

3000 SERIES • VARIABLE OR CONSTANT VOLUME PRODUCT OVERVIEW

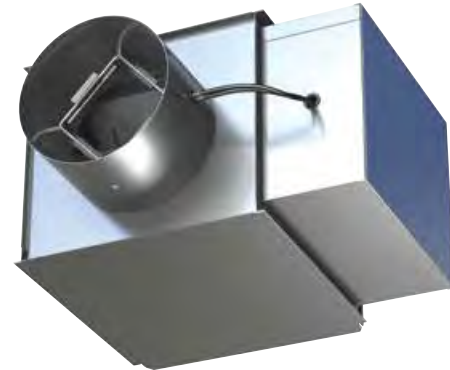


Nailor 3000 Series Single Duct Terminal units are simply put, versatile. Whether the requirement calls for a constant or variable air volume (VAV) single duct terminal, an electric or hot water reheat option or requires basic attenuation, the 3000 Series terminal units deliver.

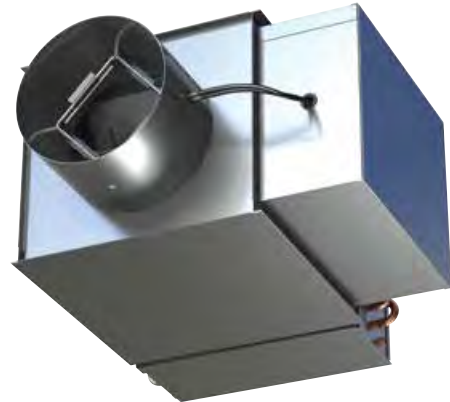
Available in numerous configurations, each 3000 Series is designed to control airflow in response to a control signal. At the center of each unit is the control damper. Constructed of a single blade on smaller units or inclined opposed blades on larger units, the damper provides a more linear flow characteristic than the typical butterfly type. The result is a more accurate flow control, thus providing a more stable zone temperature.

The pressure independent 3000 Series terminal units operate in both constant and variable flow configurations. Unlike a constant volume system, which is sized for the peak demand of the entire building, a VAV system is sized for the instantaneous peak demand of all zones. Since VAV systems modulate airflow based on demand, operating costs are generally reduced compared to constant volume systems as less fan energy and refrigeration is needed.

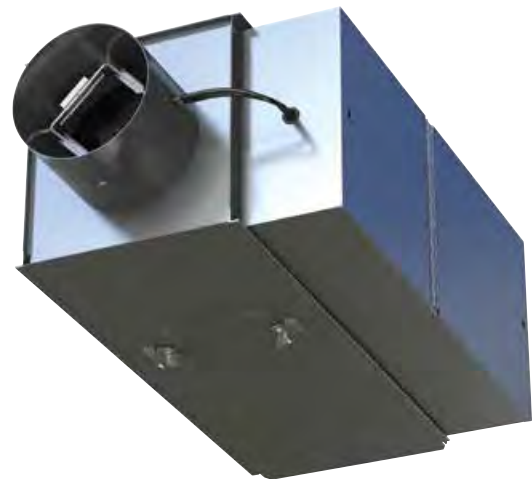
Numerous options on the 3000 Series allow for application specific customization. Options range from different insulation types, reheat versions, attenuators, control sequences, low temperature and ultra low casing leakage construction to access doors. Controls options include digital, analog electric and pneumatic types suitable for most applications. Depending on the selected controls option, a full NEMA 1 type low voltage enclosure may be included. All pressure independent control options utilize the multi-point averaging Nailor Diamond Flow sensor to measure velocity pressure.



3001 Cooling or Heating Only



30RW Cooling with Hot Water Reheat



30RE Cooling with Electric Reheat

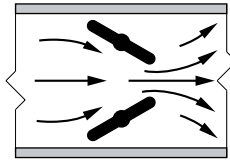
SINGLE DUCT VARIABLE OR CONSTANT AIR VOLUME

3000 SERIES

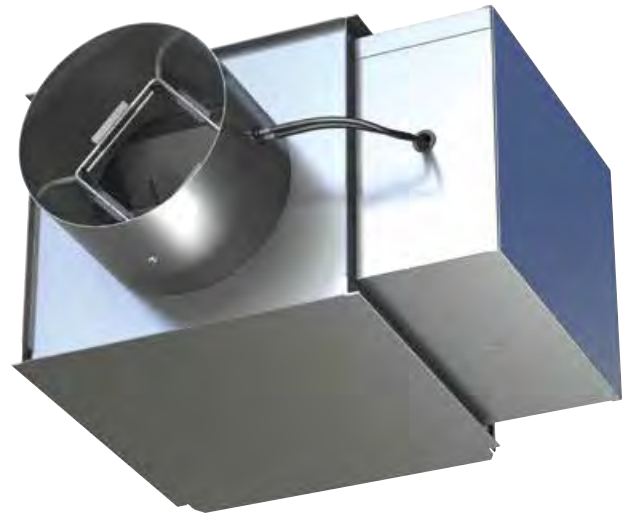
A
SINGLE DUCT TERMINAL UNITS

Models:

- 3001** Cooling or Heating only
- 30RW** Cooling with Hot Water Reheat
- 30RE** Cooling with Electric Reheat



Inclined opposed blade damper configuration minimizes noisy turbulence and provides smooth, accurate, near linear flow control.



Model 3001

The 3000 Series Single Duct Terminal Units form the backbone of Nailor's single duct line. Utilizing an inclined opposed blade damper, the 3000 Series exhibit a more linear flow characteristic than the common butterfly type. Used in constant volume or VAV applications, the 3000 series provides minimal system pressure drop while offering maximum system flexibility. 3000 Series units are available with electric and hot water reheat as well as options like removable flow sensors and access doors. Each unit is available with multiple insulation types, ranging from standard fiberglass to Indoor Air Quality (IAQ) types.

STANDARD FEATURES:

- 22 ga. (0.86) zinc coated steel casing, mechanically sealed, low leakage construction. Leakage is less than 1% of the terminal rated airflow at 1" w.g. (249 Pa).
- 16 ga. (1.61) corrosion-resistant steel inclined opposed blade damper with extruded PVC seals (single blade on size 4, 5 and 6). 45° rotation, CW to close, tight shut-off. Damper leakage is less than 2% of nominal flow at 3" w.g. (746 Pa).
- Self-lubricating Celcon® bearings.
- 1/2" (13) dia. plated steel drive shaft. An indicator mark on the end of the shaft shows damper position.
- Inclined opposed blade damper is inherently more linear in its flow characteristics than the standard butterfly type damper. More accurate flow control is ensured, which reduces hysteresis for more stable control of the temperature in the zone.
- Available in 11 unit sizes to handle from 0 – 8300 cfm (0 – 3917 l/s).
- Maximum unit height is only 12 1/2" (318) for sizes 4 through 16. Unit sizes 4 through 10 feature round inlets and 12 through 16 features flat oval

equivalent inlets. Size 24 x 16 features a rectangular inlet.

- Multi-point averaging Diamond Flow Sensor. Aluminum construction. Supplied with balancing tees for field calibration and balancing.
- Rectangular discharge with slip and drive cleat duct connection.
- Full NEMA 1 type low voltage enclosure for factory mounted controls.
- 3/4" (19) dual density fiberglass insulation maximizes acoustical and thermal performance. 4 lb. high density skin is treated to resist abrasion and erosion from airflow. Edges are coated. Meets requirements of NFPA 90A and UL 181.
- Single point electrical or pneumatic main air connection (except 600V with electric heat).
- Right-hand controls location is standard (shown) when looking in direction of airflow. Optional left hand controls mounting is available. Unit is flippable. Caution: If unit has access door.
- Independently tested and certified laboratory performance data.

Options:

- Steri-Liner.
- Fiber-Free Liner.
- Solid metal liner.
- Removable Flow Sensor.
- 1" (25) Fiberglass liner.
- Bottom access door.
- 24 VAC Control transformer.
- Hanger bracket.
- Controls enclosure for field or factory mounted controls.
- Dust tight enclosure seal.
- Low temperature construction (thermally isolated inlet collar and non porous steri-liner construction).
- Ultra Low Leakage casing.
- Bottom mount controls enclosure.
- Seismic Certification.
- Oversized casing.



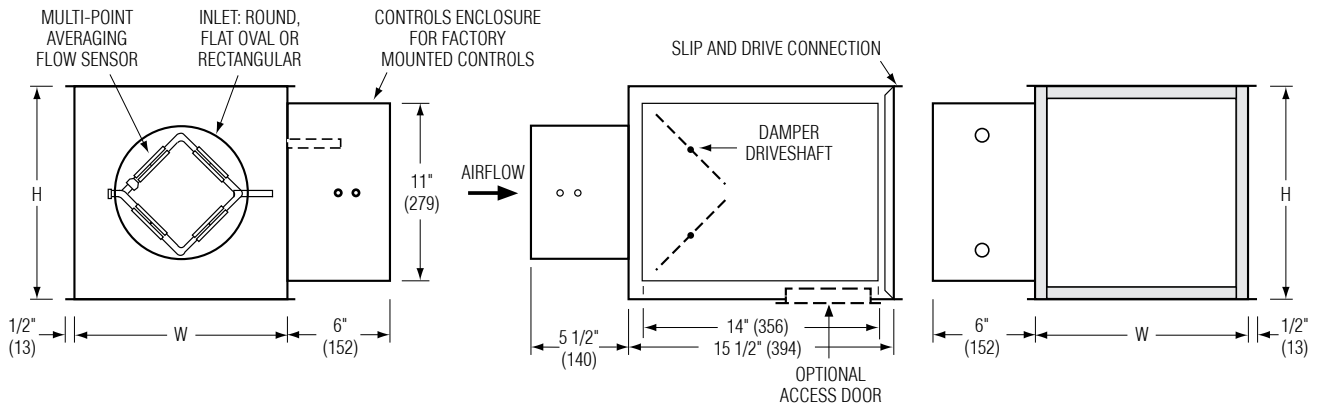
Intertek

Dimensions

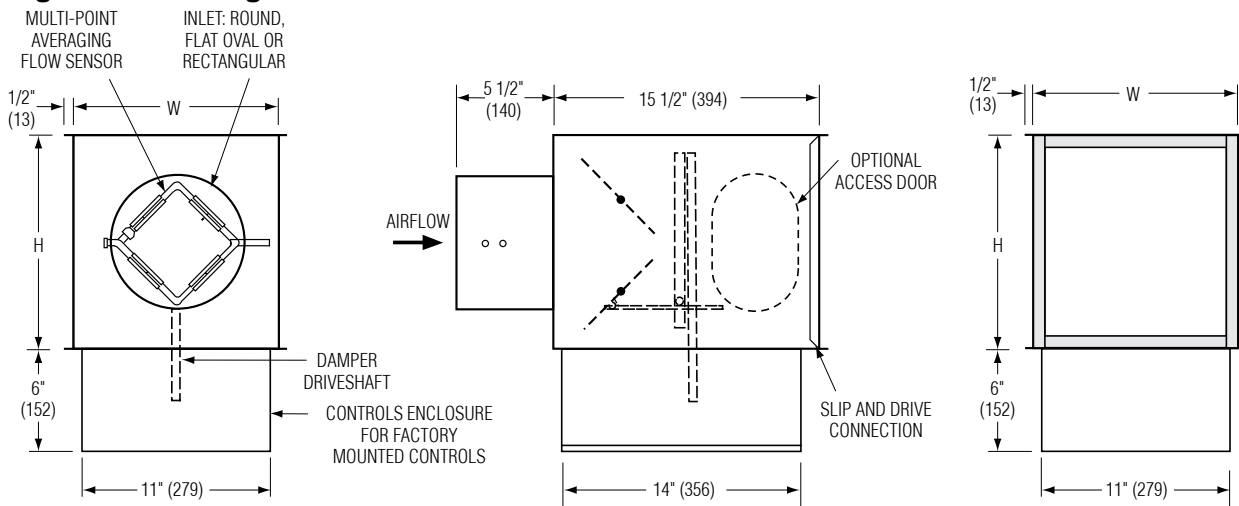
Model 3001 • Basic Unit

Digital and Analog Electronic Controls

- A full NEMA 1 controls enclosure is provided for factory mounted controls. Optional for field mounted controls.

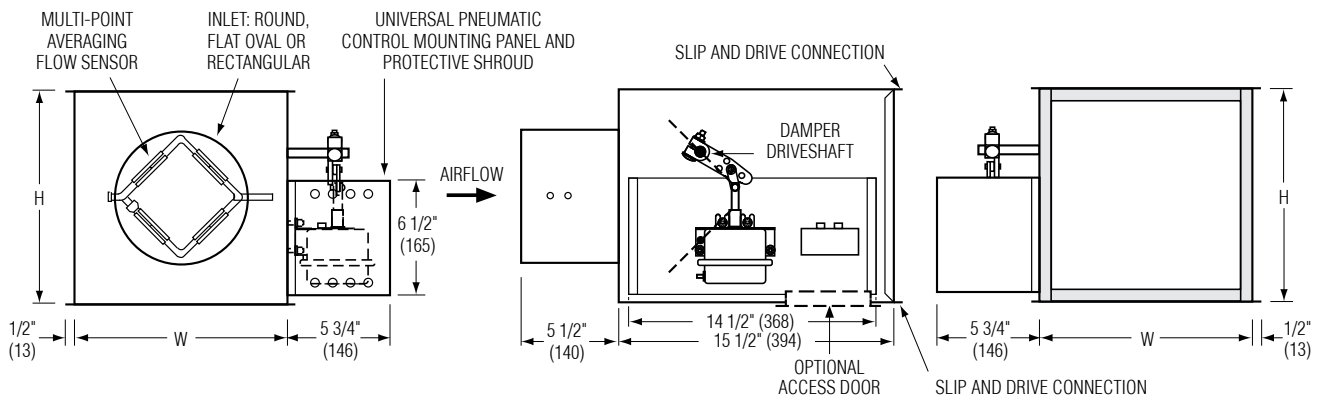


Digital and Analog Electronic Controls with Bottom Mount Control Enclosure



Pneumatic Controls

- Universal pneumatic control mounting panel features double wall stand-off construction for strength and rigidity. Controls mounting screws do not penetrate terminal casing.

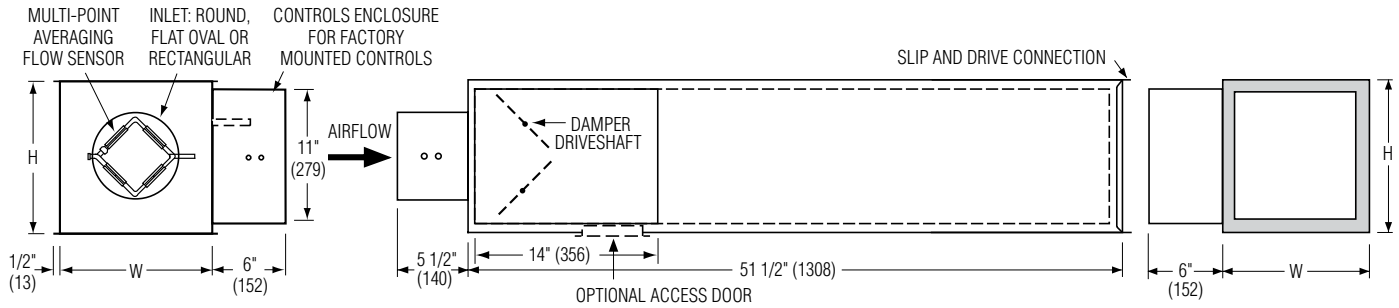


Dimensions

Model 3001 • Integral Sound Attenuator

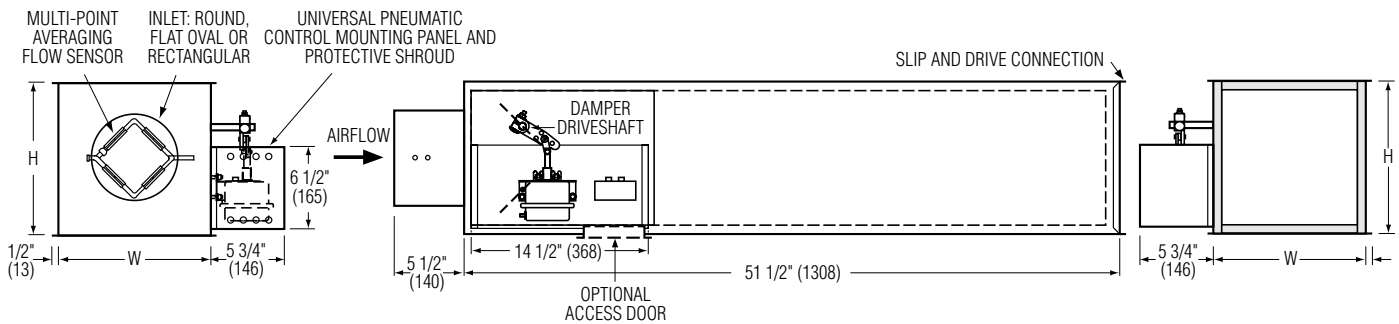
Digital and Analog Electronic Controls

- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Pneumatic Controls

- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Dimensional Data

Unit Size	W	H	Inlet Size
4	10 (254)	10 (254)	3 7/8 (98) Round
5	10 (254)	10 (254)	4 7/8 (124) Round
6	10 (254)	10 (254)	5 7/8 (149) Round
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.

A

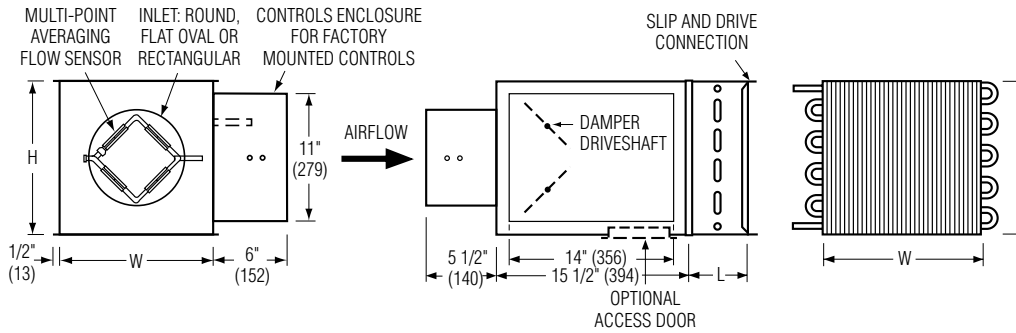
SINGLE DUCT TERMINAL UNITS

Dimensions

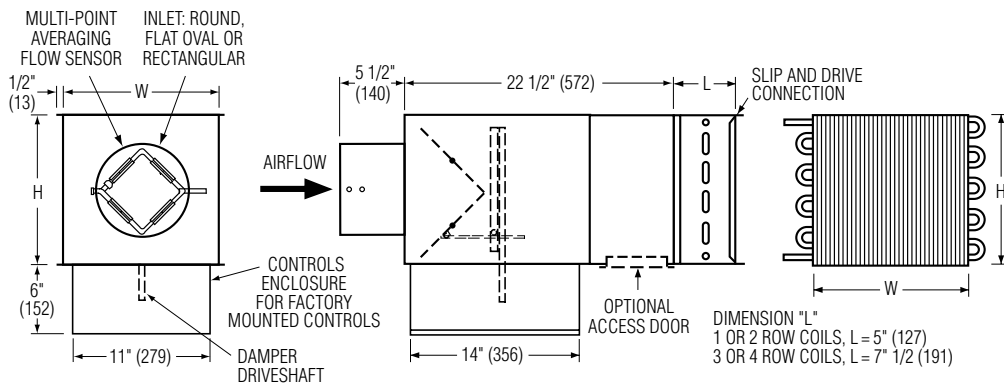
Model 30RW • Hot Water Reheat Coil

- One, two, three and four row available.
- Hot water coils have copper tubes and aluminum ripple fins. Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.
- AHRI Certified coils.
- Coil Performance data on pages A43-A51.
- Oversized Casing option on pages A40-A42.

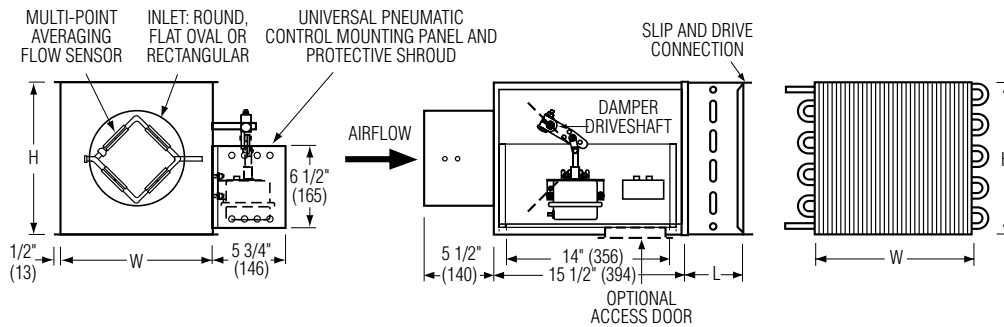
Digital and Analog Electronic Controls



Digital and Analog Electronic Controls with Bottom Mount Controls location



Pneumatic Controls

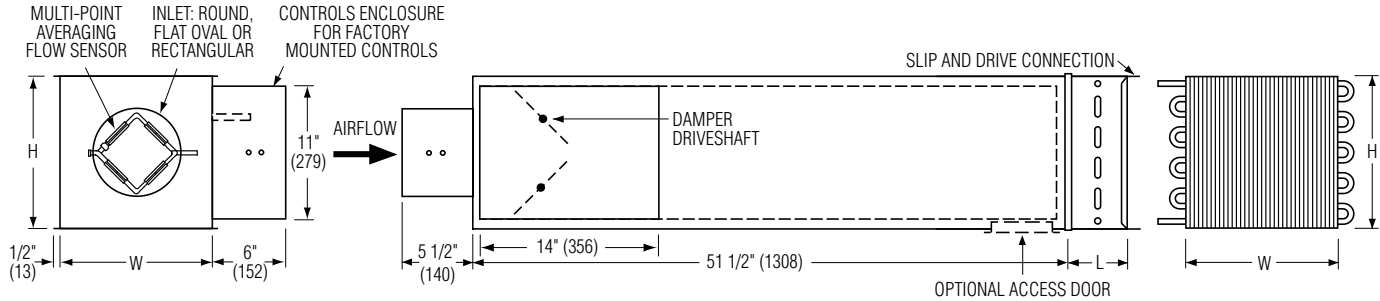


Dimensions

Model 30RW • Integral Attenuator plus Hot Water Reheat Coil

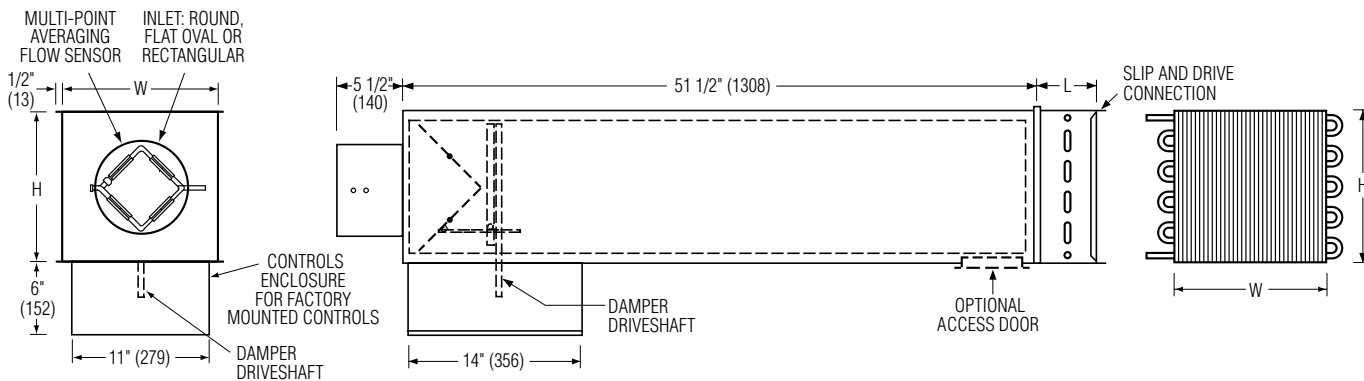
- All the benefits of both the Integral Sound Attenuator and the Hot Water Coils in one.
- Coil performance data on pages A43-A51.

Digital and Analog Electronic Controls



Digital and Analog Electronic Controls with Bottom Mount Controls Location

- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Dimensional Data

Unit Size	W	H	Inlet Size	Coil Connections				Hot Water Coil	
				1 Row	2 Row	3 Row	4 Row	L (1 & 2 Row)	L (3 & 4 Row)
4	10 (254)	10 (254)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
5	10 (254)	10 (254)	4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
6	10 (254)	10 (254)	5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval	7/8 (22)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.	7/8 (22)	7/8 (22)	1 3/8 (35)	1 3/8 (35)	5 (127)	7 1/2 (191)

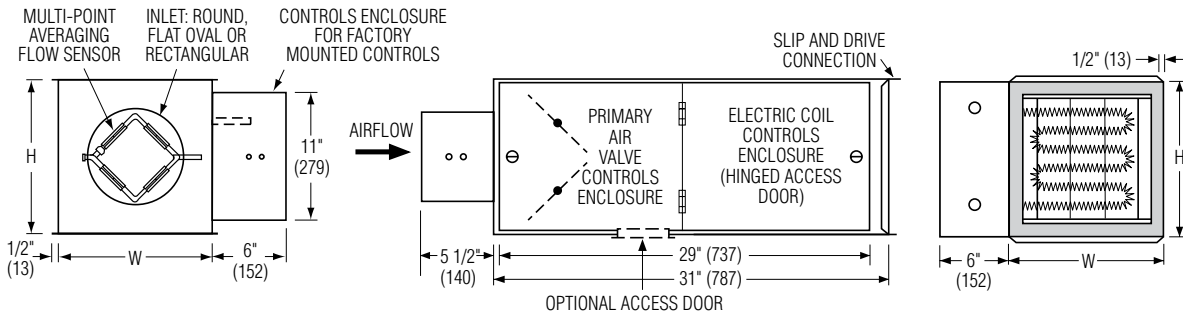
A SINGLE DUCT TERMINAL UNITS

Dimensions

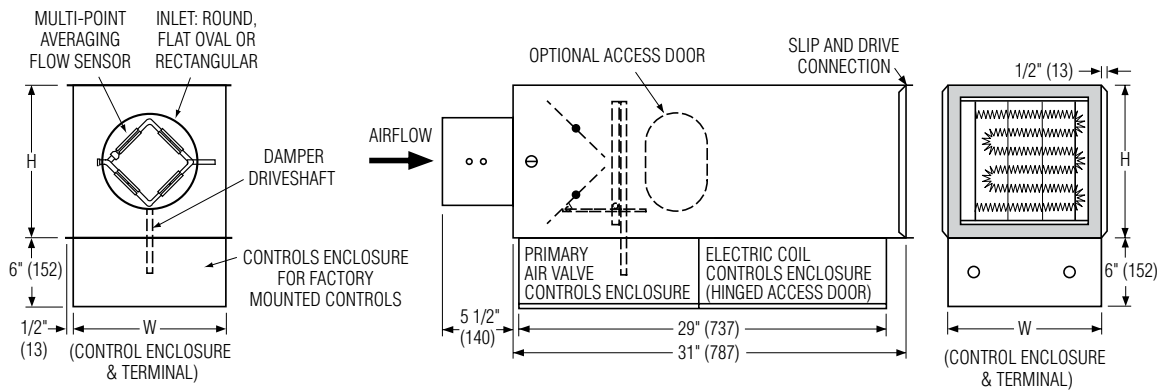
Model 30RE • Integral Electric Reheat

Digital and Analog Electronic Controls

- Electric coil is factory mounted in an integral extended plenum section.
- Perforated diffuser plate minimizes air stratification.
- Full details and selection guide on page A52.



Digital and Analog Electronic Controls with Bottom Mount Control Enclosure



Dimensional Data

Unit Size	W	H	Inlet Size
4	10 (254)	10 (254)	3 7/8 (98) Round
5	10 (254)	10 (254)	4 7/8 (124) Round
6	10 (254)	10 (254)	5 7/8 (149) Round
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.

Options:

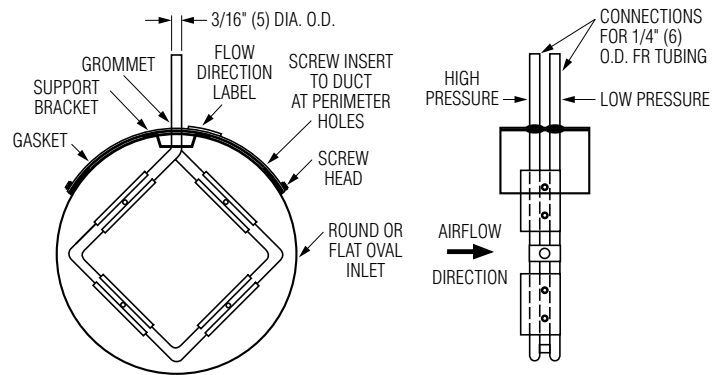
FMI Removable Flow Sensor

The (FMI) Removable Flow Sensor is a multi-point averaging airflow sensor. Designed to provide accurate sensing by sampling air velocities in four quadrants of a duct, the differential pressure flow sensor provides an averaged reading at an amplification of approximately 2.5 times the velocity pressure, dependent upon nominal size.

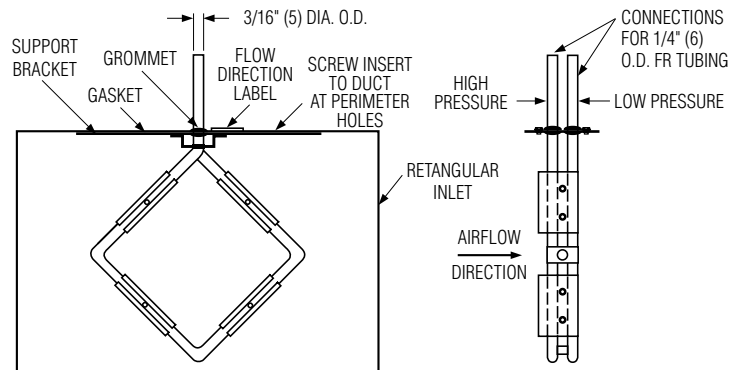
Features:

- Removable for cleaning.
- All metal construction - no combustible materials in the air stream.
- Amplifies velocity pressure approximately 2.5 times to give a wide range of useful output signal vs. flow.
- Compact size allows for easy removal in tight spaces.
- Sensor design minimizes pressure drop and regenerated noise.
- Label provided on each unit gives airflow direction.
- Multi-point sensing gives an accurate output signal with a maximum deviation of only $\pm 5\%$ with a hard 90 degree elbow, provided a straight inlet condition with a minimum length of two equivalent duct diameters is provided.

Round or Flat Oval Inlet



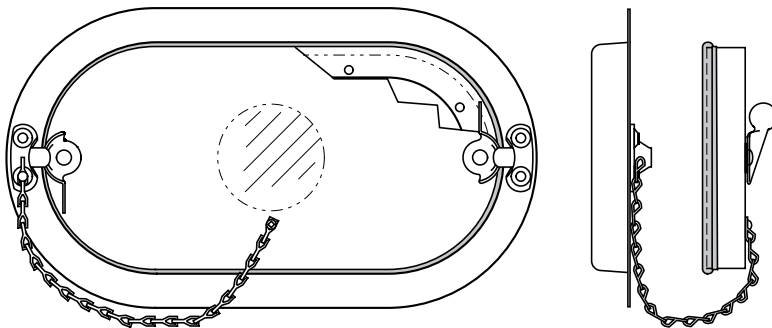
Rectangular Inlet



Access Door

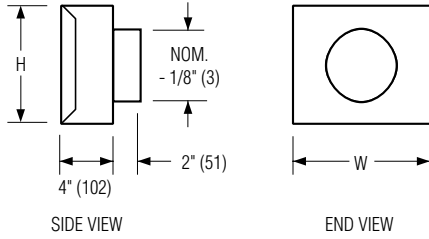
Ultra-low leakage, premium quality and performance. Flat oval design.

- Die formed 22 ga. (0.85) galvanized steel flanged frame and door panel.
- Positive bulb door seal.
- Plated steel camlock fasteners.
- 1" (25) insulation with 22 ga. (0.85) galv. backing plate.
- Leakage tested in conformance with British Standard DW/142 Class C.
- See 0800-1 submittal for more detailed information.



Terminal Unit Size	Nominal Door Size	Max. Leakage 8" w.g. (2 kPa) cfm
4 - 12	8" x 5" (203 x 127)	0.036 cfm (1.02 l/min.)
14 - 24 x 16	12" x 6" (305 x 152)	0.064 cfm (1.8 l/min.)

FF Round Discharge Collar



Unit Size	W	H	FF Outlet Size / Oval
4, 5, 6	10 (254)	10 (254)	4, 5, 6 (102, 127, 152)
7, 8	12 (305)	12 1/2 (318)	7, 8 (178, 203)
9, 10	14 (356)	12 1/2 (318)	9, 10 (229, 254)
12	18 (457)	12 1/2 (318)	12 (305)
14	24 (610)	12 1/2 (318)	14 (356)
16	28 (711)	12 1/2 (318)	16 (406)
24 x 16	38 (965)	18 (457)	—

Ultra Low Leakage Casing (ULC) Option, CFM (l/s)

Inlet Size	Pressure, w.g. (Pa)			
	0.5" (124)	1.0" (249)	3" (746)	6" (1049)
4, 5, 6	1 (0.5)	1 (0.5)	3 (1)	6 (3)
7, 8	1 (0.5)	2 (1)	4 (2)	7 (3)
9, 10	1 (0.5)	2 (1)	4 (2)	8 (4)
12	2 (1)	3 (1)	5 (2)	9 (4)
14	2 (1)	3 (1)	5 (2)	9 (4)
16	2 (1)	3 (1)	5 (2)	10 (5)
24 x 16	3 (1)	4 (2)	6 (3)	12 (6)

The ULC option consists of silicone applied to all internal seams during assembly, resulting in an air tight casing to meet the strictest project specifications.

Standard Leakage Casing, CFM (l/s)

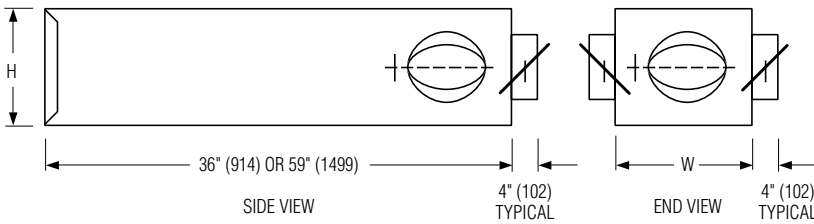
Inlet Size	Pressure, w.g. (Pa)		
	0.25" (62)	0.5" (124)	1.0" (249)
4, 5, 6	3 (1)	4 (2)	3 (1)
7, 8	2 (1)	3 (1)	7 (3)
9, 10	2 (1)	3 (1)	5 (2)
12	2 (1)	3 (1)	6 (3)
14	3 (1)	4 (2)	4 (2)
16	3 (1)	4 (2)	6 (3)
24 x 16	7 (3)	9 (4)	7 (3)

Accessories:

Accessories ordered as separate models.

MOA (Multi-Outlet Attenuator)

- MOA303 3' (916) Long
- MOA305 5' (1524) Long



Unit Size	W	H	No. of Outlets	Outlet Size
4, 5, 6	10 (254)	10 (254)	1, 2, or 3	6 (152)
7, 8	12 (305)	12 1/2 (318)	2, 3, 4 or 5	6, 8 (152, 203)
9, 10	14 (356)	12 1/2 (318)	3, 4 or 5	8 (203)
	14 (356)	12 1/2 (318)	2, 3 or 4	10 (254)
12	18 (457)	12 1/2 (318)	4 or 5	8 (203)
	18 (457)	12 1/2 (318)	3, 4 or 5	10 (254)
14	28 (711)	12 1/2 (318)	4 or 5	10 (254)
16	28 (711)	12 1/2 (318)	4 or 5	10 (254)

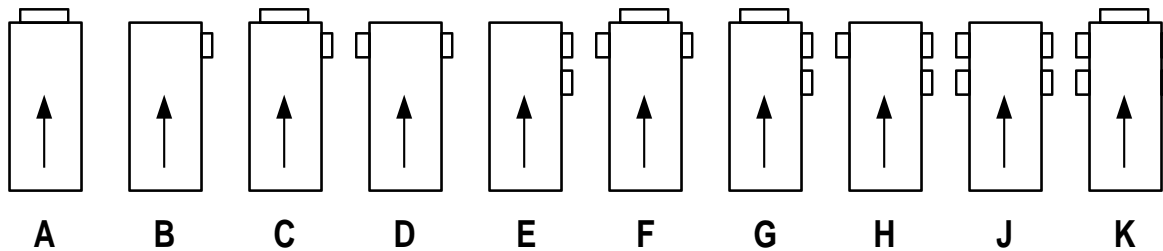
FEATURES:

- 22 ga. (0.86) galvanized steel construction, mechanically sealed, low leakage construction.
- Shipped loose for field attachment.
- Only one outlet size to be specified per M.O.A. No mixing of outlet sizes on the same unit.
- Number and size of outlets on M.O.A. not to exceed the limits listed in table, both maximum quantity of outlets and maximum size of outlet.
- All round outlets include manual dampers with hand locking quadrant.
- 3/4" (19) dual density insulation, exposed edges coated to prevent erosion.
- Denotes inlet airflow direction. →
- Slip and drive cleat duct connection.
- For special outlet sizes and arrangements, consult your Nailor representative.

OPTIONS:

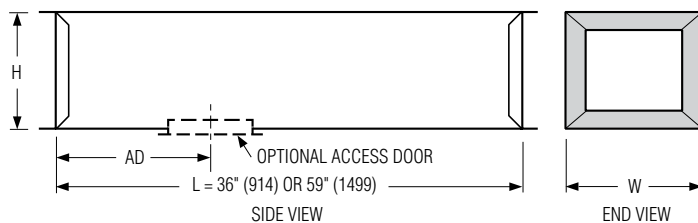
- Steri-Liner.
- Fiber-Free Liner.
- 1" (25) Fiberglass Liner.

Standard Outlet Arrangements



AT Discharge Sound Attenuator

- AT303 3' (916) Long
- AT305 5' (1524) Long



Unit Size	W	H	AD
4, 5, 6	10 (254)	10 (254)	12 (305)
7, 8	12 (305)	12 1/2 (318)	12 (305)
9, 10	14 (356)	12 1/2 (318)	12 (305)
12	18 (457)	12 1/2 (318)	12 (305)
14	24 (610)	12 1/2 (318)	12 (305)
16	28 (711)	12 1/2 (318)	12 (305)
24 x 16	38 (965)	18" (457)	12 (305)

FEATURES:

- 22 ga. (0.86) galvanized steel construction.
- Shipped loose for field attachment.
- Slip and drive connection.
- 3/4" (14) dual density fiberglass insulation, exposed edges coated to prevent erosion as standard.

OPTIONS:

- Steri-Liner.
- Fiber-Free Liner.
- Solid Metal Liner.
- 1" (25) Fiberglass Liner.
- 2" (51) Fiberglass Liner.
- Perforated Metal Liner.
- Steri-Liner with Perforated Liner.
- Access Door
 - Sizes 4 to 12 : 8" x 5" (203 x 127) Oval;
 - Sizes 14 to 24 x 16: 12" x 6" (305 x 152) Oval.

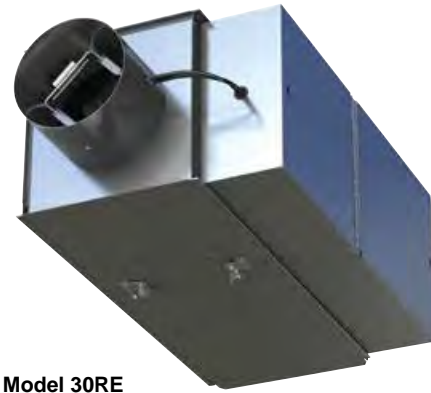
Note: Select Insulation to match VAV terminal.

Recommended Airflow Ranges For Single Duct Pressure Independent Terminal Units

The recommended airflow ranges below are for 3000 Series single duct terminal units with pressure independent controls and are presented as ranges for total and controller specific minimum and maximum airflow. Airflow ranges are based upon maintaining reasonable sound levels and controller limits using Nailor's Diamond Flow Sensor as the airflow measuring device. For a given unit size, the minimum, auxiliary minimum (where applicable) and the maximum flow setting must be within the range limits to ensure pressure independent operation, accuracy and repeatability.

Minimum airflow limits are based upon .02" w.g. (5 Pa) differential pressure signal from Diamond Flow Sensor on analog/ digital controls and .03" (7.5) for pneumatic controllers. This is a realistic low limit for many transducers used in the digital controls industry. Check your controls supplier for minimum limits. Setting airflow minimums lower, may cause damper hunting and result in a failure to meet minimum ventilation requirements. Factory settings will therefore not be made outside these ranges; however, a minimum setting of zero (shut-off) is an available option on pneumatic units. Where an auxiliary setting is specified, the value must be greater than the minimum setting.

The high end of the tabulated Total Airflow Range on pneumatic and analog electronic controls represents the Diamond Flow Sensor's differential pressure reading at 1" w.g. (249 Pa). The high end airflow range for digital controls is represented by the indicated transducer differential pressure.



Model 30RE

ASHRAE 130 "Performance Rating of Air Terminals" is the method of test for the certification program. The "standard rating condition" (certification rating point) airflow volumes for each terminal unit size are tabulated below per AHRI Standard 880. These air volumes equate to an approximate inlet velocity of 2000 fpm (10.2 m/s).

When digital or other controls are mounted by Nailor, but supplied by others, these values are guidelines only, based upon experience with the majority of controls currently available. Controls supplied by others for factory mounting are configured and calibrated in the field. Airflow settings on pneumatic and analog controls supplied by Nailor are factory preset when provided.

Imperial Units, Cubic Feet per Minute

Unit Size	Inlet Type	Total Airflow Range, cfm	Airflow at 2000 fpm Inlet Velocity (nom.), cfm	Range of Minimum and Maximum Settings, cfm							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure ("w.g.)							
				Min.	Max.	Min.	Max.	Min.	Max.	1.25	1.5
4	Round	0 – 225	150	30	180	25	180	25	180	200	225
5		0 – 400	250	55	325	45	325	45	325	360	400
6		0 – 550	400	80	450	65	450	65	450	500	550
7	Round	0 – 800	550	115	650	95	650	95	650	725	800
8		0 – 1100	700	155	900	125	900	125	900	1000	1100
9		0 – 1400	900	200	1150	165	1150	165	1150	1285	1400
10		0 – 1840	1100	260	1500	215	1500	215	1500	1675	1840
12	Flat Oval	0 – 2500	1600	355	2050	290	2050	290	2050	2300	2500
14		0 – 3370	2100	440	2550	360	2550	360	2550	2850	3125
16		0 – 4510	2800	525	3040	430	3040	430	3040	3400	3725
24 x 16	Rect.	0 – 8330	5350	1180	6800	960	6800	960	6800	7600	8330

Metric Units, Liters per Second

Unit Size	Inlet Type	Total Airflow Range, l/s	Airflow at 10.2 m/s Inlet Velocity (nom.), l/s	Range of Minimum and Maximum Settings, l/s							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure (Pa)							
				Min.	Max.	Min.	Max.	Min.	Max.	311	374
4	Round	0 – 106	71	14	85	12	85	12	85	94	106
5		0 – 189	118	26	153	21	153	21	153	170	189
6		0 – 260	189	38	212	31	212	31	212	236	260
7	Round	0 – 378	260	54	307	45	307	45	307	342	378
8		0 – 519	330	73	425	59	425	59	425	472	519
9		0 – 661	425	94	543	78	543	78	543	606	661
10		0 – 868	519	123	708	101	708	101	708	790	868
12	Flat Oval	0 – 1180	755	168	967	137	967	137	967	1085	1180
14		0 – 1590	991	208	1203	170	1203	170	1203	1345	1475
16		0 – 2128	1321	248	1435	203	1435	203	1435	1604	1758
24 x 16	Rect.	0 – 3931	2525	557	3209	453	3209	453	3209	3586	3931

Performance Data • NC Level Application Guide

3000 Series • Basic Unit

Fiberglass Liner

SINGLE DUCT TERMINAL UNITS

Inlet Size	Airflow cfm / s		Min. inlet ΔPs "w.g. Pa		NC Levels @ Inlet Pressure (ΔPs) shown																	
					DISCHARGE (basic assembly)					DISCHARGE w/ 36" (914) attenuator					RADIATED							
					Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)
4	225	106	0.53	133	21	-	30	33	34	36	-	-	29	33	33	34	-	*	-	23	25	29
	200	94	0.43	106	20	25	29	33	34	35	-	25	29	33	33	34	-	-	-	21	24	28
	150	71	0.10	25	-	21	26	29	30	30	-	-	26	28	29	30	-	-	-	21	22	22
	100	47	0.11	28	-	-	21	21	21	21	-	-	20	-	-	20	-	-	-	-	20	23
	75	35	0.06	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
5	400	189	0.19	48	-	23	28	30	33	35	-	20	26	30	31	33	-	-	-	23	26	31
	300	142	0.11	28	-	23	29	30	33	35	-	23	29	30	33	34	-	-	-	21	23	28
	250	118	0.05	12	-	23	28	31	33	34	-	-	28	30	33	34	-	-	-	-	22	25
	200	94	0.05	13	-	21	25	28	29	30	-	20	25	25	28	29	-	-	-	-	20	22
	125	59	0.02	5	-	-	20	21	21	21	-	-	20	20	20	20	-	-	-	-	-	-
6	550	260	0.01	2	-	25	29	33	36	38	-	20	25	30	33	34	-	-	20	25	28	31
	450	212	0.01	2	-	23	28	33	35	36	-	20	25	30	31	33	-	-	-	22	24	29
	400	189	0.01	2	-	20	25	30	31	33	-	-	23	26	29	30	-	-	-	21	25	29
	200	94	0.01	2	-	-	21	24	24	24	-	-	21	23	24	24	-	-	-	-	-	20
	100	47	0.01	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	800	378	0.01	2	-	24	28	31	35	38	-	23	26	30	34	36	25	-	22	28	33	37
	650	307	0.01	2	-	23	28	33	37	37	-	23	26	31	34	36	20	-	21	24	29	34
	550	260	0.01	2	-	-	24	30	31	34	-	-	24	28	30	33	-	-	-	24	28	32
	335	158	0.01	2	-	-	21	25	25	26	-	-	20	24	24	25	-	-	-	20	22	24
	225	106	0.01	2	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-
8	1100	519	0.01	2	25	28	31	34	37	40	24	26	29	31	36	39	-	20	25	29	31	35
	900	425	0.01	2	20	24	29	33	36	38	-	23	26	31	34	37	-	-	23	26	29	33
	700	330	0.01	2	-	21	26	31	35	38	-	-	25	30	33	35	-	-	21	24	26	31
	600	283	0.01	2	-	-	25	30	34	36	-	-	23	29	30	31	-	-	-	23	25	31
	400	189	0.01	2	-	-	-	25	26	28	-	-	-	24	24	24	-	-	-	20	21	25
9	1400	661	0.01	2	23	28	31	34	37	39	21	28	30	33	36	39	20	20	23	28	34	38
	1250	590	0.01	2	-	25	29	33	35	38	-	24	29	31	35	37	-	20	22	26	33	36
	900	425	0.01	2	-	-	24	28	31	35	-	-	23	28	30	33	-	-	-	23	28	31
	675	319	0.01	2	-	-	23	28	30	33	-	-	23	28	30	31	-	-	-	20	25	26
	450	212	0.01	2	-	-	-	23	24	25	-	-	-	21	23	24	-	-	-	-	20	22
10	1850	873	0.01	2	24	31	34	36	38	39	24	30	31	34	36	38	22	22	26	31	33	37
	1650	779	0.01	2	20	28	31	35	37	39	-	28	31	33	35	37	-	20	25	30	31	36
	1100	519	0.01	2	-	21	25	28	31	35	-	-	21	25	29	31	-	-	21	24	25	31
	825	389	0.01	2	-	-	20	25	29	31	-	-	-	21	25	29	-	-	-	21	23	28
	550	260	0.01	2	-	-	-	21	24	26	-	-	-	-	21	23	-	-	-	-	-	22
12	2500	1180	0.01	2	-	31	34	35	38	40	-	31	33	35	36	38	29	28	31	34	35	40
	2000	944	0.01	2	-	28	30	31	35	37	-	26	28	30	31	34	22	25	29	31	33	37
	1600	755	0.01	2	-	23	26	29	33	35	-	20	23	26	29	33	-	20	25	28	30	35
	1200	566	0.01	2	-	-	21	25	29	33	-	-	-	23	25	29	-	-	20	24	28	31
	800	378	0.01	2	-	-	-	-	21	24	-	-	-	-	-	21	-	-	-	20	21	24
14	3125	1475	0.01	2	23	31	34	35	38	39	20	31	33	34	36	38	29	28	31	36	39	43
	2700	1274	0.01	2	-	29	30	33	35	37	-	28	29	31	34	36	24	25	30	34	37	40
	2100	991	0.01	2	-	21	25	29	33	36	-	21	24	28	30	34	-	21	26	31	34	37
	1550	731	0.01	2	-	-	21	26	30	33	-	-	20	25	26	29	-	-	24	28	30	34
	1050	495	0.01	2	-	-	-	21	24	26	-	-	-	21	23	24	-	-	-	24	26	28
16	3725	1758	0.03	8	-	29	31	33	35	38	-	28	30	31	35	38	30	30	33	37	40	44
	3500	1652	0.03	8	-	26	29	31	34	36	-	24	28	31	34	35	28	30	33	36	39	43
	2800	1321	0.02	6	-	23	26	29	31	34	-	21	25	29	30	33	23	24	29	34	36	40
	2100	991	0.02	4	-	-	20	25	26	30	-	-	-	23	25	28	-	-	26	30	34	36
	1400	661	0.01	3	-	-	-	-	21	24	-	-	-	-	-	23	-	-	21	26	29	31
24 x 16	8330	3931	0.02	5	49	49	49	52	53	53	48	48	48	50	52	52	44	44	49	51	54	57
	7000	3303	0.02	4	45	45	45	48	49	50	44	44	44	46	48	49	40	41	47	49	51	55
	6000	2831	0.01	2	40	41	43	45	46	48	39	40	41	44	45	46	36	39	45	47	49	53
	5350	2525	0.01	2	35	38	40	43	45	46	34	36	39	41	44	45	32	38	44	46	48	51
	4000	1888	0.01	2	25	31	35	38	40	43	24	30	34	36	39	41	24	35	39	43	45	47
3000	1416	0.01	2	-	24	29	33	35	38	-	23	28	31	34	37	20	31	36	38	40	44	

Performance Notes:

1. NC Levels are calculated based on procedures as outlined on page A101.
2. Dash (-) in space indicates a NC less than 20.
3. Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.

