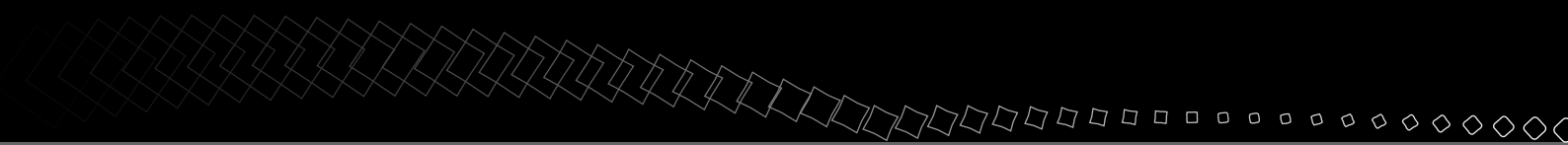


AIR HANDLING UNITS



COMPANY

Juwent company from the moment of its establishment in 1992 collected from years of own reach experiences on manufacturing of ventilating-heating devices and since 1997 very dynamically develops manufacturing of air handling units (AHU) based on several tens of years of experience in construction, building, research, design and manufacturing of the devices from this range represented by significant part of present Juwent team.

Starting the production of the units was the crucial step realized with the full consciousness of the risk because of strong competition on the Polish market represented by domestic and foreign manufacturers. From the beginning we were working with the consciousness that our advantage cannot be based on low prices which that time reached incredibly low level. So as our main argument we chose the flexibility in selection of parameters and units dimensions, the possibility of their (untypical) application, solid quality of chosen components and the durable construction of the units as well as own production of wide range of heat exchangers. With such assumptions during first 3 years of manufacturing we did not receive the significant economic profits but really meaningful gain in the adulation of advantages of our units by many leading domestic designers who, thanks to our units, were able to project lots of important objects as Daewoo-FSO, Thompson–Piaseczno etc.

The way we chose meant:

- Robust fans of renowned European manufacturers
- Cross-flow exchangers intended for heat recovery of the Swedish Heatex Company
- Rotary exchangers of Klingenburg company
- Own heaters and air coolers for any heating and cooling medium
- Approved air filters
- Fittings from many renowned producers
- Significant distinguishing feature of our company is also application of mineral wool as the thermal and acoustic insulation. As we know this is the only one insulating material which is on the list of inflammable materials! In the same time it is better dampening material than generally used polyurethane foam!

Simultaneously from the moment of starting the production we decided that independently from short-time results our task and aim have to be concentrated on our customers interest – which is using our units. Besides the good price of the product it should guarantee low operational costs of electricity consumption, thermal energy consumption and current service (e.g.: filters changing costs). Basing on precise calculations we are able to convict that the purchase of recommended by us unit is often more cost-effective even with slightly higher price which will pay back in the operational costs (electrical and thermal energy) within several months than smaller and less expensive unit also made by our company. Juwent company posses also modern manufacturing machines and devices with the digital control as well as modern integrated organizational system of purchases, orders and production receipt.

GENERAL CHARACTERISTICS OF JUWENT UNITS

Our new edition of Juwent units catalogue includes following modernized series of types of units:

- CP type suspended units including 3 sizes having the total range of air efficiency from 850 to 4.500 m³/h
- CSK basic series of types stationary units including 14 sizes having the total range of air efficiency from 850 to 72.500m³/h
- CSN series of types stationary units characterized with lower height and including 8 sizes with the range of air efficiency from 3.400 to 56.250 m³/h
- CM series of types stationary units with higher efficiency including 3 sizes and intended for operation with the required air efficiency within the range from 34.000 to 135.000 m³/h

In the case of suspended units the self-supporting construction is used based on the construction made of the 25 mm thick panels made of two sheets layers filled with insulation made of mineral wool.

In all other versions and sizes of units we used the construction based on spatial frame made of aluminum profile. Casing panels of these units have also the insulations made of mineral wool and their thickness equal 45 mm in the CSK and CSN type units and 50mm in the CM series of types units. For creating multi-level supply-exhaust units the CSK series of types units are intended with the height of one level up to 1,75m and all the other units of CSN series of types. All other units sizes can form the supply/exhaust systems in horizontal configuration.

Units with heat recovery are available in the following configurations:

- with using the indirect glycol circulation in all the units,
- with using the plate cross-flow exchangers in all the units except CP-3 size suspended unit,
- with using the rotary exchangers with exclusion of the suspended units, units in the hygienic, pool form as well as the sizes not included in the next chapters of this catalogue.
- with using the heating pipe excluding the suspended units as well as the types and sizes not included in the next chapters of this catalogue.

Eventual aberrances which increase the application of separate kinds of heat recovery in the specific cases which are not described in this catalogue are possible in the way of individual settlements and special production.

OUR CUSTOMERS AND THE APPLICATION OF JUWENT UNITS

Production of units in Juwent is fully oriented to satisfy long-term needs and requirements of our customers from the widely understood commercial area. Our ambition is ensuring the average exploitation period of the units of about 20 years. Juwent units successfully operate actually in all the industrial branches, in the energetic sector, in large, middle and small commercial objects, in sports objects and the public utility buildings.

Construction parameters, robust construction and quality of components as well as the materials used in our units cause the dynamic increase of their sales including the foreign markets and very demanding German market as well.

Satisfying of such market is possible only by creating very wide range of products offer including not only mentioned above constructional types of units but also those which are adapted to the special operating conditions.

Thanks to this Juwent units (of course excluding suspended units) are available for external assembling (roof), CP, CSK and CSN units available as the hygienic design have the certificate of National Hygiene Institution.

Pool versions of CSK and CSN units are also available (also with the heating pump on demand). We manufacture also the garage units.

The separate position in Juwent occupy special productions units adapted to the operation in untypical conditions. Here we talk about the units exceeding with the parameters or dimensions behind the standards determined in the catalogue. As the example we can indicate the units operating in the installations of heat recovery in the technologic machinery used in paper industry or in the drying installations which use waste heat coming from cooling the high power power generators with simultaneous keeping the full ability of cooling the aggregate also in the summer period with high temperatures.

JUWENT COOPERATION WITH THE UNITS DESIGNERS

Juwent cooperation with designers is the priority area of company operation understood as the first contact with customer representatives and his requirements. Realization of such contract is done by the our construction office located in Lodz and then the technical department is engaged in our main domicile in Ryki. On this stage we decide about the further course of operation concerning the unit selection. In this moment all the circumstances, conditions, and limitations which require using the prompt selection procedure are determined. It's necessary to exclude numerous possibilities of not specified requirements and conditions regarding process operation as well as existing building condition – even if they impose the necessity of components or parts supply. Here the cooperation between designer and Juwent is irreplaceable. Only the designer is able to present all the information about untypical external temperatures, about untypical supply air temperatures, increased building dustiness, corrosive or explosive conditions, untypical energetic supplying mediums or about the operation in tropical or sea conditions.

When initial conditions are already determined we can start to determine the right selection of the unit which is actually made exclusively with the help of the computer selection software. This software has been used for 3 years, and now we implement its complete new, user-friendly version. Its basic versions are accessible completely without any limits to all interested users, and after some period of practical use we will grant access to the more advanced versions enabling creating the more complicated configurations and individual solutions.

UNITS EQUIPMENT AND OPERATION

Units, even in its easy version are the devices which require the permanent supervision of work parameters. It's not possible to realize that task with using "manual" operation. Thus, Juwent offer on units supply includes also the supply of unit control and automatics devices set. From this rule excluded are only the cases when the customer plans the separate superordinated system controlling total air conditions process connected for example with run simultaneous technological processes. In such cases Juwent offer can be limited to the basic elements installed directly to the unit and fitted with the signals to the superordinated automatics systems. In spite of really small number of complaints Juwent keep in Poland extensive net of service points ready for intervention in the case of any disturbances. These service points are used in the case of ordering the Juwent to start-up the unit and they are ready to support in the case of preliminary operational disturbances after start-up process made by the customers himself.

CP SUSPENDED AIR HANDLING UNITS



Suspended units are based on the self-supporting construction. They are 3 sizes available with the efficiency from 850 to 4.500 m³/h intended for the air processing within the following scope: filtering, heating, cooling, moistening. There is an opportunity of using the recirculation or heat recovery on cross-flow exchanger or on glycol exchanger. They are intended mainly for building in the ceiling zone. As an option we can offer the opportunity to install on the wall, in the zone between the ceilings or in the leveled foundation. Units are available in standard, hygienic, pool or special version.

CSK STATIONARY AIR HANDLING UNITS



CSK units construction is based on the framework made of aluminum profiles. Casing consists of the "sandwich" type panels filled with 45 mm thick mineral wool. There are 14 units sizes available with efficiency from 850 to 72.000 m³/h which are intended for air processing in the scope of: filtering, heating, cooling, moistening. There is an opportunity of using the recirculation or heat recovery on the cross-flow or rotary exchanger, heat pipe or glycol exchanger. Separate sections can be optionally configured if You wish to get the adequate air processing. CSK Units can be used as serial units, multi-level units (maximum to the CSK-75 height) or parallel. The casing is available as the internal and roof version. Roof version is additionally equipped with air intake, air exhaust, flat or skew roof, specially protected air throttling valves. These units can be installed on the leveled screed or steel construction. They are available in standard, hygienic, pool or special version.

CSN STATIONARY AIR HANDLING UNITS



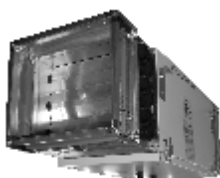
CSN units construction bases on the framework made of aluminum profiles. Casing consist of panel "sandwich" type panels filled with 45 mm thick mineral wool. There are 8 sizes of the units available with the efficiency from 3.400 to 56.250m³/h intended for the air processing in scope of: filtering, heating, cooling, moistening. There is a possibility of applying the recirculation or heat recovery on the cross-flow or rotary exchanger, heating pipe or on the glycol exchanger. Separate versions can be freely configured if You wish obtain the adequate air processing. CSN units can be used as serial units, multi-level units or connected parallelly. The casing is available as the internal and roof version. Roof version is additionally equipped with air intake, air exhaust, flat or skew roof, specially protected air throttling valves. These units can be installed on the leveled screed or steel construction. They are available in standard, hygienic, pool or special version. A special element is their lowered height when compared to the CSK type units.

CM STATIONARY AIR HANDLING UNITS



Construction of CM units bases on the framework made of aluminum profiles. Casing consists of "sandwich" type panels filled with 50 mm thick mineral wool. There are 3 sizes of the units available with the efficiency from 34000 to 135.000m³/h intended for air processing in the scope of: filtering, heating, cooling, moistening. There is an opportunity of using the recirculation or heat recovery on the glycol exchanger. CM units can be used as the serial units. Casing is available as the internal and roof version. Roof version is additionally equipped with air intake, air exhaust, flat or skewed roof, specially protected air throttling valves. Specially equipped with air throttling valves. These units can be installed on the leveled screed or on steel construction. They are available as a standard or special version.

