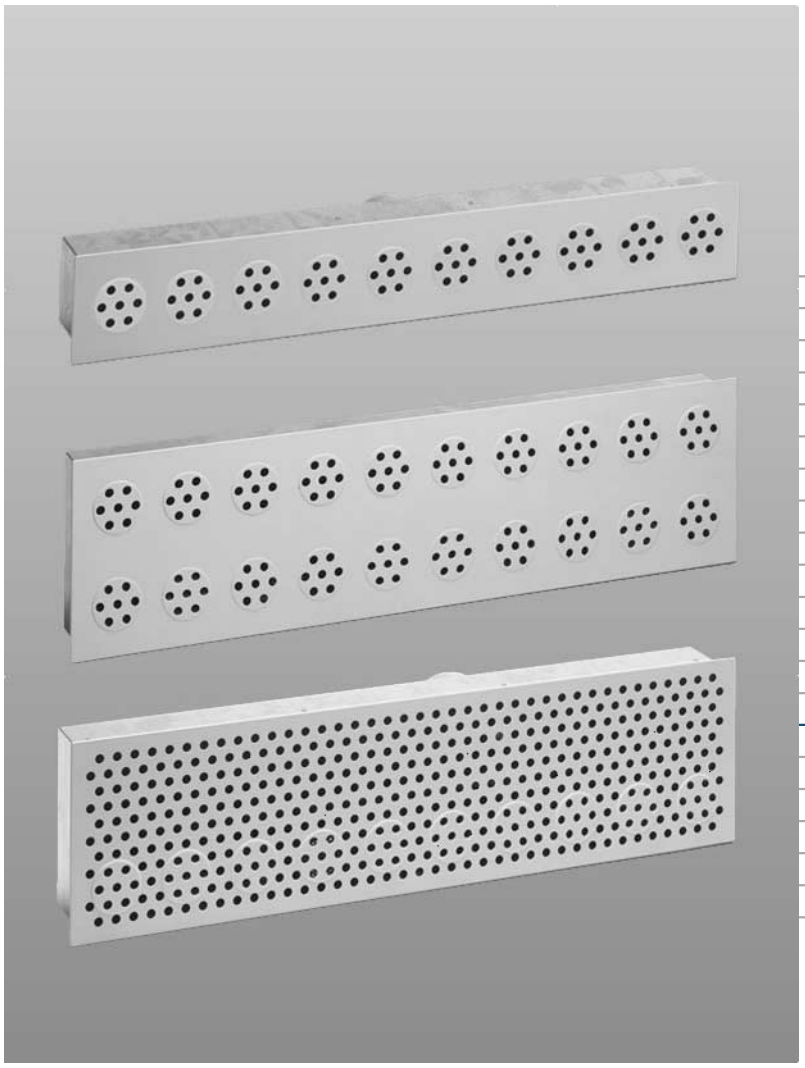
Please note,
type code is new,
see last page.

Technical Selection



Multiplex outlet FA-V....

Air-conditioning components

DS 4064 E 12.2007

KOMPONENTEN ®

Applied system solutions

Multiplex outlet

Construction design and function

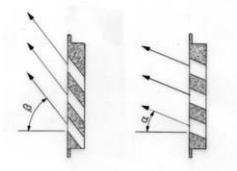
Preliminary remarks

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 feasible with the multiplex outlet from KRANTZ KOMPONENTEN. The multiplex outlet is a sidewall air outlet whose frontal 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 frontal plate **2** with several round jet bundle elements **3**. The frontal 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

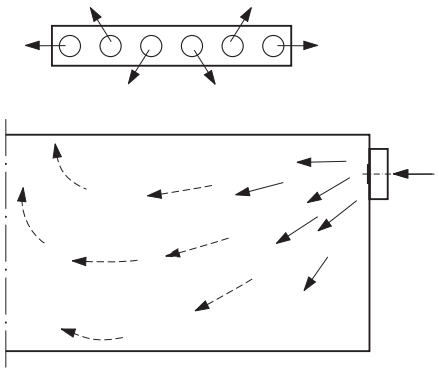
Multiplex outlet for supply air: type FA-VT or FA-VTL
The frontal plate has either no perforations (type FA-VT) or, for reasons of appearance, the same perforations as the jet bundle elements (type FA-VTL). In both cases the air is discharged through the jet bundle elements only. This generates a stable, 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 decays 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-VA or FA-VAL
The multiplex outlet can also be used for return air intake. For this purpose, the frontal plate can be supplied either with or without perforations.

