

WE WILL CREATE COMFORTABLE  
LIFE SPACE WITH IMAGINATION  
AND TECHNOLOGY.



ROUND VAV/CAV



SQUARE VAV/CAV





# VAV/CAV UNIT

## WHAT IS VAV?

VAV is an abbreviation of Variable Air Volume Unit.

It is a device to change air volume upon receipt of air-volume signal from room-thermo or manometer.

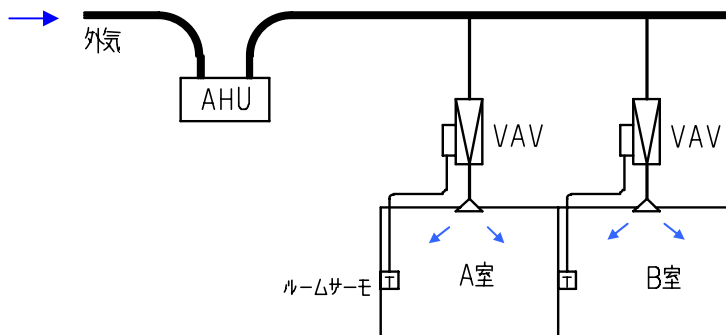
With Kuken VAV, precise control of room temp. and room pressure can be done due to the fact that

VAV unit is designed to respond to air volume change by comparing present air volume

(built-in air velocity sensor does reading) to specified volume.

In this way, it can cope immediately with sudden pressure change in air duct .

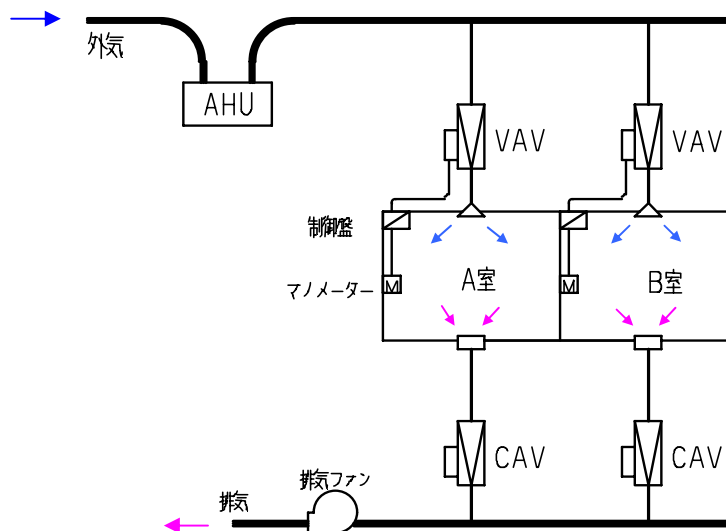
### TEMP. CONTROL WITH VAV



Unit sends air(temperature controlled by AHU) to air-duct.

VAV controls volume of the air sent to room by receiving signal from room-thermo.

### ROOM PRESSURE CONTROLLED WITH VAV & CAV



Upon sensing the change in room pressure, manometer sends signal to VAV.

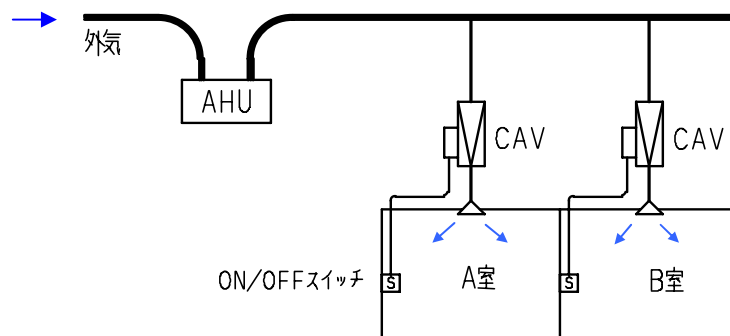
Since CAV applied in exhaust duct system exhausts air in specified amount, room-pressure control can be done effectively by the difference in air-volume (between VAV and CAV).

## WHAT IS CAV?

CAV stands for Constant Air Volume Unit.

CAV controls air-volume, reading velocity of the wind passing through CAV unit, to keep diffusing air-volume constant even if static pressure inside air duct changes.

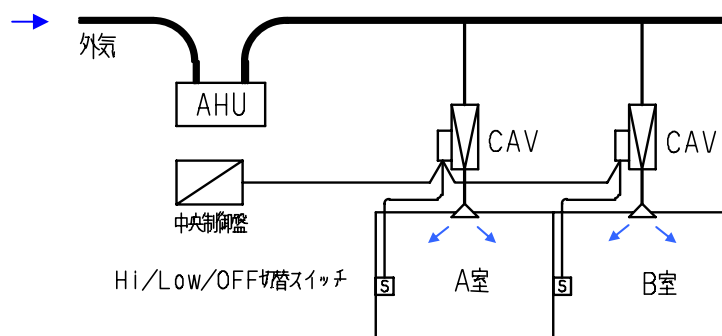
### CONTROL WITH CAV (2-POSITION)



Unit sends air(temperature controlled by AHU) to air-duct.

Keep the units off (by having the blade totally closed) in order not to send conditioned air to unoccupied room : it contributes to energy-saving.

### CONTROL WITH CAV (3-POSITION)



Unit sends air(temperature controlled by AHU) to air-duct.

Volume of air sent to rooms can be controlled with HI/LOW switch.

Keep the units off (by having the blade totally closed) in order not to send conditioned air to unoccupied room : it contributes to energy-saving.

# SELECTION

Accurate volume control is backed up by the most suitable sizing of the unit

To select the model(sizing) from the table below, focus on the blue-colored air flow range.

**Select the model with blue range where your max. air flow falls in.**

The air flow in yellow-colored range indicates possible increase/decrease range of flow after being mounted in between duct. For safety reason, selection within the range of blue is recommended.

## ROUND TYPE

MODEL	AIR FLOW RANGE FOR SELECTION (CMH)									
	100	500	1000	1500	2000	2500	3000	3500		
150	65	400	630							
200	110	340	800	1130						
250	180	530	1300	1760						
300	250	760	1900	2540						
350	350	1040	2600	3460						

## SQUARE TYPE

MODEL	AIR FLOW RANGE FOR SELECTION (CMH)														
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
0202	145	800	1440												
0302	220	640	1600	2160											
0403	430	1290	3200	4320											
0404	580	1720	4300	5760											
0504	720	2160	5400	7200											

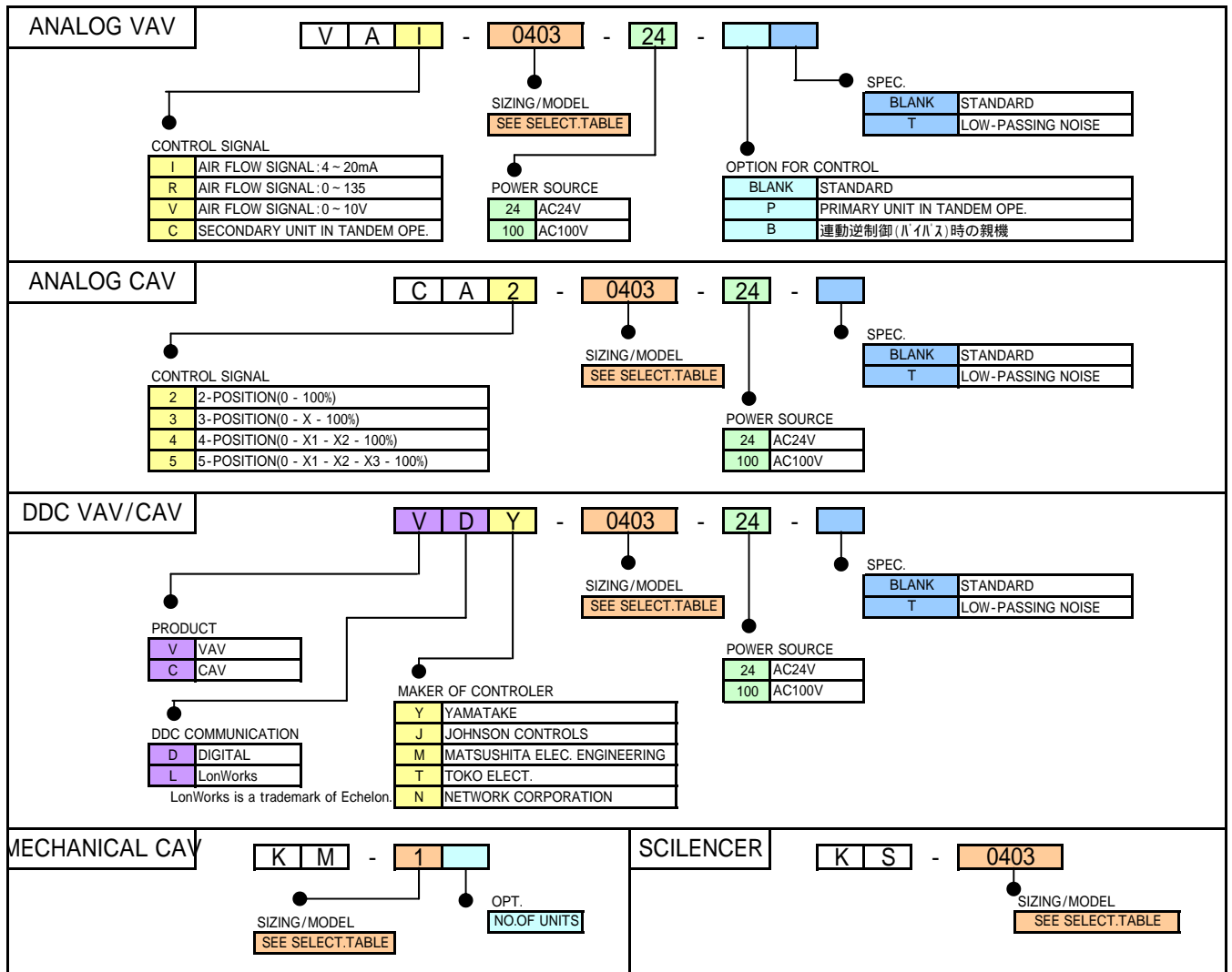
MODEL	AIR FLOW RANGE FOR SELECTION (CMH)									
	1000	5000	#####	#####	#####	#####	#####	#####	#####	#####
0704	1000	3020	7500	10080						
1004	1450	4300	11000	14400						
1006	2150	6480	16000	21600						
1008	2880	8640	21000	28800						
1208	3450	#####	26000	34500						

MODEL	AIR FLOW RANGE FOR SELECTION (CMH)									
	5000	#####	#####	#####	#####	#####	#####	#####	#####	#####
1210	4350	#####	32000	43200						
1212	5200	#####	40000	51800						
1414	7050	#####	50000	70500						
1614	8050	#####	60000	80600						
1616	9200	#####	70000	92100						

## ANALOG CAV

MODEL	AIR FLOW RANGE FOR SELECTION (CMH)									
	100	500	1000	1500	2000	2500	3000	3500	4000	
1	200	500								
2		500	1000							
3			1000	2000						
4				1500	3000					
5					2000	4000				

