DVJ Whispair®
RAM™ Whispair®
Dry Vacuum Pumps

• vacuums to 27" Hg
• capacities to 15,000 cfm
• no sealing water required

ROOTS DRESSER

ISO 9001 CERTIFIED
ROOTS QUALITY SYSTEM

ROOTS

IMPELLING QUALITY

ROOTS DVJ & RAM™

WHISPAIR® DRY VACUUM PUMPS

FRAMES 2504J, 406J & 412J, 616J & 721J, AND 1016J THRU 1838J

BASIC DRY VACUUM PUMP DESCRIPTION

GENERAL

Roots model DVJ Whispair and RAM Whispair dry vacuum pumps are heavy-duty units with an exclusive discharge jet plenum design which allows cool, atmospheric air to flow into the casing. This unique design permits continuous operation at vacuum levels to blank-off with a single stage unit, without water injection.

Standard dry vacuum pumps are limited to approximately 16" Hg vacuum because operation at higher vacuum levels can cause extreme discharge temperatures resulting in casing and impeller distortion. The Roots Whispair vacuum pump's cooling design eliminates the problems caused by high temperatures at vacuum levels beyond 16" Hg.

Whispair vacuum pumps reduce noise and power loss by utilizing an exclusive wrap-around plenum and proprietary Whispair jet to control pressure equalization – feeding backflow in the direction of impeller movement, aiding rotation.

Roots Whispair vacuum pumps can be arranged to operate in two and three stage systems to achieve vacuum levels down to 1 torr.

FRAME 2504J DVJ

The headplates, gear housing and rigid, one-piece casing are grey iron. Carburized and ground alloy steel spur timing gears are taper mounted on the shafts, secured with a locknut. These units are designed with integral-shaft ductile iron impellers. Ball bearings are used, with splash lubrication at the gear end and grease lubrication at the drive end. Lip-type seals restrict oil leakage into the air stream.

Detachable rugged steel mounting feet permit in-field adaptability to either vertical or horizontal installation requirements.

FRAMES 406J AND 412J RAM

RAM series units are designed using integral-shaft ductile iron impellers with an involute profile. The casing and headplates are grey iron, while the drive end cover and gear cover are die cast aluminum. Carburized and ground alloy steel spur timing gears are taper mounted on the shafts, secured with a locknut. Cylindrical roller bearings are splash lubricated at both the gear end and drive end.

Piston rings reduce air leakage through the headplate bores and lip-type oil seals prevent lubricants from entering the air chamber. A hydrodynamic seal on the drive shaft prevents shaft seal oil leaks. Units can be equipped with mechanical seals for gas applications.

RAM units are designed with rugged steel mounting feet which permit in-field adaptability to either vertical or horizontal installation requirements.

FRAMES 616J AND 721J DVJ

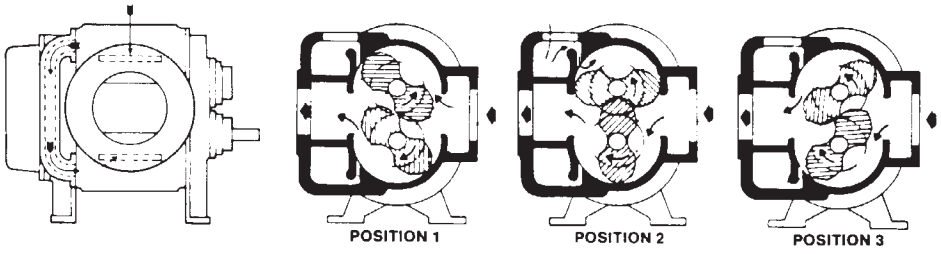
The headplates, gear cover, drive end cover and rigid, one-piece casing are grey iron. Carburized and ground alloy steel spur timing gears are taper mounted on the shafts, secured with a locknut. These units are designed with integral-shaft ductile iron impellers. Cylindrical roller bearings are used, with splash lubrication at both the gear end and the drive end. Lip-type seals restrict oil leakage into the air stream. Frame size 616J units can also be equipped with mechanical seals for gas applications.

Frame size 721J is designed with detachable rugged steel mounting feet which permit in-field adaptability to either vertical or horizontal installation requirements.

FRAMES 1016J THRU 1838J DVJ

The largest DVJ Whispair vacuum pumps are designed with forged steel stub shafts bolted to ductile iron impellers. The casing, headplates, gear cover and drive end covers are grey iron. Carburized and ground alloy steel spur timing gears are mounted on the shafts of 1000 frame size units by a taper fit, while larger sizes use a double taper ring locking assembly. Double-row spherical roller bearings are splash lubricated at both the gear end and drive end. Lip-type seals are used to restrict oil leakage into the air stream. These frame sizes can also be equipped with mechanical seals for gas applications.

