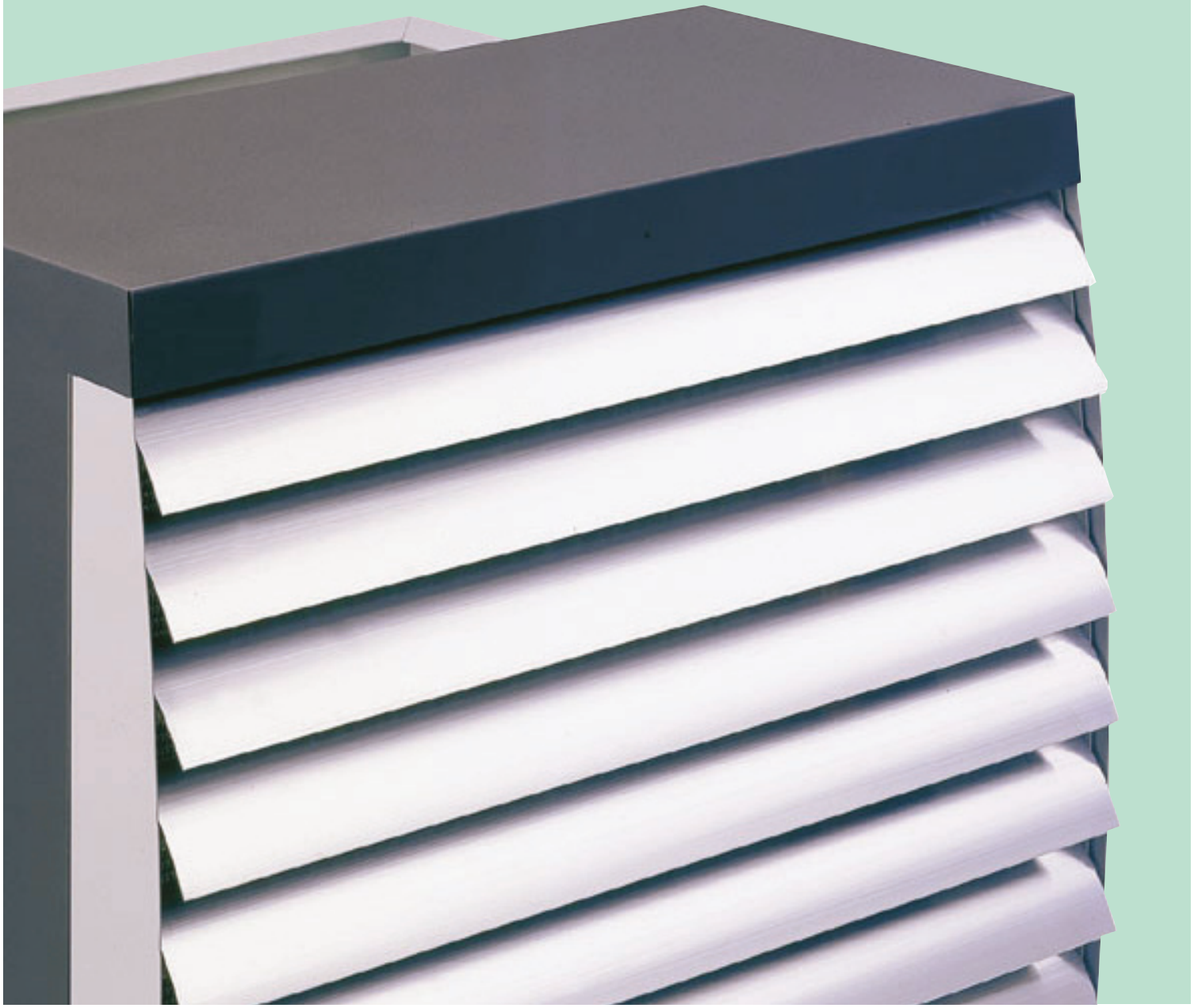
# VMA-VMB
# NOVA™ AIR HEATERS



Member of SCHAKO Group
NOVENCO
Building & Industry

# PRODUCT FACTS

## PRODUCT

The Novenco NoVa™ air heaters are water-based units with hot-water heating coils and axial flow fans fitted in cabinets.

- VMA for 10 - 20 °C cooling (typically boiler water or heat pumps)
- VMB for 30 - 40 °C cooling (typically district heating water)

## APPLICATION

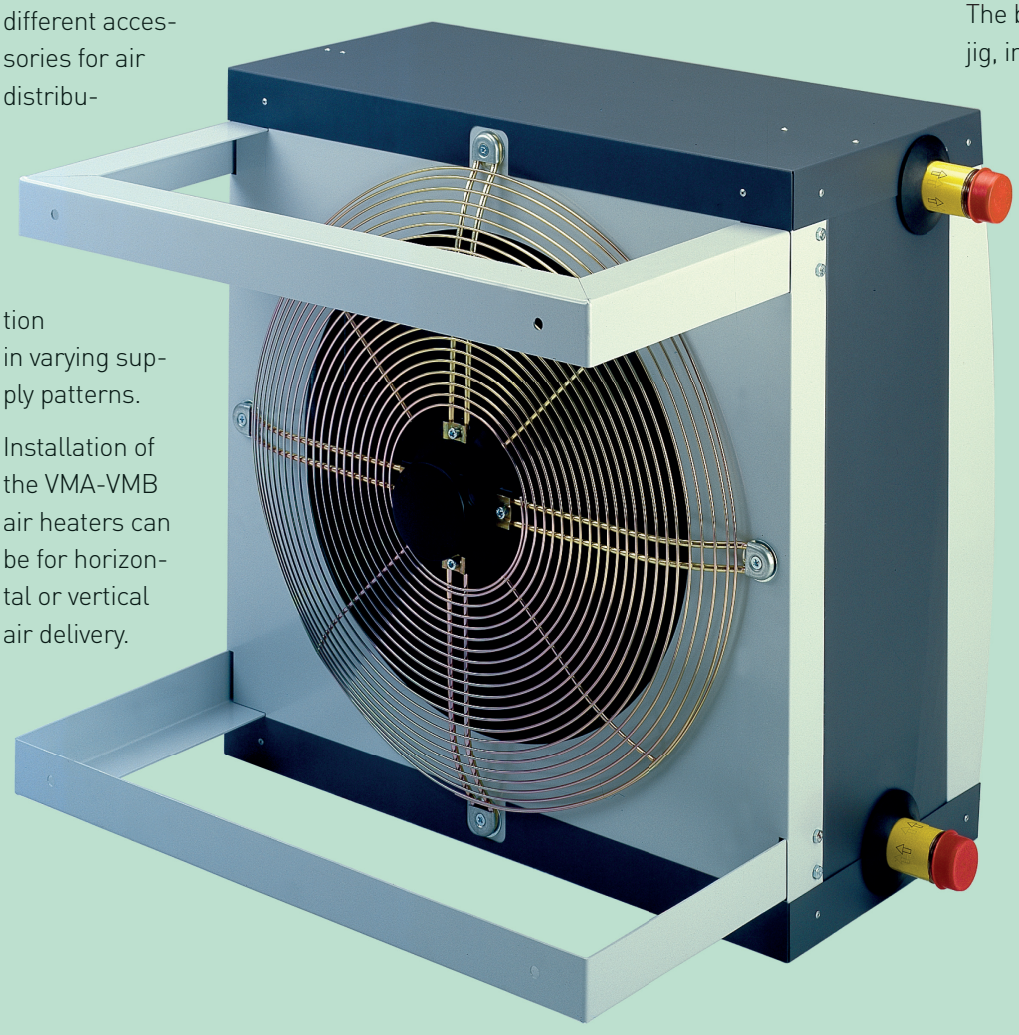
The VMA-VMB air heaters for room heating are designed for use in industrial and workshop buildings, halls, warehouses etc.

An extensive range of accessories is available for all versions.

The inlet side can be fitted with a combination of accessories for mixing of fresh air and return air, and filters.

The outlet can be fitted with different accessories for air distribution in varying supply patterns.

Installation of the VMA-VMB air heaters can be for horizontal or vertical air delivery.



## RANGE

Five installation sizes with air flow rates from 0.2 to 2.1 $m^3/s$ and heat outputs from 3 to 105 kW.

## MATERIALS - STANDARD PRODUCT

**Fan and motor:** Plate blades of aluminium, steel or plastic
**Heating coil:** Copper pipes with aluminium fins
**Cabinet:** Sendzimir galvanised sheet steel powder coated dark grey externally and with internal priming

## MATERIALS - ACCESSORIES

**Mixing and air distribution:** Sendzimir galvanised sheet steel with external powder coating
**Fresh air hood:** Stainless sheet steel
**Filter:** Galvanised sheet

## CLASSIFICATIONS

**Corrosion standards:** Operation in unheated low corrosive environments according to DS/EN ISO 12944-2
**Corrosion category:** C3

## DATA

The heating coils are designed for 10 bar working pressure and 20 bar test pressure.

Max. working temperature is 110 °C

Air flow rates are specified as volume flows ($q_v$) in $m^3/s$ with an air density ($\rho$) of 1.20 $kg/m^3$.

Heat outputs are specified in kW.

Pipes are 5/4" with thread connection

## DELIVERY FORM

All ordered parts are delivered in separate boxes.

The basic unit includes fittings, a drill jig, installation and maintenance instructions and installation screws for air distribution accessories.

The mixing housing includes mounting angles for joint mounting of the housing and the basic unit.

## ACCESSORIES FOR CONTROL

- Multi stage switches
- Stepless regulators
- Thermostats
- Dynamic valves

EU ErP 2015 Energy-related Products

# HEATING REQUIREMENTS IN BUILDINGS

Buildings are heated in different ways depending on requirements and layout. Novenco's range of air heaters addresses this need and is designed for large rooms such as halls, workshops and sports centres.

## BASIS OF CALCULATIONS

Calculating the heating requirement of buildings includes the transmission and ventilation losses.

The transmission loss (ΦT) depends on the difference between indoor and outdoor temperatures, the type of building components, the degree of insulation and a number of other factors.

The transmission calculation includes the heat gained from machines, lighting and persons.

The ventilation loss (ΦV) is directly dependent on the difference between outdoor and indoor temperatures and the mechanically supplied quantity of outdoor air.

$\Phi V = q \times \rho \times c \times (t_r - t_u)$ [W]

$t_r$ = Room temperature [°C]
$t_u$ = Outdoor temperature [°C]
q = Air flow rate [$m^3/s$] (volume flow, $q_v$)
r = Air density [1.20 $kg/m^3$]
c = Air heat capacity [kJ/kg]

For installations without ventilation the supply temperature ($t_1$) of the heat source equals the room temperature ($t_r$).

In installations with ventilation the supply temperature equals the following.

$$t_1 = \frac{(t_u \times q_v) + (t_r \times q_r)}{q}$$

$t_u$ = Outdoor temperature [°C]
$q_v$ = Air flow rate, supplied outdoor air [$m^3/s$]
$t_r$ = Room temperature [°C]
$q_r$ = Air flow rate, circulating room air [$m^3/s$]
q = To air flow rate through heat source [$m^3/s$]

The heat sources are dimensioned on the basis of the given conditions and the capacity data for the heat sources.

## EXPERIENCE VALUES AND ESTIMATES

An exact heat loss calculation is the basis for correct dimensioning of heat sources.

The empirical values in the table can be used to estimate the heating requirement (transmission loss) in buildings with various degrees of insulation. They express heating requirement in relation to volume. The dimensioning outdoor temperature is -12 °C.

| Building types | Heating requirements [W/$m^3$] |
|---|---|
| New buildings after Danish Building Code BR10 - BR15 | 10 |
| Old buildings with medium insulation or that have been re-insulated | 15 - 20 |
| Old buildings with little insulation | 25 - 30 |

Experience values for heating requirements

## AIR FLOW RATES

To ensure proper distribution of the heat, it is normally necessary to have a circulating air flow rate of at least three times per hour in room sections served by the heat source.

