

Rittling Induction Unit

Installation, Operations and Maintenance



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IMPORTANT: Submittal documentation, specific to each project, supersedes the general guidelines contained within this manual.

Water control models

Nine models are available in low profile wall hung, wall hung and ceiling mounted types. Each model has 4 lengths and 5 nozzle arrangements to meet the desired air flow.

The vertical units are best suited for under the window applications to counteract downdrafts during the heating season. Horizontal units are the best choice where the use of full length draperies is desirable and heating requirements are not too severe.

Ceiling models



Model HC: Horizontal ceiling 2-pipe system



Model H4C: Horizontal ceiling 4-pipe system

Wall models

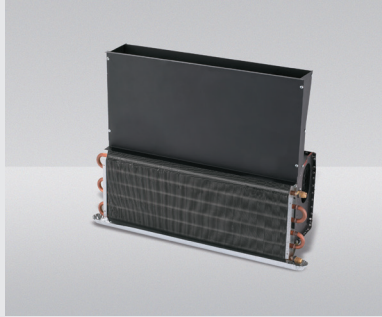


Model VL: Vertical wall with low profile 2-pipe system



Model V4L: Vertical wall low profile 4-pipe system

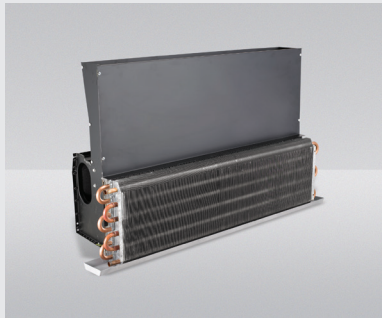
Wall models



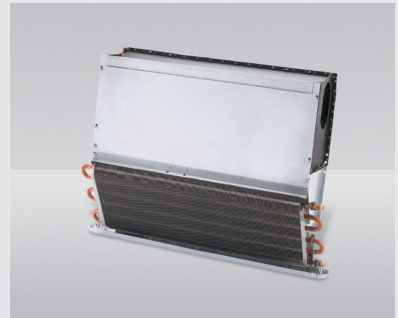
Model VH: Vertical wall with heat recovery stack 2-pipe system



Model V2H: Vertical wall with heat recovery stack high capacity coil 2-pipe system



Model V4H: Vertical wall with heat recovery stack 4-pipe system



Model VW: Vertical wall 2-pipe system



Model V4W: Vertical wall 4-pipe system

Performance Data

H4C: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20'	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1383 (0.89)																			
20	432	1820 (1.59)	1872 (0.94)			1888 (0.81)															
25	540	2251 (2.48)	2316 (1.47)	2358 (0.97)		2199 (1.26)	2402 (0.74)														
30	648	2678 (3.57)	2756 (2.11)	2806 (1.39)		2490 (1.82)	2720 (1.07)	2904 (0.71)		2375 (0.89)											
35	756		3192 (2.88)	3250 (1.90)	3233 (1.10)	2766 (2.48)	3022 (1.46)	3227 (0.97)		2612 (1.21)	2884 (0.71)										
40	864		3625 (3.76)	3691 (2.48)	3672 (1.44)	3030 (3.24)	3310 (1.91)	3534 (1.26)	3746 (0.73)	2837 (1.58)	3131 (0.94)			2646 (0.92)							
45	972			4129 (3.14)	4108 (1.82)		3587 (2.42)	3830 (1.60)	4060 (0.93)	3050 (2.01)	3367 (1.19)	3627 (0.78)		2823 (1.17)	3200 (0.72)						
50	1080			4565 (3.88)	4542 (2.25)		3854 (2.99)	4116 (1.97)	4362 (1.14)	3255 (2.48)	3594 (1.46)	3870 (0.96)	4151 (0.56)	2991 (1.45)	3391 (0.89)				2852 (0.95)		
55	1188				4974 (2.72)		4113 (3.62)	4392 (2.39)	4655 (1.39)	3453 (3.57)	3811 (1.77)	4105 (1.17)	4403 (0.68)	3152 (1.75)	3573 (1.07)	3860 (0.68)			2995 (1.15)		
60	1296				5403 (3.24)			4661 (2.85)	4940 (1.65)	3643 (3.57)	4022 (1.39)	4331 (0.81)	4645 (2.09)	3307 (1.28)	3748 (0.81)	4049 (1.28)			3131 (1.36)	3545 (0.81)	
65	1405				5832 (3.80)			4923 (3.34)	5217 (1.94)		4225 (2.48)	4550 (1.63)	4881 (0.95)	3455 (2.45)	3917 (1.50)	4231 (0.95)			3263 (1.60)	3693 (0.95)	
70	1512							5178 (3.88)	5488 (2.25)		4423 (2.87)	4763 (1.90)	5109 (1.10)	3599 (2.84)	4079 (1.74)	4407 (1.11)			3389 (1.86)	3836 (1.10)	4215 (0.72)
75	1620								5753 (2.58)		4615 (3.30)	4971 (2.18)	5331 (1.26)	3738 (3.26)	4237 (2.00)	4578 (1.27)	5027 (0.75)	3511 (2.13)	3974 (1.26)	4366 (0.83)	
80	1730								6012 (2.94)		4803 (3.76)	5173 (2.48)	5548 (1.44)	3873 (3.71)	4390 (2.27)	4743 (1.45)	5209 (0.86)	3629 (2.43)	4108 (1.44)	4513 (0.95)	
85	1838								6265 (3.32)			5370 (2.80)	5759 (1.62)		4539 (2.57)	4904 (1.63)	5385 (0.87)	3743 (2.74)	4238 (1.62)	4656 (1.07)	
90	1942								6515 (3.72)			5563 (3.14)	5966 (1.82)		4684 (2.88)	5060 (1.83)	5557 (1.09)	3855 (3.08)	4364 (1.82)	4794 (1.20)	5279 (0.69)
95	2055											5751 (3.50)	6168 (2.03)		4825 (3.21)	5213 (2.04)	5725 (1.21)	3963 (3.43)	4486 (2.03)	4929 (1.34)	5427 (0.77)
100	2160											5936 (3.87)	6367 (2.25)		4963 (3.56)	5362 (2.26)	5888 (1.34)	4069 (3.80)	4606 (2.25)	5060 (1.48)	5572 (0.86)
105	2265												6561 (2.48)		5098 (3.92)	5508 (2.50)	6048 (1.48)		4722 (2.48)	5188 (1.63)	5713 (0.95)
110	2375												6752 (2.72)			5650 (2.74)	6205 (1.63)		4836 (2.72)	5313 (1.79)	5851 (1.04)
115	2482												6940 (2.97)			5790 (2.99)	6359 (1.78)		4948 (2.97)	5436 (1.96)	5986 (1.14)
120	2590												7125 (3.24)			5927 (3.26)	6509 (1.94)		5057 (3.24)	5556 (2.13)	6118 (1.24)
125	2700												7307 (3.51)			6061 (3.54)	6657 (2.10)		5164 (3.51)	5673 (2.32)	6247 (1.34)
130	2810												7486 (3.80)			6194 (3.83)	6802 (2.27)		5269 (3.80)	5788 (2.51)	6374 (1.45)
135	2918																6944 (2.45)			5901 (2.70)	6498 (1.57)
140	3022																7084 (2.64)			6012 (2.91)	6620 (1.69)
145	3130																7222 (2.83)			6121 (3.12)	6741 (1.81)
150	3240																7358 (3.03)			6229 (3.34)	6859 (1.94)
155	3350																7492 (3.23)			6334 (3.56)	6975 (2.07)
160	3460																7624 (3.44)			6438 (3.80)	7089 (2.20)
165	3565																7754 (3.66)				7202 (2.34)
170	3675																7882 (3.89)				7313 (2.49)

