

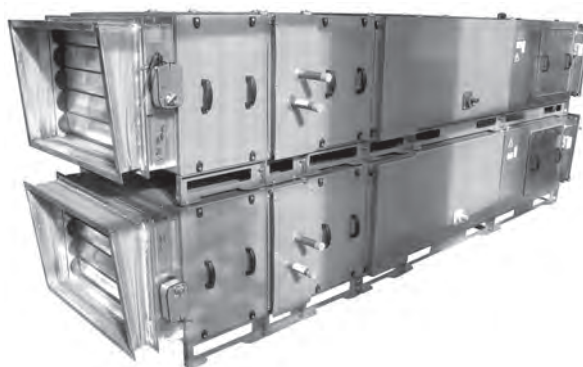
Manufactured in accordance with TU 4862-019-64600223-13

300 – 8000 m³/hour

Fans are denoted as follows:

CBAH - 0,5 - A - 3

- └─ Number of power grid phases
1 – 1x220B,
3 – 3x380B
- └─ Modification
- └─ Enclosure index
- └─ Set type (Complex AHU, low profile)



Low profile complex AHU CBAH (SVAN) are designed for setting up and sustention of artificial climate with set-up parameters in attended rooms of industrial and public buildings and facilities by means of air supply and handling. Annual average and short-time air dustiness before handling shall not exceed 1 mg/m³ and 10 mg/m³ correspondingly. Units are designed for operation in conditions of moderate (Y) and tropical (T) climate of 3rd installation category pursuant to GOST 15150.

Root-mean-square value of external vibration sources vibration velocity at the place of set allocation shall not exceed 2 mm/s.

Units are assembled of separate modules with standardized connection dimensions (see Table 2). Units are mounted on steel supporting frame. See Figure 1 for set block-diagram. Units may be mounted both in horizontal and vertical position, except for units with heat exchanger (cooling). Units with heat exchanger may be installed horizontally only.

Complement of unit modules and their position in the unit structure are defined by the air handling technology set-up at the facility.

Fan unit is represented by the ВПМ (VIPm) series fans (see page 11) with reduced noise characteristics through the walls.

Main parameters of fan unit are presented in Table 1.

ВПМ (VIPm) fans correspond to TU 4861-003-64600223-13.

Water-to-air heat exchangers (heating) Т-КВД (T-KVD) have heat-exchange surface made of two or three rows of copper tubes, ribbed with aluminium foil plates. Steel pipe headers have connecting pipes with 1" male pipe thread.

Coolant parameters:

- ◆ Maximum coolant temperature: 180°C;
- ◆ Working pressure: 1.2 mPa;
- ◆ Maximum allowable excess pressure: 1.8 mPa for water-type models, and 3.2 mPa for Freon-type models;
- ◆ Recommended velocity range for energy carrier in the pipe: 0.4 m/s to 1.75 m/s;
- ◆ Recommended air velocity: up to 3.5 m/s.

Units may be completed with both water-to-air heat exchangers and VOKF-type freon heat exchangers, as well as condensing units (CU). CU are equipped with independent control system.

Unit selection for the certain order may be effected based on the order form (see Appendix 1 on page 202) or using "CVM-Selection" software. Additional components of the unit may also be specified in order form.

See page 185 for the AHU automatic control systems.

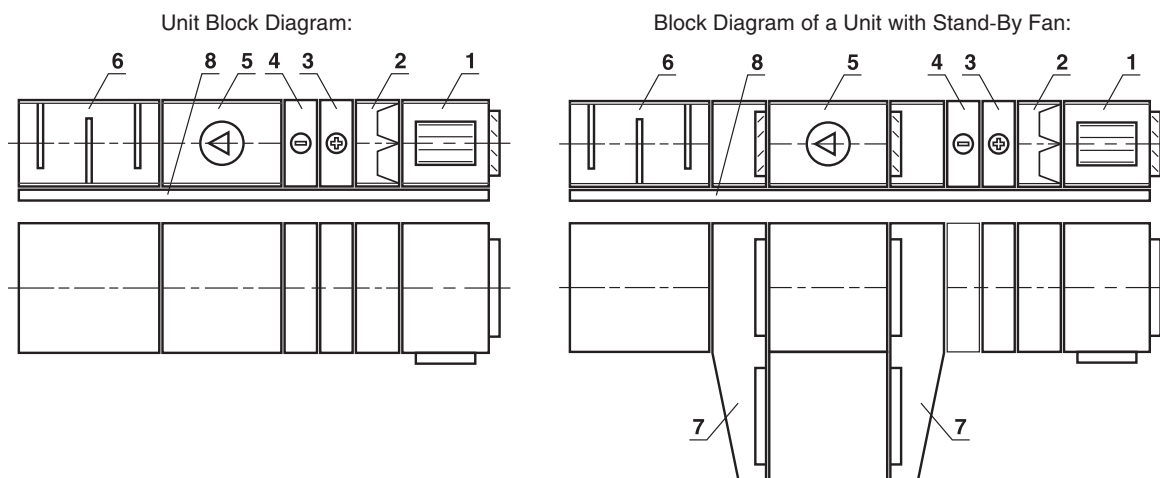


Fig. 1

1 – inlet and mixing box; 2 – filtering unit; 3 – heat exchanger (heating); 4 – heat-exchanger (cooling);
5 – fan unit; 6 – silencer; 7 – intermediate chamber; 8 – steel supporting frame.

