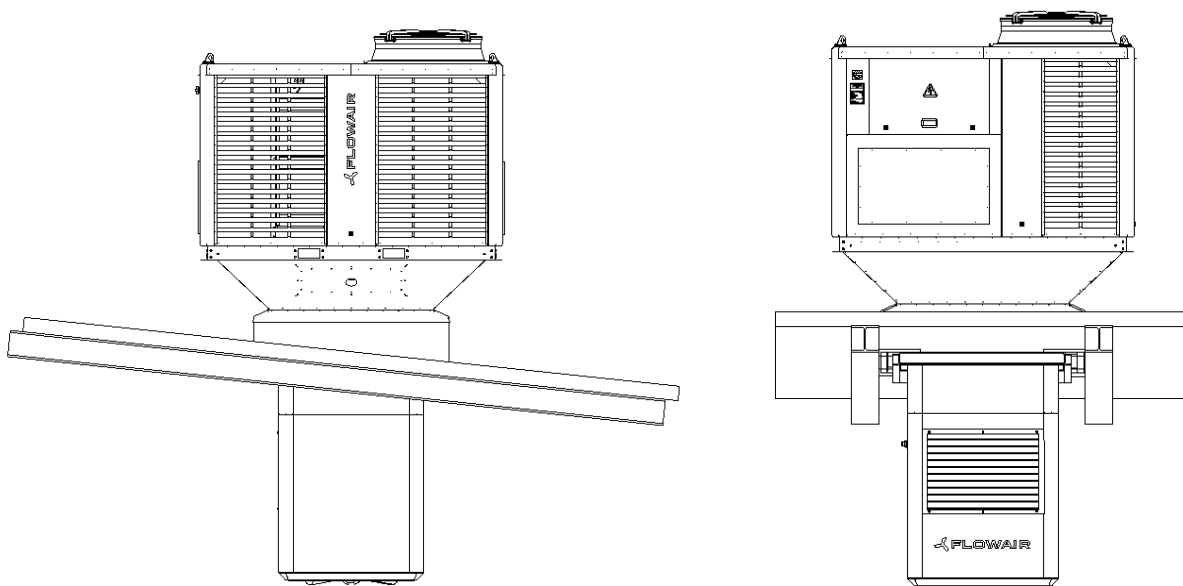
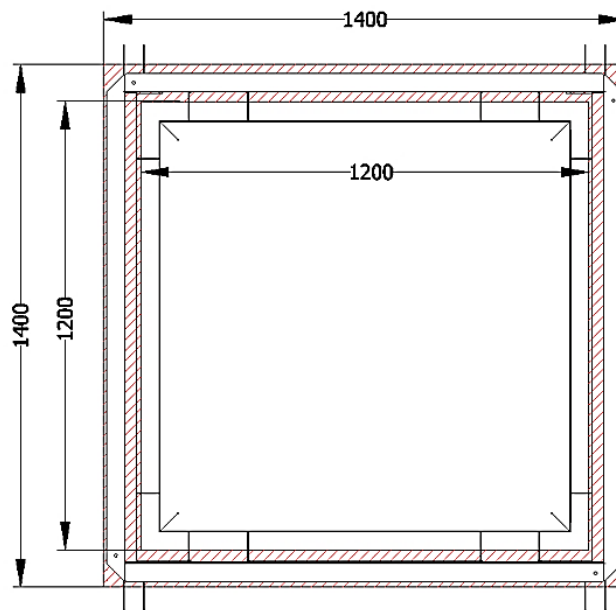
**ATTENTION:** Installation bolts are delivered inside Cube unit. The Cube unit must be attached to the base A with the supplied mounting bolts in the places as indicated in the figure below.

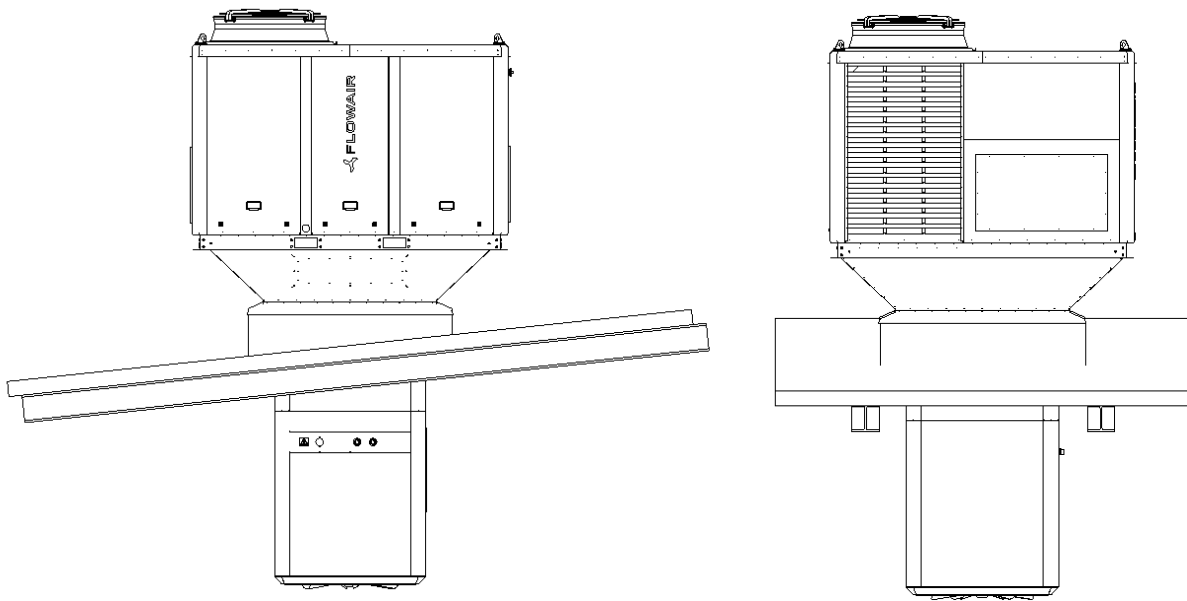
### 5.10. Roof crossing NWL (Cube 40 NWL)



**ATTENTION:** Device should be attached to the frame in a way that prevents any movement. It is recommended to use rubber spacers between the device and the mounting frame.

