

# iForce Industrial Air Curtains

Installation, Operation & Maintenance Manual

IOM 92 Issue 3



# Contents

Page

<b>1</b>	General	3
1.1	Description	3
1.2	Receipt and Preparation	4
<b>2</b>	Mounting	4
2.1	Mounting general	4
2.2	Horizontally mounted units	5
2.3	Vertically mounted units	6
2.4	Fluid piping	7
2.5	Wiring	7
2.6	Control	8
<b>3</b>	Commissioning	8
<b>4</b>	Maintenance	8
<b>5</b>	Fault finding	9
<b>6</b>	Disposal	9

# 1. General

## 1.1 Description

SPC iForce air curtains are specifically designed for use in industrial/ heavy commercial environments. They are intended for mounting above or alongside a doorway and blow a powerful, high velocity jet of air down across the door or along its width. The jet of air helps to prevent the loss of conditioned air from inside the space and if the jet is heated then it will add heat to the zone close to the doorway. The air curtains can be supplied as ambient units without any heat exchanger, with low temperature hot water heat exchangers or with electric heating elements.

The units consist of a painted steel casing with a punch inlet grille and linear discharge grille. The fans are individual forward curved blowers directly coupled to EC (brushless DC) motors. Ambient and hot water units require a single phase supply while all electric heated units require a three phase power supply.

Units are available in a range of sizes and the pertinent dimensions are shown in the diagram and table below. Note that the internal volumes and pipe connections only apply to low water temperature units.

Unit size	IAC15	IAC20	IAC25
Dry weight (kg)	125	155	200
Int. vol. 2 row (l)	3.2	4.4	6.0
Int. vol. 3 row (l)	4.7	6.4	8.6
Fan type	2xForward curved	2xForward curved	3xForward curved
Motor type	EC	EC	EC

