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CLIMATE SOLUTIONS

Multi directional heating

Air heaters
Model NOZ

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Air heaters

The ideal heat source for large areas

Air heaters are used for the heating and ventilation of large industrial buildings. New industrial buildings are built to higher standards with better insulation, reducing the need for heat. Yet, sufficient distribution of any heated air remains necessary to "serve" large spaces properly. Furthermore industrial buildings have increasingly high demands for comfort throughout, while the desired flexibility in building layout asks for equally flexible installations. Projects must be carried out ever faster, making ease of selection and installation of heating equipment a must. With the air heater, model NOZ, Biddle has responded to these trends and requirements.

Model NOZ, can be applied in large (industrial) buildings of approximately 4 to 16 meters high. If there is a need for clean air in a room, the air heater may also be used for ventilation purposes.

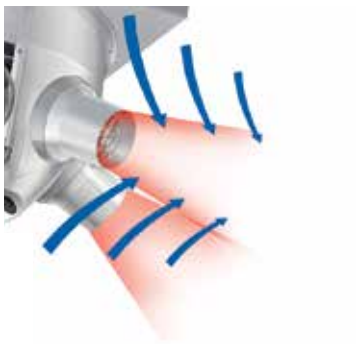
Benefits model NOZ

- *Low investment costs*
- *Even temperature gradient*
- *Directed heat and ventilation*
- *Easy control and regulation*
- *Maintenance-friendly*
- *Suitable for low-temperature water*
- *Long life*
- *Suitable for use with gas*
- *Short payback time*

Application

Because of the fast and even distribution of heat, the Biddle air heaters are suitable for spaces where physical work is done or consistent temperature storage is required.

Examples include: factories, distribution halls, warehouses, DIY shops, sports halls, supermarkets and showrooms.



The high velocity discharges induces movement of the surrounding air.

Fewer units because of induction

The air heater has individually adjustable nozzles, thus providing a better distribution of the air. Warm air is discharged downward through the nozzles in adjustable directions. The high velocity discharges induces movement of the surrounding air, resulting in good mixing and the warm air spreading quickly and evenly across a large area. As the "area of influence" of this air heater is relatively large, fewer units will be needed to heat a large space and savings can be realized on the reduced number of units and on installation costs.

Fit for various heights

The nozzles of the Biddle air heater are adjustable, which allows the unit to be installed at various mounting heights, depending on the use of the room and the specific division of the room. At all installation heights, the comfort and flexibility are guaranteed, because the nozzles are precisely adjusted to the use of the underlying space.

In rooms with lower ceilings, the nozzles are turned to a more horizontal position to enlarge the "area of the influence".

In rooms with higher ceilings, the nozzles are set more vertically, so that the warm air can reach the optimal downward penetration.

Minimal heat loss - even temperature gradient

To reach the lowest possible transmission loss a low temperature gradient and good air mixing are very important. The air heater NOZ spreads the warm air across a large area evenly through the room. The transmission loss is therefore much lower compared with conventional air heaters. Because of the strong induction a temperature gradient of 0.25 °C per meter can be reached and the air circulation ratio is 10 times the primary air displacement.

References

- *AKZO Nobel*
- *ASML*
- *Auchan*
- *Grolsch*
- *Opel*
- *Philips*
- *Renault*

Functional design

The design of the air heater is, in the first place, functional, but the aesthetic look is also important to Biddle. The air heater is delivered as a standard in the colour aluminium (RAL 9006), and the plastic rings are grey. The unit is also deliverable in the colour blue (RAL 5023) and titan. This is also the standard colour for the gas version. Other RAL colours are available at an extra charge.

Aluminium (RAL 9006).

Blue (RAL 5023) with titan.

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Type code
NOZ 25-W2-D / NOZ 25-G3-E-G20

NOZ = air heater with nozzles

Capacity
25 / 50 = nominal heating capacity kW

Heating elements
W2 = heating, 2 row
W3 = heating, 3 row
W6 = heating, 6 row
G3 = gas heating (capacity 30 kW)
A = without heating (ambient)

Supply voltage
E = 230 Volt; 1 Ph; 50 Hz
D = 400 Volt; 3 Ph; 50 Hz

Gas type
G20 - Natural Gas

The type code is obtained by choosing one of all parts.

Various options

The air heater is suitable for recirculation and/or ventilation and is deliverable in two capacities: the NOZ 25 and the NOZ 50. Model NOZ can be supplied with different heating elements:

- The water version is supplied with a two-row heating coil which is suitable for a water flow temperature of around 80° C. At lower temperatures or in situations where more heating capacity is needed, a three-row or six-row heating coil is available.
- A gas version is also one of the possibilities (capacity 30 kW). The gas burner is integrated into the unit.
- A version without heating coil (ambient) works as heat recirculation

Type	Heating battery	Supply voltage
NOZ 25	W2 / W3 / W6 / G3 / A	E (230 Volt; 1 Ph; 50 Hz) D (400 Volt; 3 Ph; 50 Hz)
NOZ 50*		D (400 Volt; 3 Ph; 50 Hz)

** NOZ 50 is not available as a gas version.*

Mounting

As the adjustable nozzles ensure delivery of the heat to the required areas the unit can be mounted free hanging in the space at the ceiling. Thanks to the adjustable nozzles, shelving or racking need not interfere with the free flow of air. Model NOZ is fit for various mounting heights. The recommended mounting height is 3 - 14 m, measured from the bottom of the unit to the floor. There are two mounting options:

1. With M8 threaded ends.

2. With a suspension frame (available as an accessory), to which four threaded ends are fixed with nuts. The suspension set makes mounting considerably easier and faster. The nuts fit into purpose-made “keyholes”.

Air heater selection

The air heater range comprises of two types which makes selection very easy and it is possible to deliver from stock. Both models are suitable for different mounting heights. The comfort requirements determine which model is applied.

Type	Heating capacity	Mounting height[1]	Influence area	Application
NOZ 25	25 kW	2.8 m - 8.5 m	100 m² - 400 m²	smaller rooms higher comfort demands
NOZ 50[2]	50 kW	3.5 m - 14 m	200 m² - 800 m²	larger rooms lower comfort demands

[1] the mounting height of the unit is measured from the bottom of the unit to the floor. The ceiling height of the room is higher.
[2] NOZ 50 is not available as a gas version.

Delivery

Air heater NOZ comes with an isolation switch (6-pole) with external thermal contacts built in as standard.

The suspension frame makes mounting easy.

Accessories

For a correct installation of the air heater the following accessories are available:

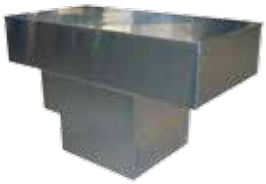
- Suspension frame for fast and easy mounting
- Plastic covers to cover up max. 2 nozzles

Accessories water version

- Control switch: 5 speeds (see page 6)
- Water temperature control to regulate the discharge air temperature
- Room thermostat

Accessories gas version

- Control panel Multitherm C with integrated timer
- External sensor for Multitherm C
- Various flue pipe components (see page 12)



Vent cap

Filter module (except for gas version)

1-way damper module

3-way damper module

Accessories for ventilation

The air heater may also be used for ventilation purposes when fresh air is required in the space. All the additional parts required to convert from “air heater” to “fresh air distributor” are available from Biddle.

- Vent cap and roof vent flange - suited to flat roof only
- Frost protection thermostat (built-in): at temperatures below 6 °C, the thermostat will send out a signal to the damper motor
- Duct sections: 0.5 or 1 metre long
- Filter module: filter class G2 (except gas version)
- Damper module: operated using the corresponding damper motor (with or without spring return)

There are 2 types of damper:
1-way damper module: used with 100% ventilation, so no draught or heat loss occurs when the air heater is off.

3-way damper module: used if not only outside air but also inside air is drawn in (recirculation). The ratio between these air flows may be controlled.

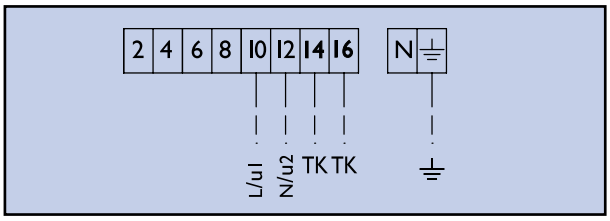
For dimensions see page 17 and 19.

