YORK® YMB MODULAR AIR HANDLING UNITS

The best choice for any application

Johnson Controls

At Johnson Controls, we look at buildings in a way very few others have ever imagined. When we look at a building, we see beyond the bricks and mortar. Beyond the steel and glass. We see a bigger picture. We see the power of the human enterprise.

That's why we create buildings and environments that help people achieve – and that give buildings, businesses and people every opportunity to reach their full potential.

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YORK® YMB
Modular Air Handling Units

Building and indoor climate requirements are constantly evolving. They can be influenced by many factors: energy legislation, occupancy churn, lighting, IT infrastructures.. all important reasons that highlight the need for reliable, efficient Air Handling units.

An Air Handling unit can be required to heat, cool, humidify, dehumidify, filter and provide cost effective heat recovery. This means you want equipment you can rely on, from a name you know and trust. By combining **YORK®** and **Johnson Controls**' more than 125 years in the HVAC&R industry, we bring you the **YORK® YMB** range of Air Handling Units – the result of continuous effort to improve the quality and engineering of our products.

Suitable for use in either new building developments or upgrades and refitting of existing buildings, our **YMB** range of AHU offers a choice of performance enhancing features such as

Energy Recovery

- Enthalpy wheels for greatest efficiency
- Plate heat exchangers and heat pipes for applications requiring complete airstream isolation

Optimized Fan Selections

- Direct-drive options eliminate drive losses and reduce maintenance costs
- Premium efficiency motors
- Variable Speed Drive (VSD) for precise air volume control

Optimized Performance

- YORK® SmartPAC Factory Packaged Controls

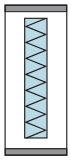
Our knowledge, flexibility and commitment to the customer address four primary requirements of building owners and designers– efficiency, flexibility, sustainability, and confidence.

Component sections

Filtration section

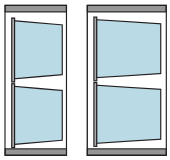
Panel filters

Functions and applications	· class: G4 · designed to be used in air-conditioning systems as preliminary filters that extend the service life of other sub-assemblies of air-conditioning units or high-efficiency filters · high mechanical resistance and durability
Construction	· housed in galvanized steel frames



Bag filters

Functions and applications	· class: F5, F7, F9 · high efficiency filters installed in Air Handling Units as the last stage of filtration, or as preliminary filtration for F9-H11 class filters · high dust-storage capacity combined with relatively small size
Construction	· housed in galvanized steel frames



Absolute HEPA filters

Functions and applications	· class: H10-H13 · application: hospitals, electronic, optical, nuclear, pharmaceutical industries, etc · high degree of filtration of fine dust, smoke, soot, pollen and bacteria
Construction	· frames and membranes made of galvanized steel

Carbon filters

Functions and applications	· efficient removal of undesirable smells thanks to the implementation of activated carbon · minimum filtration efficiency of 99.97% for 0.3µm particles · application: rooms of very high purity class, among others
Construction	· frames and membranes made of galvanized steel

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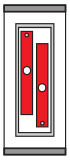
Heating section

Water heater / Glycol heater

Functions and applications	· heating of ventilation air supplied to the room or space · heating of ventilation air after the drying process to remove moisture
Construction	· a block of aluminium fins and copper tubes · manifolds with additional stub pipes: for exchanger venting and for draining heating medium from the heater · slide rails and coil frames made of galvanized steel
Maximum heating medium temperature	· 150°C
Max. operating pressure	· 1.6 MPa

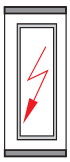


Steam heater

Functions and applications	· heating of ventilation air supplied to the room or space · heating of ventilation air after the drying process to remove moisture
Construction	· variable, dependent on operating pressure of steam · slide rails and coil frames made of galvanized steel
Maximum heating medium temperature	· 200°C
Max. operating pressure	· 1.6 MPa
pH coefficient of steam	· should be within the range: 7.5 ~ 9.5
Oxygen content	· should not exceed 0.01 mg/l

Electric heater

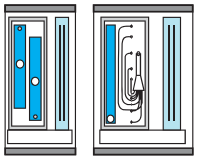
Functions and applications	· heating of ventilation air supplied to the room or space · heating of ventilation air after the drying process to remove moisture
Construction	· stainless steel elements · factory-made internal electrical connections · temperature protection measures: a thermostat and high temperature cut out facility designed to cooperate with an automatic control unit that controls heater operation · slide rails and frames made of galvanized steel
Minimum air flow speed	· 1.5 m/s



