AKYb

Supply air diffuser with nozzles for the e.r.i.c. system

FUNCTION

Ceiling diffuser with automatic flow regulation. In the event of reduced air flow the plenum box's damper adjusts the air flow to the right level. Thanks to Swegon nozzle technology the diffuser can easily handle variations in flow down to 30% of the maximum supply air flow. Developed for the e.r.i.c. system with constant pressure in branch ducts and a requirement controlled air flow rate. Manages large subnormal temperatures and air flow ranges at low sound levels.

QUICK FACTS

- Active damper control
- Manages large air flow ranges without the risk of draughts
- Cleanable
- Always used with plenum box ALE 3

QUICK GUIDE

AIR FLOW-SOUND LEVEL				
AKYb	ALEb 3	Flow range l/s		
Size	Size	Min	Max	dB(A)
400-400	160-400-400	5	67	35
600-600	250-600-600	9	130	35

All data at constant pressure 40 Pa.

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DESIGN

Consists of two parts. A mounting frame section with a removable perforated spread plate in the inlet.
A diffuser plate with aerodynamically designed nozzles sits in the mounting frame.
The diffuser section should always be fitted in plenum box ALE 3. This has a circular inlet and square outlet. Designed using galvanized sheet steel. Contains fixed test socket and sound absorber with heavy-duty surface finish and motorised adjustment damper complete with electronics.

MATERIALS AND SURFACE TREATMENT

AKY is made of sheet steel and is powder coated inside and out in Swegons white interior finish.
Nozzles are made of PC/ABS plastic.
Plenum box ALE is made of galvanized sheet steel and also contains plastic, rubber and electronic components.

CONTROL ACCESSORIES

ROOM REGULATOR:	RTC, KCD or KCW
TEMPERATURE SENSOR:	KST
CO_2:	KSC
OCCUPANCY SENSOR:	KSO

PLANNING

A comprehensive planning guide that describes the overall e.r.i.c. concept is given in the technical section.
As air diffusers are active and the pressure in the branch duct is constant, diffuser selection should be made according to the following:
Select a constant pressure. Follow the pressure line on the diagram from left to right. The flow range can now be read, with the help of the pressure range lines both the maximum and minimum flows can be determined exactly, see the example diagram. These flows should be stated in the specification for the room regulators, allowing the factory to pre-set the air flow (see the separate product sheet). Note by selecting constant pressure the sound level in the ceiling drops as the air flow is reduced.
Each individual nozzle can be adjusted through 360° without affecting the sound level or pressure drop. A vertical spread pattern is obtained by turning the nozzles towards each other. These conditions make it fully possible to set an infinite number of spread pattern combinations, both horizontal and vertical.
AKY's diffuser section is designed as a cassette. This means the size 600 x 600 is designed to fit directly in the suspended ceiling's tee supports. The design of the diffuser section ensures accessibility to the connecting duct without the use of tools.

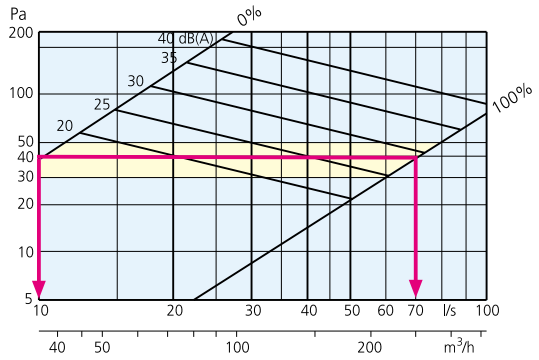

Figure 1. *AKY example diagram.*

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INSTALLATION (See figure 2)

1. The plenum box ALE 3 is suspended from the ceiling and is connected to the air duct system.
2. The mounting frame is slid inside the box and is secured with a pop rivet
3. The diffuser section with nozzles is pushed into its spring clips in the mounting frame.The measurement hose is pulled out through a nozzle.
4. Dismantling AKY takes place by removing two nozzles and then pulling the diffuser plate straight down and in doing so it becomes loose.
5. The power lead is connected to the room regulators, see the wiring diagram on the next page.

COMMISSIONING

AKY + ALE 3 are normally preset via the room regulators at the factory. There is a test socket to manually measure the diffuser's current air flow rate, see figure 2 at (8). Via this it is possible using a pressure gauge, and a special k-factor diagram to show which trimming factor, also known as the k-factor, that should apply at respective damper settings (% open). The K-factor is then used in the formula $q = k \times \sqrt{\Delta Pi}$ (l/s).

