

*Square Plate Type of VAV Air Diffuser with thermostat control*



### I. Intro.

FK-VFB/W Square Plate Type of Variable Air Volume (VAV) Air Diffuser with Thermostat Control is one of the newest product Tu-poly recently launched which widely used in the place of 5.0 meter height like office, lab, conference room, exhibition gallery, shopping mall, resting lobby and ball room etc. As well some special place where need lower air supply in VAV system if choose d type.

### II. Function and Characteristic

#### 1. Energy saving

- (1) Compared with other VAV device, FK-VFB/W can be equipped with the fan of small static pressure to dramatically save energy, because of the smaller pressure loss the air diffuser has.
- (2) Each FK-VFB/W can independently control the air volume where people will not feel overheating or overcold. The theory of energy saving is people can control the air system and unit air flow that is associated with all kind of circumstances, like actual system loading, unpredictable weather, and burdened indoor area people required.
- (3) The temperature difference between supply air temperature and room temperature is more 50% than common air diffuser if you choose the FK-VFB/W/d product where the building has the same hot load and humidity load which can low down the amount of air flow in the whole system. So that it not only low down the energy consumption of fan and motor but also reduce the dimension of air duct system and available room space. This is a real action for saving the investment cost for the project.

#### 2. Ideal air distribution

- (1) The way of increase or decrease the air flow is to adjust and change the available area at air outlet which can keep the constant air speed that is to say the different air flow has the same air speed to get the pre-design targets of required air throw (supply air distance) and well air attached performance, bringing more flowing and even room air flow. Other VAV systems cannot achieve to all above merits.
- (2) Common air diffuser whose air speed will be changing along with the air flow. When air flow lessening, the air speed will be dropping, which is easy to happen condensation when cold air supplied or people can not get warm when hot air supplied.
- (3) Individual structure of this air diffuser can prevent the common one's flaws, whose air flow comes out in every direction with even air and lower regenerative noise in summer condition.

### III. Product Code

FK	Air Diffuser
VFB/W	Square Plate Type of VAV Air Diffuser with Thermostat

1	1: cold (no mark) 2: cold and hot
d	$12^{\circ}\text{C} \geq d \geq 7^{\circ}\text{C}$ d - minor temperature $\geq 12^{\circ}\text{C}$ (no mark)
A*B	Face size for air diffuser
0	Without any accessories (connected with flexible pipe or branch air pipe)
$\phi D$	The size connected with the external diameter of air pipe (mm) ( $\phi 148$ 、 $\phi 198$ 、 $\phi 248$ )

Typical example:

FK-VFB/W1/d/596\*596/ $\phi 198$  means Minor temperature Square Plate Type of VAV Air Diffuser with Thermostat Control of cold type whose face size is 596\*596mm connected with the air pipe of  $\phi 198$ mm.

#### IV. Working Theory



Normal working conditions:

##### 1. Supply air temperature

In summer: supply air temperature  $\geq 12^{\circ}\text{C}$ , RH  $\leq 95\%$

In winter: supply air temperature  $\leq 45^{\circ}\text{C}$

Normal working conditions:

1. Supply air temperature

In summer: supply air temperature  $\geq 12\text{ }^{\circ}\text{C}$ , RH  $\leq 95\%$

In winter: supply air temperature  $\leq 45\text{ }^{\circ}\text{C}$

2. System static pressure (at air inlet)  $\leq 62\text{ Pa}$ ; the static pressure at the lowest air inlet should be more than 15 Pa. Overhigh static pressure at air inlet will lead serious air leakage at some blades of air dampers.

