Modular Air Handling Unit

Flexomix®

060–600 Air flow 0.2 - 7.0 m³/s

Product Catalogue

IV PRODUKT

Air handling with the focus on LCC

IV Produkt

IV Produkt develops, produces and markets environmentally compatible and energy efficient air handling products. We've been doing so since 1969. oday, we are one of Sweden's leading manufacturers.

IV Produkt's head office and production facilities are situated in Växjö, Sweden.
The company is owned by IV Produkt Holding AB.

Product Development

We make strict demands on design ingenuity as we develop new products and production methods. Our aim is to save you time and the resources needed for installing, operating and maintaining our products.

We are also constantly involved in making our products energy efficient. The life cycle cost, i.e. the collective cost for procurement, operation, maintenance and minimal environmental impact, is always incorporated into our calculations when we develop new products and product selection software. Our goal is to offer you products with minimal life cycle cost.

Eurovent

Our products are tested by Eurovent according to EN 1886 and EN 13053 Standards. This assures you that the performance data that we present in our specifications have been verified by an independent testing laboratory.
www.eurovent-certification.com

Quality and Environmental Awareness

Our quality management system is certified to ISO 9001. This guarantees clients and users alike prime quality and reliable performance throughout the useful life of our products.

We develop and fabricate our products according to the guidelines of our environmental management system, certified to ISO 14001. The environmental compatibility of the products is rated on the basis of the materials they contain and the propensity of these materials for recycling.

IV PRODUKT DESIGNER

IV Produkt Designer

Our product selection program is here to make your job easier – selecting the right air handling units for your application or for contacting our sales organisation.

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Flexomix – Modular Air Handling Unit

General

The Flexomix 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 you decide 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 Corrosion Class 4. 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 B negative pressure and total heat transfer coefficient T4 in accordance with CEN EN 1886 standard.

Prerequisites for Installation

The Flexomix 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 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.

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 series. The catalogue should be regarded as a complement of the IV Produkt air handling unit selection program.

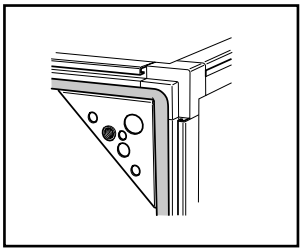
It is advisable to always use the *IV Produkt Designer* air handling unit selection program for sizing our products before you place orders for them.

LCC – Life Cycle Cost.

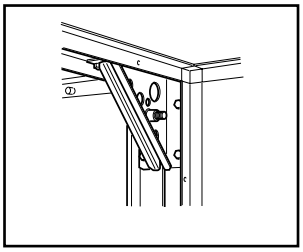
EAn air handling unit such as the Flexomix must ventilate and operate for many years. It is customary to count on a useful life of 15 – 20 years. The major costs during this period are the operating costs.

The LCC is the combined cost for capital investment, operation, maintenance and environmental compatibility. The Flexomix 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.

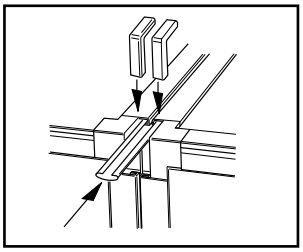
Jointing of Modules and Lifting



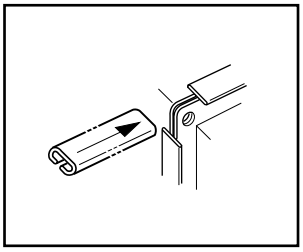
Self-adhesive sealing strips are used to seal the joints between modules.



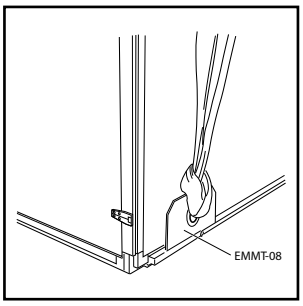
The functional sections can be jointed together by means of four bolts at the corners inside the casing.



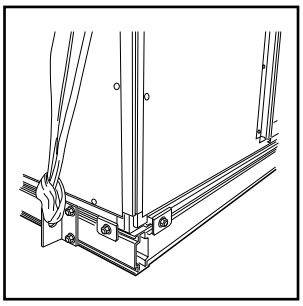
The functional sections can also be jointed together by means of a concealed PG joint.



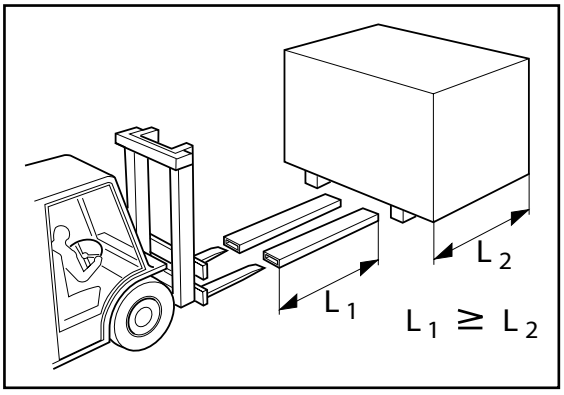
The end connection frames are equipped with four Ø 10 mm holes and are also designed for flange connection with PG joints.



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



The modules can be lifted by means of lifting mounts screwed onto the support frame.



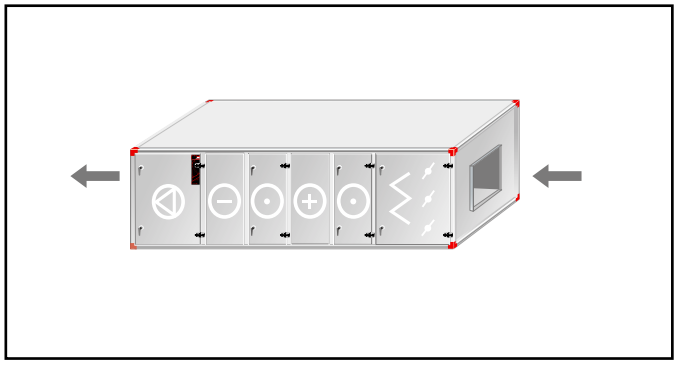
Lifting of the unit by means of a forklift.
Make sure the arms are of appropriate length

Types of Air Handling Unit

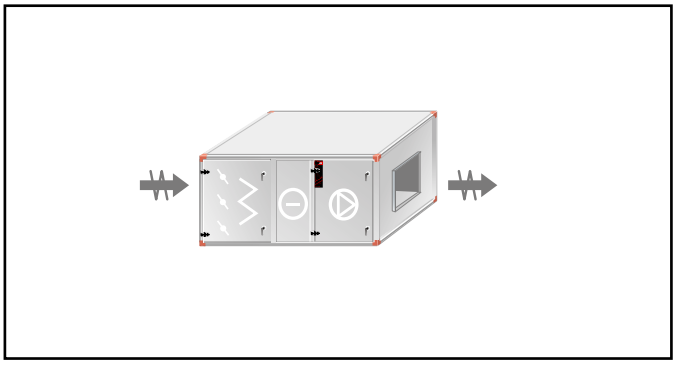
General

The Flexomix 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.

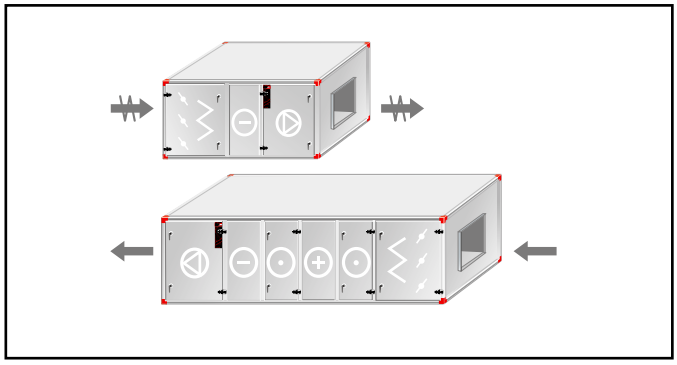
Supply air unit



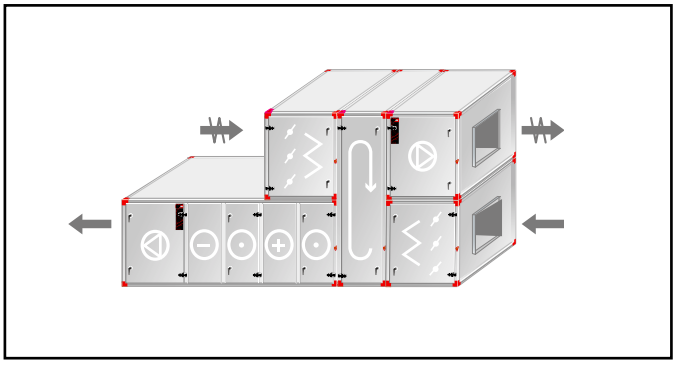
Exhaust air unit



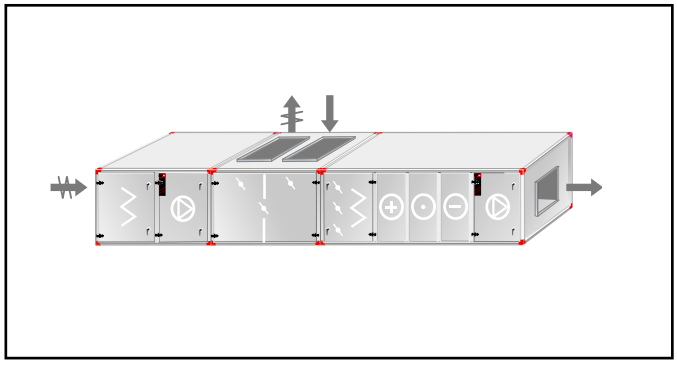
Supply air and exhaust air separated



Supply air and exhaust air stacked (on top)



Supply air and exhaust air in-line

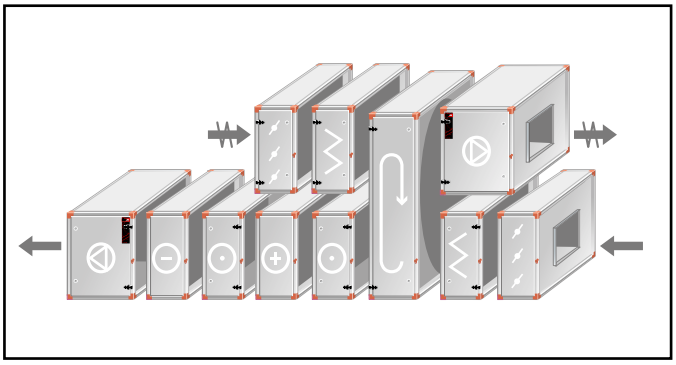


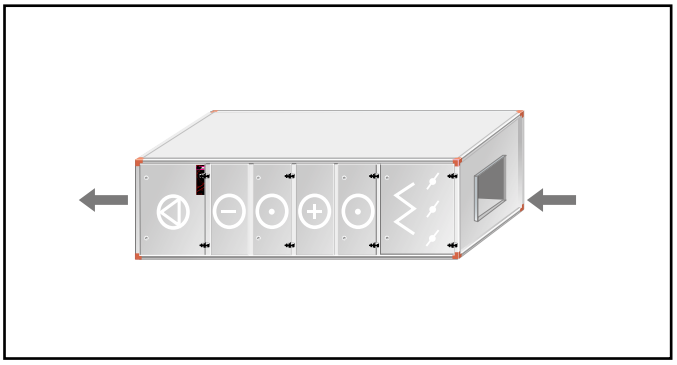
Delivery Version

General

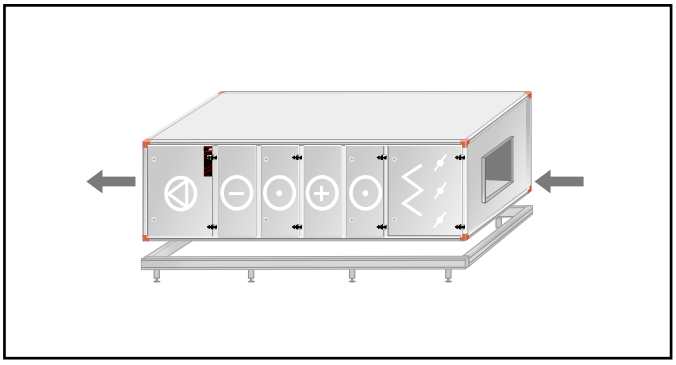
Thanks to our modular system, we can offer various delivery options for meeting your specific requirements on design and appropriate size of module for transporting and lifting the modules at the building site.

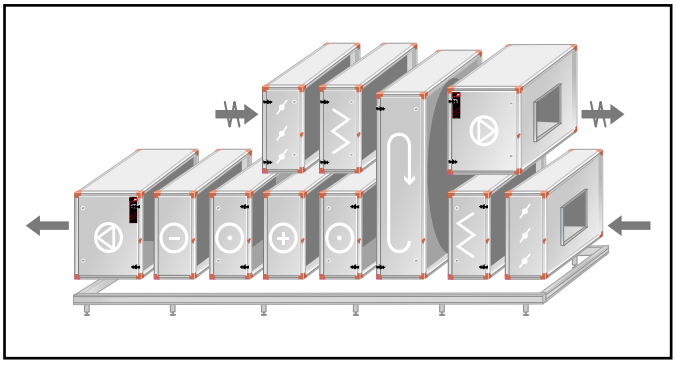
Modular version



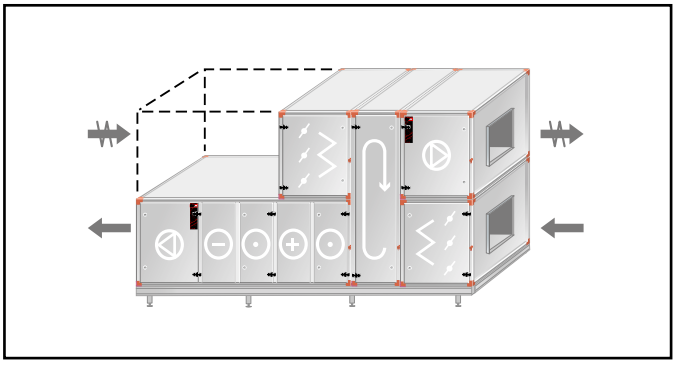


Modular version with stand/support frame (EMMT-05)

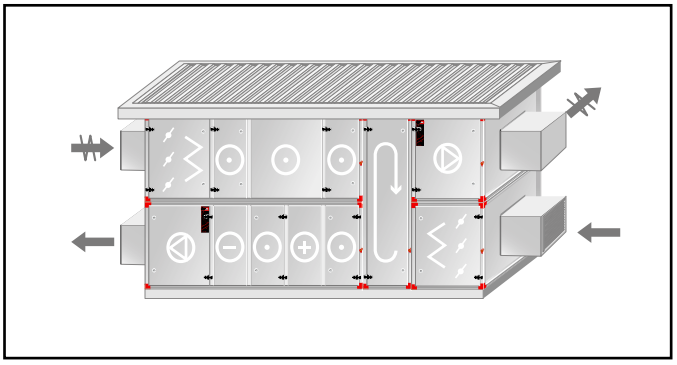




Compact unit (EMMT-10)



Outdoor unit (EMMT-04)



Outdoor version	EMMT-04	page 76
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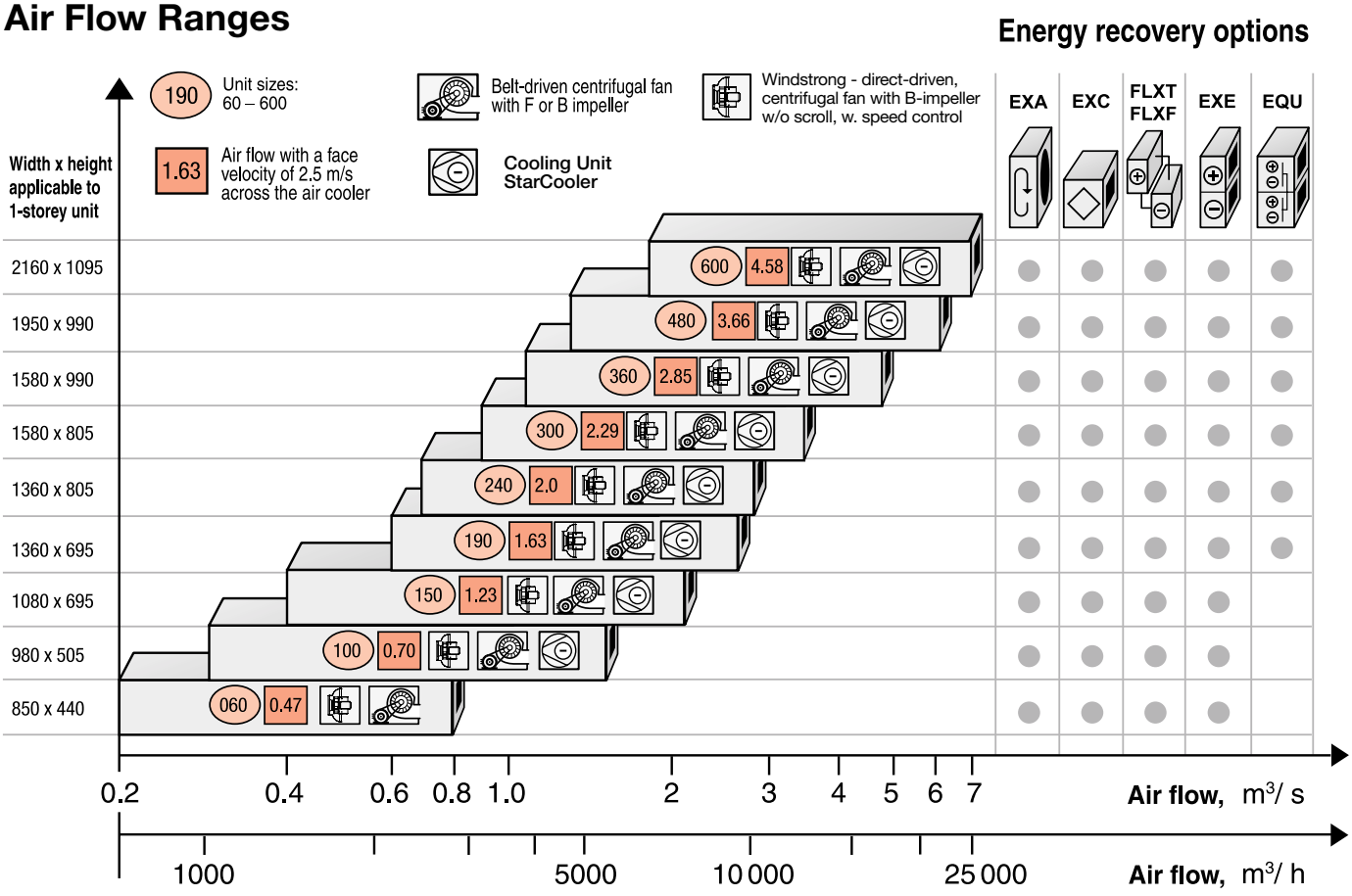
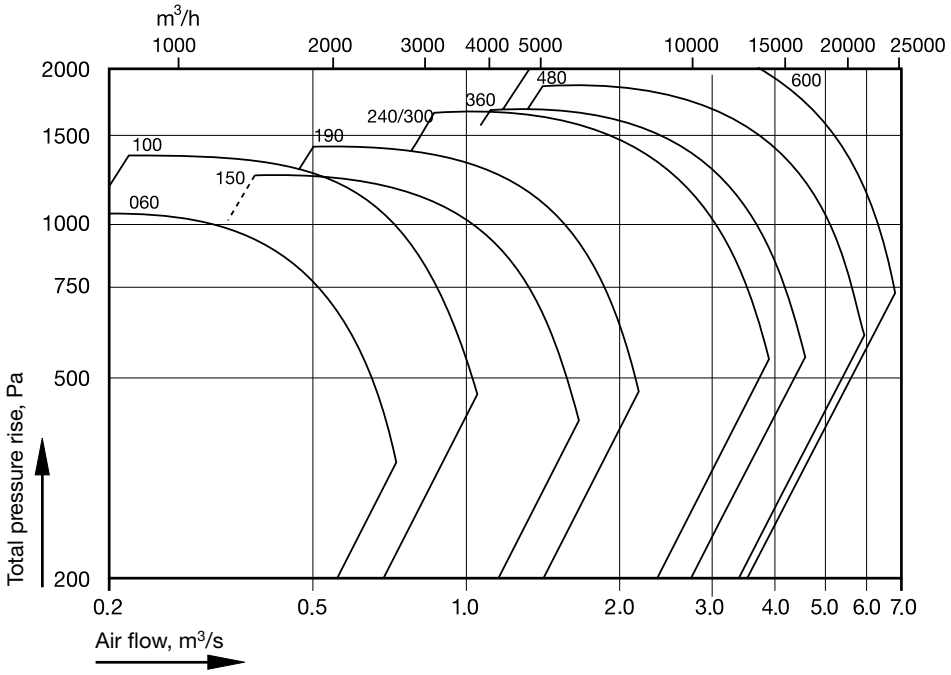
Quick Selection Guide

Air Flow Ranges

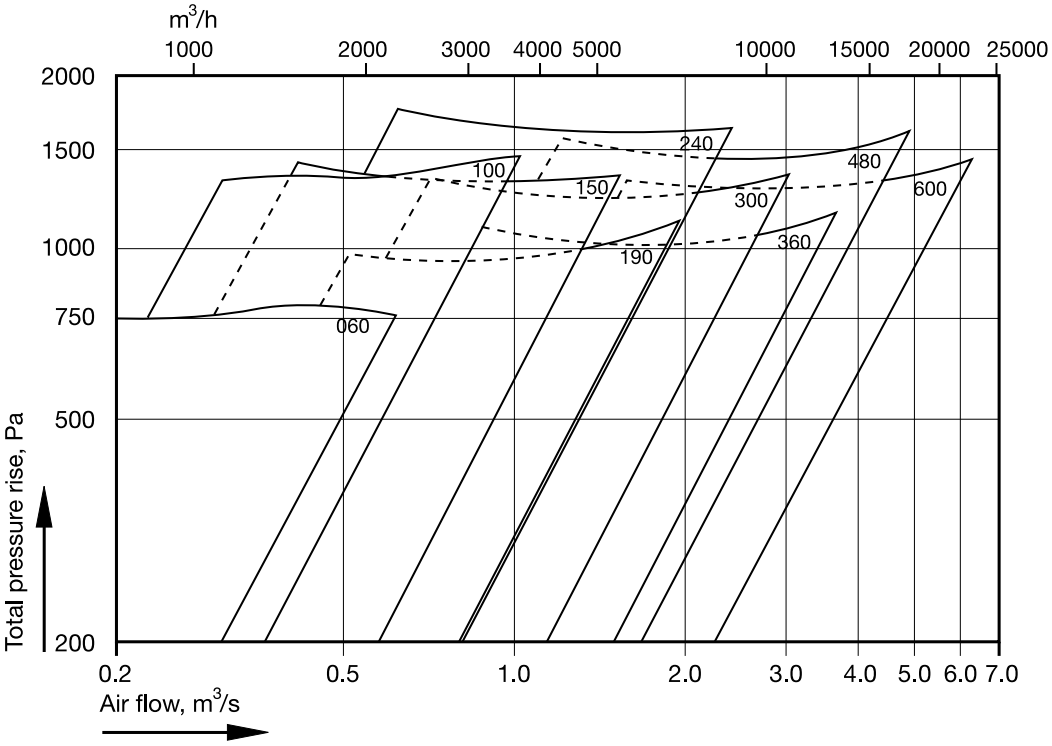


Fan Performance

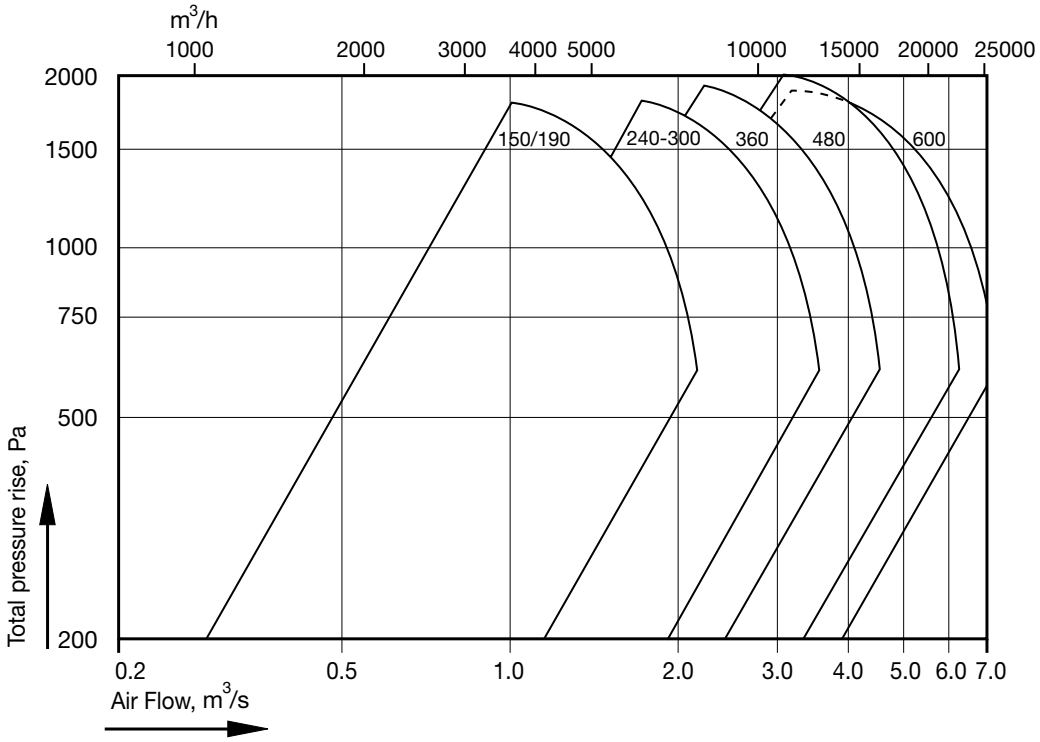
Windstrong centrifugal fan with backward-curved blades without scroll.



