

The Unico System[®]

M SERIES BLOWER MODULE SPECIFICATIONS

Bulletin 20-020.1

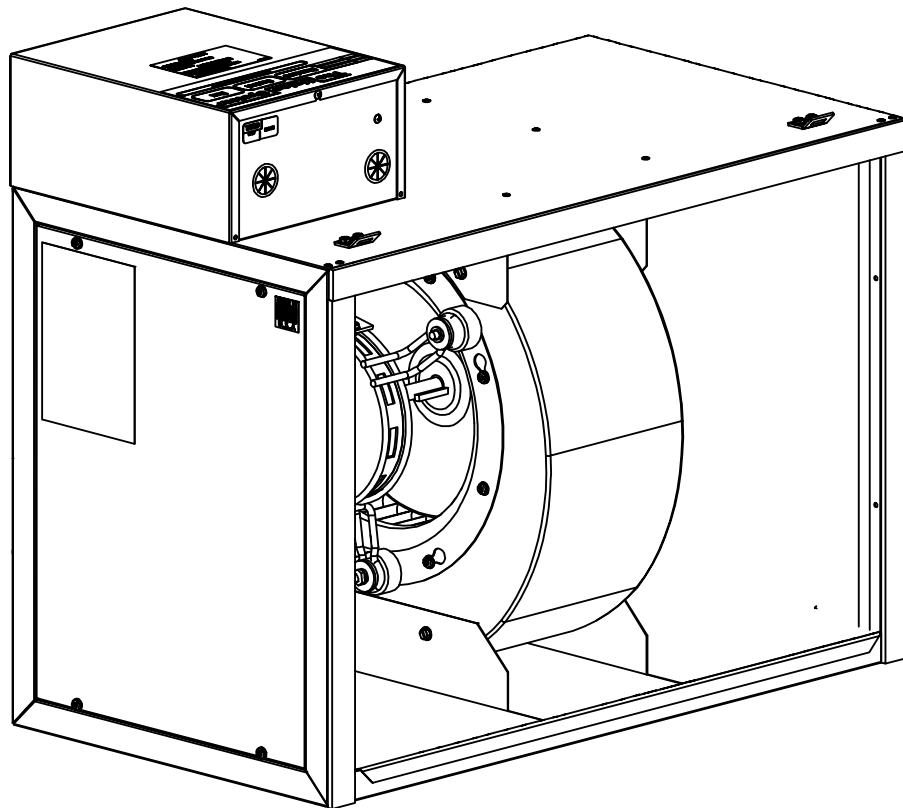


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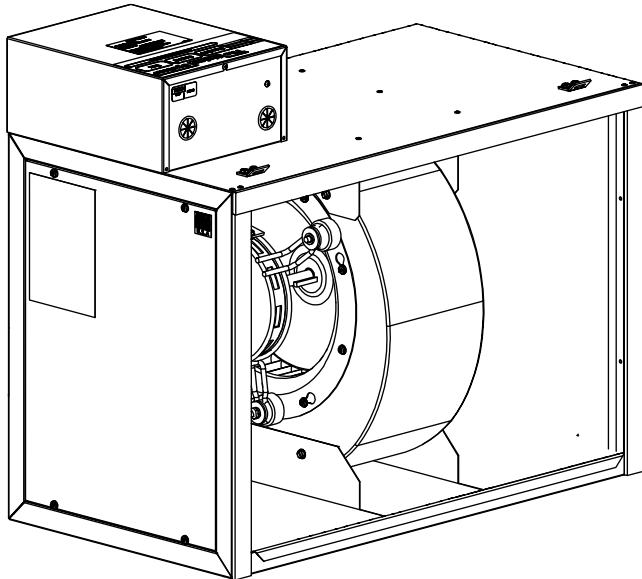
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Certified to UL 60335-2-40
 UL 60335-1
 Conforms to CSA C22.2 #60335-2-40
 CSA C22.2 #60335-1

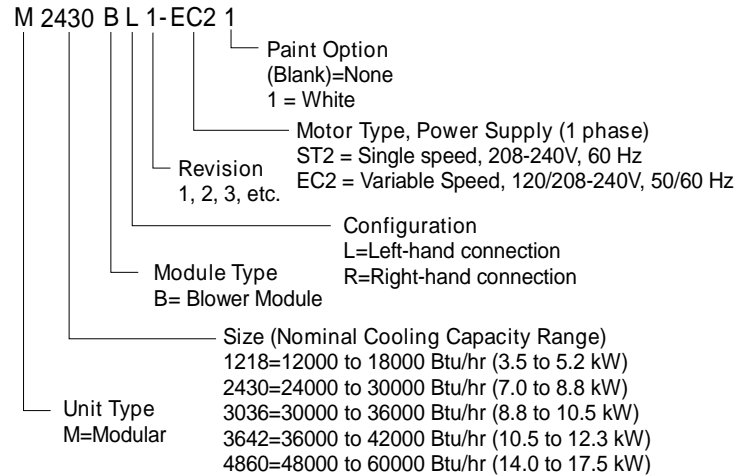


Unico products comply with the European regulations that guarantee product safety.

M Series Blower Module Engineering Specifications



Model Number Key



GENERAL INFORMATION

The Unico System modular blowers are designed for use with the Unico System small-duct high-velocity (SDHV) system. The blower modules are compatible with other modules of the same size (Table 1). The blowers exceed the U.S. Department of Energy static pressure requirements for SDHV air conditioner and heat pump systems at the rated airflow when installed with the compatible Unico air cooling module¹.

Table 1. Compatible Modules

Module	Description
MxxxxC-B,E	Refrigerant Coil
MxxxxC-C	Chilled Water Coil
MxxxxC-H	Hot Water Coil
MxxxxV	Vertical Plenum
MxxxxR	Horizontal Return

¹ Per US DOE 10CFR430, Appendix M and M1
 Prior to 1/1/23: 1.10-1.20 inches wc (270 to 300 Pa), depending on capacity;
 On or after 1/1/23: 1.15 inches wc (286 Pa).

APPLICATIONS

For air-conditioning, the rated airflow is generally 250 CFM per nominal² cooling ton (34 L/kW-s) and for heat pumps it is 275 CFM per nominal ton (37 L/kW-s). For proper operation, we do not recommend flow rates less than 200 CFM per nominal ton (27 L/kW-s).

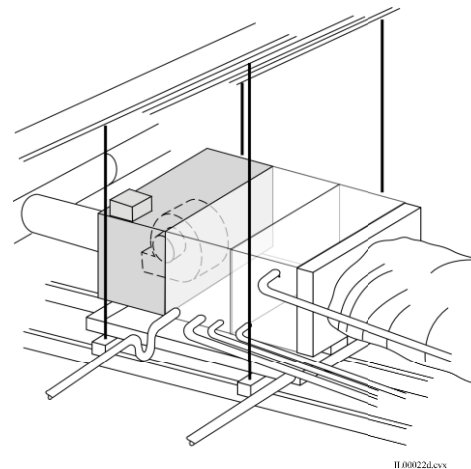


Figure 1. Attic Installation with Unico System Cooling and Heating Module.

² Nominal refers to nameplate capacity of outdoor unit, refer to AHRI product directory for rated capacity

FEATURES AND BENEFITS

The blower is available with a single-speed or variable-speed motor (see model key previous page) with its specific control box. The Model Comparison table lists the features for each motor type.

The single-speed (-ST2) is for exact replacement of existing single speed blower modules and for hot water heating applications with air temperatures exceeding 150°F (65°C). The variable speed motor version (-EC2) is more efficient and must be used for air conditioning and heat pump applications in order to meet minimum efficiency requirements.

ST2 (Version 2)

Single-speed permanent split-capacitor (PSC) motor, control box includes a fan relay, transformer, and terminal block.

EC2

Variable-speed electronically commutated motor (ECM), control box includes the S-M-A-R-T¹ control board (SCB) and a USB communications board.

Model Comparison		
Configuration	ST2	EC2
Balanced wheels	✓	✓
Direct drive motor	✓	✓
Shaft key connection	✓	✓
Quick motor replacement (QMR)	✓*	✓
Separate control box	✓	✓
Control voltage transformer	✓	✓
Screw terminal connections	✓	✓
Heat pump AFS bypass	✓	✓
Number of modes of operation	1	6
Adjustable restrictor plate	✓*	
Soft-start and soft-stop		✓
Constant airflow		✓
Optimized for efficiency and sound		✓
Preset airflow rate		✓
Laptop configurable		✓
Point-to-point wiring		✓
Electric heater interlocks		✓
Boiler Relay	**	✓
Chilled water relay		✓
Fan cycling		✓
EAC, ERV, or HRV relay		✓
Potable water circulation		✓
Humidifier compatibility		✓
Chiller/AWHP compatibility		✓
Low airflow indicator		✓
Laptop troubleshooting		✓
Optimized for zoning		✓

* except the 1218

** field supplied

¹ Software Managed Airflow Rate and Temperatures

Balanced wheels (ST2, EC2) – All blower wheels are individually balanced.

Direct drive motor (ST2, EC2) – The blower wheel is mounted directly to the motor shaft to improve drive efficiency and lower costs.

Shaft key (ST2, EC2) – The blower wheel is attached to the motor shaft using a square keyway instead of a set screw.

Quick motor replacement (QMR) (ST2, EC2) – The QMR feature is a quick twist-and-lock motor mount for easy maintenance. The motor is mounted to the inlet ring which is attached to the blower housing with six screws through twist-lock keyholes. When service is required by the motor or the wheel, the entire assembly may be removed as a whole (Figure 2).

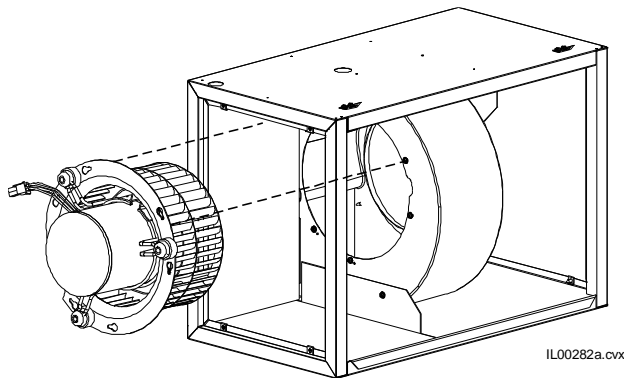


Figure 2. Quick motor replacement (QMR) feature (2430, 3036, 3642, and 4860 models only)

Separate control box (ST2, EC2) – The control box is separate from the cabinet (ships inside the cabinet) for easy accessibility. It may be mounted to the top or front of the cabinet or even on a wall, depending on which is more convenient. Knockout and starter holes for the screws are provided to assist in mounting:

Control voltage transformer (ST2, EC2) – A 48VA 24-volt transformer provides control power to the thermostat, electric heaters, and other optional equipment.

