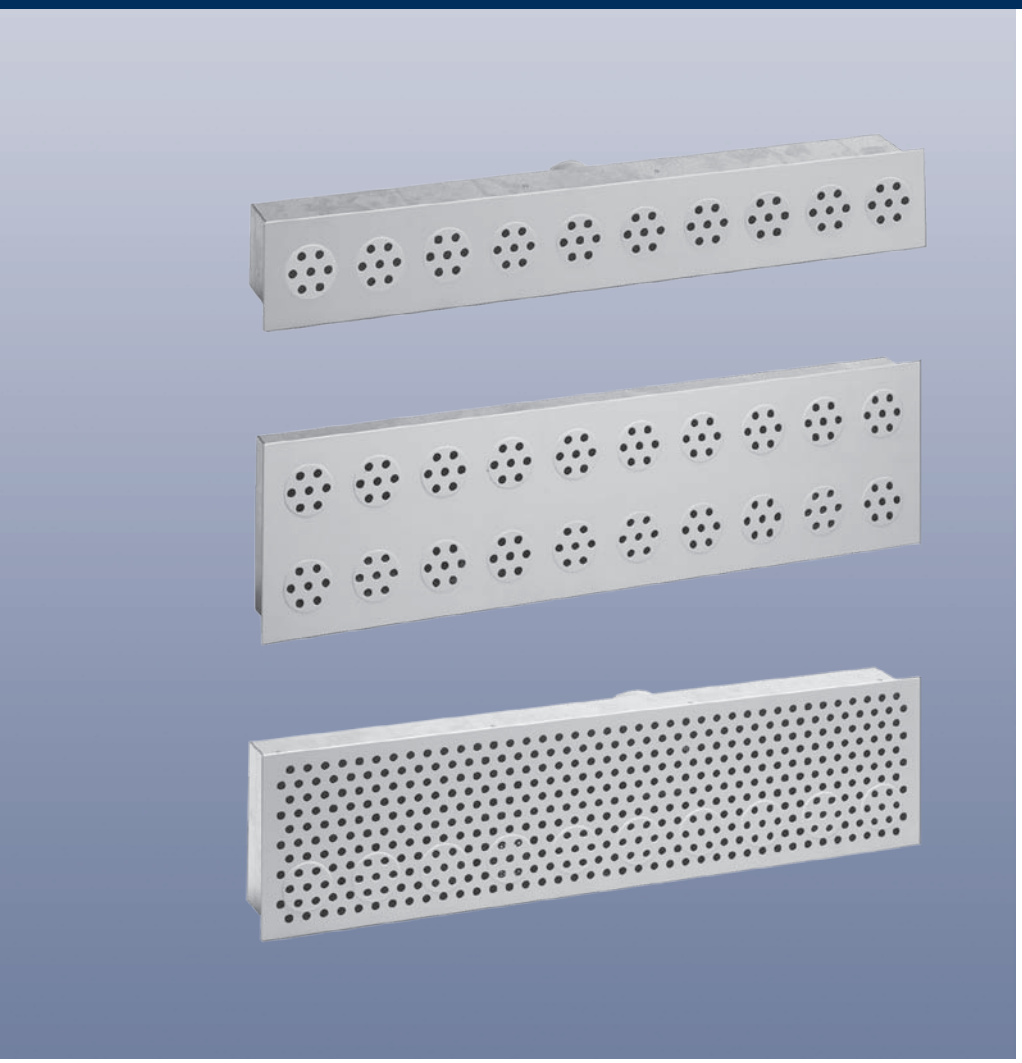
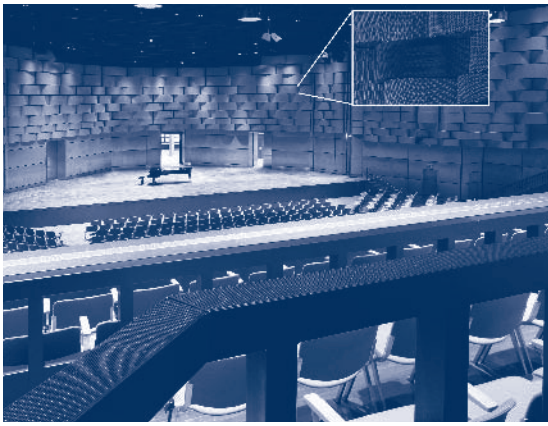
KOMPONENTEN ®
Applied system solutions





Multiplex outlet FA-VT....

Multiplex outlet

Construction design and function

Preliminary remarks

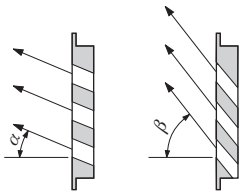
Traditionally, supply air outlets are installed in walls, close to the ceiling. Air grilles or slot outlets for linear air discharge give rise to tangential indoor air patterns that are likely to cause too high indoor air velocities.

Better indoor air flow conditions, however, can be achieved with air outlets capable of generating high-turbulence, diffuse mixing air flow while spreading the air jets. This preferable flow pattern is possible with the multiplex outlet from KRANTZ KOMPONENTEN. The multiplex outlet is a sidewall air outlet whose front plate generates a large number of thin air jets through built-in jet bundle elements. The discharge direction of these elements being adjustable, the supply air jets can be spread out as required.

