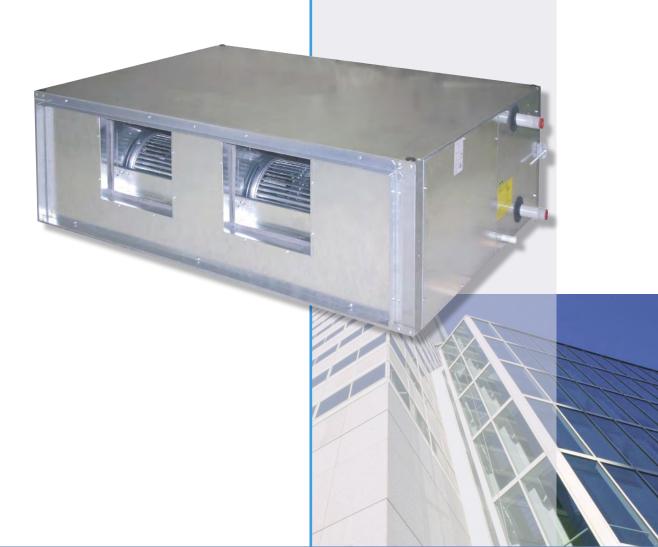
▶ Belt Drive Compact Air Handling Units

WESPAK 4.05, 5.05 & 6.05



Engineering Data Manual EDM WPKBD-A.2GB

Date : June 2007

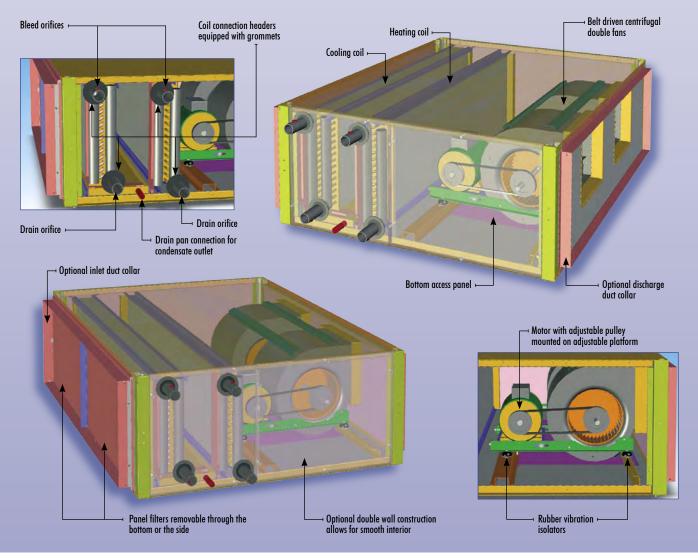
Supersedes: TM WPKBD-A.1GB/05.05



Features and Benefits

- ➤ The Wespak units offer an extension in their range, designed to meet the market demands. This extension comprises a range of **belt drive compact air handling units with low silhouette** suitable for hanging above the false ceiling. These units are intended either for new installations or for retrofit applications.
- ▶ The Wespak belt drive compact air handling units come in **3 sizes** covering an air flow range from **4000 to 9000 m³/h**.

 The units are fitted, as standard, with adjustable pulley allowing for operation with maximum static pressure or for air volume balancing for proper operation.
- ▶ Units feature maximum flexibility :
 - *Single wall or double wall construction for cleanability of unit interior.
 - Insulation flexibility: 10 mm thick synthetic foam or 25 mm thick glass filter insulation.
 - * Full line of treatment functions allows for complete system design flexibility to assure proper application: air mixing, air filtration, heating, cooling, deshumidifying, ventilation and sound attenuation.
 - * WinPak Windows based selection software helps design the most appropriate systems required by you, our customers.
 - Coil flexibility: hot water, electric type, chilled water or direct expansion.
 - * Suspension kit flexibility to minimize installation time: suspension by threaded rods or by threaded rods and hanger rails.



- ▶ Units feature also maximum serviceability :
 - Easy access with **removable panels** allows for unit cleaning and service.
 - Easy fan removal.
 - Easy coil removal.
 - * Easy filter removal from the unit through the bottom or the side without removing the connected duct.
 - * Ample access to the cooling coil drain pan through the fan bottom access panel, assures that the drain pan can be inspected and cleaned without removing the coil.

Specifications

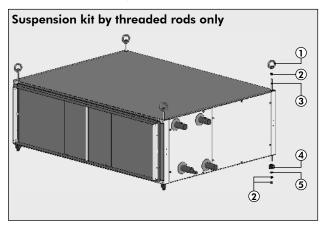
Casing

Unit casing consists of structure and panels constructed from heavy gauge galvanized sheet steel.

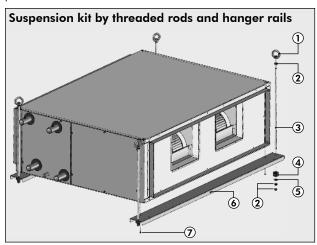
Panels are proposed in either single wall or double wall construction.

Single skin panels are insulated with 10 mm thick synthetic foam material, while double skin panels are filled with 25 mm thick glass fiber insulation.

Each casing provides hole at four corners to allow for fitting of suspension kit (by threaded rods), supplied as an option, in order to minimize installation time.



Another optional suspension kit (by threaded rods and hanger rails) can be provided to quickly hang the multi casing units to the ceiling. Again, this allows installers to save time during the installation

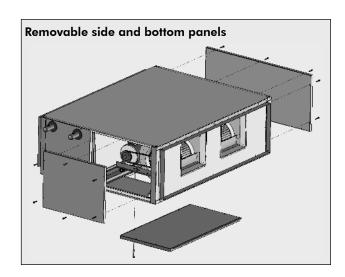


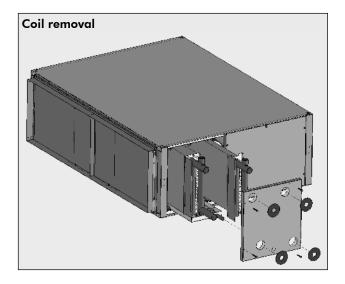
- 1 Lifting ring
- 2 Nuts
- 3 Threaded rods
- 4 Rubber isolator
- (5) Washer
- 6 Hanger rail
- 7 Hanger rail fixing screws

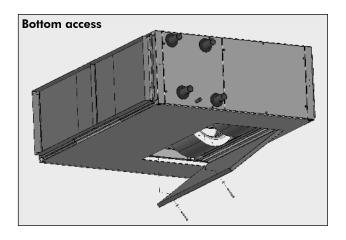
Casing provides easy access with removable side and bottom panels to facilitate unit cleaning and service.

