

WE'RE BIG ON BRUSHLESS™

BRUSHLESS DC MOTORS • BLOWERS • CONTROLLERS



AMETEK®
ROTRON
Technical Products

Table of Contents

Introduction 1, 2, 3

BLDC Motors

1.7" (43mm) diameter 4, 5
2.5" (64mm) diameter 6, 7
3.0" (79mm) diameter 8, 9
3.55" (90mm) diameter 10, 11
3.9" (99mm) diameter 12, 13
5.25" (133mm) diameter 14, 15

Low Voltage Blowers (BLDC)

2.9" (74mm) 16, 17
3.0" (76mm) 18, 19
3.3" (84mm) 20, 21
4.5" (114mm) 22, 23
5.0" (127mm) MINIJAMMER® 24, 25
5.1" (130mm) 26, 27
5.7" (145mm) WINDJAMMER® 28, 29

High Voltage Blowers (BLDC)

WINDJAMMER®

5.7" (145mm) Thru Flow/250 Watt/120VAC 30, 31
5.7" (145mm) Bypass/250 Watt/120VAC 32, 33
5.7" (145mm) Thru Flow//400 Watt/240 VAC ... 34, 35
5.7" (145mm) Bypass/400 Watt/240VAC 36, 37
5.7" (145mm) Bypass/800 Watt/120VAC 38, 39
5.7" (145mm) Bypass/1200 Watt/240VAC 40, 41

Controllers (BLDC)

5 Amp Motor/Blower 42
10 Amp Motor/Blower 43
20 Amp Motor 44

BLDC Motor/Blower

Controller Part Numbers 45

Blower/Motor Sizing Sheet 46

Application Engineering

Basics 47, 48, 49, 50, 51

AMETEK Global Locations 52, 53

Contact Information 54



The AMETEK Electromechanical Group (EMG) . . .

is one of the world's largest producers of high-speed electric motor products for original equipment manufacturers (OEMs). In business since 1915, EMG uses its core competencies in motion and air movement products as engineered solutions for application-specific needs. A unit of AMETEK EMG, Rotron offers Brushless DC motor-, blower-, and controller-based solutions.

The standard product lines of Rotron Technical Products cover a wide range of application demands. If there is a need for a product with unique performance, mounting, environment or agency requirements, Rotron can supply the solution. Whether a customer needs a standard or special design, Rotron has the solution for your application. AMETEK offers economies of scale that only can be accomplished by a company that produces more than 23 million motor products per year. With multiplant capability and flexibility, Rotron is positioned to support our customers' global programs.

AMETEK Brushless DC Motors and Blowers are an ideal choice for such varied applications as medical instruments, robotics, pumps, compressors, business equipment, fans, machine tools, tape drives, or any other precise rotary motion/air delivery applications.



Brushless DC Motors. . .

offer precise control for a wide range of applications. Rotron standard motor designs offer maximum controllable performance, coupled with the reliability of brushless technology in a compact cost effective package. First introduced in 1988, the AMETEK brushless DC motor product line has continually expanded into one of the largest mixes of fractional horsepower motor products in the industry.

Motor Selection. . .

is made easy with the wide variety of standard products available from AMETEK. Six different motor families are available in standard configurations. These include 1.7" (43mm), 2.5" (64mm), 3.0" (76mm), 3.55" (90mm), 3.9" (99mm), and 5.25" (133mm) diameter motors, with constant torque which range from 5.75 oz. in. (4.06 Ncm) to 832 oz. in. (5.87 Nm) and horsepower ratings of .014 to 1.75. Voltage options range from 12VDC to 74VDC. The table below provides a summary of the motor products, operating voltages, speed and torque ranges sorted by motor diameter. Use this chart to compare the AMETEK products to the application needs. Detailed motor information is provided on the individual product sheets.

BLDC MOTORS			
Motor Diameter	Operating Voltage (DC) <i>Controller Input</i>	Speed Range (RPM) <i>at Nom. Continuous Torque</i>	Torque Range (oz. in.) <i>Maximum Continuous</i>
1.7" (43mm)	12, 24, 36	0 - 3,000	5.75 - 11
2.5" (64mm)	12, 24, 36	0 - 5,000	14 - 69
3.0" (76mm)	13.8, 24, 27.6	0 - 4,930	19.7 - 55
3.55" (90mm)	12, 24, 36	0 - 4,300	22 - 132
3.9" (99mm)	12, 13.8, 27.6, 74	0 - 4,500	28 - 100
5.25" (133mm)	27, 27.6, 74	0 - 4,055	192 - 832

Motor Controllers

All of the AMETEK BLDC Motors require a controller to operate. The controllers require a DC input which is processed into phase drive signals. The 1.7" (43mm) and 3.0" (76mm) motors are available with integrated controllers. All other motors require an external controller. Controller details and compatibility to the different motor products are supplied in the controller section of the catalog.

Brushless DC Blowers. . .

offer variable (speed) output for a wide range of vacuum or pressure applications. Standard blower designs offer brushless DC motor drives coupled to high efficiency fan systems in a compact, cost effective package. Standard models are available in a wide range of input voltages, including 12, 24, 28, and 36VDC. A complete product line of brushless DC blowers that accepts line voltage input (120VAC and 240VAC) also is available. AMETEK brushless DC blowers are not designed for, and should not be used in, life sustaining applications. AMETEK brushless DC blowers are not 100% sealed and therefore should not be used with flammable or hazardous gases.

Blower Selection. . .

offers a wide variety of standard products available from AMETEK. Thirteen different blower families are available in standard configurations. These include seven low voltage and six high voltage products. The low voltage products provide outputs which range from 0 to 28" H₂O (pressure) at flows of 0 to 45 CFM. The high voltage products provide outputs which range from 0 to 162" H₂O (pressure) at flows of 0 to 275 CFM.

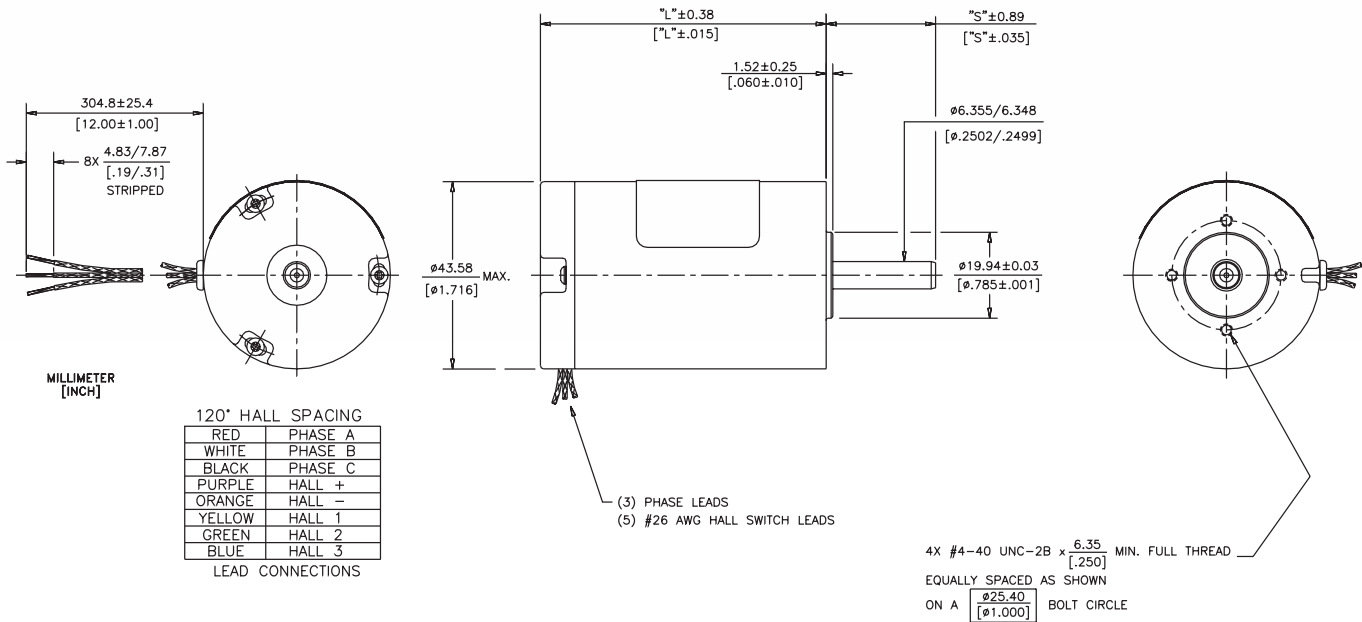
LOW VOLTAGE PRODUCTS				
Blower Diameter	Operating Voltage (DC)	CFM Range	In. H ₂ O (Pressure)	In. H ₂ O (Vacuum)
2.9" (74mm)	12, 24	0-22	0-3	-
3" (76mm)	12, 24	0-18	0-10	-
3.3" (84mm)	12, 24	0-7	0-27	-
4.5" (114mm)	12, 24	0-9	0-28	-
5" (127mm)	12, 24	0-45	0-24	-
5.1" (130mm)	12, 24	0-15	0-25	-
5.7" (145mm)	12, 24, 36	0-39	0-28	0-28
HIGH VOLTAGE BYPASS PRODUCTS				
Blower Diameter	Operating Voltage (AC)	CFM Range	In. H ₂ O (Pressure)	In. H ₂ O (Vacuum)
5.7" (145mm)	120 (250 Watt)	0-115	0-76	0-65
5.7" (145mm)	120 (800 Watt)	0-242	0-115	0-106
5.7" (145mm)	240 (400 Watt)	0-115	0-144	0-135
5.7" (145mm)	240 (1200 Watt)	0-275	0-162	0-118
HIGH VOLTAGE THRU-FLOW PRODUCTS				
Blower Diameter	Operating Voltage (AC)	CFM Range	In. H ₂ O (Pressure)	In. H ₂ O (Vacuum)
5.7" (145mm)	120 (250 Watt)	0-117	0-75	0-70
5.7" (145mm)	240 (400 Watt)	0-67	0-50	0-47

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Tech Bulletin

1.7" (43mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC



Motor Data	Unit of Measure	Part Numbers	
		119272*	119275*
No Load Speed, Nominal	RPM	4388	4308
No Load Current, Nominal	amps	.16	.18
Stall Torque, Theoretical	oz.-in.	12.7	51.3
	Ncm	8.96	36.20
Continuous Torque	oz.-in.	5.75	11
	Ncm	4.06	7.77
Speed @ Torque, Nominal	RPM	2425	3000
Current @ Torque, Nominal	amps	1.0	1.75
Continuous Power, Max.	watts out	10	24
Torque Constant	oz.-in. /amp	7.39	7.53
	Ncm/amp	5.21	5.31
Voltage Constant	V/kRPM	5.47	5.57
	V/rad/sec	0.052	0.053
Electrical Time Constant	millisecond	.273	.339
Mechanical Time Constant	millisecond	.202	.134
Motor Constant	oz.-in./(watt ^{.5})	2.37	4.12
	Ncm/(watt ^{.5})	1.67	2.91
Rotor Inertia	oz.-in.sec ²	8.00 x 10 ⁻⁶	1.60 x 10 ⁻⁵
	Ncm-sec ²	0.0565	0.0113
Terminal Resistance	ohms	9.74	3.34
Terminal Inductance	millihenry	2.66	1.13
Thermal Resistance	°C/W	3.5	1.90
Length ("L" above)	inches	1.864	2.614
	mm	47.35	66.40
Weight	lb.	.51	.78
	kg	0.23	0.35
Shaft Length ("S" above)	inches	.75	1.00
	mm	19.05	25.40

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

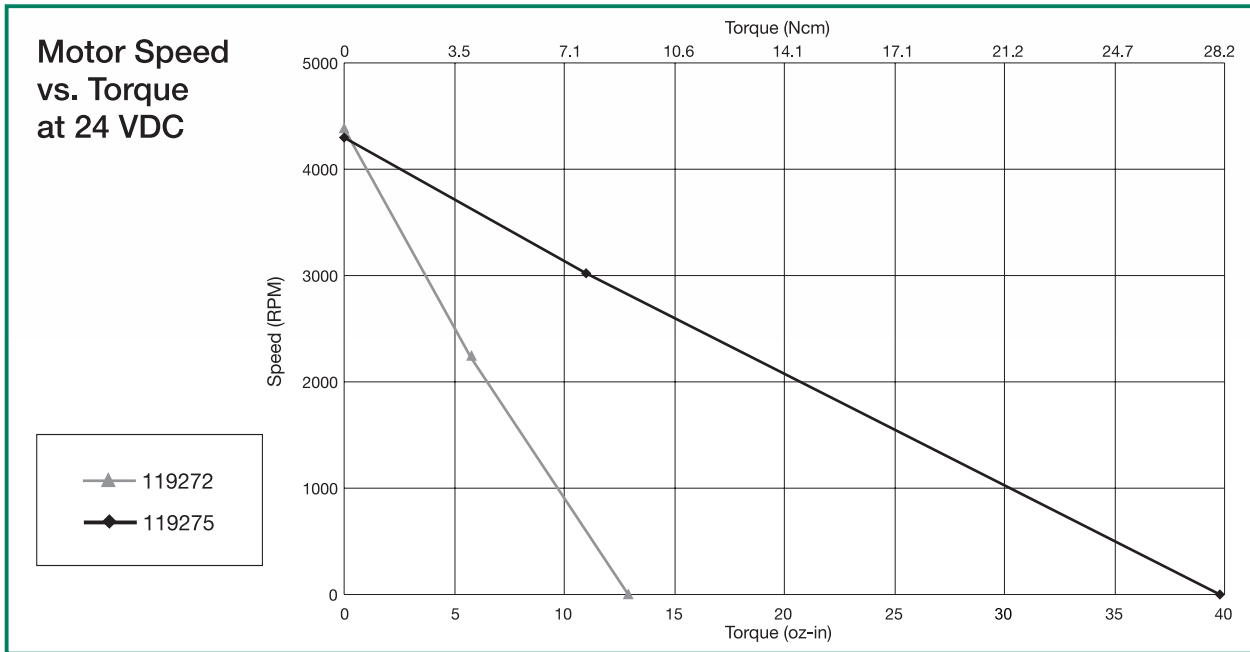
NOTES

- * Motors require brushless motor controller for operation, refer to the controller section (page 45) for applicable controllers.
- * Motor design characteristics are based on an operating environment of 25°C.
- * Nominal and maximum performance figures are based on a winding temperature of 105°C.
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1.7" (43mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC



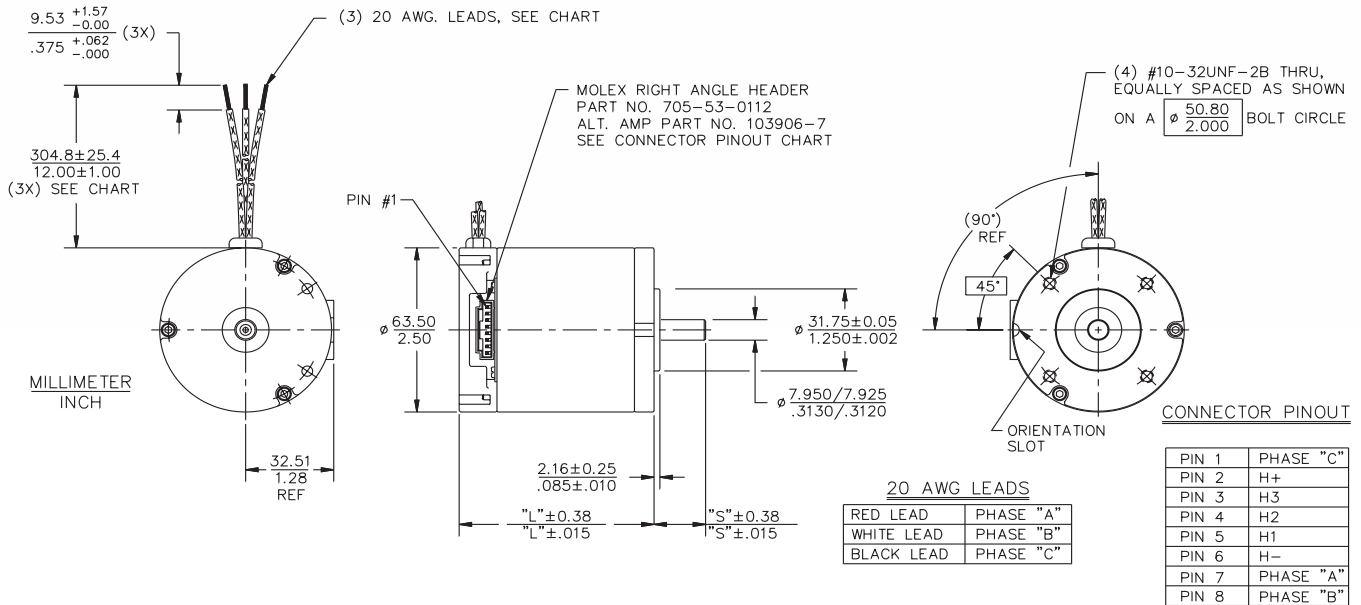
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2.5" (64mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC



Motor Data	Unit of Measure	Part Numbers								
		119000*	119001	119002	119003*	119004	119005	119006	119007	119008*
No Load Speed, Nominal	RPM	5947	5389	4233	5468	4636	4019	3575	3191	2879
No Load Current, Nominal	amps	1.14	1.07	0.93	1.08	0.98	0.91	0.85	0.81	0.77
Stall Torque, Theoretical	oz.-in.	142	179	191	267	282	294	302	311	319
	Ncm	100	127	135	189	199	208	213	219	225
Continuous Torque	oz.-in.	14	21	27	34	41	48	55	62	69
	Ncm	10	15	19	24	29	34	39	44	49
Speed @ Torque, Nominal	RPM	4928	4234	3286	4228	3455	3074	2645	2290	2002
Current @ Torque, Nominal	amps	3.7	4.6	4.5	6.8	6.8	6.8	6.9	6.9	6.9
Continuous Power, Max.	watts out	51	66	66	106	105	109	108	105	102
Torque Constant	oz.-in. /amp	5.46	6.02	7.67	5.94	7.00	8.08	9.08	10.17	11.27
	Ncm/amp	3.85	4.25	5.42	4.19	4.94	5.70	6.41	7.18	7.96
Voltage Constant	V/kRPM	4.04	4.45	5.67	4.39	5.18	5.97	6.71	7.52	8.34
	V/rad/sec	0.0385	0.0425	0.0542	0.0419	0.0494	0.0570	0.0641	0.0718	0.0796
Electrical Time Constant	millisecond	0.838	0.886	0.937	0.904	0.938	0.965	0.986	1.004	1.019
Mechanical Time Constant	millisecond	5.236	4.129	4.080	3.775	4.006	3.668	3.217	3.258	3.021
Motor Constant	oz.-in./(watt ^{.5})	6.8	8.1	9.3	10.1	11.1	12.1	12.9	13.8	14.7
	Ncm/(watt ^{.5})	4.8	5.7	6.6	7.1	7.9	8.6	9.1	9.8	10.4
Rotor Inertia	oz.-in.sec ²	0.0017	0.0019	0.0025	0.0027	0.0035	0.0038	0.0038	0.0044	0.0046
	Ncm-sec ²	0.0012	0.0013	0.0018	0.0019	0.0025	0.0027	0.0027	0.0031	0.0032
Terminal Resistance	ohms	0.648	0.557	0.678	0.348	0.396	0.444	0.493	0.541	0.589
Terminal Inductance	millihenry	0.543	0.493	0.635	0.314	0.372	0.429	0.486	0.543	0.601
Thermal Resistance	°C/W	1.26	1.22	1.19	1.15	1.11	1.08	1.04	1.00	0.96
Length ("L" above)	inches	2.335	2.335	2.835	2.835	3.585	3.585	3.585	4.085	4.085
	mm	59.31	59.31	72.01	72.01	91.06	91.06	91.06	103.76	103.76
Weight	lb.	1.15	1.25	1.60	1.75	2.15	2.25	2.30	2.70	2.80
	kg	0.52	0.57	0.73	0.79	0.98	1.02	1.04	1.22	1.27
Shaft Length ("S" above)	inches	.750	.750	.750	.750	1.500	1.500	1.500	1.875	1.875
	mm	19.05	19.05	19.05	19.05	38.1	38.1	38.1	47.63	47.63

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NOTES

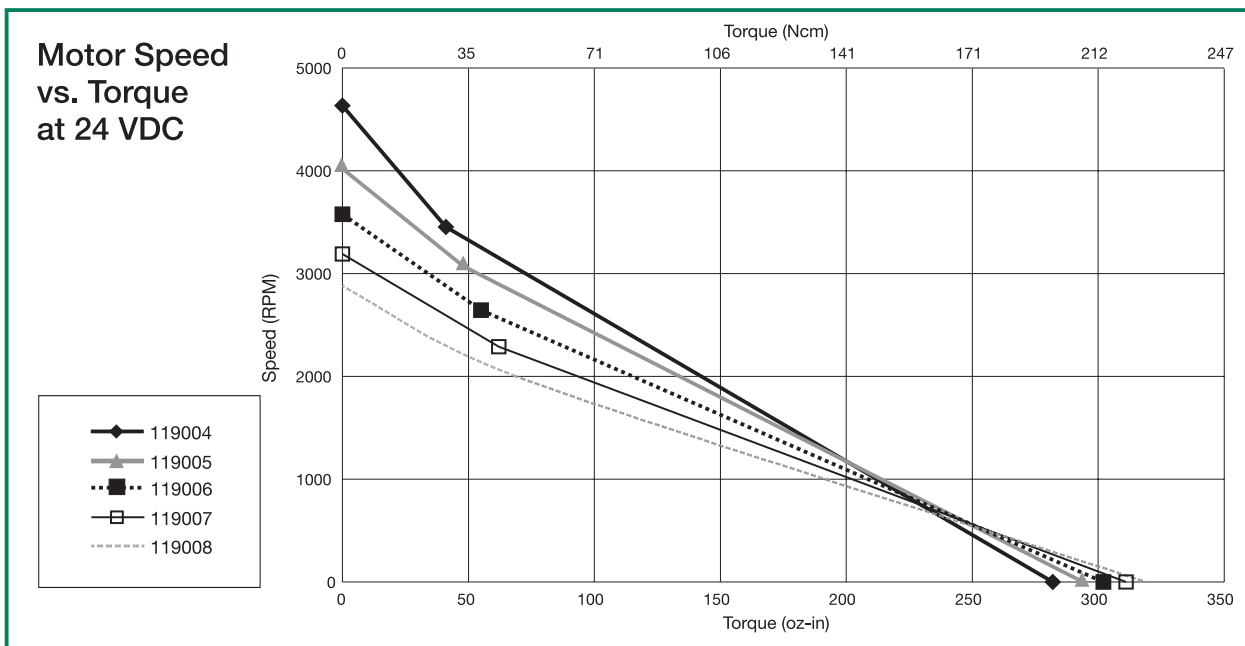
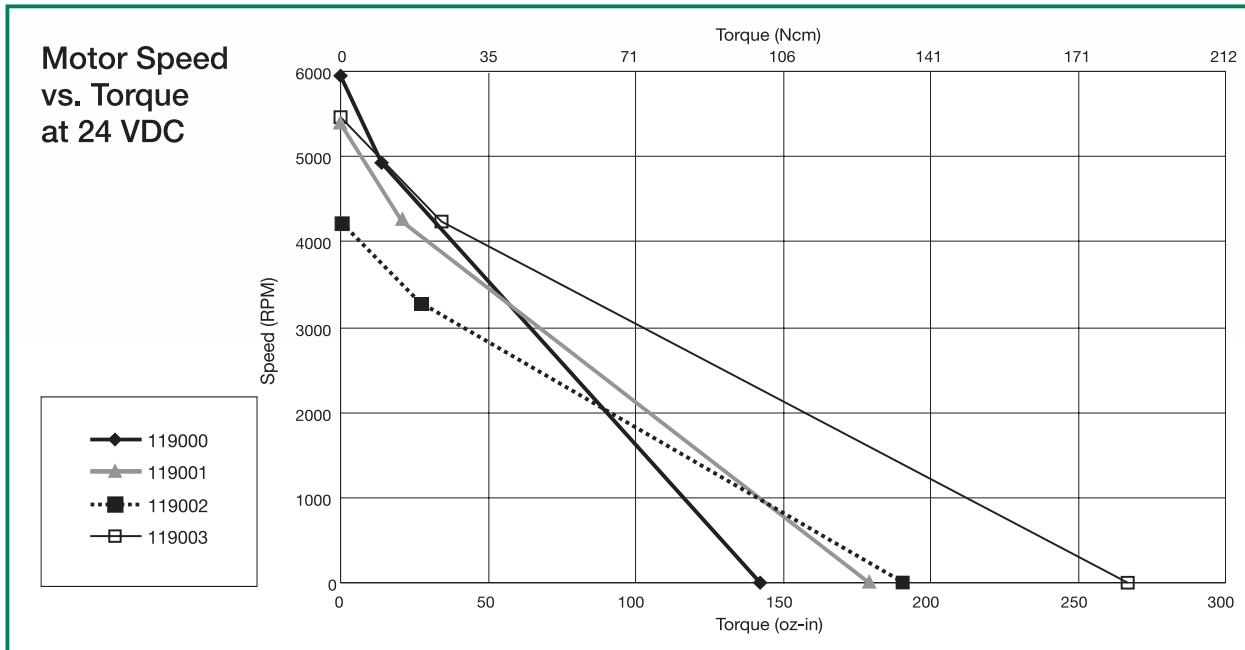
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2.5" (64mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC

BLDC MOTORS

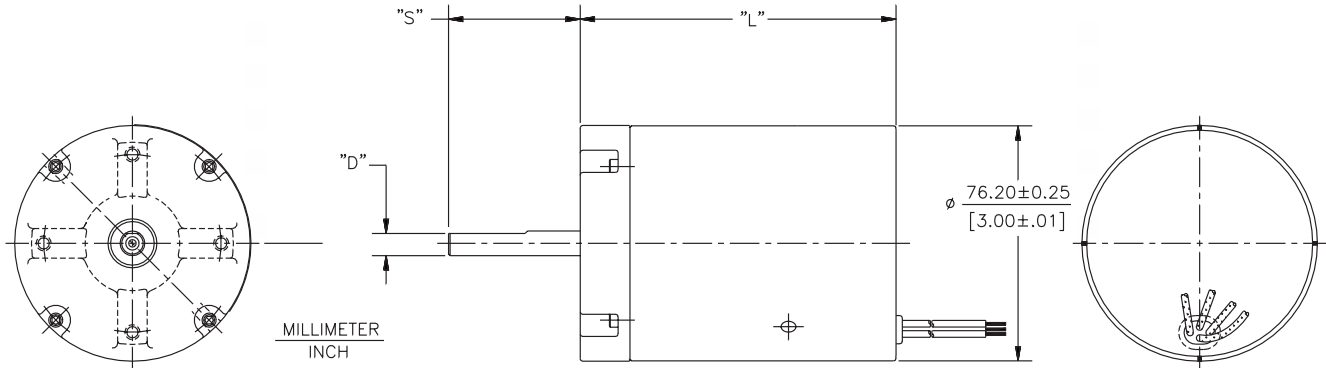


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3.0" (79mm) Diameter, 4 Pole, Brushless DC Motor



This drawing is a general outline. For a more detailed drawing please contact AMETEK Rotron.