The multiplex outlet can also be used for return air intake. Further, it is available in a design combining a lower supply air segment and an upper return air segment.

Construction design and function

The main components of the multiplex outlet are the rectangular housing **1** and the front plate **2** with several round jet bundle elements **3**. The front plate can be perforated or non-perforated and the jet bundle elements can be arranged in single or double rows.
The channels of the jet bundle elements have different discharge angles α or β. By rotating the individual elements, the direction of the jet channels – and thus the discharge direction – can be adjusted to an upward or downward incline as well as to the right or left, which enables to spread out the supply air jets as required.



Jet bundle elements with different discharge angles

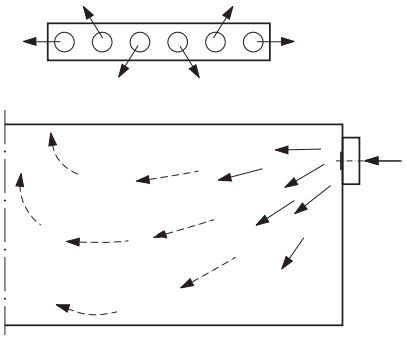
Multiplex outlet for supply air: type FA-VT-ZO or FA-VT-ZL
The front plate has either no perforations (FA-VT-ZO) or, for reasons of appearance, the same perforations as the jet bundle elements (FA-VT-ZL). In both cases the air is discharged through the jet bundle elements only. This generates a stable, high-induction turbulent mixing air flow with many single jets. The jet bundle elements can be rotated to adjust the jet spread. Supply air and indoor air mix quickly and the jet velocity drops very fast. The supply air flow to the occupied zone is draught-free even at high temperature differences between supply air and indoor air. No tangential air patterns form.

Multiplex outlet for return air: type FA-VT-AO or FA-VT-AL
The multiplex outlet can also be used for return air intake. For this purpose, the front plate can be supplied either with or without perforations.

Combined multiplex outlet for supply and return air: type FA-VT-KO or FA-VT-KL
The housing is divided into a lower supply air segment and an upper return air segment. The front plate can be non-perforated (FA-VT-KO) or perforated (FA-VT-KL). The return air segment of the perforated type has no jet bundle elements for air intake. Instead, the perforations are unobstructed so that the return air flows into the air outlet through the free perforations.

Generally:
The front plate of the multiplex outlet is fastened by means of a clip connection and can be removed from the room side. It is easy to clean, whether it has perforations or not. At the rear of the housing is a circular connection spigot **4** for duct connection.
The combined multiplex outlet has two connection spigots, one for supply air and one for return air. These spigots are available with a volume flow damper **6** that is operated from the room side.

To make use of the advantageous flow pattern of the multiplex outlet, existing supply air grilles can be replaced with multiplex outlets (on request). In such cases, the front plate of the multiplex outlet is simply inserted into the mounting frame of the existing supply air grille.



Flow pattern at standard setting; the jet bundle elements (top sketch) can be rotated manually

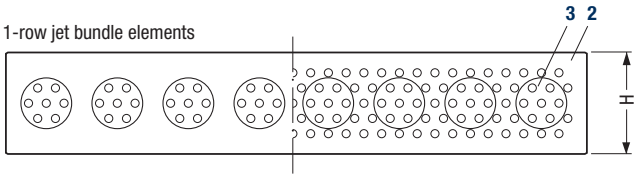
Jet pattern made visible with smoke tracer

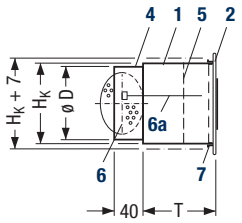
Multiplex outlet for supply air or return air

Dimensions

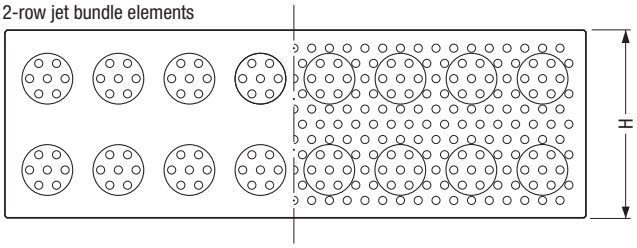
Non-perforated **front plate**	Perforated **front plate**
Supply air: FA-VT-ZO	FA-VT-ZL
Return air: FA-VT-AO	FA-VT-AL

