

**Robert J. Dole VA Medical Center  
Renovate and Modernize HVAC  
Systems, Building B6  
Wichita, KS**

**Mechanical Cut Sheets**

**Prepared for:**

M+HFG  
Wichita, KS

**PEC Project No.:**

180248-000

**Date:**

July 26, 2018  
Final Construction Documents



PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

303 SOUTH TOPEKA WICHITA, KS 67202 316-262-2691 [www.pec1.com](http://www.pec1.com)

## Job Details

180248 AHUs.mtj

Qty: **1** Tag: **AHU-1** Model Code: **NDB20CTEASSADAPG2BDABAM**

Field	Code	Description	Weight
Unit Type	NDB	ND (Premium Vertical AHU-Direct Drive, Generation: B)	0
Cabinet Size	20	20: 2000 CFM Basic Unit	274
Discharge Arrangement	C	C: Vertical Discharge (not convertible)	0
Cooling Coil	T	T: R-410A Dual Circuit A-Coil	60
Coil Treatment	E	E: Stainless Steel Coil Casing (Two Coils)	0
Future Use	A		0
Heating Coil	SS	SS: Standard Capacity Steam	30
Coil Configuration	A	A: Pre-Heat, Front Connections (Left side of Front Panel)	0
Unit Voltage	D	D: 208/240V Single Phase Electrical	0
Future Use	A		0
Motor	P	P: Integral ECM, Plenum Fan	0
Controls	G	G: Integral ECM-variable speed driven by unit-mounted potentiometer	0
Controls2	2	2: Integral Door Disconnect Switch	0
Filter	B	B: 2" Pleated Filter (MERV 8)	0
Insulation	D	D: Double Wall	0
Future Use	A		0
Drain Pan	B	B: Stainless Steel Drain Pan	0
Future Use	A		0
Tracking	M	M: Magic Aire 1-29-2018	0
Accessories	RP1	RP1: 20" Return Plenum, 3/4" cc insul'n, 5 solid sides	27
Accessories	Acc	Acc: No Additional Optional Accessories	0
<b>Totals:</b>			<b>391</b>

Configuration: 4 Pipe		Airflow (ACFM): 1575							ESP: 1.200	RPM: 2655	20180129
									TSP: 1.678	BHP: 0.756	SCT SET
	Rows	FV	EDB	EWB	TLD	SLD	LDB	LWB	Steam		
<b>Cooling:</b>	4		80.00	65.00	58850	44370	54.27	52.39	105.00	45.00	
<b>Heating:</b>	1		55.00		74000		98.37		5.00		

## Job Details

180248 AHUs.mtj

Electrical Data			Motor		EH	EH	Unit	Unit	Unit
Voltage	Ph	Freq	HP	FLA	Cap (kW)	FLA	FLA	MCA	MOPD
208	1	60	1.5	6.9	0		6.900	8.6	15
240				6.9	0		6.900		

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This product is Certified in accordance with the AHRI Central Station Air-Handling Unit Certification Program, which is based on AHRI Standard 430. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

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## Job Details

180248 AHUs.mtj

Qty: **1** Tag: **AHU-2** Model Code: **NDB20CTEASSADAPG2BDABAM**

Field	Code	Description	Weight
Unit Type	NDB	ND (Premium Vertical AHU-Direct Drive, Generation: B)	0
Cabinet Size	20	20: 2000 CFM Basic Unit	274
Discharge Arrangement	C	C: Vertical Discharge (not convertible)	0
Cooling Coil	T	T: R-410A Dual Circuit A-Coil	60
Coil Treatment	E	E: Stainless Steel Coil Casing (Two Coils)	0
Future Use	A		0
Heating Coil	SS	SS: Standard Capacity Steam	30
Coil Configuration	A	A: Pre-Heat, Front Connections (Left side of Front Panel)	0
Unit Voltage	D	D: 208/240V Single Phase Electrical	0
Future Use	A		0
Motor	P	P: Integral ECM, Plenum Fan	0
Controls	G	G: Integral ECM-variable speed driven by unit-mounted potentiometer	0
Controls2	2	2: Integral Door Disconnect Switch	0
Filter	B	B: 2" Pleated Filter (MERV 8)	0
Insulation	D	D: Double Wall	0
Future Use	A		0
Drain Pan	B	B: Stainless Steel Drain Pan	0
Future Use	A		0
Tracking	M	M: Magic Aire 1-29-2018	0
Accessories	RP1	RP1: 20" Return Plenum, 3/4" cc insul'n, 5 solid sides	27
Accessories	Acc	Acc: No Additional Optional Accessories	0
<b>Totals:</b>			<b>391</b>

Configuration: 4 Pipe		Airflow (ACFM): 1615				ESP: 1.200	RPM: 2693	20180129		
						TSP: 1.696	BHP: 0.785	SCT	SET	
	Rows	FV	EDB	EWB	TLD	SLD	LDB	LWB	Steam	
Cooling:	4		79.00	64.00	56230	44140	54.15	52.24	105.00	45.00
Heating:	1		55.00		74960		97.92		5.00	

## Job Details

180248 AHUs.mtj

Electrical Data			Motor		EH	EH	Unit	Unit	Unit
Voltage	Ph	Freq	HP	FLA	Cap (kW)	FLA	FLA	MCA	MOPD
208	1	60	1.5	6.9	0		6.900	8.6	15
240				6.9	0		6.900		

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## Job Details

180248 AHUs.mtj

**Qty: 1      Tag: AHU-3      Model Code: NDB12BTEASSADAEC2BDABAM**

Field	Code	Description	Weight
Unit Type	NDB	ND (Premium Vertical AHU-Direct Drive, Generation: B)	0
Cabinet Size	12	12: 1200 CFM Basic Unit	138
Discharge Arrangement	B	B: Shipped Horizontal, Convertible to Vertical	0
Cooling Coil	T	T: R-410A Dual Circuit A-Coil	32
Coil Treatment	E	E: Stainless Steel Coil Casing (Two Coils)	0
Future Use			0
Heating Coil	SS	SS: Standard Capacity Steam	21
Coil Configuration	A	A: Pre-Heat, Front Connections (Left side of Front Panel)	0
Unit Voltage	D	D: 208/240V Single Phase Electrical	0
Future Use			0
Motor	E	E: ECM-Premium Motor, FC Fan	0
Controls	C	C: ECM-Premium Motor Controls-24V, variable speed driven by unit-mounted potentiometer	0
Controls2	2	2: Integral Door Disconnect Switch	0
Filter	B	B: 2" Pleated Filter (MERV 8)	0
Insulation	D	D: Double Wall	0
Future Use			0
Drain Pan	B	B: Stainless Steel Drain Pan	0
Future Use			0
Tracking	M	M: Magic Aire 1-29-2018	0
Accessories	RP1	RP1: 20" Return Plenum, 3/4" cc insul'n, 5 solid sides	27
Accessories	Acc	Acc: No Additional Optional Accessories	0
<b>Totals:</b>			<b>218</b>

Configuration: 4 Pipe	Airflow (ACFM): 1325								ESP: 0.880	RPM: 1338	20180129
Rows	FV	EDB	EWB	TLD	SLD	LDB	LWB	TSP: 1.994	BHP: 1.118	SCT	SET
										Steam	
Cooling:	4	75.00	62.00	29310	29310	54.89	54.54			105.00	45.00
Heating:	1	55.00			48110			88.52			5.00

## Job Details

180248 AHUs.mtj

Electrical Data			Motor		EH	EH	Unit	Unit	Unit
Voltage	Ph	Freq	HP	FLA	Cap (kW)	FLA	FLA	MCA	MOPD
208	1	60	3/4	6.8	0		6.800	8.5	15
240				7.3	0		7.300	9.1	15

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## Job Details

180248 AHUs.mtj

**Qty: 1      Tag: AHU-4      Model Code: NDB12BTEASSADAEC2BDABAM**

Field	Code	Description	Weight
Unit Type	NDB	ND (Premium Vertical AHU-Direct Drive, Generation: B)	0
Cabinet Size	12	12: 1200 CFM Basic Unit	138
Discharge Arrangement	B	B: Shipped Horizontal, Convertible to Vertical	0
Cooling Coil	T	T: R-410A Dual Circuit A-Coil	32
Coil Treatment	E	E: Stainless Steel Coil Casing (Two Coils)	0
Future Use			0
Heating Coil	SS	SS: Standard Capacity Steam	21
Coil Configuration	A	A: Pre-Heat, Front Connections (Left side of Front Panel)	0
Unit Voltage	D	D: 208/240V Single Phase Electrical	0
Future Use			0
Motor	E	E: ECM-Premium Motor, FC Fan	0
Controls	C	C: ECM-Premium Motor Controls-24V, variable speed driven by unit-mounted potentiometer	0
Controls2	2	2: Integral Door Disconnect Switch	0
Filter	B	B: 2" Pleated Filter (MERV 8)	0
Insulation	D	D: Double Wall	0
Future Use			0
Drain Pan	B	B: Stainless Steel Drain Pan	0
Future Use			0
Tracking	M	M: Magic Aire 1-29-2018	0
Accessories	RP1	RP1: 20" Return Plenum, 3/4" cc insul'n, 5 solid sides	27
Accessories	Acc	Acc: No Additional Optional Accessories	0
<b>Totals:</b>			<b>218</b>

Configuration: 4 Pipe	Airflow (ACFM): 1210								ESP: 1.000	RPM: 1331	20180129
Rows	FV	EDB	EWB	TLD	SLD	LDB	LWB	TSP: 1.964	BHP: 1.043	SCT	SET
										Steam	
Cooling:	4		75.00	62.00	34070	27570	54.29	52.28		105.00	45.00
Heating:	1		55.00		46080		89.97			5.00	



## Job Details

180248 AHUs.mtj

Electrical Data			Motor		EH	EH	Unit	Unit	Unit
Voltage	Ph	Freq	HP	FLA	Cap (kW)	FLA	FLA	MCA	MOPD
208	1	60	3/4	6.8	0		6.800	8.5	15
240				7.3	0		7.300	9.1	15

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## NDB Series Premium Vertical Air Handling Unit

**Magic Aire NDB Series units are direct drive vertical Air Handlers delivering nominal airflows of 600 to 2000cfm and nominal cooling capacities of 1.5 to 5 tons.** Units may be specified with chilled water or DX cooling coils and hot water or steam heating coils to meet space cooling loads or heating loads or both. Flexible controls and robust construction make the NDB ideal for classroom, assisted living, and other IAQ-sensitive applications.

### **A Better Solution For a Quieter, More Comfortable Space**

Comfort is so much more than temperature. Magic Aire's NDB is a low sound, energy efficient air handling unit providing multiple options for comfort conditioning and fan control. The NDB is a perfect fit for classrooms, assisted living, condominiums and all quality living spaces.

### **Precise Load Matching**

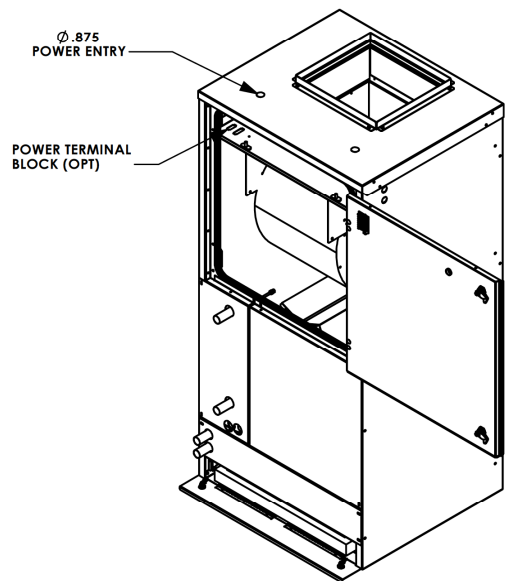
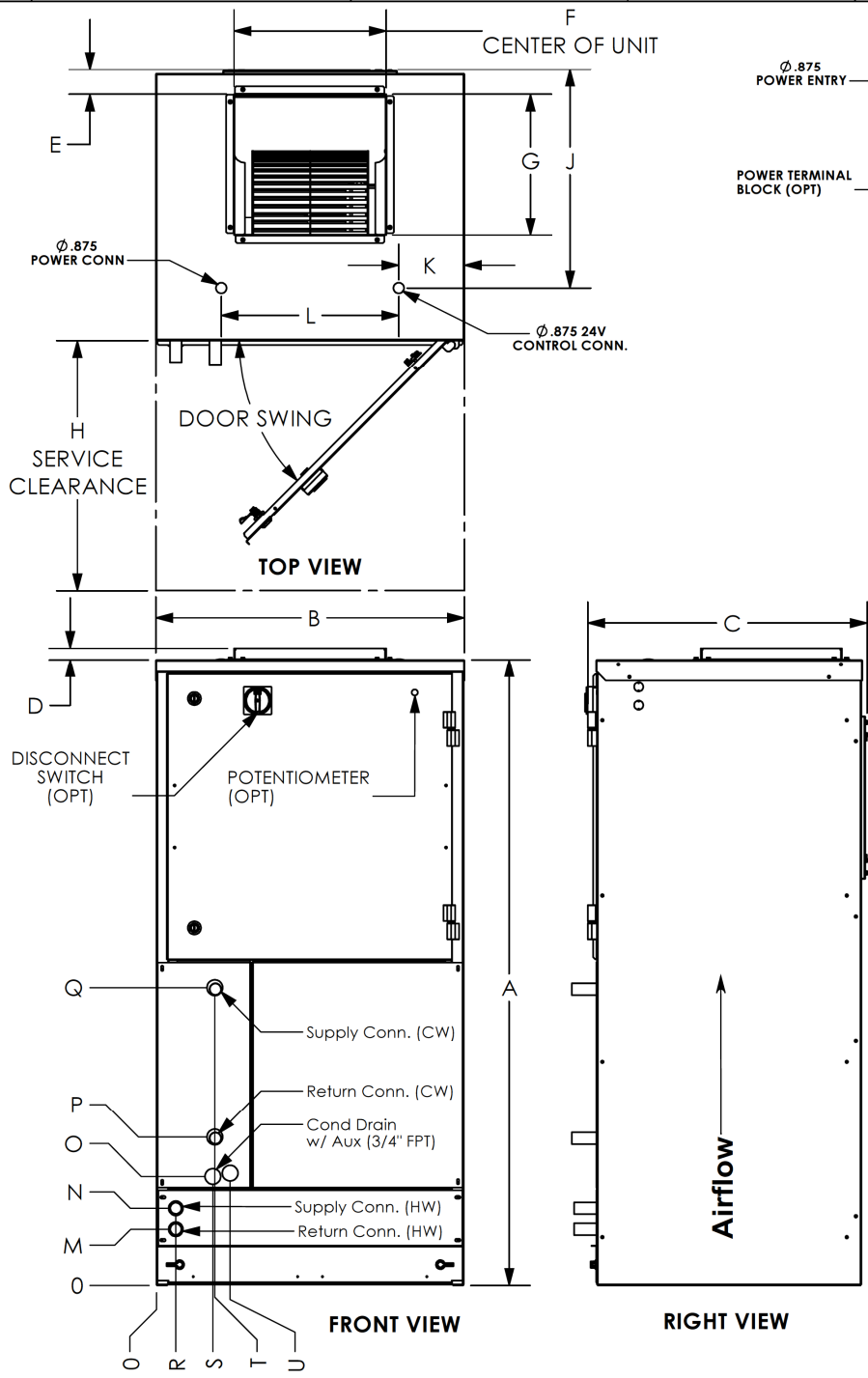
Need to create a single zone VAV system? With electronically commutated motor technology you can match your load and save more energy!