Motor Data	Unit of Measure	Part Numbers		
		150004	*150007	E-11488
Voltage Input	Volts DC	13.8	27.6	24.0
No Load Speed, Nominal	RPM	3770	5510	5400
No Load Current, Nominal	amps	0.75	1	1.5
Stall Torque, Theoretical	oz.-in.	169	1300	1298
	Ncm	119	915	917
Continuous Torque	oz.-in.	19.7	43	55
	Ncm	13.9	30	39
Speed @ Torque, Nominal	RPM	2927	4930	4400
Current @ Torque, Nominal	amps	4.6	6.9	9.9
Continuous Power	watts	43	157	181
Torque Constant	oz.-in. /amp	4.90	7.43	6.00
	Ncm/amp	3.46	5.25	4.24
Voltage Constant	V/kRPM	3.66	5	4.44
	V/rad/sec	0.035	0.048	0.0424
Length ("L" above)	inches	3.25	3.77	4.27
	mm	82.63	95.76	108.46
Weight	lb.	1.7	3	TBD
	kg	0.776	1.359	
Shaft Diameter ("D" above)	inches	.3152	.281	.281
	mm	8.0060	7.137	7.137
Shaft Length ("S" above)	inches	1.87	3.50/3.50	1.37
	mm	47.50	88.90/88.90	34.75
Drive Electronics	Internal or External	Internal	External	External
Electronic Drive Part Number			48129-03	48129-11

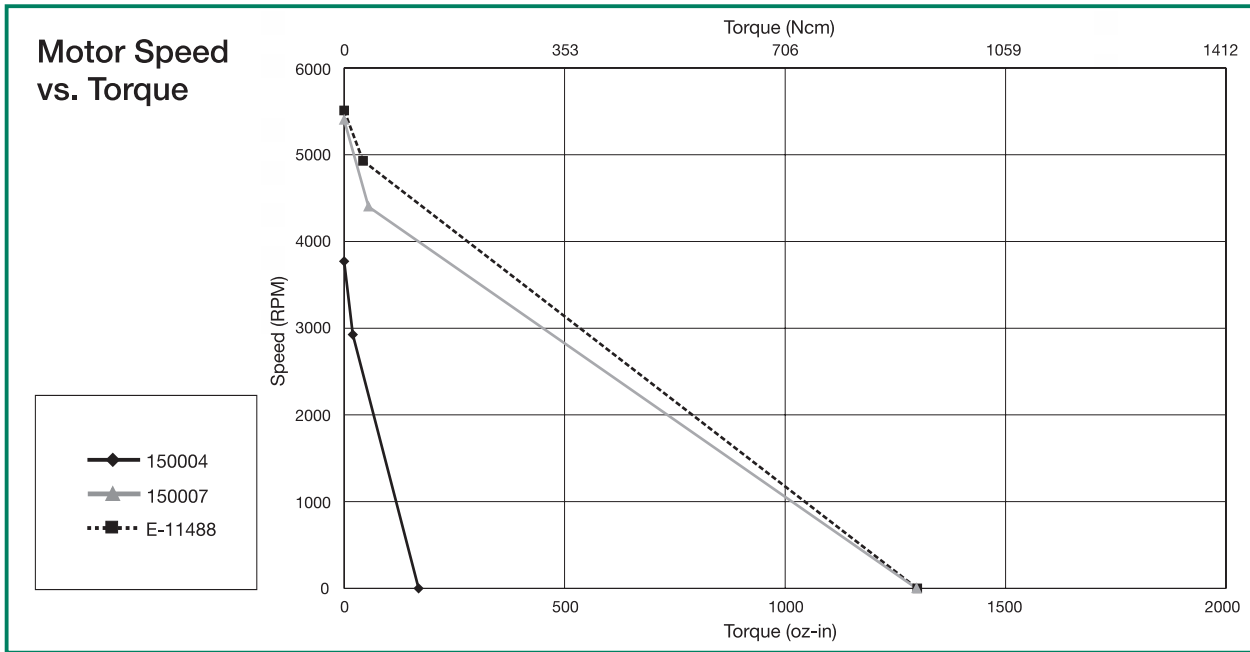
*Part Number 150007 has a dual shaft.

NOTES

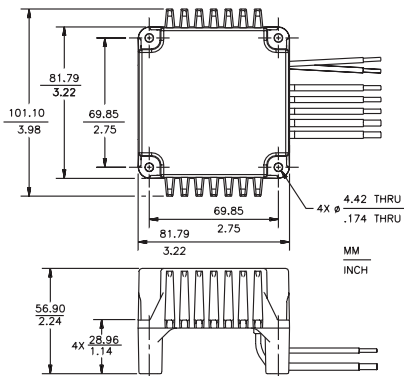
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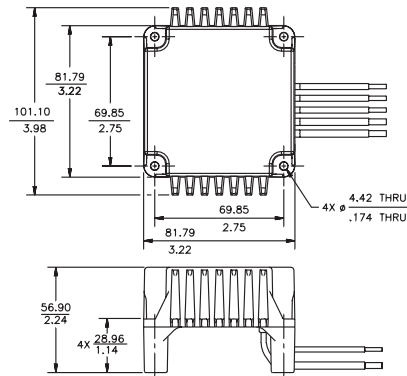
3.0" (79mm) Diameter, 4 Pole, Brushless DC Motor



External Drive Part Number
48129-03



External Drive Part Number
48129-11



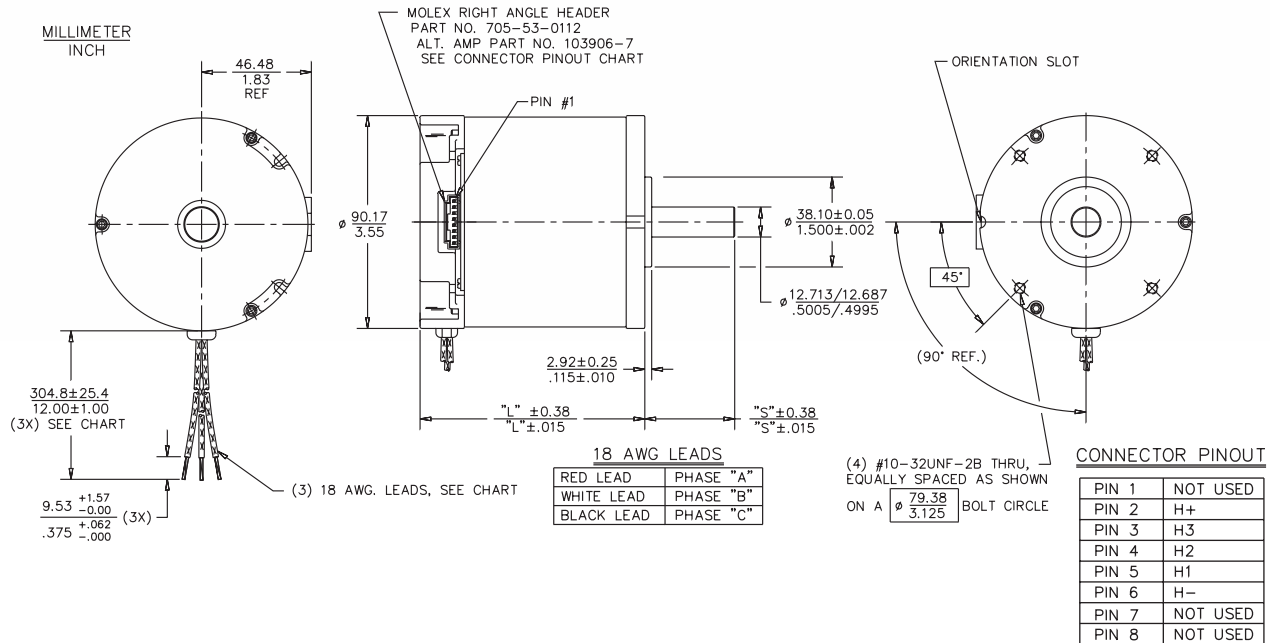
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3.55" (90mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC



Motor Data	Unit of Measure	Part Numbers								
		119050*	119051	119052	119053*	119054	119055	119056	119057	119058*
No Load Speed, Nominal	RPM	4319	5259	4067	3434	2838	2543	2281	2021	1856
No Load Current, Nominal	amps	1.48	1.74	1.41	1.24	1.07	0.99	0.92	0.85	0.80
Stall Torque, Theoretical	oz.-in.	284	375	428	453	496	505	518	541	549
	Ncm	201	265	302	320	350	357	366	382	387
Continuous Torque	oz.-in.	22	36	49	63	77	91	105	119	132
	Ncm	16	25	35	44	54	64	74	84	93
Speed @ Torque, Nominal	RPM	3715	4342	3265	2641	2174	1864	1605	1377	1214
Current @ Torque, Nominal	amps	4.4	7.6	7.6	7.9	7.8	8.1	8.3	8.3	8.4
Continuous Power, Max.	watts out	60	116	118	123	124	126	125	121	119
Torque Constant	oz.-in./amp	7.52	6.17	7.98	9.45	11.44	12.77	14.23	16.06	17.49
	Ncm/amp	5.31	4.36	5.64	6.68	8.08	9.02	10.05	11.34	12.35
Voltage Constant	V/kRPM	5.56	4.56	5.90	6.99	8.46	9.44	10.52	11.88	12.93
	V/rad/sec	0.0531	0.0436	0.0564	0.0667	0.0808	0.0901	0.1005	0.1134	0.1235
Electrical Time Constant	millisecond	1.055	1.052	1.140	1.205	1.256	1.297	1.331	1.358	1.382
Mechanical Time Constant	millisecond	14.713	13.065	12.005	10.293	11.253	10.283	9.413	9.313	8.754
Motor Constant	oz.-in./watt ^{.5}	11.5	12.5	15.0	16.6	19.0	20.1	21.4	23.1	24.1
	Ncm/watt ^{.5}	8.1	8.9	10.6	11.7	13.4	14.2	15.1	16.3	17.0
Rotor Inertia	oz.-in.sec ²	0.0138	0.0145	0.0191	0.0201	0.0286	0.0293	0.0303	0.0350	0.0360
	Ncm-sec ²	0.0097	0.0102	0.0135	0.0142	0.0202	0.0207	0.0214	0.0247	0.0254
Terminal Resistance	ohms	0.425	0.242	0.283	0.323	0.363	0.404	0.444	0.485	0.525
Terminal Inductance	millihenry	0.449	0.255	0.322	0.389	0.457	0.524	0.591	0.658	0.726
Thermal Resistance	°C/W	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.06	1.04
Length ("L" above)	inches	2.500	2.500	3.000	3.000	3.750	3.750	3.750	4.250	4.250
	mm	63.50	63.50	76.20	76.20	95.25	95.25	95.25	107.95	107.95
Weight	lb.	2.10	2.25	2.80	3.00	3.75	4.00	4.20	4.70	4.85
	kg	0.95	1.02	1.27	1.36	1.70	1.81	1.90	2.13	2.20
Shaft Length ("S" above)	inches	.750	.750	.750	.750	1.500	1.500	1.500	1.875	1.875
	mm	19.05	19.05	19.05	19.05	38.10	38.10	38.10	47.63	47.63

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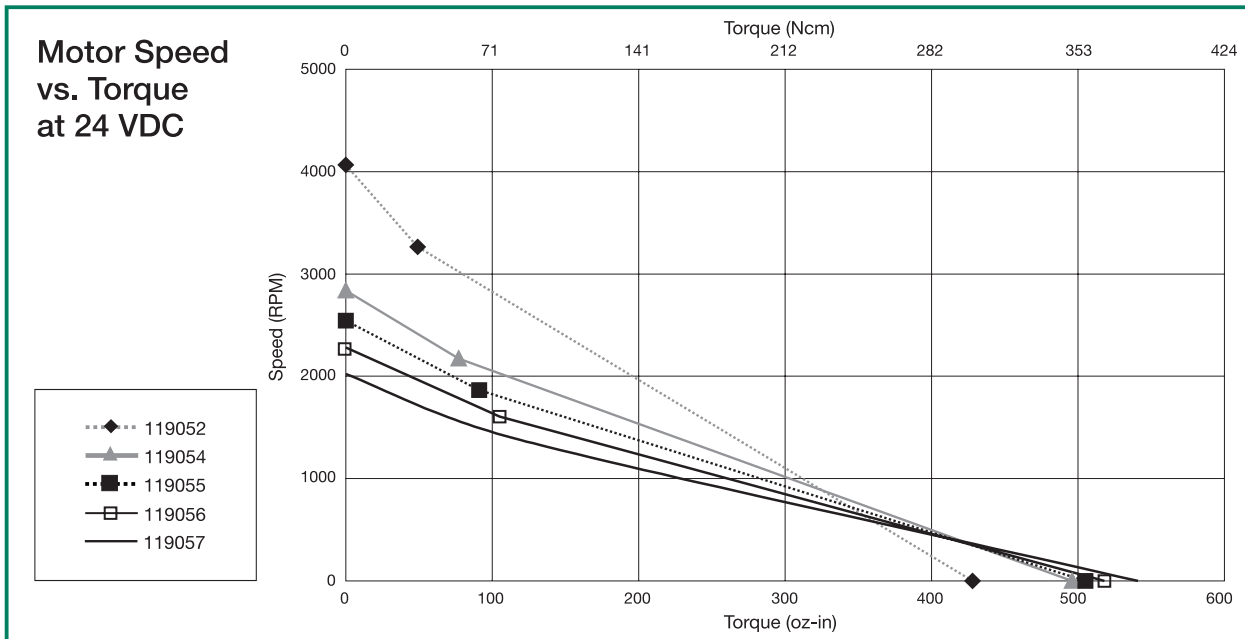
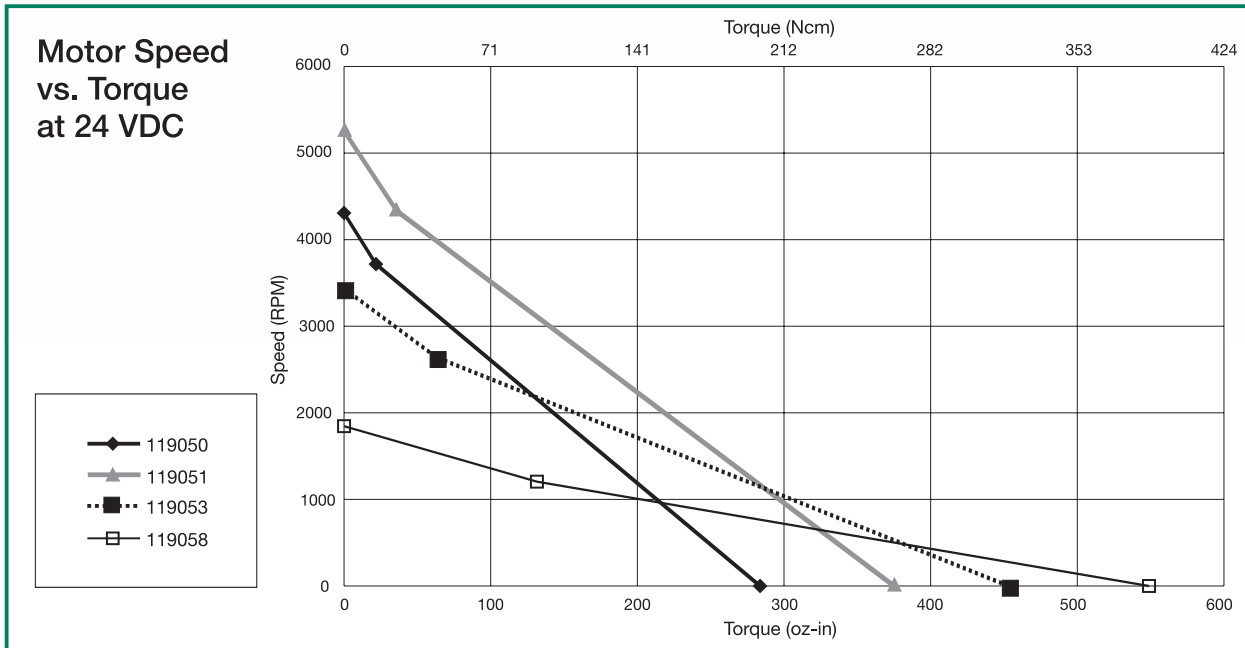
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3.55" (90mm) Diameter, 8 Pole, Brushless DC Motor

24 VDC

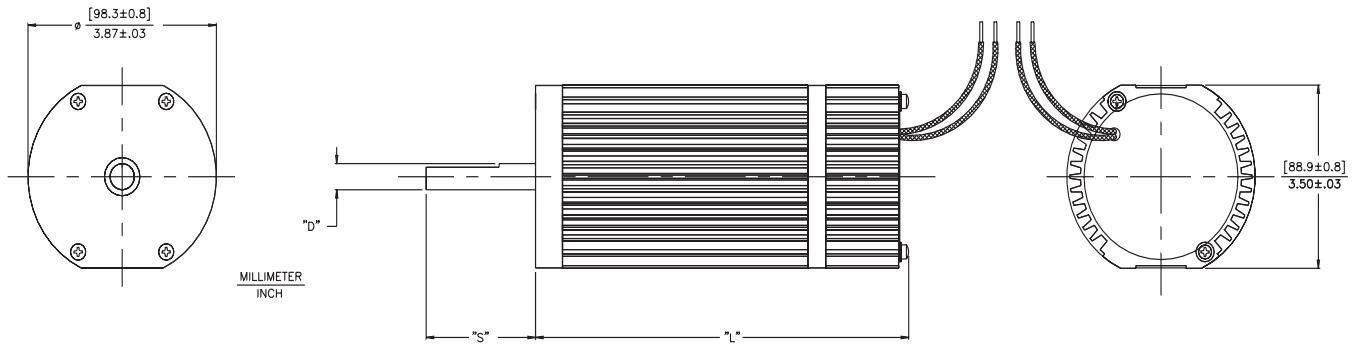


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Tech Bulletin

3.9" (99mm) Diameter, 4 Pole, Brushless DC Motor



This drawing is a general outline. For a more detailed drawing please contact AMETEK Rotron.

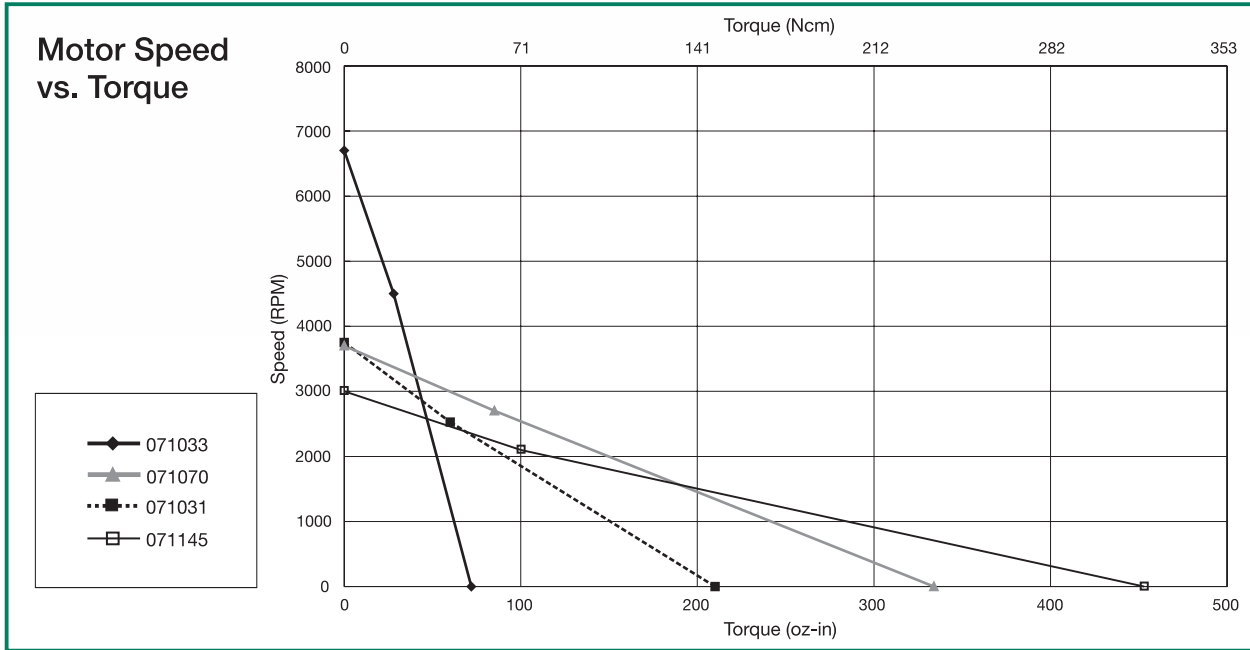
Motor Data	Unit of Measure	Part Numbers			
		071033	071070	071031	071145
Voltage Input	Volts DC	12	13.8	74	27.6
No Load Speed, Nominal	RPM	6700	3750	3700	3000
No Load Current, Nominal	amps	1	2.5	0.22	0.5
Stall Torque, Theoretical	oz.-in.	72	210	334	453
	Ncm	51	148	236	320
Continuous Torque	oz.-in.	28	60	85	100
	Ncm	20	42	60	71
Speed @ Torque, Nominal	RPM	4500	2527	2700	2100
Current @ Torque, Nominal	amps	14	14.3	3.2	8
Continuous Power	watts	94	113	171	155
Torque Constant	oz.-in. /amp	2.42	4.98	27.04	12.44
	Ncm/amp	1.71	3.51	19.10	8.79
Voltage Constant	V/kRPM	1.79	3.68	20	9.20
	V/rad/sec	0.0171	0.0351	0.1910	0.0879
Length ("L" above)	inches	5.33	6.08	6.68	7.68
	mm	135.38	154.43	169.67	195.07
Weight	lb.	6.4	7.3	8.0	9.3
	kg	2.9	3.3	3.6	4.2
Shaft Diameter ("D" above)	inches	.2495	.6250	.312	.4997
	mm	6.337	15.8750	7.925	12.6924
Shaft Length ("S" above)	inches	.83	1.00	1.65	2.25
	mm	21.08	25.40	41.91	57.15
Drive Electronics		Internal	Internal	Internal	Internal

NOTES

- * Motor design characteristics are based on an operating environment of 25°C.
- * Nominal and maximum performance figures are based on a winding temperature of 105°C.
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3.9" (99mm) Diameter, 4 Pole, Brushless DC Motor

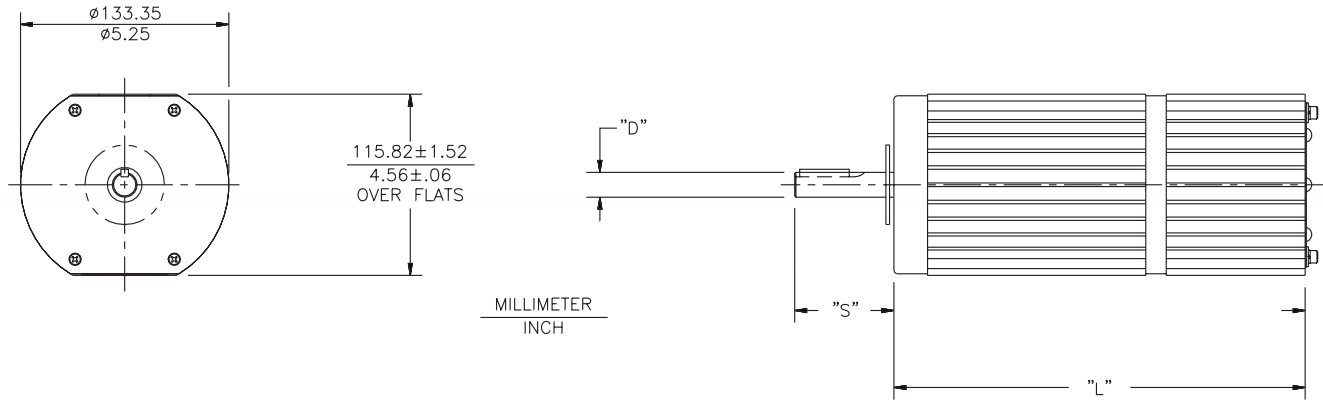


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5.25" (133mm) Diameter, 4 Pole, Brushless DC Motor



This drawing is a general outline. For a more detailed drawing please contact AMETEK Rotron.

