systemair

Handbook

OPTIMA-RES-A

Residential VAV System Box

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Description

OPTIMA-RES-A is a compact system of supply and extract VAV controllers. The product is intended for ventilation control of residential premises. The basic functionality is continuous supply and extract airflow volume control in master/slave operation mode. Additionally, it can be switched into override operation modes like open or close damper, or minimum or maximum airflow volume control. The product can be installed on a surface, or into gypsum plaster walls or ceilings.

Highlights

- Complete VAV supply and extract master/slave solution
- AC 230 V power supply
- Electrical safety elements and connection terminals on board
- Noise attenuators included
- VAV controllers can be easily detached and mounted in other supply/extract configuration

List of Accessories

- RC-C3DOC: Room Controller
- MZ3-Touch: Ventilation Control Panel
- EC-Basic – CO2 + Temperature Room Controller
- CO2RT: CO2 Room Transmitter
- ZTH-EU: Service Tool for VAV Controllers

Design

The OPTIMA-RES-A system is encased in a galvanised steel box. The system consists of one supply and one extract OPTIMA-R-FC variable airflow controller, an electric part with power supply and control circuitry, and acoustic attenuation.The VAV controllers are mounted to the circular duct connections by sleeves, so the VAV controllers are easily removable. The system box is equipped with cable pass diaphragms for cables related to the power supply, setpoint control signal, feed-back signal and override signal. These cables shall be connected by a service person on site. The corresponding terminals are available according to the wiring diagram.

Controls

The residential VAV system is equipped with BA type compact controllers in the master/slave connection. The controllers use analog input for the setpoint signal and analog output for the feedback signal. The type of the signals is DC 0 V ... 10 V. The VAV controllers are factory calibrated as standard to the air volume indicated in the table below or, upon request, they can be adjusted to site required settings of the Vmin /Vmax range. The air volumes can also be readjusted on site with the ZTH-EU hand held service tool. If specific air volumes for Vmin and Vmax would be required, they must be indicated in the ordering code or noted in the order for adequate calibration in the factory.

Factory Settings

DN	V_{min} @ 2 m/s		V_{max} @ 9 m/s		V_{nom} @ 11 m/s	
mm	m^3/h	l/s	m^3/h	l/s	m^3/h	l/s
100	57	16	254	71	311	86
125	88	24	398	111	486	135
160	145	40	651	181	796	221

Basic Functional Characteristics

Controller type: OPTIMA-RES-A-...BA

Basic Parameters and Features

Flow volume adjustment setpoint signal:

Analog input DC 0 V ... 10 V. The Systemair MZ3-Touch room control device is primarily foreseen to be connected to the analog input. It can operate in automatic mode, continuously controlling the air flow volume dependent from temperature, VOC or CO2 concentration. If switched to manual mode, the air flow setpoint can be adjusted manually in four discrete steps between the preset Vmin and Vmax of OPTIMA-RES-A. Other control devices with 0 V ... 10 V control output can also be used, e.g. Systemair RC-C3DOC.

Controller parameters setup tools: Belimo ZTH-EU

Feedback signal (actual air flow volume): Analog output DC 0 V ... 10 V

Power supply (each VAV controller, secured by transformer on board):

AC 24 V/50 Hz (4 VA)

DC 24 V (2 W)

Power supply (whole system): AC 230 V/50 Hz

Protection class (closed system box): IP40

Master/Slave Configuration

The VAV system is configured as master/slave. The supply air VAV controller (the master) reads the flow volume setpoint from an external source like e.g. a room controller or manual setpoint dial. The control range (Vmin, Vmax) of the master VAV controller can be adjusted at the factory or on site with the ZTH-EU configuration tool. The feedback signal from master VAV represents the actual measured air flow volume. This signal is connected to the extract air VAV controller (the slave) as the setpoint for the air flow volume. So the air flow volumes of supply and extract air are always equal with high reliability.

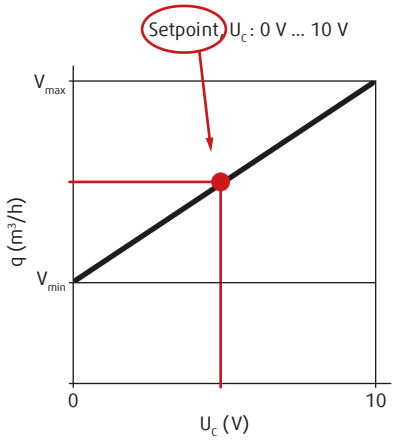
Master (Supply Air) VAV Controller Setup

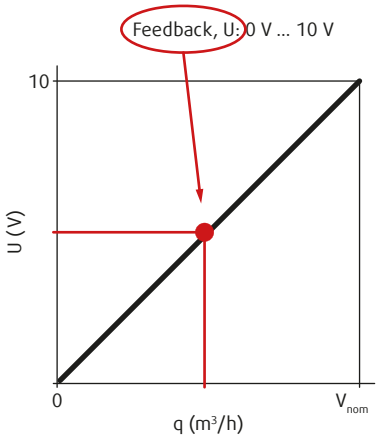
V_{min} adjustable between 0 and V_{nom}
V_{max} adjustable between V_{min} and V_{nom}. Lowest possible adjustment is 20% of V_{nom}.