Screw terminal connections (ST2, EC2) – Terminal blocks include screws and wire washers to securely connect the control wires.

Heat pump AFS bypass (ST2, EC2) – Removes the anti-frost switch (AFS) from the circuit during heat pump heating mode which eliminates nuisance shutdowns during defrost mode.

Modes of operation (EC2) – The SCB control board has 6 independent modes of operation, each with its own programmable airflow and RPM limit settings (Fan-Only, Low-Cool, High-Cool, Low-Heat, High-Heat, and Emergency-Heat).

Adjustable restrictor plate (ST2, except the 1218) – Our restrictor plate provides a low-cost solution to finely tune the airflow when using a single speed motor. The adjustable restrictor plate is accessible from the outside front of the unit even with the duct installed.

Note: Do not use restrictor plate to adjust plenum static pressure. Adjust the restrictor to the proper amperage. This will assure proper airflow.

Soft-start and soft-stop (EC2) – For quieter operation, the unit slowly ramps the motor from stop to full speed, and vice versa.

Constant airflow (EC2) – The EC2 control board will deliver the airflow requested without requiring the user to measure the amperage or make any other adjustments to the duct system.

Optimized for efficiency and sound (EC2) – The EC2 control uses the lowest motor speed required to achieve the required airflow, which minimizes sound and maximizes electrical efficiency.

Pre-set airflow rate (EC2) – The SCB is pre-programmed with two different air flow rates for the High-Cool Mode. These rates are based on the nominal tonnage of the unit (See the *Applications* section) and can be selected with a board mounted switch. Each of the six different airflow control modes are a fixed percentage of this selected airflow.

Laptop configurable (EC2) – The airflow for each mode of operation is adjustable to any value between the blower minimum and maximum using the ECMconfig software (available for download at www.unicosystem.com) and an ordinary USB cable.

Point-to-point wiring (EC2) – The control boards have separate terminals for the thermostat, electric heater, outdoor condenser, and other options for easy wiring and troubleshooting.

Electric heater interlocks (EC2) – The ECM control board includes two electric heater safety lockouts. The lockout prevents the heaters from operating if the programmed airflow is too low. This prevents the heating elements from overheating, which can severely reduce their useful life.

The other lockout prevents the electric heater third stage from operating if the heat pump is on. This prevents nuisance shutdowns from overheating the electric heater. This feature can be added to the ST control box by using an outside thermostat.

Boiler relay (EC2) – The SCB includes a separate dry-contact relay (HotW) that can be used to turn on the boiler, boiler pump, or hot water coil valve. The ST control box includes room for a relay to be added.

Chilled water relay (EC2) – The control box includes a separate dry-contact relay (ColdW) to turn on a chiller or zone pump.

Fan cycling (EC2) – The control board includes a separate switch to provide periodic cycling of the fan. This will minimize or prevent condensation in the ducts located in unconditioned spaces during winter, or to provide fresh air if the system is connected to a fresh air source.

EAC, ERV, or HRV relay (EC2) – For the optimum in indoor air quality, the control board includes a dry-contact relay to turn on an electronic air cleaner, energy recovery ventilator, or heat recovery ventilator any time the fan is on, or to control a fresh air damper for ventilation per ASHRAE 62.2-2010.

Potable water circulation (EC2) – For improved health and safety, the control board provides a switch-selectable feature to turn on the boiler pump periodically (if installed as part of a domestic water system) to prevent the formation of stagnant water.

Humidifier integration (EC2) – The control board includes a humidistat input with a humidifier output. If the humidistat calls for humidity, the humidifier output will turn on. It will also turn the fan on high or low (user selectable) if not already on.

Air-to-water heat pump (heat pump chiller) compatibility (EC2) – For systems with multiple air handlers connected to one AWHP. This feature allows one air handler (Leader) to control the mode of operation (heating or cooling) to avoid runaway cooling or heating from other connected air handlers (Followers).

Low airflow indicator (EC2) – The SCB includes an indicator light that signals the user if the desired airflow is not being met. This is usually caused by a restrictive duct system or too few outlets.

Optimized for zoning (EC2) – The ECMconfig software includes programmable motor speed limits to prevent the motor from over-speeding as zone dampers are closed without the need for a bypass damper. Refer to the Unico Tech Bulletin on zoning for more information.

Laptop troubleshooting (EC2) – The ECMconfig software will also provide the user with feedback indicating the actual airflow, motor speed, communications between the boards and the motor, and the state of various inputs and outputs.

CABINET CONSTRUCTION

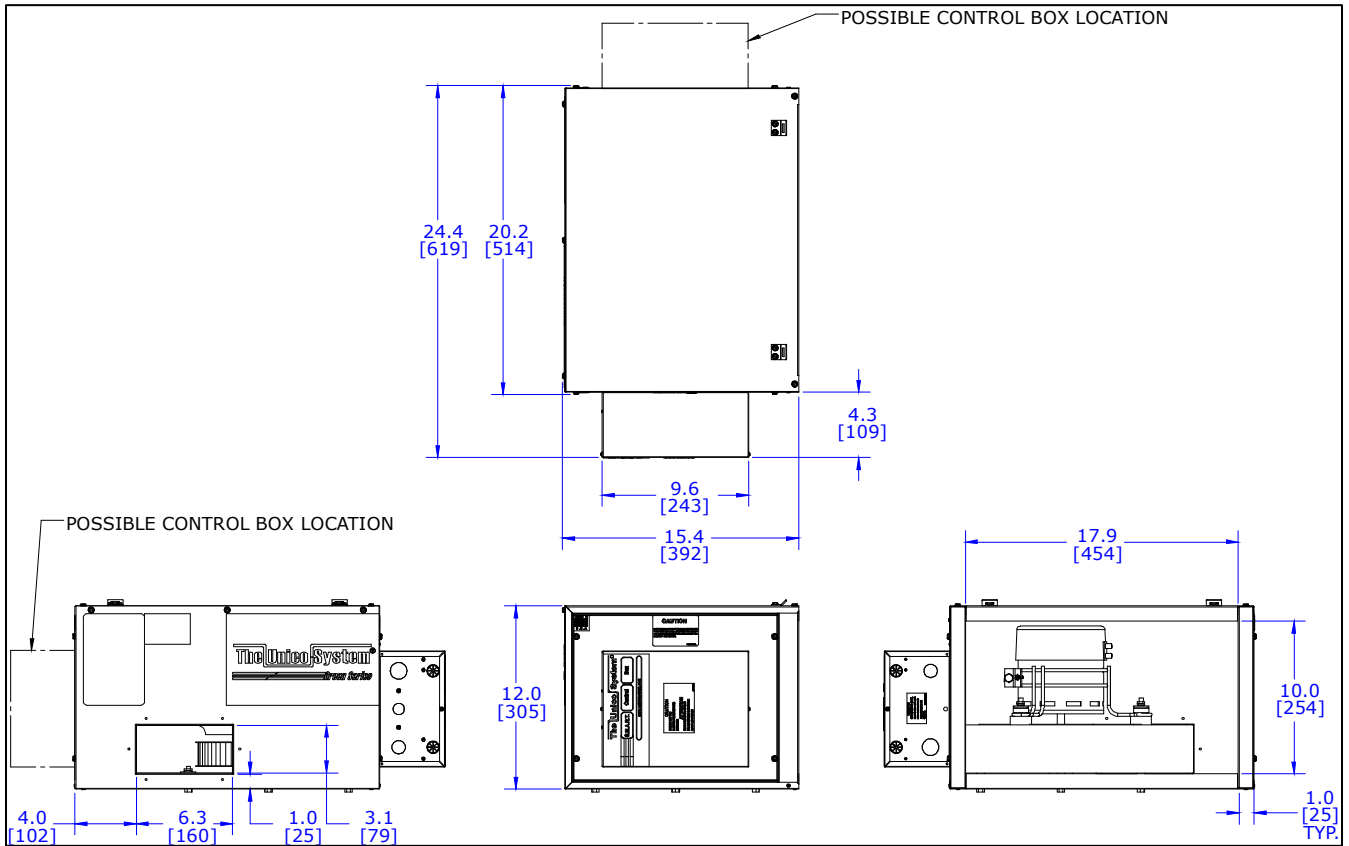
The cabinet is constructed of 22 gauge (0.7mm) galvanized steel with removable access panels installed on both sides for ease of service. All access panels are secured with slotted hex head washer screws and hardened steel U-clip nuts to prevent stripping. The cabinet is fully insulated with closed cell insulation. There is no exposed fiberglass inside the cabinet. See dimension drawing.

All blower modules feature electrical connections and service access panels on the left-hand side of the unit when viewing the return with the airflow at your back.

Right hand blowers are available upon request. In this case, the blower discharge opening is near the top of the cabinet.

