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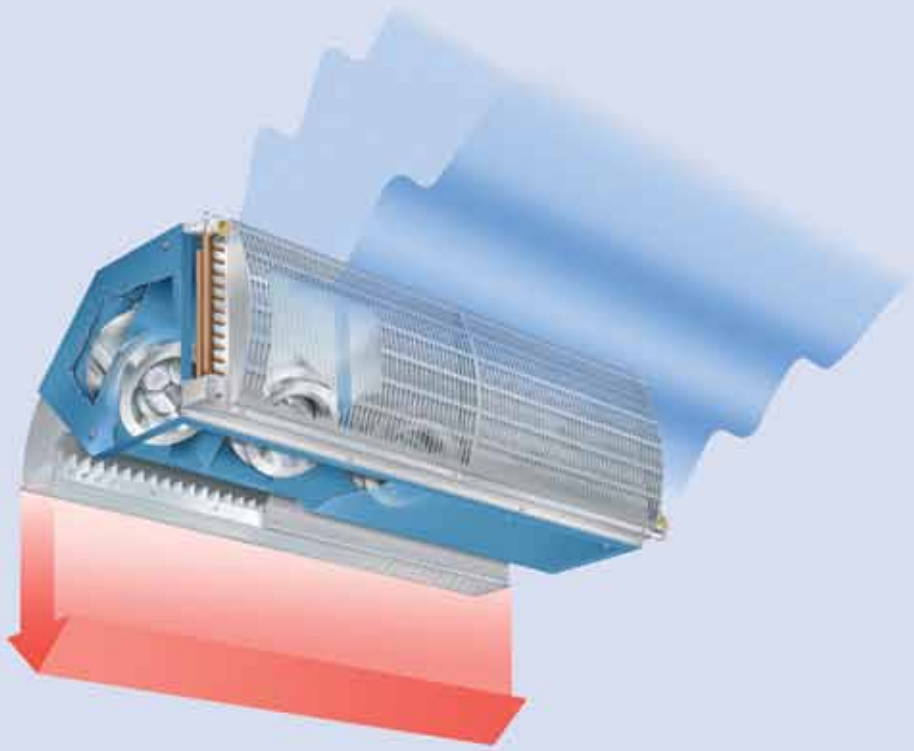

Optimal work climate with open doors




invisidor® IndAC
INDUSTRIAL AIR CURTAINS

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Industrial air curtain

Optimal work climate

During loading and unloading the door remains open, without the indoor climate being disturbed.

Industrial building doors are often open for long periods of time to facilitate transport in and out of the building. However, open doors can result in a loss of heat to the outside and the ingress of cold air. This disturbs the climate within the building, which leads to draughts. Internal transport does not want to be hindered by closed doors either, the internal doors between production halls and storage spaces for instance, are open all day long. If there is a difference in temperatures between these rooms, air will exchange. An air curtain provides climate separation that substantially limits the natural air exchange of warm and cold air through the open door. An air curtain is also an efficient solution in chill rooms. The air curtain is supplied without a heating battery (ambient), so the climate in the chill room remains constantly low. The open doors will contribute to safer and faster logistics and easier internal traffic flows. As an added benefit, the climate separation between the chill room and adjoining rooms will have a positive effect on energy usage. The IndAC industrial air curtain, is highly suitable for these kinds of situations. Many years of experience in combination with scientific research, forms the basis for the IndAC. The IndAC makes the entrance accessible for transport and prevents cold air entering the building. Free access, comfortable working conditions and less absence due to illness are the results.

Model IndAC combines well with overhead door systems.

Benefits of IndAC

- *Easy access*
- *Prevention of draughts (on workplace)*
- *Low energy consumption*
- *Flexible suspension system*
- *Easy to control*
- *Maintenance-friendly (no filter)*

Energy saving solution

Doorways of industrial buildings are usually faced with direct wind attack, or suffer from under-pressure, resulting in large air volumes being introduced into the working area. In order to provide optimum screening, a unit capable of providing large air volumes is required in most situations.
Therefore, Biddle has optimised the discharge pattern for industrial applications. The air passes through the curved discharge section with minimal resistance. The patented Double Rectifier ensures that turbulent air from the fans is directed into a laminar air stream, discharging in a straight vertical line to the floor. Additionally, the homogeneous discharge pattern across the door provides optimum heating of cold outside air, eliminating draughts and preventing expensive energy being lost to the outside. The curved design of the discharge section also means that it is easily installed close to the door, preventing air leakages. The result is a well screened doorway with a minimum loss of heat.

Model IndAC can be installed both horizontally and vertically.

Both above and next to the door

IndAC air curtains can be installed directly above or next to the door. Different installation positions are possible depending on the room layout around the door (see page 7).

Modular design

The modular design of the IndAC facilitates the installation of multiple devices next to or above each other, in order to cover any door height or width.

Easy to mount and clean

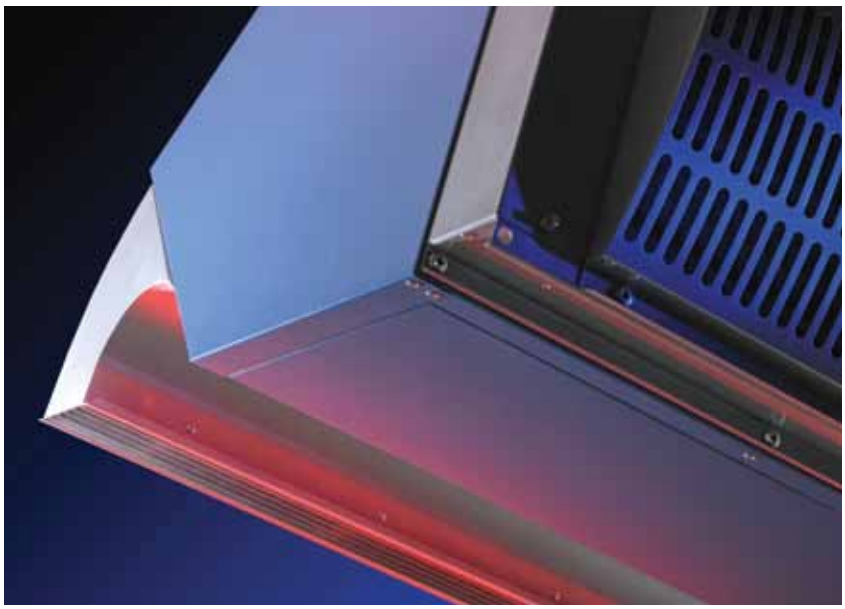
The various parts of the IndAC are very easy to access, making it easy to install, maintain and clean. The unit contains a minimum of ‘internal obstacles’, resulting in a smooth air flow through the unit in which dust has little chance of collecting.

Filter module

In normal situations, model IndAC does not need filters. However, in environments where the air quality is critical, or where the air is heavily polluted, the filter module (only IndAC S/M) may be applied in order to improve the quality of the discharged air and/or to facilitate keeping the unit clean. The filter module is suitable for all installation positions of the IndAC.

Distinctive industrial style

The IndAC is an industrial product with a robust and modern design. The colours are matched to the latest developments within the industry. Thus the casing is supplied in Blue (RAL 5023), with the components finished in a ‘metallic’ colour.
Other colours are available upon request.