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula: (trm - tew)/25 x rating at 25 °F ΔT .
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- ΔT = trm - tew (trm = room temperature and tew = entering water temperature).
- All ratings include reduction in capacity for double coil (4-pipe).

Performance Data

HC: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20°	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1537 (0.89)																			
20	432	2022 (1.59)	2080 (0.94)	2098 (0.81)																	
25	540	2501 (2.48)	2573 (1.47)	2620 (0.97)	2443 (1.26)	2669 (0.74)															
30	648	2976 (3.57)	3062 (2.11)	3118 (1.39)	2767 (1.82)	3022 (1.07)	3227 (0.71)		2639 (0.89)												
35	756		3546 (2.88)	3611 (1.90)	3592 (1.10)	3074 (2.48)	3357 (1.46)	3585 (0.97)		2902 (1.21)	3204 (0.71)										
40	864		4028 (3.76)	4101 (2.48)	4080 (1.44)	3367 (3.24)	3678 (1.91)	3927 (1.26)	4163 (0.73)	3152 (1.58)	3479 (0.94)		2940 (0.92)								
45	972			4588 (3.14)	4564 (1.82)		3986 (2.42)	4256 (1.60)	4511 (0.93)	3389 (2.01)	3742 (1.19)	4030 (0.78)		3137 (1.17)	3555 (0.72)						
50	1080			5073 (3.88)	5046 (2.25)		4283 (2.99)	4573 (1.97)	4847 (1.14)	3617 (2.48)	3993 (1.46)	4300 (0.96)	4612 (0.56)	3324 (1.45)	3767 (0.89)			3169 (0.95)			
55	1188				5526 (2.72)		4570 (3.62)	4880 (2.39)	5173 (1.39)	3836 (3.00)	4235 (1.77)	4561 (1.17)	4892 (0.68)	3503 (1.75)	3970 (1.07)	4289 (0.68)		3328 (1.15)			
60	1296				6004 (3.24)			5179 (2.85)	5489 (1.65)	4048 (3.57)	4469 (1.39)	4812 (0.81)	5162 (2.09)	3674 (1.28)	4164 (0.81)	4499 (1.28)	4289 (0.81)	3479 (0.81)	3939 (0.81)		
65	1405							5470 (3.34)	5797 (1.94)		4695 (2.48)	5056 (1.63)	5423 (0.95)	3839 (2.45)	4352 (1.50)	4702 (0.95)		3625 (1.60)	4104 (0.95)		
70	1512								6098 (2.25)		4915 (2.87)	5293 (1.90)	5677 (1.10)	3999 (2.84)	4533 (1.74)	4897 (1.11)		3765 (1.86)	4263 (1.10)	4683 (0.72)	
75	1620								6392 (2.58)		5128 (3.30)	5523 (2.18)	5924 (1.26)	4154 (3.26)	4708 (2.00)	5086 (1.27)	5586 (0.75)	3901 (2.13)	4416 (1.26)	4852 (0.83)	
80	1730								6680 (2.94)		5337 (3.76)	5747 (2.48)	6164 (1.44)	4304 (3.71)	4878 (2.27)	5270 (1.45)	5788 (0.86)	4032 (2.43)	4564 (1.44)	5015 (0.95)	
85	1838								6962 (3.32)			5966 (2.80)	6399 (1.62)		5043 (2.57)	5449 (1.63)	5984 (0.97)	4159 (2.74)	4709 (1.62)	5173 (1.07)	
90	1942											6181 (3.14)	6629 (1.82)		5204 (2.88)	5622 (1.83)	6175 (1.09)	4283 (3.08)	4849 (1.82)	5327 (1.20)	5866 (0.69)
95	2055											6390 (3.50)	6854 (2.03)		5361 (3.21)	5792 (2.04)	6361 (1.21)	4403 (3.43)	4985 (2.03)	5476 (1.34)	6030 (0.77)
100	2160												7074 (2.25)		5514 (3.56)	5958 (2.26)	6543 (1.34)	4521 (3.80)	5118 (2.25)	5622 (1.48)	6191 (0.86)
105	2265												7290 (2.48)		5664 (3.92)	6120 (2.50)	6721 (1.48)		5247 (2.48)	5765 (1.63)	6348 (0.95)
110	2375												7503 (2.72)			6278 (2.74)	6895 (1.63)		5374 (2.72)	5904 (1.79)	6501 (1.04)
115	2482												7711 (2.97)			6433 (2.99)	7065 (1.78)		5498 (2.97)	6040 (1.96)	6651 (1.14)
120	2590												7917 (3.24)			6586 (3.26)	7232 (1.94)		5619 (3.24)	6173 (2.13)	6797 (1.24)
125	2700												8119 (3.51)			6735 (3.54)	7396 (2.10)		5738 (3.51)	6303 (2.32)	6941 (1.34)
130	2810																7558 (2.27)		5854 (3.80)	6431 (2.51)	7082 (1.45)
135	2918																7716 (2.45)			6557 (2.70)	7220 (1.57)
140	3022																7872 (2.64)			6680 (2.91)	7356 (1.69)
145	3130																8025 (2.83)			6802 (3.12)	7490 (1.81)
150	3240																8176 (3.03)			6921 (3.34)	7621 (1.94)
155	3350																8325 (3.23)			7038 (3.56)	7750 (2.07)
160	3460																8471 (3.44)			7154 (3.80)	7877 (2.20)
165	3565																			8002 (2.34)	
170	3675																			8126 (2.49)	

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula:
(trm - tew)/25 x rating at 25 °F ΔT .
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).

- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- ΔT = trm - tew (trm = room temperature and tew = entering water temperature).
- All ratings include reduction in capacity for double coil (4-pipe).

