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Air Hammer & Pneumatic Vibrator



APPLICATION

INTRODUCTION

In automatic factories, there are different piping systems, conveyors, weighing arrangements, life testing equipments, and dust collectors for production process.

Material characteristic (moisture, S.G., size..) and equipment design (shape, layout...) are usually the causes of medium accumulation in the pipes and tanks.

By applying pneumatic vibrators in the problem area, it will provide the best solution. Pneumatic vibrators will shake off the clogged or attached material and eliminate friction during automatic production.

WORKING PRINCIPLE

Vibration is created by the high centrifugal force of the circulating steel roller, which runs on a steel ring at very high frequency.

MERIT OF VIBRATORS

The body of pneumatic vibrator is made of strengthened aluminum alloy. It is simple structured small size vibrator with strong vibrating force. The vibrator is responsive for sudden activation / deactivation, which eliminates the damage of the equipments to the minimum level.

The vibrator is forced by compressed air. It is easily operated without spark. The working principle does not cause sparks, which can be applied in hazardous, humid or other severe environment. Power force, frequency and amplitude can be adjusted while operating.

MODERATE TYPE

Model \ Application	Air hammer	Piston vibrator		Pneumatic vibrator		
	BAH	BVP10000-01 Strike	BVP10000-00 Cushion	BVK BALL	BVR ROLLER	BVT TURBINE
Get rid of blockage						
Pipe accumulation						
Derust piping						
Vibrating delivery sieving						
Arrangement & Conveyance						
Filling & Packing						
Defoaming while filling						
Concrete injection						
Sand compacted while molding						
Static electricity coating						
Life testing						

 Excellent

 Fair

BVP SERIES PISTON VIBRATOR (AIR CUSHIONED MODEL)

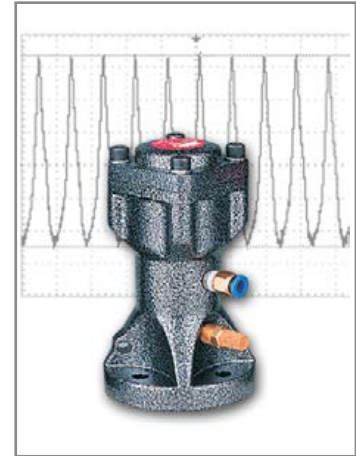
FEATURES

1. Highly strengthened aluminum body.
2. Low frequency vibration is the best solution to Bridge-break.
3. Frequency and amplitude of vibration can be adjusted as required.
4. Sudden activation and deactivation.

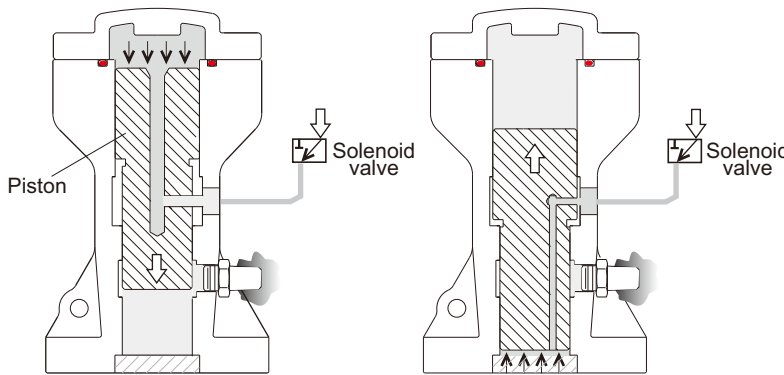
Air cushioned type, low noise character. It is a good solution to shake off attachment on the tank wall and for application that requires quietness. Also, it can be designed to apply on vibrating separator, and conveyor.

WORKING PRINCIPLE

There are tubes located in both end of cylinder. Air is compressed into the tube to push piston from one side to the other side. Vibration power is arose by the back and forth movement of piston in the body. Air cushion at both ends will keep piston away from striking onto the body. Hence, the piston will not produce noise.



Temperature: -40~100°C
Noise level range: 80-115 dBA



(1) Air is compressed into the body to push piston move downward. Air in the bottom side will be exhausted by the outlet hole.

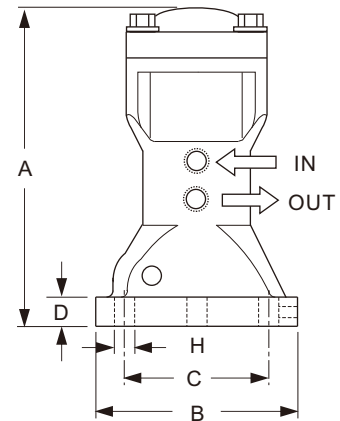
(2) Compressed air will push the piston back from the bottom. The movement repeats.

