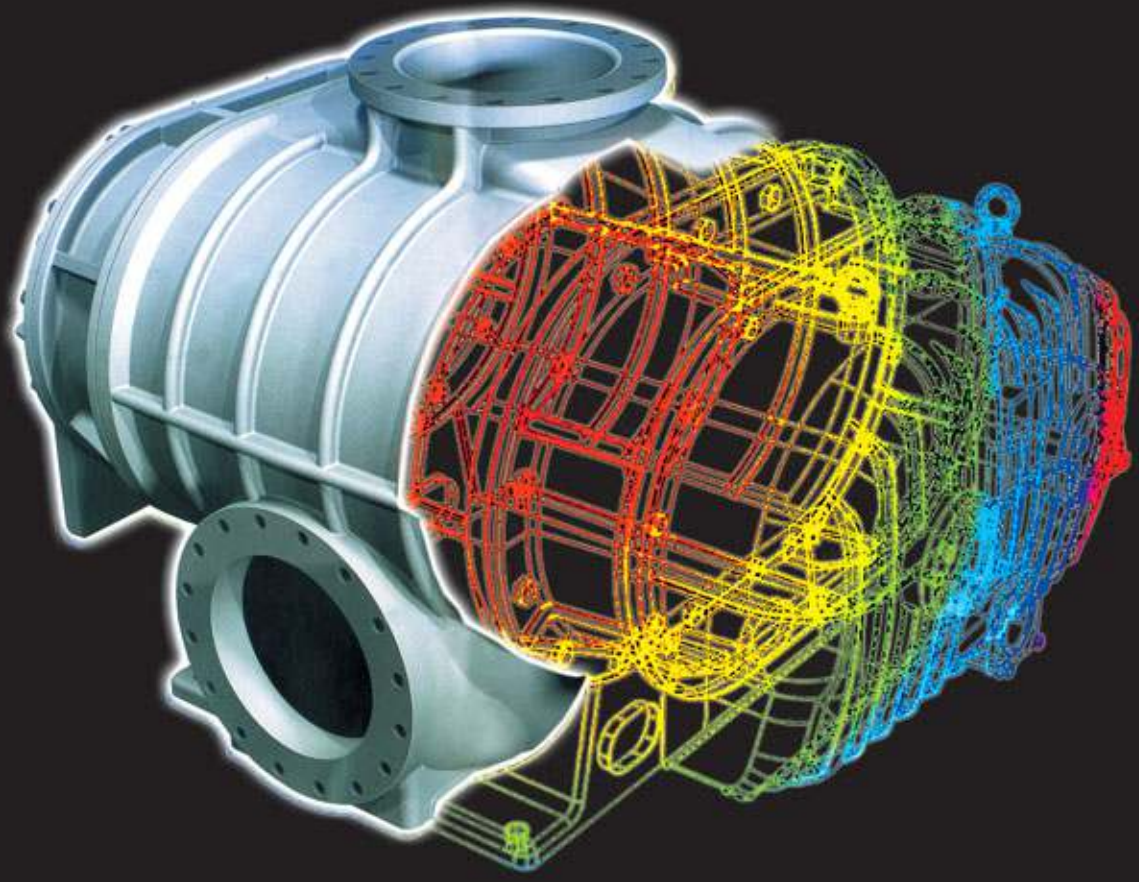
THREE LOBE ROTARY BLOWER



BLOWER DATA BOK
"ARC" SERIES

UNOMACH

" ARC" Series

" ARC " Three Lobe Positive Displacement Blower

UNOMACH has been recognized as one of the leading brands in the field of air blower. Our ARC SERIES have long been tested with highly satisfactory results in many applications ranging from wastewater treatment plant, oxygen supply to aquarium, spa pool, sand blasting, incinerator, press machinery, powder and granular material transport, and many other pneumatic conveying applications, as well as smoke extraction from clean room, vacuum packing, vacuum drying, vacuum car and vacuum casting.

Our ARC SERIES technology of three-lobe rotary blower has surpassed that of the competitors and resulted in less noise operation and longer life time.

In addition, we supply acoustic enclosure for the air blowers in order to meet the requirement of extremely sensitive noise area.

Moreover, we have air diffusers which give very fine bubbles easily dissolved into water, resulting in high oxygen transfer rate.

We have factories in many countries and we emphasize on the quality control. So our customers can be assured of the quality and have peace of mind when they use our products.

Advantages

* Three lobe rotor blower and vacuum pump:
An ideal air handler usable to satisfy a number of work conditions, the new series low noise units can be used to satisfy a wide range of user requirements. The specifications are as follows:

Blowers:

Piping size: 40 - 300 mm
Suction pressure: Atmospheric pressure
Discharge pressure: 1000 - 8000 mmAq.
Capacity: 0.38 - 190 m^3/ min.

Vacuum pumps:

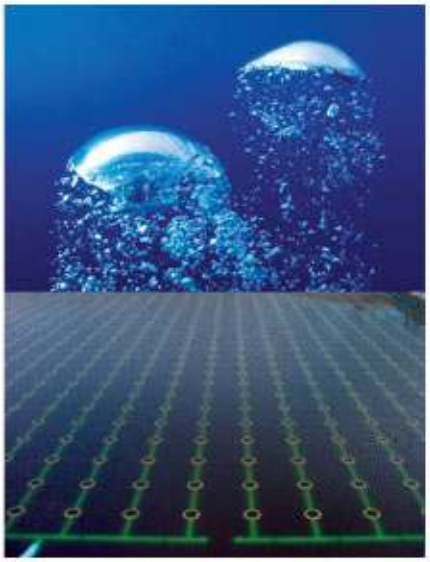
Piping size: 40 - 300 mm
Suction pressure: (-1000) - (-5000) mmAq.
Discharge pressure: Atmospheric pressure
Capacity: 0.38 - 190 m^3/ min.

This catalogue details air capacities, noise characteristics and external dimensions of units - so pick the model that meets your needs.

* Low noise - less vibration
Due to the three lobe rotor, pulsations of air discharge from the blower have been greatly reduced. Noise and vibration have also been significantly eliminated.

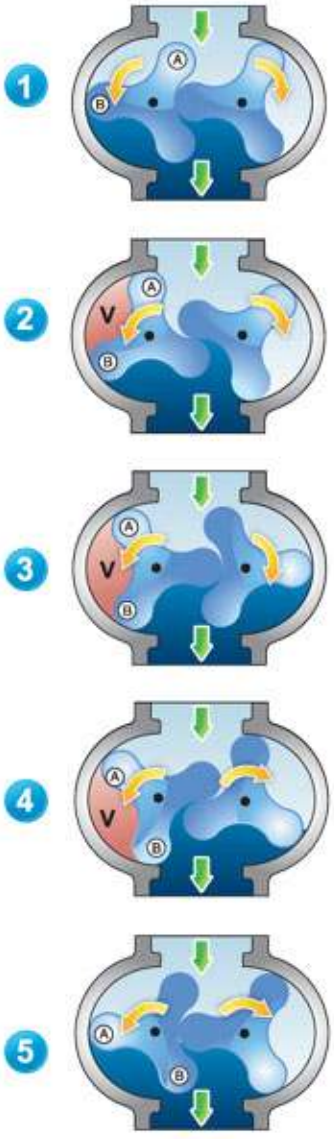
Control of Blower Speed

When blower's discharge pressure remains constant, its air volume and horse power are proportional to blower speed. When you need to adjust air volume, it is recommended not to discharge extra air into the open air, but to reduce blower speed to reduce horse power. This will greatly contribute to a reduction in power consumption. Usually, a variable speed motor is used and its rpms are controlled in response to pressure or air volume signals. Maximum and minimum blower speed differ according to service conditions, so please consult us for the necessary information.



Principle

A pair of rotors turn in opposite directions inside the casing, maintaining a precision clearance between the inside wall of the casing and the two rotors. Air is taken into the blower as the lobe end of each rotor passes the suction port and transferred from the suction side to the discharge side.
It is then discharged, forced towards the high pressure side. Air at the suction side is caught in volume "A" surrounded by lobe ends (A), (B) and the casing in process as shown in illustrations (1) and (2) at right, and after steps (3) and (4), is discharged (step 5).
With three lobes, this process is repeated six times per one rotation and constant volume of air proportional to the number of revolutions are discharged.



Advantages of the three lobe rotor

Compression takes place when the rotor's lobe end faces the discharge port and high pressure air at the discharge side flow back into the casing.
The main cause of blower noise lies in this pulsation of pressure that accompanies the back-flow compression.
In case of the three lobe rotor, the cycle of pulsation is 2/3 that of the two lobe rotor. The pressure peak value also reduces. In addition, since the three lobe rotor is of specially designed construction so as to minimize the range of pulsations, pulsations at the discharge port have been conspicuously reduced, compared with the two lobe rotor. Consequently, the back-flow compression of blower is done smoothly and noise level greatly lowered. Since discharge air pulsations have been smoothed, changes in axial torque and bearing load, and vibration and noise of timing gear and bearing have been remarkably reduced.

Shaft Sealing

The "ARC" Blowers are available with many types of standard shaft sealing. The type of blower shaft sealing is selected according to the gas handled. When handling a special kind of gas, a mechanical seal is provided-either single or double mechanical seal can be used. Available types of shaft sealing and their general uses are as follows :

1. Standard types:

The standard type for blower mainly suitable for blower that handles air.

