

# DUPLEX

## 1500-5500 RS5

Compact ventilation units with optional air recirculation for ventilation, cooling and hot-air heating

New **DUPLEX RS5** series indoor units with a unique re-circulation design solution to allow full-scale ventilation with simultaneous interior air recirculation. The units are manufactured in several capacity versions from 1500/700 to 5500/2000 m<sup>3</sup>/h of re-circulation / ventilation power. They are designed for all types of civil and residential buildings and commercial and industrial premises where heating and cooling as well as ventilation are important considerations.

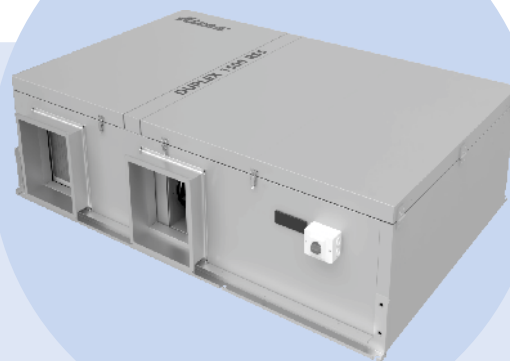
All units are made in two basic size types, which are subsequently fitted with equipment of various capacity levels such as fans and built-in heat or cold exchangers. If supply air needs to be cooled or re-heated, the units can be combined with all types of integrated exchangers, for instance electric or water-based air heaters, chilled water or direct coolers and duct heaters and coolers. EPO series electric duct pre-heaters or liquid-based duct heaters may also be used for air preheating.

All units are designed as compact devices containing in a single housing two independently powered, highly efficient EC fans with flexibly mounted motors, a counter-flow heat recovery exchanger with large heat transfer area and high efficiency, a heater recovery exchanger bypass damper with actuator, a recirculation air damper with actuator, slide-out supply, extraction and recirculation air cassette filters class G4, M5 or F7 and drain pans. The entire front acts as an opening panel, providing easy access to all components and filters. The inlets and outlets are rectangular, with an option to add accessories such as flexible flanges, covers and dampers. The housing of the unit is made of painted (silver RAL 9007) sheet metal panels with 50 mm thick mineral wool insulation ( $U = 0,85 \text{ Wm}^{-2}\text{K}^{-1}$ ).

The units are equipped with the top-of-the-range ATREA RD5 control module for operating all necessary functions.

### DUPLEX RS5 ventilation units meet the requirements of the most stringent European standards:

- Housing characteristics according to EN 1886
- EC motors compliant with ErP 2015
- SFP < 0,45 W/(m<sup>3</sup>/h) as required by Passiv Haus \*
- Commission (EU) Regulation No. 1253/2014 (Ecodesign) \*



1500 - 5500 RS5

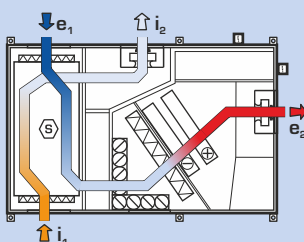
### Advantages of DUPLEX RS5 units:

- Excellent thermal insulation of the housing (Class T2)
- Thermal bridging suppression (Class TB1)
- An integrated recirculation damper with independent recirculation air supply
- Easy installation on site including levelling and stabilisation
- The enhanced compact design of the new unit types saves up to 60 % of space in comparison with built-in units
- Low investment cost
- Low power input – high efficiency of EC fans
- Highly efficient heat recovery as a result of the new generation of heat exchangers
- Acoustically efficient housing with 50 mm mineral wool insulation
- Built-in heaters and coolers
- A wide range of accessories
- Comprehensive built-in control systems fully integrated in the unit
- A built-in wiring box
- Comprehensive selection software

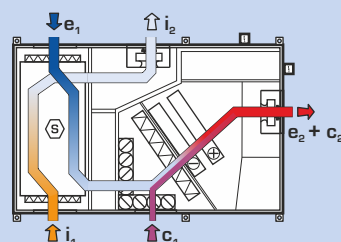


\* at defined operating points

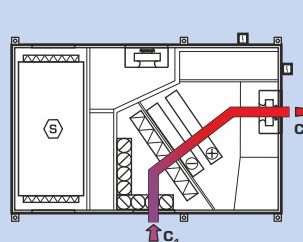
### A SELECTION OF OPERATING MODES OF DUPLEX RS5 UNITS



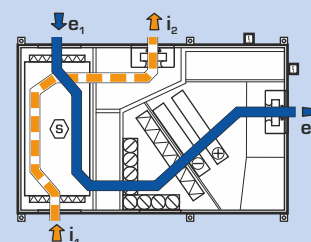
Balanced pressure ventilation including by-pass supply



Recirculation heating and ventilation



Recirculation heating with boost ventilation



Overpressure ventilation

- ➔ e<sub>1</sub> ... Fresh outdoor air inlet
- ➔ c<sub>2</sub>/e<sub>2</sub> ... Fresh and recirculation air outlet
- ➔ c<sub>1</sub> ... Recirculation air inlet

- ➔ i<sub>1</sub> ... Exhaust air inlet
- ➔ i<sub>2</sub> ... 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](http://www.atrea.eu).