NEW/OLD MODEL NO. COMPARISON TABLE

Old Model No.	New Model No.
BVP-30C	BVP10000-0030
BVP-40C	BVP10000-0040
BVP-60C	BVP10000-0060

Unit= mm

Model No.	A	φB	φC	D	φH	IN	OUT
BVP10000-0030	138	80	60	12	9	1/8" PF	1/8" PF
BVP10000-0040	166	100	75	16	11	1/4" PF	1/4" PF
BVP10000-0060	208	140	105	16	15	1/4" PF	1/4" PF



Model No.	FREQUENCY (V.P.M.)			FORCE (N)			AIR CONSUMPTION (ℓ / min)	WEIGHT (g)
	2kg/cm ²	4kg/cm ²	6kg/cm ²	2kg/cm ²	4kg/cm ²	6kg/cm ²		
BVP10000-0030	1765	2308	2857	195	380	560	230	0.9 kg
BVP10000-0040	1333	1677	1875	275	531	715	249	1.9 kg
BVP10000-0060	1000	1200	1340	404	780	1030	269	4.5 kg

BVP SERIES PISTON VIBRATOR (IMPACT MODEL)

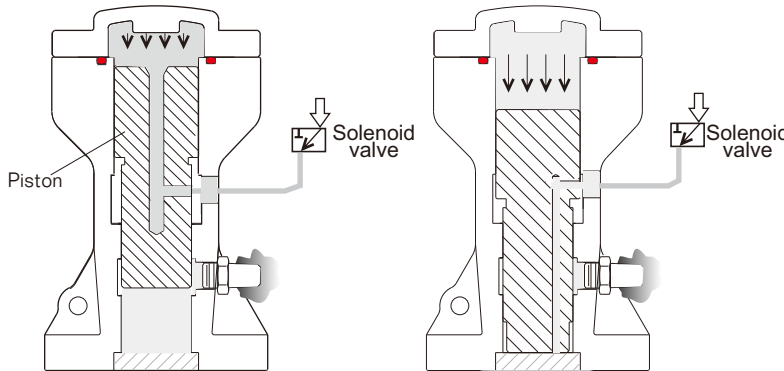
FEATURES

1. Highly strengthened aluminum body.
2. Low frequency/ continuous impact model, sudden activation/ deactivation.
3. Frequency and amplitude of impact can be adjusted as required.
4. Direct impact onto target object to produce the optimum vibration feedback.

Direct impact of piston impact type can get rid of rust and material attachment inside the pipes, and low S.G, high moisture material, and material built-up in the tank.

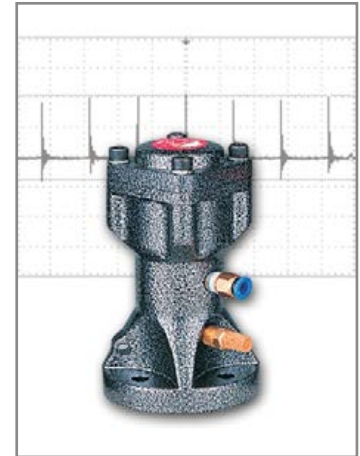
WORKING PRINCIPLE

There are air-breathing tubes located in both end side of cylinder. Air will be compressed in to push piston from one side to the other side. Vibration is arose by the back and forth movement of the piston in the body. Air cushion at top end will keep piston away from striking onto the body. On the other hand, piston will strike directly on the bottom of the body to produce strong impact.



- (1) Compressed air via top air-breathing tube pushes piston moving downward. Air in the bottom will be exhausted via outlet hole.
- (2) Compressed air via down air-breathing tube pushes piston moving upward. The movement repeats from step (1)

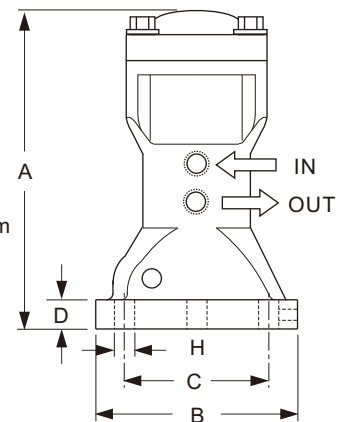
Model No.	A	ϕB	ϕC	D	ϕH	IN	OUT
BVP10000-0130	138	80	60	12	9	1/8" PF	1/8" PF
BVP10000-0140	166	100	75	16	11	1/4" PF	1/4" PF
BVP10000-0160	208	140	105	16	15	1/4" PF	1/4" PF



Temperature: -40~100°C
Noise level range: 80-115 dBA

NEW/OLD MODEL NO. COMPARISON TABLE

Old Model No.	New Model No.
BVP-30S	BVP10000-0130
BVP-40S	BVP10000-0140
BVP-60S	BVP10000-0160



Unit= mm

Model No.	FREQUENCY (V.P.M.)			FORCE (N)			AIR CONSUMPTION (ℓ / min)	WEIGHT (g)
	2kg/cm ²	4kg/cm ²	6kg/cm ²	2kg/cm ²	4kg/cm ²	6kg/cm ²		
BVP10000-0130	1900	2800	3500	3600	5400	6200	250	1.0 kg
BVP10000-0140	1700	2400	3000	6450	8750	9400	270	2.1 kg
BVP10000-0160	1200	1800	1900	6900	12850	13850	300	4.8 kg

BAH SERIES SINGLE IMPACTING TYPE

FEATURES

1. One impact wave per one shot.
2. Highly strengthened aluminum structure.
3. Impact force and interval timing can be set by request.
4. Extended magnetic strength to increase piston impact power.

The single impact model of Air Hammer impacts on one specific target spot on limited target.

Air Hammer impact will not separate water out of humid mixtures.

It is often applied onto pipe or elbow clean and tank filled with humidity or small S.G. Material.