Seal position **A** Oil seal
Seal position **B** Labyrinth seal
Seal position **C** Labyrinth seal

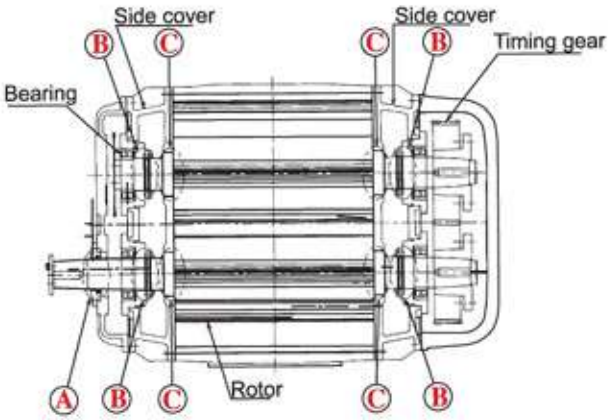
Detail of the standard shaft seal

Seal position A (Oil seal) | Seal position B (Labyrinth seal) | Seal position C (Labyrinth seal)

2. One-mechanical seal type:

Provided with one mechanical seal on the shaft. Suitable for sealing the shaft when gases that should not be leaked into air are handled-N2, H2, Ar, C0, C02 and other non-solvent gases; and also coke oven gas, city gas, digested gas, etc.
This type is available with either of two systems of "Ka" and "Kb" at seal position "A" according to working pressure and the water content of those gas being handled.

	Type "Ka"	Type "Kb"
Seal position **A**	Single mechanical seal	Double mechanical seal
Seal position **B**	Oil seal or Labyrinth seal	Oil seal or Labyrinth seal
Seal position **C**	Labyrinth seal	Labyrinth seal



3. Four-mechanical seal "B" type:

Mechanical seals are provided at four points on the back of the bearing. Used for sealing the shaft when handling solvent gases. This type is available with either single mechanical seals or double mechanical seals according to the constituents of the gas being handled.

	Type "Ba"	Type "Bb"
Seal position **A**	Oil seal	
Seal position **B**	Single mechanical seal	Double mechanical seal
Seal position **C**	Labyrinth seal	Labyrinth seal

4. Four-mechanical seal "I" type:

Mechanical seals are provided at four positions of the rotor shaft. Handled gas is completely separated from the bearing.

	Type "Ia"	Type "Ib"
Seal position **A**	Oil seal	Oil seal
Seal position **B**	Labyrinth seal	Labyrinth seal
Seal position **C**	Single mechanical seal	Double mechanical seal

Application

1. As an air blower:

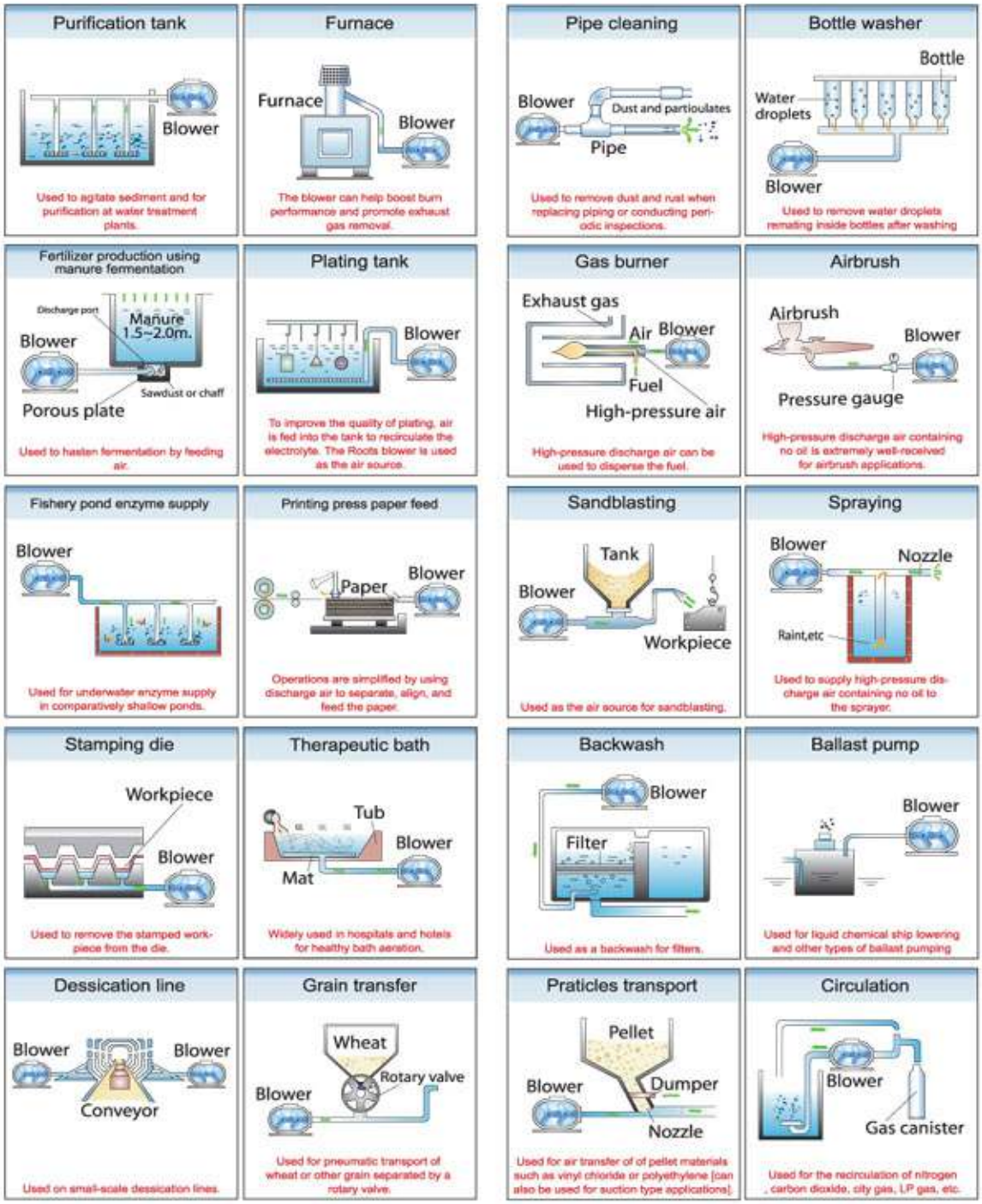
For pneumatic conveyors and the chemical industry for humidifying and aeration to water treatment and blending and aeration of powder or granular foods, cement, or vinyl.

2. As a gas blower:

For pressurized transportation or circulation of gases in chemical processes. Hydrogen, Nitrogen, Acetylene, Oxygen, Kerosene gas, Methane, Sulfurous acid gas, Stack flue gas, City gas, Carbonic acid gas, Hydrogen sulfide gas, and Hydrochloric acid gas.

3. As a vacuum pump:

Filtration equipment in the chemical industry, Pneumatic conveyors, Ship unloading.



Noise Data

Noise emissions from the rotary blower fluctuate depending upon blower size, discharge pressure and number of revolutions. The blower noise level is measured according to JIS B 8346 "Noise Level Measuring Method for Blower and Compressors. Noise is measured at 4~6 spots which are 1m apart from the blower depending on its size. Based on the measurement, a typical noise value is calculated according to the following formula.

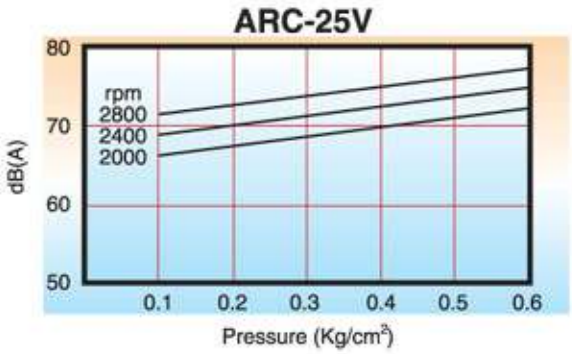
$$\bar{L} = 10\log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots\cdots + 10^{\frac{L_n}{10}}) - 10\log_{10} n$$

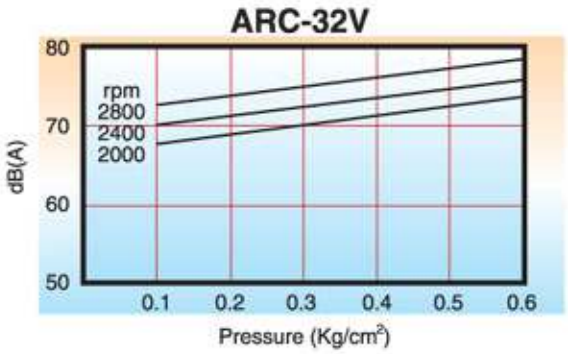
Where $\bar{L}$: typical noise level [dB(A)]

