

iSERIES

The Unico System[®]

ISERIES VERTICAL AHU ENGINEERING SPECIFICATIONS

BULLETIN 20-131.001

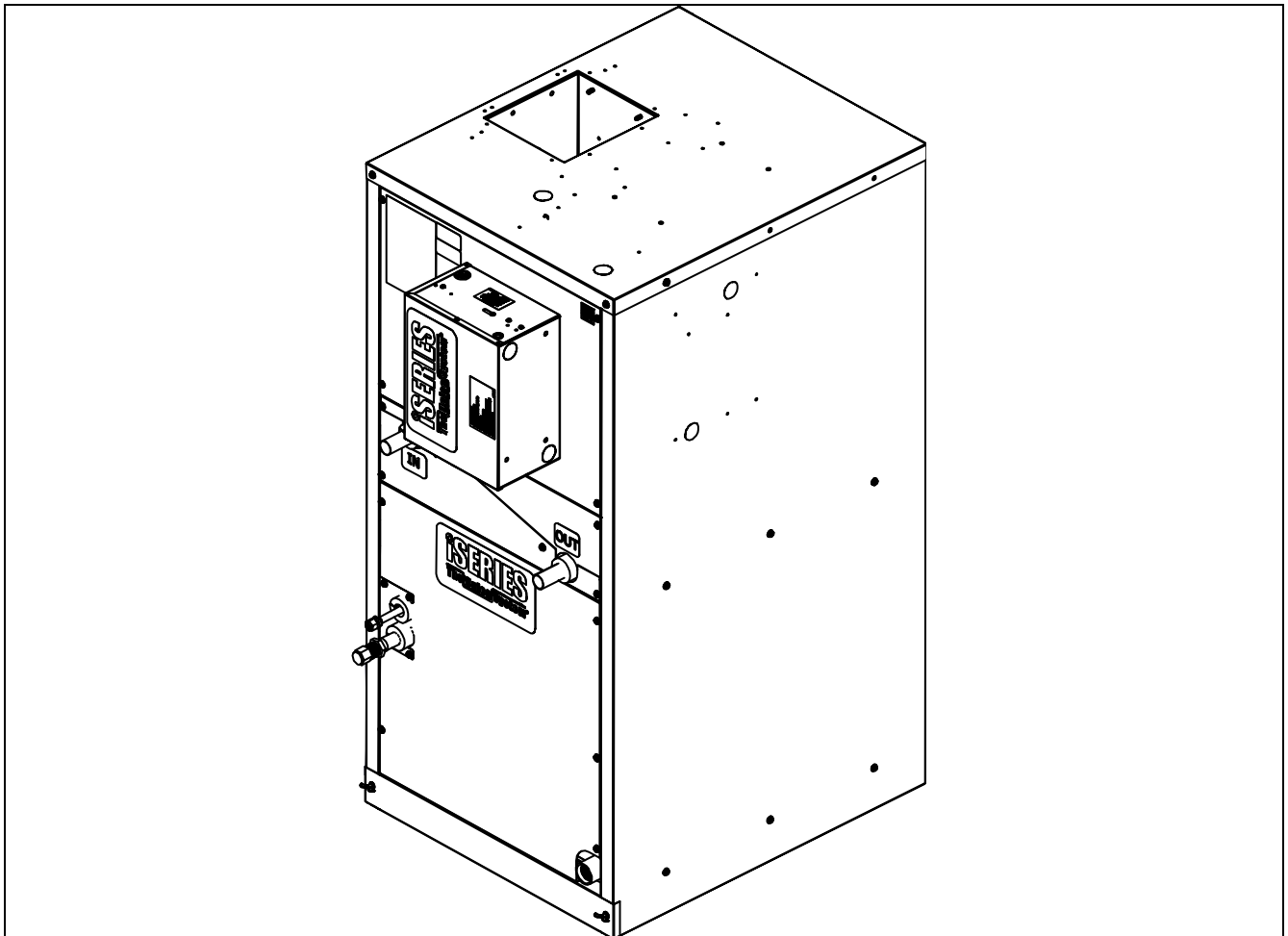


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Certified to UL Standard 1995
Conforms to CAN/CSA Standard C22.2 NO. 236