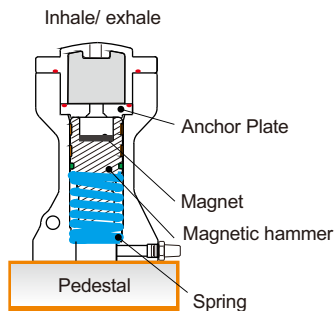
Temperature: -40~100°C
Noise level range: 80-115 dBA

WORKING PRINCIPLE

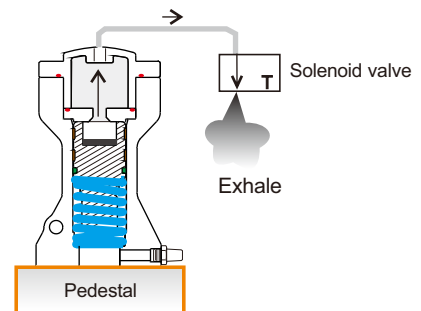
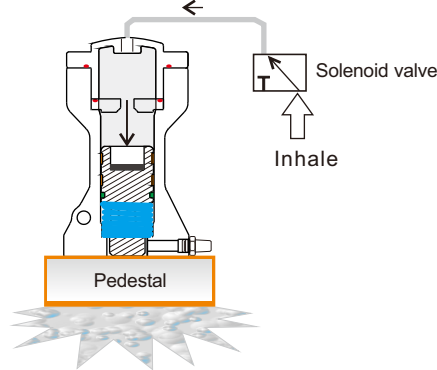
There is a powerful magnet inside the air hammer. As the inlet air pressure is higher than magnetic force, the hammer and magnet will separate and cause strong impact power. Spring will bring hammer back to the initial position automatically after the impact.

By doing so, the air pressure will be released and the strength of air pressure will be delivered to target impact container. It will help to smooth the flow and prevent accumulation inside the container.

(1) The hammer is tightly attached to magnetic anchor plate when air pressure is smaller than magnetic power.



(2) The hammer instantly drops down when air pressure overcomes the strength of Magnet to cause a downward impact.



NEW/OLD MODEL NO. COMPARISON TABLE

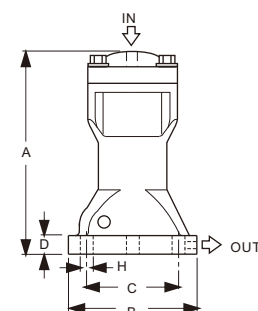
Unit= mm

Model No.	A	ϕB	ϕC	D	ϕH	IN	OUT
BAH10000-30A	138	80	60	12	9	1/4" PT	1/8" PT
BAH10000-40A	166	100	75	16	11	1/4" PT	1/8" PT
BAH10000-60A	208	140	105	16	15	1/4" PT	1/8" PT
BAH10000-80A	269	172	140	24	19	3/8" PT	1/4" PT

Old Model No.	New Model No.
BAH-30	BAH10000-30A
BAH-40	BAH10000-40A
BAH-60	BAH10000-60A
BAH-80	BAH10000-80A

Model No.	USEFUL PRESSURE	FORCE	AIR CONSUMPTION	WEIGHT (g)
BAH10000-30A	3~6 kg/cm ²	1.0 kg.m/s	0.028 l/e.t.	1.1kg
BAH10000-40A	3~6 kg/cm ²	2.8 kg.m/s	0.082 l/e.t.	1.8kg
BAH10000-60A	4~7 kg/cm ²	7.4 kg.m/s	0.228 l/e.t.	4.0kg
BAH10000-80A	4~7 kg/cm ²	12.5 kg.m/s	0.455 l/e.t.	8.4kg

※ l / e.t. means the air consumption (l) per one shot.



BVK SERIES PNEUMATIC BALL VIBRATOR

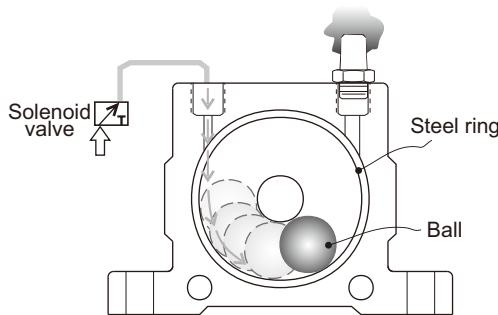
FEATURES

1. Special aluminum alloy, small size, light weight.
2. Fine enclosure protection can be applied in high humidity or dusty working area.
3. Frequency and amplitude of vibration can be adjusted as required.
4. Low price and durable.

The best choice for bridge-break in thin wall, small tank. This model can be used in vibrating separator, vibrating conveyor, automatic component arrangement, electroplating built-up, protection material packing process, process molding.

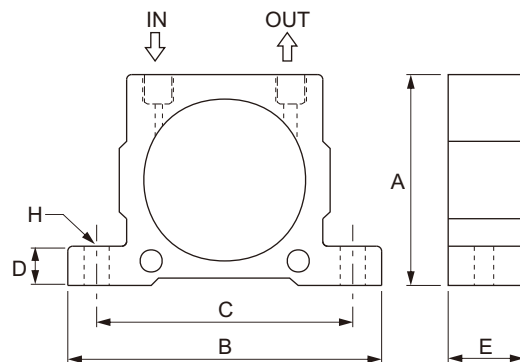
WORKING PRINCIPLE

Pneumatic Ball vibrator is equipped with steel ring and ball inside. It is tightly sealed by plastic side covers. Vibration takes place when internal ball is pushed by compressed air and centrifugal force is produced by ball rotary motion.



