

DUPLEX 1400-2400 Silent-N

Compact ventilation heat recovery units

for rooftop installation

New **DUPLEX Silent-N** units are compact rooftop ventilation units with counter-flow heat recovery heat exchanger. The units are made in two sizes – **DUPLEX 1400** and **2400 Silent-N** – and are designed for ventilation in all types of civil and residential buildings.

Each size is produced in two mirror-wise versions. The units can be optionally fitted with a base frame with adjustable mounts for proper alignment and have vibration isolators to prevent the transfer of vibrations into building structures.

The base frame has a sound attenuator on the inlet and outlet side for excellent acoustic pressure parameters. Exterior sound attenuators can be optionally fitted.

If cooling or supply air reheating is needed, the unit can be combined with all types of duct heaters and coolers – electric, water or direct ones for cooling circuits. These coils are fitted in ducts downstream the unit. For air preheating it is possible to use an integrated electric heater made up of PTC elements or standard EPO series duct pre-heaters.

All units have a compact design, and in a single casing they contain two independently powered and highly efficient EC fans with flexibly mounted motors, a highly efficient counter-flow heat recovery exchanger with large heat transfer area, a heat exchanger by-pass damper with actuator, class M5 or F7 slide-out cassette filters of supply and exhaust air and drain pans. An openable door provides easy access to all components and filters. Inlets and outlets are rectangular and can be fitted with optional accessories such as flexible flanges, covers and droplet separators. The casing is made up of silver (RAL 9007) painted sheet metal panels with polyurethane filler ($U = 0,82 \text{ Wm}^2\text{K}^{-1}$).

If requested, the units can be equipped with a comprehensive measurement and control system including internet access or another master system. For more information see the separate chapter.

Ventilation units DUPLEX Silent-N comply with the requirements of the most stringent European standards:

- Casing properties according to EN 1886
- EC motors compliant with ErP 2015
- SFP < 0,45 W/(m³/h) according to PassivHaus*
- Requirements of the Commission (EU) directive No. 1253/2014 (Ecodesign)*



DUPLEX Silent-N

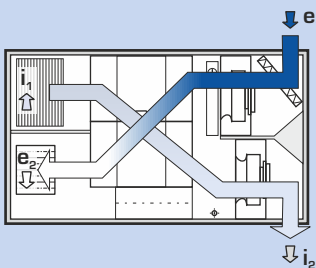
Advantages of DUPLEX Silent-N units:

- A perfect device to be combined with SMART or EASY boxes in central ventilation systems
- Excellent casing thermal insulation (class T2)
- Reduced thermal bridges (class TB1)
- An optional insulated base frame incl. sound attenuators and vibration isolators
- Easy installation on site incl. alignment and levelling-off
- The highly compact design of the new units ensures space saving of up to 60 % compared with modular units
- Low investment cost
- Low power input – high efficiency of EC fans
- Highly efficient heat recovery as a result of new heat recovery exchangers
- The best acoustic pressure parameters in the class
- Low weight
- Built-in electric pre-heater from PTC elements (optionally)
- A wide range of accessories
- Several types of comprehensive integrated control systems depending on the complexity of application; the control system is fully integrated in the unit
- Built-in wiring box
- Comprehensive selection software

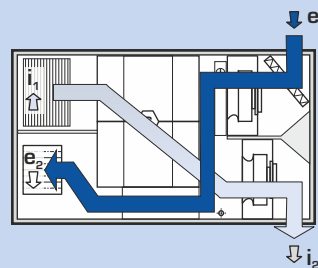


* In a defined operational range

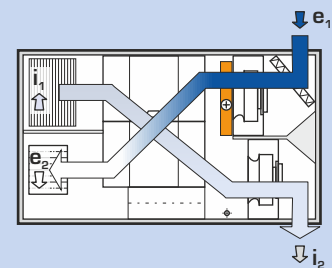
OPERATING MODES



1. equal-pressure ventilation with heat recovery



2. equal-pressure ventilation without heat recovery (through by-pass)



3. equal pressure ventilation with preheating

➔ e₁ ... Fresh outdoor air suction
 ⇨ e₂ ... Fresh filtered air outlet

⇨ i₁ ... Exhaust air suction
 ⇨ i₂ ... Exhaust air outlet

SELECTION SOFTWARE



For the detailed design of DUPLEX series units, accessories and control systems we recommend using our selection software. You can find it on our website at www.atrea.eu.