Slave (Extract Air) VAV Controller Setup

V_{min} adjusted to 0, shall not be changed.
V_{max} adjusted equal V_{nom}, shall not be changed.

Setpoint/Feedback Signal and Air Flow Volume Calculation for VAV Controller





$$U_C\,(V) = \frac{q - V_{min}}{V_{max} - V_{min}} \cdot 10$$

$$q = \frac{U\,(V)}{10} \cdot V_{nom}$$

U_c: Air flow volume setpoint signal value (range DC 0 V ... 10 V)

q: Air flow volume

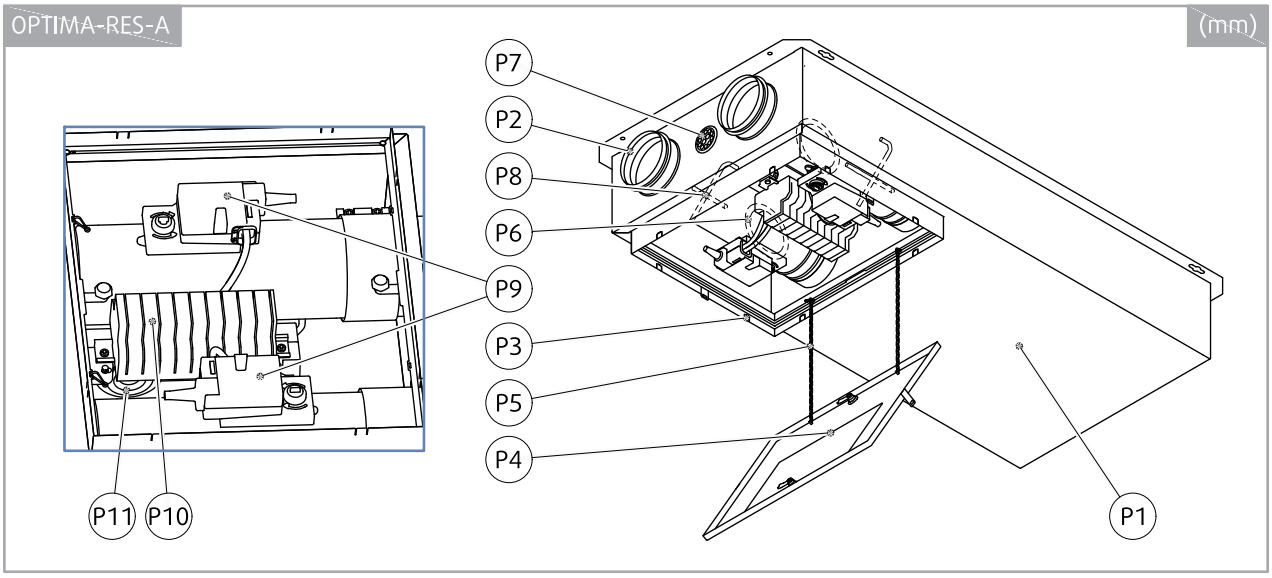
V_{min}: Minimum adjusted air flow volume (lower limit of control range)

V_{max}: Maximum adjusted air flow volume (upper limit of control range)

U: Measured air flow volume feedback signal value (range DC 0 ... 10 V)

V_{nom}: Nominal air flow volume calibrated in factory – not adjustable.