Combined multiplex outlet for supply and return air: type FA-VK or FA-VKL
The housing is divided into a lower supply air segment and an upper return air segment. Here too, the frontal plate can be non-perforated (type FA-VK) or perforated (type FA-VKL). 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 frontal plate of the multiplex outlet is fastened by means of a push-in 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 will be operated from the room.

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 case, the frontal 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

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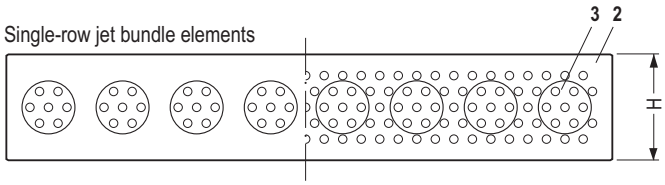
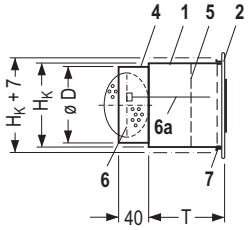
Multiplex outlet for supply air or return air

Dimensions

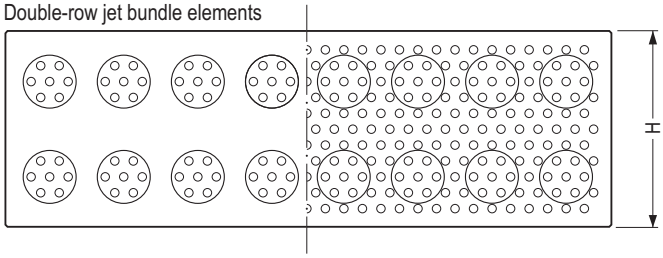
Non-perforated **frontal plate** Perforated **frontal plate**
Supply air: Type FA-VT Type FA-VTL
Return air: Type FA-VA Type FA-VAL