VENTILATION UNITS WITH HEAT RECOVERY

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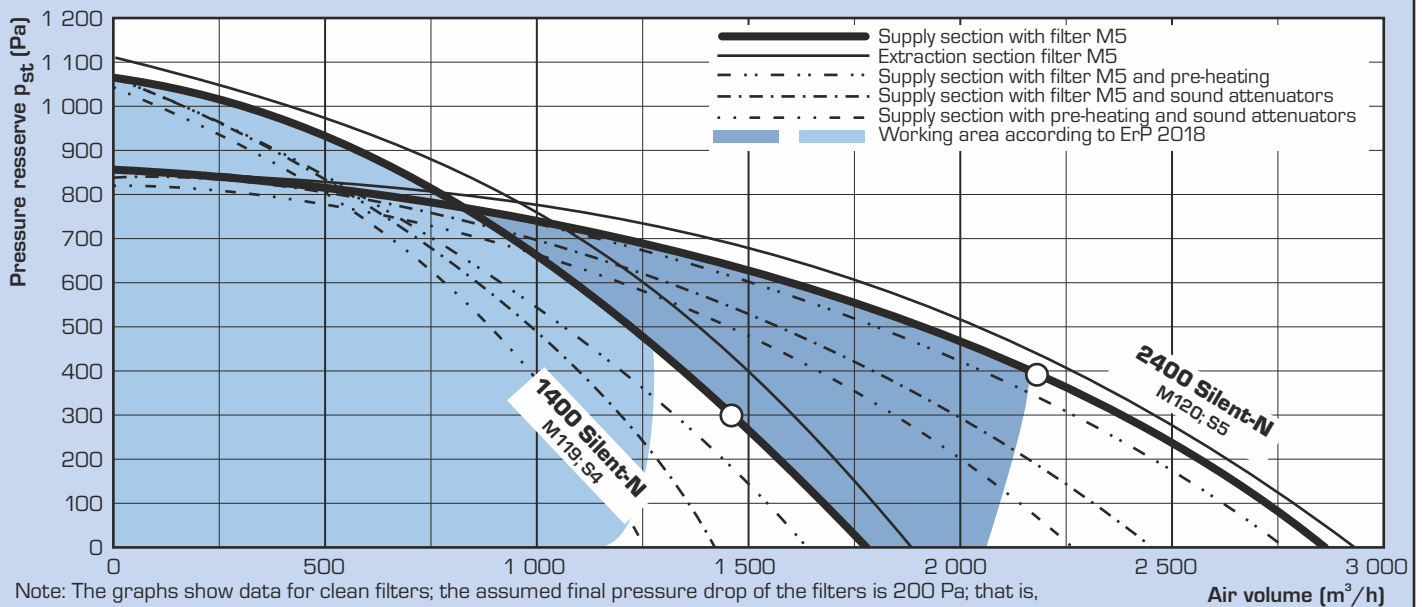
PERFORMANCE GRAPHS

TECHNICAL DATA

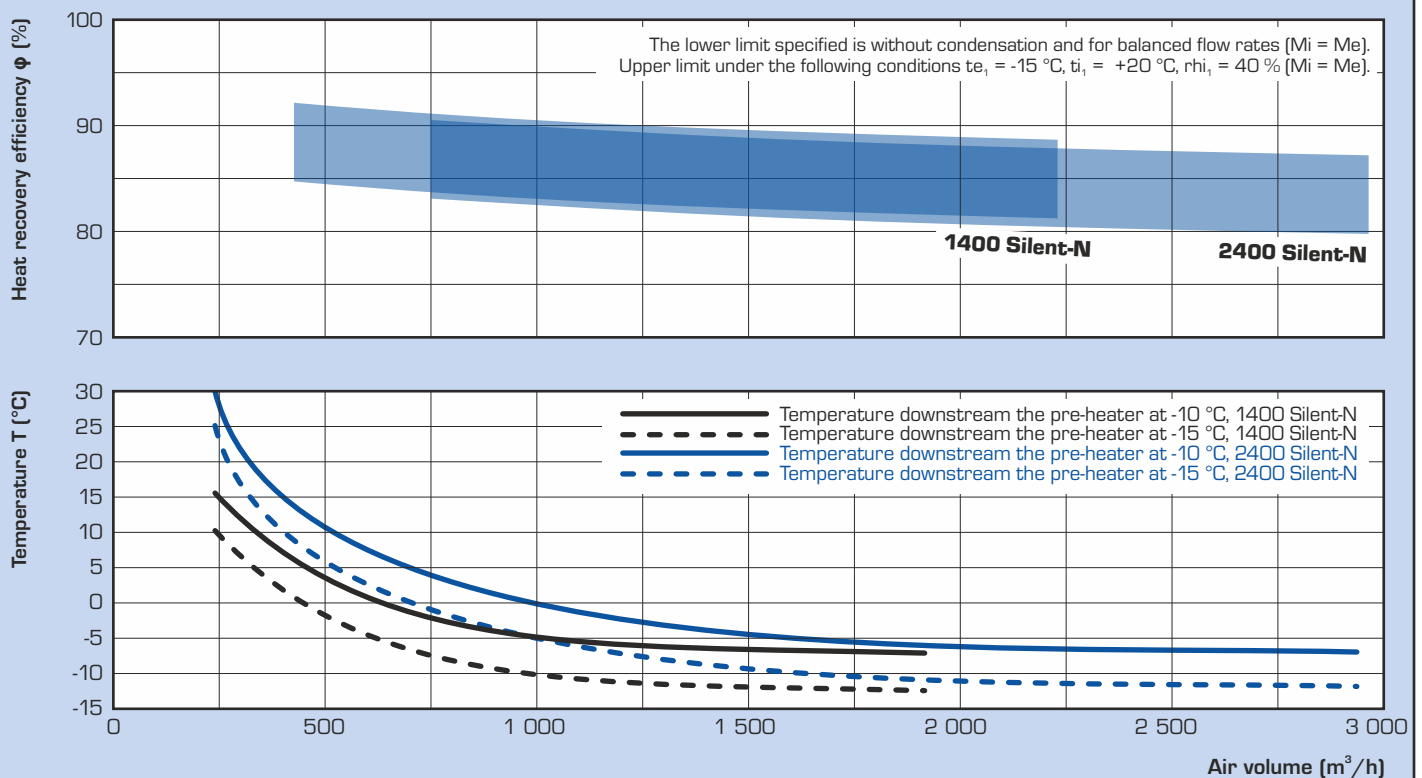
Type		DUPLEX 1400 Silent-N	DUPLEX 2400 Silent-N
Supply air – max. ¹⁾	m ³ h ⁻¹	1 950	2 900
Exhaust air – max. ¹⁾	m ³ h ⁻¹	2 000	2 900
Max. air flow rate as per ErP 2018 ⁴⁾	m ³ h ⁻¹	1 100	2 200
Heat recovery efficiency ²⁾	%	See separate graph	
Number of versions and positions	-	See the table "Installation position", page 4	
Weight ³⁾	kg	225	330
Max. power input	kW	1,45	1,58
Voltage	V	230	230
Frequency	Hz	50	50
Protection	A	10 A char. C	10 A char. C
Fan speed [revs]	min ⁻¹	3 060	2 650