3. When choose d type of FK-VFB/W/d, the supply air temperature in summer should be  $12\text{ }^{\circ}\text{C} \geq t \geq 7\text{ }^{\circ}\text{C}$

Using condition: Room temperature  $\leq 26\text{ }^{\circ}\text{C}$ 、RH  $\leq 65\%$ , room dew point temperature is  $19\text{ }^{\circ}\text{C}$ 。

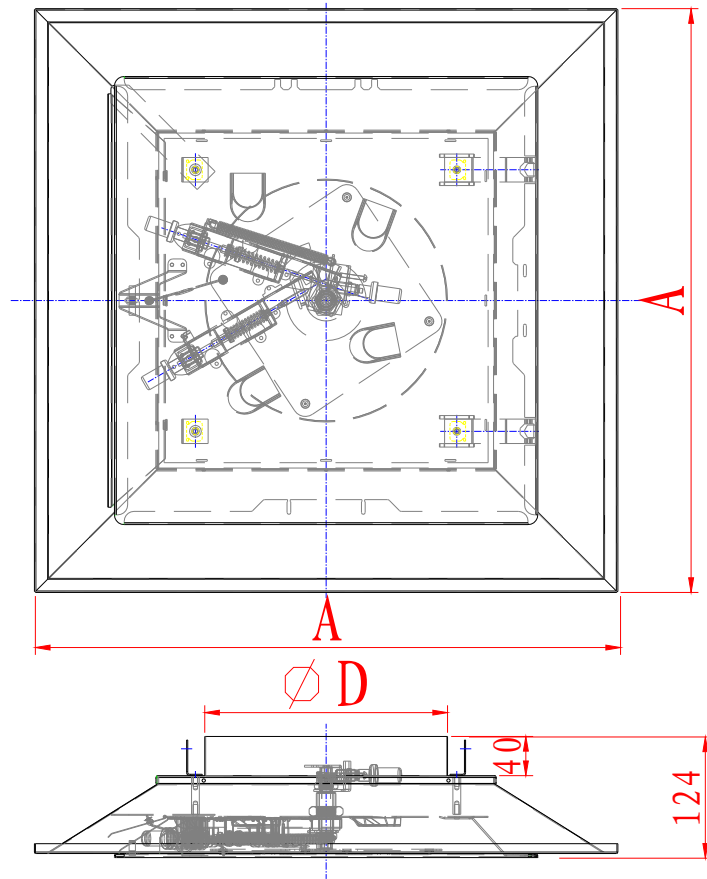
Shall do the heat preservation after installation , in general the material thickness of heat preservation shall be 25mm at least.



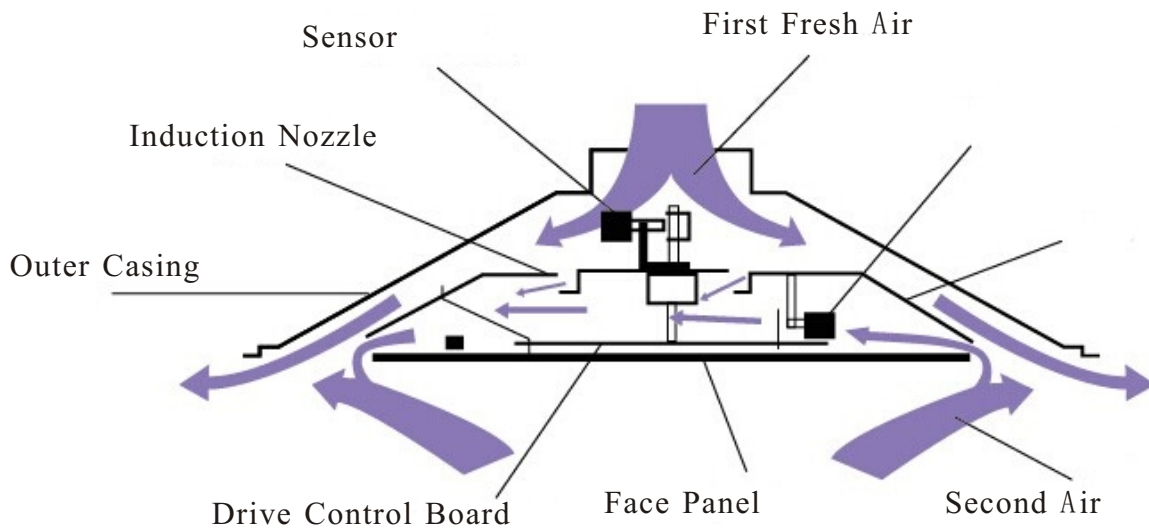
### V. Specification and Size

Size	596*596		
$\Phi D$	148	198	248
A	596*596		

Product drawing



**VI. Control Method**



*Principles of controlling Sketch map*

The control way of FK-VFB/W Square Plate Type of VAV Air Diffuser

Thermostat control

FK-VFB/W is consist of air diffuser, air regulating device, thermostat of supply air mode, drive mechanism, room thermostat, induced spout and spring reverse motion.

