Commissioning Guide

Version 2015:02

Air Diffusers
VAV/CAV- & Commissioning Dampers
Waterborne Climate Systems

Swegon

Contents

This commissioning guide shows the measurement instructions for measurable ventilation products made by Swegon AB.

The products are equipped with adjustable dampers and measuring units, which are designed to measure a reference pressure.

Product Versions

Reported k factorer concerns the current product version (for expired product versions see older editions of this guide) The product version is indicated by the lower case letter after the capital letter product name, example:

- ALSd (product ALS = product version = d)
- EAGLE Ca (product = EAGLE Ceiling, product version = a)

Measurement instructions

There are several different ways to measure a product. It depends on the product and the design of the measuring function:

- Ductwork with fixed measuring unit.
- Exhaust air terminals with fixed measuring units.
- Supply air terminals with fixed measuring units.

In this commissioning guide you will find these three categories.

Most of the products have measuring tubes connected to the measuring units. The tubes can easily be reached through the front of the terminal device. Some products have one tube and some have two tubes.

A few products have what we call a "nipple well" with a cover. The cover should be shut when balancing has been done.

Some of the flow control products do not have any measuring tubes. Instead you reach the measuring unit easily.

All the products documented together with commissioning boxes ALS, ALV and TRG must be measured together with the commissioning boxes as the measuring units are placed within those.

Procedure:

1. Define the k-factor for the specific terminal by using the tables in this commissioning guide.
2. Connect the manometer to the measuring tube(s), (measuring units, nipple well).
3. The manometer gives you a measurement pressure, pi (balancing pressure).
4. The airflow can now be calculated according to the equation on next page.
5. Adjust the damper to change the airflow. A few of the products do not have ordinary dampers. Instead you use adjustable slot openings or plastic plugs.

When the correct flow/pressure has been achieved the damper regulator should be locked in one of the following ways:

Supply air diffusers:

1. In air terminals in which the damper position adjustment control consists of one white and one black nylon cord, the outstretched cords should be tied together to form a socalled commissioning knot. Doing so ensures that the preset damper position is always indicated
2. Wind the cords one turn around the locking screw provided in the product. Lock the damper position by tightening the screw.

Extract air diffusers:

Takes place analogous to the supply airflow. If the air device is an air extract air register, the position of the cone can be locked in position by tightening a wing nut on the rear side of the air register.

VAV/CAV and commissioning dampers:

On the duct products in which measurement/commissioning takes place according to Method A2, the damper knob is equipped with a locking device.

Calculation of airflow – k-factor equations:

There is a specific balancing factor, k-factor, for each measurable Swegon product.

The products are normally marked with a k-factor.

The following equations are used to obtain the actual airflow or the balancing pressure that is valid for the designed airflow.

$$q = k \cdot \sqrt{p_i} \qquad (l/s)$$

q = measured airflow (l/s)
p_i = actual balancing pressure (Pa)
k = k-factor

$$p_i = \left(\frac{q}{k} \right)^2 \qquad (Pa)$$

p_i = balancing pressure at designed airflow (Pa)
q = designed airflow (l/s)
k = k-factor

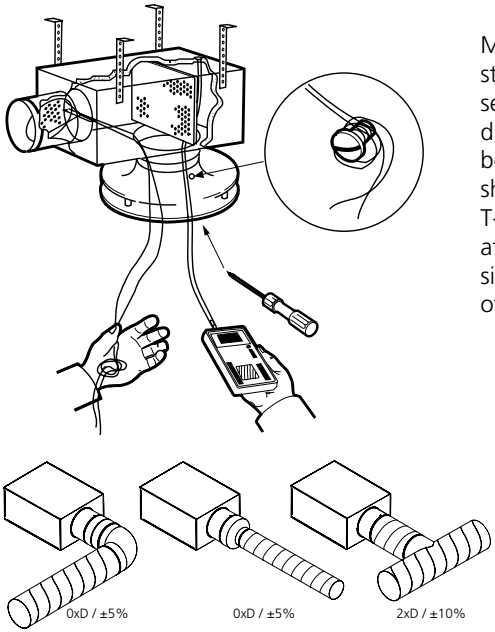
If temperature and atmospheric pressure differ from standard settings (20 °C and 1013 mbar) at the time of commissioning, the balancing pressure is recalculated according to the following equation:

$$p_i = p_{i,\,measured} \cdot \frac{1{,}2}{\rho_{time\ of\ measurement}} \qquad (Pa)$$

Or the airflow can be recalculated to the standard settings according to:

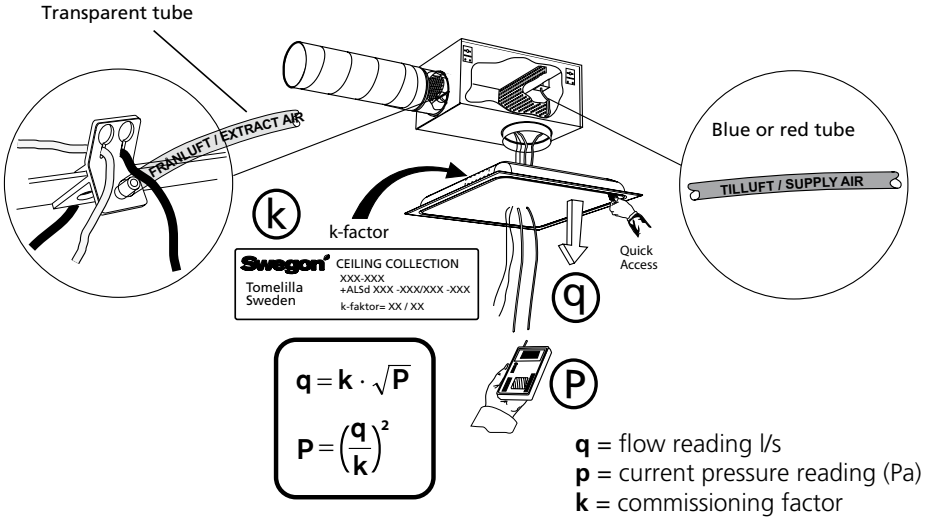
$$q = q_{measured} \cdot \sqrt{\frac{1{,}2}{\rho_{time\ of\ measurement}}} \qquad (Pa)$$

Air diffusers with commissioning box ALS



Measurement accuracy and requirement on straight duct before the commisioning box, see Figure 1. The requirements of straight duct depends on the type of disturbance before the commissioning box. Figure 1 shows a bend, a dimensional change and a T-piece. Other types of disturbances requires at least 2xD straight (D = connection dimension) for measurement accuracy of ± 10% of the flow.

Figure 1. Example ALS, measurement with one tube.



q = flow reading l/s
p = current pressure reading (Pa)
k = commissioning factor

Figure 2. Example ALS, measurement with two tubes.

CBE

ALSd	CBEa – Supply air	
Size	Size	k-factor
80-100	100	4,6
100-125	125	7,3
125-160	160	11,9

Number of measuring tubes: 1
Tube colour: Red

CDD

ALSd	CDDb – supply air 360°			
Size	Size	Slot – 20 mm	Slot – 30 mm	Slot – 40 mm
80-100	100	5,8	6,1	–
100-125	125	8,2	8,9	–
125-160	160	–	14,4	15,0
160-200	200	–	21,3	23,4
200-250	250	–	24,4	31,1
250-315	315	–	34,6	43,3

Number of measuring tubes: 1
Tube colour: Red

CDK

ALSd	CDKa – supply air 360°			
Size	Size	Slot – 20 mm	Slot – 30 mm	Slot – 40 mm
80-100	100	6,8	6,9	–
100-125	125	9,8	10,1	–
125-160	160		16,3	
160-200	200	–	26,9	27,6
200-250	250	–	38,5	42,1
250-315	315	–	57,6	69,9

Number of measuring tubes: 1
Tube colour: Red

CDR

ALSd	CDRb – tilluft 360°			
Size	Size	Slot – 20 mm	Slot – 30 mm	Slot – 40 mm
80-100	100	5,0	5,6	–
100-125	125	7,1	8,1	–
125-160	160	–	13,1	13,9
160-200	200	–	18,4	20,3
200-250	250	–	24,3	28,5
250-315	315	–	36,1	42,6

Number of measuring tubes: 1
Tube colour: Red

CKD

ALSd	CKDa – supply air		
Size	Size	Diffused	Concentrated
160-200	200	13,9	12,6
200-250	250	22,8	21,1
250-315	315	34,7	32,3
315-400	400	55,8	52,9

Number of measuring tubes: 1
Tube colour: Red

CKP

ALSd	CKPa – supply air 360°			
Size	Size	Slot – 20 mm	Slot – 30 mm	Slot – 40 mm
80-100	100	3,8	6,8	–
100-125	125	9,9	10,1	–
125-160	160	–	16,2	16,5
160-200	200	–	27,3	27,9
200-250	250	–	39,8	42,2
250-315	315	–	60,6	68,7

Number of measuring tubes: 1
Tube colour: Red

COLIBRI Ceiling – circular disc pattern

ALSd	COLIBRI CCb – supply air			
Size	Size	Standard	Low version	Tube colour
100-125	125-400	7,3	7,0	Red
100-125	125-600	7,3	7,0	Red
100-160	160-400	9,3	8,9	Blue
100-160	160-600	9,3	8,9	Blue
125-160	160-400	9,8	9,3	Red
125-160	160-600	9,8	9,3	Red
125-200	200-500	15,6	14,5	Blue
125-200	200-600	15,6	14,5	Blue
160-200	200-500	16,8	15,2	Red
160-200	200-600	16,8	15,0	Red
160-250	250-600	23,4	21,7	Blue
200-250	250-600	24,9	22,8	Red
200-315	315-600	26,4	25,4	Blue
250-315	315-600	27,4	25,6	Red
315-400	400-600	32,5	–	Red

Number of measuring tubes: 1

ALSd	COLIBRI CCb – extract air	
Size	Size	Standard
200-250	250-600	14,4
250-315	315-600	18,7
315-400	400-600	25,5