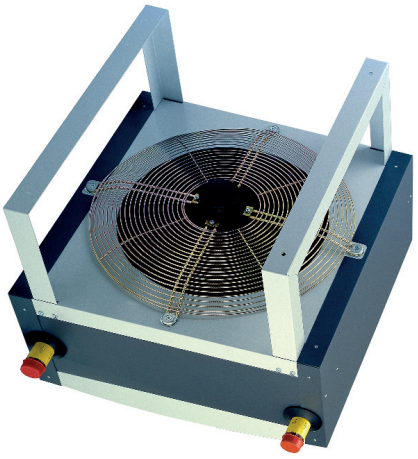
# PRINCIPLE OF AIR HEATERS

Air heaters are integrated units containing heating coils and fans. Primary application is for heating of large rooms through hot air delivery.

A number of advantages are connected with air heaters. They fall in three categories – spatial, operational and economic.

- Air heaters, which are easily installed on walls or under ceilings, take up little space and can be placed in well-suited locations with respect to the layout of the building.
- The supplied hot air mixes quickly with the room air and creates a circulating air flow that distributes the heat to all parts of the room.
- In rooms requiring forced air renewal the air heaters can be fitted with accessories for taking in outdoor air. Thus they form a combined heating and ventilation system, which can be combined with roof extractors for corresponding extraction.

NoVa mounted horizontally



NoVa mounted vertically

- Air heaters represent a very flexible heating and ventilation system that can be modified and extended in line with structural modifications.
- The system also allows for individual operation with changing heating and ventilation needs.

Air heaters represent an ideal heating system for industry and workshops, storage buildings and other rooms with large ceiling heights.

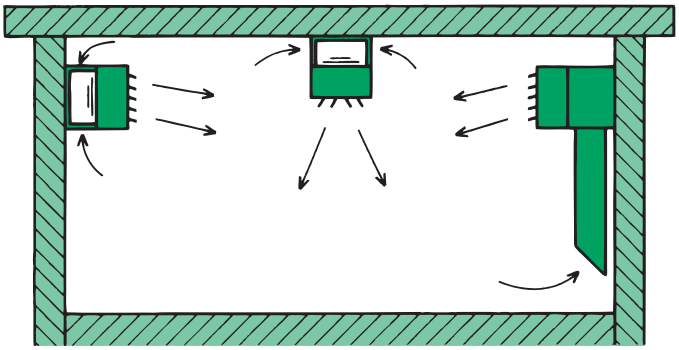
## NOVENCO AIR HEATERS

The range includes two types.

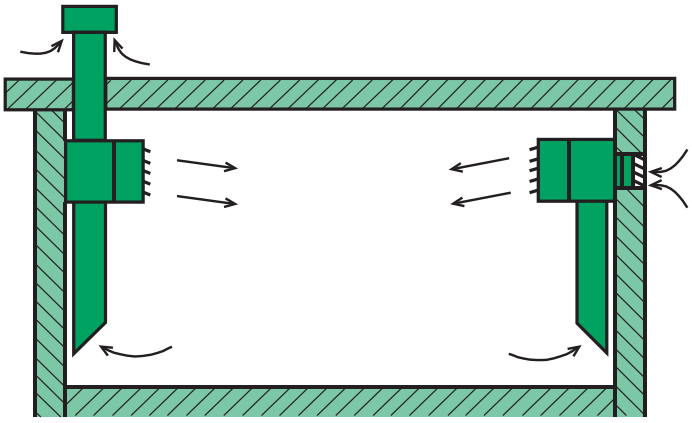
- VMA for 10 - 20 °C cooling (typically boiler water or heat pumps)
- VMB for 30 - 40 °C cooling (typically district heating water)

The types are described in detail with accessories and technical data on the following pages.

Products are shown with accessories.



Heating just by recirculation



Heating, ventilation and mixing

# NOVA SYSTEM

The NoVa range consists of a number of air heaters for both horizontal and vertical installation.

The VMA and VMB are produced in five sizes with air flow rates ranging from 0.2 to 2.1 m3/s and heating capacities from 3 to 105 kW.

The basic unit consists of an axial flow fan integrated with a fin heating coil. The outlet side on the unit can be fitted with accessories for air distribution in various designs.

| Types | Sizes | | | | |
|---|---|---|---|---|---|
| VMA | 42<br>43 | 52<br>53 | 62<br>63 | 72<br>73 | 82<br>83<br>84 |
| VMB | 43 | 53 | 63 | 73 | 83 |

NoVa-range

On the inlet side accessories can be fitted for return air, fresh air and mixing.

## VMA TYPE

The VMA is typically used in connection with boiler water or heat pumps. The water is cooled between 10 and 20 °C.

The VMA can be installed horizontally or vertically.

## VMB TYPE

The VMB is typically used for district heating water. There is a 30 to 40 °C cooling of the water.

The VMB can be installed horizontally or vertically with the pipe sockets on either side.

## CONSTRUCTION

The motor and axial flow fan form an integrated unit.

The fan mount and guard net are of galvanised steel.

The heating coil consists of copper pipes with aluminium fins. The number of pipe rows varies depending on the desired heat output.

The fan unit and heating coil are integrated in a joint cabinet of sheet steel.

The collecting pipe for the heating coil is fitted with in- and outlet sockets, which are lead out through the side of the cabinet.

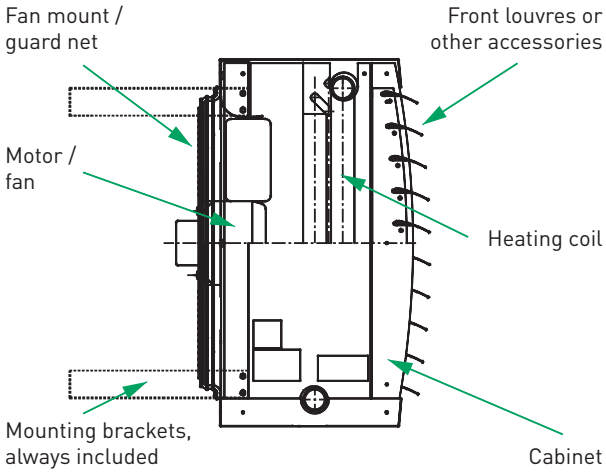
## SURFACE TREATMENT

The cabinet is Sendzimir galvanised. The inside is primed and the outside is powder coated.

The fan casing and mounting brackets are powder coated.

## ACCESSORIES

Parts for mixing and air distribution, inlet cone as well as mounting angles are powder coated.




Construction

The adjustable fins are of aluminium.

Dampers in mixing housings have aluminium profiles with shafts of stainless steel supported in plastic bushings.

The return and fresh air ducts are of galvanised sheet steel; the roof extractor is of stainless steel.

The front louvres are of aluminium.

See next page for more details on accessories.

# CONSTRUCTION SYSTEM

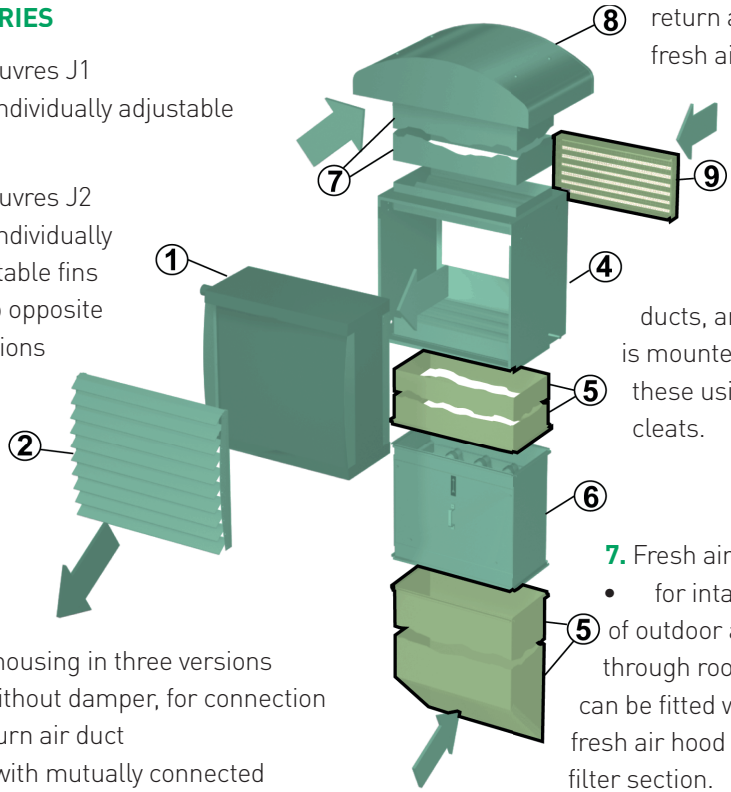
## STANDARD COMPONENTS

**1.** Basic unit VMA/VMB
- fan and heating coil in one cabinet

## ACCESSORIES

**2.** Front louvres J1
- with individually adjustable fins

**3.** Front louvres J2
- with individually adjustable fins in two opposite directions




**4.** Mixing housing in three versions
- B3, without damper, for connection of return air duct
- B13, with mutually connected dampers at the top and bottom for fresh and return air
- B23, with connected dampers at the rear and bottom for fresh and return air
- The duct connections are nipples. The mixing housings are mounted directly on the wall. The mixing dampers can be operated manually or using a damper motor directly connected to the protruding damper shaft.

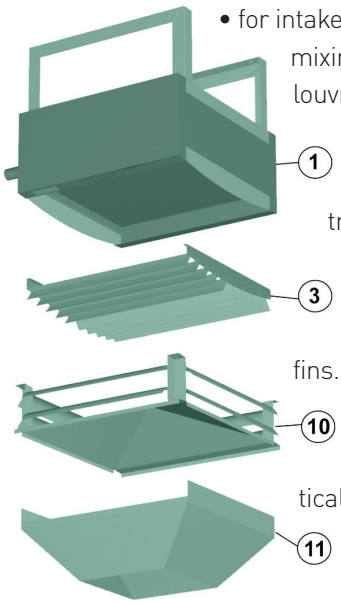
**5.** Return air duct (3rd party delivery)
- for improved circulation of the room air. Fitted with guard net. Filter section is optional.

**6.** Filter section F
- with synthetic fibre filter material in an extractable cassette. Filter section has same dimensions as return and fresh air ducts, and is mounted in these using cleats.

**7.** Fresh air duct
- for intake of outdoor air through roof. It can be fitted with fresh air hood and filter section.

**8.** Fresh air hood H
- for mounting on fresh air duct

**9.** Wall grating M for fresh air (3rd party delivery)
- for intake of outdoor air directly in mixing housing with inclined louvres and guard net.




**10.** Air distributor J4
- for horizontal air distribution at vertical inlet. Variable air distribution is possible in four directions using adjustable fins.

**11.** Inlet cone K
- for beam shaped vertical inlet in high rooms

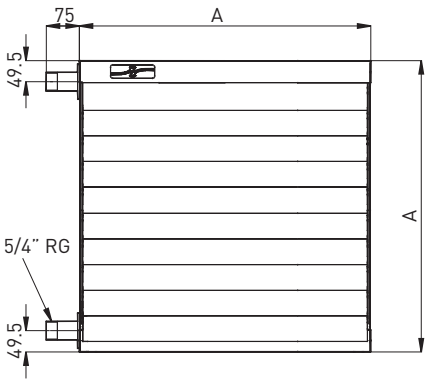
## OTHER ACCESSORIES

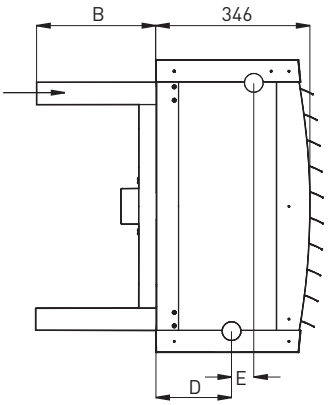
Fittings for installing air heater without mixing housing on ceiling or wall are included with the basic unit.

