

Inflex™ VN

Venturi Valve for Variable Air Volume (Normal-speed Actuation)

General

Inflex™ VN is a venturi valve combined with an airflow controller, designed to control airflow rate/room pressure in research facilities, fabrication facilities, and hospitals.

Since the model with room pressure adjustment control can measure the room differential pressure, and has the feedback control to maintain the room pressure constant and various adjustment logics, it enables more precise room pressure control. (Differential pressure sensor is required separately.)*1

Inflex VN directly communicates with our building management system (BMS) *savic-net™ FX* via LonTalk® protocol. This enables you to supervise airflow volume and status of fume hood exhaust, general exhaust, and supply air from *savic-net FX* center unit (client PC).

- Pressure-independent mechanism:
The valve performs self-balancing operation to maintain a fixed flow of air by adjusting to changes in duct static pressure.



Features

- High speed of response: 1 second or less.
- Airflow control not affected by duct static pressure fluctuation*1.
- Airflow control not affected by ductwork*2.
- No additional straight duct runs needed*2.
- Installable in horizontal/vertical duct runs (depending on the models).
- Low noise attained.
- Characterized (calibrated) at factory and no field adjustment required.
- The room pressure monitor*3 can be connected for the room pressure adjustment control model.

Note:

*1 In order to measure the room differential pressure, a differential pressure sensor is required separately.
A model number for the differential pressure sensor is also available.

*2 See the flow control accuracy in the sections **Specifications: Valve specifications** and **Performance Curves of Pressure-Independent Control**.

Note that the pressure across the valve must be in the following range for the specified accuracy:
150-750 Pa (medium differential pressure)

*3 For more details, refer to *AS-943E Room Pressure Monitor for Inflex VN Venturi Valve Specifications*.

Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual nearby for quick reference.

Usage Restrictions

This product is developed, designed, and manufactured for special airflow control. Do not use this product in a situation where human life may be affected. This product can meet stringent requirements of research facility laboratories, bio-hazard/chemical hazard clean rooms, rodent animal holding facilities, infectious disease hospitals, where reliability or control accuracy is particularly required. If this product is used in a place where safety and reliability are required, implementation of fail-safe design, redundant design, and regular maintenance should be considered. Since a whole system for airflow control must be considered to provide this product to your application, be sure to contact specialized Azbil Corporation personnel for system design, application design, usage, and purpose of this product.

This product is supposed to be continuously powered once it is turned on except during power failure. Do not turn off the product at the end of everyday operation.

Azbil Corporation will not bear any responsibility for the results produced by the operators.

Product Life

It is recommended that this product be used within its product life.

The product life is the period of service in which you can use the product safely and reliably based on the design specifications.



When you use the product beyond its product life, its failure ratio may increase due to deterioration of parts, etc.

The product life is estimated scientifically based on the results of acceleration tests, endurance tests, etc., taking into consideration the operating environment, conditions, and frequency of use as basic parameter. We can then recommend the product life during which the product can operate reliably with the lowest failure ratio and least deterioration over time.




The life of this product is 10 years.



The product life is defined assuming that maintenance work, such as replacement of the limited life parts, is carried out properly.







Warnings and Cautions








 WARNING	Alerts users that improper handling may cause death or serious injury.
 CAUTION	Alerts users that improper handling may cause minor injury or material loss.

Signs

	Alerts users possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside \triangle indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)
	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside \odot graphically indicates the prohibited action. (For example, the sign on the left notifies that disassembly is prohibited.)
	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside \bullet graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

 WARNING	
	The product weighs more than 18 kg. Carefully move the product with a vehicle or enough manpower in an appropriate manner. Careless lift or accidental drop of the product might cause injury or product damage.

 CAUTION (1/2)	
	Use the product under the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications. Failure to do so might cause fire or device failure.
	Take anti-lightening measures based on regional and building characteristics. Lightening might cause fire or critical damage to the products without the anti-lightening measures.
	Use this product within the lifespan given in the specifications and avoid instrumentations that keep the product to operate excessively. Continued use beyond this lifespan might cause fire or device failure.
	Do not stack unpacked products. Doing so might damage or stain the products.
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.

 CAUTION (2/2)	
	All wiring must comply with applicable codes and ordinances.
	Install the product in the proper position as specified in this manual. Excessively tight connection to a duct or improper installation position might damage the product.
	Do not put load or weight on the product. Doing so might damage the product.
	Do not touch the moving parts of the product. Doing so might cause injury.
	Do not disassemble the product. Doing so might cause electric shock or device failure
	Dispose of the product as industrial waste in accordance with your local regulations. Do not reuse all or part of this product.

IMPORTANT:

- Do not stuck too many cardboard package in which the products are packed.
- Do not loosen the bolt that fixes the pivot arm position. Predetermined airflow may not be assured
- Substances attached inside the valve may be toxic to the human body. When performing maintenance or disposing of the product, do not touch the attached substances. Do not let the substances touch outside, either.
- In order to ensure safely of the users who handle the safety cabinet etc., be sure to use the group alarm output and configure the system so that abnormal status is surely notified.
(E.g.) Connecting the contact output to safety cabinet, installing an alarm lamp, etc.
- If the fume hood monitor is not equipped on the room pressure adjustment control valve, or trouble state needs to be promptly notified even if the fume hood monitor is faulty, be sure to use the group alarm output and configure the system so that abnormal status is surely notified.
(E.g.) Installing an alarm lamp, etc.
- If the switches for changing the pressure setting, etc. are installed at the place where unspecified persons can access, prevent misoperations using locked or covered switches.
- After changing the pressure setting, check that the airflow has been changed by putting a hand to the gap between the door and frame, etc.

Model Numbers

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	Description
VN										Base model number
	5									Standard valve (normal-speed actuation)
	6									Shut-off valve (normal-speed actuation)*1
		2								General exhaust (LAB-N/GEX-N/GEX-N-Main)
		3								Supply air*5 (LAB-N/MAV-N/MAV-N-Main)
		4								Fume hood exhaust (EXV-N/EXV-N-Main)
		5								Booster valve for exhaust air (BST-N)
		6								Booster valve for supply air*5 (BST-N)
		7								Room pressure adjustment control for exhaust air (PCV-N/PCV-N-Main)
			0							Room pressure adjustment control for supply air*5 (PCV-N/PCV-N-Main)
				0						Medium working differential pressure: 150 to 750 Pa
				1						Horizontal
				2						Vertical upflow
					0					Vertical downflow
						C				24 V AC
						0				Single valve body without flanges (slip-in-duct)
						2				Dual valve bodies fastened with rectangular frames without flanges*4
						3				Single valve body fastened with rectangular frames without flanges*4
						4				Single valve body with welded circular ANSI flanges
							20			200 mm (8 inches)*3
							25			250 mm (10 inches)
							30			300 mm (12 inches)
								A		Uncoated
								B		Coated for general hood
								C		Coated for high corrosion-resistant hood
								D		PVDF coated for special hood*2, *3
								Blank		No room differential pressure sensor
								-F		Room differential pressure sensor*6

- [1] Base model number
- [2] Valve type
- [3] Control type
- [4] Differential pressure across valve
- [5] Valve orientation

- [6] Power
- [7] Number of valve bodies, end connection
- [8] Valve size (nominal)
- [9] Valve coating
- [10] Room differential pressure sensor

ANSI: American National Standards Institute
 VAV: Variable air volume

PVDF: Polyvinylidene difluoride

Note:

- *1 For 200 mm valve, "uncoated" type("A" for [9]) is only selectable.
- *2 "Standard valve" type ("1" for [2]) is only selectable.
- *3 "Single slip-in-duct" and "single flanged" (ANSI flange) types ("0" and "4" for [7]) are selectable.
- *4 Can be configured to triple or quad valves.
- *5 With thermal insulator.
- *6 Either the room pressure adjustment control (exhaust) or the room pressure adjustment control (supply air) can be selected as the control method.

Replacement part

Item	Part number	Note
Actuator (single valve)	83170518-210	Replacement period: 3 years (only room pressure adjustment control type)
Actuator (dual valves)	83170518-220	

IMPORTANT:

If Inflex VN, room pressure adjustment control type, is used, be sure to replace the actuator within 3 years.