Where	q	= air flow in l/s
	k	= trimming factor (k-factor)
	Pi	= measured diffuser pressure (connection pressure in Pa)

To adjust the damper setting a handterminal connected to the room regulator is used. For further information, see Commissioning guide for System e.r.i.c.

MAINTENANCE

AKY is cleaned if necessary with tepid water and a detergent. The air duct system is accessible without the need of tools. The perforated spread plate in the diffuser section (7) is dismantled by pushing down the tabs inside the mounting frame, the plenum box's motorised damper can then be easily loosened and removed.

NOTE! As the damper is electrically connected the quick connector located in the damper handle should be removed when dismantling the damper, see figure 2 at (6).

DECLARATION

The product is CE marked.

CE declaration and *Environmental Product Declaration* are available from our website.

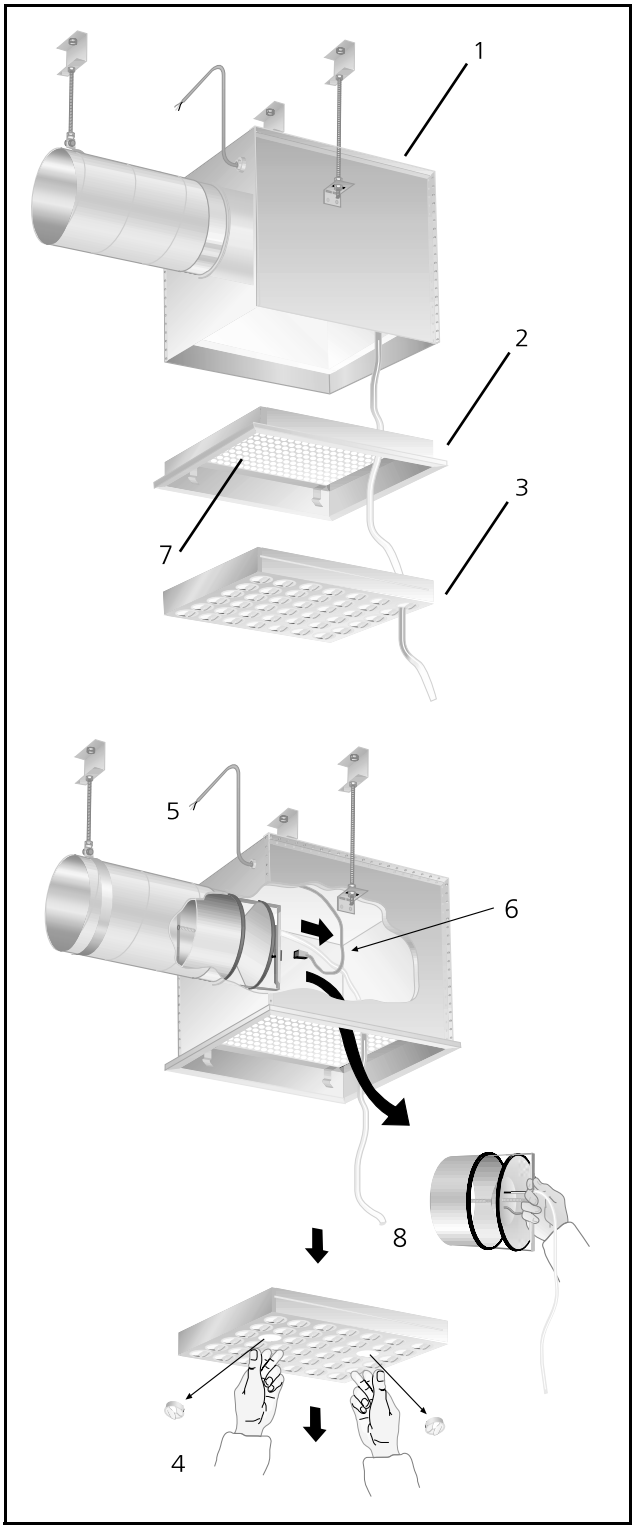

Figure 2. *AKY + ALE 3.*

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Electrical data

Input vootage	24V AC -10% +20% 50-60 Hz
Max. Power consumption	3 VA

Ambient temperature:	
Operation	0°C -+50°C
Storage	-20°C - +50°C

Connection

AKY receives its power supply via the room regulators. See the wiring diagram.
Eight active air diffusers can be connected to the same regulator. Maximum cable length from the regulator to the last diffuser is 50 m using cable 0,75 mm^2.

