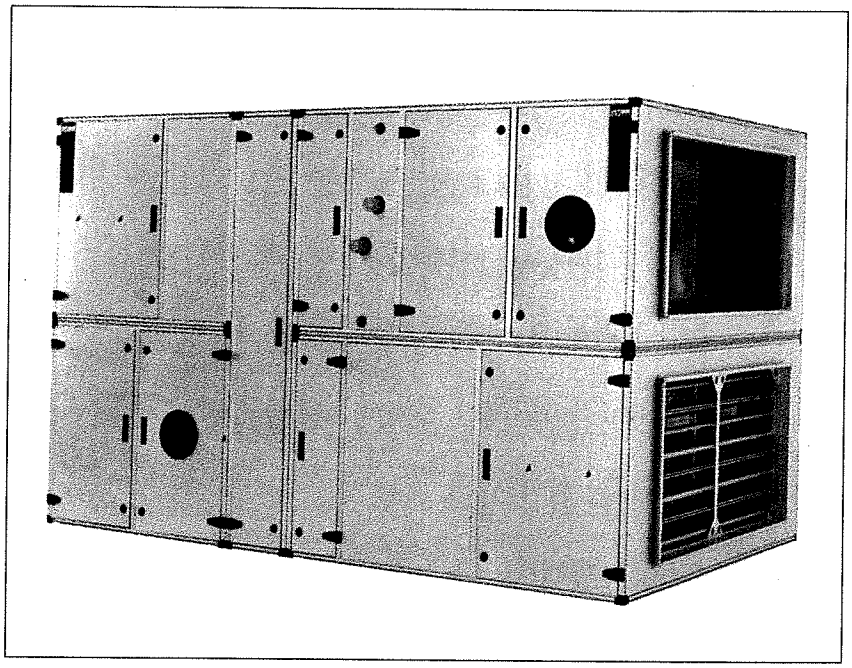
Modular Air Handling Unit

Flexomix S

Airflow range: 720 – 25200 m³/h



IV PRODUKT

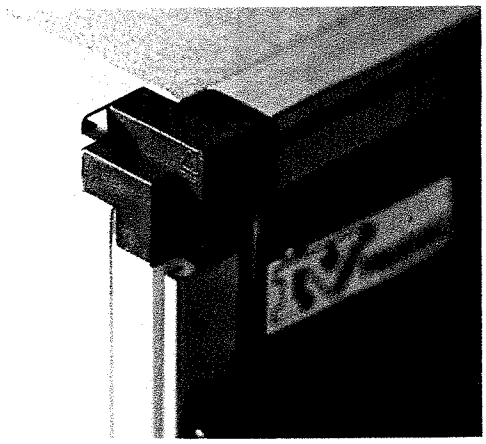
Air handling with the focus on LCC

Flexomix S – A New Generation with the Focus on LCC

Each one of the functions in an air handling unit consumes energy. Each is designed to be as energy-efficient as possible. But the only calculation that really counts is the one that tells you the total energy efficiency of the complete unit. It appears only on the bottom line of the calculation – the life cycle cost (LCC).

Flexomix S is a manifestation of our collective know-how in the field of air handling technology and what is going to be demanded in the future.

Flexomix S offers all the prerequisites for creating a ventilation system with the lowest running costs possible to suit your application.



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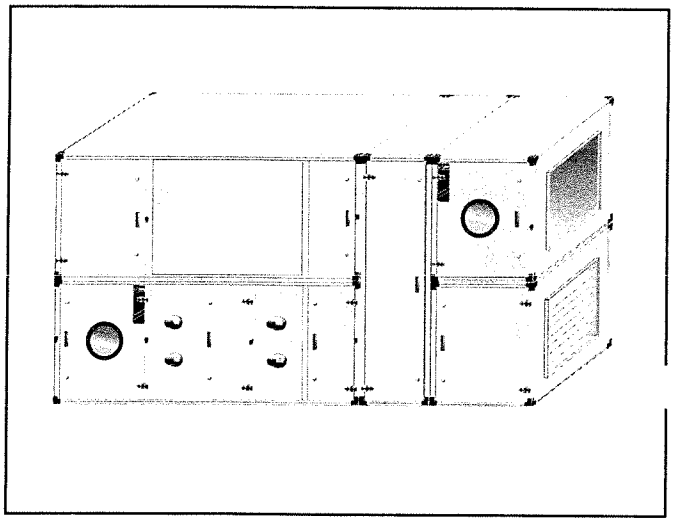
1. Flexomix S – Modular Air Handling Unit



General

The Flexomix S air handling unit has been developed to meet current and future demands made by the community at large on environmentally sound and energy-efficient equipment for ventilation. The air handling unit consists of a system of modules in which the various functions require a specific length of module and the customer decides the delivery version.

Design

Casing

The unit sections are constructed of extruded, naturally anodised aluminium profiled frame members. The panels and inspection doors are of double-skin design, made of aluminium/zinc-plated sheet steel protected by an ALC finish that meets the provisions of Environ-mental Class 3. The intervening 25 mm thick fire-retardant mineral wool insulation is standard. Insulation to Fire-resistance Class EI 30 is also available. All the inspection doors are hung on adjustable hinges. The casing meets the provisions of Tightness Class A and total heat transfer coefficient T4 in accordance with CEN preEN 1886 standard.

Prerequisites for Installation

The Flexomix S in the normal version should be located in a space in which temperatures ranging from +7 to +30 °C can be maintained. During the wintertime, the moisture content in the fan room should not exceed 3.5 g/kg air. The air handling unit can also be equipped with accessories for outdoor installation.

Range of Application

The Flexomix S can be used in most types of buildings, with various types of business or institutional activity such as: hospitals, offices, workshops, schools, banks, hotels, factories, department stores, etc., that require ventilation.

Quality

By maintaining a quality management system that complies with the provisions of international standard ISO 9001, we guarantee the quality of our products. This is your assurance that you as our customer and/or the end user can feel secure about the reliability of our products throughout their useful life.

Environment

We manufacture and develop our products in accordance with our Environmental Management System to ISO 14001 to safeguard our environment and offer our children a safer future.

We include an Environmental Product Declaration in the supply of our air handling units. This enables you to see what materials have been used in their manufacture and what percentage of these materials can be recycled.

The object of this product catalogue is to present particulars of the products in the Flexomix S series. The catalogue should be regarded as a complement of the IV Produkt air handling unit selection program.

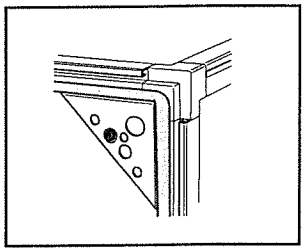
It is advisable to always use the IV Produkt air handling unit selection program for sizing our products before you place orders for them.

LCC – Life Cycle Cost.

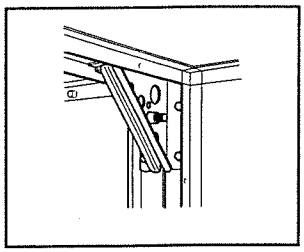
An air handling unit such as the Flexomix S must ventilate and operate for many years. It is customary to count on a useful life of 15 – 20 years. The major costs during this period are the operating costs.

The LCC is the combined cost for capital investment, operation, maintenance and environmental compatability. The Flexomix S has been developed with the focus on LCC to offer you the lowest possible life cycle cost. Our LCC calculation program for PC helps you select the right air handling unit.

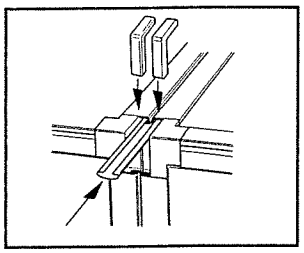
Jointing of Modules and Lifting



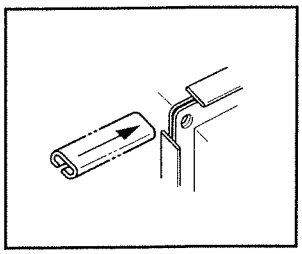
Self-adhesive sealing strips are used to seal the joints between modules.



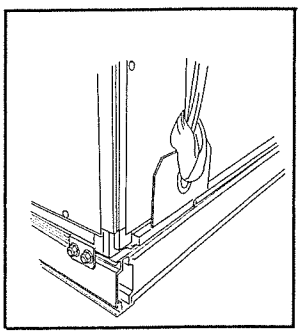
The functional sections can be jointed together by means of four bolts at the corners inside the casing.



The functional sections can also be jointed together by means of a concealed PG joint.



The end connection frames are equipped with four 10 mm dia. holes and are also designed for flange connection with slip clamps.



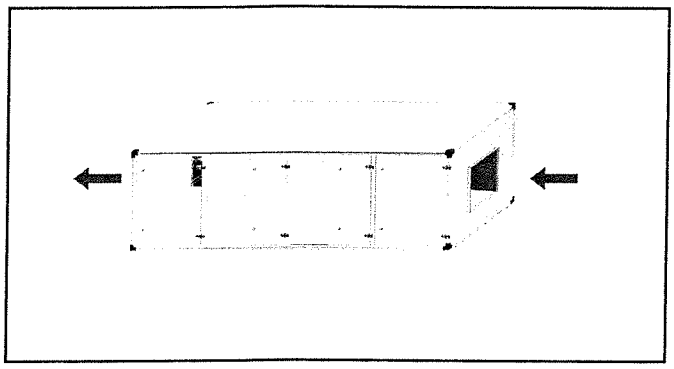
The modules can be lifted by means of lifting brackets that can be fitted into the groove provided in the aluminium profiled section.

2. Types of Air Handling Unit

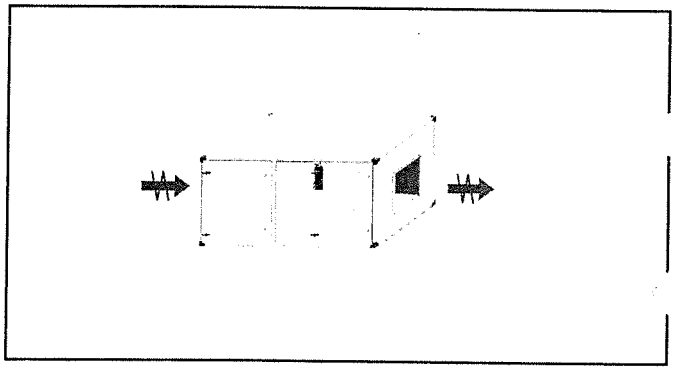
General

The Flexomix S lets you to create supply air and exhaust air units with or without energy recovery unit. We offer nine performance-overlapping sizes that cover an airflow range of 0.2 – 7 m³/s. A complete range of heat recovery units, fan systems and air handling functions. We offer you all the prerequisites for creating a custom-made ventilation and air handling system with low operating costs.

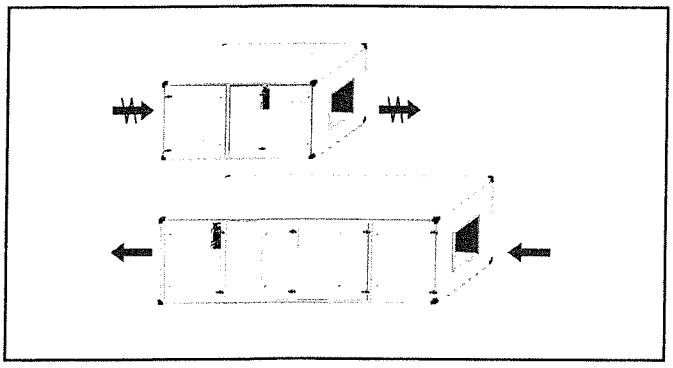
Supply air unit



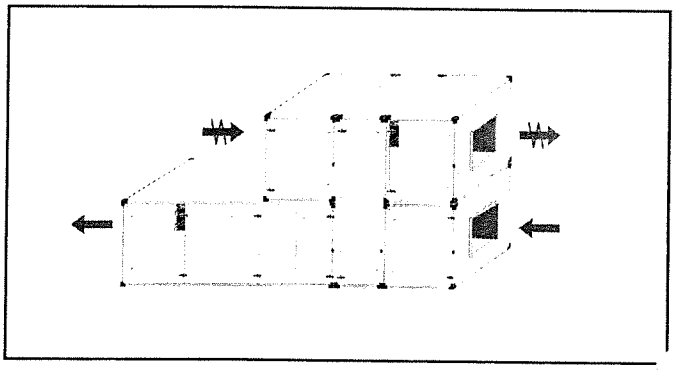
Exhaust air unit



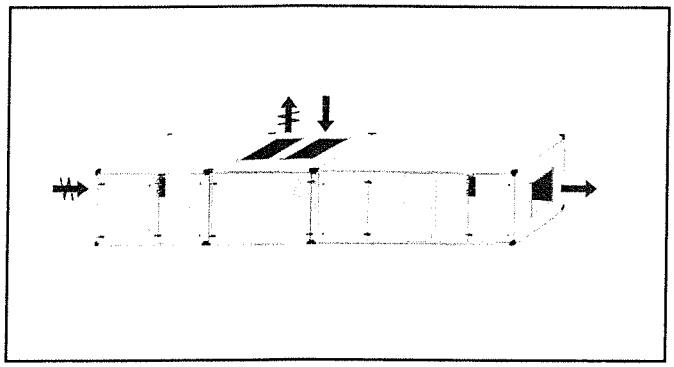
Supply air and exhaust air separated



Supply air and exhaust air stacked (on top)



Supply air and exhaust air in-line

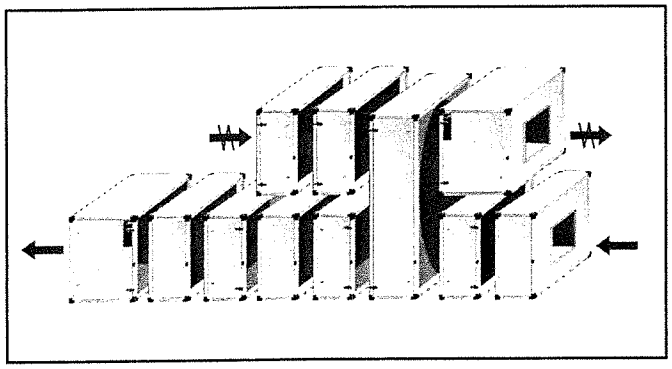


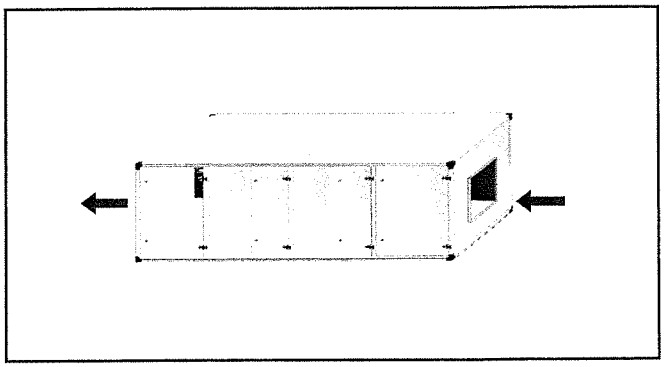
3. Delivery Version

General

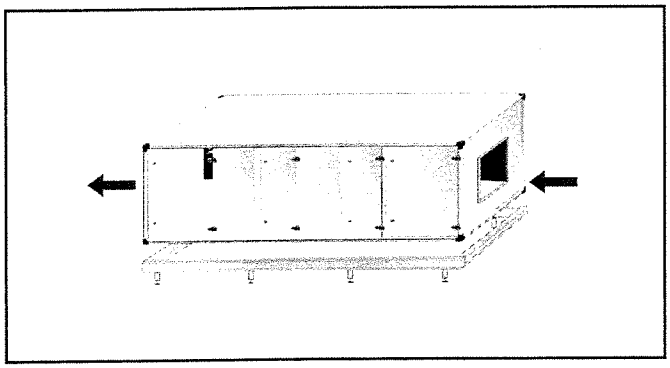
Thanks to our modular system, we can offer various delivery options for meeting your specific requirements on design and appropriate size of module for transporting and lifting the modules at the building site.

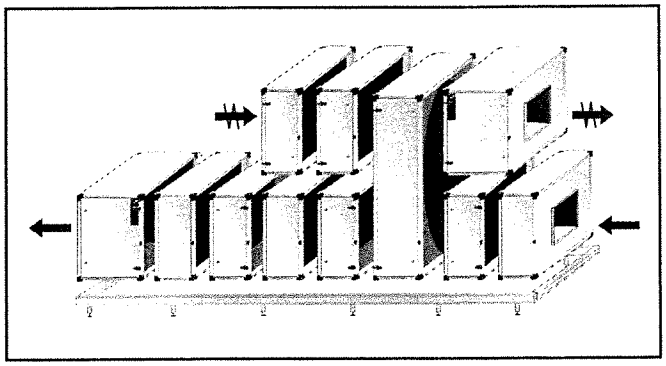
Modular version



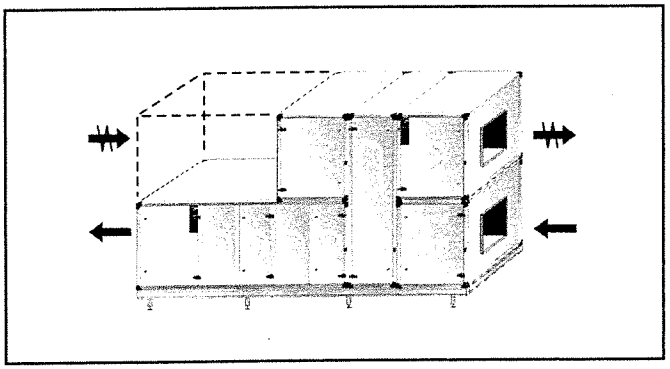


Modular version with stand/support frame (EMMT-05)

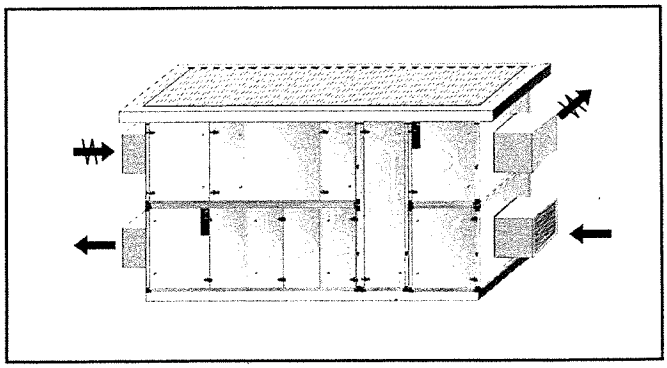




Compact unit (EMMT-10)

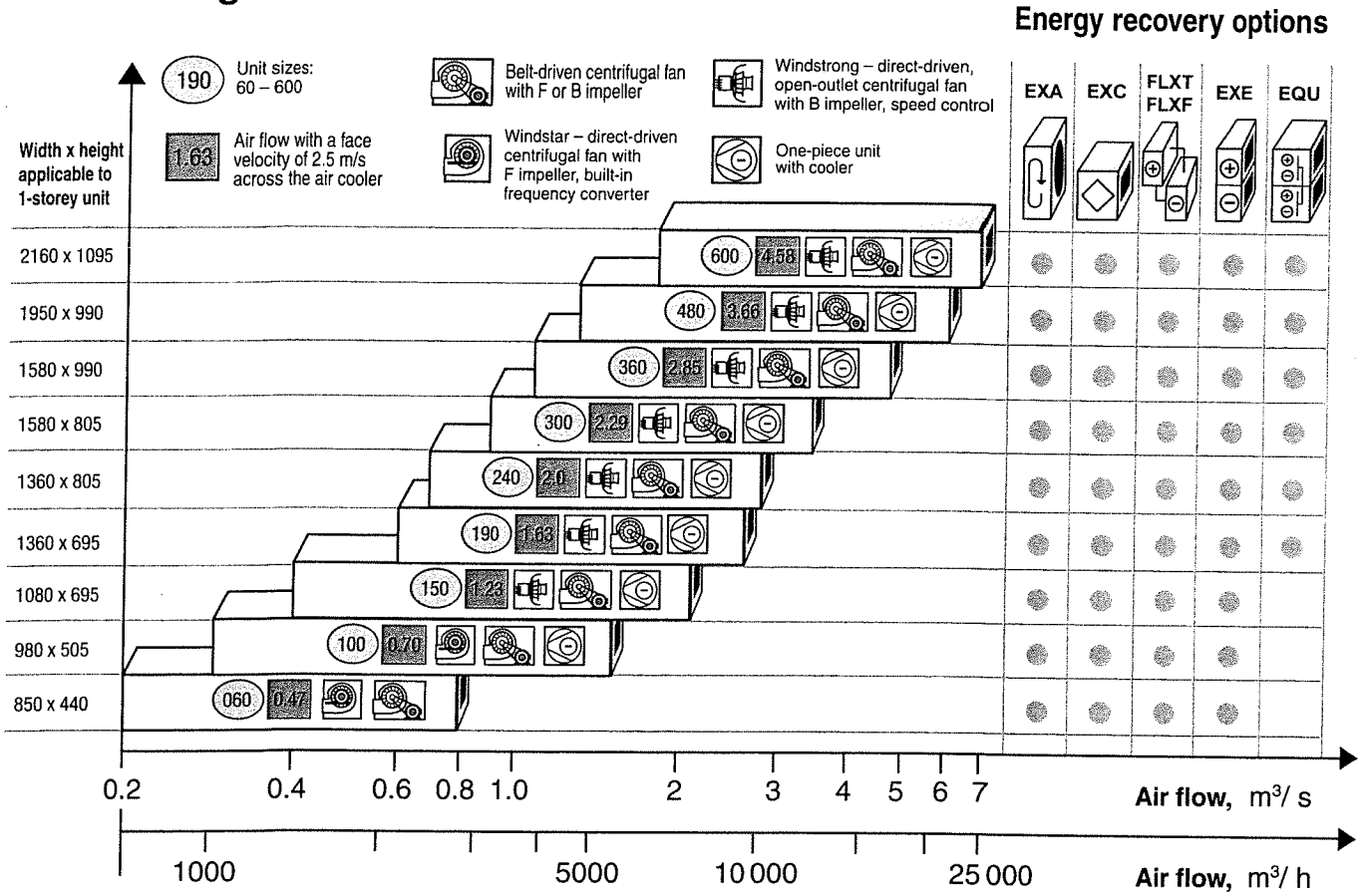


Outdoor version (EMMT-04)



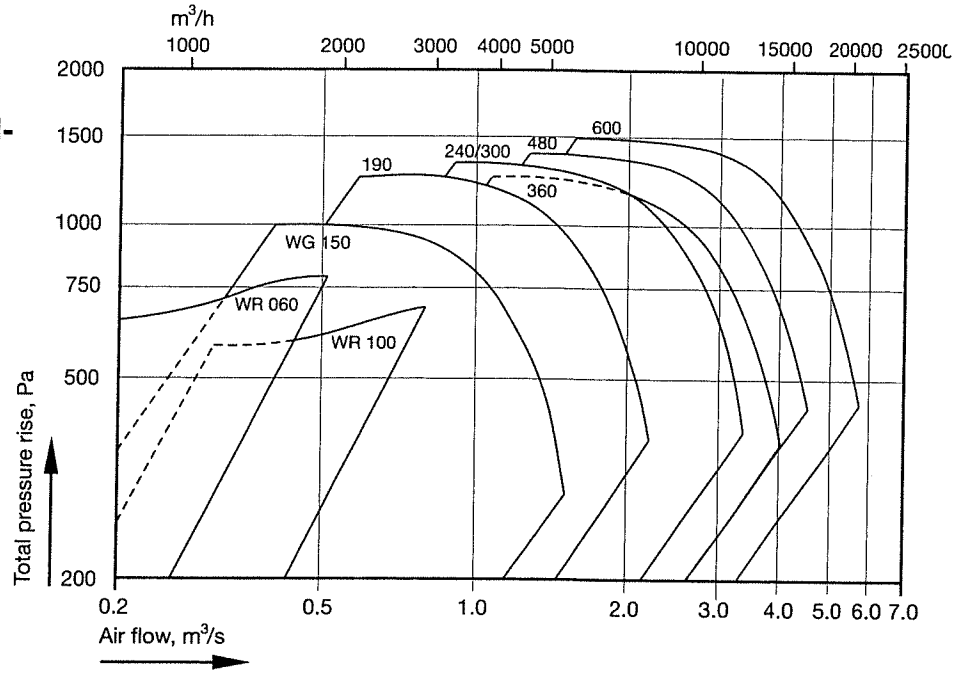
4. Quick Selection Guide

Airflow Ranges

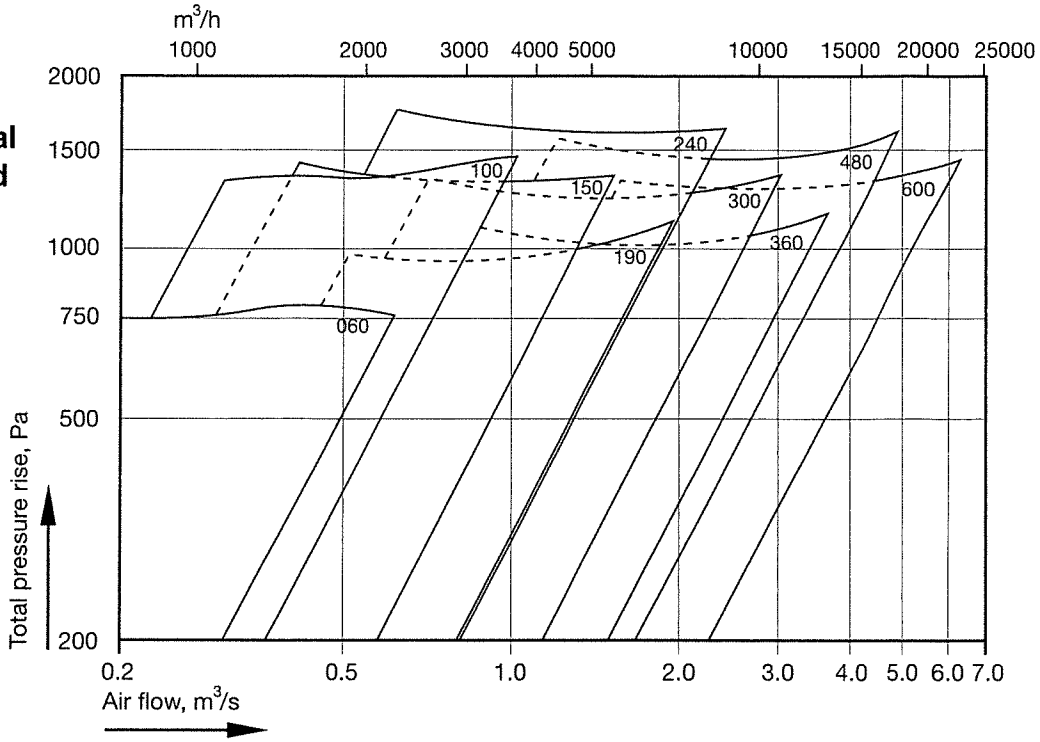


Fan Performance

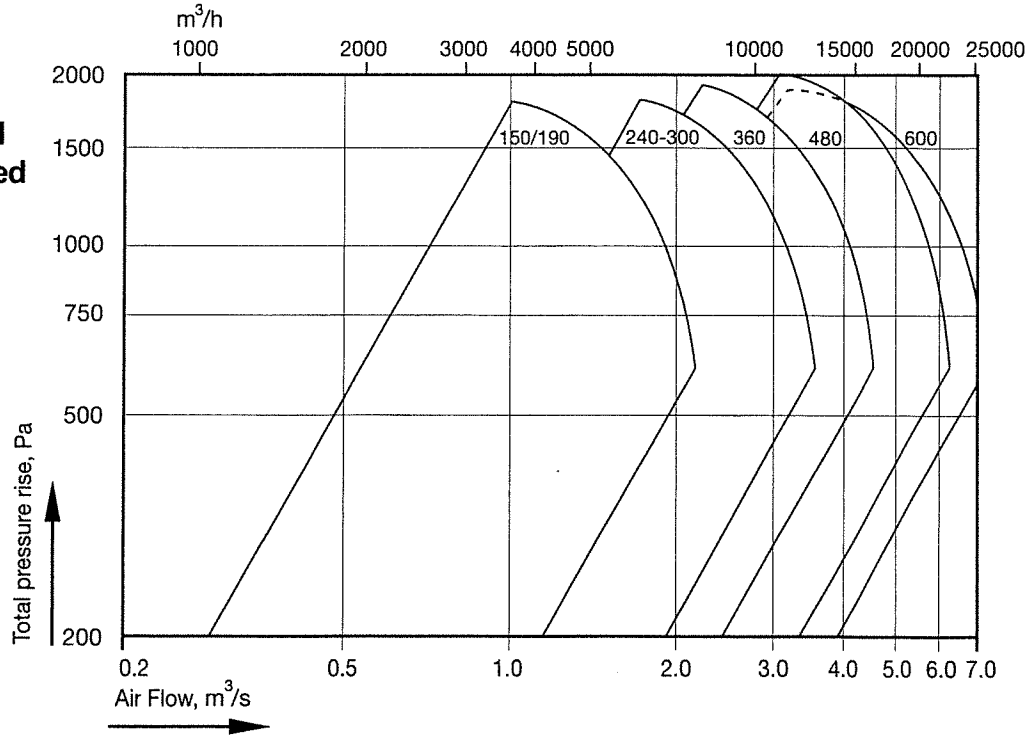
Windstar WR direct-driven centrifugal fan with forward-curved blades, and Windstrong WG centrifugal fan with backward-curved blades.