Unit= mm

Model No.	A	B	C	D	E	H	IN	OUT
BVK10000-10	51	86	68	12	20	φ7	1/4"PF	1/4"PF
BVK10000-13	67	113	90	16	24	φ9	1/4"PF	1/4"PF
BVK10000-16					27			
BVK10000-20	83	128	104	16	33	φ9	1/4"PF	1/4"PF
BVK10000-25					38			
BVK10000-32	103	160	130	20	44	φ11	3/8"PF	3/8"PF



Temperature: -40~100°C
Noise level range: 75-95 dBA

NEW/OLD MODEL NO. COMPARISON TABLE

Old Model No.	New Model No.
BVK-10	BVK10000-10
BVK-13	BVK10000-13
BVK-16	BVK10000-16
BVK-20	BVK10000-20
BVK-25	BVK10000-25
BVK-32	BVK10000-32

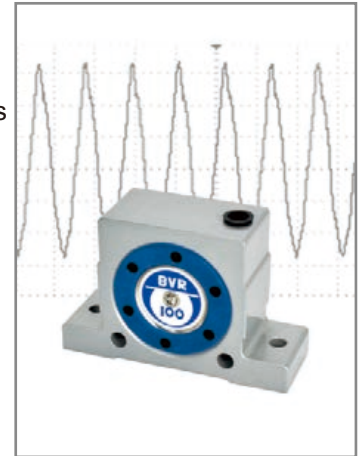
Model No.	FREQUENCY (V.P.M.)			FORCE (N)			AIR CONSUMPTION (ℓ / min)			WEIGHT (g)
	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	
BVK10000-10	22,500	28,000	34,000	250	470	710	92	150	200	140
BVK10000-13	15,000	18,500	22,500	320	550	870	94	158	225	260
BVK10000-16	13,000	17,000	19,500	450	800	1,100	122	200	280	300
BVK10000-20	10,500	14,500	16,500	720	1,220	1,720	130	230	340	530
BVK10000-25	9,200	12,200	14,000	930	1,570	2,050	160	290	425	630
BVK10000-32	7,800	9,700	12,500	1,510	2,470	3,210	215	375	570	1150

BVR SERIES PNEUMATIC ROLLER VIBRATOR

FEATURES

1. Special aluminum body, small size, light weight
2. Frequency and amplitude of vibration can be adjusted as required
3. The strongest vibration force drove by roller among other same size products

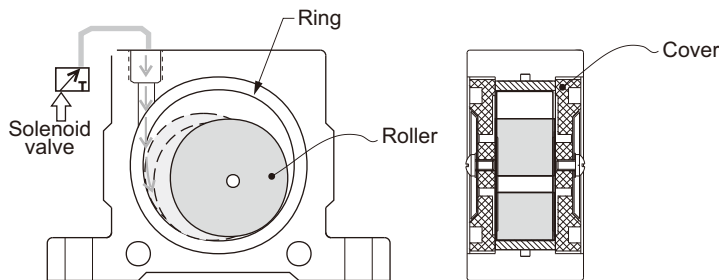
Its high vibration frequency can prevent material jam in pipe delivery, it can also be applied in bridge-break, concrete injection operation process.



Temperature: -40~100°C
Noise level range: 75-100 dBA

WORKING PRINCIPLE

Pneumatic roller vibrator is structured with roller and ring with multi nozzles. It is tightly sealed by plastic side covers. Vibration takes place when roller is pushed by compressed air and centrifugal force is produced by ball rotary motion.

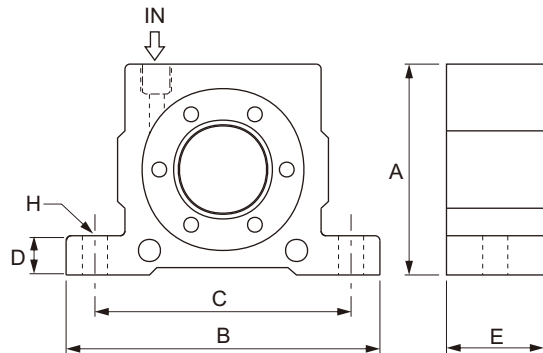


NEW/OLD MODEL NO. COMPARISON TABLE

Old Model No.	New Model No.
BVR-50	BVR10000-050
BVR-65	BVR10000-065
BVR-80	BVR10000-080
BVR-100	BVR10000-100

Unit= inch(mm)

Model No.	A	B	C	D	E	H	IN
BVR10000-050	51	86	68	12	29	φ7	1/8"PF
BVR10000-065	67	113	90	16	37	φ9	1/4"PF
BVR10000-080	83	128	104	16	42.5	φ9	1/4"PF
BVR10000-100	103	160	130	20	52	φ11	3/8"PF



Model No.	FREQUENCY (V.P.M.)			FORCE (N)			AIR CONSUMPTION(ℓ / min)			WEIGHT (g)
	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	
BVR10000-050	25,000	35,000	36,000	1,070	2,920	4,220	100	145	195	240
BVR10000-065	19,000	21,000	26,000	2,730	4,830	6,120	200	300	400	540
BVR10000-080	15,500	18,500	19,000	3,000	6,090	7,450	290	430	570	950
BVR10000-100	11,000	14,000	16,000	3,750	6,750	8,900	370	550	730	1800

