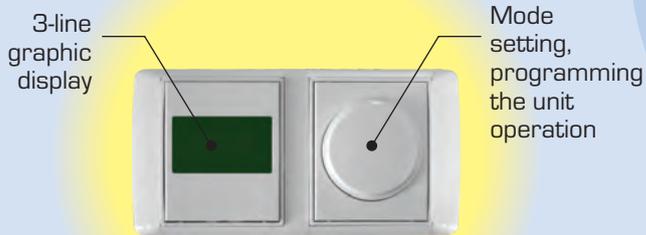


DUPLEX ECV

Compact vertical ventilation units
with heat recovery
and electronically controlled fans

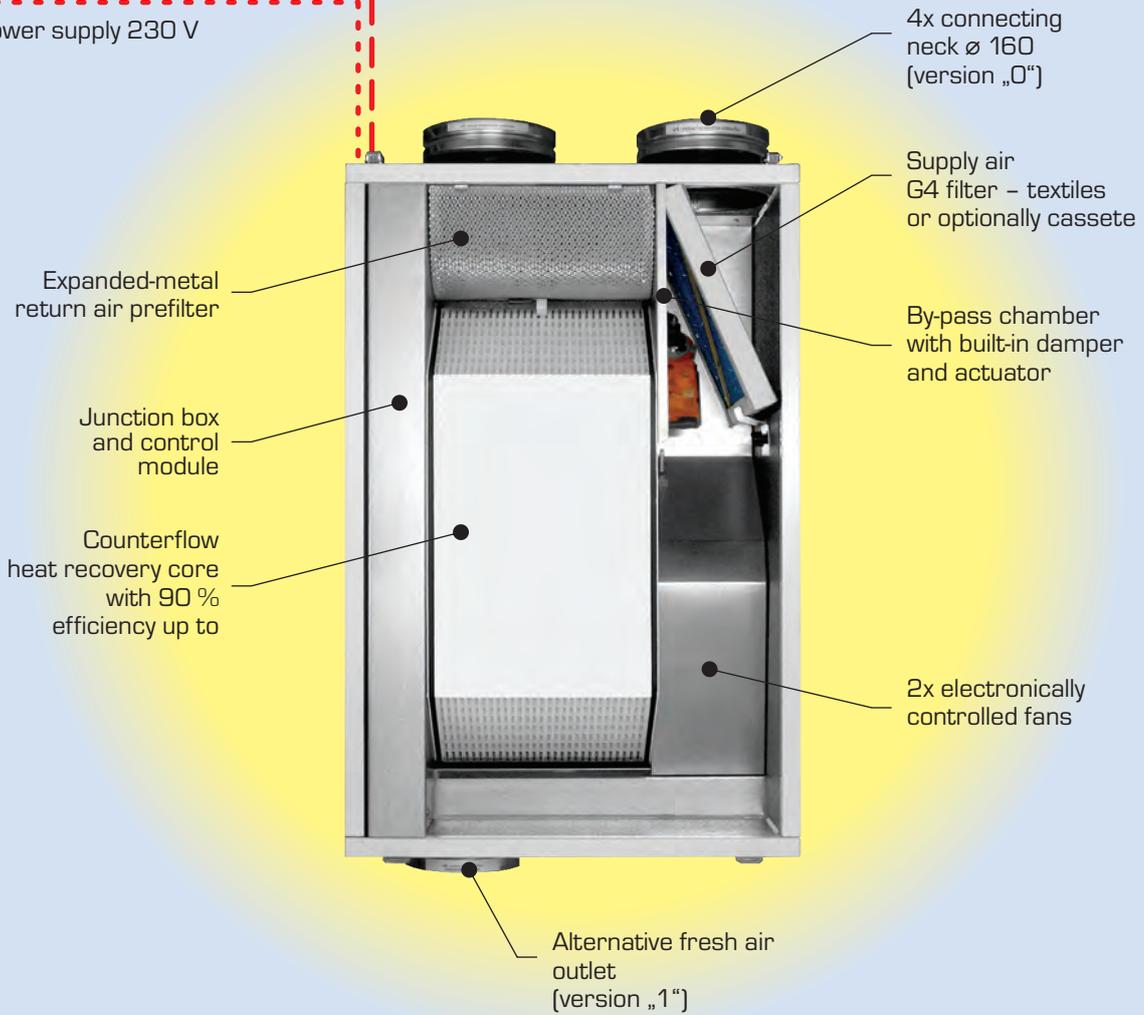


CP 08 RD CONTROLLER



3-line graphic display
Mode setting, programming the unit operation
Low-voltage cable interconnection
Power supply 230 V