With your choice of either five discreet speeds or true variable speed fan control it is easier than ever to achieve your comfort goals. Allows optimization of system for humidity control and occupant comfort while minimizing sound levels.



### **Optional Field-Installed Accessories**

- Condensate overflow switch
- Discharge mounted Electric Heat
- Return Air Plenum
- Outside Air Damper

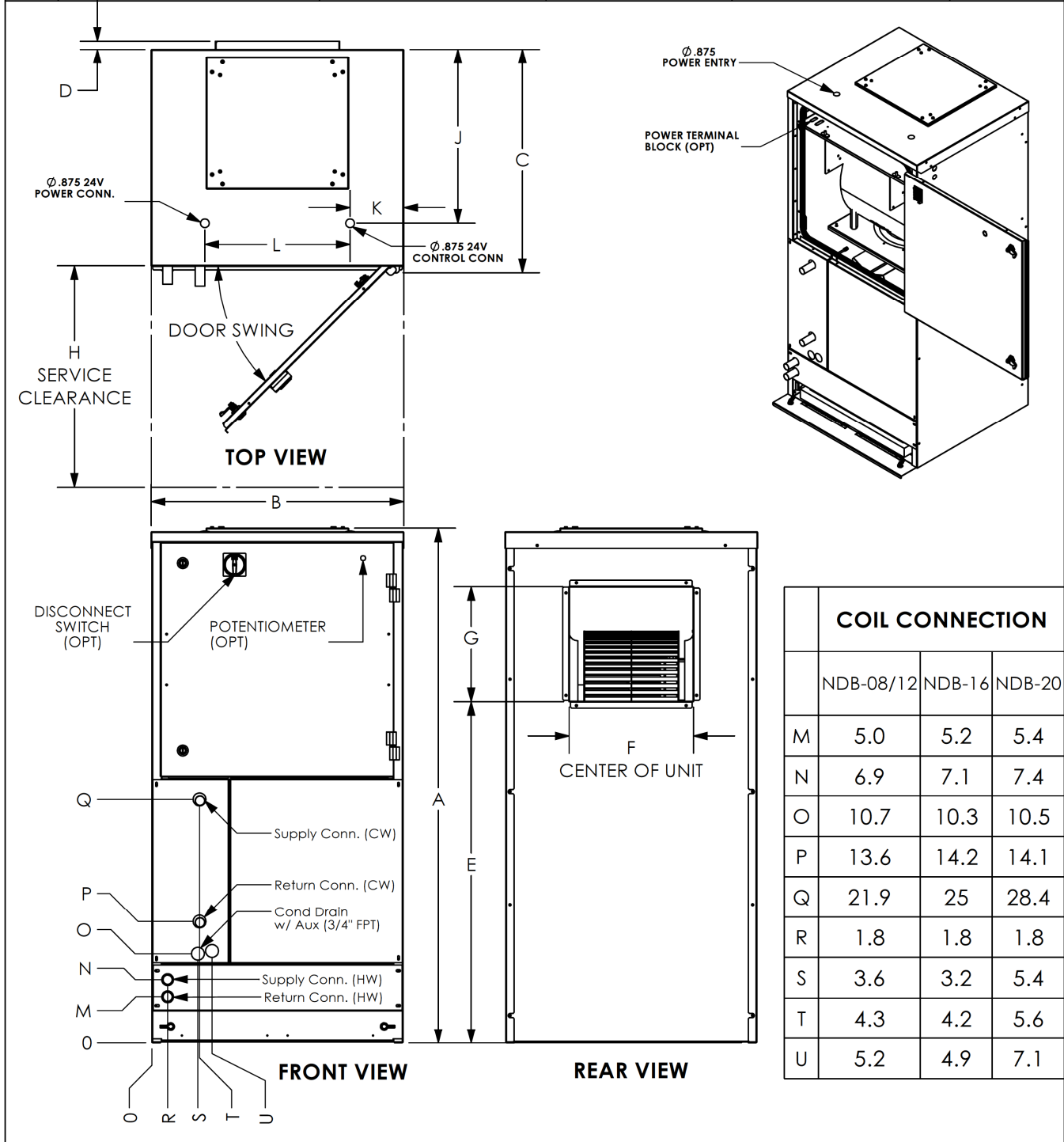


COIL CONNECTION			
	NDB-08/12	NDB-16	NDB-20
M	5.0	5.2	5.4
N	6.9	7.1	7.4
O	10.7	10.3	10.5
P	13.6	14.2	14.1
Q	21.9	25	28.4
R	1.8	1.8	1.8
S	3.6	3.2	5.4
T	4.3	4.2	5.6
U	5.2	4.9	7.1

MODEL	HEIGHT	WIDTH	DEPTH	DISCHARGE DUCT				SERVICE	ELECTRICAL CONN.		
	A	B	C	D	E	F	G	H	J	K	L
NDB-08/12	51.0	22.2	25.0	1.1	2.3	11.8	12.5	36.0	19.2	4.7	12.7
NDB-16	57.5	25.2	25.0	1.1	2.3	12.2	13.5	36.0	19.2	5.6	14.0
NDB-20	60.0	29.6	26.8	1.1	2.3	14.6	13.5	36.0	21.0	6.3	17.0

PRODUCT INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE											
JOB NAME	JOB #	BUYER	BUYER #	LOCATION							
										DRAWING NO. <b>NDB-100</b>	REV <b>C</b>

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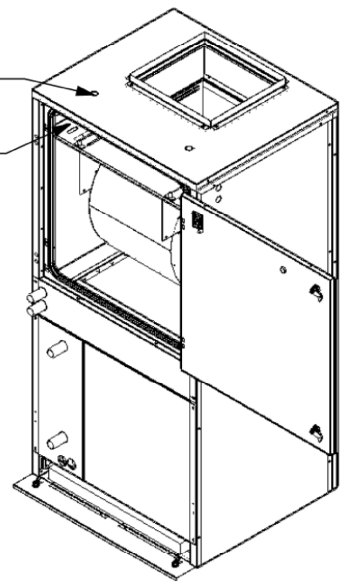
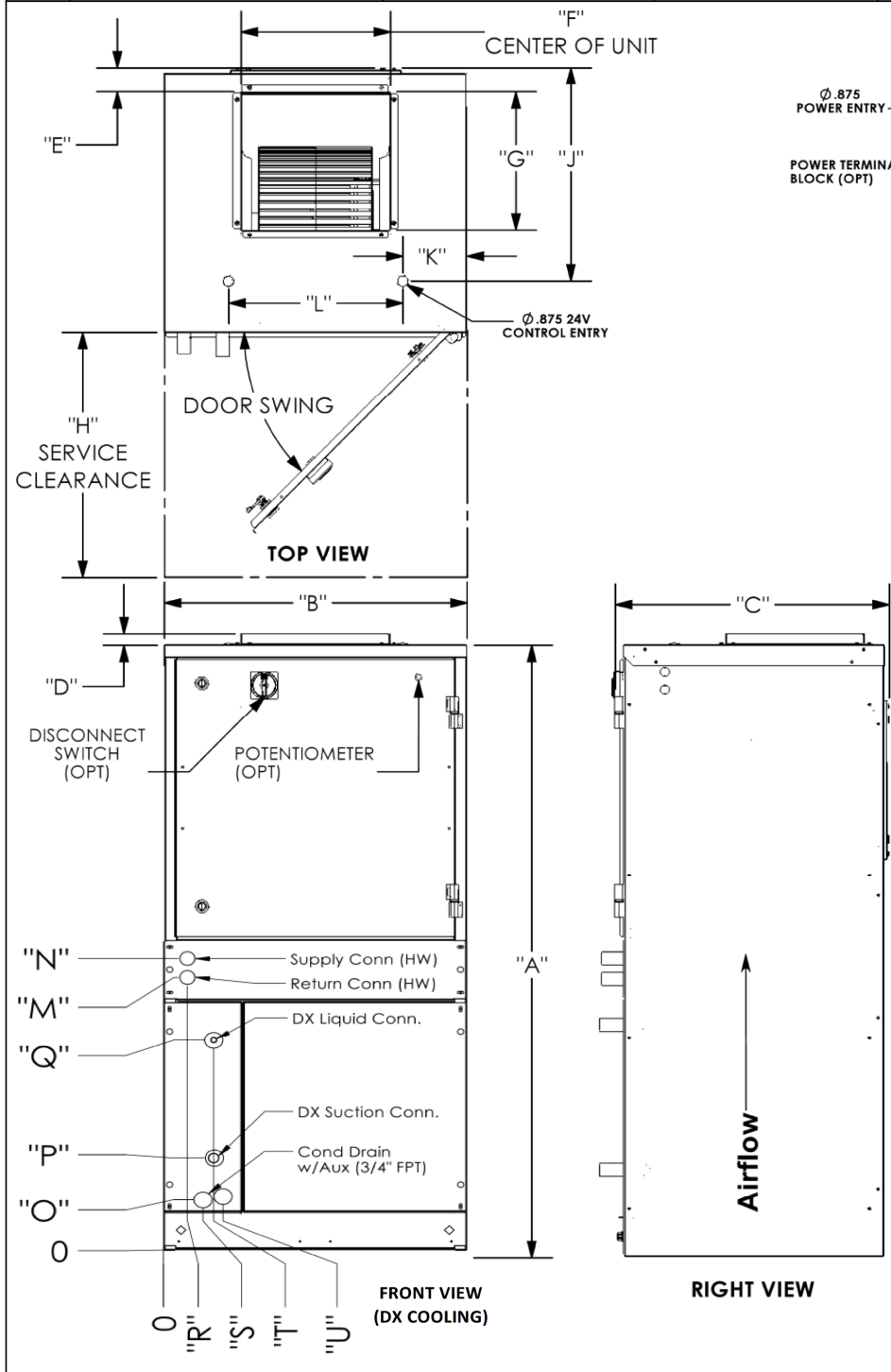
COIL CONNECTION			
	NDB-08/12	NDB-16	NDB-20
M	5.0	5.2	5.4
N	6.9	7.1	7.4
O	10.7	10.3	10.5
P	13.6	14.2	14.1
Q	21.9	25	28.4
R	1.8	1.8	1.8
S	3.6	3.2	5.4
T	4.3	4.2	5.6
U	5.2	4.9	7.1

	HEIGHT	WIDTH	DEPTH	DISCHARGE DUCT				SERVICE	ELECTRICAL CONN.		
MODEL	A	B	C	D	E	F	G	H	J	K	L
NDB-08/12	51.6	22.2	24.5	1.0	32.0	11.8	12.5	36.0	18.8	4.7	12.7
NDB-16	58.1	25.2	24.5	1.0	37.3	12.2	13.5	36.0	18.8	5.6	14.0
NDB-20	60.6	29.6	26.3	1.0	40.0	14.6	13.5	36.0	20.5	6.3	17.0

PRODUCT INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE

JOB NAME	JOB #	BUYER	BUYER #	LOCATION		DRAWING NO. <b>NDB-101</b>	REV C
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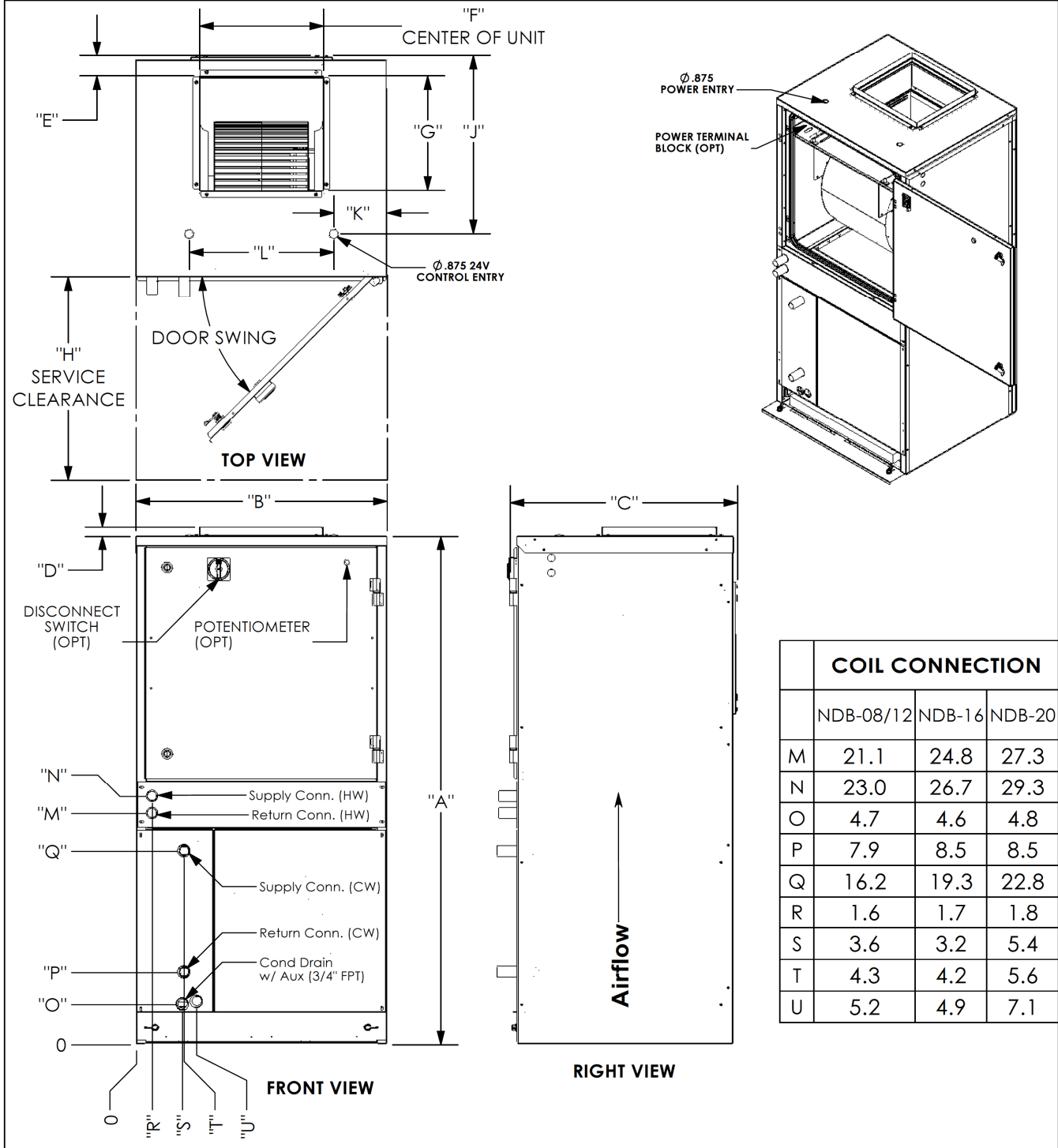
COIL CONNECTION			
	NDB-08/12	NDB-16	NDB-20
M	21.1	24.8	27.3
N	23.0	26.7	29.3
O	4.7	4.6	4.8
P	7.9	8.5	8.5
Q	16.2	19.3	22.8
R	1.6	1.7	1.8
S	3.6	3.2	5.4
T	4.3	4.2	5.6
U	5.2	4.9	7.1

	HEIGHT	WIDTH	DEPTH	DISCHARGE DUCT				SERVICE	ELECTRICAL CONN.		
MODEL	A	B	C	D	E	F	G	H	J	K	L
NDB-08/12	51.0	22.2	25.0	1.1	2.3	11.8	12.5	36.0	19.2	4.7	12.7
NDB-16	57.5	25.2	25.0	1.1	2.3	12.2	13.5	36.0	19.2	5.6	14.0
NDB-20	62.0	29.6	26.8	1.1	2.3	14.6	13.5	36.0	21.0	6.3	17.0