- 1) According to the combination and graphs below 2) Depends on flow rates – see graph 3) Depends on equipment
4) For more details use our selection software ATREA

PERFORMANCE OVERVIEW

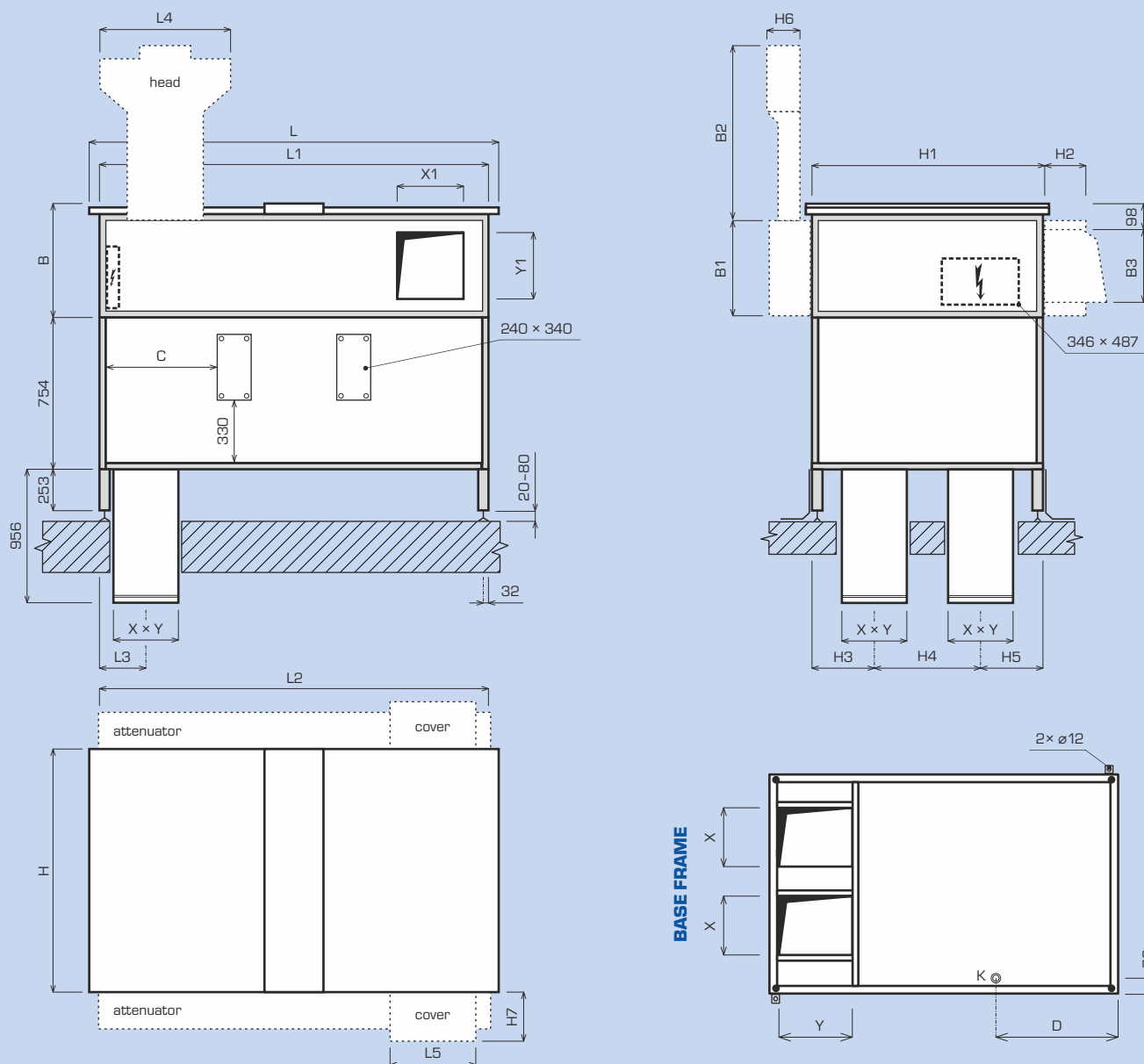


HEAT RECOVERY EFFICIENCY, OUTLET TEMPERATURE DOWNSTREAM THE PRE-HEATER



DIMENSIONS AND CONNECTING PORTS

BASIC DIMENSIONS



DUPLEX Silent-N		1 400	2 400
Dimensions B	mm	500	700
Dimensions B1	mm	385	585
Dimensions B2	mm	1 153	1 235
Dimensions B3	mm	402	602
Dimensions C	mm	442	387
Dimensions D	mm	667	724
Dimensions L	mm	2 030	2 430
Dimensions L1, L2	mm	1 900	2 300
Dimensions L3	mm	228	278
Dimensions L4	mm	753	982
Dimensions L5	mm	400	500
Dimensions H	mm	1 100	1 430
Dimensions H1	mm	1 000	1 300
Dimensions H2	mm	250	300
Dimensions H3	mm	230	330
Dimensions H4	mm	465	570
Dimensions H5	mm	305	400
Dimensions H6	mm	230	300
Dimensions H7	mm	364	463
Dimensions D		667	724
Connecting ports			
Dimensions e₂, i₁, X x Y	mm	250 x 250	350 x 350
Dimensions e₁, i₂, X1 x Y1	mm	200 x 300	250 x 500

Note: For detailed design and technical data we recommend using the specialized selection software ATREA.

INSTALLATION CONFIGURATION

CONFIGURATION AND CONNECTING PORTS

The basic configuration of the unit contains a base frame including sound attenuators, adjustable end pieces and vibration isolators. One of the two versions (mirror-wise positions) must be selected during configuration as they cannot be changed on site.

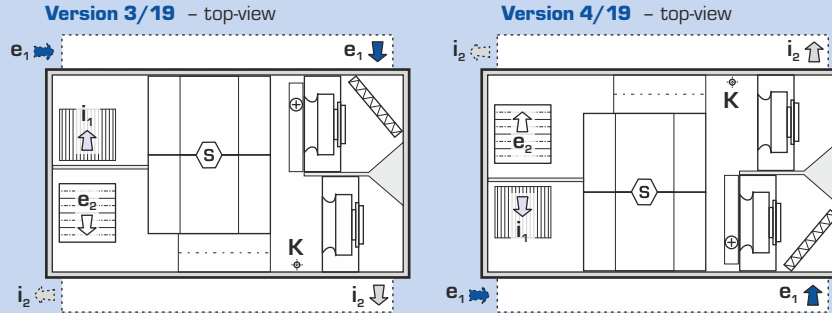
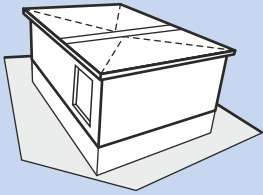
The base frame includes inspection openings for connecting a condensate drain, which must be run into a sewer as described in the installation manual. The base frame is versatile, with

openings for both versions. A wide range of accessories are available for installation such as external sound attenuators and discharge and suction heads. In addition, the ports can be fitted with flexible flanges and inlet ports may have shut-off dampers if required. For detailed design we recommend using our specialized design software for DUPLEX units available at www.atrea.com.