Number of measuring tubes: 1
Tube colour: Transparent

COLIBRI Ceiling – Square disc pattern

ALSd	COLIBRI CRb – supply air			
Size	Size	Standard	Low version	Tube colour
100-125	125-400	7,4	7,2	Red
100-125	125-600	7,4	7,2	Red
100-160	160-400	9,5	9,2	Blue
100-160	160-600	9,5	9,2	Blue
125-160	160-400	10,0	9,6	Red
125-160	160-600	10,0	9,6	Red
125-200	200-500	16,7	15,5	Blue
125-200	200-600	16,7	15,5	Blue
160-200	200-500	17,7	16,5	Red
160-200	200-600	17,7	16,5	Red
160-250	250-600	26,4	24,7	Blue
200-250	250-600	28,9	26,4	Red
200-315	315-600	30,3	28,6	Blue
250-315	315-600	32,1	29,5	Red
315-400	400-600	37,7	–	Red

Number of measuring tubes: 1

ALSd	COLIBRI CRb – extract air	
Size	Size	Standard
200-250	250-600	16,2
250-315	315-600	21,2
315-400	400-600	29,1

Number of measuring tubes: 1
Tube colour: Transparent

DPG

ALSd	DPGa – supply air	
Size	Size	k-factor
100-125	125-0	3,8

Number of measuring tubes: 1
Tube colour: Red

EAGLE Ceiling

ALSd	EAGLE Cb – supply air			
Size	Size	Standard	Low version	Tube colour
100-125	125-400	7,8	7,6	Red
100-125	125-600	7,7	7,6	Red
100-160	160-400	11,8	11,5	Blue
100-160	160-600	11,8	11,2	Blue
125-160	160-400	12,6	11,9	Red
125-160	160-600	12,6	11,7	Red
125-200	200-500	17,6	16,9	Blue
125-200	200-600	17,6	16,7	Blue
160-200	200-500	19,9	17,9	Red
160-200	200-600	19,9	17,9	Red
160-250	250-600	26,5	24,1	Blue
200-250	250-600	28,2	25,9	Red
200-315	315-600	35,2	32,2	Blue
250-315	315-600	37,3	33,5	Red
315-400	400-600	53,1	–	Red

Number of measuring tubes: 1

ALSd	EAGLE Cb – extract	
Size	Size	Standard
200-250	250-600	18,6
250-315	315-600	26,4
315-400	400-600	39,6

Number of measuring tubes: 1
Tube colour: Transparent

EAGLE Single

ALSd	EAGLE Sb – supply air
Size	k-factor
100-125	7,5
125-160	12,1
160-200	20,1
200-250	29,8
250-315	42,3
315-400	67,8

Number of measuring tubes: 1
Tube colour: Red

EIV

ALSd	EIVa – tilluft	
Size	Size	k-factor
80-80	80	4,6
80-100	100	5,9
100-125	125	8,2
125-160	160	10,3

Number of measuring tubes: 1
Tube colour: Red

FALCON Ceiling

ALSd	FALCON Ca – supply air 360°		
Size	Size	Horizontal	Vertical
100-125	125	8,6	6,8
125-160	160	13,5	8,5
160-200	200	20,6	13,2
200-250	250	32,5	19,5
250-315	315	50,2	33,3
315-400	400	82,8	51,0
400-500	500	125,0	79,5

Number of measuring tubes: 1
Tube colour: Red

GRC

ALSd	GRCa – extract air	
Size	Size	k-factor
80-100	100	3,0
100-125	125	4,9
125-160	160	8,2
160-200	200	12,7
200-250	250	22,2
250-315	315	34,0
315-400	400	59,6
400-500	500	95,0

Number of measuring tubes: 1
Tube colour: Transparent

HAWK Ceiling

ALSd	HAWK Ca – supply air			
Size	Size	Standard	Low version	Tube colour
100-125	125-600	8,4	8,0	Red
100-160	160-600	11,7	10,9	Blue
125-160	160-600	12,3	11,9	Red
125-200	200-600	19,1	17,0	Blue
160-200	200-600	20,9	18,2	Red
160-250	250-600	29,1	25,7	Blue
200-250	250-600	32,5	28,5	Red
200-315	315-600	37,0	34,2	Blue
250-315	315-600	39,4	35,3	Red
315-400	400-600	50,9	–	Red

Number of measuring tubes: 1

ALSd	HAWK Ca – extract air	
Size	Size	Standard
200-250	250-600	19,1
250-315	315-600	25,4
315-400	400-600	34,9

Number of measuring tubes: 1
Tube colour: Transparent

LOCKZONE Base

ALSd	LOCKZONE Ba – supply air	
Size	Size	k-factor
80-100	100	2,7
100-125	125	3,7
125-160	160	5,6

Number of measuring tubes: 1
Tube colour: Red

LOCKZONE Ceiling

ALSd	LOCKZONE Ca – supply air			
Size	Size	Standard	Low version	Tube colour
100-125	125-400	8,3	7,9	Red
100-125	125-600	8,2	7,8	Red
100-160	160-400	11,1	10,8	Blue
100-160	160-600	11,2	10,8	Blue
125-160	160-400	12,1	11,4	Red
125-160	160-600	12,4	11,4	Red
125-200	200-500	18,0	16,9	Blue
125-200	200-600	17,8	16,9	Blue
160-200	200-500	19,7	18,4	Red
160-200	200-600	19,7	18,0	Red
160-250	250-600	28,1	25,6	Blue
200-250	250-600	30,9	27,4	Red
200-315	315-600	36,5	35,1	Blue
250-315	315-600	39,6	39,6	Red
315-400	400-600	56,0	–	Red

Number of measuring tubes: 1

ALSd	LOCKZONE Ca – extract air	
Size	Size	Standard
200-250	250-600	18,4
250-315	315-600	27,1
315-400	400-600	42,5

Number of measuring tubes: 1
Tube colour: Transparent

LPA

ALSd	LPAa – supply air	
Size	Size	k-factor
125-160	160	11,0
160-200	200	18,1
200-250	250	27,5
250-315	315	38,0
315-400	400	58,7

Number of measuring tubes: 1
Tube colour: Red

ALSd	LPAa – extract air	
Size	Size	k-factor
125-160	160	7,0
160-200	200	11,5
200-250	250	17,7
250-315	315	28,5
315-400	400	41,6

Number of measuring tubes: 1
Tube colour: Transparent

PELICAN Ceiling – Supply

ALSd	PELICAN CSa – supply air			
Size	Size	Standard	Low version	Tube colour*)
100-125	125-400	7,1	7,7	Red + Red
100-160	160-400	10,6	10,1	Blue + Red
125-160	160-400	11,4	11,8	Red + Red
125-200	200-600	16,0	16,5	Blue + Red
160-200	200-600	18,1	19,0	Red + Red
160-250	250-600	25,7	27,1	Blue + Red
200-250	250-600	29,0	28,4	Red + Red
200-315	315-600	37,6	36,1	Blue + Red
250-315	315-600	44,0	38,1	Red + Red
315-400	400-600	68,2	–	Red**)

Number of measuring tubes: 2
*) First colour refers to ALS, second colour refers to PELICAN CS.
**) NOTE! size 400-600 1 measuring tube

PELICAN Ceiling – Extract

ALSd	PELICAN CEa – extract air		
Size	Size	Standard	Low version
100-125	125-400	4,9	4,6
125-160	160-400	7,6	7,2
160-200	200-600	14,2	12,6
200-250	250-600	21,2	20,2
250-315	315-600	27,9	27,7
315-400	400-600	41,6	–

Number of measuring tubes: 1
Tube colour: Transparent

PELICAN Ceiling Extract – High Flow

ALSd	PELICAN CE HFa – extract air	
Size	Size	k-factor
125-160	160-600	8,1
160-200	200-600	13,3
200-250	250-600	20,5
250-315	315-600	32,1
315-400	400-600	49,6

Number of measuring tubes: 1
Tube colour: Transparent

ROC

ALSd	ROCa – supply air	
Size	Size	k-factor
100-125	125	7,1
125-160	160	11,2

Number of measuring tubes: 1
Tube colour: Red

ALSd	ROCa – extract air	
Size	Size	k-factor
100-125	125	4,6
125-160	160	7,0

Number of measuring tubes: 1
Tube colour: Transparent

SWIFT Ceiling

ALSd	SWIFT Ca – supply air	
Size	Size	k-factor
160-200	200-500	18,1
200-250	250-500	22,2
160-200	200-600	20,7
200-250	250-600	28,0
250-315	315-600	32,4

Number of measuring tubes: 1
Tube colour: Red

ALSd	SWIFT Ca – extract air	
Size	Size	k-factor
200-250	250-500	14,2
200-250	250-600	15,9
250-315	315-600	22,6

Number of measuring tubes: 1
Tube colour: Transparent

Air diffusers with commissioning box ALV

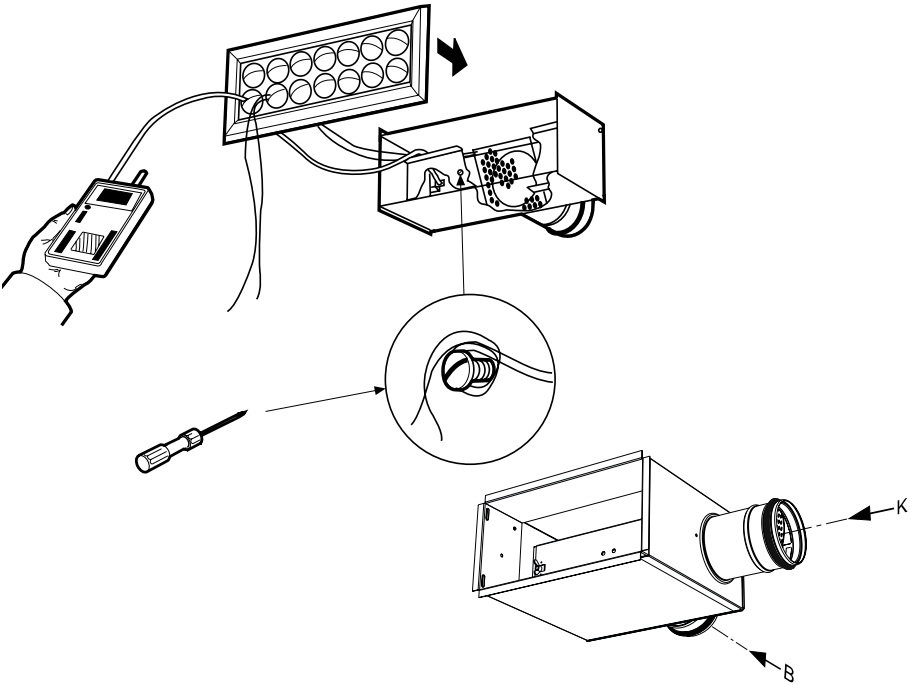


Figure 3. Example ALV, measurement with one tube and connection alternatives, B = Back side, K = Short side.