Removable side panels allow fans and coils to be easily removed from the unit casing for cleaning or replacement.

On the unit without heating coil located downstream cooling coil, the bottom access panel of the fan section allows the cooling coil drain pan to be inspected and cleaned without removing the coil.







Specifications (continued)

Components type

Fans

Each unit is equipped with double fans and belt driven motor.

Each fan is of double inlet high efficiency centrifugal type with forward curved blades.

All fans are statically and dynamically balanced to assure smooth and quiet operation.

Fan bearings are permanently lubricated ball bearings mounted on rubber inserts to eliminate vibration.

Fans are driven by a TEFC, 1500 nominal RPM, class F, IP55, 400 V/3 Ph/50 Hz motor mounted on an adjustable platform to facilitate belt adjustment.

An adjustable pulley is supplied as standard for ease and accuracy in balancing the system.

Coils

All coils are constructed of seamless copper tubes and aluminium fins.

Tubes are mechanically expanded into the fins for a permanent primary-to-secondary surface bond, assuring maximum heat transfer efficiency.

The headers of water coils are equipped, as standard, with a bleed orifice at the highest point and a drain orifice at the lowest point.

Direct expansion coils are supplied complete with a distributor.

A droplet eliminator can be supplied as an option for use with cooling coils. However, it is mandatory to use it when face air velocity is higher than 2.7~m/s.

A drain pan, made of galvanized steel, is fitted underneath cooling coils to collect condensates from coils, U-tubes and headers. Drain pan has copper tube connection for condensate outlet.

Electric heaters

The electric heaters are comprised of a series of stainless steel, sheathed heating resistances.

They are available in 3 capacity levels: BE1 (lower capacity), BE2 (medium capacity) and BE3 (higher capacity).

All electric heaters are pre-wired and connected to a terminal block provided. Each electric heater is protected by a manual reset safety thermostat.

The fan control must be interlocked with the electric heater control, to ensure that the fan is running before the heater is switched on or after the heater is switched off.

Filters

Filters are of panel type composed of cleanable synthetic media and galvanized frame.

They are available in two efficiencies: 10 mm thick G2 and 50 mm thick G4 filters.

Filters are mounted in external box and are supplied in several elements for ease of removal.

They can be removed for cleaning or replacement from the unit casing through the side or the bottom without removing the connected duct.

Dampers / Mixing boxes

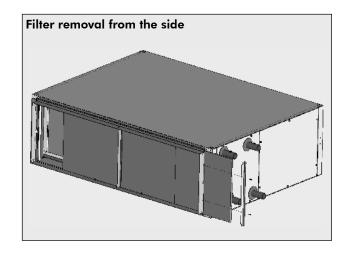
Dampers are provided for use as shut-off face damper or for use in 2-way or 3-way mixing boxes where dampers are internally mounted.

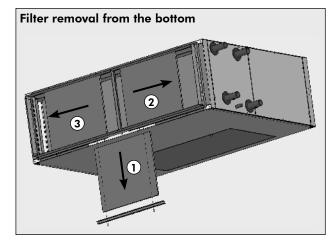
Sound attenuator

Sound attenuator is supplied for mounting at the fan discharge side. The acoustic baffles are of single piece design with an even density. They are covered by a protective non-defibrating fibre glass veil, compacted at high temperature and guaranteed for air velocity up to 15 m/s.

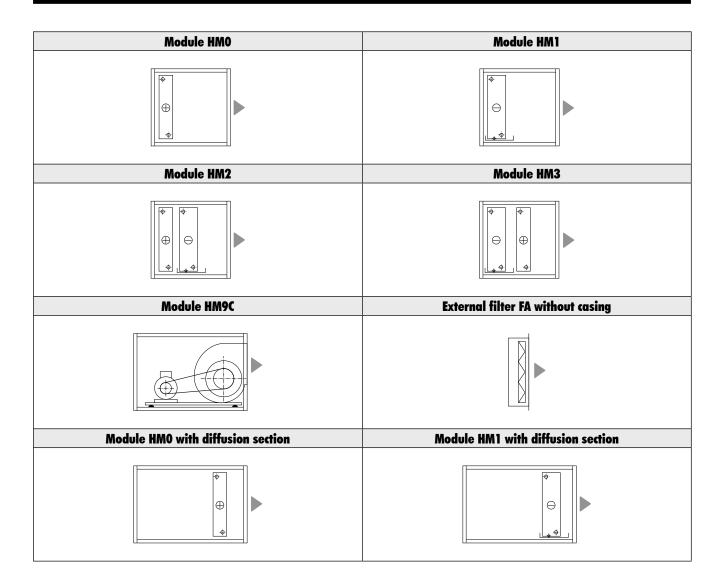
Optional features

- Inlet duct collar/Flexible connector
- Discharge duct collar/Flexible connector
- Suspension kit by threaded rods
- Suspension kit by threaded rods and hanger rails.