INSTALLATION POSITIONS AND PORT CONFIGURATIONS

ROOFTOP VERSION

Silent-N 1400 and 2400

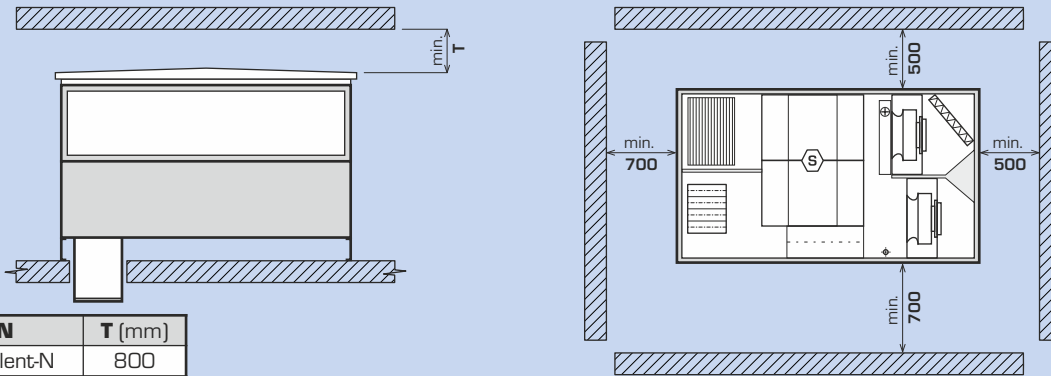


- K** ... Condensate drain
- S** ... Control terminal block
- e₁** ... Outdoor air (ODA)
- e₂** ... Supply air (SUP)
- i₁** ... Extraction air (ETA)
- i₂** ... Exhaust air (EHA)
- ...** (dashed line) ... Version with sound attenuators

MANIPULATION SPACE

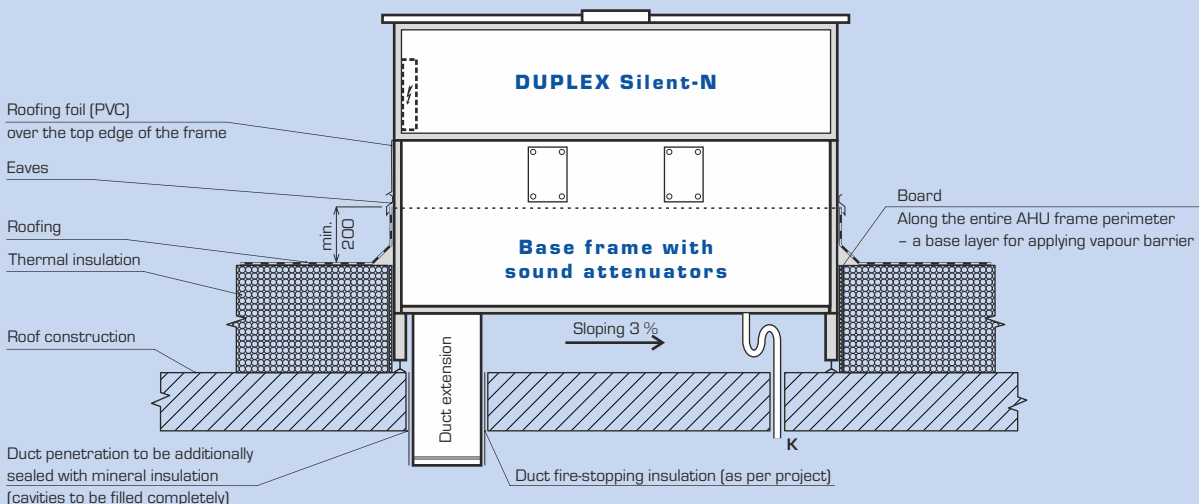
When installing DUPLEX Silent-N make sure to comply with the specified handling area around the unit. Space for a fitting condensate drain line DN 32 must be left free in the centre of the frame. The line must run at a minimum height of 150 mm through a siphon to a sewer at.

Free space for filter replacement operations and access to the unit must be left above the unit. Leave free space from the side for access to the control and measurement terminal block.



DUPLEX Silent-N	T (mm)
DUPLEX 1400 Silent-N	800
DUPLEX 2400 Silent-N	1 100

INSTALLING THE BASE FRAME IN ROOF CLADDING (RECOMMENDED DETAIL)

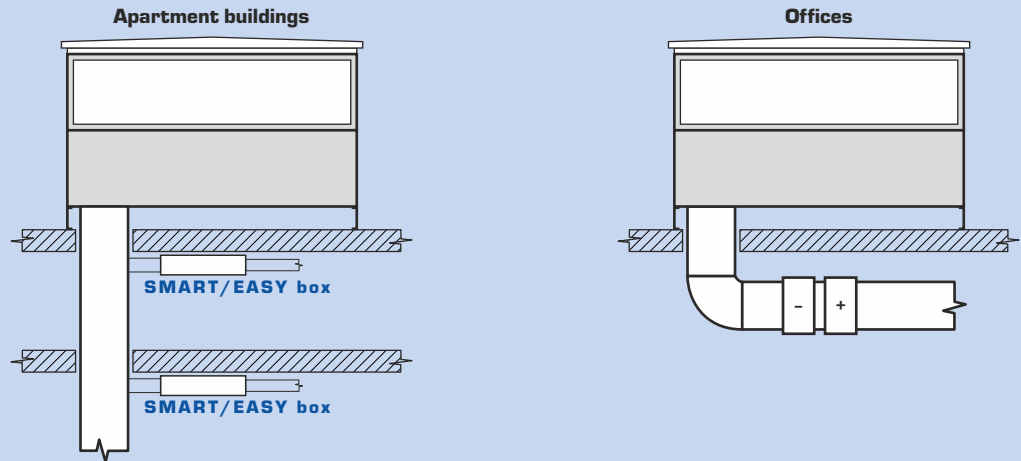


INSTALLATION STEPS

The installation process of the unit is divided into several parts:

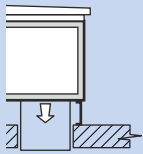
1. Assembling the base frame – assemble the entire set using the fixtures provided following the accompanying instructions, and subsequently install the frame on site and secure it in position.
2. Install the duct connectors and integrated sound attenuators in the frame and cover its surface with PVC foil according to the instructions.
3. Prepare the wiring and condensate drain.
4. Set the unit on the prepared frame and connect the condensate drain. Carry out final inspection.

