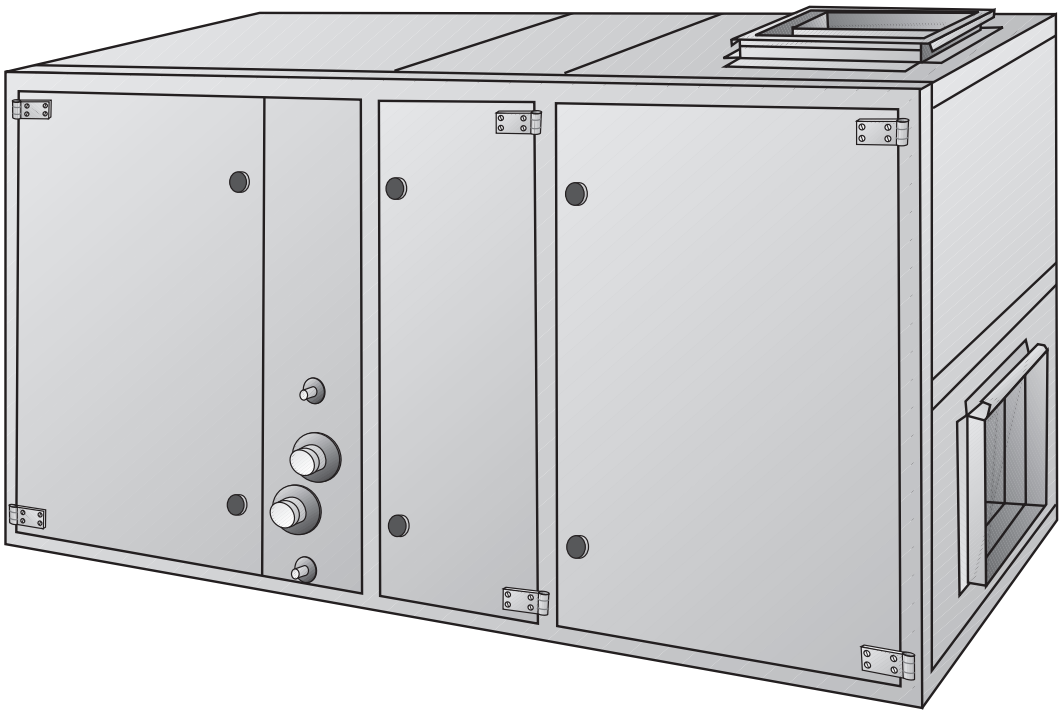
50201 E

FLEXOPAC



FLEXOPAC Air conditioning unit

General

The FLEXOPAC series is an air conditioning unit that permits effective and energy-efficient air conditioning in varying environments such as offices, workshops, homes, and schools.
The unit is available in two versions: the FLE, which is a heat recovery unit with supply and exhaust air, and the FLB, which is supplied as a block unit, and in addition to heat recovery can also be fitted with a cooling facility, recirculated air, and a flow measuring facility.

- Available in 5 sizes, with a flow range of 0,3-3,0 m^3/s.
- Can be fitted with 3 different types of heat recovery unit, Heatbank with coolant 134A, rotor and plate heat exchanger.
- Has two basic models: the FLE unit assembly, and FLB block unit.
- The maximum dimension of 890 mm on each part of the unit allows transportation through narrow passages.
- Flexible construction provides the customer with a wide range of variants and versions to choose from.
- Four filter classes up to EU 7 can be selected.
- Can be supplied for outdoor installation.
- In combination with the KEA and KEAQ, a complete climate unit is achieved.

Design

The units are made up of extruded aluminium profile frames. Doors, hatches and cover plates are manufactured from hot galvanized sheet steel. The interior unit walls are coated with sheet metal and insulated with 25 mm thick fire resistant mineral wool in the standard version, but they can also be manufactured with a type approved casing with fire resistance class A 30. All inspection hatches are fitted on hinges. In the standard version, the FLE unit assembly is supplied with a frame with a height of 150 mm.
Retractible fans featuring both forward and backward curved blades can be chosen. Rubber anti-vibration mountings effectively isolate fan vibration from the outlet. All belt pulleys are fitted with clamping bushings. The tightness class 3 is standard on the exterior air valve on the units. Supplementary information relating to the design and performance of the unit series is given on following pages in this section of the catalogue.

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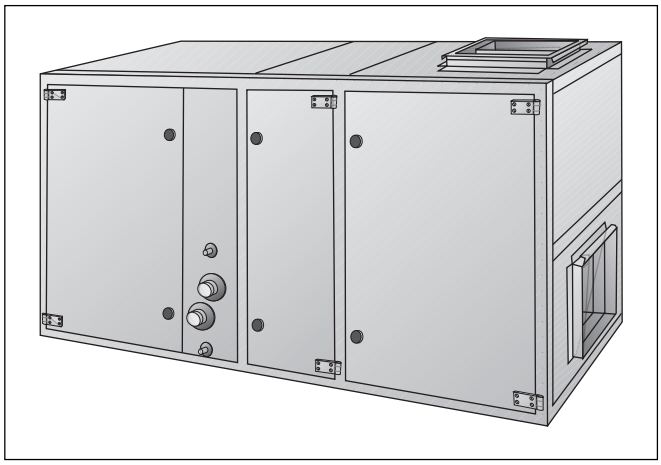
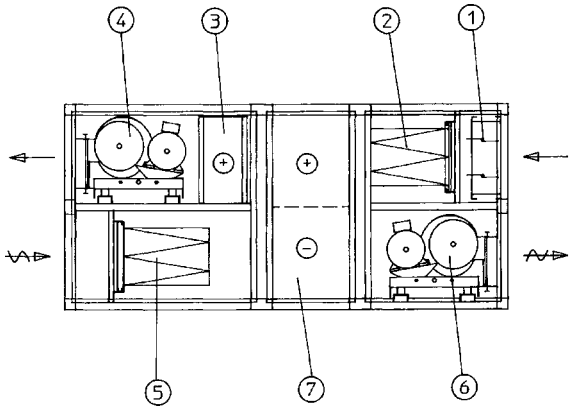
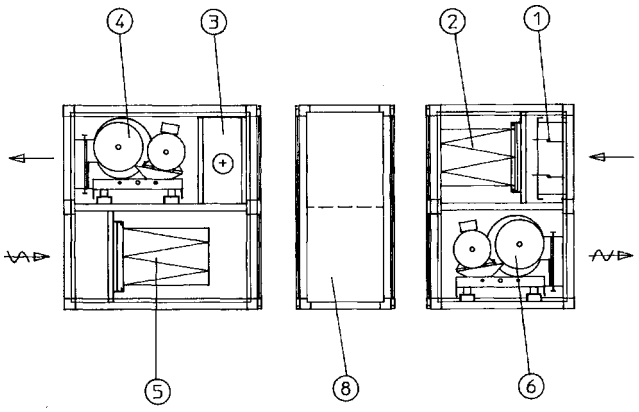


Unit assembly FLE



Block unit FLB



1. Supply air damper
2. Supply air filter
3. Air heater
4. Supply air fan
5. Exhaust air filter
6. Exhaust air fan
7. Heat recovery unit
8. Other functional units

Specification

Heat recovery unit — FLE -a-b-c-d

- Size: 055, 090, 150, 190, 300
- Casing: 00 = Standard; 30 = A 30
- Design: U 1-4, N 1-4, S 1-4
- Inspection side*: H = Right; V = Left

Supply air flow

- FAN — FLEB -a-e
  - Type: F = Forward curved blades; B = Backward curved blades; L = Backward curved with guide vanes**
  - Motor: See page 57, Electric motors
  - Belt gear: See page 63, Belt drive gear
- FILTER — FLEF -a-f
  - Filter class: 3 = EU 3 (G80); 6 = EU 6 (F65); 7 = EU 7 (F85); A = Aluminium mesh
- AIR HEATER, WATER — FLEV -a-g
  - Power variant: 1,2
- AIR HEATER, ELECTRICAL — FLEE -a-g-h-i
  - Power variant: 1,2
  - Type: HT = High temperature; LT = Low temperature
  - Air flow: Min. air flow in m³/s

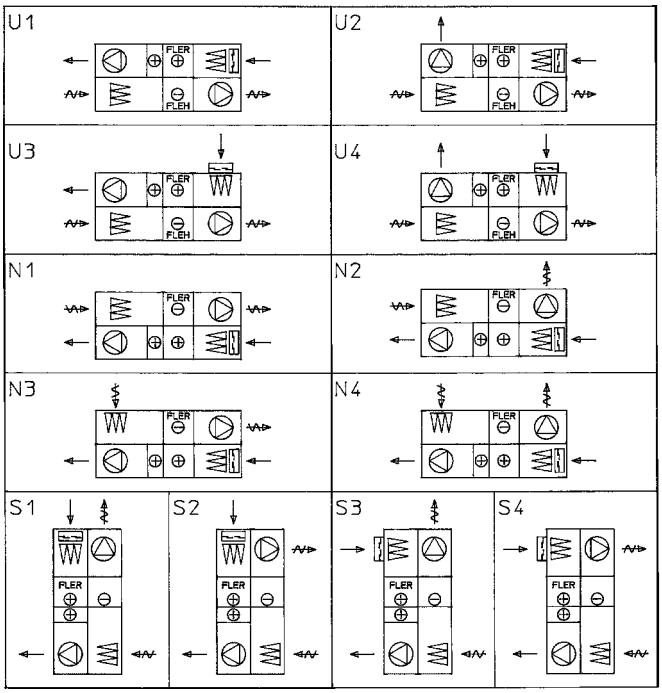
Exhaust air flow

- FAN — FLEB -a-e
  - Type: F = Forward curved blades; B = Backward curved blades; L = Backward curved with guide vanes**
  - Motor: See page 57, Electric motors
  - Belt gear: See page 63, Belt drive gear
- FILTER — FLEF -a-f
  - Filter class: 3 = EU 3 (G80); 6 = EU 6 (F65); 7 = EU 7 (F85); A = Aluminium mesh

* Inspection side viewed in direction of supply air
** For sizes 190 and 300 only

Heat recovery units FLER and FLEH are specified as per the chart on pages 9-10.

Version



Version S 1-4 only applies to sizes 055 and 090 with heat recovery unit FLER (rotary). The unit with heat recovery unit FLEH (Heatbank) can only be supplied in version U 1-4.

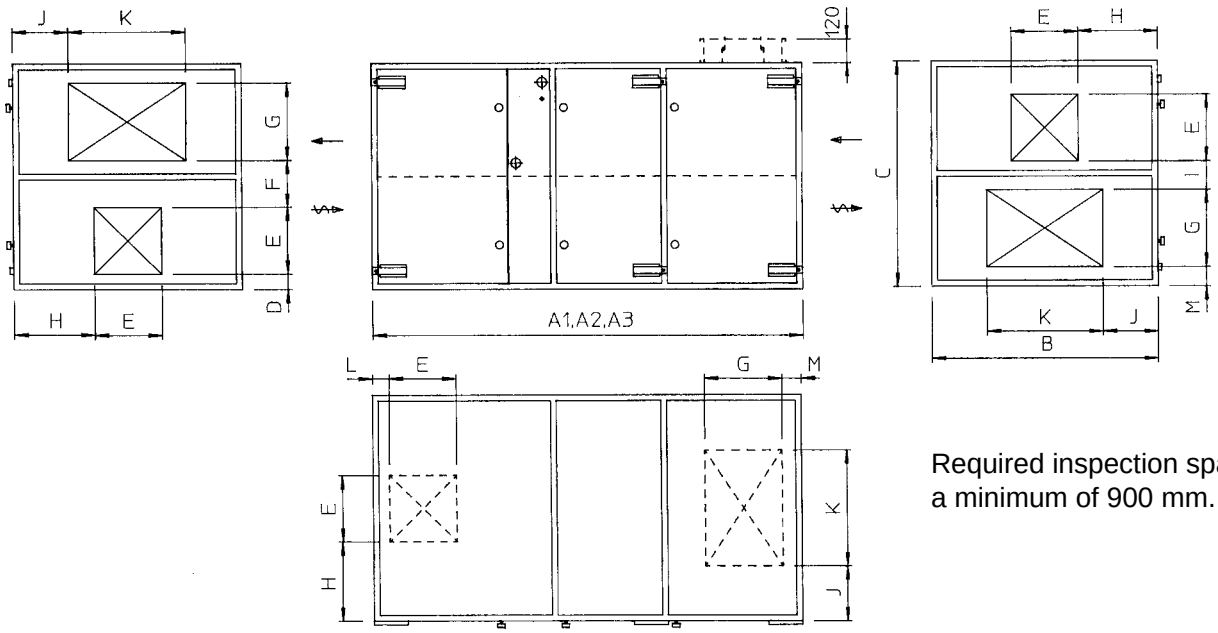
Additional equipment

Outdoor version	FLET-01 -a
Connecting frames	FLET-02 -a
Exhaust air damper	FLET-03 -a
Sound attenuator	FLET-04 -a
Spacer	FLET-05 -a
Purging door, fan	FLET-06 -a
Electrical connection	FLET-08 -a -m

Version: P = To terminal block; A = To installed cabinet

Fabric duct connection	FLET-09-a
Glass in inspection hatch	FLET-11
Reinforced fan	FLET-12-300

Dimensions and weights



Required inspection space, a minimum of 900 mm.