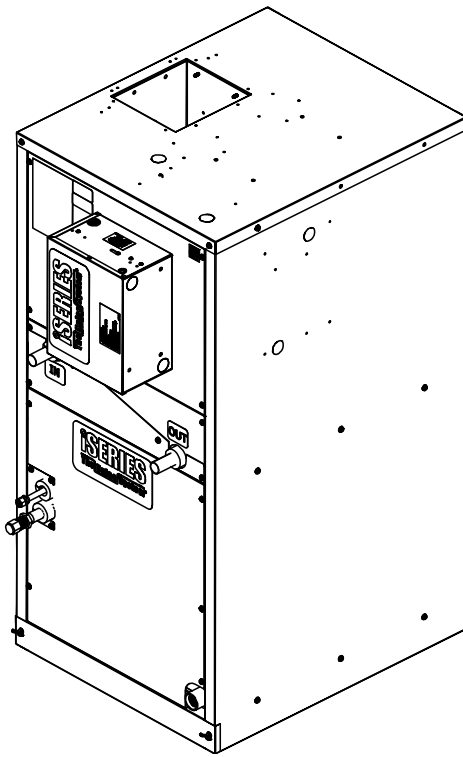


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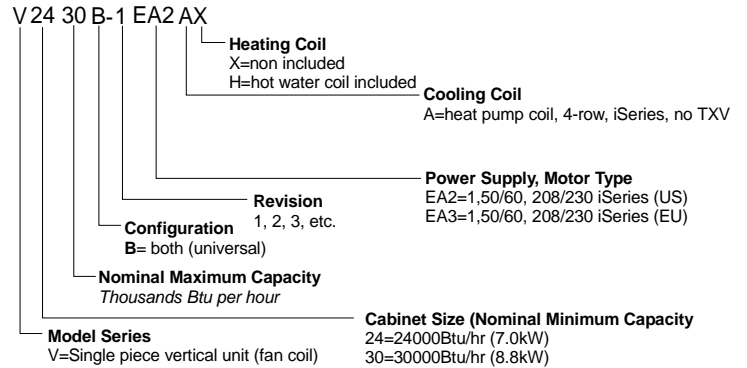


Unico products comply with the European regulations that guarantee product safety.

DESIGN & SPECIFICATIONS



Model Number Key



APPLICATIONS

The Unico System is a complete indoor comfort system that includes an indoor fan coil unit and small duct system. The fan coil unit and duct system were designed to operate together to provide the proper airflow in every installation. The conditioned air is supplied through a series of two-inch diameter ducts as a stream of air that entrains and mixes with the room air. This process of aspiration produces a more even temperature distribution in the room than a conventional system.

The Unico iSERIES Vertical Air Handler Unit is a single packaged unit in a vertical up-flow configuration.

For cooling, the unit is designed for R-410A refrigerant. For heating, the unit offers an optional hot water coil or you may use an electric heater (WON 0502 or WON 0752).

CABINET CONSTRUCTION

The cabinet is fully insulated with 1" closed cell rubber insulation. The cabinet is constructed of 22 gauge (0.7-mm) galvanized steel with removable access panels on the front for ease of service. See dimensional drawing.

FEATURES AND CONTROLS

The following table shows a comparison of the various features.

Table 1. Feature Summary and Comparison

Control Box Configuration	iSERIES
Balanced wheels	✓
Direct drive motor	✓
Shaft key connection	✓
Control voltage transformer	✓
Screw terminal connections	✓
Boiler Relay	✓
Modes of operation	VARIABLES
Requires restrictor plate to adjust air flow	NO
Adjustable Airflow	✓
Heating (boiler) relay	✓
Point-to-point wiring	✓
Electric heater fan interlock	✓
Electric heater stage 3 lockout protection	✓
Humidifier compatibility	✓
Constant Airflow	✓
Airflow indicator	✓
Adjustable Airflow	✓
Laptop Troubleshooting	✓
Optimized for efficiency and sound	✓
Optimized for zone damper systems	✓
Independent fan coil operation	✓

Balanced wheels – All blower wheels are individually balanced.

Direct drive motor – The wheel is mounted directly to the motor shaft to improve drive efficiency and lower costs.

Shaft key – The wheel is attached to the motor shaft using a square keyway which is more secure than a simple set screws.

Control voltage transformer – a 50VA 24-volt transformer which provides control voltage power to the thermostat, electric heaters, and other optional equipment.

Screw terminal connections – terminal blocks with large screws and wire washers to securely connect the control wires.

Boiler relay – The iSERIES includes a separate 24V output that can be used to turn on the boiler, boiler pump, or hot water coil valve.

Modes of operation –The iSERIES control board has multiple modes (Fan-Only, Low-Cool, High-Cool, Low-Heat, High-Heat, Supplemental Heat and Auto Changeover Heat).

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

Electric heater fan interlock – This is a safety feature that prevents the heater from energizing when there is low or no airflow. This prevents the heating elements from overheating, which can severely reduce their useful life.

Electric heater stage 3 lockout – The control board includes a lockout feature to prevent the third stage of the electric heater from turning on if the heat pump is also on. This prevents nuisance shutdowns from overheating the electric heater.

Constant airflow – The control will deliver the airflow requested without any user adjustments to the duct system, or requiring the user to measure the amperage.

Airflow indicator – The iSeries control board includes an indicator light that indicates normal operation and when the RPM limit has been reached. This is usually caused by a restrictive duct system or too few outlets.

Adjustable Airflow –The airflow for each mode of operation is adjustable to any value between the blower minimum and maximum. You can adjust to fan airflow (G), low airflow (Y1), high airflow (Y2), and a manual RPM limit setpoint.