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



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

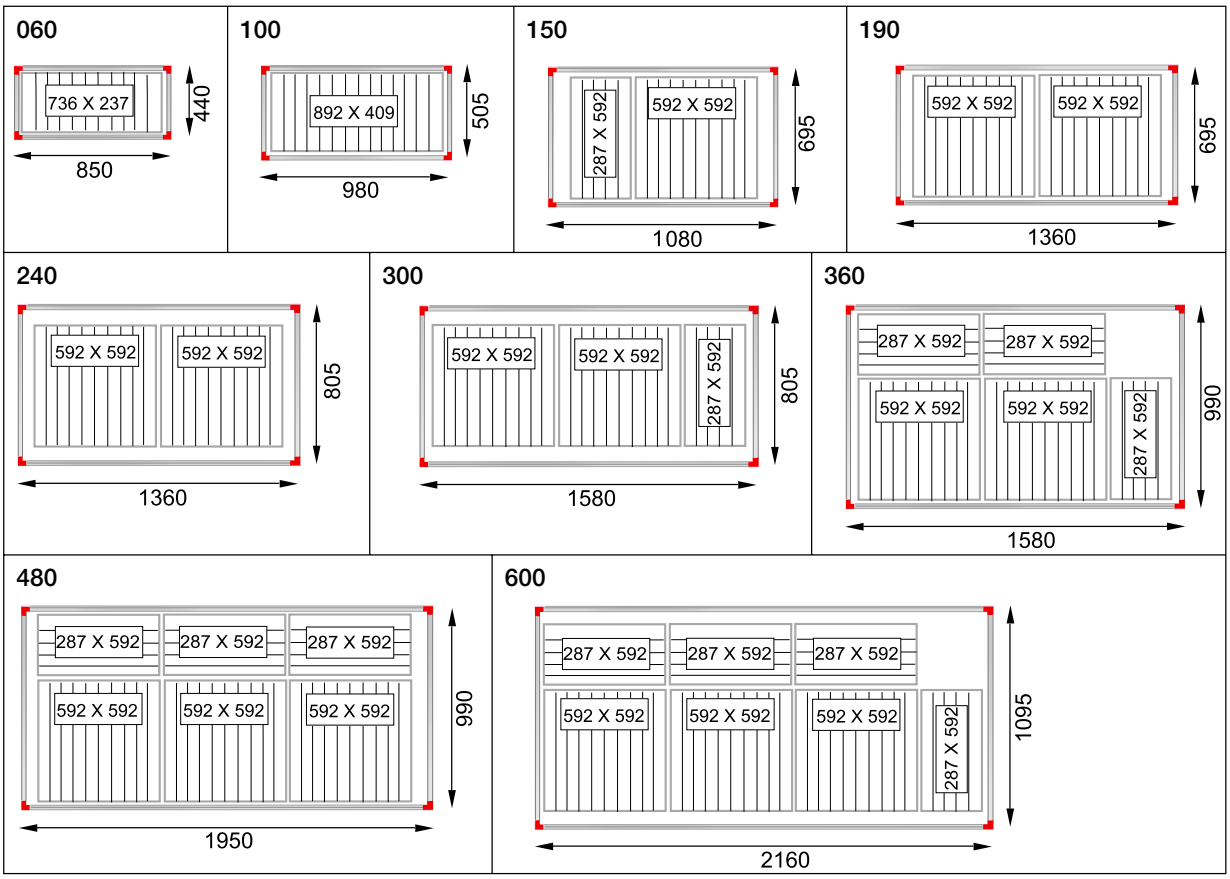


Integral Attenuation, dB

Component		Octave band, centre frequency, Hz							
		63	125	250	500	1000	2000	4000	8000
Filter	ELEF G3	-	-	1	2	3	3	5	6
	P3	-	-	1	2	3	3	5	6
	F6	2	3	6	8	14	17	19	21
	F7	3	3	6	8	14	17	19	21
	F8	3	3	6	8	14	17	19	21
	F9	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
Cooler	EQU	2	1	1	2	2	3	3	4
surplus* to	190-480	-0	-0	-3	-0	-3	-4	-4	-5
surrounding	-600	-0	-0	-7	-0	-6	-10	-9	-8
Cooler	ECR/ECU	7	6	6	6	7	11	12	17
surplus to exh.	-100	-0	-0	-11	-1	-0	-10	-6	-7
air side	-150	-0	-1	-7	-2	-0	-5	-6	-7
	-190	-0	-0	-5	-1	-11	-15	-6	-12
	-240	-0	-0	-11	-2	-15	-14	-9	-14
	-300	-0	-0	-5	-2	-9	-16	-15	-16
	-360	-0	-0	-0	-6	-8	-16	-20	-20
	-480	-0	-1	-2	-6	-8	-12	-19	-19
	-600	-0	-1	-2	-1	-9	-14	-17	-17
Silencer	KL -30	6	10	18	30	41	35	30	16
	-40	7	11	20	32	43	37	31	17
	-50	8	12	25	38	46	41	35	21
	-60	10	16	30	44	49	44	38	24
Casing	00 (standard)	4	8	15	28	31	32	35	39
	E3 (EI30)	6	11	16	28	34	35	39	43

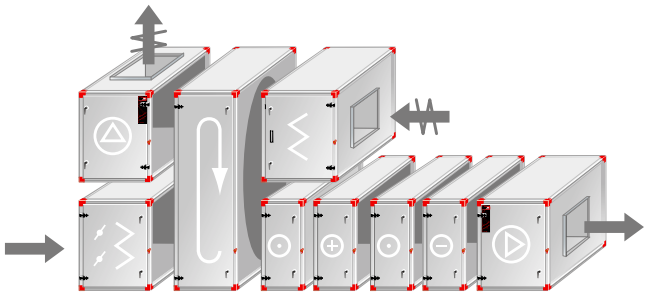
* Surplus sound emitted to surroundings based on ordinary calculation.

Cross-sectional Area and Number of filters



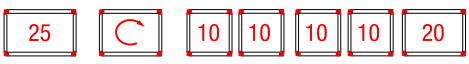
Survey of the Air Handling Functions

The Flexomix 060-600 air handling units consists 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.



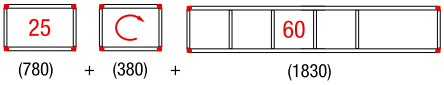
Standard module EMM	Length (mm)	Standard module EMM	Length (mm)	Standard module EMM	Length (mm)
10	330	35	1080	60	1830
15	480	40	1230	65	1980
20	630	45	1380	70	2130
25	780	50	1530	75	2280
30	930	55	1680	80	2430

Maximum number of modules supplied, supply air = 7 modules



Overall length (780) + (380) + (330) + (330) + (330) + (330) + (630) = 3110 mm

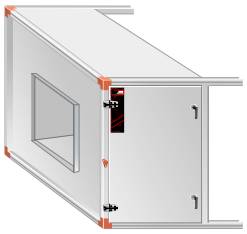
Minimum number of modules supplied, supply air = 3 modules



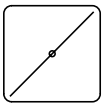
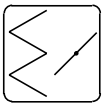
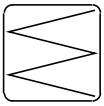
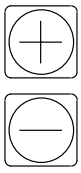
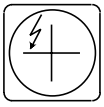
Overall length (780) + (380) + (1830) = 2990 mm

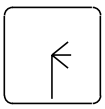
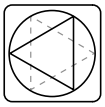
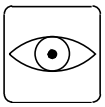
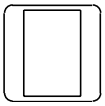
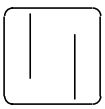
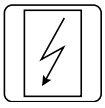
Installation Alternatives

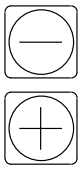
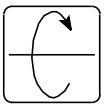
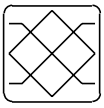
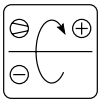
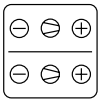
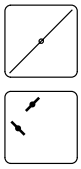
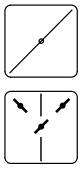
A 

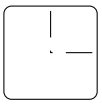
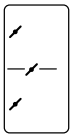
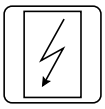
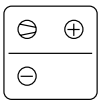
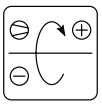
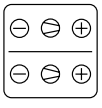
B 

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, made of extruded aluminium profiles, with nylon-reinforced ABS plastic gear wheel drive, well protected by side panels.	060-600	10	**16**
	A B	**MIE-ID Air inlet function** Connection gable, damper and filter.* **See the MIE-FB Filter and the MIE-KS Damper.*	060-600	25	**17**
	A B C	**MIE-FB Filter function** For deep-pocketed bag filters. 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, P3, F6, F7 Glass fibre — F8, F9 Synthetic+carbon (not 060-100) — C7 = F7+carbon filter Aluminium — Aluminium (flat filter)	060-600 060-600 060-600	10 (P3) 15 (G3, AL) 25 (F6, F7,) (F8,F9*,C7*) ** only for sizes 150-600*	**19**
	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 Varies depending on the output variant.	**21**
	A B C	**MIE-EL (EI) Electric 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, 35 Varies depending on the output variant.	**24**

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	**27**
	A B	**MIE-AF Fan function, for horizontal air discharge** Easily withdrawable fan system equipped with anti-vibration mountings and end connection wall. 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) Windstrong, speed-controlled, direct-driven, centrifugal fan with backward-curved blades without scroll. (sizes: 060 – 600) * *The design of some of the components in the fan systems do not conform to Corrosion Class 4.*	060-600 150 190-300 360-600	20 25 30 40	**30**
	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.	**43,44**
	C	**MIE-TD* Empty section** for special function (e.g. steam pipes). Can also be used as 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.	**44**
	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 depen-ding on the degree of attenuation desired.	**46**
	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	**47**

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 MIE-CL*	**21**
	A B	**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), untreated surfaces PLUS (NP), hygroscopically treated surfaces PLUS (HP) and epoxy-treated surfaces (EX)	060-600	380	**48**
	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	**51**
	A	**ECR StarCooler with cooling recovery** A complete two-storey functional section for cooling the air, containing a rotary heat exchanger for cooling- or heat recovery, compressor, condenser, evaporator, etc.	100-360 300-600	1540 1650	**67**
	A	**EQU Heat recovery unit** A complete two-storey functional section containing compressor, condenser, evaporator and four-way valve that recovers energy from the exhaust air whenever heating is necessary.	190-240 300-600	1080 1650	**71**
Complete Functional Sections – 1 Storey					
	A	**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	**53**
	A	**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	**55**

Complete Functional Sections – 1 Storey			Size	Length (mm)	Page
	A	**EAF Fan section, vertical air discharge** Complete functional section with fan system option described under MIE-AF.	060-100 150 190-300 360-600	630 780 930 1230	**40**
	A	**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					
	A	**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	**57**
	A	**EBD Mixing section** A complete two-storey functional section containing two dampers* specially intended for recirculating air for heating purposes during night-time operation **See the MIE-KS.*	060 100 150-190 240-300 360-480 600	440 505 695 805 990 1095	**59**
	A	**EMD Media section** Complete two-storey functional section with shielded space for electrical and control cubicle installation.	060-600	30	**62**
Cooling Units					
	A	**ECU StarCooler** A complete two-storey functional section for cooling the supply air. The cooler contains compressor, condenser, evaporator, etc.	100-360 300-600	780 890	**63**
	A	**ECR StarCooler with cooling recovery** A complete two-storey functional section for cooling the air, containing a rotary heat exchanger for cooling- or heat recovery, compressor, condenser, evaporator, etc.	100-360 300-600	1540 1650	**67**
	A	**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	**71**

EMM Standard Module

General

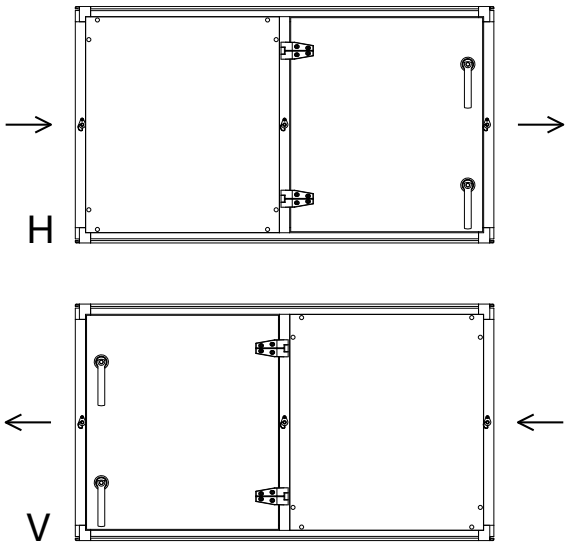
The standard modules and the casing of the complete functional sections consist of frame members made of extruded, anodized aluminium sections. The frame members are, where appropriate, jointed together by means of surface-treated corner pieces. The panels are of double-skin design and consist of two 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/m³). Fire-retardant mineral wool / EI 30 (volumetric weight: 260 kg/m³) is available as an option.

The casing meets the demands of Tightness Class B negative pressure and total heat transfer coefficient T4 to CEN EN 1886 and meets the provisions of Corrosion Class 4.

The inspection doors are equipped with adjustable hinges and a lock.

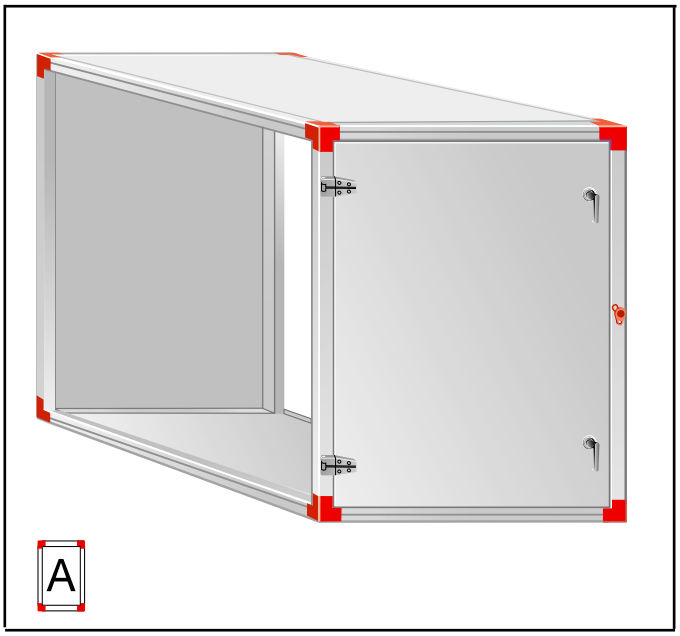
The EMM standard module together with selected fitting (front panel and functional assembly parts) constitue a complete functional section.

Configuration



H = Right-hand unit

V = Left-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

EMMT-01	Connection gable	page 75
EMMT-02	Connection frame	page 75
EMMT-03	Flexible connection	page 75
EMMT-04	Outdoor unit	page 76
EMMT-05	Stand/Support frame	page 76
EMMT-08	Lifting brackets	page 77
EMMT-10	Compact unit	page 77

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
190	30	35	45	55	65	70	80	90	100	105	115	125	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	198	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	65	80	95	120	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	120	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

Functional Components
MIE-KS Damper Fitting

General

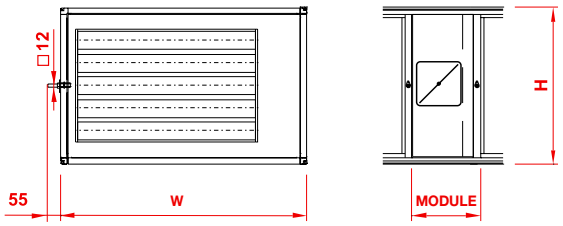
The fitting consists of a damper that can be used as an adjusting or shut-off damper, for example, and a front casing panel. The damper is designed for incorporation in an EMM module.

Design

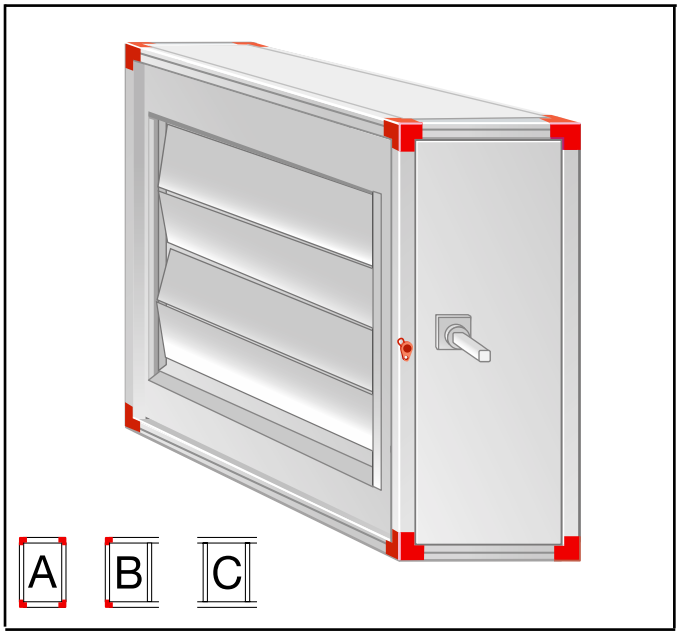
- The damper is made of aluminium profiles and meets the provisions of Corrosion Class 4.
- The damper blades are driven by means of ABS plastic gear wheels. Tubular silicone rubber seals enable a tight seal between the blades.
- Tightness Class 3 to Swedish Standard VVS AMA-98 is standard.
- Permissible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

Technical details

Dimensions and weights



Size	Module (mm) 10	B (mm)	H (mm)	Weight (kg)	Required torque (Nm)
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-02 Damper actuator

Other accessories

See the EMM standard module

MIE-ID Air Inlet Fitting

General

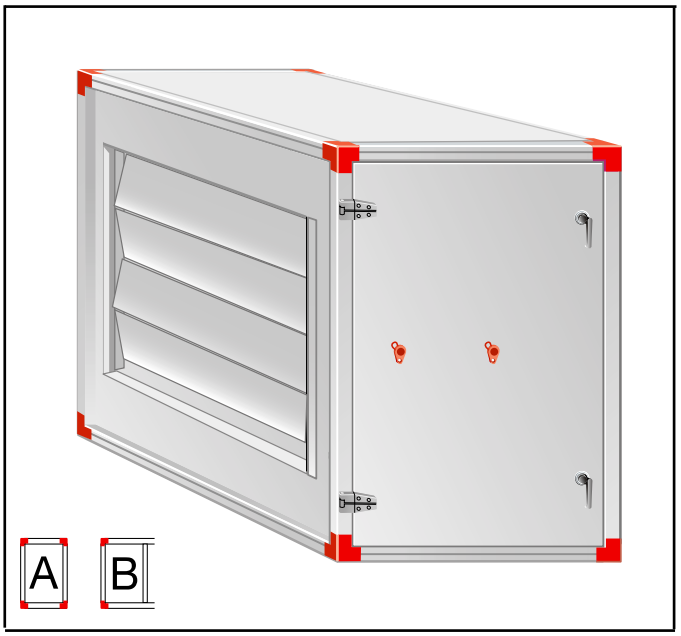
The MIE-ID fitting consists of a damper that can be used e.g. for adjusting or shutting off the air flow, mounting rails for filter cassettes, an end connection wall and a front casing panel. The assembly is primarily intended for use as an outdoor air or exhaust air intake. The assembly is designed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

Design

- The damper is made of aluminium profiles and meets the provisions of Corrosion Class 4.
- 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 is standard.
- Permissible temperature range: -40 – +80 °C.
- Permissible differential pressure: max. 1400 Pa.
- Can be equipped with a deep-pocketed, throw-away filter made of Class G3, F6 or F7 synthetic material Class F8 or F9 deep-pocketed glass fibre material (for sizes 150-600), Class C7 deep-pocketed carbon filter with prefilter or cleanable knitted aluminium filter.
  See the description under MIE-FB Filter on page 19.
- The filters are mounted on slide rails and are easy to withdraw och replace.
- The filter slide rails are fitted with effective sealing strips to 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.



Specification

Air inlet fitting	**MIE-ID -a -25 -c**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480,600
25 - Module	
c - Casing:	00 = Thermal insulation E3 = EI30
Filtersats	**ELEF -a -b**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Filter Class:	AL, G3, F6, F7, F8, F9*, C7*

** Size 150-600*

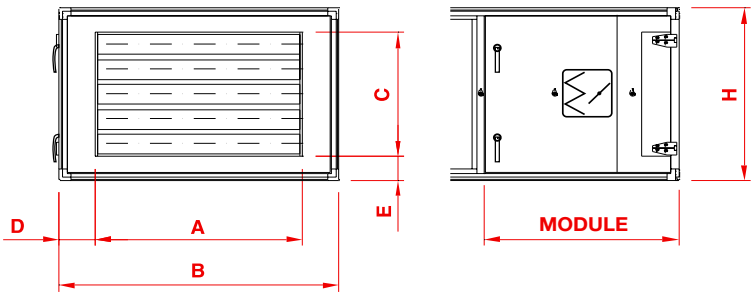
Accessories

MIET-FB-01	U-tube manometer
MIET-FB-02	Kytölä DPA 500P manometer
MIET-FB-03	Magnehelic 2000 manometer
EMMT-06	Inspection window..... page 77
EMMT-07	Light fitting..... page 77

Other accessories

See the EMM standard module.

Dimensions and weights



Size	Module (mm)	Dimension (mm)						Weight (kg)	Required torque. (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

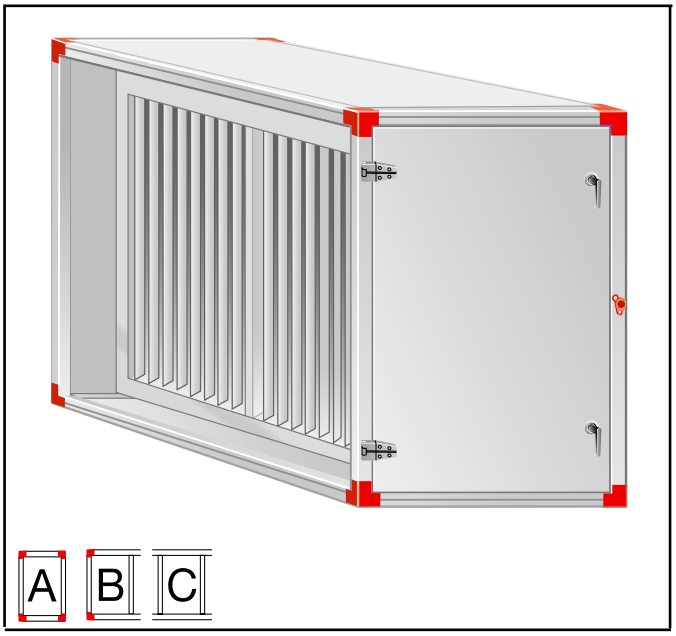
MIE-FB Filter Fitting

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, Class F8 or F9 deep-pocketed glass fibre material (for sizes 150-600), Class C7 deep-pocketed carbon filter with pre-filter or cleanable knitted aluminium filter.
- Panel filter of Class G3 (code P3) can be selected
- The filters are mounted on slide rails and are easy to withdraw and replace.
- The filter slide rails are fitted with effective sealing strips to 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).



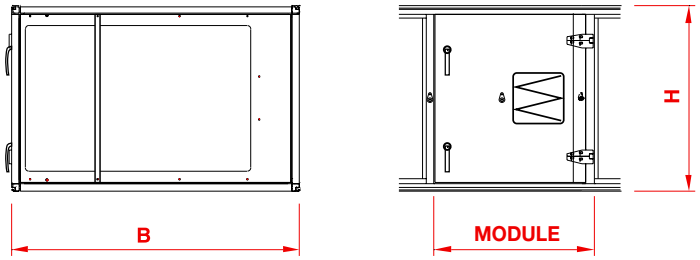
Specification

Filter fitting	**MIE-FB -a -b -c**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Module:	10, 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, P3, F6, F7, F8, F9*, C7*

** Size 150-600*

Technical details

Dimensions and weights



** Module 10 for panel filter P3.*
module 15 for filter class G3 and AL;
module 20 for other filter types

Size	Module (mm)			Dimension (mm)		Weight (kg)
	10	15	20	H	B	
060	300	450	600	440	850	5
100	300	450	600	505	980	10
150	300	450	600	695	1080	10
190	300	450	600	695	1360	15
240	300	450	600	805	1360	15
300	300	450	600	805	1575	20
360	300	450	600	990	1575	25
480	300	450	600	990	1950	35
600	300	450	600	1095	2160	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 77
EMMT-07	Light fitting..... page 77

Other accessories

See the EMM standard module.

Types of Filter

Basic filter, fine filter and panel filter

Filters in class G3, F6 and F7 consists of deep-pocketed filter bags mounted in a metallic frame. The filters are made of synthetic fibre material.
The Class F8 and F9 filters consists of deep-pocketed filter bags mounted in a metallic frame. The filters are made of glass fibre.
Panel filters of Class G3 (code P3) are made of synthetic fibre with a wax treated cardboard frame (pre filter).

Carbon filter and pre-filter

The Class C7 filter consists of deep-pocketed filter bags containing activated carbon and an integral Class 7 pre-filter. The filter offers high arresting performance and minimizes the spreading of cooking odours and automobile fumes in comfort air handling systems

Aluminium 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 bag filters

Size	Filter modules (quantity)				Filter area (m²)			
	736×287	892×409	592×287	592×592	G3	F6, F7, F8	F9	C7
060	1				1.5	2.4	-	-
100		1			2.4	4.3	-	-
150			1	1	3.9	9.8	9.8	8.0
190				2	5.2	13.0	13.0	16.0
240				2	5.2	13.0	13.0	16.0
300			1	2	6.5	16.5	16.5	19.5
360			3	2	9.1	22.9	22.9	26.5
480			3	3	11.7	29.4	29.4	34.5
600			4	3	13.0	32.7	32.7	38.0

Filter details panel filters

Size	Filter modules (quantity)				Filter area (m²)
	736×287	736×393	596×292	586×596	P3
060	1				0.21
100		1			0.29
150			1	1	0.53
190				2	0.71
240				2	0.71
300			1	2	0.88
360			3	2	1.23
480			3	3	1.59
600			4	3	1.76

Filter details flat filters

Size	Filter modules (quantity)				Filter area (m²)
	736×287	892×409	592×287	592×592	Al-knitted
060	1				0.2
100		1			0.4
150			1	1	0.5
190				2	0.7
240				2	0.7
300			1	2	0.9
360			3	2	1.2
480			3	3	1.5
600			4	3	1.7

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 00	6 mm
ELEV power variant 01	2 mm
ELEV power variant 02, 03	2,5 mm
ELBC,ELXT, ELXF	2 or 3 mm

- Headers up to diameter 25 mm are made of copper, larger connections are made of steel. The connecting pipes of the headers have male threads and are equipped with female-threaded connections for venting and drainage. ELEV also has a connection an immersion sensor.
- Air coolers ELBC, ELBD and ELXF have stainless steel drip trays with Ø32 mm 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 optimizing 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:

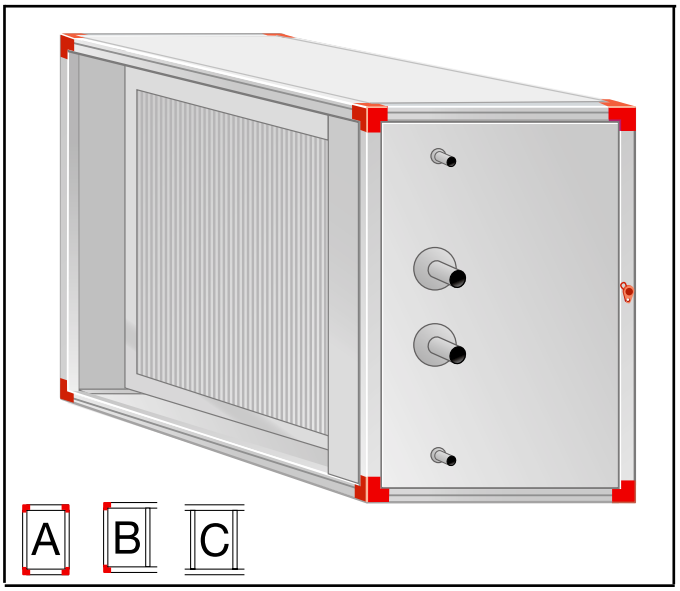
ELEV	150 °C
ELXT/ -F	100 °C
ELES	185 °C

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 trap
ELBDT-01-a	a = number of power steps

Other accessories

See the EMM standard module.