Table 1. General specification

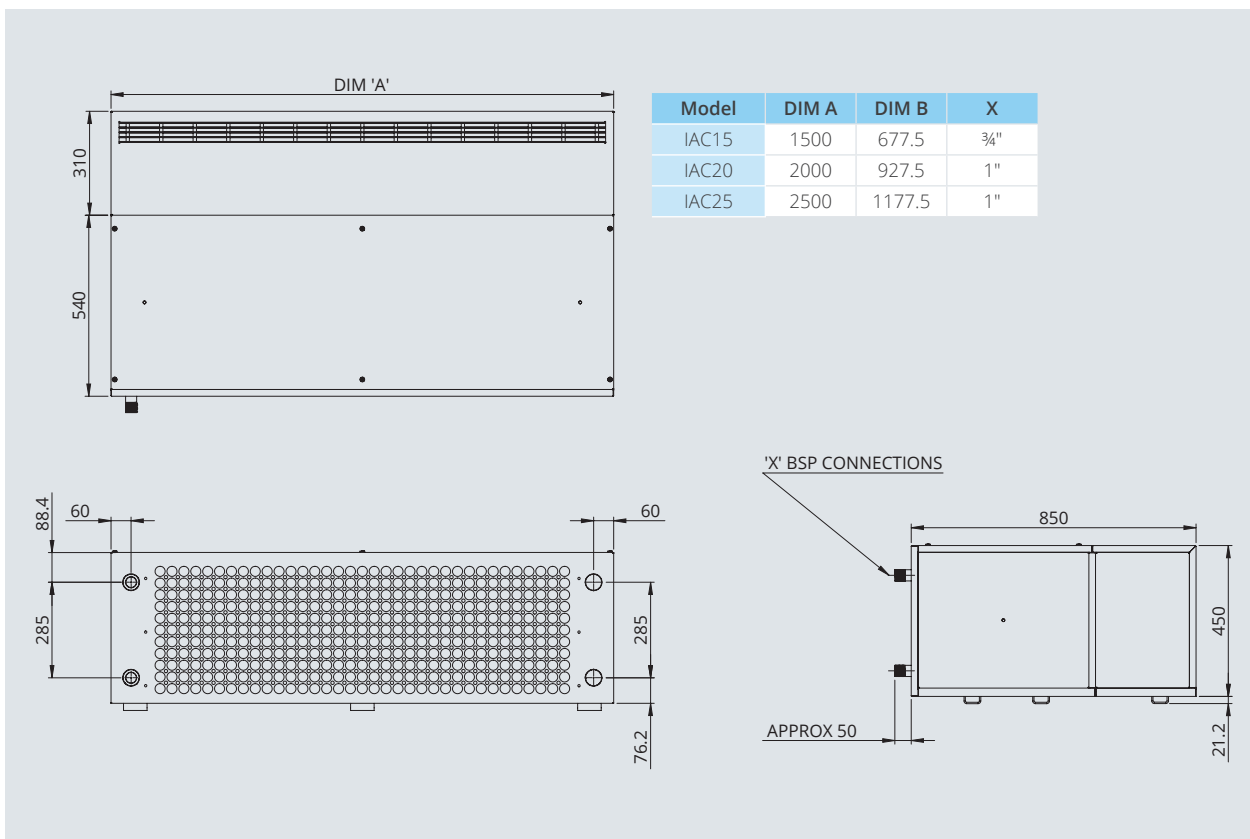


Figure 1. Major dimensions

## 1.2 Receipt and Preparation

The units are packaged and display the SPC works order number and site references where appropriate.

On receipt check that all details are correct to the schedules; any damages must be reported to the carrier and SPC immediately.

It is recommended that the packaging is kept in place and the units stored in a safe area until the necessary services are complete.

# 2. Mounting

## 2.1 Mounting general

Recommended minimum and maximum mounting heights are given in the table below and vary with the unit speed. For doorways which are either wider or taller than the length of a single unit then units can be butted together to cover the entire doorway; special mounting

arrangements are available for stacked, vertically mounted units. Higher fan speeds suit higher mounting locations but do generate additional noise so the unit speed should always be matched as closely as possible to the appropriate mounting height.

Speed	Low	Medium	High
Minimum mounting height (m)	3.0	3.5	4.0
Maximum mounting height (m)	4.5	5.0	6.0

Table 2. Mounting heights

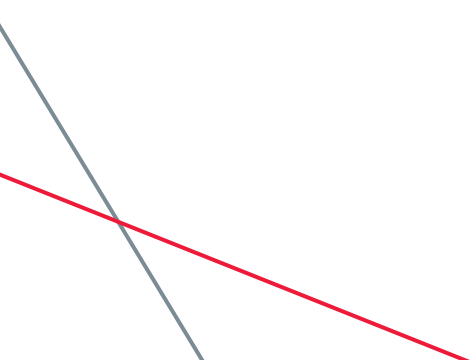
For vertically mounted units blowing across a doorway then the mounting height is equal to the effective range of the door curtain; for wide doors it may be appropriate to fit air curtains on both sides to double the effective range.

The approximate noise levels for the air curtains at their various speeds are shown in the table below. Air curtains are intended to generate high

velocity air streams and intended for installation in industrial environments so will always generate significant noise. The figures shown are representative sound pressure levels that would be expected at a distance of 5m from the outlet of the unit in the free field. Actual sound pressure levels will depend on the reverberant nature of the installation.

Unit size	IAC15			IAC20			IAC25		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Speed									
dBA	45	53	61	47	55	63	50	58	66

Table 3. Sound pressure levels



## 2.2 Horizontally mounted units

Horizontally mounted unit make use of the 9-off heavy duty mounting brackets fixed to the top of the unit casing. It is important, in order to ensure safe mounting of the units, that all of these brackets are utilised. Units can be hung directly from the brackets using M10 drop rods as shown

below; alternatively the brackets can be used for anchoring unistrut type beams which can then in turn be hung from the structure, all of the mounting brackets must be bolted to the unistrut using M10 bolts.

