

## DUPLEX Flexi 3

### Compact ventilation units with heat recovery

The ventilation units of the **new** original patented **DUPLEX Flexi 3<sup>rd</sup>** generation design range are intended for comfort ventilation with the highest heat recovery efficiency and hot-air heating in all kinds of civil and residential buildings. They are made in seven sizes: **DUPLEX 650, 1100, 1700, 2300, 3500, 4500 and 6000 Flexi**.

The units are available in multi-purpose design, i.e. for indoor installation on the floor; beneath the ceiling (only 650–3500) or for outdoor installation on the floor. In addition the unit sides may be interchanged, i.e. supply and exhaust air ports can be used conversely, allowing installation flexibility.

The units can be optionally fitted with an integrated electric pre-heater. A hot water heating coil or a chiller (water-based or direct) can be installed directly on the unit or in the duct system. The duct downstream the unit may be equipped with an electric re-heater; an electric pre-heater can also be installed upstream the unit.

From the construction point of view all units are compact sets containing in a single cabinet two independently powered, highly efficient EC fans with flexibly mounted motors a counterflow high-efficiency heat recovery core with large heat-transfer area, a by-pass damper with an actuator, removable supply and extract air cartridge filters ePM10 50 % (M5) or ePM1 55 % (F7) and a condensate drain pan, all in the same housing.

The front door enables easy access to all components. Inlet and outlet ports are rectangular. The housing is made of aluzinc metal panels with polyisocyanurate insulation ( $U = 0,82 \text{ Wm}^{-2}\text{K}^{-1}$ ).

As an option the units can be equipped with a complete control system, including a connection to the internet or to a third party management system – for detailed information see the section on controls (Page 8).



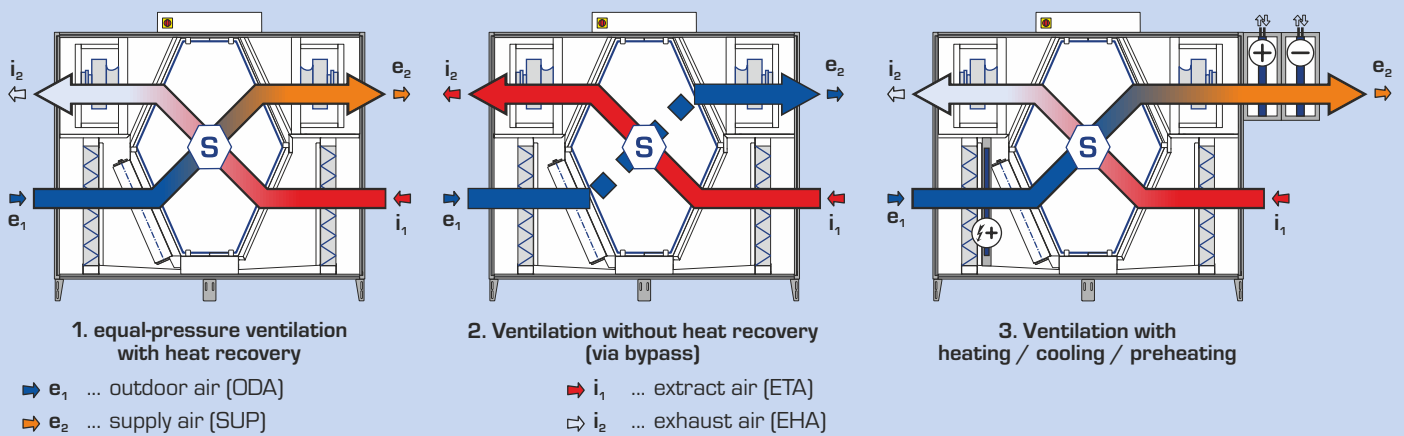
DUPLEX Flexi 3

#### Features of the DUPLEX Flexi:

- Great thermal insulation of the casing (class T2)
- Reduced thermal bridging (class TB2)
- Low profile significantly simplifies installations such as ceiling-suspended applications
- Extreme compactness of new unit types ensures up to 60 % space reduction in comparison with modular units
- Low purchase cost
- Multipurpose unit design (floorstanding / ceiling-suspended installations) simplifies ordering and on-site installations
- Low power input – high EC fan efficiency
- High heat recovery efficiency thanks to new generation heat recovery exchangers
- Low noise
- Light weight
- Different types of control systems based on application complexity; fully integrated into the unit
- The units meet hygienic requirements in accordance with the VDI 6022
- The units meet stringent efficiency and effectiveness criteria and are certified by the renowned Passive House Institute \*
- The units meet requirement in accordance with Commission regulation (EU) No. 1253/2014 (Ecodesign) \*

\* in the defined working area

#### OPERATING MODES



#### SELECTION SOFTWARE



For detailed selection of DUPLEX units, accessories and control system we recommend to use our special selection software. You may download it from our webpage [www.atrea.com](http://www.atrea.com) or contact us at our mail address.