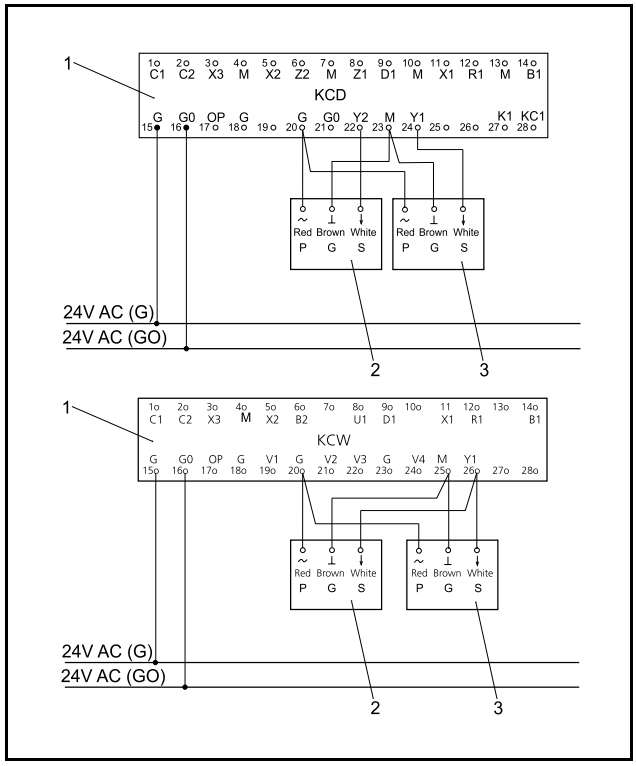

Figure 3. *Wiring diagram.*
1. Room regulator KCD or KCW
2. Supply air diffuser
3. Exhaust air terminal

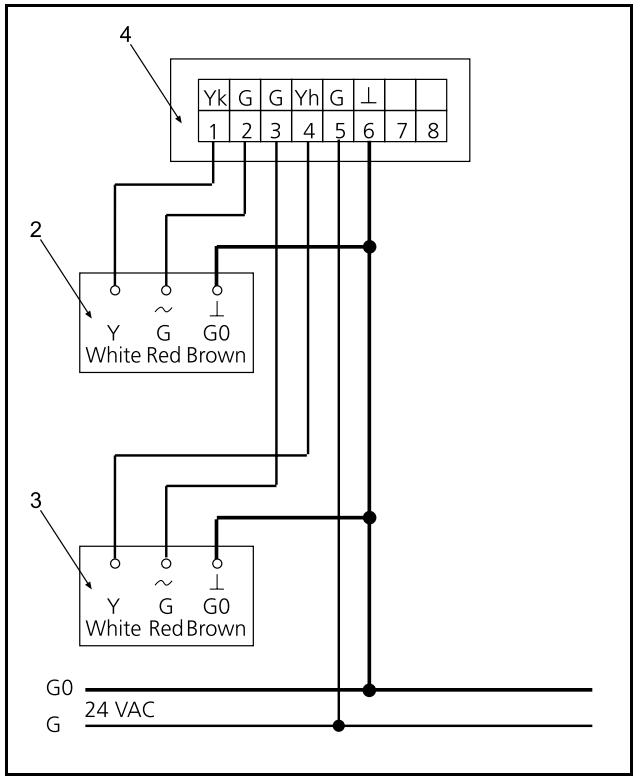

Figure 4. *Wiring diagram.*
2. Supply air diffuser
3. Exhaust air terminal
4. Room regulator RTC

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TECHNICAL DATA

- Sound level dB(A) applies for room 10 m^2 equivalent sound absorption area.
- Throw length $l_{0.2}$ is measured with isothermal air supply.
- Recommended max subnormal temperature 14°C.
- For calculation of the air spread, air velocities in the occupied zone, or sound levels in rooms with other dimensions please refer to our calculation software ProAir and ProAc. Available from our website.