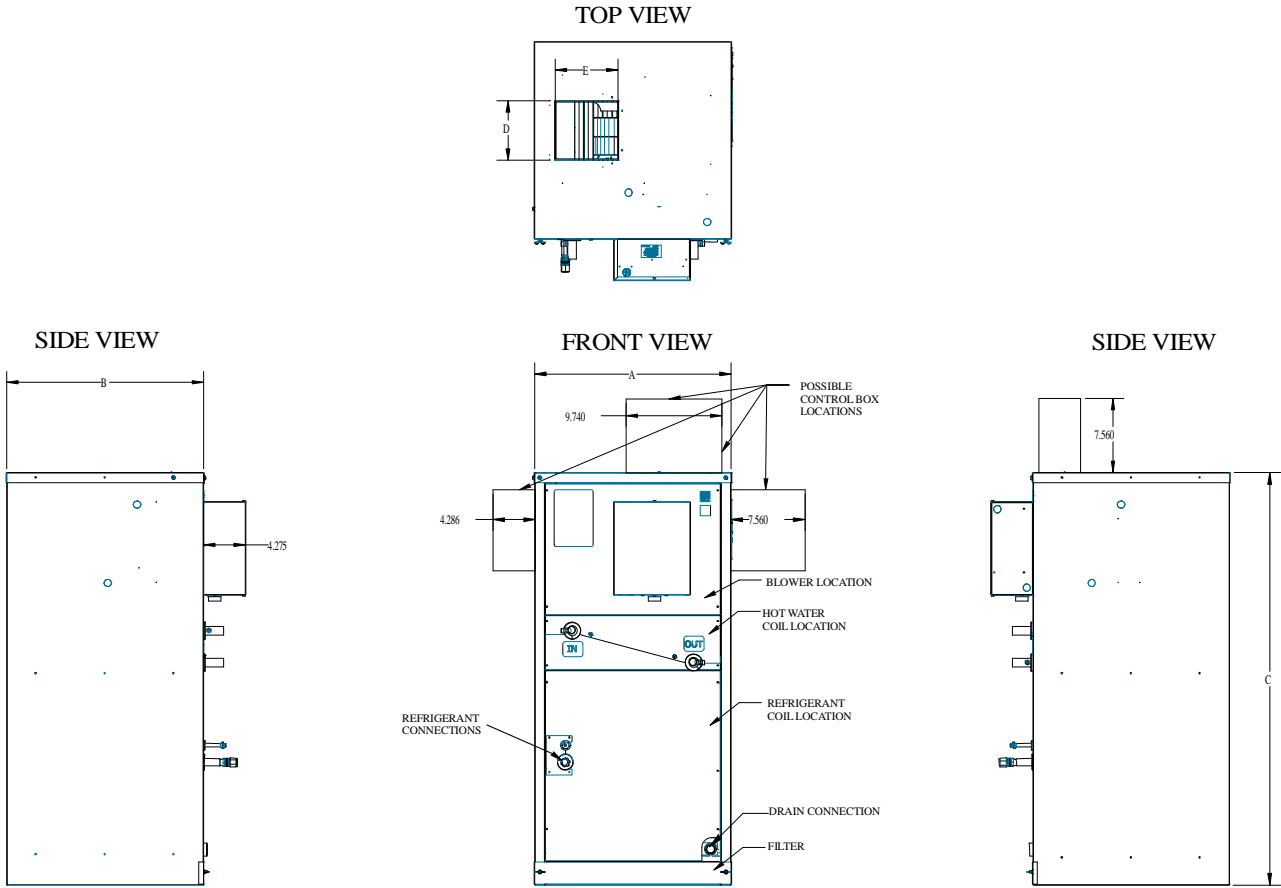
Laptop troubleshooting – The iSERIES logging software provides the user with feedback indicating the actual airflow, motor speed, and the state of various sensors, inputs and outputs.

Optimized for zoning with hydronic systems – The iSERIES logging software provides an additional feature that allows the user to specify the maximum motor speed so that the motor does not over speed when zone dampers are closed. This prevents the need for bypass loops and pressure switch controls and reduces noise at the outlets caused by the blower trying to maintain a constant airflow with fewer outlets. Refer to the Unico Tech Bulletin on zoning for more information.

Optimized for efficiency and sound – The iSERIES will use the lowest motor speed to achieve the required airflow, which minimizes sound and maximizes electrical efficiency.

Independent fan coil operation (IFCO) – If the outdoor unit is not yet installed or is malfunctioning, the indoor unit will operate independently.

DIMENSIONAL DATA



All dimensions in inches [mm]

Note: The control box and U-trap ships inside the spare parts box. The iSeries does not get shipped with an expansion valve.