CPK-0 COMPACT SUSPENDED AIR HANDLING UNITS



CPK-0 suspended unit is a compact heating-ventilating device of small overall dimensions intended for the offices, shops and small compartments. Fluently regulated single-phase fan enables the air flow up to 500 m³/h. Self-supporting casing is filled with the 25 mm thick mineral wool.

RGS HIGH-PERFORMANCE HEAT RECUPERATORS



The construction of RGS recuperators bases on the framework made of aluminum profiles. Casing consists of "sandwich type" panels filled with 25 mm thick mineral wool. There are 6 units sizes available with the efficiency from 250 to 2000 m³/h intended mainly for air filtering and heat recovery on the high-efficient counter-flow exchanger with the efficiency >80%. As an option we are also offering the heating and cooling functions. This device can be installed on the floor or hanged on the wall.

PAWGr UNDER-CEILING HEATING-VENTILATING UNITS



PAWGr type air supply unit is the under-ceiling device intended to the work on the circular air. Series of types include 2 sizes with efficiency from 2000 to 9000 m³/h. Air processing is limited to the filtering, heating and cooling with using the exchanger on ice water. Applied rotational diffuser enables the air stream range regulation.

DAWGn ROOF HEATING-VENTILATING UNITS



DAWGn type air supply unit belongs to the group of the devices intended mainly for the single-storey buildings with special consideration of those in which installation of ducts due to technological considerations is impossible or undesirable. The unit consists of two parts: internal and external. The construction of external part bases on the framework made of aluminum profiles. The casing consists of the "sandwich" type panels filled with the 45 mm thick mineral wool. Whereas internal part is the self-supporting construction. Series of types includes 2 sizes with efficiency from 2000 to 9000m³/h. Air processing is limited to the filtering, heating and cooling with using the ice water exchanger. System of throttling valves enables recirculation of removed air. Applied rotational diffuser enables regulation of air stream range.

DAWGn/w ROOF HEATING-VENTILATING UNITS



DAWGn type air supply-exhaust unit belongs to the group of the devices intended mainly for the single-storey buildings with special consideration of those in which installation of ducts due to technological considerations is impossible or undesirable. The unit consists of two parts: internal and external. The construction of external part bases on the framework made of aluminum profiles. The casing consists of the "sandwich" type panels filled with the 45 mm thick mineral wool. Whereas internal part is the self-supporting construction. Series of types includes 2 sizes with efficiency from 2000 to 9000 m³/h. Air processing is limited to the filtering, heating and cooling with using the ice water exchanger. System of throttling valves enables recirculation of removed air. Applied rotational diffuser enables regulation of air stream range.

DAWGo ROOF HEATING-VENTILATING UNITS



DAWGo type supply/exhaust unit with heat recovery belongs to the group of devices intended mainly for a single-storey buildings with special taking into consideration those in which installation of ducts due to technological considerations is impossible or undesirable. The unit consists of two parts: internal and external. The construction of external part bases on the framework made of aluminum profiles. The casing consists in the "sandwich" type panels filled with the 45 mm thick mineral wool. Whereas internal part is the self-supporting construction. Series of types include 2 sizes with efficiency from 2000 to 9000 m³/h. Air processing is limited to the filtering, heating and cooling with using the ice water exchanger. Main advantage of this unit type is heat recovery on the cross-flow exchanger. Applied rotational diffuser enables the regulations of air stream range.

All the devices presented in our catalogue are intended for applying in the ventilating and air conditioning installations both in the public utility buildings, dwelling houses and industrial objects. The information concerning the air processing, efficiency of any device, standard of manufacturing, type of casing are presented in the further part of this catalogue. The range of operation of each elements is presented in the detailed description of construction of each device or of their components.

ATTENTION: Operation of described devices is forbidden if:

- transported air can include solid, glue, fibrous or aggressive substances which cause the corrosion or decomposition of zinc, steel and aluminum,
- temperatures and humidity of external air in the summertime or wintertime are different from the temperatures determined for Europe,
- devices operation is intended for operation in the sea or tropical climate conditions,
- in high concentration of air dustiness which require very often filter replacement in the unit
- There are unstable conditions of supplying the water or steam heaters in the unit which means with the energy interruption which could be so long that even efficient automatic protection components will not protect the exchangers against freezing or eventual losses due to that (heater defect, losses as a result of compartment flooding).

Following these guidelines will guarantee stable and long time operation of the devices manufactured by JUWENT company.