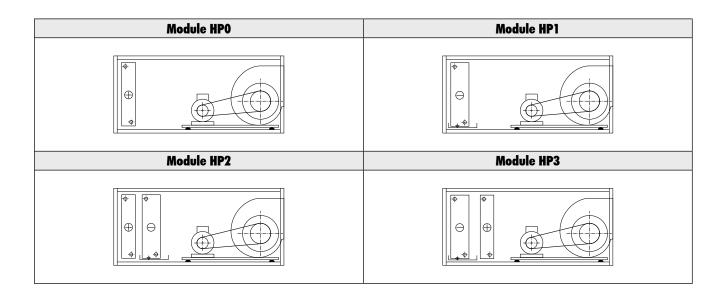




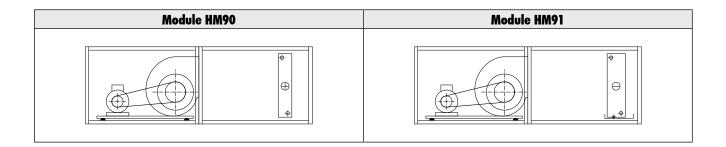
Basic Modules



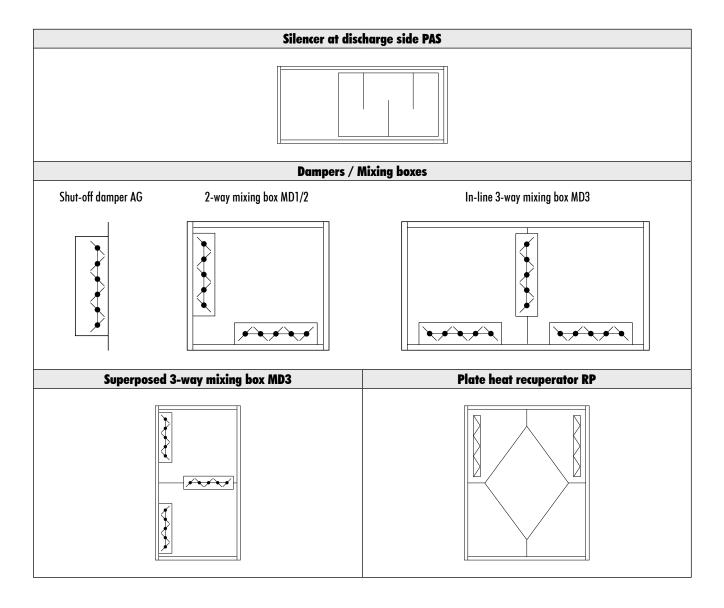
Horizontal Monobloc Units



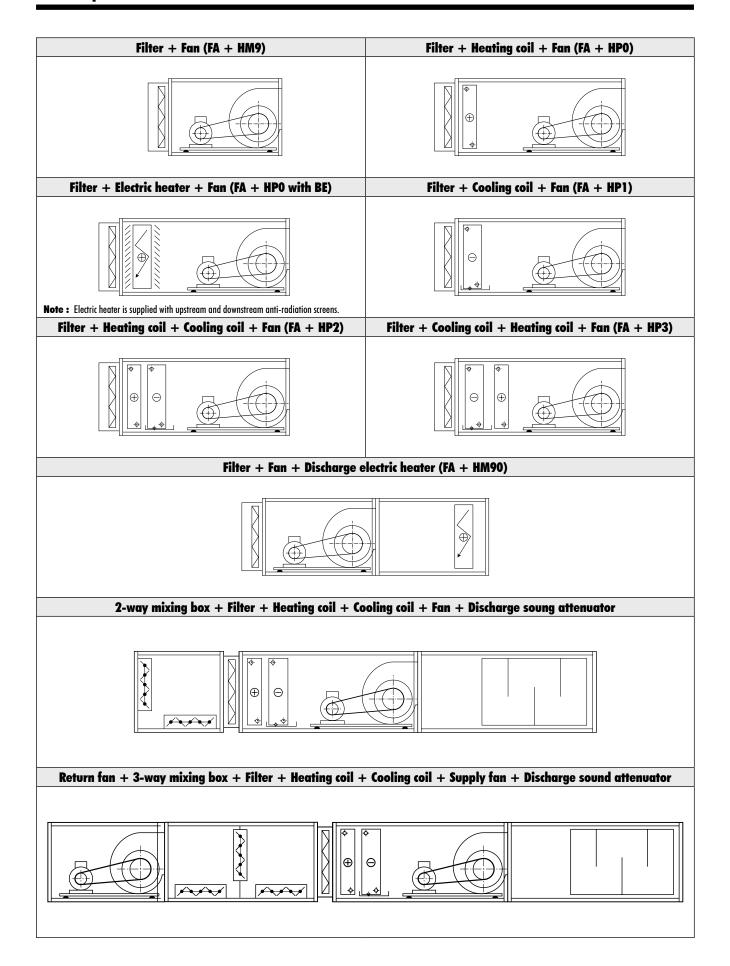
Horizontal Modular Units



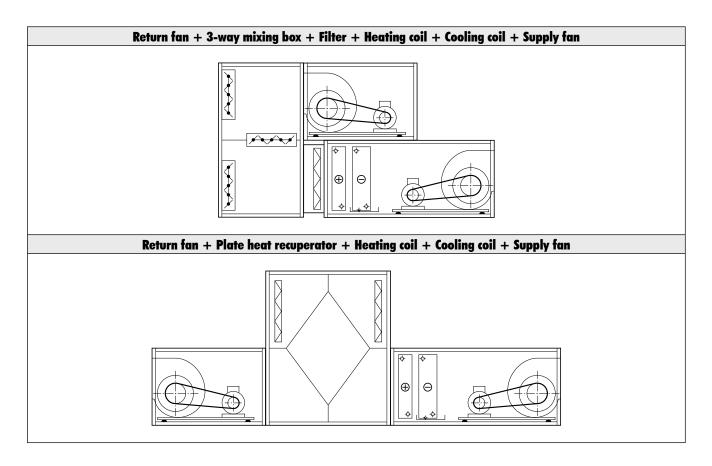
Accessories



Examples of Module Combinations



Examples of Module Combinations (continued)



Technical Data

MODELS		4.	05	5.	05	6.	05	
Air flow range	m³/h	4000 - 6000		5500	5500 - 7500		- 9000	
Nominal air flow	m³/h		00	65	00	80	00	
Fan static pressure	Pa	40	00	40	00	40	00	
Nominal cooling capacity (total/sensible) (1)	kW	25.9	/ 19.6	36.0	/ 26.5	43.2	/ 32.0	
Chilled water flow	l/h	44	41	61	72	74	09	
Nominal heating capacity (2)	kW	21	.3	29.9		35.8		
Hot water flow	l/h	1223		1716		2056		
FAN								
Туре				Double whe	el centrifugal			
Model		DA 9/	9 N2T	DA 9/9 N2T		DA 10/10 N2T		
Drive		Adjustable pulley - Belt						
MOTOR								
Туре			IP55 - P	TO - Class F -	400 V / 3 Ph	/ 50 Hz		
Power	kW	1.5	2.2	2.2	3.0	2.2	3.0	
Current	Α	3.45	4.8	4.8	6.48	4.8	6.48	
Rotational speed	rpm	1420	1430	1430	1430	1430	1430	

⁽¹⁾ Based on : 4-row coil, 27 °C/47% entering air, 7/12 °C chilled water. (2) Based on : 2-row coil, 20 °C entering air, 60/45 °C hot water.