Model	A	B	C	D	E
V2430	20.0 [508]	20.0 [508]	42.0 [1067]	6.0 [152]	6.4 [162]
V3036	20.0 [508]	24.0 [610]	42.0 [1067]	7.1 [179]	6.3 [160]

Weights

Model No.		V2430B-1EA2AX	V3036B-1EA2AX
		V2430B-1EA3AX	V3036B-1EA3AX
Weight., lbs. [kg]	Net	117[53]	138[63]
	Ship	177[80]	200[91]
Shipping Dimensions Inch [mm]	W	27.2[692]	27.2[692]
	D	21.6[549]	24.6[625]
	H	44.3[1125]	44.3[1125]

SPECIFICATIONS

Blower and Motor Specifications

Model No.		V2430B-1EA2/EA3	V3036B-1EA2/EA3
Electrical Power	Phase, Hz, Volts	1, 50/60, 208-230	
Nominal Motor Size	hp (kW)	½ (0.37)	1 (0.75)
Motor Type		EC (variable speed)	
Minimum Circuit Ampacity	amps	4.0	7.7
Max. Over Current Protection	amps	15	15
Motor Full Load Current	amps	3.2	3.1
Motor Speed	RPM	400-1800	
Blower Wheel Nom. Diameter	in., (mm)	9.5 (241)	
Blower Wheel Width	in., (mm)	3.75 (95)	5.0 (127)
Nominal Air Flow Rate+	CFM, (L/s)	600 (283)	750 (354)

Plenum Static Pressure+	in. w.c., (kPa)	1.5 (0.373)	1.5(0.373)
Minimum Plenum Size, ID	in., (mm)	7 (178)	9 (229)
Sound Pressure Level	dB(A)	56	56
	NC	50	47

+ Based on full open restrictor and minimum plenum size at 230V.

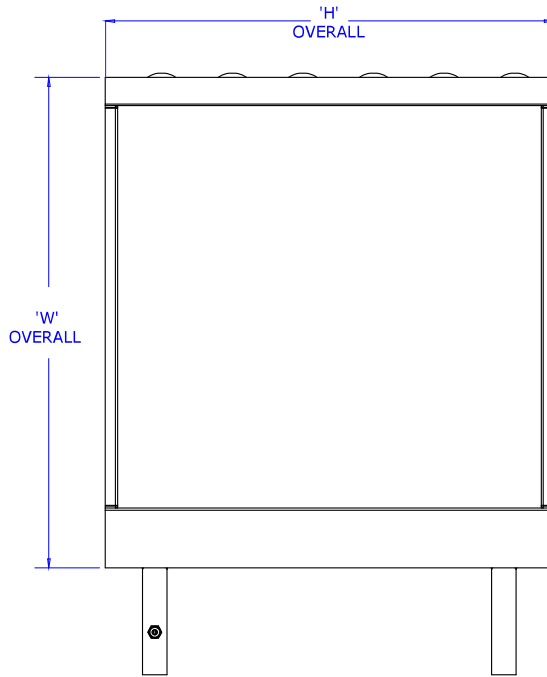
Refrigerant Coil Specifications

System Type		Heat Pump (iSeries)		Heat Pump (iSeries)	
Model No.		V2430B-1EA2		V3036B-1EA2	
		V2430B-1EA3		V3036B-1EA3	
Coil Part No.		A01948-G01		A01951-G01	
Compatible Condenser Size, ton (kW)+		See Bulletin 30-121			
Net Face Area, ft ² (m ²)		2.72	(0.25)	3.50	(0.33)
Tube diameter, in. (mm)		3/8	(9.52)	3/8	(9.52)
Fin Density, fins/in. (fins/m)		15	(590)	15	(590)
Number of rows		3		3	
Number of circuits		4		6	
Design Pressure, psig (MPa)		500	(3.5)	500	(3.5)
Refrigerant Type		R-410A			
Suction line	O.D., inch (mm)	5/8	(15.88)	3/4	(19.05)
	Connection, in.	1/2 Male Flare		5/8 Male Flare	
Liquid Line	Part No.	A02240-G01		A02240-G01	
	O.D. inch (mm)	3/8	(9.52)	3/8	(9.52)
	Connection, in.	1/4 Male Flare		3/8 Male Flare	
Condensate	Connection, in.	3/4 FPT		3/4 FPT	

+ Refer to Bulletin 30-121 for in-depth information on the iSeries compatible condenser sizes.

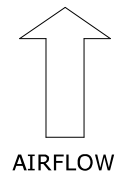
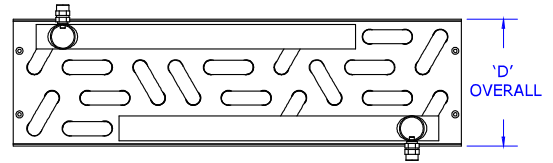
Hot Water Coil Specifications

Model No.		V2430	V3036	
WC model		HW-V2430	HW-V3036	
No. Rows		4		
Tube diameter	inch [mm]	1/2 [12.7]		
Tube material		Cu		
Fin density	inch ⁻¹ [mm ⁻¹]	10 [0.40]		
Fin material		Al		
Face Area	inch ² [m ²]	199 [0.128]	259 [0.167]	
No. Circuits		3		
Connections, ODF		7/8 [22.2]		
Weight	Net	Lbs. [kg]	8 [3.6]	11 [5.0]
	Ship	Lbs. [kg]	12 [5.4]	15 [6.8]
Coil Dimensions	W	inch [mm]	17.38 [442]	21.38 [543]
	D	inch [mm]	4.50 [114]	4.50 [114]
	H	inch [mm]	15.86 [403]	15.86 [403]