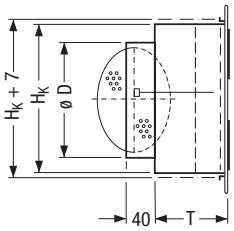
1-row jet bundle elements



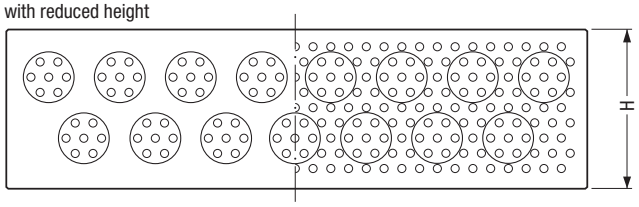


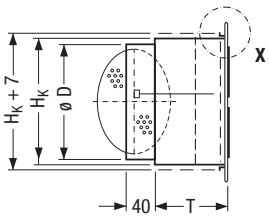
2-row jet bundle elements

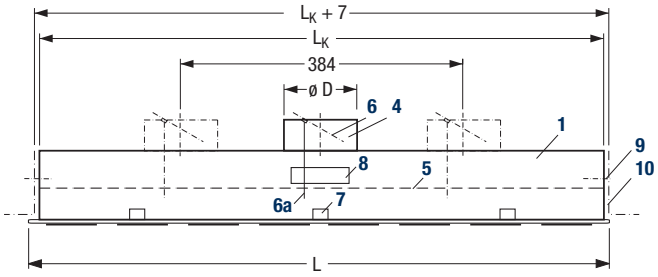


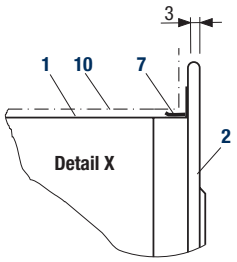


Staggered 2-row jet bundle elements with reduced height









Key for all pages

1 Housing
2 Removable front plate
3 Jet bundle element
4 Connection spigot
5 Fixed damper
6 Volume flow damper
6a Adjustment from room side
7 Clip connection
8 Mounting detail
9 Wall fastener (by others)
10 Wall

Type	Nominal length	Actual length	Length of housing	Number of jet bundle elements	Depth	FA-VT-ZO / VT-ZL (supply air) and FA-VT-AO / VT-AL (return air)			
						Diameter	Dimensions and weight		
	L_N	L mm	L_K mm	n Units	T [1] mm	D mm	H mm	H_K mm	W approx. kg
1-row	600	606	580	6	100	99	140	110	3.2
	800	798	772	8		99 [2]			4.1
	1 000	990	964	10		99 [3]			4.8
2-row	600	606	580	12	100	124	260	230	4.7
	800	798	772	16		149			5.4
	1 000	990	964	20		159			6.1
Staggered 2-row	600	606	580	11	100	124	220	190	4.5
	800	798	772	15		149			5.2
	1 000	990	964	19		159			5.9

[1] For connection box with acoustic lining: T + 20 mm

[2] Supply air outlet with 2 spigots ø 79 if required

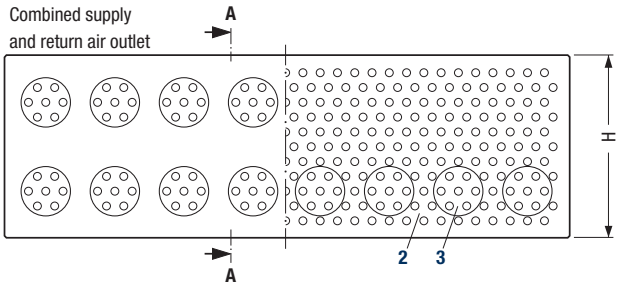
[3] Supply air outlet with 2 spigots ø 99 if required

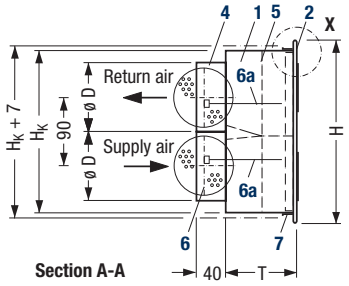
Combined multiplex outlet – Supply and return air