Performance Data

V2H: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20°	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	2131 (0.89)																			
20	432	2803 (1.59)	2884 (0.94)			2839 (0.81)															
25	540	3467 (2.48)	3567 (1.47)	3632 (0.97)		3306 (1.26)	3611 (0.74)														
30	648	4125 (3.57)	4244 (2.11)	4321 (1.39)		3744 (1.82)	4089 (1.07)	4367 (0.71)		3484 (0.89)											
35	756		4915 (2.88)	5005 (1.90)	4979 (1.10)	4159 (2.48)	4543 (1.46)	4851 (0.97)		3831 (1.21)	4230 (0.71)										
40	864		5582 (3.76)	5684 (2.48)	5655 (1.44)	4556 (3.24)	4976 (1.91)	5314 (1.26)	5632 (0.73)	4160 (1.58)	4593 (0.94)			3784 (0.92)							
45	972			6359 (3.14)	6326 (1.82)		5393 (2.42)	5758 (1.60)	6103 (0.93)	4474 (2.01)	4939 (1.19)	5319 (0.78)		4037 (1.17)	4576 (0.72)						
50	1080			7031 (3.88)	6995 (2.25)		5795 (2.99)	6188 (1.97)	6558 (1.14)	4775 (2.48)	5271 (1.46)	5677 (0.96)	6088 (0.56)	4278 (1.45)	4849 (0.89)			3974 (0.95)			
55	1188				7660 (2.72)		6184 (3.62)	6603 (2.39)	6999 (1.39)	5064 (3.00)	5590 (1.77)	6021 (1.17)	6457 (0.68)	4508 (1.75)	5109 (1.07)	5520 (0.68)		4173 (1.15)			
60	1296				8332 (3.24)			7007 (2.85)	7427 (1.65)	5343 (3.57)	5899 (2.11)	6353 (1.39)	6813 (0.81)	4729 (2.09)	5360 (1.28)	5791 (0.81)		4363 (1.36)	4939 (0.81)		
65	1405				8981 (3.80)			7400 (3.34)	7844 (1.94)		6197 (2.48)	6674 (1.63)	7158 (0.95)	4941 (2.45)	5601 (1.50)	6051 (0.95)		4546 (1.60)	5146 (0.95)		
70	1512							7784 (3.88)	8251 (2.25)		6487 (2.87)	6987 (1.90)	7493 (1.10)	5147 (2.84)	5834 (1.74)	6303 (1.11)		4722 (1.86)	5345 (1.10)	5873 (0.72)	
75	1620								8648 (2.58)		6769 (3.30)	7290 (2.18)	7819 (1.26)	5346 (3.26)	6059 (2.00)	6546 (1.27)	7189 (0.75)	4892 (2.13)	5538 (1.26)	6084 (0.83)	
80	1730								9038 (2.94)		7045 (3.76)	7587 (2.48)	8137 (1.44)	5539 (3.71)	6278 (2.27)	6783 (1.45)	7449 (0.86)	5056 (2.43)	5724 (1.44)	6289 (0.95)	
85	1838								9419 (3.32)			7876 (2.80)	8447 (1.62)		6491 (2.57)	7012 (1.63)	7701 (0.97)	5216 (2.74)	5905 (1.62)	6487 (1.07)	
90	1942								9794 (3.71)			8159 (3.14)	8750 (1.82)		6698 (2.88)	7236 (1.83)	7947 (1.09)	6080 (3.08)	6680 (1.82)	7356 (1.20)	
95	2055											8435 (3.50)	9047 (2.03)		6900 (3.21)	7455 (2.04)	8187 (1.21)	6251 (3.43)	6868 (2.03)	7562 (1.34)	
100	2160											8707 (3.87)	9338 (2.25)		7097 (3.56)	7668 (2.26)	8421 (1.34)	5669 (3.80)	7050 (2.25)	7764 (0.86)	
105	2265												9624 (2.48)		7290 (3.92)	7876 (2.50)	8649 (1.48)		6580 (2.48)	7960 (0.95)	
110	2375												9904 (2.72)			8080 (2.74)	8873 (1.63)		6739 (2.72)	8152 (1.79)	
115	2482												10179 (2.97)			8280 (2.99)	9093 (1.78)		6874 (2.97)	8340 (1.96)	
120	2590												10450 (3.24)			8476 (3.26)	9308 (1.94)		7046 (3.24)	8524 (1.24)	
125	2700												10717 (3.51)			8668 (3.54)	9519 (2.10)		7195 (3.51)	8704 (1.34)	
130	2810												10979 (3.80)			8857 (3.83)	9727 (2.27)		7341 (3.80)	8881 (1.45)	
135	2918																9931 (2.45)		8223 (2.70)	9054 (1.57)	
140	3022																10131 (2.64)		8377 (2.91)	9225 (1.69)	
145	3130																10328 (2.83)		8529 (3.12)	9392 (1.81)	
150	3240																10523 (3.03)		8679 (3.34)	9557 (1.94)	
155	3350																10714 (3.23)		8826 (3.56)	9719 (2.07)	
160	3460																10902 (3.44)		8971 (3.80)	9878 (2.20)	
165	3565																11088 (3.89)			10035 (2.34)	
170	3675																11272 (3.89)			10190 (2.49)	

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula: $(trm - tew)/25 \times \text{rating at } 25 \text{ °F } \Delta T$.
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- $\Delta T = trm - tew$ (trm = room temperature and tew = entering water temperature).