VENTILATION UNITS WITH HEAT RECOVERY

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# PERFORMANCE CURVES

## TECHNICAL PARAMETERS

DUPLEX RS5		1500/700	1500/1000	2500/700	2500/1000	3500/1200	3500/2000	5500/1200	5500/2000
supply air – max. <sup>1)</sup>	m <sup>3</sup> h <sup>-1</sup>	1 220	1 220	1 500	1 500	2 100	2 100	3 150	3 150
extraction air – max. <sup>1)</sup>	m <sup>3</sup> h <sup>-1</sup>	800	1 450	800	1 450	1 650	2 650	1 650	2 650
recirculation air – max. <sup>1)</sup>		1 650	1 650	3 200	3 200	3 850	3 850	6 900	6 900
max. air flow rate according to ErP 2018 <sup>5)</sup>	m <sup>3</sup> h <sup>-1</sup>	1 050	1 350	2 050	2 350	2 750	3 050	3 450	3 750
heat recovery efficiency <sup>2)</sup>	%	up to 93 %							
number of configurations and positions	-	see the table "Installation positions, page 4							
weight <sup>3)</sup>	kg	310–385	310–385	310–385	310–385	490–580	490–580	490–580	490–580
max. power input <sup>5)</sup>	kW	0,75	0,92	0,97	1,1	1,25	1,55	2,95	3,35
voltage	V/Hz	230 V / 50 Hz							
protection	A	10 A char. C							
filter class <sup>4)</sup>		optional G4, M5, F7							
fan speed – max.	min <sup>-1</sup>	3 900	3 500	3 400	3 400	3 100	3 100	2 950	2 950
heating capacity E basic – max. <sup>5)</sup>	kW	2,1	2,1	2,1	2,1	7,2	7,2	7,2	7,2
heating capacity E high – max. <sup>5)</sup>	kW	4,2	4,2	4,2	4,2	10,8	10,8	10,8	10,8
heating capacity T – max. <sup>5)</sup>	kW	16	16	22	22	22	42	51	51
cooling capacity CHW – max. <sup>5)</sup>	kW	10	10	16	16	16	30	42	42
cooling capacity CHF – max. <sup>5)</sup>	kW	8	8	10	10	10	25	37	37