Fan Modules Main Parameters

Table 1

Index + СВАН Unit Modification	Cross- Section [m ²]	Fan Type	Electric Motor Type		Frequency n [min ⁻¹]	Power, N _y [kW]	Adjusted Sound Power Level L _{PA} [dB(A)]		
			Three-phase	Single-phase			At the Inlet	At the Outlet	Through The Walls
0,5-A	0,045	ВИПм 30x15А	АИС56А2	АИСЕ56А2	2900	0,09	62	66	45
0,5-Б	0,045	ВИПм 30x15Б	АИР56А2	АИРЕ56В2	2900	0,18	66	70	49
1-А	0,08	ВИПм 40x20А	АИР56А2	АИРЕ56В2	2900	0,18	66	70	49
1-Б	0,08	ВИПм 40x20Б	АИР56В2	АИРЕ56С2	2900	0,25	69	73	52
1-В	0,08	ВИПм 40x20В	АИР63А2	АИРЕ63В2	2900	0,37	70	74	53
1,6-А	0,125	ВИПм 50x25А	АИС56В4	АИСЕ56В4	1450	0,09	61	65	44
1,6-Б	0,125	ВИПм 50x25Б	АИР56В2	АИРЕ56С2	2900	0,25	69	73	52
1,6-В	0,125	ВИПм 50x25В	АИР63А2	АИРЕ63В2	2900	0,37	70	74	53
1,6-Г	0,125	ВИПм 50x25Г	АИР63В2	АИРЕ71А2	2900	0,55	74	78	57
1,9-А	0,15	ВИПм 50x30А	АИР 56А4	АИРЕ56А4	1450	0,12	61	62	45
1,9-Б	0,15	ВИПм 50x30Б	АИР 63В2	АИРЕ71А2	2950	0,55	71	72	55
1,9-В	0,15	ВИПм 50x30В	АИР 71А2	АИРЕ71В2	2950	0,75	75	76	59
1,9-Г	0,15	ВИПм 50x30Г	АИР 71В2		2950	1,1	76	77	60
2,25-А	0,18	ВИПм 60x30А	АИР56В4	АИРЕ56В4	1450	0,18	64	68	47
2,25-Б	0,18	ВИПм 60x30Б	АИР63В2	АИРЕ71А2	2900	0,55	74	78	57
2,25-В	0,18	ВИПм 60x30В	АИР71А2	АИРЕ71В2	2900	0,75	76	80	59
2,25-Г	0,18	ВИПм 60x30Г	АИР80А2		2900	1,5	77	81	60
2,7-А	0,21	ВИПм 60x35А	АИР 63В4	АИРЕ71А4	1450	0,37	67	68	51
2,7-Б	0,21	ВИПм 60x35Б	АИР 71В2		2950	1,1	76	77	60
2,7-В	0,21	ВИПм 60x35В	АИР 80А2		2950	1,5	78	79	62
2,7-Г	0,21	ВИПм 60x35Г	АИР 80А2		2950	1,5	79	80	63
3,55-А	0,28	ВИПм 70x40А	АИР71А4	АИРЕ71В4	1450	0,55	71	75	54
3,55-Б	0,28	ВИПм 70x40Б	АИР80А2		2900	1,5	79	83	62
3,55-В	0,28	ВИПм 70x40В	АИР80А2		2900	1,5	80	84	63
3,55-Г	0,28	ВИПм 70x40Г	АИР80В2		2900	2,2	83	87	66
5-А	0,4	ВИПм 80x50А	АИР80А4		1450	1,1	75	79	58
5-Б	0,4	ВИПм 80x50Б	АИР80В4		1450	1,5	76	80	59
5-В	0,4	ВИПм 80x50В	АИР80В2		2900	2,2	83	87	66
5-Г	0,4	ВИПм 80x50Г	АИР90Л2		2900	3	84	88	67
6,3-А	0,5	ВИПм 100x50А	АИР90Л4		1450	2,2	78	82	61
6,3-Б	0,5	ВИПм 100x50Б	АИР90Л2		2900	3	84	88	67
6,3-В	0,5	ВИПм 100x50В	АИР100S2		2900	4	86	90	69
6,3-Г	0,5	ВИПм 100x50Г	2xАИР90Л2		2900	2x3	93	93	80

List of the Main Modules with Dimensions

Table 2

Characteristics		Unit Nominal Sizes								
		CBAH 0,5	CBAH 1,0	CBAH 1,6	CBAH 1,9	CBAH 2,25	CBAH 2,7	CBAH 3,55	CBAH 5,0	CBAH 6,3
Width (max) [mm]		400	590	650	650	810	810	822	904	1100
Height (max) [mm]		260	450	500	550	550	600	604	704	750
Length (max) [mm]	Fan unit	526	620	670	750	790	790	910	1030	1080
	Receiving unit	404	590	650	650	810	810	822	904	1100
	Receiving unit (primary and fine refining, Pocket-size, EU4 – EU7)	420								
	Water-to-air heat exchanger (heating)	220								254
	Water-to-air heat-exchanger (cooling)									
	Electric heat exchanger	450	450	450-600	600	450-600	600	450-600	450-600	450-600
	Heat-exchanger (cooling) with direct expansion (with separator and tray)	620								474
	Silencer	800		1000						
	Intermediate chambers	400								

Unit modules are provided with space for checkers and transducers installation.

Inlet and mixing boxes may be equipped with single vertical air valve installed in front or with two vertical air valves: one at the front and another on the side.

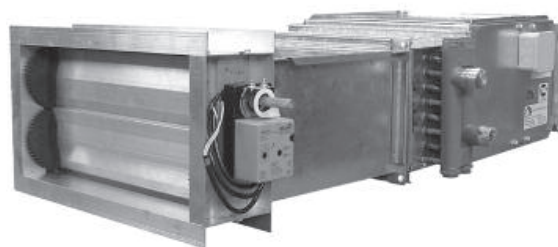
Air valves are supplied complete with manual drive or electric drive depending on order conditions. Valves are equipped with flapper gear drive.