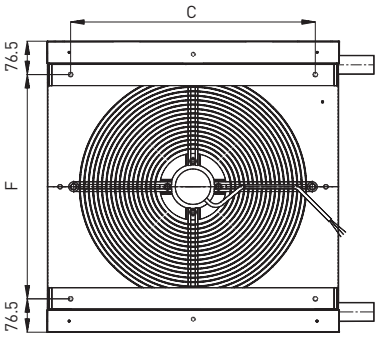
Mounting brackets for installing air heater and mixing housing on ceiling or wall are included with mixing housings.

See section "Motors and regulators" on page 19 for details on control equipment for heating and ventilation.

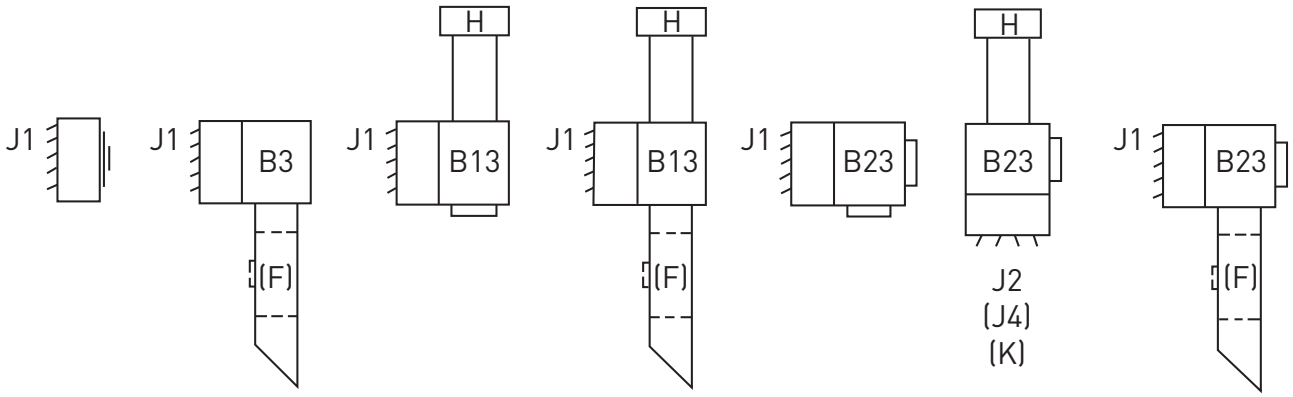
# DIMENSIONS — WEIGHTS — ARRANGEMENTS



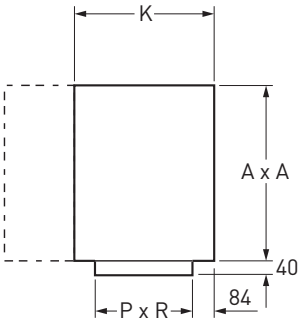




| Sizes | A | B | C | D | E | F | Weight [kg] |
|---|---|---|---|---|---|---|---|
| VMA-42<br>VMA-43 / VMB-43 | 460 | 200 | 352.5 | 164 | 57<br>50 | 307 | 18<br>20 |
| VMA-52<br>VMA-53 / VMB-53 | 560 | 225 | 452.5 | 164 | 57<br>50 | 407 | 27<br>30 |
| VMA-62<br>VMA-63 / VMB-63 | 660 | 250 | 552.5 | 170 | 57<br>50 | 507 | 36<br>40 |
| VMA-72<br>VMA-73 / VMB-73 | 760 | 275 | 652.5 | 180 | 57<br>50 | 607 | 45<br>50 |
| VMA-82<br>VMA-83 / VMB-83<br>VMA-84 | 860 | 300 | 752.5 | 164<br>164<br>150 | 57<br>50<br>107 | 707 | 54<br>60<br>67 |

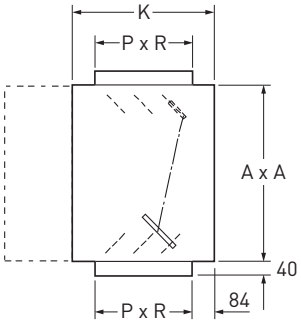



| Designations | |
|---|---|
| B3 | Mixing housing, no damper |
| B13 | Mixing housing, dampers top and bottom |
| B23 | Mixing housing, dampers rear and bottom |
| F | Filter section |
| H | Fresh air hood |
| J1 | Front louvres, one direction |
| J2 | Front louvres, two driections |
| J4 | Air distributor |
| K | Inlet cone |

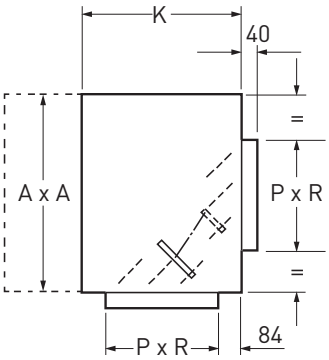
# ACCESSORIES



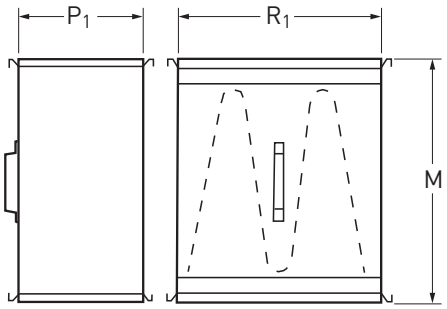

Mixing housing B3 without damper



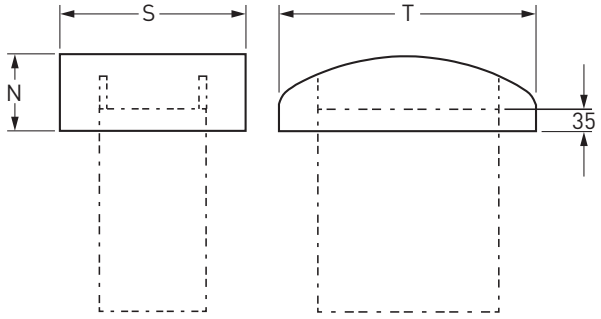

Mixing housing B13




Mixing housing B23




Filter section F



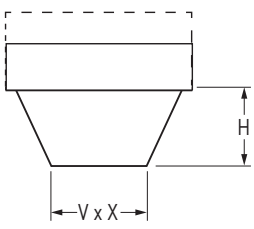

Fresh air hood H

| | Installation sizes | | | | |
|---|---|---|---|---|---|
| | 4- | 5- | 6- | 7- | 8- |
| A | 457 | 557 | 657 | 757 | 857 |
| H | 152 | 165 | 200 | 220 | 246 |
| K | 376 | 476 | 476 | 576 | 676 |
| M | | | 500 | | |
| N | 170 | 190 | 220 | 220 | 240 |
| P | 198 | 298 | 298 | 398 | 498 |
| R | 398 | 498 | 598 | 698 | 796 |
| $P_1$ | 200 | 300 | 300 | 400 | 500 |
| $R_1$ | 400 | 500 | 600 | 700 | 800 |
| S | 390 | 490 | 540 | 690 | 790 |
| T | 590 | 690 | 840 | 990 | 1090 |
| U | 458 | 558 | 658 | 758 | 858 |
| V | 222 | 298 | 332 | 397 | 449 |
| X | 205 | 278 | 329 | 407 | 474 |

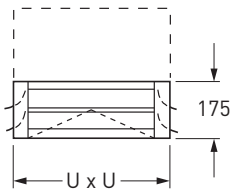
Dimensions [mm]

| | Installation sizes | | | | |
|---|---|---|---|---|---|
| | 4- | 5- | 6- | 7- | 8- |
| B3 | 6.7 | 10.0 | 12.1 | 15.9 | 19.6 |
| B13 | 10.4 | 15.7 | 18.7 | 24.9 | 31.5 |
| B23 | 10.3 | 15.5 | 18.4 | 24.5 | 30.1 |
| M | 1.7 | 3.0 | 3.5 | 5.2 | 7.2 |
| J1 | 1.5 | 2.4 | 3.6 | 5.0 | 6.6 |
| J2 | 1.5 | 2.4 | 3.6 | 5.0 | 6.6 |
| J4 | 3.7 | 4.9 | 6.2 | 7.6 | 9.3 |
| K | 1.6 | 2.5 | 3.5 | 4.8 | 6.2 |
| H | 4.0 | 5.0 | 6.3 | 9.9 | 12.5 |
| F | 8.0 | 10.5 | 12.0 | 14.5 | 17.5 |

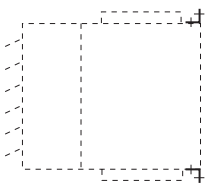
Accessory weights [kg]