<sup>1)</sup> maximum air flow rate through the unit at zero external pressure

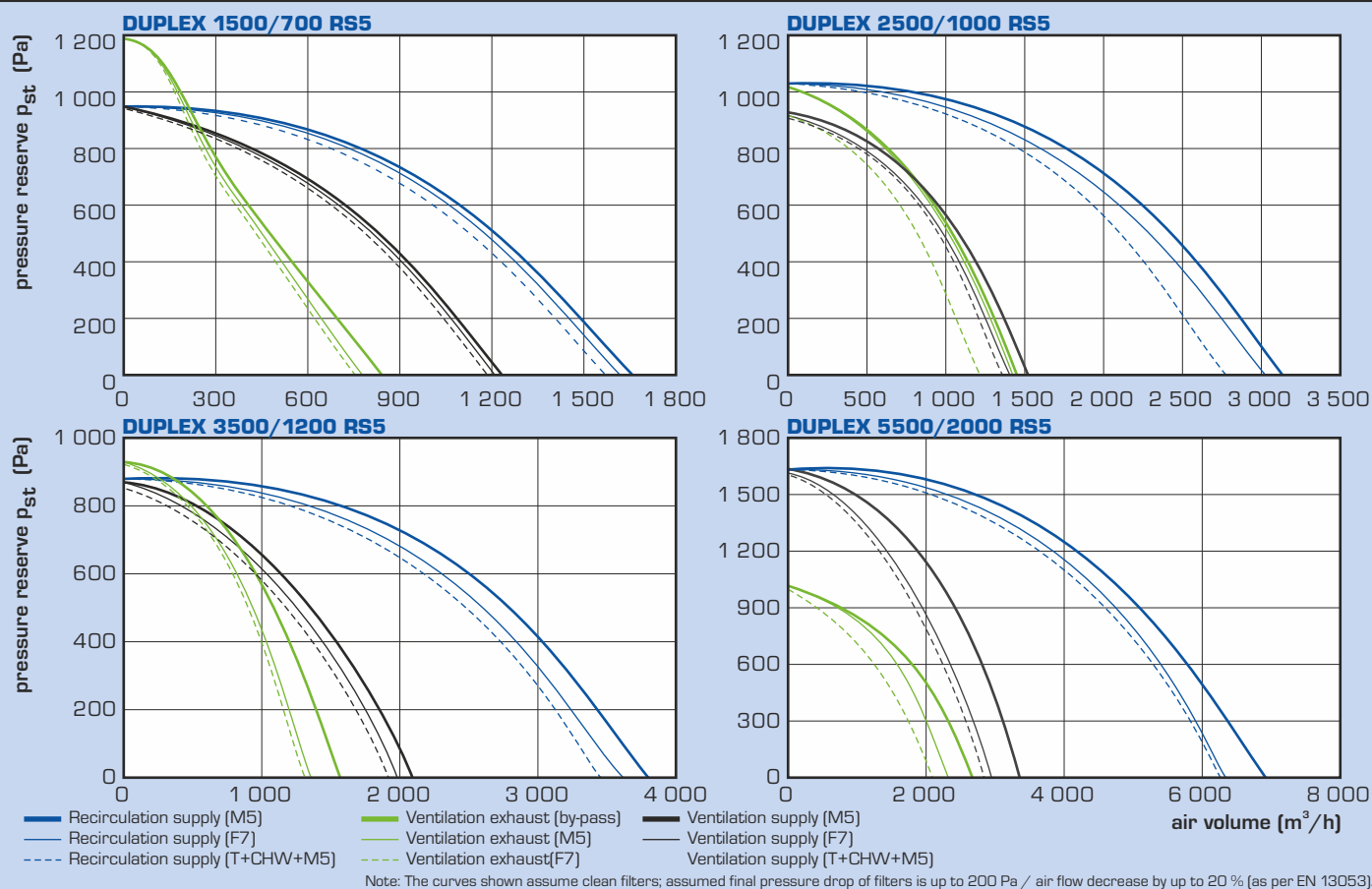
<sup>2)</sup> according to air volume

<sup>3)</sup> depending on equipment

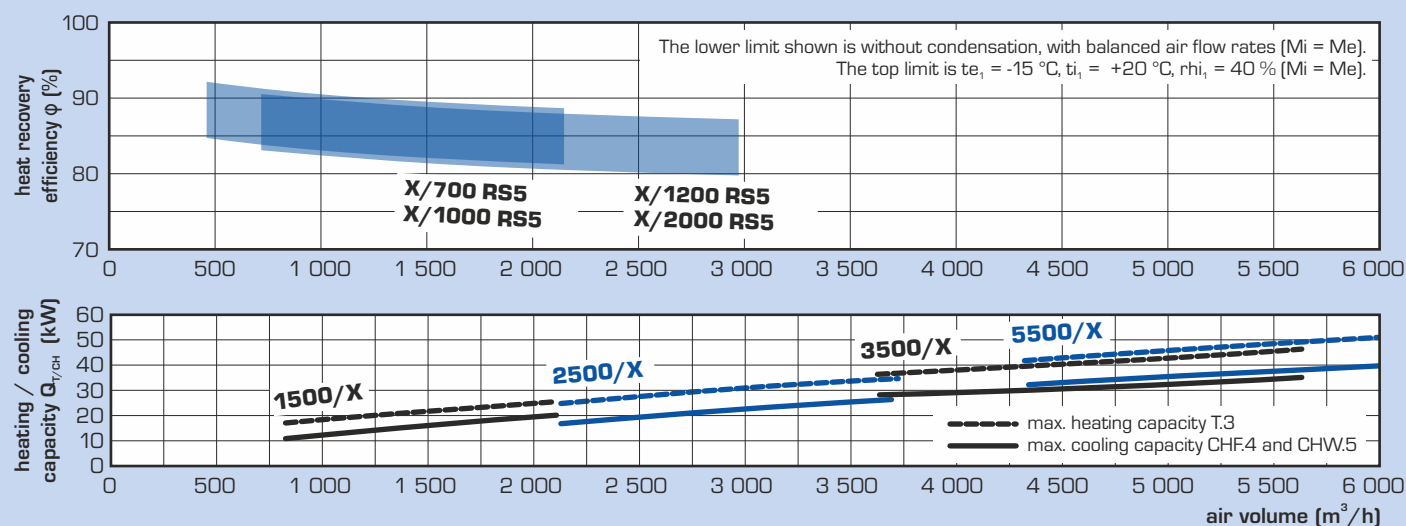
<sup>4)</sup> all filters in the unit are class M5 as standard

