CEILING-MOUNTED AIR-HANDLING UNITS

PKU Series

proKLIMA

Owing to an extraordinarily flexible range of products the PKU series is undoubtedly able to offer solutions which will best meet your specific requirements for air conditioning and ventilation of:

◀ industrial plants, workshops, warehouses .....

◀ shopping malls, supermarkets ...

shops, points of sale .... ▼

◀ restaurants, cafés, bars ....

▲ offices, business premises ....

◀ or residential buildings.

FEATURES 1

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Air-handling units are designed to maintain purity, temperature and humidity of air by means of air filtration, heating, cooling and humidification or dehumidification. In most cases the air treatment process in air-handling units is completely automatic.

Ceiling-mounted air-handling units of PKU series, size 1 - 3, are air treatment units that provide a comfort environment of air-conditioned rooms. By combining diverse functional units it is possible to provide equipment with options ranging from common ventilation with filtration to a complete air treatment that includes exploitation of exhaust air heat. They are primarily used for installation under the ceiling or into the ceiling structure and intended for horizontal or vertical installation, for connecting to ventilation ductwork or for a direct blowing of treated air into the room.

Air-handling units dimensions are determined on the basis of the module dimension of 305 mm, or rather basic filter insert dimensions of 290 x 595 mm and 290 x 290 mm.

Air-handling units in 3 different sizes cover the air flow volumes ranging from 500 - 4,000 m^3/h. The combination of sizes and designs provides a maximum adaptability to the space available. The devices are manufactured as single units or blocks comprising more elements depending on the air-handling unit size and conditions of transporting and bringing the device into a building. Commonly used air-handling blocks are offered as standard systems, with elements to be assembled into wholes, thus reducing the costs of transport, handling and installation.

Air-handling units are manufactured in conformity with EN 1886.

Ceiling-mounted air-handling units are made of aluminium profiles and galvanized double steel plate lining with a 15mm thick thermal insulation. The lining meets the basic thermal and sound insulation requirements and falls within A1 category of non-combustible materials according to DIN 4102. The heat transfer coefficient of the devices is k=1.4 W/m^2K. On customer's request the outer lining of units may have a plastic coating of a RAL colour as desired.

Locks, handles and metal fittings can be easily operated. All connections are sealed with a special waterproof and airtight rubber band and a silicone-free sealing material.

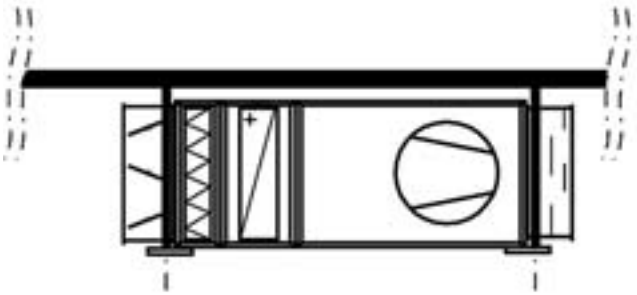
The design and quality of units and built-in materials allow a carefree and quiet operation that meets the noise level requirements prescribed.

The fan and filter manipulation doors placed on the bottom side and the heat exchanger connections placed laterally facilitate access to built-in units, their maintenance and replacement.

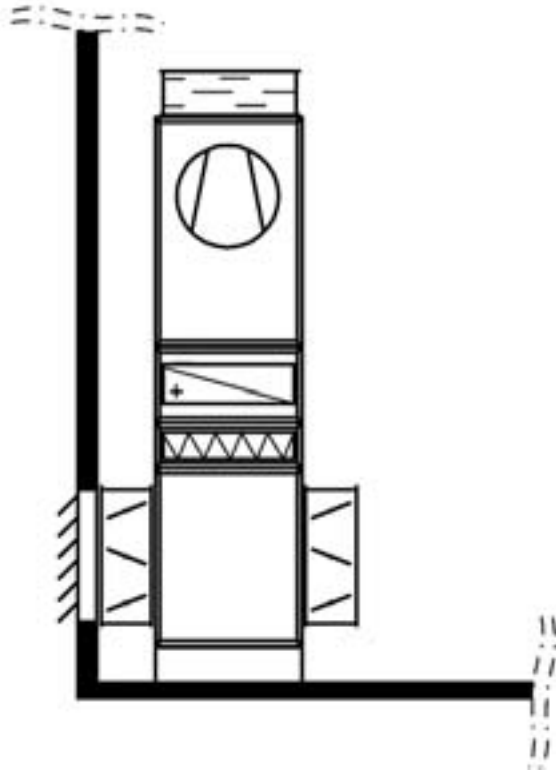
Diverse modifications in the design and connections are possible on request, depending on the on-site situation or project requirements.

2 INSTALLATION

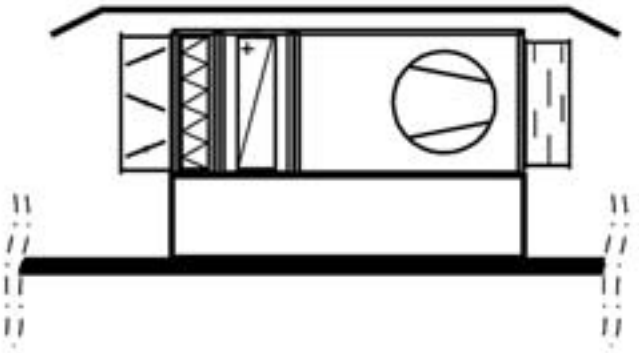
Ceiling (horizontal) installation



Vertical installation

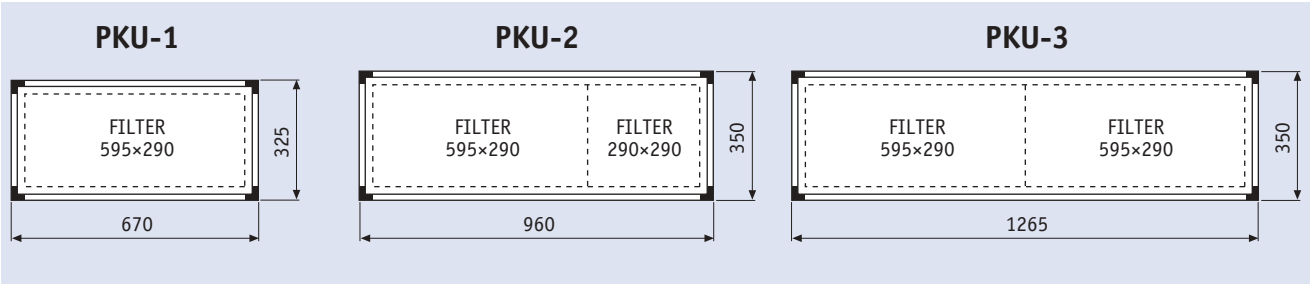


Rooftop (external) installation



3 DIMENSIONS

Basic dimensions of ceiling-mounted air-handling units are determined according to standard dimensions of filter inserts and nominal air flow volume and dependent on the handling method (from the bottom side - as standard, from the upper side or laterally on request).

