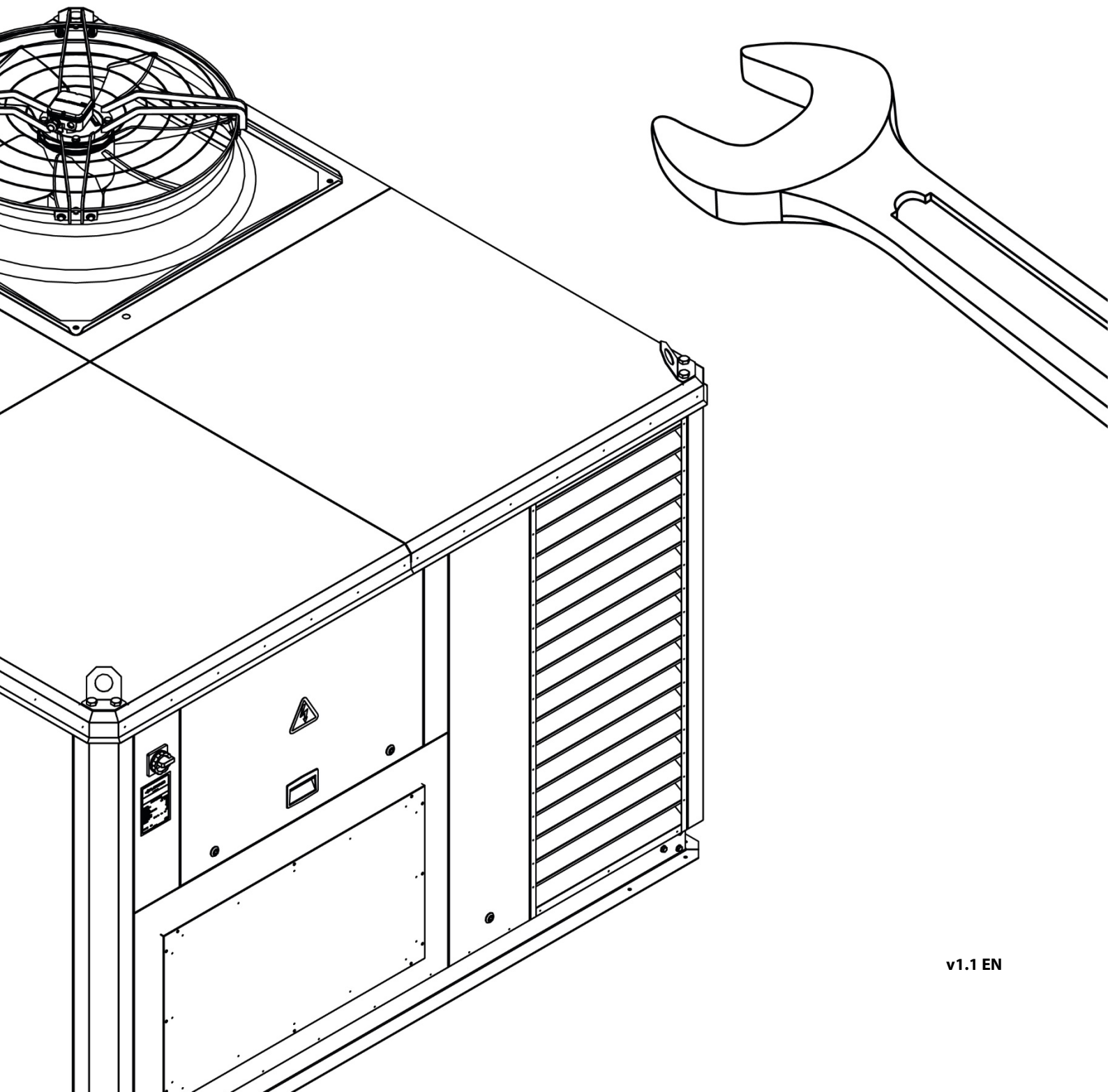


# Rooftop Cube

SHORT ASSEMBLY INSTRUCTION





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 of the unit.



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.

Before installation, launch of Cube device, the customer should read thoroughly this manual. 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.



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



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 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.

#### **FLOWAIR Głogowski i Brzeziński Sp.J.**

**Office:**

**ul. Chwaszczyńska 135, 81-571 Gdynia**

**tel. +48 (58) 627 57 41, fax +48 (58) 627 57 21**

## TABLE OF CONTENTS

|       |                                                                                  |    |
|-------|----------------------------------------------------------------------------------|----|
| 1.    | TRANSPORT .....                                                                  | 5  |
| 1.1.  | Horizontal transport .....                                                       | 5  |
| 1.2.  | Transport dimensions Cube 20 .....                                               | 5  |
| 1.3.  | Transport dimensions Cube 40 .....                                               | 6  |
| 1.4.  | Transport dimensions Cube 50/60 .....                                            | 6  |
| 1.5.  | Transport dimensions Cube 80/100 .....                                           | 6  |
| 1.6.  | Transport dimensions Cube 80/100 L .....                                         | 7  |
| 1.7.  | Transport dimensions Cube 120/160 B .....                                        | 7  |
| 1.8.  | Transport dimensions Cube 120/160 R .....                                        | 7  |
| 1.9.  | Transport dimensions Cube R8 .....                                               | 8  |
| 1.10. | Transport dimensions NWS module (Cube 20/R8 NWS) .....                           | 8  |
| 1.11. | Transport dimensions NWL module (Cube 40 NWL) .....                              | 8  |
| 1.12. | Lifting information .....                                                        | 9  |
| 1.13. | Lifting Cube 20 .....                                                            | 10 |
| 1.14. | Lifting Cube 40 .....                                                            | 11 |
| 1.15. | Lifting Cube 50/60 .....                                                         | 12 |
| 1.16. | Lifting Cube 80/100 .....                                                        | 13 |
| 1.17. | Lifting Cube 120/160 .....                                                       | 14 |
| 1.18. | Lifting heat recovery module .....                                               | 15 |
| 1.19. | Lifting Cube R8 .....                                                            | 16 |
| 1.20. | Rotating the module NWS/NWL .....                                                | 17 |
| 1.21. | Lifting NWS module (Cube 20/R8) .....                                            | 19 |
| 1.22. | Lifting NWL module (Cube 40 NWL) .....                                           | 20 |
| 2.    | FOUNDATION .....                                                                 | 21 |
| 2.1.  | Foundation Cube unit .....                                                       | 21 |
| 2.2.  | Roof crossing NWS (Cube 20/R8 NWS) .....                                         | 27 |
| 2.3.  | NWS instalation (Cube 20/R8 NWS) .....                                           | 28 |
| 2.4.  | Roof crossing NWL (Cube 40 NWL) .....                                            | 31 |
| 2.5.  | NWL installation (Cube 40 NWL) .....                                             | 32 |
| 2.6.  | Inlet and exhaust covers installation (not applicable to the Cube 40 unit) ..... | 34 |
| 2.7.  | Heat recovery unit installation Cube 80/100 L i Cube 120/160 R .....             | 35 |
| 3.    | INSTALLATION .....                                                               | 37 |
| 3.1.  | Hydraulic connection - units for duct installation .....                         | 37 |
| 3.2.  | Hydraulic hub chart for water heater in the rooftop unit .....                   | 38 |
| 3.3.  | Hydraulic connection – units dor ductless installation .....                     | 39 |
| 3.4.  | Hydraulic hub chart for water heater in the NW module .....                      | 40 |
| 3.5.  | Condensation drain .....                                                         | 41 |
| 3.6.  | Electric connection .....                                                        | 43 |
| 3.7.  | Installation flow chart .....                                                    | 52 |
| 4.    | START-UP AND EXPLOITATION .....                                                  | 54 |
| 4.1.  | Electric heater .....                                                            | 54 |
| 4.2.  | Gas heater .....                                                                 | 54 |
| 4.3.  | Water heat exchanger .....                                                       | 55 |
| 4.4.  | Water cooler .....                                                               | 55 |
| 4.5.  | Rotational exchanger .....                                                       | 55 |
| 4.6.  | Fans .....                                                                       | 55 |
| 4.7.  | Dampers .....                                                                    | 55 |
| 4.8.  | Automation control systems .....                                                 | 55 |
| 4.9.  | Filter replacment .....                                                          | 56 |
| 5.    | RESPONSIBILITY TABLE .....                                                       | 58 |

# 1. 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 (duct temperature sensor – not applicable unit with NW supply module, T-box - option, ventilation covers – not applicable Cube 40, room temperature sensor - option). 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.



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

### 1.1. 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.

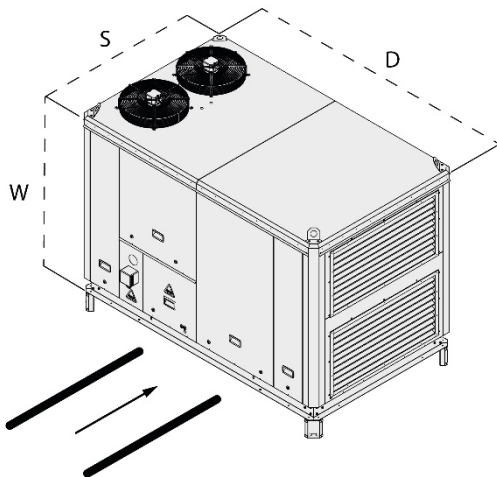


Because of unit's weight and front-end center of gravity, the size of the forklift and length of truck forks must be adapted to unit's dimension. Pay special attention to the length of truck forks, which should have at least  $\frac{3}{4}$  depth of transport rail. Shorter truck forks application may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



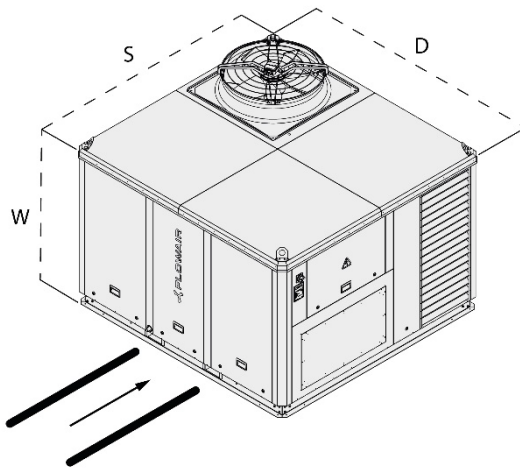
Before installing the device, remove the transport rails by unscrewing the screws.

### 1.2. Transport dimensions Cube 20



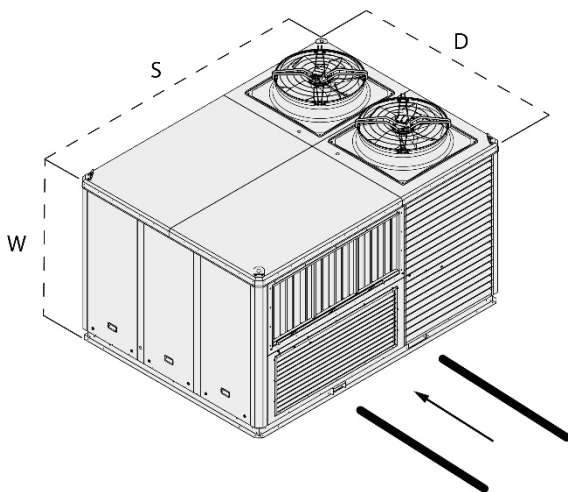
- W (Cube / + blocks / + space) - 1492 / 1592 / 1692 mm
- S (Cube / + styro / + space) - 1380 / 1480 / 1580 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – 473 mm (transport inside)
- Length of the forks – min. 1500 mm
- Fork spacing – min. 350 mm
- Weight – up to 850 kg

### 1.3. Transport dimensions Cube 40



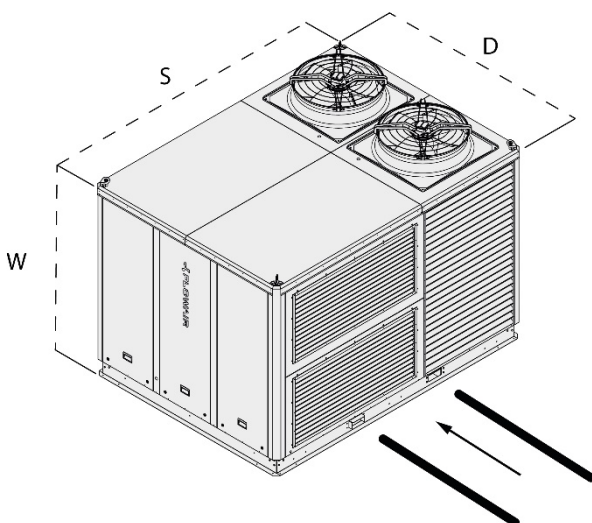
- W (Cube / + space) - 1742 / 1842 mm
- S (Cube / + styro / + space) - 2200 / 2300 / 2400 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – not applicable
- Length of the forks – min. 2300 mm
- Fork spacing – min. 485 mm
- Weight – up to 1100 kg

### 1.4. Transport dimensions Cube 50/60



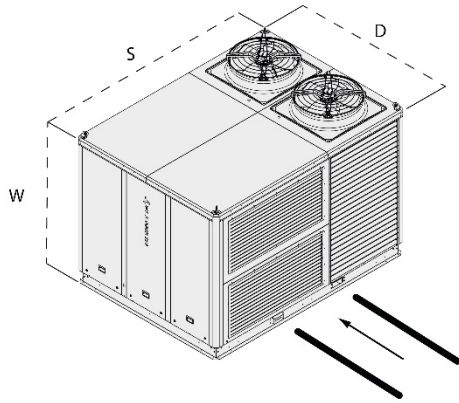
- W (Cube / + space) - 1790 / 1890 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Fork spacing – min. 845 mm
- Weight – Cube 50 – up to 1600 kg,  
Cube 60 – up to 1650 kg

### 1.5. Transport dimensions Cube 80/100

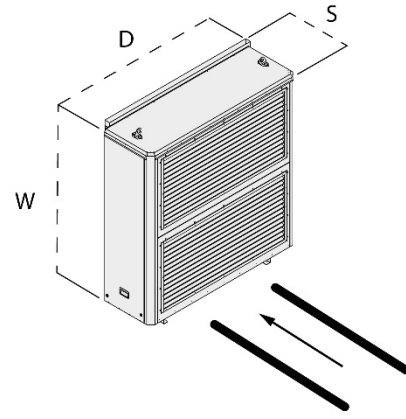


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Fork spacing – min. 845 mm
- Weight – Cube 80 - up to 1990 kg,  
Cube 100 – up to 2250 kg

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

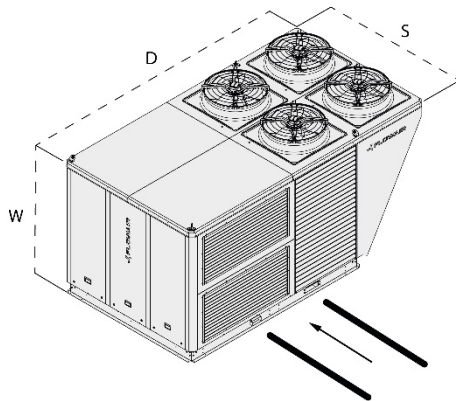


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 3100 / 3200 / 3300 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Fork spacing – min. 845 mm
- Weight – Cube 80 - up to 1990 kg,  
Cube 100 – up to 2250 kg



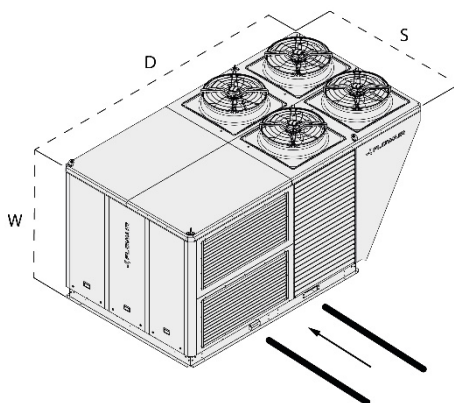
- W (L module / + space) - 2310 / 2410 mm
- S (L module / + styro / + space) - 573 / 673 / 773 mm
- D (L module / + styro / + space) - 2300 / 2400 / 2500 mm
- Length of the forks – min. 2400 mm
- Fork spacing – min. 350 mm
- Weight - 350 kg

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

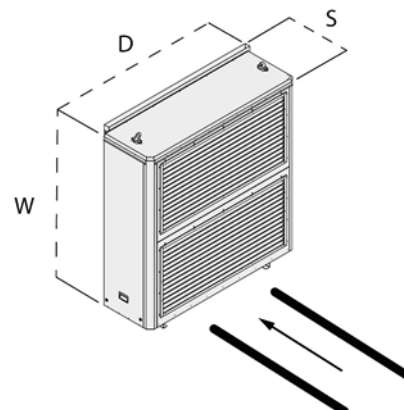


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- D (Cube / + styro / + space) - 4200 / 4300 / 4400 mm
- Ventilation duct covers – 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Fork spacing – min. 845 mm
- Weight – Cube 120 – up to 2250 kg,  
Cube 160 – up to 2350 kg

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

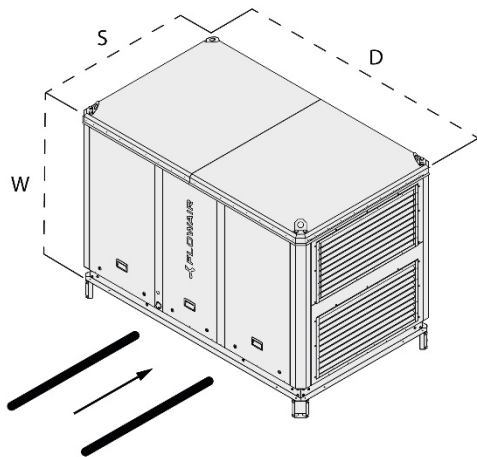


- W (Cube / + space) - 2310 / 2410 mm
- S (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- D (Cube / + styro / + space) - 4200 / 4300 / 4400 mm
- Ventilation duct covers – 482 mm (transport inside)
- Length of the forks – min. 2400 mm
- Fork spacing – min. 845 mm
- Weight – Cube 120 – up to 2250 kg,  
Cube 160 – up to 2350 kg



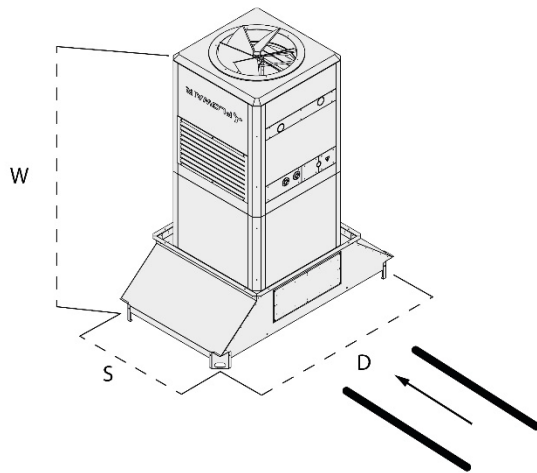
- W (L module / + space) - 2310 / 2410 mm
- S (L module / + styro / + space) - 573 / 673 / 773 mm
- D (L module / + styro / + space) - 2300 / 2400 / 2500 mm
- Length of the forks – min. 2400 mm
- Fork spacing – min. 350 mm
- Weight - 350 kg

### 1.9. Transport dimensions Cube R8



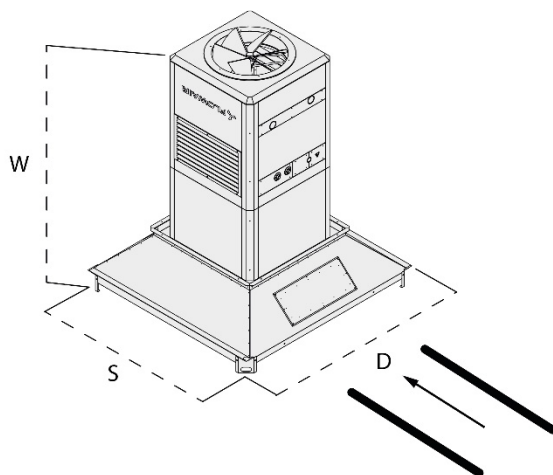
- W (Cube / + blocks / + space) - 1492 / 1592 / 1692 mm
- S (Cube / + styro / + space) - 1380 / 1480 / 1580 mm
- D (Cube / + styro / + space) - 2300 / 2400 / 2500 mm
- Ventilation duct covers – 473 mm (transport inside)
- Length of the forks – min. 1500 mm
- Fork spacing – min. 350 mm
- Weight – do 800 kg

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



- W (NW / + palette / + space) - 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
- Fork spacing – min. 350 mm
- Weight – up to 250 kg

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



- W (NW / + palette / + 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
- Fork spacing – min. 350 mm
- Weight – up to 250 kg



### 1.12. Lifting information

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

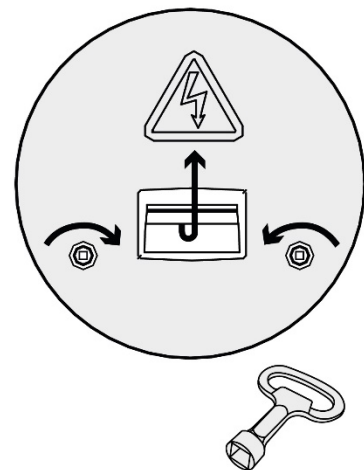
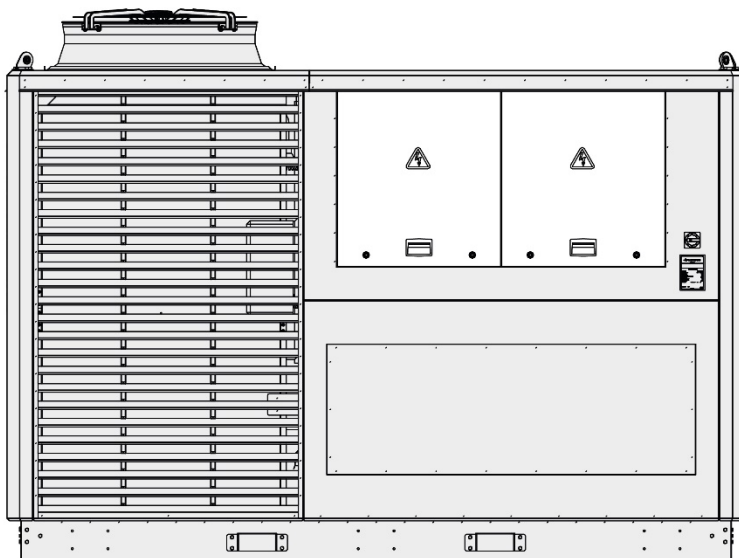
- Make sure that the ropes are properly attached to all holders,
- Always kift the device and the heat recovery module separately,
- Make sure that the device is level during lifting,
- Be especially careful when removing from the truck, so as not to damage the device by hitting the trailer elements,
- 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.



Do not stand under the device during lifting.



- The manufacturer is not responsible for damages caused by not following the guidelines written in the manual or for transport irregularities.
- Before lifting, check that the locks on all service panels are closed and verify by pulling the handles.