Neither need any electric power on site, nor any outside drive actuator, so that is to say which can help to save the energy a lot.

The best air flow rate is 1:10.

## VII. Technical Performance and Parameter

Connected pipe size	Inlet static pressure	Max air flow	Air throw of max air flow (m)		Noise	Air throw of 25% max air flow (m)		Noise
			H1 (m/s)	H2 (m/s)		H1 (m/s)	H2 (m/s)	
	(Pa)	(m <sup>3</sup> /h)			dB(A)			dB(A)
Φ148	15	160	1.72	1.15	25	0.86	0.57	24
	25	224	2.3	1.43	27	1.15	0.86	25
	50	320	2.58	2	30	1.72	1.43	27
	62	350	2.87	2.3	33	2	1.72	29
Φ198	15	300	2.6	2	25	1.8	1	24
	25	420	3.3	2.6	27	2	1.31	25
	50	590	4	2.9	30	2.7	1.9	27
	62	650	4.3	3.3	33	3	2.1	29
Φ248	15	440	2.7	2.1	25	2.1	1.8	24
	25	630	3.3	2.7	27	2.7	2.1	25
	50	880	4.2	3.3	31	3.3	2.7	27
	62	1000	4.6	3.6	34	3.7	3.1	30

Notes:

(1) Air throw H1 and H2 whose terminal air speed respective is at 0.25m/s and 0.50m/s

(2) Above data of air throw is base on summer working condition. It should be modified when the temperature difference between supply air temperature and room set temperature  $\geq 6\text{ }^{\circ}\text{C}$  in winter working condition.

Modification as below;

$6\text{ }^{\circ}\text{C} < \Delta t \leq 10\text{ }^{\circ}\text{C}$ , the data of air throw in the table \* 0.9;

$10\text{ }^{\circ}\text{C} < \Delta t \leq 15\text{ }^{\circ}\text{C}$ , the data of air throw in the table \* 0.84;

$15\text{ }^{\circ}\text{C} < \Delta t \leq 20\text{ }^{\circ}\text{C}$ , the data of air throw in the table \* 0.76;

(3) The regenerative noise in the table means unit FK-VFB/W made the noise and tested under the background whose noise  $\leq 20\text{dB(A)}$ .

### VIII. The Conditions for FK-VFB/W Used in Air Conditioning System

1. The structure characteristic determines that FK-VFB/W has a relative lower static pressure at air inlet, as called one of VAV device with lower static pressure, which is perfectly match the air pipe system whose air static pressure is lower than 100 Pa. If user wants the diffuser to be installed at a high or medium system, then just add some pressure regulator in that system. That is to say the air pipe between AHU and pressure regulator could be high or medium static pressure designed, and the air pipe after regulator could be low static pressure (lower than 100 Pa) designed.
2. When lay out FK-VFB/W in the pipe system with low static pressure, users should notice that the static pressure at air inlet of the first diffuser (the one next to the supply fan or pressure regulator) should not be more than 62 Pa, and the last diffuser more than 15 Pa.

### IX. Surface Finish

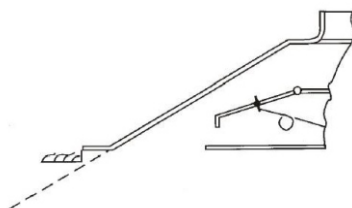
The surface can be coating power with color according to user's requirements, and our standard color is RAL 9010.

### X. Installation

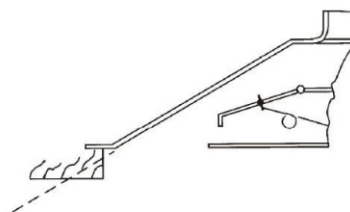
1. Finding an environment with fluid air flow to install the FK-VFB/W, to prevent impacting the room air distribution and inducing the secondary air.