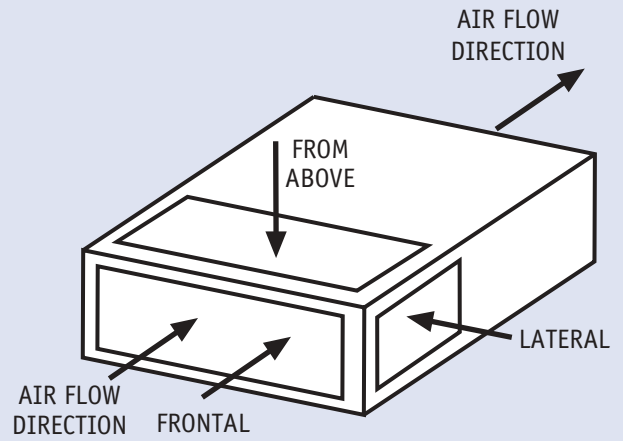


Dimensions and location of flexible connections and dampers are shown in the drawing and the table attached.

Type	Location		
	Front	Lateral	On the top
PKU1	210 x 605 310 x 605	310 x 275	210 x 605
PKU2	210 x 885 310 x 885	310 x 450	210 x 885
PKU3	210 x 1195 310 x 1195	310 x 800	210 x 1195

The dampers are 125 mm and flexible connections 135 mm wide.

Subject to technical alterations!



DESCRIPTION OF UNITS 4

FILTER UNIT (F) is a segment of an air-handling unit that separates impurities from the air. It is normally constructed as a panel filter class G3 and G4, but other filter types (bag filter, etc.) may also be installed if required.

In accordance with EN 779 and the EUROVENT 4/5 classification dimensions and types are adjusted to the air-handling unit size and the level of separation or rather efficiency. The filter is made of glass fibre, synthetic fibre, fabric, etc. with a labyrinth structure.

ELECTRIC HEATER (GE) is a heat exchanger in which electrical energy is transformed into thermal. It has a form of a circular, alloy steel rod.

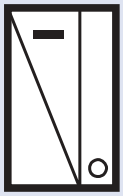
It is used mostly in cases when no other thermal energy source is available (warm water or vapour) or as an alternative heater. The heater supply voltage is 230 or 400 V/50 Hz. Depending on the capacity or requirement the heater may be actuated stepwise (1 - 6 stages linearly or 64 stages binary) or continuously.

It is recommended to mount the electric heater on the discharge side of the fan. A flow separator is to be installed between the fan and the electric heater to enable the air current distribution over the entire electric heater cross section.

A protective thermostat is used to limit the maximum temperature of air passing the fan to 60°C (40°C in case of a PKU1 model with an electric motor of P_m = 1 kW).

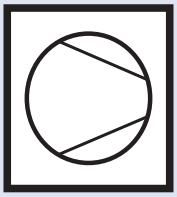
HEATER (G) is a heat exchanger between warm water and air or vapour and air made of aluminium fins placed on mechanically expanded copper tubes which allows for a high heat transfer coefficient.

Manifold connections may be threaded or flanged (on request) and are to be attached in the counterflow.



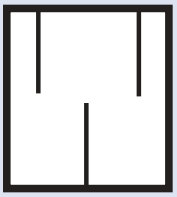
COOLER (H) is a heat exchanger between cold water and air or rather freon and air. It is made of aluminium fins placed on mechanically expanded copper tubes, which allows for a high heat transfer coefficient. A cooler of a standard design includes also a droplet eliminator, but on request or if possible (for lower air velocity) it can also be supplied without a droplet eliminator which will reduce the unit. The unit is equipped with a stainless steel condensate receiver with a 1/2" connection for condensate removal and a corresponding siphon.

Manifold connections may be threaded or flanged (on request) and are to be attached in the counterflow.



FAN UNIT (F) is an air-handling device driving unit in which the air is given energy necessary to overcome resistance to the flow through the device (internal pressure drop) and through air circuit elements (external pressure drop).

The electric motor supply voltage is 230 V / 50 Hz. According to the requirements and depending on the electric motor power, the motor turnovers may be controlled by a transformer, voltage or frequency regulator of the rated speed, which enables the accurate adjustment of the required air volume flow.



SOUND ATTENUATOR (PZ) is a unit designed to reduce the fan-generated noise level. It consists of barriers made of a special paper lined mineral wool stuffed into galvanized steel frames.

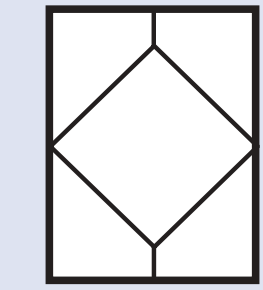
The material used for barriers is highly absorbing, does not absorb moisture and is non-combustible according to DIN 4102 class A1.

The barriers are wear resistant. Air deflectors built in on the front side provide favourable air flow conditions.

The unit is available in lengths of 600 and 900 mm, depending on the attenuation level required.

When installing a sound attenuator on the discharge side of the fan, a space of 200 mm is to be left free in front of the barriers to allow for the air flow tranquillization and distribution.

An alternative solution for sound attenuation may also be the installation of a sound attenuator in the ventilating duct.



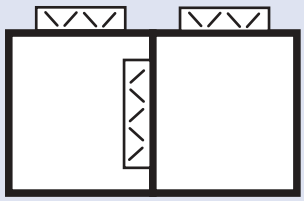


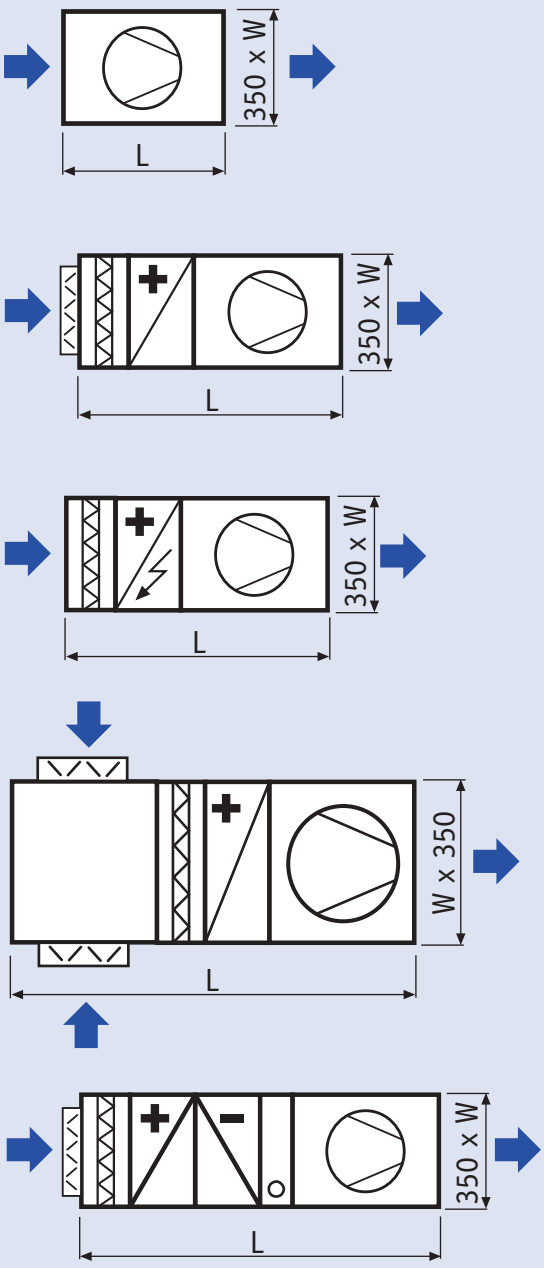
PLATE RECUPERATOR (RP) is used for exploitation of return air heat, which helps achieve considerable energy savings. It is made of specially formed interconnected aluminium fins that facilitate cross-exchange of heat between the return and fresh air flow. The plate exchanger design allows for an absolute separation of airflow, thus preventing the transfer of any impurity, smell, moisture, bacteria, etc. from the return to the fresh air.