Inlet cone K



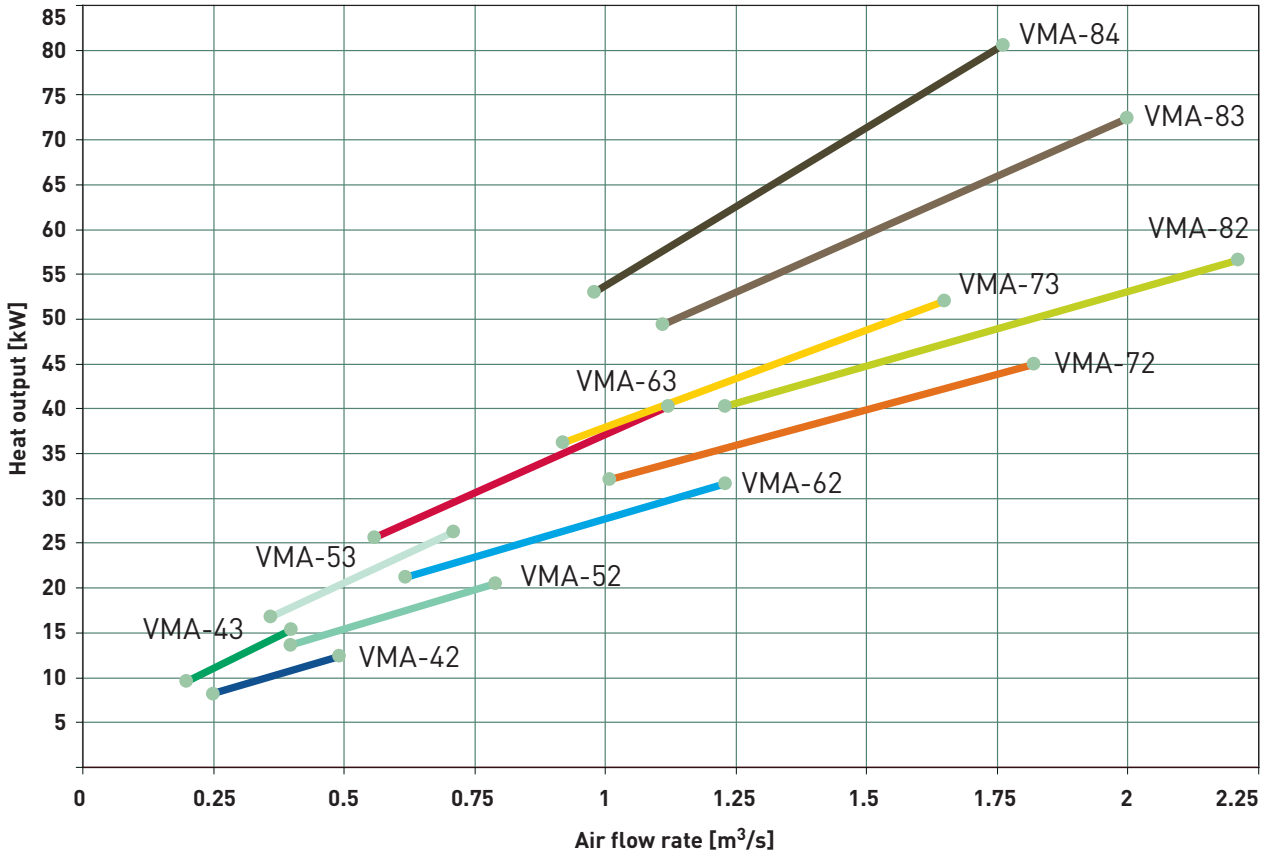

Air distributor J4



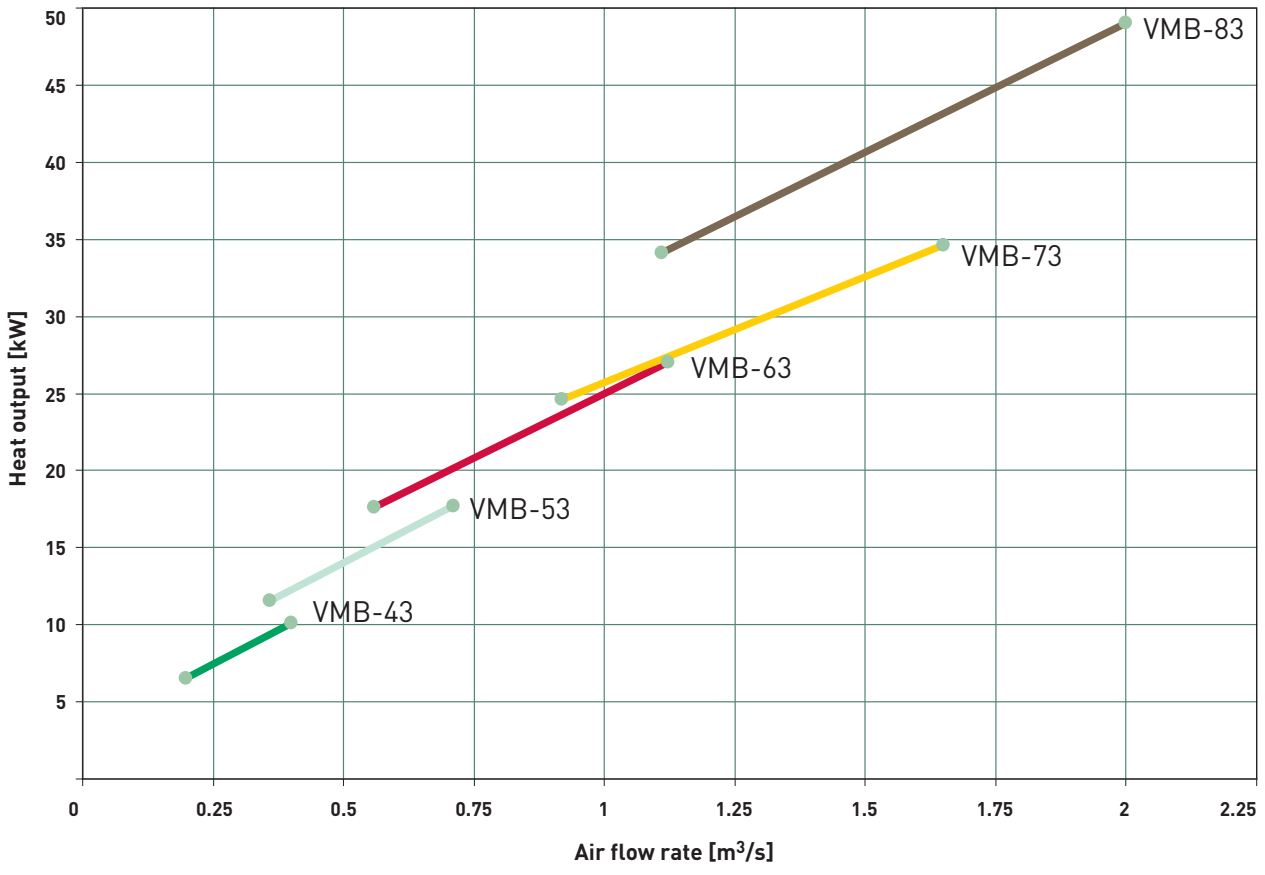
Mounting angles [1]

1. Joint support for mixing housing and basic unit, for horizontal and vertical installation. This is always included with mixing housings.

# SELECTION GRAPHS




NoVa type VMA 80-60 °C / 18 °C




NoVa type VMB 70-40 °C / 18 °C

# CAPACITIES AT 60 / 30 °C

The capacities are suitable for systems using district heating water as heat medium. T1/T2 = 60/30 °C

| | Air volume | | $t_1$ = 5 °C | | | | $t_1$ = 10 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 19.0 | 8.4 | 242 | 0.6 | 21.3 | 6.6 | 190 | 0.4 |
| VMA-43 | 0.42 | 1500 | 26.3 | 11.3 | 323 | 0.8 | 27.5 | 9.1 | 261 | 0.6 |
| VMB-43 | 0.42 | 1500 | 29.1 | 12.8 | 366 | 4.0 | 30.6 | 10.7 | 307 | 2.9 |
| VMA-52 | 0.81 | 2900 | 19.1 | 14.4 | 414 | 0.8 | 21.5 | 11.5 | 331 | 0.5 |
| VMA-53 | 0.71 | 2550 | 23.8 | 17.0 | 486 | 0.4 | 24.8 | 13.0 | 374 | 0.2 |
| VMB-53 | 0.81 | 2900 | 28.2 | 23.7 | 681 | 8.0 | 29.9 | 20.0 | 574 | 5.9 |
| VMA-62 | 1.19 | 4300 | 19.6 | 22.1 | 633 | 1.0 | 22.0 | 17.9 | 512 | 0.7 |
| VMA-63 | 1.14 | 4100 | 25.0 | 28.9 | 829 | 0.9 | 26.5 | 23.4 | 670 | 0.6 |
| VMB-63 | 1.14 | 4100 | 28.4 | 33.9 | 972 | 6.8 | 30.1 | 28.5 | 818 | 5.0 |
| VMA-72 | 1.67 | 6000 | 19.0 | 29.6 | 850 | 0.8 | 21.4 | 23.7 | 679 | 0.6 |
| VMA-73 | 1.5 | 5400 | 23.1 | 34.4 | 987 | 0.5 | 23.9 | 26.0 | 746 | 0.3 |
| VMB-73 | 1.5 | 5400 | 28.1 | 44.0 | 1261 | 3.7 | 29.7 | 36.8 | 1055 | 2.7 |
| VMA-82 | 2.17 | 7800 | 19.0 | 38.5 | 1104 | 0.9 | 21.4 | 30.7 | 880 | 0.6 |
| VMA-83 | 1.89 | 6800 | 24.8 | 47.5 | 1361 | 0.8 | 26.0 | 37.7 | 1080 | 0.5 |
| VMB-83 | 1.89 | 6800 | 28.8 | 57.2 | 1639 | 4.6 | 30.4 | 48.0 | 1377 | 3.4 |
| VMA-84 | 1.67 | 6000 | 29.5 | 52.0 | 1490 | 0.8 | 29.6 | 40.7 | 1167 | 0.5 |

| | Air volume | | $t_1$ = 15 °C | | | | $t_1$ = 18 °C | | | | $t_1$ = 20 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 22.8 | 4.5 | 129 | 0.2 | | | | | | | | |
| VMA-43 | 0.42 | 1500 | 28.3 | 6.8 | 195 | 0.3 | 27.9 | 5.0 | 143 | 0.1 | 27.8 | 3.9 | 112 | 0.1 |
| VMB-43 | 0.42 | 1500 | 31.9 | 8.6 | 247 | 2.0 | 32.6 | 7.3 | 210 | 1.5 | 32.9 | 6.4 | 184 | 1.2 |
| VMA-52 | 0.81 | 2900 | 23.5 | 8.4 | 240 | 0.3 | 23.9 | 5.8 | 165 | 0.1 | | | | |
| VMA-53 | 0.71 | 2550 | 24.8 | 8.4 | 242 | 0.1 | | | | | | | | |
| VMB-53 | 0.81 | 2900 | 31.5 | 16.2 | 465 | 4.0 | 32.3 | 13.9 | 399 | 3.1 | 32.8 | 12.3 | 353 | 2.5 |
| VMA-62 | 1.19 | 4300 | 24.2 | 13.4 | 384 | 0.4 | 25.2 | 10.4 | 298 | 0.3 | 25.3 | 7.6 | 219 | 0.1 |
| VMA-63 | 1.14 | 4100 | 27.5 | 17.4 | 500 | 0.4 | 27.5 | 13.1 | 375 | 0.2 | 27.5 | 10.2 | 293 | 0.1 |
| VMB-63 | 1.14 | 4100 | 31.6 | 23.1 | 663 | 3.4 | 32.4 | 19.8 | 567 | 2.6 | 32.8 | 17.5 | 502 | 2.1 |
| VMA-72 | 1.67 | 6000 | 23.5 | 17.3 | 495 | 0.3 | 24.0 | 12.2 | 349 | 0.1 | 25.2 | 10.5 | 300 | 0.1 |
| VMA-73 | 1.5 | 5400 | 24.6 | 17.7 | 507 | 0.1 | | | | | | | | |
| VMB-73 | 1.5 | 5400 | 31.1 | 29.5 | 847 | 1.8 | 31.8 | 25.1 | 718 | 1.3 | 32.2 | 21.9 | 629 | 1.1 |
| VMA-82 | 2.17 | 7800 | 23.4 | 22.2 | 637 | 0.3 | 23.8 | 15.2 | 436 | 0.1 | 25.4 | 13.9 | 399 | 0.1 |
| VMA-83 | 1.89 | 6800 | 26.3 | 26.1 | 748 | 0.2 | 26.7 | 19.9 | 570 | 0.1 | | | | |
| VMB-83 | 1.89 | 6800 | 31.8 | 38.7 | 1111 | 2.3 | 32.5 | 33.0 | 947 | 1.7 | 32.9 | 29.1 | 834 | 1.4 |
| VMA-84 | 1.67 | 6000 | 27.7 | 25.9 | 742 | 0.2 | 30.4 | 25.0 | 716 | 0.2 | | | | |

# CAPACITIES AT 70 / 40 °C

The capacities are suitable for systems using district heating water as heat medium. T1/T2 = 70/40 °C

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 5 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 10 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 24.9 | 12.0 | 343 | 1.1 | 27.5 | 10.3 | 295 | 0.8 |
| VMA-43 | 0.42 | 1500 | 34.1 | 15.4 | 442 | 1.4 | 35.8 | 13.4 | 383 | 1.1 |
| VMB-43 | 0.42 | 1500 | 36.6 | 16.7 | 479 | 6.5 | 38.3 | 14.7 | 421 | 5.1 |
| VMA-52 | 0.81 | 2900 | 24.8 | 20.2 | 580 | 1.4 | 27.4 | 17.5 | 500 | 1.1 |
| VMA-53 | 0.71 | 2550 | 32.0 | 24.3 | 697 | 0.8 | 33.7 | 20.9 | 599 | 0.6 |
| VMB-53 | 0.81 | 2900 | 35.2 | 30.9 | 884 | 12.7 | 37.1 | 27.2 | 778 | 10.0 |
| VMA-62 | 1.19 | 4300 | 25.1 | 30.5 | 873 | 1.8 | 27.7 | 26.4 | 756 | 1.4 |
| VMA-63 | 1.14 | 4100 | 32.5 | 39.7 | 1138 | 1.5 | 34.3 | 34.4 | 986 | 1.2 |
| VMB-63 | 1.14 | 4100 | 35.5 | 44.1 | 1262 | 10.8 | 37.3 | 38.8 | 1110 | 8.5 |
| VMA-72 | 1.67 | 6000 | 24.6 | 41.5 | 1187 | 1.5 | 27.2 | 35.8 | 1025 | 1.1 |
| VMA-73 | 1.5 | 5400 | 31.2 | 50.0 | 1431 | 0.9 | 32.9 | 42.8 | 1226 | 0.7 |
| VMB-73 | 1.5 | 5400 | 35.3 | 57.7 | 1653 | 5.9 | 37.1 | 50.7 | 1451 | 4.6 |
| VMA-82 | 2.17 | 7800 | 24.6 | 54.0 | 1547 | 1.6 | 27.3 | 46.6 | 1334 | 1.2 |
| VMA-83 | 1.89 | 6800 | 32.7 | 66.5 | 1903 | 1.5 | 34.4 | 57.4 | 1644 | 1.1 |
| VMB-83 | 1.89 | 6800 | 36.1 | 74.6 | 2138 | 7.3 | 37.9 | 65.6 | 1879 | 5.7 |
| VMA-84 | 1.67 | 6000 | 39.4 | 72.9 | 2086 | 1.4 | 40.3 | 63.0 | 1803 | 1.1 |