<sup>5)</sup> for more details see the DUPLEX selection software

## PERFORMANCE OVERVIEW



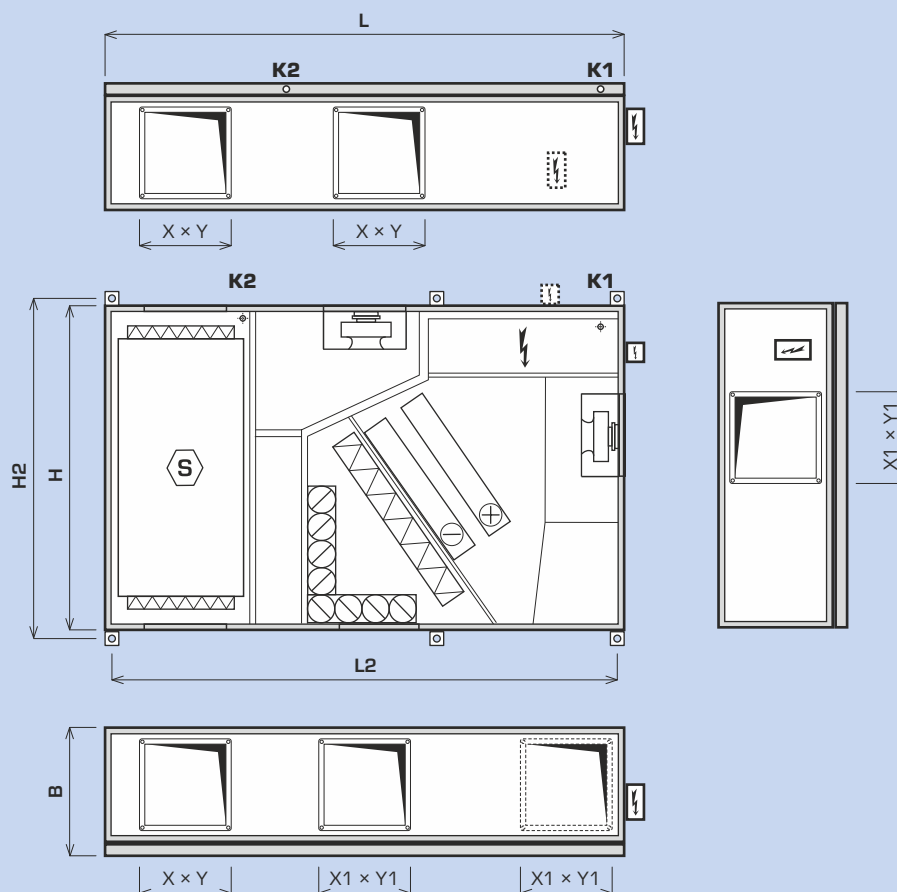
## RECOVERY EFFICIENCY, HEATING AND COOLING CAPACITY



## BASIC DIMENSIONS

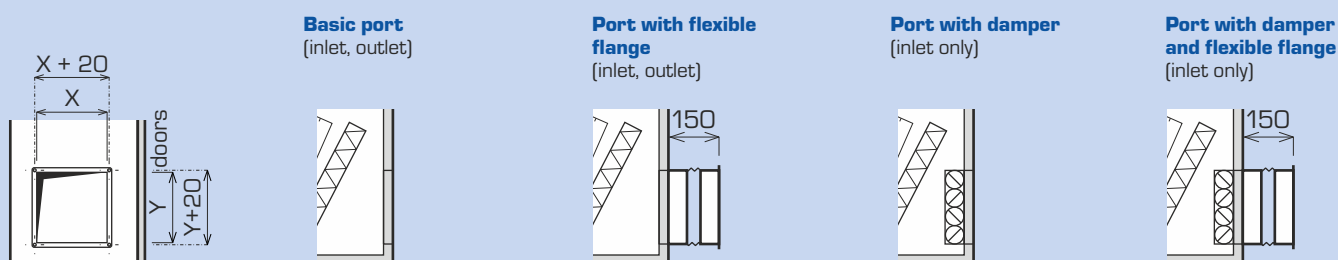
### CEILING-SUSPENDED

1500-5500 RS5



DUPLEX RS5		1500/700	1500/1000	2500/700	2500/1000	3500/1200	3500/2000	5500/1200	5500/2000
height <b>B</b>	mm	500	500	500	500	700	700	700	700
length <b>L</b>	mm	2 000	2 000	2 000	2 000	2 080	2 080	2 080	2 080
length <b>L2</b>	mm	1 952	1 952	1 952	1 952	2 034	2 034	2 034	2 034
width <b>H</b>	mm	1 250	1 250	1 250	1 250	1 400	1 400	1 400	1 400
width <b>H2</b>	mm	1 300	1 300	1 300	1 300	1 450	1 450	1 450	1 450
<b>Connecting ports</b>									
port <b>X × Y</b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 400	400 × 400	400 × 400	400 × 400
port <b>X1 × Y1</b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 500	400 × 500	400 × 500	400 × 500
port <b>e<sub>1</sub></b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 400	400 × 400	400 × 400	400 × 400
port <b>c<sub>1</sub></b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 500	400 × 500	400 × 500	400 × 500
port <b>e<sub>2</sub> / c<sub>2</sub></b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 500	400 × 500	400 × 500	400 × 500
port <b>i<sub>1</sub></b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 400	400 × 400	400 × 400	400 × 400
port <b>i<sub>2</sub></b>	mm	315 × 315	315 × 315	315 × 315	315 × 315	400 × 400	400 × 400	400 × 400	400 × 400

## TYPES AND DIMENSIONS OF CONNECTING PORTS



For detailed information refer to the ATREA selection software.