On request and in accordance with the project requirements it is possible to mount a droplet eliminator and a by-pass duct for the air flow to circumvent the heat exchanger partly or completely.

AIR MIXING (M) OR AIR DOUBLE-MIXING UNIT (MM) with dampers and necessary flexible connections enables mixing of fresh and return air in a desired proportion for energy-saving purposes. The dampers may be manually or electric motor operated.

On request or according to project requirements other functional units (humidifier, empty units, etc.) may also be mounted. In such a case please contact the manufacturer.

5 STANDARD CONFIGURATIONS



SP-1

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	550	660	660
Width B (mm)	680	960	1270
Weight (kg)	56	76	103

SP-2

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	850	960	960
Width B (mm)	680	960	1270
Weight (kg)	85	114	153

SP-3

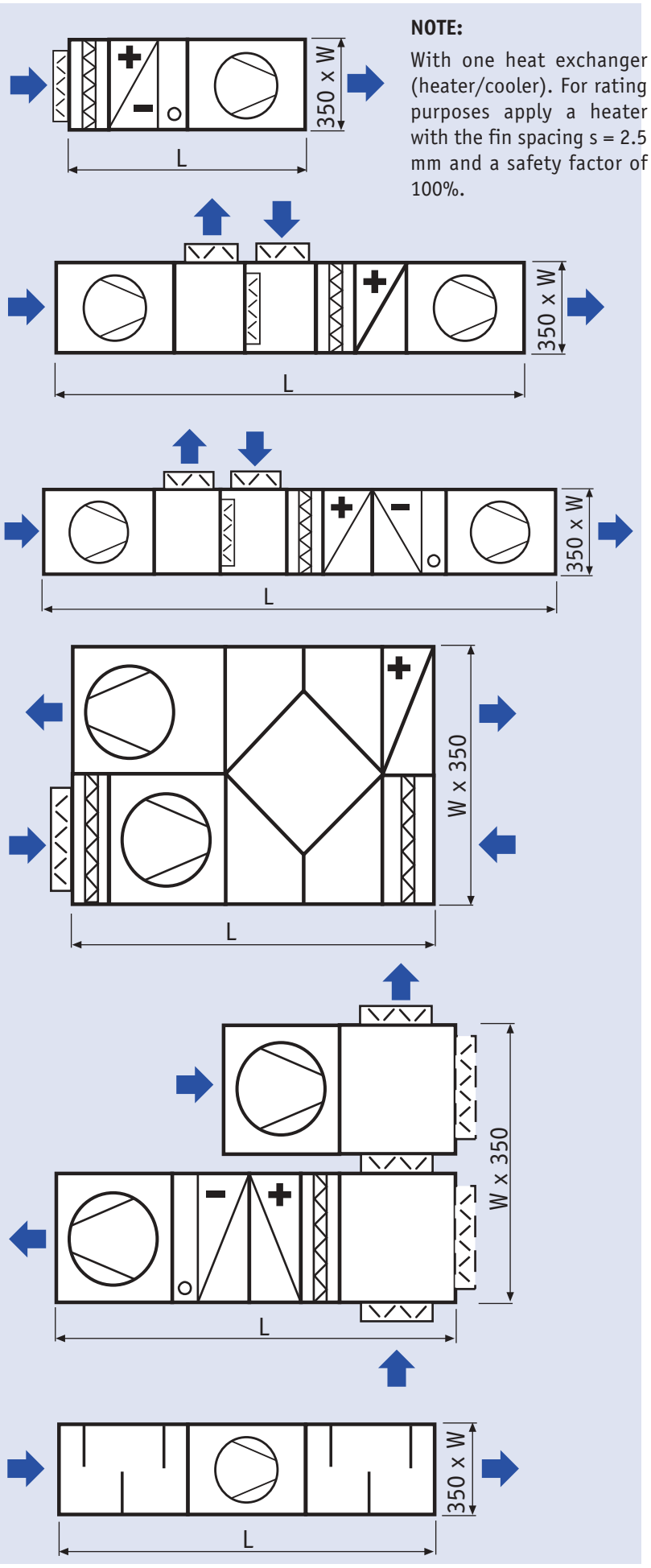
Type	PKU 1	PKU 2	PKU 3
Length L (mm)	1350	1460	1460
Width B (mm)	680	960	1270
Weight (kg)	94	122	162

SP-4

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	1200	1540	1880
Width B (mm)	680	960	1270
Weight (kg)	113	148	194

SP-5

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	1420	1530	1530
Width B (mm)	680	960	1270
Weight (kg)	114	154	208



NOTE:

With one heat exchanger (heater/cooler). For rating purposes apply a heater with the fin spacing s = 2.5 mm and a safety factor of 100%.

SP-5GH

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	1220	1330	1330
Width B (mm)	670	960	1270
Weight (kg)	95	127	170

SP-6

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	2000	2220	2420
Width B (mm)	680	960	1270
Weight (kg)	197	258	338

SP-7

Type	PKU 1	PKU 2	PKU 3
Length L (mm)	2700	2950	3150
Width B (mm)	680	960	1270
Weight (kg)	243	320	422

SP-8

Type	PKU 1	PKU 2	PKU 3
L (mm)	2400	2800	3250*
W (mm)	1400	1980	2590
Weight (kg)	386	530	731

* for a maximum air flow volume of 3,000 m³/h

NOTE :

Insulation thickness 25 mm.

Heat transfer coefficient k = 0.92 W/m²K

Additional noise damping by the unit casing

$L_{p1}(A)_{add} = L_{p1}(A) - 3$ dB

SP-9

Type	PKU 1	PKU 2	PKU 3
L (mm)	1780	2150	2470
B (mm)	1480	2040	2660
W (kg)	241	318	420

Alternative:

Placement of dampers on the front side of the unit (dashed).