Motor Data	Unit of Measure	Part Numbers				
		528512	071087	071190	524647	*524506
Voltage Input	Volts DC	27.6	27	27	74	27
No Load Speed, Nominal	RPM	4055	1935	1765	2565	2000
No Load Current, Nominal	amps	1.6	0.8	0.7	0.62	2.5
Stall Torque, Theoretical	oz.-in.	2403	4380	6400	18000	15383
	Ncm	1697	3094	4519	12707	10862
Continuous Torque	oz.-in.	192	368	560	720	832
	Ncm	136	260	395	508	587
Speed @ Torque, Nominal	RPM	3250	1573	1445	2253	1750
Current @ Torque, Nominal	amps	23	20	27.5	18.5	46.0
Continuous Power	watts	467	433	605	1214	1090
Torque Constant	oz.-in. /amp	9.20	18.85	20.68	39.01	18.25
	Ncm/amp	6.21	13.31	14.61	27.55	12.89
Voltage Constant	V/kRPM	6.81	13.94	15.30	28.85	13.50
	V/rad/sec	0.0621	0.1331	0.1461	0.2755	0.1289
Length ("L" above)	inches	6.76	7.86	10.36	8.91	10.09
	mm	171.70	199.64	263.14	226.31	256.29
Weight	lb.	18	20	23	24	27
	kg	8.2	9.1	10.4	10.9	12.2
Shaft Diameter ("D" above)	inches	.3747	.6250	.7497	.7497	.6250
	mm	9.5174	15.8750	19.0424	19.0424	15.8750
Shaft Length ("S" above)	inches	1.00	2.06	3.25	7.09	2.05/2.05
	mm	25.40	52.32	82.55	180.09	52.07/52.07
Drive Electronics	Internal or External	Internal	Internal	Internal	External	External
Drive Electronics Part Number		N/A	N/A	N/A	524731	524508

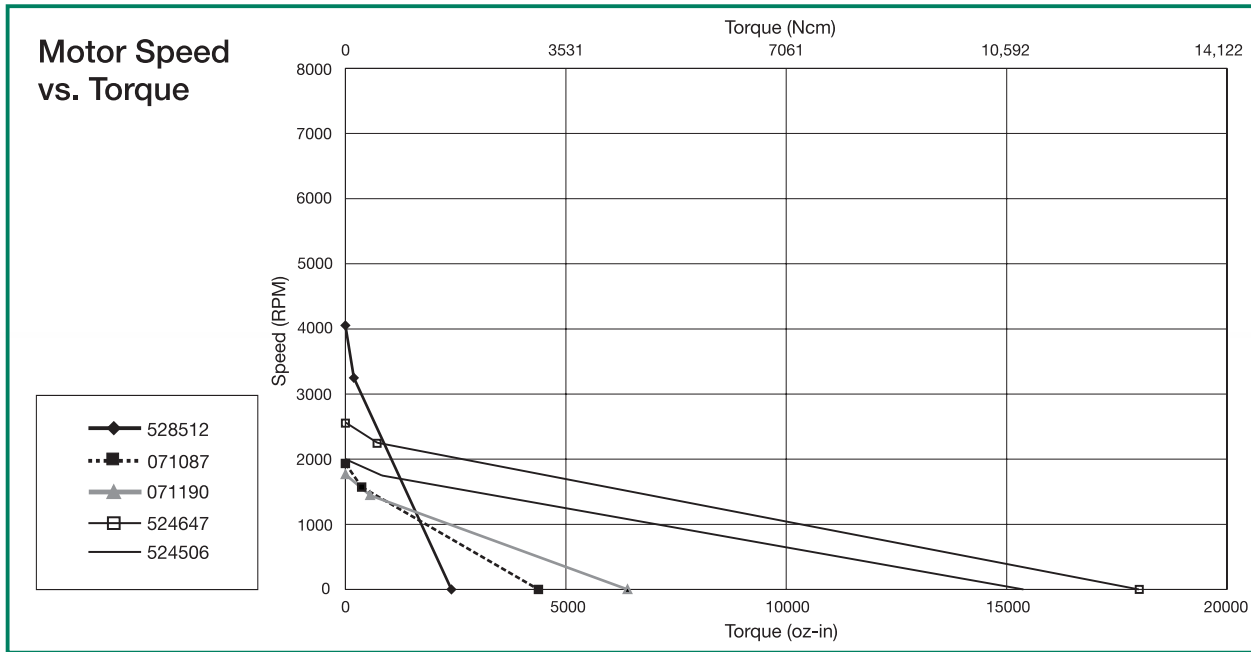
*Part Number 524506 has a dual shaft.

NOTES

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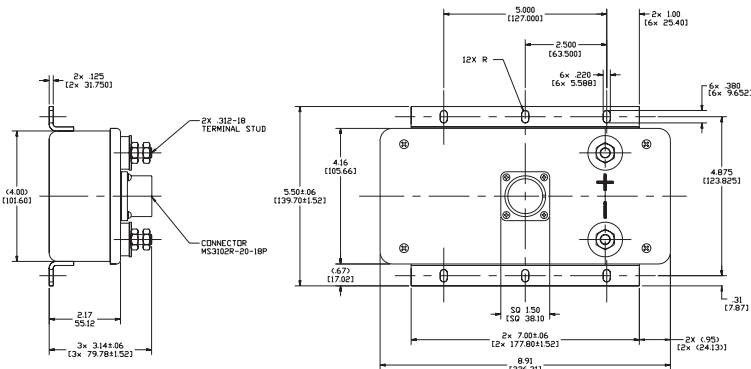


5.25" (133mm) Diameter, 4 Pole, Brushless DC Motor



External Drive Part Number

524731
524508



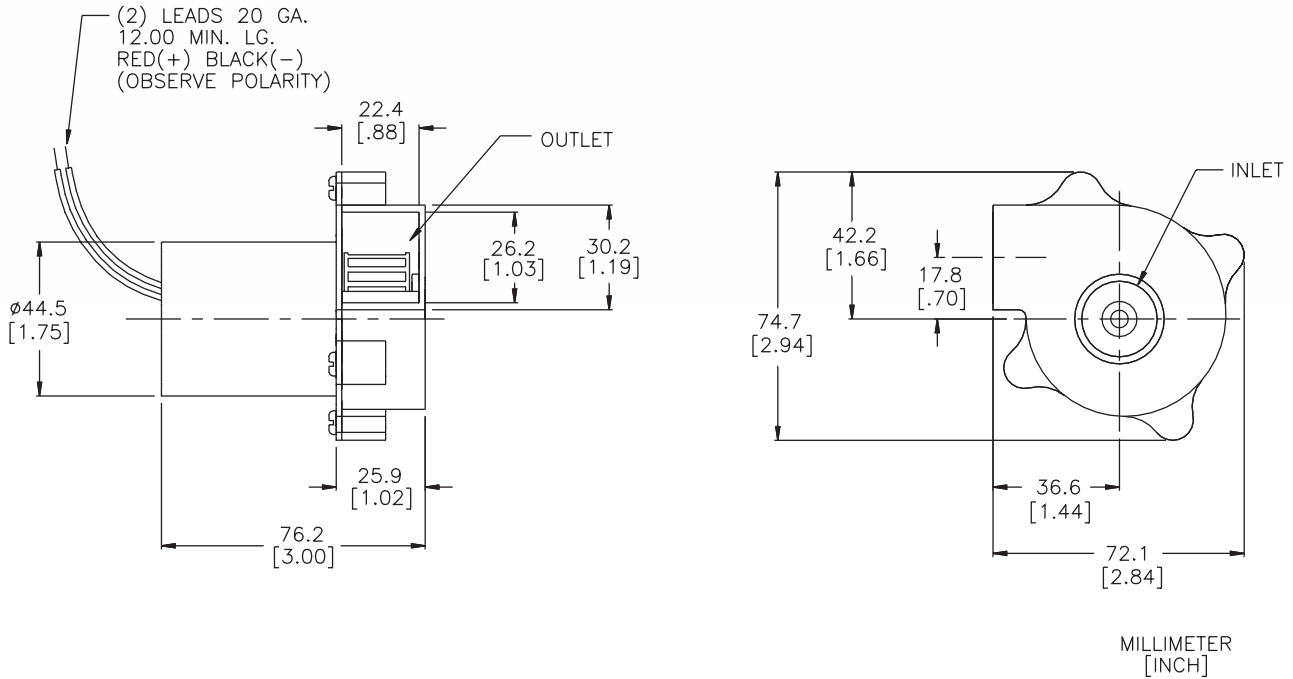
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Tech Bulletin

2.9" (74mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit of Measure	Part Number	
		119495	119496
Voltage Input	VDC	12	24
Stages		1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O, Sealed	3.4	3.4
	mBar	8.4	8.4
Flow Rate, Max. (Open Flow)	CFM	22	22
	L/sec	10.4	10.4

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	3.4	3.4
4 CFM	in. H ₂ O	3.1	3.1
8 CFM	in. H ₂ O	2.9	2.9
12 CFM	in. H ₂ O	2.5	2.5
16 CFM	in. H ₂ O	1.8	1.8

Temperature: Working Air: 0°C to 45°C, Ambient Air: 0°C to 45°C, Storage Air: -40°C to 85°C

Dielectric Testing: 200 volts applied for one second between power leads and motor body, one milliamp leakage max.

Speed Control: Speed is controlled by input voltage.

NOTES:

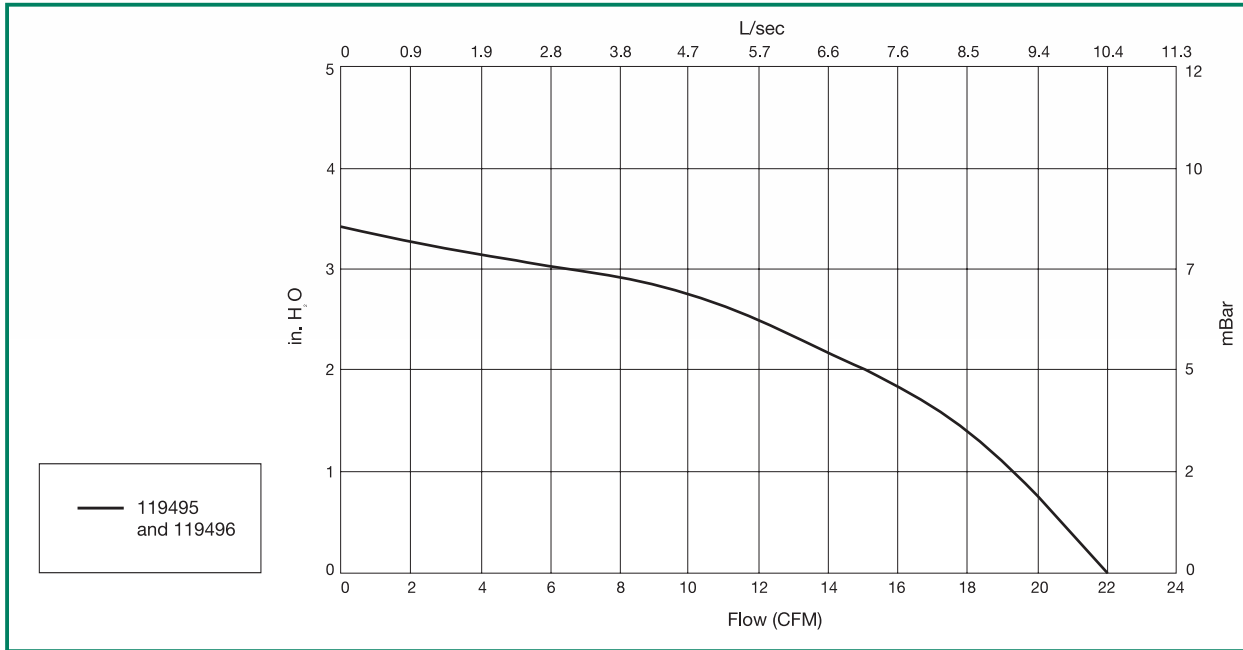
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2.9" (74mm) BLDC Low-Voltage Blower

12/24 VDC

LOW-VOLTAGE BLOWERS



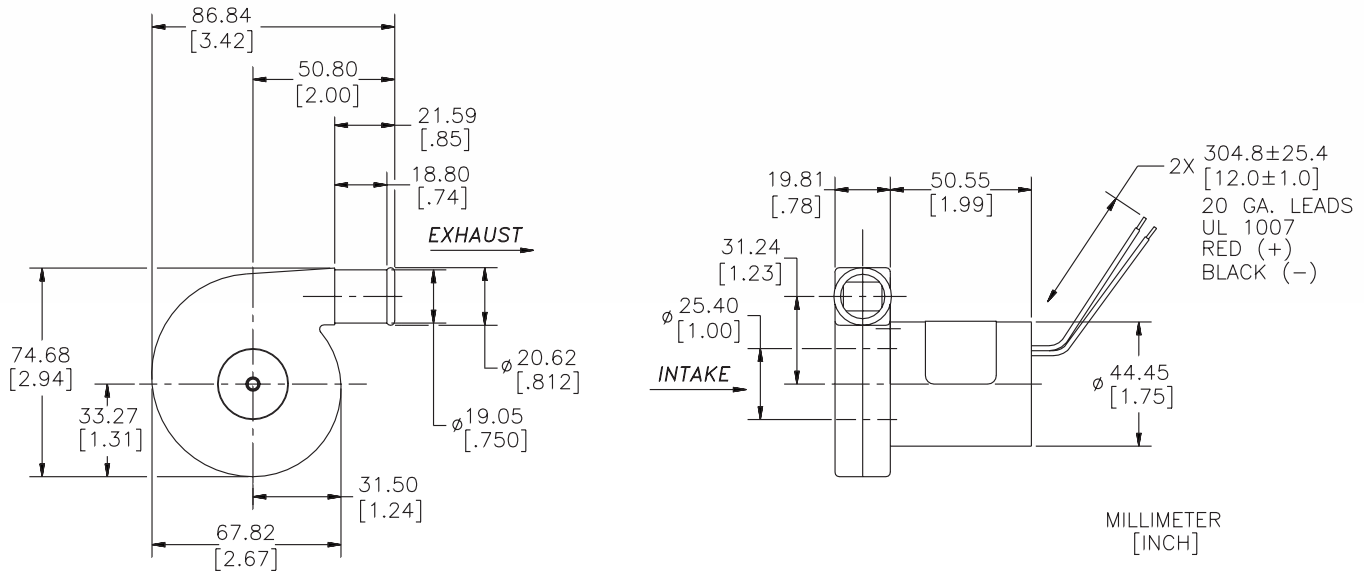
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Tech Bulletin

3.0" (76mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit of Measure	Part Number	
		119349*	119350*
Voltage Input	VDC	12	24
Stages		1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O, Sealed	10	10
	mBar	24.9	24.9
Flow Rate, Max. (Open Flow)	CFM	18	18
	L/sec	8.5	8.5

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	10	10
4 CFM	in. H ₂ O	9.1	9.1
8 CFM	in. H ₂ O	7.6	7.6
12 CFM	in. H ₂ O	5.4	5.4
16 CFM	in. H ₂ O	2.4	2.4
18 CFM	in. H ₂ O	0	0

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

Temperature: Working Air: 0° C to 45° C, Ambient Air: 0° C to 45° C, Storage Air: -40° C to 85° C

Dielectric Testing: 200 volts applied for one second between power leads and motor body, one milliamp leakage max.

Speed Control: Speed is controlled by input voltage.

NOTES:

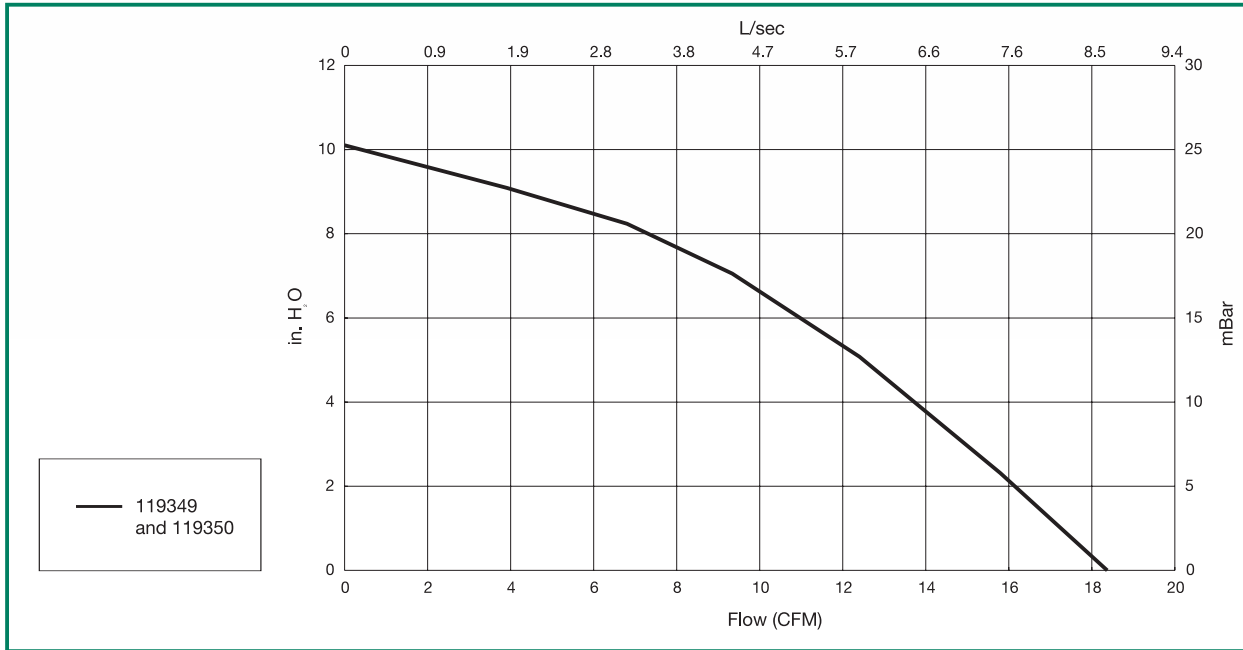
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3.0" (76mm) BLDC Low-Voltage Blower

12/24 VDC

LOW-VOLTAGE BLOWERS



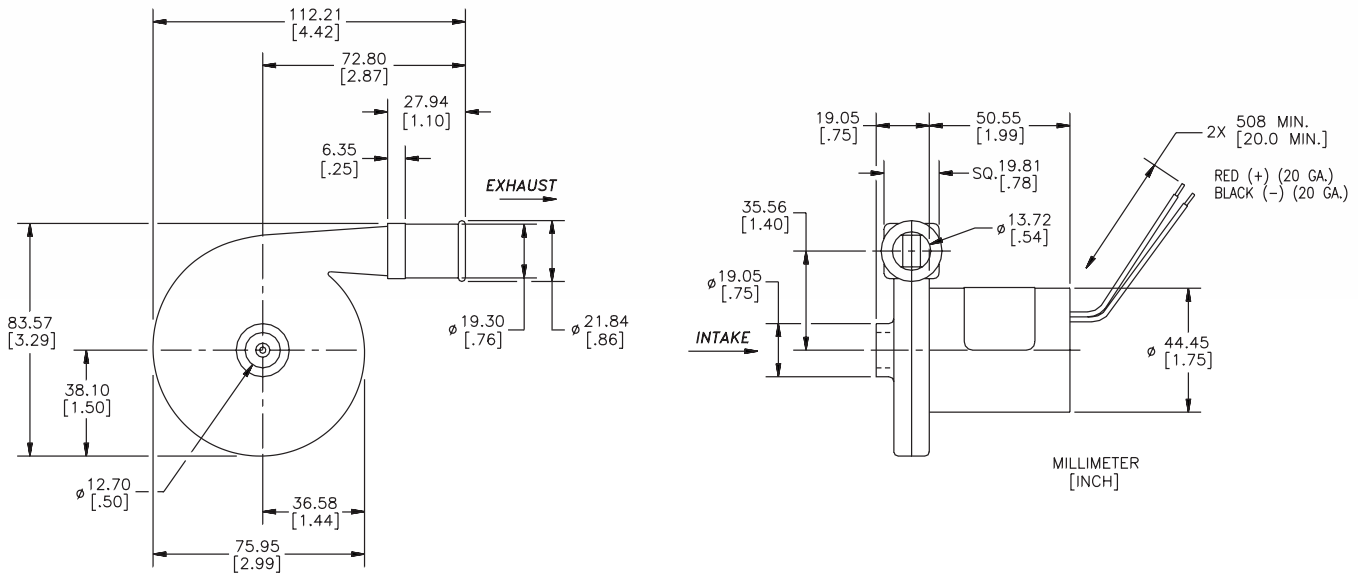
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Tech Bulletin

3.3" (84mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit of Measure	Part Number	
		119497	119498
Voltage Input	VDC	12	24
Stages		1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O, Sealed	27.3	27.3
	mBar	67.9	67.9
Flow Rate, Max. (Open Flow)	CFM	7.5	7.5
	L/sec	3.5	3.5

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	27.0	27.0
2 CFM	in. H ₂ O	26.0	26.0
4 CFM	in. H ₂ O	20.5	20.5
6 CFM	in. H ₂ O	9.0	9.0
8 CFM	in. H ₂ O	0	0

Temperature: Working Air: 0° C to 45° C, Ambient Air: 0° C to 45° C, Storage Air: -40° C to 85° C

Dielectric Testing: 200 volts applied for one second between power leads and motor body, one milliamp leakage max.

Speed Control: Speed is controlled by input voltage.

