Fan-Powered Parallel

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Fan-Powered Parallel

Service Model Number Description

Digit 1, 2—Unit Type
VP VariTrane fan-powered parallel

Digit 3—Reheat
C Cooling Only
E Electric Heat
W Hot Water Heat

Digit 4—Development Sequence
F Sixth

Digit 5, 6—Primary Air Valve
05 5" inlet (350 max cfm)
06 6" inlet (500 max cfm)
08 8" inlet (900 max cfm)
10 10" inlet (1400 max cfm)
12 12" inlet (2000 max cfm)
14 14" inlet (3000 max cfm)
16 16" inlet (4000 max cfm)

Digit 7, 8—Secondary Air Valve
00 N/A

Digit 9—Fan
P 02SQ fan (500 nominal cfm)
Q 03SQ fan (1100 nominal cfm)
R 04SQ fan (1350 nominal cfm)
S 05SQ fan (1550 nominal cfm)
T 06SQ fan (1850 nominal cfm)
U 07SQ fan (2000 nominal cfm)

Digit 10, 11—Design Sequence
A0 Design Sequence (Factory assigned)

Digit 12, 13, 14, 15—Controls
ENON No controls, field-installed DDC or analog
ENCL ENON with controls enclosure
PNON No controls, field-installed pneumatic
DD00 Trane elec actuator only
DD01 DDC – cooling only
DD02 DDC – N.C. on/off water control
DD03 DDC – prop hot water control
DD04 DDC – on/off electric heat control
DD05 DDC – pulse-width modulation electric heat control
DD07 DDC – N.O. on/off hot water control
DD11 LonTalk DDC Controller—Cooling only
DD12 LonTalk DDC Controller w/ N.C. on/off hot water control
DD13 LonTalk DDC Controller w/ proportional hot water control
DD14 LonTalk DDC Control–on/off electric heat control
DD15 LonTalk DDC Controller w/ pulse-width modulation electric heat control
DD17 LonTalk DDC Controller w/ N.O. on/off hot water control
AT08 FM Automated Logic ZN341v+
AT10 FM Automated Logic ZN141v+
FM00 FM customer actuator & control
FM01 FM Trane actuator w/ customer-supplied controller
HNY2 FM Honeywell W7751H
INV3 FM Invensys MNL-V2R
VMA2 FM Johnson VMA-1420
PWR1 FM Siemens 540-100 w/ GDE131.1 actuator
PWR2 FM Siemens 540-103 w/ GDE131.1 actuator
PW12 FM Siemens 550-065
PW13 FM Siemens 550-067
EI05 Analog – fan-powered parallel with optional on/off reheat
PN00 PN – N.O. Trane pneumatic actuator, R.A. stat
PN05 PN – N.O. PVR, R.A. stat

Notes:
N.C. = *Normally-closed*
N.O = *Normally-opened*
DA Stat = *Direct-acting pneumatic t-stat (by others)*
RA Stat = *Reverse-acting pneumatic t-stat (by others)*
PN = *Pneumatic*
FM = *Factory installation of customer-supplied controller*
PVR = *Pneumatic Volume Regulator*

Digit 16—Insulation
A 1/2" Matte-faced
B 1" Matte-faced
C 1/2" Foil-faced
D 1" Foil-faced
F 1" Double-wall
G 3/8" Closed-cell

Digit 17—Motor Type
D PSC Motor
E High-efficiency motor (ECM)

Digit 18—Motor Voltage
1 115/60/1
2 277/60/1
3 347/60/1
4 208/60/1
5 230/50/1

Digit 19—Outlet Connection
1 Flanged
2 Slip & Drive

Digit 20—Attenuator
0 None
W With

Digit 21—Water Coil
0 None
1 1-Row–Plenum inlet installed RH
2 2-Row–Plenum inlet installed RH
3 1-Row–Discharge installed, LH
4 1-Row–Discharge installed, RH
5 2-Row–Discharge installed, LH
6 2-Row–Discharge installed, RH

Digit 22—Electrical Connections
L Left
R Right

Electrical Connections Note: Airflow hitting you in the face.

Digit 23—Transformer
0 N/A (provided as standard)

Digit 24—Disconnect Switch
0 None
W With

Note: VPCF, VPWF – Toggle Disconnect
VPEF – Door Interlocking Power Disconnect

Digit 25—Power Fuse
0 None
W With

Digit 26—Electric Heat Voltage
0 None
A 208/60/1
B 208/60/3
C 240/60/1
D 277/60/1
E 480/60/1
F 480/60/3
G 347/60/1
H 575/60/3
J 380/50/3
K 120/60/1

Digit 27, 28, 29—Electric Heat kW
000 None
050 0.5 kW
010 1.0 kW
015 1.5 kW

260 26.0 kW

Electric Heat Voltage Notes:
0.5 to 8.0 kW–½ kW increments
8.0 to 18.0 kW –1 kW increments
18.0 to 46.0 kW–2 kW increments

Digit 30—Electric Heat Stages
0 None
1 1 Stage
2 2 Stages Equal
3 3 Stages Equal

Digit 31—Contactors
0 None
1 24-volt magnetic
2 24-volt mercury
3 PE with magnetic
4 PE with mercury

Digit 32—Airflow Switch
0 None
W With

Fan-Powered Parallel Selection Procedure

This section describes the elements and process required to properly select parallel fan-powered VAV terminals, and includes a specific example. The selection procedure is iterative in nature which makes computer selection desirable.

Selection of fan-powered VAV terminals involves four elements:

- Air valve selection
- Heating coil selection
- Fan size and selection
- Acoustics

Note: Use the same procedures for selecting Low-Height Parallel Fan-Powered Units as used for selecting Parallel Fan-Powered Units.

Air Valve Selection

Provided in the Performance Data—Air Pressure Requirements section of the catalog is the unit air pressure drop at varying airflows. To select an air valve, determine the airflow required at design cooling. Next, select an air valve diameter that will allow proper airflow modulation, (a velocity of 1600 – 2000 FPM is recommended). Keep in mind that **modulation below 300 FPM is not recommended**. Proper selection requires defining the minimum valve airflow (in either heating or cooling) and maintaining at least 300 FPM through the air valve. The minimum is typically set based on ventilation requirements. If zone ventilation does not come through the VAV unit, a minumum valve position can also be zero.

Heating Coil Selection

Supply Air Temperature
The first step required when selecting a heating coil is to determine the heating supply air temperature to the space, calculated using the heat transfer equation. A recommended value is 90°F, although values between 85°F and 95°F are common. Discharge air temperatures that exceed 20 degrees above space temperature are not recommended for proper diffuser operation. Air temperature difference is defined as the heating supply air temperature to the space minus the winter room design temperature. The zone design heat loss rate is denoted by the letter Q. Supply air temperature to the space equals the leaving air temperature (LAT) for the terminal unit.

Coil Leaving Air Temperature
Once the terminal unit LAT is determined, the heating requirements for the coil can be calculated. The leaving air temperature for the coil of a parallel fan-powered terminal unit varies based on the type of unit installed heat being selected.

Electric coil LAT equals terminal unit LAT because the coil is located on the unit discharge. Hot water coils can be located on either the discharge or, for maximum system efficiency, the plenum inlet when located on the entering air side of the fan. Coil LAT is calculated using a mixing equation. Given the unit heating airflow and LAT, minimum primary airflow at its supply air temperature, and the volume of heated plenum air, the leaving air temperature for the hot water coil can be determined (see the unit selection example that follows for more details).

Coil Entering Air Temperature
The entering air temperature (EAT) to the coil also varies based on the coil position on the unit.

Electric coils are mounted on the unit discharge. Hot water coils can be mounted on the discharge or on the plenum inlet. Plenum inlet mounting creates a more efficient VAV system. This is because the parallel fan is energized only when in heating mode, and thus, when in cooling mode, the water coil is not in the airstream.

The EAT for discharge mounted coils equals the temperature of blended primary air and plenum air. For plenum inlet mounted water coils, the EAT equals the plenum air temperature.

Capacity Requirement
Once both coil EAT and LAT are determined, the heat transfer (Q) for the coil must be calculated using the heat transfer equation. For electric heat units, the Q value must be converted from Btu to kW for heater selection. The required kW should be compared to availability charts in the performance data section for the unit selected. For hot water heat units, reference the capacity charts in the performance data section for the required heat transfer Q and airflow to pick the appropriate coil.

Fan Size and Selection

Fan Airflow
Fan airflow is determined by calculating the difference between the unit design heating airflow and minimum primary airflow.

Fan External Static Pressure
Fan external static pressure is the total resistance experienced by the fan, which may include downstream ductwork and diffusers, heating coils, and sound attenuators. As total airflow varies so will static pressure, making calculation of external static pressure dependent on unit type.

In many applications of parallel terminals, a minimum primary airflow must be maintained to meet ventilation requirements. This primary airflow contributes to the total resistance experienced by the fan and should be accounted for in all components downstream of the fan itself, including electric coils. Hot water coils positioned on the fan inlet are not affected by the additional primary airflow. The static pressure resistance experienced by the fan due to the hot water coil is based on fan airflow only, not the total heating airflow.

Selection
Once fan airflow and external static pressure are determined, reference the fan curves in the performance data section. Cross plot both airflow and external static pressure on each applicable graph. A selection between the minimum and maximum airflow ranges for the fan is required.

It is common to identify more than one fan that can meet the design requirements. Typically, selection begins with the smallest fan available to meet capacity. If this selection does not meet acoustical requirements, upsizing the fan and operating it at a slower speed can be done for quieter operation.

Acoustics

Air Valve Generated Noise
To determine the noise generated by the air valve, two pieces of information are required; design airflow and design air pressure drop. The design air pressure drop is determined by taking the difference between design inlet and static pressure (the valve's most over-pressurized condition) and external static pressure at design cooling flow. This represents a worst-case operating condition for the valve.

Fan Generated Noise
To determine fan noise levels, fan airflow, external static pressure and speed information is required.

Evaluation Elements
For parallel fan-powered terminal units, the air valve and fan operation must be evaluated separately because these operations are not simultaneous.

Access the appropriate acoustics table(s) of the catalog and determine the sound power and NC prediction for both the discharge and radiated paths. It is important to understand that discharge air noise is generally not a concern with fan-powered terminals. Radiated noise from the unit casing typically dictates the noise level of
the space.

If the entire unit or any element of it is generating noise in excess of the Noise Criteria requirements, the size of the appropriate portion of the terminal should be increased. Because the selection procedure is iterative, care should be taken by the designer to confirm that the change in selection does not affect other elements of the unit or system design.

Selection Example—

Parallel With Hot Water Heat

Air Valve Selection

Design Cooling Airflow	1000 cfm
Minimum Ventilation Airflow	200 cfm
Maximum Unit APD	0.25 in. wg

Choose 10" air valve
Check – Is minimum airflow above 300 FPM?
Answer – Yes. Minimum cfm allowable = 165 cfm (see General Data—Valve/ Controller Guidelines, FPP 8)

A 10" air valve is selectd with unit pressure drop = 0.01 in. wg

Heating Coil Selection
Required Information:

Zone design heat loss:	20000 Btu
Unit heating airflow:	600 cfm
Winter room design temp.:	68°F
Coil entering water temp.:	180°F
Minimum primary airflow:	200 cfm
Fan Airflow:	400 cfm
Plenum temperature:	70°F
Coil flow rate:	2 gpm
Primary air temperature:	55°F

Heat Transfer Equation (Btu)
Q = 1.085 x Cfm x DTemperature

For the heating zone, the temperature difference is the zone supply air temperature (SAT) minus the winter room design temperature.

18000 Btu = 1.085 x 600 x (SAT - 68°F)
SAT = 95.6°F

Because the designer chose to maximize system efficiency by having the hot water coil on the plenum inlet, the unit supply air temperature is equal to the mix of the heated plenum air from the fan and the minimum primary airflow.

600 cfm x 95.6°F =
200 cfm x 55°F +
(600 cfm - 200 cfm) x Coil LAT

Coil LAT = 116°F

For the heating coil, the temperature difference is the calculated coil LAT minus the coil EAT (Plenum Air Temperature).
Coil Q = 1.085 x 400 x (116-70) =
19,964 Btu = 19.96 Mbh

Coil Performance Table
Selection:
Size 02SQ fan, 1-row coil with 2 gpm = 20.53 Mbh (at 400 cfm)

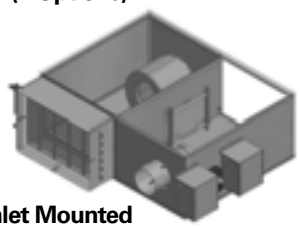
1-row coil with 2 gpm = 2.57 ft WPD

Fan Selection
Required Information:

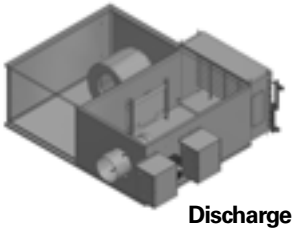
Design airflow:	400 cfm
Downstream static pressure at design airflow:	0.25 in. wg

Fan external static pressure equals downstream static pressure (ductwork and diffusers) plus coil static pressure. The coil static pressure that the fan experiences is at the fan airflow (400 cfm). The downstream static pressure the fan experiences is at fan airflow plus minimum primary airflow. The sum of fan airflow and minimum primary airflow (600 cfm) is less than design airflow (1000 cfm) and therefore the 0.25 in. wg downstream static pressure at design airflow must be adjusted for the lower heating airflow.

Parallel Fan-Powered Unit with Water Coil (2 Options)



Plenum Inlet Mounted



Discharge Mounted

Using Fan Law Two:
Heating Downstream Static Pressure = $(600/1000)^2$ x 0.25 = .09 in. wg

A size 02SQ fan has the capability to deliver approximately 650 cfm at 0.09 downstream static pressure.

If an attenuator is required, use the attenuator air pressure drop tables to define additional fan static pressure.

Acoustics
Required Information:

Design inlet static press.:	1.0 in. wg
NC criteria:	NC-35

The selection is a VPWF Parallel Fan-powered Terminal Unit, 10" primary, parallel fan size 02SQ, with a 1-row hot water coil.

Determine the casing radiated noise level because it typically dictates the sound level (NC) of the space. With a parallel unit, two operating conditions must be considered, design cooling and design heating.

Design Cooling (1000 cfm). Radiated valve typically sets the NC for parallel units in cooling mode. The closest tabulated condition (1100 cfm at 1.0 in. wg ISP) has an NC=31. (A more accurate selection can be done via TOPSS electronic selection program.):

Selection Program Output (Radiated Valve):

Octave Band	2	3	4	5	6	7	NC
Sound Power	65	60	53	48	41	32	30

Design Heating (200 cfm valve, 400 cfm fan, 0.25 in. wg DSP). Radiated fan typically sets the NC for parallel units in heating mode. The closest cataloged condition (430 fan cfm , 0.25 in. wg DSP) has an NC=32. (A more accurate selection can be done via TOPSS electronic selection program.)

Selection Program Output (Radiated Fan):

Octave Band	2	3	4	5	6	7	NC
Sound Power	66	58	56	52	48	41	31

The predicted NC level for design cooling is NC-30 and for design heating is NC-31. If the catalog path attenuation assumptions are acceptable, this unit meets all of the design requirements and the selection process is complete.

Computer Selection

The advent of personal computers has served to automate many processes that were previously repetitive and time-consuming. One of those tasks is the proper scheduling, sizing, and selection of VAV terminal units. Trane has developed a computer program to perform these tasks. The software is called the Trane Official Product Selection System (TOPSS).

The TOPSS program will take the input specifications and output the properly sized VariTrane VAV terminal unit along with the specific performance for that size unit.

The program has several required fields, denoted by red shading in the TOPSS screen, and many other optional fields to meet the criteria you have. Required values include maximum and minimum airflows, control type, and model. If selecting models with reheat, you will be required to enter information to make that selection also. The user is given the option to look at all the information for one selection on one screen or as a schedule with the other VAV units on the job.

The user can select single-duct, dual-duct, and fan-powered VAV boxes with the program, as well as most other Trane products, allowing you to select all your Trane equipment with one software program.

The program will also calculate sound power data for the selected terminal unit. The user can enter a maximum individual sound level for each octave band or a maximum NC value. The program will calculate acoustical data subject to default or user supplied sound attenuation data.

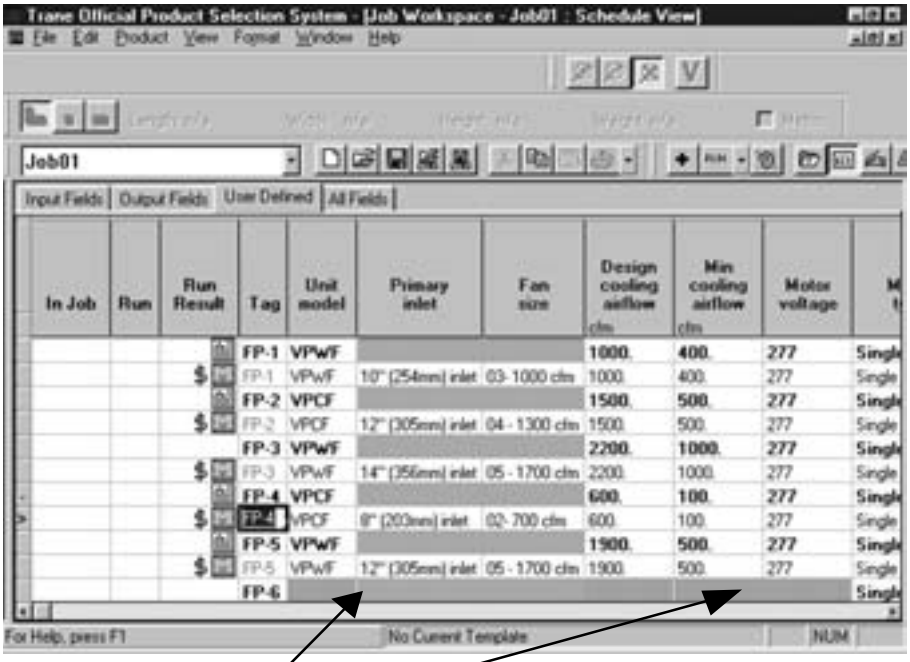
Schedule View

The program has many time-saving features such as:

- Copy/Paste from spreadsheets like Microsoft® Excel
- Easily arranged fields to match your schedule
- Time-saving templates to store default settings

The user can also export the Schedule View to Excel to modify and put into a CAD drawing as a schedule.

Specific details regarding the program, its operation, and how to obtain a copy of it are available from your local Trane sales office.



Required entry fields (in Red on TOPSS screen).

Rearrange what fields you see and in what order with a few clicks of a button.

Primary Airflow Control Factory Settings – I-P

Control Type	Air Valve Size (in.)	Maximum Valve Cfm	Maximum Controller Cfm	Minimum Controller Cfm	Constant Volume Cfm
Direct Digital Control/ UCM	5	350	40–350	0, 40–350	40–350
	6	500	60–500	0, 60–500	60–500
	8	900	105–900	0, 105–900	105–900
	10	1400	165–1400	0, 165–1400	165–1400
	12	2000	240–2000	0, 240–2000	240–2000
	14	3000	320–3000	0, 320–3000	320–3000
	16	4000	420–4000	0, 420–4000	420–4000
Pneumatic with Volume Regulator	5	350	63–350	0, 63–350	63–350
	6	500	73–500	0, 73–500	73–500
	8	900	134–900	0, 134–900	134–900
	10	1400	215–1400	0, 215–1400	215–1400
	12	2000	300–2000	0, 300–2000	300–2000
	14	2885	408–2887	0, 408–2887	408–2887
	16	3785	536–3789	0, 536–3789	536–3789
Analog Electronic	5	350	82–350	0, 82–350	82–350
	6	500	120–500	0, 120–500	120–500
	8	900	210–900	0, 210–900	210–900
	10	1400	328–1400	0, 328–1400	328–1400
	12	2000	470–2000	0, 470–2000	470–2000
	14	3000	640–3000	0, 640–3000	640–3000
	16	4000	840–4000	0, 840–4000	840–4000

Primary Airflow Control Factory Settings – SI

Control Type	Air Valve Size (in.)	Maximum Valve L/s	Maximum Controller L/s	Minimum Controller L/s	Constant Volume L/s
Direct Digital Control/ UCM	5	165	19–165	0, 19–350	19–350
	6	236	28–236	0, 28–236	28–236
	8	425	50–425	0, 50–425	50–425
	10	661	77–661	0, 77–661	77–661
	12	944	111–944	0, 111–944	111–944
	14	1416	151–1416	0, 151–1416	151–1416
	16	1888	198–1888	0, 198–1888	198–1888
Pneumatic with Volume Regulator	5	165	30–165	0, 30–165	30–165
	6	236	35–236	0, 35–236	35–236
	8	425	63–425	0, 63–425	63–425
	10	661	102–661	0, 102–661	102–661
	12	944	141–944	0, 141–944	141–944
	14	1362	193–1363	0, 193–1363	193–1363
	16	1787	253–1788	0, 253–1788	253–1788
Analog Electronic	5	165	39–165	0, 39–165	39–165
	6	236	57–236	0, 57–236	57–236
	8	425	100–425	0, 100–425	100–425
	10	661	155–661	0, 155–661	155–661
	12	944	222–944	0, 222–944	222–944
	14	1416	303–1416	0, 303–1416	303–1416
	16	1888	397–1888	0, 397–1888	397–1888

Note: Maximum airflow must be greater than or equal to minimum airflow.