A hole in the roof should be made in order to mount the roof base duct with the diffuser. The hole should be made in accordance with the guidelines contained in the drawing below.





### 5.11. Ventilation channels connection - Cube 20

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube 20 (no gas heater)	900 x 500 (bottom connection)	900 x 500 (bottom connection)
Cube 20 (with gas heater)	900 x 500 (bottom connection)	900 x 500 (bottom connection)

**ATTENTION:** In units with gas heater inlet channel can be connected from the bottom only.

### 5.12. Ventilation channels connection - Cube 40

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube 40 (no gas heater)	900 x 500 (bottom or side connection)	900 x 500 (bottom or side connection)
Cube 40 (with gas heater)	900 x 500 (bottom connection)	900 x 500 (bottom or side connection)

Cube unit's ducts can be installed from the bottom of the unit. However there is possibility to prepare the unit for installing ducts from sides. If this was not defined during ordering procedure, user can change blanking panel position and choose installation method.

**ATTENTION:** In units with gas heater inlet channel can be connected from the bottom only.

### 5.13. Ventilation channels connection - Cube 50/60

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube 50 / Cube 60 (no gas heater)	1400 x 500 (bottom or side connection)	1400 x 500 (bottom connection)
Cube 50 / Cube 60 (with gas heater)	1400 x 500 (bottom connection)	1400 x 500 (bottom connection)

Cube unit's ducts can be installed from the bottom of the unit. However there is possibility to prepare the unit for installing ducts from sides. If this was not defined during the ordering procedure, user can change blanking panel position and choose duct connection place.

**ATTENTION:** In units with gas heater inlet channel can be connected from the bottom only.

### 5.14. Ventilation channels connection - Cube 80/100

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube 80 / Cube 100 (no gas heater)	1500 x 500 (bottom connection)	1500 x 500 (bottom connection)
Cube 80 / Cube 100 (with gas heater)	1500 x 500 (bottom connection)	1500 x 500 (bottom connection)

Cube unit's ducts can be installed from the bottom of the unit. However, there is possibility to prepare the unit for installing ducts from sides. If this was not defined during the ordering procedure, user can change blanking panel position and choose duct connection place.

**ATTENTION:** In units with gas heater inlet channel can be connected from the bottom only.

### 5.15. Ventilation channels connection - Cube 120/160

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube 120 / 160 (no gas heater)	1600 x 650 (bottom or side connection)	1600 x 500 (bottom connection)
Cube 120 / 160 (with gas heater)	1600 x 650 (bottom connection)	1600 x 500 (bottom connection)

Cube unit's ducts can be installed from the bottom of the unit. However, there is possibility to prepare the unit for installing ducts from sides. If this was not defined during the ordering procedure, user can change blanking panel position and choose duct connection place.

**ATTENTION:** In units with gas heater inlet channel can be connected from the bottom only.



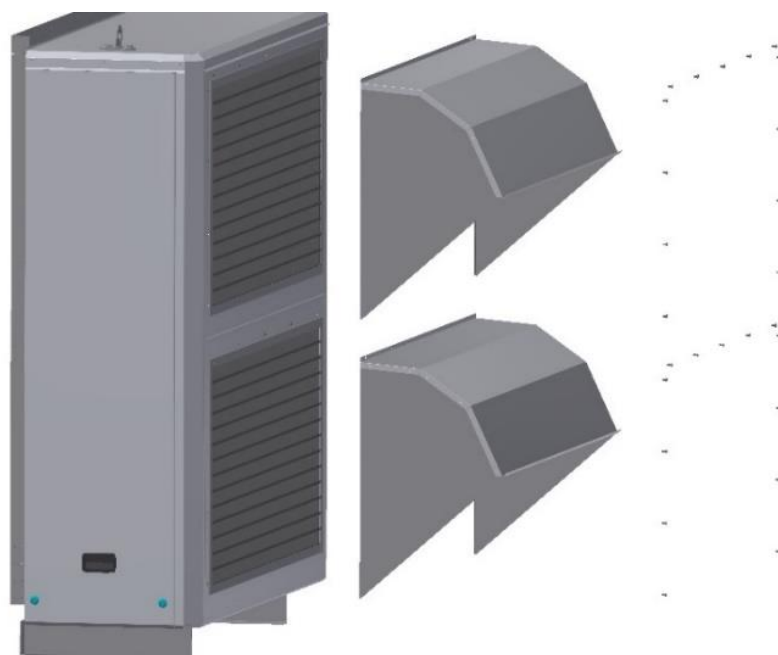
### 5.16. Ventilation channels connection - Cube R8

Delivered unit is equipped with mounting plate (flange) with the dimension of connecting duct. Connecting ducts to the unit should be done with use of flanges by mounting a frame on them, or installing directly where frame is used as a connector for unit and duct.

Unit	Inlet channel [mm]	Exhaust channel [mm]
Cube R8	900 x 500 (bottom connection)	900 x 500 (bottom connection)

### 5.17. Inlet and exhaust covers installation (not applicable to the Cube 40 unit)

Covers for Inlet and outlet channels prevent mixing of ventilation air mixing and protect against rain or snow getting into the unit. The covers are delivered inside the unit under the panels on inspection side. This is also the place where screws are located. See below drawings and install the covers properly.

