

Simply effective



**Comfort Air Curtains
Model CITY**



Comfort air curtains, model CITY

Comfort Air Curtains

Inviting and comfortable

An open door to a shop or public building breaks down barriers and is inviting. But without proper separation of the indoor and outdoor air, the climate in the building will be affected. Customers and staff will be faced with draughts caused by cold outside air entering the building, while costly hot indoor air can freely escape to the outside. In winter a Biddle comfort air curtain warms the cold outside air before it enters the shop, while at the same preventing the warm inside air from escaping, through the open door. This is pleasant, both for customers and staff as well as for the energy bill. In summer, a continuous re-circulation of indoor air prevents the influences from hot outside air on the inner climate. So, also in summer the air curtain saves energy and maintains a stable inner climate.



Optimal efficiency

Comfort air curtain, model CITY is suitable for buildings on a favourable location with stable weather circumstances, such as shops in sheltered shopping streets. In such locations, the air curtain will not need to respond frequently to changing conditions, so it can operate properly at one fixed speed most of the time. Because of the rectifier technology the comfort is very high (low air velocity) and warm air stays inside which results in an optimal efficiency. The air curtain is easy to control with the 3-speed controller. Because of the austere and neutral design the CITY integrates well in all interiors.



Model CITY provides for optimum climate separation.

Application

Biddle Comfort Air Curtains are highly suitable for use in shops, supermarkets, public buildings, hotels and hospitals.

Features model CITY

- ▶ High comfort and efficiency
- ▶ Low sound level
- ▶ Easy to use and maintain
- ▶ Suitable, as standard, for low water temperature (60°C/40°C)
- ▶ Ready for operation because of plug & play
- ▶ Clever suspension system for fast mounting
- ▶ Heating coil: hot water, electrical and no heating (ambient)
- ▶ Optional: constant outlet temperature control (2- or 3-way valve)



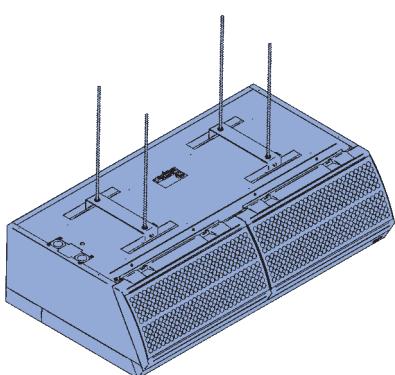
In buildings with open doors, the Biddle air curtain provides a comfortable inner climate.

Fits in any interior

The neutral design ensures that the CITY will fit in any interior. The cassette and recessed models are discreetly integrated into the ceiling. All units are finished in either white or aluminium as standard, but any alternative colour can be provided. The modular concept of the inlet grilles produces a continuous pattern of grilles if multiple units are installed next to each other.

Little maintenance

The filter is accessed by easily removing the air inlet grille. The filter prevents dust from settling on the fans and the heating coil within the unit, thus contributing to the smooth operation of the unit. The filter is easy to clean with a vacuum cleaner.



Easy installation

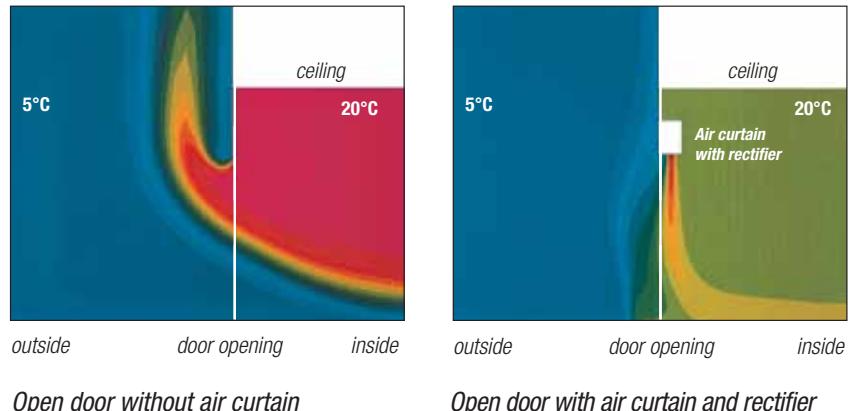
The CITY model is as standard delivered ready for operation, which makes the unit easy and quick to install. The suspension brackets supplied allow the CITY to hang from mounting rails using threaded rods. The suspension brackets can be moved across the width of the unit, so that the unit can be accurately mounted in the desired position. For wall mounting purposes, wall mounting brackets are available.