SP-10

Type	PKU 1	PKU 2	PKU 3
Sound attenuator L=600 mm			
L (mm)	1900	2010	2010
Weight (kg)	104	138	184
Sound attenuator L=900 mm			
L (mm)	2500	2610	2610
Weight (kg)	118	157	209
W (mm)	680	960	1270

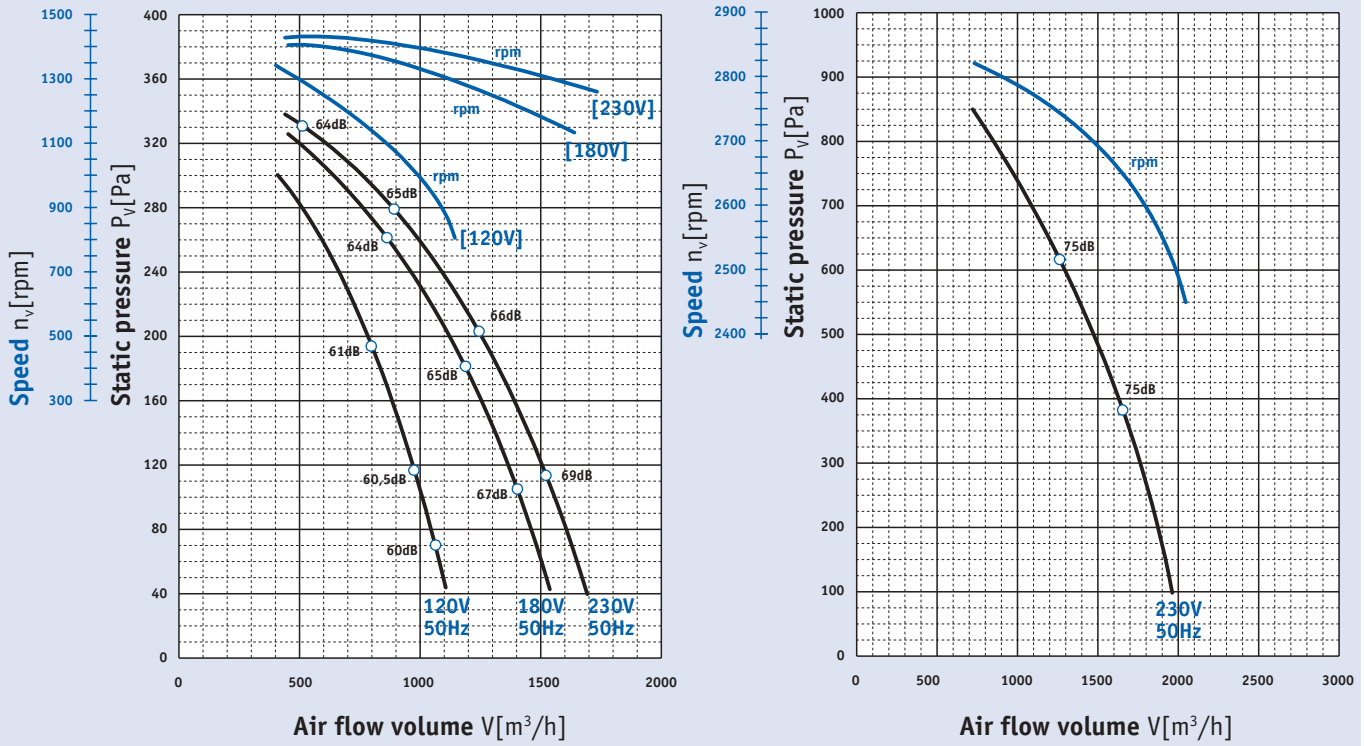
The standard system weights specified are approximate values only.

Block lengths L are maximum values, but can be smaller depending on the elements built in.

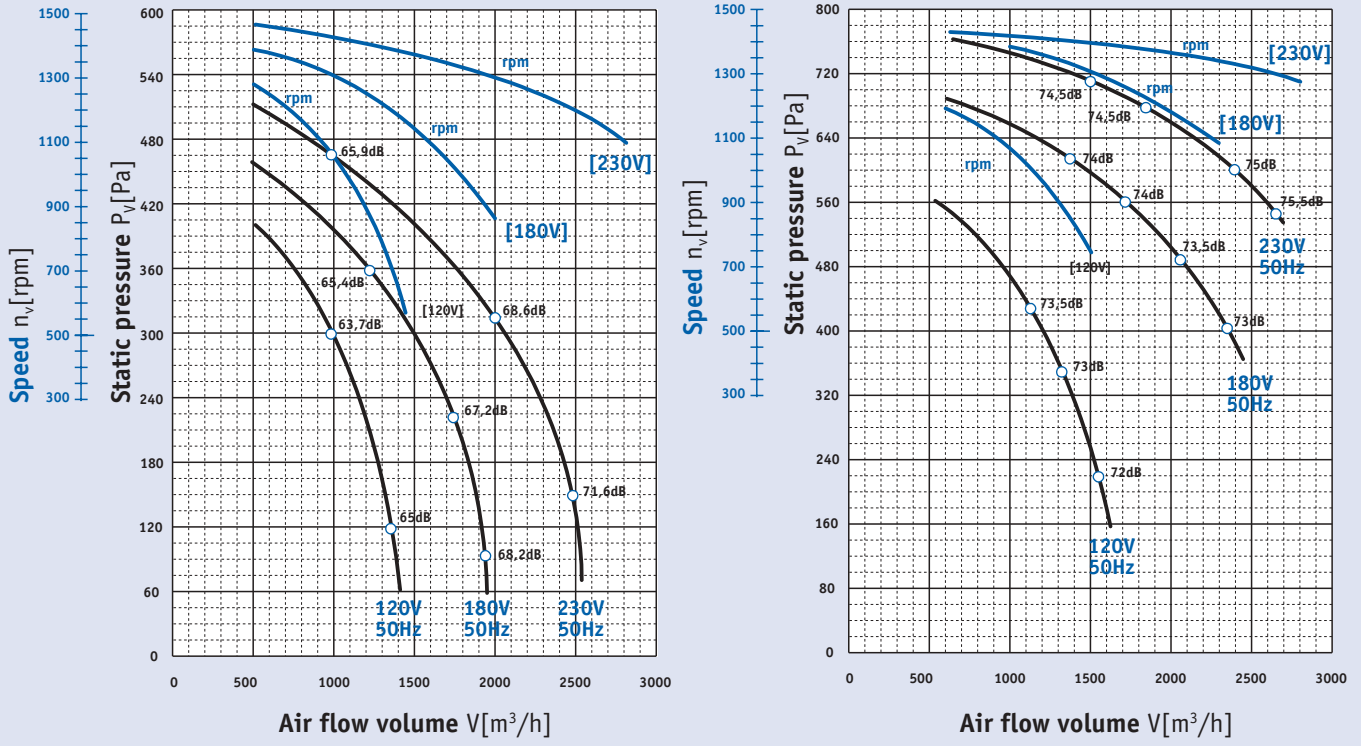
6 FAN FEATURES

Apply for air density of 1.2 kg/m³.