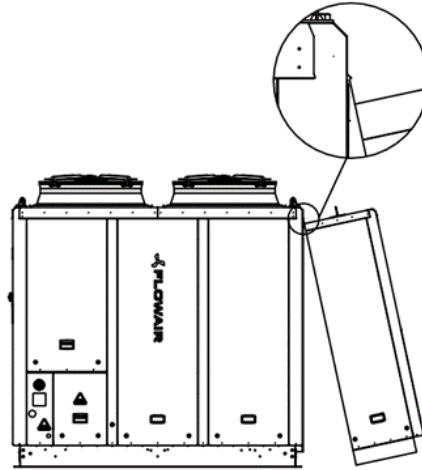


**ATTENTION:** The covers should be connected with blind rivets.

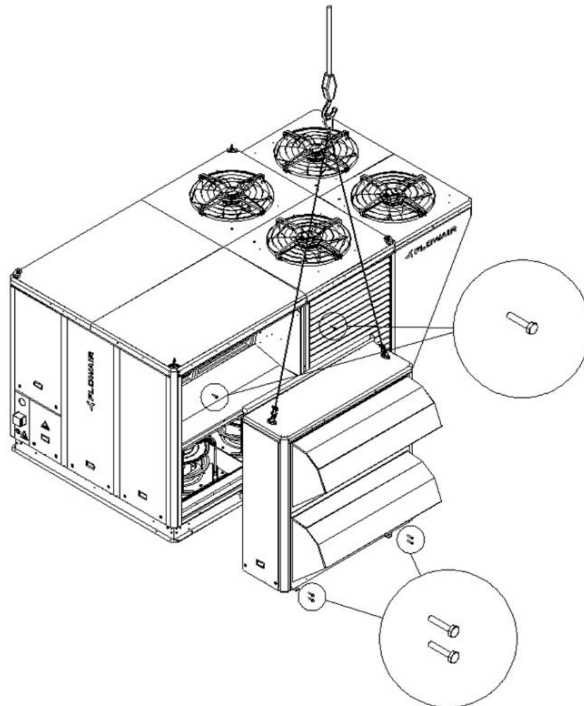
### 5.18. Heat recovery unit installation (Cube 80/100 L; Cube 120/160 R)

For Cube 80/100 L and Cube 120/160 R units, a rotational heat recovery exchanger is delivered as a separate module. Installation is based on horizontal connection of the heat recovery module to the device, the upper part of the heat recovery module should be slid under the edge of the device's roof (1). Installation is done by means of four provided M8 screws. The bottom part of the module frame should be tightened to the unit's frame with two M8 screws on each side of the frame. The upper nodes should be screwed with single bolts and the access from the inspection side is available when the door panel of the heat recovery module is removed and on the opposite side through the inspection hole specially prepared for this purpose (2). The entire load of the rotor shall rest on the ropes attached to the crane until all screws are fastened. Previous removal of the load may result in damage to the device and/or breaking of the bolts. It is unacceptable to assemble the module together with the device prior to transporting the whole device to the roof on site. It's important to note that The screws transfer only the static load of the heat recovery module.

1.



2.



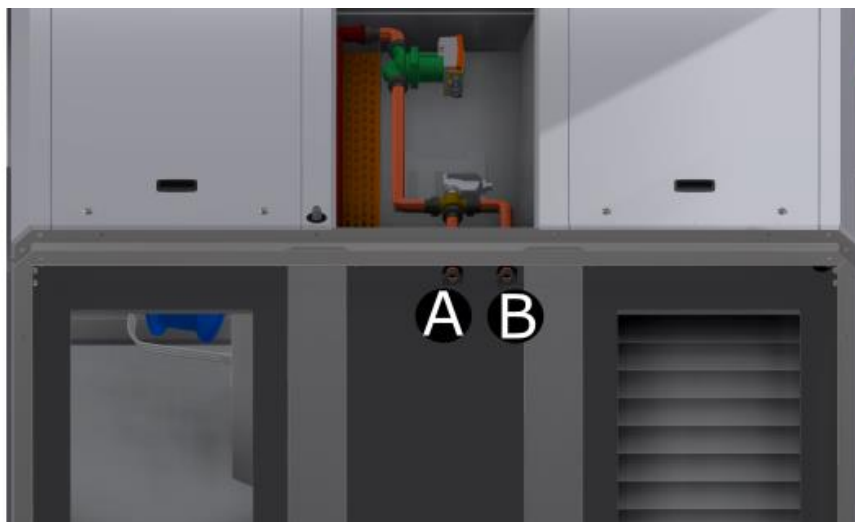
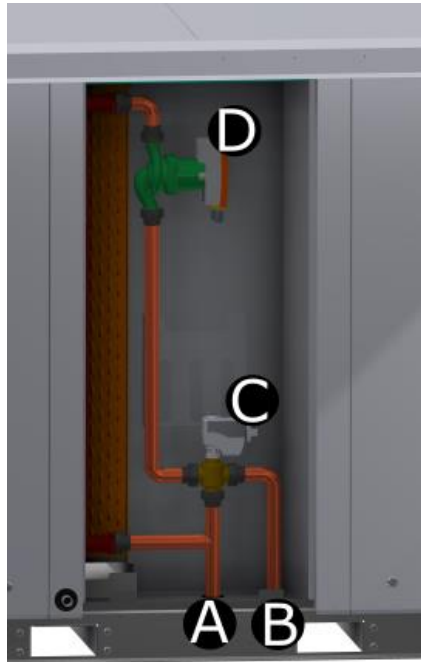
**ATTENTION:** Be sure to route the power cord from the heat recovery module to the unit.

**ATTENTION:** The Cube units cannot be raised with the heat recovery module attached.

## 6. INSTALLATION

### 6.1. Hydraulic connection - units for duct installations

Cube devices in configuration with a water supplied heat exchanger in the roof section are equipped with fittings built into the device. The fittings include a system with a three-way mixing valve, a circulation pump and a water exchanger's heater anti-freeze sensor. Such a system means that it is not required to take the pressure drops into account in the hydraulic systems inside the device, as they are covered by the circulation pump.

