



**Roots**

## 225 RAM X

Part Number – call 816-741-0282



RAM X Tri-lobe rotary positive displacement blowers feature ROOTS WHISPAIR™ discharge design which, when combined with tri-lobe impellers, delivers quieter operation than conventional tri-lobe blowers.

- Heavy-duty unit with integral-shaft ductile iron impellers with an involute profile
- Rigid one-piece casing and headplates are grey iron
- Drive end cover and end cover are aluminum
- Carburized and ground alloy steel spur timing gears
- Cylindrical roller bearings
- Piston rings reduce air leakage
- Hydrodynamic oil seals prevents oil from entering the air chamber
- Splash oil lubricated gears on drive and gear ends
- Detachable steel mounting feet
- Horizontal and vertical configurations available



816-741-0282

### Quick Specs

Flow Range	to 1227 CFM
Max ΔPressure	15 PSI
Max ΔVacuum	16" Hg
Maximum RPM	4750
Minimum RPM	850
Max ΔT	240°F
Option 1 - Rectangular Connection	8" x 13"
Option 2 - Flange Connection	6" Flange
Shaft Dia.	35mm/1.378"
Min Sheave Dia.	7.1"
Drive End Lubrication	Oil
Gear End Lubrication	Oil
Oil Sump Horiz Config	~55 oz
Oil Sump Vert Config	~27 oz
Bare Unit Weight	360 lbs (1)
Bare Unit Weight w/Adapters & Feet	428 lbs (2)
Shipping Weight on Skid	~400 lbs (1)
Shipping Weight on Skid	~468 lbs (2)
Recommended to Ship Via	Truck
Container	Wood Skid
Skid Size (L x W x H)	32" x 29" x 26"





816-741-0282

RAM X™ Blowers Parts List - Models 155 through 500

Item Number	Part Name	Quantity
1	Headplate	2
3	Gearbox	1
4	Timing Gears	2
5	End Cover	1
7	Gasket – Gearbox/Cover	2
10	Shims	Lot
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing Roller	4
16	Pin, Dowel (Pull Out)	4
17	Pin, Dowel	2
19	Key Square	1
21	Breather	2
22	Plug, Pipe	12
23	Screw, Cap Hex Hd.	*
27/27A	Seal, Hydrodynamic	4
28	Piston, Ring-Seal	4
29	Washer, Wavy Spring	2
31	Gear Nut	2
32	Scr, Cap Hex Hd.	16
33	Seal, Hydrodynamic	1
34	Brg. Clamp Plate - D. E.	2
35	Lock Washer - Spring	16
37	Sight Plug - Oil Level	2
38	Sleeve, Shaft	4
40	Slinger - D.E. (Top Drive)	1
46	Slinger - G.E.	1
49	Oil Leader L/S	1
50	Oil, Leader-R/S	1
54	Brg Clamp Plate - G. E.	2
60	Screw, Cap Butt. HD.	1
64	Pin, Spring	1
66	Screw, Cap Hex HD.	*
66A/66B	Whispair, Spring Lock 3/8M	*
70	Shims D.E. Brg.	1
75	Screw, Cap - Hex HD.	*
76	Blower Foot - RH (optional)	2
77	Blower Foot - LH (optional)	2
85	Elb, Pipe-Black	2
85.1	Plug, Pipe	2
87	Scr, Cap BH	2
88	Anti Rotation Ball	4
90	BSHG-RDCG	2
91	Washer, Plain Flat	2
92	Washer, Plain Flat	2
93	Washer	2
94	Oil Leader	2
95	Cap Screw	4
210	Inlet/Discharge Gasket	2

\*Quantity varies by blower.

F YdUJf ' ? ]hg'

Repair kits are bundled with the parts you need to complete a standard repair. It is more cost effective to buy a repair kit than to purchase individual parts. However, if you need parts not listed in the kit, it is recommended that you call Pathfinder Systems for parts pricing.

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#Ya'	E hm	? ]h8 YgW]d]cb'	D#B'
*	2	Sleeve Seal Install Tool Inboard	13728001
*	1	Sleeve Seal Install Tool Outboard	13365026
		ASSY Slinger 400/600	TK10002
7	2	Gasket 400 RCS Gearbox/Cover	52381021
7	2	Gasket 400 RAM Gearbox/Cover	78365021
10	1	Shim Set 400 RAM/Roots-Flo	52378020
14	4	Bearing, Roller	T30054020
21	2	Breather, Mini MB Style 1	T20013004
27	2	Hydrodynamic Seal, (PTFE) CW	13309027
27A	2	Hydrodynamic Seal, (PTFE) CCW	13309028
28	4	Piston, Ring Seal	12283001
29	2	Washer, Spring, Wavy	10135018
31	2	Nut, Hex ESNA 1-1/4"-12	10319019
33	1	Seal, Lip, Drive	10460034
37	2	Sight, Plug Oil Level, 1/2"	12066003
38	4	Sleeve, Piston Ring	52418020
40	1	DRIVE END SLINGER	54710020
46	1	GEAR END OIL SLINGER	T20029001
60/87	3	CAP SCREW 1/2-13x1	12800001
70	1	Shim (0.035) 400 RAM	10619141
88	4	Anti Rotation Ball	T20001001
91	2	BUSH ING STL	T20031001
93	1	GEAR END WASHER	90185020

\*A special tool is required to install the uni-directional seal.