Unit Air Pressure Drop – in. wg (I-P)

Fan/Inlet Size	Airflow Cfm	Cooling Only
02SQ–05	40	0.01
	150	0.03
	250	0.08
	350	0.17
02SQ–06	60	0.01
	200	0.05
	350	0.17
	500	0.35
02SQ–08	105	0.01
	350	0.03
	600	0.09
	900	0.21
02SQ–10	165	0.01
	550	0.01
	950	0.01
	1400	0.01
03SQ–06	60	0.01
	200	0.06
	350	0.19
	500	0.40
03SQ–08	105	0.01
	350	0.03
	600	0.08
	900	0.20
03SQ–10	165	0.01
	550	0.01
	950	0.02
	1400	0.05
03SQ–12	240	0.01
	750	0.01
	1350	0.01
	2000	0.01
04SQ–08	105	0.01
	350	0.03
	600	0.08
	900	0.20
04SQ–10	165	0.01
	550	0.01
	950	0.02
	1400	0.05
04SQ–12	240	0.01
	750	0.01
	1350	0.01
	2000	0.01
04SQ–14	320	0.01
	1200	0.01
	2100	0.01
	3000	0.01

Fan/Inlet Size	Airflow Cfm	Cooling Only
05SQ–10	165	0.01
	550	0.01
	950	0.02
	1400	0.05
05SQ–12	240	0.01
	750	0.01
	1350	0.01
	2000	0.01
05SQ–14	320	0.01
	1200	0.01
	2100	0.01
	3000	0.01
06SQ–10	165	0.01
	550	0.01
	950	0.01
	1400	0.01
06SQ–12	240	0.01
	750	0.01
	1350	0.01
	2000	0.01
06SQ–14	320	0.01
	1200	0.01
	2100	0.01
	3000	0.01
06SQ–16	420	0.01
	1600	0.01
	2800	0.01
	4000	0.01
07SQ–10	165	0.01
	550	0.01
	950	0.01
	1400	0.01
07SQ–12	240	0.01
	750	0.01
	1350	0.01
	2000	0.01
07SQ–14	320	0.01
	1200	0.01
	2100	0.01
	3000	0.01
07SQ–16	420	0.01
	1600	0.01
	2800	0.01
	4000	0.01

Note: Unit pressure drops do not include hot water coil or attenuator pressure drops.

Coil Air Pressure Drop – in. wg (I-P)

Fan Size	Airflow Cfm	1-Row HW (in. wg)	2-Row HW (in. wg)
02SQ	100	0.00	0.00
	200	0.01	0.01
	300	0.01	0.02
	400	0.02	0.03
	500	0.02	0.05
03SQ	250	0.01	0.02
04SQ	500	0.02	0.04
05SQ	750	0.04	0.08
	1000	0.07	0.13
	1250	0.10	0.19
	1400	0.12	0.23
06SQ	600	0.02	0.04
07SQ	900	0.04	0.07
	1200	0.06	0.11
	1500	0.09	0.16
	1800	0.12	0.22
	2000	0.15	0.27

Note: HW Coil Only pressure drops do not include unit pressure drop.

Attenuator Air Pressure Drop (I-P)

Fan Size	Plenum Cfm	Attenuator
02SQ	50	0.00
	200	0.00
	350	0.01
	500	0.02
	650	0.04
	750	0.06
03SQ	50	0.00
	250	0.00
	500	0.00
	750	0.00
	1000	0.01
	1200	0.06
04SQ	50	0.00
	300	0.01
	600	0.02
	900	0.03
	1200	0.05
	1450	0.06
05SQ	50	0.00
	300	0.00
	600	0.02
	900	0.06
	1200	0.13
	1550	0.24
06SQ	50	0.00
	500	0.01
	900	0.03
	1300	0.06
	1650	0.10
	1900	0.14
07SQ	50	0.00
	500	0.01
	1000	0.04
	1500	0.08
	2000	0.15
	2500	0.25

Note: Plenum cfm = (Fan cfm)

Unit Air Pressure Drop – Pa (SI)

Fan/Inlet Size	Airflow L/s	Cooling Only
02SQ–05	19	2
	71	7
	118	20
	165	41
02SQ–06	28	2
	94	13
	165	41
	236	86
02SQ–08	50	2
	165	8
	283	23
	425	51
02SQ–10	78	2
	260	2
	448	2
	661	3
03SQ–06	28	2
	94	15
	165	48
	236	99
03SQ–08	50	2
	165	6
	283	21
	425	49
03SQ–10	78	2
	260	2
	448	6
	661	13
03SQ–12	113	2
	354	2
	637	2
	944	2
04SQ–08	50	2
	165	6
	283	21
	425	49
04SQ–10	78	2
	260	2
	448	6
	661	13
04SQ–12	113	2
	354	2
	637	2
	944	2
04SQ–14	151	2
	566	2
	991	2
	1416	2

Fan/Inlet Size	Airflow L/s	Cooling Only
05SQ–10	78	2
	260	2
	448	6
	661	13
05SQ–12	113	2
	354	2
	637	2
	944	2
05SQ–14	151	2
	566	2
	991	2
	1416	2
06SQ–10	78	2
	260	2
	448	2
	661	2
06SQ–12	113	2
	354	2
	637	2
	944	2
06SQ–14	151	2
	566	2
	991	2
	1416	2
06SQ–16	198	2
	755	2
	1321	2
	1888	2
07SQ–10	78	2
	260	2
	448	2
	661	2
07SQ–12	113	2
	354	2
	637	2
	944	2
07SQ–14	151	2
	566	2
	991	2
	1416	2
07SQ–16	198	2
	755	2
	1321	2
	1888	2

Note: Unit pressure drops do not include hot water coil or attenuator pressure drops.

Coil Air Pressure Drop – Pa (SI)

Fan Size	Airflow L/s	1-Row HW (Pa)	2-Row HW (Pa)
02SQ	200	0	1
	300	1	3
	400	2	5
	500	4	8
	600	6	12
03SQ	118	2	4
04SQ	236	5	11
05SQ	354	10	21
	472	17	33
	590	25	47
	661	31	57
06SQ	900	5	10
07SQ	1200	9	18
	1500	15	28
	1800	22	41
	2150	30	56
	2500	36	67

Note: HW Coil Only pressure drops do not include unit pressure drop.

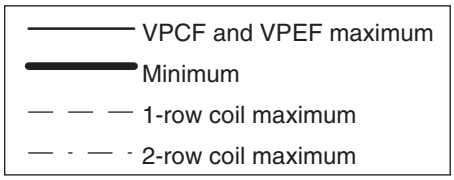
Attenuator Air Pressure Drop (SI)

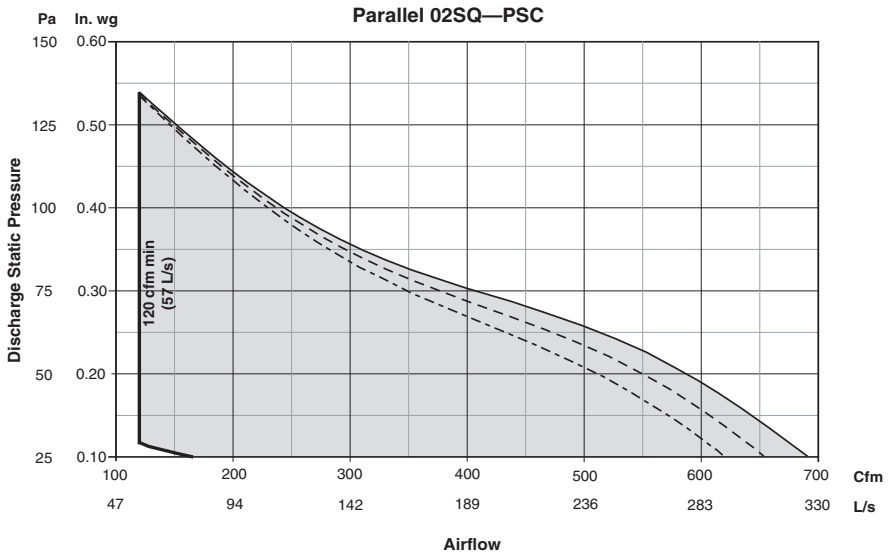
Fan Size	Plenum L/s	Attenuator
02SQ	24	0
	94	0
	165	2
	236	5
	307	10
	354	14
03SQ	24	0
	118	0
	236	0
	354	0
	472	2
	566	14
04SQ	24	0
	142	3
	283	5
	425	8
	566	11
	684	14
05SQ	24	0
	142	1
	283	5
	425	15
	566	32
	731	61
06SQ	24	0
	236	2
	425	7
	613	15
	779	26
	897	35
07SQ	24	0
	236	2
	472	9
	708	21
	944	38
	1180	62

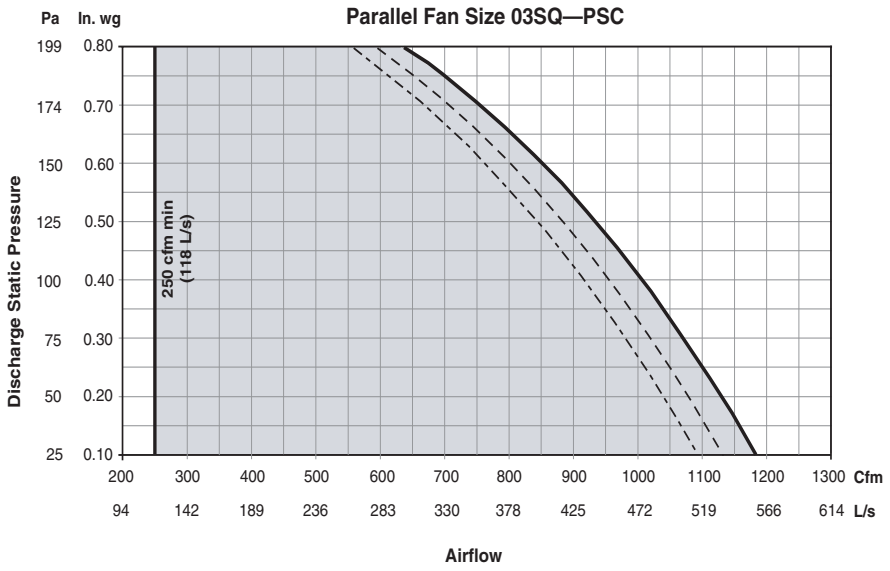
Note: Plenum cfm = (Fan cfm)

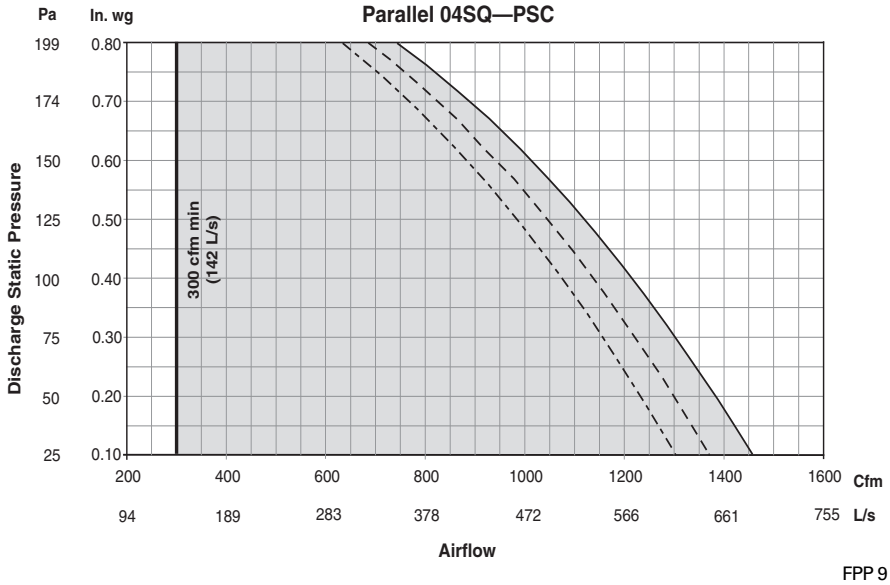
Notes:

1. When attenuator is required, add inlet attenuator pressure to discharge static pressure for final fan performance.







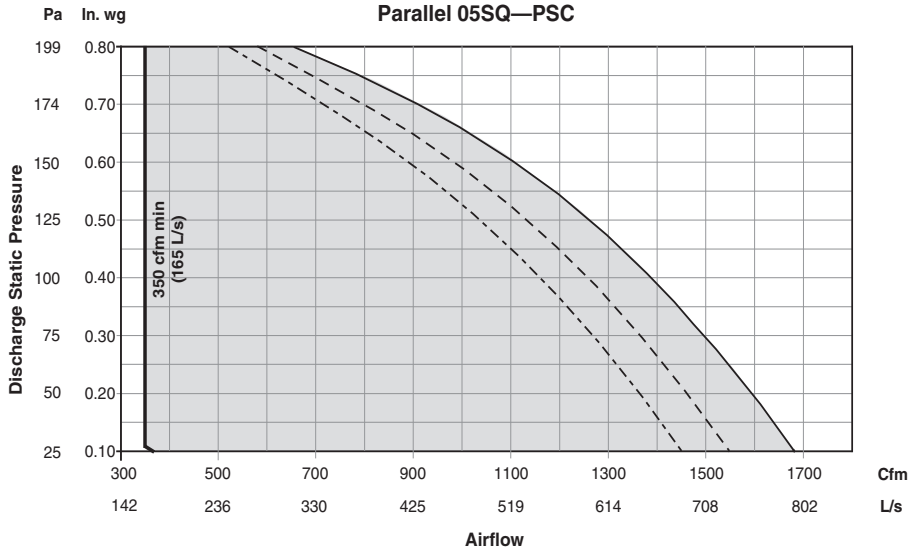


Performance Data— Fan Curves

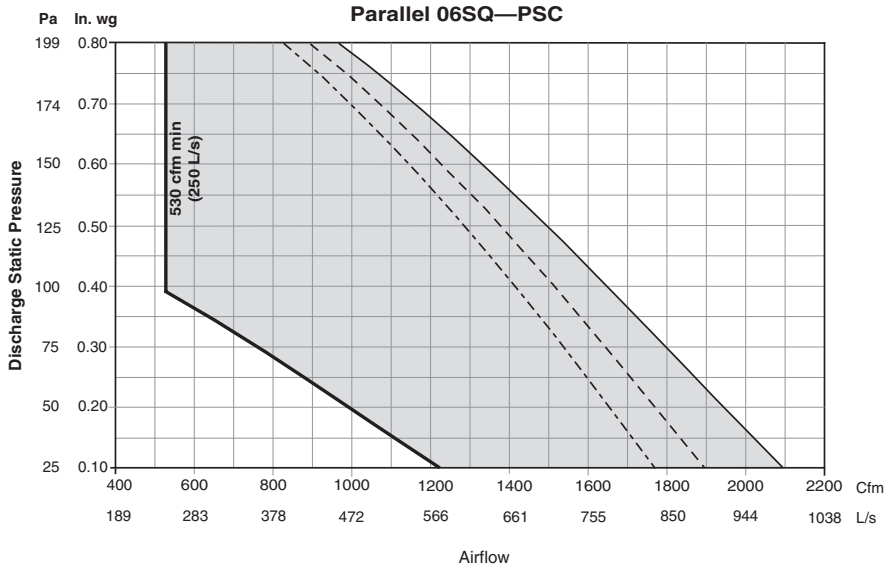
Notes:

1. When attenuator is required, add inlet attenuator pressure to discharge static pressure for final fan performance.

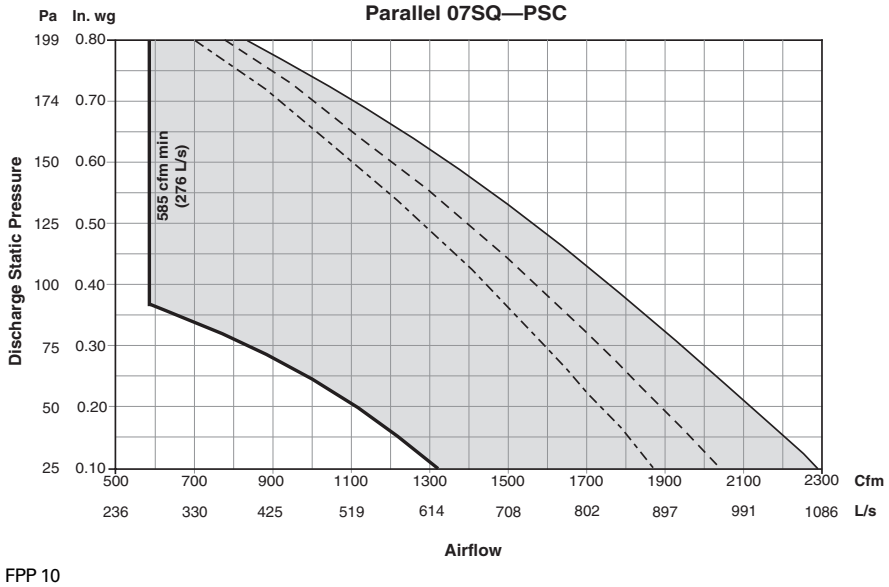
Parallel 05SQ—PSC

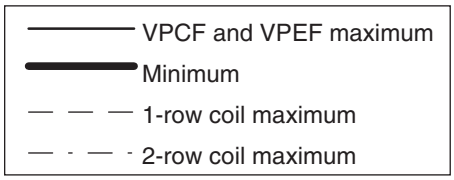


Parallel 06SQ—PSC



Parallel 07SQ—PSC

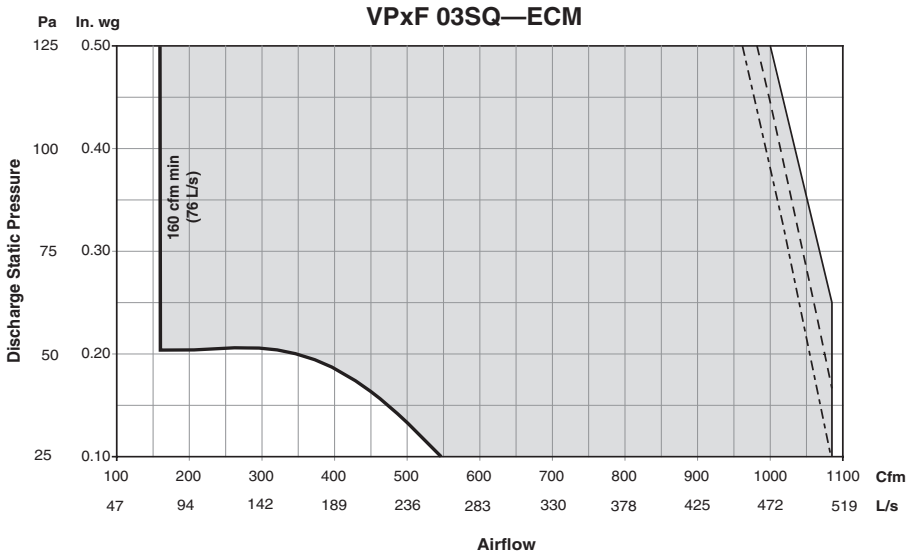


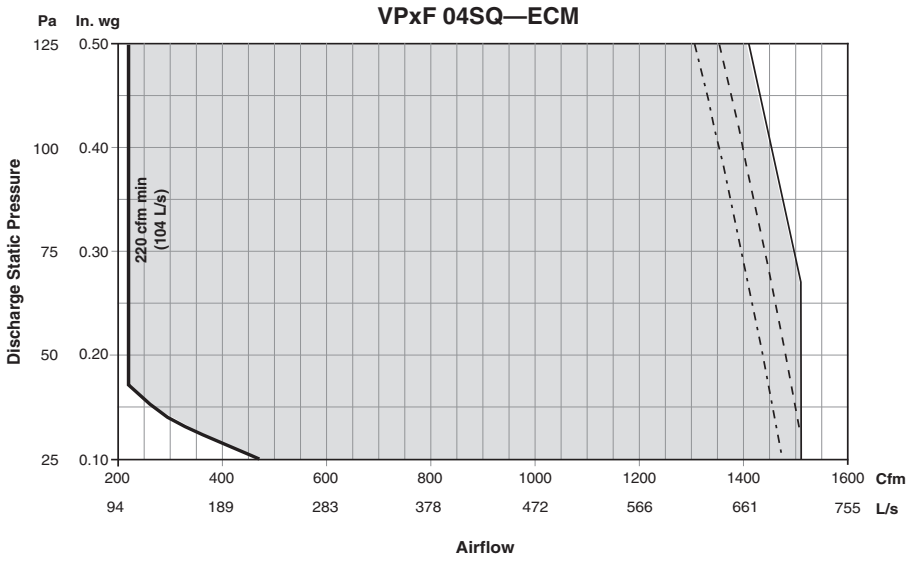


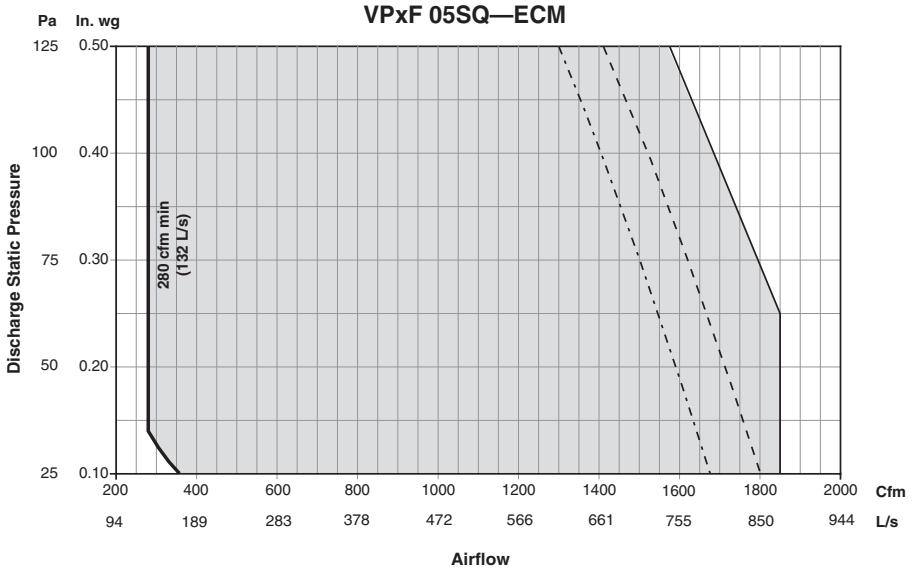
Notes:

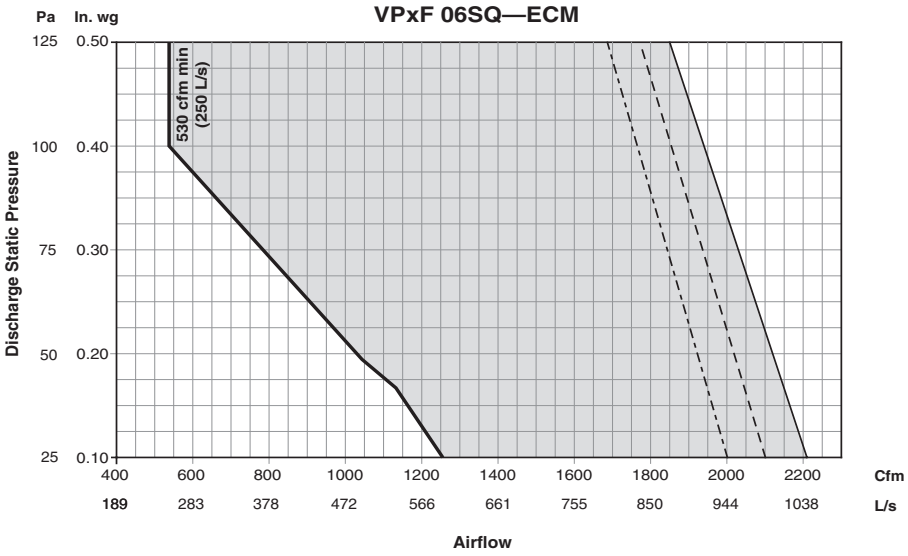
1. ECMs (Electrically Commutated Motors) are ideal for systems seeking maximum motor efficiency.
2. When attenuator is required, add inlet attenuator pressure to discharge static pressure for final fan performance.

VPCF and VPEF maximum
Minimum
1-row coil maximum
2-row coil maximum









Notes:

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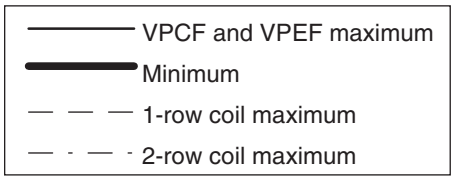


Fan Size 02SQ (I-P)

Rows	Gpm	Water Pressure Drop (ft)	Airflow (Cfm) 100	150	200	250	300	350	400	450	500	550	600
1-Row Capacity MBH	0.5	0.28	8.23	9.12	11.05	11.96	12.74	13.36	13.89	14.33	14.73	15.08	15.39
	1.0	0.74	9.29	11.64	13.35	14.69	15.82	16.80	17.67	18.46	19.24	19.95	20.61
	2.0	2.57	9.91	12.72	14.83	16.55	18.03	19.34	20.53	21.62	22.65	23.60	24.51
	3.0	5.39	10.14	13.12	15.40	17.27	18.90	20.35	21.68	22.92	24.07	25.17	26.20
	4.0	9.13	10.26	13.34	15.70	17.66	19.36	20.90	22.31	23.62	24.86	26.03	27.14
	5.0	13.77	10.33	13.47	15.88	17.90	19.66	21.24	22.71	24.07	25.35	26.57	27.74
2-Row Capacity MBH	1.0	1.16	10.07	13.96	17.22	19.97	22.30	24.30	26.03	27.53	28.93	30.18	31.27
	2.0	3.89	10.46	14.84	18.74	22.21	25.32	28.12	30.65	32.95	35.04	36.96	38.72
	3.0	7.93	10.59	15.14	19.26	22.99	26.40	29.52	32.38	35.02	37.46	39.72	41.83
	4.0	13.19	10.65	15.29	19.52	23.39	26.96	30.24	33.28	36.11	38.74	41.20	43.50
	5.0	19.58	10.69	15.37	19.67	23.63	27.29	30.68	33.84	36.78	39.53	42.11	44.54

Fan Sizes 03SQ–05SQ (I-P)

Rows	Gpm	Water Pressure Drop (ft)	Airflow (Cfm) 150	300	450	600	750	900	1050	1200	1350	1500	1650
1-Row Capacity MBH	1.0	0.23	11.92	16.09	18.59	20.59	22.14	23.41	24.48	25.41	26.23	26.95	27.59
	2.0	0.82	13.27	18.93	22.65	25.57	28.04	30.20	32.20	34.00	35.64	37.13	38.50
	3.0	1.74	13.76	20.02	24.28	27.71	30.67	33.30	35.68	37.87	39.89	41.82	43.62
	4.0	3.00	14.02	20.62	25.19	28.92	32.17	35.09	37.77	40.24	42.54	44.70	46.74
	5.0	4.58	14.18	21.00	25.77	29.70	33.15	36.27	39.14	41.81	44.31	46.67	48.90
	6.0	6.47	14.29	21.26	26.17	30.25	33.84	37.10	40.11	42.93	45.58	48.08	50.46
	7.0	8.68	14.37	21.46	26.47	30.65	34.35	37.72	40.84	43.77	46.53	49.15	51.64
	8.0	11.19	14.43	21.60	26.70	30.96	34.75	38.20	41.41	44.43	47.28	49.99	52.57
	9.0	14.02	14.48	21.72	26.89	31.21	35.06	38.59	41.87	44.95	47.88	50.66	53.32
	10.0	17.15	14.52	21.82	27.04	31.42	35.32	38.90	42.24	45.38	48.37	51.21	53.93
2-Row Capacity MBH	1.0	0.31	13.99	22.26	27.34	30.91	33.37	35.16	36.52	37.59	38.45	39.16	39.76
	2.0	1.09	15.02	25.81	33.71	39.70	44.39	48.15	51.38	54.06	56.33	58.26	59.93
	3.0	2.29	15.35	27.03	36.10	43.32	49.20	54.10	58.24	61.79	64.87	67.65	70.13
	4.0	3.90	15.51	27.66	37.37	45.29	51.89	57.48	62.29	66.48	70.16	73.43	76.35
	5.0	5.90	15.61	28.05	38.15	46.52	53.60	59.66	64.93	69.57	73.67	77.35	80.66
	6.0	8.28	15.67	28.31	38.68	47.37	54.78	61.18	66.79	71.75	76.17	80.15	83.75
	7.0	11.05	15.72	28.49	39.07	47.99	55.64	62.30	68.16	73.37	78.04	82.25	86.08
	8.0	14.19	15.76	28.63	39.36	48.46	56.31	63.16	69.22	74.63	79.48	83.88	87.89
	9.0	17.71	15.78	28.74	39.59	48.83	56.83	63.85	70.06	75.63	80.64	85.19	89.35
	10.0	21.59	15.81	28.83	39.77	49.13	57.26	64.40	70.75	76.44	81.59	86.26	90.54

Fan Sizes 06SQ & 07SQ (I-P)

Rows	Gpm	Water Pressure Drop (ft)	Airflow (Cfm) 900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1-Row Capacity MBH	0.5	0.15	17.67	17.97	18.24	18.48	18.70	18.89	19.07	19.23	19.38	19.52	19.65
	1.0	0.36	26.41	27.24	27.99	28.68	29.30	29.88	30.41	30.91	31.38	31.81	32.22
	2.0	1.21	33.25	34.73	36.11	37.40	38.60	39.73	40.80	41.81	42.77	43.69	44.55
	3.0	2.50	36.48	38.20	39.82	41.35	42.81	44.21	45.58	46.89	48.15	49.35	50.51
	4.0	4.20	38.32	40.24	42.05	43.78	45.42	46.99	48.50	49.95	51.35	52.70	54.02
	5.0	6.29	39.52	41.57	43.51	45.37	47.14	48.84	50.48	52.06	53.59	55.06	56.49
	6.0	8.76	40.36	42.51	44.54	46.49	48.36	50.16	51.89	53.56	55.18	56.75	58.28
	7.0	11.61	40.99	43.20	45.31	47.33	49.27	51.14	52.95	54.70	56.39	58.03	59.63
2-Row Capacity MBH	1.0	0.67	38.40	39.48	40.38	41.15	41.82	42.40	42.91	43.35	43.76	44.12	44.44
	2.0	2.23	51.70	54.23	56.47	58.46	60.23	61.82	63.25	64.55	65.74	66.82	67.82
	3.0	4.59	57.84	61.04	63.92	66.54	68.93	71.14	73.24	75.17	76.95	78.60	80.14
	4.0	7.63	61.27	64.96	68.33	71.41	74.25	76.87	79.30	81.56	83.67	85.65	87.54
	5.0	11.33	63.45	67.47	71.16	74.57	77.72	80.65	83.38	85.94	88.33	90.57	92.69
	6.0	15.67	64.96	69.22	73.14	76.78	80.17	83.32	86.28	89.04	91.65	94.10	96.41
	7.0	20.66	66.06	70.50	74.60	78.42	81.98	85.31	88.43	91.36	94.13	96.74	99.21

Water Coil Notes (I-P)

1. Fouling Factor = 0.00025
2. The off-coil temperature of the hot water coil on parallel fan-powered units must not exceed 140°F when mounted on plenum inlet.
3. The following equations may be used in calculating Leaving Air Temperature (LAT) and Water Temperature Difference (WTD).

$$LAT = EAT + \left(\frac{MBH \times 921.7}{Cfm}\right) \qquad WTD = EWT - LWT = \left(\frac{2 \times MBH}{Gpm}\right)$$

4. Capacity based on 70°F entering air temperature and 180°F entering water temperature. Refer to correction factors for different entering conditions.

Temperature Correction Factors for Water Pressure Drop (ft)

Average Water Temperature	200	190	180	170	160	150	140	130	120	110
Correction Factor	0.970	0.985	1.000	1.020	1.030	1.050	1.080	1.100	1.130	1.150

Temperature Correction Factors for Coil Capacity (MBH)

Entering Water Minus Entering Air	40	50	60	70	80	90	100	110	120	130
Correction Factor	0.355	0.446	0.537	0.629	0.722	0.814	0.907	1.000	1.093	1.187

Fan Size 02SQ (SI)

Rows	L/s	Water Pressure Drop (kPa)	Airflow (L/s) 47	71	94	118	142	165	189	212	236	260	283
1-Row Capacity MBH	0.03	0.84	2.41	2.67	3.24	3.51	3.73	3.92	4.07	4.20	4.32	4.42	4.51
	0.06	2.21	2.72	3.41	3.91	4.31	4.64	4.92	5.18	5.41	5.64	5.85	6.04
	0.13	7.67	2.91	3.73	4.35	4.85	5.28	5.67	6.02	6.34	6.64	6.92	7.18
	0.19	16.08	2.97	3.85	4.51	5.06	5.54	5.96	6.35	6.72	7.05	7.38	7.68
	0.25	27.24	3.01	3.91	4.60	5.18	5.67	6.13	6.54	6.92	7.29	7.63	7.95
	0.32	41.08	3.03	3.95	4.65	5.25	5.76	6.23	6.66	7.05	7.43	7.79	8.13
2-Row Capacity MBH	0.06	3.46	2.95	4.09	5.05	5.85	6.54	7.12	7.63	8.07	8.48	8.85	9.17
	0.13	11.60	3.07	4.35	5.49	6.51	7.42	8.24	8.98	9.66	10.27	10.83	11.35
	0.19	23.66	3.10	4.44	5.65	6.74	7.74	8.65	9.49	10.26	10.98	11.64	12.26
	0.25	39.35	3.12	4.48	5.72	6.86	7.90	8.86	9.75	10.58	11.35	12.08	12.75
	0.32	58.41	3.13	4.50	5.77	6.93	8.00	8.99	9.92	10.78	11.59	12.34	13.05

Fan Sizes 03SQ–05SQ (SI)

Rows	L/s	Water Pressure Drop (kPa)	Airflow (L/s) 71	142	212	283	354	425	495	566	637	708	779
1-Row Capacity kW	0.06	0.67	3.49	4.72	5.45	6.03	6.49	6.86	7.18	7.45	7.69	7.90	8.09
	0.13	2.43	3.89	5.55	6.64	7.49	8.22	8.85	9.44	9.97	10.45	10.88	11.28
	0.19	5.20	4.03	5.87	7.12	8.12	8.99	9.76	10.46	11.10	11.69	12.26	12.79
	0.25	8.95	4.11	6.04	7.38	8.48	9.43	10.28	11.07	11.79	12.47	13.10	13.70
	0.32	13.65	4.16	6.16	7.55	8.71	9.72	10.63	11.47	12.25	12.99	13.68	14.33
	0.38	19.30	4.19	6.23	7.67	8.87	9.92	10.87	11.76	12.58	13.36	14.09	14.79
	0.44	25.88	4.21	6.29	7.76	8.98	10.07	11.06	11.97	12.83	13.64	14.41	15.14
	0.50	33.39	4.23	6.33	7.83	9.07	10.19	11.20	12.14	13.02	13.86	14.65	15.41
	0.57	41.81	4.24	6.37	7.88	9.15	10.28	11.31	12.27	13.17	14.03	14.85	15.63
	0.63	51.15	4.26	6.40	7.93	9.21	10.35	11.40	12.38	13.30	14.18	15.01	15.81
2-Row Capacity kW	0.06	0.93	4.10	6.52	8.01	9.06	9.78	10.31	10.70	11.02	11.27	11.48	11.65
	0.13	3.25	4.40	7.56	9.88	11.64	13.01	14.11	15.06	15.84	16.51	17.08	17.57
	0.19	6.83	4.50	7.92	10.58	12.70	14.42	15.86	17.07	18.11	19.01	19.83	20.56
	0.25	11.62	4.55	8.11	10.95	13.27	15.21	16.85	18.26	19.49	20.56	21.52	22.38
	0.32	17.59	4.58	8.22	11.18	13.64	15.71	17.49	19.03	20.39	21.59	22.67	23.64
	0.38	24.71	4.59	8.30	11.34	13.88	16.06	17.93	19.58	21.03	22.33	23.49	24.55
	0.44	32.97	4.61	8.35	11.45	14.07	16.31	18.26	19.98	21.50	22.87	24.11	25.23
	0.50	42.34	4.62	8.39	11.54	14.20	16.50	18.51	20.29	21.87	23.30	24.59	25.76
	0.57	52.83	4.63	8.42	11.60	14.31	16.66	18.71	20.53	22.17	23.64	24.97	26.19
	0.63	64.41	4.63	8.45	11.66	14.40	16.78	18.88	20.74	22.40	23.91	25.28	26.54

Fan Sizes 06SQ & 07SQ (SI)

Rows	L/s	Water Pressure Drop (kPa)	Airflow (L/s) 425	472	519	566	613	661	708	755	802	849	897
1-Row Capacity MBH	0.03	0.45	5.18	5.27	5.35	5.42	5.48	5.54	5.59	5.64	5.68	5.72	5.76
	0.06	1.07	7.74	7.98	8.20	8.41	8.59	8.76	8.91	9.06	9.20	9.32	9.44
	0.13	3.61	9.75	10.18	10.58	10.96	11.31	11.64	11.96	12.25	12.54	12.81	13.06
	0.19	7.46	10.69	11.20	11.67	12.12	12.55	12.96	13.36	13.74	14.11	14.46	14.80
	0.25	12.53	11.23	11.79	12.32	12.83	13.31	13.77	14.22	14.64	15.05	15.45	15.83
	0.32	18.76	11.58	12.18	12.75	13.30	13.82	14.32	14.80	15.26	15.71	16.14	16.56
	0.38	26.13	11.83	12.46	13.05	13.63	14.17	14.70	15.21	15.70	16.17	16.63	17.08
	0.44	34.63	12.01	12.66	13.28	13.87	14.44	14.99	15.52	16.03	16.53	17.01	17.48
2-Row Capacity MBH	0.06	2.00	11.26	11.57	11.84	12.06	12.26	12.43	12.58	12.71	12.83	12.93	13.03
	0.13	6.65	15.15	15.89	16.55	17.13	17.65	18.12	18.54	18.92	19.27	19.58	19.88
	0.19	13.69	16.95	17.89	18.73	19.50	20.20	20.85	21.47	22.03	22.55	23.04	23.49
	0.25	22.76	17.96	19.04	20.03	20.93	21.76	22.53	23.24	23.91	24.52	25.10	25.66
	0.32	33.80	18.60	19.78	20.86	21.86	22.78	23.64	24.44	25.19	25.89	26.55	27.17
	0.38	46.75	19.04	20.29	21.44	22.50	23.50	24.42	25.29	26.10	26.86	27.58	28.26
	0.44	61.63	19.36	20.66	21.87	22.98	24.03	25.00	25.92	26.78	27.59	28.35	29.08

Water Coil Notes (SI)

1. Fouling Factor = 0.00025
2. The off-coil temperature of the hot water coil on parallel fan-powered units must not exceed 60°C when mounted on plenum inlet.
3. The following equations may be used in calculating Leaving Air Temperature (LAT) and Water Temperature Difference (WTD).

$$LAT = EAT + \left(\frac{kW \times 0.83}{L/s}\right) \qquad WTD = EWT - LWT = \left(\frac{kW}{(4.19)L/s}\right)$$

4. Capacity based on 21°C entering air temperature and 82°C entering water temperature. Refer to correction factors for different entering conditions.

Temperature Correction Factors for Water Pressure Drop (kPa)

Average Water Temperature	93	88	82	77	71	66	60	54	49	43
Correction Factor	0.970	0.985	1.000	1.020	1.030	1.050	1.080	1.100	1.130	1.150

Temperature Correction Factors for Coil Capacity (kW)

Entering Water Minus Entering Air	22	27	33	38	44	50	55	61	67	72
Correction Factor	0.355	0.446	0.537	0.629	0.722	0.814	0.907	1.000	1.093	1.187

Notes:

1. Coils available with 24-VAC magnetic or mercury contactors, or load carrying P.E. switches with magnetic or mercury contactors.
2. Available kW increments are by 0.5 from 0.5 kW to 8.0 kW, by 1.0 kW from 9.0 to 18.0 kW, and by 2.0 kW from 18.0 to 20.0 kW.
3. Each stage is equal in kW output.
4. All heaters contain an auto reset thermal cutout and a manual reset cutout .
5. The current amp draw for the heater elements is calculated by the formula on the next page.
6. Recommended coil temperature rise = 20° to 30°F (-7° to -1°C). Maximum temperature rise = 55°F (12°C).
7. Heaters should not operate at cfms below the nameplate minimum.