Specifications

Item	Specification			
Power supply	24 V AC $\pm 15\%$, 50/60 Hz, 12 VA			
Power consumption				
Environmental operating conditions		Rated operating conditions		Transportation/storage conditions (in packaged state)
	Ambient temperature	0 to 50 °C		-20 to 60 °C
	Ambient humidity	10 to 90 %RH (without condensation)		5 to 95 %RH (without condensation)
	Vibration	5.9 m/s ² , 10 to 150 Hz		Storage
Transportation				9.8 m/s ² , 10 to 150 Hz

Valve specifications

(1/2)

Item	Specification						
Type	Standard valve, shut-off valve						
Differential pressure across the valve	Medium differential pressure: 150 Pa to 750 Pa						
End connection (to duct)	Slip-in-duct / rectangular-framed (single, dual) / welded circular-flanged (ANSI flange)						
Nominal size	200 mm (8 inches), 250 mm (10 inches), or 300 mm (12 inches)						
Flow control accuracy (of standard air*1)	Valve size	Flow range			Accuracy	Note	
Standard valve (single)	200 mm	60	–	200	m ³ /h	± 20 m ³ /h	
		200	–	1015	m ³ /h	± 10 %rdg	
		1015	–	1185	m ³ /h	± 12.5 %rdg	
	250 mm	85	–	200	m ³ /h	± 20 m ³ /h	-20 m ³ /h / +15 %rdg for 135 – 200 m ³ /h flow range
		200	–	1695	m ³ /h	-10 / +15 %rdg	
	300 mm	155	–	200	m ³ /h	± 20 m ³ /h	
		200	–	2375	m ³ /h	± 10 %rdg	
		2375	–	2545	m ³ /h	± 12.5 %rdg	
	Standard valve (dual)	250 mm	170	–	400	m ³ /h	± 40 m ³ /h
400			–	3390	m ³ /h	-10 / +15 %rdg	
300 mm		310	–	400	m ³ /h	± 40 m ³ /h	
		400	–	4750	m ³ /h	± 10 %rdg	
Shut-off valve (single)	200 mm	60	–	200	m ³ /h	± 20 m ³ /h	
		200	–	850	m ³ /h	± 10 %rdg	
		850	–	1015	m ³ /h	± 12.5 %rdg	
	250 mm	85	–	200	m ³ /h	± 20 m ³ /h	-20 m ³ /h / +15 %rdg for 135 – 200 m ³ /h flow range
		200	–	1440	m ³ /h	-10 / +15 %rdg	
	300 mm	155	–	200	m ³ /h	± 20 m ³ /h	
		200	–	2040	m ³ /h	± 10 %rdg	
		2040	–	2205	m ³ /h	± 12.5 %rdg	
	Shut-off valve (dual)	250 mm	170	–	400	m ³ /h	± 40 m ³ /h
400			–	2880	m ³ /h	-10 / +15 %rdg	
300 mm		310	–	400	m ³ /h	± 40 m ³ /h	
		400	–	4080	m ³ /h	± 10 %rdg	
Full stroke time (max. to min. opening)	60 s						
	Installation orientation	Horizontal, vertical upflow, or vertical downflow					

Note:

*1 Standard air: 20 °C temperature and 101.325 kPa (abs) pressure

Item	Specification			
Installation orientation	Horizontal, vertical upflow, or vertical downflow			
Material	Uncoated	Coated for general hood	Coated for high corrosion-resistant hood	PVDF coated body for special hood
Body	Aluminum	Aluminum with phenolic coating	Aluminum with phenolic coating	Aluminum with PVDF coating
Shaft	316 stainless steel	316 stainless steel with PFA coating	316 stainless steel with PFA coating	316 stainless steel with PFA coating
Spring	302/304 stainless steel	302/304 stainless steel	302/304 stainless steel with PFA coating	302/304 stainless steel with PFA coating
Bracket	Galvanized steel (standard valve) 316 stainless steel (shut-off valve)	316 stainless steel	316 stainless steel with phenolic coating. Connection part: titanium	316 stainless steel with PVDF coating
Cotter pin	18-8 stainless steel	18-8 stainless steel	18-8 stainless steel with phenolic coating	18-8 stainless steel with phenolic coating
S-link	316 stainless steel	316 stainless steel	316 stainless steel with phenolic coating	316 stainless steel with PVDF coating
Pivot arm	Aluminum (standard valve) 316/303 stainless steel (shut-off valve)	316/303 stainless steel	316/303 stainless steel with phenolic coating	316/303 stainless steel with PVDF coating
Slider assembly	PPS (polyphenylene sulfide)			
Insulation*1	Supply valve is wrapped with 10 mm thick polyethylene sheet for thermal insulation.			
Sound*2	Valves are designed to reduce sound over all frequencies, significantly targeting the lower sound.			

PFA: Perfluoroalkoxy alkane
PVDF: Polyvinylidene difluoride

PPS: Polyphenylene sulfide

Note:

- *1 Insulation described above will not prevent condensation. Additionally insulate the valve depending on the installation and operating environment.
- *2 Sound data is available upon request. Ask our sales person for details. Note that the sound data is not the certified value but the measured data.

IMPORTANT:

Inflex VN will work properly when the differential pressure across the valve remains within the specified range.
If the differential pressure is out of the range, Inflex VN may not ensure the specified airflow.
Check conditions of the facility where Inflex VN is to be installed.

Control unit specifications

Item		Specification			
Mechanical specifications	Installation location		Indoors		
	Installation orientation		In accordance with valve orientation		
	When power fails		Maintains the position right before the power failure.		
	Indicator for opening		Not equipped		
	Material		Housing and cover: Cold rolled steel* ¹ Base channel: Cold rolled steel* ¹		
Paint		Housing and cover: Unpainted Base channel: Unpainted			
Electrical specifications	Input* ² signal	Digital input (DI)	Number of inputs	2	
			Current	5 mA typ.	
			Voltage	24 V DC typ.	
			Input type	Dry contact	
	Temperature input	Temperature input	Number of input	1	
			Input signal	Pt RTD (Pt100)	
			Measuring range	0 to 50 °C	
	Voltage input* ⁴	Voltage input* ⁴	Number of input	2	
			Input voltage range	0 to 10 V DC	
			Input impedance	500 kΩ	
	Output* ² signal	Relay output	Number of output	1	
			Output type	Dry N.O. contact	
			Contact rating	Max. 24 V AC, 0.5 A (inductive load: $\cos\phi = 0.4$ or more) Max. 24 V DC, 0.5 A	
		Voltage output	Voltage output	Min. applicable load	5 V, 10 mA
				Number of outputs	2
				Output voltage range	0 to 10 V DC, 2 to 10 V DC
	Communication	LC-bus	LC-bus	Load resistance	10 kΩ or more
Transmission system				LonTalk® protocol, TP/FT-10 transceiver	
Transmission speed				78 kbps	
Transmission distance				900 m per 1 channel (bus topology network)	
Monitor-bus (between the fume hood monitors)		Monitor-bus (between the fume hood monitors)	Number of connectable units	50	
			Transmission system	Start/stop synchronization, half duplex	
			Transmission speed	9.6 kbps	
			Transmission distance	Max. 30 m (distance to Inflex VN or repeater for extending transmission distance)* ³	
		Number of connectable units	2		

Note:

- *¹ The housing, case, and base channel may become rusty depending on the environmental conditions and operating period. Rusting on the product except its sliding surface or moving parts will not affect the performance of the product. If a rusty part easy to recognize (such as on a corner of the control unit cover or of the base channel) is not preferable, the model with the antirust paint partially applied to the control unit and the base channel is also available.
- *² Usage for inputting or outputting is fixed according to the application of valve.
- *³ One repeater for extending transmission distance can be connected. When a repeater is connected, the transmission distance is extended to max. 60 m.
- *⁴ For the room pressure adjustment control type, one of two voltage inputs (AI3) is used for measuring the room differential pressure. (For details, refer to page 14.)