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 15 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 18 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 20 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 29.9 | 8.6 | 247 | 0.6 | 31.3 | 7.6 | 218 | 0.5 | 32.2 | 6.9 | 198 | 0.4 |
| VMA-43 | 0.42 | 1500 | 37.3 | 11.4 | 325 | 0.8 | 38.1 | 10.1 | 290 | 0.7 | 38.6 | 9.3 | 266 | 0.6 |
| VMB-43 | 0.42 | 1500 | 39.9 | 12.7 | 363 | 3.9 | 40.8 | 11.5 | 328 | 3.2 | 41.4 | 10.7 | 305 | 2.8 |
| VMA-52 | 0.81 | 2900 | 29.9 | 14.7 | 421 | 0.8 | 31.4 | 13.0 | 373 | 0.6 | 32.3 | 11.9 | 340 | 0.5 |
| VMA-53 | 0.71 | 2550 | 35.2 | 17.4 | 500 | 0.4 | 35.9 | 15.3 | 439 | 0.3 | 36.4 | 13.9 | 397 | 0.3 |
| VMB-53 | 0.81 | 2900 | 38.9 | 23.5 | 673 | 7.7 | 39.9 | 21.3 | 610 | 6.4 | 40.6 | 19.8 | 568 | 5.7 |
| VMA-62 | 1.19 | 4300 | 30.3 | 22.3 | 640 | 1.0 | 31.8 | 19.9 | 569 | 0.8 | 32.7 | 18.2 | 522 | 0.7 |
| VMA-63 | 1.14 | 4100 | 36.0 | 29.2 | 836 | 0.9 | 36.9 | 26.0 | 745 | 0.7 | 37.5 | 23.9 | 683 | 0.6 |
| VMB-63 | 1.14 | 4100 | 39.1 | 33.5 | 960 | 6.5 | 40.1 | 30.4 | 870 | 5.5 | 40.7 | 28.3 | 810 | 4.8 |
| VMA-72 | 1.67 | 6000 | 29.8 | 30.1 | 862 | 0.8 | 31.3 | 26.7 | 765 | 0.7 | 32.2 | 24.4 | 698 | 0.6 |
| VMA-73 | 1.5 | 5400 | 34.4 | 35.6 | 1020 | 0.5 | 35.2 | 31.1 | 892 | 0.4 | 35.6 | 28.1 | 804 | 0.3 |
| VMB-73 | 1.5 | 5400 | 38.8 | 43.6 | 1250 | 3.5 | 39.8 | 39.4 | 1130 | 2.9 | 40.4 | 36.6 | 1050 | 2.6 |
| VMA-82 | 2.17 | 7800 | 29.8 | 39.2 | 1122 | 0.9 | 31.3 | 34.7 | 994 | 0.7 | 32.2 | 31.7 | 907 | 0.6 |
| VMA-83 | 1.89 | 6800 | 35.9 | 48.3 | 1384 | 0.8 | 36.8 | 42.8 | 1226 | 0.6 | 37.3 | 39.0 | 1118 | 0.5 |
| VMB-83 | 1.89 | 6800 | 39.5 | 56.6 | 1622 | 4.4 | 40.5 | 51.3 | 1468 | 3.7 | 41.1 | 47.7 | 1366 | 3.2 |
| VMA-84 | 1.67 | 6000 | 41.0 | 53.0 | 1517 | 0.8 | 41.3 | 46.9 | 1342 | 0.6 | 41.4 | 42.7 | 1223 | 0.5 |

# CAPACITIES AT 80 / 60 °C

The capacities are suitable for systems using boiler water as heat medium.
T1/T2 = 80/60 °C

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 5 °C $t_2$ [°C] | $t_1$ = 5 °C Power, Q [kW] | $t_1$ = 5 °C Fluid flow [l/h] | $t_1$ = 5 °C Fluid, $P_{loss}$ [kPa] | $t_1$ = 10 °C $t_2$ [°C] | $t_1$ = 10 °C Power, Q [kW] | $t_1$ = 10 °C Fluid flow [l/h] | $t_1$ = 10 °C Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 34.6 | 17.8 | 761 | 4.7 | 37.3 | 16.1 | 690 | 3.9 |
| VMA-43 | 0.42 | 1500 | 46.4 | 21.9 | 941 | 5.5 | 48.4 | 19.9 | 854 | 4.6 |
| VMA-52 | 0.81 | 2900 | 34.1 | 29.8 | 1277 | 5.7 | 36.9 | 27.0 | 1157 | 4.8 |
| VMA-53 | 0.71 | 2550 | 44.8 | 35.8 | 1535 | 3.1 | 46.7 | 32.4 | 1390 | 2.6 |
| VMA-62 | 1.19 | 4300 | 34.2 | 44.3 | 1901 | 7.4 | 37.0 | 40.2 | 1724 | 6.2 |
| VMA-63 | 1.14 | 4100 | 44.3 | 56.9 | 2439 | 6.1 | 46.4 | 51.6 | 2213 | 5.1 |
| VMA-72 | 1.67 | 6000 | 33.8 | 60.9 | 2614 | 6.3 | 36.6 | 55.3 | 2370 | 5.2 |
| VMA-73 | 1.5 | 5400 | 43.9 | 74.2 | 3181 | 4.0 | 45.9 | 67.1 | 2879 | 3.3 |
| VMA-82 | 2.17 | 7800 | 33.9 | 79.5 | 3410 | 6.6 | 36.7 | 72.1 | 3092 | 5.5 |
| VMA-83 | 1.89 | 6800 | 45.1 | 96.3 | 4128 | 6.1 | 47.1 | 87.3 | 3744 | 5.0 |
| VMA-84 | 1.67 | 6000 | 54.0 | 103.7 | 4449 | 5.7 | 55.3 | 94.1 | 4035 | 4.7 |

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 15 °C $t_2$ [°C] | $t_1$ = 15 °C Power, Q [kW] | $t_1$ = 15 °C Fluid flow [l/h] | $t_1$ = 15 °C Fluid, $P_{loss}$ [kPa] | $t_1$ = 18 °C $t_2$ [°C] | $t_1$ = 18 °C Power, Q [kW] | $t_1$ = 18 °C Fluid flow [l/h] | $t_1$ = 18 °C Fluid, $P_{loss}$ [kPa] | $t_1$ = 20 °C $t_2$ [°C] | $t_1$ = 20 °C Power, Q [kW] | $t_1$ = 20 °C Fluid flow [l/h] | $t_1$ = 20 °C Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 40.0 | 14.4 | 620 | 3.2 | 41.6 | 13.5 | 578 | 2.8 | 42.7 | 12.8 | 550 | 2.6 |
| VMA-43 | 0.42 | 1500 | 50.2 | 17.9 | 769 | 3.8 | 51.3 | 16.7 | 718 | 3.3 | 52.0 | 16.0 | 685 | 3.0 |
| VMA-52 | 0.81 | 2900 | 39.6 | 24.3 | 1040 | 3.9 | 41.3 | 22.6 | 971 | 3.5 | 42.4 | 21.6 | 925 | 3.2 |
| VMA-53 | 0.71 | 2550 | 48.6 | 29.1 | 1249 | 2.1 | 49.8 | 27.2 | 1165 | 1.9 | 50.5 | 25.9 | 1109 | 1.7 |
| VMA-62 | 1.19 | 4300 | 39.8 | 36.2 | 1551 | 5.1 | 41.4 | 33.8 | 1448 | 4.5 | 42.5 | 32.2 | 1380 | 4.1 |
| VMA-63 | 1.14 | 4100 | 48.4 | 46.4 | 1991 | 4.2 | 49.5 | 43.4 | 1859 | 3.7 | 50.3 | 41.3 | 1773 | 3.4 |
| VMA-72 | 1.67 | 6000 | 39.4 | 49.7 | 2130 | 4.3 | 41.0 | 46.3 | 1988 | 3.8 | 42.1 | 44.1 | 1893 | 3.5 |
| VMA-73 | 1.5 | 5400 | 47.9 | 60.2 | 2584 | 2.7 | 49.0 | 56.2 | 2409 | 2.4 | 49.8 | 53.5 | 2294 | 2.2 |
| VMA-82 | 2.17 | 7800 | 39.5 | 64.8 | 2778 | 4.5 | 41.1 | 60.4 | 2592 | 4.0 | 42.2 | 57.6 | 2470 | 3.6 |
| VMA-83 | 1.89 | 6800 | 49.0 | 78.4 | 3364 | 4.1 | 50.1 | 73.2 | 3140 | 3.6 | 50.8 | 69.8 | 2992 | 3.3 |
| VMA-84 | 1.67 | 6000 | 56.6 | 84.6 | 3630 | 3.9 | 57.3 | 79.0 | 3390 | 3.4 | 57.8 | 75.4 | 3232 | 3.1 |

# CAPACITIES AT 70 / 50 °C

The capacities are suitable for systems using boiler water as heat medium.
T1/T2 = 70/50 °C

| | Air volume | | $t_1$ = 5 °C | | | | $t_1$ = 10 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 29.3 | 14.6 | 627 | 3.3 | 32.0 | 13.0 | 556 | 2.7 |
| VMA-43 | 0.42 | 1500 | 39.4 | 18.2 | 782 | 3.9 | 41.2 | 16.2 | 696 | 3.2 |
| VMA-52 | 0.81 | 2900 | 29.0 | 24.5 | 1053 | 4.1 | 31.7 | 21.8 | 936 | 3.3 |
| VMA-53 | 0.71 | 2550 | 37.8 | 29.5 | 1267 | 2.2 | 39.7 | 26.2 | 1125 | 1.8 |
| VMA-62 | 1.19 | 4300 | 29.1 | 36.6 | 1572 | 5.3 | 31.9 | 32.6 | 1399 | 4.3 |
| VMA-63 | 1.14 | 4100 | 37.6 | 47.1 | 2024 | 4.4 | 39.5 | 41.9 | 1802 | 3.5 |
| VMA-72 | 1.67 | 6000 | 28.7 | 50.2 | 2157 | 4.5 | 31.5 | 44.6 | 1916 | 3.6 |
| VMA-73 | 1.5 | 5400 | 37.0 | 61.0 | 2620 | 2.8 | 38.9 | 54.1 | 2324 | 2.3 |
| VMA-82 | 2.17 | 7800 | 28.8 | 65.5 | 2813 | 4.7 | 31.5 | 58.2 | 2498 | 3.8 |
| VMA-83 | 1.89 | 6800 | 38.1 | 79.6 | 3418 | 4.3 | 40.0 | 70.7 | 3038 | 3.5 |
| VMA-84 | 1.67 | 6000 | 45.7 | 86.1 | 3699 | 4.0 | 46.9 | 76.6 | 3292 | 3.2 |