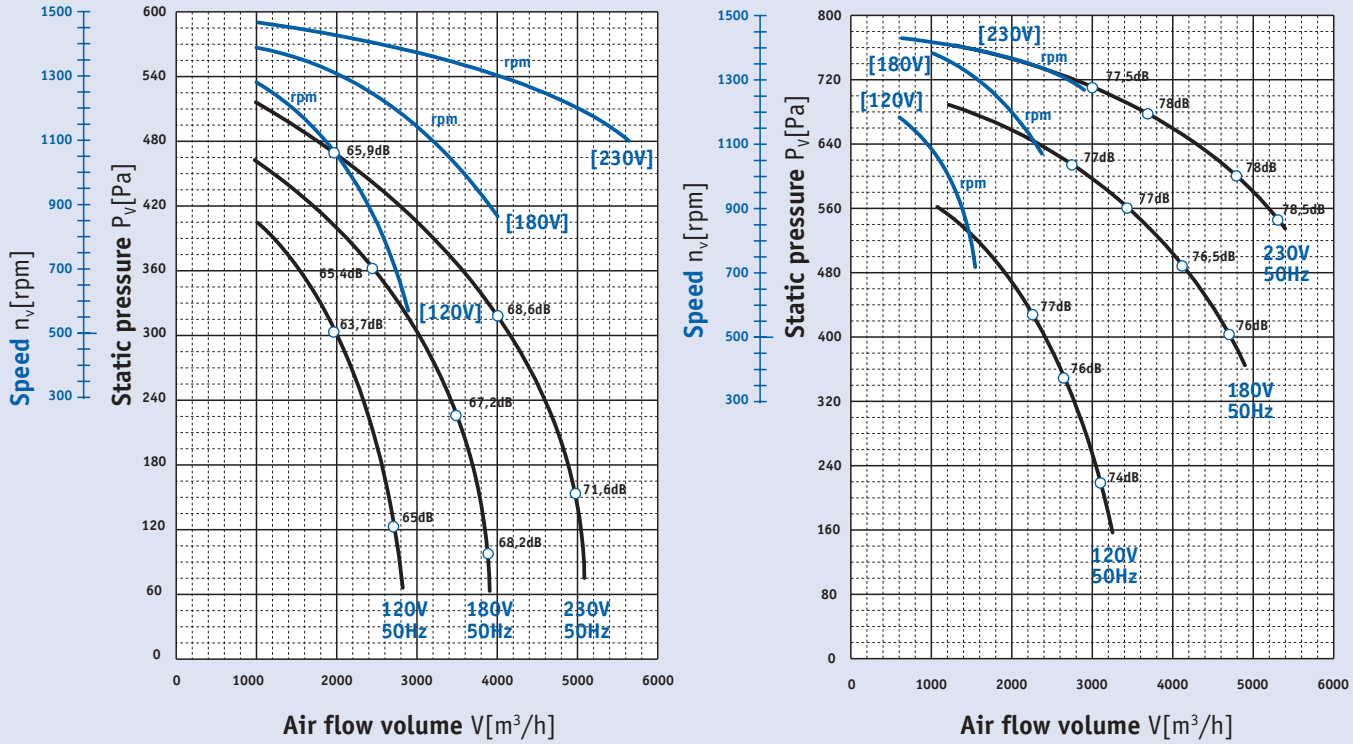
PKU 1



PKU 2



PKU 3



7 PRESSURE DROPS

Pressure drops on the air side [Pa] for individual structural elements and units are shown in the following table:

Type	PKU 1			PKU 2			PKU3		
Air flow volume [m³/h]	500	1000	1500	1500	2000	2500	2500	3250	4000
Damper inlet	10	20	30	20	25	30	25	30	35
Panel filter G3 and G4	130	150	165	150	160	170	155	170	185
Electric heater	4	9	20	10	15	21	14	20	24
Heater 2R (double-row)	5	21	45	19	33	50	28	46	68
Cooler 4R (four rows)*	12	45	100	45	80	120	65	110	160
Cooler 5R (five rows)*	17	62	133	57	98	150	83	136	201
Cooler 6R (six rows)*	20	75	160	91	118	180	100	164	242
Droplet eliminator	6	11	22	11	17	26	16	26	34
Sound attenuator	7	12	17	13	16	19	15	18	21
Plate recuperator **	60	120	160	80	120	140	140	190	220

NOTES:

*The pressure drop in the cooler unit equals the sum of the pressure drop over the heat exchanger with a selected number of rows (4R, 5R or 6R) increased by the pressure drop over the droplet eliminator.

** The pressure drop over the plate recuperator related to the plate heat exchanger only (pressure drops over the droplet eliminator and filter are not taken into account and should be added to the pressure drop over the plate recuperator).

8 HEATER FEATURES

Ratings for 2R (double-row) water heater. Fin spacing s = 2.1 mm.

PKU 1

Pipe connection R 1/2"

Air flow volume [m³/h]		500			1000			1500		
	t_{in}[°C]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]
90/70°C	-20	11.2	46.0	1.6	17.5	31.5	3.6	22.3	23.8	5.6
	-15	10.6	45.6	1.5	16.6	33.8	3.3	21.1	26.4	5.1
	-10	10.0	49.1	1.3	15.6	36.1	3.0	19.9	29.1	4.6
	-5	9.4	50.7	1.2	14.7	38.4	2.7	18.7	31.8	4.1
	0	8.9	52.7	1.1	13.8	40.7	2.4	17.5	34.5	3.7
	5	8.3	53.9	1.0	12.9	42.9	2.1	16.3	37.1	3.2
	10	7.7	55.4	0.8	11.9	45.2	1.8	15.2	39.8	2.8
80/60°C	-20	10.0	38.8	1.4	15.5	25.8	3.0	19.7	18.8	4.7
	-15	9.4	40.4	1.2	14.6	28.1	2.7	18.6	21.5	4.2
	-10	8.8	41.9	1.1	13.7	30.3	2.4	17.4	24.2	3.7
	-5	8.2	43.5	1.0	12.8	32.6	2.1	16.2	26.9	3.3
	0	7.6	45.1	0.8	11.8	34.9	1.9	15.0	29.5	2.9
	5	7.1	46.7	0.7	10.9	37.2	1.6	13.8	32.2	2.5
	10	6.5	48.2	0.6	10.0	39.5	1.4	12.7	34.9	2.1
50/45°C	-20	7.7	25.2	11.2	12.1	15.7	25.4	15.5	10.5	39.6
	-15	7.1	26.8	9.7	11.2	17.9	22.0	14.3	13.1	34.4
	-10	6.5	28.3	8.3	10.2	20.2	18.8	13.1	15.8	29.4
	-5	5.9	29.9	7.0	9.3	22.5	15.9	11.9	18.5	24.8
	0	5.3	31.5	5.8	8.4	24.8	13.2	10.7	21.1	20.5
	5	4.8	33.1	4.7	7.5	27.1	10.7	9.6	23.8	16.6
	10	4.2	34.7	3.8	6.6	29.3	8.4	8.4	26.5	13.1