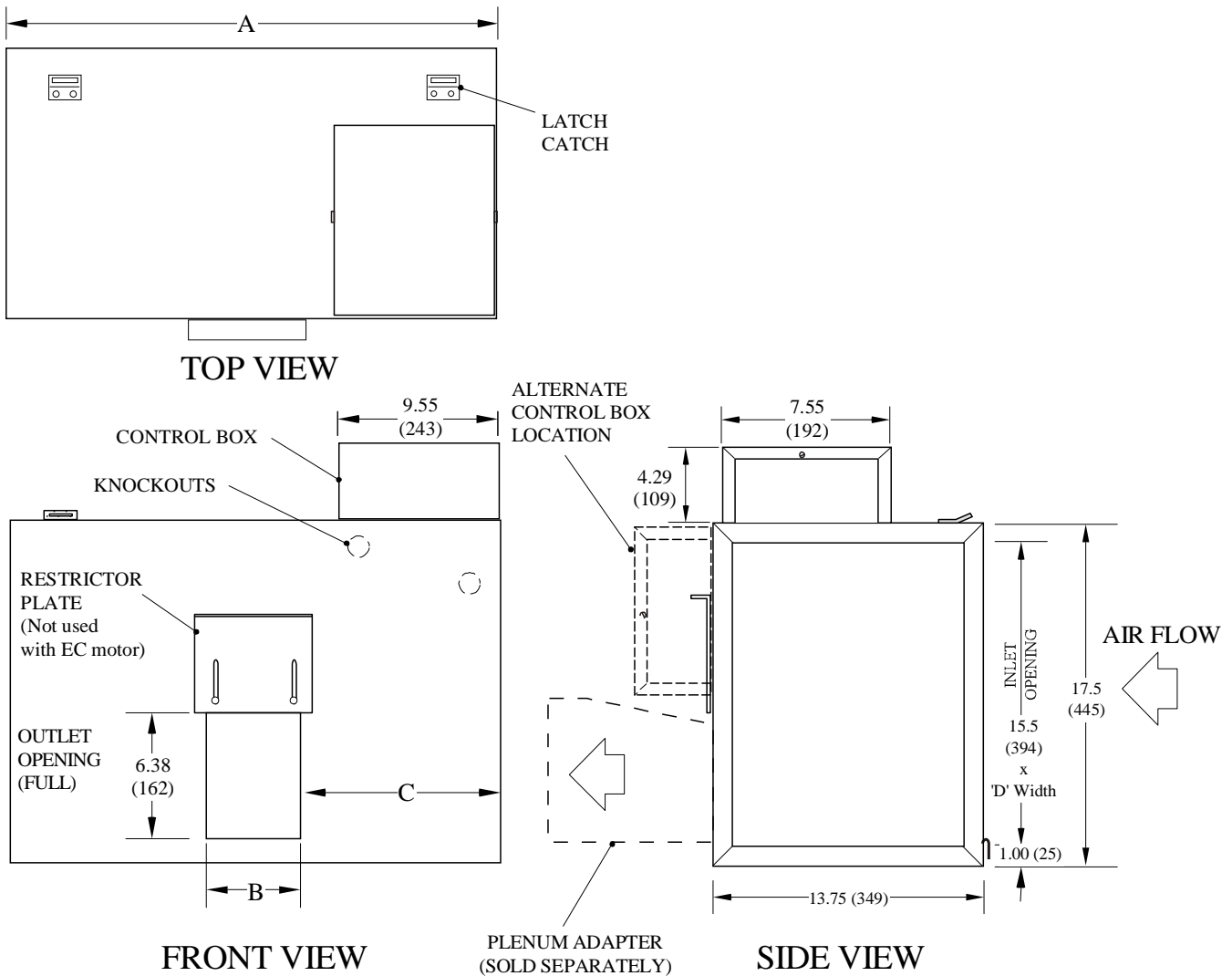
DIMENSIONAL DATA

M1218



All dimensions in inches [mm]

M2430/3036/3642/4860



IL00020e.evx

All dimensions in inches (mm)

Table 2. Blower Dimensional Table

Model No.	M2430BL	M3036BL	M3642BL	M4860BL
Dimensions [in. (mm)]				
A	25.00 (635)	30.00 (762)	38.00 (965)	38.00 (965)
B	6.00 (152)	7.24 (184)	7.16 (182)	9.92 (252)
C	9.50 (242)	11.38 (289)	15.40 (392)	14.00 (356)
D	23.00 (584)	28.00 (711)	36.00 (915)	36.00 (915)

BLOWER MODULE SPECIFICATIONS

Model No.		M1218BL	M2430BL	M3036BL	M3642BL	M4860BL
Motor Electrical Characteristics	-ST2	208-230 V, 60 Hz, 1 ph				
	-EC2	120/208-240 V, 50/60 Hz, 1 ph				
Motor Size, HP (kW)		1/2 (0.37)		1 (0.75)		
Motor Type	-ST2	PSC				
	-EC2	ECM (variable speed)				
Motor Capacitor, mfd	-ST2	7.5	10			
	-EC2	none				
Motor minimum circuit ampacity (MCA)	-ST2	3.8		7.8		
	-EC2 120/240V	7.0 / 4.0		12.8 / 7.7		
Max. Overcurrent Protection (MOP), Amps	-ST2	15		15		
	-EC2 120/240V	15 / 15		20 / 15		
Motor Full Load, Amps	-ST2	1.9	3.0	6.2		
	-EC2 120/240V	5.6 / 3.2		10.2 / 6.1		
Motor Speed, RPM	-ST2	1700	1625			
	-EC2	400 – 1800				
Blower Wheel Diameter, in. (mm)		9.5 (241)				
Blower Wheel Width, in. (mm)		1.5 (3.8)	3.75 (95)	5.0 (127)	5.0 (127)	7.75 (197)
Nominal Air Flow Rate, CFM (m ³ /s)		400 (0.19)	750 (0.35)	900 (0.42)	1100 (0.52)	1300 (0.61)
Nominal Static Pressure, in. w.c. (kPa)		1.5 (0.373)				
Minimum Plenum Size (ID), in. (mm)		7 (178)	7 (178)	9 (229)	9 (229)	10 (254)
Sound Pressure Level	dB(A)	52	56	56	56	58
	NC	40	50	47	47	50
Maximum Elevation of Operation, ft (m)		15,000 (4572)				
Shipping Weight, lbs (kg)		32 (15)	62 (28)	65 (30)	72 (33)	74 (34)

MOTOR TEMPERATURE LIMITS

Table 3. Air Over Motor

Motor Type	Recommended Temperature Limit	Maximum Temperature Limit
ST2	160 °F (71.1 °C)	160 °F (71.1 °C)
EC2	130 °F (54.4 °C)	150 °F (65.6 °C)

Note: The EC motor is sensitive to air temperatures that exceed the recommended temperature limit. A reduction in motor life of as much as 50% could result when operating at the maximum temperature limit.

MEASURING AIRFLOW

(-ST2 models) To determine the airflow, measure the amperage and look up the airflow from the fan curves in this document. The amperage versus airflow is also shown on the airflow label attached to the blower access door and in the control box installation instructions (Bulletin 30-037).

(-EC2 models) Count the LED blinks on the control board or use the ECMconfig software to display the airflow per the installation instructions.

ACOUSTIC DATA

Sound is always present in our lives and is important to comfort. Understanding how sound is defined is essential to understanding how to design a proper Unico System. Sound is defined as a physical disturbance in pressure that is detectable by the human ear. Sound is usually presented as Sound Pressure Level (SPL) in decibels (dB) but can also be presented as Sound Power Level (SWL). Sound pressure is what you hear so it is the only value that is important to the occupant. However, determining the value is difficult because it is dependent on the surroundings and distance from the sound source. For instance, a carpeted room is much quieter than a room with wood floors.

For the Unico System, it is also important to consider sound transmission losses through ceilings and walls. Since the blower is never placed in an occupied space, the SPL in that space is always less than the published value. This reduction in sound level depends on the construction of the ceiling or wall. For instance, a ceiling structure made of gypsum board with insulation above it will have a much greater sound transmission loss (TL) than a dropped ceiling without insulation.

The data shown in this catalog comes from measurements taken in a large room with hard surfaces for the walls and floor. It is considered to be the worst case (i.e. loudest) situation. The SPL in the occupied space will always be considerably less than this, depending on where the unit is located. To determine the actual SPL, subtract the TL for the barrier from the sound data of the unit. The table below shows typical TL values for common construction configurations. Subtract these values from the Unico air handler data.

Table 4. Transmission Loss for Common, dB

Construction	Frequency (Hz)						
	125	250	500	1k	2k	4k	R
Sheet Metal, 24 ga	13	17	20	27	34	39	18
Ceiling Tile, mineral fiber	13	21	27	31	35	40	20
Gypsum Frame wall	12	23	31	38	42	37	20
Gypsum Frame wall, insul.	15	30	32	43	46	38	23
Wood Floor, uninsulated	22	28	37	43	46	43	25
Wood Floor, insulated	29	40	51	57	60	58	26
Concrete Block, 190-mm	38	41	43	50	55	61	26
Concrete, 100-mm (4 in.)	41	41	45	52	56	64	26

Ref: Handbook of Acoustical Measurements and Noise Control, 1998

R = Overall Loss for typical Blower Module

All – Standard models include a restrictor plate to fine tune the airflow. This plate creates a small amount of turbulence and noise. However, this is only noticeable near the unit if the unit is installed close to the occupied space. The –EC2 models do not need a restrictor plate and, consequently, the sound pressure level in the occupied space can be as much as 3-5 dB quieter.

Note: Using muffler on the discharge of the unit will reduce the sound pressure by 3 dB. The muffler should be a metal duct with at least 1.5 inches (38 mm) of fiberglass insulation, measuring at least 10in. D × 20in. L (250mm D × 500mm L).

Example. Consider an M2430BL1 located above a dropped ceiling. The SPL generated by the unit is 56dB, and the transmission loss due to the ceiling is 20dB, resulting in a overall SPL of 36dB. Similarly, if the same unit were installed in an attic with insulation (TL=26dB), the SPL would be only 30dB. This makes the Unico System one of the quietest systems on the market.

Sound Pressure Levels (L_p)

The sound pressure level for each unit was measured in a reverberant room measuring approximately 21ft × 35ft (6.4m × 10.7m) with hard tiled floors, hard walls, acoustical ceiling tiles, and no furniture. The sound level meter was located near the side of the unit (*Figure 3*).