| | Air volume | | $t_1$ = 15 °C | | | | $t_1$ = 18 °C | | | | $t_1$ = 20 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 34.6 | 11.3 | 487 | 2.1 | 36.2 | 10.4 | 446 | 1.8 | 37.2 | 9.7 | 418 | 1.6 |
| VMA-43 | 0.42 | 1500 | 43.0 | 14.3 | 612 | 2.5 | 44.0 | 13.1 | 562 | 2.2 | 44.7 | 12.3 | 529 | 1.9 |
| VMA-52 | 0.81 | 2900 | 34.4 | 19.1 | 820 | 2.6 | 36.0 | 17.5 | 751 | 2.2 | 37.0 | 16.4 | 705 | 2.0 |
| VMA-53 | 0.71 | 2550 | 41.5 | 22.9 | 984 | 1.4 | 42.5 | 21.0 | 901 | 1.2 | 43.2 | 19.7 | 846 | 1.1 |
| VMA-62 | 1.19 | 4300 | 34.6 | 28.6 | 1227 | 3.4 | 36.2 | 26.2 | 1125 | 2.9 | 37.2 | 24.6 | 1058 | 2.6 |
| VMA-63 | 1.14 | 4100 | 41.5 | 36.8 | 1583 | 2.8 | 42.6 | 33.8 | 1453 | 2.4 | 43.3 | 31.8 | 1367 | 2.1 |
| VMA-72 | 1.67 | 6000 | 34.2 | 39.1 | 1678 | 2.8 | 35.8 | 35.8 | 1538 | 2.4 | 36.9 | 33.6 | 1445 | 2.1 |
| VMA-73 | 1.5 | 5400 | 40.8 | 47.3 | 2031 | 1.8 | 41.9 | 43.2 | 1858 | 1.5 | 42.6 | 40.6 | 1743 | 1.3 |
| VMA-82 | 2.17 | 7800 | 34.2 | 50.9 | 2188 | 3.0 | 35.8 | 46.7 | 2004 | 2.5 | 36.9 | 43.8 | 1883 | 2.2 |
| VMA-83 | 1.89 | 6800 | 41.9 | 62.0 | 2665 | 2.7 | 42.9 | 56.9 | 2443 | 2.3 | 43.6 | 53.4 | 2296 | 2.1 |
| VMA-84 | 1.67 | 6000 | 48.0 | 67.3 | 2889 | 2.5 | 48.7 | 61.7 | 2652 | 2.2 | 49.1 | 58.1 | 2494 | 1.9 |

# CAPACITIES AT 60 / 40 °C

The capacities are suitable for systems using boiler water as heat medium.
T1/T2 = 60/40 °C

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 5 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 10 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 24.0 | 11.4 | 489 | 2.2 | 26.6 | 9.7 | 419,0 | 1.6 |
| VMA-43 | 0.42 | 1500 | 32.2 | 14.4 | 619 | 2.6 | 33.9 | 12.4 | 534,0 | 2.0 |
| VMA-52 | 0.81 | 2900 | 23.7 | 19.2 | 825 | 2.7 | 26.4 | 16.5 | 708,0 | 2.0 |
| VMA-53 | 0.71 | 2550 | 30.6 | 23.0 | 991 | 1.5 | 32.3 | 19.7 | 848,0 | 1.1 |
| VMA-62 | 1.19 | 4300 | 23.9 | 28.7 | 1236 | 3.5 | 26.6 | 24.7 | 1064,0 | 2.7 |
| VMA-63 | 1.14 | 4100 | 30.7 | 37.2 | 1599 | 2.9 | 32.6 | 32.1 | 1379,0 | 2.2 |
| VMA-72 | 1.67 | 6000 | 23.5 | 39.3 | 1689 | 2.9 | 26.2 | 33.7 | 1450,0 | 2.2 |
| VMA-73 | 1.5 | 5400 | 29.9 | 47.5 | 2042 | 1.8 | 31.7 | 40.6 | 1745,0 | 1.4 |
| VMA-82 | 2.17 | 7800 | 23.6 | 51.2 | 2201 | 3.0 | 26.3 | 43.9 | 1890,0 | 2.3 |
| VMA-83 | 1.89 | 6800 | 31.0 | 62.5 | 2688 | 2.8 | 32.8 | 53.7 | 2311,0 | 2.1 |
| VMA-84 | 1.67 | 6000 | 37.1 | 68.0 | 2923 | 2.6 | 38.2 | 58.5 | 2515,0 | 2.0 |

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 15 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 18 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 20 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 29.1 | 8.1 | 350 | 1.2 | 30.6 | 7.2 | 308 | 0.9 | 31.5 | 6.5 | 280 | 0.8 |
| VMA-43 | 0.42 | 1500 | 35.6 | 10.5 | 450 | 1.5 | 36.5 | 9.3 | 400 | 1.2 | 37.1 | 8.5 | 366 | 1.0 |
| VMA-52 | 0.81 | 2900 | 29.0 | 13.8 | 592 | 1.5 | 30.5 | 12.2 | 523 | 1.2 | 31.5 | 11.1 | 477 | 1.0 |
| VMA-53 | 0.71 | 2550 | 34.0 | 16.4 | 707 | 0.8 | 34.9 | 14.4 | 621 | 0.6 | 35.5 | 13.1 | 564 | 0.5 |
| VMA-62 | 1.19 | 4300 | 29.2 | 20.8 | 894 | 1.9 | 30.8 | 18.4 | 792 | 1.6 | 31.8 | 16.8 | 724 | 1.3 |
| VMA-63 | 1.14 | 4100 | 34.4 | 27.0 | 1160 | 1.6 | 35.4 | 23.9 | 1029 | 1.3 | 36.1 | 21.9 | 942 | 1.1 |
| VMA-72 | 1.67 | 6000 | 28.9 | 28.2 | 1214 | 1.6 | 30.4 | 24.9 | 1072 | 1.3 | 31.4 | 22.7 | 978 | 1.1 |
| VMA-73 | 1.5 | 5400 | 33.4 | 33.7 | 1450 | 1.0 | 34.3 | 29.6 | 1272 | 0.8 | 34.9 | 26.8 | 1152 | 0.6 |
| VMA-82 | 2.17 | 7800 | 28.9 | 36.8 | 1581 | 1.7 | 30.4 | 32.4 | 1395 | 1.3 | 31.4 | 29.6 | 1272 | 1.1 |
| VMA-83 | 1.89 | 6800 | 34.5 | 45.0 | 1935 | 1.5 | 35.4 | 39.8 | 1711 | 1.2 | 36.0 | 36.3 | 1560 | 1.0 |
| VMA-84 | 1.67 | 6000 | 39.1 | 49.1 | 2110 | 1.4 | 39.6 | 43.4 | 1866 | 1.1 | 39.8 | 39.5 | 1701 | 1.0 |

# CAPACITIES AT 50 / 40 °C

The capacities are suitable for systems using heat pumps as heat source.
T1/T2 = 50/40 °C

| | Air volume | | $t_1$ = 5 °C | | | | $t_1$ = 10 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 23.1 | 10.9 | 935 | 7.2 | 25.7 | 9.3 | 797 | 5.4 |
| VMA-43 | 0.42 | 1500 | 30.3 | 13.4 | 1153 | 8.4 | 32.1 | 11.5 | 987 | 6.3 |
| VMA-52 | 0.81 | 2900 | 22.8 | 18.2 | 1569 | 8.8 | 25.5 | 15.6 | 1339 | 6.6 |
| VMA-53 | 0.71 | 2550 | 29.2 | 21.8 | 1879 | 4.8 | 31.1 | 18.6 | 1603 | 3.6 |
| VMA-62 | 1.19 | 4300 | 22.9 | 27.2 | 2338 | 11.5 | 25.6 | 23.2 | 1998 | 8.6 |
| VMA-63 | 1.14 | 4100 | 29.0 | 34.7 | 2990 | 9.3 | 30.9 | 29.7 | 2559 | 7.0 |
| VMA-72 | 1.67 | 6000 | 22.6 | 37.3 | 3212 | 9.6 | 25.3 | 31.9 | 2743 | 7.2 |
| VMA-73 | 1.5 | 5400 | 28.7 | 45.2 | 3892 | 6.1 | 30.6 | 38.5 | 3315 | 4.5 |
| VMA-82 | 2.17 | 7800 | 22.7 | 48.7 | 4191 | 10.2 | 25.4 | 41.6 | 3577 | 7.6 |
| VMA-83 | 1.89 | 6800 | 29.5 | 58.7 | 5056 | 9.2 | 31.3 | 50.2 | 4320 | 6.9 |
| VMA-84 | 1.67 | 6000 | 34.8 | 63.1 | 5432 | 8.5 | 36.0 | 53.9 | 4645 | 6.4 |

| | Air volume | | $t_1$ = 15 °C | | | | $t_1$ = 18 °C | | | | $t_1$ = 20 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Types | [m³/s] | [m³/h] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
| VMA-42 | 0.47 | 1700 | 28.3 | 7.7 | 662 | 3.8 | 29.9 | 6.8 | 582 | 3.0 | 30.9 | 6.1 | 528 | 2.5 |
| VMA-43 | 0.42 | 1500 | 33.8 | 9.6 | 824 | 4.5 | 34.8 | 8.5 | 728 | 3.6 | 35.5 | 7.7 | 664 | 3.0 |
| VMA-52 | 0.81 | 2900 | 28.1 | 12.9 | 1114 | 4.7 | 29.7 | 11.4 | 980 | 3.7 | 30.7 | 10.3 | 891 | 3.1 |
| VMA-53 | 0.71 | 2550 | 32.9 | 15.5 | 1330 | 2.5 | 33.9 | 13.6 | 1169 | 2.0 | 34.5 | 12.3 | 1062 | 1.7 |
| VMA-62 | 1.19 | 4300 | 28.3 | 19.3 | 1665 | 6.1 | 29.8 | 17.0 | 1468 | 4.9 | 30.9 | 15.5 | 1336 | 4.1 |
| VMA-63 | 1.14 | 4100 | 32.8 | 24.8 | 2134 | 5.0 | 33.9 | 21.9 | 1883 | 4.0 | 34.6 | 19.9 | 1717 | 3.4 |
| VMA-72 | 1.67 | 6000 | 28.0 | 26.5 | 2281 | 5.1 | 29.6 | 23.3 | 2006 | 4.1 | 30.6 | 21.2 | 1825 | 3.4 |
| VMA-73 | 1.5 | 5400 | 32.4 | 31.9 | 2749 | 3.2 | 33.5 | 28.0 | 2414 | 2.5 | 34.2 | 25.4 | 2190 | 2.1 |
| VMA-82 | 2.17 | 7800 | 28.1 | 34.5 | 2974 | 5.4 | 29.6 | 30.4 | 2616 | 4.3 | 30.7 | 27.6 | 2379 | 3.6 |
| VMA-83 | 1.89 | 6800 | 33.1 | 41.8 | 3596 | 4.9 | 34.1 | 36.8 | 3168 | 3.9 | 34.8 | 33.5 | 2884 | 3.2 |
| VMA-84 | 1.67 | 6000 | 37.1 | 45.0 | 3874 | 4.5 | 37.4 | 39.7 | 3416 | 3.6 | 38.1 | 36.2 | 3113 | 3.0 |

# CAPACITIES AT 45 / 35 °C

The capacities are suitable for systems using heat pumps as heat source.
T1/T2 = 45/35 °C