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 - Casing:	00 = Thermal insulation E3 = EI30
Air heater; Water	**ELEV -a -b**
a - Size:	*see the MIE-CL*
b - Power variant:	00, 01, 02, 03
Air heater; Steam	**ELES -a -b**
a - Size:	*see the MIE-CL*
b - Power variant:	01, 02
Air cooler; 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 mm 30 = 3 mm
e - Droplet eliminator:	0 = without 1 = with
f - Connection side:	H = right-hand V = left-hand

(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: *calculated in dimensioning program*

d – f *see the ELBC*

Energy recovery coil, supply air
ELXT -a -b -c -d -0 -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

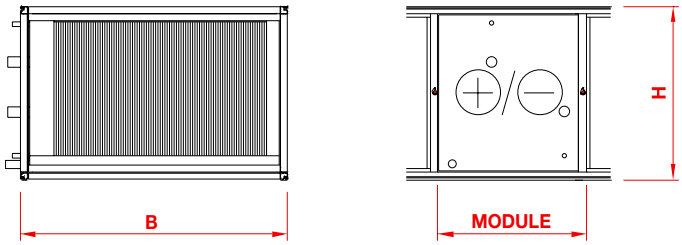
a - Size: *see the MIE-CL*

b - Power variant: *see the ELXT*

c – f *see the ELBC*

Technical details

Dimensions and weights



Size	Module (mm)			B	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					
	00	01	02	03	04	06	08	10	02	03	04	06	08	10
060	10	10	10	10	10	10	15	15	10	10	10	15	15	20
100	10	10	10	10	10	10	15	15	10	10	10	15	15	20
150	10	10	10	10	10	10	15	15	10	10	10	15	15	20
190	10	10	10	10	10	10	15	15	10	10	10	15	15	20
240	10	10	10	10	10	15	20	20	15	15	15	15	20	20
300	10	10	10	10	10	15	20	20	15	15	15	15	20	20
360	10	10	10	10	10	15	20	20	15	15	15	15	20	20
480	10	10	10	10	10	15	20	20	15	15	15	15	20	20
600	10	10	10	10	10	15	20	20	15	15	15	15	20	20

Weight (kg)

Size	ELEV, ELES, ELXT power variant								ELBC, ELBD, ELXF power variant					
	00	01	02	03	04	06	08	10	02	03	04	06	08	10
060	10	15	15	20	20	30	35	40	15	20	20	30	35	40
100	15	15	20	25	30	35	40	50	20	25	30	35	45	50
150	20	25	30	40	45	60	70	85	30	40	45	60	60	85
190	25	30	35	45	50	70	85	105	35	45	50	70	85	105
240	25	30	40	50	55	85	105	125	50	60	65	95	115	135
300	30	35	45	60	60	95	120	140	55	70	70	105	130	150
360	30	40	55	70	75	115	140	170	65	80	85	125	150	180
480	35	45	65	80	80	135	170	205	80	95	95	150	165	220
600	45	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			
	00	01	02	03	02	03	04	06	08	02	03	04	06	08	04	06	08	10	04	06	08	10
060	15	15	25	25	25	25	25	25	32	15	25	25	25	25	25	25	25	25	25	25	25	25
100	15	15	25	25	25	25	25	25	32	25	25	25	25	25	25	25	25	25	25	25	25	25
150	25	25	25	32	25	25	32	32	32	25	25	25	32	32	25	25	25	32	25	25	25	25
190	25	25	25	32	32	32	32	50	50	25	32	32	32	32	32	32	32	32	25	25	25	25
240	25	25	25	32	25	32	32	50	50	25	25	32	32	32	25	32	32	32	25	25	25	25
300	25	25	32	50	32	50	50	50	50	25	32	32	50	50	25	32	32	50	25	32	32	32
360	25	25	32	50	32	50	50	80	80	32	32	50	50	50	32	50	50	50	32	32	32	32
480	25	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	50	80	80	80	80	80	50	50	80	80	80	50	50	50	50	50	50	50	50

Size	ELBD			ELES	
	Power variant			Power variant	
	02 in:out	03 in:out	04 in:out	01 in:out	02 in:out
060	5/8":28	5/8":28	5/8":28	25/25	25/25
100	5/8":28	5/8":28	5/8":28	25/25	25/25
150	5/8":28	7/8":28	7/8":34	32/25	32/25
190	5/8":28	7/8":34	7/8":41	32/25	32/25
240	7/8":34	7/8":34	7/8":41	32/25	50/25
300	7/8":34	7/8":34	7/8":41	50/25	50/25
360	7/8":41	7/8":41	7/8":54	50/25	50/25
480	7/8":41	1 1/8:54	7/8":54	80/32	80/32
600	7/8":41	1 1/8:54	1 1/8:54	80/32	80/32

Water volume (l)

Size	ELEV, ELBC, ELXT/ELXF							
	00	01	02	03	04	06	08	10
060	1	1	2	3	4	6	8	10
100	2	2	3	5	6	9	11	14
150	3	3	5	8	10	15	20	25
190	4	4	7	10	13	20	26	33
240	4	4	8	12	16	24	32	40
300	5	5	10	14	18	28	37	46
360	6	6	12	17	23	35	46	57
480	8	8	15	22	29	44	58	73
600	10	10	18	28	37	55	74	92

Row depth

Power variant	Row depth
00,01	1
02	2
03	3
04	4
06	6
08	8
10	10

MIE-EL Electric 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 high and 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 IP 43 to SSEN 60529
- 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.

Electrical Connection

Electric Air Heater without Control (HT, LT)

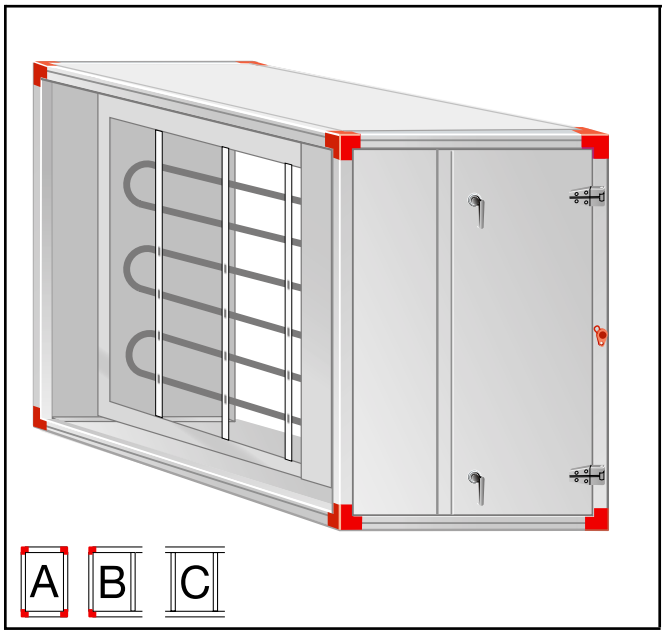
Ø1 Ø2	Overheating protection with automatic reset
Ø3 Ø4	Overheating protection with manual reset
Ø5 Ø	Connection for First step: 0.2-3.5 kW 2-phase 400 V N.B. For outputs above 3.5 kW the first step is 3-phase 400 V. Connect the output steps one-by-one beginning with Connection 5
Ø Ø Ø	Connection for Second step: 3.6-43 kW 3-phase 400 V
Ø Ø Ø	Connection for Third step: 3.6-43 kW 3-phase 400 V
Ø Ø Ø	Connection for Fourth step: 3.6-43 kW 3-phase 400 V

If any output group exceeds 43 kW, it must be split into two equal groups

Electric Air Heater with Integrated Control: 0-10 V signal (HS)

Ø1 Ø2	Alarm (closes in the event of an alarm). Max 250 V, 10 A
ØG0 ØY	0-10 V control signal

Ø7 L Ø8 N	Interlocking across fan circuit/airflow in the ducting Control circuit: 230 V~
ØL1 ØL2 ØL3	Power supply



Specification

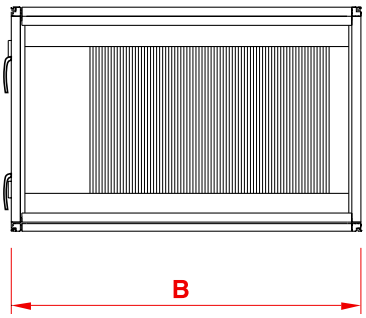
Air Heater Fitting	**MIE-EL -a -b -c**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Module:	15, 20, 25, 35
c - Front panel:	00 = Thermal insulation E3 = EI30
Electric Air Heater	**ELEE -a -b -c -d**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Power variant:	01, 02, 03, 04, 05
c - Variant:	HT = High temperature LT = Low temperature HS = High temp. with built-in control equipment

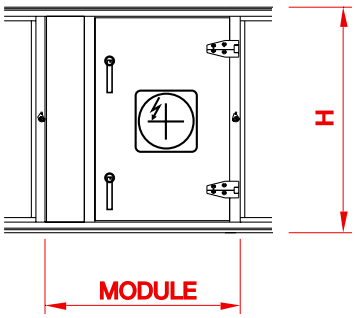
Other accessories

See standard module EMM.

Technical details

Dimensions and weights





Size	Module (mm)				B (mm)	H (mm)
	15	20	25	35		
060	450	600	750	1050	850	440
100	450	600	750	1050	980	505
150	450	600	750	1050	1080	695
190	450	600	750	1050	1360	695
240	450	600	750	1050	1360	805
300	450	600	750	1050	1575	805
360	450	600	750	1050	1575	990
480	450	600	750	1050	1950	990
600	450	600	750	1050	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	35
240	15	20	20	15	20	25	15	20	20	35	35
300	15	20	20	15	20	25	15	20	20	35	-
360	15	20	20	15	20	25	15	20	20	35	-
480	15	20	25	15	20	25	15	20	35	-	-
600	15	20	25	15	20	25	15	20	35	-	-

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	100
240	40	50	50	45	65	45	55	90	65	75	140	95	95	185	120
300	45	55	55	50	70	60	65	105	75	85	160	105	110	215	140
360	45	60	55	80	55	65	70	125	80	100	185	120	125	250	-
480	60	75	70	70	105	80	95	160	110	125	250	-	160	335	-
600	65	85	75	80	120	90	110	195	130	155	305	-	195	415	-

Output table

Size	Min. air-flow (m³/s)	Power variant	Total power (kW)	Rated Current (A at 400 V)	Power steps (kW)			
					1	2	3	4
060	0.2	01	3.0	-	3.0	-	-	-
		02	6.0	8.7	6.0	-	-	-
		03	13.0	18.8	13.0	-	-	-
		04	24.0	34.6	24.0	-	-	-
		05	30.0	43.3	2.0	4.0	8.0	16.0
100	0.33	01	5.0	7.2	5.0	-	-	-
		02	9.0	13.0	9.0	-	-	-
		03	19.0	27.4	19.0	-	-	-
		04	34.0	49.1	2.3	4.5	9.0	18.2
		05	54.0	77.9	3.6	7.2	14.4	28.8
150	0.5	01	7.5	10.8	7.5	-	-	-
		02	15.0	21.7	15.0	-	-	-
		03	27.0	39.0	1.8	3.6	7.2	14.4
		04	47.0	67.8	3.2	6.3	12.5	25.0
		05	67.5	97.4	4.5	9.0	18.0	36.0
190	0.63	01	9.0	13.0	9.0	-	-	-
		02	17.0	24.5	17.0	-	-	-
		03	39.0	56.3	2.6	5.2	10.4	20.8
		04	67.5	97.4	4.5	9.0	18.0	36.0
		05	90.0	129.9	6.0	12.0	24.0	2 × 24.0
240	0.77	01	13.0	18.8	13.0	-	-	-
		02	24.0	34.6	24.0	-	-	-
		03	47.0	67.8	3.1	6.3	12.5	25.1
		04	84.0	121.2	2.6	11.2	22.4	2 × 22.4
		05	120.0	173.2	8.0	16.0	32.0	2 × 32.0
300	1.0	01	15.0	21.7	15.0	-	-	-
		02	27.0	39.0	1.8	3.6	7.2	14.4
		03	54.0	77.9	3.6	7.2	14.4	28.8
		04	98.0	141.5	6.5	13.1	26.1	2 × 26.1
		05*	140.0	202.1	9.3	18.7	37.3	2 × 37.3
360	1.2	01	17.0	24.5	17.0	-	-	-
		02	34.0	49.1	2.3	4.5	9.1	18.1
		03	67.5	97.4	4.5	9.0	18.0	36.0
		04	120.0	173.2	8.0	16.0	32.0	2 × 32.0
		05*	170.0	245.4	11.3	22.7	2 × 22.7	4 × 22.7
480	1.6	01	24.0	34.6	24.0	-	-	-
		02	47.0	67.8	3.1	6.3	12.5	25.1
		03	92.0	132.8	6.1	12.3	24.5	2 × 24.5
		04*	161.0	232.4	10.7	21.5	42.9	2 × 42.9
		05*	230.0	332.0	15.3	30.7	2 × 30.7	4 × 30.7
600	2.0	01	27.0	39.0	1.8	3.6	7.2	14.4
		02	54.0	77.9	3.6	7.2	14.4	28.8
		03	116.0	167.4	7.7	15.5	30.9	2 × 30.9
		04*	203.0	293.0	13.5	27.1	2 × 27.1	4 × 27.1
		05*	290.0	418.6	19.3	38.7	2 × 38.7	4 × 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.

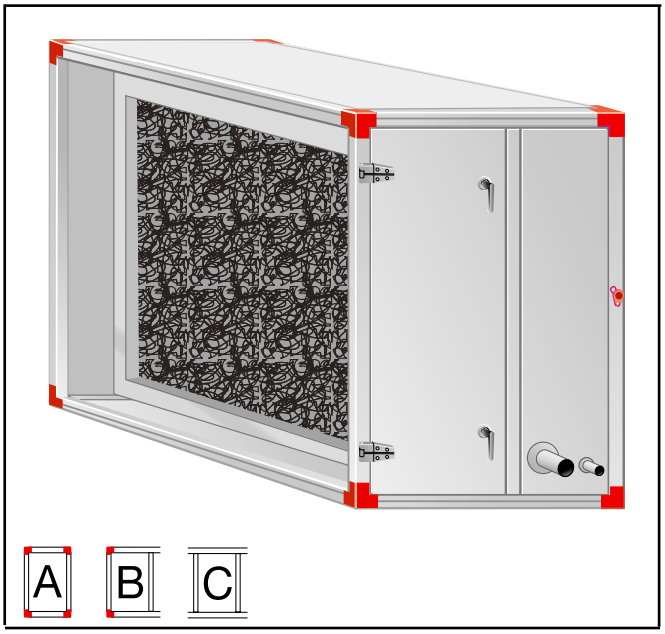
MIE-EF Humidifier Fitting

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.

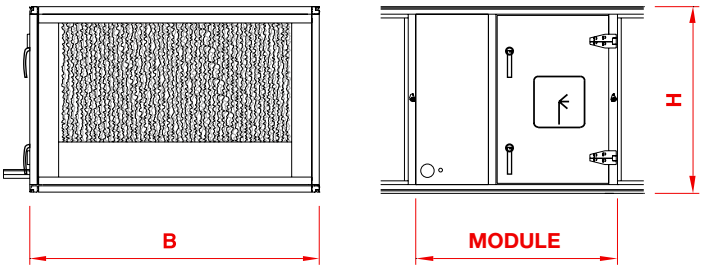
Design

- 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	Module (mm)			Weight (kg)	
	Module 25	B	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	**MIE-EF -a -25 -c**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
25 - Module	
c - Casing:	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

Sizes 060 and 100 are only available with direct-water and humidification rate of 85% and no droplet eliminator.
** Viewed in direction of air flow.*

Accessories

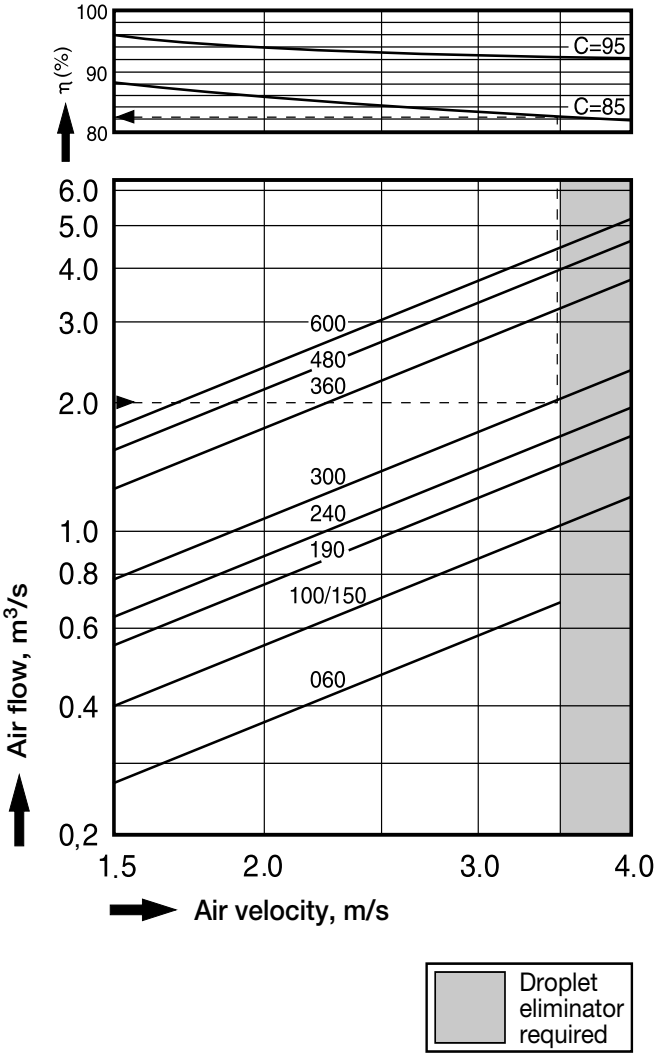
MIET-EF-01 Solenoid valve
MIET-EL-04 Water trap

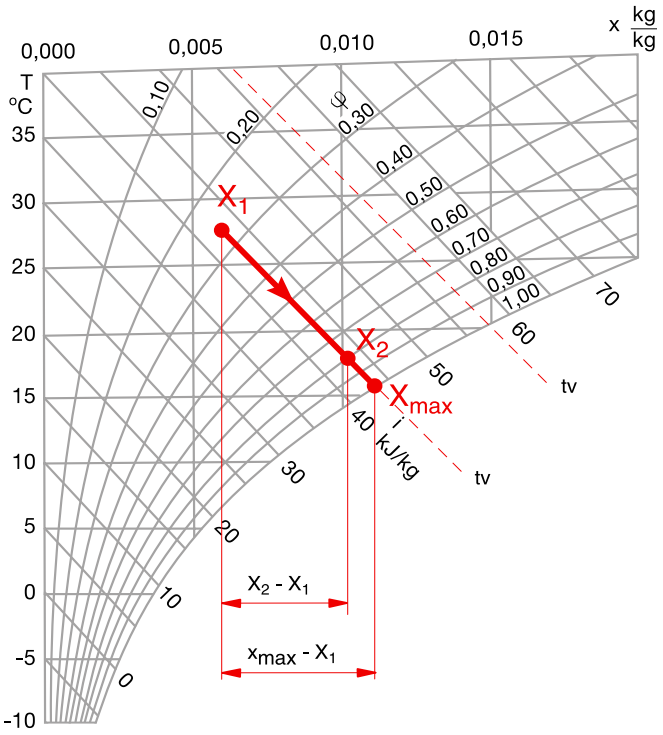
Other accessories

See the EMM standard module.

Electrical data

Size	Module (mm)		
	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 isolation 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 air) kg/kg

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

Example

Given:

Air flow q = 2,0 m^3/s

$X_2 - X_1$ = 0.82 (0.010 - 0.006) = 0.003 kg/kg

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

$E = 2.0 \cdot 1.2 \cdot 0.003 = 0.007$ kg/s

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.

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

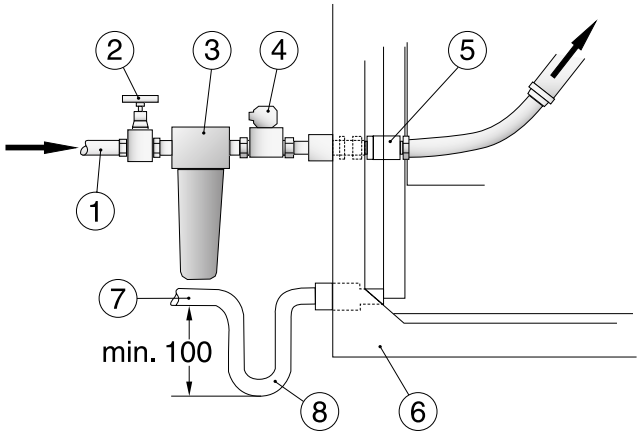
The fresh water supply pipe should be equipped with a shut-off valve (2). If the water contains coarse-grained particles, a water filter (3) with a mesh of 500 µm should also be fitted.

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 product series. The fan assembly is designed for incorporation in an EMM module.

Design

- The fan is available in three versions:

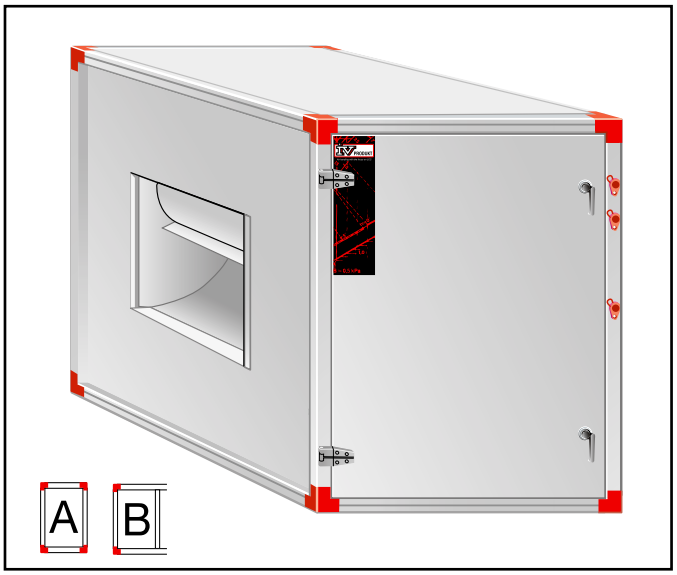
  FB - Belt-driven centrifugal fan with casing, for ward-curved blades. (Sizes 060 – 600)

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

  Windstrong, speed-controlled, direct-driven, centrifugal fan with backward-curved blades without scroll. WD, with fitted frequency converter, and W1-W3, with standard motors (an external frequency converter is required). (Sizes 060-600)

  The design of some of the components in the fan systems do not conform to Corrosions Class C4.

- 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 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:	Storlek 060 - 100 = 20 Storlek 150 = 25 Storlek 190 - 300 = 30 Storlek 360 - 600 = 40
c - Casing:	00 = Thermal insulation E3 = EI30
d - Forw. curved:	FB (060 – 600)
Backw. curved:	BB (150 – 600)
Windstong:	WD, W1, W2, W3 (060 – 600)

Motor	1-bbbb-1-ddd-eeee-ff-g
b - Size:	[The code always contain 4 characters: 3 digits and 1 letter. E.g. 112M]
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 = Termo-contact
Belt drive:	RD = V-belts RB = Poly-V-belts

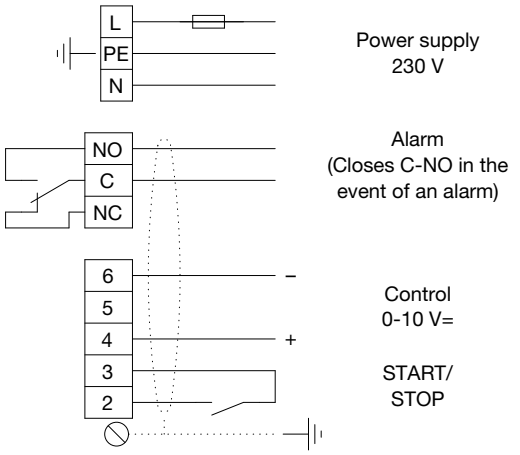
* The first two digits denote integers and the last two denote decimals.

** Applicable to single-speed motors.

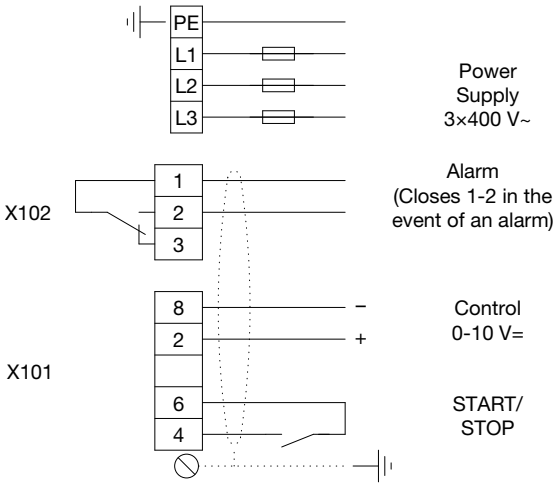
Accessories

Common frame, small	**MIET-AF-01-a**
Flexible connection, small	**MIET-AF-02-a**
Steel spring anti-vibration mountings	**MIET-AF-03-a** (FB, BB 150-600)
Spark-proof fan inlet	**MIET-AF-05-a-d** (FF, BB)
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**

Wiring diagram size 060-100



Wiring diagram size 150-600



Other accessories

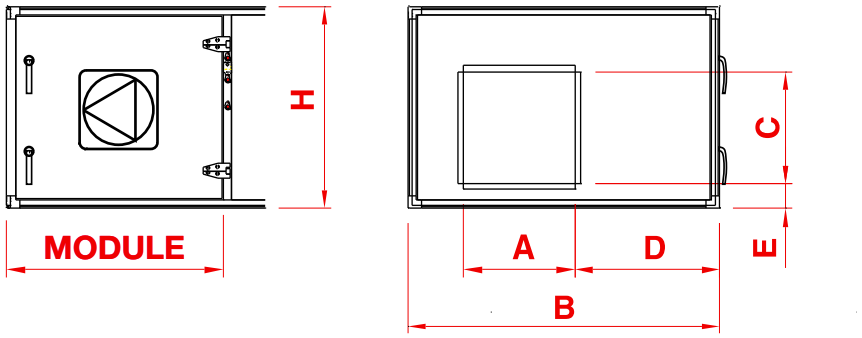
MIET-AF-04 Clean-out hatch
MIET-AF-06 Wiring to safety isolating switch
EMMT-06 Inspection window..... page 77
EMMT-07 Light fitting..... page 77
See also tha accessories described under the EMM standard module.