Electric connections

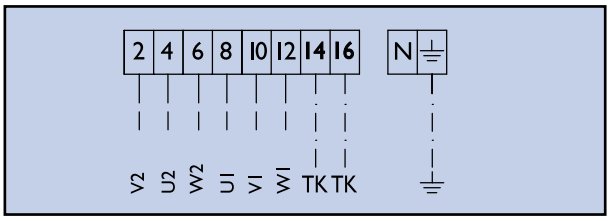
Water and ambient versions

The feeder cable may be connected to the isolation switch (protection class IP 21), which is built in as a standard.

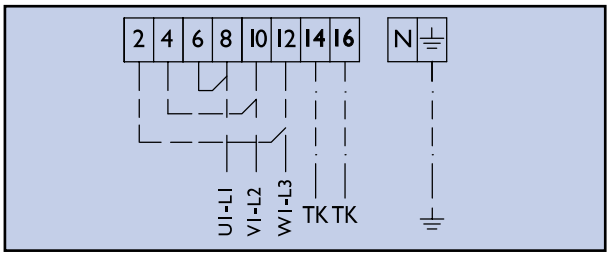
Provisions for connecting isolation switch



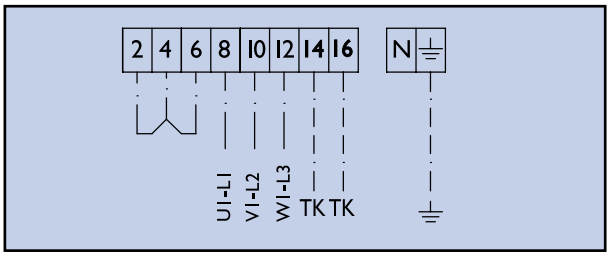
230 Volts



400 Volts low/high speed (Y/Δ)



400 Volts, high speed (Δ)



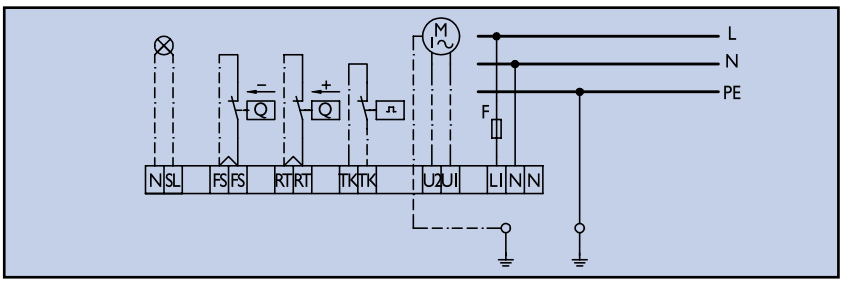
400 Volts, low speed (Y)

Speed controller with neon light and connections for room thermostat and thermal contacts.

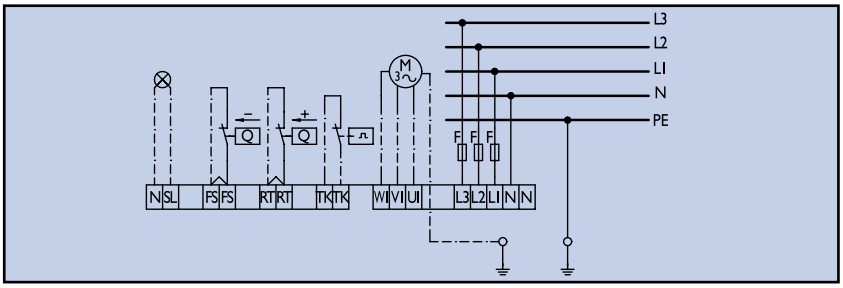
Type	w x h x d (in mm)
RKE: 3A / 6A / 9A	160 x 400 x 140
RKD: 3A / 6A	180 x 540 x 100
10A	210 x 610 x 200

Speed controller (for 1 or more units)

The speed controller is connected to the unit with a 230/400 V cable (depending on the type of unit). This is also the power cable for the unit. *If multiple units are connected to a single speed controller, the thermal contacts must be switched in series.*
There are various speed controllers to suit the application.



1. Type RKE: 5 speeds, 230 Volts, 3, 6 or 9 A, IP 21



2. Type RKD: 5 speeds, 400 Volts, 3, 6 or 10 A, IP 21

Gas version

The air heater, model NOZ G, has an integrated gas burner. The gas burner takes in fresh air from outside and transports the combustion gases out of the building. This is a closed system, which is separated from the air that the unit takes in and discharges heated or ambient air inside the building. The unit is fitted with an isolation switch that disconnects the entire unit from the mains supply. The NOZ gas is controlled by the MultiTherm thermostat C.

MultiTherm C
This thermostat is connected to the control electronics in the air heater. The gas burner starts automatically when the fan of the unit is on, and there is demand for heat. Up to eight units can be connected to one thermostat.

MultiTherm C
- 120 x 120 x 25 mm (w x h x d)
- IP 30

- **NOZ E**

Single-phase units (E) are fitted with a mains lead with plug. This type has 2 fan speeds which are preset by the factory:
- Fan speed Low = 130 V
- Fan speed High = 190 V

The installer can change the tapping voltage himself: 115-130-150-170-190-230 V. The air volume per tapping voltage is shown at page 12.

- **NOZ D**

With three-phase units (type designation D), the mains supply is connected internally in the unit. This version has only 1 fan speed. The installer can connect the mains supply in either star or delta connection. This will determine the speed of the fan.

Energy saving by intelligent control
If the heat remains at the top of the room, the unit presses down this heat and divides it among the room. The thermostat measures the temperature difference in the top and bottom of the room using two temperature sensors: one on the unit and one in the room thermostat. When the temperature gradient (this can be set) is too big, then the hot air at the top of the room is moved down and the unit will stop heating until the temperature difference is eliminated. With an external sensor (accessory), the temperature in the room can be measured in a different place.

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Technical data NOZ 25-W2/W3/W6-E

Basic data

supply voltage	V/ph/Hz	230/1/50 **(single phase)**				
max. input current	A	2.2				
max. input power	kW	0.52				
heating battery		**W2**		**W3**		**W6**
water range	°C	90/70		60/40		50/30
weight	kg	39		41		49
	speed	**1**	**2**	**3**	**4**	**5**
tapping voltage, fan	V	95	115	130	155	230
noise level W2	dB(A)	44	50	52	55	59
noise level W3/W6	dB(A)	43	49	52	55	59