OPERATING PRINCIPLE



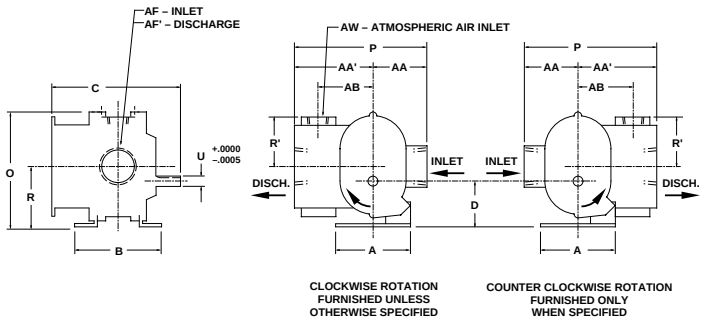
Shaded blue areas indicate air pressure variations from intake to atmospheric discharge.

Position 1:
Incoming air (right) is trapped between the impellers and the case, producing a vacuum in the application system. Simultaneously, air is discharged (left) from the vacuum pump.

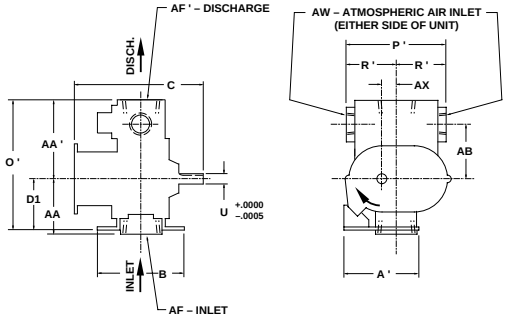
Position 2:
As the upper impeller passes the jet plenum, atmospheric air flows into the space between the impeller and the case. This cools the trapped air, aids impeller movement, and reduces discharge shock and power loss.

Position 3:
The trapped air is then moved to the discharge flange (left). Backflow is reduced resulting in lower discharge noise relative to conventional rotary vacuum pumps.

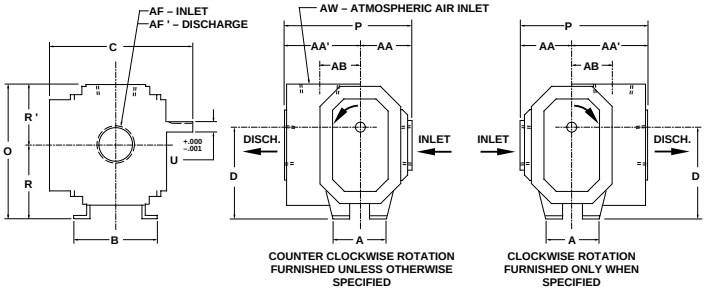
OUTLINE DRAWING & DIMENSIONAL TABLE



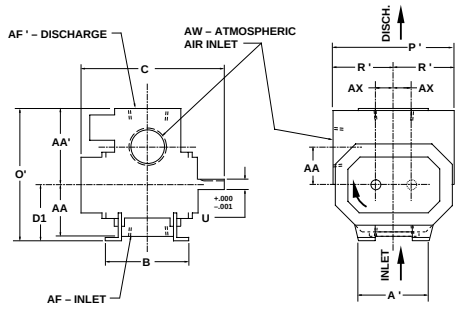
FRAME 2504J
VERTICAL CONFIGURATION



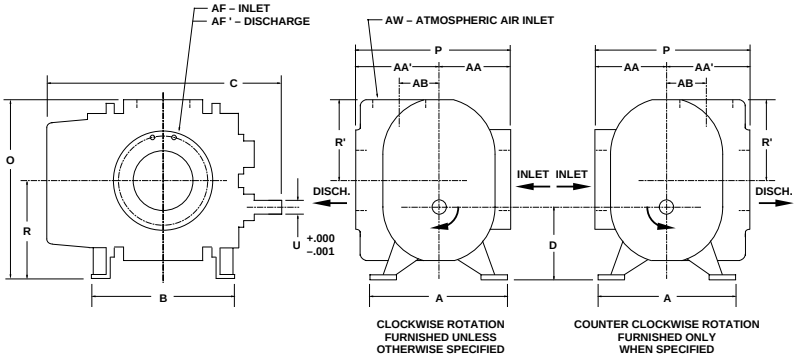
FRAME 2504J
HORIZONTAL CONFIGURATION



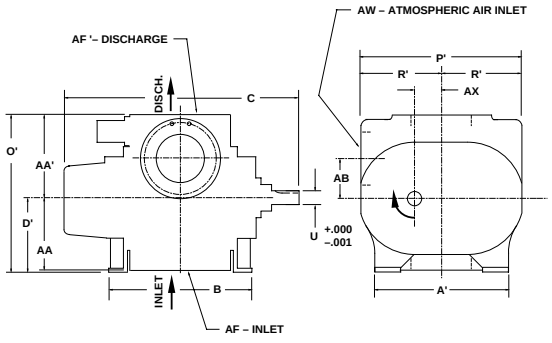
FRAMES 406J, 412J, 616J AND 721J
VERTICAL CONFIGURATION