Performance Data

V4H: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20'	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1851 (0.89)																			
20	432	2436 (1.59)	2505 (0.94)			2375 (0.81)															
25	540	3012 (2.48)	3100 (1.47)	3156 (0.97)		2765 (1.26)	3021 (0.74)														
30	648	3584 (3.57)	3687 (2.11)	3754 (1.39)		3132 (1.82)	3421 (1.07)	3652 (0.71)		2803 (0.89)											
35	756		4270 (2.88)	4348 (1.90)	4326 (1.10)	3479 (2.48)	3800 (1.46)	4057 (0.97)		3083 (1.21)	3403 (0.71)										
40	864		4850 (3.76)	4939 (2.48)	4912 (1.44)	3811 (3.24)	4162 (1.91)	4445 (1.26)	4710 (0.73)	3347 (1.58)	3695 (0.94)			2900 (0.92)							
45	972			5525 (3.14)	5496 (1.82)		4510 (2.42)	4816 (1.60)	5104 (0.93)	3000 (2.01)	3974 (1.19)	4280 (0.78)		3094 (1.17)	3508 (0.72)						
50	1080			6108 (3.88)	6077 (2.25)		4847 (2.99)	5175 (1.97)	5485 (1.14)	3841 (2.48)	4241 (1.46)	4568 (0.96)	4899 (0.56)	3279 (1.45)	3716 (0.89)				2893 (0.95)		
55	1188				6654 (2.72)		5172 (3.62)	5523 (2.39)	5854 (1.39)	4074 (3.00)	4497 (1.77)	4894 (1.17)	5195 (0.68)	3455 (1.75)	3916 (1.07)	4231 (0.68)			3038 (1.15)		
60	1296				7230 (3.24)			5861 (2.85)	6212 (1.65)	4300 (3.57)	4746 (1.39)	5111 (0.81)	5482 (2.09)	3625 (1.28)	4108 (0.81)	4439 (1.28)			3177 (1.86)	3596 (0.81)	
65	1405				7812 (3.80)			6190 (3.34)	6562 (1.94)		4986 (2.48)	5370 (1.63)	5760 (0.95)	3788 (2.84)	4293 (1.50)	4591 (0.95)			3309 (1.60)	3746 (0.95)	
70	1512							6511 (3.88)	6901 (2.25)		5219 (2.87)	5621 (1.90)	6030 (1.10)	3945 (2.84)	4471 (1.74)	4831 (1.11)			3438 (1.86)	3899 (1.10)	
75	1620								7233 (2.58)		5446 (3.30)	5865 (2.18)	6291 (1.26)	4098 (3.26)	4645 (2.00)	5018 (1.27)	5511 (0.75)		3562 (2.13)	4032 (1.26)	
80	1730								7559 (2.94)		5667 (3.76)	6104 (2.48)	6547 (1.44)	4245 (3.71)	4812 (2.27)	5200 (1.27)	5710 (0.86)		3682 (2.43)	4167 (1.44)	
85	1838								7878 (3.32)			6336 (2.80)	6796 (1.62)		4975 (2.57)	5375 (1.63)	5903 (0.97)		3797 (2.74)	4300 (1.62)	
90	1942								8191 (3.72)			6564 (3.14)	7090 (1.82)		5134 (2.88)	5547 (1.83)	6092 (1.09)		3910 (3.08)	4426 (1.82)	
95	2055											6787 (3.50)	7280 (2.03)		5289 (3.21)	5714 (2.04)	6275 (1.21)		4020 (3.43)	4551 (2.03)	
100	2160											7005 (3.87)	7513 (2.25)		5440 (3.56)	5878 (2.26)	6454 (1.34)		4127 (3.80)	4672 (2.25)	
105	2265												7743 (2.48)		5588 (3.92)	6037 (2.50)	6630 (1.48)		4790 (2.48)	5262 (1.63)	5795 (0.95)
110	2375												7968 (2.72)			6194 (2.74)	6802 (1.63)		4906 (2.72)	5390 (1.79)	5935 (1.04)
115	2482												8190 (2.97)			6397 (2.99)	6970 (1.78)		5018 (2.97)	5514 (1.96)	6072 (1.14)
120	2590												8408 (3.24)			6497 (3.26)	7134 (1.94)		5130 (3.24)	5636 (2.13)	6205 (1.24)
125	2700												8622 (3.51)			6644 (3.54)	7296 (2.10)		5238 (3.51)	5757 (2.32)	6337 (1.34)
130	2810												8834 (3.80)			6790 (3.83)	7455 (2.27)		5344 (3.80)	5871 (2.51)	6465 (1.45)
135	2918																7612 (2.45)			5986 (2.70)	6592 (1.57)
140	3022																7765 (2.64)			6099 (2.91)	6716 (1.69)
145	3130																7917 (2.83)			6210 (3.12)	6837 (1.81)
150	3240																8065 (3.03)			6318 (3.34)	6957 (1.94)
155	3350																8212 (3.23)			6425 (3.56)	7076 (2.07)
160	3460																8357 (3.44)			6531 (3.80)	7191 (2.20)
165	3565																8500 (3.66)				7306 (2.34)
170	3675																8640 (3.89)				7418 (2.49)

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula:
(trm - tew)/25 x rating at 25 °F ΔT .
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).

- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- $\Delta T = trm - tew$ (trm = room temperature and tew = entering water temperature).
- All ratings include reduction in capacity for double coil (4-pipe system).

Performance Data

V4L: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20°	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1517 (0.89)																			
20	432	1996 (1.59)	2054 (0.94)			1979 (0.81)															
25	540	2469 (2.48)	2540 (1.47)	2587 (0.97)		2304 (1.26)	2516 (0.74)														
30	648	2938 (3.57)	3022 (2.11)	3079 (1.39)		2609 (1.82)	2850 (1.07)	3043 (0.71)		2375 (0.89)											
35	756		3500 (2.88)	3565 (1.90)	3546 (1.10)	2899 (2.48)	3166 (1.46)	3381 (0.97)		2612 (1.21)	2884 (0.71)										
40	864		3976 (3.76)	4048 (2.48)	4027 (1.44)	3175 (3.24)	3468 (1.91)	3703 (1.26)	3926 (0.73)	2837 (1.58)	3131 (0.94)				2523 (0.92)						
45	972			4529 (3.14)	4506 (2.25)		3758 (2.42)	4013 (1.60)	4254 (0.93)	3050 (2.01)	3368 (1.19)	3627 (0.78)			2691 (1.17)	3050 (0.72)					
50	1080			5007 (3.88)	4981 (2.25)		4039 (2.99)	4312 (1.97)	4571 (1.14)	3255 (2.48)	3594 (1.46)	3870 (0.96)	4151 (0.56)	2852 (1.45)	3231 (0.89)				2560 (0.95)		
55	1188				5454 (2.72)		4310 (3.62)	4602 (2.39)	4958 (1.39)	3453 (3.00)	3812 (1.77)	4105 (1.17)	4403 (0.68)	3005 (1.75)	3407 (1.07)	3680 (0.68)			2687 (1.15)		
60	1296				5926 (3.24)			4883 (2.85)	5176 (1.65)	3643 (3.57)	4022 (2.11)	4335 (1.39)	4646 (0.81)	3152 (2.09)	3573 (1.28)	3861 (0.81)			2809 (1.36)	3181 (0.81)	
65	1405				6396 (3.80)			5158 (3.34)	5467 (1.94)		4226 (2.48)	4559 (1.63)	4881 (0.95)	3294 (2.45)	3734 (1.50)	4034 (0.95)			2927 (1.60)	3314 (0.95)	
70	1512							5425 (3.88)	5750 (2.25)		4424 (2.87)	4769 (1.90)	5109 (1.10)	3431 (2.84)	3889 (1.74)	4202 (1.11)			3040 (1.86)	3442 (1.10)	3782 (0.72)
75	1620								6028 (2.58)		4615 (3.30)	4971 (2.18)	5332 (1.26)	3564 (3.26)	4039 (2.00)	4364 (1.27)	4793 (0.75)	3151 (2.13)	3566 (1.26)	3918 (0.83)	
80	1730								6300 (2.94)		4803 (3.76)	5172 (2.48)	5548 (1.44)	3693 (3.71)	4183 (2.27)	4522 (1.45)	4966 (0.86)	3256 (2.43)	3686 (1.44)	4050 (0.95)	
85	1838								6565 (3.32)			5370 (2.80)	5759 (1.62)		4327 (2.57)	4675 (1.63)	5134 (0.97)	3359 (2.74)	3803 (1.62)	4177 (1.07)	
90	1942								6826 (3.72)			5563 (3.14)	5966 (1.82)		4465 (2.88)	4824 (1.83)	5298 (1.09)	3459 (3.08)	3915 (1.82)	4301 (1.20)	4736 (0.69)
95	2055											5751 (3.50)	6169 (2.03)		4600 (3.21)	4970 (2.04)	5458 (1.21)	3556 (3.43)	4025 (2.03)	4423 (1.34)	4870 (0.77)
100	2160											5936 (3.87)	6367 (2.25)		4731 (3.56)	5112 (2.26)	5614 (1.34)	3651 (3.80)	4133 (2.25)	4540 (1.48)	5000 (0.86)
105	2265												6561 (2.48)		4860 (3.92)	5251 (2.50)	5766 (1.48)		4237 (2.48)	4655 (1.63)	5126 (0.95)
110	2375												6753 (2.72)			5387 (2.74)	5916 (1.63)		4340 (2.72)	4768 (1.79)	5250 (1.04)
115	2482												6940 (2.97)			5520 (2.99)	6061 (1.78)		4440 (2.97)	4877 (1.96)	5370 (1.14)
120	2590												7126 (3.24)			5651 (3.26)	6205 (1.94)		4537 (3.24)	4985 (2.13)	5489 (1.24)
125	2700												7307 (3.51)			5780 (3.54)	6346 (2.10)		4633 (3.51)	5090 (2.32)	5605 (1.34)
130	2810												7485 (3.80)			5905 (3.83)	6485 (2.27)		4727 (3.80)	5194 (2.51)	5719 (1.45)
135	2918																6620 (2.45)			5295 (2.70)	5830 (1.57)
140	3022																6754 (2.64)			5395 (2.91)	5940 (1.69)
145	3130																6885 (2.83)			5493 (3.12)	6048 (1.81)
150	3240																7075 (3.03)			5589 (3.34)	6154 (1.94)
155	3350																7142 (3.23)			5683 (3.56)	6259 (2.07)
160	3460																7268 (3.44)			5777 (3.80)	6361 (2.20)
165	3565																7392 (3.66)			5862 (2.34)	6462 (2.34)
170	3675																7515 (3.89)			5950 (2.49)	6560 (2.49)