PSC Motor Units—Electric Coil kW Guidelines – Minimum to Maximum (VPEF)

Fan Size	Stages	Single-Phase Voltage						Three-Phase Voltage		
		120V	208V	240V	277V	347V	480V	208V	480V	600V
02SQ	1	0.5–5.0	0.5–6.0	0.5–6.0	0.5–6.0	0.5–6.0	0.5–6.0	0.5–6.0	1.0–6.0	1.5–6.0
	2	0.5–5.0	0.5–6.0	0.5–6.0	1.0–6.0	1.0–6.0	1.0–6.0	1.0–6.0	2.0–6.0	3.0–6.0
	3*	1.0–5.0	1.0–6.0	1.0–6.0	1.0–6.0	1.5–6.0	1.5–6.0	1.5–6.0	3.0–6.0	4.5–6.0
03SQ	1	0.5–5.0	0.5–9.0	0.5–10.0	0.5–11.0	0.5–11.0	0.5–11.0	0.5–11.0	1.0–11.0	1.5–11.0
	2	0.5–5.0	0.5–9.0	0.5–10.0	1.0–11.0	1.0–11.0	1.0–11.0	1.0–11.0	2.0–11.0	3.0–11.0
	3*	1.0–5.0	1.0–9.0	1.0–10.0	1.0–11.0	1.5–11.0	1.5–11.0	1.5–11.0	3.0–11.0	4.5–11.0
04SQ	1	0.5–4.5	0.5–8.0	0.5–10.0	0.5–12.0	0.5–14.0	0.5–14.0	0.5–14.0	1.0–14.0	1.5–14.0
	2	0.5–4.5	0.5–8.0	0.5–10.0	1.0–12.0	1.0–14.0	1.0–14.0	1.0–14.0	2.0–14.0	3.0–14.0
	3*	1.0–4.5	1.0–8.0	1.0–10.0	1.0–12.0	1.5–14.0	1.5–14.0	1.5–14.0	3.0–14.0	4.5–14.0
05SQ	1	0.5–4.5	0.5–8.0	0.5–9.0	0.5–12.0	0.5–15.0	0.5–18.0	0.5–14.0	1.0–18.0	1.5–18.0
	2	0.5–4.5	0.5–8.0	0.5–9.0	1.0–12.0	1.0–15.0	1.0–18.0	1.0–14.0	2.0–18.0	3.0–18.0
	3*	1.0–4.5	1.0–8.0	1.0–9.0	1.0–12.0	1.5–15.0	1.5–18.0	1.5–14.0	3.0–18.0	4.5–18.0
06SQ	1	—	0.5–9.0	—	0.5–12.0	0.5–15.0	0.5–16.0	0.5–15.0	1.0–16.0	1.5–16.0
	2	—	0.5–9.0	—	1.0–12.0	1.0–15.0	1.0–16.0	1.0–15.0	2.0–16.0	3.0–16.0
	3*	—	1.0–9.0	—	1.0–12.0	1.5–15.0	1.5–16.0	1.5–15.0	3.0–16.0	4.5–16.0
07SQ	1	—	0.5–8.0	—	0.5–11.0	0.5–15.0	0.5–20.0	0.5–14.0	1.0–20.0	1.5–20.0
	2	—	0.5–8.0	—	1.0–11.0	1.0–15.0	1.0–20.0	1.0–14.0	2.0–20.0	3.0–20.0
	3*	—	1.0–8.0	—	1.0–11.0	1.5–15.0	1.5–20.0	1.5–14.0	3.0–20.0	4.5–18.0

*Three stages of electric heat available only with pneumatic controls.

ECM Units—Electric Coil kW Guidelines – Minimum to Maximum (VPEF)

Fan Size	Stages	Single-Phase Voltage						Three-Phase Voltage		
		120V	208V	240V	277V	347V	480V	208V	480V	600V
03SQ	1	0.5–4.5	0.5–8.0	0.5–10.0	0.5–11.0	—	0.5–11.0	0.5–11.0	1.0–11.0	—
	2	0.5–4.5	0.5–8.0	0.5–10.0	1.0–11.0	—	1.0–11.0	1.0–11.0	2.0–11.0	—
	3	1.0–4.5	1.0–8.0	1.0–10.0	1.0–11.0	—	1.5–11.0	1.5–11.0	3.0–11.0	—
04SQ	1	0.5–4.5	0.5–8.0	0.5–9.0	0.5–12.0	—	0.5–14.0	0.5–14.0	1.0–14.0	—
	2	0.5–4.5	0.5–8.0	0.5–9.0	1.0–12.0	—	1.0–14.0	1.0–14.0	2.0–14.0	—
	3	1.0–4.5	1.0–8.0	1.0–9.0	1.0–12.0	—	1.5–14.0	1.5–14.0	3.0–14.0	—
05SQ	1	0.5–4.0	0.5–7.0	0.5–8.0	0.5–11.0	—	0.5–18.0	0.5–12.0	1.0–18.0	—
	2	0.5–4.0	0.5–7.0	0.5–8.0	1.0–11.0	—	1.0–18.0	1.0–12.0	2.0–18.0	—
	3	1.0–4.0	1.0–7.0	1.0–8.0	1.0–11.0	—	1.5–18.0	1.5–12.0	3.0–18.0	—
06SQ	1	0.5–4.0	0.5–7.0	0.5–8.0	0.5–11.0	—	0.5–16.0	0.5–12.0	1.0–16.0	—
	2	0.5–4.0	0.5–7.0	0.5–8.0	1.0–11.0	—	1.0–16.0	1.0–12.0	2.0–16.0	—
	3	1.0–4.0	1.0–7.0	1.0–8.0	1.0–11.0	—	1.5–16.0	1.5–12.0	3.0–16.0	—

Notes:
1. Coils available with 24-VAC magnetic or mercury contactors, load carrying P.E. switches, and P.E. switch with magnetic or mercury contactors.
2. Available kW increments are by 0.5 from 0.5 kW to 8.0 kW, by 1.0 kW from 9.0 to 18.0 kW, and by 2.0 kW from 18.0 to 20.0 kW.
3. Each stage will be equal in kW output.
4. All heaters contain an auto reset thermal cutout and a manual reset cutout .
5. The current amp draw for the heater elements is calculated by the formula on the next page.
6. Recommended coil temperature rise = 20° to 30°F (-7° to -1°C). Maximum temperature rise = 55°F (12°C).
7. Heaters should not operate at cfms below the nameplate minimum.
8. Only two stages of electric reheat available with Trane controls (ECM only).

Fan Electrical Performance (PSC)

Maximum Fan Motor Amperage (FLA)

Fan Size	HP	115 VAC	208 VAC	277 VAC
02SQ	1/8	1.6	—	0.7
03SQ	1/3	4.3	—	1.6
04SQ	1/3	5.5	—	2.0
05SQ	1/2	6.7	—	2.4
06SQ	1/2	—	4.6	3.8
07SQ	1	—	6.6	4.7

Notes:
1. Electric Heat Units - Units with fan sizes 02SQ to 05SQ and a primary voltage of 208/60/1, 208/60/3, or 240/60/1 have 115/60/1 VAC fan motors. Fan sizes 06SQ and 07SQ with the same voltages, have 208/60/1 VAC motors.
2. Electric Heat Units - Units with primary voltage of 277/60/1, 480/60/1 or 480/60/3 use 277 VAC fan motors.
3. Electric Heat Units - Units with primary voltage of 347/60/1 or 575/60/3 use 347 VAC fan motors.
4. With 380/50/3 and 230/50/1, use 230/50 motors.

Fan Electrical Performance (ECM)

Maximum Fan Motor Amperage (FLA)

Fan Size	HP	115 VAC	277 VAC
03SQ	1/3	4.5	2.4
04SQ	1/2	6.5	3.5
05SQ	1	10.1	5.4
06SQ	1	9.5	5.1

Notes:
1. Electric heat units—units with primary voltages of 208/60/1, 208/60/3, or 240/60/1 have 115-VAC fan motors.
2. Electric heat units—units with primary voltages of 277/60/1, 480/60/1, or 480/60/3 have 277-VAC fan motors.
3. 347/60/1 and 230/50/1 voltage motors not available with ECMs.

Formulas

Minimum Circuit Ampacity (MCA) Equation

- MCA = 1.25 x (Σ motor amps + heater amps)
  Motor amps is the sum of all motor current draws if more than one is used in the unit.

Maximum Overcurrent Protection (MOP) Equation

- MOP = (2.25 x motor1 amps) + motor2 amps + heater amps
  motor1 amps = current draw of largest motor
  motor2 amps = sum of current of all other motors used in unit

General Sizing Rules:

- If MOP = 15, then fuse size = 15
- If MOP = 19, then fuse size = 15 with one exception. If heater amps x 1.25 > 15, then fuse size = 20.
- If MOP ≤ MCA, then choose next fuse size greater than MCA.
- Control fusing not applicable.
- Standard Fuse Sizes: 15, 20, 25, 30, 35, 40, 45, 50, and 60.

Example:

A model VPEF, electric reheat unit size 10-05SQ has 480/3 phase, 12 kW electric reheat with 2 stages and 277-Volt motor.

For MOP of fan-powered unit:

12 kW - 480/3 heater $\frac{12 \times 1000}{480 \times 1.73}$ = 14.45 amps

MCA = (2.4 + 14.45) x 1.25 = 21.06, MOP = (2.25 x 2.4) + 14.45 = 19.9.

Since MOP ≤ MCA, then MOP = 25.

For total current draw of unit:

12 kW—480/3 heater $\frac{12 \times 1000}{480 \times 1.73}$ = 14.45
Two heat outputs (2 stages) @0.5 amps max each = 1.00
Motor amps: 277 V (Fan size 0517) = 2.4
18.35 amps max

Useful formulas:

$kW = \frac{Cfm \times ATD}{3145}$

$kW = 1214 \times L/s \times ATD$

$3\phi amps = \frac{kW \times 1000}{Primary\ Voltage \times \sqrt{3}}$

$1\phi amps = \frac{kW \times 1000}{Primary\ Voltage}$

$ATD = \frac{kW \times 3145}{Cfm}$

$ATD = \frac{kW}{1214 \times L/s}$

Minimum Unit Electric Heat Cfm Guidelines (PSC)

Unit kW	Cfm 02SQ	03SQ	04SQ	05SQ	06SQ	07SQ
0.5	118	200	315	350	533	585
1	118	200	315	350	533	585
1.5	118	200	315	350	533	585
2	118	200	315	350	533	585
2.5	146	200	315	350	533	585
3	174	200	315	350	533	585
3.5	201	200	315	350	533	585
4	229	230	315	350	533	585
4.5	257	260	315	350	533	585
5	285	290	315	350	533	585
5.5	312	315	315	350	533	585
6	340	350	350	350	533	585
6.5	—	375	375	375	533	585
7	—	400	400	400	533	585
7.5	—	430	430	430	533	585
8	—	460	460	460	533	585
9	—	515	515	515	589	633
10	—	575	575	575	645	682
11	—	630	630	630	701	730
12	—	—	690	690	758	779
13	—	—	745	745	814	827
14	—	—	810	810	870	876
15	—	—	—	860	926	924
16	—	—	—	920	982	972
17	—	—	—	973	—	1021
18	—	—	—	1030	—	1069
20	—	—	—	—	—	1166

Minimum Unit Electric Heat L/s Guidelines (PSC)

Unit kW	L/s 02SQ	03SQ	04SQ	05SQ	06SQ	07SQ
0.5	56	94	149	165	252	276
1	56	94	149	165	252	276
1.5	56	94	149	165	252	276
2	56	94	149	165	252	276
2.5	69	94	149	165	252	276
3	82	94	149	165	252	276
3.5	95	94	149	165	252	276
4	108	109	149	165	252	276
4.5	121	123	149	165	252	276
5	134	137	149	165	252	276
5.5	147	149	149	165	252	276
6	160	165	165	165	252	276
6.5	—	177	177	177	252	276
7	—	189	189	189	252	276
7.5	—	203	203	203	252	276
8	—	217	217	217	252	276
9	—	243	243	243	278	299
10	—	271	271	271	305	322
11	—	297	297	297	331	345
12	—	—	326	326	358	367
13	—	—	352	352	384	390
14	—	—	382	382	410	413
15	—	—	—	406	437	436
16	—	—	—	434	463	459
17	—	—	—	459	—	482
18	—	—	—	486	—	505
20	—	—	—	—	—	550

Minimum Unit Electric Heat Cfm Guidelines (ECM)

Unit kW	Cfm 03SQ	04SQ	05SQ	06SQ
0.5	200	315	350	560
1	200	315	350	560
1.5	200	315	350	560
2	200	315	350	560
2.5	200	315	350	560
3	200	315	350	560
3.5	200	315	350	560
4	230	315	350	560
4.5	260	315	350	560
5	290	315	350	560
5.5	315	315	350	560
6	350	350	350	560
6.5	375	375	375	560
7	400	400	400	560
7.5	430	430	430	560
8	460	460	460	560
9	515	515	515	604
10	575	575	575	649
11	630	630	630	693
12	—	690	690	738
13	—	745	745	782
14	—	810	810	826
15	—	—	860	871
16	—	—	920	915
17	—	—	973	—
18	—	—	1030	—

Minimum Unit Electric Heat L/s Guidelines (ECM)

Unit kW	L/s 03SQ	04SQ	05SQ	06SQ
0.5	94	149	165	264
1	94	149	165	264
1.5	94	149	165	264
2	94	149	165	264
2.5	94	149	165	264
3	94	149	165	264
3.5	94	149	165	264
4	109	149	165	264
4.5	123	149	165	264
5	137	149	165	264
5.5	149	149	165	264
6	165	165	165	264
6.5	177	177	177	264
7	189	189	189	264
7.5	203	203	203	264
8	217	217	217	264
9	243	243	243	285
10	271	271	271	306
11	297	297	297	327
12	—	326	326	348
13	—	352	352	369
14	—	382	382	390
15	—	—	406	411
16	—	—	434	432
17	—	—	459	—
18	—	—	486	—

Discharge Sound Power (dB)

Valve Only

Fan Size	Inlet Size	Cfm	L/s	Discharge Sound Power (dB) 0.5" ΔPs 2	3	4	5	6	7	1.0" ΔPs 2	3	4	5	6	7	2.0" ΔPs 2	3	4	5	6	7	3.0" ΔPs 2	3	4	5	6	7
02SQ	6	200	94	51	50	44	43	38	30	53	51	48	47	43	39	56	53	54	53	51	50	59	55	57	57	56	56
		300	142	56	52	49	48	44	35	58	55	54	53	50	43	60	57	57	56	54	50	62	59	61	59	57	55
		400	189	58	53	49	47	42	36	63	59	58	57	54	46	64	61	60	61	58	52	65	63	63	63	60	56
		500	236	60	56	53	51	47	41	66	62	60	59	55	47	67	64	64	65	62	55	69	67	66	68	65	58
02SQ	8	350	165	52	48	46	45	40	33	56	53	51	48	46	45	59	57	56	53	52	51	61	59	59	56	55	55
		520	245	57	53	50	49	44	37	60	57	55	52	50	47	62	61	60	57	55	52	64	63	63	60	58	56
		700	330	62	59	55	53	49	42	64	62	60	57	54	49	66	66	65	62	59	54	68	68	67	65	62	57
		900	425	66	63	59	57	52	45	69	66	64	61	57	52	70	69	69	66	62	57	72	71	71	68	65	60
02SQ	10	550	260	59	54	52	52	49	39	63	59	57	57	55	47	67	64	62	62	59	54	69	66	65	65	62	58
		820	387	62	57	56	56	54	44	67	63	61	61	59	51	72	69	67	67	65	58	74	71	70	70	67	61
		1100	519	65	60	59	59	58	48	69	66	64	65	63	55	75	71	70	70	68	60	78	74	73	74	71	64
		1400	661	67	64	62	62	60	51	72	69	67	67	65	57	78	74	72	73	71	63	81	77	76	76	74	67
03SQ	6	100	47	44	44	41	37	33	30	45	45	44	39	37	39	46	47	47	43	45	47	47	47	47	45	49	53
		200	94	48	47	43	40	35	29	51	50	47	44	41	40	53	52	52	48	47	48	54	54	54	50	51	54
		300	142	53	50	46	43	36	32	56	55	51	47	44	40	58	58	56	52	50	49	59	59	59	55	54	54
		400	189	55	52	48	44	38	34	60	58	54	50	46	42	62	62	59	55	52	49	64	63	62	58	56	54
		600	283	59	58	56	50	46	44	61	60	57	53	48	46	69	67	64	61	56	52	71	69	68	64	60	56
03SQ	8	175	83	44	44	42	39	34	30	46	46	44	41	41	42	49	48	47	45	47	49	51	49	49	48	51	53
04SQ		350	165	48	47	44	41	35	31	52	51	49	46	43	41	56	56	55	52	51	51	58	57	58	54	54	55
		525	248	53	52	49	47	42	34	57	56	54	51	47	42	61	60	59	56	53	51	62	62	62	58	56	56
		700	330	58	56	53	51	47	40	60	59	57	55	51	45	64	64	63	60	56	52	66	66	66	62	59	57
		1050	496	64	63	60	59	51	46	68	67	65	63	59	53	69	69	68	67	63	57	71	71	71	69	65	60
03SQ	10	275	130	48	47	46	44	38	32	50	50	49	47	46	47	52	53	53	51	50	49	54	55	56	54	54	53
04SQ		550	260	53	51	50	47	42	35	56	56	54	51	48	43	59	61	60	57	55	54	61	63	63	60	58	56
05SQ		825	389	57	55	53	50	46	39	60	60	58	56	52	46	63	65	64	60	58	53	66	68	68	64	62	59
		1100	519	60	59	57	54	50	43	63	63	62	59	55	49	68	68	67	64	61	56	70	70	70	67	64	60
		1640	774	65	65	63	59	54	48	69	69	68	64	61	55	72	73	72	69	66	60	75	76	75	73	70	64
03SQ	12	385	182	48	47	47	41	38	34	52	51	51	46	43	41	55	56	57	52	50	48	55	58	60	55	54	53
04SQ		775	366	54	52	52	49	43	37	59	58	57	54	50	47	63	64	63	59	55	52	65	66	66	61	58	55
05SQ		1160	547	58	56	55	51	47	41	63	61	60	57	54	49	69	67	67	64	61	55	72	70	70	67	64	59
		1550	732	61	59	58	54	50	44	66	64	63	60	57	51	73	70	69	67	64	58	76	74	73	71	68	62
		2350	1105	66	65	65	60	56	50	71	70	69	65	61	55	77	74	73	71	68	62	80	78	77	75	72	66
05SQ	14	525	248	51	49	48	45	41	35	55	53	53	50	48	44	59	58	59	55	53	52	60	61	62	58	56	55
		1050	496	57	55	54	51	51	40	63	61	60	57	54	49	66	67	66	62	59	56	68	69	69	65	62	58
		1575	743	60	58	57	54	52	44	67	64	63	60	57	52	71	71	70	67	63	59	73	74	73	70	67	62
		2100	991	63	61	60	57	53	47	68	67	66	62	59	56	75	73	72	70	66	61	78	77	76	73	70	65
		3200	1510	68	67	67	63	59	55	73	71	71	67	64	59	79	77	76	73	70	65	83	81	79	77	74	69
06SQ	10	550	260	50	48	46	43	38	31	53	53	51	49	45	41	57	59	58	54	52	54	59	62	62	58	56	54
07SQ		800	378	54	52	50	46	41	34	57	57	55	52	48	42	61	62	61	57	54	53	63	65	65	61	59	56
		1000	472	57	55	53	49	44	36	60	60	58	54	50	43	64	64	63	60	56	52	66	67	67	64	61	57
		1200	566	59	58	56	52	46	39	63	63	61	57	52	46	67	67	66	62	58	53	69	69	69	66	62	58
		1350	637	61	60	58	54	48	42	65	65	63	59	54	48	69	69	68	64	60	54	71	71	71	67	63	59
06SQ	12	800	378	60	55	55	54	51	42	65	61	61	61	59	51	68	66	65	66	64	57	70	69	68	69	67	60
07SQ		1100	519	62	56	56	54	52	43	69	64	63	63	60	53	72	70	69	70	67	60	74	73	72	73	71	64
		1400	661	63	58	58	54	52	44	71	66	64	64	62	54	76	72	71	72	70	62	78	76	74	76	74	66
		1700	802	64	60	60	55	52	44	72	68	66	65	62	55	79	74	72	73	71	63	81	78	76	77	76	68
		2000	944	66	62	61	55	52	46	73	69	67	65	63	55	81	76	74	74	71	64	83	80	78	78	77	69
06SQ	14	1100	519	57	53	53	51	48	41	62	59	58	57	54	48	66	65	64	61	60	55	70	70	69	64	62	59
07SQ		1600	755	61	57	56	55	52	45	66	63	62	61	58	52	71	69	68	66	64	59	74	72	71	69	67	62
		2100	991	64	60	60	57	55	47	69	66	66	64	61	55	74	71	71	69	67	61	77	75	74	72	70	65
		2500	1180	67	63	63	60	57	50	71	68	67	66	63	56	77	73	72	71	69	63	80	76	76	74	72	66
		3000	1416	70	66	66	63	60	53	74	70	69	68	65	58	80	75	74	73	71	65	84	78	78	76	74	68
06SQ	16	1400	661	59	56	54	54	51	43	64	62	61	60	57	52	69	69	67	65	62	57	72	74	72	67	65	61
07SQ		2100	991	61	59	58	56	54	46	68	65	63	62	60	55	73	72	71	69	67	62	75	75	74	72	70	65
		2700	1274	64	62	61	59	56	49	70	67	66	65	62	57	76	73	72	71	69	64	79	77	76	75	73	68
		3400	1605	67	64	64	62	58	52	72	69	68	66	64	58	79	74	74	72	70	65	83	78	77	76	74	69
		4000	1888	70	67	67	64	61	55	74	71	70	68	65	60	81	76	75	74	71	66	86	79	78	77	75	70

1. All data are measured in accordance with Industry Standard ARI 880-98.
2. All sound power levels, dB re: 10^{-12} Watts.
3. Where ΔPs is inlet static pressure minus discharge static pressure.

