



Wind-Velocity Sensor (Pitot Tubing)

VAV/CAV for Kitchen-Exhaust Application

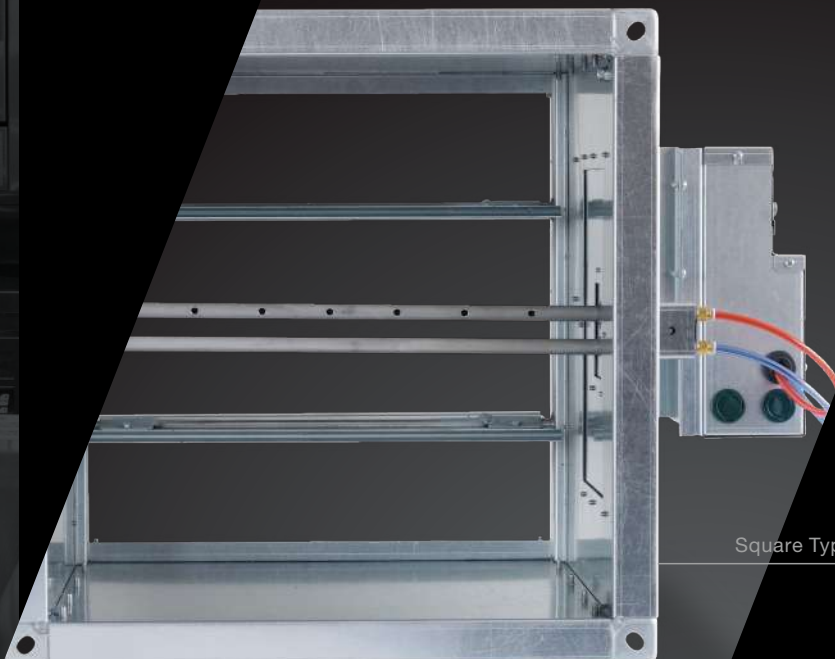
VAV/CAV to cope with
oil-contained wind in large volume



Round Shape Type

VAV/CAV FOR KITCHEN-EXHAUST APPLICATION

Variable Air Volume, Constant Air Volume



Square Type



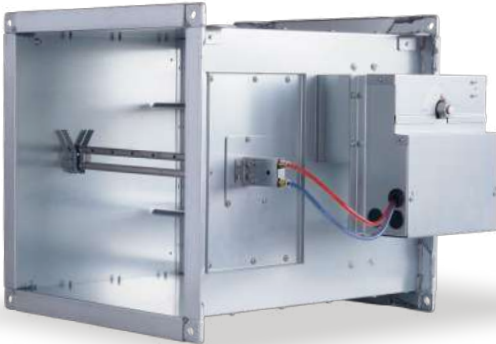
VAV/CAV FOR KITCHEN-EXHAUST APPLICATION

Variable Air Volume, Constant Air Volume

Perfect for the use
for oily-air exhaust in large volume
required for kitchen.



Round Shape Type



Square Type

Product image above is as per year 2021. Details in design may be subject to change/revision for improvement purpose without prior notice.



Role of VAV/CAV for Kitchen-Exhaust Application

VAV is an abbreviation used to indicate "Variable Air Volume" device which is designed to supply wind always in designated volume no matter how static pressure inside duct varies.

Whereas CAV is to indicate "Constant Air Volume" device, designed to supply wind always in a specific volume. Since kitchen of restaurant always deals with fire, it needs a device to exhaust hot air in large volume.

This is why VAV/CAV for kitchen-exhaust application is useful to keep air volume applied for entire restaurant in balance. In addition, equipments applied in exhaust duct are susceptible to mal-function due to oily dust adhering on mechanical parts in consequence with poor maintenance given to the duct.

Here comes Kuken VAV/CAV specially designed for the application with simple maintenance device equipped on to cope with malfunction caused by adherence of oil/dust.

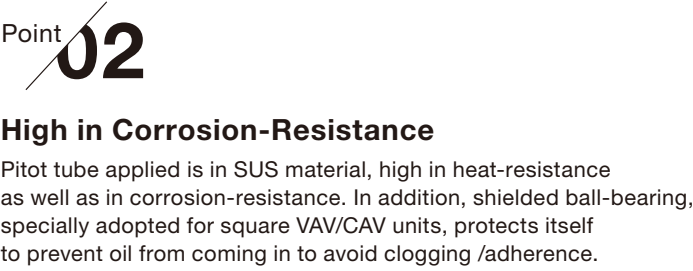


Pitot Tube Velocity Sensor Applied

Wind-velocity Reading made at many points averaging pressure difference realizes stable control over wind volume.



