SOLID AIR®
INTERNATIONAL

02-2022
6809530-202012

Good climate, better performance!

INSTRUCTIONS FOR CONTRACTORS

TYPE: **CPL**
English | subject to modifications

SOLID AIR®
INTERNATIONAL

TABLE OF CONTENTS

1. ABOUT THIS DOCUMENT

>> Read this document before you begin working on the appliance.
>> Follow the instructions in this document.
Failure to observe these instructions voids any Solid Air Climate Solutions warranty.

1.1 Scope

This document is for the Solid Air CPL comfort compact ventilation unit.

1.2 Target group

This document is intended for air conditioning, ventilation and electricity contractors.

1.3 Other applicable documents

- Wiring diagram for control.
- WRS-K instructions.
- Configuration assistant.
- Notes in the form of labels.
- The documents for all accessory modules and other accessories also apply where relevant.

1.4 Safekeeping of these documents

Documents must be kept in a suitable location and must be available at all times.
The user is responsible for the safekeeping of all documents.
The documents are provided by the contractor.

1.5 Symbols

The following symbols are used in this document:

Symbol	Meaning
>>	An action which must be taken..
1	Indicates a step in images: The numbering indicates the order in which steps are taken.
➠	A necessary requirement.
✓	The outcome of an action.
	Important information regarding the proper use of the appliance.
	A reference to other relevant documents.

Table 1.1 Meaning of the symbols.

1.6 Warnings

Warnings in the text warn you of possible risks before the start of an instruction.
The warnings provide you with information on the possible severity of the risk using a pictogram and a keyword.

Symbol	Keyword	Explanation
	**DANGER**	This means that there is a risk of serious injury or loss of life.
	**WARNING**	This means that there is a potential risk of serious injury or loss of life.
	**CAUTION**	This means that there is a potential risk of minor to moderate injury.
	**NOTE**	This means that material damage may occur.

Table 1.2 Meaning of warnings.

2. SAFETY

>> The heat generator may only be worked on by contractors.
>> In accordance with VDE 0105 Part 1, work on electrical components may only be carried out by qualified electricians.

2.1 Intended use

Solid Air CPL ventilation units are designed to heat and filter normal air. The maximum air intake temperature is +40 °C. The use of these units in wet rooms or rooms with explosive atmospheres is not permissible. Handling very dusty or aggressive media is not permissible.

Any onsite modification or improper use of the unit is not permissible and Solid Air GmbH accepts no liability for any damage caused as a result.

If additional protective equipotential bonding is required due to structural requirements, this should be provided onsite. The user or the certified electrician is obliged to ensure correct earthing of the appliances in accordance with the applicable national and local electrical and installation regulations.

A conductive or non-conductive connection can be established between modules depending on the appliance configuration. Modules with electrical equipment must always be connected with the earth conductor.

Ventilation units intended for internal installation must be placed in rooms that meet the requirements of VDI 2050 (VDI 2050, Requirements for technical equipment rooms - Planning and execution). A contractor is defined as a qualified and properly trained installer, electrician, etc.
The user is defined as somebody who has been trained to use the heat generator by a specialist.

The appliance may only be used up to an elevation of 2000 m above sea level.
The cables used in the unit are silicone-free and cadmium-free. They meet fire safety standards of class Eca (DIN 60332-2).

2.2 Safety measures

Never remove, bypass or otherwise disable any safety or monitoring equipment. Only operate the heat generator if it is in perfect technical condition. Any faults or damage that impact or might impact safety must be remedied immediately by a qualified contractor.
>> All faulty components must be replaced with original Solid Air spare parts.

It may only be used for handling air. This air must not contain any harmful, combustible, explosive, aggressive, corrosive or otherwise dangerous substances, as these would be distributed throughout the duct system or building, where they could cause a risk to the health of, or even kill the occupants, animals or plants living there.

2.2.1 What to do in the event of a fire

The unit does not present a direct risk of fire. The small numbers of seals fitted inside the unit can burn away if subjected to external influences.
>> If there is a fire, disconnect the appliance from the power supply using the onsite smoke detector.
>> Wear respiratory equipment if you fight a fire.
>> Use standard extinguishing agents such as water, extinguishing foam or extinguishing powder..

2.3 General safety information

DANGER

Electrical voltage!

Danger of death from electrocution.

>> All electrical work must be performed by a contractor.

DANGER

Rotating fan!

Risk of severe to life-threatening injuries due to positive pressure or negative pressure.

>> Wait until the fan comes to a stop.

>> Open the inspection doors carefully.

>> Notify an approved contractor.

2.4 Handover to operator

>> Provide these instructions and the other applicable documents to the operator.

>> Instruct the operator on how to operate the system.

>> Make the operator aware of the following:

- Annual inspections and maintenance must be performed by a contractor.
- Solid Air recommends concluding an inspection and maintenance contract with a contractor.
- Repair work must be performed by a contractor.
- Use only genuine Solid Air spare parts.
- Do not make any technical changes to the appliance or control components.
- This guide and the other applicable documents must be kept safely in a suitable location and must be available at all times.

>> Refer the operator to the operating instructions.

2.5 Declaration of Conformity

This product complies with European regulations and national requirements.

3. STANDARDS AND REGULATIONS

3.1 Geldende normen en voorschriften

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- ErP Directive 2009/125/EC
- DIN EN ISO 12100 ..... Safety of machinery - general principles for design
- DIN EN ISO 13857: ..... Safety of machinery - safety distances
- DIN EN 349 ..... Safety of machinery - minimum clearances
- DIN EN 953 ..... Safety of machinery - guards
- DIN EN 1886 ..... Ventilation for buildings - central air-handling units
- DIN ISO 1940-1 ..... Mechanical vibration - balance quality requirements
- VDMA 24167 ..... Fans - safety requirements
- DIN EN 60204-1 ..... Safety of machinery - electrical equipment of machines
- DIN EN 60730 ..... Automatic electrical controls
- DIN EN 61000 -6-2+3 ..... Electromagnetic Compatibility
- DIN EN 60335-1 (VDE 0700-1) ..... Safety of electrical appliances - general requirements

3.2 The following standards and regulations apply to installation and operation

- DIN EN 50106 (VDE 0700-500) ..... Safety of electrical appliances - tests
- DIN VDE 0100 ..... Regulations regarding the installation of high voltage systems up to 1000V
- DIN EN 50110-1 (VDE 0105-1) ..... Operation of electrical installations
- DIN VDE 0105-100 ..... Operation of electrical systems - general requirements
- DIN VDE 0701-0702 ..... Inspection after repair, modification of electrical appliances, periodic inspection of electrical appliances
- VDI 2050 ..... Requirements for technical equipment rooms - Planning and execution

4. DESCRIPTION

4.1 CPL-iV

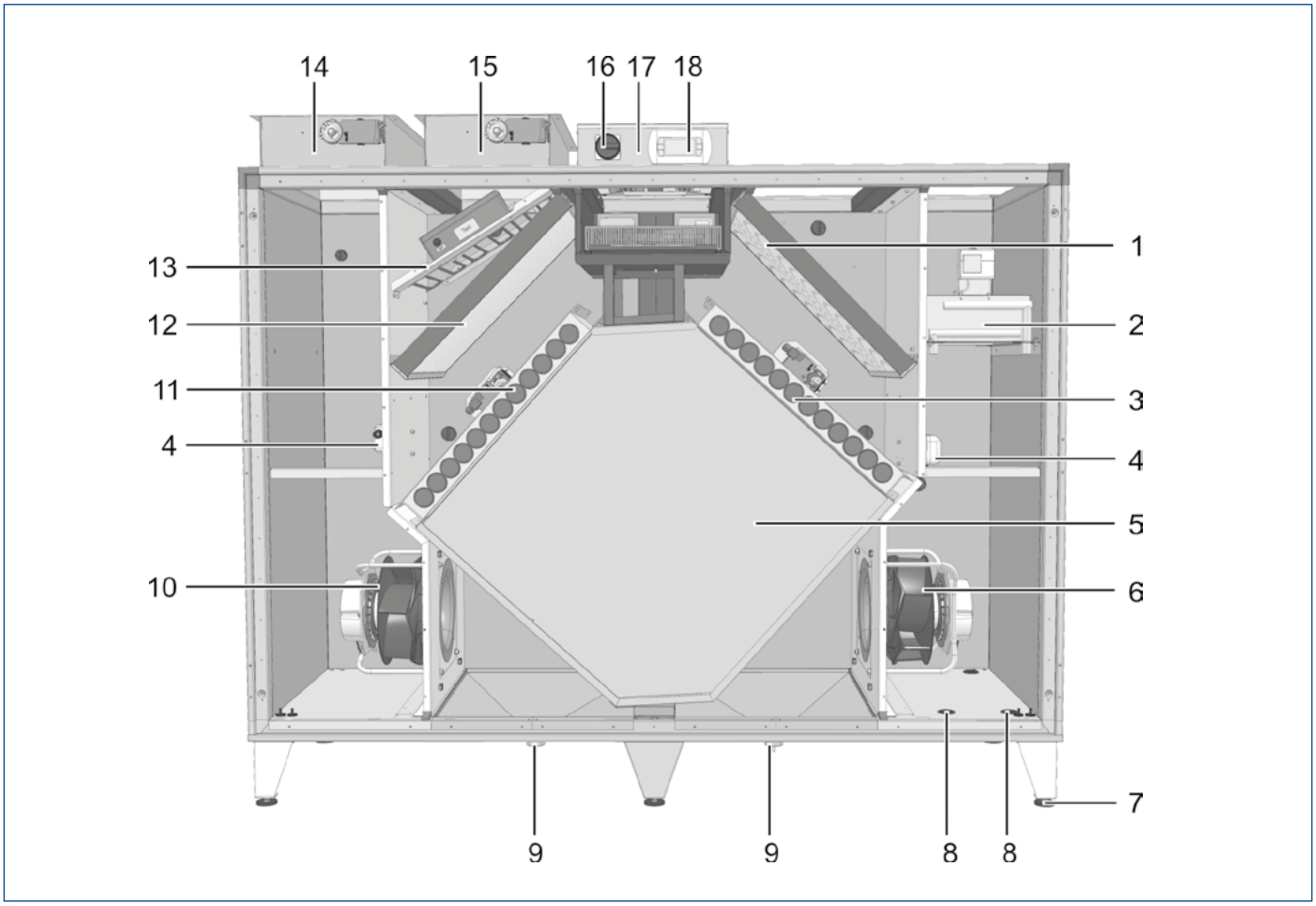


Fig. 4.1 Description of CPL-iV

1 Compact filter, extract air
2 PWW heat exchanger (optional)
3 Boost damper with servomotor (optional)
4 Differential pressure switch for filter monitoring
5 Countercurrent heat exchanger with bypass
6 EC fan, supply air
7 Adjustable feet
8 PWW aperture
9 Connectors for DN 50 trap
10 EC fan, extract air
11 Bypass damper with servomotor (variable speed)
12 Compact filter, outdoor air
13 Filter pre-dryer (optional)
14 Exhaust air damper with servomotor (open/close)
15 Outdoor air damper with servomotor (open/close)
16 Unit isolator
17 Control panel
18 BMK programming unit

4.1.1 CPL-iV specifications/dimensions

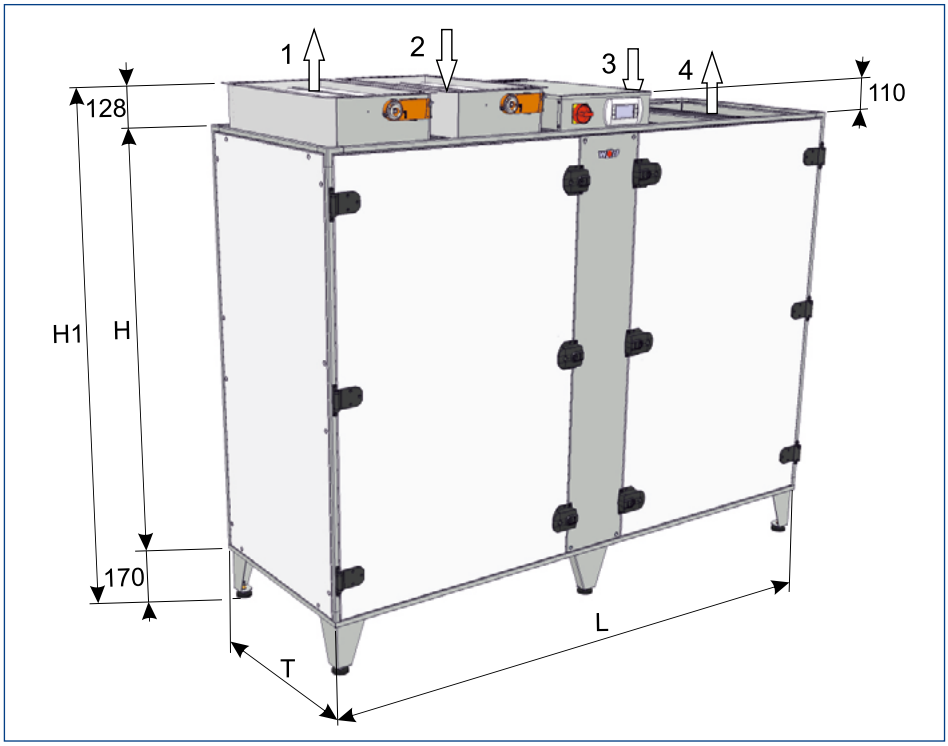


Fig. 4.2 CPL-iV dimensions

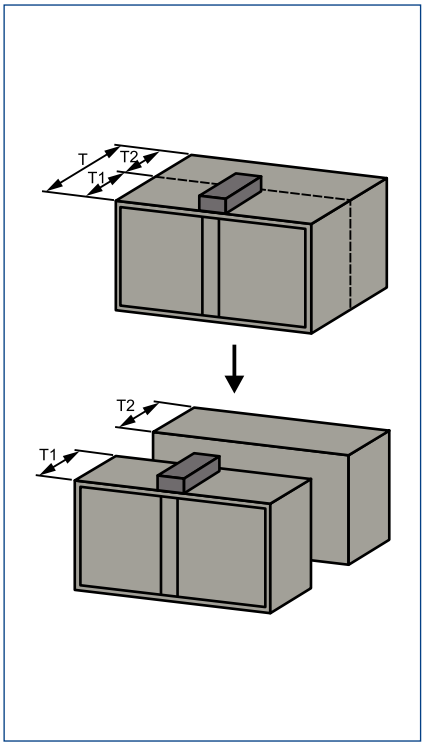


Fig. 4.3 CPL-iV 4700/CPL-iV-6100 split, Control unit pivotable

1 Exhaust air
2 Outdoor air
3 Extract air
4 Supply air

Specifications

Type CPL-iV-	1400	2400	3300	4700	6100
Length L (mm)	1525	2033	2033	2237	2237
Depth T (mm)	750	750	950	1360	1665
Depth T1 (incl. locks) (mm)	-	-	-	765	968
Depth T2 (incl. locks) (mm)	-	-	-	630	732
Total height H1 (mm)	1315	1722	1722	1749	1749
Height H (mm)	1017	1424	1424	1424	1424
Foot height (mm)	170	170	170	170	170
Damper height (mm)	128	128	128	155	155
Exhaust air (1) (mm)	Intl 596 x 206*	Intl 596 x 307*	Intl 799 x 307*	Intl 1222 x 356*	Intl 1527 x 356*
Outdoor air (2) (mm)	Intl 596 x 206*	Intl 596 x 307*	Intl 799 x 307*	Intl 1222 x 356*	Intl 1527 x 356*
Extract air (3) (mm)	Intl 596 x 206*	Intl 596 x 307*	Intl 799 x 307*	Intl 1222 x 356*	Intl 1527 x 356*
Supply air (4) (mm)	Intl 596 x 206*	Intl 596 x 307*	Intl 799 x 307*	Intl 1222 x 356*	Intl 1527 x 356*
Condensate connector	1½ “	1½ “	1½ “	1½ “	1½ “
Weight (kg)	250	360	450	645	725
Max. flow rate (m³/h)	1400	2400	3300	4700	6100