DUPLEX ECV UNIT



Residential ventilation and heating – chapter 3 – issue 09/2011
Unit ventilators, heat recovery – chapter 3



RESIDENTIAL VENTILATION & HEATING

ATREA s.r.o., V Aleji 20
466 01 Jablonec n. N.
Czech Republic



Phone: +420 483 368 133
Fax: +420 483 368 112
E-mail: atrea@atrea.cz

www.atrea.cz

DESCRIPTION, TECHNICAL DATA

DESCRIPTION

Application – the new 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.

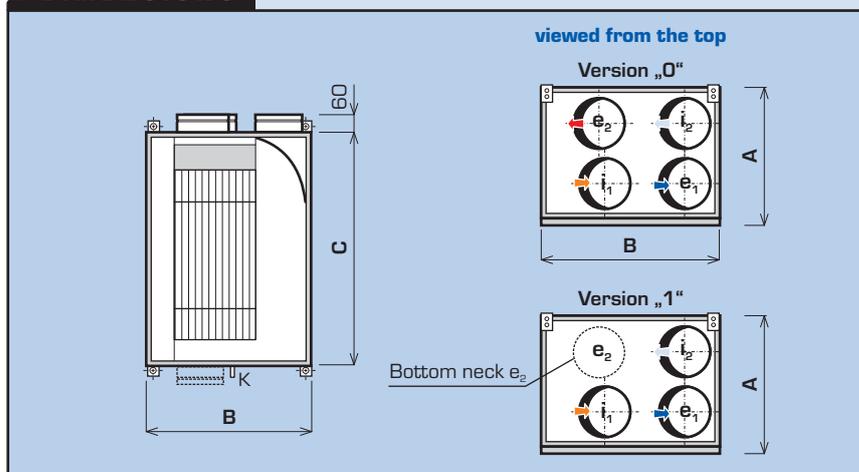
Basic description – in a casing made of white-painted sheet metal with polyurethane insulation ($U = 0,95 \text{ Wm}^{-2}\text{K}^{-1}$) without thermal bridges the unit contains a counterflow plastic heat recovery core (efficiency of 90 %), two centrifugal fans with electronic EC control, supply air 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 m^3/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

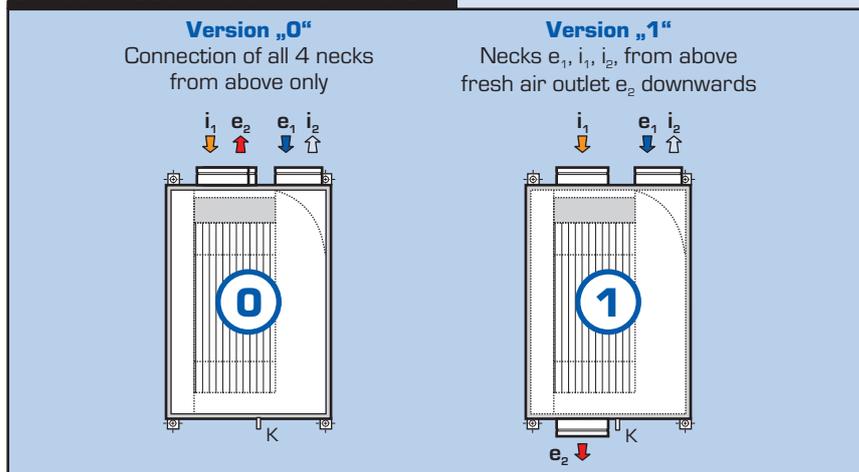


TECHNICAL DATA

DUPLEX		250 ECV	380 ECV	540 ECV
Supply air – max. *	m^3/h	240	360	550
Return air – max. *	m^3/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	4x \varnothing 160	4x \varnothing 160	4x \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 input and 14-step 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
- with open by-pass flow through the recovery exchanger is eliminated
- 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 unit
- 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
- when the unit's capacity is set to maximum (via by-pass), the flat may be cooled down in summer using night-time precooling
- enabling automatic control of 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
- K condensate discharge diameter 22 mm

