



KOMPLET
a.s.

Project data (verze 1.0)

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Heat pumps air – air



1. Basic information – Use

The HPAA heat pumps are designed as „air – air“ pumps. Their source of low-potential heat is external air. The heat produced by a HPAA heat pump is carried off by air circulation in the heated internal space.

The HPAA heat pumps are intended for energetic and economical cost-saving heating in large-volume spaces such as stockrooms, production halls and similar.

2. Technical description – standard models

The HPAA heat pump consists of an external part, an internal part and a control box which are functionally interconnected one another (so called split system). The distance of the external part and the internal part should not be larger than 10 m (as measured by interconnecting pipelines – not the distance of location places). Any larger distance shall be consulted with the manufacturer.

- **The external part** – the heat pump evaporator working as a cooler of external air is to be situated in a free area in the vicinity of the heated object. The position of the evaporator must provide free air flow through the evaporator as well as outflow of water condensing or freezing out on the evaporator (Note: to defrost ice coating on the evaporator, it is employed energetically efficient method not thermally influencing – not cooling down the heated space).

Air flow through the evaporator is provided by ultra-silent axial flow fans with two-position speed regulation by means of which the noise level can be further reduced, e.g. in night operation. A part of the evaporator is also a thermostatic expansion valve.

The external part is manufactured of corrosion resistant materials.

- **The internal part** containing other heat pump elements, primarily a hermetic spiral compressor (Scroll) and a lamella condenser – air heater and other parts of the cooling circuit shall be placed in a suitable location in the internal space. Air flow through the condenser is provided by an axial flow fan. The heat pump inlet for air from the heated space is equipped with an air filter.

The internal part consists of two individually transportable sections joined together in one unit during installation. Its inlet section contains a „filtration“ and an „energetic“ part, its outlet section contains a „fan“ part. Both sections are assembled in aluminium section frames in which there are set panels providing thermal and acoustical insulation. The panels consist of zinc-coated sheet envelopes and mineral fibre insulation. For easy access to the inlet air filter, the respective panel is provided with a handle and secured with quick-couplers. The internal part has only one side for service access, its front end.

- **The control box** provides the functions of operation and control of the heat pump and it is functioning as heat pump power switchboard. As standard, the control box does not provide regulation or control of heating and for that reason it must be connected to a superior control system. In simple cases e.g. a room thermostat will do. The control box shall be placed near the internal part so that it can be easily accessible for operating.

To the control box, there are externally connected particularly electric power supply line, superior control system signal of heat pump operation demand and ripple control signal of from the energetic enterprise to be blocked heat pump function.

Heat pump control and its fully automatic operation is provided by programmable microprocessor regulator „MicroTC“ in connection with the control panel that communicates with the operator, monitors important parameters and operating conditions displaying those on the display screen or indicating them through indicator lamps. In case any important operating condition exceeds its limit value, the heat pump switches off and on the control panel is displayed the respective fault or more precisely the cause of heat pump putting out of operation.

As standard, HPAA heat pumps are delivered in two type sizes (see the table of technical parameters). The standard offer includes both „right-hand“ and „left-hand“ models of the internal part referring to the direction of air flow (the dimensioned sketch shows a „right-hand“ model). HPAA heat pumps bearing ...R marking enable also the function of room cooling in addition to their standard function of heating.

3. Above-standard models of HPAA heat pumps

With regard to the used system of the split structure and the modular design of the internal part, HPAA heat pumps can be adapted to customer specific requirements:

- Different requirements for quality of air filtration
- Different requirement for external static pressure of the fan or air outlet orientation
- To integrate a water or electric air reheater

4. Installation of the HPAA heat pump and its putting into operation

The heat pump external part shall be placed in external space either on a suitable hard surface or a basement. If slight movement due to subsoil freezing is possible, interconnecting ducts shall enable the necessary expansion. The external part shall be positioned in consideration to some noise produced by the fans, the necessity of free air inlet as well as outlet without obstructions, sufficient assembly and maintenance access and that condensed humidity and defrosted icing may not cause problems.

The heat pump internal part and the control box shall be positioned so that they can provide access for maintenance and service of the machinery as well as electric part and easy operating. The whole area of a length of min. 800 mm in front of the heat pump „service side“ shall remain clear and problem-free accessible. The heat pump internal part shall be secured to a supporting steel frame mounted on brackets or suspended on tiebacks.

The available external static pressure of the heat pump internal part fan enables to connect air ducts for distribution of warmed-up air if required. The duct is to be connected to the heat pump by means of a flexible damping connector.

When a specialist has made interconnection of all parts of the heat pump and has connected the heat pump to air ducts (if used), the mains and the superior control system, the heat pump can be activated and put into operation.

5. Operating conditions

The heat pump may not be situated and operated in any environment endangered by explosion of combustible gases and vapours BE3N2 by ČSN 33 2000-3.

The heat pump must be put out of operation (by main supply switching off) prior to commencing any works (e.g. gluing, varnishing and similar) possibly resulting in a change of the environment of the room the heat pump is installed in.