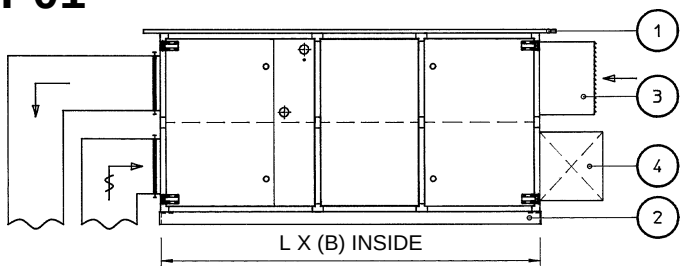
Vers.	Size	A_1	A_2	A_3	B	C	D	E	F	G	H	I	J	K	L	M	Weight* V_1 kg	Weight* V_2 kg	Weight* V_3 kg	Max. motor inst. size
Standard	055	1725	1945	2150	850	850	80	225	175	300	310	120	275	300	85	70	210	250	310	80
	090	1860	2080	2280	980	980	80	275	220	300	430	150	290	400	85	100	270	315	385	100
	150	1990	2210	2415	1170	1170	80	345	245	400	470	150	285	600	85	100	360	430	540	112
	190	2150	2370	2575	1325	1325	80	380	325	400	470	190	265	800	85	140	450	550	700	112
	300	2285	2505	2710	1575	1575	80	475	370	500	550	200	290	1000	85	150	580	735	945	132
A 30	055	1790	2010	2215	885	915	115	225	175	300	335	120	300	300	120	105	260	305	370	80
	090	1925	2145	2345	1015	1045	115	275	220	300	455	150	315	400	120	135	340	385	460	100
	150	2055	2275	2480	1205	1235	115	345	245	400	495	150	310	600	120	135	435	510	625	112
	190	2215	2435	2640	1360	1390	115	380	325	400	495	190	290	800	120	175	550	655	810	112
	300	2350	2570	2775	1610	1640	115	475	370	500	575	200	315	1000	120	185	700	865	1080	132

* Weight excluding motors

A_1 V_1 = Dimension and weight with rotor. A_2 V_2 = Dimension and weight with single Heatbank
A_3 V_3 = Dimension and weight with double Heatbank

Outdoor version FLET-01, FLBT-01

In the U1, U5, PN01, and PN05 versions, the FLE and FLB units can be supplied for outdoor installation. When mounted on roof, the unit is placed on a rim or support strut above a compact outer roof. In the outdoor version, the unit is supplemented with a roof, bottom frame, outer wall grille, exhaust hood, and the required number of seals. See diagram.
L = total external length of unit +-5 mm
B = exterior width of unit +-5 mm



1. Roof
2. Bottom frame
3. Outer wall grille
4. Exhaust hood

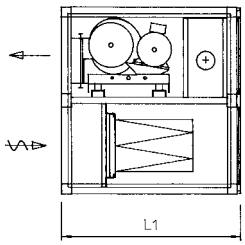
Unit overview, FLB

General

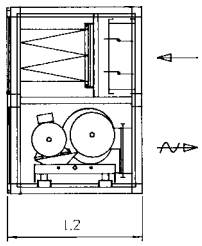
FLB is the designation of the Flexopac unit when it is supplied in the block version. The block model consists of a supply and an exhaust air section.
In order to comply with other air conditioning requirements, the unit can be supplemented with functional units indicated in the table below.

Dimensions and weights

Supply air unit



Exhaust air unit



Size	Version	Standard L_1	Standard L_2	Standard L_1+L_2	A 30 L_1	A 30 L_2	A 30 L_1+L_2	Weight* Standard V_1 kg	Standard V_2 kg	Standard V_1+V_2 kg	A 30 V_1 kg	A 30 V_2 kg	A 30 V_1+V_2 kg
055	U 1-4, N 1-4	820	615	1435	855	650	1505	90	60	150	110	80	190
	U 5-8, N 5-8	615	615	1230	650	650	1300	55	60	115	75	80	155
090	U 1-4, N 1-4	890	680	1570	925	715	1640	115	80	195	140	100	250
	U 5-8, N 5-8	680	680	1360	715	715	1430	75	80	155	95	100	195
150	U 1-4, N 1-4	960	740	1700	995	775	1770	155	110	265	190	135	325
	U 5-8, N 5-8	740	740	1480	775	775	1550	100	110	210	125	135	260
190	U 1-4, N 1-4	1040	820	1860	1075	855	1930	195	140	335	240	175	415
	U 5-8, N 5-8	820	820	1640	855	855	1710	125	140	265	160	175	335
300	U 1-4, N 1-4	1105	890	1995	1140	925	2065	255	185	440	310	230	540
	U 5-8, N 5-8	890	890	1780	925	925	1850	165	185	350	210	230	440

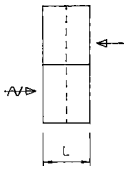
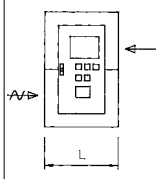
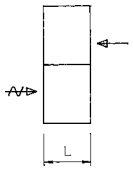
Other dimensions are given in the table on page 3.
* Weight excluding motor V_1 = Weight of supply air unit; V_2 = Weight of exhaust air unit

Functional units

Designation			Heat recovery unit FLBH		Heat recovery unit FLBR	Heat recovery unit FLBP	KEA KEAQ*	Air heater unit FLBL	Air cooler unit FLBK		Recirculated air unit FLBB
Length (L)			Single = 630 Double = 835		410	Size 055= 835 090=1120 150=1200 190=1200 300=1460	Size 150=975 190=1055 300=1120	Water heater= 330 Electric heater= 410	Short= 330 Long = 630		545
		Size	Single	Double					Short	Long	
Weight (kg)	Standard	055	100	160	60	95	–	40	60	85	50
		090	120	190	75	130	–	50	80	100	60
		150	165	275	95	170	410	65	100	130	70
		190	215	365	115	200	470	85	120	160	85
		300	295	505	140	285	580	100	150	190	100
	A 30	055	115	180	70	110	–	50	70	100	50
		090	135	210	90	160	–	65	95	120	75
		150	185	300	110	210	460	80	115	150	90
		190	240	395	135	245	530	105	140	185	105
		300	325	540	160	350	670	120	170	220	125
Technical data, page			10		9	11	49/53	18-19	20-21		22

*KEA = Cooling unit
KEAQ= Cooling unit with heat recovery

Functional units

Designation			Measuring unit FLBD	Media unit FLBM	Inspection unit FLBI	
						
Length (L)			330	755	Short = 330 Long = 630	
Weight (kg)		Size			Short	Long
	Standard	055	30	115	25	50
		090	35	140	30	60
		150	40	170	35	70
		190	50	195	40	80
		300	60	225	45	90
	A 30	055	35	140	35	70
		090	45	170	40	80
		150	55	205	45	90
		190	65	235	50	100
		300	75	270	60	120
Technical data, page			23	24	24	

Specification

BLOCK UNIT — FLB -a -b -c -d

- Size: 055, 090, 150, 190, 300
- Casing: 00 = Standard; 30 = A 30
- Version: U 1-8, PU 01-16; N 1-8, PN 01-16

See page 8

- Inspection side*: H = Right; V = Left

Supply air flow

FAN — FLEB -a -e

- Type: F = Forward curved blades; B = Backward curved blades; L = Backward curved with guide vanes**
- Motor: See page 57, Electric motors
- Belt gear: See page 63, Belt drive gear

FILTER — FLEF -a -f

- Filter class: 3 = EU 3 (G80); 6 = EU 6 (F65); 7 = EU 7 (F85); A = Aluminium mesh

AIR HEATER, WATER — FLEV -a -g

- Power variant: 1, 2

AIR HEATER, ELECTRICAL — FLEE -a -g -h -i

- Power variant: 1, 2
- Type: HT = High temperature; LT = Low temperature
- Air flow: Min. air flow in m³/s

AIR COOLER — FLBC -a -d -j -k -l

- Cooling system: VK = Water cooler; DX = DX cooler
- Power variant: 1, 2, 3
- Droplet separator: 0 = Without; 1 = With

Exhaust air flow

FAN — FLEB a-e

- Type: F = Forward curved blades; B = Backward curved blades; L = Backward curved with guide vanes**
- Motor: See page 57, Electric motors
- Belt gear: See page 63, Belt drive gear

FILTER — FLEF -a -f

- Filter class: 3 = EU 3 (G80); 6 = EU 6 (F65); 7 = EU 7 (F85); A =Aluminium mesh

* Inspection side viewed in direction of supply air
** For sizes 190 and 300 only

Additional equipment

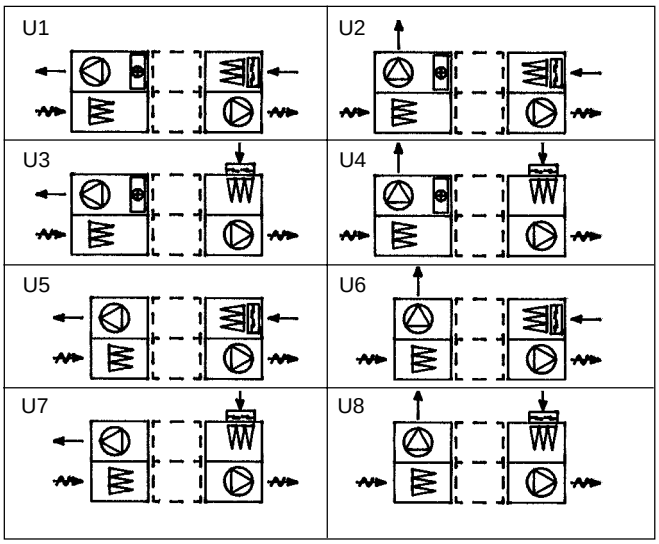
Outdoor version	FLBT-01 -a
Connecting frames	FLET-02 -a
Exhaust air damper	FLET-03 -a
Sound attenuator	FLET-04 -a
Spacer	FLET-05 -a
Purging door, fan	FLET-06 -a
Frame	FLBT-07 -a
Electrical connection	FLBT-08 -a -m

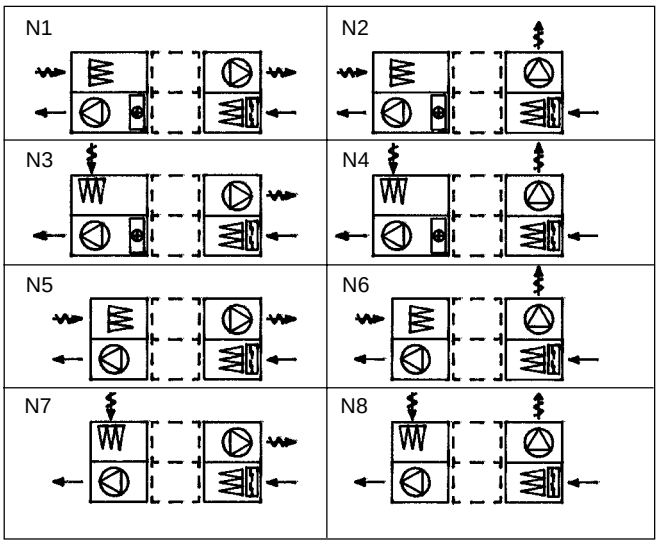
Version: P= To terminal block; A= To installed cabinet

Fabric duct connection	FLET-09-a
Flowmeter	FLET-10
Glass in inspection hatch	FLET-11
Reinforced fan	FLET-12-300

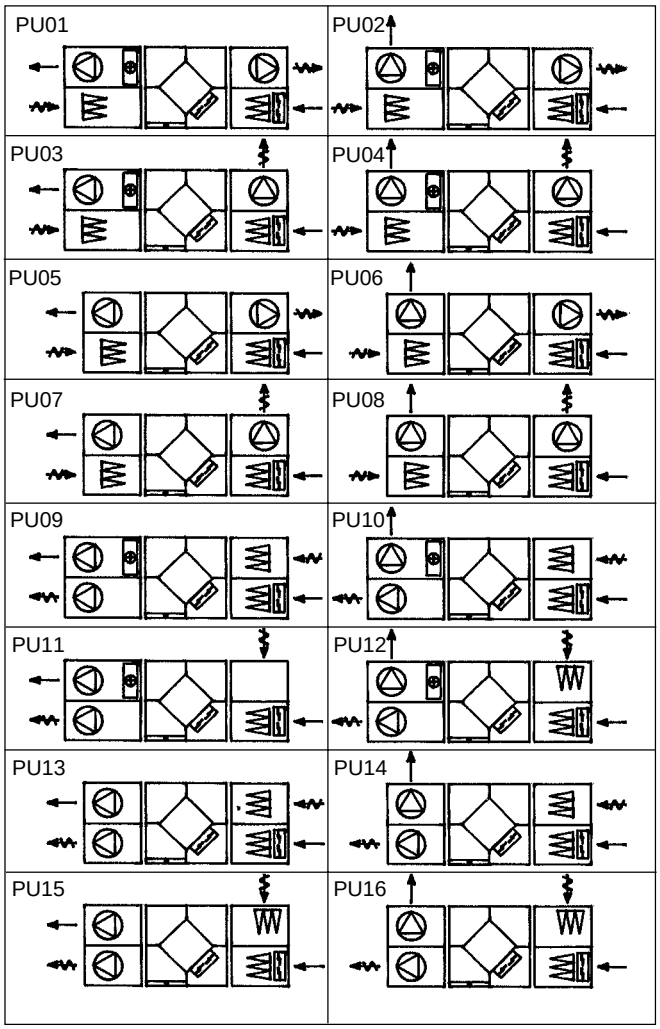
Version

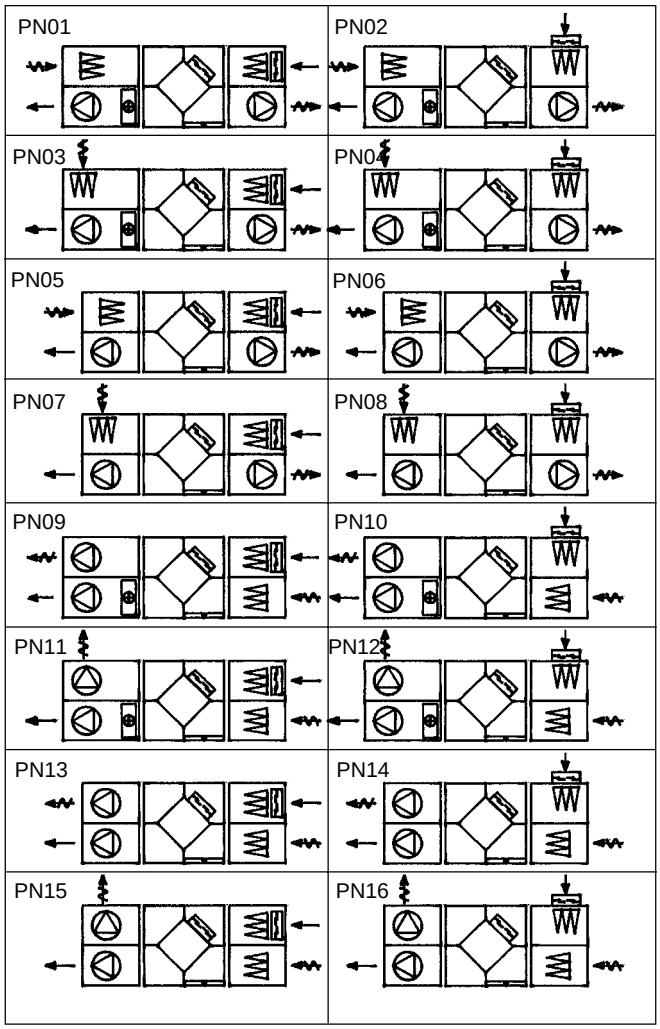
Versions U1-U8 apply to units with FLBH (Heatbank) heat recovery unit. Versions U1-U8, N1-N8 apply to units with FLBR (rotary) heat recovery unit and also KEA and KEAQ.