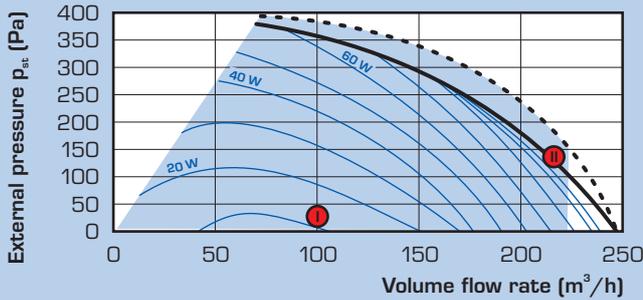
SELECTION SOFTWARE

For detailed selection of DUPLEX units, accessories and control system we recommend to use our special selection software. To select a heat recovery exchanger you can use our special selection software. Download it from our webpage www.atrea.cz or contact us at our mail address.

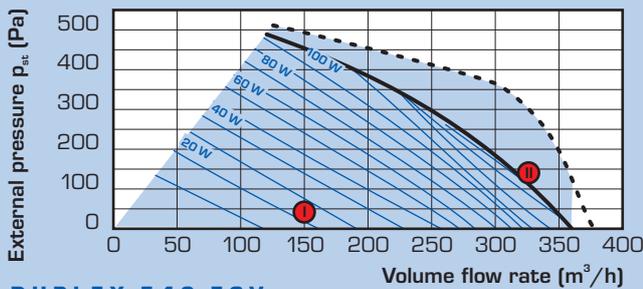


CAPACITY PARAMETERS

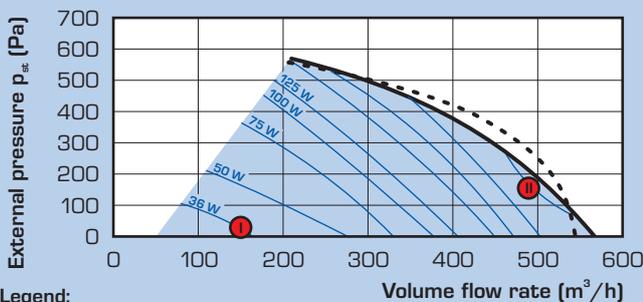
DUPLEX 250 ECV



DUPLEX 380 ECV



DUPLEX 540 ECV



Legend:

- Pressure reserve - recovery*
- - - - - Pressure reserve - via by-pass*
- Input of each fan

* max. pressure reserve is specified, units contain control function for constant flow, i.e. each fan is automatically independently controlled to ensure required flow

SOUND POWER LEVEL L_w (dB)

		dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
DUPLEX 250 ECV							
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)

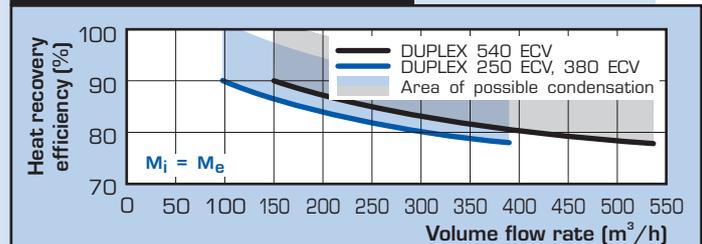
		dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
DUPLEX 250 ECV							
To ambient	I.	26,3	19,2	22,5	23,3	21,6	19,2
	II.	48,6	41,6	44,9	45,6	44,0	41,6

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 possible 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, possibly 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 - with an additional distribution element or by means of DUPLEX R hot-air heating and ventilation units.