# MODEL EXPLANATION



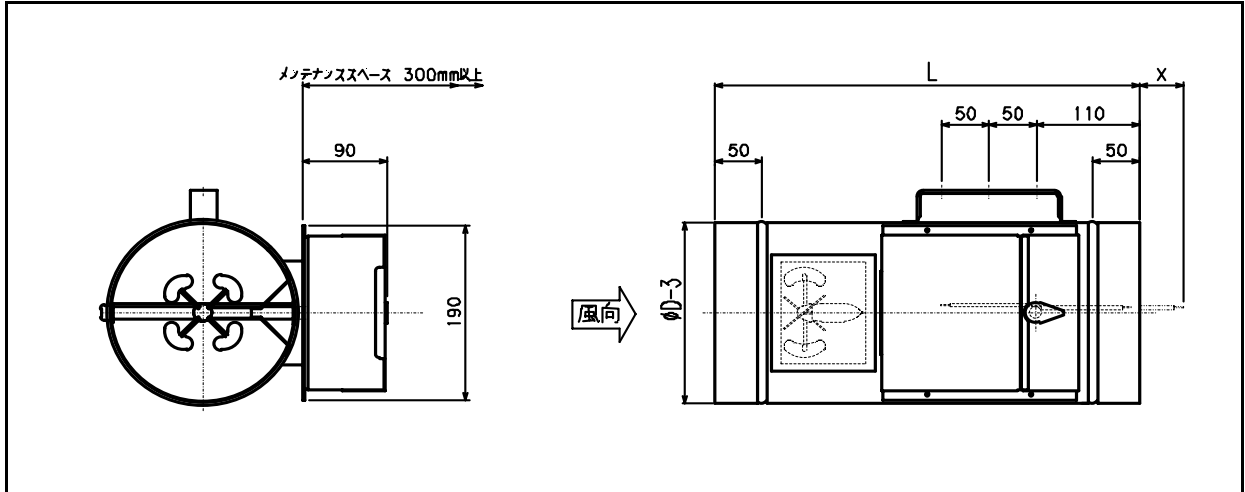
# SPECIFICATION

PRODUCT	CAV (ANALOG)	VAV (ANALOG)	CAV (DDC)	VAV (DDC)
POWER SOURCE	AC 24V (STANDARD) 、 AC 100V (OPTION) 50/60Hz			
ELECT. CONSUMPTION	4VA / 1 UNIT OF ACTUATOR (CONSUMPTION OF DDC NOT CONSIDERED)			
APPLICABLE TEMP.	0 ~ 60 (UNDER NO CONDENSATION, NO FREEZING)			
RANGE OF STATIC PRESS.	STANDARD : 20 ~ 800Pa WITH SCILENCER BOX : 50 ~ 800Pa			
MATERIAL	STANDARD : H.D.GALVANIZED PLATE OPTION : SUS, GALVARIUM PLATE			
PAINTING (OPTION)	CLORIDE-VINYL RESIN, EPOXY-RESIN PAINT			
FLOW SIGNAL OUT	DC4 ~ 20mA (OPTION)		PULSE (VOLTAGE BASED), OR DC VOLTAGE (0 ~ 5V)	
REQ.FLOW SIGNAL	CONTACT SIGNAL FROM OUTSIDE	4 ~ 20mA (224 ), 0 ~ 135 0 ~ 10V (18.2k )		COMAND FROM DDC
SPECIAL OPTIONAL CONTROL	BY-PASS TANDEM OPE., PRIMARY-SECONDARY TANDEM OPE.			
FULL OPEN/CLOSE COMAND	CONTACT SIGNAL FROM OUTSIDE		COMAND FROM DDC	
FULL OPEN/CLOSE TIME	102(50Hz) / 85(60Hz) SEC. FROM FULLY CLOSED TO FULLY OPEN			
FULL OPEN SIGNAL	OPTION		STANDARD	
SUITABLE OPEN SIGNAL	OPTION		STANDARD	
CONTACT SIGNAL FOR OPE	OPTION			

# DIMENSION

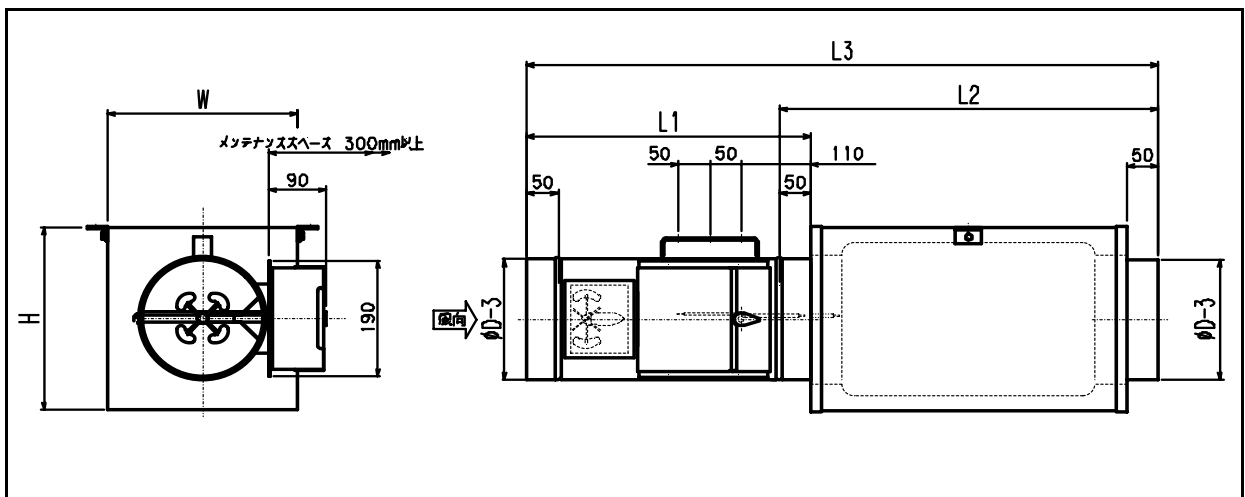
## ROUND

MODEL	DIM. D (DUCT SIZE)	DIM. L	DIM. X
150	150	450	0
200	200	450	0
250	250	450	0
300	300	500	21
350	350	500	46



## ROUND WITH SILENCER BOX

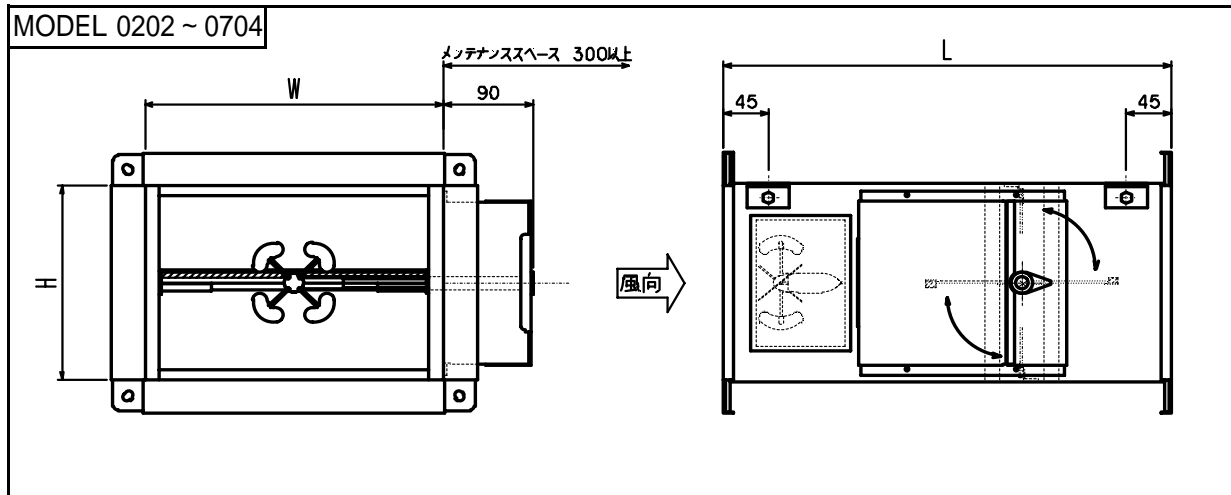
MODEL	DIM. D (DUCT SIZE)	DIM. L	SILENCER BOX			
			W	H	L 2	L 3
150	150	450	250	250	600	1000
200	200	450	300	300	600	1000
250	250	450	350	350	600	1000
300	300	500	400	400	700	1150
350	350	500	450	450	700	1150



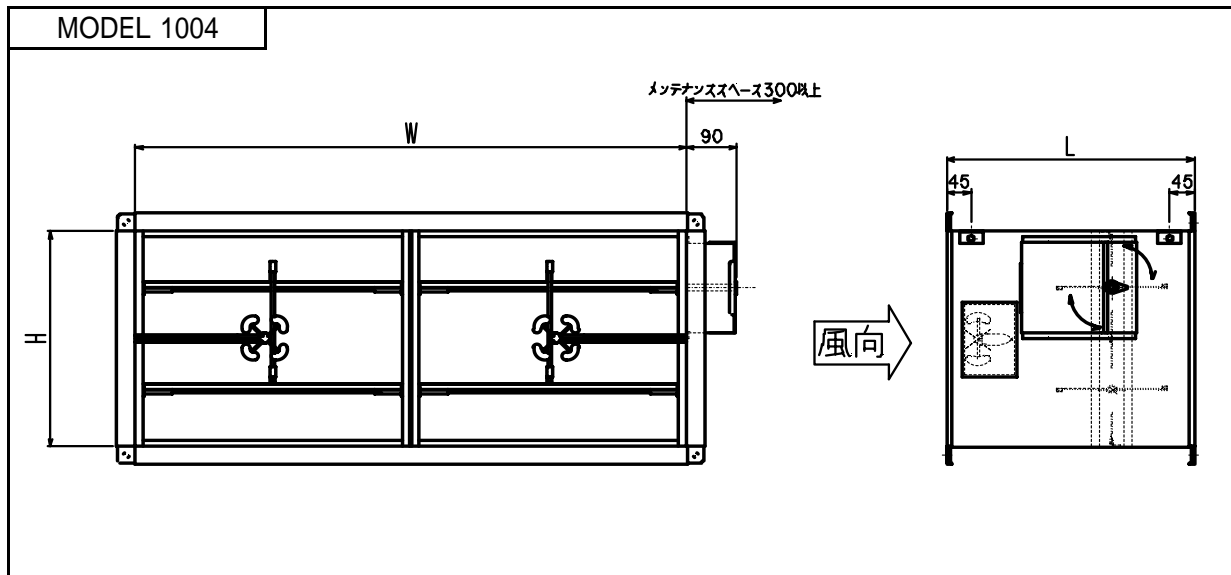
SQUARE

MODEL	DUCT SIZE		DIM. L
	W	H	
0202	200	200	450
0302	300	200	450
0403	400	300	450
0404	400	400	450
0504	500	400	450
0704	700	400	450
1004	1000	400	450
1006	1000	600	500
1008	1000	800	500
1208	1200	800	500
1210	1200	1000	500
1212	1200	1200	500
1414	1400	1400	500
1614	1600	1400	500
1616	1600	1600	500