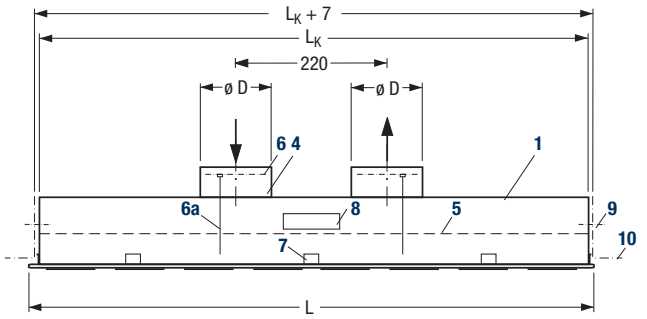
Dimensions

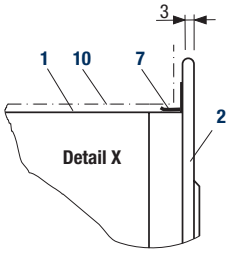
Non-perforated **front plate** FA-VT-KO

Perforated **front plate** FA-VT-KL



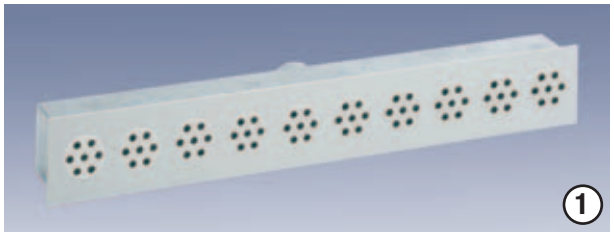


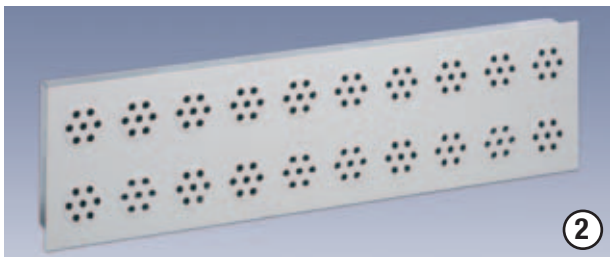




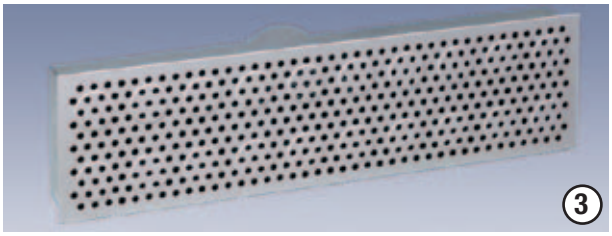
Type	Nominal length L_N	Actual length L mm	Length of housing L_K mm	Number of jet bundle elements n Units FA-VT-KO	Number of jet bundle elements n Units FA-VT-KL	Depth T [1] mm	FA-VT-KO and FA-VT-KL Diameter D mm	Dimensions and weights H mm	Dimensions and weights H_K mm	Dimensions and weights G approx. kg
1-row	600	606	580	12	6	100	99	260	230	4.8
	800	798	772	16	8		124			5.5
	1 000	990	964	20	10		124			6.2

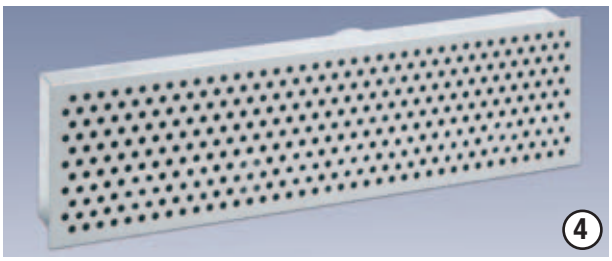
[1] For connection box with acoustic lining: T + 20 mm





Multiplex outlets for supply air or return air, with non-perforated front plates; jet bundle elements arranged in 1-row ① or 2-row ②.





Multiplex outlet for supply air or return air with perforated front plate ③, jet bundle elements arranged in 2-rows, and combined multiplex outlet for supply and return air ④, perforated front plate with jet bundle elements in lower supply air segment. The jet bundle elements can be rotated manually to alter the discharge direction.

Multiplex outlet

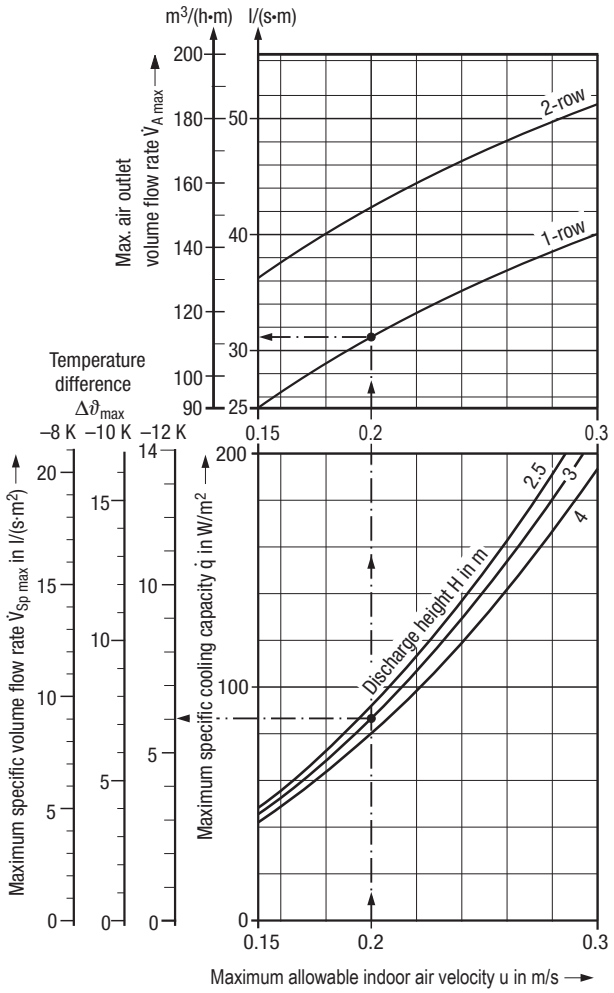
Layout

Layout specifications

At standard setting of the jet bundle elements (jets spread out), a jet penetration depth of up to 2.5 m and a supply air coverage of up to approx. 6 m are obtained. It is advantageous to arrange the air outlets with sufficient spacing to one another so as to make full use of the jet spread. The maximum temperature differences between supply air and indoor air can amount to –12 K when cooling and +15 K when heating.

Comfort criteria [1)]

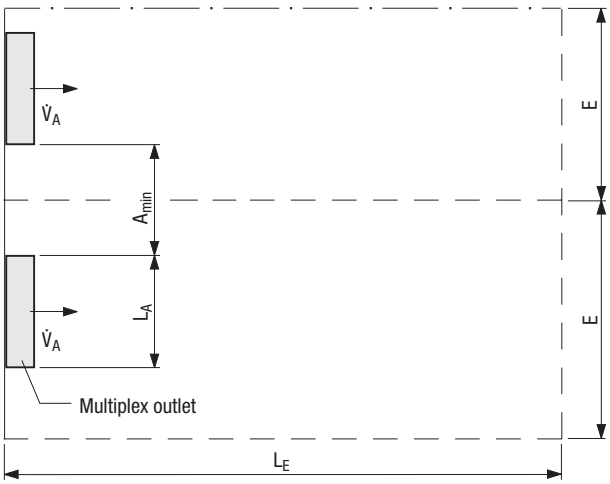
The outlet layout must comply with the maximum allowable indoor air velocities in the occupied zone in cooling mode. The indoor air velocity depends on the cooling load that is to be removed from the room. The maximum specific cooling capacity $\dot{q}$ depends on the discharge height and the maximum allowable indoor air velocity u (Graph 1). First, the maximum specific volume flow rate $\dot{V}_{Sp\ max}$ is determined in relation to the indoor air velocity u, the discharge height H and the maximum temperature difference supply air to return air $\Delta\vartheta_{max}$ using Graph 1.