Wires specifications

Item	Specification*1			Note
	Type	Size	Length*2	
Power line	CVV	2.0 mm ² or more	—	—
Ground line	CVV	2.0 mm ² or more	—	Separate ground with 100 Ω or lower ground resistance
LC-bus line	TIA/EIA-568 Category 5	—	900 m	Bus topology
Monitor-bus (between Inflex VN and Fume Hood Monitor)	VCTF	0.3 mm ² (4 cores)	30 m	When a repeater is connected, the transmission distance is extended to max. 60 m.
Digital input	CVV	1.25 mm ²	50 m	—
	KPEV	0.9 mm ² , 1.25 mm ²		
Relay output	CVV	1.25 mm ²	50 m	30 V AC/DC or less
Temperature input	CVV	1.25 mm ²	50 m	—
	KPEV			
Voltage input	CVV	1.25 mm ²	50 m	
	KPEV	0.9 mm ² , 1.25 mm ²		
Voltage output	CVVS	1.25 mm ²	20 m	Inverter output
	CVV	1.25 mm ²	20 m	Valve actuator, damper actuator, etc.
	KPEV			

Note:

*1 Pin terminals cannot be used.

*2 Wiring length in the table above is the total length from the product to the load (e.g., device) in connection including the relay terminal block.

Power supply wiring

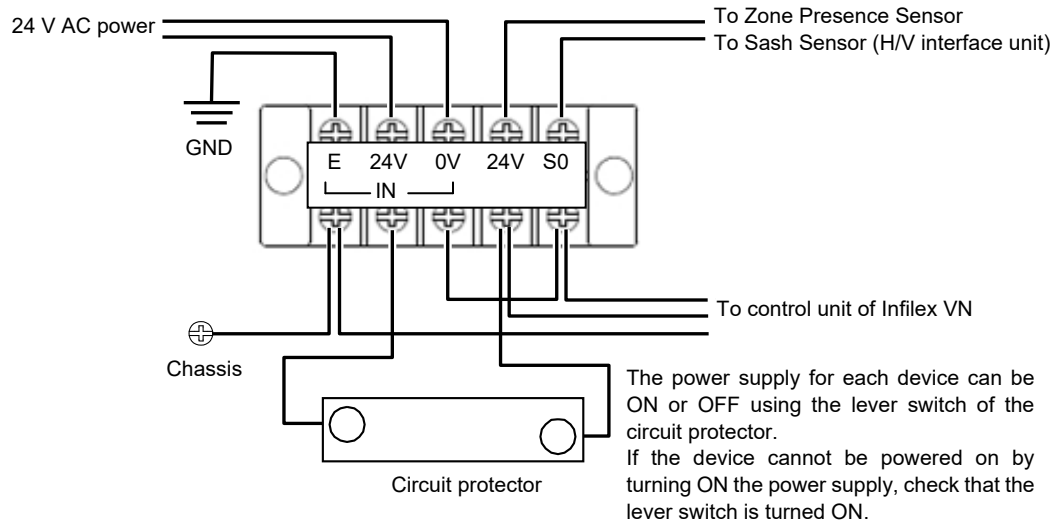
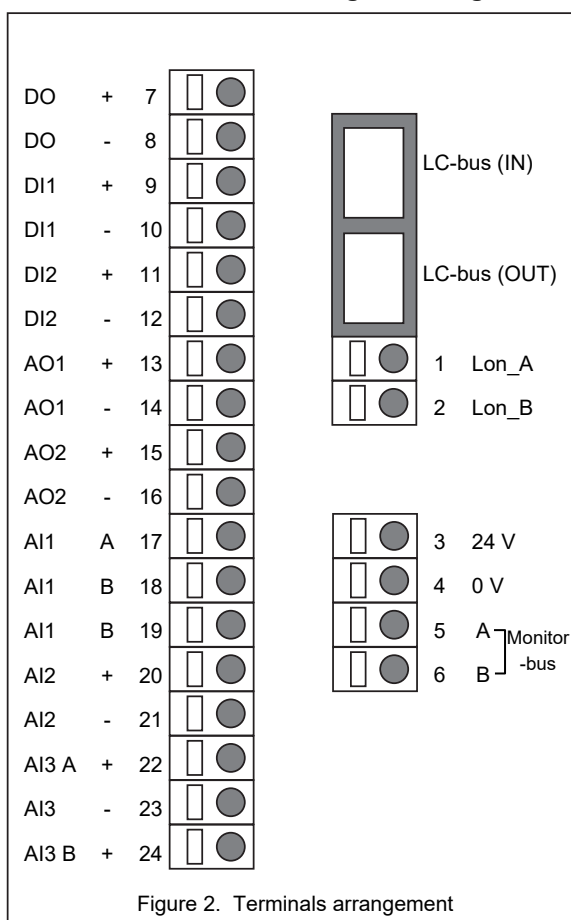


Figure 1. Connection of power supply terminals: 24 V AC power model

Communication and signal wiring



Term. No.	Connection to:	Signal		
		Type	Description	
CN1	Between controllers	LonTalk® communication	LC-bus input	
CN2			LC-bus output	
1	Unused			
2	Unused			
3	Room pressure monitor	24 V DC power supply	24 V (power)	
4			0 V	
5			Monitor bus communication	
6			Monitor-bus A	
7	Alarm panel	Dry contact output	DO (alarm output, etc.)	
8				
9		Dry contact input	DI	
10				
11		Dry contact input	DI	
12				
13		1-5 V DC vol. output 2-10 V DC vol. output 0-5 V DC vol. output 0-10 V DC vol. output	AO1	Selectable by parameter. Default: • Fan output 2-10 V • FBK airflow output 0-10 V
14				
15		1-5 V DC vol. output 2-10 V DC vol. output 0-5 V DC vol. output 0-10 V DC vol. output	AO2	Selectable by parameter. Default: • Reheater coil output 2-10 V • Room pressure measurement output 0-10 V
16				
17	Temperature sensor	Pt100 temperature input	A1	Room temperature measuring
18			B	
19			A1	
20		0-10 V DC voltage input	A12	
21			A12	
22	Differential pressure sensor etc.	0-10 V DC voltage input	A13A	
23			A13	
24	Unused		A13B	

Available inputs and outputs

Input/output		Valve model					
Type	For	EXV-N EXV-N-Main	LAB-N	MAV-N MAV-N-Main	GEX-N GEX-N-Main	BST-N	PCV-N PCV-N-Main
AI1	Room temperature	N/A	✓	✓	✓	N/A	✓
AI2	Additional flow feedback input	N/A	✓	✓	✓	N/A	N/A
	Overriding airflow setting	N/A	✓(selectable)	N/A	N/A	N/A	N/A
	Flow command input	✓	N/A	N/A	N/A	✓	N/A
AI3 A	Room humidity	N/A	✓	✓	✓	N/A	N/A
	Room pressure input	N/A	N/A	N/A	N/A	N/A	✓
AO1	Fan inverter output	N/A	✓	N/A	N/A	N/A	N/A
	Flow feedback output	✓	N/A	N/A	N/A	✓	✓
AO2	Reheater coil output	N/A	✓	✓	✓	N/A	N/A
DI1	OFF mode switch	✓	N/A	N/A	N/A	N/A	N/A
	Ventilation frequency switch	N/A	✓	N/A	N/A	N/A	N/A
	Offset flow switch	N/A	✓(selectable)	N/A	N/A	N/A	N/A
	Fume hood exhaust state	N/A	N/A	N/A	N/A	N/A	✓
	Room pressure adjusting control stop switch	N/A	N/A	N/A	N/A	N/A	✓(selectable)
DI2	Two-position switch	✓	N/A	N/A	N/A	N/A	N/A
	Additional flow feedback input	N/A	✓	✓	✓	N/A	N/A
	Offset flow switch	N/A	✓(selectable)	N/A	N/A	N/A	N/A
	Door state	N/A	N/A	N/A	N/A	N/A	✓
	Fume hood exhaust state	N/A	N/A	N/A	N/A	N/A	✓(selectable)
DO	Group alarm	✓	✓	✓	✓	✓	✓
	Two-position state	✓(selectable)	N/A	N/A	N/A	N/A	N/A

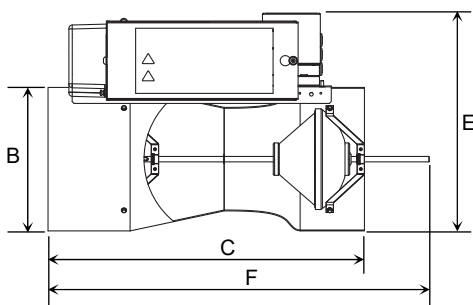
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Polarity of DI input and DO output is described below.

