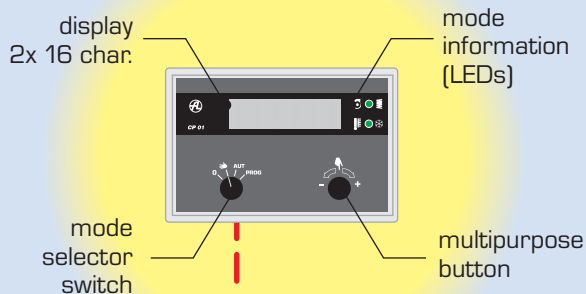


# DUPLEX ECV

Compact vertical ventilation units  
with heat recovery  
and electronically controlled fans



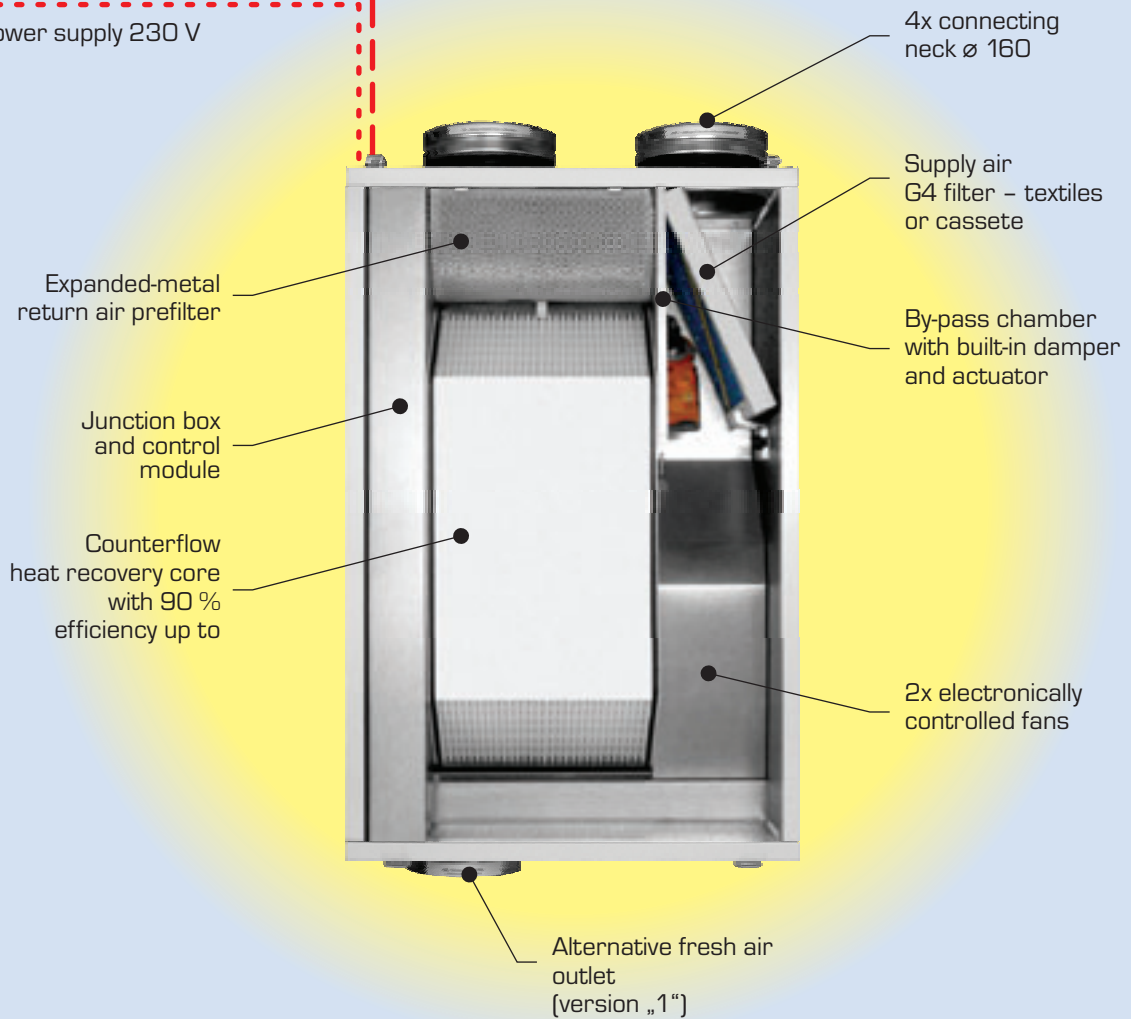
## CP 01 CONTROLLER



Low-voltage cable  
interconnection

Power supply 230 V

## DUPLEX ECV UNIT



RESIDENTIAL VENTILATION & HEATING DIVISION

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# DESCRIPTION, TECHNICAL DATA

## DESCRIPTION

**Application** – the patented DUPLEX units of the ECV series are designed for comfort ventilation of all types of residential buildings, mainly for low-energy and passive family houses and high-rise residential buildings.

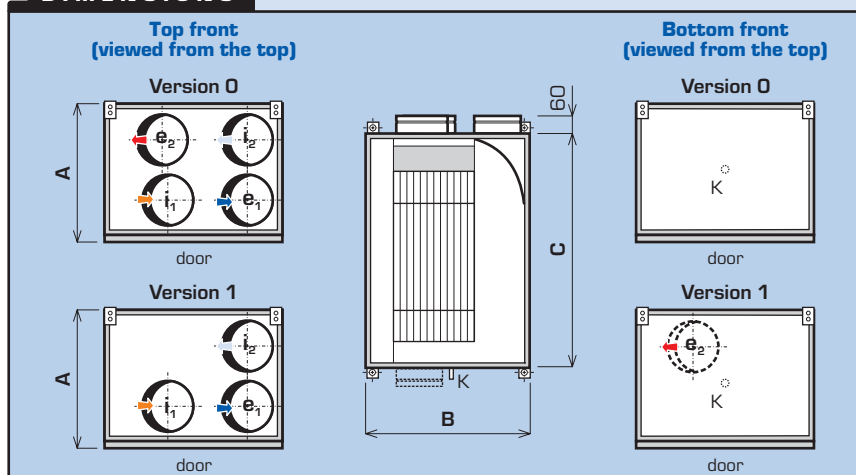
**Basic description** – in a casing made of white-painted sheet metal with polyurethane insulation ( $U = 0,95 \text{ Wm}^{-2}\text{K}^{-1}$ ) without thermal bridges the unit contains a counterflow plastic heat recovery core (efficiency of 90 %), two centrifugal fans with electronic EC control, supply air G4 filter, return air prefilter, automatic bypass damper, control module and a junction box. Condensate drain is located according to a unit installation position. Access to the unit via a removable door with quick-closing locks.

DUPLEX ECV units have a special vertical design and are available in three capacity variations 250, 380 and 540  $\text{m}^3/\text{h}$ .

The units are made in two versions with respect to connection to HVAC systems:

- Version "0" with the connection of all four necks from above only
- Version "1" with necks  $e_1, i_1, i_2$  from above and supply fresh air outlet  $e_2$  heading downwards – ideal for underfloor systems in the rooms

