

DUPLEX

500 to 11000 Multi

All-purpose ventilation units
with counterflow
heat exchangers

DUPLEX 500–11000 Multi is a new generation of all-purpose ventilation units with counterflow heat recovery exchangers.

The indoor version of compact DUPLEX 500–11000 Multi units are used for comfort ventilation, hot-air heating and cooling in small facilities, shop floors, stores, schools, restaurants, shops, sports and industrial halls. They are suitable wherever efficient ventilation and possibly hot-air circulation ventilation and cooling must be provided at minimum running cost, i.e. the highest efficiency of heat recovery, low power input of fans and as little noise as possible.

DUPLEX Multi units are produced in compact (500 to 8000 Multi) and semi-compact (10000 to 11000 Multi) version and contain two independently controlled EC fans with backward curved blades, a heat recovery exchanger with large heat-transfer surface and high efficiency, slide-out supply and exhaust air class G4, M5 or F7 filters, drain pans and possibly also an a circulation damper with a servo drive or integrated air heaters and coolers.

Unit casing is divided into two versions:

DUPLEX 500–8000 Multi are frameless construction, casing is made of painted metal sheet with 30 mm PIR insulation with heat transfer coefficient ($\lambda = 0,024 \text{ W/mK}$).

DUPLEX 10000–11000 Multi are frame construction, casing is made of painted metal sheet with 45 mm mineral wool insulation with heat transfer coefficient ($\lambda = 0,037 \text{ W/mK}$).

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

- Casing properties according to EN 1886
- EC motors according to ErP 2015
- SFP < 0,45 W/(m³/h) according to PassivHaus*
- Hygienic requests according to VDI 6022
- Commission regulation (EU) requirements No. 1253/2014 (Ecodesign)*

Advantages of DUPLEX Multi units:

- New design of ventilation units with excellent parameters
- Great thermal insulation of the casing (class T2)
- Reduced thermal bridging (class TB1/TB2**)
- Compact dimensions
- Very flat unit suitable for under ceiling installation
- Ease of installation
- Variable configuration of discharge ports
- Unified dimensions of ports
- Optional versions with a bypass and circulation damper
- Horizontal floor-standing up to 11 000 m³/h, ceiling-suspended types up to 8 000 m³/h and floor-standing flat types up to 6 500 m³/h
- High efficiency fans – SFP < 0,45 W/(m³/h)*
- High heat recovery efficiency of the counterflow heat exchanger – up to 93 %
- Integrated control system including temperature sensors
- Integrated web server (RD5 regulation)
- Comprehensive design software

* in the defined working area

** TB1 for 500–8000 Multi
TB2 for 10000–11000 Multi



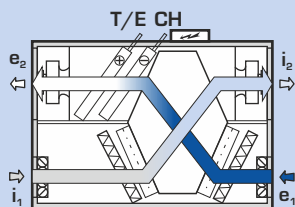
500 to 11000 Multi



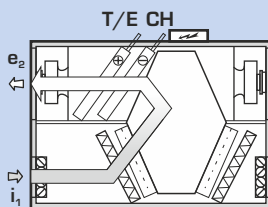
AVAILABLE MODIFICATIONS (CAN BE COMBINED)

- | | | | |
|------|----------------------------------|-------|-----------------------------------|
| – B | with in-built bypass damper | – T | with in-built hot-water heater |
| – C | with in-built circulation damper | – CHF | with in-built direct chiller |
| – CH | with in-built electrical heater | – CHW | with in-built water-based chiller |

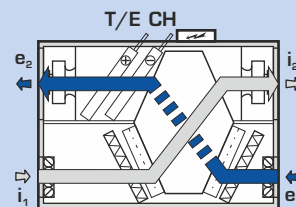
OPERATING MODES OF DUPLEX MULTI UNITS



Ventilation with heat recovery with re-heating (with cooling)



Circulation heating or cooling



Ventilation without heat recovery (via bypass)

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

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

- T/E... Central heating / electrical heater connection
CH ... Cooling connection

SELECTION SOFTWARE



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

Atrea[®]