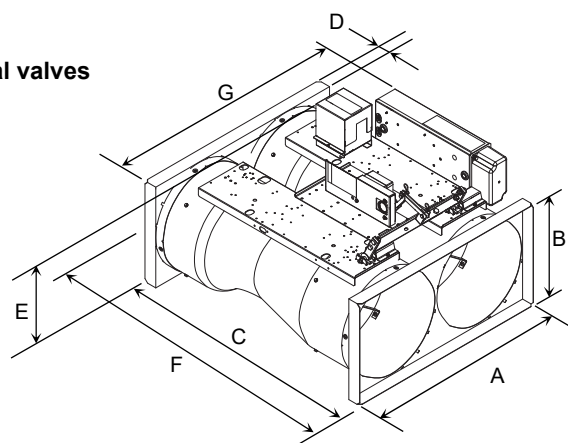
Usage		Description	Remarks
DI1	OFF mode switch	Contact OFF: OFF mode cancel	
		Contact ON: OFF mode transition	
	Ventilation frequency switch	Contact OFF: Normal mode	
		Contact ON: Nighttime mode	
	Offset flow switch	Contact OFF: Use offset flow 1.	
		Contact ON: Use offset flow 2.	
	Fume hood exhaust state	Contact OFF: Fume hood exhaust is not used.	
		Contact ON: Fume hood exhaust is used.	
Room pressure adjusting control stop	Contact OFF: Control starts		
	Contact ON: Control stops		
DI2	Two-position switch	Contact OFF: Stops (min. airflow)	Polarity can be changed. Can set "Contact OFF: Operate", "Contact ON: Stop" by changing the settings with the DI2 input.
		Contact ON: Operates (max. airflow)	
	Additional airflow feedback	Contact OFF: Additional flow feedback input "invalid"	
		Contact ON: Additional flow feedback input "valid"	
	Door state	Contact OFF: Door closed	Polarity can be changed. Can set "Contact OFF: Door open", "Contact ON: Door closed" by changing the IPD of "Door state" point.
		Contact ON: Door open	
DO	Group alarm	Contact OFF: Normal	
		Contact ON: Abnormal	
	Two-position state	Contact OFF: Stops (min. airflow)	Although polarity of the DI2's two-position switch is reversed, the polarity of two-position state is not reversed.
		Contact ON: Operates (max. airflow)	

Dimensions

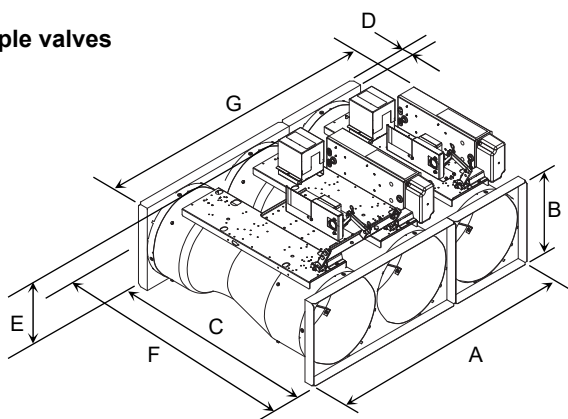
Single valve



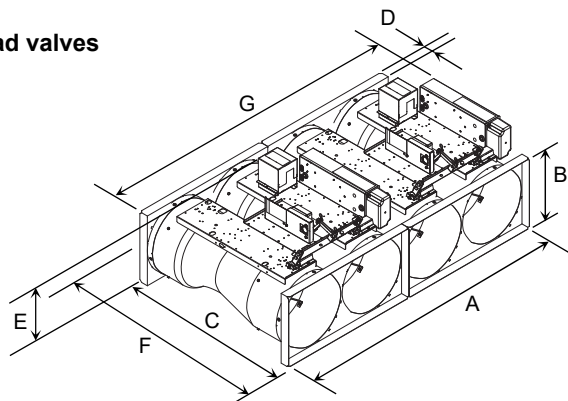
Dual valves



Triple valves



Quad valves



Valve configuration	Valve size (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F*1 (mm)	G (mm)	Weight (kg)
Single	200	—	200	597	—	330	711	258*2	9.9
Single	250	—	251	553	—	380	666	284*2	9.0
Single	300	—	302	681	—	431	830	309*2	11.8
Dual	250	511	257	629	38	384	704	542	17.5
Dual	300	613	308	757	38	435	868	618	20.6
Triple	300	921	308	757	38	435	868	925	32.3
Quad	300	1226	308	757	38	435	868	1231	41.1

Note:

*1 Dimension F is the total distance of the maximum shaft projecting length (from the valve inlet) and the dimension C.

*2 Dimension G of the single valve is the width between this side (facing to you in the figure above) of the control unit and the other side of the valve body.

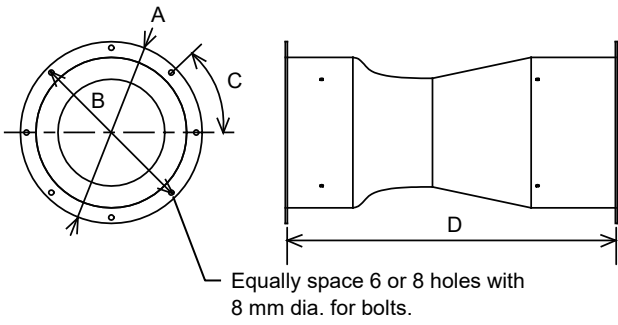
Figure 3. Dimensions (mm)

IMPORTANT:

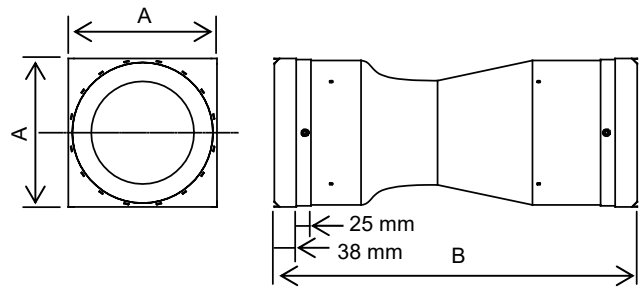
- Leave minimum of 400 mm clearance around the product for maintenance.
- When installing the product somewhere in the ceiling, select the location where our serviceperson will be able to perform the maintenance of the product.
- Dimensions given above are accurate to ± 3 mm. To facilitate the connection of the valve onto a installed duct at a job site, set an adjustment margin on each end of the valve (for flange halls, etc.).
- No additional straight duct runs before and after the valve is necessary. The shaft, however, needs an unobstructed space larger than [dimension F - dimension C + 20] mm in the duct on the inlet side of the valve for operation. To prevent extreme pressure difference between the inlet and outlet of the dual/triple/quad valves, a certain length of straight duct runs might be necessary on the valve inlet and outlet sides, or a duct vane might be necessary inside the valve-duct joint.
- Dimensions given above do not include 10 mm thick insulation for the valve.
- Valve body is 1.5 mm thick.