MODEL 0202 ~ 0704



MODEL 1004

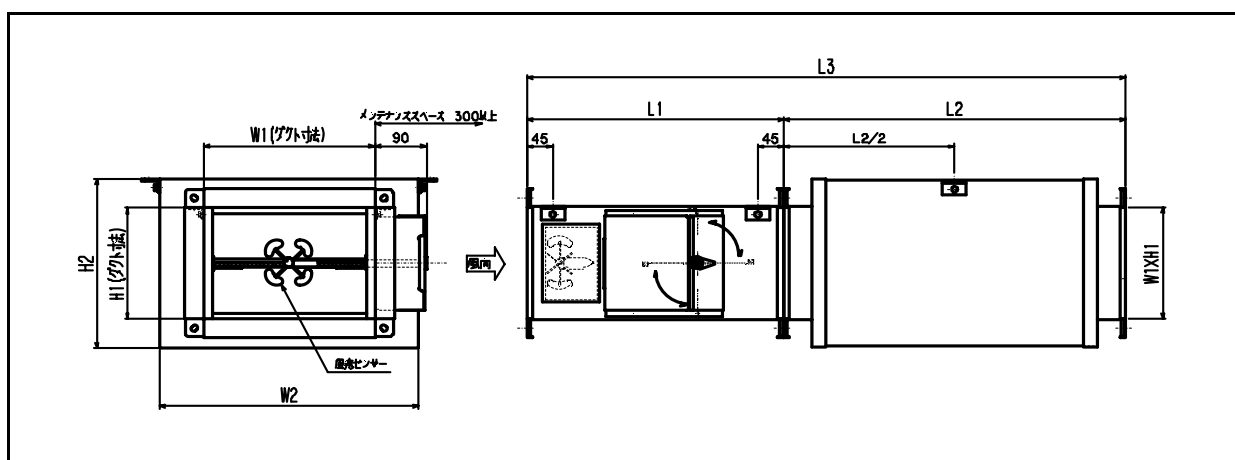




# DIMENSION

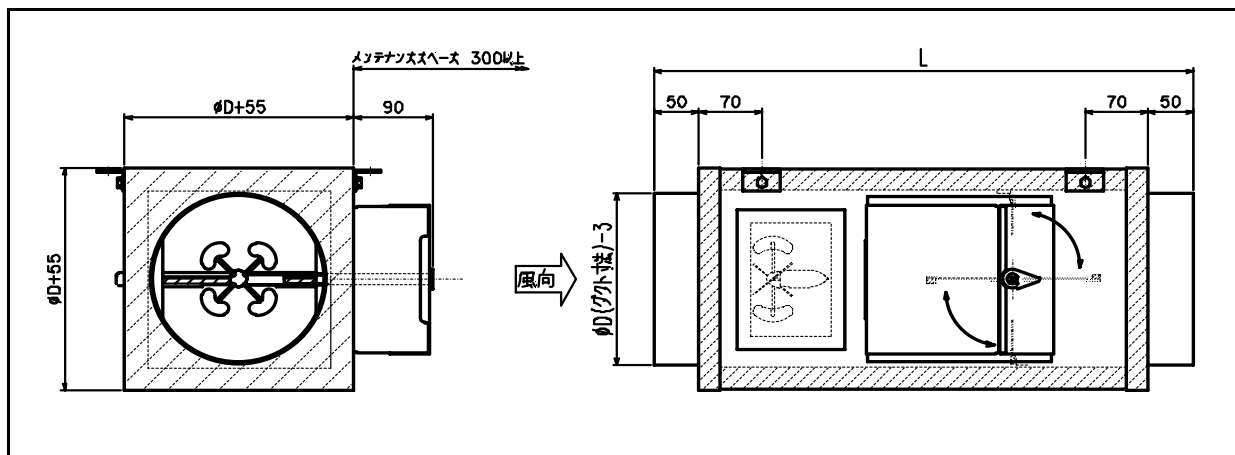
## SQUARE WITH SILENCER BOX

MODEL	DUCT SIZE		DIM. L	SILENCER BOX			
	W 1	H 1		W 2	H 2	L 2	L 3
0202	200	200	450	350	300	500	1050
0302	300	200	450	450	300	500	1050
0403	400	300	450	600	400	550	1100
0404	400	400	450	600	500	600	1150
0504	500	400	450	700	500	700	1250
0704	700	400	450	900	500	800	1350
1004	1000	400	450	1100	500	1000	1550
1006	1000	600	500	1100	700	1000	1600
1008	1000	800	500	1100	900	1000	1600
1208	1200	800	500	1300	900	1200	1800
1210	1200	1000	500	1300	1100	1200	1800
1212	1200	1200	500	1300	1300	1200	1800
1414	1400	1400	500	1500	1500	1400	2000
1614	1600	1400	500	1700	1500	1600	2200
1616	1600	1600	500	1700	1700	1600	2200



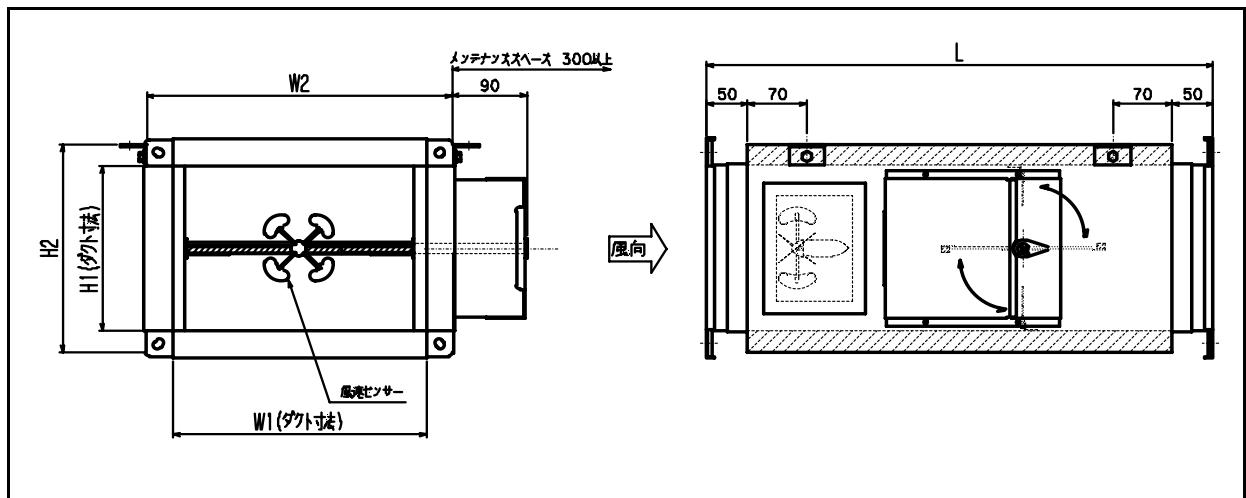
## LOW PASSING NOISE (WITH ROUND DUCT CONNECTION)

MODEL	DIM. D (DUCT SIZE)	DIM. L
150	150	500
200	200	500
250	250	500
300	300	500
350	350	500



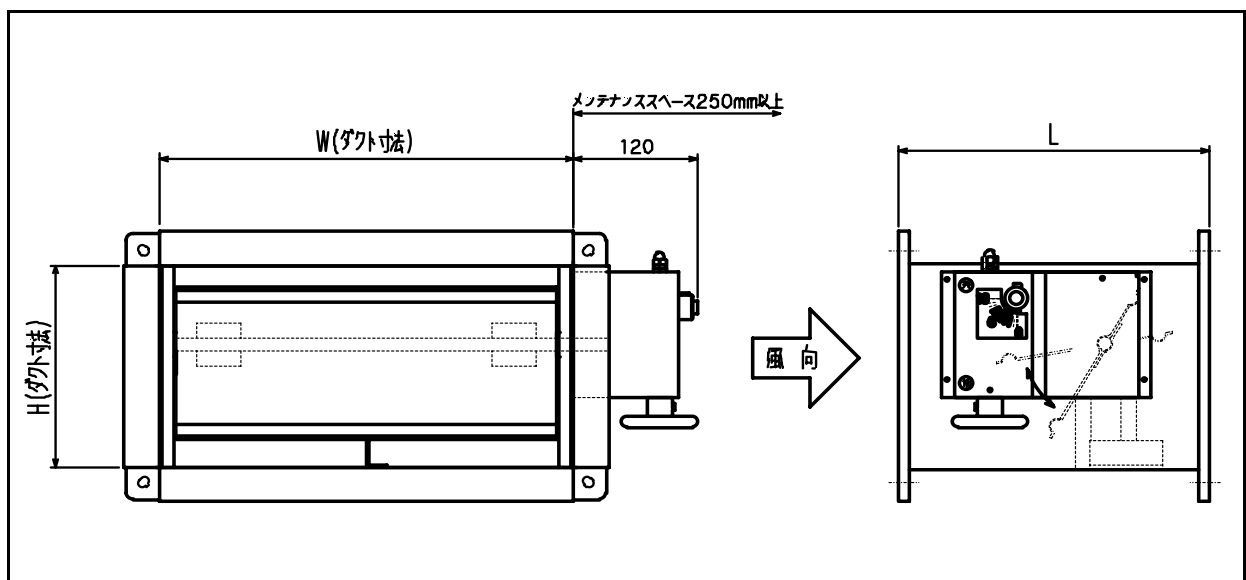
LOW PASSING NOISE(WITH SQUARE DUCT CONNECTION)

MODEL	DUCT SIZE		UNIT ITSELF		DIM. L
	W 1	H 1	W 2	H 2	
0202	200	200	260	255	600
0302	300	200	360	255	600
0403	400	300	460	355	600
0404	400	400	460	455	600
0504	500	400	560	455	600
0704	700	400	760	455	600



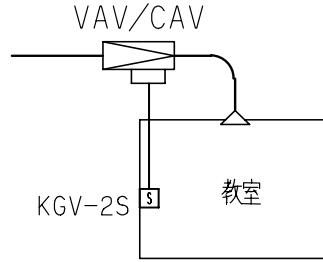
MECHANICAL CAV

MODEL	DUCT SIZE		DIM. L
	W	H	
KM-1	100	200	300
KM-2	200	200	300
KM-3	400	200	300
KM-4	600	200	300
KM-5	800	200	300



# RELATED DEVICES

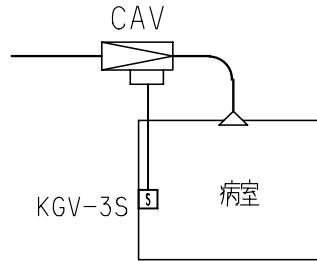
## ON/OFF SWITCH



THIS SWITCHING DEVICE ACTIVATES VAV/CAV TO INTRODUCE FIXED-TEMP. AIR(AT AHU) TO ROOM. .

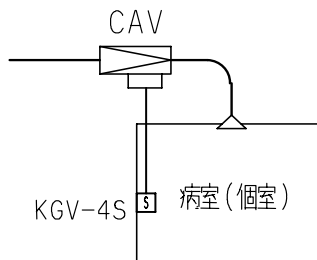
PERFECT FOR THE USE FOR CLASS ROOM WITH A LARGE NUMBER OF STUDENTS.

## OFF/LOW/HI SWITCH (KGV-3S)



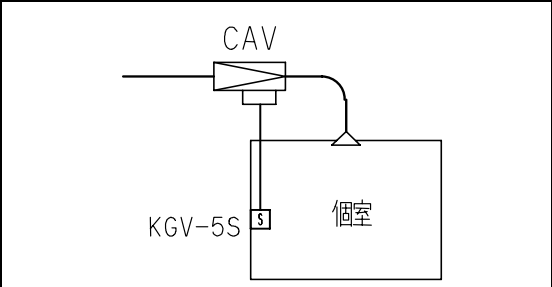
SWITCHING DEVICE WITH HI/LOW CONTROL. FOR HOSPITAL ROOMS.

## OFF/LOW/MID/HI (KGV-4S)



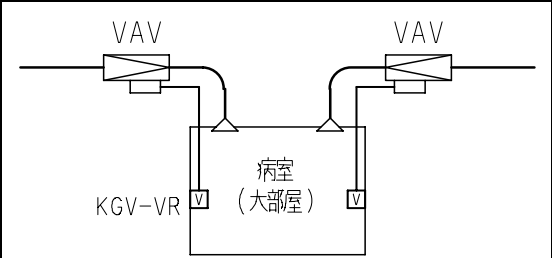
AIR- VOLUME IS FULLY UNDER YOUR CONTROL. BEST FOR THE USE IN PRIVATE ROOM IN HOSPITAL..

**MULTI-STAGE SWITCH (KGV-5S)**



BEST FOR THE USE IN PRIVATE ROOM IN HOSPITAL.

**NON-STEP SWITCH (KGV-VR)**



BEST FOR THE USE IN HOSPITAL ROOM WITH 5 ~ 6 PATIENTS.