PKU 2

Pipe connection R 1/2"

Air flow volume [m³/h]		1500			2000			2500		
	t_{in}[°C]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]
90/70°C	-20	26.7	32.6	3.6	31.8	26.9	4.9	36.3	22.8	6.2
	-15	25.3	34.8	3.2	30.1	29.4	4.4	34.3	25.5	5.6
	-10	23.9	37.0	2.9	28.4	31.9	4.0	32.4	28.2	5.0
	-5	22.5	39.3	2.6	26.8	34.5	3.6	30.5	31.0	4.5
	0	21.1	41.5	2.3	25.1	37.0	3.2	28.6	33.7	4.0
	5	19.7	43.7	2.1	23.4	39.5	2.8	26.6	36.4	3.5
	10	18.3	46.0	1.8	31.7	42.0	2.5	24.7	39.1	3.1
80/60°C	-20	23.8	26.7	3.0	28.3	21.7	4.1	32.2	18.0	5.1
	-15	22.4	29.0	2.7	26.6	24.2	3.6	30.3	20.7	4.6
	-10	21.0	31.2	2.4	24.9	26.7	3.2	28.3	23.4	4.1
	-5	19.5	33.4	2.1	23.2	29.2	2.9	26.4	26.2	3.6
	0	18.1	35.7	1.8	21.5	31.7	2.5	24.5	28.9	3.1
	5	16.7	37.9	1.6	19.8	34.3	2.2	22.6	31.6	2.7
	10	15.3	40.1	1.4	18.2	36.8	1.8	20.6	34.3	2.3
50/45°C	-20	18.5	16.3	24.8	22.1	12.5	34.1	25.2	9.7	43.4
	-15	17.1	18.5	21.5	20.4	15.0	29.5	23.3	12.5	37.6
	-10	15.6	20.8	18.4	18.7	17.6	25.3	21.3	15.2	32.2
	-5	14.2	23.0	15.5	17.0	20.1	31.4	19.4	17.9	27.1
	0	12.8	25.2	12.9	15.3	22.6	17.7	17.5	20.6	22.5
	5	11.4	27.5	10.5	13.6	25.1	14.4	15.6	23.4	18.2
	10	10.0	29.7	8.3	12.0	27.6	11.3	13.6	26.1	14.4

PKU 3

Pipe connection R 3/4"

Air flow volume [m³/h]		2500			3250			4000		
	t_{in}[°C]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	Δp_W[kPa]
90/70°C	-20	41.1	28.5	4.6	48.0	23.6	6.1	54.1	19.9	7.6
	-15	39.0	31.0	4.2	45.5	26.3	5.6	51.2	22.8	6.9
	-10	36.8	33.4	3.8	42.9	29.0	5.0	48.4	25.7	6.2
	-5	34.6	35.8	3.4	40.4	31.7	4.5	45.5	28.5	5.6
	0	32.5	38.3	3.0	37.8	34.3	4.0	42.6	31.4	4.9
	5	30.3	40.7	2.7	35.3	37.0	3.5	39.7	34.3	4.4
	10	28.1	43.2	2.3	32.8	39.7	3.1	36.8	37.2	3.8
80/60°C	-20	36.5	23.1	3.9	42.6	18.7	5.1	48.0	15.4	6.3
	-15	34.4	25.5	3.5	40.1	21.4	4.6	45.1	18.3	5.7
	-10	32.2	28.0	3.1	37.5	24.1	4.1	42.3	21.2	5.0
	-5	30.0	30.4	2.7	35.0	26.8	3.6	39.4	24.0	4.4
	0	27.9	32.9	2.4	32.5	29.5	3.1	36.5	26.9	3.9
	5	25.7	35.3	2.1	29.9	32.1	2.7	33.6	29.8	3.3
	10	23.5	37.8	1.8	27.4	34.8	2.3	30.8	32.7	2.8
50/45°C	-20	28.5	13.6	32.3	33.4	10.3	43.0	37.7	7.8	53.6
	-15	26.3	16.0	28.0	30.8	13.0	37.3	34.8	10.7	46.4
	-10	24.1	18.5	24.0	28.3	15.6	31.9	31.9	13.5	39.6
	-5	22.0	20.9	20.3	25.7	18.3	26.9	29.0	16.4	33.4
	0	19.8	23.3	16.8	23.2	21.0	22.3	26.1	19.3	27.7
	5	17.6	25.8	13.6	20.6	23.7	18.1	23.2	22.1	22.5
	10	15.4	28.2	10.8	18.1	26.4	14.2	20.4	25.0	17.7

Ratings for other modes of operation available on request.

COOLER FEATURES 9

WATER COOLER

Fin spacing s = 2.5 mm

PKU 1

Pipe connection R 3/4"

Air flow volume [m³/h]				500				1000				1500			
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]
Water 7/12°C	4R	34	45	5.8	14.4	91	3	9.5	17.7	82	8	12.4	19.8	77	13
		32	40	4.4	14.1	88	2	7.0	17.2	78	5	9.1	19.0	73	8
		29	46	3.8	13.7	90	2	6.0	16.4	81	4	7.8	18.0	76	6
	5R	34	45	6.5	12.3	95	5	11.0	15.4	88	13	14.7	17.4	82	22
		32	40	5.0	12.2	93	3	8.3	15.0	84	8	10.9	16.9	78	13
		29	46	4.3	12.0	94	2	7.2	14.5	87	6	9.4	16.1	62	10
	6R	34	45	7.0	10.8	97	7	12.2	13.6	91	18	16.5	15.5	87	31
		32	40	5.4	10.8	96	4	9.3	13.4	89	11	12.4	15.1	83	19
		29	46	4.7	10.7	96	3	8.1	13.0	90	9	10.8	14.5	86	15

PKU 2

Pipe connection R 1"

Air flow volume [m³/h]				1500				2000				2500			
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]
Water 7/12°C	4R	34	45	14.5	17.5	83	9	17.5	19.0	79	13	20.2	20.1	76	17
		32	40	10.8	17.0	79	5	13.0	18.3	75	8	14.9	19.3	72	10
		29	46	9.3	16.2	82	4	11.2	17.3	78	6	12.8	18.2	75	7
	5R	34	45	16.9	15.0	88	15	20.8	16.5	85	21	24.2	17.6	82	28
		32	40	12.8	14.7	85	9	15.6	16.0	81	13	18.1	17.0	78	17
		29	46	11.1	14.2	87	7	13.5	15.3	84	10	15.7	16.2	81	13
	6R	34	45	18.7	13.3	92	20	23.2	14.6	89	30	27.3	15.7	86	40
		32	40	14.2	13.0	89	12	17.6	14.3	86	18	20.6	15.3	82	24
		29	46	12.4	12.7	91	10	15.3	13.8	88	14	17.9	14.7	85	19

PKU 3

Pipe connection R 1"