*Duct connection dimensions

4.2 CPL-iH

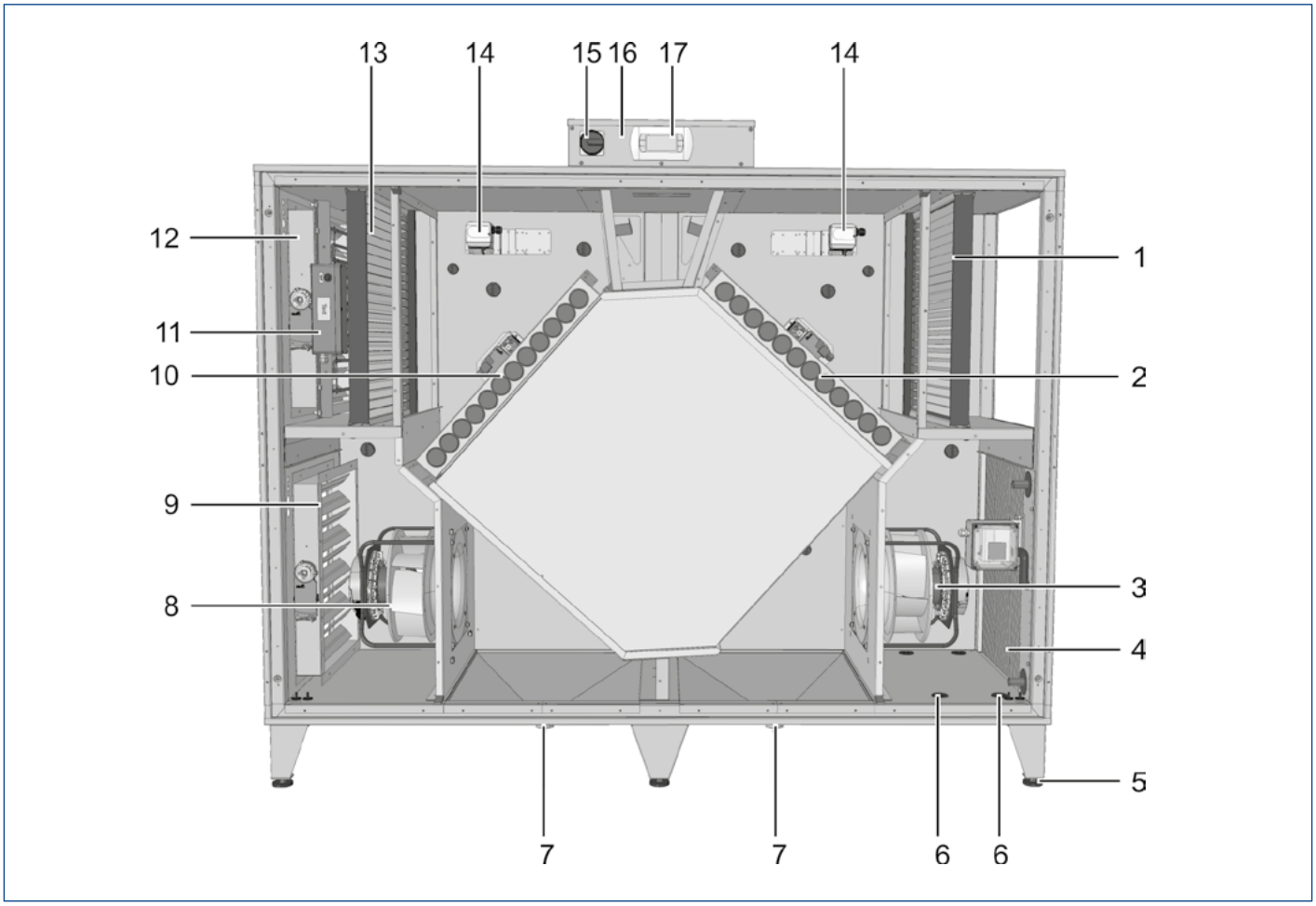


Fig. 4.4 Description of CPL-iH

1 Compact filter, extract air
2 Boost damper with servomotor (optional)
3 EC fan, supply air
4 PWW heat exchanger (optional)
5 Adjustable feet
6 PWW aperture
7 Connectors for DN 50 trap
8 EC fan, extract air
9 Exhaust air damper with servomotor (open/close)
10 Bypass damper with servomotor (variable speed)
11 Filter pre-dryer (optional)
12 Outdoor air damper with servomotor (open/close)
13 Compact filter, outdoor air
14 Differential pressure switch for filter monitoring
15 Unit isolator
16 Control panel
17 BMK programming unit

4.2.1 CPL-iH specifications/dimensions

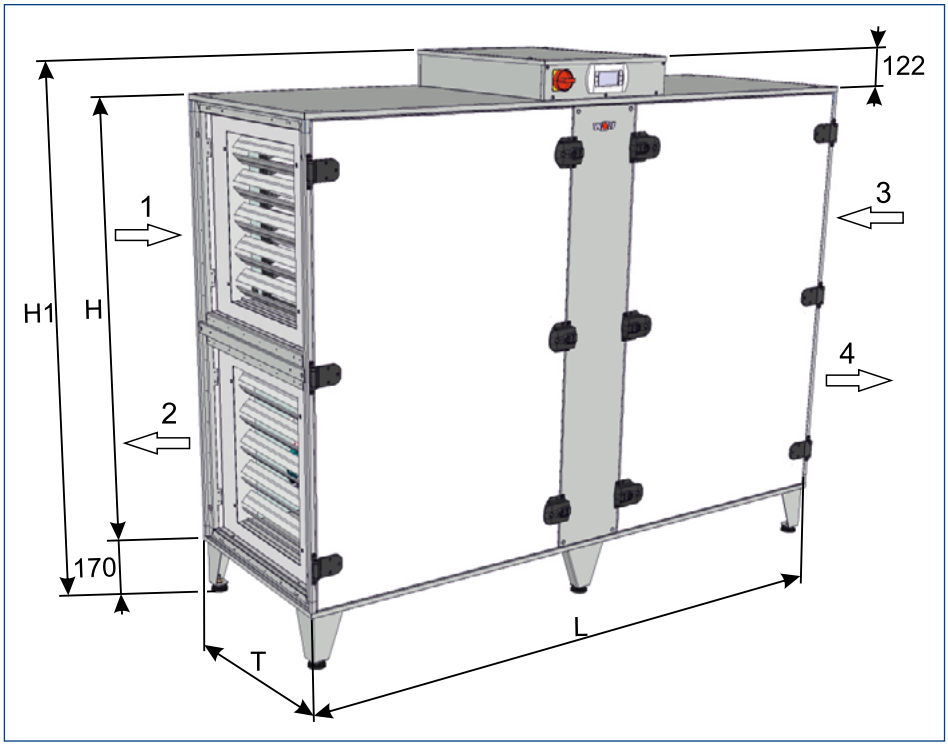


Fig. 4.5 CPL-iH dimensions

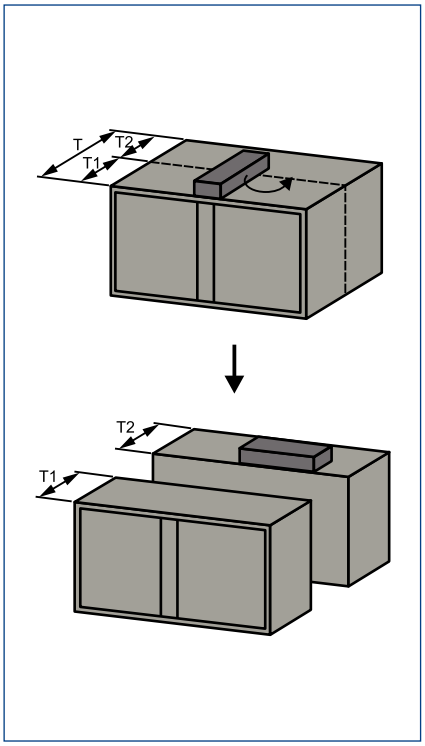


Fig. 4.6 CPL-iH-4700, CPL-iH-6100 split, Control unit pivotable

1 Outdoor air
2 Exhaust air
3 Extract air
4 Supply air

Specifications

Type CPL-iH-	1400	2400	3300	4700	6100
Length L (mm)	1525	2033	2033	2237	2237
Depth T (mm)	750	750	950	1360	1665
Depth T1 (incl. locks) (mm)	-	-	-	663	968
Depth T2 (incl. locks) (mm)	-	-	-	732	732
Total height H1 (mm)	1309	1716	1716	1716	1716
Height H (mm)	1017	1424	1424	1424	1424
Foot height (mm)	170	170	170	170	170
Control (mm)	122	122	122	122	122
Exhaust air (2) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Outdoor air (1) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Extract air (3) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Supply air (4) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Condensate connector	1½“	1½“	1½“	1½“	1½“
Weight (kg)	250	360	450	645	725
Max. flow rate (m³/h)	1400	2400	3300	4700	6100

*Duct connection dimensions

4.3 CPL-A

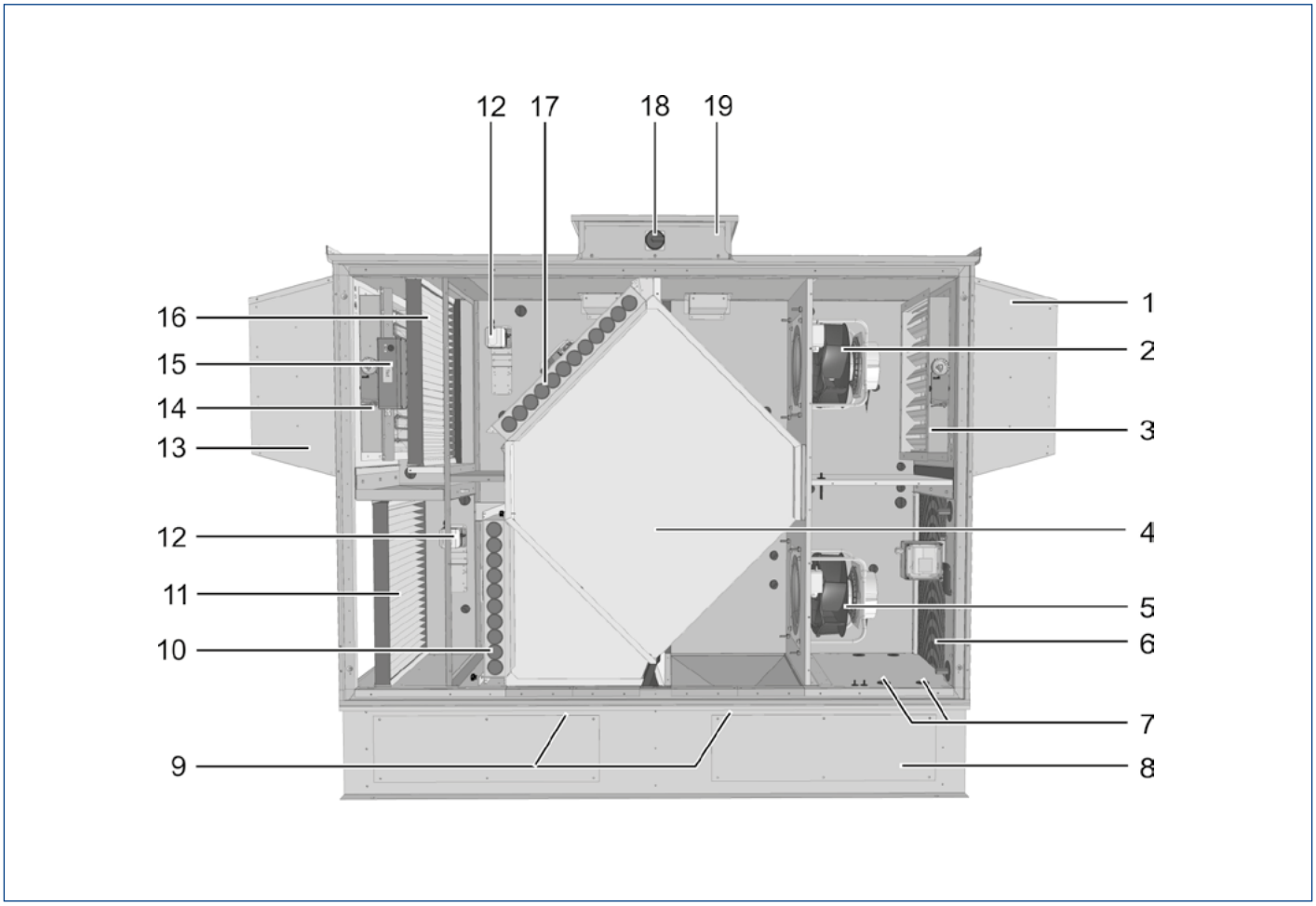


Fig. 4.7 Description of CPL-A

1 Discharge hood, extract air
2 EC fan, extract air
3 Exhaust air damper with servomotor (open/close)
4 Countercurrent plate heat exchanger with bypass
5 EC fan, supply air
6 PWW heat exchanger
7 PWW connection
8 Base frame
9 Connectors for DN 50 trap
10 Boost damper with servomotor (optional)
11 Compact filter, extract air
12 Differential pressure switch for filter monitoring
13 Intake hood, outdoor air
14 Outdoor air damper with servomotor (open/close)
15 Filter pre-dryer (optional)
16 Compact filter, outdoor air
17 Bypass damper with servomotor (variable speed)
18 Unit isolator
19 Control panel

4.3.1 CPL-A specifications/dimensions

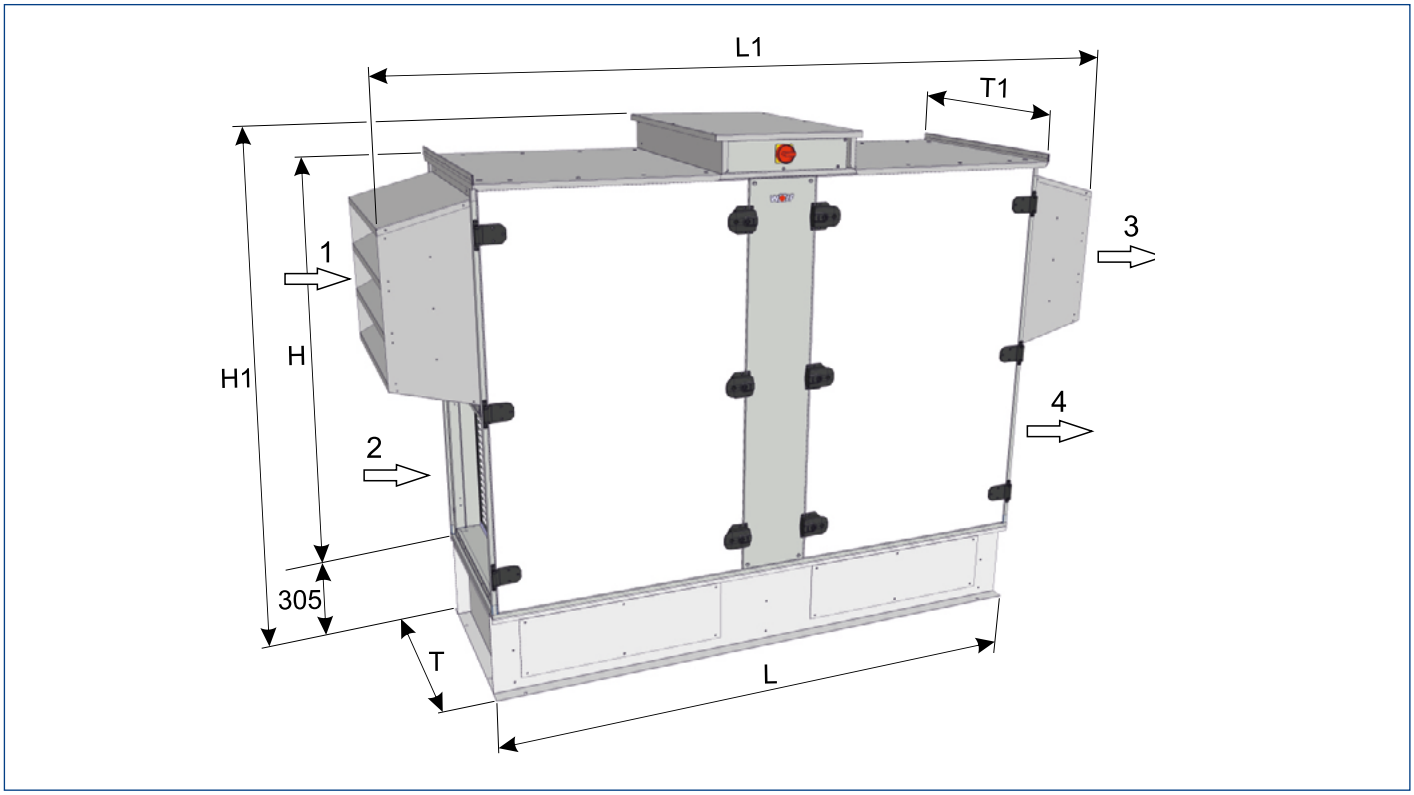


Fig. 4.8 CPL-A dimensions

1 Outdoor air
2 Extract air
3 Exhaust air
4 Supply air

Specifications

Type CPL-A-	1400	2400	3300	4700	6100
Total length L1 (mm)	1905	2573	2573	2780	2780
Total depth T1 (mm)	815	815	1017	1425	1730
Total height H1 (mm)	1455	1860	1860	1860	1860
Length L (mm)	1525	2033	2033	2237	2237
Depth T (mm)	712	712	915	1322	1627
Height H (mm)	1021	1428	1428	1428	1428
Base frame (mm)	305	305	305	305	305
Extract air (2) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Supply air (4) (mm)	Intl 612 x 409*	Intl 612 x 612*	Intl 815 x 612*	Intl 1222 x 612*	Intl 1527 x 612*
Condensate connector	1½ “	1½ “	1½ “	1½ “	1½ “
Weight (kg)	315	460	555	715	800
Max. flow rate (m³/h)	1400	2400	3300	4700	6100

*Duct connection dimensions

5. PLANNING

5.1 Siting the internal unit

- The installation site must be level and sufficiently load-bearing (at least 450 kg).
- The installation site must be able to bear the load of the ventilation unit without vibrations on a long term basis.
- Site the appliance in a room that is free from the risk of frost.

>> A clearance of at least 750 mm for the CPL-1400 and 950 mm for the CPL-2400, CPL-3300, CPL-4700 and CPL-6100 is required in front of the appliance to be able to open the inspection doors. Approx. 700 mm clearance is necessary above the unit for air duct connections.

>> Level the unit horizontally (align using the adjustable feet).

>> Provide drain outlet for draining off the condensate.