**DATA CONTROLLER (KGV-PS)**



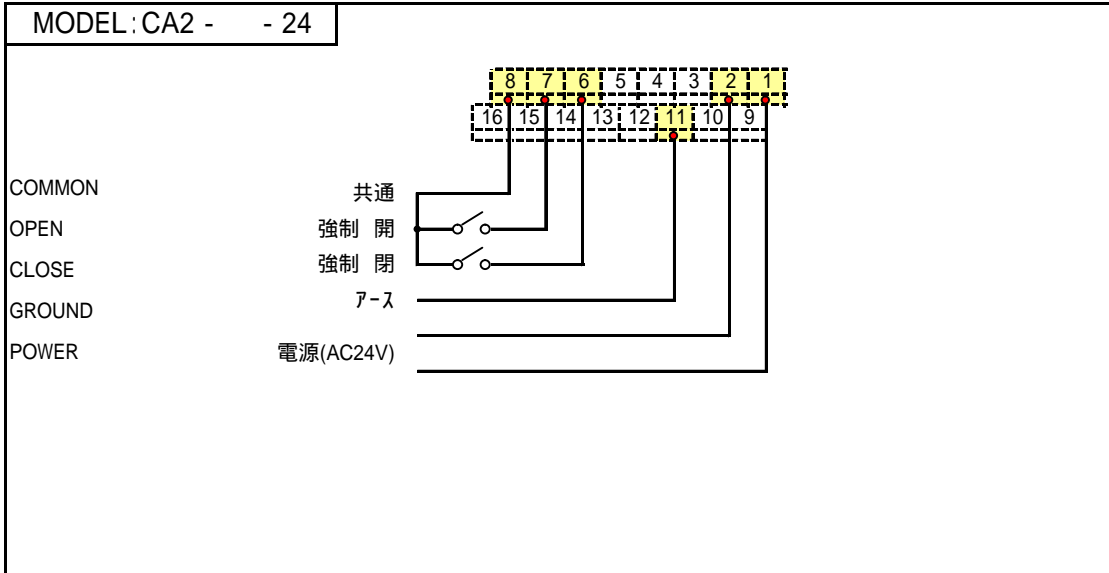
**DATA CORRECTION MADE SIMPLE**

THIS IS THE CONTROLLING DEVICE SIMPLY USED BY CONNECTING TO CIRCUIT FOR DATA CORRECTION (ie. AIR VOLUME) AT SITE.

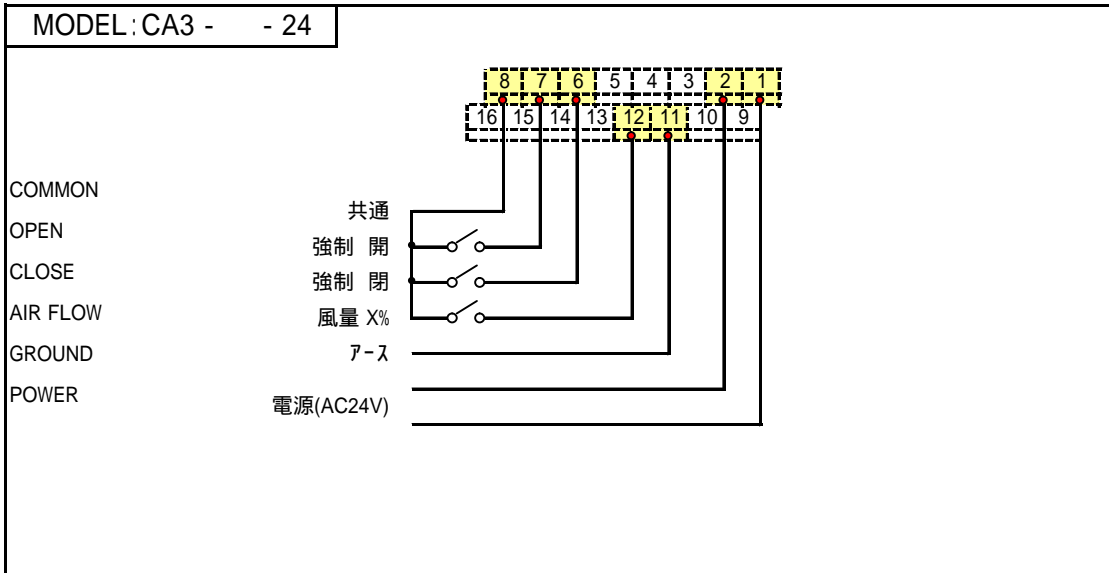
IT CAN ALSO BE A MONITOR SHOWING OPERATING CONDITION (INCLUDING AIR VOLUME) OF VAV/CAV UNIT.

# WIRING DIAGRAM

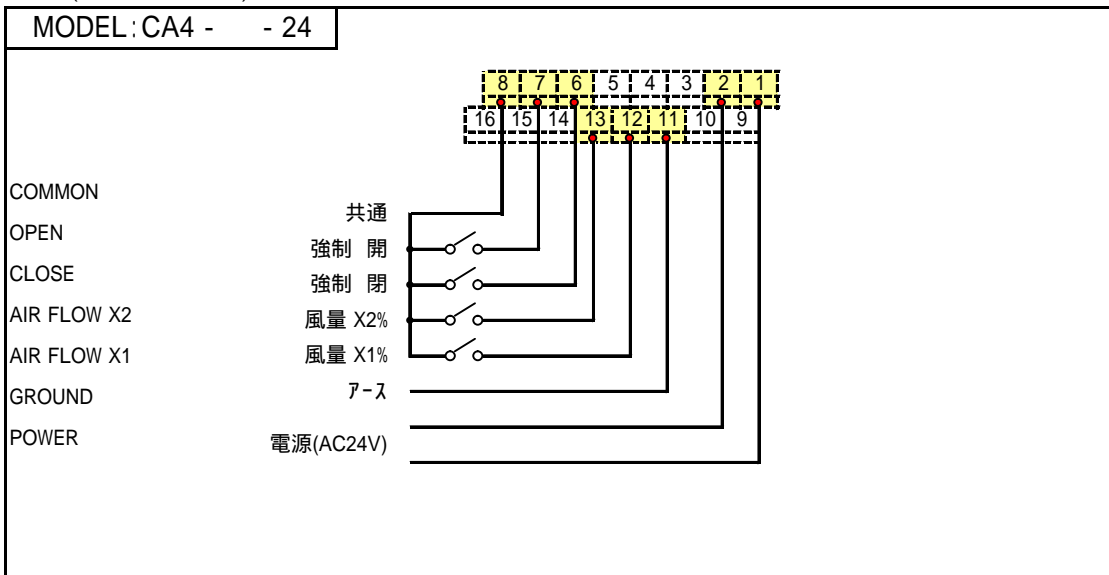
## CAV (2-POSITION)



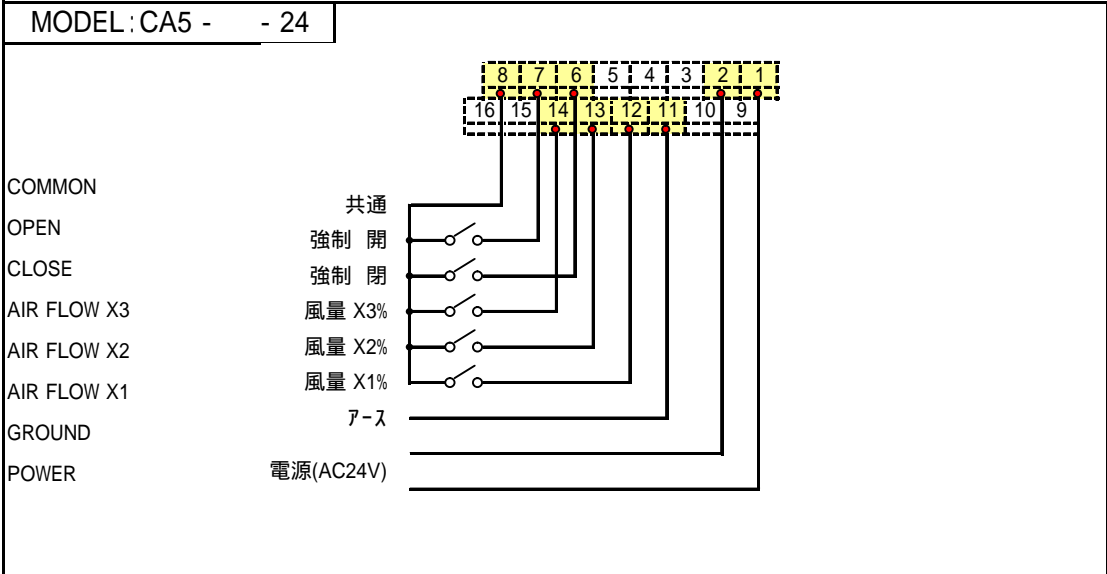
## CAV (3-POSITION)



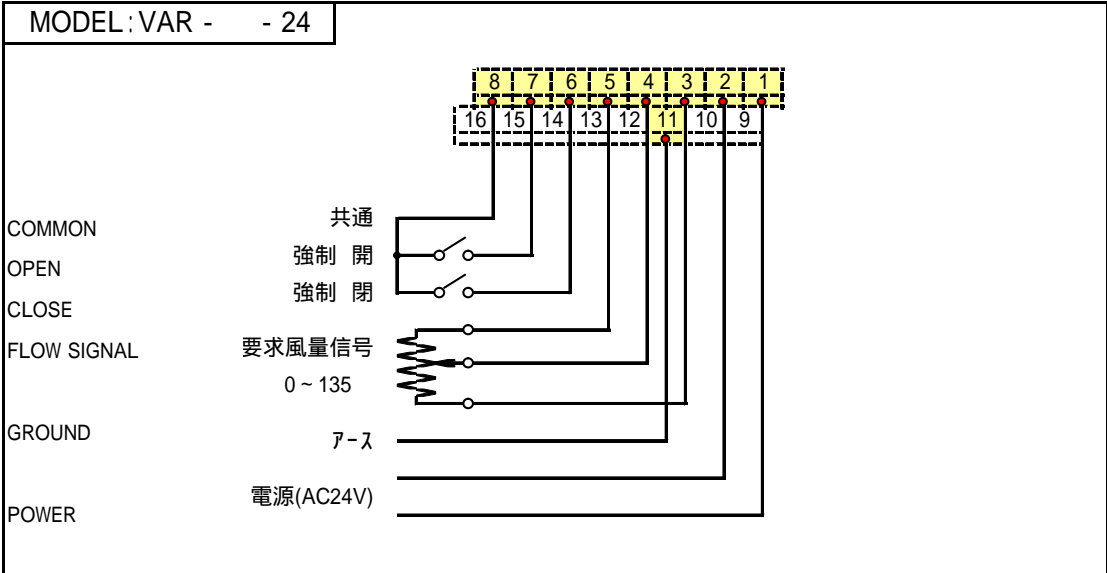
## CAV (4-POSITION)



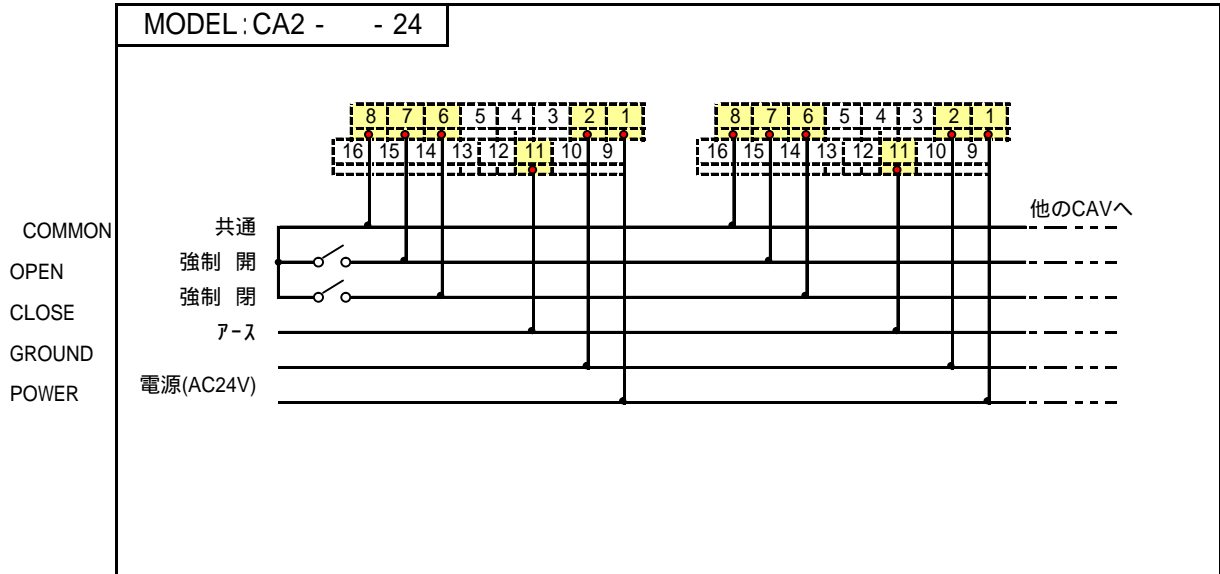
CAV (5-POSITION)