For instance, do not install the diffuser near the sidewall or lights, in this case, the air might be reflect back or to other directions, so the induced temperature cannot be real match the room temperature

2. There has to be no obstacle around the diffuser, otherwise which will decrease the supply air of the diffuser, like below incorrect installation, especially being influenced with lower supply air.

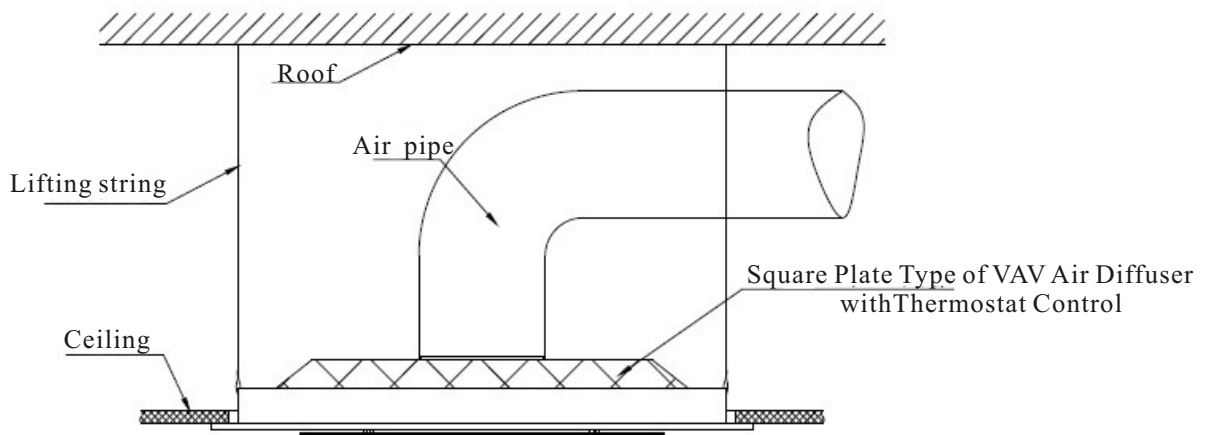


Correct installation

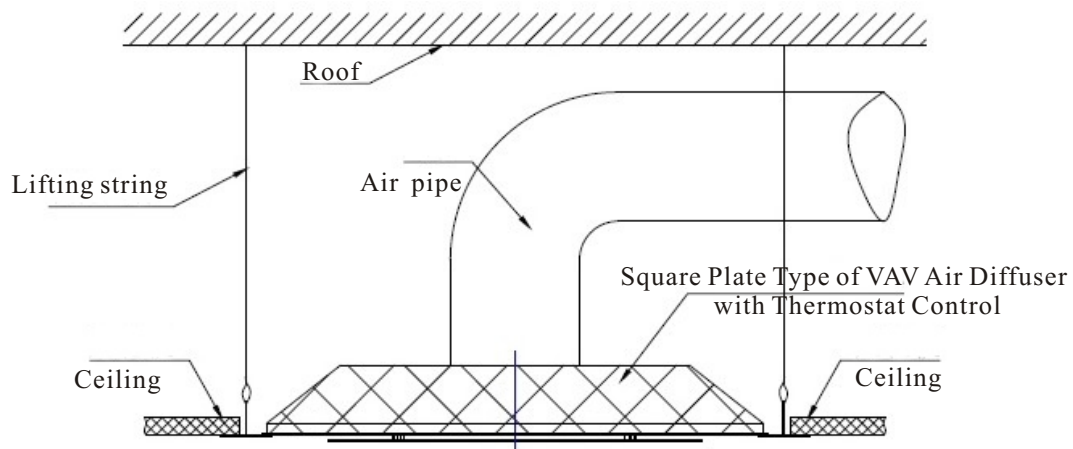


Incorrect installation

### Ceiling installation



### Keel installation



## XI. Ordering

1. All the parameters in the catalogue we mentioned is according to given conditions or environment. When using the diffuser in different conditions, the values in the table may have some little change.
2. When ordering, you should choose the only symbol code as part II mentioned.
3. The products has been developing and innovating all the time, our company keep the rights to amend and interpret the catalogue.