LOCATIONS OF UNITS IN BUILDING

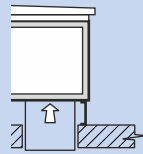


CONNECTING PORT TYPES AND DIMENSIONS

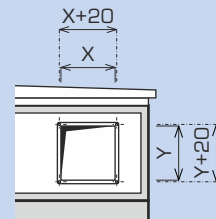
Outlet port e_2



Inlet port i_1

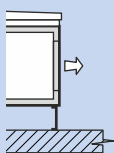


Connecting dimensions – generally

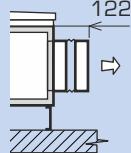


Outlet port i_2

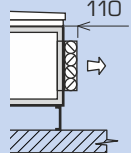
Basic port



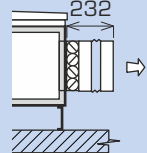
Port with flexible flange



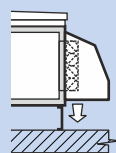
Port with closing damper



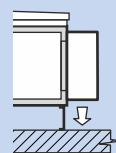
Port with closing damper and flexible flange



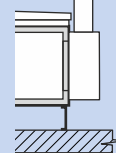
Cover with optional closing damper



Attenuator

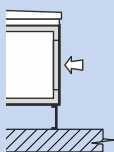


Attenuator with head

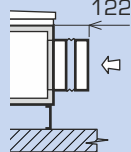


Inlet port e_1

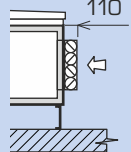
Basic port



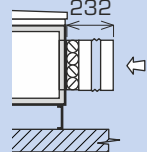
Port with flexible flange



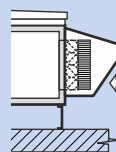
Port with closing damper



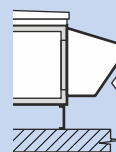
Port with closing damper and flexible flange



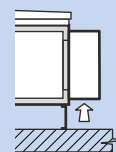
Cover with droplet eliminator and optional closing damper



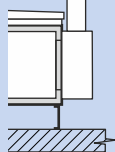
Separate cover



Attenuator



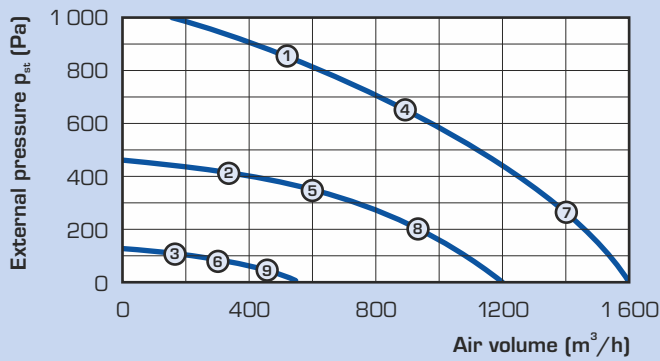
Attenuator with head



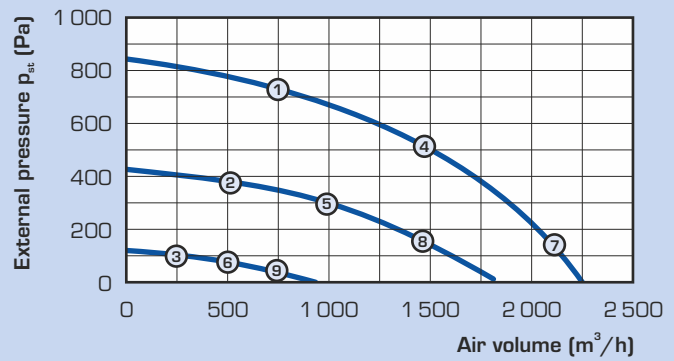
ACOUSTICS, BASIC UNIT

ACOUSTIC POWER $L_w(A)$ (dB)