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**Table 2 - Recommended Oil Grades**

Ambient* Temperature °F (°C)	ISO Viscosity No.
Above 90° (32°)	320
32° to 90° (0° to 32°)	220
0° to 32° (-18° to 0°)	150
Below 0° (-18°)	100

\*Ambient temperature is defined as the temperature of the space in which the blower and drive are located.

Use a good grade of **industrial type** non-detergent, rust inhibiting, anti-foaming oil and of correct viscosity per Table 2. Roots synthetic oil (Roots P/N 813-106-) is **specified and recommended**. Roots does not recommend automotive type lubricants, as they are not formulated with the properties mentioned above.

**Due to sludge build-up and seal leakage problems, Roots recommendation is DO NOT USE Mobil SHC synthetic oils in ROOTS blowers.**

**Table 3 - RAM X™ Approximate Oil Sump Capacities**

Model Number/ Drive Shaft Location	Gearbox		Drive End	
	Fluid Ounces	Liters	Fluid Ounces	Liters
155,225,280 (left or right)	36	1.06	19	0.56
155, 225, 280 (top or bottom)	18	0.52	9	0.27
400, 500 (left or right)	95	2.81	50	1.48
400, 500 (top or bottom)	55	1.63	28	0.83
600, 770 (left or right)	155	4.59	70	2.07
600, 770 (top or bottom)	80	2.37	40	1.18
800, 1000 (left or right)	256	7.6	120	3.5
800, 1000 (top or bottom)	144	4.3	80	2.37

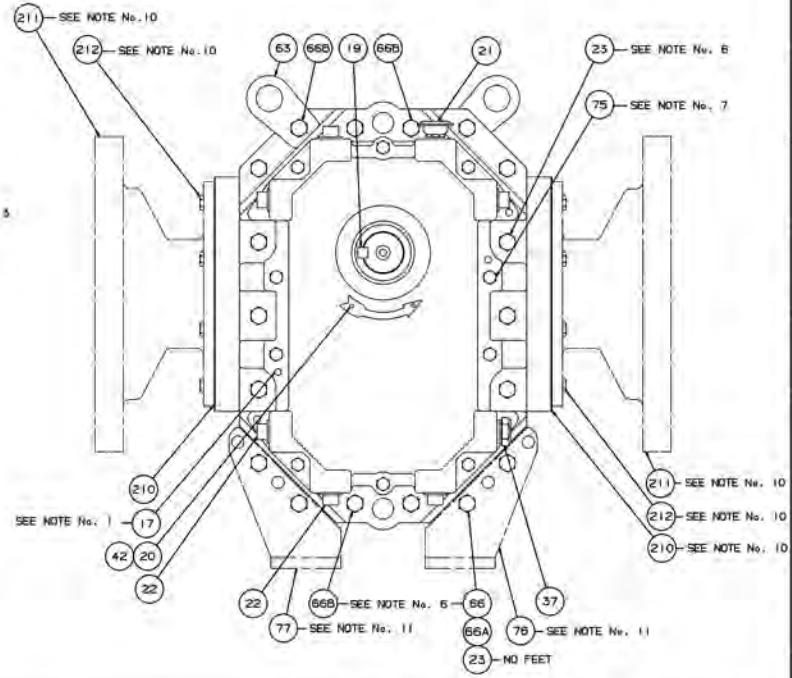
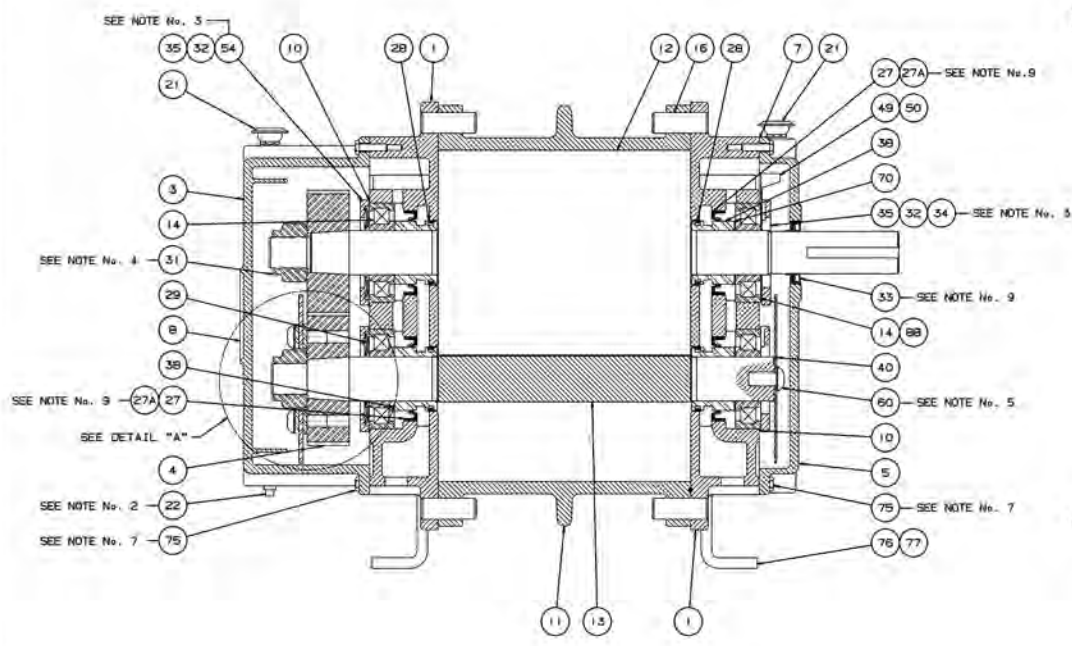
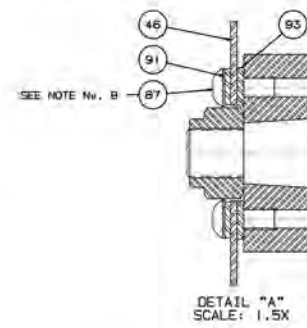
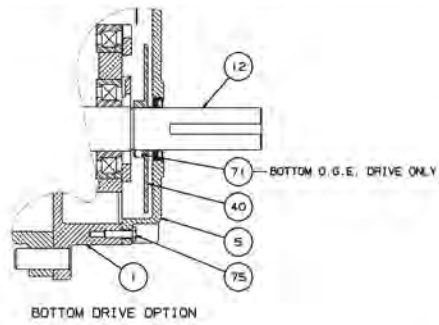
These capacities are provided to assist stocking the correct amount of oil. Exact sump capacity may differ slightly. See "Lubrication" section for proper filling instructions.