Flange/frame dimensions

Circular ANSI flange



Square frame



Valve size	A	B (PCD*)	C (angle)	D	Bolt hole diameter	Number of bolt holes
200 mm (8 in)	261 mm	238 mm	60°	597 mm	8 mm	6
250 mm (10 in)	324 mm	289 mm	60°	553 mm	8 mm	6
300 mm (12 in)	375 mm	340 mm	45°	681 mm	8 mm	8

Valve size	A	B
200 mm (8 in)	207 mm	673 mm
250 mm (10 in)	257 mm	629 mm
300 mm (12 in)	308 mm	757 mm

PCD: Pitch Circle Diameter

Thickness of the circular ANSI flange: 3.2 mm

Thickness of the square frame: 0.9 mm

Figure 4. Flange/frame dimensions

Parts Identification

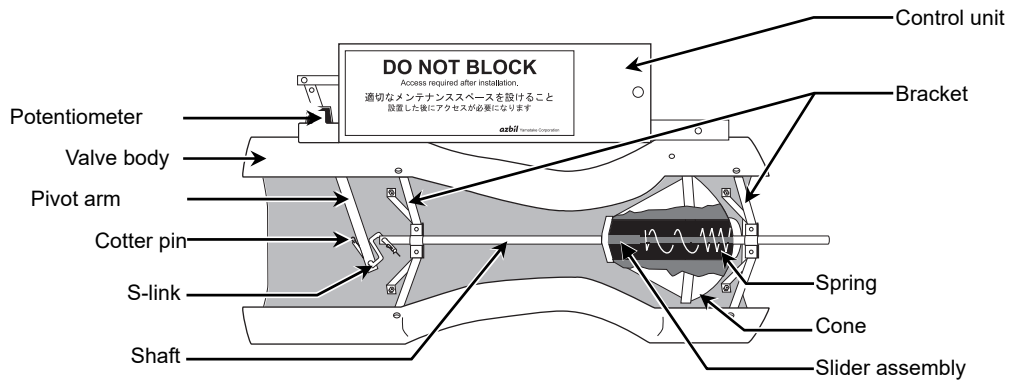


Figure 5. Parts identification

Functions

(1/2)

Function	Description	Valve type					
		EXV-N EXV-N-Main	LAB-N	MAV-N MAV-N-Main	GEX-N GEX-N-Main	BST-N	PCV-N PCV-N-Main
Two-position switch	Using DI2, switches the flow control of hood exhaust valve between two positions. (Polarity of DI2 can be set by the parameter.)	✓	N/A	N/A	N/A	N/A	N/A
Airflow switch	Using AI2, switches the exhaust airflow arbitrarily.	✓	N/A	N/A	N/A	N/A	N/A
OFF mode switch	Using DI1, switches the flow of hood exhaust valve to the minimum flow position (normal valve) or to the shut off position (shut-off valve).	✓	N/A	N/A	N/A	N/A	N/A
Airflow balance control	LAB calculates the airflow balance of supply/exhaust air responding to exhaust air volume of home exhaust and calculates the supply air/general exhaust so that the offset airflow becomes constant, and then send the results to each valve. MAV/GEX controls airflow to attain the flow sent by LAB.	N/A	✓	✓	✓	N/A	N/A
Minimum ventilation control	Controls airflow to maintain the minimum ventilation level in a room by calculating the supply air/general exhaust. This control cooperates with the airflow valance control.	N/A	✓	N/A	N/A	N/A	N/A
Temperature control	When the primary air handler operates in cooling mode, controls cooling operation and calculates the supply air to control airflow of supply/general exhaust valve. Also, can use the supply airflow calculated by other DDC. (Override setting airflow input is used.) Note that the airflow calculated by the airflow balance control is maintained.	N/A	✓*1	N/A	N/A	N/A	N/A
Room temperature measurement input	Room temperature measurement can be input. Used for temperature control and room temperature monitoring.	N/A	✓	✓	✓	N/A	N/A
Reheater control	Performs heating control based on the room temperature, controls the reheater.	N/A	✓	N/A	N/A	N/A	N/A
Additional flow feedback input (continuously variable)	The airflow feedback from third party's VAV, etc. is input to AI, and the supply air or exhaust air is added. (Additional flow feedback input is used.)	N/A	✓*1	N/A	N/A	N/A	N/A
Additional flow feedback input (two-position)	The airflow feedback from third party's VAV, etc. is input to DI2, and the supply air or exhaust air is added. (Additional flow feedback input is used.)	N/A	✓*2	N/A	N/A	N/A	N/A
Humidity monitoring input	Humidity measurement can be input.	N/A	✓	✓	✓	N/A	N/A
Ventilation frequency switch	Using DI1, the minimum ventilation (ventilation frequency) that is used for the minimum ventilation control can be switched by 2 steps.	N/A	✓*3	N/A	N/A	N/A	N/A
Airflow increase by BST	Airflow can be increased using BST.	✓*4	N/A	✓*4	✓*4	✓	✓*4
Feedback airflow output	Feedback airflow is output to AO.	✓	N/A	N/A	N/A	✓	✓
Group alarm output*5	Logical OR of valve failure or airflow unmatched is output to the contact as an alarm.	✓*6	✓*7	N/A	N/A	N/A	N/A
Group alarm gathering	Alarm of each valve is gathered to LAN-N and it is sent to the central monitoring or output to the contact as an alarm. And, notifies the gathered alarms using the room pressure monitor connected to PCV-N.	N/A	✓*7	N/A	N/A	N/A	N/A

Function	Description	Valve type					
		EXV-N EXV-N-Main	LAB-N	MAV-N MAV-N-Main	GEX-N GEX-N-Main	BST-N	PCV-N PCV-N-Main
Insufficient differential pressure alarm* ⁸ (differential pressure sensor)	Detects the insufficient differential pressure between valves and alarms.	✓	✓	✓	✓	✓	✓
Two-position state output	Outputs the state of two-position to DO.	✓* ⁶	N/A	N/A	N/A	N/A	N/A
Room pressure adjustment control	In order to maintain the differential pressure constant, between inside and outside room, performs the PID calculation using the measurement/setting value for the room pressure and keeps the airflow around the specified range to control the room pressure.	N/A	N/A	N/A	N/A	N/A	✓
Room pressure monitor connection	Connects the room pressure monitor to display the measured room pressure. Also, notifies valve failure and room pressure trouble. Using the room pressure monitor, pressure setting is switched, or room pressure setting is changed.	N/A	N/A	N/A	N/A	N/A	✓
Pressure setting switch * ⁹	Using the DI of LAB or the room pressure monitor connected to PCV, the offset airflow and room pressure setting value are switched.	N/A	✓* ^{2,*3}	N/A	N/A	N/A	✓

*1 Select either the additional flow feedback input (continuously variable) or the override setting airflow input.

*2 Select either the additional flow feedback input (two-position) or the offset flow switch input.

*3 Select either the ventilation frequency switch or the offset flow switch input.

*4 Airflow increase is supported by ***-N-Main.

*5 Refer to IMPORTANT below.

IMPORTANT:

- In order to ensure safety of users for safety cabinet etc., be sure to use the group alarm output and configure the system so that abnormal status is surely notified.
(E.g.) Connecting the contact output to safety cabinet, installing an alarm lamp, etc.
- If the fume hood monitor is not equipped on the room pressure adjustment control valve, or trouble state needs to be promptly notified even if the fume hood monitor is faulty, be sure to use the group alarm output and configure the system so that abnormal status is surely notified.
(E.g.) Installing an alarm lamp, etc.

*6 Select either the group alarm output or the two-position state output.

*7 Select outputting alarm of LAB, or outputting the gathered alarm.

*8 This sensor cannot be used for measuring.

*9 Refer to IMPORTANT below.

IMPORTANT:

- If the switches for changing the pressure setting, etc. are installed at the place where unspecified persons can access, prevent misoperations using locked or covered switches.
- After changing the pressure setting, check that the airflow has been changed by putting a hand to the gap between the door and frame, etc.

Room differential pressure sensor

In order to execute the room pressure adjustment control, the room differential pressure sensor is required.

Select the room differential pressure sensor from the following models supplied by Azbil in accordance with the measurement range.

- Model number: PY9000D2010 (measurement range: -100 to 100 Pa)
- Model number: PY9000D2005 (measurement range: -50 to 50 Pa)

Note: If a room differential pressure sensor not listed above is used and any problem occurs in combining Inflex VN and the sensor, Azbil

Corporation cannot guarantee the operation.

In order to connect the room differential pressure sensor to the room pressure adjustment control valve, the following parts are required separately.