Electrical data – Windstrong

Size	W. equipped w. frequency transformer	Standard motor	Motor type	Power consumption kW	Voltage	Current A	Rec. fuse AT
060	WD		AC	0.55	230 V, 1-phase	3.7	10
		W2	AC	0.55	230/400 V, 3-phase	2.35/1.35	
100	WD		AC	1.1	230 V, 1-fas	7.4	10
		W2	AC	1.1	230/400 V, 3-phase	4.3/2.5	
150	WD		AC	1.5	400 V, 3-phase	3.3	10
		W2	AC	1.5	230/400 V, 3-phase	6.1/3.5	
190	WD		AC	2.2	400 V, 3-phase	4.7	10
		W2	AC	2.2	230/400 V, 3-phase	8.5/4.8	
240/300	WD		AC	3.0	400 V, 3-phase	6.4	10
		W1	AC	2.2	230/400 V, 3-phase	8.5/4.8	
		W2	AC	3.0	230/400 V, 3-phase	11.3/6.6	
		W3	AC	4.0	230/400 V, 3-phase	15.4/8.9	
360	WD		AC	4.0	400 V, 3-phase	8.4	10
		W1	AC	3.0	230/400 V, 3-phase	11.3/6.6	
		W2	AC	4.0	230/400 V, 3-phase	14.3/8.3	
		W3	AC	5.5	230/400 V, 3-phase	19.6/11.3	
480	WD		AC	5.5	400 V, 3-phase	11.1	16
		W1	AC	4.0	230/400 V, 3-phase	14.3/8.3	
		W2	AC	5.5	230/400 V, 3-phase	19.1/11.0	
		W3	AC	7.5	230/400 V, 3-phase	25.4/14.6	
600	WD		AC	7.5	400 V, 3-phase	15.1	16
		W1	AC	5.5	230/400 V, 3-phase	19.1/11.0	
		W2	AC	7.5	230/400 V, 3-phase	25.4/14.6	
		W3	AC	11.0	230/400 V, 3-phase	38.3/22.0	

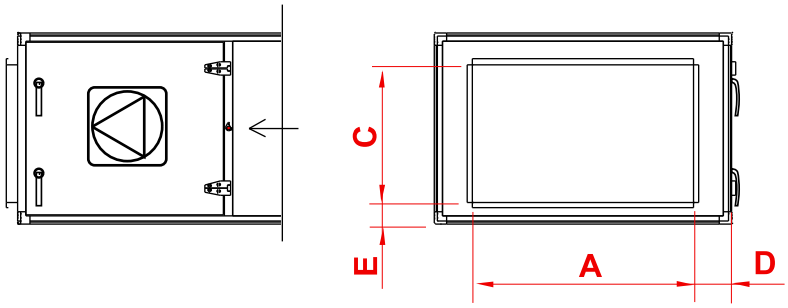
Technical details

Dimensions and weights



Size	Module (mm)				Dimension (mm)						Fan system (kg)			Max motor size
	20	25	30	40	A	B	C	D	E	H	FB	BB	WD	
060	600	-	-	-	230	850	230	380	85	440	25	-	35	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	105	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, dimensions



Size	Module (mm)				Large frame: EMMT-02 (mm)				
			FB/BB					E	
	A	C	D	E	A	C	D	FB/BB	WD
060	300	300	345	80	500	300	175	80	70
100	300	300	470	80	700	300	140	80	100
150	500	500	430	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 systems

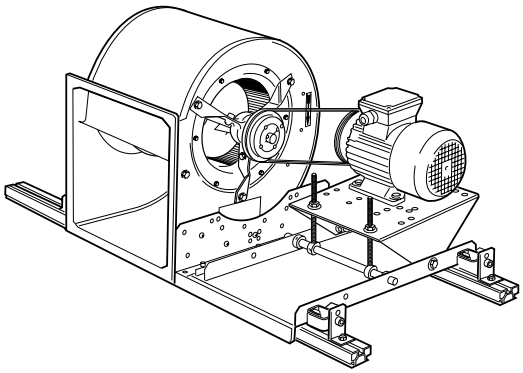
General

The air handling units in the Flexomix product series are equipped with belt-driven, centrifugal fans, or with type Windstrong direct-driven, centrifugal fans with the impeller mounted directly on the motor shaft. The Windstrong is equipped with speed controller that operates the fan 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.

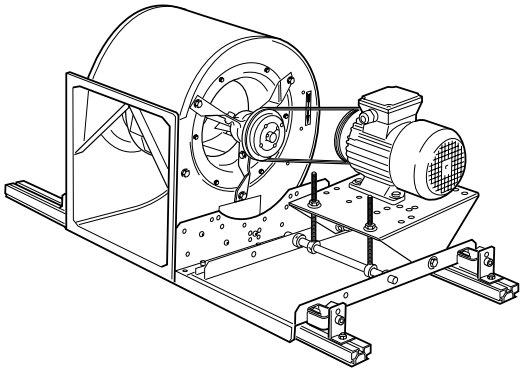
Belt-driven centrifugal fan with forward-curved blades (FB):

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):

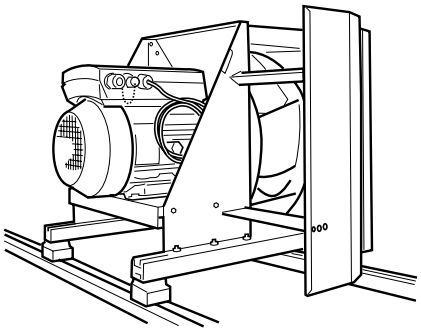
Available for the size 150 through 600 units. The fan impeller and fan casing are made of galvanised sheet steel. The bearings are permanently lubricated deep-groove ball bearings. The fan casing is equipped with a V-shaped tongue that offers low outlet losses.



Windstrong:

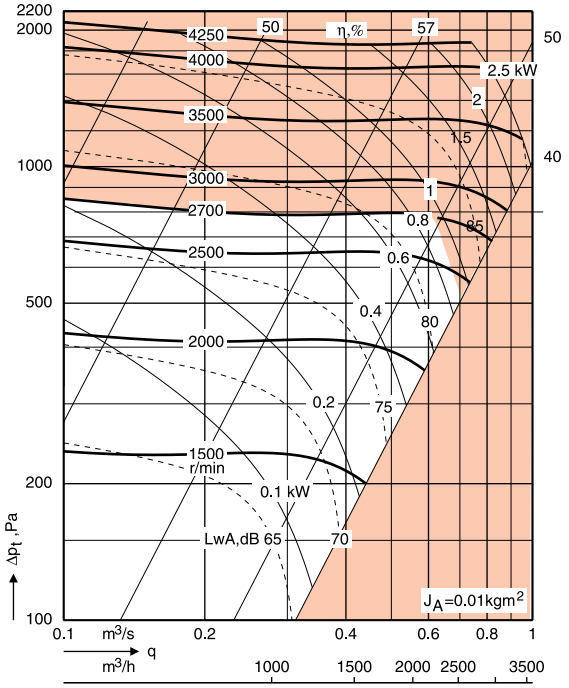
Available for all sizes. Direct-driven, centrifugal fan with backward-curved blades without scroll, impeller made of sheet steel with baked, powder-painted finish, equipped with our patented energy spoiler that offers extremely high total performance. The fan system has a built-in speed controller for the WD, and standard motors for the W1, W2 and W3.

W1, W2 och W3 requires external frequency converters.

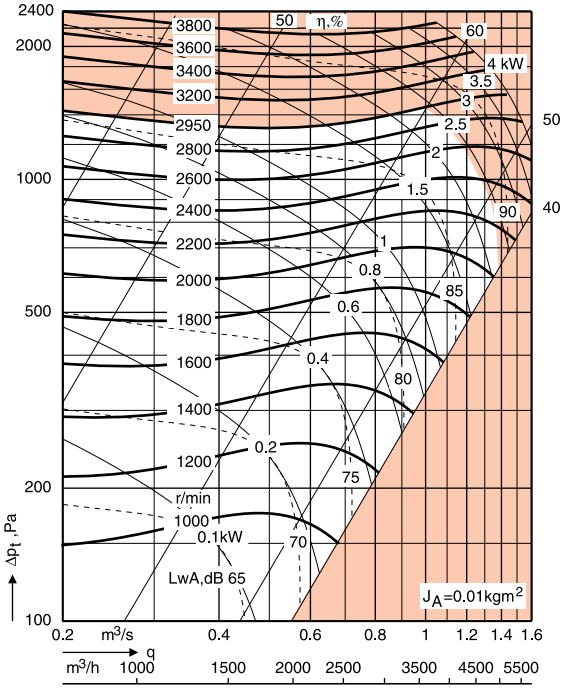


Fan performance – Belt-driven centrifugal fan with forward-curved blades

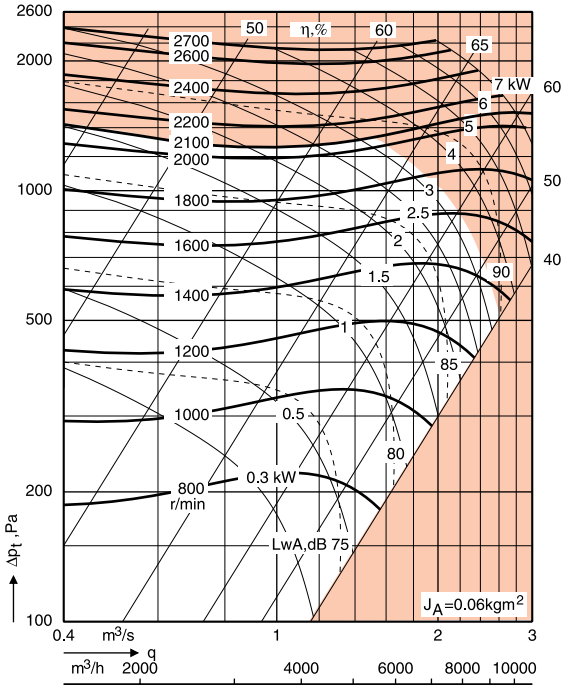
FB 060



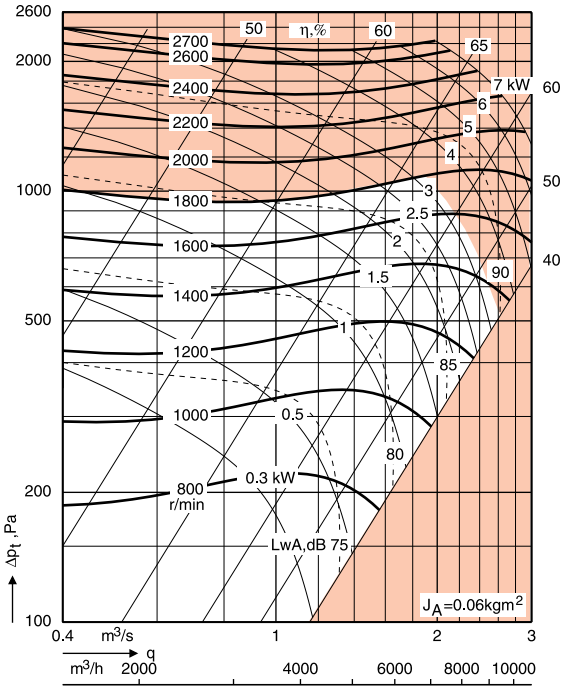
FB 100



FB 150



FB 190



Sound level (data to ISO 5136)

The sound power level L_{WA} read in the appropriate chart can be broken down into octave bands by adding a correction value K_{ok} 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 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 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

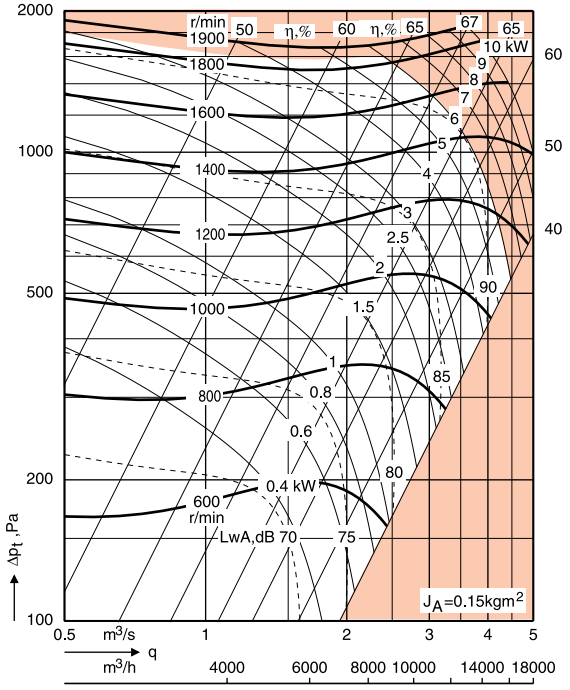
FB 190

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

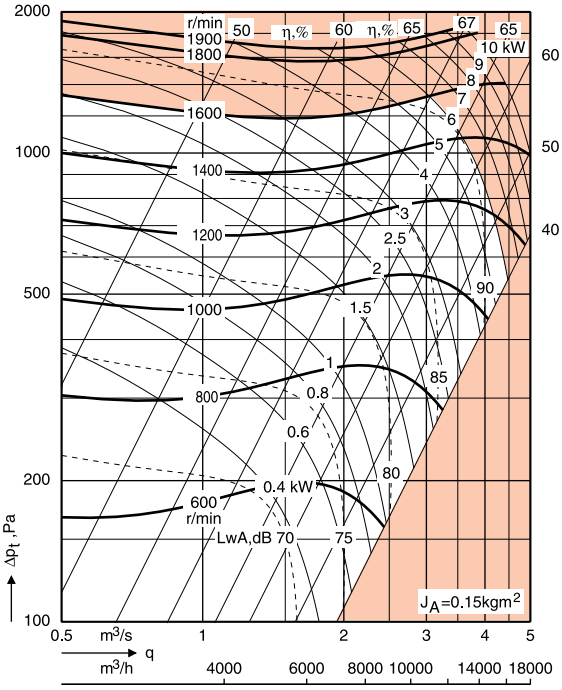
Δpt = Total pressure rise
kW = Power demand excluding transmission losses

q = Air flow
L_{WA} = Total sound power level (A-weighted)

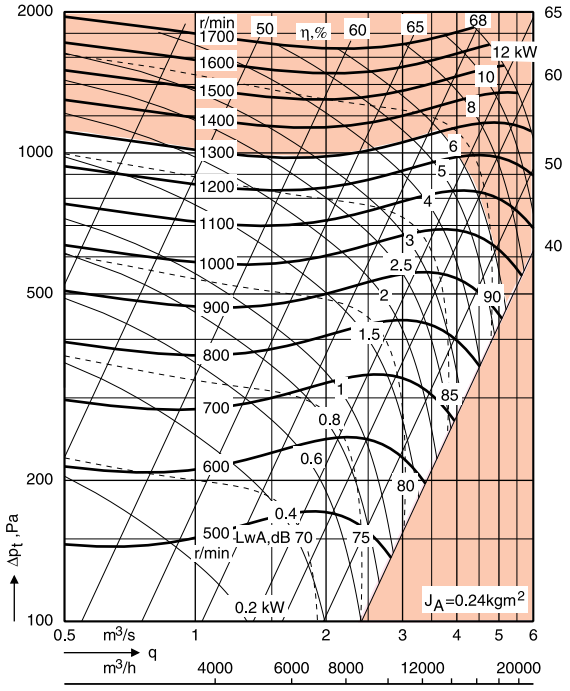
FB 240



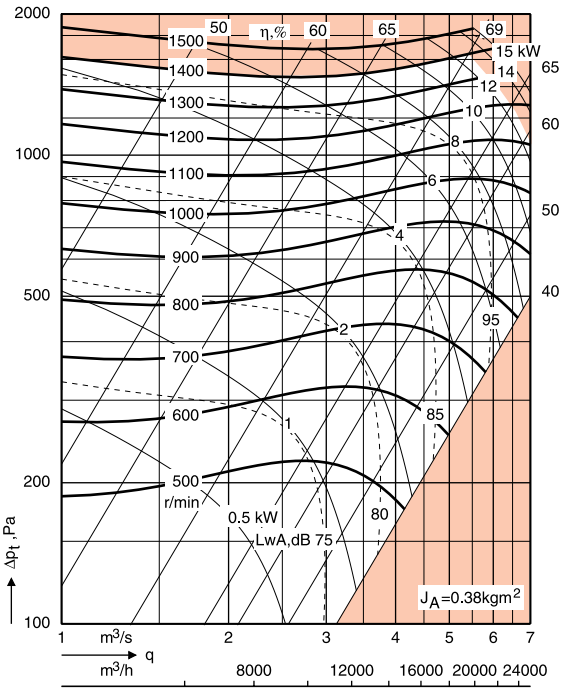
FB 300



FB 360



FB 480



Sound level (data to ISO 5136)

The sound power level L_{wA} read in the appropriate chart can be broken down into octave bands by adding a correction value K_{ok} 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

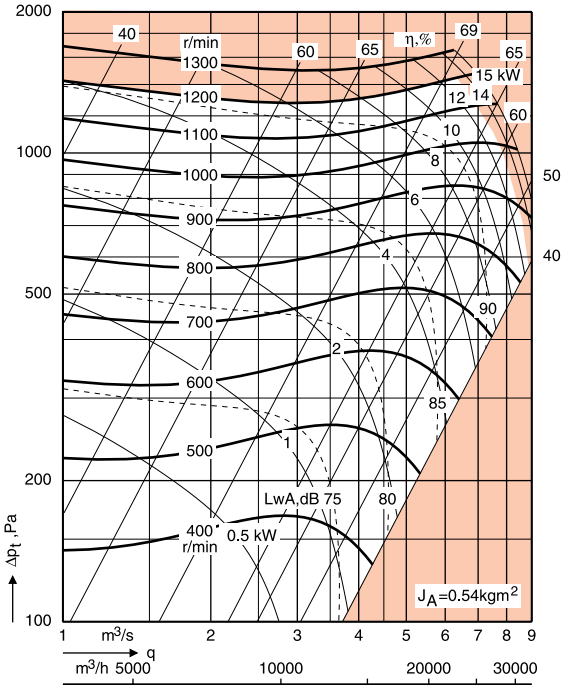
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	+2	-1	0	-1	-2	-12	-18	-27
to outlet	+8	-2	-2	-4	-5	-13	-20	-27

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
L_{wA} = Total sound power level (A-weighted)

FB 600



Sound level (data to ISO 5136)
The sound power level L_{wA} read in the appropriate chart can be broken down into octave bands by adding a correction value K_{ok} from the corresponding table below. The result will be a sound power level that is not A-weighted.

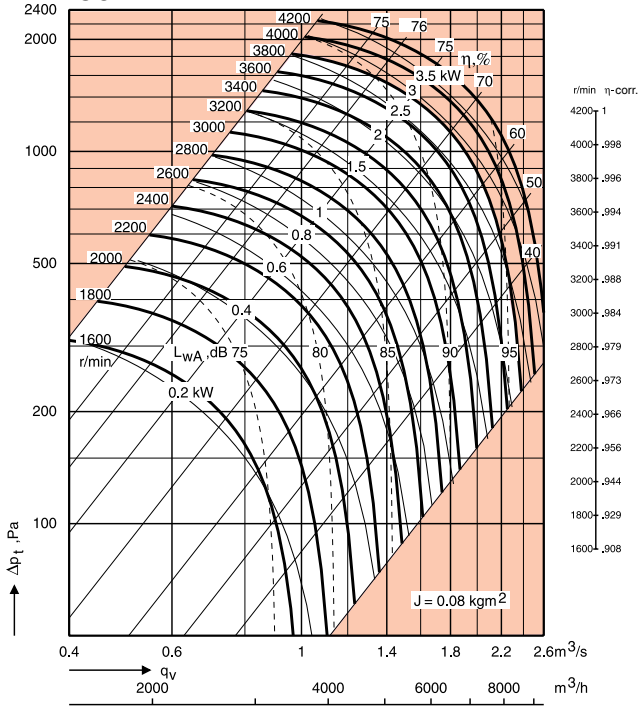
FB 600

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

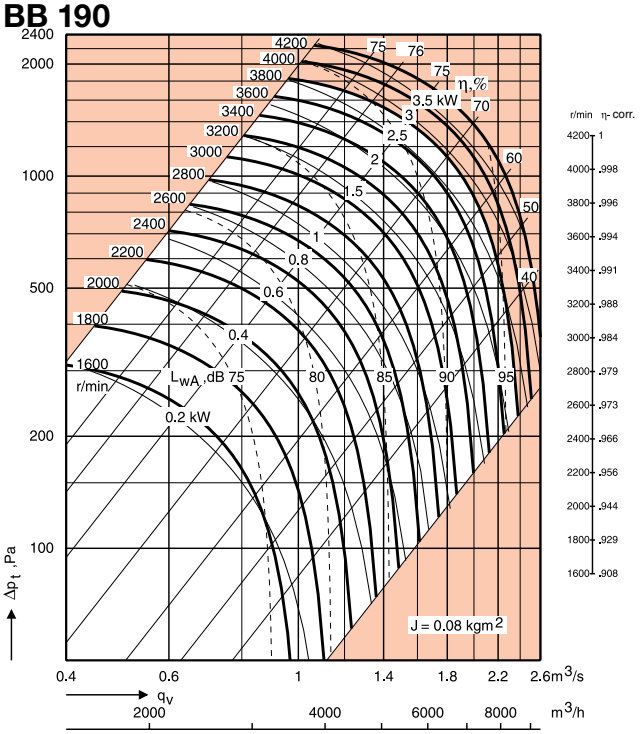
Δpt = Total pressure rise
q = Air flow
kW = Power demand excluding transmission losses
L_{wA} = Total sound power level (A-weighted)

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

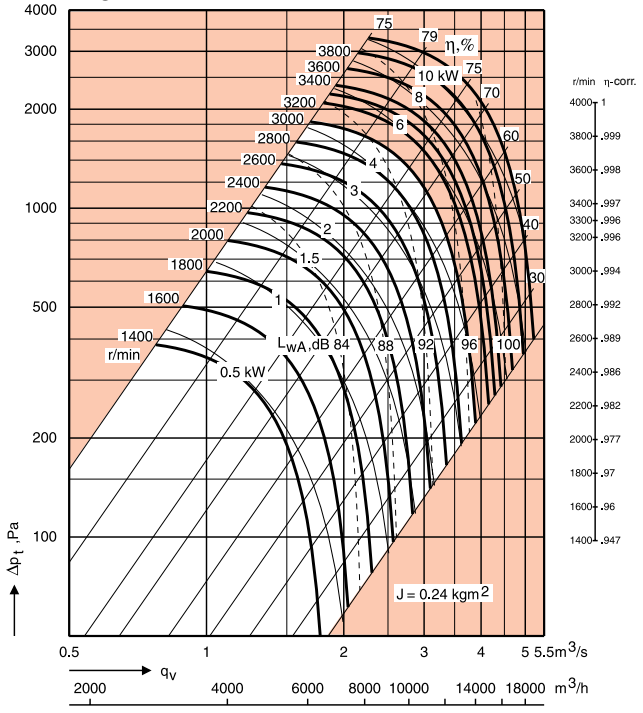
BB 150



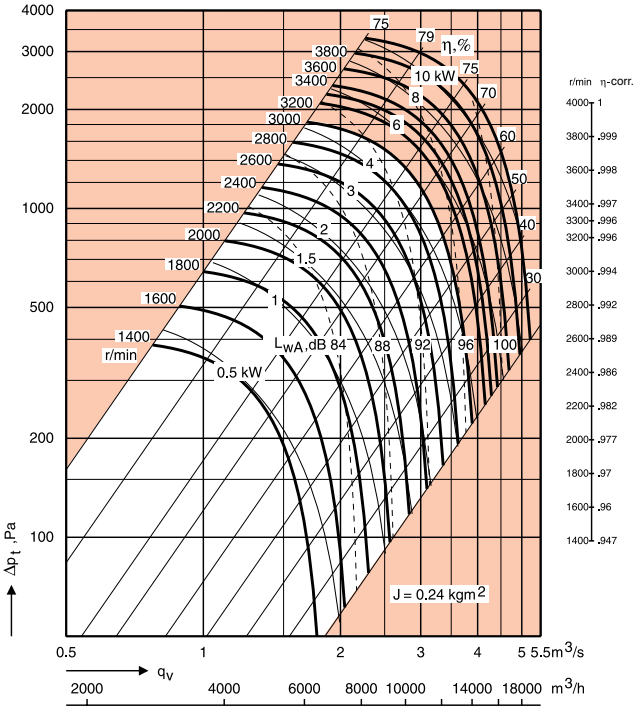
BB 190



BB 240



BB 300



Sound level (data to ISO 5136)

The sound power level L_{WA} read in the appropriate chart can be broken down into octave bands by adding a correction value K_{ok} 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

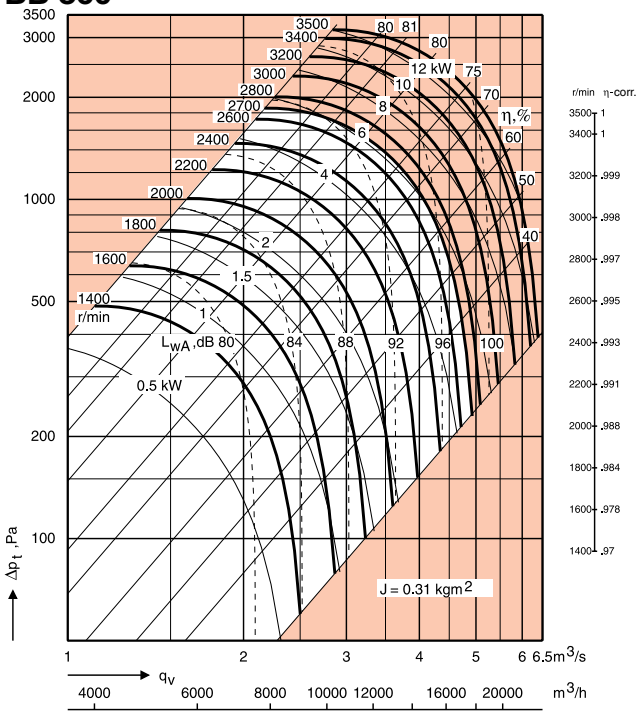
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-7	-5	-4	-1	-5	-13	-22	-33
to outlet	-4	-2	-5	-3	-6	-11	-22	-31

BB 300

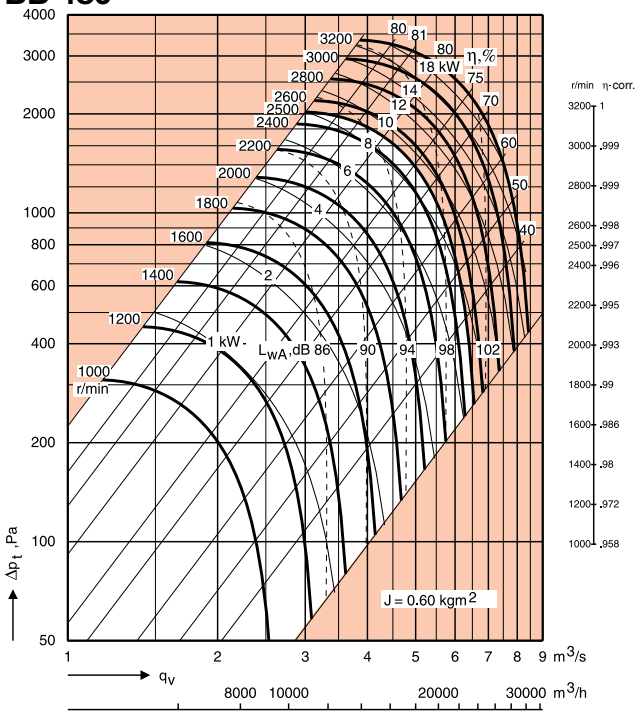
Centre frequency (Hz)	63	125	250	500	1000	2000	4000	8000
to inlet	-7	-5	-4	-1	-5	-13	-22	-33
to outlet	-4	-2	-5	-3	-6	-11	-22	-31

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

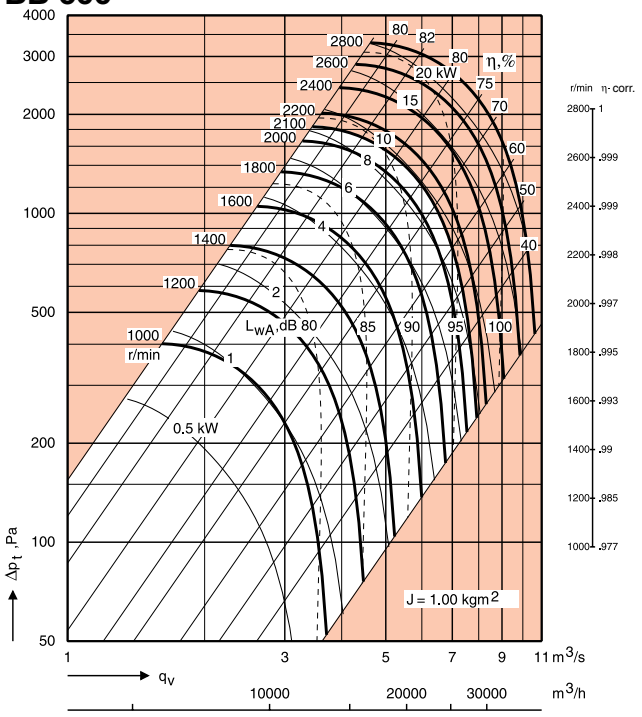
BB 360



BB 480



BB 600



Sound level (data to ISO 5136)