Water Heating

NOZ 25-W2/W3/W6-E		**W2**				**90/70 °C**	**W3**				**60/40 °C**	**W6**				**50/30 °C**
	speed	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air volume[1]	**m³/h**	**2080**	**2610**	**2860**	**3190**	**3620**	**1930**	**2420**	**2740**	**3030**	**3460**	**1800**	**2260**	**2500**	**2820**	**3220**
air inlet temperature	°C	-10					-10					-10				
heating capacity	**kW**	**28.6**	**32.6**	**34.4**	**36.5**	**39.0**	**23.8**	**27.4**	**29.5**	**31.4**	**33.9**	**29.1**	**34.4**	**37.1**	**40.4**	**44.3**
air outlet temperature	°C	27	23	22	20	19	23	20	19	18	16	33	31	30	28	27
water flow rate	l/h	1261	1437	1514	1609	1721	1032	1191	1282	1363	1471	1259	1488	1604	1745	1916
water pressure loss	kPa	5.3	6.8	7.5	8.3	9.4	4.2	5.4	6.2	6.9	8.0	11.4	15.4	17.6	20.5	24.3
air inlet temperature	°C	0					0					0				
heating capacity	**kW**	**24.9**	**28.4**	**29.9**	**31.8**	**34.0**	**19.2**	**22.2**	**23.8**	**25.4**	**27.4**	**22.7**	**26.8**	**28.9**	**31.4**	**34.5**
air outlet temperature	°C	33	30	29	28	26	28	25	24	23	22	35	33	32	31	30
water flow rate	l/h	1097	1251	1319	1402	1500	833	961	1035	1100	1188	983	1159	1249	1358	1490
water pressure loss	kPa	4.1	5.3	5.8	6.5	7.3	2.8	3.7	4.2	4.7	5.4	7.2	9.8	11.2	13.0	15.4
air inlet temperature	°C	+10					+10					+10				
heating capacity	**kW**	**21.3**	**24.3**	**25.6**	**27.2**	**29.1**	**14.8**	**17.0**	**18.3**	**19.5**	**21.0**	**16.6**	**19.5**	**21.0**	**22.8**	**24.9**
air outlet temperature	°C	39	37	36	34	33	32	30	29	28	27	36	35	34	33	32
water flow rate	l/h	938	1070	1128	1200	1284	641	739	795	845	912	715	842	906	983	1077
water pressure loss	kPa	3.1	4.0	4.4	4.9	5.5	1.7	2.3	2.6	2.9	3.3	4.1	5.5	6.2	7.2	8.6
air inlet temperature	°C	+15					+15					+15				
heating capacity	**kW**	**19.5**	**22.3**	**23.5**	**25.0**	**26.7**	**12.6**	**14.5**	**15.6**	**16.6**	**17.9**	**13.5**	**15.8**	**17.0**	**18.5**	**20.2**
air outlet temperature	°C	42	40	39	38	37	34	32	32	31	30	37	35	35	34	33
water flow rate	l/h	860	982	1035	1101	1178	547	630	677	720	776	583	684	736	798	873
water pressure loss	kPa	2.6	3.4	3.7	4.2	4.7	1.3	1.7	1.9	2.2	2.5	2.8	3.8	4.3	5.0	5.8
air inlet temperature	°C	+18					+18					+18				
heating capacity	**kW**	**18.5**	**21.1**	**22.2**	**23.6**	**25.3**	**11.3**	**13.0**	**14.0**	**14.9**	**16.0**	**11.6**	**13.6**	**14.6**	**15.9**	**17.3**
air outlet temperature	°C	44	42	41	40	39	35	34	33	32	32	37	36	35	35	34
water flow rate	l/h	814	929	980	1042	1115	491	565	607	645	696	503	589	633	685	749
water pressure loss	kPa	2.4	3.1	3.4	3.8	4.3	1.1	1.4	1.6	1.8	2.0	2.1	2.9	3.3	3.8	4.4
air inlet temperature	°C	+20					+20					+20				
heating capacity	**kW**	**17.8**	**20.3**	**21.4**	**22.8**	**24.4**	**10.5**	**12.0**	**12.9**	**13.7**	**14.8**	**10.4**	**12.1**	**13.0**	**14.1**	**15.4**
air outlet temperature	°C	45	43	42	41	40	36	35	34	33	33	37	36	35	35	34
water flow rate	l/h	784	894	943	1003	1074	454	522	561	595	642	449	525	563	609	665
water pressure loss	kPa	2.2	2.8	3.1	3.5	4.0	0.9	1.2	1.4	1.5	1.8	1.7	2.3	2.6	3.0	3.6

Note: *see page 14 for correction factors for other water temperatures.*

[1] *Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.*

Technical data NOZ 25-W2-D

Basic data

supply voltage	V/ph/Hz	400/3/50 **(three phase)**				
max. input current	A	1.1				
max. input power	kW	0.52				
water range	°C	90/70				
weight	kg	37				
	speed	**1**	**2**	**3**	**4**	**5**
tapping voltage, fan	V	105	145	195	265	400

Water Heating

NOZ 25-W2-D		**Y-connection**					**Δ-connection**				
	speed	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air volume[1]	**m³/h**	**830**	**1210**	**1650**	**2200**	**3010**	**1550**	**2130**	**2670**	**3160**	**3560**
noise level at 5 m	dB(A)	22	31	39	46	54	37	45	51	55	58
air inlet temperature	°C	-10					-10				
heating capacity	**kW**	**16.0**	**20.6**	**25.0**	**29.6**	**35.3**	**24.0**	**29.0**	**33.0**	**36.3**	**38.7**
air outlet temperature	°C	41	35	30	26	21	31	26	23	21	19
water flow rate	l/h	707	907	1100	1303	1558	1059	1279	1457	1600	1706
water pressure loss	kPa	1.8	2.9	4.2	5.7	7.9	3.9	5.5	7.0	8.3	9.3
air inlet temperature	°C	0					0				
heating capacity	**kW**	**13.9**	**17.9**	**21.7**	**25.7**	**30.8**	**20.9**	**25.2**	**28.8**	**31.6**	**33.7**
air outlet temperature	°C	46	41	36	32	28	37	33	30	28	26
water flow rate	l/h	613	788	956	1134	1357	921	1112	1268	1394	1487
water pressure loss	kPa	1.4	2.3	3.2	4.4	6.1	3.0	4.2	5.4	6.4	7.2
air inlet temperature	°C	+10					+10				
heating capacity	**kW**	**11.9**	**15.3**	**18.5**	**22.0**	**26.3**	**17.9**	**21.6**	**24.6**	**27.1**	**28.9**
air outlet temperature	°C	51	46	42	39	35	43	39	36	35	33
water flow rate	l/h	523	673	818	970	1161	787	951	1085	1193	1273
water pressure loss	kPa	1.1	1.7	2.4	3.3	4.6	2.3	3.2	4.1	4.8	5.4
air inlet temperature	°C	+15					+15				
heating capacity	**kW**	**10.9**	**14.0**	**17.0**	**20.2**	**24.2**	**16.4**	**19.8**	**22.6**	**24.8**	**26.5**
air outlet temperature	°C	53	49	45	42	38	46	42	40	38	37
water flow rate	l/h	480	617	750	889	1065	722	872	995	1094	1168
water pressure loss	kPa	0.9	1.4	2.1	2.8	3.9	1.9	2.7	3.5	4.1	4.6
air inlet temperature	°C	+18					+18				
heating capacity	**kW**	**10.3**	**13.2**	**16.1**	**19.1**	**22.9**	**15.5**	**18.7**	**21.4**	**23.5**	**25.1**
air outlet temperature	°C	55	50	47	44	40	47	44	42	40	39
water flow rate	l/h	454	584	710	842	1008	683	826	942	1036	1105
water pressure loss	kPa	0.8	1.3	1.9	2.5	3.5	1.7	2.5	3.1	3.7	4.2
air inlet temperature	°C	+20					+20				
heating capacity	**kW**	**9.9**	**12.7**	**15.5**	**18.4**	**22.0**	**14.9**	**18.0**	**20.6**	**22.6**	**24.1**
air outlet temperature	°C	55	51	48	45	42	48	45	43	41	40
water flow rate	l/h	437	562	683	810	970	657	795	906	997	1064
water pressure loss	kPa	0.8	1.2	1.7	2.4	3.3	1.6	2.3	2.9	3.5	3.9

Note: *see page 14 for correction factors for other water temperatures.*

[1] *Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.*

Technical data NOZ 25-W3-D

Basic data

supply voltage	V/ph/Hz	400/3/50 **(three phase)**				
max. input current	A	1.1				
max. input power	kW	0.52				
water range	°C	60/40				
weight	kg	39				
	speed	**1**	**2**	**3**	**4**	**5**
tapping voltage, fan	V	105	145	195	265	400