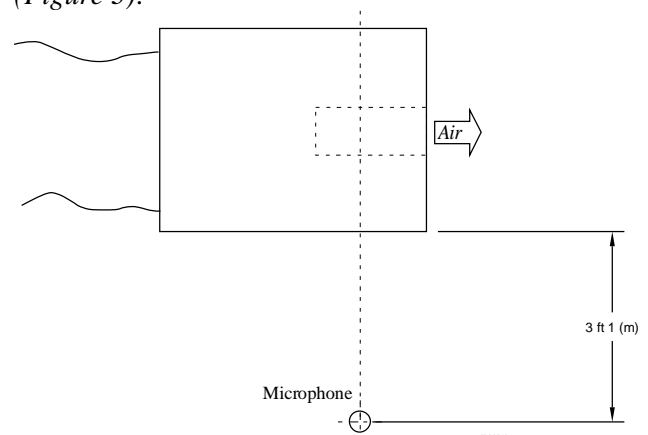
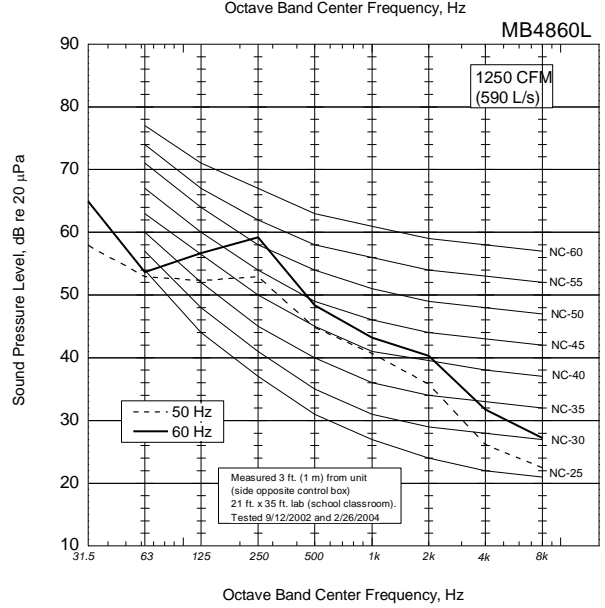
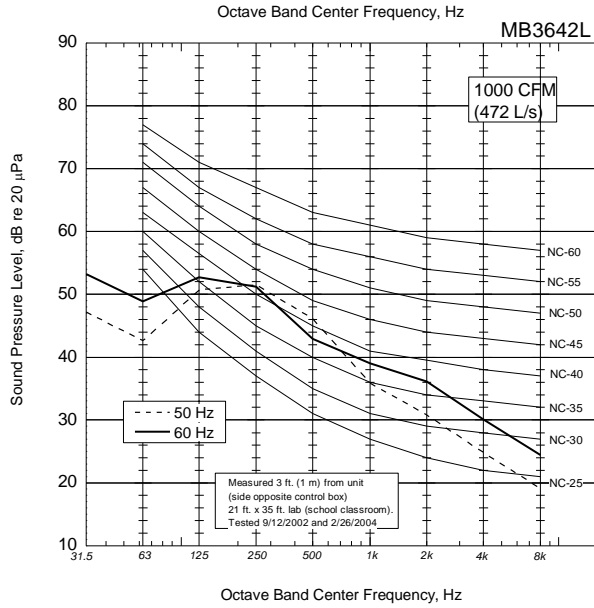
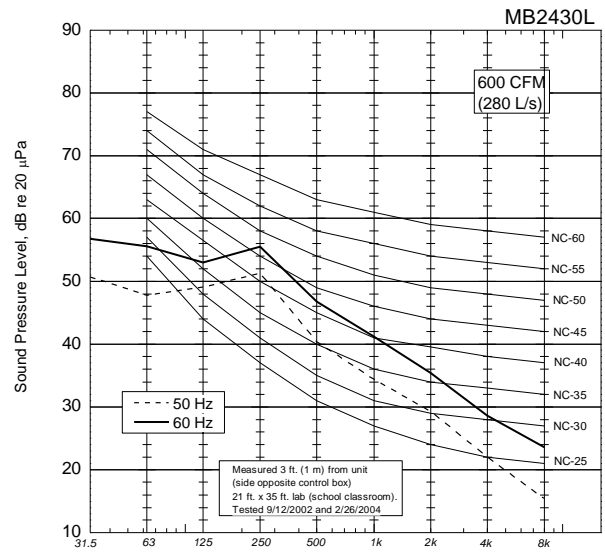
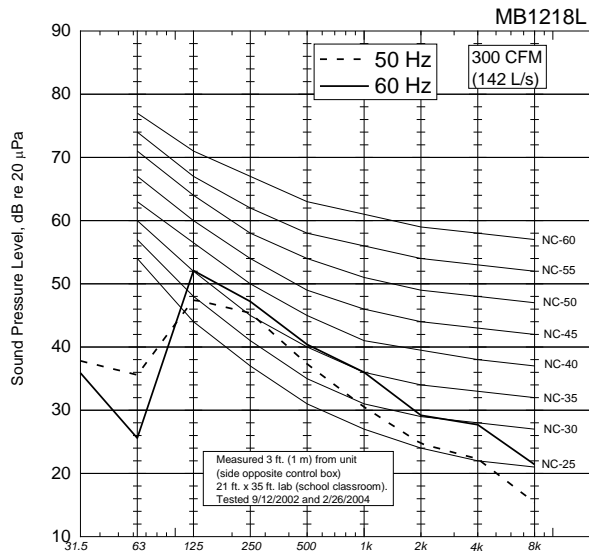


Figure 3. Location of Sound Level Meter

The data shown on the next page was measured at a motor speed of 1700 RPM at maximum airflow. It is considered the worst (loudest) case scenario. Using the EC motor with additional outlets will significantly reduce the radiated sound by reducing the required static pressure and consequently the motor speed.



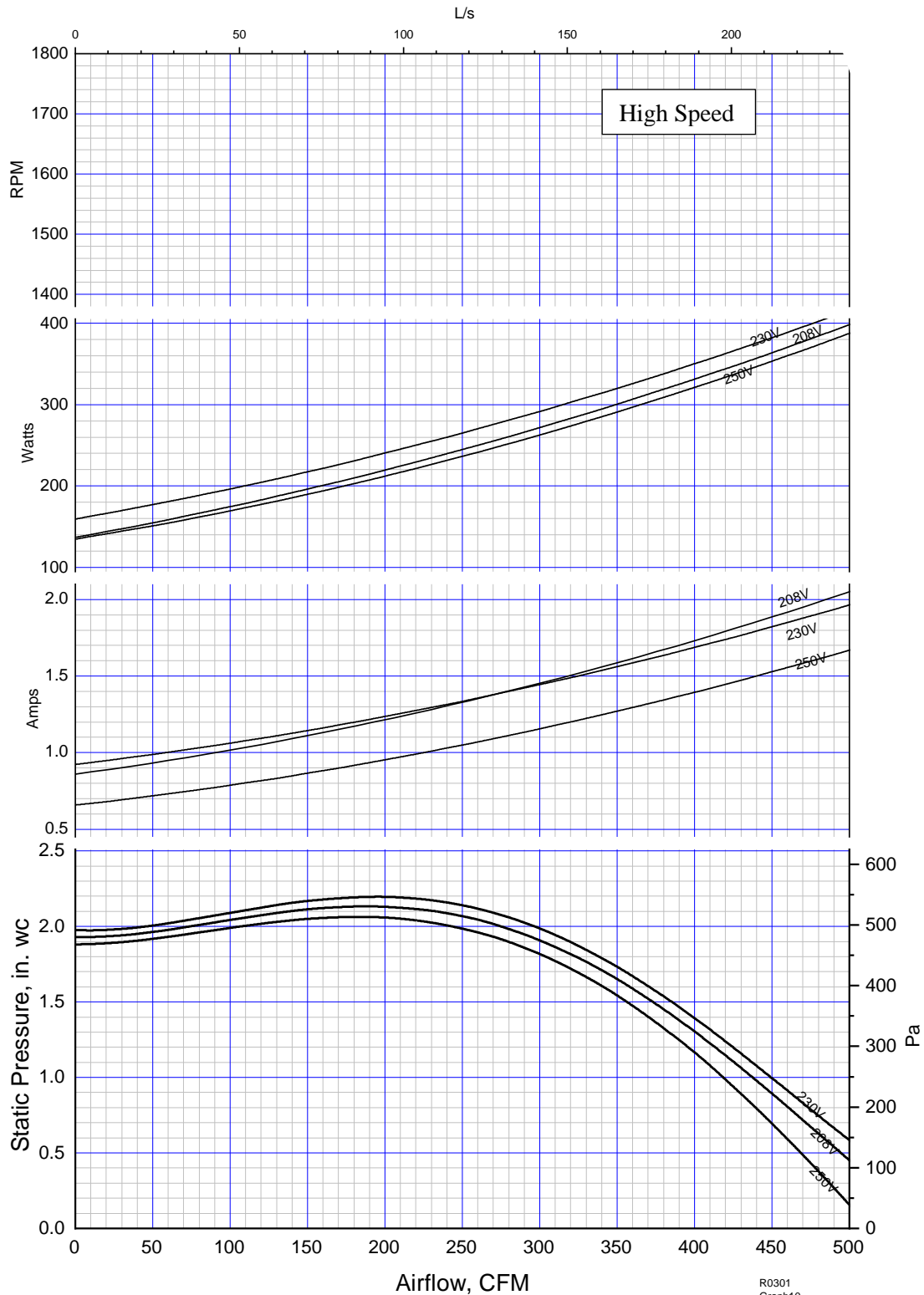
BLOWER PERFORMANCE DATA

Model	External Static Pressure [in. w.c. (kPa)]									
	1.0 (0.25)		1.25 (.031)		1.5 (0.37)		1.75 (0.44)		2.0 (0.50)	
	CFM(L/s)	Amps	CFM(L/s)	Amps	CFM(L/s)	Amps	CFM(L/s)	Amps	CFM(L/s)	Amps
-ST Models										
M1218BL1/2	450 (0.21)	1.82	420 (0.20)	1.73	385 (0.18)	1.65	345 (0.16)	1.56	300 (0.14)	1.44
M2430BL1/2	870 (410)	3.1	810 (383)	2.9	740 (351)	2.7	660 (310)	2.4	510 (240)	2.0
M3036BL1/2	1170 (552)	4.6	1150 (543)	4.4	1070 (505)	4.1	965 (455)	3.8	825 (389)	3.2
M3642BL1/2	1240 (585)	4.8	1170 (552)	4.5	1070 (505)	4.1	925 (437)	3.6	745 (352)	3.1
M4860BL1/2	1472 (695)	4.7	1400 (660)	4.5	1300 (610)	4.2	1162 (548)	3.9	953 (450)	3.4

*The EC Motor adjusts RPM to maintain a desired airflow. Refer to page 17-21 for the performance map.