Sound data AKY + ALE 3 - Supply air

Sound power level Lw (dB)
Table K_{OK}

Size	Mid-frequency (Octave band) Hz							
AKYb + ALEc 3	63	125	250	500	1000	2000	4000	8000
400-400	-4	6	6	0	-1	-7	-18	-23
600-600	-2	5	1	0	0	-6	-14	-14
Tol. ±	2	2	2	2	2	2	2	2

Sound attenuation ΔL (dB)
Table ΔL

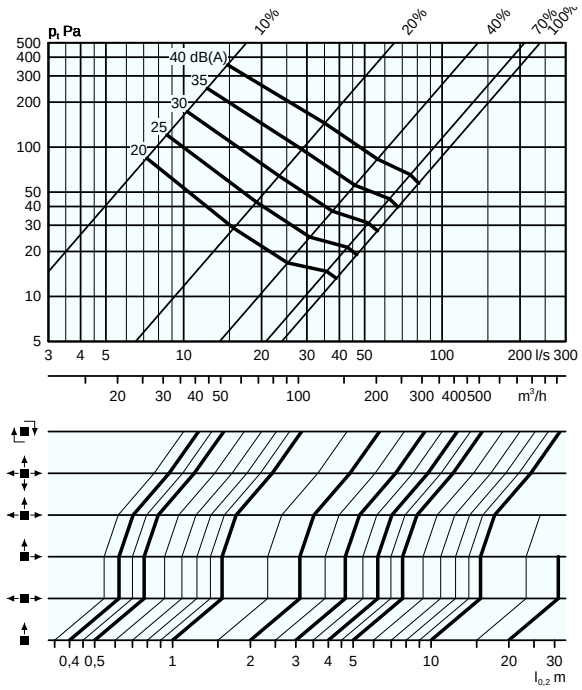
Size	Mid-frequency (Octave band) Hz							
AKYb + ALEc 3	63	125	250	500	1000	2000	4000	8000
400-400	21	12	10	15	19	16	17	16
600-600	18	8	10	13	15	12	17	17
Tol. ±	2	2	2	2	2	2	2	2

Engineering graphs AKY + ALE 3 - Supply air

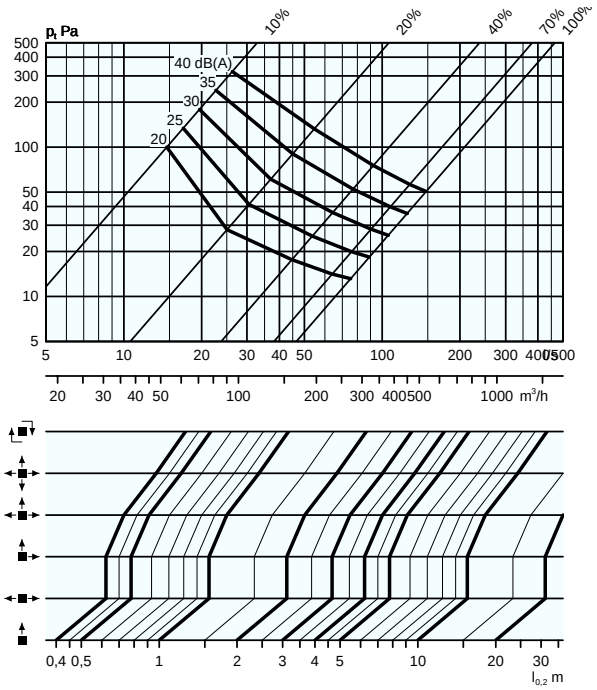
Air flow - Pressure drop - Sound level - Throw length

- The graph should not be used for commissioning.
- dB(A) applies for a normally attenuated room (4 dB room attenuation).
- dB(C) the value normally lies 6-9 dB higher than the dB(A) value. For a more accurate calculation please contact you nearest Swegon office

AKYb 400-400 + ALEc 3 160-400-400



AKYb 600-600 + ALEc 3 250-600-600



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DIMENSIONS AND WEIGHT

AKYb + ALEc 3

Size	A	B	C	ØD	E	G
400-400	395	355	355	159	287	175
600-600	595	555	555	249	387	230

AKYb + ALEc 3

Size	K	L	Weight,kg	Number of discs
400-400	95	395	6,5	64
600-600	140	595	16,0	169