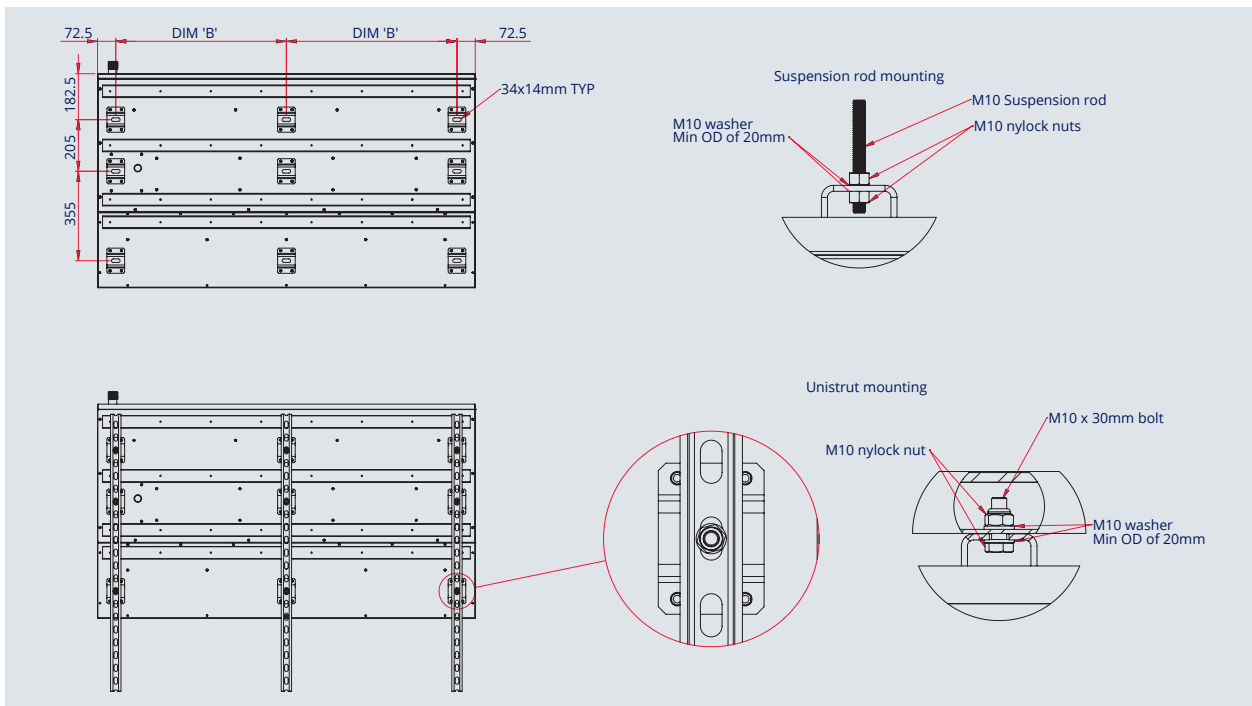
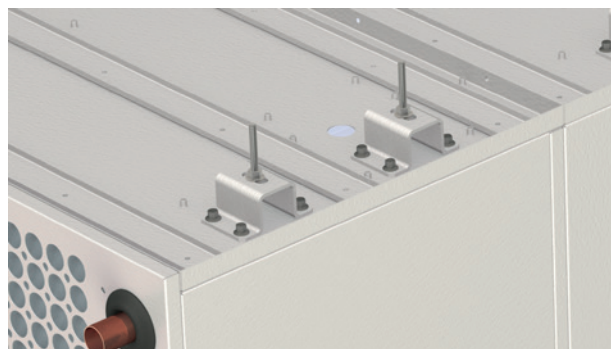
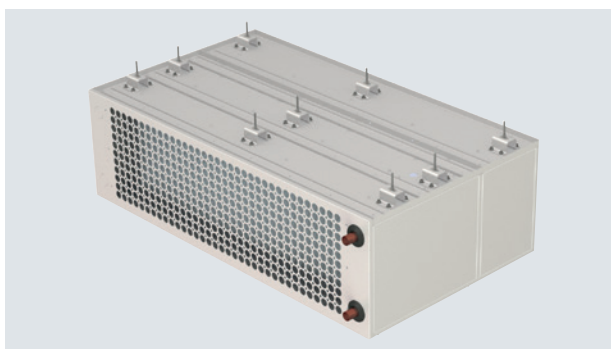
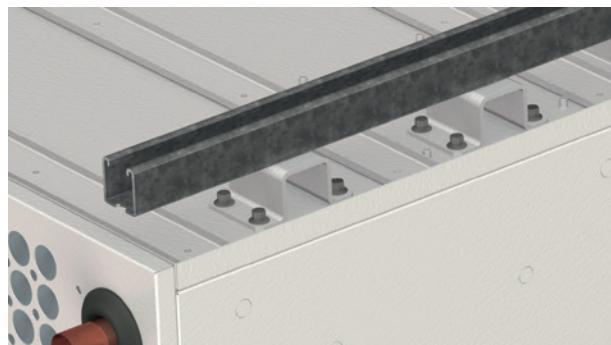