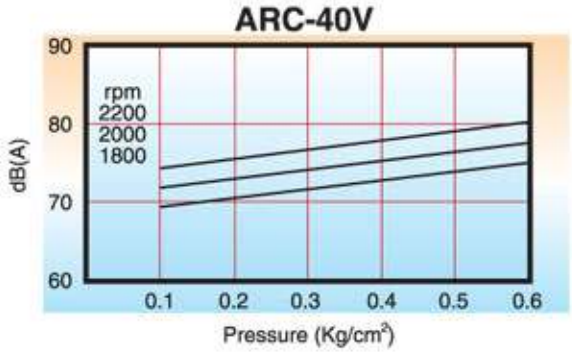
$L_1, L_2 \cdots\cdots L_n$: measured value [dB(A)]

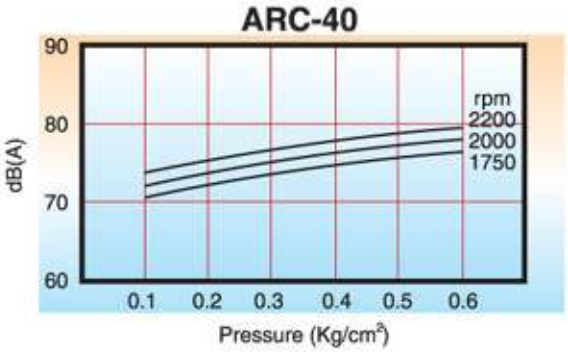
n : number of measured values

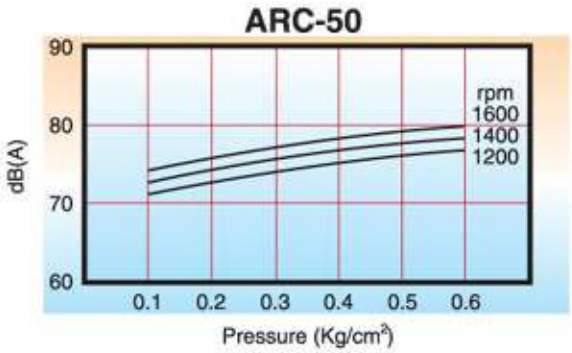
Typical noise values shown below are estimated values that will be obtained when measured values that will be obtained when measured according to the JIS mode above.

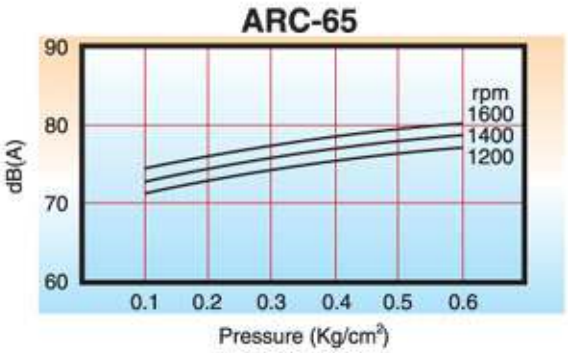






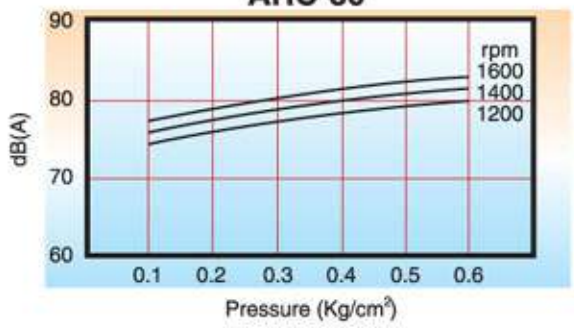




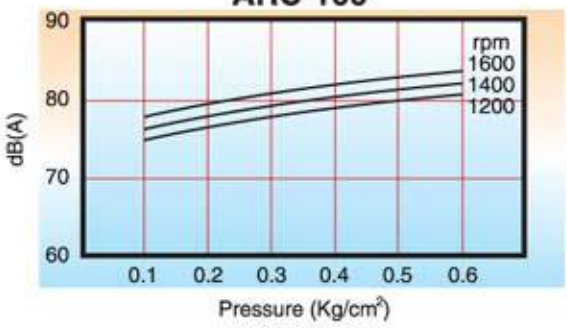


Noise Data

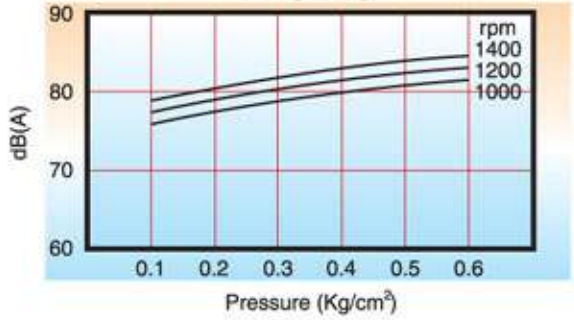
ARC-80



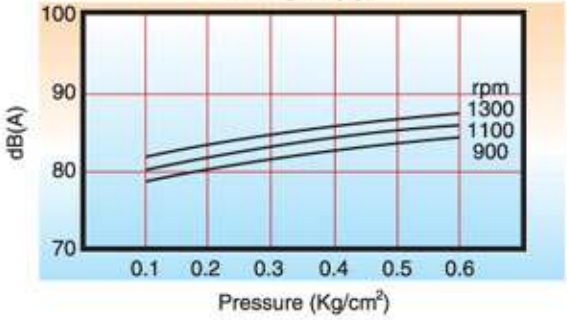
ARC-100



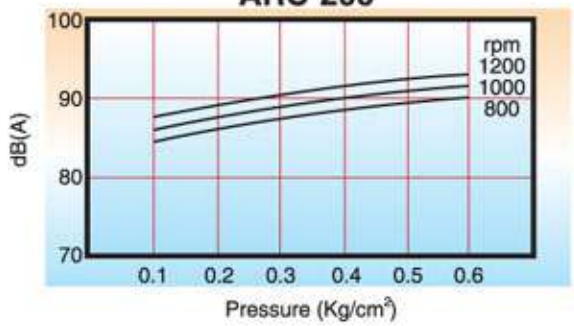
ARC-125



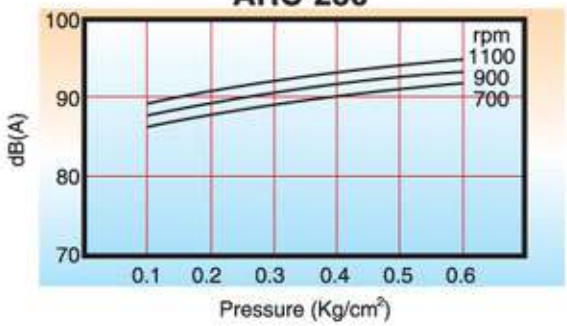
ARC-150



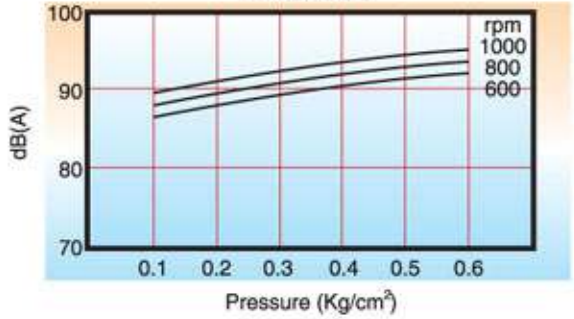
ARC-200

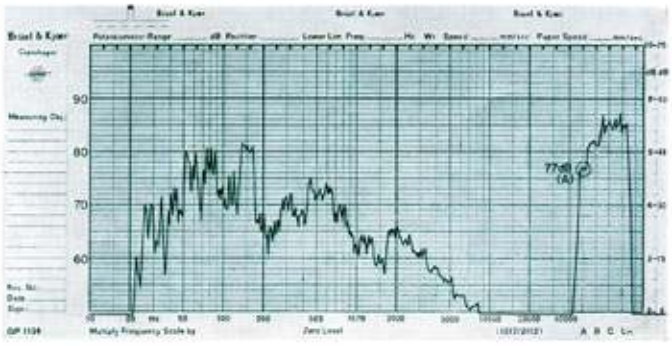


ARC-250



ARC-300





Noise Spectrum

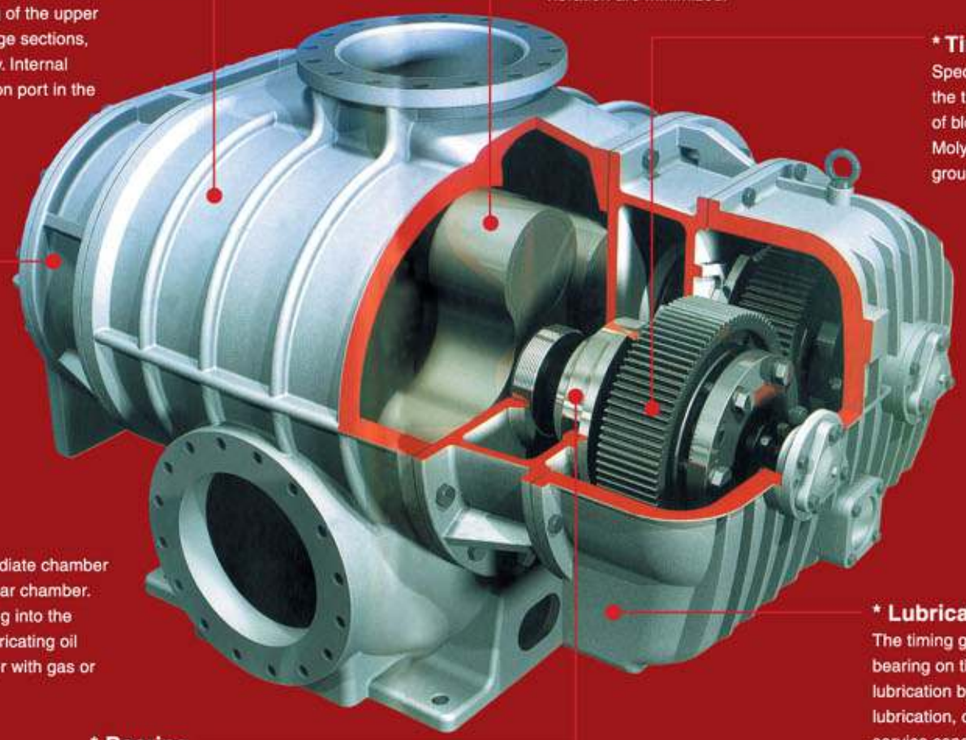
Noise from each size blower Has a spectrum distribution (1/3 octave band), as shown in the illustration at the right.