Manufactured in accordance with TU 4862-017-64600223-13

300 – 8000 m³/hour

Standard set consists of:

- ◆ Air control valve with different drive options depending on automatics configuration
- ◆ Pocket filter EU3;
- ◆ Water-to-air or electric heat exchanger (heating);
- ◆ Water-to-air or direct expansion heat-exchanger (cooling)
- ◆ БРПП (VRPP) fan.



CVM Manufacturing Works produces standard units and enhanced configuration units against separate order.

ABC (AVS) units are completed with standardized components of duct systems of the following flow section similar to БРПП (VRPP) fan flow sections (see page 7) in millimeters:

300x150; 400x200; 500x250; 500x300; 600x300; 600x350; 700x400; 800x500; 1000x500. Water-to-air heat exchangers (heating) have exchanging surface made of two or three rows of copper tubes, ribbed with aluminium foil plates. Steel pipe headers have connecting pipes with 1» male pipe thread.

Coolant parameters:

- ◆ Maximum coolant temperature: 180°C;
- ◆ Working pressure: 1.2 mPa;
- ◆ Maximum allowable excess pressure: 1.8 mPa for water-type models, and 3.2 mPa for Freon-type models;
- ◆ Recommended velocity range for energy carrier in the pipe: 0.4 m/s to 1.75 m/s;
- ◆ Recommended air velocity: up to 3.5 m/s.

Heat exchangers (heating) may be mounted in any position, except for the positions, when heat exchanger connecting pipes are directed upward or downward.

Unit selection for the certain order may be effected based on the order form (see Appendix 1 on page 202) or using “CVM-Selection” software. Additional components of the unit may also be specified in order form.



Ventilation box with
removable filter



Valve



Flexible insert



Electric heater

See page 185 for the AHU automatic control systems.

Manufactured in accordance with TU 4861-020-64600223-13

Fans are denoted as follows:

HOBA - 1 B - 2 - 1 K

- Fastening method:
 - K – using mounting brackets
 - Ш1 – pin-mounted to ceiling (sideways flow)
 - Ш2 – pin-mounted to ceiling (downward flow);
- Number of power grid phases
 - 1 – 1x220V
 - 3 – 3x380V;
- Heat exchanger rows number code:
 - 2 – two-rows
 - 3 – three-rows;
- Special enclosure version (Explosion-proof);
- Set nominal size 1, 2, 3;
- Set type (Pod-mount heating and ventilation unit).



Attached heating and ventilation units HOBA (NOVA) are designed for air heating using hot water circulating through aluminum-copper set heat exchanger (heating), and homogeneously distributing of air in a room using fan and guide vanes. Components are designed for operation in inside air. Heat-carrying agent shall not contain substances chemically active towards copper and steel.

Operating pressure of water-to-air heat exchanger (heating) shall not exceed 1.2MPa. Temperature shall not exceed 180 °C.

Implementation of axial fan with special profile blades provides low noise level and low energy consumption during operation.

HOBA (NOVA) unit housing is made of galvanized steel. Optionally, housing may be coated with powder paint. Equipment is supplied completed with control cabinet.

Unit configuration is presented in Figure 1.

Overall and installation dimensions are listed in Table 1. Unit characteristics are presented in Table 2.

Automatic Control System see p.193.

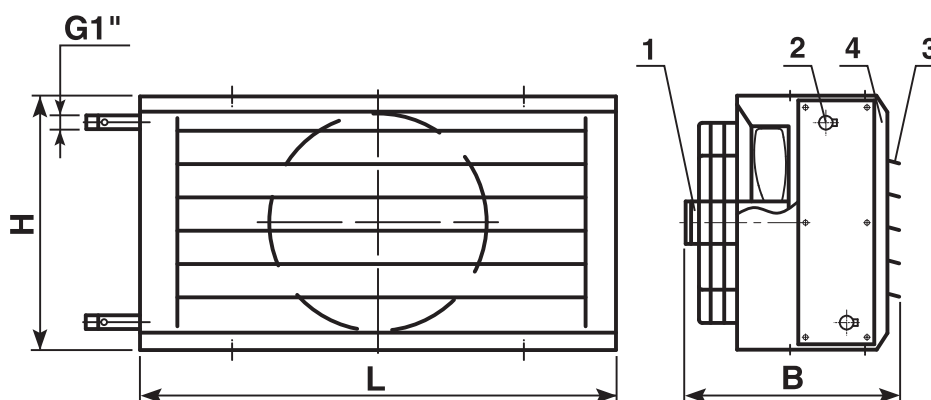


Fig. 1

1 – fan; 2 – heat exchanger (heating); 3 – guide vanes; 4 – housing.

Table 1

Set Name	Dimensions [mm]								
	B	H	L	W _{min}	I	b	b1	h	h1
HOBA - 1	480	460	732	165	400	540	200	200	130
HOBA - 2	462	540	833	180	505	550	144	250	190
HOBA - 3	555	630	1143	200	700	570	200	300	230

Table 2

Characteristics	Unit Nominal Sizes					
	HOBA 1-2	HOBA 1-3	HOBA 2-2	HOBA 2-3	HOBA 3-2	HOBA 3-3
Air flow rate (min) [m ³ /hour]	2000	1800	3000	2600	5000	4600
Heating power [kW]*	15,8	20,6	21,7	25,3	37,7	47,2
Heating temperature [°C]*	23,7	34,3	21,7	29,6	22,6	30,8
Heat exchanger cross-section	600x350		700x400		1000x500	
Voltage [V]	1x220		3x380 (1x220)		3x380 (1x220)	
Motor power [kW]	0,11		0,22		0,25	
Weight [kg]	37	39	43,5	47,5	75	77
Sound power [dBA]	69	69	72	72	75	75

*) At the water temperature of 95/70 °C and air temperature of 20 °C.