Performance Data • Radiated Sound Power Levels

3000 Series • Basic Unit
Fiberglass Liner



Inlet Size	Airflow		Min. inlet ΔPs		Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown																																									
					Minimum ΔPs							0.5" wg (125Pa) ΔPs							1.0" wg (250Pa) ΔPs							1.5" wg (375Pa) ΔPs							2.0" wg (500Pa) ΔPs							3.0" wg (750Pa) ΔPs						
					2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
4	225	106	0.53	133	-	37	33	33	-	-	*	*	*	*	*	*	51	48	45	38	32	30	55	54	49	42	33	32	55	55	51	44	35	33	56	57	54	48	39	38						
	200	94	0.43	106	-	36	33	32	-	-	-	39	37	38	29	29	49	46	43	37	30	29	53	52	47	40	32	31	53	53	50	42	33	33	54	55	53	47	37	37						
	150	71	0.10	25	-	35	29	31	-	-	-	40	36	30	25	23	47	46	40	34	28	26	49	50	47	39	31	30	47	48	48	43	34	32	48	48	48	50	40	37						
	100	47	0.11	28	-	-	-	-	-	-	-	37	32	27	-	-	-	43	42	34	27	23	-	44	45	41	32	29	-	43	46	46	36	32	-	42	44	51	43	38						
	75	35	0.06	16	-	-	-	-	-	-	-	37	31	26	-	-	-	41	43	37	29	24	-	42	45	42	32	29	-	38	42	45	40	33	-	36	41	48	44	40						
5	400	189	0.19	48	49	41	34	36	34	27	52	45	40	40	39	36	56	48	45	38	37	34	60	52	49	40	39	34	63	56	51	42	40	36	63	59	56	45	44	40						
	300	142	0.11	28	47	38	32	32	30	27	50	43	37	35	33	31	54	46	44	37	35	31	57	49	47	39	38	33	59	52	49	40	39	35	59	55	53	43	43	39						
	250	118	0.05	12	-	35	31	25	23	-	50	40	36	32	30	25	54	45	42	33	32	28	55	48	45	35	35	30	56	51	48	37	37	32	57	53	51	42	41	35						
	200	94	0.05	13	-	-	-	-	-	-	50	38	34	27	25	-	52	43	39	31	30	25	52	45	43	32	32	28	53	48	46	36	36	30	53	48	48	44	41	34						
	125	59	0.02	5	-	-	-	-	-	-	-	33	29	21	-	-	48	40	38	28	27	-	48	42	42	34	33	27	49	42	44	39	38	29	49	42	44	47	46	37						
6	550	260	0.01	2	48	47	41	39	31	29	49	48	42	41	35	31	57	52	46	41	35	32	62	55	49	45	36	34	64	58	51	45	40	38	67	61	56	48	44	43						
	450	212	0.01	2	48	44	37	35	30	28	48	47	40	38	32	29	56	50	45	40	34	31	59	53	48	44	36	33	61	55	50	43	39	37	64	58	54	46	42	41						
	400	189	0.01	2	-	42	33	33	28	26	49	46	39	35	30	28	56	49	44	38	32	29	59	52	47	40	36	33	62	54	49	42	39	36	64	58	54	45	42	41						
	200	94	0.01	2	-	-	-	-	-	-	47	36	30	24	-	-	53	43	38	30	29	28	53	45	43	32	31	30	53	47	44	36	32	32	55	49	46	43	37	37						
	100	47	0.01	2	-	-	-	-	-	-	-	34	27	-	-	-	-	35	38	33	29	24	45	39	40	37	31	28	47	39	40	42	37	32	46	40	40	46	44	38						
7	800	378	0.01	2	50	47	51	37	36	36	50	48	45	37	33	33	57	52	48	40	34	32	63	58	53	46	38	35	68	62	56	49	40	38	70	66	61	54	45	42						
	650	307	0.01	2	49	45	46	38	31	30	49	48	45	37	31	29	54	50	47	40	34	32	60	54	50	44	37	35	64	58	54	48	40	38	67	63	58	51	44	43						
	550	260	0.01	2	48	43	41	33	27	25	48	44	40	32	28	26	55	49	45	38	32	30	61	54	49	43	36	33	64	58	52	45	38	36	65	61	57	50	42	40						
	335	158	0.01	2	-	-	28	33	-	-	-	-	40	35	29	24	-	52	48	42	36	30	28	57	51	46	40	32	30	57	52	48	42	34	32	57	53	50	47	39	38					
	225	106	0.01	2	-	-	-	-	-	-	-	-	39	33	28	-	-	50	45	40	34	28	25	52	47	43	38	31	29	51	47	43	41	33	31	52	48	45	42	35	36					
8	1100	519	0.01	2	52	50	45	37	34	33	57	51	46	37	35	32	60	54	51	40	38	33	65	57	53	43	42	36	67	60	56	45	44	39	70	63	60	49	48	42						
	900	425	0.01	2	51	47	40	34	31	29	56	50	45	37	34	31	58	53	49	39	37	33	63	56	51	42	42	36	65	58	54	44	44	39	68	60	56	47	48	42						
	700	330	0.01	2	50	43	37	31	29	25	51	47	42	33	31	28	57	51	47	37	36	32	61	53	50	40	39	35	63	55	51	42	41	37	64	59	56	45	44	40						
	600	283	0.01	2	-	39	33	29	26	-	50	45	40	31	30	26	57	49	45	35	34	31	60	53	49	38	38	33	61	55	51	40	40	36	63	59	56	44	43	40						
	400	189	0.01	2	-	35	26	-	-	-	49	41	36	28	27	24	54	47	41	32	31	30	57	52	46	35	34	32	57	52	47	37	36	34	59	54	51	41	40	39						
9	1400	661	0.01	2	51	46	46	44	37	35	52	47	46	41	38	35	57	53	49	42	37	35	64	58	53	47	41	37	66	63	57	50	43	40	69	67	61	54	47	44						
	1250	590	0.01	2	51	46	45	42	35	35	51	46	46	41	37	34	56	52	48	42	36	34	63	57	52	46	40	37	65	62	56	50	43	40	68	65	60	53	46	44						
	900	425	0.01	2	48	40	39	36	30	29	50	45	42	37	32	30	56	50	45	40	35	33	60	54	49	44	39	36	63	58	52	47	41	38	64	61	56	50	44	42						
	675	319	0.01	2	47	37	31	29	22	-	49	41	36	31	28	25	55	48	42	37	32	30	58	52	46	41	35	33	60	56	50	44	38	36	60	57	52	47	41	39						
	450	212	0.01	2	-	-	24	-	-	-	48	40	33	30	26	24	53	46	39	34	30	29	54	49	43	38	33	31	55	50	46	41	35	34	56	52	48	45	39	38						
10	1850	873	0.01	2	57	47	48	40	36	27	58	49	48	40	37	31	60	55	52	45	39	35	64	59	56	50	43	39	65	62	57	52	46	42	68	66	61	56	49	46						
	1650	779	0.01	2	55	45	45	40	35	26	57	49	46	39	36	30	59	54	51	44	38	34	63	58	55	49	42	38	64	60	56	51	45	41	67	65	60	55	48	45						
	1100	519	0.01	2	51	37	35	30	25	-	53	46	42	35	31	27	55	50	47	41	35	31	60	54	50	45	39	36	61	56	51	47	42	39	64	61	55	51	45	43						
	825	389	0.01	2	-	33	29	25	-	-	50	43	38	32	29	25	55	48	43	38	33	30	58	52	47	42	37	34	59	54	49	44	39	37	61	57	53	49	43	41						
	550	260	0.01	2	-	-	-	-	-	-	-	38	33	29	25	-	51	44	38	34	30	28	53	47	42	38	34	32	56	50	45	41	36	35	57	52	48	45	40	38						
12	2500	1180	0.01	2	57	55	54	50	42	36	60	57	53	46	41	38	63	61	54	50	42	39	66	63	57	53	45	41	67	64	59	55	48	44	70	69	63	59	52	50						
	2000	944	0.01	2	54	50	48	44	37	33	58	55	51	46	39	35	63	61	59	53	49	42	37	64	61	56	52	45	41	65	62	58	55	48	44	68	66	61	58	51	49					
	1600	755	0.01	2	52	45	41	36	30	27	56	52	45	40	34	30	59	56	49	46	38	35	61	58	53	49	42	39	62	60	55	51	44	42	65	64	58	55	48	46						
	1200	566	0.01	2	47	39	33	29	24	-	52	48	40	36	30	27	55	52	45	41	34	32	58	55	49	45	38	36	60	58	51	48	41	39	61	61	55	52	45	44						
	800	378	0.01	2	-	-	-	-	-	-	50	41	34	30	26	-	52	48	41	37	31	30	53	52	45	42	35	33	54	53	47	44	37	36	56	55	50	48	42	42						
14	3125	1475	0.01	2	61	57	54	50	45	38	62	58	53	49	45	38	64	61	55	50	47	40	67	65	59	52	49	46	67	68	61	54	52	49	71	71	65	58	5							

Performance Data • AHRI Certification and Performance Notes

3000 Series • Basic Unit • AHRI Certification Rating Points

Fiberglass Liner

Inlet Size	Airflow		Min. Inlet ΔPs		Discharge Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs							Radiated Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs						
					Octave Band							Octave Band						
	cfm	l/s	"w.g.	Pa	2	3	4	5	6	7	2	3	4	5	6	7		
4	150	71	0.10	25	69	68	62	58	51	48	49	50	47	39	31	30		
5	250	118	0.05	12	71	70	63	61	51	48	55	48	45	35	35	30		
6	400	189	0.01	2	72	70	63	60	53	51	59	52	47	40	36	33		
7	550	260	0.01	2	74	70	65	62	55	53	61	54	49	43	36	33		
8	700	330	0.01	2	76	71	67	65	58	55	61	53	50	40	39	35		
9	900	425	0.01	2	75	69	67	65	58	55	60	54	49	44	39	36		
10	1100	519	0.01	2	74	69	66	65	58	55	60	54	50	45	39	36		
12	1600	755	0.01	2	76	70	69	68	62	58	61	58	53	49	42	39		
14	2100	991	0.01	2	75	70	71	70	64	60	63	61	55	48	44	43		
16	2800	1321	0.02	5	76	70	68	67	62	58	65	63	57	50	44	39		
24 x 16	5350	2525	0.01	2	87	81	79	76	72	69	72	70	70	65	60	55		



Ratings are certified in accordance with AHRI Standards.

Performance Notes for Sound Power Levels:

- Discharge sound power is the noise emitted from the unit discharge into the downstream duct. Discharge Sound Power Levels (SWL) now include duct end reflection energy as part of the standard rating. Including the duct end correction provides sound power levels that would normally be transmitted into an acoustically, non-reflective duct. The effect of including the energy correction to the discharge SWL, is higher sound power levels when compared to previous AHRI certified data. For more information on duct end reflection calculations see AHRI Standard 880.
- Radiated sound power is the breakout noise transmitted through the unit casing walls.
- Sound power levels are in decibels, dB re 10⁻¹² watts.
- All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation. Dash (-) in space indicates sound power level is less than 20 dB or equal to background.
- Minimum inlet ΔPs is the minimum operating pressure requirement of the unit (damper full open) and the difference in static pressure from inlet to discharge of the unit.
- Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.
- Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 130 and AHRI Standard 880.

A

SINGLE DUCT TERMINAL UNITS

3000Q SERIES • QUIET TYPE WITH DISSIPATIVE SILENCER PRODUCT OVERVIEW



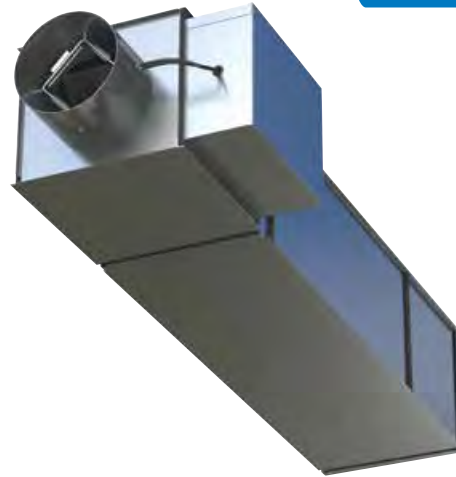
Nailor 3000Q Series Quiet Terminal units control the flow of conditioned primary air into a constant or variable air volume (VAV) HVAC system at exceptionally quiet levels. There are three versions of the 3000Q series: the standard cooling unit (3001Q), a cooling with water reheat unit (30RWQ) and a cooling unit with electric reheat (30REQ). Each unit includes a VAV terminal and factory installed dissipative silencer providing an assembly ideal for use in sound sensitive environments like libraries, performance halls, classrooms, conference rooms, studios and hospitals.

The 3000Q Series shares design features with the 3000 Series terminal units like the opposed blade damper (OBD), rectangular discharge, multi-point averaging Diamond Flow Sensor and various control options. The VAV and silencer assembly is designed to provide minimal impact on system pressure drop while concurrently delivering superior sound attenuation.

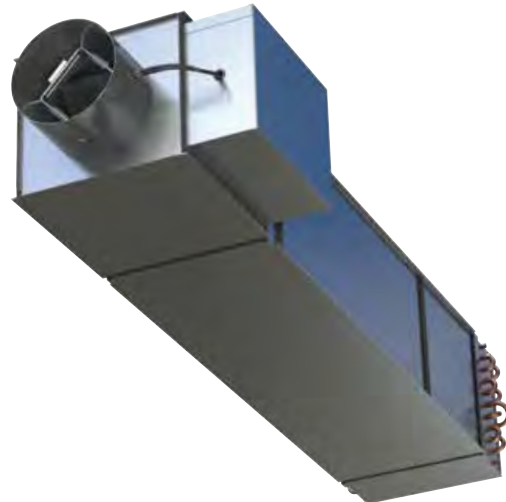
Each dissipative silencer is constructed with internal baffle (an acoustic absorption media) and is internally insulated. The baffles are made of perforated steel and are designed with elliptical nose pieces to transition air into and out of the silencer. Arranged inside the silencer as side pods, the baffles act to attenuate discharge sound using an acoustical media placed between the silencer casing and the baffle. Internal (top and bottom) panels exposed to the airstream are insulated with fiberglass and as a result, field installed externally wrapped insulation is not needed.

Of the three available types of media, the standard is a simple fiberglass fill which provides exceptional attenuation. When IAQ is a concern, the fiberglass can be wrapped in a woven fiberglass cloth to prevent erosion and entrainment of fibers into the airstream. Since the fiberglass cloth is porous moisture can penetrate the underlying fiberglass. There is also an option that wraps the fiberglass with Mylar, designed primarily for environments where fiberglass isolation is paramount.

In the past, selecting a silencer to mate with a VAV terminal involved multiple calculations, guesswork and an intimate knowledge of silencer performance. The engineer or contractor had to contend with pressure classes, sizes and free area to balance the associated pressure drop, attenuation and self generated noise against the VAV terminal performance. Even after careful selection, the result was still a guess due to the unknown system effect created by the close coupled terminal/silencer assembly. Since each 3000Q Series unit is designed, manufactured and tested as a complete assembly, the guesswork is eliminated.



3001Q Cooling or Heating only



30RWQ Cooling with Hot Water Reheat



30REQ Cooling with Electric Reheat

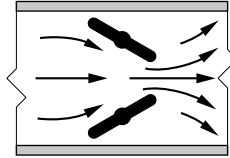
SINGLE DUCT VARIABLE OR CONSTANT AIR VOLUME

3000Q SERIES

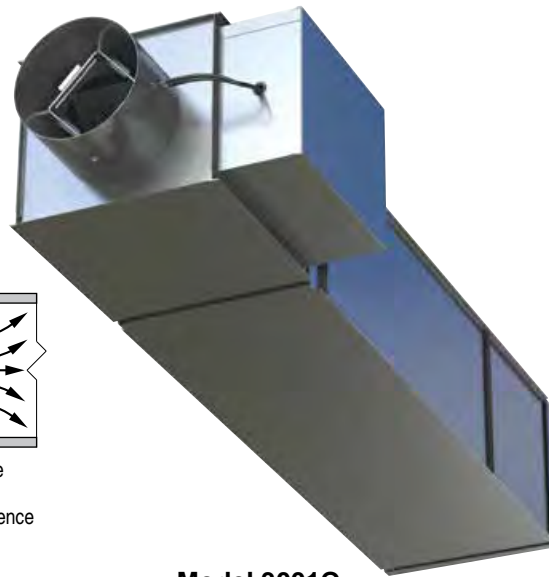
- QUIET
- DISSIPATIVE SILENCER

Models:

- 3001Q** Cooling or Heating only
- 30RWQ** Cooling with Hot Water Reheat
- 30REQ** Cooling with Electric Reheat



Inclined opposed blade damper configuration minimizes noisy turbulence and provides smooth, accurate, near linear flow control.



Model 3001Q

3000Q Series Quiet terminal units are used in noise sensitive applications such as libraries, studios, performance halls, classrooms, conference rooms and hospitals. The integral dissipative silencer minimizes pressure loss, reduces self-generated sound and maximizes acoustical attenuation, providing an extremely quiet terminal without the addition of downstream acoustic insulation. Model 3000Q Series are available with electric or hot water reheat as well as options like removable flow sensors and access doors. Each unit is available with multiple insulation types, ranging from standard fiberglass to IAQ types.

STANDARD FEATURES:

- Designed for noise sensitive applications such as classrooms, libraries, studios and performance halls.
- 22 ga. (0.86) galvanized steel casing, mechanically sealed, low leakage construction.
- 16 ga. (1.63) corrosion-resistant steel inclined opposed blade damper with extruded PVC seals (single blade on size 4, 5, 6). 45° rotation, CW to close. Tight shut-off. Damper leakage is less than 2% of the terminal rated airflow at 3" w.g. (746 Pa).
- 1/2" (13) dia. plated steel drive shaft. An indicator mark on the end of the shaft shows damper position.
- Multi-point averaging Diamond Flow Sensor. Aluminum construction. Supplied with balancing tees.
- Rectangular discharge with slip and drive cleat duct connection.
- Full NEMA 1 type controls enclosure for factory mounted controls.
- VAV section is lined with 3/4" (19), dual density insulation, exposed

edges coated to prevent air erosion. Meets the requirements of NFPA 90A and UL 181.

- Right-hand controls location is standard (shown) when looking in direction of airflow. Optional left hand controls mounting is available. Unit is flippable. Caution: If unit has access door.
- Available in 11 sizes ranging from 0 to 8300 cfm (0-3917 l/s) for 3001Q and 30RWQ units. 25-8300 cfm (12-3917 l/s) on 30REQ.

Silencer Section:

- Designed to mate with VAV section for optimum performance and ultra quiet operation.
- Optimized internal baffle geometry reduces self-generated noise, maximizes acoustic attenuation.
- 22 ga. (0.86) coated steel perforated baffles encapsulate fiberglass acoustic media.
- Internal insulation on top and bottom exposed panels optimizes sound reduction and eliminates need for external field applied thermal duct wrap.

Options and Accessories:

- Bottom access door.
- Removable insert type Diamond Flow Sensor.
- 24 VAC control transformer.
- Toggle disconnect switch.
- Hanger brackets.
- Controls enclosure for field or factory mounted controls.
- Dust tight enclosure seal.
- 20 ga. (1.00) construction.
- Multiple VAV liners.
- IAQ Acoustic liners available on dissipative silencer.
- Seismic certification.
- Oversized casing.



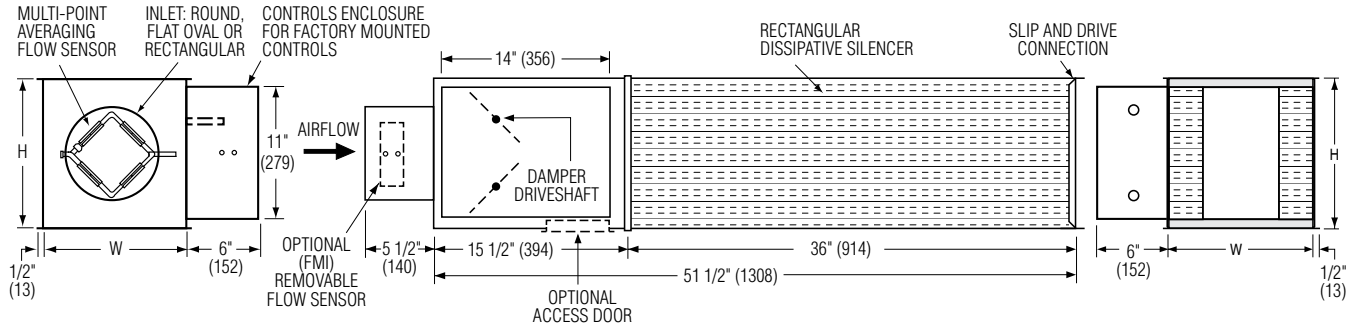
Intertek

Dimensions

Model 3001Q • Quiet • Dissipative Silencer

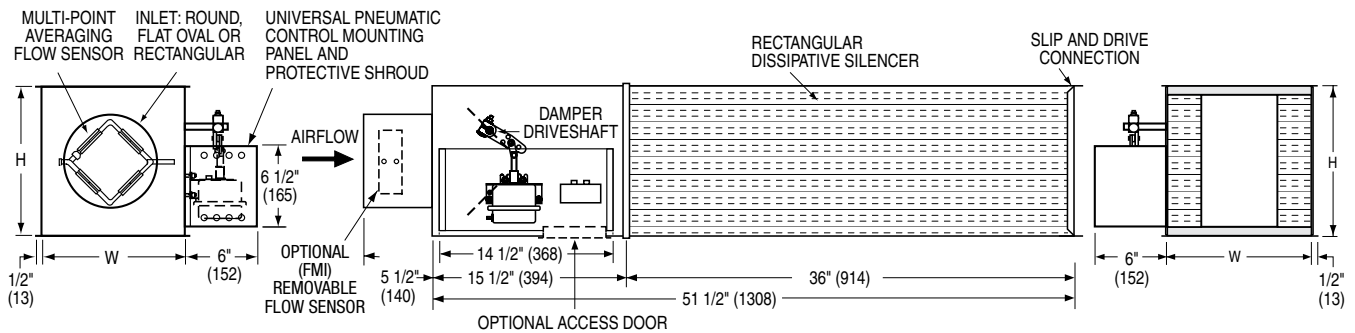
Digital and Analog Electronic Controls

- A full NEMA 1 controls enclosure is provided for factory mounted controls. Optional for field mounted controls.



Pneumatic Controls

- Universal pneumatic control mounting panel features double wall stand-off construction for strength and rigidity Controls mounting screws do not penetrate terminal casing.



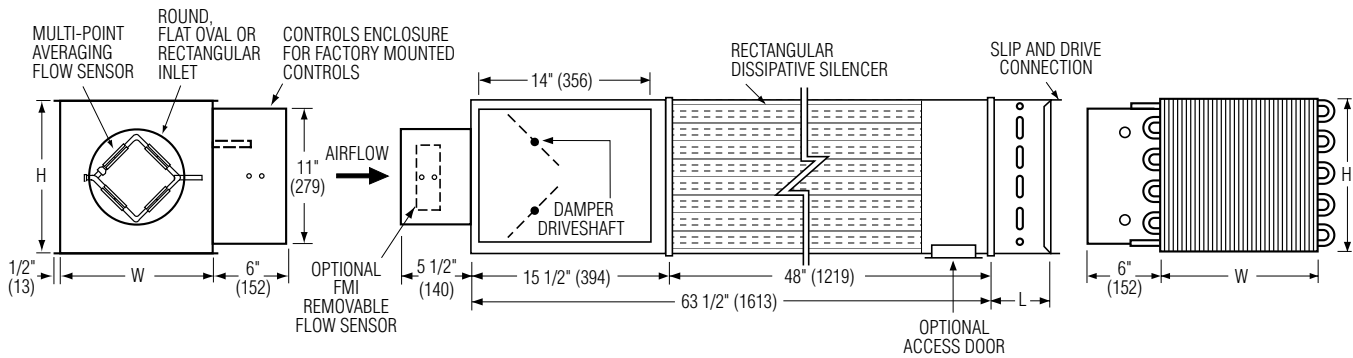
Dimensional Data

Unit Size	W	H	Inlet Size
4	10 (254)	10 (254)	3 7/8 (98) Round
5	10 (254)	10 (254)	4 7/8 (124) Round
6	10 (254)	10 (254)	5 7/8 (149) Round
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.

Dimensions

Model 30RWQ • Quiet • Dissipative Silencer • Hot Water Reheat Coil

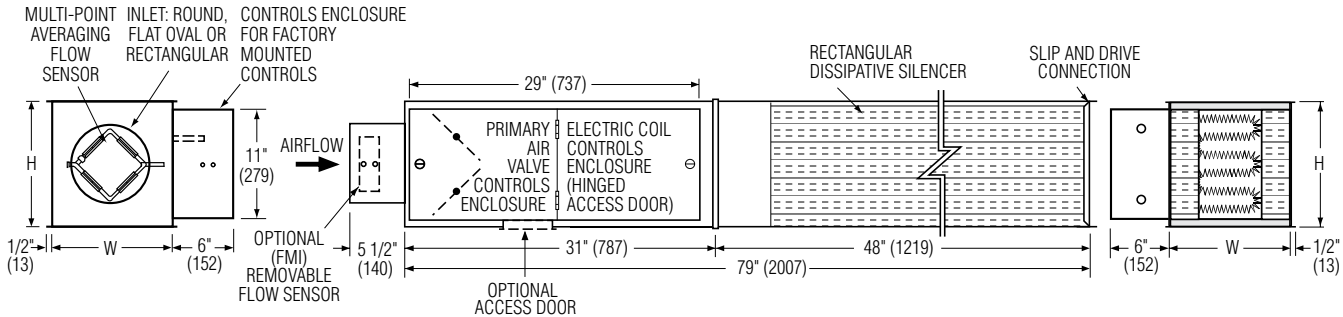
- One, two, three and four row available.
- Hot water coils have 1/2" (13) copper tubes and aluminum ripple fins, 10 per inch.
- Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.
- AHRI Certified coils.
- Coil Performance data on pages A43-A51.
- Oversized casing option on pages A40-A42.



Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.

30REQ • Integral Electric Reheat

- Electric coil is factory mounted in an integral extended plenum section.
- Full details and selection guide on page A52.



Dimensional Data

Unit Size	W	H	Inlet Size	Coil Connections			Hot Water Coil	
				1 Row	2 Row	3 & 4 Row	L (1 & 2 Row)	L (3 & 4 Row)
4	10 (254)	10 (254)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
5	10 (254)	10 (254)	4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
6	10 (254)	10 (254)	5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.	7/8 (22)	7/8 (22)	1 3/8 (35)	5 (127)	7 1/2 (191)

A SINGLE DUCT TERMINAL UNITS

Options:

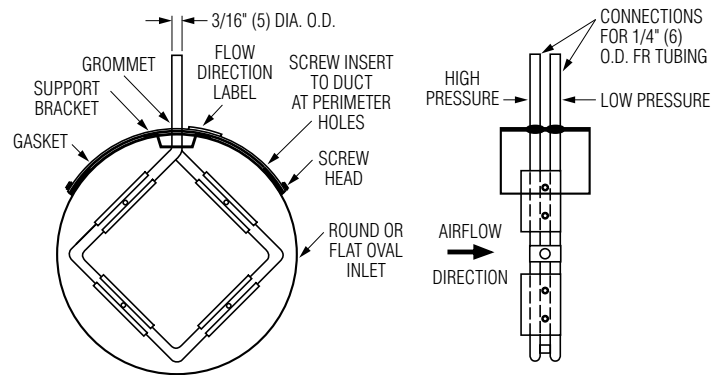
FMI Removable Flow Sensor

The (FMI) Removable Flow Sensor is a multi-point averaging airflow sensor. Designed to provide accurate sensing by sampling air velocities in four quadrants of a duct, the differential pressure flow sensor provides an averaged reading at an amplification of approximately 2.5 times the velocity pressure, dependent upon nominal size.

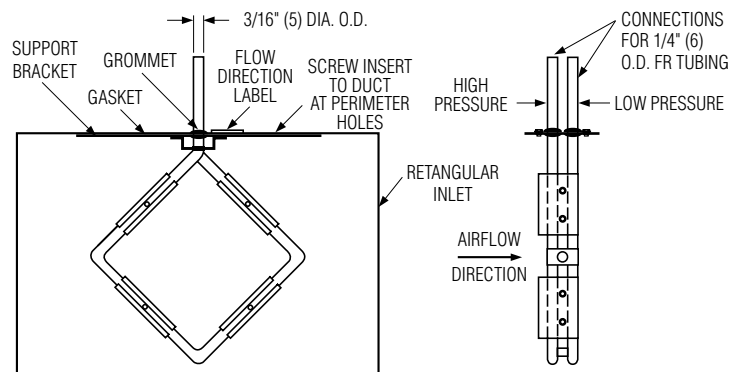
Features:

- Removable for cleaning.
- All metal construction - no combustible materials in the air stream.
- Amplifies velocity pressure approximately 2.5 times to give a wide range of useful output signal vs. flow.
- Compact size allows for easy removal in tight spaces.
- Sensor design minimizes pressure drop and regenerated noise.
- Label provided on each unit gives airflow direction.
- Multi-point sensing gives an accurate output signal with a maximum deviation of only $\pm 5\%$ with a hard 90 degree elbow, provided a straight inlet condition with a minimum length of two equivalent duct diameters is provided.

Round or Flat Oval Inlet



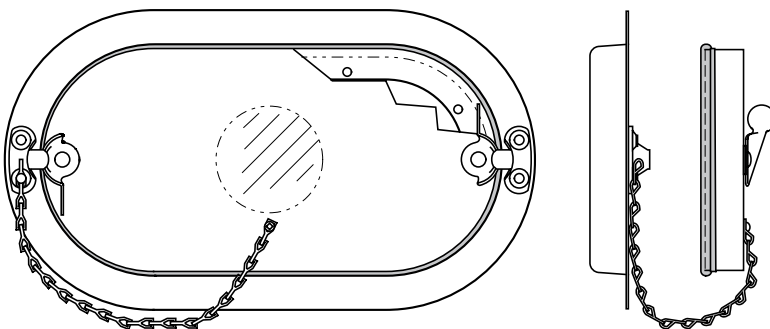
Rectangular Inlet



Access Door

Ultra-low leakage, premium quality and performance. Flat oval design.

- Die formed 22 ga. (0.86) galvanized steel flanged and door panel.
- Positive bulb door seal.
- Plated steel camlock fasteners.
- 1" (25) insulation with 22 ga. (0.86) galvanized backing plate.
- Leakage tested in conformance with British Standard DW/142 Class C.
- See 0800-1 submittal for more detailed information.



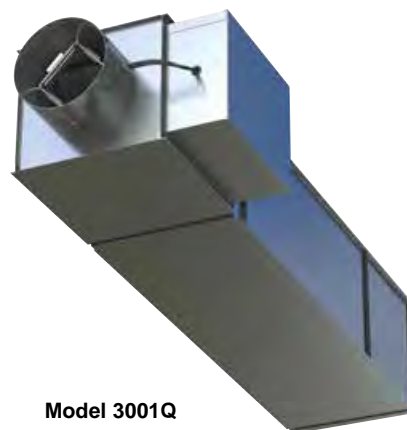
Terminal Unit Size	Nominal Door Size	Max. Leakage 8" w.g. (2 kPa) cfm
4 - 12	8" x 5" (203 x 127)	0.036 cfm (1.02 l/min.)
14 - 24 x 16	12" x 6" (305 x 152)	0.064 cfm (1.8 l/min.)

Recommended Airflow Ranges For Single Duct Terminal Units

The recommended airflow ranges below are for 3000Q Series single duct terminal units with pressure independent controls and are presented as ranges for total and controller specific minimum and maximum airflow. Airflow ranges are based upon maintaining reasonable sound levels and controller limits using Nailor's Diamond Flow Sensor as the airflow measuring device. For a given unit size, the minimum, auxiliary minimum (where applicable) and the maximum flow setting must be within the range limits to ensure pressure independent operation, accuracy and repeatability.

Minimum airflow limits are based upon .02" w.g. (5 Pa) differential pressure signal from Diamond Flow Sensor on analog/digital controls and .03" (7.5) for pneumatic controllers. This is a realistic low limit for many transducers used in the digital controls industry. Check your controls supplier for minimum limits. Setting airflow minimums lower, may cause damper hunting and result in a failure to meet minimum ventilation requirements. Factory settings will therefore not be made outside these ranges; however, a minimum setting of zero (shut-off) is an available option on pneumatic units. Where an auxiliary setting is specified, the value must be greater than the minimum setting.

The high end of the tabulated Total Airflow Range on pneumatic and analog electronic controls represents the Diamond Flow Sensor's differential pressure reading at 1" w.g. (250 Pa). The high end airflow range for digital controls is represented by the indicated transducer differential pressure.



Model 3001Q

ASHRAE 130 "Performance Rating of Air Terminals" is the method of test for the certification program. The "standard rating condition" (certification rating point) airflow volumes for each terminal unit size are tabulated below per AHRI Standard 880. These air volumes equate to an approximate inlet velocity of 2000 fpm (10.2 m/s).

When digital or other controls are mounted by Nailor, but supplied by others, these values are guidelines only, based upon experience with the majority of controls currently available. Controls supplied by others for factory mounting are configured and calibrated in the field. Airflow settings on pneumatic and analog controls supplied by Nailor are factory preset when provided.

Imperial Units, Cubic Feet per Minute

Unit Size	Inlet Type	Total Airflow Range, cfm	Airflow at 2000 fpm Inlet Velocity (nom.), cfm	Range of Minimum and Maximum Settings, cfm							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure ("w.g.)							
				Min.	Max.	Min.	Max.	Min.	Max.		
				.03	1.0	.02	1.0	.02	1.0	1.25	1.5
4	Round	0 – 225	150	30	180	25	180	25	180	200	225
5		0 – 400	250	55	325	45	325	45	325	360	400
6		0 – 550	400	80	450	65	450	65	450	500	550
7	Round	0 – 800	550	115	650	95	650	95	650	725	800
8		0 – 1100	700	155	900	125	900	125	900	1000	1100
9		0 – 1400	900	200	1150	165	1150	165	1150	1285	1400
10		0 – 1840	1100	260	1500	215	1500	215	1500	1675	1840
12	Flat Oval	0 – 2500	1600	355	2050	290	2050	290	2050	2300	2500
14		0 – 3125	2100	440	2550	360	2550	360	2550	2850	3125
16		0 – 3725	2800	525	3040	430	3040	430	3040	3400	3725
24 x 16	Rect.	0 – 8330	5350	1180	6800	960	6800	960	6800	7600	8330

Metric Units, Liters per Second

Unit Size	Inlet Type	Total Airflow Range, l/s	Airflow at 10.2 m/s Inlet Velocity (nom.), l/s	Range of Minimum and Maximum Settings, l/s							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure (Pa)							
				Min.	Max.	Min.	Max.	Min.	Max.		
				7.5	249	5	249	5	249	311	374
4	Round	0 – 106	71	14	85	12	85	12	85	94	106
5		0 – 189	118	26	153	21	153	21	153	170	189
6		0 – 260	189	38	212	31	212	31	212	236	260
7	Round	0 – 378	260	54	307	45	307	45	307	342	378
8		0 – 519	330	73	425	59	425	59	425	472	519
9		0 – 661	425	94	543	78	543	78	543	606	661
10		0 – 868	519	123	708	101	708	101	708	790	868
12	Flat Oval	0 – 1180	755	168	967	137	967	137	967	1085	1180
14		0 – 1475	991	208	1203	170	1203	170	1203	1345	1475
16		0 – 1758	1321	248	1435	203	1435	203	1435	1604	1758
24 x 16	Rect.	0 – 3931	2525	557	3209	453	3209	453	3209	3586	3931

A SINGLE DUCT TERMINAL UNITS

Performance Data • NC Level Application Guide

3000Q Series • Quiet • Dissipative Silencer

Fiberglass Acoustic Media (FAM)

Inlet Size	Airflow cfm l/s		Min. inlet ΔPs "w.g. Pa		NC Levels @ Inlet Pressure (ΔPs) shown											
					DISCHARGE					RADIATED						
					Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)
4	200	94	0.38	94	-	-	-	21	20	21	-	-	-	21	24	28
	150	71	0.23	57	-	-	-	-	-	-	-	-	-	21	22	22
	100	47	0.11	28	-	-	-	-	-	-	-	-	-	-	20	23
	50	24	0.04	11	-	-	-	-	-	-	-	-	-	-	-	-
5	350	165	0.17	41	-	-	20	24	24	28	-	-	-	23	25	30
	250	118	0.08	20	-	-	23	25	25	26	-	-	-	-	22	25
	150	71	0.03	7	-	-	-	-	-	-	-	-	-	-	-	20
	100	47	0.02	5	-	-	-	-	-	-	-	-	-	-	-	-
6	500	236	0.05	13	-	-	-	21	21	26	-	-	20	23	26	30
	400	189	0.04	10	-	-	-	20	20	23	-	-	-	21	25	29
	300	142	0.03	6	-	-	-	-	-	-	-	-	-	20	21	25
	200	94	0.01	3	-	-	-	-	-	-	-	-	-	-	-	20
7	700	330	0.03	7	-	-	23	26	29	31	22	-	21	26	30	35
	550	260	0.01	2	-	-	-	23	26	28	-	-	-	24	28	32
	400	189	0.01	2	-	-	-	23	23	24	-	-	-	20	23	26
	250	118	0.01	2	-	-	-	-	-	-	-	-	-	-	-	20
8	1100	519	0.02	4	-	20	25	28	33	36	-	20	25	29	31	35
	900	425	0.01	3	-	-	23	26	30	34	-	-	23	26	29	33
	700	330	0.01	2	-	-	23	25	30	33	-	-	21	24	26	31
	500	236	0.01	2	-	-	-	23	24	28	-	-	-	21	23	26
9	1400	661	0.01	2	-	21	25	28	33	36	20	20	23	28	34	38
	1150	543	0.01	2	-	-	20	26	29	31	-	-	21	25	31	35
	900	425	0.01	2	-	-	-	24	26	29	-	-	-	23	28	31
	650	307	0.01	2	-	-	-	23	23	25	-	-	-	20	23	26
10	1500	708	0.02	5	-	20	23	28	30	34	-	20	24	28	30	35
	1100	519	0.02	4	-	-	-	21	24	28	-	-	21	24	25	31
	700	330	0.01	2	-	-	-	-	-	21	-	-	-	21	23	28
	215	101	0.01	1	-	-	-	-	-	-	-	-	-	-	-	-
12	2500	1180	0.04	10	-	25	29	33	34	35	29	28	31	34	35	40
	2050	967	0.03	7	-	21	25	28	30	33	22	25	29	31	33	38
	1600	755	0.02	6	-	20	24	24	28	29	-	20	25	28	30	35
	1150	543	0.02	4	-	-	-	20	21	26	-	-	20	24	26	30
14	2650	1251	0.02	5	-	21	23	26	29	30	24	25	30	34	37	40
	2100	991	0.02	4	-	-	-	24	26	30	-	21	26	31	34	37
	1550	731	0.01	2	-	-	-	-	21	25	-	-	24	28	30	34
	1000	472	0.01	2	-	-	-	-	-	-	-	-	-	21	25	26
16	3725	1758	0.14	36	23	25	29	28	33	38	30	*	33	37	40	44
	2800	1321	0.12	30	-	-	-	24	24	28	23	24	29	34	36	40
	1800	849	0.05	12	-	-	-	-	-	21	-	-	24	29	31	35
	800	378	0.01	2	-	-	-	-	-	-	-	-	26	30	34	36
24 x 16	8330	3931	0.05	12	30	31	39	48	49	56	44	44	49	51	54	57
	7000	3303	0.04	10	27	29	36	43	46	49	43	43	48	50	53	56
	5350	2525	0.01	2	-	26	34	41	44	46	40	41	47	49	51	55
	3800	1793	0.01	2	-	-	24	28	29	32	32	38	44	46	48	51

Performance Notes:

1. NC Levels are calculated based on procedures as outlined on page A101.
2. Dash (-) in space indicates a NC less than 20.
3. Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.

A

SINGLE DUCT TERMINAL UNITS

Performance Data • Discharge Sound Power Levels

3000Q Series • Quiet • Dissipative Silencer

Fiberglass Acoustic Media (FAM)



Inlet Size	Airflow		Min. inlet ΔPs		Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown																																			
					Minimum ΔPs		0.5" w.g. (125Pa) ΔPs					1.0" w.g. (250Pa) ΔPs					1.5" w.g. (375Pa) ΔPs					2.0" w.g. (500Pa) ΔPs					3.0" w.g. (750Pa) ΔPs													
					"w.g.	Pa	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5
4	200	94	0.38	94	58	47	35	25	24	30	60	55	41	29	26	31	62	55	42	29	28	35	65	58	44	32	31	38	64	58	46	33	32	40	65	60	49	37	36	44
	150	71	0.21	52	56	44	30	-	-	24	59	50	35	-	21	25	61	53	38	24	24	31	60	55	41	27	28	36	60	55	42	29	30	39	60	55	43	35	35	44
	100	47	0.11	28	51	39	-	-	-	-	54	44	29	-	-	21	54	46	35	-	22	30	55	47	37	27	27	35	56	47	38	30	30	38	56	47	38	31	35	43
	50	24	0.04	11	50	37	-	-	-	-	51	38	26	-	-	-	52	39	29	-	-	28	53	41	32	-	26	35	54	41	32	-	24	36	55	42	32	-	30	38
5	350	165	0.17	41	59	50	37	30	27	31	64	56	45	36	32	33	67	60	49	38	34	37	70	61	51	39	37	40	70	63	51	40	38	42	73	65	53	42	41	45
	250	118	0.10	25	56	45	30	-	-	22	61	55	39	29	23	27	66	58	41	32	27	32	68	60	44	34	31	37	68	61	46	35	32	39	69	62	49	37	35	42
	150	71	0.03	7	54	41	-	-	-	-	59	47	30	-	-	21	60	51	35	23	20	27	62	53	40	26	24	32	62	53	42	29	27	35	62	54	43	35	33	41
	100	47	0.02	5	53	41	-	-	-	-	56	44	30	-	-	-	57	46	34	23	24	28	59	48	37	25	25	34	59	48	37	26	28	36	59	49	39	31	33	40
6	500	236	0.05	13	53	44	32	35	28	27	59	53	40	41	37	36	63	56	43	41	38	39	68	62	46	42	39	42	68	62	48	44	41	44	72	64	52	45	43	47
	400	189	0.05	12	52	39	29	28	21	22	59	51	36	37	32	31	62	54	39	38	34	35	67	60	42	38	36	39	67	59	46	40	39	43	69	61	49	41	41	47
	300	142	0.03	6	54	37	21	-	-	-	60	46	33	31	27	30	62	49	36	33	30	33	65	54	39	34	33	39	65	54	42	37	37	42	66	56	45	38	40	45
	200	94	0.01	3	52	36	-	-	-	-	56	40	27	-	-	29	57	45	31	24	-	31	59	49	35	26	32	35	59	49	35	26	32	35	60	49	41	39	43	44
7	700	330	0.03	7	58	49	37	33	34	34	66	57	45	44	43	41	69	60	47	44	46	45	72	64	51	45	49	49	74	67	53	47	50	51	76	69	55	48	51	53
	550	260	0.04	10	56	46	32	28	26	26	62	54	40	38	38	37	66	57	43	39	42	42	69	62	46	40	45	45	72	64	49	43	46	48	73	66	51	44	48	51
	400	189	0.01	2	57	41	28	22	23	-	60	52	36	32	35	35	65	55	39	34	37	39	69	59	43	37	41	43	69	60	45	39	42	45	70	61	48	40	44	48
	250	118	0.01	2	54	32	-	-	-	-	54	43	25	-	24	26	56	45	29	22	26	30	60	49	32	25	31	35	59	49	34	31	33	39	60	48	36	31	35	43
8	1100	519	0.02	4	66	60	50	44	42	42	69	63	54	47	47	47	73	67	56	48	48	49	75	69	58	49	49	53	78	73	61	51	50	54	79	76	63	52	51	56
	900	425	0.01	3	63	56	44	38	34	35	68	60	49	43	42	42	71	65	52	45	44	46	74	67	55	46	45	49	76	71	58	48	46	51	78	74	60	49	48	53
	700	330	0.01	2	59	51	37	32	25	27	64	57	44	39	37	39	69	61	48	40	39	42	71	64	51	42	41	45	75	69	54	43	42	48	75	72	57	45	44	51
	500	236	0.01	2	57	45	29	22	-	-	61	54	40	32	29	32	64	59	43	33	33	37	69	64	47	36	35	41	69	65	51	38	37	44	70	68	54	41	39	48
9	1400	661	0.01	2	67	62	52	49	50	49	69	64	53	48	51	51	72	67	56	52	52	53	75	69	59	53	53	56	78	73	62	55	55	58	80	76	64	56	55	60
	1150	543	0.01	2	59	56	46	43	42	39	65	59	48	45	44	44	69	62	52	47	46	47	74	65	55	49	48	51	76	69	57	50	49	52	78	71	59	50	50	54
	900	425	0.01	2	55	52	41	39	34	30	64	56	45	43	41	41	68	60	48	44	43	44	72	64	51	45	44	48	74	67	53	46	46	50	75	70	56	47	48	53
	650	307	0.01	2	53	45	35	31	28	24	62	52	41	37	34	35	65	57	43	38	38	39	69	62	46	39	40	44	69	64	49	41	41	47	70	66	53	42	43	50
10	1500	708	0.02	5	67	55	45	45	45	43	69	62	52	47	51	51	71	65	54	48	52	54	75	68	56	50	53	57	77	71	59	51	54	58	80	74	60	52	55	60
	1100	519	0.02	4	63	49	37	36	30	26	61	56	45	42	42	40	66	59	47	43	44	45	70	62	50	45	46	50	72	65	53	45	47	51	74	69	55	47	49	53
	700	330	0.01	2	56	40	28	22	-	-	56	49	37	34	31	31	60	54	41	35	35	38	65	58	44	36	39	43	66	61	47	38	41	46	66	63	50	39	44	49
	215	101	0.01	1	42	-	-	-	-	-	38	29	-	-	-	-	46	37	22	-	-	-	49	45	26	-	-	21	49	45	30	-	22	27	48	47	34	20	26	32
12	2500	1180	0.04	10	64	55	49	49	53	50	73	65	57	54	59	59	76	68	59	55	59	61	79	70	62	56	60	64	80	72	63	58	62	65	81	74	65	60	63	67
	2050	967	0.03	7	63	51	44	45	48	43	70	61	52	50	55	53	73	65	55	52	57	57	75	67	58	53	58	59	77	69	59	54	59	61	79	72	62	57	61	63
	1600	755	0.02	6	61	48	39	42	40	35	69	58	49	47	52	49	72	62	50	48	53	51	72	64	54	49	55	54	75	67	55	50	55	55	75	70	58	52	57	58
	1150	543	0.02	4	54	44	34	35	29	25	60	54	43	43	45	40	65	58	46	44	47	44	69	62	49	46	50	49	70	64	51	47	52	52	73	68	55	49	54	55
14	2650	1251	0.02	5	62	52	47	50	51	48	68	60	53	53	57	57	71	62	57	55	58	59	74	65	59	57	60	62	76	67	62	60	62	63	77	69	65	62	64	66
	2100	991	0.02	4	59	47	42	45	44	40	62	56	50	50	53	51	66	58	53	52	55	54	72	62	56	54	57	57	74	65	60	57	59	60	77	67	63	60	61	62
	1550	731	0.01	2	58	42	36	37	32	28	58	51	45	45	46	43	64	54	49	48	49	47	68	59	53	51	53	52	70	61	56	53	55	54	73	64	59	55	57	57
	1000	472	0.01	2	52	38	27	22	-	-	56	45	40	39	37	35	60	49	44	42	42	40	64	53	48	46	47	46	66	56	52	49	50	50	67	58	55	51	53	53
16	3725	1758	0.14	36	62	52	52	58	63	59	70	63	59	62	63	61	76	67	64	57	62	61	75	69	62	59	63	63	79	72	66	60	65	63	83	73	67	61	65	66
	2800	1321	0.12	30	53	48	44	47	47	43	62	57	51	50	52	50	68	60	55	52																				

Performance Data • Radiated Sound Power Levels

3000Q Series • Quiet • Dissipative Silencer
Fiberglass Acoustic Media (FAM)



Inlet Size	Airflow		Min. inlet ΔPs		Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown																																									
					Minimum ΔPs							0.5" w.g. (125Pa) ΔPs							1.0" w.g. (250Pa) ΔPs							1.5" w.g. (375Pa) ΔPs							2.0" w.g. (500Pa) ΔPs							3.0" w.g. (750Pa) ΔPs						
					"w.g.	Pa	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7				
4	200	94	0.38	94	-	36	33	32	-	-	-	39	37	38	29	29	49	46	43	37	30	29	53	52	47	40	32	31	53	53	50	42	33	33	54	55	53	47	37	37						
	150	71	0.23	57	-	35	29	31	-	-	-	40	36	30	25	23	47	46	40	34	28	26	49	50	47	39	31	30	47	48	48	43	34	32	48	48	48	50	40	37						
	100	47	0.11	28	-	-	-	-	-	-	-	37	32	27	-	-	-	43	42	34	27	23	-	44	45	41	32	29	-	43	46	46	36	32	-	42	44	51	43	38						
	50	24	0.04	11	-	-	-	-	-	-	-	37	38	30	-	-	-	36	41	40	32	27	-	35	40	43	38	31	-	35	40	43	38	31	-	32	36	37	35	37						
5	350	165	0.17	41	48	39	33	32	30	27	52	45	39	38	37	32	55	48	45	38	36	32	59	51	49	40	39	34	61	54	51	42	40	36	61	57	55	45	44	40						
	250	118	0.08	20	-	35	31	25	23	-	50	40	36	32	30	25	54	45	42	33	32	28	55	48	45	35	35	30	56	51	48	37	37	32	57	53	51	42	41	35						
	150	71	0.03	7	-	-	-	-	-	-	49	35	31	23	20	20	50	41	39	30	29	21	50	43	43	34	33	27	48	45	45	40	39	31	51	45	46	46	44	37						
	100	47	0.02	5	-	-	-	-	-	-	-	33	29	-	-	-	-	39	38	28	26	-	-	40	42	36	34	26	46	40	43	43	41	31	47	41	43	47	46	37						
6	500	236	0.05	13	48	44	38	36	30	28	49	48	42	40	33	30	57	52	46	41	35	32	60	54	49	45	36	34	62	57	51	45	40	38	65	59	55	47	43	42						
	400	189	0.04	10	-	42	33	33	28	26	49	46	39	35	30	28	56	49	44	38	32	29	59	52	47	40	36	33	62	54	49	42	39	36	64	58	54	45	42	41						
	300	142	0.03	6	-	34	27	26	-	-	47	42	35	29	25	-	55	46	40	33	30	28	58	49	44	36	33	32	59	51	47	38	36	34	60	55	51	43	39	39						
	200	94	0.01	3	-	-	-	-	-	-	47	36	30	24	-	-	53	43	38	30	29	28	53	45	43	32	31	30	53	47	44	36	32	32	55	49	46	43	37	37						
7	700	330	0.03	7	49	46	48	37	33	32	49	48	45	37	31	30	56	51	47	40	34	31	62	57	52	45	37	34	66	60	55	48	40	37	68	64	60	52	44	42						
	550	260	0.01	2	48	43	41	33	27	25	48	44	40	32	28	26	55	49	45	38	32	30	61	54	49	43	36	33	64	58	52	45	38	36	65	61	57	50	42	40						
	400	189	0.01	2	46	39	33	33	-	-	46	43	38	30	26	20	53	48	43	37	31	29	57	51	46	41	34	32	59	53	49	44	36	34	60	56	52	47	40	40						
	250	118	0.01	2	-	-	20	31	-	-	-	39	34	28	21	-	51	46	41	35	29	27	54	47	43	38	31	30	53	48	44	40	33	32	53	49	46	43	37	38						
8	1100	519	0.02	4	52	50	45	37	34	33	57	51	46	37	35	32	60	54	51	40	38	33	65	57	53	43	42	36	67	60	56	45	44	39	70	63	60	49	48	42						
	900	425	0.01	3	51	47	40	34	31	29	56	50	45	37	34	31	58	53	49	39	37	33	63	56	51	42	42	36	65	58	54	44	44	39	68	60	56	47	48	42						
	700	330	0.01	2	50	43	37	31	29	25	51	47	42	33	31	28	57	51	47	37	36	32	61	53	50	40	39	35	63	55	51	42	41	37	64	59	56	45	44	40						
	500	236	0.01	2	-	38	30	27	24	-	50	44	39	31	29	25	55	48	44	35	34	31	58	51	47	37	37	33	59	53	49	39	39	36	61	55	52	43	43	40						
9	1400	661	0.01	2	51	46	46	44	37	35	52	47	46	41	38	35	57	53	49	42	37	35	64	58	53	47	41	37	66	63	57	50	43	40	69	67	61	54	47	44						
	1150	543	0.01	2	50	45	44	41	34	34	51	46	45	40	36	33	56	52	47	41	36	34	62	56	51	45	39	37	64	61	55	49	42	39	67	64	59	52	46	43						
	900	425	0.01	2	48	40	39	36	30	29	50	45	42	37	32	30	56	50	45	40	35	33	60	54	49	44	39	36	63	58	52	47	41	38	64	61	56	50	44	42						
	650	307	0.01	2	47	36	31	28	21	-	49	41	36	31	28	25	54	48	42	37	32	30	57	51	46	41	35	33	59	54	49	44	38	36	60	57	52	47	41	39						
10	1500	708	0.02	5	54	43	43	38	34	26	56	48	46	39	35	30	58	53	50	44	38	34	62	57	53	48	42	38	64	59	55	50	45	41	66	64	59	54	48	45						
	1100	519	0.02	4	51	37	35	30	25	-	53	46	42	35	31	27	55	50	47	41	35	31	60	54	50	45	39	36	61	56	51	47	42	39	64	61	55	51	45	43						
	700	330	0.01	2	-	33	29	25	-	-	50	43	38	32	29	25	55	48	43	38	33	30	58	52	47	42	37	34	59	54	49	44	39	37	61	57	53	49	43	41						
	215	101	0.01	1	-	-	-	-	-	-	41	36	30	27	25	-	51	41	35	32	29	28	53	43	39	36	32	30	56	45	40	38	34	33	57	47	44	42	38	37						
12	2500	1180	0.04	10	57	55	54	50	42	36	60	57	53	46	41	38	63	61	54	50	42	39	66	63	57	53	45	41	67	64	59	55	48	44	70	69	63	59	52	50						
	2050	967	0.03	7	55	50	48	44	37	33	58	55	51	46	39	35	61	59	53	49	42	37	64	61	56	52	45	41	65	62	58	55	48	44	68	67	61	58	51	49						
	1600	755	0.02	6	52	45	41	36	30	27	56	52	45	40	34	30	59	56	49	46	38	35	61	58	53	49	42	39	62	60	55	51	44	42	65	64	58	55	48	46						
	1150	543	0.02	4	47	38	31	27	23	-	52	48	40	36	30	26	55	52	45	41	34	32	58	55	49	45	38	36	59	57	51	48	41	39	61	60	55	52	45	44						
14	2650	1251	0.02	5	57	53	50	46	42	35	58	56	49	44	40	35	62	60	53	48	45	39	64	63	56	50	47	44	65	66	59	52	49	47	69	69	63	57	52	50						
	2100	991	0.02	4	54	48	44	39	35	30	56	53	46	41	37	31	60	57	50	44	41	38	63	61	55	48	44	43	64	63	57	50	46	45	66	66	60	55	50	48						
	1550	731	0.01	2	46	40	35	30	26	-	51	48	42	35	31	27	57	55	48	40	36	35	60	58	52	45	40	39	60	60	53	47	43	41	62	63	57	52	47	45						
	1000	472	0.01	2	-	-	-	-	-	-	48	45	37	31	28	24	52	51	43	37	33	31	54	53	46	41	37	35	55	56	49	44	40	38	56	57	52	48	43	42						
16	3725	1758	0.14	36	58	58	55	51	45	38	* * * * *	64	62	57	53	48	39	67	66	60	56	50	45	69	69	62	57	51	49	71	72	65	59	53	49											
	2800	1321	0.12	30	54	51	49	43	37	32	59	55	50	44	38	32	62	59	53	47	41	35	65	63	57	50	44	39	66	65	59	52	46	41	68	69	62	56	50	46						
	1800	849	0.05	12	47	40	37	30	24	-	52	49	42	36	32	27	57	55	49	41	36	32	59	59	52	44	39	35	61	61	54	48	42	38	62	64	57	52	46	43						
	800	991	0.01																																											

Performance Data • AHRI Certification and Performance Notes

3000Q Series • Quiet • Dissipative Silencer • AHRI Certification Rating Points

Fiberglass Acoustic Media (FAM)

Inlet Size	Airflow		Min. Inlet ΔPs		Discharge Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs							Radiated Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs						
					Octave Band							Octave Band						
	cfm	l/s	"w.g.	Pa	2	3	4	5	6	7	2	3	4	5	6	7		
4	150	71	0.21	52	60	55	41	27	28	36	49	50	47	39	31	30		
5	250	118	0.10	25	68	60	44	34	31	37	55	48	45	35	35	30		
6	400	189	0.05	12	67	60	42	38	36	39	59	52	47	40	36	33		
7	550	260	0.04	10	69	62	46	40	45	45	61	54	49	43	36	33		
8	700	330	0.01	2	71	64	51	42	41	45	61	53	50	40	39	35		
9	900	425	0.01	2	72	64	51	45	44	48	60	54	49	44	39	36		
10	1100	519	0.02	5	70	62	50	45	46	50	60	54	50	45	39	36		
12	1600	755	0.02	5	72	64	54	49	55	54	61	58	53	49	42	39		
14	2100	991	0.02	5	72	62	56	54	57	57	63	61	55	48	44	43		
16	2800	1321	0.12	30	72	63	58	54	56	57	65	63	57	50	44	39		
24 x 16	5350	2525	0.01	2	86	78	76	72	73	73	72	70	70	65	60	55		



Ratings are certified in accordance with AHRI Standards.