Construction

*** Rotor**
The three lobe rotor is built of cast iron of good quality subjected to high precision machining. The inside clearances are precision matched and optimum efficiency is guaranteed. In addition, as it is perfectly balanced by means of balancing machine, noise and vibration are minimized.

*** Casing**
Since piece body of cast iron, consisting of the upper suction and the lower horizontal discharge sections, ensures sufficient strength and durability. Internal inspections are facilitated by large suction port in the casing.

*** Timing gear**
Special considerations have been given to the timing gear, since it is as important part of blower as the rotor. Made of Nickel Chrome Molybdenum steel, carburized, quenched and ground, it is excellent in durability.



*** Side cover**
The side cover functions as an intermediate chamber between the casing and the bearing/gear chamber. This prevents lubricating oil from leaking into the casing, while eliminating the fear of lubricating oil deteriorating due to contaminated water with gas or air handled.

*** Lubrication**
The timing gear, the bearing on the gear side and the bearing on the pulley side are subjected to splash lubrication by oil bath. In order to ensure ideal lubrication, oil is used throughout. Depending upon service conditions, a cooling pipe can be attached to each of the oil basins on the pulley and the gear sides, in order to prevent oil temperature from rising, or prevent oil itself from deteriorating.

*** Bearing**
The bearings are high precision ball bearings with a load capacity suited for working conditions. Stable performance and long service life are guaranteed.

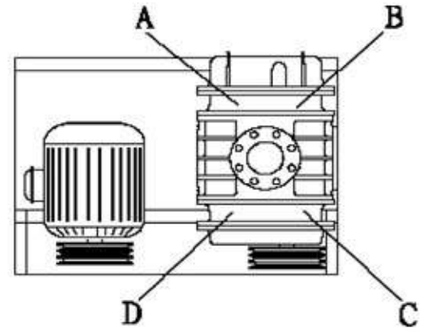
Spare Parts:

Size	Model	Dimensions
Oil Seal	ARC-32V ARC-40 ARC-50, ARC-65 ARC-80, ARC-100 ARC-125, ARC-150 ARC-200, ARC-250 ARC-300	23x33x4 18x30x7 32x58x8 42x65x10 55x78x12 72x95x13 95x120x13
Bearings	ARC-32V ARC-40 ARC-50, ARC-65 ARC-80, ARC-100 ARC-125, ARC-150 ARC-200, ARC-250 ARC-300	6303ZZ 6204Z 6207Z 6309Z 6312Z Pulley side: 22215, Gear side: NU 2215 Pulley side: 22220, Gear side: NU 2220

ARC Series blower
with special sound enclosure

ARC Series blower
with cooling water design

Vibration test report



MODEL	mmAq	A	B	C	D
ARC-32V	3000	1.4	1.6	1.6	1.6
ARC-40	3000	1.3	1.4	1.2	1.6
	4000	1.9	2.1	2.2	2.5
	5000	2.3	2.6	2.7	2.9
ARC-50	3000	2.2	2.3	2.5	2.4
	4000	2.8	2.7	2.9	3.0
	5000	3.4	3.6	3.5	3.5
ARC-65	3000	2.6	2.7	2.9	2.9
	4000	3.4	3.5	3.7	3.5
	5000	4.1	4.3	4.6	4.4
ARC-80	3000	2.9	2.7	3.0	2.9
	4000	3.5	3.5	3.6	3.5
	5000	4.3	4.7	4.6	4.4
ARC-100	3000	3.1	3.0	3.1	2.9
	4000	3.7	3.5	3.6	3.5
	5000	4.6	4.7	4.6	4.4
ARC-125	3000	3.3	3.4	3.1	3.2
	4000	3.7	3.5	3.6	3.8
	5000	4.9	4.7	4.6	4.5
ARC-150	3000	3.8	3.9	4.2	4.1
	4000	4.5	4.5	4.6	4.8
	5000	5.3	5.2	5.6	5.1
ARC-200	3000	4.4	4.3	4.2	4.1
	4000	4.9	4.8	4.9	5.2
	5000	5.3	5.7	5.7	5.8
ARC-250	3000	5.0	4.9	4.9	5.2
	4000	5.4	5.5	5.7	5.8
	5000	6.1	6.3	6.5	6.4
ARC-300	3000	5.3	5.4	5.4	5.2
	4000	5.9	5.7	6.0	5.8
	5000	6.8	6.7	6.9	6.8

Unit : mm/s
Allowance : 7.0 mm/s

Performance table

MODEL	SPEED (rpm)	Capacity Qa (m^3/min) & shaft power L (kW) at each discharge pressure															
		1000mmAq		2000mmAq		3000mmAq		4000mmAq		5000mmAq		6000mmAq		7000mmAq		8000mmAq	
		Qa	L	Qa	L	Qa	L	Qa	L	Qa	L	Qa	L	Qa	L	Qa	L
ARC-32V	2800	3.68	3.21	3.60	3.36	3.04	3.42	3.81	3.93								
	2850	3.96	3.40	3.84	3.60	3.40	3.80	3.88	3.88								
ARC-40	1800	3.46	3.15	3.45	3.29	3.43	3.43	3.41	3.54	3.39	3.66	3.38	3.79				
	1900	3.64	3.17	3.61	3.32	3.49	3.46	3.47	3.59	3.45	3.71	3.44	3.91				
	1950	3.82	3.19	3.67	3.35	3.55	3.50	3.51	3.64	3.51	3.78	3.50	3.98				
	2100	3.96	3.30	3.83	3.37	3.61	3.54	3.58	3.68	3.57	3.82	3.55	3.95				
	2250	4.13	3.31	3.89	3.43	3.67	3.57	3.63	3.73	3.61	3.88	3.62	4.08				
	2400	4.19	3.32	3.76	3.43	3.73	3.61	3.71	3.78	3.69	3.94	3.68	4.08				
	2550	3.84	3.34	3.81	3.45	3.79	3.65	3.77	3.83	3.76	3.99	3.74	4.15				
ARC-50	900	3.99	3.51	3.79	3.60	3.60	3.70	3.80	3.91	3.98	3.84	3.99	3.78	3.99	3.95	3.78	3.74
	1000	4.29	3.46	4.11	3.64	3.96	3.81	3.82	3.77	3.70	3.78	3.63	3.83	3.62	3.90	3.47	3.89
	1150	4.63	3.56	4.44	3.68	4.29	3.77	4.15	3.84	3.94	3.92	3.49	3.93	3.97	3.98	3.88	3.93
	1300	4.86	3.63	4.78	3.72	4.61	3.81	4.45	3.91	4.31	3.97	4.25	3.98	4.18	3.95	4.12	4.19
	1450	5.27	3.76	5.08	3.86	4.89	3.98	4.78	4.07	4.67	4.13	4.56	4.07	4.50	4.16	4.44	4.07
	1600	5.50	3.77	5.45	3.93	5.25	4.19	5.11	4.04	4.99	4.46	4.90	4.06	4.82	4.01	4.76	4.16
	1750	5.90	3.85	5.72	4.04	5.57	4.29	5.45	4.11	5.31	4.78	5.22	4.43	5.14	4.50	5.08	4.66
ARC-63	900	5.07	5.02	4.89	4.21	4.71	4.16	4.59	4.28	4.41	4.75	4.29	4.28	4.19	4.71	4.09	4.15
	1000	5.58	5.73	5.41	4.61	5.22	4.07	5.07	4.68	4.93	5.08	4.81	4.89	4.71	4.87	4.60	4.85
	1150	6.10	6.04	5.83	5.04	5.74	5.08	5.58	5.08	5.45	5.27	5.33	5.01	5.25	5.03	5.13	5.02
	1300	6.62	6.90	6.45	5.65	6.25	5.65	6.14	5.52	5.98	4.25	5.84	4.09	5.74	5.66	5.64	6.20
	1450	6.19	7.66	6.06	6.06	5.77	5.01	5.62	5.66	5.48	6.75	5.35	5.58	5.25	6.34	5.15	7.06
	1600	6.60	7.17	6.48	6.28	6.20	5.32	6.13	6.26	6.02	6.61	5.88	6.13	5.77	6.88	5.67	7.61
	1750	6.17	7.28	5.96	6.40	6.61	5.63	6.53	6.71	6.21	5.73	6.39	6.71	6.29	7.62	6.19	8.66
ARC-80	900	5.60	7.12	5.67	6.14	5.54	5.08	5.23	5.84	5.89	4.73	5.30	5.47	5.49	5.15	5.22	5.74
	1000	6.90	7.32	6.77	6.32	6.44	5.83	5.73	6.62	6.89	5.07	6.60	6.44	6.06	7.24	5.19	7.00
	1150	6.60	7.21	6.67	6.90	6.39	6.16	6.03	6.03	5.75	6.60	5.80	7.60	5.28	8.23	5.08	8.10
	1300	6.70	7.71	5.57	6.27	5.24	4.71	4.63	6.02	4.63	7.24	4.40	8.07	4.19	9.41	3.99	10.59
	1450	6.60	7.81	6.47	6.66	6.14	5.25	5.83	6.73	5.59	8.08	5.30	9.00	5.06	10.00	4.66	11.00
	1600	7.00	8.11	7.37	6.03	7.04	5.79	6.72	7.00	6.48	8.91	6.20	10.00	5.98	11.68	5.78	12.75
	1750	8.40	8.26	8.27	6.41	7.94	6.83	7.83	8.11	7.35	8.75	7.10	11.26	6.88	13.67	6.66	13.86
ARC-100	900	5.80	7.87	5.19	9.00	4.65	4.21	4.18	5.51	5.74	6.60	5.36	7.66	5.00	8.62	5.74	9.31
	1000	7.06	7.84	6.66	9.00	6.91	6.07	6.32	6.09	5.59	7.50	4.62	9.07	4.25	10.14	4.00	11.19
	1150	8.35	8.10	7.71	4.05	7.17	6.83	6.68	7.46	6.26	8.97	5.86	10.26	5.55	11.66	5.30	12.66
	1300	8.56	8.40	8.07	4.56	8.43	6.93	7.94	8.43	7.52	10.14	7.14	11.71	6.81	13.18	6.52	14.64
	1450	10.64	8.67	10.23	5.11	9.89	7.28	9.28	9.61	8.78	11.58	8.40	13.05	8.07	14.75	7.78	16.22
	1600	12.10	8.90	11.68	5.64	10.95	8.11	10.48	10.68	10.04	13.07	9.66	14.62	9.33	16.23	9.04	17.90
	1750	13.30	9.03	12.70	6.11	12.21	8.87	11.73	11.35	11.35	13.94	10.83	15.77	10.58	17.74	10.30	19.07