**Atrea**<sup>®</sup>

UNIT VENTILATORS & HEAT RECOVERY

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# PERFORMANCE CURVES

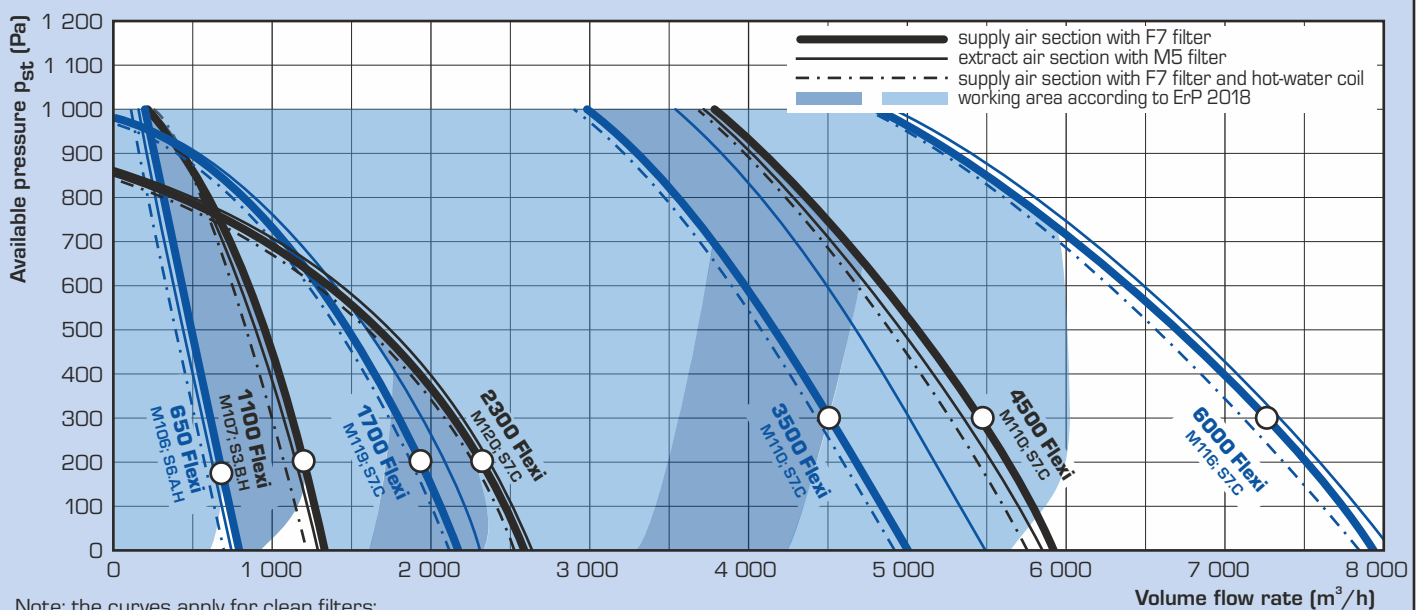
## TECHNICAL DATA

Unit		650 Flexi	1100 Flexi	1700 Flexi	2300 Flexi	3500 Flexi	4500 Flexi	6000 Flexi
Nominal airflow	m <sup>3</sup> /h <sup>1</sup>	650	1 100	1 700	2 300	3 500	4 500	6 000
Nominal external static pressure	Pa	170	200	200	200	300	300	300
Power input at nominal operating point	W	320	670	1 200	1 600	2 100	2 300	3 000
Recovery efficiency <sup>1)</sup>	%	see curve						
Weight <sup>2)</sup>	kg	105	150	235	280	325	390	510
Power supply	V	230	230	230	230	400	400	400
Frequency	Hz	50						
Max. power input	W	340	780	1 600	1 700	5 200	5 200	6 400
Fan speed	min <sup>-1</sup>	4 300	3 400	2 360	2 470	2 970	2 970	2 700
Heating output (pre-heater)	kW	2,2	3,3	4,4	7,7	11	13,2	16,5
Filtration class	-	ePM1 55 % (F7) / ePM10 50 % (M5)						