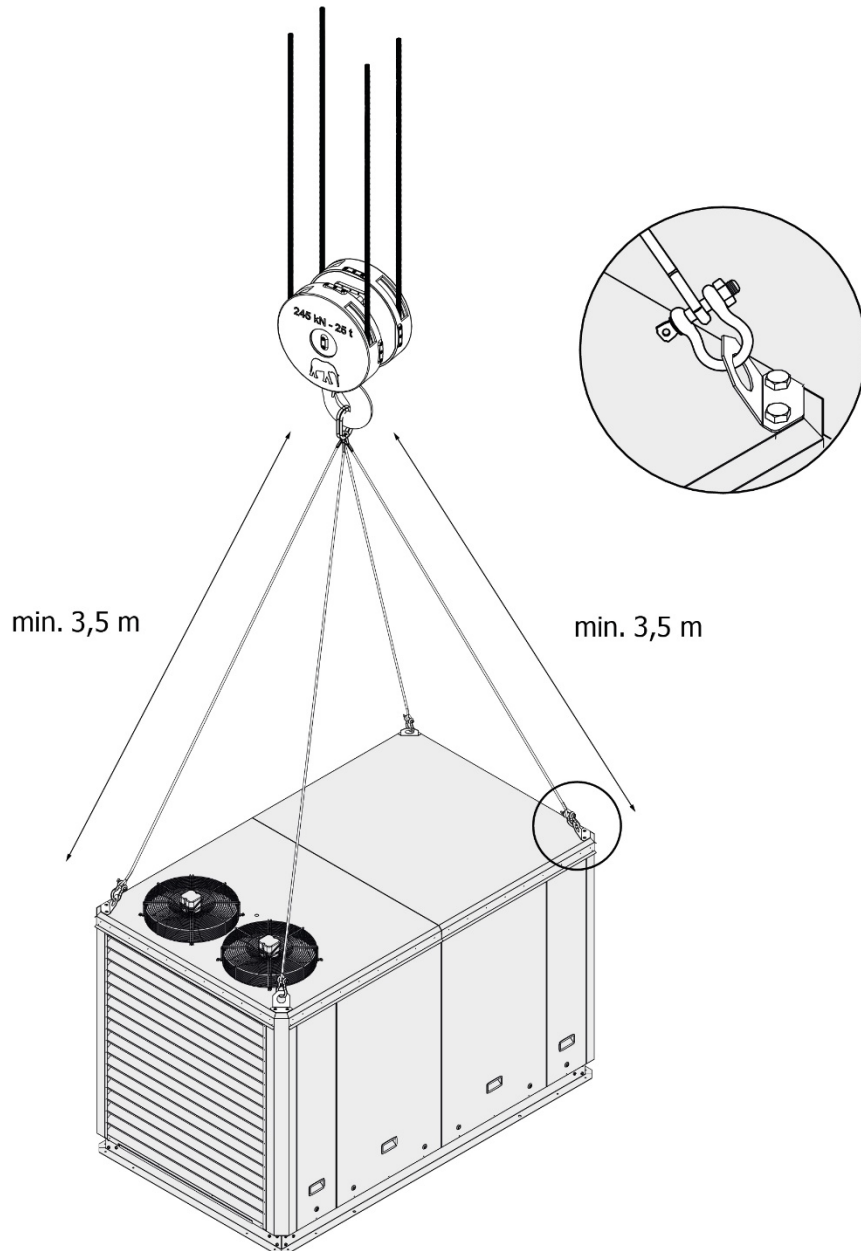


### 1.13. Lifting Cube 20

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.



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.

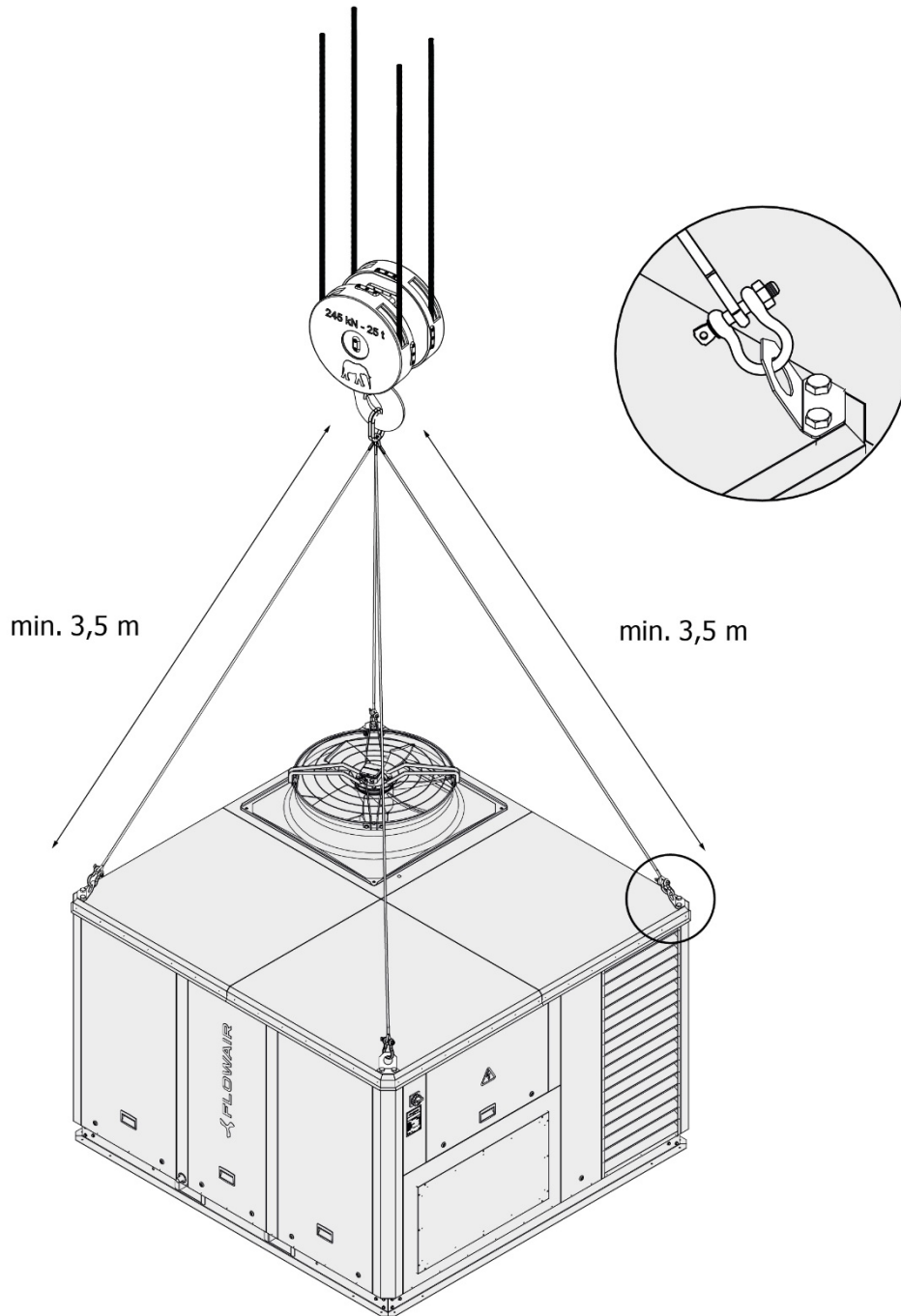


### 1.14. Lifting Cube 40

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.



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.

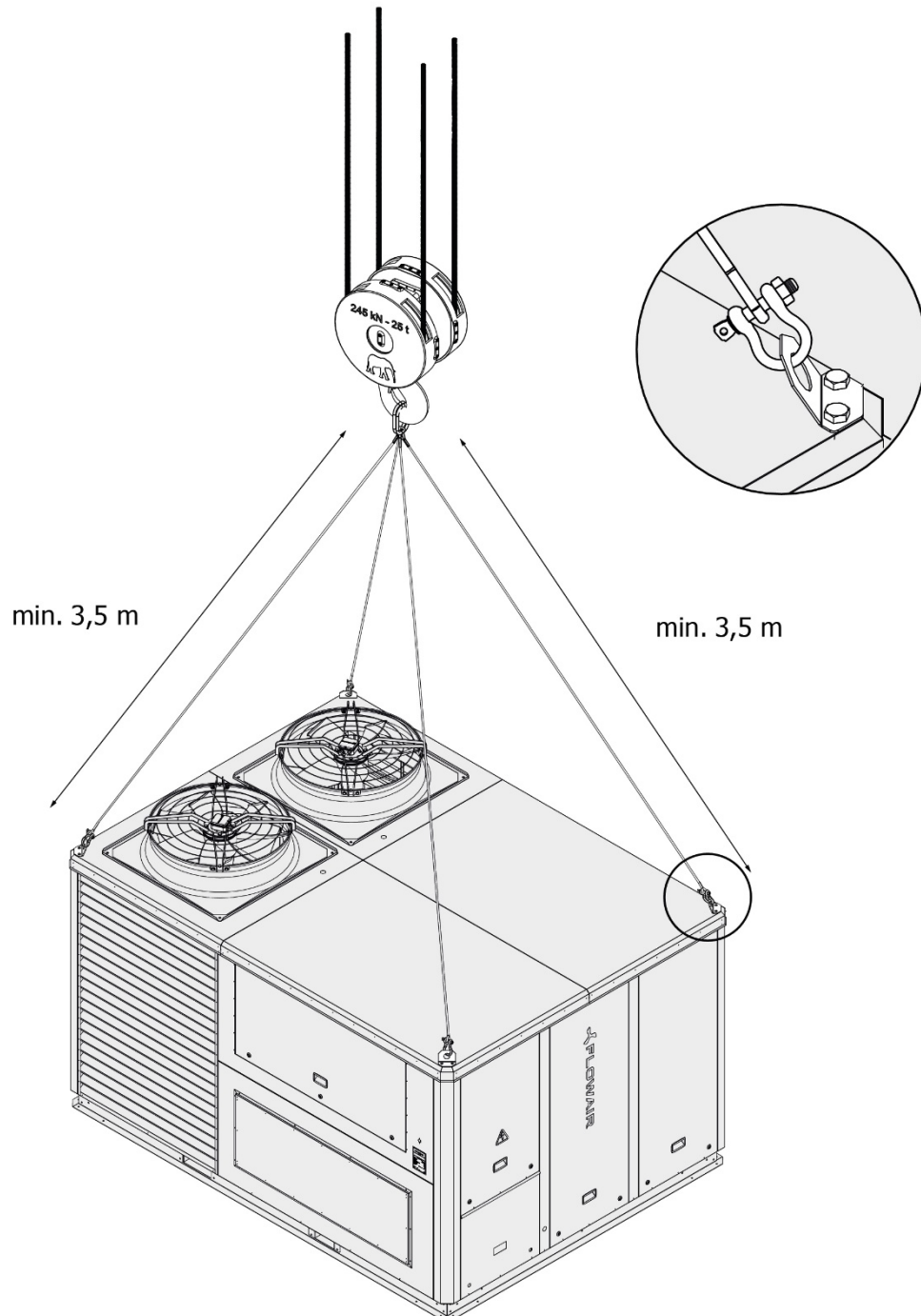


### 1.15. Lifting Cube 50/60

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.



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.

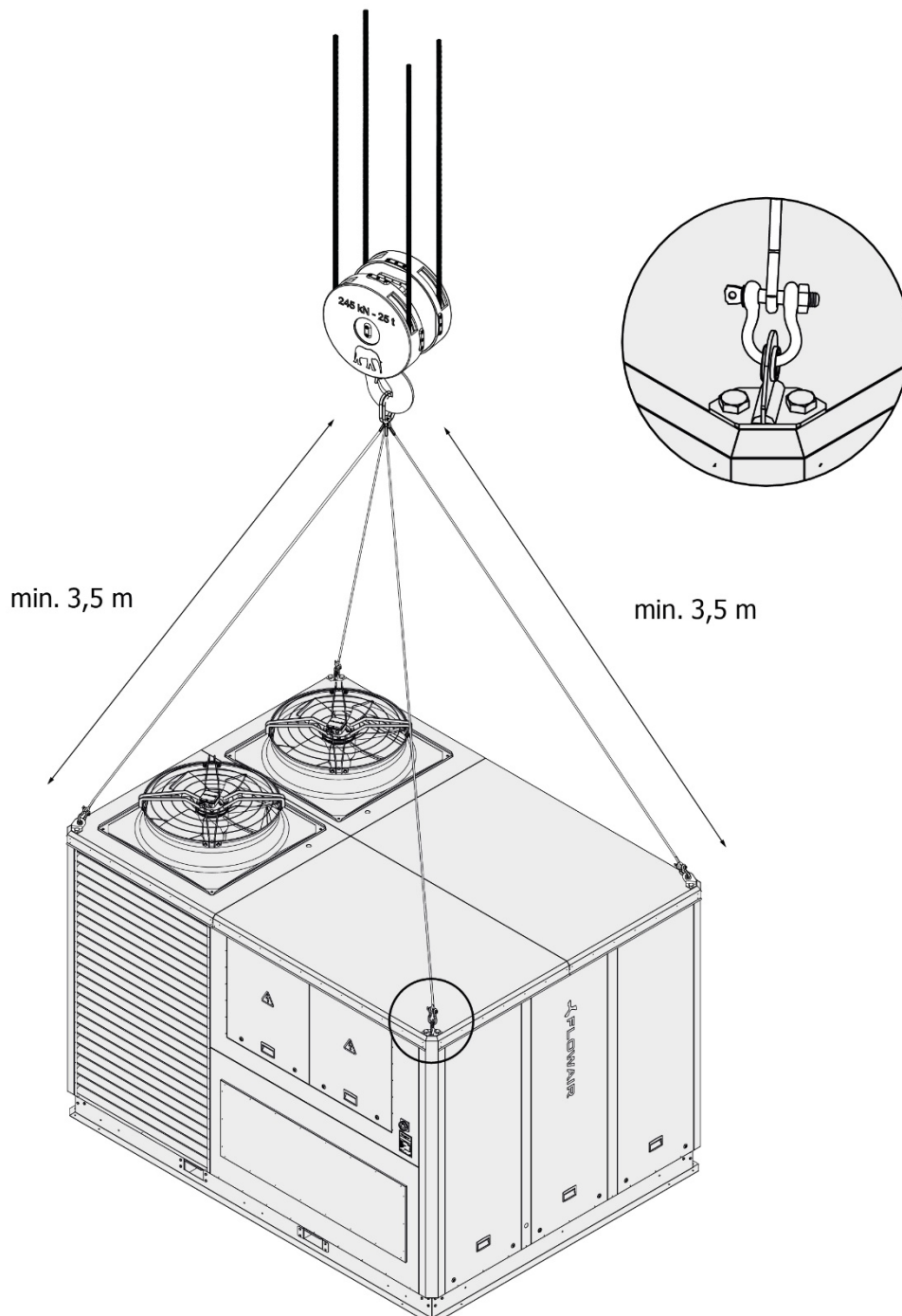


### 1.16. Lifting Cube 80/100

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.



- 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.
- The Cube 80/100 L cannot be raised with the heat recovery module attached. Installation of the heat recovery module to the Cube 80/100 L device should be done on the roof, after mounting the Cube device. Installation is carried out in accordance with the guidelines presented later in this manual.

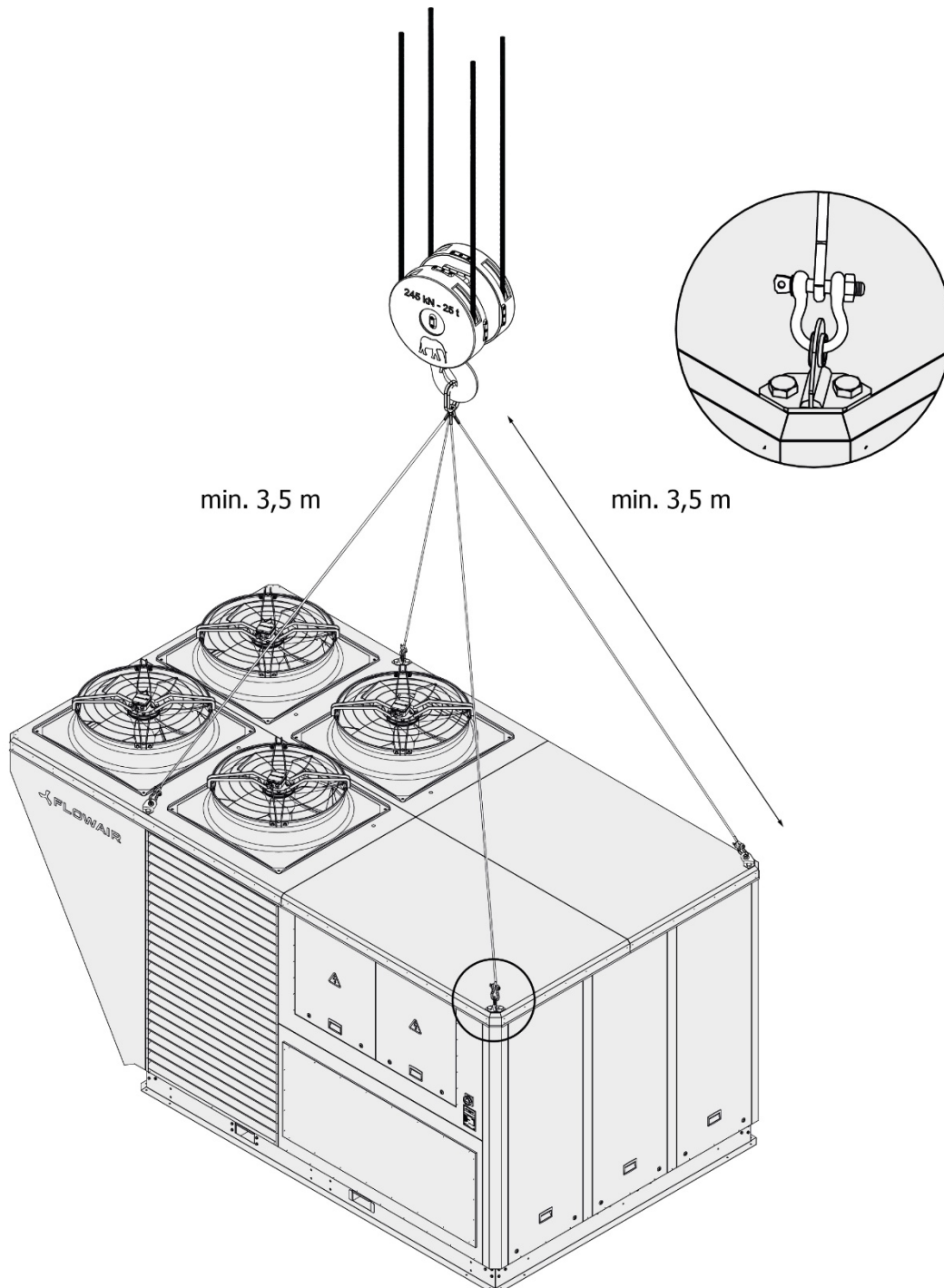


### 1.17. Lifting Cube 120/160

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.



- 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.
- The Cube 120/160 R cannot be raised with the heat recovery module attached. Installation of the heat recovery module

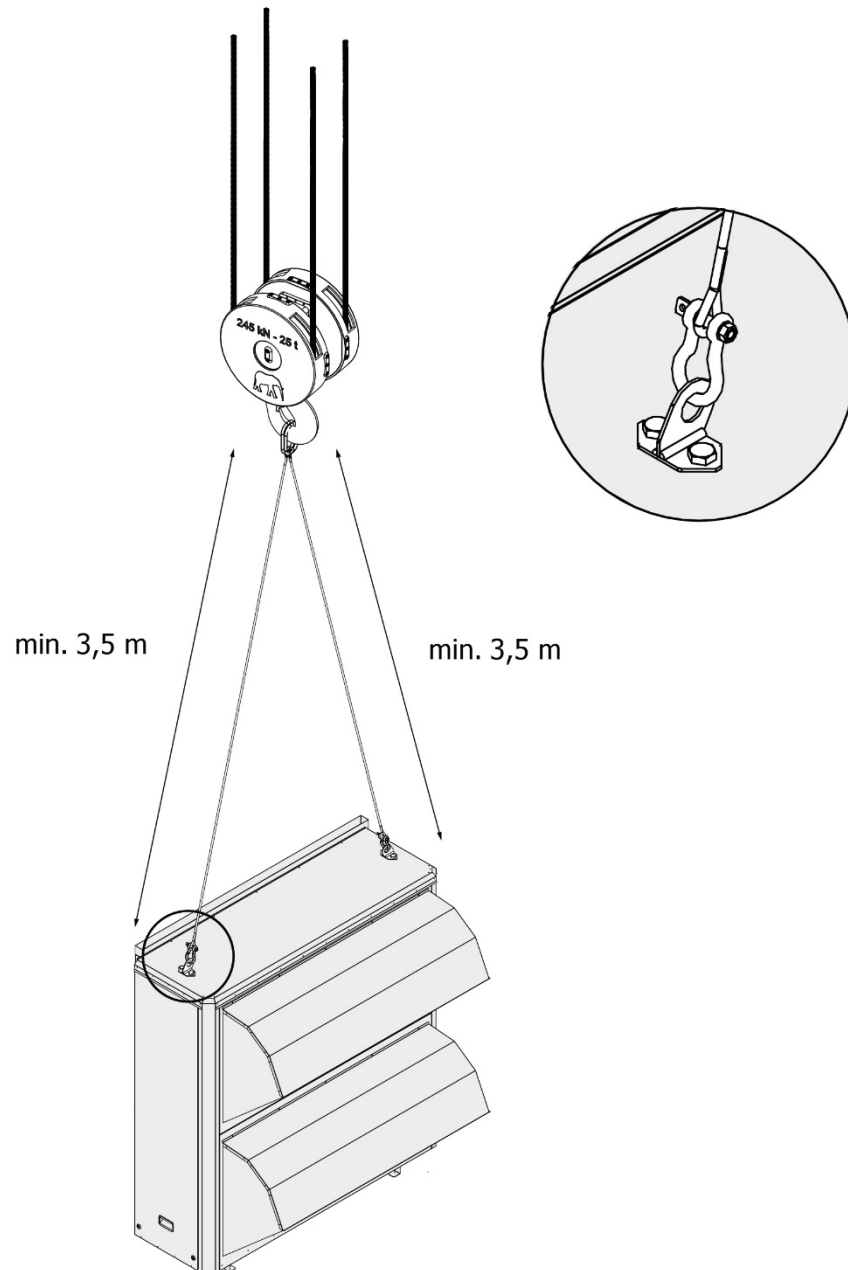


### 1.18. Lifting heat recovery module

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.



**The Cube 80/100 and Cube 120/160 R units cannot be raised with the heat recovery module attached.**

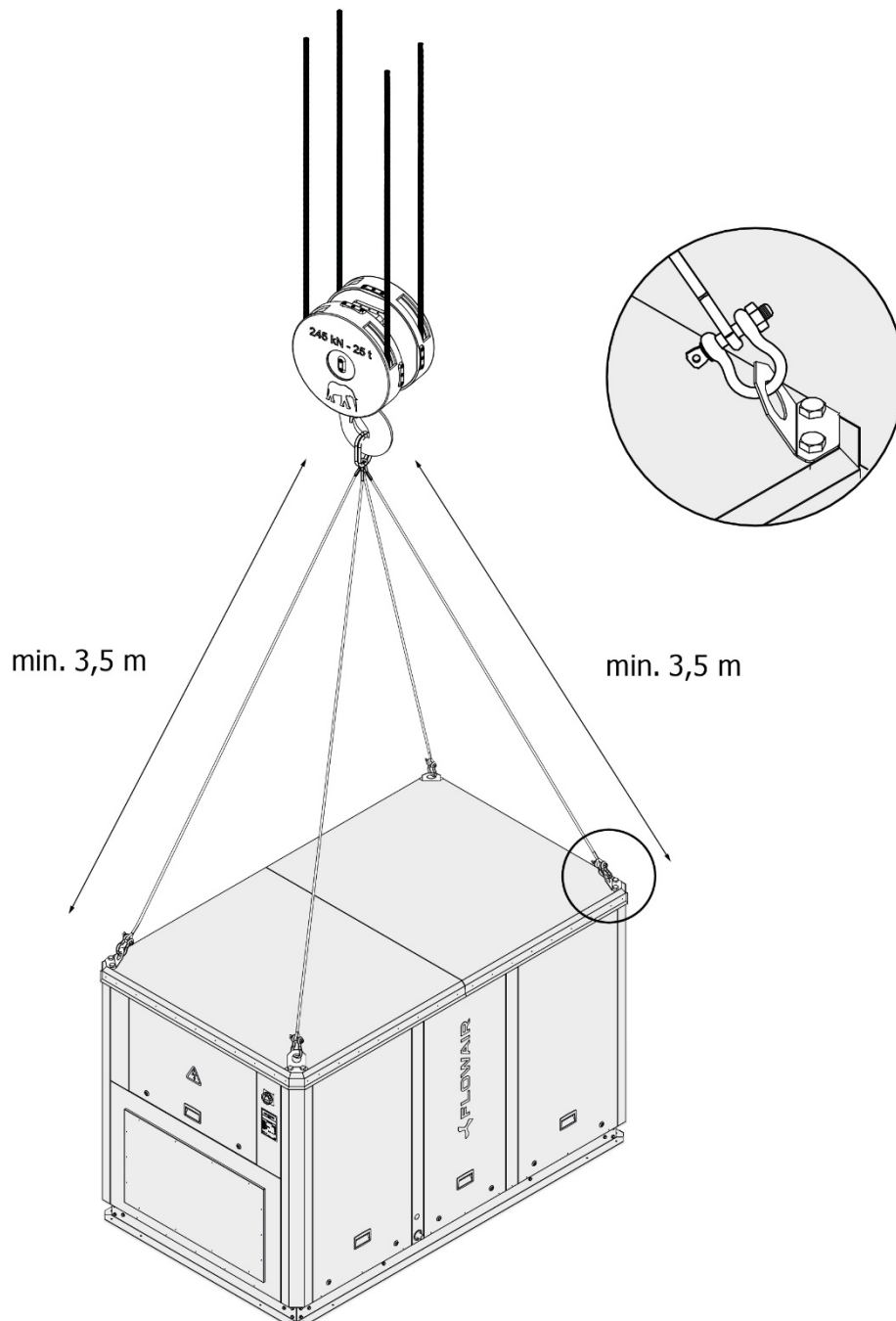


### 1.19. Lifting Cube R8

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.