5.1.1 Minimum clearance between outdoor air intake and exhaust air discharge to prevent an air short circuit

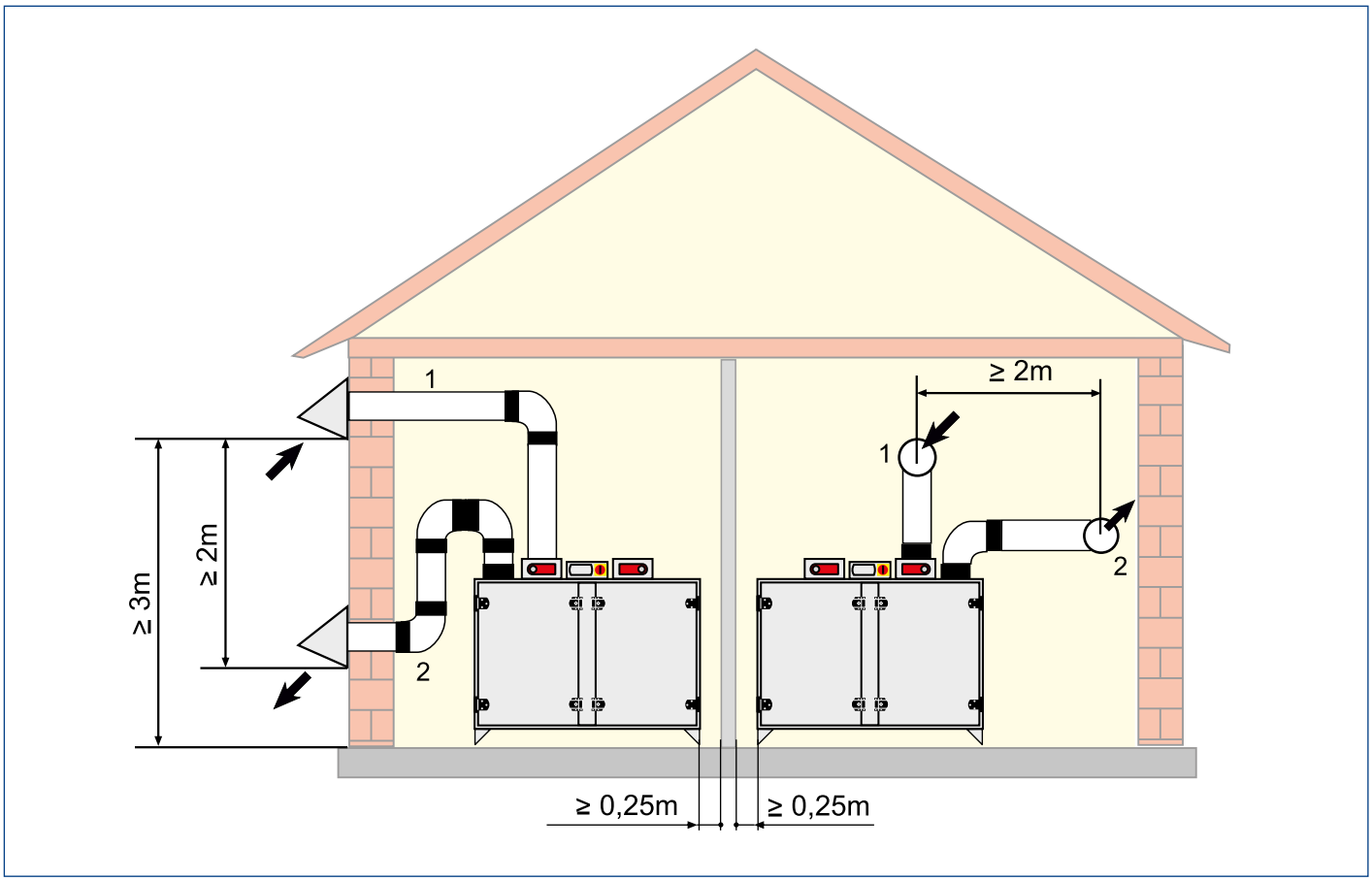


Fig. 5.1 CPL-A minimum clearance intake - discharge

1 Outdoor air
2 Exhaust air

5.2 Siting the external unit (weatherproof)

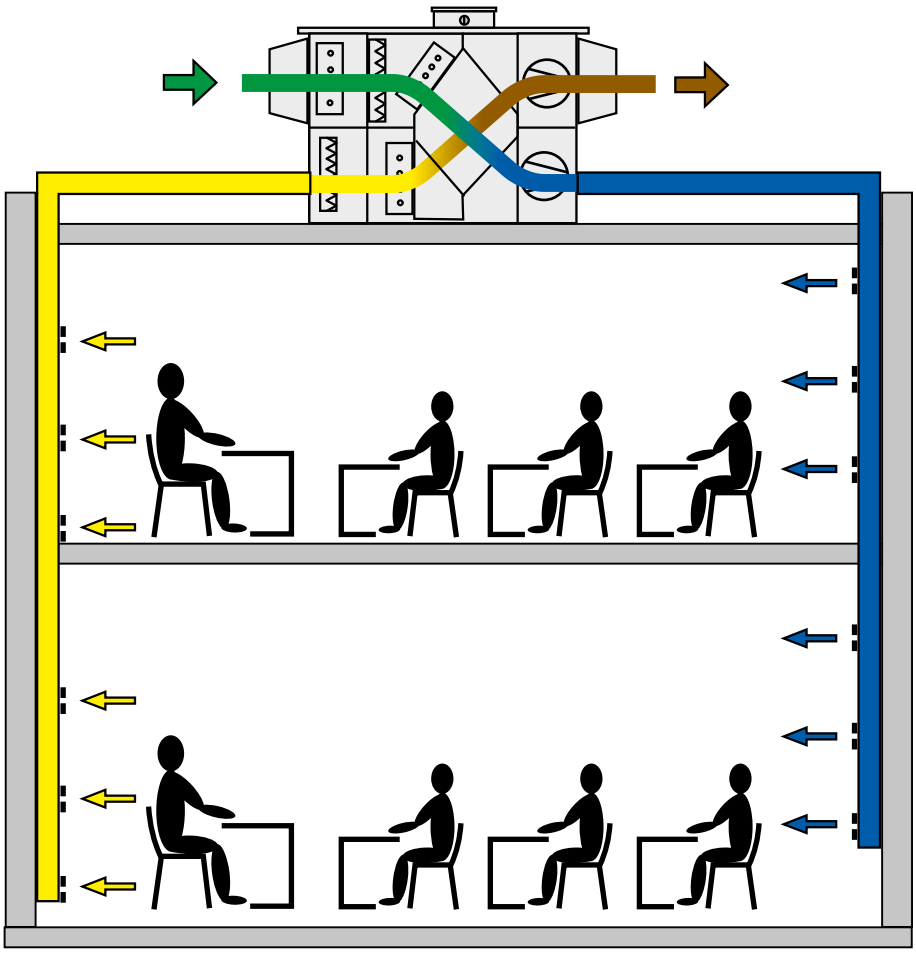


Fig. 5.2 Siting the CPL-A external unit

Weatherproof units must not be used for any load-bearing building functions or as a replacement for any part of the roof (VDI 3803 5.1/DIN EN 13053 6.2).

5.2.1 Connecting the condensate drain pipe and PWW heat exchanger

- With weatherproof units sited outdoors, keep the condensate drain and DHW coil free of frost; provide suitable protection if required.

5.3 Position of operating side

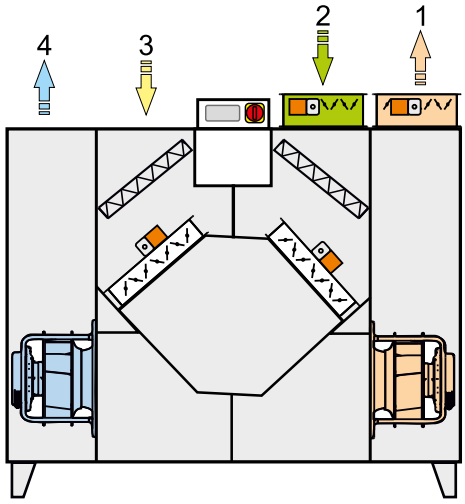
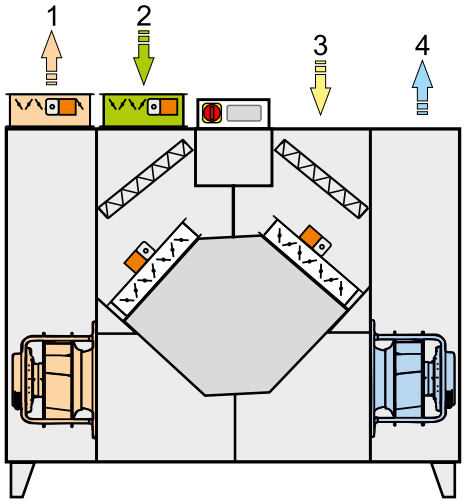
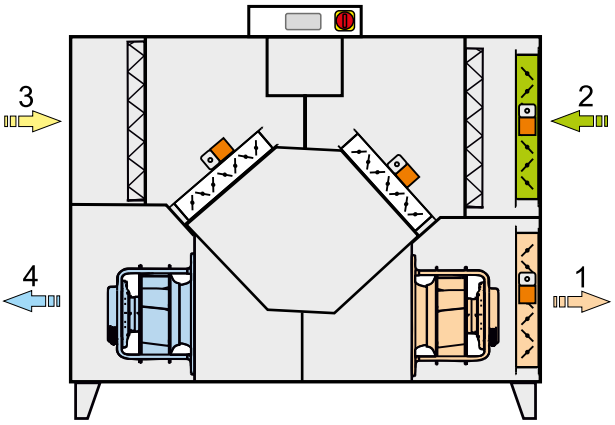
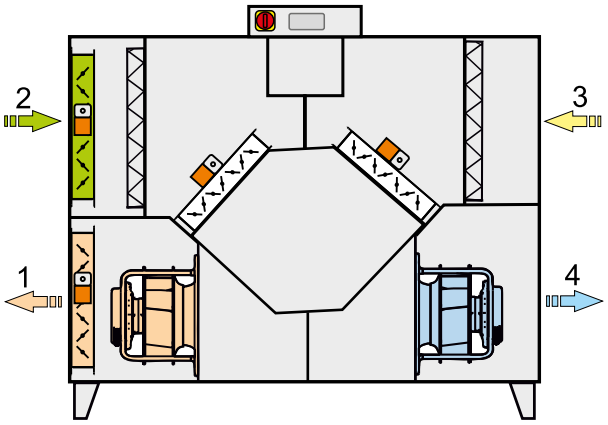
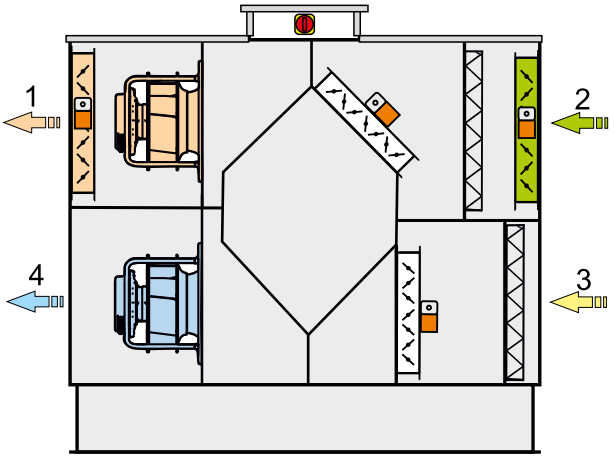
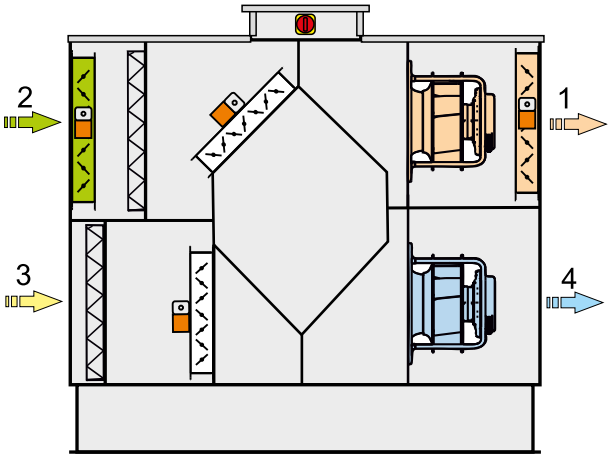
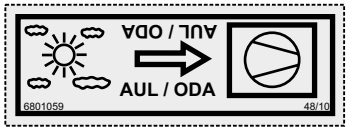
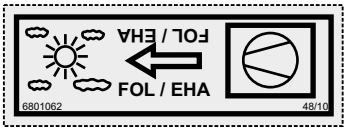
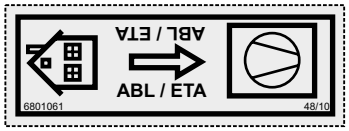
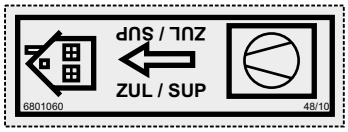
CPL-iV operating side, supply air, left	CPL-iV operating side, supply air, right
	
CPL-iH operating side, supply air, left	**CPL-iH operating side, supply air, right**
	
CPL-A operating side, supply air, left	**CPL-A operating side, supply air, right**
	

Fig. 5.1 Operating side

1 Exhaust air
2 Outdoor air
3 Extract air
4 Supply air

Air duct connections are identified with the following labels:	
Outdoor air	**Exhaust air**
	
Extract air	**Supply air**
	

6. INSTALLATION

6.1 Delivered condition

Fig. 6.1 CPL delivered condition

- Appliances are supplied fully assembled and fully wired.
- CPL ventilation units are supplied in packaging that protects them from dirt and damage.

>> Check the appliance for transport damage.

>> If there is any transport damage or a suspicion of damage, the recipient must indicate this on the consignment note and have it countersigned by the haulier.

>> Report all transport damage to Solid Air immediately.

>> Dispose of the transport packaging in accordance with local regulations.

6.1.1 Storage

>> Store the ventilation in a dry area in temperatures between -25°C and +55°C.

>> If it is stored for a long time, ensure that all apertures are sealed against air and water ingress.

6.2 Transport

NOTE

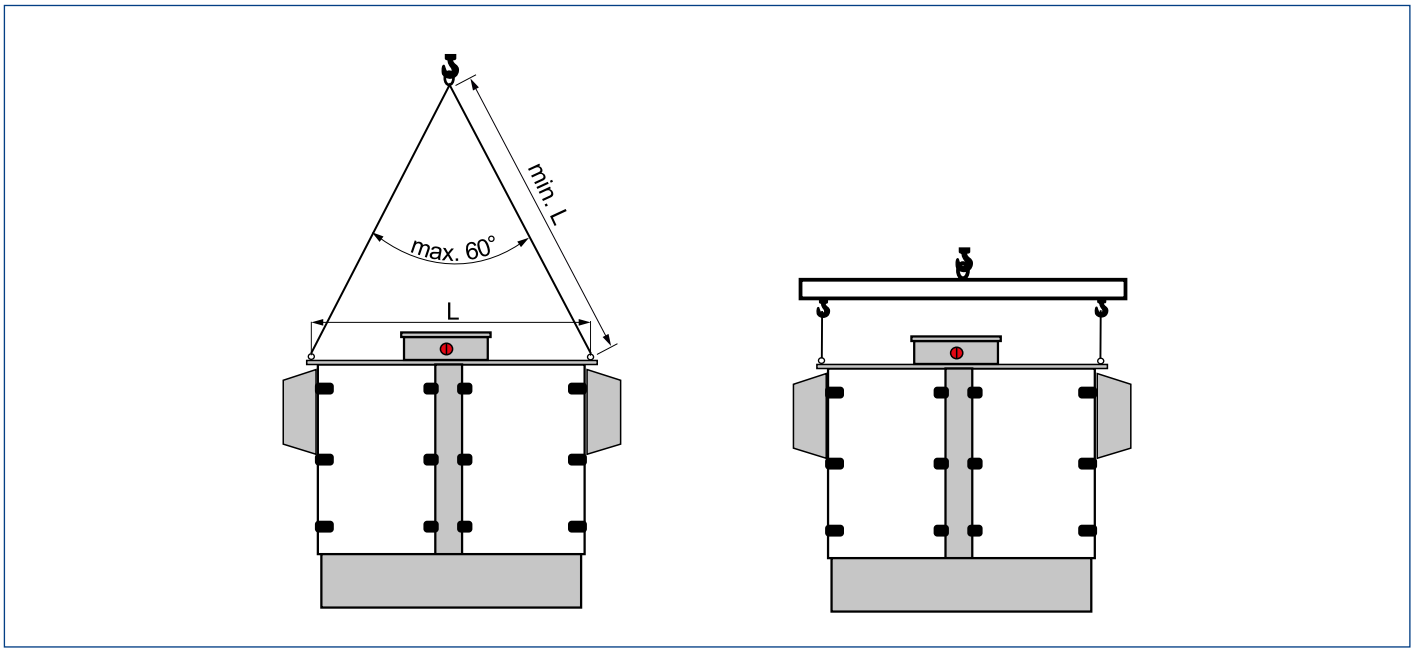
Damaged heat exchanger!

Plate heat exchangers and internal components are damaged.

>> Do not tilt the appliance during transport.

Transport external units using the eye bolts

>> Transport ropes must be at least as long as the distance to the eye bolts or crossbar.



6.3 Disposal and recycling

>> When the appliance reaches the end of its service life, it may only be dismantled by qualified personnel.
>> Before starting to dismantle the appliance, disconnect the power supply.
>> Power cables must be removed by qualified electricians.
>> Sort and dispose of metal and plastic parts according to material types and in compliance with local regulations.
>> Dispose of electrical and electronic components as electrical waste.

6.4 Installing the outdoor unit

- Weatherproof units must not be used for any load-bearing building functions or as a replacement for any part of the roof (VDI 3803 5.1/DIN EN 13053 6.2).

>> The outdoor unit must be placed on a level horizontal surface with adequate load bearing capacity.

>> Base frames must be levelled horizontally (check with a spirit level).

- To prevent the inspection doors from jamming, the entire base frame must sit on the foundation. Point loads are not permitted!

>> Provide permanently elastic noise insulation in the form of insulation strips between the installation surface and the base frame. (This provides insulation against structure-born noise.)