The versions indicated below apply to units with an FLBP (plate heat exchanger) heat recovery unit.



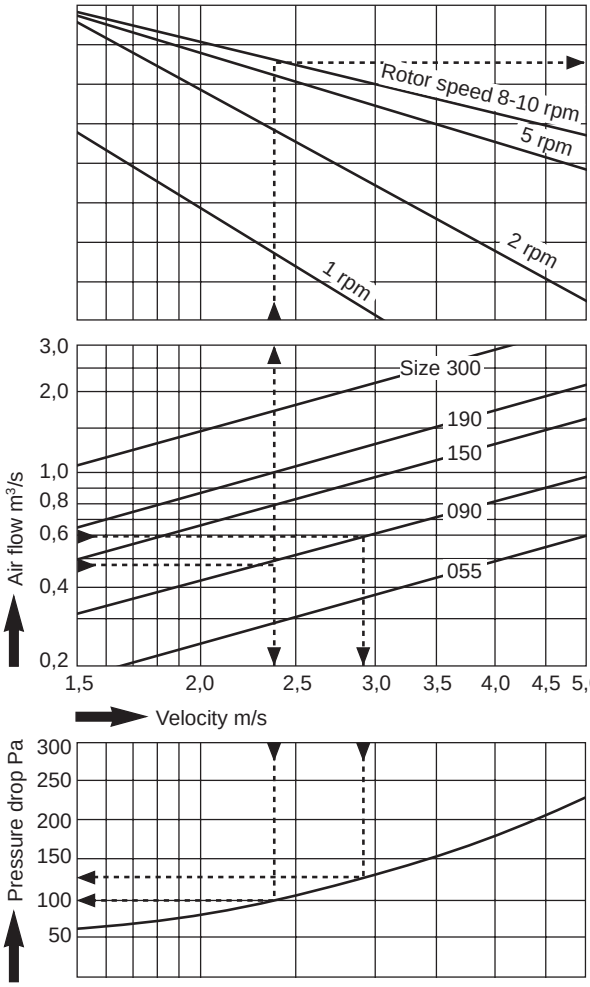


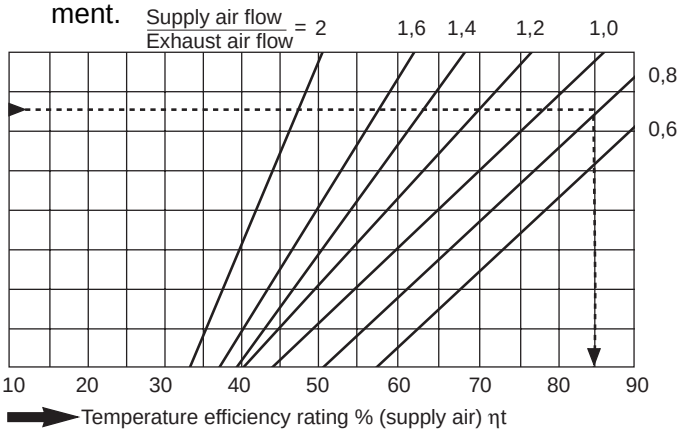
Heat recovery units FLER and FLBR

Description

The FLER and FLBR heat recovery units are of the rotary type. The rotor is assembled from alternate layers of flat and corrugated thin sheet aluminium. A purging sector ensures continuous cleaning of the rotor. An ”on/off” drive system can be selected, or, when there are high demands on the control of transmitted power, there is electronic equipment available for the control of the rotor speed. When there are high demands on moisture transmission, the rotor can be supplied with hygroscopic treatment.

Technical data





Example:

Given:

Supply air flow 0,48 m/s
Exhaust air flow 0,60 m³/s
Size 090 10 r/m

The charts give:

Temperature efficiency rating (supply air) = 85 %
Pressure drop (supply air)= 100 Pa
Pressure drop (exhaust air)= 130 Pa

Specification

HEAT RECOVERY UNIT -a-b-c-d-e

For installation in	FLEH= Unit assembly FLBH=Block assembly
Size	055, 090, 150, 190, 300
Casing	00=Standard 30=A-30
Rotor	NO=Normal HY=Hygroscopic
Drive unit	K=Constant speed R=Speed control

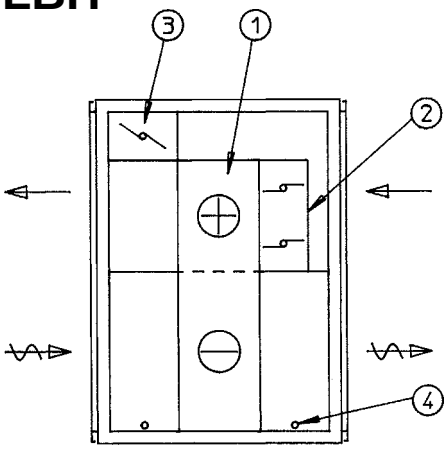
Motordata

Vers	Size	Power W	Voltage type	Rated current/Fuse
Const. speed 10 r/min	055 - 090	45	3 x 380 V	0,22 A
	150 - 190	120	3 x 380 V	0,33 A
	300	180	3 x 380 V	0,72 A
Speed control	055 - 090	30	1 x 220 V	2 A Delay
	150 - 300	90	1 x 220 V	6 A Delay

Heat recovery units FLEH and FLBH

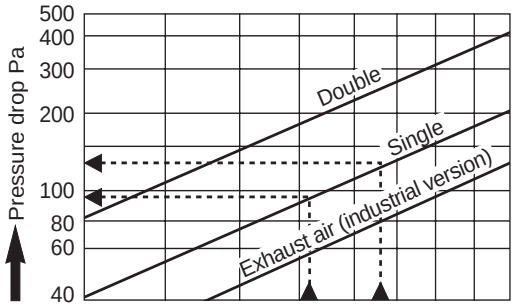
Description

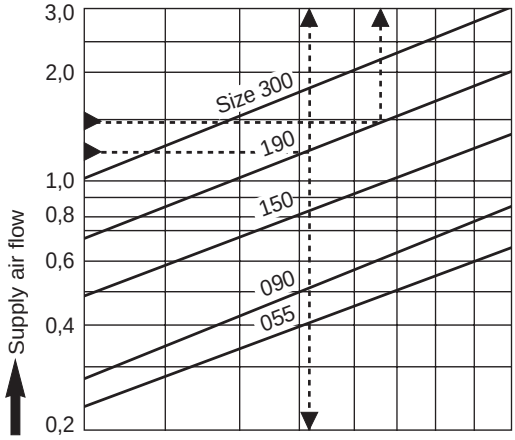
The FLEH and FLBH heat recovery units are of the Heatbank heat pipe exchanger type.
Single or double heat recovery units with a fin pitch of 1,8 mm can be selected for comfort installations. In the case of installations in industrial environments, where there is polluted exhaust air, the industrial version should always be used. This version has a fin pitch of 2,8 mm on the exhaust air side.
A corrosion-resistant drip tray with drain connections is provided to collect condensation water.
Defrosting and power regulation is performed with the help of integrated by-pass and shut-off damper connected to a common drive shaft.
Refrigerant: AFC 134 A (Tetrafluorethane)

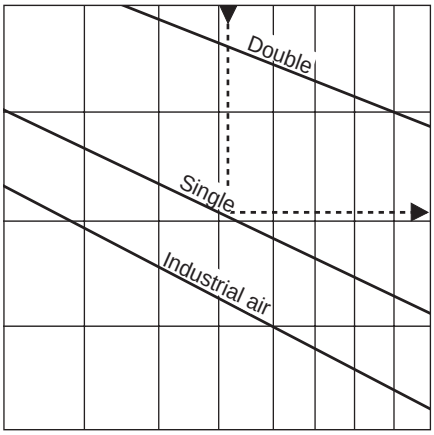


1. Heat recovery unit
2. Shut-off damper
3. By-pass damper
4. Drain connection 15

Technical data







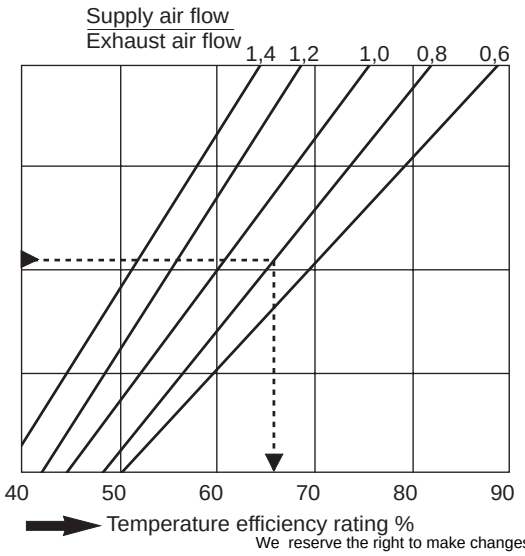
Specification

HEAT RECOVERY UNIT -a -b -c -d

For installation in	FLEH = Unit assembly FLBH = Block unit
Size	055, 090, 150, 190, 300
Casing	00 = Standard 30 = A-30
Version	E = Single D = Double I = Industrial version

Example:

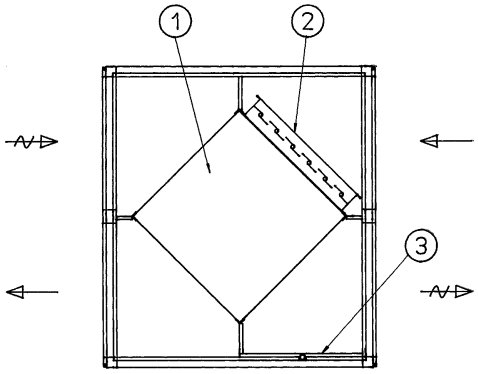
Supply air flow = 1,2 m³/s
Exhaust air flow = 1,5 m³/s
Size 190, single
The charts give:
Temperature efficiency rating (supply air) 66%
Pressure drop (supply air) 95 Pa
Pressure drop (exhaust air) 130 Pa



Heat recovery unit FLBP

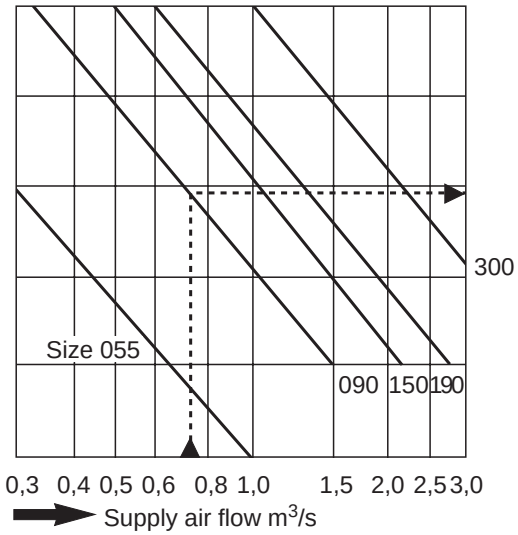
Description

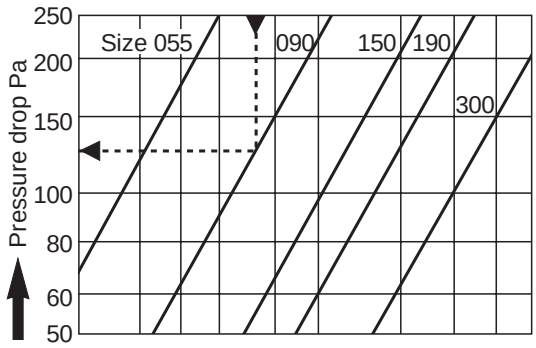
The FLBP heat recovery unit is a unit that contains a cross-current type of plate heat exchanger. Defrosting and power regulation are performed with the help of the integrated by-pass and shut-off valves. A corrosion-resistant drip tray with drain connections is provided to collect condensation water.

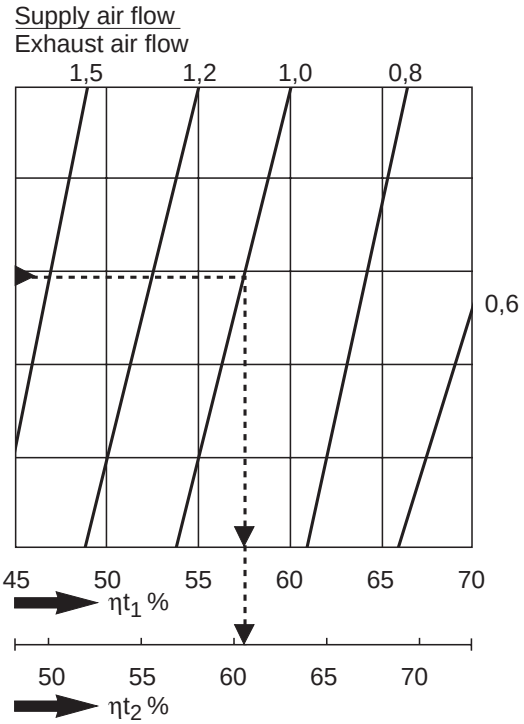


1. = Heat recovery unit
2. = By-pass and shut-off valves
3. = Drip tray with drain connection 15

Technical data







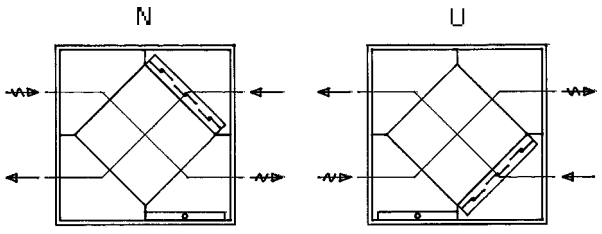
ηt_1 = Dry temp. efficiency rating
ηt_2 = Temp. efficiency rating at exhaust air +20, 30% RH, and an outdoor air temperature of -10°C.