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.



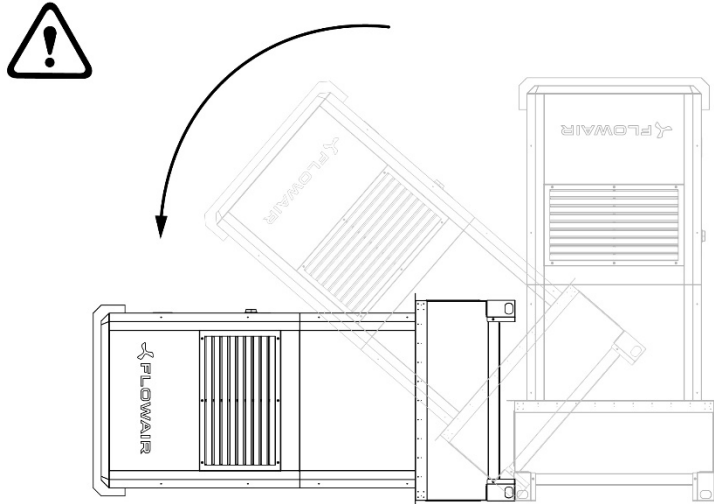


### 1.20. Rotating the module NWS/NWL

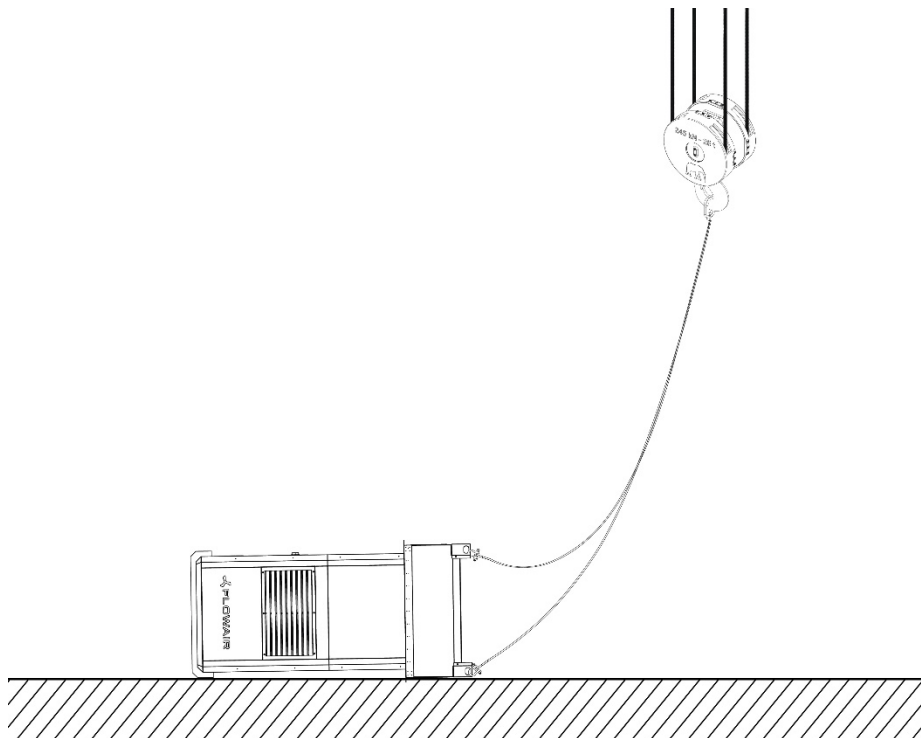
The supply air module is delivered to the site of delivery upside down. Before placing the module on the base, be careful when turning it in the correct position as to not damage the module.



In order to secure the module when turning it please use the styrofoam cover which comes with the module.



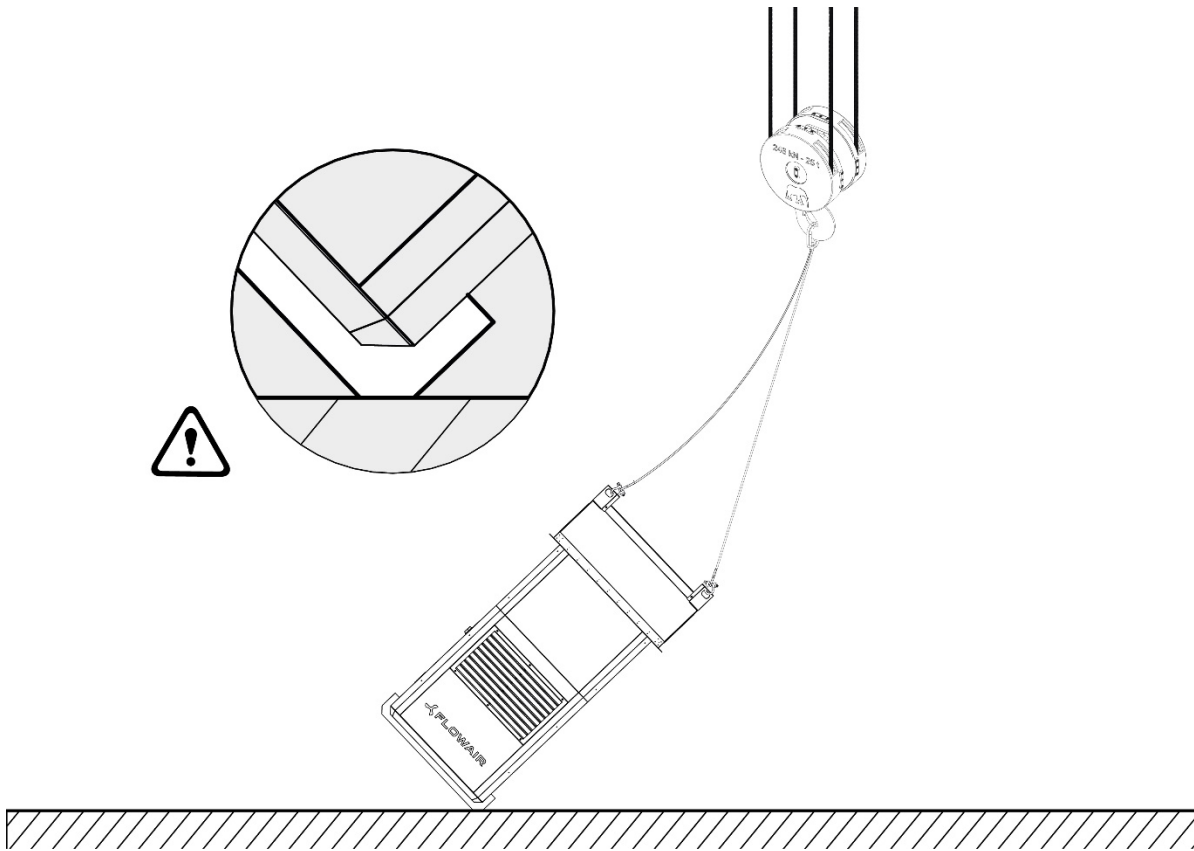
Place the air supply module carefully in horizontal position, then attach the ropes to the prepared lugs and start lifting it carefully using styrofoam cover as a protective base and specially securing the corners.



The polystyrene cover should not be removed before turning over NW supply module. Storing the device without the polystyrene cover may damage the actuator.



In order to secure the module when turning it please use the styrofoam cover which comes with the module.



The polystyrene cover should not be removed before turning over NW supply module. Storing the device without the polystyrene cover may damage the actuator.

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

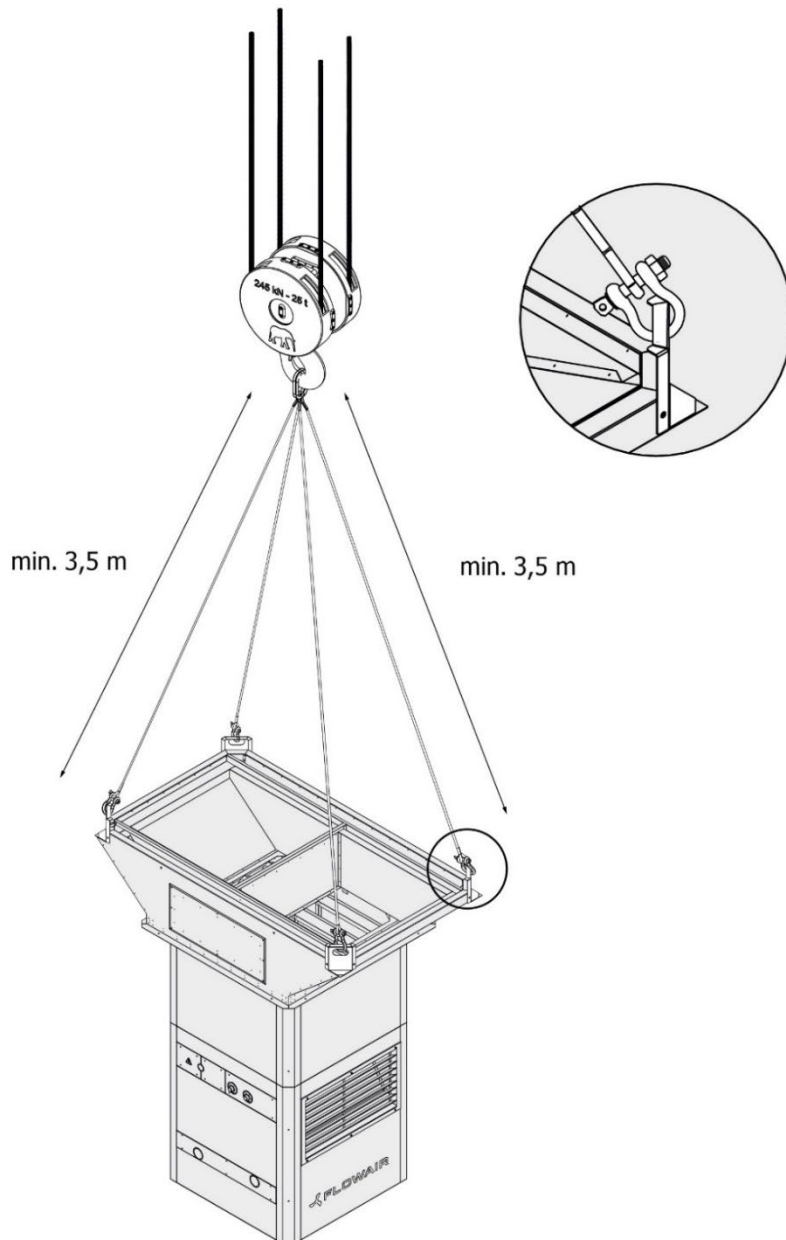
All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.



**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. The process of rotating the module is described in section 5.20.**



- The polystyrene cover should not be removed before turning over NWS supply module. Storing the air supply module without a polystyrene cover may damage the actuator.
- Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this



Before placing the device on the NWS supply air module, unscrew the transport lugs.

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

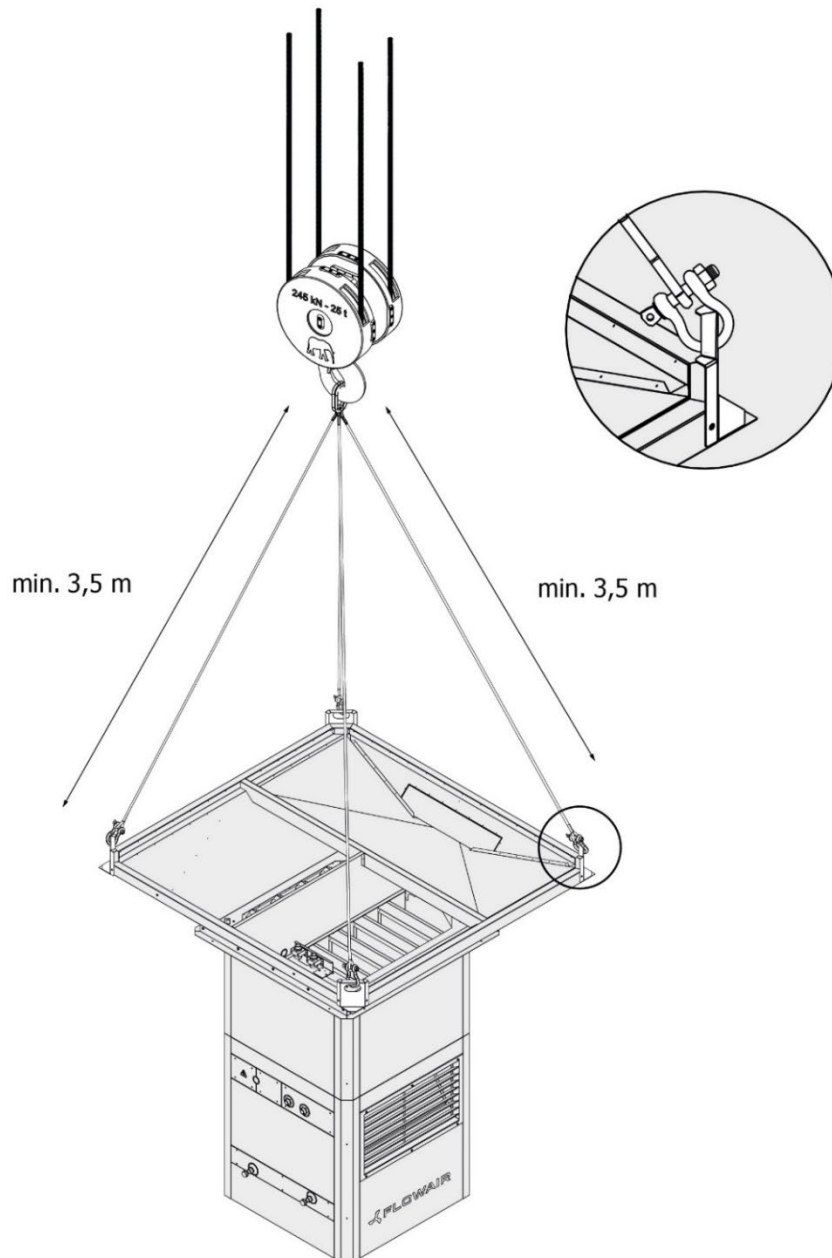
All Cube units are equipped with handles for ropes, localized in upper part, allowing to lift the unit. Spreader beam application is not necessary. Handles for lifting the unit and heat module are indicated in pictures below.



**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 NWS supply module while turning. The process of rotating the module is described in section 5.20.**



- The polystyrene cover should not be removed before turning over NWL supply module. Storing the air supply module without a polystyrene cover may damage the actuator.
- Because of load distribution, minimum length of hoisting ropes from handle to hook is 3,5 m. Disobeying this

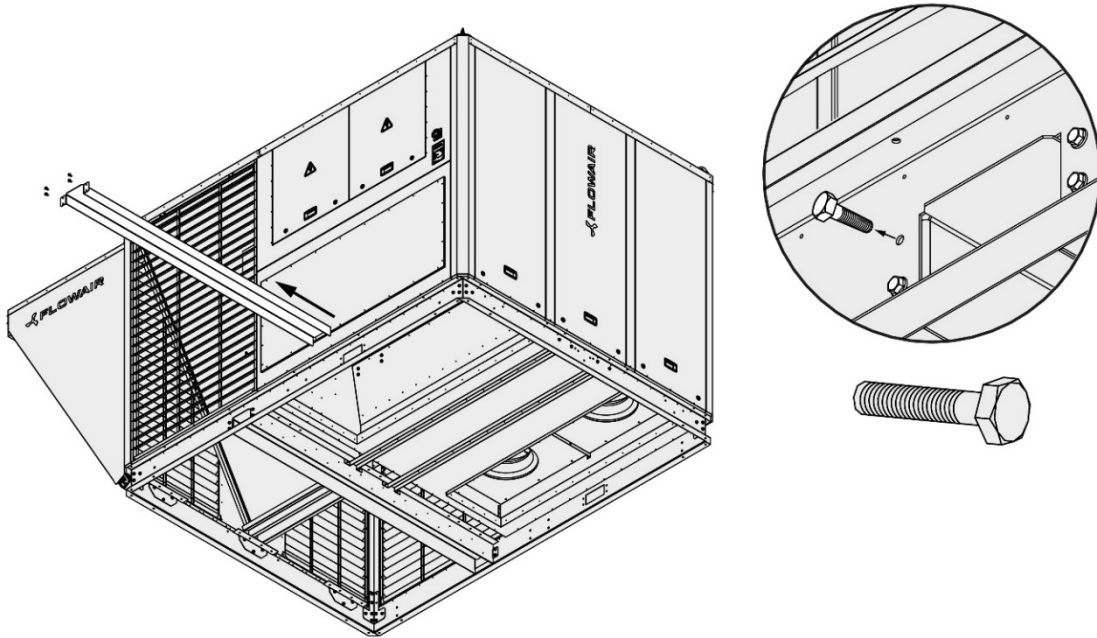


Before placing the device on the NWL supply air module, unscrew the transport lugs.

## 2. FOUNDATION

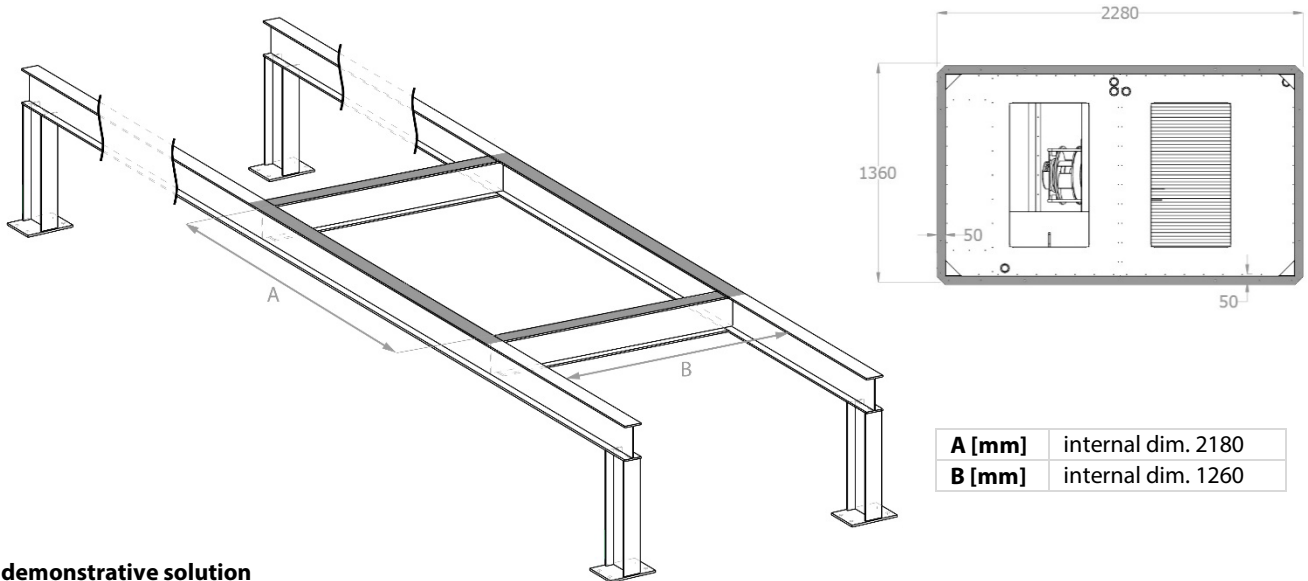
### 2.1. Foundation Cube unit

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 20



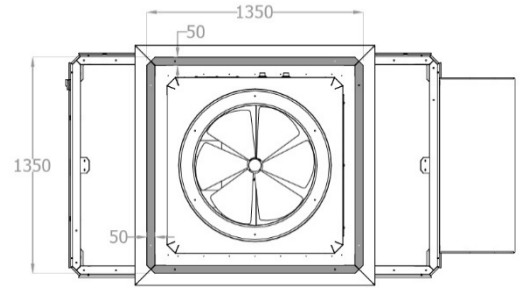
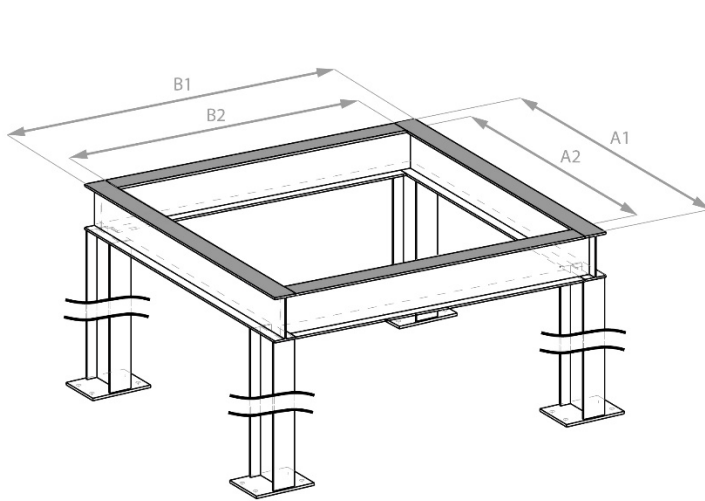
#### demonstrative solution



- 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.
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.

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 20 NWS**



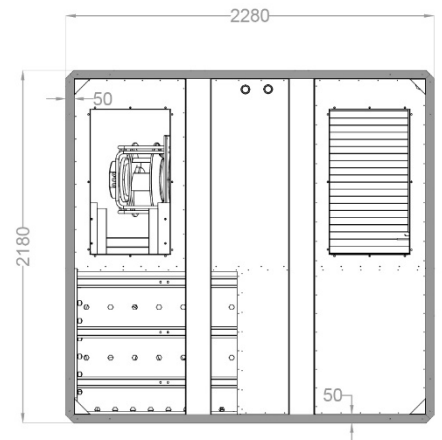
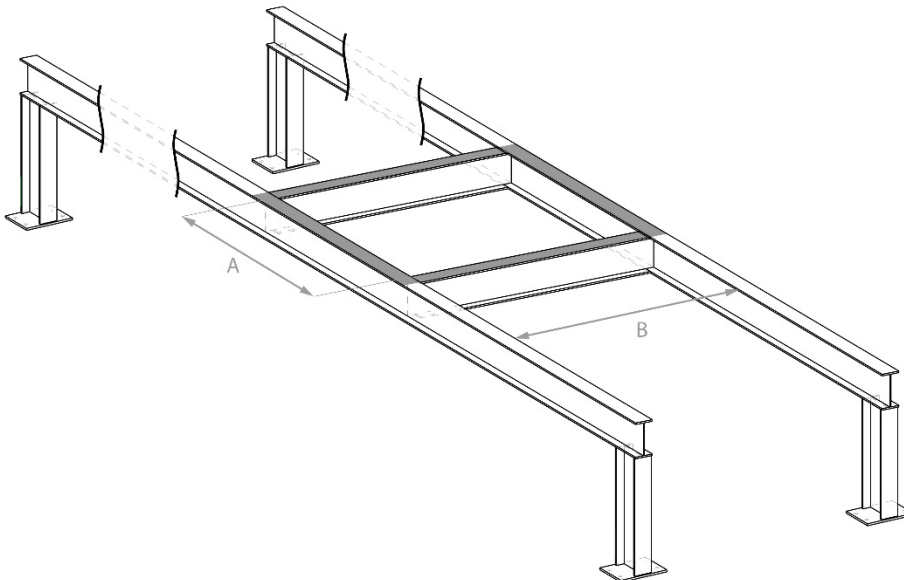
|                |             |
|----------------|-------------|
| <b>A1 [mm]</b> | max. 1400 * |
| <b>A2 [mm]</b> | min. 1200   |
| <b>B1 [mm]</b> | max. 1400 * |
| <b>B2 [mm]</b> | min. 1200   |

**demonstrative solution**



\*Please observe the maximum dimensions of the frame. Longer frame than specified above will result in damaging the module.