## DIMENSIONS

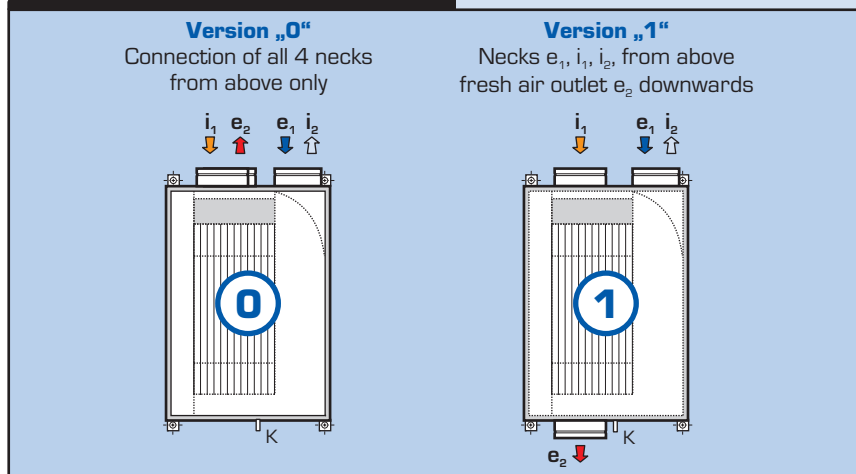


## TECHNICAL DATA

DUPLEX		250 ECV	380 ECV	540 ECV
Supply air – max. *	$\text{m}^3/\text{h}$	240	360	550
Return air – max. *	$\text{m}^3/\text{h}$	240	360	530
Heat recovery efficiency – max.	%	90	90	90
Depth	mm	440	440	465
Width	mm	520	520	780
Height (without ports)	mm	800	800	900
Connection port diameter	mm	4 $\varnothing$ 160	4 $\varnothing$ 160	4 $\varnothing$ 200
Weight	kg	29		31
By-pass	-	YES (full, with automatic control)		
Power supply	V	230 / 50 Hz		
Supply air filtration class	-	G4 (alter: F7)		
Condensate drain	mm	1x $\varnothing$ 22		

\* correct values according to respective performance curves

## INSTALLATION POSITIONS



## FEATURES

- standardly built-in EC type fans are characterized by very low power intake and modulating speed control with constant airflow for equal-pressure space ventilation
- higher unit air volume flow enables occasional intensive air exhaust or summer ventilation
- excellent thermal insulation parameters of unit casing with total avoidance of thermal bridges
- a built-in by-pass is a standard part of units and need no additional space
- in addition, opening the by-pass significantly reduces flow through the heat recovery exchanger
- a standard digital control system enables comfort weekly schedule setting, connecting other inputs (e.g. IAQ or humidity sensor), and automatic by-pass damper control based on temperature
- energy-optimized heat recovery exchanger reaches very economical ratio of used electric energy and air volume flow cost ( $w = 0,38 \text{ W}/\text{m}^3/\text{h}$ )
- energy efficiency reaches up to 17,0
- the small size allows installation into e.g. a standard 600 mm wide casing (applicable for DUPLEX 250 ECV and 380 ECV units)

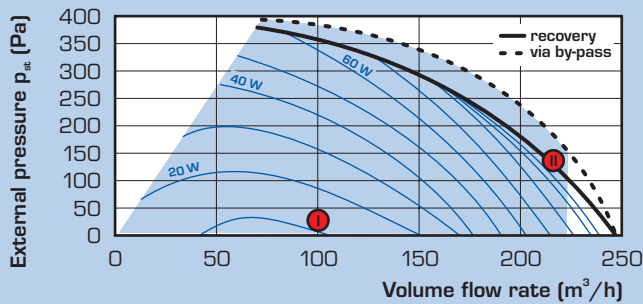
## AIR-HANDLING SYSTEM ADVANTAGES

- guarantee of mandatory continuous air changes with possibility of occasional increasing based on an external bathroom or kitchen contact
- savings up to 90 % ventilation cost
- avoiding mold propagation
- avoiding thermal discomfort in apartments by using air supply with minimum temperature drop
- utilizing all internal and external heat gains from an apartment for preheat of ventilation air and covering its remaining transfer losses.
- supply of totally filtered air (G4-F7) significantly limits occurrence of allergies and respiratory illnesses of residents
- using unit max. air volume flow (via by-pass) rooms can be effectively cooled in summer season, even with night precooling
- enabling automatic control of  $\text{CO}_2$  and relative humidity
- a complete modular system enables simple installation, even with self-help

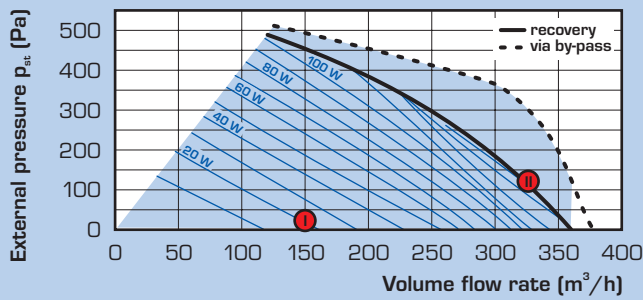
## LEGEND

- ➔  $e_1$  fresh outdoor air inlet
- ➔  $e_2$  fresh filtered supply air outlet
- ➔  $i_1$  stale return air inlet
- ➔  $i_2$  exhaust air outlet