Provision of optimal quantity of heating and ventilation unit necessary for the room heating and maintaining of set-up temperature requires definition of demanded heat power enough to compensate heat loss in a room.

Room heat loss mainly depends on:

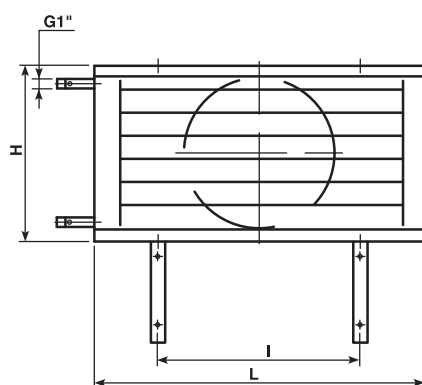
- ◆ estimated ambient temperature
- ◆ required (set-up) indoor temperature
- ◆ heat engineering parameters of surrounding structures.

Demanded heat power definition requires, apart from heat loss, consideration for heat gain, for instance, from working indoor machinery, equipment and people.

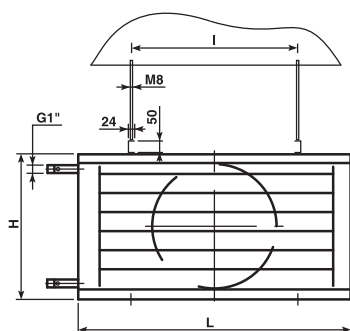
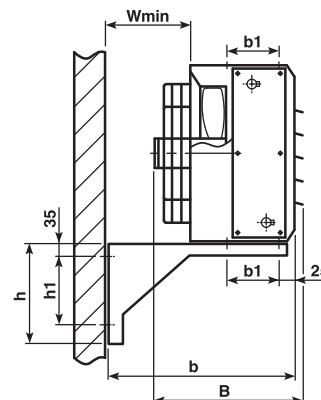
HOBA (NOVA) units selection is performed using software allowing to define required quantity of HOBA (NOVA) units of a certain nominal size. If required, software allows calculation of the building heat loss based on aggregated data. Recommended as a result of calculation minimal height of the HOBA (NOVA) unit installation is defined based on condition that average air speed in a jet from set shall not exceed 0.2 m/s at the height above floor of no more than 1.5m.

The assignment for selection of the unit is made upon submission of ORDER FORM (see Appendix 1 on page 203).

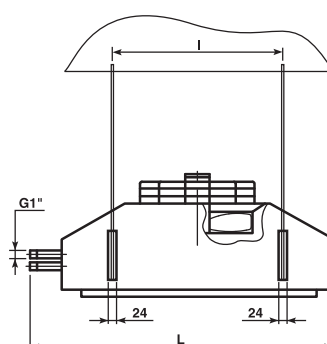
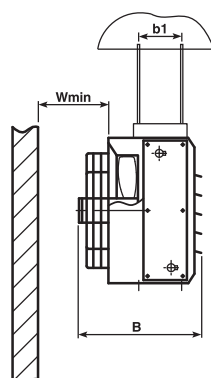
Options of HOBA (NOVA) Unit Installation



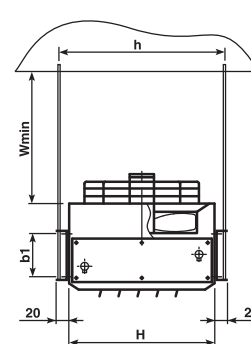
Bracket mounted



Pin mounted to the ceiling (sideways flow)



Pin mounted to the ceiling (downwards flow)



Manufactured in accordance with TU 4861-013-64600223-13

Fans are denoted as follows:

3BB - 1.2 - B - 01 - B3 - 2.5 - K - Пп

- Enclosure: Пп – right, Л – left
- Slot position:
 - K – along the short side of the duct section,
 - Д – along the long side of the duct section
- Slot length [m];
- Heat exchanger (heating) type:
 - B2, B3 – water-to-air: two-rows, three-rows
 - П2, П3 – steam-type: two-rows, three-rows
- Slot width code
- Special enclosure version (Explosion-proof)
- Impeller version code
- Curtain duct nominal size
- Curtain type (Gateway air curtain)



ZVV air curtains are designed for gateways protection against sweep of warm or cold outside air through opening with area of 4 m² and more by means of forming of an air jet in the gate opening plane. Air jet moving from the curtain slot mixes with outside air on one side and with inside air on the other side gaining definite average temperature.

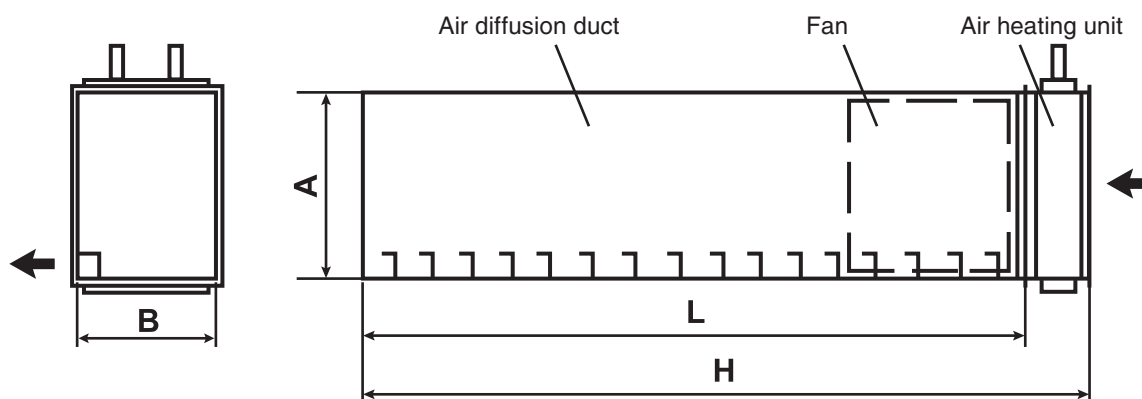
Average jet temperature t_{cm} in the pertinent curtain at the farthest from the slot point of gate opening shall be in standardized limits according to SNiP 23-01-99* and SP 60.13330.2012 (standardizes mixture temperature only for the cold season).