COLIBRI Wall

ALVd	COLIBRI Wb – supply air				
Size	Size	Back side connection		Short side connection	
		Closed slot	Open slot	Closed slot	Open slot
300-150-100	300-150	5,4	7,1	5,1	6,6
400-150-125	400-150	7,8	9,9	7,6	9,4
400-200-160	400-200	10,2	12,7	10,1	12,4
550-250-200	550-250	16,9	20,5	16,5	20,0
550-300-250	550-300	19,8	23,7	19,6	23,5

Number of measuring tubes: 1
Tube colour: Transparent

EAGLE Wall

ALVd	EAGLE Wb – supply air				
Size	Size	Back side connection		Short side connection	
		Closed slot	Open slot	Closed slot	Open slot
300-150-100	300-100	7,8	9,2	7,2	8,1
400-150-125	400-150	9,9	11,8	9,6	11,1
400-200-160	400-200	14,8	17,1	14,0	15,9
550-250-200	550-250	25,5	27,8	24,4	26,8
550-300-250	550-300	31,1	33,9	30,5	33,4

Number of measuring tubes: 1
Tube colour: Transparent

LOCKZONE Wall

ALVd	LOCKZONE Wa – supply air	
Size	Back side connection	Short side connection
300-150	7,4	6,9
400-150	10,0	9,9
400-200	15,0	14,3
550-250	26,3	24,9
550-300	32,4	32,0

Number of measuring tubes: 1
Tube colour: Transparent

PELICAN Wall

ALVd	PELICAN Wa – supply air		
Size	Size	Back side connection	Short side connection
300-150-100	300-100	8,8	8,1
400-150-125	400-150	10,9	11,1
400-200-160	400-200	17,3	17,3
550-250-200	550-250	25,6	25,1
550-300-250	550-300	32,2	32,6

Number of measuring tubes: 1
Tube colour: Transparent

ROW

ALVd	ROWb – supply air		
Size	Size	Back side connection	Short side connection
400-150-125	400-150	10,0	9,9
400-200-160	400-200	15,0	14,3

Number of measuring tubes: 1
Tube colour: Transparent

Air diffusers with commissioning box TRG

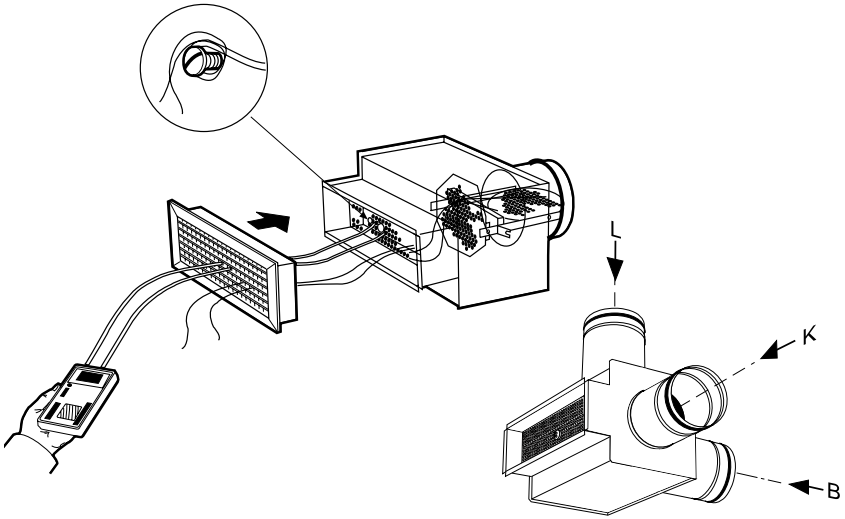


Figure 4. Example TRG, measurement with two tubes and connection alternatives, B = Back side, K = Short side, L = Long side.

ALG

TRGc	ALGc – supply air			ALGc – extract air		
Size	B	K	L	B	K	L
200-100-125	7,2	7,1	7,4	7,6	7,7	7,2
300-100-160	11,9	12,2	12,3	13,4	13,0	12,3
400-100-160	15,9	16,2	15,5	19,3	18,2	17,4
500-100-200	21,4	21,4	22,2	23,2	23,0	21,2
300-150-200	19,6	19,4	20,2	20,9	21,4	19,2
400-150-250	26,9	26,3	27,3	28,9	28,2	26,4
500-150-250	35,0	34,5	32,4	36,3	35,7	33,3
400-200-250	36,8	38,5	42,0	45,6	44,3	41,0
500-200-315	52,4	50,8	48,5	56,3	56,1	51,5
600-200-315	61,9	60,7	57,6	70,7	69,6	61,0

Connection alternatives: B = Back side, K = Short side, L = Long side
Number of measuring tubes: 2
Tube colours: Transparent + Blue

GRL

TRGc	GRLc – extract air		
Size	B	K	L
200-100-125	7,9	8,5	7,0
300-100-160	13,3	13,2	11,8
400-100-160	18,9	18,5	16,9
500-100-200	23,2	23,3	21,0
300-150-200	21,0	20,9	18,5
400-150-250	29,1	28,4	25,3
500-150-250	36,6	35,7	32,4
400-200-250	46,6	42,9	39,8
500-200-315	56,8	55,4	47,9
600-200-315	70,0	68,5	59,4
600-300-400	109,0	107,0	104,0

Connection alternatives: B = Back side, K = Short side, L = Long side
Number of measuring tubes: 2
Tube colours: Transparent + Blue

GTH

TRGc	GTHc – supply air – straight blades			GTHc – supply air – blades 45°		
Size	B	K	L	B	K	L
200-100-125	7,5	7,2	7,3	7,2	7,0	7,1
300-100-160	12,1	12,1	12,3	11,3	11,9	12,1
400-100-160	16,2	16,6	15,4	15,0	16,1	15,0
500-100-200	21,1	20,7	22,1	20,1	20,4	21,1
300-150-200	19,3	19,2	19,7	19,4	18,8	19,2
400-150-250	26,5	26,1	27,9	25,4	25,8	26,6
500-150-250	34,8	33,5	32,9	33,8	33,4	30,9
400-200-250	38,1	39,2	41,2	37,4	38,1	41,1
500-200-315	50,5	48,4	48,3	48,0	48,2	46,4
600-200-315	60,3	58,7	56,6	57,6	57,8	54,4

Connection alternatives: B = Back side, K = Short side, L = Long side
Number of measuring tubes: 2
Tube colours: Transparent + Blue

Air diffusers with circular commissioning box

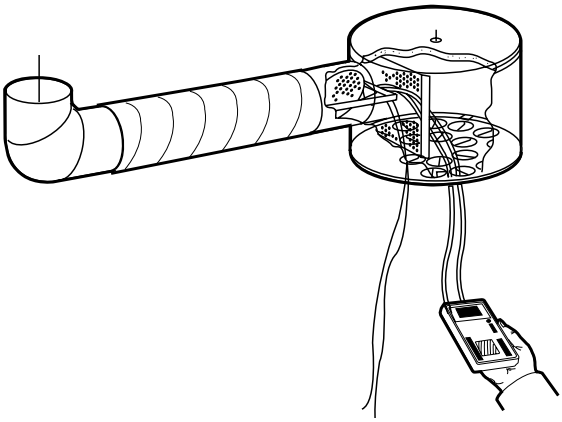


Figure 5. Exemple circular commissioning box, measurement with two tubes.

Straight sections are required before the diffuser to secure that the stated method errors, 5 %, will be obtained, see table:

1 · 90° bend	3 · Ød
2 · 90° bend	4 · Ød
T-joint	4 · Ød
Damper 45°	6 · Ød

EAGLE Free

EAGLE Fe – supply air	
Size	k-factor
100	5,2
125	8,2
160	14,8
200	24,5
250	36,9
315	62,6
400	101,0

Number of measuring tubes: 2
Tube colours: Blue + Blue

EAGLE Fe – extract air	
Size	k-factor
100	4,9
125	8,1
160	12,8
200	21,5
250	30
315	44,5
400	70

Number of measuring tubes: 1
Tube colour: Transparent

LOCKZONE Free

LOCKZONE Fa – supply air 360		
Size	Slot – 20 mm	Slot – 30 mm
125	14,1	15,2
160	23,4	25,7
200	35,1	38,6
250	51,5	56,7
315	74,5	83,1

Number of measuring tubes: 1
Tube colour: Transparent
No straight section required.

Displacement units

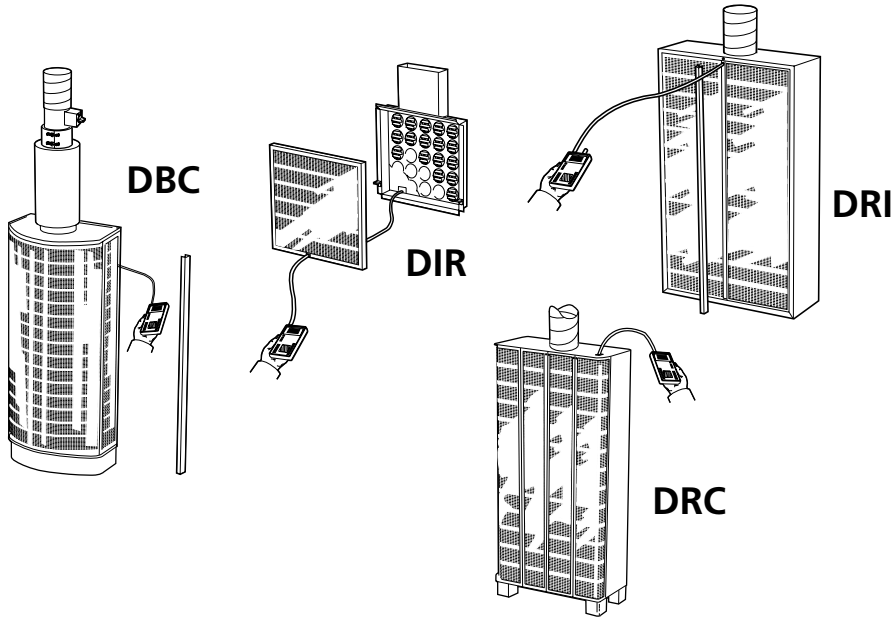


Figure 6. Exemple displacement units, measurement with one tube.