ROOTS® Synthetic Oil: ISO-VG-320 Grade	
	Part Number
Quart	13106004
Gallon	13106005
Case (12 qts)	13106007
ROOTS® Synthetic Oil: ISO-VG-220 Grade	
	Part Number
Quart	13106001
Gallon	13106002
Case (12 qts)	13106008
ROOTS® Synthetic Oil: ISO-VG-150 Grade	
	Part Number
Quart	13106020
Gallon	13106021
Case (12 qts)	13106023
5 Gallon Pail	13106022
55 Gallon Drum	13106025
ROOTS® Synthetic Oil: ISO-VG-100 Grade	
	Part Number
Quart	13106011
Gallon	13106012
Case (12 qts)	13106014
5 Gallon Pail	13106013
55 Gallon Drum	13106016

REV.	PART NAME	REV. NO.	DATE

**NOTES:**

1. DRIVE END COVER TO BE PINNED TO HEADPLATE AFTER ALIGNING SEAL BORE WITH SHAFT WITHIN .001 (.025 MM)
2. USE TEFLON SEALANT ON ALL PIPE THREADS.
3. ITEMS 34 & 54 MUST BE INSTALLED WITH OIL GROOVE AT TOP
4. TORQUE TO 400 FT.-LBS. (55 KG.M)
5. TORQUE TO 75 FT.-LBS. (10 KG.M) APPLY LOCTITE TO SCREW THREADS & BOTH FACES OF WASHER & SLINGER.
6. TORQUE TO 35 FT.-LBS. (4.8 KG.M) (HEADPLATE)
7. TORQUE TO 10 FT.-LBS. (1.3 KG.M) (GEARBOX / END COVER)
8. LOCKTITE AND TORQUE TO 75 FT.-LBS. (10.2 KG.M)
9. INSTALL PER ROTATION
10. OPTIONAL INLET / DISCHARGE ADAPTERS.
11. OPTIONAL FEET



REV.	REV.	DATE	BY	CHKD.	APP.	DATE	BY	CHKD.	APP.

**CONFIDENTIAL**

THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION OF ROOTS DIVISION, DRESSER INDUSTRIES, INC. IT SHALL BE HELD IN STRICTEST CONFIDENCE, AND BE USED ONLY IN CONNECTION WITH ROOTS DIVISION BUSINESS.