# INSTALLATION AND CONFIGURATION

## INSTALLATION CONFIGURATION AND CONNECTING PORTS

The entire DUPLEX RS5 range has very compact dimensions, a wide range of accessories and variable configuration options to allow easy installation even in confined spaces. The only installation position is ceiling-mounted. The unit's housing with its transportation and installation frame is suitable for transport. The opening service and inspection panel on the front is divided for easy service access to the unit. The variable position of the inlet port allows the optimum connection of HVAC lines. All units are supplied with various connecting ports / flanges – without

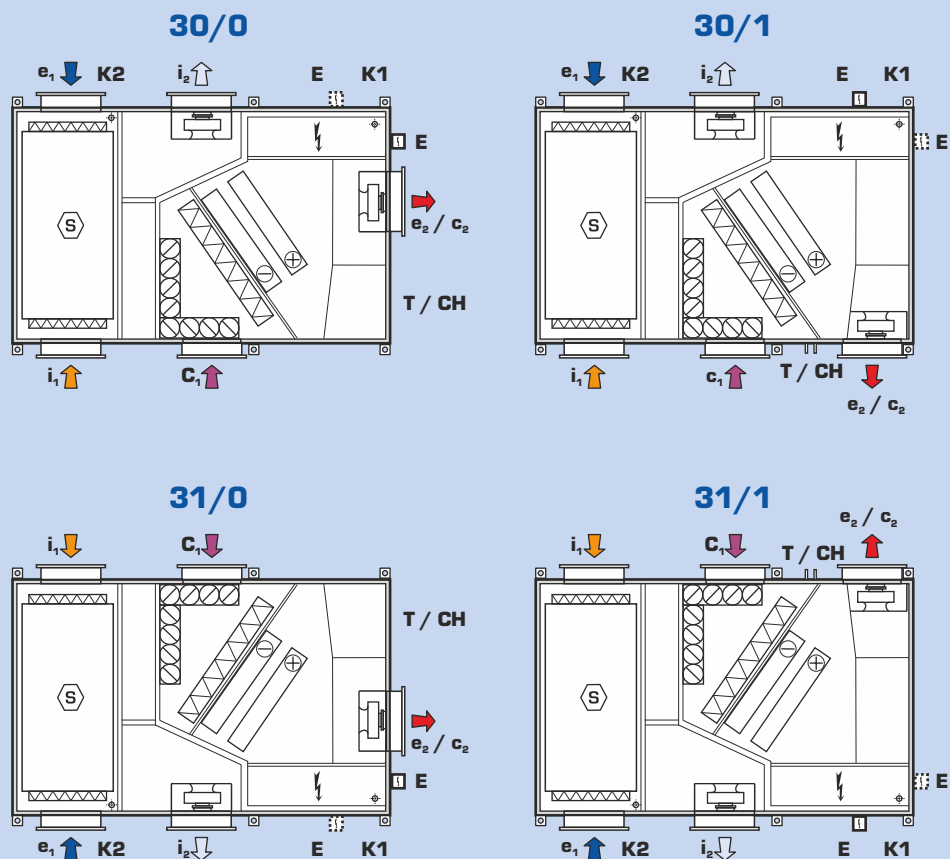
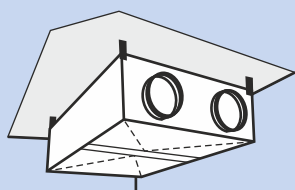
connection, with a flexible flange or an integrated shut-off damper with emergency function. For supply air treatment a variety of built-in heaters and coolers are available – hot water or electric air heaters, chilled water or direct coolers. Air filters are a standard feature, in classes G4/M5/F7.

For detailed selection we recommend using our specialized selection software for DUPLEX units, available at [www.atrea.com](http://www.atrea.com).

## INSTALLATION POSITIONS

### CEILING-SUSPENDED 1500–5500 RS5

configuration 30/0 to 31/1 – plan view, 4 configurations in total



- $e_1$  ... Fresh outdoor air inlet
- $c_1$  ... Recirculation air inlet
- $e_2/c_2$  ... Fresh and recirculation air outlet
- $i_1$  ... Exhaust air inlet
- $i_2$  ... Exhaust air outlet
- $T$  ... Central heating connection / Main power switch
- $E$  ... Electric heater connection
- $CH$  ... Cooling connection
- $K1$  ... Condensate drain DN15 from the cooling process
- $K2$  ... Condensate drain DN15 from the waste heat recovery process