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula:
(trm - tew)/25 x rating at 25 °F ΔT .
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- ΔT = trm - tew (trm = room temperature and tew = entering water temperature).
- All ratings include reduction in capacity for double coil (4-pipe).

Performance Data

V4W: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity @ 20°	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1383 (0.89)																			
20	432	1820 (1.59)	1872 (0.94)		1888 (0.81)																
25	540	2251 (2.48)	2316 (1.47)	2358 (0.97)	2199 (1.26)	2402 (0.74)															
30	648	2678 (3.57)	2756 (2.11)	2806 (1.39)	2490 (1.82)	2720 (1.07)	2904 (0.71)	2375 (0.89)													
35	756		3192 (2.88)	3250 (1.90)	3233 (1.10)	2766 (2.48)	3022 (1.46)	3227 (0.97)	2612 (1.21)	2884 (0.71)											
40	864		3625 (3.76)	3691 (2.48)	3672 (1.44)	3030 (3.24)	3310 (1.91)	3534 (1.26)	3746 (0.73)	2837 (1.58)	3131 (0.94)				2646 (0.92)						
45	972			4129 (3.14)	4108 (1.82)		3587 (2.42)	3830 (1.60)	4060 (0.93)	3050 (2.01)	3367 (1.19)	3627 (0.78)			2823 (1.17)	3200 (0.72)					
50	1080			4565 (3.88)	4542 (2.25)		3854 (2.99)	4116 (1.97)	4362 (1.14)	3255 (2.48)	3594 (1.46)	3870 (0.96)	4151 (0.56)	2991 (1.45)	3391 (0.89)				2852 (0.95)		
55	1188			4974 (2.72)			4113 (3.62)	4392 (2.39)	4655 (1.39)	3453 (3.00)	3811 (1.77)	4105 (1.17)	4403 (0.68)	3152 (1.75)	3573 (1.07)	3860 (0.68)			2995 (1.15)		
60	1296			5403 (3.24)			4661 (2.85)	4940 (1.65)	3643 (3.57)	4022 (2.11)	4331 (1.39)	4645 (0.81)	3307 (2.09)	3748 (1.28)	4049 (0.81)				3131 (1.36)	3545 (0.81)	
65	1405			5832 (3.80)			4923 (3.34)	5217 (1.94)		4225 (2.48)	4550 (1.63)	4881 (0.95)	3455 (2.45)	3917 (1.50)	4231 (0.95)				3263 (1.60)	3693 (0.95)	
70	1512						5178 (3.88)	5488 (2.25)		4423 (2.87)	4763 (1.90)	5109 (1.10)	3599 (2.84)	4079 (1.74)	4407 (1.11)				3389 (1.86)	3836 (1.10)	4215 (0.72)
75	1620						5753 (2.58)			4615 (3.30)	4971 (2.18)	5331 (1.26)	3738 (3.26)	4237 (2.00)	4578 (1.27)	5027 (0.75)	3511 (2.13)	3974 (1.26)	4366 (0.83)		
80	1730						6012 (2.94)			4803 (3.76)	5173 (2.48)	5548 (1.44)	3873 (3.71)	4390 (2.27)	4743 (1.45)	5209 (0.86)	3629 (2.43)	4108 (1.44)	4513 (0.95)		
85	1838						6265 (3.32)			5370 (2.80)	5759 (1.62)		4539 (2.57)	4904 (1.63)	5385 (0.97)	3743 (2.74)	4238 (1.62)	4656 (1.07)			
90	1942						6515 (3.72)			5563 (3.14)	5966 (1.82)		4684 (2.88)	5060 (1.83)	5557 (1.09)	3855 (3.08)	4364 (1.82)	4794 (1.20)	5279 (0.69)		
95	2055									5751 (3.50)	6168 (2.03)		4825 (3.21)	5213 (2.04)	5725 (1.21)	3963 (3.43)	4486 (2.03)	4929 (1.34)	5427 (0.77)		
100	2160									5936 (3.87)	6367 (2.25)		4963 (3.56)	5362 (2.26)	5888 (1.34)	4069 (3.80)	4606 (2.25)	5060 (1.48)	5572 (0.86)		
105	2265												6561 (2.48)	5098 (3.92)	5508 (2.50)	6048 (1.48)		4722 (2.48)	5188 (1.63)	5713 (0.95)	
110	2375												6752 (2.72)		5650 (2.74)	6205 (1.63)		4836 (2.72)	5313 (1.79)	5851 (1.04)	
115	2482												6940 (2.97)		5790 (2.99)	6359 (1.78)		4948 (2.97)	5436 (1.96)	5986 (1.14)	
120	2590												7125 (3.24)		5927 (3.26)	6509 (1.94)		5057 (3.24)	5556 (2.13)	6118 (1.24)	
125	2700												7307 (3.51)		6061 (3.54)	6657 (2.10)		5164 (3.51)	5673 (2.32)	6247 (1.34)	
130	2810												7486 (3.80)		6194 (3.83)	6802 (2.27)		5269 (3.80)	5788 (2.51)	6374 (1.45)	
135	2918																	5901 (2.70)	6498 (1.57)		
140	3022																	6012 (2.64)	6620 (1.69)		
145	3130																	6121 (2.83)	6741 (1.81)		
150	3240																	6229 (3.03)	6859 (1.94)		
155	3350																	6334 (3.23)	6975 (2.07)		
160	3460																	6438 (3.44)	7089 (3.80)		
165	3565																	6543 (3.66)	7202 (2.34)		
170	3675																	6648 (3.89)	7313 (2.49)		

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula: (trm - tew)/25 x rating at 25 °F ΔT.
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).