REV.	DESCRIPTION	DATE	BY	CHKD.	APP.
1	ITEM 212 #95 ITEM 123	04/01/01	MS75M	JJ	MS071 7959Y
2	ADDED OPTIONAL FEET & ADAPTERS	04/01/01	MS09Y	DMD	7169Y 8209Y
3	REPT DRIVE OPTION IS JAWE REVERTED	04/01/01	MS09Y	MS09Y	8209Y
4	UPDATED TO RAM X TRI-LOBE	04/01/01	7369Y	ADP	MS09Y 8209Y
5	ADDED ITEM 27A & NOTE #10	04/01/01	7369Y	ADP	MS09Y 8209Y
6	ADDED FLANGE GASKET #210	04/01/01	7904Y	ADP	MS09Y 8209Y

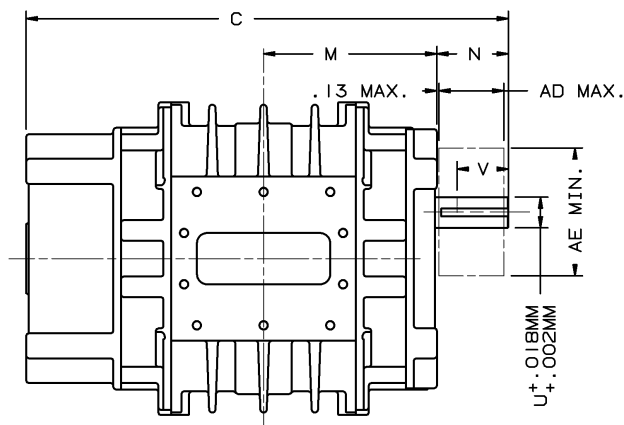
**SECTIONAL ASSEMBLY**  
MODELS: 155, 225, & 280 RAM 4TH TRI-LOBE

**DRESSER**  
Roots

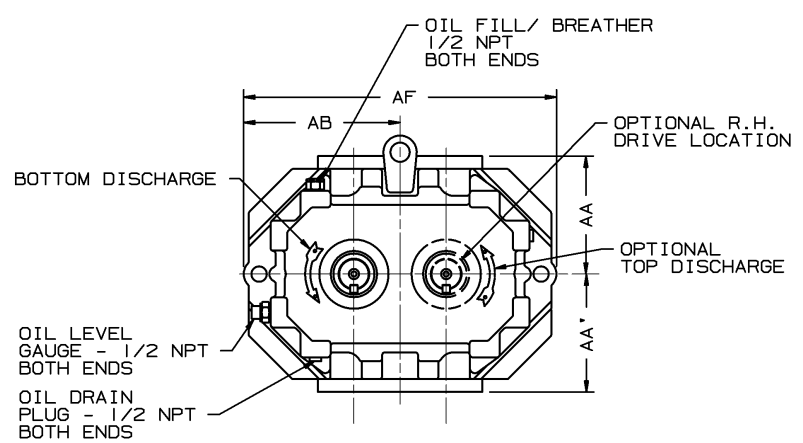
Dresser Roots, Dresser, Inc.  
Cleveland, OH, USA

**90860023**

**Assembly of RAM X™ Tri-Lobe Blowers Models 155, 225, & 280**



VIEW OF DISCHARGE



INLET & DISCHARGE FLANGES TO MATE FLUSH & SQUARE WITH FLAT FACE FLANGE ONLY. USE FULL FACE GASKETS.

V-BELT DRIVEN UNITS: MOTOR TO BE LOCATED ON INLET SIDE OF HORIZONTAL FLOW UNITS & ON DRIVE SHAFT SIDE OF VERTICAL FLOW UNITS.

AD - MAXIMUM SHEAVE WIDTH (SEE OVERHUNG LOAD LIMIT K-24102)

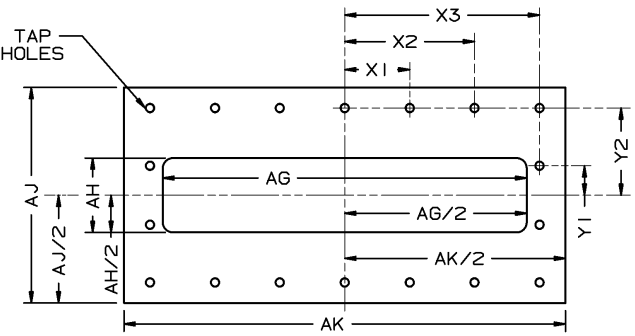
AE - MINIMUM SHEAVE DIAMETER (SEE OVERHUNG LOAD LIMIT K-24102)

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED METRIC DIMENSIONAL #9074-7021