Air flow volume [m³/h]				2500				3250				4000			
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]	Q[kW]	t_{out}[°C]	r.v.out[%]	Δp_W[kPa]
Water 7/12°C	4R	34	45	22.6	18.5	80	12	26.7	19.9	77	16	30.4	20.9	74	20
		32	40	16.7	17.9	76	7	19.7	19.1	72	9	22.3	20.0	69	11
		29	46	14.3	17.0	79	5	16.9	18.0	76	7	19.1	18.8	74	9
	5R	34	45	23.4	17.6	85	14	27.9	18.8	81	20	32.0	19.8	79	25
		32	40	16.7	17.2	82	8	19.9	18.3	78	11	22.7	19.2	75	14
		29	46	14.1	16.6	84	6	16.7	17.5	81	8	19.0	18.2	78	10
	6R	34	45	26.2	15.9	89	20	31.6	17.1	86	28	36.5	18.0	83	36
		32	40	19.0	15.6	86	11	22.8	16.7	83	16	26.3	17.6	80	20
		29	46	16.1	15.2	88	8	19.3	16.1	85	11	22.1	16.8	83	15

Ratings for other modes of operation and refrigerants (ethylene-glycol mixture) available on request.

FREON COOLER

Fin spacing s = 2.5 mm

PKU 1

Air flow volume [m³/h]				500			1000			1500		
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]
R22 t_i = +5°C	4R	34	45	6.5	12.5	92	10.7	16.2	84	14.0	18.4	78
		32	40	5.1	12.1	89	8.4	15.5	79	10.9	17.6	74
		29	46	4.6	11.7	91	7.4	14.7	82	9.6	16.5	77
	5R	34	45	7.2	10.5	85	12.2	13.9	89	16.2	16.1	84
		32	40	5.7	10.2	93	9.6	13.4	85	12.6	15.4	79
		29	46	5.1	10.0	94	8.5	12.8	87	11.2	14.6	82
	6R	34	45	7.7	9.1	98	13.3	12.2	92	17.6	14.6	88
		32	40	6.1	8.9	96	10.5	11.8	89	14.0	13.7	84
		29	46	5.5	8.8	97	9.4	11.3	91	12.5	13.0	87

PKU 2

Air flow volume [m³/h]				1500			2000			2500		
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]
R22 t_i = +5°C	4R	34	45	16.3	16.0	84	19.7	17.6	80	22.7	18.8	77
		32	40	12.7	15.3	80	15.3	16.8	75	17.6	17.9	72
		29	46	11.3	14.5	83	13.6	15.8	79	15.6	16.8	76
	5R	34	45	18.6	13.6	89	22.8	15.2	86	26.2	16.6	83
		32	40	14.6	13.1	86	17.9	14.5	82	20.8	15.6	79
		29	46	13.1	12.5	88	15.9	13.7	84	18.5	14.8	82
	6R	34	45	20.3	11.9	93	24.7	13.6	90	28.8	14.9	87
		32	40	16.0	11.5	90	19.8	12.8	86	23.1	14.0	83
		29	46	14.3	11.0	92	17.7	12.2	88	20.6	13.2	86

PKU 3

Air flow volume [m³/h]				2500			3250			4000		
	No.of rows	t_{in}[°C]	r.v.in[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]	Q[kW]	t_{out}[°C]	r.v.out[%]
R22 t_i = +5°C	4R	34	45	25.4	17.1	81	30.1	18.5	78	34.0	19.7	75
		32	40	19.8	16.3	77	23.4	17.7	73	26.5	18.7	70
		29	46	17.5	15.4	80	20.7	16.6	77	23.5	17.5	74
	5R	34	45	29.2	14.7	87	34.7	16.3	83	39.6	17.5	81
		32	40	22.9	14.1	83	27.4	15.4	79	31.3	16.5	76
		29	46	20.4	13.4	85	24.3	14.6	82	27.8	15.5	80
	6R	34	45	32.0	13.0	91	38.1	14.6	87	43.8	15.8	85
		32	40	25.3	12.4	87	30.4	13.7	84	34.6	15.0	81
		29	46	22.6	11.9	89	27.2	13.1	86	31.2	14.0	84

Ratings for other modes of operation, refrigerants or evaporation temperatures available on request.
Inlet and outlet connection sizes depend on cooling capacity and are available on request.

10 SOUND ATTENUATOR FEATURES

SOUND ATTENUATORS

The sound attenuator performance [dB] at a specific frequency is showed in the following table:

PKU 1

Length [mm]	Frequency [Hz] 63	125	250	500	1000	2000	4000	8000
600	2	5	12	12	19	20	17	11
900	3	7	15	15	23	24	20	15

PKU 2

Length [mm]	Frequency [Hz] 63	125	250	500	1000	2000	4000	8000
600	4	5	12	12	15	10	7	7
900	5	9	19	20	22	14	10	9

PKU 3

Length [mm]	Frequency [Hz] 63	125	250	500	1000	2000	4000	8000
600	4	5	12	12	15	10	7	7
900	5	9	19	20	22	14	10	9

FAN NOISE ABSORPTION BY UNIT CASING

The sound power level of fans L_W(A) ("A" scale) measured in a free field at a distance of d = 1 m can be read off from the fan diagrams.

The data specified apply to a free air suction and escape into the ventilating duct.

The fan noise absorption by means of the unit casing may be calculated according to the formula:

$$L_{w1}\ (A) = L_w\ (A) - R$$

R values (dB) may be found in the table attached.

Noise absorption by means of the unit casing at a distance of 1 m in front of the unit (according to DIN 52210):

Frequency range [Hz] 63	125	250	500	1000	2000	4000	8000
11	12	13	15	25	26	26	26

ELECTRICAL DATA 11

ELECTRIC HEATER

Type	Air volume V[m³/h]	Capacity Q[kW]	Temperature rise Δt_2[°C]
PKU 1	1500	11	22,0
PKU 2	2500	17	20,0
PKU 3	4000	26	19,5

Supply voltage 230 V or 400 V / 50 Hz.

Heaters may be activated in 1 - 6 stages or continuously (on request).