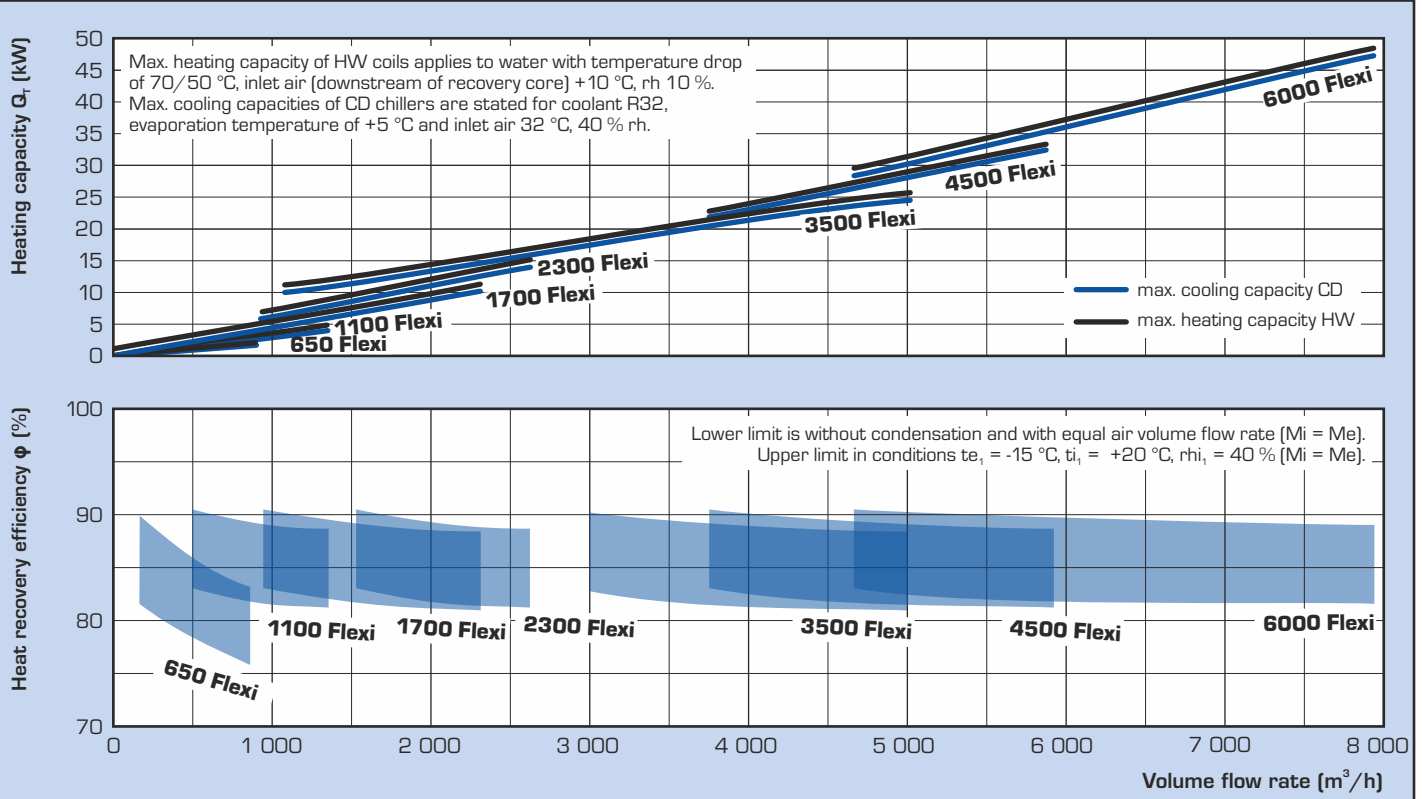
<sup>1)</sup> based on air volume flow – see curve