Technical Data (continued)

MODELS		4.0	05	5.	05	6.	05
COOLING COILS						I.	
Туре			Copper to	ubes - Alumini	um fins, 2.1 mi	m spacing	
Finned length	mm	13	60	18	800	1800	
Number of tubes per row		1	5	1	5	1	7
Number of rows		4	6	4	6	4	6
Number of circuits		15	22	15	22	17	25
Number of empty tubes		0	2	0	2	0	2
Header diameter (inlet / outlet)	mm	33 / 42 -	- 33 / 42	33 / 42	- 33 / 42	33 / 42	- 33 / 42
Condensate drain diameter	inch	7/	8"	7,	/8"	7/	′8"
Water content	litres	8.4 16.1		10.5	20.7	11.6	23.2
HEATING COIL							
Туре			Copper to	ubes - Alumini	um fins, 2.1 mi	m spacing	
Finned length	mm	1360		18	100	18	00
Number of tubes per row		15		1	5	1	7
Number of rows		2		2		2	
Number of circuits		15		15		17	
Number of empty tubes		()		0)
Header diameter (inlet / outlet)	mm	33 / 42 -	33 / 42	33 / 42 - 33 / 42		33 / 42	- 33 / 42
Water content	litres	5.	.2	6	.2	6	.8
ELECTRIC HEATER							
Heating element type		Finned	d tube	Smoo	th tube	Smoot	h tube
BE1 capacity	kW	1	2	24		36	
BE2 capacity	kW	2	4	3	6	48 (1)	
BE3 capacity	kW	36	(1)	48	(1)	60	(1)
Supply voltage			400 \	//3 Ph/50 H	lz + Neutral +	Earth	
AIR FILTERS							
Filter efficiency		G2	G4	G2	G4	G2	G4
Media type				Synt	hetic		
Length	mm	48	30	4	70	47	70
Height	mm	44	15	4.	45	50	00
Thickness	mm	10 50		10	50	10	50
Quantity		3	3		4	4	4
DIMENSIONS AND WEIGHT (2)							
Length	mm	11	50	13	50	13	50
Width	mm	15	50	19	90	1990	
Height	mm	48	35	4	85	540	
Weight	kg	18	34	2	50	28	30

⁽¹⁾ To be imperatively installed in discharge electric heater casing.(2) For double skin configuration: 50 mm thick filter + cooling coil + heating coil + fan.

Fan Curves

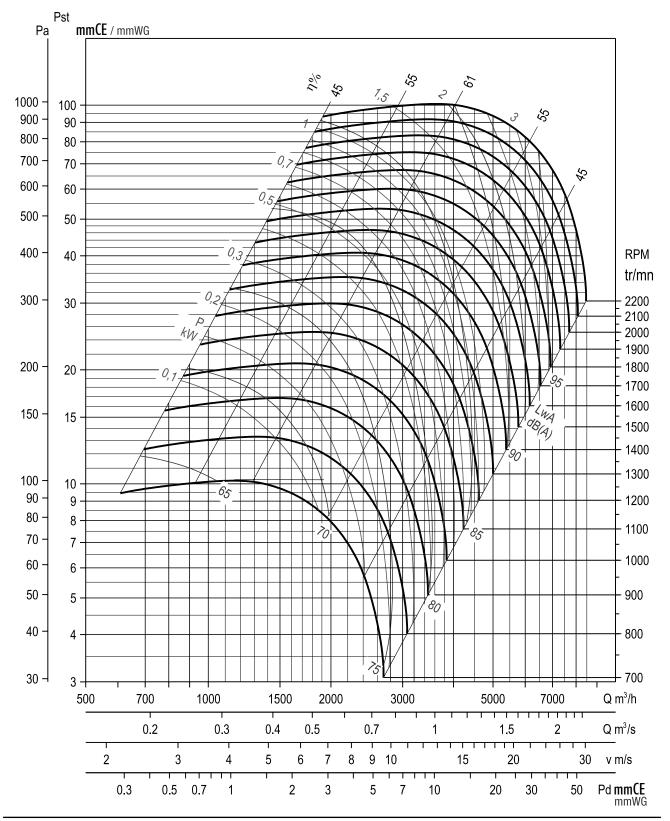
The Wespak compact air handling units are equipped with DA-N2T double type fans : **DA-9/9-N2T** (models 4.05 & 5.05) and **DA-10/10-N2T** (model 6.05).

The fan curves shown below are given for DA single type fans. From those curves, the performances of the DA-N2T double type fans are calculated as follows :

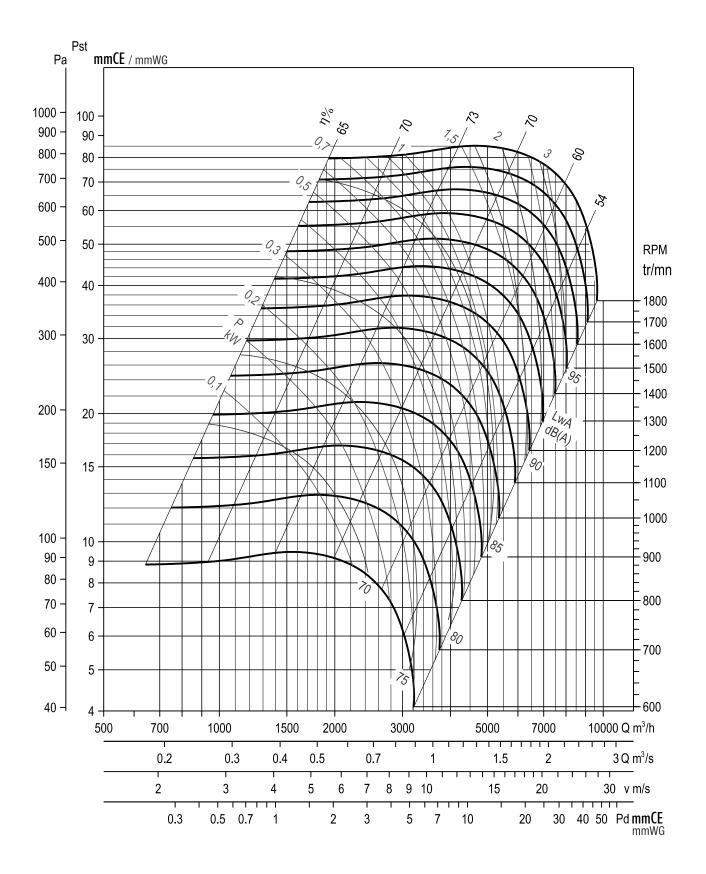
- Multiply air flow by 2,
- Multiply RPM by 1.05,
- Multiply fan shaft power by 2.15.

Fan motor selection shall be based on fan shaft power multiplied by **1.15**.