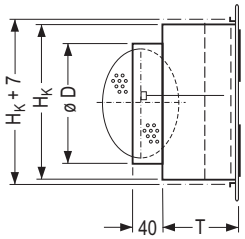
Single-row jet bundle elements



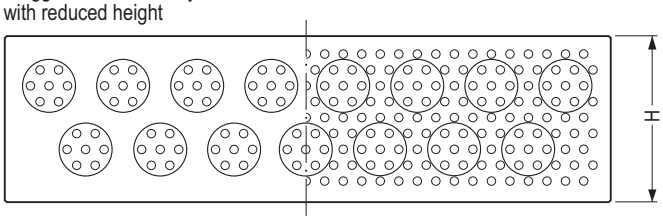


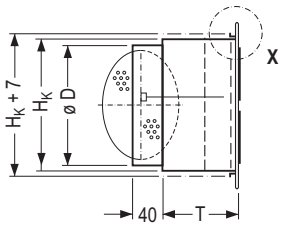
Double-row jet bundle elements

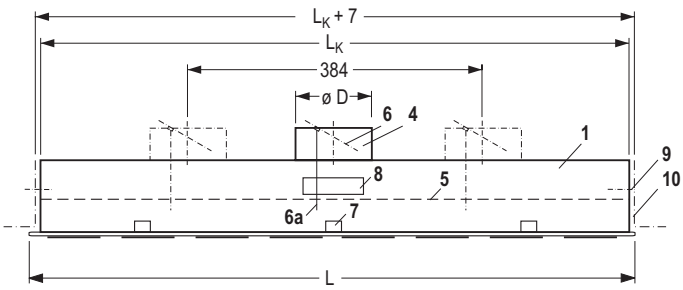


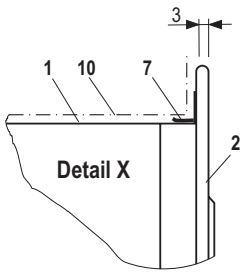


Staggered double-row jet bundle elements
with reduced height









Key for all pages

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

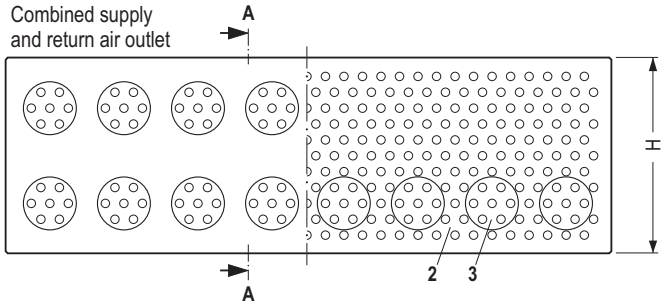
Type	Nominal length L_N	Actual length L mm	Length of housing L_K mm	Number of jet bundle elements n Units	Depth T [1] mm	Types FA-VT / VTL (supply air) and FA-VA / VAL (return air) Diameter D mm	Dimensions and weight H mm	H_K mm	G approx. kg
Single-row	600	606	580	6	100	99	140	110	3.2
	800	798	772	8		99 [2]			4.1
	1 000	990	964	10		99 [3]			4.8
Double-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 double-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

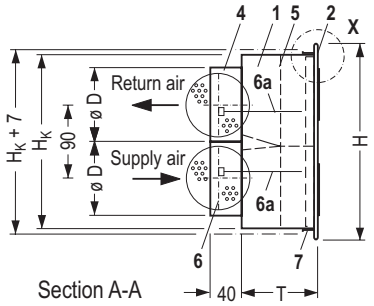
1) For connection box with acoustic lining: T+20 mm
2) Supply air outlet with 2 spigots ø 79 if required
3) Supply air outlet with 2 spigots ø 99 if required

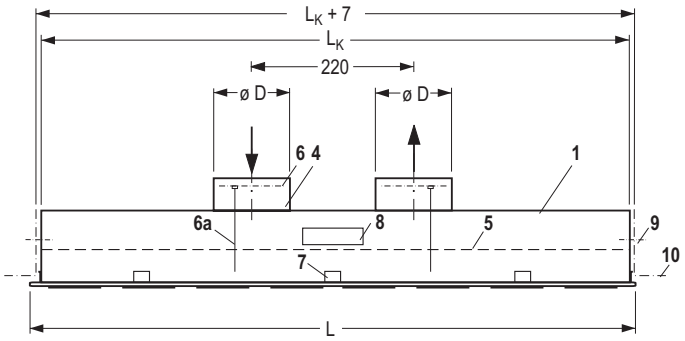
Combined multiplex outlet for supply and return air

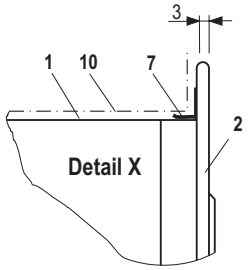
Dimensions

Non-perforated **frontal plate** Perforated **frontal plate**
Type FA-VK Type FA-VKL