Performance Notes for Sound Power Levels:

- Discharge sound power is the noise emitted from the unit discharge into the downstream duct. Discharge Sound Power Levels (SWL) now include duct end reflection energy as part of the standard rating. Including the duct end correction provides sound power levels that would normally be transmitted into an acoustically, non-reflective duct. The effect of including the energy correction to the discharge SWL, is higher sound power levels when compared to previous AHRI certified data. For more information on duct end reflection calculations see AHRI Standard 880.
- Radiated sound power is the breakout noise transmitted through the unit casing walls.
- Sound power levels are in decibels, dB re 10⁻¹² watts.
- All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation. Dash (-) in space indicates sound power level is less than 20 dB or equal to background.
- Minimum inlet ΔPs is the minimum operating pressure requirement of the unit (damper full open) and the difference in static pressure from inlet to discharge of the unit.
- Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.
- Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 130 and AHRI Standard 880.

A

SINGLE DUCT TERMINAL UNITS

30HQ SERIES • HOSPITAL GRADE • QUIET TYPE WITH DISSIPATIVE SILENCER

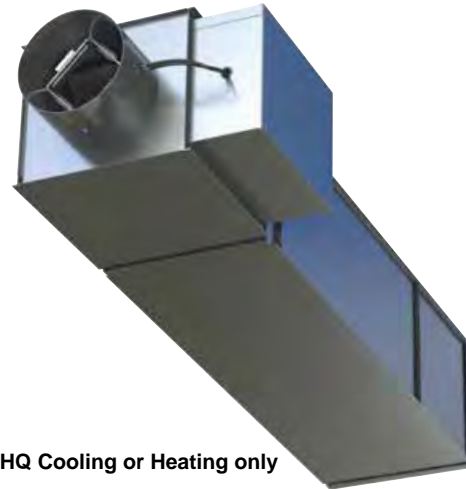
PRODUCT OVERVIEW

Nailor 30HQ Series Single Duct Hospital Grade Terminal units control the flow of conditioned primary air in a constant or variable air volume (VAV) HVAC system. Each unit is comprised of a VAV terminal section coupled with a factory installed dissipative silencer and unique design features specifically tailored for IAQ (Indoor Air Quality) sensitive hospital applications. Integral electric or hot water coil sections are also available for re-heat applications.

Hospital projects frequently size VAV terminals more aggressively than general office buildings due to increased space restrictions. The 30HQ Series design and construction addresses hospital environments that require both low sound operating levels and high IAQ adherence. Many of the 30HQ Series standard features such as the inclined opposed damper and Diamond Flow Sensor are borrowed from the robust 3000 Series of terminal units. Other features, like the silencer and liners options, are specifically chosen to address hospital maintenance and sanitation practices. The factory installed dissipative silencer provides minimal impact on system pressure drop while simultaneously delivering superior sound attenuation. By combining optimized side baffle geometry with mylar encapsulated fiberglass acoustic media, the silencer provides excellent attenuation.

While quiet operation is paramount, maintenance and sanitation requirements cannot be overlooked. The mylar barrier, encased within the silencer side baffles, prevents entrainment of fiberglass fibers into the airstream and acts a vapor barrier to the acoustics media, preventing mold and fungi growth. All 30HQ Series VAV sections include Steri-Liner, a rigid fiberglass board with a reinforced non-porous aluminum FSK (Foil-scrim-Kraft). This insulation is also found in the silencer sections not covered by the sound attenuating side baffles. Steri-Liner provides a durable, cleanable surface while offering excellent insulating and sound absorbing characteristics. Another benefit to using Steri-Liner in the factory installed silencer is that the internal insulation eliminates the need for field applying thermal duct wrap, thus saving on additional labor and costs.

In the past, selecting a silencer to mate with a VAV terminal involved multiple calculations, guesswork and an intimate knowledge of silencer performance. The engineer or contractor had to contend with pressure classes, sizes and free area to balance the associated pressure drop, attenuation and self generated noise against the VAV terminal performance. Even after careful selection, the result was still a guess due to the unknown system effect created by the close coupled terminal/silencer assembly. Since each 30HQ Series unit is designed, manufactured and tested as a complete assembly, the guesswork is eliminated.



30HQ Cooling or Heating only



30HQW Cooling with Hot Water Reheat



30HQE Cooling with Electric Reheat

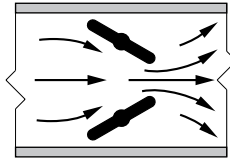
SINGLE DUCT VARIABLE OR CONSTANT AIR VOLUME

30HQ SERIES

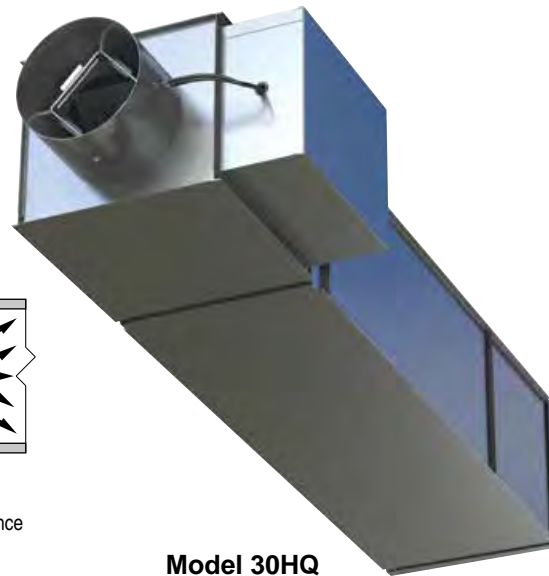
- HOSPITAL GRADE
- DISSIPATIVE SILENCER
- SUPER QUIET

Models:

- 30HQ** Cooling or Heating only
- 30HQW** Cooling with Hot Water Reheat
- 30HQE** Cooling with Electric Reheat



Inclined opposed blade damper configuration minimizes noisy turbulence and provides smooth, accurate, near linear flow control.



Model 30HQ

Hospital system designs have to contend with the presence of infectious diseases, chemical hazards, biological contaminants and low sound level requirements. The 30HQ hospital grade terminal unit has been purposely designed to address these parameters by using innovative options and construction methods, resulting in simplified maintenance and improved sound performance.

Each unit includes a factory mounted dissipative silencer that maximizes acoustical attenuation, minimizes pressure loss and reduces self-generated sound. Steri-liner insulation offers a durable, cleanable surface throughout the VAV section and the exposed silencer portions. By fully lining the silencer, there is no need to field apply external thermal duct wrap. Optional components such as access doors and removable flow sensors enhance the functionality of the 30HQ Series units to provide optimum performance and flexibility in hospital environments.

STANDARD FEATURES:

- Designed for hospital and other critical environment applications where IAQ (Indoor Air Quality) is a concern.
- 22 ga. (0.86) galvanized steel casing, mechanically sealed, low leakage construction.
- 16 ga. (1.63) corrosion-resistant steel inclined opposed blade damper with extruded PVC seals (single blade on size 4, 5, 6). 45° rotation, CW to close. Tight shut-off. Damper leakage is less than 2% of the terminal rated airflow at 3" w.g. (746 Pa)
- 1/2" (13) dia. plated steel drive shaft. An indicator mark on the end of the shaft shows damper position.
- Multi-point averaging Diamond Flow Sensor. Aluminum construction. Supplied with balancing tees.
- Rectangular discharge with slip and drive cleat duct connection.
- Full NEMA 1 type controls enclosure for factory mounted controls.
- VAV section is lined with 13/16" (21) thick, 4 lb. density Steri-Liner insulation. Fiberglass with a reinforced aluminum

FSK facing. Meets the requirements of NFPA 90A, UL 181 and ASTM C655.

- Right-hand controls location is standard and is determined looking into direction of airflow. Optional left hand controls mounting is available. Unit is flippable. Caution: If unit has access door.
- Available in 11 sizes ranging from 0 to 8330 cfm (0-3931 l/s) for 30HQ and 30HQW units. 25-8330 cfm (12-3931 l/s) on 30HQE.

Silencer Section:

- Designed to mate with VAV section for optimum performance and quiet operation.
- Optimized internal baffle geometry reduces self-generated noise, maximizes acoustic attenuation.
- 22 ga. (0.86) coated steel perforated baffles with 13% free area encapsulate fiberglass acoustic media. Mylar lining with acoustical spacer isolates material from airstream.
- Internal Steri-Liner insulation on top and bottom optimizes sound reduction

and eliminates need for external field applied thermal duct wrap.

Options and Accessories:

- Bottom access door.
- FMI Removable insert type Diamond Flow Sensor.
- 24 VAC control transformer.
- Toggle disconnect switch.
- Hanger brackets.
- Controls enclosure for field or factory mounted controls.
- Dust tight enclosure seal.
- 20 ga. (1.00) construction.
- Seismic certification.
- Oversized casing.



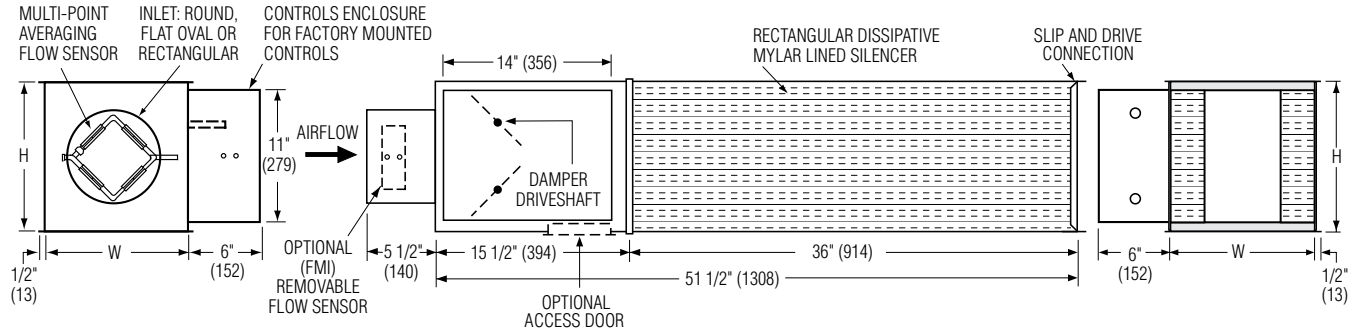
Intertek

Dimensions

Model 30HQ • Hospital Grade • Dissipative Silencer

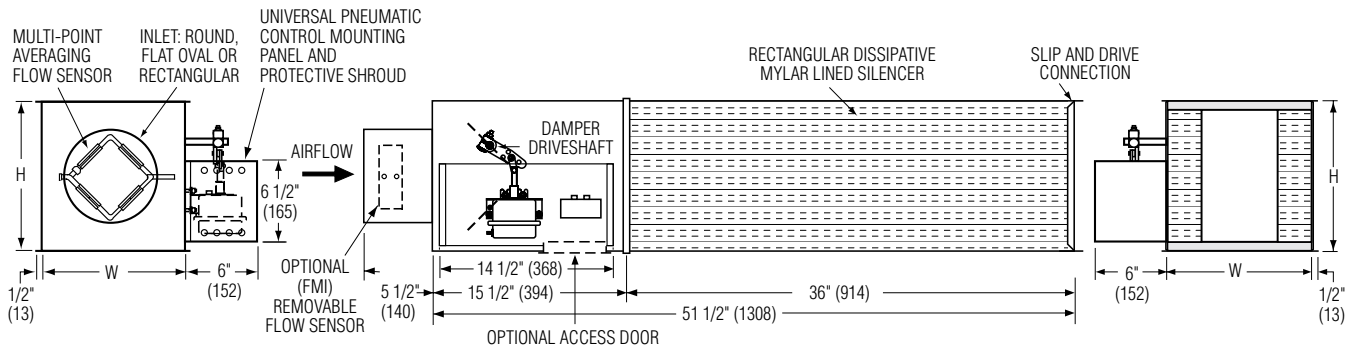
Digital and Analog Electronic Controls

- A full NEMA 1 controls enclosure is provided for factory mounted controls. Optional for field mounted controls.



Pneumatic Controls

- Universal pneumatic control mounting panel features double wall stand-off construction for strength and rigidity. Controls mounting screws do not penetrate terminal casing.



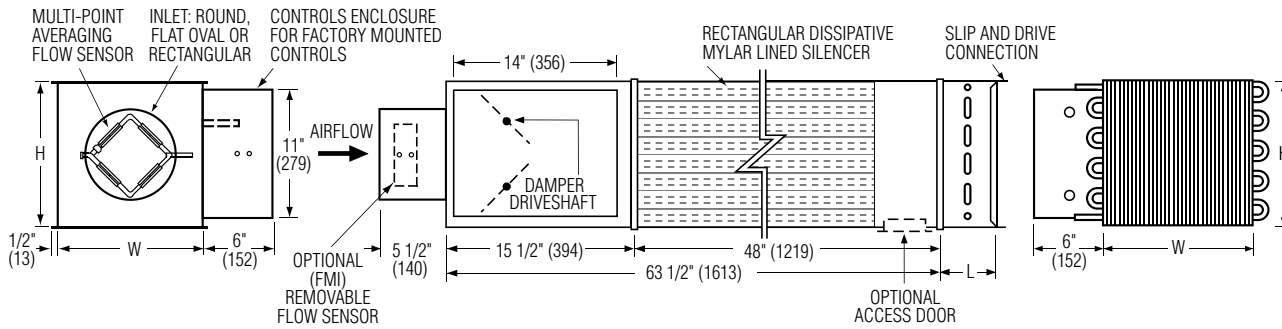
Dimensional Data

Unit Size	W	H	Inlet Size
4	10 (254)	10 (254)	3 7/8 (98) Round
5	10 (254)	10 (254)	4 7/8 (124) Round
6	10 (254)	10 (254)	5 7/8 (149) Round
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.

Dimensions

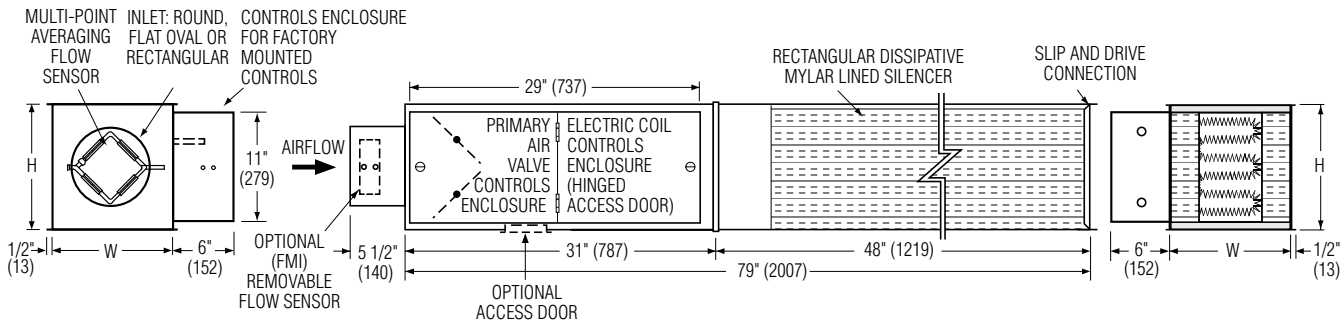
Model 30HQW • Hospital Grade • Dissipative Silencer • Hot Water Reheat Coil

- One, two, three and four row available.
- Hot water coils have copper tubes and aluminum ripple fins.
- Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.
- AHRI Certified coils.
- Coil Performance data on pages A43-A51.
- Oversized casing option on pages A40-A42.



30HQE • Hospital Grade • Dissipative Silencer • Integral Electric Reheat

- Electric coil is factory mounted in an integral extended plenum section.
- Full details and selection guide on page A52.



Dimensional Data

Unit Size	W	H	Inlet Size	Coil Connections				Hot Water Coil	
				1 Row	2 Row	3 Row	4 Row	L (1 & 2 Row)	L (3 & 4 Row)
4	10 (254)	10 (254)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
5	10 (254)	10 (254)	4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
6	10 (254)	10 (254)	5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
7	12 (305)	12 1/2 (318)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
8	12 (305)	12 1/2 (318)	7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
12	18 (457)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
14	24 (610)	12 1/2 (318)	16 1/16 x 9 13/16 (408x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
16	28 (711)	12 1/2 (318)	19 3/16 x 9 13/16 (487 x 249) Oval	7/8 (22)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.	7/8 (22)	7/8 (22)	1 3/8 (35)	1 3/8 (35)	5 (127)	7 1/2 (191)

SINGLE DUCT TERMINAL UNITS

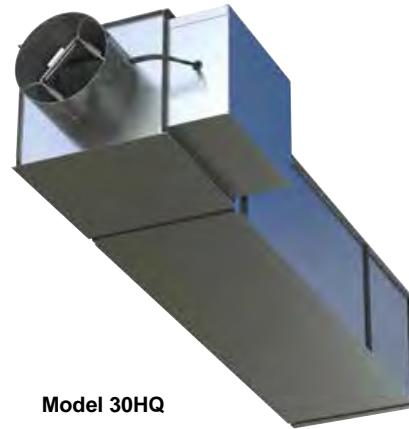
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Recommended Airflow Ranges For Single Duct Terminal Units

The recommended airflow ranges below are for 30HQ Series single duct terminal units with pressure independent controls and are presented as ranges for total and controller specific minimum and maximum airflow. Airflow ranges are based upon maintaining reasonable sound levels and controller limits using Nailor's Diamond Flow Sensor as the airflow measuring device. For a given unit size, the minimum, auxiliary minimum (where applicable) and the maximum flow setting must be within the range limits to ensure pressure independent operation, accuracy and repeatability.

Minimum airflow limits are based upon .02" w.g. (5 Pa) differential pressure signal from Diamond Flow Sensor on analog/digital controls and .03" (7.5) for pneumatic controllers. This is a realistic low limit for many transducers used in the digital controls industry. Check your controls supplier for minimum limits. Setting airflow minimums lower, may cause damper hunting and result in a failure to meet minimum ventilation requirements. Factory settings will therefore not be made outside these ranges; however, a minimum setting of zero (shut-off) is an available option on pneumatic units. Where an auxiliary setting is specified, the value must be greater than the minimum setting.

The high end of the tabulated Total Airflow Range on pneumatic and analog electronic controls represents the Diamond Flow Sensor's differential pressure reading at 1" w.g. (250 Pa). The high end airflow range for digital controls is represented by the indicated transducer differential pressure.



Model 30HQ

ASHRAE 130 "Performance Rating of Air Terminals" is the method of test for the certification program. The "standard rating condition" (certification rating point) airflow volumes for each terminal unit size are tabulated below per AHRI Standard 880. These air volumes equate to an approximate inlet velocity of 2000 fpm (10.2 m/s).

When digital or other controls are mounted by Nailor, but supplied by others, these values are guidelines only, based upon experience with the majority of controls currently available. Controls supplied by others for factory mounting are configured and calibrated in the field. Airflow settings on pneumatic and analog controls supplied by Nailor are factory preset when provided.

Imperial Units, Cubic Feet per Minute

Unit Size	Inlet Type	Total Airflow Range, cfm	Airflow at 2000 fpm Inlet Velocity (nom.), cfm	Range of Minimum and Maximum Settings, cfm							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure ("w.g.)							
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
				.03	1.0	.02	1.0	.02	1.0	1.25	1.5
4	Round	0 – 225	150	30	180	25	180	25	180	200	225
5		0 – 400	250	55	325	45	325	45	325	360	400
6		0 – 550	400	80	450	65	450	65	450	500	550
7	Round	0 – 800	550	115	650	95	650	95	650	725	800
8		0 – 1100	700	155	900	125	900	125	900	1000	1100
9		0 – 1400	900	200	1150	165	1150	165	1150	1285	1400
10		0 – 1840	1100	260	1500	215	1500	215	1500	1675	1840
12	Flat Oval	0 – 2500	1600	355	2050	290	2050	290	2050	2300	2500
14		0 – 3125	2100	440	2550	360	2550	360	2550	2850	3125
16		0 – 3725	2800	525	3040	430	3040	430	3040	3400	3725
24 x 16	Rect.	0 – 8330	5350	1180	6800	960	6800	960	6800	7600	8330

Metric Units, Liters per Second

Unit Size	Inlet Type	Total Airflow Range, l/s	Airflow at 10.2 m/s Inlet Velocity (nom.), l/s	Range of Minimum and Maximum Settings, l/s							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure (Pa)							
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
				7.5	249	5	249	5	249	311	374
4	Round	0 – 106	71	14	85	12	85	12	85	94	106
5		0 – 189	118	26	153	21	153	21	153	170	189
6		0 – 260	189	38	212	31	212	31	212	236	260
7	Round	0 – 378	260	54	307	45	307	45	307	342	378
8		0 – 519	330	73	425	59	425	59	425	472	519
9		0 – 661	425	94	543	78	543	78	543	606	661
10		0 – 868	519	123	708	101	708	101	708	790	868
12	Flat Oval	0 – 1180	755	168	967	137	967	137	967	1085	1180
14		0 – 1475	991	208	1203	170	1203	170	1203	1345	1475
16		0 – 1758	1321	248	1435	203	1435	203	1435	1604	1758
24 x 16	Rect.	0 – 3931	2525	557	3209	453	3209	453	3209	3586	3931

Performance Data • NC Level Application Guide

Model 30HQ • Hospital Grade • Dissipative Silencer

Terminal: Steri-Liner • Silencer: Mylar, Spacer, Steri-Liner (MSSL) Media

Inlet Size	Airflow cfm / s		Min. inlet ΔPs "w.g. Pa		NC Levels @ Inlet Pressure (ΔPs) shown											
					DISCHARGE					RADIATED						
					Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)
4	200	94	0.38	94	-	-	-	21	21	24	-	-	-	21	24	28
	150	71	0.21	52	-	-	-	-	-	-	-	-	-	21	22	22
	100	47	0.11	28	-	-	-	-	-	-	-	-	-	-	20	23
	50	24	0.05	12	-	-	-	-	-	-	-	-	-	-	-	-
5	350	165	0.17	41	-	-	20	23	24	26	-	-	-	23	25	30
	250	118	0.10	25	-	-	20	23	23	25	-	-	-	-	22	25
	150	71	0.03	7	-	-	-	-	-	-	-	-	-	-	-	20
	100	47	0.02	5	-	-	-	-	-	-	-	-	-	-	-	-
6	500	236	0.05	13	-	-	-	23	25	28	-	-	20	23	26	30
	400	189	0.05	12	-	-	-	-	21	24	-	-	-	21	25	29
	300	142	0.03	6	-	-	-	-	-	-	-	-	-	20	21	25
	200	94	0.01	3	-	-	-	-	-	-	-	-	-	-	-	20
7	700	330	0.03	7	-	-	20	25	28	31	22	-	21	26	30	35
	550	260	0.04	10	-	-	-	21	25	28	-	-	-	24	28	32
	400	189	0.01	2	-	-	-	20	21	23	-	-	-	20	23	26
	250	118	0.01	2	-	-	-	-	-	-	-	-	-	-	-	20
8	1100	519	0.02	4	21	24	28	30	34	37	-	20	25	29	31	35
	900	425	0.01	3	-	20	24	28	31	35	-	-	23	26	29	33
	700	330	0.01	2	-	-	21	26	30	34	-	-	21	24	26	31
	500	236	0.01	2	-	-	-	23	25	28	-	-	-	21	23	26
9	1400	661	0.01	2	-	24	28	30	34	37	20	20	23	28	34	38
	1150	543	0.01	2	-	-	21	25	29	33	-	-	21	25	31	35
	900	425	0.01	2	-	-	-	23	26	30	-	-	-	23	28	31
	650	307	0.01	2	-	-	-	21	24	26	-	-	-	20	23	26
10	1500	708	0.02	5	-	21	25	29	33	35	-	20	24	28	30	35
	1100	519	0.02	4	-	-	-	23	26	30	-	-	21	24	25	31
	700	330	0.01	2	-	-	-	-	23	25	-	-	-	-	21	24
	215	101	0.01	1	-	-	-	-	-	-	-	-	-	-	-	-
12	2500	1180	0.04	10	-	26	30	33	35	36	29	28	31	34	35	40
	2050	967	0.03	7	-	23	25	28	30	33	22	25	29	31	33	38
	1600	755	0.02	6	-	-	23	25	28	29	-	20	25	28	30	35
	1150	543	0.02	4	-	-	-	-	21	24	-	-	20	24	26	30
14	2650	1251	0.02	5	-	21	25	28	30	33	24	25	30	34	37	40
	2100	991	0.02	4	-	-	20	24	28	30	-	21	26	31	34	37
	1550	731	0.01	2	-	-	21	26	30	33	-	-	24	28	30	34
	1000	472	0.01	2	-	-	-	-	-	-	-	-	-	21	25	26
16	3725	1758	0.14	36	-	23	26	30	33	35	30	*	33	37	40	44
	2800	1321	0.12	30	-	-	21	25	29	31	23	24	29	34	36	40
	1800	849	0.05	12	-	-	-	-	21	24	-	-	24	29	31	35
	700	330	0.01	2	-	-	-	-	-	-	-	-	-	-	-	21
24 x 16	8330	3931	0.05	12	34	44	40	46	50	53	44	44	49	51	54	57
	7000	3303	0.03	7	25	36	38	44	48	49	40	41	47	49	51	55
	5350	2525	0.01	3	21	33	36	43	45	46	32	38	44	46	48	51
	3800	1793	0.01	2	-	20	25	29	30	33	24	35	39	43	45	47

Performance Notes:

1. NC Levels are calculated based on procedures as outlined on page A101.
2. Dash (-) in space indicates a NC less than 20.
3. Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.

A SINGLE DUCT TERMINAL UNITS

Performance Data • AHRI Certification and Performance Notes

30HQ Series • Hospital Grade • Dissipative Silencer • AHRI Certification Points

Terminal: Steri-Liner • Silencer: Mylar, Spacer, Steri-Liner (MSSL) Media

Inlet Size	Airflow		Min. Inlet Δ Ps		Discharge Sound Power Levels @ 1.5" w.g. (375 Pa) Δ Ps							Radiated Sound Power Levels @ 1.5" w.g. (375 Pa) Δ Ps						
					Octave Band							Octave Band						
					2	3	4	5	6	7	2	3	4	5	6	7		
4	150	71	0.24	60	62	58	55	48	29	37	49	50	47	39	31	30		
5	250	118	0.08	20	66	62	53	49	30	38	55	48	45	35	35	30		
6	400	189	0.06	15	66	61	54	52	39	41	59	52	47	40	36	33		
7	550	260	0.06	16	68	63	56	51	38	43	61	54	49	43	36	33		
8	700	330	0.08	21	72	67	59	51	37	46	61	53	50	40	39	35		
9	900	425	0.07	17	71	65	57	49	41	48	60	54	49	44	39	36		
10	1100	519	0.14	34	71	65	56	49	46	51	60	54	50	45	39	36		
12	1600	755	0.19	48	73	66	57	51	54	55	61	58	53	49	42	39		
14	2100	991	0.19	46	72	66	61	56	57	57	63	61	55	48	44	43		
16	2800	1321	0.30	75	73	67	61	55	57	59	65	63	57	50	44	39		
24 x 16	5350	2525	0.01	2	87	80	77	72	74	75	72	70	70	65	60	55		



Ratings are certified in accordance with AHRI Standards.

Performance Notes for Sound Power Levels:

- Discharge sound power is the noise emitted from the unit discharge into the downstream duct. Discharge Sound Power Levels (SWL) now include duct end reflection energy as part of the standard rating. Including the duct end correction provides sound power levels that would normally be transmitted into an acoustically, non-reflective duct. The effect of including the energy correction to the discharge SWL, is higher sound power levels when compared to previous AHRI certified data. For more information on duct end reflection calculations see AHRI Standard 880.
- Radiated sound power is the breakout noise transmitted through the unit casing walls.
- Sound power levels are in decibels, dB re 10-12 watts.
- All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation. Dash (-) in space indicates sound power level is less than 20 dB or equal to background.
- Minimum inlet Δ Ps is the minimum operating pressure requirement of the unit (damper full open) and the difference in static pressure from inlet to discharge of the unit.
- Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.
- Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 130 and AHRI Standard 880.

A

SINGLE DUCT TERMINAL UNITS

Oversized Casing • Larger Hot Water Coils

Models: 30RW, 30RWQ and 30HQW

Nailor offers oversized casing on all Single Duct Terminal Units with hot water reheat. This oversized casing option allows the selection of a standard inlet size with a larger casing. The use of standard larger casing sizes and standard water coils allows standard performance and delivery while taking advantage of increased heat transfer area needed for lower water temperatures.

FEATURES:

- One, two, three and four row available.
- Hot water coils have copper tubes and aluminum ripple fins. Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.



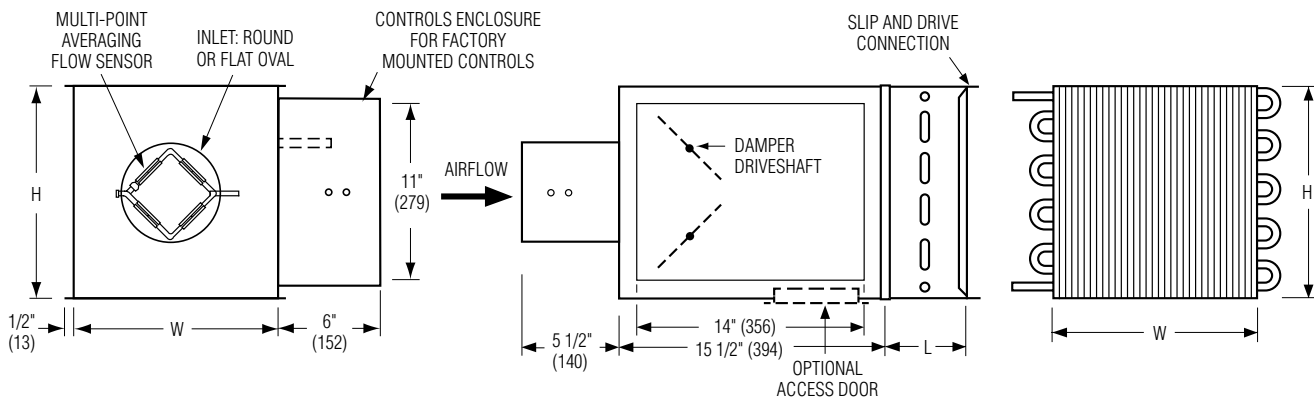
Model D30RW with Oversized Casing

- AHRI Certified coils.
- Coil Performance data on pages A43-A51.
- Denotes inlet airflow direction.
- Slip and drive cleat duct connection.
- For special outlet sizes and arrangements, consult your Nailor representative.

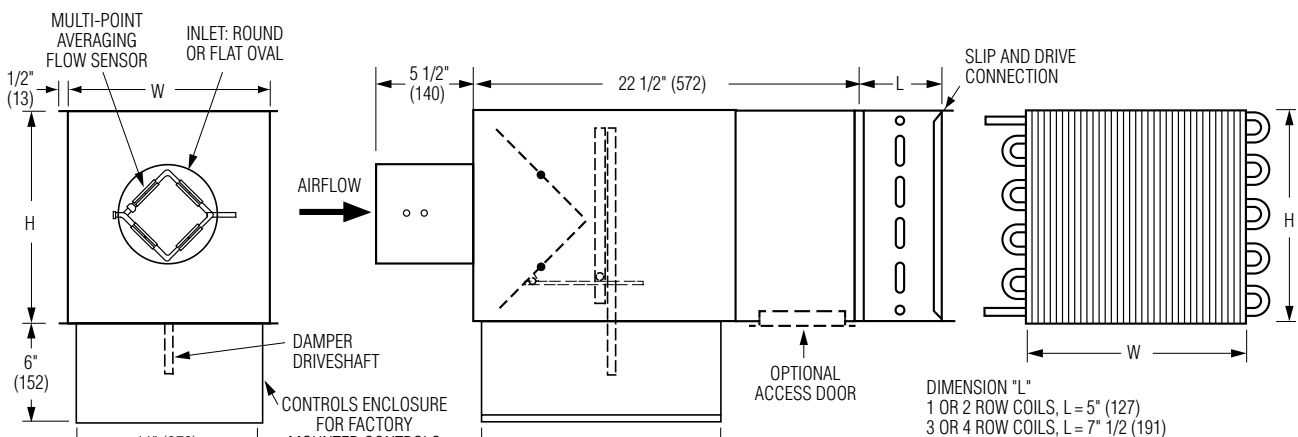
Dimensions

Model 30RW • Hot Water Reheat Coil

Digital and Analog Electronic Controls



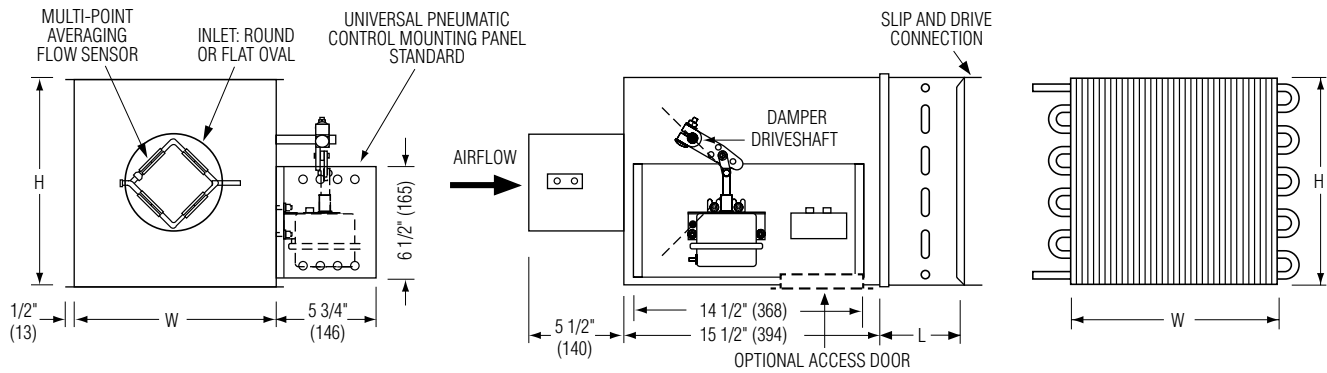
Digital and Analog Electronic Controls with Bottom Mount Controls location



A SINGLE DUCT TERMINAL UNITS

Dimensions

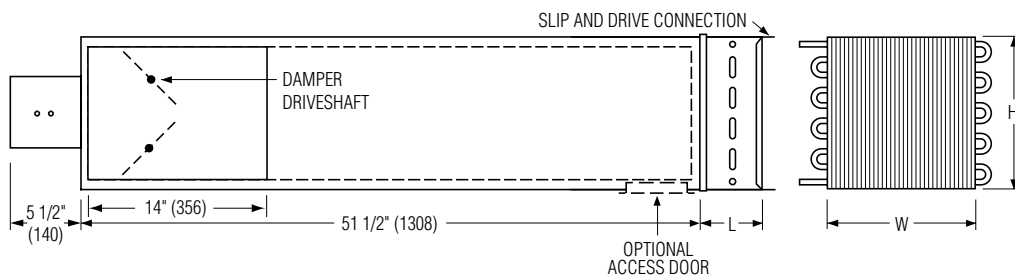
Pneumatic Controls



Model 30RW • Integral Attenuator plus Hot Water Reheat Coil

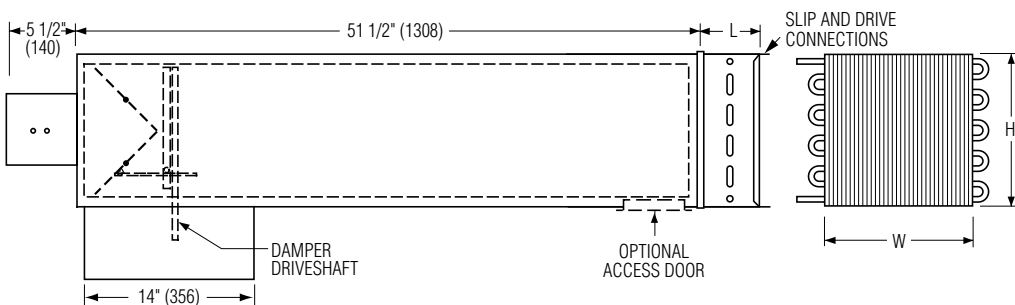
- All the benefits of both the Integral Sound Attenuator and the Hot Water Coils in one.
- Coil performance data on pages A43-A51.

Digital and Analog Controls



Digital and Analog Controls with Bottom Mount Controls Location

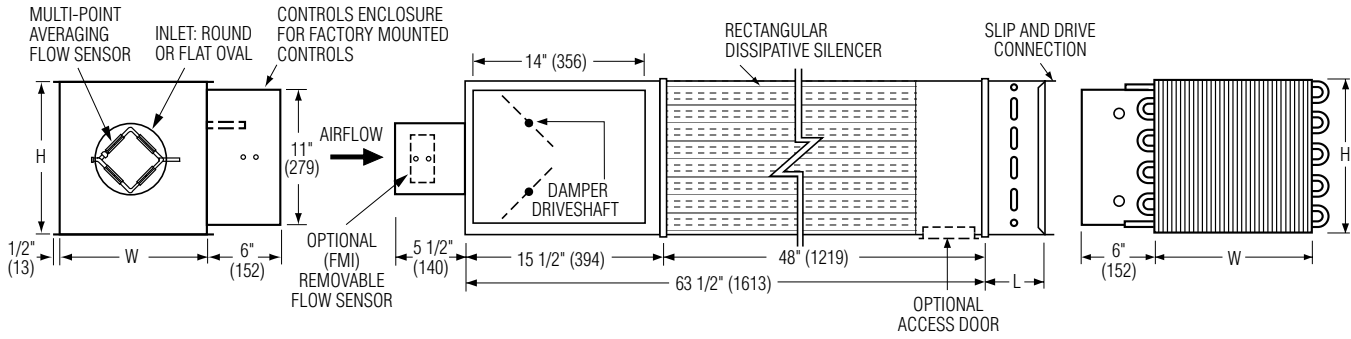
- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Dimensions

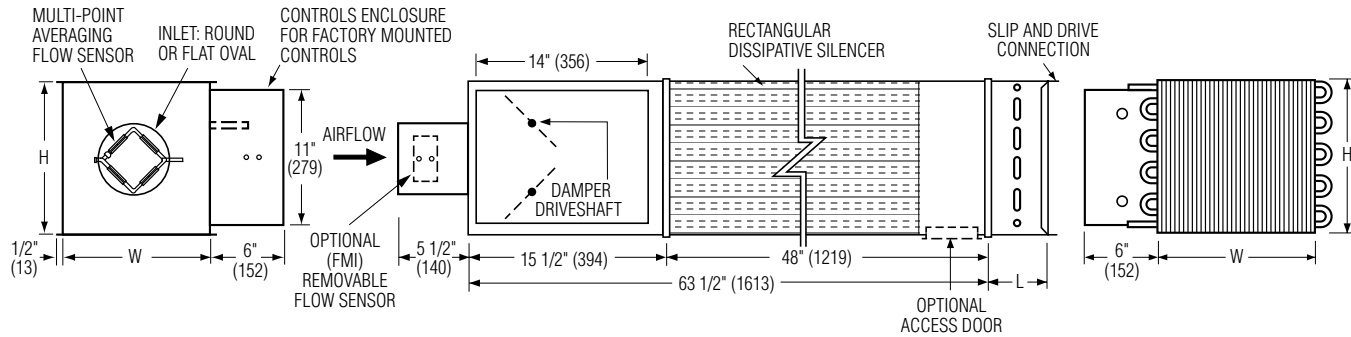
Model 30RWQ

Digital and Analog Controls



Model 30HQW

Digital and Analog Controls



Dimensional Data

Unit Size	Inlet Size	W	H	Inlet Size (Nominal)	Coil Connections			
					1 Row	2 Row	3 Row	4 Row
8	4	12 (305)	12 1/2 (318)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	5			4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	6			5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
10	7	14 (356)	12 1/2 (318)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	8			7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
12	9	18 (457)	12 1/2 (318)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	10			9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
14	12	24 (610)	12 1/2 (318)	12 15/16 x 9 13/16 (329 x 249) Oval	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
16	14	28 (711)	12 1/2 (318)	16 1/16 x 9 13/16 (408 x 249) Oval	7/8 (22)	7/8 (22)	7/8 (22)	7/8 (22)
24	16	38 (965)	18 (457)	19 3/16 x 9 13/16 (487 x 249) Oval	7/8 (22)	7/8 (22)	1 3/8 (35)	1 3/8 (35)

A

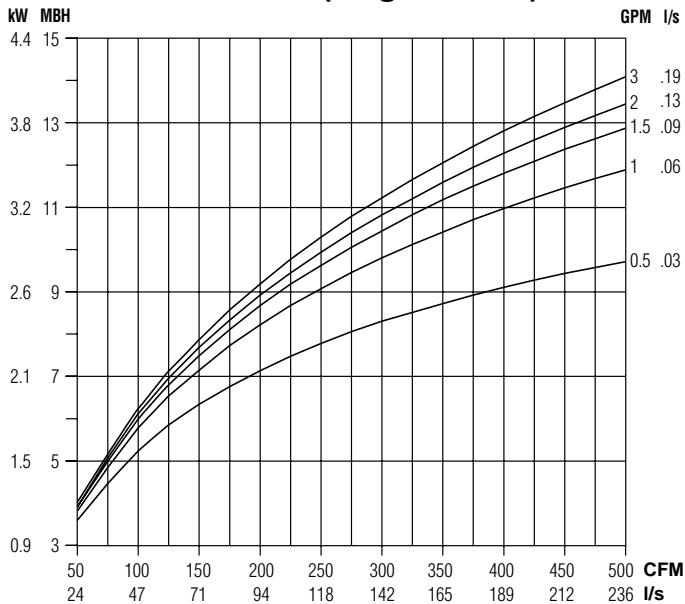
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Capacities

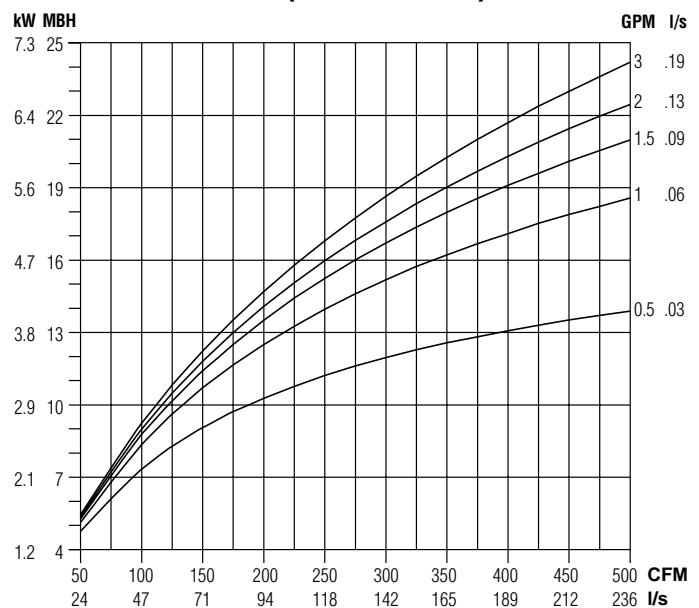
Models: 30RW, 30RWQ and 30HQW

Unit Sizes 4, 5 and 6

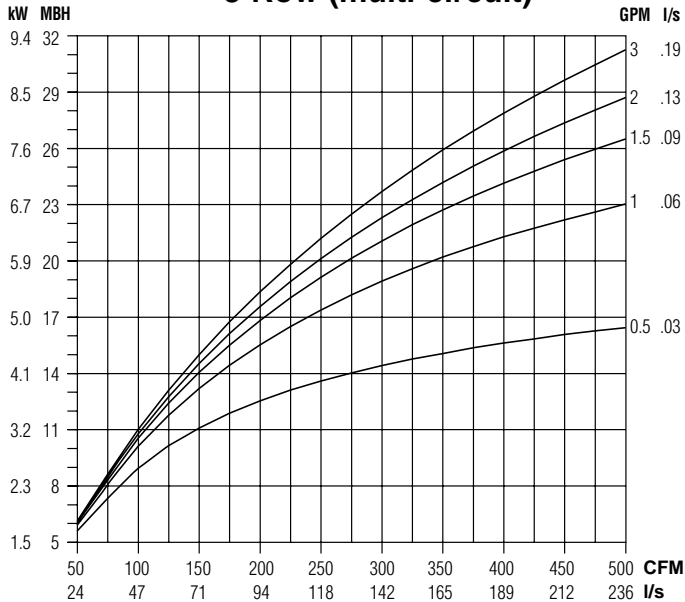
1 Row (single circuit)



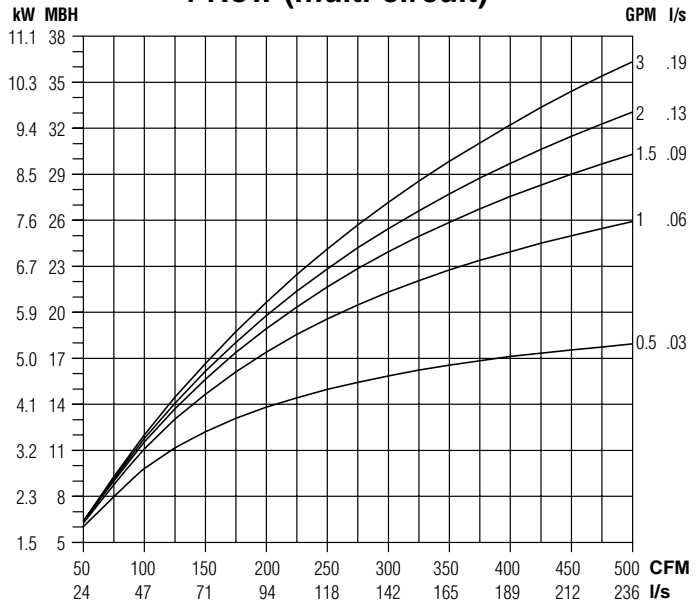
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.
 $ATR (^\circ F) = 927 \times \frac{MBH}{cfm}$, $ATR (^\circ C) = 829 \times \frac{kW}{l/s}$
- Water Temp. Drop.
 $WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}$, $WTD (^\circ C) = .224 \times \frac{kW}{l/s}$
- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

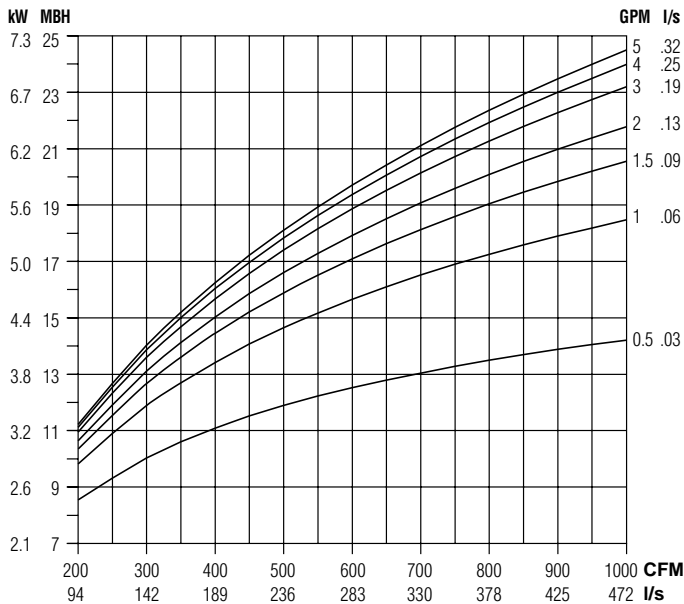
Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

Performance Data • Hot Water Coil • Capacities

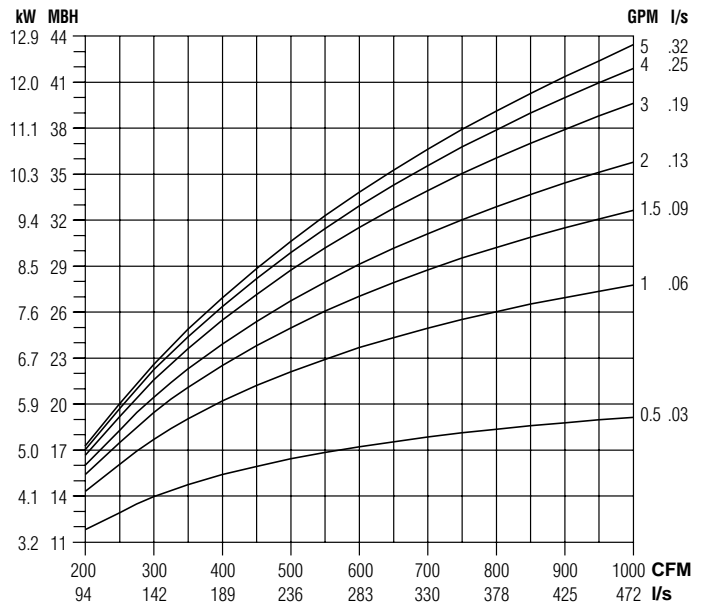
Models: 30RW, 30RWQ and 30HQW

Unit Sizes 7 and 8

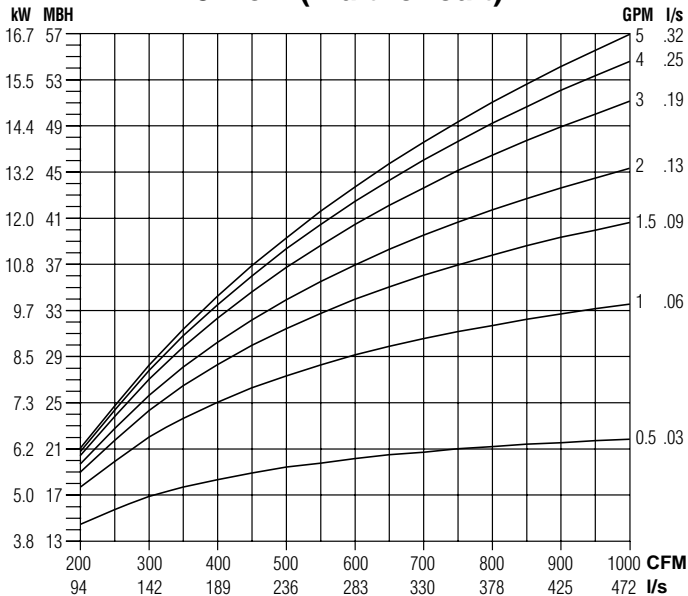
1 Row (single circuit)



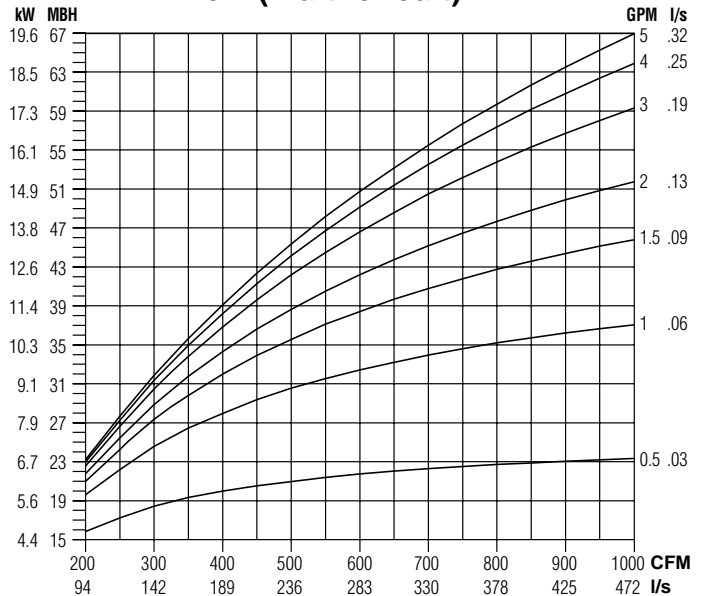
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