FRAMES 406J, 412J, 616J AND 721J
HORIZONTAL CONFIGURATION



FRAMES 1016J, 1021J, 1220J, 1428J,
1431J, 1833J AND 1838J
VERTICAL CONFIGURATION



FRAMES 1016J, 1021J AND 1220J
HORIZONTAL CONFIGURATION

NOTES:
1. All dimensions are in inches.
2. Do not use for construction.

Frame Size	A	A '	B	C	Drive shaft location D	Drive shaft location D1	O	O '	P	P '	R	R '	U	Keyway	AA	AA '	AB	AF Inlet Diameter	AF ' Discharge Diameter	AW	AX	Approx. Net Wt. (Lbs.)
2504J	6.50	6.50	7.50	11.38	4.000	4.000	9.88	11.63	12.38	8.75	5.25	4.38	.7500	.188 X .094	4.75	7.63	4.75	2.5 NPT	2.5 NPT	2 NPT	1.25	65
406J	7.00	11.50	10.00	20.50	11.250	6.750	16.63	17.25	17.75	15.25	9.00	7.38	1.500	.375 X .188	7.25	10.50	6.75	4 NPT	5 NPT	4 NPT	2.25	365
412J	7.00	11.50	16.00	26.50	11.250	6.750	16.63	18.50	17.75	15.25	9.00	7.63	1.500	.375 X .188	6.00	11.75	6.50	6 FLG	6 FLG	5 FLG	2.25	575
616J	10.00	16.00	21.44	32.50	15.000	9.000	21.63	22.75	21.25	19.25	12.00	9.63	2.000	.500 X .250	7.50	13.75	6.75	8 FLG	10 FLG	8 FLG	3.00	975
721J	19.00	26.00	27.00	39.38	17.000	10.000	24.88	25.25	24.25	22.75	13.50	11.38	2.375	.625 X .313	9.00	15.25	5.50	12 FLG	12 FLG	12 FLG	3.50	1750
1016J	27.00	27.00	23.25	41.00	14.500	14.500	34.88	31.88	31.63	30.75	19.50	15.38	2.250	.500 X .250	14.25	17.38	8.50	12 FLG	12 FLG	10 FLG	5.00	2400
1021J	27.00	27.00	27.75	45.50	14.500	14.500	38.00	28.75	28.50	36.00	19.50	18.00	2.250	.500 X .250	14.25	14.25	7.50	14 FLG	14 FLG	12 FLG	5.00	2750
1220J	30.50	30.50	27.50	48.06	16.625	16.625	40.63	35.88	35.75	36.00	22.63	18.00	2.625	.625 X .313	16.50	19.25	8.50	16 FLG	14 FLG	12 FLG	6.00	3650
1428J	34.00	34.00	36.25	58.63	18.750	18.750	47.56		46.75		25.75		3.000	.750 X .375	19.25	27.50	14.75	20 FLG	18 FLG	16 FLG		6000
1431J	34.00	34.00	39.75	62.13	18.750	18.750	47.56		46.75		25.75		3.000	.750 X .375	19.25	27.50	14.75	20 FLG	18 FLG	16 FLG		6200
1833J	41.00	41.00	43.50	69.81	23.250	23.250	59.25		56.75		32.25		4.188	1.00 X .500	24.75	32.00	15.00	24 FLG	24 FLG	20 FLG		10500
1838J	41.00	41.00	48.00	74.31	23.250	23.250	59.25		56.75		32.25		4.188	1.00 X .500	24.75	32.00	15.00	24 FLG	24 FLG	20 FLG		10800