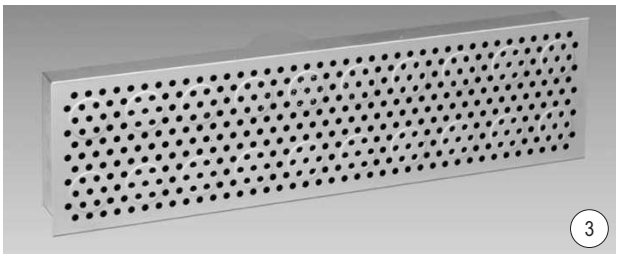


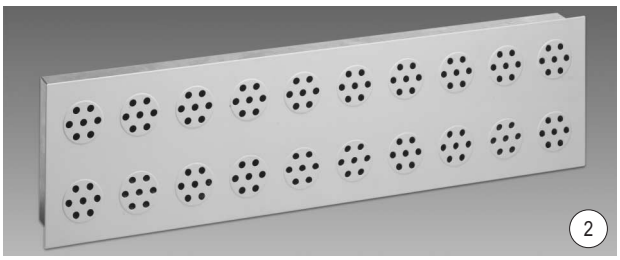


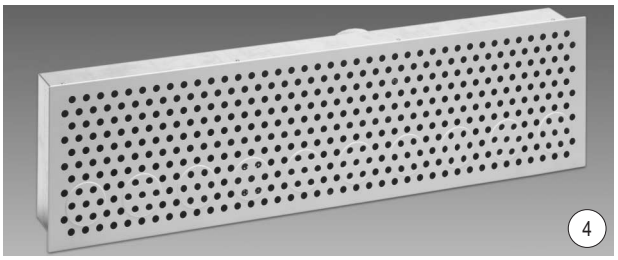


Type	Nominal length L_N	Actual length L mm	Length of housing L_K mm	Number of jet bundle elements VK / VKL n Units		Depth T 1) mm	Types FA-VK and FA-VKL Diameter D mm	Dimensions and weights H mm	H_K mm	G approx. kg
Single-row	600	606	580	12	6	100	99	260	230	4.8
	800	798	772	16	8		124			5.5
	1 000	990	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 frontal plates; jet bundle elements arranged in single row ① or double row ②.

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

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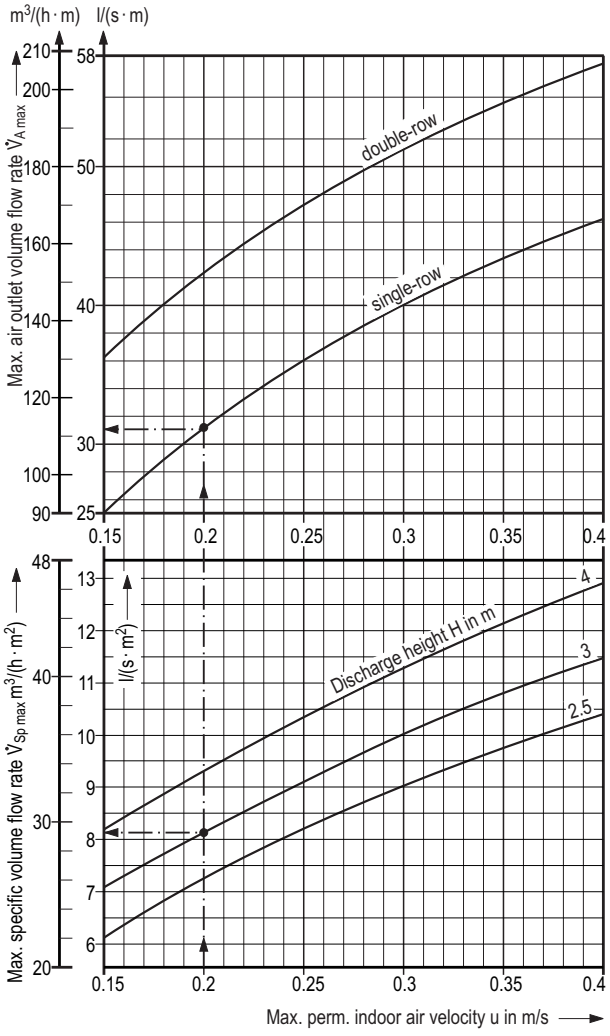
Layout specifications

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 spreading. The maximum temperature differences between supply air and indoor air can amount to –12 K when cooling and +15 K when heating.

Comfort criteria

The layout of the multiplex outlet is based on compliance with the required maximum permissible indoor air velocities. The maximum specific air volume flow rate $\dot{V}_{Sp\,max}$, the maximum air volume flow rate per air outlet $\dot{V}_{A\,max}$ and the minimum air outlet spacing t_{min} are dependent on the discharge height and the maximum permissible indoor air velocity and can be determined using the graph below and the following equations.