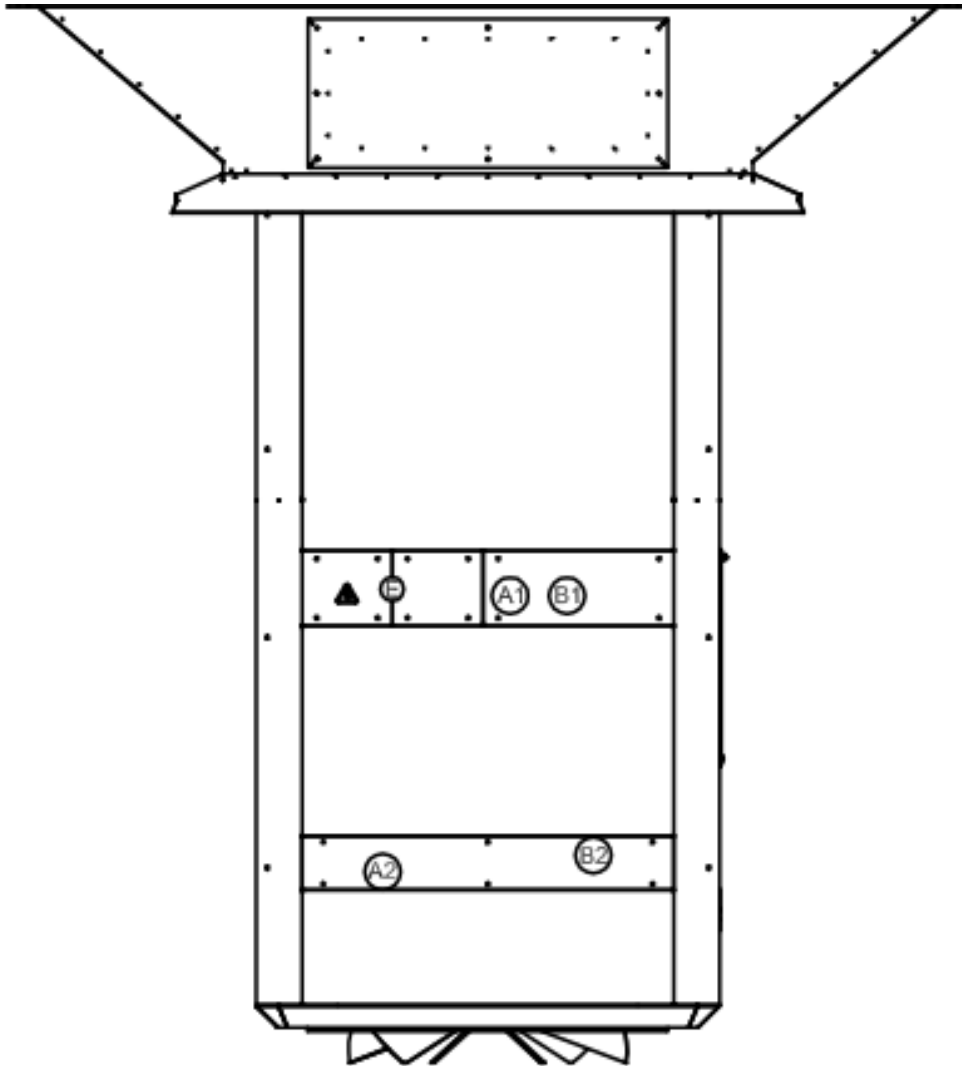


Built-in hydraulic system description	
A	Water heat exchanger return connection
B	Connection supplying water heat exchanger with heating medium
C	3-way valve with actuator 0-10V
D	Circulation pump (not applicable to the units with water heat exchanger in NWS/NWL supply module)

**ATTENTION:** A water filter must be installed. It is required to protect the hydraulic system.

## 6.2. Hydraulic connection - units for ductless installations

Cube units with a water supplied heat exchanger are equipped with a built-in set of hydraulic fittings. They consist of a 3-way mixing valve and an anti-freeze sensor for the water heat exchanger. When placing the Cube on the NW base, connect the flexible pipe stubs to the connection points in the device using the inspection flap as shown in the figure below:

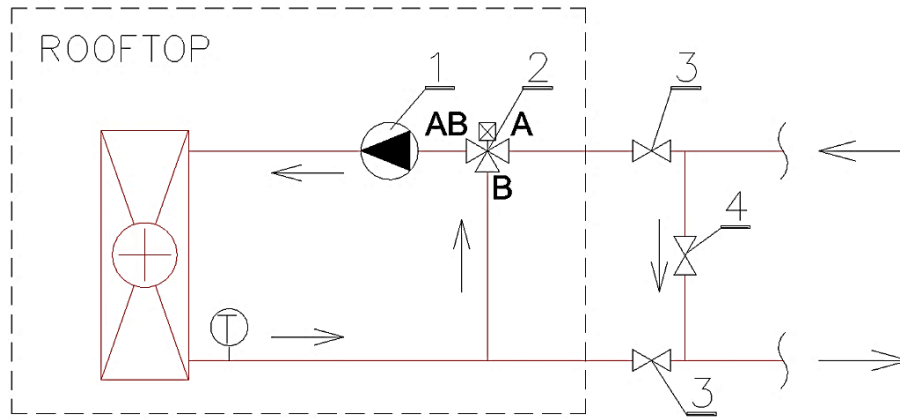


Description of the built-in hydraulic system	
A1	Water heat exchanger's return connection in the section above the roof
B1	Connection supplying water heat exchanger in the section above the roof
A2	Water heat exchanger return connection in the NWS/NWL supply module
B2	Connection supplying water heat exchanger in the NWS/NWL supply module

**ATTENTION:** A water filter must be installed. It is required to protect the hydraulic system.

**ATTENTION:** For units with a supply module (NWS-W; NWL-W) equipped with a water supplied heat exchanger located in the air supply module, the 3-way valve is delivered in the control cabinet and must be installed on the hydraulic system supplying the device.