Type FB belt-driven double-inlet centrifugal fan with forward-curved blades



Type BB belt-driven double-inlet centrifugal fan with backward-curved blades



5. Internal Pressure Drop and Integral Attenuation

Approximate pressure drop figures for approximate calculations in Pa

Function	Code	Variant	Size	Air flow, m³/s			
			060	0.28	0.38	0.47	0.57
			100	0.42	0.56	0.70	0.84
			150	0.74	0.98	1.22	1.47
Damper	KS,EBA,EBB,EBC			5	5	10	10
Filter (Sized)	ELEF	AL		80	85	90	95
		G3		70	75	80	85
		F6		95	100	110	115
		F7		125	130	140	155
		F8		160	165	175	185
		C7 Not applicable to sizes 060,100		125	135	150	160
Rotery heat exchanger	EXA			90	120	145	180
Heat-pipe heat exchanger	EXE	Single, Industrial version		60	100	135	200
		Double		105	175	235	320
Plate heat exchanger	EXC			60	110	160	225
Air heater/cooler, 2 mm fin pitch	ELEV,ELES ELBC,ELBD FLXT,FLXF	Power var. 01		10	15	25	35
		02		20	35	50	70
		03		35	55	75	105
		04		40	70	100	140
		06		65	105	150	210
		08		85	140	195	275
		10		105	180	245	345
Air heater/cooler, 3 mm fin pitch	ELEV,ELES ELBC,ELBD FLXT,FLXF	Power var. 01		10	15	20	30
		02		15	25	40	55
		03		25	40	60	80
		04		30	55	75	110
		06		50	80	110	160
		08		65	105	145	210
		10		80	130	185	260
Electric air heater, high-temp. version	ELEE	All output variants		5	10	10	15
Electric air heater, low-temp. version	ELEE	Power var. 01		10	20	30	40
		02		15	25	35	55
		03		25	40	55	90
		04		35	60	100	130
		05		50	85	130	200
Humidifier	EFEF	85 %		45	75	120	180
		95 % Not applicable to sizes 060,100		75	125	200	290
Droplet eliminator				10	20	30	40
Silencer	KL	All lengths		10	10	25	35
Cooling unit	ECU	Supply air Not applicable to size 060		40	60	90	115
		Exhaust air Not applicable to size 060		45	65	95	125
Connection losses	F impeller, small conn.			15	25	35	50
	F impeller, large conn.			30	55	85	115
	F impeller, against func. section			50	90	140	190
	B impeller, small conn.	Not applicable to sizes 060,100		10	20	20	30
	B impeller, large conn.	Not applicable to sizes 060,100		20	45	50	70
	B impeller, against func. section	Not applicable to sizes 060,100		30	60	75	95
	Windstar, small conn.	Not applicable to size 150		10	15	25	35
	Windstar, large conn.	Not applicable to size 150		25	40	65	90
	Windstar, against func. section	Not applicable to size 150		30	55	85	130
	Windstrong	Not applicable to sizes 060,100		5	5	5	10

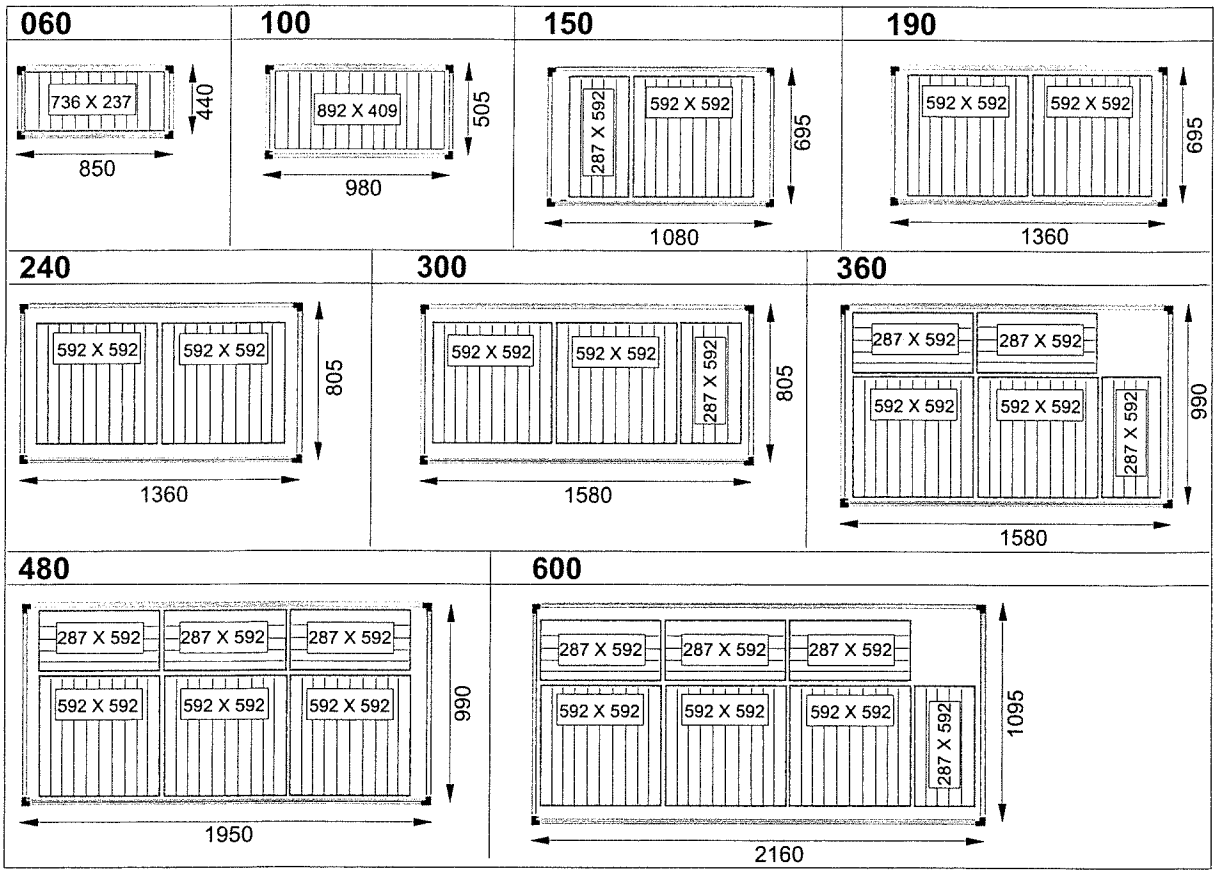
Function	Code	Variant	Size	Air flow, m³/s			
			190	0.98	1.30	1.62	1.94
			240	1.20	1.59	1.98	2.37
			300	1.38	1.83	2.29	2.74
			360	1.71	2.27	2.84	3.41
			480	2.19	2.92	3.65	4.58
			600	2.75	3.66	4.57	5.48
Damper	KS,EBA,EBB,EBC			5	5	10	10
Filter (Sized)	ELEF	AL		80	85	90	95
		G3		70	75	80	85
		F6		95	100	110	115
		F7		125	130	140	155
		F8		160	165	175	185
		C7		125	135	150	160
Rotary heat exchanger	EXA			90	120	145	180
Heat-pipe heat exchanger	EXE	Single, Industrial version		60	100	135	200
		Double		105	175	235	320
Plate heat exchanger	EXC			65	110	165	235
Air heater/cooler 2 mm fin pitch	ELEV,ELES ELBC,ELBD FLXT,FLXF	Power var.	01	10	15	25	35
			02	20	35	50	70
			03	35	55	75	105
			04	40	70	100	140
			06	65	105	150	210
			08	85	140	195	275
			10	105	180	245	345
Air heater/cooler 3 mm fin pitch	ELEV,ELES ELBC,ELBD FLXT,FLXF	Power var.	01	10	15	20	30
			02	15	25	40	55
			03	25	40	60	80
			04	30	55	75	110
			06	50	80	110	160
			08	65	105	145	210
			10	80	130	185	260
Electric air heater, high-temp version	ELEE	All power variants		5	10	10	15
Electric air heater, low-temp. version	ELEE	Power var.	01	10	20	30	40
			02	15	25	35	55
			03	25	40	55	90
			04	35	60	100	130
			05	50	85	130	200
Humidifier	EFEF	85 %		45	75	105	160
		95 %		60	120	155	210
Droplet eliminator				10	15	25	35
Silencer	KL	All lengths		10	10	25	35
Cooler	ECU	Supply air	Not applcable	35	55	80	105
		Exhaust air	to size 600.	60	90	120	160
Cooler	EQU	Supply air	Not applicable	-	50	70	-
		Exhaust air	to size 600.	-	100	130	-
Connection losses	F impeller, small conn.			15	25	40	55
	F impeller, large conn.			30	60	90	130
	F impeller, against func. section			55	100	150	200
	B impeller, small conn.			10	20	30	40
	B impeller, large conn.			25	45	65	100
	B impeller, against func. section			35	60	90	130
	Windstrong			5	5	5	10

Integral Attenuation of the Components

Component		Octave band, centre frequency, Hz							
		63	125	250	500	1000	2000	4000	8000
Filter	ELEF G3	-	-	1	2	3	3	5	6
	F 6	2	3	6	8	14	17	19	21
	F 7	3	3	6	8	14	17	19	21
	F 8	3	3	6	8	14	17	19	21
	AL flat filter	1	1	1	2	3	3	5	6
	Carbon	-	-	-	1	1	2	2	3
Air heaters	ELEV	1	1	1	1	2	2	3	3
	ELEE	1	1	1	1	1	1	1	1
	ELES	1	1	1	1	2	2	3	3
Air coolers	ELBC	4	2	2	3	3	6	6	9
	ELBD	4	2	2	3	3	6	6	9
Recovery coils	ELXT	4	2	2	3	3	6	6	9
	ELXF	4	2	2	3	3	6	6	9
Humidifier	EFEF 85%	3	2	2	3	5	6	12	15
	95%	3	2	3	3	5	7	13	16
Angle section	EKV	2	6	7	6	3	4	4	4
Rot. heat exchanger	EXA	3	4	4	3	4	5	6	8
Plate heat exchanger	EXC	6	7	6	5	7	10	15	18
HeatBank	EXE	4	2	2	3	3	5	7	10
Cooler	EQU	2	1	1	2	2	3	3	4
surplus (1)	190-480	-0	-0	-3	-0	-3	-4	-4	-5
to surr.	-600	-0	-0	-7	-0	-6	-10	-9	-8
Cooler surplus	ECU100	-0	-0	-1	-0	-9	-11	-19	-21
exh. air side	-150	-0	-0	-0	-0	-8	-12	-18	-24
	-190	-0	-0	-1	-0	-11	-12	-19	-28
	-240	-0	-0	-2	-0	-12	-14	-19	-28
	-300	-0	-0	-4	-0	-16	-17	-21	-32
	-360-1	-0	-0	-4	-0	-16	-17	-21	-22
	-360-2	-0	-2	-16	-8	-25	-31	-35	-46
	-480-1	-0	-2	-16	-8	-25	-31	-35	-46
	-480-2	-2	-9	-27	-14	-30	-36	-42	-51
Sound baffle	KL-30	6	11	20	28	43	34	28	10
	-40	7	12	23	36	45	43	34	19
	-50	11	16	32	47	50	46	39	26
	-60	12	19	37	52	53	46	42	29
Casing 00 (standard)		7	8	17	26	22	19	22	28
E3 (EI 30)		10	10	19	28	25	22	25	31

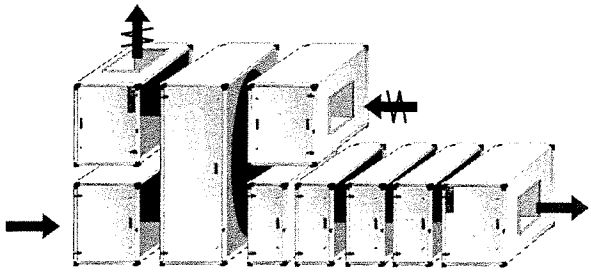
1) = Surplus sound emitted to surroundings based on ordinary calculation.

6. Cross-sectional Area and Number of Filters



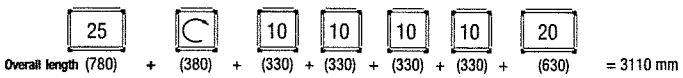
7. Survey of the Air Handling Functions

The Flexomix S air handling units consist of a number of complete functional sections and 15 modules in standard lengths. The modules can be fitted with the air handling functions selected – with your dimension restrictions for on-site transport – as limit factors. Concise details of the complete functional sections, air handling functions and basic data for determining the overall length of unit are specified on the pages that follow.

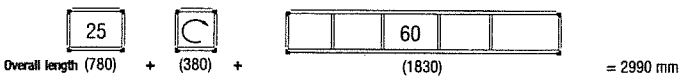


Standard module EMM	Length (mm)	Standard module EMM	Length (mm)	Standard module EMM	Length (mm)
10	330	35	1080	60	1830
15	480	40	1230	65	1980
20	630	45	1380	70	2130
25	780	50	1530	75	2280
30	930	55	1680	80	2430

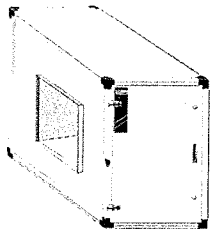
Maximum number of modules supplied, supply air = 7 modules

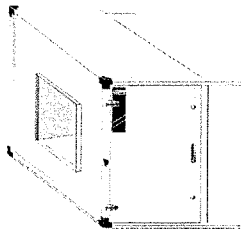


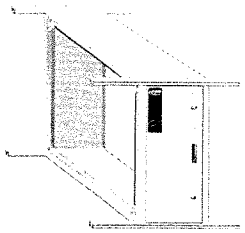
Minimum number of modules supplied, supply air = 3 modules

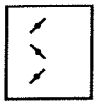


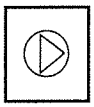
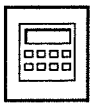
Installation Alternatives

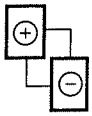
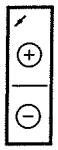
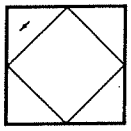
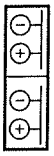
A 

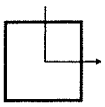
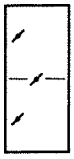
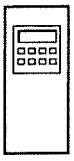
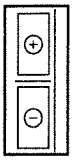
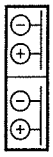
B 

C 

Functional Components			Size	Module	Page
	A B C	**MIE-KS Damper function** Damper to Tightness Class 3 in accordance with Swedish Standard VVS-AMA 98 (type 4 to VVS-AMA 83) made of extruded, anodised aluminium sections, with nylon-reinforced ABS plastic gear wheel drive, well protected by side panels.	060 – 600	10	**18**
	A B	**MIE-ID Air intake function** Connection gable, damper and filter.* ** See the MIE-FB Filter and the MIE-KS Damper.*	060 – 600	25	**19**
	A B C	**MIE-FB Filter function** For deep-pocketed bag filter. Equipped with filter slide rails and eccentric clamping device for maximum tightness. Standard size filter bags for unit sizes: 150 – 600. Filter material: / Filter class: Synthetic material / G3, F6, F7 Glass fibre / F8 Synthetic + carbon (not 060 – 100) / C7 = F7 + carbon filter Aluminium / Aluminium (flat filter)	060 – 600 060 – 600	15 *(G3, AL)* 25 *(F6, F7)* *(F8, C7)*	**21**
	A B C	**MIE-CL Air heater/cooler function (water, DX and steam)** The coils consist of copper tubes and aluminium fins. ELEV Air heater for hot water, ELES Air heater for steam, ELBC Air cooler for chilled water, ELBD Direct-expansion air cooler, ELXT and ELXF Energy recovery coils.	060 – 600	10 15 20 *Vary depending on the output variant.*	**23**
	A B C	**MIE-EL (EI) Electrmc air heater function** ELEE-LT Electric air heaters of finned design (low temp.) or ELEE-HT of flat-element design (high temperature) and ELEE-HS (high temperature with control equipment). Desired total output and output step divisions are available to special order.	060 – 600	15 20 25 *Vary depending on the output variant.*	**26**

Functional Components, contd.			Size	Module	Page
	A B C	**MIE-EF Humidifier function** Designed for EFEF evaporative humidifier for direct-water or circulating water. Humidification rates: 85% or 95 %. Sizes 060 – 100 are available for direct-water only. Degree of humidification: 85%	060 – 600	25	**29**
	A	**MIE-AF Fan, for horizontal air discharge** Easily withdrawable fan system equipped with anti-vibration mountings and end connection wall.	060 – 100	20	**32**
	B	FB belt-driven centrifugal fan with fan casing, forward-curved blades. (Sizes: 060 – 600)	150	25	
		BB belt-driven centrifugal fan with fan casing, backward-curved blades. (Sizes: 150 – 600)	190 – 300	30	
		WG Windstrong, speed-controlled, direct-driven, open-outlet centrifugal fan with backward-curved blades. (sizes: 150 – 600)	360 – 600	40	
		WR Windstar, speed-controlled, direct-driven centrifugal fan with fan casing and forward-curved blades. (Sizes: 060 – 100) * *The design of some of the components in the fan systems do not conform to Environment Class M3.*			
	A B	**MIE-KM Inspection door, MIE-TD Empty section panel** MIE-KM* hinged inspection door and MIE-TD empty section panel for installation between unit sections.	060 – 600	10 15 20 *Vary as required.*	**42**
	C	**MIE-TD* Empty section panel** for special function (e.g. steam pipes). Can also be used on spacer section. * *The MIE-KM/ TD is required between the fan and a down-stream function (not for the Windstrong fan system).*	060 – 600	05 – 80 *Vary as required.*	**43**
	A B C	**MIE-KL Silencer function** Withdrawable sound baffle elements consisting of mineral wool covered with cleanable woven fabric (Cleantech).	060 – 600	30 40 50 60 *Vary depending on the degree of attenuation desired.*	**45**
	A B C	**MIE-MD Media installation components** Shielded space for the installation of electrical and control cubicles. Equipped with an inspection door hung on hinges.	240 – 600	30	**46**

Energy Recovery Options			Size	Length (mm)	Page
	A B C	**Coil heat exchanger** Heat exchanger system consisting of type FLXT and FLXF energy recovery coils*. Water mixed with some form of anti-freeze agent is used as the heating medium. **See the MIE-CL Air heater/air cooler.*	060 – 600	See the MIE-CL Air heater/ air cooler.	**23**
	A	**EXA Rotary heat exchanger** A complete functional section with regenerative rotary heat exchanger and electronic speed controller. The rotor consists of alternating flat and corrugated strips of aluminium foil and is available in the following versions: with untreated surfaces (NO), hygroscopically treated surfaces (HY) and epoxy-treated surfaces (EX)	060 – 600	380	**47**
	A	**EXE Heat-pipe heat exchanger/HeatBank** A complete functional section containing a bypass damper and a two-phase heat exchanger filled with tetrafluorethane R134a. The heat pipe heat exchanger is available in the following versions: Single (E), Double (D) and Industrial (I). All the versions are available with epoxy-treated fins on the exhaust air side.	060 – 600	630 (E, I) 780 (D)	**50**
	A	**EXC Plate heat exchanger** A complete functional section containing a plate heat exchanger made of aluminium. The EXC is of cross-flow design and has a bypass damper. The heat exchanger is available with epoxy-treated surfaces.	060 100 150 – 190 240 – 300 360 – 600	780 1080 1230 1530 1980	**52**
	A	**EQU Heat recovery unit** A complete two-storey functional section containing compressor, condenser, evaporator, four-way valve that recovers energy from the exhaust air whenever heating is necessary.	190 – 240 300 – 600	930 1080	**67**

Complete Functional Sections – 1 STOREY		Size	Length (mm)	Page
	**EBA Mixing section** Complete functional section containing two interconnected dampers* for mixing outdoor air and exhaust air, for example. **See the MIE-KS.*	060 100 150 – 190 240 – 300 360 – 480 600	440 505 695 805 990 1095	**54**
	**EBB Mixing section** Complete functional section containing three dampers*, has two outgoing shafts, for mixing outdoor air, exhaust air and recirculated air, for example. **See the MIE-KS.*	060 100 150 – 190 240 – 300 360 – 480 600	880 1010 1390 1610 1980 2190	**56**
	**EAF Fan section, vertical air discharge** Complete functional section with fan system option described under MIE-AF. However not the WR (Windstar).	060 – 100 150 190 – 300 360 – 600	630 780 930 1230	**58**
	**EKV Angle section** A functional section for deflecting the air flow 90° upward or downward. Can be fitted with a filter*. **See the MIE-FB.*	060 100 150 – 190 240 – 300 360 – 480 600	440 505 695 805 990 1095	**61**
Complete Functional Sections – 2 STOREYS				
	**EBC Mixing section** A complete two-storey functional section containing three dampers* with two outgoing shafts, for mixing outdoor air, exhaust air and recirculated air. **See the MIE-KS.*	060 100 150 – 190 240 – 300 360 – 480 600	440 505 695 805 990 1095	**62**
	**EMD Media section** Complete two-storey functional section with shielded space for electrical and control cubicle installation.	060 – 600	930	**64**
Cooling Units				
	**ECU StarCooler** A complete two-storey functional section for cooling the supply air. The cooler contains compressor, condenser, evaporator, etc.	100 360 - 480	780 930	**65**
	**EQU Q-Cooler** A complete two-storey functional section for cooling the supply air. The cooler contains compressor, condenser, evaporator, four-way valve, etc.	190 – 240 300 – 600	930 1080	**67**

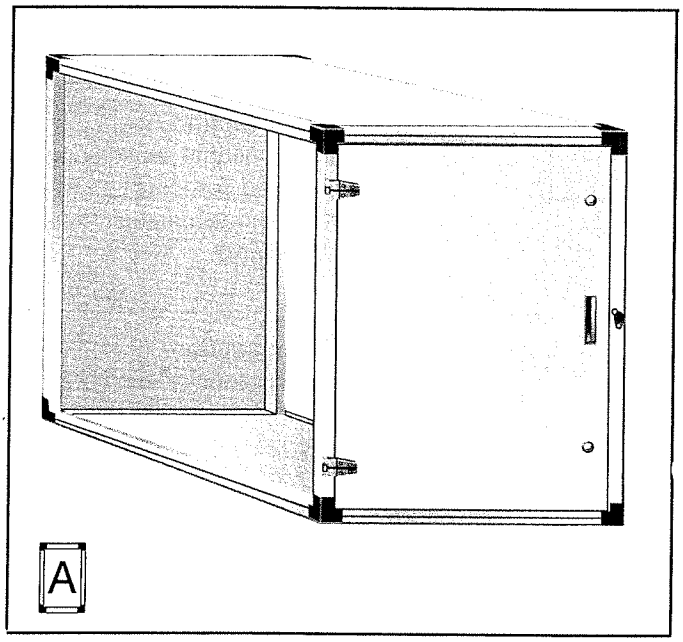
8. EMM Standard Module

General

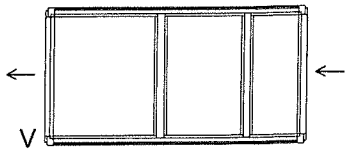
The standard modules and the casing of the complete functional sections consist of frame members made of extruded, naturally anodized aluminium sections. The frame members are, where appropriate, jointed together by means of surface-treated aluminium corner pieces. The panels are of double-skin design and consist of two sheets of aluminium-zinc-plated sheet steel protected by an ALC finish, with an intervening 25 mm thick slab of thermal insulation (volumetric weight: 40 kg/m^3). Fire-retardant mineral wool / EI 30 (volumetric weight: 260 kg/m^3) is available as an option.

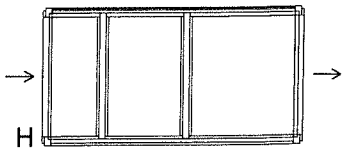
The casing meets the demands of tightness class A and total heat transfer coefficient T4 to CEN preEN 1886 and meets the provisions of Environmental Class 3.
The inspection doors are equipped with adjustable hinges and a lock.

The EMM standard module together with selected fitting (front panel and functional assembly parts) constitue a complete functional section.



Configuration





V = Left-hand unit

H = Right-hand unit

Specification

Module	EMM -a -b -c
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	10, 15, 20, 25, 30, 35 40, 45, 50, 55, 60, 65 70, 75, 80
c - Casing:	00 = Thermal insulation E3 = EI 30

Accessories

Technical details

Dimensions and weights

The length of module can be read below on the basis of the appropriate module number specified in the descriptive text of the relevant air handling function. Our product selection program is available to guide you in selecting the best AHU combination for your application. The modules are available in 15 lengths from 330 mm up to 2430 mm.

The total weight of a functional section can be determined by adding the weight of the module to that of the air handling function on the pages that follow.

Module	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Size	Standard modular casing 00 (kg)														
060	20	25	30	35	40	50	55	60	65	70	75	80	85	90	95
100	20	30	35	40	45	55	60	65	70	80	85	90	100	105	110
150	25	35	40	50	55	65	70	80	85	95	100	110	115	125	135
												125			
190	30	35	45	55	65	70	80	90	100	105	115		135	140	150
240	30	40	50	60	65	75	85	95	105	115	125	130	140	150	160
300	35	45	55	65	75	85	95	105	115	125	125	145	155	165	175
360	35	45	55	65	75	90	100	110	120	130	145	155	165	175	185
480	40	50	65	75	85	100	110	125	140	150	165	175	185	200	210
600	40	55	70	85	95	110	125	140	150	165	180	195	205	220	235
Length (mm)	330	480	630	780	930	1080	1230	1380	1530	1680	1830	1980	2130	2280	2430

Module	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Size	Standard modular casing E3 (kg)														
060	25	30	35	45	50	60	65	75	80	85	95	100	110	115	120
100	25	35	40	50	55	65	75	80	90	100	105	115	125	130	140
150	30	40	50	60	70	80	90	100	105	115	125	135	145	155	165
190	35	45	55	65	80	90	100	115	125	135	145	160	170	180	190
240	35	45	60	70	80	95	105	120	130	140	155	165	175	190	200
300	35	50	65	75	90	100	115	130	145	155	170	180	195	205	220
360	40	55	70	80	95	110	125	140	155	165	180	195	210	225	235
480	45	60	75	95	110	125	140	160	175	190	205	225	240	255	270
600	50	65	85	105	121	140	155	175	195	210	230	245	265	280	300
Length (mm)	330	480	630	780	930	1080	1230	1380	1530	1680	1830	1980	2130	2280	2430

Example:

Given :
Functional components selected: MIE-ID-300-25-00 weighing 45 kg.

The total weight can be determined by adding the weight of the air intake components to that of a size 300, no. 25 standard module read in the table above.

Total weight = 45 + 65 = 110 kg

Given :
Functional components selected: MIE-ID-300-25-00, weighing 45 kg and coil components MIE-CL-300- 10-00 with ELEV air heater for hot water (power var. 3) weighing 60 kg.

The total weight can be determined by adding the weight of the air intake and coil components to that of a size 300, no. 35 standard module read in the table above.

Total weight = 45 + 60 + 85 = 190 kg

9. Functional Components
MIE-KS Damper Fitting

General

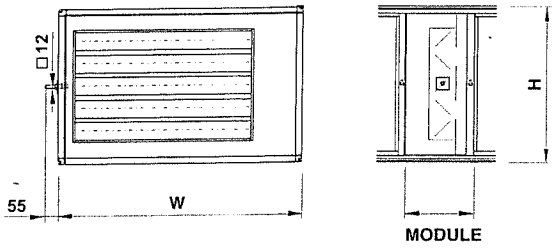
The fitting consists of a damper that can be used as an adjusting or shut-off damper, for example, and a front casing panel. The damper is designed for incorporation in an EMM module.

Design

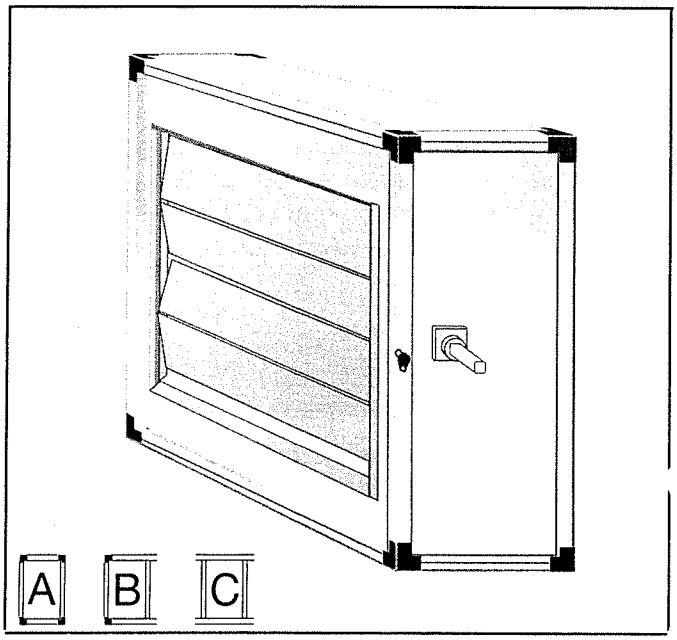
- The damper is made of anodised aluminium profiles and meets the provisions of Environmental Class 3.
- The damper blades are driven by means of ABS plastic gear wheels. Tubular silicone rubber seals enable a tight seal between the blades.
- Tightness Class 3 to Swedish Standard VVS AMA-98 (type 4 to VVS AMA-83) is standard.
- Permissible temperature range: -40 – +80 °C.
- Permissible differential pressure: max. 1400 Pa.

Technical details

Dimensions and weights



Size	Module (mm)	W (mm)	H (mm)	Wgt (kg)	Required torque. (Nm)
	10				
060	300	850	440	5	2
100	300	980	505	10	2
150	300	1080	695	10	3
190	300	1360	695	15	4
240	300	1360	805	15	4
300	300	1575	805	20	4
360	300	1575	990	20	5
480	300	1950	990	25	9
600	300	2160	1095	30	9



Specification

Damper fitting	**MIE-KS -a -10 -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
10 - Module	
c - Front panel:	00 = Thermal insulation E3 = EI 30

Accessory

KJST-03 Damper actuator

Other accessories

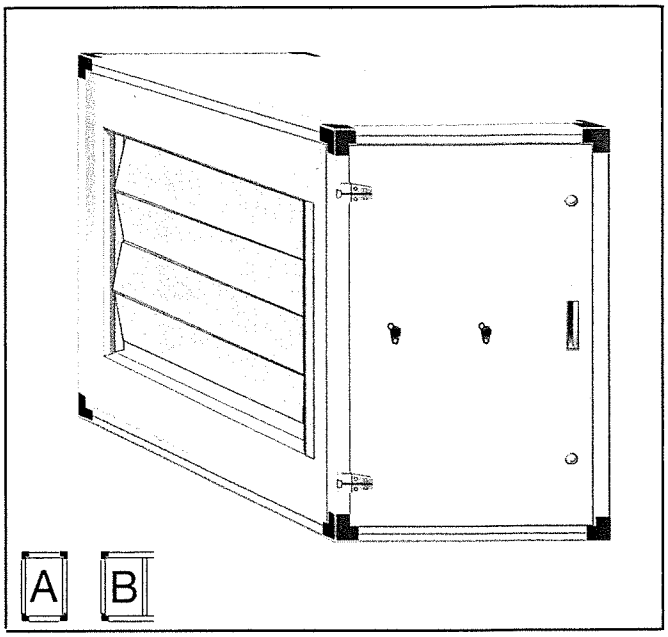
See the EMM standard module on page 16.

For pressure drop data, see pages 8 and 9.

MIE-ID Air Inlet Fitting

General

The MIE-ID fitting consists of a damper that can be used e.g. for adjusting or shutting off the air flow, mounting rails for filter cassettes, an end connection wall and a front casing panel. The assembly is primarily intended for use as an outdoor air or exhaust air intake. The assembly is designed for incorporation in an EMM module.



Design

- The damper is made of anodised aluminium profiles and meets the provisions of Environmental Class 3.
- The damper blades are driven by ABS plastic gear wheels. Tubular silicone rubber seals provide a tight seal between the blades.
- Tightness Class 3 to Swedish Standard VVS AMA-98 (type 4 to VVS AMA-83) is standard.
- Permissible temperature range: -40 – +80 °C
- Permissible differential pressure: 1400 Pa max.
- Can be equipped with a deep-pocketed, throw-away filter made of Class G3, F6 or F7 synthetic material or Class F8 deep-pocketed glass fibre material, Class C7 deep-pocketed carbon filter with pre-filter or cleanable knitted aluminium filter.
  See the description under MIE-FB Filter on page 21.
- The filters are mounted on slide rails and are easily to withdraw och replace.
- The filter slide rails are fitted with effective sealing strips that minimize the risk of leakage.
- The filters can be locked in position by means of eccentric clamping rails.
- Equipped with measurement tappings for connection to a differential pressure manometer (accessory).
- The inlet is as standard fitted with a connection gable.

Technical details

Filter data: See the MIE-FB Filter on page 21.

Specification

Air intake fitting	**MIE-ID -a -25 -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480,600
25 - Module	
c - Front panel:	00 = Thermal insulation E3 = EI30
Set of filters	**ELEF -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Filter Class:	AL, G3, F6, F7, F8, C7

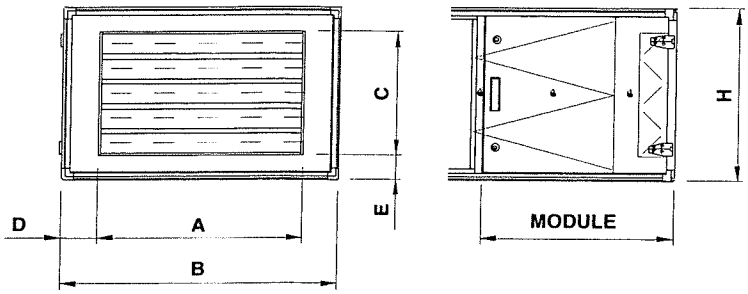
Accessories

MIET-FB-01	U-tube manometer
MIET-FB-02	Kytölä DPA 500P manometer
MIET-FB-03	Magnehelic 2000 manometer
EMMT-06	Inspection window..... page 72
EMMT-07	Light fitting ..... page 73

Other accessories

See the EMM standard module on page 16.