AIR PROCESSING FUNCTION DESIGNATION

FILTERS



- PRELIMINARY



- PRELIMINARY Ex



- EXACT

DAMPERS



- SHORT



- MEDIUM



- LONG

HEATERS



- WATER



- STEAM



- ELECTRIC



- GAS

COOLERS



- WATER



- FREON

HUMIDIFIERS



- WATER



- STEAM

HEAT RECOVERY



- RECIRCULATION



- GLYCOL



- HEAT PIPE



- CROSS-FLOW



- ROTARY

FANS



- BELT DRIVE



- BELT DRIVE Ex



- DIRECT DRIVE



- DIRECT DRIVE Ex

OTHER



- DROPLET SEPARATOR

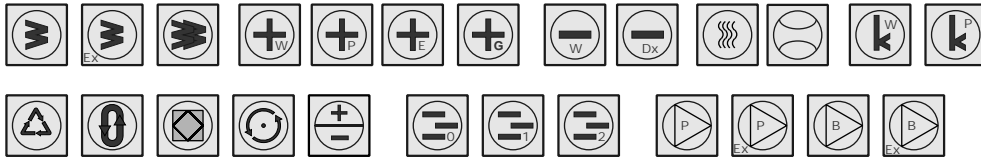


- REFRIGERATION SYSTEM

CSK UNITS SELECTION NOMOGRAM

STATIONERY UNITS - SIZES 05 ÷ 75
850 - 33.750m³/h

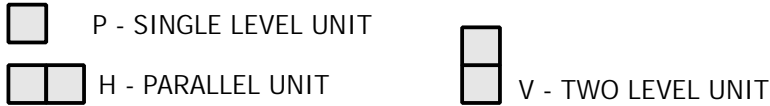
FUNCTIONS OF AIR PROCESSING



VERSION

- S - STANDARD
- H - HYGIENIC
- B - POOL
- E - SPECIAL

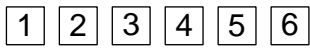
UNITS SPATIAL CONFIGURATION



CASING TYPE

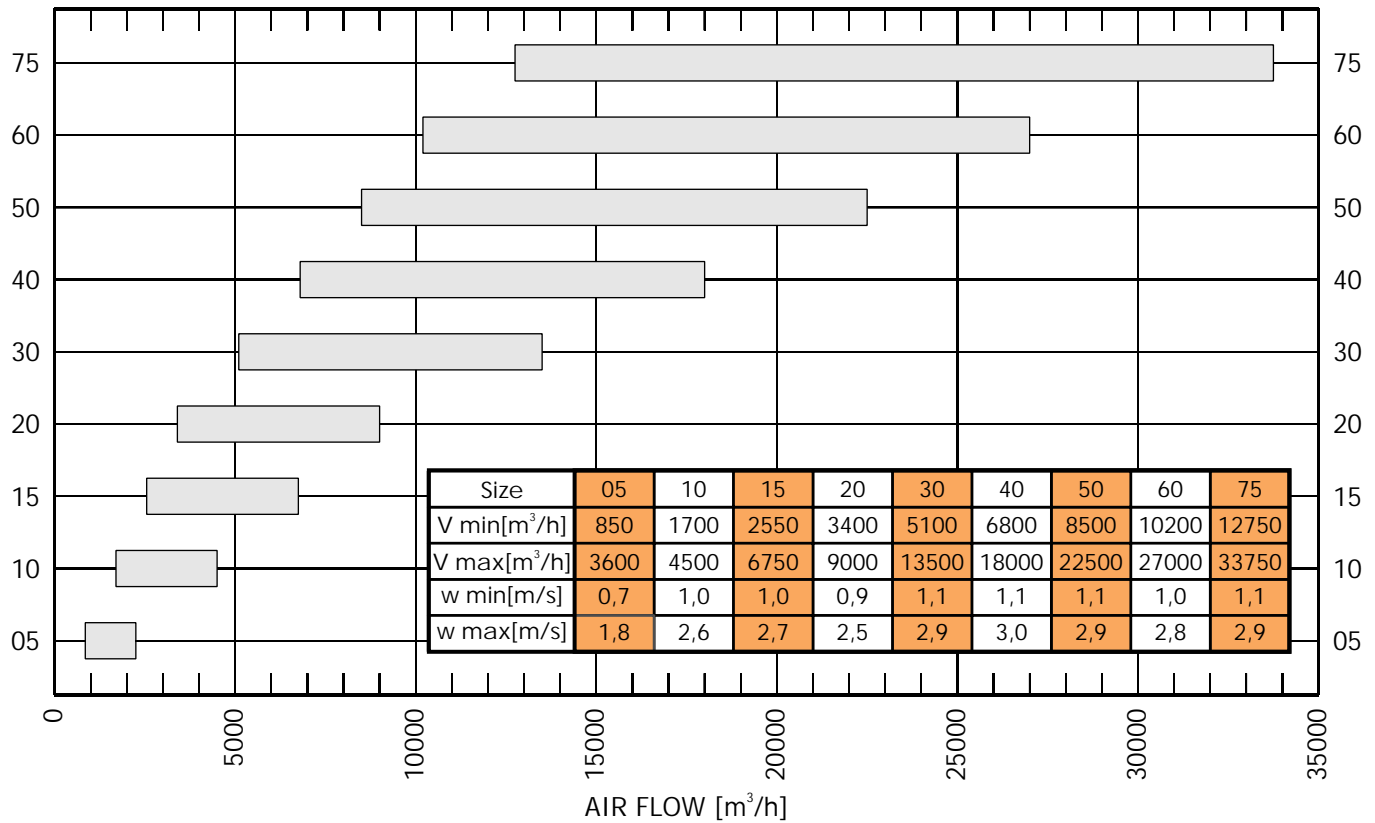
- W - INTERIOR
- D - ROOF

TYPES OF INLET AND OUTLET

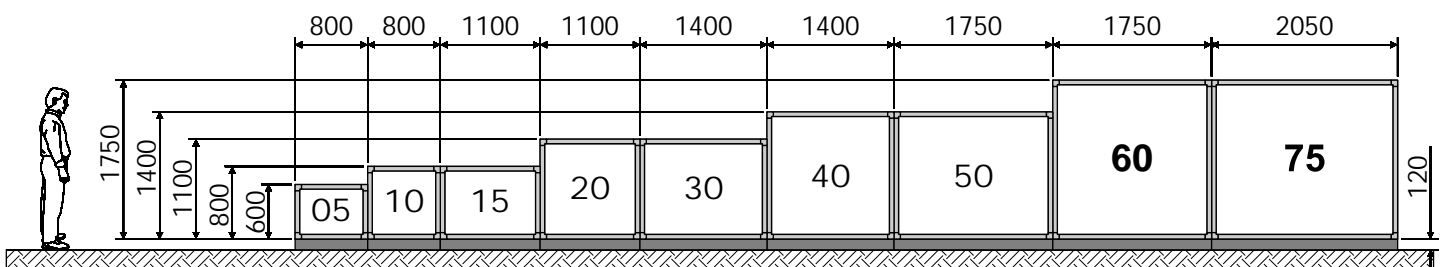


UNIT SIZE

AIR CAPACITY RANGE



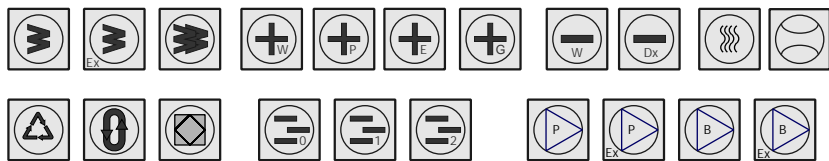
UNITS CROSS-SECTIONS



STATIONERY UNITS - SIZES 90÷160

30.600 - 72.000m³/h

FUNCTIONS OF AIR PROCESSING



VERSION

S - STANDARD
H - HYGIENIC
B - POOL
E - SPECIAL

UNITS SPATIAL CONFIGURATION

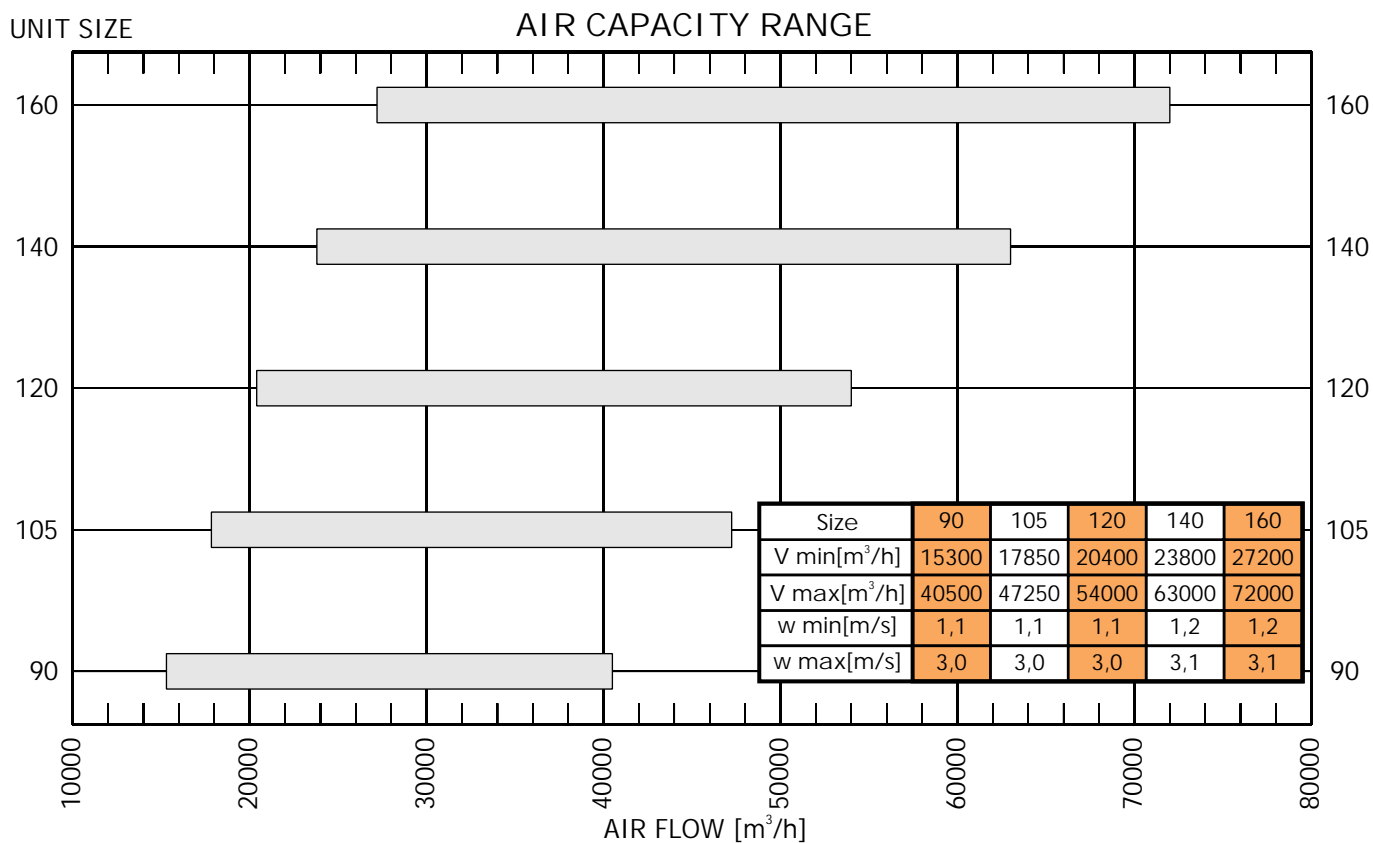