BVT SERIES PNEUMATIC TURBINE VIBRATOR

FEATURES

1. Special Aluminum body, low noise, high vibration frequency, small size and light weight.
2. Sudden activation/ deactivation
3. Frequency and amplitude of vibration can be adjusted as required

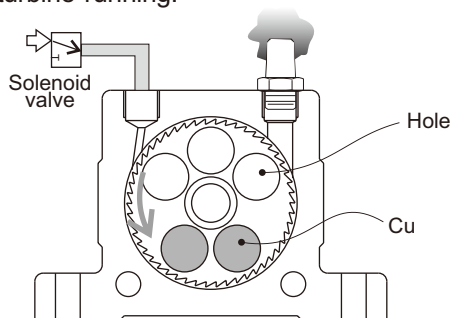
Best choice in low noise environment. It is usually installed on vibrating separator, conveyer, automatic arrangement machine, packing machine, filling machine etc.



Temperature: -40~100°C
Noise level range: 60-75 dBA

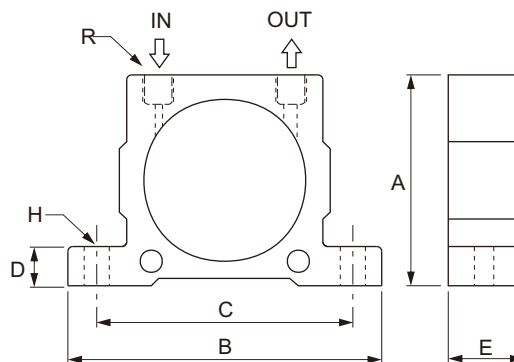
WORKING PRINCIPLE

The vibration is produced by centrifugal force of the unbalance weights from turbine movement. The operation noise is low because the ball bearing supports turbine running.



Unit= inch(mm)

Model No.	A	B	C	D	E	H	R
BVT10000-08	51	86	68	12	33	φ7	1/8"PF
BVT10000-10							
BVT10000-13	67	113	90	16	42	φ9	1/4"PF
BVT10000-16							
BVT10000-20	83	128	104	16	56	φ9	1/4"PF
BVT10000-25							
BVT10000-30	100	160	130	20	73	φ11	3/8"PF
BVT10000-36							



NEW/OLD MODEL NO. COMPARISON TABLE

Model No.	FREQUENCY (V.P.M.)			FORCE (N)			AIR CONSUMPTION (ℓ / min)			WEIGHT (g)
	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	2Bar 29PSI	4Bar 58PSI	6Bar 87PSI	
BVT10000-08	36,000	42,000	46,000	990	2,060	2,910	46	80	112	250
BVT10000-10	27,500	35,000	37,500	840	1,390	2,400	46	80	112	255
BVT10000-13	26,000	30,000	33,000	1,400	2,440	3,730	120	200	290	565
BVT10000-16	17,000	21,500	24,000	1,220	2,090	3,160	120	200	290	580
BVT10000-20	17,000	20,000	23,000	2,170	4,040	5,520	185	325	455	1090
BVT10000-25	12,000	15,500	17,000	2,120	3,510	5,070	185	325	455	1120
BVT10000-30	13,000	14,000	16,000	3,380	5,430	7,540	330	530	745	2200
BVT10000-36	8,000	10,000	13,000	3,290	5,360	7,190	330	530	745	2300

Old Model No.	New Model No.
BVT-08	BVT10000-08
BVT-10	BVT10000-10
BVT-13	BVT10000-13
BVT-16	BVT10000-16
BVT-20	BVT10000-20
BVT-25	BVT10000-25
BVT-30	BVT10000-30
BVT-36	BVT10000-36

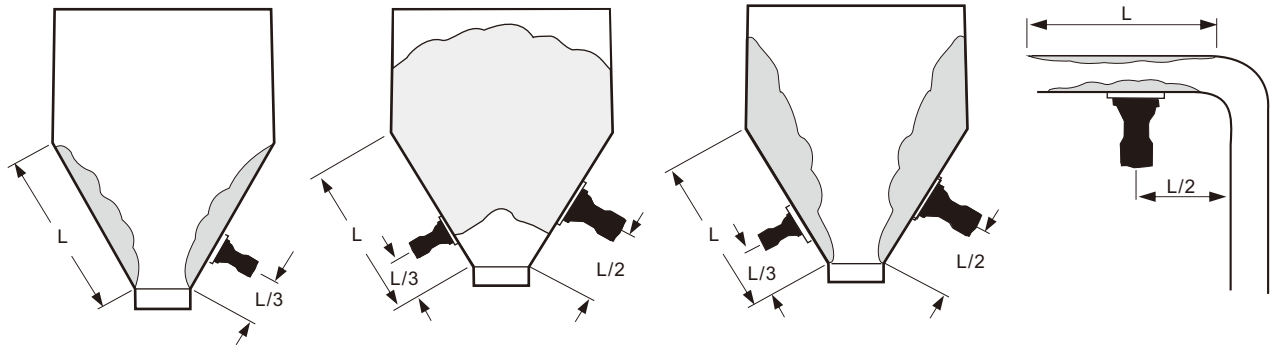
ACCUMULATED MATERIAL SOLUTION

Different applications require various tanks. Customers choose appropriate vibrators to meet application demand (tank shape/ material, applied material humidity/ S.G./ granule size...). Suitable vibrator will not only prevent obstruction problem but also avoid the damage of tank wall.