Dimensions and weights



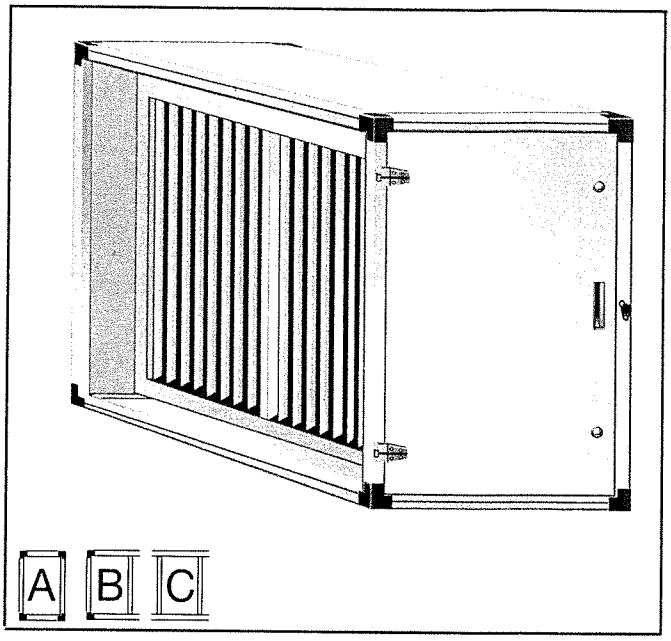
Size	Module (mm)	Dimensions (mm)						Wgt. (kg)	Torque required (Nm)
	25	A	B	C	D	E	H		
060	750	500	850	300	175	70	440	15	2
100	750	700	980	300	140	105	505	20	3
150	750	800	1080	500	140	100	695	25	3
190	750	1000	1360	500	180	100	695	35	4
240	750	1000	1360	600	180	100	805	40	4
300	750	1200	1575	600	190	100	805	45	4
360	750	1200	1575	800	190	95	990	55	5
480	750	1400	1950	800	275	95	990	70	9
600	750	1600	2160	800	280	150	1095	80	9

For pressure drop data, see pages 8 and 9.

MIE-FB Filter Fitting

General

The filter fitting consist of retaining rails for the filter modules and a front casing panel. The assembly parts are designed for incorporation in an EMM module.



Design

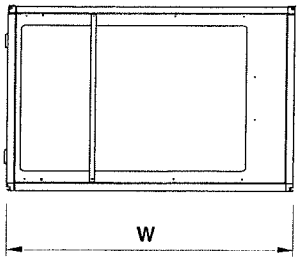
- Can be equipped with a deep-pocketed, throw-away filter made of Class G3, F6 or F7 synthetic material or Class F8 deep-pocketed glass fibre material, Class C7 deep-pocketed carbon filter with pre-filter or cleanable knitted aluminium filter.
- The filters are mounted on slide rails and are easily to withdraw och replace.
- The filter slide rails are fitted with effective sealing strips that minimize the risk of leakage. The filters can be locked in position by means of eccentric clamping rails.
- Equipped with measurement tappings for connection to a differential pressure manometer (accessory).

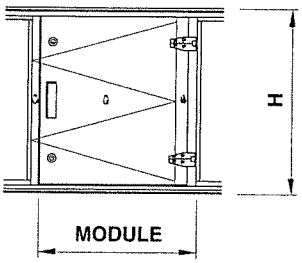
Specification

Filter fitting	**MIE-FB -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	15, 20
c - Front panel:	00 = Standard, E3 = EI30
Set of filters	**ELEF -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Filter Class:	AL, G3, F6, F7, F8, C7

Technical details

Dimensions and weights





* Module no. 15 for Class G3 filters and AL filter; module no. 20 for other types of filter.

Size	Module (mm)		Dim. (mm)		Wgt. (kg)
	15	20	W	H	
060	450	600	850	440	5
100	450	600	980	505	10
150	450	600	1080	695	10
190	450	600	1360	695	15
240	450	600	1360	805	15
300	450	600	1575	805	20
360	450	600	1575	990	25
480	450	600	1950	990	35
600	450	600	2160	1095	40

Accessories

MIET-FB-01 U-tube manometer
MIET-FB-02 Kytölä DPA 500P manometer
MIET-FB-03 Magnehelic 2000 manometer
EMMT-06 Inspection window ..... page 72
EMMT-07 Light fitting ..... page 73

Other accessories

See the EMM standard module on page 16.

Types of Filter

Basic filter and fine filter

The Class G3, F6 and F7 filters consist of deep-pocketed filter bags mounted in a metallic frame. The filters are made of synthetic fibre material. The Class F8 filters consist of deep-pocketed filter bags with metallic frame. The filters are made of glass fibre.

Pre-filter and carbon filter

The Class C7 filter consists of deep-pocketed filter bags containing activated carbon and an integral Class F7 pre-filter. The filter offers high arresting performance and minimizes the spreading of cooking odours and automobile fumes in comfort air handling systems.

Grease filter

The cleanable knitted aluminium filter is a 25 mm thick flat filter, and is designed for use in air containing greasy impurities.

Filter details

Size	Filter modules (quantity)				Filter area (m^2)			
	736 x 287	892 x 409	592 x 287	592 x 592	G3	F6, F7	C7	Al. knitted
060	1				1.5	2.4	-	0.2
100		1			2.4	4.3	-	0.4
150			1	1	3.9	9.8	14.1	0.5
190				2	5.2	13.0	19.6	0.7
240				2	5.2	13.0	19.6	0.7
300			1	2	6.5	16.5	23.9	0.9
360			3	2	9.1	22.9	32.5	1.2
480			3	3	11.7	29.4	42.3	1.5
600			4	3	13.0	32.7	46.6	1.7

For pressure drop data, see pages 8 and 9.

MIE-CL Coil Fitting

General

The coil fitting consist of mounting rails and front casing panel, and is designed for the ELEV air heater for hot water, ELES air heater for steam, ELBC air cooler for chilled water, ELBD direct-expansion coil and ELXT/ELXF heat recovery coil. The assembly parts are designed for incorporation in an EMM module.

Design

- The coil body consists of copper tubes and aluminium fins.
- Fin pitch:

ELEV, power variant 1	2 mm
ELEV, power variant 2, 3	2.5 mm
ELBC, ELXT, ELKF	2 or 3 mm

- Headers – made of steel (in some cases copper) – the connecting pipes of the headers have male threads and are equipped with female-threaded connections for venting and drainage.
- The ELBC, ELBD and ELXF air coolers have a stainless steel drip tray with a 32 mm dia. drain connection. Droplet eliminators are required if the air velocity exceeds 2.8 m/s.
- ELBC, ELXT, and ELXF can be selected with long or short coupling (water path) for opimizing the coil on the water side.
- Max. permissible operating pressure:

ELEV, ELBC, ELXT/ -F	1.6 MPa (16 atö)
ELBD	2.2 MPa (22 atö)
ELES	1.0 MPa (10 atö)

- Max. permissible operating temperature:

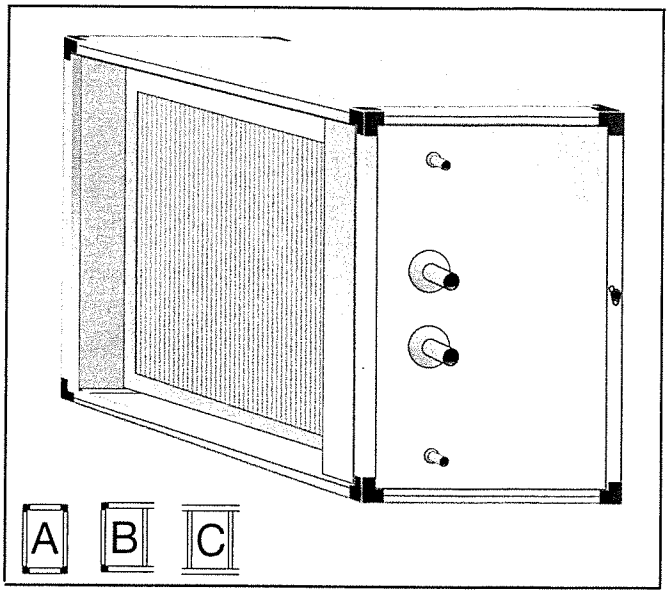
ELEV	150 °C
ELXT/ -F	100 °C
ELES	185 °C

Accessories

MIET-CL-01	Air purging valve
MIET-CL-02	Drain valve
MIET-CL-03	T-pipe for anti-frosting protection and venting
MIET-CL-04	Water seal
ELBDT-01-a	Extra power steps (a = number of extra steps over and above 1)

Other accesssories

See the EMM standard module on page 16.



Specification

Coil fitting	**MIE-CL -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	10, 15, 20
c - Front panel:	00 = Thermal insulation E3 = EI30
Air heater for hot water	**ELEV -a -b**
a - Size:	*see the MIE-CL*
b - Power variant:	01, 02, 03
Air heater for steam	**ELES -a -b**
a - Size:	*see the MIE-CL*
b - Power variant:	01, 02
Air cooler, chilled water	**ELBC -a -b -c -d -e -f**
a - Size:	*see the MIE-CL*
b - Power variant:	02, 03, 04, 06, 08
c - Coupling:	1 = Short coupling 2 = Long coupling
d - Fin pitch:	20 = 2.0 mm 30 = 3.0 mm
e - Droplet eliminator:	0 = Without 1 = With
f - Connection side:	H = Right-hand V = Left-hand

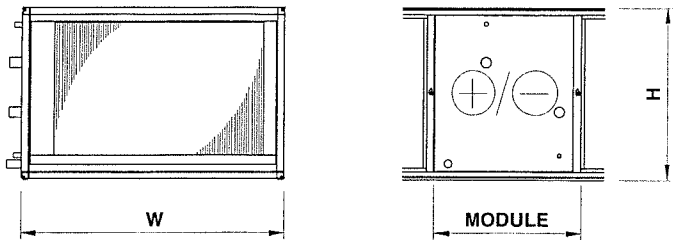
Contd.

(Contd.)

DX Air cooler	**ELBD -a -b -c -d -e -f**
a - Size:	*see the MIE-CL*
b - Power variant:	02, 03, 04
c - Coupling	*see the ELBC*
d – f -	*see the ELBC*
Energy recovery coil, supply air	**ELXT -a -b -c -d -e -f**
a - Size:	*see the MIE-CL*
b - Power variant:	04, 06, 08, 10
c – f-	*see the ELBC*
Energy recovery coil, exhaust air	**ELXF -a -b -c -d -e -f**
a - Size:	*see the MIE-CL*
b - Power variant:	*see the ELXT*
c – f-	*see the ELBC*

Technical details

Dimensions and weights



Size	Module (mm)			W	H
	10	15	20	(mm)	(mm)
060	300	450	600	850	440
100	300	450	600	980	505
150	300	450	600	1080	695
190	300	450	600	1360	695
240	300	450	600	1360	805
300	300	450	600	1575	805
360	300	450	600	1575	990
480	300	450	600	1950	990
600	300	450	600	2160	1095

Type of module

Size	ELEV, ELES, ELXT Power variant							ELBC, ELBD, ELXF Power variant					
	01	02	03	04	06	08	10	02	03	04	06	08	10
060	10	10	10	10	15	15	15	10	10	10	15	15	15
100	10	10	10	10	15	15	15	10	10	10	15	15	15
150	10	10	10	10	15	15	15	10	10	10	15	15	15
190	10	10	10	10	15	15	15	10	10	10	15	15	15
240	10	10	10	10	15	15	15	15	15	15	15	20	20
300	10	10	10	10	15	15	15	15	15	15	15	20	20
360	10	10	10	10	15	15	15	15	15	15	15	20	20
480	10	10	10	10	15	15	15	15	15	15	15	20	20
600	10	10	10	10	15	15	15	15	15	15	15	20	20

Weight (kg)

Size	ELEV, ELES, ELXT Power variant							ELBC, ELBD, ELXF Power variant					
	01	02	03	04	06	08	10	02	03	04	06	08	10
060	15	15	20	20	30	35	40	15	20	20	30	35	40
100	15	20	25	30	35	40	50	20	25	30	35	45	50
150	25	30	40	45	60	70	85	30	40	45	60	60	85
190	30	35	45	50	70	85	105	35	45	50	70	85	105
240	30	40	50	55	85	105	125	50	60	65	395	115	135
300	35	45	60	60	95	120	140	55	70	70	105	130	150
360	40	55	70	75	115	140	170	65	80	85	125	150	180
480	45	65	80	80	135	170	205	80	95	95	150	165	220
600	55	80	105	115	170	210	250	95	120	130	185	225	295

Pipe connections

Size	ELEV			ELBC										ELXT, ELXF							
				Short coupling					Long coupling					Short coupling				Long coupling			
	Power variant			Power variant					Power variant					Power variant				Power variant			
	1	2	3	2	3	4	6	8	2	3	4	6	8	4	6	8	10	4	6	8	10
060	15	25	25	25	25	25	25	32	15	25	25	25	25	25	25	25	25	25	25	25	25
100	15	25	25	25	25	25	25	32	25	25	25	25	25	25	25	25	25	25	25	25	25
150	25	25	32	25	25	32	32	32	25	25	25	32	32	25	25	25	32	25	25	25	25
190	25	25	32	32	32	32	50	50	25	32	32	32	32	32	32	32	32	25	25	25	25
240	25	25	32	25	32	32	50	50	25	25	32	32	50	25	32	32	32	25	25	25	25
300	25	32	50	32	50	50	50	50	25	32	50	50	50	25	32	32	50	25	32	32	32
360	32	32	50	32	50	50	50	50	32	32	32	50	50	32	50	50	50	32	32	32	32
480	32	32	50	32	50	50	80	80	32	32	50	50	50	32	50	50	50	32	32	32	32
600	25	50	50	80	80	80	80	80	50	50	50	80	80	50	50	50	50	50	50	50	50

Size	ELBD			ELES	
	Power variant			Power variant	
	2	3	4	1 in/out	2 in/out
060	28	28	28	25/25	25/25
100	28	28	28	25/25	25/25
150	28	28	34	32/25	32/25
190	28	34	34	32/25	32/25
240	34	34	41	32/25	50/25
300	34	34	41	50/25	50/25
360	34	41	54	50/25	50/25
480	41	54	54	80/32	80/32
600	41	54	54	80/32	80/32

Water volume (l)

Size	ELEV, ELBC, ELXT/ELXF Power variant						
	01	02	03	04	06	08	10
060	1	2	3	4	6	8	10
100	2	3	5	6	9	11	14
150	3	5	8	10	15	20	25
190	4	7	10	13	20	26	33
240	4	8	12	16	24	32	40
300	5	10	14	18	28	37	46
360	6	12	17	23	35	46	57
480	8	15	22	29	44	58	73
600	10	18	28	37	55	74	92

For pressure drop data, see pages 8 and 9.

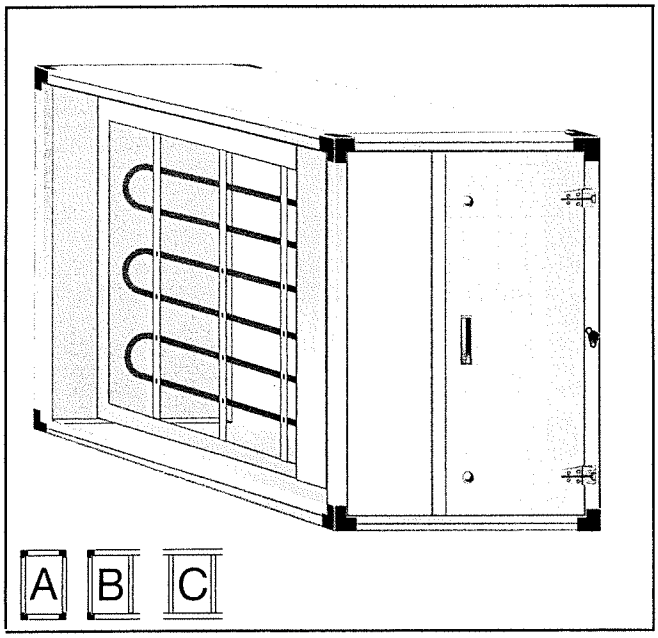
MIE-EL Air Heater Fitting

General

The electric air heater fitting consist of mounting rails, an inspection door and a front casing panel. The parts are customised for the ELEE electric air heater. The installation components are designed for incorporation in the EMM module.

Design

- The ELEE is an electric air heater and is available in a high or low-temperature variants.
- The heating surfaces of the low-temperature variant consist of aluminium fins with 3 mm pitch and copper tubes in which the heating elements are inserted.
- The high-temperature variant consists of SS 2337/ AISI 321 stainless steel tubular heating elements.
- The air heaters have two overheating protections (one is manually resettable) that open the power supply whenever overheating is likely.
- Degree of protection S 32 to SEN 2121
- The high-temperature variant is also available with integrated control equipment.
- Five power variants are available as standard for each unit size. However, other power variants can be supplied if specified.



Specification

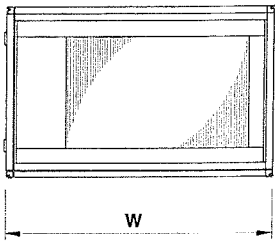
Air heater fitting	**MIE-EL -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	15, 20, 25
c - Front panel:	00 = Thermal insulation E3 = EI30
Electric air heater	**ELEE -a -b -c -d**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Power variant:	01, 02, 03, 04, 05
c - Variant:	HT = High temperature LT = Low temperature HS = High temp. with built-in control equipment

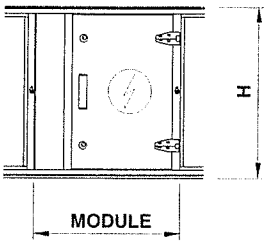
Other accessories

See the EMM standard module on page 16.

Technical details

Dimensions and weights





Size	Module (mm)			W (mm)	H (mm)
	15	20	25		
060	450	600	750	850	440
100	450	600	750	980	505
150	450	600	750	1080	695
190	450	600	750	1360	695
240	450	600	750	1360	805
300	450	600	750	1575	805
360	450	600	750	1575	990
480	450	600	750	1950	990
600	450	600	750	2160	1095

Type of module

Size	Variant										
	HT			LT			HS				
	Power variant			Power variant			Power variant				
	01 02 03	04	05	01 02 03	04	05	01	02	03	04	05
060	15	20	25	15	20	25	15	20	20	25	25
100	15	15	20	15	20	25	15	15	15	20	25
150	15	15	20	15	20	25	15	15	20	20	25
190	15	20	20	15	20	25	15	15	20	25	-
240	15	20	20	15	20	25	15	20	20	-	-
300	15	20	20	15	20	25	15	20	20	-	-
360	15	20	20	15	20	25	15	20	20	-	-
480	15	20	25	15	20	25	15	20	-	-	-
600	15	20	25	15	20	25	15	20	-	-	-

Weight (kg)

Size	01			02			03			04			05		
	HT	LT	HS	HT	LT	HS	HT	LT	HS	HT	LT	HS	HT	LT	HS
060	20	25	20	25	25	25	25	35	25	30	50	30	35	55	35
100	25	30	25	30	35	30	35	50	35	40	65	40	50	90	50
150	30	35	40	35	45	45	40	60	50	50	85	60	60	110	75
190	35	45	45	40	55	50	50	80	60	65	115	75	80	145	-
240	40	50	50	45	65	45	55	90	65	75	140	-	95	185	-
300	45	55	55	50	70	60	65	105	75	85	160	-	110	215	-
360	45	60	55	80	55	65	70	125	80	100	185	-	125	250	-
480	60	75	70	70	105	80	95	160	-	125	250	-	160	335	-
600	65	85	75	80	120	90	110	195	-	155	305	-	195	415	-

For pressure drop data, see pages 8 and 9.

Output table

Size	Power variant	Total power (kW)	Rated current (A at 400V)	Power steps (kW)			
				1	2	3	4
060	1	3.0	-	3.0	-	-	-
	2	6.0	8.7	6.0	-	-	-
	3	13.0	18.8	13.0	-	-	-
	4	24.0	34.6	24.0	-	-	-
	5	30.0	43.3	2.0	4.0	8.0	16.0
100	1	5.0	7.2	5.0	-	-	-
	2	9.0	13.0	9.0	-	-	-
	3	19.0	27.4	19.0	-	-	-
	4	34.0	49.1	2.3	4.5	9.0	18.2
	5	54.0	77.9	3.6	7.2	14.4	28.8
150	1	7.5	10.8	7.5	-	-	-
	2	15.0	21.7	15.0	-	-	-
	3	27.0	39.0	1.8	3.6	7.2	14.4
	4	47.0	67.8	3.2	6.3	12.5	25.0
	5	67.5	97.4	4.5	9.0	18.0	36.0
190	1	9.0	13.0	9.0	-	-	-
	2	17.0	24.5	17.0	-	-	-
	3	39.0	56.3	2.6	5.2	10.4	20.8
	4	67.5	97.4	4.5	9.0	18.0	36.0
	5 *	90.0	129.9	6.0	12.0	24.0	2 x 24.0
240	1	13.0	18.8	13.0	-	-	-
	2	24.0	34.6	24.0	-	-	-
	3	47.0	67.8	3.1	6.3	12.5	25.1
	4	84.0	121.2	5.6	11.2	22.4	2 x 22.4
	5 *	120.0	173.2	8.0	16.0	32.0	2 x 32.0
300	1	15.0	21.7	15.0	-	-	-
	2	27.0	39.0	1.8	3.6	7.2	14.4
	3	54.0	77.9	3.6	7.2	14.4	28.8
	4 *	98.0	141.5	6.5	13.1	26.1	2 x 26.1
	5 *	140.0	202.1	9.3	18.7	37.3	2 x 37.3
360	1	17.0	24.5	17,0	-	-	-
	2	34.0	49.1	2.3	4.5	9.1	18.1
	3	67.5	97.4	4.5	9.0	18.0	36.0
	4 *	120.0	173.2	8.0	16.0	32.0	2 x 32.0
	5 *	170.0	245.4	11.3	22.7	2 x 22.7	4 x 22.7
480	1	24.0	34.6	24.0	-	-	-
	2	47.0	67.8	3.1	6.3	12.5	25.1
	3 *	92.0	132.8	6.1	12.3	24.5	2 x 24.5
	4 *	161.0	232.4	10.7	21.5	42.9	2 x 42.9
	5 *	230.0	332.0	15.3	30.7	2 x 30.7	4 x 30.7
600	1	27.0	39.0	1.8	3.6	7.2	14.4
	2	54.0	77.9	3.6	7.2	14.4	28.8
	3 *	116.0	167.4	7.7	15.5	30.9	2 x 30.9
	4 *	203.0	293.0	13.5	27.1	2 x 27.1	4 x 27.1
	5 *	290.0	418.6	19.3	38.7	2 x 38.7	4 x 38.7

* Not available in the HS variant.

Groups rated up to and including 3.5 kW should have a 2-phase, 400 V AC supply, and be protected by a max. 10 A fuse.
Groups that exceed 3.5 kW should have a 3-phase, 400 V AC supply.

MIE-EF Humidifier Fitting

General

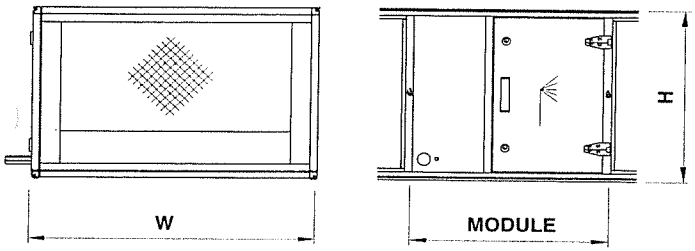
The humidifier fitting consist of an evaporative humidifier with cold humidification surfaces, which can also be utilised for evaporative cooling, and a front casing panel. The installation components are designed for incorporation in an EMM module.

Design

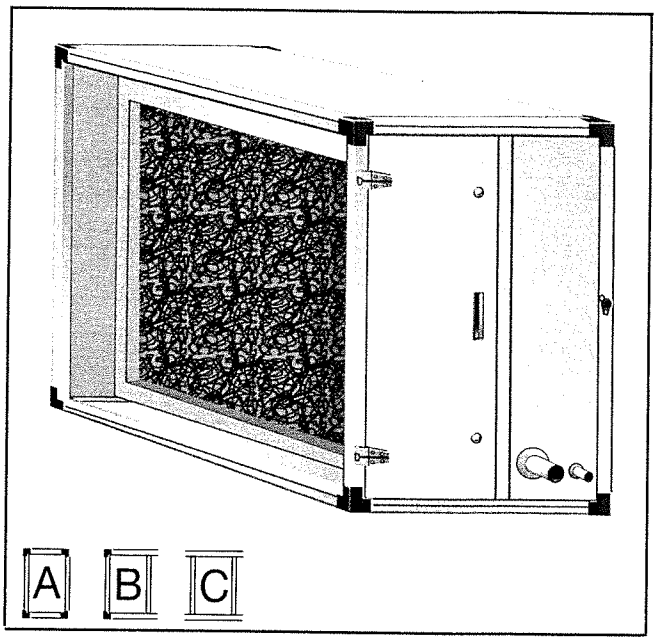
- Consists of a casing, humidifier fills, water tray and water distribution system.
- The water tray is made of stainless sheet steel. The spray pipes are made of PVC plastic.
- The humidifier fills are made of a special, impregnated composite material.
- Available in two versions: with a humidification rate of max. 85% or max. 95%.
- Circulated or direct water can be used.
- Droplet eliminators are available.
- The pump is included as standard in a humidifier for circulated water.

Technical details

Dimensions and weights



Size	Dimensions (mm)			Weight (kg)	
	Module 25	W	H	85%	95%
060	750	850	440	35	-
100	750	980	505	35	-
150	750	1080	695	40	45
190	750	1360	695	50	60
240	750	1360	805	55	65
300	750	1575	805	60	70
360	750	1575	990	70	80
480	750	1950	990	75	90
600	750	2160	1095	95	115



Specification

Humidifier fitting parts — **MIE-EF -a -25 -c**

a - Size: 060, 100, 150, 190, 240 300, 360, 480, 600

25 -Module

c - Front panel: 00 = Thermal insulation
E3 = EI30

Humidifier — **EFEF -a -b -c -d -e**

a - Size: 060, 100, 150, 190, 240 300, 360, 480, 600

b - Humidification rate: 85, 95%

c - Water system: Circulated water = C1
Direct-water = D1

d - Droplet eliminator: 0 = Without
1 = With

e - Inspection side*: R/L

Size 060 and 100 humidifiers are only available for direct-water and a humidification rate of 85%.
** Viewed in direction of air flow.*

Accessories

MIET-EF-01 Solenoid valve

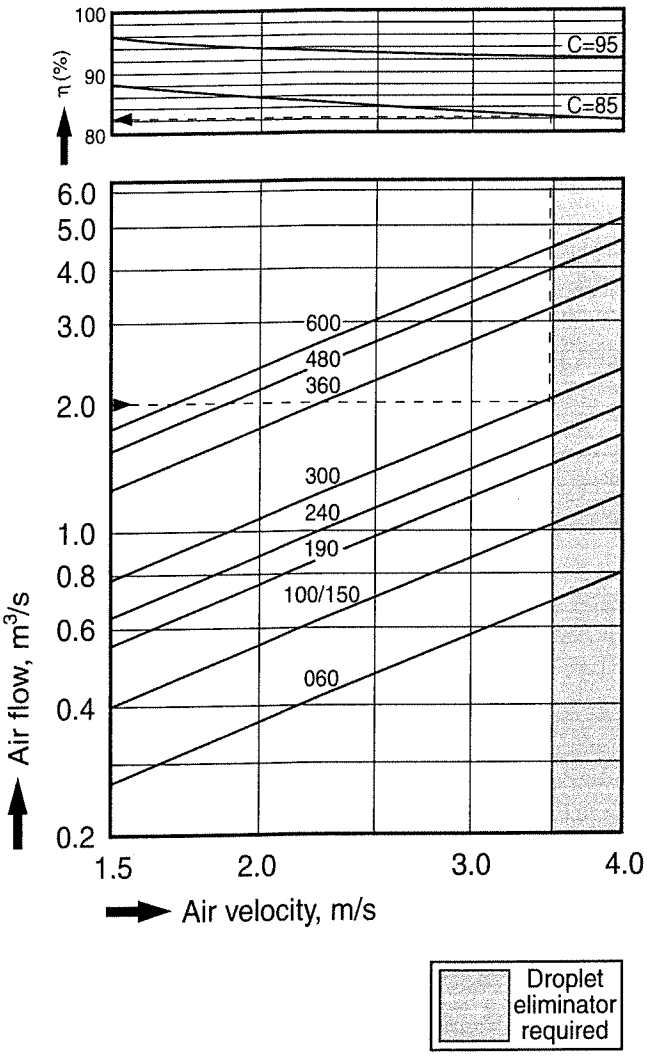
MIET-EL-04 Water seal

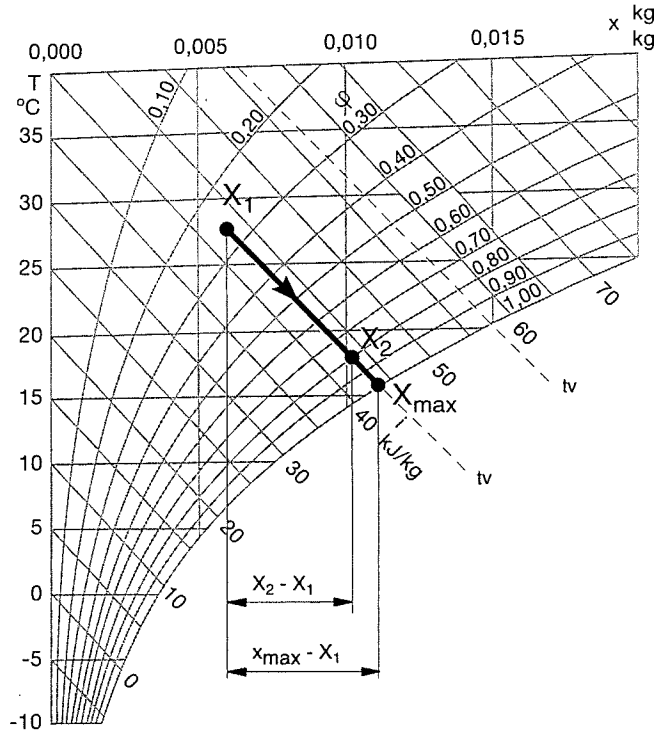
Other accessories

See the EMM standard module on page 16.

Electrical data

Size	Pump motor		
	Voltage (V)	Rated output (W)	Current (A)
150-300	230/400	80	0.45/0.26
360-600	230/400	140	0.71/0.41
	Degree of protection IP 44, Insulation Class B		





Symbols

X_1 = moisture content, inlet air, kg/kg
X_2 = moisture content, outlet air, kg/kg
X_{max} = water content at saturation point, kg/kg
φ = relative humidity x 100, %
T = dry-bulb temperature, °C
t_v = wet-bulb temperature, °C
Δ_x = $X_2 - X_1$ moisture absorbed by the air, kg/kg of dry air

Humidification rate, η = $\dfrac{X_2 - X_1}{X_{max} - X_1}$

Example

Given:

Air flow q = 2.0 m³/s
$X_2 - X_1 = \eta \cdot 0.82\ (0.011 - 0.006) = 0.004$
High values with short duration can be disregarded when determining $X_2 - X_1$.