Cooling section

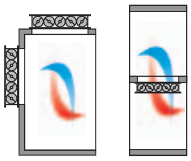
Water cooler/glycol cooler/freon cooler

Functions and applications	· cooling of ventilation air supplied to the room or space
Construction	· a block of aluminium fins and copper tubes · droplet eliminator (best results in droplet elimination obtained, when the coil face velocity is within the range of 2.5–4 m/s), trap, condensate tray · water cooler manifolds with additional stub pipes: for exchanger venting and for water draining · slide rails and coil frames made of galvanized steel · a tray made of galvanized metal sheet coated with polyester (stainless steel when supplied in hygienic version)
Maximum operating pressure	· water/glycol cooler – 1.6 MPa · freon cooler – 2.2 MPa



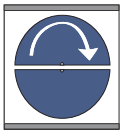
Mixing section

Functions and applications	· mixing of re-circulated air with fresh air in the proportion defined by the system design · heat, cold and humidity recovery
Construction	· multi-blade dampers · damper housings and blades made of profiled aluminium · wheels and bearings made of polyamide modified with glass fibre (up to 25%) · blade seals and flexible connections available



Rotary heat exchanger section

Functions and applications	· heat, cold and humidity recovery and hygroscopic humidity recovery · heat recovery realized through the transfer of heat from the exhaust air stream through finned heat exchanger to the supply air stream · heat recovery efficiency up to 85%
Construction	· heat exchanger with variable rotational speed of the rotor · slide rails and housing made of galvanized steel · rotor housing made of galvanized steel sheets



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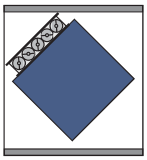
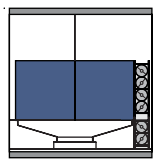
Cross-flow heat exchanger section

Functions and applications	· heat and cold recovery · heat exchange process is realized by exchange of heat between the hot air stream and cold air stream · up to 70% of temperature heat recovery
Construction	· aluminium plates, epoxy coated in case of installation in an aggressive environment · damper with by-pass facility · slide rails and housing made of galvanized steel · a tray made of galvanized metal sheet coated with polyester (stainless steel when supplied in hygienic version)



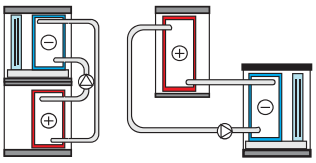
Double cross-flow heat exchanger section CROSS-DUO

Functions and applications	· heat and cold recovery · heat exchange process is realized by exchange of heat between the hot air stream and cold air stream · up to 80% of temperature heat recovery
Construction	· aluminium plates, epoxy coated in case of installation in an aggressive environment · damper with by-pass facility · slide rails and housing made of galvanized steel · a tray made of galvanized metal sheet coated with polyester (stainless steel when supplied in hygienic version I)



Glycol recovery system section

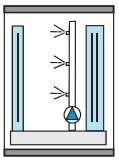
Functions and applications	· heat and cold recovery · heat recovery realized through a circulating medium; the medium receives heat from one heat exchanger (installed in the stream of exhaust air) and transfers it to the other heat exchanger (installed in the stream of supplied air) · heat recovery up to 60%
Construction	· a heat exchanger comprised of block of aluminium fins and copper tubes of the exchanger · droplet eliminator (best results in droplet elimination obtained, when the coil face velocity is within the range of 2.5-4 m/s), trap, condensate tray · water cooler manifolds with additional stub pipes: for exchanger venting and for water draining · slide rails and coil frames made of galvanized steel · a tray made of Aluzinc (stainless steel when supplied in hygienic version)



Humidification section

Air Washer

Functions and applications	· humidification of suppy air · used especially in larger installations, where high loads are required without generating high level of electric energy consumption · humidification efficiency: approx 95%
Construction	· body made of plastic reinforced with glass fibre · air inlet guide vane, water distributing pipelines, water nozzles assembly, droplet eliminator, water pump, conduits, float valve · all metal elements made of corrosion-resistant materials



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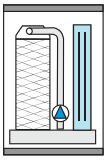
Humidification section (cont.)