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 5 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 10 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 20.5 | 9.3 | 800 | 5.5 | 23.1 | 7.7 | 663 | 3.9 |
| VMA-43 | 0.42 | 1500 | 26.8 | 11.5 | 993 | 6.4 | 28.5 | 9.6 | 828 | 4.6 |
| VMA-52 | 0.81 | 2900 | 20.2 | 15.6 | 1344 | 6.7 | 22.9 | 13.0 | 1116 | 4.8 |
| VMA-53 | 0.71 | 2550 | 25.8 | 18.7 | 1608 | 3.6 | 27.5 | 15.5 | 1334 | 2.6 |
| VMA-62 | 1.19 | 4300 | 20.3 | 23.3 | 2006 | 8.7 | 23.0 | 19.4 | 1670 | 6.3 |
| VMA-63 | 1.14 | 4100 | 25.6 | 29.9 | 2573 | 7.2 | 27.5 | 24.9 | 2144 | 5.1 |
| VMA-72 | 1.67 | 6000 | 20.1 | 32.0 | 2752 | 7.3 | 22.8 | 26.5 | 2286 | 5.2 |
| VMA-73 | 1.5 | 5400 | 25.3 | 38.6 | 3327 | 4.6 | 27.1 | 32.0 | 2754 | 3.2 |
| VMA-82 | 2.17 | 7800 | 20.1 | 41.7 | 3589 | 7.7 | 22.8 | 34.6 | 2980 | 5.5 |
| VMA-83 | 1.89 | 6800 | 26.0 | 50.4 | 4342 | 7.0 | 27.8 | 41.9 | 3609 | 5.0 |
| VMA-84 | 1.67 | 6000 | 30.6 | 54.3 | 4675 | 6.5 | 31.8 | 45.2 | 3894 | 4.6 |

| Types | Air volume [m³/s] | Air volume [m³/h] | $t_1$ = 15 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 18 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] | $t_1$ = 20 °C $t_2$ [°C] | Power, Q [kW] | Fluid flow [l/h] | Fluid, $P_{loss}$ [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VMA-42 | 0.47 | 1700 | 25.6 | 6.1 | 528 | 2.6 | 27.1 | 5.2 | 447 | 1.9 | 28.1 | 4.6 | 393 | 1.5 |
| VMA-43 | 0.42 | 1500 | 30.2 | 7.7 | 666 | 3.1 | 31.1 | 6.6 | 569 | 2.3 | 31.8 | 5.9 | 505 | 1.9 |
| VMA-52 | 0.81 | 2900 | 25.5 | 10.3 | 891 | 3.2 | 27.0 | 8.8 | 757 | 2.4 | 28.0 | 7.8 | 668 | 1.9 |
| VMA-53 | 0.71 | 2550 | 29.2 | 12.3 | 1061 | 1.7 | 30.2 | 10.4 | 899 | 1.3 | 30.8 | 9.2 | 789 | 1.0 |
| VMA-62 | 1.19 | 4300 | 25.6 | 15.5 | 1338 | 4.2 | 27.2 | 13.2 | 1140 | 3.1 | 28.2 | 11.7 | 1009 | 2.5 |
| VMA-63 | 1.14 | 4100 | 29.4 | 3.4 | 1722 | 3.4 | 30.4 | 17.1 | 1470 | 2.6 | 31.1 | 15.1 | 1303 | 2.1 |
| VMA-72 | 1.67 | 6000 | 25.4 | 21.2 | 1825 | 3.5 | 27.0 | 18.0 | 1551 | 2.6 | 28.0 | 15.9 | 1368 | 2.1 |
| VMA-73 | 1.5 | 5400 | 28.9 | 25.4 | 2187 | 2.1 | 29.8 | 21.4 | 1847 | 1.6 | 30.5 | 18.8 | 1618 | 1.2 |
| VMA-82 | 2.17 | 7800 | 25.4 | 27.6 | 2379 | 3.6 | 27.0 | 23.5 | 2020 | 2.7 | 28.0 | 20.7 | 1781 | 2.1 |
| VMA-83 | 1.89 | 6800 | 29.5 | 33.5 | 2887 | 3.3 | 30.5 | 28.5 | 2456 | 2.4 | 31.1 | 25.2 | 2168 | 1.9 |
| VMA-84 | 1.67 | 6000 | 32.8 | 36.2 | 3121 | 3.0 | 33.3 | 30.9 | 2658 | 2.3 | 33.7 | 27.3 | 2348 | 1.8 |

# CORRECTION FACTORS AND PROJECTION DISTANCES

## CAPACITIES – CORRECTION FACTORS

The use of accessories reduces the air flow rate and the heat output.

The table in the below example shows the approximate percentages of capacities with various accessories fitted.

## MIXING HOUSING AND FILTER SECTION EXAMPLE

Heat output: 100 x 0.93 x 0.60 = 56%

Air flow rate: 100 x 0.85 x 0.50 = 43%

| Designations | Heat output | Air flow rate |
|---|---|---|
| Front louvres J1 and J2 | 100% | 100% |
| Mixing housings B3, B13, B23 | 93% | 85% |
| Fresh air hood H | 93% | 85% |
| Filter section F | 60% | 50% |
| Air distributor J4 | 95% | 90% |
| Inlet cone K | 93% | 85% |

Correction factors for accessories

## DAMPER MOTORS FOR MIXING HOUSINGS

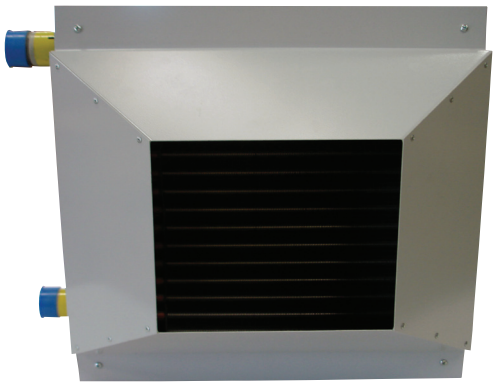
The motors are connected directly to the damper shafts. The required torque for damper motors is 8 Nm.

Damper motors are optional and are available on request.

## VERTICAL PROJECTION DISTANCES – WITH BUILT-ON CONE

The table shows the connection between outlet temperature, room temperature and vertical projection distances of the outlet air.

The project distance influences on the heating of cold rooms to normal room temperature with vertical air supply. The heating occurs faster in the residence zone when the inlet temperature is gradually increased. The reason for this is the increase of the projection distance due to the smaller difference in temperature between the inlet and room air.



| Sizes | Air [m³/s] | $t_2 - t_r$ [1] 10 °C [m] | 20 °C [m] | 30 °C [m] | 40 °C [m] | 50 °C [m] | 60 °C [m] |
|---|---|---|---|---|---|---|---|
| -42 | 0.40 | 9.0 | 6.0 | 5.0 | 4.2 | 4.0 | 3.5 |
| -43 | 0.36 | 7.4 | 5.2 | 4.2 | 3.7 | 3.3 | 3.0 |
| -52 | 0.69 | 11.3 | 8.0 | 6.5 | 5.7 | 5.0 | 4.6 |
| -53 | 0.60 | 10.1 | 7.2 | 5.8 | 5.1 | 4.5 | 4.2 |
| -62 | 1.01 | 13.0 | 9.2 | 7.6 | 6.5 | 5.7 | 5.3 |
| -63 | 0.97 | 11.1 | 7.9 | 6.5 | 5.6 | 4.9 | 4.6 |
| -72 | 1.42 | 14.5 | 10.0 | 8.0 | 7.0 | 6.0 | 5.4 |
| -73 | 1.28 | 13.0 | 9.0 | 7.3 | 6.2 | 5.5 | 5.0 |
| -82 | 1.84 | 14.5 | 10.0 | 8.2 | 7.0 | 6.3 | 5.9 |
| -83 | 1.61 | 13.0 | 9.0 | 7.0 | 6.0 | 5.5 | 5.0 |
| -84 | 1.42 | 10.5 | 7.5 | 6.0 | 5.1 | 4.7 | 5.0 |

Vertical projection distances

1. $t_2$ = Outlet temperature, air; $t_r$ = Room temperature

# SOUND CONDITIONS

The sound produced by the air heaters when operating is called the sound power level. It is a measure of the sound energy emitted by the fan and depends primarily on the fan output.

The sound power level is part of all calculations of sound conditions in rooms served by the air heaters. It is expressed in dB with a reference value of $10^{-12}$ W.

The sound pressure level is a measure of the perceived sound impression at a given location in the environment. It depends on the sound power level, the distance from the fans, the direction factor and the sound absorbing properties of the environment. The sound pressure level is expressed in dB(A) with a reference value of 2 x $10^{-5}$ Pa.

| Sizes | RPMs | Sound power level total [dB] | Sound pressure level [dB(A)] [1] |
|---|---|---|---|
| 4- | 1350 | 59 | 45 |
| 5- | 1300 | — | — |
| 6- | 1400 | 74 | 60 |
| 7- | 910 | 71 | 57 |
| 8- | 950 | 76 | 62 |

Sound data for VMA and VMB without accessories

1. Sound pressure level at a distance of 5 m, 1500 m3 room, normal reflection (R = 120) and direction factor Q = 2

The table shows the sound power and sound pressure levels at different RPMs. Installing mixing housings and other accessories influence on the values.

# HEAT REGULATION

Heat dissipation from the air heaters can be regulated in several ways.

- Starting and stopping of fans
- Regulation of air flow rate by changing the fan RPMs.

The heating coils must be protected from frost in installations where the inlet air temperature may fall below 0 °C.

Optimum room comfort and operation economy is among other things controlled through regulation of the heat emission. It is recommended to install an automatic regulation system that can regulate the heat medium as to inflow and water temperature in the heating coil.

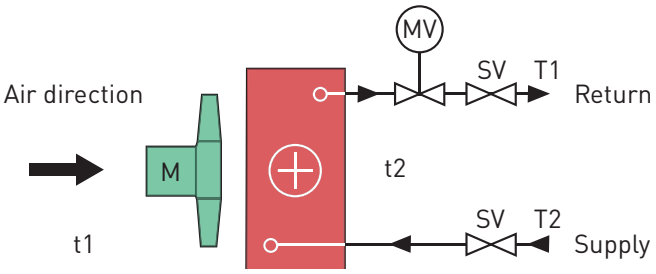
The system is furthermore protected against frost by fitting a thermostat in connection with the heating coil. With air heaters this is best done with a stem bulb sensor in the return water from the heating coil.

The frost thermostat is usually set to trigger at a value below +6 °C. The fan then stops, the heat medium flows fully through coil and any outdoor air dampers are closed. When the temperature rises, the thermostat automatically reverts the system to normal.

The desired fresh air flow rate can be adjusted by automatic control of the damper motor for the damper in the mixing housing.

When the fan stops, the outdoor air damper must close.

In large installations, several air heaters can be included in the same regulation and control group. The operation of corresponding extraction fans can also be included in the control group.