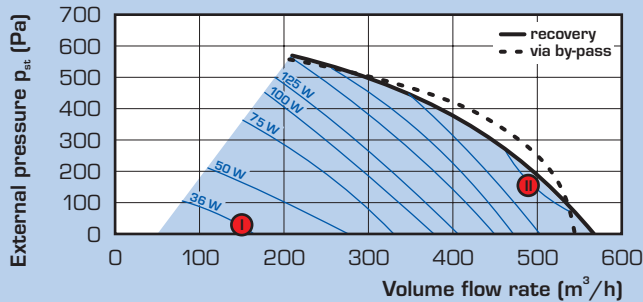
## DUPLEX 250 ECV



## DUPLEX 380 ECV



## DUPLEX 540 ECV



## SOUND POWER LEVEL $L_w$ (dB)

		dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
<b>DUPLEX 250 ECV</b>							
Intake	I.	35,5	42,4	40,8	30,9	23,4	21,1
	II.	56,7	63,7	62,0	52,2	44,7	42,3
Outlet	I.	52,9	56,0	52,7	48,5	46,5	46,2
	II.	74,2	77,3	73,9	69,8	67,8	67,4
To ambient	I.	37,2	30,2	33,5	34,2	32,6	30,2
	II.	58,2	51,2	54,5	55,2	53,6	51,2

## DUPLEX 380 ECV

Intake	I.	45,1	51,1	52,1	39,1	29,1	24,6
	II.	63,9	69,9	70,9	57,9	47,9	43,4
Outlet	I.	57,6	62,5	58,3	54,5	50,6	49,5
	II.	76,4	81,3	77,1	73,3	69,4	68,3
To ambient	I.	44,1	43,0	43,1	43,5	38,2	33,7
	II.	63,0	61,9	62,0	62,4	57,1	52,6

## DUPLEX 540 ECV

Intake	I.	39,6	52,3	41,1	33,4	31,6	< 25,0
	II.	55,7	68,3	57,1	49,5	47,6	38,8
Outlet	I.	60,6	60,9	57,9	54,1	55,3	52,6
	II.	76,6	77,0	74,0	70,1	71,3	68,6
To ambient	I.	46,7	46,5	47,5	43,6	41,2	38,0
	II.	62,2	62,0	63,0	59,1	56,7	53,5

## SOUND PRESSURE LEVEL $L_{p1}$ (dB)

		dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
<b>DUPLEX 250 ECV</b>							
To ambient	I.	26,3	19,2	22,5	23,3	21,6	19,2
	II.	48,6	41,6	44,9	45,6	44,0	41,6

## DUPLEX 380 ECV

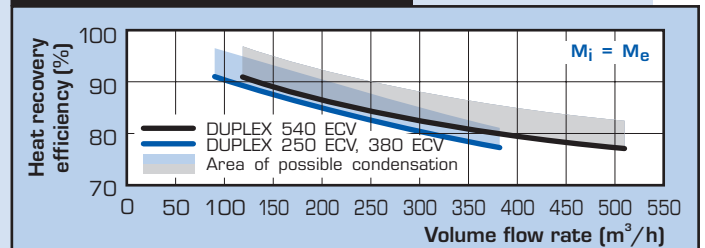
To ambient	I.	33,1	32,0	32,1	32,5	27,2	22,7
	II.	52,0	50,9	51,0	51,4	46,1	41,6

## DUPLEX 540 ECV

To ambient	I.	35,7	35,5	36,5	32,6	30,2	27,0
	II.	51,2	51,0	52,1	48,1	45,7	42,5

Sound pressure level is stated for distance of 1 m.