<sup>2)</sup> based on accessories

## PERFORMANCE CURVES



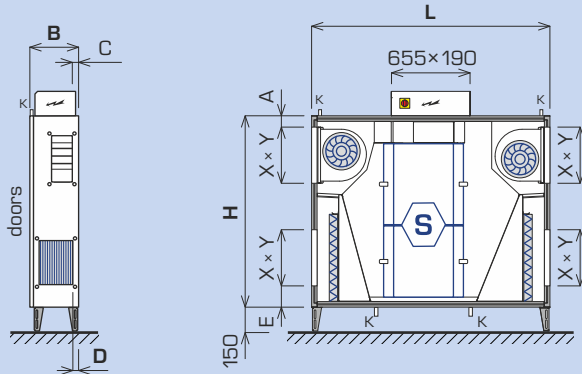
## HEATING AND COOLING CAPACITY, RECOVERY EFFICIENCY



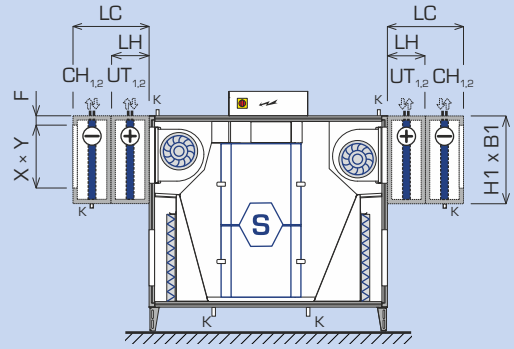
# DIMENSIONS AND CONNECTION PORTS

## DUPLEX 650, 1100 FLEXI

### UNIT ONLY



### UNIT WITH HEATING COIL AND / OR CHILLER

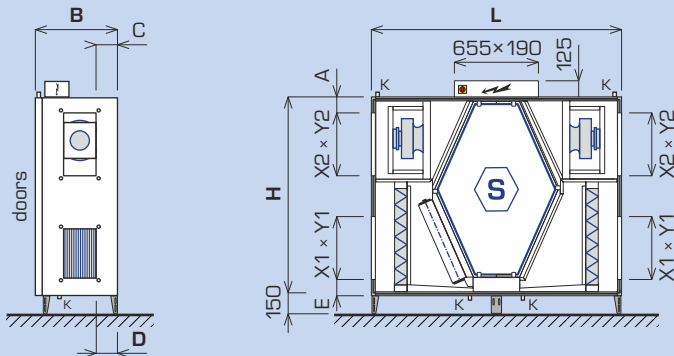


Unit	L	H	B	X	Y	A	C	D	E	F	LH	LC	H1	B1
650 Flexi	1 370	1 100	298	250	200	122	45	35	170	122	325	630	600	260
1100 Flexi	1 700	1 100	395	355	200	90	70	70	105	105	310	685	595	350

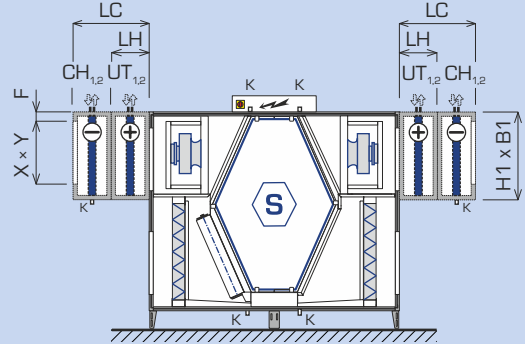
UT<sub>1,2</sub> ... Heating coil connection; CH<sub>1,2</sub> ... Chiller connection; K ... Condensate drain; X x Y ... Connecting port dimensions; LH ... Stand-alone heating coil; LC ... Stand-alone chiller or heating coil with chiller;

## DUPLEX 1700 - 6000 FLEXI

### UNIT ONLY



### UNIT WITH HEATING COIL AND / OR CHILLER

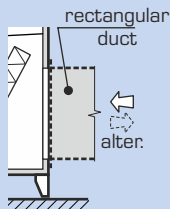


Unit	L	H	B	X1	Y1	X2	Y2	A	C	D	E	F	LH	LC	H1	B1
1700 Flexi	1 950	1 550	455	500	250	500	250	85	50	85	105	150	375	725	805	365
2300 Flexi	1 950	1 550	580	500	250	630	355	45	75	145	105	85	375	725	805	495
3500 Flexi	1 950	1 550	780	500	500	630	500	45	120	120	105	85	375	725	805	685
4500 Flexi	1 950	1 600	990	500	500	630	500	45	225	225	150	85	375	725	805	920
6000 Flexi	1 950	1 600	1 295	500	710	630	710	45	270	270	150	85	375	725	805	1 225

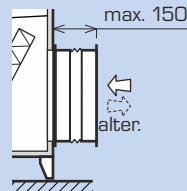
LH ... Stand-alone heating coil; LC ... Stand-alone chiller  
X x Y ... Connecting port dimensions; UT<sub>1,2</sub> ... Heating coil connection; CH<sub>1,2</sub> ... Chiller connection; K ... Condensate drain

## RECTANGULAR CONNECTION PORTS

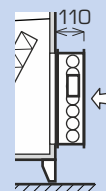
**Basic port**  
(inlet, outlet)



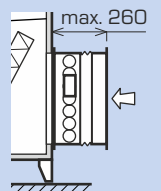
**Port with a flexible connection**  
(inlet, outlet; delivered separately)



**Port with a damper**  
(inlet only; delivered separately)

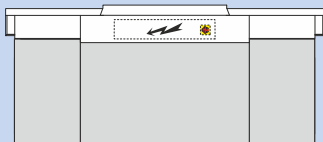


**Port with a damper and flexible connection**  
(inlet only; delivered separately)

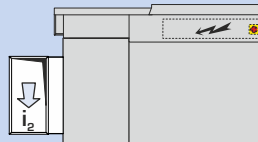


Note: For detailed design and technical data we recommend using our dedicated selection software.