Graph 1: Max. specific volume flow rate and max. air outlet volume flow rate

To comply with the maximum allowable indoor air velocities, the volume flow rate supplied to the room $\dot{V}_{Sp\ tats}$ may not exceed the maximum specific volume flow rate $\dot{V}_{Sp\ max}$. On the basis of the maximum specific volume flow rate $\dot{V}_{Sp\ max}$ and the coverage length L_E, the coverage width E and the minimum air outlet spacing A_{min} can be determined using the following equations:

$$E = \frac{\dot{V}_A}{\dot{V}_{Sp\ max} \cdot L_E} \qquad A_{min} = E - L_A$$



Coverage width E, coverage length L_E and minimum spacing A_{min}

Key for layout:

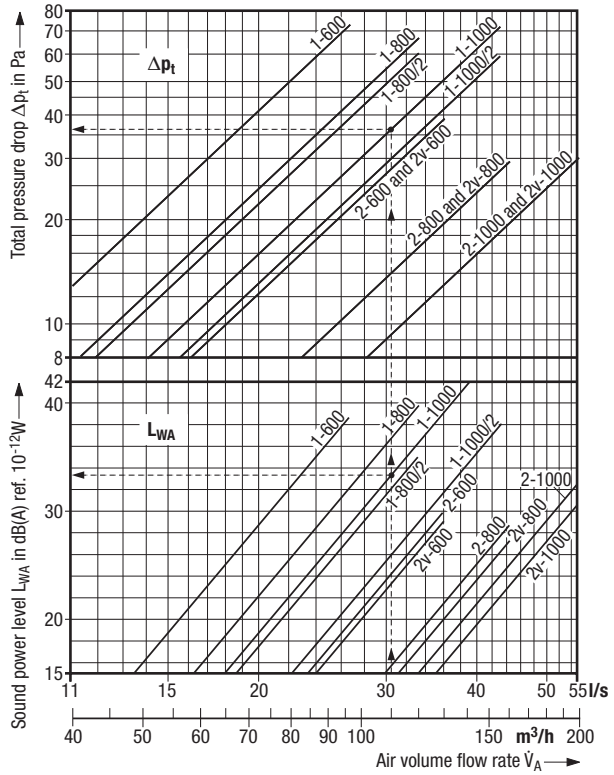
$\dot{V}_A$ = supply air volume flow rate per air outlet in l/s
$\dot{V}_{tot}$ = total supply air volume flow rate in l/s
$\dot{V}_{A\ max}$ = max. volume flow rate per m of air outlet depending on discharge height H and allowable indoor air velocity in l/s
$\dot{V}_{Sp\ max}$ = max. specific volume flow rate per m² of floor area in l/(s·m²)
$\dot{V}_{Sp\ tats}$ = actual specific volume flow rate per m² of floor area in l/(s·m²)
u = max. allowable indoor air velocity in m/s
E = coverage width of supply air in m
L_E = coverage length of supply air in m
L_A = air outlet length in m
A_{min} = minimum spacing required between two air outlets in m
n = number of air outlets
$\Delta\vartheta_{max}$ = max. temperature difference supply air to return air in K
$\dot{q}$ = max. specific cooling capacity in W/m²
H = discharge height in m
L_{WA} = sound power level in dB(A) ref. 10^{-12} W
Δp_t = total pressure drop in Pa

[1)] See our brochure ref. TB 69 'Layout specifications for thermal comfort'