"Wet Deck" type

Functions and applications	· humidification of supply air · three versions depending on device efficiency: 65%, 85%, 95%
Construction	· all metal elements made of stainless steel · for air flow speeds exceeding 3.5 m/s, the section is supplied with a droplet eliminator · slide rails and housing made of galvanized steel



Direct Injection ("live" steam) type

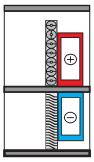
Functions and applications	· humidification of supply air · supply of steam from an external source at the pressure of 0.015 MPa – 0.4 MPa · four-stage steam preparation process · capacity: 0.6-1800 kg/h · application: especially in facilities that have a source of steam used for other processes, e.g. in hospitals
Construction	· elements made of cast iron and stainless steel

Self Generating type

Functions and applications	· humidification of supply air · water inside a tank is heated by electrodes to the boiling point and the generated steam is distributed into the units · steam generation capacity: 5-90 kg/h (in case several humidifiers are connected in one air-conditioning unit, the capacity is up to do 500 kg/h)
Construction	· humidifier made of plastic and stainless steel · electric steam generator, spraying lance, elastic hoses for supplying steam and condensate removal · supply of municipal water, softened or demineralised (hardness: 10 - 40 French DFst.) at the pressure of 1 ÷ 6 bar and temperature of < 40°C · drain tray made of aluzinc sheet (stainless steel in hygienic version

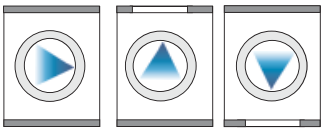
Heat pipe section

Functions and applications	· heat recovery through the circulation of refrigerant within a seald housing · up to 70% of temperature heat recovery
Construction	· damper with by-pass · drain tray made of Aluzinc sheet (stainless steel in hygienic version)



Fan section

Functions and applications	· circulating air from an area with lower pressure to an area with higher pressure · fan types used: centrifugal fan, plenum fan
Construction	· electric motor, belt transmission (in case of a centrifugal fan), frame, anti-vibration mounts · fan outlet connected to the housing of the air handling unit by means of elastic flexible connection · maintenance-free fan bearings – life: up to 40 000 hours at the maximum rotational speed · electric motor powered with the voltage of 400V or 230V · optional: servicing circuit breaker · available motor types: one-speed, two-speed, explosion-proof or inverter-controlled; protection grade: IP54 · centrifugal fan with choice of forward or backward inclined blades



Attenuation section

Functions and applications	· reduction of the noise level generated by the Air Handling Unit
Construction	· set of baffles made from galvanised steel · absorbing material – mineral wool with a veil protecting against moisture ingress and wool fibre migrating into ducts

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Cooling system section

Functions and applications	· cooling of suppy air · coefficient of performance (COP)= typically 2.5 - 5 · suitable for connection to condenser section
Construction	· a block of aluminium fins and copper tubes · droplet eliminator (best results in droplet elimination obtained, when the coil face velocity is within the range of 2.5-4 m/s), trap, condensate tray · water cooler manifolds with additional stub pipes: for exchanger venting and for water draining · slide rails and coils frames made of galvanized steel · scroll type compressor with lower level of electric energy consumption than in reciprocating compressor

Heat pump system section

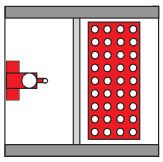
Functions and applications	· heating of supply air (recovery of heat from exhaust air and heat transfer to supply air)
Construction	· coil blocks of aluminium fins and copper tubes · droplet eliminator (best results in droplet elimination obtained, when the coil face velocity is within the range of 2.5 to 4 m/s), trap, condensate tray · slide rails and coil frames made of galvanized steel · a complete integrated refrigeration system with all necessary controls, regulation and valves · scroll type compressor with lower level of energy consumption than in tradtitional reciprocating compressor

Reversible system section

Functions and applications	· cooling of supplied air in summer, heating supplied air in winter
Construction	· coil blocks of aluminium fins and copper tubes · droplet eliminator (best results in droplet elimination obtained, when the coil face velocity is within the range of 2.5 to 4 m/s), trap, condensate tray · four-way solenoid valve