CAV (NON-STAGE)

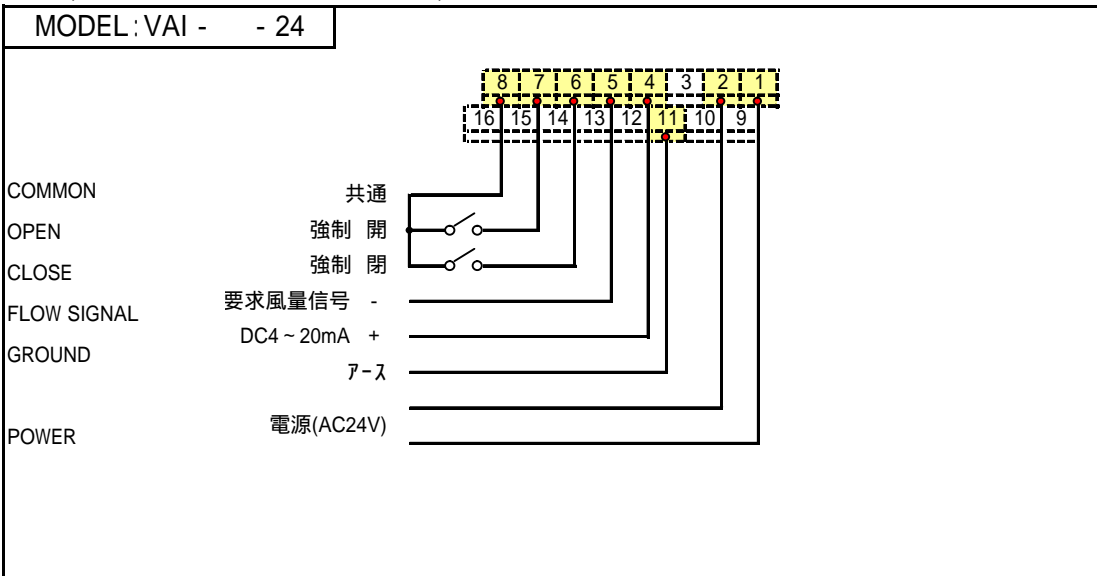


CAV TANDEM OPE. (FOR 2 POSITION)

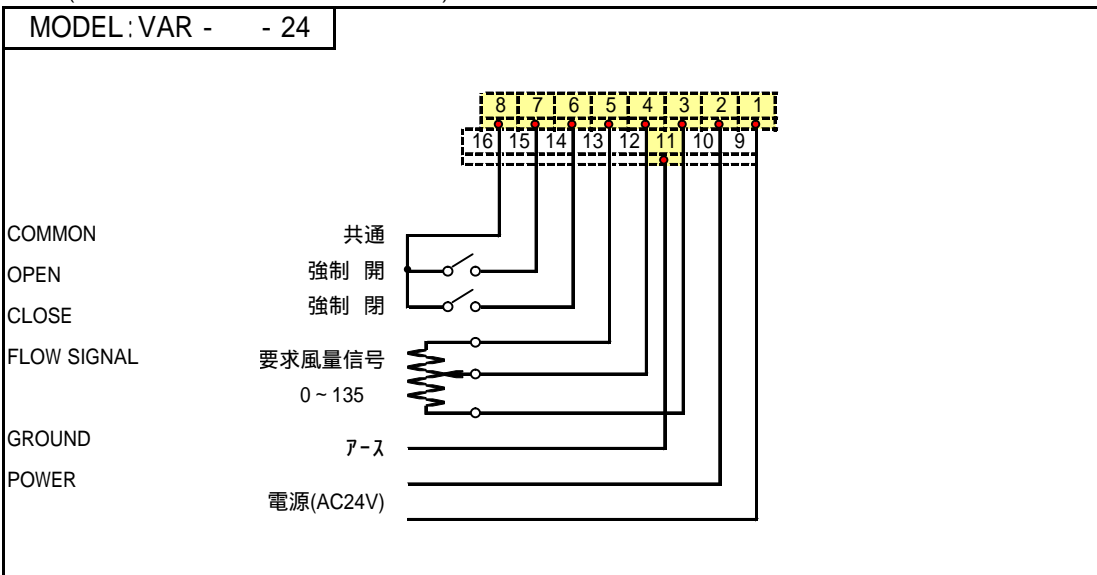


# WIRING DIAGRAM

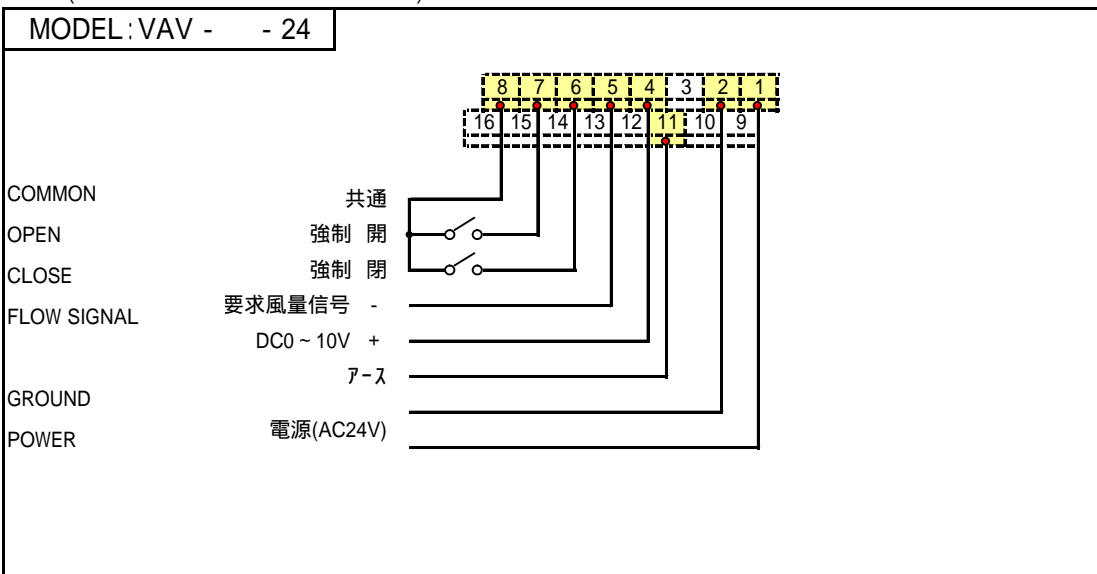
VAV (AIR FLOW SIGNAL 4 ~ 20mA)



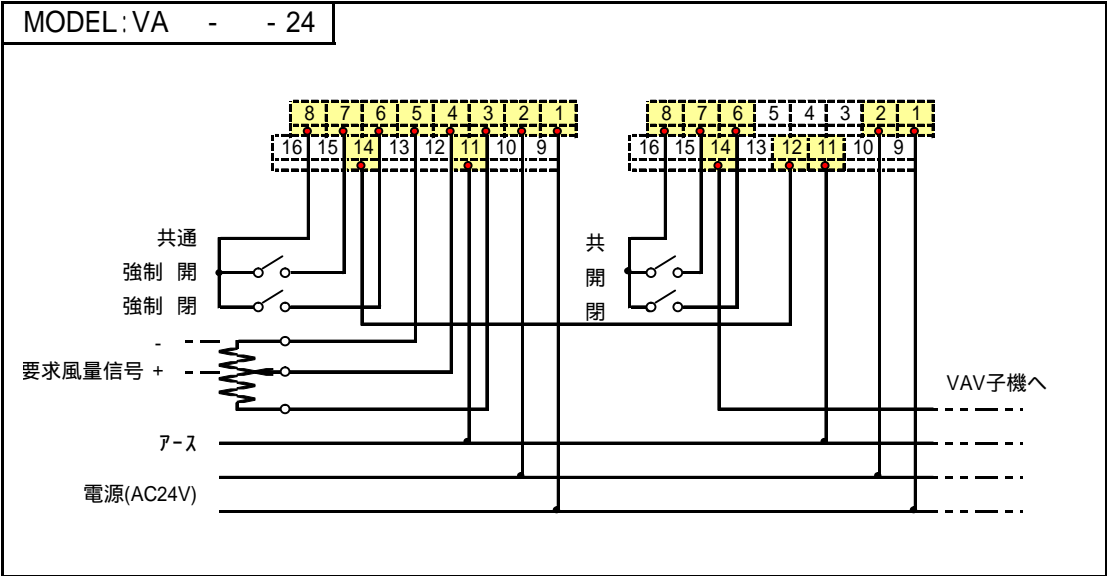
VAV (AIR FLOW SIGNAL 0 ~ 135 )



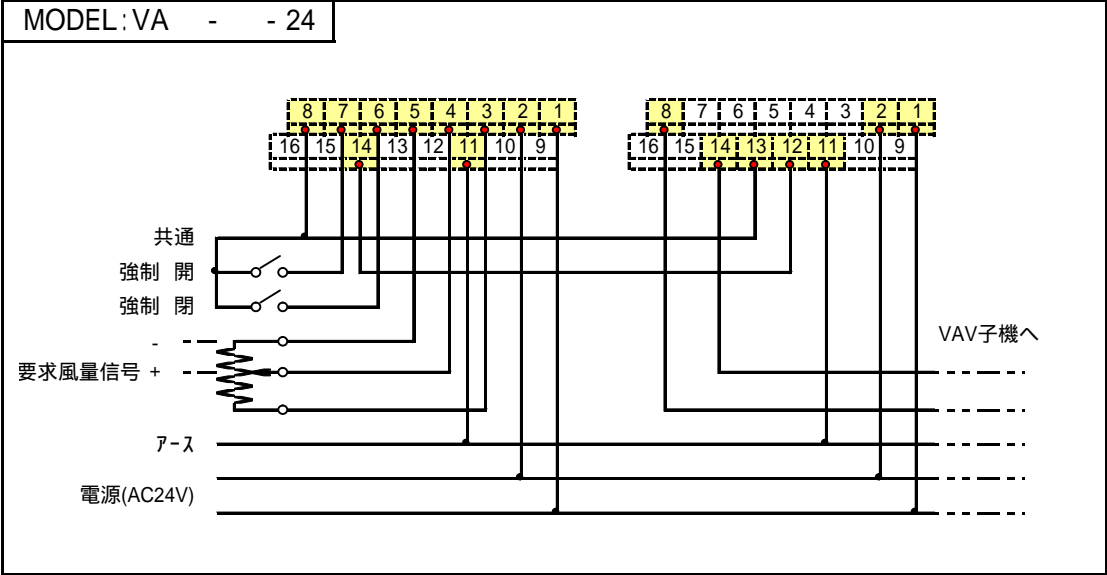
VAV (AIR FLOW SIGNAL 0 ~ 10V)



VAV PRIMARY-SECONDARY TANDEM OPE. (单独強制開閉)



VAV PRIMARY-SECONDARY TANDEM OPE. (連動強制開閉)