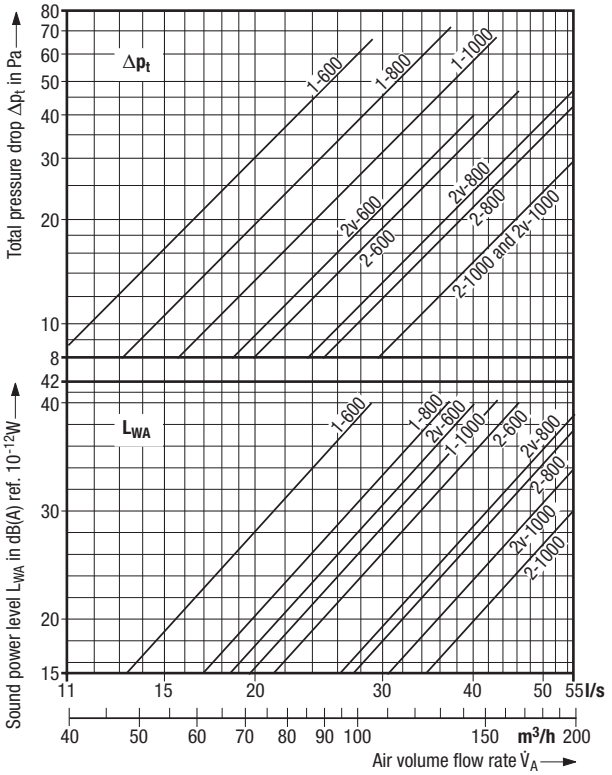
Multiplex outlet

Layout

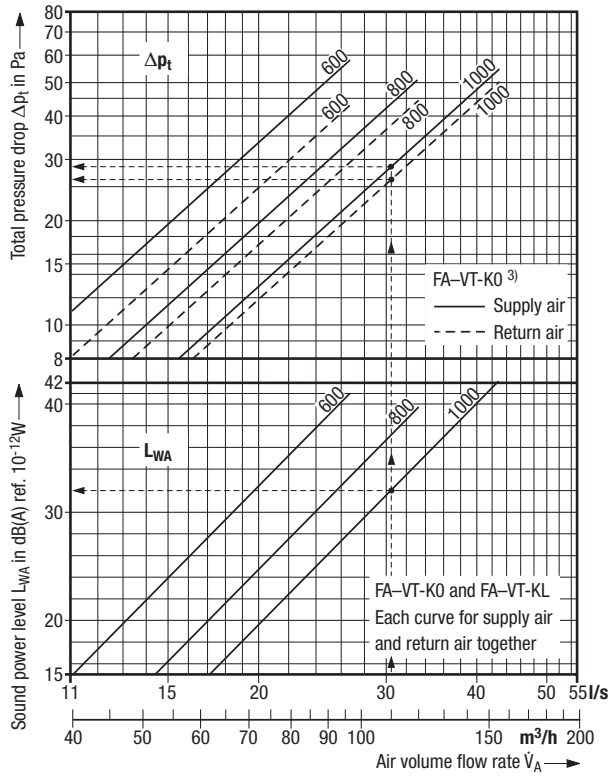
Supply air, FA-VT-ZO and FA-VT-ZL [1]



Return air, FA-VT-AO and FA-VT-AL [1]



Supply and return air combined, FA-VT-KO and FA-VT-KL [1 + 2]



Layout example for supply air outlets installed in an office

1	Room width B_R	=	8 m
2	Room depth L_E	=	5 m
3	Total supply air volume flow rate $\dot{V}_{tot}$	=	185.5 l/s
4	Discharge height H	=	3 m
5	Indoor air temperature ϑ_R	=	26 °C (at max. cooling load)
6	Max. allowable indoor air velocity u	=	0.2 m/s
7	Allowable sound power level L_{WA}	=	35 dB(A) ref. 10^{-12} W
8	Actual specific volume flow rate $\dot{V}_{Sp\ tats}$	=	4.6 l/(s·m) [**3** : (**1** · **2**)]
9	1-row multiplex outlet FA-VT, L_N = 1 000		

From graph

10	$\dot{V}_{Sp\ max}$	=	6 l/(s·m²)
11	$\dot{V}_{A\ max}$	=	33.1 l/(s·m)
12	$L_{N\ total}$	=	5.9 m [**3** : **11**]
13	n	≈	6 units [**12** : **9**]
14	$\dot{V}_A$ selected	≈	30.5 l/s [**3** : **13**]
15	E	$= \frac{30.5}{6 \bullet 5}$	= 1.02 m ⇒ A_{min} = 0.02 m
16	L_{WA}	≈	33 dB(A) ref. 10^{-12} W
17	Δp_t	=	36 Pa

Checking specific volume flow rates

18 $\dot{V}_{Sp\ tats} < \dot{V}_{Sp\ max}$ = 4.6 < 6 l/(s·m²) [**8** < **10**]

19 $\dot{V}_A$ selected < $\dot{V}_{A\ max}$ = 30.5 < 33.1 l/(s·m) [**14** < **11**]

Types		***Nominal length***
1	1-row	600
2	2-row	800
2v	staggered 2-row	1 000
/2	with two connection spigots	

Example 2-800: 2-row jet bundle elements, nominal length 800

[1] Values for outlet housing with acoustic lining available on request.

[2] The layout of the combined multiplex outlets is in line with the example. The return air flow rate equals the supply air flow rate.

[3] For FA-VKL the pressure drops are lower by approx. 15% for supply air and by approx. 35% for return air.

Multiplex outlet

Sound power level and pressure drop [1]

Supply air outlets FA-VT-ZO and FA-VT-ZL [1]