Technology

What happens when a door is open?

When a door is open, the difference between the indoor and outdoor temperatures means that air is exchanged, whereby heat is lost to the outside while, at the same time, cold outside air flows in. In most situations, there is also some underpressure in the building, which results in even more cold air entering through the open door.

Source: TNO-research, 1995
(Dutch National Research Centre)



What does the air curtain do?

The first function of the air curtain is to prevent heat from being lost to the outside. The unit draws the warm air that is about to escape to outside and blows this air out, straight down to the floor. Circulation ensures that this air stays inside the building. The second function of the air curtain is to heat up the outside air flowing in through the open door to a comfortable temperature level.



The patented rectifier prevents turbulence.

Patented Rectifier Technology

All Biddle air curtains come with the patented rectifier technology. This technology ensures that the turbulent air flow from the fans is converted into a practically laminar air stream. This ensures the floor can be reached with far less air, and that the comfort (lower air velocity) and the efficiency are much higher compared with conventional air curtains. An air curtain without a rectifier must, due to the turbulent flow, move much more air at higher speed to achieve the same result. This leads to substantial heat loss and to less comfort.

Selection

Type code

CITY M-150-W-F

Capacity

S = Small (up to 2.4 m)

M = Medium (up to 2.8 m)

L = Large (up to 3.3 m)

Unit width (cm)

100 - 150 - 200 - 250

Coil type

W = hot-water heating

E = electric heating

A = ambient

Model type

F = free-hanging model

R = recessed model

C = cassette model

Final selection depends on local circumstances.

An air curtain is selected properly if it is able to screen off the entire width and height of the door opening. The air curtain must be at least as wide as the doorway, to prevent cold air bypassing the air stream. In addition, the unit must have sufficient capacity to heat the entering cold outside air to a comfortable temperature level. It is also important for the distance between the air curtain and the door to be as short as possible.

Various options

The CITY is available in three capacities: S(mall), M(edium) and L(arge) which are designed for door heights of 2.0 to a maximum of 3.0 m. By installing multiple units next to each other, there is always a solution for any door width. All types come in four widths: 1.0, 1.5, 2.0, and 2.5 m. Biddle can deliver freehanging, recessed and cassette models, which all have a hot-water or electric heating battery.

Type	Door height ¹	Door width ²	Heating battery	Models
CITY S	200 - 240 cm		W (water)	free-hanging (F)
CITY M	240 - 280 cm	100 - 150 - 200 - 250 cm	E (electric)	recessed (R)
CITY L	280 - 330 cm		A (ambient)	cassette (C)

¹ mounting height, measured from floor to bottom of unit.

² by banking air curtain units, also a door opening wider than 2.5 m. can be covered.

Colour combinations

The CITY air curtain is as standard available in two colours: white (RAL 9016) with a greish white (RAL 9002) air inlet grille and in aluminium colour (RAL 9006) for trendy uses. Other colours are available on request.

Accessories

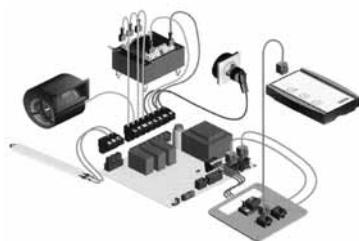
The CITY is delivered with mounting brackets for suspension from the ceiling.