DA-9/9 Fan curve

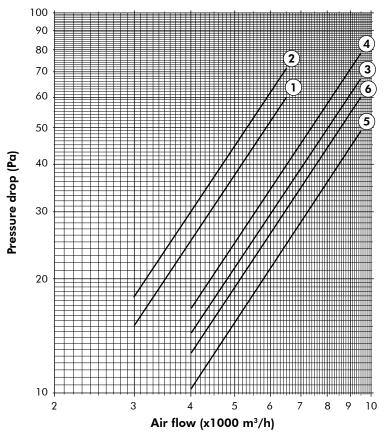


DA-10/10 Fan curve



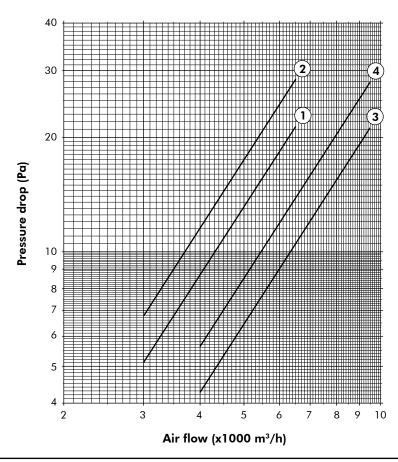
Air Pressure Drop Curves

G2 & G4 filters



- (1) G2 filter Wespak 4.05
- 2 G4 filter Wespak 4.05
- 3 G2 filter Wespak 5.05
- 4 G4 filter Wespak 5.05
- **5** G2 filter Wespak 6.05
- 6 G4 filter Wespak 6.05

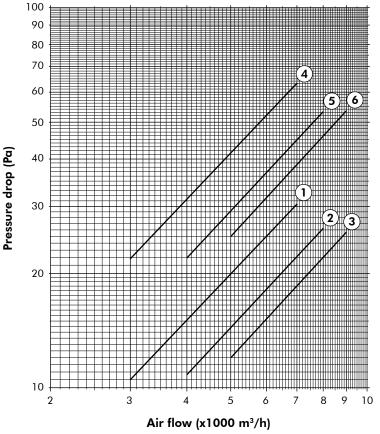
Electric heaters



- 1 Electric heater BE1 Wespak 4.05
- 2 Electric heater BE2 & BE3 Wespak 4.05
- (3) Electric heater BE1 Wespak 5.05 & 6.05
- 4 Electric heater BE2 & BE3 Wespak 5.05 & 6.05

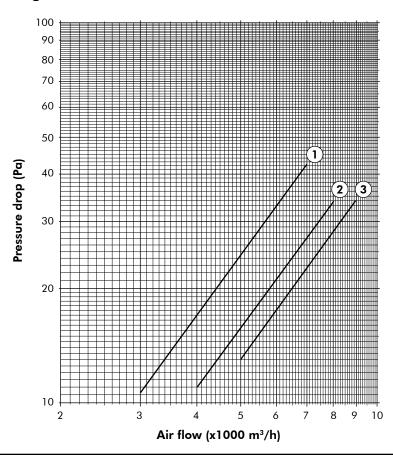
Air Pressure Drop Curves (continued)

Anti-radiation screens and droplet eliminators



- 1 Anti-radiation screen Wespak 4.05
- 2 Anti-radiation screen Wespak 5.05
- 3 Anti-radiation screen Wespak 6.05
- 4 Droplet eliminator Wespak 4.05
- 5 Droplet eliminator Wespak 5.05
- 6 Droplet eliminator Wespak 6.05

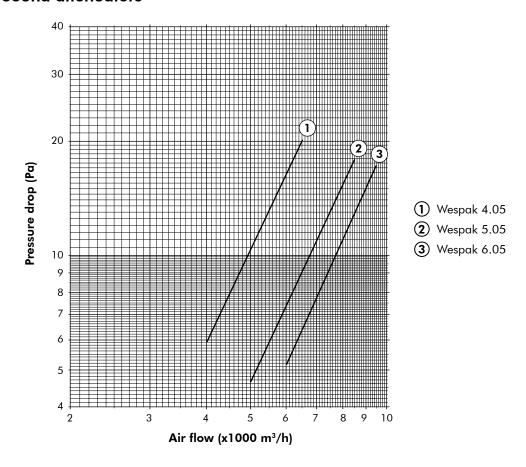
Mixing boxes



- 1 Mixing box Wespak 4.05
- 2 Mixing box Wespak 5.05
- 3 Mixing box Wespak 6.05

Air Pressure Drop Curves (continued)

Sound attenuators



Sound Data

ΔLw values - Wespak 4.05 & 5.05

Hz	125	250	500	1000	2000	4000
ΔLw	21	12	10	4.1	5.5	9

ΔLw values - Wespak 6.05

Hz	125	250	500	1000	2000	4000
ΔLw	21	14	9	3.6	6.2	9

Fan sound power levels Lw

Hz	125	250	500	1000	2000	4000
Lw (dBA)	LwA + 3 - ΔLw					

LwA: Global sound power level in dBA obtained from fan chart.

Silencer sound attenuation

Hz	125	250	500	1000	2000	4000
Attenuation (dB)	7.7	8.8	15.2	22.7	21.4	19.6

Casing sound attenuation

Hz	125	250	500	1000	2000	4000
Attenuation (dB)	3.7	8.6	12.5	10.5	13.3	18.1

In-duct sound levels

In-duct sound levels are obtained by deducting silencer sound attenuation from fan sound levels.

Radiated sound levels

Radiated sound levels are obtained by deducting casing sound attenuation from fan sound levels.

Cooling Capacity Data

WESPAK 4.05

				Coil face velocity (m/s)					
Water		Entering Air	Capacity	2.0	2.5	3.0 (max.)			
temperature (°C)	of rows		(kW)						
, ,	, ,			3730	4660	5595			
	4 07/50	27/50	Total	22.4	26.6	30.4			
7/12	4	27/50	Sensible	15.6	18.6	21.4			
6	27/50	Total	26.7	32.2	37.3				
	27/50	Sensible	18.5	22.3	26.0				

WESPAK 5.05

			Coil face velocity (m/s)						
Water		Entering	Capacity	2.0	2.5	3.0 (max.)			
temperature (°C)	of rows	Air (°C/%)	(kW)	Air volume (m³/h)					
, ,				4935	6170	7405			
	4	07/50	Total	31.9	37.5	42.6			
7/10	4	27/50	Sensible	21.7	25.7	29.4			
//12	7/12	27/50	Total	37.8	45.5	52.4			
6	27/50	Sensible	25.7	30.9	35.8				

WESPAK 6.05

				Coil face velocity (m/s)				
Water	Number	Entering	Capacity	2.0	2.5	3.0 (max.)		
temperature (°C)	of rows	Air (°C/%)	(kW)		Air volume (m³/h)			
, ,	´ ` '	, , ,		5595	6995	8395		
	4		Total	36.1	42.4	48.2		
7/10	4	27/50	Sensible	24.6	29.0	33.3		
7/12	6	27/50	Total	42.9	51.5	59.3		
			Sensible	29.0	35.0	40.6		