**Cube 40**



|               |                    |
|---------------|--------------------|
| <b>A [mm]</b> | internal dim. 2080 |
| <b>B [mm]</b> | internal dim. 2180 |

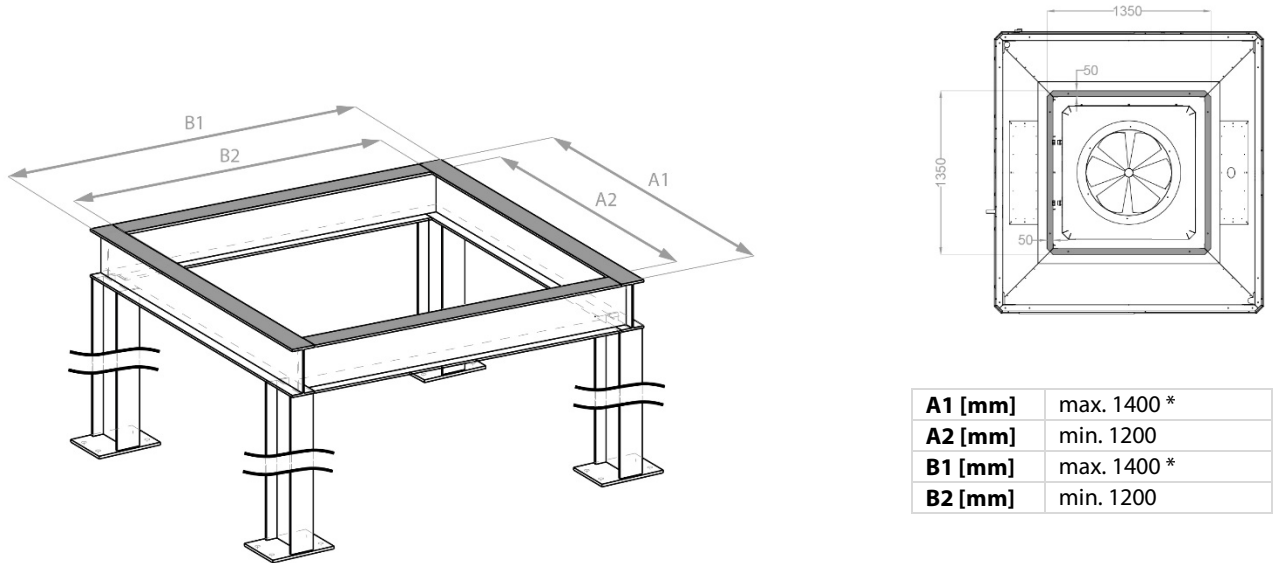
**demonstrative solution**



- 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
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.

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 40 NWL**

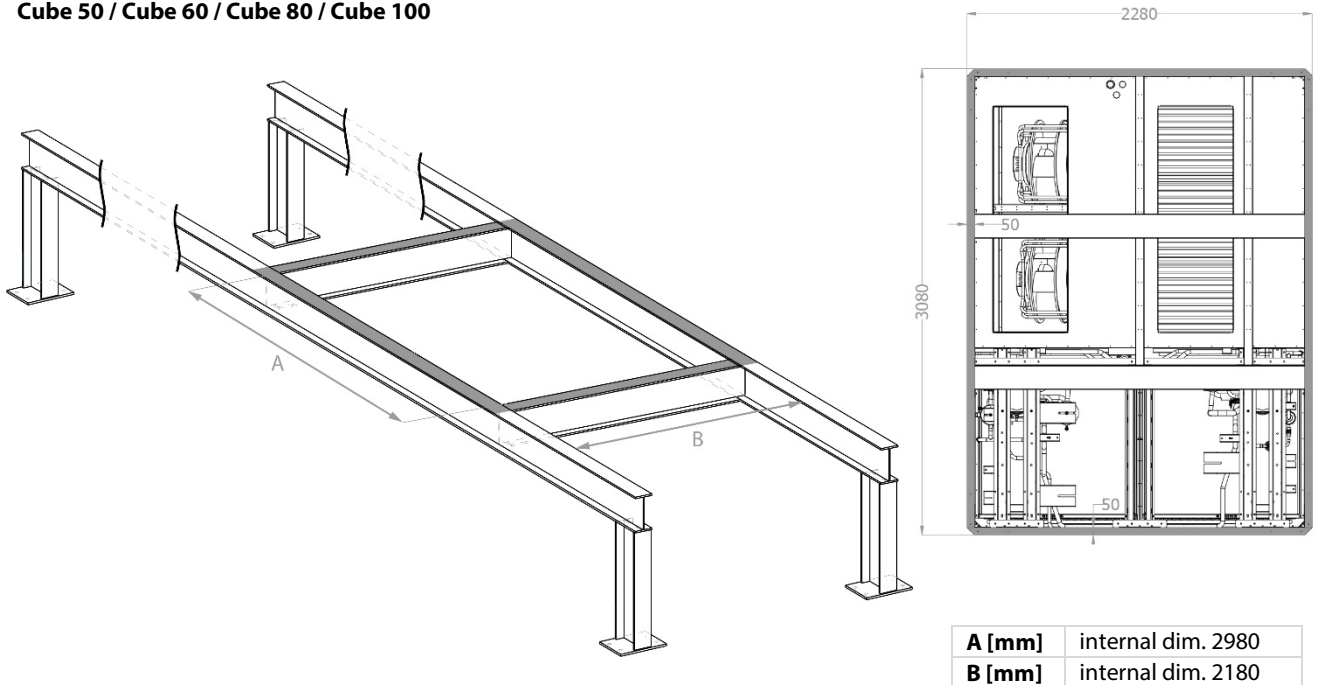


**demonstrative solution**



\* Please observe the maximum dimensions of the frame. Longer frame than specified above will result in damaging the module.

**Cube 50 / Cube 60 / Cube 80 / Cube 100**



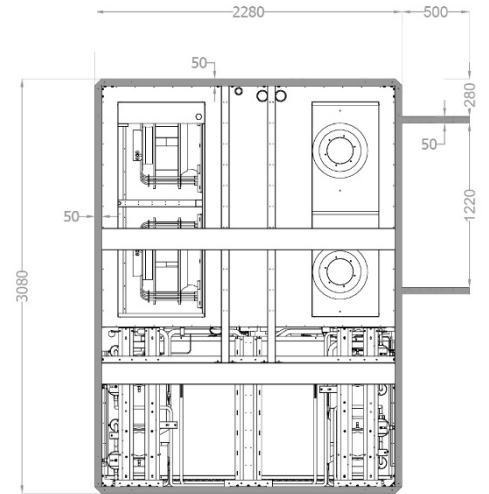
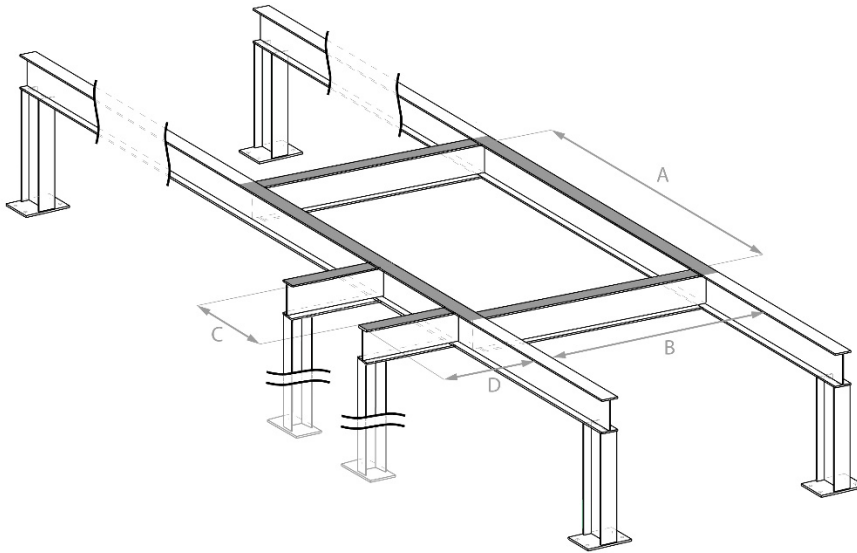
**demonstrative solution**



- 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.
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.

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.

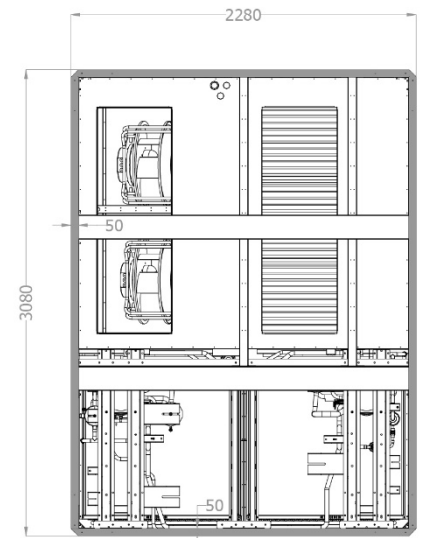
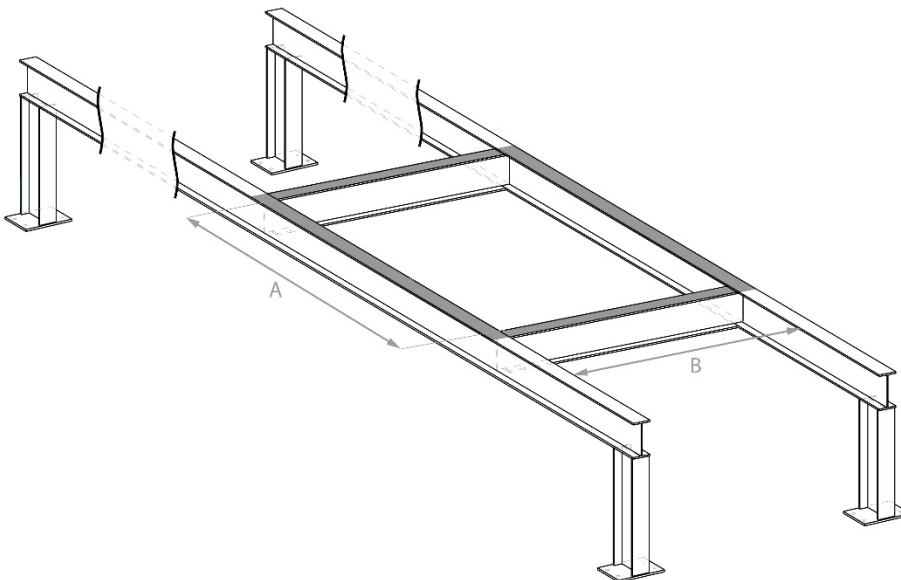
**Cube 80 /100 L**



**demonstrative solution**

|               |                    |
|---------------|--------------------|
| <b>A [mm]</b> | internal dim. 2980 |
| <b>B [mm]</b> | internal dim. 2180 |
| <b>C [mm]</b> | 1220               |
| <b>D [mm]</b> | 1220               |

**Cube 120 / 160 B**



**demonstrative solution**

|               |                    |
|---------------|--------------------|
| <b>A [mm]</b> | internal dim. 2980 |
| <b>B [mm]</b> | internal dim. 2180 |

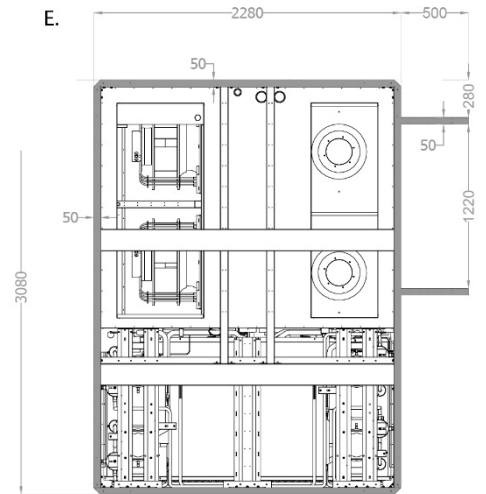
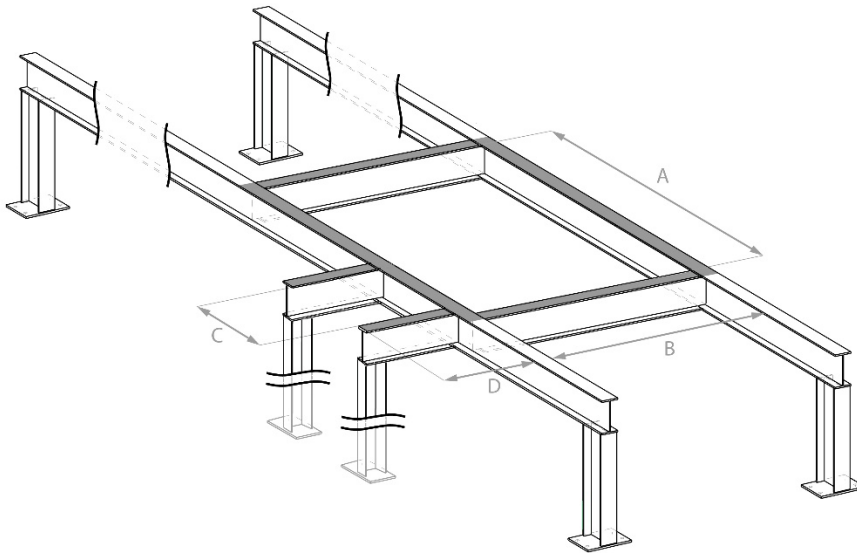


- Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.



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.

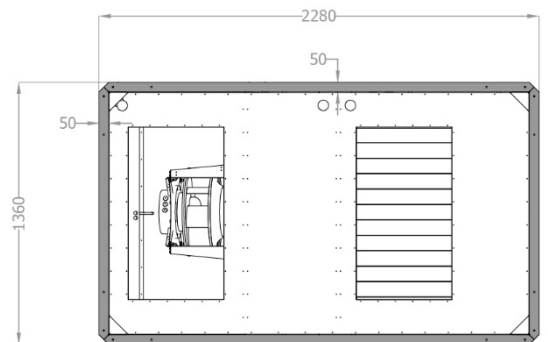
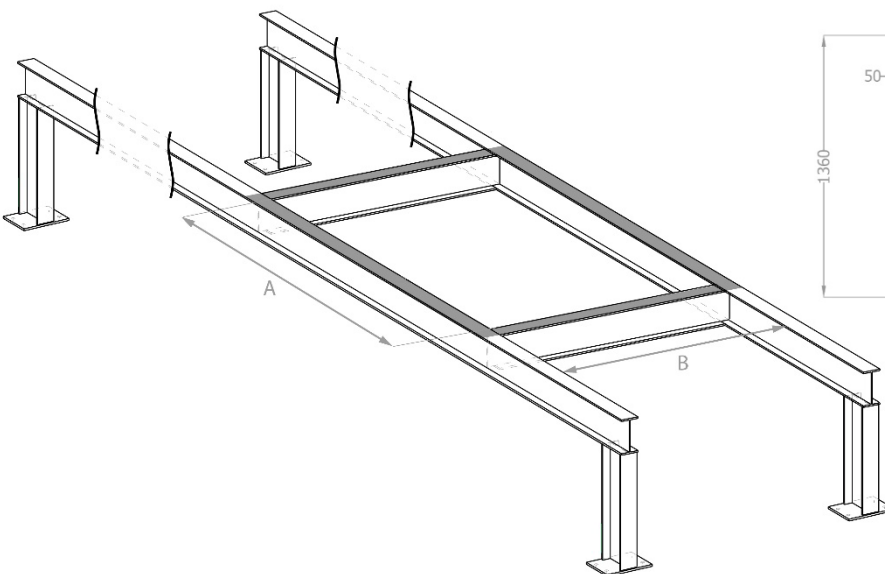
**Cube 120 / 160 R**



|               |                    |
|---------------|--------------------|
| <b>A [mm]</b> | internal dim. 2980 |
| <b>B [mm]</b> | internal dim. 2180 |
| <b>C [mm]</b> | 1220               |
| <b>D [mm]</b> | 1220               |

**demonstrative solution**

**Cube R8**



|               |                    |
|---------------|--------------------|
| <b>A [mm]</b> | Internal dim. 2180 |
| <b>B [mm]</b> | Internal dim. 1260 |

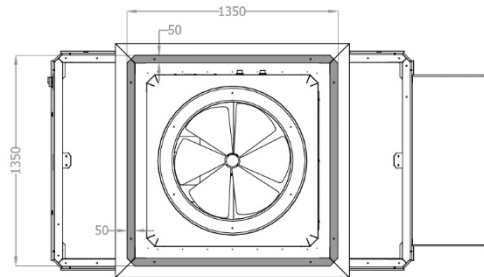
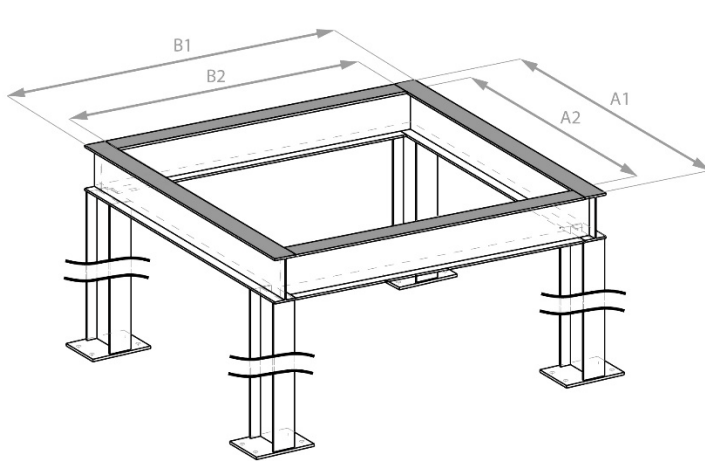
**demonstrative solution**



- 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.
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.

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 R8 NWS**



|                |             |
|----------------|-------------|
| <b>A1 [mm]</b> | max. 1400 * |
| <b>A2 [mm]</b> | min. 1200   |
| <b>B1 [mm]</b> | max. 1400 * |
| <b>B2 [mm]</b> | min. 1200   |

**demonstrative solution**



\* Please observe the maximum dimensions of the frame. Longer frame than specified above will result in damaging the module.



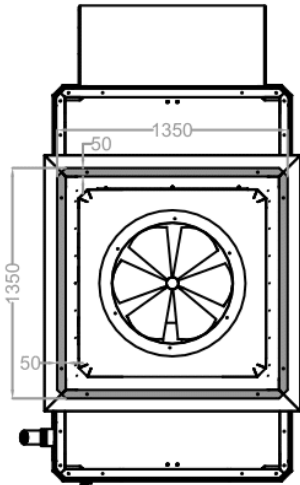
- Unit should be mounted to a frame in such way to ensure no move of unit. Using rubber pads between unit and frame is highly advisable.
- Install unit in such way that inlet and exhaust are not directed to windward.
- The manufacturer allows installation on a frame with support on the two long sides of the unit's frame.

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

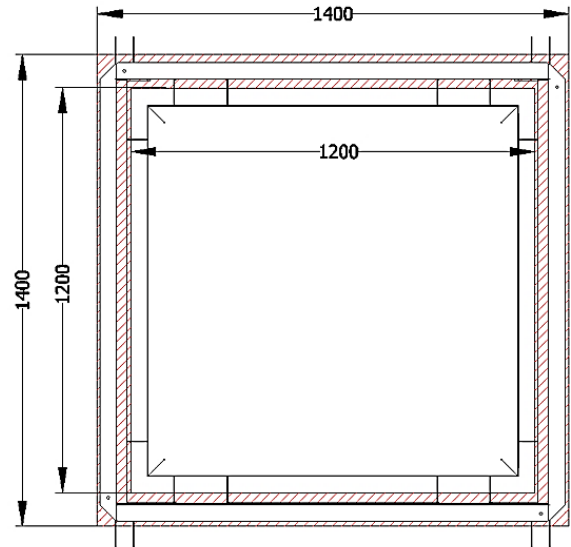
For the Cube 20 / R8 NWS, as additional accessories there is a base that serves as a roof transition and an adapter for the swirl diffuser. The base supporting frame, under which the substructures shown in the drawing [1] should be designed.

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 figures [2], [3].

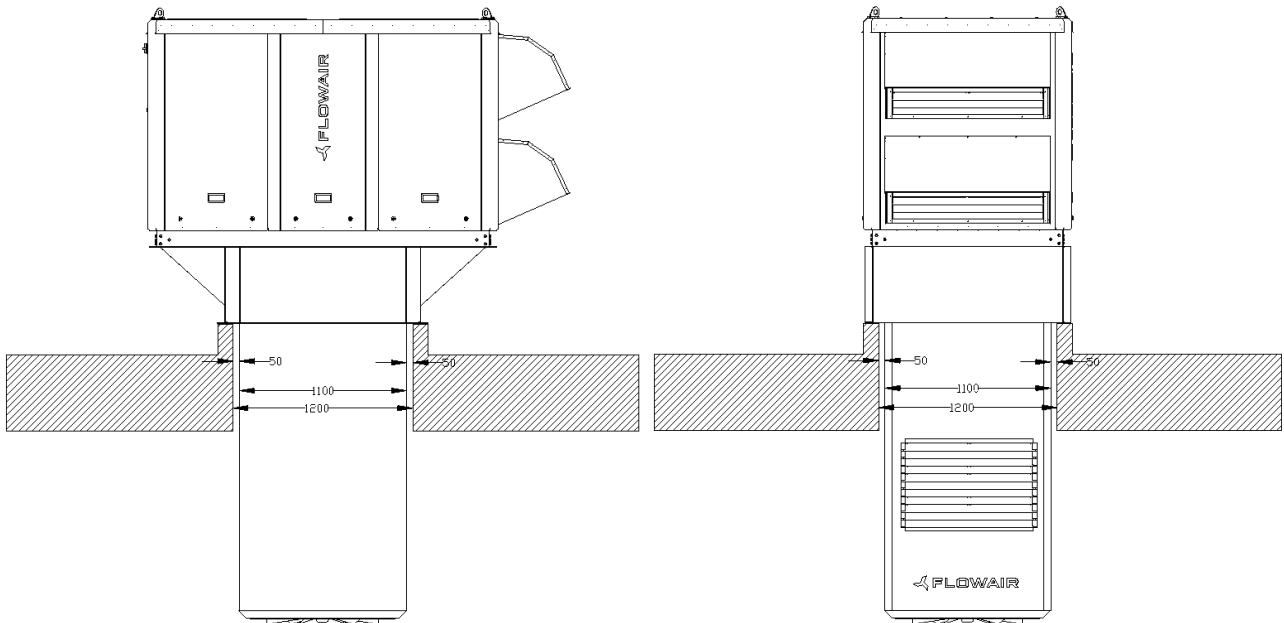
1.



2.



3.