Specification

HEAT RECOVERY UNIT FLBP-a-b-c

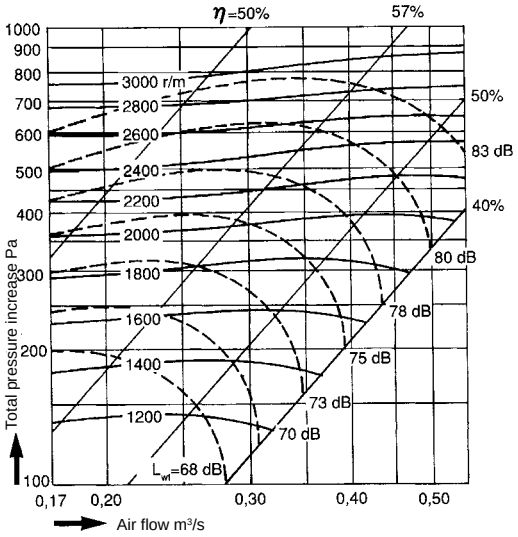
Size	055, 090, 150, 190, 300
Casing	00=Standard 30= A30
Version	U or N

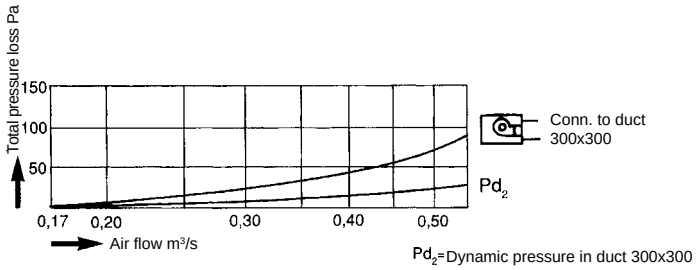
Version



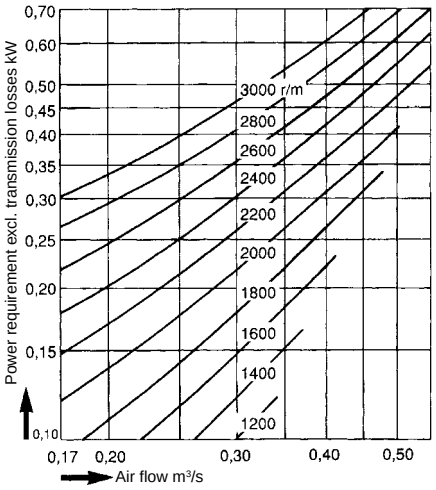
Fan capacity

FLEB-055-F





Pd$_2$=Dynamic pressure in duct 300x300



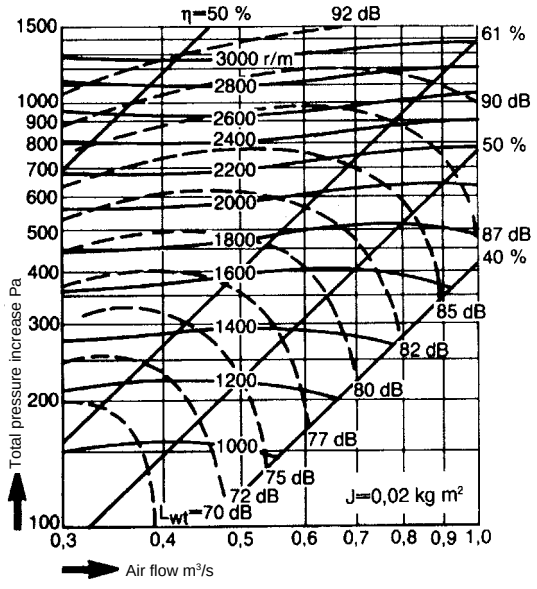
Sound data*

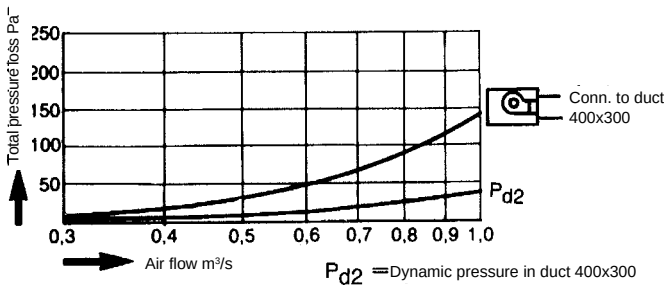
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok}duct	-4	-8	-9	-11	-11	-12	-14	-19
Correction K_{ok}fan compartment	-21	-19	-23	-34	-34	-35	-40	-44

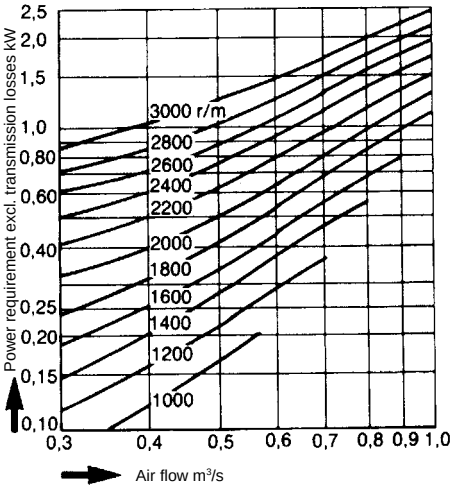
* According to ISO

FLEB-090-F





P_{d2} =Dynamic pressure in duct 400x300



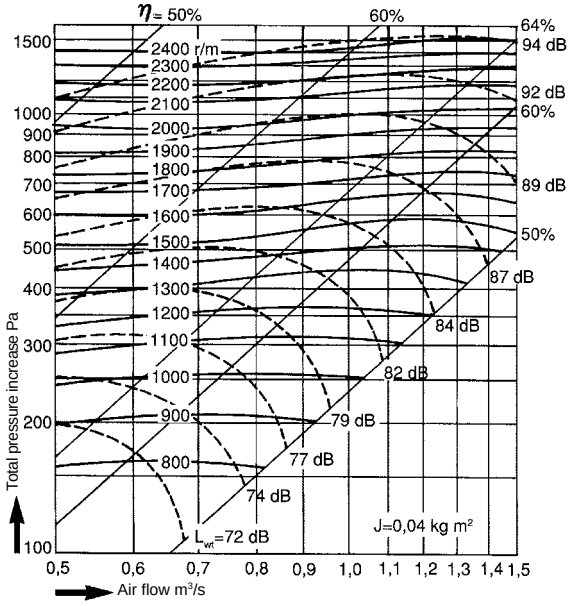
Sound data*

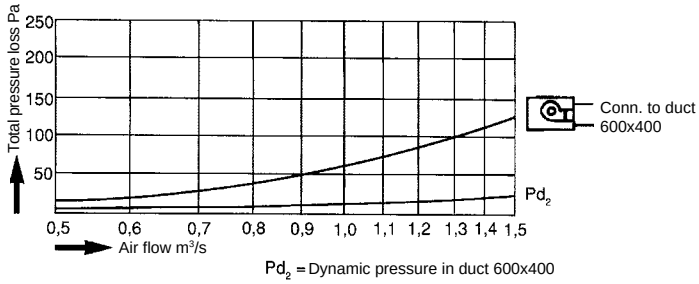
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok}duct	-4	-8	-9	-11	-11	-12	-14	-19
Correction K_{ok}fan compartment	-21	-19	-23	-34	-34	-35	-40	-44

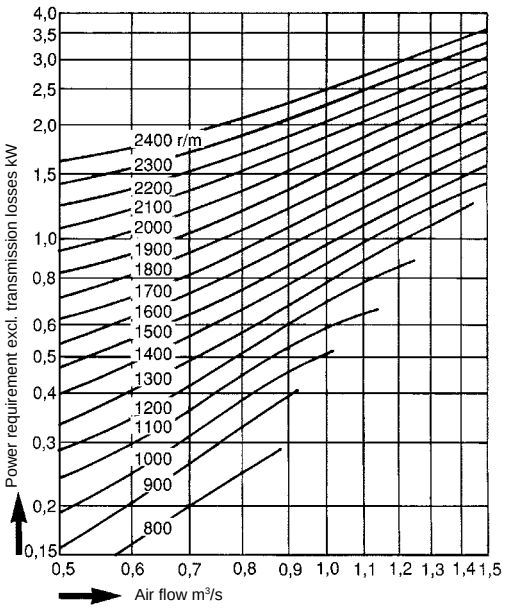
*According to ISO

FLEB-150-F





Pd_2 = Dynamic pressure in duct 600x400



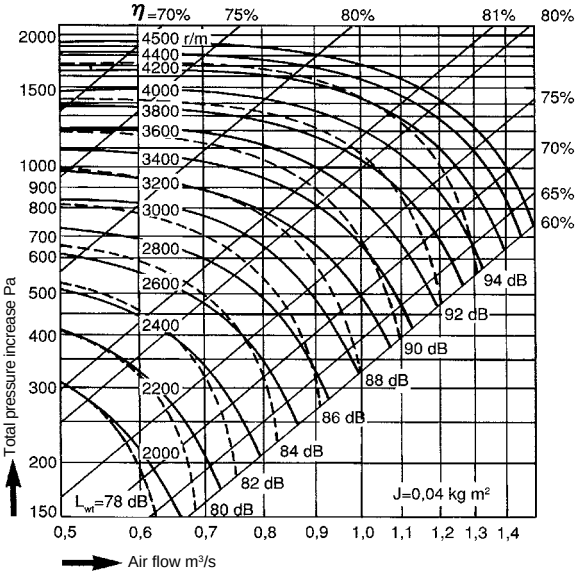
Sound data*

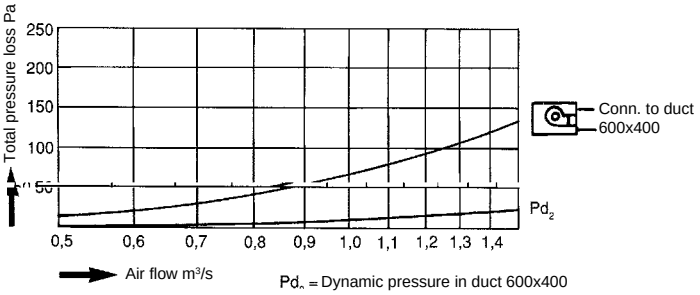
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	-3	-9	-10	-10	-11	-14	-16	-21
Correction K_{ok} fan compartment	-20	-19	-23	-33	-34	-38	-42	-48

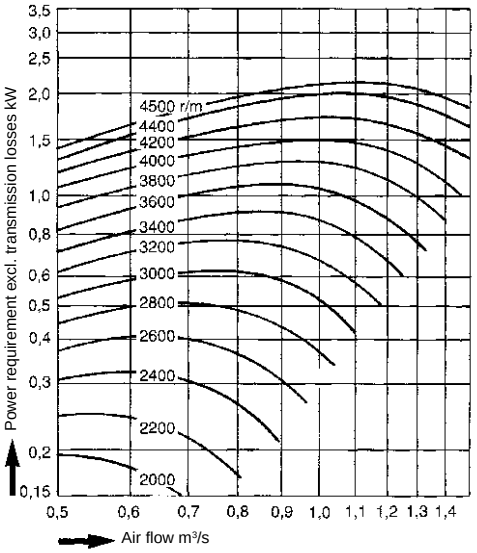
*According to ISO

FLEB-150-B





Pd_2 = Dynamic pressure in duct 600x400



Sound data*

For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

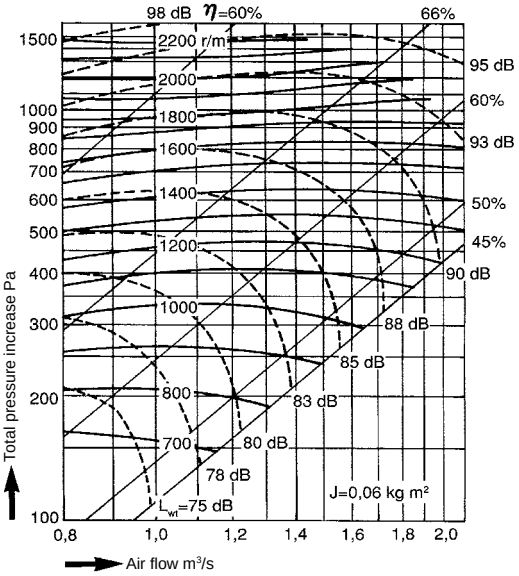
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	-8	-7	-11	-6	-7	-9	-14	-18
Correction K_{ok} fan compartment	-18	-22	-27	-30	-33	-34	-39	-45

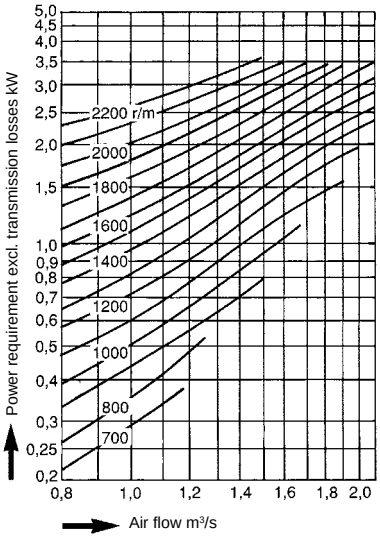
*According to ISO

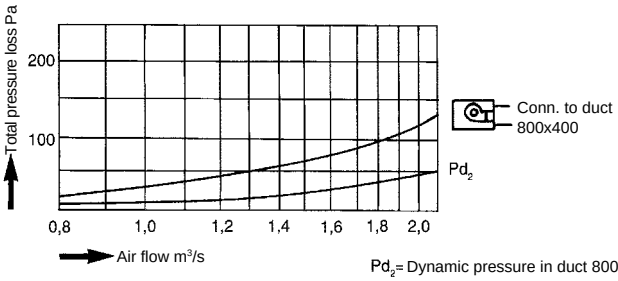
We reserve the right to make changes without prior notice