M1218BL2-ST2

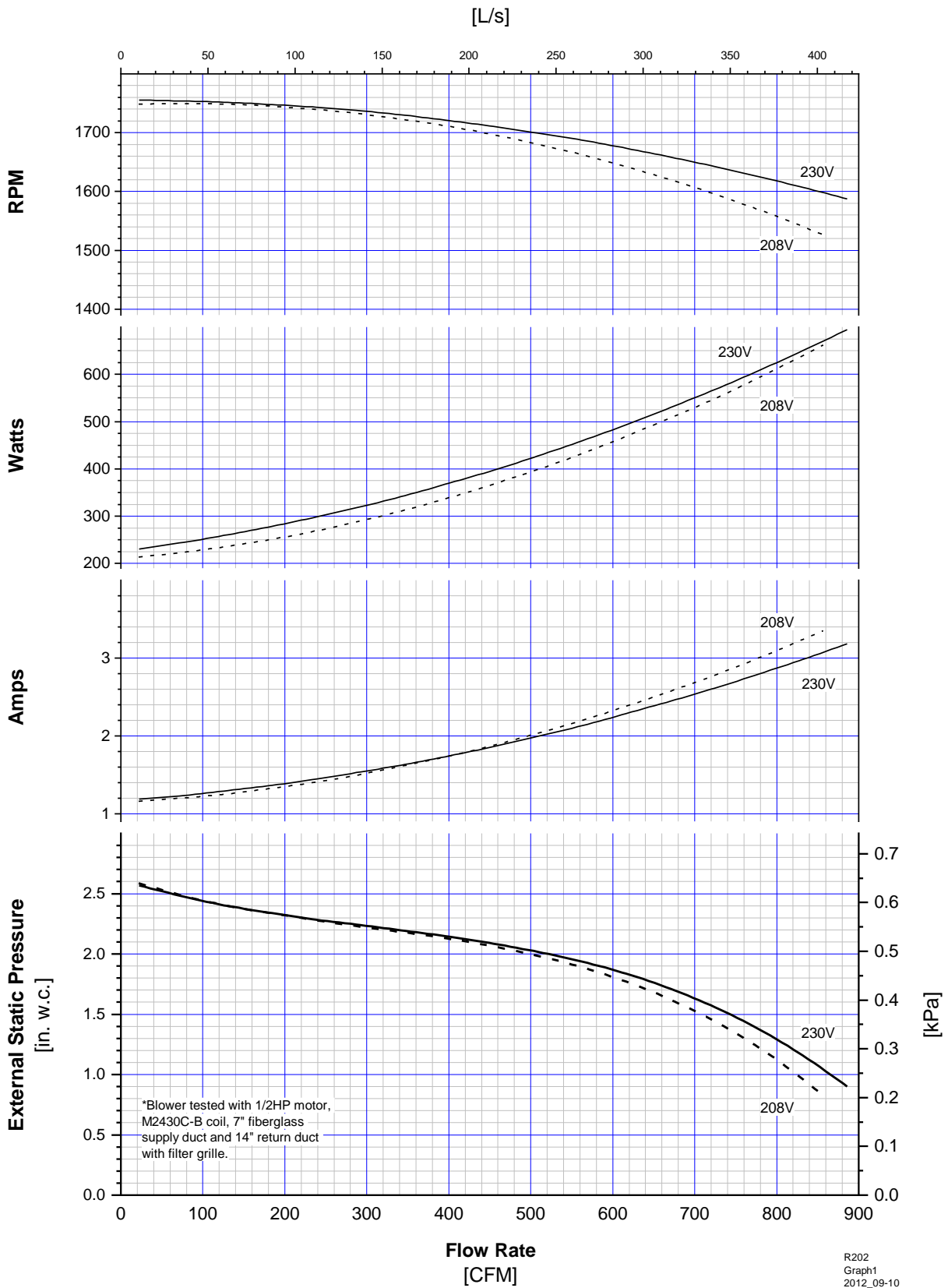
60 Hz



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 Tested by: J. Riley
 Approved by: C. Messmer