“Pegaz” flow and heat-exchanger gas heater

Functions and applications	· heating air in ventilation installations with forced air circulation
Construction	· the heater is equipped with a gas burner: a one-step, two-step (progressive), modulated burner · burners for the following types of gaseous fuel: natural gas from E, Lw and Ls groups and liquid gases: P (technological propane), B/P (LPG) · by-pass facility · slide rails and housing made of galvanized steel sheets



Spacer section

Functions and applications	· an “empty” section for connecting sections of air-conditioning units in case it is necessary to increase the distance between particular sub-assemblies or to install atypical equipment inside the air handling unit
Construction	· manufactured in sections of 100mm increments 300-3000mm · section length adjusted to requirements

Available components and functions for ceiling void mounted units

- Mixing section
- Cassette filter section
- Bag filter section
- Carbon filter section
- Flat filter section
- Absolute filter section
- Water heater section
- Electric heater section
- Steam heater section
- Freon cooler section
- Water cooler section
- Ventilator system section
- Damping section
- Transitory section
- Humidification section
- Cross-flow heat exchanger section

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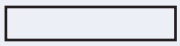
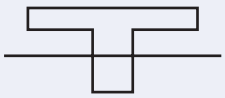
Construction and assembly

CONSTRUCTION		STRUCTURAL DESIGN
SECTIONAL		· housing made as a skeleton structure of aluminium profiles with insulated walls consisting of fixed panels, removable panels and doors · panels and doors made of two sheets of galvanized steel (external sheet metal coated with polyester) filled with 25 mm or 50 mm thick insulation made of mineral wool
COMPACT		
DUCTLESS		
SUSPENDED		· housing made as a frameless structure consisting of: · C-shaped shell-type panels and a removable panel (for 1150 mm long units) · panel-type housing consisting of three fixed panels and a removable panel (for units that are longer than 1150mm) · panels made of two sheets of galvanized steel (external sheet metal coated with polyester) filled with 40 mm thick insulation made of mineral wool (70 mm optionally)

Air Handling Unit automation and device control

Upon request, Air Handling units can be supplied with **YORK® SmartPac** factory fitted automation and **BMS controls package**.

YORK® SmartPac is designed with all necessary protection measures required for proper and safe operation of our Air Handling Units.

The control panel contains thermal protection for fan motors and protective devices for each module powered from the station. The BMS controller maintains set-up air parameters depending on the functional assembly of the unit by adjusting:

- Temperature (heating, cooling, heat or cold air recovery);
- Humidity (dehumidification, humidification);
- Air efficiency (driven by inverters to maintain constant flow rate or pressure);
- By switching operation modes according to Seasonal and/or weather demands.

Moreover, the automation system:

- detects Air Handling Units with **water heaters** – protects heat exchangers against freezing by opening the heater valve and stopping the unit, when the air temperature behind the heat exchanger drops below a safe value;
- recognises Air Handling Units with **electric heaters** – controls their power to prevent overheating of elements;
- In systems with **heat recovery**, it protects heat exchangers against frosting by taking maximum advantage of the energy from the exhaust air extracted from a room;
- is equipped with **alarm monitoring** that reports the condition of air filters and the need to replace them if resistance increases.

YORK® SmartPac controllers are provided with open protocols, and can be integrated with a BMS system with BacNet MSTP, or BacNet over I/P.

For standalone applications, the AHU can be supplied with a simple Key Pad and display.

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Air Handling Unit characteristics

YMBS / YMBD

Available sizes	12
Airflow range (m^3/h)	1 000 ~ 100 000
Application	· housing and reatil construction industry · public utility buildings · industrial facilities construction · leisure facilities
Basic options	· G4 class filters · F5, F7, F9 class filters · heat recovery · water / steam / glycol / electric heater · water / glycol / freon cooler · humidification, fan and attenuation section
Additional options	· sub-assemblies manufactured as explosion-proof · swimming pool version · hygienic version · automation module · automation module designed to cooperate with intelligent BMS system
Heat recovery	· recirculation · cross-flow heat exchanger · rotary heat exchanger · heat pipe · glycol recovery system · heat pump
Installation type	indoors (YMBS) / outdoors (YMBD)