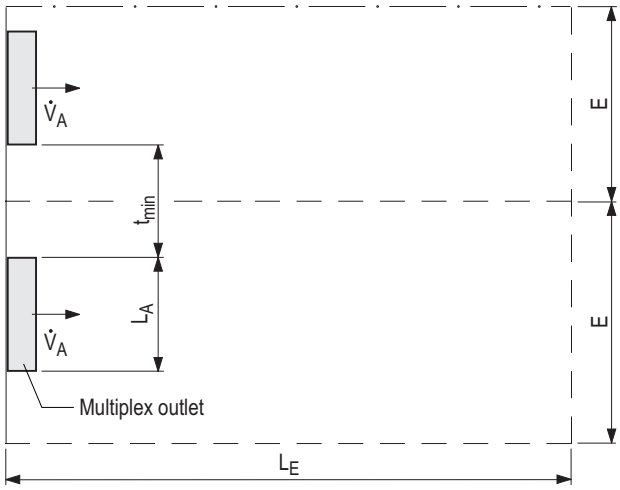
The layout criterion is based on $\Delta\vartheta_{max}$ = –10 to –12 K
If the maximum temperature difference is lower,
$\dot{V}_{Sp\,max}$ can be increased by the following percentage:
$\Delta\vartheta_{max}$ = –8 K ⇒ $\dot{V}_{Sp\,max}$ 15% higher
$\Delta\vartheta_{max}$ = –6 K ⇒ $\dot{V}_{Sp\,max}$ 35% higher
$\Delta\vartheta_{max}$ = –4 K ⇒ $\dot{V}_{Sp\,max}$ 70% higher



Coverage width and minimum spacing

The coverage width E and the minimum air outlet spacing t_{min} can be determined on the basis of the maximum specific volume flow rate $\dot{V}_{Sp\,max}$ and the coverage length L_E:

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



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

Layout example for supply air outlets installed in an office

1	Room width B_R	=	8 m
2	Room depth B_T	=	5 m
3	Total supply air volume flow rate $\dot{V}_G$	=	185.5 l/s
4	Discharge height H	=	3 m
5	Indoor air temperature ϑ_R	=	26°C (at max. cooling load)
6	Max. permissible indoor air velocity u	=	0.2 m/s
7	Permissible sound power level L_{WA}	=	35 dB(A) ref. 10^{-12} W
8	Actual specific volume flow rate $\dot{V}_{Spez}$	=	4.6 l/(s · m) **[3 :(1 · 2)]**
9	**Double-row** multiplex outlet, type FA-VT or FA-VTL, L_N = 1.0 m		

From graph

10	$\dot{V}_{Sp\,max}$	=	8.1 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	$\dot{V}_{A\,gew}$	≈	30.5 l/s **[3 : 13]**
15	t	=	$\frac{B_R - (6 \cdot 1.0)}{6}$ = 0.33 m
16	L_{WA}	≈	33 dB(A) ref. 10^{-12} W [Graph Page 6]
17	Δp_t	=	36 Pa [Graph Page 6]

Checking specific volume flow rates

18	$\dot{V}_{Spez}$ < $\dot{V}_{Sp\,max}$	= 4.6 < 8.1 l/(s · m²)	**[8 < 10]**
19	$\dot{V}_{A\,gew}$ < $\dot{V}_{A\,max}$	= 30.5 < 33.1 l/(s · m)	**[14 < 11]**