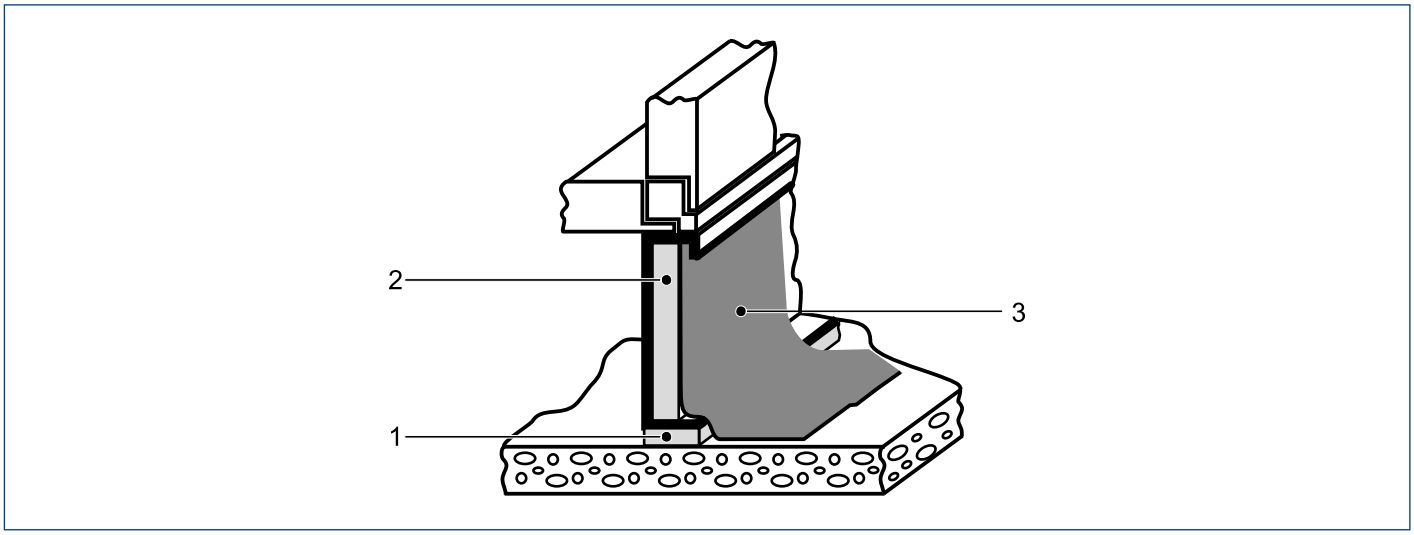


Fig. 6.2 Insulation against structure-borne noise for the building

1 Insulation against structure-borne noise
2 Roof membrane
3 Insulation if required

>> The Solid Air base frame must be insulated and integrated into the roof membrane onsite.

>> In the case of elevated positioning (CPL on onsite framework), the CPL must be secured against wind load.

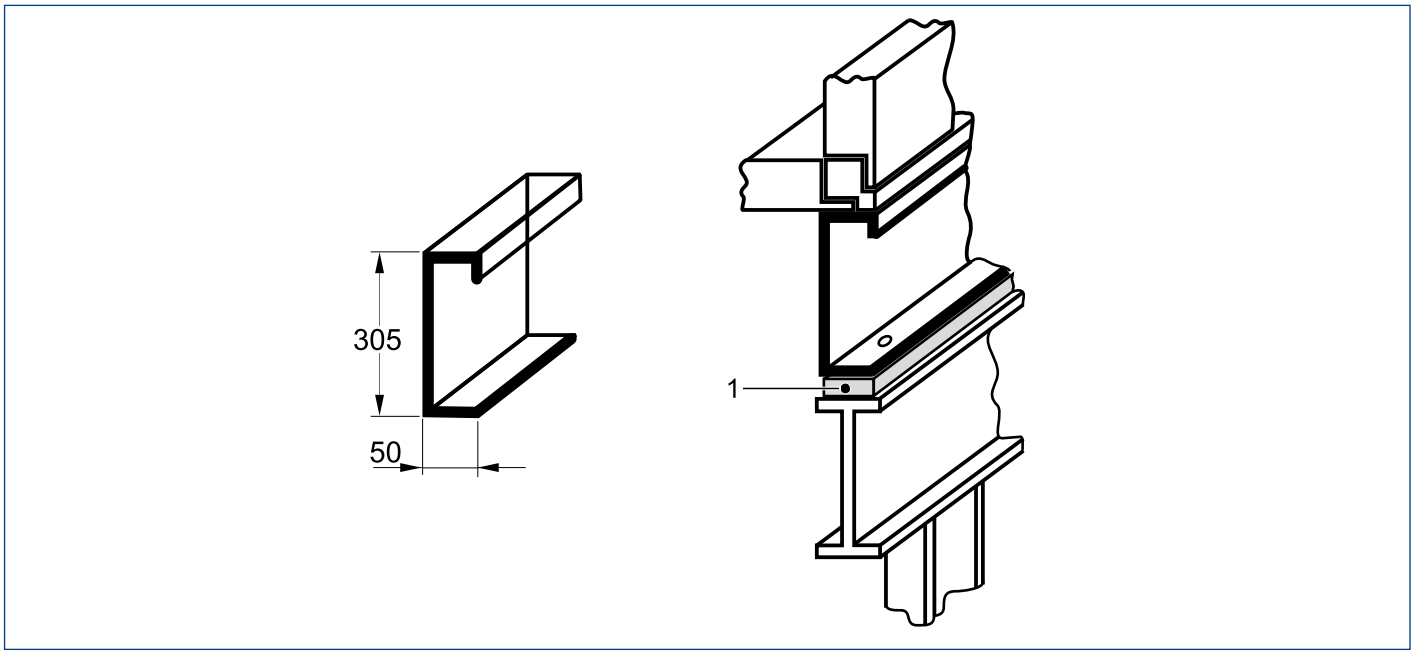


Fig. 6.3 Insulation against structure-borne noise for the frame

1 Insulation against structure-borne noise

6.5 Installing duct connections

The unit connectors are rectangular.
Use the square to round adapter for round duct systems.

6.5.1 Installing square duct systems

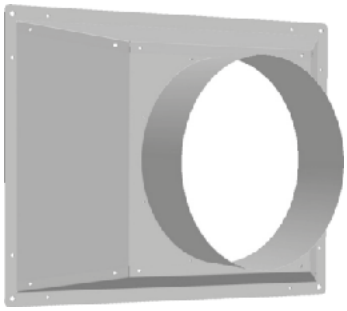
>> Install square duct systems directly on the appliance.
>> Insulate the ducts in accordance with applicable regulations and industry standards.

6.5.2 Installing round duct systems

Adaptor box for round duct systems for internal unit; air direction vertical (accessory).

Afb. 6.4 Square to round adaptor box

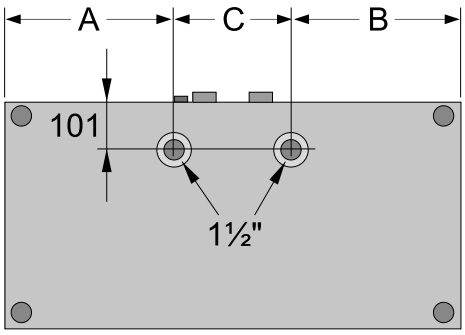
Adaptor insulating collar for round duct connection for internal unit with horizontal air direction and weatherproof unit (accessory).

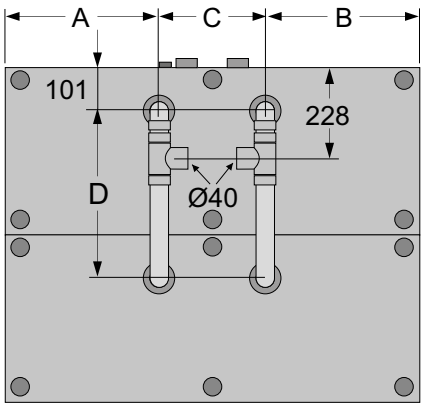


Afb. 6.5 Square to round adaptor insulating collar

>> Install round duct systems on adaptor.
>> Insulate the ducts in accordance with applicable regulations and industry standards.

6.6 Fitting the trap

Position siphon-connector [mm]		Dimension A (mm)	Dimension B (mm)	Dimension C (mm)
	CPL-iV-1400	533,5		458
	CPL-iV-2400	711,5		610
	CPL-iV-3300	713,5		606
	CPL-iH-1400	559		407
	CPL-iH-2400	711,5		610
	CPL-iH-3300	723		587
	CPL-A-1400	648,5	534	343
	CPL-A-2400	750		532
	CPL-A-3300	750		532
	CPL-A-4700	813	864	559
	CPL-A-6100	813	864	559

Position siphon-connector split unit


	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)	Dimension D (mm)
CPL-iV-4700	796		645	712
CPL-iV-6100	796		645	915
CPL-iH-4700	831	796	610	610
CPL-iH-6100	831	796	610	915

The effective height of the trap h (mm) must exceed the maximum underpressure or overpressure at the condensate connector (1 mm WC = 10 Pa).

h = 1.5 x p (mm WC) + 50 mm (minimum)	
p	= Under- or overpressure in mm WC according to appliance design
50 mm (WC)	= Reserve (imprecision in design, evaporation)
1,5	= Additional safety factor

- The trap drain line must not be connected directly to the public sewage system, but rather must be able to run out freely.
- Vent longer drain lines to prevent condensate backing up in the line (provide additional vent in trap drain line).

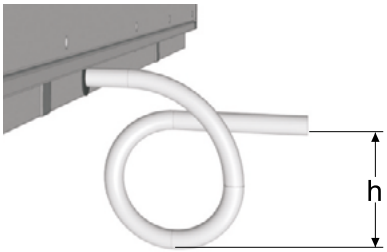
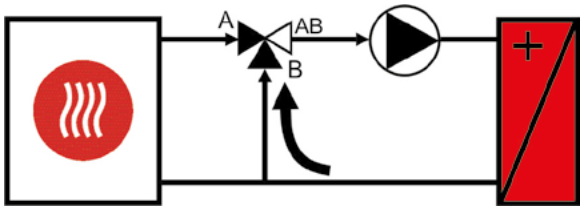
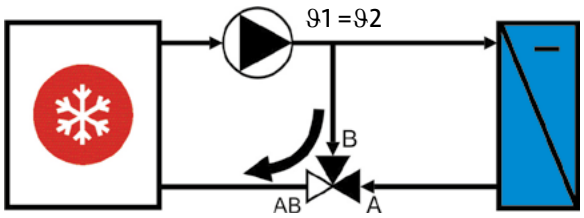
	
Ball trap	Trap

Fig. 6.6 Trap types

>> Fill the trap with water.

6.7 Hydraulic connection

Heating coil	
Admixing circuit Benefits: good control characteristics, low risk of freezing .	

Cooling coil	
Diverting circuit Benefits: constant flow temperature in cooling coil, good dehumidification even at partial load.	

>> Provide a hydraulic connection between the heat generator and the heat exchanger.

6.8 Electrical connection

6.8.1 General information

Follow the instructions for the control unit and the control unit accessory.

>> Electricity may only be connected by an approved electrical contractor.
>> Power connection lines must be in line with the specifications for the unit, local conditions and the selected cabling method. Use cables with flexible cores.
>> Connecting cables, installation ducts or tubes, etc., must be weatherproof, UV-resistant and protected from mechanical damage.
>> Feed the onsite cable through the opening in the control panel.

DANGER

Electrical voltage!

Danger of death from electrocution.

>> All electrical work must be performed by a contractor.
>> Before working on the unit, shut it down via the unit isolator.
>> The main terminals are 'live' even when the ON/OFF switch is in the OFF position.
>> Do not touch the EC fans for five minutes after disconnecting the power across all poles.
>> Use type B residual current protective devices with 300 mA, as only these are suitable for DC residual currents. Type A residual current protective devices are not suitable.
>> Press the test button every six months to check the functioning of the residual current devices (RCDs).
>> Observe the specified electrical fuse ratings.**“6.8.2 Power cable cross-section/onsite fuse protection”** on page 24
>> Before connecting the appliance to the power supply, ensure that all electrical covers and protective devices are fully installed.
>> Inspect the installation in accordance with the safety requirements of VDE 0701-0702 and VDE 0700 Part 500.
>> Comply with the wiring diagram in the Appendix

NOTE

Electrical voltage!

Damage to components of the appliance.

>> Never route sensor leads alongside 230 V or 400 V cables.
>> Power connection lines must be in line with the specifications for the appliance and the local conditions.
>> Only use cables that meet local wiring regulations with regard to voltage, current, insulation material, load etc.
>> Provide earth conductor.
>> Integrate the appliance properly into the onsite lightning protection system.
>> Connect the unit to the onsite equipotential bonding system.
>> Check the earth conductor and insulation resistance in accordance with EN 60204 (VDE 0113) while taking all necessary safety precautions.

I We accept no liability for any damage or loss resulting from technical modifications to Solid Air control units.

I If control voltage is present or a set speed is saved, the EC fans will restart automatically after power failure.

6.8.2 Power cable cross-section/onsite fuse protection

CPL	Power cable	Onsite fuse/MCB
CPL-1400	3 x 1,5 mm²	16 A
CPL-2400	5 x 1,5 mm²	16 A
CPL-2400 with electric coil	5 x 2,5 mm²	20 A
CPL-3300	5 x 1,5 mm²	16 A
CPL-3300 with electric coil	5 x 4,0 mm²	25 A
CPL-4700	5 x 2,5 mm²	20 A
CPL-6100	5 x 2,5 mm²	20 A

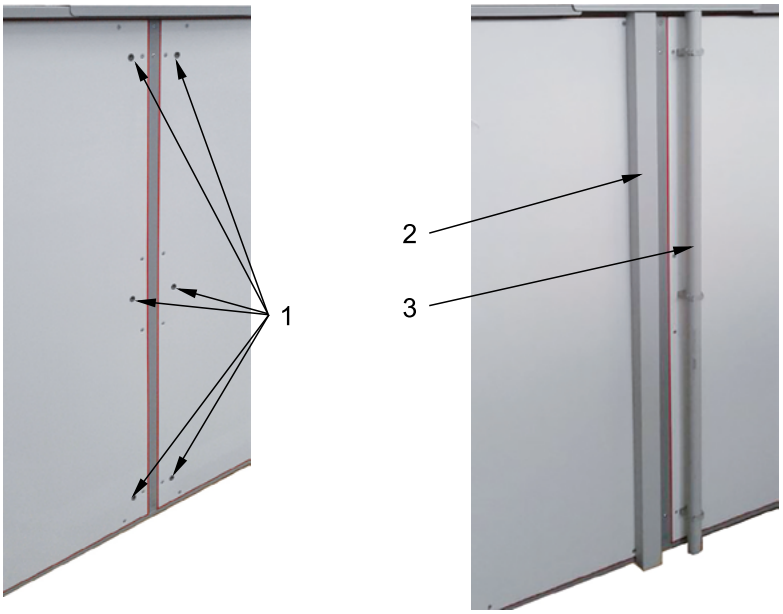
6.8.3 Motor data

CPL	1400	2400	3300	4700	6100
Rated voltage	1 x 230 V (50/60 Hz)	3 x 400 V (50/60 Hz)	3 x 400 V (50/60 Hz)	3 x 400 V (50/60 Hz)	3 x 400 V (50/60 Hz)
Maximum power consumption/maximum current draw of both fans	1,0 kW/ 4,6 A	2,1 kW/ 3,2 A	4,8 kW/ 7,2 A	5,0 kW/ 8,0 A	5,0 kW/ 8,0 A
Speed	3080 1/rpm	3400 1/rpm	3700 1/rpm	3100 1/rpm	2500 1/rpm
IP rating/protection class	IP55/Iso F	IP55/Iso F	IP55/Iso F	IP55/Iso F	IP55/Iso F

6.8.4 Fixing cable ducts for outdoor units

>> Attach cable ducts or installation tubing to the M8 threaded holes on the back of the outdoor units.
Do not make any drilled holes in the unit! (matching cable duct available as optional accessory)

>> Lay the onsite cable to the control panel in the cable duct/installation tube.



1 M8 threaded holes.
2 Cable duct fitted to threaded holes.
3 Installation tube fitted to threaded holes.

7. COMMISSIONING

DANGER

Electrical voltage!

Danger of death from electrocution.

>> Only work on the unit when it is disconnected from the power.

>> Only operate the unit once all safety features are in place and functioning properly.

If control voltage is present or a set speed is saved, the EC fans will restart automatically after power failure.

DANGER

Moving components!

>> Injuries can be caused by rotating fans or moving dampers.

>> Only work on the unit when it is disconnected from the power.

>> Only operate the unit once all safety features are in place and functioning properly.

NOTE

Unqualified personnel!

System damage.

>> Commissioning and maintenance must be performed by a qualified contractor.

>> According to DIN EN 50110-1 (VDE 0105-1), only qualified electricians may carry out the installation and commissioning of the ventilation control unit and connected accessories.

7.1 Preparation for commissioning

>> Check that the duct system has been correctly installed and is not leaking.
>> Check that the hydraulic lines to the heat exchanger have been correctly installed and that none are leaking.
>> Trap fitted and filled with water.
>> Accessory parts securely fitted.
>> Electrical accessories are correctly connected.

7.2 Starting the system

>> Engage the unit isolator.
>> Wait until the BMK programming unit initialises and changes to the display mode.
>> Select the required operating mode on the BMK.
✓ The system will start with the preset parameters.
>> To modify functions and parameters, see the installation and operating instructions provided.

To modify functions and parameters, see the operating instructions provided.

>> **Check the following functions:**

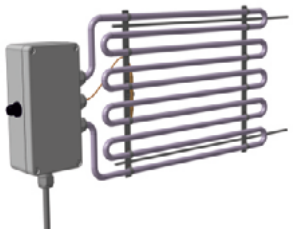
- Check all inputs and outputs for correct wiring and function.
- Frost protection function.
- Fan rotational direction.
- Outdoor air/extract air damper rotational direction.
- Plausible sensor values (room sensor, supply air sensor, extract air sensor, outdoor air sensor, ice sensor).
- Check motor currents.
- Motor protection (thermal cut-outs/thermistors).
- Air flow monitoring.
- Filter monitor.
- Bypass damper function (rotational direction).
- Actuator, heating/cooling.
- Heating circuit pump/cooling circuit pump.
- As well as all other system-specific functions.

The Solid Air warranty will be void if the function test is not carried out correctly.

7.2.1 Starting the fans

>> Close the doors securely using a tool. Otherwise there is a risk of motor overload.
>> Carry out air flow rate tests with the doors closed.
>> Route test hose connections out of the unit (see flow rate calculation).
>> Changes are made via the BMK programming unit (see relevant operating instructions).