Airflow Technology

Patented Double Rectifier

When a door is open, the difference between the outside and inside temperature leads to an exchange of air, resulting in cold air entering and warm heated air flowing out. An air curtain above or next to the open door provides separation of the two climates. Whilst developing the Invisidor IndAC, Biddle has researched the outlet discharge pattern. The result is the Double Rectifier.

Patented Double Rectifier

With industrial doorways the air volumes required to deal with climate separation are high. The Double Rectifier, which minimises turbulence in the discharge air stream and surrounding air, ensures that the air movement generated by the fans is directed downward in a deeply penetrating laminar air stream, reducing energy consumption and increasing comfort levels all year round (see figure 1 & 2).

The pressure chamber behind the rectifier evenly distributes the air stream across the whole width of the unit, ensuring air does not bypass at the ends of the unit.

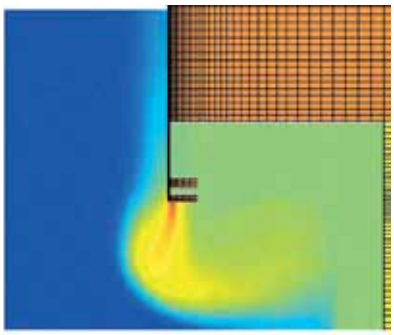


Fig. 1
Industrial air curtain without rectifier

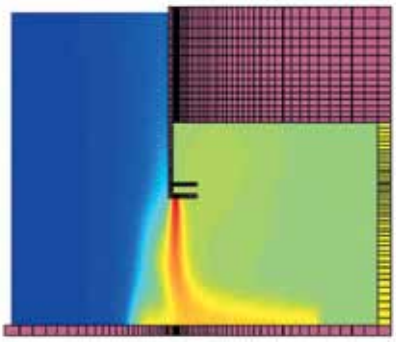


Fig. 2
IndAC with Double Rectifier

Fan Technology - Improved Fan Design

Radial backward curved fans are used in conjunction with the Double Rectifier to provide an evenly distributed aire stream pattern across the whole unit width, without dead spots associated with more commonly used individual axial, or centrifugal fans.

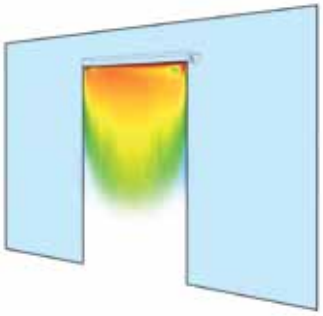


Fig. 3
Industrial air curtain without rectifier

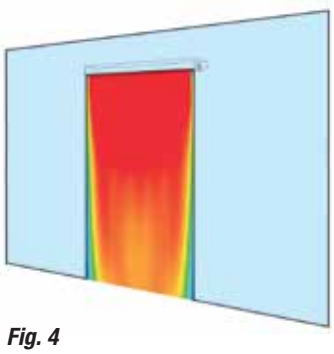


Fig. 4
IndAC with Double Rectifier and backward curved fans

Selection

An air curtain should be selected so that it has sufficient capacity to heat up the cold entering air to a comfortable temperature. Additionally, the unit should be able to screen off the entire doorway. The selection of an appropriate air curtain depends on:

1. Door height or width

The door height or width is measured from the bottom or side of the unit. These are known data, so based on the table below it is easy to select an air curtain. It is important for the air curtain to be positioned close to the door with a minimal gap. In addition, the air curtain should be at least as wide or high as the door opening, as an air curtain that is too short will lead to air leakages on the sides or at the top.

2. Situation (building)

The conditions at a doorway vary continuously, leading to difficulty in determining the volume and temperature of outside air entering the building. Other aspects such as multiple open doors in a single room, or the orientation of the building may also have a large influence on the capacity need. To make selection easier for you, please use the following guidelines.

- **Favourable conditions:** no direct wind attack, a sheltered location, internal (inside) doors.
- **Normal conditions:** little direct wind attack, no open doors opposite one another.
- **Unfavourable conditions:** direct wind attack on open door, multiple open doors, large mechanical extraction rates, location in open country.

Door height / width[1]	***Conditions***		
	Favourable	***Normal***	***Unfavourable***
3 - 4 m	IndAC S	IndAC S	IndAC M
4 - 5 m	IndAC S	IndAC M	IndAC L
5 - 6 m	IndAC M	IndAC M	IndAC L/XL
6 - 8 m	IndAC L	IndAC L	IndAC XL

[1] *Mounting height, measured from the bottom or side of the unit.*

The above selection table is for indicative purposes only. If in doubt, please contact Biddle for advice.

Various options

Variants

The industrial air curtain is available in four capacities: S(mall), M(edium), L(arge) and XL (Extra Large). There are three lengths to choose from; 1.5, 2.0 and 2.25 meters. The air curtains are supplied with a water heating coil, an electric heating coil, or without a heating coil (ambient). The Invisidor IndAC can be positioned horizontally and vertically (see page 7). Further, the device is available with a Basic, Plus or Automatic control unit (see page 8).

Type	Unit length[1]	Coil type	Control	Installation positions
IndAC S	150	W1, W2, W3 (water)	Basic / Plus	Horizontal
IndAC M	200	E (electric)[2]	Basic / Plus /	Vertical
		A (ambient)	Automatic	- left or right
IndAC L	150	W1, W3 (water)	Basic / Plus /	- square or parallel
IndAC XL	225	A (ambient)	Automatic	to wall

[1] *By banking air curtain units, also a door opening wider than 2.5 m can be covered.*
[2] *Electric heating units can not be controlled by the Basic controller.*

Typecode
IndAC S-150-W1-2R

Types
S = Small
M = Medium
L = Large
XL = Extra Large

Unit length (cm)
150 - 200 - 225

Coil type
W1 = Water heating - high water temperatures
W2 = Water heating - medium water temperatures
W3 = Water heating - low water temperatures
E = Electrical heating
A = Ambient, no heating coil

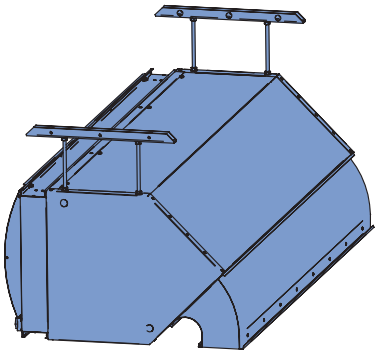
Installation position
0 = Horizontal, above door
1L = Vertical, left side, square to wall
1R = Vertical, right side, square to wall
2L = Vertical, left side, parallel to wall
2R = Vertical, right side, parallel to wall

Standard delivery and accessories

Model IndAC is delivered with:
- two suspension brackets - for horizontal installation
- two coupling plates - for vertical installation
- wall bracket - for vertical installation
- connection cable to interlink adjoining units

These components are also needed:
- Basic, Plus or Automatic controller
- base plate / plinth - for vertical installation (see page 18)

Options:
- door contact switch
- room thermostat
- filter module (filter G4) for IndAC S/M



Flexible suspension system

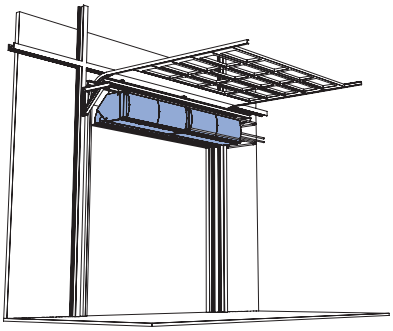
With horizontal installation, the unit is suspended above the door by using four threaded rods (M12) and the suspension brackets supplied (see page 18).