DBC

Size	DBCa – supply air
200	34,0
250	54,0
315	89,5
400	142,5
200-600	122,0
300-600	185,0

Number of measuring tubes: 1

DCP

DHC

DVC

Size	DCPe – supply air	DHCe – supply air	DVCe – supply air
125	12,2	12,0	12,0
160	22,8	20,0	20,0
200	37,0	33,0	33,0
250	58,0	50,0	50,0
315	88,0	84,0	84,0
400	141,0	134,0	134,0
500	210,0	202,0	–
630	295,0	285,0	–
800	–	520,0	–

Number of measuring tubes: 1

DIR

DRI

Size	DIRc – supply air	DRIf – supply air
400-100	13,1	–
500-125	18,7	–
600-160	23,5	–
900-200	46,8	–
200	–	32,0
250	–	53,0
315	–	85,0
400	–	130,0
200-600	–	120,0
250-800	–	176,0
500	–	–
630	–	–
800	–	–

Number of measuring tubes: 1

Home air diffuser

DOMO

DOMOc	
Adjustment	k-factor
R 1	1,3
R 2	2,3
R 3	3,3
R 4	3,9

Duct diffuser

IBIS Control

Size	IBIS Ca – Adjustable measuring unit
160-1500	14,8
200-1500	22,5
250-1500	36,1
315-1500	61,2
400-1500	96,0

Number of measuring tubes: 2

Straight sections are required before the diffuser to secure that the stated method errors, 5 %, will be obtained, see table:

1 · 90° bend	3 · Ød
2 · 90° bend	4 · Ød
T-joint	4 · Ød
Damper 45°	6 · Ød

Extract air diffusers

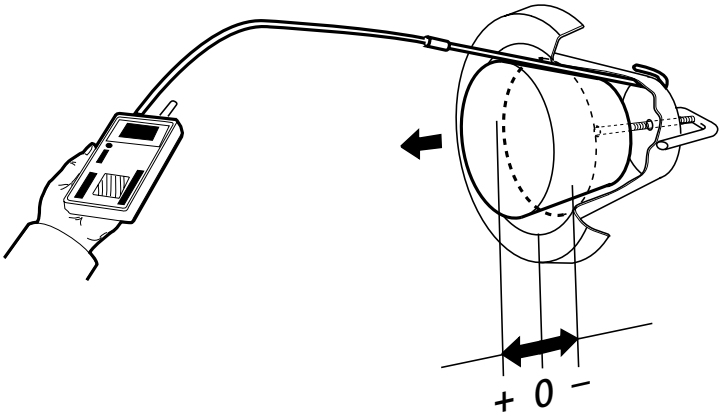


Figure 7. Example extract air diffusers, measurement with one tube.

EXC

EXCa – k-factor for each size depending on cone position				
Cone position	100	125	160	200
-15	0,6	–	–	–
-12	0,8	–	–	–
-10	1,0	1,3	2,0	–
-5	1,4	1,9	2,8	–
-3	–	–	–	1,8
0	1,8	2,6	3,6	2,6
+5	2,3	3,2	4,5	3,8
+10	2,7	3,9	5,4	5,2
+15	–	–	6,2	6,4
+20	–	–	–	7,5
+25	–	–	–	8,6

Measured by pressure gauge.

ROE

ROEa – k-factor for each size depending on cone position				
Cone position	100	125	160	200
-15	0,6	–	–	–
-12	0,8	–	–	–
-10	1,0	1,3	2,0	–
-5	1,4	1,9	2,8	–
-3	–	–	–	1,8
0	1,8	2,6	3,6	2,6
+5	2,3	3,2	4,5	3,8
+10	2,7	3,9	5,4	5,2
+15	–	–	6,2	6,4
+20	–	–	–	7,5
+25	–	–	–	8,6

Measured by pressure gauge.

Linear diffusers

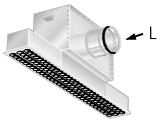
SWAN/SWAN Wall-To-Wall

SWAN Ta	SWANa/W-T-Wa – supply air		
Size*)	1-way	2-way	vertical
2-160	21,0	21,0	18,8
2-200	22,4	22,4	19,8
2-250	23,4	23,4	19,8
3-160	27,1	–	24,9
3-200	29,4	–	25,8
3-250	32,2	–	25,8
4-160	27,6	27,6	25,1
4-200	35,4	35,4	30,8
4-250	39,0	39,0	34,2

Number of measuring tubes: 1
Supply air: Blue
*) First figure indicates the number of slots

SWAN Ta	SWANa/W-T-Wa – extract air
Size*)	k-factor
2-160	13,0
2-200	16,6
2-250	18,7
3-160	15,8
3-200	19,3
3-250	22,8
4-160	16,7
4-200	22,5
4-250	29,1

Number of measuring tubes: 1
Extract air: Transparent
*) First figure indicates the number of slots



SRY

SRYT 1b	SRYb – supply air			
Size	Size**)	k-factor	Size**)	k-factor
1-500-125-L	1-900-1	4,5	1-1200-1	5,3
2-500-160-L	2-900-1	8,6	2-1200-2	6,5
3-500-160-L	3-900-1	12,4	3-1200-2	9,4
4-500-200-L	4-900-1	16,2	4-1200-2	12,4
1-500-125-L	1-1500-2	4,2	1-1800-2	4,6
2-500-160-L	2-1500-2	7,8	2-1800-2	8,6
3-500-200-L	3-1500-2	11,4	3-1800-2	13,0
4-500-200-L	4-1500-2	14,4	4-1800-3	12,4

Note! The K-factor is valid for one commissioning box. Ex: With two or three commissioning boxes for one diffuser, the total of the designed airflow shall be divided by the number of commissioning boxes.
Number of measuring tubes: 1
**) Last figure indicates the number of commissioning boxes

VAV/CAV and commissioning damper

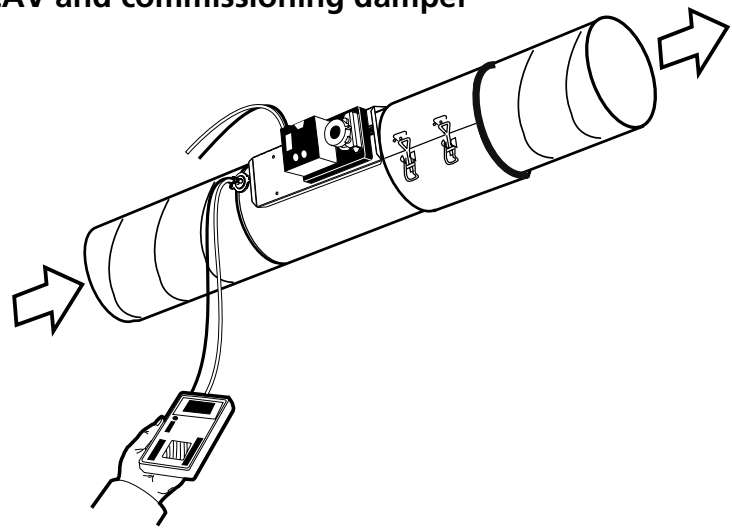


Figure 8. Example VAV/CAV. Number of measuring tubes: 2. Connected to "nipple well". The K-factor is also valid for the combination VAV with sound attenuator CLA L = 500 or 1000 mm.

REACT – Circular

Size	REACTa
100	5,3
125	8,7
160	15,5
200	24,8
250	40,0
315	63,4
400	102,0
500	164,0

Straight sections are required before the damper to secure that stated method errors, 5%, will be obtained, see table:

1 · 90° bend	3 · Ød
2 · 90° bend	4 · Ød
1 · T-joint	4 · Ød
Mixing box	4 · Ød

REACT – Rectangular

Size	REACTa
200-200	33,5
300-200	50,0
400-200	66,5
500-200	83,5
600-200	100,0
700-200	117,0
800-200	133,0
1000-200	167,0
300-300	76,0
400-300	102,0
500-300	127,0
600-300	152,0
700-300	178,0
800-300	203,0
1000-300	254,0
400-400	136,0
500-400	171,0
600-400	205,0
700-400	239,0
800-400	273,0
1000-400	341,0
1200-400	409,0
1400-400	478,0
1600-400	546,0

Size	REACTa
500-500	214,0
600-500	257,0
700-500	300,0
800-500	343,0
1000-500	429,0
1200-500	514,0
1400-500	600,0
1600-500	686,0
600-600	309,0
700-600	361,0
800-600	412,0
1000-600	515,0
1200-600	618,0
1400-600	722,0
1600-600	825,0
700-700	422,0
800-700	482,0
1000-700	603,0
1200-700	723,0
1400-700	844,0
1600-700	964,0

SIRI

SIRIa – K-factors for curent sizes dependent of damper position						
Damper position	80	100	125	160	200	250
1	3,9	6,0	10,2	21,3	35,4	53,3
2	2,1	3,8	6,7	15,0	24,7	39,3
3	1,2	2,6	4,7	11,1	18,3	30,4
4	0,7	1,8	3,3	8,5	14,0	24,2
5	0,3	1,2	2,3	6,6	10,8	19,4
6		0,7	1,5	5,1	8,4	15,7
7				3,9	6,4	12,6
8					4,9	10,1
9						7,8
10						
11						
12						
13						
14						