Air Flow Rate		Hot Water Coil Model			
CFM	(m ³ /h)	HW-V2430		HW-V3036	
400	(680)	0.11	(26)	0.08	(20)
500	(850)	0.16	(39)	0.10	(25)
625	(1060)	0.23	(58)	0.15	(36)
750	(1270)	0.32	(80)	0.20	(50)
875	(1490)	-	0.27	(66)	
1000	(1700)	-	0.34	(83)	

Note: Evaluated at 70°F db (21°C)



HOT WATER COIL PERFORMANCE

V2430		Airflow, SCFM (m ³ /h)						Water Pressure Drop	
Entering Water Temp	Water Flow Rate	400 (680)		500 (850)		600 (1020)			
		°F (°C)	GPM (L/s)	Total Capacity					
		MBH	(kW)	MBH	(kW)	MBH	(kW)		
100 (38)	2 (0.13)	8.50	(2.48)	9.70	(2.84)	10.7	(3.13)	0.47	(1.40)
	4 (0.25)	9.40	(2.74)	10.9	(3.21)	12.4	(3.62)	1.60	(4.78)
	6 (0.38)	9.70	(2.83)	11.4	(3.34)	13.0	(3.81)	3.29	(9.83)
120 (49)	2 (0.13)	14.3	(4.18)	16.3	(4.78)	18.0	(5.28)	0.47	(1.40)
	4 (0.25)	15.7	(4.59)	18.4	(5.38)	20.7	(6.08)	1.60	(4.78)
	6 (0.38)	16.2	(4.74)	19.1	(5.60)	21.8	(6.38)	3.29	(9.83)
140 (60)	2 (0.13)	20.1	(5.89)	23.0	(6.74)	25.4	(7.46)	0.47	(1.40)
	4 (0.25)	22.0	(6.46)	25.8	(7.57)	29.2	(8.56)	1.60	(4.78)
	6 (0.38)	22.7	(6.65)	26.9	(7.87)	30.6	(8.97)	3.29	(9.83)
160 (71)	2 (0.13)	26.0	(7.62)	29.8	(8.73)	33.0	(9.66)	0.47	(1.40)
	4 (0.25)	28.4	(8.33)	33.4	(9.78)	37.8	(11.1)	1.60	(4.78)
	6 (0.38)	29.3	(8.58)	34.7	(10.2)	39.5	(11.6)	3.29	(9.83)
	4 (0.25)	34.9	(10.2)	40.9	(12.0)	46.3	(13.6)	1.60	(4.78)
	6 (0.38)	35.9	(10.5)	42.5	(12.4)	48.5	(14.2)	3.29	(9.83)
Recommended No. of Outlets		12		15		18			

Capacities are based on 70°F (21°C) return air temperature (T_m)

Conversion Factors: MBH = 1000 Btu/hr, 1 kW = 3413 Btu/hr

V3036		Airflow, SCFM (m ³ /h)								Water Pressure Drop	
Entering Water Temp	Water Flow Rate	450 (760)		625 (1060)		750 (1270)		875 (1490)			
		°F (°C)	GPM (L/s)	Total Capacity							
		MBH	(kW)	MBH	(kW)	MBH	(kW)	MBH	(kW)		
100 (38)	2 (0.13)	9.80	(2.86)	11.8	(3.46)	12.9	(3.77)	13.9	(3.79)	0.56	(1.7)
	4 (0.25)	10.8	(4.07)	13.6	(3.16)	15.3	(3.98)	16.8	(4.45)	1.90	(5.7)
	6 (0.38)	11.1	(4.48)	14.3	(4.92)	16.2	(3.26)	17.9	(4.18)	3.89	(11.6)
	8 (0.50)	11.3	(4.70)	14.6	(4.75)	16.7	(5.26)	18.6	(3.32)	6.48	(19.4)
120 (49)	2 (0.13)	16.4	(4.80)	19.9	(5.82)	21.8	(6.35)	23.4	(6.39)	0.56	(1.7)
	4 (0.25)	18.1	(6.86)	22.8	(5.29)	25.7	(6.68)	28.2	(7.46)	1.90	(5.7)
	6 (0.38)	18.6	(7.52)	23.9	(8.27)	27.1	(5.46)	30.1	(6.99)	3.89	(11.6)
	8 (0.50)	18.9	(7.88)	24.4	(7.95)	27.9	(8.82)	31.1	(5.54)	6.48	(19.4)
140 (60)	2 (0.13)	23.1	(6.76)	28.0	(8.21)	30.8	(8.98)	33.1	(9.02)	0.56	(1.7)
	4 (0.25)	25.4	(9.69)	32.1	(7.43)	36.2	(9.40)	39.8	(10.5)	1.90	(5.7)
	6 (0.38)	26.1	(10.6)	33.5	(11.6)	38.2	(7.66)	42.3	(9.83)	3.89	(11.6)
	8 (0.50)	26.5	(11.1)	34.3	(11.2)	39.2	(12.4)	43.7	(7.77)	6.48	(19.4)
160 (71)	2 (0.13)	29.8	(8.74)	36.3	(10.6)	39.8	(11.6)	42.8	(11.7)	0.56	(1.7)
	4 (0.25)	32.7	(12.6)	41.4	(9.59)	46.7	(12.1)	51.4	(13.6)	1.90	(5.7)
	6 (0.38)	33.7	(13.7)	43.3	(15.1)	49.2	(9.87)	54.6	(12.7)	3.89	(11.6)
	8 (0.50)	34.2	(14.3)	44.2	(14.4)	50.5	(16.0)	56.3	(10.0)	6.48	(19.4)
	4 (0.25)	40.1	(11.8)	50.8	(14.9)	57.3	(16.8)	63.1	(18.5)	1.90	(5.7)
	6 (0.38)	41.3	(12.1)	53.0	(15.5)	60.4	(17.7)	67.0	(19.6)	3.89	(11.6)
	8 (0.50)	41.8	(12.3)	54.1	(15.9)	61.9	(18.1)	69.1	(20.2)	6.48	(19.4)
Recommended No. of Outlets		14		19		23		27			