Fan capacity

FLEB-190-F







Pd$_2$= Dynamic pressure in duct 800x400

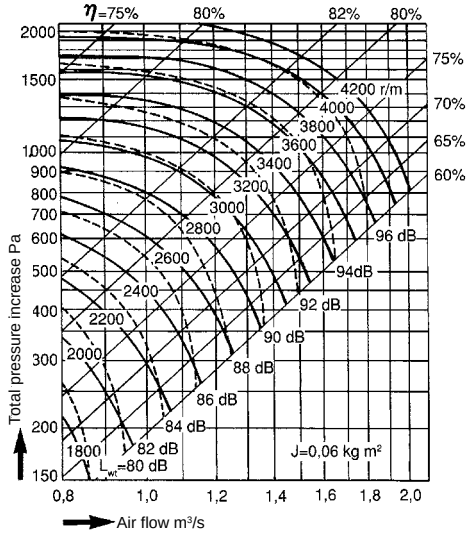
Sound data*

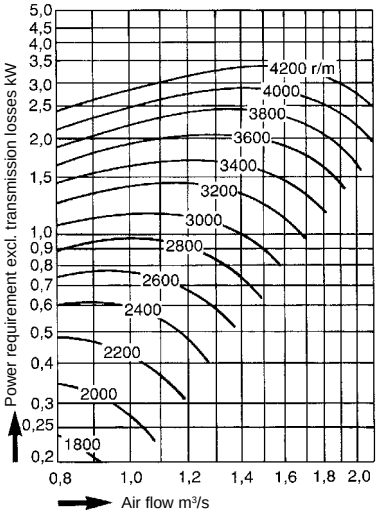
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

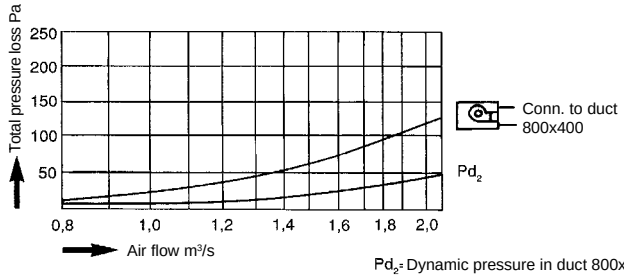
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok}duct	-3	-9	-10	-10	-11	-14	-16	-21
Correction K_{ok}fan compartment	-20	-19	-23	-33	-34	-38	-42	-48

*According to ISO

FLEB-190-B







Pd$_2$= Dynamic pressure in duct 800x400

Sound data*

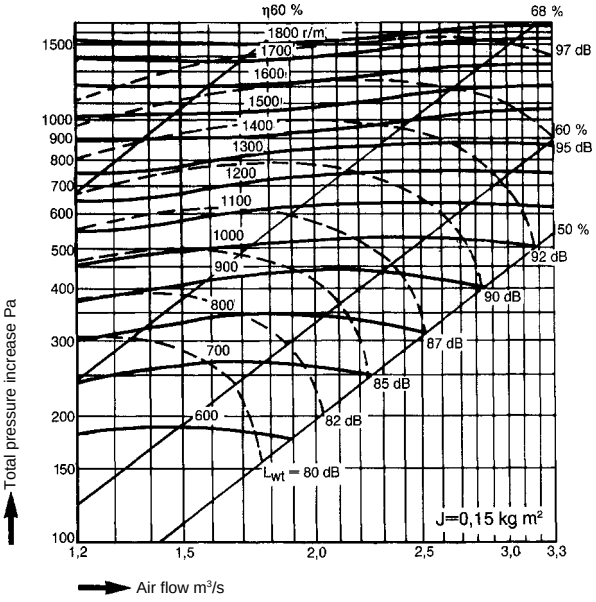
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

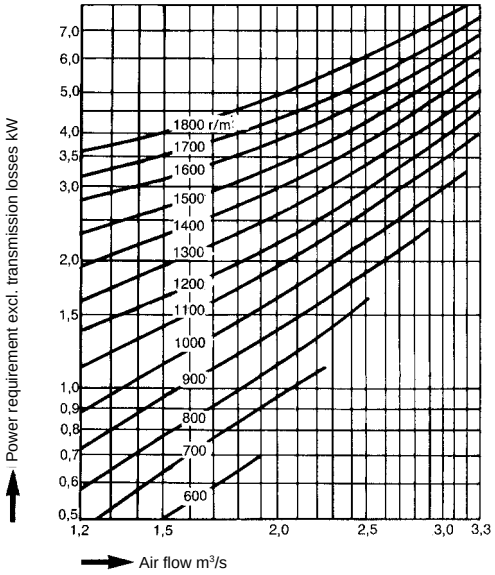
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok}duct	-8	-7	-11	-6	-7	-9	-14	-18
Correction K_{ok}fan compartment	-18	-22	-27	-30	-33	-34	-39	-45

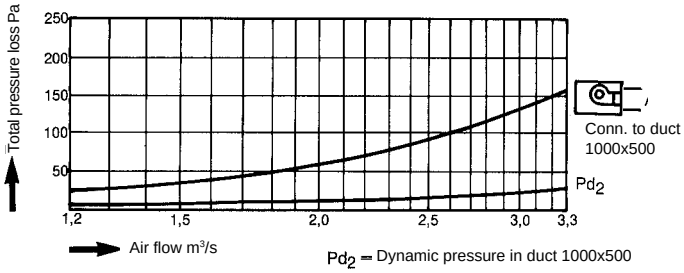
*According to ISO

Fan capacity

FLEB-300-F







Pd_2 = Dynamic pressure in duct 1000x500

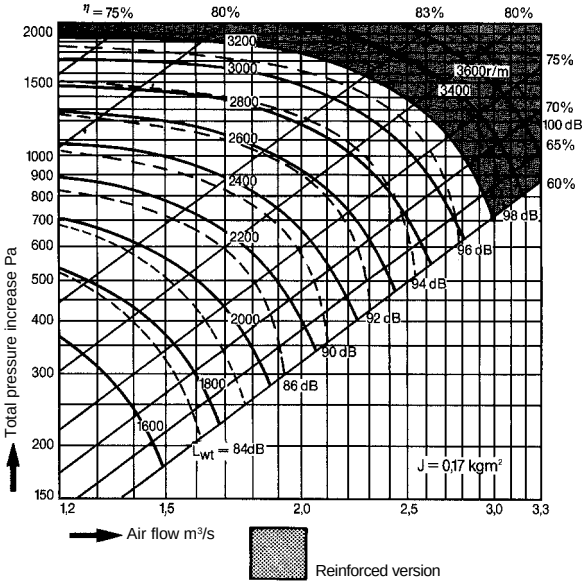
Sound data*

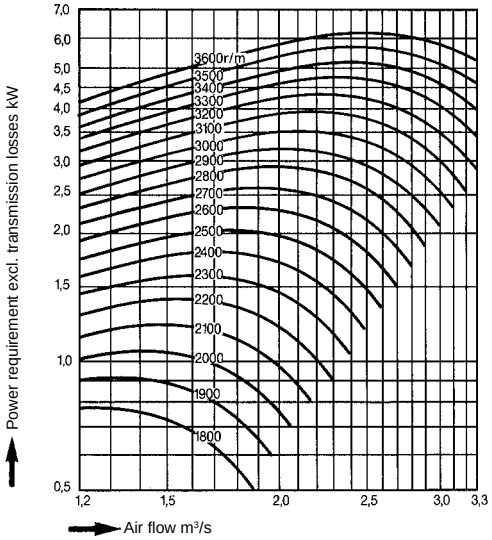
For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

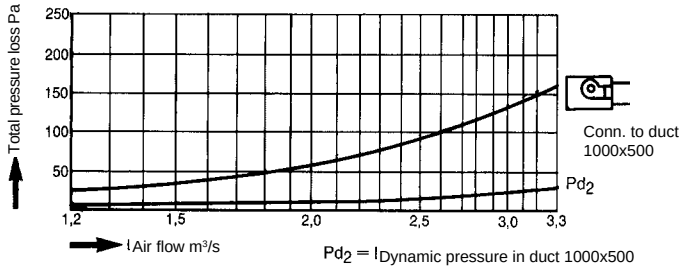
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	-3	-9	-10	-10	-11	-14	-16	-21
Correction K_{ok} fan compartment	-20	-19	-23	-33	-34	-38	-42	-48

*According to ISO

FLEB-300-B







Pd_2 = Dynamic pressure in duct 1000x500

Sound data*

For dividing octave bands, add a correction K_{ok} to the value L_{wt} derived from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	-8	-7	-11	-6	-7	-9	-14	-18
Correction K_{ok} fan compartment	-18	-22	-27	-30	-33	-34	-39	-45

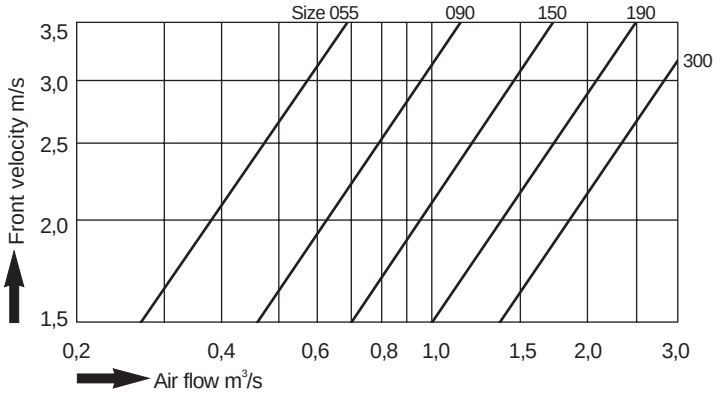
*According to ISO

We reserve the right to make changes without prior notice

Filter FLEF

Description

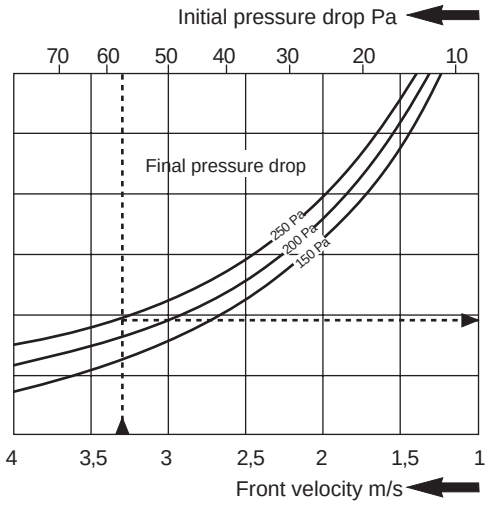
The FLEF filter is available in 4 different grades. In addition to deep-folded disposable bags in the EU3, EU6, and EU7 classes, a cleanable aluminium filter can be selected. This should be used particularly in installations in which the exhaust air contains greasy substances, such as found in ventilation systems in homes.
In the standard version, delivery of the unit includes a U-tube manometer for monitoring the filter.

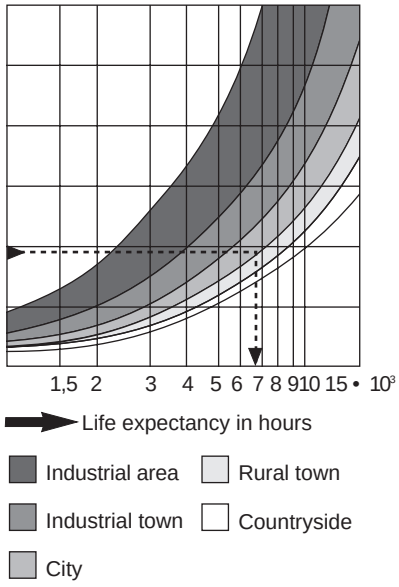


Technical data

EU 3 (G80)

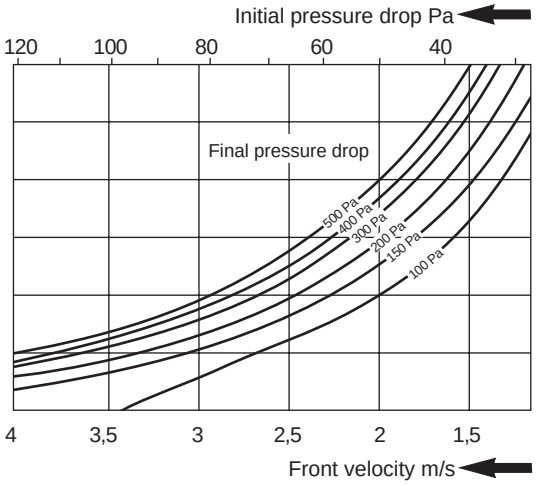
The filter is a deep-folded disposable filter that cannot be cleaned and is made of polyamide fibres.

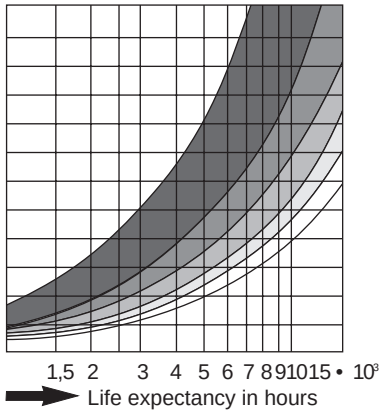




EU 6 (F65)

The filter is a deep-folded disposable filter that cannot be cleaned and is made of fibreglass.



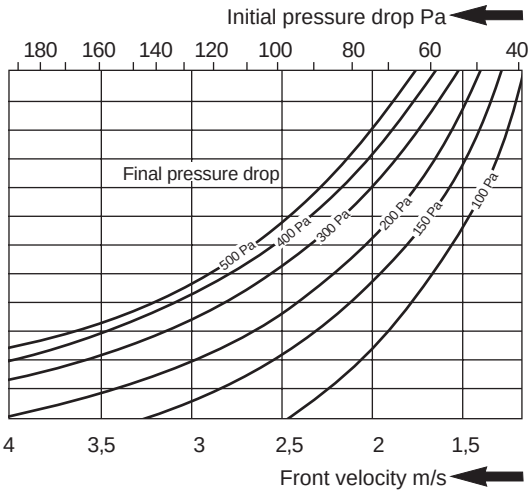


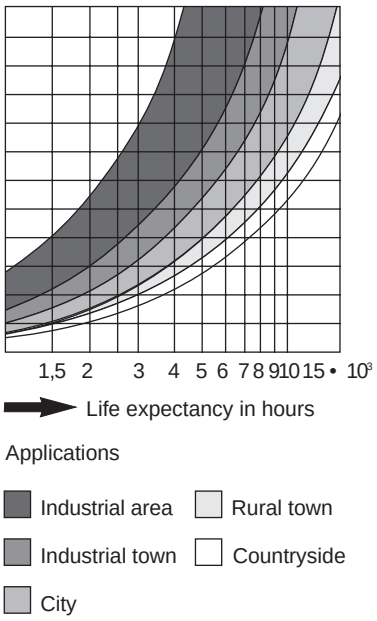
Applications

Industrial area
Rural town
Industrial town
City

EU 7 (F85)

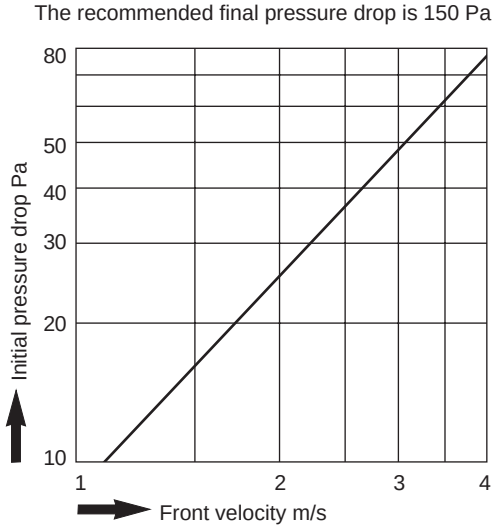
The filter is a deep-folded disposable filter that cannot be cleaned and is made of fibreglass.