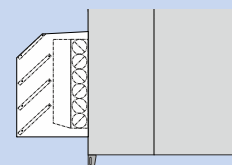
## ACCESSORIES FOR OUTDOOR VERSION



Roof of the unit



Outlet hood



Inlet hood with droplet eliminator

# INSTALLATION CONFIGURATION

## INSTALLATION POSITIONS AND PORT CONFIGURATIONS

The units are available in multipurpose design, allowing the unit to be installed on the floor or beneath the ceiling. For all three unit positions (floor-standing, ceiling-suspended and rooftop), the standard support zinc-coated steel legs are used for installation. Chillers must always be suspended separately.

Each unit is fitted with several condensate drain pipes as standard. Chillers have their own condensate drains. The condensate drains used must be connected into a sewer system. During installation the respective drain should be selected.

In addition, unit sides can be interchanged, i.e. supply and exhaust air ports can be used conversely. This ensures high installation flexibility on site.

Hot water heating coil HW.2 and /or a water-based or direct chiller (to be fitted directly on to the unit) or an EPO-V electric heating coil (to be installed in to the duct) may be optionally connected to the unit. For a detailed unit design we recommend a special DUPLEX selection software be used; available at [www.atrea.com](http://www.atrea.com).

**K** ... Condensate drain

➔ **e<sub>1</sub>** ... outdoor air (ODA)

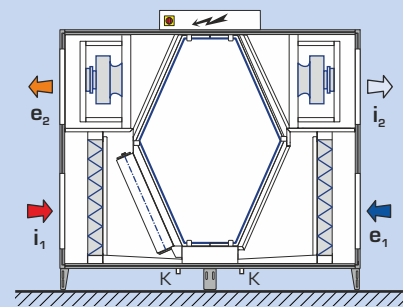
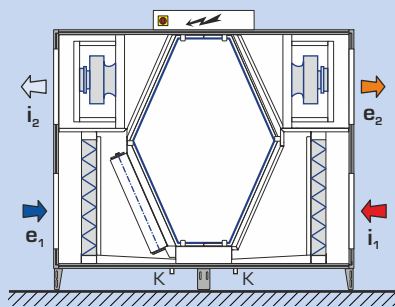
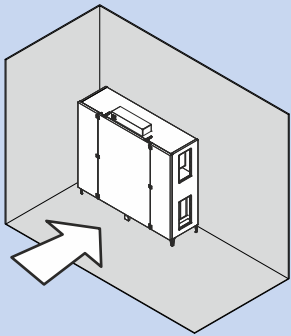
⇨ **e<sub>2</sub>** ... supply air (SUP)

⇨ **i<sub>1</sub>** ... extract air (ETA)

⇨ **i<sub>2</sub>** ... exhaust air (EHA)

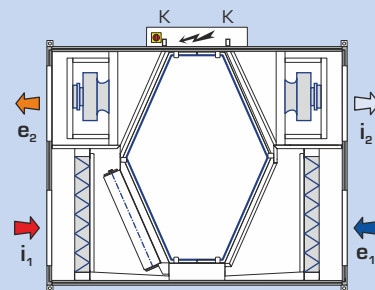
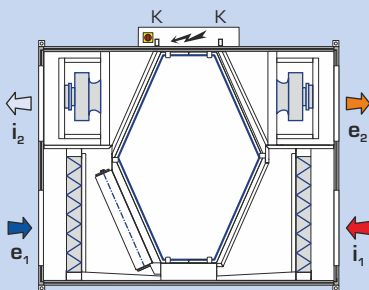
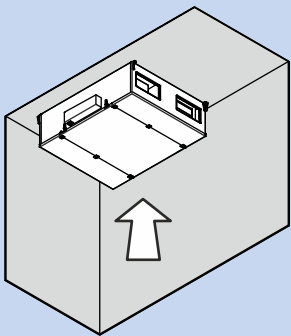
### FLOOR-STANDING POSITION

- the unit is installed using the adjustable legs supplied



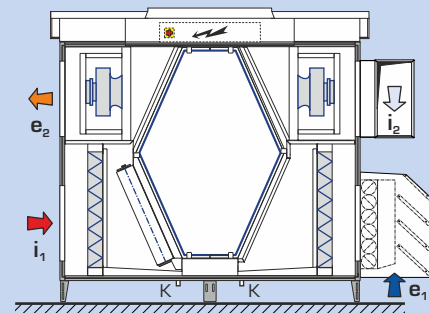
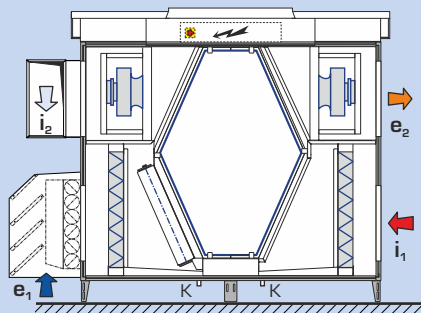
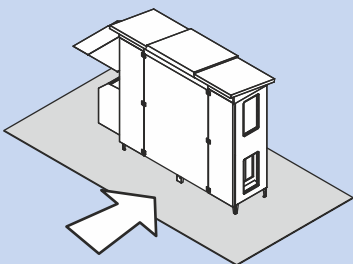
### CEILING-SUSPENDED POSITION