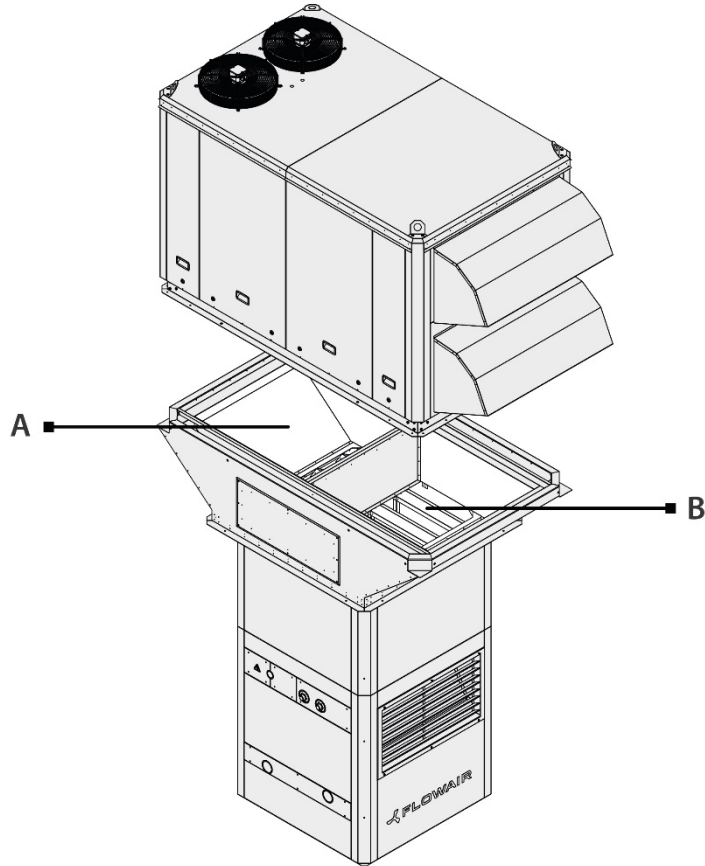


- Device should be attached to the frame in a way that prevents any movement. It is recommended to use rubber spacers between the device and the mounting frame.
- Install unit in such way that inlet and exhaust are not directed to windward.

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

During the foundation, pay attention to the correct assembly in relation to the ducts.

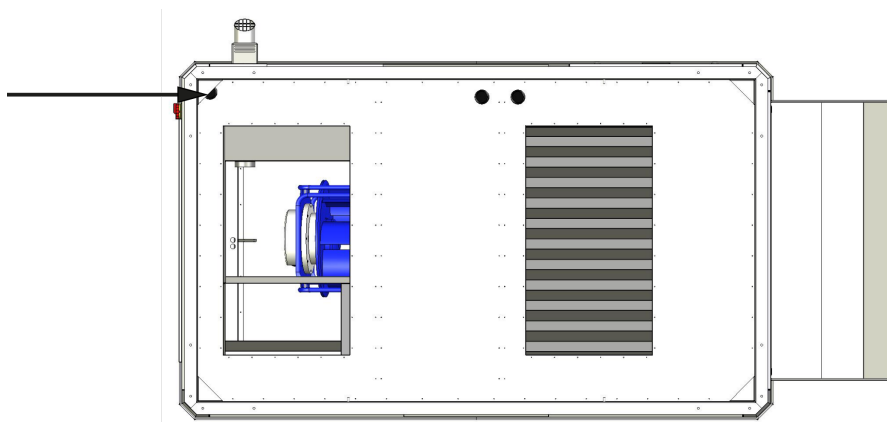
|   |                 |
|---|-----------------|
| A | Supply channel  |
| B | Exhaust channel |



Before placing the device on the NWS air supply module, unscrew the transport rail. Then, through the prepared openings, route the power and control cables from the supply air module to the device control cabinet as described below.

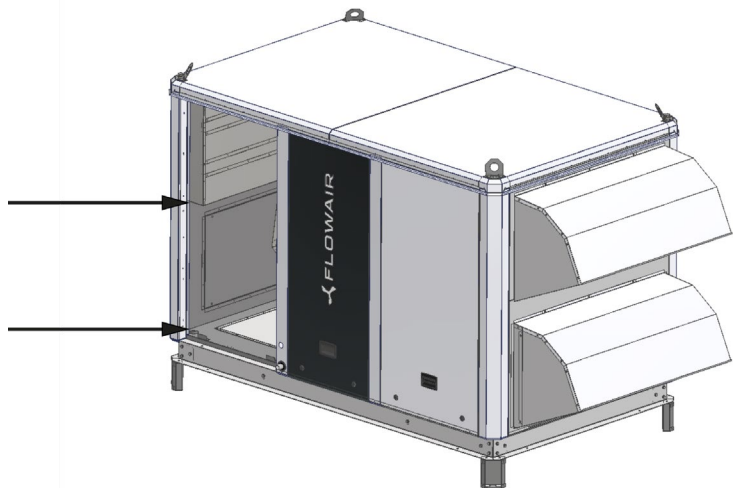
#### Cube R8

Through the prepared openings, route the power and control cables from the supply air module to the device control cabinet [1].



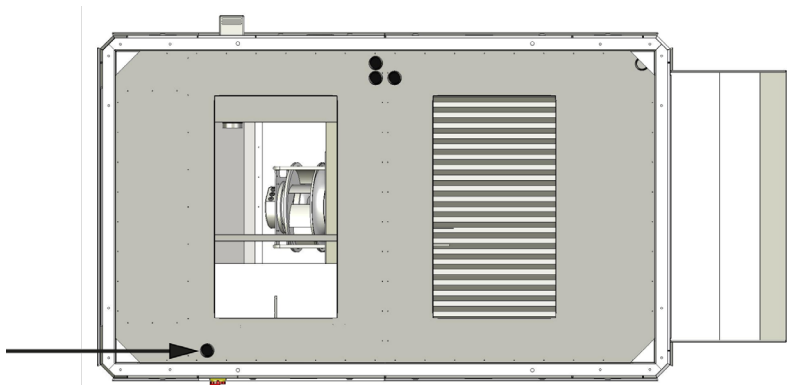
(bottom view)

Open the service panel and route cables as shown in the figure [2].



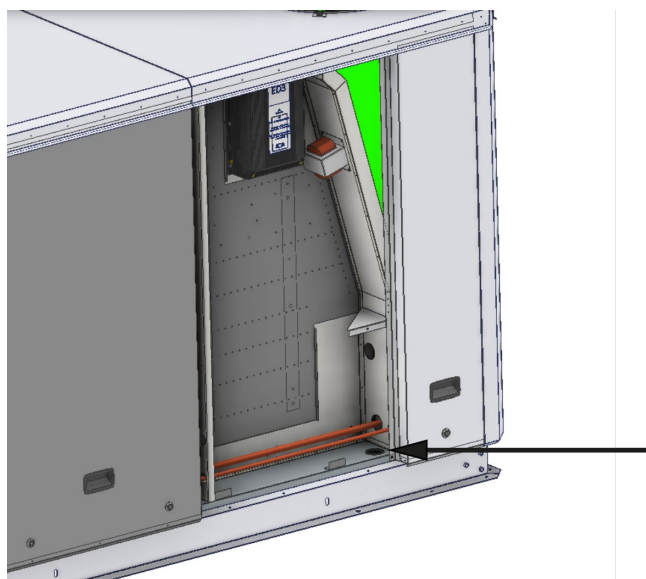
**Cube 20**

Through the prepared openings, route the power and control cables from the supply air module to the device control cabinet [1].

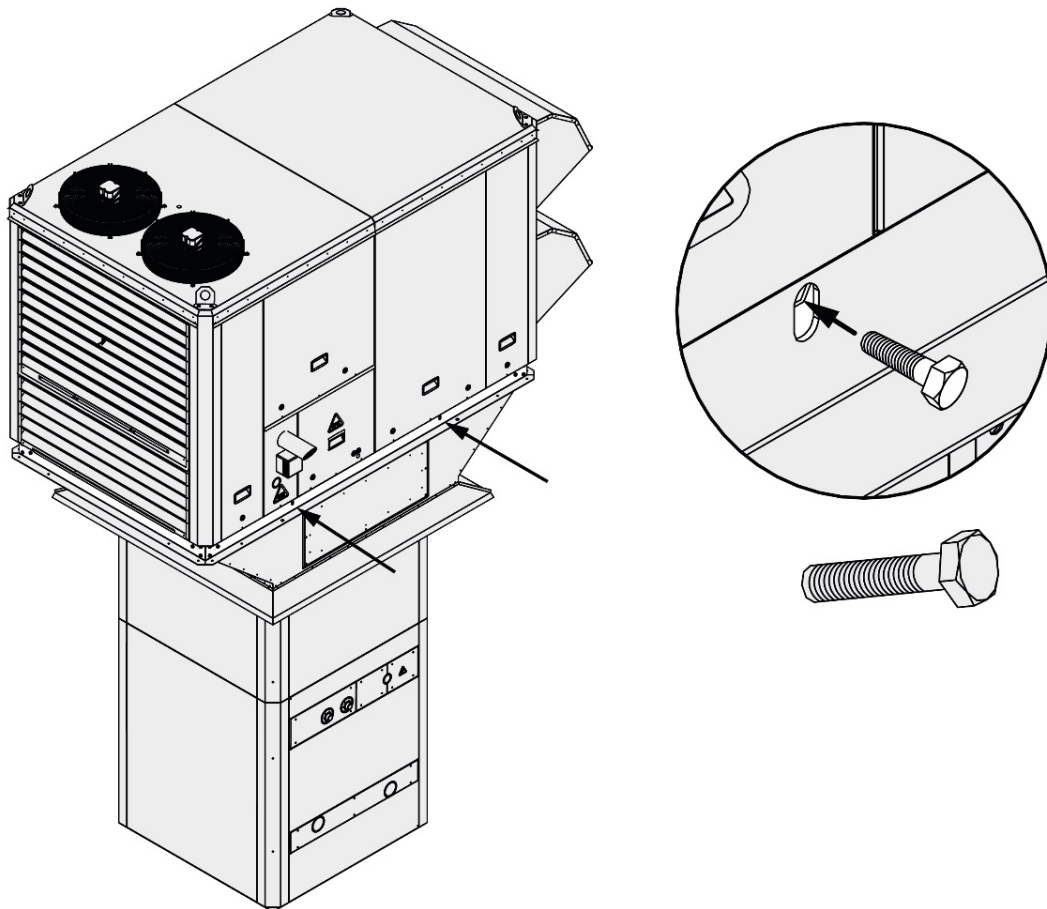


(bottom view)

Open the service panel and route cables as shown in the figure [2].



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



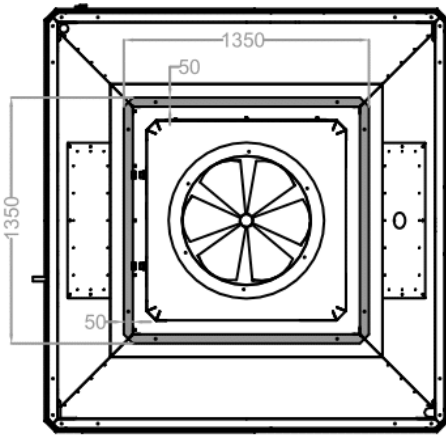
- Before placing the unit on the base it is necessary to lead the cables from air supply module to the control cabinet..
- It is necessary to seal the area of connection between the module and the unit.

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

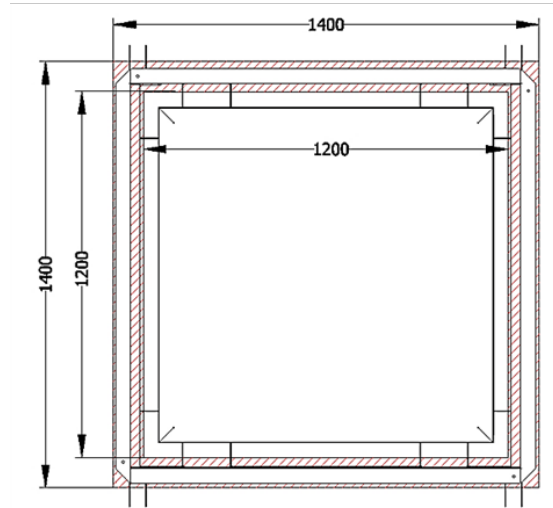
For the Cube 40 NWL, as additional accessories there is a base that serves as a roof transition and an adapter for the swirl diffuser. The base supporting frame, under which the substructures shown in the drawing [1] should be designed.

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 figures [2], [3].

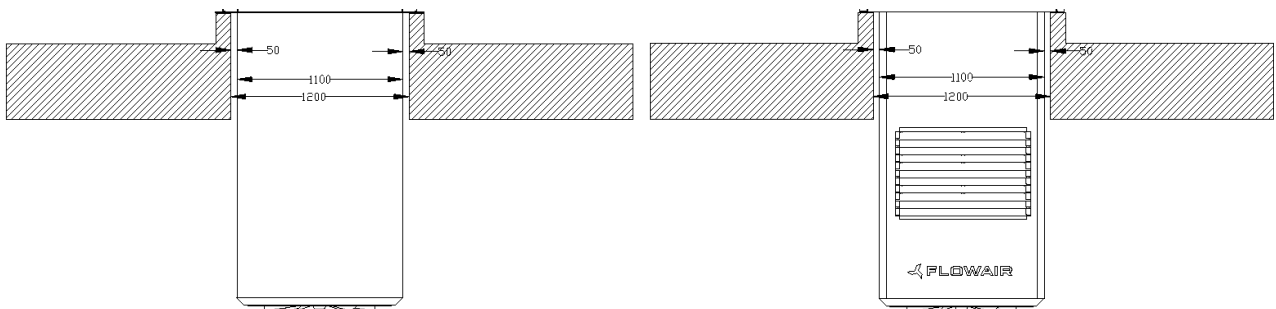
1.



2.



3.

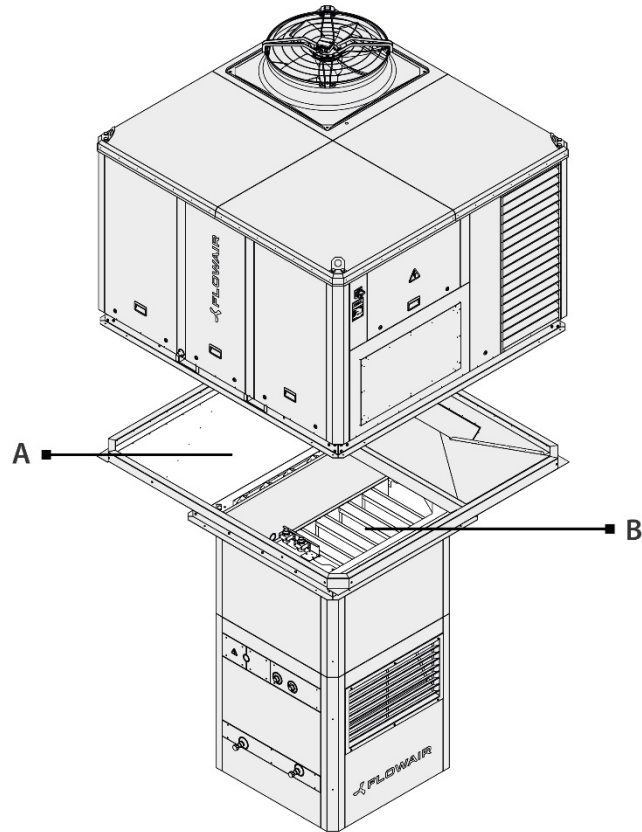


- Device should be attached to the frame in a way that prevents any movement. It is recommended to use rubber spacers between the device and the mounting frame.
- Install unit in such way that inlet and exhaust are not directed to windward.

## 2.5. NWL installation (Cube 40 NWL)

During the foundation, pay attention to the correct assembly in relation to the ducts.

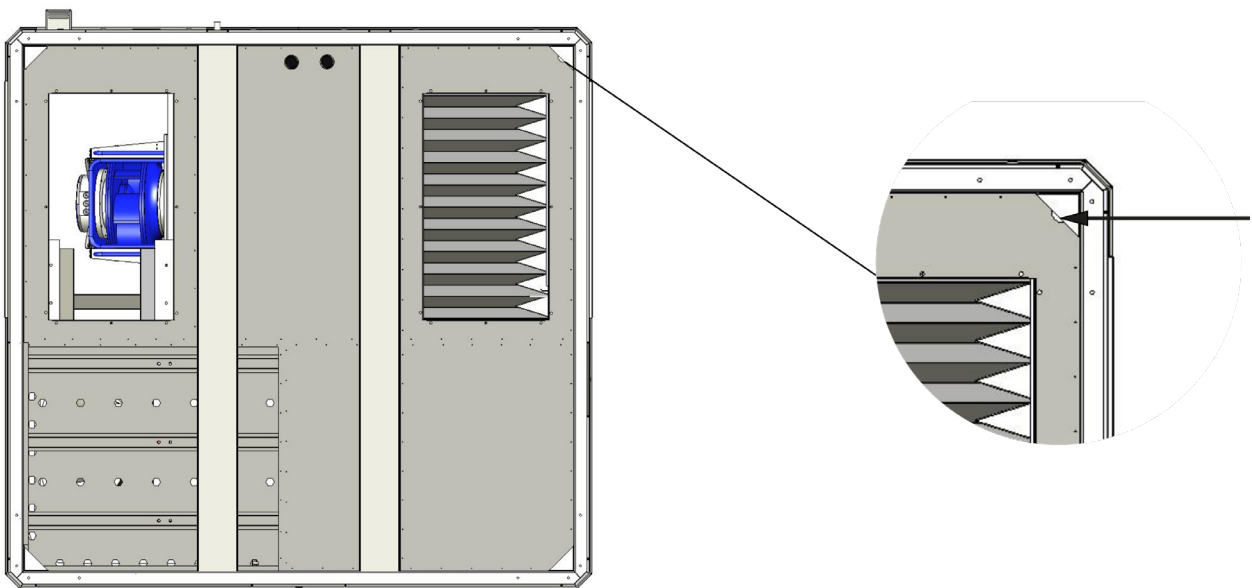
|   |                 |
|---|-----------------|
| A | Supply channel  |
| B | Exhaust channel |



Before placing the device on the NWL air supply module, unscrew the transport rail. Then, through the prepared openings, route the power and control cables from the supply air module to the device control cabinet as described below.

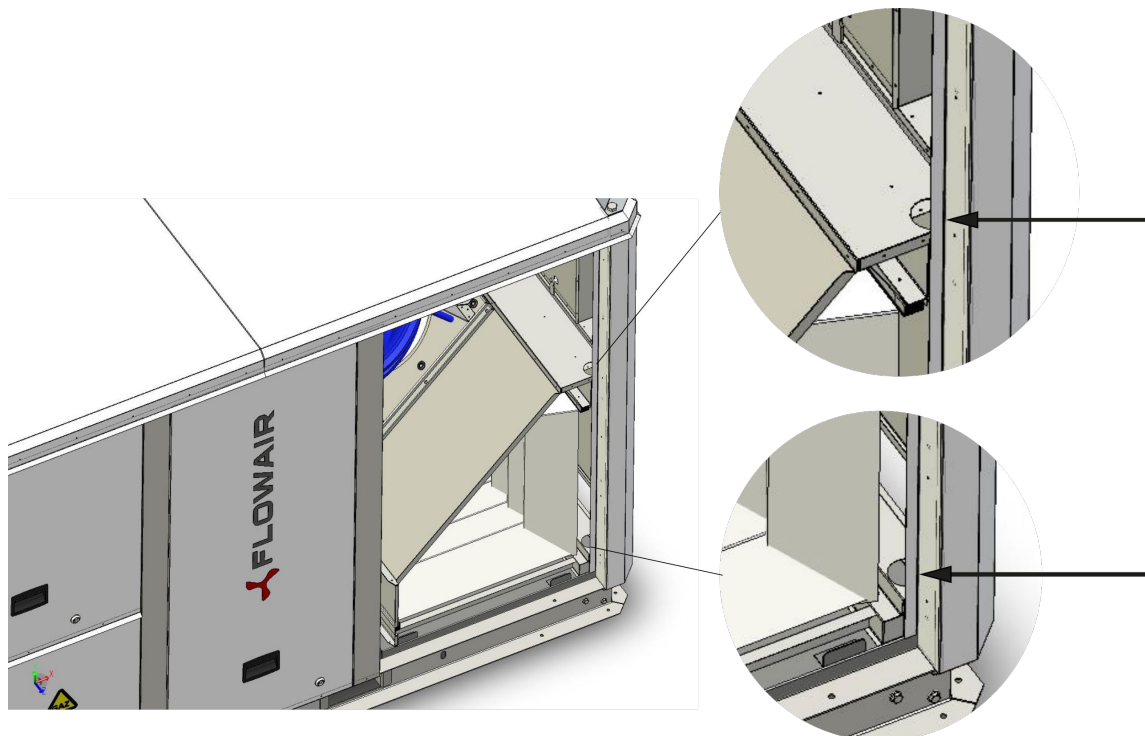
### Cube 40

Through the prepared openings, route the power and control cables from the supply air module to the device control cabinet [1].

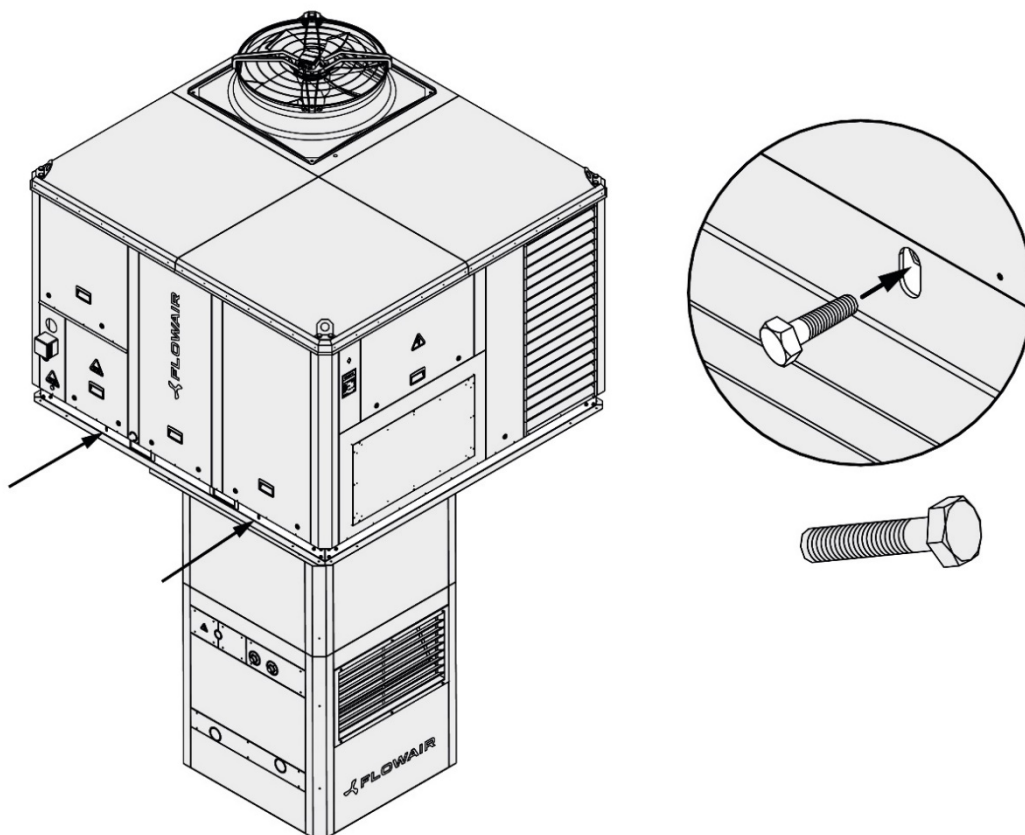




Open the service panel and route cables as shown in the figure [2].



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



- Before placing the unit on the base it is necessary to lead the cables from air supply module to the control cabinet..
- It is necessary to seal the area of connection between the module and the unit.