P - SINGLE LEVEL UNIT H - PARALLEL UNIT

CASING TYPE

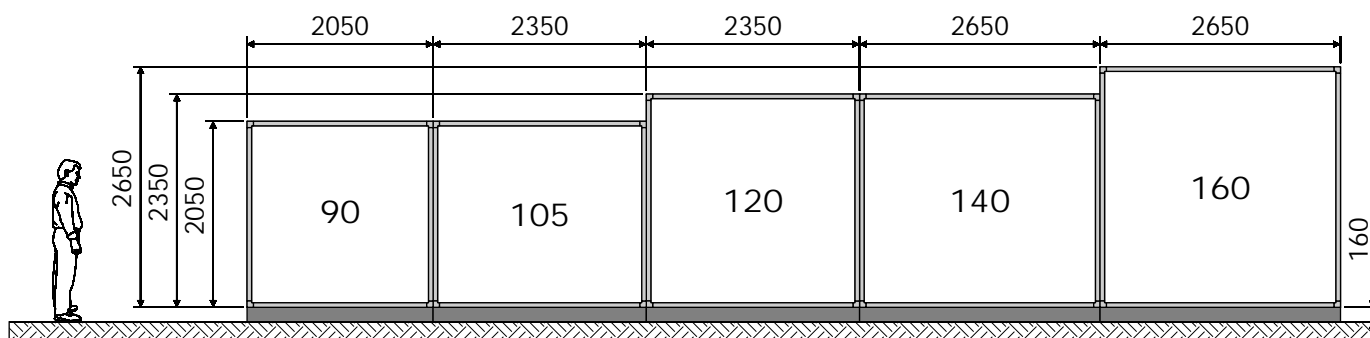
W - INTERIOR
D - ROOF

TYPES OF INLET AND OUTLET

1 2 3 4 5 6



UNITS CROSS-SECTIONS

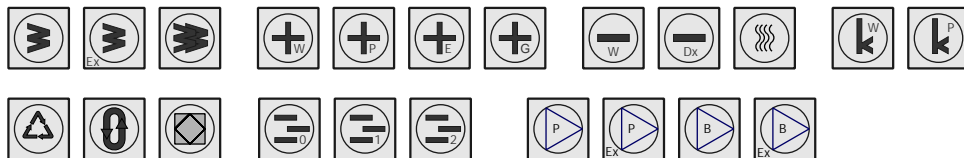


CSN UNITS SELECTION NOMOGRAM

STATIONERY UNITS - SIZES 20÷125

3.400 - 56.250m³/h

FUNCTIONS OF AIR PROCESSING



VERSION

- S - STANDARD
- H - HYGIENIC
- B - POOL
- E - SPECIAL

UNITS SPATIAL CONFIGURATION



CASING TYPE

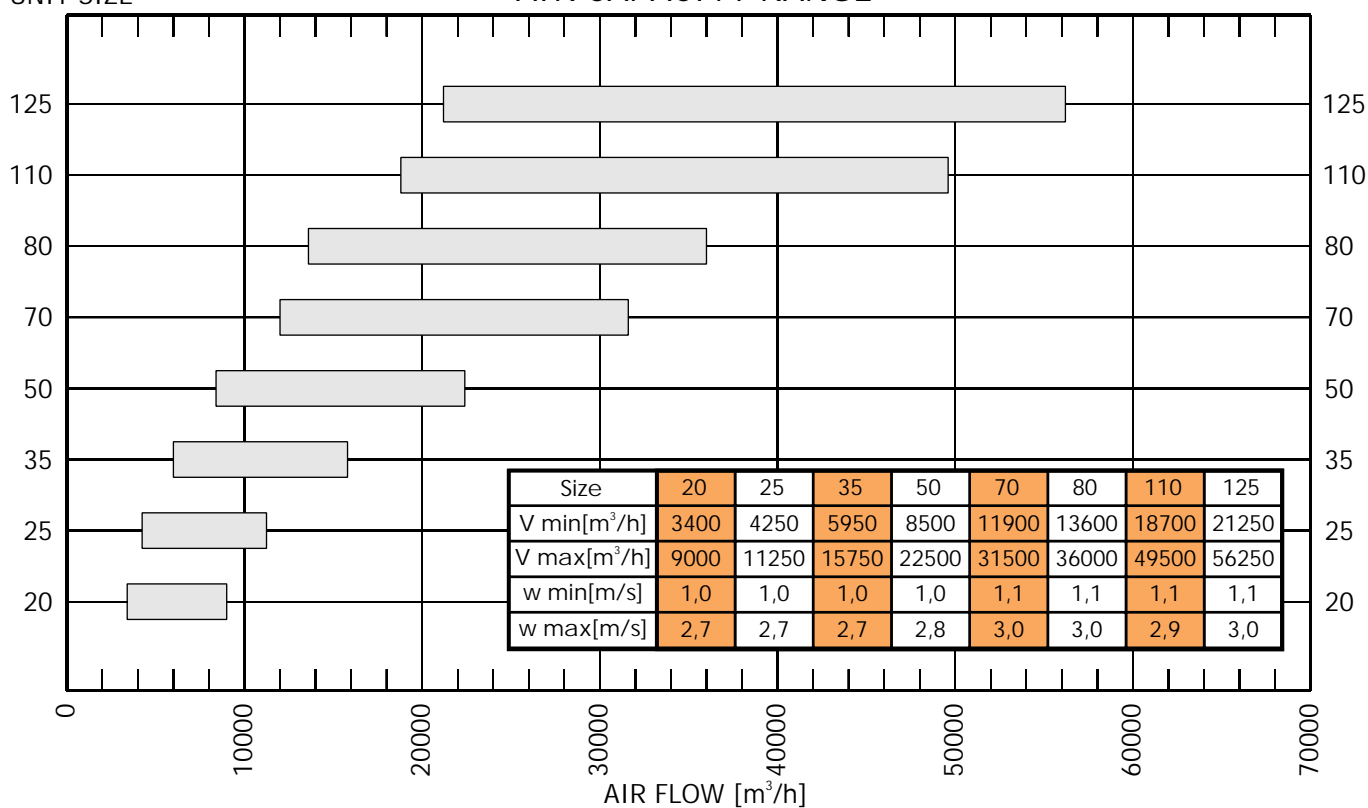
- W - INTERIOR
- D - ROOF

TYPES OF INLET AND OUTLET

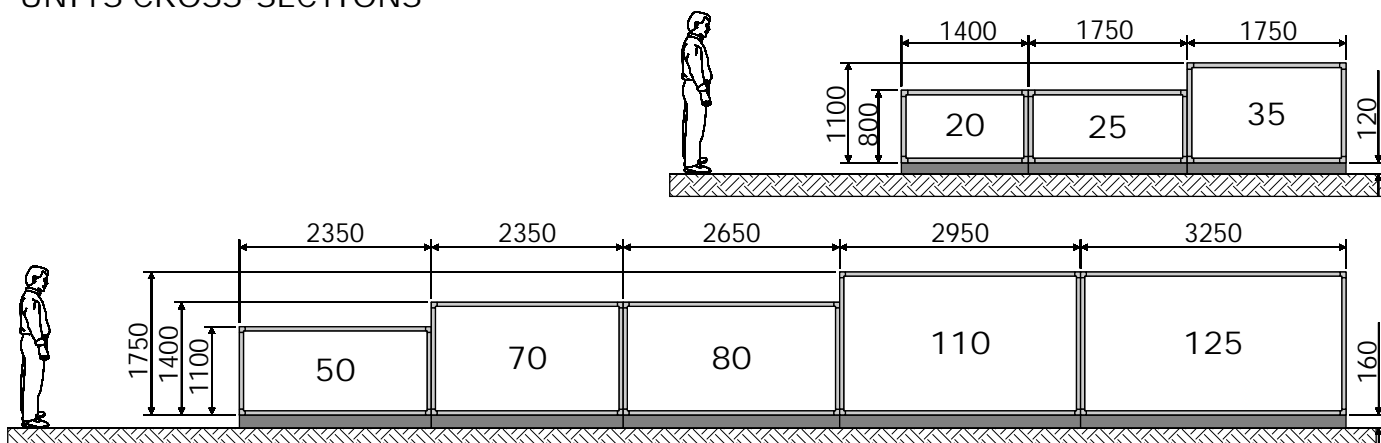


UNIT SIZE

AIR CAPACITY RANGE



UNITS CROSS-SECTIONS

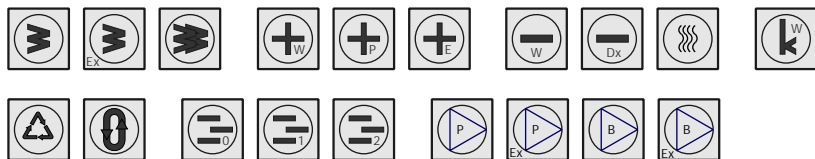


CM UNITS SELECTION NOMOGRAM

STATIONERY UNITS - SIZES 200÷300

34.000 - 135.000m³/h

FUNCTIONS OF AIR PROCESSING



VERSION

S - STANDARD

E - SPECIAL

UNITS SPATIAL CONFIGURATION

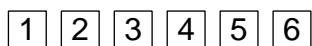
P - SINGLE LEVEL UNIT H - PARALLEL UNIT

CASING TYPE

W - INTERIOR

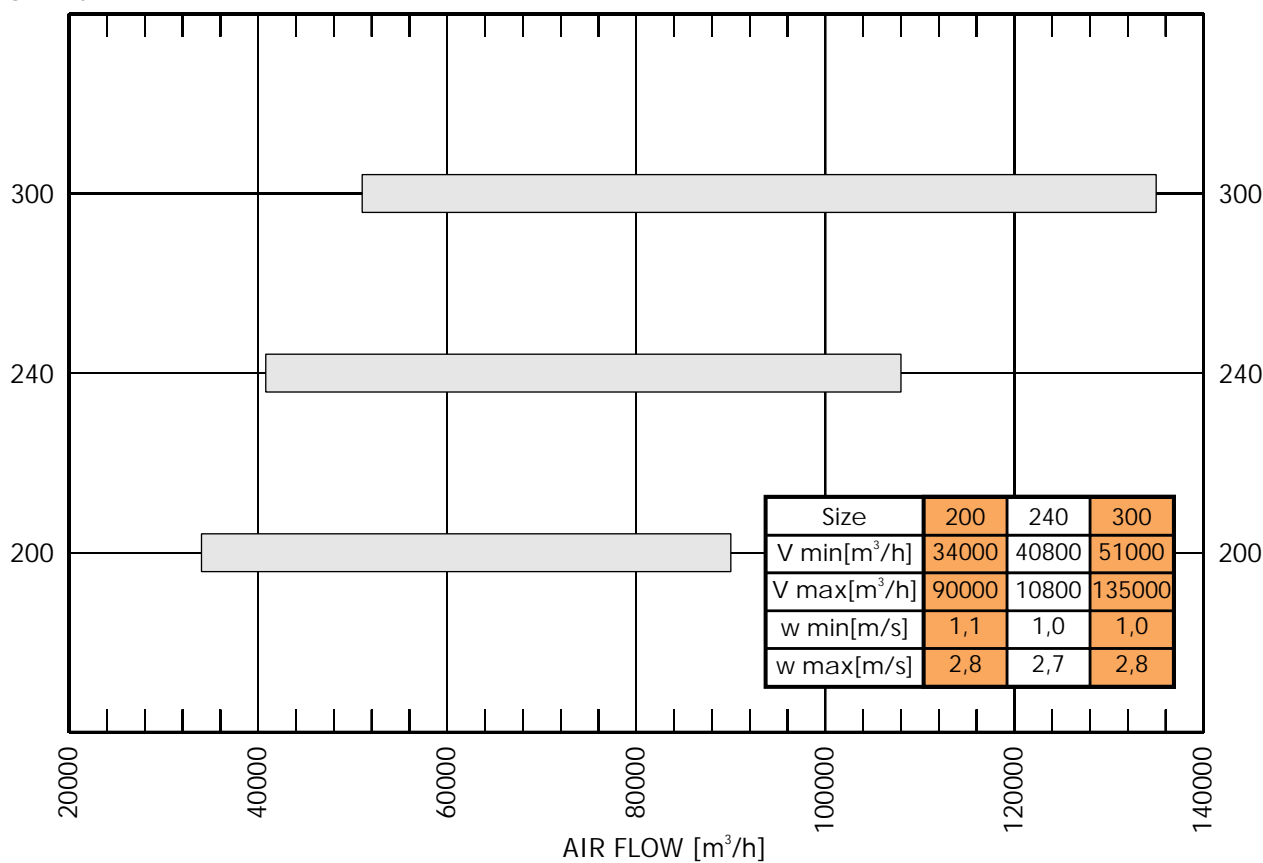
D - ROOF

TYPES OF INLET AND OUTLET

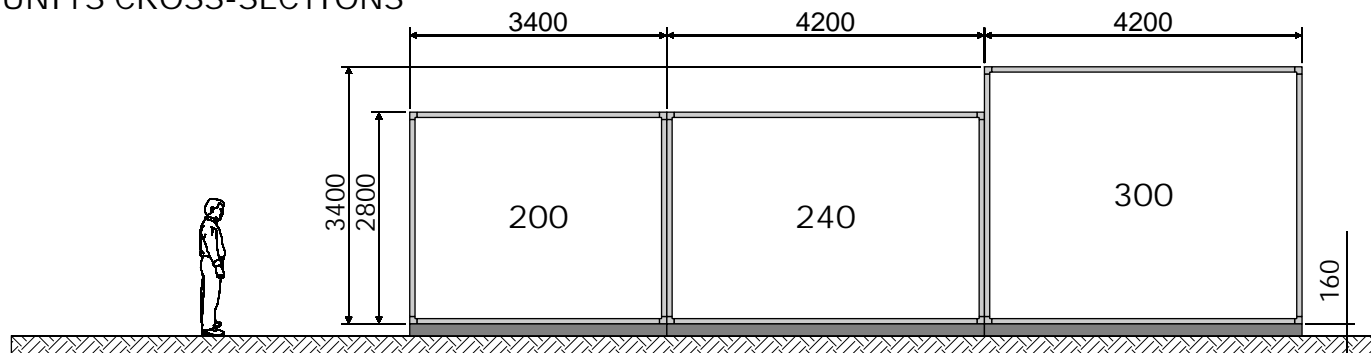


UNIT SIZE

AIR CAPACITY RANGE



UNITS CROSS-SECTIONS



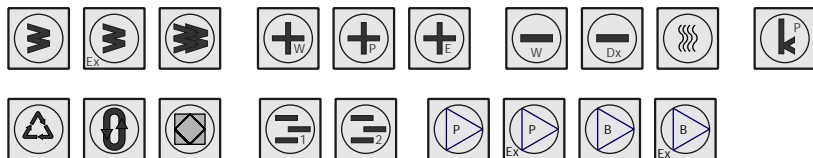
NOTE

The length of each section are determined in each case on an individual query.