		DRIVE LOCATION	
		LH	RH
DISCH. LOCATION	TOP	CW	CCW
	BOTTOM	CCW	CW

UNIT IS BUILT TO CUSTOMERS SPECIFIED ORIENTATION

"W" SIZE OF TAP  
"Z" No. OF HOLES



MODEL	C	M	N	U MM	V MM	KEYWAY MM	INLET DISCH AAAA'	AB	AD	AE	AF	AG	AH	AJ	AK	APPROX WEIGHT
155	23.50	8.44	3.50	35.0	63.5	10.0X5.0	5.75 5.75	7.63	3.06	7.10	15.25	6.50	4.00	8.00	9.02	300 LBS
225	27.50	10.44	"	"	"	"	" "	" "	" "	" "	" "	10.50	"	"	13.02	360 LBS
280	30.75	12.06	"	"	"	"	" "	" "	" "	" "	" "	13.75	"	"	16.27	420 LBS
400	33.56	13.08	4.33	50.0	76.2	14.0X5.5	7.25 7.25	10.00	4.44	8.50	20.00	13.75	5.50	10.50	17.36	730 LBS
500	37.73	15.17	"	"	"	"	" "	" "	" "	" "	" "	17.75	"	"	21.53	850 LBS

MODEL	X1	X2	X3	Y1	Y2	W	Z
155	3.25		3.88	1.25	3.25	M12x1.75	10
225	2.63	5.25	5.88	1.25	3.25	M12x1.75	14
280	3.50	6.88	7.50	1.25	3.25	M12x1.75	14
400	3.75		7.50	1.44	4.25	M12x1.75	14
500	3.17	6.33	9.50	1.44	4.25	M12x1.75	18

CERTIFIED CORRECT FOR

CUSTOMER ORDER No. \_\_\_\_\_

ROOTS ORDER No. \_\_\_\_\_

DATE \_\_\_\_\_

B	MODELS 155, 225, & 280 "AH" WAS 2.75 MODELS 400 & 500 "AH" WAS 3.69	DAB	8202V													
A	REV. MODEL DESIGNATIONS, REMOVED V. UNITS "C" & "N" DIMS CORRECTED	RDR	800IV													
	REVISIONS	BY	CHANGE NOTICE	CHKD.	APP.											

V-BELT DRIVE DATA



BELTS \_\_\_\_\_

DRIVE SHEAVE \_\_\_\_\_

DRIVEN SHEAVE \_\_\_\_\_

CENTER DISTANCE \_\_\_\_\_

RAM X<sup>TM</sup>  
TRI-LOBE BLOWERS  
MODELS 155 THRU 500

**DRESSER**   Dresser ROOTS, Dresser, Inc.  
Connersville, IN USA

**Roots**

RDR							
DR	CHKD	APP					

90724021

REV. B

90724A21 XXAD





# ROOTS

Blowers Compressors Exhausters

## RAM X™

### ROOTS™ RAM X™ Tri-Lobe Rotary Positive Displacement Blowers

Models 155, 225, 280, 400, 500, 600, 770, 800, 1000

The ROOTS™ RAM X™ tri-lobe positive displacement blower has been designed to incorporate the latest technology for reduced noise and vibration and minimal downstream pulse. This series is based upon the field operation success of ROOTS RAM™ blower series and features state-of-the-art engineering based on tri-lobe principles originally designed by Roots.

#### BLOWER DESCRIPTION

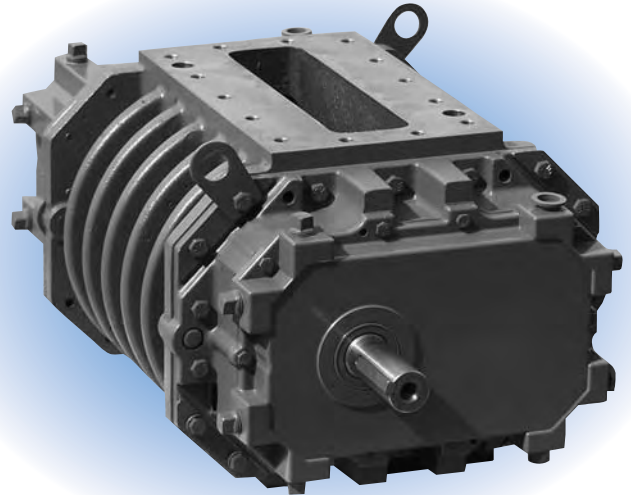
RAM X tri-lobe rotary blowers are heavy-duty units with high strength integral-shaft ductile iron impellers designed for maximum efficiency. The blowers feature ROOTS WHISPAIR™ discharge design which, when combined with tri-lobe impellers, delivers quieter operation than conventional tri-lobe blowers.