PRODUCT INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE

JOB NAME	JOB #	BUYER	BUYER #	LOCATION	DRAWING NO.	REV
					<b>NDB-105 DX</b>	-

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MODEL	HEIGHT	WIDTH	DEPTH	DISCHARGE DUCT				SERVICE	ELECTRICAL CONN.		
	A	B	C	D	E	F	G	H	J	K	L
NDB-08/12	51.0	22.2	25.0	1.1	2.3	11.8	12.5	36.0	19.2	4.7	12.7
NDB-16	57.5	25.2	25.0	1.1	2.3	12.2	13.5	36.0	19.2	5.6	14.0
NDB-20	62.0	29.6	26.8	1.1	2.3	14.6	13.5	36.0	21.0	6.3	17.0

PRODUCT INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE											
JOB NAME	JOB #	BUYER	BUYER #	LOCATION					DRAWING NO.	REV	
									<b>NDB-105</b>	-	

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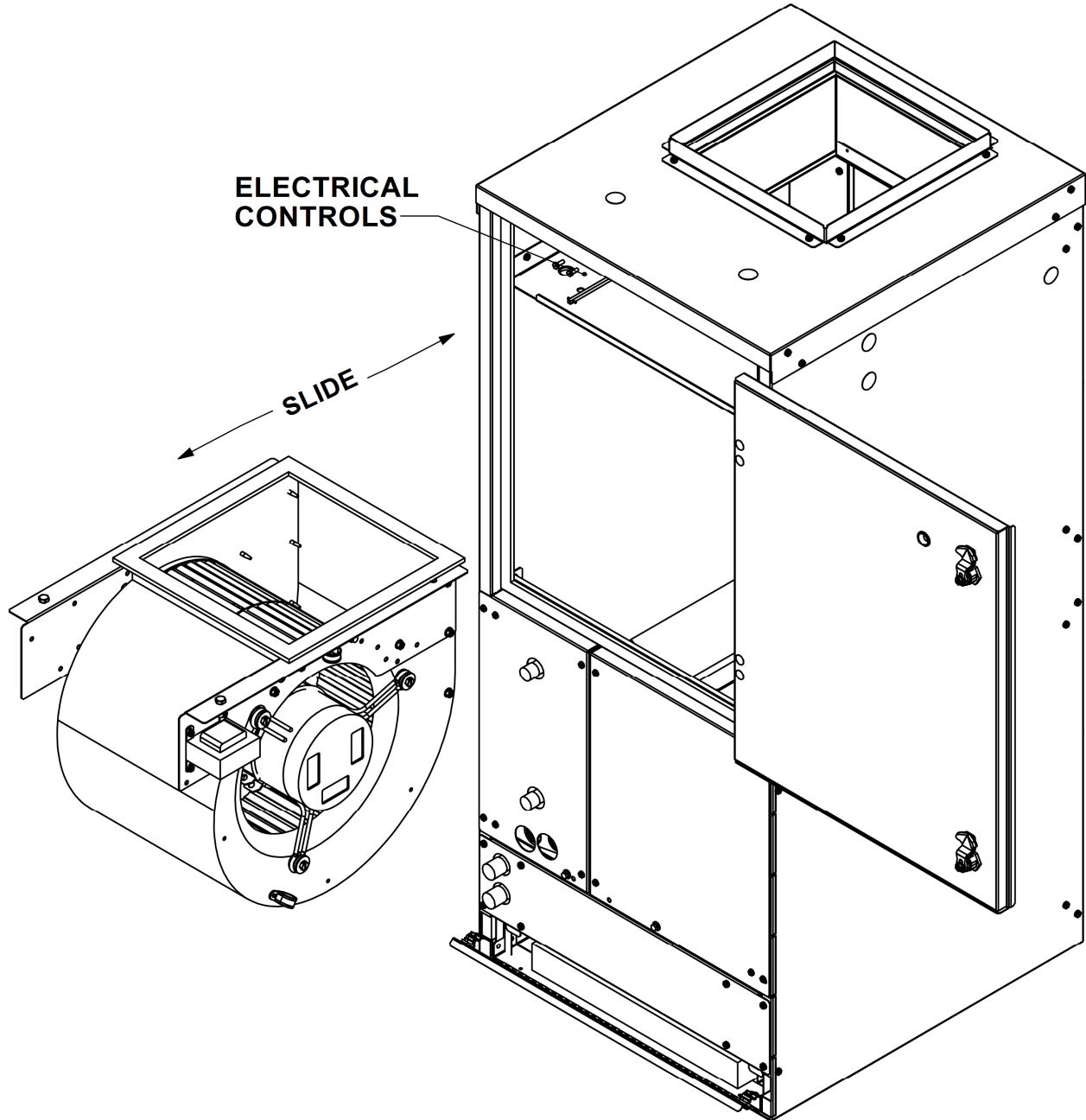
*Magic Aire*®

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**NDB0812**  
CW/HW/DOUBLE WALL  
VERTICAL DISCHARGE

**NDB**



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JOB NAME      JOB #      BUYER      BUYER #      LOCATION

DRAWING NO.  
**NDB-103**

REV  
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CODE NO.

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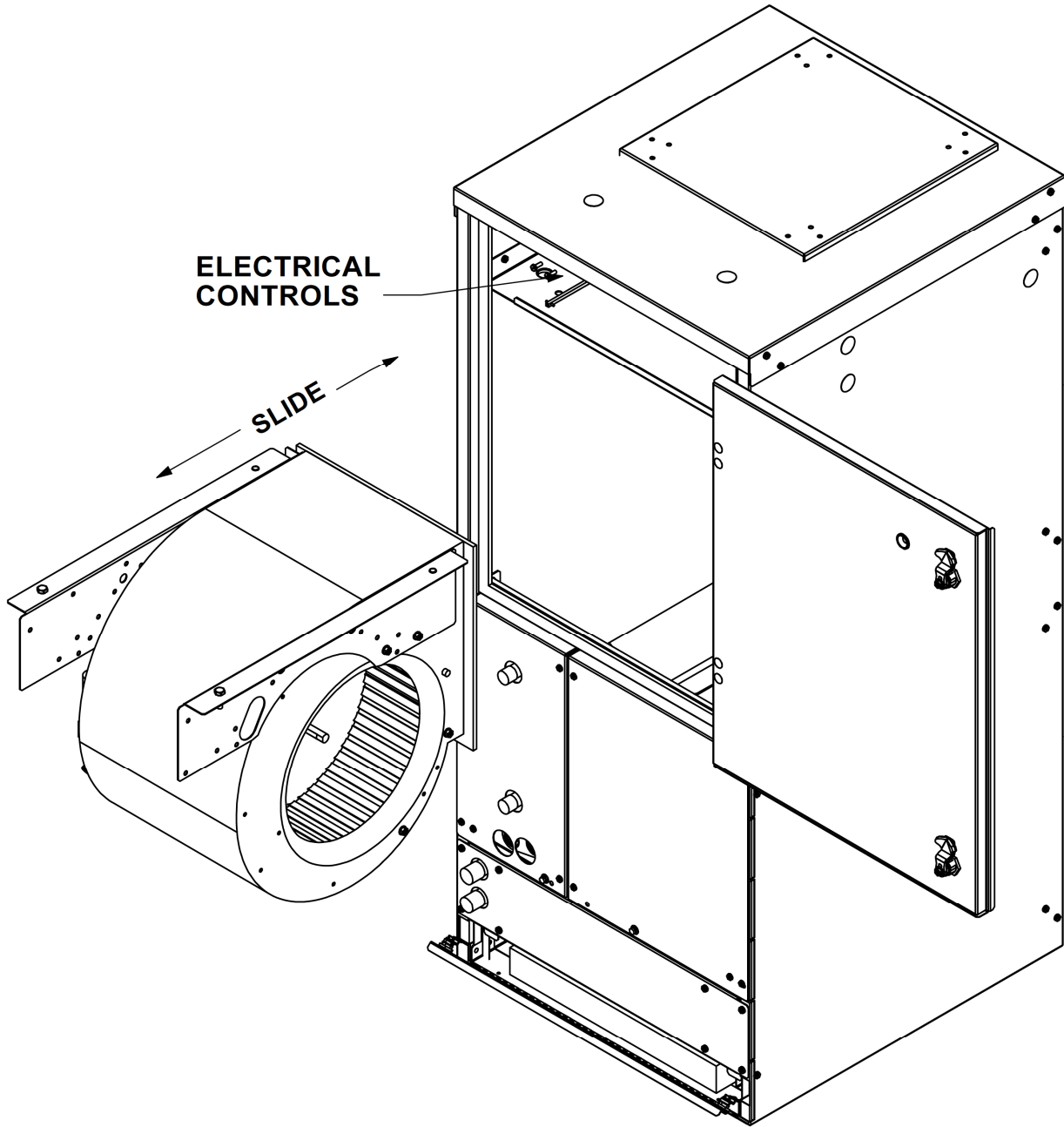
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**NDB08/12**  
CWH/H/DOUBLE WALL  
HORIZONTAL DISCHARGE

**NDB**

CATALOG NO.



PRODUCT INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE

JOB NAME

JOB #

BUYER

BUYER #

LOCATION

DRAWING NO.  
**NDB-104**

REV

-

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## **Magic Aire Premium Air Handling Unit HVAC Guide Specifications**

Size Range: **600 to 2000 Nominal CFM**  
Magic Aire Model **NDB**

### **Part 1 — General**

#### **1.01 SYSTEM DESCRIPTION**

Vertical, Direct Drive, 2-pipe or 4-pipe (or electric heat as available), room fan coil unit with painted finish cabinet for exposed installation or ducting.

#### **1.02 QUALITY ASSURANCE**

Unit shall be tested in accordance with ARI Standard 440 and ETL listed to US and Canadian safety standards. Each coil shall be factory tested for leakage at 600 psig air pressure with coil submerged in water. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation. All equipment wiring shall comply with NEC requirements.

#### **1.03 DELIVERY, STORAGE AND HANDLING**

Each unit shall be individually packaged from point of manufacture. Unit shall be handled and stored in accordance with the manufacturer's instructions.

### **Part 2 — Product**

#### **2.01 EQUIPMENT**

##### **General:**

Factory-assembled, vertical, draw-thru type fan coil for exposed or concealed installations, ducted or free discharge with plenum. Unit shall be complete with water or DX cooling coil, water heating coil, fan(s), motor(s), drain pan, and all required wiring, piping, controls and special features.

##### **A. Base Unit:**

1. Units shall be fabricated of galvanized or galvanized steel, 19gauge, exterior panels with 19gauge interior panels. Internal insulation is 1" fiberglass with 1.5 pound density, providing effective acoustical and thermal control and fire safety. Cabinet shall include a removable bottom access panel with a ducted return air, filter rack and 2-in. fiberglass throwaway filter or 2-in. pleated MERV 8 filter. Cabinet exterior has a baked-on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117. Fan access doors shall be hinged and utilize ¼-turn or ½-turn slot head latches for service convenience. Filter access doors shall be hinged and utilize ¼-turn latches with handles for tool-less filter change access. Optional: coated inner liner panels have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117.

2. The drain pan shall extend the entire length and width of the coil, with primary and auxiliary connections that are ¾" FPT.

- i) Standard – double-sloped polymer with zinc plated carbon steel connections.
- ii) Optional – 20ga 304 stainless steel. Drain pan shall have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117, and that protects the pan surface for the life of the air handling unit.

##### **B. Fans:**

1. Direct-driven, double-width fan wheels with forward curved blades shall be statically and dynamically balanced. The housing shall be constructed of heavy gauge galvanized steel with die-formed inlet cones. Fan wheels shall be constructed of galvanized steel.
2. Backward curved fans shall be welded construction, statically and dynamically balanced with ECM motor integrated into the wheel.

##### **C. Coils:**

1. Standard base unit shall be equipped with a 3 or 4-row CW or DX coil for installation in a 2 or 4-pipe system.
2. Hot water heating coils in a 4 pipe system shall be 2-row or 3-row water coils, slab style perpendicular to airflow, factory installed. Coil fin spacing shall be 10, 12 or 14 fins per inch (FPI). Tube diameter options are 3/8" OD and ½" OD.
3. Steam coils are slab style perpendicular to airflow, tube-in-tube steam distributing type coils with copper tubes and aluminum fins, single row, with copper or red brass headers and connections; vent/vacuum breaker connection provided, vacuum breaker assembly/valve is field-provided and installed. Fins are minimum 0.0045-in and fin spacing is 8FPI (standard capacity option) or 12 FPI (high capacity option). Coil operating pressure is 6psig max steam pressure.
4. Field installed electric resistance heater (as available) shall be 1.0 to 30.0kW, depending on unit size and voltage, for mounting on unit discharge opening. Heaters shall include manual reset and automatic reset high limit switches, heat contactor, airflow proving switch and fan contactor.
5. Cooling coil options include a 3-row or 4-row DX coil with TXV or without TXV (R22 or R-410A).
6. All coils shall have copper tubes and aluminum fins. Coil fins are mechanically bonded to tubes. The copper tubes comply with ASTM B-75. The fin thickness is 0.0045-in. All coils are tested with air under water.

**D. Controls and Safeties:**

1. Fan Controls: Unit shall be furnished with 24V fan controls to allow control by field-provided and installed 24V thermostat. Options include:
  - i) ECM-VE motor controls, 3 operating speeds (3 fan relays), select from 5 programmed speeds
  - ii) ECM-Premium motor controls, 3 operating speeds (select from 6)
  - iii) ECM-Premium or Integrated ECM motor controls: variable speed driven by unit-mounted potentiometer
  - iv) ECM-Premium or Integrated ECM motor controls: variable speed driven by customer-provided 4-20mA fan signal
  - v) ECM-Premium or Integrated ECM motor controls: variable speed driven by customer-provided 0-10VDC fan signal
2. Optional factory-wired selections:
  - i) Integral door disconnect switch
  - ii) Fan current switch (dry contacts)
  - iii) Condensate overflow switch (shipped loose, field wired to factory-wired harness or terminal block)

**E. Operating Characteristics:**

1. A unit with single hydronic coil installed in a 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system and as determined by field-provided and installed valves and controls.
2. A unit with two hydronic coils installed in a 4-pipe system shall be capable of providing heating and cooling, controlled as determined by field-provided and installed valves and controls.
3. A unit with single DX coil installed in a standard split system shall be capable of providing cooling when field-supplied and installed condensing unit is in cooling mode. Also capable of heating when heat pump condensing unit is operating in heating mode.
4. In all arrangements, the temperature controls are field-provided and installed and can interface with the unit per section "Controls and Safeties."

**F. Electrical Requirements:**

The unit power supply shall be 60 Hz, with standard construction 115V/1-phase. Other factory options are 208/240V/1-phase or 277V/1-phase.

**G. Motor(s):**

Fan motor options are:

1. ECM-VE electrically commutated motor with 5 preprogrammed speeds, up to 40% more efficient than permanent split-capacitor type induction motors.
2. ECM-Premium electrically commutated motor, up to 40% more efficient than permanent split-capacitor type induction motors, with control options including preprogrammed fixed speed and continuously variable speed options.
3. Integral ECM electrically commutated motor built into the plenum fan wheel assembly, up to 40% more efficient than permanent split-capacitor type induction motors, with continuously variable speed options.