- The ratings above are based on 25 °F ΔT, 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- ΔT = trm - tew (trm = room temperature and tew = entering water temperature).
- All ratings include reduction in capacity for double coil (4-pipe system).

Performance Data

VH: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20°	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1969 (0.89)																			
20	432	2591 (1.59)	2665 (0.94)			2581 (0.81)															
25	540	3204 (2.48)	3297 (1.47)	3357 (0.97)		3005 (1.26)	3283 (0.74)														
30	648	3812 (2.11)	3922 (1.39)	3994 (1.39)		3404 (1.82)	3718 (1.07)	3970 (0.71)		3114 (0.89)											
35	756		4543 (2.88)	4626 (1.90)	4602 (1.10)	3781 (2.48)	4130 (1.46)	4410 (0.97)		3425 (1.21)	3781 (0.71)										
40	864		5159 (3.76)	5254 (2.48)	5226 (1.44)	4142 (3.24)	4524 (1.91)	4831 (1.26)	5120 (0.73)	3719 (1.58)	4106 (0.94)				3296 (0.92)						
45	972			5878 (3.14)	5847 (1.82)		4902 (2.42)	5235 (1.60)	5548 (0.93)	4000 (2.01)	4415 (1.19)	4755 (0.78)			3516 (1.17)	3986 (0.72)					
50	1080			6498 (3.88)	6465 (2.25)		5268 (2.99)	5625 (1.97)	5962 (1.14)	4268 (2.48)	4712 (1.46)	5075 (0.96)	5443 (0.56)	3726 (1.45)	4223 (0.89)				3404 (0.95)		
55	1188				7079 (2.72)		5622 (3.62)	6003 (2.39)	6363 (1.39)	4527 (3.00)	4997 (1.77)	5382 (1.17)	5772 (0.68)	3926 (1.75)	4450 (1.07)	4808 (0.68)			3574 (1.15)		
60	1296				7691 (3.24)			6370 (2.85)	6752 (1.65)	4777 (3.57)	5273 (2.11)	5679 (1.39)	6091 (0.81)	4119 (2.09)	4668 (1.28)	5044 (0.81)			3737 (1.36)	4230 (0.81)	
65	1405				8301 (3.80)			6728 (3.34)	7131 (1.94)		5540 (2.48)	5966 (1.63)	6399 (0.95)	4304 (2.45)	4878 (1.50)	5271 (0.95)			3893 (1.60)	4407 (0.95)	
70	1512							7077 (3.88)	7501 (2.25)		5799 (2.87)	6246 (1.90)	6699 (1.10)	4483 (2.84)	5081 (1.74)	5490 (1.11)			4044 (1.86)	4578 (1.10)	
75	1620								7862 (2.58)		6051 (3.30)	6517 (2.18)	6990 (1.26)	4656 (3.26)	5278 (2.00)	5702 (1.27)	6262 (0.75)	4190 (2.13)	4743 (1.26)		
80	1730								8216 (2.94)		6297 (2.48)	6782 (1.44)	7274 (3.71)	4824 (2.27)	5468 (1.45)	5908 (0.86)	6488 (2.43)	4331 (1.44)	4902 (1.44)		
85	1838								8563 (3.32)		7040 (2.80)	7551 (1.62)		5653 (2.57)	6108 (1.63)	6708 (0.97)	4467 (2.74)	5057 (1.62)			
90	1942								8903 (3.72)		7293 (3.14)	7822 (1.82)		5834 (2.88)	6303 (1.83)	6922 (1.09)	4600 (3.08)	5207 (1.82)			
95	2055										7541 (3.50)	8088 (2.03)		6010 (3.21)	6493 (2.04)	7131 (1.21)	4729 (3.43)	5354 (2.03)			
100	2160										7783 (3.87)	8348 (2.25)		6182 (3.56)	6679 (2.26)	7334 (1.34)	4855 (3.80)	5496 (2.25)			
105	2265												8603 (2.48)	6350 (3.92)	6860 (2.50)	7534 (1.48)		5635 (2.48)	6191 (1.63)	6818 (0.95)	
110	2375												8853 (2.72)		7038 (2.74)	7729 (1.63)		5771 (2.72)	6341 (1.79)	6982 (1.04)	
115	2482												9100 (2.97)		7212 (2.99)	7920 (1.78)		5904 (2.97)	6487 (1.96)	7143 (1.14)	
120	2590												9342 (3.24)		7383 (3.26)	8107 (1.94)		6035 (3.24)	6630 (2.13)	7300 (1.24)	
125	2700												9580 (3.51)		7550 (3.54)	8291 (2.10)		6162 (3.51)	6770 (2.32)	7455 (1.34)	
130	2810												9815 (3.80)		7715 (3.83)	8472 (2.27)		6287 (3.80)	6907 (2.51)	7606 (1.45)	
135	2918															8650 (2.45)			7042 (2.70)	7755 (1.57)	
140	3022															8824 (2.64)			7175 (2.91)	7901 (1.69)	
145	3130															8996 (2.83)			7305 (3.12)	8044 (1.81)	
150	3240															9165 (3.03)			7433 (3.34)	8185 (1.94)	
155	3350															9332 (3.23)			7559 (3.56)	8324 (2.07)	
160	3460															9496 (3.44)			7683 (3.80)	8460 (2.20)	
165	3565															9658 (3.66)				8595 (2.34)	
170	3675															9818 (3.89)				8727 (2.49)	

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula: (trm - tew)/25 x rating at 25 °F ΔT.
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °FΔT, 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- ΔT = trm - tew (trm = room temperature and tew = entering water temperature).