Radiated Sound Power (dB)

Valve Only

Fan Size	Inlet Size	Cfm	L/s	Radiated Sound Power (dB) 0.5" ΔPs 2	3	4	5	6	7	1.0" ΔPs 2	3	4	5	6	7	2.0" ΔPs 2	3	4	5	6	7	3.0" ΔPs 2	3	4	5	6	7
02SQ	6	200	94	48	40	38	35	31	25	48	44	42	37	33	26	53	48	47	43	38	33	54	50	47	44	41	37
		300	142	51	45	42	35	29	24	54	49	46	39	33	26	57	51	50	44	38	32	60	55	53	48	42	37
		400	189	54	48	46	38	32	25	58	53	49	42	35	26	61	55	52	47	40	33	63	57	55	49	43	37
		500	236	52	50	48	40	33	27	62	56	52	45	37	29	65	59	56	50	42	34	65	60	57	52	45	38
02SQ	8	350	165	53	45	40	37	31	23	55	49	44	39	35	30	60	53	50	45	41	36	62	55	52	48	45	40
		520	245	57	49	44	40	34	26	59	53	48	42	37	31	64	57	53	47	43	38	66	59	56	51	46	41
		700	330	61	53	48	43	37	29	63	57	52	46	40	33	68	61	57	50	45	40	70	63	60	54	48	42
		900	425	66	58	53	47	41	33	68	62	56	50	44	37	72	65	61	53	48	42	73	67	63	56	50	44
02SQ	10	550	260	57	50	44	39	32	25	61	54	48	42	36	28	65	58	52	46	40	34	67	60	56	50	43	38
		820	387	59	52	46	41	34	25	64	58	52	46	40	31	69	63	56	51	44	37	71	66	60	54	47	40
		1100	519	62	56	50	44	41	26	66	61	54	49	42	33	72	66	60	54	48	39	75	68	63	57	51	42
		1400	661	65	60	53	47	44	30	68	64	57	52	45	36	74	69	63	57	50	41	77	71	66	60	53	44
03SQ	6	100	47	49	44	38	37	31	24	50	46	41	41	35	29	52	47	44	46	41	36	53	48	45	48	45	40
		200	94	50	44	39	37	31	24	53	48	43	41	36	29	56	51	47	46	42	36	59	53	49	49	45	40
		300	142	52	45	40	38	31	25	54	50	45	42	36	30	59	53	50	47	42	37	60	55	53	49	45	40
		400	189	54	47	42	39	33	26	57	53	48	44	38	31	61	55	52	48	43	38	62	57	55	50	46	41
		600	283	58	53	50	45	40	34	58	56	54	48	42	35	64	61	58	51	45	39	67	62	60	53	48	42
03SQ	8	175	83	52	45	39	36	33	26	54	47	42	41	36	30	57	50	45	46	42	36	59	52	46	49	45	39
04SQ		350	165	57	50	43	38	33	26	59	52	46	42	37	30	61	54	50	47	43	37	63	55	52	50	46	40
		525	248	58	51	45	39	34	27	61	55	48	43	38	31	64	57	53	48	44	37	66	58	56	51	47	41
		700	330	60	53	47	42	36	30	63	56	51	45	39	33	66	60	55	49	44	37	68	62	58	52	48	41
		1050	496	63	59	55	49	42	35	68	62	57	51	45	38	72	65	60	54	48	41	74	67	63	56	50	43
03SQ	10	275	130	55	49	43	38	34	27	57	51	45	42	37	30	58	53	48	47	43	36	59	54	50	50	46	40
04SQ		550	260	59	54	47	40	34	28	61	56	50	45	39	34	63	58	53	51	45	41	64	60	56	54	51	44
05SQ		825	389	61	55	49	42	36	29	63	58	53	46	40	35	66	61	57	51	46	41	69	64	60	54	50	44
		1100	519	62	56	50	44	38	32	66	60	54	49	43	37	70	64	59	53	48	43	72	66	62	56	51	46
		1640	774	65	61	55	50	43	37	70	65	58	53	46	40	76	69	64	58	51	45	79	72	67	61	55	49
03SQ	12	385	182	52	47	42	40	36	30	55	50	45	43	40	35	59	53	48	47	44	39	61	55	50	50	47	42
04SQ		775	366	59	51	45	40	35	28	63	55	48	43	38	33	66	59	52	48	44	39	69	62	56	52	48	42
05SQ		1160	547	63	54	47	41	35	30	67	58	51	46	39	35	72	63	56	51	45	40	75	67	60	54	49	43
		1550	732	66	58	50	43	37	31	71	62	54	48	42	36	75	66	59	53	46	41	78	70	63	56	50	44
		2350	1105	69	64	55	49	42	36	74	68	59	52	45	40	79	72	64	57	50	44	82	75	67	60	54	47
05SQ	14	525	248	58	51	45	40	34	27	61	53	48	44	38	31	64	56	51	49	44	37	66	59	54	51	47	40
		1050	496	62	56	49	42	37	30	66	59	52	46	42	34	71	63	57	51	46	39	74	66	60	54	49	42
		1575	743	65	59	52	44	37	31	70	62	55	48	42	35	75	67	61	54	48	40	78	70	64	57	51	43
		2100	991	67	60	54	45	38	33	72	64	58	50	43	36	78	69	63	56	49	43	83	74	68	61	54	46
		3200	1510	72	66	59	51	44	38	77	70	63	55	48	42	83	75	68	60	53	47	86	78	71	63	56	50
06SQ	10	550	550	51	44	42	40	37	32	54	49	45	44	42	38	58	55	49	49	48	45	61	58	52	52	52	49
07SQ		800	378	53	48	43	41	37	32	57	52	47	45	42	38	62	58	52	50	48	45	65	61	55	53	52	49
		1000	472	55	51	44	42	38	33	59	55	48	46	42	38	65	61	54	51	48	45	68	63	57	54	52	49
		1200	566	58	53	47	43	38	33	62	58	51	47	42	38	67	63	56	52	48	45	70	65	59	56	52	49
		1350	637	60	55	49	44	39	34	64	60	53	48	43	39	69	65	58	53	49	45	72	67	61	57	53	49
06SQ	12	800	378	58	50	44	40	33	26	62	55	49	45	38	31	66	60	54	50	43	36	68	63	56	52	46	39
07SQ		1100	519	60	52	46	40	33	27	65	58	51	47	40	33	70	64	58	53	46	39	72	66	60	56	50	42
		1400	661	62	54	46	40	34	27	67	60	53	48	41	34	73	66	60	55	48	41	75	69	64	58	52	44
		1700	802	64	56	48	42	34	28	68	62	54	48	41	35	76	68	61	56	49	42	78	72	66	60	54	46
		2000	944	65	58	49	47	36	31	70	63	55	50	42	35	77	70	62	57	50	43	79	73	67	61	55	48
06SQ	14	1100	519	56	49	44	40	32	25	61	55	48	44	38	30	66	61	54	49	43	36	69	66	57	51	45	40
07SQ		1600	755	59	53	47	42	35	27	65	59	52	48	41	33	70	64	58	53	46	39	74	68	61	55	49	42
		2100	991	64	57	51	46	38	29	68	61	55	50	43	35	74	67	61	55	49	41	77	70	64	59	52	45
		2500	1180	67	59	53	48	40	31	71	63	57	52	44	36	76	68	62	56	50	42	79	72	66	60	54	46
		3000	1416	71	62	56	50	42	33	74	66	59	54	46	38	78	70	64	58	51	44	82	74	68	62	56	48
06SQ	16	1400	661	63	54	48	41	36	29	67	59	53	46	42	35	70	66	58	52	48	40	72	70	61	54	50	43
07SQ		2100	991	66	57	51	44	39	32	71	63	56	49	45	38	75	69	63	56	52	44	77	72	66	59	55	47
		2700	1274	68	60	54	46	41	34	73	65	59	51	47	40	78	72	66	59	54	47	80	75	69	62	58	50
		3400	1605	70	63	57	51	46	42	76	68	61	54	48	42	81	74	68	60	56	48	83	76	70	64	59	52
		4000	1888	73	66	60	56	52	50	78	70	63	56	50	45	83	75	70	62	57	50	85	78	72	65	60	53

1. All data are measured in accordance with Industry Standard ARI 880-98.
2. All sound power levels, dB re: 10^{-12} Watts.
3. Where ΔPs is inlet static pressure minus discharge static pressure.

Sound Noise Criteria (NC)

Fan Only

Fan Size	Fan Cfm	L/s	Outlet Static	Discharge NC Level	Radiated NC/NC with Attenuator
02SQ	200	94		—	27/ *
	280	132	0.25	—	29/ *
	350	165	(63 Pa)	—	30/ *
	430	203		—	32/ *
	500	236		—	34/ *
03SQ	250	118		—	27/24
	400	189	0.25	—	30/27
	610	288	(63 Pa)	—	35/ *
	850	401		15	37/ *
04SQ	300	142		—	29/24
	530	250	0.25	—	31/26
	790	373	(63 Pa)	—	35/34
	1100	519		19	39/37
05SQ	350	165		—	29/26
	650	307	0.25	—	32/29
	970	458	(63 Pa)	16	37/32
	1300	614		21	40/37
06SQ	920	434		16	37/ *
	1200	566	0.25	20	39/ *
	1400	661	(63 Pa)	21	41/ *
	1700	802		25	44/ *
07SQ	1050	496		16	37/32
	1300	614	0.25	21	41/35
	1500	708	(63 Pa)	24	44/36
	1800	850		25	44/40

* Attenuator not recommended

Notes:

1. "–" represents NC levels below NC 15.
2. NC Values are calculated using current Industry Standard ARI 885, 2002 addendum to revision 1998. Radiated Transfer Function obtained from Appendix E, Type 2 Mineral Fiber Insulation.

Fan Only Sound Power

Fan Size	Outlet Static	Fan Cfm	L/s	Discharge Sound Power (dB) Octave Bands 2	3	4	5	6	7	Radiated Sound Power (dB) Octave Bands 2	3	4	5	6	7
02SQ		200	94	55	50	50	46	42	35	63	55	53	50	44	37
	0.25	280	132	57	52	51	48	44	38	65	57	54	52	46	40
	(63 Pa)	350	165	58	53	52	50	46	40	66	58	55	52	48	42
		430	203	61	55	54	52	49	43	68	60	57	54	50	45
		500	236	62	56	55	53	50	46	69	61	58	56	52	48
03SQ		250	118	53	49	51	45	40	39	61	55	53	49	42	35
	0.25	400	189	56	51	53	46	42	41	64	56	55	51	45	40
	(63 Pa)	610	288	63	58	57	53	48	47	70	62	60	56	51	48
		850	401	65	59	60	56	52	51	72	63	62	59	55	53
04SQ		300	142	55	51	52	47	41	38	61	56	54	49	43	34
	0.25	530	250	56	53	55	50	45	42	63	57	56	51	47	41
	(63 Pa)	790	373	62	58	59	55	50	48	69	62	60	56	52	49
		1100	519	65	62	64	60	56	55	72	66	64	60	57	55
		1350	637	68	65	66	65	60	59	75	69	67	64	61	60
05SQ		350	165	56	52	54	46	40	37	63	57	54	48	42	35
	0.25	650	307	58	55	57	50	45	42	65	60	57	51	47	43
	(63 Pa)	970	458	61	60	62	57	51	50	68	63	62	57	53	51
		1300	614	64	63	66	63	58	57	71	67	65	62	59	57
06SQ		920	434	63	60	60	56	51	48	71	64	62	56	51	47
	0.25	1200	566	66	63	61	59	54	51	73	65	63	59	53	51
	(63 Pa)	1400	661	68	64	63	61	56	54	75	67	64	60	55	53
		1700	802	70	67	65	63	58	57	77	69	66	63	58	56
07SQ		1050	496	59	60	61	55	49	46	67	61	62	56	50	46
	0.25	1300	614	62	64	62	58	53	50	69	64	66	58	54	50
	(63 Pa)	1500	708	64	66	64	61	56	53	70	65	68	60	56	52
		1800	850	66	67	68	65	60	57	73	68	68	63	59	56

1. All data are measured in accordance with Industry Standard ARI 880-98.
2. All sound power levels, dB re: 10^{-12} Watts.

ARI 885-98 DISCHARGE TRANSFER FUNCTION ASSUMPTIONS:

	Octave Band 2	3	4	5	6	7
Small Box (<300 Cfm)	-24	-28	-39	-53	-59	-40
Medium Box (300–700 Cfm)	-27	-29	-40	-51	-53	-39
Large Box (>700 Cfm)	-29	-30	-41	-51	-52	-39

Subtract from terminal unit sound power to determine discharge sound pressure in the space.

ARI 885-98 RADIATED TRANSFER FUNCTION ASSUMPTIONS:

	Octave Band 2	3	4	5	6	7
Type 2- Mineral Fiber Insulation	-18	-19	-20	-26	-31	-36
Total dB reduction	-18	-19	-20	-26	-31	-36

Subtract from terminal unit sound power o determine radiated sound pressure in the space.

Sound Noise Criteria (NC)

Valve Only

Fan Size	Inlet Size	Cfm	L/s	Discharge NC Level ΔPs 0.5" (127 Pa)	1.0" (254 Pa)	2.0" (508 Pa)	3.0" (762 Pa)	Radiated NC Level ΔPs 0.5" (127 Pa)	1.0" (254 Pa)	2.0" (508 Pa)	3.0" (762 Pa)
02SQ	6	200	94	—	—	—	20	—	15	21	21
		300	142	—	—	—	19	15	20	24	27
		400	189	—	16	19	21	20	23	26	30
		500	236	—	20	22	26	22	26	31	32
02SQ	8	350	165	—	—	15	19	—	17	24	26
		520	245	—	—	19	21	19	22	27	31
		700	330	16	20	25	27	24	26	32	35
		900	425	21	25	29	31	30	32	37	39
02SQ	10	550	260	—	16	22	25	19	24	29	31
		820	387	—	21	29	31	21	27	34	37
		1100	519	17	25	31	35	25	31	37	41
		1400	661	22	29	35	38	30	35	40	*
03SQ	6	100	47	—	—	—	16	—	—	18	20
		200	94	—	—	—	17	—	16	21	23
		300	142	—	—	16	17	—	19	24	27
		400	189	—	16	21	22	15	22	26	30
		600	283	16	19	27	30	24	29	33	35
03SQ	8	175	83	—	—	—	17	—	15	19	21
04SQ		350	165	—	—	15	19	19	21	24	26
		525	248	—	—	17	20	20	24	27	31
		700	330	—	16	22	25	22	26	30	33
		1050	496	21	26	29	31	30	32	37	40
03SQ	10	275	128	—	—	—	17	16	19	22	24
04SQ		550	260	—	—	18	20	22	25	27	31
05SQ		825	389	—	16	22	26	24	27	32	35
		1100	519	15	20	26	29	25	30	35	37
		1640	774	22	27	32	36	31	36	42	*
03SQ	12	385	182	—	—	—	17	15	19	22	24
04SQ		775	366	—	—	21	24	21	26	30	34
05SQ		1160	547	—	17	25	29	26	31	37	41
		1550	732	15	21	29	34	30	36	41	45
		2350	1105	22	29	34	38	35	40	*	*
05SQ	14	525	248	—	—	16	19	20	24	27	30
		1050	496	—	17	25	27	25	30	36	40
		1575	743	—	21	30	34	29	35	41	45
		2100	991	17	25	32	37	31	37	45	52
		3200	1510	25	30	37	41	37	44	52	56
06SQ	10	550	260	—	—	18	19	15	19	24	27
07SQ		800	378	—	—	19	22	16	21	27	31
		1000	472	—	16	21	25	19	24	31	34
		1200	566	—	20	25	27	21	27	34	36
		1350	637	16	22	27	30	24	30	36	38
06SQ	12	800	260	—	17	24	27	20	25	30	34
07SQ		1100	519	—	21	29	32	22	29	35	37
		1400	661	—	24	31	36	25	31	39	41
		1700	802	16	26	34	38	27	32	42	*
		2000	944	19	27	36	40	29	35	*	*
06SQ	14	1100	519	—	15	22	29	17	24	31	37
07SQ		1600	755	—	20	27	31	21	29	35	40
		2100	991	16	24	30	35	27	32	40	44
		2500	1180	20	26	32	36	31	36	42	46
		3000	1416	24	29	35	39	36	40	45	50
06SQ	16	1400	661	—	19	27	34	26	31	37	41
07SQ		2100	991	15	22	31	35	30	36	41	44
		2700	1274	19	25	32	37	32	39	45	*
		3400	1605	21	27	34	38	35	42	*	*
		4000	1888	25	30	36	41	39	45	52	55

*Not a recommended selection

Discharge Sound Power (dB)

Valve Only
ARI Conditions

Fan Size	Inlet Size	Cfm	L/s	1.5" Inlet Pressure (381 Pa) 2	3	4	5	6	7
02SQ	5	250	118	61	56	54	53	50	47
02SQ	6	400	189	63	60	59	60	57	49
02SQ	8	700	330	65	64	63	60	57	52
02SQ	10	1100	519	73	69	68	68	66	58
03SQ	6	400	189	61	60	57	53	50	46
03SQ 04SQ	8	700	330	62	62	60	57	54	49
03SQ 04SQ 05SQ	10	1100	519	66	66	65	62	59	53
03SQ 04SQ 05SQ	12	1600	755	70	67	66	64	61	55
04SQ 05SQ	14	2100	991	72	71	69	66	63	59
06SQ 07SQ	10	1100	519	63	64	62	58	54	49
06SQ 07SQ	12	1600	755	75	71	69	69	67	60
06SQ 07SQ	14	2100	991	72	69	68	67	64	58
06SQ 07SQ	16	2800	1321	74	70	69	68	66	61

Radiated Sound Power (dB)

Valve Only
ARI Conditions

Fan Size	Inlet Size	Cfm	L/s	1.5" Inlet Pressure (381 Pa) 2	3	4	5	6	7
02SQ	5	250	118	50	48	46	42	38	30
02SQ	6	400	189	60	54	51	44	37	29
02SQ	8	700	330	66	59	55	48	43	39
02SQ	10	1100	519	70	64	58	52	45	36
03SQ	6	400	189	59	55	51	46	41	35
03SQ 04SQ	8	700	330	64	58	53	47	42	35
03SQ 04SQ 05SQ	10	1100	519	68	62	57	51	46	40
03SQ 04SQ 05SQ	12	1600	755	73	64	57	51	44	39
04SQ 05SQ	14	2100	991	75	66	60	53	46	40
06SQ 07SQ	10	1100	519	63	59	53	49	46	42
06SQ 07SQ	12	1600	755	73	65	58	53	46	40
06SQ 07SQ	14	2100	991	72	64	58	53	46	38
06SQ 07SQ	16	2800	1321	76	69	62	55	51	44

Note: Oversizing primary valves to achieve lower sound levels will increase the minimum operable cfm. (See "Valve/Controller Airflow Guidelines".)This will increase energy consumption at minimum airflows when local reheat is energized.

Discharge Sound Power (dB)

Fan Only
ARI Conditions

Fan Size	Inlet Size	Cfm	L/s	2	3	4	5	6	7
02SQ	6, 8, 10	500	236	62	56	55	53	50	46
03SQ	6, 8, 10, 12	1090	514	70	64	65	63	58	58
04SQ	8, 10, 12, 14	1300	614	67	64	66	64	59	58
05SQ	10, 12, 14	1550	732	66	65	67	66	61	60
06SQ	10, 12, 14, 16	1960	925	72	69	68	66	62	60
07SQ	10, 12, 14, 16	2020	953	67	68	69	66	62	59

Radiated Sound Power (dB)

Fan Only
ARI Conditions

Fan Size	Inlet Size	Cfm	L/s	2	3	4	5	6	7
02SQ	6, 8, 10	500	236	69	61	58	56	52	48
03SQ	6, 8, 10, 12	1090	514	77	68	66	64	60	59
04SQ	8, 10, 12, 14	1300	614	74	68	66	63	60	59
05SQ	10, 12, 14	1550	732	74	69	68	65	62	61
06SQ	10, 12, 14, 16	1960	925	79	71	67	64	61	59
07SQ	10, 12, 14, 16	2020	953	74	69	69	65	61	58

Notes:
1. All data are measured in accordance with current Industry Standard ARI 880, version 98.
2. All sound power levels, dB re: 10^{-12} Watts.

Parallel Inlet Attenuator Appurtenance Effects (Fan Noise Only)

	Discharge Sound Effect* (dB)						Radiated Sound Effect* (dB)					
Fan	**2**	**3**	**4**	**5**	**6**	**7**	**2**	**3**	**4**	**5**	**6**	**7**
Matte-faced and foil-faced insulation, solid double-wall**												
02SQ	2	1	1	2	1	2	1	-2	-8	-13	-15	-16
03SQ, 04SQ, 05SQ	2	1	1	2	1	2	0	-1	-8	-12	-16	-17
06SQ, 07SQ	2	1	1	2	1	2	1	0	-8	-12	-15	-18
Closed-cell insulation												
02SQ	1	1	1	1	1	1	1	-1	-3	-2	-4	-4
03SQ, 04SQ, 05SQ	1	1	1	1	1	1	0	-1	-3	-2	-4	-4
06SQ, 07SQ	1	1	1	1	1	1	1	-1	-3	-2	-4	-4

* Add to sound power, a negative effect represents a sound reduction, a positive effect represents a sound increase.