Aluminium mesh filter

The filter is a panel filter made of aluminium mesh, and is cleanable.



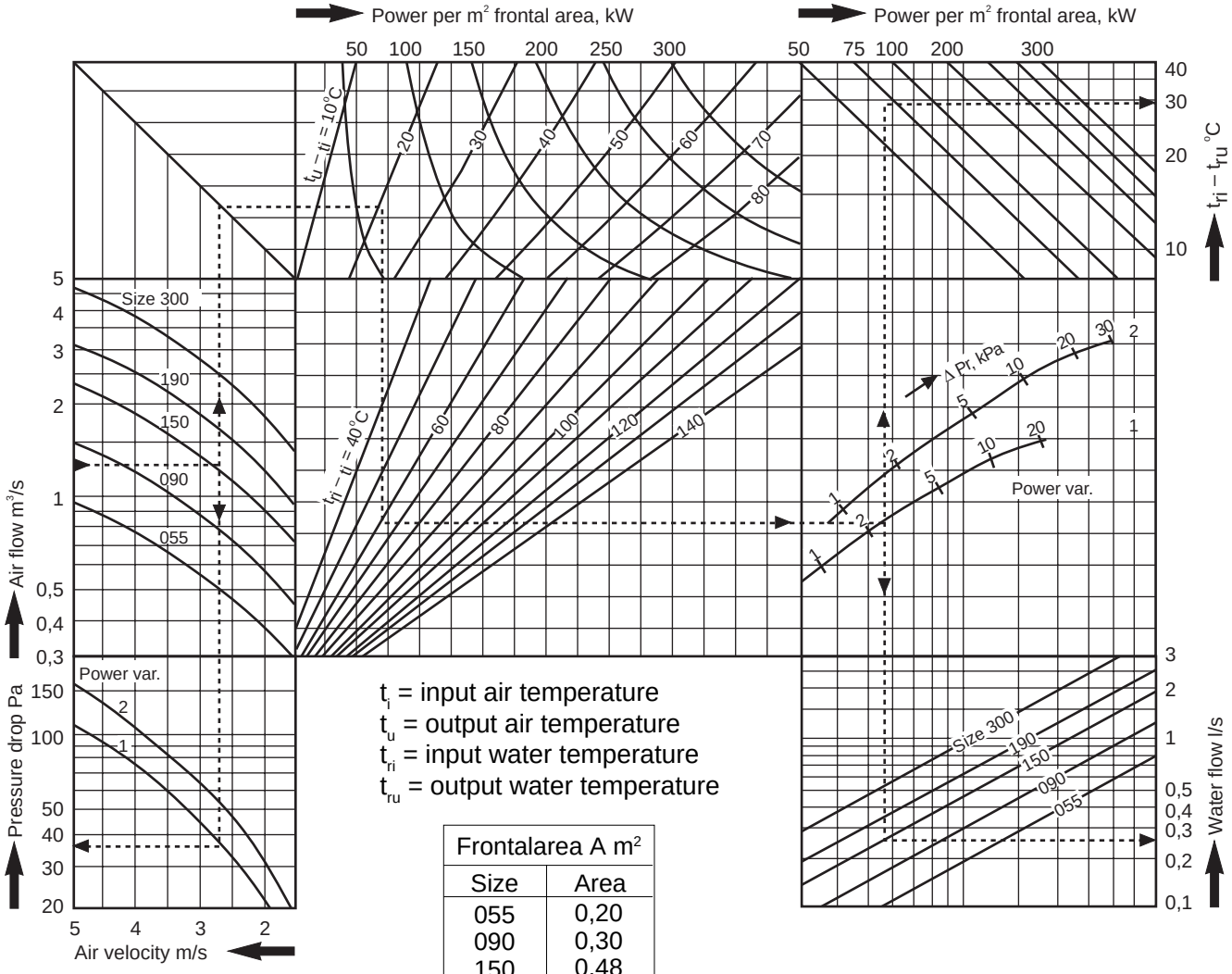
Air heater FLEV

Design

The FLEV air heater is a fin-type heat exchanger for heating with hot water. The coil body consists of copper pipes and aluminium fins.
The collection pipes have an external thread and are fitted with outlets for ventilation and draining. A freeze monitor can be connected to a plunger sensor with a maximum diameter of Ø5 mm.

Connection dimension:
Size 055-150 conn. 25
Size 190-300 conn. 32

Technical data



t_i = input air temperature
t_u = output air temperature
t_{ri} = input water temperature
t_{ru} = output water temperature

Frontalarea A m²	
Size	Area
055	0,20
090	0,30
150	0,48
190	0,62
300	0,95

Example:

Given:
Airflow = 1,3 m³/s
t_i = ± 0 °C
t_u = + 20 °C
t_{ri} = + 60 °C
t_{ru} = + 40 °C
Size 150

Solution:

Read off the chart with flow 1.3 m³/s
Select size 150
Follow the dashed line.
At tu-ti = 20°C, the power will be 65 kW per m² frontal area.
Move to the ”break-off” line tri-ti 60°C and on to the dimensioning curve for power variant 1.
Check the upper chart to make sure tri-tru exceeds the dimensioned data. If it does not, power variant 2 must be used.

The following can be obtained from the chart:

Power variant = 1
Water flow = 0.26 l/s
Pressure drop Pr = 2.5 kPa
tri-tru = 29 °C (which means that the return temp. is 60-29 = 31°C)
Pressure drop, air = 38 Pa

Air heater FLEE

Design

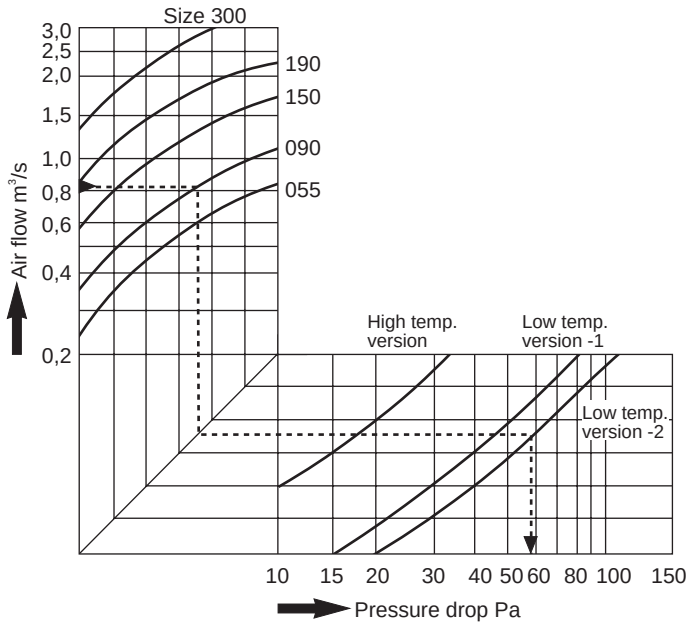
The FLEE air heater is an electric heater in a low or a high temperature version.
In the low temperature version, the heating surface consists of aluminium fins with a pitch of 3.2 mm and copper pipes in which element rods are inserted.
The high temperature version consists of stainless steel pipe elements.
The heaters feature double overheating protectors, one of which is reset manually, that switch-off the power supply in a risk of overheating-situation.
Protection form S 32 in accordance with SEN 2121.
There are standard air heaters with 2 power variants to each size. Other power variants can be supplied, however, according to specification.

Power division

Size	Power stage	
	Variant 1 kW	Variant 2 kW
055	8	13
090	13	7+15=22
150	7+15=22	2,4+4,8+9,6+19.2=36
190	1) 1,8+3,6+7,2+14,4=27	3+6+12+24=45
300	3+6+12+24=45	4,8+9,6+19,2+2x19,2=72

1) Connected to single-phase 220 V in low temp. version.

Pressure drop

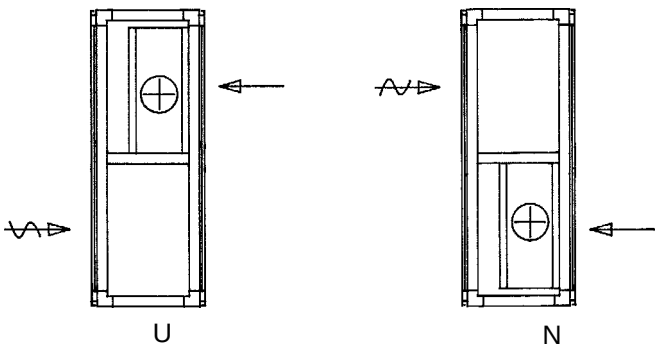


Air heater unit FLBL

General

The FLEV and FLEE air heaters can be installed and delivered in a separate unit, FLBL.
In this case, the supply air unit can be supplied without space provided for an air heater, and is then shortened to allow the entire unit to be passed through a 90 cm wide opening.

Design



Specification

AIR HEATER UNIT FLBL -a -b -c -d

Size	055, 090, 150, 190, 300
Casing	00 = Standard 30 = A 30
Type	VA = Water heater EL = Electric heater
Version	U or N

Air cooler FLBC

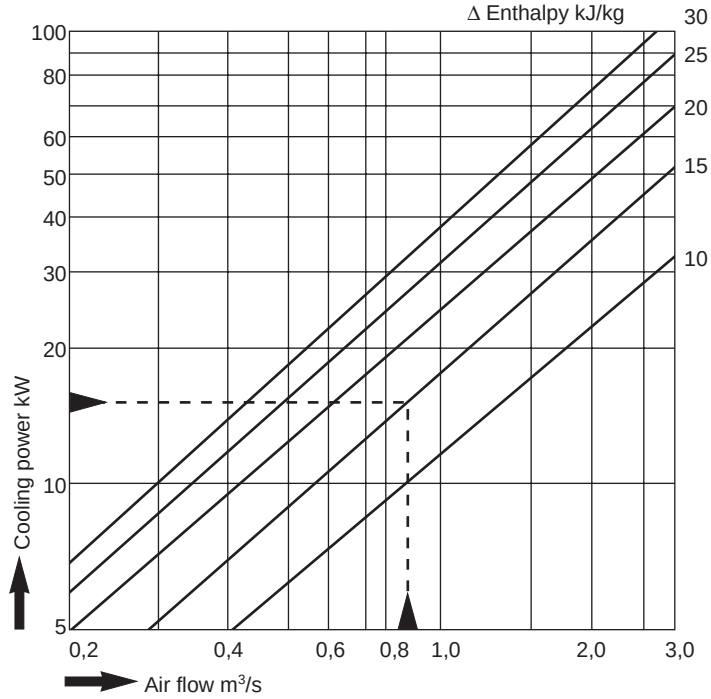
Design

The FLBC air cooler is available as a water cooler or DX cooler. The coil body consists of aluminium fins with a pitch of 2 mm and copper pipes through which media the can flow.
In the water cooler version, the collecting pipes are made of steel and have recesses for draining and ventilation.
The DX coil has collecting and distributing pipes made of copper designed for solder joints.

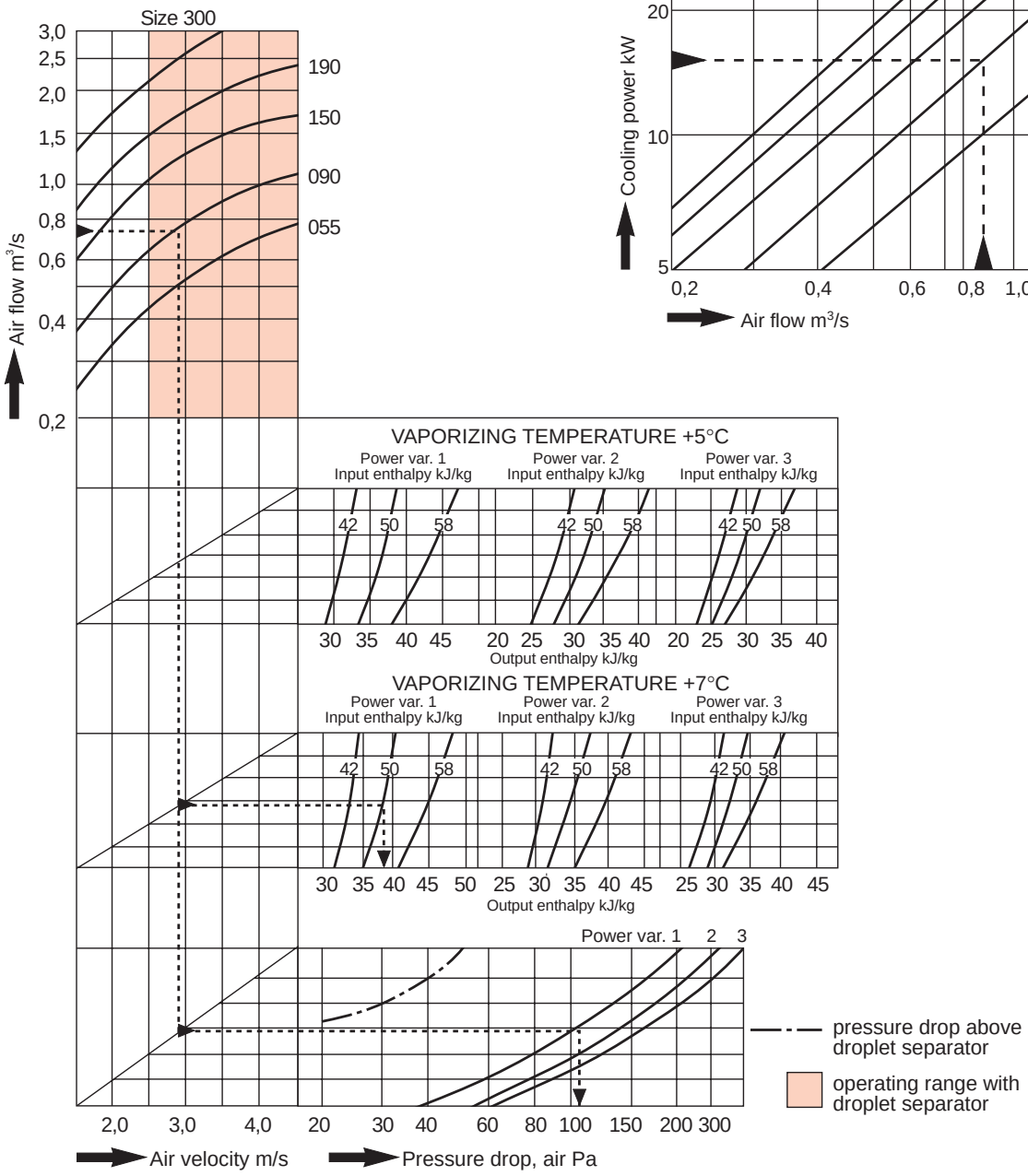
Max. operating pressure, 15 above atm pr.