DDC MAKERS

- YAMATAKE
- JOHNSON CONTROLS
- MATSUSHITA ELEC. CO.
- TOKO ELECTRIC CO.,
- NETWORK CORPORATION



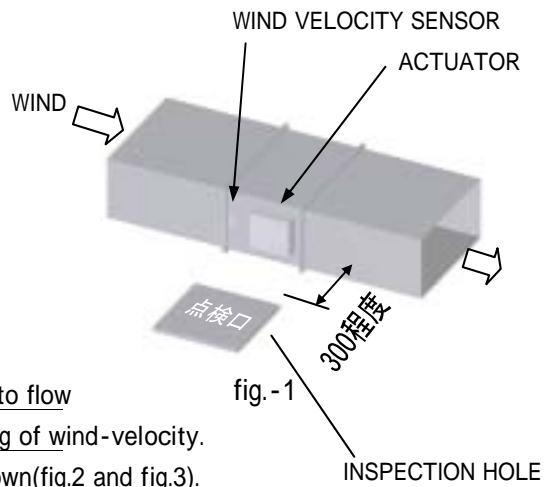
# INSTALLATION

## BEFORE CONNECTING VAV/CAV

- Design duct system that minimizes the chance of generating uneven, partial flow.
- Avoid applying the unit outdoor or in the location expected to have ambient air temp. 50 or above.
- Prepare inspection hole(on ceiling for easy access to actuator) and maintenance space(300mm or more).
- Keep the unit away from air-intake port to avoid the chance of rain water coming into the unit.
- It negatively affect performance of wind-velocity sensor.
- Do not give physical shock to the unit.
- Do not step, sit, nor stand on the unit(body and actuator).
- Connect the unit to duct in the way wind-velocity sensor faces up-stream.
- Electronic type can be facing any direction(up, down, horizontal..) as long as shaft is situated horizontally against ground. Mechanical type can only be situated horizontally against ground(facing horizontally).
- Do not drill or make additional hole on actuator and unit body.
- Take countermeasure for input signal wire to prevent noise from coming in.
- Prepare cable wire or 600V vnyln insulation wire or equivalent for power cable.
- Applicable wind pressure against the unit(both in-coming and out-going) should be 800Pa or below.
- Do not apply corrosive gas(air containing acid or alkaline vapor).
- Air sent to the unit should be free from dust(prepare filter for dusty room).
- Do not apply flexible duct as a rectifier pipe(see INSTALLATION OF VAV/CAV below).
- The unit is designed for air-cond. application only.

## INSTALLATION OF VAV/CAV

- Secure inspection hole on ceiling ( 450 or 600) with ample maintenance space(fig.1).
- Unit contains electronic parts.
- Keep the unit away from water and excessively high ambient temp.(applicable range : 0 ~ 60 ).



- If elbow exists upstream of the unit, wind tends to flow unevenly into the unit. It negatively affects reading of wind-velocity.
- Prepare a straight rectifier duct like the way shown(fig.2 and fig.3).
- If wind is already coming unevenly upstream of the elbow, longer rectifier is required.

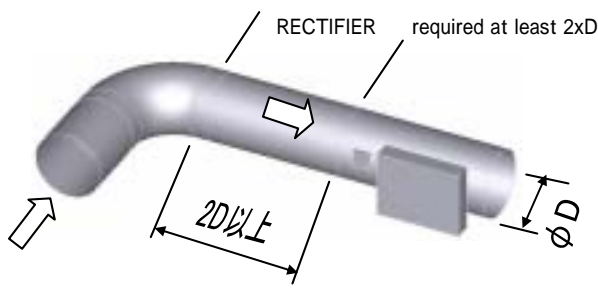


fig.2

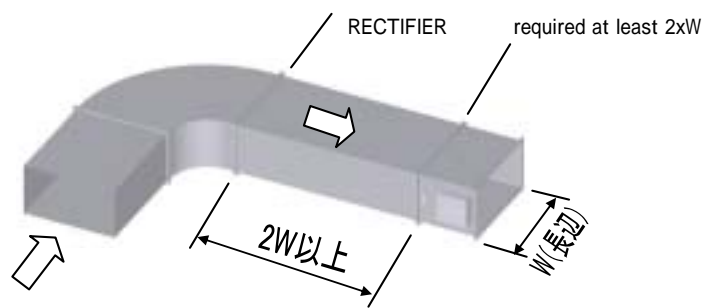


fig.3

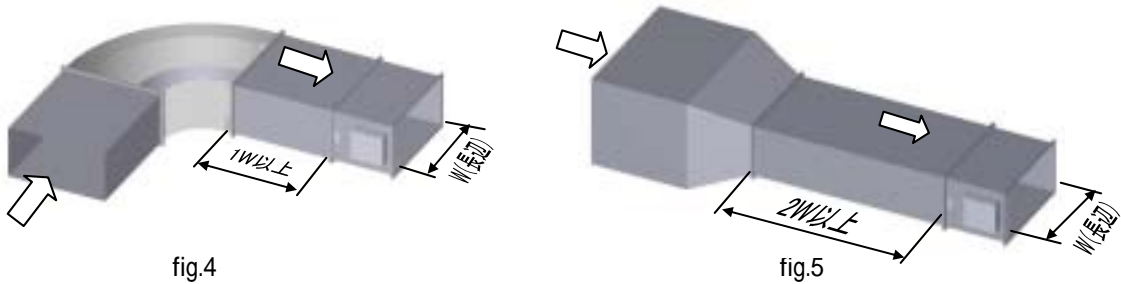
\* Recommendable length of rectifier pipe

## INSTALLATION OF VAV/CAV

If straight pipe(rectifier) can not be applicable when elbow exists upstream, apply elbow with guide-vane equipped internally(fig.4). The unit cannot be connected to elbow duct directly.

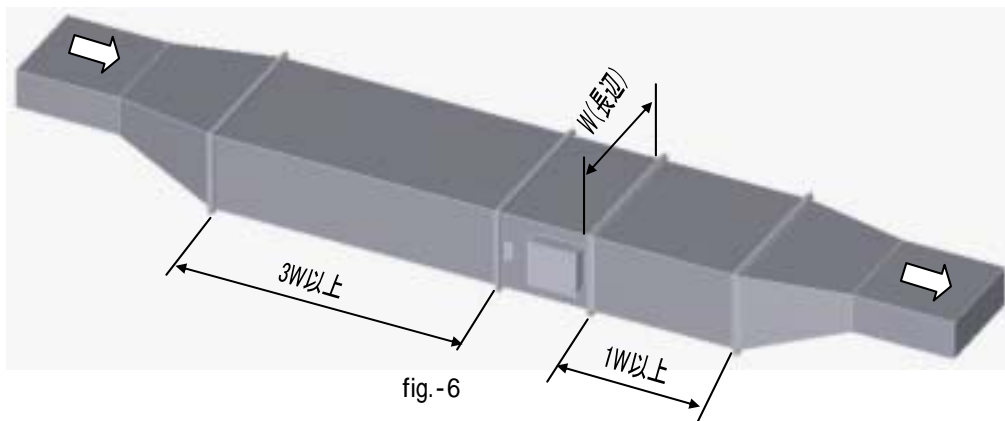
If hopper comes upstream of the unit, apply straight duct as shown in fig.5.

If wind is already coming unevenly upstream of the elbow,  
longer straight duct is required.



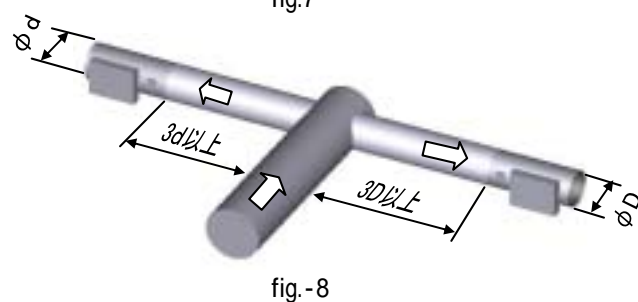
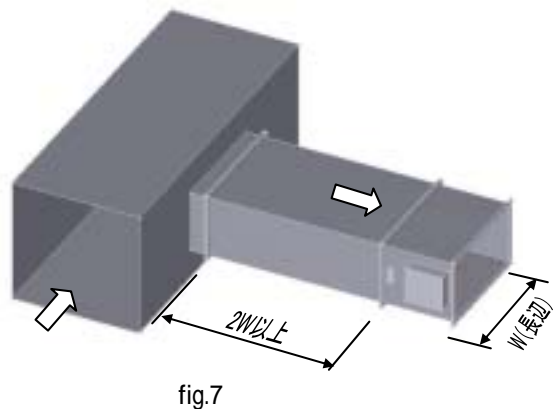
If duct ends(both on upstream & downstream) are smaller than the unit size, wind mostly tends to go through extension area of duct internal when length of straight duct is enough. Follow fig.6.

If wind is already coming unevenly upstream of hopper,  
longer straight duct is required.



If unit is applied on branch ducts,  
straight duct like the way shown on fig.7.

If branches split at the edge of main duct,  
prepare straight duct like the way shown  
on fig.8.



# sound level

·ELECTRONIC VAV , CAV · OCTAVE BAND POWER LEVEL(dB) (BASED ON 10<sup>-12</sup> Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C	
150	65	20	36	28	33	27	-	-	-	-	-	
		100	38	28	33	37	35	30	26	17	23	
		200	41	35	37	43	43	41	39	34	32	
		300	58	49	50	56	57	56	54	50	47	
	230	20	40	27	31	26	17	-	-	-	-	-
		100	40	46	46	46	41	39	32	25	31	
		200	44	52	51	50	49	46	42	39	38	
		300	49	55	53	53	53	50	47	43	42	
	400	20	39	48	44	40	36	29	24	-	24	
		100	52	54	54	52	48	44	41	32	37	
		200	54	60	58	56	54	51	48	43	43	
		300	55	63	61	59	57	55	51	48	46	
200	340	20	36	33	34	32	30	17	-	-	18	
		100	43	47	47	44	43	42	34	24	33	
		200	47	50	52	51	50	49	43	37	40	
		300	51	52	54	54	54	48	46	49	43	
	570	20	45	42	42	39	38	31	20	-	27	
		100	52	51	51	49	46	42	39	30	35	
		200	55	56	56	54	52	47	46	42	41	
		300	56	59	59	58	56	54	51	49	45	
	800	20	50	50	52	48	46	41	35	27	35	
		100	60	59	59	55	53	50	47	41	42	
		200	64	64	63	60	57	54	53	49	46	
		300	64	67	65	62	59	56	55	53	48	
250	530	20	43	38	36	35	27	17	-	-	19	
		100	60	56	52	49	43	43	37	26	34	
		200	66	63	60	57	53	50	48	40	43	
		300	69	66	65	63	58	55	52	47	49	
	920	20	47	43	42	44	37	30	19	-	29	
		100	66	61	56	54	48	49	45	34	40	
		200	71	68	63	60	55	52	51	45	46	
		300	74	72	68	65	60	67	55	50	58	
	1300	20	54	52	51	55	46	43	37	32	40	
		100	69	64	60	59	53	51	48	40	45	
		200	76	72	66	64	58	56	54	49	50	
		300	79	76	71	68	63	60	58	54	55	
300	760	20	43	34	35	35	32	23	-	-	20	
		100	57	54	51	47	44	43	36	28	34	
		200	61	59	58	53	51	49	46	40	40	
		300	65	61	61	57	56	53	52	47	45	
	1330	20	48	41	41	42	39	34	22	-	28	
		100	64	59	56	52	50	49	44	35	40	
		200	69	66	63	58	54	53	51	45	44	
		300	71	70	68	62	58	56	55	51	50	
	1900	20	58	51	48	48	46	43	36	27	35	
		100	69	62	60	59	56	54	50	44	45	
		200	75	71	67	63	60	59	56	52	50	
		300	78	75	72	67	63	61	59	56	55	
350	1040	20	45	37	24	34	28	20	-	-	18	
		100	59	52	48	46	43	53	36	26	44	
		200	67	59	55	52	50	49	54	42	46	
		300	71	63	59	57	54	54	53	50	45	
	1820	20	56	45	41	42	39	30	19	-	28	
		100	65	59	54	52	49	52	49	36	43	
		200	70	65	61	57	54	53	54	45	46	
		300	74	69	64	61	58	56	56	53	48	
	2600	20	68	60	53	52	51	44	39	30	40	
		100	72	64	60	58	57	54	52	44	46	
		200	77	71	66	63	61	59	56	53	50	
		300	79	74	70	66	63	61	59	56	53	