The recessed models (type R) are provided with duct connections (the delivery does not include the ducts). For control and mounting purposes, the following additional accessories are available:

- Touch pad controller for one or more units
- Low-voltage, two-plug cables: 5, 15, 25 or 35 m
- Constant outlet temperature control (2- or 3-way valve)
- Door contact switch
- Wall mounting brackets



The touch controller can be mounted to the wall in any desired location



Electric control

The CITY model is equipped with electronic speed control. The standard controller, which features three keys, allows the user to set the desired fan speed easily. The controller of an electrical unit offers two additional keys to operate the electrical elements.

Plug-in-system

The upper side of the unit houses a connector plate with three connectors. The controller can be simply connected with the unit's connector plate using a low-voltage cable that has RJ11 plugs. One single controller allows the user to operate a maximum of ten units. The maximum control cable length within a control system is 100 metres. External components such as a timer, a low-limit thermostat, a door switch or a Building Management System (BMS) can be connected to the connector plate as well. The interface controls the speed of the fans via the transformer. In electrically heated units, the interface also controls the heating element.

Connections

To connect hot-water heated units to the mains supply, they come with a fixed, approx. 2m long cable that has a moulded, earthed plug.

The CH connections and the connector plate are located at the top of the unit. So, the unit need not be opened during installation.

Technical data

CITY S

Base data			CITY S-100			CITY S-150			CITY S-200			CITY S-250		
max. door width	cm	100			150			200			250			
max. door height	cm	200 - 240			200 - 240			200 - 240			200 - 240			
room temperature	°C	20			20			20			20			
water range	°C	90/70			90/70			90/70			90/70			
General selection data	Speed	1	2	3	1	2	3	1	2	3	1	2	3	
air displacement	m ³ /h	671	823	1164	1007	1235	1746	1342	1646	2328	1678	2058	2910	
heating capacity (water heating) ¹	kW	3.5	4.3	6.1	5.2	6.4	9.1	7	8.6	12.1	8.7	10.7	15.1	
sound pressure level at 3 m	dB(A)	34	37	47	36	39	49	37	40	50	38	41	51	
Installation data			W	E	W	E	W	E	W	E	W	E		
weight model F	kg	40	43	58	60	73	78	90	94					
model R		54	57	80	82	102	107	126	130					
model C		52	55	75	77	96	101	118	122					
electrical supply	V	230	400	230	400	230	400	230	400					
max. heating capacity ²	kW	11.6	-	18.9	-	26.2	-	33.4	-					
heating capacity ³	speed 1	kW	-	3.3	-	4.9	-	6.7	-					
	speed 2	kW	-	6.7	-	9.9	-	13.3	-					
max. water volume (m_{W_1})	l/h	513	-	833	-	1153	-	1474	-					
max. water pressure loss, incl. valve (Δp_{W_1})	kPa	0.4	-	1.3	-	3	-	5.5	-					
max. power, motors	kW	0.23	0.23	0.35	0.35	0.46	0.46	0.58	0.58					
max. power consumption heating	kW	-	7	-	10.4	-	14	-						
max. current, motors (1 phase)	A	1.06	1.06	1.59	1.59	2.12	2.12	2.65	2.65					
max. current cons. incl. fans (3 phases)	A	-	12	-	17.8	-	23.9	-						