## RECOVERY EFFICIENCY



## ATREA AIR-HANDLING SYSTEM FOR LOW-ENERGY AND PASSIVE HOUSES

The air-handling system provides controlled equal-pressure ventilation with heat recovery for family houses and high-rise buildings, with supply air reheat, summer precooling, and with efficient utilization of all internal and external energy gains.

The system provides filtered fresh air supply to each room and kitchen as well as exhaust of stale air from bathrooms and kitchen.

For low-energy buildings it supplements the ventilation system with a basic heating system (radiators, floor heating, etc.).

For passive houses without the basic heating system, only supply air reheat via a duct heating coil is installed, sometimes in combination with a fireplace insert or other bivalent heat source.

In order to maintain optimum humidity in the EPD when heating via air is required we recommend using internal circulation - DUPLEX R hot-air heating and ventilation units.

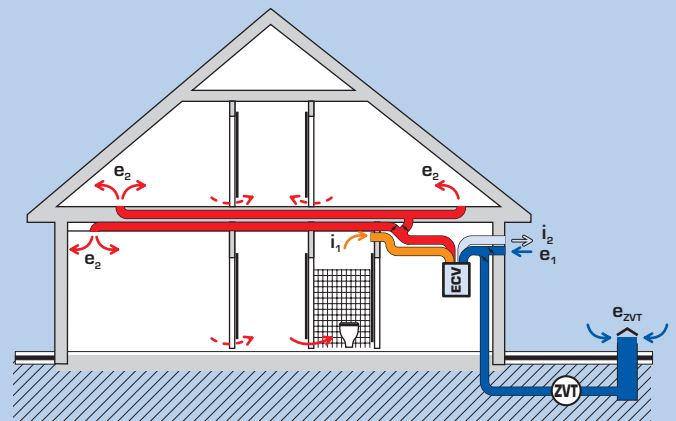
### Legend:

- $e_1$  fresh air inlet from facade
- $e_{zvt}$  fresh air inlet from a ground heat exchanger (option)
- $e_2$  fresh air supply to rooms
- $i_1$  stale return air inlet from bathrooms and kitchen
- $i_2$  exhaust air outlet after heat recovery

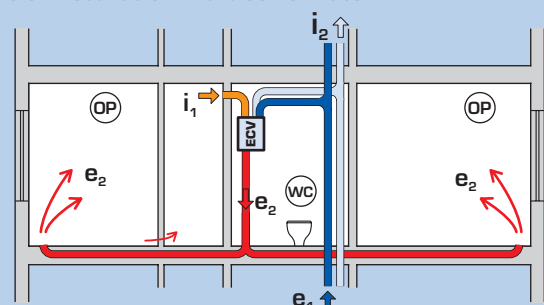
ECV unit ventilator of DUPLEX ECV

ZVT ground heat exchanger (optional)

### Example of installation in a family house



### Example of installation in a block of flats



## DUPLEX EC CONTROLS - DIGITAL SYSTEM

### Digital control module

The DUPLEX units of the EC series standardly include a built-in digital control module.

The modul includes temperature sensors, power switching and safety devices, two digital input and one analog 0 - 10 V input, enabling connection of other sensors or switches, possibly linking to a supervisory system.

### CP 01 digital controller

The CP 01 controller provides very simple remote control with comfort setting of all air-handling system parameters.

The CP 01 is equipped with a two-row display, LEDs for operation and alarm indication, rotary switch and mode selector switch:

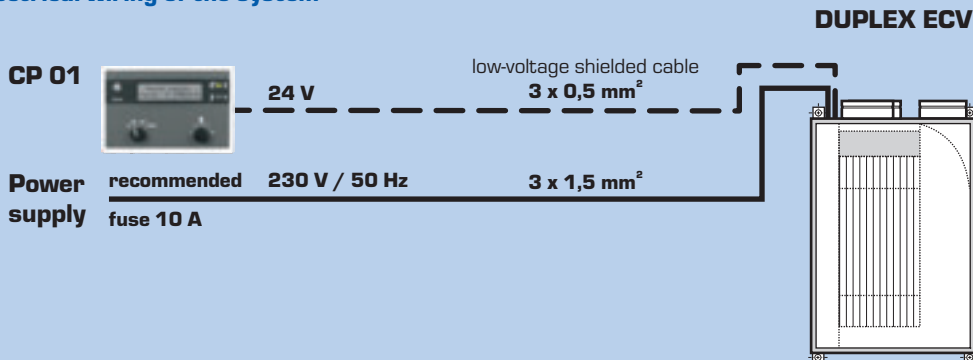
- **mode selector switch** enables to switch the system off, manual mode, automatic mode and setting mode
- **multipurpose button** enables parameter setting