Heating Capacity Data

WESPAK 4.05

	Water Number Entering			Coil face velocity (m/s)						
			Capacity	2.0	2.5	3.0	3.5	4.0 (max.)		
temperature (°C)	of rows	Air (°C/%)	(kW)							
	, ,			3730	4660	5595	6525	7460		
90/70	2	20	Total	36.1	41.9	47.3	52.2	56.8		
70/60	2	20	Total	27.8	32.4	36.5	40.4	43.9		
60/50	2	20	Total	21.0	24.4	27.4	30.3	32.9		

WESPAK 5.05

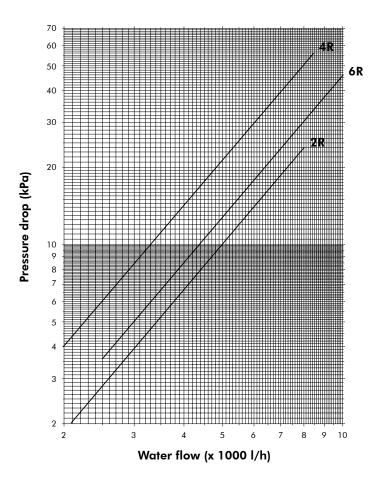
					Coil	face velocity (m/s)		
	Entering	Capacity	2.0	2.5	3.0	3.5	4.0 (max.)		
temperature (°C)	ture of Air rows (°C/%)	(kW)							
				4935	6170	7405	8640	9875	
90/70	2	20	Total	49.2	57.2	64.5	71.3	77.6	
70/60	2	20	Total	37.6	43.8	49.5	54.7	59.6	
60/50	2	20	Total	28.6	33.3	37.5	41.4	45.1	

WESPAK 6.05

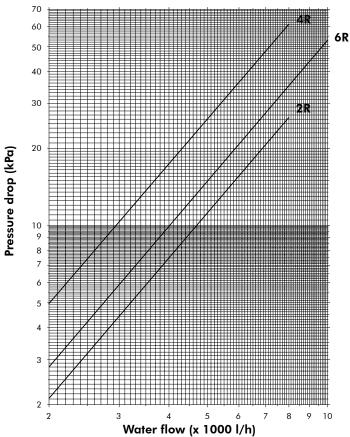
				Coil face velocity (m/s)				
Water temperature (°C) Number rows		Entering	Capacity	2.0	2.5	3.0	3.5	4.0 (max.)
		Air (°C/%)	(kW)					
				5600	6995	8395	5 9795 11	11195
90/70	2	20	Total	55.8	64.8	73.2	80.8	87.9
70/60	2	20	Total	42.7	49.7	56.1	62.0	67.6
60/50	2	20	Total	32.5	37.7	42.5	47.0	51.1

Water Pressure Drop Curves

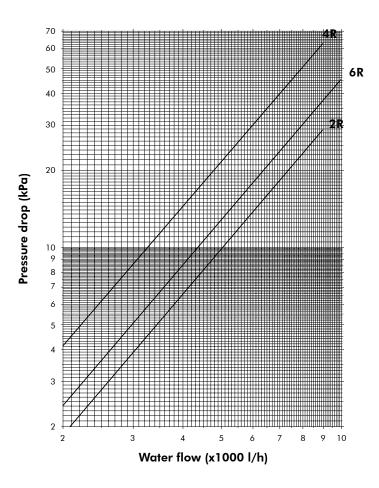
Wespak 4.05



Wespak 5.05

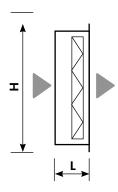


Wespak 6.05



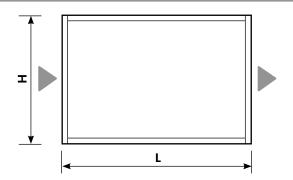
Casing Dimensions (mm)

External filter FA without casing



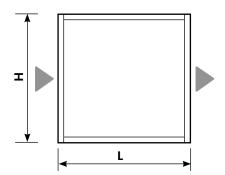
Sizes	L		н	Width	
	G2 filter	G4 filter	••	Widiii	
4.05	62	102	485	1550	
5.05	62	102	485	1990	
6.05	62	102	540	1990	

Modules: HM9, HM0 with diffusion section, HM1 with diffusion section



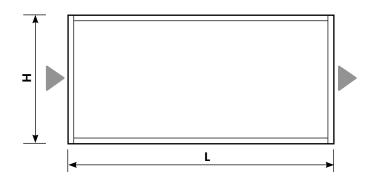
Sizes	L	Н	Width
4.05	710	485	1550
5.05	910	485	1990
6.05	910	540	1990

Modules: HMO, HM1, HM2, HM3, Diffusion section



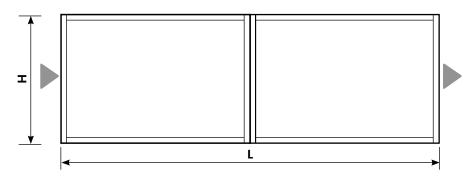
Sizes	L	Н	Width
4.05	540	485	1550
5.05	540	485	1990
6.05	540	540	1990

Modules: HPO, HP1, HP2, HP3, PAS



Sizes	L	н	Width
4.05	1150	485	1550
5.05	1350	485	1990
6.05	1350	540	1990

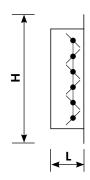
Modules: HM90, HM91



Sizes	L	Н	Width
4.05	1420	485	1550
5.05	1820	485	1990
6.05	1820	540	1990

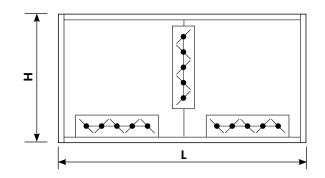
Accessory Dimensions (mm)

Shut-off damper AG



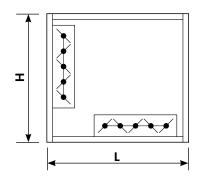
Sizes	L	Н	Width
4.05	220	485	1550
5.05	220	485	1990
6.05	220	540	1990

In-line 3-way mixing box MD3



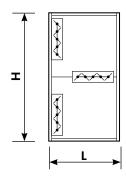
Sizes	L	Н	Width
4.05	1237	485	1550
5.05	1237	485	1990
6.05	1438	540	1990

2-way mixing box MD1/2



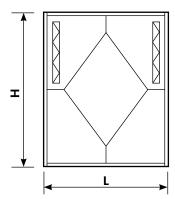
		,	
Sizes	L	Н	Width
4.05	620	485	1550
5.05	620	485	1990
6.05	720	540	1990