## 2.6. 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.

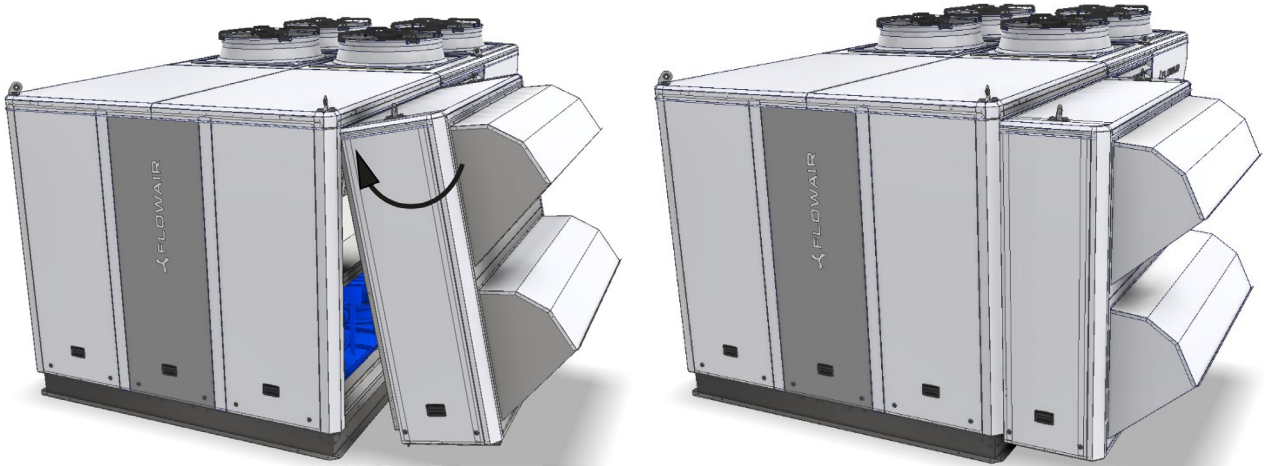


- Connection must be done with the blind rivets. Do not use screws witch might loosen doe to vibration.
- Protection covers in Cube 50/60 must be fastened with supplied bolts.
- The covers should be screwed to the device using the mounting screws included in the set.

## 2.7. Heat recovery unit installation Cube 80/100 L i Cube 120/160 R

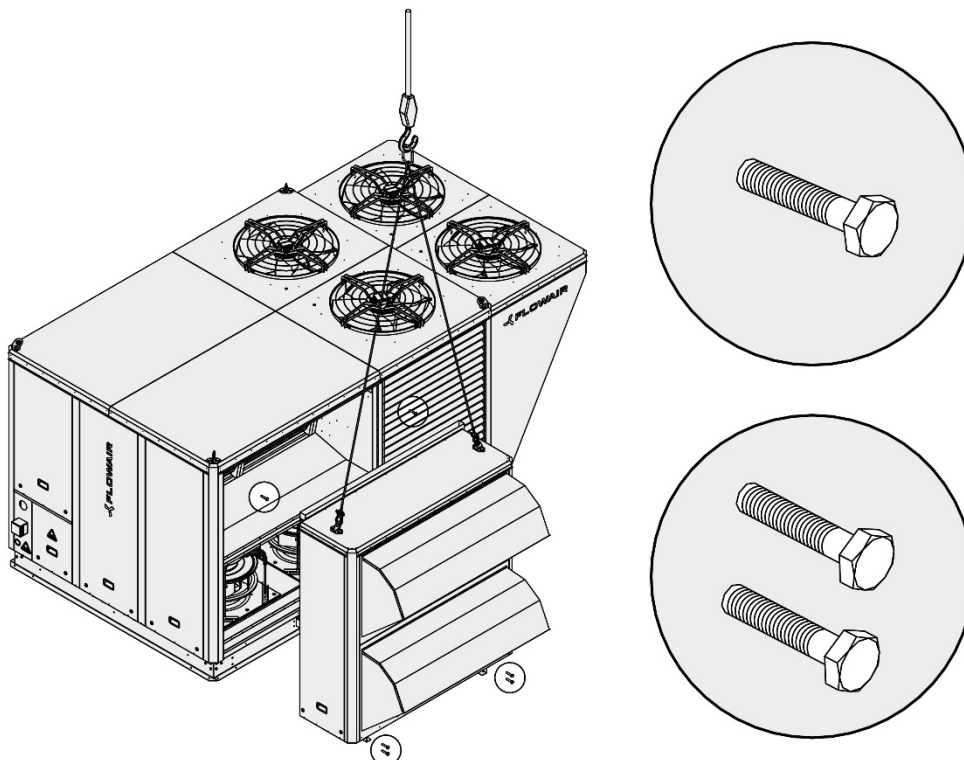
For Cube 80/100 L and Cube 120/160 R units, a rotational heat recovery exchanger is delivered as a separate module. Installation is based on horizontal connection of the heat recovery module to the device, the upper part of the heat recovery module should be slid under the edge of the device's roof [1].

1.



Installation is done by means of four provided screws [2]. 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.

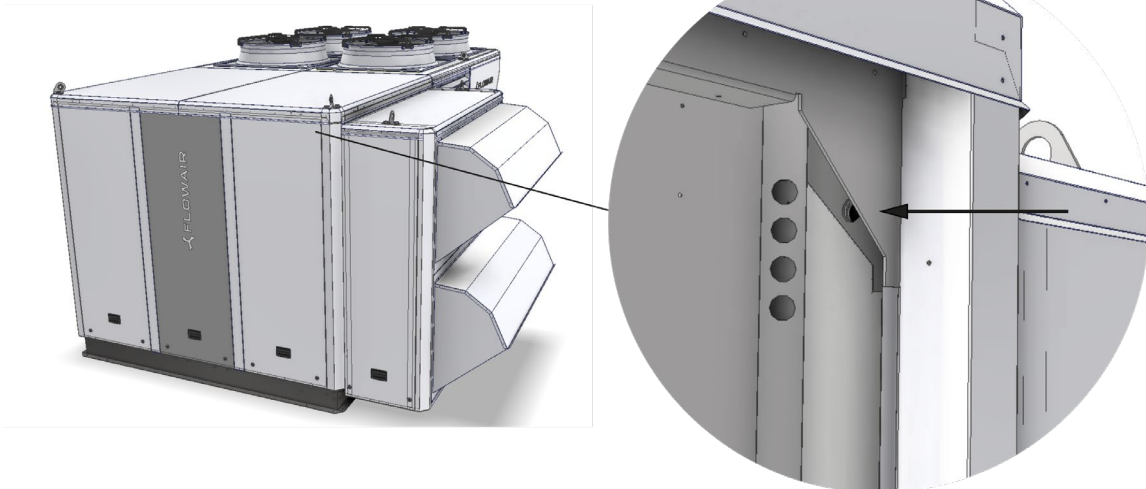
2.



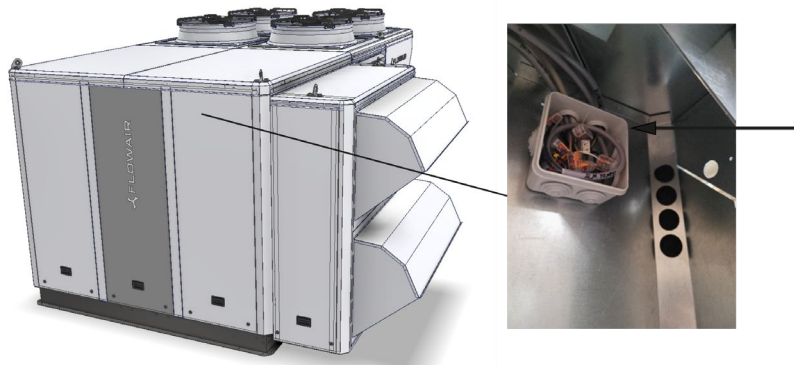
It is unacceptable to assemble the module together with the device prior to transporting the whole device to the roof on site. It's important to note that The screws transfer only the static load of the heat recovery module.

The upper nodes should be screwed M10 with single bolts and the access from the inspection side is available when the door panel of the heat recovery module [3] is removed and on the opposite side through the inspection hole specially prepared for this purpose [4]. 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.

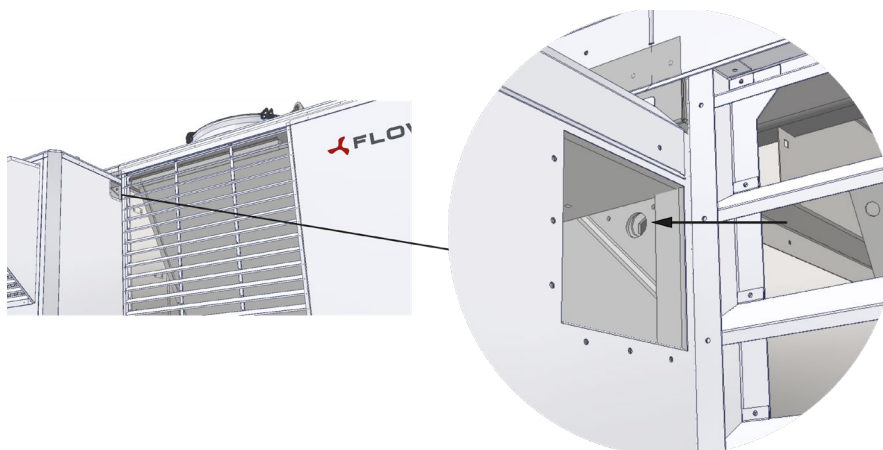
3.



During installation, remember to route the power and control harness and connect the wires in the electrical box.



4.



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



The Cube 120/160 R / Cube 80/100 L cannot be raised with the heat recovery module attached. Installation of the heat recovery module to the Cube device should be done on the roof, after mounting the Cube device. Installation is carried out in accordance with the guidelines presented later in this manual.

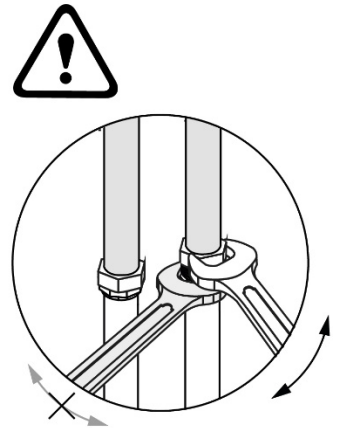
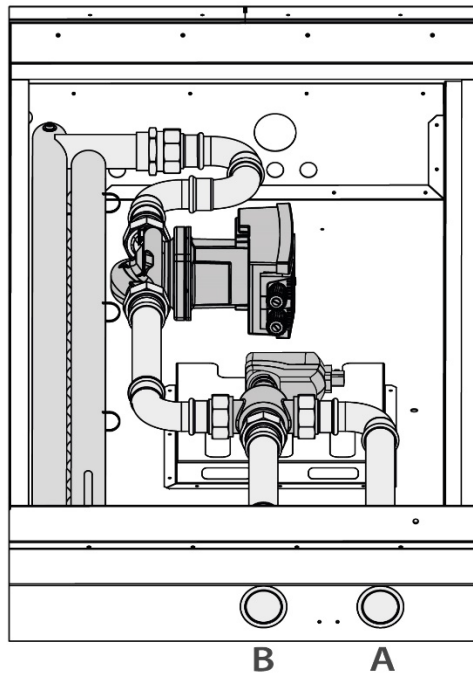
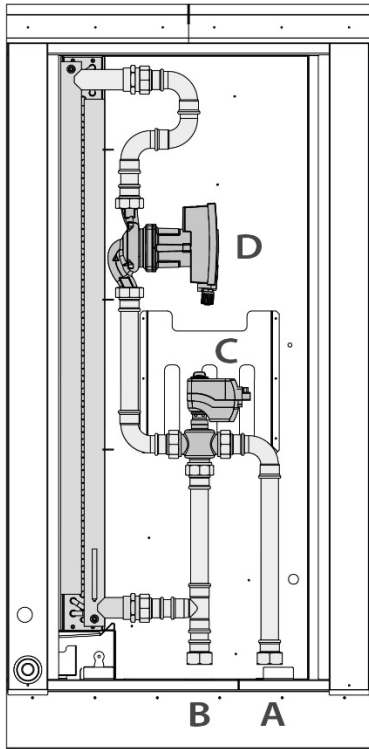
### 3. INSTALLATION

#### 3.1. Hydraulic connection - units for duct installation

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.



During assembly of the installation it is absolutely necessary to immobilize the exchanger's connector pipes (counter).



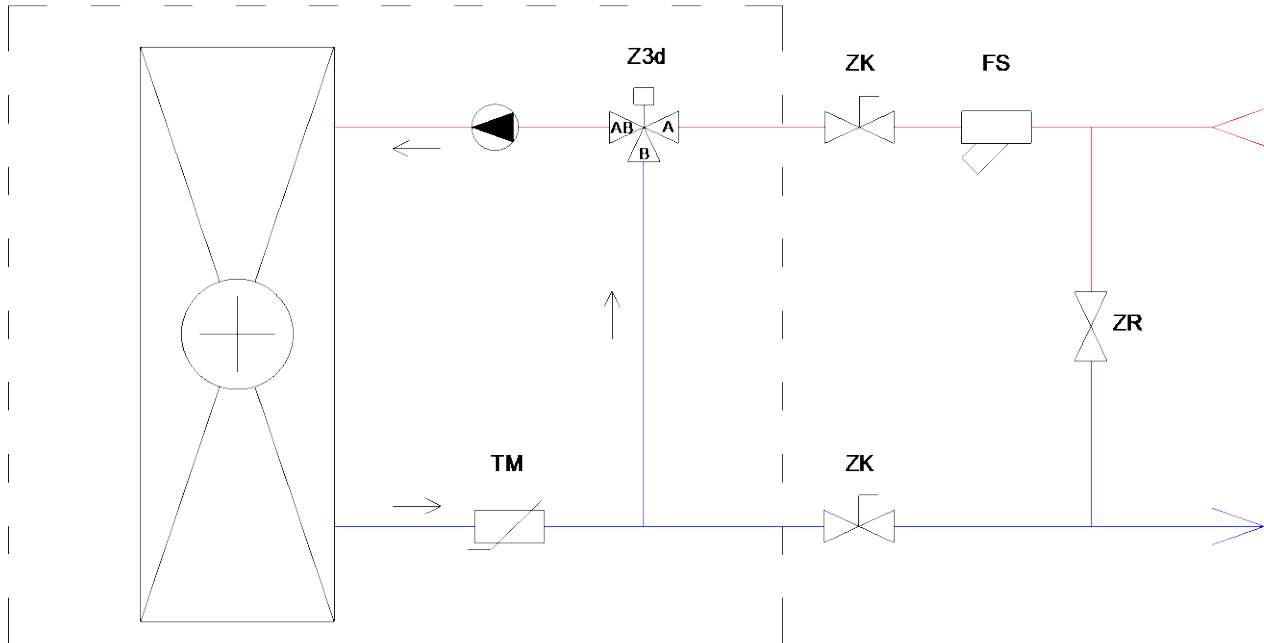
| Hydraulic system |                                                                                                   |
|------------------|---------------------------------------------------------------------------------------------------|
| A                | Connection supplying water heat exchanger with heating medium                                     |
| B                | Water heat exchanger return connection                                                            |
| 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) |



- A water filter must be installed. It is required to protect the hydraulic system.
- Make sure there is easy service access to the connection stub.

### 3.2. Hydraulic hub chart for water heater in the rooftop unit

#### CUBE W



ZK – shut-off valve  
ZR – regulating valve  
TM – temperature sensor

Z3d – 3-way valve with actuator  
FS – mesh filter



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

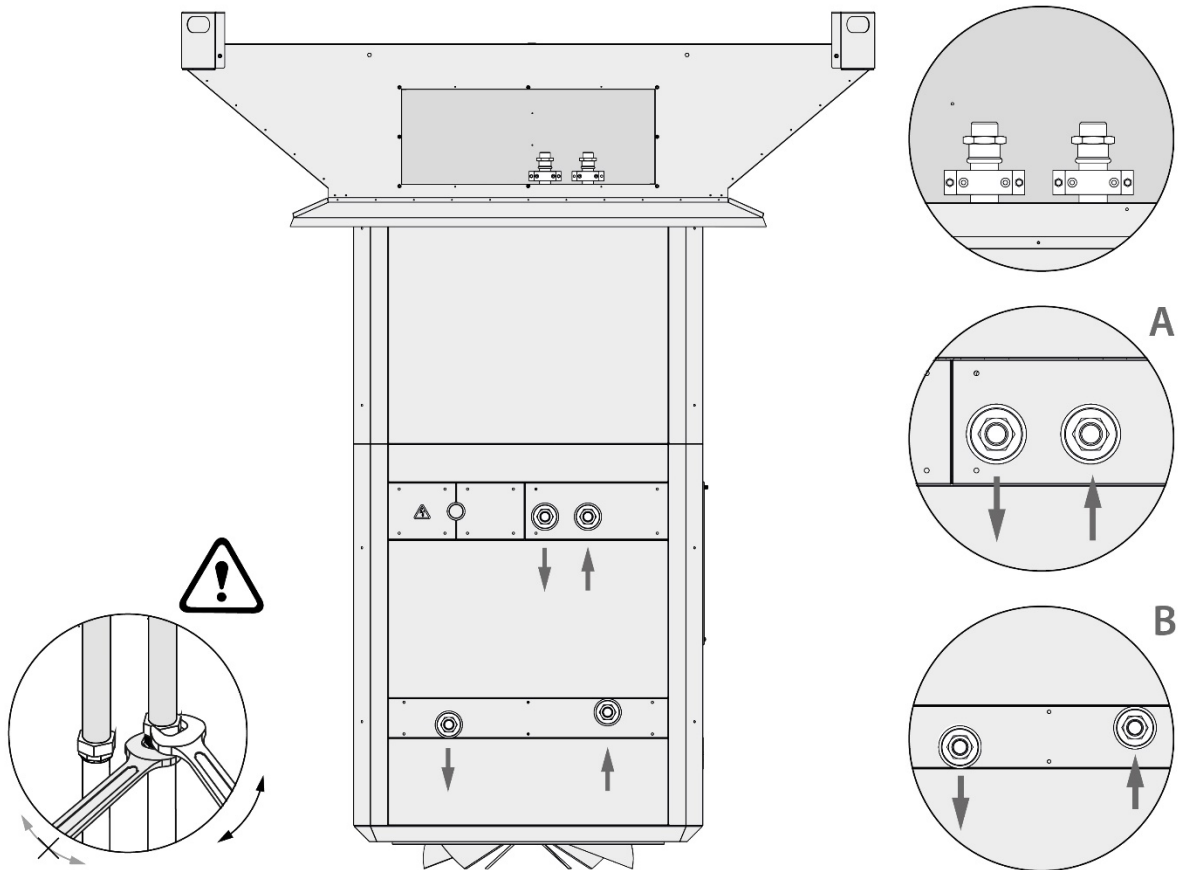
### 3.3. Hydraulic connection – units dor ductless installation

The supply module allows you to connect the water supply to the water heater located in the roof section (A) and to the water heater located in the supply module (B). In case of a device configuration with an exchanger in the roof section when placing the Cube on the supply air module, connect the flexible pipe stubs to the connections through the inspection hatch - as shown in the picture.

Cube units in configuration with a water heat exchanger are equipped with a three-way mixing valve. The three-way valve is transported in the device control cabinet. The valve should be installed in accordance with the hydraulic diagram of this manual.



During assembly of the installation it is absolutely necessary to immobilize the exchanger's connector pipes (counter).



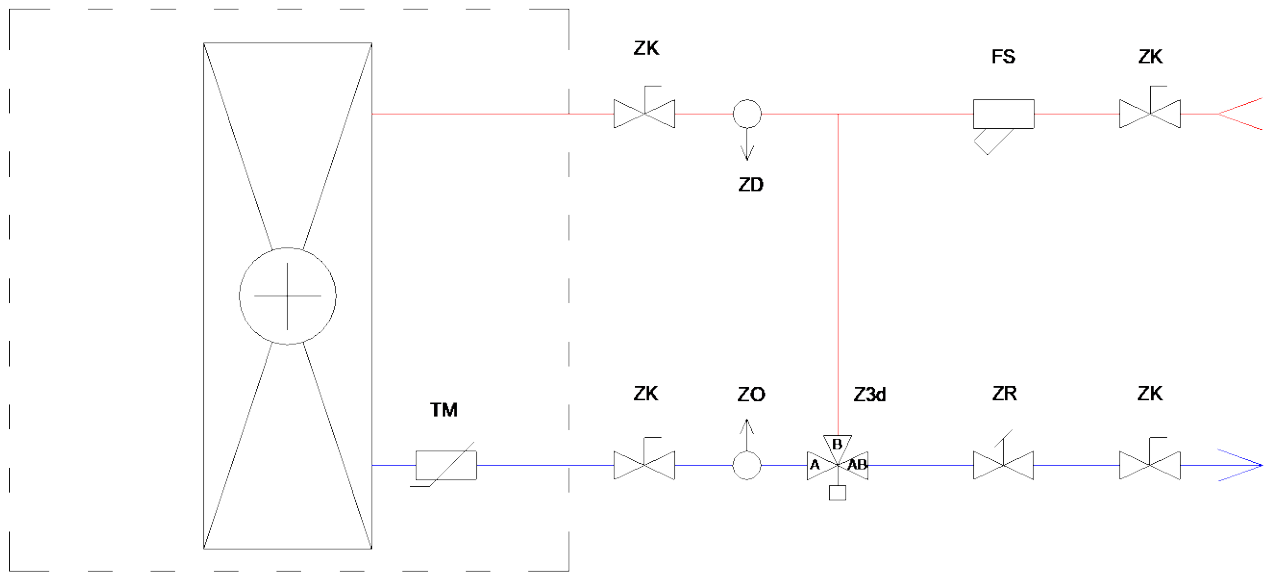
| Hydraulic system |                                                  |
|------------------|--------------------------------------------------|
| A                | Water heater connection in the roof section      |
| B                | Water heater connection in the supply air module |



- A water filter must be installed. It is required to protect the hydraulic system.
- Make sure there is easy service access to the connection stub.
- For Cube units with a supply module (NWS-W; NWL-W) equipped with a water heat exchanger located in the supply air module, no built-in circulation pump is supplied.

### 3.4. Hydraulic hub chart for water heater in the NW module

#### NWS - W / NWL - W



ZK – shut-off valve  
 ZO – vent valve  
 ZD – drain valve  
 TM – temperature sensor

ZR – regulating valve  
 FS – mesh filter  
 Z3d – 3-way valve with actuator



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



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.

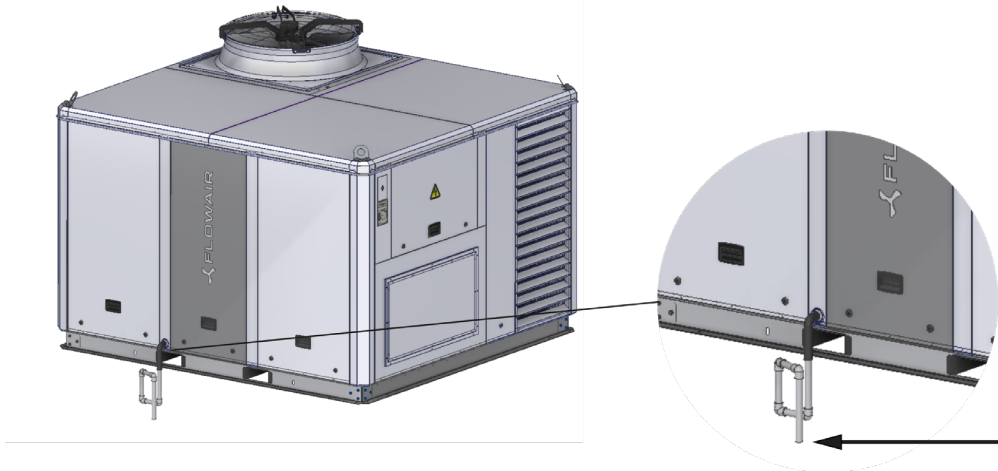


### 3.5. Condensation drain

Cube units are equipped with plate exchangers, acting as water supplied heat exchanger and compressor system's evaporator/condenser. Condensate precipitation is possible. The Cube unit's in the set are equipped with a condensation drain and a siphon.

Please ensure proper drainage of excess condensate to the plant's plumbing installation according to pictures below.

#### CUBE 20 / CUBE 40



#### CUBE 50 – 100

The excess condensate is drained from the bottom of the device in the place shown in the figures below.