As a flat surface is essential with vertical installation, it is recommended to place the IndAC on a base plate. By using the supplied coupling plates and wall bracket it is easy to fix and secure the unit.

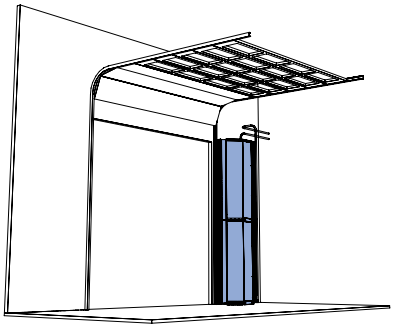
Diversity in installation positions

The room layout around a door determines where and how an air curtain can be best installed. Thanks to a diverse range of installation positions, the IndAC air curtain can be matched to the constructional possibilities offered by the local situation.

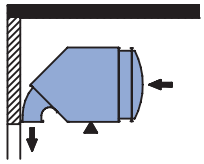
Model IndAC should be positioned above or next to the door, covering the full length or width of the doorway. Depending on the situation, the air curtain is either installed horizontally above or vertically next to the door. There are a total of five installation positions, which are shown below.

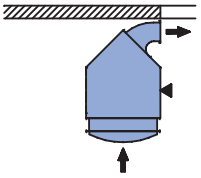
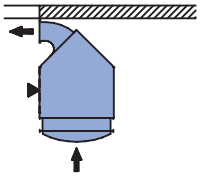


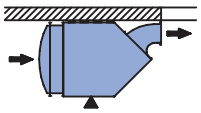
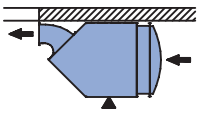
Horizontal installation (position 0): excellent to combine with overhead door systems.



Example of vertical installation (position 2R): to the right and parallel to wall.

Installation position	***0***
Horizontal above door opening	

Installation position	***1L***	***1R***
Vertical side of door opening: square to wall	 Left	 Right

Installation position	***2L***	***2R***
Vertical side of door opening: parallel to wall	 Left	 Right

◄ Air direction ▲ Inspection side Wall Door Ceiling

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Control options

Three types of controller are available: Basic, Plus or Automatic.

Basic controller: Five speed controller with neon indicator and a connection for a door contact switch.

1. Basic controller

The five-speed controller allows you to match the air volume to different conditions. The controller has a rotary control switch for five speeds, a neon indicator and an input for a door contact switch. Electric heated units can not be controlled by the Basic controller.

Plus controller: The control panel has two switches with five speeds. Dimensions: 600 x 330 x 205 mm.

2. Plus controller

The Plus controller has two switches with five speeds:
1 = with open door
2 = heat demand when door closed

This controller is supplied with two rotary control switches. To switch from button 1 to 2, a door contact switch should be connected to the first input. A room thermostat is connected to the second input. The air curtain will not switch off until the room has reached the desired indoor temperature. On request, this controller can be delivered with more control options.

The PLC-service panel is part of the automatic control.

3. Automatic controller

Automatic control makes the IndAC very easy to use. This automatic control provides for optimum climate separation and makes it easy for the user to keep the indoor climate comfortable in a consistent and energy-efficient way.

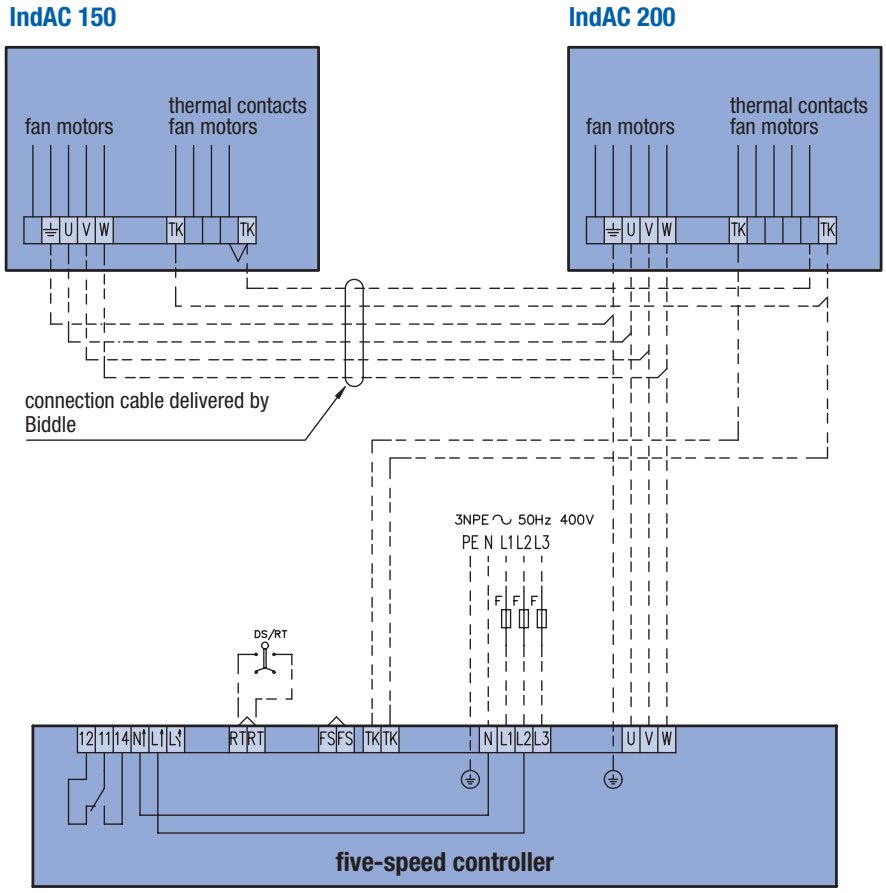
The fully automatic control unit consists of a PLC controller, a speed controller, an outdoor sensor, and two sensors in the air curtain.

The air volume and the discharge air temperature are automatically linked to one another by the PLC controller. The control unit adjust the heat demand to different (weather) conditions.

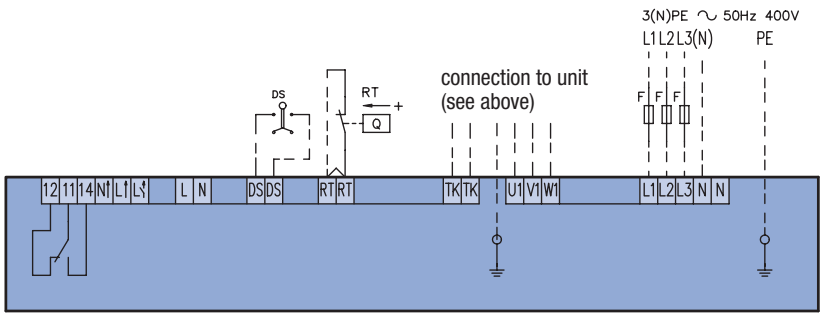
It is also possible to add other sensors on a project by project basis, such as floor, intake-air-temperature or room sensors. In consultation with you, the possibilities of this automatic control will be tailored to your local situation.

Electrical connections

Interlinking units and connecting Basic controller



Connecting Plus controller



——— wired by Biddle
——— restriction of unit
– – – – – not wired by Biddle
DS/RT on / off door contact switch or room thermostat

The IndAC is supplied fully wired. The connection cable included makes it easy to interlink. Apart from this cable, only the mains supply cable needs to be connected.

