

# ROOTS™ UNIVERSAL RAI-J® WHISPAIR™ ROTARY POSITIVE BLOWERS

Frames 33J thru 56J

## BASIC BLOWER DESCRIPTION

Patented Universal RAI-J® WHISPAIR™ blowers are heavy duty rotary units in a compact, sturdy design, engineered for continuous service when operated within speed and vacuum/pressure ratings.

The basic model features a cast iron casing with a computer-designed cast relief for noise and shock suppression, carburized and ground alloy steel spur timing gears secured to steel shafts with a taper mounting and locknut, and cast iron involute impellers. Oversized anti-friction bearings are used, with a cylindrical roller bearing at the drive shaft to withstand V-belt pull. Detachable rugged steel mounting feet permit easy in-field adaptability to either vertical or horizontal installation requirements.

The Universal RAI-J® incorporates grease lube on the drive end and splash lube on the gear end. ROOTS' exclusive "figure-eight" gearbox design improves oil distribution to maximize bearing and gear life.

## LOWER AIR PULSATION

Patented WHISPAIR™ blowers operate with up to 40% less pressure pulsation than conventional blowers, due to the pressure equalizing effect of the WHISPAIR™ jet design.

In conventional blowers, as the impeller opens up to the outlet port, the higher pressure air in the discharge line rapidly expands into the lower pressure pocket

formed by the impeller and the blower case. The resulting shock wave strikes the advancing surface of the impeller at near-sonic velocity. Four pressure pulses occur during each revolution, transmitting shock loads to the gear and bearings.



## LONGER BEARING LIFE

The pre-pressurization of the low pressure pocket through the WHISPAIR™ jet cavity smooths the pulsations, resulting in less shock being transmitted through the impellers to the bearings, providing longer bearing life.

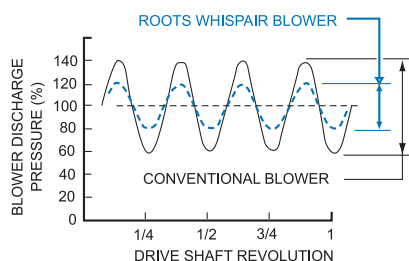
## LOWER VIBRATION

The reduction in the magnitude of the pressure pulsation results in smoother operation.

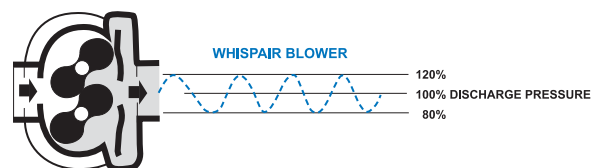
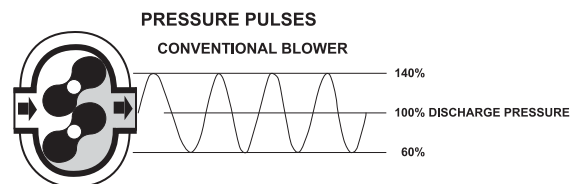
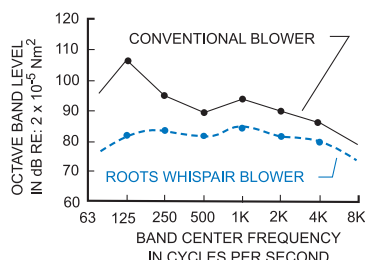
## LOWER NOISE

The pressure pulses, inherent in the rotary-lobe design, are also the major source of blower noise. The rapid backflow of air into the blower from the discharge line, four times per revolution, results in high noise levels in a conventional blower. The WHISPAIR™ jet design controls the backflow of air into the blower, reducing noise by approximately 5 dBA vacuum, 3 dB pressure.