7.2.2 Commission the electric preheating coil (accessories)

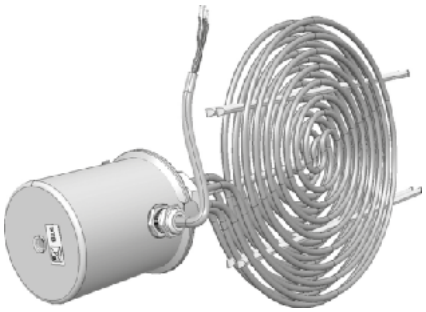


>> The air volume must not be below the minimum level.
- Minimum air volume:

CPL-1400	=	600 m³/h
CPL-2400	=	1100 m³/h
CPL-3300	=	1500 m³/h
CPL-4700	=	2200 m³/h
CPL-6100	=	2900 m³/h

>> Follow the relevant safety regulations for electric heating coils.
>> The electric preheating coil must be protected from moisture and water.
- The electric preheating coil (filter pre-dryer) is activated by the control unit based on the outside temperature.

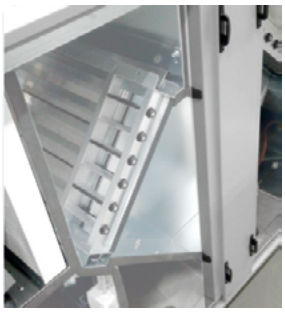
7.2.3 Electric reheating coil (accessory)



>> The electric reheating coil is switched by the temperature controller.
>> Minimum air volume.

CPL-1400	=	600 m³/h
CPL-2400	=	1100 m³/h
CPL-3300	=	1500 m³/h

7.2.4 Countercurrent plate heat exchanger



- The countercurrent plate heat exchanger is generally maintenance-free.

>> Check the rotational direction of the bypass damper (Bypass, HR mode).

7.2.5 Quick heat-up (boost function)

>> Check quick heat-up mode.

- Extract air is fed back directly into the room via the boost damper.
- In order to achieve the required set room temperature as quickly as possible, the air temperature is raised to a maximum via a reheating coil.
- All outdoor air dampers and exhaust air dampers are completely closed.
- Extract air fan out of action.
- The supply air fan is running and delivers the required flow rate.
- When the set room temperature has been achieved, the unit switches to standard control mode.

7.3 Flow rate calculation

>> The flow rate is calculated using the effective pressure method.

- Compare the static pressure upstream of the inlet nozzle with the static pressure in the inlet nozzle.
- The flow rate is calculated on the basis of the effective pressure Δp w (differential pressure of the two static pressures) using the following equation:

$$\dot{V} = k \cdot \sqrt{\Delta p_w}$$

$\dot{V}$ in [m³/h] und Δp_w in [Pa]

- The doors must be closed to determine the correct flow rate.
- Feed the test houses to the outside (e.g. CPL-A through the exhaust air aperture, CPL-iH and CPL-iV through the base).

7.3.1 Measure effective pressure

Fig. 7.1 Measure effective pressure

7.3.2 CPL-1400 effective pressure

K value of fan 76.

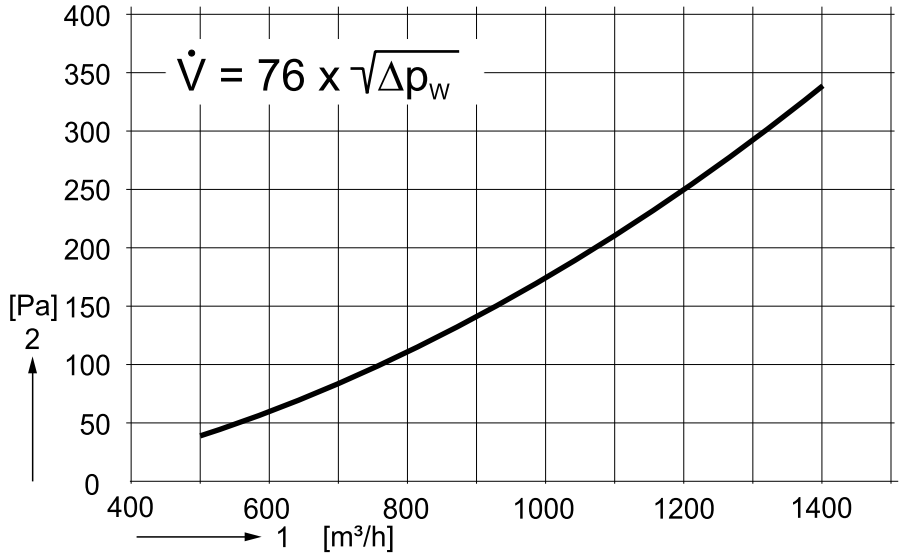


Fig. 7.2 CPL-1400 effective pressure

1 Flow rate **2** Effective pressure Δp

Δp	(Pa)	43	62	85	110	140	175	210	250	293	340
$\dot{V}$	(m³/h)	500	600	700	800	900	1000	1100	1200	1300	1400

7.3.3 CPL-2400 effective pressure

K value of fan 93.

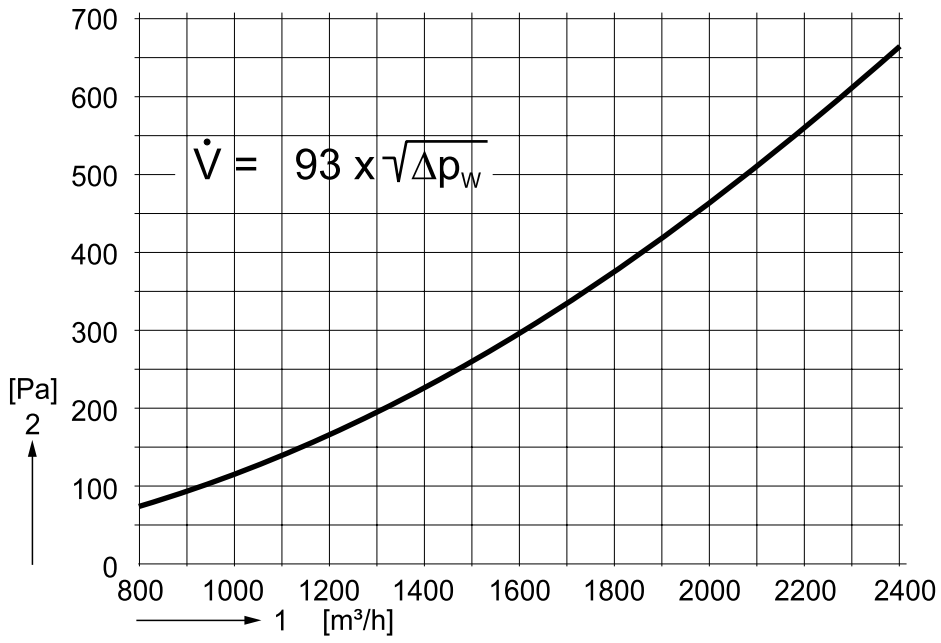


Fig. 7.3 CPL-2400 effective pressure

1 Flow rate **2** Effective pressure Δp

Δp	(Pa)	74	115	166	226	295	375	463	560	666
$\dot{V}$	(m³/h)	800	1000	1200	1400	1600	1800	2000	2200	2400

7.3.4 CPL-3300 effective pressure

K value of fan 106.

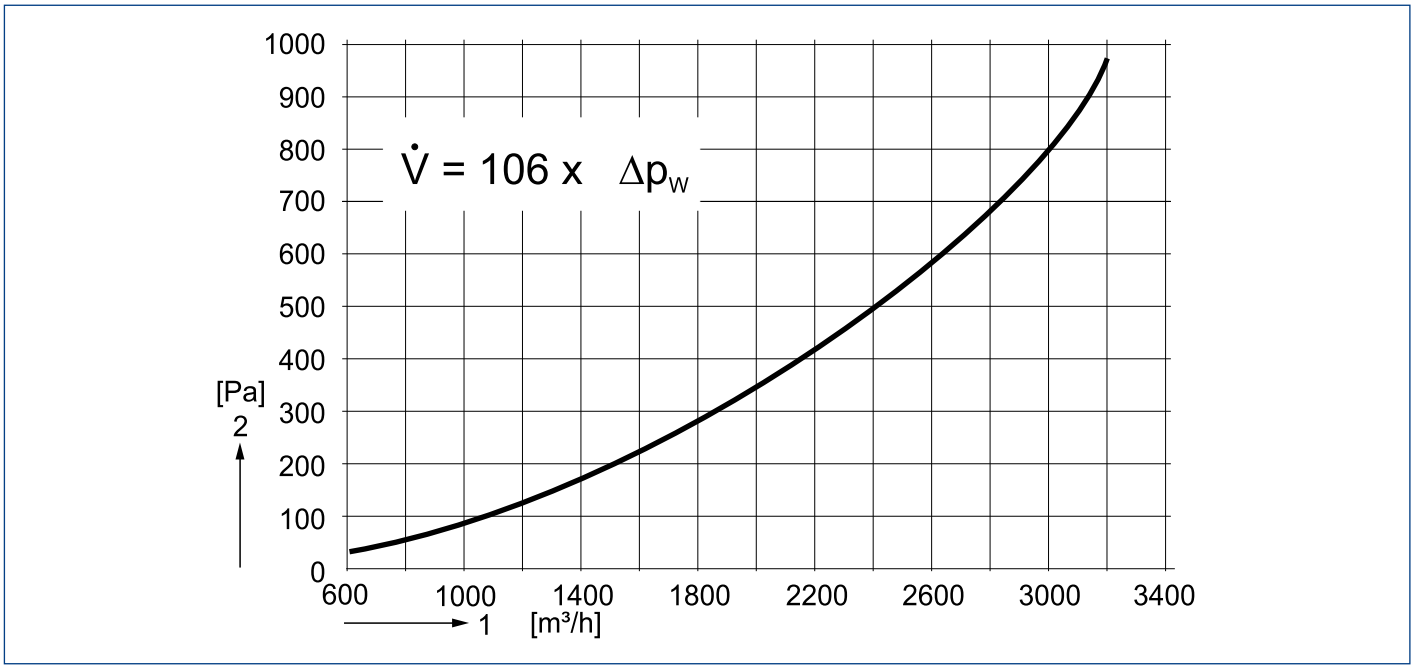


Fig. 7.4 CPL-3300 effective pressure

1 Flow rate **2** Effective pressure Δp

Δp	(Pa)	32	90	175	288	430	602	800	970
V̇	(m³/h)	600	1000	1400	1800	2200	2600	3000	3300

7.3.5 CPL-4700 effective pressure

K value of fan 140.

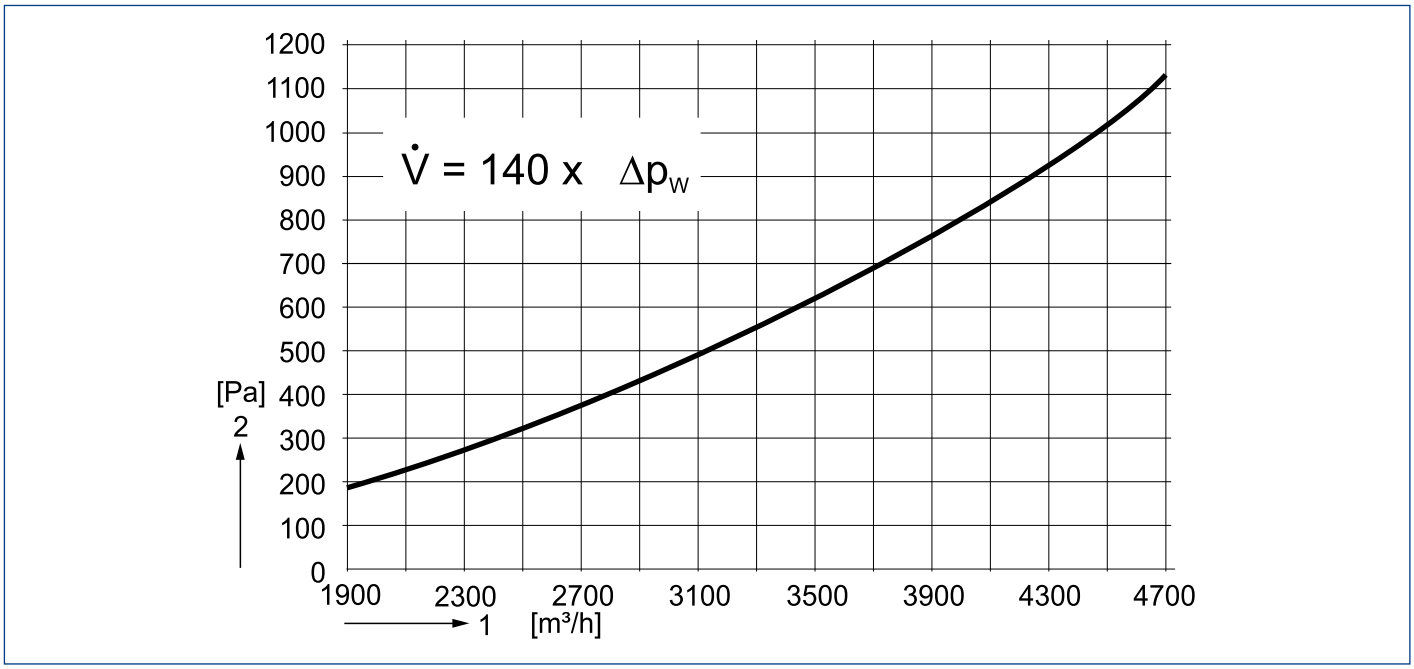


Fig. 7.5 CPL-4700 effective pressure

1 Flow rate **2** Effective pressure Δp

Δp	(Pa)	184	270	372	490	625	776	943	1127
V̇	(m³/h)	1900	2300	2700	3100	3500	3900	4300	4700

7.3.6 CPL-6100 effective pressure

K value of fan 180.

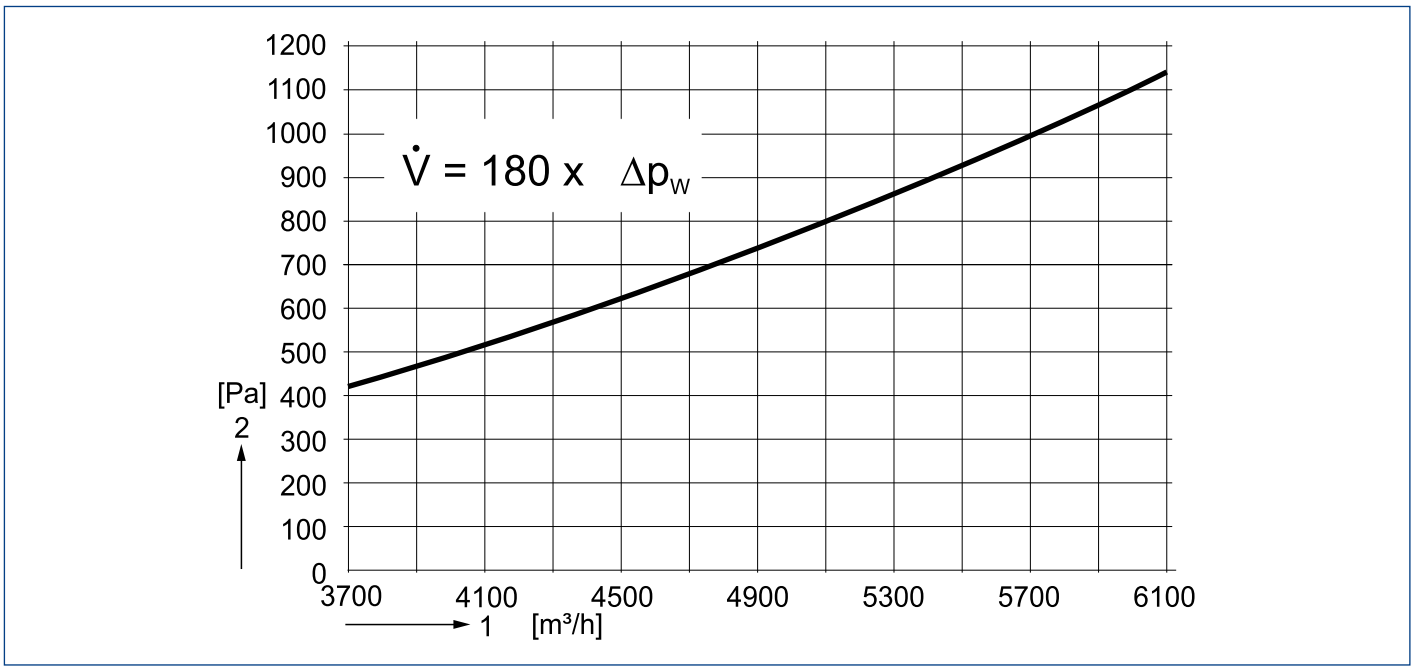


Fig. 7.6 CPL-6100 effective pressure

1 Flow rate **2** Effective pressure Δp

Δp	(Pa)	32	90	175	288	430	602	800	970
$\dot{V}$	(m³/h)	600	1000	1400	1800	2200	2600	3000	3300

7.4 Further settings for the BMK and accessories

- Further settings for the BMK programming unit can be found in the operating instructions for the WRS-K control unit.
- Accessories are installed in accordance with separate instruction manuals, which are provided with the relevant accessories.

8. MAINTENANCE

8.1 General information about maintenance

DANGER

Risk of electrical voltage even when the ON/OFF switch is set to OFF!

Danger of death from electrocution.

>> Do not touch the EC fans for five minutes after disconnecting the power across all poles.

>> Use a rubber mat if working on the unit when it is electrically charged

WARNING

Risk from rotating parts!

Risk of injury due to rotating fans or moving dampers.

>> Secure the unit isolator to prevent restarting.

>> Only open the inspection doors after the fans have come to a complete stop.

8.2 Maintenance shutdown

Fig. 8.1CPL maintenance

1 Unit isolator **2** Inspection door closures

>> Regularly check that the ventilation unit is functioning correctly.

>> Shut the system down using the unit isolator and safeguard against restarting.

8.3 Servicing the equipment

8.3.1 Compact filter

The compact filters are not renewable.

>> Compact filters must be replaced when they are dirty or no later than after 12 months.

>> Wear a suitable dust mask.