Shielded Ball-Bearing



Point 02

High in Corrosion-Resistance

Pitot tube applied is in SUS material, high in heat-resistance as well as in corrosion-resistance. In addition, shielded ball-bearing, specially adopted for square VAV/CAV units, protects itself to prevent oil from coming in to avoid clogging /adherence.



Point 03

Maintenance Made Simple

Wind-velocity sensor is removable from unit body. Large inspection port prepared for square-type facilitates internal visual check.

In order to make perfect control on flow rate, selection must be done properly with flow rate applicable within the capacity(sizing) of the unit. Selection remains the same for VAV and CAV.

ROUND	MODEL	FLOW RATE AVAILABLE FOR EACH MODEL							(CMH)
		0	500	1000	1500	2000	2500	3000	
	150	130	400	630					
	200	230		800	1130				
	250		360		1300	1760			
	300			510		1900	2540		
	350				700		2600	3460	

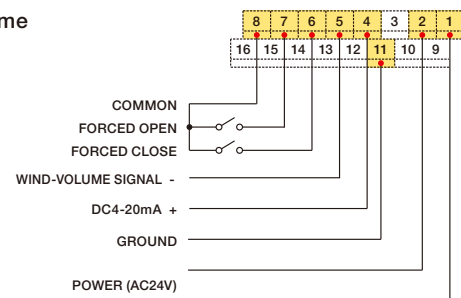
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MODEL	FLOW RATE AVAILABLE FOR EACH MODEL							(CM/H)
	0	500	1000	1500	2000	2500	3000	
150	130	400	560					
200	230		800	1000				
250		360		1300	1580			
300		510			1900	2280		
350			700			2600	3110	

DDC SQUARE	MODEL	FLOW RATE AVAILABLE FOR EACH MODEL																				(CMH)		
		0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500		10000	
100	0403			870					3200		3880													
	0404			1150							4300		5180											
	0504				1440								5400		6480									
	0704					2020										7500		9070						
150	MODEL	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	20000	21000	(CMH)
	0708					4032											15120		18144					

WIRING DIAGRAM

VAV
(Wind-Volume Signal 4~20mA)
MODEL : VAI-□-24



*The unit with AC24V is not equipped with function to isolate wind-velocity signal from power. Measures must be taken to make the separation(with transformer) if applied with other controlling devices(the one with AC100V is equipped with transformer).

*If multiple units are electrically wired together, apply the same wiring configuration on terminal for each unit.

Selection table and wiring diagram are available.



<https://www.kuken.com/catalog/>

ROUND	MODEL	DIM. ØD (DUCT)	DIM. L	DIM. X
	150	150	500	0
	200	200	500	0
	250	250	500	0
	300	300	500	0
	350	350	500	10

Technical drawings of the outdoor unit showing side and front views with dimensions.

Side View (Left): Shows a circular fan assembly with a diameter of 180 mm. A dimension line indicates a "MAINTENANCE SPACE 500mm OR MORE" between the unit and a wall.

Front View (Right): Shows the unit's profile with dimensions: total width 230 mm, height 229 mm, and a duct diameter ϕD (DUCT DN.) of 3 mm. A blue arrow labeled "WIND" points towards the unit. The top section has a total width of 110 mm, composed of 50 mm, 50 mm, and 10 mm segments. The bottom section has a total width of 50 mm, composed of 50 mm and 0 mm segments. The unit is labeled "X" on the right side.

SQUARE	MODEL	DUCT DIM.		DIM.L
		W	H	
	0403	400	300	500
	0404	400	400	500
	0504	500	400	500
	0704	700	400	500

The technical drawings illustrate the dimensions of the M2000 series outdoor unit. The front view (left) shows a rectangular unit with a width labeled 'W (DUCT DIM.)' and a height labeled 'H (DUCT DIM.)'. It includes a 'MAINTENANCE SPACE' of '500mm OR MORE' on the left and '180' on the right. A side view (right) shows the unit's depth with a total width of '229' and a height of '240'. It also shows a 'MAINTENANCE SPACE' of 'W+100mm OR MORE' on the right. A blue arrow labeled 'WIND' indicates the airflow direction from the right side of the unit. The side view also shows a '150' dimension for the main body and '45' for the top and bottom flanges.

SQUARE	MODEL	DUCT DIM.		DIM.L
		W	H	
	0708	700	800	500

MAINTENANCE SPACE
500mm OR MORE

W (DUCT DIM.)

H (DUCT DIM.)