Average jet temperature t_{cm} value depends on the following parameters:

- ◆ Increasing of air temperature in a curtain – t_3 , °C;
- ◆ Outside air temperature – t_h , °C;
- ◆ Inside air temperature – t_b , °C;
- ◆ Wind velocity – v , m/s;
- ◆ Air speed at the outlet of the curtain slot – U , m/s;
- ◆ Gate size along the jet direction – B , m;
- ◆ Slot width – b , m.

Curtains are selected using software allowing definition of jet trajectory and mixture temperature at the jet tail for the curtain air nominal size. The assignment for selection of the curtain is made upon submission of ORDER FORM (see Appendix 1 on page 204).

Curtain structure is presented on the Figure below:



3BB (ZVV) air curtain characteristics are presented in Table 1.

ZVV Curtains Characteristics
Table 1

Characteristics	Curtain Nominal Sizes										
	3BB-0.2	3BB-1.1	3BB-1.2	3BB-2.1	3BB-2.2	3BB-3.1	3BB-3.2	3BB-4.1	3BB-4.2	3BB-5.1	3BB-5.2
Air diffuser cross-section AxB [mm]	600 x 410	700 x 470	700 x 470	800 x 530	800 x 530	900 x 590	900 x 590	1100 x 660	1100 x 660	1400 x 750	1400 x 750
Min air flow rate [m ³ /hour]	3500	4000	5000	6000	8000	9200	11200	13000	16500	18800	24000
Heat power of two-row water-to-air or steam heat exchanger [kW]	23,3	27	33	40	53	61	75	87	110	125	160
Heat power of three-row water-to-air or steam heat exchanger [kW]	35	40	50	60	80	91	112	130	165	187	240
Heat power of tubular electric heating element (reduced/max) [kW]	27/45	27/45	45	45/67	67	67/90	90	---	---	---	---
Maximum water flow of two-row water-to-air air heat exchanger [kg/hour]*	840	972	1200	1440	1900	2200	2700	3130	4000	4500	5760
Maximum water flow of three-row water-to-air heat exchanger [kg/hour]*	1260	1460	1800	2160	2900	3300	4050	4700	5950	6750	8640
Water pressure drop in the two-row water-to-air heat exchanger in case of maximum water flow [kPA]	13	7	11	5	9	13	15	27	44	17	28
Water pressure drop in the three-row water-to-air heat exchanger in case of maximum water flow [kPA]	13	10	15	6	11	15	22	32	51	23	37
Fan rotation speed [rpm]	1500										
Voltage [V]	3x380										
Electric motor power [kW]	0,55	0,75	1,1	1,1	1,5	2,2	3	4	5,5	7,5	11
H dimension (max) for the air-type or steam heat exchanger [mm motor power [kW]	L+300										
Noise level [dBA]**	75	83	85	86	88	89	92	93	95	96	99
Curtain fan weight [kg]	35	38	42	52	58	68	75	105	117	135	155
Curtain housing weight [kg/long meter]	32	37	37	42	42	47	47	57	57	70	70

*) At the water temperature of 95/70 °C.

**) Noise characteristics are defined in accordance with GOST 31353.3-2007 and represented by the values in dBA of adjusted sound power level L_{PA}. See page 56 to learn how to define sound pressure level L at the certain distance from the curtain.

In case of different heat-carrying agent parameters, air temperature at the curtain slot outlet is defined using following equation:

$$t_3 = 3000 \cdot Q_T / G_3,$$

where:

Q_T – heat exchanger (heating) heating power [kW]

G₃ – air flow rate [m³/hour].

Air diffusing box is equipped with straight-through radial fan. Air is supplied in the duct through the butt-end equipped with a fan. Air exhaust is performed through the side slot along the whole length of the duct. Air is heated (by the value of no less than 20 °C) using heat exchanger (heating) connected to the duct air intake end forming common air channel with rectangular section. Curtains provide angle of jet axis initial displacement from the gate plane equal to 15°. Jet offset inside the room may be herewith reduced under the wind pressure effect.

Curtain longitudinal size exceeds slot length only by the value of heat exchanger (heating) longitudinal size, which is the main distinctive feature of curtains upon high cost effectiveness and reduced spatial requirements longwise the duct.

Curtains are available with right-hand or left-hand slot location in relation to air flow direction in a duct, and slot location on long or short side of the duct cross-section to expand capabilities of curtain installation in limited space above serviced gateway or next to it. Curtains are made of galvanized steel without zinc coating disturbance. Curtains are equipped with water-to-air, steam or electric heat exchanger (heating). Steam working pressure shall not exceed 1.2MPa, and temperature shall not exceed 180 °C.

Curtain design is protected by the Useful Model Certificates. See page 195 to learn about air curtain automatic control systems.

Manufactured in accordance with TU 4864-013-64600223-13

Fans are denoted as follows:

ЗИС - 1 B - 01 B3 - 2,5 K Пп

- Enclosure: Пп – right-hand, Л – left-hand;
- Slot position:
 - K – along the short side of the duct section,
 - Д – along the long side of the duct section;
- Slot length [m] (multiple of 0.25m);
- Heat exchanger (heating) type:
 - B2, B3 – water-to-air: two-rows, three-rows
 - П2, П3 – steam: two-rows, three-rows;
- Slot width code;
- Special enclosure version (Explosion-proof);
- Curtain duct nominal size;
- Curtain type (complex industrial curtain).