UNIT VENTILATORS & HEAT RECOVERY

ATREA s.r.o., Čs. armády 32
466 05 Jablonec n. Nisou
Czech Republic



www.atrea.eu

Phone: +420 483 368 111
Fax: +420 483 368 112
E-mail: atrea@atrea.eu

PERFORMANCE GRAPHS

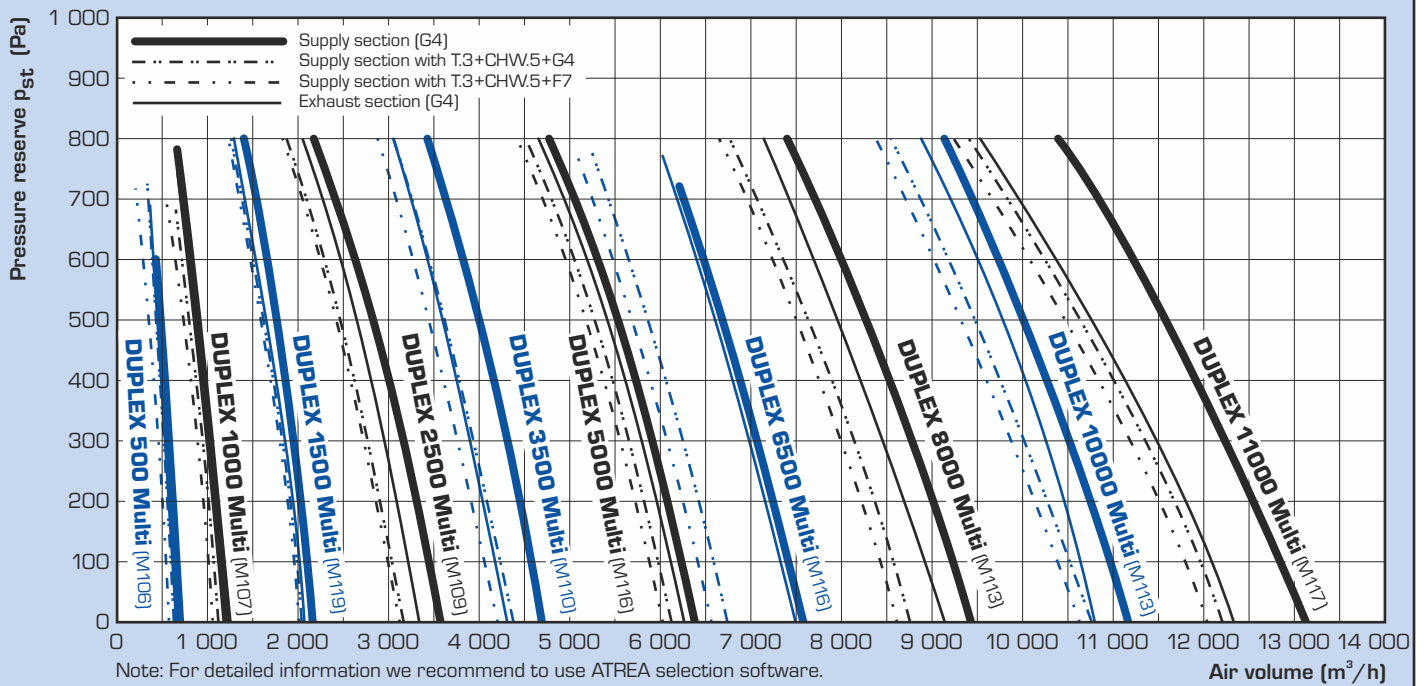
DUPLEX MULTI

| DUPLEX Multi | | 500 | 1000 | 1500 | 2500 | 3500 | 5000 | 6500 | 8000 | 10000 | 11000 | |
|--|--------------------------------|--|--------|---------|---------|---------|---------|---------|---------|-----------|-----------|--|
| Supply air - max. ¹⁾ | m ³ h ⁻¹ | 660 | 1 200 | 2 200 | 3 400 | 4 600 | 6 400 | 7 600 | 9 600 | 11 100 | 13 050 | |
| Extraction air - max. ¹⁾ | m ³ h ⁻¹ | 670 | 1 150 | 1 800 | 3 200 | 4 200 | 6 350 | 7 500 | 9 100 | 10 700 | 12 300 | |
| Max. airflow according to ErP 2018 ³⁾ | m ³ h ⁻¹ | 550 | 850 | 1 600 | 2 350 | 2 800 | 4 250 | 5 000 | 5 700 | 7 700 | 8 300 | |
| Heat recovery efficiency ²⁾ | % | up to 93 % | | | | | | | | | | |
| Number of versions and positions | - | see table „Mounting positions“, page 4 | | | | | | | | | | |
| Weight ³⁾ | kg | 80-110 | 95-130 | 200-280 | 290-370 | 320-390 | 370-450 | 480-560 | 580-670 | 1170-1280 | 1230-1350 | |
| Max. power input | kW | 0,3 | 0,7 | 1,2 | 2,6 | 4,5 | 6,7 | 7,3 | 9,3 | 10,7 | 10,8 | |
| Voltage | V | 230 | 230 | 230 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | |
| Frequency | Hz | 50 | | | | | | | | | | |
| Revolutions - max. | min ⁻¹ | 4 300 | 3 350 | 2 920 | 3 000 | 2 980 | 2 700 | 2 820 | 2 570 | 2 570 | 2 130 | |
| Heating output E low - max. ⁵⁾ | kW | 1,8 | 1,8 | 2,1 | 4,2 | 7,2 | 7,2 | 9,9 | 9,9 | - | - | |
| Heating output E high - max. ⁵⁾ | kW | - | - | 4,2 | 8,4 | 10,8 | 12,6 | 14,7 | 14,7 | - | - | |
| Heating output T - max. ⁴⁾ | kW | 5 | 14 | 22 | 30 | 42 | 51 | 71 | 88 | 95 | 100 | |
| Cooling output CHW - max. ⁴⁾ | kW | 4 | 8 | 16 | 22 | 30 | 42 | 56 | 62 | 65 | 70 | |
| Cooling output CHF - max. ⁴⁾ | kW | 3 | 6 | 10 | 13 | 25 | 37 | 41 | 50 | 60 | 65 | |