DUPLEX 1400 Silent-N



DUPLEX 2400 Silent-N



Point	DUPLEX 1400 Silent-N					DUPLEX 2400 Silent-N				
	inlet e_1	outlet e_2	inlet i_1	outlet i_2	surround	inlet e_1	outlet e_2	inlet i_1	outlet i_2	surround
1	66 / 52	77 / 60	68 / 57	82 / 64	67	70 / 57	74 / 60	64 / 50	77 / 62	55
2	58 / 44	68 / 53	60 / 50	72 / 55	57	63 / 50	66 / 52	57 / 44	67 / 52	45
3	43 / 31	52 / 36	44 / 36	55 / 39	43	47 / 36	49 / 36	41 / 28	49 / 35	29
4	64 / 50	75 / 55	67 / 55	80 / 63	66	70 / 50	74 / 58	61 / 46	79 / 63	58
5	57 / 44	68 / 50	60 / 50	72 / 56	58	58 / 47	62 / 46	57 / 42	70 / 55	48
6	44 / 31	53 / 36	45 / 36	56 / 40	43	49 / 37	48 / 35	47 / 35	52 / 38	33
7	65 / 49	72 / 51	65 / 51	81 / 64	68	71 / 59	68 / 48	65 / 49	84 / 67	61
8	57 / 42	67 / 47	61 / 47	73 / 56	58	65 / 55	64 / 45	60 / 45	75 / 59	54
9	44 / 30	53 / 36	45 / 36	57 / 40	43	52 / 40	49 / 35	50 / 38	57 / 42	36

Note: For the detailed design of DUPLEX units, accessories and control systems we recommend using the specialized selection software.
Values in the brackets apply to units equipped with ATREA sound attenuators.

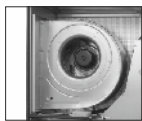
DUPLEX SILENT-N - BASIC UNIT CONFIGURATION



DUPLEX 1400-2400 Silent-N

The basic configuration of the compact unit includes a supply and extraction fan with free-running wheel incl. anti-vibration mounting, a removable counter-flow heat recovery exchanger made up from thin-walled plastic panels, slide-in supply and extraction air filters (class M5 or F7) and a drain pan with DN 32 hose for condensate drainage. It has a top panel for access to all built-in equipment, and a side panel to facilitate condensate drain handling and provide access to the control system.

DUPLEX xxxx Silent-N



Fans

All DUPLEX Silent-N units have highly efficient fans (Ziehl Abegg) with free-running wheel and backward-curved blades. All fans in the DUPLEX 1400, 2400 Silent-N series comply with the requirements of European standard ErP 2015.

Me.xxx; Mi.xxx



Heat recovery exchanger

The units have a high-efficiency heat recovery exchanger of completely new design, made up from thin-walled plastic plates, with high heat recovery efficiency of up to 93 %.

S4 / S5

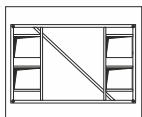


By-pass damper („B“)

A plate heat recovery exchanger by-pass including servo drive. When the by-pass opens, flow through the heat recovery exchanger automatically closes and no heat transfer takes place.

B.x

DUPLEX SILENT-N - OPTIONAL ACCESSORIES



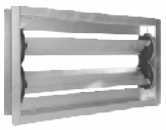
Base frame including e_2 and i_1 sound attenuators

A base frame including insulation, duct connection adapters, adjustable end pieces with vibration isolators and inspection openings. The frame is made of galvanized sheet metal without any finish, designed to be covered with PVC foil. It is used for stabilizing the position of the unit on site. Supply and extraction sound attenuators to be installed in the base frame. Each set has two sections of two pieces each to be stacked on top of each other. The design is a combination of the gate and absorption attenuator.

OPTIONAL ACCESSORIES (GENERAL OVERVIEW)

Ke.xxx; Ki.xxx

Shutoff dampers e₁; i₂



Shut-off dampers are installed on the inside of the ports. The dampers are supplied in sizes to match the ports of the unit, with two servo drive types – standard type LM 24A and the LF 24 type with emergency function (spring) for closing in the event of a power cut.

Fe.xxx; Fi.xxx

Air filtration



DUPLEX units have cassette filters of class M5 / M5 as a standard feature (supply / extraction). Other available filter combinations are M5 / F7 and F7 / F7.

TPO

Hot-water based heaters TPO



Separately supplied duct heaters for connection to DUPLEX units. The heaters include a vapor/gas capillary thermostat as a standard feature. For power and diameters see separate technical sheets.

EPO-V

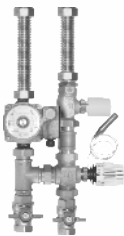
Electric heaters EPO-V



Separately supplied heaters for rectangular or circular ducts for connection to DUPLEX units. For power and diameters see separate technical sheets.

RE-HW.4; RE-HW.3

Control manifolds for water heaters



Designed for controlling the heating power of water heaters, they all include a three-speed pump, two shut-off ball valves and connecting ducting. Depending on the type they also include:

- RE-HW.4 – A four-way mixing unit with servo drive
- RE-HW.3 – A three-way mixing unit with servo drive

E.xxx

Electric pre-heaters E



An electric air pre-heater from PTC elements for installation in the unit. Each specific unit requires a specific type. The set includes the necessary control and protection features.

FK.x

Spare filter cassettes



Sets of spare filter cassettes in sizes as per the unit type. They are supplied in filter classes M5 and F7.