Figure 2. Horizontally mounted unit



Horizontal Mounted via Suspension Rods



Horizontal Mounted via Unistruts

## 2.3 Vertically mounted units

Units for vertical mounting blow a horizontal stream of air, typically from one side of the door. For very wide doors it is possible to arrange air curtains to blow from both sides.

Vertically mounted units are supplied with heavy duty mounting plates; the lower mounting plate must be securely anchored into the floor as shown below. The air curtain casing is then fastened to the mounting plate via M8 screws and weld nuts in the mounting plate.

If two units are to be stacked one on top of the other then an additional mounting plate will be supplied and this needs to be fitted as shown below.

Vertically mounted units must not rely on the mounting plate only in order to remain stable. It is imperative that the units are fastened to the wall as well as into the floor. The units are supplied with an array of brackets on the back and these must be used for either direct fixing to the wall or fixing via unistrut beams in a similar fashion to that described above for horizontally mounted units.

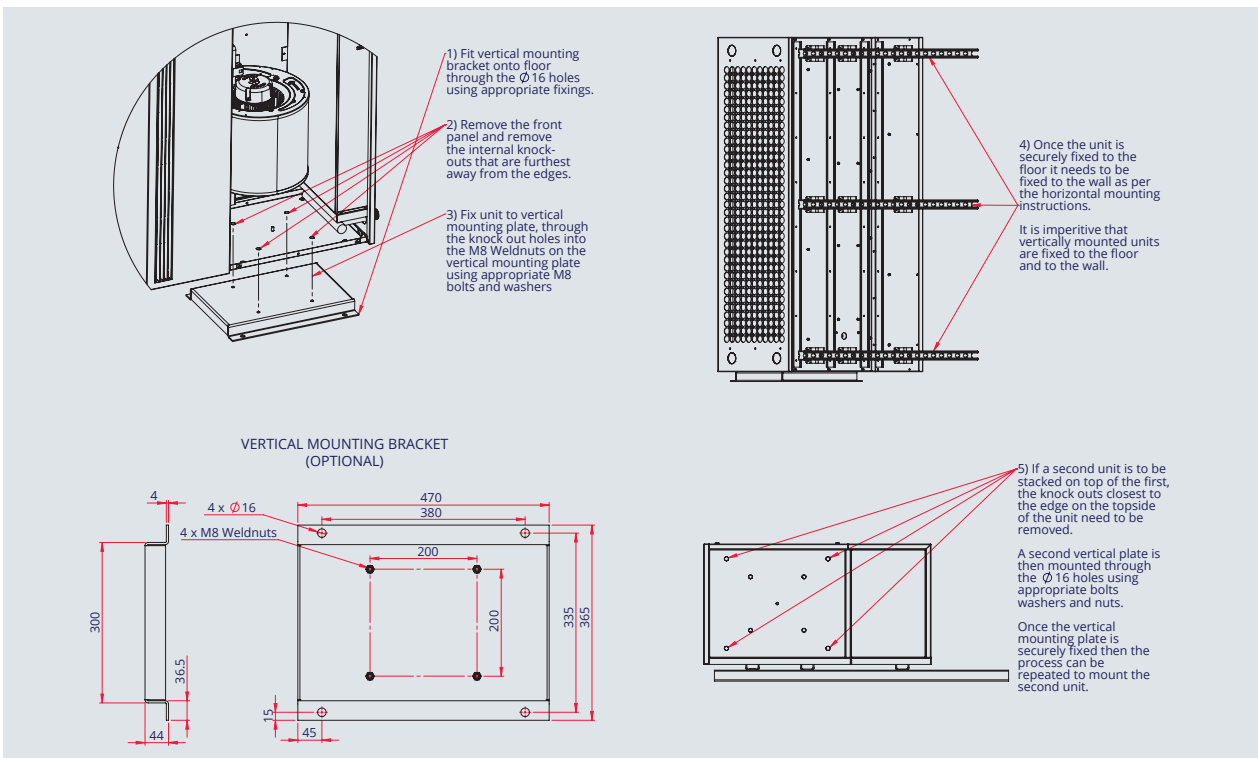


Figure 3. Vertically mounted unit



Vertical Mounted via Unistruts & Vertical Mounting Plate



Vertically mounted stacked units via Unistruts and Vertical Mounting Plate

## 2.4 Fluid piping

The flow and return pipes penetrate the back of the unit casing for horizontally mounted units and the top of the case for vertically mounted units. Optimal performance is ensured by making the flow connection closest to the bottom of horizontally mounted units and the front of vertically mounted units.

Connections are steel with a BSP male taper thread and are 3/4" on the IAC15 unit and 1" on