Performance table

MODEL	SPEED (min^{-1})	Capacity Qs (m^3/min) & shaft power L (kW) at each discharge pressure															
		1000mmAq		2000mmAq		3000mmAq		4000mmAq		5000mmAq		6000mmAq		7000mmAq		8000mmAq	
		Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L
ARC-125	750	10.29	2.59	9.42	4.96	8.62	7.13	7.88	9.12	7.25	10.97	6.66	12.67	6.11	14.26	5.65	15.74
	900	12.69	3.11	11.81	5.95	11.01	8.55	10.28	10.95	9.64	13.16	9.05	15.21	8.51	17.11	8.04	18.89
	1050	15.08	3.63	14.20	6.94	13.41	9.98	12.67	12.77	12.03	15.35	11.44	17.74	10.90	19.97	10.44	22.04
	1200	17.48	4.15	16.60	7.93	15.80	11.40	15.07	14.59	14.43	17.55	13.84	20.28	13.29	22.82	12.83	25.18
	1350	19.87	4.66	18.99	8.92	18.19	12.83	17.46	16.42	16.82	19.74	16.23	22.81	15.69	25.67	15.23	28.33
	1500	22.26	5.18	21.39	9.91	20.59	14.25	19.85	18.24	19.22	21.93	18.63	25.35	18.08	28.52	17.62	31.48
	1650	24.66	5.70	23.78	10.90	22.98	15.68	22.25	20.07	21.61	24.13	21.02	27.88	20.48	31.38	20.01	34.63
ARC-150	750	13.32	3.34	12.62	6.39	11.98	9.19	11.40	11.76	10.87	14.14	10.39	16.34	10.00	18.39	9.61	20.30
	900	16.40	4.01	15.70	7.67	15.06	11.03	14.49	14.11	13.95	16.97	13.48	19.61	13.09	22.07	12.70	24.36
	1050	19.49	4.68	18.79	8.95	18.15	12.86	17.58	16.47	17.04	19.80	16.57	22.88	16.18	25.75	15.78	28.41
	1200	22.58	5.35	21.88	10.23	21.24	14.70	20.66	18.82	20.13	22.62	19.65	26.15	19.26	29.42	18.87	32.47
	1350	25.66	6.02	24.96	11.50	24.33	16.54	23.75	21.17	23.21	25.45	22.74	29.42	22.35	33.10	21.96	36.53
	1500	28.75	6.68	28.05	12.78	27.41	18.38	26.84	23.52	26.30	28.28	25.83	32.63	25.44	36.78	25.05	40.59
	1650	31.84	7.35	31.14	14.06	30.50	20.21	29.92	25.88	29.39	31.11	28.91	35.96	28.52	40.46	28.13	44.65
ARC-200	600	17.01	4.84	15.95	9.27	15.04	13.32	14.21	17.06	13.53	20.51	12.93	23.71	12.40	26.68	11.98	29.45
	750	22.68	6.05	21.62	11.58	20.71	16.65	19.88	21.32	19.20	25.64	18.60	29.64	18.07	33.36	17.65	36.82
	900	28.35	7.27	27.29	13.90	26.38	19.98	25.55	25.59	24.87	30.77	24.27	35.57	23.74	40.03	23.32	44.18
	1050	34.02	8.48	32.96	16.22	32.05	23.32	31.22	29.85	30.54	35.89	29.94	41.49	29.41	46.70	28.99	51.55
	1200	39.69	9.69	38.63	18.53	37.72	26.65	36.89	34.12	36.21	41.02	35.61	47.42	35.08	53.37	34.66	58.91
	1350	45.36	10.90	44.30	20.85	43.39	29.98	42.56	38.38	41.88	46.15	41.28	53.35	40.75	60.04	40.33	66.27
	1500	51.03	12.11	49.97	23.17	49.06	33.31	48.23	42.56	47.55	51.28	46.95	59.28	46.42	66.71	46.00	73.64
ARC-250	600	27.72	7.40	26.22	14.16	24.89	20.35	23.68	26.06	22.58	31.34	21.60	36.23	20.73	40.77	19.98	45.00
	750	36.38	9.25	34.88	17.70	33.55	25.44	32.34	32.58	31.24	39.17	30.26	45.28	29.39	50.96	29.64	56.25
	900	45.05	11.10	43.54	21.24	42.22	30.53	41.00	39.09	39.91	47.01	38.92	54.34	38.06	61.15	37.31	67.50
	1050	53.71	12.95	52.21	24.77	50.88	35.62	49.67	45.61	48.57	54.84	47.59	63.39	46.72	71.34	45.97	78.75
	1200	62.37	14.80	60.87	28.31	59.54	40.71	58.33	52.12	57.23	62.67	56.25	72.45	55.38	81.54	54.63	90.00
	1350	71.03	16.65	69.53	31.85	68.20	45.80	66.99	58.64	65.89	70.51	64.91	81.51	64.04	91.73	63.29	101.30
	1500	79.70	18.50	78.19	35.39	76.87	50.89	75.65	65.16	74.56	78.34	73.57	90.56	72.71	101.90	71.96	112.50
ARC-300	600	70.91	17.15	67.70	32.80	65.03	47.16	62.35	60.38	60.21	72.60	58.20	83.93	56.46	94.46	54.99	104.30
	750	90.98	21.43	87.77	41.00	85.10	58.95	82.42	75.48	80.28	90.75	78.27	104.90	76.53	118.10	75.06	130.30
	900	111.10	25.72	107.80	49.20	105.20	70.74	102.50	90.57	100.40	108.90	98.34	125.90	96.60	141.70	95.13	156.40
	1050	131.10	30.01	127.90	57.40	125.20	82.53	122.60	105.70	120.40	127.10	118.40	146.90	116.70	165.30	115.20	182.50
	1200	151.20	34.29	148.00	65.60	145.30	94.32	142.60	120.80	140.50	145.20	138.50	167.90	136.70	188.90	135.30	208.50
	1350	171.30	38.58	168.10	73.80	165.40	106.10	162.70	135.90	160.60	163.40	158.60	188.80	156.80	212.50	155.30	234.60
	1500	191.30	42.87	188.10	82.00	185.40	117.90	182.80	151.00	180.60	181.50	178.60	209.80	176.90	236.10	175.40	260.70

Note for the performance table

1. Air volume listed in the table (hereafter referred to as listed air volume) represents a suction air volume at the standard suction state (temperature 20 °C, absolute pressure 10332 mmAq (1013m bar), relative humidity 65%).
2. Air volume at standard conditions (0 °C, 10332 mmAq. Abs.) can be converted into listed air volume by the following formula:

$$Qs = QN \times \frac{10332}{10332+Ps} \times \frac{273 + t_s}{273} \quad (1)$$

Air volume at discharge state can be converted into listed air volume by the following formula:

$$Qs = Qd \times \frac{10332 + Pd}{10332} \times \frac{273 + t_s}{273 + t_d} \quad (2)$$

Where:

Qs	:	Listed air volume	(m3/min)
QN	:	Air volume at standard condition	(m3/min)
Qd	:	Air volume at discharge state	(m3/min)
ps	:	Suction pressure	(mmAq G)
pd	:	Discharge pressure	(mmAq G)
ts	:	Suction temperature	(°C)
td	:	Discharge temperature	(°C)

To use the formula (2) for conversion, it is necessary to assume a discharge temperature. Discharge temperature of air right after being discharged can be obtained in approximate value by the following formula.