180

280

DDC COVER

280

DDC COVER

MAINTENANCE SPACE
W+100mm OR MORE

L

150

45

229

45

240

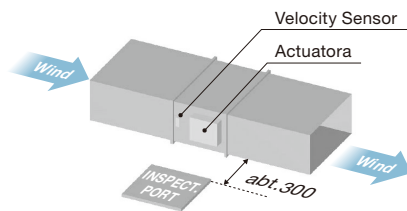
240

WIND

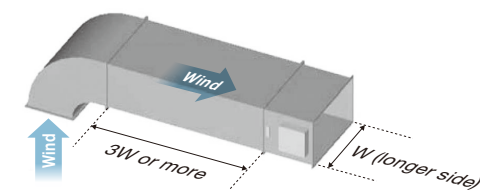
PRODUCT	VAV (ANALOG)	CAV (ANALOG)	VAV (DDC)	CAV (DDC)
Power Voltage	AC 24V±10% (STD) AC 100V±10% (OPTIONAL) 50/60Hz			
Electric Consumption	4VA (per 1 unit of actuator not including electric consumption)			
Applicable Temp.	Internal of Duct (0-80℃), Ambient (0-50℃) (No Freezing, No Condensation)			
Static Press. (Differential)	ROUND: 20-500Pa SQUARE: 20-800Pa			
Material (Body)	Standard: H.D.Galvanized Steel Plate Optional: SUS, Galvarium Steel Plate			
Painted (Optional)	-			
Wind-Velocity Signal Output	DC4~20mA*1(250Ω or Below, Non-Insulated) *Optional		Voltageed Pulse or DC Voltage (0~5V, Non-Insulated)	
Air Flow Signal	4~20mA (Impedance 224Ω)	Non-Voltage Signal from Outside	Command by DDC	
	0~135Ω			
	0~10V (Impedance 18.2kΩ)			
Special Function	*Bypass Interlocked Control *Optional *PrimaRy-Secondary Interlocked Control *Optional			
Command for Force Fully-Open/Close	Non-Voltage Signal from Outside (DC5V,5mA)		Command by DDC	
Time Required to Complete Fully-Open/Close	140(50hZ) / 120(60hZ) sec. from fully-closed to fully-open			
Fully-Open (Contact Signal)	MAX.Rated AC125V/0.5A *Optional		Standard	
Appropriate-Opening (Contact Signal)	MAX.Rated AC125V/5A *Optional		Standard	
Operation Contact Signal	MAX.Rated AC125V/5A *Optional			

INSTALLATION

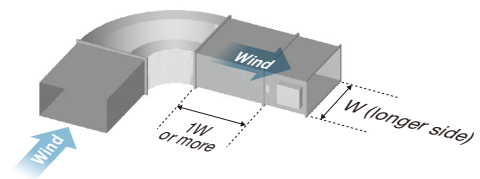
Install the unit in a space (0-50°C) not subject to water-dripping.



Secure space sufficient to do maintenance/ replacement work (actuator) by preparing inspect.port on the ceiling (□450 or □600).

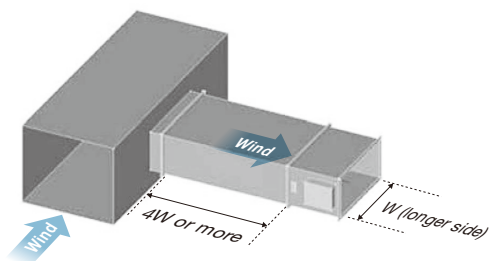


With elbow (affecting on longer side) applied



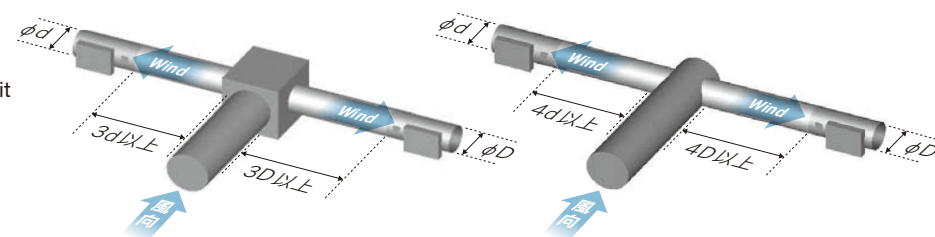
If elbow is adopted upstream of the unit without straight line applied, elbow must be equipped with guide-vane.

*The unit is not designed to be directly connected to elbow.

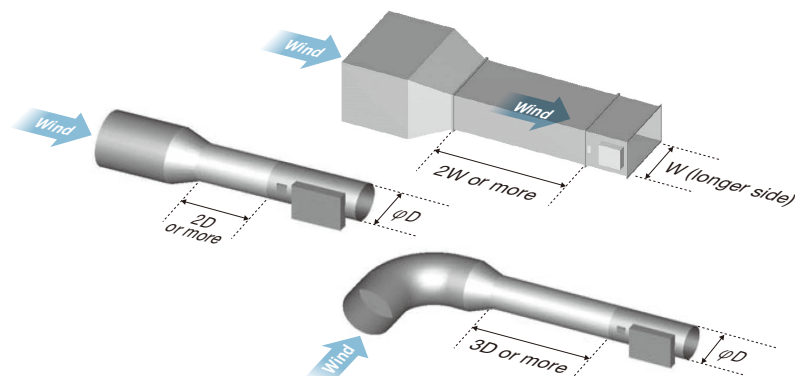


Add straight line between the unit and duct branched off from main duct.