### 6.3. Hydraulic hub chart



- 1- Mixing circuit pump (delivered with each Cube W)
- 2- Mixing 3-way valve (delivered with each Cube W)
- 3- Cut-off valve
- 4- Control valve

**ATTENTION:** For units with a supply module (NWS-W; NWL-W) equipped with a water heat exchanger located in the supply air module built-in circulation pump is not supplied.

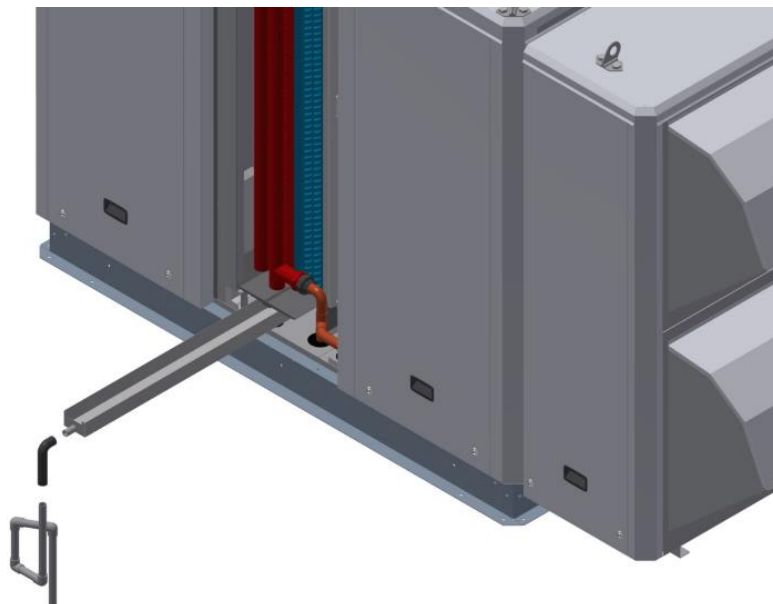
**ATTENTION:** For units with a supply module (NWS-W; NWL-W) equipped with a water heat exchanger located in the supply air module, the 3-way valve is delivered in the control cabinet and must be installed on the hydraulic system supplying the device.

**ATTENTION:** For units dedicated for duct installation to avoid water exchanger damage caused by freezing, if electrical power is not available, glycol must be used as a refrigerant.

**ATTENTION:** For Cube units equipped with a water heat exchanger located in the NWS/NWL supply module, the use of glycol is not required. Units with the NWS / NWL module are equipped with a passive frost protection system when the heater is installed in the supply air module and with an active and passive frost protection system when the heater is installed in the section above the roof.

### 6.4. Condensation drain

Cube units are equipped with plate exchangers, acting as water supplied heat exchanger and compressor system's evaporator/condenser. Condensate precipitation is possible. Please ensure proper drainage of excess condensate to the plant's plumbing installation according to picture below:



**ATTENTION:** Remember to periodically check the water level in the siphon.

**ATTENTION:** It is necessary to install the condensate drainage on your own if it is needed.

## 6.5. Electric connection

Before installing the unit make sure that the system is disconnected from power supply. Units should be powered with power cords of proper diameter resulting from the length, method of routing and unit's rated power.

Unit's power cord routing is indicated on pictures with unit's dimensions (point 3.17 – 3.27).

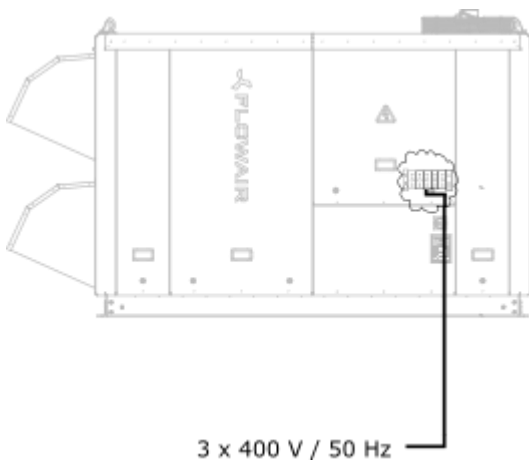
In the Cube 20 / Cube 40 / Cube R8 devices, the place of electrical connection are the ZUG terminals under the automation cabinet cover on the right side (1).

In the Cube 50 – 160 device, the place of electrical connection are the ZUG terminals in the cooling section (2).

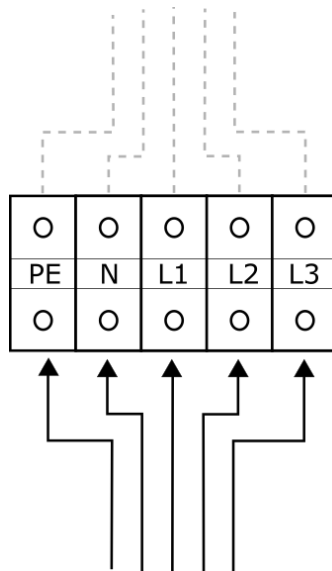
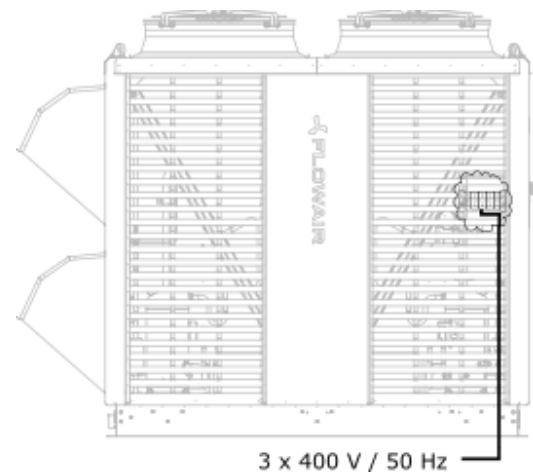
The power chord of the device should be routed into the device through the exhaust chamber to the automation cabinet (1) / cooling section (2) as shown in the figures below.