DVJ PERFORMANCE TABLE

* Denotes blank-off

FRAME SIZE	SPEED RPM	MAXIMUM FREE AIR CFM	12" Hg VAC. CFM	12" Hg VAC. BHP	16" Hg VAC. CFM	16" Hg VAC. BHP	20" Hg VAC. CFM	20" Hg VAC. BHP	24" Hg VAC. CFM	24" Hg VAC. BHP	27" Hg VAC. CFM	27" Hg VAC. BHP
	2400		47	2.1	37	2.8	22	3.5				
2504J	2990		67	2.6	57	3.5	42	4.4				
	3985		101	3.6	90	4.7	75	5.9				
	4970	170	135	4.6	124	6.0	109	7.4				
	2320		288	10.3	258	13.5	216	16.7	135	20.0	*	23.0
406J	2695		350	12.2	320	15.8	278	19.5	198	23.2	*	27.0
	3564		496	16.9	465	21.4	423	26.2	343	30.9	143	34.5
	4000	668	569	19.5	538	24.4	496	29.6	416	34.8	216	38.8
	2320		576	20.2	516	26.6	432	33.1	270	39.6	*	45.0
412J	2695		700	23.7	640	31.1	556	38.6	396	46.1	*	52.0
	3564		992	32.2	930	41.7	846	51.4	686	61.2	286	68.5
	4000	1332	1138	36.7	1076	47.1	992	58.0	832	68.9	432	77.0
	1750		1015	36	901	47	748	59	448	71	*	80
616J	2124		1310	44	1196	58	1043	72	743	86	*	97
	2437		1556	51	1443	67	1290	83	990	99	244	111
	3000	2367	2001	63	1887	83	1734	102	1434	122	688	137
	1180		1137	43	975	57	752	71	323	85	*	97
721J	1770		1967	67	1804	87	1585	108	1153	128	83	144
	2200		2572	85	2409	110	2190	135	1758	160	688	179
	2600	3658	3135	104	2972	131	2750	161	2321	190	1250	212
	980		1712	58	1557	77	1345	95	933	114	*	128
1016J	1170		2142	70	1985	92	1774	114	1363	137	337	153
	1750		3453	108	3296	141	3083	174	2674	206	1648	231
	1800	4068	3566	112	3410	144	3198	177	2787	211	1761	235
	980		2182	74	1984	98	1714	121	1189	145	*	163
1021J	1170		2730	89	2530	117	2261	145	1737	175	429	195
	1750		4400	138	4200	180	3931	222	3408	263	2100	294
	1800	5184	4544	143	4346	183	4075	225	3552	268	2244	300
	880		2826	91	2627	120	2356	149	1831	178	523	201
1220J	980		3220	102	3022	134	2751	167	2226	199	917	224
	1170		3969	123	3770	161	3500	199	2974	237	1664	266
	1500	5910	5269	161	5070	208	4800	257	4274	305	2964	342
	880		5542	175	5207	230	4748	285				
1428J	980		6295	196	5960	257	5501	319	Maximum vacuum limited to 22.5" Hg			
	1170		7726	237	7390	310	6932	382				
	1300	9789	8705	267	8369	347	7911	427				
	880		6234	196	5857	258	5341	321				
1431J	980		7081	220	6704	289	6188	358	Maximum vacuum limited to 22" Hg			
	1170		8690	266	8313	348	7797	429				
	1300	11011	9791	299	9414	389	8898	479				
	705		8947	278	8472	365	7823	453	6564	540		
1833J	880		11549	354	11074	461	10425	569	9167	676	Maximum vacuum limited to 24" Hg	
	980		13036	399	12561	518	11912	636	10654	755		
	1000	14870	13334	409	12859	529	12209	650	10951	770		
	705		10151	314	9612	414	8875	513				
1838J	880		13103	399	12564	522	11827	644	Maximum vacuum limited to 21.5" Hg			
	980		14790	450	14251	585	13514	720				
	1000	16870	15127	460	14588	598	13851	736				

Notes: 1. Vacuum ratings based on inlet and jet air at standard temperature of 68°F, discharge and jet pressure of 30" Hg and specific gravity of 1.0.
2. Refer to Factory for performance guarantee above 24" HgV.

DESIGN & CONSTRUCTION FEATURES

1. Rigid cast iron cylinder and headplates
2. Inlet and discharge connections in standard pipe sizes
3. Splash lubricated spur timing gears
4. Involute profile ductile iron impellers
5. Anti-friction ball bearings on 2504J frame size
   cylindrical roller bearings on 406J, 412J, 616J, 721J frame sizes
   spherical roller bearings on 1016J and larger frame sizes

ROOTS DRESSER

DRESSER INDUSTRIES, INC.
ROOTS DIVISION
900 WEST MOUNT STREET
TELEPHONE: 765/827-9200

http://www.rootsblower.com/
CONNERSVILLE, INDIANA 47331
FAX: 765/825-7669

The original ROOTS blower ™

B-58C94 Revised July, 1997 (Was B-5584)