NOTES:

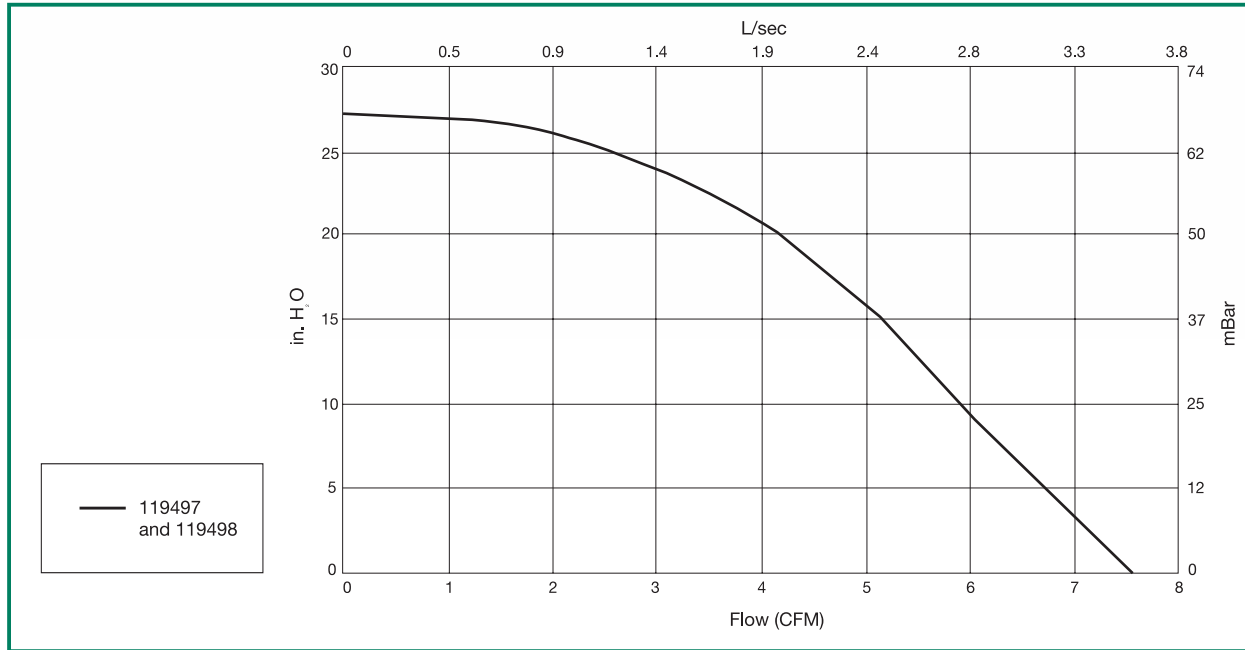
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3.3" (84mm) BLDC Low-Voltage Blower

12/24 VDC

LOW-VOLTAGE BLOWERS



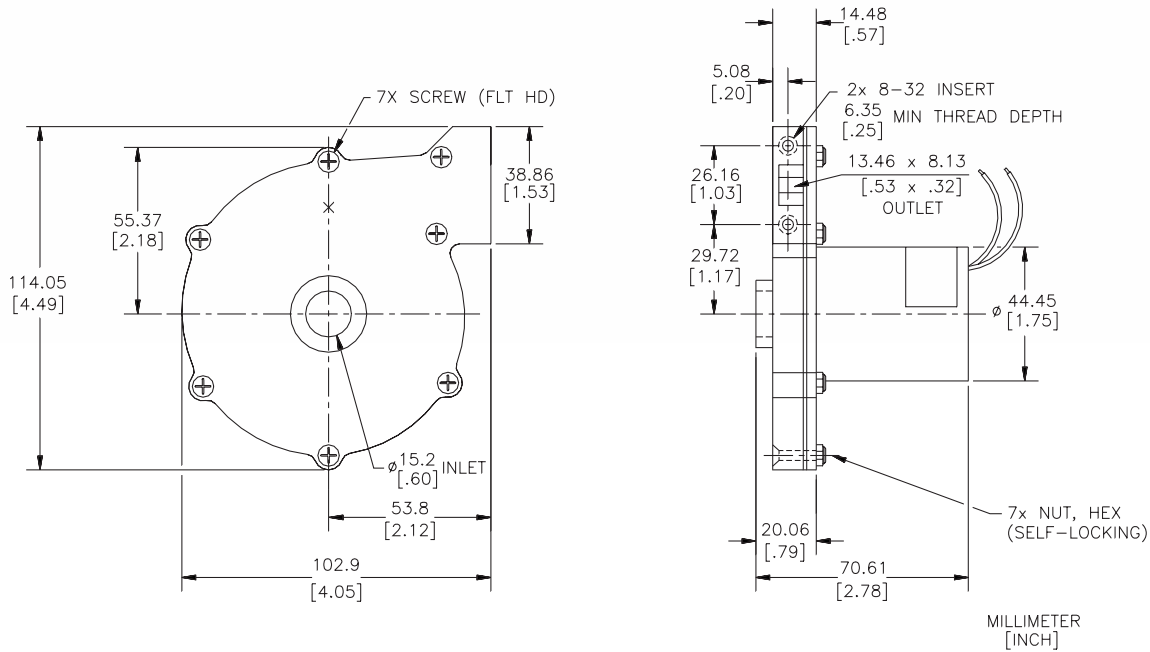
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Tech Bulletin

4.5" (114mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit of Measure	Part Number	
		119494	119395
Voltage Input	VDC	12	24
Stages		1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O, Sealed	28.4	28.4
	mBar	70.7	70.7
Flow Rate, Max. (Open Flow)	CFM	9.1	9.1
	L/sec	4.3	4.3

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	28.4	28.4
2 CFM	in. H ₂ O	26.2	26.2
4 CFM	in. H ₂ O	22.4	22.4
6 CFM	in. H ₂ O	15.3	15.3
8 CFM	in. H ₂ O	5.6	5.6
10 CFM	in. H ₂ O	0	0

Temperature: Working Air: 0°C to 45°C, Ambient Air: 0°C to 45°C, Storage Air: -40°C to 85°C

Dielectric Testing: 200 volts applied for one second between power leads and motor body, one milliamp leakage max.

Speed Control: Speed is controlled by input voltage.

NOTES:

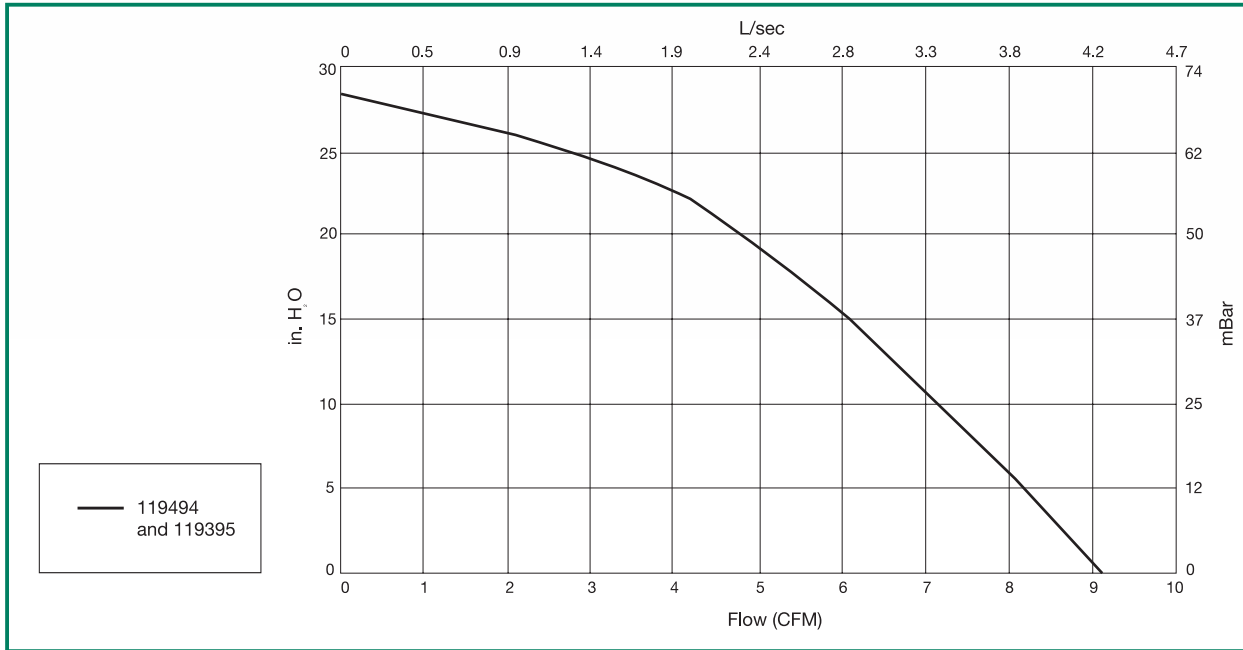
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4.5" (114mm) BLDC Low-Voltage Blower

12/24 VDC

LOW-VOLTAGE BLOWERS

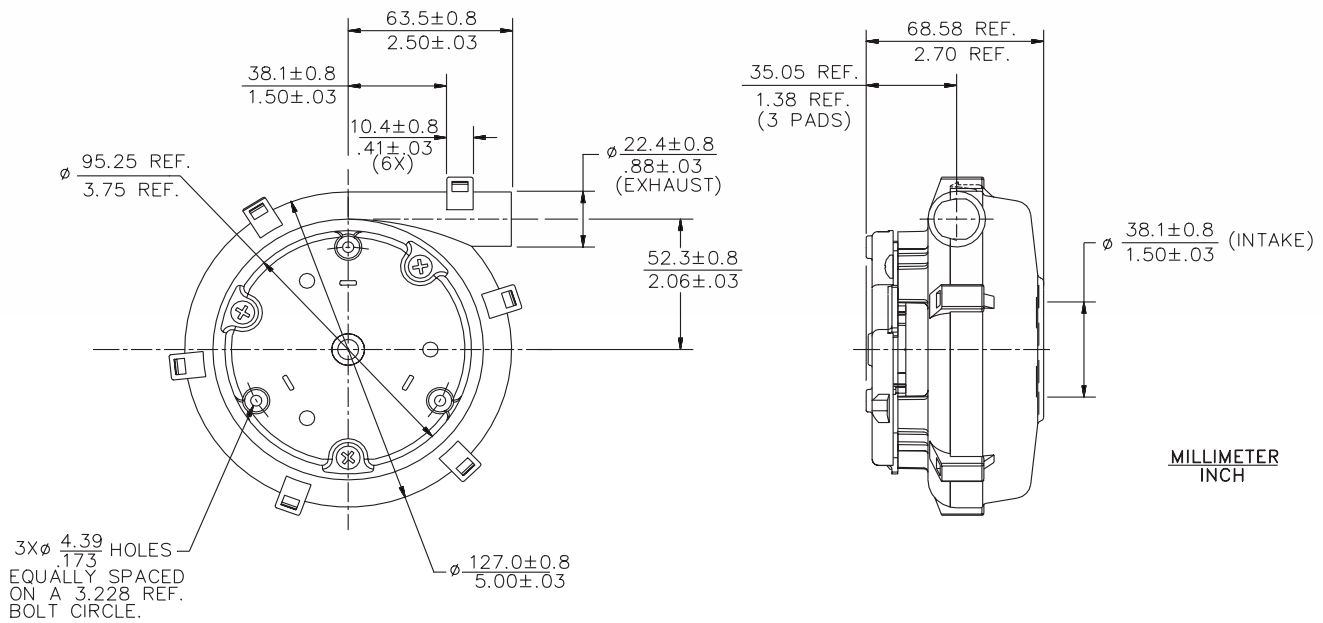


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Tech Bulletin

5.0" (127mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit Measure	Part Number					
		Standard Flow				High Output	
		119380	119381 M 119382 E	119383	119384 M 119385 E	119375	119378 M 119379 E
Voltage Input	VDC	12	12	24	24	24	24
Stages		1	1	1	1	1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O	12	12	12	12	24	24
	mBar	30	30	30	30	60	60
Flow Rate, Max. (Open Flow)	CFM	34	34	34	34	45	45
	L/sec	16	16	16	16	21	21
Drive Electronics	Internal or External	External	Internal	External	Internal	External	Internal

Typical Performance Points

Air Flow	Pressure	119380	119381 M 119382 E	119383	119384 M 119385 E	119375	119378 M 119379 E
0 CFM	in. H ₂ O	12.5	12.5	12.5	12.5	24.3	24.3
10 CFM	in. H ₂ O	11.7	11.7	11.7	11.7	22.0	22.0
20 CFM	in. H ₂ O	7.6	7.6	7.6	7.6	18.4	18.4
30 CFM	in. H ₂ O	2.3	2.3	2.3	2.3	10.8	10.8
40 CFM	in. H ₂ O					3.5	3.5

NOTES:

Temperature: Working Air: 0°C to 45°C, Ambient Air: 0°C to 45°C, Storage Air: -40°C to 85°C

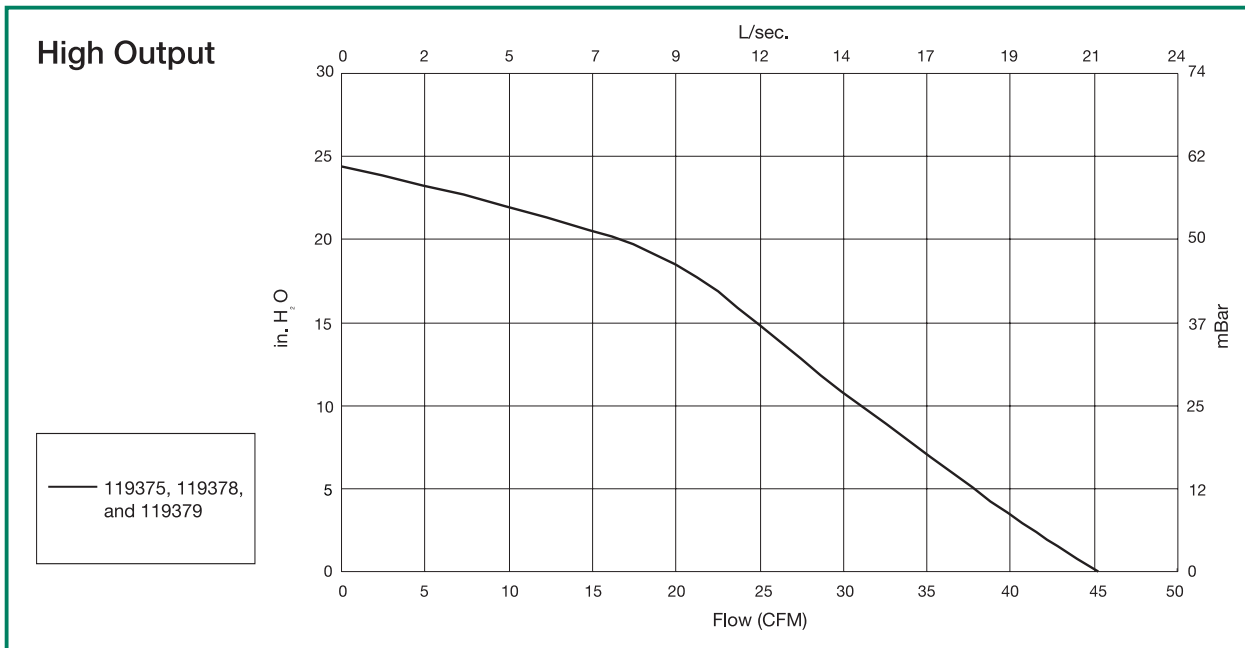
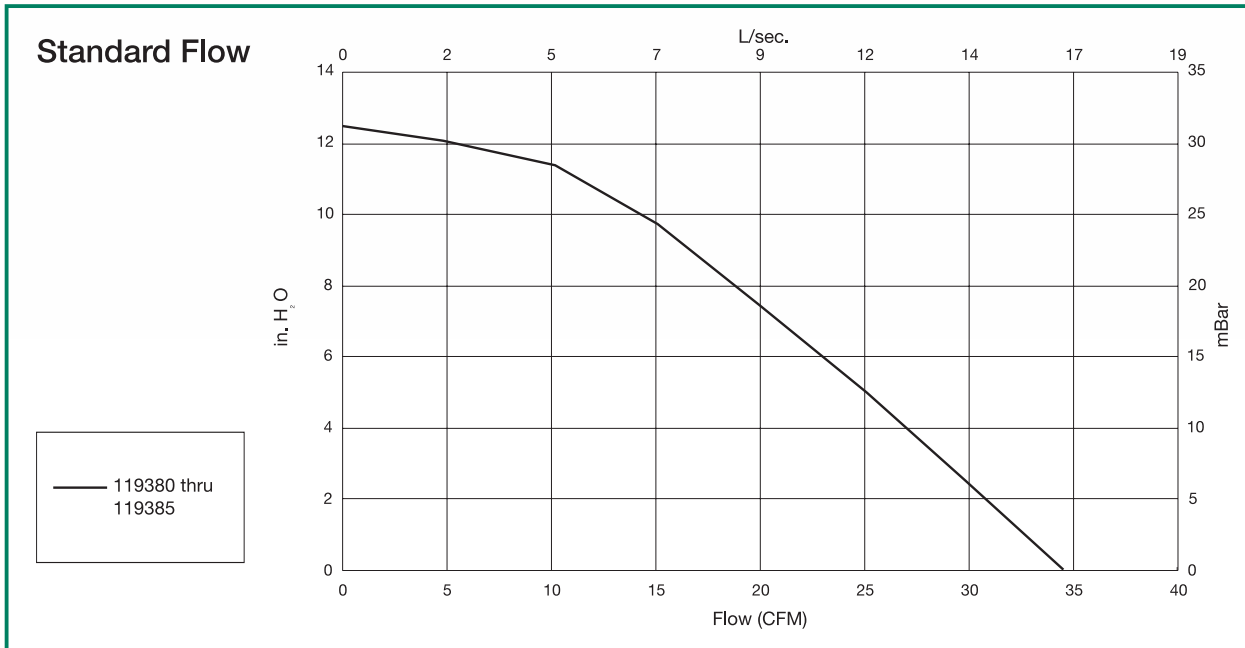
Dielectric Testing: 500 volts AC RMS 60Hz applied for one second between input pins and ground, one milliamps leakage max.

Speed Control: Internal – E (Electrical): Pulse Width Modulated or Analog input voltage (User Supplied), 0 to 5 Volts DC Nominal

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed.
External - These blowers require a 3 phase electronic commutated input to operate. A separate blower controller provides this input and speed control. AMETEK blower controller part numbers 48069 for 12VDC blowers and 48070 for 24 VDC blowers are design for use with the above blowers.

5.0" (127mm) BLDC Low-Voltage Blower

12/24 VDC



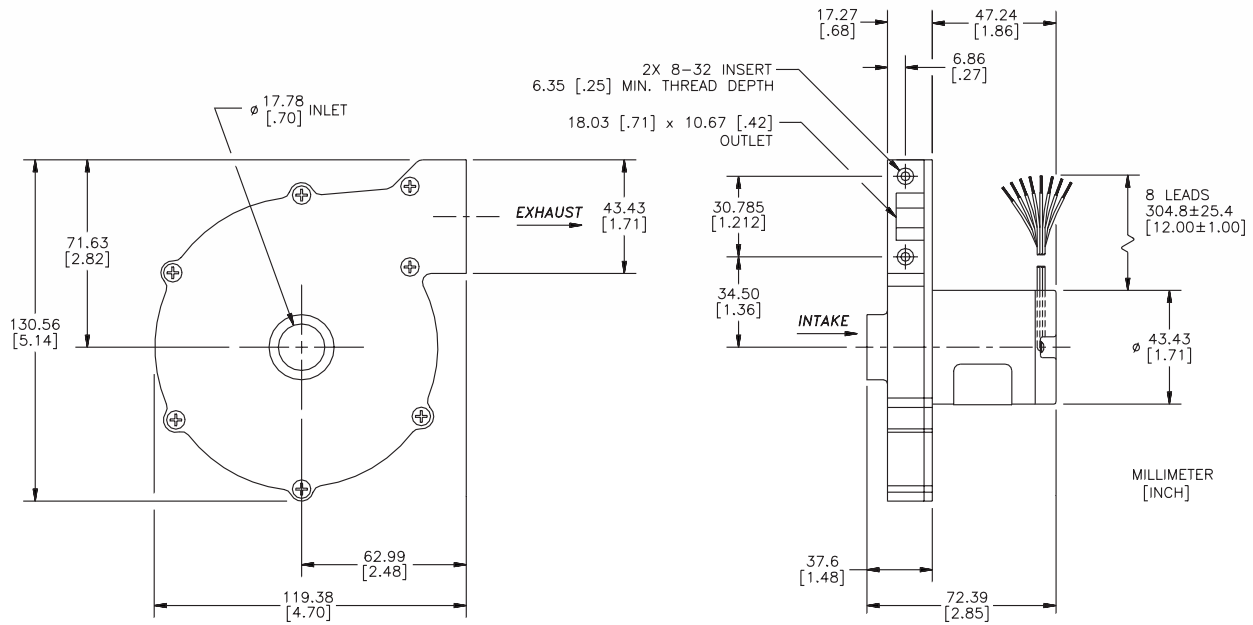
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Tech Bulletin

5.1" (130mm) BLDC Low-Voltage Blower

12/24 VDC



Blower Data	Unit of Measure	Part Number	
		119396	119397
Voltage Input	VDC	12	24
Stages		1	1
Pressure, Max. (Sealed Pressure)	in. H ₂ O, Sealed	25.70	25.70
	mBar	64	64
Flow Rate, Max. (Open Flow)	CFM	15.30	15.30
	L/sec	7.22	7.22

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	25.7	25.7
2 CFM	in. H ₂ O	23.8	23.8
4 CFM	in. H ₂ O	21.7	21.7
6 CFM	in. H ₂ O	19.5	19.5
8 CFM	in. H ₂ O	16.5	16.5
10 CFM	in. H ₂ O	12.0	12.0
12 CFM	in. H ₂ O	7.1	7.1
14 CFM	in. H ₂ O	2.2	2.2
16 CFM	in. H ₂ O	0	0

Input voltage: This product requires a 3 phase electronic commutated input to operate. Refer to the controller section of this catalog for proper controller selection. Input voltages listed in the chart above indicate the controller input voltage requirement.

Temperature: Working Air: 0° C to 45° C, Ambient Air: 0° C to 45° C, Storage Air: -40° C to 85° C

Dielectric Testing: 200 volts applied for one second between power leads and motor body, one milliamp leakage max.

Speed Control: Via 0.5 VDC analog signal or potentiometer setting at controller.

NOTES:

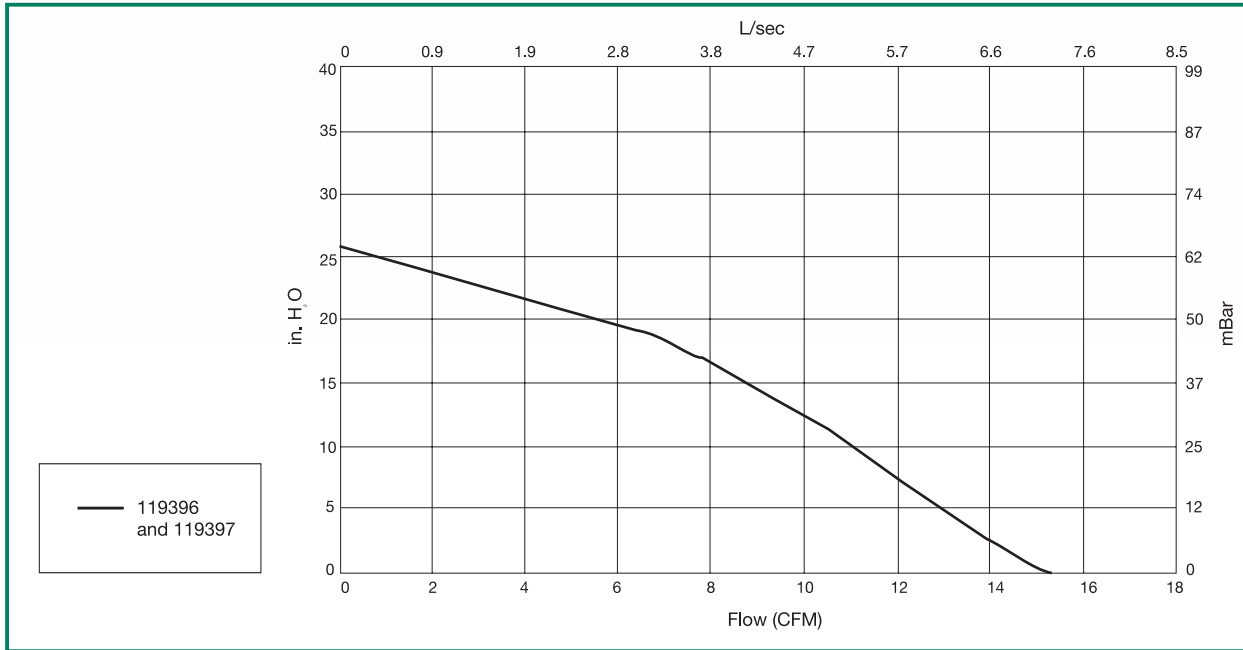
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5.1" (130mm) BLDC Low-Voltage Blower

12/24 VDC

LOW-VOLTAGE BLOWERS



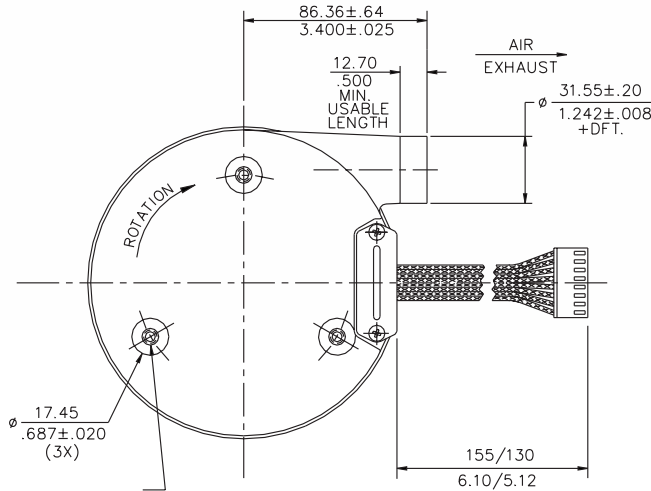
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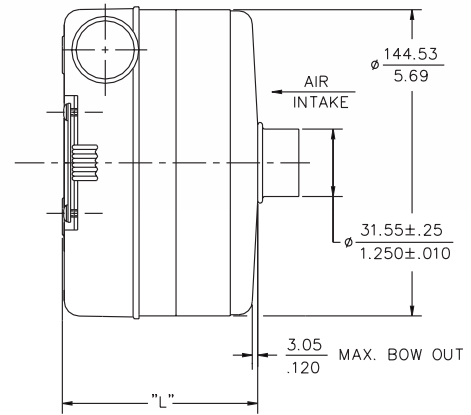
Tech Bulletin

5.7" (145mm) BLDC Low-Voltage Blower

24 VDC



(3) 1/4-20 UNC-2B THREADS,
9.53±.51/.375±.020 DEEP,
Ø7.62±.38/Ø.300±.015 X 81°±1°
C'SINK, EQUALLY SPACED AS
SHOWN ON Ø A 101.60 B.C.