>> Remove the compact filters from the unit casing once the right-hand inspection doors have been opened (see spare parts).

>> Dispose of the dirty air filters in accordance with local regulations.

NOTE

Operation without filter

Contamination or damage of heat exchanger, fan and duct system

>> The appliance may only be operated with the designated filters.

8.3.2 Fan motor unit

- Motor and bearing are maintenance-free.

>> If necessary, clean the impeller with a soapy solution.

>> Check that the test lead is seated firmly at the test connector on the inlet nozzle (errors may be encountered if the test lead is loose).

8.3.3 Electrical equipment

>> Check the unit's electrical equipment regularly.

>> Replace loose connections and faulty cables immediately.

>> Check the earth conductors on a regular basis.

8.3.4 Countercurrent plate heat exchanger (PHE)

>> Check and clean at regular intervals.

>> Cleaning the heat exchanger (possible without replacing the PHE):

>> Vacuum, taking care not to bend the fins

>> Clean with water (non-pressurised) or a soapy solution.

- Cleaning methods that use high pressure (e.g. steam jet/high pressure washer) carry a risk of mechanically destroying the plate heat exchanger

8.3.5 Electric preheating coil/electric reheating coil (accessory)

>>Check and clean at regular intervals.

>>Cleaning the electric coils:

- Vacuum, taking care not to bend the heating coils
- Blow off with compressed air, max. 1 bar.

- If the cleaning pressure is too high, there is a risk of irreparable mechanical damage to the electric coils.
- The electric heating coil must be protected from moisture and water.

8.3.6 Bypass damper/extract air damper/outdoor air damper/boost damper

>> Check the dampers for ease of movement.

>> Never lubricate the dampers. This could destroy the plastic used and compromise the damper function.

>> To clean, wipe down with a soapy solution; otherwise maintenance-free.

8.3.7 Damper servomotors OPEN/CLOSED or variable

- The motors are maintenance-free.

>> At regular intervals, check that the connection from the servomotor to the damper drive is firmly seated.

8.3.8 Condensate pans

>> Regularly check the condensate pans for contamination and clean if required.

8.3.9 Trap

>> Regularly check the trap for contamination and clean if required.

>> Refill the trap with water before returning into use.

8.4 Hygiene CPL List

Hygiene checklist (extract from VDI 6022, sheet 1).
System commissioned: Date

Activity	Action if required	Months				
		1	3	6	12	24
Hygiene inspection.						X
Outdoor air intakes						
Check for contamination, damage and corrosion.	Clean and repair.				X	
Structural units/unit casing						
Check for contamination, damage and corrosion on the air side.	Clean and repair.				X	
Check for condensation.	Clean.			X		
Check casing for contamination, damage and corrosion.	Clean and repair.				X	
Air vents						
Check air vents, integral perforated plates, wire mesh or sieves for contamination, damage and corrosion (spot check).	Clean or replace.				X	
Spot check filter.	Replace.				X	
Spot check air vents with indoor air induction and extract air intakes for deposits.	Clean.				X	
Air filters						
Check for impermissible contamination, damage (leaks) and odours.	Changing the affected filters (Never operate the unit without filters!).		X			
Longest filter replacement interval.					X	
Air ducts						
Check accessible air duct sections for damage.	Repair.				X	
Check inner air duct surface for contamination, corrosion and condensation at two or three representative points.	Inspect the duct network at further points and decide whether cleaning is necessary (not only the visible areas).				X	
Silencer						
Check silencers for contamination, damage and corrosion.	Repair or replace; contact spotting if required.				X	
Fan						
Check for contamination, damage and corrosion.	Clean and repair.			X		
Heat exchanger (including heat recovery)						
Visual inspection of air/air plate heat exchanger for contamination, damage and corrosion.	Visual inspection.			X		
	Clean, remove if necessary (undo spacer and clean out plate heat exchanger).				X	
Heating coil: Check for contamination, damage, corrosion and tightness.	Clean and repair.			X		
Check condensate pan for contamination, corrosion, damage and tightness.	Clean and repair.		X			
Check the function of the drain and trap.	Clean and repair.		X			

Repairs

>> Only qualified personnel may remove faults or repair damage.
>> Only replace faulty components with original Solid Air spare parts.

9. APPENDIX

9.1 Connection diagram for CPL-1400, 2400, 3300, 4700, 6100

Wiring colours	
Main circuit	Black
Neutral conductor	Light blue
Earth conductor	Green/yellow
Control circuit for AC	Red/red-white
Control circuit for DC	Dark blue/dark blue/white
Floating contact (external voltage)	Orange

Before commissioning the control panel, note the following:

- On appliances without control unit, the main switch must be integrated into the wiring. Rated current 25 A. Cable harness wired to terminal strips; otherwise no other wiring.
- Make all connections in accordance with the regulations of the local power supply utility.
- Check all connecting screws and contact screws as well as the unassigned contacts for secure seating. (May become loose during transport.)
- The motor overload relays installed for the EC fans and electric heating coils are used as circuit breakers and do not need to be set to the rated current.
- Compare mains voltage with control panel supply voltage.
- Max. line length for sensors, servomotors, 24V control cables 50 m. Never route together with 230/400 V cables, or alternatively use shielded cables.
- Listed cable cross-sections are minimum cross-sections for copper cables without taking into account the cable length and onsite conditions.
- Cable types must be selected according to the type of routing.
- Frost protection is only guaranteed if mains switch Q1 is not deactivated.
- Residual current protective device RCD. Only AC/DC-sensitive fault current safety devices, type B, with 300 mA are permissible.

9.1.1 General symbols

Symbol	Description
	Additional designation for plug-in terminals X1 and X2 (Only for terminal strip X1 and X2).
	Marking for components which are only available/present in specific designs (e.g. PWW+PCW).
	Symbol for optional components (these components must be selected when purchasing the air conditioning appliance).
	Symbol for accessories (These components can also be bought from Solid Air later and connected to the air conditioning appliance).
	Shielded cable.
3 x 1,0 mm² **(24V)**	**Cable designation:** 3 = Number of cores 1.0 = Line cross-section (24V) = Voltage
	Onsite installation: Components with this marking must be wired up/connected onsite by a qualified electrician.
	**Detailed connection:** Detailed connection instructions are provided on a separate page for components with this marking.
FeBeSy	**Field device naming system:** Solid Air's internal system for designating field devices to improve identification.

9.1.2 Arrangement of terminal strips in different versions of the unit

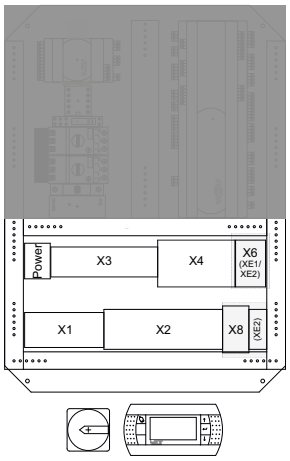
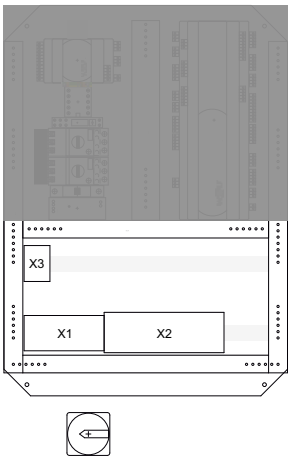
CPL-iH 1400 to 6100, CPL-A 4700 and 6100	
With control unit	Without control unit
	

Fig. 9.1 CPL- iH Terminal strips with and without control unit

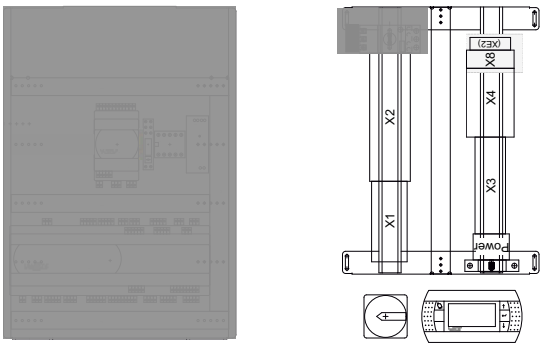
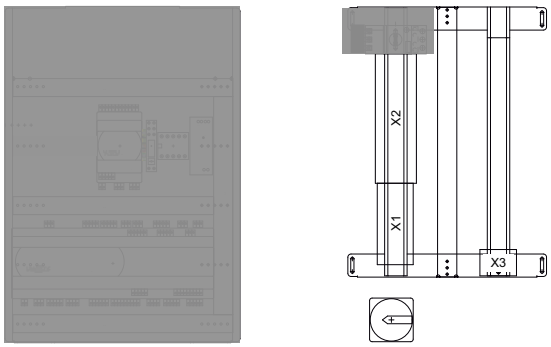
CPL-iV 1400 to 6100	
With control unit	Without control unit
	

Fig. 9.2 CPL-iV Terminal strips with and without control unit

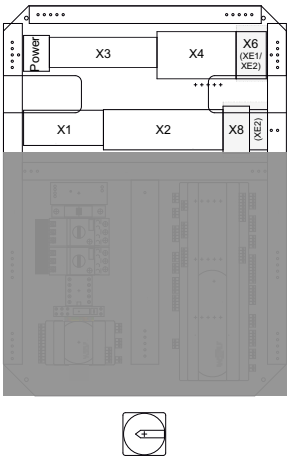
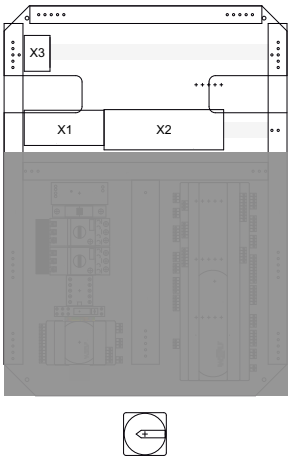
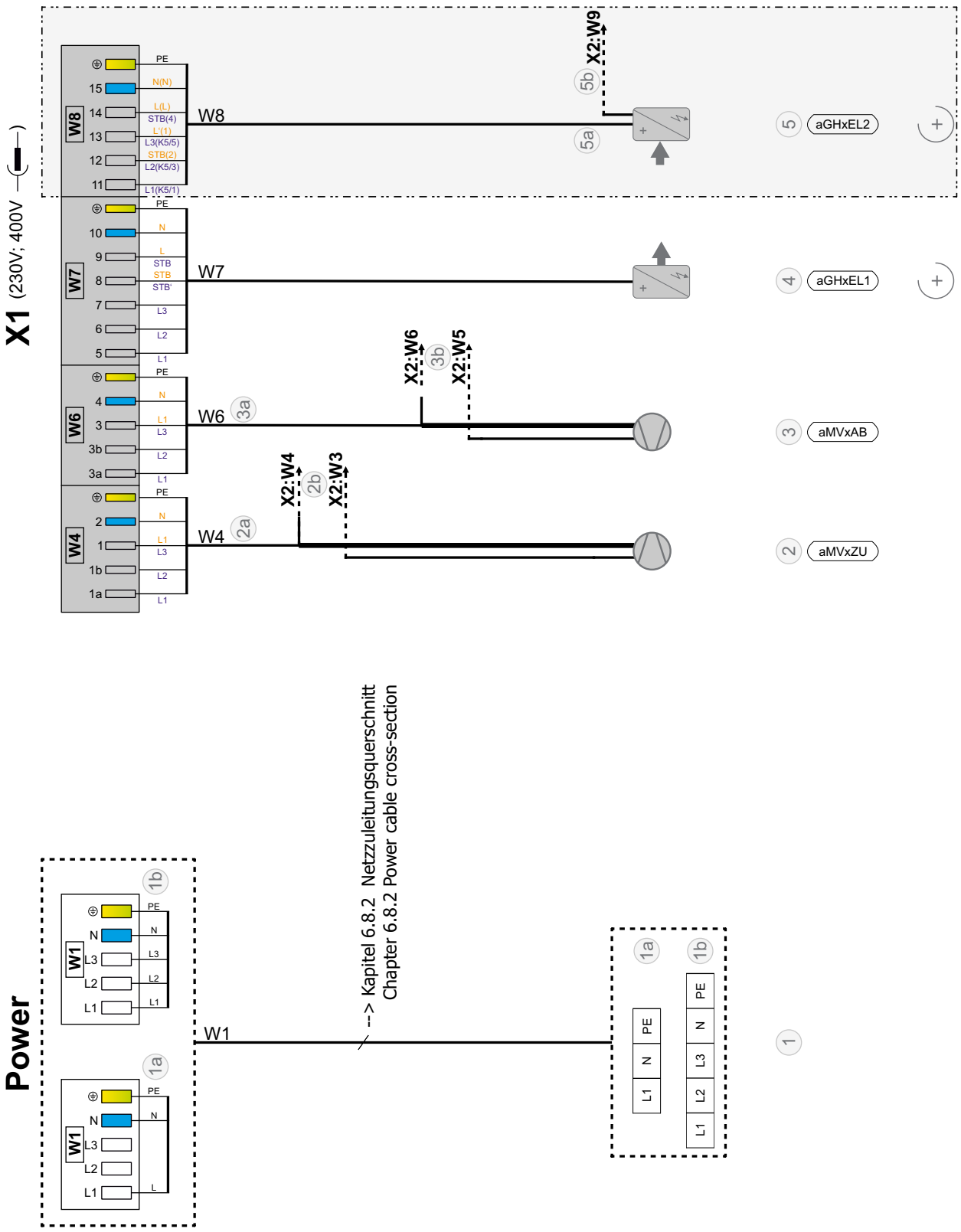
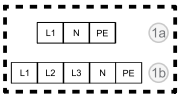
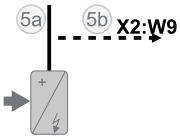
CPL-A 1400 to 3300 with and without control unit	
With control unit	Without control unit
	

Fig. 9.3 CPL-A Terminal strips

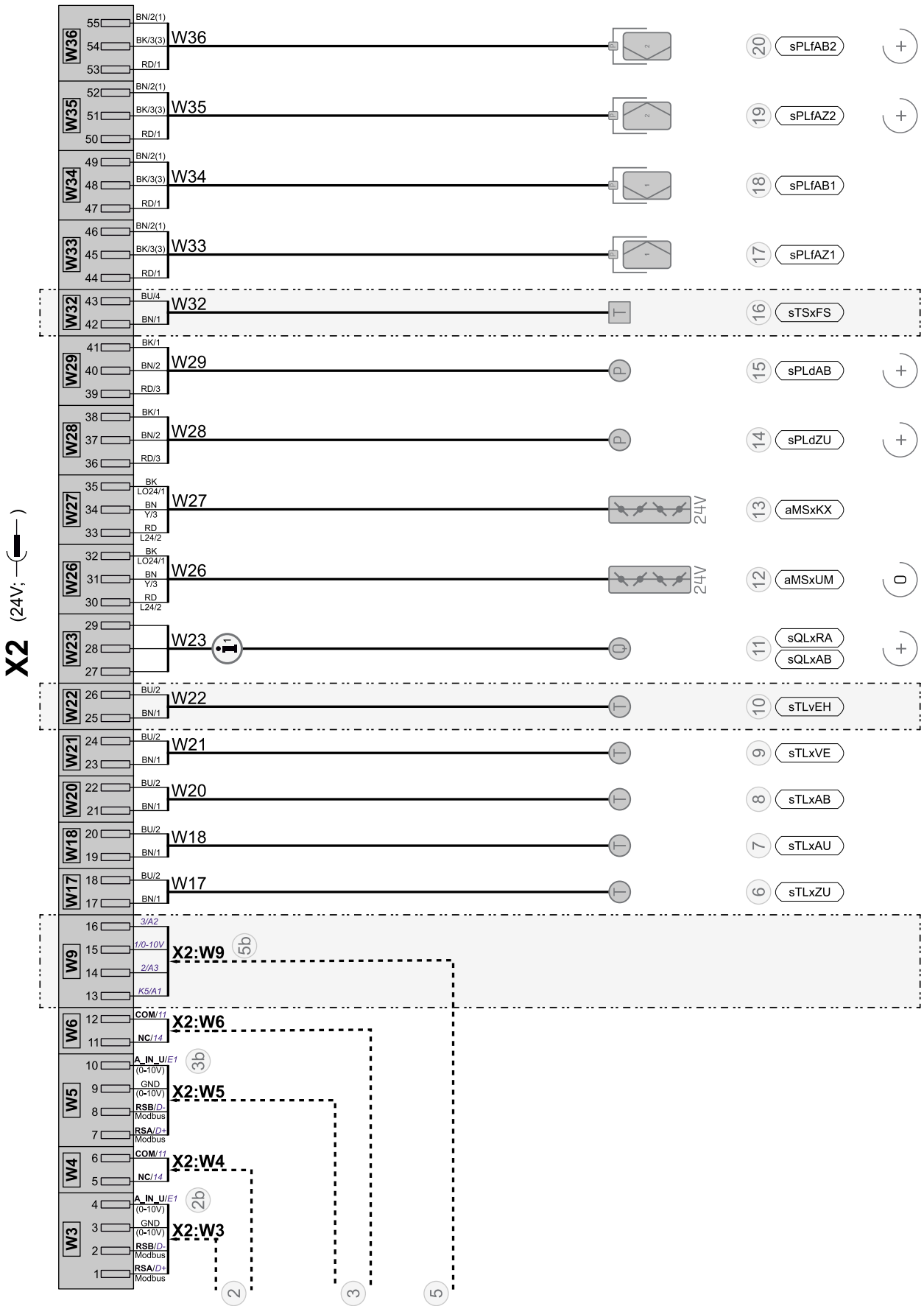
9.1.3 NS terminal strip X1



Key for terminal strip X1

No.	FeBeSy	Symbol	Description
①			1a: Voltage feed-in single phase: 1/N/PE/230 VAC 1b: Voltage feed-in three phase: 3/N/PE/400VAC Power cable cross-section and onsite fuse protection, see chapter 6.8.2 “Power cable cross-section”. 
②	aMVxZU		**Supply air fan** 2a: Power supply (fuse protection: CPL-1400 –> F1; CPL-2400 and CPL-3300, CPL-4700 and CPL-6100 –> Q2). 2b: Signal line **Note:** A bridge must be placed between port “24V” and “D1” at the fan with ZIEHL-ABEGG version. **CPL-1400**/CPL-2400, CPL-3300, CPL-4700, CPL-6100.
③	aMVxAB		**Extract air fan** 3a: Power supply (fuse protection: CPL-1400 –> F1; CPL-2400 and CPL-3300, CPL-4700 and CPL-6100 –> Q2). 3b: Signal line. **Note:** A bridge must be placed between port “24V” and “D1” at the fan with ZIEHL-ABEGG version. **CPL-1400**/CPL-2400, CPL-3300, CPL-4700, CPL-6100.
④	aGHxEL1		**Filter pre-dryer** (Elec. heating coil; fuse protection: CPL-1400 –> F1; CPL-2400 and CPL-3300, CPL-4700 and CPL-6100 –> Q3). Accessories **CPL-1400**/CPL-2400, CPL-3300, CPL-4700, CPL-6100.
⑤	aGHxEL2		**Reheating coil** (Elec. heating coil; fuse protection: CPL-1400 –> F1; CPL-2400 and CPL-3300 –> Q3). 5a) Line present only for the following unit designs: 1400 e.coil + WP, 1400 e.coil + PCW, 1400 without coil, 2400 e.coil + WP, 2400 e.coil + PCW, 2400 without coil, 3300 e.coil + WP, 3300 e.coil + PCW, 3300 without coil. 5b) Line present only for the following unit designs: 2400 e.coil + WP, 2400 e.coil + PCW, 2400 without coil, 3300 e.coil + WP, 3300 e.coil + PCW, 3300 without coil. **Accessories** **CPL-1400**/CPL-2400, CPL-3300.