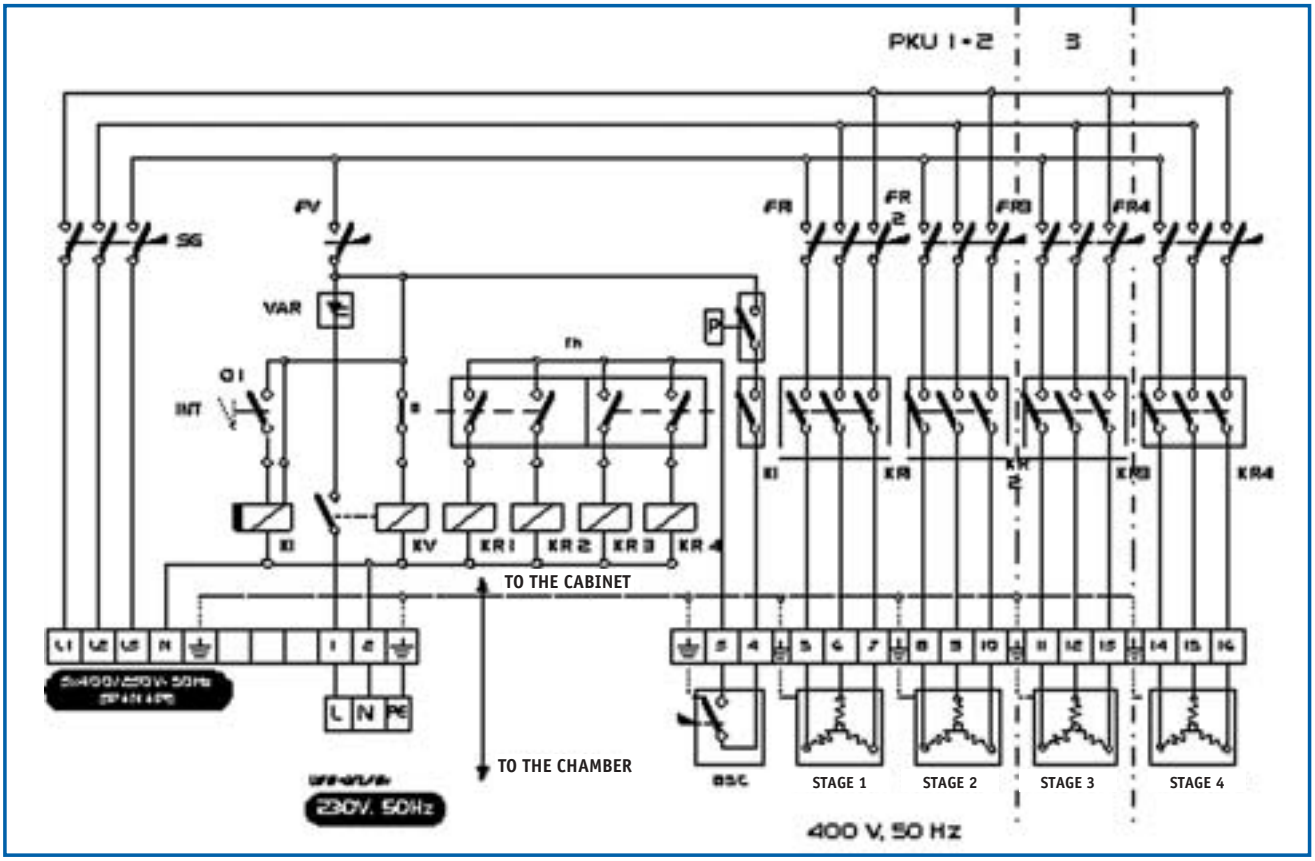
Installation of other (higher) electric heater power available on request.

ELECTRIC MOTOR

Type	Electric power	No. of poles	Supply voltage		Thermal protection	Mechanical protection class	Max. air tempera-ture	Max. current	Speed regulator type
PKU 1	300 W	4	230 V	50 Hz	DA	IP44	60°C	2,6A	RVM 3
	1000 W	2	230 V	50 Hz	DA	IP20	40°C	8,5A	RT 10
PKU 2	550 W	4	230 V	50 Hz	DA	IP44	60°C	6,0A	RVM 9
PKU 3	2×550 W	4	230 V	50 Hz	DA	IP44	60°C	2×6A	RT 10, RT 12

NOTE: Frequency regulator available (on request).

WIRING DIAGRAM 12



Symbols:

FV - manual switch
VAR - speed regulator
INT - switch (ON/OFF)
KV - fan switch
K1 - time relay
KR 1-4 - heater element contactors
Th - step-by-step thermostat
P - pressure differential cut-out0
FR 1-4 - heater fuses
BSC - overheat control (limit thermostat)

12 TENDER TEXT (example)

Ceiling-mounted air-handling unit, type PKU 3 SP-5, external plastic coating (with ceiling suspension brackets).
Dimensions: WxHxL = 665 x 1440 x 3080 mm
System: CORRIDOR 1. FLOOR

Technical specifications:

EXHAUST (DISCHARGE)
- flexible connection
- damper (electric-motor drive on/off)

FILTER, class G3
- with spare inserts
- filter dirt control: inclined pressure gauge 0-500 Pa

ELECTRIC HEATER
- electric heating capacity — Q_g = kW
  (- inlet/outlet air temp.) — tz_{ul}/tz_{iz} = °C
- heater actuation: stepwise (,continuously)

HEATER
- heating capacity — Q_g = kW
- inlet/outlet air temperature — tz_{ul}/tz_{izl} = °C
- pressure drop on the air side — dp_{zr} = Pa
- inlet/outlet temperature of medium — tw_{ul}/tw_{izl} = °C
- pressure drop on the water side — dp_w = Pa
- design: standard (,epoxy layer)

WATER COOLER
- cooling capacity — Q_h = kW
- inlet air temperature/relative humidity — tz_{ul}/rv = °C/%
- outlet air temperature/relative humidity — tz_{izl}/rv = °C/%
- pressure drop on the air side — dp_{zr} = Pa
- medium: water (30% glycol)
- inlet/outlet temperature of medium — tw_{ul}/tw_{izl} = °C
- pressure drop on the water side — dp_w = Pa
- design: standard (,epoxy layer)
- with droplet eliminator (• w/o droplet eliminator)

FREON COOLER
- cooling capacity — Q_h = kW
- inlet air temperature/relative humidity — tz_{ul}/rv = °C/%
- outlet air temperature/relative humidity — tz_{izl}/rv = ˚C/%
- pressure drop on the air side — dp_{zr} = Pa
- refrigerant: R22 (R407C,...)
- evaporation temperature — t_i = ˚C
- design: standard (,epoxy layer)
- with Droplet eliminator (• w/o droplet eliminator)

FAN UNIT
- air flow volume — V = m^3/h
- external pressure drop — dp_{ext} = Pa
- total pressure drop — dp_{tot} = Pa
- design: standard (,explosion-proof, ...)
- electric motor power — P_m = kW
- protection class: IP54 (,IP57)
- (double-speed electric motor, triple-speed electric motor)
- design: standard (explosion-proof, tropic, marine)
  (• prepared for frequency regulator)
- with RVM 3 speed regulator (• with frequency converter)

SOUND ATTENUATOR 600 mm long
- sound attenuation at 250 Hz — dB(A)

PLATE RECUPERATOR
- fresh/return air flow volume — V = m^3/h
- fresh air temperature/relative humidity — tz_{ul}/rv = °C/%
- pressure drop on the air side — dp_{zr} = Pa
- return air temperature/relative humidity — tz_{izl}/rv = °C/%
- pressure drop on the air side — dp_{zr} = Pa
- heat recovery coefficient — h = %
- with by-pass installed (and droplet eliminator)

MIXING UNIT

Our partners and representatives:

PB-PKUO3-ENG

proKLIMA

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