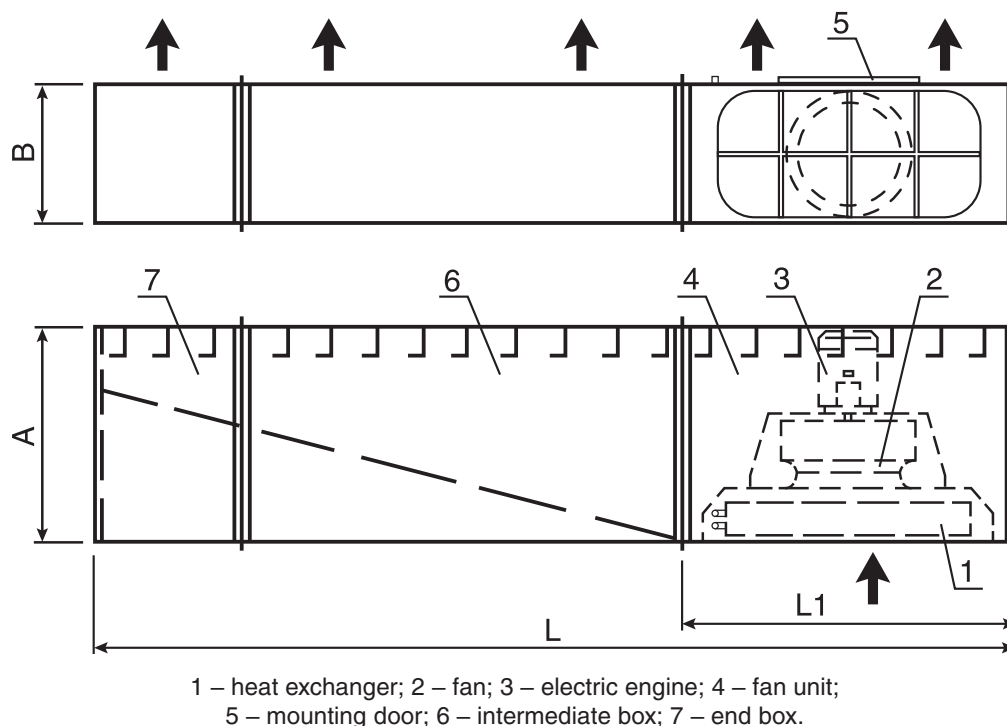
ЗИС (ЗИС) air curtains are designed for open gateways protection against sweep of warm or cold outside air by means of forming of an air jet with the temperature different from the outside air temperature in the gate opening plane. Air jet moving from the curtain slot mixes with outside air on one side and with inside air on the other side gaining definite average temperature. Average jet temperature t_{CM} in the pertinent curtain at the farthest from the slot point of gate opening shall be in standardized limits according to SNiP 23-01-99* and SP 60.13330.2012 (standardizes mixture temperature only for the cold season).

Average jet temperature t_{CM} depends on the following parameters:

- ◆ Increasing of air temperature in a curtain – t_3 , °C;
- ◆ Outside air temperature – t_H , °C;
- ◆ Inside air temperature – t_B , °C;
- ◆ Wind velocity – v , m/s;
- ◆ Air speed at the outlet of the curtain slot – U , m/s;
- ◆ Gate size along the jet direction – B , m;
- ◆ Slot width – b , m.

Curtains are selected using software allowing picking-up the required nominal size of a curtain and required quantity of modules (if one module is not enough at the specified module size limitation), as well as defining of jet trajectory and mixture temperature at the jet tail for the curtain air nominal size. The assignment for selection of the curtain is made upon submission of ORDER FORM (see Appendix 1 on page 204).

Curtain structure is presented on the Figure below:



ЗИС (ЗИС) air curtain characteristics are presented in Table 1.

ЗИС (ZIS) Curtains Characteristics
Table 1

Characteristics	Curtain Nominal Sizes					
	ЗИС - 1	ЗИС - 2	ЗИС - 3	ЗИС - 4	ЗИС - 5	ЗИС - 6
Размер сечения воздухо­распре­дителя АхВ, мм	600х410	700х470	800х530	900х590	1100х660	1400х750
Min air flow rate [m ³ /hour]	2800	3600	5400	8300	12000	17000
Heat power of two-row water-to-air or steam heat exchanger [kW]	18,7	24	36	55	80	113
Heat power of three-row water-to-air or steam heat exchanger [kW]	28	36	54	82,5	120	170
Maximum water flow of two-row water-to-air heat exchanger [kg/hour]*	675	864	1300	1980	2880	4070
Maximum water flow of three-row water-to-air heat exchanger [kg/hour]*	1020	1300	1950	3000	4350	6100
Water pressure drop in the two-row water-to-air heat exchanger in case of maximum water flow [kPA]	10	5	4	9	22	17
Water pressure drop in the three-row water-to-air heat exchanger in case of maximum water flow [kPA]	10	7	5	12	26	17
Fan rotation speed [rpm]	1500					
Voltage [V]	3x380					
Electric motor power [kW]	0,37	0,75	1,1	2,2	4	7,5
Noise level [dBA]**	73	83	86	89	93	96
Curtain fan weight [kg]	40	43	50	68	135	183
Length L [mm]	Defined at the order					
Length L ₁ [mm]	1000	1000	1000	1250	1500	1750
Curtain housing weight [kg/long meter]	30	33	36,7	42	49,2	59,5

*) At the water temperature of 95/70 °C.