The ZUG terminals on the vertical bus are marked: L1, L2, L3, N and PE. After connecting and switching on the device using the service switch on the device housing, check the phase sequence on the integrated controller (RED LED / NO SIGNALING - WRONG PHASE ORDER). Incorrect phase sequence prevents the device from being switched on.

1.



2.



**ATTENTION:** All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.

**ATTENTION:** Remember to ground the unit and to use lightning rod to secure the unit.

**ATTENTION:** Copper cable must be used.

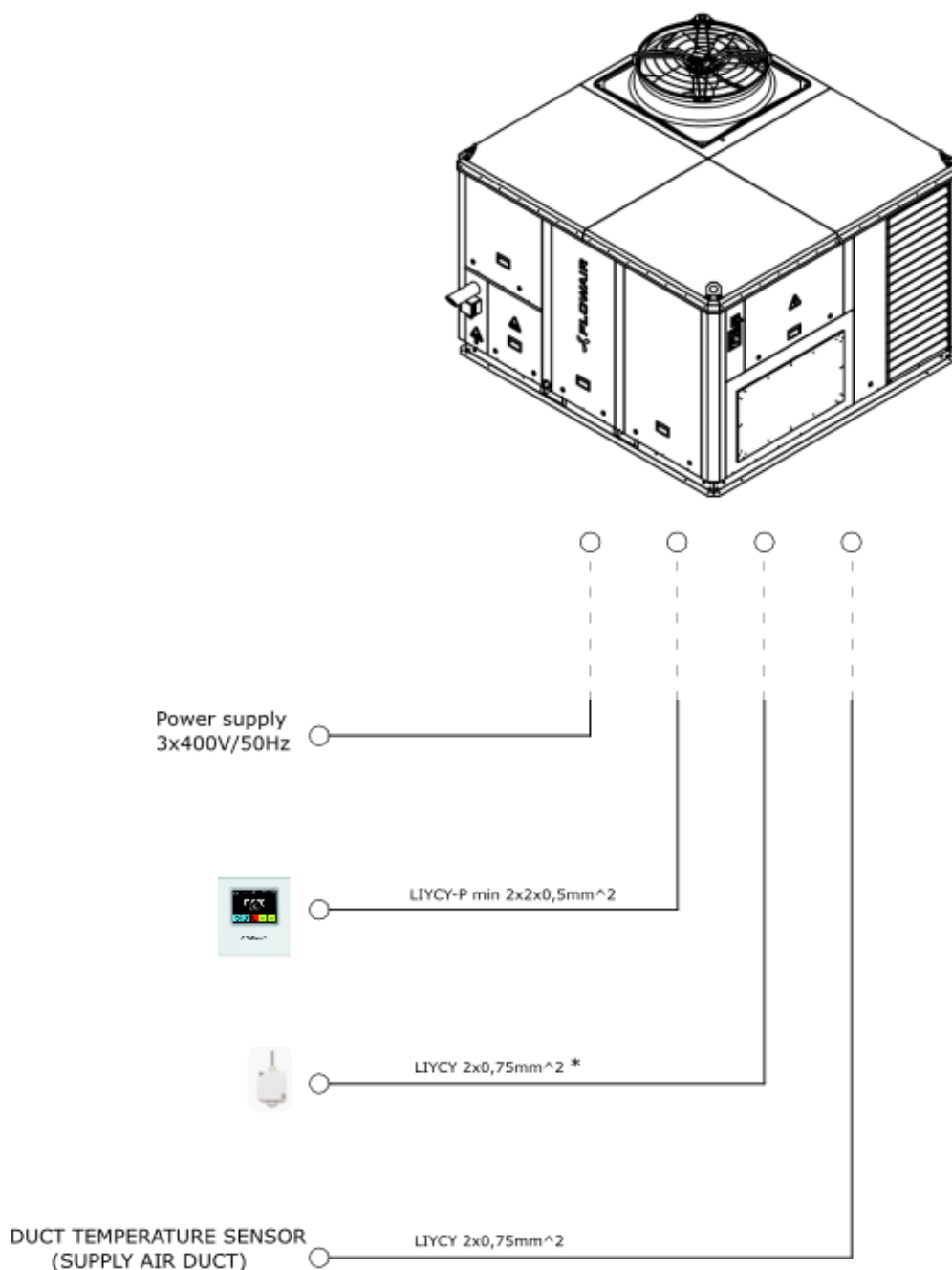
**ATTENTION:** Unit's power cord routing is indicated on pictures with unit's dimensions.

## 6.6. Installation flow chart

The controller in the device allows you to connect the Tbox controls, which allows the user to change the operating parameters of the device from the room.

Climatix controller, present in every Cube unit can be connected to the Internet. By connecting to the Internet, user can change operation parameters directly from web browser. W sprawie uzyskania takiego dostępu prosimy o kontakt z autoryzowanym serwisem.

Before the first start-up of the device, connect the power supply in accordance with the guidelines in point 6.5. of this documentation. Lead the communication cable of the control system (T-box), the duct air supply temperature sensor cable and optionally, the room temperature sensor cable to the control cabinet.



\* **ATTENTION:** Power cord cross-section should be selected by a designer based on its length and maximum current flow specified in technical data chart and should be selected individually for each unit.

\* **ATTENTION:** NTC temperature sensor, allowing measurement directly in operation area is available on request.