Product Parts

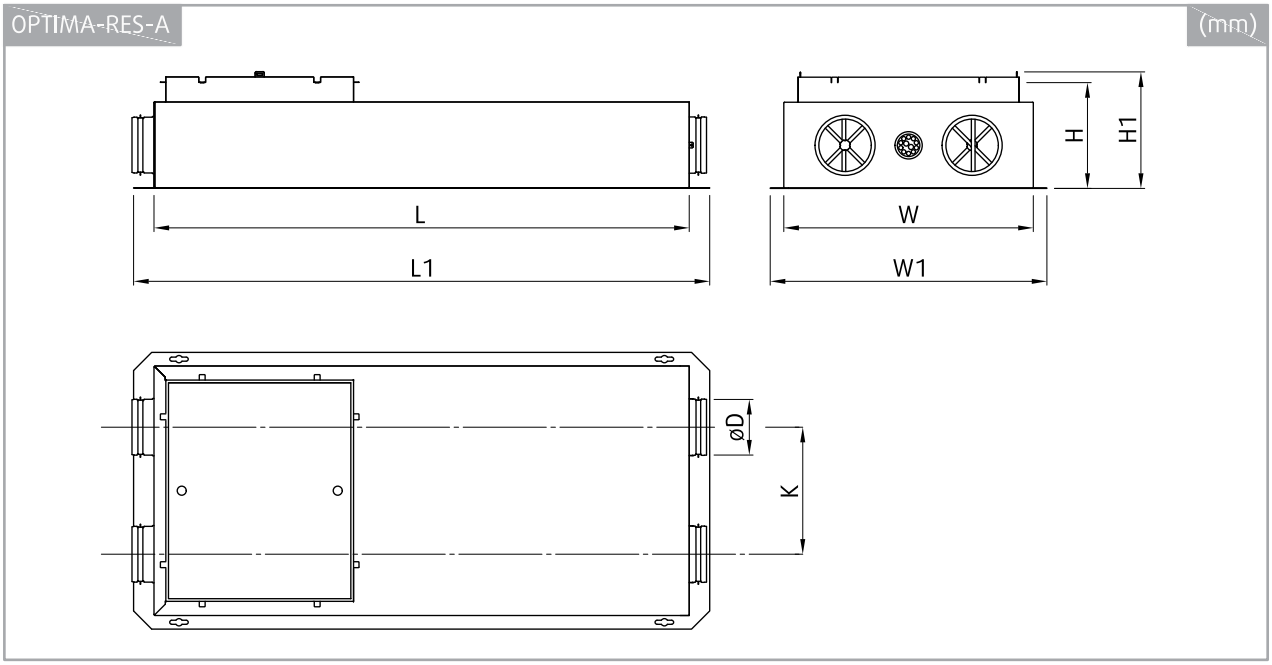


Legend:

P1 Casing
P2 Duct connection with gasket
P3 Bendable handles
P4 Cover
P5 Welded chain
P6 Damper blade with gasket
P7 Connection terminal
P8 Measurement probe
P9 Modular control/actuator unit
P10 Electrical terminal bar
P11 Transformator

Dimensions & Weights

OPTIMA-RES-A (mm)



DN	øD	K	W	W_1	H	H_1	L	L_1	m	v
mm									kg	l
100	98	250	495	555	200	225	1080	1170	25	147
125	123	280	550	610	235	260	1180	1270	29	202
160	157,5	320	640	700	282	306	1190	1280	35	275

Ordering Codes

OPTIMA-RES-A-

Nominal size ø (mm)

100

125

160

Control range setup V_{min} ... V_{max} (m^3/h)

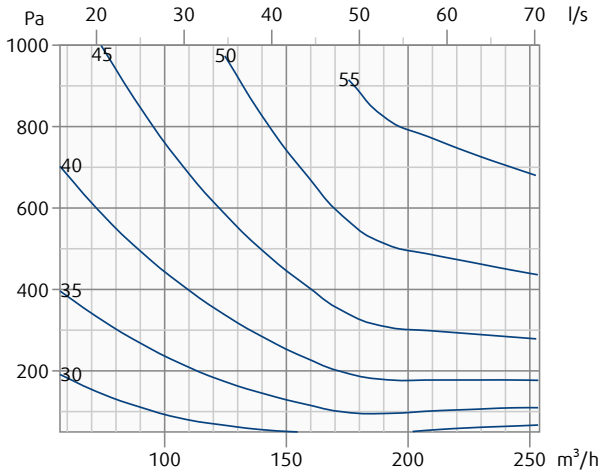
Example of the Ordering Code

OPTIMA-RES-A-125-130-310
Residential VAV control system with nominal size 125, control range 130 m^3/h (V_{min}) up to 310 m^3/h (V_{max})

Technical Parameters

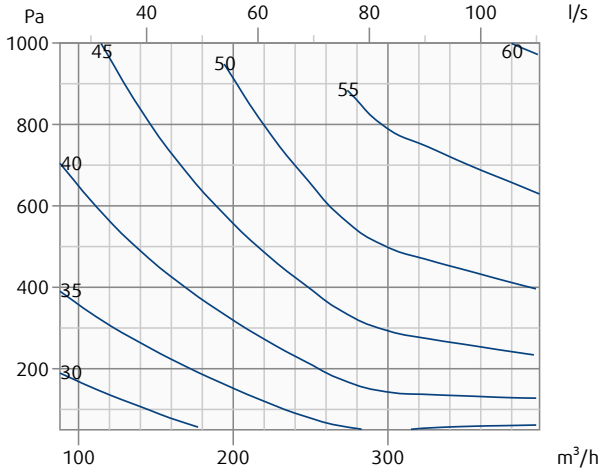
OPTIMA-RES-A-100

Pressure drop & A-weighted sound power level in dB(A)



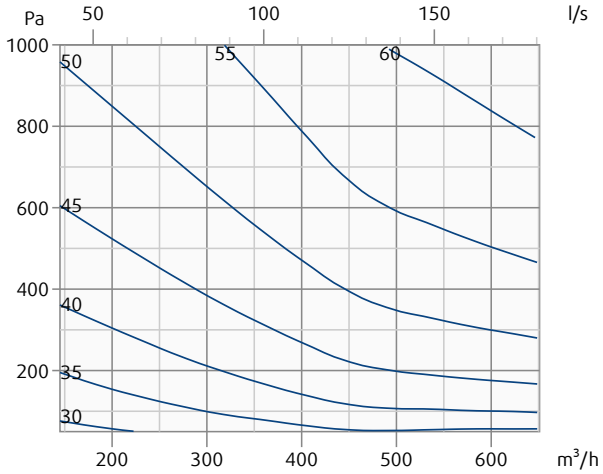
OPTIMA-RES-A-125

Pressure drop & A-weighted sound power level in dB(A)