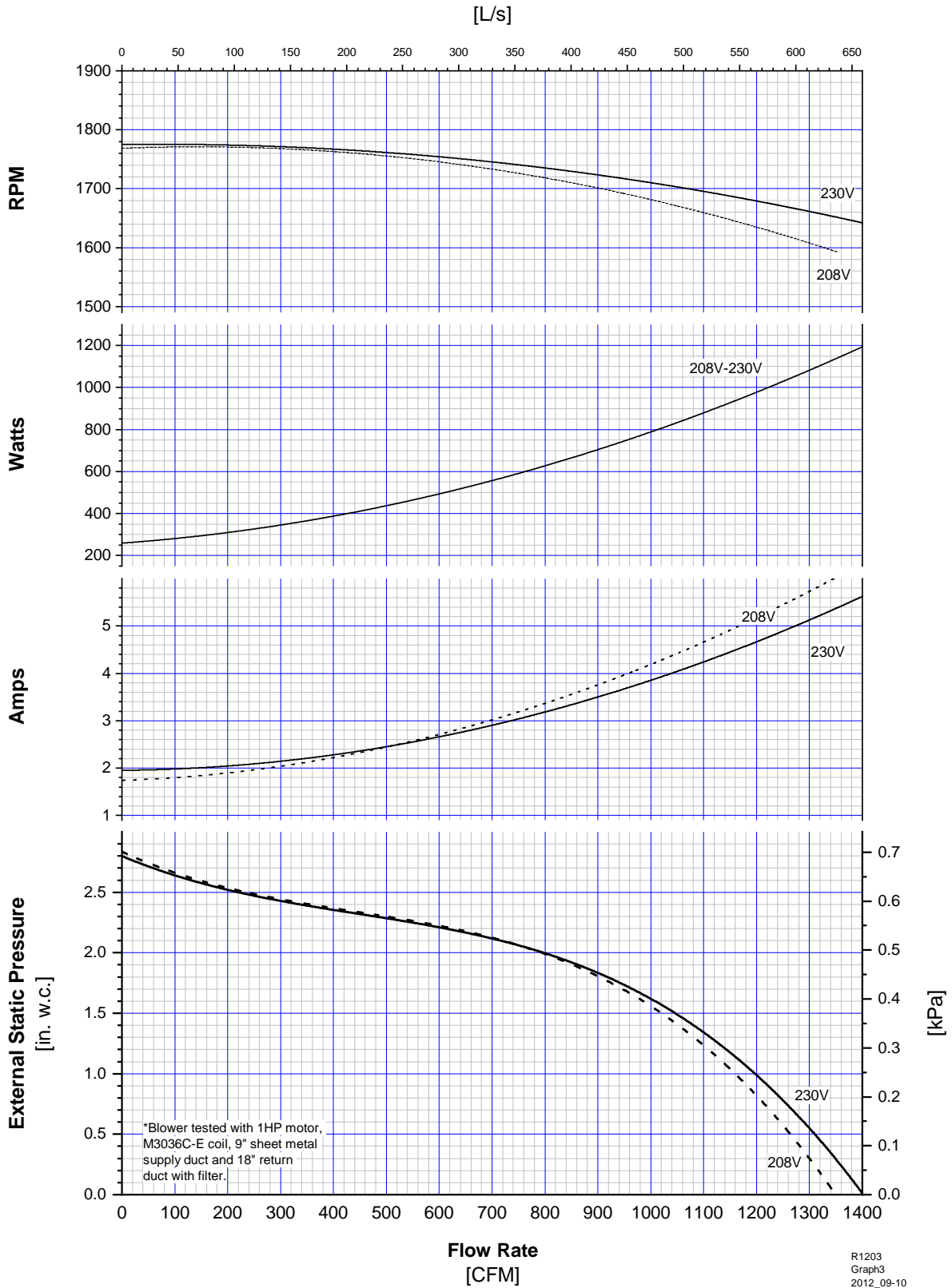
M2430BL2-ST2

60Hz



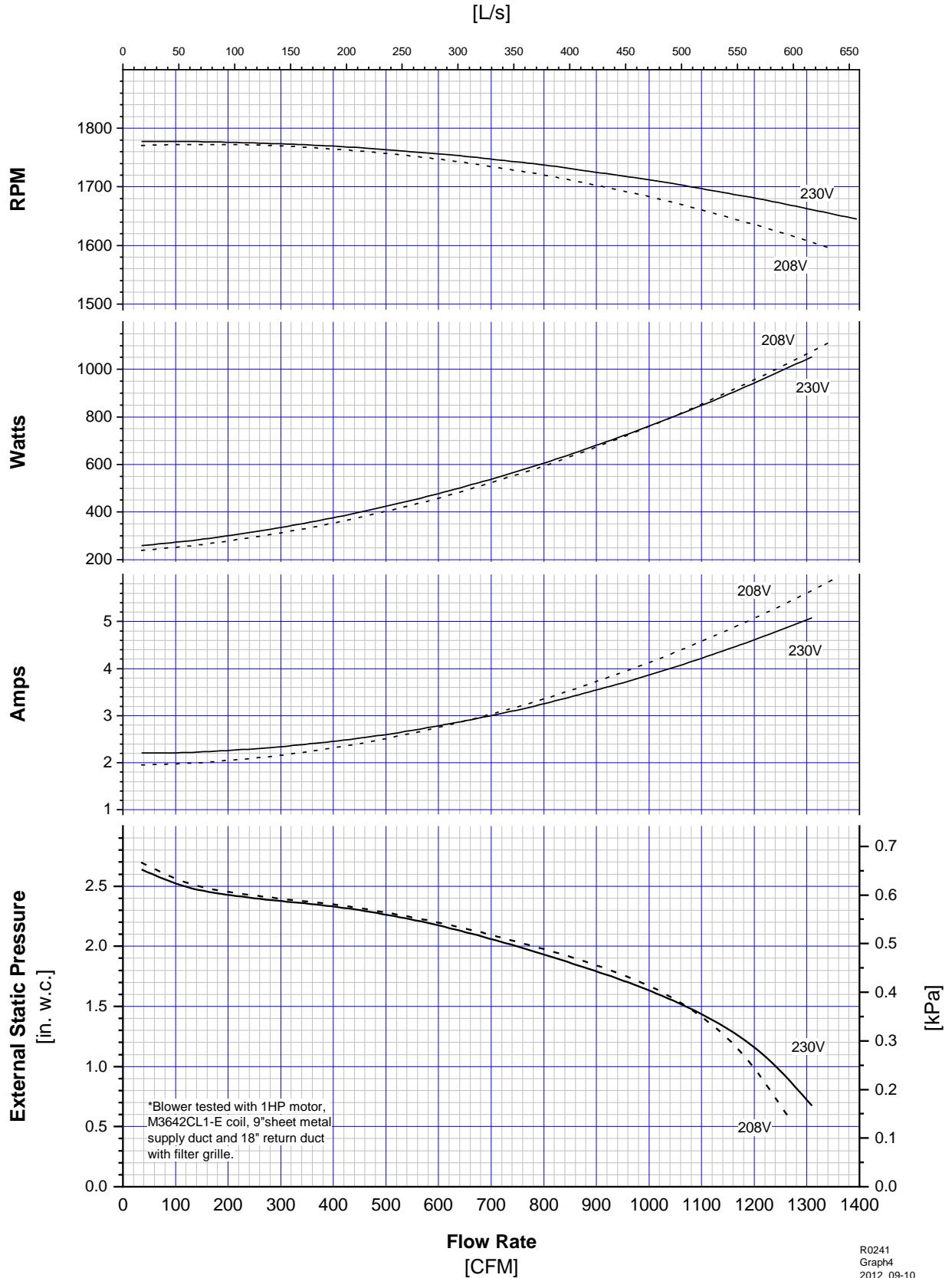
M3036BL2-ST2

60Hz



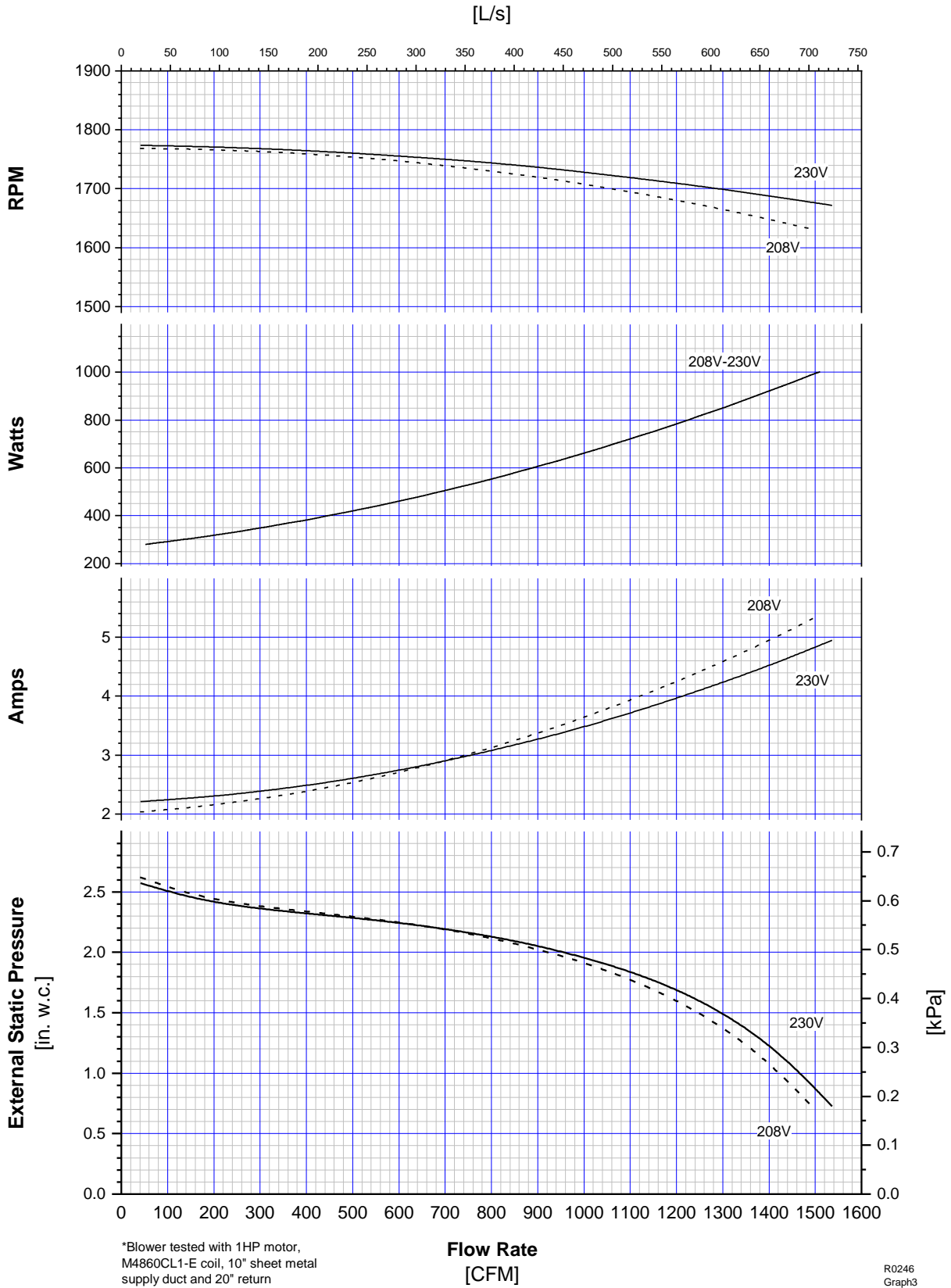
M3642BL2-ST2

60Hz



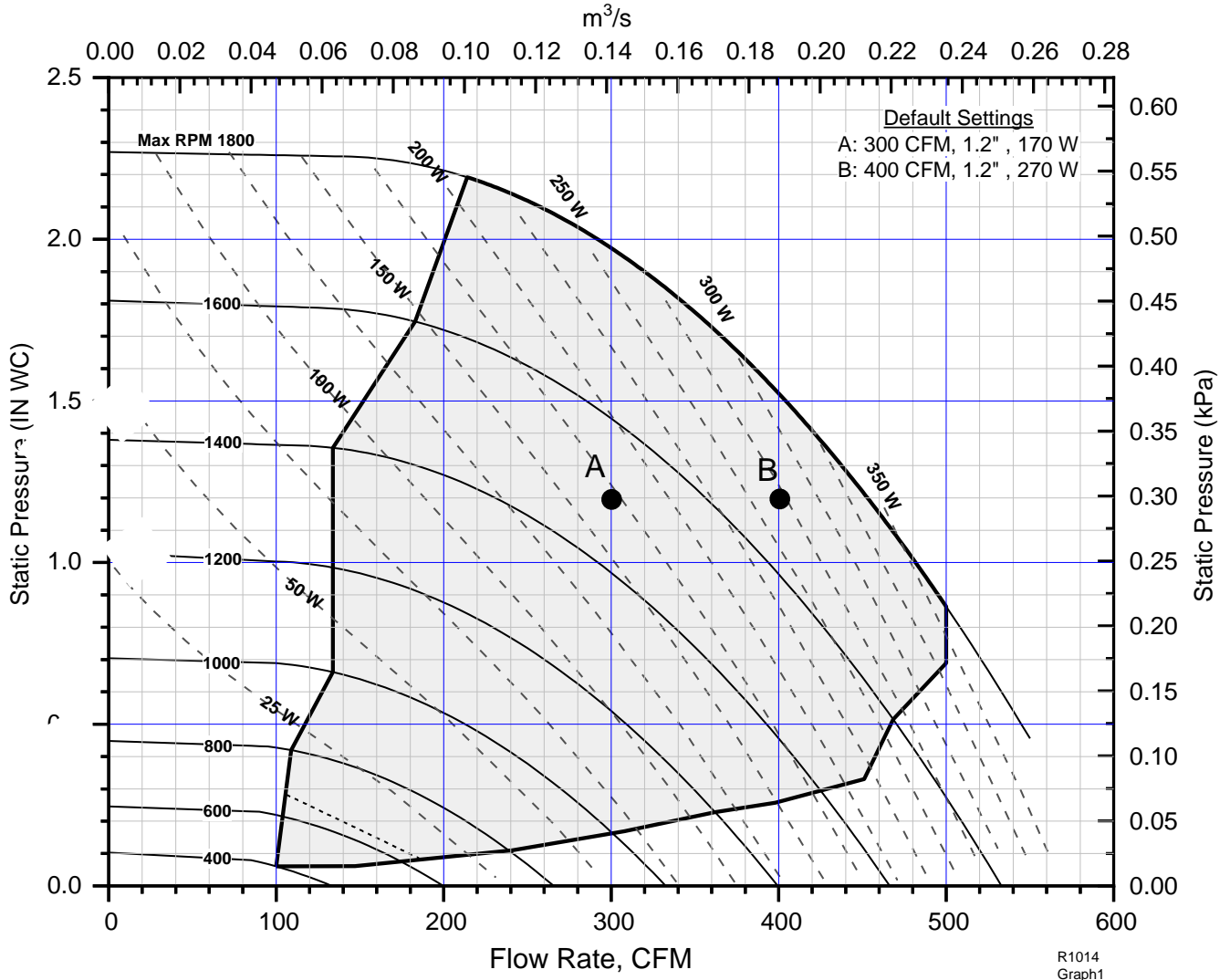
M4860BL2-ST2

60Hz



M1218BL1-EC2

50/60 Hz

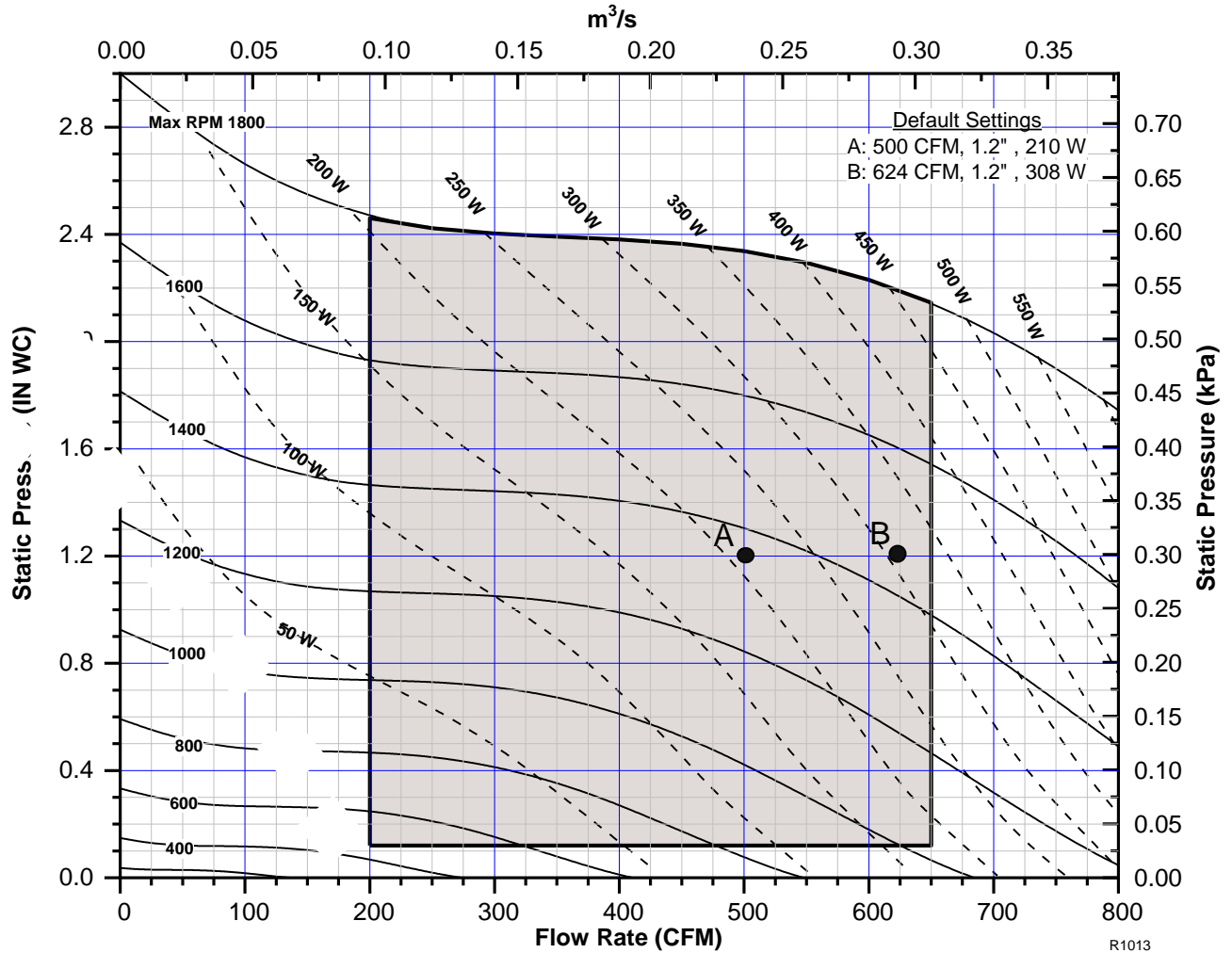


* Shaded Area Represents the best Operating Range

SP, in. wc (Pa)	0.25 (62)	0.5 (124)	0.75 186	1 (248)	1.2 (298)	1.5 (373)	1.75 (435)
CFM (m ³ /hr)	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W
100 (0.05)	640 10	870 25	1050 35	1210 50	1320 65	1470 85	1590 100
150 (0.07)	710 20	910 35	1090 50	1230 70	1340 85	1490 105	1600 125
200 (0.09)	800 30	980 50	1140 65	1280 90	1380 105	1520 135	1630 155
250 (0.12)	910 50	1070 70	1210 90	1340 115	1440 135	1570 165	1680 195
300 (0.14)	1030 75	1170 95	1300 120	1420 150	1510 170	1630 205	1730 235
350 (0.16)	1160 105	1280 130	1400 160	1510 190	1590 215	1710 255	1800 285
400 (0.19)	1290 150	1400 180	1510 210	1610 240	1680 270	1790 310	-- --