**) Noise characteristics are defined in accordance with GOST 31353.3-2007 and represented by the values in dBA of adjusted sound power level L_{PA}. See page 26 to learn how to define sound pressure level L at the certain distance from the curtain.

In case of heat exchanger (heating) using, air temperature at the curtain slot outlet is defined using following equation:

$$t_3 = 3000 \cdot Q_T / G_3,$$

where:

Q_T – heat exchanger heating power [kW]

G₃ – air flow rate [m³/hour].

Air is supplied in the diffusing duct using built-in radial fan. Air intake is performed from the smaller side of the air diffusing box cross-section. Air is heated by heat exchanger (heating) built in the module equipped with a fan. Heat exchanger (heating) and Air diffusing box with built-in fan form common air channel with rectangular section and lateral air exhaust through slot along the whole length of the duct. ЗИС (ZIS) curtains provide angle of jet axis initial displacement from the gate plane equal to 15°. Jet offset inside the room may be herewith reduced under the wind pressure effect. Each ЗИС (ZIS) curtain nominal size may be provided with various slot width values, which show the best correlation with certain curtain operation conditions.

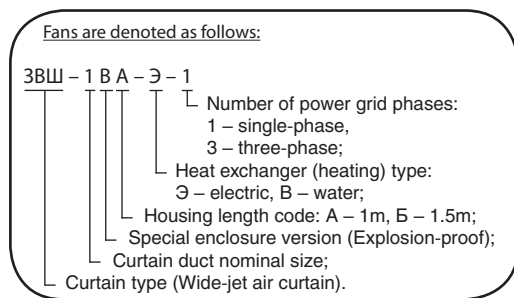
Curtain longitudinal size does not exceed slot length, which is the main distinctive feature of ЗИС (ZIS) curtains upon high cost effectiveness and the lowest spatial requirements for installation.

Curtains are available with right-hand or left-hand slot location in relation to air flow direction in a duct, and slot location on long or short side of the duct cross-section to expand capabilities of curtain installation in limited space above serviced gateway or next to it. If it is required to provide higher values of air flow rate per 1 long meter of the slot length, then ЗИС (ZIS) curtains may be installed one above the other (in case of vertical duct position), or one next to the other (in case of horizontal duct position) touching with duct blind ends. ЗИС (ZIS) curtains selection software allows selection of curtain modules on the principle of minimum modules quantity required for provision of demanded flow-rate, or definition of required modules quantity of nominal size with minimum cross-section (in case of limited space requirements for curtain installation). Curtains are made of galvanized steel without zinc coating disturbance. Air curtains are equipped with water-to-air or steam heat exchanger (heating).

Heat-carrying agent shall not contain substances chemically active towards copper and steel. Operating pressure of water-to-air heat exchanger (heating) shall not exceed 1.2MPa. Temperature shall not exceed 180 °C.

See page 195 to learn about air curtain automatic control systems.

Manufactured in accordance with TU 4864-013-64600223-13

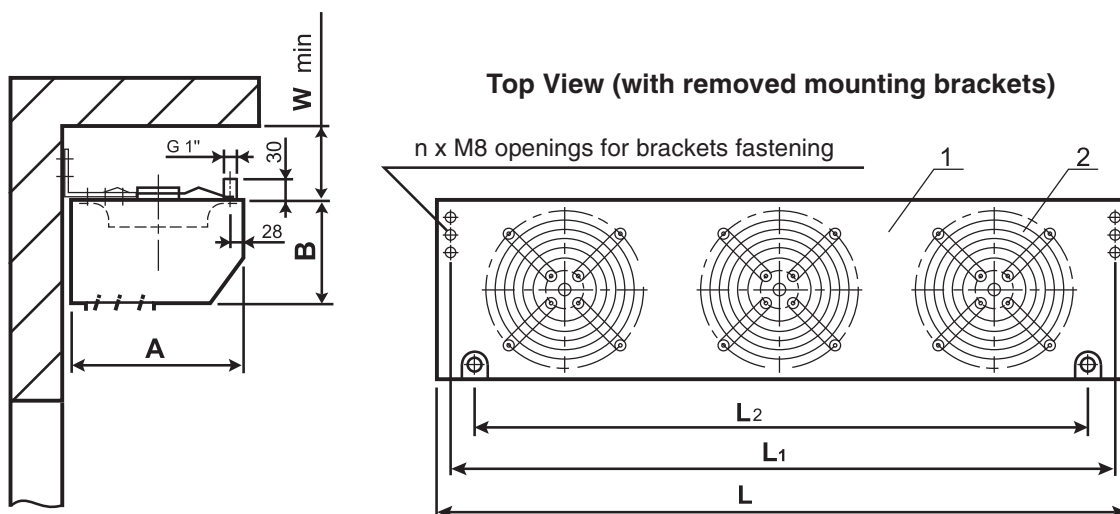


3BШ «Клим» (ZVSh "Klim") air curtains are designed for making a barrier on the way of warm or cold outside air flow through open gateways (doors). This is achieved by formation of air jet with the temperature equal to the inside air temperature in a gate opening plane. While moving away from curtain slot, jet mixes with outside air from one side, and with indoor air from the other side, reaching some average temperature value. If a curtain is selected correctly, then jet average temperature in the gate opening point farthest from slot shall be located within range rated by SP 60.13330.2012. 3BШ (ZVSh) curtains are designed in such a way that heat exchanger (heating) implementation is not required, but may be equipped with electric or water-to-air heat exchanger. Owing to supply of the warmest air wide-jet, the jet average temperature equal to 5-8°C may be maintained at the minimum outside air temperature and maximum wind velocity.

Each 3BШ (ZVSh) curtain standard size may be produced with various slot sizes showing the best correlation with specific air curtain operation conditions.