**H. Field Installed Accessories:**

1. Return Plenum – single wall plenum, 16" high with options: return grille, outside air damper for up to 30% OA airflow at full open position, with factory installed 24V 25in-lb actuator ready for 0-10VDC field provided position signal; ¾" closed cell insulation, 19ga galvanized steel cabinet, cabinet exterior has a baked on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117. Filter door shall be hinged and utilize ¼-turn tool-less latches for service convenience. Foam seals and flanged sides allow easy field connection to the NDB unit.
2. Return Plenum with Filter – same as Return Plenum but 20" high and with 4" MERV 13 filter and hinged front access door with tool-less hardware for ease of service. Not for discharge service.
3. Discharge Plenum – same as 16" high return plenum, equipped with ¾" closed cell insulation, no factory openings or up to 2 factory-cut side openings or with one double deflection supply grille.
4. Condensate Overflow Switch – thread-in PVC housing with liquid level sensing overflow switch, field installed, for use in 24VAC or 24VDC control systems and thermostats; switch assembly is pre-wired to easily interface with the NDB unit controls and is field installed in the ¾" FPT auxiliary condensate drain connection on the unit exterior.

**COMPONENT AIR PRESSURE DROPS**

Model	CFM	Chilled Water		Hot Water						DX	Steam		Filter	
		Std Cap	Std Cap (H2)	3/8-2R-10 (H5)	3/8-3R-10 (H6)	3/8-2R-12 (H8)	3/8-3R-12 (H9)	3/8-2R-14 (J2)	3/8-3R-14 (J3)	Std Cap	Std Cap	High Cap	T/A	Pleated - MERV 8
NDB-08	600	0.06	0.08	0.06	0.09	0.07	0.10	0.08	0.12	0.12	0.07	0.13	0.13	0.12
	650	0.07	0.10	0.07	0.10	0.08	0.12	0.09	0.14	0.13	0.08	0.15	0.15	0.14
	700	0.08	0.11	0.08	0.11	0.09	0.13	0.10	0.15	0.14	0.09	0.17	0.16	0.15
	750	0.09	0.12	0.08	0.13	0.10	0.15	0.12	0.17	0.15	0.10	0.19	0.18	0.16
	800	0.10	0.13	0.09	0.14	0.11	0.16	0.13	0.19	0.17	0.11	0.21	0.20	0.17
	850	0.12	0.15	0.10	0.15	0.12	0.18	0.14	0.21	0.18	0.13	0.23	0.22	0.19
	900	0.13	0.16	0.11	0.17	0.13	0.20	0.15	0.23	0.20	0.14	0.25	0.24	0.20
	950	0.14	0.17	0.12	0.18	0.15	0.22	0.17	0.25	0.21	0.16	0.28	0.26	0.21
	1000	0.16	0.19	0.13	0.20	0.16	0.24	0.18	0.27	0.22	0.17	0.30	0.28	0.23
NDB-12	900	0.13	0.16	0.11	0.17	0.13	0.20	0.15	0.23	0.22	0.14	0.25	0.24	0.20
	960	0.15	0.18	0.13	0.19	0.15	0.22	0.17	0.25	0.24	0.16	0.28	0.26	0.22
	1020	0.17	0.19	0.14	0.21	0.16	0.24	0.19	0.28	0.27	0.18	0.31	0.29	0.23
	1080	0.19	0.21	0.15	0.23	0.18	0.27	0.21	0.31	0.29	0.20	0.34	0.31	0.25
	1140	0.21	0.23	0.17	0.25	0.20	0.29	0.23	0.34	0.32	0.22	0.38	0.34	0.27
	1200	0.23	0.24	0.18	0.27	0.22	0.32	0.25	0.37	0.34	0.24	0.41	0.37	0.28
	1260	0.25	0.26	0.20	0.30	0.24	0.35	0.27	0.40	0.37	0.26	0.45	0.40	0.30
	1320	0.28	0.28	0.22	0.32	0.25	0.38	0.29	0.43	0.39	0.28	0.48	0.43	0.32
	1380	0.31	0.30	0.23	0.35	0.27	0.41	0.32	0.47	0.42	0.31	0.52	0.46	0.34
	1440	0.34	0.32	0.25	0.37	0.30	0.44	0.34	0.50	0.45	0.33	0.56	0.49	0.36
	1500	0.37	0.34	0.27	0.40	0.32	0.47	0.37	0.54	0.48	0.36	0.60	0.53	0.37
NDB-16	1200	0.13	0.19	0.14	0.20	0.16	0.24	0.18	0.27	0.22	0.20	0.35	0.26	0.22
	1280	0.15	0.21	0.15	0.22	0.18	0.26	0.21	0.30	0.24	0.22	0.39	0.29	0.23
	1360	0.17	0.22	0.17	0.25	0.20	0.29	0.23	0.34	0.27	0.25	0.43	0.32	0.25
	1440	0.19	0.24	0.18	0.27	0.22	0.32	0.25	0.37	0.29	0.28	0.48	0.35	0.27
	1520	0.21	0.27	0.20	0.30	0.24	0.35	0.27	0.41	0.32	0.31	0.52	0.38	0.29
	1600	0.23	0.29	0.22	0.33	0.26	0.38	0.30	0.44	0.34	0.34	0.57	0.41	0.31
	1680	0.25	0.31	0.24	0.36	0.28	0.42	0.33	0.48	0.37	0.37	0.62	0.44	0.33
	1760	0.28	0.33	0.26	0.39	0.31	0.45	0.35	0.52	0.39	0.40	0.68	0.47	0.35
	1840	0.31	0.35	0.28	0.42	0.33	0.49	0.38	0.56	0.42	0.44	0.73	0.51	0.37
	1920	0.34	0.37	0.30	0.45	0.36	0.53	0.41	0.61	0.45	0.47	0.79	0.55	0.39
	2000	0.37	0.40	0.32	0.48	0.38	0.57	0.44	0.65	0.48	0.51	0.84	0.58	0.41
NDB-20	1500	0.13	0.17	0.12	0.18	0.15	0.22	0.17	0.25	0.22	0.10	0.18	0.21	0.18
	1600	0.15	0.19	0.14	0.20	0.16	0.24	0.19	0.28	0.24	0.11	0.20	0.23	0.20
	1700	0.17	0.21	0.15	0.22	0.18	0.26	0.21	0.30	0.27	0.12	0.23	0.25	0.21
	1800	0.19	0.22	0.17	0.25	0.20	0.29	0.23	0.34	0.29	0.14	0.25	0.28	0.23
	1900	0.21	0.24	0.18	0.27	0.22	0.32	0.25	0.37	0.32	0.15	0.27	0.30	0.24
	2000	0.23	0.26	0.20	0.30	0.24	0.35	0.27	0.40	0.34	0.17	0.30	0.33	0.26
	2100	0.25	0.28	0.22	0.32	0.26	0.38	0.29	0.44	0.37	0.18	0.32	0.35	0.27
	2200	0.28	0.30	0.23	0.35	0.28	0.41	0.32	0.47	0.39	0.20	0.35	0.38	0.29
	2300	0.31	0.32	0.25	0.38	0.30	0.44	0.34	0.51	0.42	0.21	0.37	0.41	0.31
	2400	0.34	0.34	0.27	0.41	0.32	0.48	0.37	0.55	0.45	0.23	0.40	0.43	0.32
	2500	0.37	0.37	0.29	0.44	0.35	0.51	0.40	0.59	0.48	0.25	0.43	0.46	0.34

- NOTES:**
1. All values are in inches wc.
  2. Pressure drop includes standard fiberglass filters.
  3. All pressure drops are with dry coil.



# Unit Rating

203 Gum Springs Road - Longview, TX 75602 - Ph. (903) 236-4403 Fax (903) 236-4463  
AAONEcat32 Ver. 4.262 (SN: 4980864)

**C B - B - 0 6 0 - 9 - D - 1 : F 0 0 0 D 0 0**

Tag: CU# 1

### Job Information

Job Name: *Bldg 6 CUs*  
Job Number: *180248*  
Site Altitude: *0 ft*  
Refrigerant: *R-410A*

### Unit Information

Approx. Op./Ship Weights: *281 / 281 lbs. (±5%)*  
Suction Temperature: *45.00 °F*  
Ambient Temperature: *105 °F DB / 75 °F WB*

### Cooling Section

Cooling @ 45.00° Suction : *54.3 MBH*  
  
Cooling @ 35° Suction: *44.8 MBH*  
Cooling @ 40° Suction: *49.3 MBH*  
Cooling @ 45° Suction: *54.3 MBH*  
Cooling @ 50° Suction: *59.6 MBH*

### EER - AHRI Listing Information

*Published AHRI SEER value is based on matching this condensing unit with a F1-060 air handling unit.  
Due to DOE Regional Standards this unit cannot be installed in the states of Arizona, California, Nevada, or New Mexico.*

SEER @ AHRI Conditions: *14.6*  
Application EER @ Op. Conditions: *10.2*

EER Compressor Only @ AHRI Conditions: *N/A*

### Electrical Data

Rating:	<i>208/1/60Hz</i>	Minimum Circuit Amp:	<i>35</i>										
Unit FLA:	<i>29</i>	Maximum Overcurrent:	<i>60</i>										
Compressor 1:	<i>1</i>	HP	<i>0.33</i>	VAC	<i>208</i>	Phase	<i>1</i>	RPM	<i>1075</i>	FLA	<i>2.8</i>	RLA	<i>26</i>
Condenser Fans:	<i>1</i>												

### Connection Sizes

System	Suction Line	Liquid Line
<i>1</i>	<i>0.875</i>	<i>0.375</i>



# Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 6 0 - 9 - D - 1 : F 0 0 0 D 0 0**

Condensing Unit Tag:

### Job Information

Job Name: Bldg 6 CUs Job Number: 180248

### Factory Supplied / Factory Installed

Quantity	Description	Part #:	Location

### Factory Supplied / Field Installed

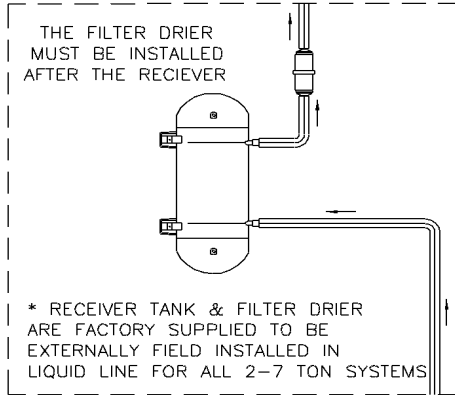
Quantity	Description	Part #:	Location
1	Receiver, 16 lb.	R40060	CU

### Field Supplied / Field Installed

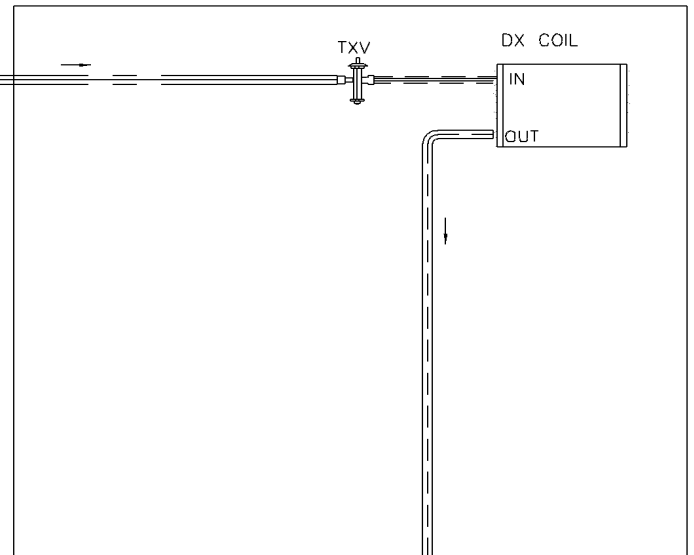
Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU

- ▲ SHUTOFF VALVE
- ≡≡≡ DISCHARGE LINE
- ≡≡≡ LIQUID LINE
- ≡≡≡ SUCTION LINE
- ≡≡≡ HOT GAS LINE

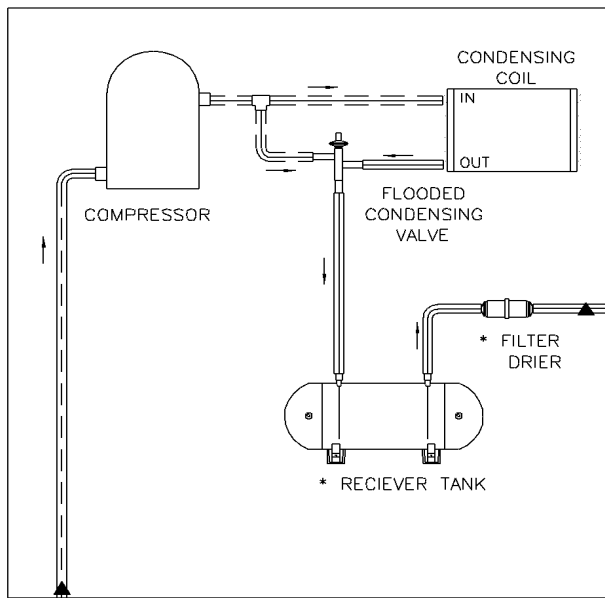
DETAIL B



AIR HANDLING UNIT



CONDENSING UNIT



SEE DETAIL B

SUCTION LINE

LIQUID LINE

OPTIONAL SUCTION LINE ACCUMULATOR FIELD SUPPLIED FIELD INSTALLED

AAON INC.

PIPING SCHEMATIC DIAGRAM

AC W/ LAC

SUCTION DOWN FLOW

DATE	DRAWING NUMBER	REV
	AC LAC - SD	

Circuit #: 1



# Unit Rating

203 Gum Springs Road - Longview, TX 75602 - Ph. (903) 236-4403 Fax (903) 236-4463  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 6 0 - 9 - D - 1 : F 0 0 0 D 0 0**

Tag: CU# 2

### Job Information

Job Name: Bldg 6 CUs  
Job Number: 180248  
Site Altitude: 0 ft  
Refrigerant: R-410A

### Unit Information

Approx. Op./Ship Weights: 281 / 281 lbs. (±5%)  
Suction Temperature: 45.00 °F  
Ambient Temperature: 105 °F DB / 75 °F WB

### Cooling Section

Cooling @ 45.00° Suction : 54.3 MBH  
  
Cooling @ 35° Suction: 44.8 MBH  
Cooling @ 40° Suction: 49.3 MBH  
Cooling @ 45° Suction: 54.3 MBH  
Cooling @ 50° Suction: 59.6 MBH

### EER - AHRI Listing Information

Published AHRI SEER value is based on matching this condensing unit with a F1-060 air handling unit.  
Due to DOE Regional Standards this unit cannot be installed in the states of Arizona, California, Nevada, or New Mexico.