** Note- Attenuators on double-wall units contain foil-faced insulation.

Parallel Cabinet Lining Appurtenance Effects (Fan Noise and Valve Noise)

	Discharge Sound Effect* (dB)						Radiated Sound Effect* (dB)					
Fan	**2**	**3**	**4**	**5**	**6**	**7**	**2**	**3**	**4**	**5**	**6**	**7**
Solid double-wall												
02SQ	3	1	1	-1	1	3	1	0	0	1	4	7
03SQ, 04SQ, 05SQ	1	-1	1	3	4	5	1	0	2	5	8	8
06SQ, 07SQ	3	1	1	1	3	5	-1	-1	-1	2	4	5
Closed-cell insulation												
02SQ	1	1	1	0	1	4	0	0	2	2	5	7
03SQ, 04SQ, 05SQ	1	1	2	2	2	3	1	2	4	4	4	5
06SQ, 07SQ	1	1	2	1	2	4	1	0	3	4	5	6

* Add to sound power, a negative effect represents a sound reduction, a positive effect represents a sound increase

Parallel Heating Coil Appurtenance Effects

	Discharge Sound Effect* (dB)						Radiated Sound Effect* (dB)					
Fan	**2**	**3**	**4**	**5**	**6**	**7**	**2**	**3**	**4**	**5**	**6**	**7**
Hot Water Coil**												
02SQ	-1	0	-1	-1	0	-1	-1	-1	0	-1	-1	-3
03SQ, 04SQ, 05SQ	2	2	2	2	2	1	1	1	1	1	0	0
06SQ, 07SQ	2	1	0	-1	0	0	0	0	0	-1	0	-1
Electric Heat***												
02SQ	0	0	0	-1	-2	-1	0	0	0	0	0	0
03SQ, 04SQ, 05SQ	0	0	0	0	0	1	0	0	0	0	0	0
06SQ, 07SQ	3	4	3	2	4	4	1	0	0	0	0	0

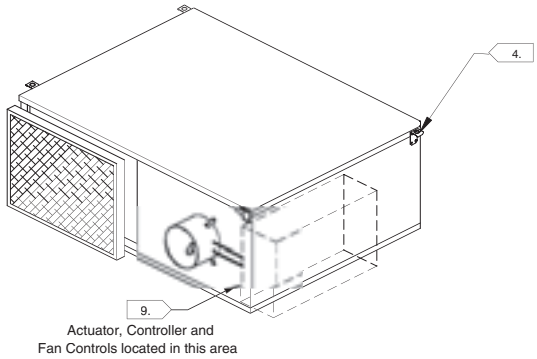
* Add to sound power, a negative effect represents a sound reduction, a positive effect represents a sound increase.

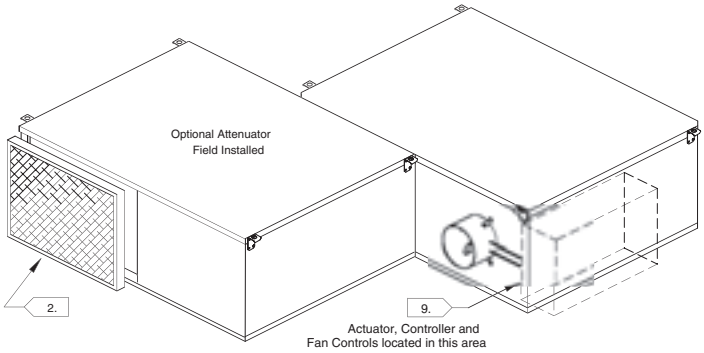
** Add to fan sound only, not valve sound.

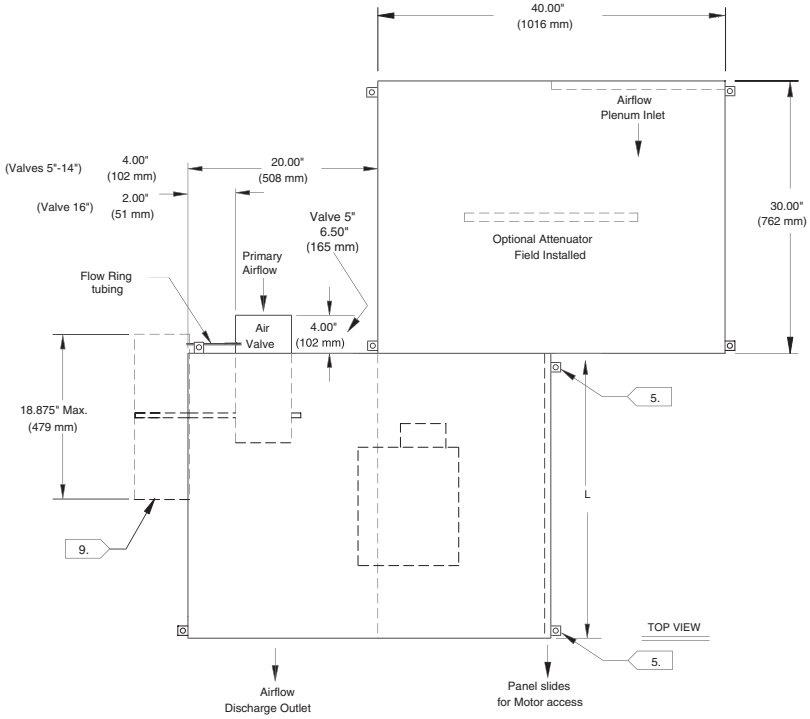
*** Add to both fan sound and valve sound. Apply fan only data, not valve sound.

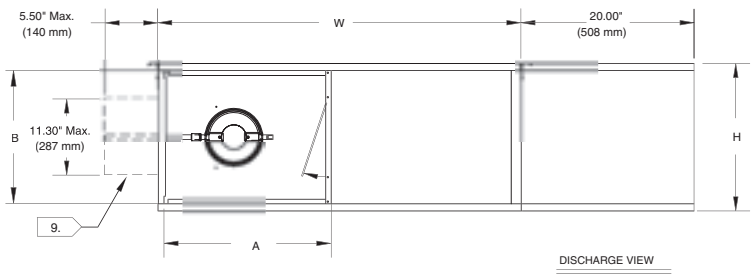
PARALLEL COOLING ONLY (VPCF)

FAN SIZE	INLET SIZE AVAILABILITY (NOMINAL Ø")	INLET SIZE AVAILABILITY (NOMINAL Ømm)	H	W	L	DISCHARGE DIMENSIONS		UNIT WT WT LBS (kg)
						A	B	
02SQ	5", 6", 8", 10"	127 mm, 152 mm, 203 mm, 254 mm	15.50" (394 mm)	40.00" (1016 mm)	30.00" (762 mm)	19.25" (489 mm)	14.00" (356 mm)	78 (35)
03SQ	6", 8", 10", 12"	152 mm, 203 mm, 254 mm, 305 mm	17.50" (445 mm)		32.50" (826 mm)		16.00" (406 mm)	96 (43)
04SQ	8", 10", 12", 14"	203 mm, 254 mm, 305 mm, 356 mm						97 (44)
05SQ	10", 12", 14"	254 mm, 305 mm, 356 mm						111 (50)
06SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm	21.50" (546 mm)		40.00" (1016 mm)		20.00" (508 mm)	117 (53)
07SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm						125 (57)









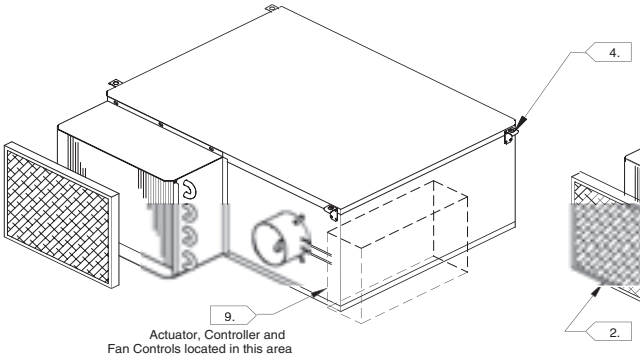
Fan Size	Filter Size	Attn. Weight Wt Lbs (kg)
02SQ	14" x 20" x 1" (356 mm x 508 mm x 25 mm)	46 (21)
03SQ 04SQ 05SQ	16" x 20" x 1" (406 mm x 508 mm x 25 mm)	48 (22)
06SQ 07SQ	20" x 20" x 1" (508 mm x 508 mm x 25 mm)	54 (25)

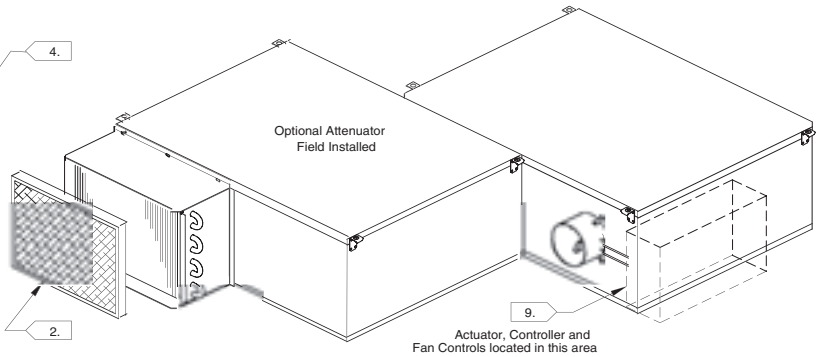
NOTES:

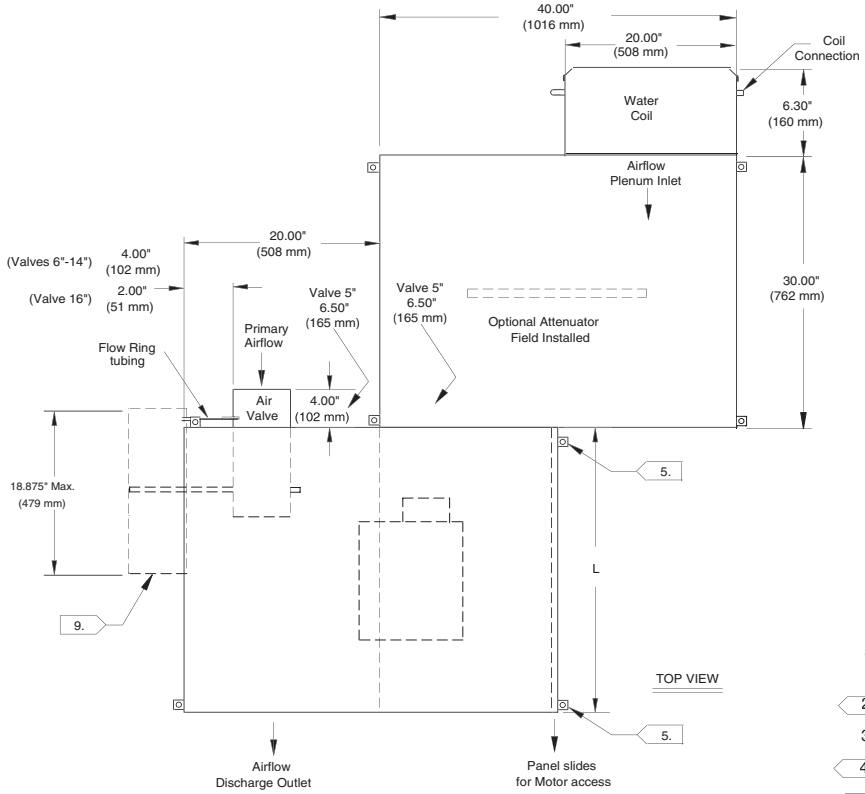
1. Allow a minimum 6" (152 mm) plenum inlet clearance for unducted installations.
2. Filter location with optional Attenuator.
3. Attenuator-factory assembled, field installed.
4. See Installation Documents for exact hanger bracket location.
5. For Motor access, remove bottom screw on hanger brackets to slide panel as shown in drawing.
6. When Attenuator option selected, water coil ships mounted to attenuator.
7. Air valve centered between top and bottom panel.
8. All high & low voltage controls have same-side NEC jumpback clearance. (Left-hand shown, right-hand/mirror image optional.)
9. Maximum dimensions for controls area shown. Configurations and types of control boxes vary according to control type selected. See "Enclosure Details" for specific layout.

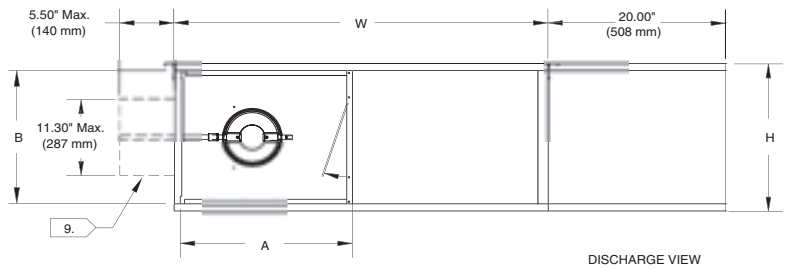
PARALLEL HOT WATER (VPWF)

FAN SIZE	INLET SIZE AVAILABILITY (NOMINAL Ø")	INLET SIZE AVAILABILITY (NOMINAL Ømm)	H	W	L	DISCHARGE DIMENSIONS		UNIT WT WT LBS (kg)
						A	B	
02SQ	5", 6", 8", 10"	127 mm, 152 mm, 203 mm, 254 mm	15.50" (394 mm)	40.00" (1016 mm)	30.00" (762 mm)	19.25" (489 mm)	14.00" (356 mm)	78 (35)
03SQ	6", 8", 10", 12"	152 mm, 203 mm, 254 mm, 305 mm	17.50" (445 mm)		32.50" (826 mm)		16.00" (406 mm)	96 (43)
04SQ	8", 10", 12", 14"	203 mm, 254 mm, 305 mm, 356 mm						97 (44)
05SQ	10", 12", 14"	254 mm, 305 mm, 356 mm						111 (50)
06SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm	21.50" (546 mm)		40.00" (1016 mm)		20.00" (508 mm)	117 (53)
07SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm						125 (57)









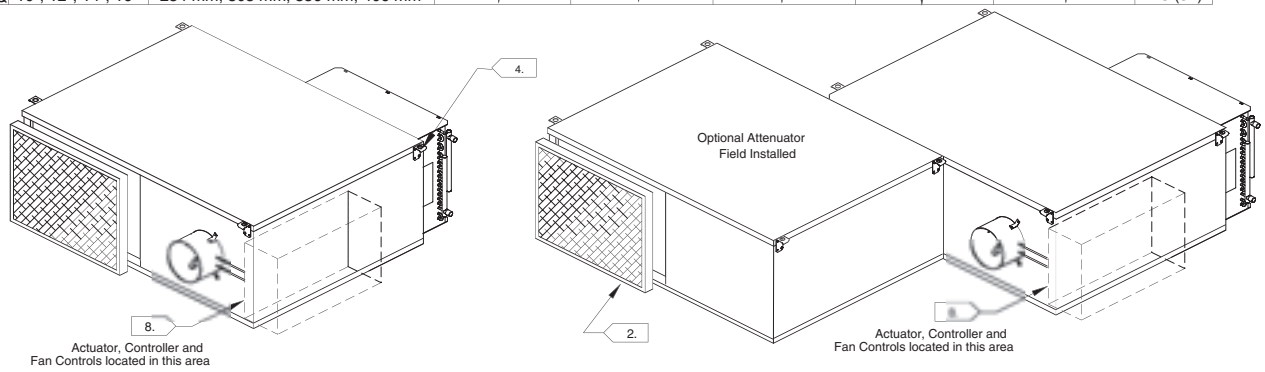
Fan Size	Filter Size	Attn. Weight Wt Lbs (kg)
02SQ	14" x 20" x 1" (356 mm x 508 mm x 25 mm)	46 (21)
03SQ 04SQ 05SQ	16" x 20" x 1" (406 mm x 508 mm x 25 mm)	48 (22)
06SQ 07SQ	20" x 20" x 1" (508 mm x 508 mm x 25 mm)	54 (25)

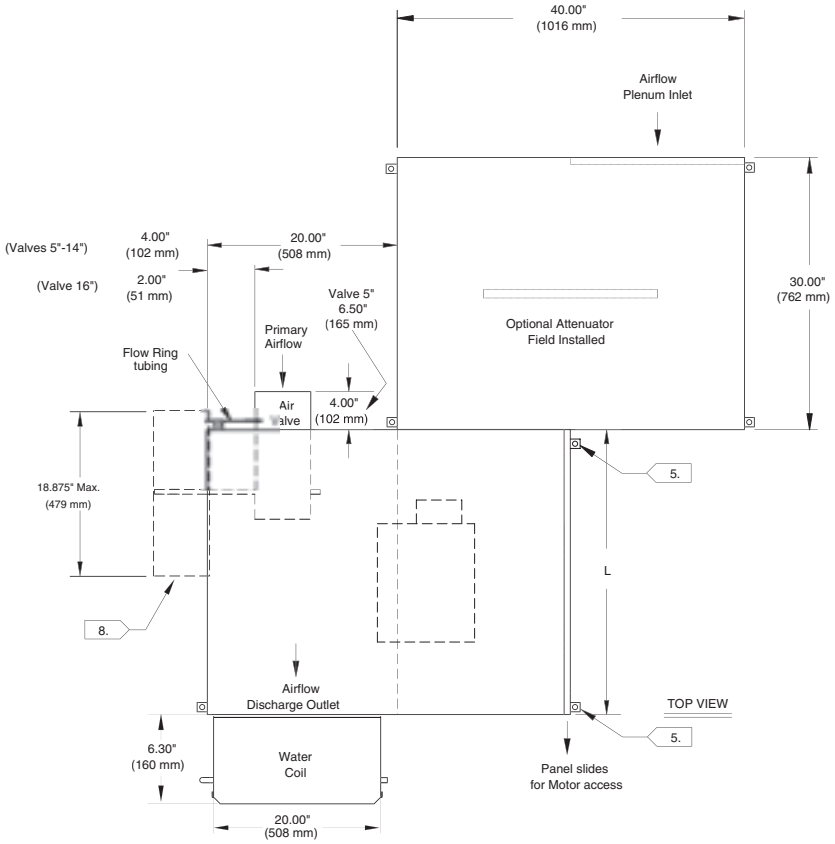
NOTES:

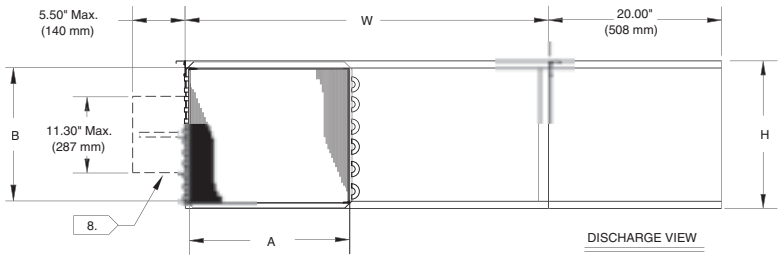
1. Allow a minimum 6" (152 mm) plenum inlet clearance for unducted installations.
2. Filter location with optional Attenuator.
3. Attenuator-factory assembled, field installed.
4. See Installation Documents for exact hanger bracket location.
5. For Motor access, remove bottom screw on hanger brackets to slide panel as shown in drawing.
6. When Attenuator option selected, water coil ships mounted to attenuator.
7. Air valve centered between top and bottom panel.
8. All high & low voltage controls have same-side NEC jumpback clearance. (Left-hand shown, right-hand/mirror image optional.)
9. Maximum dimensions for controls area shown. Configurations and types of control boxes vary according to control type selected. See "Enclosure Details" for specific layout.