Superposed 3-way mixing box MD3



Sizes	L	Н	Width
4.05	620	970	1550
5.05	620	970	1990
6.05	720	1080	1990

Plate heat recuperator RP



Sizes	L	Н	Width
4.05	1150	970	1550
5.05	1350	970	1990
6.05	1350	1080	1990

Casing Weight (kg)

	4.	05	5.	05	6.05	
MODELS	SP	DP	SP	DP	SP	DP
CASINGS						
FA with filter G2	2	-	3	-	4	-
FA with filter G4	3	-	4	-	5	-
Diffusion section	33	49	50	75	51	78
нмо	44	56	54	69	59	75
HM1	62	74	77	92	84	100
HM2 - HM3	82	94	102	117	112	128
HM9	86	98	106	121	116	132
HM0 with diffusion section	53	69	75	100	79	106
HM1 with diffusion section	71	87	98	123	104	131
HP0	120	146	165	202	188	227
HP1	138	164	188	225	213	252
HP2 - HP3	158	184	213	250	241	280
НМ90	126	154	173	213	197	240
HM91	144	172	196	236	222	265
PAS	73	99	99	136	104	143

SP: single skin **DP**: double skin

Extra Weight (kg)

Models	4.05	5.05	6.05
BE1 (1)	14	16	18
BE2 (1)	20	22	24
BE3 (1)	24	26	28
BF6	16	21	24
FMA2	3	6	6

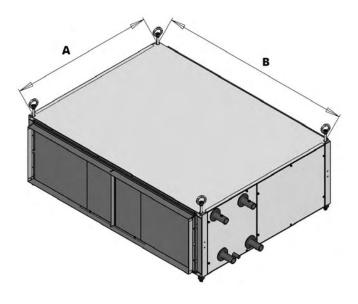
⁽¹⁾ For replacement of hot water coil by electric heating coil.

Option and Accessory Weight (kg)

Models	MD1/2	MD3 in line	MD3 superposed	AG	RP
4.05	45	80	80	10	131
5.05	70	130	130	13	163
6.05	80	145	145	16	163

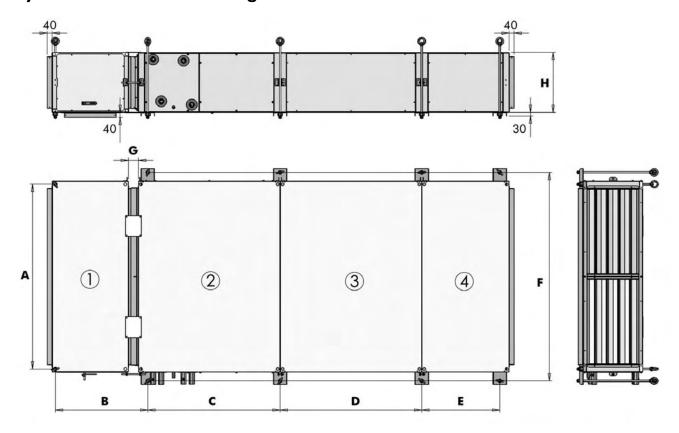
Models	EL	RS screen	CA duct collar	CR duct collar	M flexible connector
4.05	2	2	2	2	2
5.05	3	3	2	2	3
6.05	4	4	2	2	4

By threaded rods only



		Dimensions (mm)								
	Fan only electric he		Standard silence							
Sizes	Α	В	Α	В						
4.05	670	1498	1110	1498						
5.05	870	1940	1310	1940						
6.05	870	1940	1310	1940						

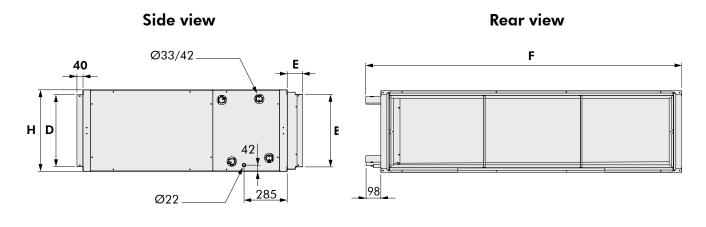
By threaded rods and hanger rails



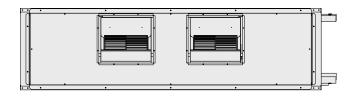
	Dimensions (mm)									
Sizes	Α	B C D E F		_	C	}	н			
Sizes	A	D		U		_	G2 filter	G4 filter		
4.05	1498	750	1074	1150	633	1690	82	122	485	
5.05	1940	750	1274	1350	833	2132	82	122	485	
6.05	1940	852	1274	1350	833	2132	82	122	540	

1	2-way mixing box
2	Standard casing
3	Silencer casing
4	Electric heater casing

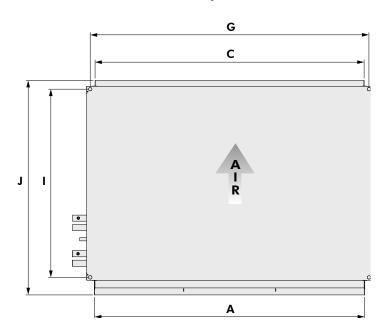
Duct Connection Dimensions



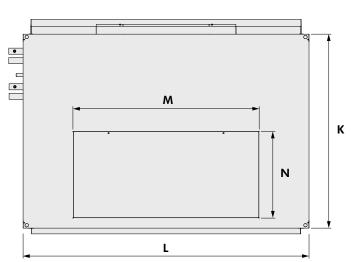
Front view



Top view



Bottom view

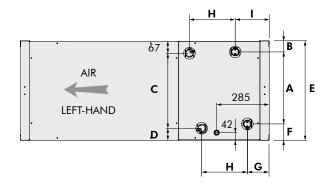


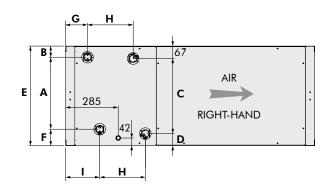
		Dimensions (mm)								
Sizes	^	В	С	_		E	F	G		
Sizes	Α	D		U	G2 filter	G4 filter				
4.05	1438	424	1430	420	62	102	1646	1498		
5.05	1880	424	1872	420	62	102	2088	1940		
6.05	1880	479	1872	475	62	102	2088	1940		

		Dimensions (mm)								
Sizes	н	ı		J	v		м	NI		
Sizes	П		G2 filter	G4 filter	K	L	//\	N		
4.05	485	1110	1252	1292	1150	1548	950	500		
5.05	485	1310	1452	1492	1350	1990	1290	600		
6.05	540	1310	1452	1492	1350	1990	1290	600		

Remark: The dimensions of mixing box connection are identical to those of inlet duct collar connection (dimensions A & B).