SIRIa – K-factors for curent sizes dependent of damper position					
Damper position	315	400	500	630	800
1	85,3	119,0	218,0	325,0	540,0
2	65,3	95,3	176,0	272,0	446,0
3	52,1	78,5	148,0	233,0	379,0
4	42,9	65,7	124,0	202,0	325,0
5	35,6	55,6	107,0	177,0	282,0
6	29,8	47,2	93,1	156,0	247,0
7	24,9	40,1	81,2	139,0	216,0
8	20,7	34,0	71,0	123,0	190,0
9	17,0	28,7	62,0	109,0	167,0
10	13,9	23,8	54,0	63,7	147,0
11	11,1	19,5	46,7	85,8	129,0
12		15,6	40,4	75,6	112,0
13		12,3	34,4	66,8	98,7
14			29,4	58,9	85,6

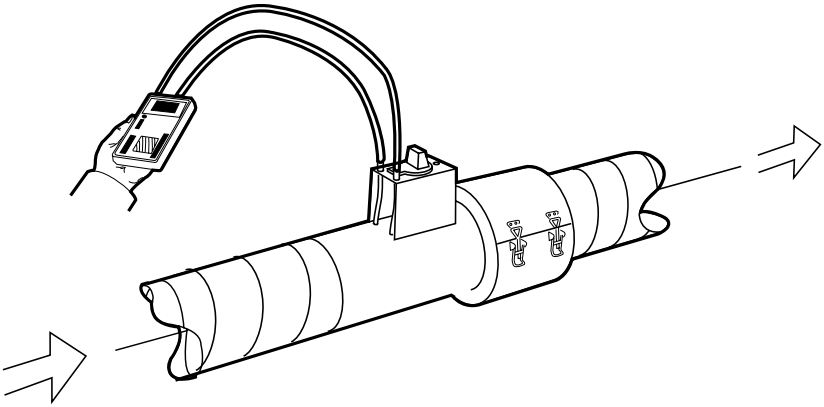


Figure 9. Example measuring products and commissioning dampers, measurement with two tubes.

Straight sections are required before the damper to secure that the stated method errors, 5%, will be obtained, see table:

1 · 90° bend	3 · Ød
2 · 90° bend	4 · Ød
T-joints	4 · Ød
Damper 45°	6 · Ød

CRM 1

CRM 5

Size	CRMc 1	CRMc 5
100	9,2	9,2
125	9,6	9,6
160	15,8	15,8
200	23,5	23,5
250	35,6	35,6
315	59,2	59,2
400	95,6	95,6
500	147,0	147,0
630	230,0	230,0

Number of measuring tubes: 1

Waterborne Indoor Climate Systems

Calculation formula

$$q = k \cdot \sqrt{p_i} \qquad (l/s)$$

q = primary airflow (l/s)
p = commissioning pressure in (Pa)
k = the unit's k-factor
The k-factor applies to 20 °C and 1013 mbar.

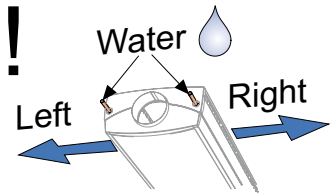
Measuring point

All the climate beams and comfort modules are equipped with measuring hoses. When commissioning, connect a manometer to the measurement hose having an inner diameter of 4 mm.

The location of the measurement hose depends on the type of product:

- ADRIATIC – At the centre of the climate beam.
- PARAGON and PACIFIC – By the duct connection.
- PARASOL and PARASOL EX - At one of the corners of the product.
- ADAPT Parasol and ADAPT Parasol EX – At one of the corners of the product and at the centre of the product.

ADRIATIC VF



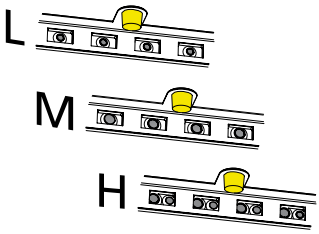
$q = k \cdot \sqrt{p_i}$ [l/s]

$p_i = (q/k)^2$ [Pa]

L: $k_{600mm\ (1side)} = 0.314$

M: $k_{600mm\ (1side)} = 0.694$

H: $k_{600mm\ (1side)} = 0.969$



1

Room 203
ADRIATIC VF c 1.8
22 l/s

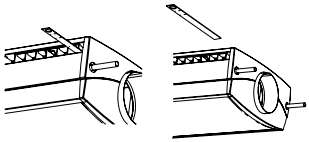
2

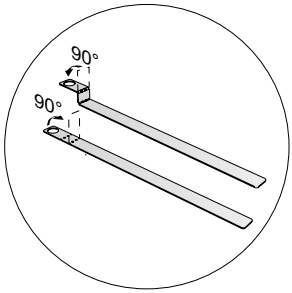
ADRIATIC VF c 1.8

q = 17.5-26.5 (l/s)