PARALLEL WITH HOT WATER ON DISCHARGE (VPWF)

FAN SIZE	INLET SIZE AVAILABILITY (NOMINAL Ø")	INLET SIZE AVAILABILITY (NOMINAL Ømm)	H	W	L	DISCHARGE DIMENSIONS		UNIT WT WT LBS (kg)
						A	B	
02SQ	5", 6", 8", 10"	127 mm, 152 mm, 203 mm, 254 mm	15.50" (394 mm)	40.00" (1016 mm)	30.00" (762 mm)	20.00" (508 mm)	14.00" (356 mm)	78 (35)
03SQ	6", 8", 10", 12"	152 mm, 203 mm, 254 mm, 305 mm	17.50" (445 mm)		32.50" (826 mm)		16.00" (406 mm)	96 (43)
04SQ	8", 10", 12", 14"	203 mm, 254 mm, 305 mm, 356 mm						97 (44)
05SQ	10", 12", 14"	254 mm, 305 mm, 356 mm						111 (50)
06SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm	21.50" (546 mm)		40.00" (1016 mm)		20.00" (508 mm)	117 (53)
07SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm						125 (57)







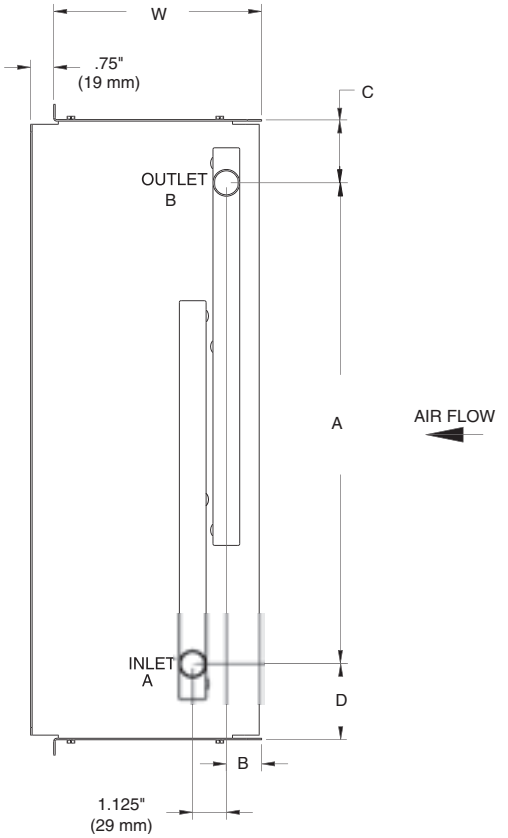
Fan Size	Filter Size	Attn. Weight Wt. Lbs. (kg)
02SQ	14" x 20" x 1" (356 mm x 508 mm x 25 mm)	46 (21)
03SQ 04SQ 05SQ	16" x 20" x 1" (406 mm x 508 mm x 25 mm)	48 (22)
06SQ 07SQ	20" x 20" x 1" (508 mm x 508 mm x 25 mm)	54 (25)

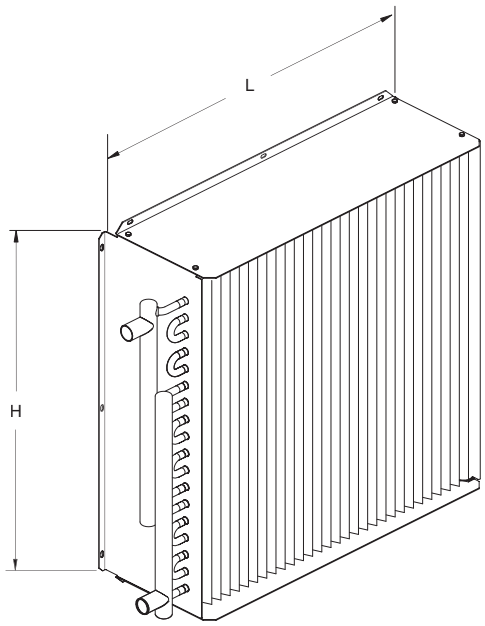
NOTES:

1. Allow a minimum 6" (152 mm) plenum inlet clearance for unducted installations.
2. Filter location with optional Attenuator.
3. Attenuator-factory assembled, field installed.
4. See Installation Documents for exact hanger bracket location.
5. For Motor access, remove bottom screw on hanger brackets to slide panel as shown in drawing.
6. Air valve centered between top and bottom panel.
7. All high & low voltage controls have same-side NEC jumpback clearance. (Left-hand shown, right-hand/mirror image optional.)
8. Maximum dimensions for controls area shown. Configurations and types of control boxes vary according to type selected. See "Enclosure Details" for specific layout.

COIL INFORMATION FOR PARALLEL PLENUM INLET 1-ROW COIL

FAN SIZE	COIL CONNECTION	A	B	C	D	L	H	W
02SQ	.875" (22 mm) O.D.	9.75" (248 mm)	1.30" (33 mm)	2.00" (51 mm)	2.50" (64 mm)	20.20" (513 mm)	14.20" (359 mm)	6.75" (171 mm)
03SQ		13.75" (349 mm)	1.00" (25 mm)	1.00" (25 mm)	1.50" (38 mm)	20.00" (508 mm)	16.00" (406 mm)	6.30" (160 mm)
04SQ								
05SQ								
06SQ		15.75" (400 mm)	1.25" (32 mm)	2.00" (51 mm)	2.50" (64 mm)	20.20" (513 mm)	20.20" (513 mm)	6.75" (171 mm)
07SQ								





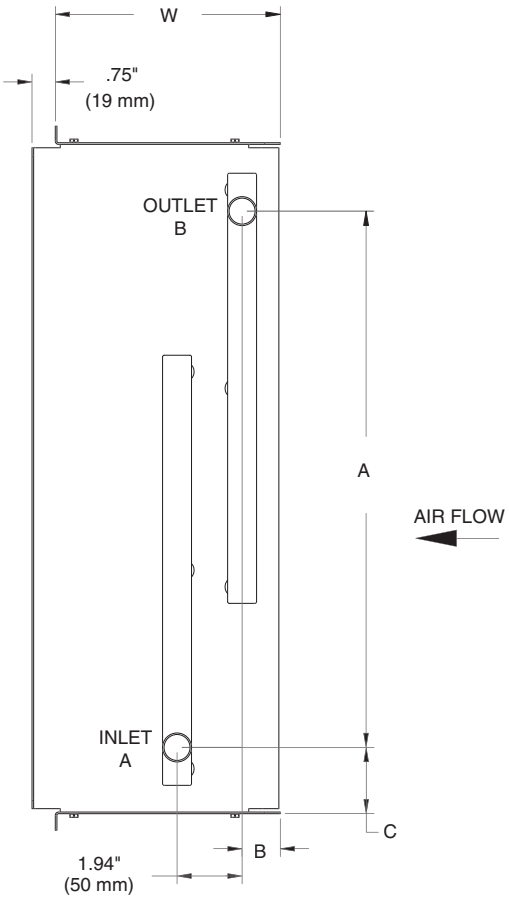
FAN SIZE	INTERNAL VOLUME GAL (L)	OPERATING WEIGHT LBS (KG)
02SQ	0.14 (.53)	12.3 (5.6)
03SQ 04SQ 05SQ	0.21 (.80)	21.9 (9.9)
06SQ 07SQ	0.22 (.84)	14.5 (6.6)

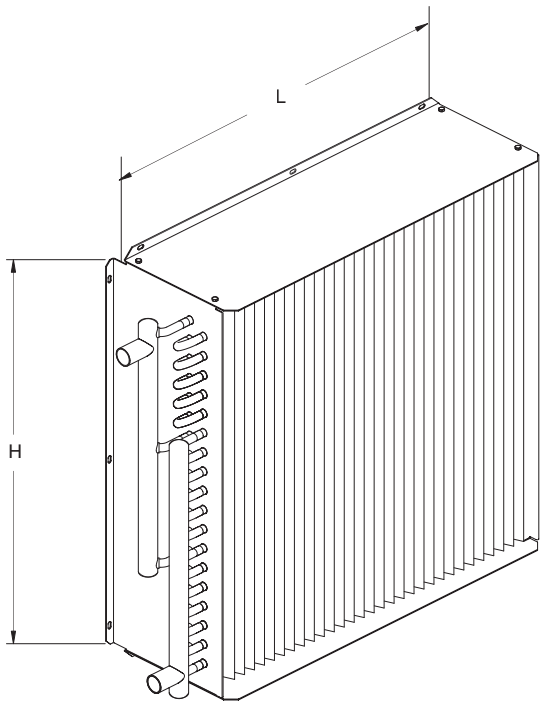
NOTES:

1. Location of coil connections is determined by facing air stream. R.H. coil connection shown, L.H. not available.
2. Coil furnished with stub sweat connections.

INFORMATION FOR PARALLEL PLENUM INLET 2-ROW COIL

FAN SIZE	COIL CONNECTION	A	B	C	L	H	W
02SQ	.875" (22 mm) O.D.	10.25" (260 mm)	1.25" (32 mm)	6.80" (173 mm)	20.20" (513 mm)	14.20" (359 mm)	6.75" (171 mm)
03SQ		13.75" (349 mm)	1.00" (25 mm)	6.70" (170 mm)	20.00" (508 mm)	16.00" (406 mm)	6.30" (160 mm)
04SQ							
05SQ							
06SQ		15.75" (400 mm)	1.12" (28 mm)	6.80" (173 mm)	20.20" (513 mm)	20.20" (513 mm)	6.75" (171 mm)
07SQ							





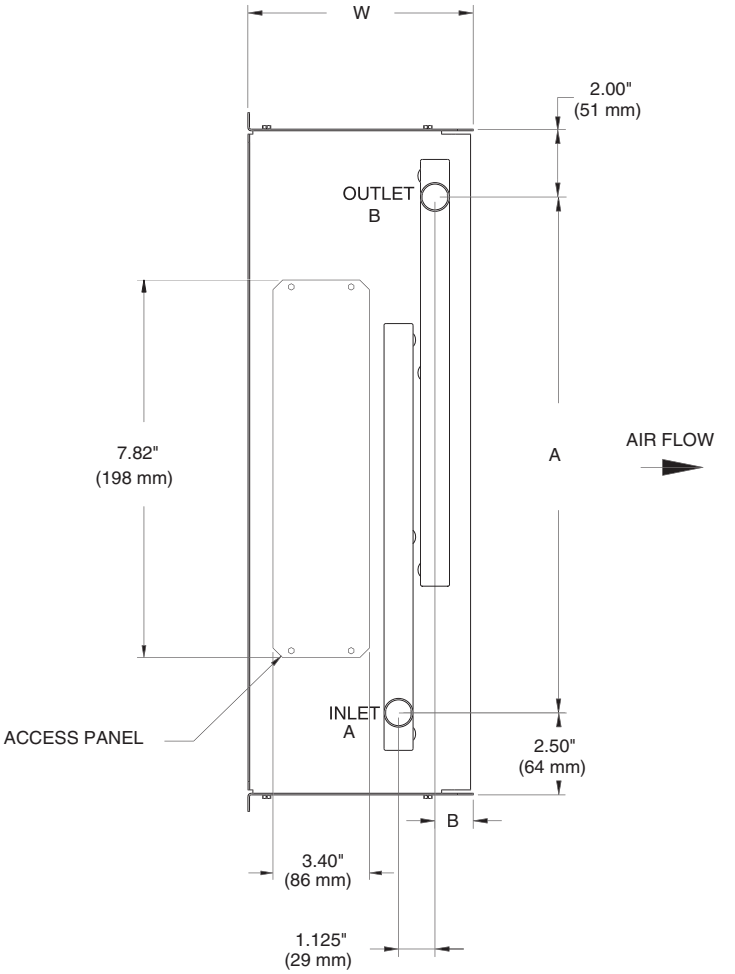
FAN SIZE	INTERNAL VOLUME GAL (L)	OPERATING WEIGHT LBS (KG)
02SQ	0.25 (.95)	16.8 (7.6)
03SQ 04SQ 05SQ	0.36 (1.38)	24.8 (11.2)
06SQ 07SQ	0.38 (1.46)	20.1 (9.1)

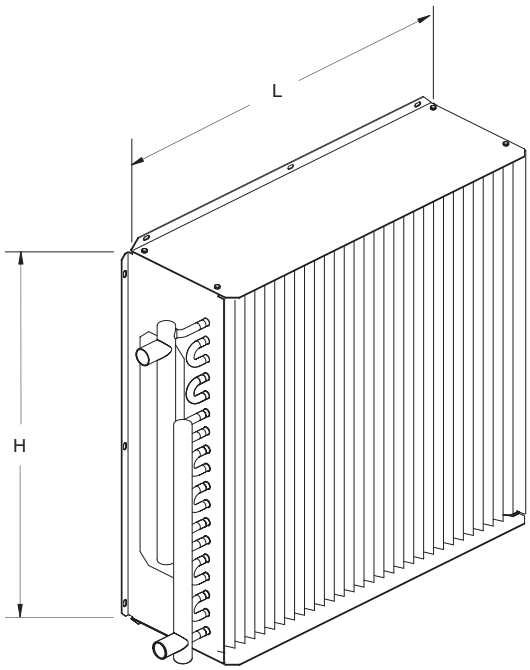
NOTES:

1. Location of coil connections is determined by facing air stream. R.H. coil connections shown, L.H. not available.
2. Coil furnished with stub sweat connections.

COIL INFORMATION FOR PARALLEL DISCHARGE 1-ROW COIL

FAN SIZE	COIL CONNECTION	A	B	L	H	W
02SQ	.875" (22 mm) O.D.	9.75" (248 mm)	1.60" (41 mm)	20.20" (513 mm)	14.20" (359 mm)	6.75" (171 mm)
03SQ		13.75" (349 mm)		20.00" (508 mm)	16.00" (406 mm)	6.30" (160 mm)
04SQ						
05SQ						
06SQ		15.75" (400 mm)		20.20" (513 mm)	20.20" (513 mm)	6.75" (171 mm)
07SQ						





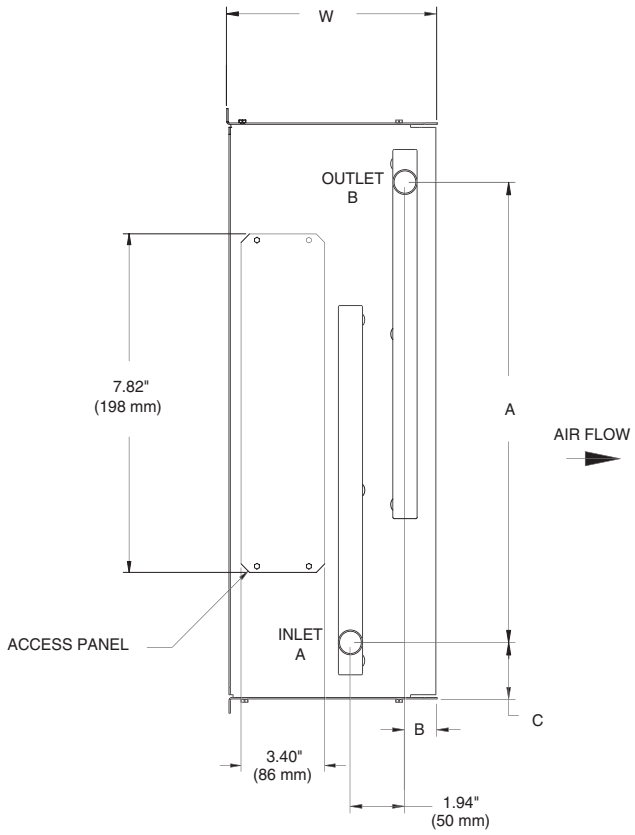
FAN SIZE	INTERNAL VOLUME GAL (L)	OPERATING WEIGHT LBS (KG)
02SQ	0.14 (.53)	12.3 (5.6)
03SQ 04SQ 05SQ	0.21 (.79)	21.9 (9.9)
06SQ 07SQ	0.22 (.83)	14.5 (6.6)

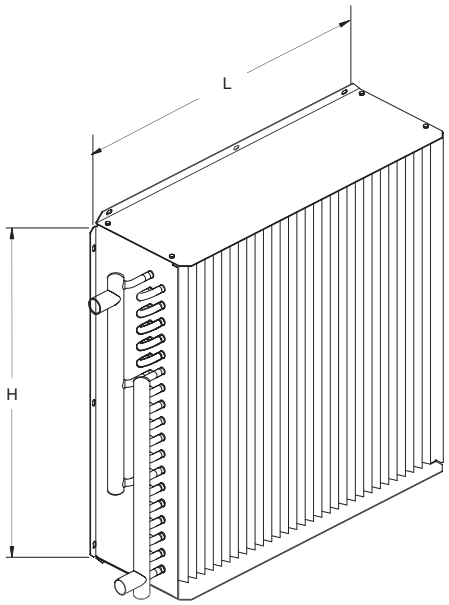
NOTES:

1. Location of coil connections is determined by facing air stream. L.H. coil connections shown, R.H. opposite.
2. Coil furnished with stub sweat connections.
3. Coils can be field-rotated for opposite connections. Note: Water inlet is always the bottom connection.
4. Flanged water coil shown. Slip and Drive available.
5. Access panel is standard.

COIL INFORMATION FOR PARALLEL DISCHARGE 2-ROW COIL

FAN SIZE	COIL CONNECTION	A	B	C	D	L	H	W
02SQ	.875" (22 mm) O.D.	9.75" (248 mm)	1.60" (41 mm)	6.80" (173 mm)	2.00" (51 mm)	20.20" (513 mm)	14.20" (359 mm)	6.75" (171 mm)
03SQ		13.75" (349 mm)	1.00" (25 mm)	6.70" (170 mm)	1.00" (25 mm)	20.00" (508 mm)	16.00" (406 mm)	6.30" (160 mm)
04SQ								
05SQ								
06SQ		15.75" (400 mm)	1.25" (32 mm)	6.80" (173 mm)	2.00" (51 mm)	20.20" (513 mm)	20.20" (513 mm)	6.75" (171 mm)
07SQ								





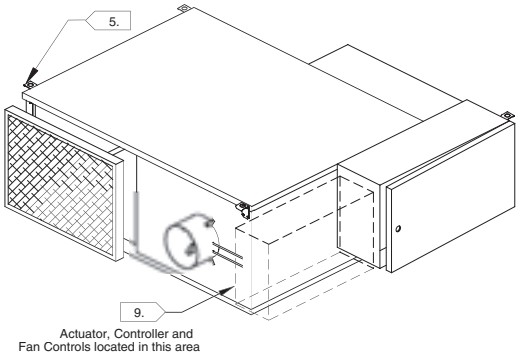
FAN SIZE	INTERNAL VOLUME GAL (L)	OPERATING WEIGHT LBS (KG)
02SQ	0.25 (.95)	16.8 (7.6)
03SQ 04SQ 05SQ	0.36 (1.36)	24.8 (11.2)
06SQ 07SQ	0.38 (1.44)	20.1 (9.1)

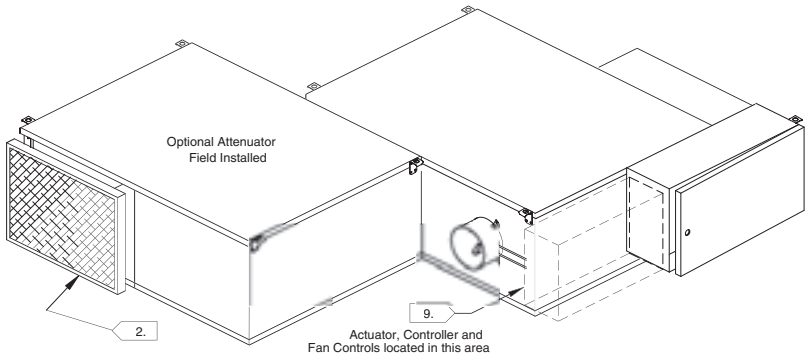
NOTES:

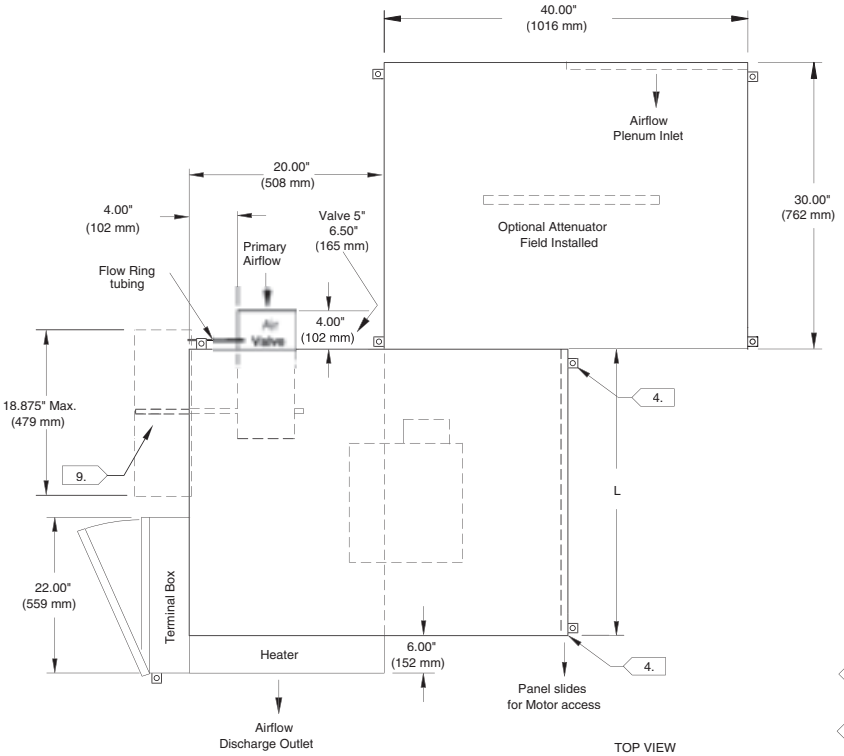
1. Location of coil connections is determined by facing air stream. L.H. coil connections shown, R.H. opposite.
2. Coil furnished with stub sweat connections.
3. Coils can be field-rotated for opposite connections. Note: Water inlet is always the bottom connection.
4. Flanged water coil shown. Slip and Drive available.
5. Access panel is standard.

