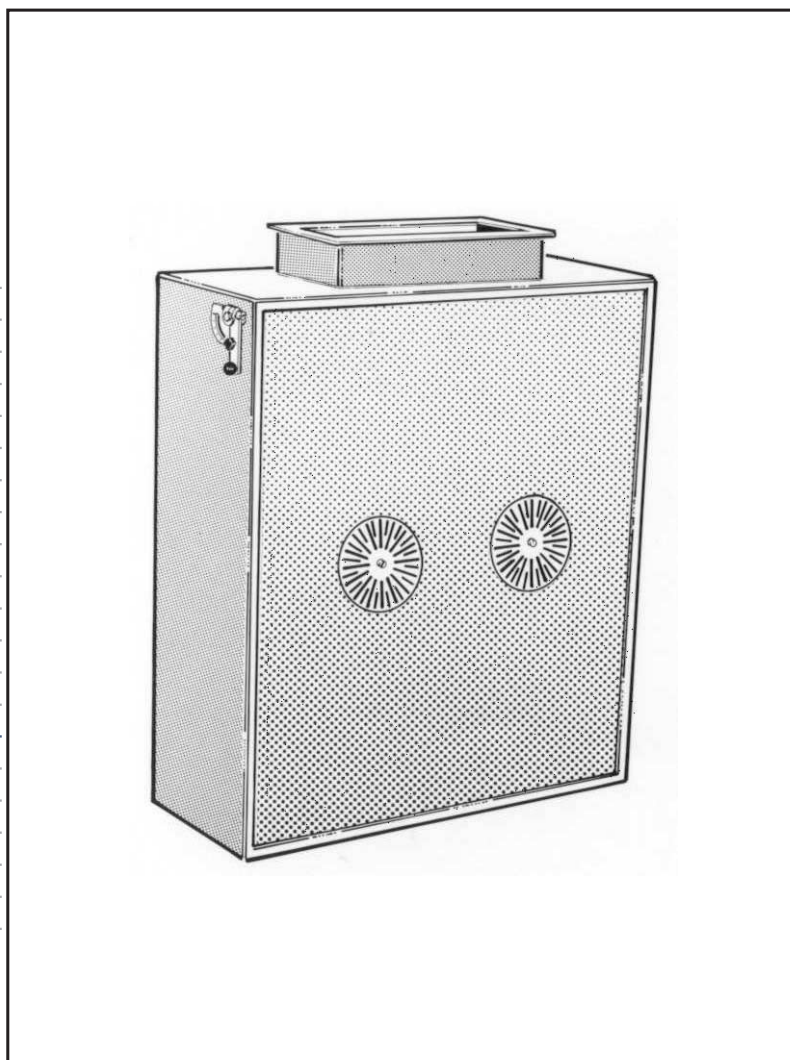


Please note,
type code is new,
see last page.

Technical Selection



**Rectangular
displacement outlet VA-RN....
with adjustment device VA-RV....**

Preliminary remarks

Displacement air outlets are used for the effective removal of pollutants, without substantial admixture of indoor air. With light pollutants or high specific heat loads in the room, the best air outlet placement is on or near the floor. Most suitable for space reasons are flat rectangular displacement outlets with even discharge surface for wall or floor installation.

When cooling, the colder supply air is discharged horizontally and flows due to gravity in a layer close to the floor deep into the room.

When heating, the warm supply air is supposed to be discharged towards the floor to avoid an early upflow due to buoyancy. This can be done with the adjustable rectangular displacement outlet.

To meet all needs, KRANTZ KOMponenten provides the rectangular displacement outlet without adjustment device, type VA-RN, or with adjustment device, type VA-RV.

Construction design

The **non-adjustable** rectangular displacement outlet mainly consists of the housing 1 with flat discharge surface 2, air inlet spigot 3 and the built-in air guide 5. The air inlet spigot is fitted above, in the centre or off-centre. It has a connection flange 4 to fit standard corner flanges.

The **adjustable** outlet is fitted with an additional air damper 8 and control lever 9; damper control with electric servomotor on request.

The discharge surface 6 is made of finely perforated sheet metal and contains 2 to 5 twist outlets 7 type DB - DN 200, depending on air outlet size.

The air outlet housing with the inplants, the air inlet spigots and the finely perforated frontal plate are made of galvanized sheet steel. The twist outlets are made of polycarbonate with 10% fibreglass content.

Mode of operation

The perforated metal sheet generates low-turbulence air jets with a pronounced displacement pattern. The twist outlets in contrast produce high-momentum supply air jets with high induction. The interaction of both jet components creates a stable total jet bundle with higher coverage. Figure 2 shows the indoor air flow pattern for a typical arrangement of the air outlets at a wall.