SEER @ AHRI Conditions: 14.6  
Application EER @ Op. Conditions: 10.2

EER Compressor Only @ AHRI Conditions: N/A

### Electrical Data

Rating:	208/1/60Hz			Minimum Circuit Amp:	35		
Unit FLA:	29			Maximum Overcurrent:	60		
	<b>Qty</b>	<b>HP</b>	<b>VAC</b>	<b>Phase</b>	<b>RPM</b>	<b>FLA</b>	<b>RLA</b>
Compressor 1:	1		208	1			26
Condenser Fans:	1	0.33	208	1	1075	2.8	

### Connection Sizes

<b>System</b>	<b>Suction Line</b>	<b>Liquid Line</b>
1	0.875	0.375



# Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 6 0 - 9 - D - 1 : F 0 0 0 D 0 0**

Condensing Unit Tag:

### Job Information

Job Name:

Bldg 6 CUs

Job Number:

180248

### Factory Supplied / Factory Installed

Quantity	Description	Part #:	Location

### Factory Supplied / Field Installed

Quantity	Description	Part #:	Location
1	Receiver, 16 lb.	R40060	CU

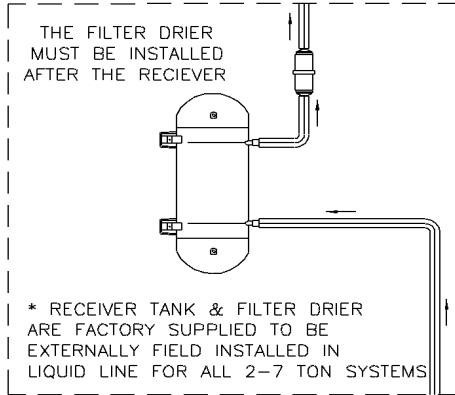
### Field Supplied / Field Installed

Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU

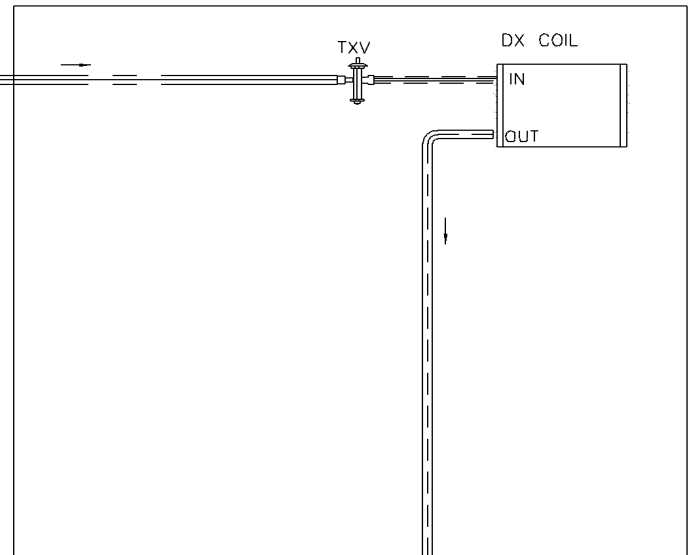


- ▲ SHUTOFF VALVE
- ≡≡≡ DISCHARGE LINE
- ≡≡≡ LIQUID LINE
- ≡≡≡ SUCTION LINE
- ≡≡≡ HOT GAS LINE

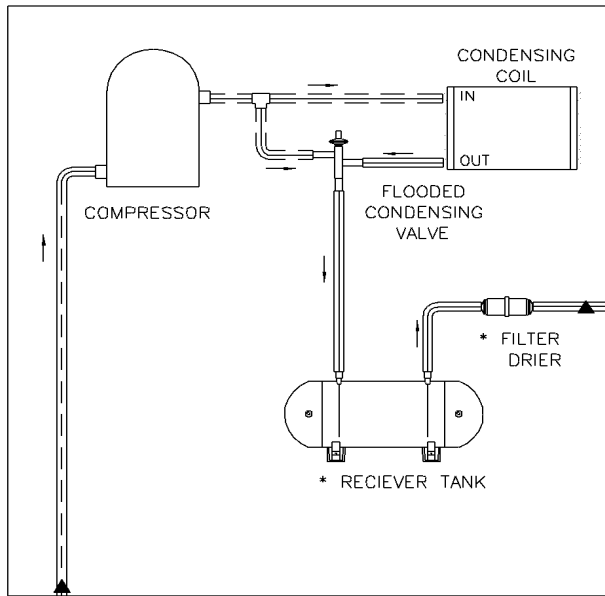
DETAIL B



AIR HANDLING UNIT



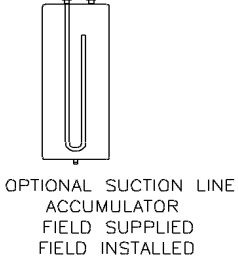
CONDENSING UNIT



SEE DETAIL B

SUCTION LINE

LIQUID LINE



AAON INC.		
PIPING SCHEMATIC DIAGRAM		
AC W/ LAC		
SUCTION DOWN FLOW		
DATE	DRAWING NUMBER AC LAC - SD	REV

Circuit #: 1



# Unit Rating

203 Gum Springs Road - Longview, TX 75602 - Ph. (903) 236-4403 Fax (903) 236-4463  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 3 6 - 9 - D - 1 : F 0 0 0 D 0 0**

Tag: CU# 3

### Job Information

Job Name: Bldg 6 CUs  
Job Number: 180248  
Site Altitude: 0 ft  
Refrigerant: R-410A

### Unit Information

Approx. Op./Ship Weights: 237 / 237 lbs. (±5%)  
Suction Temperature: 45.00 °F  
Ambient Temperature: 105 °F DB / 75 °F WB

### Cooling Section

Cooling @ 45.00° Suction : 36.0 MBH  
  
Cooling @ 35° Suction: 30.0 MBH  
Cooling @ 40° Suction: 32.9 MBH  
Cooling @ 45° Suction: 36.0 MBH  
Cooling @ 50° Suction: 39.2 MBH

### EER - AHRI Listing Information

Published AHRI SEER value is based on matching this condensing unit with a F1-036 air handling unit.

SEER @ AHRI Conditions: 16.0  
Application EER @ Op. Conditions: 10.8

EER Compressor Only @ AHRI Conditions: N/A

### Electrical Data

Rating: 208/1/60Hz  
Unit FLA: 21

Minimum Circuit Amp: 26  
Maximum Overcurrent: 40

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		208	1			18.5
Condenser Fans:	1	0.33	208	1	1075	2.8	

### Connection Sizes

System  
1

Suction Line  
0.75

Liquid Line  
0.375



# Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 3 6 - 9 - D - 1 : F 0 0 0 D 0 0**

Condensing Unit Tag:

### Job Information

Job Name: Bldg 6 CUs Job Number: 180248

### Factory Supplied / Factory Installed

Quantity	Description	Part #:	Location

### Factory Supplied / Field Installed

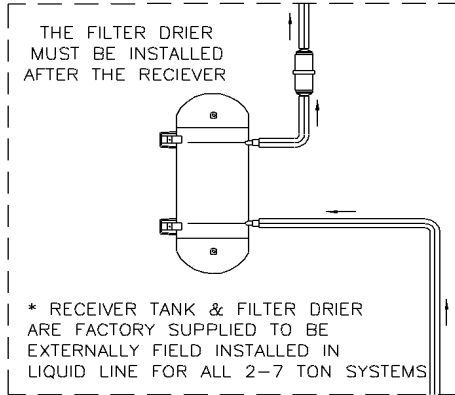
Quantity	Description	Part #:	Location
1	Receiver, 16 lb.	R40060	CU

### Field Supplied / Field Installed

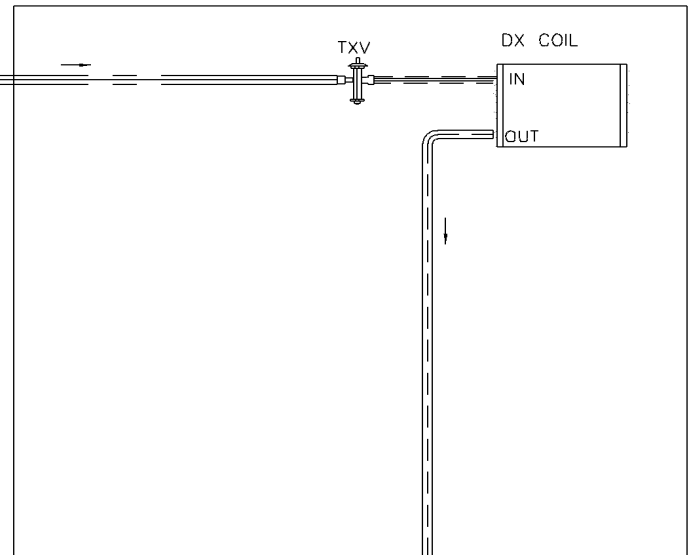
Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU

- ▲ SHUTOFF VALVE
- ≡≡≡ DISCHARGE LINE
- ≡≡≡ LIQUID LINE
- ≡≡≡ SUCTION LINE
- ≡≡≡ HOT GAS LINE

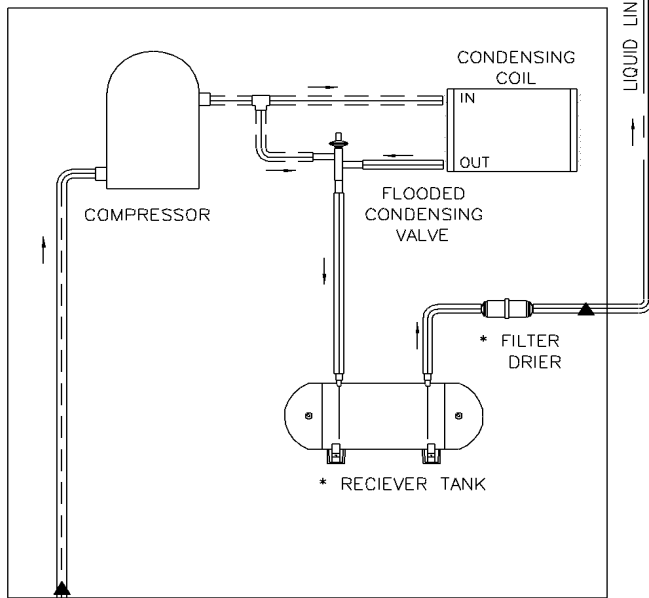
DETAIL B



AIR HANDLING UNIT



CONDENSING UNIT



SEE DETAIL B

LIQUID LINE

SUCTION LINE

OPTIONAL SUCTION LINE  
ACCUMULATOR  
FIELD SUPPLIED  
FIELD INSTALLED

AAON INC.

PIPING SCHEMATIC DIAGRAM

AC W/ LAC

SUCTION DOWN FLOW

DATE	DRAWING NUMBER	REV
	AC LAC - SD	

Circuit #: 1



# Unit Rating

203 Gum Springs Road - Longview, TX 75602 - Ph. (903) 236-4403 Fax (903) 236-4463  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

**C B - B - 0 3 6 - 9 - D - 1 : F 0 0 0 D 0 0**

Tag: CU# 4

### Job Information

Job Name: *Bldg 6 CUs*  
Job Number: *180248*  
Site Altitude: *0 ft*  
Refrigerant: *R-410A*

### Unit Information

Approx. Op./Ship Weights: *237 / 237 lbs. (±5%)*  
Suction Temperature: *45.00 °F*  
Ambient Temperature: *105 °F DB / 75 °F WB*

### Cooling Section

Cooling @ 45.00° Suction : *36.0 MBH*  
  
Cooling @ 35° Suction: *30.0 MBH*  
Cooling @ 40° Suction: *32.9 MBH*  
Cooling @ 45° Suction: *36.0 MBH*  
Cooling @ 50° Suction: *39.2 MBH*

### EER - AHRI Listing Information

*Published AHRI SEER value is based on matching this condensing unit with a F1-036 air handling unit.*

SEER @ AHRI Conditions: *16.0*      EER Compressor Only @ AHRI Conditions: *N/A*  
Application EER @ Op. Conditions: *10.8*

### Electrical Data

Rating: *208/1/60Hz*      Minimum Circuit Amp: *26*  
Unit FLA: *21*      Maximum Overcurrent: *40*

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		208	1			18.5
Condenser Fans:	1	0.33	208	1	1075	2.8	

### Connection Sizes

System	Suction Line	Liquid Line
1	0.75	0.375



# Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.262 (SN: 4980864-)

C B - B - 0 3 6 - 9 - D - 1 : F 0 0 0 D 0 0

Condensing Unit Tag:

### Job Information

Job Name: Bldg 6 CUs Job Number: 180248

### Factory Supplied / Factory Installed

Quantity	Description	Part #:	Location

### Factory Supplied / Field Installed

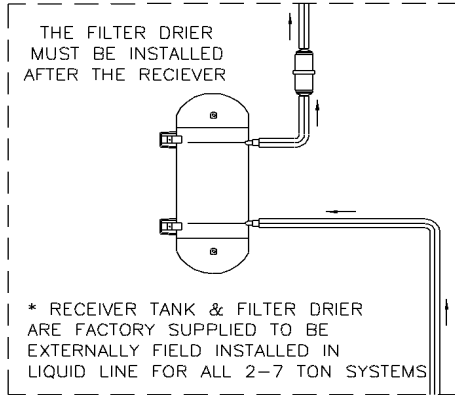
Quantity	Description	Part #:	Location
1	Receiver, 16 lb.	R40060	CU

### Field Supplied / Field Installed

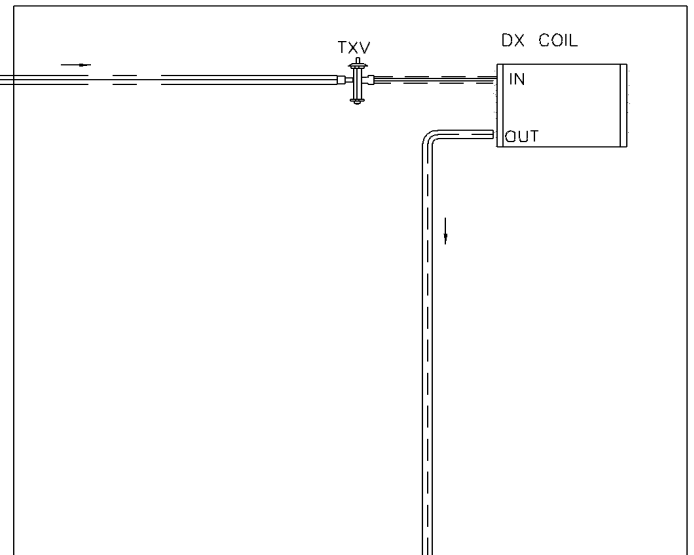
Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU

- ▲ SHUTOFF VALVE
- ≡≡≡ DISCHARGE LINE
- ≡≡≡ LIQUID LINE
- ≡≡≡ SUCTION LINE
- ≡≡≡ HOT GAS LINE

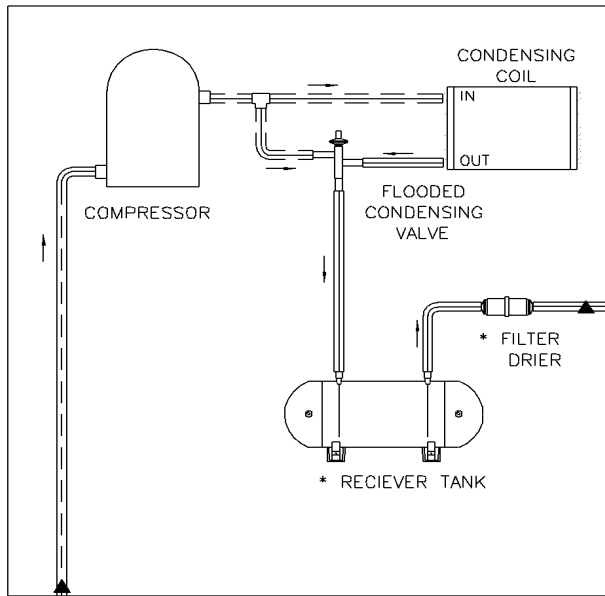
DETAIL B



AIR HANDLING UNIT



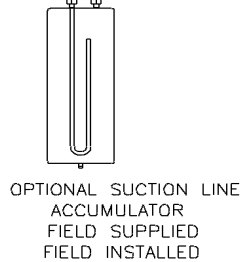
CONDENSING UNIT



SEE DETAIL B

SUCTION LINE

LIQUID LINE



AAON INC.

PIPING SCHEMATIC DIAGRAM

AC W/ LAC

SUCTION DOWN FLOW

DATE	DRAWING NUMBER	REV
	AC LAC - SD	

Circuit #: 1

# Centrifugal Ceiling Exhaust and Inline Cabinet Fans Models SP and CSP



BUILDING VALUE IN AIR.