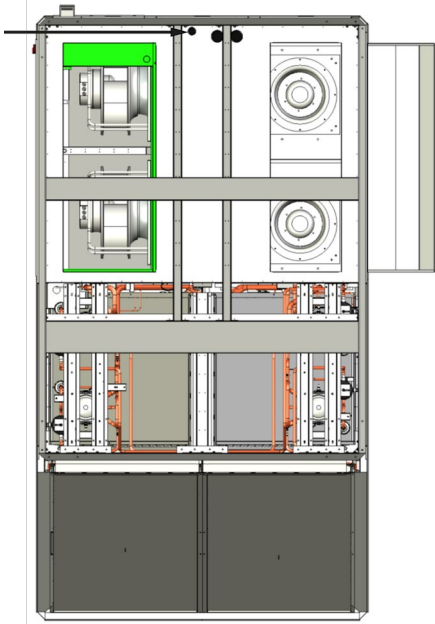
(bottom view)



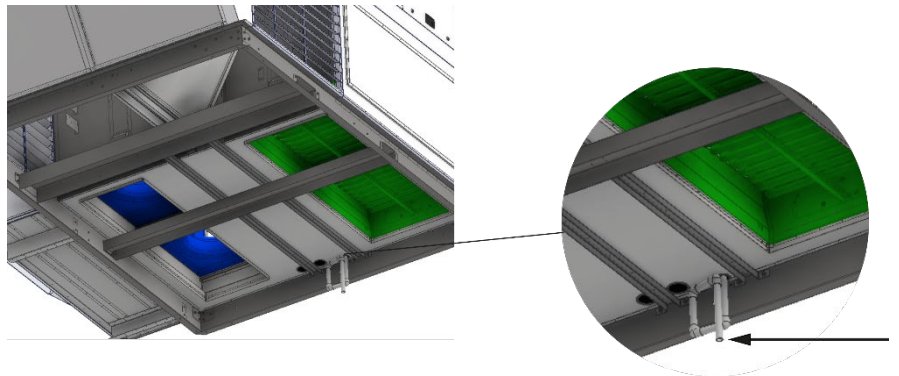
Remember to periodically check the water level in the siphon.  
It is necessary to install the condensate drainage on your own if it is needed.

## CUBE 120/160

The excess condensate is drained from the bottom of the device in the place shown in the figures below.



(bottom view)



Remember to periodically check the water level in the siphon.  
It is necessary to install the condensate drainage on your own if it is needed.

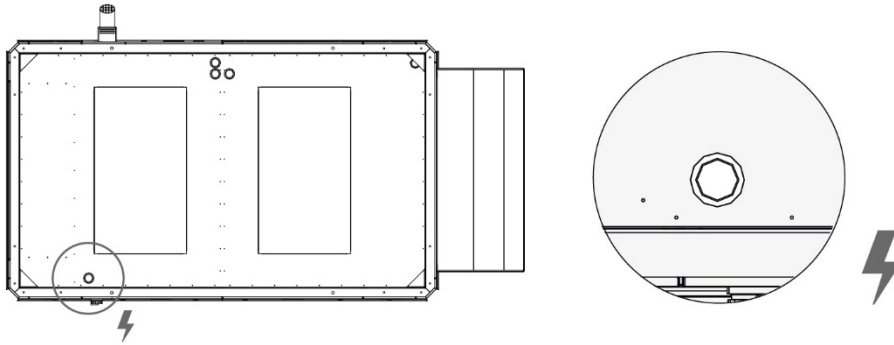
### 3.6. Electric connection

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.

The following pictures show where to route the power cord for each device.

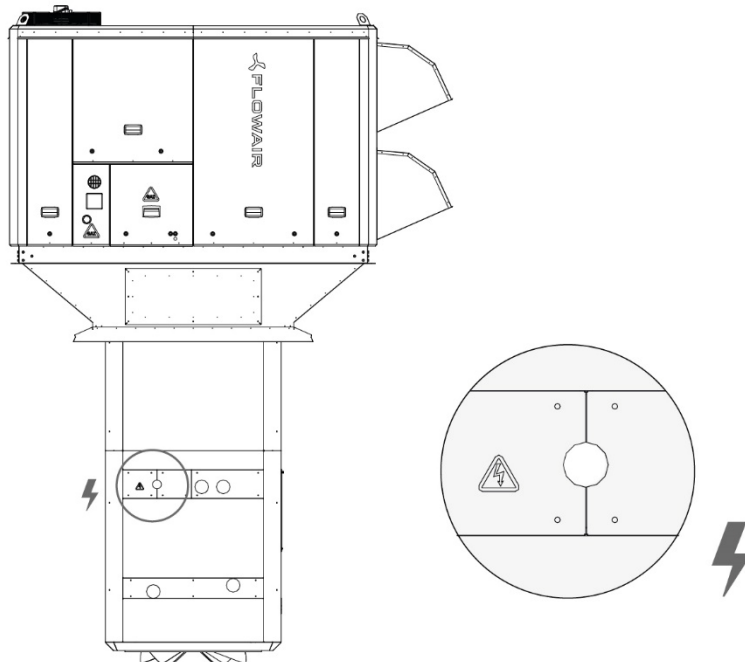
#### Cube 20

The power cord of the device should be led through the prepared openings to the automation cabinet cover. Then the cable should be connected to the ZUG terminals as described in the further part of the description.



#### Cube 20 NWS

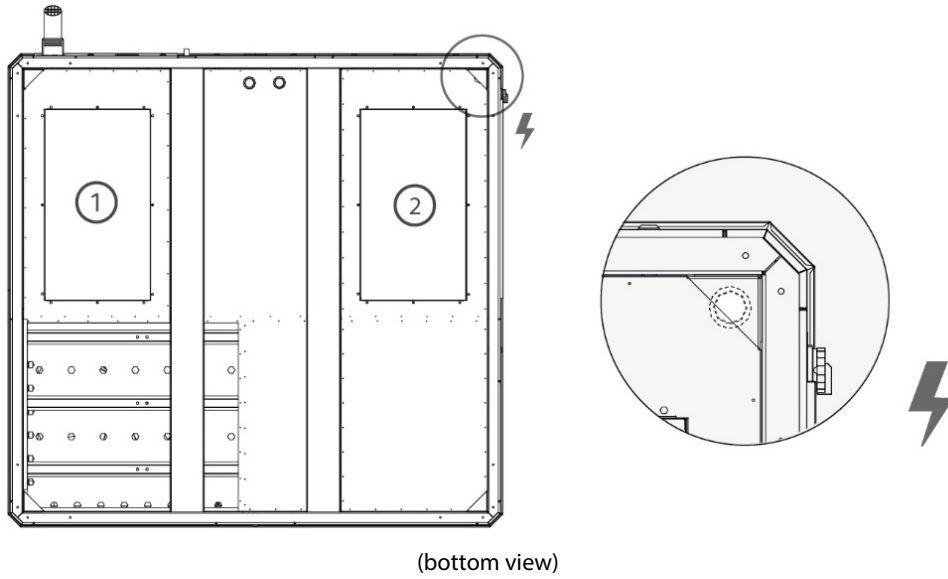
The power cord of the device should be led through the prepared hole in the supply air module. Then the cable should be connected to the ZUG terminals as described in the further part of the description.



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.

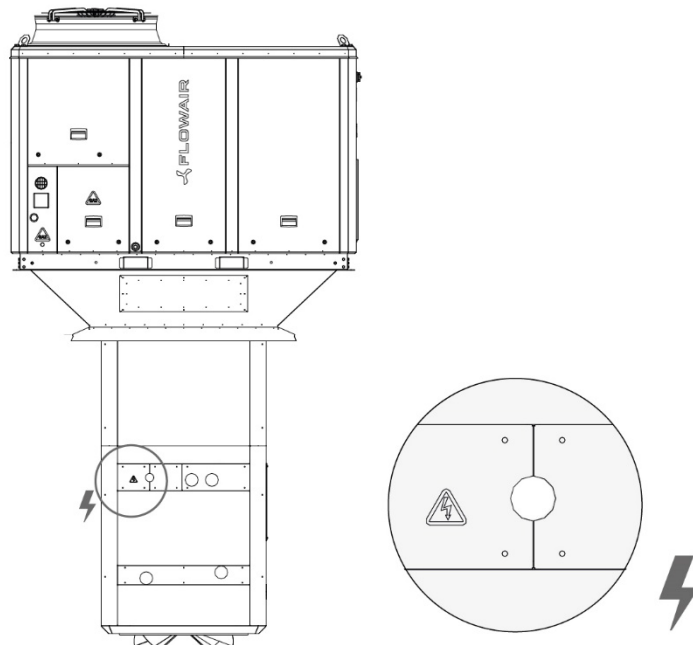
### Cube 40

The power cord of the device should be led through the prepared hole to the automation cabinet cover. Then the cable should be connected to the ZUG terminals as described in the further part of the description.



### Cube 40 NWL

The power cord of the device should be led through the prepared hole in the supply air module. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

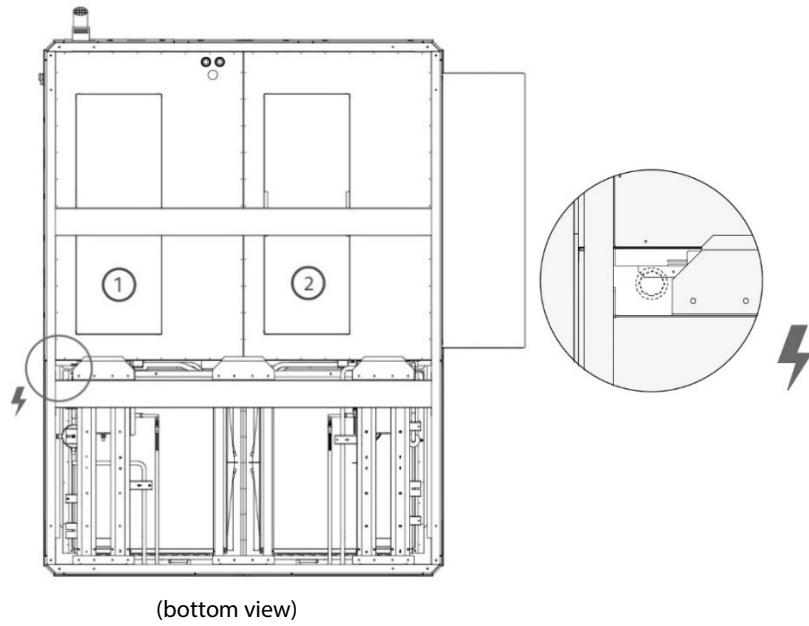


All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.

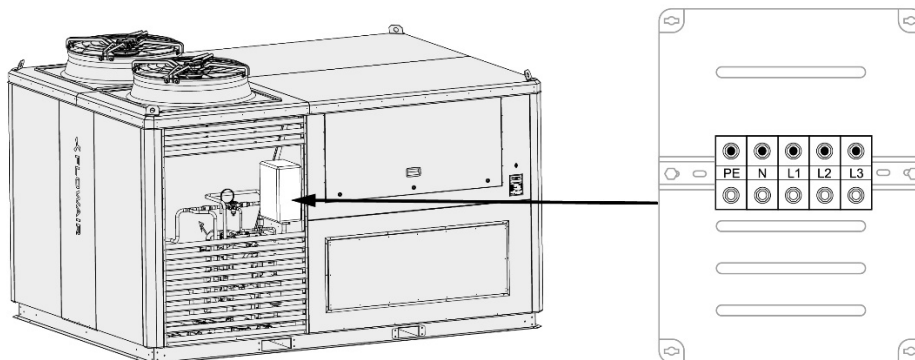
### Cube 50 / 60

The power cord of the device should be led through the prepared hole [1] to the ZUG terminals in the cooling section [2]. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

1.



2.

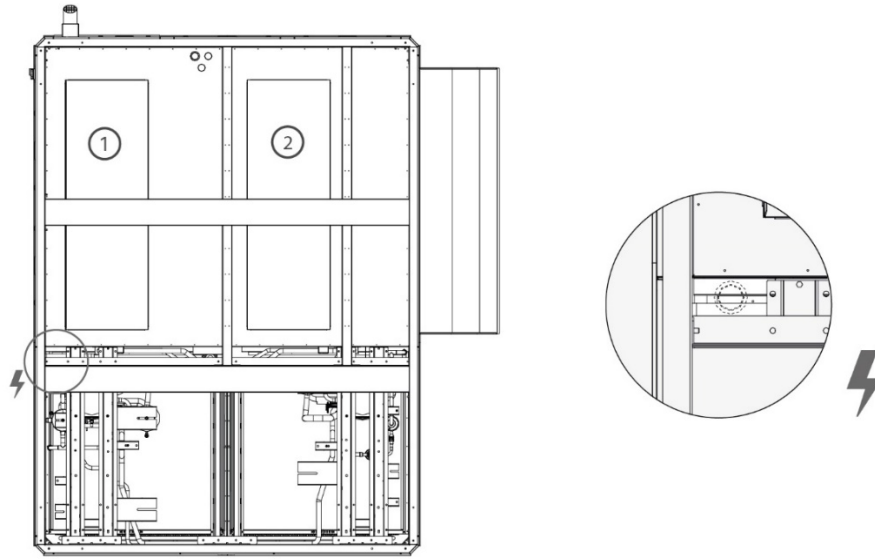


All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.

### Cube 80 / 100

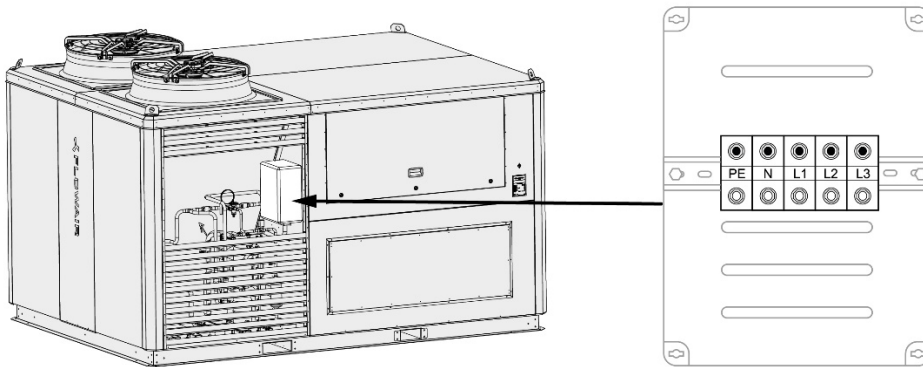
The power cord of the device should be led through the prepared hole [1] to the ZUG terminals in the cooling section [2]. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

1.



(bottom view)

2.

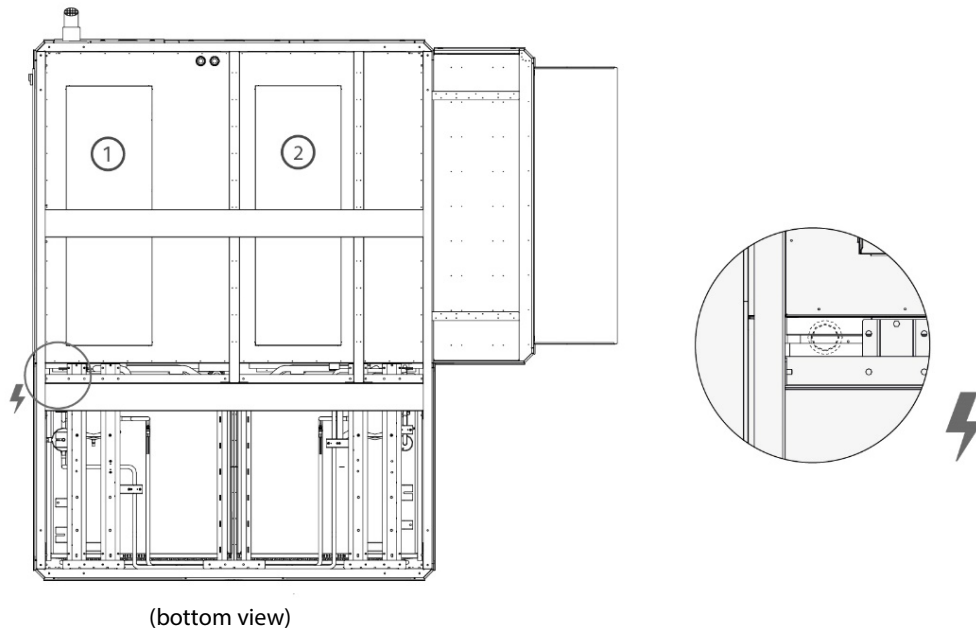


All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.

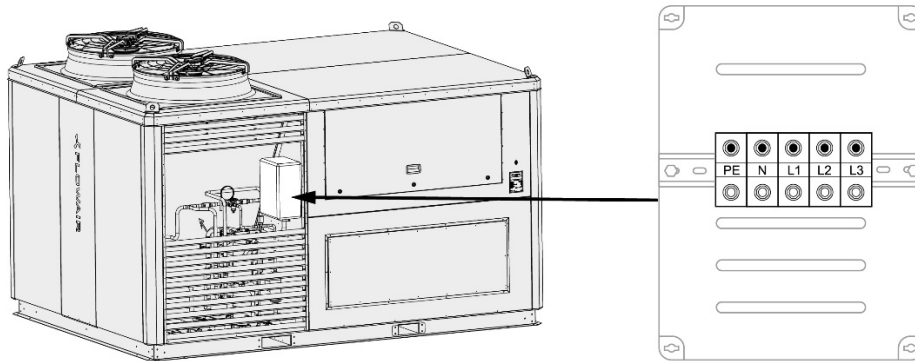
### Cube 80 / 100 L

The power cord of the device should be led through the prepared hole [1] to the ZUG terminals in the cooling section [2]. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

1.



2.

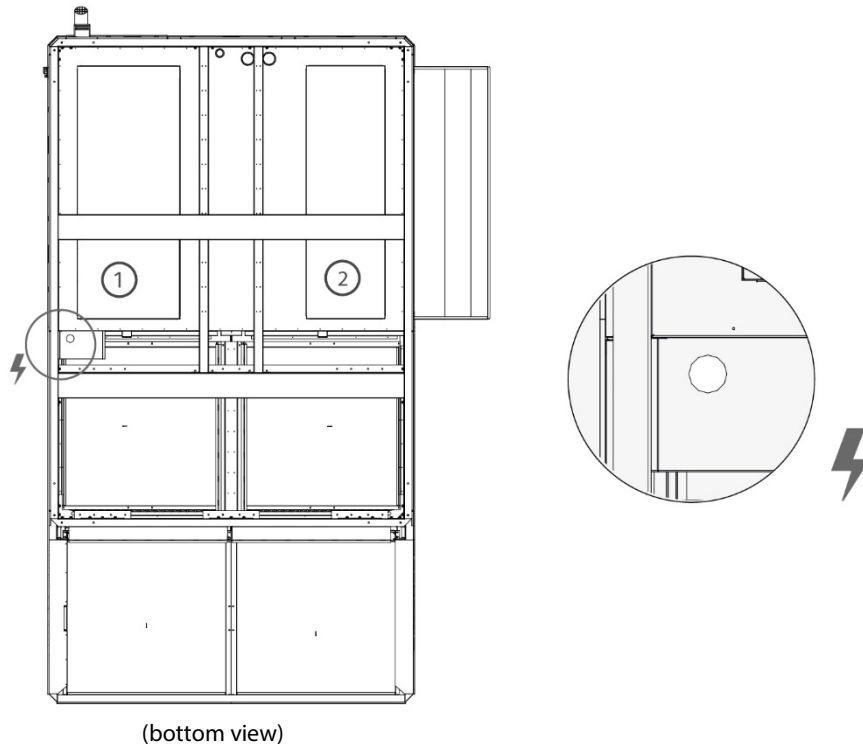


All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.

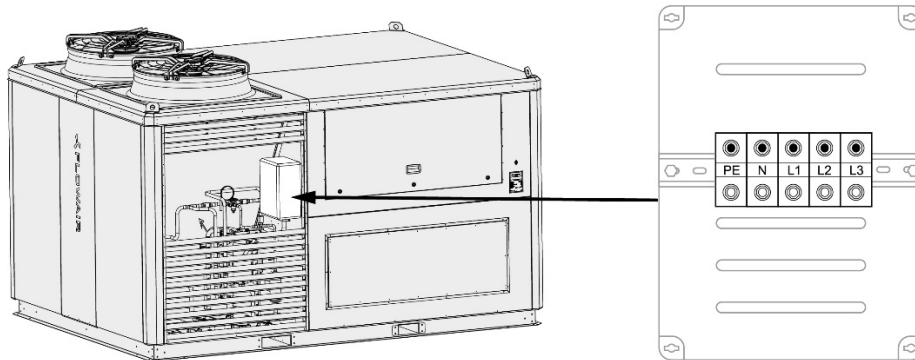
### Cube 120 / 160 B

The power cord of the device should be led through the prepared hole [1] to the ZUG terminals in the cooling section [2]. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

1.



2.



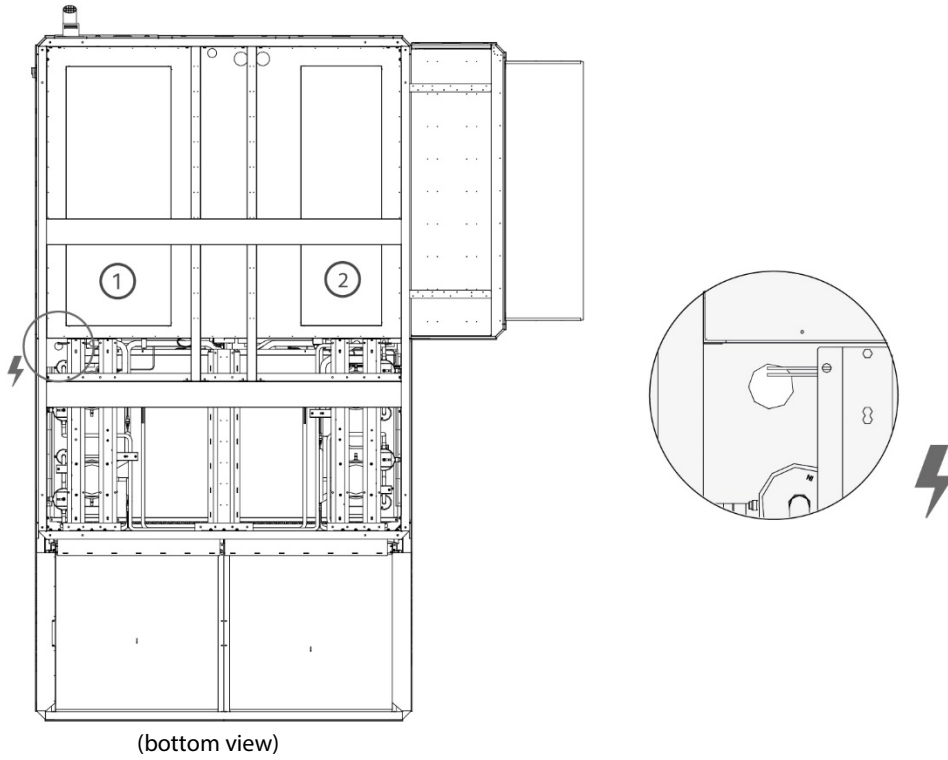
All activities during connecting to electrical installation must be conducted by qualified staff, having necessary permissions and certificates to work with live electrical devices according to the laws of the country.



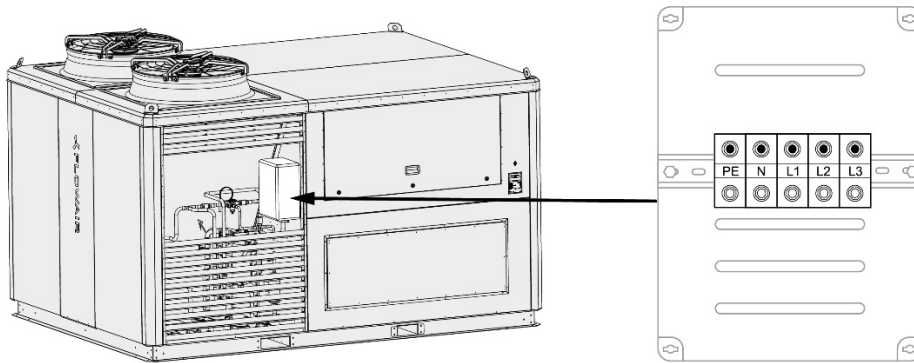
### Cube 120 /160 R

The power cord of the device should be led through the prepared hole [1] to the ZUG terminals in the cooling section [2]. Then the cable should be connected to the ZUG terminals as described in the further part of the description.