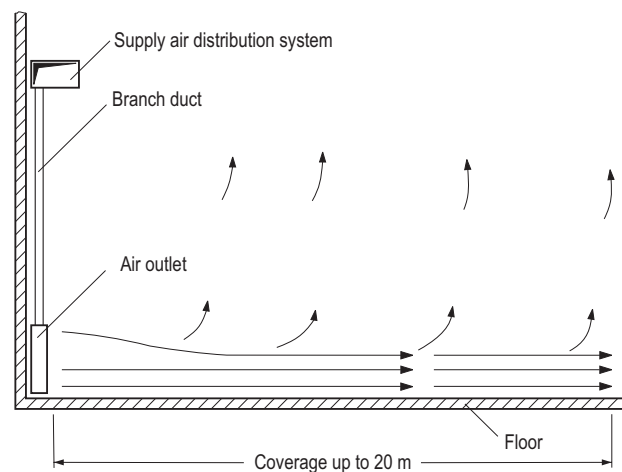


Figure 2: Air flow pattern

- | | | |
|--|--|---------------------------------|
| Key | | 5 Air guide |
| 1 Housing | | 6 Perforated metal sheet |
| 2 Discharge surface | | 7 Twist outlet |
| 3 Air inlet spigot, in the centre or off-centre | | 8 Air damper |
| 4 Connection flange | | 9 Damper control lever |

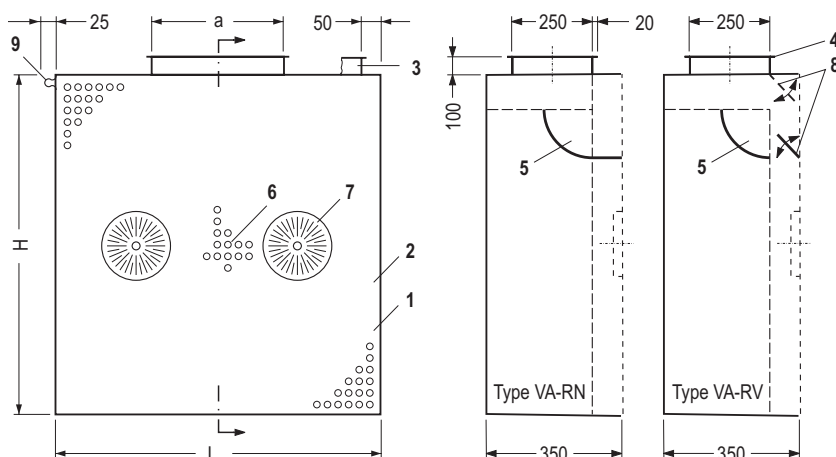


Figure 1: Rectangular displacement outlet, standard sizes with measurements and weights

Dimensions ¹⁾ in mm and weight G in kg							
Standard length L	Size	1		2			
		Standard height H		Standard height H			
		765		1150			
1000	Possible spigot with a) ²⁾ and weight G	a	160	315	160	315	500
		G	37	38	43	44	45
1500		a	250	500	250	500	710
		G	59	60	65	66	67
2000		a	315	530	315	530	1000
		G	80	88	86	87	89
2500		a	400	800	400	800	1250
		G	102	104	108	110	112

- 1) Other dimensions on request
 2) Spigot width 'a' selected so that air velocity related to a x b is ≤ 7 m/s

When cooling: Rectangular displacement outlet with and without adjustment device

Indoor air flow when cooling, produced by non-adjustable as well as adjustable air outlets with closed air dampers is the same. Initially, the supply air discharged horizontally slides more or less along the floor and penetrates up to 20 m into the room, depending on volume flow rate. Due to the buoyancy in the room (machinery, lighting, heat from occupants, etc.) the air ascends gradually, flushes the occupied zone and is collected with the displaced pollutants in the ceiling zone.

The supply air jet contact to the floor depends on the temperature difference between supply air and indoor air. The lower the supply air temperature, the closer the supply air contact with the floor.

When heating: Rectangular displacement outlet with adjustment device

If in low-turbulence displacement flow the supply air temperature exceeds room temperature (heating mode), the air dampers **8** are opened. The air discharge direction inclines to the floor and the warm supply air covers a much larger area. The entire surrounding room zone is adequately flushed. Pollutants and heat gains are transported with the ascending indoor air to the collection points.