The air coolers are fitted with a corrosion-resistant drip tray with a drain connection.

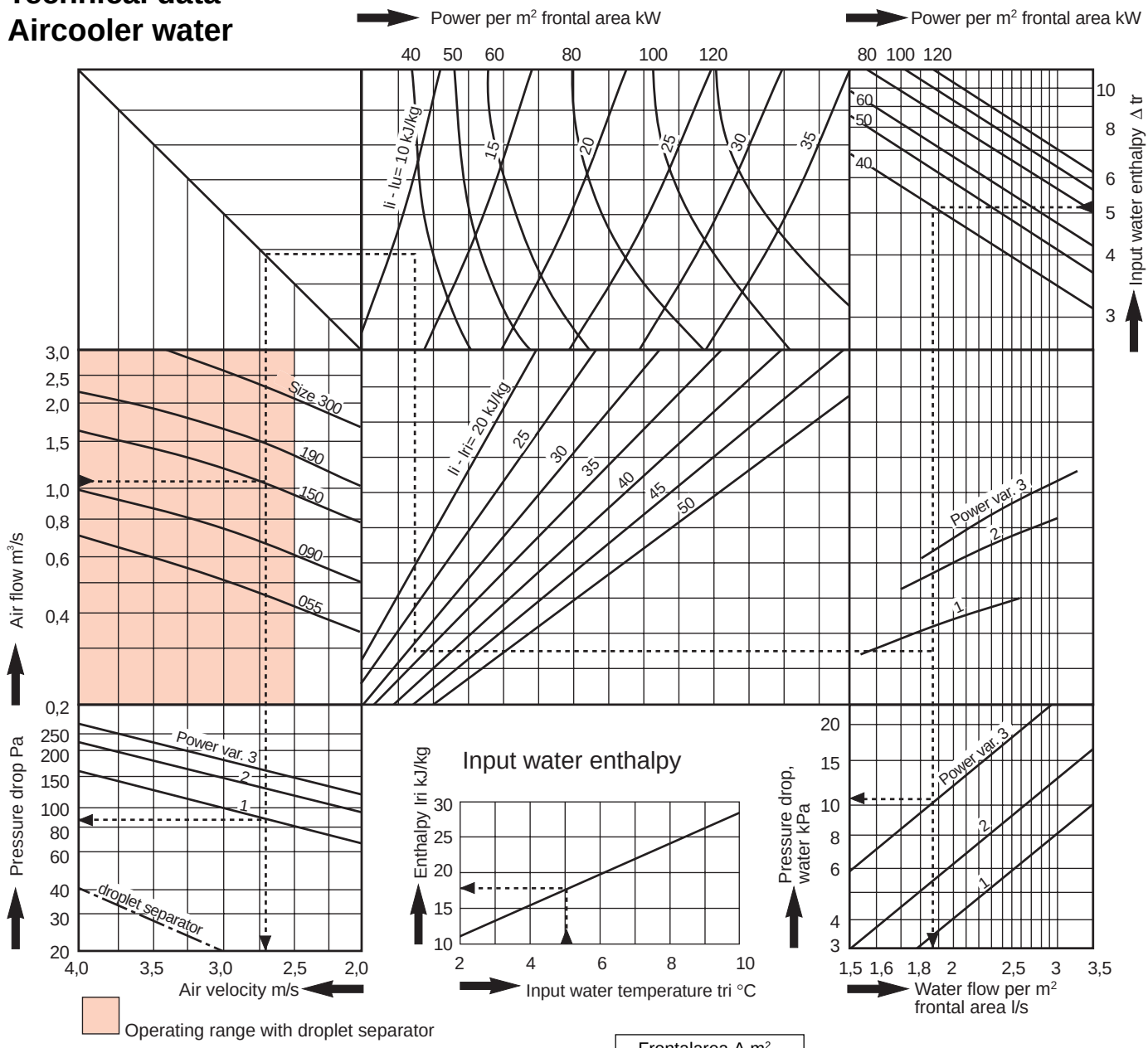
At air velocities above 2,5 m/s, the droplet separator should be used to avoid the excitation of condensation water.



Technical data
DX-cooler



Technical data
Aircooler water



Frontalarea A m²	
Size	Area
055	0,17
090	0,25
150	0,40
190	0,55
300	0,85

Example:
Given:
Air flow = 1.1 m³/s
Input air temperature ti = +25°C
RH of input air = 50%
Output air temp. tu = +15°C
Input water temp. tri = +5°C
Output water temp. tru = +10°C
Size 150 A=0.40 m²

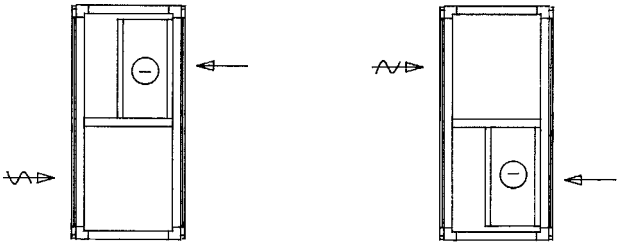
Solution:
According to the Mollier chart:
Enthalpy of input air li = 50 kJ/kg
Enthalpy of output air lu = 38 kJ/kg
According to the chart:
Enthalpy of input water lri = 18 kJ/kg
Read off the chart with air flow 1.1 m³/s
Select size 150
Follow the dashed line.At lu-li = 12 kJ/kg, the power will be 38 kW per m² frontal area.
Move to the ”break-off” line li-lri 32 kJ/kg and on to the chart to determine the power variant.
Use water temperature difference tr = 5°C and move via power 38 kW per m² in the chart to determine the power variant.
Select the power variant (1) that is nearest above the break-point which arises.
The following can be obtained from the chart:
Air velocity = 2.7 m/s
(this means a droplet separator is required)
Pressure drop, air = 90 Pa
Power = A x power per m² = 0,4x38 = 15,2 kW
Power variant = 1
Water flow = A x water flow per m² = 0,40x1,85 = 0,74 l/s
Pressure drop, water = 10,5 kPa

Air cooler unit FLBK

General

The FLBK air cooler unit is a unit in which the FLBC air cooler is placed.
The shorter version is designed for an air cooler with power variant 1 or 2 without droplet separator. In other cases, the longer version must be used.

Version



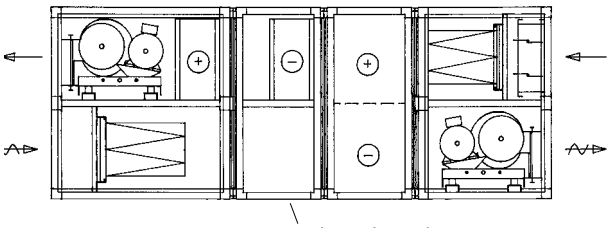
U N

Specification

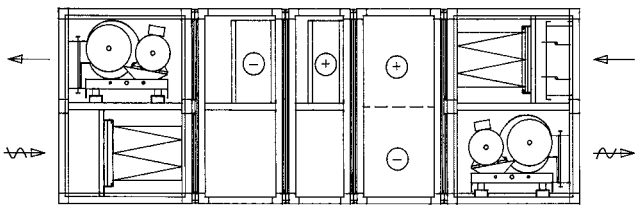
AIR COOLER UNIT FLBK -a -b -c -d -e

Size	055, 090, 150, 190, 300
Casings	00 = Standard 30 = A 30
Variant	K = Short L = Long
Version	U or N
Connection side	H = right V = left

Installation



Example 1: With the DX cooler, the air cooler can be placed between the air heater and the heat recovery unit. If the supply air temperature is less than +14°C, however, the installation should be made as shown in example 2.



Example 2: To avoid freezing in the air cooler, it should always in the case of a water cooler be placed behind the air heater.

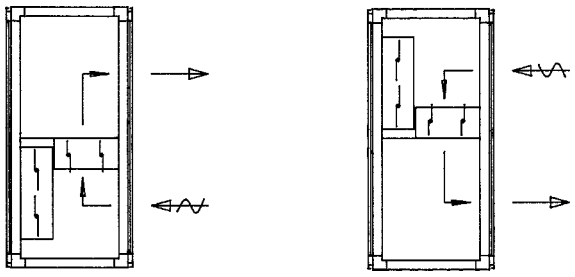
Recirculated air unit FLBB

General

The FLBB recirculated air unit is used in installations in which the retention of heat at nights is achieved by means of a recirculated air operation.

The unit includes two dampers with the tightness class 3 that are connected to a common output shaft.

Version



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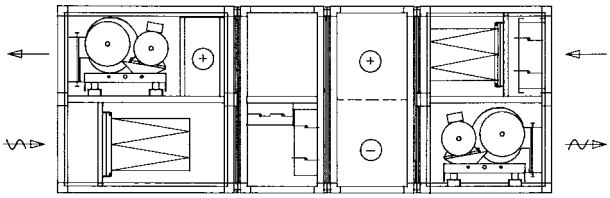
Specification

RECIRCULATED AIR UNIT FLBB -a -b -c -d

Size	055, 090, 150, 190, 300
Casings	00 = Standard 30 = A 30
Version	U or N
Connection side	H = right V = left

Installation



Measuring unit FLBD

General

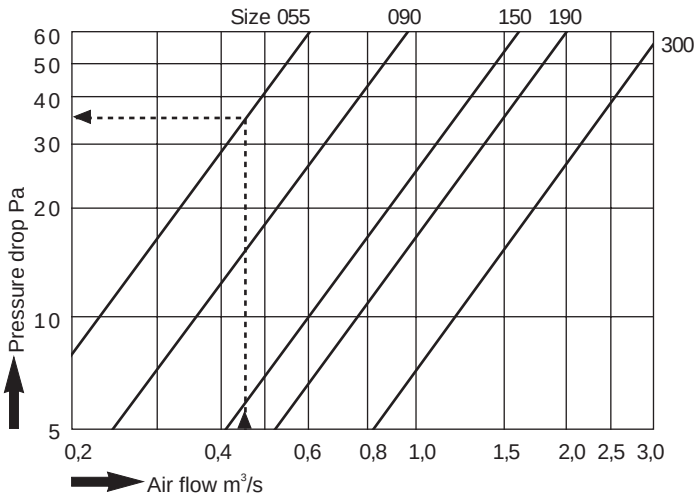
The FLBD measuring unit can be used for simple forms of measuring the total flow or for continuous flow monitoring.
The measuring unit has a measuring outlet for both supply and exhaust air flows.
It can also be used as an inspection unit between the air heater and heat recovery unit, for example.
When measuring efficiency, a temperature sensor can be placed in the measuring unit.
To achieve the best possible measuring results, the measuring unit should be installed as shown in the example below.

Specification

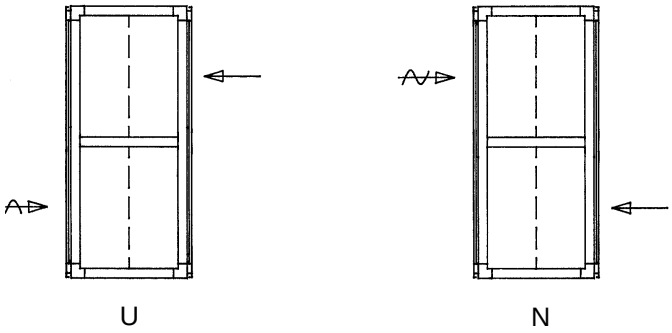
MEASURING UNIT FLBD -a -b -c

Size	055, 090, 150, 190, 300
Casings	00 = Standard 30 = A 30
Version	U or N

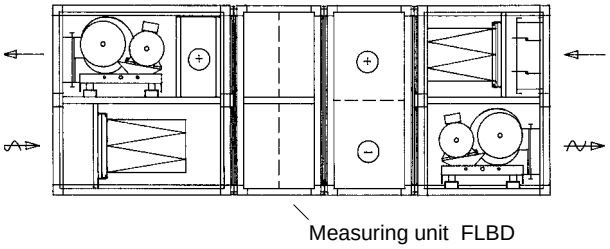
Pressure drop



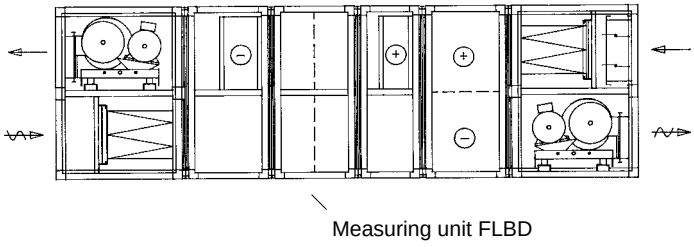
Version



Installation



Example 1: Measuring unit placed between air heater and heat recovery unit.



Example 2: Measuring unit placed between air heater and air cooler.

Inspection unit FLBI

General

The FLBI inspection unit can be used in installations where there are special requirements for inspection and cleaning. It can be placed between the heat recovery unit and air heater, for example.