MILLIMETER
INCH

Blower Data	Unit of Measure	Part Numbers		
		116521*	116522	116450*
Voltage Input	VDC	24	24	24
Stages		1	2	3
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O mBar	6 15	20 50	24 60
Pressure, Max. (Sealed Pressure)	in. H ₂ O, sealed mBar	8.2 20	22 55	26 64
Flow Rate, Max. (Open Flow)	CFM L/sec	39 18	35 17	38 18
Length Dimension "L"	inches mm	2.65 67.31	3.66 92.96	4.56 115.82

Typical Performance Points

Air Flow	Pressure		
	in. H ₂ O	in. H ₂ O	in. H ₂ O
0 CFM	8.2	35.7	26.0
5 CFM	8.0	18.1	23.0
10 CFM	7.6	15.5	22.0
15 CFM	7.2	12.8	20.5
20 CFM	6.3	10.0	17.5
25 CFM	5.0	6.3	13.0
30 CFM	3.3	4.0	8.5
35 CFM	1.7	0.10	3.0

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

Input voltage: This product requires a 3 phase electronic commutated input to operate. Refer to the controller section of this catalog for proper controller selection. Input voltages listed in the chart above indicate the controller input voltage requirement.

Input current: 6-10 Amps, Current is dependent on blower model.

Temperature: Working Air: 0° C to 45° C, Ambient Air: 0° C to 45° C, Storage Air: -40° C to 85° C

Dielectric Testing: 500 volts AC RMS 60Hz applied for one second between input pins and ground, one milliamp leakage max.

Speed Control: Speed control is achieved at the blower controller. Refer to the controller section (PAGE 45) of this catalog for proper controller operation.

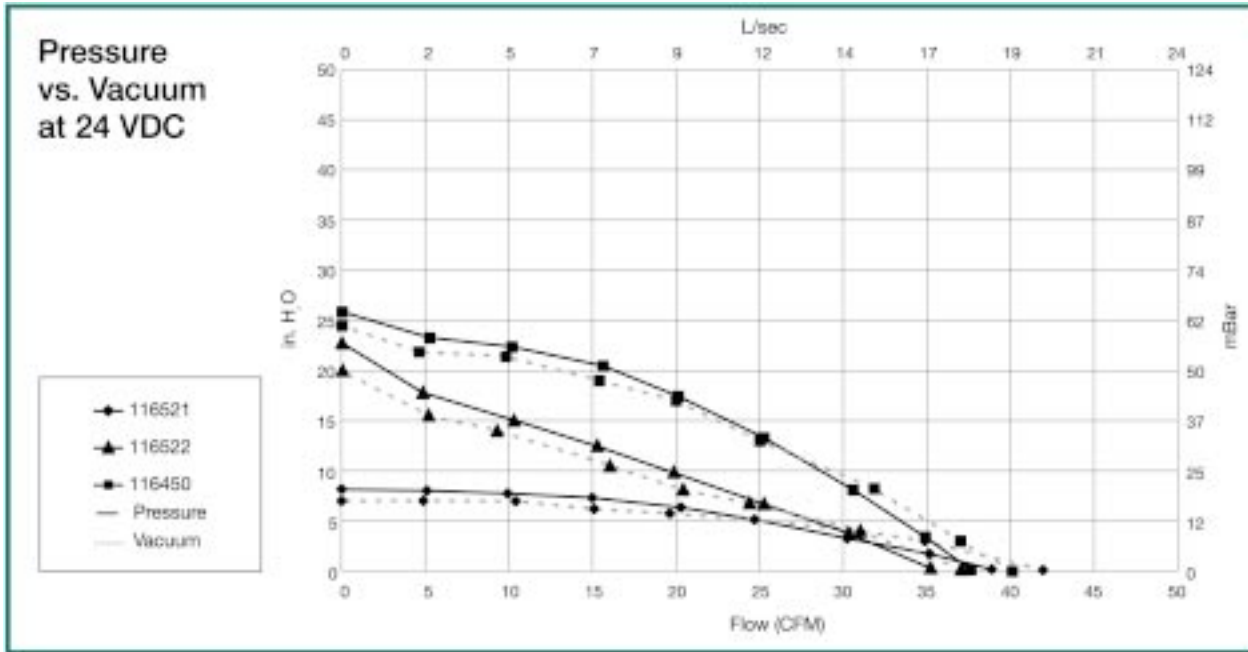
NOTES:

- * This document is for informational purposes only and should not be considered as a binding description of the products and their performance in all applications.
- * AMETEK Rotron products are not designed for and should not be used in medical life support applications.
- * AMETEK reserves the right to revise its products without notification.
- * The above characteristics represent standard products. For product designed to meet specific applications contact AMETEK Rotron Marketing and Sales.

5.7" (145mm) BLDC Low-Voltage Blower

24 VDC

LOW-VOLTAGE BLOWERS



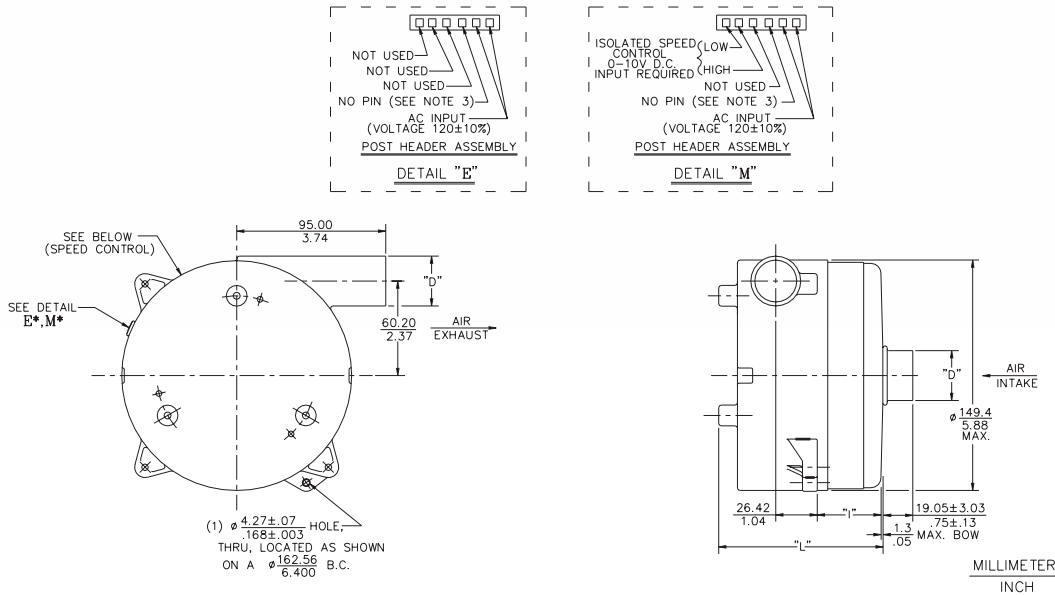
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Tech Bulletin

5.7" (145mm) BLDC Thru Flow Blower

250 WATT, 120 VOLT



Blower Data	Unit of Measure	Part Number					
		Standard Flow			High Flow		
		116626 M	116627 M	116628 M	116644 M	116645 M	116646 M
		116629 E*	116630 E*	116631 E	116647 E	116648 E	116649 E
Stages		1	2	3	1	2	3
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	29	50	70	24	34	45
	mBar	72	124	174	60	84	112
Pressure, Max. (Sealed Pressure)	in. H ₂ O	32	52	75	27	37	50
	mBar	79	129	186	67	92	124
Flow Rate, Max. (Open Flow)	CFM	67	62	46	117	90	80
	L/sec	32	29	22	55	42	38
Inlet/Outlet Diameter	inches	1.25	1.25	1.25	1.75	1.75	1.75
	mm	31.75	31.75	31.75	44.45	44.45	44.45
Length (Dimension "I" above)	inches	0.74	1.65	2.5	0.76	1.88	1.75
	mm	18.80	41.91	63.50	19.30	47.75	44.45
Length (Dimension "L" above)	inches	3.21	4.12	5.02	3.28	4.33	5.34
	mm	81.53	104.65	127.51	83.31	109.98	135.64

Typical Performance Points

Air Flow	Pressure						
0 CFM	in. H ₂ O	32.0	52.2	75.0	27.0	37.1	50.0
10 CFM	in. H ₂ O	30.0	44.5	52.2	26.1	34.1	46.3
20 CFM	in. H ₂ O	28.1	42.3	34.2	25.3	31.7	42.0
30 CFM	in. H ₂ O	24.3	31.8	21.5	23.3	28.9	35.9
40 CFM	in. H ₂ O	19.0	21.8	8.0	23.0	25.9	28.6
50 CFM	in. H ₂ O	12.5	11.7		21.4	21.4	21.9
60 CFM	in. H ₂ O	6.0			18.0	17.8	15.6
70 CFM	in. H ₂ O				16.7	12.4	7.5
80 CFM	in. H ₂ O				13.9	5.7	0
90 CFM	in. H ₂ O				10.2	.09	
100 CFM	in. H ₂ O				6.1		
110 CFM	in. H ₂ O				2.6		

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 120 Volts AC RMS +/- 10%, 60Hz

Input current: 5 amps AC RMS maximum

Temperature: Working Air: 0° C to 50° C, Ambient Air: 0° C to 50° C, Storage Air: -40° C to 85° C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

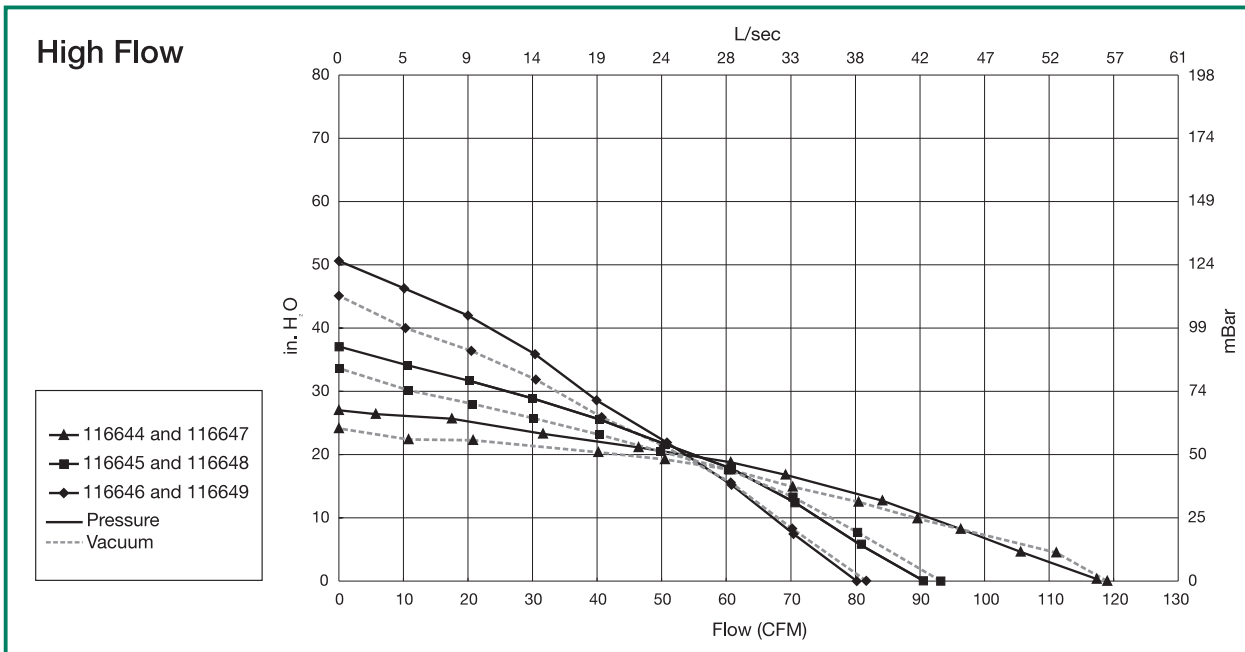
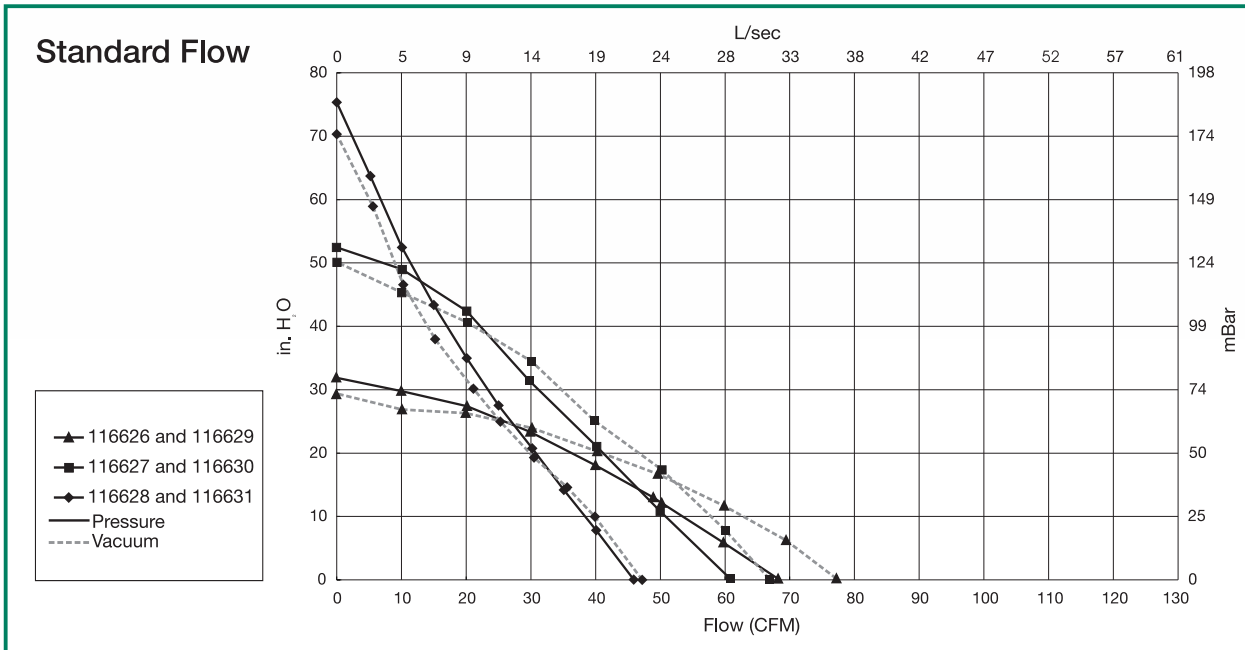
Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

5.7" (145mm) BLDC Thru Flow Blower

250 WATT, 120 VOLT

HIGH-VOLTAGE BLOWERS



Regulatory Agency Certification: Underwriters Laboratories, Inc. is qualified per UL507 under File E-94403. Canadian Standards Association is qualified per C22.2#113 under File LR 43448.

Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust must be free of grease, oil, or foreign particles. Amp housing #350809-1 (to be supplied by customer), mates with post header assembly.

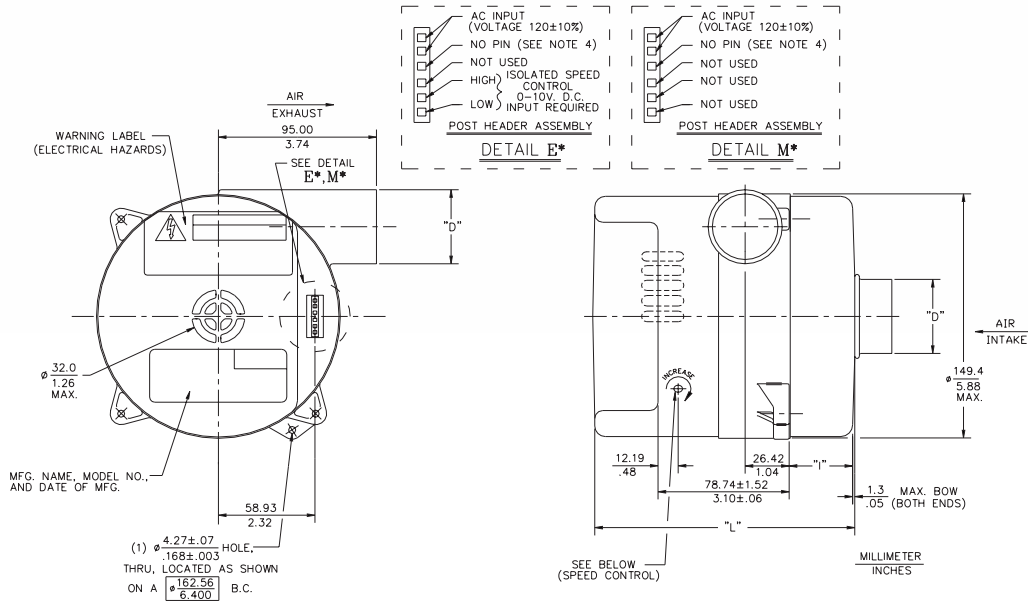
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Tech Bulletin

5.7" (145mm) BLDC Bypass Blower

250 WATT, 120 VOLT



Blower Data	Unit of Measure	Part Number					
		Standard Flow			High Flow		
		116634 M*	116633 M	116632 M*	116637 M*	116636 M*	116635 M
		116640 E*	116639 E	116638 E*	116643 E*	116642 E*	116641 E
Stages		1	2	3	1	2	3
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	29	48	65	26	57.5	42
	mBar	72	119	161	64	143	104
Pressure, Max. (Sealed Pressure)	in. H ₂ O	32	56	76	27	68.0	46
	mBar	79	139	188	67	169	114
Flow Rate, Max. (Open Flow)	CFM	68	63	49	115	110	80
	L/sec	32	30	23	54	52	38
Inlet/Outlet Diameter	inches	1.25	1.25	1.25	1.75	1.75	1.75
	mm	31.75	31.75	31.75	44.45	44.45	44.45
Length (Dimension "I" above)	inches	0.33	1.25	2.14	0.47	1.53	2.53
	mm	8.38	31.75	54.36	11.94	38.86	64.26
Length (Dimension "L" above)	inches	5.08	6.35	6.89	5.22	6.27	7.28
	mm	129.03	161.29	175.01	132.59	159.26	184.91

Typical Performance Points

Air Flow		Pressure					
0 CFM	in. H ₂ O	31.8	56.1	76.2	27.1	48.1	46.0
10 CFM	in. H ₂ O	28.7	48.0	60.3	25.0	44.0	42.8
20 CFM	in. H ₂ O	27.7	44.3	44.1	24.4	41.6	39.2
30 CFM	in. H ₂ O	24.7	38.1	28.9	22.9	37.9	34.9
40 CFM	in. H ₂ O	20.1	28.9	16.1	21.2	32.2	30.0
50 CFM	in. H ₂ O	14.5	18.2		19.1	25.8	24.3
60 CFM	in. H ₂ O	7.3	4.2		17.2	20.5	16.2
70 CFM	in. H ₂ O				15.0	15.8	9.8
80 CFM	in. H ₂ O				12.2	7.1	
90 CFM	in. H ₂ O				8.0		
100 CFM	in. H ₂ O				5.5		

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 120 Volts AC RMS +/- 10%, 60Hz

Input current: 5 amps AC RMS maximum

Temperature: Working Air: 0° C to 50° C, Ambient Air: 0° C to 50° C, Storage Air: -40° C to 85° C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

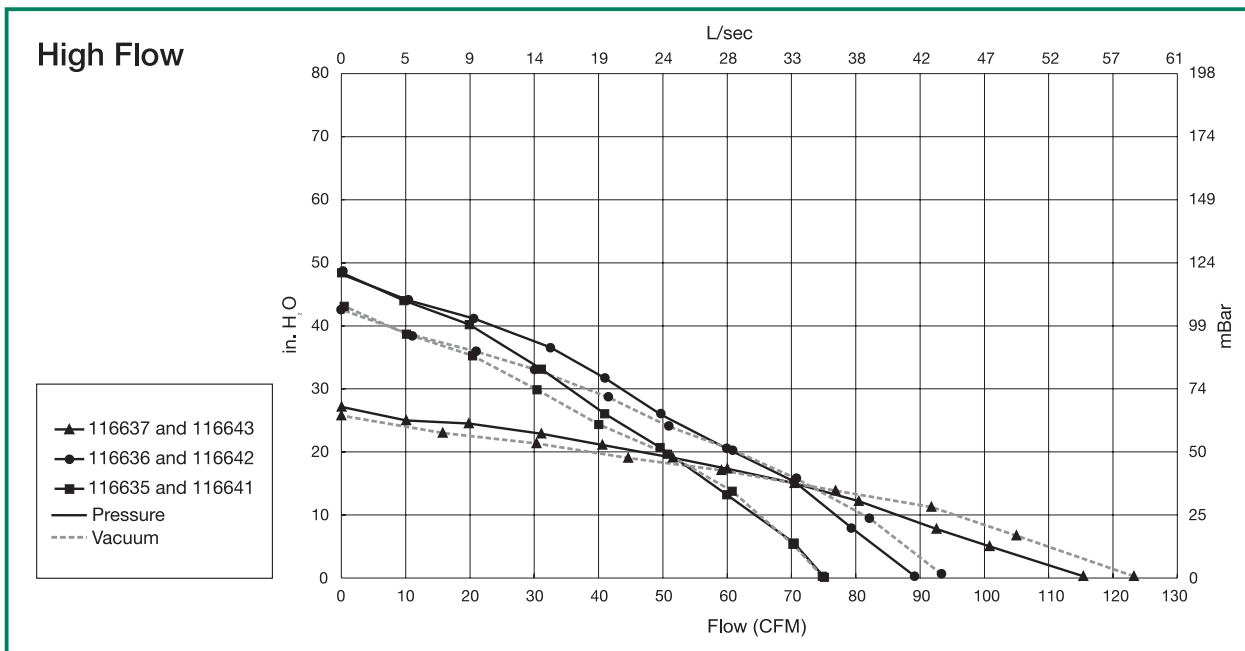
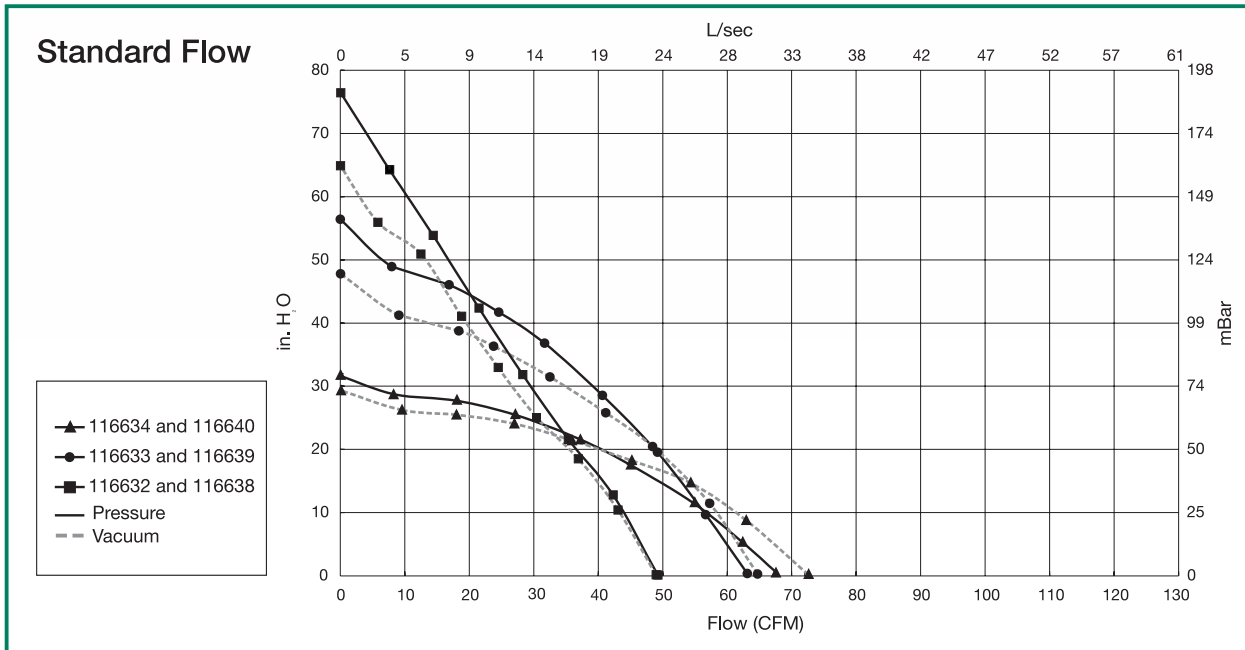
Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

5.7" (145mm) BLDC Bypass Blower

250 WATT, 120 VOLT

HIGH-VOLTAGE BLOWERS



Regulatory Agency Certification: Underwriters Laboratories, Inc. is qualified per UL507 under File E-94403; Canadian Standards Association is qualified per C22.2#113 under File LR 43448.

Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust are free of grease, oil, or foreign particles. Amp housing #640250-6 (to be supplied by customer), mates with post header assembly.

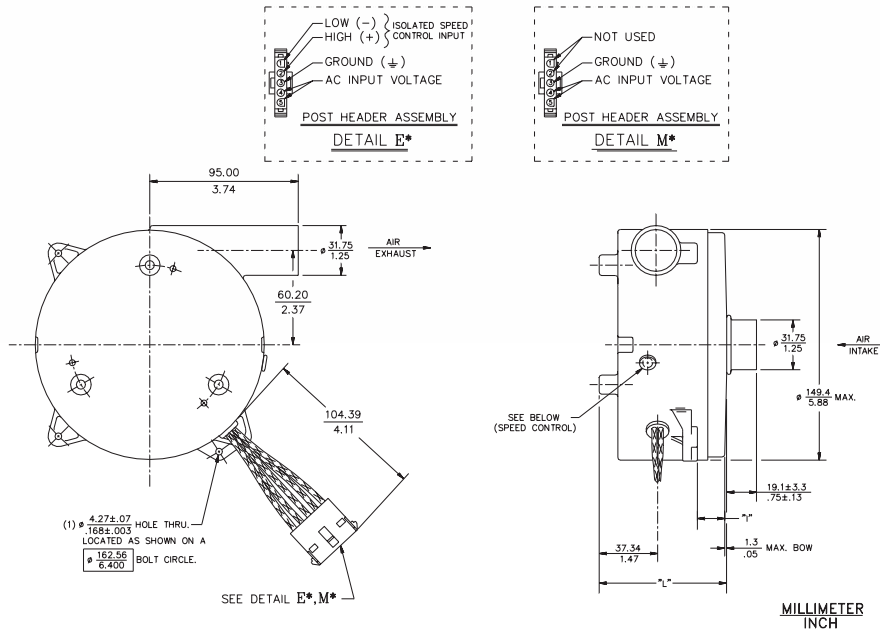
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Tech Bulletin

5.7" (145mm) BLDC Thru Flow Blower

400 WATT, 240 VOLT



Blower Data	Unit of Measure	Part Number	
		Standard Flow	
		117629 E*	117630 E*
Stages		1	2
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	28	47
	mBar	69	117
Pressure, Max. (Sealed Pressure)	in. H ₂ O	31	50
	mBar	77	124
Flow Rate, Max. (Open Flow)	CFM	67	65
	L/sec	32	31
Length (Dimension "I" above)	inches	.69	1.60
	mm	17.53	40.64
Length (Dimension "L" above)	inches	3.21	4.12
	mm	81.53	104.65

Typical Performance Points

Air Flow	Pressure		
0 CFM	in. H ₂ O	31.1	50.5
10 CFM	in. H ₂ O	26.8	45.4
20 CFM	in. H ₂ O	23.8	40.9
30 CFM	in. H ₂ O	20.5	33.7
40 CFM	in. H ₂ O	15.8	25.3
50 CFM	in. H ₂ O	10.0	16.0
60 CFM	in. H ₂ O	4.4	6.46
70 CFM	in. H ₂ O		

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 240 Volts AC RMS +/- 10%, 60Hz

Input current: 5 amps AC RMS maximum

Temperature: Working Air: 0° C to 50° C, Ambient Air: 0° C to 50° C, Storage Air: -40° C to 85° C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

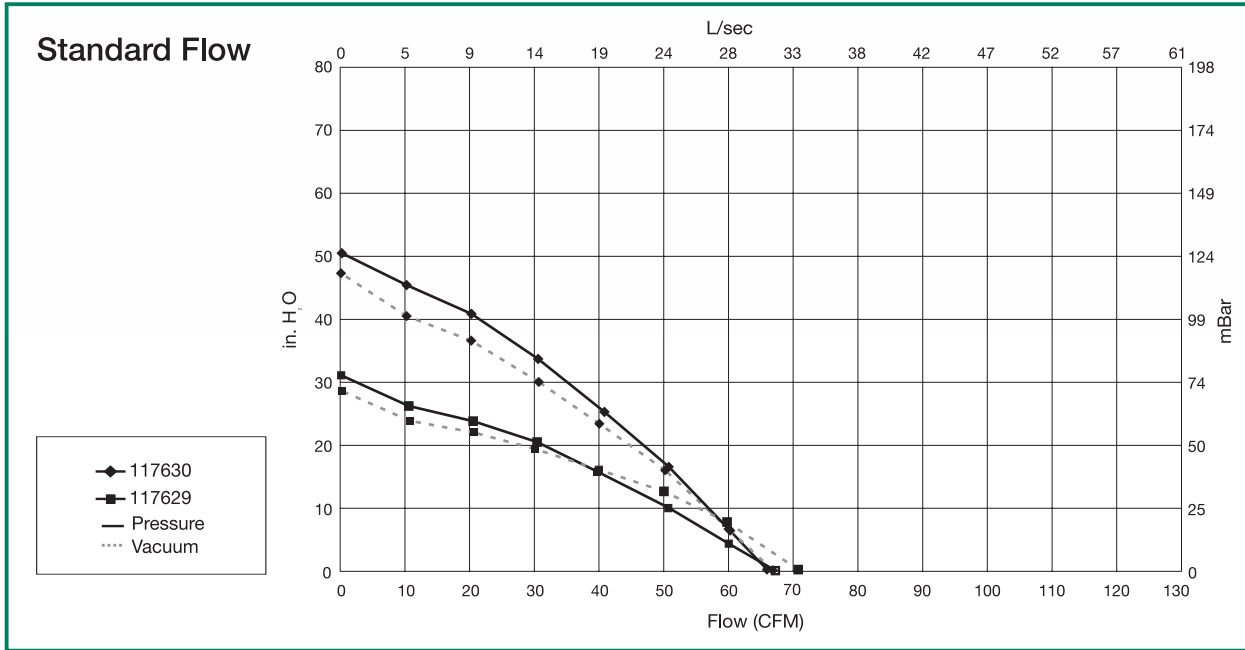
Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

5.7" (145mm) BLDC Thru Flow Blower

400 WATT, 240 VOLT

HIGH-VOLTAGE BLOWERS



Regulatory Agency Certification: Underwriters Laboratories, Inc. is qualified per UL507 under File E-94403; Canadian Standards Association is qualified per C22.2#113 under File LR 43448.

Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust are free of grease, oil, or foreign particles. Amp housing #350809-1 (to be supplied by customer), mates with post header assembly.

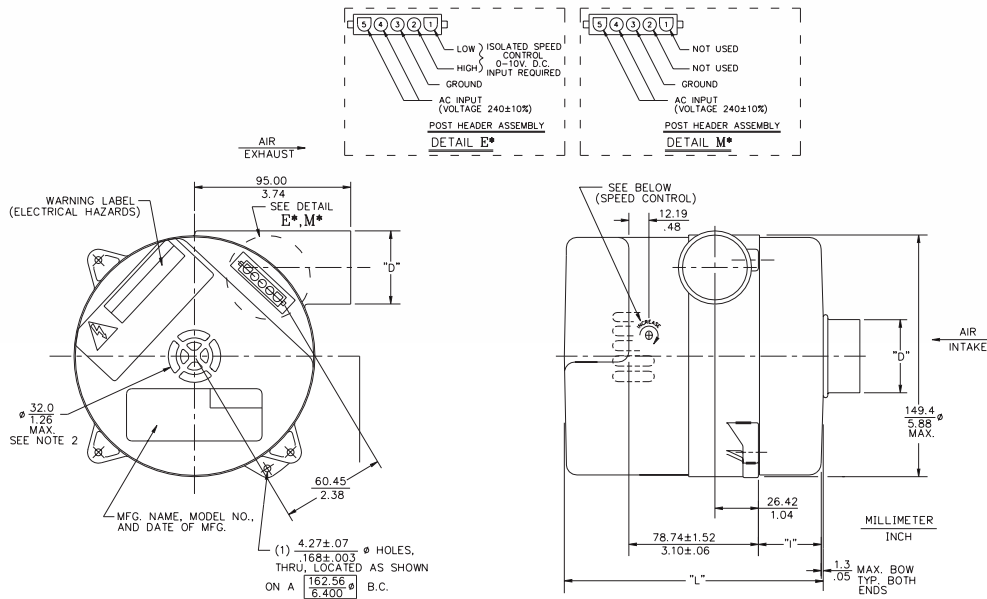
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Tech Bulletin

5.7" (145mm) BLDC Bypass Blower

400 WATT, 240 VOLT



Blower Data	Unit of Measure	Part Number					
		Standard Flow			High Flow		
		117634 M*	117633 M	117632 M*	117637 M*	117636 M*	117635 M*
		117640 E*	117639 E	117638 E*	117643 E*	117642 E*	117641 E*
Stages		1	2	3	1	2	3
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	28	45	60	23	39	53
	mBar	69	112	149	57	97	131
Pressure, Max. (Sealed Pressure)	n. H ₂ O	30	51	70	25	45	61
	mBar	74	126	174	62	112	151
Flow Rate, Max. (Open Flow)	CFM	69	62	58	114	97	86
	L/sec	33	29	27	54	46	41
Inlet/Outlet Diameter	inches	1.25	1.25	1.25	1.75	1.75	1.75
	mm	31.75	31.75	31.75	44.45	44.45	44.45
Length (Dimension "I" above)	inches	2.53	1.25	2.14	.47	1.53	2.53
	mm	64.26	31.75	54.36	11.94	38.86	64.26
Length (Dimension "L" above)	inches	5.08	5.99	6.89	5.22	6.27	7.28
	mm	129.03	152.15	175.01	132.59	159.26	184.91

Typical Performance Points

Air Flow		Pressure					
0 CFM	in. H ₂ O	30.3	51.0	69.9	24.8	44.6	61.5
10 CFM	in. H ₂ O	27.9	44.2	59.9	23.6	41.0	55.8
20 CFM	in. H ₂ O	26.2	41.8	52.8	22.6	39.8	51.5
30 CFM	in. H ₂ O	23.6	35.9	44.1	21.5	35.8	46.0
40 CFM	in. H ₂ O	19.0	27.8	32.1	19.5	32.0	40.1
50 CFM	in. H ₂ O	13.3	16.6	18.1	17.9	28.0	34.2
60 CFM	in. H ₂ O	7.0	3.7		16.1	23.9	28.2
70 CFM	in. H ₂ O	3.7			13.8	17.9	19.6
80 CFM	in. H ₂ O				12.0	12.1	8.1
90 CFM	in. H ₂ O				8.7	0	
100 CFM	in. H ₂ O				6.7		
110 CFM	in. H ₂ O				0		

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 240 Volts AC RMS +/- 10%, 50/60Hz

Input current: 5 amps AC RMS maximum

Temperature: Working Air: 0° C to 50° C, Ambient Air: 0° C to 50° C, Storage Air: -40° C to 85° C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

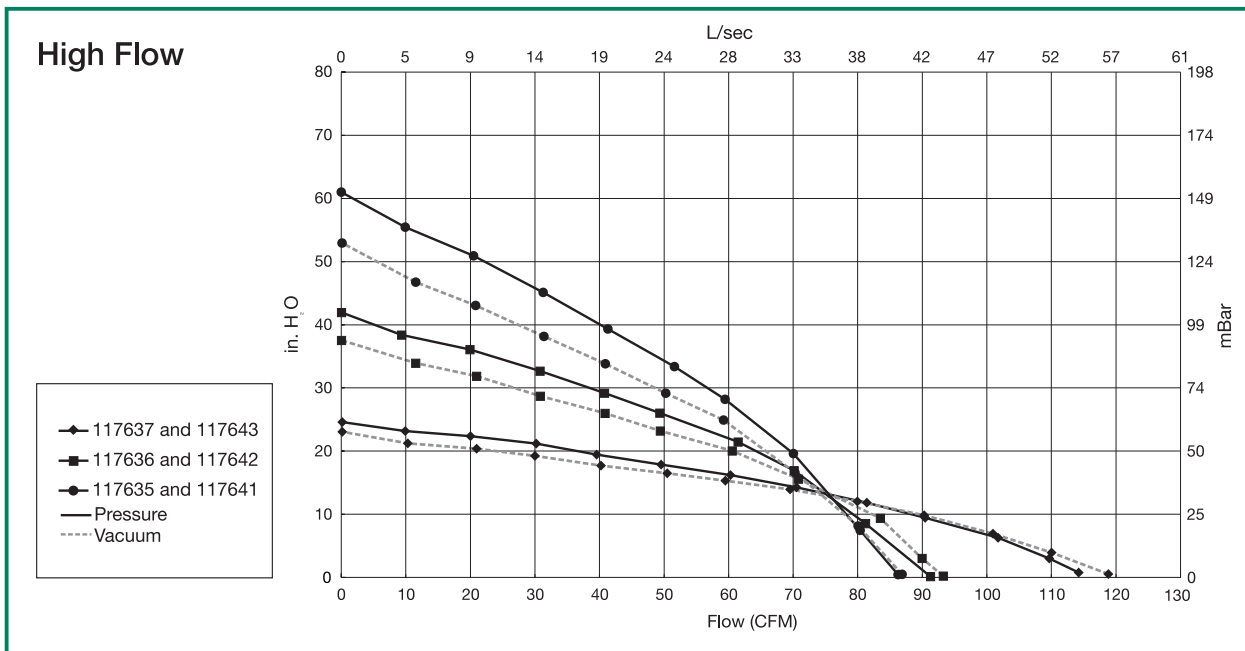
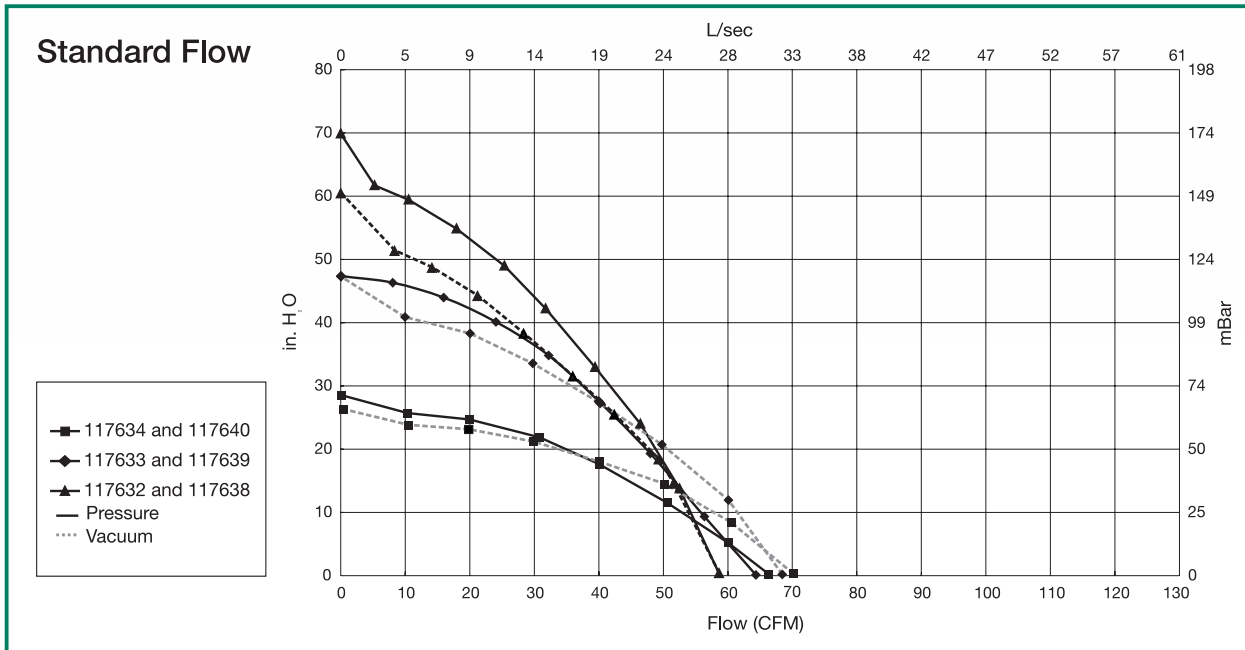
Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

5.7" (145mm) BLDC Bypass Blower

400 WATT, 240 VOLT

HIGH-VOLTAGE BLOWERS



Regulatory Agency Certification: T.U.V. Rheinland Bauart Certification* is qualified per EN60950 under License No. R0097184. Underwriters Laboratories, Inc. Qualified per UL507 under File E-94403. Canadian Standards Association Qualified per C22.2#113 under File LR 43448.

Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust are free of grease, oil, or foreign particles. Amp housing #1-480763-0 (to be supplied by customer), mates with post header assembly.

*IEC 801 testing has been completed, and specific data can be provided upon request.

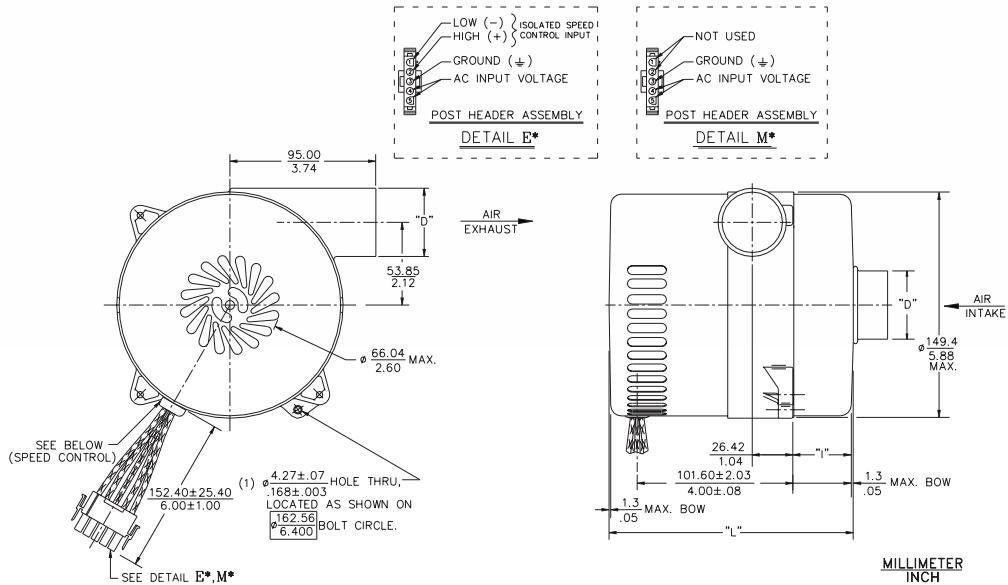
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Tech Bulletin

5.7" (145mm) BLDC Bypass Blower

800 WATT, 120 VOLT



Blower Data	Unit of Measure	Part Number			
		Standard Flow	High Flow		Ultra Flow
		117418 M*	119102 M*	119104 M*	
		117417 E*	119101 E*	119103 E*	119105 E*
Stages		3	1	2	1
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	106	41	71	26
	mBar	263	102	176	64
Pressure, Max. (Sealed Pressure)	in. H ₂ O	115	44	76	29
	mBar	285	109	188	72
Flow Rate, Max. (Open Flow)	CFM	67	161	119	242
	L/sec	32	76	56	114
Inlet/Outlet Diameter	inches	1.25	1.75	1.75	2.75/2.50
	mm	31.75	44.45	44.45	69.85/63.50
Length (Dimension "I" above)	inches	2.12	.47	1.53	.71
	mm	53.85	11.94	38.86	18.03
Length (Dimension "L" above)	inches	6.87	5.30	6.35	5.46
	mm	174.50	134.62	161.29	138.68

Typical Performance Points

Air Flow	Pressure				
0 CFM	in. H ₂ O	115.8	44.1	76.2	29.3
20 CFM	in. H ₂ O	86.6	41.8	68.4	27.5
40 CFM	in. H ₂ O	54.9	39.2	57.2	26.1
60 CFM	in. H ₂ O	18.3	34.1	43.5	23.5
80 CFM	in. H ₂ O		29.0	33.2	21.6
100 CFM	in. H ₂ O		23.3	19.8	17.6
120 CFM	in. H ₂ O		14.4	0	15.8
140 CFM	in. H ₂ O		7.0		14.1
160 CFM	in. H ₂ O		0		11.2
180 CFM	in. H ₂ O				8.2
200 CFM	in. H ₂ O				5.5
220 CFM	in. H ₂ O				2.8
240 CFM	in. H ₂ O				1.2

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 120 Volts AC RMS +/- 10%, 60Hz

Input current: 10 amps AC RMS maximum

Temperature: Working Air: 0°C to 50°C, Ambient Air: 0°C to 50°C, Storage Air: -40°C to 85°C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

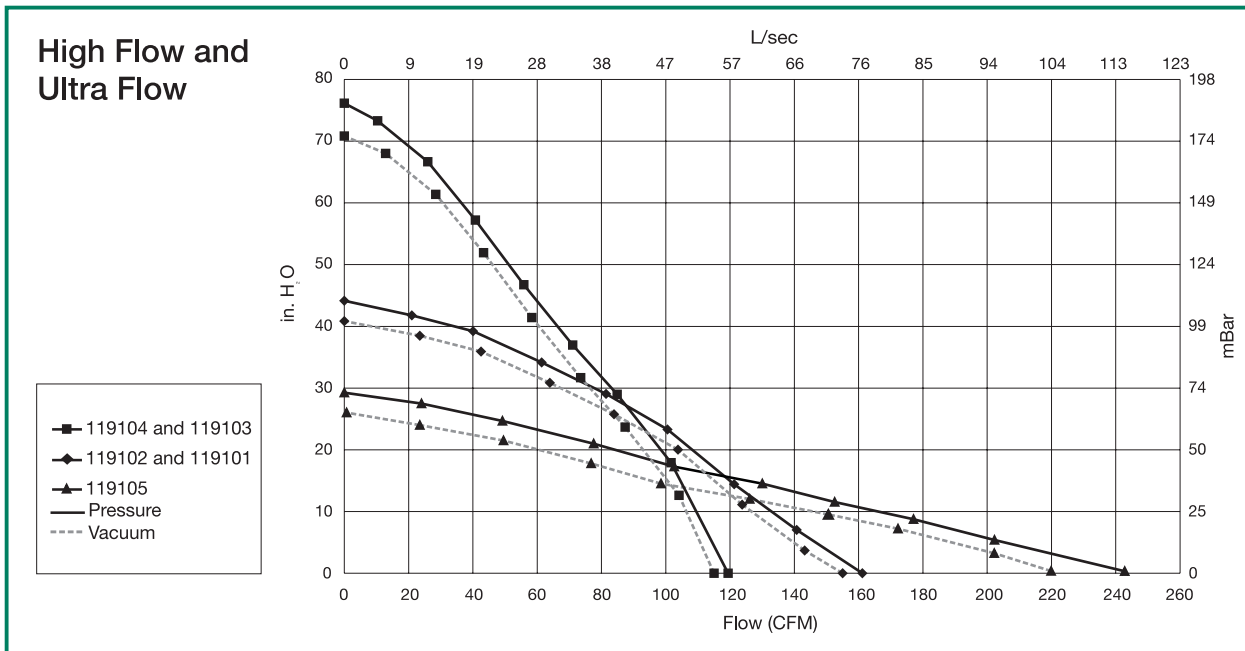
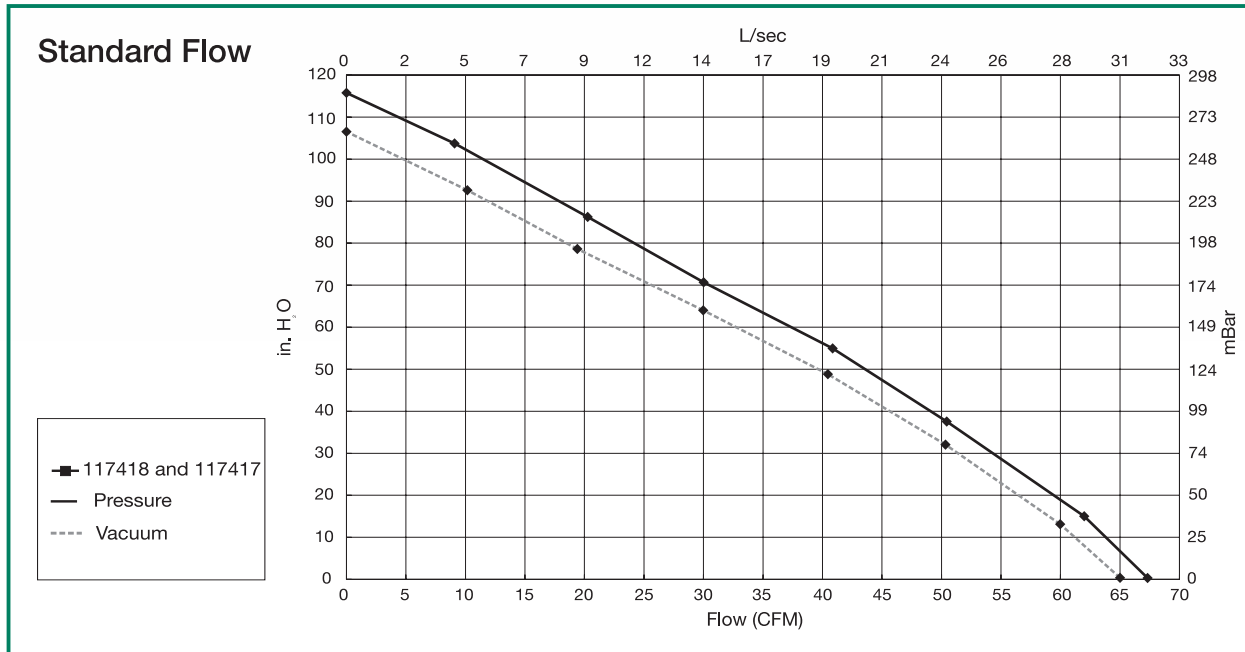
Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

5.7" (145mm) BLDC Bypass Blower

800 WATT, 120 VOLT

HIGH-VOLTAGE BLOWERS



Regulatory Agency Certification: T.U.V. Rheinland Bauart Certification* is qualified per EN60950 under Licence No. R9571008; Underwriters Laboratories, Inc. is qualified per UL507 under File E-94403; Canadian Standards Association is qualified per C22.2#113 under File LR 43448.