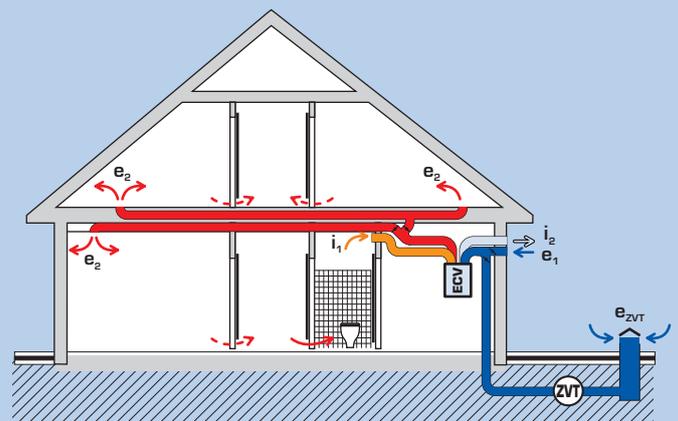
Legend:

- 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

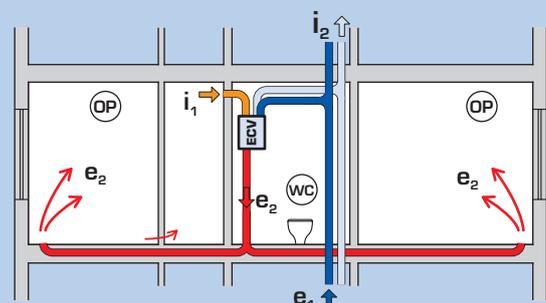
ECV unit ventilator of DUPLEX ECV

ZVT ground heat exchanger (optional)

Example of installation in a family house



Example of installation in a block of flats



DUPLEX ECV CONTROLS - DIGITAL SYSTEM

Built-in control module

DUPLEX ECV units contain, as standard, a digital control module that provides all basic functions of the unit and at the same time has a wide range of other inputs and outputs for connecting the unit to optional sensors (e.g. Co₂, humidity etc.), signals from rooms (toilet, bathroom, kitchen etc.), heating systems.

The unit may be controlled by:

- CP 08 RD controller with a graphic display

In addition, the control module contains a SD card slot (optional accessory) for easier software updates or possible recording of ventilation unit settings.

Controller CP 08 RD

Controller CP 08 RD is intended for setting basic ventilation modes and displaying the status of the ventilation unit including the indication of errors.

The controller provides user access to general functions or operation mode programming,

Controller CP 08 RD may be operated in manual or automatic mode depending on the weekly programme setting. The controller also makes it possible to set a temporary party / holiday mode.

All data is displayed on a well-arranged 3-line display. Setting and control is carried out via rotary controller.

The controller is designed to be installed into standard electric boxes, the controller's electronics is located under the wall level and the controller thus does not protrude into the surrounding space.

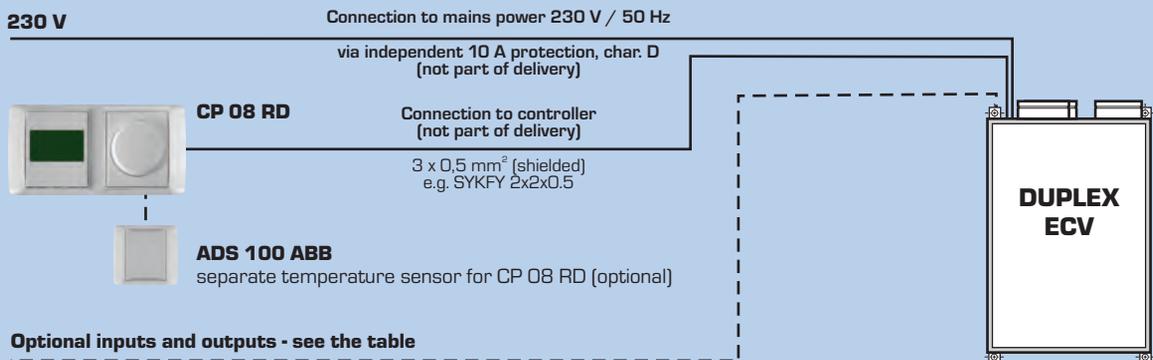


Functions

The control module with the CP 08 RD controller provides the following:

- programming various ventilation capacities for a day or a week
- smooth capacity control of both fans with a constant capacity function
- automatic by-pass damper control (supply air by-pass) depending on the outside air temperature
- electric heater control (optional accessory) to constant supply air temperature between 15 and 50 °C (max. available temperature depends on the capacity of the electric heater installed) or air temperature control depending on the pre-programmed temperature difference against the required room temperature (may be automatically adjusted during the day depending on the setting)
- switching on the hot-water heater (optional accessory), supply air temperature is set on the thermostatic head of the heater or optional direct control of the heating water mixing junction via 0-10 V signal, including antifreeze protection of the hot-water heater (the risk of freezing is sensed by capillary).
- antifreeze protection of the heat recovery exchanger
- switching over to the selected capacity level by external signal (e.g. from the toilet, bathroom, kitchen) with optional start-up and run-down times
- control of the closing damper on the inlet and exhaust (dampers are not included in delivery)
- optional automatic operation controlled by sensors - CO₂ concentration, relative humidity or VOC (optional accessory) - input 0 - 10 V or switch-on
- the control module and controller CP 08 RD allows zone ventilation (two zones - dampers)

SYSTEM CONNECTION DIAGRAM



Optional inputs and outputs - functions and applications

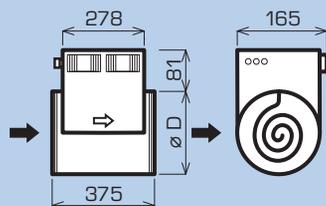
Optional inputs and outputs - functions and applications	ID	recommended cable
Input, switching on intermittent ventilation via 230 V impulse from the toilet and bathroom with the optional setting of start-up and run-down delay times	D1	CYKY 20 x 1,5
	D2	CYKY 20 x 1,5
	D3	CYKY 20 x 1,5
Input, switching on intermittent ventilation by 230 V - kitchen ventilation, no run-down time, max. ventilation period 2 hours	D4	CYKY 20 x 1,5
Input, opening contact, opening switches the unit off - signal may be channeled from e.g. Fire system	STP	SYKFY 2 x 2 x0,5
Input, switching contact of an external thermostat or heater operation permission, heat source control	TR	SYKFY 2 x 2 x0,5
Input 0 - 10 V or switching contact, ventilation capacity control (sensors for CO ₂ , relative humidity, air quality or control via superior system)	IN1	SYKFY 2 x 2 x0,5
	IN2	SYKFY 2 x 2 x0,5
Contact output, underground exchanger damper or supply air damper control 24 V	SV	CYKY 30 x 1,5
Output 0 - 10 V, heating water junction control, switching on the electric heater	SK	SYKFY 2 x 2 x0,5
Switching output 24 V, zone ventilation damper - zone 1	SZ1	CYKY 30 x 1,5
Switching output 24 V, zone ventilation damper - zone 2	SZ2	CYKY 30 x 1,5
Switching output 24 V, control of heating branch valve 1	YV1	CYKY 30 x 1,5
Switching output 24 V, control of heating branch valve 2	YV2	CYKY 30 x 1,5
Contact output, heating source operation permission (switching on the pump)	K-K	CYKY 30 x 1,5
Switching output 24 V, closing other extraction branches when external signal from the kitchen switches on	EXT	CYKY 30 x 1,5

OPTIONAL ACCESSORIES

EPO-V ELECTRIC HEATING COILS



allowed location of terminal box

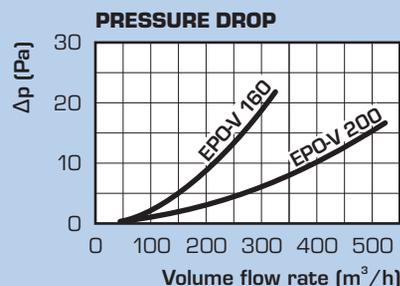


- ADS 120 sensor must be installed (into the duct behind the heater)
- casing made of galvanized sheet metal,
- casing includes terminal strip, internal wiring and accessories
- heating rods made of stainless steel
- equipped with two safety thermostats, with auto reset (60 °C), without auto reset (activates 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 08 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 ³ /h)	∅ 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