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Technical data IndAC S/M

Water Heating

General data		S-150	S-200	M-150	M-200
unit length	m	1.5	2.0	1.5	2.0
door width / -height[1]	m	3.0 - 4.0		4.0 - 6.0	
air inlet temperature	ºC	15			
electrical supply	V/ph/Hz	400 / 3 / 50			
max. current motors	A	0.96	1.28	1.56	2.08
max. power motors	kW	0.33	0.44	0.81	1.08

	speed	1	2	3	4	5
tapping voltage	V	95	145	190	240	400

The air displacement values are less when a filter module is used: IndAC S: 10% and IndAC M: 15 %.

IndAC S-150		W1 LPHW 82/71°C					W2 LPHW 80/60°C					W3 LPHW 60/40°C				
	speed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	1840	2840	3640	4280	5150	1830	2840	3640	4320	5150	1830	2840	3640	4320	5150
air outlet temperature[2]	ºC	45	40	38	36	34	50	45	42	40	38	41	37	35	33	32
heating capacity	kW	18.8	24.5	28.3	31.3	34.2	22.2	29.3	33.9	37.4	41.2	16	21.3	24.7	27.3	30.1
water flow rate	l/h	1512	1980	2268	2484	2736	971	1282	1485	1639	1807	695	923	1071	1183	1304
water pressure loss	kPa	2.3	3.8	5.0	5.9	7.0	1	1.7	2.2	2.7	3.2	0.6	1	1.3	1.5	1.8
sound pressure level at 5m	dB(A)	34	44	50	54	59	34	44	50	54	59	34	44	50	54	59
weight	kg	92					95					97				

IndAC S-200		W1 LPHW 82/71°C					W2 LPHW 80/60°C					W3 LPHW 60/40°C				
	speed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	2450	3780	4860	5760	6880	2440	3790	4850	5760	6870	2440	3790	4850	5760	6870
air outlet temperature[2]	ºC	46	41	39	37	35	52	47	44	42	40	43	39	37	35	34
heating capacity	kW	26.1	34.2	39.5	43.5	47.9	30.9	41.1	47.7	52.7	58.2	23	30.8	35.9	39.8	44
water flow rate	l/h	2088	2736	3168	3492	3816	1356	1799	2090	2309	2551	998	1337	1558	1725	1908
water pressure loss	kPa	4.9	8.2	10.7	12.9	15.4	2.1	3.6	4.8	5.8	7	1.3	2.2	2.9	3.5	4.3
sound pressure level at 5m	dB(A)	35	45	52	56	61	35	45	52	56	61	35	45	52	56	61
weight	kg	119					124					126				

IndAC M-150		W1 LPHW 82/71°C					W2 LPHW 80/60°C					W3 LPHW 60/40°C				
	speed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	2740	4180	5220	5800	7560	2750	4160	5230	6150	7410	2750	4160	5230	6150	7410
air outlet temperature[2]	ºC	41	36	34	33	31	46	41	38	37	35	37	34	32	31	29
heating capacity	kW	24.1	30.5	34.4	36.3	41.1	28.7	36.6	41.6	45.3	49.9	20.9	26.7	30.3	33	36.3
water flow rate	l/h	1944	2448	2772	2916	3276	1258	1605	1822	1986	2186	906	1158	1314	1432	1576
water pressure loss	kPa	3.7	5.7	7.2	8.0	10.0	1.6	2.6	3.2	3.8	4.6	0.9	1.5	1.8	2	2.6
sound pressure level at 5m	dB(A)	40	48	53	57	62	40	48	53	57	62	40	48	53	57	62
weight	kg	99					102					104				

IndAC M-200		W1 LPHW 82/71°C					W2 LPHW 80/60°C					W3 LPHW 60/40°C				
	speed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	3670	5540	6980	7700	9860	3670	5550	6970	8200	9870	3670	5550	6970	8200	9870
air outlet temperature[2]	ºC	42	37	35	34	32	47	42	40	38	36	39	36	34	32	31
heating capacity	kW	33.6	42.6	48.3	50.9	57.7	40.3	51.6	58.7	64.1	70.7	30.2	38.9	44.3	48.5	53.5
water flow rate	l/h	2700	3420	3852	4068	4608	1765	2261	2572	2808	3097	1311	1689	1924	2103	2319
water pressure loss	kPa	7.9	12.4	15.6	17.3	21.9	3.5	5.6	7.1	8.4	10	2.1	3.4	4.3	5.1	6.1
sound pressure level at 5m	dB(A)	41	49	55	58	63	41	49	55	58	63	41	49	55	58	63
weight	kg	128					133					136				

[1] *Based on normal circumstances. For selection see page 5.*

[2] *The max. allowable discharge outlet temperature is 65°C. The data are limited at this temperature.*

Technical data IndAC L/XL

Water Heating

General data		L-150	L-225	XL-150	XL-225
unit length	m	1.5	2.25	1.5	2.25
door width/-height[1]	m	6.0 - 8.0			
air inlet temperature	ºC	15			
electrical supply	V/ph/Hz	400 / 3 / 50			
max. current motors	A	4.6	6.9	7.9	11.9
max. power motors	kW	2.96	4.44	3.44	5.16

	speed	1	2	3	4	5
tapping voltage	V	95	145	190	240	400

IndAC L-150		W1 LPHW 120/100°C					W3 LPHW 80/60 ºC				
	speed	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	4120	6160	8320	10100	13740	4120	6160	8320	10100	13740
air outlet temperature	ºC	55	48	44	41	38	51	46	43	40	37
heating capacity	kW	55.7	70.1	82.4	91	106	51.3	66	78.5	87.3	103
water flow rate	l/h	2484	3129	3677	4061	4726	2247	2891	3440	3826	4500
water pressure loss	kPa	2.1	3.2	4.3	5.2	6.9	1.1	1.7	2.4	2.9	4
sound pressure level at 5m	dB(A)	44	54	59	64	72	44	54	59	64	72
weight	kg	201					201				

IndAC L-225		W1 LPHW 120/100°C					W3 LPHW 80/60 ºC				
	speed	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	6170	9240	12470	15150	20600	6170	9240	12470	15150	20600
air outlet temperature	ºC	57	51	46	43	39	55	49	46	43	39
heating capacity	kW	88.7	112	132	146	171	83.3	109	130	145	172
water flow rate	l/h	3955	5005	5901	6531	7620	3674	4768	5706	6373	7534
water pressure loss	kPa	6.4	9.9	13.4	16.1	21.5	3.1	5	7.1	8.7	12
sound pressure level at 5m	dB(A)	46	56	61	66	74	46	56	61	66	74
weight	kg	277					277				

IndAC XL-150		W1 LPHW 120/100°C					W3 LPHW 80/60 ºC				
	speed	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	7080	10400	12480	14110	15820	7080	10400	12480	14110	15820
air outlet temperature	ºC	46	41	39	37	36	45	40	38	37	35
heating capacity	kW	75.7	92.4	101	107	113	71.6	88.7	97.7	104	110
water flow rate	l/h	3375	4123	4511	4788	5059	3137	3887	4282	4563	4836
water pressure loss	kPa	3.7	5.3	6.3	7	7.8	2	3	3.6	4.1	4.6
sound pressure level at 5m	dB(A)	56	65	70	73	76	56	65	70	73	76
weight	kg	201					201				