### Functions

The unit control module with the CP 01 controller enables:

- modulating speed control of both fans
- bypass (supply air) damper control; the damper can be set to three basic modes: summer mode, winter mode, and automatic mode based on temperature value
- electric heating coil control (optional) based on supply air temperature in range of 5 to 30 °C (max. available temperature depends on capacity of an installed electric heating coil)
- switching of a hot-water heating coil (optional), supply air temperature setting on the coil thermostatic valve
- freeze protection of a heat recovery core
- freeze protection of the hot-water coil; a capillary sensor senses the low temperature
- operation and alarm status indication by diodes (freeze protection, fuses)
- switching to selected fan speed based on remote switch (e.g. bathroom, kitchen) with selectable fan stop delay
- supply and exhaust shutoff damper control (not supplied)
- automatic operation based on CO<sub>2</sub> value or VOC (optional accessories)

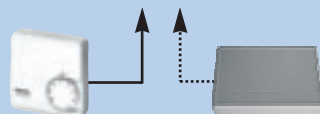
### Electrical wiring of the system



### Optional accessory: digital input

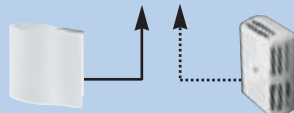
#### Humidity switch (HYG 6001)

For control based on room RH value (e.g. in swimming pools)



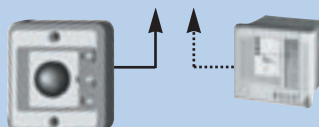
#### IAQ controller (GPA 84)

For control based on IAQ value (e.g. reacts to cigarette smoke)



#### Movement sensor (PS 1000)

Switches the unit off during unoccupancy



### Optional accessory: 0 - 10 V analog input

#### CO<sub>2</sub> sensor (e.g. AS CO<sub>2</sub>-P; EE85-2C35)

For modulating control based on room CO<sub>2</sub> value

#### IAQ sensor (RQ 3)

For modulating control based on indoor air quality value (e.g. reacts to cigarette smoke)

#### Suprvisory control system

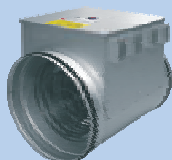
Remote control by a BMS (building management system)

### Note:

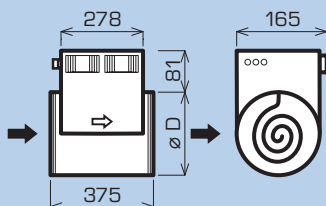
The above stated examples are only schematic samples of some control possibilities. The control module enables to connect one voltage-free digital and one 0 - 10 V analog input. You cannot use weekly operating mode when connecting the analog input. Contact your closest service technician or the manufacturer for more detailed information.

# OPTIONAL ACCESSORIES

## EPO-V ELECTRIC HEATING COILS



allowed location of terminal box

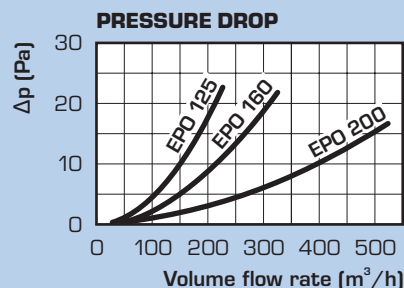


- ADS 120/2 sensor must be installed (into the duct behind the heater)
- casing made of galvanized sheet metal,
- casing includes terminal strip, internal wiring and accessories
- heating rods made of stainless steel
- equipped with two safety thermostats, with auto reset (60 °C), without auto reset (activates at 120 °C)
- reset button of the safety thermostat

is located on the casing, watch the access when installing the coil; do not place it with lid down