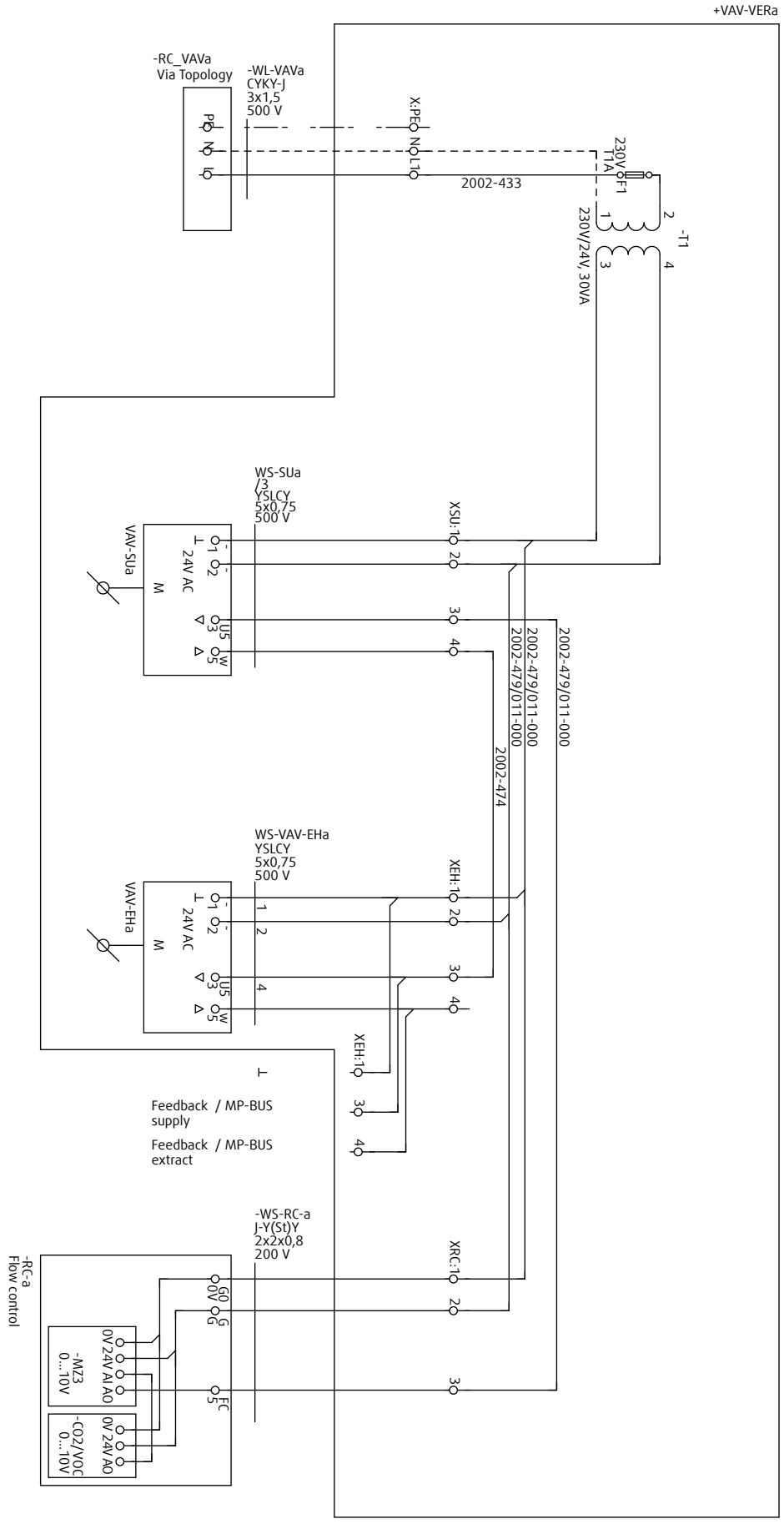


OPTIMA-RES-A-160

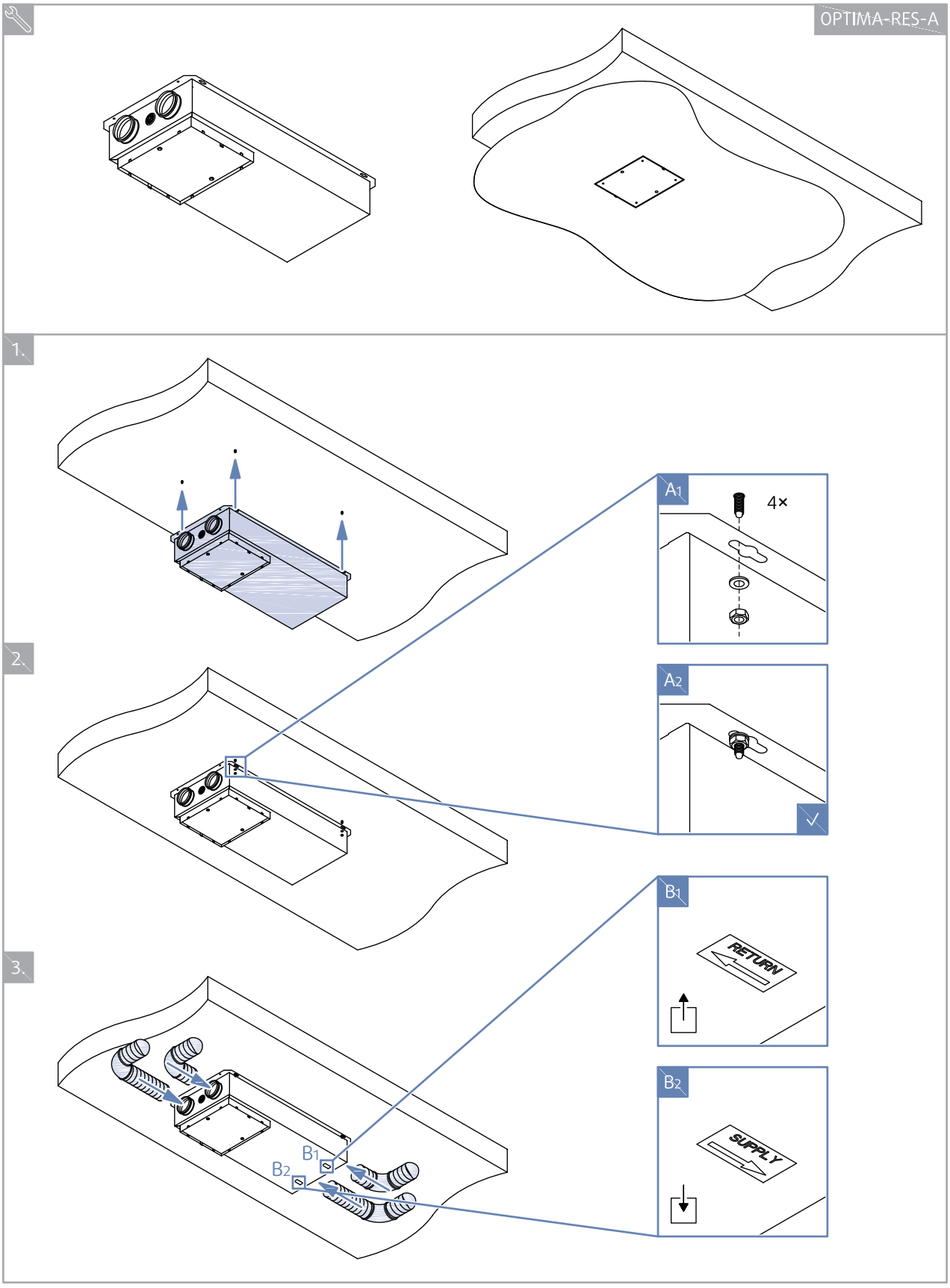
Pressure drop & A-weighted sound power level in dB(A)