A

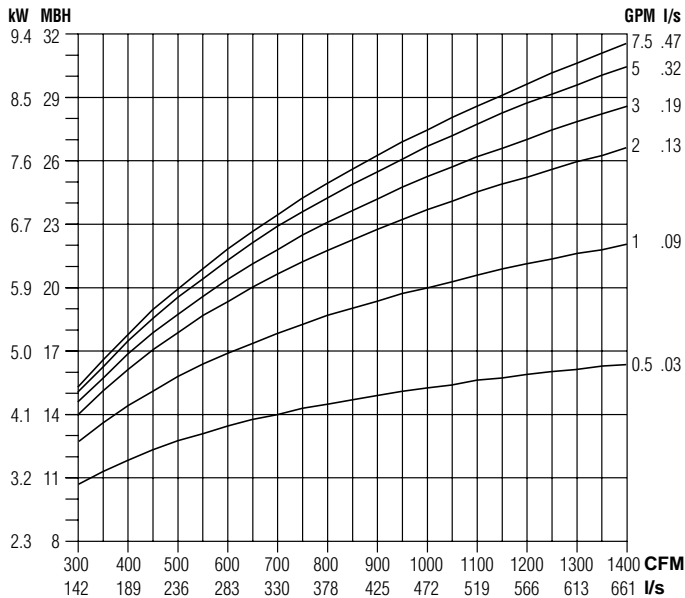
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Capacities

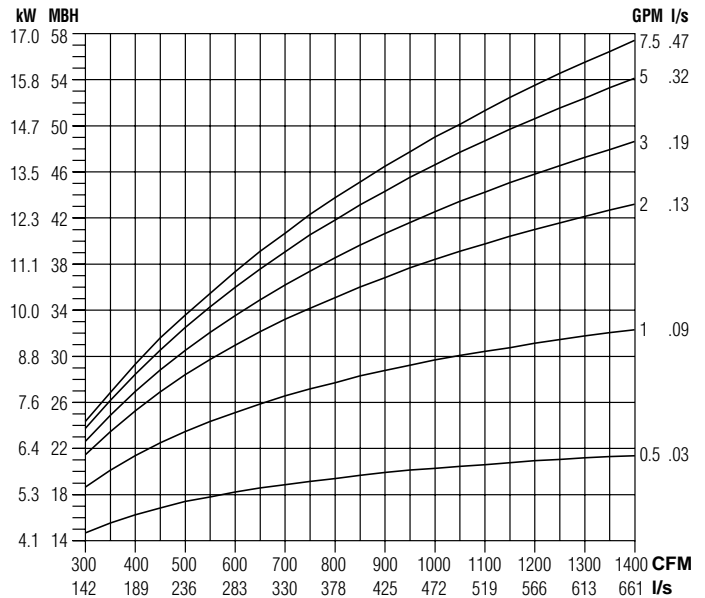
Models: 30RW, 30RWQ and 30HQW

Unit Sizes 9 and 10

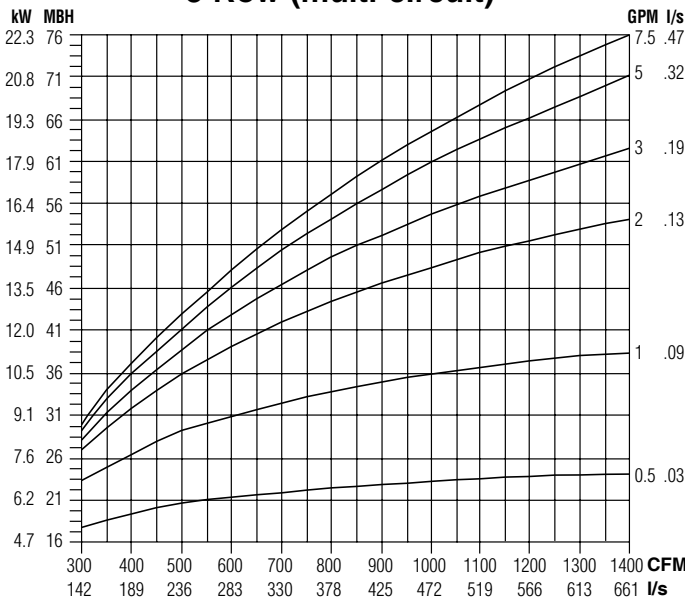
1 Row (single circuit)



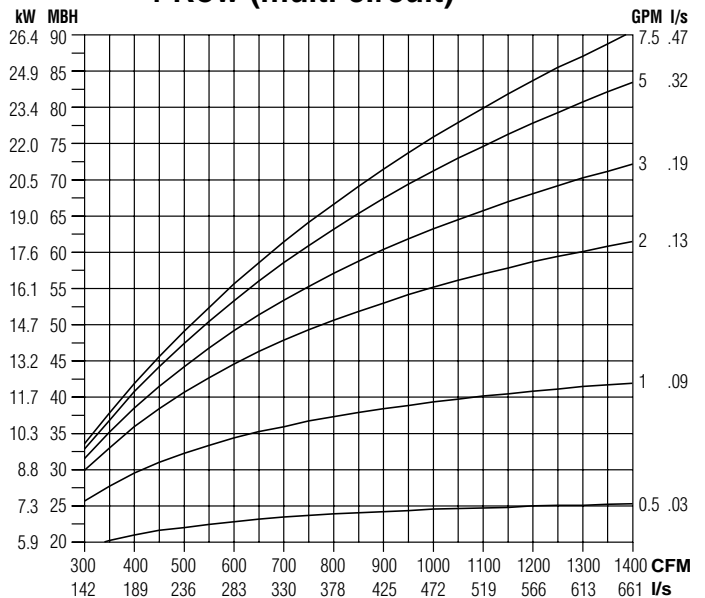
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.
 $ATR (^\circ F) = 927 \times \frac{MBH}{cfm}$, $ATR (^\circ C) = 829 \times \frac{kW}{l/s}$
- Water Temp. Drop.
 $WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}$, $WTD (^\circ C) = .224 \times \frac{kW}{l/s}$
- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

A

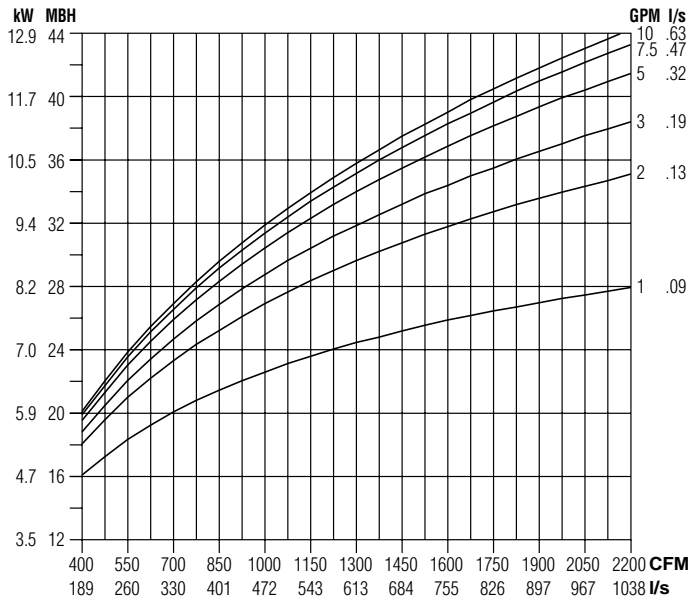
SINGLE DUCT TERMINAL UNITS

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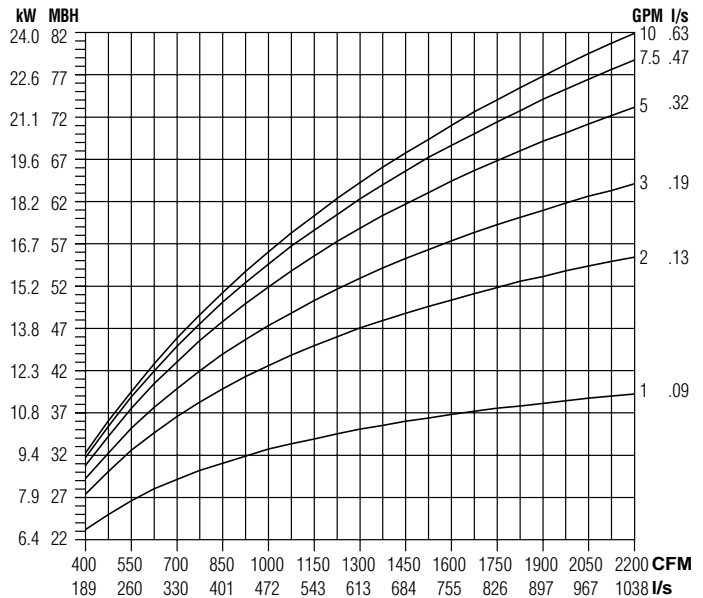
Models: 30RW, 30RWQ and 30HQW

Unit Size 12

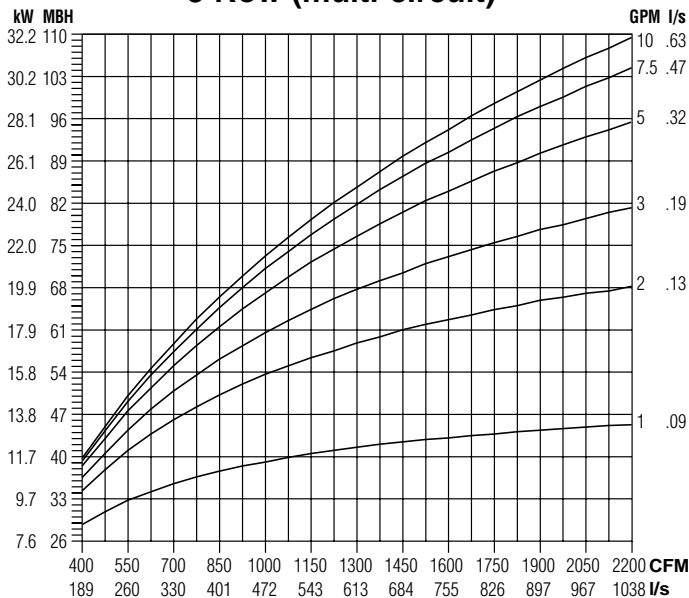
1 Row (single circuit)



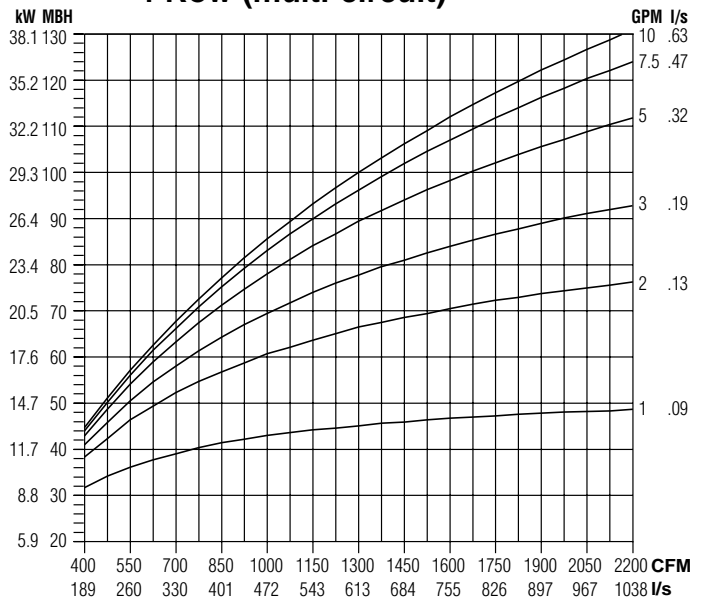
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

3. Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

4. Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

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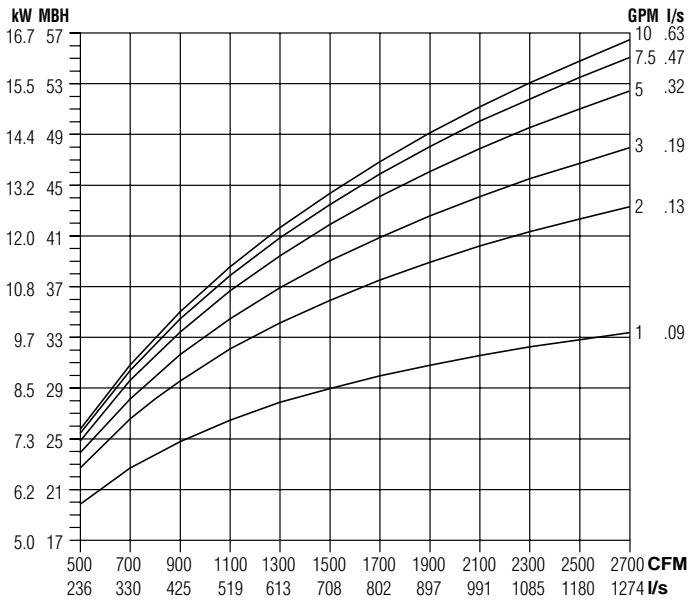
SINGLE DUCT TERMINAL UNITS

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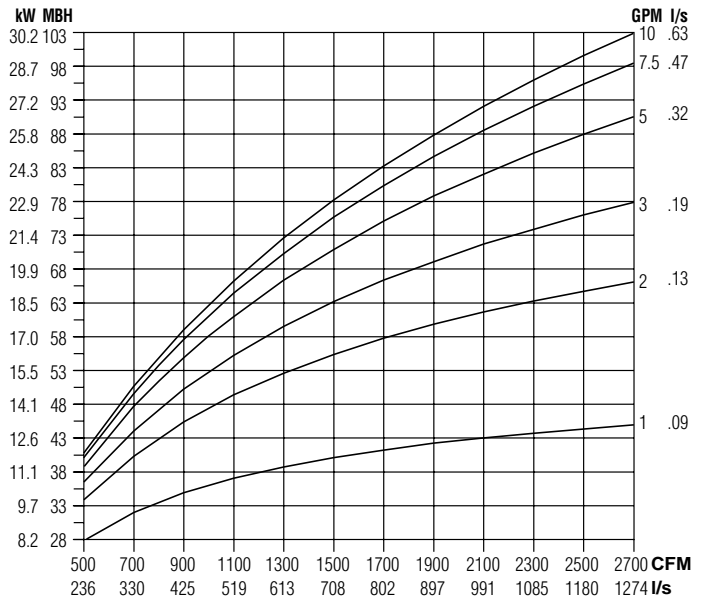
Models: 30RW, 30RWQ and 30HQW

Unit Size 14

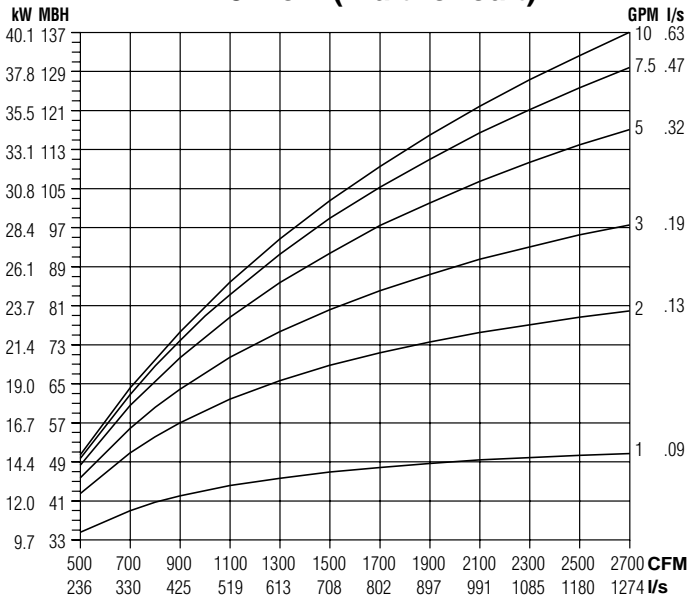
1 Row (single circuit)



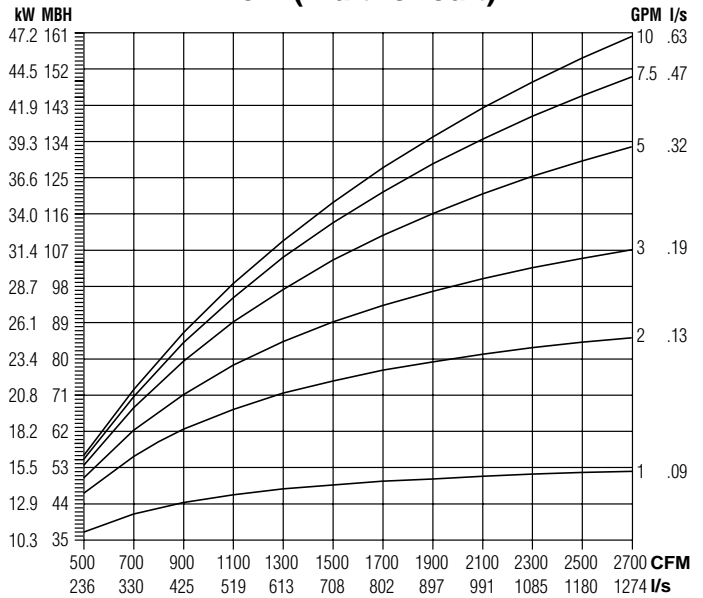
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \quad \text{ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \quad \text{WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

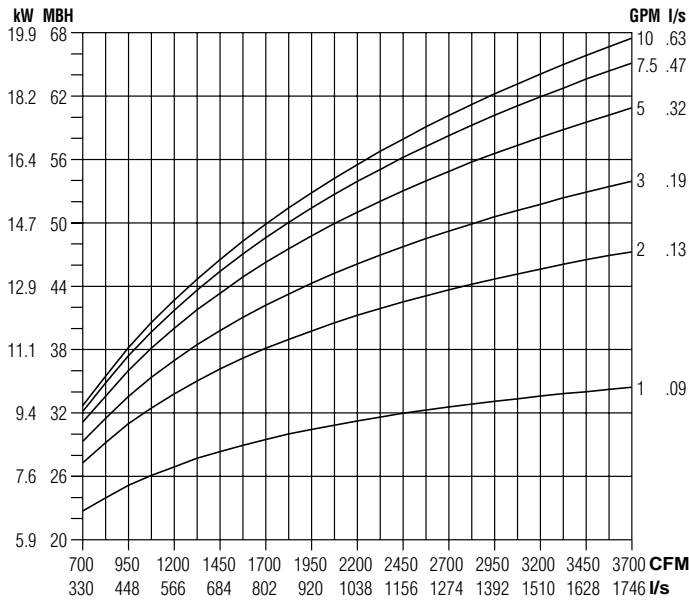
Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

Performance Data • Hot Water Coil • Capacities

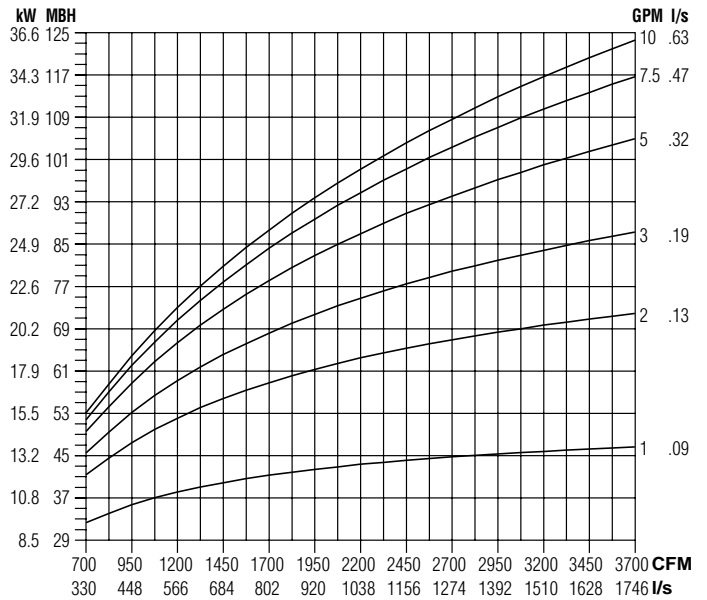
Models: 30RW, 30RWQ and 30HQW

Unit Size 16

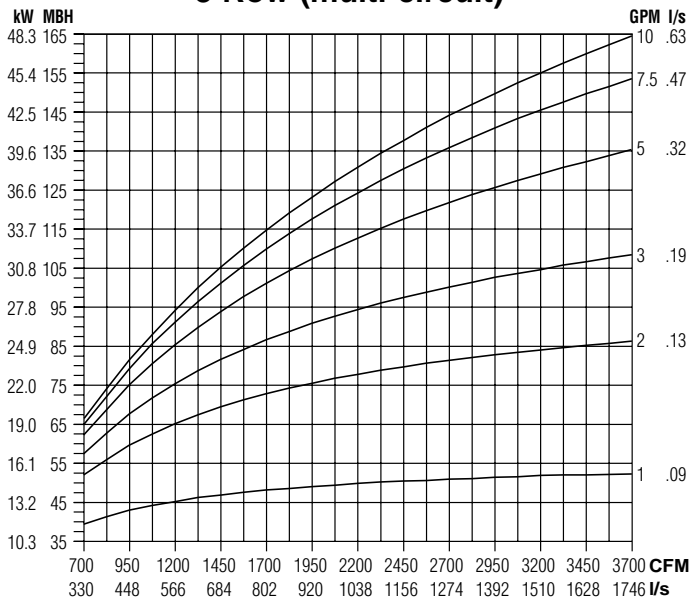
1 Row (single circuit)



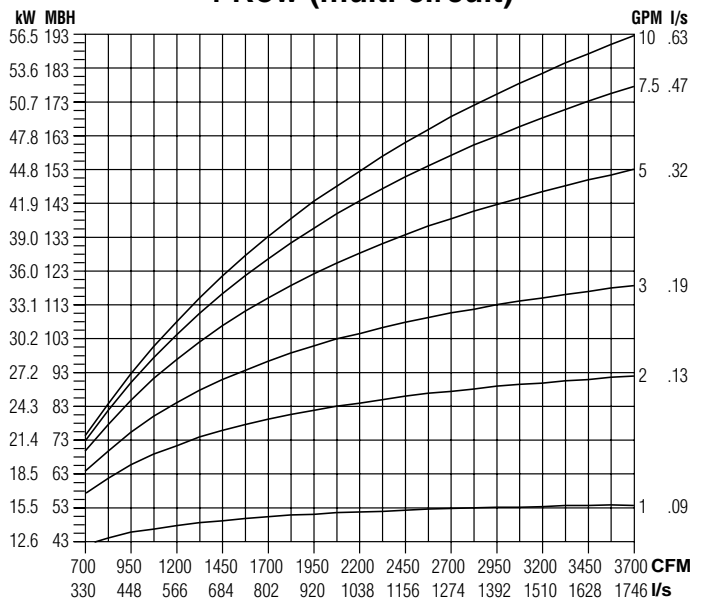
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1, 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

A

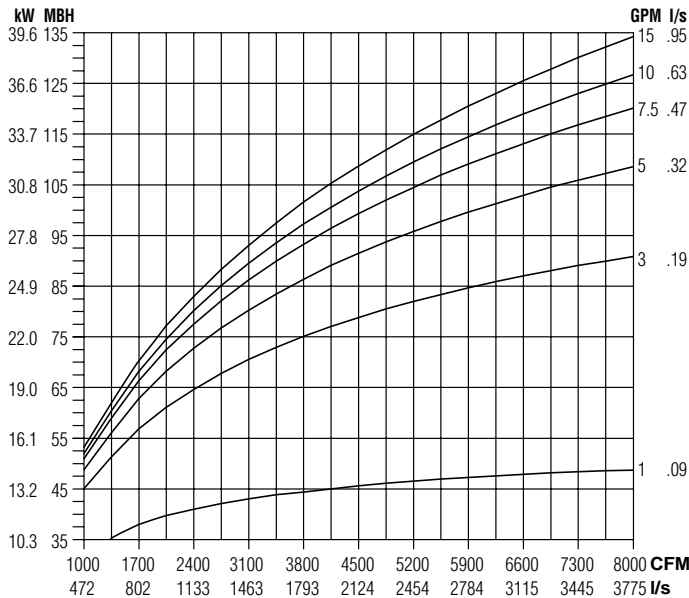
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Capacities

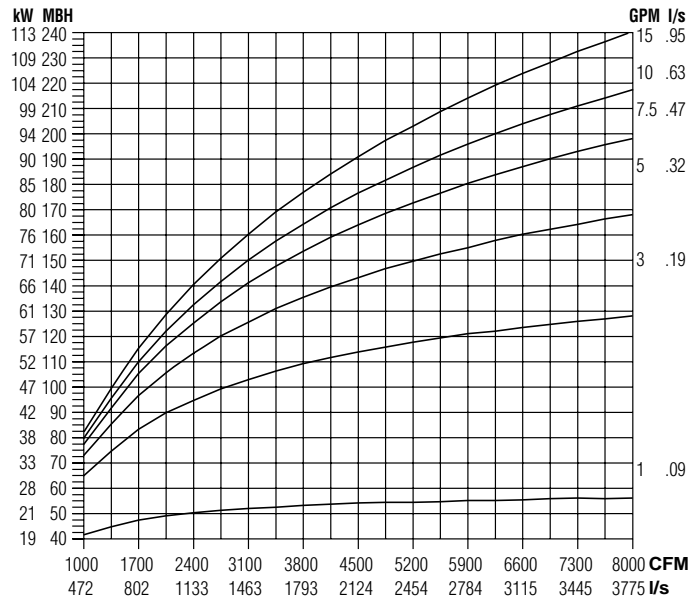
Models: 30RW, 30RWQ and 30HQW

Unit Size 24 x 16

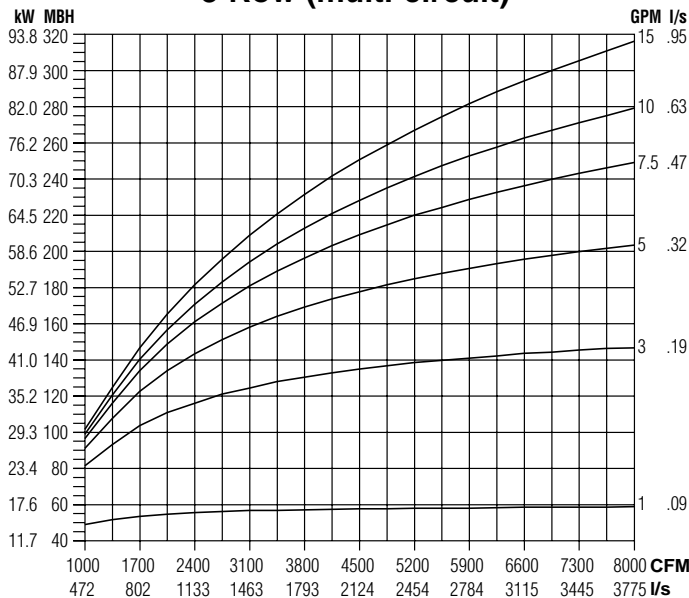
1 Row (single circuit)



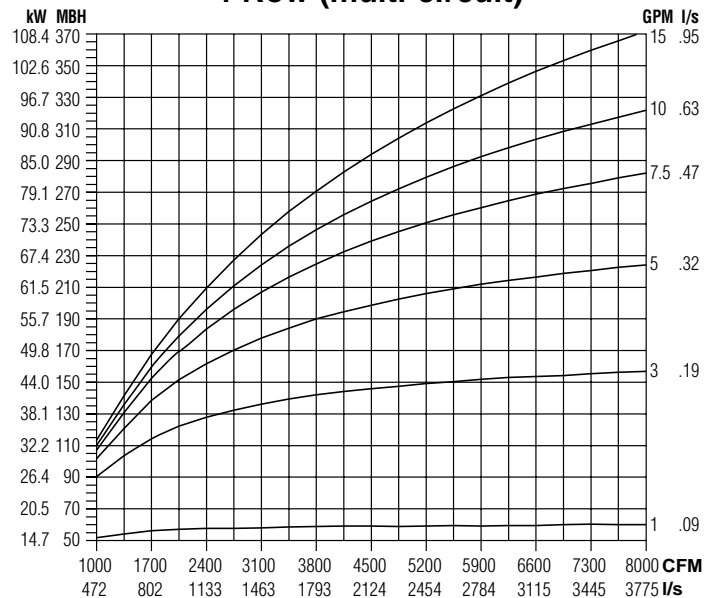
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 and 2 Row 7/8" (22). 3 and 4 Row 1 3/8" (35); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

A

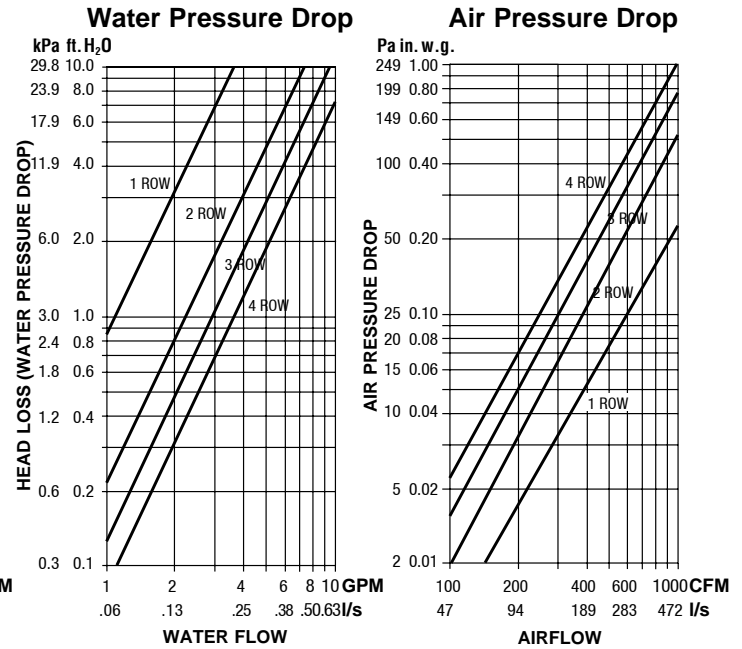
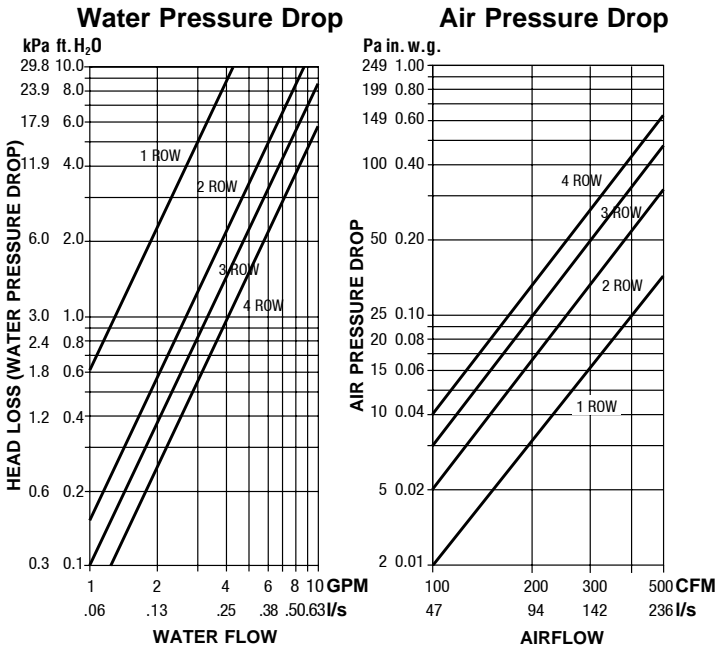
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Pressure Drop

Models: 30RW, 30RWQ and 30HQW

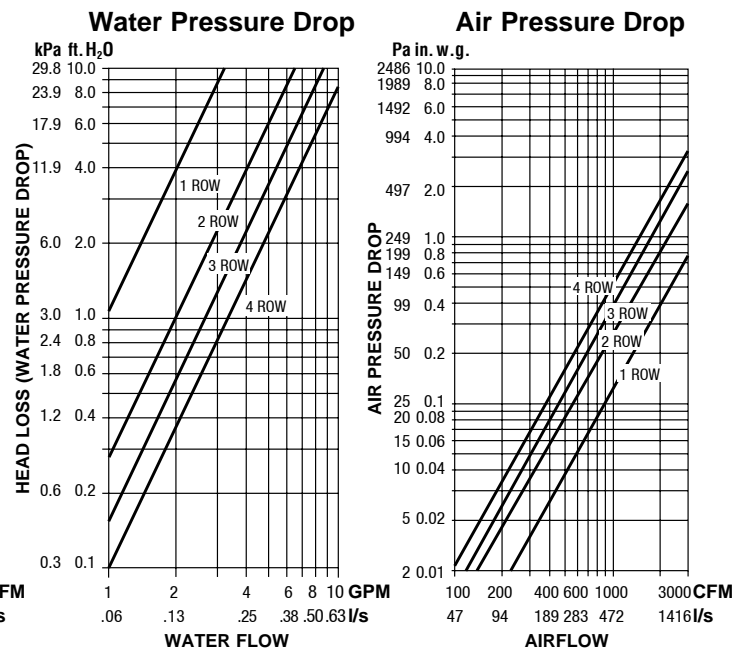
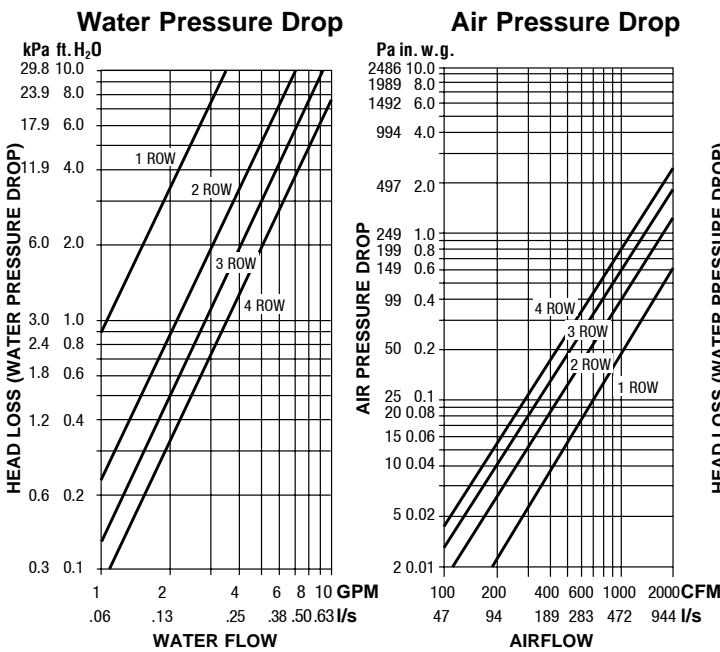
Unit Sizes 4, 5 & 6

Unit Sizes 7 & 8



Unit Sizes 9 & 10

Unit Size 12



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.
- Air Temperature Rise.
 $ATR (^\circ F) = 927 \times \frac{MBH}{cfm}$, $ATR (^\circ C) = 829 \times \frac{kW}{l/s}$
- Water Temp. Drop.
 $WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}$, $WTD (^\circ C) = .224 \times \frac{kW}{l/s}$
- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

A

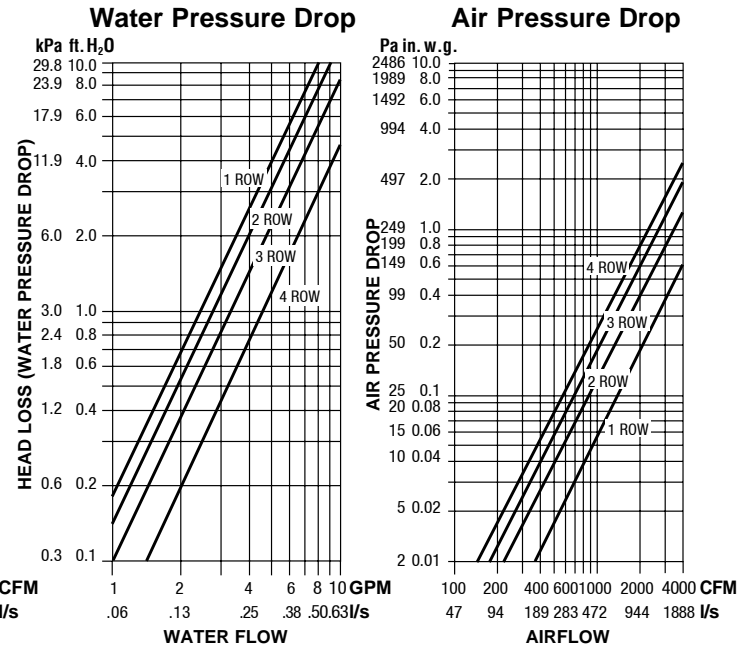
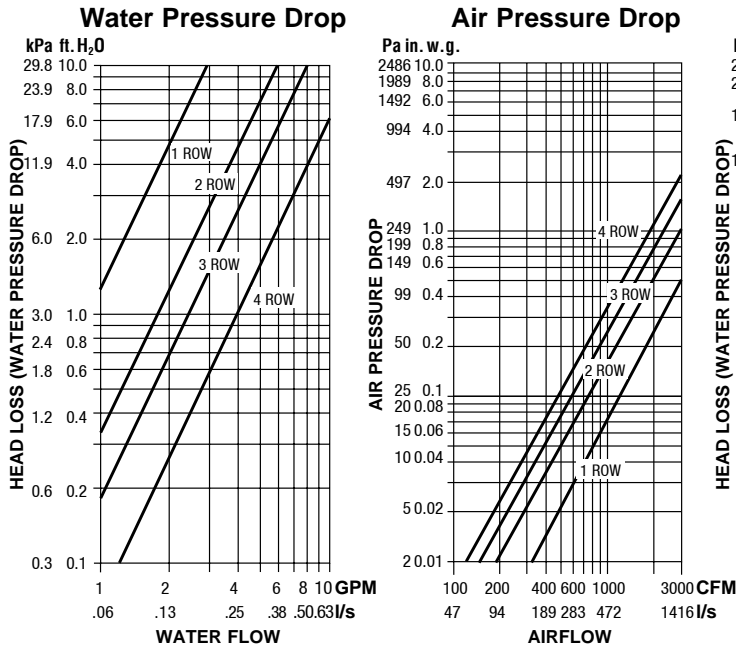
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Pressure Drop

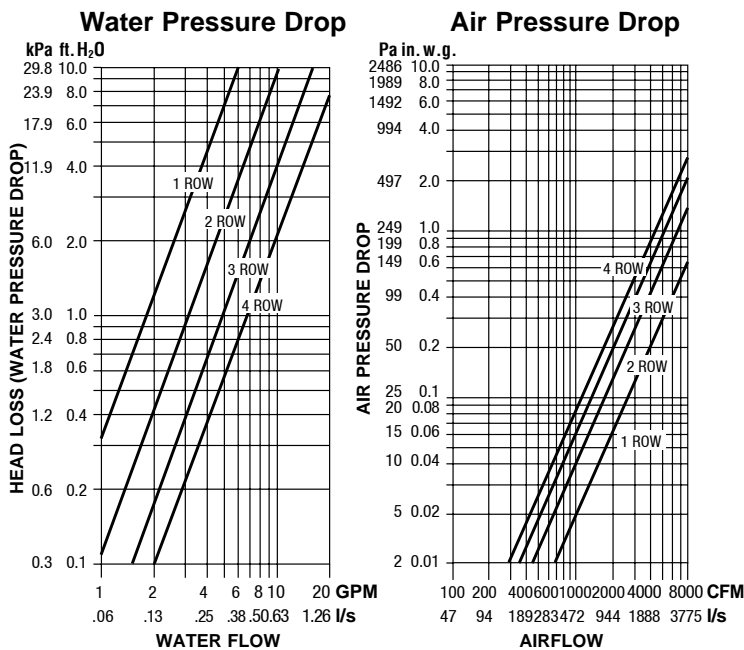
Models: 30RW, 30RWQ and 30HQW

Unit Size 14

Unit Size 16



Unit Size 24 x 16



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \quad \text{ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \quad \text{WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Electric Heating Coils Selection, Capacities and Features

Models: 30RE, 30REQ and 30HQE

Nailor manufactures its own electric heating coils. They have been specifically designed and tested for use with variable air volume single duct terminal units.

All terminals with electric heat have been tested and ETL listed as an assembly, eliminating the need to mount coils a minimum of 36" (914) downstream or having to ship a bulky length of ductwork when coils are to be supplied mounted on the terminal.

Nailor electric coils are factory mounted as an integral part of the terminal unit in an insulated extended plenum section. Total length of the casing including heater terminal is only 31" (787), providing a compact, easy to handle unit. The unique inclined opposed blade damper design provides improved and more even airflow over the coil elements compared with round butterfly damper designs, which helps to minimize air stratification, avoid nuisance tripping of the thermal cut-outs and maximize heat transfer.

Selection Guidelines:

The table below provides a general guideline as to the voltages and maximum kiloWatts available for each terminal unit size. Up to three stages of heat are available. A minimum of 0.5 kW/ stage is required.

For optimum diffuser performance and maximum thermal comfort, ASHRAE recommends that discharge temperatures do not exceed 15°F (8°C) above room set point, as stratification and short circuiting may occur. ASHRAE Standard 62.1 limits discharge temperatures to 90°F (32°C) or increasing the



Model 30RE

ventilation rate when heating from the ceiling. Never select kW to exceed a discharge temperatures of 115°F (46°C).

$$\Delta T (\text{Air Temp. Rise, } ^\circ\text{F}) = \frac{\text{kW} \times 3160}{\text{cfm}}$$

The coil ranges listed are restricted to a maximum of 48 amps and do not require circuit fusing to meet NEC code requirements. A minimum of .1" w.g. (25 Pa) of downstream static pressure is required to ensure proper operation of the heater. To avoid possible nuisance tripping of the thermal cutouts due to insufficient airflow, a minimum airflow of 70 cfm (33 l/s) per kilowatt must be maintained.

Electric Coil Limitations

Unit Size	Heating Range* cfm (l/s)	Maximum kW									
		Single Phase						Three Phase			
		120V	208V	220V	240V	277V	347V	208V	380V	480V	600V
4	25 – 225 (12 – 106)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5	45 – 400 (21 – 189)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6	65 – 550 (31 – 260)	5.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
7	95 – 800 (45 – 378)	5.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
8	125 – 1100 (59 – 519)	5.5	9.5	10.5	11.0	13.0	13.0	13.0	13.0	13.0	13.0
9	165 – 1400 (78 – 661)	5.5	9.5	10.5	11.0	13.0	16.0	16.0	16.0	16.0	16.0
10	215 – 1840 (101 – 868)	5.5	9.5	10.5	11.0	13.0	16.5	17.0	16.5	21.0	21.0
12	290 – 2500 (137 – 1180)	5.5	9.5	10.5	11.0	13.0	16.5	17.0	16.5	30.0	30.0
14	360 – 3125 (170 – 1475)	5.5	9.5	10.5	11.0	13.0	16.5	17.0	16.5	31.0	38.5
16	430 – 3725 (203 – 1758)	5.5	9.5	10.5	11.0	13.0	16.5	17.0	16.5	31.0	38.5
24 x 16	960 – 8330 (453 – 3931)	5.5	9.5	10.5	11.0	13.0	16.5	17.0	16.5	31.0	38.5

* Minimum required airflow must be the greater of the air volume listed or 70 cfm per kilowatt (33 L/s/kW)

Standard Features:

- Primary auto-reset high limit thermal cut-out.
- Secondary manual reset high limit thermal cut-outs (one per element).
- Positive pressure airflow switch.
- Derated high quality nickel-chrome alloy heating elements.
- Magnetic or safety contactors and/or PE switches as required.
- Control transformer. Class II, 24 Vac for digital and analog controls.
- Line terminal block.
- ETL Listed as an assembly.
- Hinged door control enclosure.
- High performance arrowhead insulators.

- Slip and drive discharge connection.
- Class A 80/20 Ni/Cr wire.

Options:

- Quiet contactors.
- Mercury contactors.
- Toggle type disconnect switch.
- Door interlock disconnect switch.
- Power circuit fusing.
- Dust tight construction.
- SCR control.



Intertek

Tested and approved to the following standards:

ANSI/UL 1996, 4th ed.

CSA C22.2 No. 155-M1986.

A SINGLE DUCT TERMINAL UNITS

3100 SERIES • VARIABLE OR CONSTANT VOLUME PRODUCT OVERVIEW



Nailor 3100 Series Single Duct Terminal units are simply put, versatile. Whether the requirement calls for a constant or variable air volume (VAV) single duct terminal, hot water reheat or requires basic attenuation, the 3100 Series terminal units deliver.

Available in numerous configurations, each 3100 Series is designed to control airflow in response to a control signal. The industry proven round butterfly damper utilizes a peripheral gasket for extremely tight shutoff. The series provides a round inlet for size 4-16.

The pressure independent 3100 Series terminal units operate in both constant and variable flow configurations. Unlike a constant volume system, which is sized for the peak demand of the entire building, a VAV system is sized for the instantaneous peak demand of all zones. Since VAV systems modulate airflow based on demand, operating costs are generally reduced compared to constant volume systems as less fan energy and refrigeration is needed.

Numerous options on the 3100 Series allow for application specific customization. Options range from different insulation types, reheat versions, attenuators, control sequences, low temperature and ultra low casing leakage construction to access doors. Controls options include digital, analog electric and pneumatic types suitable for most applications. Depending on the selected controls option, a full NEMA 1 type low voltage enclosure may be included. All pressure independent control options utilize the multi-point averaging Nailor Diamond Flow sensor to measure velocity pressure.



3101 Cooling or Heating Only



31RW Cooling with Hot Water Reheat

A

SINGLE DUCT TERMINAL UNITS

SINGLE DUCT VARIABLE OR CONSTANT AIR VOLUME

3100 SERIES

- Butterfly Damper
- Round Inlets



Model 3101

Models:

- 3101** Cooling or Heating only
- 31RW** Cooling with Hot Water Reheat

Variable Air Volume Systems supply a constant temperature to an area and vary the volume as opposed to a conventional HVAC system which supplies a constant volume and varies the air temperature.

Operating costs are greatly reduced compared to the larger conventional HVAC systems by using less fan and refrigeration energy. Variable Air Volume Systems also cut initial cost by taking advantage of building diversity. System capacity is determined by the instantaneous peak demand of all zones in lieu of the peak demand for the entire building.

The smaller components of a VAV system require less floor space and give the owner the flexibility to adapt to tenant changes as desired at any time during or after construction of the building.

With today's energy conservation and efficiency requirements, **Model Series 3100** terminals units are designed for and adaptable to any modern VAV requirements. Control components and options provide maximum flexibility with a wide scope for cost effective innovation.

STANDARD FEATURES:

- 22 ga. (0.86) galvanized steel casing, mechanically sealed, low leakage construction. Leakage is less than 1% of the terminal rated airflow at 1" w.g. (249 Pa).
- 2 x 20 ga. (1.00) round laminated butterfly damper with a polyurethane gasket. Damper leakage is less the 1% of the terminal rated airflow at 3" w.g. (750 pa.) and less than 2% at 6" w.g. (1500 pa.) as tested in accordance with ANSI / ASHRAE Standard 130.
- Self-lubricating Celcon® bearings.
- 1/2" (13) dia. plated steel drive shaft, with indicator mark on the end to show damper position.
- Available in 11 unit sizes to handle from 0 – 8300 cfm (0 – 3917 l/s).
- Unit sizes 4 – 16 feature round inlet collars.
- Unit size 24 x 16 features a rectangular inlet.
- Multi-point averaging Diamond Flow Sensor. Aluminum construction. Supplied with balancing tees for field calibration and balancing.
- Rectangular discharge with slip and drive cleat duct connection.
- Full NEMA 1 type low voltage enclosure for factory mounted controls.
- 3/4" (19) dual density fiberglass insulation maximizes acoustical and thermal performance. 4 lb. high density skin is treated to resist abrasion and erosion from airflow. Exposed edges are coated. Meets requirements of NFPA 90A and UL 181.
- Right-hand controls location is standard (shown) when looking in direction of airflow. Damper is CW to close. Optional left-hand controls location is available.
- Model D3101 can be installed horizontally, vertical or at any angle. Operation is not affected by position.
- Options:
 - Steri-Liner
 - Fiber-Free Liner
 - Solid metal liner
 - Removable Flow Sensor
 - 1" (25) Fiberglass liner
- Bottom access door
- 24 VAC Control transformer
- Toggle disconnect switch
- Hanger brackets
- Controls enclosure for field mounted controls
- Dust tight enclosure seal
- 20 ga. (1.00) construction
- Low temperature construction
- Ultra Low Leakage casing
- Bottom mount controls enclosure
- Seismic Certification
- Oversized casing.



Intertek

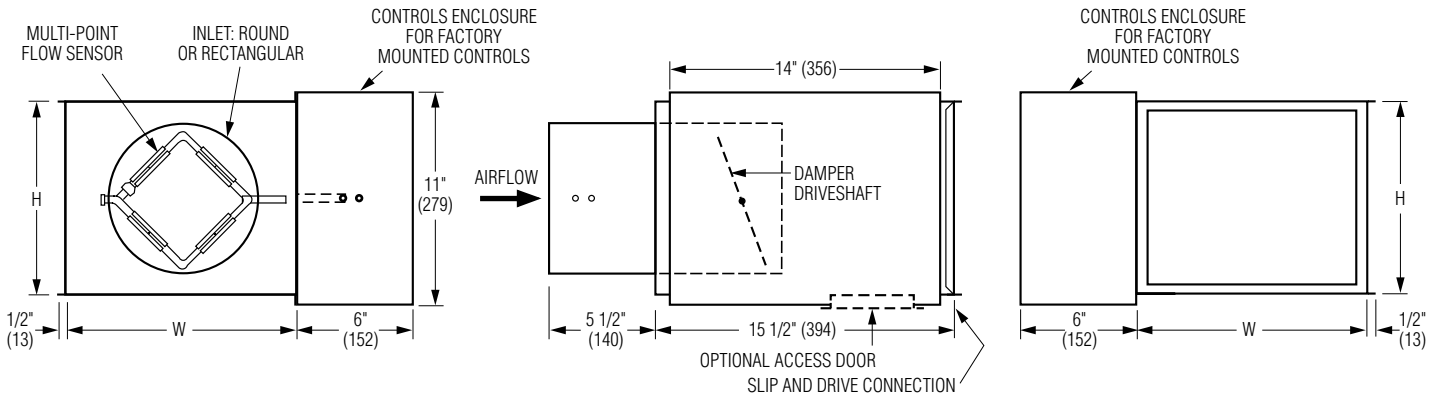


Dimensions

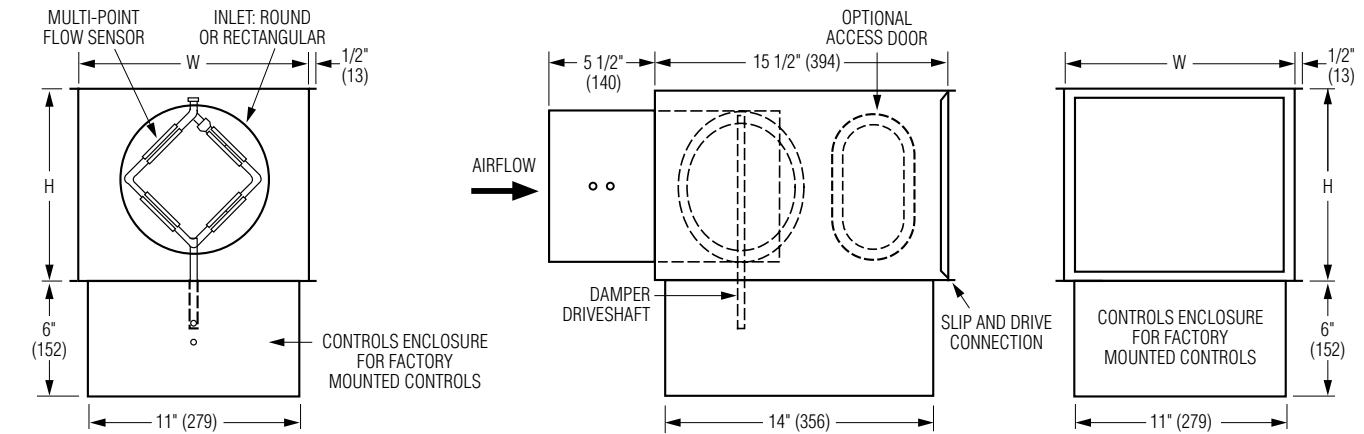
Model 3101 • Basic Unit with Controls

Digital and Analog Electronic Controls

- Full NEMA 1 controls enclosure is provided for factory mounted controls. Optional for field mounted controls.