- Resistor for current/voltage conversion (500 Ω) (model number: 83173007-001)
- 24 V DC power supply unit (model number: RYY792D3001)

The model number (VN_____F), with the room differential pressure sensor, includes the room differential pressure sensor (measurement range: -100 to 100 Pa) and the resistor for current/voltage conversion (500 Ω) . But the 24 V DC power supply unit needs to be prepared separately.

Operation

Basic operation

The product has been characterized at the factory so that the feedback signal is matched with the airflow. It is controlled so that the airflow command input and airflow feedback output are always matched.

Pressure-independent mechanism

All valves strictly maintain set flow rate of air by quickly adjusting to changes in duct static pressure. Each valve has a cone assembly with a spring designed to compensate for changes in duct static pressure.

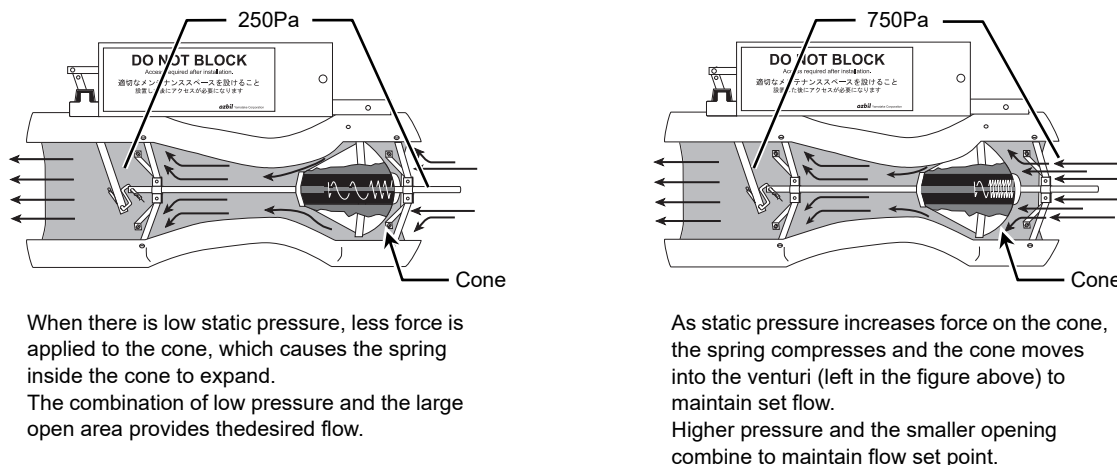


Figure 6. Pressure-independent mechanism

Valve Leakage Performance

Shut-off valve: Shut-off leakage shown in the below table is common to all the sizes of the shut-off valves

Static pressure (Pa)	Leakage (m ³ /h)
1250	9
1000	8
750	7
500	6
250	5

Shut-off valve: Casing leakage shown in the below table is common to all the sizes of the shut-off valves

Static pressure (Pa)	Leakage (m ³ /h)
2500	0.19
2000	0.16
1500	0.13
1000	0.09
500	0.05

Application and Control Details

General airtightness control

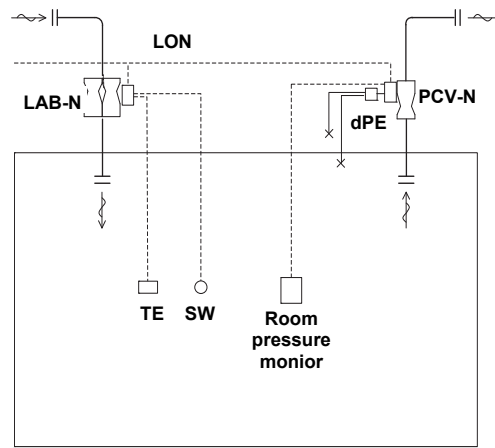


Figure 7. Factory (pharmaceuticals)

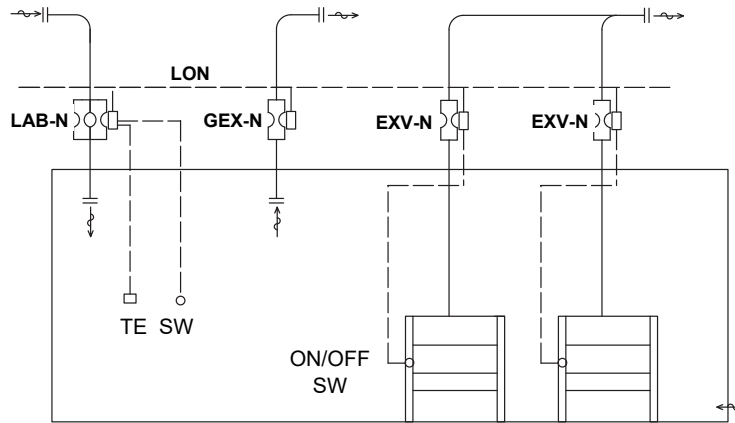


Figure 8. Biochemistry laboratory

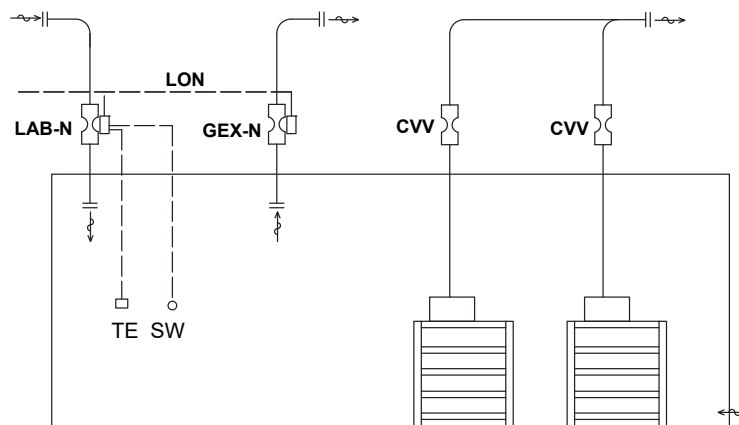


Figure 9. Animal laboratory

IMPORTANT:

- In case to use a fume hood exhaust VAV valve with this product, select the Inflex VN venturi valve for VAV (high-speed actuation). Also, use the Inflex VN (high-speed actuation) for the supply air valve and the general exhaust valve. The Inflex VN (normal-speed actuation) cannot follow the movement of sash for fume hood, and contamination may flow back into the room.
- For the room where the fume hood exhaust, general exhaust, or Inflex VN (high-speed) for supply air is used, the Inflex VN (normal-speed) can be installed as a fume hood exhauster.

* For Inflex VN (high-speed), refer to AS-928E *Inflex VN Venturi Valve for Variable Air Volume (High-speed Actuation) Specifications*.