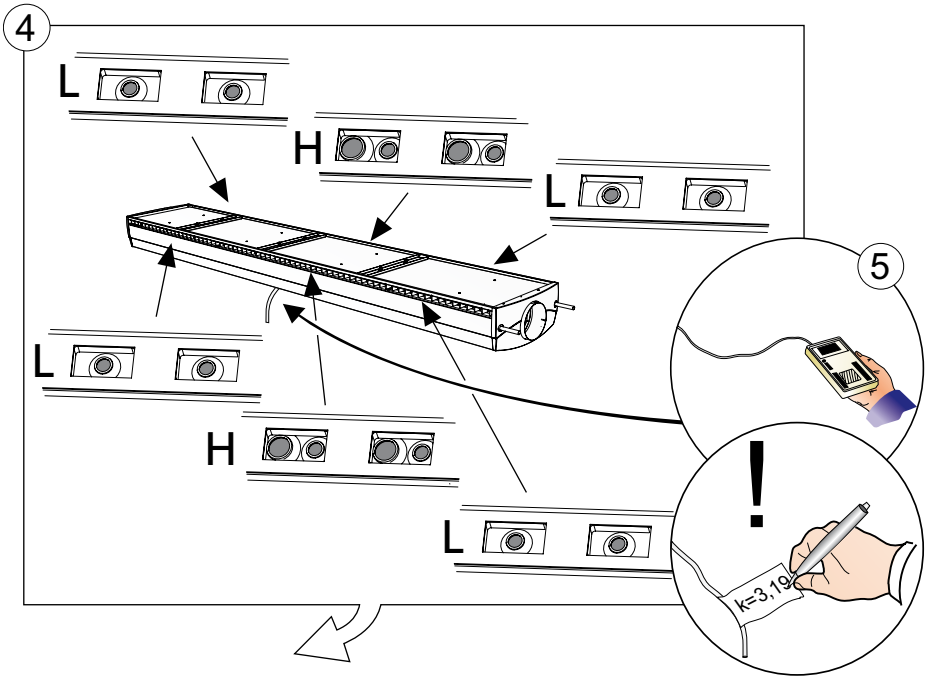
k = 3.19
q50%=>2LH
q50%=>2LH

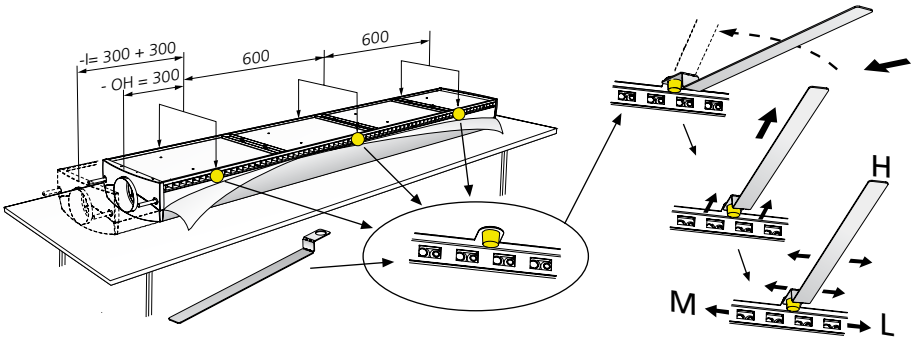
3





ADRIATIC VF





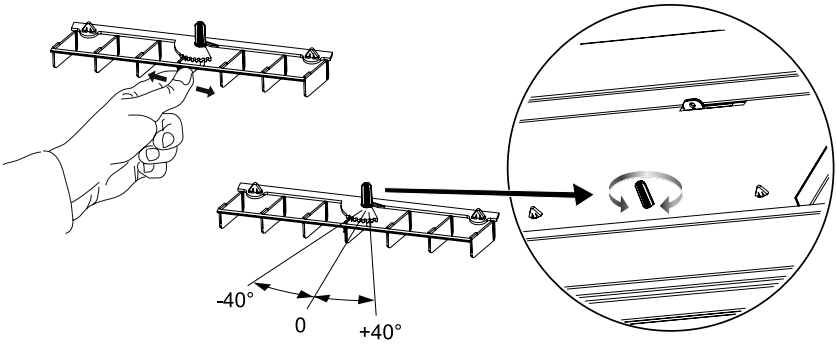
ADRIATIC VF

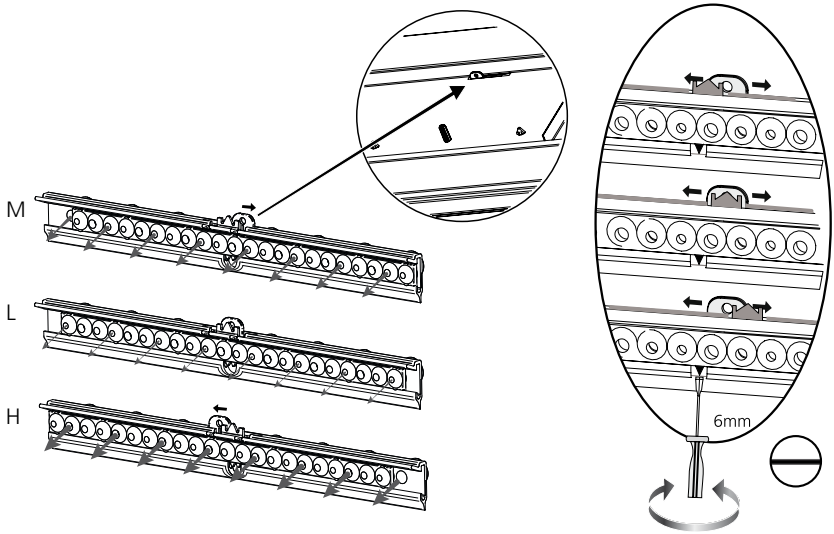
	Symmetric (q=50%/50%)				
	pi (Pa)	q (l/s)	k	q=50%	q=50%
ADRIATIC VF 1.2-OH	30-70 Pa	7-10.5	1.25	2L	2L
	30-70 Pa	11-17	2.01	LM	LM
	30-70 Pa	14-21.5	2.57	LH	LH
ADRIATIC VF 1.5-I	30-70 Pa	15.5-23.5	2.77	2M	2M
	30-70 Pa	18.5-27.5	3.33	MH	MH
	30-70 Pa	21.5-32.5	3.88	2H	2H
ADRIATIC VF 1.8-OH	30-70 Pa	10.5-15.5	1.88	3L	3L
	30-70 Pa	14.5-22	2.64	2LM	2LM
	30-70 Pa	17.5-26.5	3.19	2LH	2LH
ADRIATIC VF 2.1-I	30-70 Pa	21.5-33	3.95	LMH	LMH
	30-70 Pa	24.5-37.5	4.5	L2H	L2H
	30-70 Pa	28.5-44	5.26	M2H	M2H
	30-70 Pa	31.5-48.5	5.81	3H	3H
ADRIATIC VF 2.4-OH	30-70 Pa	13.5-21	2.51	4L	4L
	30-70 Pa	18-27	3.27	3LM	3LM
	30-70 Pa	22-33.5	4.03	2L2M	2L2M
ADRIATIC VF 2.7-I	30-70 Pa	26.5-40	4.79	L3M	L3M
	30-70 Pa	30.5-46	5.55	4M	4M
	30-70 Pa	36.5-...	6.65	2M2H	2M2H
	30-70 Pa	42.5-...	7.75	4H	4H
ADRIATIC VF 3.0-OH	30-70 Pa	17.5-26	3.14	5L	5L
	30-70 Pa	21.5-32.5	3.9	4LM	4LM
	30-70 Pa	25.5-38.5	4.66	3L2M	3L2M
ADRIATIC VF 3.3-I	30-70 Pa	30-45	5.42	2L3M	2L3M
	30-70 Pa	34-51.5	6.18	L4M	L4M
	30-70 Pa	41-...	7.49	4MH	4MH
	30-70 Pa	47-...	8.59	2M3H	2M3H
ADRIATIC VF 3.6-OH	30-70 Pa	20.5-31.5	3.76	6L	6L
	30-70 Pa	25-37.5	4.52	5LM	5LM
	30-70 Pa	29-44	5.28	4L2M	4L2M
ADRIATIC VF 3.9-I	30-70 Pa	33-50.5	6.04	3L3M	3L3M
	30-70 Pa	39.5-...	7.14	3LM2H	3LM2H
	30-70 Pa	43.5-..	7.9	2L2M2H	2L2M2H
	30-70 Pa	47.5-...	8.66	L3M2H	L3M2H

ADRIATIC VF

	Asymmetric (q≈70%/30%)				
	pi (Pa)	q (l/s)	k	q≈70%	q≈30%
	30-70 Pa	11-17	2.01	2M	2L
	30-70 Pa	14-21.5	2.57	2H	2L
⇨	30-70 Pa	16-24.5	2.95	2H	LM
	30-70 Pa	14.5-22	2.64	L2M	3L
	30-70 Pa	19.5-30	3.57	M2H	3L
	30-70 Pa	21-32	3.85	3H	3L
⇨	30-70 Pa	23-35.5	4.23	3H	2LM
	30-70 Pa	25.5-38.5	4.61	3H	L2M
	30-70 Pa	18-27	3.27	2L2M	4L
	30-70 Pa	22-33.5	4.03	4M	4L
	30-70 Pa	25-38	4.58	2M2H	4L
⇨	30-70 Pa	28-42.5	5.13	4H	4L
	30-70 Pa	34.5-52	6.27	4H	L3M
	30-70 Pa	25.5-39	4.66	L4M	5L
	30-70 Pa	30.5-46.5	5.59	3M2H	5L
	30-70 Pa	35.5-...	6.41	5H	5L
⇨	30-70 Pa	39-...	7.17	5H	3L2M
	30-70 Pa	26.5-40	4.8	4LMH	6L
	30-70 Pa	33-50.5	6.04	6M	6L
	30-70 Pa	37.5-...	6.87	3M3H	6L
⇨	30-70 Pa	40.5-...	7.42	M5H	6L

PACIFIC





PACIFIC

PACIFIC Airflow variant LF		
Nozzle setting		k-factor/nozzle strip
Low flow	L	0.104
Medium flow	M	0.168
High flow	H	0.224

Number of nozzle strips		
Size	Side 2	Side 4
1100	4	4
1600	6	6
2200	8	8
2700	10	10

PACIFIC Airflow variant MF		
Nozzle setting		k-factor/nozzle strip
Low flow	L	0.152
Medium flow	M	0.256
High flow	H	0.328

PACIFIC Airflow variant HF		
Nozzle setting		k-factor/nozzle strip
Low flow	L	0.152
Medium flow	M	0.296
High flow	H	0.392

Example for MF: Pacific 1792-1600 MF, Nozzle setting L2M3H/3LM2H

Total k-factor = 0.152 + 2 x 0.256 + 3 x 0.328 + 3 x 0.152 + 0.256 + 2 x 0.328 = 3.016

PARAGON / PARAGON WALL

1.

2.

PARAGON 1300

Size	Nozzle pressure	Airflow	Pcs	Nozzle setting
(mm)	(Pa)	(l/s)		
900	50 - 150 Pa	9.6 - 16.6	1.5	L/L
900	50 - 150 Pa	12 - 20.8	1.5	L/M
900	50 - 150 Pa	13.6 - 23.1	1.99	M/M
900	50 - 150 Pa	16.8 - 29	2.37	L/H
900	50 - 150 Pa	19.2 - 31.5	2.97	M/H
900	50 - 150 Pa	22.9 - 39.7	4.24	H/H
1100	50 - 150 Pa	13.7 - 23.8	1.96	L/L
1100	50 - 150 Pa	19.5 - 26.8	2.79	L/M

q=16.4-28.4 (l/s)

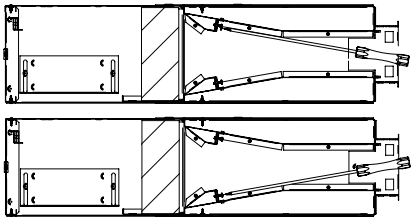
k=2.32

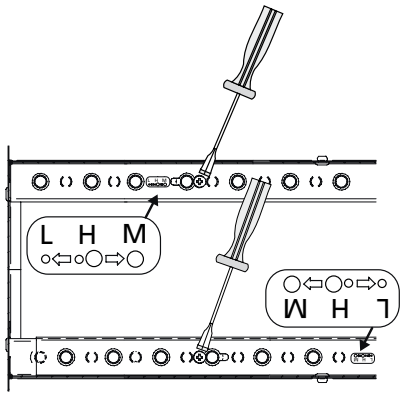
q=L/L

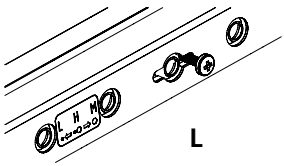
$q = k \cdot \sqrt{p_i}$ [l/s]

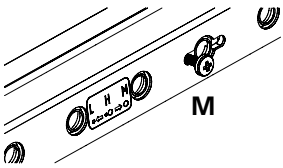
$p_i = (q/k)^2$ [Pa]

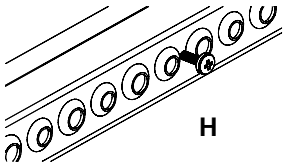
3.





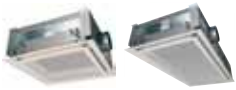




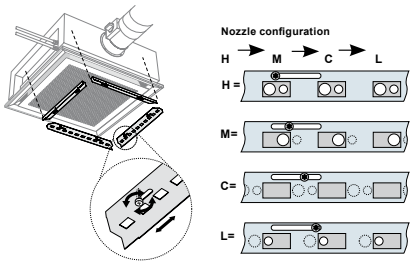


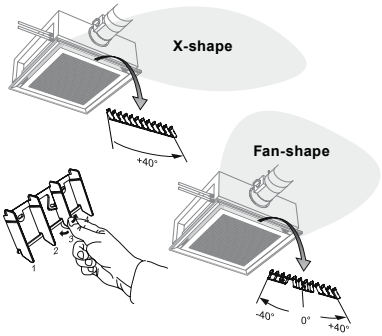
PARAGON / PARAGON WALL

Size (mm)	Nozzle pressure (pa)	Airflow (l/s)	K_{pl}	Nozzle setting
900	50 - 200 Pa	10.6 - 21.2	1.5	L / L
900	50 - 200 Pa	12 - 24	1.7	L / M
900	50 - 200 Pa	13.4 - 26.7	1.89	M / M
900	50 - 200 Pa	16.8 - 33.5	2.37	L / H
900	50 - 200 Pa	18.2 - 36.3	2.57	M / H
900	50 - 200 Pa	22.9 - 45.8	3.24	H / H
1100	50 - 200 Pa	13.7 - 27.4	1.94	L / L
1100	50 - 200 Pa	15.5 - 31	2.19	L / M
1100	50 - 200 Pa	17.3 - 34.5	2.44	M / M
1100	50 - 200 Pa	21.7 - 43.4	3.07	L / H
1100	50 - 200 Pa	23.5 - 47	3.32	M / H
1100	50 - 200 Pa	29.6 - 59.3	4.19	H / H
1300	50 - 200 Pa	16.4 - 32.8	2.32	L / L
1300	50 - 200 Pa	18.5 - 37.1	2.62	L / M
1300	50 - 200 Pa	20.6 - 41.3	2.92	M / M
1300	50 - 200 Pa	25.9 - 51.8	3.66	L / H
1300	50 - 200 Pa	28 - 56	3.96	M / H
1300	50 - 200 Pa	35.4 - 70.7	5	H / H
1500	50 - 200 Pa	13.9 - 27.9	1.97	L / L
1500	50 - 200 Pa	18.8 - 37.6	2.66	L / M
1500	50 - 200 Pa	23.7 - 47.4	3.35	M / M
1500	50 - 200 Pa	25.1 - 50.2	3.55	L / H
1500	50 - 200 Pa	30 - 60	4.24	M / H
1500	50 - 200 Pa	36.2 - 72.4	5.12	H / H



PARASOL





PARASOL 600

PARASOL 600 MF		
Nozzle setting per side	Nozzle size	k_{pl} per side
L	Small	0.253
M	Large	0.440
H	Small + large	0.693
C	Fully closed	0

PARASOL 600 MF	
Nozzle setting *)	k_{pl}
LLLL	1.01
LLMM	1.39
MMMM	1.76
MMHH	2.27
HHHH	2.77

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 1. See Figure 2 for example.