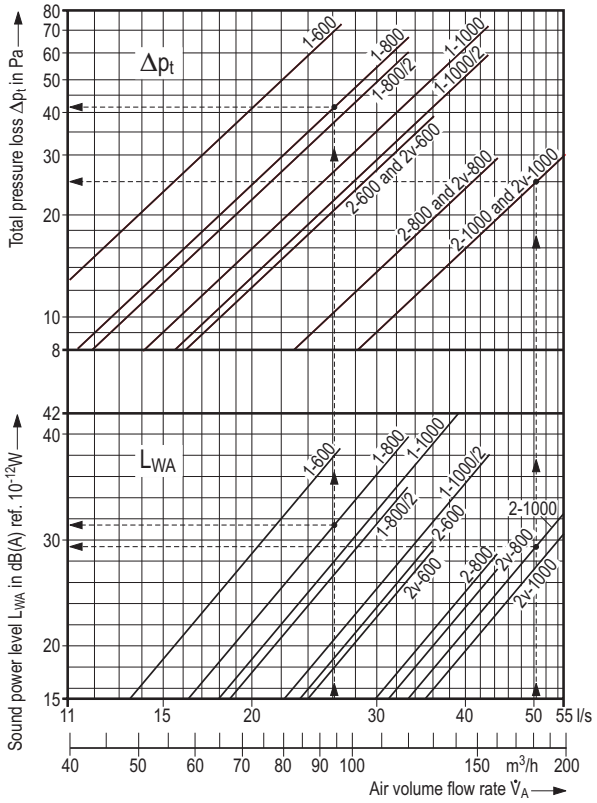
Key to pages 5 and 6

$\dot{V}_A$	=	Supply air volume flow rate per air outlet
$\dot{V}_{A\,max}$	=	Max. volume flow rate per m of air outlet depending on discharge height H and permissible indoor air velocity u
$\dot{V}_{A\,gew}$	=	Selected volume flow rate, taking account of permissible sound pressure level
$\dot{V}_{Spez}$	=	Actual specific volume flow rate per m² of floor area
$\dot{V}_{Sp\,max}$	=	Max. specific volume flow rate per m² of floor area
u	=	Max. permissible indoor air velocity, in m/s
E	=	Coverage width
L_E	=	Coverage length
t_{min}	=	Minimum air outlet spacing
L_A	=	Air outlet length

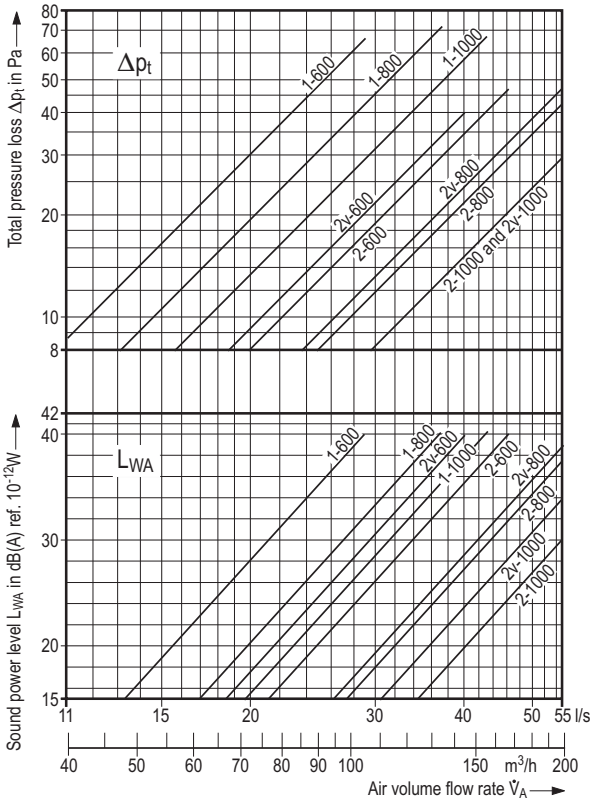
Multiplex outlet

Layout and features

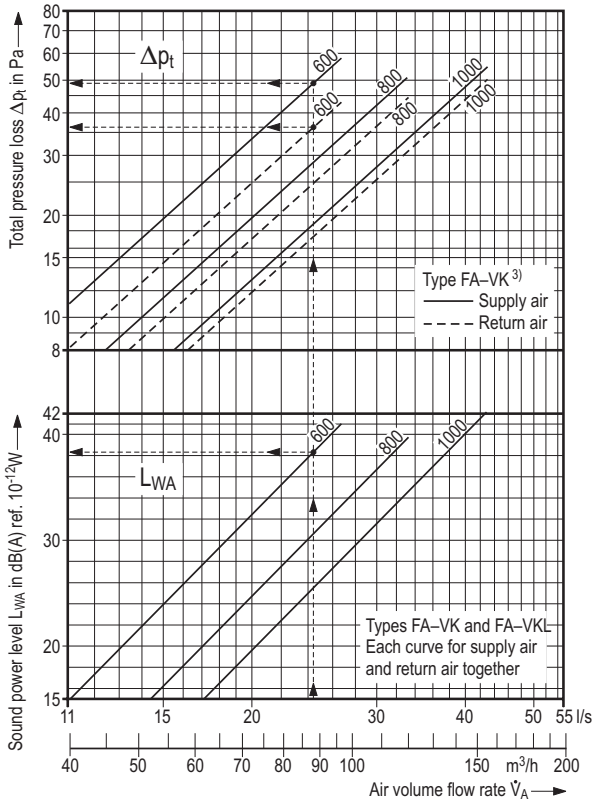
Supply air, FA-VT and FA-VTL[1)]



Return air, FA-VA and FA-VAL[1)]



Supply and return air combined, FA-VK and FA-VKL[1 + 2)]