1.



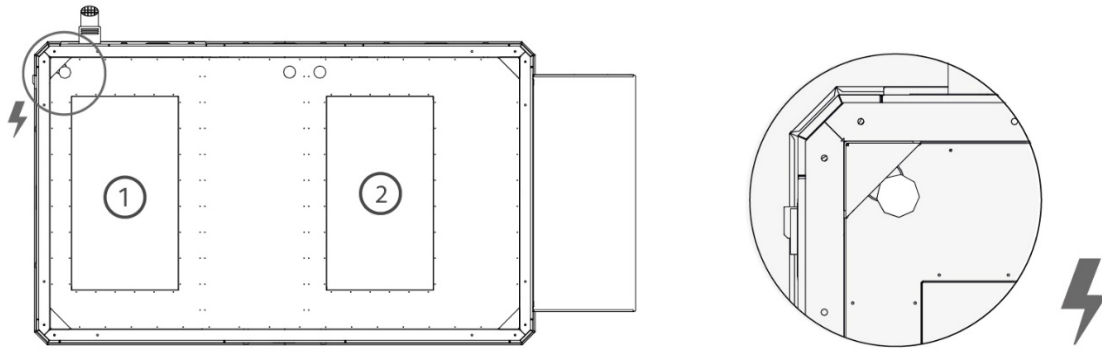
2.



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.

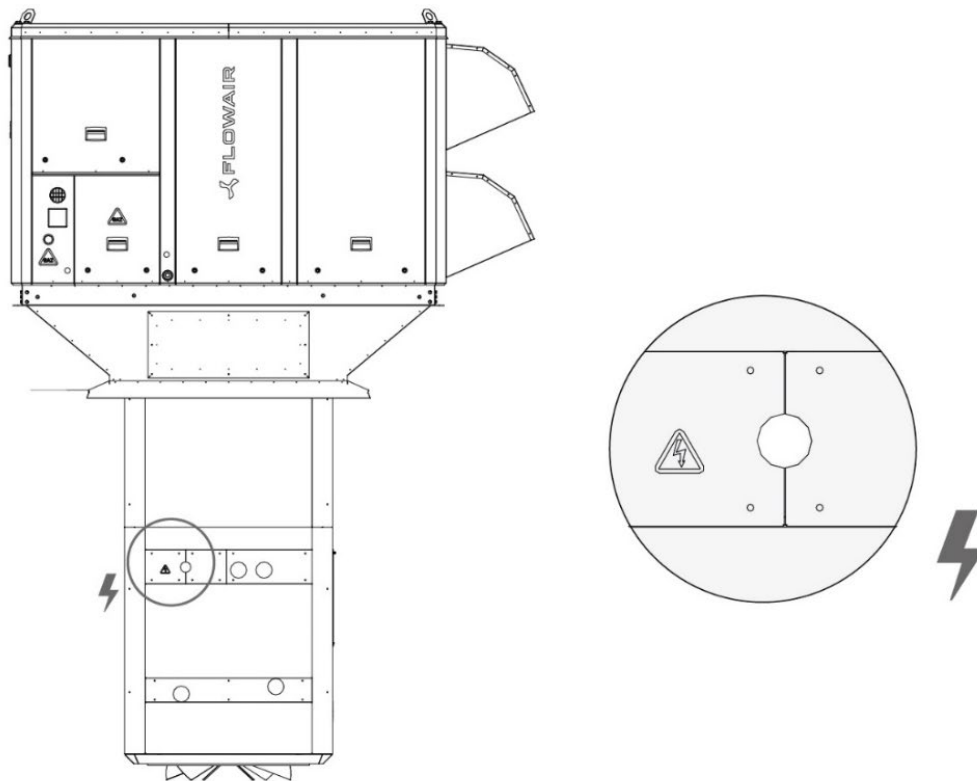
### Cube R8

The power cord of the device should be led through the prepared hole to the automation cabinet cover. Then the cable should be connected to the ZUG terminals as described in the further part of the description.



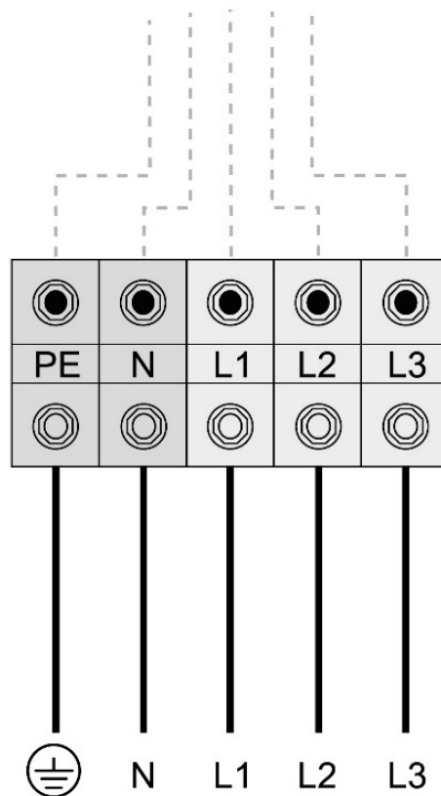
### Cube R8 NWS

The power cord of the device should be led through the prepared hole in the supply air module. Then the cable should be connected to the ZUG terminals as described in the further part of the description.



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.

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 (not applicable Cube R8/20) - NO PHASE / PHASE ASYMMETRY - RED LED.



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.



- Remember to ground the unit and to use lightning rod to secure the unit.
- Copper cable must be used.
- Incorrect phase sequence prevents the device from being switched on.

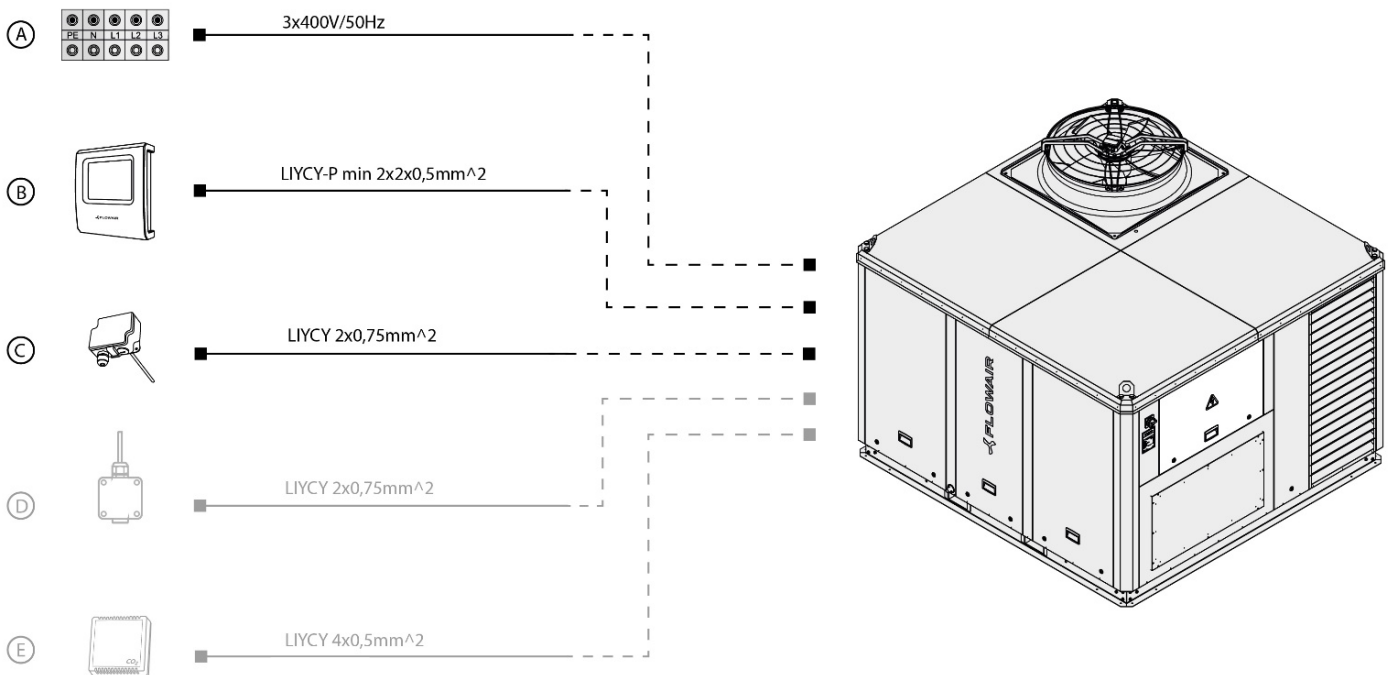
### 3.7. Installation flow chart

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.

#### T-box - Cube



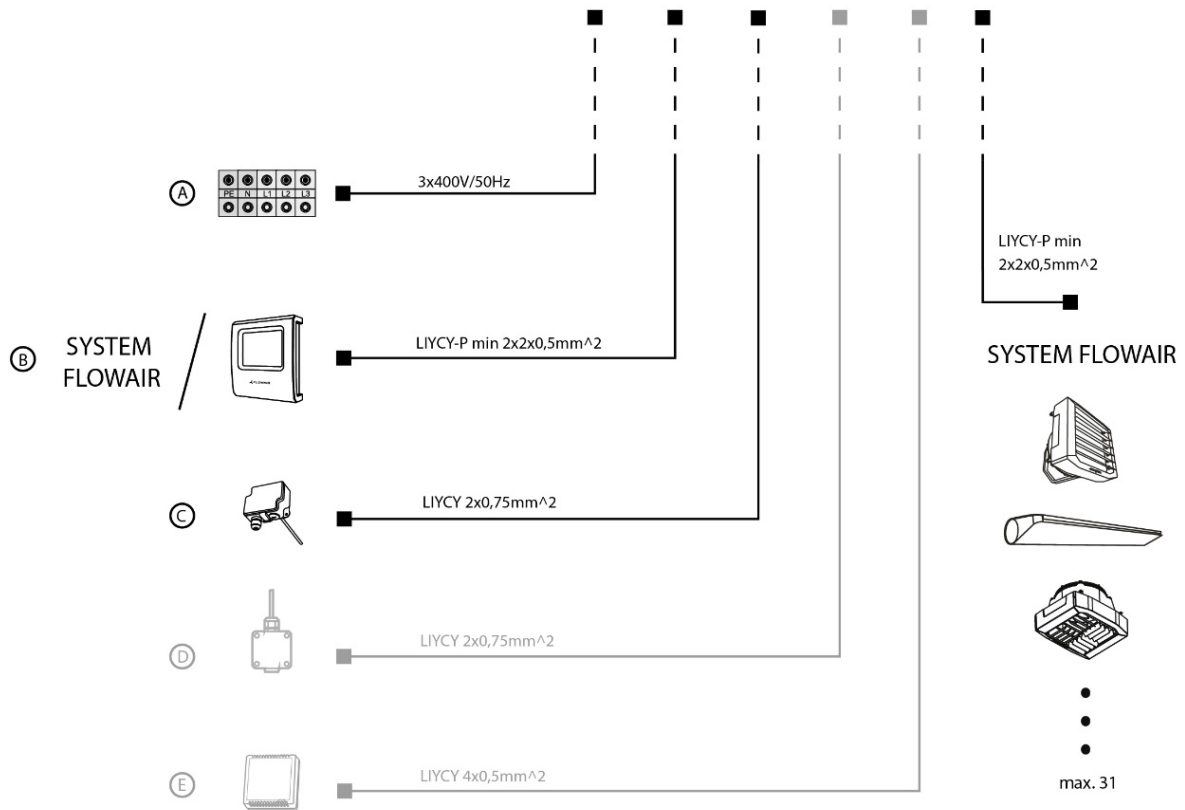
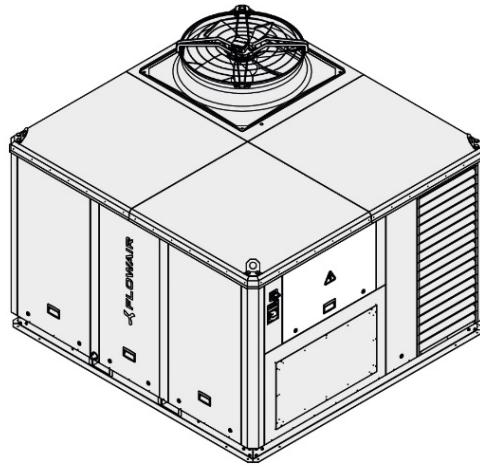
|   |                                    |
|---|------------------------------------|
| A | Power supply                       |
| B | Controller T-box                   |
| C | Duct air supply temperature sensor |
| D | Optional temperature sensor        |
| E | Optional CO2 detector              |



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.

## Cube as part of the System Flowair

|   |                                    |
|---|------------------------------------|
| A | Power supply                       |
| B | Controller T-box                   |
| C | Duct air supply temperature sensor |
| D | Optional temperature sensor        |
| E | Optional CO2 detector              |



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.

## 4. START-UP AND EXPLOITATION

### 4.1. 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.

### 4.2. Gas heater

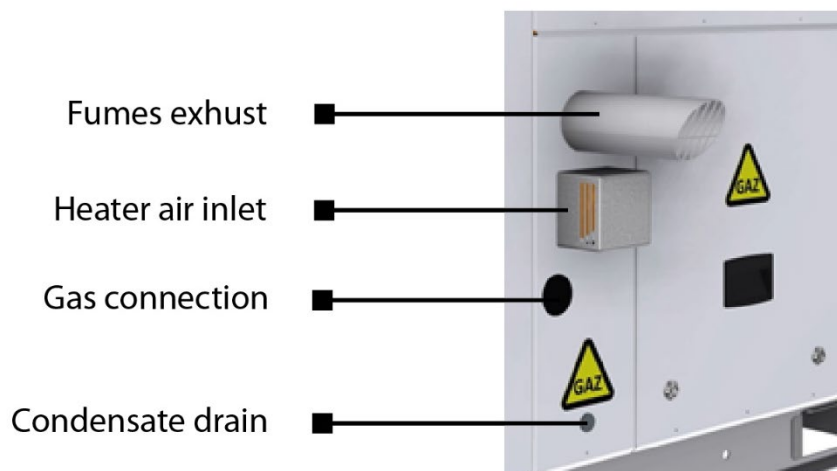
Gas connection to device can be conducted only by qualified staff with proper attestations.

Przed każdym urządzeniem należy zamontować zawór odcinający, w miejscu łatwo dostępnym dla użytkownika. Zaleca się również montaż siatkowych filtrów gazowych przed każdym urządzeniem. Stosowanie takich filtrów zabezpiecza wewnętrzną armaturę gazową (elektrozawór) przed zanieczyszczeniami oraz pozwala na szybkie i pewne odpowietrzenie instalacji bez konieczności rozkręcania instalacji (jest to szczególnie istotne podczas pierwszego uruchomienia).

Make sure there is easy service access to the connection stub.

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.



First launch must be conducted by authorized service staff.

**Caution high exhaust gas outlet temperature.**



**The condensate drainage system from the gas heater must be adapted to the designed operating conditions, taking into account local regulations.**

An additional nozzle must be purchased when using a gas other than G20, G30 or G31. The nozzles can be purchased by contacting the manufacturer.

| Gas type        | G20     | G27     | G2.350  | G30          | G31            |
|-----------------|---------|---------|---------|--------------|----------------|
| Supply pressure | 20 mbar | 20 mbar | 13 mbar | 30 – 50 mbar | 30 –37-50 mbar |
| Pilot nozzle    | 0,70 mm | 0,75 mm | 0,70 mm | 0,51 mm      | 0,51 mm        |

### 4.3. 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.

Make sure there is easy service access to the connection stub.



- To protect the components of the Cube units, filling of the water systems is required all year round.
- To avoid water exchanger damage caused by freezing, if electrical power is not available, glycol must be used as a refrigerant.



- 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.
- 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.

### 4.4. 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.

### 4.5. Rotational exchanger

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

### 4.6. 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.

### 4.7. 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.

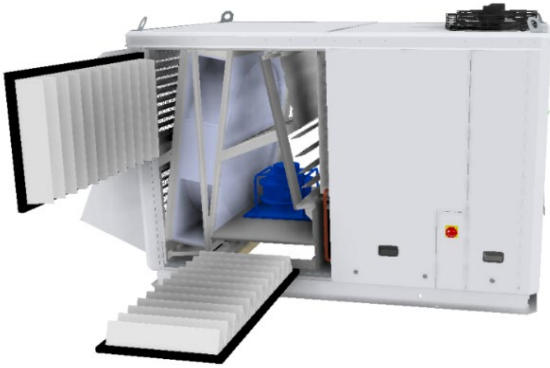
### 4.8. Automation control systems

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.

#### 4.9. 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.

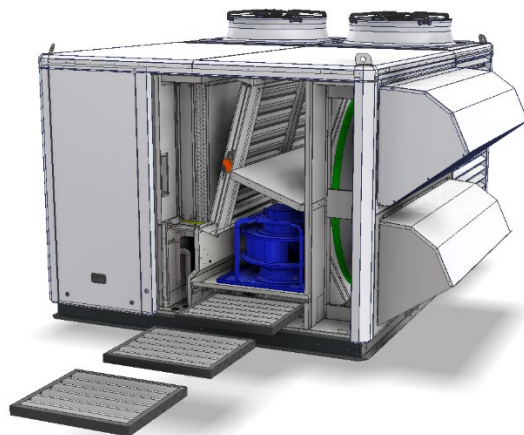
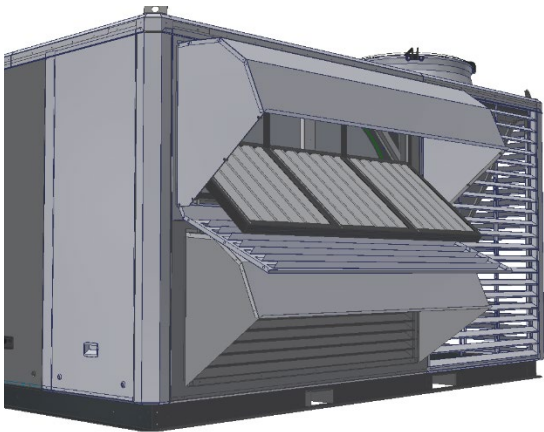
##### Cube 20



##### Cube 40

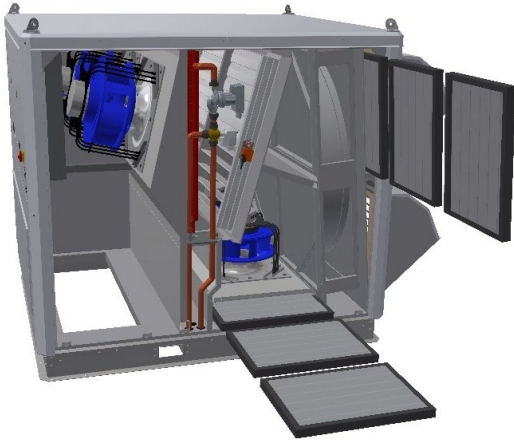


##### Cube 50/60

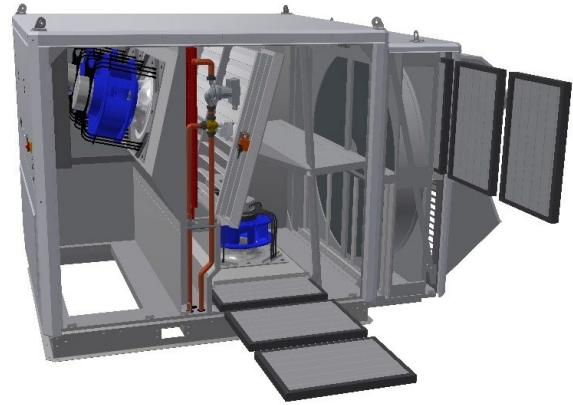




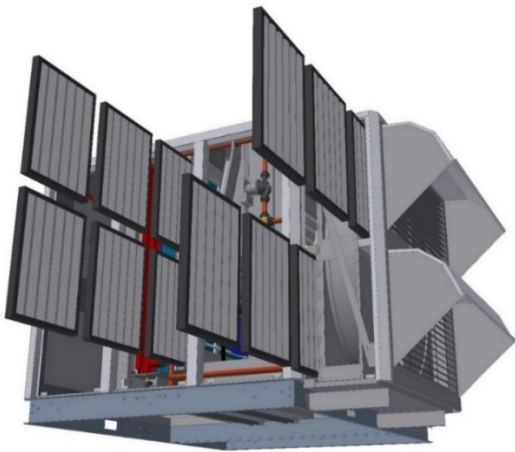
**Cube 80/100**



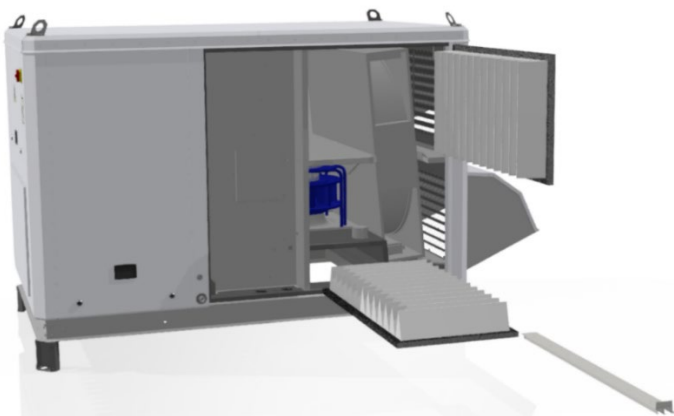
**Cube 80\_100 L**



**Cube 120/160**



**Cube R8**



## 5. RESPONSIBILITY TABLE

|                                                                                                                                                                                                            | <b>Executive company</b> | <b>Manufacturer's service</b> | <b>Remarks</b>                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|--------------------------------------------------------------|
| Placement of the unit in accordance with producers documentation .                                                                                                                                         | X                        |                               |                                                              |
| Leading the cables from supply module to control cabinet.                                                                                                                                                  | X                        |                               | refers to<br>Cube R8 NWS<br>Cube 20 NWS<br>Cube 40 NWL       |
| Connection of power supplies to the connectors in the Cube control cabinet (please observe the correct phase connection).                                                                                  | X                        |                               | refers to<br>Cube R8<br>Cube 20<br>Cube 40                   |
| Connection of power supplies to the connectors in the Cube NW module (please observe the correct phase connection).<br>ATTENTION! Before performing this action please finish the task in the point above. | X                        |                               | refers to<br>Cube R8 NWS<br>Cube 20 NWS<br>Cube 40 NWL       |
| Connection of power supplies to the connectors in the Cube cooling section (please observe the correct phase connection).                                                                                  | X                        |                               | refers to<br>Cube 50 / 60<br>Cube 80 / 100<br>Cube 120 / 160 |
| Lead the power/control cables, temperature sensor and communication cables to the Cube control cabinet according to device documentation.                                                                  | X                        |                               |                                                              |
| Installation of air supply / exhaust cover element must be done according with documentation.                                                                                                              | X                        |                               | not applicable<br>Cube 40                                    |
| Installation and connection heat recovery module must be done according with device documentation.                                                                                                         | X                        |                               | refers to<br>Cube 80/100 L<br>Cube 120/160 R                 |
| Hydraulic installation and bleeding (remove air) must be correct way.                                                                                                                                      | X                        |                               | option                                                       |
| Supply and connection of the ventilation ducts.                                                                                                                                                            | X                        |                               | option                                                       |
| Installation of the gas system and bleeding (remove air) must be done according the device documentation.                                                                                                  | X                        |                               | option                                                       |
| Installation of the siphon and filling the siphon with water.                                                                                                                                              | X                        |                               | option                                                       |
| Providing service access in accordance with the device documentation.                                                                                                                                      | X                        |                               |                                                              |
| Roofing works to seal the connection and protect between the rooftop unit and roof structure.                                                                                                              | X                        |                               |                                                              |
| Connection of power/control cables, temperature sensors and communication cables to the Cube control cabinet.                                                                                              |                          | X                             |                                                              |
| First start-up of device.                                                                                                                                                                                  |                          | X                             |                                                              |