January  
2018



**Great things** come in small packages, as do our **SP** ceiling exhaust fan and **CSP** inline cabinet fan models. Be assured when you buy any Greenheck product, it is a quality product at a **competitive price**. Plus, we guarantee our SP and CSP fans with a **three-year warranty**. We are your market leader for the most comprehensive ceiling and cabinet fan line in the market.

**Typical Installations**

- Multifamily housing
- Hotels
- Hospitals
- Schools
- Bathrooms
- Storage rooms

**Benefits**

- Industry leading sound levels
- Compact size
- Wide range of performance
- Available with EC motors for higher efficiency and more controllability

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### Model Comparison

Model	Location		Mounting					Airflow				Application						Drive Type		Impeller Type			Performance		
	Outdoor	Indoor	Roof Curb	Base/Floor	Hanging	Wall	Ceiling Mounted	Exhaust	Supply	Reversible	Recirculate	General/Clean Air	Contaminated Air	Spark Resistant	Grease (UL 762)	Smoke Control (UL)	High Wind (150 mph)	High Temp (above 200°F)	Belt	Direct	Centrifugal	Propeller/Axial	Mixed Flow	Maximum Volume (cfm)	Maximum Static Pressure (in. wg)
SP		✓				✓	✓	✓				✓							✓		✓			1,600	1
CSP		✓			✓		✓	✓			✓								✓		✓			3,800	1



SP fans are designed for ceiling mounted exhaust applications.



CSP fans are designed for inline supply or exhaust applications.

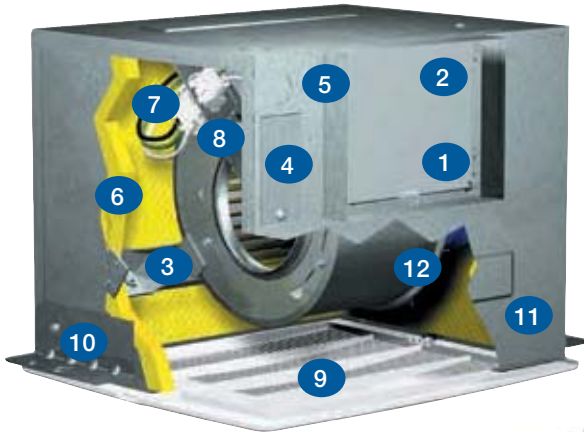
Model	Level of Construction	Description	Profile min. height	Sound min. sones	Air Volume max. cfm	UL Listing
Ceiling Fans	SP	<b>Premium Plus:</b> Green/energy efficient highest performing	7 inches (178 mm)	<0.3	710 cfm (1206 m³/hr)	UL/cUL Listed for above bathtub/shower with GFCI branch protected circuit (sizes 110 and 80 only)
	SP	<b>Premium Constant CFM Ceiling Fan:</b> 3 Speed CFM Selection	9 inches (229 mm)	<0.3	130 cfm (220 m³/hr)	UL/cUL Listed for above bathtub/shower with GFCI branch protected circuit
	SP	<b>Premium Ceiling Fan:</b> Widest selection to meet sound requirements	9 inches (229 mm)	<0.3	1,600 cfm (2718 m³/hr)	UL/cUL Listed for above bathtub/shower with GFCI branch protected circuit (Sizes A390 and smaller)
	SP	<b>Deluxe Ceiling Fan:</b> Compact to fit most applications with quiet operation	7 inches (178 mm)	0.8	200 cfm (340 m³/hr)	UL/cUL Listed for above bathtub/shower with GFCI branch protected circuit
	SP	<b>Low Profile Ceiling Fan:</b> Designed to fit in 2x4 wall construction	3 5/8 inches (86 mm)	1.0	84 cfm	UL/cUL Listed for above bathtub/shower with GFCI branch protected circuit.
	SP	<b>Economy Ceiling Fan:</b> Designed for light commercial applications	3 5/8 inches (86 mm)	3.0	50 cfm (85 m³/hr)	UL Listed
Inline Fans	CSP	<b>Premium Inline Fan:</b> Outperforms the competition and is preferred by specifying engineers	9 inches (229 mm)	0.8	3,775 cfm (6414 m³/hr)	UL/cUL Listed
	CSP	<b>Deluxe Inline Fan:</b> Compact design to fit in small remote spaces	7 inches (178 mm)	1.5	185 cfm (314 m³/hr)	UL/cUL Listed

All dimensions are in inches (millimeters)

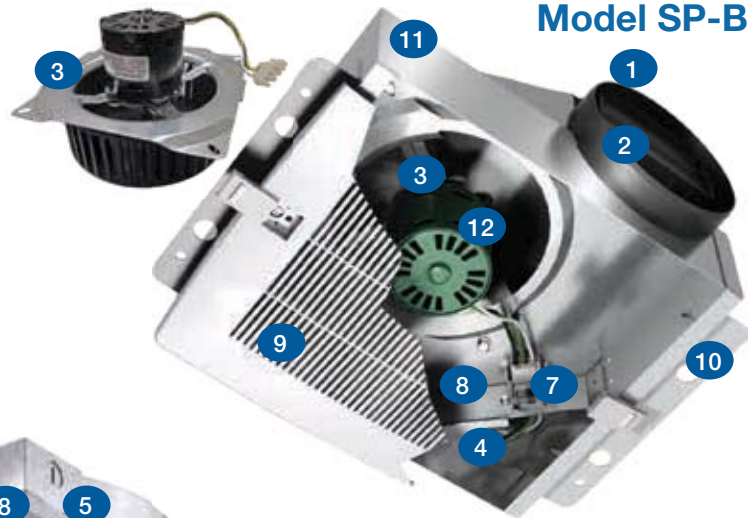


# Standard Construction Features

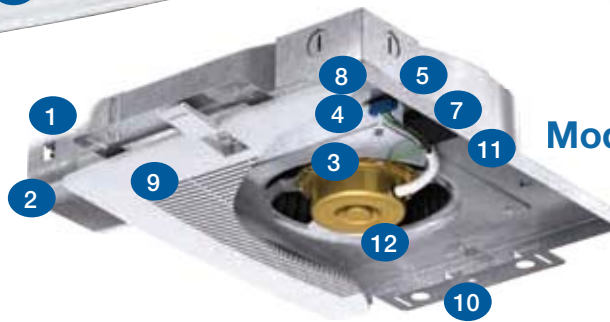
**Model SP-A and SP-A-VG**



**Model SP-B**



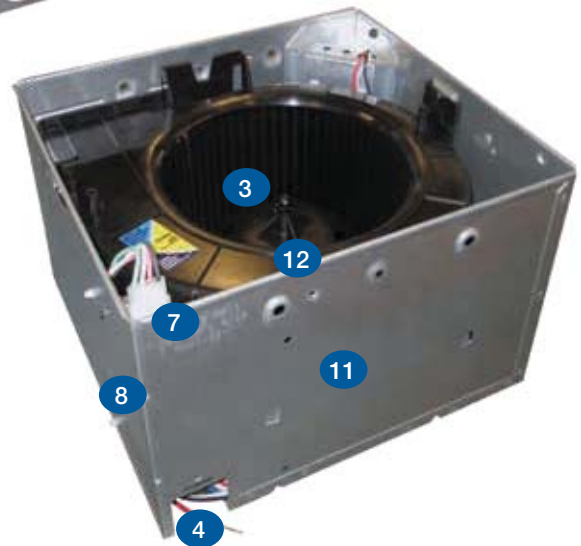
**Model SP-L**



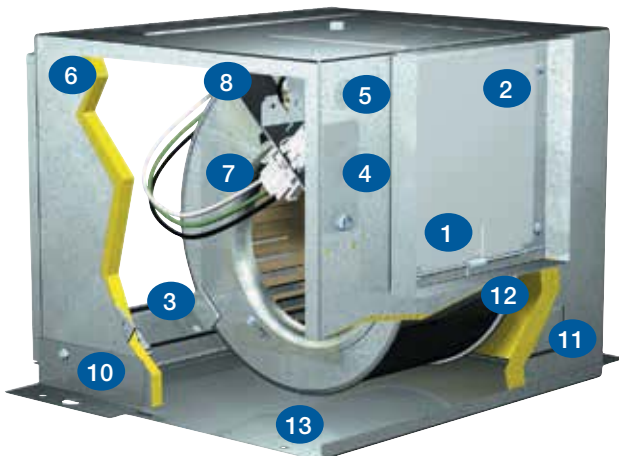
**Model SP-C**



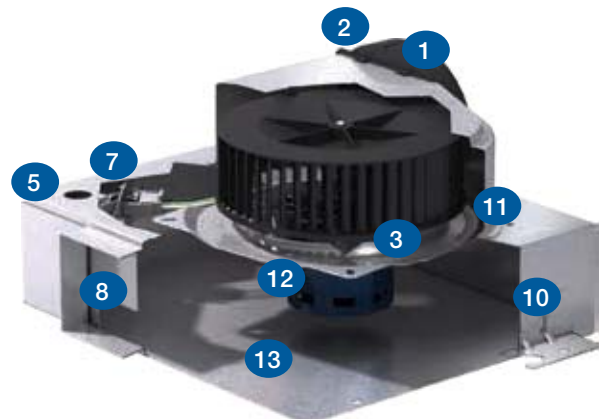
**Model SP-VG**



**Model CSP-A**



**Model CSP-B**



Number and Description			Specific Features for Each Model						
			SP-VG	SP-A	SP-B	SP-C	SP-L	CSP-A	CSP-B
1	Backdraft Damper	Durable plastic to reduce backdrafts		50-90	✓	✓	✓		✓
		Aluminium to reduce backdrafts	✓	110-1150				✓	
2	Outlet	Round - For quick and easy connections	✓	50-90 50-90-VG 90-130-VG	✓	✓			✓
		Square - For quick and easy connections		110-1550				✓	
		Oval - Metal construction for increased fire resistance					✓		
3	Power Pack	Removes quickly for maintenance/replacement		✓	✓	✓	✓	✓	✓
		Includes conversion from horizontal to vertical discharge		✓				✓	
4	Electrical Access	Vertical electrical access to eliminate drilling holes		✓	✓		Ceiling	✓	✓
		Horizontal electrical access					Wall		
		External electrical access to save installation time	✓	✓				✓	
5	Electrical Knockouts	Eliminates drilling holes (horizontal or vertical)	✓	✓	✓	✓	✓	✓	
6	Acoustic Insulation	Absorbs sound		✓			✓		
7	Disconnect	Servicing is quick and safe	✓	✓	✓	✓	✓	✓	
8	Electrical Junction Box	Large for easy wiring	✓	✓	✓	✓	✓	✓	
9	Grille	Concealed attachment screws securely fasten grille to housing for quiet, rattle free operation		✓	✓		✓		
10	Mounting Brackets	Adjustable for multiple installation conditions	✓	✓	✓	✓		✓	✓
		Integral for quick installation				✓	✓		
11	Housing	Embossed galvanized steel for rigidity	✓	✓	✓	✓	✓	✓	✓
		A low profile for height restricted areas	✓		✓	✓	✓		✓
12	Motors	Motors are compatible for use with speed controls and have thermal overload protection Domestic & International • 50 cycle, 220v or 240v • 60 cycle, 115v, 208v, 220v, 230v, & 277v options (See CAPS or pg. 6 for availability)	60 cycle, 115v only	✓	✓	60 cycle, 115v only	60 cycle, 115v only	✓	✓
13	Access Panel	Gain easy access to internal components once installed	✓	✓	✓	✓	✓	✓	✓
	Exclusive Electrical Wiring Feature	Electrical access cover located on the housing exterior. This feature permits external wiring without removing the power assembly, saving installation time and cost. Available on models SP-A and CSP-A.							
	Double-Wide Fans	Available for applications requiring 700 cfm or greater. Double-wide fans have two double-width forward-curved wheels, which are housed in separate scrolls, and driven by a single motor. Available on models SP-A and CSP-A.							
	Vertical Discharge	Exhaust outlet duct installed in the optional vertical position. The power assembly must be rotated to match the duct adapter position. Available on SP-A and CSP-A models.							

Available Motor Voltage and Cycle Ratings						
Power Rating V/Hz						
Models Available (X)	115V/60Hz	115V/50Hz	220-240V/50Hz	220-240V/60Hz	277V	Vari-Green Motor Option
SP-A50	x	x	x	x		x
SP-A70	x	x	x	x		x
SP-A90	x	x	x	x		x
SP-A110	x	x	x	x	x	x
SP-A125	x				x	
SP-A130	x	x	x	x		x
SP-A190	x		x	x	x	
SP-A200	x					
SP-A250	x					
SP-A290	x		x	x		
SP-A390	x	x	x	x		
SP-A410	x					
SP-A510	x		x	x		x
SP-A700	x					
SP-A710	x					x
SP-A780	x		x	x		
SP-A900	x					
SP-A1050	x		x	x		
SP-A1410	x					
SP-A1550	x		x	x		
SP-B50	x					
SP-B70	x					
SP-B80	x					
SP-B90	x		x	x		
SP-B110	x		x	x	x	
SP-B150	x		x	x	x	
SP-B200	x		x	x	x	
SP-L50	x					
SP-L80	x					

Note: All motors are rated for continuous use.



Greenheck Fan Corporation certifies that the SP models shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. The SP models are not AMCA certified with 50 hertz motors.



Greenheck Fan Corporation certifies that the CSP models shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program. The CSP models are not AMCA certified with 50 hertz motors.

Products that earn the ENERGY STAR® prevent greenhouse gas emissions by meeting strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and the U.S. Department of Energy.



Fans that are ENERGY STAR qualified include: SP-A70, SP-A90, SP-A110, SP-A125, SP-A190, SP-A200, SP-A250, SP-B70, SP-B80, SP-B90, SP-L50, SP-L80, SP-80-VG, SP-80L-VG, SP-110-VG, SP-110L-VG, SP-A50-90-VG and SP-A90-130-VG



Models SP and CSP are listed electric fans (UL/cUL 507). Ceiling Exhaust Fans are also UL Listed for above bathtub/shower with GFCI branch protected circuit. File no. E33599. Note: SP/CSP fans are rated for direct contact with insulation.



## Vari-Green® Motor

**EC Motor Technology Information & Advantages -** Greenheck's Vari-Green (VG) Electronically Commutated (EC) motor combines motor technology, controllability and energy-efficiency into one single low maintenance unit and is the industry's first fully controllable motor. The EC motor operates on AC power that is converted to DC – providing more efficient motor operation as compared to an AC operation. The controllability of the Vari-Green motor allows communication compatibility with a variable volume system. This allows speed adjustment of the motor to meet the needs of the system to exhaust air as needed and reduce over-exhausting conditioned air.

Available Vari-Green Controls and Models						
Controls	Models					
	SP-80(L)-VG	SP-110(L)-VG	SP-A 50-90-VG	SP-A 90-130-VG	SP/CSP-A510-VG	SP/CSP-A710-VG
VOC					X	X
Temperature/Humidity					X	X
Two-Speed					X	X
Remote Dial					X	X
Touch Remote					X	X
Constant Pressure					X	X
Transformer					X	X
Built-in Time Delay	X	X				
Built-in Two Speed	X	X				
Constant Airflow			X	X	X	X
0-10V DC					X	X
CFM			X	X		

See Greenheck's Vari-Green Motor and Vari-Green Controls brochures for more information.

## Vari-Green® Controls

**Air Quality –** Control a Vari-Green motor via changes in Volatile Organic Compounds (VOC's). VOC's are gasses that are emitted from humans, building materials, perfumes, foods, and furniture off-gassing. Range is 0-2000 CO<sub>2</sub> ppm equivalent.