the IAC20 and IAC25 units. When tightening it is important that the connections are 'held-off' to prevent twisting and damage that would invalidate the warranty. The installer will need to fit vents and drains in the pipework at high and low points. An automatic air vent is often employed and fitted at the high point in the piping.

## 2.5 Wiring

All units incorporate high efficiency EC motors directly coupled to the fans. The quantity of fans/ motors is shown in the table above. Power to the ambient and LPHW units is from a standard 230V/1Ph/50Hz supply and transformation and

rectification is provided at the motor itself. The table below gives power draw data for the units at various speeds. Units which use electric heaters require a 400V/3Ph/50Hz supply.

Unit size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
Power draw (W)	250	750	1300	300	900	1500	450	1350	2250

Table 4. Electrical details for ambient and LPHW units

Unit size	IAC15		IAC20		IAC25	
	Medium	High	Medium	High	Medium	High
Speed						
Fan power draw (W)	750	1300	900	1500	1350	2250
Heating element power (kW)	12	18	18	24	24	36
Heating element current/phase (A)	18	26	26	35	35	53

Table 5. Electrical details for electric heated unit. All 400V/3Ph/50Hz

All wiring should be undertaken by a certified electrician in line with the latest version of the wiring regulations and the unit should be isolated prior to working on it or opening the terminal box. It is recommended that each single phase unit be powered via a dedicated fused/switched spur and three phase units a dedicated circuit breaker. An earth connection must be provided as part of the power supply. The casing/electrical box can have

holes cut in the sides to facilitate cable entry but suitable glands/grommets should be used.

A wiring diagram specific to the controls ordered with each unit is provided and all customer wiring should be made in line with this. Please contact SPC if the wiring diagram cannot be found; do not attempt to wire to the units without this diagram.