The headplates and rigid, one-piece cylinder are cast iron, while the drive-end and gear covers are aluminum (cast iron for models 600-1000). Carburized and ground alloy steel spur timing gears are taper mounted on the shafts and are secured with a locknut (bolt for models 800-1000). Cylindrical roller bearings are used to accept side loads from v-belt drives.

Piston rings reduce air leakage through the shaft openings in the headplates and hydrodynamic oil seals prevent lubricant from entering the air chamber. RAM X blowers incorporate thrust control, with splash oil lubrication at both ends of the blower.

All model sizes are designed with detachable rugged steel mounting feet which permit in-field adaptability to either vertical or horizontal installation requirements.

The top shaft is adaptable for drive on side outlet blow-



ers, and either shaft can be extended for drive on top or bottom outlet blowers.

#### DESIGN FEATURES AND BENEFITS

- Tri-lobe impellers for less vibration and minimal downstream pulse
- WHISPAIR discharge design combined with tri-lobe impellers for quieter operation than conventional tri-lobe blowers
- Carburized and ground alloy steel timing gears for long life and consistent performance
- Cylindrical roller bearings for longer bearing life
- Piston ring seals for less air leakage
- Splash lubrication from oil sumps with sight glasses on each end for easy maintenance
- Detachable feet and drive shaft extension to adapt to horizontal or vertical configuration

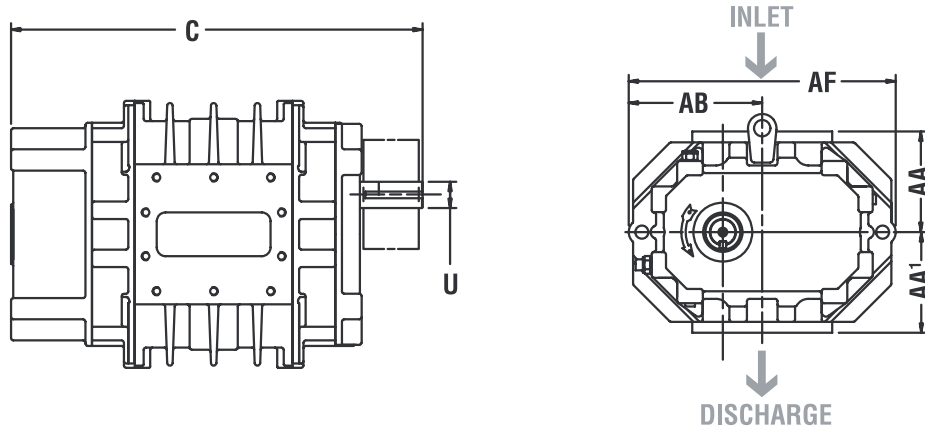
#### WARRANTY PERIOD

Models 155-500: Twenty-four (24) months from date of original unit start-up or 30 months from date of original shipment, whichever occurs first.

Models 600-1000: Twelve (12) months from date of original unit start-up or 18 months from date of original shipment, whichever occurs first.



# OUTLINE DRAWING & DIMENSIONS



Dimensions are in inches (except U and Keyway are mm), weight is in pounds.

Model	C	U	Keyway	AA	AA'	AB	AF	Approx. Wt.
155	23.50	35	10 x 5.0	5.75	5.75	7.63	15.25	300
225	27.50	35	10 x 5.0	5.75	5.75	7.63	15.25	360
280	30.75	35	10 x 5.0	5.75	5.75	7.63	15.25	420
400	33.56	50	14.0 x 5.5	7.25	7.25	10.0	20.0	730
500	37.73	50	14.0 x 5.5	7.25	7.25	10.0	20.0	850
600	41.17	60	18.0 x 7.0	8.63	8.63	11.63	23.25	1325
770	46.92	60	18.0 x 7.0	8.63	8.63	11.63	23.25	1540
800	46.98	70	20.0 x 8.0	10.0	10.0	13.86	27.72	2000
1000	52.98	70	20.0 x 8.0	10.0	10.0	13.86	27.72	2500