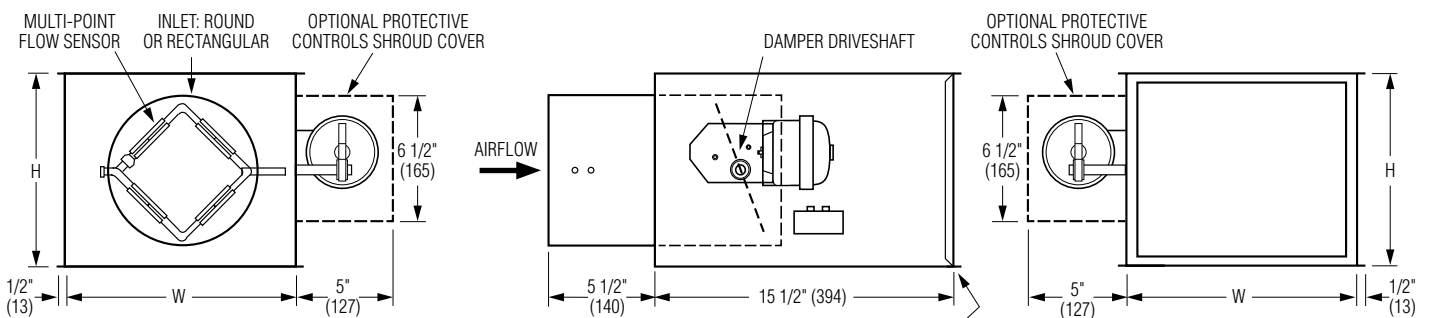


Digital and Analog Electronic Controls with Bottom Mount Control Enclosure



Pneumatic Controls

- Units are equipped with CSC-3011 universal reset controller. Direct or reverse acting, with the damper normally open or normally closed. Rotary actuator MCP-3631 is standard.

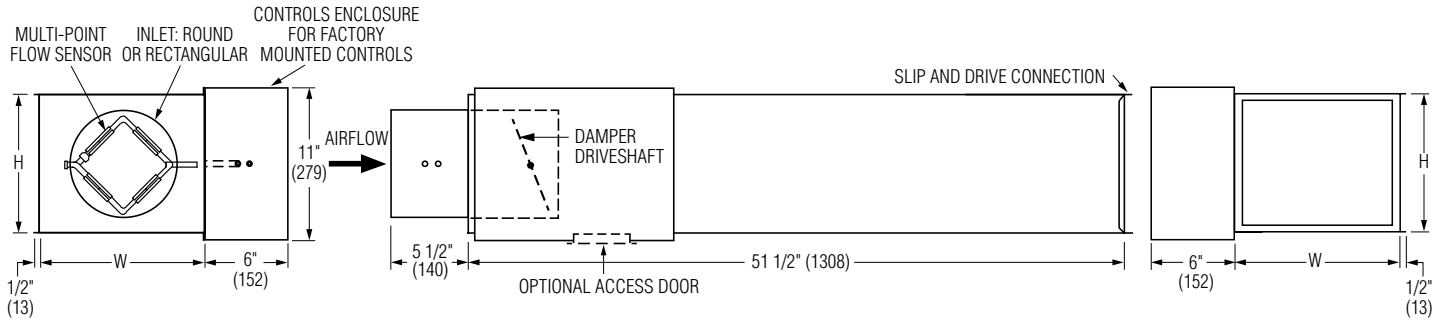


Dimensions

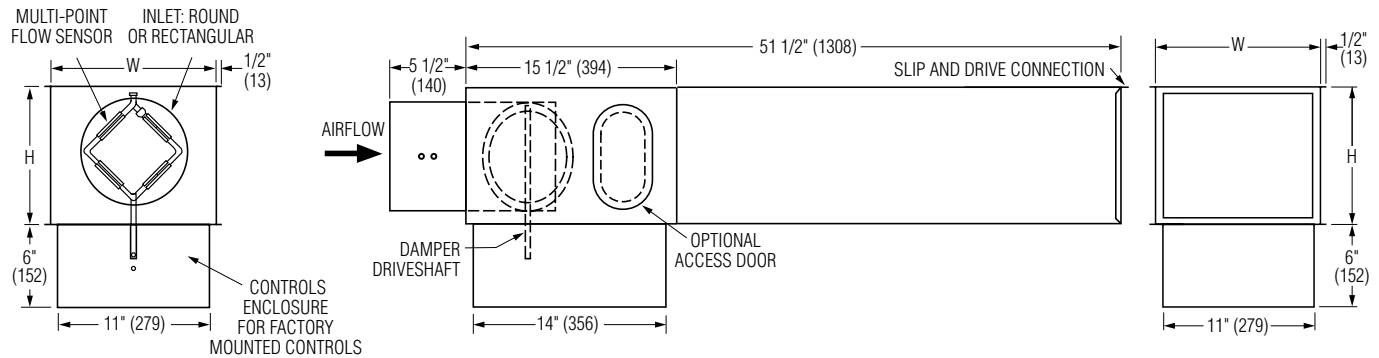
Model 3101 • Integral Sound Attenuator

Digital and Analog Electronic Controls

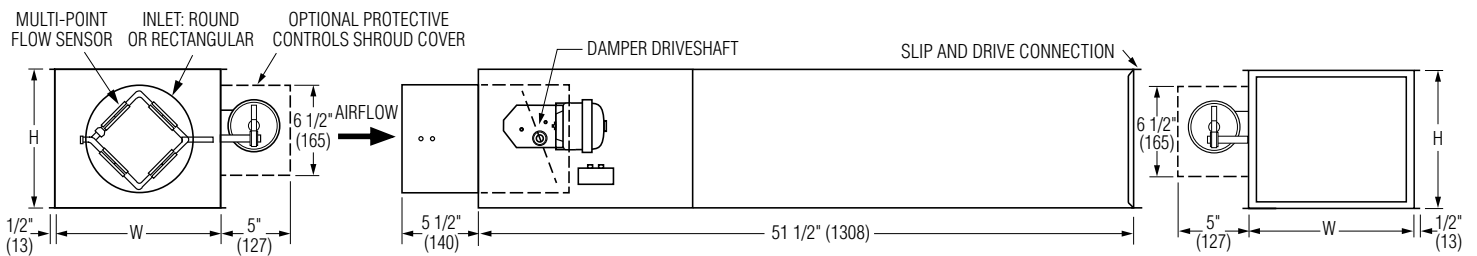
- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Digital and Analog Electronic Controls with Bottom Mount Control Enclosure



Pneumatic Controls



Dimensional Data

Unit Size	Airflow Range* cfm (l/s)	W	H	Inlet Size
4	0 – 225 (0 – 106)	12 (305)	8 (203)	3 7/8 (98) Round
5	0 – 400 (0 – 189)	12 (305)	8 (203)	4 7/8 (124) Round
6	0 – 550 (0 – 260)	12 (305)	8 (203)	5 7/8 (149) Round
7	0 – 800 (0 – 378)	12 (305)	10 (254)	6 7/8 (175) Round
8	0 – 1100 (0 – 519)	12 (305)	10 (254)	7 7/8 (200) Round
9	0 – 1400 (0 – 661)	14 (356)	12 1/2 (318)	8 7/8 (225) Round
10	0 – 1840 (0 – 868)	14 (356)	12 1/2 (318)	9 7/8 (251) Round
12	0 – 2500 (0 – 1180)	16 (406)	15 (381)	11 7/8 (302) Round
14	0 – 3370 (0 – 1590)	20 (508)	17 1/2 (445)	13 7/8 (352) Round
16	0 – 4510 (0 – 2128)	24 (610)	18 (457)	15 7/8 (403) Round
24 x 16	0 – 8330 (0 – 3931)	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.

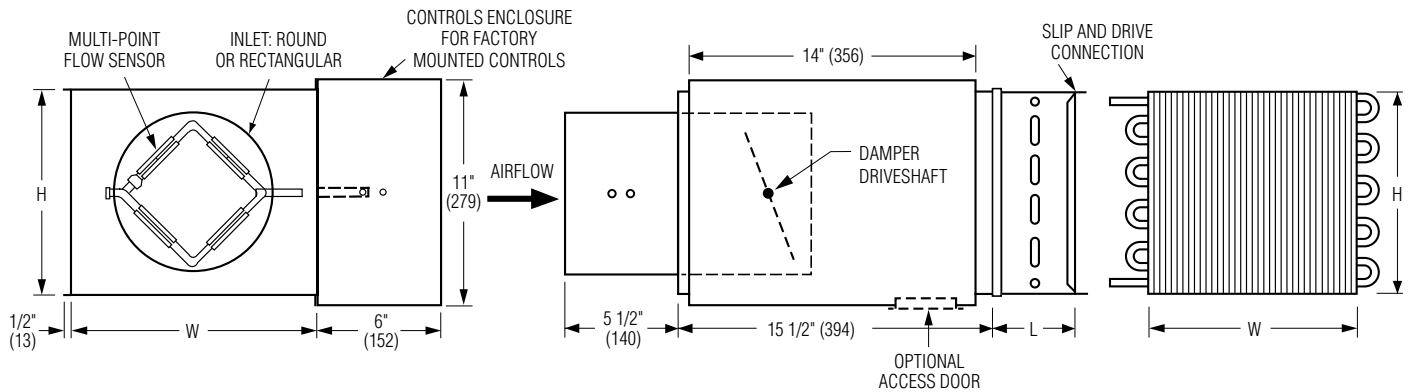
* Maximum airflow limit is based upon 1.5" w.g. (373 Pa) max. differential pressure signal from Diamond Flow Sensor.

Dimensions

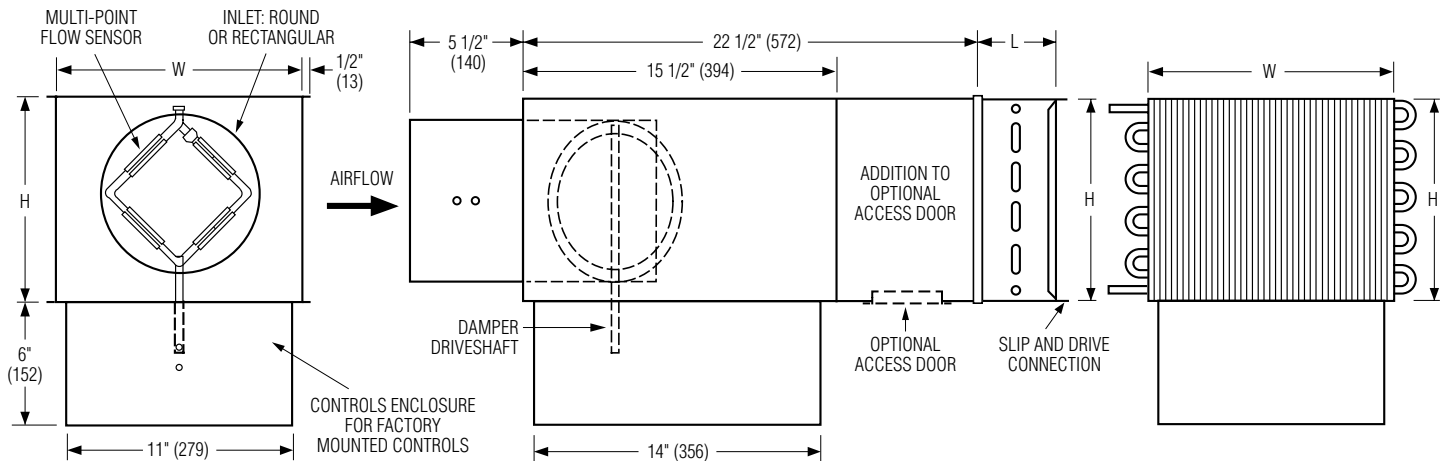
Model 31RW • Hot Water Reheat Coil

- One, two, three and four row available.
- Hot water coils have copper tubes and aluminum ripple fins. Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.
- AHRI Certified coils
- Coil Performance data on pages A92-A100
- Oversized Casing option on pages A90-A91

Digital and Analog Electronic Controls



Digital and Analog Electronic Controls with Bottom Mount Controls location

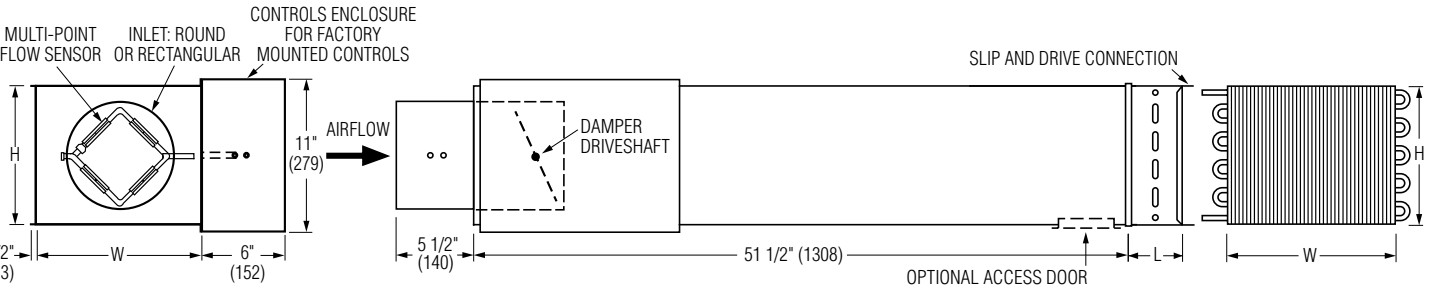


Dimensions

Model 31RW • Integral Attenuator plus Hot Water Reheat Coil

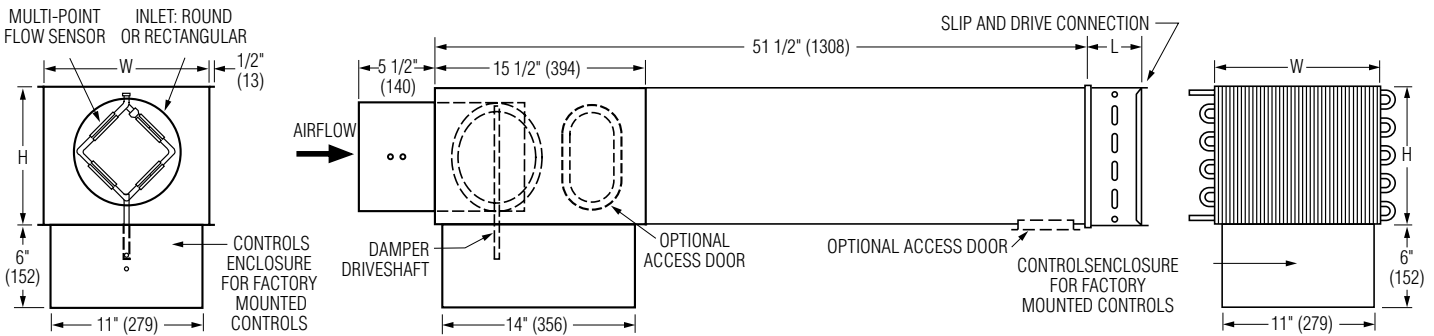
- All the benefits of both the Integral Sound Attenuator and the Hot Water Coils shown above in one.
- Coil performance data on pages A92-A100

Digital and Analog Electronic Controls



Digital and Analog Electronic Controls with Bottom Mount Controls Location

- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.



Dimensional Data

Unit Size	W	H	Inlet Size	Coil Connections				Hot Water Coil	
				1 Row	2 Row	3 Row	4 Row	L (1 & 2 Row)	L (3 & 4 Row)
4	12 (305)	8 (203)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
5	12 (305)	8 (203)	4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
6	12 (305)	8 (203)	5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
7	12 (305)	10 (254)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
8	12 (305)	10 (254)	7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
9	14 (356)	12 1/2 (318)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
10	14 (356)	12 1/2 (318)	9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
12	16 (406)	15 (381)	11 7/8 (302) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
14	20 (508)	17 1/2 (445)	13 7/8 (352) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
16	24 (610)	18 (457)	15 7/8 (403) Round	7/8 (22)	7/8 (22)	7/8 (22)	7/8 (22)	5 (127)	7 1/2 (191)
24 x 16	38 (965)	18 (457)	23 7/8 x 15 7/8 (606 x 403) Rect.	7/8 (22)	7/8 (22)	1 3/8 (35)	1 3/8 (35)	5 (127)	7 1/2 (191)

SINGLE DUCT TERMINAL UNITS

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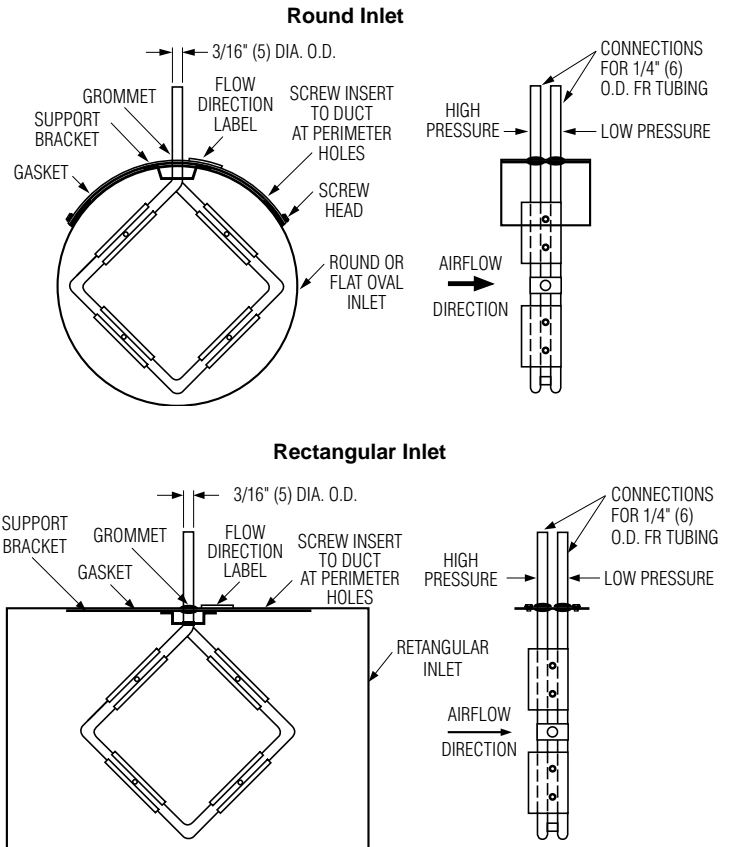
Options:

FMI Removable Flow Sensor

The (FMI) Removable Flow Sensor is a multi-point averaging airflow sensor. Designed to provide accurate sensing by sampling air velocities in four quadrants of a duct, the differential pressure flow sensor provides an averaged reading at an amplification of approximately 2.5 times the velocity pressure, dependent upon nominal size.

Features:

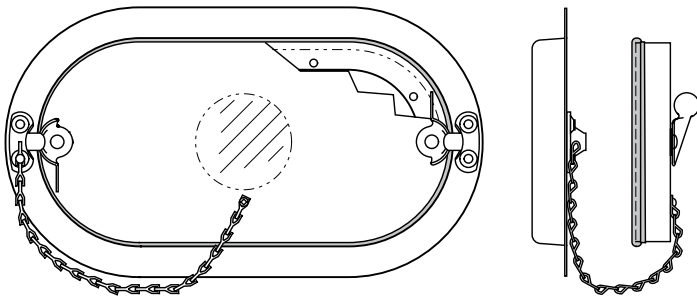
- Removable for cleaning
- All metal construction - no combustible materials in the air stream.
- Amplifies velocity pressure approximately 2.5 times to give a wide range of useful output signal vs. flow.
- Compact size allows for easy removal in tight spaces.
- Sensor design minimizes pressure drop and regenerated noise.
- Label provided on each unit gives airflow direction.
- Multi-point sensing gives an accurate output signal with a maximum deviation of only $\pm 5\%$ with a hard 90 degree elbow, provided a straight inlet condition with a minimum length of two equivalent duct diameters is provided.



Access Door

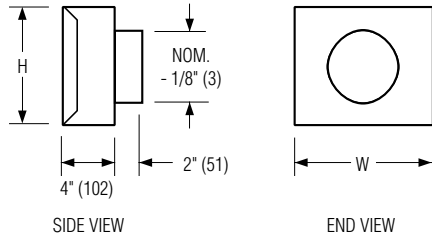
Ultra-low leakage, premium quality and performance. Flat oval design.

- Die formed 22 ga. (0.85) galvanized steel flanged frame and door panel.
- Positive bulb door seal
- Plated steel camlock fasteners.
- 1" (25) insulation with 22 ga. (0.85) galv. backing plate.
- Leakage tested in conformance with British Standard DW/142 Class C.
- See 0800-1 submittal for more detailed information.



Terminal Unit Size	Nominal Door Size	Max. Leakage 8" w.g. (2 kPa) cfm
4 - 12	8" x 5" (203 x 127)	0.036 cfm (1.02 l/min.)
14 - 24 x 16	12" x 6" (305 x 152)	0.064 cfm (1.8 l/min.)

FF Round Discharge Collar



Unit Size	W	H	FF Outlet Size / Oval
4, 5, 6	12 (305)	8 (203)	4, 5, 6 (102, 127, 152)
7, 8	12 (305)	10 (254)	7, 8 (178, 203)
9, 10	14 (356)	12 1/2 (318)	9, 10 (229, 254)
12	16 (406)	15 (381)	12 (305)
14	20 (508)	17 1/2 (445)	14 (356)
16	24 (610)	18 (457)	16 (406)
24 x 16	38 (965)	18 (457)	—

Ultra Low Leakage Casing (ULC) Option, CFM (l/s)

Inlet Size	Pressure, w.g. (Pa)			
	0.5" (124)	1.0" (249)	3" (746)	6" (1049)
4, 5, 6	1 (0.5)	1 (0.5)	3 (1)	6 (3)
7, 8	1 (0.5)	2 (1)	4 (2)	7 (3)
9, 10	1 (0.5)	2 (1)	4 (2)	8 (4)
12	2 (1)	3 (1)	5 (2)	9 (4)
14	2 (1)	3 (1)	5 (2)	9 (4)
16	2 (1)	3 (1)	5 (2)	10 (5)
24 x 16	3 (1)	4 (2)	6 (3)	12 (6)

The ULC option consists of silicone applied to all internal seams during assembly, resulting in an air tight casing to meet the strictest project specifications.

Standard Leakage Casing, CFM (l/s)

Inlet Size	Pressure, w.g. (Pa)		
	0.25" (62)	0.5" (124)	1.0" (249)
4, 5, 6	3 (1)	4 (2)	3 (1)
7, 8	2 (1)	3 (1)	7 (3)
9, 10	2 (1)	3 (1)	5 (2)
12	2 (1)	3 (1)	6 (3)
14	3 (1)	4 (2)	4 (2)
16	3 (1)	4 (2)	6 (3)
24 x 16	7 (3)	9 (4)	7 (3)

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SINGLE DUCT TERMINAL UNITS

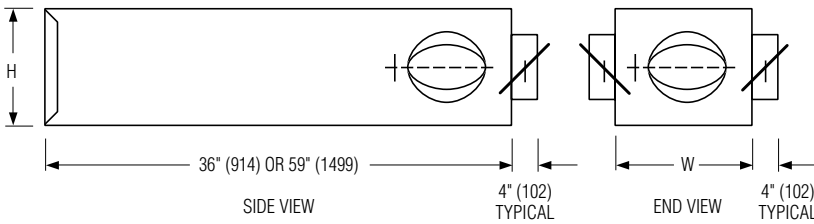
Accessories:

Accessories ordered as separate models.

MOA (Multi-Outlet Attenuator)

MOA313 3' (916) Long

MOA315 5' (1524) Long



Unit Size	W	H	No. of Outlets	Outlet Size
4, 5, 6	12 (305)	8 (203)	1, 2, or 3	6 (152)
7, 8	12 (305)	10 (254)	2, 3, 4 or 5	6, 8 (152, 203)
9, 10	14 (356)	12 1/2 (318)	3, 4 or 5	8 (203)
	14 (356)	12 1/2 (318)	2, 3 or 4	10 (254)
12	16 (406)	15 (381)	4 or 5	8 (203)
	16 (406)	15 (381)	3, 4 or 5	10 (254)
14	24 (610)	18 (457)	4 or 5	10 (254)
16	38 (965)	18 (457)	4 or 5	10 (254)

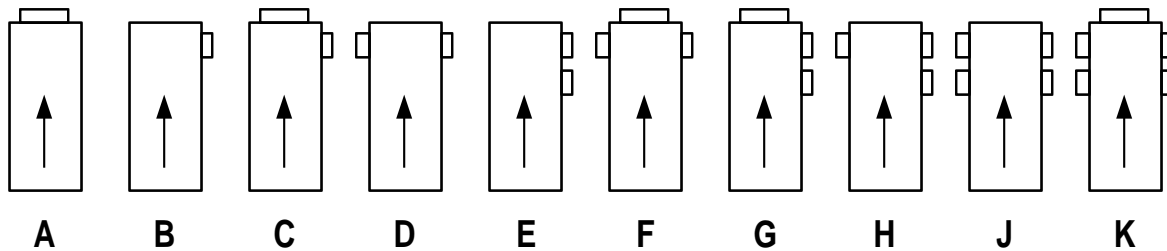
FEATURES:

- 22 ga. (0.86) galvanized steel construction, mechanically sealed, low leakage construction.
- Shipped loose for field attachment.
- Only one outlet size to be specified per M.O.A. No mixing of outlet sizes on the same unit.
- Number and size of outlets on M.O.A. not to exceed the limits listed in table, both maximum quantity of outlets and maximum size of outlet.
- All round outlets include manual dampers with hand locking quadrant.
- 3/4" (19) dual density insulation, exposed edges coated to prevent erosion.
- Denotes inlet airflow direction. →
- Slip and drive cleat duct connection.
- For special outlet sizes and arrangements, consult your Nailor representative.

OPTIONS:

- Steri-Liner.
- Fiber-Free Liner.
- 1" (25) Fiberglass Liner.

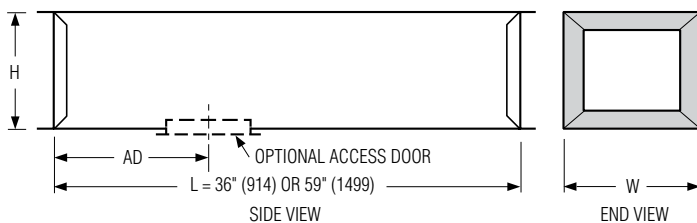
Standard Outlet Arrangements



AT Discharge Sound Attenuator

AT313 3' (916) Long

AT315 5' (1524) Long



Unit Size	W	H	AD
4, 5, 6	12 (305)	8 (203)	12 (305)
7, 8	12 (305)	10 (254)	12 (305)
9, 10	14 (356)	12 1/2 (318)	12 (305)
12	16 (406)	15 (381)	12 (305)
14	20 (508)	17 1/2 (445)	12 (305)
16	24 (610)	18 (457)	12 (305)
24 x 16	38 (965)	18 (457)	12 (305)

FEATURES:

- 22 ga. (0.86) galvanized steel construction.
- Shipped loose for field attachment.
- Slip and drive connection.
- 3/4" (14) dual density fiberglass insulation, exposed edges coated to prevent erosion as standard.

OPTIONS:

- Steri-Liner.
- Fiber-Free Liner.
- Solid Metal Liner.
- 1" (25) Fiberglass Liner.
- 2" (51) Fiberglass Liner.
- Perforated Metal Liner.
- Steri-Liner with Perforated Liner.
- Access Door
 - Sizes 4 to 12 : 8" x 5" (203 x 127) Oval;
 - Sizes 14 to 24 x 16: 12" x 6" (305 x 152) Oval.

Note: Select Insulation to match VAV terminal.

Recommended Airflow Ranges For Single Duct Pressure Independent Terminal Units

The recommended airflow ranges below are for 3100 Series single duct terminal units with pressure independent controls and are presented as ranges for total and controller specific minimum and maximum airflow. Airflow ranges are based upon maintaining reasonable sound levels and controller limits using Nailor's Diamond Flow Sensor as the airflow measuring device. For a given unit size, the minimum, auxiliary minimum (where applicable) and the maximum flow setting must be within the range limits to ensure pressure independent operation, accuracy, and repeatability.

Actual minimum airflow limits are based upon the sensitivity of the pressure transducer on the controller. Values for .004" (1 Pa) and .02" w.g. (5 Pa) differential pressure signal from Diamond Flow Sensor on digital controls are provided as a reference. For analog controls we show .02" (5 Pa) and .03" (7.5) for pneumatic controllers. These are realistic low limit pressure readings for many transducers used in the digital controls industry. Check your controls supplier for minimum limits. Setting airflow minimums lower than what the transducer will sense, may cause damper hunting and result in a failure to meet minimum ventilation requirements. Factory settings will therefore not be made outside these ranges; however, a minimum setting of zero (shut-off) is an available option on pneumatic units. Where an auxiliary setting is specified, the value must be greater than the minimum setting.



Model 31RW

The high end of the tabulated Total Airflow Range on pneumatic and analog electronic controls represents the Diamond Flow Sensor's differential pressure reading at 1" w.g. (249 Pa). The high end airflow range for digital controls is represented by the indicated transducer differential pressure.

ASHRAE 130 "Performance Rating of Air Terminals" is the method of test for the certification program. The "standard rating condition" (certification rating point) airflow volumes for each terminal unit size are tabulated below per AHRI Standard 880. These air volumes equate to an approximate inlet velocity of 2000 fpm (10.2 m/s).

When digital or other controls are mounted by Nailor, but supplied by others, these values are guidelines only, based upon experience with most controls currently available. Controls supplied by others for factory mounting are configured and calibrated in the field. Airflow settings on pneumatic and analog controls supplied by Nailor are factory preset when provided.

Imperial Units, Cubic Feet per Minute

Unit Size	Inlet Type	Total Airflow Range, cfm	Airflow at 2000 fpm Inlet Velocity (nom.), cfm	Range of Minimum and Maximum Settings, cfm							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure ("w.g.)							
				Min.	Max.	Min.	Max.	Min.		Max.	
		.03	1.0	.02	1.0	.004	.02	1.0	1.5		
4	Round	0 – 225	150	30	180	26	182	12	26	182	223
5		0 – 400	250	55	325	46	325	21	46	325	398
6		0 – 550	400	80	450	64	455	29	64	455	557
7		0 – 800	550	115	650	93	657	42	93	657	805
8		0 – 1100	700	155	900	127	899	57	127	899	1101
9		0 – 1400	900	200	1150	164	1158	73	164	1158	1418
10		0 – 1840	1100	260	1500	212	1497	95	212	1497	1833
12		0 – 2500	1600	355	2050	290	2048	130	290	2048	2508
14		0 – 3370	2100	440	2550	388	2742	173	388	2742	3358
16		0 – 4510	2800	525	3040	521	3683	233	521	3683	4511
24 x 16	Rect.	0 – 8330	5350	1180	6800	961	6797	430	961	6797	8325

Metric Units, Liters per Second

Unit Size	Inlet Type	Total Airflow Range, l/s	Airflow at 10.2 m/s Inlet Velocity (nom.), l/s	Range of Minimum and Maximum Settings, l/s							
				Pneumatic 3000 Controller		Analog Electronic Controls		Digital Controls			
				Transducer Differential Pressure (Pa)							
				Min.	Max.	Min.	Max.	Min.		Max.	
		7.5	249	5	249	1	5	249	374		
4	Round	0 – 106	71	14	85	12	86	6	12	86	105
5		0 – 189	118	26	153	22	153	10	22	153	188
6		0 – 260	189	38	212	30	215	14	30	215	263
7		0 – 378	260	54	307	44	310	20	44	310	380
8		0 – 519	330	73	425	60	425	27	60	425	520
9		0 – 661	425	94	543	77	547	34	77	547	670
10		0 – 868	519	123	708	100	707	45	100	707	866
12		0 – 1180	755	168	967	137	967	61	137	967	1184
14		0 – 1590	991	208	1203	183	1295	82	183	1295	1586
16		0 – 2128	1321	248	1435	246	1739	110	246	1739	2130
24 x 16	Rect.	0 – 3931	2525	557	3209	454	3210	203	454	3210	3931

SINGLE DUCT TERMINAL UNITS

Performance Data • NC Level Application Guide

3100 Series • Basic Unit

Fiberglass Liner

Inlet Size	Airflow cfm / s		Min. inlet ΔPs "w.g. Pa	NC Levels @ Inlet Pressure (ΔPs) shown																		
				DISCHARGE (basic assembly)					DISCHARGE w/ 36" (914) attenuator					RADIATED								
				Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	Min. ΔPs	0.5" w.g. (125 Pa)	1.0" w.g. (250 Pa)	1.5" w.g. (375 Pa)	2.0" w.g. (500 Pa)	3.0" w.g. (750 Pa)	
4	225	106	0.53	133	37	*	38	39	40	40	33	*	35	35	36	37	25	25	26	26	27	28
	200	94	0.43	106	35	35	36	37	38	38	32	31	33	33	34	35	22	22	23	24	24	26
	150	71	0.10	25	27	30	31	32	33	33	26	28	29	30	29	30	-	-	-	-	-	22
	100	47	0.11	28	20	23	24	25	26	26	-	22	24	24	25	26	-	-	-	-	-	-
	75	35	0.06	16	-	-	-	20	21	22	-	-	-	-	-	20	-	-	-	-	-	-
5	400	189	0.19	48	24	30	34	37	38	41	-	28	33	37	37	38	-	20	26	30	32	35
	300	142	0.11	28	-	25	29	32	33	36	-	25	29	32	33	35	-	-	20	24	27	31
	250	118	0.05	12	-	21	26	28	30	32	-	-	26	27	29	32	-	-	-	22	25	28
	200	94	0.05	13	-	-	21	23	25	27	-	-	-	21	23	26	-	-	-	-	21	25
125	59	0.02	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6	550	260	0.01	2	-	23	29	32	35	39	-	-	25	30	32	34	-	25	29	32	34	37
	450	212	0.01	2	-	-	26	29	32	36	-	-	23	27	29	32	-	21	26	29	31	34
	400	189	0.01	2	-	-	24	28	30	34	-	-	22	24	28	31	-	-	24	27	29	32
	200	94	0.01	2	-	-	-	-	21	25	-	-	-	-	-	21	-	-	-	-	-	22
	100	47	0.01	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	800	378	0.01	2	-	20	28	33	36	40	-	-	27	31	35	38	-	23	29	33	36	39
	650	307	0.01	2	-	-	27	32	35	40	-	-	26	31	32	38	-	-	26	30	33	36
	550	260	0.01	2	-	-	26	30	34	38	-	-	26	28	32	37	-	-	24	27	30	34
	335	158	0.01	2	-	-	22	26	29	34	-	-	20	25	27	32	-	-	-	23	25	29
	225	106	0.01	2	-	-	-	24	27	32	-	-	-	23	27	32	-	-	-	-	22	26
8	1100	519	0.01	2	-	24	30	34	37	41	-	22	29	32	36	40	-	26	30	34	37	41
	900	425	0.01	2	-	21	28	32	35	39	-	20	26	31	33	38	-	23	27	31	34	38
	700	330	0.01	2	-	-	26	30	33	37	-	-	25	29	31	34	-	20	24	28	31	35
	600	283	0.01	2	-	-	24	28	31	35	-	-	23	26	28	30	-	-	23	27	30	34
	400	189	0.01	2	-	-	-	24	26	30	-	-	-	22	24	27	-	-	-	22	25	29
9	1400	661	0.01	2	-	23	28	32	34	37	-	23	28	31	33	36	-	26	31	34	36	39
	1250	590	0.01	2	-	21	27	30	33	36	-	20	27	29	33	36	-	24	29	32	34	37
	900	425	0.01	2	-	-	22	26	28	31	-	-	22	26	27	29	-	-	23	26	28	32
	675	319	0.01	2	-	-	-	23	25	29	-	-	-	21	23	27	-	-	-	21	24	29
	450	212	0.01	2	-	-	-	-	-	23	-	-	-	-	-	22	-	-	-	-	20	25
10	1850	873	0.01	2	-	23	29	32	35	38	-	22	26	30	33	36	-	31	35	37	39	41
	1650	779	0.01	2	-	22	27	31	33	37	-	21	27	28	31	34	-	29	33	35	36	39
	1100	519	0.01	2	-	-	22	26	28	32	-	-	-	23	26	28	-	20	24	26	28	30
	825	389	0.01	2	-	-	-	22	25	28	-	-	-	-	22	26	-	-	-	-	23	27
	550	260	0.01	2	-	-	-	-	21	25	-	-	-	-	-	21	-	-	-	-	-	22
12	2500	1180	0.01	2	-	27	32	35	36	39	-	27	31	35	35	36	-	28	33	36	39	42
	2000	944	0.01	2	-	24	28	31	33	36	-	22	26	29	30	33	-	24	30	33	35	38
	1600	755	0.01	2	-	-	24	27	29	33	-	-	21	24	26	30	-	20	26	29	31	35
	1200	566	0.01	2	-	-	-	23	25	29	-	-	-	21	22	25	-	-	22	25	27	30
	800	378	0.01	2	-	-	-	-	-	23	-	-	-	-	-	21	-	-	-	22	24	27
14	3125	1475	0.01	2	-	29	34	36	38	40	-	29	33	35	37	39	-	25	29	32	34	37
	2700	1274	0.01	2	-	26	31	33	35	37	-	25	29	32	34	36	-	22	26	29	31	35
	2100	991	0.01	2	-	21	25	28	29	32	-	21	25	28	29	32	-	-	21	25	27	31
	1550	731	0.01	2	-	-	-	22	24	27	-	-	-	21	22	24	-	-	-	21	23	27
	1050	495	0.01	2	-	-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-	22
16	3725	1758	0.03	8	-	30	34	37	39	41	-	29	34	36	39	41	-	29	34	38	40	44
	3500	1652	0.03	8	-	28	33	35	37	40	-	25	30	35	37	38	-	28	33	37	39	43
	2800	1321	0.02	6	-	23	27	30	31	34	-	21	26	30	31	34	-	24	30	33	35	40
	2100	991	0.02	4	-	-	-	22	24	26	-	-	-	22	23	25	-	-	25	28	31	36
	1400	661	0.01	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	25	29
24 x 16	8330	3931	0.02	5	49	50	49	52	53	53	48	48	48	51	52	52	43	44	49	51	54	57
	7000	3303	0.02	4	45	45	46	48	50	50	44	44	44	47	49	49	40	41	47	49	51	55
	6000	2831	0.01	2	40	42	43	45	47	48	38	40	42	44	45	47	36	39	45	47	49	52
	5350	2525	0.01	2	35	38	40	43	45	47	34	36	39	42	44	45	32	38	44	46	48	51
	4000	1888	0.01	2	25	31	35	37	40	42	23	30	34	36	39	41	24	35	39	43	45	47
	3000	1416	0.01	2	-	23	29	31	35	38	-	22	28	30	34	37	-	31	36	38	40	44

Performance Notes:

1. NC Levels are calculated based on procedures as outlined on page A101.
2. Dash (-) in space indicates a NC less than 20.
3. Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.

Performance Data • Discharge Sound Power Levels

3100 Series • Basic Unit

Fiberglass Liner



Table with columns: Inlet Size, Airflow (cfm, l/s), Min. inlet ΔPs (w.g., Pa), and Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown. Rows are grouped by Inlet Size (4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 24 x 16). Sound Power Octave Bands include 0.5" wg (125Pa), 1.0" wg (250Pa), 1.5" wg (375Pa), 2.0" wg (500Pa), and 3.0" wg (750Pa). Each band has 7 octave frequency columns.

For performance table notes, see page A89; highlighted numbers indicate embedded AHRI certification points.

A

SINGLE DUCT TERMINAL UNITS

Performance Data • Discharge Sound Power Levels

3100 Series • With 3 ft. (914) Integral Attenuator

Fiberglass Liner

Inlet Size	Airflow		Min. inlet ΔPs		Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown																																			
					Minimum ΔPs		0.5" wg (125Pa) ΔPs					1.0" wg (250Pa) ΔPs					1.5" wg (375Pa) ΔPs					2.0" wg (500Pa) ΔPs					3.0" wg (750Pa) ΔPs													
					2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
4	225	106	0.53	133	75	67	51	37	29	20	*	*	*	*	*	*	76	72	59	49	34	26	76	74	62	52	35	30	77	73	63	53	37	32	77	73	64	55	39	35
	200	94	0.43	106	74	64	48	34	26	18	73	69	53	43	30	20	74	71	57	48	34	27	75	71	60	51	36	31	75	71	61	52	36	32	76	72	63	54	36	33
	150	71	0.10	25	69	56	37	22	17	7	70	61	50	40	26	-	71	65	53	44	28	22	72	65	55	47	29	27	71	66	56	48	30	28	72	67	58	50	32	31
	100	47	0.11	28	63	50	32	18	12	3	66	56	45	36	23	21	68	56	47	38	25	21	67	56	48	39	25	22	68	57	50	39	24	23	69	58	52	40	25	25
	75	35	0.06	16	59	43	25	11	5	-	62	49	38	31	-	-	64	50	42	33	25	-	63	51	44	33	-	-	64	50	47	37	22	-	64	53	51	41	26	23
5	400	189	0.19	48	61	60	49	35	21	15	66	68	59	48	30	24	69	73	65	53	34	30	71	76	68	56	37	33	73	76	69	57	39	36	75	77	71	59	41	39
	300	142	0.11	28	56	53	42	28	15	8	62	65	55	45	28	22	66	69	60	50	33	28	68	71	64	52	35	33	69	72	65	54	36	33	71	73	68	55	37	35
	250	118	0.05	12	51	46	34	21	10	4	61	59	54	43	26	-	64	66	59	47	29	25	66	67	61	50	30	30	67	69	63	51	32	31	68	71	65	53	35	34
	200	94	0.05	13	48	44	33	18	8	13	59	58	52	41	26	22	63	61	56	43	29	26	64	62	57	44	30	27	66	64	59	44	30	28	69	66	62	45	31	30
	125	59	0.02	5	37	31	22	7	-	0	53	49	44	33	21	21	57	52	49	35	28	22	58	54	51	35	22	-	59	54	55	39	26	23	61	56	59	44	31	27
6	550	260	0.01	2	45	28	21	15	-	-	64	60	56	46	27	20	67	66	62	51	31	27	69	70	67	54	34	31	71	72	68	55	36	34	73	73	70	57	39	38
	450	212	0.01	2	43	25	18	12	-	-	62	60	53	44	26	-	65	65	59	49	31	27	67	68	62	51	34	32	68	69	65	53	35	33	70	72	68	55	37	35
	400	189	0.01	2	43	24	16	11	-	-	61	59	52	42	25	-	65	63	57	47	29	25	66	65	61	50	30	30	67	68	62	51	32	32	69	72	65	53	36	35
	200	94	0.01	2	35	17	7	1	-	-	54	49	42	34	22	-	58	54	47	37	25	22	59	56	49	37	26	24	61	58	51	38	26	26	64	62	54	39	27	28
	100	47	0.01	2	27	13	-	-	-	-	46	40	29	23	-	-	50	46	35	25	23	-	51	48	38	25	-	-	53	52	42	29	22	-	55	56	47	34	27	24
7	800	378	0.01	2	45	22	23	30	-	-	68	62	57	54	32	26	72	69	63	57	37	33	74	72	67	60	40	37	75	75	69	61	42	40	77	78	71	62	46	44
	650	307	0.01	2	42	21	20	27	-	-	66	62	54	50	29	24	70	67	60	54	35	31	73	71	63	56	38	36	74	72	66	57	40	38	76	77	69	59	43	42
	550	260	0.01	2	41	21	18	25	-	-	64	60	52	47	27	21	68	67	62	55	32	29	70	69	61	53	36	35	72	72	63	54	38	37	74	76	66	56	41	41
	335	158	0.01	2	37	18	11	21	1	-	60	56	45	39	23	-	64	62	50	42	28	27	66	66	53	43	32	31	68	68	56	44	33	34	70	72	59	46	36	37
	225	106	0.01	2	33	14	10	18	-	-	56	53	38	33	26	20	60	59	44	35	27	25	62	63	48	36	27	27	64	67	51	39	30	30	67	71	54	42	35	34
8	1100	519	0.01	2	51	33	24	29	6	-	70	65	58	56	38	26	73	70	63	60	42	32	75	73	66	62	45	35	76	76	69	64	47	38	78	80	73	66	50	42
	900	425	0.01	2	49	30	22	26	5	-	68	63	56	53	35	23	71	68	61	57	39	30	73	72	64	59	42	33	74	74	67	61	44	37	76	78	71	63	47	41
	700	330	0.01	2	47	28	20	23	3	-	66	59	53	48	30	-	69	66	59	53	36	28	71	70	62	56	40	32	72	71	65	58	42	35	74	73	69	60	45	39
	600	283	0.01	2	46	26	18	21	2	-	64	58	51	45	27	-	67	64	57	50	34	26	69	67	61	53	39	33	71	69	64	56	41	36	73	71	67	59	44	40
	400	189	0.01	2	42	20	16	17	-	-	60	56	47	41	26	-	64	61	54	46	32	26	66	64	58	49	36	30	67	65	60	51	38	32	69	68	62	55	41	36
9	1400	661	0.01	2	54	35	34	31	8	-	71	65	60	54	37	29	73	69	64	58	42	35	75	72	66	60	44	38	76	74	68	61	46	41	79	76	71	63	49	44
	1250	590	0.01	2	53	34	33	30	7	-	69	61	59	53	36	28	72	69	63	56	40	34	74	70	65	58	43	37	75	73	67	60	45	39	77	76	70	62	47	43
	900	425	0.01	2	49	31	26	26	4	-	65	59	53	47	30	23	68	64	58	51	36	30	70	68	61	53	39	35	71	69	63	54	41	37	73	70	65	56	43	40
	675	319	0.01	2	45	28	23	22	3	-	63	56	48	42	27	21	65	60	53	46	33	29	67	62	56	48	36	33	68	64	58	50	38	36	69	68	61	52	41	39
	450	212	0.01	2	40	25	18	18	-	-	57	52	43	37	24	21	59	56	48	41	29	27	61	59	52	43	32	31	62	61	53	45	34	33	64	64	55	47	37	36
10	1850	873	0.01	2	54	38	31	26	6	2	70	64	60	53	38	34	74	68	65	57	43	40	75	71	68	60	46	44	77	74	70	61	48	46	79	76	73	64	50	49
	1650	779	0.01	2	52	33	31	25	6	3	70	61	60	52	37	34	73	69	65	57	42	39	74	70	67	59	45	42	76	72	69	61	47	45	77	75	72	63	50	48
	1100	519	0.01	2	46	27	22	21	2	-	63	57	53	46	32	27	66	62	58	50	37	34	68	66	62	53	40	38	70	68	64	54	42	40	71	70	66	57	45	43
	825	389	0.01	2	43	26	20	18	3	2	60	55	49	42	30	26	62	59	55	47	35	32	64	62	58	49	38	36	65	64	60	51	40	38	67	68	63	53	43	41
	550	260	0.01	2	36	21	16	14	-	-	54	51	45	38	27	24	57	56	50	42	32	30	60	59	54	44	35	33	61	61	55	46	36	35	62	63	58	49	39	38
12	2500	1180	0.01	2	53	35	35	25	11	3	75	65	63	54	40	37	78	69	68	58	45	43	80	72	70	60	47	46	81	74	72	62	49	48	82	76	74	64	51	52
	2000	944	0.01	2	51	34	32	23	9	1	71	62	59	51	37	35	74	67	64	55	42	41	76	69	67	58	45	45	77	71	68	60	47	47	79	73	71	62	50	50
	1600	755	0.01	2	49	32	29	21	8	1	67	60	56	48	36	33	70	64	60	53	40	39	73	66	63	55	43	43	73	68	65	57	45	45	76	72	68	59	48	49
	1200	566	0.01	2	42	28	26	18	7	1	62	55	52	45	33	31	67	60	56	49	38	37	69	63	58	51	41	41	71	64	60	53	43	43	72	67	63	56	46	46
	800	378	0.01	2	38	21	19	13	4	-	57	50	45	39	29	28	60	56	49	44	34	34	63	59	52	46	37	38	64	61	54	48	39	40	66	64	56	51	41	43
14	3125	1475	0.01	2	56	40	45	31	20	9	76	66	64	55	44	39	79	70	68	59	48	44	81	72	71	62	50	46	82	73	72</									

SINGLE DUCT TERMINAL UNITS • 3100 SERIES



Performance Data • Radiated Sound Power Levels

3100 Series • Basic Unit

Fiberglass Liner



SINGLE DUCT TERMINAL UNITS

Inlet Size	Airflow		Min. inlet ΔPs		Sound Power Octave Bands @ Inlet Pressure (ΔPs) shown																																			
					Minimum ΔPs					0.5" wg (125Pa) ΔPs					1.0" wg (250Pa) ΔPs					1.5" wg (375Pa) ΔPs					2.0" wg (500Pa) ΔPs					3.0" wg (750Pa) ΔPs										
					2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
4	225	106	0.53	133	62	54	45	43	42	32	62	54	44	42	42	32	63	55	48	45	44	36	63	56	50	46	45	39	63	57	51	47	46	41	64	58	53	48	47	44
	200	94	0.43	106	60	51	42	40	39	29	60	52	43	41	40	30	61	53	46	43	42	34	61	54	48	44	43	37	61	55	50	45	44	39	62	56	52	47	45	42
	150	71	0.10	25	53	43	31	32	30	14	55	46	39	37	35	25	56	48	42	39	37	30	57	49	44	41	38	32	57	50	46	41	39	34	57	51	48	43	40	37
	100	47	0.11	28	47	35	25	27	24	8	49	39	33	32	28	-	49	41	37	34	30	23	50	42	39	35	32	25	50	42	40	36	32	27	51	43	42	37	34	30
	75	35	0.06	16	42	29	18	21	17	-	44	34	29	28	24	-	45	35	33	30	26	-	45	36	35	31	27	21	46	37	36	32	28	23	46	38	38	34	29	25
5	400	189	0.19	48	49	46	38	38	33	18	56	52	45	43	38	27	62	57	50	46	42	33	65	60	53	48	44	37	67	62	55	49	45	39	70	65	58	51	47	43
	300	142	0.11	28	42	37	29	31	25	9	53	47	40	38	33	23	58	52	45	41	37	29	61	55	48	43	39	33	64	57	51	44	41	35	67	60	54	46	43	39
	250	118	0.05	12	34	28	21	24	18	-	51	44	38	35	30	20	56	49	43	38	34	27	60	52	46	40	36	30	62	53	48	41	38	33	65	56	51	43	40	36
	200	94	0.05	13	32	24	17	21	14	-	49	40	34	31	26	-	54	45	39	34	30	24	57	48	42	36	32	27	59	50	44	37	34	30	62	52	47	39	36	33
	125	59	0.02	5	20	9	3	9	2	-	44	32	27	23	-	-	49	36	32	27	22	-	52	39	35	28	25	21	54	41	37	30	26	23	57	44	40	32	28	27
6	550	260	0.01	2	42	27	27	10	2	-	60	54	50	37	33	25	63	59	55	42	38	32	65	62	57	45	41	36	66	64	59	47	43	40	68	66	61	50	47	44
	450	212	0.01	2	40	25	24	7	-	-	58	52	47	35	30	22	61	56	51	40	35	29	63	59	54	42	38	34	64	61	56	44	41	37	66	64	58	47	44	41
	400	189	0.01	2	39	23	22	5	-	-	56	50	45	33	28	20	60	55	50	38	33	28	61	58	52	41	37	32	63	60	54	43	39	35	64	62	56	46	42	39
	200	94	0.01	2	32	15	11	-	-	-	49	41	35	23	-	-	53	46	39	28	24	-	54	49	41	31	27	22	56	51	43	33	29	25	57	54	45	36	32	30
	100	47	0.01	2	25	6	0	-	-	-	42	33	24	-	-	-	45	37	28	-	-	-	47	40	30	21	-	-	49	42	32	23	-	-	50	45	34	26	22	-
7	800	378	0.01	2	37	19	16	19	15	-	59	51	49	43	39	29	63	56	55	47	43	35	65	60	58	49	45	39	67	62	61	51	47	42	69	65	64	54	49	46
	650	307	0.01	2	35	18	13	16	12	-	57	49	46	40	35	26	61	55	52	44	40	33	63	58	55	46	42	36	64	61	58	48	44	39	67	64	61	51	46	43
	550	260	0.01	2	33	17	11	14	10	-	55	48	44	37	33	24	59	54	50	42	37	30	61	57	53	44	40	34	62	60	56	46	41	37	65	63	59	48	44	40
	335	158	0.01	2	27	13	4	7	2	-	49	45	37	30	26	-	53	51	43	34	30	23	55	54	46	37	32	27	57	56	49	39	34	30	59	60	52	41	36	34
	225	106	0.01	2	22	11	-	1	-	-	44	42	32	24	-	-	48	48	38	29	24	-	50	51	41	31	26	22	52	54	44	33	28	24	54	57	47	35	30	28
8	1100	519	0.01	2	45	21	6	13	5	-	63	54	45	41	35	30	66	60	52	46	40	37	68	63	56	49	43	41	69	66	59	51	45	44	71	69	63	53	48	48
	900	425	0.01	2	43	19	4	11	3	-	61	52	43	39	33	28	64	58	50	44	38	35	66	61	54	46	41	39	67	64	57	48	43	42	69	67	61	51	46	46
	700	330	0.01	2	41	17	2	8	1	-	58	50	41	36	30	26	61	56	47	41	36	33	63	59	51	44	39	37	64	61	54	46	41	40	66	65	58	48	44	44
	600	283	0.01	2	39	15	0	7	-	-	57	48	39	34	29	24	60	54	46	39	34	31	62	57	50	42	37	35	63	60	53	44	39	38	65	63	57	47	42	42
	400	189	0.01	2	35	11	-	2	-	-	53	44	35	30	25	20	56	50	42	35	30	27	58	54	46	38	33	31	59	56	49	40	35	34	61	59	53	42	38	38
9	1400	661	0.01	2	41	14	28	19	7	-	60	50	52	42	36	23	64	56	56	46	41	31	66	60	59	48	44	36	67	62	61	50	47	40	69	66	63	52	50	44
	1250	590	0.01	2	40	13	26	18	6	-	59	49	50	41	35	23	63	55	55	45	40	31	65	59	57	47	43	36	66	61	59	49	46	39	68	65	61	51	49	44
	900	425	0.01	2	36	10	21	14	3	-	55	46	45	37	32	21	59	52	49	41	37	29	61	56	52	43	40	34	62	58	54	45	43	37	64	62	56	47	46	42
	675	319	0.01	2	33	7	16	11	-	-	52	43	40	34	30	-	55	49	45	38	35	28	57	53	47	40	38	32	59	56	49	42	40	36	61	59	52	44	43	41
	450	212	0.01	2	28	4	9	7	-	-	47	39	34	29	26	-	50	46	38	33	31	25	52	49	41	36	34	30	54	52	42	37	36	34	56	56	45	40	39	38
10	1850	873	0.01	2	22	15	37	16	-	-	56	50	57	44	33	-	62	56	60	49	41	31	65	60	62	52	46	38	68	62	64	54	49	43	71	66	66	56	54	49
	1650	779	0.01	2	21	14	35	15	-	-	54	49	54	42	31	-	60	55	58	47	39	30	64	58	60	50	44	36	66	61	61	52	48	41	70	65	63	55	53	48
	1100	519	0.01	2	16	9	27	8	-	-	49	44	46	36	26	-	55	51	50	41	34	25	59	54	52	44	39	31	61	57	53	46	43	36	65	61	55	49	47	43
	825	389	0.01	2	12	6	21	4	-	-	46	42	41	32	22	-	51	48	44	37	31	21	55	51	46	39	35	28	57	54	48	41	39	33	61	58	50	44	44	39
	550	260	0.01	2	7	2	13	-	-	-	40	37	33	26	-	-	46	44	36	30	25	-	50	47	38	33	30	23	52	50	40	35	34	28	56	53	42	38	39	34
12	2500	1180	0.01	2	40	27	26	23	15	-	64	53	52	46	42	31	68	58	56	51	46	37	71	61	59	53	49	40	73	63	61	55	51	43	75	65	63	57	54	46
	2000	944	0.01	2	37	26	23	20	12	-	61	52	49	44	39	29	66	57	53	48	43	34	68	59	56	50	46	38	70	61	58	52	48	40	72	64	60	54	51	44
	1600	755	0.01	2	34	24	20	17	9	-	58	51	46	41	36	26	63	55	50	45	41	32	65	58	53	47	43	35	67	60	55	49	45	38	69	63	58	51	48	41
	1200	566	0.01	2	31	23	17	14	6	-	55	49	42	37	32	23	59	53	47	41	37	29	62	56	49	43	40	32	63	58	51	45	42	34	66	61	54	47	44	38
	800	378	0.01	2	25	20	12																																	

Performance Data • AHRI Certification and Performance Notes

3100 Series • Basic Unit • AHRI Certification Rating Points

Fiberglass Liner

Inlet Size	Airflow		Min. Inlet ΔPs		Discharge Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs							Radiated Sound Power Levels @ 1.5" w.g. (375 Pa) ΔPs						
					Octave Band							Octave Band						
	cfm	l/s	"w.g.	Pa	2	3	4	5	6	7	2	3	4	5	6	7		
4	150	71	0.10	25	74	66	59	54	51	44	57	49	44	41	38	32		
5	250	118	0.05	12	68	68	65	57	52	47	60	52	46	40	36	30		
6	400	189	0.01	2	68	68	65	57	52	47	61	58	52	41	37	32		
7	550	260	0.01	2	71	71	64	59	55	52	61	57	53	44	40	34		
8	700	330	0.01	2	72	71	65	60	56	51	63	59	51	44	39	37		
9	900	425	0.01	2	71	68	64	59	56	52	61	56	52	43	40	34		
10	1100	519	0.01	2	70	68	66	62	59	54	59	54	52	44	39	31		
12	1600	755	0.01	2	75	69	68	64	61	57	65	58	53	47	43	35		
14	2100	991	0.01	2	75	68	67	64	61	57	61	56	49	45	42	35		
16	2800	1321	0.02	5	77	69	68	63	60	56	67	62	58	50	46	41		
24 x 16	5350	2525	0.01	2	87	81	79	76	72	69	72	70	70	65	60	55		



Ratings are certified in accordance with AHRI Standards.