Types

1	Single-row	Nominal length
2	Douple-row	600
2v	Staggered double-row	800
/2	with two connection spigots	1000

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

Features

- Sidewall air outlet for turbulent mixing air flow
- Spreading of supply air flow as desired by altering the discharge direction at built-in rotatable jet bundle elements
- Rapid reduction of 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 air 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
- Single-row and double-row design available
- Volume flow rate up to 43 l/(s · m) [155 m^3/(h · m)] for single-row design and up to 51.5 l/(s · m) [185 m^3/(h · m)] for double-row design
- Nominal lengths: 600, 800, 1 000
- Visible part of frontal plate painted to RAL 9010, pure white, jet bundle elements body-tinted (similar to RAL 9010, pure white); other colours on request
- Painted frontal 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

1) Values for outlet housing with acoustic lining on request
2) The layout of the combined multiplex outlets is in line with the example of page 5. The return air flow rate equals the supply air flow rate.
3) For type FA-VKL the pressure loss values are lower by approx. 15% for supply air and by approx. 35% for return air.

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Multiplex outlet

Sound power level and pressure loss [1]

Supply air outlets FA-VT and FA-VTL [1]

Type	Nominal length	Volume flow rate		Total pressure loss	Sound power level L_W in dB ref. 10^{-12} W						
	L_N	$\dot{V}_A$	$\dot{V}_A$	Δp_t	L_{WA}	Octave band centre frequency in Hz					
		l/s	m³/h	Pa	dB(A)	125	250	500	1 K	2 K	4 K
Single-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
	1000	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
	1000/2 [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
Double-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		
	1000	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 double-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		
	1000	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-VA and FA-VAL [1]

Type	Nominal length	Volume flow rate		Total pressure loss	Sound power level L_W in dB ref. 10^{-12} W						
	L_N	$\dot{V}_A$	$\dot{V}_A$	Δp_t	L_{WA}	Octave band centre frequency in Hz					
		l/s	m³/h	Pa	dB(A)	125	250	500	1 K	2 K	4 K
Single-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
	1000	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
Double-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	
	1000	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 double-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	
	1000	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-VK and FA-VKL [1]

Type	Nominal length	Volume flow rate [2]		Total pressure loss [3]		Sound power level L_W in dB ref. 10^{-12} W [4]						
	L_N	$\dot{V}_A$	$\dot{V}_A$	Δp_t Supply air	Δp_t Return air	L_{WA}	Octave band centre frequency in Hz					
		l/s	m³/h	Pa	Pa	dB(A)	125	250	500	1 K	2 K	4 K
Single-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
	1000	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	1000	2000	4000
FA-VT / -VTL						
– Single-row	1	1	3	4	4	7
– Double-row	1	1	2	5	8	8
FA-VA / -VAL						
– Single-row	1	1	3	6	4	7
– Double-row	1	1	4	5	8	8
FA-VK						
– Supply air side	0	1	3	5	7	11
– Return air side	0	1	3	3	7	8
FA-VKL						
– 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 on request
2) For supply air and return air respectively
3) Applies for type FA–VK. For type FA-VKL the pressure loss values are lower by approx. 15% for supply air and by approx. 35% for return air
4) Applies for FA–VK and FA–VKL, for supply air and return air together
5) With 2 connection spigots

Multiplex outlet

Type code and tender text

Type code

FA – V____ – ____ - ____

Multiplex outlet
Adjustable
Kind / Function
Arrangement of jet bundle elements
Nominal length

Please note, type code is new, see last page.

Kind / Function

T = For supply air, turbulent mixing air flow
A = For return air
L = Perforated frontal plate
K = Combined supply and return air outlet, non-perforated frontal plate
KL = Combined supply and return air outlet, perforated frontal plate

Arrangement of bundle elements

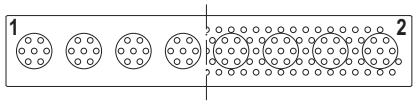
1 = single-row
2 = double-row
2v = staggered double-row