Figure 5: Rectangular displacement outlet with adjustment device

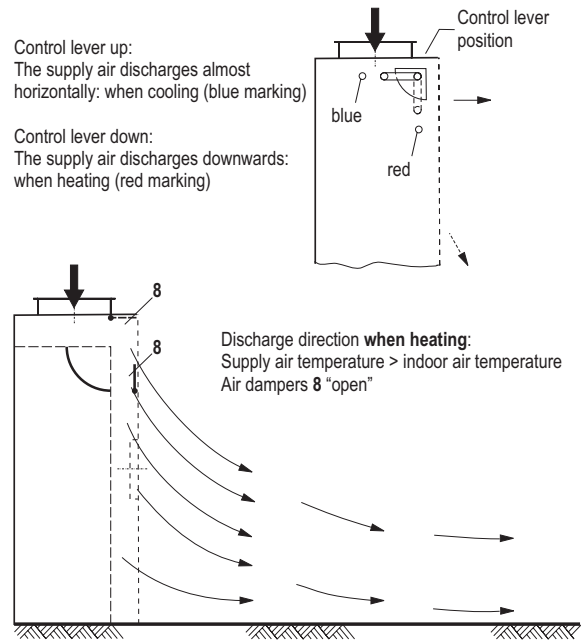
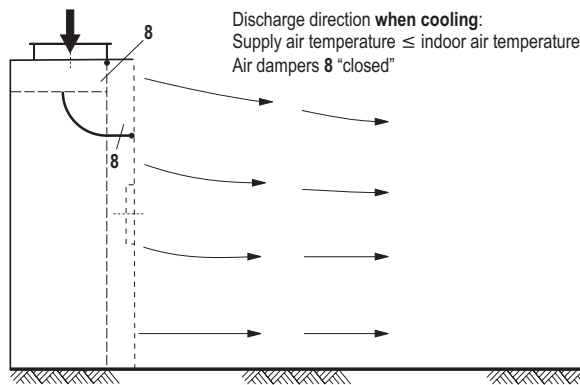
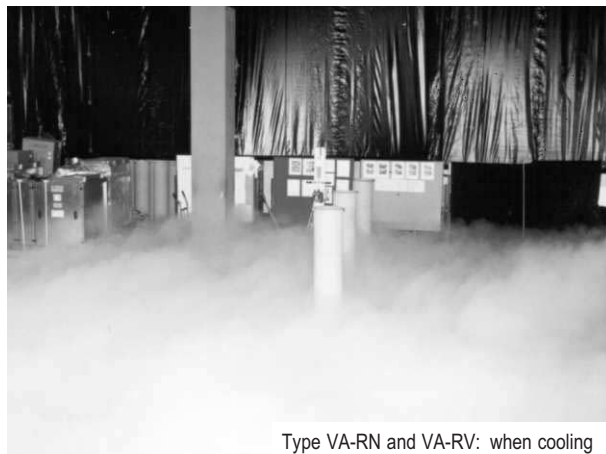


Figure 3: Influence of the adjustment device on discharge flow with corresponding control lever position



Type VA-RN and VA-RV: when cooling



Type VA-RV: when heating

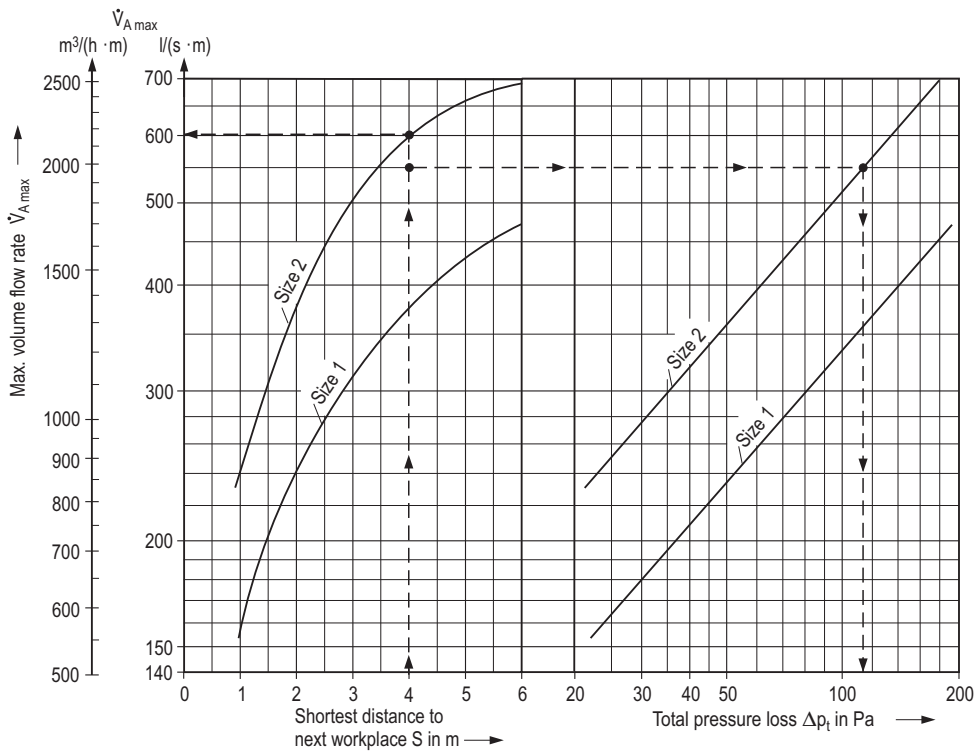
Figure 4: Dispersion of supply air made visible with smoke tracer