Air curtains selection is performed using special software enabling to define mixture temperature at the jet tip of the curtain standard size. You can get this software and all required advisory upon request. Request for air curtain selection is submitted upon filling in of ORDER FORM (see Appendix 1 on page 204).

3BШ (ZVSh) air curtain configuration is presented on a Figure:



Air diffusion duct with built-in fans form common air channel with air exhaust performing through an slot made along the whole length of a duct. Air supply to air diffusion duct 1 is performed through intake openings from the side opposite to the slot location by the action of built-in axial fans 2. 3BШ (ZVSh) air curtains provide angle of jet axis initial displacement from the gate plane equal to 15 degrees. Jet sweep inside the room under wind load can be therewith reduced.

The main distinctive feature of 3BШ «Клим» (ZVSh "Klim") air curtains is high cost efficiency. Curtains are located above protected gateway or next to it from one or both sides. Curtains are supplied with various length of air diffusion duct for the purpose of optimal selection of total curtain length in accordance with gateway width (height). Total curtain length may be shorter than gateway width (height) by no more than a half of the curtain short duct length (A). Air intake above curtain requires free space of at least 1/2 of air curtain duct height (see tables on page 82).

Curtain air diffusion duct is made of steel and coated with powder paint.

All air curtains are certified by the GOSTR Certification System and have sanitary and epidemiological inspection report.

Characteristics of ЗВШ «Клим» (ZVSh “Klim”) air curtains without heat exchanger

Characteristics	Curtain Nominal Sizes									
	ЗВШ-1А	ЗВШ-1Б	ЗВШ-2А	ЗВШ-2Б	ЗВШ-3А	ЗВШ-3Б	ЗВШ-4А	ЗВШ-4Б	ЗВШ-5А	ЗВШ-5Б
Air diffusing box cross-section A x B [mm]	340x200	340x200	400x270	400x270	440x230	440x230	535x300	535x300	660x350	660x350
Air diffusing box length L [m]	700	1050	900	1350	1000	1500	1080	1620	700	1400
Distance between bracket fastening bolts L ₁ [mm]	670	1020	860	1310	960	1460	1040	1580	660	1360
W _{min} , [mm]	115		165		165		180		200	
Air flow rate (min) [m ³ /hour]	1280	1920	3450	5175	5000	7500	7990	11990	8820	17640
Motor power, [kW]	2x0.05	3x0.05	2x0.135	2x0.135	2x0.135	3x0.135	2x0.27	3x0.27	0.78	2x0.78
Sound power, [dBA]	40	42	46	50	49	51	52	54	56	59
Weight [kg]	7,4	11	14,8	22,3	16,5	25,5	23,5	35	24	48
Supply voltage	1x220V				1x220V or 3x380V				3x380V	

Characteristics of ЗВШ «Клим» (ZVSh “Klim”) air curtains with electric heat exchanger

Characteristics	Curtain Nominal Sizes					
	ЗВШ-1А-Э	ЗВШ-1Б-Э	ЗВШ-2А-Э	ЗВШ-2Б-Э	ЗВШ-3А-Э	ЗВШ-3Б-Э
Air diffusing box cross-section A x B [mm]	340x200	340x200	400x270	400x270	440x230	440x230
Air diffusing box length L [m]	700	1050	900	1350	1000	1500
Distance between bracket fastening bolts L ₁ [mm]	670	1020	860	1310	960	1460
W _{min} , [mm]	120	120	150	150	170	170
Air flow rate (min) [m ³ /hour]	1280	1920	2600	3900	5000	7500
Motor power [kW]	2x0.05	3x0.05	2x0.135	3x0.135	2x0.135	3x0.135
Electric power of each tubular electric heating element [kW]	5	7	9	13,5	17	25
Tubular electric heating elements quantity [ea.]	3				6	12
Supply voltage	1x220V – electric motors; 3x380V wye-connected tubular electric heating elements					
Sound power, [dBA]	40	42	46	50	49	51
Weight [kg]	15,5	22,5	28,0	39,0	33,0	48,0

Characteristics of ЗВШ «Клим» (ZVSh “Klim”) air curtains with water-to-air heat exchanger

Characteristics	Curtain Nominal Sizes									
	3BW- 3A-B-1	3BW- 3A-B-3	3BW- 3B-B-1	3BW- 3B-B-3	3BW- 4A-B-1	3BW- 4A-B-3	3BW- 4B-B-1	3BW- 4B-B-3	3BW- 5A-B-3	3BW- 5B-B-3
Air diffusing box cross-section A x B [mm]	440x300	440x300	440x300	440x300	535x300	535x300	535x300	535x300	660x350	660x350
Air diffusing box length L [mm]	1000	1000	1500	1500	1080	1080	1620	1620	700	1400
Distance between bracket fastening bolts L ₁ [mm]	960	960	960	1460	1040	1040	1580	1580	660	1360
Number of openings for brackets fastening n	6	6	6	6	6	6	6	6	6	6
Distance W _{min} , [mm]	170				180				300	
Air flow rate (min) [m³/hour]	5000	5000	7500	7500	7400	7400	11100	11100	7800	15600
Electric motor power [kW]	2x0,135	2x0,135	3x0,135	3x0,135	2x0,27	2x0,27	3x0,27	3x0,27	0,78	2x0,78
Sound pressure [dBA]*	49	49	51	51	52	52	54	54	56	59
Weight [kg]	40	40	40	50	51	51	78	78	40	59
Water-to-air heat exchanger power at the water/air temperature of 95/70 [kW]	16,5		25		24,5		37		26	52
Distance between water-to-air heater connecting pipes L ₂ [mm]	875		1375		950		1475		575	1275
Supply voltage	1x220V or 3x380V								3x380V	

* at a distance of 3 m

Automatic Control System see p.195.