Table 5. Software

Functions	Abbreviation	Specifications
Fume hood exhaust valve	EXV-N	Exhaust air valve for the fume hood exhaust used for the safety cabinet, etc. Corresponding to the two-position airflow switch of the hood exhaust, prevents the flow back of air from the hood exhaust with the minimum airflow.
Fume hood exhaust valve (with booster valve connection function)	EXV-N-Main	Fume hood exhaust valve that has functions of EXV-N, BST-N, and communication. If a required exhaust airflow cannot be supplied by one EXV-N, it is used to connect BST-N for increasing air. Maximum two BST-Ns can be connected to one EXV-N-Main.
Supply/exhaust airflow balance control calculation value	LAB-N	Calculates the airflow balance of supply/exhaust air and transmits the airflow setting to other valves. Normally it is used as a supply air valve and is possessed of the temperature control function (room temperature input, output to reheater). Also, can input the humidity monitoring data. Supports ventilation frequency changeover using the external contact. Inputs the airflow of other values that do not perform LON communication with analog input data, also can adjust the airflow of supply/exhaust air.
Supply air valve	MAV-N	Receives the airflow setting from LAB-N and controls the supply air volume. Used to connect dual supply air valves, or used as a supply valve when LAB-N is used for exhausting air.
Supply air valve (with booster valve connection function)	MAV-N-Main	Supply air valve that has functions of MAV-N, BST-N, and communication. If a required exhaust airflow cannot be supplied by LAB-N and MAV-N, it is used to connect BST-N for increasing air. Maximum five BST-Ns can be connected to one MAV-N-Main.
General exhaust valve	GEX-N	Receives the airflow setting from LAB-N and controls the exhaust air volume. Used as a general exhaust valve when LAB-N is used for supplying air.
General exhaust valve (with booster valve connection function)	GEX-N-Main	Exhaust air valve that has functions of GEX-N, BST-N, and communication. If a required exhaust airflow cannot be supplied by one GEX-N, it is used to connect BST-N for increasing air. Maximum five BST-Ns can be connected to one GEX-N-Main.
Room pressure adjustment control valve	PCV-N	Valve that measures room pressure using the room differential pressure sensor and performs the room pressure adjustment control. Installed as a supply air valve, general exhaust air valve, or its booster valve. Maintains the room differential pressure constant by adding or subtracting the airflow calculated by the room pressure adjustment control on the airflow calculated by the airflow balance control. Also it can be installed stand-alone separating from the airflow balance control, and can adjust the room pressure for the airflow specified individually. Notifies valve failure or room pressure trouble by connecting the room pressure monitor. In addition, using the room pressure monitor, the pressure setting can be switched, or the room pressure setting can be changed.
Room pressure adjustment control valve (with booster valve connection function)	PCV-N-Main	Room pressure adjustment control valve that has functions of PCV-N, BST-N, and communication. It is used as a supply air valve, general exhaust air valve, or to connect BST-N for increasing air. Maximum five BST-Ns can be connected to one PCV-N-Main.
Booster valve	BST-N	Used to increase airflow for EXV-N-Main, MAV-N-Main, GEX-N-Main, and PCV-N-Main.