Performance Notes for Sound Power Levels:

- Discharge sound power is the noise emitted from the unit discharge into the downstream duct. Discharge Sound Power Levels (SWL) now include duct end reflection energy as part of the standard rating. Including the duct end correction provides sound power levels that would normally be transmitted into an acoustically, non-reflective duct. The effect of including the energy correction to the discharge SWL, is higher sound power levels when compared to previous AHRI certified data. For more information on duct end reflection calculations see AHRI Standard 880.
- Radiated sound power is the breakout noise transmitted through the unit casing walls.
- Sound power levels are in decibels, dB re 10⁻¹² watts.
- All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation. Dash (-) in space indicates sound power level is less than 20 dB or equal to background.
- Minimum inlet ΔPs is the minimum operating pressure requirement of the unit (damper full open) and the difference in static pressure from inlet to discharge of the unit.
- Asterisk (*) in space indicates that the minimum inlet static pressure requirement is greater than 0.5" w.g. (125 Pa) at rated airflow.
- Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 130 and AHRI Standard 880.

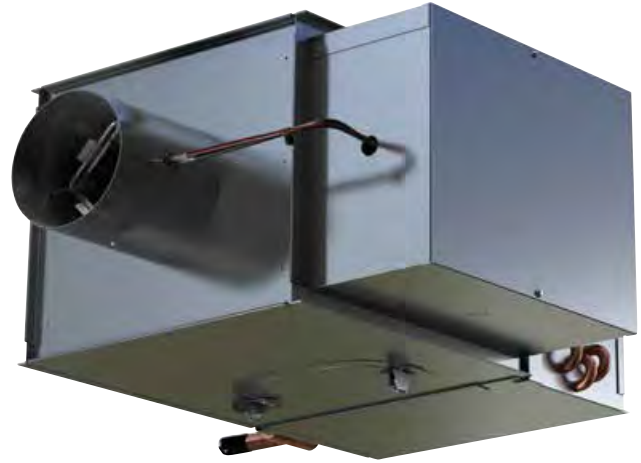
Oversized Casing • Larger Hot Water Coils

Model: 31RW

Nailor oversized casing option utilizes a cabinet that is one size larger than the standard unit. This provides the ability to increase the size of the heating coil, compared to the standard unit. In applications where additional heating is required, using an oversized casing option can provide what is needed.

FEATURES:

- One, two, three and four row coils available.
- Hot water coils have copper tubes and aluminum ripple fins. Coils have 1/2" (13), 7/8" (22) or 1 3/8" (35) O.D. sweat connections.
- Right or left hand coil connection is determined by looking through the terminal inlet in the direction of airflow.
- Galvanized steel casing with slip and drive discharge duct connection.
- Optional low leakage gasketed access door is recommended for coil access and cleaning.
- AHRI Certified coils



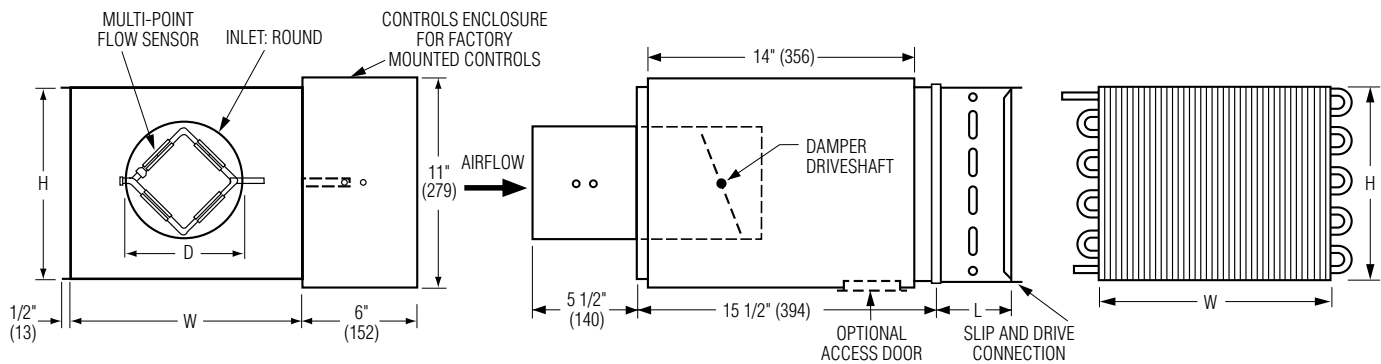
Model D31RW with Oversized Casing

- Coil Performance data on pages A92-A100
- Denotes inlet airflow direction
- Slip and drive cleat duct connection
- For special outlet sizes and arrangements, consult your Nailor representative.

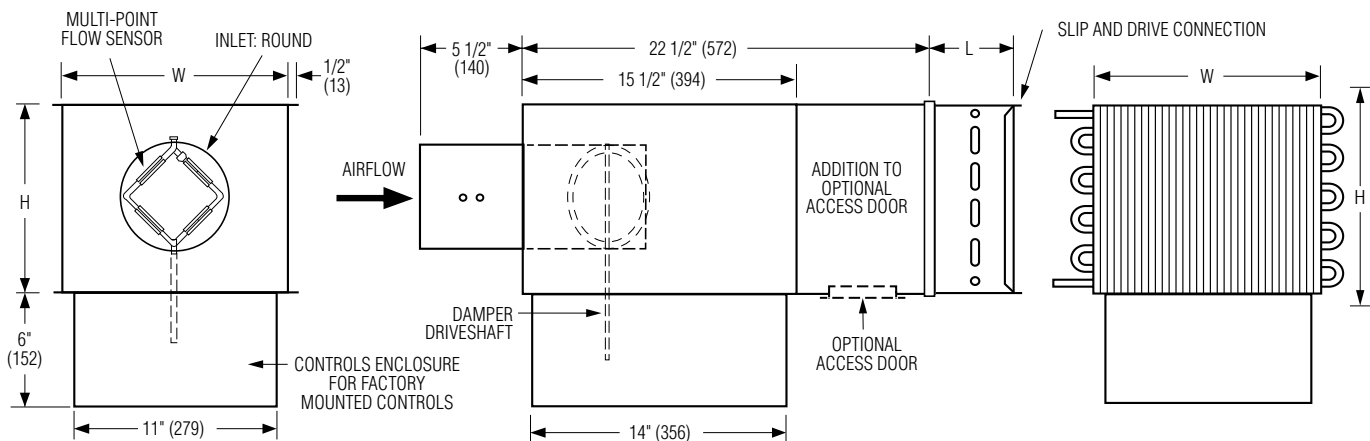
Dimensions

Model 31RW • Hot Water Reheat Coil

Digital and Analog Electronic Controls



Digital and Analog Electronic Controls with Bottom Mount Controls location



A

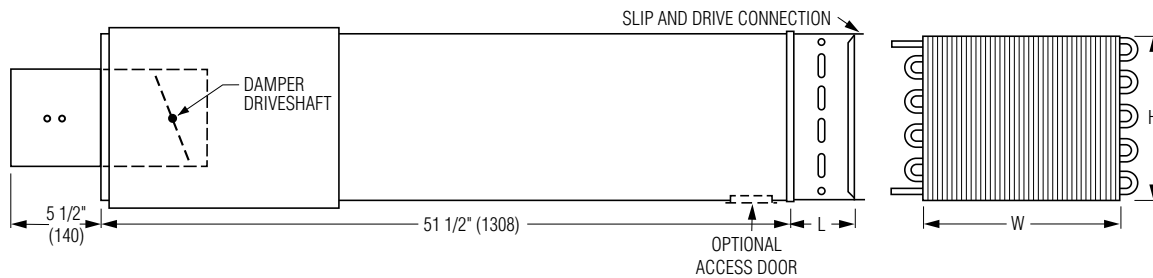
SINGLE DUCT TERMINAL UNITS

Dimensions • Oversized Casing with Larger Hot Water Coils

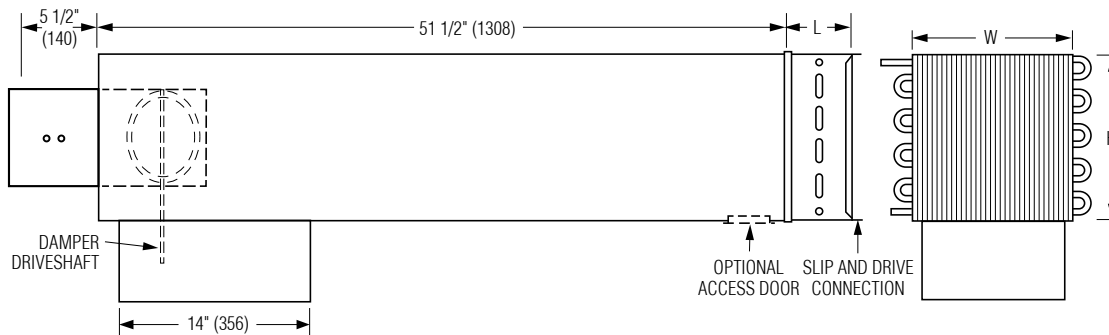
Model 31RW • Integral Attenuator plus Hot Water Reheat Coil

- All the benefits of both the Integral Sound Attenuator and the Hot Water Coils in one.
- Single continuous length terminal construction minimizes casing leakage.
- Continuous internal insulation reduces insulation seams and minimizes airflow disturbance.
- Supplied with same liner as basic unit.
- Coil performance data on pages A92-A100.

Digital and Analog Controls



Digital and Analog Controls with Bottom Mount Controls Location



Dimensional Data

Unit Size	Inlet Size	Airflow Range, cfm (l/s) Digital*	W	H	Inlet Size (Nominal)	Coil Connections			
						1 Row	2 Row	3 Row	4 Row
8	4	0 – 225 (0 – 106)	12 (305)	10 (254)	3 7/8 (98) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	5	0 – 400 (0 – 189)			4 7/8 (124) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	6	0 – 550 (0 – 260)			5 7/8 (149) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
10	7	0 – 800 (0 – 378)	14 (356)	12 1/2 (318)	6 7/8 (175) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	8	0 – 1100 (0 – 519)			7 7/8 (200) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
12	9	0 – 1400 (0 – 661)	16 (406)	15 (381)	8 7/8 (225) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
	10	0 – 1840 (0 – 868)			9 7/8 (251) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
14	12	0 – 2500 (0 – 1180)	20 (508)	17 1/2 (508)	11 7/8 (302) Round	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)
16	14	0 – 3370 (0 – 1590)	24 (610)	18 (457)	13 7/8 (352) Round	7/8 (22)	7/8 (22)	7/8 (22)	7/8 (22)
24	16	0 – 4510 (0 – 2128)	38 (965)	18 (457)	15 7/8 (403) Round	7/8 (22)	7/8 (22)	1 3/8 (35)	1 3/8 (35)

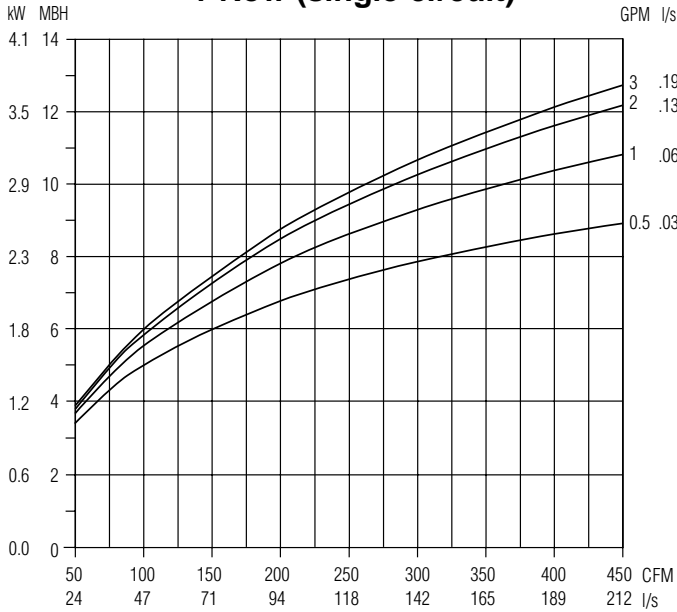
* Maximum airflow limit is based upon 1.5" w.g. (373 Pa) max. differential pressure signal from Diamond Flow Sensor..

Performance Data • Hot Water Coil • Capacities

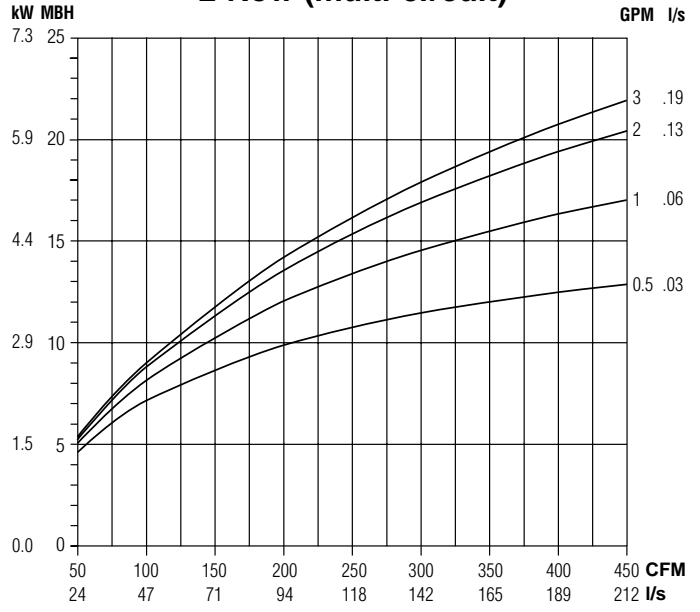
Model: 31RW

Unit Sizes 4, 5 and 6

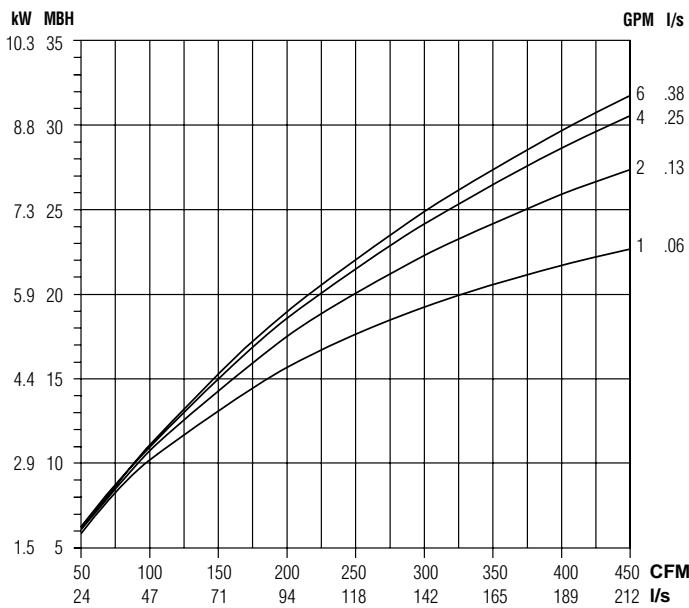
1 Row (single circuit)



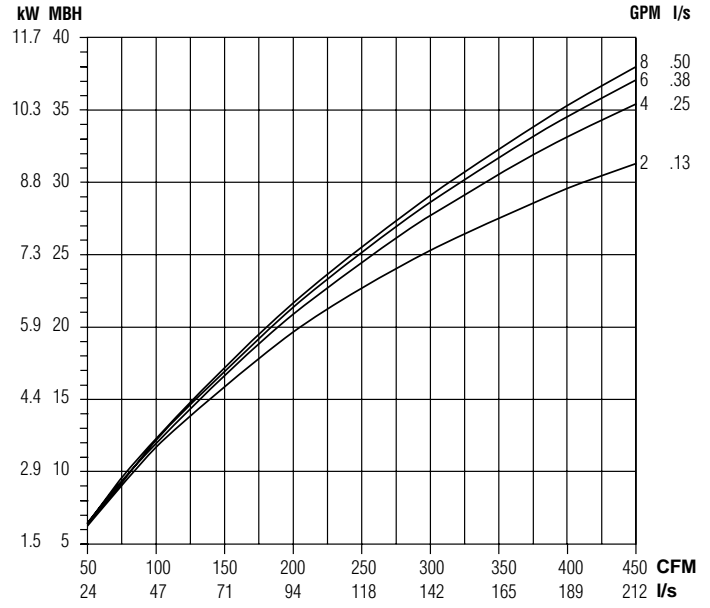
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

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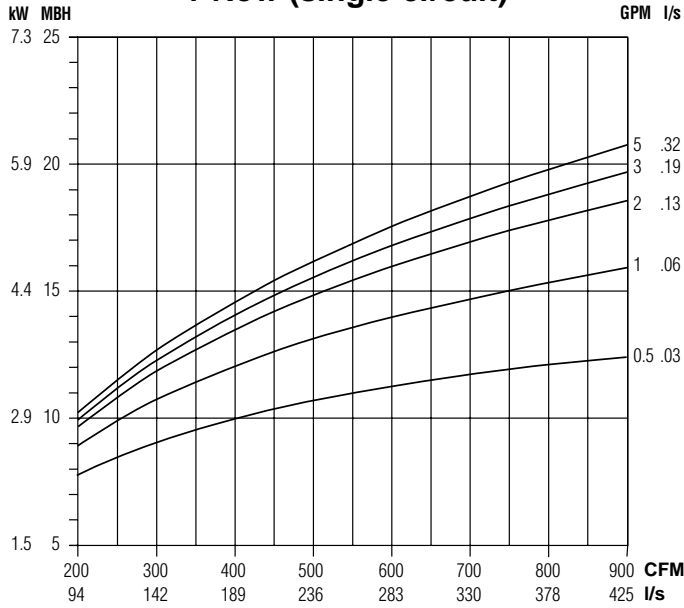
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Capacities

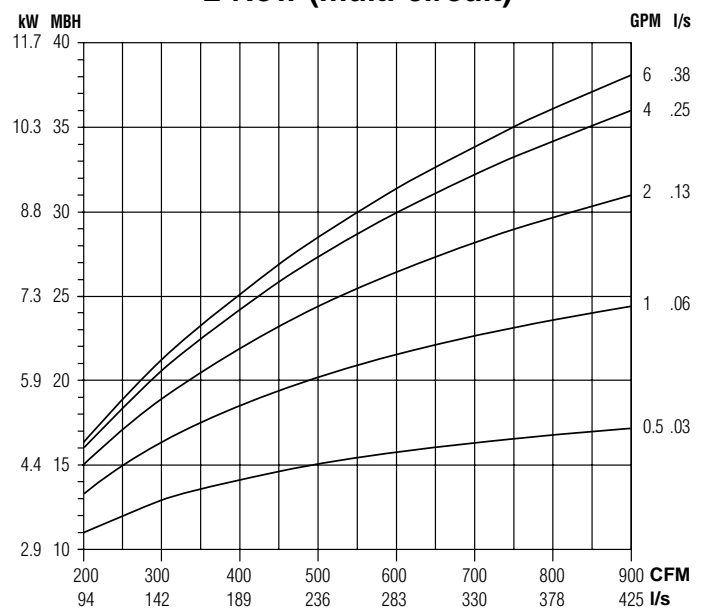
Model: 31RW

Unit Sizes 7 and 8

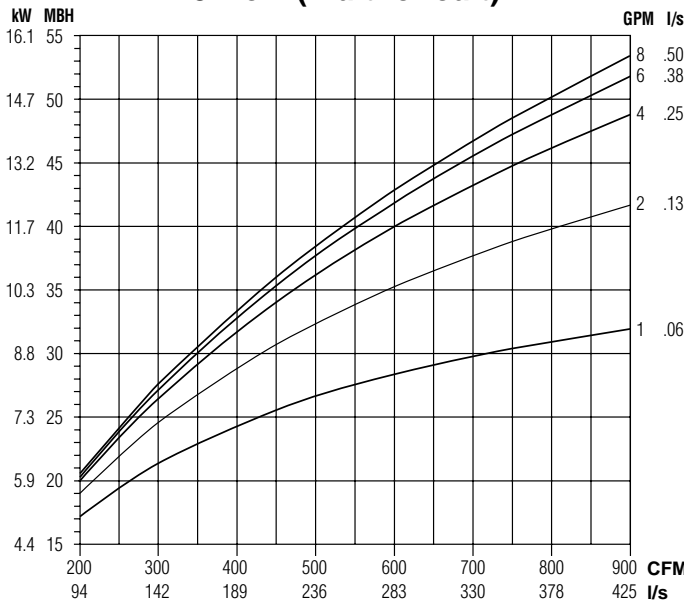
1 Row (single circuit)



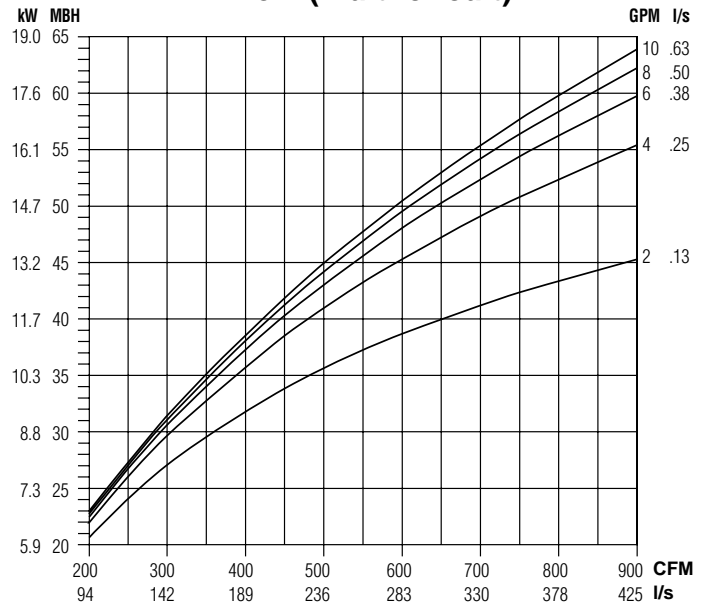
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$
- Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$
- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

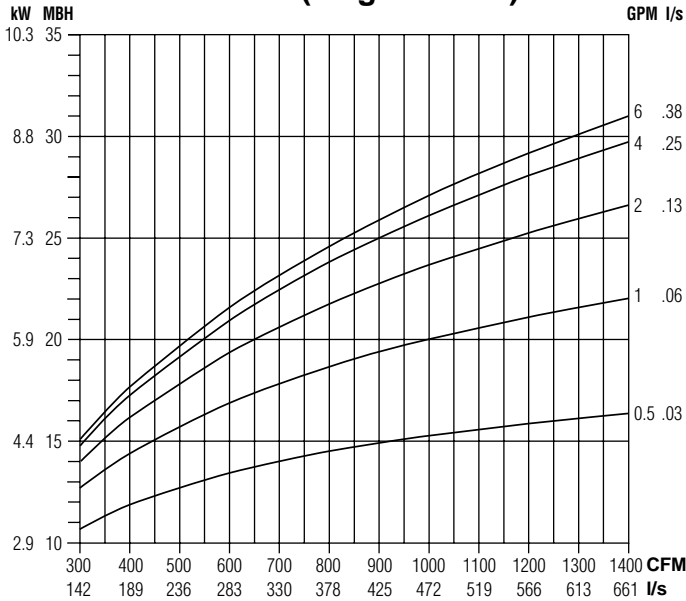
Performance Data • Hot Water Coil • Capacities

Model: 31RW

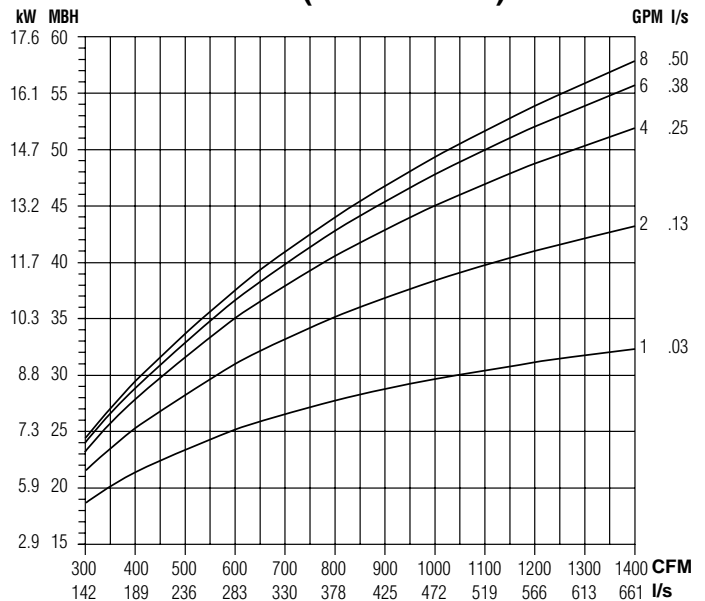
Unit Sizes 9 and 10

SINGLE DUCT TERMINAL UNITS

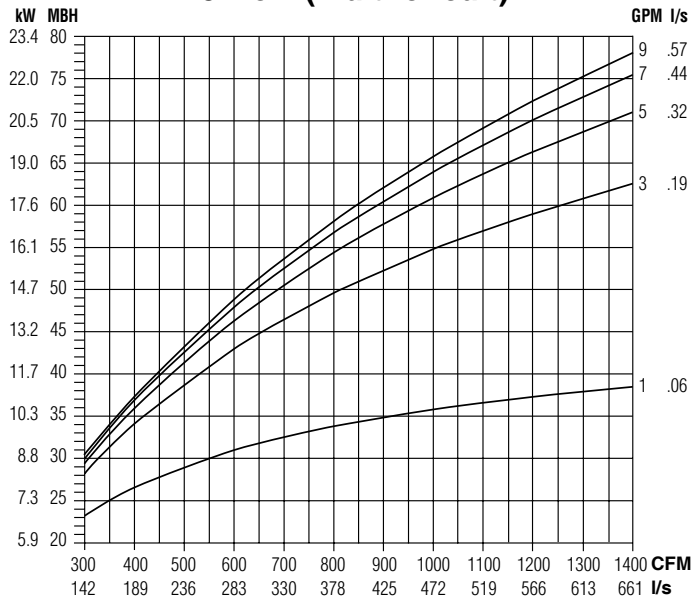
1 Row (single circuit)



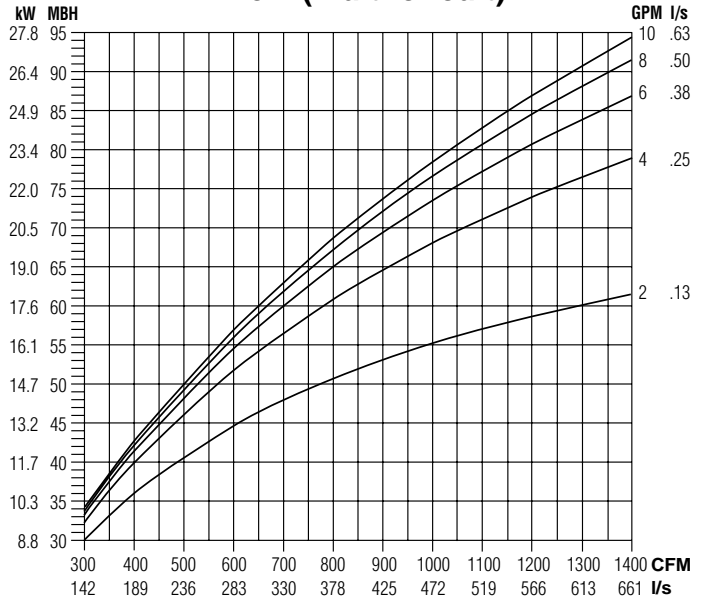
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.
 $ATR (^\circ F) = 927 \times \frac{MBH}{cfm}$, $ATR (^\circ C) = 829 \times \frac{kW}{l/s}$
- Water Temp. Drop.
 $WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}$, $WTD (^\circ C) = .224 \times \frac{kW}{l/s}$
- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

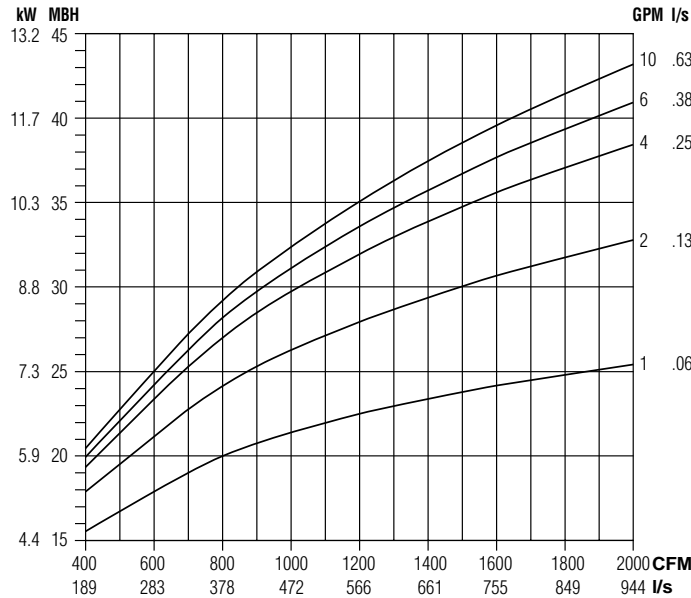
Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

Performance Data • Hot Water Coil • Capacities

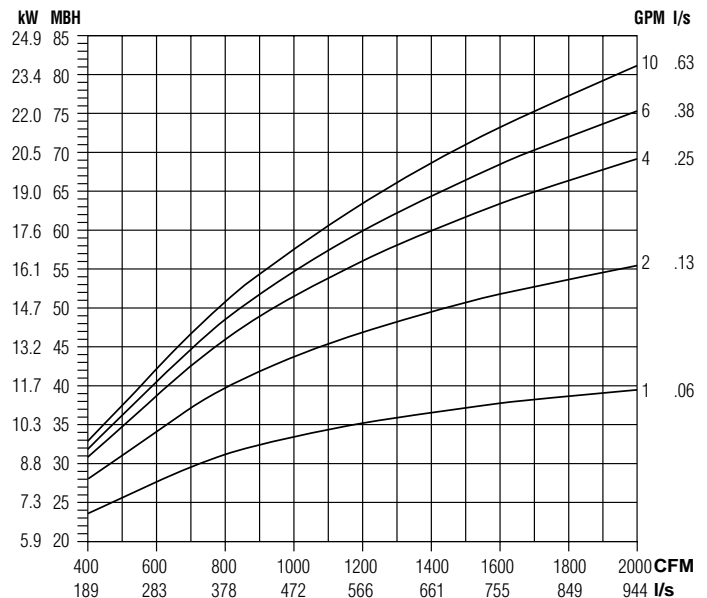
Model: 31RW

Unit Size 12

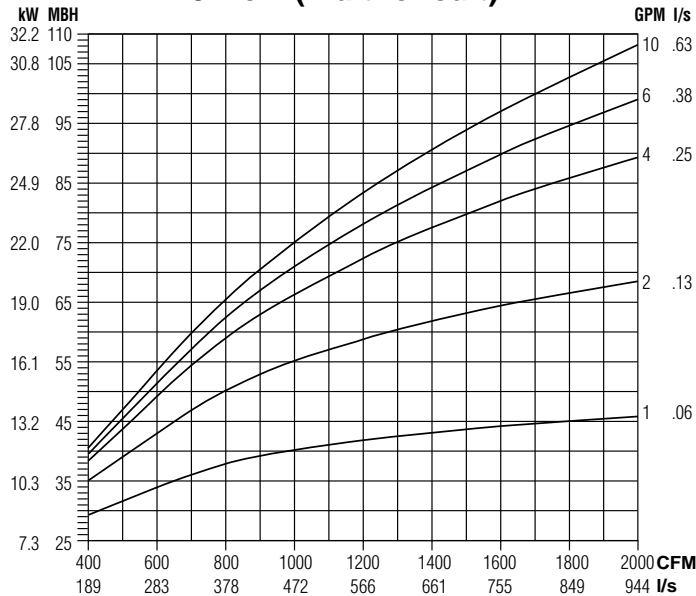
1 Row (single circuit)



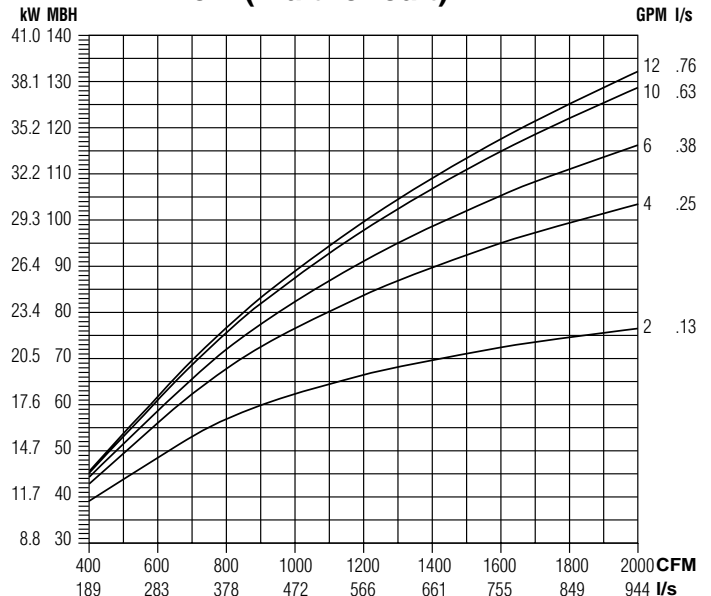
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

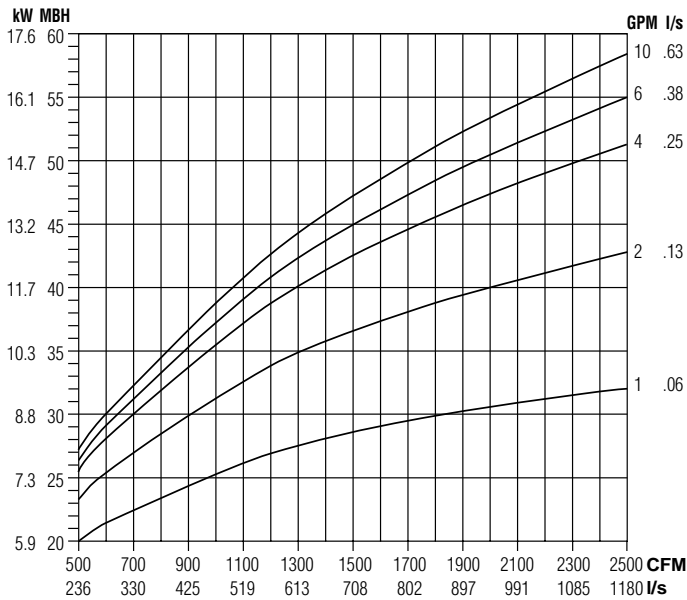
Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

Performance Data • Hot Water Coil • Capacities

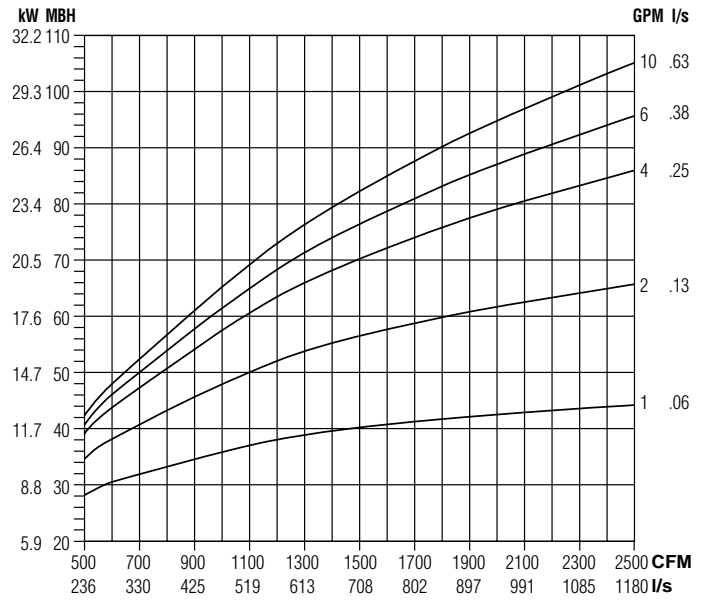
Model: 31RW

Unit Size 14

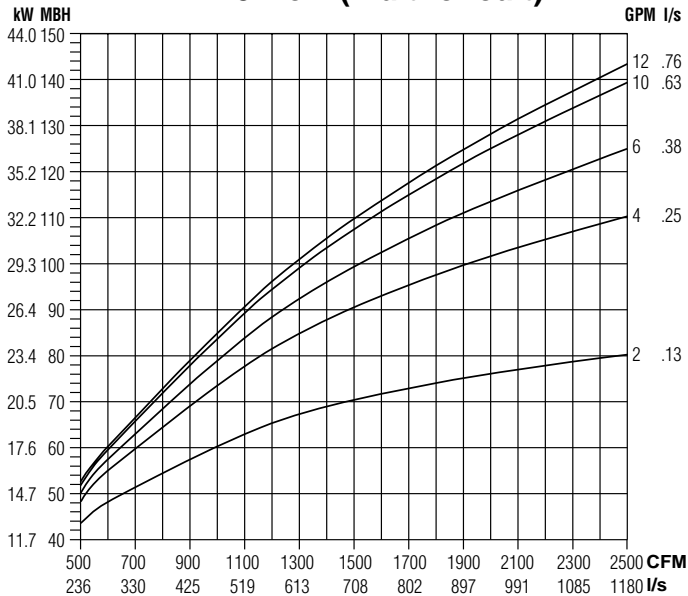
1 Row (single circuit)



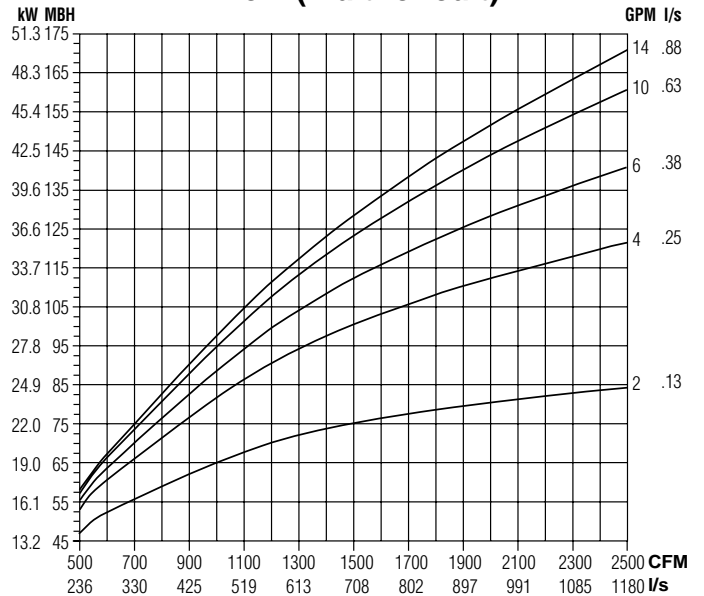
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{ WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 Row 1/2" (13), 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

A

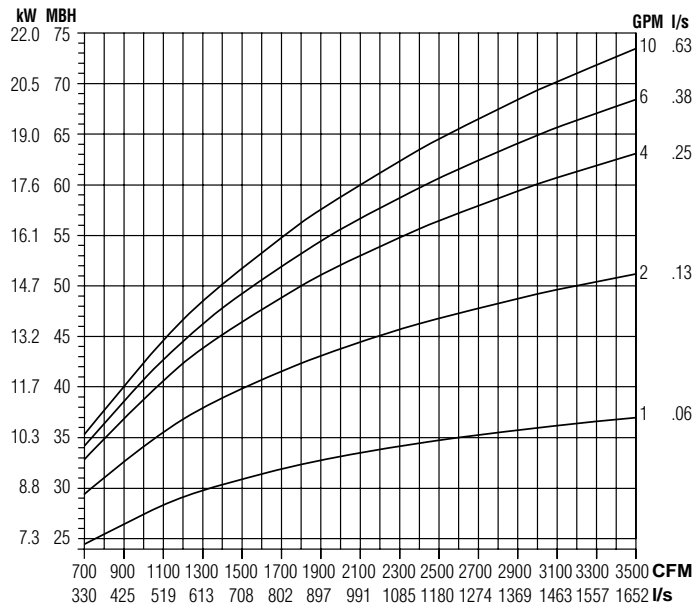
SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Capacities

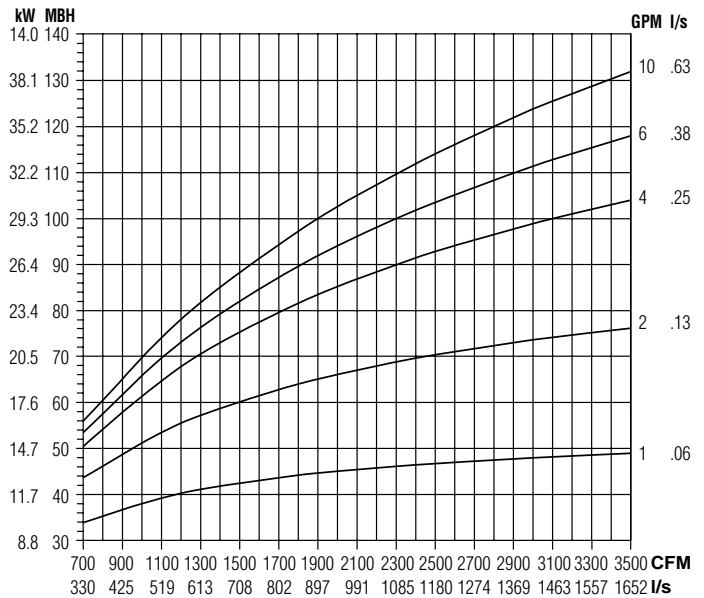
Model: 31RW

Unit Size 16

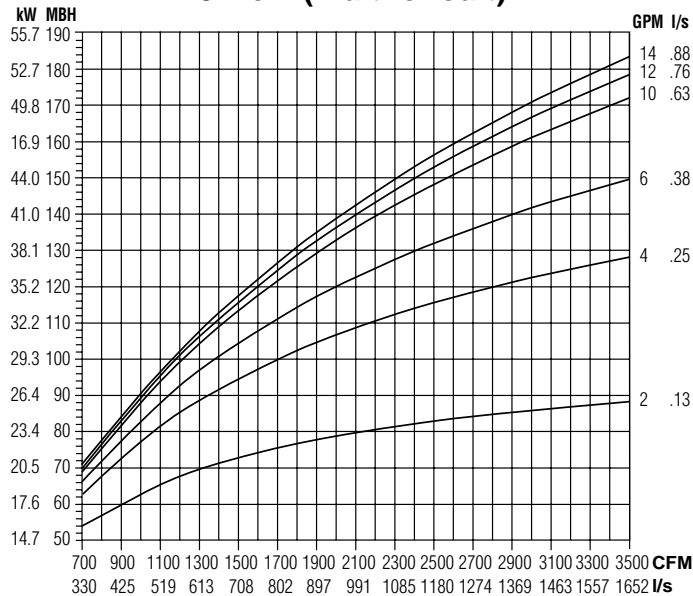
1 Row (single circuit)



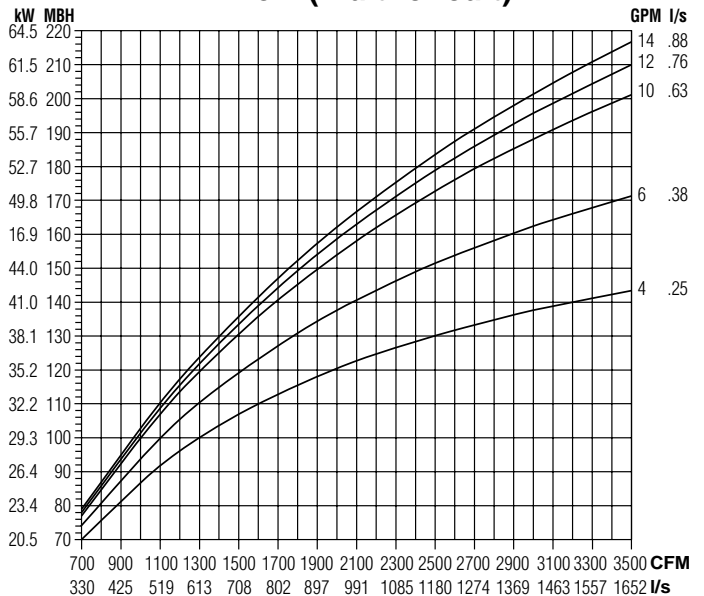
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

3. Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \text{ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

4. Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \text{WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

5. Connections: 1, 2, 3 and 4 Row 7/8" (22); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

Correction factors at other entering conditions:

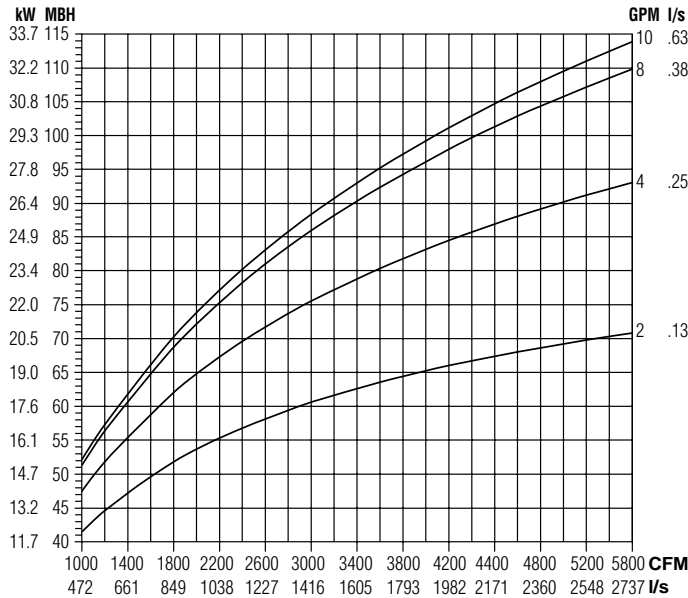
Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

Performance Data • Hot Water Coil • Capacities

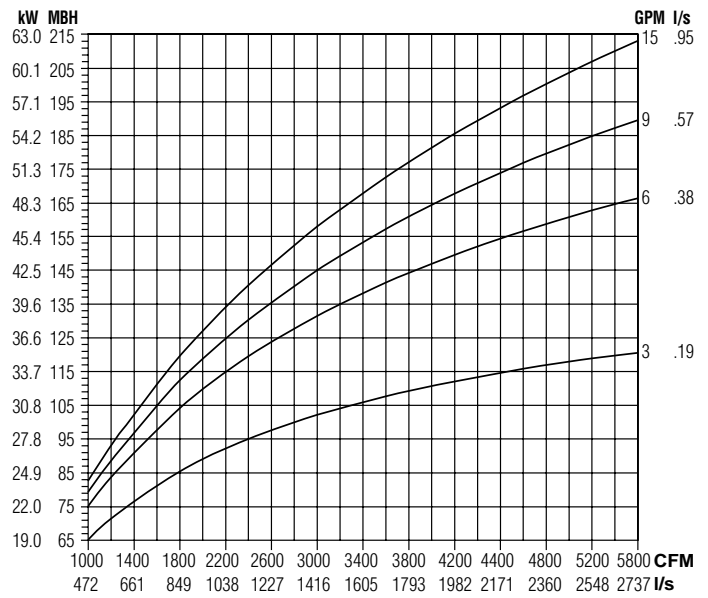
Model: 31RW

Unit Size 24 x 16

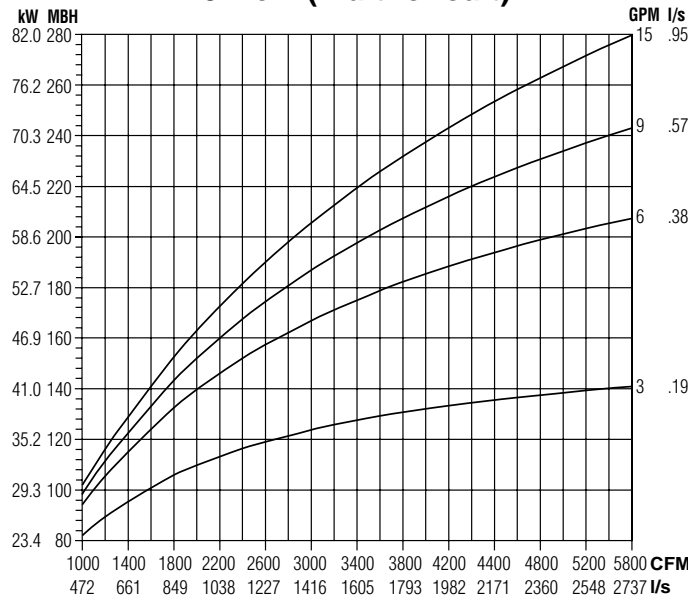
1 Row (single circuit)



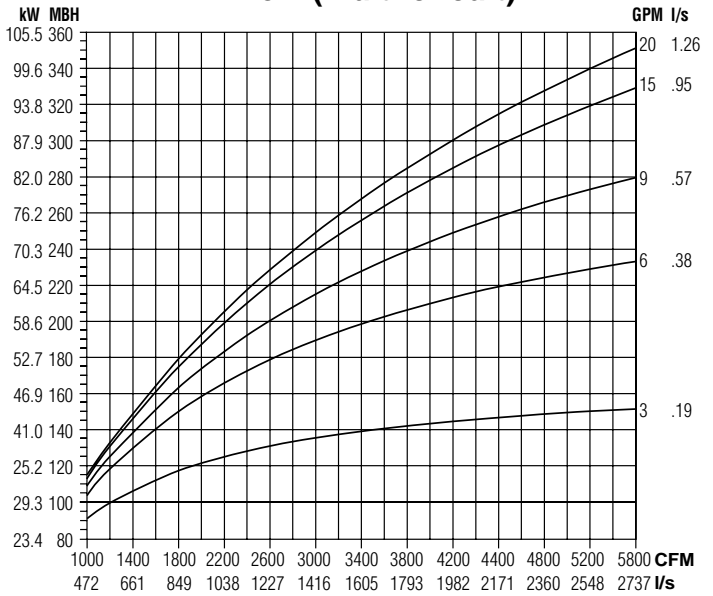
2 Row (multi-circuit)