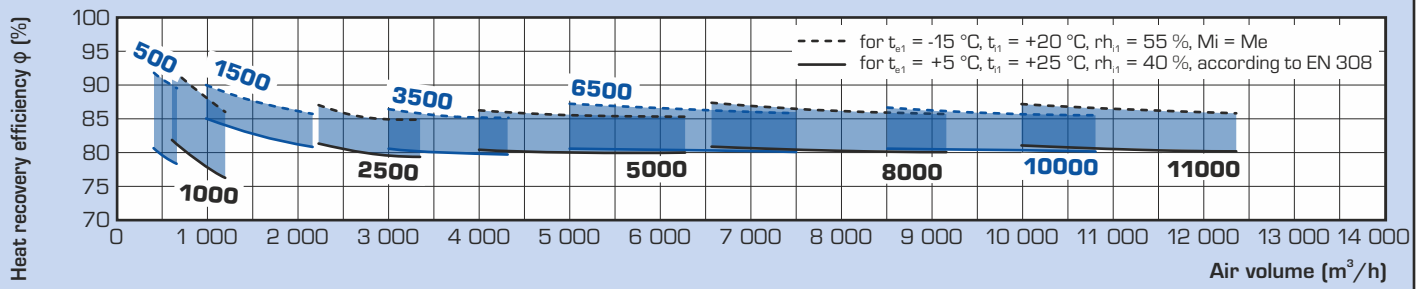
¹⁾ Maximum flow rate through units at zero external pressure
²⁾ According to air volume

³⁾ Depending on equipment
⁴⁾ Depending on register type, liquid and flow rates
⁵⁾ For detailed information please use our DUPLEX selection software.