The sound power level L_{WA} read in the appropriate chart can be broken down into octave bands by adding a correction value K_{ok} 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 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

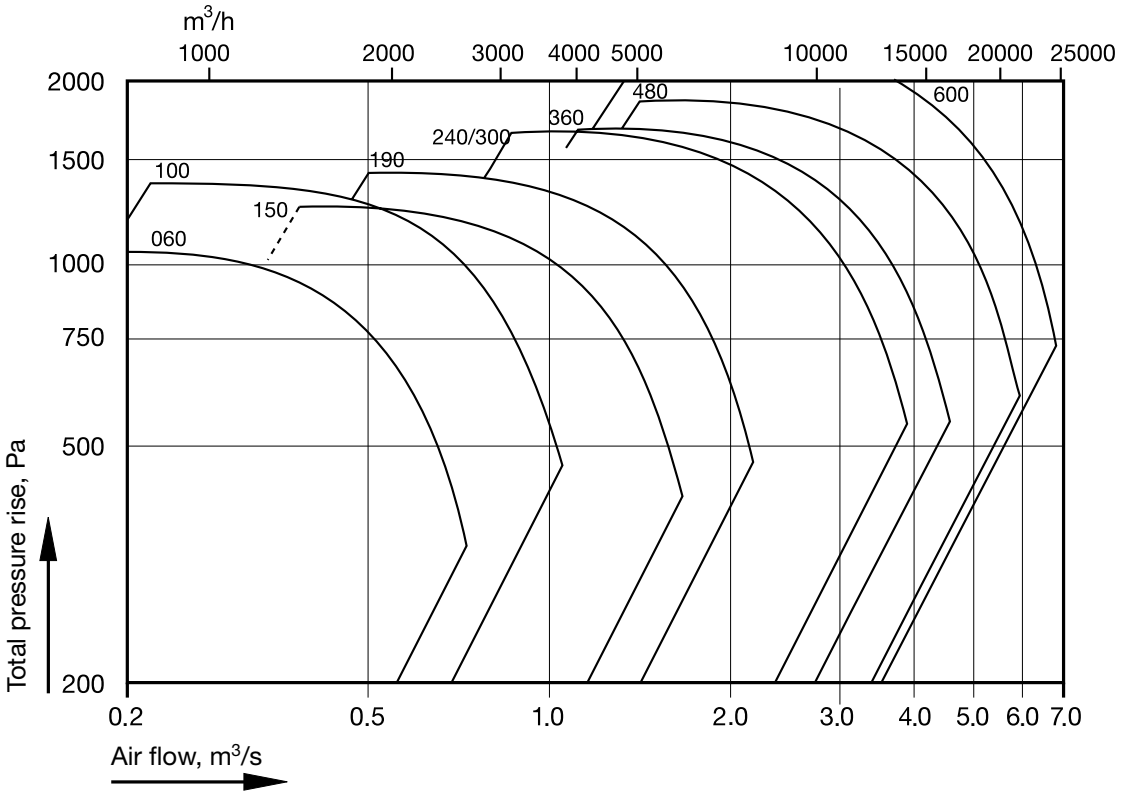
BB 600

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

Δpt = Total pressure rise
kW = Power demand excluding transmission losses

q = Air flow
L_{WA} = Total sound power level (A-weighted)

Fan performance – Windstrong



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 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)

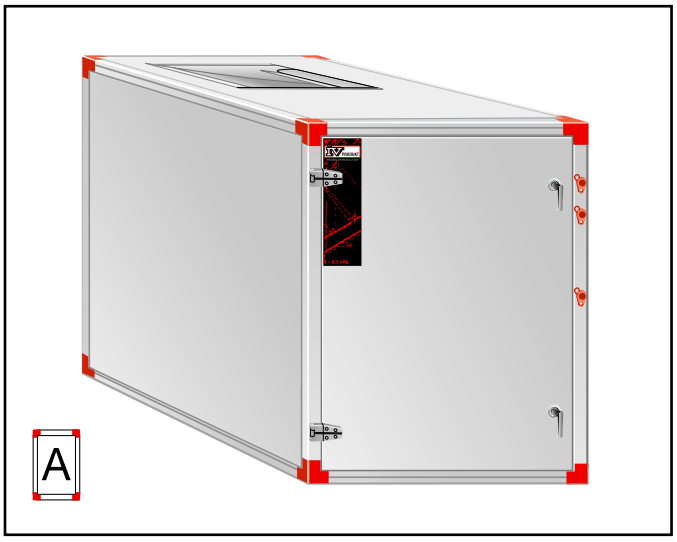
  BB - Belt-driven centrifugal fan with fan casing, backward-curved blades. (Sizes 150–600)

  Windstrong, speed-controlled, direct-driven, centrifugal fan with backward-curved blades without scroll.
  WD, with fitted frequency converter, and
  W1-W3, with standard motors (an external frequency converter is required). (Sizes 060-600)

  The design of some of the components in the fan systems do not conform to Corrosion Class C4.

- 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 fan section outlet is as standard fitted with a connection gable.

Other information is available under Fan fitting MIE-AF



Specification

Fläktdel		**EAF -a -b -c**
a -	**Size:**	060, 100, 150, 190, 240, 300, 360, 480, 600
b -	**Casing:**	00 = Thermal insulation E3 = EI30
c -	**Forw. curved:**	FB: 060 - 600
	Backw. curved:	BB: 150 - 600
	Windstong:	WD, W1-W3: 060 - 600
Motor		**1-bbbb-1-ddd-eeee-ff-g**
b -	**Size:**	[The code always contains 4 figures: 3 digits and 1 letter. E.g. 112M]
d -	**Number of poles:**	200 = 2-poles 240 = 2/4-poles 400 = 4-poles 460 = 4/6-poles 480 = 4/8-poles
e -	**Power*:**	E.g. 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:		RD = V-belt RB = Poly-V-belt

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

** Applicable to single-speed motors.

Accessories

Connection frame, small
MIET-AF-01-a

Flexible connection, small
MIET-AF-02-a

Steel spring anti-vibration mountings
MIET-AF-03-a
(FB, BB 150 – 600)

Spark-proof fan inlet **MIET-AF-05-a-c**
(FF, BB)

Flow measurement tapping (excl. meter)
MIET-AF-08-a-c

Air flow meter, manometer type
MIET-AF-09-a-c

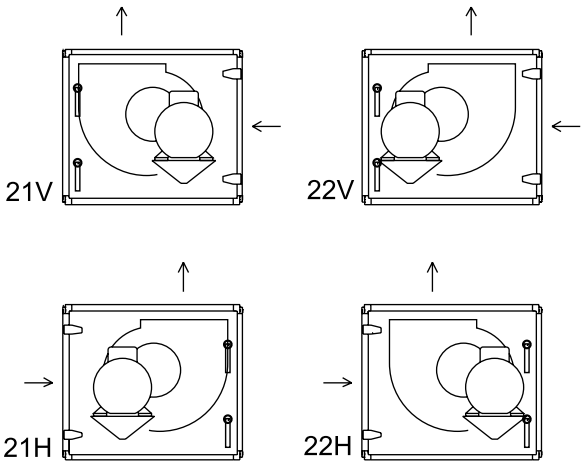
Air flow meter, electronic
MIET-AF-10-a-c

Other accessories

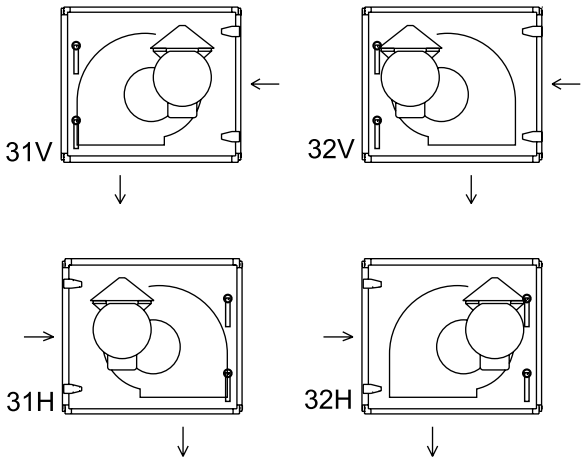
MIET-AF-04 Clean-out hatch
MIET-AF-06 Wiring to safety isolating switch
EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection ..... page 75
EMMT-04 Outdoor unit ..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window ..... page 77
EMMT-07 Light fitting ..... page 77
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77

Configuration

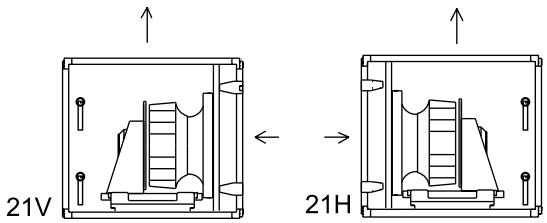
FB 060 - 600 / BB 150 - 600



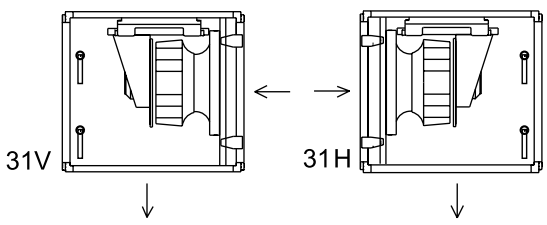
FB 060 - 190 / BB 150 -190



Windstrong 060 - 600



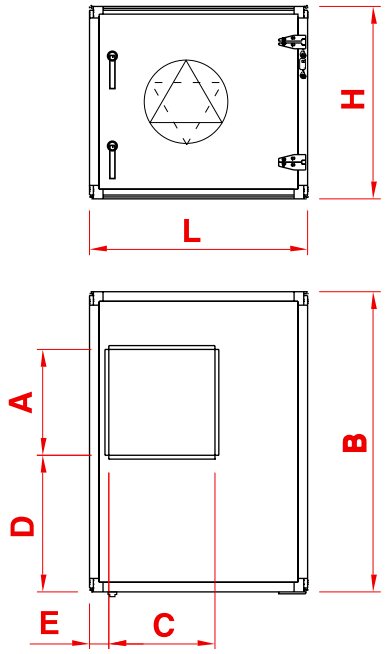
Windstrong 060 - 190



V = Left-hand
H = Right-hand

Technical details

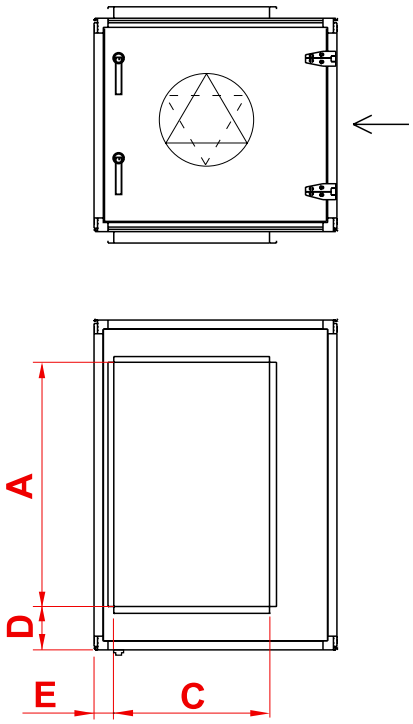
Dimensions and weights



Size	Dimension (mm) FB/BB								Dimension (mm) WD				00 (kg)			E3 (kg)			Max. motor size
	L	B	H	A	C	D	E V.21 & 31	E V.22 & 32	A	C	D	E	FB	BB	WD	FB	BB	WD	
060	630	850	440	230	230	380	80	320	500	300	175	165	55	-	67	60	-	75	80
100	630	980	505	280	280	480	65	285	700	300	140	306	65	-	75	75	-	95	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

Connection frames

Size	Connection frame small MIET-AF-01 Dimension (mm)					Connection frame large EMMT-02 Dimension (mm)					
	FB/BB					FB/BB					WD
	A	C	D	E V.21 & 31	E V.22 & 32	A	C	D	E V.21 & 31	E V.22 & 32	E
060	300	300	345	65	265	500	300	175	65	265	165
100	300	300	470	65	265	700	300	140	65	265	205
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



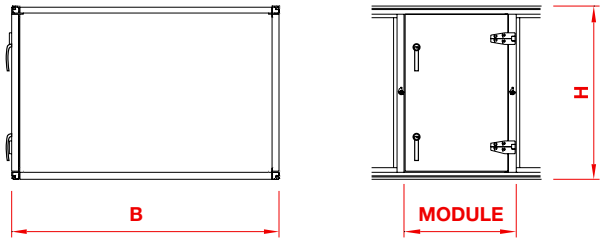
MIE-KM Inspection fitting

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

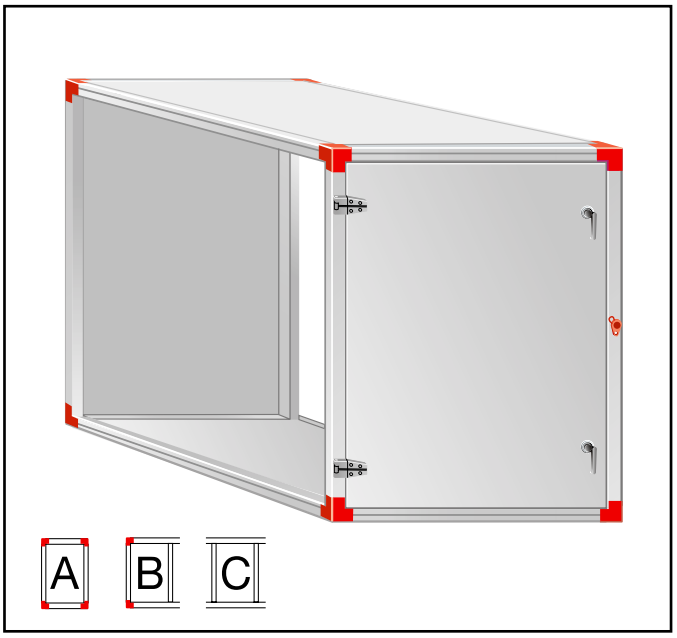


Dimensions

Size	Module (mm)			Dimension (mm)	
	10	15	20	B	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

Weight

Size	Weight (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 - Casing:	00 = Thermal insulation E3 = EI30

Accessories

Air distributor	**MIET-KM-01-a**

Other accessories

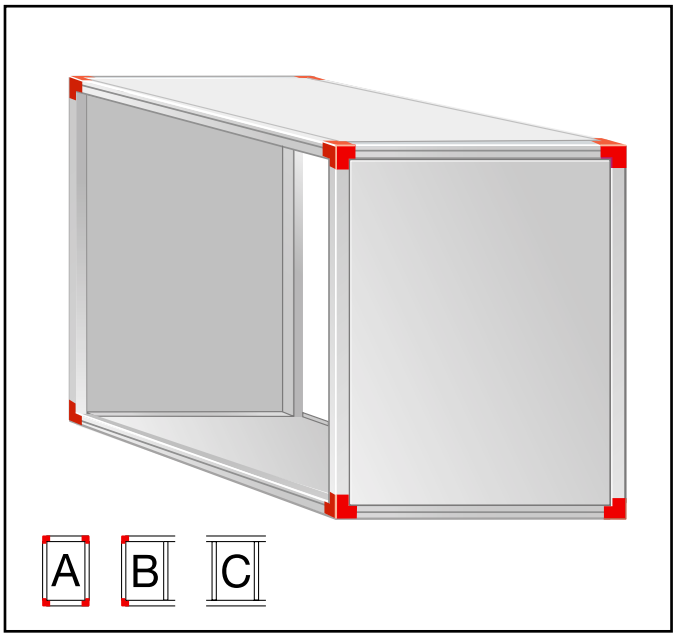
EMMT-06 Inspection window..... page 77
EMMT-07 Light fitting..... page 77

See also accessories described under the EMM standard module.

MIE-TD Empty section fitting

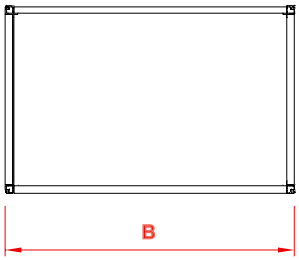
General

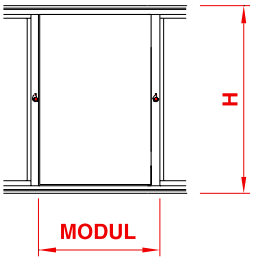
The fitting consists of a fixed front casing panel. The panel is designed for incorporation in an EMM module.



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 -	**Casing:**	00 = Thermal insulation E3 = EI30

Accessories

Drip tray **MIET -TD- 01 -a**

** Not available as a separate module.*

Other accessories

EMMT-06 Inspection window..... page 77

EMMT-07 Light fitting..... page 77

See also accessories described under the EMM standard module.

Dimensions, mm

Size	Module (mm)																Dimension (mm)	
	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	B	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

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

* Stated weight refers to casing with thermal insulation. For casing with EI 30 weight increases by 25%.

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

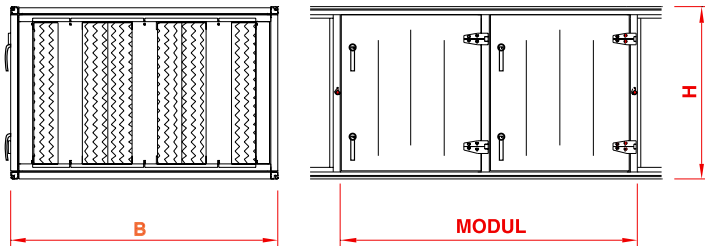
- The silencer has 200 mm thick baffle elements.
- The baffle material (mineral wool) is covered with a cleanable woven fabric, Cleantech.
- The material has been granted type-approval for use as lining inside ventilation ducting.
- The baffles are mounted on rails and are easily withdrawable for cleaning.
- 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.

Technical details

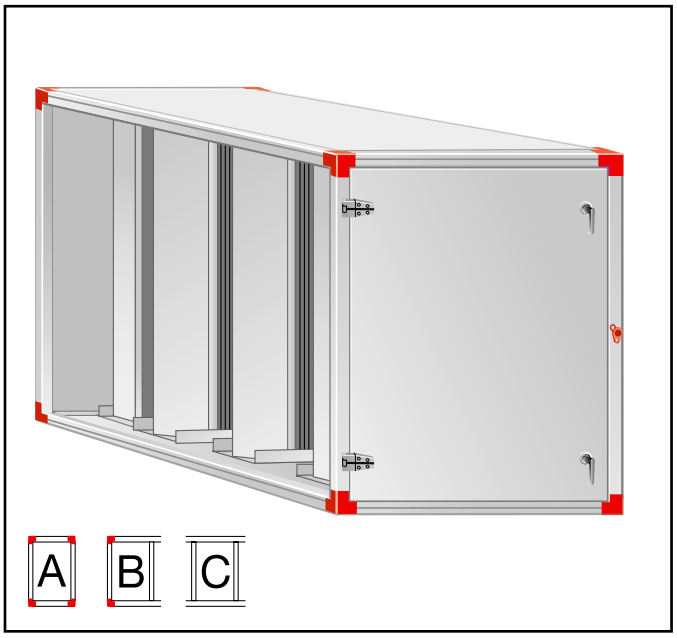
The integral attenuation is tabulated on page 8.

Dimensions and weights

Dimensions



Size	Module (mm)				Dimension (mm)	
	30	40	50	60	B	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



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 - Casing:	00 = Thermal insulation E3 = EI30

Other accessories

See the EMM standard module.

Weight

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

MIE-MD Media fitting

General

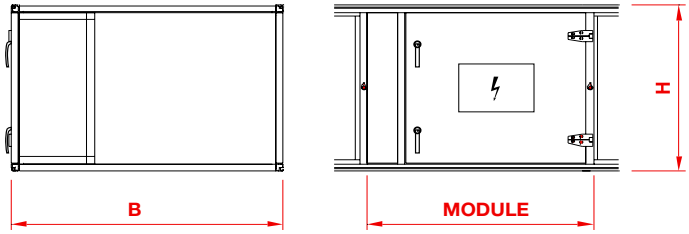
The fitting consist of a shielded space for the installation of electrical and control equipment cubicles, and a front casing panel. The assembly parts are designed for incorporation in an EMM module.

Design

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

Technical details

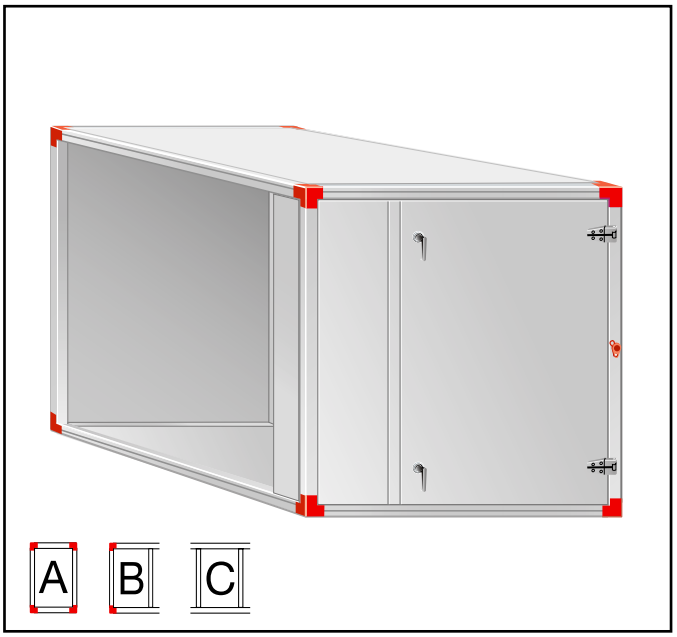
Dimensions and weights



Size	Module (mm)	Dimension (mm)		Weight (kg)
	30	B	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

Available space 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	998	280



Specification

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

Other accessories

See the EMM standard module.

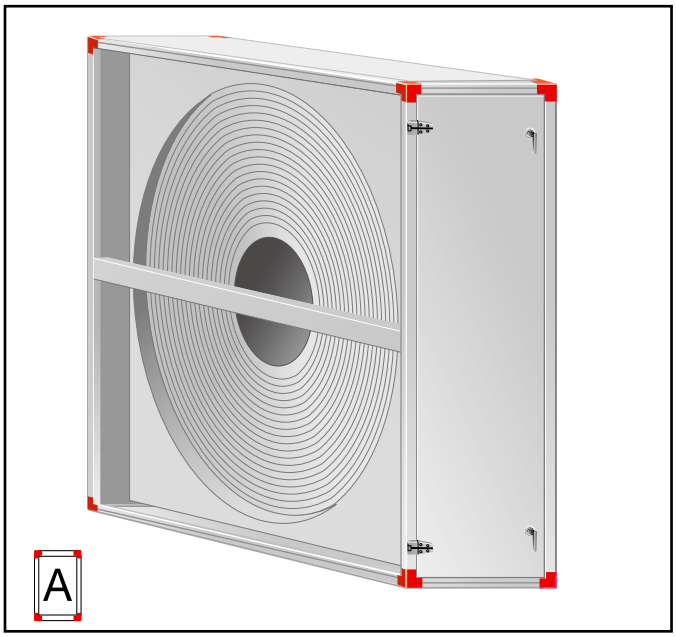
Energy Recovery Units
EXA Rotary Heat Exchanger

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 is also vavilable in Plus-version with increased recovery efficiency
- 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.



Specification

Rotary heat exchanger **EXA -a -b -c**

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

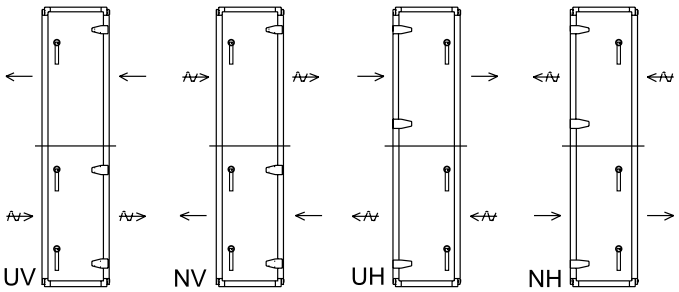
b - Casing: 00 = Thermal insulation
E3 = EI30

c - Typ:
NO = Normal
HY = Hygroscopic
NP = Normal Plus
HP = Hygroscopic Plus
EX = Epoxi

Accessories

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

Configuration



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

Other accessories

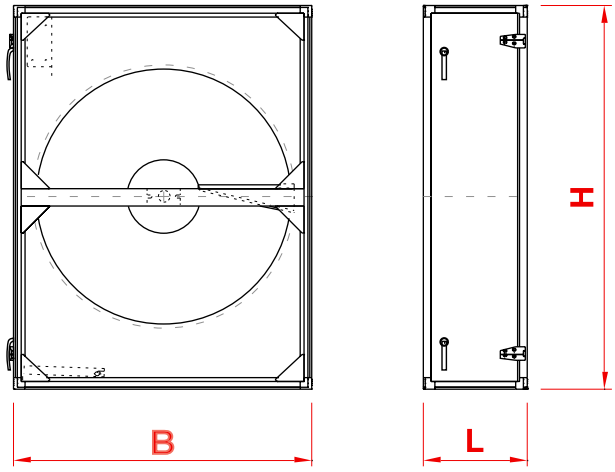
EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Dukstos ..... sida 77
EMMT-04 Outdoor unit ..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window ..... page 77
EMMT-07 Light fitting ..... page 77
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77

Motor data

Size	Output W	Current A	Voltage V	Fuse
060-150	40	0,33	1 × 230	10 A Delay action
190-360	40	0,7	1 × 230	10 A Delay action
480-600	100	1,3	1 × 230	10 A Delay action

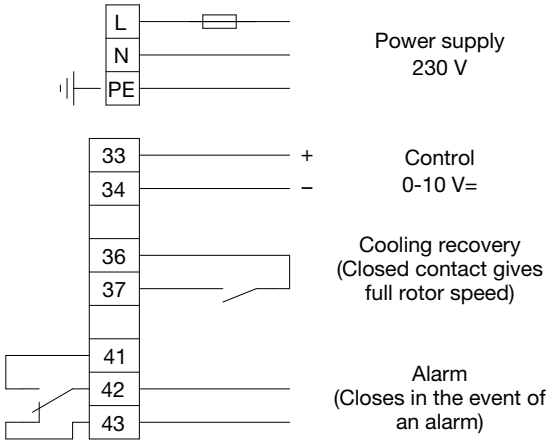
Technical details

Dimensions and weights



Size	Module (mm)			Dimension (mm)	
	L	B	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

Wiring diagram



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.

For size 190-600 operation control is done without rotation speed monitor. The controller monitors the torque of the motor and gives signal if it falls short of the set value. Rotor speed control is matched to a regulating curve which is as good as linear to that of the temperature efficiency.

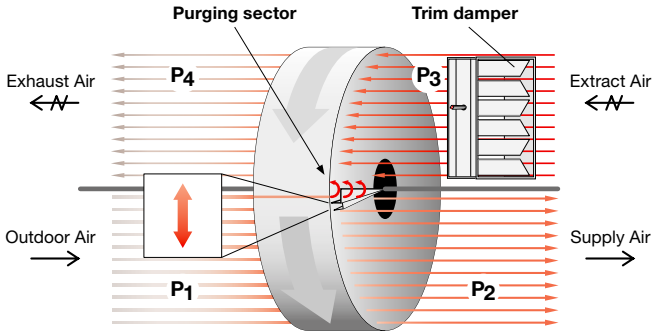
Purging operation and leakage air flow

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.