CP UNITS SELECTION NOMOGRAM

SUSPENDED UNITS - SIZES 1 ÷ 3
850 - 4.500m³/h

FUNCTIONS OF AIR PROCESSING

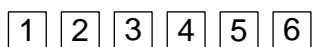


Caution: cross-flow exchanger only in sizes 1 and 2

UNITS SPATIAL CONFIGURATION



TYPES OF INLET AND OUTLET



VERSION

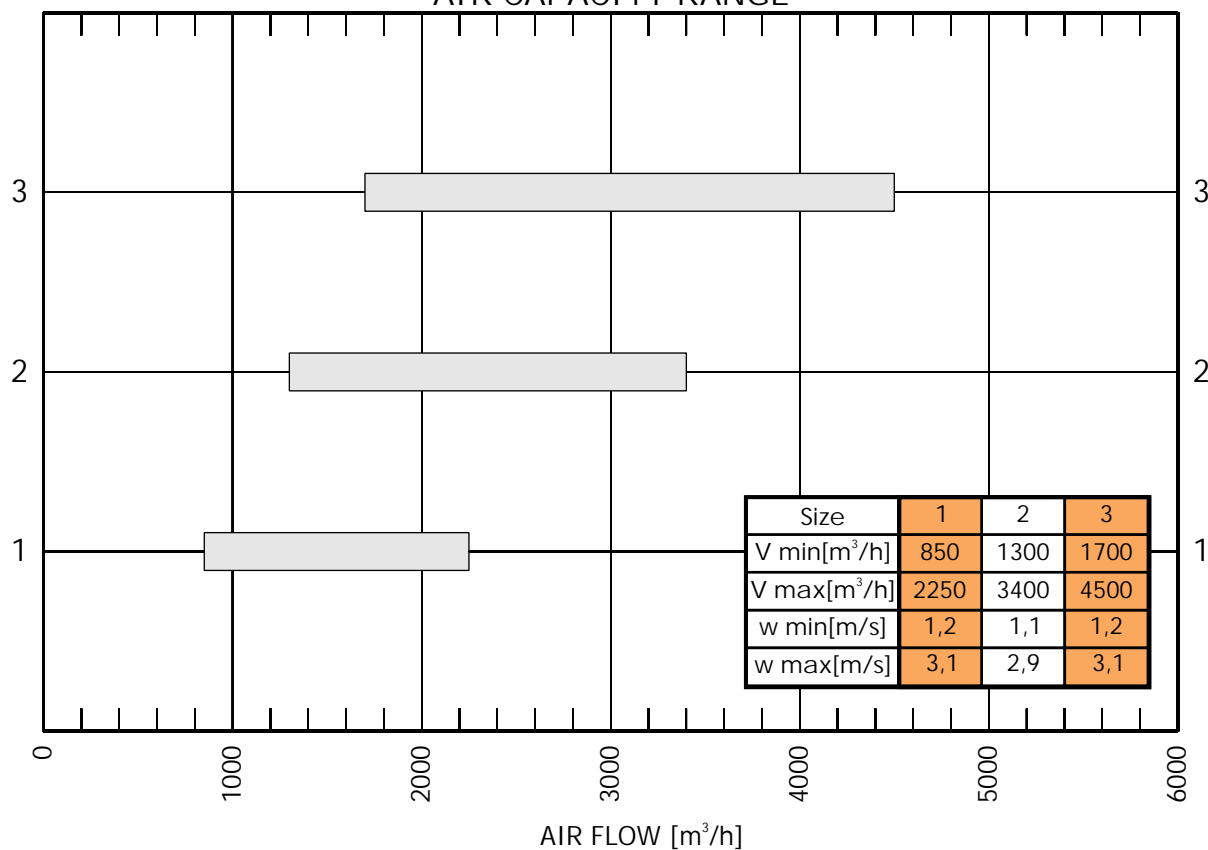
S - STANDARD
H - HYGIENIC
B - POOL
E - SPECIAL

CASING TYPE

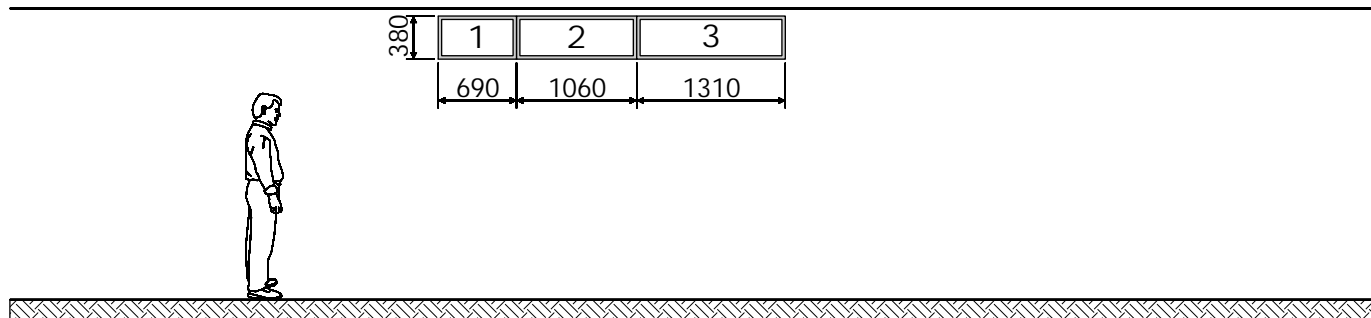
W - INTERIOR

UNIT SIZE

AIR CAPACITY RANGE



UNITS CROSS-SECTIONS



DESCRIPTION OF THE ELEMENTS

CASING OF CSK, CSN, CM UNITS

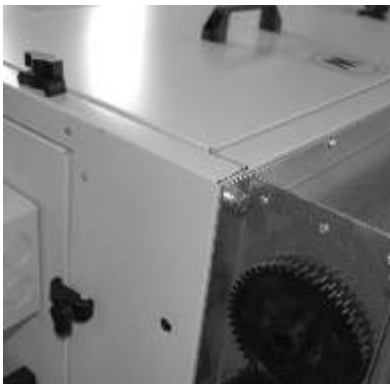


Casing construction bases on the spacious frame made of aluminum profile. Casing panels has the insulation made of 45 mm thick mineral wool with in the CSK and CSN type units and 50 mm for the CM series of type. Casings of each section have the inspection panels equipped with the clamps and grips. Fan section can additionally be equipped with locks.

Casing parameters according to the EN 1886 standard:

- Heat infiltration coefficient $U = 1,17 \text{ W/m}^2\text{K}$ – class T3
- Heating bridges influence coefficient – class Tb1
- Mechanical strength of the casing - class 1
- Leak tightness - class B
- working temperature in standard version from -40°C to $+90^\circ\text{C}$

CASING OF CP UNITS

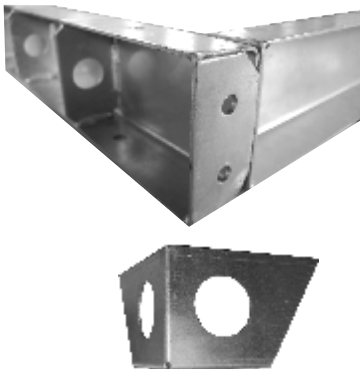


Self-supporting casing construction. Casing panels have the insulations made of 25 mm thick mineral wool. Casings of each sections have the inspection panels equipped with clamps and grips. Fan section can additionally be equipped with locks.

Casing parameters according to the EN 1886 standard:

- Heat infiltration coefficient $U = 1,85 \text{ W/m}^2\text{K}$, Class T4
- Heating bridges influence coefficient –class TB2
- Mechanical strength of the casing – class 1
- Leak tightness - class 3A
- Working temperature in standard version from -40°C to $+90^\circ\text{C}$

BASES AND FEETS



- channel bar 120x60x2,5 – ground floor units of width up to 1400mm
- channel bar 120x60x3,0 ground floor units of width from 1750mm to 2050mm and the multi-level units of width up to 2050mm
- channel bar 160x60x3,0 – ground floor and multi-level units of width more than 2050mm
- 100 mm high feet – units of width up to 1100mm
- 14 anchor holes in longitudinal beams at the distance of 100mm from their ends

ROOF



There are two types of roof in the roof version: flat and skew

Flat roof is made for the units of width up to 2050 mm from galvanized, varnished sheets. It consists of the single sheets connected with the armed labial seal.

Skew roof is made for the units of width at least 2350 mm as pitched roof from trapezoidal, varnished sheets.

All the sheet metal work is made from galvanized, varnished sheets.

If the unit width is equal or bigger than 2350mm and the ground floor sections are longer than floor sections then on these sections we install also the flat roof.

DESCRIPTION OF THE ELEMENTS

ELASTIC SPOUTS



Elastic spouts protect the channel system (installation) against carrying the vibrations from the unit. They also serve to minimize the misalignment of ventilation channels. Connecting frames are made of galvanized steel. Collar width is 30mm. As a standard elastic spouts are equipped with ground wire.

Work parameters:

- Environment temperature in standard version from -40°C to $+70^{\circ}\text{C}$
- Environment temperature in special version from $+70^{\circ}\text{C}$ to $+110^{\circ}\text{C}$

INTAKE AND EXHAUST VENTS



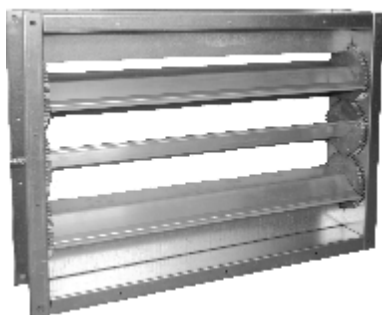
Intake and exhaust vents are made of galvanized, varnished sheet. Specially profiled panels protect the inlets or outlets of the units against the atmospheric factors influences such as rain or snow. They are equipped with nets which preclude the access, for the birds for example, to inside of the unit. Built-up depth - 330 mm.

PWA THROTTLES



Throttling valve panels are made of aluminum. Throttling valve frame is made of galvanized sheet. Drive is operated with the help of plastic gear wheels installed inside the frame. For the units with width up to 2050 mm throttling valves have one shaft for installing the servo-motor from the service side of the unit. Above the width of 2350 throttling valves are spoilt and have two shafts on both sides of the unit. PWA throttling valves are installed mainly in the internal units. In case of roof units they are used in the air intake or exhaust vents sets. They are intended for cutting off the air flow, air mixing level adjustment in the mixing sections and realizes the protecting functions in the sections where the by-pass function is used.

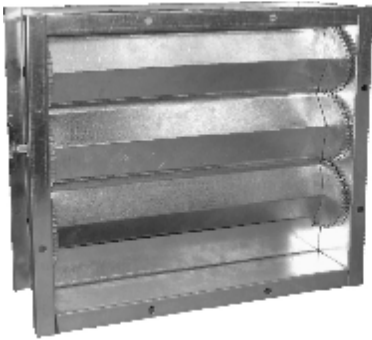
PWJ THROTTLES



Throttling valve panels are made of aluminum. On the edges they are protected with gaskets. Throttling valve frame is made of galvanized sheet. Drive is operated with the help of plastic gear wheels installed inside the frame. For the units with width up to 2050 mm throttling valves have one shaft for installing the servo-motor from the service side of the unit. Above the width of 2350 throttling valves are spoilt and have two gears on both sides of the unit. PWJ throttling valves are installed everywhere where the PWA throttling valves cannot be used, mainly in the roof units. They are intended for cutting off the air, adjustment of air mixing in the mixing sections.