·ELECTRONIC C A V WITH SILENCER BOX ·OCTAVE BAND POWER LEVEL(dB) (BASED ON 1 0<sup>-12</sup> Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C	
150 WITH SILENCER	65	20	34	28	27	-	-	-	-	-	-	
		100	35	27	28	26	22	-	-	-	-	
		200	39	33	32	32	28	16	19	16	16	
		300	58	48	44	45	43	32	34	32	32	
	230	20	39	25	24	-	-	-	-	-	-	-
		100	39	45	40	35	27	-	-	-	19	
		200	43	49	44	39	35	21	20	21	23	
		300	49	54	47	43	40	24	27	25	29	
	400	20	39	46	38	32	24	16	-	-	-	-
		100	51	53	48	41	35	23	20	-	27	
		200	52	58	52	46	41	29	28	25	32	
		300	55	62	56	49	44	31	30	30	41	
200 WITH SILENCER	340	20	33	28	25	18	-	-	-	-	-	
		100	41	47	39	33	26	17	16	-	17	
		200	45	49	45	41	33	25	24	20	25	
		300	49	52	47	44	36	24	28	31	29	
	570	20	39	41	38	27	22	-	-	-	-	-
		100	50	51	43	39	30	19	20	-	23	
		200	54	55	49	43	35	23	26	24	28	
		300	53	59	51	47	38	30	32	31	32	
	800	20	49	50	46	37	30	16	-	-	24	
		100	58	59	52	44	40	28	25	20	32	
		200	63	63	54	49	43	33	33	30	37	
		300	62	66	56	51	44	34	35	35	40	
250 WITH SILENCER	530	20	42	36	33	25	-	-	-	-	-	
		100	58	56	48	39	25	23	22	-	28	
		200	64	62	56	47	35	31	33	25	36	
		300	68	65	61	54	42	36	37	31	42	
	920	20	44	41	40	36	21	-	-	-	20	
		100	65	58	52	44	31	29	29	19	32	
		200	70	66	58	50	37	32	35	30	40	
		300	73	70	63	54	43	47	40	34	45	
	1300	20	53	51	47	46	27	19	-	-	31	
		100	69	62	54	51	36	30	31	24	36	
		200	76	70	61	55	41	36	38	34	45	
		300	78	74	67	59	46	41	42	39	50	
300 WITH SILENCER	760	20	42	33	33	25	18	-	-	-	-	
		100	55	54	47	36	26	25	21	-	25	
		200	60	57	54	41	33	32	30	24	34	
		300	65	59	56	44	38	34	36	31	36	
	1330	20	46	40	40	32	25	16	-	-	17	
		100	64	58	53	42	35	32	28	20	33	
		200	69	65	60	48	37	36	36	29	40	
		300	71	69	65	51	40	39	39	35	42	
	1900	20	57	49	46	37	30	25	17	-	24	
		100	68	61	56	49	41	36	33	28	36	
		200	75	66	63	52	44	41	41	36	44	
		300	78	71	67	56	45	43	44	40	49	
350 WITH SILENCER	1040	20	44	35	21	24	-	-	-	-	-	
		100	57	49	44	36	24	43	24	-	34	
		200	66	56	50	42	30	36	42	30	34	
		300	68	59	52	46	34	39	39	37	31	
	1820	20	54	44	39	32	21	-	-	-	-	
		100	64	56	51	42	31	36	35	22	30	
		200	69	62	57	47	35	39	41	31	37	
		300	73	65	59	49	37	42	42	39	39	
	2600	20	66	58	51	42	35	28	24	16	30	
		100	71	61	57	48	40	39	37	31	37	
		200	75	67	62	53	44	44	42	40	43	
		300	78	71	65	56	46	46	45	43	47	

# sound level

·ELECTRONIC VAV/CAV LOW PASSING-NOISE ·OCTAVE BAND POWER LEVEL(dB)(BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C	
150 LOW PASS NOISE	65	20	-	16	-	-	-	-	-	-	-	
		100	41	26	32	19	16	-	-	-	-	
		200	37	25	30	23	23	-	-	-	-	
		300	45	29	29	24	24	19	20	-	-	
	230	20	24	22	21	-	-	-	-	-	-	-
		100	44	32	35	26	25	16	-	-	-	-
		200	44	32	35	30	29	21	17	-	17	
		300	50	36	36	32	31	26	23	18	19	
	400	20	39	29	32	31	29	24	-	-	17	
		100	48	39	39	36	35	31	20	-	23	
		200	52	42	42	38	37	31	23	17	25	
		300	56	44	44	42	40	35	28	24	29	
200 LOW PASS NOISE	340	20	30	30	23	21	-	-	-	-	-	
		100	44	47	41	34	25	16	-	-	18	
		200	51	53	47	39	31	23	16	11	25	
		300	50	57	52	47	39	31	27	22	32	
	570	20	34	34	29	27	19	-	-	-	-	-
		100	44	47	43	36	29	21	-	-	20	
		200	50	53	48	42	34	28	20	16	27	
		300	52	57	52	47	40	34	28	22	32	
	800	20	42	52	42	39	33	27	18	-	23	
		100	52	55	53	48	42	36	26	-	33	
		200	58	61	58	53	47	42	33	23	38	
		300	62	65	61	56	49	45	37	30	42	
250 LOW PASS NOISE	530	20	27	23	22	18	-	-	-	-	-	
		100	41	35	38	38	32	25	-	-	22	
		200	51	39	41	39	37	34	26	18	25	
		300	54	40	42	42	40	40	33	26	31	
	920	20	41	29	30	23	-	-	-	-	-	-
		100	47	39	42	38	33	26	-	-	22	
		200	50	44	47	46	41	36	27	18	31	
		300	55	46	48	49	46	41	34	26	35	
	1300	20	55	44	47	45	43	39	30	23	32	
		100	59	48	51	49	46	41	34	28	35	
		200	65	54	58	56	51	48	42	38	42	
		300	67	60	63	59	55	51	46	42	45	
300 LOW PASS NOISE	760	20	30	24	22	19	-	-	-	-	-	
		100	44	38	39	40	34	25	-	-	24	
		200	46	41	42	42	38	35	27	18	27	
		300	48	41	42	46	44	41	34	26	33	
	1330	20	42	31	30	25	-	-	-	-	-	-
		100	50	40	42	40	33	25	-	-	24	
		200	56	49	49	49	43	37	28	18	34	
		300	59	49	50	52	48	42	35	26	37	
	1900	20	48	44	46	49	41	36	28	21	34	
		100	57	49	50	52	45	41	33	28	37	
		200	63	57	57	60	52	48	42	39	46	
		300	65	63	63	63	56	52	47	43	49	
350 LOW PASS NOISE	1040	20	29	25	23	19	-	-	-	-	-	
		100	45	37	38	39	32	25	-	-	23	
		200	50	43	43	42	39	34	26	18	28	
		300	53	44	45	46	44	41	34	25	33	
	1820	20	43	32	31	27	20	15	-	-	-	
		100	51	41	42	41	33	26	20	-	25	
		200	57	49	50	50	43	36	28	20	35	
		300	60	51	52	54	48	42	35	28	39	
	2600	20	49	43	44	47	39	35	26	18	32	
		100	57	49	49	51	44	39	32	26	36	
		200	62	56	57	59	50	46	40	37	45	
		300	65	62	63	62	53	49	45	41	48	

·ELECTRONIC VAV , CAV · OCTAVE BAND POWER LEVEL(dB)(BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
0202	145	20	36	32	37	32	26	22	-	-	-
		100	35	43	48	50	45	45	42	35	36
		200	41	47	51	55	53	53	52	46	44
		300	40	51	53	58	58	58	58	54	50
	470	20	31	38	40	37	34	27	-	-	22
		100	45	50	52	52	50	50	45	38	41
		200	50	54	58	58	57	58	54	50	49
		300	52	57	62	62	61	63	59	56	54
	800	20	38	44	47	47	49	45	37	26	38
		100	58	58	60	62	57	55	49	44	48
		200	62	62	64	65	61	60	57	53	51
		300	64	65	66	66	65	64	61	57	55
0302	640	20	31	33	38	36	31	25	16	-	20
		100	48	51	55	52	52	52	47	42	43
		200	53	55	63	60	58	60	57	52	51
		300	56	59	65	66	63	65	62	58	56
	1120	20	42	41	45	46	44	41	34	27	33
		100	57	57	59	59	55	57	56	48	48
		200	63	63	65	63	61	62	60	56	43
		300	66	66	69	67	65	66	64	61	57
	1600	20	54	49	50	50	48	44	41	35	37
		100	62	61	63	65	61	59	57	51	52
		200	69	67	70	69	66	64	64	61	56
		300	72	71	73	72	71	68	67	65	60
0403	1290	20	36	32	37	33	32	20	-	-	20
		100	50	49	50	52	58	58	48	38	49
		200	58	58	59	59	60	62	62	53	54
		300	62	62	62	59	62	65	67	62	59
	2250	20	41	36	37	39	38	25	17	-	27
		100	56	53	55	54	58	56	51	44	47
		200	62	61	62	61	62	62	61	55	53
		300	65	65	65	64	65	66	66	61	58
	3200	20	47	42	43	43	46	39	33	26	35
		100	59	56	57	55	56	55	50	43	41
		200	65	64	64	62	62	62	61	55	53
		300	69	69	68	67	67	67	65	61	58
0404	1720	20	45	37	35	35	31	25	-	-	19
		100	54	51	53	54	57	58	50	39	49
		200	60	59	57	60	59	61	63	53	55
		300	66	64	64	61	63	64	66	61	58
	3010	20	44	38	38	42	37	27	17	-	27
		100	62	58	56	55	58	58	53	42	49
		200	70	66	64	62	62	63	63	55	55
		300	72	73	70	66	66	67	67	61	59
	4300	20	47	46	46	47	49	42	38	27	38
		100	64	60	59	60	57	55	54	43	46
		200	72	68	65	65	63	61	61	57	53
		300	76	73	70	68	67	66	63	60	57
0504	2160	20	42	36	37	35	30	21	-	-	19
		100	56	53	54	56	57	59	54	41	50
		200	62	59	58	60	59	61	63	52	55
		300	71	66	64	63	62	64	66	60	58
	3780	20	46	39	38	44	36	29	17	-	29
		100	60	56	56	55	58	59	54	40	50
		200	66	62	63	64	62	64	64	54	56
		300	72	68	67	67	67	67	67	60	59
	5400	20	56	48	45	50	47	43	37	29	36
		100	66	60	57	58	58	60	55	43	51
		200	72	65	64	64	63	63	63	57	55
		300	76	71	69	69	68	67	65	61	58

# sound level

·ELECTRONIC VAV , CAV · OCTAVE BAND POWER LEVEL(dB) (BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
0704	3020	20	45	41	37	37	33	24	16	-	21
		100	60	58	56	59	61	62	56	41	53
		200	62	64	62	62	61	61	65	53	57
		300	76	70	65	64	64	66	69	63	61
	5260	20	51	45	40	47	37	32	21	-	32
		100	62	62	57	57	60	61	56	41	52
		200	68	63	66	67	65	66	66	54	58
		300	77	68	72	69	68	71	69	62	62
	7500	20	61	49	50	52	48	47	41	32	38
		100	70	65	60	62	61	63	56	47	54
		200	75	70	65	64	63	65	64	60	56
		300	81	73	69	71	68	70	68	62	61
1004	4300	20	47	43	39	38	34	26	17	-	22
		100	61	58	56	61	63	63	58	42	54
		200	64	67	64	63	61	63	67	53	59
		300	77	71	67	64	65	67	70	61	62
	7650	20	51	46	41	48	37	33	23	-	33
		100	62	64	60	57	61	61	58	40	52
		200	70	65	68	68	66	66	67	56	59
		300	79	68	73	71	69	73	70	62	64
	11000	20	62	50	52	53	48	47	41	31	38
		100	72	66	62	63	62	64	56	44	55
		200	76	72	66	65	63	67	65	57	58
		300	83	76	70	71	68	71	69	61	62