Cooling and heating configuration in the direction of air flow



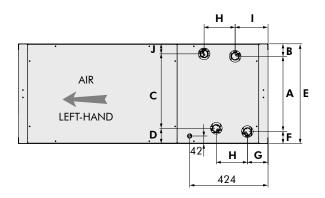


	Instal	nstallation with 4-row cooling and 2-row heating coils							
Sizes	Α	В	С	D	E	F	G	Н	ı
4.05	339	57	356	62	485	89	119	247	185
5.05	339	57	356	62	485	89	119	247	185
6.05	390	57	407	66	540	89	119	247	185

Dimensions are in mm.

	Instal	nstallation with 6-row cooling and 2-row heating coils							
Sizes	Α	В	С	D	E	F	G	Н	ı
4.05	351	50	356	62	485	84	140	226	206
5.05	351	50	356	62	485	84	140	226	206
6.05	402	54	407	66	540	84	140	226	206

Heating and cooling configuration in the direction of air flow



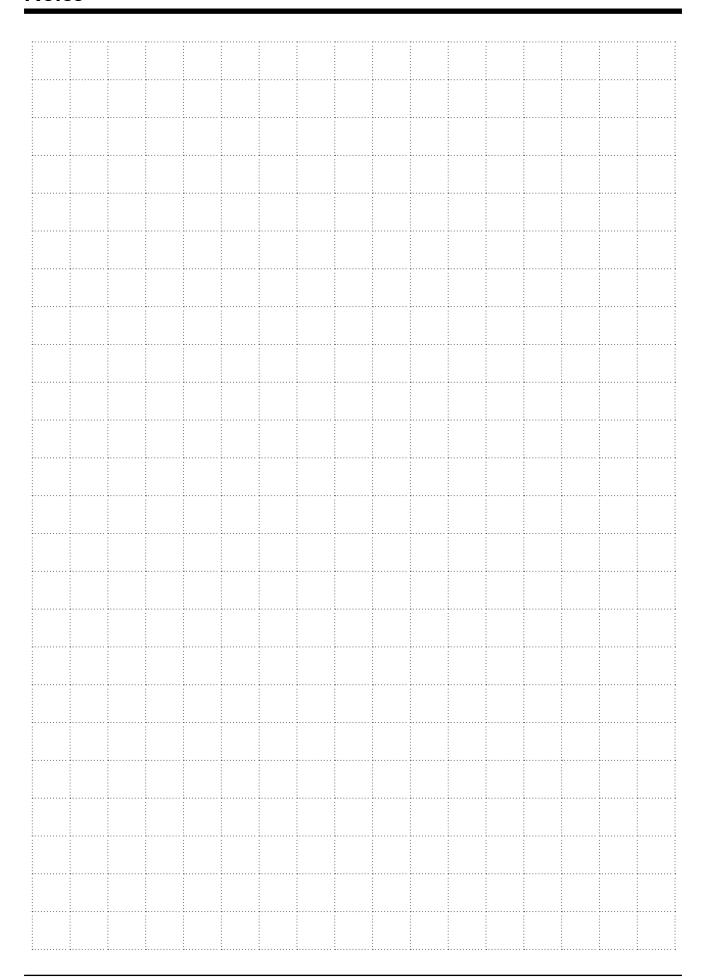
	Insta	Installation with 4-row cooling and 2-row heating coils								
Sizes	Α	В	С	D	Е	F	G	Н	ı	J
4.05	356	66	339	90	485	63	112	146	178	56
5.05	356	66	339	90	485	63	112	146	178	56
6.05	407	67	390	90	540	66	112	146	178	60

Dimensions are in mm.

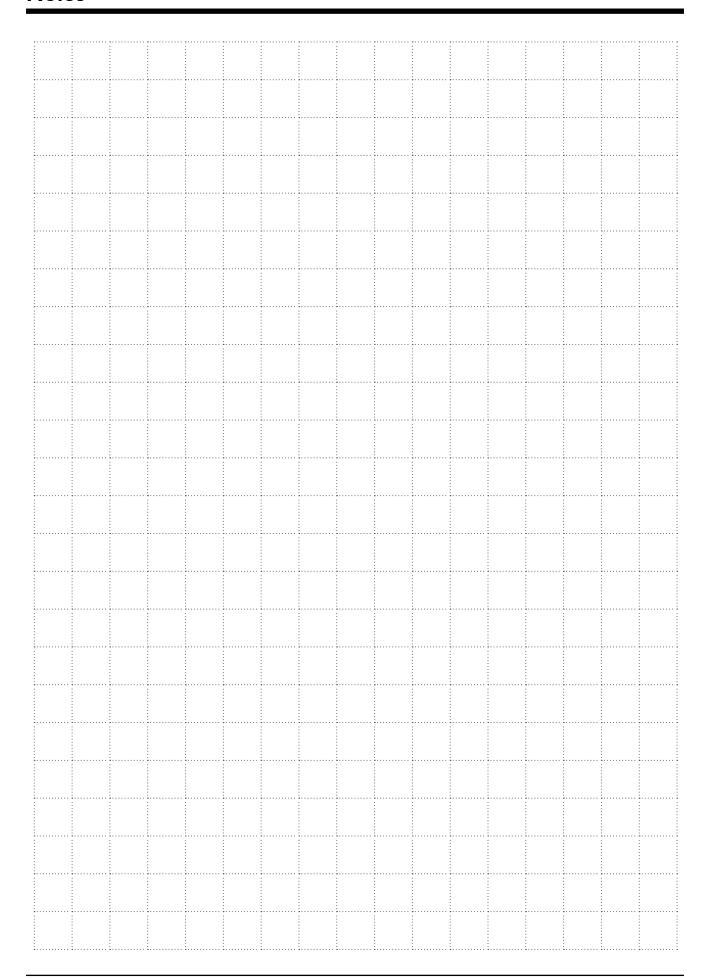
	G H
E A	AIR C RIGHT-HAND
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	Installation with 6-row cooling and 2-row heating coils											
Sizes	Α	В	С	D	E	F	G	Н	ı	J		
4.05	356	66	352	83	485	63	112	168	178	50		
5.05	356	66	352	83	485	63	112	168	178	50		
6.05	407	67	402	83	540	66	112	168	178	55		

Notes



Notes





WinPak Selection Software

To select the most suitable Wespak belt drive compact air handling units according to job specifications, Wesper provides a computer selection program operating under MS Windows System.

This selection software allows you to select quickly the best solution for each application.

For any specific requirements, please contact your nearest Wesper distributor.



As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.



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