Water Heating

NOZ 25-W3-D		**Y-connection**					**Δ-connection**				
	speed	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air volume[1]	**m³/h**	**700**	**1080**	**1510**	**2040**	**2830**	**1200**	**1890**	**2500**	**3000**	**3390**
noise level at 5 m	dB(A)	17	28	37	45	53	31	43	50	54	58
air inlet temperature	°C	-10					-10				
heating capacity	**kW**	**11.8**	**16.1**	**20.3**	**24.7**	**30.1**	**17.4**	**23.5**	**28.0**	**31.2**	**33.5**
air outlet temperature	°C	35	30	26	22	18	29	23	20	18	16
water flow rate	l/h	513	700	881	1071	1308	755	1019	1213	1354	1453
water pressure loss	kPa	1.2	2.1	3.1	4.5	6.4	2.4	4.1	5.6	6.8	7.8
air inlet temperature	°C	0					0				
heating capacity	**kW**	**9.6**	**13.0**	**16.4**	**19.9**	**24.3**	**14.1**	**19.0**	**22.6**	**25.2**	**27.0**
air outlet temperature	°C	38	33	30	27	24	32	28	25	23	22
water flow rate	l/h	415	565	712	865	1056	610	823	980	1093	1173
water pressure loss	kPa	0.8	1.4	2.1	3.0	4.3	1.6	2.8	3.8	4.6	5.3
air inlet temperature	°C	+10					+10				
heating capacity	**kW**	**7.4**	**10.1**	**12.6**	**15.3**	**18.7**	**10.8**	**14.6**	**17.4**	**19.3**	**20.8**
air outlet temperature	°C	40	37	34	32	29	36	32	30	29	28
water flow rate	l/h	321	436	548	665	811	470	633	753	839	900
water pressure loss	kPa	0.5	0.9	1.3	1.9	2.7	1.0	1.7	2.3	2.9	3.2
air inlet temperature	°C	+15					+15				
heating capacity	**kW**	**6.3**	**8.6**	**10.8**	**13.1**	**15.9**	**9.3**	**12.5**	**14.8**	**16.5**	**17.7**
air outlet temperature	°C	41	38	36	34	31	37	34	32	31	30
water flow rate	l/h	275	373	468	567	691	402	540	642	715	767
water pressure loss	kPa	0.4	0.7	1.0	1.4	2.0	0.7	1.3	1.8	2.1	2.4
air inlet temperature	°C	+18					+18				
heating capacity	**kW**	**5.7**	**7.7**	**9.7**	**11.7**	**14.3**	**8.3**	**11.2**	**13.3**	**14.8**	**15.8**
air outlet temperature	°C	42	39	37	35	33	38	35	34	33	32
water flow rate	l/h	248	336	420	509	619	362	485	575	641	687
water pressure loss	kPa	0.3	0.5	0.8	1.1	1.6	0.6	1.1	1.4	1.7	2.0
air inlet temperature	°C	+20					+20				
heating capacity	**kW**	**5.3**	**7.2**	**9.0**	**10.8**	**13.2**	**7.7**	**10.3**	**12.2**	**13.6**	**14.6**
air outlet temperature	°C	42	40	38	36	34	39	36	35	33	33
water flow rate	l/h	230	311	389	470	572	335	448	531	591	634
water pressure loss	kPa	0.3	0.5	0.7	1.0	1.4	0.5	0.9	1.2	1.5	1.7

Note: *see page 14 for correction factors for other water temperatures.*

[1] *Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.*

Technical data NOZ 25-W6-D

Basic data

supply voltage	V/ph/Hz	400/3/50 **(three phase)**				
max. input current	A	1.1				
max. input power	kW	0.52				
water range	°C	50/30				
weight	kg	47				
	speed	**1**	**2**	**3**	**4**	**5**
tapping voltage, fan	V	105	145	195	265	400

Water Heating

NOZ 25-W6-D		**Y-connection**					**Δ-connection**				
	speed	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air volume[1]	**m³/h**	**640**	**1000**	**1410**	**1920**	**2680**	**1190**	**1810**	**2370**	**2850**	**3220**
noise level at 5 m	dB(A)	18	29	37	45	53	33	43	50	54	57
air inlet temperature	°C	-10					-10				
heating capacity	**kW**	**12.4**	**18.2**	**24.1**	**30.6**	**39.0**	**21.0**	**29.2**	**35.7**	**40.7**	**44.4**
air outlet temperature	°C	42	39	36	32	29	37	33	30	28	27
water flow rate	l/h	538	786	1041	1320	1685	908	1260	1542	1760	1918
water pressure loss	kPa	2.4	4.8	8.0	12.4	19.3	6.3	11.4	16.4	20.8	24.4
air inlet temperature	°C	0					0				
heating capacity	**kW**	**9.8**	**14.2**	**18.8**	**23.8**	**30.4**	**16.4**	**22.8**	**27.8**	**31.7**	**34.5**
air outlet temperature	°C	42	40	37	34	31	38	35	32	31	30
water flow rate	l/h	423	616	813	1030	1312	710	983	1201	1370	1492
water pressure loss	kPa	1.6	3.1	5.1	7.9	12.2	4.0	7.2	10.4	13.2	15.4
air inlet temperature	°C	+10					+10				
heating capacity	**kW**	**7.2**	**10.5**	**13.7**	**17.3**	**22.0**	**12.0**	**16.6**	**20.2**	**22.9**	**25.0**
air outlet temperature	°C	43	40	38	36	34	39	36	34	33	32
water flow rate	l/h	313	452	594	749	950	520	716	871	992	1079
water pressure loss	kPa	0.9	1.8	2.9	4.4	6.8	2.3	4.1	5.8	7.4	8.6
air inlet temperature	°C	+15					+15				
heating capacity	**kW**	**6.0**	**8.6**	**11.2**	**14.1**	**17.8**	**9.9**	**13.5**	**16.4**	**18.6**	**20.2**
air outlet temperature	°C	42	40	38	36	34	39	37	35	34	33
water flow rate	l/h	258	371	486	610	771	426	583	708	804	874
water pressure loss	kPa	0.6	1.2	2.0	3.1	4.7	1.6	2.8	4.0	5.0	5.8
air inlet temperature	°C	+18					+18				
heating capacity	**kW**	**5.2**	**7.5**	**9.7**	**12.2**	**15.3**	**8.5**	**11.6**	**14.1**	**16.0**	**17.3**
air outlet temperature	°C	42	40	38	37	35	39	37	36	35	34
water flow rate	l/h	225	322	420	526	663	369	503	609	691	749
water pressure loss	kPa	0.5	1.0	1.6	2.3	3.5	1.2	2.2	3.0	3.8	4.4
air inlet temperature	°C	+20					+20				
heating capacity	**kW**	**4.7**	**6.7**	**8.7**	**10.9**	**13.6**	**7.7**	**10.4**	**12.6**	**14.2**	**15.4**
air outlet temperature	°C	42	40	38	37	35	39	37	36	35	34
water flow rate	l/h	203	289	376	469	589	331	449	542	614	665
water pressure loss	kPa	0.4	0.8	1.3	1.9	2.9	1.0	1.8	2.5	3.1	3.6

Note: *see page 14 for correction factors for other water temperatures.*

[1] *Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.*

Technical data NOZ 25-G3-E/D-G20

Gas data

gas type		G20
gas supply pressure	mbar	20
gas category		I2H
gas connection		G1/2"
nom. heat input	kW	20.5 - 32.0
nom. heat output	kW	19.1 - 29.2
CO_2	%	9.2 ± 0.5
gas consumption (max.)	m^3/h	3.4

Gas Heating

Basic data

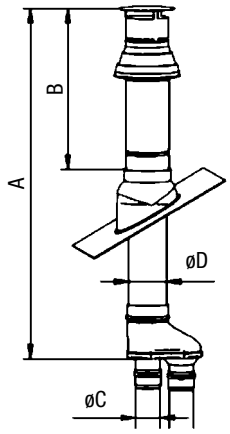
Type		**NOZ 25-G3-E-G20**	**NOZ 25-G3-D-G20**
supply voltage	V/ph/Hz	230/1/50 **(single phase)**	400/3/50 **(three phase)**
max. input current	A	2.7	1.1
max. input power	kW	0.59	0.54
weight	kg	72	69

NOZ 25-G3-E-G20	**Position**			**L***			**H***	
tapping voltage, fan	V	80	115	130	150	170	190	230
air volume[1]	m^3/h	1470	2290	2540	2815	3000	3115	3250
noise level at 5 m	dB(A)	38	51	53	56	58	59	60

** Factory setting: L =fan speed low, H =fan speed high, see explanation on page. 7.*

NOZ 25-G3-D-G20	**Position**	**Y-position**	**Δ-position**
air volume[1]	m^3/h	2700	3250
noise level at 5 m	dB(A)	55	60

[1]Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.