## 7. START-UP AND EXPLOITATION

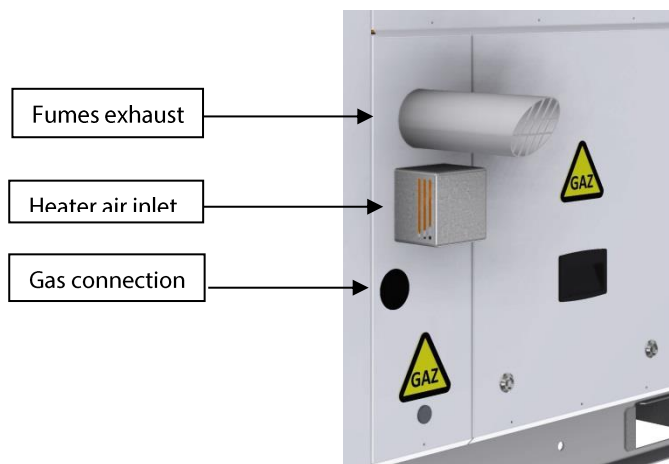
### 7.1. Electric heater

When using electric heater unit please check if each electric wire is connected properly. Electric heater is equipped with thermostat with temperature set option and separate temperature limiting system. When requested temperature is reached, thermostat will switch off the current, and switch it on again after heater is cooled. When the temperature limit is exceeded, to start system again, temperature limit system reset is necessary. Please remember to switch off the unit when resetting system. Heater proper working is determined by service staff during first launch, and also during maintenance checks.

### 7.2. Gas heater

Before switching on the heater check:

- air duct to burning chamber and smoke outlet duct are unobstructed,
- gas pipes are vented,
- power system and all controlling and securing devices are installed properly,
- heater is set for proper gas type (nozzle diameter),
- in the case of using gas other than GZ-50 / E or propane / propane-butane, it is necessary to inform the service department in advance in order to equip employees with adequate nozzles,
- gas pressure in heater is correct.



**ATTENTION:** Gas connection to device can be conducted only by qualified staff with proper attestations.

**ATTENTION:** A shut-off valve must be installed with every unit. Valve must be easily reachable. It is recommended to install strainer to every unit. Using strainers secures inner gas fitting against pollution and allows quick vent without installation dismantling (which is essential during first launch).

**ATTENTION:** First launch must be conducted by authorized service staff.



### **7.3. Water heat exchanger**

Unit equipped with fan heater and fitting set, including 3-way mixing valve and circuit pump. System is secured by temperature sensor mounted in exhaust duct. Connecting valve with circuit pump can be done only by authorized service. Please make sure that installation is filled, sealed and vented. After launching please check valve and circuit pump. At the end please check inlet temperature with requested temperature.

**ATTENTION: To protect the components of the Cube units, filling of the water systems is required all year round.**

**ATTENTION:** Cube units are equipped with anti-frost system which forces refrigerant flow through water exchanger after reaching critical temperature. This system is operational even when the unit is switched off.

**ATTENTION: To avoid water exchanger damage caused by freezing, if electrical power is not available, glycol must be used as a refrigerant.**

**ATTENTION:** For Cube units equipped with a water heat exchanger located in the NWS/NWL supply module, the use of glycol is not required. Units with the NWS / NWL module are equipped with a passive frost protection system when the heater is installed in the supply air module and with an active and passive frost protection system when the heater is installed in a rooftop unit.

### **7.4. Water cooler**

In case of water cooler, the procedure is similar to fan heater. Water cooler installed by qualified staff needs checks by controlling requested temperatures. Proper cooler working depends on proper cooling system work.

### **7.5. Rotational exchanger**

If unit is equipped with rotational exchanger, please check it by setting different outlet temperatures together with condenser system.

### **7.6. Fans**

All fans in units are pre-installed and do not need control. Because of inner electronic switched fan construction a check is done by determining fan's proper rotation and proper air flow. Such fans are not equipped with drive belts or inverters, what makes check during launch impossible.

### **7.7. Filter replacment**

It is recommended to change the filters used in the Cube units at least twice a year or in case of serious air pollution – more frequent. Filters are secured against pressure drop with differential pressure switch. In case of excessive pressure drop, an alarm message on controller is displayed suggesting filter change. Before first launch please check, if filters are installed properly and there are no alarm messages. When message suggests filter change, but in fact they do not need to be changed, please check pressure loss parameter on pressure switch, which is situated inside center post or electric post. To change filters please remove side panel and pull out filter cases. Please contact the manufacturer to purchase additional filters.

### **7.8. Dampers**

Unit's launching procedure requires proper work of recirculation, shut off, or by-pass damper if installed. Please check if damper is working freely by pressing actuator switch which will release it from interlocking and checking manual force needed to open the damper. It should rotate freely with no resistance. Next checks involve examining working damper with requested parameters.

### **7.9. Automation control systems**

Cube units are equipped with Climatix control system. First launch is conducted by qualified manufacturer's staff that checks proper configuration and connections depending on model. In case of improper working of control system please contact manufacturer's service.

### **7.10. SERVICE AND WARRANTY**

**Please contact your dealer in order to get acquitted with the warranty terms and its limitation.**

In the case of any irregularities in the device operation, please contact the manufacturer's service department.