- Institutional facilities – Schools, court houses, hospitals; bathrooms, waiting rooms, cafeterias.
- Commercial buildings – Offices, conference rooms, bathrooms, break rooms.

**Air Quality –** Control a Vari-Green motor via changes in temperature, humidity, or both. Range is 32° to 120°F and 0 to 100% relative humidity.

- Multifamily structures – Apartments, condos, hotels; bathrooms, utility rooms.
- Commercial buildings – Office buildings; offices, conference rooms, utility rooms, bathrooms.

**Transformer -** Provides 24V power from the existing line voltage at the fan to the Vari-Green motor and controls. Dual voltage primary (120/240V) transformer provided with the fan.

**Remote Dial or Touch Remote -** Allows the user to manually adjust a fan's speed from a remote location and mounts to a wall using a 2x4 junction box. The 24VDC transformer, described above, is included with all orders. A wall cover plate is supplied.

- The Touch Remote includes a countdown timer to automatically turn the fan off after 10, 30, 60 or 90 minutes.
- Recommended for use in commercial buildings and restaurants.

**Two-Speed Control with Integral Transformer -** Control allows motor RPM to be set at two independent speeds (high or low). Meets minimum airflow requirements with the ability to bump up to high speed in an emergency or meet maximum airflow requirements or reset to low speed for energy conservation.

**Constant Pressure Control -** Control Vari-Green motor via static (variable volume) or velocity (constant CFM) pressure on the inlet or outlet side of the fan. Optional, one or two, duct or room probes for use in:

- Multifamily structures - Apartments, condos, hotels; dryers, residential kitchens and bathrooms.
- Institutional facilities - Schools, prisons, multistory office buildings; bathrooms.

**CFM Speed Selector -** These models utilize an internal switch to set the fan to run at one of three speeds. User to set 3-position switch to desired airflow.



# Sound and Fan Selection

## Things to know when sound is critical



### Sound Data

The sound data shown in this catalog has been presented to aid the system designer in selecting a fan which will meet the desired sound criteria. Some levels have been included on the performance pages to provide a means of quickly evaluating the relative loudness of a fan selection.

### What is a sone?

Sones are an internationally recognized unit of loudness. In practical terms, the loudness of one sone is equivalent to the sound of a quiet refrigerator measured from five feet away in an acoustically average room. A sone is a single number rating, indicating the inlet noise derived from the eight audible octave bands. Sones are a linear measurement of sound level. For example, a sound level of 10 sones is twice as loud as 5 sones.

### Can radiated noise increase sound levels?

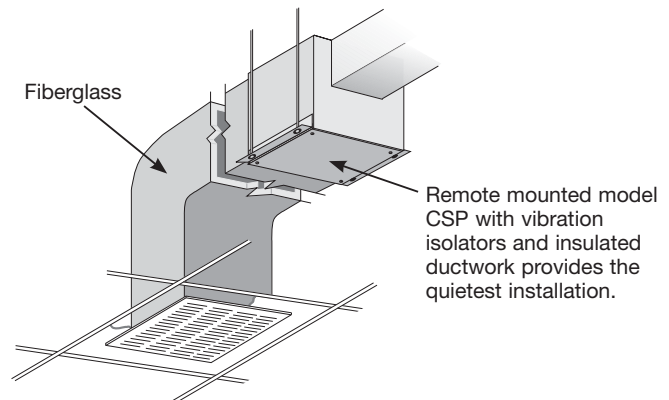
Radiated noise from fan housings can cause unacceptable sound levels on any brand of fan. The size of these fans allows them to be placed in areas where this noise will be transmitted to the conditioned space through walls or ceilings. Where possible, cabinet fans should be located in remote parts of the ventilation system.

### Where should an SP or CSP fan be used?

Model SP and CSP fans are designed for the lowest possible sound levels. Forward-curved wheels, insulated housings and vibration isolators between the motor and housing contribute to quiet, efficient

operation. Applied and installed as recommended, SP and CSP sound levels will fall well within the ranges shown in the Suggested Limits for Room Loudness chart. For applications where sound levels are critical, a remote mounted CSP with ductboard is recommended. Placement of SP and CSP fans should take into account the desired sound level at the location of the listener.

The compact size of the SP and CSP fans provides the system designer greater flexibility in locating these fans for lowest sound levels. In critical sound areas, insulated ductwork, flexible duct connections, or placing the fan in a remote section of the ductwork (away from the critical area) offers the best means of meeting desired sound levels.



Suggested Limits for Room Loudness		
Sones	dBA	
1.3-4	32-48	Private homes (rural and suburban)
1.7-5	36-51	Conference rooms
2-6	38-54	Hotel rooms, libraries, movie theatres, executive offices
2.5-8	41-58	Schools and classrooms, hospital wards and operating rooms
3-9	44-60	Court rooms, museums, apartment houses, private homes (urban)
4-2	48-64	Restaurants, lobbies, general open offices, banks
5-15	51-67	Corridors and halls, cocktail lounges, washrooms and toilets
7-21	56-72	Hotel kitchens and laundries, supermarkets

Reprinted from AMCA Publication 302 (Application of Sone Ratings for Non-ducted Air Moving Devices, with room-sone-dBA correlations) with the written permission from the AMCA International, Inc., 30 West University Drive, Arlington Heights, IL 60004-1893.

NOTE: Values above are for room loudness and are not sound ratings. Room loudness is the resulting level in a conditioned space after the acoustical qualities of the room have been accounted for.

When room sound levels are critical, such as in executive offices, conference rooms, hospital operating rooms, and school study areas, a CSP fan is the best choice. Shown here is a comparison of SP and CSP fans of the same size, with equal performance in typical installations. The CSP shows lower sone values.

Model	CFM	WG	FRPM	Sones
SP-A410	405	1/8	1000	3.0
CSP-A410	403	1/8	1000	1.5

Sone value on CSP is with insulated inlet duct.

ENERGY STAR® is a market-based partnership formed to reduce greenhouse gas emissions through energy efficiency and make it easier for consumers to identify energy-efficient products that offer savings, performance, features, and comfort.

To earn the ENERGY STAR label, products must meet strict energy-efficient standards set by the U.S. Environmental Protection Agency (EPA) for energy consumption, air and sound performance. Fan models that are ENERGY STAR qualified are identified in this catalog.

*Note: ENERGY STAR is only for products 500 cfm or less.*



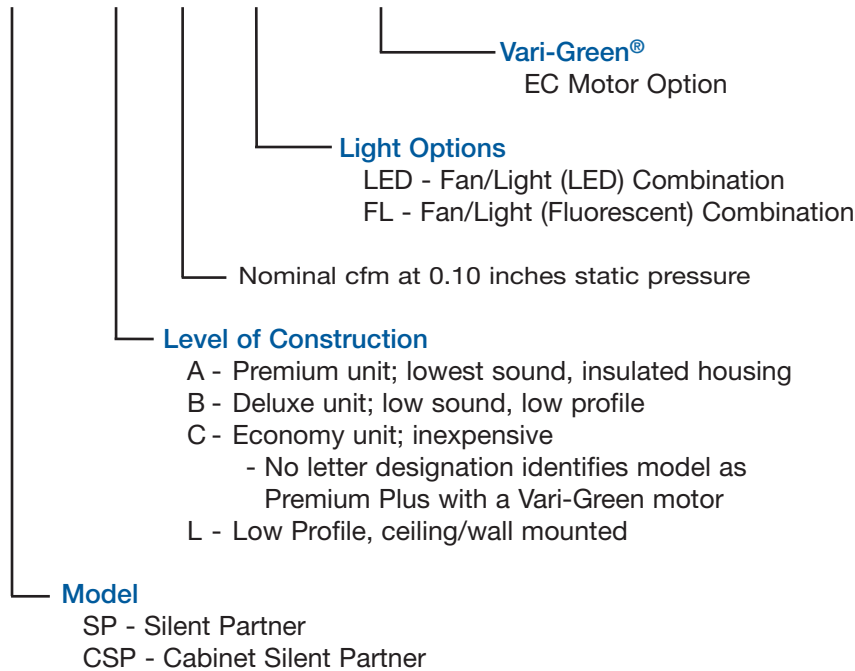
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Fans that are ENERGY STAR qualified include: SP-A70, SP-A90, SP-A110, SP-A125, SP-A190, SP-A200, SP-A250, SP-B70, SP-B80, SP-B90, SP-L50, SP-L80, SP-80-VG, SP-80L-VG, SP-110-VG, SP-110L-VG, SP-A50-90-VG and SP-A90-130-VG

## Model Number Code

The model number code system is designed to completely identify the fan. The remainder of the model code is determined by the size and performance of the fan.

### SP - A 50 FL - VG





# Model SP-VG

## Premium Ceiling Exhaust Fan

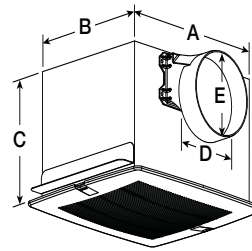


### Model SP-VG — 6-EF-1 = 75 CFM

Model SP-VG Dimensions							
Model	A	B	C	D	E	Designer Grille	Unit Weight
80(L)	11 $\frac{3}{8}$ (289)	10 $\frac{1}{2}$ (267)	7 $\frac{5}{8}$ (194)	—	4 (102)	14 x 13 (356 x 330)	12 (5)
110(L)	11 $\frac{3}{8}$ (289)	10 $\frac{1}{2}$ (267)	7 $\frac{5}{8}$ (194)	6 (152)	—	14 x 13 (356 x 330)	12 (5)

All dimensions are in inches (millimeters) and weight in pounds (kilograms).  
 Outlet connection width is 1 in. (25 mm). Mounting bracket width is 1 $\frac{1}{2}$  in. (38 mm).  
 For complete dimensional information, see CAPS submittal drawings.

SP-VG 80, 110



### — 6-EF-2, 6-EF-3, 6-EF-4 = 100 CFM

\*Amp and Watt draw is approximate and may vary based on motor manufacturer. Below performance is for **115V**.

Model SP-VG Performance		ENERGY STAR®	RPM	Amps*	Max. Input Watts*	CFM / Static Pressure in Inches wg														
Model						0	0.1	0.125	0.25	0.375	0.5	0.625	0.75	0.875	1.0					
						SP-80(L)-VG	☆	935	0.1	6.1	CFM	80	80	80	80	78	66	38		
					Sones	<0.3	<0.3	<0.3	0.6	1.4	2.2	3.0								
SP-110(L)-VG	☆	940	0.2	8.4	CFM	110	110	110	109	100	62	28								
					Sones	<0.3	<0.3	<0.3	1.4	8.3	3.0	3.6								

Performance certified is for model SP exhaust for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (rpm) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in spherical fan sones at 5 ft (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical fan sone levels.



## Grille Options

### Designer - standard

Available in white polystyrene finish, with or without motion detector with time delay. Standard on SP models A50-A390 and B50-B200. L50 and L80 (no grille mounted motion detector option).



### Aluminum

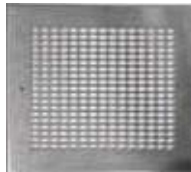
White enamel finish standard for models A410-A1550.

Optional for models A50-A390 and B50-B200.



### Stainless Steel

Polished stainless steel finish optional for models A50-A390 and B50-B200.



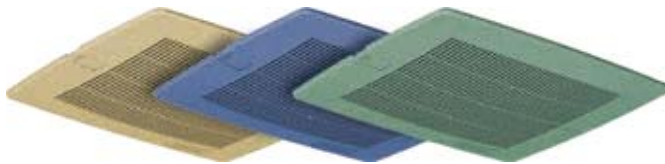
### Decorative

White plastic finish, with or without light, motion detector with time delay. Optional for models A50-A390 and B50-B200.



### Custom

Molded polystyrene available in an array of colors. Includes all the same accessory options as the standard grilles. For more information on the many ways this grille option can be used, please contact your Greenheck representative.



### Customized Grille Lens

Lenses can be customized with formed shapes or logos. Contact your Greenheck representative for details.



## Lighted Grille Options

Greenheck's fan and light combinations include either a prismatic or a frosted lens and either compact fluorescent or LED lamps. Our unique light box is manufactured with a reflective material to increase the light given off by either type of lamp. *UL Listed for above bathtub and showers with GFCI branch protected circuit.*

Model SP-A, sizes 50 - 390

Model SP-B, sizes 50 - 200

*Note: When selecting a lighted grille it will add height to the fan assembly. See CAPS drawings for exact values.*

### Prismatic Lens

The prismatic lens design provides approximately 25% more light than a traditional frosted lens. The lens may be easily removed to replace light bulbs.



### Frosted Lens

The frosted lens option is a traditional design which lets approximately 80% of light through the lens. The lens may be easily removed to replace light bulbs.



*Note: Compact Fluorescent light bulbs are ENERGY STAR® certified. Not all fan/lighted grill options are ENERGY STAR® certified. See CAPS for availability.*

## Compact Fluorescent Lamps (CFL)

- GU24 Base
- 10,000 hour average rated life
- Complies with UL 1993 End-of-Life requirements
- Replacement bulbs can be found wherever standard light bulbs and fixtures are sold
- Energy efficient ENERGY STAR® qualified fixtures
- California Energy Title 24 compliant

## LED

- GU24 Base
- 25,000 hour life
- Reflective light box
- 85% more efficient than incandescent
- Energy efficient ENERGY STAR® qualified fixtures

## Switches

Switches may be used on model SP and CSP fans to enable manual control of your fan or fan and light combination.

### 1 Function

Single pole rocker switch assembly

- Rated for 120-277V, 15A
- UL Listed

### 1 Function with Pilot Light

Single pole light combination switch assembly

- Rated for 120V, 15A
- UL Listed

### 2 Function

Two single pole combination switch assembly

- Rated for 120V, 15A
- UL Listed

## Time Delay Switch

Time delay switches save energy by automatically turning off equipment. They may be used with SP and CSP fans or fan and light combinations for extended operating time of fan. Time delay switches act in the same manner as a standard switch, however, there is a delay of 10 to 60 minutes after the fan has been turned off.

## Minimum Ventilation Control

This control contains a microprocessor that monitors the operation of the fan to make sure that the space is receiving the correct amount of ventilation per ASHRAE 62.2

- 120V, 2.5A
- UL Listed



## Motion Detectors

Motion detectors may be used with SP and CSP fans or fan and light combinations. Motion detectors use a passive infrared motion detector to automatically turn the fan on when a change in motion is sensed. They have a viewing area of 180 degrees, however they must be placed in the line-of-sight.

### Grille Mounted

Available on models up through size SP-A390 and SP-B200.

- Rated for 115V
- UL Listed

### Wall Mounted

For use on fan or lights. Available shipped loose.

- Rated for 115V
- UL Listed
- Requires 2x4 handy box
- Time delay can be set for 30 seconds to 30 minutes in 5 minute increments



## Firestat

- 120V, 8 Amp to 120V, 4 Amp capacities
- Max element temperature of 350°F (177°C)
- Type II – 5 inch insertion
- Type III – 11½ inch insertion



## Transformers

Transformers are available for applications requiring voltage reduction. Selection is based on motor amperage. All transformers are shipped loose. See performance pages for motor amp ratings.