PARALLEL ELECTRIC HEAT (VPEF)

FAN SIZE	INLET SIZE AVAILABILITY (NOMINAL Ø")	INLET SIZE AVAILABILITY (NOMINAL Ømm)	H	W	L	DISCHARGE DIMENSIONS A	DISCHARGE DIMENSIONS B	UNIT WT WT LBS (kg)
02SQ	5", 6", 8", 10"	127 mm, 152 mm, 203 mm, 254 mm	15.50" (394 mm)	40.00" (1016 mm)	30.00" (762 mm)	20.00" (508 mm)	14.00" (356 mm)	120 (54)
03SQ	6", 8", 10", 12"	152 mm, 203 mm, 254 mm, 305 mm	17.50" (445 mm)		32.50" (826 mm)		16.00" (406 mm)	96 (43)
04SQ	8", 10", 12", 14"	203 mm, 254 mm, 305 mm, 356 mm						138 (63)
05SQ	10", 12", 14"	254 mm, 305 mm, 356 mm						141 (64)
06SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm	21.50" (546 mm)		40.00" (1016 mm)		20.00" (508 mm)	178 (80)
07SQ	10", 12", 14", 16"	254 mm, 305 mm, 356 mm, 406 mm						186 (84)





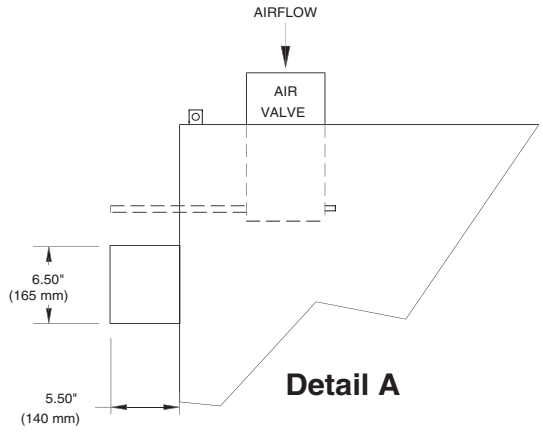


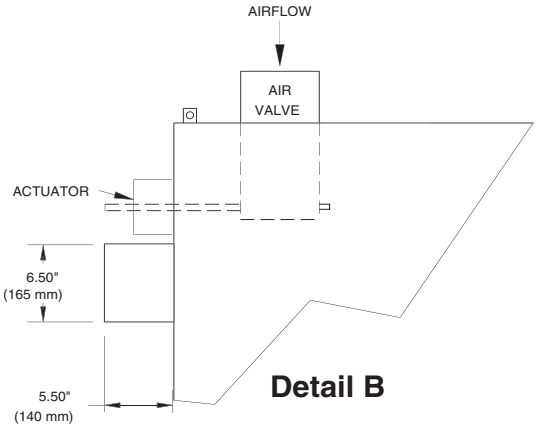
Fan Size	Filter Size	Attn. Weight Wt. Lbs. (kg)
02SQ	14" x 20" x 1" (356 mm x 508 mm x 25 mm)	46 (21)
03SQ 04SQ 05SQ	16" x 20" x 1" (406 mm x 508 mm x 25 mm)	48 (22)
06SQ 07SQ	20" x 20" x 1" (508 mm x 508 mm x 25 mm)	54 (25)

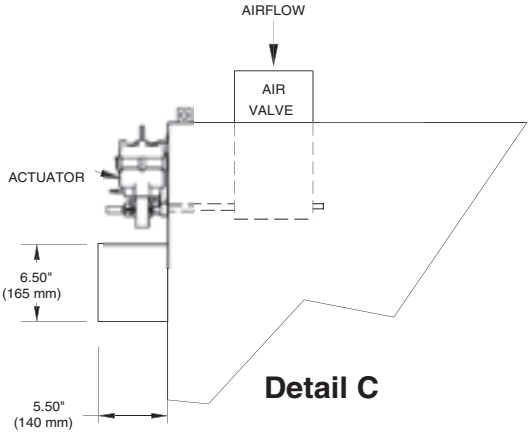
NOTES:

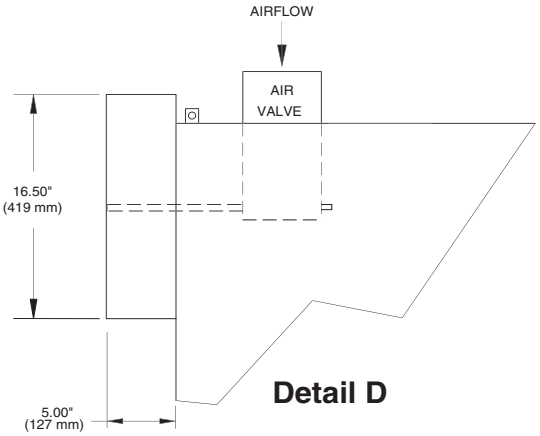
1. Allow a minimum 6" (152 mm) plenum inlet clearance for unducted installations.
2. Filter location with optional Attenuator.
3. Attenuatory factory assembled, field installed.
4. For motor access, remove bottom screws on hanger brackets to slide panel as shown in drawing.
5. See Installation Documents for exact hanger bracket location.
6. Air valve centered between top and bottom panel.
7. Heating coil uninsulated. External insulation may be field supplied and installed as required.
8. All high & low voltage controls have same side NEC jumpback clearance. (Left-hand shown, right-hand/mirror image optional.)
9. Maximum dimensions for controls area shown. Configurations and types of control boxes vary according to control type selected. See "Enclosure Details" for specific layout.

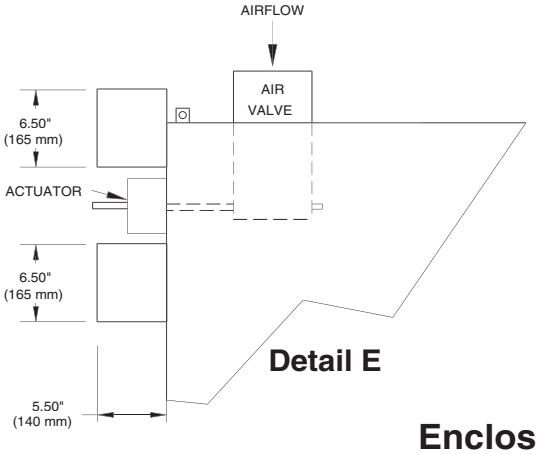
ENCLOSURE DETAILS (Parallel Units)











NOTES:

1. All high & low voltage controls have same-side jumpback clearance. (Left-hand shown, right-hand available.

Enclosure Detail Summary

Control Type		ENON	PNON	DD00	PNOO	PNO5	EI05	DD01 thru DD07	DD11 thru DD17	ENCL	FM00
Fan Size	02SQ	D	D	D	D	D	D	D	D	D	D
	03SQ 04SQ 05SQ	D	D	D	D	D	D	D	D	D	D
	06SQ 07SQ	A	A	B	C	C	E	E	D	D	D

MODELS VPCF, VPWF and VPEF Parallel fan-powered terminal units.

VPCF – Cooling Only

VPWF – With Hot Water Coil

VPEF – With Electric Coil

Fan–Inlet Combinations:

	VPXF					
Inlet	02SQ	03SQ	04SQ	05SQ	06SQ	07SQ
5"	X					
6"	X	X				
8"	X	X	X			
10"	X	X	X	X	X	X
12"		X	X	X	X	X
14"			X	X	X	X
16"					X	X

CASING
22-gage galvanized steel. Hanger brackets, side access, and plenum filter are provided as standard.

AGENCY LISTING
The unit is UL and Canadian UL Listed as a room air terminal unit. Control # 9N65.

ARI 880 Certified.

INSULATION

1/2" (12.7 mm) Matte-faced Insulation—The interior surface of the unit casing is acoustically and thermally lined with ½-inch, 1.5 lb/ft³ (12.7 mm, 24.0 kg/m³) composite density glass fiber with a high-density facing. The insulation R-Value is 1.9. The insulation is UL listed and meets NFPA-90A and UL 181 standards. There are no exposed edges of insulation (complete metal encapsulation).

1" (25.4 mm) Matte-faced Insulation—The interior surface of the unit casing is acoustically and thermally lined with 1 inch, 1.0 lb/ft³ (25.4 mm, 16.0 kg/m³) composite density glass fiber with a high-density facing. The insulation R-Value is 3.85. The insulation is UL listed and meets NFPA-90A and UL 181 standards. There are no exposed edges of insulation (complete metal encapsulation).

1/2" (12.7 mm) Foil-faced Insulation—The interior surface of the unit casing is acoustically and thermally lined with ½-inch, 1.5 lb/ft³ (12.7 mm, 24.0 kg/m³) density glass fiber with foil facing. The insulation R-Value is 2.1. The insulation is UL listed and meets NFPA-90A and UL 181 standards as well as bacteriological standard ASTM C 665. There are no exposed edges of insulation (complete metal encapsulation).

1" (25.4 mm) Foil-faced Insulation—The interior surface of the unit casing is acoustically and thermally lined with 1-inch, 1.5 lb/ft³ (25.4 mm, 24.0 kg/m³) density glass fiber with foil facing. The insulation R-Value is 4.1. The insulation is UL listed and meets NFPA-90A and UL 181 standards as well as bacteriological standard ASTM C 665. There are no exposed edges of insulation (complete metal encapsulation).

1" (25.4 mm) Double-wall Insulation—The interior surface of the unit casing is acoustically and thermally lined with a 1-inch, 1.0 lb./ft³ (25.4 mm, 16.0 kg/m³) composite density glass fiber with high-density facing. The insulation R-value is 3.8. The insulation is UL listed and meets NFPA-90A and UL 181 standards. The insulation is covered by an interior liner made of 26-gage galvanized steel. All wire penetrations are covered by grommets. There are no exposed edges of insulation (complete metal encapsulation).

3/8" (9.5 mm) Closed-cell Insulation—The interior surface of the unit casing is acoustically and thermally lined with 3/8-inch, 4.4 lb/ft³ (9.5 mm, 70.0 kg/m³) closed-cell insulation. The insulation is UL listed and meets NFPA-90A and UL 181 standards. The insulation has an R-Value of 1.4. There are no exposed edges of insulation (complete metal encapsulation).

PRIMARY AIR VALVE

Air Valve Round—The primary air inlet connection is an 18-gage galvanized steel cylinder sized to fit standard round duct. A multiple-point, averaging flow sensing ring is provided with balancing taps for measuring +/-5% of unit cataloged airflow. An airflow-versus-pressure differential calibration chart is provided. The damper blade is constructed of a closed-cell foam seal that is mechanically locked between two 22-gage galvanized steel disks. The damper blade assembly is connected to a cast zinc shaft supported by self-lubricating bearings. The shaft is cast with a damper position indicator. The valve assembly includes a mechanical stop to prevent over-stroking. At 4 in. wg, air valve leakage does not exceed 1% of cataloged airflow.

ATTENUATORS
The attenuator is 22-gage galvanized steel with an internal acoustical liner. Attenuators have been tested in accordance with ARI 880 standards.

FAN MOTOR
PSC—Single-speed, direct-drive, permanent split capacitor type. Thermal overload protection provided. Motors will be designed specifically for use with an open SCR. Motors will accommodate anti-backward rotation at start up. Motor and fan assembly are isolated from terminal unit.

ECM—Electrically Commutated Motor is designed for high-efficient operation with over 70% efficiency throughout the operating range.

FAN SPEED CONTROL

Variable Speed Control Switch (SCR)—The SCR speed control device is provided as standard and allows the operator infinite fan speed adjustment.

TRANSFORMER
The 50-VA transformer is factory-installed in the fan control box to provide 24 VAC for controls.

DISCONNECT SWITCH
A toggle disconnect is provided as standard and allows the operator to turn the unit on or off by toggling to the appropriate setting. This switch breaks both legs of power to the fan and the electronic controls (if applicable)

OUTLET CONNECTION

Flanged Connection—A rectangular opening on the unit discharge to accept a 90° flanged ductwork connection.

FILTER
A 1" (25 mm) filter is provided on the plenum inlet and attaches to the unit with a filter frame.

HOT WATER COIL

Parallel Water Coils—factory-installed on the plenum inlet.

The coil has 1-row with 144 aluminum-plated fins per foot (.305 m), and if needed 2-row with 144 aluminum-plated fins per foot (.305 m). Full fin collars provided for accurate fin spacing and maximum fin-tube contact. The 3/8" (9.5 mm) OD seamless copper tubes are mechanically expanded into the fin collars. Coils are proof tested at 450 psig (3102 kPa) and leak tested at 300 psig (2068 kPa) air pressure under water. Coil connections are brazed.

ELECTRIC HEAT COIL

The electric heater is a factory-provided and installed, UL recognized resistance open-type heater. It also contains a disc-type automatic pilot duty thermal primary cutout, and manual reset load carrying thermal secondary device. Heater element material is nickel-chromium. The heater terminal box is provided with 7/8" (22 mm) knockouts for customer power supply. Terminal connections are plated steel with ceramic insulators. All fan-powered units with electric reheat are single-point power connections.

ELECTRIC HEAT OPTIONS

Magnetic Contactor—An optional electric heater 24-volt contactor for use with direct digital control (DDC) or analog electronic controls.

Mercury Contactor—An optional electric heater 24-volt contactor for use with direct digital control (DDC) or analog electronic controls.

P.E. Switch with Magnetic Contactor—This optional switch and magnetic contactor is for use with pneumatic controls.

P.E. Switch with Mercury Contactor—This optional switch and mercury contactor is for use with pneumatic controls.

Airflow Switch—An optional air pressure device designed to disable the heater when the system fan is off.

Power Fuse—If a power fuse is chosen with a unit containing electric heat, then a safety fuse is located in the electric heater's line of power to prevent power surge damage to the electric heater.

Any electric heat unit with a calculated MCA greater than or equal to 30 will have a fuse provided.

Disconnect Switch—An optional factory-provided door interlocking disconnect switch on the heater control panel disengages primary voltage to the terminal.

UNIT CONTROLS SEQUENCE OF OPERATION

The unit controller continuously monitors the zone temperature against its setpoint and varies the primary airflow as required to meet zone setpoints. Airflow is limited by minimum and maximum position set points. For a parallel unit, the controller will intermittently start the fan upon a call for heat. Upon a further call for heat, reheat is enabled.

1. Primary Airflow—The fan energizes when primary airflow drops below the fan setpoint airflow. The fan automatically starts when the zone temperature drops to the heating temperature setpoint.
2. Zone Temperature—The fan energizes when the zone temperature drops to a selectable number of degrees above the heating temperature setpoint.

DIRECT DIGITAL CONTROLS

DDC Actuator—Trane 3-wire, 24-VAC, floating-point control actuator with linkage release button. Torque is 35 in-lb minimum and is non-spring return with a 90-second drive time. Travel is terminated by end stops at fully-opened and -closed positions. An integral magnetic clutch eliminates motor stall.

Direct Digital Controller—The microprocessor-based terminal unit controller provides accurate, pressure-independent control through the use of a proportional integral control algorithm and direct digital control technology. The controller, named the Unit Control Module (UCM), monitors zone temperature setpoints, zone temperature and its rate of change, and valve airflow using a differential pressure signal from the pressure transducer. Additionally, the controller can monitor either supply duct air temperature or CO_2 concentration via appropriate sensors. The controller is provided in an enclosure with 7/8" (22 mm) knockouts for remote control wiring. A Trane UCM zone sensor is required.

DDC Zone Sensor—The UCM controller senses zone temperature through a sensing element located in the zone sensor. In addition to the sensing element, zone sensor options may include an externally-adjustable setpoint, communications jack for use with a portable edit device, and an override button to change the individual controller from unoccupied to occupied mode. The override button has a cancel feature that will return the system to unoccupied. Wired zone sensors utilize a thermistor to vary the voltage output in response to changes in the zone temperature. Wiring to the UCM controller must be 18- to 22-awg. twisted pair wiring. The setpoint adjustment range is 50–88°F (10–31°C). Depending upon the features available in the model of sensor selected, the zone sensor may require from a 2-wire to a 5-wire connection. Wireless zone sensors report the same zone information as wired zone sensors, but do so using radio transmitter technology. Therefore with wireless, wiring from the zone sensor to the UCM is unnecessary.

Digital Display Zone Sensor with Liquid Crystal Display (LCD)—The digital display zone sensor contains a sensing element, which sends a signal to the UCM. A Liquid Crystal Display (LCD) displays setpoint or space temperature. Sensor buttons allow the user to adjust setpoints, and allow space temperature readings to be turned on or off. The digital display zone sensor also includes a communication jack for use with a portable edit device, and an override button to change the UCM from unoccupied to occupied. The override button has a cancel feature, which returns the system to unoccupied mode.

Trane LonTalk—The Controller is designed to send and receive data using SCC LonTalk profile. Current unit status conditions and setpoints may be monitored and/or edited from any of several LonTalk-compatible system-level controllers.

ANALOG ELECTRONIC CONTROLS

Analog Actuator—A Trane 3-wire, 24-VAC, floating-point control actuator with linkage release button. Torque is 35 in-lb minimum and is non-spring return with a 90-second drive time. Travel is terminated by end stops at fully-opened and -closed positions. An integral magnetic clutch eliminates motor stall.

Analog Electronic Controller—The controller consists of a circuit board that offers basic VAV unit operation and additional override functions and operates using 24 VAC

power. The controller uses a capacitive type pressure transducer to maintain consistent air delivery regardless of system pressure changes. The enclosure has 7/8" (22 mm) knockouts for remote control wiring. A Trane electronic zone sensor is required.

Analog Electronic Thermostat—This single-temperature, wall-mounted electronic device utilizes a thermistor to vary the voltage output in response to changes in the zone temperature. Connections to the VAV unit circuit board are made using standard three-conductor thermostat wire. The setpoint adjustment range is 63–85°F (17–29°C). The sensor is available in two models. One model has a concealed, internally-adjustable setpoint. The other model has an externally-adjustable setpoint.

PNEUMATIC CONTROLS

Normally Open Actuator—Pneumatic 3 to 8 psig (20 to 55 kPa) spring-range pneumatic actuator.

3011 Pneumatic Volume Regulator (PVR)—The regulator is a thermostat reset velocity controller, which provides consistent air delivery within 5% of cataloged flow down to 18% of unit cataloged cfm, independent of changes in system static pressure. Factory-calibrated, field-adjustable setpoints for minimum and maximum flows. Average total unit bleed rate, excluding thermostat, is 28.8 scim at 20 psig (7.87 ml/min at 138 kPa) supply.

UNIT OPTIONS

Power Fuse (VPCF, VPWF)—Optional fuse is factory-installed in the primary voltage hot leg.

HOT WATER VALVES

Two-Position Valve—The valve is a field-adaptable, 2-way or 3-way configuration and ships with a cap to be field-installed when configured as a 2-way valve. All connections are National Pipe Thread (NPT). The valve body is forged brass with a stainless steel stem and spring. Upon demand, the motor strokes the valve. When the actuator drive stops, a spring returns the valve to its fail-safe position.

Flow Capacity – 1.17 Cv
Overall Diameter – ½" NPT
Close-off Pressure – 30 psi (207 kPa)

Flow Capacity – 3.0 Cv
Overall Diameter – 3/4" NPT
Close-off Pressure – 14.5 psi (100 kPa)

Flow Capacity – 6.4 Cv
Overall Diameter – 1" NPT
Close-off Pressure – 9 psi (62 kPa)

Maximum Operating Fluid Temperature – 203°F (95°C)

Maximum system pressure – 300 psi (2067 kPa)

Maximum static pressure – 300 psi (2067 kPa)

Electrical Rating – 7 VA at 24 VAC, 6.5 Watts, 50/60 Hz

8 feet (2.44 m) of plenum rated wire lead is provided with each valve.

Proportional Water Valve—The valve is a field-adaptable, 2-way or 3-way configuration and ships with a cap over the bottom port. This configures the valve for 2-way operation. For 3-way operation, remove the cap. The valve is linear equal percentage design. The intended fluid is water or water and glycol (50% maximum glycol). The actuator is a synchronous motor drive. The valve is driven to a predetermined position by the UCM controller using a proportional plus integral control algorithm. If power is removed, the valve stays in its last position. The actuator is rated for plenum applications under UL 94-5V and UL 873 standards.

Pressure and Temperature Ratings – The valve is designed and tested in full compliance with ANSI B16.15 Class 250 pressure/temperature ratings, ANSI B16.104 Class IV control shutoff leakage, and ISA S75.11 flow characteristic standards.

Flow Capacity – 0.7 Cv, 2.2 Cv, 3.8 Cv, 6.6 Cv

Overall Diameter – ½" NPT, ¾" NPT (6.6 Cv)

Maximum Allowable Pressure – 300 psi (2068 kPa)

Maximum Operating Fluid Temperature – 200°F (93°C)

Maximum Close-off Pressure – 55 psi (379 kPa)

Electrical Rating – 6 VA at 24 VAC.

10 feet (3.05 m) of plenum rated 22-gage wire for connection. Terminations are #6 stabs.

Fan-Powered Parallel