From the chart:

E = water content absorbed by the air, kg/s
$E = q \cdot 1.2(X_2 - X_1)$ kg/s
$E = 2.0 \cdot 1.2 \cdot 0.004 = 0.0096$ kg/s

For pressure drop data, see pages 8 and 9.

Circulating water bleed-off

The mineral concentration of the water increases as the circulating water evaporates and continuous bleed-off and make-up with fresh water is therefore necessary.
The bleed-off rate is determined by the evaporation rate, the pH of the water and the calcium and bicarbonate concentration. The pH of the water should not be lower than 5 or higher than 10.
Under certain circumstances, lime precipitation may take place in the system. This would have a detrimental effect on the performance and useful life of the humidifier. The risk of lime precipitation increases at high pH and high contents of calcium and bicarbonate.
Bleed-off at a specific rate makes it profitable to pre-treat the water to reduce the bleed-off flow by 10 l/min.

Water consumption

Circulating water

The total water consumption of the humidifier is the sum of the volume of water evaporated and that which has been bled-off. The necessary bleed-off can be calculated according to the instructions for sizing.
The water bleed-off flow should be adjusted at the building site according to the instructions supplied.

Direct-water

Water consumption, l/min

Size	85%	95%
060	2.0	-
100	2.8	-
150	5.7	7.0
190	8.0	11.4
240	8.5	11.4
300	9.0	11.4
360	9.0	11.4
480	11.4	16.0
600	11.4	16.0

Installation

Connection to the mains water system

Circulating water supply pipe

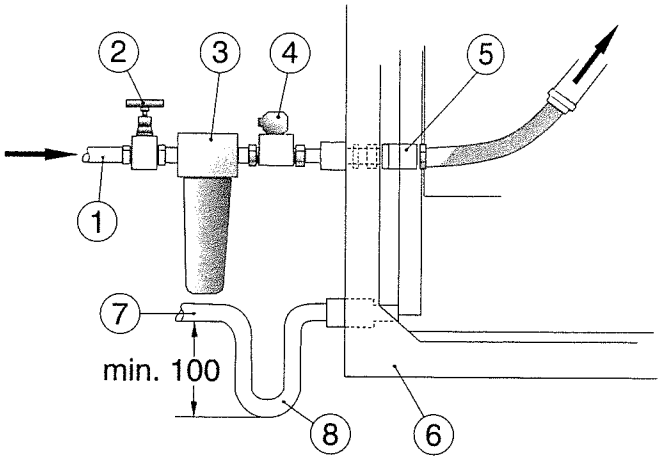
The fresh water supply pipe should be equipped with a shut-off valve (2). If the water contains coarse-grained particles, a water filter (3) with a mesh of 500 µm should also be fitted.

Direct-water supply pipe

If direct-water is supplied to the humidifier, in addition to a shut-off valve (2) and water filter (3) (if required), a solenoid valve (4) and a constant flow valve (5) should also be fitted.

Drain pipework

The drain pipe (7) should be fitted with a cleanable water trap (8) and should be run, without reduction in diameter, to a floor gulley.



1 = Water supply pipe, size 15 conn.
2* = Shut-off valve
3* = Water filter (if the water contains impurities)
4* = External solenoid valve (required for once-through water)
5 = Constant flow valve (for direct-water)
6 = Unit casing
7* = Outlet pipe made of plastic, size 32 conn.
8* = Water trap

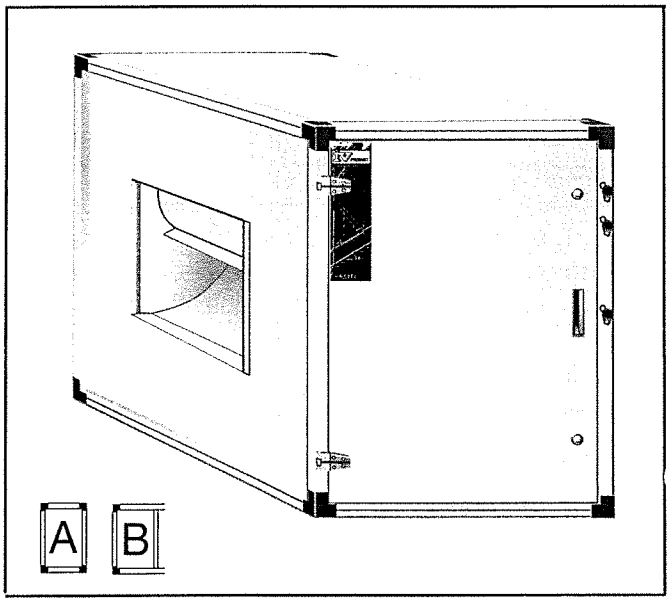
* Not included in the standard supply of EFEF air humidifier.

If the air contains impurities
If the air is highly polluted, the air handling unit should be equipped with a fine filter. In plants, in which the air contains cellulose dust or similar substances, the recirculation of air should be avoided if circulated water is used. Otherwise, direct-water is advisable.

MIE-AF Fan Fitting

General

The MIE-AF Fan fitting consists of mounting brackets, a front casing panel and a fan. The fan can be used as a supply air or exhaust air fan in an air handling system together with other functional sections in the Flexomix S product series. The fan assembly is designed for incorporation in an EMM module.



Design

- The fan is available in four versions:

  FB – Belt-driven centrifugal fan with casing, for ward-curved blades. (Sizes 060 – 600)

  BB – Belt-driven centrifugal fan with casing, backward-curved blades. (Sizes 150 – 600)

  WG – Windstrong, speed-controlled, direct-driven, free outlet centrifugal fan with backward-curved blades. (Sizes 150 – 600) (Direct current: 150 – 300 / alternating current: 360 – 600)

  WR – Windstar, speed-controlled, direct-driven centrifugal fan with casing and forward-curved blades. (Sizes 060 – 100)

  ** The design of some of the components in the fan systems do not conform to Environment Class M3.*

- The fan and motor unit are withdrawable from the casing to facilitate maintenance.
- The ambient temperature should not exceed 50 °C to allow adequate cooling of the motor.
- The fan and motor are effectively isolated from the casing by means of a flexible outlet connection and rubber anti-vibration mountings that are sized to match the performance of the fan. The normal resonance frequency range is 7 – 10 Hz.
- V-belts or poly-V belts may be selected for the belt drive. The belt drives are described in the publication "Air Handling System Products".
- The fan section is as standard fitted with a connection gable.

Specification

Fan fitting		**MIE-AF -a -b -c -d**
a -	**Size:**	060, 100, 150, 190, 240 300, 360, 480, 600
b -	**Module:**	Size 060 – 100 = 20 Size 150 = 25 Size 190 – 300 = 30 Size 360 – 600 = 40
c -	**Front panel:**	00 = Thermal insulation E3 = EI30
d -	**FB Forw.-curved:**	060 – 600
	BB Backw.-curved:	150 – 600
	WG Windstong:	150 – 600
	WR Windstar:	060, 100
Motor		**1-bbbb-1-ddd-eeee-ff-g**
1 -	**Type:**	
b -	**Size:**	[The code always contains 4 figures: 3 digits and 1 letter. Example: 112M]
1 -		-
d -	**Number of poles:**	2 poles = 200 2/4 poles = 240 4 poles = 400 4/6 poles = 460 4/8 poles = 480
e -	**Power*:**	Ex. 0018 = 0.18 kW 1100 = 11 kW

f - Voltage:	12 = 1-phase, 230 V 32 = 3-phase, 230/400 V 34 = 3-phase, 400 V
g - Special:**	0 = Standard 1 = Thermo-contact
Belt drive:	V-belts or poly-V belts

Accessories

Connnection frame, small	**MIET-AF-01-a**
Flexible connection, small	**MIET-AF-02-a**
Steel spring anti-vibration mountings (FB, BB 150 – 600)	**MIET-AF-03-a**
Spark-proof fan inlet (FF, BB)	**MIET-AF-05-a-d**
Flow measurement sockets (excl. meter)	**MIET-AF-08-a-d**
Air flow meter, manometer type	**MIET-AF-09-a-d**
Air flow meter, electronic	**MIET-AF-10-a-d**

** The first two digits denote integers and the last two denote decimals.*

*** Applicable to single-speed motors.*

Other accessories

MIET-AF-04 Clean-out cover – fan
MIET-AF-06 Wiring to safety isolating switch
EMMT-06 Inspection window ..... page 72
EMMT-07 Light fitting ..... page 73
See also the accessories described under the EMM standard module on page 16.

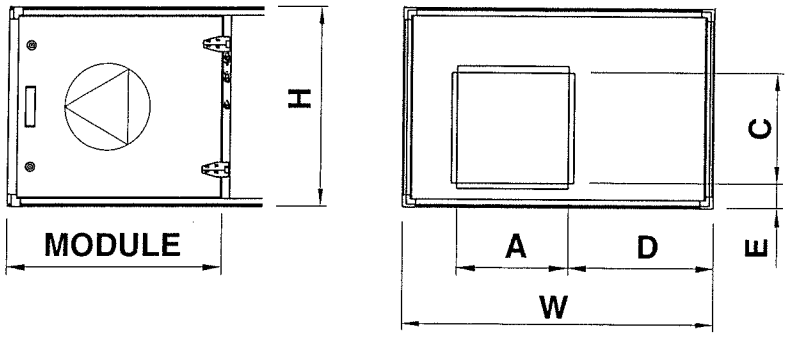
Electrical data – Windstar/Windstrong

Size	Fan system with speed control	Motor type	Power supply, kW	Voltage	Rated current A
060	Windstar	AC	0.55	230 V, 1-phase	6.2
100	Windstar	AC	1.0	230 V, 1-phase	10.0
150	Windstrong	DC	1.2	400 V, 3-phase	2.6
190	Windstrong	DC	1.85	400 V, 3-phase	3.5
240	Windstrong	DC	3.0	400 V, 3-phase	6.0
300	Windstrong	DC	3.0	400 V, 3-phase	6.0
360	Windstrong	AC	4.0	400 V, 3-phase	6.6
480	Windstrong	AC	5.5	400 V, 3-phase	8.8
600	Windstrong	AC	7.5	400 V, 3-phase	11.9

For particulars of connection losses, see pages 8 and 9.

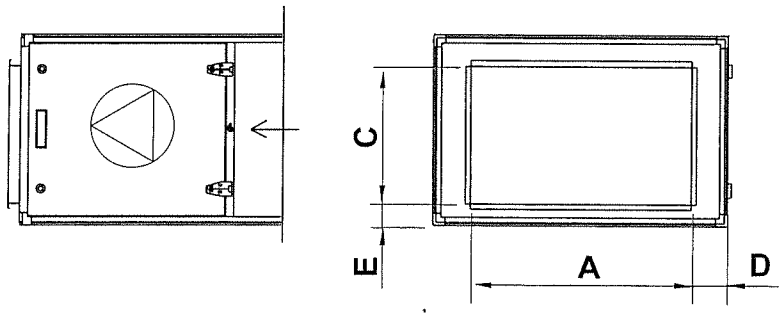
Technical details

Dimensions and weights



Fan outlet

Size	Module (mm)				Dimension (mm)						Fan system (kg)				Max Motor Size
	20	25	30	40	A	W	C	D	E	H	FB	BB	WR	WG	
060	600	-	-	-	230	850	230	380	85	440	25	-	30	-	80
100	600	-	-	-	280	980	280	480	80	505	35	-	40	-	100
150	-	750	-	-	385	1080	385	490	85	695	50	50	-	50	112
190	-	-	900	-	385	1360	385	700	85	695	55	55	-	60	112
240	-	-	900	-	475	1360	475	550	85	805	75	80	-	85	132
300	-	-	900	-	475	1575	475	730	85	805	80	85	-	90	132
360	-	-	-	1200	530	1575	530	730	85	990	100	105	-	125	132
480	-	-	-	1200	570	1950	570	780	95	990	175	180	-	130	160 M
600	-	-	-	1200	640	2160	640	780	95	1095	190	200	-	145	160 L



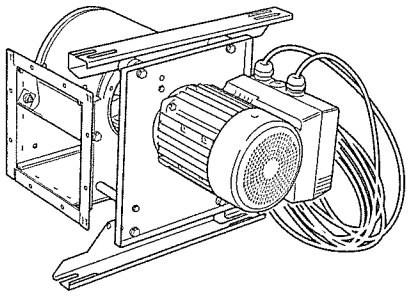
Connection frames

Size	Small frame : MIET-AF-01							Large frame : EMMT-02							
			FB / BB		WR					FB / BB		WG	WR		
	A	C	D	E	D	E Left-hand	E Right-hand	A	C	D	E	E	D	E left-hand	E Right-hand
060	300	300	345	80	500	80	75	500	300	175	80	-	260	80	75
100	300	300	470	80	585	80	140	700	300	140	80	-	165	80	140
150	500	500	730	80	-	-	-	800	500	140	80	100	-	-	-
190	500	500	640	80	-	-	-	1000	500	180	80	100	-	-	-
240	600	600	485	80	-	-	-	1000	600	180	80	100	-	-	-
300	600	600	665	80	-	-	-	1200	600	190	80	100	-	-	-
360	800	800	595	80	-	-	-	1200	800	190	80	95	-	-	-
480	800	800	665	90	-	-	-	1400	800	275	90	95	-	-	-
600	800	800	665	90	-	-	-	1600	800	280	90	150	-	-	-

Fan system

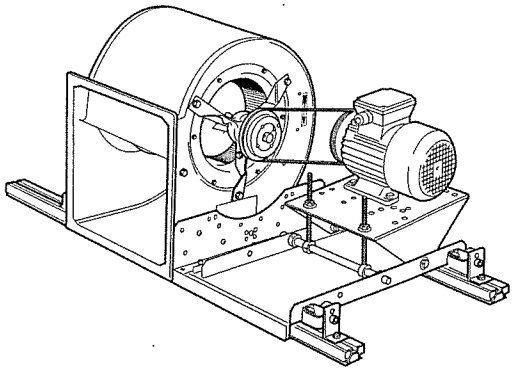
General

The air handling units in the Flexomix S product series are equipped with belt-driven, centrifugal fans, or with type Windstrong or Windstar direct-driven, centrifugal fans with the impeller mounted directly on the motor shaft. The Windstrong and Windstar are equipped with speed controller that operates the fans across a broad performance range.
All the components of the fan system are disturbance-neutralised to conform to the provisions of the EMC Directives for public networks.



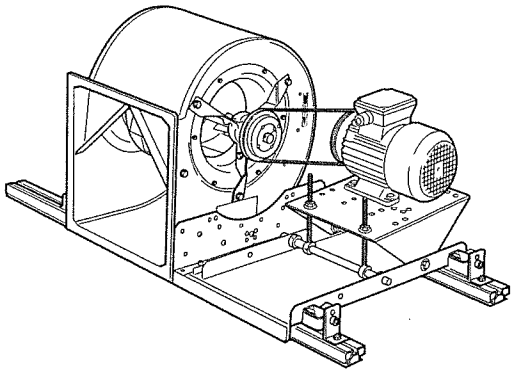
Windstar (WR):

Available for the size 060 and 100 units. Direct-driven, centrifugal fan with forward-curved blades and built-in outlet diffusor that offers the highest possible total performance. The fan motor is designed for a single-phase power supply and has a built-in frequency converter. The fan impeller and fan casing are made of galvanised sheet steel.



Belt-driven centrifugal fan with forward-curved blades (FB):

Available in all the unit sizes. The fan impeller and fan casing are made of galvanised sheet steel. The bearings are permanently lubricated deep-groove ball bearings.

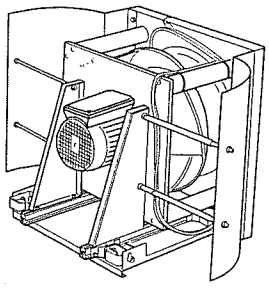


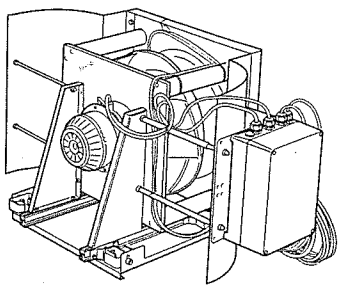
Belt-driven centrifugal fan with backward-curved blades (BB):

Available for the size 150 through 600 units. The fan impeller and fan casing are made of galvanised sheet steel. The bearings are permanently lubricated deep-groove ball bearings. The fan casing is equipped with a V-shaped tongue that offers low outlet losses.

Windstrong (WG):

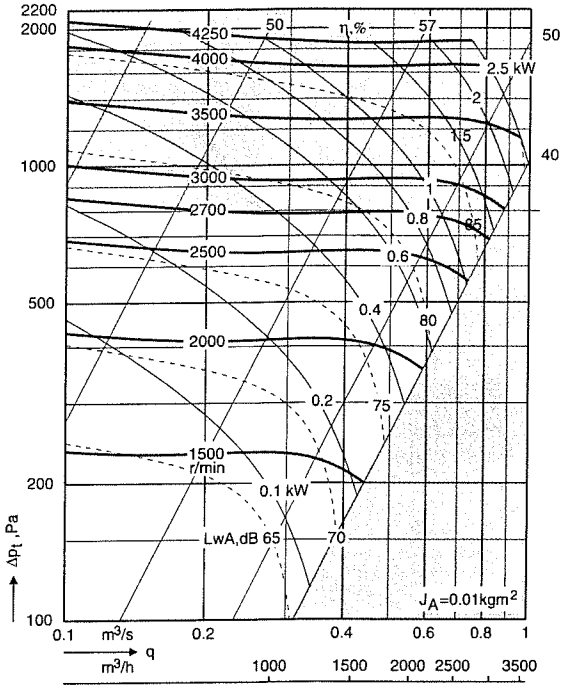
Available for the size 150 through 600 units. Direct-driven, open-outlet, centrifugal fan with backward-curved blades, impeller made of sheet steel with baked, powder-painted finish, equipped with our patented energy spoiler that offers extremely high total performance. The fan system has a built-in speed controller. In the size 150 – 300 units, the controller is located on the energy spoiler.



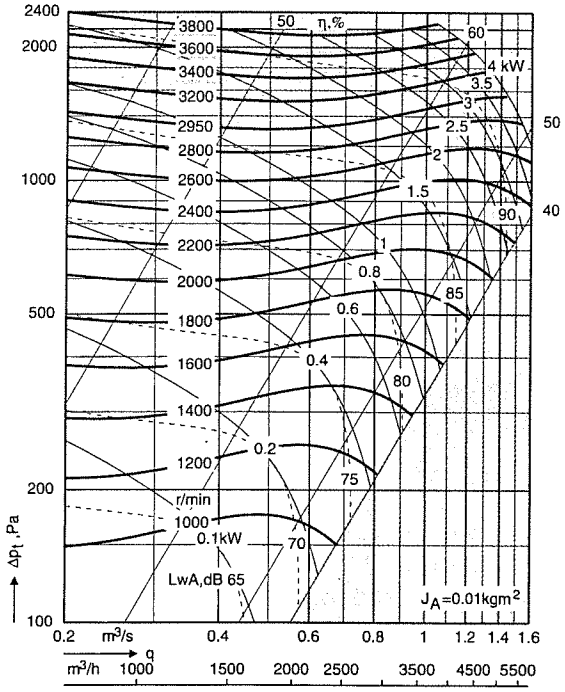


Fan performance – Belt-driven, centrifugal fan with forward-curved blades

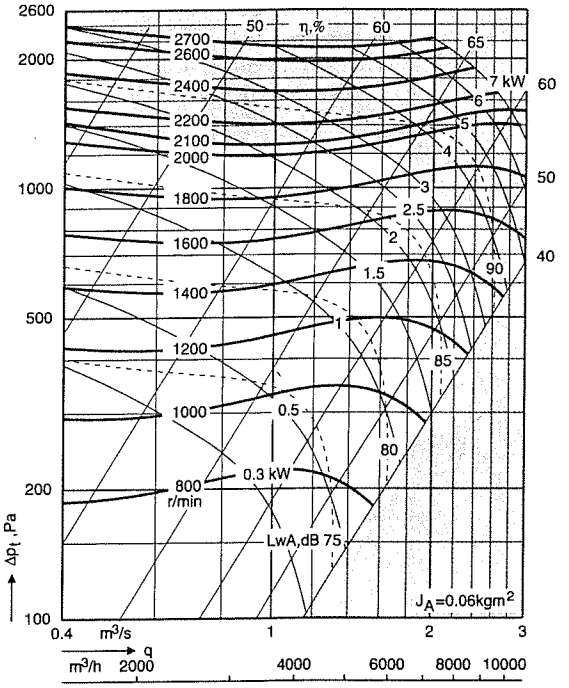
FB 060



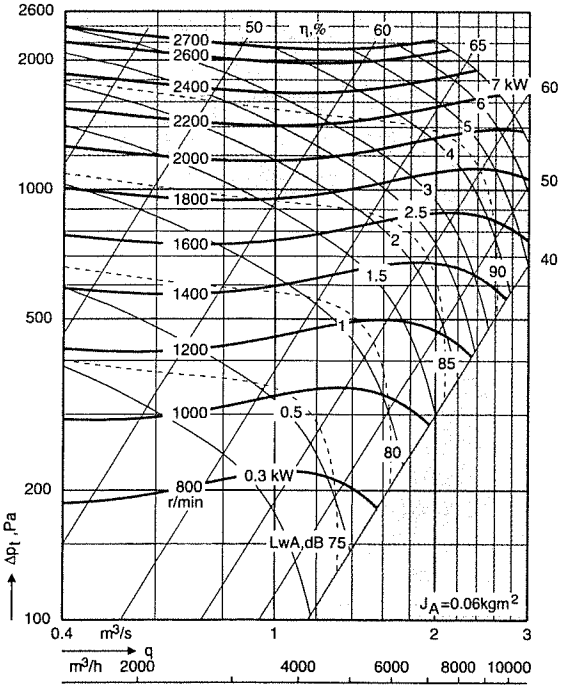
FB 100



FB 150



FB 190



Sound level (data to ISO 5136)

The sound power level Lwa read in the appropriate chart can be broken down into octave bands by adding a correction value Kok from the corresponding table below. The result will be a sound power level that is not A-weighted.

FB 060

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-2	-4	-3	-5	-4	-12	-20	-26
to outlet	+5	-4	-5	-7	-8	-14	-21	-28

FB 150

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

FB 100

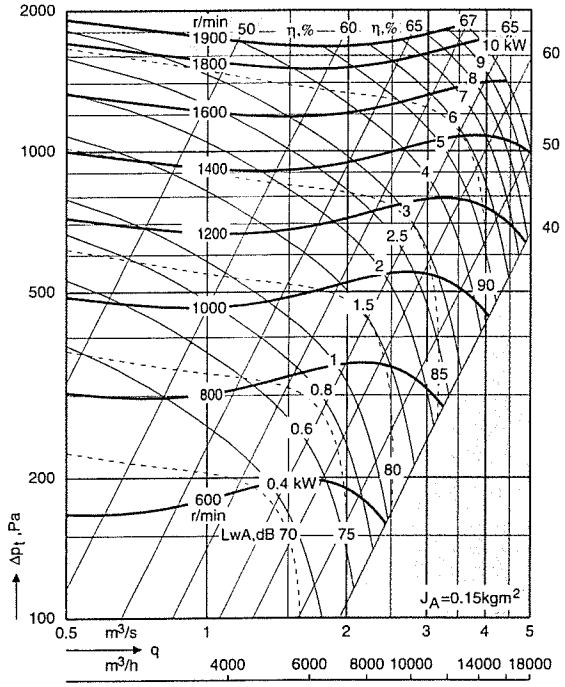
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	0	-2	-1	-3	-2	-10	-18	-24
to outlet	+7	-2	-3	-5	-6	-12	-19	-26

FB 190

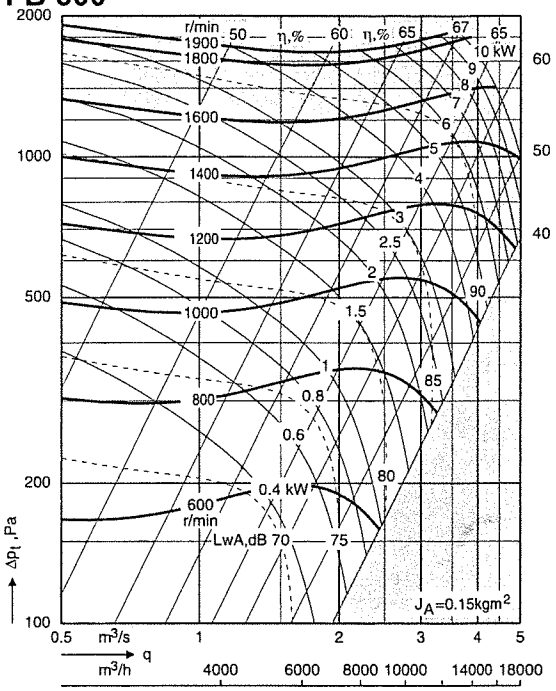
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

Δpt = Total pressure rise
kW = Power demand excluding transmission losses
q = Air flow
LwA = Total sound power level (A-weighted)

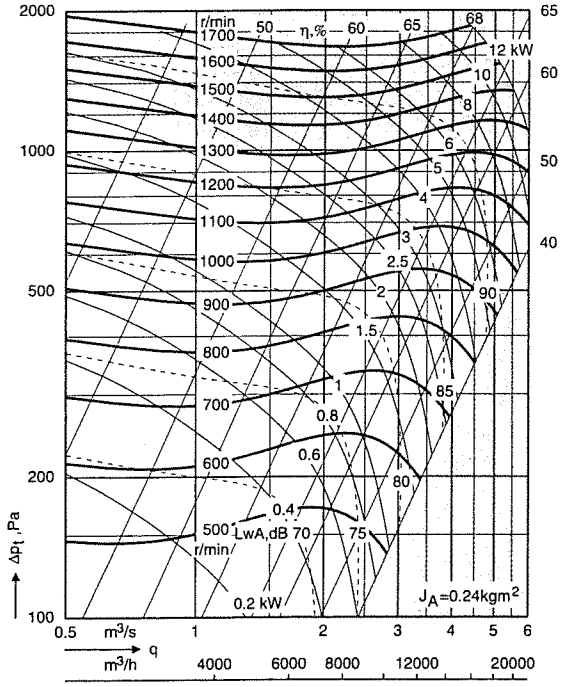
FB 240



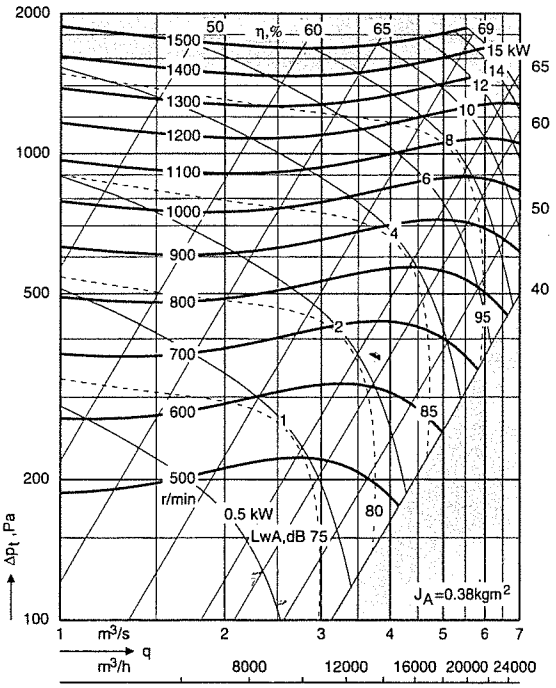
FB 300



FB 360



FB 480



Sound level (data to ISO 5136)

The sound power level Lwa read in the appropriate chart can be broken down into octave bands by adding a correction value Kok from the corresponding table below. The result will be a sound power level that is not A-weighted.

FB 240

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

FB 300

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

FB 360

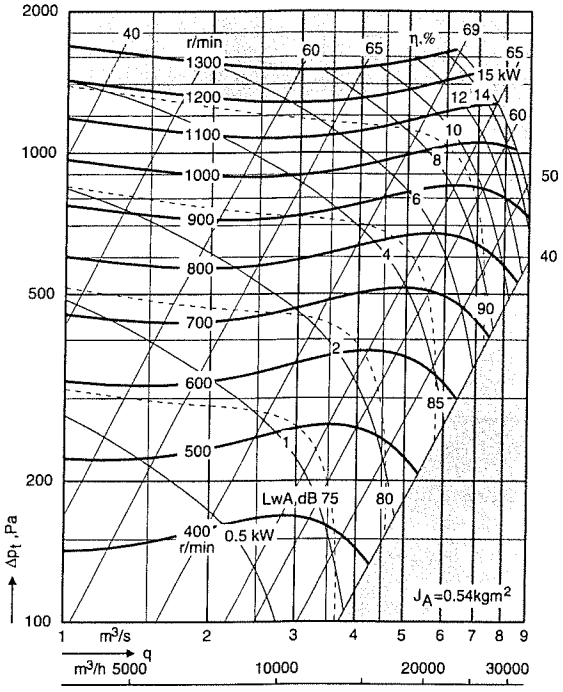
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

FB 480

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+1	-2	-1	-2	-2	-13	-19	-28
to outlet	+7	-3	-3	-5	-6	-14	-21	-28

Δpt = Total pressure rise
kW = Power demand excluding transmission losses
q = Air flow
LwA = Total sound power level (A-weighted)

FB 600



Sound level (data to ISO 5136)

The sound power level Lwa read in the chart can be broken down into octave bands by adding a correction value Kok from the table below. The result will be a sound power level that is not A-weighted.