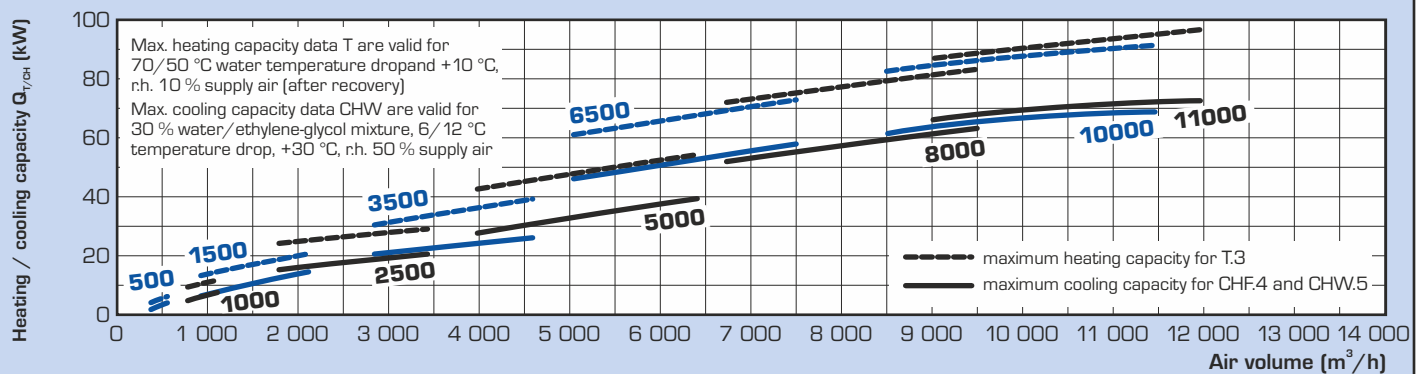
PERFORMANCE SUMMARY



HEAT RECOVERY EFFICIENCY

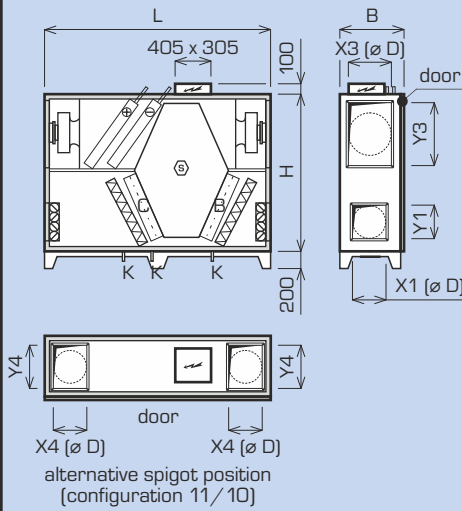


HEATING AND COOLING PERFORMANCES

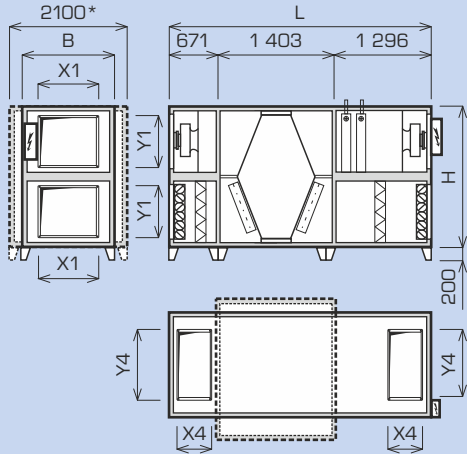


BASIC DIMENSIONS

FLOOR-STANDING (front view) Multi 500 to 8000



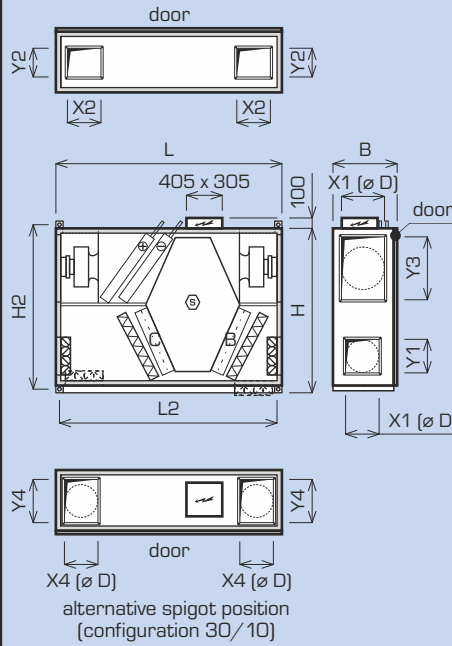
Multi 10000 to 11000



* dimension only for DUPLEX 11000 Multi

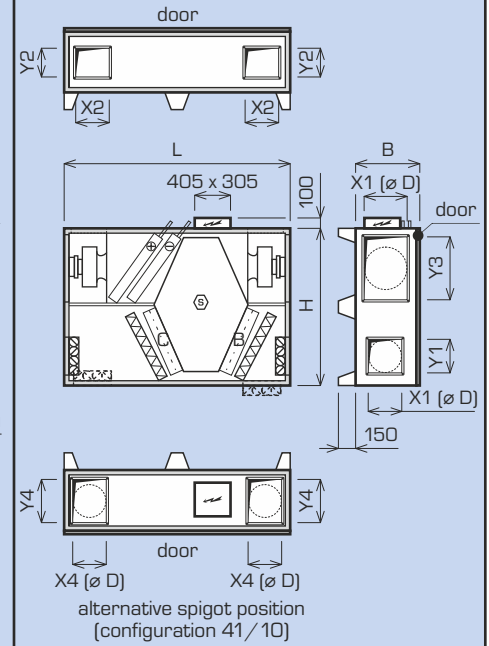
UNDERCEILING (top view) Multi 500 to 8000

alternative spigot position
(configuration 30/10)



FLOOR-STANDING FLAT (top view) Multi 1500 to 6500

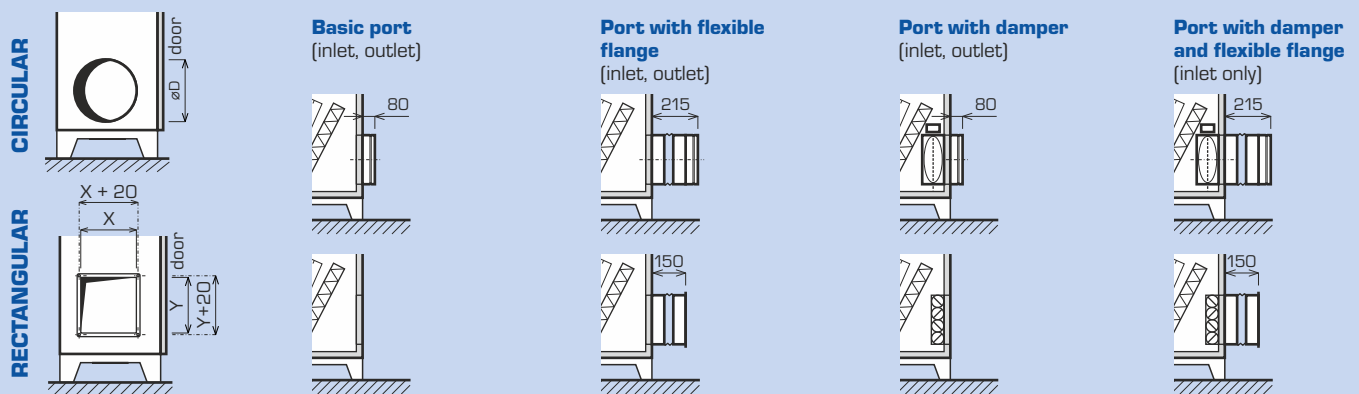
alternative spigot position
(configuration 41/5)