# PERFORMANCE TABLE

Model	Speed RPM	4 PSI		6 PSI		8 PSI		10 PSI		12 PSI		15 PSI		Max. Vacuum		
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	"HG	CFM	BHP
155	2000	317	7.2	301	10.6	288	13.9	276	17.3	266	20.7	251	25.7	15	253	12.6
	3560	618	14.8	602	20.8	589	26.8	577	32.8	567	38.8	553	47.8	16	545	24.7
	4750	847	22.8	832	30.8	818	38.8	807	46.7	796	54.7	782	66.7	16	774	34.4
225	2000	459	10.3	436	15.2	417	20.1	400	25	385	29.8	364	37.2	15	366	18.2
	3560	895	20.9	872	29.5	853	38.2	836	46.9	821	55.6	800	68.6	16	789	35.6
	4750	1227	31.5	1205	43.1	1186	54.7	1169	66.3	1154	77.9	1133	95.2	16	1122	49.2
280	2000	573	13.01	545	19.1	521	25.2	500	31.3	481	37.4			15	458	22.7
	3560	1118	26.3	1090	37.1	1066	48	1045	58.8	1026	69.7			16	986	44.6
	4750	1534	39.9	1506	54.5	1482	68.9	1461	83.4	1442	97.8			16	1402	61.7
400	1500	801	18.2	758	26.8	721	35.5	689	44.2	660	52.8			14	648	30.1
	2500	1463	33	1420	47.04	1383	61.8	1351	76.3	1322	90.7	1283	112	16	1261	58.3
	3560	2165	53.1	2122	73.6	2085	94.2	2053	114.72	2024	135.3	1985	166.1	16	1963	85.9
500	1500	995	23	941	33.8	896	44.5	856	55.3	820	66			14	805	37.6
	2500	1817	43.1	1763	61	1718	78.9	1678	96.8	1642	114.8			16	1566	73.4
	3560	2688	72.1	2634	97.6	2589	123.1	2549	148.6	2513	174.1			16	2437	109.6
600	1400	1360	31.3	1294	45.7	1238	60.1	1189	74.6	1144	89			14	1127	50.7
	2200	2307	54.8	2240	77.4	2184	100.1	2135	122.8	2090	145.5	2030	179.6	16	1998	93.1
	3050	3312	88	3246	119.4	3190	150.9	3141	182.3	3096	213.8	3035	261	16	3003	134.8
770	1400	1705	39.1	1622	57.2	1552	75.3	1490	93.4	1434	111.5			14	1413	63.5
	2200	2892	68.1	2809	96.6	2738	125	2676	153.5	2620	181.9			16	2504	116.5
	3050	4152	108.9	4069	148.4	3999	187.8	3937	227.3	3881	266.7			16	3765	168.3
800	1300	1898	43.3	1808	63.3	1732	83.3	1666	103.4	1605	123.4			14	1582	70.3
	1900	2958	68.6	2868	97.9	2793	127.2	2726	156.5	2666	185.7	2584	229.6	16	2541	119.2
	2670	4319	110.3	4229	151.5	4153	192.6	4086	233.7	4026	274.9	3945	336.6	16	3901	174
1000	1300	2372	54.0	2260	79	2166	104.1	2082	129.1	2007	154.1			14	1978	87.8
	1900	3698	85.4	3586	122	3491	158.6	3408	195.2	3332	231.8			16	3176	148.9
	2670	5399	136.9	5287	188.3	5192	239.8	5109	291.2	5033	342.6			16	4877	217.1

Notes: 1. Pressure ratings are based on inlet at standard pressure of 14.7 psia, standard temperature of 68° F and specific gravity of 1.0.  
 2. Vacuum ratings are based on inlet air at standard temperature of 68° F, discharge of 30" Hga and specific gravity of 1.0.



Roots

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**United Kingdom Operations** • Phone: +44 (0) 1695 52600  
**USA/Canada Sales** • Phone: 773-444-3360  
**Houston, Texas Factory Service** • Phone: 713-896-4810  
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**Malaysia Sales** • Phone: +60 3 2163 0480  
**China Sales** • Phone: +86 10 8486 2440  
**Shanghai Factory Service** • Phone: +86 21 5858 7638