Performance Data

VL: Cooling coil capacities (Btuh)

Primary Air		Nozzle Arrangement																			
Cfm	F ΔT (Btuh) Capacity 20"	F				G				H				J				K			
		Unit Size																			
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"
15	324	1614 (0.89)																			
20	432	2123 (1.59)	2185 (0.94)			2151 (0.81)															
25	540	2626 (2.48)	2702 (1.47)	2752 (0.97)		2504 (1.26)	2735 (0.74)														
30	648	3125 (3.57)	3215 (2.11)	3274 (1.39)		2836 (1.82)	3098 (1.07)	3308 (0.71)		2639 (0.89)											
35	756		3724 (2.88)	3792 (1.90)	3772 (1.10)	3151 (2.48)	3441 (1.46)	3675 (0.97)		2902 (1.21)	3204 (0.71)										
40	864		4229 (3.76)	4306 (2.48)	4284 (1.44)	3451 (3.24)	3770 (1.91)	4025 (1.26)	4267 (0.73)	3152 (1.58)	3479 (0.94)				2867 (0.92)						
45	972			4818 (3.14)	4793 (1.82)		4085 (2.42)	4362 (1.60)	4624 (0.93)	3389 (2.01)	3742 (1.19)	4030 (0.78)			3058 (1.17)	3466 (0.72)					
50	1080			5326 (3.88)	5299 (2.25)		4390 (2.99)	4687 (1.97)	4968 (1.14)	3617 (2.48)	3993 (1.46)	4300 (0.96)	4612 (0.56)	3241 (1.45)	3673 (0.89)				3011 (0.95)		
55	1188				5803 (2.72)		4685 (3.62)	5002 (2.39)	5302 (1.39)	3836 (3.00)	4235 (1.77)	4561 (1.17)	4892 (0.68)	3415 (1.75)	3871 (1.07)	4182 (0.68)			3161 (1.15)		
60	1296				6304 (3.24)			5308 (2.85)	5626 (1.65)	4048 (3.57)	4469 (2.11)	4812 (1.39)	5162 (0.81)	3582 (2.09)	4060 (1.28)	4387 (0.81)			3305 (1.36)	3742 (0.81)	
65	1405				6804 (3.80)			5606 (3.34)	5942 (1.94)		4695 (2.48)	5056 (1.63)	5423 (0.95)	3743 (2.45)	4243 (1.50)	4584 (0.95)			3444 (1.60)	3898 (0.95)	
70	1512							5897 (3.88)	6250 (2.25)		4915 (2.87)	5293 (1.90)	5677 (1.10)	3899 (2.84)	4419 (1.74)	4775 (1.11)			3577 (1.86)	4049 (1.10)	4449 (0.72)
75	1620								6552 (2.58)		5128 (3.30)	5523 (2.18)	5924 (1.26)	4050 (3.26)	4590 (2.00)	4959 (1.27)	5446 (0.75)		3706 (2.13)	4195 (1.26)	4609 (0.83)
80	1730								6847 (2.94)		5337 (3.76)	5747 (2.48)	6164 (1.44)	4196 (3.71)	4756 (2.27)	5138 (1.45)	5643 (0.86)		3830 (2.43)	4336 (1.44)	4764 (0.95)
85	1838								7136 (3.32)			5966 (2.80)	6399 (1.62)		4917 (2.57)	5312 (1.63)	5834 (0.97)	3951 (2.74)	4473 (1.62)	4914 (1.07)	
90	1942								7419 (3.72)			6181 (3.14)	6629 (1.82)		5074 (2.88)	5482 (1.83)	6020 (1.09)	4069 (3.08)	4606 (1.82)	5060 (1.20)	5572 (0.69)
95	2055											6390 (3.50)	6854 (2.03)		5227 (3.21)	5647 (2.04)	6202 (1.21)	4183 (3.43)	4735 (2.03)	5203 (1.34)	5729 (0.77)
100	2160											6596 (3.87)	7074 (2.25)		5376 (3.56)	5809 (2.26)	6379 (1.34)	4295 (3.80)	4862 (2.25)	5341 (1.48)	5881 (0.86)
105	2265												7290 (2.48)		5523 (3.92)	5967 (2.50)	6552 (1.48)		4985 (2.48)	5476 (1.63)	6030 (0.95)
110	2375												7503 (2.72)			6121 (2.74)	6722 (1.63)		5105 (2.72)	5609 (1.79)	6176 (1.04)
115	2482												7711 (2.97)			6272 (2.99)	6888 (1.78)		5223 (2.97)	5738 (1.96)	6318 (1.14)
120	2590												7917 (3.24)			6421 (3.26)	7051 (1.94)		5338 (3.24)	5864 (2.13)	6457 (1.24)
125	2700												8119 (3.51)			6567 (3.54)	7211 (2.10)		5451 (3.51)	5988 (2.32)	6594 (1.34)
130	2810												8317 (3.80)			6710 (3.83)	7369 (2.27)		5561 (3.80)	6110 (2.51)	6728 (1.45)
135	2918																7523 (2.45)			6229 (2.70)	6859 (1.57)
140	3022																	7675 (2.64)		6346 (2.91)	6988 (1.69)
145	3130																	7824 (2.83)		6462 (3.12)	7115 (1.81)
150	3240																	7972 (3.03)		6575 (3.34)	7240 (1.94)
155	3350																		8116 (3.23)	6686 (3.56)	7363 (2.07)
160	3460																		8259 (3.44)	6796 (3.80)	7483 (2.20)
165	3565																		8400 (3.66)		7602 (2.34)
170	3675																		8539 (3.89)		7719 (2.49)

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula:
(trm - tew)/25 x rating at 25 °F ΔT .
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- $\Delta T = trm - tew$ (trm = room temperature and tew = entering water temperature).

Performance Data

VW: Cooling coil capacities (Btuh)