| DUPLEX Multi | | 500 | 1000 | 1500 | 2500 | 3500 | 5000 | 6500 | 8000 | 10000 | 11000 |
|--|----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|------------|------------|
| dimension H | mm | 765 | 970 | 1 600 | 1 600 | 1 600 | 1 600 | 1 600 | 1 600 | 1 795 | 1 795 |
| dimension H2 | mm | 715 | 920 | 1 650 | 1 650 | 1 650 | 1 650 | 1 650 | 1 650 | - | - |
| dimension B | mm | 384 | 384 | 455 | 580 | 665 | 885 | 1 065 | 1 295/1 390* | 1 620 | 1 620 |
| length L | mm | 1 600 | 1 800 | 2 300 | 2 300 | 2 300 | 2 500 | 2 500 | 2 500 | 3 370 | 3 370 |
| length L2 | mm | 1 652 | 1 852 | 2 270 | 2 270 | 2 270 | 2 470 | 2 470 | 2 368 | - | - |
| condensate drain | mm | ø 22 | | | ø 32 | | | | | | |
| Connecting ports | | | | | | | | | | | |
| dimension X1 × Y1 (standard e ₁ , i ₁), D | mm | ø 200 | ø 250 | ø 315 | 300 × 400 | 400 × 400 | 500 × 500 | 500 × 500 | 700 × 500 | 900 × 710 | 900 × 710 |
| dimension X2 × Y2 (atyp e ₁ , i ₁), D | mm | ø 200 | ø 250 | 400 × 200 | 300 × 400 | 400 × 400 | 500 × 500 | 500 × 500 | 500 × 700 | - | - |
| dimension X3 × Y3 (standard e ₂ , i ₂) | mm | 200 × 250 | 200 × 350 | ø 315 | 450 × 710 | 500 × 710 | 710 × 710 | 900 × 710 | 900 × 710 | - | - |
| dimension X4 × Y4 (atyp e ₂ , i ₂) | mm | - | - | - | 250 × 355 | 250 × 400 | 355 × 630 | 355 × 800 | 355 × 900 | 400 × 1200 | 400 × 1200 |

* For DUPLEX 8000 Multi in configuration 30/x. For detailed information please use our ATREA selection software.

TYPES AND DIMENSIONS OF CONNECTING PORTS



INSTALLATION AND VERSIONS

INSTALLATION VERSIONS AND CONNECTING PORTS

DUPLEX 500 to 11000 Multi units are available in a range of versions to facilitate their installation in the machine room. This significantly increases options to install DUPLEX Multi units in cramped spaces.

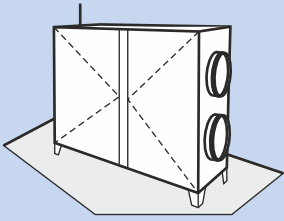
For structural reasons and to ensure condensate drain it is not possible to have all units available in all mounting positions. Detailed drawings are shown in the summary table "Mounting positions".

DUPLEX Multi units are characterised by a wide range of accessories – the ports may be optionally fitted with flexible flanges and inlet ports may have shut-off dampers if required.

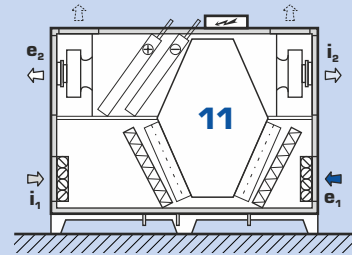
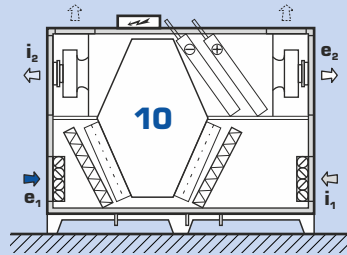
MOUNTING POSITIONS

FLOOR-STANDING HORIZONTAL POSITION

Multi 500 to 11000

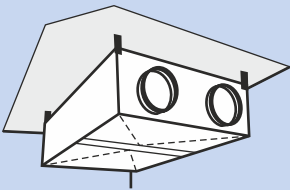


configuration 10/0 to 11/10 – door-side view (up to 8 configurations in total)

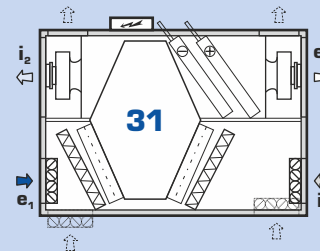
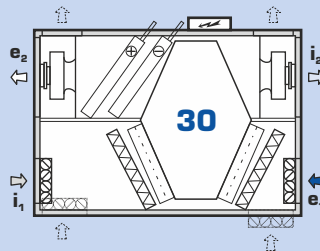


CEILING-SUSPENDED POSITION

Multi 500 to 8000

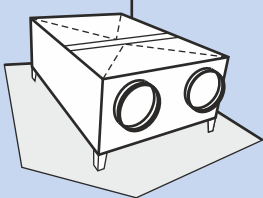


configuration 30/0 to 31/15 – top view (up to 32 configurations in total)