IndAC XL-225		W1 LPHW 120/100°C					W3 LPHW 80/60 ºC				
	speed	1	2	3	4	5	1	2	3	4	5
air displacement	m^3/h	10610	15600	18720	21170	23720	10610	15600	18720	21170	23720
air outlet temperature	ºC	48	43	40	39	38	48	43	41	39	38
heating capacity	kW	121	149	163	173	183	118	148	163	174	185
water flow rate	l/h	5407	6629	7267	7721	8164	5189	6478	7175	7642	8115
water pressure loss	kPa	11.4	16.6	19.7	22	24.4	5.9	9	11	12.3	13.7
sound pressure level at 5m	dB(A)	58	67	72	74	77	58	67	72	74	77
weight	kg	277					277				

[1] *Based on normal circumstances. For selection see page 5.*

[2] *The max. allowable discharge outlet temperature is 65°C. The data are limited at this temperature.*

biddle
CLIMATE SOLUTIONS

Technical data

Electric heating and ambient (no heating)

General data		S-150	S-200	M-150	M-200	L-150	L-225	XL-150	XL-225
unit length	m	1.5	2.0	1.5	2.0	1.5	2.25	1.5	2.25
door width/-height[1]	m	3.0 - 6.0				6.0 - 8.0			
electrical supply	V/ph/Hz	400 / 3 / 50							
max. current motors	A	0.96	1.28	1.56	2.08	4.6	6.9	7.9	11.9
max. cons. (per phase)[2]	A	45.2	60.9	67.8	91.3	-	-	-	-
max. power motors	kW	0.33	0.44	0.81	1.08	2.96	4.44	3.44	5.16
max. power consumption[2]	kW	31.2	42	46.8	63	-	-	-	-
	speed	**1**		**2**		**3**		**4**	**5**
tapping voltage	V	95		145		190		240	400

[1] *Based on normal circumstances (see page 5).* [2] *Only for electric heating.*

Electric		150					200				
IndAC S	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement	m^3/h	1830	2840	3640	4320	5150	2440	3790	4850	5760	6870
air outlet temperature[3]	°C	27	28	29	30	32	27	28	29	30	32
heating capacity	kW	7.4	12.4	17.3	22.2	29.6	10	16.6	23.3	29.9	39.9
sound pressure level at 5m	dB(A)	34	44	50	54	59	35	45	52	56	61
weight	kg	119					155				
IndAC M	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement	m^3/h	2750	4160	5230	6150	7410	3670	5550	6970	8200	9870
air outlet temperature[3]	°C	31	31	32	33	33	31	31	32	33	33
heating capacity	kW	14.8	22.2	29.6	37.1	44.5	20	29.9	39.9	49.9	59.9
sound pressure level at 5m	dB(A)	40	48	53	57	62	41	49	55	58	63
weight	kg	126					165				

[3] *The max. allowable discharge outlet temperature is 65°C. The data are limited at this temperature.*

Ambient		150					200				
IndAC S	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement[4]	m^3/h	1830	2840	3640	4320	5150	2440	3790	4850	5760	6870
sound pressure level at 5m	dB(A)	34	44	50	54	59	35	45	52	56	61
weight	kg	78					101				
IndAC M	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement[4]	m^3/h	2750	4160	5230	6150	7410	3670	5550	6970	8200	9870
sound pressure level at 5m	dB(A)	40	48	53	57	62	41	49	55	58	63
weight	kg	85					111				
		150					**225**				
IndAC L	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement	m^3/h	4120	6160	8320	10100	13740	6170	9240	12470	15150	20600
sound pressure level at 5m	dB(A)	44	54	59	64	72	46	56	61	66	74
weight	kg	190					249				
IndAC XL	**speed**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
air displacement	m^3/h	7080	10400	12480	14110	15820	10610	15600	18720	21170	23720
sound pressure level at 5m	dB(A)	56	65	70	72	76	58	67	72	74	77
weight	kg	190					249				

[4] *The air displacement values are less when a filter module is used: IndAC S: 10% and IndAC M: 15 %.*

Explanation of technical data

Heating capacity correction coefficients

The heating capacity of the battery type W1 represented in the tables on page 10 is based on a water range of 82/71ºC. The heating capacity of battery type W2 is based on a water range of 80/60ºC and of W3 on 60/40°C. The heating capacity of the battery type W1 represented in the tables on page 11 is based on a water range of 120/100°C and W3 is based on 80/60°C. An air inlet temperature of +15ºC has been assumed. When other water temperatures and/or air inlet temperatures are used, the heating capacity is to be multiplied by the appropriate correction factor given below.

Heating capacity correction factors for battery types W1, W2 and W3 ***IndAC S/M***

Water-temperature	***Air inlet temperature***														
	+ 5 ºC			***+ 10 ºC***			***+ 15 ºC***			***+ 18 ºC***			***+ 20 ºC***		
W1W2 W3	**W1**	**W2**	**W3**	**W1**	**W2**	**W3**	**W1**	**W2**	**W3**	**W1**	**W2**	**W3**			
120/100 °C	1.75	2.11	3.82	1.64	1.99	3.59	1.54	1.87	3.37	1.48	1.80	3.24	1.44	1.75	3.16
110/90 °C	1.56	1.90	3.43	1.46	1.77	3.21	1.36	1.66	2.99	1.30	1.59	2.86	1.26	1.54	2.78
100/80 °C	1.37	1.68	3.03	1.27	1.56	2.82	1.17	1.44	2.61	1.11	1.37	2.48	1.07	1.33	2.40
90/70 °C	1.17	1.45	2.63	1.07	1.34	2.42	0.98	1.22	2.21	0.92	1.15	2.09	0.88	1.11	2.00
82/71 °C	1.20	n/a	n/a	1.10	n/a	n/a	1	n/a	n/a	0.94	n/a	n/a	0.90	n/a	n/a
80/60 °C	0.97	1.23	2.22	0.88	1.11	2.01	0.78	1	1.81	0.72	0.93	1.69	0.69	0.89	1.61
70/50 °C	0.77	1.00	1.81	0.68	0.89	1.60	0.59	0.78	1.40	0.53	0.71	1.29	0.50	0.67	1.21
60/40 °C	0.58	0.77	1.39	0.48	0.66	1.20	0.39	0.56	1	0.34	0.49	0.88	0.31	0.45	0.81
50/40 °C	0.60	0.75	1.35	0.50	0.64	1.15	0.41	0.53	0.96	0.36	0.47	0.84	0.32	0.42	0.76

To increase the service life of the fans as well as for safety reasons, the maximum discharge air temperature allowed is 65ºC.

Heating capacity correction factors for battery types W1 and W3 ***IndAC L/XL***

Water-temperature	***Air inlet temperature***									
	+ 5 ºC		***+ 10 ºC***		***+ 15 ºC***		***+ 18 ºC***		***+ 20 ºC***	
W1 W3	**W1**	**W3**	**W1**	**W3**	**W1**	**W3**	**W1**	**W3**	**W1**	**W3**
120/100 °C	1.13	2.21	1.07	2.08	1	1.95	0.96	1.87	0. 93	1.82
110/90 °C	1.01	1.98	0.95	1.85	0.88	1.72	0.84	1.64	0.82	1.59
100/80 °C	0.89	1.74	0.82	1.61	0.76	1.49	0.72	1.41	0.70	1.36
90/70 °C	0.76	1.49	0.70	1.37	0.63	1.24	0.60	1.17	0.57	1.12
82/71 °C	0.78	n/a	0.71	n/a	0.65	n/a	0.61	n/a	0.59	n/a
80/60 °C	0.63	1.24	0.57	1.12	0.51	1	0.47	0.93	0.44	0.88
70/50 °C	0.50	0.99	0.44	0.87	0.38	0.76	0.34	0.69	0.32	0.64
60/40 °C	0.37	0.74	0.31	0.63	0.25	0.51	0.22	0.45	0.20	0.40
50/40 °C	0.39	0.76	0.32	0.64	0.27	0.52	0.23	0.46	0.21	0.41

To increase the service life of the fans as well as for safety reasons, the maximum discharge air temperature allowed is 65ºC.