PEAK-TO-PEAK PRESSURE PULSE



TYPICAL BLOWER NOISE CURVE



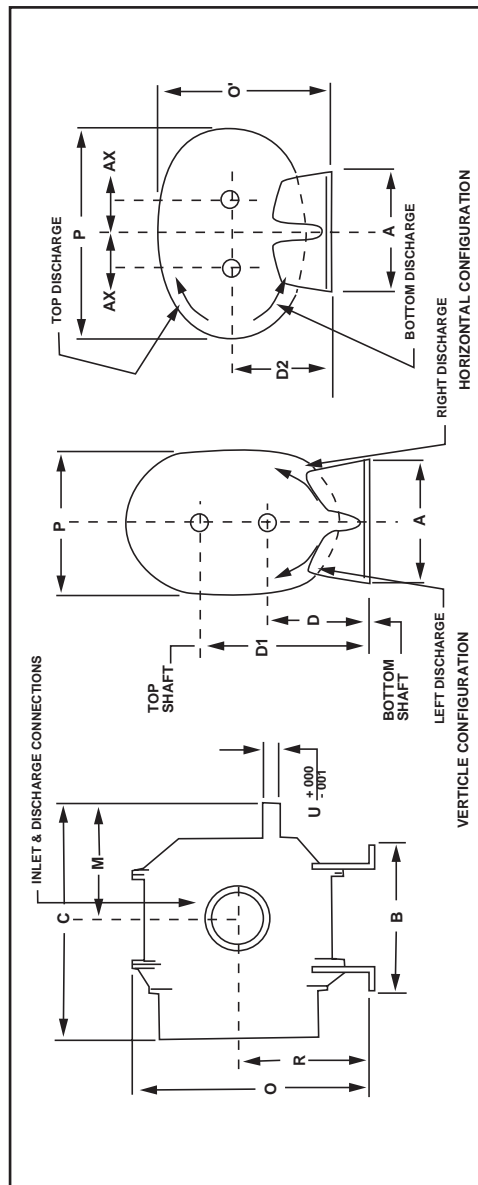
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**PERFORMANCE TABLE: ROOTS Universal URAI-J**

Frame Size	4 PSI		5 PSI		6 PSI		7 PSI		8 PSI		9 PSI		10 PSI		12 PSI		13 PSI		VACUUM DATA	
	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	INHG	CFM
33UJ	1750	1.9	71	2.4	67	2.9	64	3.3	61	3.8	58	4.3	56	4.7	51	5.7	13	53		
	2950	3.3	145	4.1	141	4.9	138	5.7	135	6.5	132	7.3	130	8.1	125	9.7	15	119		
	3550	4.1	182	5.0	178	6.0	175	6.9	172	7.9	169	8.8	167	9.8	162	11.7	15	156		
36UJ	1750	3.2	126	3.9	121	4.7	117	5.5									14	95		
	2950	5.5	249	6.8	244	8.1	239	9.4									15	212		
	3550	6.7	310	8.3	305	9.9	300	11.5									15	273		
45UJ	1750	3.8	155	4.7	150	5.6	145	6.6	140	7.5	136	8.4	132	9.3			14	121		
	2950	6.7	300	8.2	295	9.8	290	11.3	285	12.9	281	14.4	277	16.0			16	253		
	3550	8.2	373	10.1	368	12.0	363	13.9	358	15.7	354	17.6	349	19.5			16	326		
47UJ	1750	5.0	208	6.2	201	7.4	195	8.6									14	165		
	2950	8.8	399	10.8	392	12.9	386	14.9									15	348		
	3550	10.9	495	13.3	488	15.8	482	18.3									15	444		
56UJ	1750	4.6	188	5.7	182	6.9	175	8.0	170	9.1	164	10.2	159	11.4	150	13.6	14	146		
	2950	7.0	316	8.7	310	10.4	304	12.1	298	13.8	292	15.5	287	17.2	278	20.5	15	266		
	3550	12.2	560	15.0	553	17.7	547	20.5	541	23.2	536	26.0	530	28.7	521	34.2	16	501		

NOTES: 1. Performance based on inlet air at standard pressure of 14.7 psia, standard temperature of 68° F, and specific gravity of 1.0.  
2. Vacuum ratings based on inlet air at standard temperature of 68° F, and specific gravity of 1.0.

**OUTLINE DRAWING & DIMENSIONAL TABLE: ROOTS Universal URAI-J**



FRAME	A	A'	B	C	D	D1	D2	M	O	O'	P	P'	R	U	INLET DISCH.	AX	WGT
33UJ	7.25	7.63	12.13	5.00	8.50	5.00	6.25	12.81	10.00	10.00	12.13	12.13	6.75	7.50	2.0NPT	1.75	84
36UJ	7.25	10.00	14.63	5.00	8.50	5.00	7.56	12.81	10.50	11.00	12.13	12.13	6.75	7.50	2.5NPT	1.75	112
45UJ	8.00	10.00	15.50	6.25	10.25	6.25	8.00	15.06	12.25	12.00	13.63	13.63	8.25	8.75	2.5NPT	2.00	119
47UJ	8.00	11.75	17.63	6.25	10.25	6.25	9.25	15.06	12.25	12.00	13.63	13.63	8.25	8.75	3.0NPT	2.00	138
56UJ	10.50	11.00	17.50	6.25	11.25	6.75	9.19	17.38	14.00	14.00	17.25	17.25	8.75	1.125	4.0NPT	2.50	190

**DESIGN AND CONSTRUCTION FEATURES**

1. Detachable steel mounting feet
2. Rigid one-piece cast iron casing
3. Anti-friction bearings
4. Splash oil lubricated spur timing gears
5. Connections in standard pipe sizes
6. Ground steel shafts
7. Straight, precision machined two-lobe impellers



**Roots**

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