## 2.6 Control

A variety of control methods are available for use with the door curtains and these will have been arranged at quotation/order stage. The wiring diagram that is supplied with the unit should be used and will refer to all the remote components that need to be wired in.

Manual control via remote on/off switch (plus optional change speed/heat switch) is the simplest form of control. Automatic control will be more energy efficient and this can be via door control or thermostatic. Automatic door control will switch on the air curtain when the door it is protecting is opened; a delay relay is included so that the unit runs on when the door closes and prevents the unit starting/stopping too regularly. The door contact may be magnetic or mechanical but will need to be wired back to the air curtain; consult the wiring diagram supplied with the unit. Thermostatic control regulates the heat that is added to the zone around the door; it is not appropriate to modulate the heat output on the airside of an air curtain as this would compromise the effectiveness of the

curtain. Thermostatic control involves the use of a waterside valve and controller. The controller modulates the opening of the valve to match the heat output rate to the rate of loss in the environment close to the door. Valves are all fitted external to the unit and can be fitted to either flow or return piping. The wiring diagram supplied with the unit must be consulted before attempting to wire in the combination of unit, remote controller and valve actuator.

When more than one air curtain is used to protect the same entrance then master/slave control of the multiple units is appropriate.

If a BMS (central) control is available this may be used to control the air curtain via an enable relay and/or to control a waterside valve. If the option of using BACNET protocol is required then a wall mounted controller can be supplied to suit.

If any holes are cut in the casing of the air curtain in order to run control cables then these must be protected using suitable glands/grommets.

# 3. Commissioning

Commissioning of air curtains involves the following:

- Check rotation of fan
- Check leaving air temperature
- Check operation of any controls
- Check no excessive and/or unexpected noise (there will be significant air noise)
- Check coil/pipework is properly vented on LPHW units



## 4. Maintenance

Units must always be isolated electrically prior to any maintenance work being undertaken.

To ensure effective and safe operation of the air curtains they should be subject to periodic inspection and cleaning. The outside of the case should be cleaned with a dry cloth; if liquids are used then they must not be allowed to contact the electrical box or the fan/motor. A vacuum or airline can be used to suck/blow and debris which is attached to the fins of the coil. The fans can be cleaned in a similar manner with vacuum or compressed air, they can be recached removing the access panel. It is recommended that an

inspection is made at least every 6 months though the rate at which cleaning is required will be largely determined by the nature of the environment.

The fans/motors contain sealed for life bearings and no lubrication is required.

Internal surfaces of the coil heat exchangers are a combination of copper and steel so common water additives suitable for use with these material can be included. Coil heat exchangers are factory pressure tested to 22 bar air under water so have a safe working pressure of up to 15 bar on standard low pressure hot water systems.

## 5. Fault finding

Below is a list of common faults and the steps required to resolve them:

Fault	Cause	Remedy
<b>Fan(s) not running</b>	No power	Check electricity supply
	Fuse blown/circuit breaker tripped	Check/change
	Controls	Check controls are not preventing fan from running
	Damaged fan/motor	Replace
<b>Low leaving air temperature</b>	Controls	Check controls are not preventing valves from opening
	No/low water flow and/or temperature	Check for good flow of hot water to unit and that there is no excessive temperature drop on the water side. High temperature drops indicate low water flow. Check temperature of water to the unit

## 6. Disposal



Units have a heat exchanger from copper tubes and aluminium fins. The units include fan assemblies from mixed materials and electrical components which should be disposed of separately in line with WEEE directives. It is not recommended that the units are disposed of with domestic waste but that the components are recycled as far as possible.



SPC House  
Evington Valley Road  
Leicester  
LE5 5LU

**T:** 0116 249 0044  
**E:** [spc@spc-hvac.co.uk](mailto:spc@spc-hvac.co.uk)  
**[spc-hvac.co.uk](http://spc-hvac.co.uk)**

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