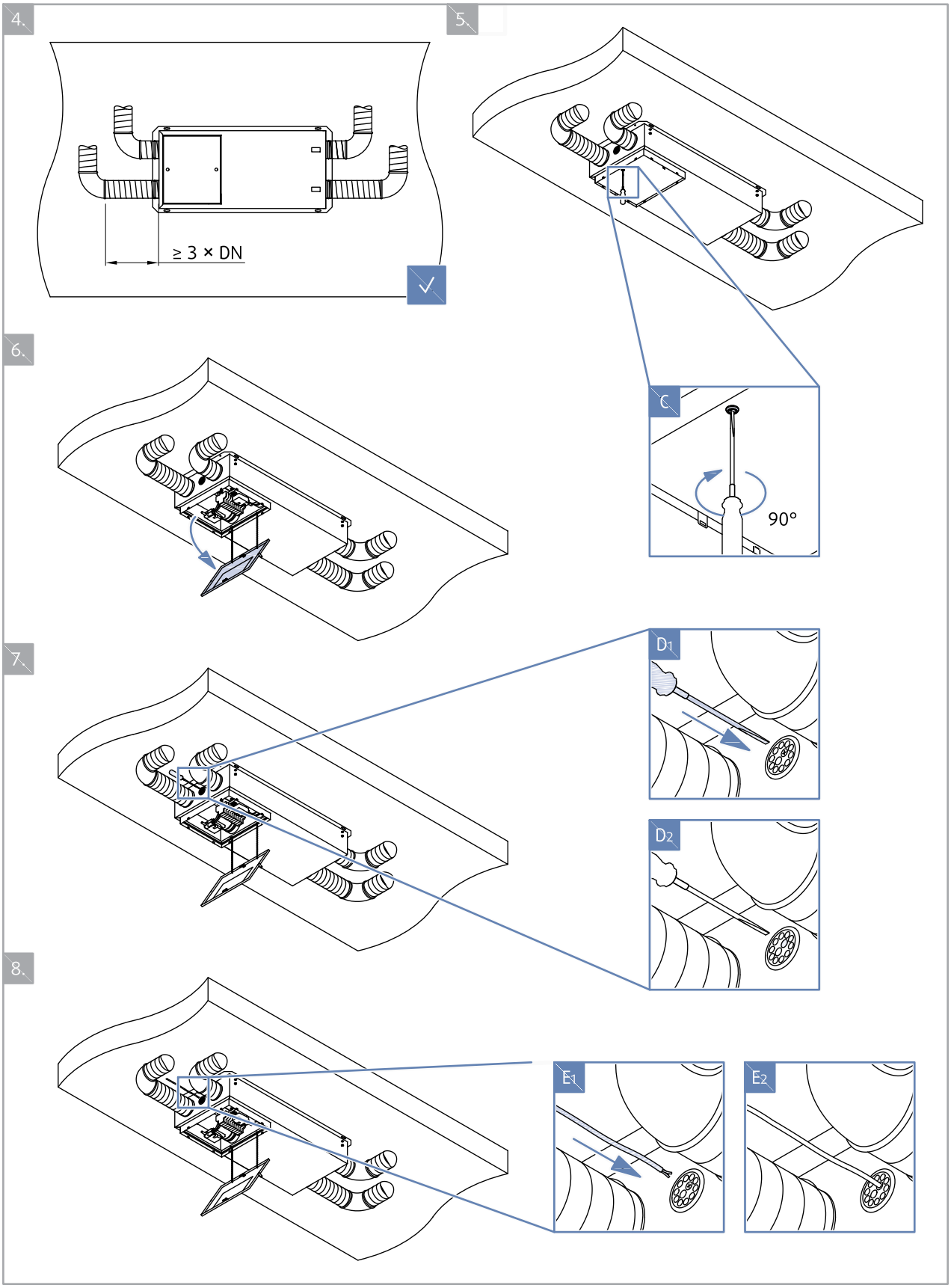


Wiring Diagram

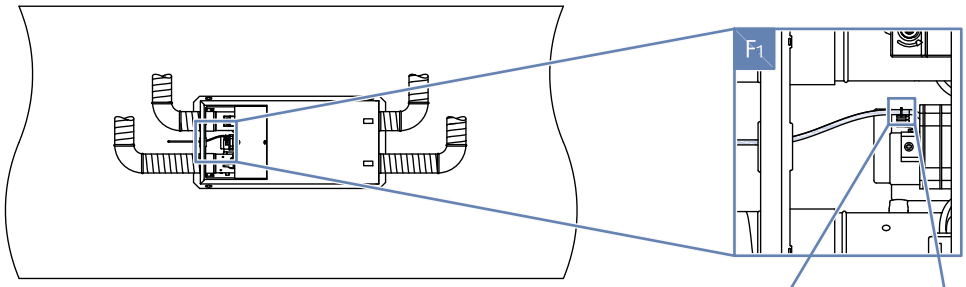


Installation




4.
≥ 3 × DN
5.
C
90°
6.
7.
D1
D2
8.
E1
E2

9.