YPS

Available sizes	4
Airflow range (m^3/h)	500 ~ 5 100
Application	· in suspended ceilings and wherever building construction limitations do not allow other systems to be implemented, e.g. in: · industrial workshops · warehouses · wholesale establishments · workshops · offices, etc
Basic options	· G4 class filters · F5, F7, F9 class filters · heat recovery · water / steam / glycol / electric heater · water / glycol / freon cooler · humidification, fan and attenuation section
Additional options	· sub-assemblies manufactured as explosion-proof · automation module · automation module designed to cooperate with intelligent BMS system
Heat recovery	· cross-flow heat exchanger · recirculation
Installation type	indoors

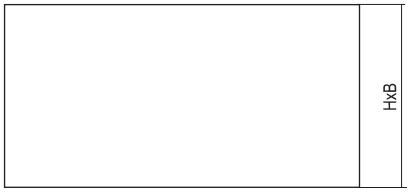
YMBS/YMBD and YPS performances

YMBS/YMBD*				
Unit size	Airflow range [m³/h]	Width B	Height H1	Height H2
Insulation 25 mm				
1	1 000 - 3 000	690	640	1 280
2	2 600 - 4 100	740	740	1 480
3	3 900 - 6 100	980	740	1 480
4	6 000 - 9 400	980	1 050	2 100
5	8 000 - 12 600	1 290	1 050	2 100
Insulation 50 mm				
1	1 000 - 3 000	690	600	1 280
2	2 600 - 4 100	740	700	1 480
3	3 900 - 6 100	980	700	1 480
4	6 000 - 9 400	980	1 010	2 100
5	8 000 - 12 600	1 290	1 050	2 100
6	9 600 - 15 100	1 290	1 250	2 500
5-BIS	11 000 - 17 000	1 580	1 050	2 100
6-BIS	13 200 - 21 000	1 580	1 250	2 500
7	13 500 - 21 300	1 580	1 370	2 740
7-BIS	18 000 - 28 000	1 885	1 370	2 740
8	21 300 - 33 700	1 885	1 670	3 340
9	26 000 - 41 000	1 885	2 020	4 040
8-BIS	30 000 - 46 000	2 400	1 670	3 340
10	34 000 - 53 000	2 400	2 020	4 040
8A-BIS	38 000 - 59 000	3 000	1 670	3 340
11	43 000 - 69 000	2 400	2 500	5 000
10-BIS	46 000 - 71 500	3 000	2 020	4 040
12	57 000 - 90 000	3 000	2 500	5 000
12-BIS	68 000 - 106 000	4 800	2 020	-

* YMBD only in 50 mm thick insulation (optionally, YMBS and YMBD in 70 mm thick insulation)