## ACOUSTICS - CIRCULATION HEATING / VENTILATION MODE

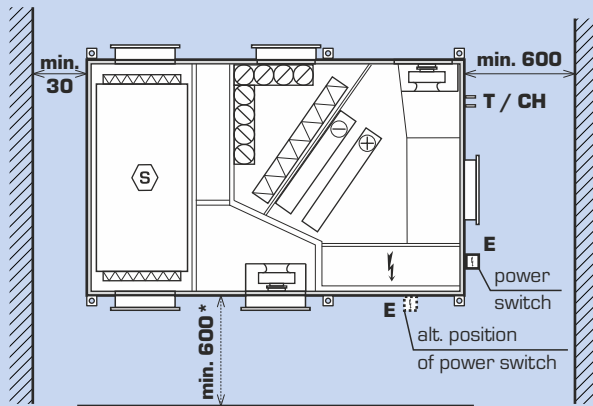
Type	Working point	Acoustic power $L_w$ [dB(A)]					Acoustic pressure $L_{p3}$ [dB(A)] at distance of 3 m
		inlet $e_1$ (ODA)	inlet $i_1$ (ETA)	outlet $e_2+c_2$ (SUP)	outlet $i_2$ (EHA)	unit	
1500/700 RS5	1 300 / 500 m <sup>3</sup> /h (200 Pa)	- / 39	53 / 47	78 / 65	- / 76	61 / 58	40 / 38
1500/1000 RS5	1 300 / 800 m <sup>3</sup> /h (200 Pa)	- / 45	53 / 56	77 / 73	- / 76	60 / 60	40 / 40
2500/700 RS5	2 000 / 500 m <sup>3</sup> /h (200 Pa)	- / 36	41 / 47	80 / 58	- / 76	59 / 58	38 / 37
2500/1000 RS5	2 000 / 800 m <sup>3</sup> /h (200 Pa)	- / 47	41 / 56	80 / 71	- / 76	59 / 59	38 / 39
3500/1200 RS5	3 000 / 1 000 m <sup>3</sup> /h (200 Pa)	- / 47	66 / 57	82 / 71	- / 79	61 / 62	39 / 42
3500/2000 RS5	3 000 / 1 500 m <sup>3</sup> /h (200 Pa)	- / 51	66 / 57	82 / 76	- / 77	61 / 63	40 / 43
5500/1200 RS5	5 000 / 1 000 m <sup>3</sup> /h (200 Pa)	- / 45	75 / 57	87 / 70	- / 79	65 / 61	45 / 41
5500/2000 RS5	5 000 / 1 500 m <sup>3</sup> /h (200 Pa)	- / 50	75 / 57	87 / 75	- / 77	65 / 61	45 / 40

## HANDLING SPACE

DUPLEX units must be installed with the prescribed handling space around the unit in mind. Below the unit at least 150 mm must be left to install the DN 32 condensate drain line. This line must run through a U-bend at least 150 mm high into a sewer. This space is easily provided when the steel supporting feet supplied as standard are used. Handling space in front of the unit must be maintained for opening the front door, replacing filters and providing servicing and installation access to each unit part.

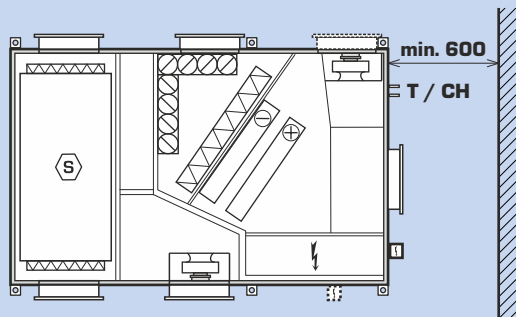
### DUPLEX RS5

configuration 31/0 – top view



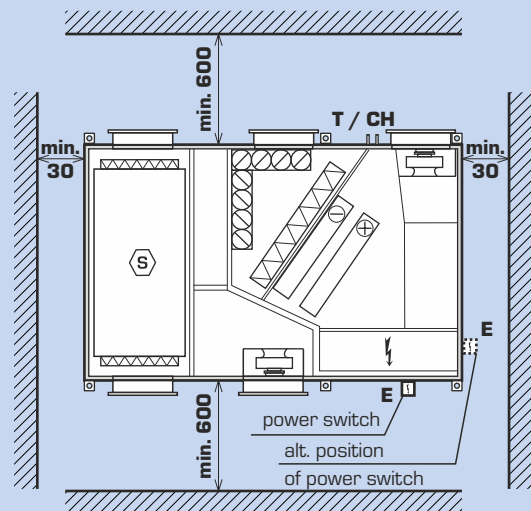
\* when using an alternate power switch position

#### Control manifolds

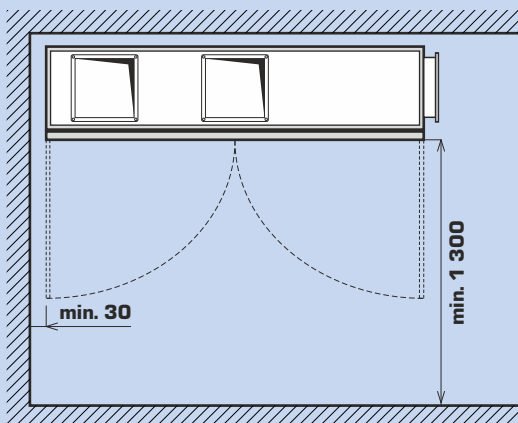
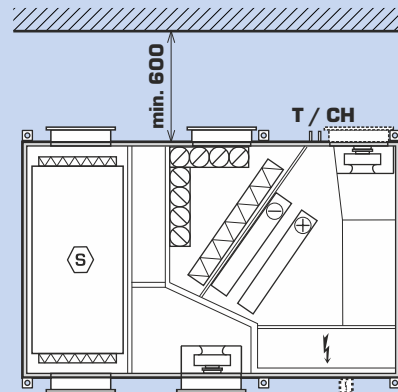


Each drawing shows the minimum handling space. In addition, each unit must have the minimum handling space of 600 mm from the side of the control system electric switchboard according to CSN. Units with a heating or cooling control manifold must have free space from the side of the manifold, too.