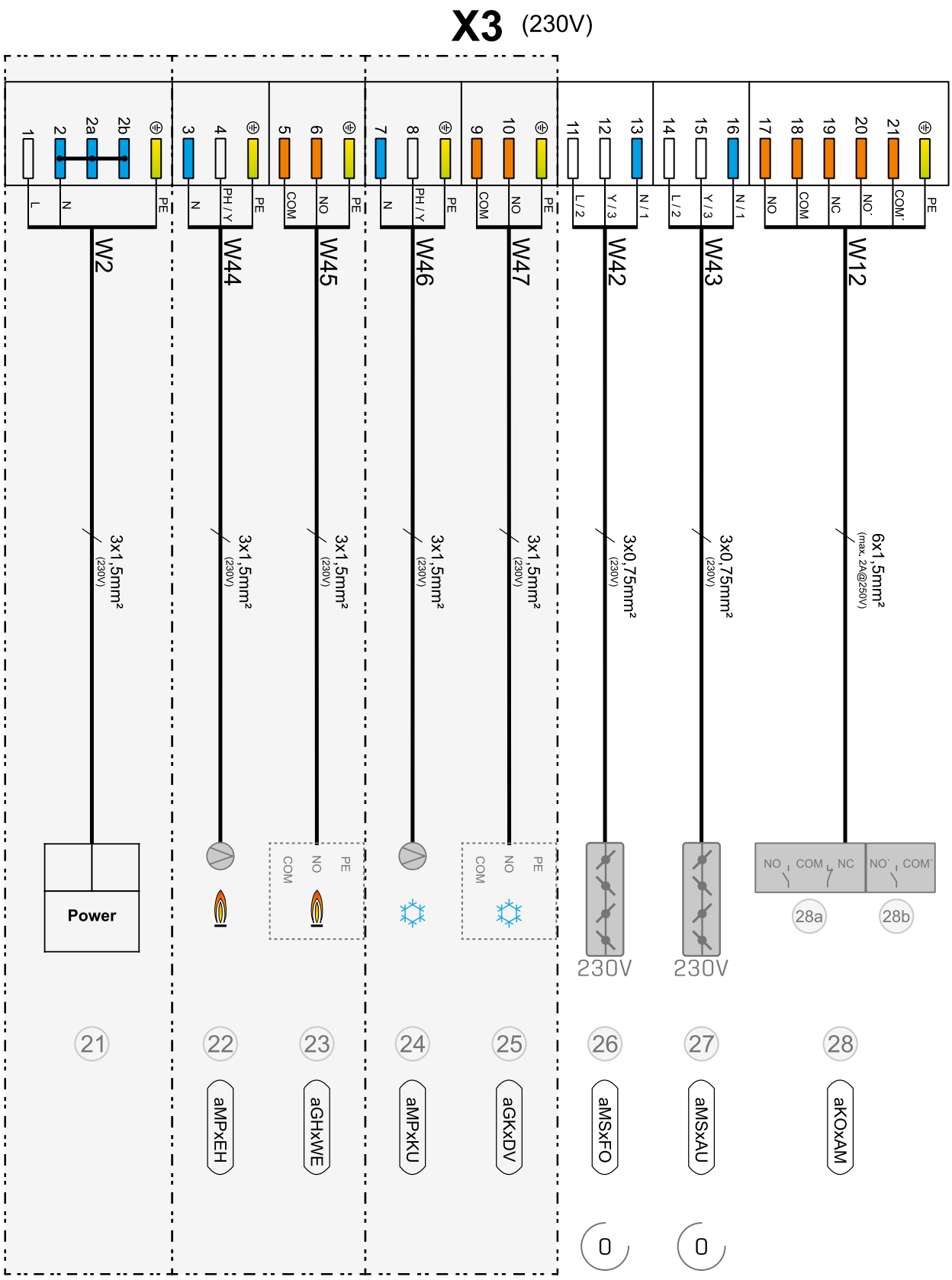
9.1.4 Connections terminal strip X2



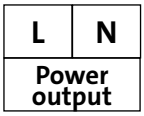
Key for terminal strip X2

No.	FeBeSy	Symbol	Description	
6	sTLxZU	T	**Supply air temperature sensor** When retrofitting a reheater, the internal sensor must be disconnected and the supply air sensor from the preheater module connected.	
7	sTLxAU		**Outside air temperature sensor** When retrofitting an external outside sensor, the internal sensor must be disconnected and the external outside sensor connected.	
8	sTLxAB		**Extract air temperature sensor**	
9	sTLxVE		**Icing-up temperature sensor** (installed on the exhaust air side downstream of the HR system).	
10	sTLvEH		**Temperature sensor downstream of HR and upstream of reheating coil** Only present/available for the following unit designs: - Systems with Solid Air Clima-Split.	
11	sQLxAB sQLxRA	Q	**Air quality sensor and CO_2 sensor accessories** If an expansion box is fitted, the air quality sensor can also be fitted outside the basic appliance.	
12	aMSxUM		**Servomotor recirculation air (boost),** 24V, 0-10V; (optional).	
13	aMSxKX		**Servomotor KGX/bypass,** variable, 24V.	
14	sPLdZU	P	**Supply air pressure sensor** constant (accessory).	
15	sPLdAB		**Extract air pressure sensor** constant (accessory).	
16	sTSxFS	T	**Frost thermostat switching** (note: Insert jumper if component is not present). Only present/available for the following unit designs: 1400 PWW + PCW, 1400 PWW + HP, 1400 without control, 2400 PWW + PCW, 2400 PWW + HP, 2400 without control, 3300 PWW + PCW, 3300 PWW + HP, 3300 without control 4700 PWW + PKW, 4700 PWW + WP, 4700 without control, 6100 PWW + PKW, 6100 PWW + WP, 6100 without control.	
17 19	sPLfAZ		**Pressure cell outdoor air filter:** Analogue or digital. Note: Analogue pressure cell: RD/1, BK/3, BN/2; Digital pressure cell: BK/3, BN/1.	X = numbering (1, 2) Outdoor air/Supply air 1: Default Outdoor air/Supply air 2: Accessories
18 20	sPLfAB		**Pressure cell extract air filter:** Note: Analogue pressure cell: RD/1, BK/3, BN/2 Digital pressure cell: BK/3, BN/1.	X = numbering (1, 2) Extract air 1: Default Extract air 2: Accessories

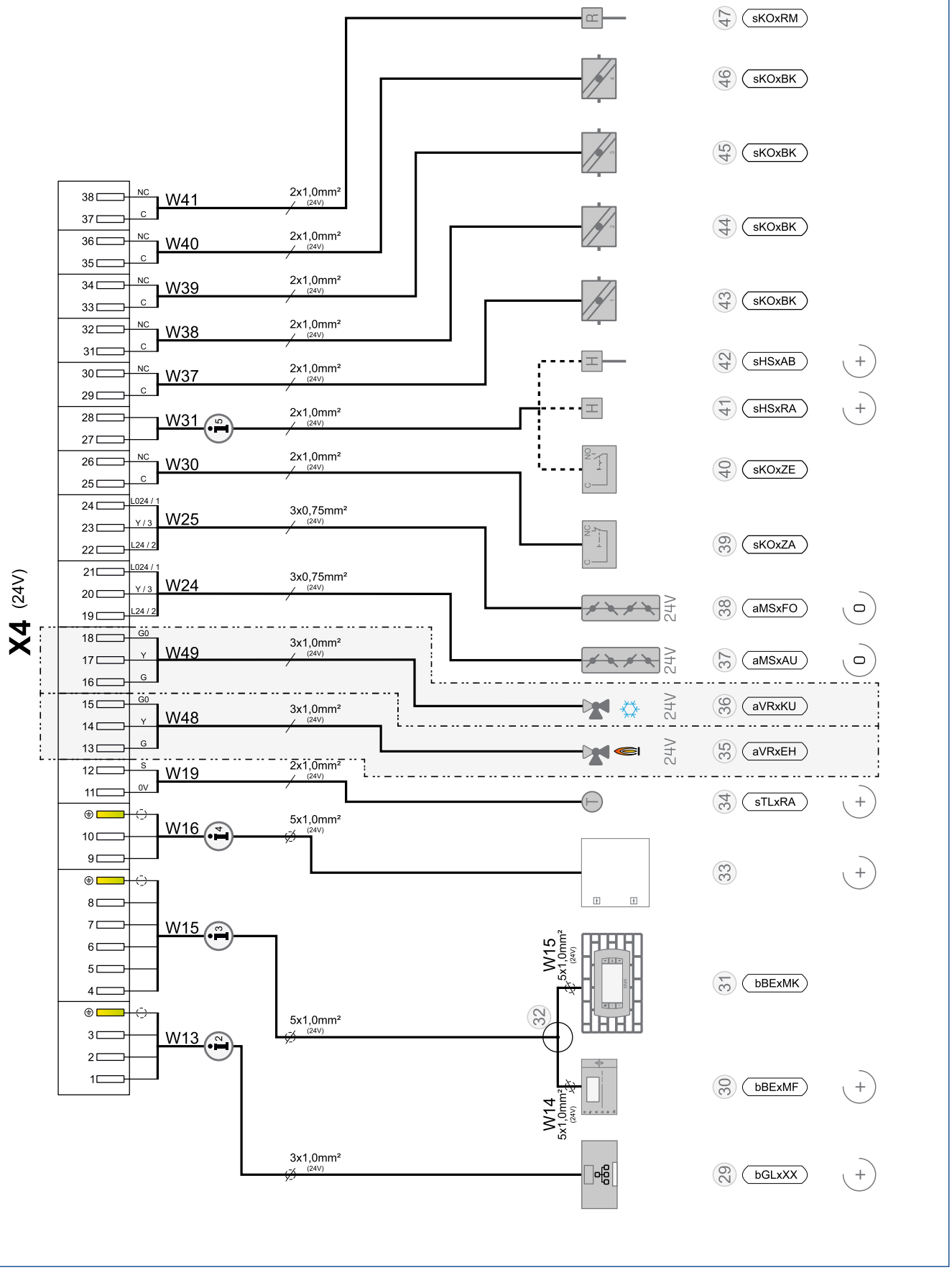
9.1.5 X3 Connections terminal strip X3



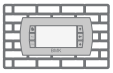
Key for terminal strip X3

No.	FeBeSy	Symbol	Description
21			**Voltage output reserve, 230V max. 1A** Protected with B6 MCB "F1". Only present/available for the following unit designs: - All except "without coil" designs.
22	aMPxEH		**Heat pump,** (or pump for heating and cooling for change-over coil), max. 1.5A, 230V (onsite). Only present/available for the following unit designs: 1400 PWW + PCW, 1400 PWW + WP, 2400 PWW + PCW, 2400 PWW + WP, 3300 PWW + PCW, 3300 PWW + WP, 4700 PWW + PCW, 4700 PWW + WP, 6100 PWW + PCW, 6100 PWW + WP.
23	aGHxWE		**Heat/burner** demand (floating contact), max. 2A@250V. Only present/available for the following unit designs: 1400 PWW + PCW, 1400 PWW + WP, 2400 PWW + PCW, 2400 PWW + WP, 3300 PWW + PCW, 3300 PWW + WP, 4700 PWW + PCW, 4700 PWW + WP, 6100 PWW + PCW, 6100 PWW + WP.
24	aMPxKU		**Cooling pump,** max. 1.5A, 230V (onsite) Only present/available for the following unit designs: 1400 PWW + PCW, 1400 e.coil + PCW, 2400 PWW + PCW, 2400 e.coil + PCW, 3300 PWW + PCW, 3300 e.coil + PCW , 4700 PWW + PCW, 6100 PWW + PCW.
25	aGKxDV		**Cooling demand** (floating contact), max. 2A@250V Only present/available for the following unit designs: 1400 PWW + PCW, 1400 e.coil + PCW, 2400 PWW + PCW, 2400 e.coil + PCW, 3300 PWW + PCW, 3300 e.coil + PCW , 4700 PWW + PCW, 6100 PWW + PCW.
26	aMSxFO		**Servomotor, exhaust** air open - closed, 230V (optional) (line fuse: F1).
27	aMSxAU		**Servomotor, outdoor** air open - closed, 230V (optional) (line fuse: F1).
28	aKOxAM		Floating contacts: **28a: Central fault** **28b: Op. message** max. 2A@250V Only present/available for the following unit designs: - All with exception of "without coil" designs.