- the unit is installed using supplied hangers



### ROOFTOP POSITION

- the unit is installed using the adjustable legs supplied



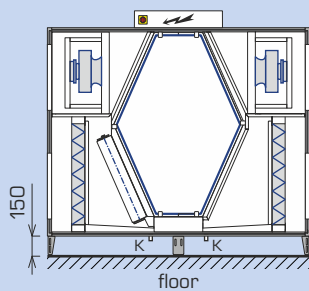
## HANDLING SPACE

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.

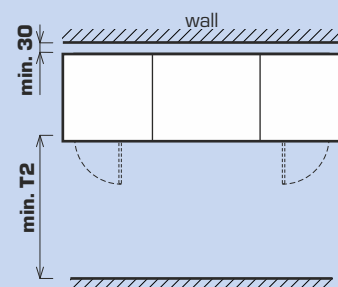
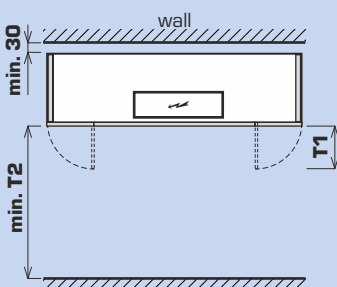
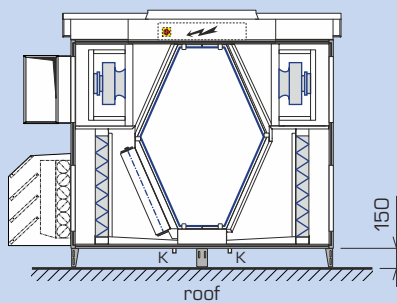
Each drawing shows the minimum handling space. In addition, each unit must have the minimum handling space of 600 mm from the side of the control system electric switchboard according to CSN. Units with a heating or cooling control manifold must have free space from the side of the manifold, too.

### Handling space in front of the door

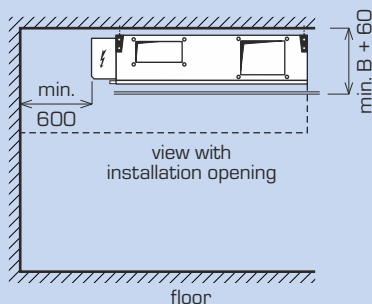
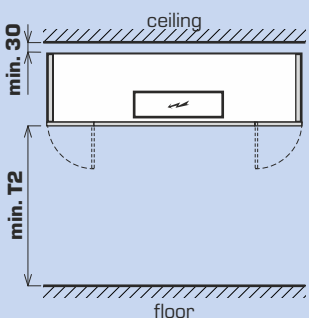
**Floor-standing indoor  
650-6000 Flexi**



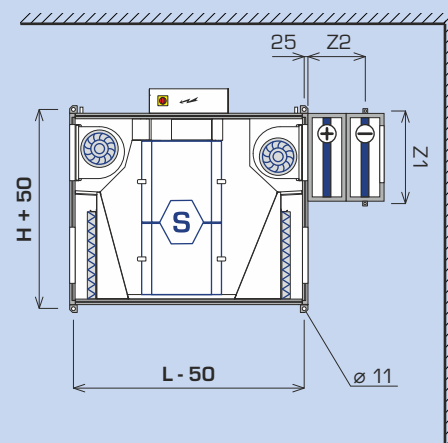
**Floor-standing rooftop  
650-6000 Flexi**



**Ceiling-suspended indoor  
650-3500 Flexi**



### Handling space for accessories



Unit	filter replacement T1 (mm)	service access T2 (mm)	Z1 (mm)	Z2 (mm)
650 Flexi	250	300	465	655
1100 Flexi	320	500	475	645
1700 Flexi	500	500	520	845
2300 Flexi	500	600	520	845
3500 Flexi	500	800	520	845
4500 Flexi	500	1 000	520	845
6000 Flexi	500	1 300	520	845