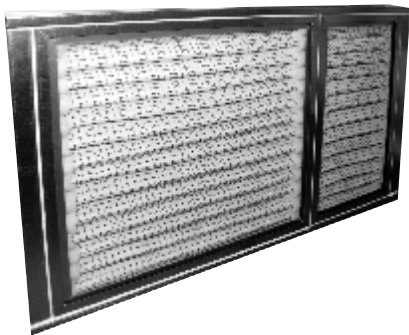
DESCRIPTION OF THE ELEMENTS

PWN THROTTLE



Throttling valves are manufactured only for untypical solutions. Panels and frames can be made from galvanized or acid-resistant sheet. Drive is operated through the aluminum gear installed inside the frame.

PLEATED FILTER



- G4 and F5 class filters
- Filtering cloth made of material of polyester fibers in the shield made of metal grid
- 48 mm thick metal frame
- Standard dimensions: 596x596 and 596x287.
- Final Pressure difference according to the PN-EN 13053 standard is:
 - for class G4 ? P=150 Pa
 - for class F5 ? P=250 Pa
- Working environment +70°/100%

SHORT POCKET FILTER



- G4, F5, F6, F7 class filters
- Filtering cloth made of material of polyester fibers in the shield made of metal grid
- 25 mm thick metal frame
- Standard dimensions: 596x596 and 596x287.
- 360 mm long filtering pockets
- Final pressure difference according to the PN-EN 13053 standard is:
 - for class G4 ? P=150 Pa
 - for class F5-F7 ? P=250 Pa
- working environment +70°/100%

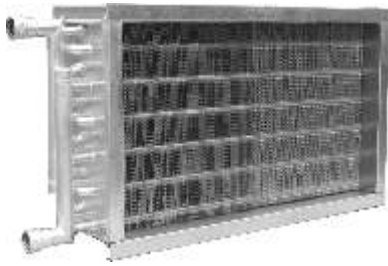
LONG POCKET FILTER



- F5, F6, F7, F8, F9 class filters
- Filtering cloth made of material of polyester fiber in the shield made of metal grid
- 25 mm thick metal frame
- Standard dimensions: 596x596 and 596x287.
- 600 mm long filtering pockets
- final pressure difference according to the PN-EN 13053 standard is:
 - for class G4 ? P=150 Pa
 - for class F5-F7 ? P=250 Pa
 - for class F8-F9 ? P=350 Pa
- working environment +70°/100%

DESCRIPTION OF THE ELEMENTS

NLW WATER HEATER



- copper pipes with diameter 10, 12, 16
- aluminum louvers
- louvers spacing:
 - 10 – 2.0 mm
 - 12 – 2.0; 2.4; 3.0 mm
 - 16 – 2.4 mm
- casing made of galvanized sheet
- pipe wall thickness 0,5 mm
- louver thickness 0,12 mm
- number of rows 2-10
- exchanger spouts equipped with the vent and draining valve
- maximal medium temperature 110°C
- maximal working pressure 1,0MPa

NW WATER HEATER FOR HIGH PARAMETERS



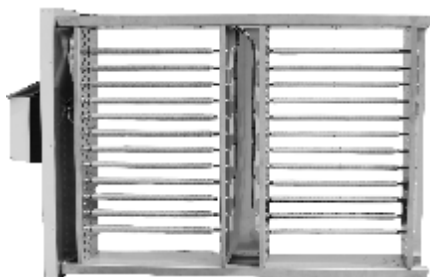
- core – steel pipe
- wound – thick - walled aluminum pipe rotationally cold-rolled;
- louvers spacing 2,8 mm;
- core pipe diameter 16 mm;
- casing made of galvanized sheet
- average rib thickness 0,3 mm;
- number of rows 2-10;
- exchanger spouts equipped with posses the vent and draining valve;
- max medium temp. 150°C;
- max working pressure 1,6MPa

NP STEAM HEATER



- Core – steel pipe;
- wound – thick- walled pipe rotationally cold-rolled;
- louver spacing 2,8 mm or 0,5mm;
- core pipe diameter 25mm;
- casing made of galvanized sheet;
- average rib thickness 0,3mm;
- number of rows 2-10;
- exchanger spouts equipped with posses the vent and draining valve;
- maximal medium temperature 160°C;
- max working pressure 1,6MPa

NE ELECTRIC HEATER



- heater jacket material – copper or acid-resistant steel
- heater filling – magnesium oxide
- heater radiator material – aluminum
- dribs spacing – 2,3 mm
- jacket diameter – 8,5 mm
- heater diameter / 27,00
- average rib thickness – 0,45 mm
- asing material / galvanized or acid-resistant sheet
- number of rows 1- 4
- maximal medium temperature 60°C;
- supply voltage 3x400V

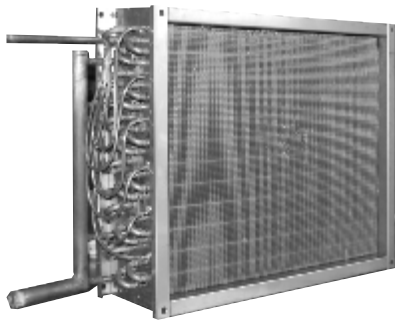
DESCRIPTION OF THE ELEMENTS

CLW WATER COOLER



- Copper pipes with diameters 10, 12, 16
- Aluminum louvers
- Louvers spacing:
 - 10 – 2.0 mm
 - 12 – 2.0; 2.4; 3.0 mm
 - 16 – 2.4 mm
- Casing made of galvanized sheet
- Pipe wall thickness 0,5 mm
- Louver thickness 0,12 mm
- Number of rows 2- 10
- Exchanger spouts equipped with posses the vent and draining valve
- Minimal medium temperature for ice water +2°C
- Maximal working pressure 1,0 MPa

CF FREON COOLER



- copper pipes with diameter 10, 12, 16
- aluminum louvers with spacing:
 - 10 – 2.0 mm
 - 12 – 2.0; 2.4; 3.0 mm
 - 16 – 2.4 mm
- casing made of galvanized sheet
- pipe wall thickness 0,5 mm
- louver thickness 0,12 mm
- number of rows 2-10
- minimal temperature of cooling medium vaporization +3°C
- maximal working pressure 2,0MPa

GAS HEATER



Gas exchangers are intended for heating the air with using the gas fuels as well as liquid fuels. Air is heated thanks to flowing on the combustion chamber surface and bunch of exchanger pipes. Exhaust gases outlet is placed on the opposite side of the unit than installed burner. Power regulation depends of used burner and it could be:

- modulated
- two-leveled
- ON/OFF
- working environment max 70°C
- max difference of temperatures in standard version 35K.

COOLING SYSTEM



Cooling system consists of the evaporator and the condenser as well as scroll type compressor. Evaporator and condenser are made of copper pipes with the pipes aluminum louvers pack. Compressors are placed on vibro-insulators. Cooling circuit consists of: filters and cooling medium dryers, thermostatic expansion valve, low and high pressure switches, low and high pressure manometers, regulation and protecting circuits and cooling fittings. As the cooling medium the R407c is used. Cooling system can be used for supply/exhaust units with cold recovery on cross-flow exchanger..

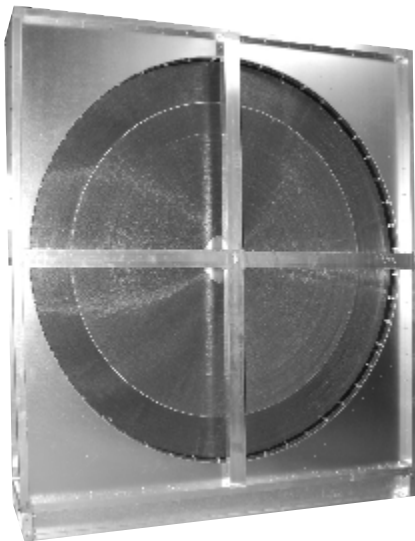
DESCRIPTION OF THE ELEMENTS

CROSS-FLOW EXCHANGER



- Assembly of redrawn plates made from:
 - aluminum,
 - epoxy coated aluminum,
- casing from galvanized sheets,
- exchanger by-pass,
- drip tray made from acid-resistant sheet,
- drop separator,
- plates spacing depends on exchanger type – from 5 to 12 mm,
- used in the units with up to 1750 mm storey height,
- working environment from -40°C to $+80^{\circ}\text{C}$.

ROTARY EXCHANGER



- welded carrying frame made of aluminum profiles
- types of rotors:
 - PT – condensating intended mainly for heat recovery. Moisture recovery is made only in case when exhaust air is cooled below the dew-point.
 - ET – enthalpy regenerator has the hygroscopic coat supporting the moisture exchange
 - XT – sorptive with strong hygroscopic coat enabling very effective heat and moisture recovery through the whole year
 - KT – condensation epoxy coated increasing the resistance to corrossions.
- Foil thickness 0.07 mm
- Fold height 1.9 mm
- Exchanger thickness 430 mm
- Drive with adjusted rotational velocity with belt transmission
- Brushing circumferential and lateral seals
- Used in the units with up to 1750 mm storey height
- Working environment from -40°C to $+80^{\circ}\text{C}$

HEAT PIPE

- assembly of redrawn plates made of aluminum
- casing made of galvanized sheet
- exchanger by-pass
- drip tray made of acid-resistant sheet
- drop separator
- used in the units with with up to 1750 mm storey height
- exchanger thickness
 - 700 mm - VI, VIII, X rows
 - 800 mm - XII rows
- R134a medium
- working environment from -40°C to $+80^{\circ}\text{C}$

DESCRIPTION OF THE ELEMENTS

FAN WITH DIRECT DRIVE



- Fan and motor assembly placed on one frame
- Rotor installed on motor shaft
- Vibro-insulators and elastic flange cutting off the vibrations from the unit casing
- Fluent regulation of rotations with the frequency converter
- Manufacture standards:
 - standard
 - epoxy coated
 - explosion proof Ex
- working environment in standard version from -15°C to $+40^{\circ}\text{C}$
- working environment in special version from -40°C to $+110^{\circ}\text{C}$

FAN WITH BELT DRIVE



- Fan and motor assembly placed on one frame
- Radial fans with double suction with the blades inclined backward or forward
- indirect drive through the belt transmission
- Taper-lock type wheels enabling using huge variations of wheels
- three-phase motors
- vibro-insulators and elastic flange cutting off the vibrations of the assembly from the unit casing
- manufacture standards:
 - standard
 - epoxy coated
 - explosion proof Ex
- operational environment in typical version from -15°C to $+40^{\circ}\text{C}$

DAMPER



- damping cartridges (slotted levers) made of mineral wool with the density of 80kg/m^3
- slotted lever thickness 100mm
- slotted levers spacing 50mm
- external surfaces of slotted levers covered with thin cloth "veil" type in order to eliminate infiltration of mineral wool parts to the air
- standard lengths:
 - 900 mm
 - 1150 mm
 - 1450 mm