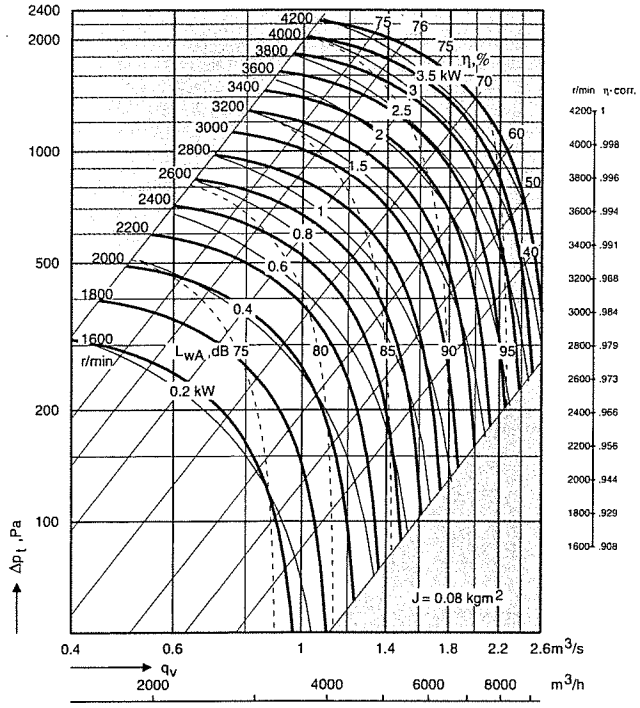
FB 600

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+1	-2	-1	-2	-3	-13	-19	-28
to outlet	+7	-3	-3	-5	-6	-14	-21	-28

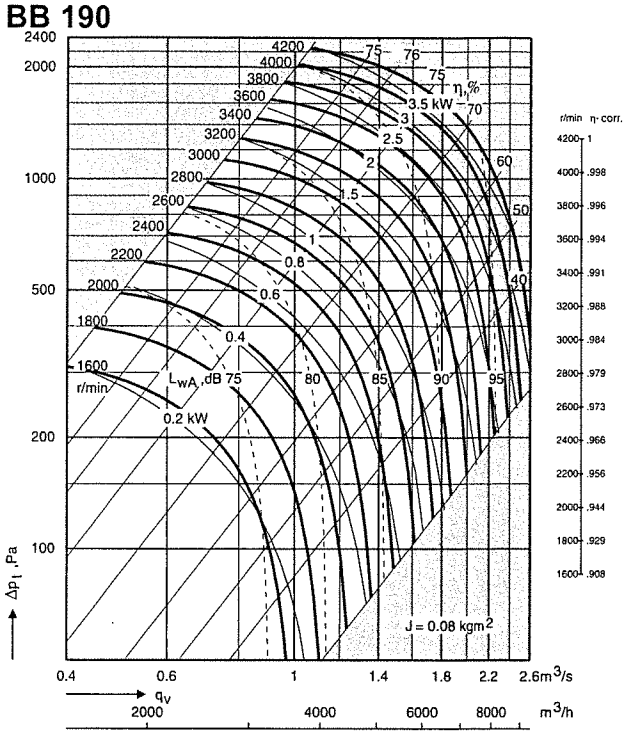
Δpt = Total pressure rise
q = Air flow
kW = Power demand excluding transmission losses
LwA = Total sound power level (A-weighted)

Fan performance – Belt-driven, centrifugal fan with backward-curved blades

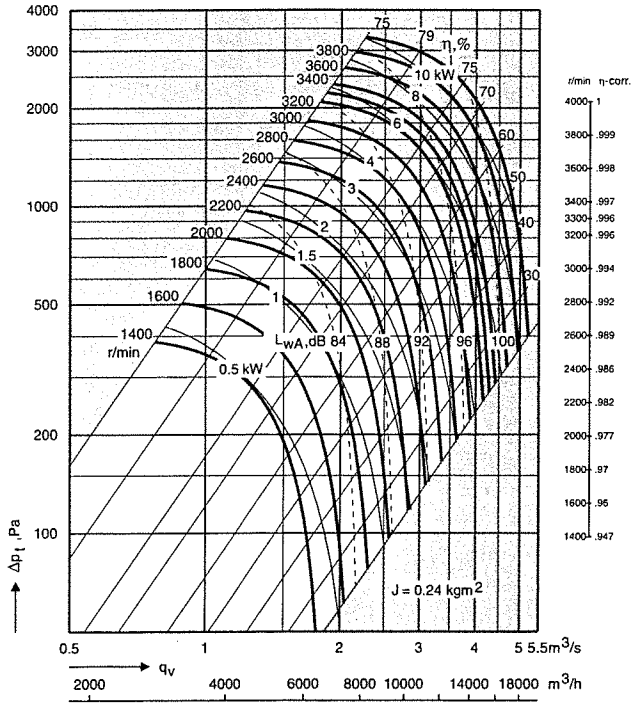
BB 150



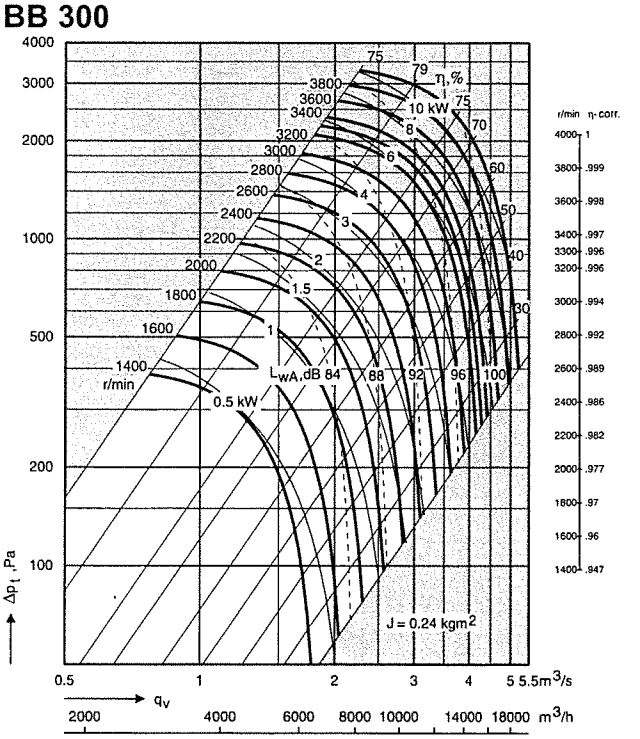
BB 190



BB 240



BB 300



Sound level (data to ISO 5136)

The sound power level Lwa read in the appropriate chart can be broken down into octave bands by adding a correction value Kok from the corresponding table below. The result will be a sound power level that is not A-weighted.

BB 150

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-6	-5	-3	+1	-2	-13	-23	-33
to outlet	+2	+1	-4	-2	-6	-13	-22	-29

BB 190

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-6	-5	-3	+1	-2	-13	-23	-33
to outlet	+2	+1	-4	-2	-6	-13	-22	-29

BB 240

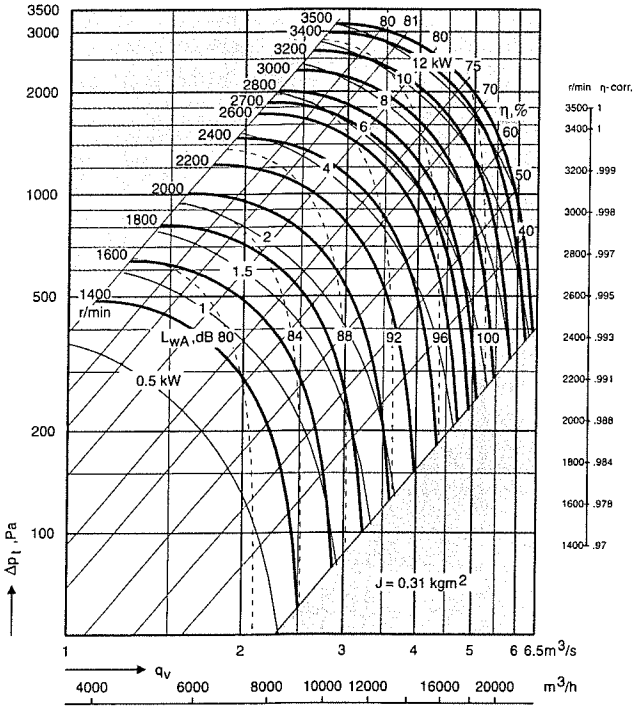
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-7	-5	-4	-1	-5	-13	-22	-33
to outlet	-4	-2	-5	-3	-6	-11	-22	-31

BB 300

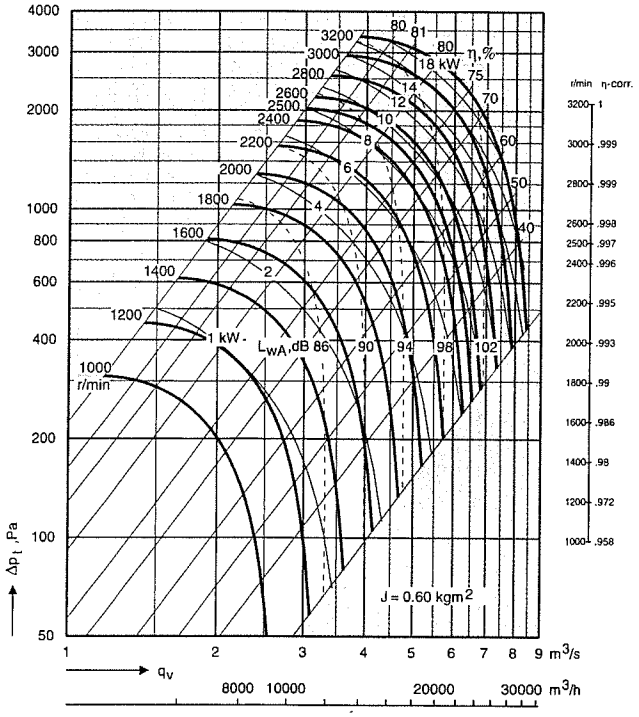
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-7	-5	-4	-1	-5	-13	-22	-33
to outlet	-4	-2	-5	-3	-6	-11	-22	-31

Δpt = Total pressure rise
kW = Power demand excluding transmission losses
q = Air flow
LwA = Total sound power level (A-weighted)

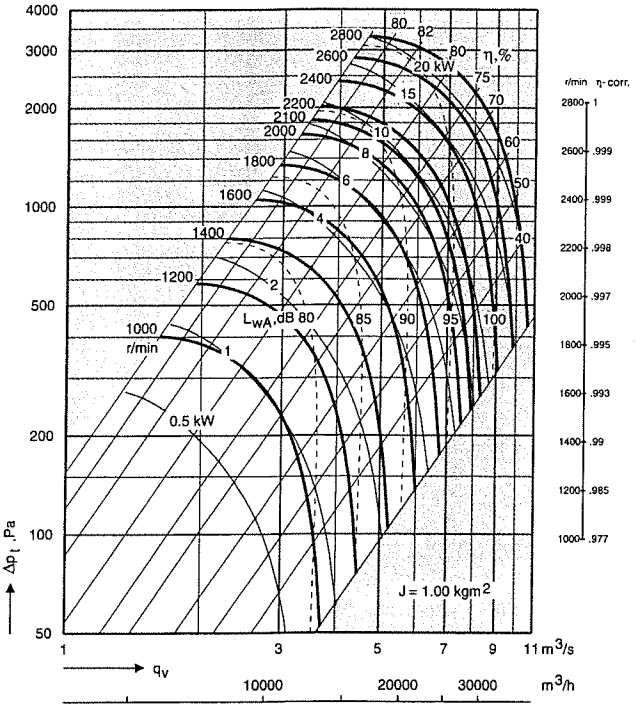
BB 360



BB 480



BB 600



Sound level (data to ISO 5136)

The sound power level Lwa read in the appropriate chart can be broken down into octave bands by adding a correction value Kok from the corresponding table below. The result will be a sound power level that is not A-weighted.

BB 360

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-10	-7	-8	-2	-4	-13	-23	-32
to outlet	-6	-4	-8	-4	-5	-11	-22	-30

BB 600

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-3	-3	+1	-3	-4	-14	-22	-30
to outlet	0	-2	+2	-7	-5	-15	-24	-30

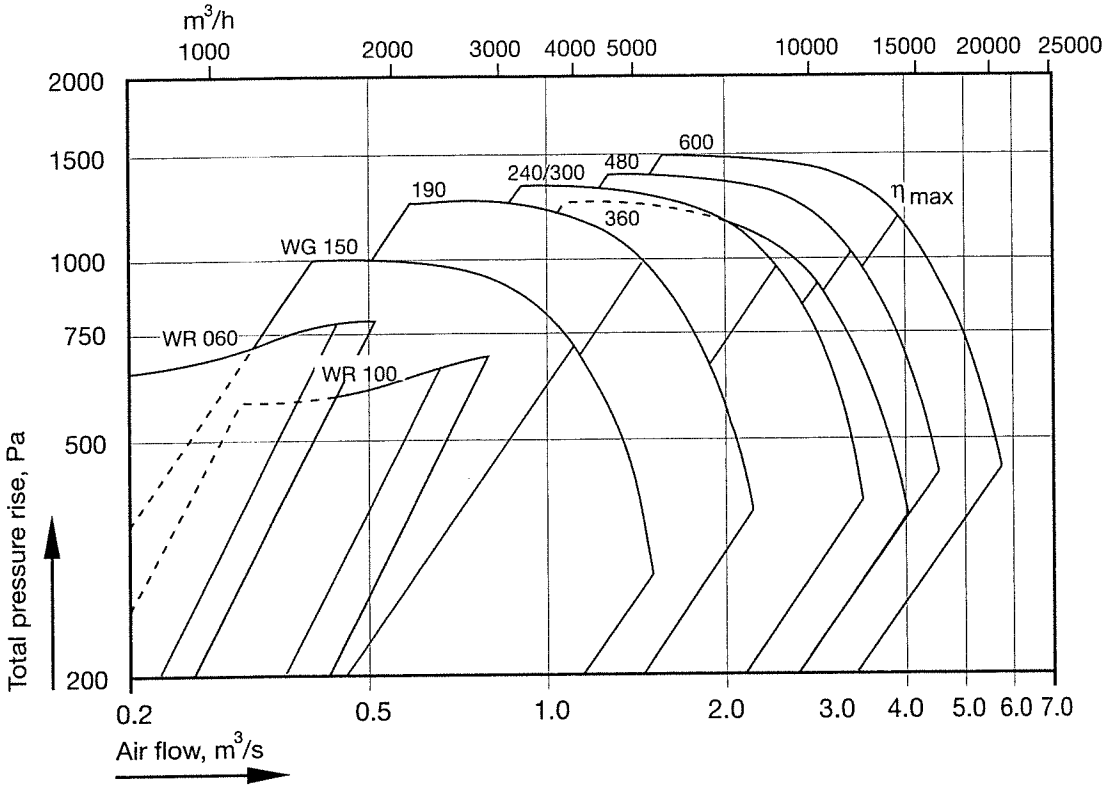
BB 480

Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-3	-2	0	-4	-2	-13	-21	-31
to outlet	-3	-2	+2	-7	-3	-14	-24	-30

Δpt = Total pressure rise
kW = Power demand excluding transmission losses
q = Air flow
LwA = Total sound power level (A-weighted)

Fan performance – Windstar and Windstrong

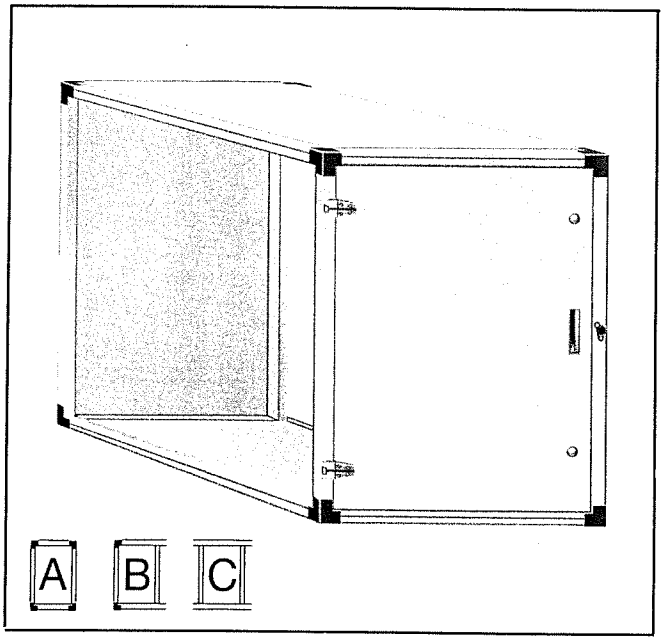
WR 060 - 100 / WG 150 - 600



MIE-KM Inspection Fitting

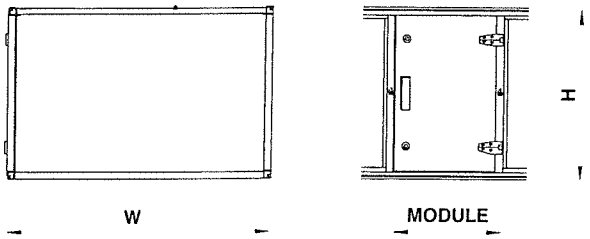
General

The fitting consists of a front casing panel in the form of an inspection door. An air distributor can be installed as an accessory. The functional component is designed for incorporation in an EMM module.



Technical details

Dimensions and weights



Dimensions

Size	Module (mm)			Dim. (mm)	
	10	15	20	W	H
060	300	450	600	850	440
100	300	450	600	980	505
150	300	450	600	1080	695
190	300	450	600	1360	695
240	300	450	600	1360	805
300	300	450	600	1575	805
360	300	450	600	1575	990
480	300	450	600	1950	990
600	300	450	600	2160	1095

Weights

Size	Module (kg)		
	10	15	20
060	5	5	5
100	5	5	5
150	5	5	5
190	5	5	5
240	5	5	5
300	5	5	5
360	5	5	10
480	5	5	10
600	5	5	10

Specification

Inspection fitting	**MIE-KM -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	10, 15, 20
c - Front panel:	00 = Thermal insulation E3 = EI30

Accessories

Air distributor	MIET-KM-01-a

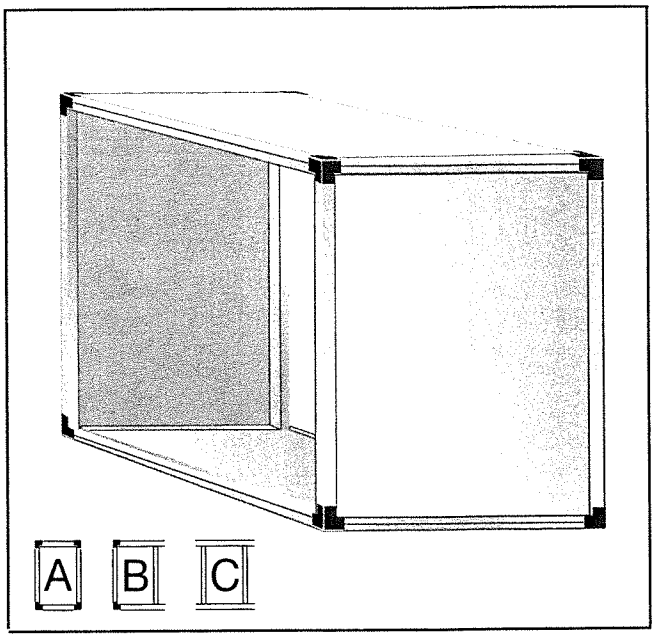
Other accessories

EMMT-06 Inspection window ..... page 72
EMMT-07 Light fitting ..... page 73
See also the acessories described under the EMM standard module on page 16.

MIE-TD Empty Section Fitting

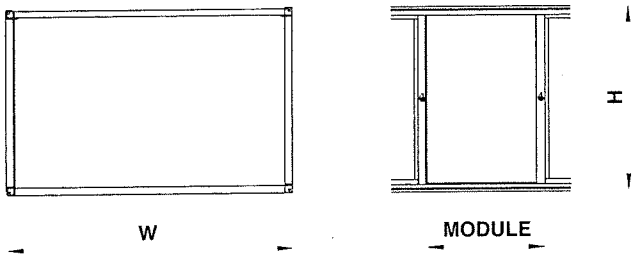
General

The fitting consists of a fixed front casing panel. The panel is designed for incorporation in an EMM module.



Technical details

Dimensions and weights



Specification

Empty section fitting	**MIE-TD -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	05, 10, 15, 20, 25, 30, 35 40, 45, 50, 55, 60, 65, 70 75, 80
c - Front panel:	00 = Thermal insulation E3 = EI30

Accessory

Drip tray	MIET -TD- 01 -a

Other accessories

EMMT-06 Inspection window ..... page 72
EMMT-07 Light fitting ..... page 73
See also the accessories described under the EMM standard module on page 16.

Dimensions, mm

Size	Module (mm)																Dim. (mm)	
	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	W	H
060	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	850	440
100	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	980	505
150	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1080	695
190	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1360	695
240	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1360	805
300	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1575	805
360	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1575	990
480	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	1950	990
600	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2160	1095

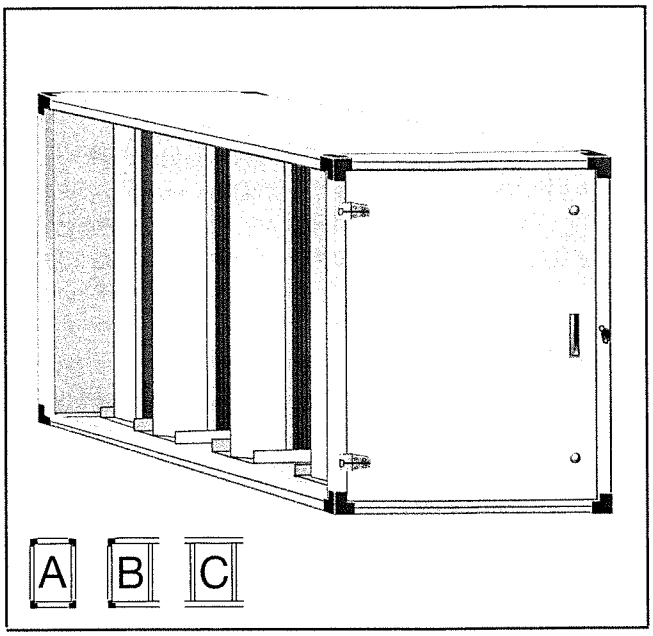
Weight, kg

Size	Module (kg)															
	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
060	5	5	5	5	5	5	5	10	10	10	10	10	10	15	15	15
100	5	5	5	5	5	5	5	10	10	10	10	10	15	15	15	15
150	5	5	5	5	5	5	10	10	10	15	15	15	15	20	20	20
190	5	5	5	5	5	10	10	10	10	15	15	15	15	20	20	20
240	5	5	5	5	10	10	10	10	15	15	15	20	20	20	20	25
300	5	5	5	5	10	10	10	10	15	15	15	20	20	20	20	25
360	5	5	5	10	10	10	15	15	15	20	20	25	25	25	25	30
480	5	5	5	10	10	10	15	15	15	20	20	25	25	25	25	30
600	5	5	5	10	10	15	15	15	20	20	25	25	25	30	30	30

MIE-KL Silencer Fitting

General

The MIE-KL Silencer fitting consists of baffle elements and sliding rails. The silencer is designed for incorporation in an EMM module.



Design

- The silencer has 200 mm thick baffle elements.
- The baffle material (mineral wool) is covered with a cleanable woven fabric, Cleantech.
- The material has been granted type-approval for use as lining inside ventilation ducting.
- The baffles are mounted on rails and are easily withdrawable for cleaning.
- Max. permissible temperature: 50 °C
- The front edges of the baffle elements are tapered to minimise the pressure drop.
- The silencer is available in four different versions conditional on the demands made on attenuation.

Specification

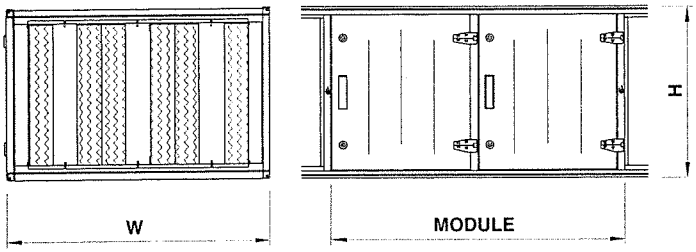
Silencer fitting	**MIE-KL -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Module:	30, 40, 50, 60
c - Front panel:	00 = Thermal insulation E3 = EI30

Technical details

The integral attenuation is tabulated on page 10.

Dimensions and weights

Dimensions



Other accessories

See under the EMM standard module on page 16.

Weights

Size	Module (mm)				Dim. (mm)	
	30	40	50	60	W	H
060	900	1200	1500	1800	850	440
100	900	1200	1500	1800	980	505
150	900	1200	1500	1800	1080	695
190	900	1200	1500	1800	1360	695
240	900	1200	1500	1800	1360	805
300	900	1200	1500	1800	1575	805
360	900	1200	1500	1800	1575	990
480	900	1200	1500	1800	1950	990
600	900	1200	1500	1800	2160	1095

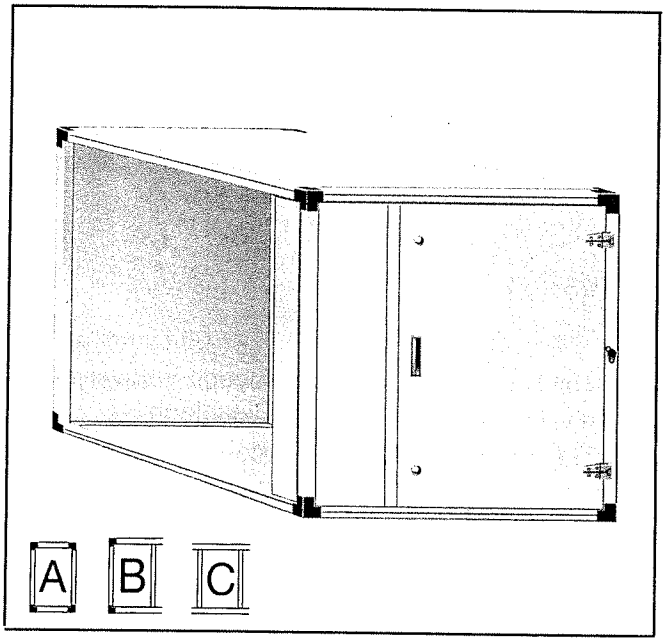
Size	Module (kg)			
	30	40	50	60
060	30	35	55	60
100	40	50	80	90
150	50	65	100	115
190	65	80	130	145
240	70	90	145	160
300	85	105	170	190
360	100	125	200	225
480	115	145	235	260
600	145	180	290	325

For pressure drop data, see pages 8 and 9.

MIE-MD Media Fitting

General

The fitting consist of a shielded space for the installation of electrical and control equipment cubicles, and a front casing panel. The assembly parts are designed for incorporation in an EMM module.

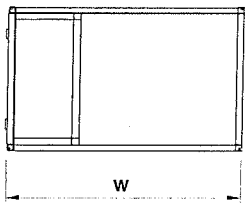


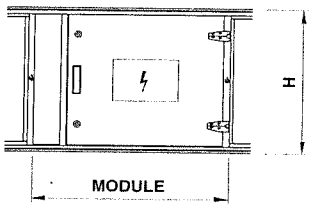
Design

- The media assembly parts are available for the size 240 – 600 units.

Technical details

Dimensions and weights





Size	Module (mm)	Dim. (mm)		Front panel (kg)
	30	W	H	
240	900	1360	805	25
300	900	1575	805	25
360	900	1575	990	30
480	900	1950	990	30
600	900	2160	1095	35

Space available for control equipment cubicle

Size	Dim. (mm)		
	Width	Height	Depth
240	680	705	280
300	680	705	280
360	680	890	280
480	680	890	280
600	680	995	280

Specification

Media fitting	**MIE-MD -a -30 -c**
a - Size:	240, 300, 360, 480, 600
30 - Module	
c - Front panel:	00 = Thermal insulation E3 = EI30

Other accessories

See under the EMM standard module on page 16.

10. Energy Recovery Units
EXA Rotary Heat Exchanger

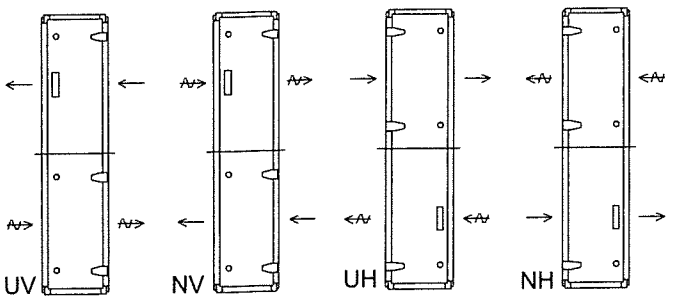
General

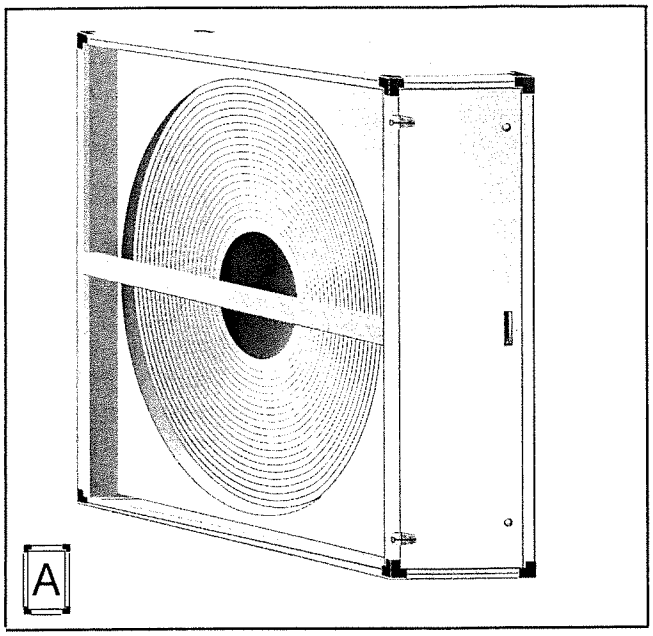
The EXA Rotary heat exchanger is a complete unit section with a rotor that transfers heat according to the air-to-air principle.

Design

- The rotor in the heat recovery unit consists of alternate flat and corrugated thin strips of aluminium foil. This arrangement produces a large number of smooth passages through which the air flows in a laminar manner. This provides low pressure drop and little risk of dust or dirt deposits in the passages.
- The rotor, which can be removed from the unit, is journalled in permanently lubricated spherical ball bearings.
- A effective bristled seal is fitted along the periphery and between the supply air and exhaust air passages in the unit.
- An adjustable purging sector continuously blows the rotor clean of impurities.
- The rotor is driven by a worm gear motor with electronic speed control.
- Moisture can be recovered from the exhaust air at low outdoor air temperatures. The heat exchanger can be equipped with a hygroscopic rotor if strict demands are made on moisture transfer. The rotor can also be utilised for recovering cooling energy. A hygroscopic design is then appropriate.
- The rotor can be made of epoxy-treated aluminium foil for operation in aggressive environments.
- The rotor package can be edge-reinforced with polyurethane paint as simpler type of corrosion protection.

Configuration





Specification

Rotary heat exchanger	**EXA -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30
c - Type of rotor:	NO = Normal HY = Hygroscopic EX = Epoxy-treated

Accessory

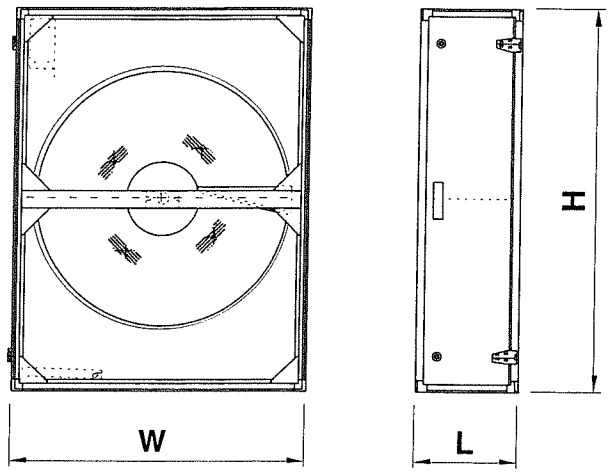
Edge-reinforced rotor	**EXAT-01-a**

Other accessories

U = Supply air flows through upper section
N = Supply air flows through lower section
V = Left-hand
H = Right-land

Technical details

Dimensions and weights



Size	Dimension (mm)			Weight (kg)	
	L	W	H	00	E3
060	380	850	880	85	90
100	380	980	1010	100	105
150	380	1080	1390	135	140
190	380	1360	1390	160	170
240	380	1360	1610	170	180
300	380	1575	1610	200	210
360	380	1575	1980	205	215
480	380	1950	1980	290	300
600	380	2160	2190	335	345

Motor data

Ver.	Size	Output W	Power supply	Rated current/fuse
Speed control	**060 - 100**	40	1× 230 V	6A Delay action
	150 - 360	90	1× 230 V	6A Delay action
	480 - 600	180	1× 230 V	6A Delay action

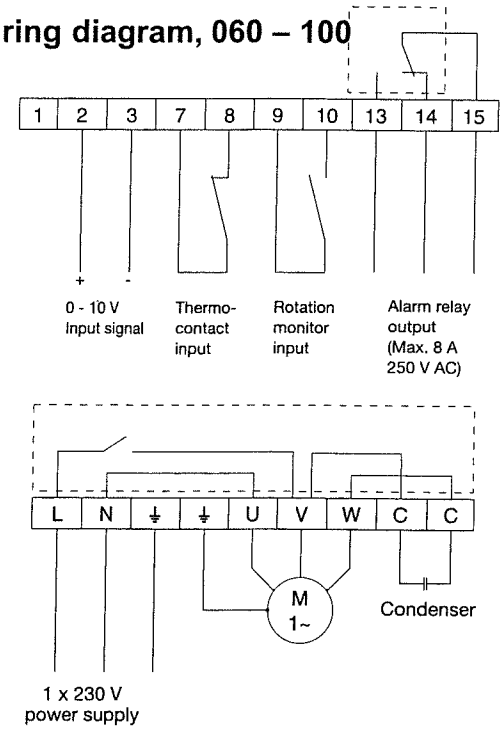
Electronic speed control

The electronic controller and drive motor are the principal components of the electronic speed control function.