Requirements for heat pump location

In case the heat pump is located in a special machinery room, according to ČSN EN 378-1 the heat pump is not subject to any limits with regard to the volume of the room in which the heat pump is placed as related to the volume of cooling agent filling. In any other case, for the volume of the room in which the heat pump is situated it must be valid that the room volume [in m³] shall be larger than cooling agent filling [in kg] divided through 0.48 (critical concentration [in kg/m³]).

Technical parameters of electric installations:

- | | |
|------------------------------|---|
| – Nominal supply voltage | 3 x 400/230 V ± 10 % |
| – Current type and frequency | alternating, 50 Hz ± 1 % |
| – Maximum power input | see tables |
| – Network characteristic | TN-C – by ČSN 33 2000-3 |
| – Protection class | I – by ČSN EN 60335-1 |
| – Rate of protection | |
| external part | IP54 – by ČSN EN 60529 (when installed as prescribed) |
| internal part | IP40 – by ČSN EN 60529 (when installed as prescribed) |

Main power supply line:

- Fixed, dimensional design and protection must comply with ČSN 33 2000-5-523, ČSN 33 2000-4-43, ČSN EN 60898-1, ČSN 33 2000-4-41.

HP3AA heat pump technical parameters air-air

Type	HP3AA		16	36	16 R	36 R
Data		Unit				
Energetic parameters	A7/A20¹⁾					
	- heating output	kW	20,8	41,5	20,8	41,5
	- effective input	kW	5,6	11,1	5,6	11,1
	- performance factor (COP)	-	3,7	3,7	3,7	3,7
	A2/A20¹⁾					
	- heating output	kW	18,8	37,6	18,8	37,6
	- effective input	kW	5,4	10,9	5,4	10,9
	- performance factor (COP)	-	3,5	3,5	3,5	3,5
	A-7/A20¹⁾					
	- heating output	kW	14,6	29,2	14,6	29,2
	- effective input	kW	5,2	10,4	5,2	10,4
	- performance factor (COP)	-	2,8	2,8	2,8	2,8
Cooling	A-15/A20¹⁾					
	- heating output	kW	11,9	23,8	11,9	23,8
	- effective input	kW	5,0	9,9	5,0	9,9
	- performance factor (COP)	-	2,4	2,4	2,4	2,4
Cooling	A35/A27¹⁾					
	- cooling capacity	kW	-	-	12,9	26,0
	- effective input	kW	-	-	6,3	13,9
	- energy efficiency ratio (EER)	-	-	2,0	1,9	
Circuit parameters	Secondary circuit					
	- rate of air flow	m ³ /h	2400	5000	2400	5000
	- dispensable pressure	Pa	100	130	100	130
	- class of filtration	-	EU 4			
Electric parameters	- feeding voltage	V / Hz	3x400 / 50			
	- max. input (with fans)	kW	7,7	16,7	7,7	16,7
	- start up current compr.	A	37	83	37	83
	- HP power lead fuse	A	C 20 A	C 40 A	C 20 A	C 40 A
Other parameters	- number of compressors	piece	1	1	1	1
	- total number of the fans	piece	3	5	3	5
Noise level of the external part	- Standard fan speed ²⁾	dB(A)	57	57	57	57
	- Reduced fan speed ²⁾	dB(A)	52	52	52	52
Compressor	-		Scroll			
Refrigerant	-		R 404A			
Range temp. of the primary heat source (air)	°C		-25 to +35			
Maximal inlet temperatura ³⁾	°C		50			
Piping dimension	- suction de x t	mm	22 x 1	28 x 1	22 x 1	28 x 1
	number of pipes	piece	2	2	2	2
	- liquid de x t	mm	16 x 1	22 x 1	16 x 1	22 x 1
	number of pipes	piece	1	1	1	1
	- air duct connection	mm	400 x 200		400 x 200	
Size and weight	Inside part					
	- length	mm	1800	2000	1800	2000
	- width	mm	800	970	800	970
	- height	mm	800	1200	800	1200
	- weight	kg	190	370	195	375
	Outside part					
	- number of pieces	piece	1	2	1	2
	- width	mm	1135	950	1135	950
	- length	mm	1972	2140	1972	2140
	- height	mm	1295	1295	1295	1295
	- anchor openings	mm	1045 x 1775	870 x 1945	1045 x 1775	870 x 1945
	- weight (1 piece)	kg	210	205	210	205

1) For example A2/A20 means: The temperature of primary source of energy (air) +2 °C, inlet temperature of circulating air of +20 °C.

2) The value of acoustic pressure equivalent level $L_{Aeq,T}$ measured at a distance of 1 m from the external part – the evaporator. Data apply to one evaporator.

3) Maximum outlet temperature of circulating air of +50 °C in the temperature inlet of primary source of energy (air) -15 °C (A-15/A20).

Note: The dimension of the piping applies to a standard distance between the inside and outside part of the heat pump of up to 10 m.

HP3AA heat pump technical parameters