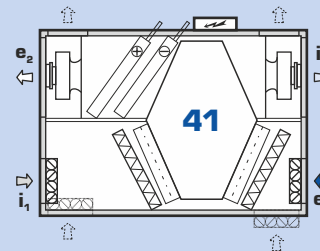
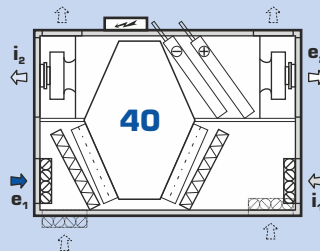


FLOOR-STANDING FLAT POSITION

Multi 1500 to 6500



configuration 40/0 to 41/15 – top view (up to 32 configurations in total)



500 and 1000 Multi units are available in following configurations:

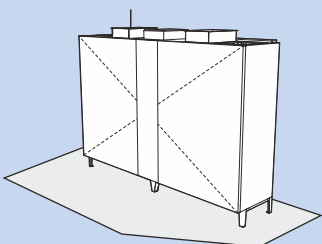
- horizontal: 10/0, 11/0
- ceiling - suspended: 30/0, 30/1, 30/4, 30/5, 31/0, 31/1, 31/4, 31/5

For more detailed technical information check out ATREA selection software.

OTHER CONFIGURATIONS OF DUPLEX MULTI

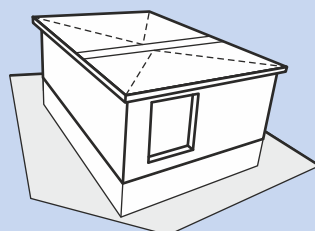
UPRIGHT POSITION

DUPLEX Multi-V 1500 to 8000



ROOFTOP UNITS - FLAT

DUPLEX Multi-N 1500 to 11000



For detailed information please see separate technical catalogues.

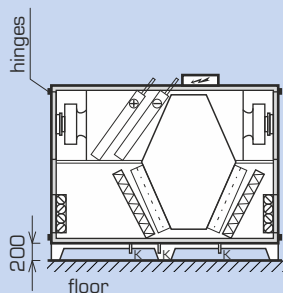
HANDLING SPACE

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.

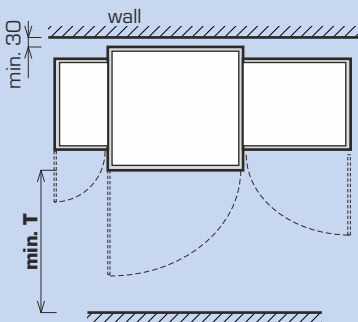
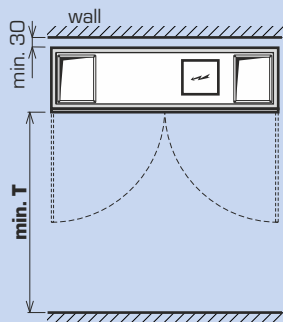
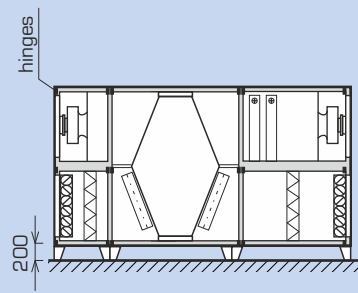
Each drawing shows the minimum handling space. In addition, each unit must have the minimum handling space of 600 mm from the side of the control system electric switchboard according to CSN. Units with a heating or cooling control manifold must have free space from the side of the manifold, too.

Handling space in front of the door

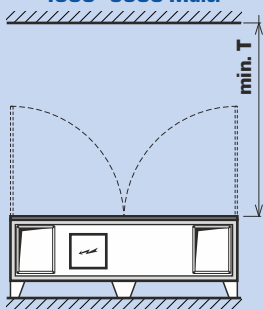
Floor-standing horizontal 500-8000 Multi



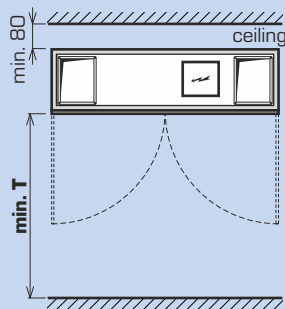
Floor-standing horizontal 10000-11000 Multi