$t_d \fallingdotseq t_s + pd / 100$ (3)

where, ts represents suction temperature between 0 and 40 °C.

3. Between two adjacent blower models, air volumes at boundary level overlap. Either of the two models can be used, but, from the economical standpoint it is recommended that smaller model is used. Occasionally, however, a larger model is used at low speed in consideration of noise level. Please refer to noise data given in this catalogue, it this is being considered.

4. Shaft horse power listed in the performance table is a required horse power, including the power requirements for transmission (V Belt). Motor with an output corresponding to the listed shaft horse power can be used. However, it will be better to use motors, of which the outputs are 5 - 10% larger than shaft horse powers. The use of an excessively larger motor would result in unnecessary energy waste, as no load current will increase, causing the motor efficiency to drop.

5. The number of revolutions of each type in the performance table is shown by the standard rpm (common to 50 Hz, 60 Hz) that can be obtained by combining a 4-pole motor and a JIS V-pulley. Use this standard rpm unless otherwise required.

6. This three lobe rotary blower can be used as a dry type vacuum pump for a vacuum up to 5,000 mmAq. Please refer to the table in the next page.

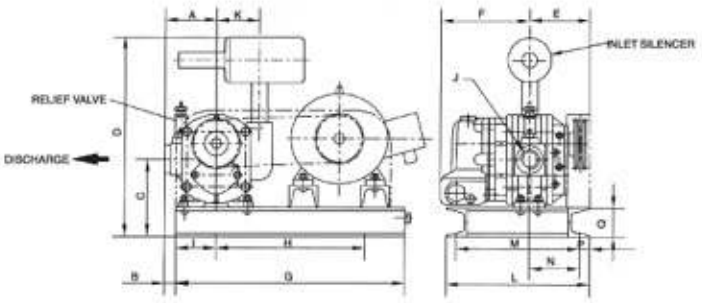
Performance table

MODEL	SPEED (min^{-1})	Capacity Qs (m^3/min) & shaft power L (kW) at each vacuum															
		-1000mmAq		-2000mmAq		-2500mmAq		-3000mmAq		-3500mmAq		-4000mmAq		-4500mmAq		-5000mmAq	
		Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L
ARC-40	1650	0.48	0.15	0.46	0.29	0.44	0.36	0.43	0.42	0.40	0.48	0.38	0.54				
	1800	0.54	0.17	0.52	0.32	0.50	0.39	0.49	0.46	0.46	0.52	0.44	0.59				
	1950	0.60	0.18	0.58	0.35	0.56	0.42	0.55	0.50	0.52	0.57	0.50	0.64				
	2100	0.66	0.20	0.64	0.37	0.62	0.46	0.61	0.54	0.58	0.61	0.56	0.69				
	2250	0.72	0.21	0.70	0.40	0.68	0.49	0.67	0.57	0.64	0.66	0.62	0.73				
	2400	0.78	0.22	0.76	0.43	0.74	0.52	0.73	0.61	0.70	0.70	0.68	0.78				
	2550	0.84	0.24	0.82	0.45	0.80	0.55	0.79	0.65	0.76	0.74	0.74	0.83				
ARC-50	850	0.99	0.41	0.82	0 .80	0.72	0.98	0.61	1.16	0.51	1.34	1.68	1.51	0.27	1.67	0.14	1.84
	1000	1.31	0.48	1.14	0.94	1.04	1.16	0.93	1.37	0.83	1.57	2.00	1.77	0.59	1.97	0.46	2.16
	1150	1.63	0.56	1.47	1. 08	1.36	1.33	1.25	1.57	1.15	1.81	2.32	2.04	0.91	2.27	0.79	2.49
	1300	1.95	0.63	1.79	1.22	1.69	1.50	1.58	1.78	1.48	2.05	2.64	2.31	1.24	2.56	1.11	2.81
	1450	2.27	0.70	2.11	1.36	2.01	1.68	1.90	1.98	1.80	2.28	2.96	2.57	1.56	2.86	1.43	3.13
	1600	2.60	0.77	2.43	1.50	2.33	1.85	2.22	2.19	2.12	2.52	3.29	2.84	1.88	3.15	1.75	3.46
	1750	2.92	0.85	2.75	1.64	2.65	2.02	2.54	2.39	2.44	2.75	3.61	3.11	2.20	3.45	2.07	3.78
ARC-65	850	2.09	0.66	1.91	1.28	1.80	1.58	1.68	1.87	1.55	2.15	1.41	2.42	1.26	2.69	1.09	2.95
	1000	2.60	0.78	2.43	1.51	2.32	1.86	2.19	2.20	2.07	2.53	1.92	2.85	1.77	3.16	1.60	3.47
	1150	3.12	0.89	2.95	1.73	2.84	2.14	2.71	2.53	2.58	2.91	2.44	3.28	2.29	3.64	2.12	3.99
	1300	3.64	1.01	3.46	1.96	3.35	2.41	3.23	2.86	3.10	3.29	2.96	3.71	2.81	4.11	2.64	4.51
	1450	4.15	1.13	3.98	2.19	3.87	2.69	3.74	3.19	3.62	3.67	3.47	4.13	3.32	4.59	3.15	5.03
	1600	4.67	1.24	4.50	2.41	4.39	2.97	4.26	3.52	4.13	4.04	3.99	4.56	3.84	5.06	3.67	5.55
	1750	5.19	1.36	5.01	2.64	4.90	3.25	4.78	3.85	4.65	4.42	4.51	4.99	4.36	5.54	4.19	6.08
ARC-80	850	3.24	1.12	2.83	2.14	2.60	2.62	2.36	3.08	2.10	3.52	1.83	3.94	1.54	4.34	1.23	4.73
	1000	4.14	1.32	3.73	2.52	3.50	3.08	3.26	3.62	3.00	4.14	2.73	4.63	2.44	5.11	2.13	5.57
	1150	5.04	1.51	4.63	2.90	4.40	3.54	4.16	4.16	3.90	4.76	3.63	5.33	3.34	5.88	3.03	6.40
	1300	5.94	1.71	5.53	3.27	5.30	4.01	5.06	4.71	4.80	5.38	4.53	6.02	4.24	6.64	3.93	7.24
	1450	6.84	1.91	6.43	3.65	6.20	4.47	5.96	5.25	5.70	6.00	5.43	6.72	5.14	7.41	4.83	8.08
	1600	7.74	2.11	7.33	4.03	7.01	4.93	6.86	5.79	6.60	6.62	6.33	7.41	6.04	8.18	5.73	8.91
	1750	8.64	2.30	8.23	4.41	8.00	5.39	7.76	6.33	7.50	7.24	7.23	8.11	6.94	8.94	6.63	9.75
ARC-100	850	5.79	1.57	5.19	3.00	4.85	3.67	4.48	4.31	4.09	4.92	3.67	5.51	3.22	6.08	2.74	6.63
	1000	7.05	1.84	6.45	3.53	6.11	4.31	5.74	5.07	5.35	5.79	4.93	6.49	4.48	7.15	4.00	7.80
	1150	8.31	2.12	7.71	4.05	7.37	4.96	7.00	5.83	6.61	6.66	6.19	7.46	5.74	8.23	5.26	8.97
	1300	9.57	2.40	8.97	4.58	8.63	5.61	8.26	6.59	7.87	7.53	7.45	8.43	7.00	9.30	6.52	10.14
	1450	10.83	2.67	10.23	5. 11	9.89	6.25	9.52	7.35	9.13	8.40	8.71	9.41	8.26	10.37	7.78	11.31
	1600	12.09	2.95	11.49	5. 64	11.15	6.90	10.78	8.11	10.39	9.27	9.97	10.38	9.52	11.45	9.04	12.47
	1750	13.35	3.23	12.75	6.1 7	12.41	7.55	12.04	8.87	11.65	10.14	11.23	11.35	10.78	12.52	10.30	13.64