Layout

Typical applications for the rectangular displacement outlet are printing halls, ironing shops, laundries, foundries, etc.

The right air volume flow rate per outlet for each application depends on the distance to the next permanent

workplace. This ratio is shown in the chart in Figure 6. Pressure loss for the respective air outlet volume flow rate can also be read off the chart.



Layout example:

- 1 Volume flow rate $\dot{V} = 13\,350$ l/s
- 2 Shortest distance to next workplace $S = 4$ m
- 3 Size 2
- 4 Standard length $L = 2$ m

From chart:

- 5 $\dot{V}_{A,max} = 605$ $\text{l}/(\text{s} \cdot \text{m})$
- 6 $\dot{V}_{A,selected} = 550$ $\text{l}/(\text{s} \cdot \text{m})$
- 7 $Z_1 = 24$ lfdm (1 : 6)
- 8 $Z_2 = 12$ units (7 : 4)
- 9 $\Delta p_t \approx 110$ Pa

Figure 6: Chart for layout

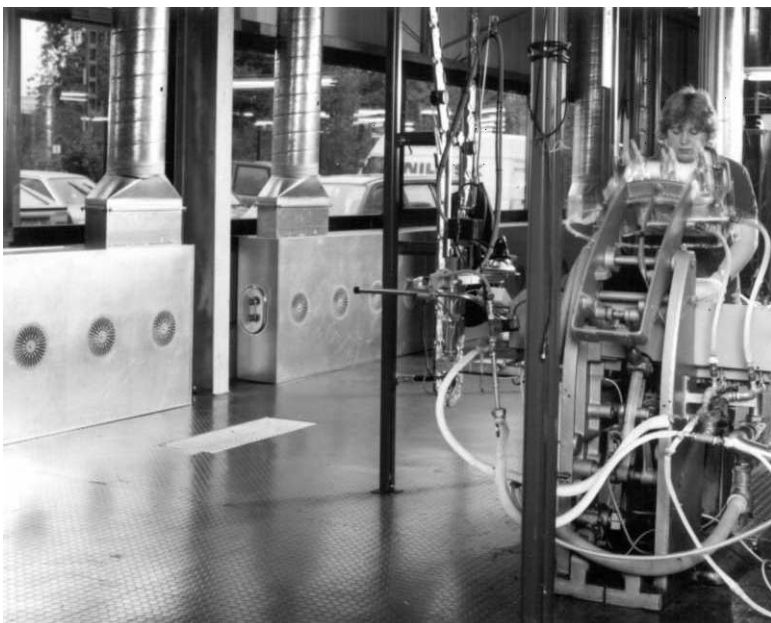


Figure 7: Air outlet in an ironing shop



Figure 8: Air outlet in a printing hall

Features

- Low-turbulence displacement flow
- Installation on or directly above the floor
- Adjustable air outlet option to alter discharge direction for sufficient coverage with warm supply air (heating mode)
- Manual adjustment; with electric servomotor on request
- Coverage zone up to 20 m
- Max. temperature difference supply air-indoor air:
 - adjustable and non-adjustable type, when cooling $\Delta\vartheta = -8\text{ K}$
 - adjustable type, when heating $\Delta\vartheta = +6\text{ K}$
- Volume flow rate up to 695 l/(s · m); (2500 m³/(h · m))
- Available in two sizes with standard lengths 1, 1.5, 2 and 2.5 m
- Small depth of 350 mm
- Duct connection by flange joint from above
- Air outlets can be arranged closely adjacent in a row
- Made of galvanized sheet steel, built-in twist outlets made of polycarbonate
- Robust construction with few adjustable parts
- Special constructions also with other lengths available on request