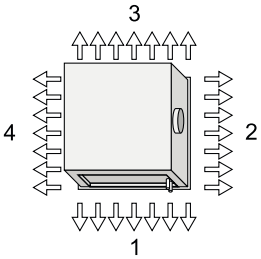


Figure 1. Top view, nozzle setting, single-module unit, PARASOL, sides 1-4.

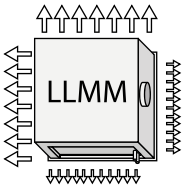


Figure 2. Nozzle setting example PARASOL single-module unit - LLMM.

PARASOL 1200

PARASOL 1200 LF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per side
L	Short side	Small	0.124
L	Long side	Small	0.328
M	Short side	Large	0.176
M	Long side	Large	0.464
H	Short side	Small + large	0.3
H	Long side	Small + large	0.792
C	Short side	Fully closed	0
C	Long side	Fully closed	0

PARASOL 1200 LF	
Nozzle setting *)	k_{pl}
LLLL	0.9
LLMM	1.09
MMMM	1.28
MMHH	1.73
HHHH	2.18

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 3. See Figure 4 for example.

PARASOL 1200 MF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per sida
L	Short side	Small	0.176
L	Long side	Small	0.464
M	Short side	Large	0.253
M	Long side	Large	0.667
H	Short side	Small + large	0.429
H	Long side	Small + large	1.131
C	Short side	Fully closed	0
C	Long side	Fully closed	0

PARASOL 1200 MF	
Nozzle setting *)	k_{pl}
LLLL	1.28
LLMM	1.56
MMMM	1.84
MMHH	2.48
HHHH	3.12

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 3. See Figure 4 for example.

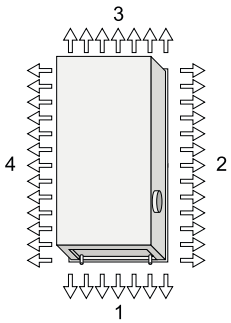


Figure 3. Top view, nozzle setting, PARASOL two-module unit, sides 1-4.

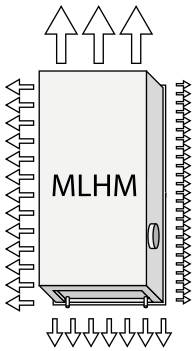


Figure 4. Nozzle setting example, PARASOL two-module unit - MLHM.

PARASOL 1200

PARASOL 1200 HF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per side
L	Short side	Small	0.253
L	Long side	Small	0.667
M	Short side	Large	0.44
M	Long side	Large	1.16
H	Short side	Small + large	0.693
H	Long side	Small + large	1.827
C	Short side	Fully closed	0
C	Long side	Fully closed	0

PARASOL 1200 HF	
Nozzle setting **)	k_{pl}
LLLL	1.84
LLMM	2.52
MMMM	3.2
MMHH	4.12
HHHH	5.04

**) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 5. See Figure 6 for example.

PARASOL 1200 PF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per side
L	Short side	Small	0.842
L	Long side	Small	2.221
M	Short side	Large	0.991
M	Long side	Large	2.612
H	Short side	Small + large	1.211
H	Long side	Small + large	3.192
C*)	Short side	Closed	0.556
C*)	Long side	Closed	1.467

*) Parasol PF with nozzle C is not completely closed

PARASOL 1200 PF	
Nozzle setting ***)	k_{pl}
LLLL	6.126
LLMM	6.666
MMMM	7.206
MMHH	8.006
HHHH	8.806

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 5. See Figure 7 for example.

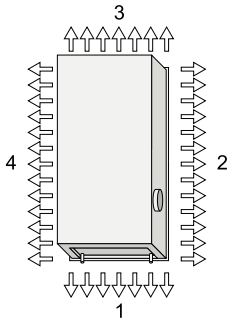


Figure 5. Top view, nozzle setting, PARASOL two-module unit, sides 1-4.

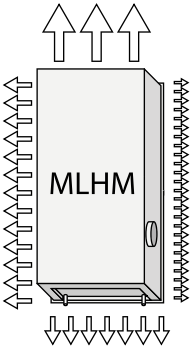


Figure 6. Nozzle setting example PARASOL two-module unit - MLHM.

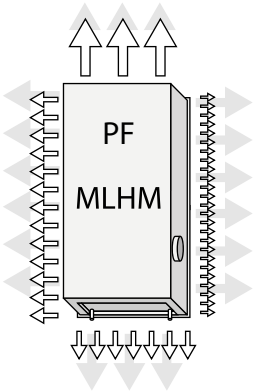
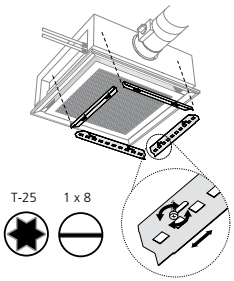
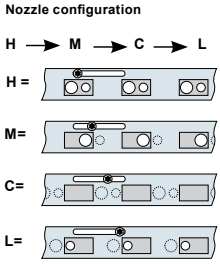
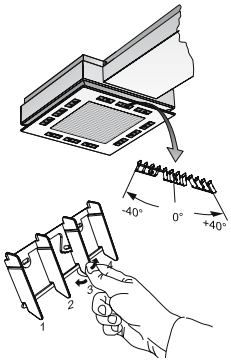


Figure 7. Nozzle setting example PARASOL PF two-module unit - MLHM.

PARASOL EX







PARASOL EX 690

PARASOL EX 690 MF		
Nozzle setting per side	Nozzle size	k_{pl} per side
L	Small	0.253
M	Large	0.44
H	Small + large	0.693
C	Fully closed	0

PARASOL EX 690 MF	
Nozzle setting *)	k_{pl}
LLLL	1.01
LLMM	1.39
MMMM	1.76
MMHH	2.27
HHHH	2.77

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 8. See Figure 9 for example.

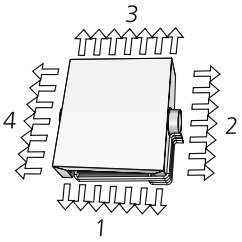


Figure 8. Top view, nozzle setting, PARASOL EX single-module unit, sides 1-4.

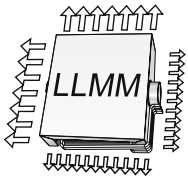


Figure 9. Nozzle setting example, PARASOL EX single-module unit - LLMM.

PARASOL EX 1290

PARASOL EX 1290 MF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per side
L	Short side	Small	0.176
L	Long side	Small	0.464
M	Short side	Large	0.253
M	Long side	Stor	0.667
H	Short side	Small + large	0.429
H	Long side	Small + large	1.131
C	Short side	Fully closed	0
C	Long side	Fully closed	0

PARASOL EX 1290 MF	
Nozzle setting *)	k_{pl}
LLLL	1.28
LLMM	1.56
MMMM	1.84
MMHH	2.48
HHHH	3.12

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 10. See Figure 11 for example.

PARASOL EX 1290 HF			
Nozzle setting per side	Side	Nozzle size	k_{pl} per side
L	Short side	Small	0.253
L	Long side	Small	0.667
M	Short side	Large	0.44
M	Long side	Large	1.16
H	Short side	Small + large	0.693
H	Long side	Small + large	1.827
C	Short side	Fully closed	0
C	Long side	Fully closed	0

PARASOL EX 1290 HF	
Nozzle setting*)	k_{pl}
LLLL	1.84
LLMM	2.52
MMMM	3.2
MMHH	4.12
HHHH	5.04

*) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 10. See Figure 11 for example.

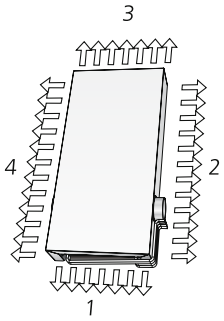


Figure 10. Top view, nozzle setting, PARASOL EX two-module unit, sides 1-4.

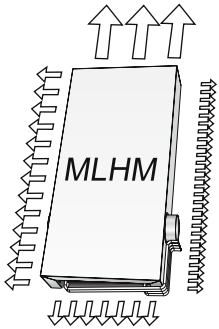
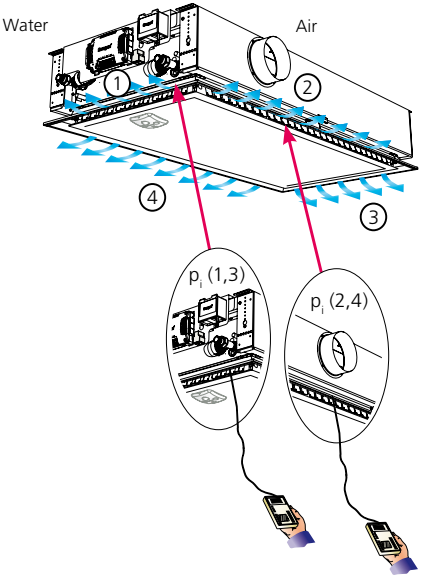


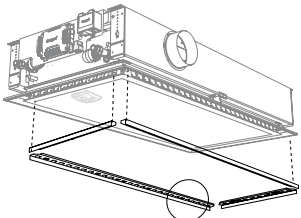
Figure 11. Nozzle setting example PARASOL EX two-module unit - MLHM.