Type	Nominal length	Volume flow rate		Total pressure drop	Sound power level L_W in dB ref. 10^{-12} W						
						Octave band centre frequency in Hz					
	L_N	$\dot{V}_A$		Δp_t	L_{WA}						
		l/s	m^3/h	Pa	dB(A)	125	250	500	1 K	2 K	4 K
1-row	600	14	50	20	16	20	17	13	—	—	—
		18	65	34	25	21	30	24	13	—	—
		22	80	50	32	23	35	32	24	19	—
		26.5	95	72	38	24	40	38	31	28	17
	800	18	65	20	19	21	24	17	10	—	—
		24	85	34	28	25	32	27	19	—	—
		29	105	52	35	32	38	35	29	20	—
		33	120	67	40	31	41	40	35	29	17
	1 000	22	80	20	22	28	26	21	12	—	—
		29	105	34	32	29	35	32	25	11	—
		36	130	52	39	31	39	39	34	24	—
		43	155	72	45	32	45	45	40	32	20
	800/2 [5]	18	65	18	15	18	15	10	—	—	—
		24	85	31	23	18	27	22	12	—	—
		29	105	48	31	23	34	31	23	15	—
		33	120	62	35	27	36	35	30	22	14
	1 000/2 [5]	22	80	16	15	19	14	14	—	—	—
		29	105	27	24	24	26	25	12	—	—
		36	130	42	31	25	32	31	22	15	—
		43	155	60	37	27	37	38	30	24	12
2-row	600	22	80	15	13	21	11	—	—	< 10	< 10
		25	90	19	16	19	19	12	—		
		28	100	24	20	21	25	17	10		
		30.5	110	28	23	23	28	22	12		
	800	28	100	12	12	17	10	10	—		
		32	115	16	17	19	20	14	—		
		36	130	20	20	20	24	19	10		
		41.5	150	26	25	22	30	24	17		
	1 000	30.5	110	9	11	13	10	10	—		
		37.5	135	14	18	18	23	16	—		
		44.5	160	20	24	22	28	24	14		
		51.5	185	26	29	27	33	30	22		
Staggered 2-row	600	22	80	15	14	17	11	12	—	< 10	< 10
		25	90	19	18	21	19	17	—		
		28	100	24	21	22	25	21	—		
		30.5	110	28	25	23	29	25	16		
	800	28	100	12	13	17	13	10	—	< 10	
		32	115	16	18	21	21	16	—		
		36	130	20	22	23	26	22	—		
		41.5	150	26	27	26	31	27	18		
	1 000	30.5	110	9	13	20	16	16	—	—	
		37.5	135	14	19	23	24	17	—	—	
		44.5	160	20	25	25	30	24	15	—	
		51.5	185	26	30	29	34	29	23	11	

Return air outlets FA-VT-AO and FA-VT-AL [1]

Type	Nominal length	Volume flow rate		Total pressure drop	Sound power level L_W in dB ref. 10^{-12} W						
						Octave band centre frequency in Hz					
	L_N	$\dot{V}_A$		Δp_t	L_{WA}						
		l/s	m^3/h	Pa	dB(A)	125	250	500	1 K	2 K	4 K
1-row	600	14	50	14	17	18	18	17	—	—	—
		18	65	22	25	23	25	25	18	16	—
		22	80	38	32	26	32	30	26	25	—
		26.5	95	55	37	27	33	34	30	32	17
	800	18	65	16	17	20	15	17	—	—	—
		24	85	27	26	26	28	26	18	16	—
		29	105	43	33	28	33	32	27	25	—
		33	120	58	37	33	37	35	31	31	17
	1 000	22	80	17	19	25	22	18	—	—	—
		29	105	29	28	30	30	28	20	16	—
		36	130	46	34	33	35	33	28	26	11
		43	155	66	40	37	39	39	34	32	19
2-row	600	22	80	10	17	19	18	17	—	—	< 10
		25	90	13	20	20	21	21	10	—	
		28	100	16	24	21	24	25	15	—	
		30.5	110	20	27	22	26	28	20	15	
	800	28	100	10	16	19	16	15	—	—	
		32	115	14	20	20	21	21	—	—	
		36	130	17	24	22	24	25	16	—	
		41.5	150	24	28	24	28	28	22	15	
	1 000	30.5	110	9	12	16	12	—	—	—	
		37.5	135	13	18	18	20	18	—	—	
		44.5	160	19	23	21	24	24	15	—	
		51.5	185	25	27	27	28	27	20	15	
Staggered 2-row	600	22	80	12	21	18	20	23	—	—	< 10
		25	90	15	24	19	22	26	15	—	
		28	100	19	28	20	26	29	21	14	
		30.5	110	23	31	25	27	32	25	18	
	800	28	100	11	17	19	21	16	—	—	
		32	115	15	22	21	24	22	14	—	
		36	130	19	25	23	25	26	18	10	
		41.5	150	26	30	25	30	30	24	17	
	1 000	30.5	110	9	15	17	16	15	—	—	
		37.5	135	13	21	19	23	21	13	—	
		44.5	160	19	27	24	27	27	18	11	
		51.5	185	25	31	27	30	32	24	17	

Combined supply and return air outlets FA-VT-KO and FA-VT-KL [1]

Type	Nominal length	Volume flow rate [2]		Total pressure drop [3]		Sound power level L_W in dB ref. 10^{-12} W [4]						
							Octave band centre frequency in Hz					
	L_N	$\dot{V}_A$		Δp_t Supply air	Δp_t Return air	L_{WA}						
		l/s	m^3/h	Pa	Pa	dB(A)	125	250	500	1 K	2 K	4 K
1-row	600	11	40	11	8	15	19	17	13	—	—	—
		17	60	24	18	27	22	29	28	17	12	—
		22	80	43	30	35	28	35	35	29	26	10
		26.5	95	58	42	40	31	39	39	34	32	18
	800	17	60	14	12	20	21	23	19	12	—	—
		24	85	27	23	29	25	29	29	23	16	—
		29	105	40	35	36	28	34	36	30	27	10
		33	120	50	44	40	32	37	38	35	34	19
	1 000	19	70	12	11	19	21	20	19	10	—	—
		28	100	24	22	29	25	30	29	23	17	—
		36	130	40	38	37	32	36	37	31	28	11
		43	155	54	50	42	34	40	41	37	35	20