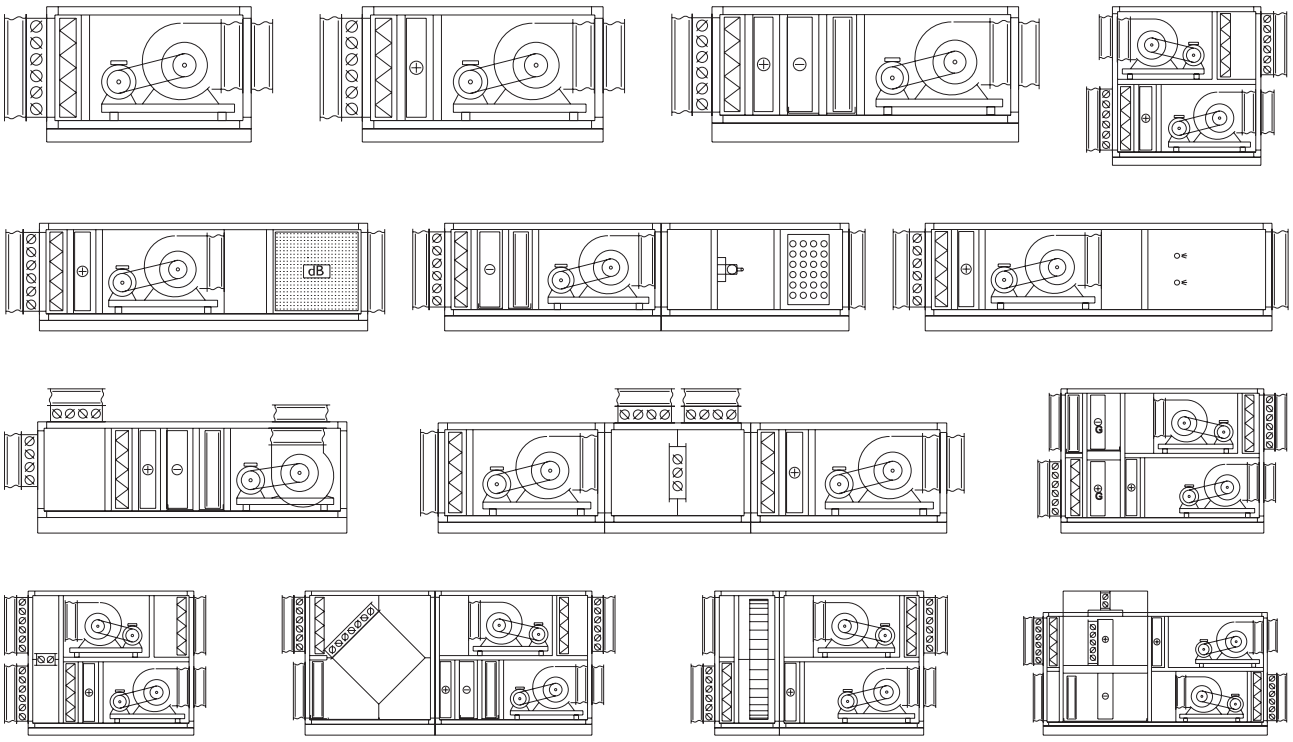
YPS			
Unit size	Airflow range [m³/h]	Width B	Height H
Insulation 40 mm			
1	500 - 3 000	760	395
2	1 100 - 4 500	1 070	395
3	800 - 3 600	760	525
4	1 700 - 5 100	1 070	525

YMBS/YMBD

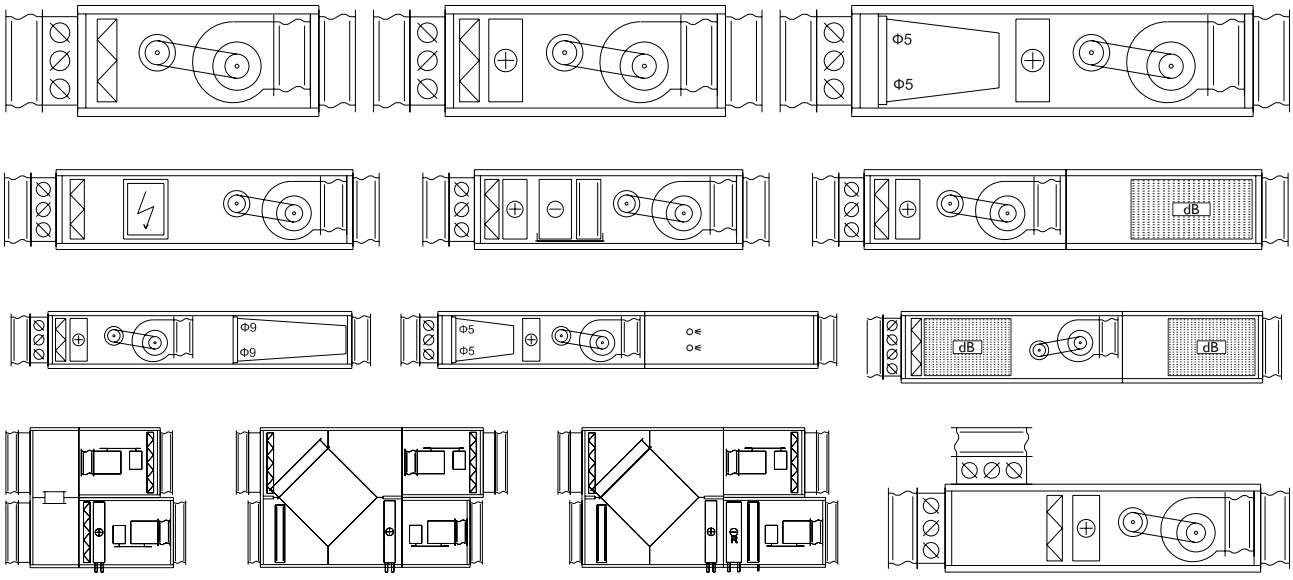


YSP

Examples of configurations of YMB Air Handling Units:



Examples of configurations of YPS Suspended Air Handling Units:



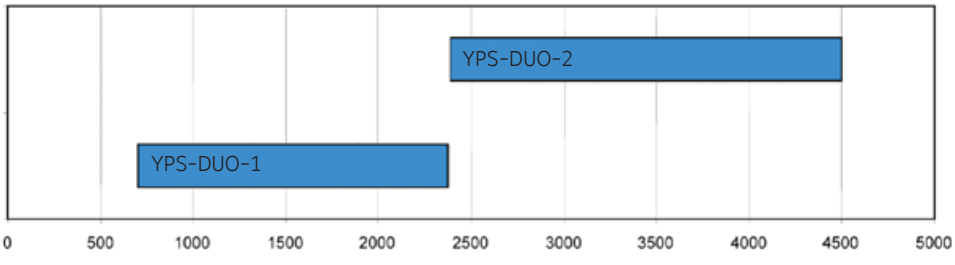
YPS-DUO suspended ventilation units

This series of air-conditioning units consists of two sizes: **YPS-DUO size 1** and **YPS-DUO size 2**.

- **Heat recovery** is realized through an assembly of two rotary heat exchangers that ensure temperature efficiency reaching up to 82%.
- The devices are **frame-less structures** with 50 mm thick panels, which ensure proper heat and sound insulation.
- **Insulation** is made of mineral wool and thermaflex.
- The **innovative construction** and the implementation of rotary heat exchangers allows the air-conditioning units to be reduced to 1880 mm.
- Proper levels of **air flow delivery** are ensured by axial-flow centrifugal fans with direct drive.
- The housing construction allows the device to be extended with a **water/freon cooler section**, attenuator section or to replace class G4 filters with class F5/F7 filters.
- As a standard, the device is **adapted to be suspended**. It is possible to place the unit on legs. Then, the device is accessed from the top for maintenance purposes.
- There is a possibility to equip this device with the system of **adjustable guards**. This solution is a very important simplification of air-handling unit usage and it also increases user safety.

YPS-DUO

Device type	suspended	
Available sizes	2	
Insulation thickness	50 mm	
Airflow range (m^3/h)	YPS-DUO-1 (700-2400 m^3/h) YPS-DUO-2 (2400-4500 m^3/h)	
Basic options	· filter G4 · water heater	· double rotary heat exchanger · axial-flow centrifugal fans
Additional options	· filter F5, F7 · water/freon cooler · electric heater	· dampers · automation module
Installation type	indoors	
Other features	· high heat recovery efficiency - up to 82% · special self-supporting structure, without aluminium profiles (heat bridges eliminated)	
Dimensions of the basic version	· YPS-DUO-1 H x L x D = 635 x 1260 x 1880 mm · YPS-DUO-2 H x L x D = 785 x 1560 x 1880 mm	
Weight	· YPS-DUO-1 = 320 kg · YPS-DUO-2 = 450 kg	



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YMB AURA ventilation units with heat recovery

- **Automation module** – allows temperature of the supply or exhaust air to be maintained.
- **Temperature control** – through the adjustment of the rotational speed of the rotary heat exchanger, if it is hot in the space, the heat exchanger is not in operation.
- When the **room temperature drops**, the regulator increases the rotational speed of the heat exchanger, which increases the heat recovery efficiency; if the room temperature keeps dropping in spite of high rate of rotation, the amount of supply air is reduced to ensure constant room temperature
  - if the device is equipped with a **heater**, it is used to heat air up in the conditioned space, should the room temperature keeps dropping in spite of maximum rate of rotation of the heat exchanger.
  - if the device is equipped with a **cooler**, it is used to cool air down in the conditioned space, should the room temperature keeps growing in spite of stopping the rotation of the heat exchanger.
- constant airflow can be maintained regardless of pressure increase due to filter condition;
- airflow is maintained by means of airflow sensors that determine the necessary fan speed (when maximum filter capacity is exceeded, an alarm signals they must be replaced).