**The manufacturer bears no responsibility for operating the device in a manner inconsistent with its purpose, by persons not authorised for this, and for damage resulting from this!**

**Made in Poland  
Made in EU**

**Manufacturer: FLOWAIR GŁOGOWSKI I BRZEZIŃSKI SP.J.**

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### FLOWAIR CUBE operating limits

	Cube R8	Cube 20	Cube 40	Cube 50	Cube 60	Cube 80	Cube 100	Cube 120	Cube 160
Max. ambient temp. for operating compressor: cooling mode for standard supply air parameters <sup>(1)</sup>	-	43°C	45°C	49°C	47°C	47°C	44°C	49°C	47°C
Min. ambient temp. for operating compressor: cooling mode	-	3°C	3°C	3°C	3°C	3°C	3°C	3°C	3°C
Max. ambient temp. for operating compressor: heating mode (Cube HP)	-	15°C	15°C	15°C	15°C	15°C	15°C	15°C	15°C
Min. ambient temp. for operating compressor: heating mode (Cube HP)	-	-12°C	-12°C	-12°C	-12°C	-12°C	-12°C	-12°C	-12°C
Min. temp. fresh air reaching the recovery exchanger	-30°C	-30°C	-30°C	-30°C	-30°C	-30°C	-30°C	-30°C	-30°C
Min. ambient temp. <sup>(2)</sup>	-45°C	-45°C	-45°C	-45°C	-45°C	-45°C	-45°C	-45°C	-45°C
Max. ambient temp. while compressor is OFF and heat recovery is ON	50°C	50°C	50°C	50°C	50°C	50°C	50°C	50°C	50°C
Max. fresh air temp. while compressor is OFF and heat recovery is OFF	40°C	40°C	40°C	40°C	40°C	40°C	40°C	40°C	40°C
Max. fresh exhaust air temperature	40°C	40°C	40°C	40°C	40°C	40°C	40°C	40°C	40°C
Max. temp. supplying factor's water heat exchanger (Cube W)	130°C (10 bar) 110°C (16 bar)								
The heat exchanger tubes are made of copper. The feed medium should not cause corrosion of this material (Cube W)	Content of impurities: free of sediments/particles Total hardness: [Ca <sup>2+</sup> , Mg <sup>2+</sup> ]/[HCO <sub>3</sub> <sup>-</sup> ] > 0.5 Oil and grease: <1 mg/l Oxygen: <0.1mg/l HCO <sub>3</sub> <sup>-</sup> : 60-300 mg/l Ammonium: < 1.0 mg/l Sulphide: < 0.05 mg/l Chloride, Cl: <100 mg/l								

(1) Inlet temperature .27°C dry thermometer/19°C wet thermometer

(2) Required: equipping the device with a heating package, power supply continuity

## Declaration Of Conformity

**FLOWAIR Głogowski i Brzeziński Sp.J.**  
ul. Chwaszczyńska 135, 81-571 Gdynia

hereby confirms that units:

product: **rooftop**

type: **Cube 20, Cube 40, Cube 50, Cube 60, Cube 80, Cube 100, Cube 120, Cube 160, Cube R8 (RM), Cube R21**

options: **all options configurations including heaters (N/W/E/G), heat pump (HP), heat recovery (R/B/X), supply modules (NW/NWS/NWL) and others**

were produced in accordance to the following Europeans Directives:

<b>2006/42/EC</b>	<b>MD</b> - Machinery
<b>2014/30/UE</b>	<b>EMC</b> - Electromagnetic Compatibility (EMC)
<b>2014/35/UE</b>	<b>LVD</b> - Low voltage
<b>2009/125/EC</b> wg 2281/2016	<b>ErP</b> - Air heating products, cooling products
<b>2009/125/EC</b> wg 1253/2014	<b>ErP</b> - Ventilation units (Ecodesign)
<b>2009/125/EC</b> wg 327/2011	<b>ErP</b> - Fans
<b>2009/142/EC</b>	<b>GAD</b> - Units Burning gaseous fuels

and devices equipped with cooling cycle that includes R410a refrigerant qualifield to group 2 comply with:

<b>2014/68/UE</b>	<b>PED</b> - Pressure devices
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The following devices covered by this declaration, in accordance with Directive 2014/68 / EU, have been qualified:

- **Cube 20, Cube 20HP, Cube 40, Cube 40HP** to category I and are subject to conformity assessment according to module A,
- **Cube 50, Cube 50HP, Cube 60, Cube 60HP, Cube 80, Cube 80HP, Cube 100, Cube 100HP, Cube 120, Cube 120HP, Cube 160, Cube 160HP** to category II and are subject to conformity assessment according to module A2.

and harmonized norms, with above directives:

<b>PN-EN 378-1</b>	Cooling systems and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and selection criteria
<b>PN-EN 378-2</b>	Cooling systems and heat pumps - Safety and environmental requirements - Part 2: Design, execution, checking, marking and documentation
<b>PN-EN 378-3</b>	Cooling systems and heat pumps - Safety and environmental requirements - Part 3: Location and personal protection
<b>PN-EN 378-4</b>	Cooling systems and heat pumps - Safety and environmental requirements - Part 4: Operation, maintenance, repair and recovery
<b>PN-EN 60335-2-40</b>	Household and similar electrical appliances - Safety - Part 2-40: Particular requirements for electric heat pumps, air conditioners and dehumidifiers
<b>PN-EN 60335-1</b>	Household and similar electrical appliances - Safety - Part 1: General requirements
<b>PN-EN 60529</b>	Degree of protection provided by enclosures (IP code)
<b>PN-EN ISO 12100</b>	Machine Safety - General Principles of Design - Risk Assessment and Risk Reduction
<b>PN-EN 55014-1</b>	Electromagnetic compatibility - Requirements for consumer products, electrical tools and similar equipment - Part 1: Emissions
<b>PN-EN 55014-2</b>	Electromagnetic Compatibility (EMC) - Requirements for consumer devices, electrical tools and similar devices - Electromagnetic compatibility - Product group standard
<b>PN-EN 61000-6-1</b>	Electromagnetic Compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
<b>PN-EN 61000-6-2</b>	Electromagnetic Compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
<b>PN-EN 61000-6-3</b>	Electromagnetic Compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
<b>PN-EN 61000-6-4</b>	Electromagnetic Compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
<b>PN-EN 61000-3-12</b>	Electromagnetic Compatibility (EMC) - Part 3-12: Permissible Levels - Harmonic Current Limits for receivers with rated phase current > 16 A and <or = 75 A connected to the public mains power supply

06 February 2020 r.  
Filip Konieczny  
Product Manager

*Filip Konieczny*