Performance Curves of Pressure-Independent Control

- 200 mm (8 inches) valve

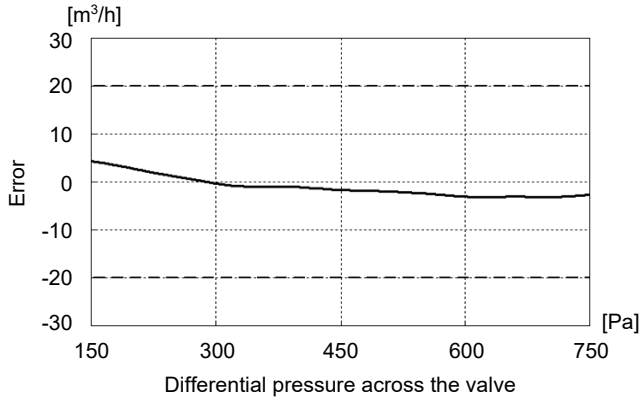


Figure 10. 200 mm (8 inches) valve at 60 m³/h flow

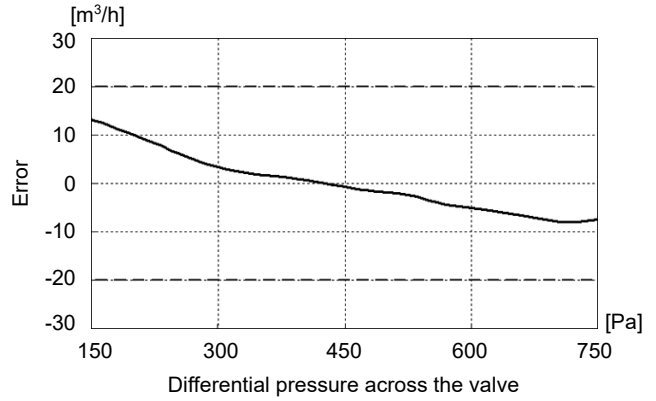


Figure 11. 200 mm (8 inches) valve at 155 m³/h flow

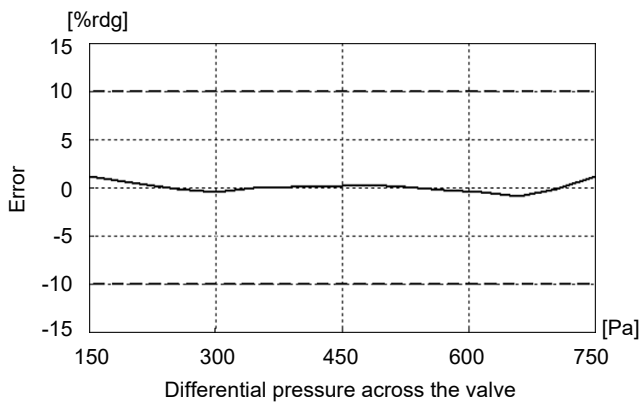


Figure 12. 200 mm (8 inches) valve at 425 m³/h flow

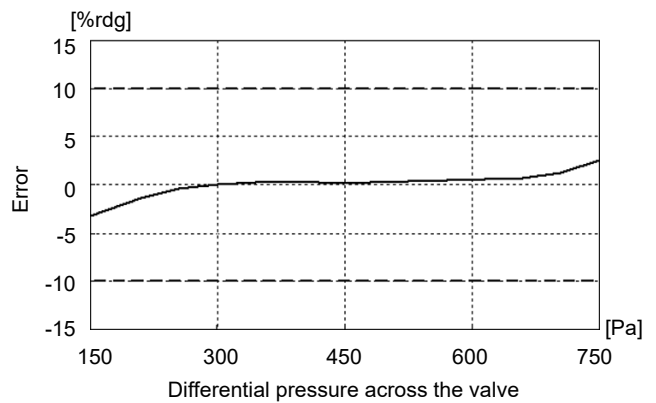


Figure 13. 200 mm (8 inches) valve at 850 m³/h flow

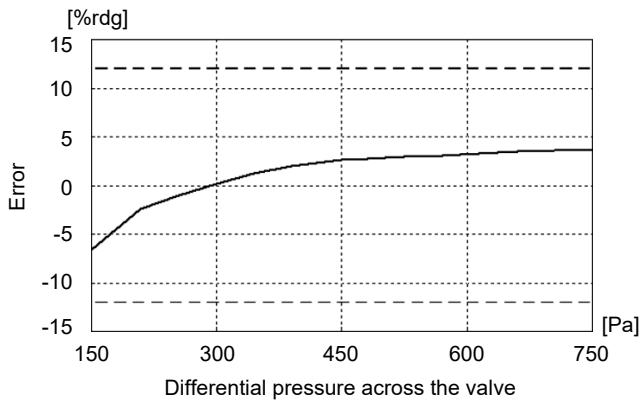


Figure 14. 200 mm (8 inches) valve at 1185 m³/h flow

- 250 mm (10 inches) valve

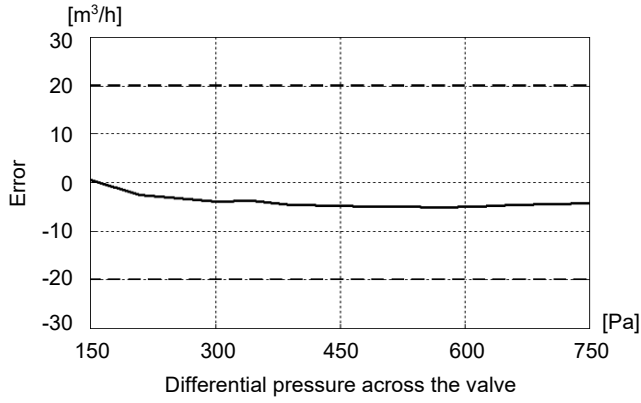


Figure 15. 250 mm (10 inches) valve at 85 m³/h flow

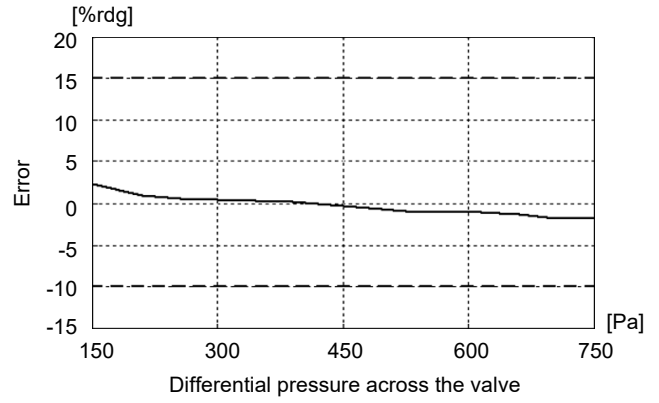


Figure 16. 250 mm (10 inches) valve at 220 m³/h flow

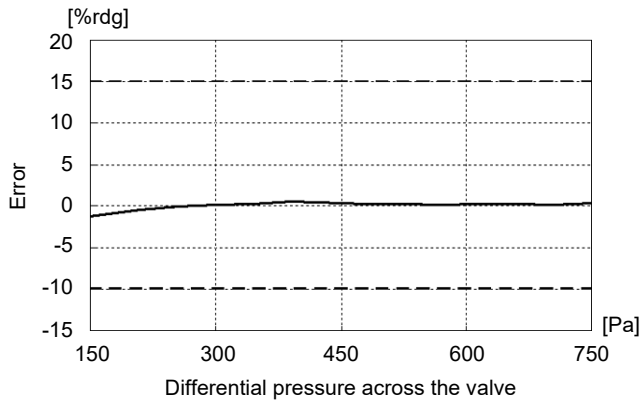


Figure 17. 250 mm (10 inches) valve at 595 m³/h flow

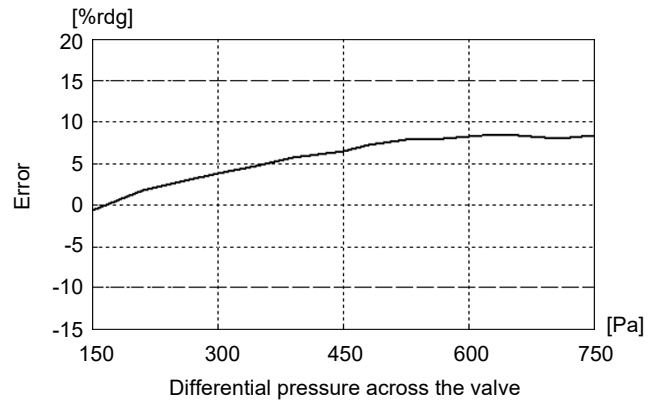


Figure 18. 250 mm (10 inches) valve at 1105 m³/h flow

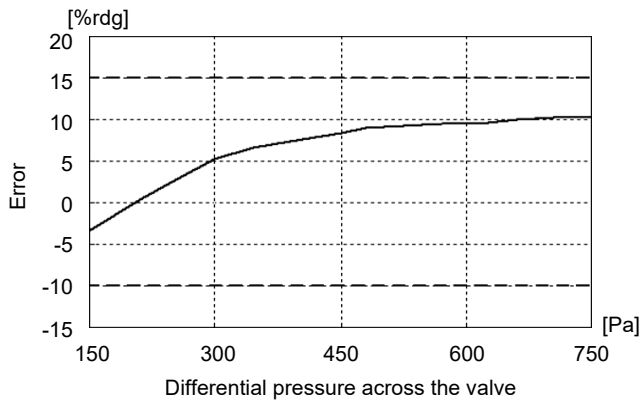


Figure 19. 250 mm (10 inches) valve at 1695 m³/h flow

- 300 mm (12 inches) valve

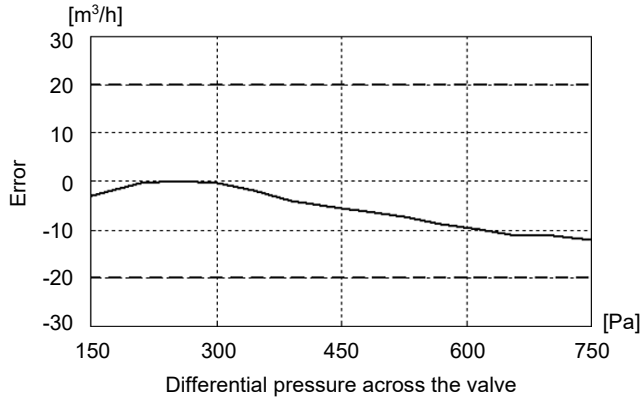


Figure 20. 300 mm (12 inches) valve at 155 m³/h flow

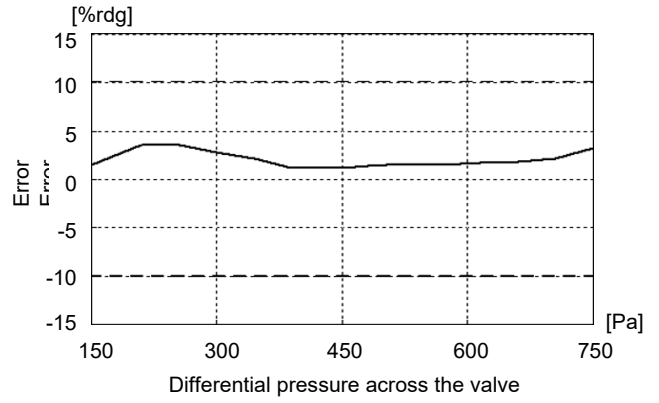


Figure 21. 300 mm (12 inches) valve at 440 m³/h flow

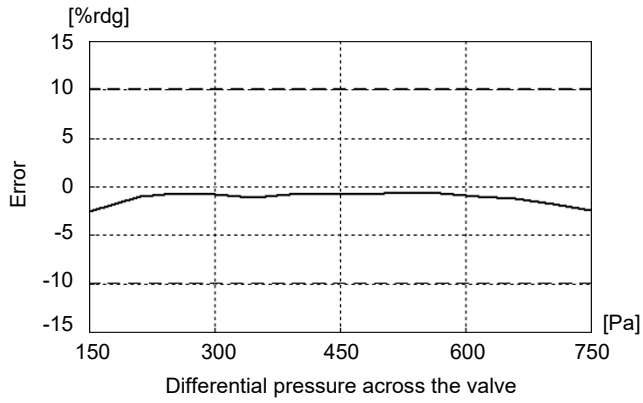


Figure 22. 300 mm (12 inches) valve at 1070 m³/h flow

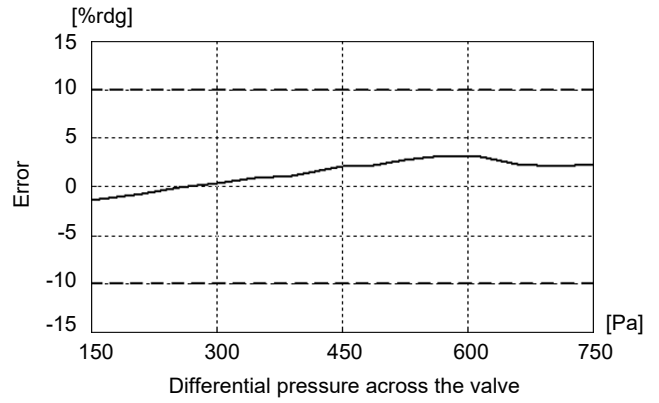


Figure 23. 300 mm (12 inches) valve at 1785 m³/h flow

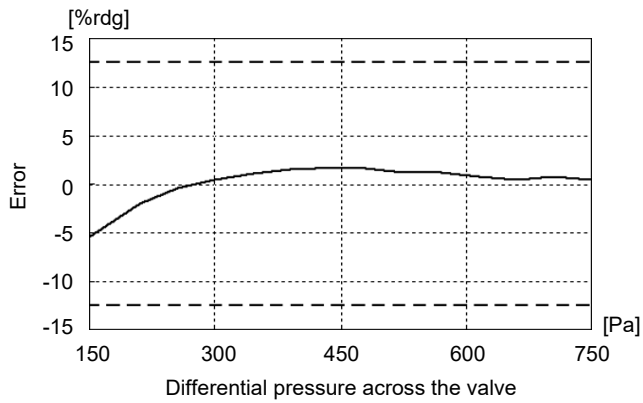


Figure 24. 300 mm (12 inches) valve at 2545 m³/h flow

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