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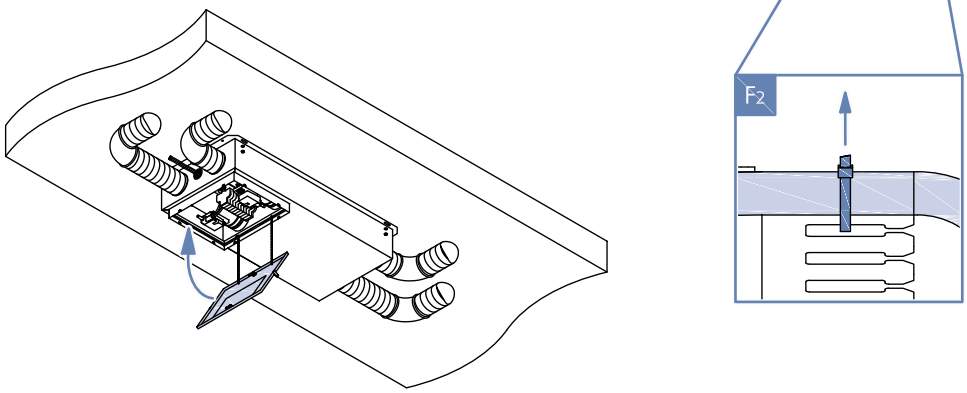

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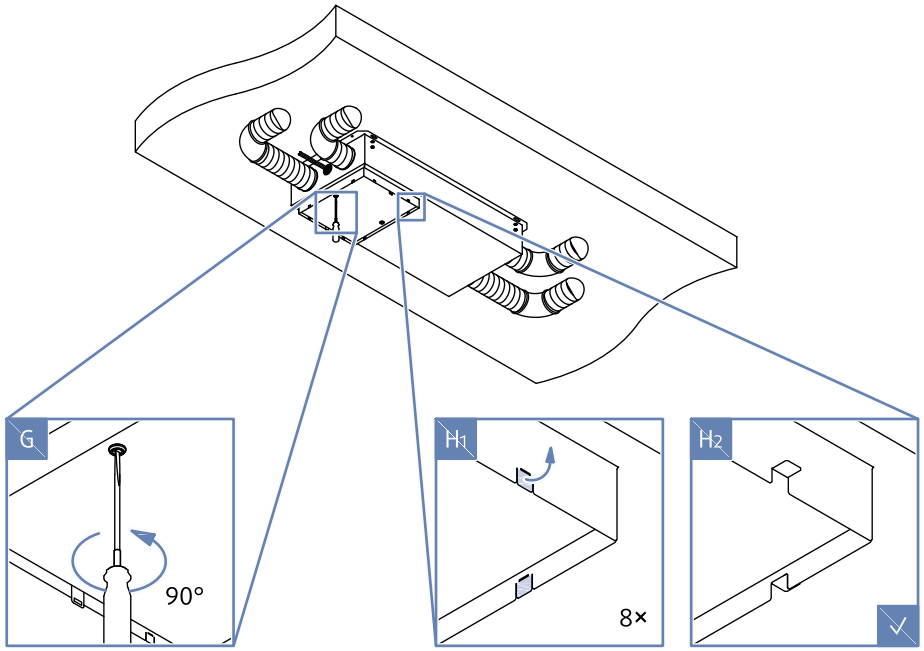