Performance table

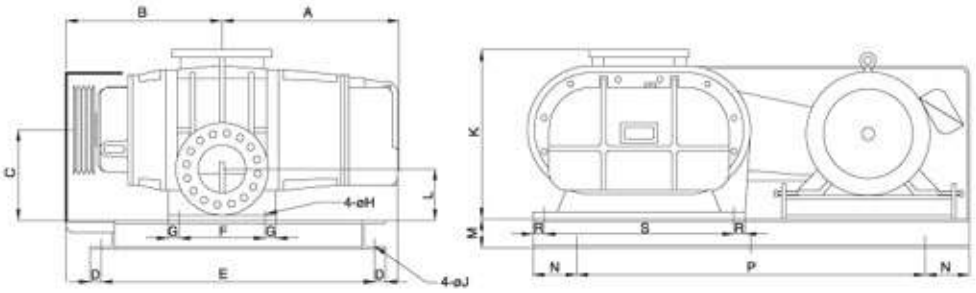
MODEL	SPEED (min^{-1})	Capacity Qs (m^3/min) & shaft power L (kW) at each vacuum															
		-1000mmAq		-2000mmAq		-2500mmAq		-3000mmAq		-3500mmAq		-4000mmAq		-4500mmAq		-5000mmAq	
		Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L	Qs	L
ARC-125	750	10.29	2.59	9.30	4.96	8.78	6.06	8.20	7.13	7.61	8.14	7.01	9.12	6.34	10.06	5.65	10.97
	900	12.69	3.11	11.70	5.95	11.17	7.28	10.60	8.55	10.01	9.77	9.40	10.95	8.73	12.07	8.04	13.16
	1050	15.08	3.63	14.09	6.94	13.57	8.49	12.99	9.98	12.40	11.40	11.79	12.77	11.12	14.09	10.44	15.35
	1200	17.48	4.15	16.49	7.93	15.96	9.70	15.39	11.40	14.79	13.03	14.19	14.59	13.52	16.10	12.83	17.55
	1350	19.87	4.66	18.88	8.92	18.35	10.92	17.78	12.83	17.19	14.66	16.58	16.42	15.91	18.11	15.23	19.74
	1500	22.26	5.18	21.27	9.91	20.75	12.13	20.17	14.25	19.58	16.29	18.98	18.24	18.31	20.12	17.62	21.93
	1650	24.66	5.70	23.67	10.90	23.14	13.34	22.57	15.68	21.98	17.92	21.37	20.07	20.70	22.14	20.01	24.13
ARC-150	750	13.32	3.34	12.55	6.39	12.14	7.82	11.69	9.19	11.20	10.50	10.68	11.76	10.13	12.97	9.55	14.14
	900	16.40	4.01	15.64	7.67	15.23	9.38	14.78	11.03	14.28	12.60	13.77	14.11	13.21	15.57	12.64	16.97
	1050	19.49	4.68	18.73	8.95	18.23	10.95	17.86	12.86	17.37	14.70	16.86	16.47	16.30	18.16	15.72	19.80
	1200	22.58	5.35	21.81	10.23	21.40	12.51	20.95	14.70	20.46	16.80	19.94	18.82	19.39	20.76	18.81	22.62
	1350	25.66	6.02	24.90	11.50	24.49	14.07	24.04	16.54	23.54	18.90	23.03	21.17	22.47	23.35	21.90	25.45
	1500	28.75	6.68	27.99	12.78	27.58	15.64	27.12	18.38	26.63	21.00	26.12	23.52	25.56	25.95	24.98	28.28
	1650	31.84	7.35	31.08	14.06	30.66	17.20	30.21	20.21	29.72	23.10	29.20	25.88	28.65	28.54	28.07	31.11
ARC-200	600	17.01	4.84	15.99	9.27	15.42	11.34	14.86	13.32	14.21	15.23	13.49	17.06	12.78	18.82	11.98	20.51
	750	22.68	6.05	21.66	11.58	21.09	14.17	20.53	16.65	19.88	19.04	19.16	21.32	18.45	23.52	17.65	25.64
	900	28.35	7.27	27.33	13.90	26.76	17.01	26.20	19.98	25.55	22.84	24.83	25.59	24.12	28.23	23.32	30.77
	1050	34.02	8.48	33.00	16.22	32.43	19.84	31.87	23.32	31.22	26.65	30.50	29.85	29.79	32.93	28.99	35.89
	1200	39.69	9.69	38.67	18.53	38.10	22.67	37.54	26.65	36.89	30.46	36.17	34.12	35.46	37.64	34.66	41.02
	1350	45.36	10.90	44.34	20.85	43.77	25.51	43.21	29.98	42.56	34.26	41.84	38.38	41.13	42.34	40.33	46.15
	1500	51.03	12.11	50.01	23.17	49.44	28.34	48.88	33.31	48.23	38.07	47.51	42.65	46.80	47.05	46.00	51.28
ARC-250	600	21.72	7.40	26.22	14.16	25.35	17.32	24.43	20.35	23.45	23.27	22.35	26.06	21.19	28.75	19.98	31.34
	750	36.38	9.25	34.88	17.70	34.01	21.65	33.09	25.44	32.11	29.08	31.01	32.58	39.86	35.94	28.64	39.17
	900	45.05	11.10	43.54	21.24	42.68	25.98	41.75	30.53	40.77	34.90	39.67	39.09	38.52	43.13	37.31	47.01
	1050	53.71	12.95	52.21	24.77	51.34	30.31	50.42	35.62	49.43	40.72	48.34	45.61	47.18	50.31	45.97	54.84
	1200	62.37	14.80	60.87	28.31	60.00	34.64	59.08	40.71	58.10	46.53	57.00	52.12	55.84	57.50	54.63	62.67
	1350	71.03	16.65	69.53	31.85	68.66	38.97	67.74	45.80	66.76	52.35	65.66	58.64	64.51	64.69	63.29	70.51
	1500	79.70	18.50	78.19	35.39	77.33	43.30	76.40	50.89	75.42	58.16	74.32	65.16	73.17	71.88	71.96	78.34
ARC-300	600	70.91	17.15	67.70	32.80	65.96	40.13	63.96	47.16	61.95	53.90	59.81	60.38	57.40	66.61	54.99	72.60
	750	90.98	21.43	87.77	41.00	86.03	50.16	84.03	58.95	82.02	67.38	79.88	75.48	77.47	83.26	75.06	90.75
	900	111.10	25.72	107.80	49.20	106.10	60.20	104.10	70.47	102.10	80.86	99.95	90.57	97.54	99.92	95.13	108.90
	1050	131.10	30.01	127.90	57.40	126.20	70.23	124.20	82.53	122.20	94.33	120.00	105.70	117.60	116.60	115.20	127.10
	1200	151.20	34.29	148.00	65.60	146.20	80.26	144.20	94.32	142.20	107.80	140.10	120.80	137.70	133.20	135.30	145.20
	1350	171.30	39.58	168.10	73.80	166.30	90.29	164.30	106.10	162.30	121.30	160.20	135.90	157.80	149.90	155.30	163.40
	1500	191.30	42.87	181.10	82.00	186.40	100.30	184.40	117.90	182.40	134.80	180.20	151.00	177.80	166.50	175.40	181.50

Outline Dimensions



UNITS : mm

MODEL	A	B	C	D	E	F	G	H	I	J DISCHARGE DIA.	K	L	M	N	P	Q	n x R	Wt.(Kg) incl motor
ARC-25V	90	25	132	370	105	155	500	400	50	PT 1"	75	245	210	87.5	17.5	50	4xM8	35
ARC-32V	90	25	132	370	112.5	162.5	500	400	50	PT1-1/4"	75	245	210	95	17.5	50	4xM8	42
ARC-40V	110	37.5	154	410	150	190	500	400	50	PT1-1/2"	90	315	280	125	17.5	50	4xM10	70



UNITS : mm

MODEL	SUCTION DIA.		DISCHARGE DIA.		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	Wt.(Kg) incl motor	Wt.(Kg) incl max size motor
ARC-40	PT 1" Thread		PT 1.5" Thread		150	160	120	15	350	80	15	15	12	240	45	50	50	400	18	135	70	95
ARC-50	JIS10K Flange	2"	JIS10K Flange	2"	240	270	165	20	370	125	15	15	15	360	90	75	80	610	15	200	100	180
ARC-65		2.5"		2.5"	280	290	165	20	370	200	15	15	15	360	95	75	80	610	15	210	120	260
ARC-80		3"		3"	310	350	220	20	450	190	25	17	15	400	102	75	100	770	25	250	200	340
ARC-100		4"		4"	365	420	220	20	450	290	25	17	15	400	115	75	100	770	25	250	230	410
ARC-125		5"		5"	440	485	310	25	605	320	25	21	19	515	155	100	200	830	25	350	450	800
ARC-150		6"		6"	495	540	310	25	605	425	25	21	19	515	155	100	200	830	25	350	500	930
ARC-200		8"		8"	500	520	360	32.5	730	270	40	23	19	650	187	125	200	1100	40	550	810	1380
ARC-250		10"		10"	620	620	430	32.5	730	460	40	23	19	720	225	125	200	1100	40	550	1100	2200
ARC-300		12"		12"	791	835	500	40	1120	620	80	27	24	866	250	200	200	1600	55	620	2030	4250