Type code

VA - R___ - ___ / ___ - ___

Displacement outlet
Rectangular
Function / Kind
Size
Standard length
Adjustment

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

Function / Kind

V = adjustable
N = non-adjustable

Size

1 = Height 765 mm
2 = Height 1150 mm
Standard length: 1 000, 1 500, 2 000, 2 500 mm

Adjustment

M = manual
E = with electric servomotor ¹⁾

Example: Rectangular displacement outlet with adjustment device, size 2, standard length = 1.5 m, manual adjustment

Type: VA - RV - 2 / 1 500 - M

Tender text

..... Units
Rectangular displacement outlet for installation on or above floor,
with low induction effect and minimum admixture of supply air and indoor air, for optimum displacement of pollutants from the occupied zone,
 adjustable for large coverage zone with warm supply air (heating mode), manual adjustment ¹⁾,

consisting of:

Rectangular housing with low depth and built-in air guide, Discharge surface made of finely perforated sheet metal with built-in twist outlets,
 Adjustment device with air dampers and adjustment mechanism, control level at side in air flow direction to the right, left,

Connection spigot for flange joint.

Technical data

Volume flow rate: l/s (m³/h)
Size:
Length: mm
Pressure loss: Pa

- Adjustment
- manual
- with electric servomotor ¹⁾

Material

- Housing, inplants and perforated frontal plate: Galvanized steel
- Twist outlets: Polycarbonate coloured similar to RAL 7037, dust grey,
 visible air outlet parts on request (except twist outlets) painted to RAL

Measurements:

Air outlet – Length: mm
– Height: mm
– Depth: 350 mm

Connection spigot – Width: mm
– Depth: 250 mm

Make: KRANTZ KOMPONENTEN

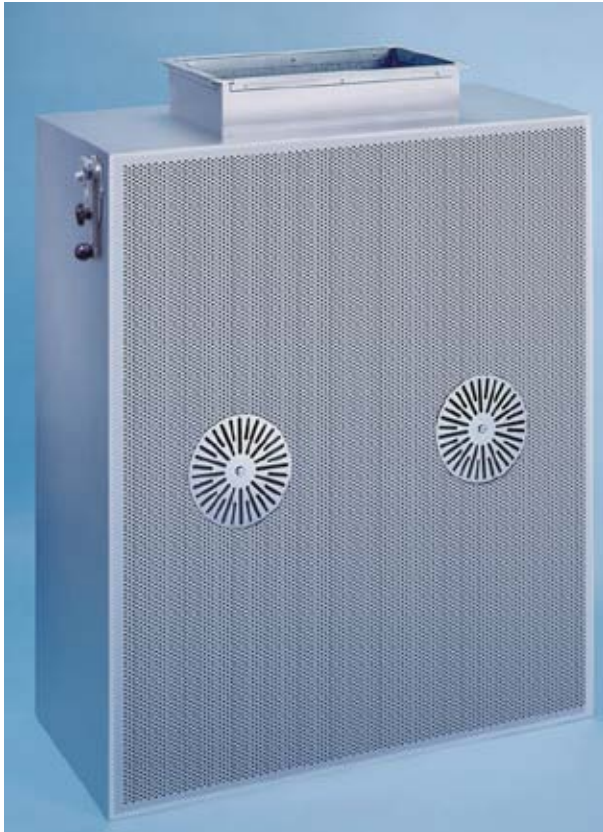
Type: VA - R___ - ___ / ___ - ___

Subject to technical alterations!

Cross for rectangular displacement outlets with adjustment device
1) with electric servomotor on request

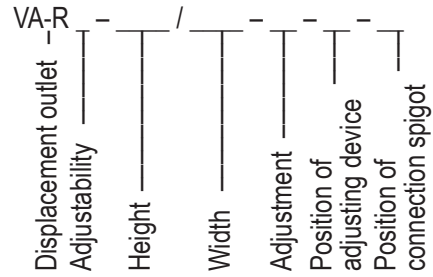


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Rectangular displacement outlet

Type code



Adjustability

- N = non-adjustable
- V = adjustable

Height

- 765 = Height 765 mm
- 1150 = Height 1150 mm

Width

- 1000 = Width 1000 mm
- 1500 = Width 1500 mm
- 2000 = Width 2000 mm
- 2500 = Width 2500 mm

Adjustment

- MA = manual
- E13 = „Siemens servomotor, 0 – 10 V modulation“, rotation drive type GLB161.1E

Position of adjusting device

- R = to the right (related to air flow) - standard
- L = to the left (related to air flow)

Position of connection spigot

- M = Connection spigot in top centre
- L = Connection spigot to the left (related to air flow)
- R = Connection spigot to the right (related to air flow)

Subject to technical alteration.