## ACOUSTIC POWER $L_w$ AND ACOUSTIC PRESSURE $L_{D3}$

Unit	Working point	Acoustic power $L_w$ [dB(A)]					Acoustic pressure $L_{D3}$ [dB(A)] at distance of 3 m
		inlet $e_1$	inlet $i_1$	outlet $e_2$	outlet $i_2$	unit	
DUPLEX 650 Flexi	600 m <sup>3</sup> /h (200 Pa)	55	54	79	77	57	36
DUPLEX 1100 Flexi	1 000 m <sup>3</sup> /h (200 Pa)	58	61	80	81	61	40
DUPLEX 1700 Flexi	1 500 m <sup>3</sup> /h (200 Pa)	54	53	71	72	54	33
DUPLEX 2300 Flexi	2 000 m <sup>3</sup> /h (200 Pa)	54	56	75	71	54	34
DUPLEX 3500 Flexi	3 000 m <sup>3</sup> /h (200 Pa)	56	57	76	76	57	36
DUPLEX 4500 Flexi	4 000 m <sup>3</sup> /h (200 Pa)	65	66	82	78	62	41
DUPLEX 6000 Flexi	5 500 m <sup>3</sup> /h (200 Pa)	73	73	84	83	63	43

# MODIFICATIONS

## DUPLEX FLEXI - BASIC UNIT



### Basic configuration

The compact unit consists of supply and exhaust centrifugal fans with electric motors in anti-vibration mounting, removable counterflow air-to-air heat recovery core assembled from thin plastic plates, removable ePM10 50 % (M5) or ePM1 55 % (F7) supply and exhaust air filters, and a condensate pan. A front door enables easy access to all built-in components and filters. The units meet requirement in accordance with Commission regulation (EU) No. 1253/2014 (Ecodesign) in the defined working area.

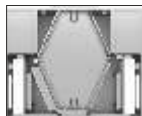
DUPLEX xxxx Flexi



### Fans

All units are equipped with high-efficiency fans (ebm-papst and Ziehl Abegg) with impellers and backward curved blades in semispiral casing. Whole range of DUPLEX 650 to 6000 Flexi fans meets the requirements of the European directive ErP 2015.

Me.xxx; Mi.xxx



### Heat recovery core

The units are equipped with a high-performance heat recovery cores - type S3, S6 or S7. This is made of thin plastic plates with high recovery efficiency up to 93 %.

S.x

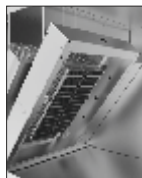


### By-pass („B“)

The heat recovery core bypass, includes an actuator. When opening the by-pass damper, airflow through the recovery core closes automatically to avoid heat transfer.

B.x

## DUPLEX FLEXI - OPTIONAL ACCESSORIES FOR ADDITIONAL INSTALLATION



### Electric preheater

Integrated electric heating coils provide the antifreeze protection of the HR exchanger when equal-pressure ventilation is continuously required. Control is provided through the DUPLEX RD5 unit control system. For more information please refer to the selection software DUPLEX. An option delivered separately.

HE.x



### Hot water heating coil

External water-to-air heating coil; made of copper pipes and aluminum fins. Designed for systems up to 110 °C and 1,0 MPa. Units with heating coil must be equipped with e, supply air shutoff damper; an actuator with spring-return function is recommended. An external coil hydraulic kit for heating capacity control of RE-HW.4 or RE-HW.3 type can be supplied with the coil upon request. For more information please refer to the selection software DUPLEX. An option delivered separately.

HW.x



### Chilled water cooling coil

External coil made of copper pipes and aluminum fins with a special hydrophilic surface improving water drainage. The cooling coil can be equipped with the R-CW.3 external hydraulic kit on request. For more information please refer to the selection software DUPLEX. An option delivered separately.

CW.x



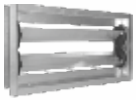
### Direct expansion (DX) coil

External coil made of copper pipes and aluminum fins with a special hydrophilic surface improving water drainage. For more information please refer to the selection software DUPLEX. An option delivered separately.

CD.x

## OPTIONAL ACCESSORIES (BASIC OVERVIEW)

**Ke.xxx; Ki.xxx**



### Shutoff damper e, i,

Shutoff dampers are fitted on inlet ports. The dampers are available in different sizes based on unit ports and actuator types – the standard type is LM 24A and the type with spring return is LF 24 (to be shut off in case of power cuts). An option delivered separately.

**Fe.xxx; Fi.xxx**



### Air filtration

The DUPLEX series are equipped with filter cartridges as standard (ePM1 55 % (F7) / ePM10 50 % class filters – supply / exhaust). This filter combination fulfills hygiene requirements according to VDI 6022. Other filter combinations available are: ePM10 50 % / ePM10 50 %, ePM1 55 % (F7) / ePM1 55 % (F7) and ePM10 50 % / ePM1 55 % (F7).

**H.P**



### Flexible connection

Flexible connection for rectangular ports in the unit port sizes. An option delivered separately.