Big amplitude, low frequency piston types are suitable in granule with small S.G. . AB1/AB2/AB3 types are better choices for high S.G. or material accumulation in filtration environment. It is recommended to use multiple vibrators in serious clogging situation or big tank surrounding.

Accumulation condition and vibrator installation

According to various clogging situations, the recommended vibrators and suitable installation positions (usually 1/2L or 1/3L) are shown by below.



Vibration force calculation

Taking accumulation situation into consideration, appropriate vibrator will give 0.2~0.4 G accelerated vibration force onto target object.

$$F = 0.2 \sim 0.4GW,$$

F: Vibration force (N)
 G: $9.8m/s^2$
 W: Material weight (KG)

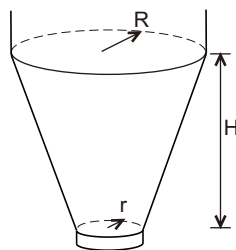
EX: Cone tank, R=3.5m, r=2.5m, Tank height H=2m, material S.G.=0.8, please calculate the vibration needed for this tank.

Sol: Get volume of material first (please refer to fig. on the right for formula) .
 Material Weight (W)=volume(V)*specific gravity(S.G)
 Vibration F=0.2 GW (G=9.8m/s², W=material weight)

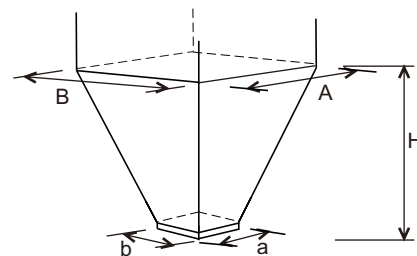
Material weight calculation

Cone volume $V = 3.14 \times 2/3 (3.5^2 \times 3.5 + 3.5 \times 2.5 + 0.25 \times 0.5) = 29.83(m^3)$
 Material Weight $W = 29.83 \times 0.8 = 23.86 = 23680(kg)$
 Vibration $F = 0.2 \times 23860 \times 9.8 = 46765$ Newton Force(N)

W: Material weight (KG)
 V: Chute volume (m³)
 γ : Specific gravity



$$W = 1000V\gamma \quad V = \frac{\pi H}{3} (R^2 + Rr + r^2)$$

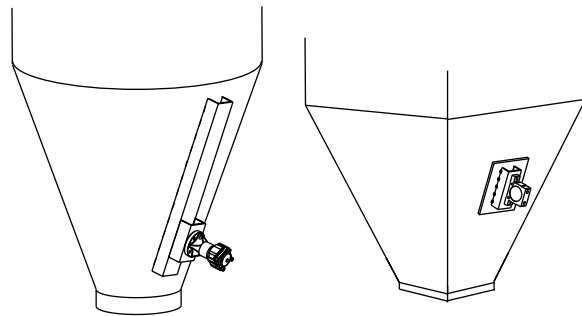
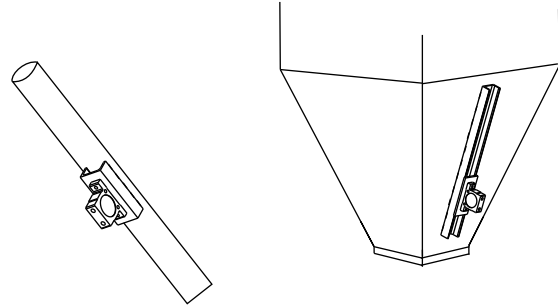


$$V = \frac{H}{6} [A \times B + (A+a)(B+b) + a \times b]$$

INSTALLATION

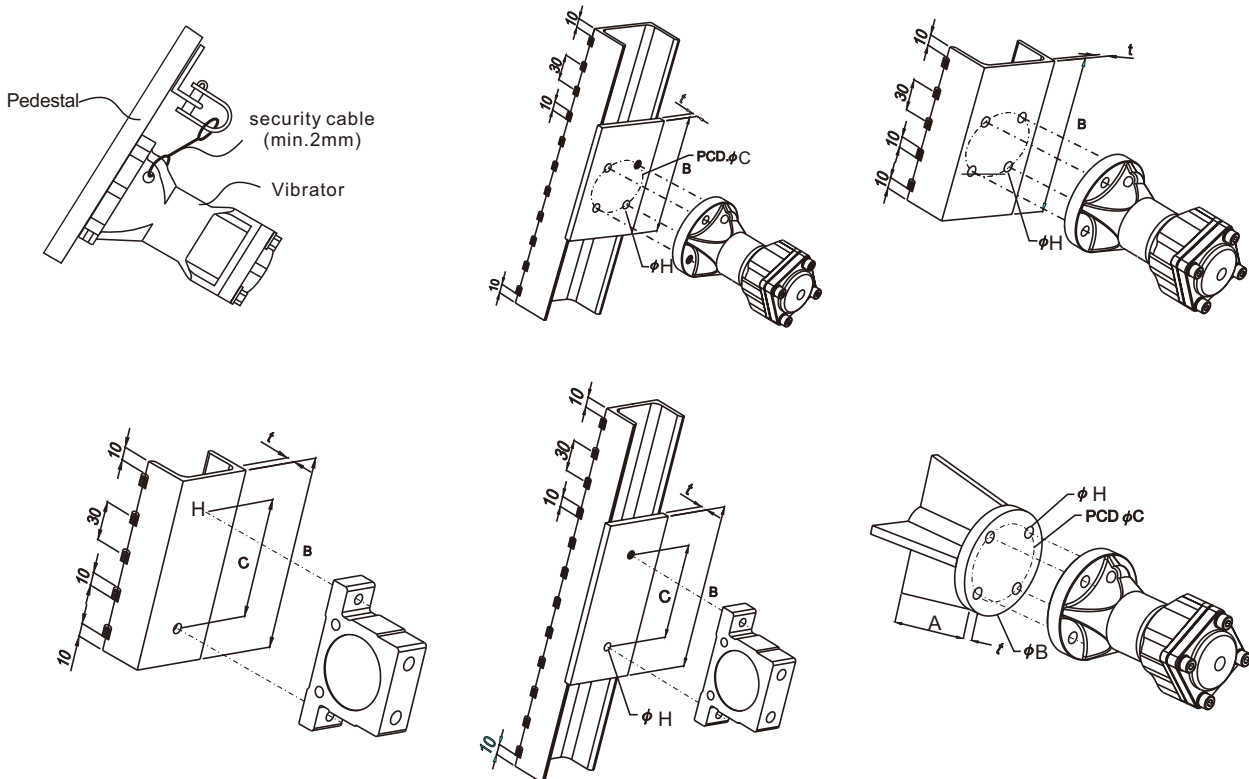
Vibration force transmits more efficiently in conical hopper tank than in rectangular hopper. It is recommended to install two vibrators for rectangular hopper application.