Technical data

CITY M

Base data			CITY M-100			CITY M-150			CITY M-200			CITY M-250		
		cm	100			150			200			250		
max. door width	cm	100	240 - 280			240 - 280			240 - 280			240 - 280		
max. door height	cm	240 - 280	20			20			20			20		
room temperature	°C	20	90/70			90/70			90/70			90/70		
water range	°C	90/70	90/70			90/70			90/70			90/70		
General selection data		Speed	1	2	3	1	2	3	1	2	3	1	2	3
air displacement	m ³ /h	875	1223	1605	1313	1835	2408	1750	2446	3210	2188	3058	4013	
heating capacity (water heating) ¹	kW	4.6	6.4	8.4	6.8	9.5	12.5	9.1	12.7	16.7	11.4	15.9	20.8	
sound pressure level at 3 m	dB(A)	35	44	50	36	46	51	38	47	53	39	48	54	
Installation data			W	E		W	E		W	E		W	E	
weight model F	kg	44	45		63	67		82	87		97		106	
model R		59	60		85	89		111	116		133		142	
model C		56	57		80	84		105	110		125		134	
electrical supply	V	230	400		230	400		230	400		230		400	
max. heating capacity ²	kW	14.2	-		23.2	-		32.2	-		41.2		-	
heating capacity ³	speed 1	-	5		-	7.4		-	10		-	12.4		
	speed 2	-	8.3		-	12.4		-	16.6		-	20.7		
max. water volume (m_{W_1})	l/h	627	-		1023	-		1420	-		1818		-	
max. water pressure loss, incl. valve (Δp_{W_1})	kPa	0.6	-		1.9	-		4.3	-		8.1		-	
max. power, motors	kW	0.37	0.37		0.56	0.56		0.75	0.75		0.94		0.94	
max. power consumption heating	kW	-	8.75		-	13		-	17.5		-	21.75		
max. current, motors (1 phase)	A	1.64	1.64		2.46	2.46		3.28	3.28		4.1		4.1	
max. current cons, incl. fans (3 phases)	A	-	15.2		-	22.5		-	30.3		-	37.7		

Technical data

CITY L

Base data			CITY L-100			CITY L-150			CITY L-200			CITY L-250		
		cm	100			150			200			250		
max. door width	cm	100	280 - 330			280 - 330			280 - 330			280 - 330		
max. door height	cm	280 - 330	20			20			20			20		
room temperature	°C	20	90/70			90/70			90/70			90/70		
General selection data		Speed	1	2	3	1	2	3	1	2	3	1	2	3
air displacement	m ³ /h	1591	2056	3100	2387	3084	4650	3182	4112	6200	3978	5140	7750	
heating capacity (water heating) ¹	kW	8.3	10.7	16.1	12.4	16	24.2	16.5	21.4	32.2	20.7	26.7	40.3	
sound pressure level at 3 m	dB(A)	36	43	53	38	45	54	39	46	56	40	47	57	
Installation data			W	E		W	E		W	E		W	E	
weight model F	kg	63	69		94	104		119	137		151		170	
model R		81	87		139	149		153	171		194		213	
model C		79	85		116	126		149	167		188		207	
electrical supply	V	230	400		230	400		230	400		230		400	
max. heating capacity ²	kW	24.9	-		40.7	-		56.6	-		72.5		-	
heating capacity ³	speed 1	-	10		-	14.8		-	20.0		-	24.8		
	speed 2	-	20		-	29.6		-	39.9		-	49.6		
max. water volume (m_{W_1})	l/h	1096	-		1794	-		2495	-		3197		-	
max. water pressure loss incl. valve (Δp_{W_1})	kPa	1.2	-		3.5	-		7.6	-		13.8		-	
max. power, motors	kW	0.75	0.75		1.13	1.13		1.5	1.5		1.88		1.88	
max. power consumption heating	kW	-	21		-	31.2		-	42		-	52.2		
max. current, motors (1 phase)	A	3.3	3.3		4.95	4.95		6.6	6.6		8.25		8.25	
max. current cons. incl. fans (3 phases)	A	-	33.7		-	50.2		-	67.5		-	83.9		

¹ Heating capacity is based on an outlet temperature of 35°C. For good functioning, Biddle recommends the accessory 'constant outlet temperature control'.

² To be used only for deviating water range, see page 8.

³ Speed 2 of the heating capacity is only possible with speed 2 and 3 of the unit. Outlet temperature is limited at 40°C.

Explanation of technical data

Heating capacity

Water range	Room temp. °C		
	+15	+18	+20
90/70 °C	1.10	1.04	1
80/60 °C	0.90	0.83	0.79
70/50 °C	0.69	0.63	0.59
60/50 °C	0.67	0.61	0.57
50/40 °C	0.48	0.42	0.38

The maximum heating capacity stated in the tables on page 6 and 7 are based on a water range of 90/70°C. If different water temperatures are concerned, the max. heating capacity may be multiplied by the factors from the table alongside. The air displacement and the heating capacities for each speed from the table on page 6-7 are lower, by 10% at the most, for electrically heated units.