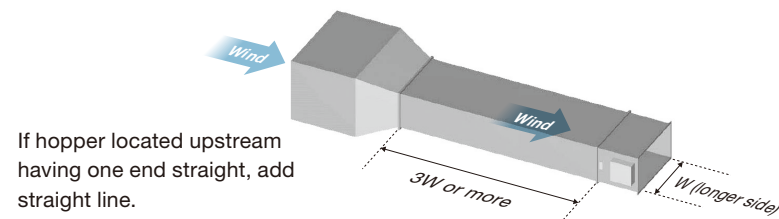
Apply straight line to connect the unit to branch pipe located at the end of the duct line in accordance with diameter of the unit.



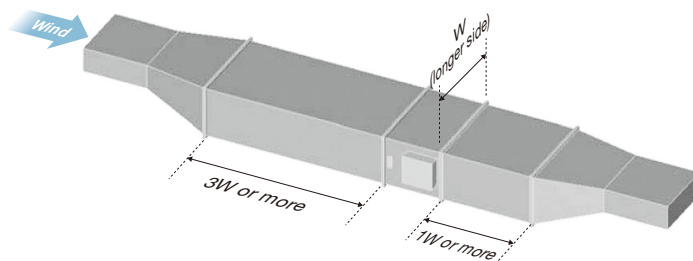
If the unit is subject to partial flow generated by elbow located upstream, it fails to make accurate reading on wind-velocity. Add straight line to avoid the problem.



Apply straight line if hopper stays upstream of the unit.



If hopper located upstream having one end straight, add straight line.



If duct is designed to be narrowed upstream/downstream of the unit, apply long straight line.

CAUTION IN INSTALLATION

1. Apply primary treatment with device such as grease-filter to minimize the chance for possible clogging of wind-velocity sensor(pitot tube) and movable parts caused by oil-dust.
2. In order to secure accurate wind-volume reading, avoid partial flow.
3. Keep the temperature inside duct below 80°C. Also avoid installing the unit outdoor or in area in temp.exceeding 60°C.
4. Prepare inspection port on ceiling face for maintenance purpose. Keep sufficient room for maintenance(refer to the product drawing).
5. Exercise care not to cut or bend the tube connected to wind-velocity sensor.
6. The product could be damaged if it is stored in a location subject to water-spilling/condensation.
7. Do not give shock nor to step on the unit.
8. Make sure to install the unit so as to have wind-volume sensor(pitot tube) set on windward side.
9. The unit can be installed in any way as long as it is installed so as to have shaft kept horizontally.
10. Do not screw on surface of the unit or actuator. It may cause malfunction (Round stick-in type is allowed to be screwed at duct-connecting portion: within 30mm from the edge)
11. Take a measure for input signal wiring to prevent electrical noise from coming in.
12. Power cable must be equivalent to 600V vinyl insulated electric wire or cable wire.
13. Pressure difference between inlet and outlet must be 500 Pa or below for round type, and 800Pa or below for square type.
14. Do not apply flex.duct for straight line located upstream of the unit.
15. Apply measuring voltage 500V or below for insulation resistance test.

INSPECTION/CLEANING

To maintain the function of the product, follow the instruction below for periodical inspection/cleaning.

INSPECTION

1. The unit fully opens and fully closed smoothly by giving forced open/close signal.
2. No abnormal noise coming from the body or actuator.
3. Pressure-detection tube is firmly connected to the unit without bend or cut/fissure.
4. No foreign substance is left clogged in pressure-detection tube.
5. Wind-velocity sensor(pitot tube) is not fissured/damaged and no foreign substance is left clogged inside.
6. No fissure, deformation, rust appeared on the unit/actuator.

CLEANING

In accordance with the inspection result, clean the followings:

1. Internal of the unit
2. Wind-velocity sensor(pitot tube)

FREQUENCY OF INSPECTION

At least once every 6 months (depending on how clean the unit can be maintained).

FREQUENCY OF REPLACEMENT

For preventive measure, following parts are recommended to be replaced periodically.

PARTS	FREQUENCY
Wind-Velocity Sensor (Pitot Tube)	4 yrs
Pressure-Detection Tube	4 yrs
Packing for Inspect.Port	4 yrs
Actuator	8 yrs
Bearing	8 yrs



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