Capacities are based on 70°F (21°C) return air temperature (T_m)

Conversion Factors: MBH = 1000 Btu/hr, 1 kW = 3413 Btu/hr

Recommended number of outlets is based on 33 CFM (60 m³/h) per outlet for a quiet system.

WARNING!

To prevent injury or damage from high temperatures, do not install floor outlets when operating with discharge temperature above 160°F (71°C).

Caution

To prevent damage to the EC motor from overheating, do not operate in the shaded region where discharge temperature is more 150 °F (65 °C).

BLOWER PERFORMANCE

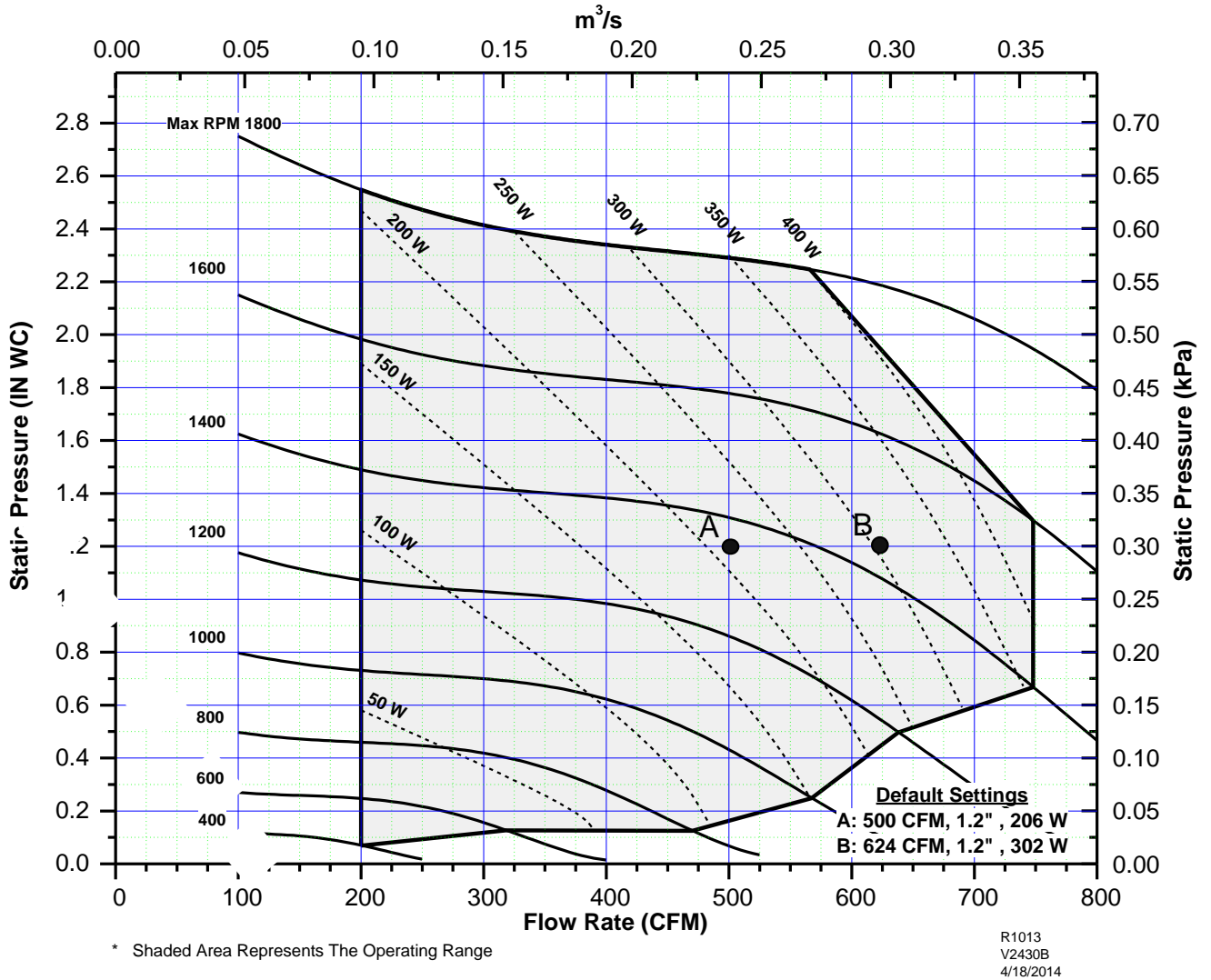


Figure 1: V2430BL-1EA Blower Performance