Explanation of technical data

Water flow rate

m_W = *water flow rate [l/h]*
Q = *capacity [kW]*
ρ_W = *density of water (=1) [kg/l]*
C_{pW} = *specific heat of water (=4.18) [kJ/kg°C]*
ΔT_W = *temperature difference, water [°C]*

When water and room temperatures other than the values represented in the tables are used, the water flow rate can be roughly calculated using the formula below. Before doing so, the heating capacity must first be recalculated based on the table on page 13.

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

Waterside pressure loss

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

When water temperatures other than the values represented in the tables are used, the waterside pressure loss can be calculated using the formula below. To do so, the water flow rate must first be calculated.

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

Sound

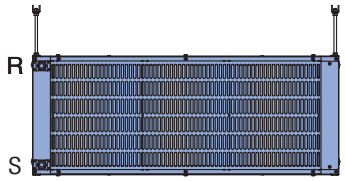
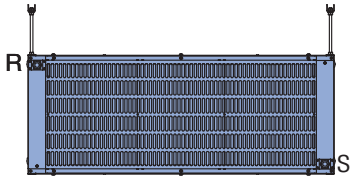
L_p = *niveau sonore dB(A)*
T = *reverberation value, deviating room [s]*
T_0 = *reverberation value reference room [s] (0.8 s)*
V = *volume, deviating room [m^3]*
V_0 = *volume, reference room [m^3] (2500 m^3)*
d = *distance of the device*
d_0 = *reference distance is 5 m*
n = *number of units*

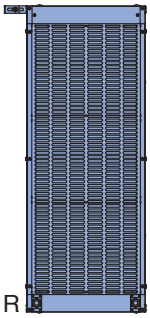
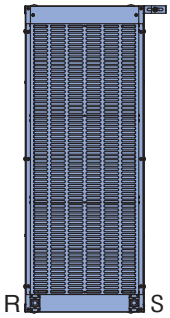
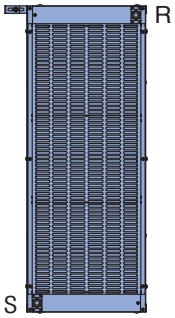
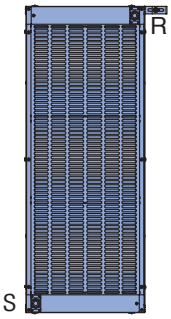
The sound data represented on pages 10 to 12 were measured at a distance of 5m from the device, in a room with a reverberation time of 0.8 seconds and with a volume of 2500 m^3. If a unit is used in a deviating room, or if multiple devices are used in a single room, the sound pressure level must be recalculated. This can be done using the below formula below. The relevant table value can be found in the tables on pages 10 to 12.

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

Water connections

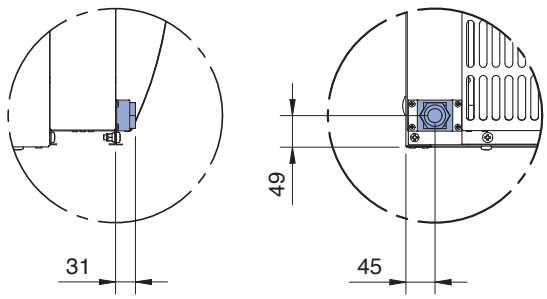
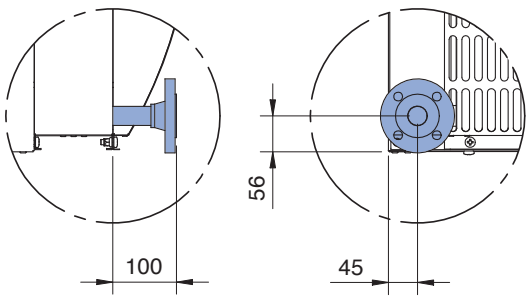
Positions

Horizontal above door opening (0)	
 IndAC S/M W1, IndAC L/XL W1/W3	 IndAC S/M W2/W3

Vertical left on the wall (1L / 2L)	Vertical right on the wall (1R / 2R)
 IndAC S/M W1, IndAC L/XL W1/W3	 IndAC S/M W1, IndAC L/XL W1/W3
 IndAC S/M W2/W3	 IndAC S/M W2/W3

(R = Return, S = Supply)
The ambient unit does not have water connections.

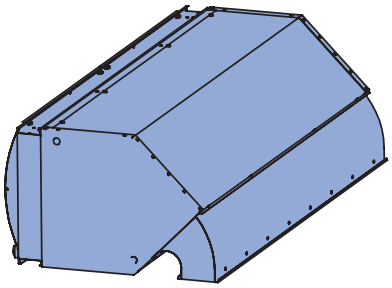
Dimensional sketches

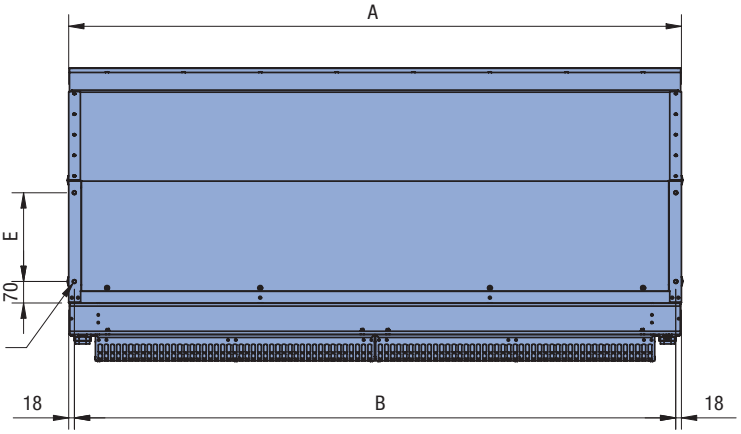
G1" female thread	Flanges (DIN 2635 - NW 25 - PN 40)
	
IndAC S/M and IndAC L/XL (only W3) come as a standard with G1" female thread (flanges are optional).	*IndAC L/XL (only W1) come as a standard with flanges.*

Note:
- *All dimensions are in mm.*

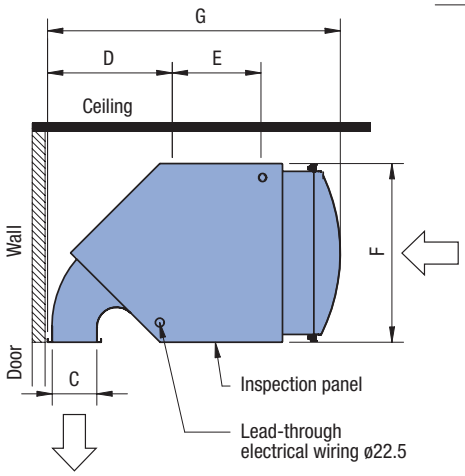
Dimensional sketches

Installation position: 0, 1L and 1R (see page 7)