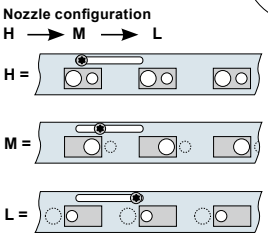
ADAPT Parasol

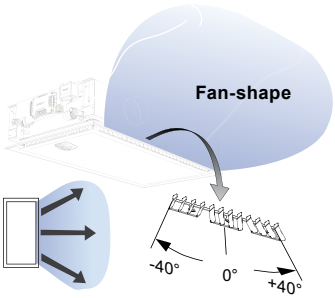


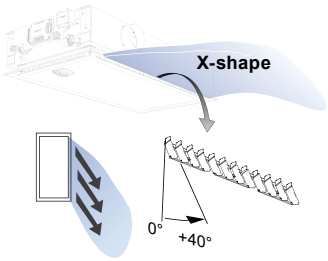
1. k (1+3) + p_i (1,3) => q (1+3)
   The K-factor of the short sides together with the commissioning pressure reading of these equals the flow of the short sides, 1&3.
2. k (2+4) + p_i (2,4) => q (2+4)
   The K-factor of the long sides together with the commissioning pressure reading of these equals the flow of the long sides, 2 & 4.
3. q tot =q (1+3) + q (2+4)
   The product's total flow is the sum of the above.

NB! p_i (1,3) ≠ p_i (2,4)
NOTE: The commissioning pressure is different for the long sides (2 & 4) and the short sides (1 & 3).









ADAPT Parasol 600

ADAPT Parasol 600		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,25
L	2&4	0,25
M	1&3	0,44
M	2&4	0,44
H	1&3	0,69
H	2&4	0,69

ADAPT Parasol 600		
Example nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,50	0,50
LHLH	0,50	1,38
MMMM	0,88	0,88
HHHH	1,38	1,38

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 12. See Figure 13 for example.
*) Total k-factor for side 1 and 3
**) Total k-factor for side 2 and 4

ADAPT Parasol 600 PF

ADAPT Parasol 600 PF		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,28
L	2&4	1.29
M	1&3	0,44
M	2&4	1,45
H	1&3	0,69
H	2&4	1,70

ADAPT Parasol 600 PF		
Example nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,56	2,58
LHLH	0,56	3,40
MMMM	0,88	2,90
HHHH	1,38	3,40

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 12. See Figure 13 for example.
*) Total k-factor for side 1 and 3
**) Total k-factor for side 2 and 4

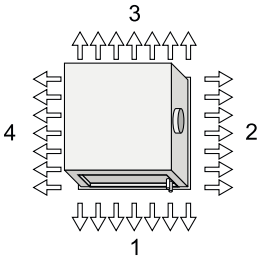
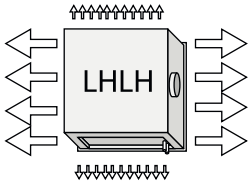


Figure 12. Top view, nozzle setting, ADAPT Parasol single-module unit, sides 1-4.



Figur 13. Nozzle setting example, ADAPT Parasol single-module unit - LHLH.

ADAPT Parasol 1200

ADAPT Parasol 1200		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,25
L	2&4	0,66
M	1&3	0,44
M	2&4	1,16
H	1&3	0,69
H	2&4	1,82

ADAPT Parasol 1200		
Example Nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,50	1,32
LHLH	0,50	3,64
MMMM	0,88	2,32
HHHH	1,38	3,64

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 14. See Figure 15 for example.
*) Total k-factor for side 1 and 3
**) Total k-factor for side 2 and 4

ADAPT Parasol 1200 PF

ADAPT Parasol 1200 PF		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,28
L	2&4	2,59
M	1&3	0,44
M	2&4	2,98
H	1&3	0,69
H	2&4	3,53

ADAPT Parasol 1200 PF		
Example Nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,56	5,18
LHLH	0,56	7,06
MMMM	0,88	5,96
HHHH	1,38	7,06

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 14. See Figure 15 for example.
*) Total k-factor for side 1 and 3
**) Total k-factor for side 2 and 4

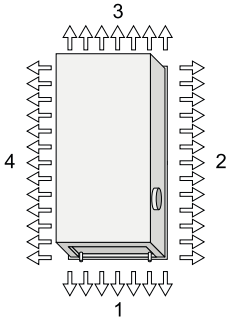


Figure 14. Top view, nozzle setting, ADAPT Parasol two-module unit, sides 1-4.

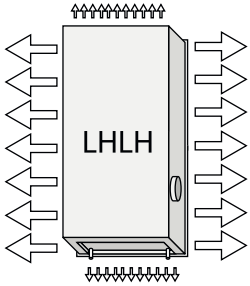
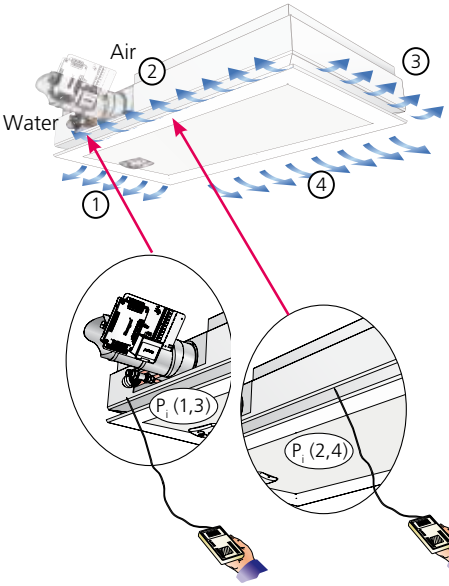


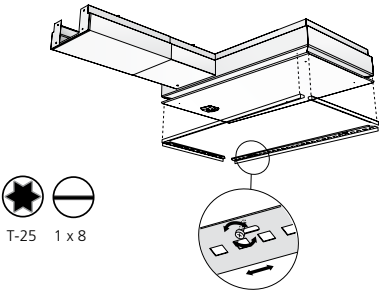
Figure 15. Nozzle setting example, ADAPT Parasol two-module unit - LHLH.

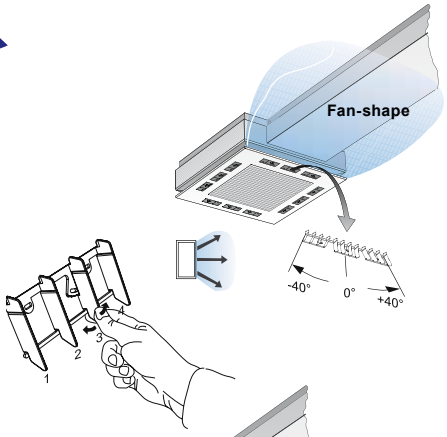
ADAPT Parasol EX



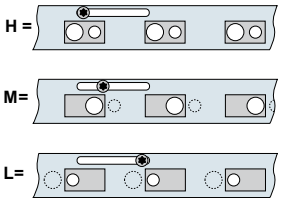
1. k (1+3) + p_i (1,3) => q (1+3)
   The K-factor of the short sides together with the commissioning pressure reading of these equals the flow of the short sides, 1&3.
2. k (2+4) + p_i (2,4) => q (2+4)
   The K-factor of the long sides together with the commissioning pressure reading of these equals the flow of the long sides, 2 & 4.
3. q tot =q (1+3) + q (2+4)
   The product's total flow is the sum of the above.

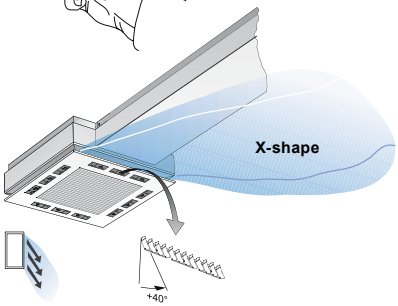
NB! p_i (1,3) ≠ p_i (2,4)
NOTE: The commissioning pressure is different for the long sides (2 & 4) and the short sides (1 & 3).





Nozzle configuration
H → M → L





ADAPT Parasol EX 690

ADAPT Parasol 690 EX		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,25
L	2&4	0,25
M	1&3	0,44
M	2&4	0,44
H	1&3	0,69
H	2&4	0,69

ADAPT Parasol 690 EX		
Example Nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,50	0,50
LHLH	0,50	1,38
MMMM	0,88	0,88
HHHH	1,38	1,38

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 16. See Figure 17 for example.
*) Total k-factor for side 1 and 3
**) Total k-factor for side 2 and 4

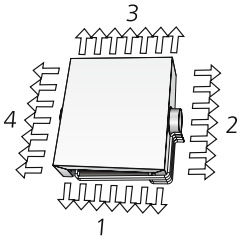


Figure 16. Top view, nozzle setting, ADAPT Parasol EX single-module unit, sides 1-4.

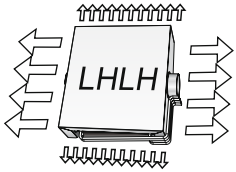


Figure 17. Nozzle setting example, ADAPT Parasol EX single-module unit - LHLH.

ADAPT Parasol EX 1290

ADAPT Parasol 1290 EX		
Nozzle setting per side	Side	k_{pl} per side
L	1&3	0,25
L	2&4	0,66
M	1&3	0,44
M	2&4	1,16
H	1&3	0,69
H	2&4	1,82

ADAPT Parasol 1290 EX		
Example Nozzle setting ***)	k_{pl} k (1,3) *)	k (2,4) **)
LLLL	0,50	1,32
LHLH	0,50	3,64
MMMM	0,88	2,32
HHHH	1,38	3,64

***) All four sides on the unit can be set individually. The designation of the nozzle setting follows the order according to Figure 18. See Figure 19 for example.

*) Total k-factor for side 1 and 3

**) Total k-factor for side 2 and 4

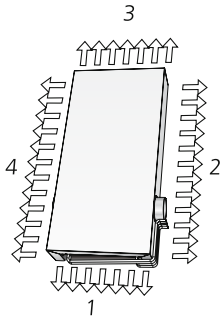


Figure 18. Top view, nozzle setting, ADAPT Parasol EX two-module unit, sides 1-4.

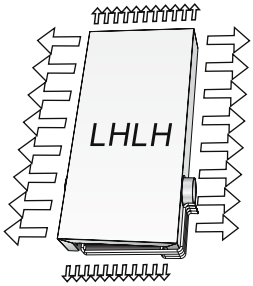


Figure 19. Nozzle setting example, ADAPT Parasol EX two-module unit - LHLH.

Complete documentation is available at
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GB-Commissioning guide 2015-02

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