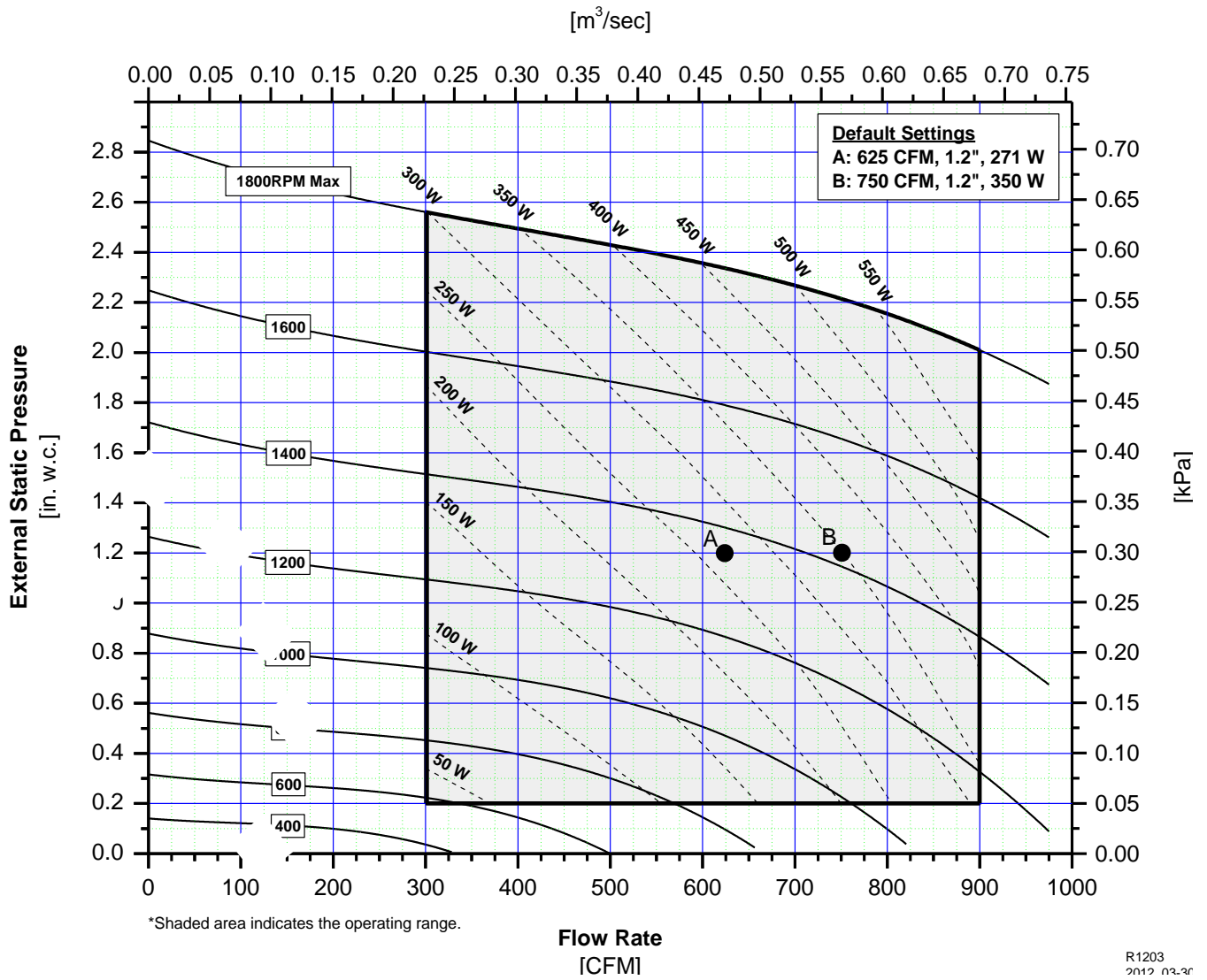


Figure 2: V3036BL-1EA Blower Performance

ACOUSTICAL DATA

Sound is always present 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. The blower is never placed in the occupied room so the sound 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 was measured in a large room with hard surfaces for the walls and floor. It is considered to be the worst case (i.e. loudest). The sound level in the occupied space will always be considerably less than this, depending on where the unit is located. To determine the actual sound level, 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.