3 Row (multi-circuit)



4 Row (multi-circuit)



NOTES:

- Capacities are in MBH (kW), *thousands of Btu per hour (kiloWatts)*.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.
 $ATR (^\circ F) = 927 \times \frac{MBH}{cfm}$, $ATR (^\circ C) = 829 \times \frac{kW}{l/s}$
- Water Temp. Drop.
 $WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}$, $WTD (^\circ C) = .224 \times \frac{kW}{l/s}$
- Connections: 1 and 2 Row 7/8" (22), 3 and 4 Row 1 3/8" (35); O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
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Correction factors at other entering conditions:

Δt °F (°C)	40 (22)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	125 (69)	140 (78)	160 (89)	180 (100)
Factor	.320 (.319)	.400 (.406)	.480 (.478)	.560 (.565)	.640 (.638)	.720 (.725)	.800 (.812)	.880 (.884)	1.00 (1.00)	1.12 (1.13)	1.28 (1.29)	1.44 (1.45)

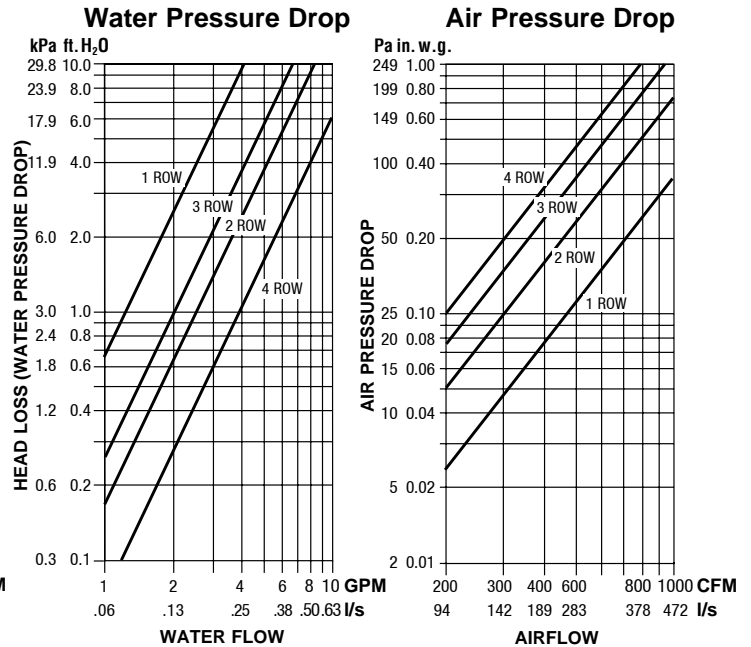
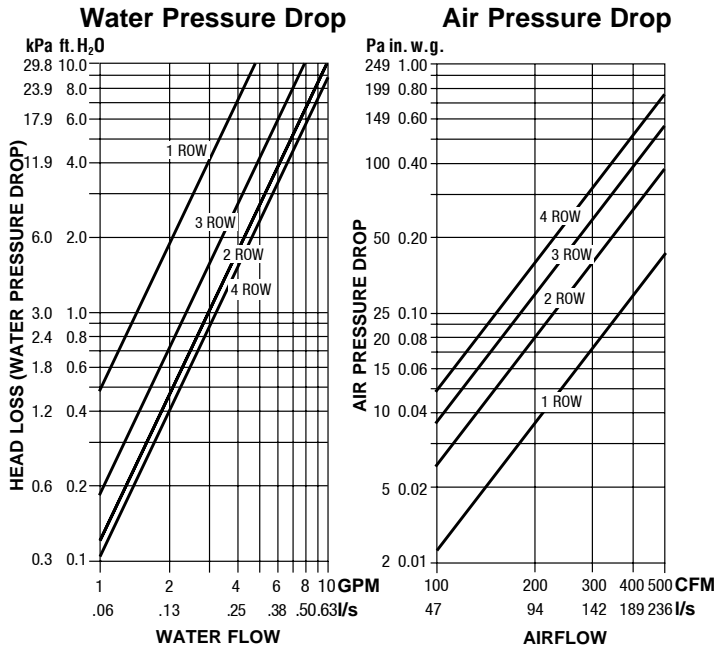
A SINGLE DUCT TERMINAL UNITS

Performance Data • Hot Water Coil • Pressure Drop

Model: 31RW

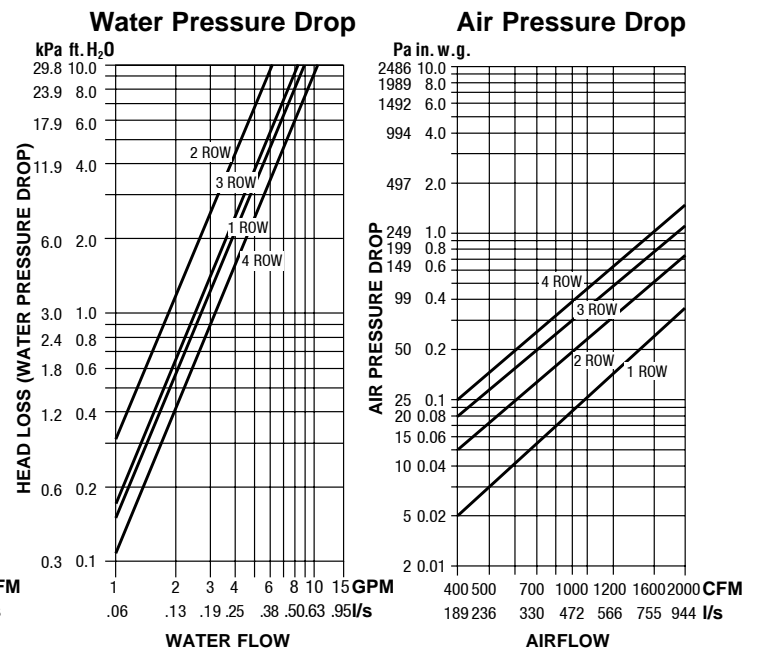
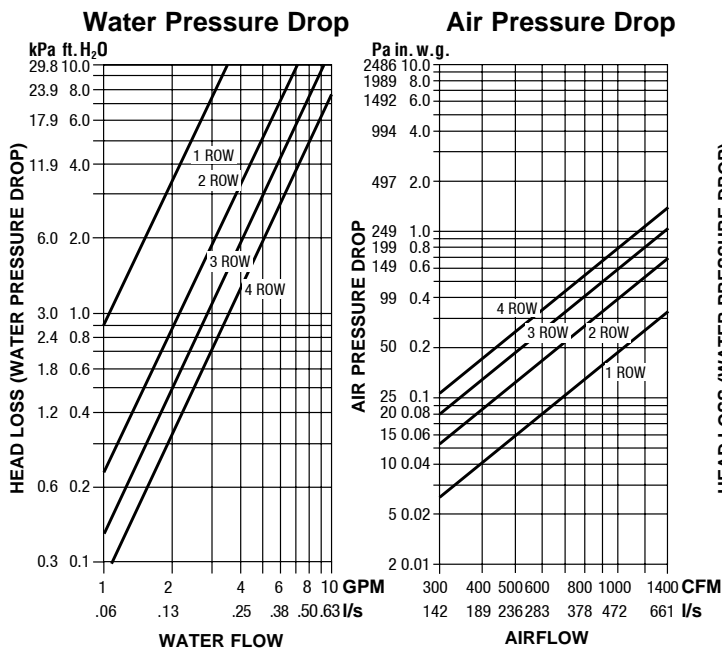
Unit Sizes 4, 5 & 6

Unit Sizes 7 & 8



Unit Sizes 9 & 10

Unit Size 12



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (}^\circ\text{F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \quad \text{ATR (}^\circ\text{C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (}^\circ\text{F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \quad \text{WTD (}^\circ\text{C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

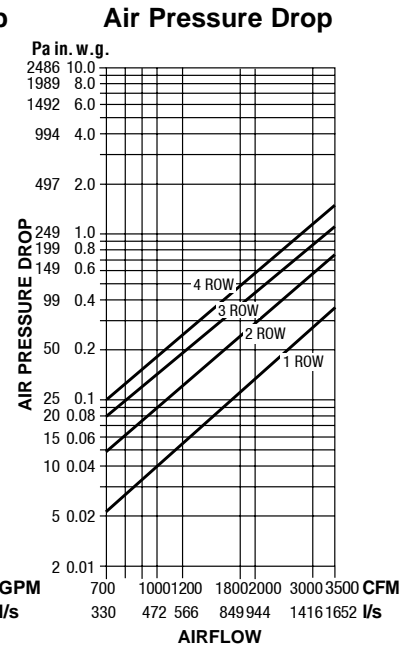
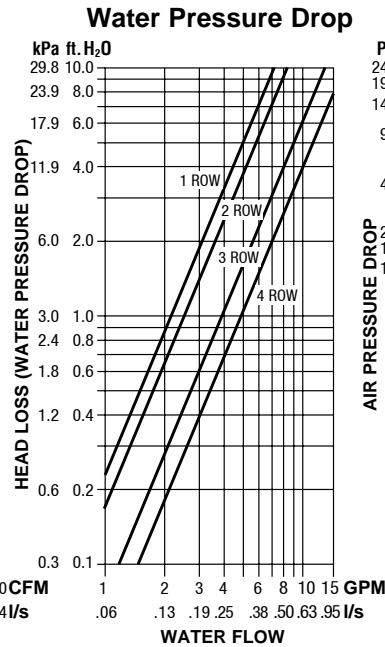
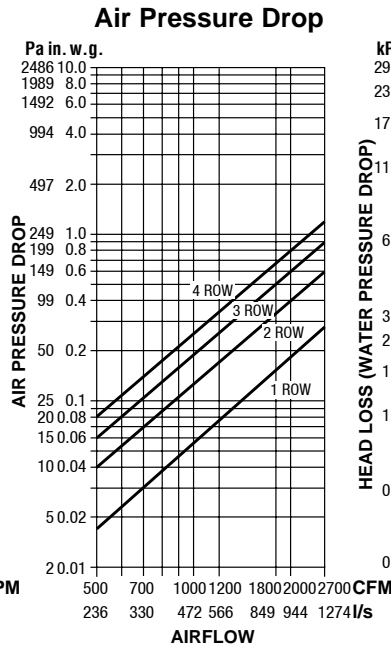
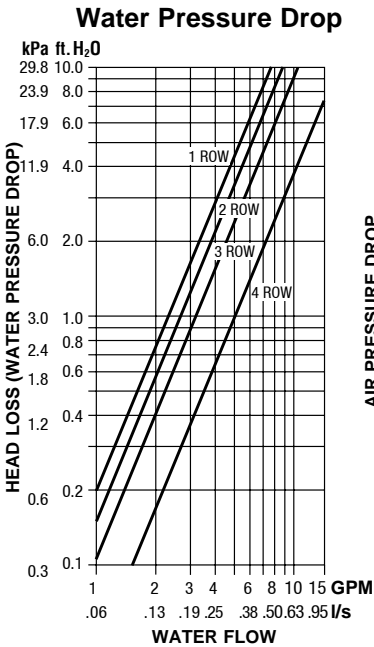
Performance Data • Hot Water Coil • Pressure Drop

Model: 31RW

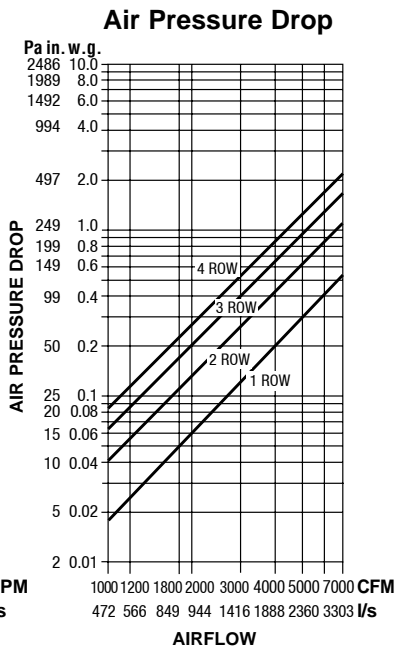
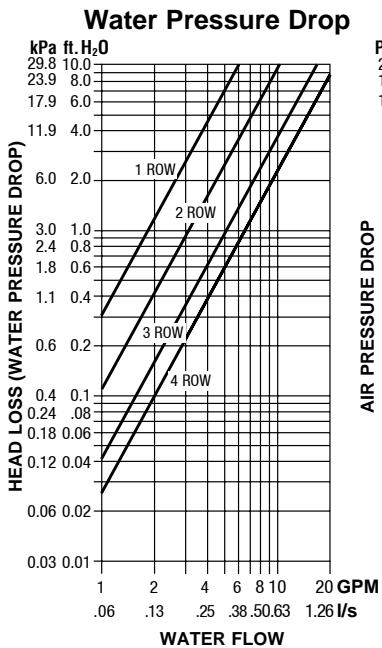
Unit Size 14

Unit Size 16

SINGLE DUCT TERMINAL UNITS



Unit Size 24 x 16



NOTES:

- Capacities are in MBH (kW), **thousands of Btu per hour (kiloWatts)**.
- MBH (kW) values are based on a Δt (temperature difference) of 125°F (69°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$ATR (^{\circ}F) = 927 \times \frac{MBH}{cfm}, \quad ATR (^{\circ}C) = 829 \times \frac{kW}{I/s}$$
- Water Temp. Drop.

$$WTD (^{\circ}F) = 2.04 \times \frac{MBH}{GPM}, \quad WTD (^{\circ}C) = .224 \times \frac{kW}{I/s}$$

Performance Data Explanation

Sound Power Levels vs. NC Levels

The **Nailor 3000, 3000Q, 30HQ, 30X, 30HQX and 3100 Series** single duct terminal unit performance data is presented in two forms (where applicable).

The laboratory obtained discharge and radiated sound power levels in octave bands 2 through 7 (125 through 4000 Hz) center frequency for each unit size at various flow rates and inlet static pressures is presented. This data is derived in accordance with ANSI/ASHRAE Standard 130 and AHRI Standard 880. This data is raw with no attenuation deductions and includes AHRI Certification standard rating points.

Nailor also provides an NC Level table as an application aid in terminal selection, which includes attenuation allowances as explained below. The suggested attenuation allowances are not representative of specific job site conditions. It is recommended that the sound power level data be used and a detailed NC calculation be performed using the procedures outlined in AHRI Standard 885, Appendix E for accurate space sound levels.

Explanation of NC Levels

Tabulated NC levels are based on attenuation values as outlined in AHRI Standard 885 "Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets". AHRI Standard 885, Appendix E provides typical sound attenuation values for air terminal discharge sound and air terminal radiated sound.

As stated in AHRI Standard 885, Appendix E, "These values can be used as a quick method of estimating space sound levels when a detailed evaluation is not available. The attenuation values are required for use by manufacturers to catalog application sound levels. In product catalogs, the end user environments are not known and the following factors are provided as typical attenuation values. Use of these values will allow better comparison between manufacturers and give the end user a value which will be expected to be applicable for many types of space."

Radiated Sound

Table E1 of Appendix E provides radiated sound attenuation values for three types of ceiling: Type 1 – Glass Fiber; Type 2 – Mineral Fiber; Type 3 – Solid Gypsum Board.

Since Mineral Fiber tile ceilings are the most common construction used in commercial buildings, these values have been used to tabulate Radiated NC levels.

The following table provides the calculation method for the radiated sound total attenuation values based on AHRI Standard 885.

	Octave Band					
	2	3	4	5	6	7
Environmental Effect	2	1	0	0	0	0
Ceiling/Space Effect	16	18	20	26	31	36
Total Attenuation Deduction	18	19	20	26	31	36

The ceiling/space effect assumes the following conditions:

1. 5/8" (16) tile, 20 lb/ft³ (320 kg/m³) density.
2. The plenum is at least 3 feet (914) deep.
3. The plenum space is either wide [over 30 feet (9 m)] or lined with insulation.
4. The ceiling has no significant penetration directly under the unit.

Discharge Sound

Table E1 of Appendix E provides typical discharge sound attenuation values for three sizes of terminal unit.

1. Small box: Less than 300 cfm (142 l/s)
[Discharge Duct 8" x 8" (203 x 203)].
2. Medium box: 300 – 700 cfm (142 - 330 l/s)
[Discharge Duct 12" x 12" (305 x 305)].
3. Large box: Greater than 700 cfm (330 l/s)
[Discharge Duct 15" x 15" (381 x 381)].

These attenuation values have been used to tabulate Discharge NC levels applied against the terminal airflow volume and not terminal unit size.

The following tables provide the calculation method for the discharge sound total attenuation values based on AHRI Standard 885.

Small Box <300 cfm	Octave Band					
	2	3	4	5	6	7
Environmental Effect	2	1	0	0	0	0
5 ft. (1.5 m) 1" (25) Duct Lining	2	6	12	25	29	18
Branch Power Division (1 outlet)	0	0	0	0	0	0
5 ft. (1.5 m), 8 in. dia. (203) Flex Duct	5	10	18	19	21	12
End Reflection	10	5	2	1	0	0
Space Effect	5	6	7	8	9	10
Total Attenuation Deduction	24	28	39	53	59	40

Medium Box 300 – 700 cfm	Octave Band					
	2	3	4	5	6	7
Environmental Effect	2	1	0	0	0	0
5 ft. (1.5 m) 1" (25) Duct Lining	2	4	10	20	20	14
Branch Power Division (2 outlets)	3	3	3	3	3	3
5 ft. (1.5 m), 8 in. dia. (203) Flex Duct	5	10	18	19	21	12
End Reflection	10	5	2	1	0	0
Space Effect	5	6	7	8	9	10
Total Attenuation Deduction	27	29	40	51	53	39

Large Box >700 cfm	Octave Band					
	2	3	4	5	6	7
Environmental Effect	2	1	0	0	0	0
5 ft. (1.5 m) 1" (25) Duct Lining	2	3	9	18	17	12
Branch Power Division (3 outlets)	5	5	5	5	5	5
5 ft. (1.5 m), 8 in. dia. (203) Flex Duct	5	10	18	19	21	12
End Reflection	10	5	2	1	0	0
Space Effect	5	6	7	8	9	10
Total Attenuation Deduction	29	30	41	51	52	39

1. Flexible duct is non-metallic with 1" (25) insulation.
2. Space effect (room size and receiver location) 2500 ft.³ (69 m³) and 5 ft. (1.5 m) distance from source.

For a complete explanation of the attenuation factors and the procedures for calculating room NC levels, please refer to the acoustical engineering guidelines at the back of this catalog and AHRI Standard 885.

Liner and Acoustic Media Options

Nailor offers several liner choices for Single Duct Terminal Units applications. Whether the application requires industry standard fiberglass or a high IAQ (Indoor Air Quality) type, each liner provides acoustical attenuation of discharge and radiated sound as well as addresses concerns with fiberglass erosion, microbial growth and isolation of insulation from the airstream.

As the Single Duct Terminals are used in various applications, not all liner choices are available for each series. The following chart summarizes availability of liners per series:

TERMINAL UNITS	LINERS							SILENCER			
	DD Fiberglass	1" DD Fiberglass	Steri-Liner	Fiber Free (Close-Cell Foam)	Perforated Metal Liner	Perforated Metal + Steri-Liner	Solid Metal Liner	FAM (Fiberglass Acoustic Media)	FCL (Fiberglass Cloth Liner)	MSL (Mylar/Spacer Liner)	MSSL (Mylar/Spacer/Steri-Liner)
Series:											
3000	Std.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	N/A	N/A	N/A	N/A
3000Q	Std.	N/A	Opt.	Opt.	Opt.	Opt.	Opt.	Std.	Opt.	Opt.	N/A
30HQ	N/A	N/A	Std.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Std.
30X	Std.	N/A	Opt.	Opt.	Opt.	Opt.	Opt.	N/A	N/A	N/A	N/A
30HQX	N/A	N/A	Std.	N/A	N/A	N/A	Opt.	N/A	N/A	N/A	Std.
3100	Std.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	N/A	N/A	N/A	N/A

General Notes On Liner Types And Offerings By Series:

3000 and 3100 Series

Liner inside optional attenuator will match VAV terminal liner unless otherwise stated.

3000Q Series

There are two components to the 3000Q Series terminal units, the VAV terminal and the dissipative silencer. Liner selection determines the liner type installed into the terminal portion only. Each dissipative silencer is lined top and bottom with fiberglass as standard. When the FCL or MSL acoustic media is selected, a foil faced fiberglass is used. As the entire silencer is internally insulated, there is no need for field applied duct wrap.

There are three acoustic media options available within the side pods of the dissipative silencer. From the standard FAM (Fiberglass Acoustic Media) to IAQ sensitive options, each version provides superior attenuation characteristics.

30HQ Series

Model 30HQ Hospital Grade terminal units include, as standard, Steri-Liner in the VAV section. The top and bottom of the dissipative silencer is lined with Steri-Liner while the side pods include fiberglass acoustic media encapsulated within a Mylar bag, and then covered with perforated metal baffles. Like the 3000Q series, the 30HQ Series does not require field applied thermal duct wrap.

30X Series

Liner inside optional attenuator will match VAV terminal liner unless otherwise stated.

30HQX Series

Model 30HQX Hospital Grade exhaust units include, as standard, Steri-Liner in the VAV section, with a solid metal liner as an option. The top and bottom of the dissipative inlet silencer is lined with Steri-Liner while the sides are lined with fiberglass acoustic media encapsulated in a Mylar bag and then covered with perforated metal baffles. The 30HQX also does not require field applied thermal duct wrap.

A

SINGLE DUCT TERMINAL UNITS

Liners

Dual Density Fiberglass

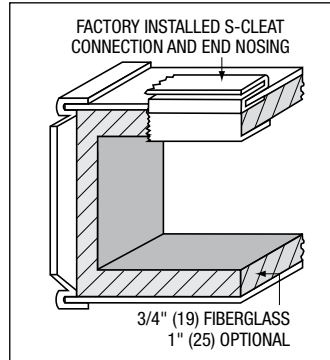
Nailor uses dual density blanket-type fiber glass insulation with a high density skin, on the exposed side and a low density core. The 4 lb. high density skin aids in resisting abrasion and erosion from airflow. Furthermore, Nailor coats all exposed edges with NFPA 90A approved sealant to reduce erosion and the entrainment of fibers into the airstream.

Fiberglass liner contributes to indoor comfort by lowering heat loss or gain through duct walls. Additionally, fiberglass liner enhances indoor environmental quality by absorbing sound within duct. The thermal and acoustical absorption of fiberglass is generally classified as excellent.

- 3/4" (19) thick dual density insulation, 4 lb./cu. ft. (64 kg/m³) skin and 1.5 lb./cu. ft. (24 kg/m³) core, with exposed edges coated to reduce air erosion.
- 1" (25) thick dual density insulation optional.

Meets requirements:

- UL 181 & 723
- NFPA 90A & 90B
- ASTM E 84 & C 1071
- CAN/ULC S102-M88



Steri-Liner

Steri-Liner is an internal insulation designed to reduce the risk of microbial growth within the terminal. A smooth non-porous facing provides a vapor barrier to moisture and reduces the risk of microorganisms becoming trapped. This facing also facilitates cleaning and prevents insulating material erosion. Damage to the liner will expose fiberglass particles to the airstream.

Acoustic absorption of aluminum foil lined insulation is reduced for discharge sound levels and essentially unchanged for radiated sound levels when compared to standard fiberglass insulation.

- 13/16" (21) thick, 4 lb./cu. ft. (64 kg/m³) density rigid fiberglass with a fire resistant reinforced aluminum FSK (foil-scrim-kraft) facing.
- 1" (25) thick steri-liner insulation optional.

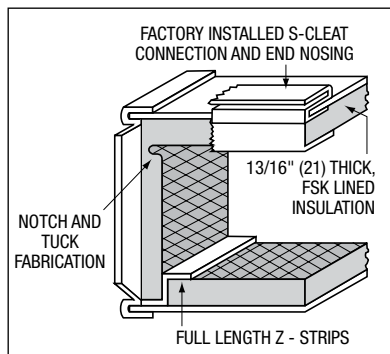
- No exposed edges. Steri-Liner features notch and tuck fabrication and full seam length steel Z-strip construction providing both superior edge protection and an extremely rigid terminal.

- Metal nosing at unit discharge captures and seals insulation ends.

- End nosing is provided and sealed in place to eliminate the risk of liner damage and aid installation.

Meets requirements:

- UL 181 & 723
- NFPA 90A & 90B
- ASTM E 84, C 665, C 1071, C 1338, G21 & G22



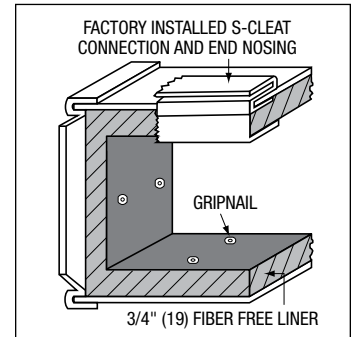
Fiber Free Liner

Nailor's Fiber-Free liner is a closed cell elastomeric foam. This liner has excellent insulating characteristics and provides acoustical attenuation roughly equivalent to Steri-Liner. The construction of fiber free insulation prevents the insulation from absorbing water, helping to reduce the likelihood of mold or bacterial growth.

- 3/4" (19) thick closed cell elastomeric foam.
- Smooth washable surface helps to prevent dirt and debris from accumulating.

Meets requirements:

- UL 181 & 723
- ASTM E 84, C 209 & C 665
- CAN/ULC S102-M88



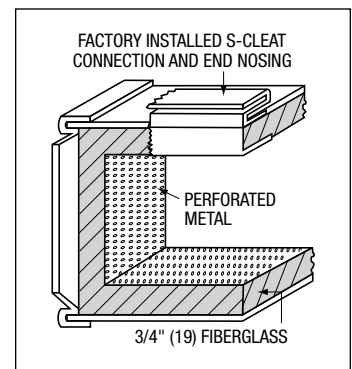
Perforated Metal Liner

Standard dual density fiberglass insulation covered with a 50% free area perforated metal sheet, constructed of steel, as a duct liner. The perforated metal sheet provides additional protection against erosion by airflow, but does not prevent moisture from contacting the insulation. Small fiberglass particles may escape through the metal perforations should the skin of the insulation be compromised.

- 22 ga. (.86) perforated steel liner.
- 3/4" (19) dual density fiberglass insulation, 4 lb./cu. ft. (64 kg/m³) skin.

Meets requirements:

- UL 181 & 723
- ASTM E 84, C 665 & C 1071



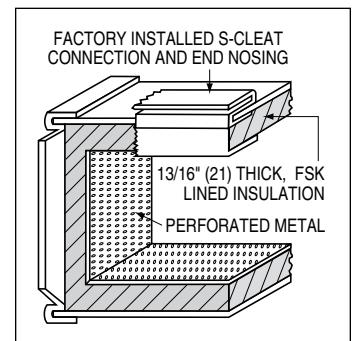
Steri-Liner + Perforated Metal Liner

This liner includes a 50% free area perforated metal sheet that covers the Steri-Liner insulation. By covering the Steri-Liner, the perforated metal helps to protect the FSK (foil-scrim-kraft) facing from punctures.

- 22 ga. (.86) perforated steel liner.
- 13/16" (21) thick, 4 lb./cu. ft. (64 kg/m³) density rigid fiberglass with FSK facing.
- Metal nosing at unit discharge captures and seals insulation ends.
- Z-strip construction providing both superior edge protection and an extremely rigid terminal.

Meets requirements:

- UL 181, 723
- ASTM E 84, C 665 & C 1071



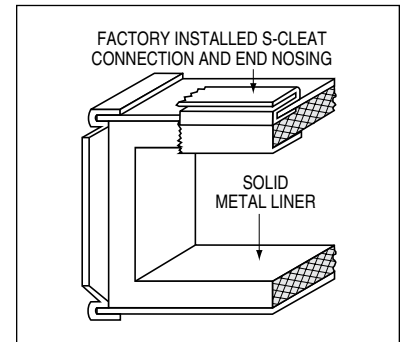
Solid Metal Liner

Nailor offers a solid inner metal liner that completely isolates the standard fiberglass liner from the airstream. Solid metal liners offer the ultimate protection against exposure of fiberglass particles to the airstream, all but eliminating the possibility of punctures that expose fiberglass. This option is also resistant to moisture. The encased insulation still provides thermal resistance and radiated sound attenuation, but acoustic absorption of discharge sound is eliminated. Solid Metal fabrication is a box within a box and uses metal end nosing to encapsulate exposed edges of the insulation.

- Solid inner liner is 22 ga. (.86) steel.
- 3/4" (19) dual density fiberglass insulation, 4 lb./ cu. ft. (64 kg/m³) skin and 1.5 lb./cu. ft. (24 kg/m³) core.

Meets requirements:

- UL 181 & 723
- ASTM E 84, C 655 & C 1071
- NFPA 90A & 90B



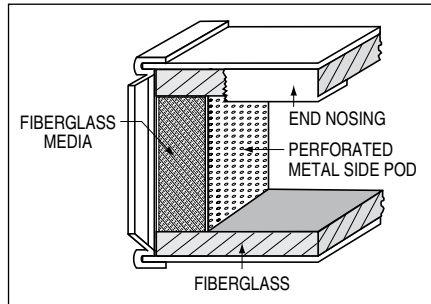
Dissipative Silencer

Acoustic Media

A Dissipative Silencer is standard on all 3000Q, 30HQ and 30HQX Series terminal units. There are three acoustic media options available on the 3000Q Series silencers; FAM, FCL and MSL. All 30HQ and 30HQX Hospital Grade units include a MSSL acoustic media option as standard. From the standard fiberglass media to the IAQ sensitive options, each version provides superior attenuation characteristics.

Fiberglass Acoustic Media (FAM)

The Standard FAM choice is the simplest of the types offered and provides the best attenuation of discharge sound. Fiberglass insulation is packed between the silencer casing and the side pod metal silencer baffles. There is minimal exposure of the fiberglass through the perforations of the metal side baffles.

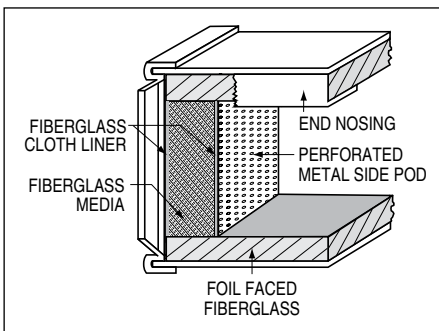


Meets requirements:

- UL 181
- NFPA 90A & 90B
- ASTM E 84, C 1071 & C 655

Fiberglass Cloth (FCL)

A tightly woven fiberglass cloth encapsulates the fiberglass media packed between the silencer casing and the side pod silencer baffles. The cloth eliminates the erosion of the fiberglass media and prevents entrainment of fibers into the airstream. Since the cloth is porous, it absorbs sound. Performance of the cloth liner is similar to the fiberglass lined silencer and offers the best balance between fiberglass erosion and sound attenuation.

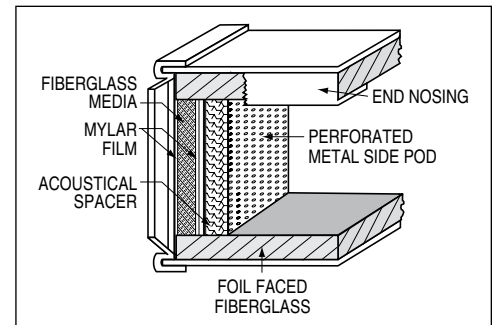


Meets requirements:

- UL 181 & 723
- ASTM E 84, C 655 & C 1071
- NFPA 90A

Mylar/Spacer (MSL)

Similar to the fiberglass cloth liner, the fiberglass media is wrapped. Using Mylar to create an impregnable barrier around the acoustic media, this option is recommended where isolating fiberglass material is a critical concern. This option is an excellent choice for IAQ sensitive applications.

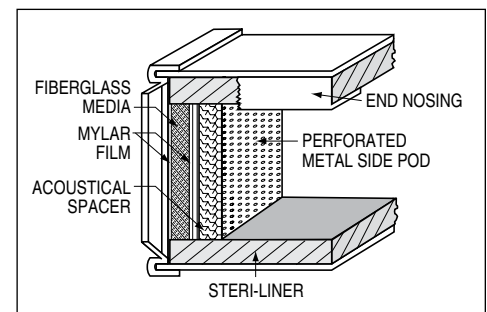


Meets requirements:

- NFPA 90A & 90B
- UL 181 & 723
- UL 94 (mylar)
- ASTM E 84, C 665, C 1338 & C 1071

Mylar/Spacer Steri-Liner (MSSL)

Standard on all hospital grade series, this acoustic media version is similar to the MSL option but substitutes Steri-Liner in place of the foil faced fiberglass. Using Mylar to create an impregnable barrier around the fiberglass acoustic media. This option is an excellent choice for IAQ sensitive applications.



Meets requirements:

- NFPA 90A & 90B
- UL 181, 723
- UL 94 (mylar)
- ASTM E 84, C 665, C 1338 & C 1071

Single Duct Terminal Units • 3000 Series

Model 3001 • Basic Unit

1. Furnish and install **Nailor 3000 Series Single Duct Variable Volume Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.
2. The entire terminal unit shall be designed and built as a single unit. The unit shall be provided with a primary variable air volume damper that controls the air quantity in response to a (DDC, analog electronic, pneumatic electric) thermostat. The unit shall also include all options such as electric or hot water heating coils, attenuators and access doors. The space limitations shall be reviewed carefully to insure that all units will fit into the space allowed.
3. Unit casing shall be 22 ga. (.86) galvanized steel with round, flat oval or rectangular inlets with 5 1/2" (140) deep inlet duct collar for field connection. Outlets shall be rectangular and configured for slip and drive connections. Casing leakage downstream of the damper shall not exceed 1% @ 1" w.g. (249 Pa). High side casing leakage shall not exceed 2% @ 3" w.g. (746 Pa).
4. Damper assemblies of 16 ga. (1.63) galvanized steel shall be multiple opposed blade construction arranged to close at 45 degrees from full open to minimize air turbulence and provide near linear operation. Damper blades shall be fitted with flexible seals for tight closure and minimized sound generation. Damper blades shall be screwed through the shaft to insure that no slippage occurs. Blade shafts shall pivot on corrosion free Celcon® bearings. In the fully closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3" w.g. (746 Pa) inlet static pressure as rated by ASHRAE Standard 130.
5. The terminal units shall be capable of operation as described herein with a minimum inlet static pressure that shall not exceed .18" w.g. (45 Pa) @ 2000 fpm (10.2 m/s) inlet velocity. (The sequence of operations should be described here, if not part of the temperature controls specifications.) Each unit shall be complete with factory mounted (DDC, electric, analog electronic or pneumatic) controls. Gauge tap ports shall be supplied in the piping between the flow pick up and the controller.
6. Each unit shall be constructed with single point electrical or pneumatic connection. All electrical components shall be ETL or UL listed or recognized and installed in accordance with the National Electrical Code. All electrical components shall be installed in a control box. The entire assembly shall be ETL listed and so labeled.
7. Each unit shall be internally lined with 3/4" (19) dual density fiberglass insulation. Edges shall be sealed against airflow erosion. Units shall meet NFPA 90A and UL 181 standards.
8. All sound data shall be compiled in an independent laboratory and in accordance with the latest version of AHRI Standard 880 and ANSI/ASHRAE Standard 130. All units shall be AHRI certified and bear the AHRI certification label.

OPTIONS

Electric Heat:

Model: 30RE Staged

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30RE Single Duct Variable Volume Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.
- 9. Single Duct Terminal Unit Staged Electric Heating Coils:**
 - a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.
 - b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 16.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 16.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz. Coils shall be available in one, two or three stages.
 - c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.
 - d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.
 - e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 48 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.
 - f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.
 - g. Electric heating coils shall be designed for operation with the DDC controller and control system.
 - h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater and the VAV damper, shall be no longer than 37" (940) in length.
 - i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.
 - j. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Single Duct Terminal Units • 3000 Series

Model 3001 • Basic Unit OPTIONS (continued)

Proportional Heat (SCR): (Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30RE Single Duct Variable Volume Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

9. Single Duct Terminal Unit Proportional Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with proportional heat control for the single circuit, branch circuit fusing on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

f. An electric heater shall be factory mounted and pre-wired as an integral package with single duct variable volume terminal unit. Heaters shall be sized as shown on the drawings. The entire assembly including the electric heater shall be ETL listed for zero clearance and so labeled and shall meet all requirements of the latest National Electrical Code, (CSA C22.2 No.236). The unit shall have a single point electrical and/or pneumatic connection (dual point electrical on 600V). Heater casing and panel shall be a minimum of 20 ga. (1.00) galvanized steel. Each heater shall be complete with automatic reset high limit thermal cut-outs, control voltage transformer as required, ground terminal and high grade nickel chrome alloy wire.

Element wires shall be supported by ceramic isolators. Each heater shall be supplied with factory supplied and pre-wired branch circuit fusing as required by NEC and UL. Circuiting and fusing shall also be in accordance with the circuiting requirements as shown on the plans.

Additional accessories shall include (control transformer, circuit fusing, disconnect switch, pneumatic electric switches) for heater control.

Heater shall be capable of providing proportional control of heater capacity from an input signal of 4 – 20 mA, 2 – 10 VDC or 0 – 10 VDC. The SCR controller shall provide a 1 – 24 VDC pulsed output to SSR(s) [solid state relay(s)] in proportion to zone heating demand. The SSR's shall switch with zero cross over to reduce system noise and thermal shock on heater coils.

g. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

h. Electric heating coils shall be designed for operation with the DDC controller and control system.

i. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater and the VAV damper, shall be no longer than 37" (940) in length.

j. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

k. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Proportional Heat with Discharge Temperature Control (DTC): (Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30RE Single Duct Variable Volume Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

9. Single Duct Terminal Unit Proportional Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with proportional heat control for the single circuit, branch circuit fusing on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

Single Duct Terminal Units • 3000 Series

Model 3001 • Basic Unit

OPTIONS (continued)

f. An electric heater shall be factory mounted and pre-wired as an integral package with the single duct variable volume terminal unit. Heaters shall be sized as shown on the drawings. The entire assembly including the electric heater shall be ETL listed for zero clearance and so labeled and shall meet all requirements of the latest National Electrical Code, (CSA C22.2 No.236). The unit shall have a single point electrical and/or pneumatic connection (dual point electrical on 600V). Heater casing and panel shall be a minimum of 20 ga. (1.00) galvanized steel. Each heater shall be complete with automatic reset high limit thermal cut-outs, control voltage transformer as required, ground terminal and high grade nickel chrome alloy wire.

Element wires shall be supported by ceramic isolators. Each heater shall be supplied with factory supplied and pre-wired branch circuit fusing as required by NEC and UL. Circuiting and fusing shall also be in accordance with the circuiting requirements as shown on the plans.

Additional accessories shall include (control transformer, circuit fusing, disconnect switch, pneumatic electric switches) for heater control.

Heater shall be capable of providing proportional control of heater capacity from an input signal of 4 – 20 mA, 2 – 10 VDC or 0 – 10 VDC. The SCR controller shall provide a 1 – 24 VDC pulsed output to SSR(s) [solid state relay(s)] in proportion to zone heating demand. The SSR's shall switch with zero cross over to reduce system noise and thermal shock on heater coils.

The SCR controller shall contain a discharge temperature sensor capable of limiting leaving air temperature to a user defined setpoint. The SCR controller shall pulse the coil to maintain zone demand while providing the set maximum discharge air temperature. Upon measuring a discharge air temperature above the user defined setpoint, the controller shall reduce heater capacity to maintain maximum allowable discharge air temperature. The discharge air temperature setpoint shall be adjustable from 80 – 120°F (27 – 49°C) by use of a controller mounted potentiometer.

g. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

h. Electric heating coils shall be designed for operation with the DDC controller and control system.

i. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater and the VAV damper, shall be no longer than 37" (940) in length.

j. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

k. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Hot Water Heating Coils:

Model: 30RW

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30RW Single Duct Variable Volume Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

9. Single Duct Terminal Device Hot Water Heating Coils

a. Terminal unit hot water heating coils shall be mounted on the discharge of the unit with slip and drive connections. Provide an access door or panel on the bottom of the attenuator section of the terminal unit for servicing and cleaning the unit.

b. Hot water heating coils shall be constructed with copper tubes and aluminum plate fins. Coils shall have a maximum of 10 fins per inch. Supply and return connections shall be on the same end of the coil. Fins shall be bonded to the tubes by means of mechanical expansion of the tubes. Fins shall be at least .0045" (.11) thick.

c. Coils shall have galvanized steel casings on all sides no lighter than 20 ga. (1.00).

d. Tubes shall be ½" (13) O.D. and shall be spaced approximately 1 ¼" (32) apart and shall have a minimum wall thickness of 0.016" (.41). Hot water shall be equally distributed through all tubes by the use of orifices or header design. Water velocity in the tubes shall not exceed five feet per second. The water pressure drop through the coil shall not exceed 10 feet. Heating coil face velocities shall not exceed the maximum face velocity indicated in the schedules on the Contract Documents.

e. Coils shall be tested by air pressure under water. Coils shall be tested at 350 psi (2,413 kPa) air static pressure.

f. Coil ratings, calculations and selection data shall be in accordance with the applicable AHRI Standards and shall be submitted with the Shop Drawings.

Liner:

Steri-Liner

(Substitute the following paragraph:)

7. Each unit shall be fully lined with non-porous, sealed liner which complies with NFPA 90A & 90B, ASTM E84, UL 723, UL 181 and ASTM G21 & G22. Installation shall be 1/2" (13) minimum thickness, 4 lb./cu. ft. (64 kg/m³) density with reinforced aluminum foil-scrim-kraft (FSK) facing. All cut edges shall be secured with steel angles or end caps to encapsulate edges and prevent erosion. Insulation shall be Nailor Steri-Liner or equal.

Fiber-Free Liner

(Substitute the following paragraph:)

7. Each unit shall be fully lined with a non-porous closed cell elastomeric foam liner which complies with NFPA 90A & 90B, ASTM E84, UL 723 and UL 181. Installation shall be 3/8" (10) minimum thickness and secured to the interior of the terminal with mechanical fasteners. No fiberglass is permitted. Insulation shall be Nailor Fiber-Free Liner or equal.

Single Duct Terminal Units • 3000 Series

Model 3001 • Basic Unit

OPTIONS (continued)

EZvav Digital Controls

1.1 ASC VAV BACnet CONTROLLERS

A. Digital VAV Controllers shall be responsible for monitoring and controlling directly connected VAV Terminals as required. Controllers shall include fully adjustable analog outputs and digital outputs as required utilizing a proportional plus integral control loop to control damper, electric heat and hot water coils for the purpose of maintaining user setpoints. Each controller shall be classified as a native BACnet device, conforming to the BACnet Advanced Specific Controllers (B-ASC) profile, ANSI/ASHRAE BACnet Standard 135.

B. The VAV controller shall be available with integrated applications (based on model) for Single Duct, Dual Duct, and Fan Powered terminal units, including any of the following as required by the control sequence. For Single/Dual Duct terminals: Cooling Only, Cooling/Heating with Changeover and Morning Warm up. For Fan Powered terminals: Cooling with Reheat/Supplementary Heat, Heating coil operation may be with analog, floating or binary control as required.

C. The controller shall be fully configurable via the Digital Display Sensor, including communication parameters (instance, MAC, baud) and application settings (K-factor, flow limits, box configuration, reheat or fan type, default user setpoints, etc.), without any specific PC-based software. VAV controllers shall not require the use of a personal computer and PC based software and/or any interface modules.

D. The VAV controller shall be capable of being balanced from the Digital Room Sensor without any specific pc-based software.

E. The controller shall have integrated MS/TP communications. The communication port shall have network protection bulbs and integrated end-of-line (EOL) terminations.

F. The controller shall have an integrated actuator rated at 40 in-lbs. Connection to the damper shall be with a v-bolt clamp, accepting 3/8" to 5/8" damper shaft sizes. The actuator shall travel 0 to 95 degrees with adjustable end stops at 45 and 60 degrees of rotation. The actuator shall have an integrated gear disengagement mechanism.

G. The controller shall have an integrated transducer pressure sensor for airflow measurement. The sensor shall have a range of 0-2"wc, consuming and accurate to 4.5% of reading or 0.0008"wc, whichever is greater.

H. The controller shall have a Dedicated Room Sensor port for direct interface to a Digital Display Room Sensor or Discrete Room Sensor. The controller shall have the ability of detecting if a sensor has been connected to the port and identify its type, either digital display or discrete. Sensors shall be hot-swappable without powering down the controller. Sensor information via the ports shall not consume any of the devices terminated input capacity.

I. The controller shall have screw terminal blocks that can accommodate wire sizes 14-22 AWG. Terminals shall be color coded: black terminals for power, green terminals for input and outputs, and grey terminals for twisted-shielded-pair communication.

J. The power supply for the controller shall be 24 volts AC (-15%, +20%) power. Voltage below the operating range of the system shall be considered an outage.

1.2 DIGITAL ROOM SENSOR

A. The Digital Display Room Sensor (thermostat) shall provide space condition measurements and indications, including temperature and local motion/occupancy (optional), and user setpoint adjustments.

B. The Digital Room Sensor shall connect directly to the controller and shall not utilize any of the hardware I/O points of the controller. The Digital Display Room Sensor shall be able to be located up to 75' from the controller.

C. The Digital Display Room Sensor shall provide a Temporary Network Interface jack, field accessible without uninstalling the sensor, for connection to the BACnet MS/TP communication trunk to which the devices connected. The Digital Display Room Sensor, the connected controller, and all other devices on the BACnet network shall be accessible through the temporary communication jack. Microprocessor based sensors whose port only allows communication with the controller to which it is connected shall not be acceptable.

D. The Digital Display Room Sensor shall have an integrated sensor for temperature measurement as standard and a second integrated sensor for motion/occupancy (optional).

E. User/Occupant setpoints may be adjusted via the Digital Display Room Sensor.

F. The Digital Display Room Sensor shall have pre-configured menus for all control sequences allowing access to communication and application parameters.

G. The Digital Display Room Sensor shall have two levels of password protection: One level to protect user setpoint adjustment, and one level to protect configuration menu parameters. Passwords shall be at least 4 digits in length.

Model 3001Q • Quiet Unit

1. Furnish and install **Nailor 3000Q Series Single Duct Variable Volume Quiet Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

2. The entire quiet terminal unit shall be designed and built as a single unit. The unit shall be provided with a primary variable air volume damper that controls the air quantity in response to a (DDC, electric, analog electronic or pneumatic) thermostat. The unit shall have a factory installed dissipative silencer and include all options such as electric or hot water heating coils and access doors. The space limitations shall be reviewed carefully to insure that all units will fit into the space allowed.

3. Unit casing shall be 22 ga. (.86) galvanized steel with round, flat oval or rectangular inlets with 5 1/2" (140) deep inlet duct collar for field connection. Outlets shall be rectangular and configured for slip and drive connections. Casing leakage downstream of the damper shall not exceed 1% @ 1" w.g. (250 Pa). High side casing leakage shall not exceed 2% @ 3" w.g. (746 Pa).

4. Damper assemblies of 16 ga. (1.63) galvanized steel shall be multiple opposed blade construction arranged to close at 45 degrees from full open to minimize air turbulence and provide near linear operation. Damper blades shall be fitted with flexible seals for tight closure and minimized sound generation. Damper blades shall be screwed through the shaft to insure that no slippage occurs. Blade shafts shall pivot in corrosion free self-lubricating bronze oilite bearings. In the fully closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3" w.g. (746 Pa) inlet static pressure as rated by ASHRAE Standard 130.

5. The terminal units shall be capable of operation as described herein with a minimum inlet static pressure that shall not exceed 0.30" w.g. (75 Pa) @ 2000 fpm (10.2 m/s) inlet velocity. (The sequence of operations should be described here, if not part of the temperature controls specifications.) Each unit shall be complete with factory mounted (DDC, electric, analog electronic or pneumatic) controls. Gauge tap ports shall be supplied in the piping between the flow pick up and the controller.

6. Each unit shall be constructed with single point electrical (and pneumatic) connections. All electrical components shall be ETL or UL listed or recognized and installed in accordance with the National Electrical Code. All electrical components shall be installed in a control box. The entire assembly shall be ETL listed and so labeled.

Single Duct Terminal Units • 3000Q Series

7. Each VAV section unit shall be internally lined with ¾" (19) dual density fiberglass insulation. Edges shall be sealed against airflow erosion. Units shall meet NFPA 90A and UL 181 standards.
8. All sound data shall be compiled in an independent laboratory and in accordance with the latest version of AHRI Standard 880 and ANSI/ASHRAE Standard 130.
9. Dissipative silencers shall contain a unit casing constructed of 22 ga. (.86) galvanized steel. Inlet and discharge shall be rectangular and configured for slip and drive connections. Each silencer shall be lined with fiberglass insulation, placed inside the top and bottom sides of the silencer, thereby eliminating the requirement for field wrapping with thermal insulation. The silencer baffles shall be filled with fiberglass absorption media and encapsulated by 22 ga. (.86) perforated coated steel baffles. The perforated metal baffles shall be rigidly fastened to the casing of the silencer. Units shall meet NFPA 90A and UL 181 standards.

OPTIONS

Electric Heat:

Model: 30REQ

Staged

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30REQ Single Duct Variable Volume Quiet Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.
10. **Single Duct Quiet Terminal Unit Staged Electric Heating Coils:**
 - a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.
 - b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 16.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 16.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz. Coils shall be available in one, two or three stages.
 - c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.
 - d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.
 - e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 48 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.
 - f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

- g. Electric heating coils shall be designed for operation with the DDC controller and control system.
- h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.
- i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.
- j. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Proportional Heat (SCR):

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30REQ Single Duct Variable Volume Quiet Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.
- b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz.
- c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.
- d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.
- e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.
10. **Single Duct VAV Quiet Terminal Unit Staged Electric Heating Coils:**
 - a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.
 - f. An electric heater shall be factory mounted and pre-wired as an integral package with the fan powered terminal unit. Heaters shall be sized as shown on the drawings. The entire assembly including the electric heater shall be ETL listed for zero clearance and so labeled and shall meet all requirements of the latest National Electrical Code, (CSA C22.2 No.236). The unit shall have a single point electrical and/or pneumatic connection (dual point electrical on 600V). Heater casing

Single Duct Terminal Units • 3000Q Series

Model 3001Q • Quiet Unit

OPTIONS (continued)

and panel shall be a minimum of 20 ga. (1.00) galvanized steel. Each heater shall be complete with automatic reset high limit thermal cut-outs, control voltage transformer as required, ground terminal, fan relay for interlocking the heater and fan and high grade nickel chrome alloy wire. Element wires shall be supported by ceramic isolators. Each heater shall be supplied with factory supplied and pre-wired branch circuit fusing as required by NEC and UL. Circuiting and fusing shall also be in accordance with the circuiting requirements as shown on the plans.

Additional accessories shall include (control transformer, circuit fusing, disconnect switch, pneumatic electric switches) for heater control. Heater shall be capable of providing proportional control of heater capacity from an input signal of 4 – 20 mA, 2 – 10 VDC or 0 – 10 VDC. The SCR controller shall provide a 1 – 24 VDC pulsed output to SSR(s) [solid state relay(s)] in proportion to zone heating demand. The SSR's shall switch with zero cross over to reduce system noise and thermal shock on heater coils.

g. Electric heating coils shall be designed for operation with the DDC controller and control system.

h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.

i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

j. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Proportional Heat with Discharge Temperature Control (DTC):

(Substitute the following paragraphs):

1. Furnish and install **Nailor Model 30REQ Single Duct Variable Volume Quiet Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

10. Single Duct Quiet Terminal Unit Staged Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

The SCR controller shall contain a discharge temperature sensor capable of limiting leaving air temperature to a user defined setpoint. The SCR controller shall pulse the coil to maintain zone demand while providing the set maximum discharge air temperature. Upon measuring a discharge air temperature above the user defined setpoint, the controller shall reduce heater capacity to maintain maximum allowable discharge air temperature. The discharge air temperature setpoint shall be adjustable from 80–100°F (27–149°C) by use of a controller mounted potentiometer.

g. Electric heating coils shall be designed for operation with the DDC controller and control system.

h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.

i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

j. Shop Drawings shall be submitted for review. Shop Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Hot Water Heating Coils:

Model: 30RWQ

(Substitute the following paragraphs):

10. Single Duct Quiet Terminal Device Hot Water Heating Coils

a. Terminal unit hot water heating coils shall be mounted on the discharge of the unit with slip and drive connections. Provide an access door or panel on the bottom of the silencer section of the terminal unit for servicing and cleaning the unit.

b. Hot water heating coils shall be constructed with copper tubes and aluminum plate fins. Coils shall have a maximum of 10 fins per inch. Supply and return connections shall be on the same end of the coil. Fins shall be bonded to the tubes by means of mechanical expansion of the tubes. Fins shall be at least .0045" (.11) thick.

c. Coils shall have galvanized steel casings on all sides no lighter than 20 ga. (1.00).

d. Tubes shall be ½" (13) O.D. and shall be spaced approximately 1 ¼" (32) apart and shall have a minimum wall thickness of 0.016" (.41). Hot water shall be equally distributed through all tubes by the use of header. Water velocity in the tubes shall not exceed five feet per second. The water pressure drop through the coil shall not exceed 10 feet. Heating coil face velocities shall not exceed the maximum face velocity indicated in the schedules on the Contract Documents.