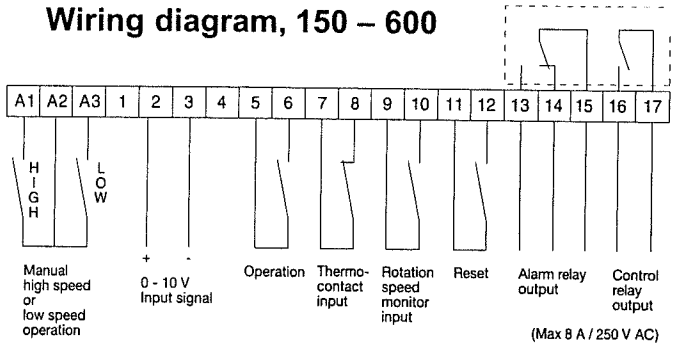
Ready-to use purging operation, rotation speed monitor and alarm functions are available in the controller, which is an integrated component in the heat recovery unit. The pulse sensor of the rotation speed monitor is included in the standard supply.
The equipment is prewired for connection to a 0 – 10 V control signal.
The controller should be wired to a single-phase 230 V power supply across a delay action fuse.

Wiring

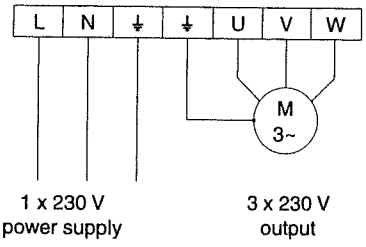
Wiring diagram, 060 – 100



Wiring diagram, 150 – 600



Power section



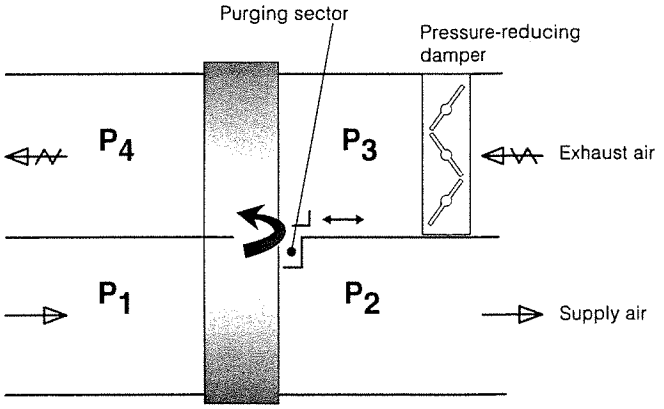
Purging operation and leakage air flow

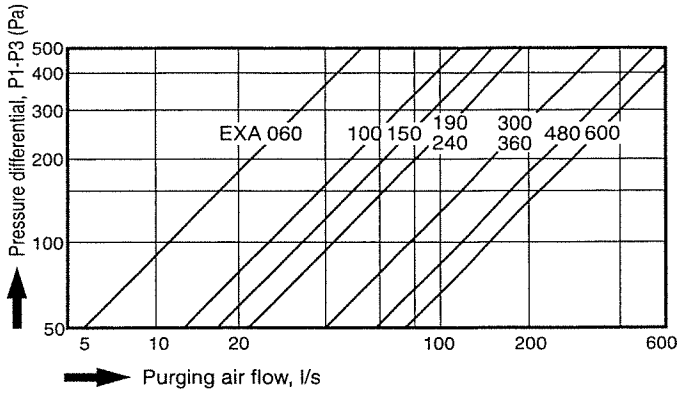
The rotary heat exchanger will always transfer a certain volume of exhaust air to the supply air and supply air to the exhaust air respectively by carry-over.

If a purging sector is fitted and set at the appropriate angle, it purges the rotor with air. This will eliminate the transfer of exhaust air to the supply air. If a heat recovery unit with purging sector is installed, the fans should be located so that P1 > P4 and P2 > P3 as illustrated in the adjacent figure. A pressure-adjusting damper can be fitted in the unit to achieve the pressure balance required.

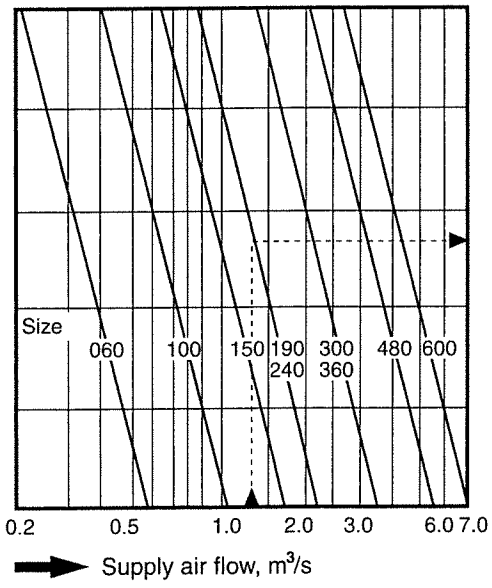
The adjustable purging sector can be used to adjust the air flow.

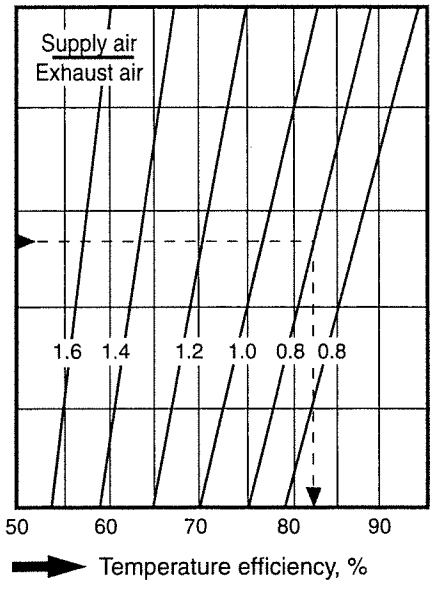
The chart to the right indicates the leakage flow if the purging sector is completely open. If the pressure differential is higher than normal, this must be taken into account when sizing the fans.





Temperature efficiency





Example

Given:

Supply air flow	1.3 m³/s
Exhaust air flow	1.6 m³/s
Size	190

The values plotted in the charts indicate a temperature efficiency of 82 %.

For pressure drop data, see pages 8 and 9.

EXE Heat-pipe Heat Exchanger

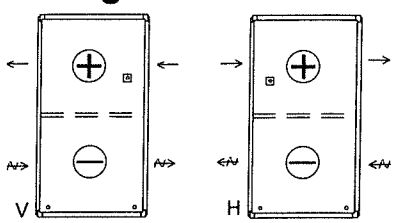
General

The EXE heat recovery unit is a complete heat-pipe heat exchanger that operates according to the air-to-liquid/ gas-to-air principle. The unit is primarily designed for installation in air handling systems in which leakage between the supply air and exhaust air is unacceptable.

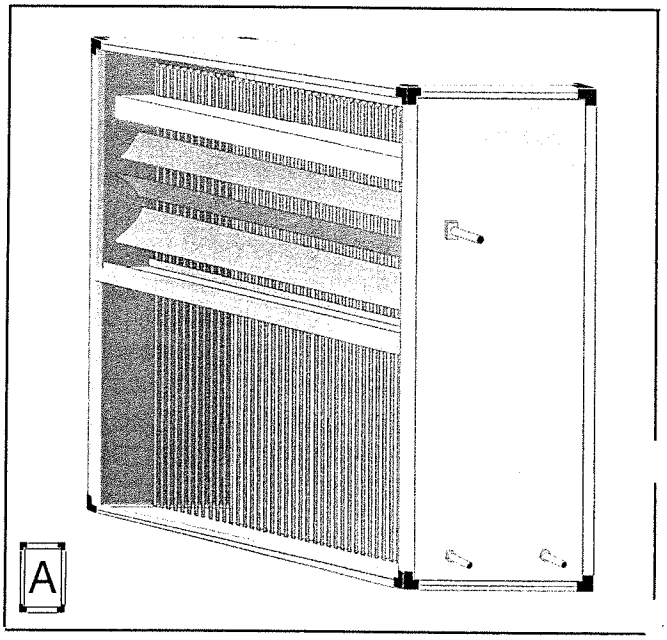
Design

- The heat recovery unit consists of expanded, vacuum-pumped, gas filled aluminium tubes, so-called heat pipes. Tetrafluorethane 134a is used as the heat transfer medium. The pipes are firmly expanded in an aluminium fin package. An air-tight intermediate wall eliminates any leakage between the supply air and exhaust air. The exhaust air flows through the lower part of the heat exchanger while the outdoor air simultaneously flows in the opposite direction through the upper part. The liquid in the tubes evaporates and rises. When the vapour reaches the outdoor air half, it is cooled and condenses giving up its heat to the outdoor air as it evaporates. The condensate then runs back down to the exhaust air side where it is heated once more.
- The process works without moving parts and offers high efficiency.
- Heat recovery units with 1.9 mm fin pitch are used in comfort applications The industrial version with a 2.5 mm fin pitch on the exhaust air side should be selected for industrial environments.
- Moisture cannot be recovered from the exhaust air. However, at low outdoor temperatures, moisture will precipitate from the exhaust air and release energy. Condensate is collected in a galvanised drop tray. At normal humidity and temperature, the temp. efficiency of the EXE increases by 3 percentage units.
- Moisture precipitation also involves a risk of frosting on the exchanger. Frosting can be counteracted by allowing part of the outdoor air flow to by-pass the exchanger.
- Type KJS by-pass and shut-off dampers having Tightness Class 2 to VVS AMA-98 and Environmental Class 3 to VVS AMA-83 are used.

Configuration



V = Left-hand
H = Right-hand



Specification

Heat exchanger	**EXE -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30
c - Type of HeatBank:	**E** = Single **D** = Double **I** = Industrial version

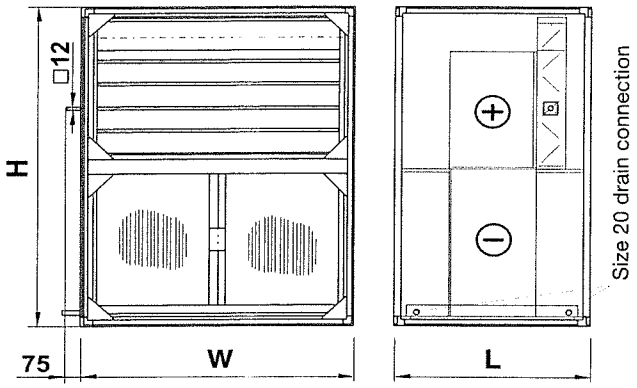
Accessories

Droplet eliminator	**EXET-01 -a**
Epoxy-treated fins on exhaust air side	**EXET-02 -a- c**

Other accessories

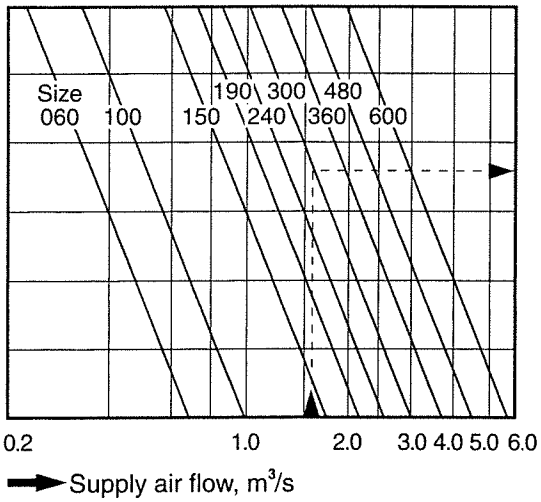
Technical details

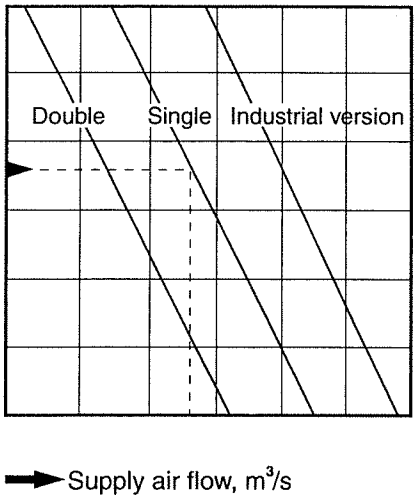
Dimensions and weights

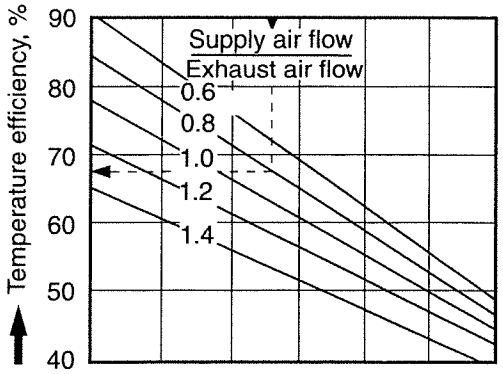


Size	Dimension (mm)				Weight (kg)				Req.* torque (Nm)
	Single/ Industrial	Double			Single/ Industrial		Double		
	L	L	W	H	00	E3	00	E3	
060	630	780	850	880	120	130	190	200	3
100	630	780	980	1010	155	165	245	260	3
150	630	780	1080	1390	225	235	370	390	4
190	630	780	1360	1390	270	285	450	470	5
240	630	780	1360	1610	305	320	520	540	5
300	630	780	1575	1610	355	370	610	630	5
360	630	780	1575	1980	470	490	825	945	6
480	630	780	1950	1980	590	610	1010	1035	10
600	630	780	2160	2190	715	735	1240	1270	10

** Only one damper actuator is required.*







Example

Given:

Supply air flow	1.6 m³/s
Exhaust air flow	2.0 m³/s
Size	300 single

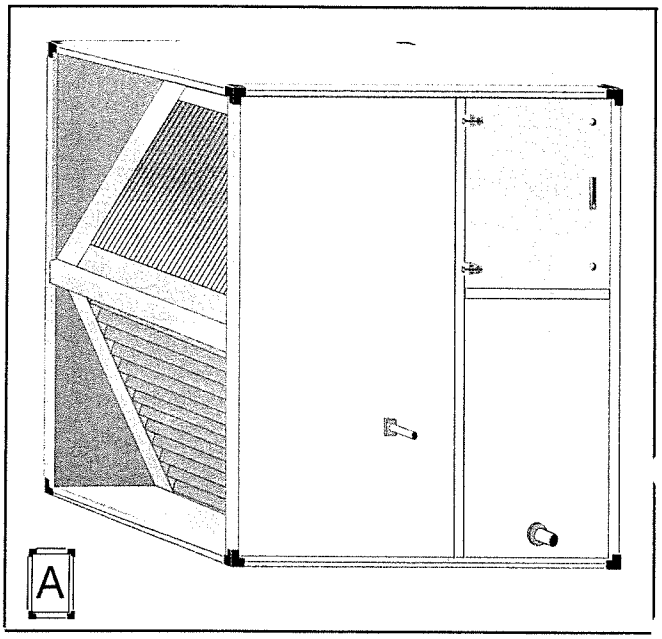
The values plotted in the charts indicate a temperature efficiency of 68 %

For presure drop data, see pages 8 and 9.

EXC Plate Heat Exchanger

General

The EXC Plate heat exchanger section is a complete unit section with plate heat exchanger that transfers heat according to the air-to-air principle.



Design

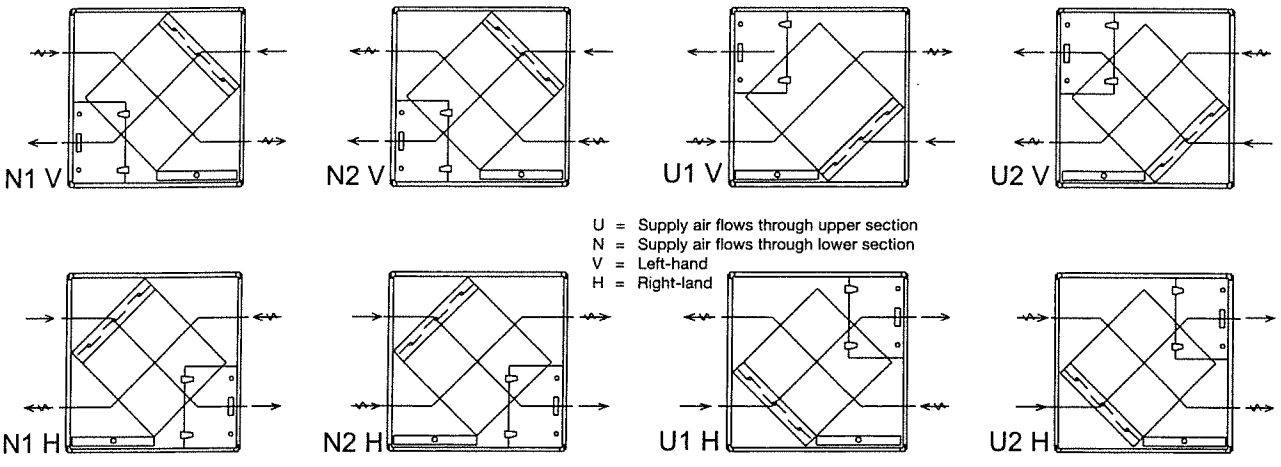
- The heat exchanger is of cross-flow type and consists of aluminium plates which are also available with epoxy-treated finish. The smooth passages in the direction of air flow provide low pressure drop and little risk of dust or dirt deposits.
- A special jointing technique makes the heat exchanger tight and minimises the risk of leakage from the exhaust air to the supply air. Pressed enlarging passage area in the direction of air flow provide stability that permits wide pressure differentials.
- Moisture cannot be recovered from the exhaust air. However, at low outdoor temperatures, moisture will precipitate from the exhaust air and release energy. Condensate is collected in a galvanised drop tray. At normal humidity and temperature, the temperature efficiency of the exchanger increases by 3 percentage units.
- Moisture precipitation also involves a risk of frosting on the exchanger. Frosting can be counteracted by allowing some of the outdoor air flow to by-pass the exchanger.
- Type KJS by-pass and shut-off dampers having Tightness Class 2 to VVS AMA-98 and Environmental Class 3 to VVS AMA-83 are used.

Specification

Plate heat exchanger	**EXC -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30
c - Type:	A = Aluminium B = Epoxy-treated

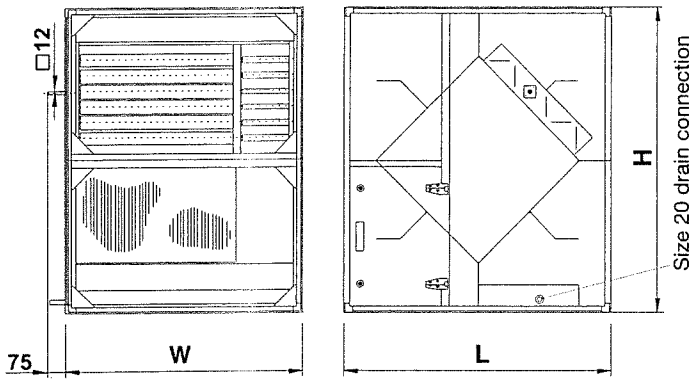
Other accessories

Configuration



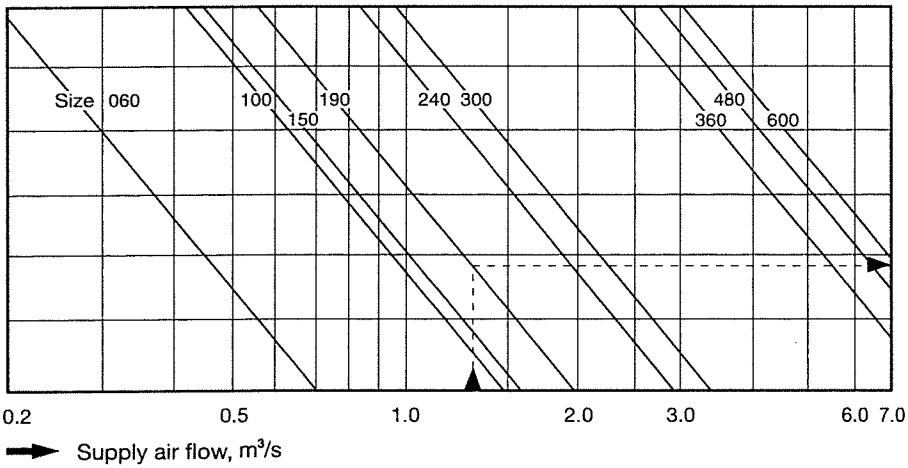
Technical details

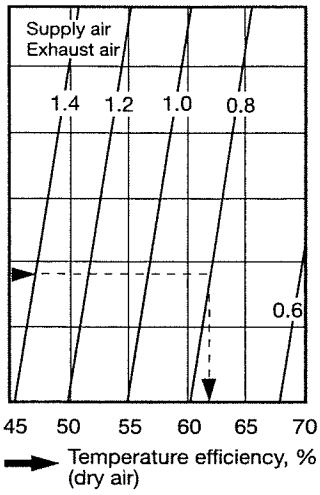
Dimensions and weights



Size	Dimension (mm)			Weight (kg)		Req.* torque (Nm)
	L	W	H	00	E3	
060	780	850	880	100	110	3
100	1080	980	1010	150	170	3
150	1230	1080	1390	195	220	4
190	1230	1360	1390	223	250	5
240	1530	1360	1610	285	320	5
300	1530	1575	1610	320	360	5
360	1980	1575	1980	440	480	6
480	1980	1950	1980	535	600	10
600	1980	2160	2190	600	670	10

**Only one damper actuator is required.*





For pressure drop data, see pages 8 and 9.

Example

Given:

Supply air flow	1.3 m³/s
Exhaust air flow	1.63 m³/s
Size	190

From the chart:

Temperature efficiency 62%

11. Complete Functional Sections
EBA Mixing Section

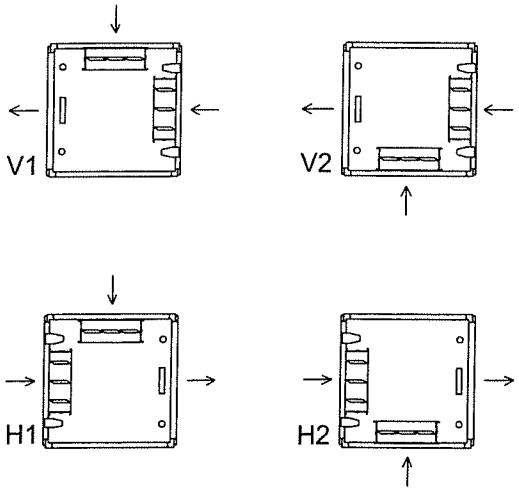
General

The EBA Mixing section is a functional section with two interconnected dampers, for mixing of outdoor air and recirculated air.

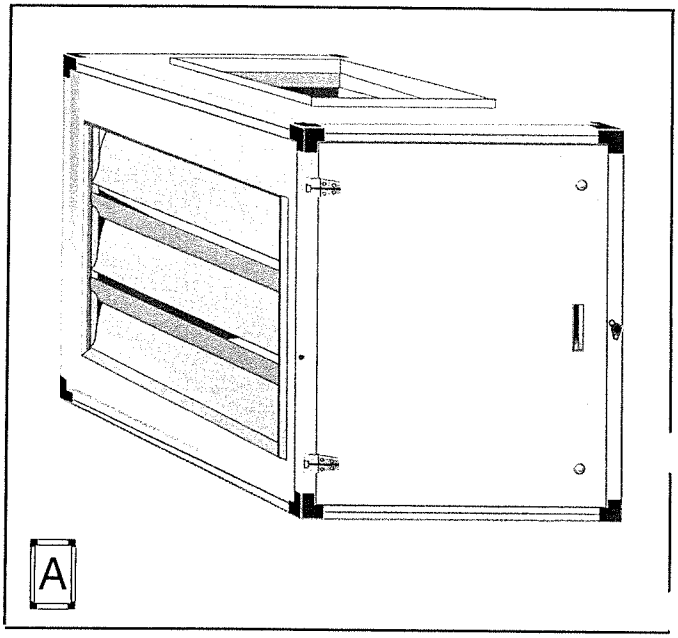
Design

- The dampers are made of anodised aluminium profiles and meet the provisions of Environmental Class 3.
- The damper blades are driven by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber provides a tight seal between the blades.
- The dampers are interlinked to a common shaft inside the damper
- Tightness Class 3 to VVS AMA -98 (Type 4 to VVS AMA -83) is standard.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa
- The inspection door is standard.

Configuration



V = Left-hand
H = Right-hand



Specification

Mixing section	**EBA -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Front panel:	00 = Thermal insulation E3 = EI30

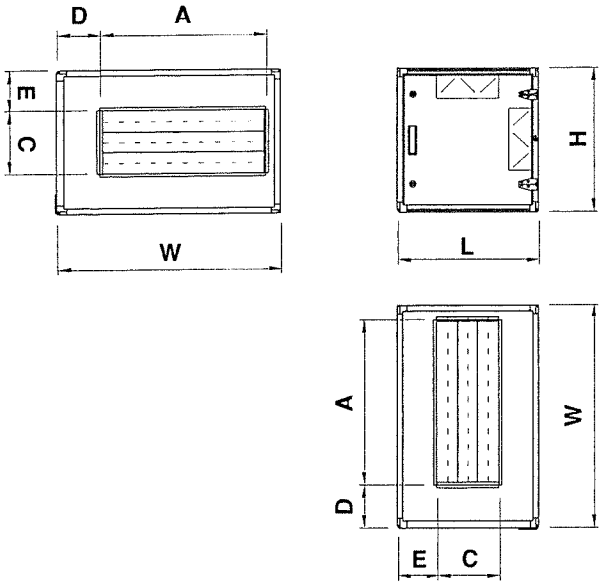
Accessory

KJST-03 Damper actuator

Other accessories

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg) Casing		Req.* torque
	L	W	H	A	C	D	E	00	EI 30	(Nm)
060	440	850	440	500	200	210	70	30	35	3
100	505	980	505	700	200	210	120	45	45	4
150	695	1080	695	800	300	210	200	55	65	5
190	695	1360	695	1000	300	210	200	65	75	5
240	805	1360	805	1000	400	210	200	75	90	6
300	805	1575	805	1200	400	210	200	85	100	6
360	990	1575	990	1200	500	210	245	105	125	6
480	990	1950	990	1400	500	275	245	125	145	8
600	1095	2160	1095	1600	600	280	245	150	175	12

** Only one damper actuator is required (12x12 mm damper shaft)*

For pressure drop data, see pages 8 and 9.

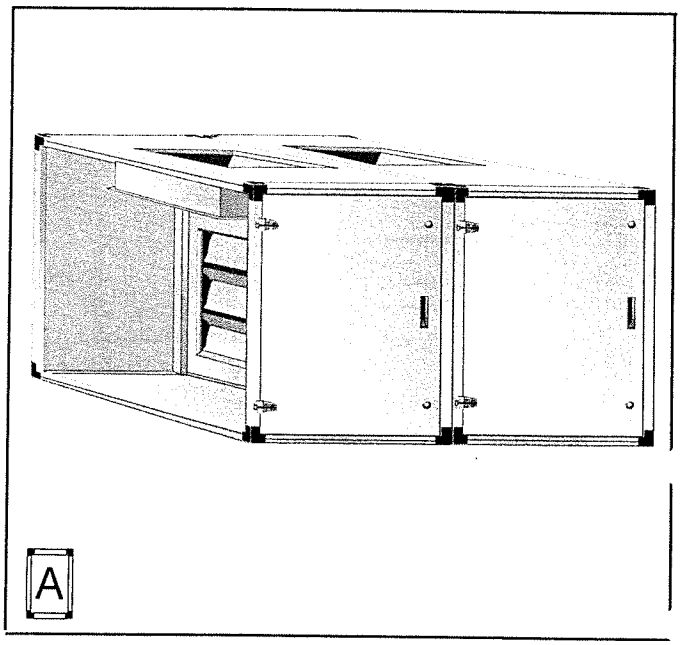
EBB Mixing Section

General

The EBB Mixing section is a unit section with three dampers for mixing exhaust air, recirculated air and outdoor air.

Design

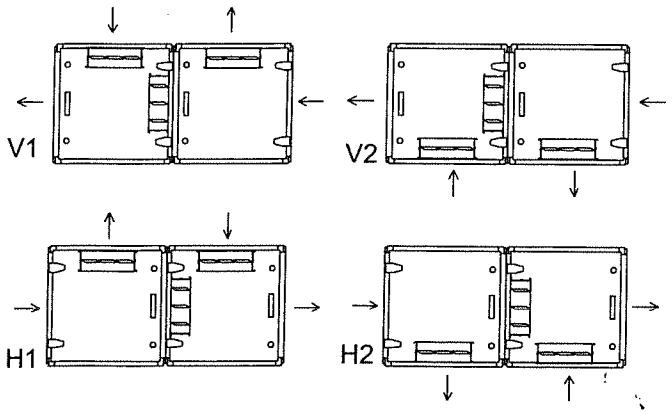
- The EBB mixing section has built-in type KJS dampers of IV Produkt manufacture.
- The dampers are made of anodised aluminium profiles and meet the provisions of Environmental Class 3.
- The damper blades are driven by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber provides a tight seal between the blades.
- The dampers are interlinked across two shafts inside the damper
- Tightness Class 4 to VVS AMA -98 (Type 3 to VVS AMA -83) is standard.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa
- The unit section has an inspection door as standard.



Specification

Mixing section	**EBB -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Front panel:	00 = Thermal insulation E3 = EI30

Configuration



V = Left-hand
H = Right-hand

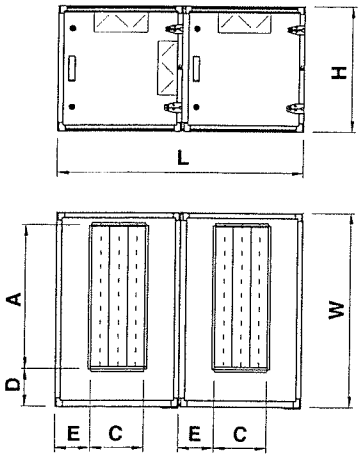
Accessory

KJST-03 Lever actuator

Other accessories

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg)		Req. * torque (Nm)
								Casing		
	L	W	H	A	C	D	E	00	EI 30	
060	880	850	440	500	200	210	70	55	65	3
100	1010	980	505	700	200	210	120	70	80	3
150	1390	1080	695	800	300	210	200	105	120	5
190	1390	1360	695	1000	300	210	200	115	125	5
240	1610	1360	805	1000	400	210	200	140	160	6
300	1610	1575	805	1220	400	210	200	155	180	6
360	1980	1575	990	1200	500	210	245	190	225	8
480	1980	1950	990	1400	500	275	245	215	260	8
600	2190	2160	1095	1600	600	280	245	260	315	12

* *Two motorised damper actuators are required (12x12 mm damper shaft). One of the motors should be sized according to the appropriate torque tabulated above; the other can be sized for the torque read in the table x 0.5.*

For pressure drop data, see pages 8 and 9.

EAF Fan Section

General

The EAF Fan section is a unit section with built-in fan with vertical outlet and can be used as a supply air or exhaust air fan in ventilation systems together with the other functional sections in the Flexomix S product series.