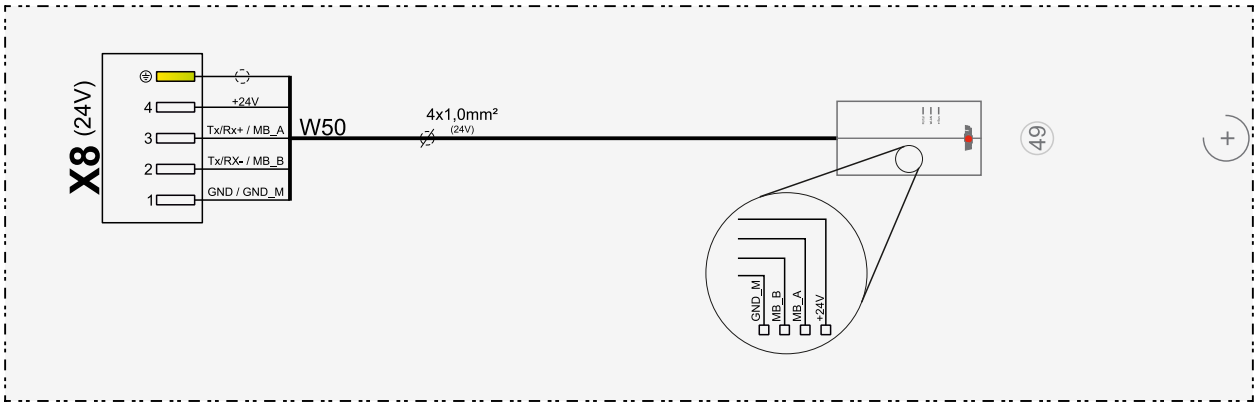
9.1.6 Connection terminal strip X4

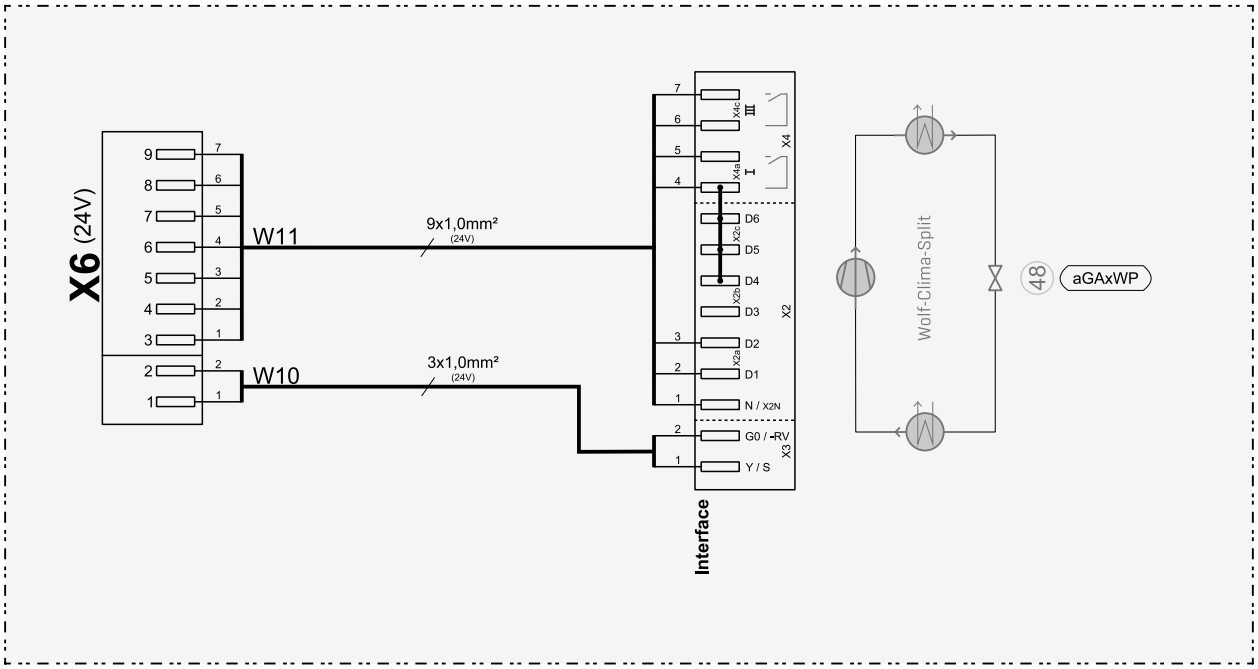


Key for terminal strip X4

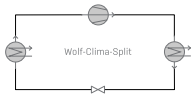
No.	FeBeSy	Symbol	Description
29	bGLxXX		**Interface module:** (accessory) LON, Modbus/KNX, BACnet or Ethernet. Only present/available for the following unit designs: - All except “without control” designs.
30	bBExMF		**“BMK-F” remote control unit** (accessory) Only present/available for the following unit designs: - All except “without coil” designs.
31	bBExMK		**Programming unit for wall mounting** (loose in external units) only present/available for the following unit designs: - All except “without control” designs.
32			**Terminal box** (socket) (onsite) BMK-F is connected in parallel with onsite terminals.
33			**Power supply, auxiliary module,** 24VDC, max. 0.5A, (onsite, accessory). Only present/available for the following unit designs: - all except “without coil” designs.
34	sTLxRA		**Room temperature sensor** (accessory), required for special functions like night ventilation, preheat programme, etc. Only present/available for the following unit designs: - All except “without coil” designs.
35	aVRxEH		**Heating actuator,** (or actuator for heating and cooling for change-over coil), variable, 24V (onsite), only present/available for the following unit designs: 1400 PWW + PCW, 1400 PWW + WP, 2400 PWW + PCW, 2400 PWW + WP, 3300 PWW + PCW, 3300 PWW+WP, 4700 PWW + PCW, 4700 PWW + WP, 6100 PWW + PCW, 6100 PWW + WP.
36	aVRxKU		**Cooling actuator,** variable, 24V, (onsite) only present/available for the following unit designs: 1400 PWW + PCW, 1400 e.coil + PCW, 2400 PWW + PCW, 2400 e.coil + PCW, 2400 PWW + PCW, 3300 e.coil + PCW, 4700 PWW + PCW, 6100 PWW + PCW.
37	aMSxAU		**Servomotor, outdoor air,** 24V, 0-10V, (optional).
38	aMSxFO		**Servomotor, exhaust air,** 24V, 0-10V, (optional).
39	sKOxZA		**Additional customer-supplied contact OFF** (Note: Remove jumper if component is present). Only present/available for the following unit designs: - All except “without coil” designs.
40	sKOxZE		**Additional customer-supplied contact ON** Only present/available for the following unit designs: - All except “without coil” designs.
41	sHSxRA		**Hygrostat room** (accessory) Only present/available for the following unit designs: - All except “without coil” designs.
42	sHSxAB		**Hygrostat extract air/duct** (accessory) Only present/available for the following unit designs: - All except “without coil” designs.
43 44 45 46	sKOxBK		**Fire damper,** floating NC contact, (onsite), X= numbering (1, 2, 3, 4) (Note: Insert jumper if component is not present). Only present/available for the following unit designs: - All except “without coil” designs, For more than 4 dampers, use the wiring diagram of the fire protection dampers control panel.
47	sKOxRM		**Smoke detector,** floating NC contact (onsite) (Note: Insert jumper if component is not present). Only present/available for the following unit designs: - All except “without coil” designs.

9.1.7 Connection terminal strip X6 and X8

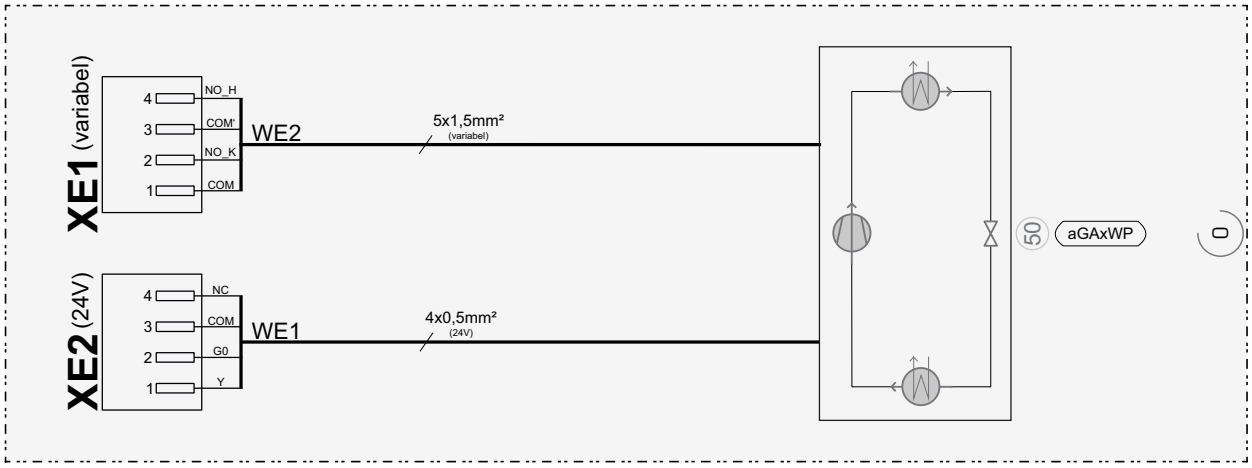




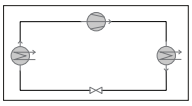
Key for terminal strips X6 and X8

No.	FeBeSy	Symbol	Description	
48	aGAxWP		**Solid Air unit:** Y-G0: 0-10V; max. 10 mA N: 0V D1: Enable contact (NO contact) D2: Heating mode (open contact)/cooling mode (closed contact) I: Solid Air fault III: Defrost mode **PLEASE NOTE:** Disconnect the unit from the power when making changes to the position of the DIP switch. Only present/available for the following unit designs: - Systems with Solid Air. The Solid Air system includes control cables (W10 and W11) in the cable harness. These must be wired into the control panel of the Solid Air system. Please refer to the instructions for information about the connection.	
49			**Solid Air Link Pro** Note: Under **“Contractor Menu/Misc”** change **“Interface BMS2 present” to “yes” in the BMK** Only present/available for the following unit designs: - Systems with XL controller (KLM_XL; mat. no. 2746118). **Accessories:** Connection information is provided in the “Solid Air Link home/Solid Air Link pro interface module” instructions.	

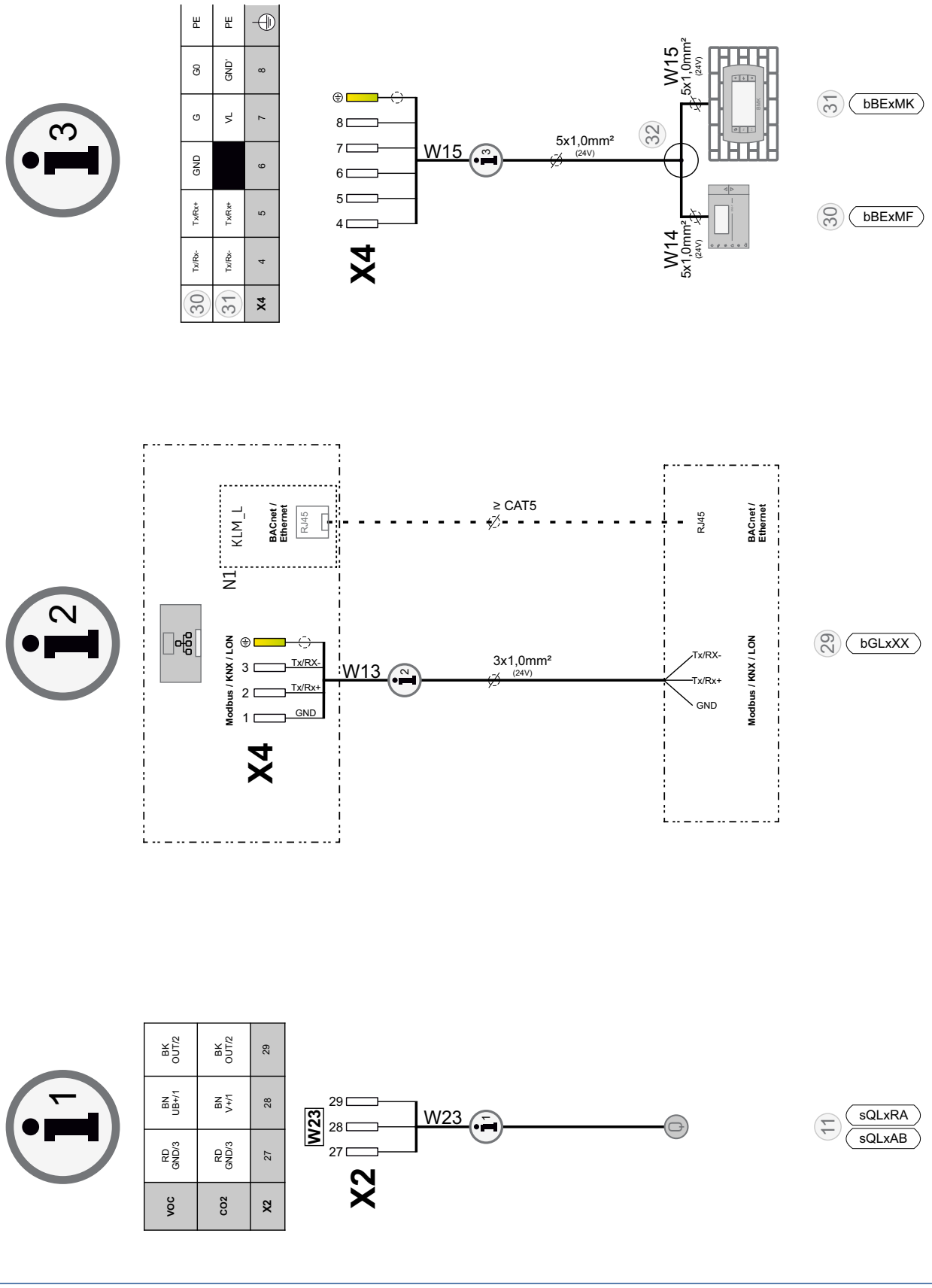
9.1.8 Connection terminal strips XE1 and XE2



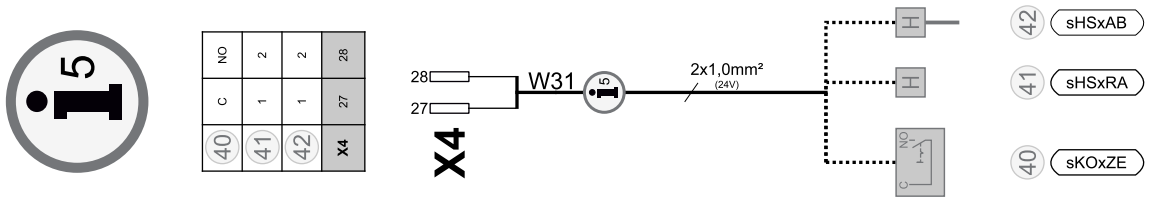
Legenda XE1 en XE2

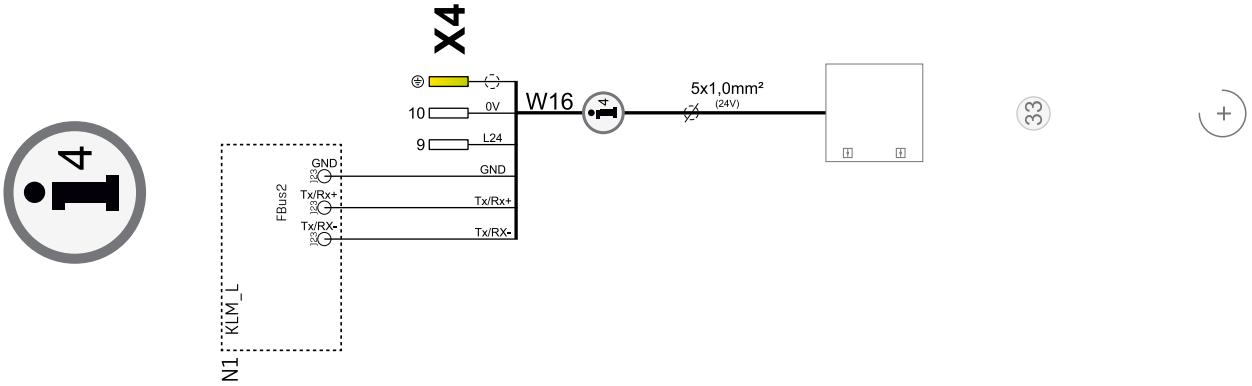
No.	FeBeSy	Symbol	Description	
50	aGAxWP		**Onsite heat pump (special equipment):** XE2: 1-2 : Heating/cooling signal heating pump 0-10V. XE2: 3-4 : Heat pump fault (floating NC contact). XE1: 1-2 : Cooling demand at heat pump (floating NO contact). XE1: 3-4 : Heating demand at heat pump (floating NO contact). Only present/available for the following unit designs: - Systems with onsite heat pump.	
51	sKoxBM		**Fire alarm system contact (special equipment)** (Note: Insert jumper if component is not present). Only present/available for the following unit designs: - Systems which are fitted with the “fire alarm system contact” when ordered. Systems on which the “fire alarm system contact” was retrofitted.	
52	aGKxDV		**Fault message contact for cooling system:** (Note: Insert jumper if component is not present). Only present/available for the following unit designs: - Systems that make use of a direct evaporator for the cooling function.	

9.1.9 Detailed connection for i1 to i3



9.1.10 Detailed connection for i4 to i5





9.1.11 Overview of cables for onsite wiring

Listed cable cross-sections are minimum cross-sections for copper cables without taking into account the cable length and onsite conditions.
Cable types must be selected according to the type of routing.
Never route cables for sensors, valves, servomotors (24V) together with 230/400V cables.
Alternatively, use shielded cables.
PLEASE NOTE: (24V) cable - number of cores without green-yellow cores.

Description	Source	Name of component	Number of cores	Cross-section	Voltage	No.
W1	Power	Supply onsite	(1a) 3	See chapter 6.8.2	230V	(1)
			(1b) 5		400V	
W2	X3	Power supply reserve	3	1,5	230V	(21)
W12	X3	System messages	7	1,5	variable	(28)
W13	X4	Bus connections	3	1,0	24V + shielding	(29)
W14	X4	BMK-F	5	1,0	24V + shielding	(30)
W15	X4	BMK	5	1,0	24V + shielding	(31)
W16	X4	Auxiliary module	5	1,0	24V + shielding	(33)
W19	X4	Room temperature sensor	2	0,5	24V	(34)
W30	X4	Additional customer-supplied contact OFF	2	1,0	24V	(39)
W31	X4	Additional customer-supplied contact ON	2	1,0	24V	(40)(41)(42)
W37	X4	Fire protection group 1	2	1,0	24V	(43)
W38	X4	Fire protection group 2	2	1,0	24V	(44)
W39	X4	Fire protection group 3	2	1,0	24V	(45)
W40	X4	Fire protection group 4	2	1,0	24V	(46)
W41	X4	Smoke detector	2	1,0	24V	(47)
W44	X3	Heat pump	3	1,5	230 V	(22)
W45	X3	Heat/boiler demand	3	1,5	variable	(23)
W46	X3	Cooling pump	3	1,5	230V	(24)
W47	X3	Cooling demand	3	1,5	variable	(25)
W48	X4	Heating actuating signal	3	1,0	24V	(35)
W49	X4	Cooling actuating signal	3	1,0	24V	(36)
W50	X8	Solid Air Link Pro	4	1,0	24V + shielding	(49)
WE1	XE2	Onsite heat pump	4	0,5	24V	(50)
WE2	XE1	Onsite heat pump	5	1,5	variable	(50)
WE3	XE2	Fire alarm system contact	2	0,5	24V	(51)
WE4	XE2	Coolunsystem fault message	2	0,5	24V	(52)

9.1.12 Temperature sensors performance curve (NTC5k)

Temperature °C	Resistance Ω	Temperature °C	Resistance Ω	Temperature °C	Resistance Ω	Temperature °C	Resistance Ω
-21	51.393	14	8.233	49	1.870	84	552
-20	48.487	15	7.857	50	1.800	85	535
-19	45.762	16	7.501	51	1.733	86	519
-18	43.207	17	7.162	52	1.669	87	503
-17	40.810	18	6.841	53	1.608	88	487
-16	38.560	19	6.536	54	1.549	89	472
-15	36.447	20	6.247	55	1.493	90	458
-14	34.463	21	5.972	56	1.438	91	444
-13	32.599	22	5.710	57	1.387	92	431
-12	30.846	23	5.461	58	1.337	93	418
-11	29.198	24	5.225	59	1.289	94	406
-10	27.648	25	5.000	60	1.244	95	393
-9	26.189	26	4.786	61	1.200	96	382
-8	24.816	27	4.582	62	1.158	97	371
-7	23.523	28	4.388	63	1.117	98	360
-6	22.305	29	4.204	64	1.078	99	349
-5	21.157	30	4.028	65	1.041	100	339
-4	20.075	31	3.860	66	1.005	101	330
-3	19.054	32	3.701	67	971	102	320
-2	18.091	33	3.549	68	938	103	311
-1	17.183	34	3.403	69	906	104	302
0	16.325	35	3.265	70	876	105	294
1	15.515	36	3.133	71	846	106	285
2	14.750	37	3.007	72	818	107	277
3	14.027	38	2.887	73	791	108	270
4	13.344	39	2.772	74	765	109	262
5	12.697	40	2.662	75	740	110	255
6	12.086	41	2.558	76	716	111	248
7	11.508	42	2.458	77	693	112	241
8	10.961	43	2.362	78	670	113	235
9	10.442	44	2.271	79	670	114	228
10	9.952	45	2.183	80	628	115	222
11	9.487	46	2.100	81	608	116	216
12	9.046	47	2.020	82	589	117	211
13	8.629	48	1.944	83	570	118	205