Boiler capacity

For selecting the CH boiler one may depart from the heating capacity at an air outlet temperature of 35°C.

Water volume

Explanation formula:

m_W = water volume [l/h]

Q = heating capacity [kW]

ρ_W = density of water at 90°C
(=0,984) [kg/l]

c_{pw} = specific heat of water
(=4,18) [kJ/kg°C]

ΔT_W = temperature difference water [°C]

The water volumes stated in the tables on page 6 and 7 are based on a water range of 90/70°C and a room temperature of 20°C. If different values are concerned, the water volume may be roughly calculated using the formula below. To do so, the heating capacity must first be calculated (see above).

$$m_W = \frac{Q}{\rho_W c_{pw} \Delta T_W} \cdot 3600 \text{ [l/h]}$$

Water pressure loss

Explanation formula:

Δp_{W_1} = water pressure loss, table values

Δp_{W_2} = water pressure loss

m_{W_1} = water volume, table values

m_{W_2} = water volume (see formula)

The water pressure loss stated in the tables on page 6 and 7 is based on a water range of 90/70 °C. If different water temperatures are concerned, the water pressure loss may be roughly calculated using the formula below. To do so, the water volume must first be calculated (see page 7).

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

Sound

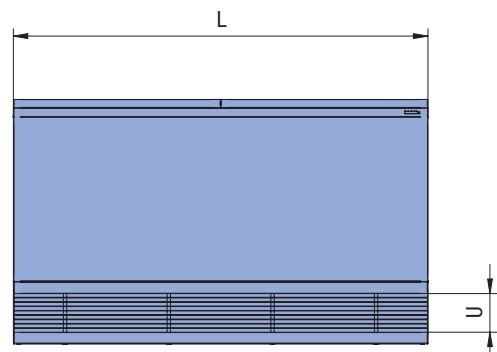
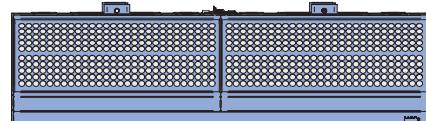
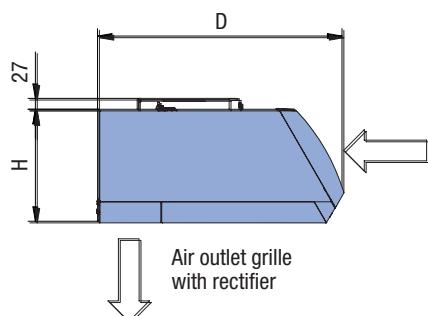
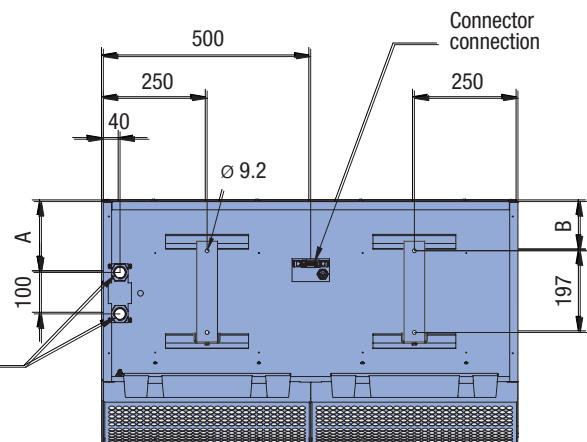
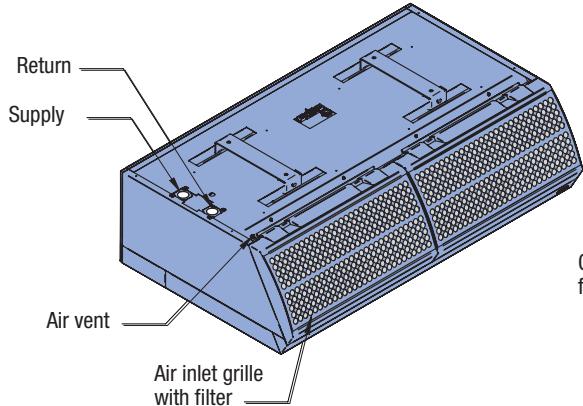
The sound data stated in the tables on page 6 and 7 are based on the direct field, in situations with open doors and sound-absorbing ceilings. Sound data for other conditions may be determined by adding the following values to the table values below. Closed door: + 1 à 2 dB(A), Acoustical "hard" ceiling: + 2 à 3 dB(A).