Roof terminal

Flue pipe components

Biddle can offer the following:

- Roof terminal: standard and long
- Wall terminal
- Weather slate: for angled or flat roofs
- Flue pipe sections:
  Straight: ø 80 mm, lengths: 0,25 - 0,5 - 1,0 and 2,0 m
  Elbow: ø 80 mm, 90° and 45°
- Wall bracket: ø 80 mm

	Roof terminal (mm)	
	standard	**long**
A	1280	1850
B	500	955
ø C	80	80
ø D	125	125

The Maximum equivalent length for flue gas discharge is 9m. For every 90° elbow deduct 2m and for every 45° elbow deduct 1m. The Maximum dry length is 4m (straight).

Technical data NOZ 50-W2/W3/W6-D

Basic data

supply voltage	V/ph/Hz	400/3/50 **(three phase)**				
max. input current	A	2.4				
max. input power	kW	1.35				
battery type		**W2**		**W3**		**W6**
water range	°C	90/70		60/40		50/30
weight	kg	64		67		76
	speed	**1**	**2**	**3**	**4**	**5**
tapping voltage, fan	V	105	145	195	265	400
noise level W2	dB(A)	44	50	52	55	59
noise level W3	dB(A)	45	52	58	63	66
noise level W6	dB(A)	44	51	56	60	64
Y-connection						

Water Heating

NOZ 50-W2/W3/W6-D		**W2**				**90/70 °C**	**W3**				**60/40 °C**	**W6**				**50/30 °C**
	speed	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air volume[1]	**m³/h**	**3310**	**4630**	**5840**	**6920**	**8030**	**3280**	**4580**	**5780**	**6850**	**7950**	**2720**	**3850**	**4910**	**5880**	**6930**
air inlet temperature	°C	-10					-10					-10				
heating capacity	**kW**	**49.6**	**60.4**	**68.9**	**75.6**	**81.8**	**43.0**	**53.1**	**61.2**	**67.5**	**73.5**	**46.8**	**61.3**	**73.3**	**83.4**	**93.3**
air outlet temperature	°C	30	25	21	19	17	25	21	18	16	15	36	32	30	28	26
water flow rate	l/h	2185	2664	3037	3332	3607	1864	2306	2654	2930	3189	2024	2648	3167	3602	4033
water pressure loss	kPa	4.0	5.7	7.3	8.7	10.0	4.3	6.3	8.1	9.7	11.4	8.8	14.4	19.9	25.2	30.9
air inlet temperature	°C	0					0					0				
heating capacity	**kW**	**43.1**	**52.6**	**60.0**	**65.8**	**71.3**	**34.7**	**42.9**	**49.4**	**54.6**	**59.4**	**36.6**	**47.8**	**57.1**	**64.9**	**72.6**
air outlet temperature	°C	36	31	28	26	25	29	26	24	22	21	37	34	32	31	29
water flow rate	l/h	1899	2318	2644	2902	3143	1507	1863	2144	2367	2577	1582	2067	2468	2805	3139
water pressure loss	kPa	3.1	4.4	5.6	6.7	7.8	2.9	4.3	5.5	6.6	7.7	5.6	9.2	12.7	16.0	19.6
air inlet temperature	°C	+10					+10					+10				
heating capacity	**kW**	**36.8**	**44.9**	**51.3**	**56.3**	**61.0**	**26.8**	**33.1**	**38.0**	**41.9**	**45.6**	**26.8**	**34.8**	**41.5**	**47.0**	**52.5**
air outlet temperature	°C	42	38	35	33	32	33	31	29	28	26	38	36	34	33	32
water flow rate	l/h	1623	1981	2261	2483	2690	1162	1434	1649	1820	1980	1158	1505	1792	2032	2270
water pressure loss	kPa	2.3	3.3	4.2	5.0	5.8	1.8	2.6	3.4	4.1	4.8	3.2	5.2	7.1	8.9	10.9
air inlet temperature	°C	+15					+15					+15				
heating capacity	**kW**	**33.7**	**41.2**	**47.0**	**51.6**	**56.0**	**22.9**	**28.2**	**32.4**	**35.7**	**38.9**	**21.9**	**28.4**	**33.7**	**38.2**	**42.6**
air outlet temperature	°C	45	41	39	37	35	35	33	31	30	29	39	37	35	34	33
water flow rate	l/h	1488	1816	2073	2277	2467	993	1224	1406	1551	1687	948	1227	1457	1649	1839
water pressure loss	kPa	2.0	2.8	3.6	4.3	5.0	1.3	2.0	2.5	3.0	3.5	2.2	3.6	4.9	6.1	7.4
air inlet temperature	°C	+18					+18					+18				
heating capacity	**kW**	**31.9**	**39.0**	**44.5**	**48.9**	**53.0**	**20.6**	**25.3**	**29.1**	**32.0**	**34.8**	**19.0**	**24.5**	**29.0**	**32.8**	**36.5**
air outlet temperature	°C	46	43	40	39	37	36	34	33	32	31	39	37	35	34	34
water flow rate	l/h	1407	1718	1962	2154	2335	892	1098	1261	1390	1512	821	1059	1254	1417	1578
water pressure loss	kPa	1.8	2.6	3.3	3.9	4.5	1.1	1.6	2.1	2.5	2.9	1.7	2.7	3.7	4.6	5.6
air inlet temperature	°C	+20					+20					+20				
heating capacity	**kW**	**30.7**	**37.5**	**42.8**	**47.0**	**51.0**	**19.0**	**23.4**	**26.9**	**29.6**	**32.2**	**17.0**	**21.9**	**25.8**	**29.2**	**32.4**
air outlet temperature	°C	48	44	42	40	39	37	35	34	33	32	39	37	36	35	34
water flow rate	l/h	1354	1654	1888	2073	2247	825	1015	1165	1284	1395	735	945	1117	1260	1401
water pressure loss	kPa	1.6	2.4	3.0	3.6	4.2	1.0	1.4	1.8	2.2	2.5	1.4	2.2	3.0	3.7	4.5

[1] *Air volume is less with ventilation models - if 1 module is used, by 15% and if more than 1 module, by 20%.*

biddle
CLIMATE SOLUTIONS

Explanation of technical data

Correction factors heating capacity

If circumstances differ from those described here, such as different water temperatures or more than one unit in a single room, please do not hesitate to ask for our advice.

The heating capacities of the W2 heating battery, stated in the tables on pages 9 to 13, are based on a water range of 90/70 °C, the capacities of W3 on a water range of 60/40 °C and of the W6 50/30 °C. The air inlet temperature is 15 °C. If water and air inlet temperature differ, the heating capacity is to be multiplied by the correction factors from the tables below. These are based on the NOZ 25, the data for the NOZ 50 do not differ significantly.

Heating capacity

LPHW W2	Air inlet temperature							
	-10°C	-5°C	0°C	+5°C	+10°C	+15°C	+18°C	+20°C
110/90 °C	1.82	1.72	1.63	1.53	1.44	1.35	1.29	1.26
100/80 °C	1.64	1.55	1.45	1.36	1.27	1.18	1.12	1.08
90/70 °C	1.46	1.37	1.27	1.18	1.09	1.00	0.95	0.91
82/71 °C	1.44	1.34	1.25	1.16	1.07	0.98	0.92	0.89
80/60 °C	1.28	1.18	1.09	1.00	0.91	0.82	0.77	0.74
70/50 °C	1.09	1.00	0.91	0.82	0.74	0.65	0.60	0.56
60/40 °C	0.91	0.82	0.73	0.64	0.56	0.47	0.42	0.39

LPHW W3	Air inlet temperature							
	-10°C	-5°C	0°C	+5°C	+10°C	+15°C	+18°C	+20°C
90/70 °C	2.99	2.79	2.60	2.41	2.23	2.05	1.94	1.87
82/71 °C	2.93	2.73	2.54	2.35	2.17	1.98	1.88	1.80
80/60 °C	2.62	2.43	2.24	2.06	1.88	1.70	1.59	1.52
70/50 °C	2.26	2.07	1.89	1.71	1.53	1.35	1.24	1.18
60/40 °C	1.89	1.71	1.53	1.35	1.17	1.00	0.90	0.83

LPHW W6	Air inlet temperature							
	-10°C	-5°C	0°C	+5°C	+10°C	+15°C	+18°C	+20°C
70/50 °C	3.13	2.87	2.62	2.38	2.14	1.90	1.76	1.67
60/40 °C	2.66	2.41	2.17	1.93	1.69	1.46	1.32	1.23
50/30 °C	2.20	1.95	1.71	1.47	1.23	1.00	0.86	0.76

With the ventilation model, air volume decreases (due to modules and ductwork). The following guideline may be used:

- 1 module = 15 % less than the table values
- 2 modules and duct work = 20 % less than the table values

A decrease in air volume also leads to a decrease in heating capacity. Using the formula, you may calculate the new heating capacity.