450 (0.21)	1420 205	1520 235	1620 270	1710 305	1780 335	-- --	-- --

M2430BL1-EC

50/60 Hz



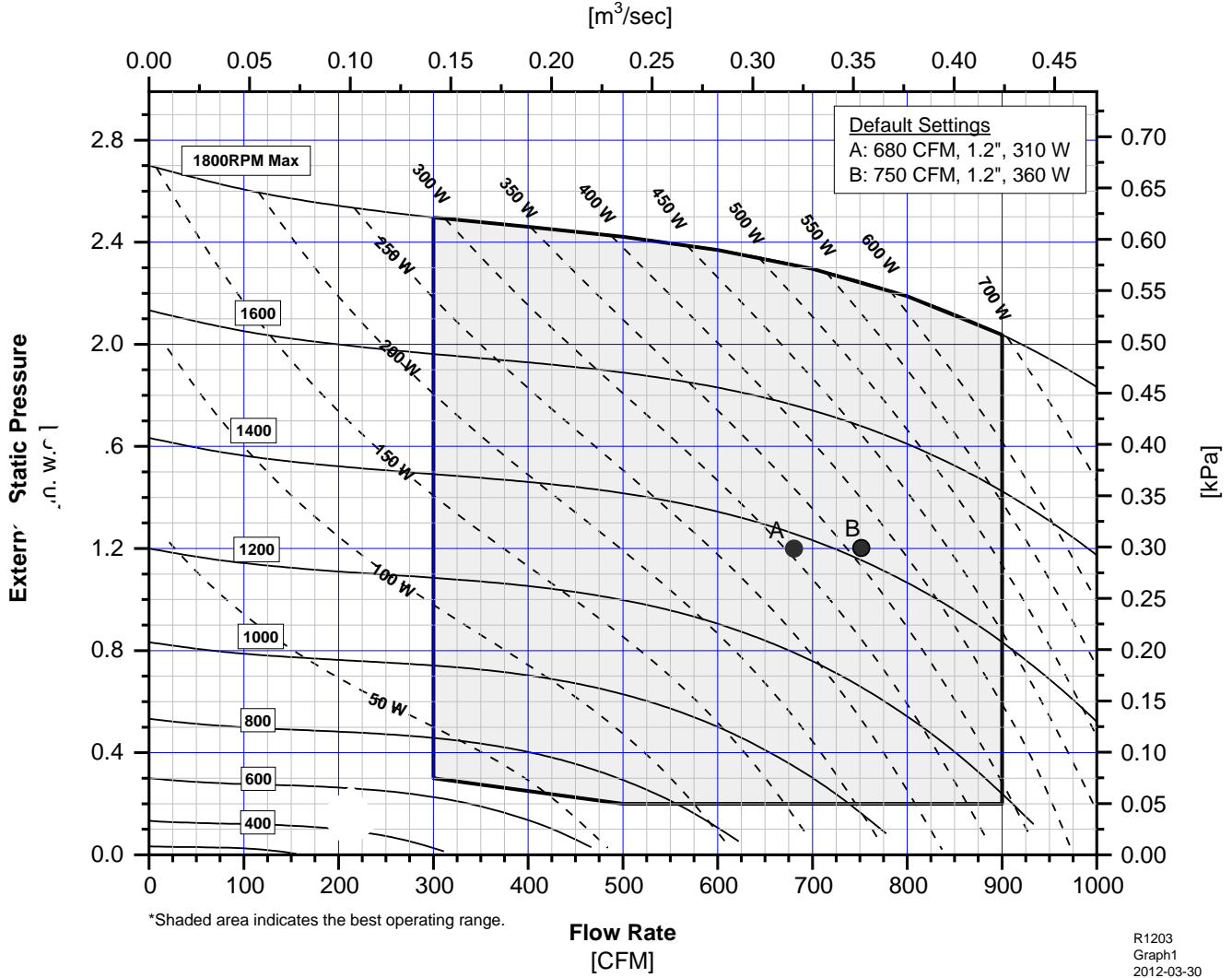
* Shaded Area Represents the best Operating Range

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 Graph17
 3/25/2010

SP, in. wc (Pa)	0.25 (62)	0.5 (124)	0.75 (186)	1 (248)	1.2 (298)	1.5 (373)	1.75 (435)
CFM (m³/hr)	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W
100 (0.05)	580 10	810 20	990 30	1140 45	1240 55	1380 75	1480 90
200 (0.09)	600 15	830 30	1010 50	1160 70	1270 85	1420 110	1530 130
300 (0.14)	680 35	860 50	1020 75	1170 95	1280 115	1430 150	1540 175
400 (0.19)	790 60	940 85	1070 110	1200 135	1300 160	1440 195	1550 225
500 (0.24)	910 105	1040 130	1160 160	1270 190	1360 215	1480 255	1580 290
600 (0.28)	1040 165	1150 195	1260 230	1360 265	1430 290	1540 335	1630 375
700 (0.33)	1170 245	1280 285	1370 325	1460 360	1530 395	1630 440	1710 485
800 (0.38)	1310 355	1400 400	1490 445	1570 485	1640 520	1730 575	1800 620