Hole size = B x C + 5 mm

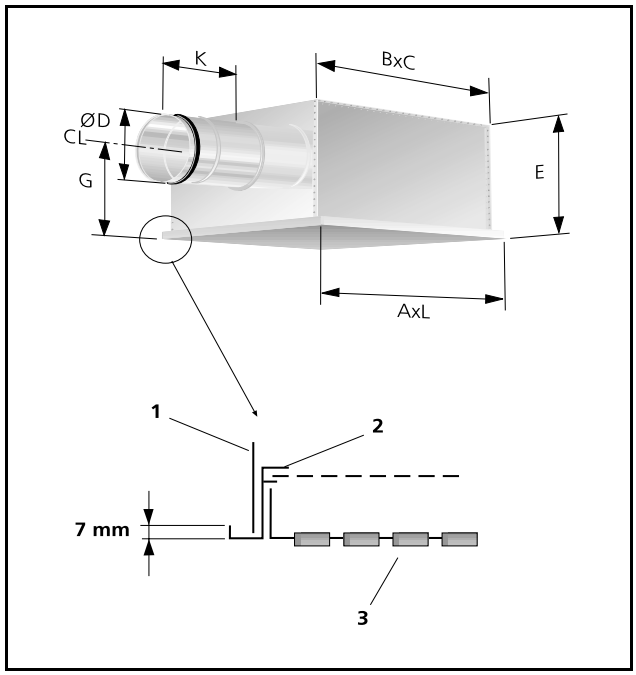

Figure 5. *AKY + ALE 3.*
1. Plenum box
2. Mounting frame
3. Diffuser section with discs

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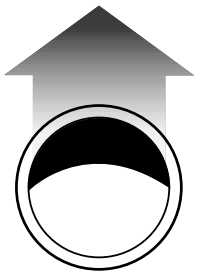
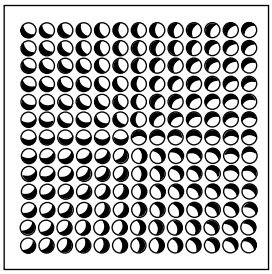
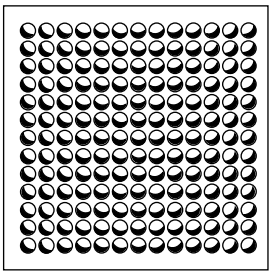
Disc setting - spread pattern

On delivery the diffuser is set to the standard setting as shown below.

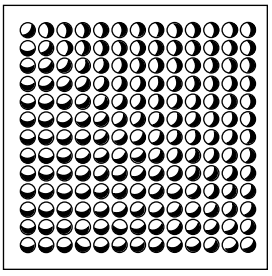




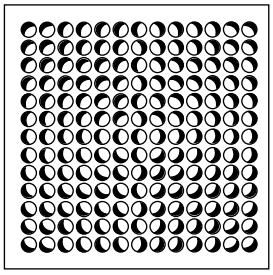
1-way



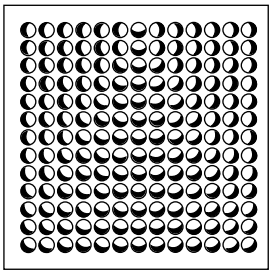
2H-way



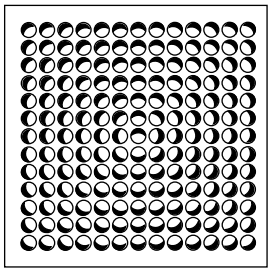
2M-way



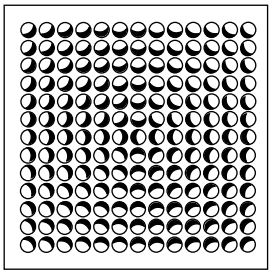
3-way



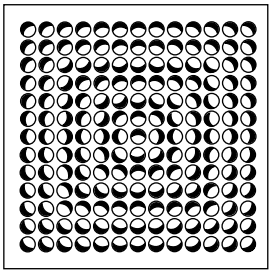
4-way



V1 Vertical Conc.



V2 Vertical diff.



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ORDER KEY

Product designation

Square active diffuser for ceilings	AKYb	-aaa-bbb
Size Nominal connection dimension, mm		

NOTE! Min/Max-air flow stated in the specification for related room regulator RTC, KCD or KCW

Standard range:

Size: 400-400, 600-600

Accessories

Plenum box	ALEc 3	-aaa-bbb

AKYb	ALEc 3
400-400	160-400-400
600-600	250-600-600

Control accessories

RTC	Room regulator
KCD	Room regulator
KCW	Room regulator
KST	Temperature sensor
KSC	CO_2
KSO	Occupancy sensor

Specified in respective product sheets

SPECIFICATION EXAMPLE

Swegons square active ceiling diffuser type AKYb with plenum box ALEc 3, with the following functions:

- Active damper control
- Aerodynamically designed rotatable discs
- Cleanable, can be opened
- Powder coated white
- Cleanable plenum box ALE 3 featuring test function with low systematic error and internal sound absorber with heavy-duty surface finish and motorised damper
- Low constant pressure drop
- Optimised sound levels
- Guaranteed air flow rate with small tolerances

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