Transmission Loss for Common Construction, dB

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 (based on MB4260H-50HZ)

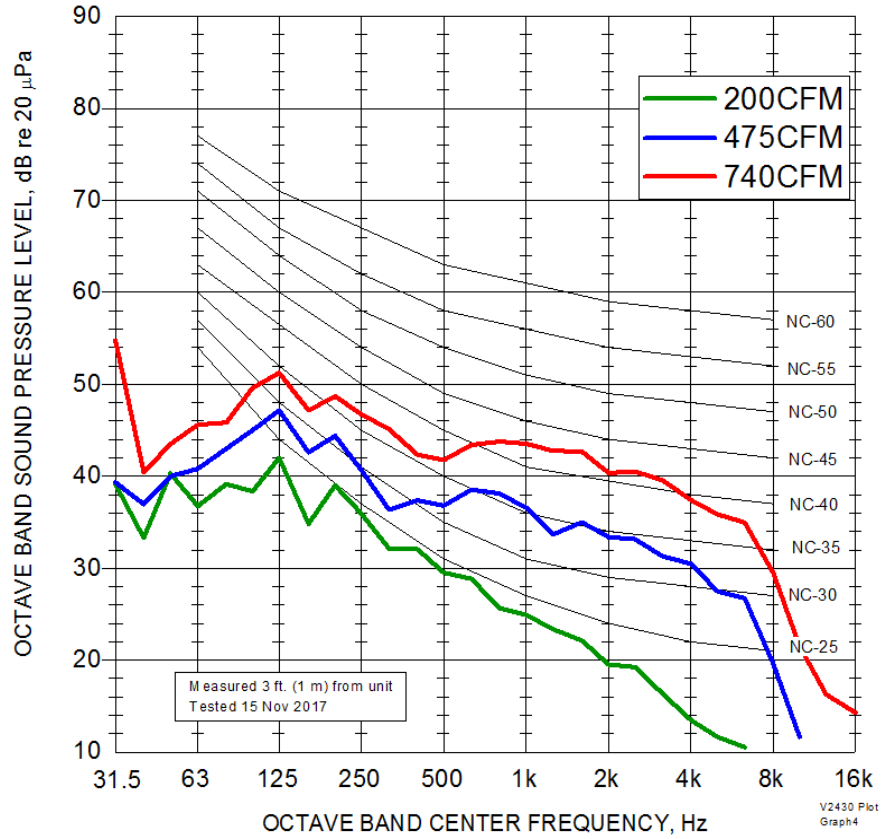


Figure 3 V2430BL-1EA Raw Sound Data

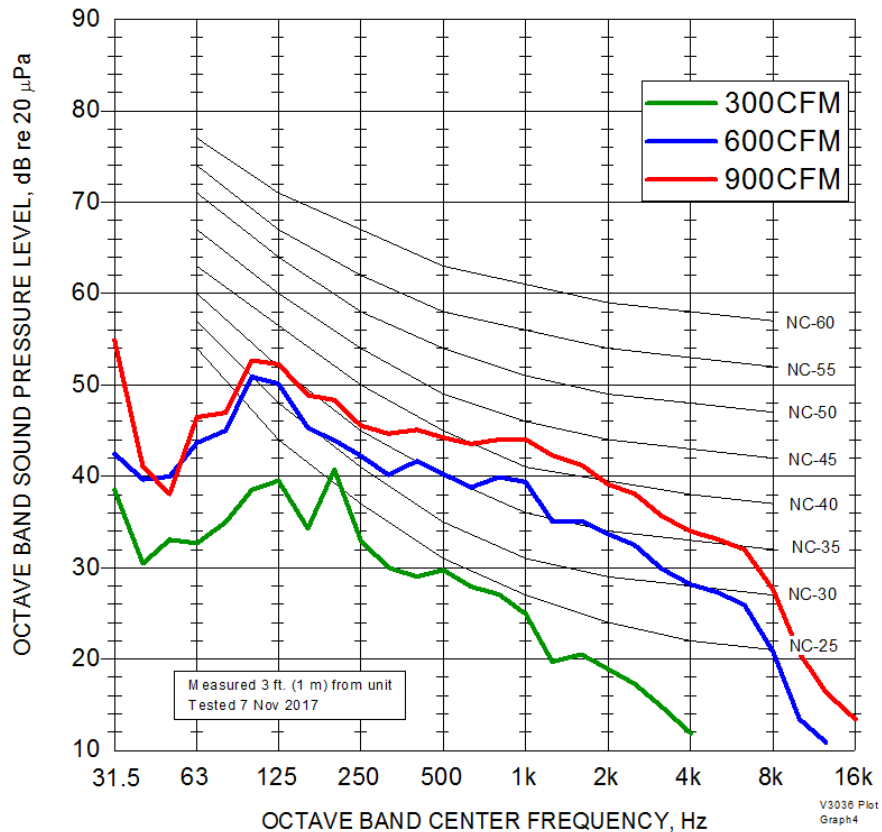


Figure 4 V3036BL-1EA Raw Sound Data