- 1 module = Q_{new} = 0,93 x $Q_{table\ value}$
- 2 modules and duct work = Q_{new} = 0,90 x $Q_{table\ value}$

Explanation of technical data

Water flow rate

m_W = *water flow rate [l/h]*
Q = *heating capacity [kW]*
Cp_W = *specific heat of water (=4.18) [kJ/kg°C]*
ΔT_W = *water temperature differential [°C]*
ρw = *density of water at 90 °C (=0.984) [kg/l]*

The water flow rates stated in the tables on pages 9 to 13 are based on a water temperature range of 90/70 °C, 60/40 °C or 50/30 °C. If water temperatures differ, the water flow rate may be roughly calculated using the below formula. Before doing so, the heating capacity must first be recalculated (see page 16).

$$m_W = \frac{Q}{C_{pW}\ \Delta T_W\ \rho_W}\ 3600\ [l/h]$$

Water pressure loss

Δp_{W_1} = *water pressure loss, table values [kPa]*
Δp_{W_2} = *water pressure loss [kPa]*
m_{W_1} = *water flow rate, table values [l/h]*
m_{W_2} = *water flow rate, calculated using formula above [l/h]*

If water temperatures differ, the water pressure loss may be roughly calculated using the formula below. However, before doing so, the water flow rate must first be recalculated (see above).

$$\Delta p_{W_2} = \Delta p_{W_1} \left(\frac{m_{W_2}}{m_{W_1}}\right)^2\ [kPa]$$

Sound

The sound data represented on pages 9 to 13 was measured at a distance of 5 m from the unit, in a room with a reverberation time of 1.2 seconds and with a volume according to the table below. With these room volumes, the air circulation ratio in the room is 1 at fan speed 5 (without induction).

Type	Connection	Room volume
NOZ 25-W2/W3/W6-E	-	3620/3460/3220 m³
NOZ 25-W2/W3/W6-D	Y	3010/2830/2680 m³
NOZ 25-W2/W3/W6-D	Δ	3560/3390/3220 m³
NOZ 50-W2/W3/W6-D	Y	8030/7950/6930 m³

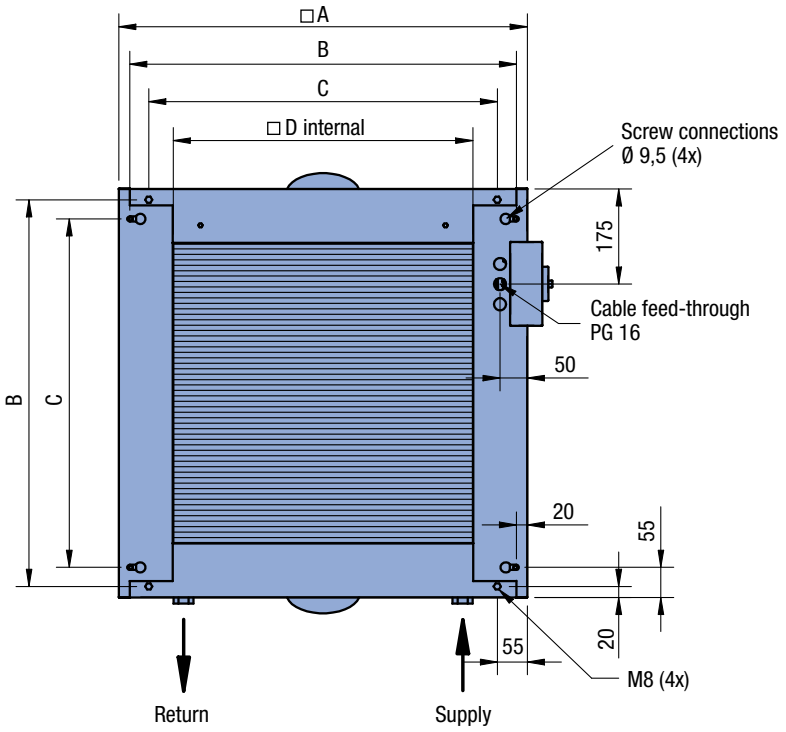
Different room, different distance or multiple units

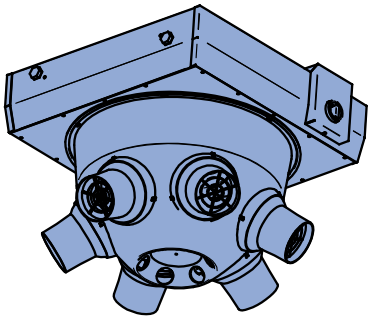
L_p = *sound level [dB(A)]*
T = *reverberation value in deviating room [s]*
T_0 = *reverberation value is 1.2 s*
V = *volume of deviating room [m]*
V_0 = *volume of reference room [2500 m³]*
d = *distance from the unit*
d_0 = *reference distance is 5 m*
n = *number of units*

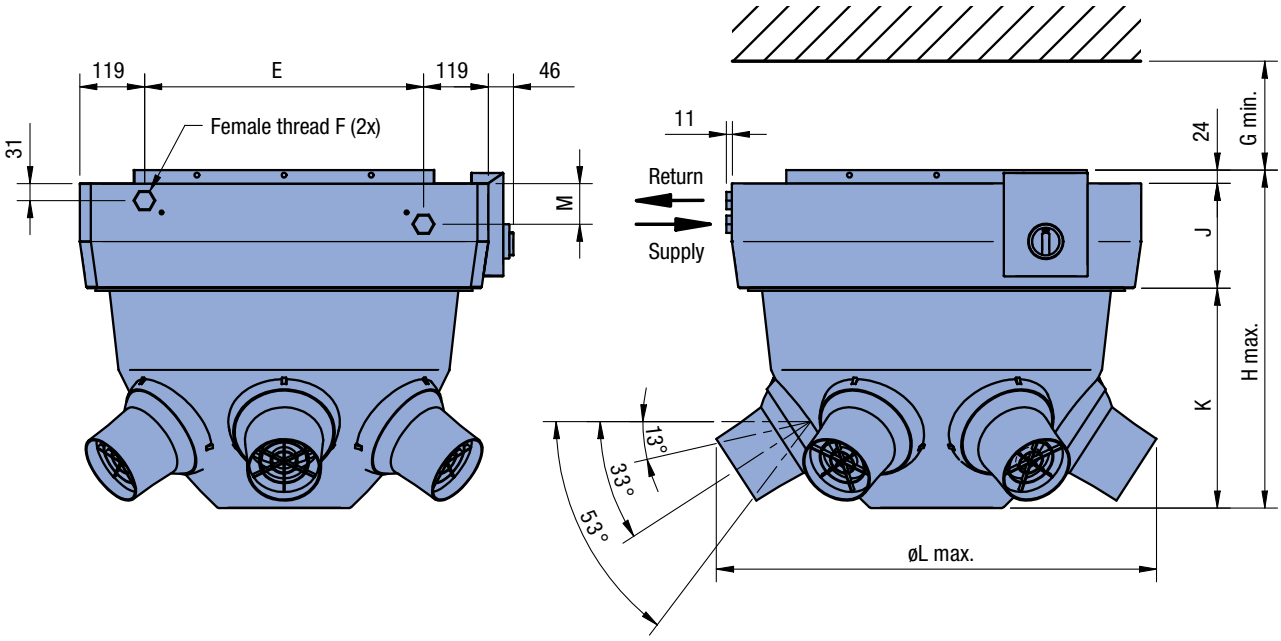
If a unit is used in a different room, a different distance from the unit or if multiple units are used in a single room, the sound level must be recalculated. This can be done using the formula below. Whereby the relevant table value can be retrieved from the tables on pages 9 to 15.