DROPLET SEPARATOR



- Panels of the drop separator made of plastics, specially shaped profile enabling effective catching the water particles
- panels thickness 130 mm
- maximal flow velocity 4m/s
- minimal velocity 2m/s, below this value use of the drop separator is not required
- section equipped with the tub made of acid-resistant sheet

DESCRIPTION OF THE ELEMENTS

SIGHT HOLE



- round inspection window built in the inspection door
- enables monitoring of the unit interior during its operation
- used mainly in the units in hygienic version

LIGHTING



- rectangular glow discharge tubes
- enable monitoring of the unit interior during its operation
- used mainly in the units in hygienic version
- power supply 24V

TRAY GUTTERS



- made of acid-resistant sheet
- installed outside of the unit in order to carry away units washing cleaners
- used mainly in the units in hygienic version

STANDARD VERSION

All the units elements are made from following materials:

- internal casing panels made of galvanized sheets
- external side panel and upper panel made of galvanized sheets or of varnished, galvanized sheet
- all the slots on the contact with casing elements are filled with silicone
- door panels seals are made from EPDM;
- rails and slideways working with withdrawable elements, filters frames, heat exchangers casings, fans partitions are made of galvanized sheet;
- drip trays under the coolers and heat recovery exchangers are made of stainless steel
- elements carrying away the liquids with the flow toward the drain
- drainage of condensate protected against drawback with the help of siphons
- bases of units made of galvanized steel

HYGIENIC VERSION

Construction of hygienic units bases on adequately modified solutions present in the standard versions of these units. Modifications include in any case the following constructional elements:

- internal sheet of side and upper panel made of galvanized, varnished sheet whereas floor panel is made of stainless steel;
- in the intended for use in operation blocks, treatment rooms, infectious diseases departments and laboratories internal sheets of all panels made of stainless steel
- external side and upper panel sheet and made of galvanized, varnished sheet whereas floor panel is made of galvanized sheet;
- all the slots on the casing elements contact are filled with attested silicone with antibacterial addition;
- door panels gaskets are made of material resistant to the cleaner and disinfectant activity
- floor surface in all the unit sections is flat without caving and slots
- rails and slide ways working with withdrawable elements, filters frames, heat exchangers casings, fans partitions, gutters carrying away cleaners and disinfectants from the unit interior and the drip tubs under coolers and heat recovery exchangers are made of stainless steel;
- elements carrying away the liquids with the fall toward the drain direction
- condensate drains protected against drawback with the help of siphons
- in the filters section of filters, fans and moisteners sight holes and lighting is installed;
- only steam moisteners, placed at the end of the units
- fans and heat exchangers epoxy coated
- drop separator behind the separately removed cooler
- distances between the exchangers enable the access to them from the both sides'
- surfaces of slotted levers of silencers resistant on abrasion
- preliminary filters at least F5 (EU5) class;
- fans with direct drive

On the customer's demand units in hygienic version can additionally include the following modifications:

- internal sheets of side, upper and floor panels made of stainless steel
- sight holes and lighting in the other selected sections of the unit;
- indicators of constant measurement of pressure drop on the filters
- fan with belt drive
- ultra-violet lamps for lighting the filtration section
- In justified cases excluding operation blocks, treatment rooms, infectious diseases departments and laboratories the fans and heating exchangers are not epoxy coated.

HYGIENIC SUSPENDED

Construction of hygienic units bases on the adequately modified solutions in standard versions of these units. In this case, the modifications include the following constructional elements

- internal sheet of side and upper panel made of galvanized and varnished sheets, and floor panel is made of stainless steel sheets
- external sheet of all panels is made of galvanized, varnished sheets
- all the slots on the contacts of casing elements are filled with attested silicone with the antibacterial addition
- door panel gaskets are made of material resistant to cleaners and disinfectants activity
- rails and slide ways working with withdrawable elements, frames for withdrawing the filters, heat exchangers casings, fans partitions, drip tubes under the coolers and heat exchangers made of stainless steel;
- only steam moistener, placed on the end of units
- fans and heat exchangers epoxy coated;
- distances between exchangers enabled the access to them from both sides
- slotted levers surfaces of noise dampeners resistant on abrasion;
- preliminary filters at least F5 (EU5) class;

On the customer's demand units in hygienic version can additionally include the following modifications:

- internal sheets of side, upper and floor panel made of stainless steel sheets
- indicators of constant measurement of pressure drop on the filters'
- fan with belt drive
- ultra-violet lamps for lighting the filtration section

POOL

Construction of pool units bases on adequately modified solutions of the standard versions of this units. In this case, the modifications include the following constructional elements:

- internal panel sheets made of galvanized, epoxy coated sheets,
- external sheet of side and upper panel made of galvanized and varnished sheet, and floor panel is made of galvanized sheet,
- all the slots on the contact of casing elements are filled with attested silicone with the antibacterial addition,
- door panel gaskets are made of material resistant to cleaners and disinfectants activity,
- rails and slide ways working with withdrawable elements, drip tubes under the coolers and heat recovery exchangers made from stainless steel,
- filters frames, heat exchangers casings, fans partitions made from galvanized, epoxy coated sheets,
- elements carrying away the liquid with the fall toward the drain direction,
- condensate drain protected against drawback with the help of siphons,
- fans and heat exchangers epoxy coated,
- surfaces of silencers slotted levers resistant to abrasion.

SPECIAL

Except the productions of the units with parameters and characteristics shown in the catalogue data our company with consultation with designer is able to realize the individual units supply or their components which differ from the standard solutions in the following range:

- using the components not included in catalogue
- units dimensions by creating untypical height or width dimensions from the typical units dimensions and on the other sizes of the same series of types.
- material solutions (for example: casing from the stainless steel sheets);
- untypical air parameters for air condition processes including the possibility of heat recovery from the technological processes.

Such projects have to be agreed in writing by both parties. Such cases are not considered in JUWENT units selection computer software and require contact with the JUWENT constructional office in Juwent division located in Lodz

STORING AND TRANSPORT ON BUILDING SITE

Individual unit's elements are wrapped with foil and placed on wooden pallets. Foils have to be removed directly before assembling.

Device has to be stored in original packages, in the dry place and not exposed to influence of the atmospheric factors. The units can be transported with the help of the fork lift or the crane in the normal operation position with paying special attention on protection the side surfaces and protruded elements against damage. Before lifting the device it's necessary to make sure that the door and inspection flaps are closed.

ASSEMBLING AND CONNECTIONS

Units have to be placed on the leveled ground with adequate strength, appropriate for the unit's weight and dimensions. Units equipped with condensates drain should be placed on the concrete or steel pedestal with height enabling mounting the water siphon. The device should be placed on rubber vibro-insulating washers, "Mafund" for example. In case of multi-sectional unit the surface area of washers for each module should be selected according to their weight on such way that deflection of all the washers will be equal after device assembly. A free space should be ensured from the unit service site with the width enabling opening all the doors and inspection flaps and executing the standard operating procedures. Hydraulic installations, electric installations etc. should be placed in such way that access to the unit will not be difficult.

Minimal width enabling the filters replacement should be equal with unit width.

Minimal width enabling the service of other sections is 800mm.

Moreover the space enabling to exchange internal components of the unit should be arranged from the service side. Width of the space should be equal at least the unit width + 200 mm. During normal exploitation other devices and installations can be located in this space but it's necessary to ensure the opportunity of their easy and quick disassembling.

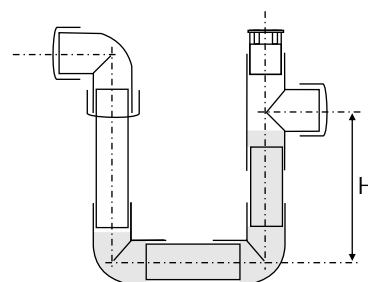
CONDENSATES OFFTAKE

In the drip trays of cooling section, glycol exchanger, cross-flow and rotary exchanger the condensates carrying away spouts are installed outside of the unit casing. The siphons have to be connected to the drain spouts responsible for carrying away the water dropped out on the exchangers, at the different pressure values in the section and the environment. Ball siphons can be used in the unit sections with negative pressure. Ball siphon cannot be installed in the pressing part of the unit. There is no need to install drainage siphons in sections with positive pressure. In order to minimize the air scavenges it's possible to use siphoning on the installation carrying away the condensates by installing the siphon according to the picture below. The useful height "H" of the siphons depends on pressure difference between the pressure in the unit section, from which the condensate is drained during the operation and the environment pressure.

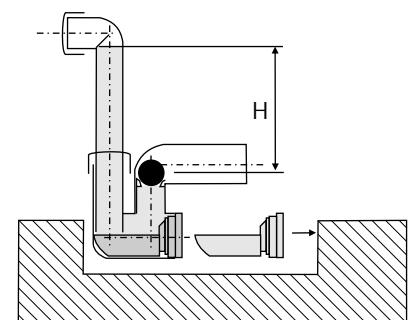
Dimension H calculated in mm must be bigger than the pressures differences expressed in H₂O mm. It is permitted to connect the siphons of the different sections with one drain collector under the condition that the collector will have the connection with surroundings (venting). Before unit start-up siphons have to be filled with water. In the cold environment the water drainage has to be insulated and eventually use adequate heating installation.

CAUTION! Due to the different values of the pressure in the units during their operation connection of several condensates drain spouts with one siphon is not permitted.

No	Total fan pressure [Pa]	Dimension H[mm]
1	<600	60
2	600-1000	100
3	1000-1400	140
4	1400-1800	180
5	1800-2200	220
6.	2200-2600	240



Siphon on pressing



Ball siphon on suction

INTRODUCTION

This chapter of catalogue presents the example systems of automatic regulation systems which can be developed and completed on customer's demand. In case of systems other than described standard ones, we ask You to deliver the technical assumptions for its elaboration, and then we will be appreciated to present You the complete offer together with automatics elements selection and with the price list. It concerns in particularly the situations when the ventilation and air condition system of a large building consists of many units and require integrated control.

Price list in the offer (concerning automatics presented in the catalogue or on customer's demand) include:

- supply of the devices presented in the set for a given type of the system
- supply of supply-control box with built-in programmed CPU driver and set-up manual
- service switch if in the order automatics set is not presented

In addition through the net of our distributors we can offer:

- wiring and start-up of the system,
- after warranty overhauls,
- measurement and adjusting the parameters,
- after warranty service,
- sales of automatics components
- sales of frequency converters

We offer also a wide range of trainings during which we try to share with our experience and to solve any of Your doubts concerning the ventilating and air condition units automatics besides complex presentation of our offer.

We invite to cooperation.

REVIEW OF AUTOMATICS ELEMENTS

Using the JUWENT automatics systems for ventilation and air condition units we reach the comfort with keeping the exploitation costs on the possible low level as well as certainty of automatics elements protection and control against the damages. The task of such systems is possibly the biggest limitation of human influence on direct operation of such automatics elements in order to limit the service staff tasks to set the parameters of required conditions. All the other functions should be ensured by the automatic regulation system which adapts as well to the conditions in the compartments as to the changing external conditions.