### Accessories for rooftop version

- **NR** – Custom designed roof to protect the unit against weather. The roof includes a service cover for access to the junction box.
- **N1.E**– Cover for outdoor air inlet port with lamellas and droplet eliminator.
- **N2**– Adjustable cover for exhaust port with protective grille and the ability to change the direction of air flow.

**RE-HW.4, RE-HW.3**



### Heating coil hydraulic kit

Its function is to control heating capacity of a heating coil. It consists of a three-speed pump, two globe shutoff valves and connection pipes. Further equipment depends on the type:

- **RE-HW.4** – three-way mixing valve with an actuator for digital control system
- **RE-HW.3** – three-way diverting valve with a thermostatic valve for electric control system

**EPO-V**



### Electric re- and pre-heaters EPO-V

EPO-V electric heating coils are used in two ways:

- 1) to provide the antifreeze protection of the HR exchanger when equal-pressure ventilation is continuously required,
- 2) heating the air supplied by a ventilation unit to a building.

Control is provided through the DUPLEX RD5 unit control system. When installing the heating coil requirements specified in a separate technical sheet must be adhered to. An option delivered separately.



**A.MFF**



### Tube manometers

Accessory for filters for simple view of current pressure drop. The tube manometers are obligatory for hygienic unit design in accordance with the VDI 6022. An option delivered separately.

**FK.x**



### Spare cartridge filters

Replacement filter cartridges in different sizes based on the unit type. Available in ePM10 50 % and ePM1 55 % (F7) filtration class.

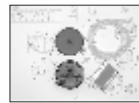
**R-CW.3**



### Control modes for water chillers

Designed to control the cooling capacity of water chillers. The R-CW.3 with a 3-way fitting has a 3-way Belimo ball valve with a Belimo TR24-SR servo drive and two ball stop valves. An option delivered separately.

**A.CF.XXX**



### Constant air flow and pressure

Manometers reading fan pressure together with controls, enables intelligent fan control of preselected airflow. This accessory assumes the unit is equipped with RD5 digital control system. Using a second manometer (optional accessory) in the supply air duct enables the user to control constant pressure in the supply duct. An option delivered separately.

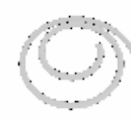
**KP**



### Condensate pump

Condensate removal pump with reservoir for ceiling-suspended units.

**KH**



### Heating cable

The heating cable helps to protect the condensate drain from freezing.

# CONTROLS




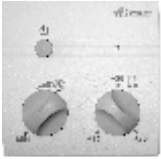
DUPLEX Flexi units are delivered with basic control components or with complete control systems.

There are three types of control systems available (Basic, CPM 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 FLEXI CONTROL SYSTEMS

Type	Use	Controller
<b>"Basic" controls</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="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>basic version</b>                      (fans, actuators, thermostats, pressure switches and others on request)                 </div> <div style="text-align: center; margin: 5px 0;">                     ↑                      ↓                 </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">                     Supervisory control system                 </div> </div>
<b>"CPM" controls</b>	<p><b>Standard functions</b></p> <ul style="list-style-type: none"> <li>- EC fan speed control (stepless)</li> <li>- automatic by-pass damper position</li> <li>- frost protection of heat exchanger</li> <li>- switching of electric or water heater</li> <li>- input for external switch</li> <li>- inlet and outlet shut-off damper control</li> <li>- minimum and maximum fan speed preselection</li> <li>- analogue input (0-10 V) for air quality sensor (CO<sub>2</sub>, RH)</li> <li>- outputs for controlling electrical preheater and heater (pulse switched 10 V) or water heater (controlled by 0-10 V signal)</li> <li>- outputs for controlling cooling (direct or water), eventually heat pump</li> </ul> <p><b>Controller CPM</b></p> <ul style="list-style-type: none"> <li>- fully graphic touchscreen</li> <li>- weekly program</li> <li>- „party" mode</li> <li>- „holiday" mode</li> <li>- filter change notice</li> <li>- automatic operation based on constant signal - e.g. constant pressure</li> </ul> <p><b>Controller CP 10 RA</b></p> <ul style="list-style-type: none"> <li>- rotatable controller</li> </ul>	<div style="text-align: center;">  <p><b>CPM controller</b> with touchscreen display</p>  <p><b>CP 10 RA</b> with mechanical knob</p> </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 instantaneous) - 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> </ul> <p><b>Additional RD-IO module</b></p> <ul style="list-style-type: none"> <li>- optional manometer connection to ensure constant airflow control (see Constant airflow and pressure control on previous page)</li> <li>- constant pressure control</li> <li>- cooling control outputs (DX- or chilled-water cooling), possibly for a heat pump</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>CP10RT</b></p>  <p><b>Web server (as standard)</b></p> 