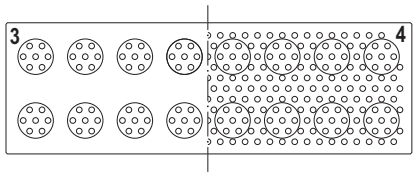
Nominal length

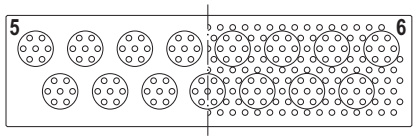
600, 800, 1000

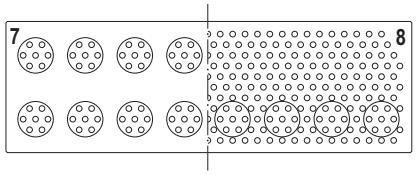
Possible types as examples for nominal length 800

Figure	For supply air	For return air
1	FA-VT-1-800	FA-VA-1-800
2	FA-VTL-1-800	FA-VAL-1-800
3	FA-VT-2-800	FA-VA-2-800
4	FA-VTL-2-800	FA-VAL-2-800
5	FA-VT-2v-800	FA-VA-2v-800
6	FA-VTL-2v-800	FA-VAL-2v-800
	Combined supply and return air outlet	
7	FA-VK-1-800	
8	FA-VKL-1-800	









1) With lip seal on request
2) Other colours on request

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 V̇ damper adjustable from the room; types available:

☐ **Multiplex outlet for supply air**
with frontal plate fitted with round jet bundle elements, each manually rotatable for supply air jet spread as desired by altering the discharge direction; rapid reduction of jet velocity and temperature difference between supply air and indoor air.
Frontal plate ☐ non-perforated ☐ perforated.
Arrangement of jet bundle elements
☐ single-row ☐ double-row ☐ staggered double-row.
Supply air discharge through jet bundle elements.

☐ **Multiplex outlet for return air**
with frontal plate fitted with round jet bundle elements,
frontal plate ☐ non-perforated ☐ perforated.
Arrangement of jet bundle elements
☐ single-row ☐ double-row ☐ staggered double-row.
Return air intake through jet bundle elements.

☐ **Combined multiplex outlet for supply and return air** with common frontal plate,
☐ 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.

☐ 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 reduction of jet velocity and temperature difference supply air–indoor air.

Material:
– jet bundle elements: acrylonitrile-butadiene-styrene ABS body-tinted similar to RAL 9010, pure white,
– housing and frontal plate: galvanized sheet metal visible part of frontal plate painted to RAL 9010, pure white[2]

Dimensions of frontal plate:
– Nominal length L_N: .....
– Height H: ..... mm

Technical data
Volume flow rate: ..... l/s (m^3/h)
Permissible sound power level: .....dB(A) ref. 10^{-12}W
Pressure loss: ..... Pa
Make: KRANTZ KOMPONENTEN
Type: FA – V___ – ___ - _____

DS 4064 E Bl. 8 09.2006 – Subject to technical alteration –

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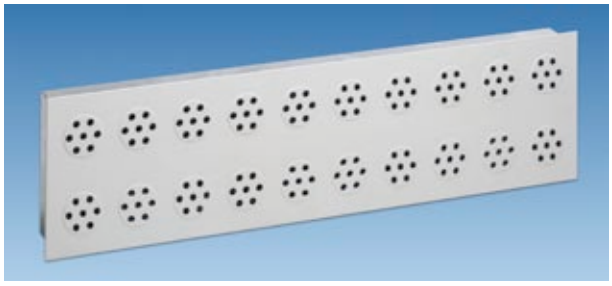
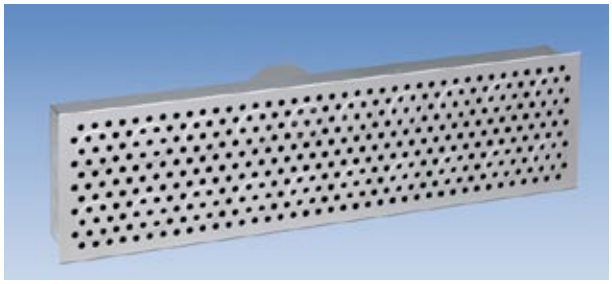
Multiplex outlet

Multiplex outlet, single row



Multiplex outlet, double row



Multiplex outlet, double row with perforated frontal plate

Combined multiplex outlet with perforated frontal plate (single row)

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

O = 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 1000

Surface finish

9010 = Face painted to RAL9010, semi-matt

Colour of discharge element

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

Subject to technical alteration.

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

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