- install the coil downstream of the unit; put approx. 1 m of duct between the coil and unit
- EPO operation is controlled by the CP 01 controller based on supply air setpoint
- minimum coil air speed is 1,5 m/s
- IP 43

Type	input [kW]	voltage [V]	min. flow [m <sup>3</sup> /h]	ø D [mm]	for DUPLEX unit
EPO-V 160/1,5	1,5	230	110	160	250 ECV 380 ECV
EPO-V 200/2,1	2,1	230	170	200	540 ECV



## TPO HOT-WATER COIL

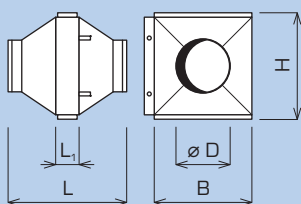


- casing made of galvanized sheet metal
- copper tubes with aluminum fins
- max. operating pressure is 10 bar
- max. operating temperature is 100 °C

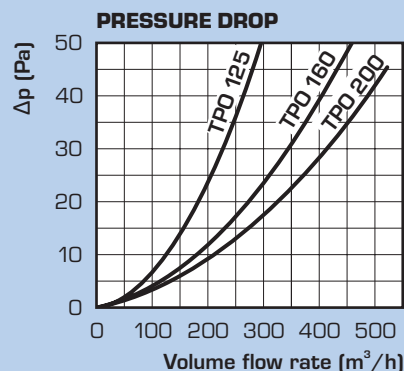
- the coil comes standardly with:
  - freeze protection capillary thermostat
  - electrically controlled shutoff valve
  - thermostatic control valve with a duct capillary temperature sensor

air flow [m <sup>3</sup> /h]	water flow [l/hod]	pressure loss [kPa]	Q [kW]
100	30	0,12	0,7
150	40	0,19	0,94
200	54	0,31	1,25
250	67	0,46	1,56
300	80	0,62	1,87
350	94	0,81	2,18

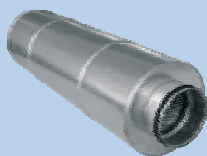
the chart applies to the temperature of heating water 55 / 35 °C, inlet air after recovery 12 °C, outlet air min. 30 °C



typ	ø D [mm]	B [mm]	H [mm]	L [mm]	G ["]	L <sub>1</sub> [mm]	for DUPLEX unit
TPO 160 EC	160	380	300	485	1/2"	50	240 ECV 380 ECV
TPO 200 EC	200	380	300	485	1/2"	50	540 ECV

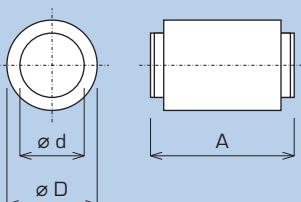


## MAA SOUND ATTENUATORS



- attenuator casing of galvanized sheet metal
- simple installation

- possibility to interconnect several attenuators to reach extremely low noise level
- attenuator pressure drop is estimated as double the pressure drop of straight duct





type	A [mm]	ø d [mm]	ø D [mm]	dB attenuation in octave band frequency (Hz)					
				125	250	500	1 000	2 000	4 000
MAA 100	600	100	200	8	13	25	40	50	40
MAA 125	600	125	224	7	12	23	39	47	32
MAA 125	900	125	224	3	16	29	53	47	39
MAA 160	600	160	260	4	8	21	37	40	22
MAA 160	900	160	260	4	12	27	46	51	29




# ATREA MODULAR AIR-HANDLING SYSTEM




## DUPLEX ECV UNITS (DIGITAL CONTROL)

	<b>DUPLEX 250 ECV/0</b>	order no. A160250	Unit ventilator with a counterflow heat recovery core, automatic by-pass including actuator; electronically controlled EC motors, built-in digital control module, G4 filters, operation and maintenance manual
	<b>DUPLEX 250 ECV/1</b>	order no. A160251	
	<b>DUPLEX 380 ECV/0</b>	order no. A160260	
	<b>DUPLEX 380 ECV/1</b>	order no. A160261	
	<b>DUPLEX 540 ECV/0</b>	order no. A160270	
<b>DUPLEX 540 ECV/1</b>	order no. A160271		
	<b>CP 01 controller</b>	order no. A160002	Digital controller with 2-row display, LEDs, mode selector and parameter setting switch, including external electric and hot-water coil control