Installation Guides

Vacuum pump operation

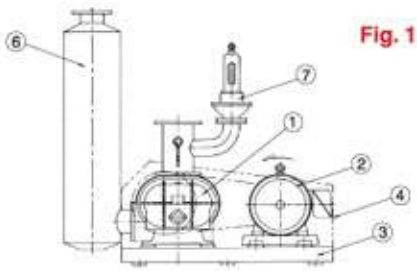


Fig. 1

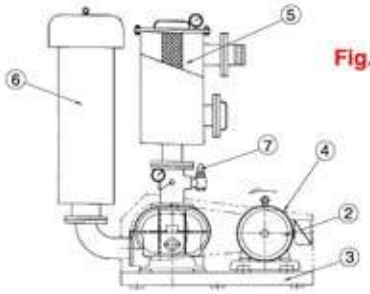


Fig. 2

No.	Part name
1	Vacuum Pump
2	Motor
3	Common Base
4	Belt Guard
5	Suction Filter Tank
6	Discharge Silencer
7	Vacuum Breaker

Blower operation

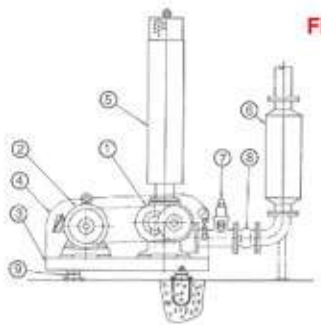


Fig. 3

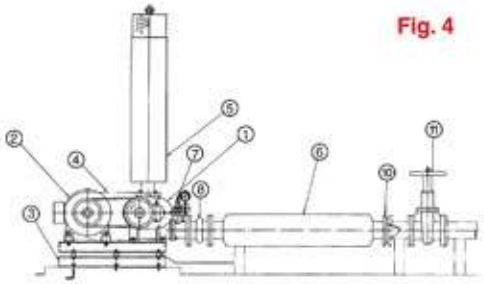


Fig. 4

No.	Part name
1	Rotary Blower
2	Motor
3	Common Base
4	Belt Guard
5	Suction Silencer
6	Discharge Silencer
7	Relief Valve
8	Flexible Joint
9	Vibration Isolator
10	Check Valve
11	Gate Valve

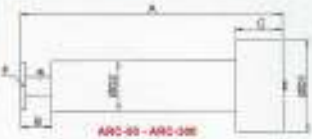
Note : When using a flexible joint, be sure to provide a support under the discharge silencer

Accessories

Suction Silencer

TYPE	F	A	B	ØD1	ØD2	C
US-40	40A JIS 10 K	732	70	220	137	125
US-50	50A JIS 10 K	800	100	305	169	170
US-65	65A JIS 10 K	800	100	305	190	190
US-80	80A JIS 10 K	800	100	322	198	210
US-100	100A JIS 10 K	900	100	355	190	214
US-125	125A JIS 10 K	1045	100	466	330	305
US-150	150A JIS 10 K	1375	100	515	386	328
US-200	200A JIS 10 K	1650	100	627	475	450
US-250	250A JIS 10 K	1750	100	750	668	600
US-300	300A JIS 10 K	1850	200	800	668	600

ARC-40



ARC-50 - ARC-300

Discharge Silencer

TYPE	F	H	L	ØD
UD - 40	40A JIS 10 K	560	93	140
UD - 50	50A JIS 10 K	560	93	159
UD - 65	65A JIS 10 K	650	93	190
UD - 80	80A JIS 10 K	710	96	220
UD - 100	100A JIS 10 K	810	96	250
UD - 125	125A JIS 10 K	900	92	290
UD - 150	150A JIS 10 K	1100	90	330
UD - 200	200A JIS 10 K	1620	100	480
UD - 250	250A JIS 10 K	1750	120	550
UD - 300	300A JIS 10 K	1900	140	650

ARC-40

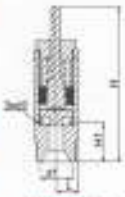
ARC-50 - ARC-300

Safety Valve 1"

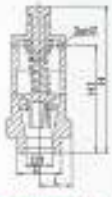
TYPE	H	H1	D1	L	Weight (kg)	Model
R-040	103	20	20	34.35	0.4	ARC-40

Safety Valve 1 ½"

TYPE	H	H1	D1	D	L	Weight (kg)	Model
R-060	123	31	30	42	29	1	ARC-50,300



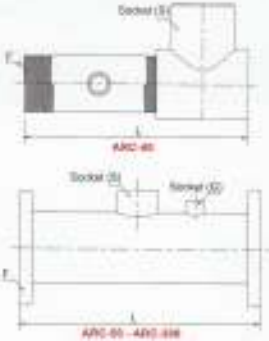
Safety valve 1"



Safety Valve 1 ½"

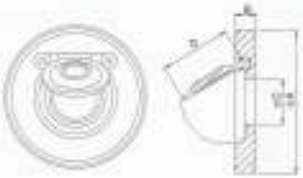
Short Pipe

TYPE	F	S	L	Weight (kg)
USP-50	50A, JIS 10 K	1 1/2"	165 mm	5
USP-65	65A, JIS 10 K	1 1/2"	165 mm	7.1
USP-80	80A, JIS 10 K	1 1/2"	229 mm	7.1
USP-100	100A, JIS 10 K	1 1/2"	305 mm	9.5
USP-125	125A, JIS 10 K	1 1/2"	279 mm	11.5
USP-150	150A, JIS 10 K	1 1/2"	210 mm	19
USP-200	200A, JIS 10 K	1 1/2"	300 mm	26.5
USP-250	250A, JIS 10 K	1 1/2"	300 mm	33
USP-300	300A, JIS 10 K	1 1/2"	350 mm	45



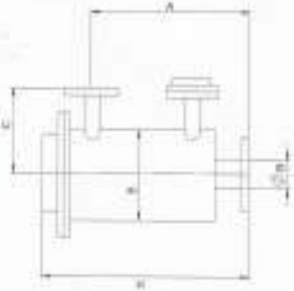
Check Valve

TYPE	A	B	C	D
ARC - 50	131	17	56	43
ARC - 65	134	19	66	56
ARC - 80	134	20	66	70
ARC - 100	159	20	100	89
ARC - 125	189	23	125	110
ARC - 150	216	24	150	140
ARC - 200	276	25	200	180
ARC - 250	330	30	250	240
ARC - 300	375	32	300	290



Filter Tank

MODEL	A	B	C	F	H
S - 50	410	50	160	210	600
S - 65	410	65	160	210	600
S - 80	460	80	210	270	700
S - 100	550	100	210	270	700
S - 125	660	125	240	320	850
S - 150	690	150	240	320	850
S - 200	830	200	360	490	1000
S - 250	940	250	360	550	1000
S - 300	950	300	360	490	1000



Typical Applications
Wastewater Aeration
Mixing
Aquaculture Aeration
General Water Treatment

Membrane

Our membrane is specially designed and manufactured for tropical weather. In normal operation, air temperature is raised 10-15 degree celsius for every meter of submerged depth. For a typical tank of 3.5 meter depth, and ambient temperature of 30 degree celsius, the membrane will be blown by as hot as 70 degree celsius air temperature. This is the reason why membrane not made for tropical weather deteriorates fast.

Unlike other manufactures that use sulfur vulcanizing system, we employ peroxide cured and compression mould process for our UNO membrane. Our process is harder to make but they yield an excellent quality suitable for use under higher temperature conditions.

Advantages

Energy-saving

More than 50% of treatment power was attributed to aeration. By replacing your aeration system from mechanical aerators, you could half your electricity bill. In most cases, the capital investment for replacement is justified by the saving on electricity cost in just one year.

Gentle Mixing

UNO provides a very fine bubble, which promotes sludge floc forming. Good sludge floc make precipitation easy and thus improve effluent quality.

Increase Treatment Capacity

Efficient aeration like UNO system results in shorter retention time in aeration tank. Many plants see the increase in treatment capacity after using our UNO system.

Less Maintenance

Not having any moving parts under water is a blessing every maintenance personnel requested for. The only maintenance required is for some period cleaning during months of operation.

Test Tank Facility

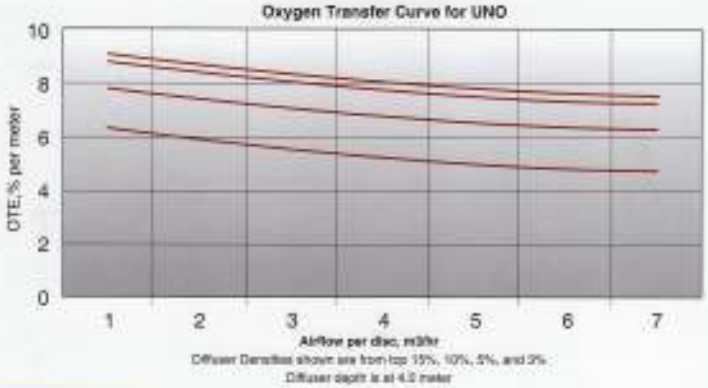
Accessories

Gas Injection Valves

Water Drainage

Plastic Pipe Support

Mobile Cleaning System



Inquiries

When inquiring about Unomach three lobe rotary blowers,
please furnish the following information.

1.Application:	Water aeration, pneumatic conveying, filter, intra-furnace air blowing, etc
2.Specification:	Capacity, suction and discharge conditions (Temperature, pressure)
3.Type of gas:	Name of gas, gas constant, corrosiveness, character and quantity of liquid contained.
4.Conditions for installation:	Whether indoors or outdoors, ambient temperature, condition of dust, etc
5.Drive:	Type, rpm and frequency of motor to be used.
6.Accessories, spare parts:	Required or not
7.Color of paint:	

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