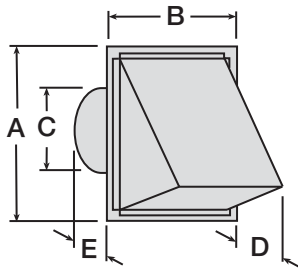


Models	Voltage Ratings	Amp Ratings
T-2.0	230/277V to 115	2.0 Amps
T-4.3	230/277V to 115	4.3 Amps
T-6.5	230/277V to 115	6.5 Amps
T-8.6	230/277V to 115	8.6 Amps

**Note:** All switch covers are standard white. Other colors available upon request.

## Model WC - Hooded Wall Cap (Round Connection)

- Aluminum construction - aluminum finish
- For outside wall applications
- Built-in birdscreen (not available on WC-4) and damper

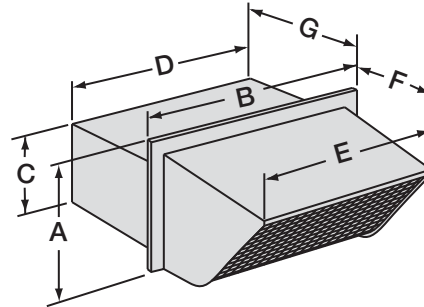


Model	Recommended Sizes	A	B	C	D	E
WC-4	C50, L50, L80	6½ (165)	6 (152)	4 (101)	4 (101)	5 (127)
WC-6	B50-B200, 80, 80L A50-A190, 110, 100L	8 (203)	8 (203)	6 (152)	4⅞ (105)	5 (127)
WC-8	A200-A510	11 (279)	11 (279)	8 (203)	5⅞ (130)	3½ (89)

All dimensions shown in inches (millimeters).

## Model WC - Hooded Wall Cap (Square or Rectangular Connections)

- Steel construction with black enamel finish
- For outside wall applications
- Built-in birdscreen and damper

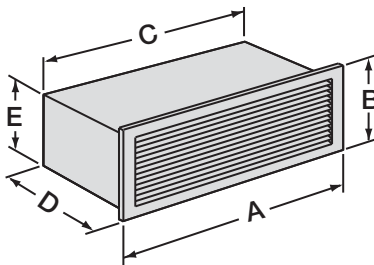


Model	Recommended Sizes	A	B	C	D	E	F	G
WC-10x3	50-290	5½ (140)	12¾ (324)	3½ (89)	10¼ (260)	11⅞ (283)	4¼ (108)	5 (127)
WC-8x8	200-510	10¼ (260)	10¼ (260)	8¼ (210)	8¼ (210)	8¼ (210)	6¾ (171)	5 (127)
WC-18x8	700-1550	10¼ (260)	20¼ (514)	8¼ (210)	18¼ (464)	18¼ (464)	6¾ (171)	5 (127)

All dimensions shown in inches (millimeters).

## Model WL - Wall Louvered Discharge

- Anodized aluminum grille
- Built-in damper
- Not recommended for exterior applications exposed to severe weather conditions. An external wall louver is recommended for such applications.

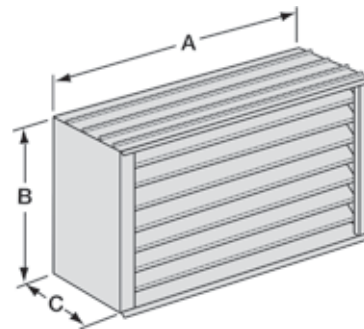


Model	Recommended Sizes	A	B	C	D	E
WL-10x3	50-290	12 (305)	5¼ (133)	10 (254)	7¾ (197)	3½ (89)
WL-18x6	390-1550	19¾ (502)	8 (203)	18 (457)	9 (229)	6 (152)

All dimensions shown in inches (millimeters).

## Model BVE - Brick Vent

- Designed for installation in masonry walls
- Anodized aluminum construction
- Built-in aluminum mesh insect screen



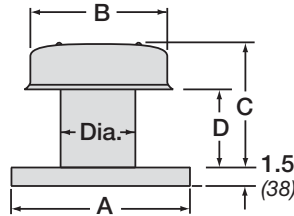
Model	Recommended Sizes	A	B	C
BVE808	50-290	8⅞ (206)	7¾ (197)	4 (102)
BVE128	390-510	12 (305)	7¾ (197)	4 (102)
BVE157	700-1050	15⅞ (397)	7¾ (197)	4 (102)

All dimensions shown in inches (millimeters).



## Model RCC-7 - Curb Cap

- Weathertight aluminum construction
- Integral birdscreen
- Built-in curb cap
- Requires roof curb

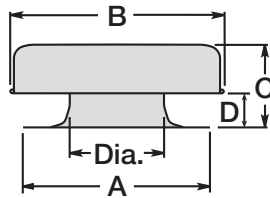


Model	For all sizes:	A	B	C	D	Throat Dia.
RCC-7	50-390	15 (381)	12 (305)	10 (254)	6 <sup>5</sup> / <sub>16</sub> (162)	7 (178)

All dimensions shown in inches (millimeters).

## Model GRSF - Flashing Flange

- All aluminum exterior construction
- Galvanized steel internal supports
- Integral birdscreen
- Built-in flashing flange

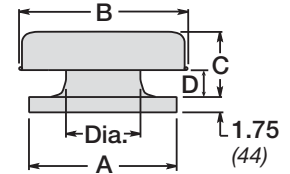


Model	For all sizes:	A	B	C	D	Throat Dia.
GRSF-10	410-710	23 (584)	20 <sup>1</sup> / <sub>2</sub> (521)	7 <sup>3</sup> / <sub>4</sub> (197)	2 (51)	10 <sup>1</sup> / <sub>4</sub> (260)
GRSF-12	780-1050	26 (660)	29 (737)	10 (254)	3 <sup>1</sup> / <sub>2</sub> (89)	12 <sup>1</sup> / <sub>4</sub> (311)
GRSF-16	1410-2150	30 (762)	29 (737)	11 (279)	4 <sup>1</sup> / <sub>4</sub> (108)	16 <sup>5</sup> / <sub>16</sub> (414)
GRSF-20	3600	34 (864)	35 <sup>1</sup> / <sub>2</sub> (902)	11 <sup>1</sup> / <sub>4</sub> (286)	3 <sup>3</sup> / <sub>4</sub> (95)	20 <sup>5</sup> / <sub>16</sub> (516)

All dimensions shown in inches (millimeters).

## Model GRS - Curb Cap

- All aluminum exterior construction
- Galvanized steel internal supports
- Integral birdscreen
- Built-in curb cap
- Requires roof curb

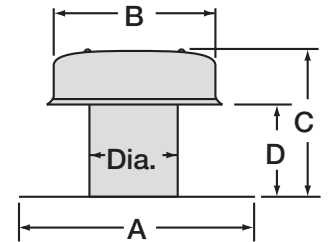


Model	For all sizes:	A	B	C	D	Throat Dia.
GRS-10	410-710	19 (483)	20 <sup>1</sup> / <sub>2</sub> (521)	7 <sup>3</sup> / <sub>4</sub> (197)	2 (51)	10 <sup>1</sup> / <sub>4</sub> (260)
GRS-12	780-1050	22 (559)	29 (737)	10 (254)	3 <sup>1</sup> / <sub>2</sub> (89)	12 <sup>1</sup> / <sub>4</sub> (311)
GRS-16	1410-2150	26 (660)	29 (737)	11 (279)	4 <sup>1</sup> / <sub>4</sub> (108)	16 <sup>5</sup> / <sub>16</sub> (414)
GRS-20	3600	30 (762)	35 <sup>1</sup> / <sub>2</sub> (902)	11 <sup>1</sup> / <sub>4</sub> (286)	3 <sup>3</sup> / <sub>4</sub> (95)	20 <sup>5</sup> / <sub>16</sub> (516)

All dimensions shown in inches (millimeters).

## Model RFC-7 - Flashing Flange

- Weathertight aluminum construction
- Integral birdscreen
- Built-in flashing flange

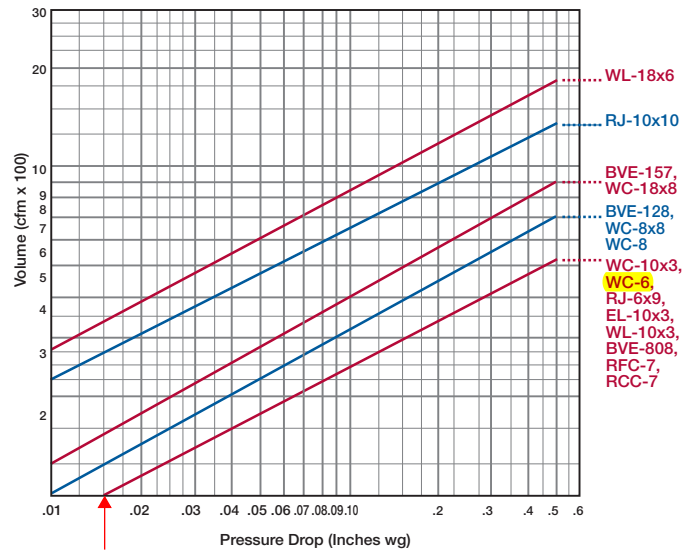


Model	For all sizes:	A	B	C	D	Throat Dia.
RFC-7	50-390	18 (457)	12 (305)	10 (254)	6 <sup>5</sup> / <sub>16</sub> (162)	7 (178)

All dimensions shown in inches (millimeters).

## Accessory Pressure Drops

The chart to the right can be used with all of the discharge accessories shown on pages 23, 26 and 27. Specific pressure drop values for these accessories must be included in total system calculations for proper fan selection.



Above accessories tested with 4 feet of inlet duct



### Vari-Green Motor

Motor to be an electronic commutation (EC) motor specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and prewired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted on the motor or by a 0-10 VDC signal. Motor shall be a minimum of 85% efficient at all speeds.

### Vari-Green Control - Remote Dial

Remote Dial shall be a Vari-Green Control specifically designed to provide 0-10 volt DC signal to Greenheck's Vari-Green Motor.

### Vari-Green Control - Two Speed

Two speed control shall be a Vari-Green Control specifically designed to allow the Vari-Green Motor to operate at two discrete speeds. Two speed control shall include two dials that may be set at any point between 0 and 10 volts DC and an integral transformer capable of reducing 115/208-240 volt AC power to 24 volt AC power.

### Vari-Green Control – Indoor Air Quality – Temperature / Humidity

Control to be a packaged indoor air quality control designed to regulate fan speed based on level of temperature and/or relative humidity in a space. Control shall include a Proportional Integral Derivative (PID) feedback loop and shall have labeled terminal strips for easy wiring. Fan shall be direct drive including an electronic commutation (EC) Vari-Green Motor. Control package shall be Vari-Green Indoor Air Quality – Temperature / Humidity Control.

### Vari-Green Control – Indoor Air Quality – VOC (Volatile Organic Compound)

Control to be a packaged indoor air quality control designed to regulate fan speed based on level of VOC concentration in a space. Control shall include a Proportional Integral Derivative (PID) feedback loop and shall have labeled terminal strips for easy wiring. Fan shall be direct drive including an electronic commutation (EC) Vari-Green Motor. Control package shall be Vari-Green Indoor Air Quality – VOC Control.

### Vari-Green Control – Constant Pressure

Control to be a packaged constant pressure control designed to regulate fan speed based on demand. Control shall include a Proportional Integral Derivative (PID) feedback loop and shall have all components prewired to labeled terminal strips for easy wiring. System shall include the appropriate pressure tap and preset pressure transducer. Fan shall be direct drive including an electronic commutation (EC) Vari-Green Motor. Control package shall be Vari-Green Constant Pressure Control.

Indoor installations shall include pressure tap (duct or room) and control box with integral pressure transducer.

Outdoor installations shall include duct pressure tap, pressure transducer, and control box. Control box shall be prewired and in a NEMA-3R weather tight enclosure for mounting outdoors near the fan location.

### LEED information

Greenheck became one of the first manufacturers in the Air Movement and Control industry to join the LEED/green movement when they joined the United States Green Building Council (USGBC) in 2005. Greenheck has been actively researching qualification requirements for our products to meet LEED credits and prerequisites.



The Vari-Green® motor significantly helps qualification efforts for the Energy and Atmosphere credits and prerequisites; specifically credit one, Optimize Energy Performance and prerequisite two, Minimum Energy Performance.



## Models SP-A50 thru A1550

Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy-gauge galvanized steel. The housing interior shall be lined with 0.5 inch (13 mm) acoustical insulation. The outlet duct collar shall include a polypropylene backdraft damper on SP-A50 - SP-A90 and a spring loaded aluminum backdraft damper on SP-A110 and larger. Outlet shall be adaptable for horizontal or vertical discharge. The designer grille for sizes SP-A50 through SP-A390 shall be constructed of high-impact polystyrene and for sizes SP-A410 through SP-A1550, the grille shall be constructed of aluminum. Grilles shall be non-yellowing.

The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced. All fans shall bear the AMCA Certified Ratings program AMCA Sound and Air Performance seal and shall be UL/cUL Listed. Ceiling fans shall be model SP as manufactured by Greenheck Fan Corporation, Schofield, Wisconsin.

Model SP-A fans with 50 hertz motors are not AMCA certified.

## Model SP-80(L)-VG, SP-110(L)-VG

Ceiling mounted exhaust fans shall be of the centrifugal direct drive type with an EC motor and overload protection. The fan housing shall be constructed of galvanized steel and have a low profile housing. The outlet duct collar shall have an aluminum backdraft damper. The fan shall be capable of built-in two-speed operation with a time delay.

The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced. All fans shall bear the AMCA Certified Ratings program AMCA Sound and Air Performance Seal and shall be UL/cUL Listed.

## Models SP-B50, B70, B80, B90, B110, B150, and B200

Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of galvanized steel. The polypropylene duct collar shall be 6 inches (152 mm) in diameter and shall include a backdraft damper. The designer grille shall be constructed of non-yellowing high-impact polystyrene and attached to the housing with hidden attachment screws. The access for wiring shall be internal. The motor disconnect shall be internal and of the plug-in type.

The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward-curved centrifugal type, constructed of calcium carbonate filled polypropylene and dynamically balanced. All fans shall bear the AMCA Certified Ratings program AMCA Sound and Air Performance Seal and shall be UL/cUL Listed. Ceiling fans shall be model SP-B50, B70, B80, B90, B110, B150 or B200 as manufactured by Greenheck Fan Corporation, Schofield, Wisconsin.

Model SP-B fans with 50 hertz motors are not AMCA certified.



# Design and Selection Support

Enjoy Greenheck's extraordinary service, before, during and after the sale.

Greenheck offers added value to our wide selection of top performing, energy-efficient products by providing several unique Greenheck service programs.



- Our Quick Delivery Program ensures shipment of our in-stock products within 24 hours of placing your order. Our Quick Build made-to-order products can be produced in 1-3-5-10-15 or 25-day production cycles, depending upon their complexity.
- Greenheck's free Computer Aided Product Selection program (CAPS), rated by many as the best in the industry, helps you conveniently and efficiently select the right products for the challenge at hand.
- Greenheck has been Green for a long time! Our energy-saving products and ongoing corporate commitment to sustainability can help you qualify for LEED credits.
- Our 3D service allows you to download, at no charge, easy-to-use AutoDesk® Revit® 3D drawings for many of our ventilation products.

Find out more about these special Greenheck services at [greenheck.com](http://greenheck.com)



## Building Value in Air

Greenheck delivers value to mechanical engineers by helping them solve virtually any air quality challenges their clients face with a comprehensive selection of

top quality, innovative air-related equipment. We offer extra value to contractors by providing easy-to-install, competitively priced, reliable products that arrive on time.

And building owners and occupants value the energy efficiency, low maintenance and quiet dependable operation they experience long after the construction project ends.

## Our Commitment

*As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.*

Specific Greenheck product warranties are located on [greenheck.com](http://greenheck.com) within the product area tabs and in the Library under Warranties.



Prepared to Support Green Building Efforts