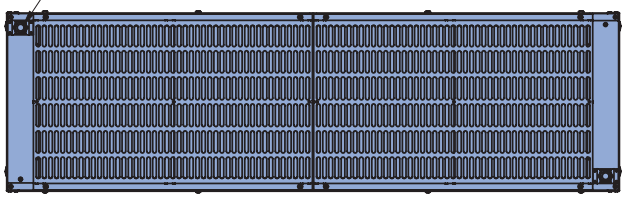


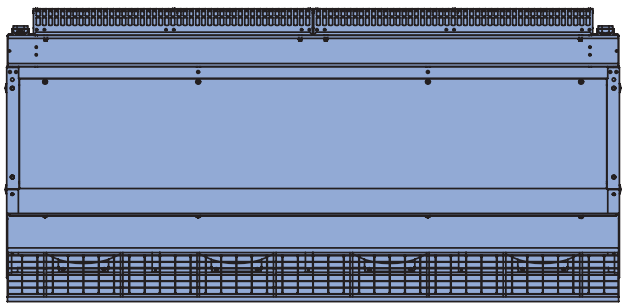


Position 0



See page 15 for positions and dimensional sketches water connections.



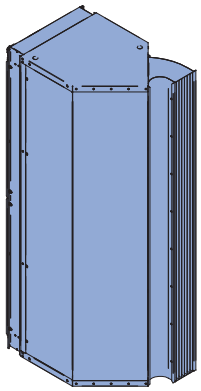


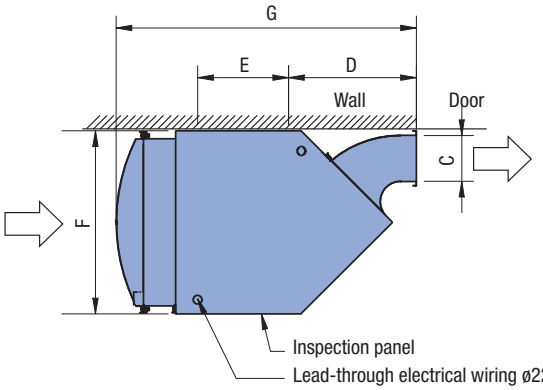
							Ambient		Water		Electric
							no filter module	filter module	no filter module	filter module	no filter module
Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**				
IndAC S-150	1500	1464	104	407	290	583	853	976	956	1079	976
IndAC S-200	2000	1964									
IndAC M-150	1500	1464	146								
IndAC M-200	2000	1964									
IndAC L/XL-150	1500	1464	209	547	450	808	1193	-	1316	-	-
IndAC L/XL 225	2250	2214									

Note:
- *All dimensions are in mm.*

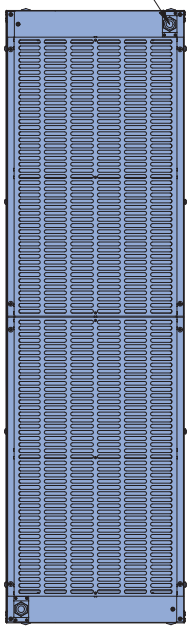
Dimensional sketches

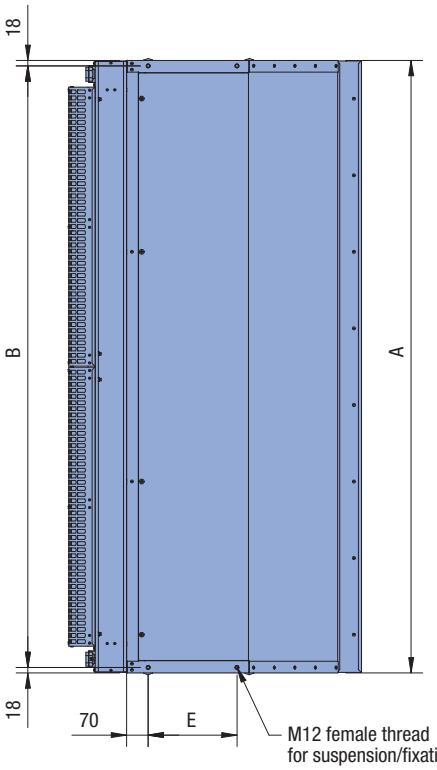
Installation position: 2L and 2R (see page 7)

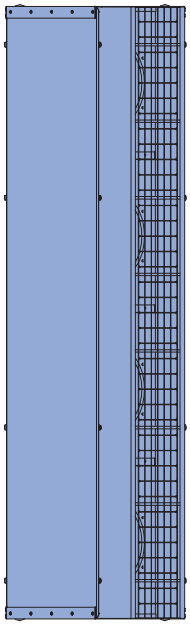




See page 15 for positions and dimensional sketches water connections.





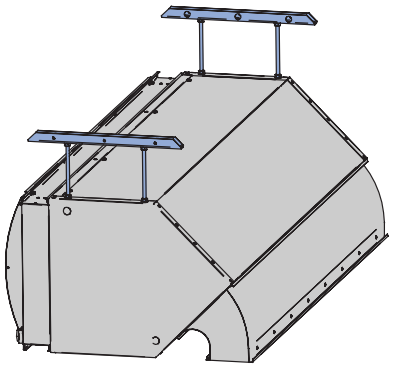


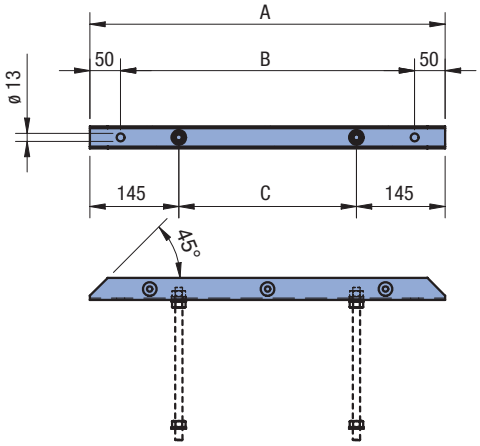
							Ambient		Water		Electric
							no filter module	filter module	no filter module	filter module	no filter module
Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**				
IndAC S-150	1500	1464	104	407	290	583	853	976	956	1079	976
IndAC S-200	2000	1964									
IndAC M-150	1500	1464	146								
IndAC M-200	2000	1964									
IndAC L/XL-150	1500	1464	209	547	450	808	1193	-	1316	-	-
IndAC L/XL 225	2250	2214									

Note:
• All dimensions are in mm.