### configuration 31/1 – top view



#### Control manifolds



For detailed information please use our ATREA selection software.

# MODIFICATION

## DUPLEX RS5 - BASIC UNIT CONFIGURATION



### Basic unit configuration

The basic compact unit configuration includes supply and extractor fans with free-running impeller and anti-vibration mounting, a removable counterflow heat recovery exchanger from thin-walled plastic panels, slide-out supply and extraction air filters (filter class G4, M5 or F7) and a drain pan with DN15 drains. The units are supplied with a transportation and installation frame including adjustable end pieces. The split inspection access panel provides easy access to all integrated components. The internal wiring has minimum space requirements.

**DUPLEX xxxx RS5**



### Fans

All DUPLEX RS5 units have highly efficient EC fans (Ziehl Abegg) with free-running impellers and backward-curved blades. Fans in the entire DUPLEX 1500-5500 RS5 range comply with the requirements of the ErP 2015 European standard.

**Me.xxx; Mi.xxx**



### Heat recovery exchanger

Two types of plastic heat recovery exchangers, highly efficient in counter-flow configuration. The new generation of plastic heat recovery exchangers S4 and S5 has efficiency rates of up to 93 %.

**Sx**



### By-pass damper

A heat recovery plate exchanger bypass including actuator. When the bypass opens, flow through the heat recovery exchanger stops to eliminate heat transfer.

**Bx**



### Recirculation damper

A basic feature of all units of this range, the set of actuator-operated recirculation dampers is fully automatically controlled based on the demand of a selected mode or temperature. The recirculation damper provides fully balanced flow rates in all available modes.

**Cx**

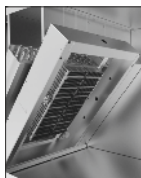
## DUPLEX RS5 - DESCRIPTION OF MODIFICATIONS



### Hot-water air heater ("T")

A built-in water-to-air exchanger, with three (alternatively more) rows of copper tubes and pressed-on aluminium slats for systems up to 110 °C and 1.0 MPa. A standard feature of the heater is a freeze protection steam-gas capillary thermostat and flexible connecting ductwork. T-modification units (with a hot-water air heater) must have a shut-off damper for supply air e.g., The actuator-fitted version with emergency function is recommended. The heater can be optionally supplied with a control manifold for heating power control, type RETPO4 or RETPO3.

**T.x**



### Electric heater ("E")

Integrated electric heaters consisting of PTC (Positive Temperature Coefficient) cells are generally used for supply air heating. As a standard feature the electric heater includes protection thermostats (operating and emergency with manual reset function) and a KM control module with power switching elements with so-called zero switching (SSR). The built-in electric heaters are available in two capacity versions (basic and high performance). For detailed information refer to the ATREA selection software.

**E.x**



### Direct evaporator ("CHF")

A built-in exchanger from copper tubes and pressed-on aluminium slats including a condensate pan and a manostat. Depending on the required capacity level, coolant type and air parameters the exchangers have three or more rows with various evaporation temperature levels. Optionally a double-circuit 1:1 or 1:2 split evaporator or a fully custom-made one is available.

**CHF.x**



### Chilled water air cooler ("CHW")

A built-in exchanger from copper tubes and pressed-on aluminium slats including a condensate pan and a separate condensate drain. Depending on the required capacity level, cooling water temperature and air parameters the exchangers have three or more rows. The chilled water air coolers can be optionally fitted with control manifold R-CHW2 or R-CHW3.

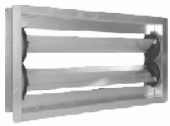
**CHW.x**



## OTHER OPTIONAL ACCESSORIES (BASIC OVERVIEW)

Ke.xxx; Ki.xxx

### Shut-off dampers e, i,



The suction dampers are fitted on the inlet port (unit inlet). The damper sizes supplied depend on the ports of the unit, with two actuator types – the standard type LM 24A and the LF 24 type with emergency function (spring) for power failure situations. The shut-off dampers are a mandatory feature for the hygienic version according VDI 6022.A separately supplied accessory.

Fe.xxx; Fi.xxx

### Air filtration



DUPLEX RS5 series units include three class M5 filters as a standard feature. Optionally, depending on the air flow rate, unit type and air pollution level, G4 or F7 supply or exhaust air filters with external pressure drop of approximately 50–100 Pa (clean filter) can be fitted.