## OPTIONAL ACCESSORIES - CONTACT INPUT

	<b>HYG 6001</b>	order no. A141303	Room humidity switch - RH sensor to switch the unit ON/OFF based on set RH value
	<b>PS 1000</b>	order no. A141306	Room movement switch - to switch the unit based on occupancy
	<b>QPA 84</b>	order no. A141301	Room IAQ sensor - to switch selected fan speed based on increased concentration (reacts mainly to cigarette smoke)



## OPTIONAL ACCESSORIES - DIGITAL INPUT 0 - 10 V

	<b>RQ 3</b>	order no. A142301	Room sensor to modulate unit fan speed based on IAQ (reacts mainly to cigarette smoke)
	<b>AS CO2-P</b>	order no. A142308	Room sensor to modulate ventilation rate based on current CO <sub>2</sub> value - 0 - 10 V output and a switch-on contact with adjustable sensitivity
	<b>EE85-2C35</b>	order no. A142309	Channel sensor CO <sub>2</sub> (0 - 2 000 ppm) with 0 - 10 V output

## OPTIONAL ACCESSORIES - HEATING COILS

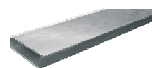

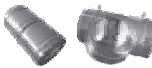



	<b>EPO-V 160/1,5</b>	order no. A150102	The electric heater for installation into a duct contains heating coils with the power output of 1.5 kW, non-spurious switching elements, operational and safety thermostats, instructions for installation, operation and maintenance. Must be installed with an ADS 120/2 sensor.
	<b>EPO-V 200/2,1</b>	order no. A150103	
	<b>ADS 120/2</b>	order no. A160007	
	<b>TPO 160 EC</b>	order no. A160203	
	<b>TPO 200 EC</b>	order no. A160209	

## SPARE FILTER

	<b>FK 250 ECV - G4</b>	order no. A160912	Spare filter cassettes with basic filtration class G4 / with higher filtration class F7 (Packaging: 1 piece - 1 replacement) - for DUPLEX 250 ECV and 380 ECV
	<b>FK 250 ECV - F7</b>	order no. A160913	
	<b>FK 525 - G4</b>	order no. A132709	
	<b>FK 525 - F7</b>	order no. A132759	
	<b>FT 360 - G4</b>	order no. A160908	Spare filtration textiles with basic filtration class G4 / with higher filtration class F7 (Packaging: 1 piece - 1 replacement) - for DUPLEX 250 ECV and 380 ECV
	<b>FT 360 - F7</b>	order no. A160909	
	<b>FT 525 - G4</b>	order no. A132312	
	<b>FT 525 - F7</b>	order no. A132512	

## AIR DISTRIBUTION, DISTRIBUTION ELEMENTS

ATREA s. r. o. offers a complete air distribution system for DUPLEX units including fittings and terminal elements. For detailed specifications see the „**System of warm-air heating and ventilation of family houses with heat recovery - Designed data, product catalog**“.

	<b>Floor ducts</b>	160 x 40 mm air distribution ducts for floor system; 200 x 50 mm including distribution shafts, transitions and complete accessories
	<b>Round ducts</b>	Complete range of sturdy and flexible ducts, with acoustic and thermal insulation, sound attenuators - see the „Atrea catalog“
	<b>Air distribution</b>	Complete range of fitting, facade louvers, transitions, etc. - see the „ATREA catalog“
	<b>Floor grilles</b>	Adjustable grilles for floor supply air outlet to room
	<b>Floor grilles</b>	Special air outlet ø 100 mm for jet air supply from wall under ceiling
	<b>Round diffusers</b>	Wall and ceiling diffusers with lock for supply and return air - see „ATREA catalog“