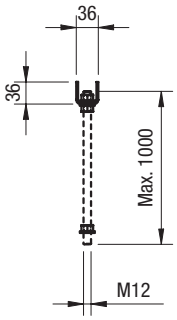
Dimensional sketches

Horizontal installation

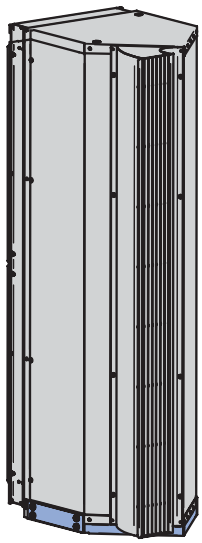




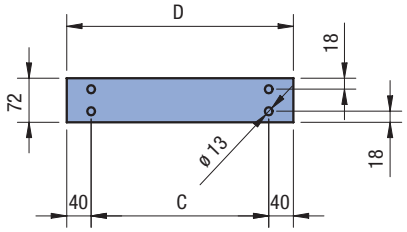
Suspension brackets



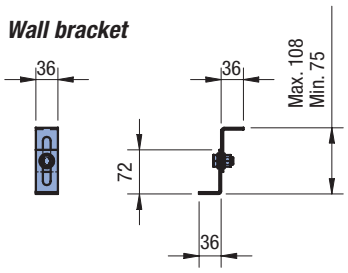
Vertical installation

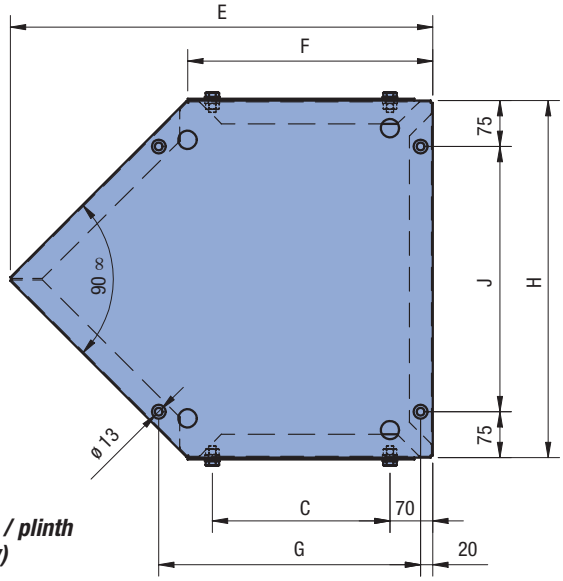


Coupling plate



Wall bracket





Base plate / plinth (accessory)

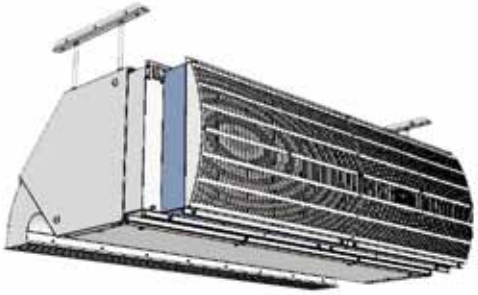
Type	A	B	C	D	E	F	G	H	J
IndAC S/M	580	480	290	370	690	400	427	583	433
IndAC L/XL	740	640	450	530	963	560	588	808	658

Notes:

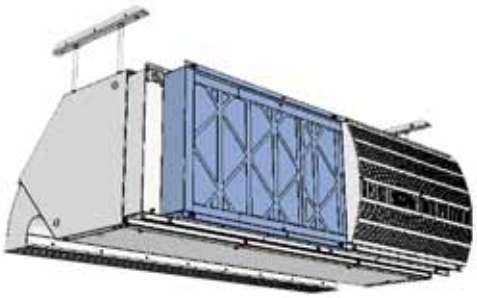
- *All dimensions are in mm.*
- *With horizontal installation, two suspension brackets are supplied as standard. Threaded rods are not supplied as standard.*
- *With vertical installation, two coupling plates and a wall bracket are supplied as standard. The base plate / plinth is an accessory.*

Dimensional sketches filter module

For IndAC S/M water heating whit female thread or ambient unit.



IndAC with filter module



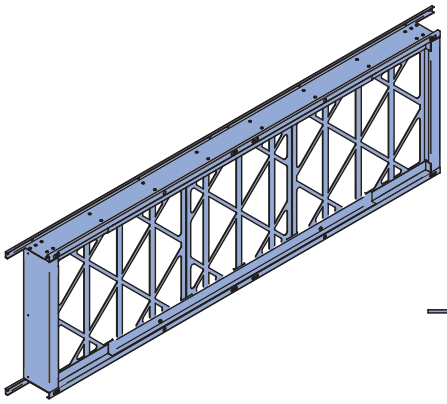
The filter module is visible behind the inlet grilles.

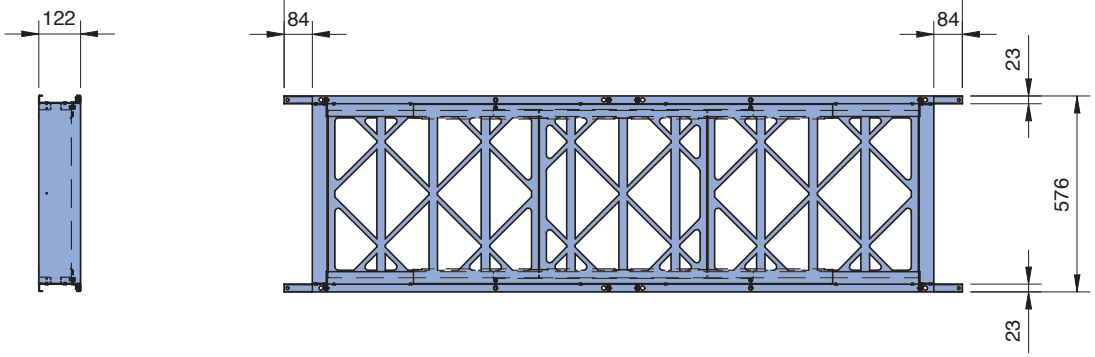
Number of filter per inlet grille

	filter dimensions / number	
Type	600x500x100	500x500x100
IndAC S/M-150	2	0
IndAC S/M-200	2	1

Weight filter module

Type	kg
IndAC S/M-150	20
IndAC S/M-200	23





Type	A
IndAC S/M-150	1493
IndAC S/M-200	1993

Note:
• All dimensions are in mm.

biddle
CLIMATE SOLUTIONS

Specifications

Casing

The casing and the inlet grille are manufactured from zinc-plated sheet steel, extra strengthened to minimise deformations and vibrations, and have a full-polyester powder coating. The Double rectifying discharge grille is made of aluminium. The main casing is supplied in Blue (RAL 5023) and the air inlet and discharge grilles in the colour titan (Polydrox). Other colours are available at an extra charge.

Motor / fan assembly

The radial backward curved fans are mounted in the casing such that they cause no vibration. Each fan is driven by a rotor motor on ball bearings. The fan casing and impellers are manufactured from aluminium. Motors for water and ambient units are rated to protection class IP44. The standard motor is supplied with thermal contacts, which will break the circuit of the motor when the maximum permissible motor temperature is exceeded.

Heating battery

The heating battery LPHW is manufactured with $^1/_2$" copper tubes and aluminium fins. The water connections are G1" female thread (except for Indac L/XL W1). The test pressure is 9 bar and the maximum operating pressure is 8 bar at 125ºC. The water connections of the W1 battery for Indac L/XL have flanges. The test pressure is 30 bar and the maximum operating pressure is 24 bar at 175°C. Higher temperatures and pressures are available upon request.

The electric heating battery is manufactured with aluminium fins. The battery is controlled electronically and fitted with overload protection. When the device is switched off, the fans will continue to rotate until the fins have cooled sufficiently.

- ISO 9001
- ISO 14001

Subject to change

Biddle Air Systems Ltd.
St. Mary's Road, Nuneaton
Warwickshire CV11 5AU
United Kingdom
T +44 (0) 2476 38 42 33
F +44 (0) 2476 37 36 21
E sales@biddle-air.co.uk
I www.biddle-air.com

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