Insertion loss in dB

Type	Octave band centre frequency in Hz					
	125	250	500	1 K	2 K	4 K
FA-VT-ZO / FA-VT-ZL						
– 1-row	1	1	3	4	4	7
– 2-row	1	1	2	5	8	8
FA-VT-AO / FA-VT-AL						
– 1-row	1	1	3	6	4	7
– 2-row	1	1	4	5	8	8
FA-VT-KO						
– Supply air side	0	1	3	5	7	11
– Return air side	0	1	3	3	7	8
FA-VT-KL						
– Supply air side	0	1	2	2	5	6
– Return air side	0	1	1	1	2	4

[1] Values for design with acoustic lining available on request

[2] For supply air and return air respectively

[3] Applies to FA-VT-KO; for FA-VT-KL the pressure drops are lower by approx. 15% for supply air and by approx. 35% for return air

[4] Cumulative levels for supply air and return air

[5] With 2 connection spigots

Multiplex outlet

Features and type code

Features

- Sidewall air outlet for turbulent mixing air flow
- Spread of supply air flow as desired by altering the discharge direction at built-in rotatable jet bundle elements
- Rapid decrease in jet velocity and temperature difference between supply air and indoor air due to single, thin air jets
- No tangential air patterns
- Maximum temperature difference between supply and indoor air: –12 K when cooling and +15 K when heating (up to 3 m room height)
- Low sound power level
- Flush installation in upper wall area, discharge height 2.5 to 4 m
- 1-row and 2-row design available
- Volume flow rate up to 40 l/(s•m) [145 m^3/(h•m)] for 1-row design and up to 51.5 l/(s•m) [185 m^3/(h•m)] for 2-row design
- Nominal lengths: 600, 800, 1 000
- Visible part of front plate painted to RAL 9010, pure white, jet bundle elements body-tinted (similar to RAL 9010, pure white); other colours on request
- Painted front plate easy to clean
- Can also be used for return air intake
- Also available as combined supply and return air outlet with common housing
- Well suited for replacing simple air grilles

Type code

FA-VT-__ __ – __ – ___ – ___ – __

- Multiplex outlet
- Supply/Return air
- Design
- Outlet rows
- Nominal length
- Surface finish
- Colour of discharge element

Supply/Return air

Z = supply air
A = return air
K = combined

Design

0 = non-perforated front plate
L = perforated front plate

Outlet rows [1)]

1 = 1 row
2 = 2 rows
2v = 2 rows, staggered

Nominal length

600 = nominal length 600
800 = nominal length 800
1000 = nominal length 1 000

Surface finish

9010 = face painted to RAL 9010, semi-matt

Colour of discharge element

S = black similar to RAL 9005
W = white similar to RAL 9010

Examples

Combined multiplex outlet with non-perforated front plate and 1 outlet row, nominal length 1 000, face painted to RAL 9010, pure white, discharge element body-tinted in a colour similar to RAL 9010, pure white

FA-VT–KO – 1 – 1000 – 9010 – W

Multiplex outlet for supply air with perforated front plate and 2 staggered outlet rows, nominal length 800, face painted to RAL 9010, pure white, discharge element body-tinted in a colour similar to RAL 9010, pure white

FA-VT–ZL – 2v – 800 – 9010 – W

[1)] Each option for supply air or return air

Tender text

..... units

Multiplex outlet for flush installation in the upper area of a room wall, with rectangular housing; rear air connection via connection spigot [1] fitted with damper adjustable from the room side;

types available:

– **Multiplex outlet for supply air**
  with front plate fitted with round jet bundle elements, each manually rotatable for supply air jet spread as desired by altering the discharge direction; rapid decrease in jet velocity and temperature difference between supply air and indoor air.
  Supply air discharge through jet bundle elements.
  1-row, 2-row or staggered 2-row arrangement of jet bundle elements.
  Front plate either non-perforated or perforated.
– **Multiplex outlet for return air**
  with front plate fitted with round jet bundle elements.
  Return air intake through jet bundle elements.
  1-row, 2-row or staggered 2-row arrangement of jet bundle elements.
  Front plate either non-perforated or perforated.
– **Combined multiplex outlet for supply and return air**
  with common front plate,
  either **non-perforated**, with round jet bundle elements in lower supply air and upper return air segments; supply air discharge and return air intake through jet bundle elements; or **perforated**, with round jet bundle elements in lower supply air segment; supply air discharge through jet bundle elements, return air intake through free perforations in upper return air segment.
  Jet bundle elements for supply air manually and individually rotatable for air jet spread as desired by altering the discharge direction; rapid decrease in jet velocity and temperature difference supply air to indoor air.

Material:

– 2-part jet bundle elements (nozzle discs)
  → Orifice disc made of polycarbonate PC-GF-10-V0 body-tinted in a colour similar to RAL 9010, pure white, or similar to RAL 9005, jet-black [2]
  → Nozzle support made of acrylonitrile-butadiene-styrene ABS-V0 body-tinted in a colour similar to RAL 9005, jet-black
– Housing and front plate made of galvanized sheet metal, visible part of front plate painted to RAL 9010, pure white [2]

Make: KRANTZ KOMPONENTEN
Type: FA – VT-__ __ – __ – ___ – ___ – __

Subject to technical alteration.

[1] With lip seal on request
[2] Other colours on request

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