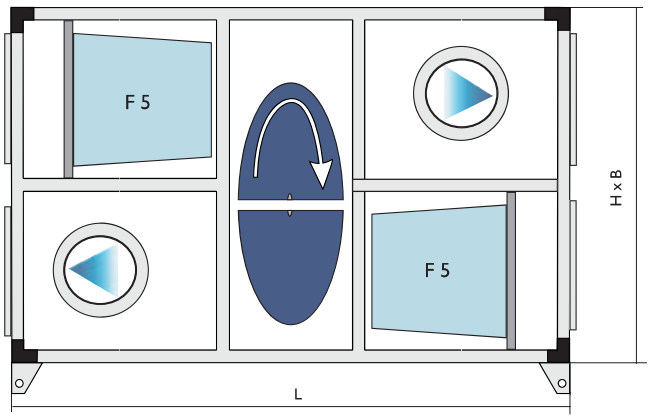
Mode of operation:

1. **Switch Off** – the unit does not operate. In the case of units with a water heater, only the anti-freezing functions are active.
2. **Operation at minimum delivery** – the unit regulates the temperature and delivery of air at the minimum set delivery.
3. **Operation at rated delivery** – the unit regulates the temperature and delivery of air at the rated delivery.

Available sizes	2
Airflow range (m^3/h)	400–12 000
Application	• especially suitable for areas with high heat gains and space temperatures • offices, banks, conference halls, cafes, restaurants, discos, schools
Basic options	• 2 axial-flow centrifugal fans • F5 class filters • heat exchanger • automation module
Additional options	• electric/water heater • water/freon cooler • automation module designed to cooperate with a superior BMS system
Heat recovery	• regenerative rotary heat exchanger
Installation type	indoors
Other features	• devices may operate only in the horizontal position, but the connections of the exhaust and supply air may be adjusted, depending on the needs, without rotating the unit

YMB AURA technical features

			Insulation thickness: 30 mm		Insulation thickness: 50 mm	
Unit size			1	2	3	4
Delivery range		m^3/h	400 - 1 500	700 - 3 000	2 000 - 6 000	3 500 - 12 000
Electric characteristics for one motor	Rated power	kW	0.55	1.1	2.2	4
	Rated speed	rpm	2 790	2 835	2 850	1 435
	Nominal current	A	1.38	2.45	4.65	9
	Maximum speed	rpm	4 500	4 300	3 250	2 250
	Maximum frequency	Hz	79	76	57	78
	Power supply	V/Hz	3x400/50	3x400/50	3x400/50	3x400/50
Heat recovery	Efficiency	%	87-77	87-71	88-73	88-70
Dimensions	Width B	mm	860	1 010	1 500	1 900
	Height H	mm	860	1 010	1 500	1 900
	Length L	mm	1 360	1 500	1 810	2 400
Weight		kg	215	280	650	1 050



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HYGIENIC YMBS/YMBD Air-Conditioning units

Available sizes	19
Available types	YMBS-h, YMBD-h,
Airflow range (m^3/h)	1 000-100 000
Application	· spaces where a high air purity class is to required to be maintained, such as: · hospitals · laboratories · production facilities in pharmaceutical industry, food industry and electronic industry, etc.
Basic options	· G4 class filters · F5, F7, F9 class filters · heat recovery · water/steam/glycol/electric heater · water/glycol/freon cooler · humidification section · fan system · attenuator section
Additional options	· automation module · automation module designed to cooperate with intelligent BMS system
Heat recovery	· recirculation · cross-flow heat exchanger · rotary heat exchanger · heat pipe · glycol recovery system · heat pump
Installation type	Indoors YMBS / outdoors YMBD
Other features	· heat exchanger housing made of stainless steel, internal and external shielding plates (fixed panels, removable panels or doors) made of sheet metal galvanized on both sides (thickness: 0.7 mm), coated with a polyester coating · sloping floors made of stainless steel internal elements - e.g. the frames and slide rails – are made of stainless steel sheet · painted fans with a drainage plug or an inspection door for cleaning operations · bolts, self-piercing screws and pop rivets are made of stainless steel · access sections with IP 54 lighting, IP 56 UV lamps; IP 56 lamps in the humidifier section · automation module – IP 54 · silicone with fungicidal agent used in assembly

Warranty and Service

For added peace of mind, YMB series Air Handling units come with a warranty period of up to 24 months subject to terms and conditions (18 months as standard).

Johnson Controls will also be pleased to discuss your service and maintenance requirements and offer you a service contract.

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PUB-6894