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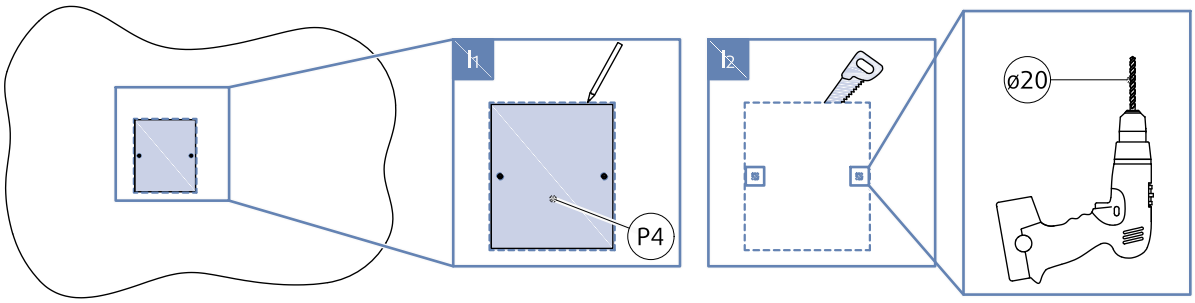

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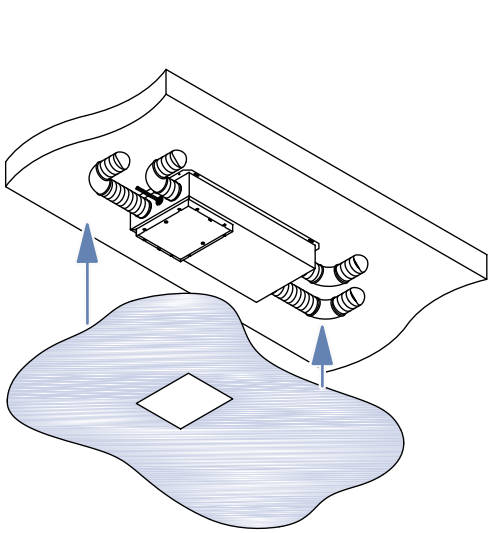

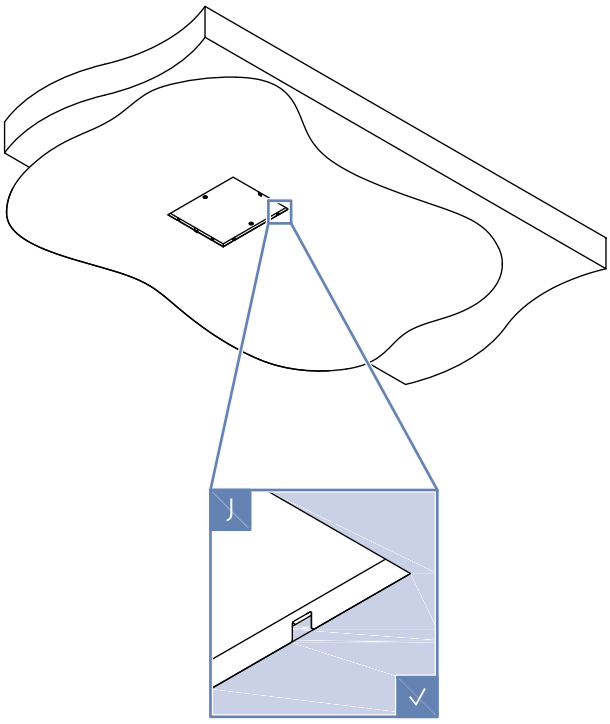

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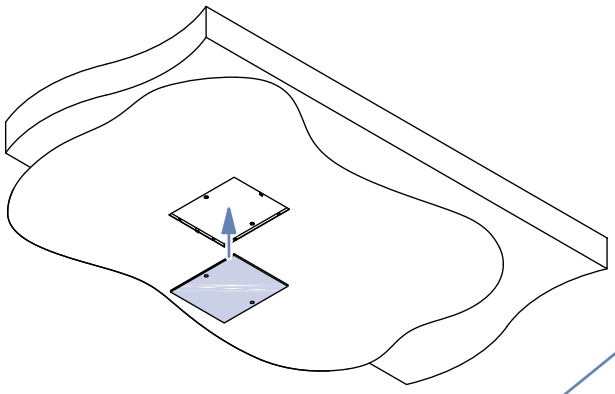