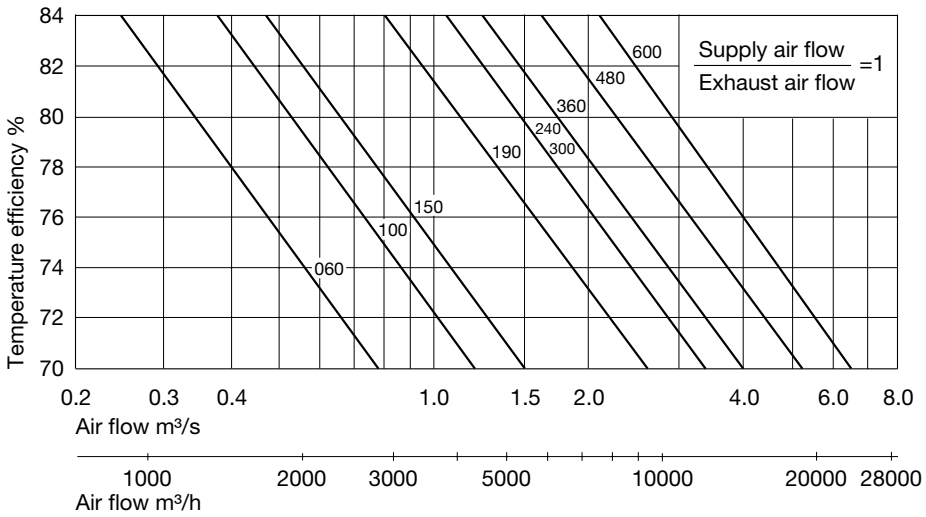
If a purging sector is fitted and set at the appropriate angle, it purges the rotor with air. This will eliminate the transfer of exhaust air to the supply air. If a heat recovery unit with purging sector is installed, the fans should be located so that P1 > P4 and P2 > P3 as illustrated in the adjacent 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 cleaning air flow.

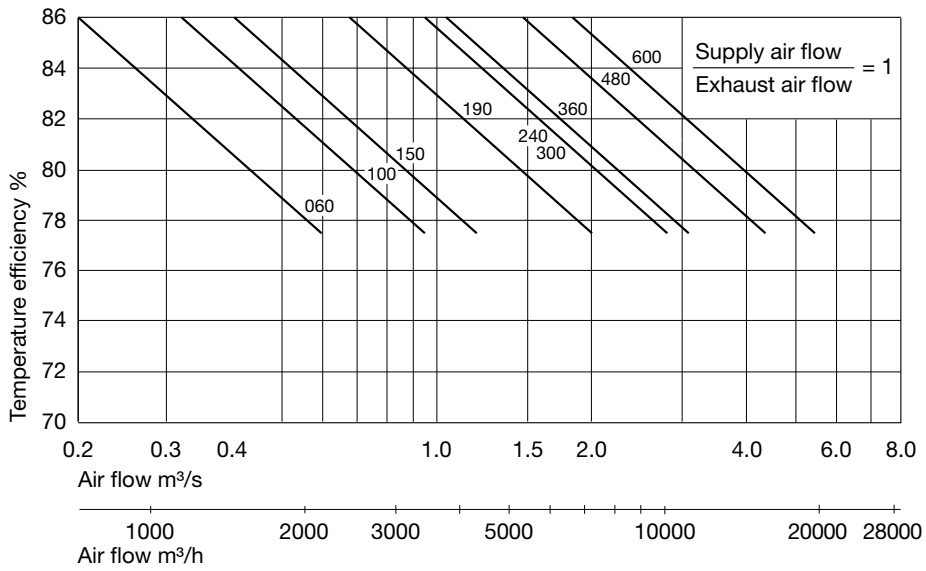
IV Produkt Designer calculates leakage air flow and determines whether a trim damper will be neccessary or not.



Temperature efficiency NO and HY rotors



Temperature efficiency NP and HP rotors



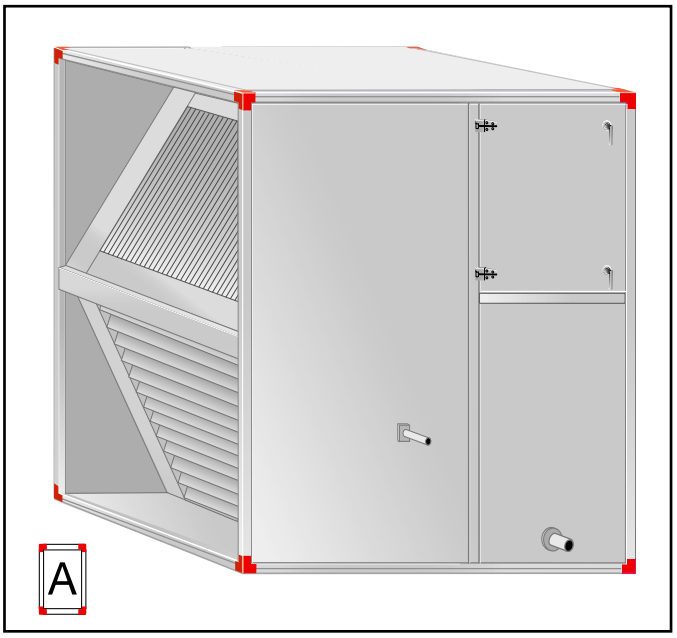
EXC Plate Heat Exchanger

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 Corrosion Class C4 are used.



Specification

Plate heat exchanger EXC -a -b -c

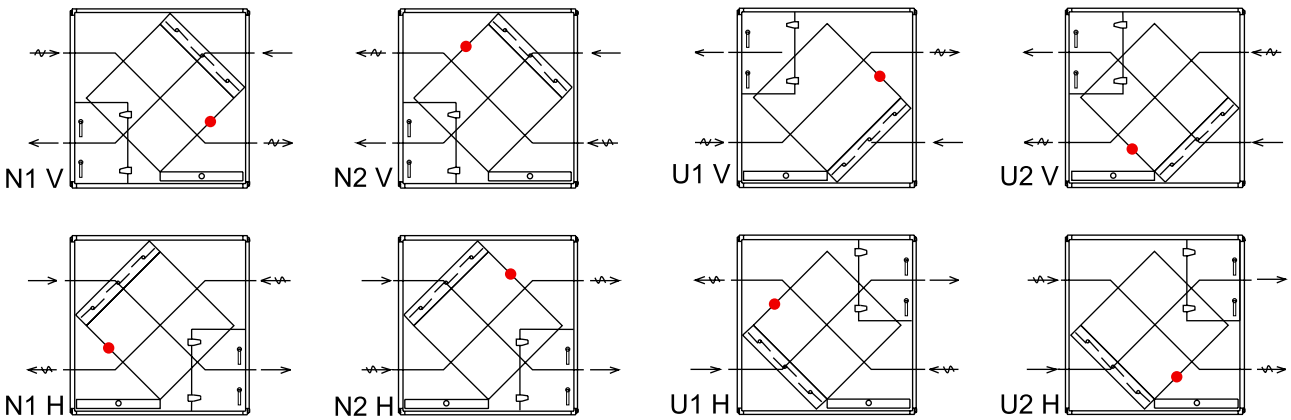
a -	**Size:**	060, 100, 150, 190, 240, 300, 360, 480, 600
b -	**Casing:**	00 = Thermal insulation E3 = EI30
c -	**Type:**	A = Aluminium B = Epoxy-treated

Other accessories

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection..... page 75
EMMT-04 Outdoor unit..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77

Configuration

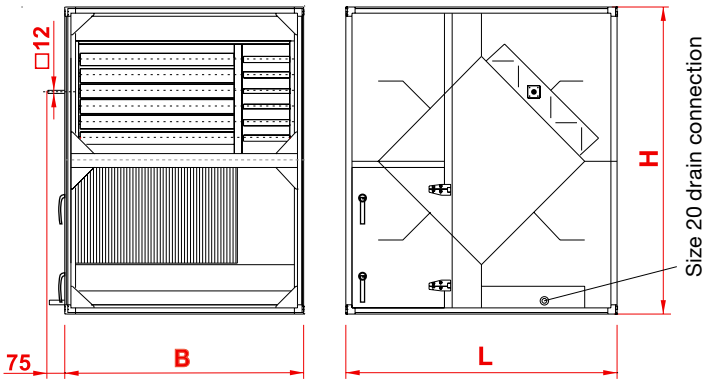
U = Supply air flow through upper section
N = Supply air flow through lower section
V = Left-hand
H = Right-hand



● = Placing of frosting sensor.

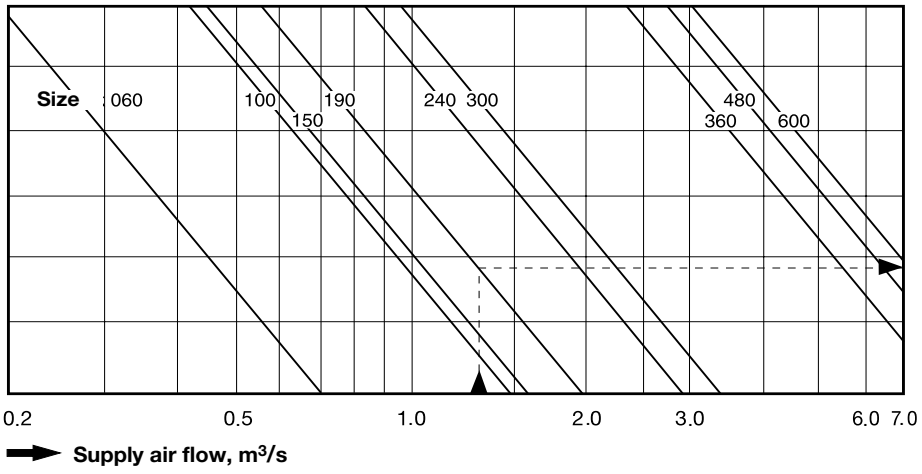
Technical details

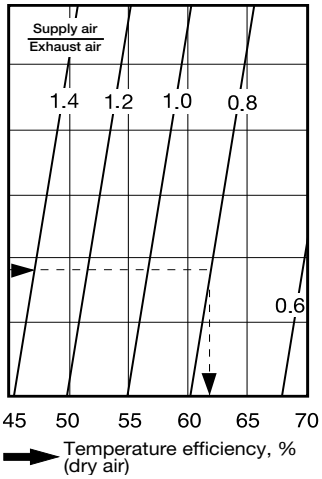
Dimensions and weights



Size	Dimension (mm)			Weight (kg)		Req.* torque (Nm)
	L	B	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.*





Example

Given:

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

From the chart:

Temperature efficiency 62%

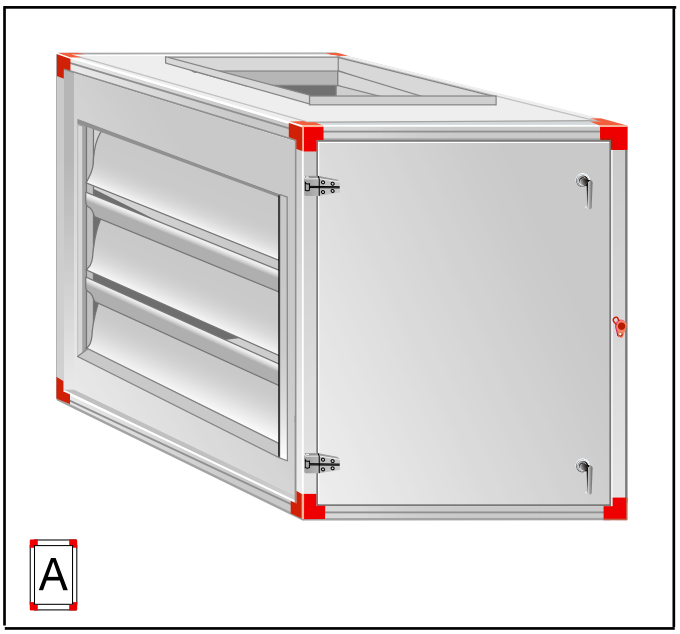
Complete Functional Sections
EBA Mixing section

General

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

Design

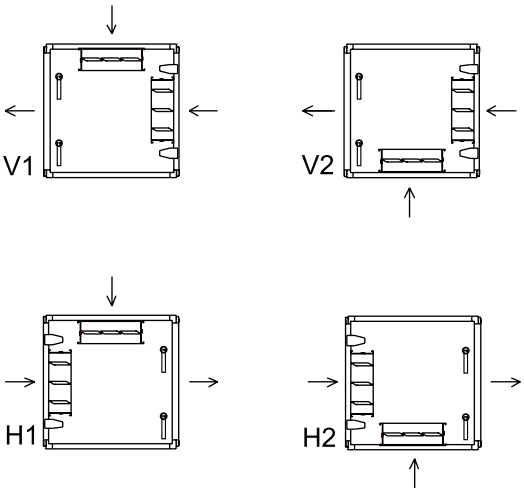
- The dampers are made of aluminium profiles and meet the provisions of Environmental Class 3.
- The damper blades are driven by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber provides a tight seal between the blades.
- The dampers are interlinked to a common shaft inside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



Specification

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

Configuration



V = Left-hand
H = Right-hand

Accessories

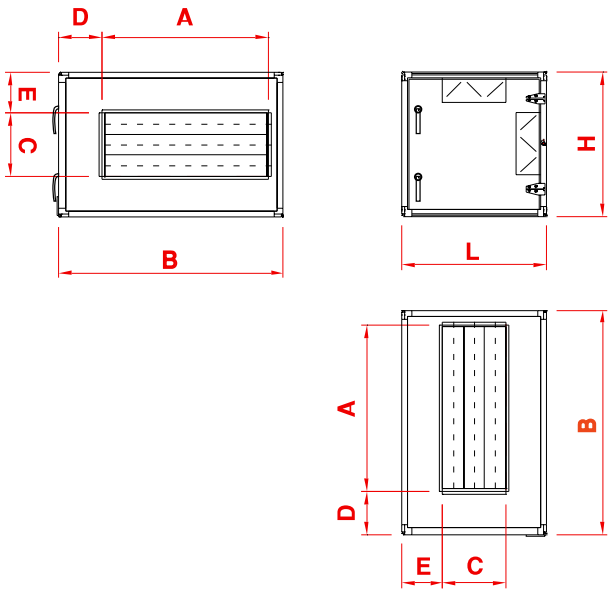
KJST-02 Damper actuator

Other accessories

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection..... page 75
EMMT-04 Outdoor unit..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window..... page 77
EMMT-07 Light fitting..... page 77
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg)		Req.* torque (Nm)
								Casing		
	L	B	H	A	C	D	E	00	E3	
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 (12×12 mm damper shaft)*

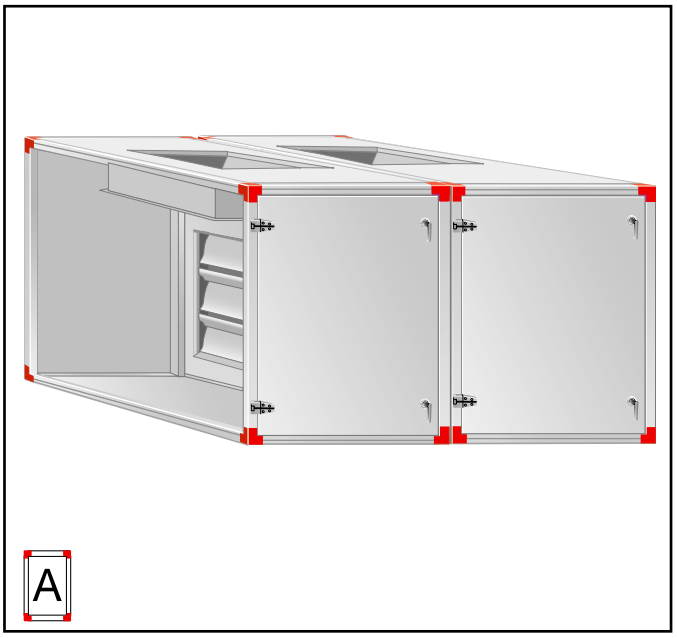
EBB Mixing section

General

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

Design

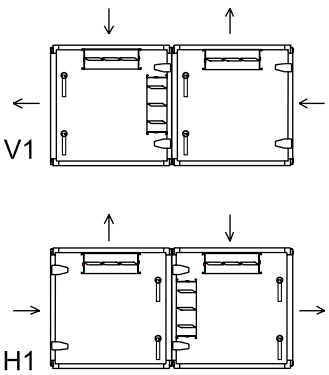
- The EBB mixing section has built-in type KJS dampers of IV Produkt manufacture.
- The dampers are made of aluminium profiles and meet the provisions of Corrosion Class C4.
- The damper blades are driven by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber provides a tight seal between the blades.
- The dampers are interlinked across two shafts inside the section.
- Tightness Class 3 to VVS AMA -98.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa
- The unit section has inspection doors as standard.



Specification

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

Configuration



Accessories

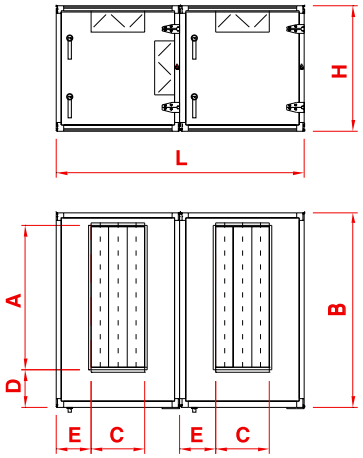
KJST-02	Damper actuator

Other accessories

EMMT-01	Connection gable	page 75
EMMT-02	Connection frame	page 75
EMMT-03	Flexible connection	page 75
EMMT-04	Outdoor unit	page 76
EMMT-05	Stand/Support frame	page 76
EMMT-06	Inspection window	page 77
EMMT-07	Light fitting	page 77
EMMT-08	Lifting brackets	page 77
EMMT-10	Compact unit	page 77

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg)		Req. torque (Nm)
								Casing		
	L	B	H	A	C	D	E	00	E3	
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	1200	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 × 0.5.*

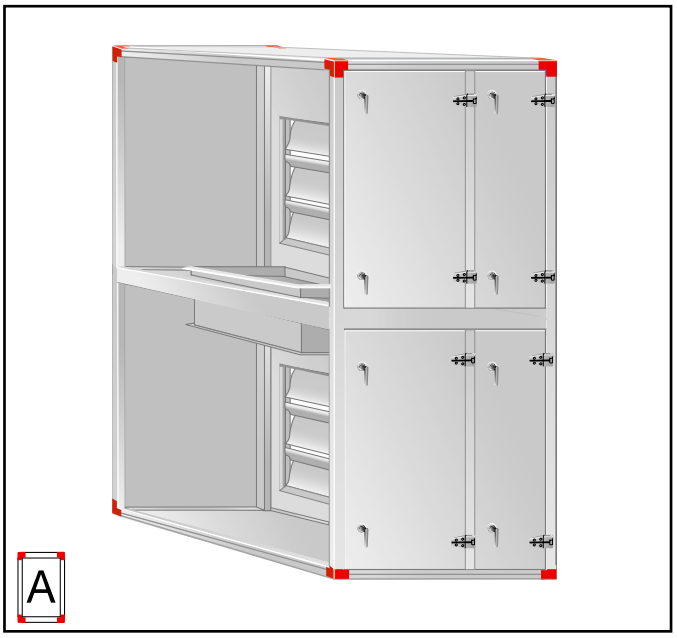
EBC Mixing section

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

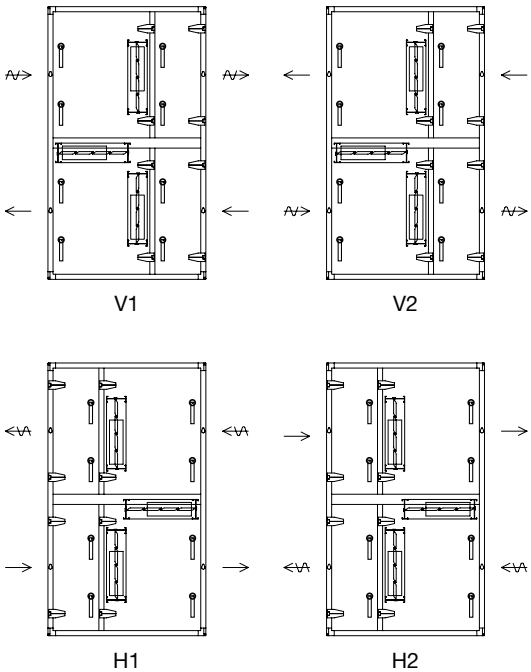
- The EBC mixing section has built-in type KJS dampers of IV Produkt manufacture.
- The dampers are made of aluminium profiles and meet the provisions of Corrosion Class C4.
- The damper blades are positioned by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber achieves a tight seal between the blades.
- The dampers are interlinked across two shafts inside the section
- Tightness Class 3 to VVS AMA -98 is standard.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa.
- The EBC mixing section has an inspection door in the upper level aswell as in the lower level.



Specification

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

Configuration



V = Left-hand
H = Right-hand

Accessories

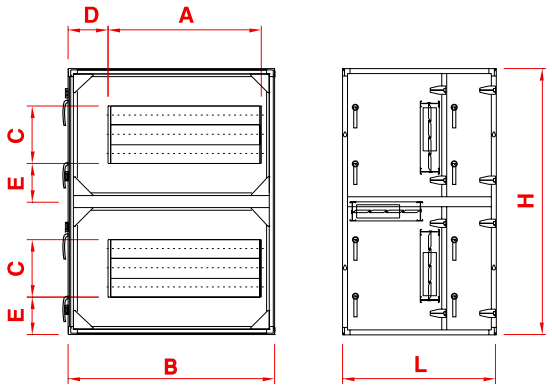
KJST-02 Damper actuator

Other accessories

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection..... page 75
EMMT-04 Outdoor unit..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window..... page 77
EMMT-07 Light fitting..... page 77
EMMT-08 Lifting bracket..... page 77
EMMT-10 Compact unit ..... page 77

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg)		Req. torque (Nm)
								Casing		
	L	B	H	A	C	D	E	00	E3	
060	440	850	880	500	200	210	70	55	65	3
100	505	980	1010	700	200	210	120	70	80	3
150	695	1080	1390	800	300	210	200	105	120	5
190	695	1360	1390	1000	300	210	200	115	125	5
240	805	1360	1610	1000	400	210	200	140	160	6
300	805	1575	1610	1200	400	210	200	155	180	6
360	990	1575	1980	1200	500	210	245	190	225	8
480	990	1950	1980	1400	500	275	245	215	260	8
600	1095	2160	2190	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 × 0.5.*

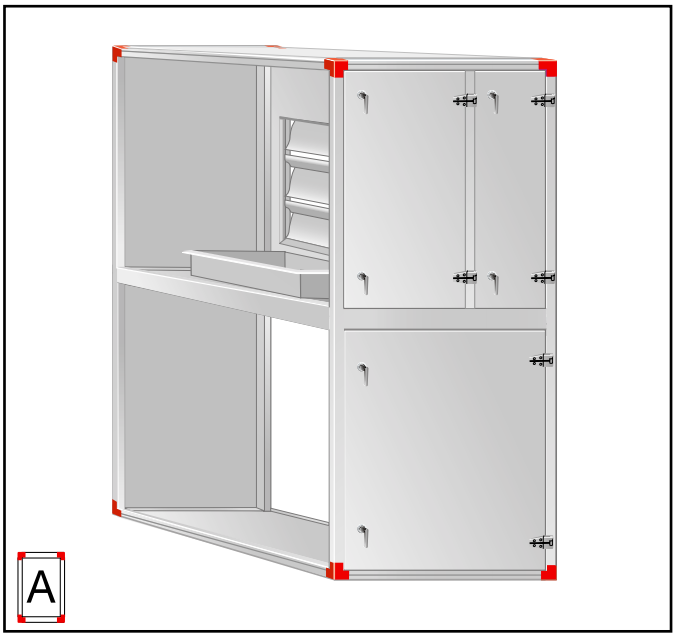
EBD Mixing Section

General

EBD Mixing section is a unit section with two dampers specially intended for recycled air for the purpose of heating during night-time operation.

Design

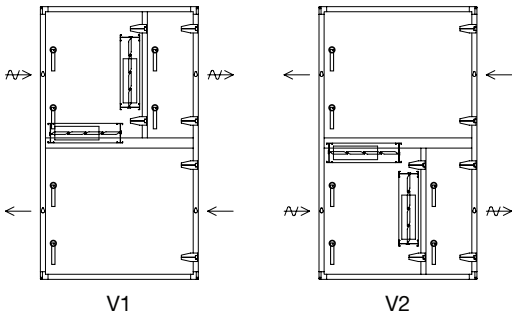
- The EBD mixing section has built-in type KJS dampers of IV Produkt manufacture.
- The dampers are made of aluminium profiles and meet the provisions of Corrosion Class C4.
- The damper blades are driven by means of gear wheels made of ABS plastic. A tubular seal made of silicone rubber provides a tight seal between the blades.
- The dampers are interlinked across two shafts inside the section.
- Tightness Class 3 to VVS AMA -98.
- Permissible temperature range: -40 – +80 °C.
- Max. permissible differential pressure: 1400 Pa.
- The EBD mixing section has inspection doors in upper aswell as lower level.

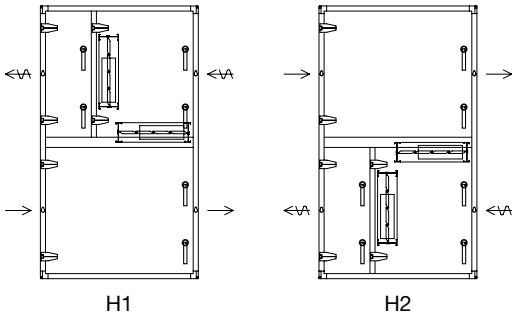


Specification

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

Configuration





V = Left-hand
H = Right-hand

Accessories

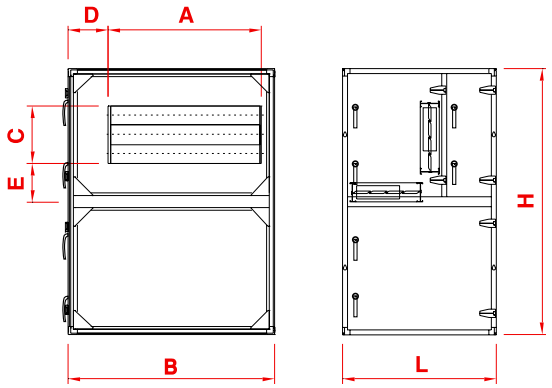
KJST-02 Damper actuator

Other accessories

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection..... page 75
EMMT-04 Outdoor unit..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window..... page 77
EMMT-07 Light fitting..... page 77
EMMT-08 Lifting bracket..... page 77
EMMT-10 Compact unit ..... page 77

Technical details

Dimensions and weights



Size	Dimension (mm)							Weight (kg) Casing		Req. torque (Nm)
	L	B	H	A	C	D	E	00	E3	
060	440	850	880	500	200	210	70	50	60	3
100	505	980	1010	700	200	210	120	63	73	3
150	695	1080	1390	800	300	210	200	94	109	5
190	695	1360	1390	1000	300	210	200	101	111	5
240	805	1360	1610	1000	400	210	200	124	144	6
300	805	1575	1610	1200	400	210	200	136	161	6
360	990	1575	1980	1200	500	210	245	167	202	8
480	990	1950	1980	1400	500	275	245	186	231	8
600	1095	2160	2190	1600	600	280	245	225	280	12

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

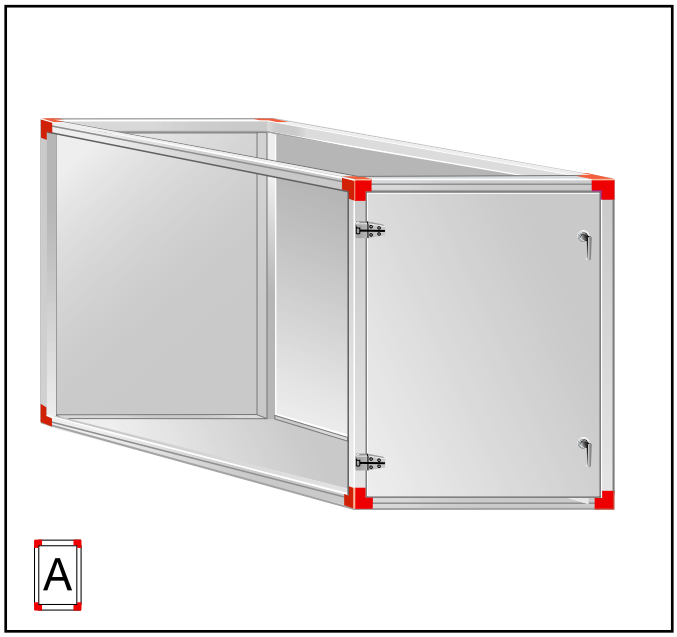
EKV Angle section

General

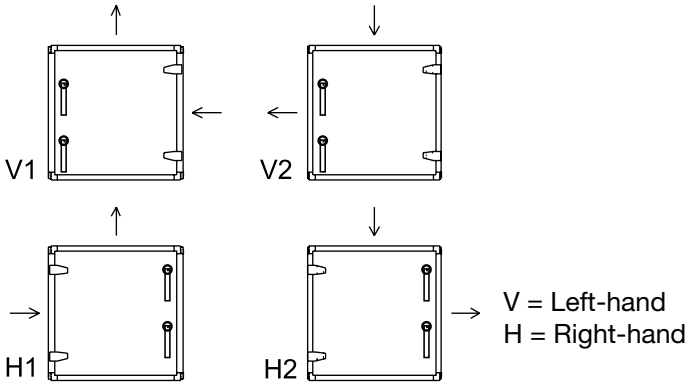
The EKV Angle section is utilised for deflecting the air flow.