Floor-standing flat 1500-6500 Multi

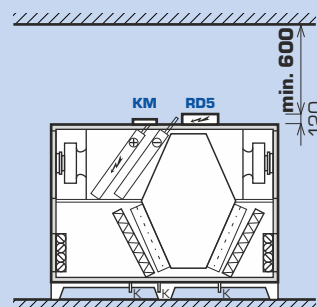


Ceiling-suspended 500-8000 Multi

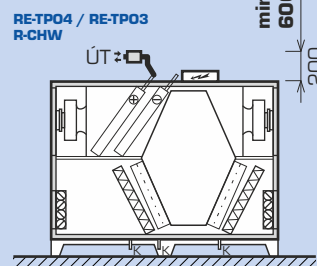


Handling space for accessories

Control modules



Control manifolds



| Typ | standard door T (mm) | hingeless door T (mm) |
|--------------------|----------------------|-----------------------|
| DUPLEX 500 Multi | 800 | 500 |
| DUPLEX 1000 Multi | 900 | 500 |
| DUPLEX 1500 Multi | 1 200 | 500 |
| DUPLEX 2500 Multi | 1 200 | 600 |
| DUPLEX 3500 Multi | 1 200 | 680 |
| DUPLEX 5000 Multi | 1 150 | 900 |
| DUPLEX 6500 Multi | 1 150 | 1 100 |
| DUPLEX 8000 Multi | 1 320 | 1 300 |
| DUPLEX 10000 Multi | - | 1 600 |
| DUPLEX 11000 Multi | - | 1 600 |

ACOUSTIC POWER L_w AND ACOUSTIC PRESSURE L_{D_3}

| Type | Working point | Acoustic power L_w [dB(A)] | | | | | Acoustic pressure L_{D_3} [dB(A)] at distance of 3 m |
|--------------------|-----------------------------------|------------------------------|-------------|--------------|--------------|------|---|
| | | inlet e_1 | inlet i_1 | outlet e_2 | outlet i_2 | unit | |
| DUPLEX 500 Multi | 500 m ³ /h (200 Pa) | 53 | 66 | 80 | 82 | 59 | 38 |
| DUPLEX 1000 Multi | 1 000 m ³ /h (200 Pa) | 66 | 65 | 85 | 86 | 62 | 42 |
| DUPLEX 1500 Multi | 1 500 m ³ /h (200 Pa) | 61 | 61 | 86 | 86 | 64 | 43 |
| DUPLEX 2500 Multi | 2 500 m ³ /h (200 Pa) | 59 | 55 | 79 | 79 | 70 | 49 |
| DUPLEX 3500 Multi | 3 500 m ³ /h (200 Pa) | 60 | 59 | 91 | 88 | 70 | 49 |
| DUPLEX 5000 Multi | 5 000 m ³ /h (200 Pa) | 68 | 67 | 91 | 93 | 78 | 58 |
| DUPLEX 6500 Multi | 6 500 m ³ /h (200 Pa) | 70 | 71 | 95 | 95 | 76 | 55 |
| DUPLEX 8000 Multi | 8 000 m ³ /h (200 Pa) | 75 | 74 | 99 | 96 | 69 | 49 |
| DUPLEX 10000 Multi | 9 000 m ³ /h (200 Pa) | 66 | 67 | 98 | 97 | 74 | 53 |
| DUPLEX 11000 Multi | 10 000 m ³ /h (200 Pa) | 63 | 64 | 88 | 88 | 73 | 52 |

MODIFICATIONS

DUPLEX MULTI - BASIC UNIT



Basic configuration

DUPLEX 500-8000 Multi

The compact unit consists of supply and exhaust free-wheel fans with electric motors in anti-vibration mounting, removable counterflow air-to-air heat recovery core assembled from thin plastic plates, removable G4, M5 or F7 supply and exhaust air filters, and a condensate pan with flexible hose. A front door enables easy access to all built-in components and filters.

DUPLEX 9000-11000 Multi

The unit consists of 3 separate sections:

- 1 - supply free-wheel fan with electric motors in anti-vibration mounting, removable supply filter G4, M5 or F7
- 2 - cross-flow heat recovery exchanger with an electric motor, a belt pulley and a belt
- 3 - exhaust free-wheel fan with electric motors in anti-vibration mounting, removable exhaust filter G4, M5 or F7

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 Multi



Fans

All units are equipped with high-efficiency fans (ebm-papst and Ziehl Abegg) with free-running impellers and backward curved blades. Ventilators of DUPLEX 500 to 11000 Multi units meets the requirements of the ErP 2015.

Me.xxx; Mi.xxx



Heat recovery exchanger

The only heat recovery core type S7 or S3 made of plastic in counterflow arrangement with high efficiency - up to 93 %.

Sx

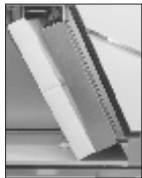
DUPLEX MULTI - MODIFICATION DESCRIPTION



By-pass ("B")

By-pass of the plate heat recovery core on supply air side. By-pass consists of an opposed-blade damper and an actuator. It is fitted next to the recovery core inside the unit; it does not increase size of the unit. The standard actuator is BELIMO 24 V; other types are available upon request.

B.x



Mixing damper ("C")

The mixing damper is used to mix exhaust and supply air. Circulation valve consists of an opposed-blade damper and actuator. It is fitted next to the recovery core inside the unit, it does not increase the size of the unit. The standard actuator is BELIMO 24 V; other types are available upon request.