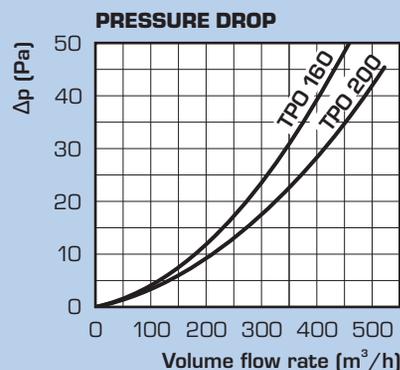
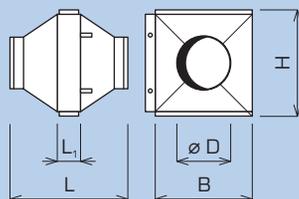


- ADS 120 sensor must be installed (into the duct behind the heater)
- casing made of galvanized sheet metal
- copper tubes with aluminum fins
- max. operating pressure is 10 bar

- max. operating temperature is 100 °C
- the coil comes standardly with:
 - freeze protection capillary thermostat
 - an electric throttling valve with 24 VDC power supply and 0-10 V controls

air flow (m ³ /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



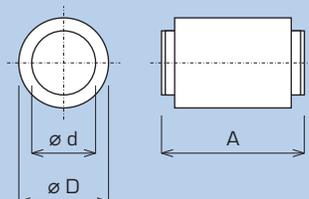
typ	∅ D (mm)	B (mm)	H (mm)	L (mm)	G (")	L ₁ (mm)	for DUPLEX unit
TPO 160 EC THV	160	380	300	485	1/2"	50	250 ECV 380 ECV
TPO 200 EC THV	200	380	300	485	1/2"	50	540 ECV

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)	∅ d (mm)	∅ 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)

	DUPLEX 250 ECV/0	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
	DUPLEX 250 ECV/1	order no. A160251	
	DUPLEX 380 ECV/0	order no. A160260	
	DUPLEX 380 ECV/1	order no. A160261	
	DUPLEX 540 ECV/0	order no. A160270	
	CP 08 RD controller - white	order no. A170280	Controller for units with built-in digital control - a digital version with a display, integrated temperature control and a built-in room temperature sensor. It allows the convenient control of the entire system in automatic mode or via manual setting. A wide range of parameter setting options.
	CP 08 RD controller - ivory	order no. A170281	

OPTIONAL ACCESSORIES - CONTACT INPUT

	HYG 6001	order no. A141303	Room humidity switch - RH sensor to switch the unit ON/OFF based on set RH value
	PS 1000	order no. A141306	Room movement switch - to switch the unit based on occupancy
	QPA 84	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

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

OPTIONAL ACCESSORIES - HEATING COILS

	EPO-V 160/1,5	order no. A150102	The electric heater for installation into a duct contains heating coils with the power output of 0.9 kW (resp. 1,5 or 2,1 kW), non-spurious switching elements, operational and safety thermostats, instructions for installation, operation and maintenance. Must be installed with an ADS 120 sensor.
	EPO-V 200/2,1	order no. A150103	
	ADS 120	order no. A142203	a pipe sensor downstream of a heating coil (EPO or TPO EC THV)
	TPO 160 EC	order no. A160203	A ducted hot-water coil kit including a heating coil, a freeze-up protection capillary thermostat, an electric throttling valve (24 VDC power supply and 0-10 V control signal), and an installation, operation and maintenance manual. Must be installed with an ADS 120 sensor.
	TPO 200 EC	order no. A160209	

SPARE FILTER

	FK 250 ECV - G4	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
	FK 250 ECV - F7	order no. A160913	
	FK 525 - G4	order no. A132709	Spare filter cassettes with basic filtration class G4 / with higher filtration class F7 (Packaging: 1 piece - 1 replacement) - for DUPLEX 540 ECV
	FK 525 - F7	order no. A132759	
	FT 360 - G4	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
	FT 360 - F7	order no. A160909	
	FT 525 - G4	order no. A132312	Spare filtration textiles with basic filtration class G4 / with higher filtration class F7 (Packaging: 4 pieces - 4 replacements) - for DUPLEX 540 ECV
	FT 525 - F7	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**“.

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