For other distances, or for multiple units next to each other, see table below.

Distance	Total unit width					
	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m
1.0 m	+4.8	+6.2	+7.1	+7.6	+8.0	+8.3
2.0 m	+1.8	+3.4	+4.5	+5.3	+6.0	+6.4
3.0 m	0	+1.7	+2.9	+3.8	+4.5	+5.0
4.0 m	-2.5	-0.8	+0.4	+1.4	+2.1	+2.7
5.0 m	-4.4	-2.7	-1.5	-0.5	+0.2	+0.8

Correction factors for sound pressure in dB(A)

Dimensional sketches free-hanging model (F)

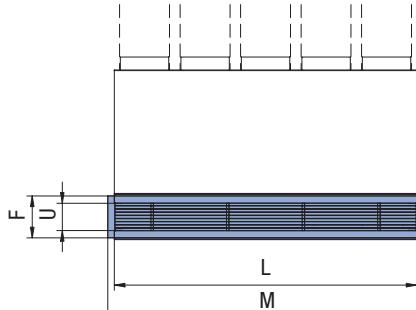
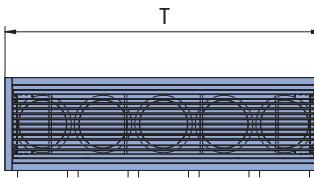
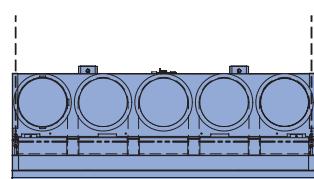
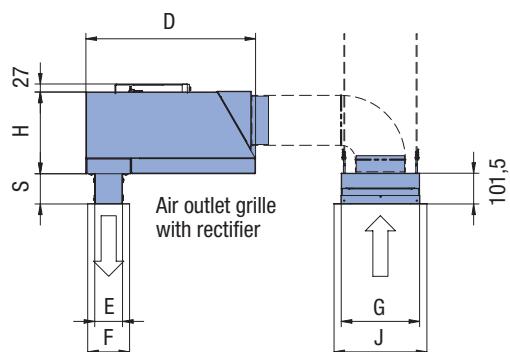
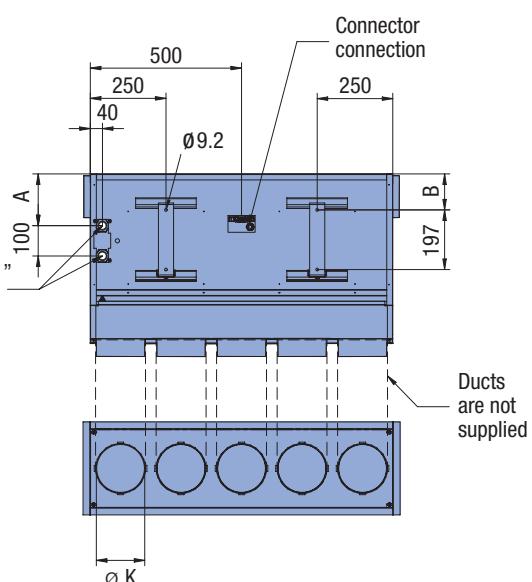
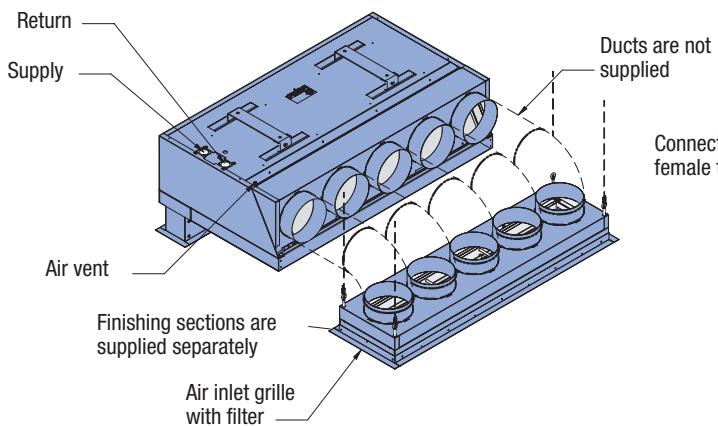