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, EMT-01 can be fitted to the EKV.



Configuration



Specification

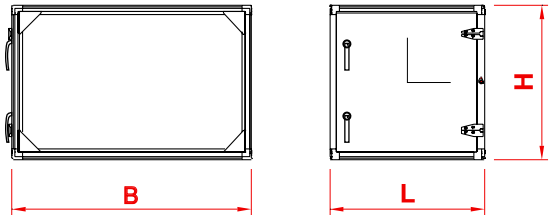
Angle section	**EKV -a -b**
a - Size:	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30

Accessories

Filter fitting	EKVT -01 -a

Technical details

Dimensions and weights



Size	Dimension (mm)			Casing (kg)	
	L	B	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 Manometer DPA 500P Kytölä
MIET-FB-03 Manometer 2000 Magnehelic

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection ..... page 75
EMMT-04 Outdoor unit ..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-06 Inspection window ..... page 77
EMMT-07 Light fitting ..... page 77
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77
EMT-01* Air intake/duct damper ..... page 78

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

EMD Media section

General

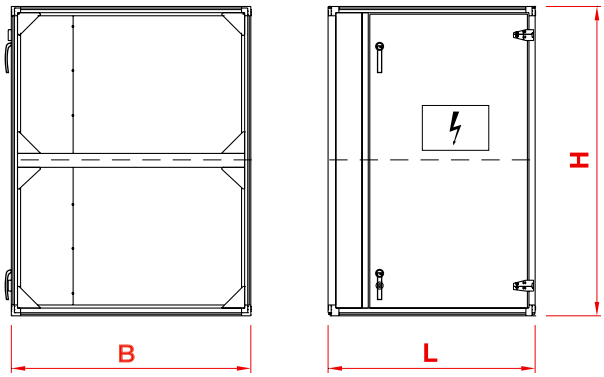
The EMD Media section has a shielded space for the installation of an electrical and control equipment cubicles.

Design

- The media section has two levels.

Technical details

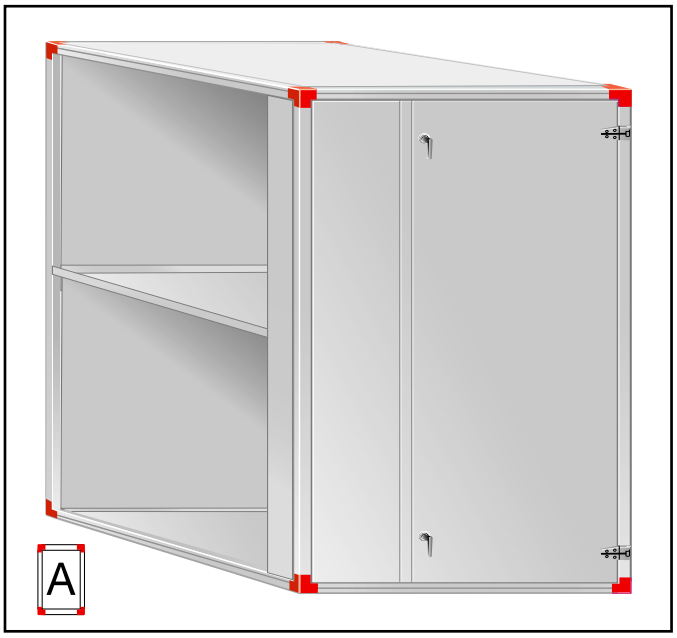
Dimensions and weights



Size	Dimension (mm)			Casing (kg)	
	L	B	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	1575	1610	140	170
360	930	1575	1980	155	190
480	930	1950	1980	175	210
600	930	2160	2190	190	230

Space available for control equipment cubicle

Size	Dimension (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

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection ..... page 75
EMMT-04 Outdoor unit ..... page 76
EMMT-05 Stand/Support frame ..... page 76
EMMT-08 Lifting brackets ..... page 77
EMMT-10 Compact unit ..... page 77

Cooling Units
StarCooler ECU

General

The ECU StarCooler is a complete cooling unit, designed for cooling the supply air in Flexomix air handling units, whenever cooling is necessary. The cooling unit is available in 8 unit sizes as standard, within the air flow range of 0.3-5.8 m³/s, with cooling outputs ranging from 15 to 119 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.

As standard the unit is equipped with the ACA (Automatic Cooling Adjustment) function. This function increases reliability of operation and enables cooling of variable air flows within a wide air flow range.

As an accessory in case of very high outdoor and indoor temperatures the unit, in output variant 2, can be equipped with a water cooled condenser, WCC.

The evaporation coil is designed in such a way as to enable condesate water runoff to a drip tray without the need for a droplet eliminator. The coil has reinforced fins for extra corrosion protection.

- 8 unit sizes in the air flow range of 0.3–5.8 m³/s, with cooling output from 15 to 119 kW.
- 2 output variants for sizes 300, 360, 480 and 600.
- Effect stage control of the cooling power in 3 steps.
- Environmentally compatible refrigerant R407C.
- CE-labelled, tested and documented cooling installation.
- Service friendly construction that is easily planned and commissioned.
- Can be planned and optimized using the *IV Produkt Designer* product selection program.

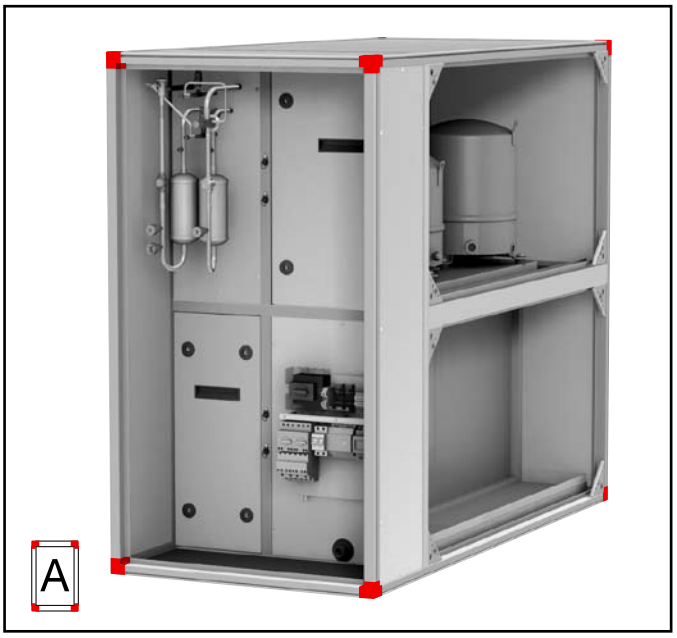
Design

The StarCooler has a direct-acting cooling system, DX, that uses a minimum volume of refrigerant. The evaporator heat chilled by the compressor is transferred to a condenser in the exhaust air path.

A lockable cover in the front of the unit is provided enabling access for adjustments and servicing. Removable covers for inspecting the coils, compressors, etc. are provided on the unit. The compressors are anti-vibration isolated and mounted on withdrawable compressor plates.

The casing of the cooling unit is of the same design as the other functional sections in the Flexomix series.

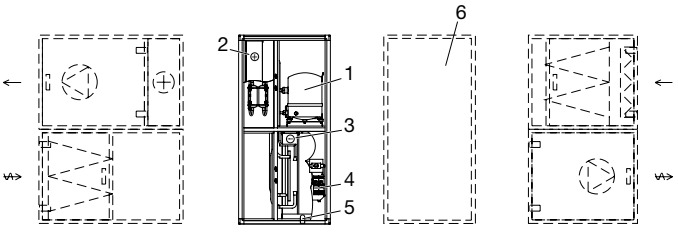
The evaporator and condenser coils have copper tubes and aluminium fins. The drip trays are made of stainless steel and have plastic condensate drain connections.



The Refrigerant Circuit

The refrigerant circuit consists of the following:

- Fully hermetic scroll-type compressor with sight glass and temperature and current-sensitive phase switch.
- Evaporator coil with drip tray,condenser coil, drying filter,choke for expansion,low and high pressure switches,pressure protection equipment.
- In-operation pressure switch with restarting function for controlling the ACA function.
- Copper refrigerant tubing jointed together by brazing.
- Service connections and refrigerant.



1. Compressor
2. Condenser
3. Evaporator
4. Electrical equipment
5. Condensate drain connection, Ø32 mm
6. Placing of the rotary heat exchanger

Project Design

The unit can be engineered to handle optional supply and extract airflows within the specified min. and max.permissible flow range.Accurate sizing is carried out in the IV Produkt Designer product selection program.

Electrical Equipment

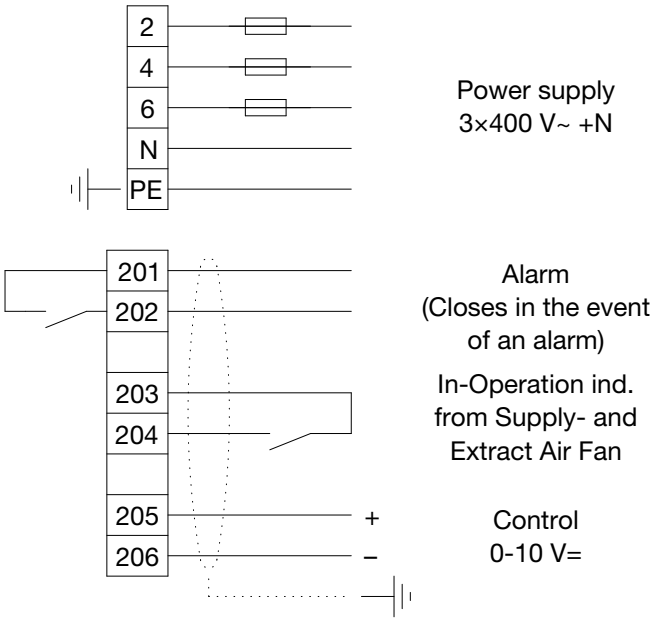
The electrical equipment includes a protective motor switch, contactors and a controller for the compressors. The cooling capacity is controlled by means of external 0-10 VDC inputs on external contact closure (24 V potential-free).
In response to low airflow and an extract air temperature higher than 50 °C, a pressure switch in cooling circuit 1 reduces the cooling capacity. Automatic restart via a stepping switch with delayed action switch in.
If a pressure switch or protective motor switch should trip, the compressor will be switched out and a group alarm will be initiated across potential-free contacts.

Commissioning

Prior to commissioning, the fitter must see to the following:

1. Connect the power and control signal cables for cooling operation.
2. Connect the condensate drain pipework to a drain gulley.
3. Adjust the design airflows on the supply air and extract air sides.
4. Connect the cold main water supply and the drain pipework from the condenser, if a watercooled condenser is used.

Wiring ECU

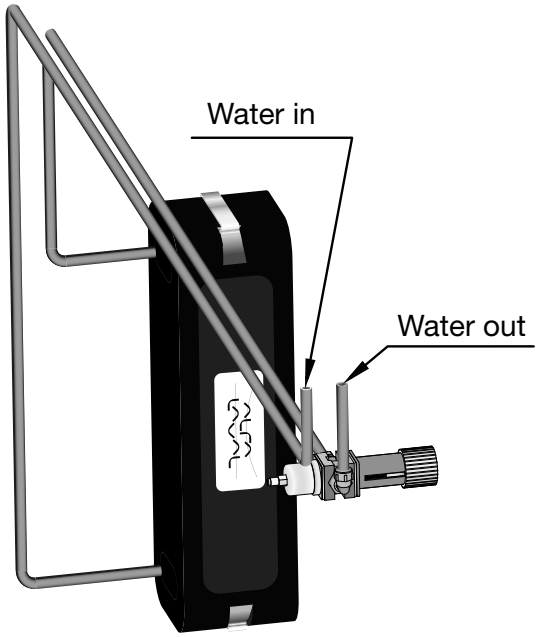


Water-Cooled Condenser, WCC

Water-cooled condenser with mechanical pressure-controlled water-saving valve mounted inside unit.

Connect condensor preferably to the mains water supply; max. permissible water flow 0.3 l/s at 30 kPa.

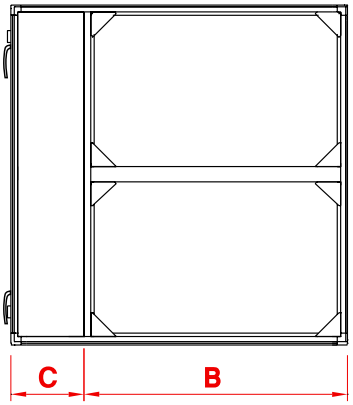
Connection on water side, Cu Ø 15 mm conn.

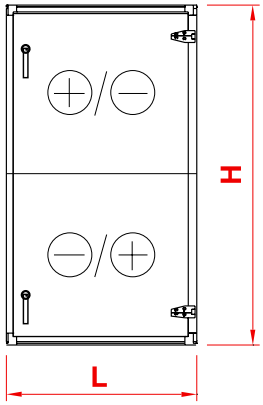


Technical details

Dimensions and weights

Size	Power variant	Casing	Dimension (mm)				Weight (kg)
			L	B	H	C	
100	1	00	780	980	1010	300	200
	1	E3	780	980	1010	300	228
150	1	00	780	1080	1390	300	249
	1	E3	780	1080	1390	300	284
190	1	00	780	1360	1390	300	286
	1	E3	780	1360	1390	300	325
240	1	00	780	1360	1606	300	320
	1	E3	780	1360	1606	300	362
300	1	00	780	1576	1606	300	344
	2	00	890	1576	1606	300	430
	1	E3	780	1576	1606	300	388
	2	E3	890	1576	1606	300	481
360	1	00	780	1576	1980	300	387
	2	00	890	1576	1980	300	507
	1	E3	780	1576	1980	300	437
	2	E3	890	1576	1980	300	564
480	1	00	890	1950	1980	300	516
	2	00	890	1950	1980	300	573
	1	E3	890	1950	1980	300	578
	2	E3	890	1950	1980	300	635
600	1	00	890	2160	2190	300	639
	2	00	890	2160	2190	300	722
	1	E3	890	2160	2190	300	707
	2	E3	890	2160	2190	300	790





Specification

Cooling unit	ECU -a -b -c -d -e -f-g
a - Size:	100, 150, 190, 240, 300, 360, 480, 600
b - Casing:	00 = Thermal insulation E3 = EI30
c - Power variant:	10 = 1 (size 100-600) 20 = 2 (size 300-600)
d - Water cooled condenser	0 = Without 1 = With (only for power variant 2)
e - Voltage:	40 = 400 V
f - Supply air:	U = Upper section N = Lower section
g - Insp.side	H = Right-hand V = Left-hand

Accessories

MIET-CL-04 Water trap

Other accessories

EMMT-01 Connection gable ..... page 75
EMMT-02 Connection frame ..... page 75
EMMT-03 Flexible connection ..... page 75
EMMT-04 Outdoor unit ..... page 76
EMMT-06 Inspection window ..... page 77
EMMT-07 Light fitting ..... page 77
EMMT-08 Lifting brackets ..... page 77

Survey of the capacities

Size			100	150	190	240	300		360		480		600	
Power variant			1	1	1	1	1	2	1	2	1	2	1	2
Air volume	min.	(m³/s)	0.32	0.54	0.71	0.82	0.97		1.22		1.54		1.93	
	max.	(m³/s)	0.83	1.30	1.80	2.40	2.65		3.20		4.80		5.60	
Max. cooling output*		(kW)	13.5	21.9	28.8	37.9	40.8	54.0	49.6	66.7	80.6	99.7	89.8	113.9
Power demand compressor		(kW)	2.8	5.2	6.5	7.9	8.9	14.2	11.3	17.1	16.1	24.9	18.0	29.2
Rated cooling efficiency factor		(C.O.P.)	4.9	4.2	4.4	4.8	4.6	3.8	4.4	3.9	5.0	4.0	5.0	3.9
Number of compressors		(pcs)	2	2	2	2	2	2	2	2	2	2	2	3
Number of control steps (incl. cooling energy recovery)		(pcs)	3	3	3	3	3	3	3	3	3	3	3	3
Max. perm. operating current, 3×400V +N 50Hz		(A)	7.7	14.4	17.4	19.8	22.6	33.9	28.4	39.2	35.2	49.7	42.5	64.5
Rec. fuse, 3×400V +N 50Hz		(A)	16	20	25	25	35	50	35	50	50	63	63	80
Refrigerant R407C	Circuit 1	(kg)	1.4	2.1	2.8	3.1	3.2	6.1	4.5	7.1	6.2	9.2	8.5	11.4
	Circuit 2	(kg)	1.8	2.9	3.5	3.7	4.7	5.9	5.4	7.5	9.2	9.5	10.6	11.7

*Applicable to ᵗoutdoor air: 26°C; RH 50%, ᵗextract air: 22°C, and with a hygroscopic rotor in standard version.

StarCooler Cooling Unit with Cooling Energy Recovery ECR

General

The type ECR StarCooler is a complete cooling unit, intended for cooling the supply air. The unit has a built-in rotary exchanger for recovering cooling energy in sequence with the the cooling unit. This provides maximal energy utilization and low power consumption. Besides the rotary exchanger, the cooling unit consists of a cooling circuit with evaporator and condenser coils,electrical equipment for power and safety – all ready-to-use, wired and factory tested.

As standard, the unit is equipped with the ACA (Automatic Cooling Adjustment) function. This function provides increased operational reliability and enables variable airflow cooling operation within a wide flow range.

As an option for extremely high outdoor and indoor temperatures, capacity variant 2 can be equipped with WCC (Water-Cooled Condenser).

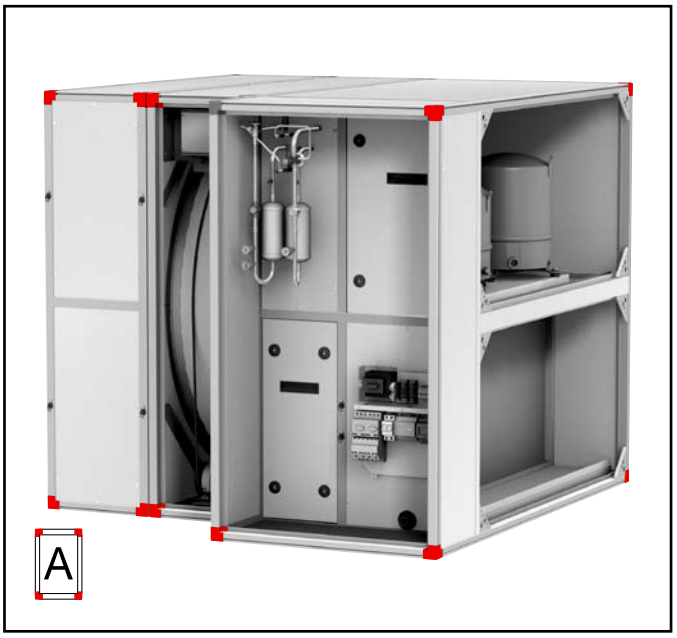
The design of the evaporator coil enables condensate runoff to a drip tray without droplet eliminator. The coil has reinforced fins for increased protection against corrosion.

The unit can be supplied in a split version to facilitate transport at the site.

The rotary exchanger can be selected in all sizes in the standard or plus rotor version, with or without hygroscopic surfaces, making it possible to optimize the total capacity.

If heating is required, the rotary heat exchanger operates in sequence with the reheater for recovering energy from the extract air.

- 8 unit sizes for airflows ranging from 0.3 to 5.8 m ³/s, with cooling capacity from 20 to 153 kW.
- 2 capacity variants for sizes 300, 360, 480 and 600.
- Cooling capacity controlled in 3 steps plus cooling energy recovery.
- Environmentally compatible refrigerant: R407C.
- CE-labelled, tested and documented cooling installation.
- Designed for easy service, simple to plan and install.
- Can be planned and optimized via the IV Produkt Designer product selection program.



Design

The StarCooler has a direct-acting cooling system, DX,that uses a minimum volume of refrigerant. Under cooling conditions when the outdoor temperature is higher than the indoor temperature,the rotary exchanger operates in sequence with the cooling unit to cool the supply air. In this case, the rotor transfers heat and moisture from the outdoor air to the exhaust air, which reduces the cooling load from the active cooling unit.

The evaporator heat chilled by the compressor is transferred to a condenser in the extract air path.

A lockable cover in the front of the unit is provided enabling access for adjustments and servicing. Doors and removable covers for inspecting the coils,compressors,and the rotary exchanger are provided on the unit.The compressors are anti-vibration isolated and mounted on withdrawable compressor base plates.

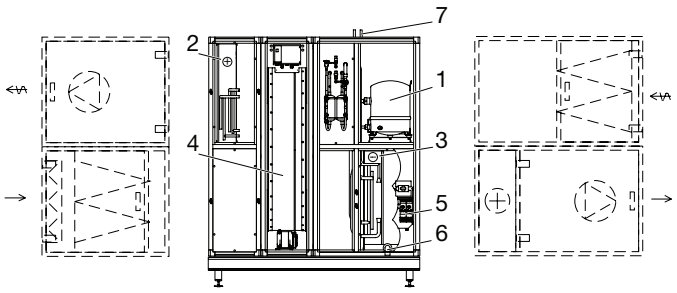
The casing of the cooling unit is of the same design as the other functional sections in the Flexomix series. The evaporator and condenser coils have copper tubes and aluminium fins. The drip trays are made of stainless steel and have plastic condensate drain connections.

The size 100–360 units are supplied without stand. the other sizes are supplied on a stand with legs and adjustable feet.

The Refrigerant Circuit

The refrigerant circuit consists of the following:

- Fully hermetic scroll-type compressor with sight glass and temperature and current-sensitive phase switch.
- Evaporator coil with drip tray, condenser coil, drying filter, choke for expansion,low and high pressure switches, pressure protection equipment.
- In-operation pressure switch with restarting function for controlling the ACA function.
- Copper refrigerant tubing jointed together by brazing.
- Service connections and refrigerant.



1. Compressor
2. Condenser
3. Evaporator
4. Rotary heat exchanger
5. Electrical equipment
6. Condensate drain connection Ø 32 mm
7. Connections for water-cooled condenser (optional)

Project Design

The unit can be engineered to handle optional supply and extract airflows within the specified min. and max. permissible flow range. Accurate sizing is carried out in the IV Produkt Designer product selection program.

Electrical quipment

The electrical equipment includes a main switch, protective motor switch,contactors and a equipment for controlling the compressors.

The cooling capacity is controlled by means of external 0-10 VDC inputs. The cooling unit is permitted to start when both fans are operating by means of external contact closure (24 V potential-free).

If the airflow rate is low and the extract air temperature is higher than 50 °C,a pressure switch in cooling circuit 1 reduces the cooling capacity. Automatic restart via a stepping switch with delayed action switch in.

If a pressure switch or protective motor switch should trip,the compressor will be switched out and a group alarm will be initiated across potential-free contacts.
The rotary heat exchanger consists of an electronic controller, drive motor, rotation monitor, motor protection and alarm. Connect the equipment to a 0–10 V control signal and a 1 ×230 V power supply, 6 AT fuse protection.

Commissioning

Prior to commissioning, the fitter must see to the following:

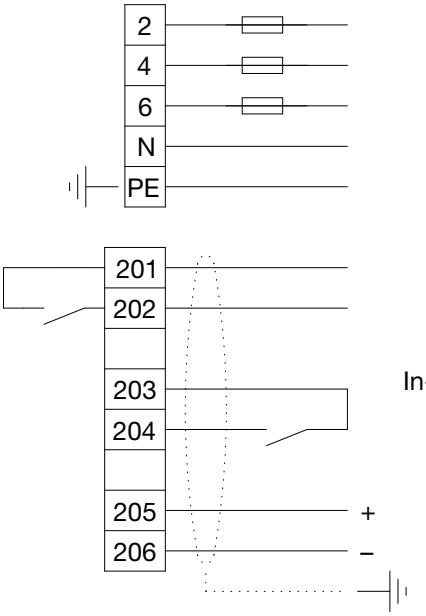
Cooling Unit:

1. Connect the power across a main switch and wire control signal cables for cooling operation.
2. Connect a water trap and install condensate drain pipework to a drain gulley.
3. Adjust the design airflows n the supply air and extract air sides.
4. Connect the cold main water supply and the drain pipework from the condenser, if a water-cooled condenser is fitted.

Rotary Heat Exchanger:

Connect power and control signal to the controller.

Wiring ECR

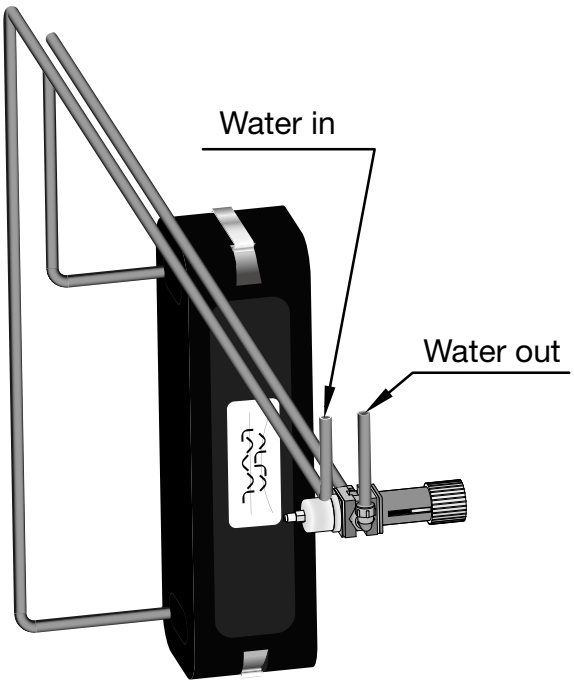


Water-Cooled Condenser, WCC

Water-cooled condenser with mechanical pressure-controlled water-saving valve mounted inside unit.

Connect condensor preferably to the mains water supply; max. permissible water flow 0.3 l/s at 30 kPa.

Connection on water side, Cu Ø 15 mm conn.