$$L_p = \text{table value} + \left(10 \log\left(\frac{T}{T_0}\right) - 10 \log\left(\frac{V}{V_0}\right) + 10 \log\left(\frac{d_0^2}{d^2}\right) + 10 \log (n)\right)\ [dB(A)]$$

Dimensional sketches model NOZ





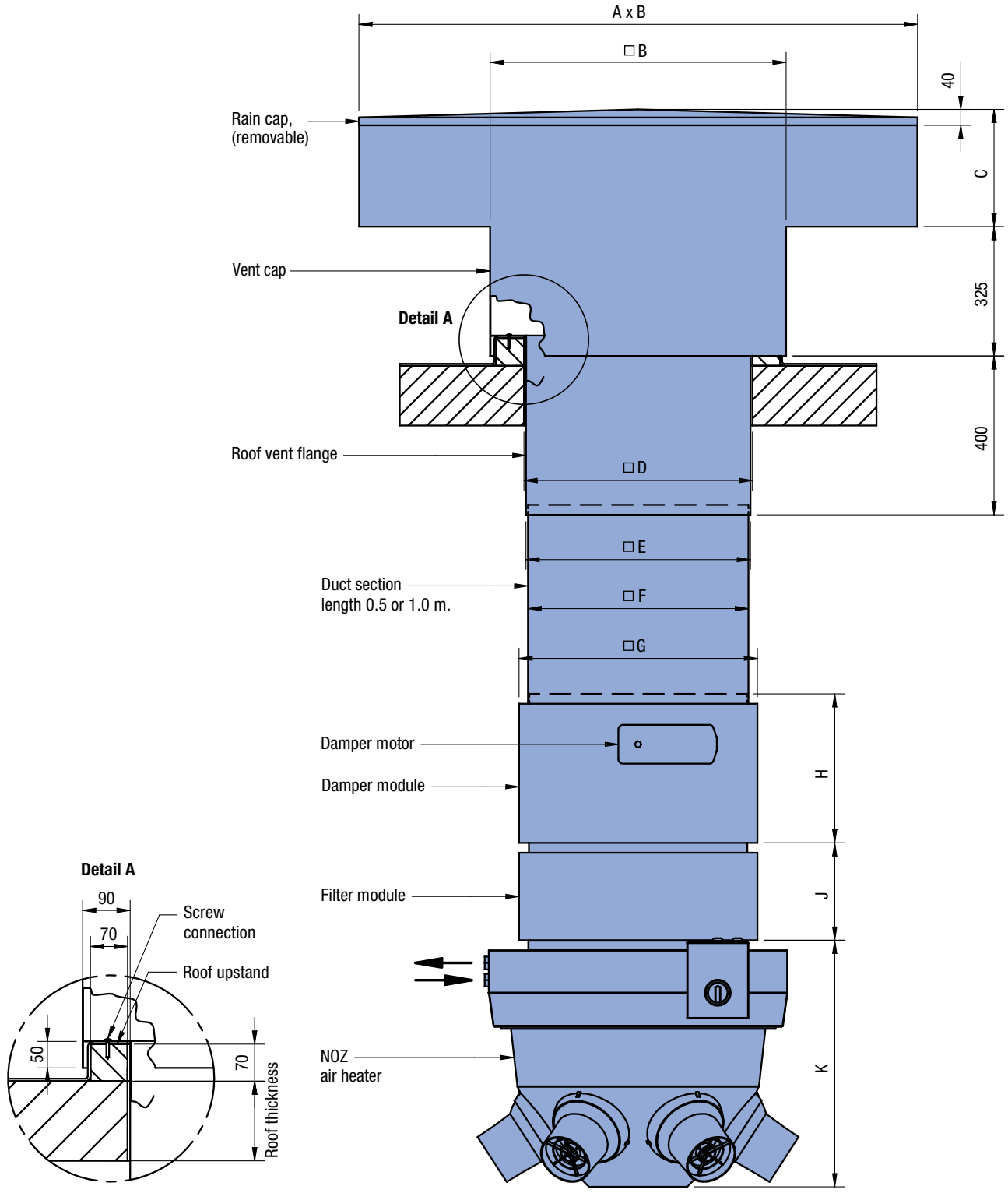


Type	A	B	C	D	E	F	G	H	J	K	L	M
NOZ 25-W2/W3	750	710	640	550	512	G 3/4"	200	632	193	405	805	74
NOZ 25-W6								692	253			139
NOZ 50-W2/W3	975	935	865	775	737	G 1"	300	814	249	506	1010	74
NOZ 50-W6								842	277			139

Note

• All dimensions are in mm.

Dimensional sketches ventilation model NOZ

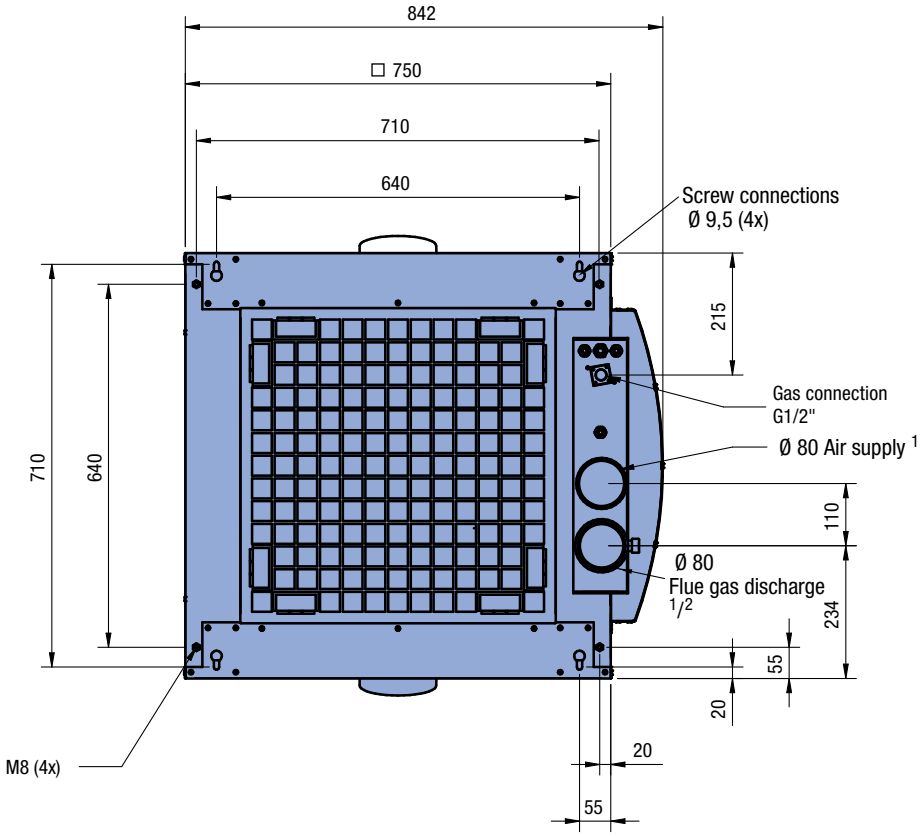


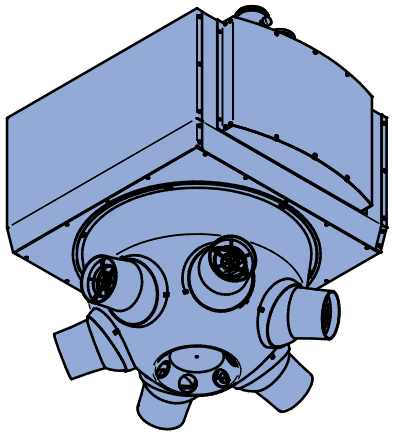
Type	A	B	C	D	E	F	G	H (1-way)	H (3-way)	J	K
NOZ 25-W2/W3	1406	746	295	575	565	557	604	176	376	248	622
NOZ 25-W6											682
NOZ 50-W2/W3	1871	971	415	800	790	782	829		556		779
NOZ 50-W6											807