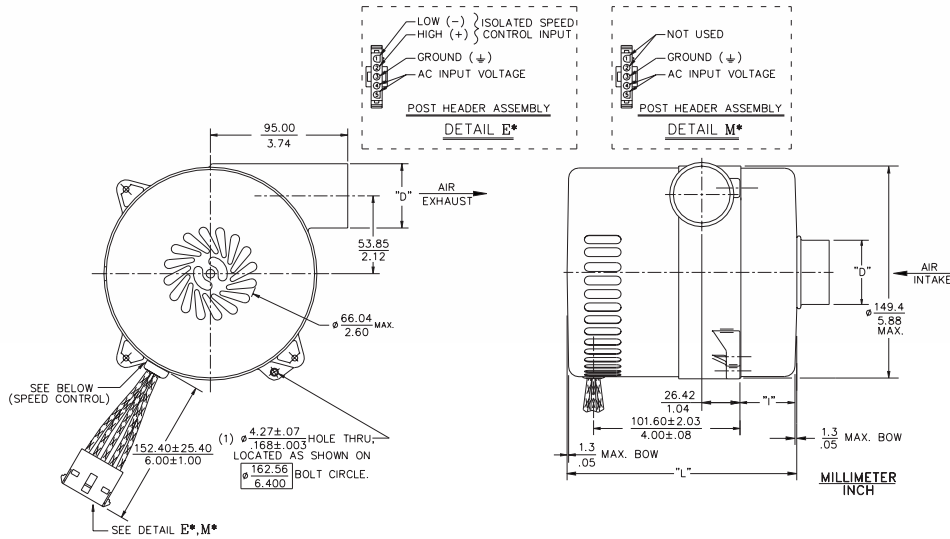
Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust must be free of grease, oil, or foreign particles. Amp housing #350810-1 (to be supplied by customer), mates with post header assembly.

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions, data is corrected to 0.075 lb./ft³ air density (29.92" Hg @ 70° F.). Actual performance will vary depending on the operating environment and application. AMETEK Rotron products are not designed for use with volatile, hazardous or corrosive gases. Blower housings are not sealed, slight air/gas leakage will occur. AMETEK Rotron products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification.

Tech Bulletin

5.7" (145mm) DC Bypass Blower

1200 WATT, 240 VOLT



Blower Data	Unit of Measure	Part Number			
		Standard Flow	High Flow		Ultra Flow
		117416 M*	119152 M*	119154 M*	
		117415 E*	119151 E*	119153 E*	119155 E*
Stages		3	1	2	1
Vacuum, Max. (Sealed Vacuum)	in. H ₂ O	135	50	91	33
	mBar	335	124	226	82
Pressure, Max. (Sealed Pressure)	in. H ₂ O	144	54	97	39
	mBar	357	134	241	97
Flow Rate, Max. (Open Flow)	CFM	82	190	156	307
	L/sec	39	90	74	145
Inlet/Outlet Diameter	inches	1.25	1.75	1.75	2.75/2.50
	mm	31.75	44.45	44.45	69.85/63.50
Length (Dimension "I" above)	inches	2.12	.47	1.53	.70
	mm	53.85	11.94	38.86	17.78
Length (Dimension "L" above)	inches	6.87	5.11	6.35	5.47
	mm	174.50	128.77	161.29	138.94

Typical Performance Points

Air Flow	Pressure				
0 CFM	in. H ₂ O	144.3	54.0	97.0	39.2
20 CFM	in. H ₂ O	129.1	53.9	92.5	38.0
40 CFM	in. H ₂ O	102.9	51.1	85.8	37.5
60 CFM	in. H ₂ O	60.8	47.0	75.9	35.3
80 CFM	in. H ₂ O	10.8	43.2	62.3	33.5
100 CFM	in. H ₂ O		37.0	40.5	31.4
120 CFM	in. H ₂ O		29.4	32.1	28.0
140 CFM	in. H ₂ O		22.3	15.0	25.4
160 CFM	in. H ₂ O		14.2		21.5
180 CFM	in. H ₂ O				18.5
200 CFM	in. H ₂ O				16.1
220 CFM	in. H ₂ O				13.1
240 CFM	in. H ₂ O				10.0
260 CFM	in. H ₂ O				7.4
280 CFM	in. H ₂ O				4.3
300 CFM	in. H ₂ O				1.0

*These part numbers are available through AMETEK Rotron distributors. See page 54 for distributor information.

NOTES:

Nominal input voltage: 240 Volts AC RMS +/- 10%, 50/60Hz

Input current: 5 amps AC RMS maximum

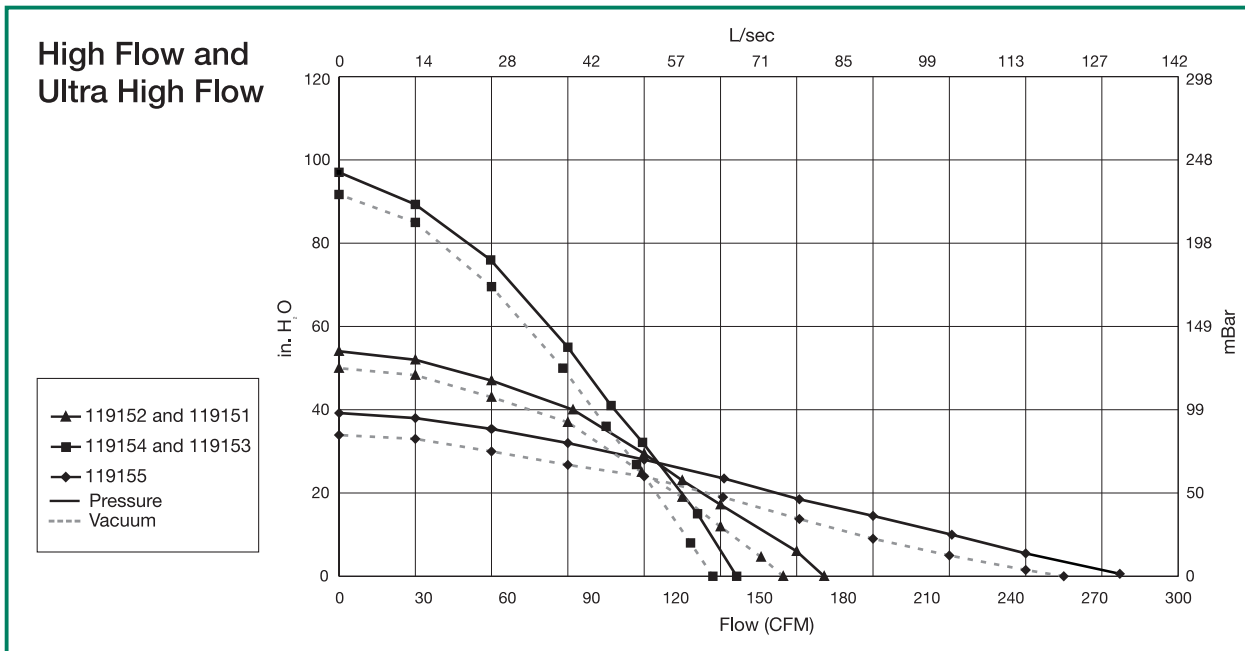
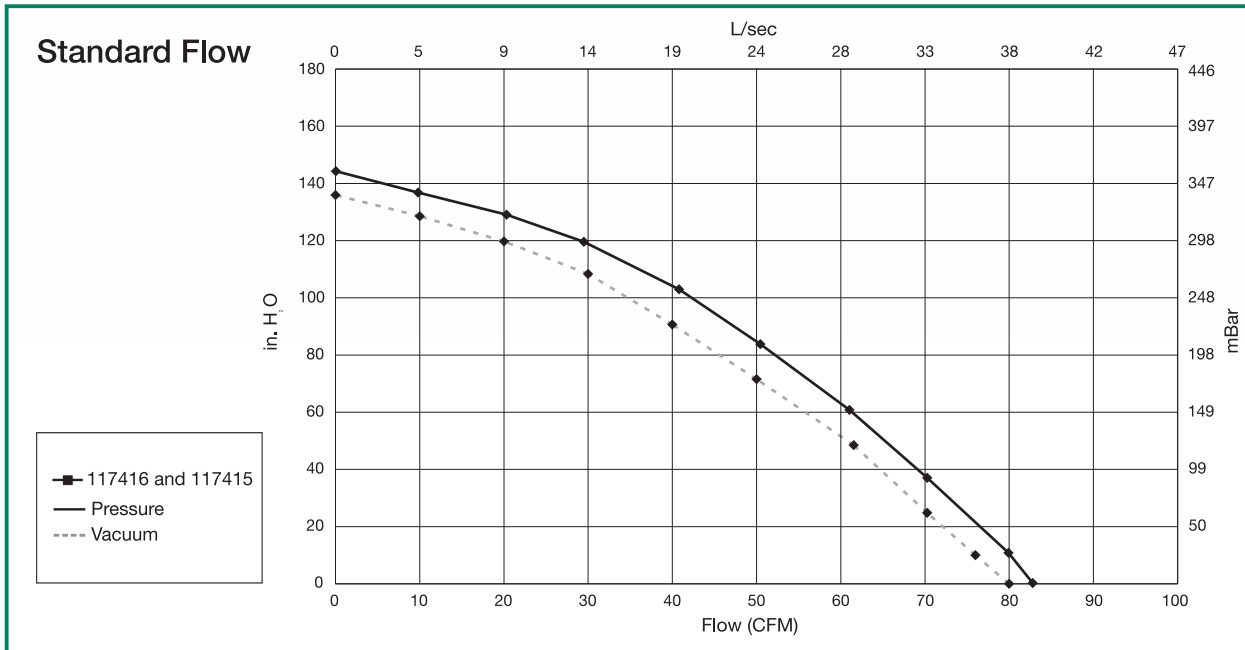
Temperature: Working Air: 0°C to 50°C, Ambient Air: 0°C to 50°C, Storage Air: -40°C to 85°C

Dielectric Testing: 1500 volts AC RMS 60Hz applied for one second between input pins and ground, 3mA leakage max.

5.7" (145mm) DC Bypass Blower

1200 WATT, 240 VOLT

HIGH-VOLTAGE BLOWERS



NOTES (continued):

Speed Control: E (Electrical): Pulse Width Modulation or Analog input voltage (User Supplied), 0 to 10 Volts DC Nominal, 10mA Maximum, 3 to 15 volts DC Maximum. Access to sensitivity adjustment for 0-10 VDC speed control. (Ref. pin connection)

M (Mechanical): A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access to speed adjustment.

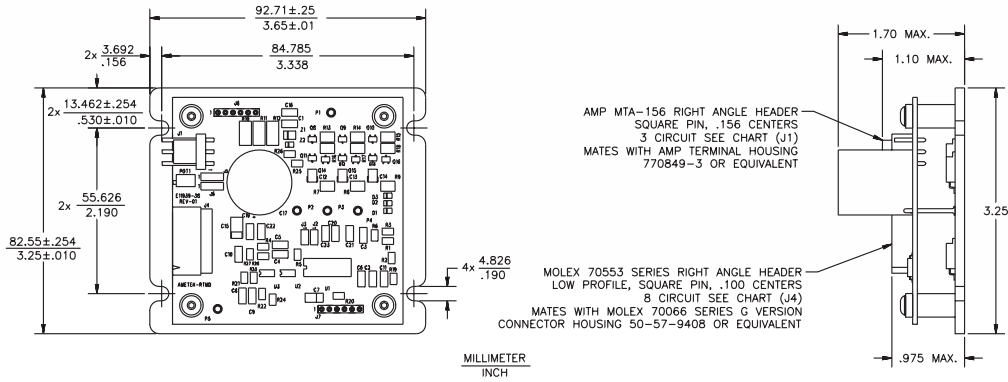
Regulatory Agency Certification: T.U.V. Rheinland Bauart Certification* is qualified per EN60950 under License No. 9571008; Underwriters Laboratories, Inc. is qualified per UL507 under File E 94403; Canadian Standards Association is qualified per C22.2#113 under File LR 43448.

Miscellaneous: Intake & exhaust tubes, all cooling ducts and vents must not be obstructed. Intake and exhaust must be free of grease, oil, or foreign particles. Amp housing #350809-1 (to be supplied by customer), mates with post header assembly.

*IEC 801 testing has been completed, and specific data can be provided upon request.

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5 Amp BLDC Blower Controller



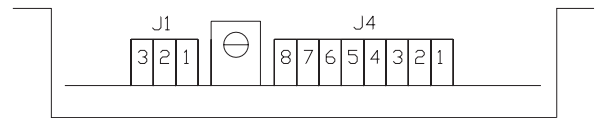
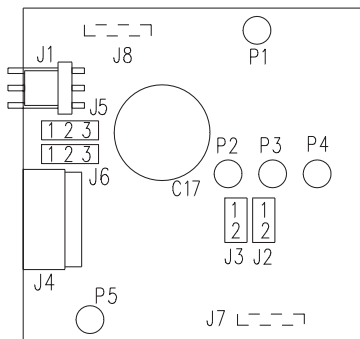
Controller Data	Blower Controllers
	48132
Max Continuous Current	5 A
Input Voltage Range	11-52 VDC
Controller PWM Frequency	25 kHz
Analog Speed Input	0-5 VDC
Electrical Hall Spacing	60° or 120°
Waveform	8-Step Trapezoidal
Current Limit Protection	Yes
Rotation	CW / CCW

NOTES:

Temperature: Operating: 0° C to 50° C, Storage Air: -40° C to 85° C

Speed Control: Electrical speed control is achieved by applying a 0 to 5 VDC signal on J1 Pin 3 with respect to J1 Pin 2. Mechanical speed control is achieved by adjusting the potentiometer when J6 is in position 1 to 2.

Current Control: Trip point is at 5 Amp maximum.



- | | |
|-----------------------|--------------------|
| J1-1 Vin | J4-1 Motor Phase A |
| J1-2 Vin Return (Gnd) | J4-2 Motor Phase C |
| J1-3 Analog Speed In | J4-3 Hall - (Gnd) |
| | J4-4 Hall 1 |
| | J4-5 Hall 2 |
| | J4-6 Hall 3 |
| | J4-7 Hall + (+12V) |
| | J4-8 Motor Phase B |

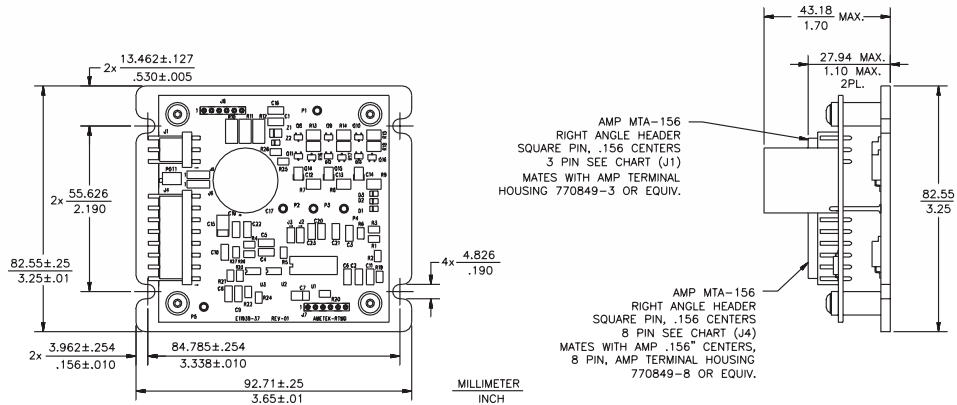
Caution should be taken. Misplacement of jumper setting will destroy the control.

- Jumper Settings:**
- J6 Set to position 1-2 for internal speed adjust.
Set to position 2-3 for analog speed input voltage.
 - J3 Disable or enable to determine forward/reverse rotation.
 - J2 Disable for 60° electrical spacing.
Enable for 120° electrical spacing.
 - J5 Set position 1-2 for 16-52 VDC
Set position 2-3 for 11-16 VDC

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10 Amp BLDC Blower Controller



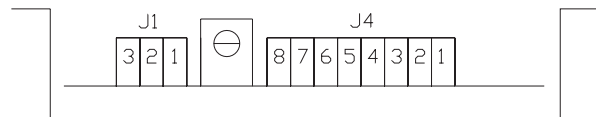
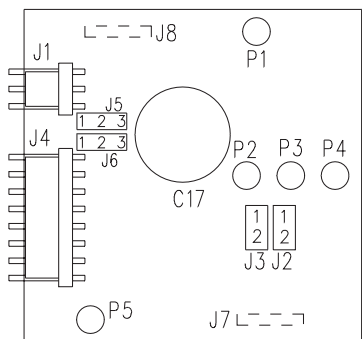
Controller Data	Blower Controllers
	48133
Max Continuous Current	10 A
Input Voltage Range	11-52 VDC
Controller PWM Frequency	25 kHz
Analog Speed Input	0-5 VDC
Electrical Hall Spacing	60° or 120°
Waveform	8-Step Trapezoidal
Current Limit Protection	Yes
Rotation	CW / CCW

NOTES:

Temperature: Operating: 0° C to 50° C, Storage Air: -40° C to 85° C

Speed Control: Electrical speed control is achieved by applying a 0 to 5 VDC signal on J1 Pin 3 with respect to J1 Pin 2. Mechanical speed control is achieved by adjusting the potentiometer when J6 is in position 1to 2.

Current Control: Trip point is at 10 Amp maximum.



- | | |
|----------------------|--------------------|
| J1-1 Vin | J4-1 Phase C |
| J1-2 Gnd | J4-2 Phase B |
| J1-3 Analog Speed In | J4-3 Phase A |
| | J4-4 Hall - (Gnd) |
| | J4-5 Hall + (+12V) |
| | J4-6 Hall 1 |
| | J4-7 Hall 2 |
| | J4-8 Hall 3 |

Caution should be taken. Misplacement of jumper setting will destroy the control.

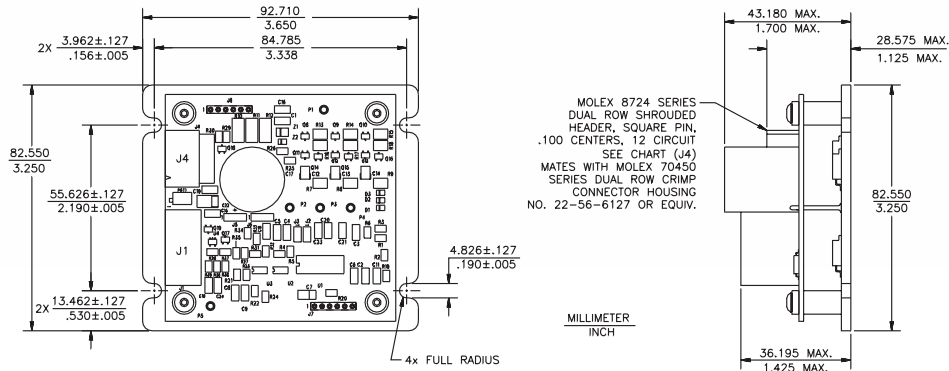
- Jumper Settings:**
- J6 Set to position 1-2 for internal speed adjust.
Set to position 2-3 for analog speed input voltage.
 - J3 Disable or enable to determine forward/reverse rotation.
 - J2 Disable for 60° electrical spacing.
Enable for 120° electrical spacing.
 - J5 Set position 1-2 for 16-52 VDC
Set position 2-3 for 11-16 VDC

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Tech Bulletin

20 Amp BLDC Motor Controller



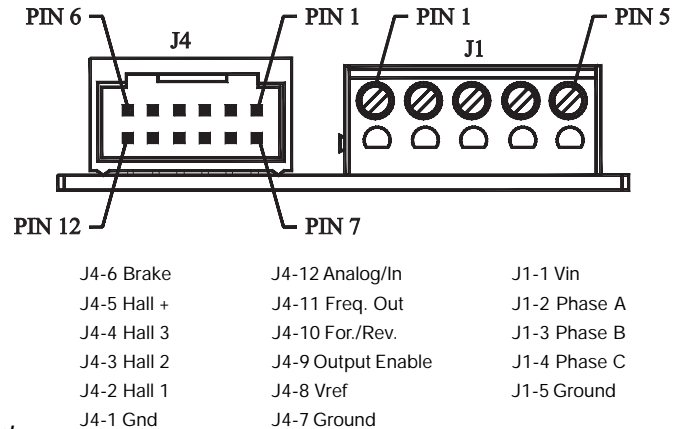
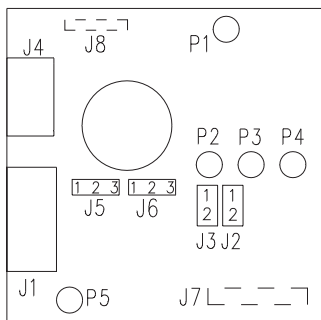
Controller Data	Motor Controller
	48134
Max Continuous Current	20 A
Input Voltage Range	11-52 VDC
Controller PWM Frequency	25 kHz
Analog Speed Input	0-5 VDC
Electrical Hall Spacing	60° or 120°
Waveform	8-Step Trapezoidal
Current Limit Protection	Yes
Rotation	CW / CCW

NOTES:

Temperature: Operating: 0° C to 50° C, Storage Air: -40° C to 85° C

Speed Control: Electrical speed control is achieved by applying a 0 to 5 VDC signal on J4 Pin 12 with respect to J4 Pin 7. Mechanical speed control is achieved by adjusting the potentiometer when J6 is in position 1 to 2.

Current Control: Trip point is at 20 Amp maximum.



Caution should be taken. Misplacement of jumper setting will destroy the control.

- Jumper Settings:**
- J5 Set to position 1-2 for 16-52 VDC operation.
Set to position 2-3 for 11-16 VDC operation.
 - J6 Set to position 1-2 for internal speed adjust.
Set to position 2-3 for analog speed input voltage.
 - J3 Disable or enable to determine forward/reverse rotation.
 - J2 Disable for 60° electrical spacing.
Enable for 120° electrical spacing.

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BLDC Motor/Blower Controller Numbers

Motor/Blower Part Numbers	Controller Part Numbers	Mating Cable From Controller to Blower/Motor	Input Power Cable
119272	48134	N/A	N/A
119275	48134	N/A	N/A
119000	48134	39831 or 39817*	N/A
119001	48134	39831 or 39817*	N/A
119002	48134	39831 or 39817*	N/A
119003	48134	39831 or 39817*	N/A
119004	48134	39831 or 39817*	N/A
119005	48134	39831 or 39817*	N/A
119006	48134	39831 or 39817*	N/A
119007	48134	39831 or 39817*	N/A
119008	48134	39831 or 39817*	N/A
119050	48134	39831 or 39817*	N/A
119051	48134	39831 or 39817*	N/A
119052	48134	39831 or 39817*	N/A
119053	48134	39831 or 39817*	N/A
119054	48134	39831 or 39817*	N/A
119055	48134	39831 or 39817*	N/A
119056	48134	39831 or 39817*	N/A
119057	48134	39831 or 39817*	N/A
119058	48134	39831 or 39817*	N/A
119375	48133	39851	39773
119380	48133	39851	39773
119383	48133	39851	39773
119381	N/A	N/A	39773
119382	N/A	N/A	39773
119384	N/A	N/A	39773
119385	N/A	N/A	39773
119378	N/A	N/A	39773
119379	N/A	N/A	39773
119396	48134	N/A	N/A
119397	48134	N/A	N/A
116521	48133	N/A	39773
116522	48133	N/A	39773
116450	48133	N/A	39773
117007**	48132	39685	39773
117011**	48132	39685	39773
119319**	48132	39685	39773
119317**	48132	39685	39773

Cable	mm	inches
39831	457.2±12.7	18.00±.50
39817	457.2 ±12.7	18.00±.50
39817-1	609.6±12.7	24.00±.50
39817-2	304.8±12.7	12.00±.50
39851	152.4±12.7	6.00±.50
39851-1	304.8±3.0	12.00±.12
39851-2	457.2±3.0	18.00±.12
39851-3	609.6±3.0	24.00±.12
39685	145.0±3.0	5.71±.12
39685-1	292.1±3.0	11.50±.12
39685-2	241.3±3.0	9.50±.12
39685-3	304.8±12.7	12.00±.50
39685-4	457.2±12.7	18.00±.50
39685-5	609.6±12.7	24.00±.50
39773	368.3±12.7	14.50±.50
39773-1	304.8±12.7	12.00±.50
39773-2	457.2±12.7	18.00±.50
39773-3	609.6±12.7	24.00±.50

* Cable 39831 transfers hall signals from the motor to the controller. Cable 39817 does the same, but also provides cabling for analog input, tach output, braking, forward/reverse, enable/disable, and voltage reference of a nominal 6.25 VDC at a maximum of 10 mAmp.