Specification

INSPECTION UNIT — FLBI -a -b -c

Size	055, 090, 150, 190, 300
Casing	00 = Standard 30 = A 30
Variant	K = Short L = Long

Media unit FLBM

General

The FLBM media unit has space for an apparatus cabinet and shunt group. The space for the apparatus cabinet is entirely separate from the air flow. Pass-throughs have been prepared for input feed.

In the unit installation, the media unit is placed between the air heater and heat recovery unit.

For sizes 055-150, the shunt group is fitted on the outside. For other sizes it is fitted on the inside.

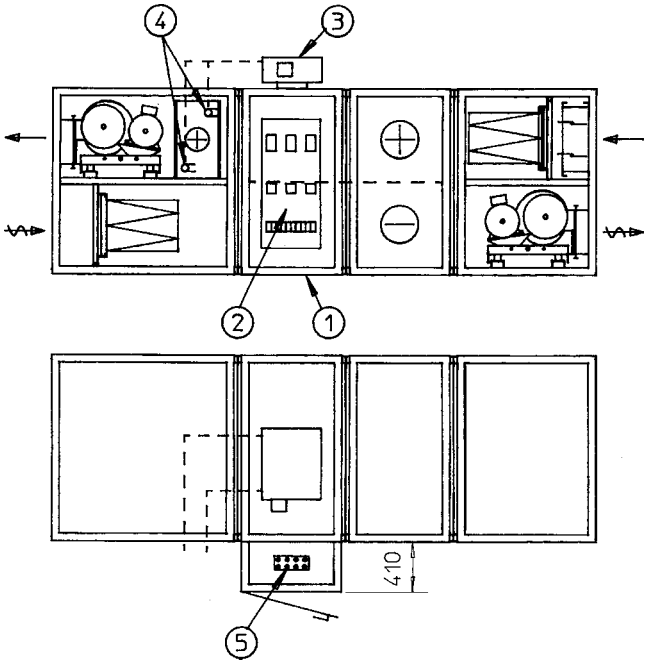
Specification

MEDIA UNIT — FLBM -a -b

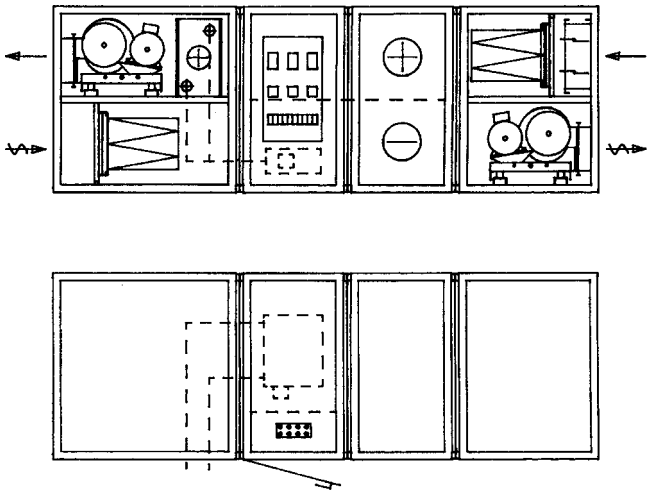
Size	055, 090, 150, 190, 300
Casing	00 = Standard 30 = A 30

Installation

Sizes 055-150



Sizes 190 - 300



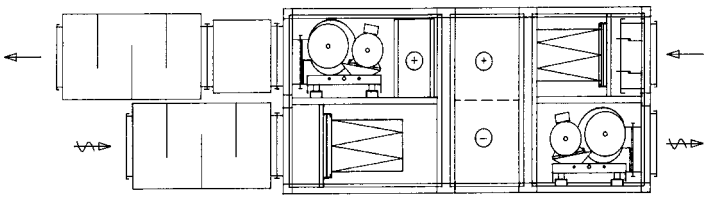
1. Media unit FLBM
2. Apparatus cabinet
3. Shunt group
4. Thermometer
5. Cable pass-through

Sound attenuator FLET-04

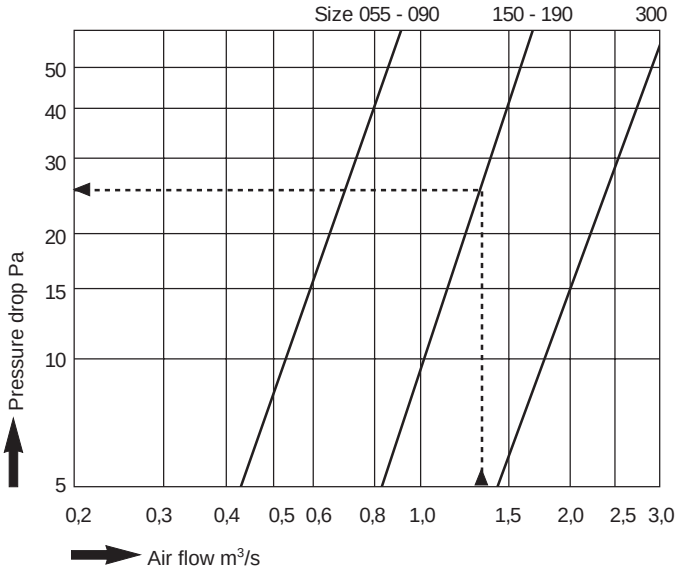
Design

The sound attenuators consist of a hot galvanized sheet steel casing with 200 mm thick baffle elements made of mineral wool, and with a layer of fibreglass fabric on the air side. The distance between baffles is 100 mm. To reduce the pressure drop, the baffles are ”pointed” at the inlet and outlet. The sound attenuator can be connected directly to the unit inlet. When installing on the fan outlet, a spacer should be placed between the unit and the sound attenuator.

Installation



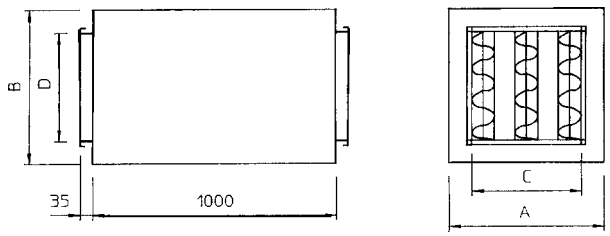
Pressure drop



Sound damping

Octave band	1	2	3	4	5	6	7	8
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Damping dB	8	11	19	29	40	35	27	19

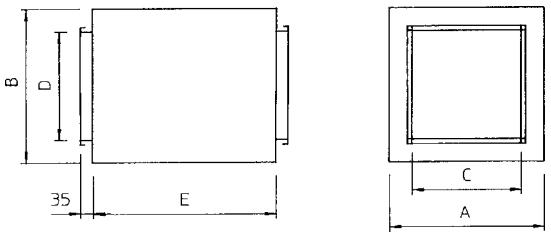
Dimensions and weights



Size	A	B	C	D	Weight kg
055	600	400	300	300	36
090	600	400	400	300	37
150	900	500	600	400	57
190	900	500	800	400	57
300	1200	700	1000	500	95

Spacer unit FLET-05

Dimensions and weights



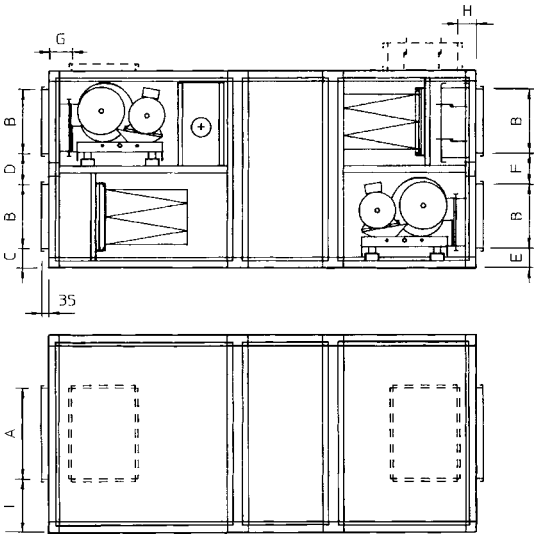
Size	A	B	C	D	E	Weight kg
055	350	350	300	300	230	4
090	450	350	400	300	230	5
150	650	450	600	400	330	8
190	850	450	800	400	330	11
300	1050	550	1000	500	430	14

Connecting frame FLET-02

General

FLET-02 connecting frames are prepared for a PG connection of ducts. As they are ordered together with the unit, they are fitted on both the supply and exhaust sides.

Dimensions

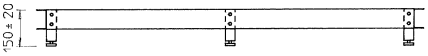


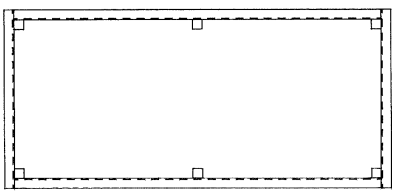
Vers.	Size	A	B	C	D	E	F	G	H	I
Standard	055	300	300	70	120	80	100	85	70	275
	090	400	300	100	155	80	200	85	100	290
	150	600	400	100	150	80	190	85	100	285
	190	800	400	140	190	80	310	85	140	265
	300	1000	500	150	200	80	345	85	150	290
A-30	055	300	300	105	120	115	100	120	105	300
	090	400	300	135	155	115	200	120	135	315
	150	600	400	135	150	115	190	120	135	310
	190	800	400	175	190	115	310	120	175	290
	300	1000	500	185	200	115	345	120	185	315

Frame FLET-07, FLBT-07

General

A frame can be supplied for installing the unit in a fan compartment.
The frame is manufactured from steel sections and is provided with legs with adjustable feet. They are delivered in kit form.





Air flow meter FLET-10

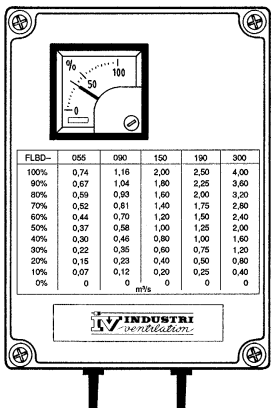
General

The FLET-10 is an air flow meter which, together with measuring unit FLDB, indicates the relevant air flow in the unit. The air flow is read off continuously from an indicator instrument on the flowmeter

Function

The air flow is indicated as a percentage (%). 0 (zero) % is the same as no flow, and 100% is the same as full flow for the relevant unit size. The percentage read off is translated into m^3/s on a chart fitted on the unit.

An output signal 0-10 from the FLET-10 can be used for:



- Parent monitoring system
- Alarm function for high and low flow
- Flow control via control centre

Tecnichal data FLET-10

Voltage supply	24 V AC
Power consumption	4 VA
Dim. W x H x D (mm)	125 x 175 x 85
Weight (kg)	0,3
Voltage output	0 - 10 V
Hose connection (x 2)	6 mm

Description text FLEXOPAC

Flexopac air conditioning units of the IV- type

- ❏ FLE unit assembly in version
- ❏ FLB block unit in version

The unit should have a frame made up of extruded aluminium sections, and a casing made of

- ❏ hot galvanized sheet steel
- ❏ aluminium coated sheet steel

and also inspection doors/hatches fitted with hinges.

The casing should be insulated

- ❏ with 25 mm mineral wool (standard) and coated on the inside with metal plate
- ❏ in a type approved A 30 version

The unit is supplied for

- ❏ indoor installation
- ❏ outdoor installation

Heat recovery

should be of the

- ❏ rotary type with a rotor made of
  - ❏ aluminium, non-treated
  - ❏ aluminium, hygroscopic

and with

  - ❏ on/off control
  - ❏ electronic speed control
- ❏ heatbank (heat pipe exchanger)
  - ❏ single version
  - ❏ double version
  - ❏ industrial version
- ❏ plate heat exchanger

fitted with a corrosion resistant drip tray with drain connection and by-pass and shut-off valves.

The supply air fan should have

- ❏ forward curved blades
- ❏ backward curved blades
- ❏ backward curved blades and guide vanes
- ❏ and purging door

and also be retractible, belt-driven, and vibration insulated.

The exhaust air fan should have

- ❏ forward curved blades
- ❏ backward curved blades
- ❏ backward curved blades and guide vanes
- ❏ and purging door

and also be retractible, belt-driven, and vibration insulated.

The unit should also include

- ❏ a type 3 outdoor air damper
- ❏ a deep-folded supply air filter
  - ❏ EU 3
  - ❏ EU 6
  - ❏ EU 7

panel filter ❏ aluminium mesh
including U-tube manometer

- ❏ air heater for
  - ❏ water heater
  - ❏ electric heater ❏ low temperature ❏ high temperature
- ❏ air cooler for
  - ❏ water cooler
  - ❏ DX cooler
  - ❏ with droplet separator
- ❏ type 3 exhaust air valve
- ❏ deep-folded exhaust air filter
  - ❏ EU 3
  - ❏ EU 6
  - ❏ EU 7

panel filter ❏ aluminium mesh
including U-tube manometer

- ❏ air heater unit FLBL
- ❏ air cooler unit FLBR
- ❏ recirculated air unit FLBR
- ❏ inspection unit FLBI ❏ short ❏ long
- ❏ measuring unit FLBD
- ❏ media unit FLBM
- ❏ sound attenuator, supply air FLET-04
- ❏ sound attenuator, exhaust air FLET-04
- ❏ spacer unit, supply air FLET-05
- ❏ spacer unit, exhaust air FLET-05
- ❏ connecting frame for guide connection FLET-02
- ❏ frame with adjustable feet FLET-07

The delivery package should also include

Replacement filters for

Supply air	Exhaust air
❏ EU 3	❏ EU 3
❏ EU 6	❏ EU 6
❏ EU 7	❏ EU 7
❏ Aluminium mesh	❏ Aluminium mesh

Replacement belts for

- ❏ Fans
- ❏ Rotary heat recovery unit

Dimensioning data

Supply air flow	...m³/s
Supply air, external pressure drop	...Pa
Exhaust air flow	...m³/s
Exhaust air, external pressure drop	...Pa
Outdoor air temperature (DUT)	...°C
Supply air temperature	...°C
Exhaust air temperature	...°C
Relative humidity, exhaust air	...%RH
Temperature efficiency, heat exchanger, dry	...%
Heating water	.../...°C
Coolant	
Refrigerant, DX cooler	.../...°C
Vaporizing temperature, DX cooler	.....
Cooling power	...kW
Input air temperature	..°C
Input relative humidity	...%RH