Design

- The fan in this unit section is available in three versions:

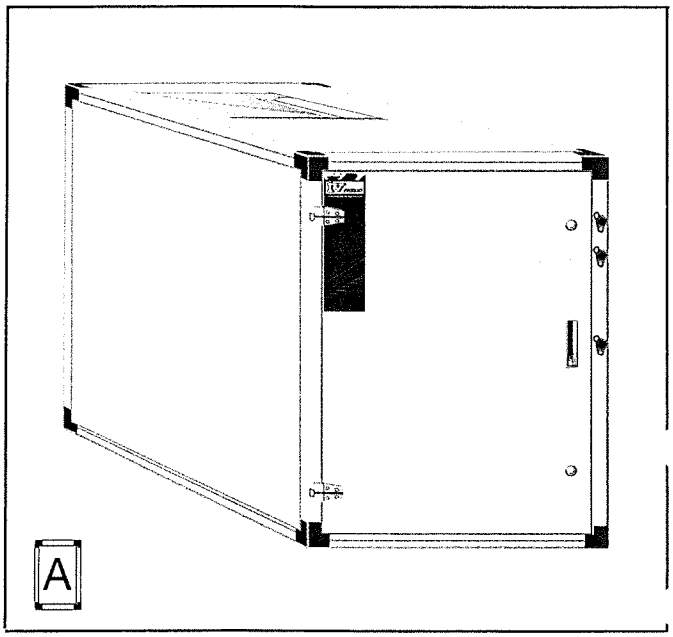
  FB – Belt-driven centrifugal fan with fan casing, forward-curved blades. (Sizes 060 – 600)

  BB – Belt-driven centrifugal fan with fan casing, backward-curved blades. (Sizes 150 – 600)

  WG – **Windstrong**, speed-controlled, direct-driven, open-outlet fan with fan casing and backward-curved blades. (Sizes 150 – 600) (Direct current: 150 – 300 / alternating current: 360 – 600)

  ** The design of some of the components in the fan systems do not conform to Environment Class M3.*

- The fan and motor unit are withdrawable from the casing to facilitate maintenance.
- The ambient temperature should not exceed 50 °C to allow adequate cooling of the motor.
- The fan and motor are effectively isolated from the casing by means of a flexible outlet connection and rubber anti-vibration mountings that are sized to match the performance of the fan. The normal resonance frequency range is 7 – 10 Hz.
- V-belts or poly-V belts may be selected for the belt drive. The belt drives are described in the publication "Air Handling System Products".
- Other information is available under MIE-AF on page 32.
- The fan section outlet is as standard fitted with a connection gable



Specification

Fan section	**EAF -a -b -c**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing :	00 = Thermal insulation E3 = EI30
c - FB Forw.-curved:	060 – 600
BB Backw.-curved:	150 – 600
WG Windstong:	150 – 600
Motor	**1-bbbb-1-ddd-eeee-ff-g**
1 - Type:	
b - Size:	[The code always contains 4 figures: 3 digits and 1 letter. Example: 112M]
1 -	-
d - Number of poles:	200 = 2 poles 240 = 2/4 poles 400 = 4 poles 460 = 4/6 poles 480 = 4/8 poles
e - Power*:	Ex. 0018 = 0.18 kW 1100 = 11 kW
f - Voltage:	12 = 1-phase, 230 V 32 = 3-phase, 230/400 V 34 = 3-phase, 400 V
g - Special:**	0 = Standard 1 = Thermo-contact

Belt drive: V-belt or poly-V-belt

Accessories

Connnection frame, small	**MIET-AF-01-a**
Flexible connection, small	**MIET-AF-02-a**
Steel spring anti-vibration mountings (FB, BB 150 – 600)	**MIET-AF-03-a**
Spark-proof fan inlet (FF, BB)	**MIET-AF-05-a-d**
Flow measurement tapping (excl. meter)	**MIET-AF-08-a-d**
Air flow meter, manometer type	**MIET-AF-09-a-d**
Air flow meter, electronic	**MIET-AF-10-a-d**

** The first two digits denote integers and the last two denote decimals.*

*** Applicable to single-speed motors.*

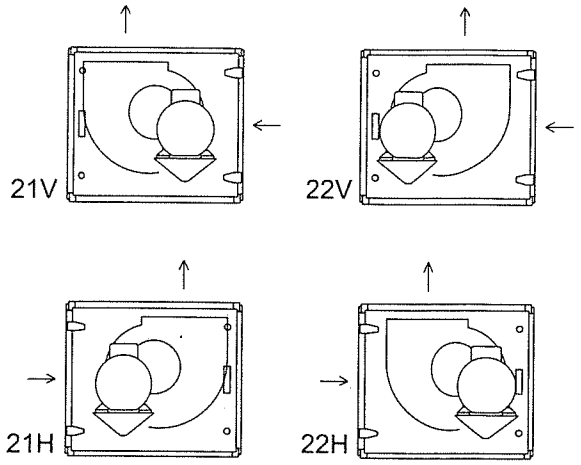
Other accessories

MIET-AF-04	Clean-out panel – fan	
MIET-AF-06	Wiring to safety isolating switch	
EMMT-01	Connection gable	page 70
EMMT-02	Connection frame	page 70
EMMT-03	Flexible connection	page 71
EMMT-04	Outdoor version	page 71
EMMT-05	Stand/Support frame	page 72
EMMT-06	Inspection window	page 72
EMMT-07	Light fitting	page 73
EMMT-08	Lifting brackets	page 73
EMMT-10	Compact unit	page 73

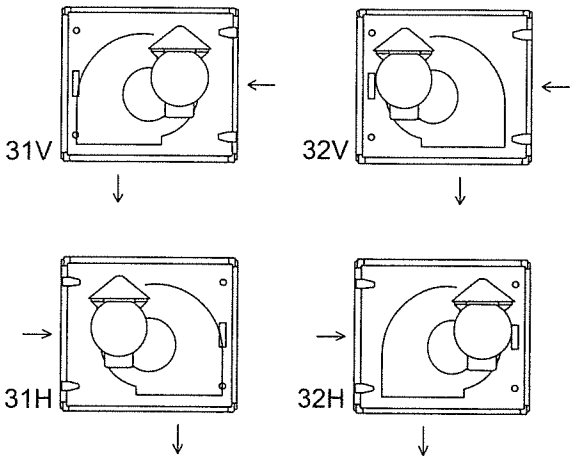
For particulars of the connection losses, see pages 8 and 9.

Configuration

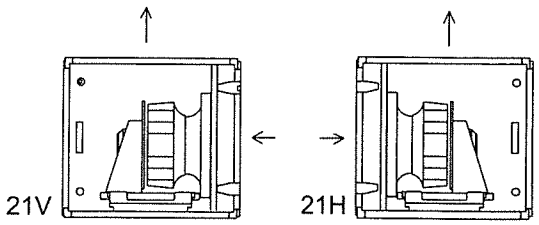
FB 060 - 600 / BB 150 - 600



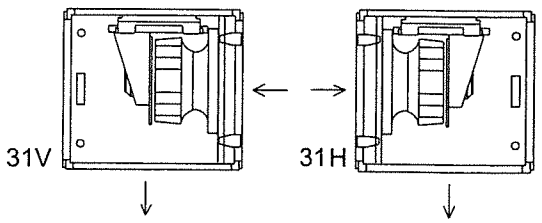
FB 060 - 190 / BB 150 -190



WG 150 - 600



WG 150 - 190

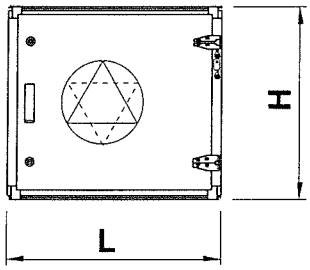


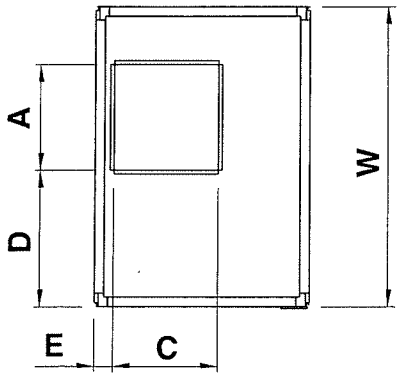
V = Left-hand
H = Right-hand

Technical details

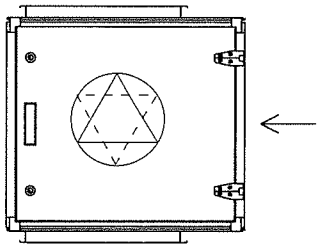
Dimensions and weights

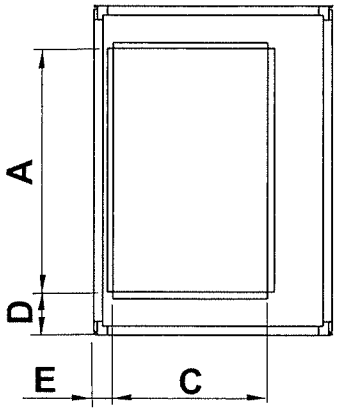
Fan outlet





End connection frames





Fan outlet

Size	Dimensions (mm) FB / BB								Dimensions (mm) WG				00 (kg)			E3 (kg)			Max Motor Size
	L	W	H	A	C	D	$E_{Vers.21}$	$E_{Vers.22}$	A	C	D	E	FB	BB	WG	FB	BB	WG	
060	630	850	440	230	230	380	80	320	-	-	-	-	55	-	-	60	-	-	80
100	630	980	505	280	280	480	65	285	-	-	-	-	65	-	-	75	-	-	100
150	780	1080	695	385	385	490	65	330	800	500	140	100	100	100	95	110	110	105	112
190	930	1360	695	385	385	700	65	480	1000	500	180	250	115	115	120	135	135	135	112
240	930	1360	805	475	475	550	75	380	1000	600	180	100	140	145	150	160	165	165	132
300	930	1575	805	475	475	730	75	380	1200	600	190	100	150	155	155	170	175	175	132
360	1230	1575	990	530	530	730	95	605	1200	800	190	100	195	200	220	230	235	250	132
480	1230	1950	990	570	570	780	210	450	1400	800	275	100	285	290	240	325	330	270	160 M
600	1230	2160	1095	640	640	780	255	335	1600	800	280	100	315	320	265	355	365	300	160 L

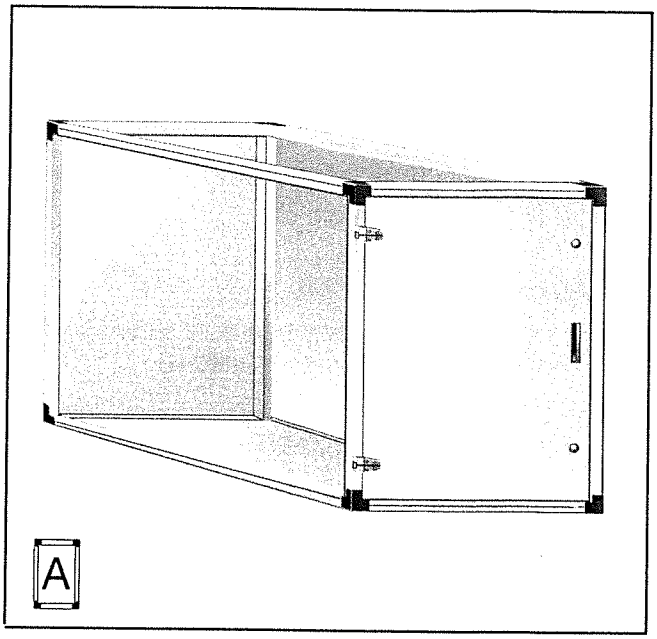
End connection frames

Size	MIET-AF-01 Small frame Dimensions (mm)					EMMT-02 Large frame Dimensions (mm)					
	FB / BB					FB / BB					WG
	A	C	D	$E_{Vers.21}$	$E_{Vers.22}$	A	C	D	$E_{Vers.21}$	$E_{Vers.22}$	E
060	300	300	345	65	265	500	300	175	65	265	-
100	300	300	470	65	265	700	300	140	65	265	-
150	500	500	430	65	215	800	500	140	65	215	100
190	500	500	640	65	365	1000	500	180	65	365	250
240	600	600	485	65	265	1000	600	180	65	265	100
300	600	600	665	65	265	1200	600	190	65	265	100
360	800	800	595	65	365	1200	800	190	65	365	100
480	800	800	665	200	230	1400	800	275	200	230	100
600	800	800	665	200	230	1600	800	280	200	230	100

EKV Angle Section

General

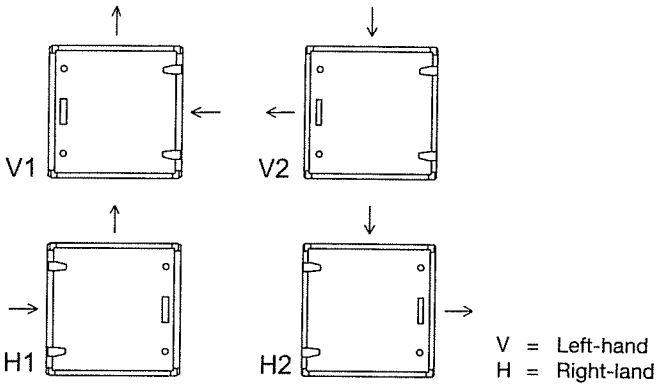
The EKV Angle section is utilised for deflecting the air flow.



Design

- The angle section is an empty unit section used for deflecting the air flow 90° upwards or downwards.
- The unit section has an inspection door.
- The empty section can be equipped with a filter *(see the MIE-FB)*.
- A surface-mounted damper can be fitted to the EKV.

Configuration

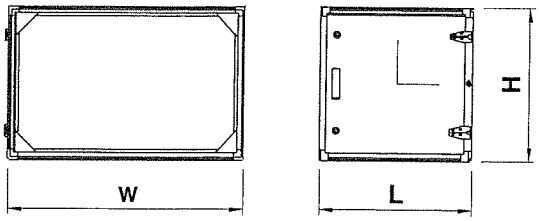


Specification

Angle section	**EKV -a -b**
a - Size:	060, 100, 150, 190,240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30
Accessories	
Filter fitting	EKVT -01 -a

Technical details

Dimensions and weights



Size	Dimensions (mm)			Casing (kg)	
	L	W	H	00	E3
060	440	850	440	25	30
100	505	980	505	30	35
150	695	1080	695	45	55
190	695	1360	695	50	60
240	805	1360	805	60	75
300	805	1575	805	65	80
360	990	1575	990	80	100
480	990	1950	990	90	115
600	1095	2160	1095	110	140

Other accessories

MIET-FB-01 U-tube manometer
MIET-FB-02 Kytölä DPA 500P manometer
MIET-FB-03 Magnehelic 2000 manometer

** To be mounted on the outside of the unit section.*

EBC Mixing Section

General

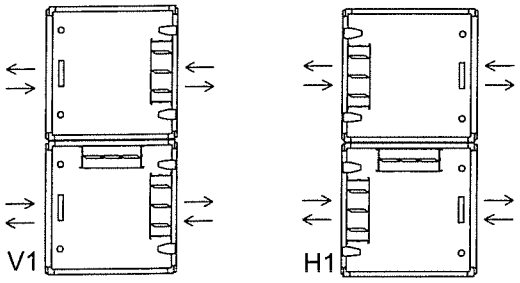
• The EBC Mixing section is a unit section, with three dampers, for the three-way mixture of exhaust air, recirculated air and outdoor air.

Design

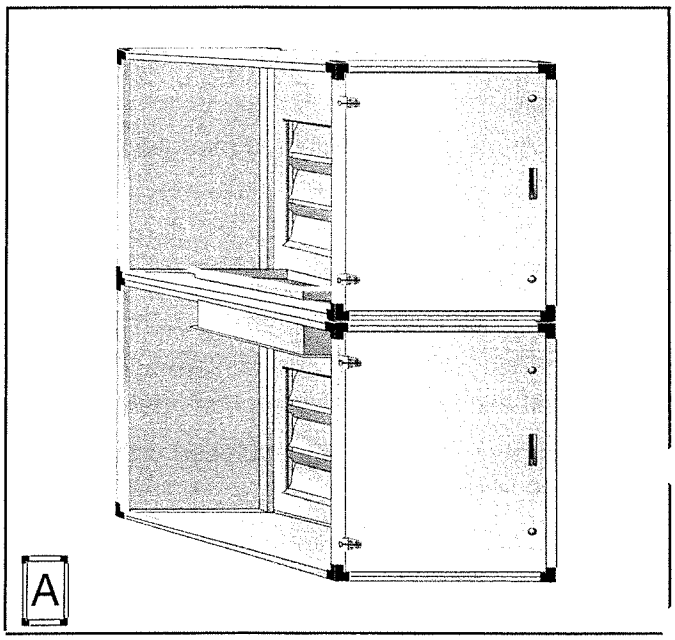
- The EBC mixing section has built-in type KJS dampers of IV Produkt manufacture.
- The dampers are made of anodised aluminium profiles and meet the provisions of Environmental Class 3.
- The damper blades are positioned by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber achieves a tight seal between the blades.
- The dampers are interlinked across two shafts inside the damper
- Tightness Class 4 is standard.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa
- The EBC mixing section has an inspection door in both the upper level and in the lower level.

* See the tightness class under MIE-KS on page 18.

Configuration



V = Left-hand
H = Right-hand



Specification

Mixing section	**EBC -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30

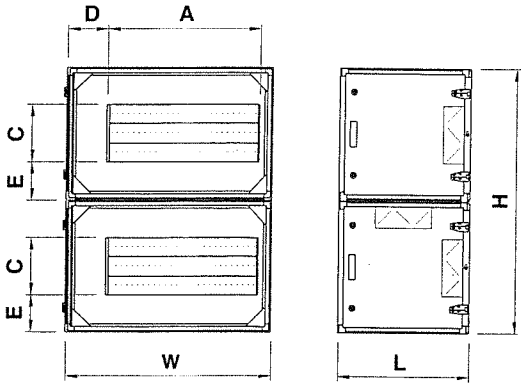
Accessory

KJST-03 Lever actuator

Other accessories

Technical details

Dimensions and weights



Size	Dimensions (mm)							Weight (kg)		Req * torque (Nm)
								Casing		
	L	W	H	A	C	D	E	00	EI 30	
060	880	850	440	500	200	210	70	55	65	3
100	1010	980	505	700	200	210	120	70	80	3
150	1390	1080	695	800	300	210	200	105	120	5
190	1390	1360	695	1000	300	210	200	115	125	5
240	1610	1360	805	1000	400	210	200	140	160	6
300	1610	1575	805	1220	400	210	200	155	180	6
360	1980	1575	990	1200	500	210	245	190	225	8
480	1980	1950	990	1400	500	275	245	215	260	8
600	2190	2160	1095	1600	600	280	245	260	315	12

* *Two motorised damper actuators are required (12x12 mm damper shaft). One of the motors should be sized according to the appropriate torque tabulated above; the other can be sized for the torque read in the table x 0.5.*

For presure drop data, see pages 8 and 9.

EMD Media Section

General

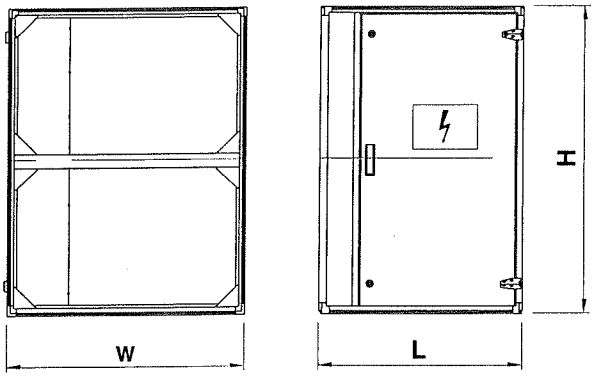
The EMD Media section has a shielded space for the installation of an electrical and control equipment cubicles.

Design

- The media section has two levels.

Technical details

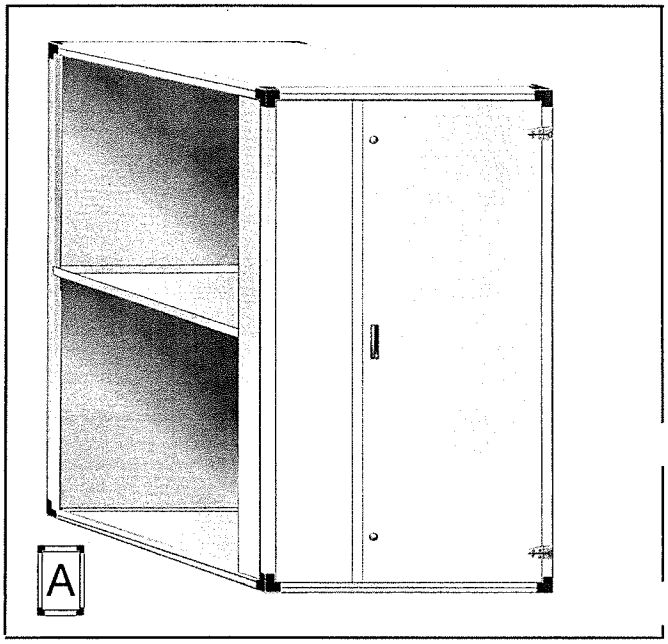
Dimensions and weights



Size	Dimensions (mm)			Casing (kg)	
	L	W	H	00	E3
060	930	850	880	80	95
100	930	980	1010	90	105
150	930	1080	1390	110	130
190	930	1360	1390	120	145
240	930	1360	1610	130	160
300	930	1557	1610	140	170
360	930	1557	1980	155	190
480	930	1950	1980	175	210
600	930	2160	2190	190	230

Space available for control equip. cubicle

Size	Dimensions (mm)		
	Width	Height	Depth
060	680	780	230
100	680	910	230
150	680	1290	230
190	680	1290	230
240	680	1510	280
300	680	1510	280
360	680	1880	280
480	680	1880	280
600	680	2090	280

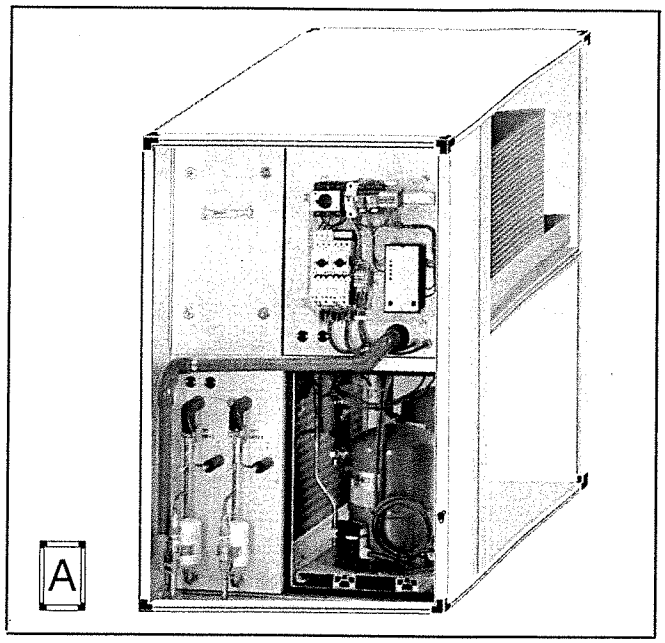


Specification

Media section	EMD -a -b
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30

Accessories

12. ECU Cooling Unit – StarCooler



General

The ECU StarCooler is a complete cooling unit, designed for cooling the supply air in Flexomix S air handling units, whenever cooling is necessary. The cooling unit is available in 7 unit sizes as standard with cooling outputs ranging from 8 to 69 kW. The cooler contains evaporation and condensing coils, a refrigeration machine and electrical equipment for power and safety, all ready-built, tested and documented at the factory.
The output of the cooling unit is controlled with a number of power steps, uses a minimum volume of environmentally compatible type R407C refrigerant, and its design makes it simple to design into the project, easy to install and easy to service.

Design

The ECU StarCooler is constructed as a direct-expansion system which utilises a minimum volume of refrigerant. Its "cooling efficiency factor" is high. Two compressor circuits cool the supply air across an evaporation coil where the heat absorped is transferred to a condenser situated in the exhaust air. The unit has a compact design. The casing conforms to Environmental Class 3 and its design is similar to that of the other functional sections in the Flexomix S product series. The components of the cooler are accessible for adjustment and maintenance from a lockable cover in the front of the unit. The cooler is equipped with removable covers for inspection of the coils, compressors, etc. The compressors are isolated by anti-vibration mountings and mounted on a withdrawable base plate. The cooler is supplied without stand.

Refrigerant circuit

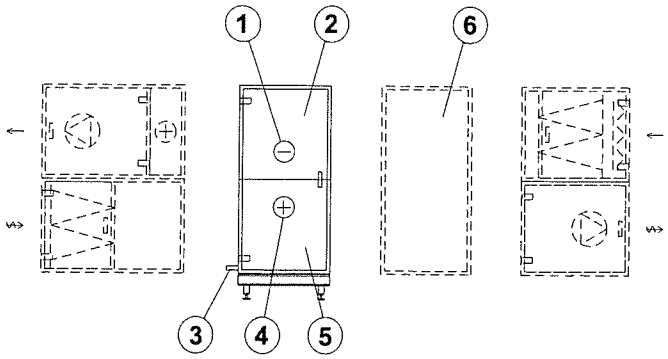
The refrigerant circuits contain the following:
Fully hermetic reciprocating compressors of Maneurop manufacture with oil sight glass and temperature and current-sensing circuit breaker.
Evaporation coil with drip tray, condenser coil, drying filter, throttling device for expansion, low and high pressure switches and pressure relief equipment.
Refrigerant tubes made of copper, jointed together by means of brazing, service tappings and refrigerant.

Electrical equipment

The electrical equipment includes a main switch, motor protection switch, contactors, control equipment for the compressors. The cooling output is controlled by an external 0 – 10 V DC control signal input together with the supply of 24 V AC power. The refrigeration machine is switched in on closure of potential-free contacts (24 V DC) when both fans are running.
In the event that the pressure switch or motor protection switch trips, the relevant circuit will be opened and a group alarm will be initiated across potential-free contacts.

Commissioning

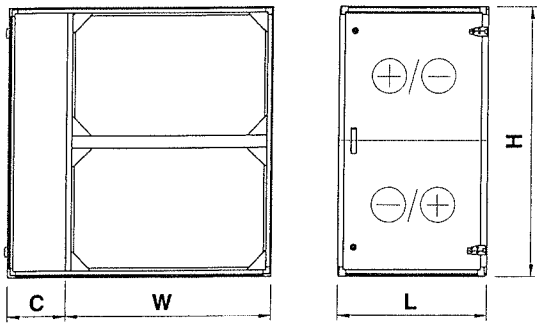
The ECU StarCooler is a factory-built cooling unit, tested and documented at the factory.
The cooler must be commissioned by an authorised technician who holds a refrigeration equipment fitter's certificate.



1. Supply air coil
2. Electric equipment
3. Condense water drain
4. Exhaust air coil
5. Compressor
6. Placing of heat exchanger.

Technical details

Dimensions and weights



Size	Vers.	Dimensions (mm)				Weight (kg)
		L	W	H	C	
100	00	780	980	1010	300	260
	E3	780	980	1010	300	276
150	00	780	1080	1390	300	342
	E3	780	1080	1390	300	362
190	00	780	1360	1390	300	393
	E3	780	1360	1390	300	415
240	00	780	1360	1606	300	431
	E3	780	1360	1606	300	455
300	00	780	1576	1606	300	488
	E3	780	1576	1606	300	513
360	00	930	1576	1980	300	602
	E3	930	1576	1980	300	634
480	00	930	1950	1980	300	688
	E3	930	1950	1980	300	724

Specification

Cooling unit	ECU -a -b -c -d -e -f
a - Size:	100, 150, 190, 240, 300 360, 480
b - Casing:	00 = Thermal insulation E3 = EI30
c - Output variant:	1.2*
d -	0
e - Supply air:	U = Upper section N = Lower section
f - Insp.side:	H = Right-hand V = Left-hand

* Sizes 100 – 300 are available in var.1 only.

Accessories

MIET-CL-04 Water trap

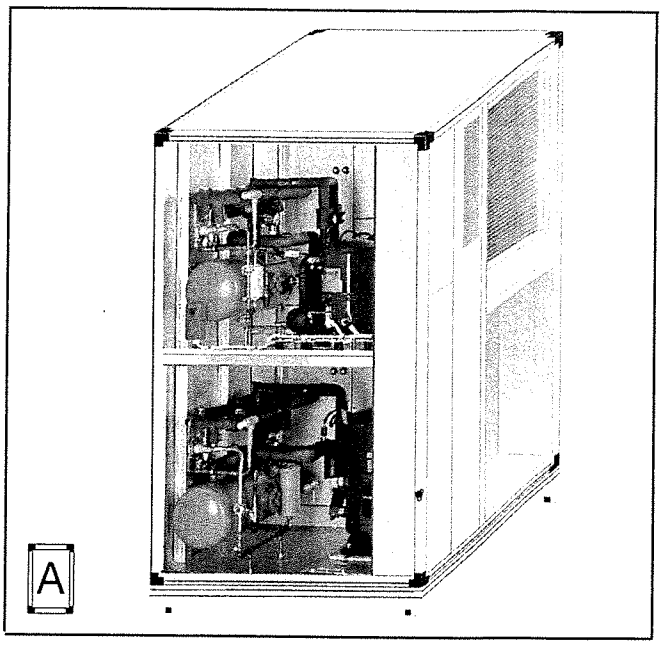
Other accessories

Survey of the capacities

Size	100	150	190	240	300	360		480	
	1	1	1	1	1	1	2	1	2
Air vol. (m^3/s) min. suppl./exh. air	0.43	0.77	0.94	1.19	1.40	1.75	2.14	2.17	2.80
max. suppl./exh. air	0.80	1.47	1.89	2.33	2.80	3.49	3.56	4.34	4.54
Max. cooling output (kW)	10.8	17.8	22.4	28.9	33.8	40.6	49.7	53.2	68.7
At: ᵗ outd: 25 °C; RH 50%									
ᵗ indoors: 22°C									
Max. power demand, compr. (kW)	2.23	3.73	4.52	6.06	7.27	9.07	10.76	10.70	15.77
Number of compressors	2	2	2	2	2	2	2	2	2
Number of control steps	2	3	3	3	3	3	3	3	3
Max. perm. operating current (A) 3 × 400 V	5.8	9.6	11.4	15	17.7	21.8	25.3	25.3	35.9
Req. fuse (A) 3 × 400 V	10	16	16	20	25	35	35	35	50
R407C refrigerant									
Circuit 1	1.8	2.0	2.6	3.1	3.7	4.7	4.7	5.9	5.9
Circuit 2	1.8	4.0	5.3	6.3	7.4	9.3	9.3	11.8	11.8

For pressure drop data, see pages 8 and 9.

Q-Cooler EQU with built-in Heat Recovery Unit

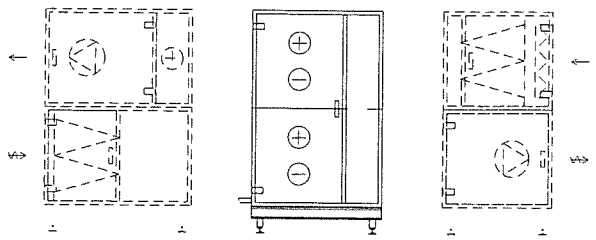


General

The EQU Q-cooler is a fully reversible cooling unit, designed for cooling supply air if cooling is required and, as a heat pump, for recovering heat from the exhaust air and transferring it to the supply air if heating is required.