S-RAMX-EAX2 rev.0907

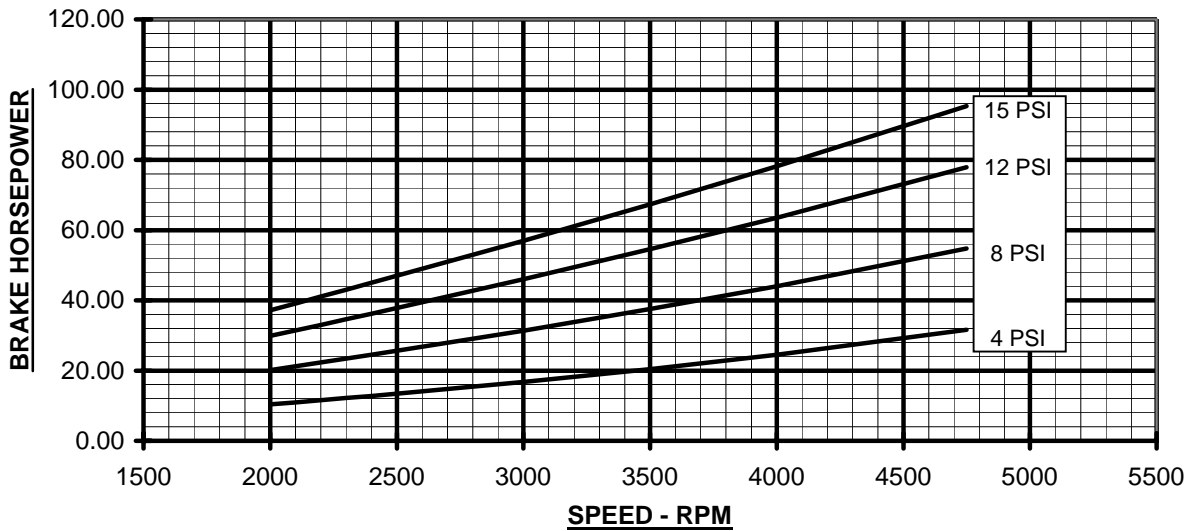
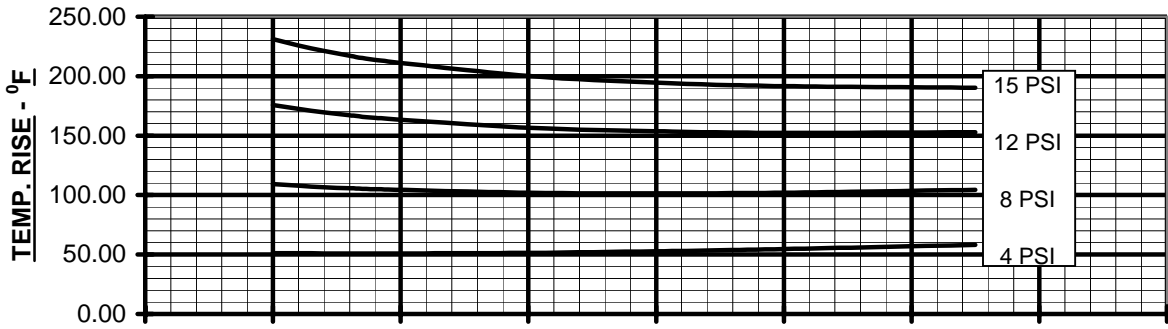
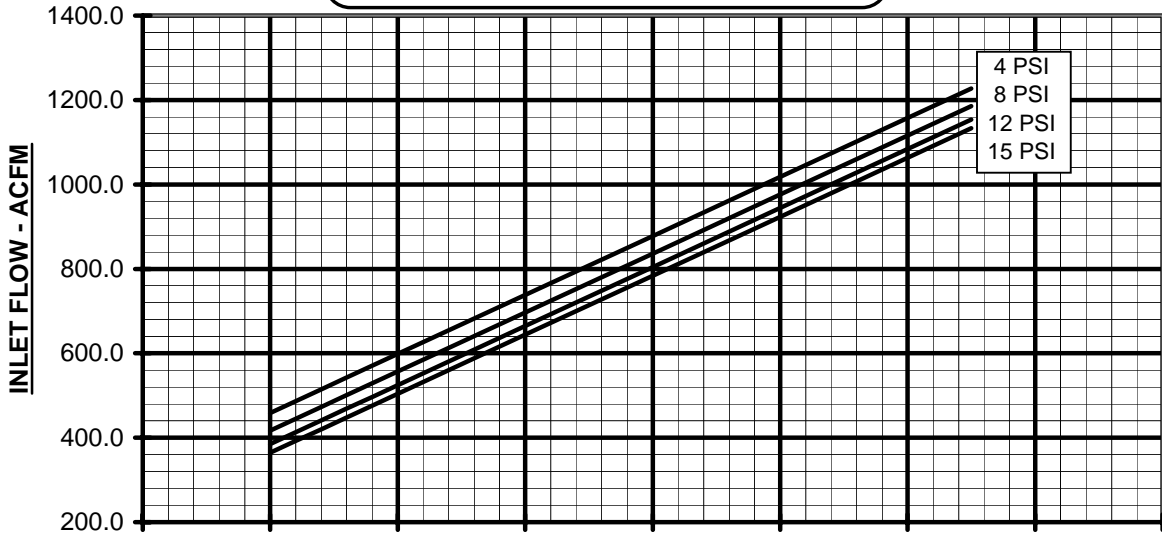
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PERFORMANCE BASED ON AIR,  
 INLET PRESSURE = 14.7 PSIA  
 INLET TEMPERATURE = 68 °F  
 MARCH 2007

**PRESSURE PERFORMANCE**  
**RAM X™ TRI-LOBE BLOWER SIZE 225**  
 MAX. PRESSURE RISE = 15 PSI  
 MAX. SPEED = 4750 RPM





**VACUUM PERFORMANCE**  
**RAM X™ TRI-LOBE BLOWER SIZE 225**  
 MAX. VACUUM = 16" HG  
 MAX. SPEED = 4750 RPM

PERFORMANCE BASED ON AIR,  
 INLET TEMPERATURE = 68°F  
 DISCH. PRESSURE = 30" HGA  
 MARCH 2007