H.P

Flexible flanges



Ports can be optionally supplied with flexible flanges.

A.MFF

Inclined manometers



A filter accessory for simple visualization of current filter pressure drop. Inclined manometers are mandatory for the hygienic configuration of the units in compliance with VDI 6022.

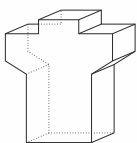
A.CF.XXXX

Constant flow rate and pressure control



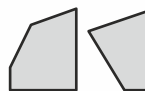
Manometers detecting pressure at fans in combination with the control system for intelligent control of fans in order for them to run at preset flow rates. This accessory requires for the unit to be fitted with the RD5 control system. When another manometer (optional accessory) is connected to the air supply duct, constant pressure control is possible.

Heads



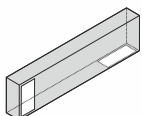
Combined suction / discharge heads to be installed onto external sound attenuators.

Special covers



Covers for inlet (e₁) and outlet (i₂) ports. The cover for port e₁ is supplied in conjunction with a built-in droplet eliminator.

External sound attenuators



External sound attenuators are designed for easy installation on the side of suction or discharge ports of Silent units to reduce the emissions of acoustic parameters.

CONTROLS


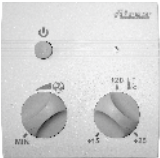


DUPLEX Silent-N units are delivered with basic control components or with complete control systems.

There are three types of control systems available (electric, digital and control for kitchens) according to customer needs and an application. The systems also include variety of sensors (temperature, humidity, air quality, CO₂) for effective operation control.

Features of the control systems

- selection of the most suitable and efficient control system at the lowest cost, depending on the particular application
- control system is integrated with the unit, most components are already wired and checked in factory, thus reducing the risk of incorrect wiring
- no control system project documentation is necessary for standard cases, standardized solutions can be used
- simple wiring, system simplicity, error indication
- qualified technical support and consulting

SUMMARY OF DUPLEX SILENT-N CONTROL SYSTEMS

Type	Use	Controller
Basic	<ul style="list-style-type: none"> - all electrical components are wired to a junction box terminal strip inside or outside the unit - standard components are fans, damper actuators, capillary freeze protection thermostat of hot water heating coil - more components are included upon customer's request (exact actuator type, sensors, thermostats, pressure switches etc.) - suitable for applications with separate delivery of control system; e.g. large buildings with central control system etc. 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"> basic version (fans, actuators, thermostats, pressure switches and others on request) </div> <div style="text-align: center;"> ↑ ↓ </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"> Supervisory control system </div>
"RD5" controls Suitable for SMART Boxes	<p>Standard functions of the "RD5" controls</p> <ul style="list-style-type: none"> - EC fan speed control (based on selected mode) - automatic by-pass damper position (heat and cool recovery) - evaluates and prevents emergency limits based on measured temperature - ventilation and temperature weekly program setting - A web server and an Ethernet interface built in as standard connection for remote internet communication - inputs for switching using 230 V (4 inputs - 3 delayed, 1 instantenious) - switch e.g. from bathrooms etc. - optional connection of CO₂ or RH sensor - max. 2 sensors with a switch or 0-10 V output - outputs for electric preheater and heater control (pulse 10 V) or hot-water control (0-10 V) <p>Additional RD-IO module</p> <ul style="list-style-type: none"> - optional manometer connection to ensure constant airflow control (see Constant airflow and pressure control on previous page) - constant pressure control - cooling control outputs (DX- or chilled-water cooling), possibly for a heat pump <p>Additional RD-K module</p> <ul style="list-style-type: none"> - additional inputs and outputs significantly extending control system functions <p>BACnet / KNX converter</p> <ul style="list-style-type: none"> - optional converter allowing connection to supervisory control system via BACnet or KNX protocol 	<p>CP Touch (touchscreen)</p>  <p>CP10RT</p>  <p>Web server (as standard)</p> 
"CPM" controls Suitable for EASY Boxes	<p>Standard functions</p> <ul style="list-style-type: none"> - EC fan speed control (stepless) - automatic by-pass damper position - frost protection of heat exchanger - switching of external electric or built-in water heater - input for external switch - inlet and outlet shut-off damper control - minimum and maximum fan speed preselection - analogue input (0-10 V) for air quality sensor (CO₂, RH) - outputs for controlling electrical preheater and heater (pulse switched 10 V) or water heater (controlled by 0-10 V signal) - outputs for controlling cooling (direct or water), eventually heat pump <p>Controller CPM</p> <ul style="list-style-type: none"> - fully graphic touchscreen - weekly program - „party“ mode - „holiday“ mode - filter change notice - automatic operation based on constant signal - e.g. constant pressure <p>Controller CP 10 RA</p> <ul style="list-style-type: none"> - rotatable controller 	<p>CPM controller with touchscreen display</p>  <p>CP 10 RA with mechanical knob</p> 