M = Motor
MV = Dynamic flow valve
SV = Shut-off valve
t1 = Inlet air temperature
t2 = Outlet air temperature
T1 = Return water temperature
T2 = Supply water temperature

Example of regulation circuit

# MOTORS AND REGULATORS

## MOTORS [1]

| Sizes | Frequency [Hz] | RPMs | Power [W] | Current [A] | Starting current [A] | Ambient temp. ranges [°C] | Weight [kg] | Encap-sulation |
|---|---|---|---|---|---|---|---|---|
| 4- | 50 / 60 | 1350 / 1490 | 110 / 148 | 0.52 / 0.66 | 1.20 / 1.18 | -20 to 45 | 3.5 | IP44 |
| 5- | 50 / - | 1300 / - | 190 / - | 0.66 / - | - | - | - | |
| 6- | 50 / 60 | 1320 / 1450 | 410 / 570 | 1.90 / 2.50 | 4.40 / - | -15 to 60 | 9.2 | IP54 |
| 7- | | 910 / 980 | 390 / 580 | 1.80 / 2.60 | - | - | - | |
| 8- | | 920 / 1080 | 470 / 730 | 2.30 / 3.20 | 5.50 / - | -15 to 45 | 12.8 | |

Specifications for 1 x 230 V motors

1. The motors comply with EU's ErP 2015 directive.

## REGULATORS

| Types | Regulation type | Voltage [V] | Max. current [A] | Encap sulation | h [mm] | w [mm] | d [mm] | Weight [kg] |
|---|---|---|---|---|---|---|---|---|
| RDG100T | Thermostat | 1x230 | 4 | IP30 | 128 | 93 | 30.8 | 0.3 |
| NV515 | | | 6 | IP34 | - | - | - | - |
| 5-step | Speed | | 1.5 | IP54 | 205 | 115 | 100 | 2.1 |
| | | | 2.5 | | 255 | 170 | 140 | 5.0 |
| | | | 5 | | 255 | 170 | 140 | 5.4 |
| | | | 10 | | 325 | 300 | 185 | 13.2 |
| Stepless | | | 2.5 | | 82 | 82 | 65 | 0.24 |
| | | | 5 | | 160 | 83 | 81 | 0.59 |

Regulators for single-phased motors

All air heaters are connected to regulators. Several fan motors can be connected in parallel, if the number of motors is within that stated in the table.

| Sizes | Current [A] | Types RDG100T (max. 4 A) | NV515 (max. 5 A) | 5-step, 1.5 A | 5-step, 2.5 A | 5-step, 5 A | 5-step, 10 A [1] | Stepless, 2.5 A | Stepless, 5 A |
|---|---|---|---|---|---|---|---|---|---|
| 4- | 0.52 / 0.66 | 7 / 5 | 9 / 7 | 2 / 2 | 4 / 3 | 9 / 7 | 15 / 13 | 4 / 3 | 9 / 7 |
| 5- | 0.66 / - | 6 / - | 7 / - | 2 / - | 3 / - | 7 / - | 15 / - | 3 / - | 7 / - |
| 6- | 1.90 / 2.50 | 2 / 1 | 2 / 2 | - / - | 1 / 1 | 2 / 2 | 4 / 3 | 1 / 1 | 2 / 2 |
| 7- | 1.80 / 2.60 | 2 / 1 | 2 / 1 | - / - | 1 / - | 2 / 1 | 4 / 3 | 1 / - | 2 / 1 |
| 8- | 2.30 / 3.20 | 1 / 1 | 2 / 1 | - / - | 1 / - | 2 / 1 | 4 / 3 | 1 / - | 2 / 1 |

Max. number of motors per regulator at 50 / 60 Hz

1. The regulator cannot be used with the RDG100T.

## TEMPERATURE REGULATOR RDG100T

The regulator displays the temperature received from the room sensor. The device has a week clock and is programmable.

It offers three modes of operation; comfort, economy and (frost) protection. The display is a backlit LCD. Operating voltage is 1x230 V, max. current 4 A and encapsulation is IP30.

Temperature regulator

## THERMOSTAT NV515

NV515

This room temperature regulator is suited for 5-step transformers and stepless triac regulators.

The set temperature is compared to the surrounding temperature and a control signal turns the air heater On and Off.

The unit has a 5 °C night-time lowering and a regulating range of 0 - 40 °C.

## HAND REGULATOR

The hand regulator is for direct mounting on the damper shaft of the mixing housing. It allows for direct regulation of the air flow.


Hand regulator

## 5-STEP SPEED REGULATORS

The speed regulators control the fan speed by user-selection of 5 preset speeds excl. the off-position. The units are in durable design with indicator lights, have low noise levels and with ready-mounted cable glands. Operating voltage is 1x230 V, max. currents available for 1.5 A , 2.5 A , 5 A and 10 A. Encapsulation is IP54.

Current fuses are built-in and manually reset after overheating by turning the switch to the off-position.

**1.5 A and 2.5 A** **5 A** **10 A**

5-step speed regulator

## STEPLESS SPEED REGULATORS

The stepless speed regulators control fan speed by hand control of a knob. Versions for 2.5 A and 5 A are available.

The 2.5 A version is suitable for both inset and surface mounting, while the 5 A version is for surface mounting only.

The 5 A version has a separate off-position and the option of setting a minimum allowed speed. It offers two modes of operation. One called Kickstart where the motor starts at max. speed for 8 – 10 seconds and then follows the position of the potentiometer. Mode two is Normal and has no start-up delay.

For both versions, the operating voltage is 1x230 V, max. current is 2.5 A or 5 A, respectively. Encapsulation is IP54.

2.5 A 5 A

Stepless speed regulators

## DYNAMIC FLOW VALVES

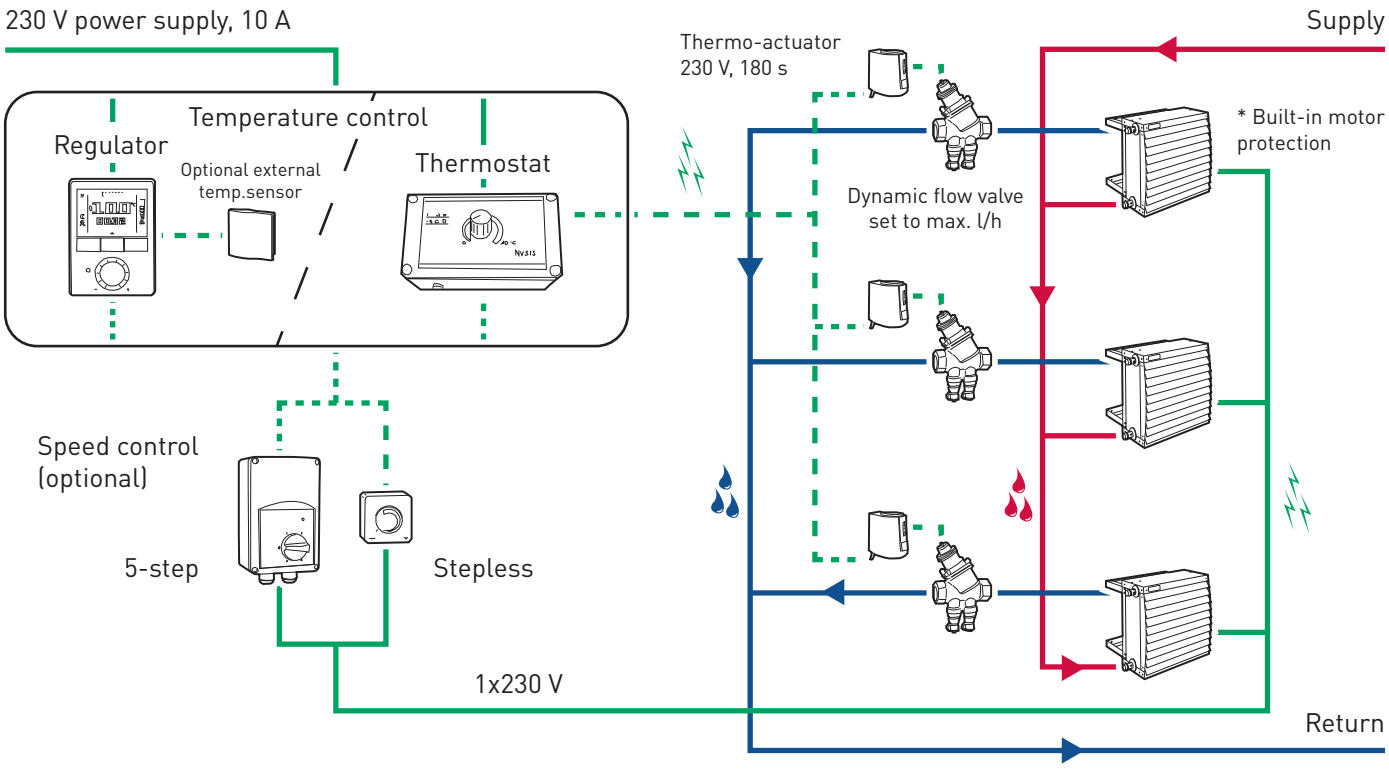
The valves are made of stainless steel and have integrated measuring connectors. The operating ranges run from 65 - 3609 l/hour. The maximum differential pressure is 400 kPa and a temperature range of 0 - 120 °C.

Dynamic flow valve

## THERMO ACTUATOR

The actuator is in encapsulation class IP 54, has an actuator power of 100 Nm, a stroke of 5.0 - 5.5 mm and 180 s running time.

Thermo actuator NV5528




Basic system layout – pipe circuit and electric wiring

# ITEM NUMBERS

| Fan basic unit | Voltage | Description | Item numbers | | | | |
|---|---|---|---|---|---|---|---|
| | | | 4 | 5 | 6 | 7 | 8 |
| VMA | 1 x 230 V | * 2 pipe rows | 630626-0 | 630632-0 | 630639-0 | 630645-0 | 630650-0 |
| | | * 3 pipe rows | 630627-0 | 630633-0 | 630640-0 | 630646-0 | 630651-0 |
| | | * 4 pipe rows | - | - | - | - | 630652-0 |
| VMB | | * 3 pipe rows | 630628-0 | 630634-0 | 630641-0 | 630647-0 | 630653-0 |
| **ACCESSORIES** | | | | | | | |
| Louvres | J1 | - | 630669-0 | 630670-0 | 630671-0 | 630672-0 | 630673-0 |
| | J2 | - | 630674-0 | 630675-0 | 630676-0 | 630677-0 | 630678-0 |
| Cones | K | - | 630679-0 | 630680-0 | 630681-0 | 630682-0 | 630683-0 |
| Distributors | J4 | - | 630684-0 | 630685-0 | 630686-0 | 630687-0 | 630688-0 |
| Mixing housings | B3 | - | 630689-0 | 630690-0 | 630691-0 | 630692-0 | 630693-0 |
| | B13 | - | 630694-0 | 630695-0 | 630696-0 | 630697-0 | 630698-0 |
| | B23 | - | 630699-0 | 630700-0 | 630701-0 | 630702-0 | 630703-0 |
| Stainless hoods | H | - | 371655-0 | 371556-0 | 371657-0 | 371658-0 | 371659-0 |
| Filter sections | F | - | 926615-0 | 926616-0 | 926617-0 | 926618-0 | 926619-0 |
| Hand regulator | - | - | 609731-0 | | | | |
| Adapter plate - ARG70.2 | | for thermostat RDG100T | 926596-0 | | | | |
| Room sensor - QAA32 | | | 926597-0 | | | | |
| **ELECTRIC REGULATORS** | | | | | | | |
| NV515 | 1 x 230 V | Thermostat | 918097-0 | | | | |
| RDG100T | | Temperature regulator | 926595-0 | | | | |
| Transformer controller 1.5 A | | 5-step transformer | 926603-0 | | | | |
| Transformer controller 2.5 A | | | 926604-0 | | | | |
| Transformer controller 5.0 A | | | 926605-0 | | | | |
| Transformer controller 10.0 A | | | 926606-0 | | | | |
| Speed - 2.5 A | | Stepless transformer | 926643-0 | | | | |
| Speed - 5 A | | | 926644-0 | | | | |
| **VALVES** | | | | | | | |
| Dynamic flow | - | 65 - 370 l/hour | 926519-0 | | | | |
| | - | 220 - 1330 l/hour | 926520-0 | | | | |
| | - | 600 - 3609 l/hour | 926521-0 | | | | |
| NV5528 | 1 x 230 V | Thermo actuator | 926522-0 | | | | |

NoVa air heaters and accessories

# QUALITY AND SERVICE


## REST ASSURED

The NoVa air heaters are produced in accordance with Novenco's well-known quality standards.
Novenco Building & Industry A/S is ISO certified and all units are inspected and tested.

The air heaters are offered with options for technical guidance on installation, test of function and training.

## WARRANTY

Novenco Building & Industry A/S provides according to law a standard 12 months warranty from the product is sent from the factory. The warranty covers materials and manufacturing defects. Wear parts are not covered.

Extended warranty can be agreed upon.

## IMPORTANT

This document is provided 'as is'. Novenco Buidling & Industry A/S reserves the right to changes without further notice due to continuous product development.

Some pictures in the catalogue show products with accessories fitted.

The fans are designed for continuous operation. The following kinds of operation may cause fatigue break in the impellers and endanger people.

- Operation in stall area
- Operation with pulsating counter pressure – called pump mode
- Daily operation with exceedingly starting and stopping

If in doubt, Novenco should be contacted to assess the suitability of the fans.



## PATENTS AND TRADEMARKS

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ISO 9001
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