** Earlier versions of the 5.0" Minijammer blower.





PLEASE COMPLETE THIS FORM AND FAX IT TO (330) 678-8227,
ATTENTION: ROTRON MARKETING DEPARTMENT

DATE _____
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 NAME _____
 TITLE _____ DEPT. _____
 TELEPHONE _____ FAX _____

Complete applicable side for additional information.

Blower Sizing

Purpose of product which blower is to be incorporated in _____

Describe general operation _____

Estimated annual requirements _____

Power Supply _____ VDC _____ VAC

Air Flow Requirements _____ To _____ CFM

Pressure Requirements _____ To _____ In. H₂O

Standard Operating Point:

Pressure or Vacuum _____ In. H₂O, Flow _____ CFM

Surrounding Temperature:

Min. _____ ° F Max. _____ ° F

Humidity _____

Agency Requirements:

- ISO9001 UL TUV CSA Other

Expected Life Hours _____

Production Delivery Date _____

Expected Price Range _____

If Replacement

Current Manufacturer _____

Model _____

Motor Sizing

Purpose of product which motor is to be incorporated in _____

Describe general operation _____

Estimated annual requirements _____

Power Supply _____ VDC _____ Other

Speed Requirements _____ To _____ RPM

Maximum Continuous Performace Requirement

Speed _____ RPM

Torque _____ Oz. In.

Power _____ HP

Dimension, Max.:

Diameter _____ Inches, Length _____ Inches

Surrounding Temperature:

Min. _____ ° F Max. _____ ° F

Humidity _____

Expected Life Hours _____

Production Delivery Date _____

Expected Price Range _____

If Replacement

Current Manufacturer _____

Model _____

Application Engineering Basics

Throughout our catalog, you will find terminology used for air moving selection and product sizing. Below are a few of the key terms:

Flow

- Volume Rate/Time
- AMETEK charts are in SCFM, m³/min, or L/S
- SCFM = Standard Cubic Feet Per Minute (American)
- Air density = 0.075 lb/cubic foot
- M³/min = Cubic Meters Per Minute (Metric)
- L/sec = Liters Per Second (Metric)
- 1 m³/min = 35.3 SCFM
- 1 L/sec = 2.119 SCFM
- See Standard Engineering Conversions for other flows on pg. 44

Pressure

- Force/Area
- AMETEK charts are in In. H₂O (IWG), PSIG, MM of Water, IHG, or mbar
- IWG = Inches of Water Gauge (American)
- PSIG = Pounds Per Square Inch Gauge (American)
- mm of Water = Millimeter of Water Gauge (Metric)
- IHG = Inches of Mercury Gauge (American)
- mbar = Millibar Gauge (Metric)
- PSIA = Pounds Per Square Inch Absolute (American)
- 27.7 IWG = 1 PSIG
- 703.58 MM of Water = 1 PSIG
- 2.036 IHG = 1 PSIG
- 0.069 Bars = 69 mbar = 1 PSIG
- Standard Atmosphere = 0 PSIG = 14.7 PSIA
- See Basic Fan Laws Chart for correcting pressure due to speed or density changes

Density

- Weight/Volume
- Standard Air = 0.075 lb/cubic foot

Specific Gravity

- Density Ratio Relative to Air
- Standard Air SG = 1.0
- Methane SG = 0.55

Velocity

- Distance/Time or Flow/Area
- FPM = Feet Per Minute (American)
- M/min = Meters Per Minute (Metric)
- See Standard Engineering Conversion Chart for other velocities on pg. 44

Pressure Drop/Back Pressure/Impedance

- Friction causes air to slow down and lost energy is measured in pressure drop terms
- Typical pressure drop areas include piping, elbows, accessories and system
- Each fixed system has a fixed system impedance caused by a single or multiple pressure drop points
- Changing the system impedance will cause the blower's work point to change

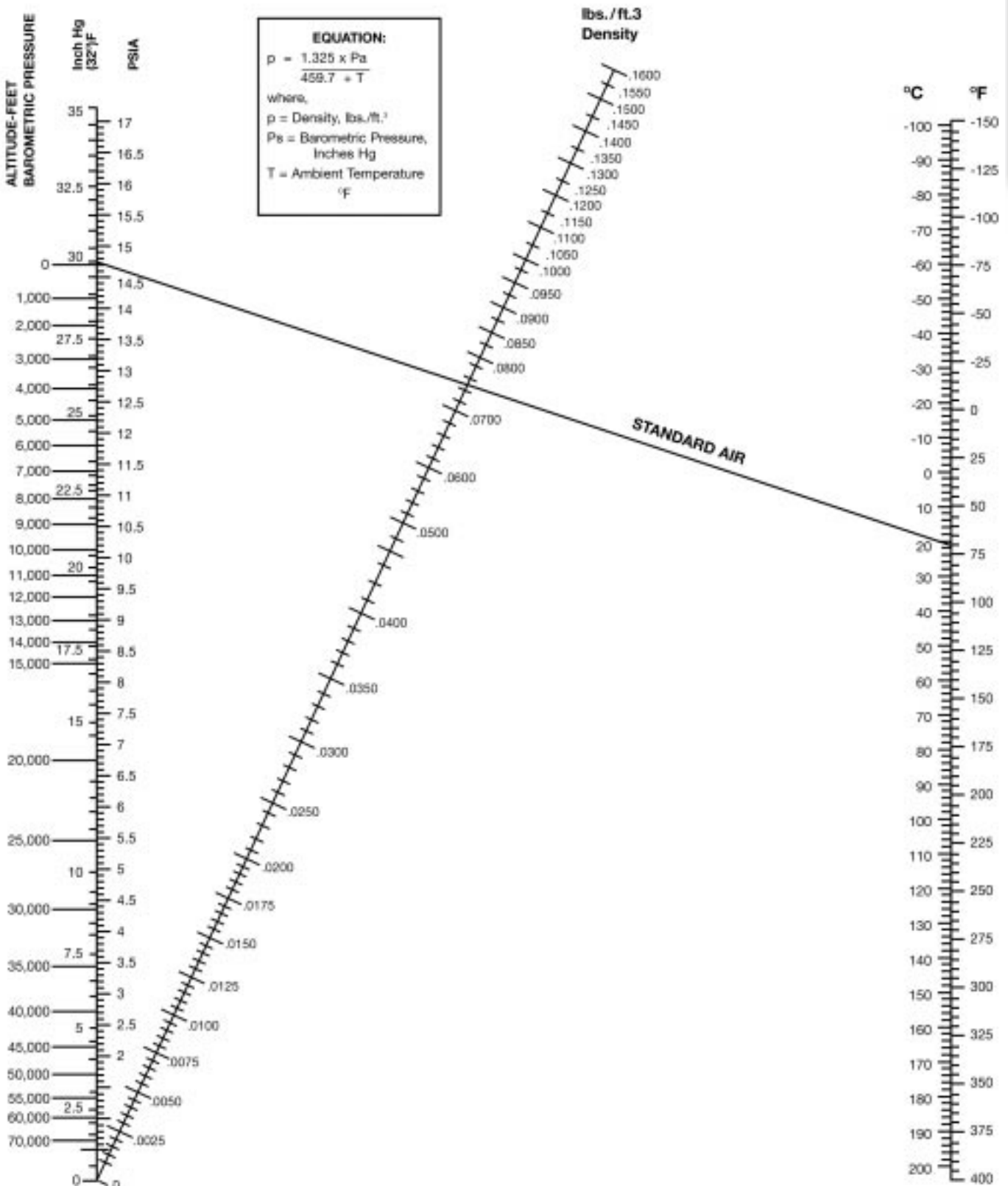
Application Engineering Basics

Standard Engineering Conversions

MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
Atmospheres	76.0	Cms. of Mercury	Kgs./Cubic Meter	0.06243	Pounds/Cubic Foot
Atmospheres	29.92	Inches of Mercury	Kilometers	3281	Feet
Atmospheres	406.8348	Inches of Water	Kilowatts	56.92	British Thermal Units/Min.
Atmospheres	10,333	Kgs./Sq. Meter	Kilowatts	737.6	Foot-Pounds/Sec.
Atmospheres	1.013 x 10 ⁵	Pascals	Kilowatts	1.341	Horsepower
Atmospheres	14.70	Pounds/Sq. Inch	Kilowatts	14.34	Kg.-Calories/Min.
Atmospheres	760	Torrs	Kilowatt-Hours	3415	British Thermal Units
Bars	0.9869	Atmospheres	Liters	10 ³	Cubic Centimeters
Bars	1. x 10 ⁵	Dynes/Sq. Cm.	Liters	61.02	Cubic Inches
Bars	1.020 x 10 ⁴	Kgs./Square Meter	Liters	10 ⁻³	Cubic Meters
Bars	14.50	Pounds/Sq. Inch	Liters	.2642	Gallons
British Thermal Units	0.2520	Kilogram-Calories	Liters/Minute	.0353	Cubic Feet/Minute
British Thermal Units	777.5	Foot-Pounds	Log ₁₀ N	2.303	Log ₁₀ N or Ln N
British Thermal Units	1054	Joules	Log N or Ln N	0.4343	Log ₁₀ N
British Thermal Units	107.5	Kilogram-Meters	Meters	100	Centimeters
British Thermal Units	2.928 x 10 ⁻⁴	Kilowatt-Hours	Meters	3.2808	Feet
Centimeters of Mercury	0.01316	Atmospheres	Meters	39.37	Inches
Centimeters of Mercury	0.0372	Inches of Water	Meters	10 ⁻³	Kilometers
Centimeters of Mercury	136.0	Kgs./Square Meter	Meters	10 ³	Millimeters
Centimeters of Mercury	0.1934	Pounds/Sq. Inch	Miles	5280	Feet
Centimeters/Second	1.969	Feet/Minute	Miles	1.6093	Kilometers
Centimeters/Second	0.6	Meters/Minute	Miles	1760	Yards
Cubic Centimeters	3.531 x 10 ⁻⁵	Cubic Feet	Millibars	.4019	Inches of Water
Cubic Centimeters	6.102 x 10 ⁻²	Cubic Inches	Mms. of Mercury	0.0394	Inches of Mercury
Cubic Centimeters	10 ⁻⁶	Cubic Meters	Mms. of Mercury	1.3595 ⁻³	Kgs./Square Cm.
Cubic Centimeters	10 ⁻³	Liters	Mms. of Mercury	0.01934	Pounds/Square Inch
Cubic Feet	2.832 x 10 ⁴	Cubic Cms.	Newton Meters	.7376	Pound-Force-Foot
Cubic Feet	1728	Cubic Inches	Ounce - Force - Inch	0.706	Newton - Centimeter
Cubic Feet	0.02832	Cubic Meters	Ounce - Force - Inch	7.06 x 10 ⁻³	Newton - Meter
Cubic Feet	0.03704	Cubic Yards	Ounce - Force - Inch	5.21 x 10 ⁻³	Pound - Force - Foot
Cubic Feet	28.32	Liters	Pascals	.004	Inches of Water
Cubic Feet/Minute	472.0	Cubic Cms./Sec.	Pints (Liq.)	28.87	Cubic Inches
Cubic Feet/Minute	1.6992	Cubic Meters/Hour	Pints (U.S. liquid)	473,179	Cubic Centimeters
Cubic Feet/Minute	.02832	Cubic Meters/Minute	Pints (U.S. liquid)	16	Ounces (U.S. fluid)
Cubic Feet/Minute	28.32	Liters/Minute	Pounds	444,823	Dynes
Cubic Feet/Minute	0.4720	Liters/Second	Pounds	453.6	Grams
Cubic Feet/Minute	62.4	Lbs. of Water/Min.	Pounds	16	Ounces
Cubic Inches	16.39	Cubic Centimeters	Pounds of Carbon to CO ₂	14,544	British Thermal Units (mean)
Cubic Inches	5.787 x 10 ⁻⁴	Cubic Feet	Pounds of Water	27.68	Cubic Inches
Cubic Inches	1.639 x 10 ⁻⁵	Cubic Meters	Pounds of Water	0.1198	Gallons
Cubic Meters	105	Cubic Centimeters	Pounds of Water	970.3	British Thermal Units
Cubic Meters	35.31	Cubic Feet	Evaporated at 212° F	16.02	Kgs./Cubic Meter
Cubic Meters	61,023	Cubic Inches	Pounds/Cubic Foot	4.882	Kgs./Square Meter
Cubic Meters	5.885	Cubic Feet/Minute	Pounds-Force-Foot	1.3558	Newton Meters
Cubic Meters/Minute	35.3107	Cubic Feet/Minute	Pounds/Square Inch	0.06804	Atmospheres
Feet	30.48	Centimeters	Pounds/Square Inch	27.7	Inches of Water
Feet	12	Inches	Pounds/Square Inch	2.036	Inches of Mercury
Feet	0.3048	Meters	Pounds/Square Inch	703.1	Kgs./Square Meter
Feet	1/3	Yards	Pounds/Square Inch	6.895 x 10 ³	Pascals
Feet of Air (1 atmosphere 60° F)	5.30 x 10 ⁻⁴	Pounds/Square Inch	Pounds/Square Inch	51.715	Millimeters of Mercury at 0° C
Gallons	3.785	Liters	Square Centimeters	1.973 x 10 ⁵	Circular Mills
Grams/Cu. Cm.	62.43	Pounds/Cubic Foot	Square Centimeters	1.076 x 10 ⁻³	Square Feet
Horsepower	42.44	British Thermal Units/Min.	Square Centimeters	0.1550	Square Inches
Horsepower	33,000	Foot-Pounds/Min.	Square Feet	929.0	Square Centimeters
Horsepower	10.70	Kg. Calories/Min.	Square Feet	0.09290	Square Meters
Horsepower	745.7	Watts	Square Inches	1.273 x 10 ⁶	Circular Mills
Horsepower-Hours	2547	British Thermal Units	Square Inches	6.452	Square Centimeters
Inches	2.540	Centimeters	Square Inches	6.944 x 10 ⁻³	Square Feet
Inches	10 ³	Mils	Square Inches	106	Square Mills
Inches of Mercury	0.03342	Atmospheres	Square Inches	645.2	Square Millimeters
Inches of Mercury	13.60	Inches of Water	Square Kilometers	10.76 x 10 ⁶	Square Feet
Inches of Mercury	345.3	Kgs./Square Meter	Square Kilometers	1.196 x 10 ⁶	Square Yards
Inches of Mercury	25.40	Mms. of Mercury	Square Meters	10.764	Square Feet
Inches of Mercury	0.4912	Pounds/Square In.	Square Meters	1.196	Square Yards
Inches of Water	0.002458	Atmospheres	Temp. (°C) +273	1	Abs. Temp. (°C)
Inches of Water	0.07355	Inches of Mercury	Temp. (°C) +17.8	1.8	Temp. (°F)
Inches of Water	25.40	Kgs./Square Meter	Temp. (°F) +460	1	Abs. Temp. (°F)
Inches of Water	2.4884	Millibars	Temp. (°F) -32	5/9	Temp. (°C)
Inches of Water	248.8	Pascals	Watts	0.05692	British Thermal Units/Min.
Inches of Water	5.204	Pounds/Square Ft.	Watts	10 ⁷	Ergs/Second
Inches of Water	0.03613	Pounds/Square In.	Watts	44.26	Foot-Pounds/Min.
			Watts	1.341 x 10 ⁻³	Horsepower
			Watts	0.01434	Kg.-Calories/Min.
			Watts-Hours	3.415	British Thermal Units
			Watts-Hours	1.341 x 10 ⁻³	Horsepower/Hours



Density Correction Chart



APPLICATION ENGINEERING

Application Engineering Basics

Physical Laws for Blower Applications

In the following formulae these symbols are used:

- P-Pressure in pounds per square inch (PSI) or inches of mercury column (inches Hg)
- CFM-Volume in cubic feet per minute
- RPM-Speed in revolutions per minute
- D-Density in pounds per cubic foot (lbs./cu. ft.)
- H-Height of air or gas column (ft.)
- SG-Specific Gravity (ratio of density of gas to the density of air)

“Standard Air”-Air at 68° F (absolute temperature 528°) and 29.92” Hg. (barometric pressure at sea level). The density of such air is 0.075 lbs./cu. ft. and the specific volume is 13.29 cu. ft./lb. The specific gravity is 1.0.

The outlet pressure of a blower depends on the condition of the air or gas at the inlet. The inlet condition is influenced by:

- a-Specific gravity (the ratio of density of the gas to density of standard air)
- b-Altitude (location of blower)
- c-Temperature of inlet air

Basic Fan Laws Chart

VARIABLE	VOLUME	PRESSURE	HORSEPOWER
WHEN SPEED CHANGES	Varies DIRECT with Speed Ratio $CFM_2 = CFM_1 \left(\frac{RPM_2}{RPM_1} \right)$	Varies with SQUARE of Speed Ratio $P_2 = P_1 \left(\frac{RPM_2}{RPM_1} \right)^2$	Varies with CUBE of Speed Ratio $HP_2 = HP_1 \left(\frac{RPM_2}{RPM_1} \right)^3$
WHEN DENSITY CHANGES	Does Not Change	Varies DIRECT with Density Ratio $P_2 = P_1 \left(\frac{D_2}{D_1} \right)$	Varies DIRECT with Density Ratio $HP_2 = HP_1 \left(\frac{D_2}{D_1} \right)$

Volume

The Volume changes in direct ratio to the speed.

Example – A blower is operating at 3500 RPM and delivering 1000 CFM. If the speed is reduced to 3000 RPM, what is the new volume?

- V_1 = Original Volume (1000 CFM)
- V_2 = New Volume
- RPM_1 = Original Speed (3500 RPM)
- RPM_2 = New Speed (3000 RPM)

$$V_2 = V_1 \left(\frac{RPM_2}{RPM_1} \right)^1 = 1000 \times \left(\frac{3000}{3500} \right)^1 = 1000 \times .857 = 857 \text{ CFM}$$

Pressure

Pressure (barometric) varies in direct proportion to altitude.

Example – A blower is to operate at an elevation of 6000 feet and is to deliver 3 PSI pressure. What pressure (standard air) blower is required?

$$\text{Pressure} = 3 \times \frac{29.92}{23.98} = 3.75 \text{ or } 3 \frac{3}{4} \text{ PSI}$$

If it is desired to determine what pressure a 3 PSI (standard air) blower will deliver at 6000 feet –

$$\text{Pressure} = 3 \times \frac{23.98}{29.92} = 2.4 \text{ or about } 2 \frac{1}{2} \text{ PSI}$$

When a blower is to operate at a high altitude it is frequently specified that the blower be capable of handling a given volume of “standard air”. It is then necessary to determine the equivalent volume of air at the higher altitude.

Example – A blower is to operate 6000 feet altitude and is to handle 1000 CFM of standard air. What is the CFM of air the blower must handle at 6000 feet altitude?

- Let: V_1 = Volume of standard air (1000 CFM)
- V_2 = Volume of thinner air
- Hg_1 = Barometric pressure sea level (29.92)
- Hg_2 = Barometric pressure 6000’ (23.98)

$$V_2 = V_1 \times \frac{Hg_1}{Hg_2} = 1000 \times \frac{29.92}{23.98} = 1248 \text{ CFM}$$

The pressure changes as the square of the speed ratio.

Example – A blower is operating at a speed of 3500 RPM and delivering air at 5.0 PSI pressure. If the speed is reduced to 3000 RPM, what is the new pressure?

- P_1 = Original Pressure (5 PSI)
- P_2 = New Pressure
- RPM_1 = Original Speed (3500 RPM)
- RPM_2 = New Speed (3000 RPM)

$$P_2 = P_1 \left(\frac{RPM_2}{RPM_1} \right)^2 = 5 \times \left(\frac{3000}{3500} \right)^2 = 5 \times .735 = 3.68 \text{ PSI}$$



The Air Density varies in inverse proportion to the absolute temperature.

Example – A blower is to handle 200° F air at 3 PSI pressure. What pressure (standard air) blower is required?

- Let: P₁ = Pressure hot air (3 PSI)
- P₂ = Pressure standard air
- AT₁ = Absolute temperature hot air (200+460=660° F)
- AT₂ = Absolute temperature standard air (68+460=528° F)

$$P_2 = P_1 \times \frac{AT_1}{AT_2} = 3 \times \frac{660}{528} = 3.75 \text{ or } 3 \frac{3}{4} \text{ PSI}$$

A blower is capable of delivering 3 PSI pressure with standard air. What pressure will it develop handling 200° F inlet air?

$$P_1 = P_2 \times \frac{AT_2}{AT_1} = 3 \times \frac{528}{660} = 2.4 \text{ or about } 2 \frac{1}{2} \text{ PSI}$$

Horsepower

The horsepower changes as the cube of the speed ratio.

Example – A blower is operating at a speed of 3500 RPM and requiring 50 horsepower. If the speed is reduced to 3000 RPM, what is the new required horsepower?

- HP₁ = Original Horsepower (50)
- HP₂ = New Horsepower
- RPM₁ = Original Speed (3500 RPM)
- RPM₂ = New Speed (3000 RPM)

$$HP_2 = HP_1 \times \left(\frac{RPM_2}{RPM_1}\right)^3 = 50 \times \left(\frac{3000}{3500}\right)^3 = 50 \times .630 = 31.5 \text{ horsepower}$$

Pressure varies in direct proportion to the density.

Example – A 3 PSI (standard air) blower is to be used to handle gas having a specific gravity of 0.5. What pressure does the blower create when handling the gas?

- Let: P_a = Air pressure (3 PSI)
- P_g = Gas pressure
- SG = Specific gravity of gas (0.5)

$$P_g = P_a \times SG = 3 \times .5 = 1.5 \text{ PSI}$$

If we are required to handle a gas having a specific gravity of 0.5 at 1.5 PSI pressure, we can determine the standard air pressure blower as follows:

$$\text{Let: } P_a = \frac{P_g}{SG} = \frac{1.5}{.5} = 3 \text{ PSI}$$

Horsepower vs. Specific Gravity & Ratio of Density.

The horsepower varies in direct proportion to the specific gravity (ratio of density of gas to density of air).

Example – A standard air blower requires a 10 HP motor. What horsepower is required when this blower is to handle a gas whose specific gravity is 0.5?

$$HP = 10 \times 0.5 = 5 \text{ horsepower}$$

It is possible that several of the above modifications may be required on one installation. Therefore, it may be necessary to use various combinations of these formulae.

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AMETEK, Inc.

AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. Listed on the New York Stock Exchange (AME) since 1930, AMETEK's annual sales are approaching \$1 billion. Operations are in North America, Europe, and Asia, with about one-third of sales to markets outside the United States. AMETEK is serving its customers with investments in new products, global and market expansion, strategic acquisitions, and operational excellence. The Company's operating groups are Electronic Instruments and Electromechanical.

Rotron

The Electromechanical Group (EMG) is one of the world's largest producers of high-speed electric motor products for original equipment manufacturers (OEMs). In business since 1915, EMG is using its core competencies to enhance its worldwide presence. A business unit of AMETEK EMG, Rotron has facilities in California, New York, North Carolina, and Ohio. Rotron serves the military, aerospace, medical, transportation, office equipment, industrial, and environmental markets worldwide. Rotron supports its customers with more than 650 employees that are organized in three business segments:

- *Technical Products*
- *Military & Aerospace Products*
- *Industrial Products*

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Rotron's standard product lines of brushless DC motors, blowers, and controllers offer a wide range of application demands. Brushless DC motors and blowers are an ideal choice for such varied applications as medical instruments, robotics, pumps, compressors, office equipment, fans, machine tools, tape drives, or any other precise rotary motion/air delivery applications. If there is a need for a product with unique performance, mounting environment, or agency requirements, Rotron can supply the solution.



ROTRON
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