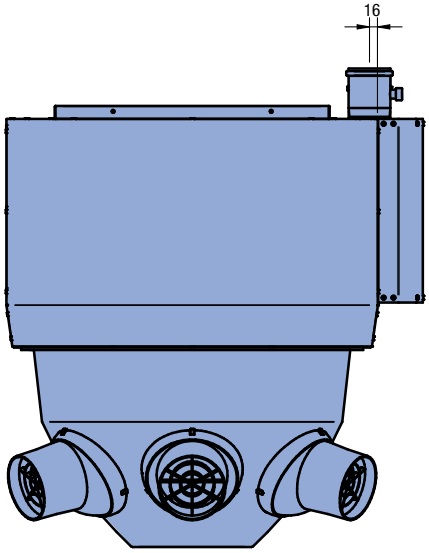
Note

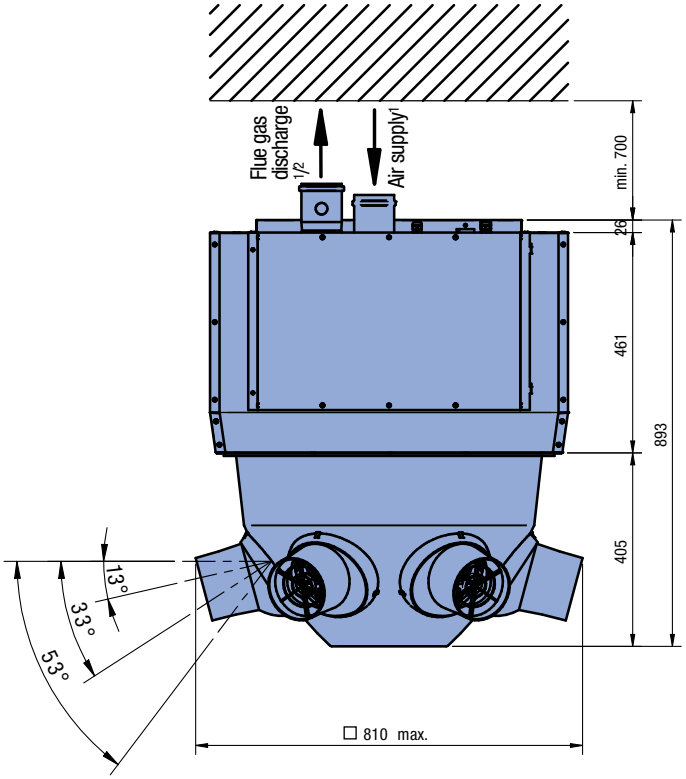
• All dimensions are in mm.

Dimensional sketches model NOZ-G (Gas Heating)









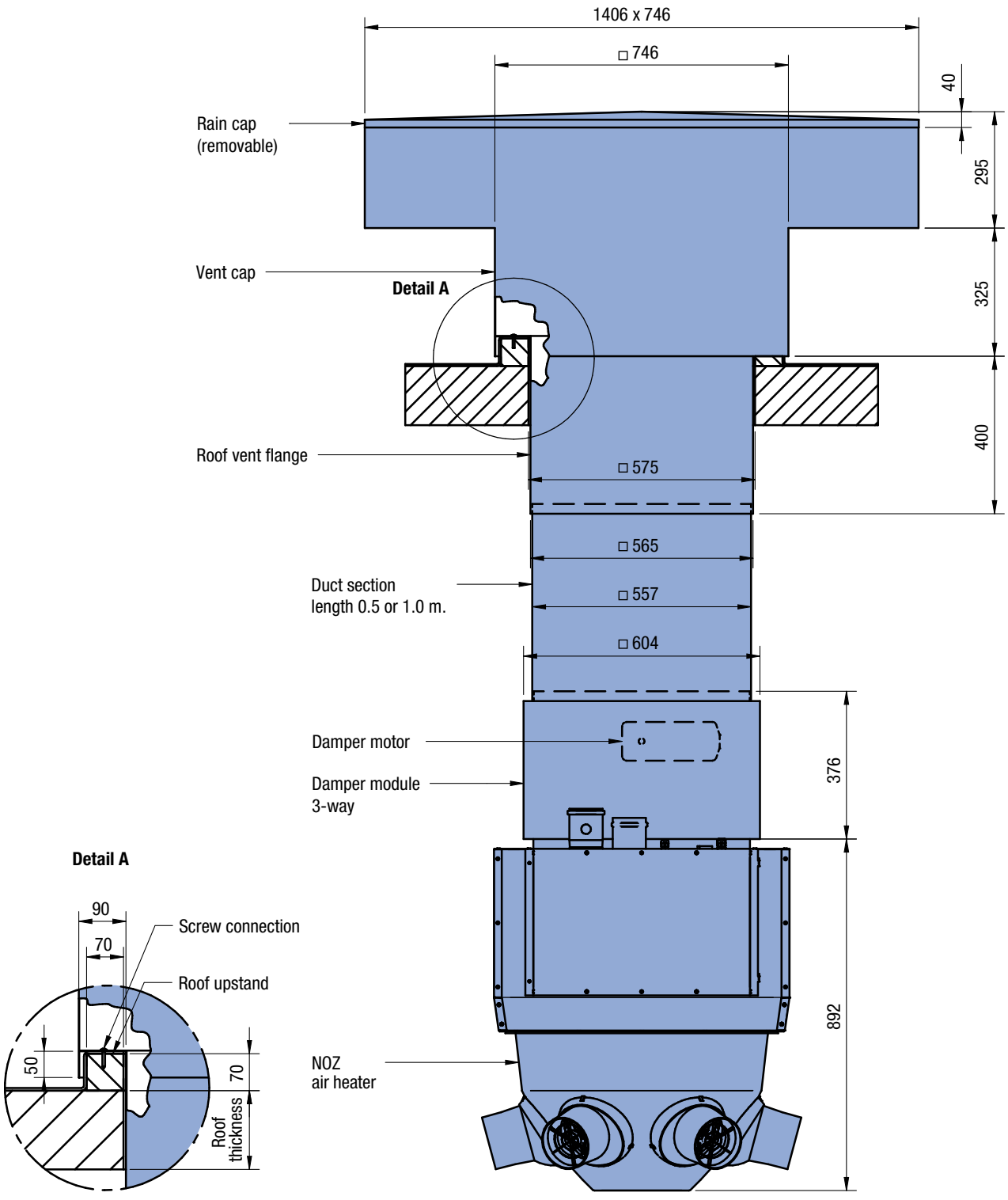
Note

- *All dimensions are in mm.*

[1] *Max. length flue gas discharge is 9 m. For every 90° curve deduct 2m and for every 45° curve deduct 1 m.*

[2] *Max. dry length is 4 m (straight).*

Dimensional sketches ventilation model NOZ-G (Gas Heating)



Note

• All dimensions are in mm.

Biddle air heaters provide a comfortable inner climate in a sports hall.

Specifications

Casing

The casing is made of zinc plated sheet steel and has an inspection panel in the side. The cone, the nozzles and the rings are made of plastic. The unit is delivered as a standard in the colour RAL 9006 (aluminium) and the plastic rings in grey. The unit is also deliverable in the colour blue (RAL 5023) and titan. This is also the standard colour for the gas version. Other RAL colours are available at an extra charge.

Motor / Fan assembly

The diagonal fan is made up of a plastic (NOZ 25)/aluminium (NOZ 50) impeller and an external rotor motor. The fan speed can be controlled by varying the supply voltage. If overheated; the motor is protected by thermal contacts, which will break the electric circuit.

Heating battery

The heating batteries are made up of $^{3}/_{8}$" copper pipes and aluminium fins. The water connections for the NOZ 25 are G $^{3}/_{4}$" and for the NOZ 50 G1". These connections (internally secured against torsion) are located in the side of the unit. The test pressure is 33 bar and the max. operating pressure is 16 bar at 110 °C and 10 bar at 130 °C. The gas connection for NOZ 25 is G $^{1}/_{2}$". The connection is on top of the unit.

• ISO 9001
• ISO 14001

Subject to change.

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