Type	L	H	D	U	A	B
CITY S/M	1000-1500-	270	590	93	171	119
CITY L	2000-2500	370	774	124.5	245.5	200

Notes

- All dimensions in mm.
- The 2500 mm wide units have 3 suspension brackets, the third one is at the mid-point.

Dimensional sketches recessed model (R)



Number of ducts per unit

Type	100	150	200	250
CITY S/M	5	7	10	12
CITY L	3	5	6	8

Number of inlet grilles per unit

Type	number	length of inlet grille
CITY 100/150	1	1000/1500
CITY 200/250	2	1000/1250

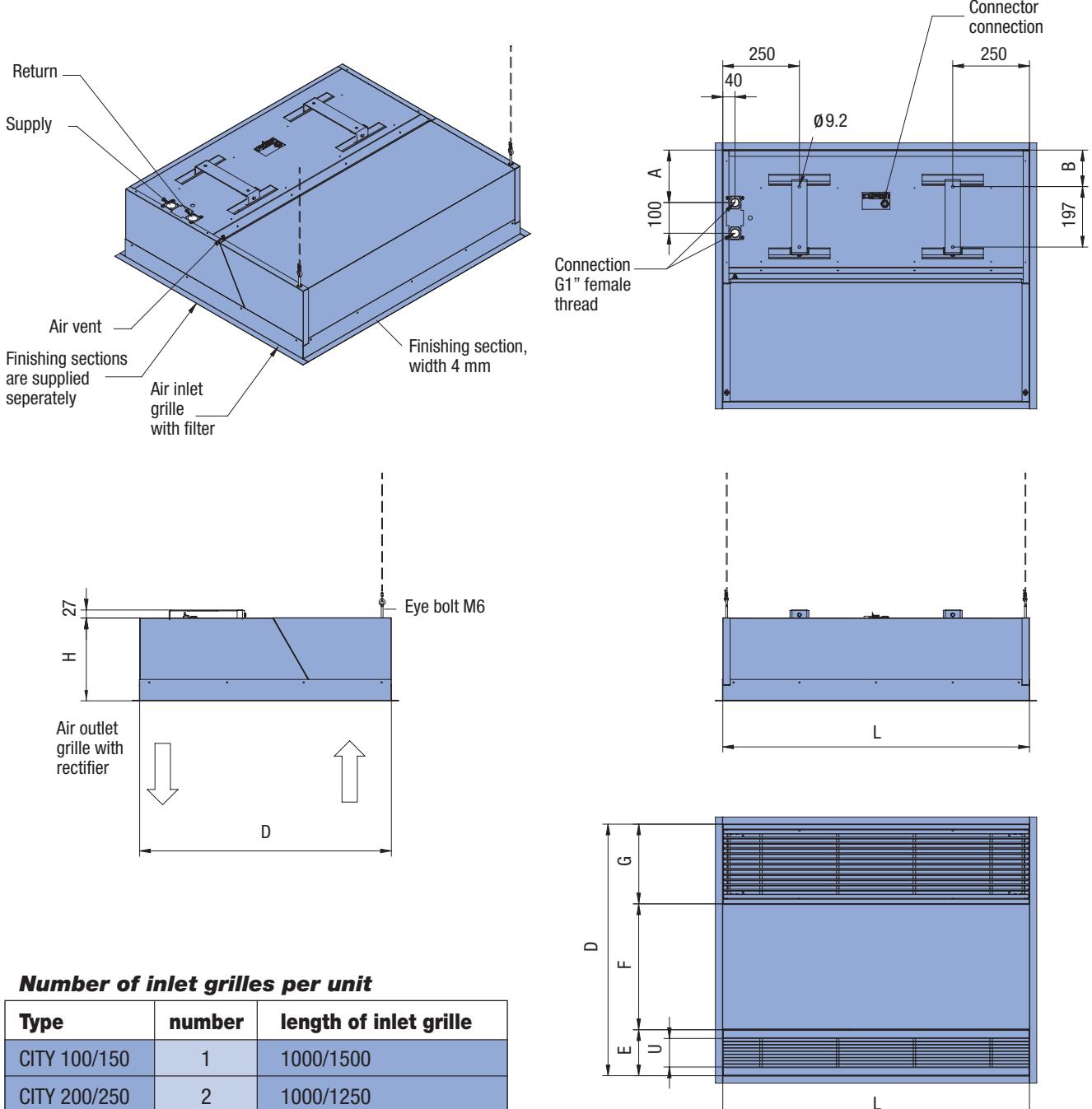
* 1 outlet grille per unit.