·ELECTRONIC CAV WITH SILENCER BOX ·OCTAVE BAND POWER LEVEL(dB) (BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
0202 WITH SILENCER	145	20	35	31	31	27	19	-	-	-	-
		100	34	42	46	46	40	41	37	25	32
		200	42	44	50	50	47	43	45	35	37
		300	42	46	52	52	52	46	50	44	42
	470	20	30	36	39	34	27	16	-	-	18
		100	43	50	50	48	44	41	37	26	33
		200	50	55	56	53	51	48	44	38	40
		300	53	57	60	57	55	52	49	45	44
	800	20	37	43	44	39	34	25	17	-	23
		100	58	58	56	55	48	45	37	30	40
		200	60	61	60	60	53	50	44	40	46
		300	65	64	63	60	57	54	49	46	46
0302 WITH SILENCER	640	20	34	33	36	32	29	16	-	-	17
		100	47	51	52	47	47	41	37	30	36
		200	51	55	59	55	52	48	47	41	41
		300	52	58	63	60	57	54	52	47	46
	1120	20	41	42	42	41	34	29	23	-	25
		100	57	56	57	53	47	44	47	36	39
		200	66	62	63	57	53	51	51	45	44
		300	67	65	66	61	58	55	53	49	48
	1600	20	53	47	47	49	42	39	35	28	34
		100	61	58	61	59	51	48	47	40	45
		200	67	62	68	63	56	53	54	51	50
		300	71	69	70	65	59	56	57	54	53

·ELECTRONIC CAV WITH SILENCER BOX ·OCTAVE BAND POWER LEVEL(dB) (BASED ON 10<sup>-12</sup> Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
0403 WITH SILENCER	1290	20	38	32	35	28	19	-	-	-	-
		100	51	48	49	47	47	49	43	31	40
		200	61	59	57	53	49	52	54	44	46
		300	61	59	59	54	52	54	58	52	50
	2250	20	41	34	36	32	23	16	-	-	-
		100	57	52	52	48	45	48	44	35	39
		200	64	59	59	55	51	54	54	46	46
		300	65	63	62	58	55	58	59	54	51
	3200	20	46	43	40	35	28	25	20	-	19
		100	60	55	56	51	46	46	46	36	38
		200	65	64	61	56	52	54	55	48	47
		300	68	68	65	60	56	58	58	53	50
0404 WITH SILENCER	1720	20	45	37	31	28	22	-	-	-	
		100	52	50	49	49	49	48	37	26	39
		200	61	58	54	54	51	51	51	42	43
		300	69	64	62	57	61	55	56	51	50
	3010	20	43	38	35	37	32	16	-	-	21
		100	60	58	52	50	52	46	43	31	41
		200	66	65	62	56	56	52	53	44	45
		300	71	74	67	61	56	55	56	49	50
	4300	20	64	56	52	49	45	36	35	25	34
		100	67	59	57	54	49	44	45	37	39
		200	73	67	62	59	56	50	50	45	45
		300	75	71	67	67	60	54	53	49	54
0504 WITH SILENCER	2160	20	43	35	34	29	22	-	-	-	
		100	59	53	52	52	55	50	44	31	44
		200	61	59	55	55	54	50	53	40	45
		300	69	66	60	58	56	52	56	49	48
	3780	20	42	38	36	38	30	18	-	-	22
		100	59	57	53	50	48	47	43	28	38
		200	66	61	61	58	54	51	55	42	47
		300	75	67	65	61	59	56	58	49	50
	5400	20	57	47	42	44	40	32	26	17	29
		100	65	58	54	57	51	48	45	32	43
		200	71	62	62	58	53	52	53	46	45
		300	74	66	67	63	58	56	55	51	49
0704 WITH SILENCER	3020	20	43	40	33	32	25	-	-	-	
		100	61	57	53	53	53	52	44	30	47
		200	65	64	60	58	59	52	55	43	48
		300	75	70	62	59	59	55	59	51	51
	5260	20	49	45	36	42	31	20	-	-	27
		100	58	61	55	51	54	50	46	30	43
		200	67	64	63	62	55	54	55	42	48
		300	77	67	70	63	60	58	60	50	53
	7500	20	64	48	48	46	40	36	32	21	31
		100	71	64	57	56	54	52	45	35	43
		200	74	68	62	63	56	53	54	49	49
		300	80	70	67	65	58	59	58	51	51
1004 WITH SILENCER	4300	20	46	43	36	33	29	18	-	-	17
		100	59	58	52	56	57	51	48	31	46
		200	60	66	62	57	55	52	57	42	49
		300	76	72	64	59	55	55	59	49	51
	7650	20	51	45	39	42	29	20	16	-	27
		100	65	63	58	51	53	50	49	29	42
		200	71	64	65	62	59	55	56	44	48
		300	78	66	70	70	62	61	60	51	57
	11000	20	61	47	50	47	38	36	31	20	32
		100	70	61	60	57	52	53	46	34	44
		200	75	70	63	58	51	55	55	46	47
		300	85	76	68	66	55	60	59	50	53



# sound level

·ELECTRONIC VAV/CAV LOW PASSING-NOISE ·OCTAVE BAND POWER LEVEL(dB) (BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
0202 LOW PASS NOISE	145	20	23	17	23	23	-	-	-	-	-
		100	23	27	30	40	35	31	26	22	24
		200	31	35	40	47	41	41	39	32	32
		300	28	38	43	49	47	45	41	38	36
	470	20	19	24	30	26	21	16	-	-	-
		100	32	38	43	42	39	38	33	25	29
		200	37	39	44	49	46	44	39	37	35
		300	40	41	44	52	51	49	43	43	40
	800	20	28	32	36	39	37	33	24	-	25
		100	46	45	50	53	46	42	32	28	38
		200	50	48	54	54	48	49	43	40	40
		300	51	53	57	56	54	52	49	44	43
0302 LOW PASS NOISE	640	20	18	18	24	27	20	-	-	-	-
		100	36	35	37	42	42	38	31	29	31
		200	43	43	52	52	46	48	44	38	39
		300	44	46	55	57	52	52	45	42	43
	1120	20	30	27	35	35	31	30	20	-	21
		100	44	45	50	49	44	45	44	35	36
		200	50	48	51	54	50	48	45	43	39
		300	54	50	51	57	55	52	48	48	44
	1600	20	44	37	39	42	36	32	28	21	27
		100	50	48	53	56	50	46	40	35	42
		200	57	53	60	58	53	53	50	48	44
		300	59	59	64	62	60	56	55	52	49
0403 LOW PASS NOISE	1290	20	23	17	23	24	21	-	-	-	-
		100	38	33	32	42	48	44	32	25	37
		200	48	46	48	51	48	50	49	39	41
		300	50	49	52	50	51	52	50	46	43
	2250	20	29	22	27	28	25	-	-	-	-
		100	43	41	46	44	47	44	39	31	36
		200	49	46	48	52	51	48	46	42	40
		300	53	49	47	54	55	52	50	48	44
	3200	20	37	30	32	35	34	27	20	-	22
		100	47	43	47	46	45	42	33	27	34
		200	53	50	54	51	49	51	47	42	42
		300	56	57	59	57	56	55	53	48	46
0404 LOW PASS NOISE	1720	20	32	22	21	26	20	-	-	-	-
		100	42	35	35	44	47	44	34	26	36
		200	50	47	46	52	47	49	50	39	42
		300	54	51	54	52	52	51	49	45	41
	3010	20	32	24	28	31	24	16	-	-	-
		100	49	46	47	45	47	46	41	29	37
		200	57	51	50	53	51	49	48	42	40
		300	60	57	52	56	56	53	51	48	45
	4300	20	37	34	35	39	37	30	25	-	25
		100	52	47	49	51	46	42	37	27	36
		200	60	54	55	54	50	50	47	44	41
		300	63	61	61	58	56	54	51	47	45
0504 LOW PASS NOISE	2160	20	29	21	23	26	19	-	-	-	-
		100	44	37	36	46	47	45	38	28	36
		200	52	47	47	52	47	49	50	38	42
		300	59	53	54	54	51	51	49	44	42
	3780	20	34	25	28	33	23	18	-	-	16
		100	47	44	47	45	47	47	42	27	38
		200	53	47	49	55	51	50	49	41	41
		300	60	52	49	57	57	53	51	47	46
	5400	20	46	36	34	42	35	31	24	-	27
		100	54	47	47	49	47	47	38	27	38
		200	60	51	54	53	50	52	49	44	43
		300	63	59	60	59	57	55	53	48	46

·ELECTRONIC VAV/CAV LOW PASSING-NOISE ·OCTAVE BAND POWER LEVEL(dB) (BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C	
0704	3020	20	32	26	23	28	22	-	-	-	-	
		100	48	42	38	49	51	48	40	28	40	
		200	52	52	51	54	49	49	52	39	44	
		300	64	57	55	55	53	53	52	47	44	
	5260	20	39	31	30	36	24	21	-	-	20	
		100	49	50	48	47	49	49	44	28	40	
		200	55	48	52	58	54	52	51	41	44	
	7500	300	65	52	54	59	58	57	53	49	48	
		20	48	34	36	43	37	33	26	19	28	
		100	58	49	42	52	51	49	40	34	40	
	1004	4300	200	65	58	54	56	51	53	51	46	44
			300	69	60	59	62	57	57	51	46	48
20			35	29	29	27	21	-	-	-	-	
100			48	46	47	51	52	51	46	29	42	
7650		200	51	52	50	54	50	49	52	40	44	
		300	65	55	49	54	55	53	54	48	46	
		20	38	31	27	39	26	19	-	-	23	
		100	50	48	42	47	51	47	42	27	40	
11000		200	60	53	57	60	54	54	54	42	46	
		300	67	55	63	62	58	60	53	46	51	
		20	50	36	42	42	35	36	27	18	27	
		100	59	54	53	53	51	52	44	31	43	
	300	63	57	52	56	52	53	50	44	44		
		71	60	52	61	58	57	53	48	48		

·MECHANICAL CAV LOW PASSING-NOISE ·OCTAVE BAND POWER LEVEL(dB) (BASED ON  $10^{-12}$  Watt)

MODEL	FLOW CMH	Pa	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	N C
1	200	100	50	55	56	53	53	48	41	34	42
		300	51	56	58	59	61	61	55	48	52
	350	100	51	58	53	54	53	49	42	33	42
		300	55	63	64	63	62	60	54	48	51
	500	100	53	56	64	55	55	51	43	34	45
		300	57	66	67	67	65	61	57	51	54
2	500	100	50	57	55	52	49	43	35	25	38
		300	53	58	61	63	62	59	53	48	51
	750	100	57	57	57	55	53	47	40	30	42
		300	59	64	67	67	63	59	54	49	54
	1000	100	61	59	59	58	56	51	45	36	45
		300	63	69	69	69	65	62	57	52	56
3	1000	100	60	56	53	48	49	44	36	26	38
		300	64	68	69	67	62	60	54	48	54
	1500	100	64	57	53	51	51	47	41	31	40
		300	71	70	68	66	62	60	55	49	53
	2000	100	65	61	58	58	57	53	48	40	46
		300	68	72	68	65	63	61	58	51	52
4	1500	100	62	58	55	51	51	46	37	28	40
		300	67	70	72	68	63	62	57	52	55
	2250	100	65	62	57	55	54	49	42	33	43
		300	74	74	70	66	63	61	57	50	53
	3000	100	66	62	58	57	55	51	44	41	44
		300	75	76	71	68	64	62	58	53	55
5	2000	100	64	59	55	52	51	47	39	30	40
		300	68	70	73	69	63	62	58	52	56
	3000	100	67	64	58	56	55	51	43	34	44
		300	75	74	73	70	64	63	59	54	57
	4000	100	68	65	59	58	56	50	46	37	45
		300	75	75	74	71	65	63	61	55	58

# PERFORMANCE