Technical details

Dimensions and weights

Size	Power variant	Casing	Dimension (mm)				Weight (kg)
			L	B	H	C	
100	1	00	1540	980	1010	780	341
	1	E3	1540	980	1010	780	379
150	1	00	1540	1080	1390	780	454
	1	E3	1540	1080	1390	780	501
190	1	00	1540	1360	1390	780	507
	1	E3	1540	1360	1390	780	559
240	1	00	1540	1360	1606	780	555
	1	E3	1540	1360	1606	780	612
300	1	00	1540	1576	1606	780	615
	2	00	1650	1576	1606	890	701
	1	E3	1540	1576	1606	780	675
	2	E3	1650	1576	1606	890	767
360	1	00	1540	1576	1980	780	670
	2	00	1650	1576	1980	890	790
	1	E3	1540	1576	1980	780	737
	2	E3	1650	1576	1980	890	834
480	1	00	1650	1950	1980	890	947
	2	00	1650	1950	1980	890	1005
	1	E3	1650	1950	1980	890	1029
	2	E3	1650	1950	1980	890	1087
600	1	00	1650	2160	2190	890	1132
	2	00	1650	2160	2190	890	1214
	1	E3	1650	2160	2190	890	1222
	2	E3	1650	2160	2190	890	1305

Specification

Cooling unit **ECR -a -b -c -d -e -f-g-h**

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

b - Casing: 00 = Thermal insulation
E3 = EI30

c - Output variant: 10 = 1 (size 100-600)
20 = 2 (size 300-600)

d - Water-cooled condenser
0 = Without
1 = With

e - Voltage: 40 = 400 V

f - Rotor: NO = Normal
HY = Hygroscopic
NP = Normal Plus
HP = Hygroscopic Plus

g - Supply air: U = Upper
N = Lower

h - Insp.side H = Right-hand
V = Left-hand

Accessories

Split version **ECRT-01 -a -c**

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

c - Output variant: 10 = 1 (size 100-600)
20 = 2 (size 300-600)

Accessories

MIET-CL-04 Water trap

Other accessories

EMMT-01 Connection gable .....page 75
EMMT-02 Connection frame .....page 75
EMMT-03 Flexible connection.....page 75
EMMT-04 Outdoor unit.....page 76
EMMT-06 Inspection window.....page 77
EMMT-07 Light fitting.....page 77
EMMT-08 Lifting brackets.....page 77

Survey of the capacities

Size			100	150	190	240	300		360		480		600	
Output variant			1	1	1	1	1	2	1	2	1	2	1	2
Air volume t/f	minimal	(m³/s)	0.32	0.54	0.71	0.82	0.97		1.22		1.54		1.93	
	maximal	(m³/s)	0.83	1.30	1.80	2.40	2.65		3.20		4.80		5.78	
Max cooling power*		(kW)	18.2	28.6	38.6	49.2	54.4	70.9	65.5	86.5	105.5	129.0	118.1	148.1
Power demand compr.		(kW)	2.6	4.9	6.1	7.5	8.4	13.6	10.7	16.3	15.3	23.9	17.1	27.4
Rated cooling efficiency factor		(C.O.P.)	6.9	5.8	6.3	6.6	6.5	5.2	6.1	5.3	6.9	5.4	6.9	5.4
Number of compressors		(pcs)	2	2	2	2	2	2	2	2	2	2	2	3
Number of control stages (incl. cooling energy recovery)		(pcs)	4	4	4	4	4	4	4	4	4	4	4	4
Max. perm. operating current, 3×400V +N 50Hz		(A)	7.7	14.4	17.4	19.8	22.6	33.9	28.4	39.2	35.2	49.7	42.5	64.5
Rec. fuse, 3×400 V; 50 Hz		(A)	16	20	25	25	35	50	35	50	50	63	63	80
Refrigerant R407C	Circuit 1	(kg)	1.4	2.1	2.8	3.1	3.2	6.1	4.5	7.1	6.2	9.2	8.5	11.4
	Circuit 2	(kg)	1.8	2.9	3.5	3.7	4.7	5.9	5.4	7.5	9.2	9.5	10.6	11.7

*Applicable to ᵗoutdoor air: 26°C; RH 50%, ᵗextract air: 22°C, and with a hygroscopic rotor in standard version.

Q-Cooler Cooling Unit/ Heat pump EQU

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.

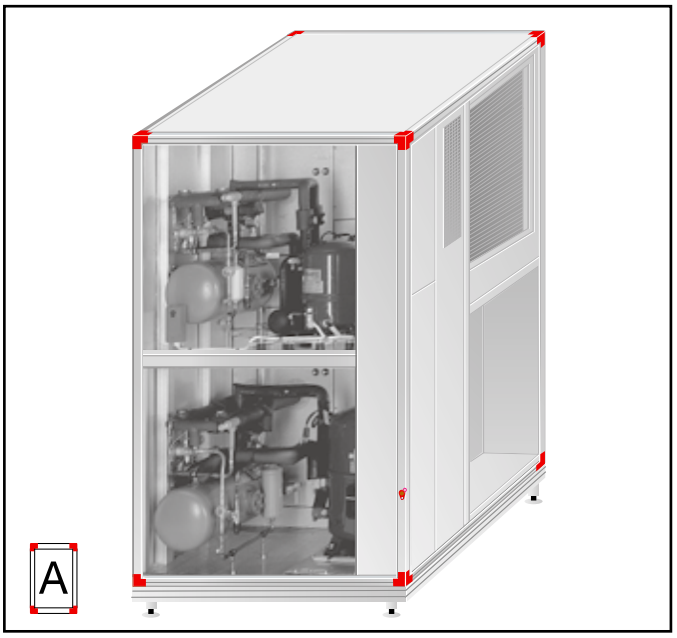
During the winter, no heat recovery means other than the built-in reversible cooling operation will be needed, however the cooler can be used in combination with a rotary heat exchanger and then be even more energy-efficient.

- The EQU is available in 6 sizes with cooling outputs ranging from 26 kW to 115 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.
- By selecting the accessory WCC (Water Cooled Condenser) you enable operation with variable air flow down to 50 % of the minimal air flow.
- Environmentally compatible refrigerant R407C.
- Heat pump function in wintertime with an annual temperature efficiency of 70%.
- Has a relatively short length and this gives the air handling unit a very short overall length.
- The Flexomix with EQU features extremely low total pressure and specific fan power (SFP).
- CE-labelled, tested and documented cooling installation.
- Designed for easy service, simple to plan and install.
- Can be planned and optimized via the IV Produkt Designer product selection program.

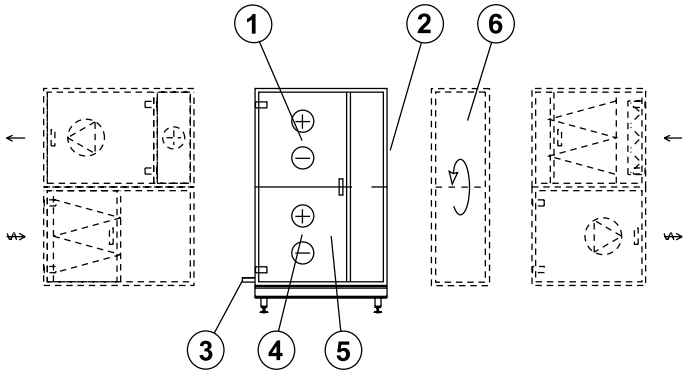
Design

The EQU 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 EQU 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. 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.

Project design

The unit can be planned for any air flow of supply- or exhaust air within the minimal and maximal air flows. For precise dimensioning and establishing whether or not climate adapter or electric air heater EQUT-02 is required, IV Produkt Designer product selection program should be used.

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.

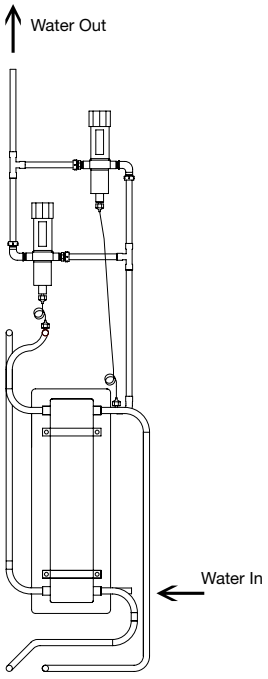
Commissioning

The EQU is a factory-built cooling unit, tested and documented at the factory.

Prior to commissioning, the fitter must carry out the wiring and coupling in accordance with the instructions below:

DX coolingmachine/heat pump

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.



Water-Cooled Condenser, WCC

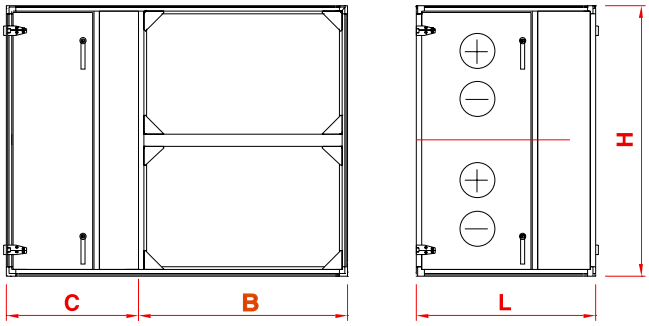
Water-cooled condenser with mechanical pressure-controlled water-saving valve mounted inside unit.

Connect condensor preferably to the mains water supply; max. permissible water flow 0.3 l/s at 30 kPa.

Connection on water side, Cu Ø 15 mm conn.

Technical details

Dimensions and weights



Size	Output var.	Casing	Dimension (mm)				Weight (kg)
			L	B	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

EQUT-01-a Outdoor unit

The EMMT-04 outdoor unit 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. 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 (W)	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.

Specification

Cooling unit/heat pump

EQU -a -b -c -d -e -f -g

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

b - Casing: 00 = Thermal insulation
E3 = EI30

c - Output variant: 1, 2 (size 190-480)
3 (size 600)

d - Water-cooled condenser, WCC:
0 = Without
1 = With

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 unit **EQUT-01 -a**

Electric heater **EQUT-02 -a**

Accessories

MIET-CL-04 Water trap

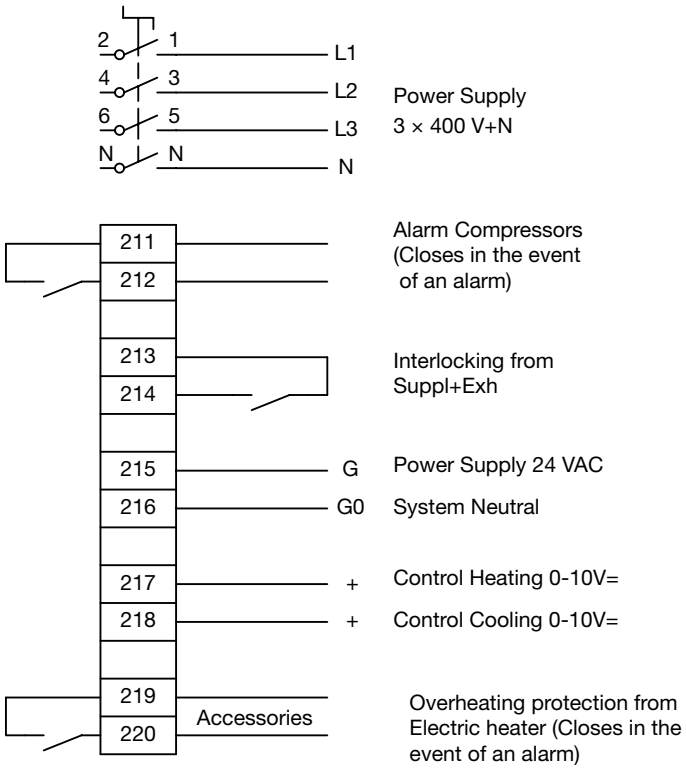
Other accessories

EMMT-01 Connection gable
EMMT-02 Connection frame
EMMT-03 Flexible connection
EMMT-04 Outdoor unit
EMMT-08 Lifting brackets

Survey of the capacities

Size		190		240		300		360		480		600		
Output variant		1	2	1	2	1	2	1	2	1	2	1	2	3
Rated supply/exh. air	(m³/s)	1.25	1.41	1.56	1.79	2.00	2.27	2.49	2.81	3.13	3.52	4.09	4.68	5.49
Min. supply/exh. air	(m³/s)	1.10	1.24	.137	1.58	1.76	1.96	2.19	2.47	2.75	3.10	3.60	4.12	5.11
Max. supply/exh. air	(m³/s)	1.86	1.90	2.08	2.40	2.66	3.00	3.31	3.60	4.17	4.80	5.45	6.00	6.00
Rated cooling conditions $t$outdoor: 26°C, RH 50% $t$exhaust air: 22 °C														
Rated Cooling Output	(kW)	26.0	29.4	32.6	37.5	41.8	46.6	52.0	58.7	65.4	73.7	85.6	98.0	114.9
Rated power demand compressors	(kW)	8.2	9.3	10.3	11.9	13.2	14.7	16.4	18.2	20.6	23.5	27.0	30.4	33.1
Rated cooling efficiency factor	(C.O.P.)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.1	3.2	3.2	3.5
Rated heating conditions $t$outdoor: 0°C; RH 50% $t$exhaust air: 20 °C														
Rated heating output	(kW)	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
Rated power demand compressors	(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
Rated heating efficiency factor		5.8	5.8	5.4	5.7	6.0	5.8	6.1	6.0	5.9	6.1	5.9	5.9	6.0
Number of compressors	(pcs)	2	2	2	3	3	3	4	4	4	4	4	4	4
Number of control stages	(pcs)	3	3	3	5	5	5	8	8	8	8	8	8	8
Max conn. power compressor	(kW)	8.7	9.8	10.9	12.6	14.0	15.5	17.4	19.3	21.9	24.9	28.6	32.3	35.1
Max operating current 3×400 V, 50 Hz	(A)	16.5	18.6	20.1	24.0	25.9	29.1	32.6	37	39.4	44.0	48.0	54.8	67.2
Rec fuse 3×400 V, 50 Hz	(A)	25	25	35	35	35	50	50	50	63	63	63	80	80
Max operating current 3×230 V, 50 Hz	(A)	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
Rec fuse 3×230 V, 50 Hz	(A)	50	50	63	63	63	63	100	100	100	100	125	125	160
Refrigerant R407C, Circuit 1	(kg)	6.0	6.0	7.0	7.0	9.9	9.9	8.1	8.1	9.5	9.5	9.6	9.6	9.6
Refrigerant R407C, Circuit 2	(kg)	9.9	9.9	12.0	12.0	14.0	14.0	21.4	21.4	26.0	26.0	29.9	29.9	29.9
Conn. power EQUT-02-a, electric heater	(kW)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0	10.0	10.0	10.0

Wiring EQU



EMMT-01 Connection gable

General

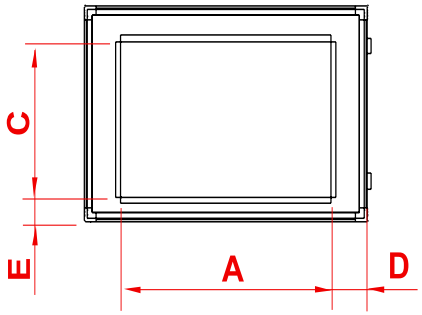
The connection gable can be selected for installation on the EMM module. The MIE-ID has an end connection wall on its inlet, the MIE-AF and the EAF have a connection gable on their outlet. The connection gable can be selected for mounting on the inlet or outlet or on both.

Design

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

Dimensions

Size	Dimension (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

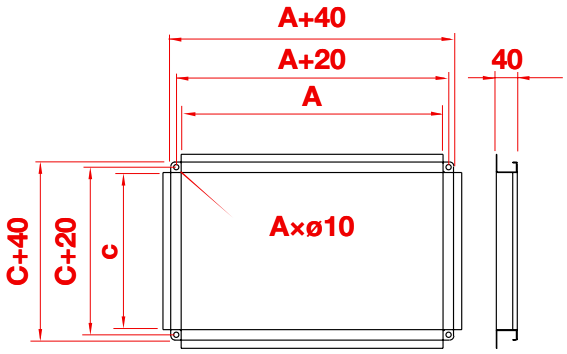
The connection frame can be selected for installation on the EMMT- 01, MIE ID, MIE AF and the EAF.

Design

- Sheet metal frame for PG and flanged connection.

Dimensions

Size	Dimension (mm)	
	A	C
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

Flexible 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 unit

General

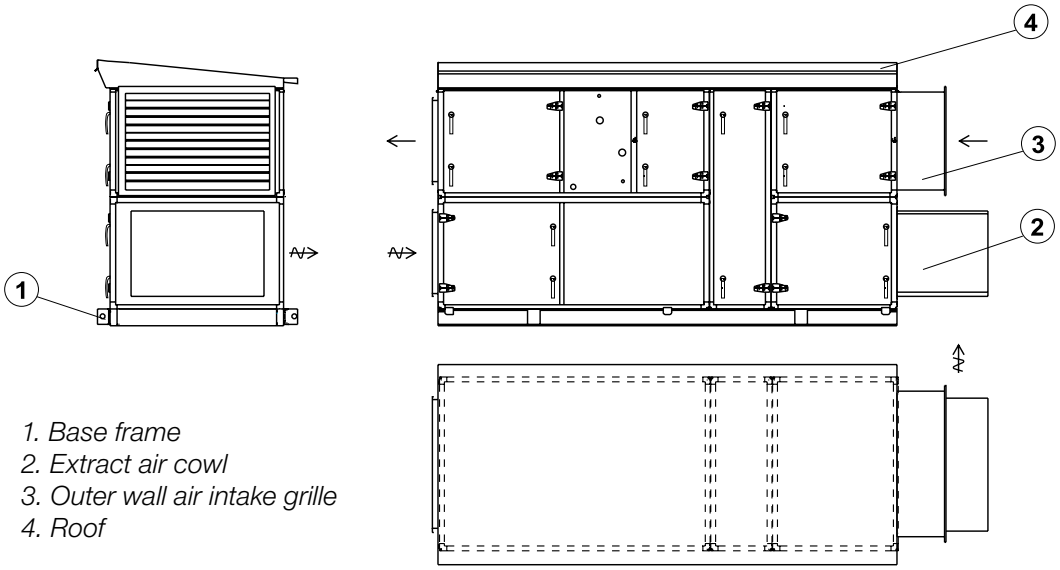
Supplementary components for air handling unit installation outdoors. If the air handling unit is mounted on the roof of a building, it must be secured on a frame support or on support legs to a water-tight roof.

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.
- 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 air handling unit selection program.

Specification

Outdoor unit	**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



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

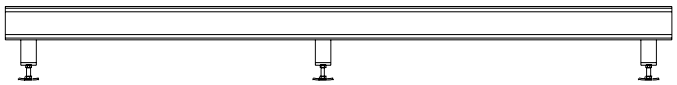
EMMT-05 Stand/support frame

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 adjustable feet.
- Height: 195–245 mm
- The length and width are conditional on the handling unit selected.



Specification

Stand/support frame	**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.

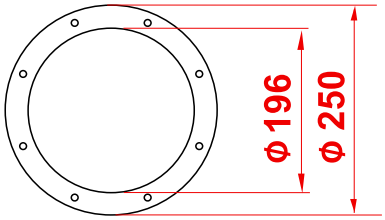
EMMT-06 Inspection window

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.



Specification

Inspection window	**EMMT-06**

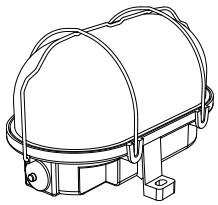
EMMT-07 Light fitting

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.



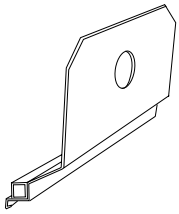
Specification

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**

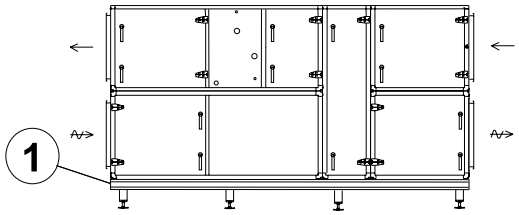
EMMT-10 Compact unit version

General

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

Design

- All the unit sections are supplied factory-mounted on an 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 version	**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

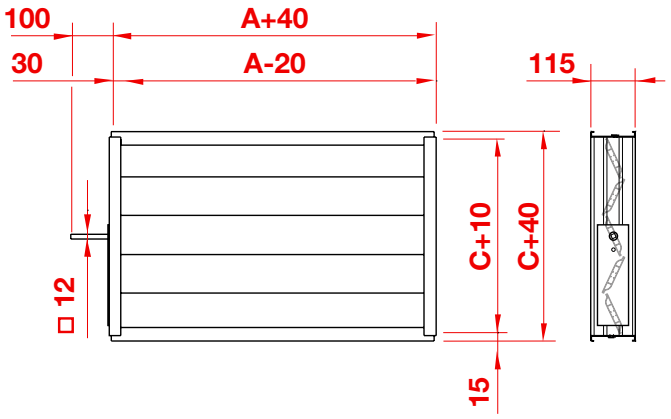
Duct Accessories
EMT-01 Duct damper

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 aluminium profiled sections and meets the provisions of Corrosion Class C4.
- 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 is standard.



Specification

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

Technical details

Dimensions

Size		060	100	150	190	240	300	360	480	600
Dimension	A	500	700	800	1000	1000	1200	1200	1400	1600
	C	300	300	500	500	600	600	800	800	800

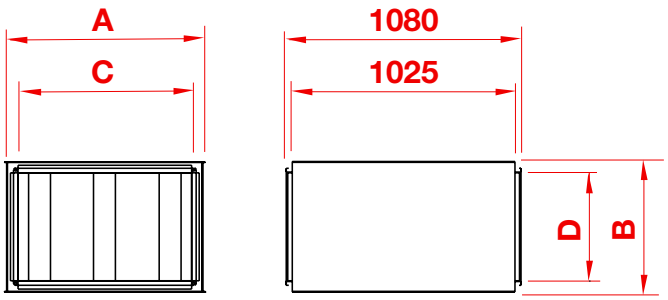
EMT-02 Duct silencer

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

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

Technical details

Sound attenuation

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

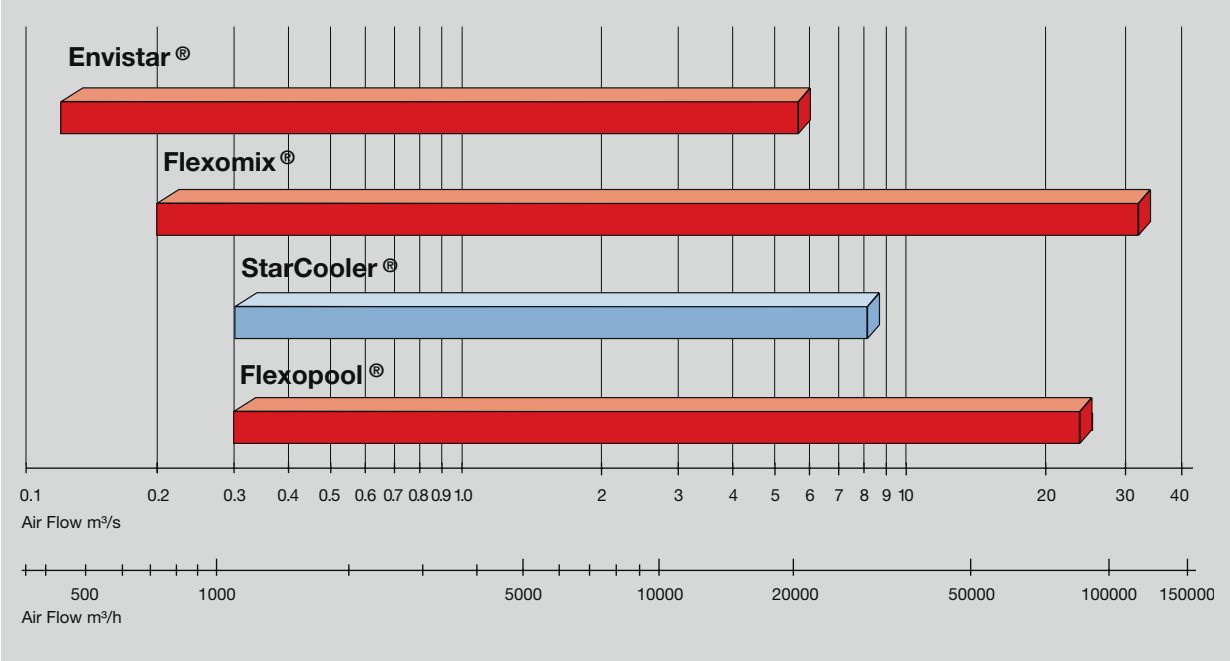
Dimensions

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

IV Produkt's Air Handling Units

IV Produkt's Air handling units are versatile, suited to meet many different indoor climate needs in both public and private buildings with various forms of activity. You can easily combine the components or find a total solution in our product mix.

An overview of IV Produkt's range of air handling units



The **Envistar** is a total air handling solution and can be supplied as a one-piece unit or as modules. The units are available in 3 different models – the Top, the Compact and the Flex, each of which are available in various sizes. The Envistar units are equipped with Siemens Saphir controls that offer a variety of functions and several different communication possibilities.

The **Flexomix** is a modular air handling unit designed to let you decide the version supplied. Available in 19 sizes and 4 different types of energy recovery.

The **StarCooler** is a complete cooling unit and is available as an optional component for our Envistar and Flexomix series.
Available with or without cooling energy recovery. Requires no installation utdoors and has the CE label of approval. The unit is an economical and reliable solution and is simple to operate.

Flexopool is a complete dehumidification unit for indoor swimming pools and public swimming baths.

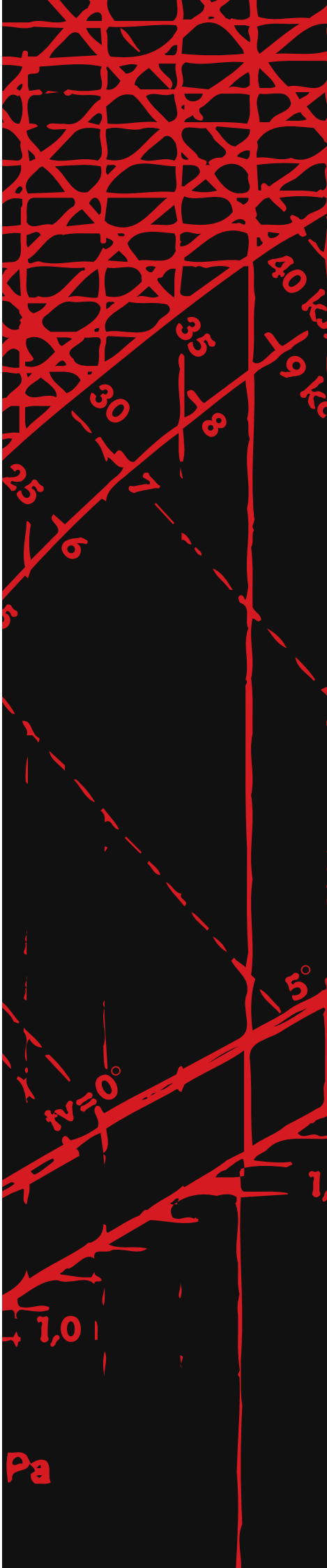
IV PRODUKT DESIGNER

IV Produkt Designer is our product selection program for choosing air handling units.

Eurovent Certification, our products are tested by Eurovent to EN 1886 and EN 13053.
www.eurovent-certification.com

EUROVENT CERTIFIED PERFORMANCE

More information available at
www.ivprodukt.se



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PRODUKT

Air handling with the focus on LCC

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