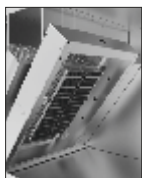
C.x



Hot water heating coil ("T")

Built-in water-to-air three-row (possibly five-row) heating coil; made of copper pipes and aluminum fins. Designed for systems up to 110 °C and 1,0 MPa. The coil is standardly equipped with flexible connection and a steam-gas capillary thermostat for freeze protection. Units in modification T (with heating coil) must be equipped with e, supply air shutoff damper; an actuator with spring-return function is recommended. A coil hydraulic kit for heating capacity control of RE-TPO4 or RE-TPO3 type can be supplied with the coil upon request.

T.x



Electric heating coil ("E")

Integrated electric heating coils consist of PTC (Positive Temperature Coefficient) cells; they are generally used to heat up supply air. By default, electric heating coils always include protective thermostats (operational as well as emergency with manual reset) and regulation module KM featuring power switching elements with so called "zero" switching function (SSR). Built-in electric heating coils are offered in the 500-8000 Multi units in two power options (basic and powerful). For more information please refer to the selection software DUPLEX.

E.x



Direct expansion (DX) coil ("CHF")

A built-in coil made of copper pipes and aluminum fins, including a condensate pan with individual condensate drainage and a pressure switch for freeze alarm. Three- or four-row coils with various evaporate temperature are chosen depending on capacity required, refrigerant type and air parameters. Optionally it is possible to deliver double-circuit evaporator in division 1:1 or 1:2, or completely atypical with needed capacity.

CHF.x



Chilled water cooling coil ("CHW")

A built-in coil made of copper pipes and aluminum fins, including a condensate pan with individual condensate drainage. Three- or five-row coils are chosen depending on capacity required, cooling medium type and air parameters. The cooling coil can be equipped with the R-CHW2 or R-CHW3 hydraulic kit on request.

CHW.x

OTHER OPTIONAL ACCESSORIES (BASIC OVERVIEW)

Ke.xxx; Ki.xxx

Shutoff damper e₁; i₁

Shutoff dampers standardly fitted with BELIMO actuators are located in the air inlet port. The following damper types are available:

- fresh air damper e₁ - mandatory for C modification (with mixing damper) and T modification (with heating coil)
- exhaust air damper i₁



Fe.xxx; Fi.xxx

Air filtration

All DUPLEX Multi units can be equipped with supply or exhaust air filtration of M5 or F7 class instead of standard G4 class. Pressure drop of the filter is then 50 to 100 Pa (clean filter) depending on air flow rate, unit type and dirt accumulated.



RE-TPO.x

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-TPO4 - four-way mixing valve with an actuator for digital control system
- RE-TPO3 - three-way mixing valve with an actuator for digital control system



R-CHW.x

Cooling coil hydraulic kit

Its function is to control cooling capacity of a chilled-water cooling coil. It always consists of two globe shutoff valves and connection pipes. Further equipment depends on the type:

- R-CHW3 - three-way mixing valve with an actuator
- R-CHW2 - throttling valve with an actuator for digital control system



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.



FK.x

Spare cartridge filters

Replacement filter cartridges in different sizes based on the unit type. Available in G4, M5 and F7 filtration class.



Delivery of disassembled unit

All units can be delivered dismantled on request. The unit is to be assembled by rivets and bolts directly on site, therefore the unit can be installed in inaccessible location. Casing insulation class T3, thermal bridging class TB2.

H.P

Flexible connections

Round and rectangular ports can be equipped with flexible connections upon request.



TPO

Hot water heating coil (TPO)

Separately supplied coil for installation into round duct.

It is suitable for cramped locations, where it is impossible to put the coil inside the unit, as well as for rooftop units.

The coil is standardly equipped with the steam-gas capillary thermostat. Capacities and diameters can be found in respective catalogue sheets.



EPO-V

Electric heating coil (EPO-V)

Separately supplied heating coil to be fitted into round or rectangular duct. Capacities and diameters can be found in respective catalogue sheets.



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 ATREA 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.



EPO-V

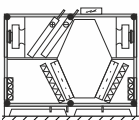
Electric preheaters EPO-V

EPO-V electric heating coils to provide the antifreeze protection of the heat recovery exchanger when equal-pressure ventilation is continuously required. It is installed inside a duct on the outdoor supply air side of the unit (e₁). This accessory assumes the unit is equipped with ATREA digital control system.



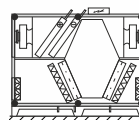
Hingeless door

When needed it is possible to deliver door without standard hinges - than necessary manipulation space is reduced. DUPLEX 9000 and 11000 Multi are supplied hingeless standardly.



External switchboard

It is possible to supply control module in external version with various cable length.




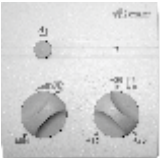



CONTROLS

DUPLEX Multi 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, CO₂) for effective operation control.

Features of the control systems

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

SUMMARY OF DUPLEX MULTI CONTROL SYSTEMS

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