RE-HW.4; RE-HW.3

### Control manifolds of hot-water air heaters



They are designed for controlling the heating capacity of hot water air heaters. They always consist of a three-speed pump, two shut-off ball valves and connecting ductwork. Depending on the type they additionally include:

- RE-HW.4 – a four-way mixing manifold with actuator
- RE-HW.3 – a three-way mixing manifold with actuator

R-CHW.x

### Control manifolds of chilled water air heaters



They are designed for controlling the cooling capacity of chilled water air heaters (CHW). They always consist of two shut-off ball valves and connecting ductwork. Depending on the type they additionally include:

- R-CHW3 – a three-way mixing manifold with actuator
- R-CHW2 – a choke valve with actuator

A.MFF

### Tube manometers



A filter accessory for easy visualisation of current pressure drop of filters. For the hygienic version of the units in keeping with VDI 6022 the inclined manometers are mandatory. A separately supplied accessory.

NFK.x

### Spare cassette filters



Spare cassette filters in sizes as required by the unit type. The filter classes supplied are G4, M5 and F7.

EPO-V

### Electric pre-heaters EPO-V



Electric pre-heaters EPO-V provide freeze protection for the heat recovery exchanger when permanent balanced pressure ventilation is required. The pre-heater is installed in the ductwork on the fresh air inlet (e, i). Control is provided by the RD5 series control system.

EPO-V

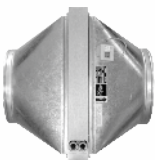
### Electric heaters EPO-V



Separately supplied heaters, to be installed in circular or rectangular ducts used for connection to DUPLEX units. For their capacity and diameters see separate catalogue sheets.

TPO

### Hot water air heaters TPO



Separately supplied heaters, to be installed in ducts used for connection to DUPLEX units. They include a steam-gas capillary thermostat as a standard feature. For their capacity and diameters see separate catalogue sheets.

### Supplied in components, assembly on site

All units can be optionally supplied as separate components prepared for assembly on site by bolting together. This allows the units to be installed in spaces which are otherwise difficult to access. Housing insulation class T3, thermal bridges class TB2.

# CONTROLS


DUPLEX RS5 units are delivered with basic control components or with complete control systems, developed by ATREA.

There are two types of control systems available (Basic and RD5) according to customer needs and an application. The systems also include variety of sensors (temperature, humidity, air quality, CO<sub>2</sub>) 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 RS5 CONTROL SYSTEMS

Type	Use	Controller
<b>Basic</b>	<ul style="list-style-type: none"> <li>– all electrical components are wired to a junction box terminal strip inside or outside the unit</li> <li>– standard components are fans, damper actuators, capillary freeze protection thermostat of hot water heating coil</li> <li>– more components are included upon customer's request (exact actuator type, sensors, thermostats, pressure switches etc.)</li> <li>– suitable for applications with separate delivery of control system; e.g. large buildings with central control system etc.</li> </ul>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <b>basic version</b>  (fans, actuators, thermostats, pressure switches and others on request) </div> <div style="text-align: center;"> ↑  ↓ </div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto; width: fit-content;"> Supervisory control system </div>
<b>"RD5" controls</b>	<p><b>Standard functions of the "RD5" controls</b></p> <ul style="list-style-type: none"> <li>– EC fan speed control (based on selected mode)</li> <li>– automatic by-pass damper position (heat and cool recovery)</li> <li>– evaluates and prevents emergency limits based on measured temperature</li> <li>– ventilation and temperature weekly program setting</li> <li>– A web server and an Ethernet interface built in as standard connection for remote internet communication</li> <li>– inputs for switching using 230 V (4 inputs – 3 delayed, 1 instantenious) – switch e.g. from bathrooms etc.</li> <li>– optional connection of CO<sub>2</sub> or RH sensor – max. 2 sensors with a switch or 0–10 V output</li> <li>– outputs for electric preheater and heater control (pulse 10 V) or hot-water control (0–10 V)</li> <li>– outputs for 2 zone dampers control to split supply air option</li> <li>– optional manometer connection to ensure constant airflow control – 3 pcs. fitted as standard</li> <li>– top-of-the-line constant flow control system thanks to automatic optimization of the circulation damper and both fans performance in order to maintain equal air flow in the individual sections of the unit</li> <li>– unit operation in selected modes – equal-pressure ventilation / equal-pressure ventilation with recirculation / recirculation / night pre-cooling / overpressure ventilation</li> <li>– automatic switching between modes according to set temperature – heating or cooling modes</li> <li>– performance control according to internal temperature including automatic performance increase depending on the required and actual room temperature</li> <li>– possibility of setting the ratio of the recirculation and ventilation air volume</li> <li>– automatic switching between heating and non-heating season</li> <li>– automatic use of the most efficient cooling source based on ration of outdoor, indoor and required temperature</li> <li>– outputs for controlling cooling (direct or water), eventually heat pump</li> <li>– built-in web-server / ModBUS communication as standard</li> </ul> <p><b>Additional RD-K module</b></p> <ul style="list-style-type: none"> <li>– additional inputs and outputs significantly extending control system functions</li> </ul> <p><b>BACnet / KNX converter</b></p> <ul style="list-style-type: none"> <li>– optional converter allowing connection to supervisory control system via BACnet or KNX protocol</li> </ul>	<p><b>CP Touch (touchscreen)</b></p>  <p><b>Web server (as standard)</b></p> 