Type	L	H	D	S	U	A	B	E	F	G	J	K	M	T
CITY S/M	1000-1500-	270	561	80-125	90	171	119	92	139	260	308	Ø160	1044-1544-	1048-1548-
CITY L	2000-2500	370	745		121.5	245.5	200	123.5	170	360	408	Ø250	2044-2544	2048-2548

Notes

- All dimensions in mm.
- The 2500 mm wide units have 3 suspension brackets, the third one is at the mid-point.
- Daylight openings (if cover moldings are used): - for air discharge 100 x (L+8) mm – for air inlet 268 x (L+8) mm.
- If the recessed model is to be built into a bulkhead, it is also available in a design that has no inlet air plenum or flexible ducts.
- To prevent false air from entering the unit, the bulkhead will need to be air-tight, so the air has to first pass through the inlet grille and filter.

Dimensional sketches cassette model (C)



Number of inlet grilles per unit

Type	number	length of inlet grille
CITY 100/150	1	1000/1500
CITY 200/250	2	1000/1250

* 1 outlet grille per unit

Type	L	H	D	U	A	B	E	F	G
CITY S/M	1000-1500-	270	821	93	171	119	150	411	260
CITY L	2000-2500	370	1105	124.5	245.5	200	181.5	563.5	360

Notes

- All dimensions in mm.
- The 2500 mm wide units have 3 suspension brackets, the third one is at the mid-point.
- Daylight openings if cover moldings are used in a suspended ceiling: (L+8) x 829 mm.

Specifications

Casing

The casing is made of zinc-plated sheet steel, extra strengthened to minimise vibration, and it has an inspection panel in the bottom. The plastic air inlet grilles have a perforated zinc-plated steel insert. The unit is as standard available in the following colours: a combination of white (RAL 9016) and greyish white (RAL 9002), and in aluminium colour (RAL 9006). Other RAL colours are available on request.

Motor / fan assembly

Two or more (depending on type) dual-inlet, vibration-free centrifugal fans. Each fan is driven by a suspended rotor motor on ball bearings. The fan casing and the impeller are made of zinc coated plate steel. The motor is manufactured according to EN 60-335-1, protection class IP44 (CITY S) or IP54 (CITY M/L), and insulation class F. The motors are, as a standard, fitted with thermal contacts. These thermal contacts will break the circuit of the motor when the maximum permissible motor temperature is exceeded.

Coil

The 2-row LPHW heating coil is made up of 3/8" copper pipes and aluminium fins. The water supply connections are G1" female thread. The test pressure is 30 bars and the operating pressure is 16 bars max. at 120 °C. The electric heating coil is composed of aluminium fins. The coil is controlled by the electronic control unit, and is fitted with overload protection. When the unit is switched off, the fans will continue to rotate until the fins have cooled off sufficiently.



- ISO 9001
- ISO 14001



Subject to change.

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