Single Duct Terminal Units • 3000Q Series

Model 3001Q • Quiet Unit

OPTIONS (continued)

- e. Coils shall be tested by air pressure under water. Coils shall be tested at 350 psi (2,413 kPa) air static pressure.
- f. Control valves automatic vents and drains, if needed, shall be supplied and field installed by others.
- g. Coil ratings, calculations and selection data shall be in accordance with the applicable AHRI Standards and shall be submitted with the Shop Drawings.

Liner:

Steri-Liner

(Substitute the following paragraph:)

3. Unit casings shall be 20 ga. (1.00) galvanized steel. Unit shall be fully lined with non-porous, sealed liner which complies with NFPA 90A & 90B, ASTM E84, UL 723, UL 181 and ASTM G21 & G22. Installation shall be 1/2" (13) minimum thickness, 4 lb./cu. ft. (64 kg/m³) density with reinforced aluminum foil-scrim-kraft (FSK) facing. All cut edges shall be secured with steel angles or end caps to encapsulate edges and prevent erosion. Insulation shall be Nailor Steri-Liner or equal.

Fiber-Free Liner

(Substitute the following paragraph:)

3. Unit casings shall be 20 ga. (1.00) galvanized steel. Unit shall be fully lined with a non-porous closed cell elastomeric foam liner which complies with NFPA 90A & 90B, ASTM E84, UL 723 & UL 181. Installation shall be 3/8" (10) minimum thickness and secured to the interior of the terminal with mechanical fasteners. No fiberglass is permitted. Insulation shall be Nailor Fiber-Free Liner or equal.

EZvav Digital Controls

1.1 ASC VAV BACnet CONTROLLERS

- A. Digital VAV Controllers shall be responsible for monitoring and controlling directly connected VAV Terminals as required. Controllers shall include fully adjustable analog outputs and digital outputs as required utilizing a proportional plus integral control loop to control damper, electric heat and hot water coils for the purpose of maintaining user setpoints. Each controller shall be classified as a native BACnet device, conforming to the BACnet Advanced Specific Controllers (B-ASC) profile, ANSI/ASHRAE BACnet Standard 135.
- B. The VAV controller shall be available with integrated applications (based on model) for Single Duct, Dual Duct, and Fan Powered terminal units, including any of the following as required by the control sequence. For Single/Dual Duct terminals: Cooling Only, Cooling/Heating with Changeover and Morning Warm up. For Fan Powered terminals: Cooling with Reheat/Supplementary Heat, Heating coil operation may be with analog, floating or binary control as required.
- C. The controller shall be fully configurable via the Digital Display Sensor, including communication parameters (instance, MAC, baud) and application settings (K-factor, flow limits, box configuration, reheat or fan type, default user setpoints, etc.), without any specific PC-based software. VAV controllers shall not require the use of a personal computer and PC based software and/or any interface modules.
- D. The VAV controller shall be capable of being balanced from the Digital Room Sensor without any specific pc-based software.
- E. The controller shall have integrated MS/TP communications. The communication port shall have network protection bulbs and integrated end-of-line (EOL) terminations.

F. The controller shall have an integrated actuator rated at 40 in-lbs. Connection to the damper shall be with a v-bolt clamp, accepting 3/8(B-ASC)" to 5/8(B-ASC)" damper shaft sizes. The actuator shall travel 0 to 95 degrees with adjustable end stops at 45 and 60 degrees of rotation. The actuator shall have an integrated gear disengagement mechanism.

G. The controller shall have an integrated transducer pressure sensor for airflow measurement. The sensor shall have a range or 0-2(B-ASC)"wc, consuming and accurate to 4.5% of reading or 0.0008(B-ASC)"wc, whichever is greater.

H. The controller shall have a Dedicated Room Sensor port for direct interface to a Digital Display Room Sensor or Discrete Room Sensor. The controller shall have the ability of detecting if a sensor has been connected to the port and identify its type, either digital display or discrete. Sensors shall be hot-swappable without powering down the controller. Sensor information via the ports shall not consume any of the devices terminated input capacity.

I. The controller shall have screw terminal blocks that can accommodate wire sizes 14-22 AWG. Terminals shall be color coded: black terminals for power, green terminals for input and outputs, and grey terminals for twisted-shielded-pair communication.

J. The power supply for the controller shall be 24 volts AC (-15%, +20%) power. Voltage below the operating range of the system shall be considered an outage.

1.2 DIGITAL ROOM SENSOR

A. The Digital Display Room Sensor (thermostat) shall provide space condition measurements and indications, including temperature and local motion/occupancy (optional), and user setpoint adjustments.

B. The Digital Room Sensor shall connect directly to the controller and shall not utilize any of the hardware I/O points of the controller. The Digital Display Room Sensor shall be able to be located up to 75' from the controller.

C. The Digital Display Room Sensor shall provide a Temporary Network Interface jack, field accessible without uninstalling the sensor, for connection to the BACnet MS/TP communication trunk to which the devices connected. The Digital Display Room Sensor, the connected controller, and all other devices on the BACnet network shall be accessible through the temporary communication jack. Microprocessor based sensors whose port only allows communication with the controller to which it is connected shall not be acceptable.

D. The Digital Display Room Sensor shall have an integrated sensor for temperature measurement as standard and a second integrated sensor for motion/occupancy (optional).

E. User/Occupant setpoints may be adjusted via the Digital Display Room Sensor.

F. The Digital Display Room Sensor shall have pre-configured menus for all control sequences allowing access to communication and application parameters.

G. The Digital Display Room Sensor shall have two levels of password protection: One level to protect user setpoint adjustment, and one level to protect configuration menu parameters. Passwords shall be at least 4 digits in length.

Single Duct Terminal Units • 30HQ Series

Model 30HQ • Hospital Grade Unit

1. Furnish and install **Nailor 30HQ Series Single Duct Variable Volume Hospital Grade Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

2. The entire hospital grade terminal unit shall be designed and built as a single unit. The unit shall be provided with a primary variable air volume damper that controls the air quantity in response to a (DDC, electric, analog electronic or pneumatic) thermostat. The unit shall include a factory installed dissipative silencer and include all options such as electric or hot water heating coils and access doors. The space limitations shall be reviewed carefully to insure that all units will fit into the space allowed.

3. Unit casing shall be 22 ga. (0.86) galvanized steel with round or flat oval inlets with 5 1/2" (140) deep inlet duct collar for field connection. Outlets shall be rectangular and configured for slip and drive connections. Casing leakage downstream of the damper shall not exceed 1% @ 1" w.g. (250 Pa). High side casing leakage shall not exceed 2% @ 3" w.g. (746 Pa).

4. Damper assemblies of 16 ga. (1.63) galvanized steel shall be multiple opposed blade construction arranged to close at 45 degrees from full open to minimize air turbulence and provide near linear operation. Damper blades shall be fitted with flexible seals for tight closure and minimized sound generation. Damper blades shall be screwed through the shaft to insure that no slippage occurs. Blade shafts shall pivot in corrosion free self-lubricating bronze oilite bearings. In the fully closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3" w.g. (746 Pa) inlet static pressure as rated by ASHRAE Standard 130.

5. The terminal units shall be capable of operation as described herein with a minimum inlet static pressure that shall not exceed 0.28" w.g. (70 Pa) @ 2000 fpm (10.2 m/s) inlet velocity. (The sequence of operations should be described here, if not part of the temperature controls specifications.) Each unit shall be complete with factory mounted (DDC, electric, analog electronic or pneumatic) controls. Gauge tap ports shall be supplied in the piping between the flow pick up and the controller.

6. Each unit shall be constructed with single point electrical (and pneumatic) connections. All electrical components shall be ETL or UL listed or recognized and installed in accordance with the National Electrical Code. All electrical components shall be installed in a control box. The entire assembly shall be ETL listed and so labeled.

7. Each VAV section shall be internally lined with 13/16" (21) thick, 4 lb. /cu. ft. (64 Kg/m³) density fiberglass insulation with a reinforced aluminum FSK facing. Units shall meet NFPA 90A and UL 181 standards.

8. All sound data shall be compiled in an independent laboratory and in accordance with the latest version of AHRI Standard 880 and ANSI/ASHRAE Standard 130. All units shall be AHRI certified and bear the AHRI certification label.

9. Dissipative silencer sections shall contain a unit casing constructed of 22 ga. (.86) galvanized steel. Inlet and discharge shall be rectangular and configured for slip and drive connections. Each silencer shall be internally lined with 13/16" (21) thick, 4 lb. density fiberglass insulation with a reinforced aluminum FSK facing, placed inside the top and bottom sides of the silencer, thereby eliminating the requirement for field wrapping with thermal insulation. The silencer baffles shall be filled with fiberglass acoustical absorption media and encapsulated by 22 ga. (.86) perforated coated steel baffles. A mylar liner shall separate the fiberglass from the perforated metal baffle, with an acoustical spacer and isolate the fiberglass from the airstream. The perforated metal baffles shall be rigidly fastened to the casing of the silencer. Units shall meet NFPA 90A and UL 181 standards.

OPTIONS

Electric Heat:

Model: 30HQE

Staged

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30HQE Single Duct Variable Volume Hospital Grade Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

10. Single Duct Hospital Grade Terminal Unit Staged Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 16.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 16.5 kW shall be three phase, four wire, 208, 480 or 600 volt, 60 hertz. Coil shall be available in one, two or three stages.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 48 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

g. Electric heating coils shall be designed for operation with the DDC controller and control system.

h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.

i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

j. Shop Drawings shall be submitted for review. Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Single Duct Terminal Units • 30HQ Series

Model 30HQ • Hospital Grade Unit

OPTIONS (continued)

Proportional Heat (SCR)

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30HQE Single Duct Variable Volume Hospital Grade Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

10. Single Duct Hospital Grade Terminal Unit Staged Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 207, 480 or 600 volt, 60 hertz.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

g. Electric heating coils shall be designed for operation with the DDC controller and control system.

f. An electric heater shall be factory mounted and pre-wired as an integral package with the fan powered terminal unit. Heaters shall be sized as shown on the drawings. The entire assembly including the electric heater shall be ETL listed for zero clearance and so labeled and shall meet all requirements of the latest National Electrical Code, (CSA C22.2 No.236). The unit shall have a single point electrical and/or pneumatic connection (dual point electrical on 600V). Heater casing and panel shall be a minimum of 20 ga. (1.00) galvanized steel. Each heater shall be complete with automatic reset high limit thermal cut-outs, control voltage transformer as required, ground terminal, fan relay for interlocking the heater and fan and high grade nickel chrome alloy wire.

Element wires shall be supported by ceramic isolators. Each heater shall be supplied with factory supplied and pre-wired branch circuit fusing as required by NEC and UL. Circuiting and fusing shall also be in accordance with the circuiting requirements as shown on the plans.

Additional accessories shall include (control transformer, circuit fusing,

disconnect switch, pneumatic electric switches) for heater control. Heater shall be capable of providing proportional control of heater capacity from an input signal of 4 – 20 mA, 2 – 10 VDC or 0 – 10 VDC. The SCR controller shall provide a 1 – 24 VDC pulsed output to SSR(s) [solid state relay(s)] in proportion to zone heating demand. The SSR's shall switch with zero cross over to reduce system noise and thermal shock on heater coils.

h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.

i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

j. Shop Drawings shall be submitted for review. Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Proportional Heat with Discharge Temperature Control (DTC)

(Substitute the following paragraphs:)

1. Furnish and install **Nailor Model 30HQE Single Duct Variable Volume Hospital Grade Terminal Units** of the sizes and capabilities as indicated on the drawings. Unit shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Unit shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

10. Single Duct Hospital Grade Terminal Unit Staged Electric Heating Coils:

a. Electric heating coils shall consist of open coils of high grade nickel and chromium resistance wire or nichrome elements and insulated with ceramic insulators in galvanized steel brackets, supported in heavy gauge galvanized steel frames. Each unit employing an electric heating coil shall be constructed and installed in accordance with the requirements of the local authorities and shall be UL or ETL listed specifically with the heater as a component of the terminal unit device.

b. Coils shall have the capacities indicated in Contract Documents. Coils rated up through 15.5 kW shall be single phase, 347 volt, 60 hertz and coils larger than 15.5 kW shall be three phase, four wire, 207, 480 or 600 volt, 60 hertz.

c. Terminal bolts, nuts and washers shall be of corrosion resistant materials. Coils shall be constructed so the installation may be accomplished in accordance with the provisions of the National Electrical Code, for zero clearance. Coils shall be given a 2000 volt dielectric test at the factory.

d. Automatic reset thermal cutouts shall be furnished for primary protection with manually resettable limit switches in power circuits for secondary protection. Both devices shall be serviceable through terminal box without removing heating element from the terminal device. The air pressure safety cutout pickup probe shall be remotely mounted near the volume control damper for maximum fidelity.

e. Heating coils shall have a terminal box and cover, with quiet type built-in magnetic step controlled contactors for each circuit, branch circuit fusing for each branch circuit on heaters over 45 amps per the NEC and an air flow safety interlock switch for installation in the heater control enclosure. Provide a 120 or 24 VAC control power transformer with an integral or separately mounted primary and/or secondary overcurrent protection device in accordance with NEC requirements.

Single Duct Terminal Units • 30HQ Series

Model 30HQ • Hospital Grade Unit

OPTIONS (continued)

f. All wiring of built-in devices shall be brought to clearly marked terminal strips. A complete wiring diagram shall be permanently attached to the heating coil panel cover.

An electric heater shall be factory mounted and pre-wired as an integral package with the fan powered terminal unit. Heaters shall be sized as shown on the drawings. The entire assembly including the electric heater shall be ETL listed for zero clearance and so labeled and shall meet all requirements of the latest National Electrical Code, (CSA C22.2 No.236). The unit shall have a single point electrical and/or pneumatic connection (dual point electrical on 600V). Heater casing and panel shall be a minimum of 20 ga. (1.00) galvanized steel. Each heater shall be complete with automatic reset high limit thermal cut-outs, control voltage transformer as required, ground terminal, fan relay for interlocking the heater and fan and high grade nickel chrome alloy wire. Element wires shall be supported by ceramic isolators. Each heater shall be supplied with factory supplied and pre-wired branch circuit fusing as required by NEC and UL. Circuiting and fusing shall also be in accordance with the circuiting requirements as shown on the plans.

Additional accessories shall include (control transformer, circuit fusing, disconnect switch, pneumatic electric switches) for heater control.

The SCR controller shall contain a discharge temperature sensor capable of limiting leaving air temperature to a user defined setpoint. The SCR controller shall pulse the coil to maintain zone demand while providing the set maximum discharge air temperature. Upon measuring a discharge air temperature above the user defined setpoint, the controller shall reduce heater capacity to maintain maximum allowable discharge air temperature. The discharge air temperature setpoint shall be adjustable from 80 – 100°F (27 – 149°C) by use of a controller mounted potentiometer.

g. Electric heating coils shall be designed for operation with the DDC controller and control system.

h. Electric heating coils and the associated control panels shall be constructed as a component of the entire terminal unit and mounted in the discharge attenuator downstream of the terminal unit. The resulting unit, including the heater, the VAV damper and the dissipative silencer shall be no longer than 79" (2007) in length.

i. The manufacturer shall prove adequate even airflow over the electric heating coil under the full range of airflow scheduled (minimum to maximum) to prevent uneven heating of the electric coils. The terminal device shall be listed in accordance with UL 1995 as a composite assembly consisting of the VAV terminal device and the electric heating device.

j. Shop Drawings shall be submitted for review. Drawings shall indicate specifically the exact construction, materials, internal wiring, NEC working clearances, etc., of the terminal units and electric heating coils to be furnished under these Specifications.

Hot Water Heating Coils:

Model: 30HQW

(Substitute the following paragraphs:)

30HQW

1. Furnish and install **Nailor 30HQW Single Duct Variable Volume Hospital Grade Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with (DDC, analog electronic, pneumatic) controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

10. Single Duct Hospital Grade Terminal Device Hot Water Heating Coils

a. Terminal unit hot water heating coils shall be mounted on the

discharge of the unit with slip and drive connections. Provide an access door or panel on the bottom of the attenuator section of the terminal unit for servicing and cleaning the unit.

b. Hot water heating coils shall be constructed with copper tubes and aluminum plate fins. Coils shall have a maximum of 10 fins per inch. Supply and return connections shall be on the same end of the coil. Fins shall be bonded to the tubes by means of mechanical expansion of the tubes. Fins shall be at least .0045" (.11) thick.

c. Coils shall have galvanized steel casings on all sides no lighter than 22 ga. (1.00).

d. Tubes shall be ½" (13) O.D. and shall be spaced approximately 1 ¼" (32) apart and shall have a minimum wall thickness of 0.016" (.41). Hot water shall be equally distributed through all tubes by the use of orifices or header design. Water velocity in the tubes shall not exceed five feet per second. The water pressure drop through the coil shall not exceed 10 feet. Heating coil face velocities shall not exceed the maximum face velocity indicated in the schedules on the Contract Documents.

e. Coils shall be tested by air pressure under water. Coils shall be tested at 350 psi (2,413 kPa) air static pressure.

f. Coil ratings, calculations and selection data shall be in accordance with the applicable AHRI Standards and shall be submitted with the Shop Drawings.

EZvav Digital Controls

1.1 ASC VAV BACnet CONTROLLERS

A. Digital VAV Controllers shall be responsible for monitoring and controlling directly connected VAV Terminals as required. Controllers shall include fully adjustable analog outputs and digital outputs as required utilizing a proportional plus integral control loop to control damper, electric heat and hot water coils for the purpose of maintaining user setpoints. Each controller shall be classified as a native BACnet device, conforming to the BACnet Advanced Specific Controllers (B-ASC) profile, ANSI/ASHRAE BACnet Standard 135.

B. The VAV controller shall be available with integrated applications (based on model) for Single Duct, Dual Duct, and Fan Powered terminal units, including any of the following as required by the control sequence. For Single/Dual Duct terminals: Cooling Only, Cooling/Heating with Changeover and Morning Warm up. For Fan Powered terminals: Cooling with Reheat/Supplementary Heat, Heating coil operation may be with analog, floating or binary control as required.

C. The controller shall be fully configurable via the Digital Display Sensor, including communication parameters (instance, MAC, baud) and application settings (K-factor, flow limits, box configuration, reheat or fan type, default user setpoints, etc.), without any specific PC-based software. VAV controllers shall not require the use of a personal computer and PC based software and/or any interface modules.

D. The VAV controller shall be capable of being balanced from the Digital Room Sensor without any specific pc-based software.

E. The controller shall have integrated MS/TP communications. The communication port shall have network protection bulbs and integrated end-of-line (EOL) terminations.

F. The controller shall have an integrated actuator rated at 40 in-lbs. Connection to the damper shall be with a v-bolt clamp, accepting 3/8(B-ASC)" to 5/8(B-ASC)" damper shaft sizes. The actuator shall travel 0 to 95 degrees with adjustable end stops at 45 and 60 degrees of rotation. The actuator shall have an integrated gear disengagement mechanism.

G. The controller shall have an integrated transducer pressure sensor for airflow measurement. The sensor shall have a range or 0-2(B-ASC)"wc, consuming and accurate to 4.5% of reading or 0.0008(B-ASC)"wc, whichever is greater.

Single Duct Terminal Units

Model 30HQ • Hospital Grade Unit

OPTIONS (continued)

H. The controller shall have a Dedicated Room Sensor port for direct interface to a Digital Display Room Sensor or Discrete Room Sensor. The controller shall have the ability of detecting if a sensor has been connected to the port and identify its type, either digital display or discrete. Sensors shall be hot-swappable without powering down the controller. Sensor information via the ports shall not consume any of the devices terminated input capacity.

I. The controller shall have screw terminal blocks that can accommodate wire sizes 14-22 AWG. Terminals shall be color coded: black terminals for power, green terminals for input and outputs, and grey terminals for twisted-shielded-pair communication.

J. The power supply for the controller shall be 24 volts AC (-15%, +20%) power. Voltage below the operating range of the system shall be considered an outage.

1.2 DIGITAL ROOM SENSOR

A. The Digital Display Room Sensor (thermostat) shall provide space condition measurements and indications, including temperature and local motion/occupancy (optional), and user setpoint adjustments.

B. The Digital Room Sensor shall connect directly to the controller and shall not utilize any of the hardware I/O points of the controller. The Digital Display Room Sensor shall be able to be located up to 75' from the controller.

C. The Digital Display Room Sensor shall provide a Temporary Network Interface jack, field accessible without uninstalling the sensor, for connection to the BACnet MS/TP communication trunk to which the devices connected. The Digital Display Room Sensor, the connected controller, and all other devices on the BACnet network shall be accessible through the temporary communication jack. Microprocessor based sensors whose port only allows communication with the controller to which it is connected shall not be acceptable.

D. The Digital Display Room Sensor shall have an integrated sensor for temperature measurement as standard and a second integrated sensor for motion/occupancy (optional).

E. User/Occupant setpoints may be adjusted via the Digital Display Room Sensor.

F. The Digital Display Room Sensor shall have pre-configured menus for all control sequences allowing access to communication and application parameters.

G. The Digital Display Room Sensor shall have two levels of password protection: One level to protect user setpoint adjustment, and one level to protect configuration menu parameters. Passwords shall be at least 4 digits in length.

Model 30X • Exhaust • Basic Unit

1. Furnish and install **Nailor 30X Series Single Duct Variable Volume Exhaust Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with DDC, analog electronic or pneumatic or controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.

2. The entire exhaust terminal unit shall be designed and built as a single unit. The units shall be provided with a variable air volume damper that controls the air quantity in response to a control signal. The units shall also include all options such as attenuators and access doors. Exhaust units shall feature a venturi valve inlet with integrated flow sensor for optimized airflow performance and reduced pressure drop. The space limitations shall be reviewed carefully to insure that all units will fit into the space allowed.

3. Unit casing shall be 22 ga. (.86) galvanized steel with rectangular inlet and outlet connections, configured for slip and drive connections. Basic valve assembly shall not exceed 30" (762) in length. Casing leakage downstream of the damper shall not exceed 1% @ 1" w.g. (250 Pa). High side leakage shall not exceed 2% @ 3" w.g. (746 Pa).

4. Damper assemblies of 16 ga. (1.6) galvanized steel shall be multiple opposed blade construction arranged to close at 45 degrees from full open to minimize air turbulence and provide near linear operation. Damper blades shall be fitted with flexible seals for tight closure and minimized sound generation. Damper blades shall be screwed through the shaft to insure that no slippage occurs. Blade shafts shall pivot on corrosion free Celcon® bearings. In the fully closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3" w.g. (746 Pa) inlet static pressure as rated by ASHRAE Standard 130.

5. The terminal unit shall be capable of operation as described herein with a minimum inlet static pressure that shall not exceed 0.37" w.g. (92 Pa) at 2000 fpm (10.2 m/s) inlet velocity for unit sizes 4 through 16. (The sequence of operations should be described here, if not part of the temperature controls specifications.) Gauge tap ports shall be supplied in the piping between the flow pick up and the controller.

6. Each unit shall be constructed with single point electrical connections. All electrical components shall be ETL or UL listed or recognized and installed in accordance with the National Electrical Code. All electrical components shall be installed in a control box. The entire assembly shall be ETL listed and so labeled.

7. Each unit shall be internally lined with ¾" (19) dual density fiberglass insulation. Edges shall be sealed against airflow erosion. Units shall meet NFPA 90A and UL 181 standards.

8. All sound data shall be compiled in an independent laboratory and in accordance with the latest version of AHRI Standard 880 and ANSI/ASHRAE Standard 130. All units shall be AHRI certified and bear the AHRI certification label.

9. The unit shall be capable of being changed from Right Hand to Left Hand configuration by flipping the unit over. No controls, field adjustments, nor field re-assembly shall be required to accomplish this. The unit shall be listed by UL or ETL under UL 1995 to operate in either orientation.

OPTIONS

Attenuator:

(Add the following paragraph to 30X Series:)

10. Attenuator section shall be 36" (914) long and constructed of 22 ga. (.86) galvanized steel. Inlet and discharge shall be rectangular and configured for slip and drive connections. Each attenuator section shall be internally lined with ¾" (19) dual density fiberglass insulation. Edges shall be sealed against airflow erosion. Units shall meet NFPA 90A and UL 181 standards.

Single Duct Terminal Units

Model 30HQX • Hospital Grade • Dissipative Silencer

1. Furnish and install **Nailor Model 30HQX Single Duct Variable Volume Exhaust Terminal Units** of the sizes and capabilities as indicated on the drawings. Units shall be pressure independent with DDC controls. Units shall reset to any flow between minimum and the maximum cataloged airflow as allowed by the specific controller.
2. The entire terminal unit shall be designed and built as a single unit. The units shall be provided with a variable air volume damper that controls the air quantity in response to a control signal. The units shall also include dissipative silencers and access doors. Exhaust units shall feature a venturi valve inlet with integrated flow sensor for optimized airflow performance and reduced pressure drop. The space limitations shall be reviewed carefully to insure that all units will fit into the space allowed.
3. Unit casing shall be 22 ga. (0.86) galvanized steel with rectangular inlet and outlet connections, configured for slip and drive connections. Casing leakage downstream of the damper shall not exceed 1% @ 1" w.g. (250 Pa). High side leakage shall not exceed 2% @ 3" w.g. (746 Pa).
4. Damper assemblies of 16 ga. (1.61) galvanized steel shall be multiple opposed blade construction arranged to close at 45 degrees from full open to minimize air turbulence and provide near linear operation. Damper blades shall be fitted with flexible seals for tight closure and minimized sound generation. Damper blades shall be screwed through the shaft to insure that no slippage occurs. Blade shafts shall pivot on corrosion free Celcon® bearings. In the fully closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3" w.g. (746 Pa) inlet static pressure as rated by ASHRAE Standard 130.
5. The terminal unit shall be capable of operation as described herein with a minimum inlet static pressure that shall not exceed 0.40" w.g. (100 Pa) at 2000 fpm (10.2 m/s) inlet velocity for unit sizes 4 through 16. (The sequence of operations should be described here, if not part of the temperature controls specifications.) Gauge tap ports shall be supplied in the piping between the flow pick up and the controller.
6. Each unit shall be constructed with single point electrical connections. All electrical components shall be ETL or UL listed or recognized and installed in accordance with the National Electrical Code. All electrical components shall be installed in a control box. The entire assembly shall be ETL listed and so labeled.
7. Each section shall be internally lined with 13/16" (21) thick, 4 lb. density fiberglass insulation with a reinforced aluminum FSK facing. Units shall meet NFPA 90A and UL 181 standards.
8. All sound data shall be compiled in an independent laboratory and in accordance with the latest version of AHRI Standard 880 and ANSI/ASHRAE Standard 130. All units shall be AHRI certified and bear the AHRI certification label.
9. The unit shall be capable of being changed from Right Hand to Left Hand configuration by flipping the unit over. No controls, field adjustments, nor field re-assembly shall be required to accomplish this. The unit shall be listed by UL or ETL under UL 1995 to operate in either orientation.

10. Silencer sections shall contain a unit casing constructed of 22 ga. (.86) galvanized steel. Inlet and discharge shall be rectangular and configured for slip and drive connections. Each silencer section shall be internally lined with 13/16" (21) thick, 4 lb./cu. ft. (64 kg/m³) density fiberglass insulation with a reinforced aluminum FSK facing, placed inside the top and bottom sides of the silencer, thereby eliminating the requirement for field wrapping with thermal insulation. The silencer baffles shall be filled with fiberglass absorption media and encapsulated by 22 ga. (.86) perforated coated steel baffles. A mylar liner shall separate the fiberglass from the perforated baffle with an acoustical spacer and isolate the fiberglass from the airstream. The perforated metal baffles shall be rigidly fastened to the casing of the silencer. Units shall meet NFPA 90A and UL 181 standards.

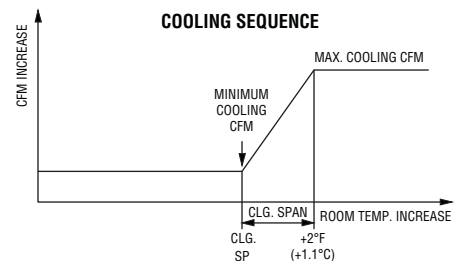
Standard Control Sequences • Single Duct Terminal Units

Nailor EZvav • Pressure Independent

Control Sequence N100

Models: 3001, 3001Q and 30HQ
Cooling Only

1. As space temperature rises above the cooling setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) above the cooling setpoint, maximum cooling airflow is maintained. On a decrease in space temperature, the controller reduces airflow. Below cooling setpoint, minimum cooling airflow is maintained.



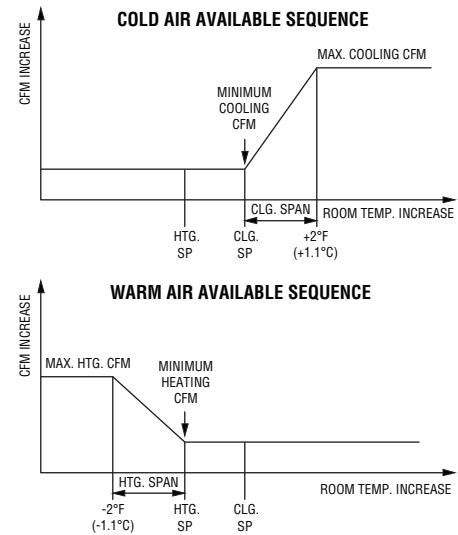
Control Sequence N101

Models: 3001, 3001Q and 30HQ
Cooling/Heating with Auto Change Over

1. Changeover/Morning Warm-up (Central AHU Heat/Cool): If supply air as measured by the discharge air temperature (DAT) sensor is below 72°F (22.2°C), cool air is said to be available. If supply air is above 76°F (24.4°C), warm air is said to be available.

2. Cool Air Available: As the space temperature rises above the cooling setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) above the cooling setpoint, maximum cooling airflow is maintained. On a decrease in space temperature, the controller reduces airflow. Below cooling setpoint, minimum cooling airflow is maintained.

3. Warm Air Available: As the space temperature drops below the heating setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) below the heating setpoint, maximum heating airflow is maintained. On an increase in space temperature, airflow heating decreases. As space temperature rises above the heating setpoint, minimum heating airflow is maintained.



Control Sequence N102

Models: 30RE, 30REQ, 30HQE, 30RW, 30RWQ and 30HQW
Cooling with Modulating Reheat

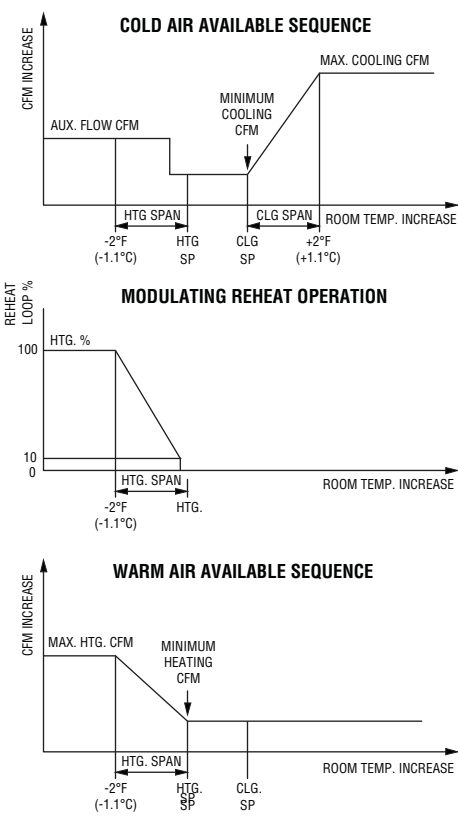
1. Changeover/Morning Warm-up (Central AHU Heat/Cool): If supply air as measured by the discharge air temperature (DAT) sensor is below 72°F (22.2°C), cool air is said to be available. If supply air is above 76°F (24.4°C), warm air is said to be available. Any time warm air is available, auxiliary heat is locked out.

2. Cool Air Available: As the space temperature rises above the cooling setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) above the cooling setpoint, maximum cooling airflow is maintained. On a decrease in space temperature, the controller reduces airflow. From cooling setpoint to heating setpoint, minimum cooling airflow is maintained. If the temperature drops further and reheat is required, the auxiliary flow rate is maintained.

3. Reheat: As the space temperature drops below the heating setpoint, the heating output modulates open. As the space temperature rises toward the heating setpoint, the heating output modulates closed. If the heating loop is less than 10%, the heating output remains at 0%.

4. If DAT Discharge Air Temperature limiting is enabled and a DAT sensor is detected, the discharge air reheat setpoint is determined based on the heating loop. The discharge temperature is limited to 15°F (8.3°C) above space temperature up to a maximum of 90°F (32.2°C).

5. Warm Air Available: As the space temperature drops below the heating setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) below the heating setpoint, maximum heating airflow is maintained. On an increase in space temperature, airflow decreases. As space temperature rises above the heating setpoint, minimum heating airflow is maintained.



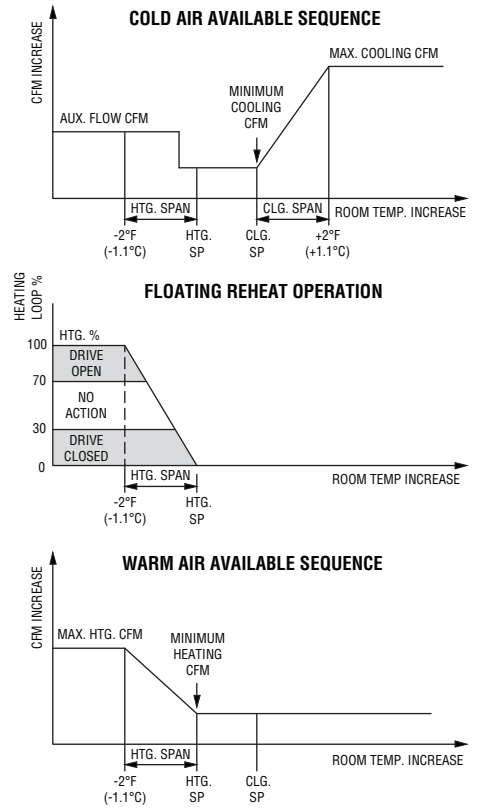
Standard Control Sequences • Single Duct Terminal Units

Nailor EZvav • Pressure Independent

Control Sequence N103

Models: 30RW, 30RWQ and 30HQW
Cooling with Floating Reheat

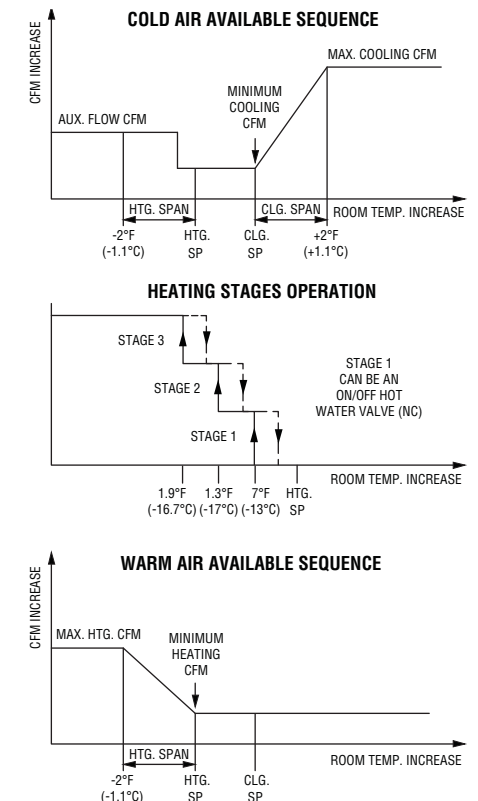
1. Changeover/Morning Warm-up (Central AHU Heat/Cool): If supply air as measured by the discharge air temperature (DAT) sensor is below 72°F (22.2°C), cool air is said to be available. If supply air is above 76°F (24.4°C), warm air is said to be available. Any time warm air is available, auxiliary heat is locked out.
2. Cool Air Available: As the space temperature rises above the cooling setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) above the cooling setpoint, maximum cooling airflow is maintained. On a decrease in space temperature, the controller reduces airflow. From cooling setpoint to heating setpoint, minimum cooling airflow is maintained. If the temperature drops further and reheat is required, the auxiliary flow rate is maintained.
3. Reheat: As the space temperature drops below the heating setpoint (heating loop is greater than 70%), the valve is driven open. As the space temperature rises back toward the heating setpoint, (heating loop is less than 30%), the valve is driven closed. If the loop is in between, there is no valve action.
4. If DAT Discharge Air Temperature limiting is enabled and a DAT sensor is detected, the discharge air reheat setpoint is determined based on the heating loop. The discharge temperature is limited to 15°F (8.3°C) above space temperature up to a maximum of 90°F (32.2°C).
5. Warm Air Available: As the space temperature drops below the heating setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) below the heating setpoint, maximum heating airflow is maintained. On an increase in space temperature, airflow decreases. As space temperature rises above the heating setpoint, minimum heating airflow is maintained.



Control Sequence N104

Models: 30RE, 30REQ and 30HQE, 30RW, 30RWQ and 30HQW
Cooling with Binary Reheat (Staged Electric On/Off Hot Water)

1. Changeover/Morning Warm-up (Central AHU Heat/Cool): If supply air as measured by the discharge air temperature (DAT) sensor is below 72°F (22.2°C), cool air is said to be available. If supply air is above 76°F (24.4°C), warm air is said to be available. Any time warm air is available, auxiliary heat is locked out.
 2. Cool Air Available: As the space temperature rises above the cooling setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) above the cooling setpoint, maximum cooling airflow is maintained. On a decrease in space temperature, the controller reduces airflow. From cooling setpoint to heating setpoint, minimum cooling airflow is maintained. If the temperature drops further and reheat is required, the auxiliary flow rate is maintained.
 3. Reheat: As the space temperature drops below the heating setpoint, up to 3 stages of electric reheat are energized respectively. As the space temperature rises back toward the heating setpoint, heating stages 3, 2 and 1 turn off respectively (Alternatively, an on/off two position spring return hot water valve can be controlled).
 4. Warm Air Available: As the space temperature drops below the heating setpoint, the controller increases airflow. At a space temperature of 2°F (1.1°C) below the heating setpoint, maximum heating airflow is maintained. On an increase in space temperature, airflow decreases. As space temperature rises above the heating setpoint, minimum heating airflow is maintained.
- Note: **DO NOT** enable the DAT Discharge Air Temperature limiting feature for binary staged or on/off reheat as short cycling will occur.



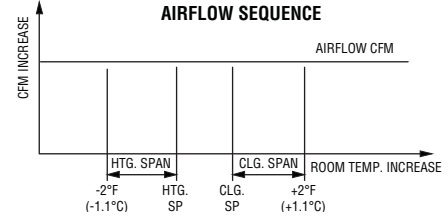
Standard Control Sequences • Single Duct Terminal Units

Nailor EZvav • Pressure Independent

Control Sequence N110

Models: 3001, 3001Q and 30HQ
Cooling Only, Constant Volume

1. Airflow setpoint is maintained.



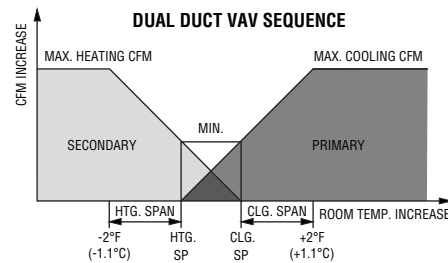
Standard Control Sequences • Dual Duct Terminal Units

Nailor EZvav • Pressure Independent

Control Sequence N200

Models: 3230 and 3240
Variable Volume

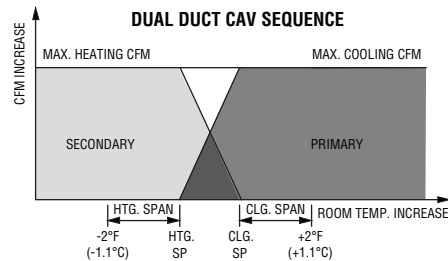
1. As the space temperature rises above the cooling setpoint, the primary airflow is modulated from the cooling minimum flow to the cooling maximum flow.
2. As the space temperature falls below the heating setpoint, the secondary airflow is modulated from the heating minimum flow to the heating maximum flow.
3. Between the heating and cooling setpoints, both the primary airflow and secondary airflow are modulated to maintain the dual mixing minimum.



Control Sequence N201

Models: 3230 and 3240
Constant Volume

1. As the space temperature rises above the cooling setpoint, the primary airflow is modulated from the cooling minimum flow to the cooling maximum flow.
2. As the space temperature falls below the heating setpoint, the secondary airflow is modulated from the heating minimum flow to the heating maximum flow.
3. Between the heating and cooling setpoints, both the primary airflow and secondary airflow are modulated to maintain the dual mixing minimum.



Standard Control Sequences • Single Duct Terminal Units

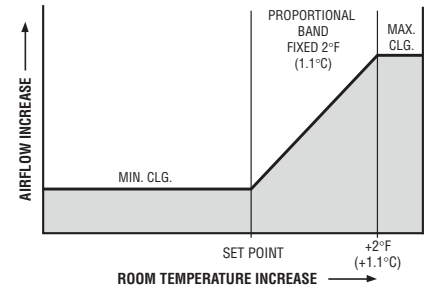
Analog Electronic • Pressure Independent

Control Sequence 1 EL

Cooling Only

The operating sequence for a cooling application is as follows:

1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.

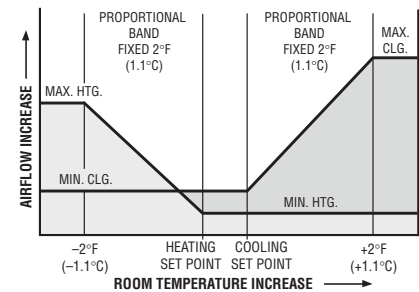


Control Sequence 3 EL

Cooling/Heating with Auto – Changeover

The heating/cooling thermostat features separate temperature set points and separate min./max. velocity limits for heating and cooling operation. The automatic changeover relay energizes either the heating or cooling mode of the thermostat in response to the duct temperature. The operating sequence is as follows:

1. At a duct temperature above 77°F (25°C), the heating side of the thermostat is energized.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) below thermostat heating set point, the maximum airflow is maintained at a preselected setting on a rise in space temperature, the thermostat regulates the controller/actuator to decrease the airflow. At a space temperature above thermostat heating set point, the minimum airflow is maintained at a preselected setting.
3. At a duct temperature below 77°F (25°C), the cooling side of the thermostat is energized.
4. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat cooling set point, the maximum airflow is maintained at a preselected setting. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce the airflow. At thermostat cooling set point, the minimum airflow is maintained at a preselected setting.
5. During both the heating and cooling cycle, airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.

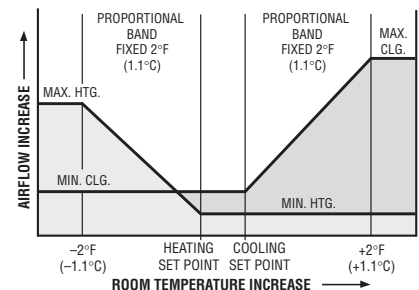


Control Sequence 4 EL

Cooling with Morning Warm-Up

The operating sequence is as follows:

1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.
4. When duct airflow temperature is above 77°F (25°C) (warm-up cycle), the inlet sensor switches a relay module and the actuator will drive the damper fully open for unrestricted maximum airflow.



Standard Control Sequences • Single Duct Terminal Units

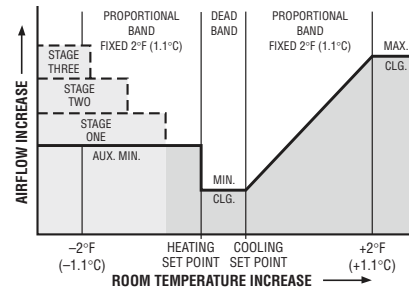
Analog Electronic • Pressure Independent

Control Sequence 5 EL

Cooling with Electric Reheat and Auxiliary Minimum Flow

The reheat thermostat features a separate temperature set point and a separate auxiliary flow limit for reheat control. The reheat relay energizes up to three stages of electric reheat in response to the thermostat. The operating sequence for a reheat application is as follows:

1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce the airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. On a further decrease in space temperature the heating side of the thermostat is activated, automatically initiating the auxiliary flow limit. Airflow is maintained at the preselected auxiliary setting.
4. Up to three stages of reheat are energized in sequence in response to the thermostat. The first stage is energized 0.7°F (0.4°C) below the heating set point. The optional second and third stage are energized at 1.3°F and 1.9°F (0.7°C and 1.1°C) below heating, respectively.
5. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.



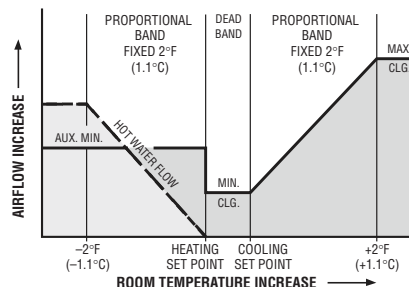
Control Sequence 8 EL

Cooling with Proportional Hot Water Reheat and Auxiliary Minimum Flow

The cooling/reheat thermostat features separate temperature set points and an auxiliary flow limit for desired airflow across the reheat coil. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.

The sequence of operation is as follows:

1. As the room temperature increases, the room thermostat modulates the cold airflow from the minimum to the maximum setting. At 2°F (1.1°C) above cooling set point, maximum airflow is maintained. On a decrease in room temperature, the damper modulates to the minimum position.
2. On a decrease in room temperature below heating set point, the heating side of the thermostat is activated, automatically indexing the auxiliary minimum setting and the proportional hot water reheat valve (0 – 10 Vdc, by others) begins to modulate open.
3. At a room temperature of 2°F (1.1°C) below the thermostat heating set point, the hot water valve is fully open.
4. On an increase in room temperature, the reverse sequence occurs.



The following additional control sequences are also available

(Contact your Nailor representative for further information):

- 6 EL • Cooling With Electric Reheat Plus Morning Warm-up.
- 7 EL • Cooling With On/Off Hot Water Reheat and Auxiliary Minimum Flow (24 VAC N.C. valve, by others).
- 9 EL • Cooling With On/Off Auxiliary Heat (Perimeter Radiation).
- 10 EL • Constant Volume Operation.

Standard Control Sequences • Single Duct Terminal Units

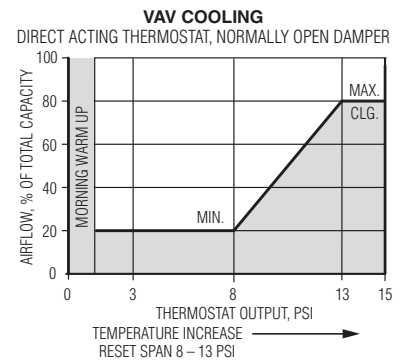
Pneumatic • Pressure Independent • Nailor 3000 Controller

The sequences illustrated feature the Nailor 3000 controller and a constant 5 psi reset span which does not vary with minimum and maximum settings. For a more detailed explanation of control options and terminology, refer to the engineering section in the back of this catalog.

Control Sequence 1P3

Direct Acting, Normally Open

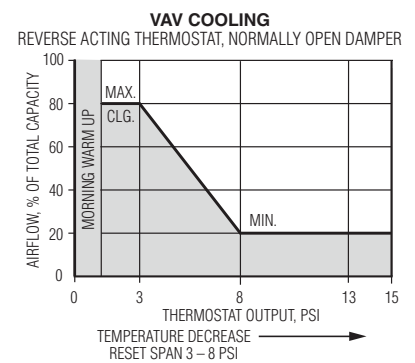
- When main control air is off, damper is fully open. Morning warm-up setting (if required) with warm air from system supplied at full flow rate.
- Main control air on – controller is activated. Begins modulating cold airflow on thermostat demand.
- Increase in room temperature increases thermostat output pressure (thus increasing airflow).
- Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which will increase airflow. At 13 psi and above, preset maximum airflow is maintained.
- If main control air fails, damper fails open.



Control Sequence 2P3

Reverse Acting, Normally Open

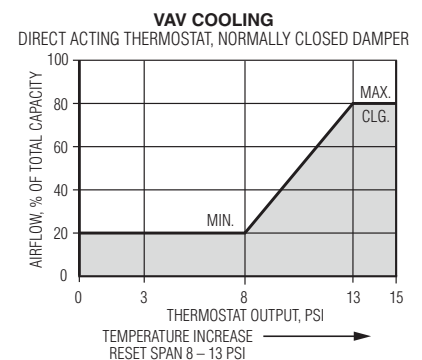
- When main control air is off, damper is fully open. Morning warm-up setting available if required.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat output.
- Decrease in room temperature increases thermostat output pressure (thus decreasing airflow).
- Maximum airflow is maintained between 0 and 3 psi thermostat signal.
- Further decrease in room temperature will increase thermostat signal from 3 to 8 psi which will decrease airflow to room. At 8 psi and above, minimum airflow is maintained.
- If main control air fails, damper fails open.



Control Sequence 3P3

Direct Acting, Normally Closed

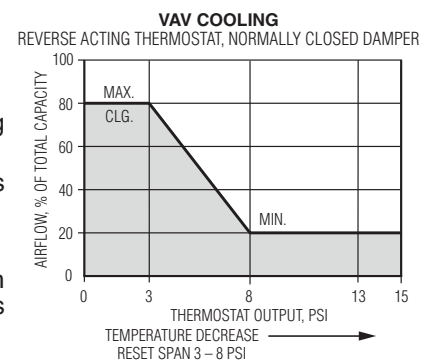
- When main control air is off, damper is closed.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat demand.
- Increase in room temperature increases thermostat output pressure (thus increasing airflow).
- Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which in turn increases airflow to room. At 13 psi and above, preset maximum airflow is maintained.
- If main control air fails, damper fails closed.



Control Sequence 4P3

Reverse Acting, Normally Closed

- When main control air is off, damper is closed.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat demand.
- Decrease in room temperature increases thermostat output pressure (thus decreasing airflow).
- Maximum airflow is maintained between 0 and 3 psi thermostat signal.
- Further decrease in room temperature will increase thermostat output pressure from 3 to 8 psi which will decrease airflow to room. At 8 psi and above, minimum airflow is maintained.
- If main control air fails, damper fails closed.



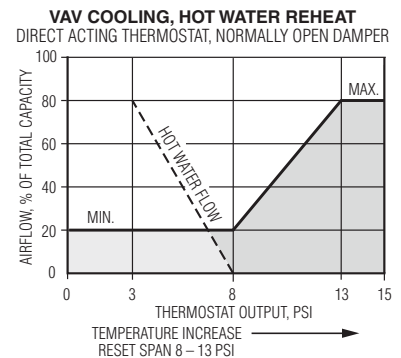
Standard Control Sequences • Single Duct Terminal Units Pneumatic • Pressure Independent • Nailor 3000 Controller

Control Sequence 1P3

D.A.N.O. - Hot Water Reheat N.O.

- When main control air is off, damper is fully open.
- Main control air on – controller is activated and begins modulating on thermostat demand.
- Increase in room temperature modulates hot water valve towards closed position (at 8 psi). Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which will increase airflow to maximum cooling.
- If main control air fails, damper fails open and hot water valve fails open.

Hot water reheat coils may also be sequenced with 2P3, 3P3 and 4P3.

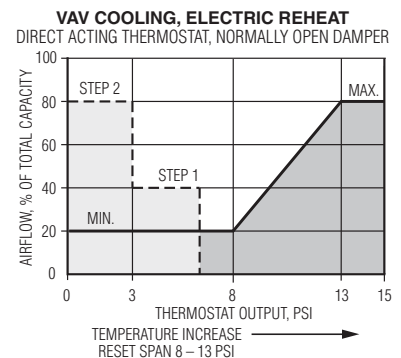


Control Sequence 1P3

D.A.N.O. - Electric Reheat N.C.

- When main control air is off, damper is fully open.
- Main control air on – controller is activated and begins modulating on thermostat demand.
- Increase in room temperature de-energizes the electric reheat coil one step at a time. Minimum airflow is maintained between 0 and 8 psi thermostat signal. At 8 psi, electric reheat is off.
- Further increase in room temperature will increase thermostat output signal from 8 to 13 psi which will increase airflow to maximum cooling.
- If main control air fails, damper fails open and P.E. switch for electric heater is closed (energized).

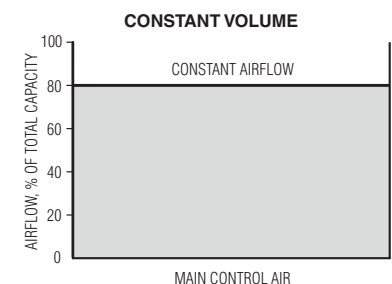
Electric reheat coils may also be sequenced with 2P3, 3P3 and 4P3.



Control Sequence 7P3

C.V.N.C.

- When main control air is off, damper is closed.
- Main control air on – controller maintains preset constant airflow regardless of duct pressure or room temperature.
- A room thermostat is not used.
- If main control air fails, damper fails closed.
- A normally open damper assembly is optional.



Control Sequence 8P3

C.V. - Hot Water Reheat N.O.

- When main air is off, damper is open.
- Main control air is on – controller maintains preset constant airflow regardless of duct pressure or room temperature.
- As room temperature increases, a room thermostat modulates the hot water valve towards the closed position, or opens it on temperature drop.
- If main control air fails, damper fails open and hot water valve fails open.