1. Vibration force can be transmitted more efficiently by using U shape steel supporter. It can help material fall smoothly in the tank or pipe. It also reduces tank damage.
2. U shape steel or fixer can prevent irregular movement of vibrators. To avoid possible damage on the tank wall caused by vibration force, stitch weld method is suggested. (10mm space will be required on two ends of U shape steel)
3. Reinforced board is required between U shape steel and thin tank wall.
4. Cross installed of U shape steel can increase vibration field in big hopper tank.



ATTENTION

Vibrator has to be fixed by high tension bolt, washer, and spring washer. It is suggested to use security cable if vibrator is installed onto hopper.



AIR SUPPLY AND LUBRICATION

AIR SUPPLY

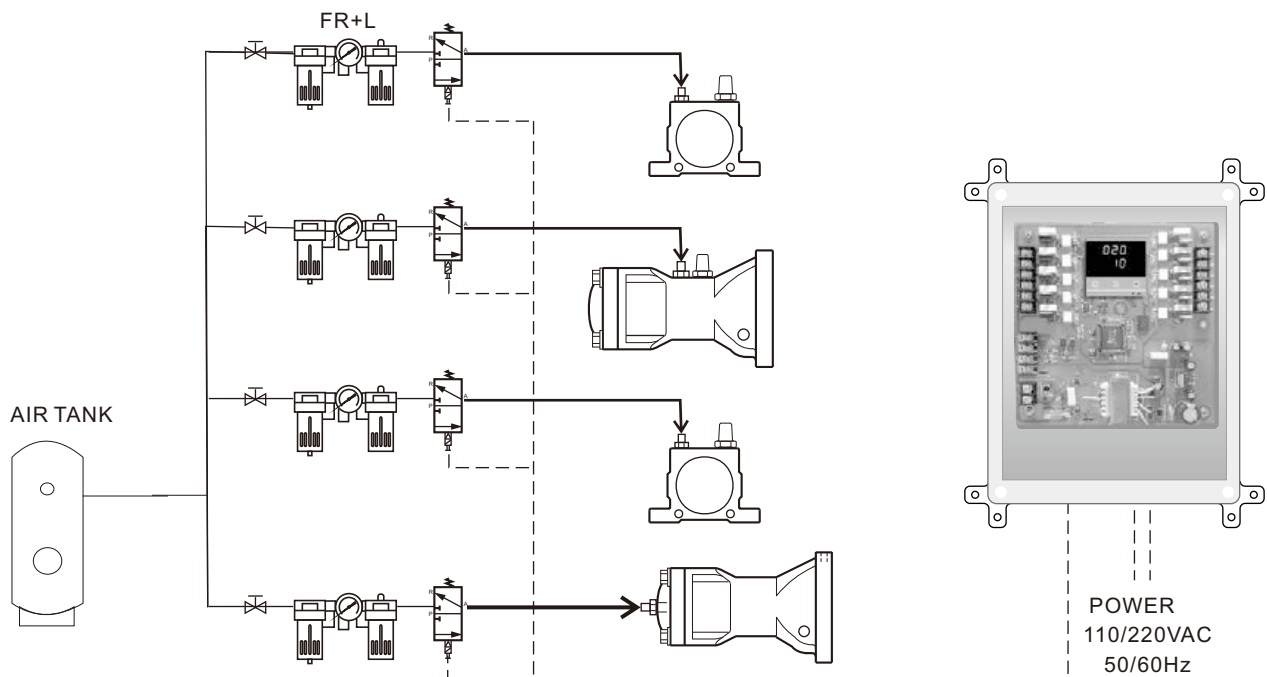
The moisture in the compressed air will erode pipes and accessories, then weaken the vibrator's performance. Make sure necessary steps are followed before applying. To fully utilize vibrator performance, choose appropriate product for different application.