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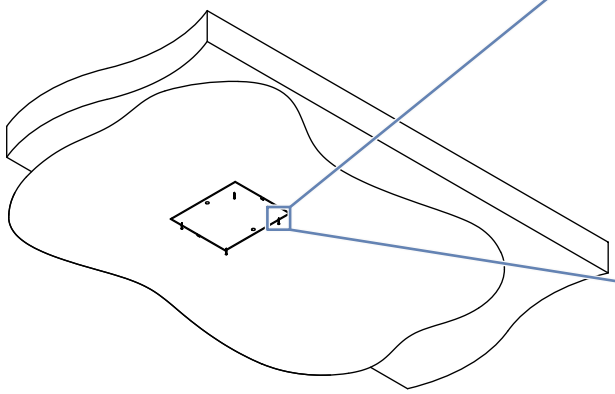
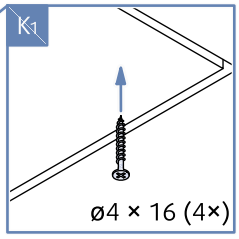
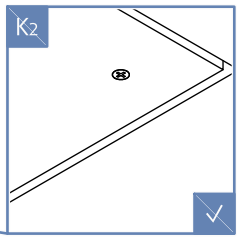
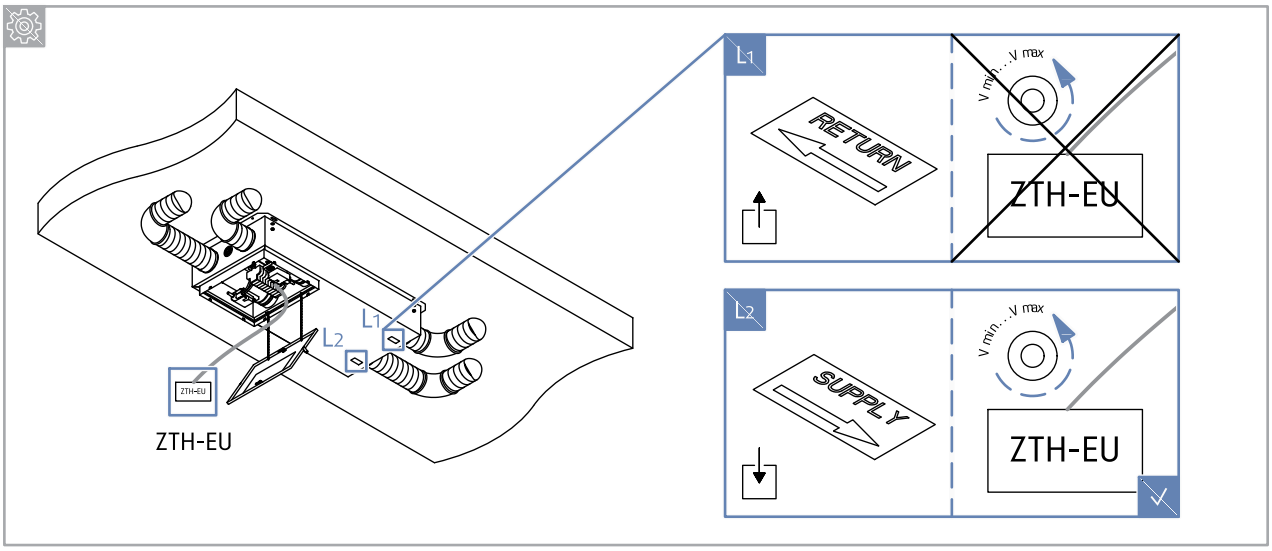


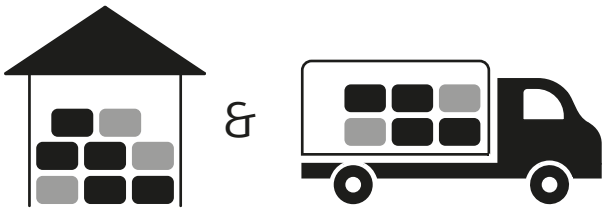




Setting

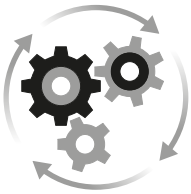

L1
L2
ZTH-EU
ZTH-EU
L1
RETURN
V min... V max
ZTH-EU
L2
SUPPLY
V min... V max
ZTH-EU

Transport, Storage and Operation



°C -20 °C ... +50 °C

% ≤ 90%



°C -20 °C ... +50 °C

% ≤ 95%

Supplement

Any deviations from the technical specifications contained herein and the terms should be discussed with the manufacturer. We reserve the right to make any changes to the product without prior notice, provided that these changes do not affect the quality of the product and the required parameters. Current information on all products is available on design.systemair.com.

Handbook_OPTIMA_RES_A_en-GB
design.systemair.com
www.systemair.com

Original instructions

2024-05-03

DOCUMENT VERSION 2