Below we present the basic and most often used automatics system elements in ventilation units.

SUPPLY-CONTROL BOX

It is intended for supplying, protecting and control of the ventilation and heating units. It's equipped with:

- main switch
- motor switch with thermal tripper
- contactors, transmitters, transformer
- signal lamps: operation, failures (fan failure, freezing of the water heater, overheating of electric heater, contamination of the filters);
- working mode switch (working mode: comfort – stop – economic operation);
- circuit protecting against icing of the heaters;
- clamp slats intended for: motors, detectors, servo-motors, pressure switch
- terminal strips for external systems: water heater pump start-up (230V,5A), fire protection signal (230V);
- functional diagram with functions description;
- complete documentation of control system;
- CPU driver (regulator)

Additional options:

- inverter (frequency converter);
- week clock
- differential current switch:
- protection of the motors against the operation with abnormal power supply (decay of phase, asymmetry of voltages);
- terminal strips for: remote control cassette, external cooling aggregate control (230V, 5A), CO detector, additional roof fan, exhaust unit.

Used switchgear of top manufacturers of electro-installation equipment decides about the highest level of distribution boards operational reliability and it's placed in the apparatus compartment, behind the front shields and only drives levers are accessible from outside, regulation hand wheels and signal apparatus. Internal connections are totally covered and protected so the service staff can safely realize the operational tasks. The advantage of such box results also from: big space for connecting the cables on by-pass terminals, high safety, operational simplicity, easy service and maintenance as well as safe and friendly construction. Cabling access to the box is on the bottom through the chocking valves, placed on the flow plate. Supply-control box power supply 3x400/50Hz should be realized from the main distribution board equipped with the main switch and differential protection.

Box casing (surface mounted) is made of metal and has the protection level IP54 protection class. Boxes are manufactured in different versions depending on the power of installed motors and types of units. Maximal dimensions for the boxes of different versions are following (height x width x depth (mm)):

- 500 x 400 x 200 water heater,
- 800 x 600 x 300 water heater with inverters;
- 600 x 600 x 250 electric / gas heater
- 800 x 600 x 300 electric / gas heater with inverters;

It's possible to make the control boxes including the control systems for several units.

CPU DRIVER

Siemens CPU driver operates within the range of analog and constant signals. It realizes the regulation and adjustment functions in ventilation, air condition and heating units.

Main functions realized by the driver are following:

- ensure the programmed unit operation
- heating and cooling sequence
- regulation of the supply air temperature and in the compartment (-35°C ÷ 130°C) with imitation of minimal and maximal value
- air humidity regulation in compartment (0 ÷ 100%)
- two level protection of the heater against freezing
- switching the working mode day/night (economic/comfort)
- control of: pumps, mixed air throttling valves, multistage aggregate
- CO₂ concentration control, fan compression and filter contamination
- read out of all measured values (value of temperatures from all the connected detectors, programmed setting, value of control signals, actual time, operation signalization and alarm activation).

Loading and modification of all data is realized directly with the help of elements located on the front plate of the driver and any additional auxiliary devices, like for example PC, are not necessary.

Supply voltage	24V AC	
Two-settings inputs	1 ÷ 2 pcs.	
Universal inputs	3 ÷ 5 pcs.	
Analog outputs	1 ÷ 3 pcs.	
Relay outputs	2 ÷ 6 pcs.	

EXECUTIVE ELEMENTS

As the very important function for system user we can indicate the operation control of individual units elements which allow to assess the correctness of the operation and immediate reaction in the case of improper operation. Processes of optional parameter adjustment wouldn't be possible if the controller had no information about its value and if couldn't influence on this value. Thus, the executive, signal and measurement elements are used which are very important for parameters adjusting from which depend the adjustment quality (accuracy, reliability, economy, costs savings and energy consumption).


Control and executive components of automatics used in JUWENT units work with temperature switch and are made by SIEMENS company, which guarantees the highest quality and long time failure-free operation.

Automatics systems presented in catalogue used as the units equipment include:

- anti-freeze thermostat;
- thermostat protecting against overheating;
- channel temperature sensor;
- room temperature sensor;
- valves;
- valves servo-motors;
- differential pressure switch;
- throttles servo-motors;
- inverter (frequency converter);
- carbon monoxide detector CO;
- remote control cassette;

ANTI - FREEZE THERMOSTAT

In the ventilation and air condition units with water heaters it's recommended to use the anti-freeze heater protection system (anti-freeze system). Thermostat has the capillary uniformly installed along the heater area which after lowering the air temperature (even on the short capillary distance) below the limit temperature (recommended 5°C) transfers the signal to the regulator which as the answer to thermostat: signalizes the alarm state, switches the fan off, closes the external air throttling valves, totally opens the heater heating water valve and switches the water pump on. The system will return to the normal working mode after the increase of heater temperature.

Measurement range	-5...+15°C	
Factory settings	5°C	
Type of contact	switching	
Capillary length	3 or 6m	
Protection level	IP54	

THERMOSTAT PROTECTING AGAINST OVERHEATING

In the units with electric and gas heaters we use the bistable thermostats intended to control the heater operation. Heater temperature increase above the safe level cause change of connection position in thermostat and the adequate reaction of the control system: heater power supply voltage is switched off and then fan is running until the heater temperature will decrease. In addition the heater is switched on only if we are sure that the air flows through it.

DUCT TEMPERATURE SENSOR

Duct temperature sensor is used for measuring the inlet and outlet air temperature as well as the limiting sensor (for example for minimal limitation of supply air) in vent ducts or directly inside the unit. In case of regulation according to supply air temperature we install it behind the fan whereas in case of regulation according to outlet air temperature we install it always in front of the fan at the outlet.

Measurement range	-50...+80°C	
Measuring element	LG-Ni 1000	
Measuring probe length	0,4m	
Protection level	IP42	

ROOM TEMPERATYURE SENSOR

Room sensor is used for measuring the temperature measurement in the compartments heated by heating, ventilation and air condition installations if the high comfort level is required.


Measurement range	0...+50°C	
Measuring element	LG-Ni 1000	
Protection level	IP42	

VALVES

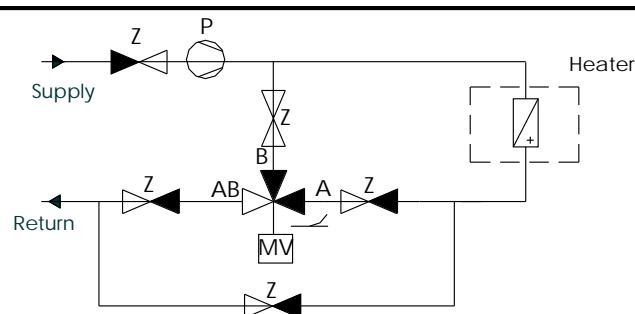
In air condition units the valves are widely used for the following flow adjustments:

- heating medium (water or steam) adjustment by heaters
- cooling medium (water, glycol) adjustment by coolers
- ice water medium adjustment by the coolers

Used three-way valves have the mixing function and should be installed on return. Medium flow depends on the signal from regulator. System regulation with using the valve consists in such valve moss adjustments that we receive the adequate medium flow through the valve what influences eg. the temperature of heated air. Valve shaft adjustments in the set position is enabled by the servo-motor with electric drive installed on the valve.


DN	k _{vs} , m ³ /h continous signal	t[°C]	PN	
20	4	1..110	16	
25	6,3			
25	10			
32	16			
40	25			
50	31			

FITTINGS:
 Z: cut – off valve: manual
 P: circulating pump
 MV: three-way adjusting valve - operated with servo-motor



VALVES SERVO-MOTORS

For direct assembly on the valves the servo-motors with electric drive are used enabling fluent valve adjustment. Position (moved out) of servo-motor stem is proportional to the control signal value sent from the driver (DC 0...10V). Thus, having information concerning the control signal value we can determine in which position is placed the valve stem. Used servo-motors have the possibility of manual adjustment.

Servo-motor type	continous signal 0...10V	
Supply voltage	24V AC	
Closing / opening time	150 s	
Protection level	IP40	

DIFFERENTIAL PRESSURE SWITCHES

Pressure switch is an element used to indicate the pressure or pressure difference. Signalization is conducted via switchable contact. Pressure level or pressure difference at which the contact changes its position is determined by handwheel by setting it to required pressure value.

The pressure switches in the units are used for:


- signaling air filter contamination (dirt build-up causes pressure increase on the supply line to the filter),
- controlling fans v-belts (working fan causes creation of differential pressure).

Measurement range	20...1000Pa	
Type of contact	switching	
Protection level	IP54	

THROTTLES SERVO-MOTORS


Servo-motors are used for controlling the air throttling valves which task is to position the air throttling valve in required position. Depending on the way of throttling valves control in the units, we use the servo-motors of following type:

- open/close (on/off) with return spring. For fresh air inlet throttling valves control where the safety function is required (water heaters protection against freezing) which permits to close the throttling valve despite lack of supply voltage.
- Open/close (on/off) without return spring. Used for the throttling valves control which don't require adjustment and without water heater (freezing danger) or with water heater but only in case when fresh air is already preliminary heated.
- with the continuous operation with the return spring. Used for the recirculation throttling valves control in the mixing chamber of supply/exhaust units as well as those which realize the safety functions (for example: protection of water heaters against freezing). Placing the throttling valve in given position is achieved by sending the control voltage of the value 0-10V.

Servo-motor type	on/off	continous signal	
Supply voltage	24V AC	24V AC	
Closing / opening time	150 s	150 s	
Protection level	IP 54	IP 54	


INVERTER (FREQUENCY CONVERTER)

Frequency converter enables adapting the units air capacity to the building requirements with the fluent or multi-stage motors rotational velocity adjustment. Using the inverter gives also measurable electric energy savings, protects the motor against the overload and decreases the level of produced noise.

Voltage	400V	
Power	0,37...22kW	
Protection level	IP20	


CARBON MONOXIDE DETECTOR

CPU controlled carbon monoxide detector is intended for continuous control of carbon monoxide presence in the compartments endangered with the emission of this gas. Control is performed by cyclic measurement of CO concentration CO in surrounded air. With the moment of exceeding strictly determined threshold values the control outlets are activated which force change of the fan speed.

Supply voltage	230V AC	
Detected gases	carbon monoxide 25 to 1000ppm	
Control signals	Alarm1, Alarm2	
Protection level	IP40	

REMOTE CONTROL CASSETTE

Enables switching the unit on/off from any compartment and the working signalization or system failures. Box casing is made of plastic.

Dimensions width x height x depth	175x160x90mm	
Protection level	IP55	