M3036BL1-EC

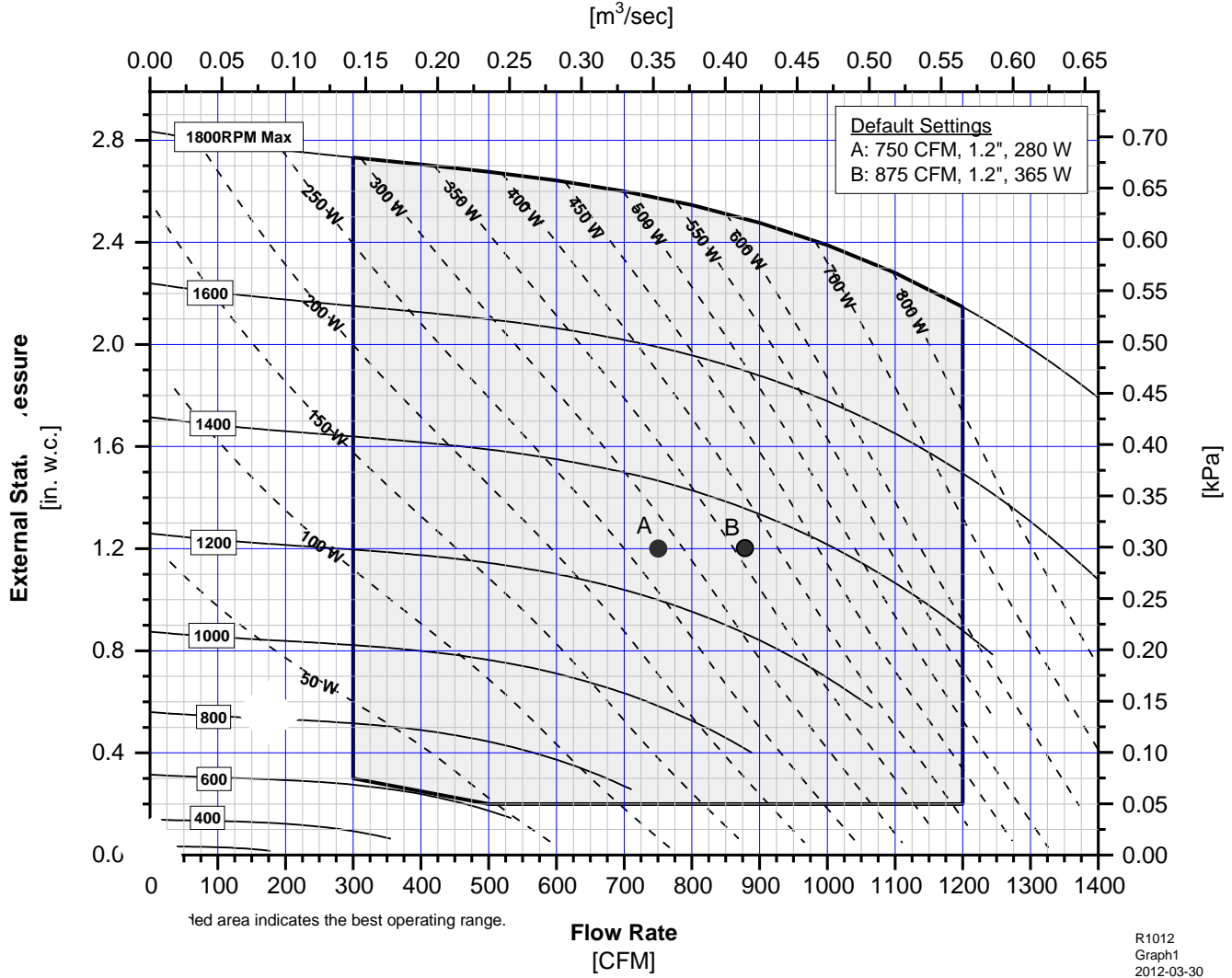
50/60 Hz



SP, in. wc (Pa)	0.25 (62)	0.5 (124)	0.75 (186)	1 (248)	1.2 (298)	1.5 (373)	1.75 (435)
CFM (m ³ /hr)	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W
100 (0.05)	570 10	800 20	980 40	1120 55	1230 70	1370 100	1480 120
200 (0.09)	590 15	810 35	990 50	1140 75	1250 90	1390 120	1500 145
300 (0.14)	620 30	830 50	1010 70	1150 95	1260 120	1400 150	1510 180
400 (0.19)	690 50	870 70	1030 100	1170 130	1280 155	1420 190	1530 225
500 (0.24)	770 80	920 105	1070 135	1200 170	1300 200	1440 240	1540 280
600 (0.28)	870 120	1000 150	1120 185	1240 225	1340 255	1470 305	1570 345
700 (0.33)	980 180	1090 215	1200 255	1300 295	1390 330	1510 380	1600 430
800 (0.38)	1090 255	1180 295	1280 335	1370 380	1450 420	1560 475	1650 525
900 (0.42)	1200 355	1290 395	1370 440	1460 490	1520 530	1630 590	1710 645
1000 (0.47)	1320 475	1390 520	1470 570	1550 620	1610 665	1700 730	1780 790

M3642BL1-EC

50/60 Hz

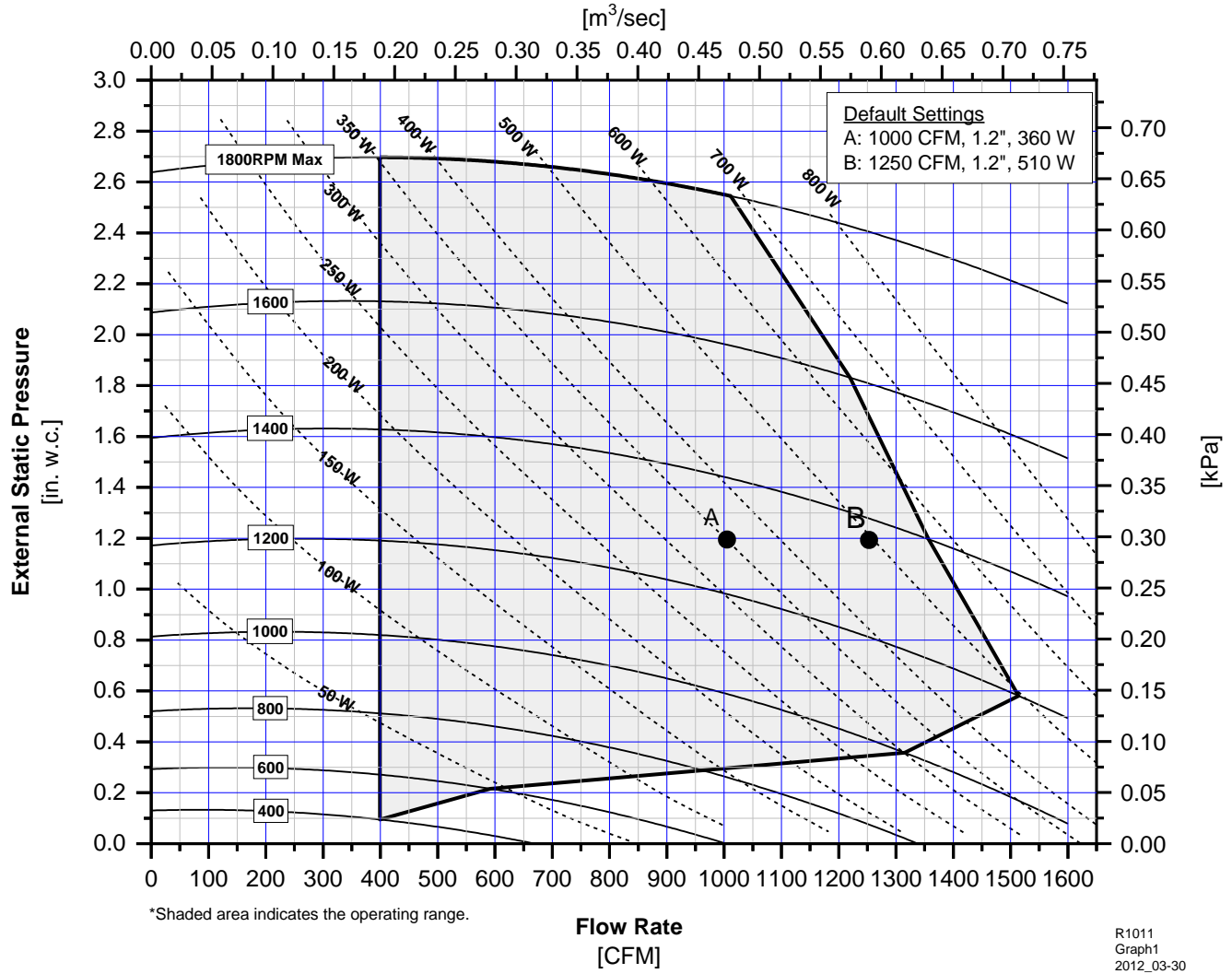


R1012
 Graph1
 2012-03-30

SP, in. wc (Pa)	0.25 (62)	0.5 (124)	0.75 (186)	1 (248)	1.2 (298)	1.5 (373)	1.75 (435)
CFM (m ³ /hr)	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W
100 (0.05)	550 10	770 20	940 35	1080 50	1180 65	1320 90	1430 115
200 (0.09)	560 15	780 30	950 45	1090 65	1190 85	1330 110	1440 135
300 (0.14)	580 25	790 40	960 65	1100 85	1200 105	1340 135	1450 165
400 (0.19)	610 35	810 60	970 85	1110 110	1210 135	1350 170	1450 200
500 (0.24)	660 55	840 80	990 110	1130 145	1230 170	1360 210	1470 245
600 (0.28)	720 75	880 110	1020 145	1150 180	1250 210	1380 255	1480 295
700 (0.33)	790 110	930 145	1060 185	1180 230	1270 260	1400 310	1500 355
800 (0.38)	860 150	990 195	1110 235	1220 285	1310 320	1430 375	1520 425
900 (0.42)	940 200	1050 250	1160 300	1270 350	1350 390	1460 450	1550 505
1000 (0.47)	1020 265	1120 315	1220 370	1320 425	1390 470	1500 540	1590 595
1100 (0.52)	1100 340	1200 400	1290 455	1380 515	1450 565	1550 640	1630 700
1200 (0.57)	1190 435	1270 495	1360 555	1440 620	1510 670	1600 750	1680 820
1101 (0.52)	1270 540	1350 605	1430 670	1510 740	1570 795	1660 880	1730 950
1400 (0.66)	1360 660	1430 730	1510 805	1580 875	1630 935	1720 1025	1790 1100

M4860BL1-EC

50/60 Hz



SP, in. wc (Pa)	0.25 (62)	0.5 (124)	0.75 186	1 (248)	1.2 (298)	1.5 (373)	1.75 (435)
CFM (m ³ /hr)	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W	RPM W
200 (0.09)	540 15	760 30	930 50	1070 75	1170 90	1310 125	1410 155
300 (0.14)	560 20	770 40	940 65	1080 90	1180 110	1310 145	1420 180
400 (0.19)	580 30	780 55	950 80	1090 110	1190 135	1320 175	1420 205
500 (0.24)	600 40	800 70	960 100	1100 135	1200 160	1330 205	1430 240
600 (0.28)	630 55	820 85	980 125	1110 160	1210 190	1340 240	1440 280
700 (0.33)	670 70	850 110	1000 150	1130 190	1230 225	1360 280	1460 325
800 (0.38)	700 90	880 135	1030 180	1150 225	1250 265	1380 325	1480 375
900 (0.42)	740 115	910 165	1050 215	1180 270	1270 310	1400 375	1490 430
1000 (0.47)	790 145	950 200	1080 255	1210 315	1300 360	1420 430	1510 490
1100 (0.52)	830 175	980 240	1120 300	1230 365	1320 415	1440 490	1540 555
1250 (0.59)	880 225	1020 300	1150 370	1270 440	1370 510	1470 585	1560 655
1300 (0.61)	930 260	1060 335	1190 410	1300 485	1380 545	1500 635	1590 705
1400 (0.66)	970 315	1110 395	1230 475	1330 555	1410 620	1530 715	1620 795
1500 (0.71)	1020 370	1150 460	1270 545	1370 630	1450 700	1560 800	1650 885