LUBRICATION

All vibrators require lubricating oil to smooth the operation. Low viscosity oil will be injected into cup of F.R.L. combination unit to adjust required spread oil amount. To aim at specific application requirement, muffler can be applied onto exhaust tube in outside area to prevent food from pollution. Or to inject 2~3 drops of edible oil via air inlet sometimes is an alternative choice. BAH series don't need lubrication unless they are running frequently.

TUBING ARRANGEMENT

Muffler can reduce noise and prevent dust enter the vibrator. The size of tubing should meet with that of vibration air inlet/ exhaust. In the meantime, as two vibrators work simultaneously, length of tubing should be equal after separation. In the meantime, the cross section of tubing should be twice of the vibrator.



VIBRATOR ACCESSORIES

MUFFLER

Muffler is an accessory that decreases noise when air is exhausted from vibrator.

MUFFLER
Material: Plastic



Type	Model	HP411-AIR006A102	HP411-AIR006A202	HP411-AIR006A402
Range of service pressure		0~9(900) kgf/cm ² (kpa)		
Range of service temperature		5~60°C		
Material	Body	BRASS		
	Filter Element	BRASS (60mm)		
Orifice	mm ²	17	42	50
Noise elimination effect	dB	1	6	13
Connection port	(PT)	1/8"	1/4"	3/8"

1/8": HP411-AIR006A101
1/4": HP411-AIR006A201
3/8": HP411-AIR006A401

F.R.L COMBINATION (OPTION PART)



Model	Port Size	Lubricator	Regulator	Bracket	Suitable Type				
					BVK	BVR	BVT	BVP	BAH
HP411-AIR008A202	1/4"	✓	✓	✓	10	50	10		30
HP411-AIR008A201	1/4"	✓	✓	✓	13 16 20 25	65 80	13 16 20 25	30 40 60	40 60 80
HP411-AIR008A401	3/8"	✓	✓	✓	32	100	32		

QUICK JOINT (OPTION PART)



Model	Pu Tube Size	Thread Size
HP411-AIR001A202	OD6xID4	PT 1/4"
HP411-AIR001A201	OD8xID5	PT 1/4"
HP411-AIR001A402	OD12xID8	PT 3/8"

NEW/OLD MODEL NO. COMPARISON TABLE

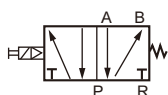
Old Model No.	New Model No.
26-4000	HP411-AIR006A102
26-4001	HP411-AIR006A202
26-4002	HP411-AIR006A402
AFC-200	HP411-AIR008A202
BFC-200	HP411-AIR008A201
BFC-300	HP411-AIR008A401
SQC 6-02	HP411-AIR001A202
SQC 8-02	HP411-AIR001A201
SQC12-03	HP411-AIR001A402
SV-6102TB	MP509-1EA1300001
SV-8103	MP509-1EA2300002

SOLENOID VALVE (OPTION PART)

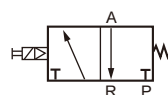


Item	Model	MP509-1EA1300001	MP509-1EA2300002
Fluid		Air	
Pressure Range		1~7Kgf/cm(100~700Kpa)	
Range Of Service Temperature		0~60°C	
Operating Method		Pilot Operate	
Number Of Positions / Ports		2/3	2/5
Valve Functions		Normal Closed	
Orifice		14(0.78) mm ² (CV)	18(1.0) mm ² (CV)
Manual Button		Push And Lock	
Connections Port		RT1/4	PT3/8
Lubrication		Lubrication Free Type	

MP509-1EA1300001



MP509-1EA2300002



TROUBLE SHOOTING

Air vibrators are simply structured, which seldom breaks down. Break-down usually arose because of careless installation methods.

Pay attention to F.R.L. combination unit after long time operation.

Trouble shooting	Possible factor	Solution
Vibrator cannot run when switch on	No air supply, or low air supply pressure	To check pressure gauge in F.R.L. Unit and air compressor, the air pressure should be adjusted to exceed 5 kg/cm ² value. Make Sure to turn on the air supply valve and compressor
	Solenoid valve not activated.	To strip air plug of vibrator away, make sure whether air exhaust after solenoid valve is activated
	Exhaust plug of vibrator not being removed	To remove plastic plug of vibrator
	Installation mistake in AC1 series air inlet hole	To make sure air in/outlet installation position is correct.
	HAH can't be operated well due to inappropriate soleuoid valve.	Soleuoid valve has to be 3/2 ways type, otherwise BAH will not be able to exhaust after operating.
Too small vibration force	Install manifold or too many branches on main tube with same cross section size	To enlarge cross section of main tube equal or bigger than sum of manifold or branches tubes. or to install tubings individually
	Insufficient air supply, Inappropriate tube, solenoid valve, F.R.L unit , or tubing is too long	To make sure applied accessories match to required ones, the length of tubing should not go beyond 5M.
	Wrong VT exhaust and inlet installation	To check pressure of F.R.L. unit and adjust its value higher
	Articles are absorbed by the vibrator	To dismantle the vibrator for checking
	Objects jam in muffler	To check pressure of air supply and adjust it stronger
Vibration noise	Screw loosen	To tight the screws
	U shape steel is not welded well	To weld again
	Vibrators problem	To remove vibrator, then activate it individually. It has to be repaired, if abnormal condition happened while running.
Solenoid valve noise	Articles are in solenoid valve	To replace solenoid valve

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