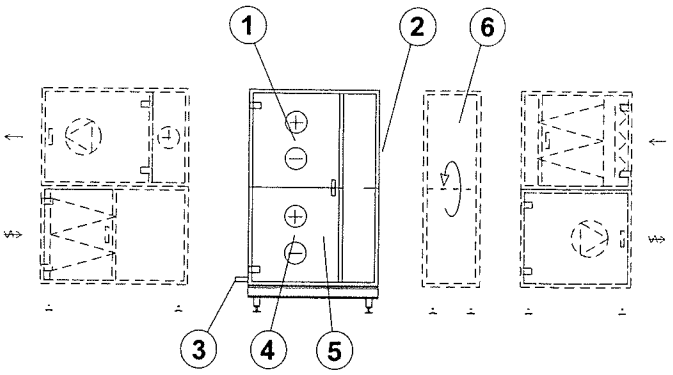
The EQU contains supply air and an exhaust air coils, refrigeration circuits and electrical equipment for power and safety, all ready-built, tested and documented at the factory. If the extra "climate adaptation" module is selected, the air flow can be variably adjusted down to 50% of the min. flow rate.
During the winter, no heat recovery means other than the built-in reversible cooling operation will be needed, however the cooler can be used in combination with a rotary heat exchanger and then be even more energy-efficient. (See our special Enviquattro brochure)

- The EQU is available in 6 sizes with cooling outputs ranging from 24 kW to 121 kW within the 1.1 to 6.0 m³/s airflow range.
- Sizes 190 – 480 are available in two output variants; size 600 is available in three output variants.
- Its output is controlled from 3 to 8 output steps.
- Has a relatively short length and this give the air handling unit a very short overall length.
- The Flexomix S with EQU features extremely low total pressure and specific fan power (SFP).



Design

The EDU Q-Cooler is designed as a direct-expansion system charged with a minimised volume of refrigerant (R407C). In the summertime, the compressor circuits cool the supply air across a coil located in the supply air where the heat absorbed is transferred to the exhaust air coil. In the wintertime, the cooling process is reversed and heat is recovered from the exhaust air and transferred to the supply air with an annual efficiency of 60-70%.
The EDU is easy to service; the cooling circuits are situated outside the air flow. The unit can be inspected and serviced from a lockable inspection cover in the front panel of the unit.
The design of the casing panels and framework of the EQU are the same as that of the other functional sections in the Flexomix S. The supply air and exhaust air coils consist of copper tubes with aluminium fins. The drip tray is made of ALC-treated sheet steel and has a condensate pump made of plastic. The cooling unit is supplied on a stand with legs and adjustable feet.



1. Supply air coil
2. Electric equipment
3. Condense water drain
4. Exhaust air coil
5. Compressor
6. Placing of rotary heat exchanger

Refrigerant circuit

The refrigerant circuit contains fully hermetic compressors of Maneurop manufacture with oil sight glass, crank casing heater, as well as temperature and current-sensing circuit breaker. Reversing valve for cooling/heating. Supply air and exhaust air coils. Refrigerant tank with sight glass, safety valve, drying filter, throttling devices for expansion, condenser pressure, low and high pressure switches.
Refrigerant tubes made of copper, jointed together by means of brazing, service tappings and refrigerant.

Climate adaptation

A water-cooled condensor with a mechanical, pressure-controlled water saving valve that senses the pressure in the condenser, opens to allow cooling water to circulate and cool the condenser. All components are factory-assembled. Climate adaptation should be connected to the mains cold water piping and a size 15 copper drain connection.
Max. permissible water flow: 0.27 l/s at 30 kPa.

Project design

The cooling unit can be project designed for optional supply air and exhaust air flows within the max. and min. permissible flow rates specified, without having to utilise climate adaptation. For accurate sizing, use the product selection program.

EQUT-01-a Outdoor version

The EMMT-04 outdoor version components together with a heating cable in the condensate drain, equipped with an earth-fault circuit breaker.

EQUT-02-a Electric heater

Often, no extra heating will be required if the EQU is combined with a rotary heat exchanger (Enviquattro). Whenever the preset supply air temperature cannot be obtained, a slight amount of additional heating output will often be sufficient:

Size	190-300	360-480	600
Power (Kw)	3	5	10

The power values tabulated above will not increase the demand on power supplied to the air handling unit, they merely indicate the difference in power required between cooling and heating operation.
Control: The power supplied for heating is controlled in one step from the built-in compressor controller. The heater can be interlocked from the pressure switch supplied.

Electrical equipment

The electrical equipment includes a motor protection switch, contactors, control equipment for the compressors, anti-frosting protection.
The cooling output and heat recovery are controlled by two external 0 – 10 V DC control signal inputs together with the supply of 24 V AC power. The refrigeration machine is switched in on closure of potential-free contacts (24 V DC) when both fans are running.
In the event that the pressure switch or motor protection switch trips, the relevant circuit will be opened and a group alarm will be initiated across potential-free contacts.

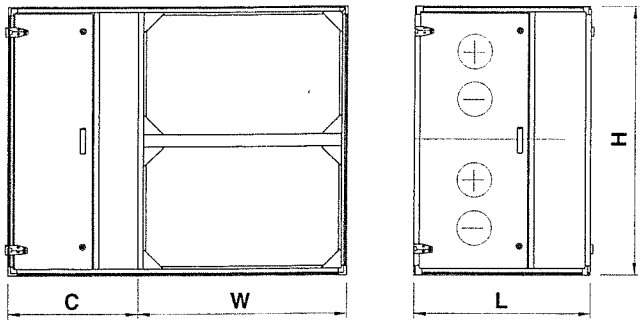
Commissioning

The EQU is a factory-built cooling unit, tested and documented at the factory.
The cooler must be commissioned by an authorised technician who holds a refrigeration equipment fitter's certificate.
Prior to commissioning, the fitter must carry out the wiring and coupling in accordance with the instructions below:

1. Wire the power cable from the mains power supply to the main switch as well as the control signal cables for cooling and heating operation.
2. Install the piping from the condensate pump to the floor gulley.
3. Install the evacuation piping from the safety valve for cooling.
4. Preset the design supply air and exhaust air flows.
5. Install the cold water piping to and the drainage piping from the condenser, if climate adaptation is included in the supply.

Technical details

Dimensions and weights



Size	Power var.	Casing	Dimensions (mm)				Wgt. (kg)
			L	W	C	H	
190	1	00	930	1360	780	1390	602
	2	00	930	1360	780	1390	610
	1	E3	930	1360	780	1390	641
	2	E3	930	1360	780	1390	645
240	1	00	930	1360	780	1606	663
	2	00	930	1360	780	1606	718
	1	E3	930	1360	780	1606	701
	2	E3	930	1360	780	1606	756
300	1	00	1080	1576	780	1606	823
	2	00	1080	1576	780	1606	839
	1	E3	1080	1576	780	1606	868
	2	E3	1080	1576	780	1606	884
360	1	00	1080	1576	930	1980	1016
	2	00	1080	1576	930	1980	1024
	1	E3	1080	1576	930	1980	1069
	2	E3	1080	1576	930	1980	1077
480	1	00	1080	1950	1080	1980	1163
	2	00	1080	1950	1080	1980	1217
	1	E3	1080	1950	1080	1980	1223
	2	E3	1080	1950	1080	1980	1277
600	1	00	1080	2160	1080	2190	1365
	2	00	1080	2160	1080	2190	1389
	3	00	1080	2160	1080	2190	1389
	1	E3	1080	2160	1080	2190	1430
	2	E3	1080	2160	1080	2190	1454
	3	E3	1080	2160	1080	2190	1454

Specification

Cooling/Heat recovery unit **EQU -a -b -c -d -e -f -g**

a - Size: 190, 240, 300, 360, 480 600

b - Casing: 00 = Thermal insulation
E3 = EI30

c - Power variant: 1, 2, 3

d - Climate adaptation: 0, 1

e - Voltage: 23 = 230 Volt,
40 = 400 Volt

f - Supply air: U = Upper section
N = Lower section

g - Insp.side: H = Right-hand
V = Left-hand

Accessories

Outdoor version **EQUT-01 -a**

Electric heater **EQUT-02 -a**

Other accessories

MIET-CL-04 Water trap

EMMT-01 Connection gable ..... page 70
EMMT-02 Connection frame ..... page 70
EMMT-03 Flexible connection ..... page 71
EMMT-04 Outdoor version ..... page 71
EMMT-08 Lifting brackets ..... page 73

Survey of the capacities

Size	190		240		300		360		480		600		
Power variant	1	2	1	2	1	2	1	2	1	2	1	2	3
Nom.- supply/exh. air (m³/s)	1.25	1.41	1.56	1.79	2.00	2.23	2.49	2.81	3.13	3.52	4.09	4.68	5.49
Min. air flow	1.10	1.24	1.37	1.58	1.76	1.96	2.19	2.47	2.75	3.10	3.60	4.12	5.11
Max. air flow	1.66	1.90	2.08	2.40	2.66	3.00	3.31	3.60	4.17	4.80	5.45	6.00	6.00
Cooling power (kW) summer at: ¹ outd. = +25 °C RH: 50% ¹ indoors = +22 °C	26.4	29.8	33.1	38.1	42.4	47.3	52.8	59.6	74.8	66.4	86.9	99.5	116.6
Power demand, compr. (kW)	7.6	8.7	10.5	11.2	11.8	13.5	14.6	16.7	20.6	18.9	24.5	28.1	32.5
Heating power (kW) winter at: ¹ outdoors = +0 °C ¹ ind. = +20 °C RH: 30%	30.4	34.3	38.1	43.8	48.7	54.4	60.7	68.6	76.3	86.0	99.9	114.4	134.1
Power demand, compr. (kW)	5.2	5.9	7.1	7.7	8.1	9.3	10.0	11.5	12.9	14.1	16.8	19.3	22.2
Max. power 3 x 400V	16.5	18.6	20.1	24.0	25.9	29.1	32.6	37.0	39.4	44.0	48.0	54.8	67.2
Rec. fuse 3 x 400V	25	25	35	35	35	50	50	50	63	63	63	80	80
Max. power 3 x 230V	34.6	39.8	44.0	55.1	51.9	55.5	74.4	82.4	74.4	81.6	90.2	95.2	116.2
Rek. fuse 3 x 230V	50	50	63	63	63	63	100	100	100	100	125	125	160
Number of compressors	2	2	2	3	3	3	4	4	4	4	4	4	4
Number of control steps	3	3	3	5	5	5	8	8	8	8	8	8	8

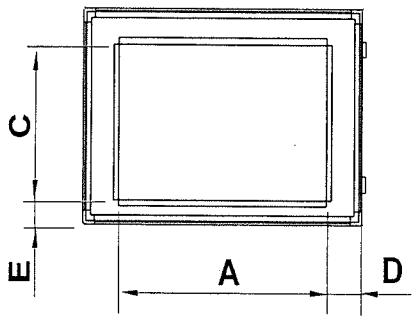
For pressure drop data, see pages 8 and 9.

13. Accessories

EMMT-01 Connection Gable

General

The connection gable can be selected for installation on the EMM module.
The MIE-ID has an end connection wall on its inlet, the MIE-AF and the EAF have a connection gable on their outlet. The connection gable can be selected for mounting on the inlet or outlet or on both.



Design

- Is a casing panel with collared opening.
- Can be fitted with an EMMT-02 connection frame.

Dimensions

Size	Dimensions (mm)			
	A	C	D	E
060	500	300	175	70
100	700	300	140	105
150	800	500	140	100
190	1000	500	180	100
240	1000	600	180	100
300	1200	600	190	100
360	1200	800	190	95
480	1400	800	275	95
600	1600	800	280	150

Specification

Connection gable	**EMMT- 01 -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30

EMMT-02 Connection frame

General

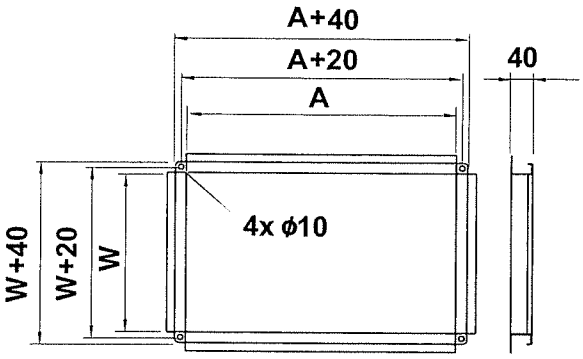
The connection frame can be selected for installation on the EMMT- 01, MIE ID, MIE AF and the EAF.

Design

- Sheet metal frame for PG and flanged connection.

Dimensions

Size	Dim. (mm)	
	A	W
060	500	300
100	700	300
150	800	500
190	1000	500
240	1000	600
300	1200	600
360	1200	800
480	1400	800
600	1600	800



Specification

Connection frame	**EMMT- 02 -a**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600

EMMT-03 Flexible Connection/Sleeve, inlet/outlet

General

Flexibel connection between the air handling unit and the ducting.

Design

- Designed for connection to the EMMT-02 end connection frame and the MIET-AF-01.

Specification

Flexible connection/sleeve	
inlet/outlet	**EMMT-03 -a**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600

EMMT-04 Outdoor version

General

Supplementary components for air handling unit installation outdoors. If the air handling unit is mounted on the roof of a building, it must be secured on a frame support or on support legs to a water-tight roof.

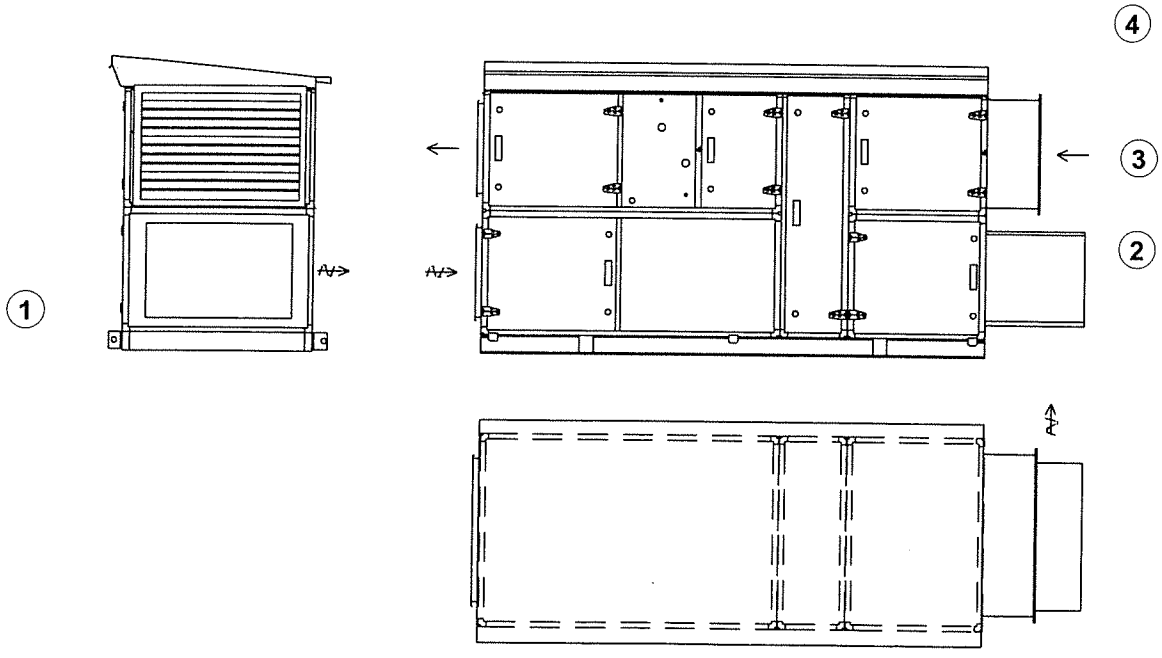
Design

- Roof made of profiled sheet steel coated with plastic.
- Air intake grille made of sheet steel with baked, painted finnish mounted in a sheet steel connection.
- Extract air cowl designed for minimising any short-circuit flow effect.

Specification

Outdoor version	EMMT-04 -a -b -c
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - No. of levels:	1, 2
c - No. of delivery units:	01, 02, 03, 04, 05, 06, 07, 08, 09, 10

- Base frame in most cases made of extruded naturally anodised aluminium profiled sections. Height: 100 mm. Groove for mounting/lifting brackets in the frame.
- Length, width and base frame dimensions can be obtained from the ait handling unit selection program.

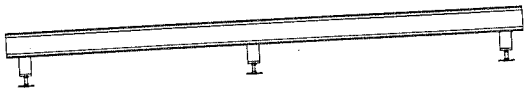


1. Base frame
2. Extract air cowl
3. Outer wall air intake grille
4. Roof

EMMT-05 Stand/Support frame

General

Stand on which the various modules and functional sections can be mounted.



Design

- The stand consists of extruded, naturally anodised aluminium profiled sections. The profiled sections can be bolted together to form a complete stand. The legs have an adjustable foot.
- Height: 195 – 245 mm
- The length and width are conditional on the handling unit selected.

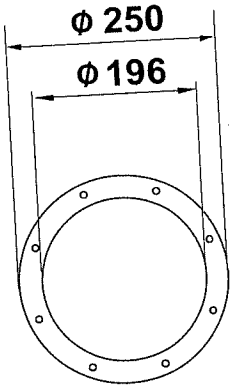
Specification

Stand	**EMMT-05 -a -b**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600
b - Length interval:	0, 1, 2, 3, 4, 5 (0 = 0 – 1000, 1 = 1000 – 2000, etc.)

EMMT-06 Inspection window

General

The inspection window is an accessory for installation in any size 15 or longer module and in an inspection door and/or in each individual delivery unit.
The inspection window cannot be selected for a Class E3 (EI30) casing.



Design

- The inspection window consists of an inner and an outer panel of plexiglass.
- Diameter: 196 mm

Specification

Inspection window	**EMMT-06**

EMMT-07 Light fitting

General

The light fitting is supplied mounted in the relevant unit section with a two metre long cable inside the armature. The light fitting should be switched from a common group of switches that also control other lighting in the fan room.

Design

- The armature consists of a polycarbonate base with an aluminium reflector and a ribbed glass globe, protected by a steel wire guard.
- Enclosure class: IP 44.
- 175 mm high, 120 mm wide, 115 mm deep.

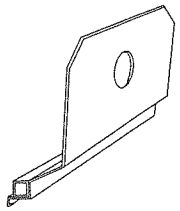
Specification

Light fitting	**EMMT-07**

EMMT-08 Lifting brackets

General

The lifting brackets can be fitted into the existing groove of the aluminium profiled section. Once they are seated in the groove, the module is ready to be lifted. The lifting brackets are supplied in sets of four.



Specification

Lifting brackets	**EMMT-08**

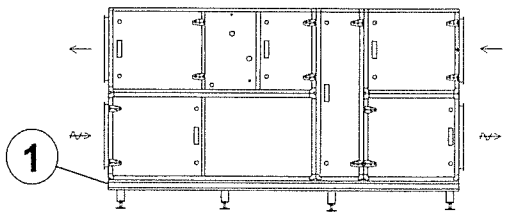
EMMT-10 Compact version

General

All types of airhandling unit in the Flexomix S series are available in the compact unit version.

Design

- All the unit sections are supplied factory-mounted on a EMMT-05 stand.
- The length, width and height are conditional on the arrangement of the air handling unit selected.



1. EMMT-05 Stand/Support frame

Specification

Compact unit		**EMMT-10 -a -b**
a -	**Size:**	060, 100, 150, 190, 240 300, 360, 480, 600
b -	**Number of delivery units:**	01, 02, 03, 04, 05, 06, 07, 08, 09, 10

14. Duct Connection Accessories

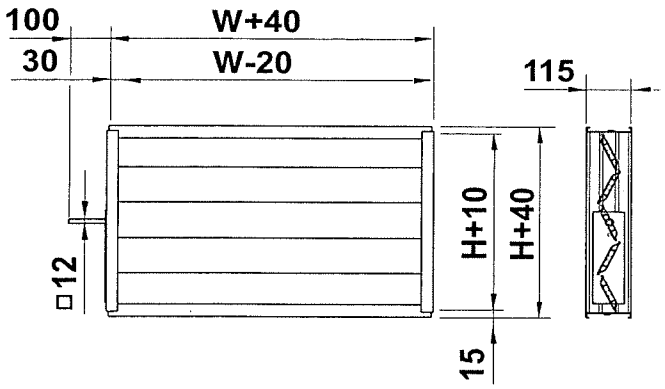
EMT-01 Duct damper

General

The duct damper is designed for use as a shut-off or adjusting damper together with the EMMT-02 end connection frame.

Design

- The louvre damper is made of anodised aluminium profiled sections and meets the provisions of Environmental Class 3.
- The damper blades are driven by ABS plastic gear wheels. Tubular, silicone rubber sealing strips provide a tight seal between the blades.
- Permissible temperature range: -40 – +80 °C
  Max. permissible differential pressure: 1400 Pa.
- Tightness Class 3 to VVS AMA-98 (type 4 to VVS AMA-83) is standard



Specification

Damper	**EMT-01-a**
a - Size:	060, 100, 150, 190, 240 300, 360, 480, 600

Technical details

Dimensions

Size	Dim. (mm)	
	W	H
060	500	300
100	700	300
150	800	500
190	1000	500
240	1000	600
300	1200	600
360	1200	800
480	1400	800
600	1600	800

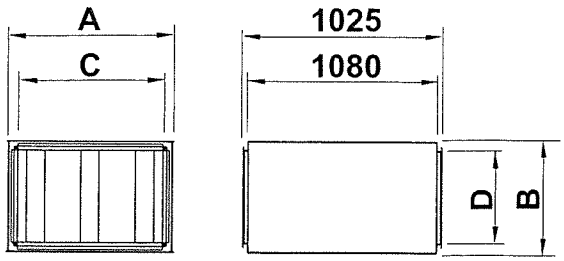
EMT-02 Duct silencer

General

The duct silencer is designed for use together with the EMMT-02 end connection frame.

Design

- The silencers consist of a galvanised sheet steel casing and a number of 200 mm thick baffle elements that contain a slab of mineral wool with an outer layer of cleantech on the air side.
- The baffle elements are arranged 100 mm from one another.
- The inlet and outlet ends of the baffles are "tapered". If the silencer is located downstream of the fan outlet, a min. 400 mm long length of straight duct must be arranged between the air handling unit and the silencer.



Specification

Silencer	**EMT-02-a**
a - Silencer:	060, 100, 150, 190, 240 300, 360, 480, 600

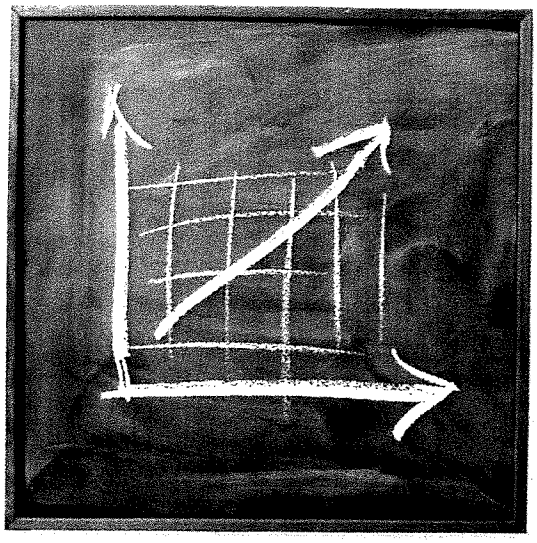
Technical details

Sound attenuation

Centre frequency. (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation (dB)	8	11	19	29	40	35	27	19

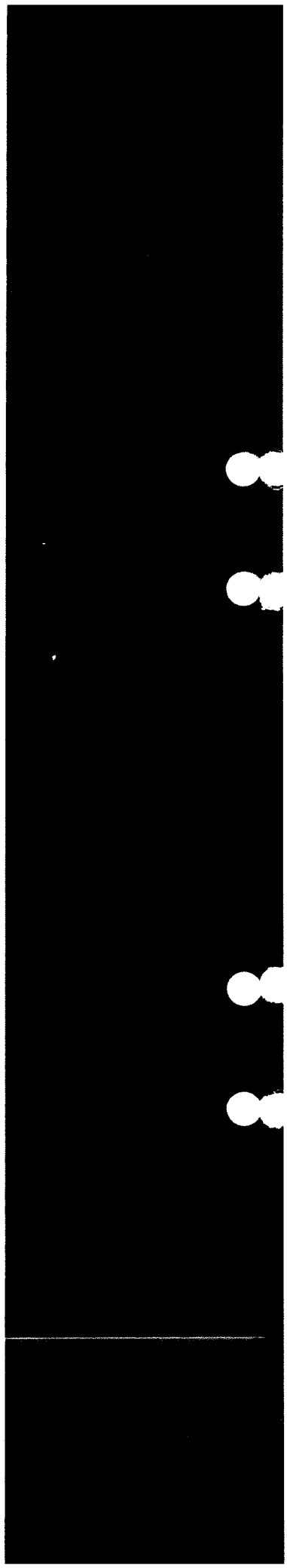
Dimensions

Size	Dimensions (mm)			
	A	W	C	D
060	600	400	500	300
100	900	400	700	300
150	900	600	800	500
190	1200	600	1000	500
240	1200	600	1000	600
300	1500	700	1200	600
360	1500	900	1200	800
480	1800	900	1400	800
600	1800	1000	1600	800



We're pessimists at heart

You need energy to transport air.
As far as mechanical ventilation is concerned, that's a fact we have to accept. The question is: Are you willing to accept your costs for this in the future?
In this case, we're incurable pessimists. Let's face it. Energy won't get any cheaper. And, when you consider that energy accounts for up to 90% of the overall costs for the nucleus of any ventilation system – it pays you to look into the future.
How much will your investment cost you over the next ten years? Or the next twenty?



IV PRODUKT

Air handling with the focus on LCC

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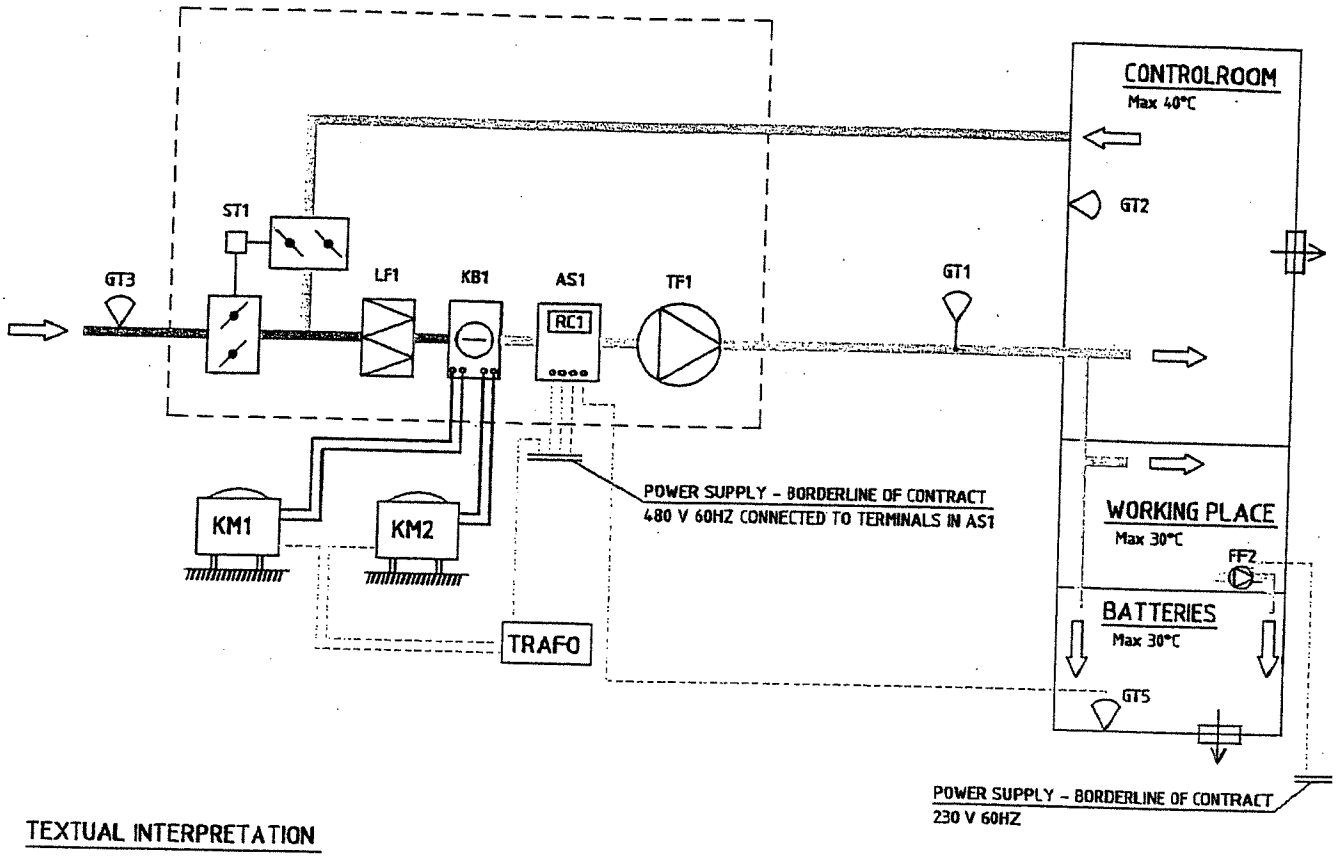
AIR TREATMENT UNIT LA532



TEXTUAL INTERPRETATION

TF1	SUPPLY AIR FAN	AS1	CONTROL CUBICLE
LF1	AIR FILTER	ST1	RETURN AIR DAMPER
KB1	COOLING COIL - DX R134A	KM1	REFRIGERATING UNIT 10 kW
GT1	SUPPLY AIR TEMP. SENSOR	KM2	REFRIGERATING UNIT 16 kW
GT2	ROOM TEMP. SENSOR	FF2	DUCT FAN
GT3	OUTSIDE TEMP. SENSOR	RC1	CONTROL UNIT
GT5	TEMP. ALARM SENSOR		

TECHNICAL DATA

TF1	500V, 60HZ, 1,0kW, 2,5A	Quantity of air: 1000 L/S
FF2	230V, 60HZ, 76W, 0,33A	Quantity of air: 56 L/S
KM1	400V, 60HZ, 7,0kW, 16A	Cooling capacity: 10 kW
KM2	400V, 60HZ, 7,0kW, 16A	Cooling capacity: 16 kW

ADJUSTMENT

Temperature adjustment of roomtemperature.
Temperature of suppty air minimum and maximum border to makes it´s adjusted values.
The return air damper ST1 keep a constant temerature in the control building and it´s adjust in sekvens with the cooling coil KB1.
Chill with outdoor air is priorited by the control unit RC1.
GT5 give an alarm signal if the temperatur in the battery space exceeds permitted temperature.

CONTROL FUNCTION

LA532 operate continusly with minimum quantity of outdoor air = 50 L/S. Control cubicle AS1 is located in LA532 and it is within reach by the door on the unit front.

INDICATION AND REAL AIRTEMPERATUR:
The real temperature in the supply air, room air and outdoor air can be read off at the control unit RC1 in the control cubicle AS1.

Cause of B-alarm/indication	Cause of A-alarm/indication
Deviations from supply and deduct temperature ought to value with +/- 3°C.	Deviations from supply and deduct temperature ought to value with +/- 8°C.
Alarm coldness.	

- A common sum alarm and indication of operating outputs are located in the control cubicle AS1 for possibly further connection.
- Alarms can be restored and manually stop can be done from the control unit RC1, who´s located in the control cubicle AS1.

IND.	NO.	REVISION	SIGN	DATE

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CONTROL BUILDING B532

FLOW AND FUNCTION DESCRIPTION, LA532
AIR TREATMENT

SCALE

PREPARED BY	APPROVED BY	ORDER NR.
MJo	MQv	401124

APPROVED DATE: 2001-11-12

DRAWING NO.: SCH-2

REV. IND.