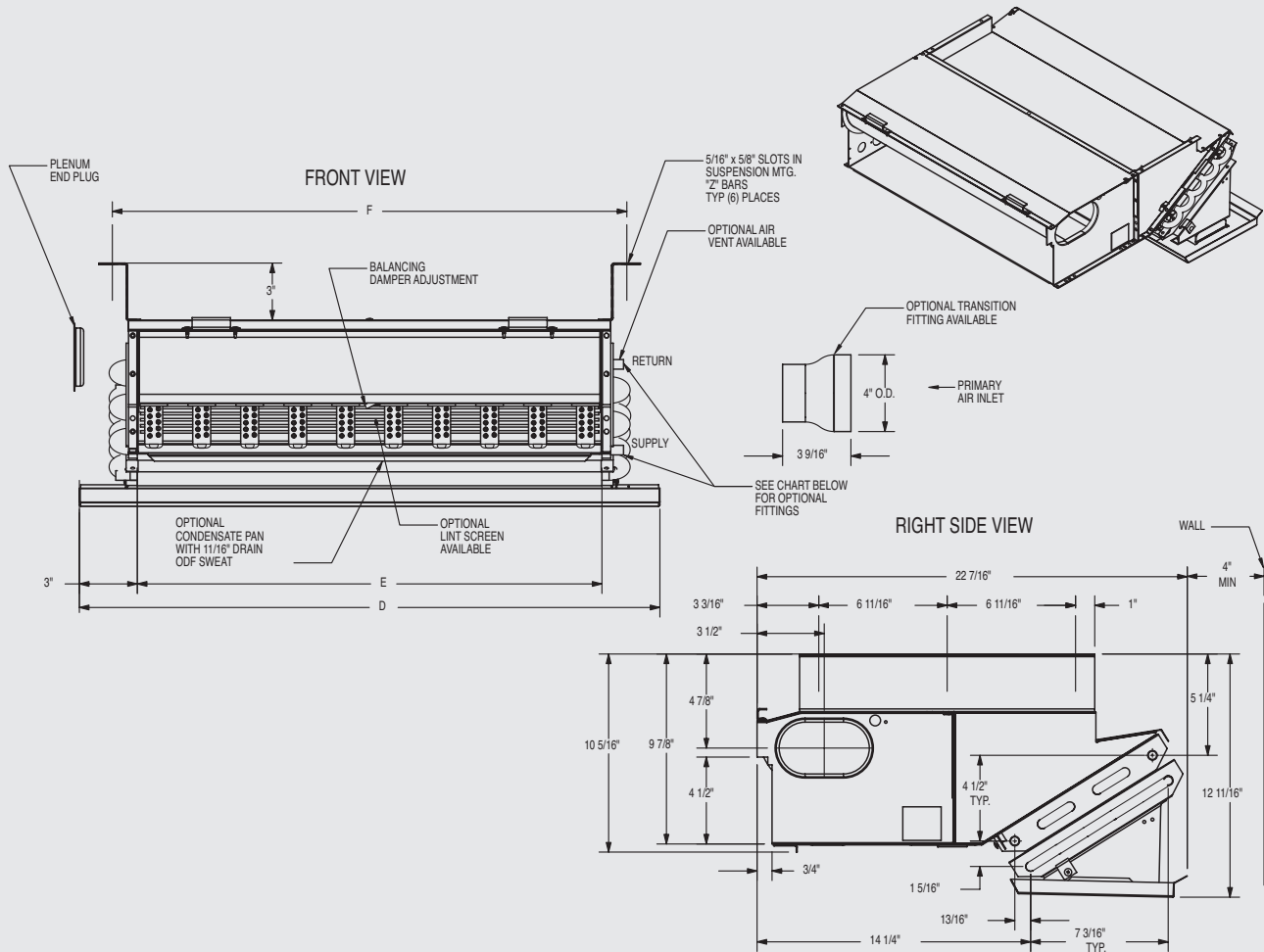
Primary Air		Nozzle Arrangement																				
Cfm	F ΔT (Btuh) Capacity 20°	F				G				H				J				K				
		Unit Size																				
		24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	24"	32"	40"	52"	
15	324	1537 (0.89)																				
20	432	2022 (1.59)	2080 (0.94)			2098 (0.81)																
25	540	2501 (2.48)	2573 (1.47)	2620 (0.97)		2443 (1.26)	2669 (0.74)															
30	648	2976 (3.57)	3062 (2.11)	3118 (1.39)		2767 (1.82)	3022 (1.07)	3227 (0.71)		2639 (0.89)												
35	756		3546 (2.88)	3611 (1.90)	3592 (1.10)	3074 (2.48)	3357 (1.46)	3585 (0.97)		2902 (1.21)	3204 (0.71)											
40	864		4028 (3.76)	4101 (2.48)	4080 (1.44)	3367 (3.24)	3678 (1.91)	3927 (1.26)	4163 (0.73)	3152 (1.58)	3479 (0.94)			2940 (0.92)								
45	972			4588 (3.14)	4564 (1.82)		3986 (2.42)	4256 (1.60)	4511 (0.93)	3389 (2.01)	3742 (1.19)	4030 (0.78)		3137 (1.17)	3555 (0.72)							
50	1080			5073 (3.88)	5046 (2.25)		4283 (2.99)	4573 (1.97)	4847 (1.14)	3617 (2.48)	3993 (1.46)	4300 (0.96)	4612 (0.56)	3324 (1.45)	3767 (0.89)				3169 (0.95)			
55	1188				5526 (2.72)		4570 (3.62)	4880 (2.39)	5173 (1.39)	3836 (3.00)	4235 (1.77)	4561 (1.17)	4892 (0.68)	3503 (1.75)	3970 (1.07)	4289 (0.68)				3328 (1.15)		
60	1296				6004 (3.24)			5179 (2.85)	5489 (1.65)	4048 (3.57)	4469 (2.11)	4812 (1.39)	5162 (0.81)	3674 (2.09)	4164 (1.28)	4499 (0.81)				3479 (0.81)	3939 (0.81)	
65	1405							5470 (3.34)	5797 (1.94)		4695 (2.48)	5056 (1.63)	5423 (0.95)	3839 (2.45)	4352 (1.50)	4702 (0.95)				3625 (1.60)	4104 (0.95)	
70	1512								6098 (2.25)		4915 (2.87)	5293 (1.90)	5677 (1.10)	3999 (2.84)	4533 (1.74)	4897 (1.11)				3765 (1.86)	4263 (1.10)	4683 (0.72)
75	1620								6392 (2.58)		5128 (3.30)	5523 (2.18)	5924 (1.26)	4154 (3.26)	4708 (2.00)	5086 (1.27)	5586 (0.75)	3901 (2.13)	4416 (2.13)	4852 (1.26)	5015 (0.83)	
80	1730								6680 (2.94)		5337 (3.76)	5747 (2.48)	6164 (1.44)	4304 (3.71)	4878 (2.27)	5270 (1.45)	5788 (0.86)	4032 (2.43)	4564 (1.44)	5015 (0.95)		
85	1838								6962 (3.32)			5966 (2.80)	6399 (1.62)		5043 (2.57)	5449 (1.63)	5984 (0.97)	4159 (2.74)	4709 (1.62)	5173 (1.07)		
90	1942										6181 (3.14)	6629 (1.82)		5204 (2.88)	5622 (1.83)	6175 (1.09)	4283 (3.08)	4849 (1.82)	5327 (1.20)	5866 (0.69)		
95	2055										6390 (3.50)	6854 (2.03)		5361 (3.21)	5792 (2.04)	6361 (1.21)	4403 (3.43)	4985 (2.03)	5476 (1.34)	6030 (0.77)		
100	2160											7074 (2.25)		5514 (3.56)	5958 (2.26)	6543 (1.34)	4521 (3.80)	5118 (2.25)	5622 (1.48)	6191 (0.86)		
105	2265											7290 (2.48)		5664 (3.92)	6120 (2.50)	6721 (1.48)		5247 (2.48)	5765 (1.63)	6348 (0.95)		
110	2375											7503 (2.72)			6278 (2.74)	6895 (1.63)		5374 (2.72)	5904 (1.79)	6501 (1.04)		
115	2482											7711 (2.97)			6433 (2.99)	7065 (1.78)		5498 (2.97)	6040 (1.96)	6651 (1.14)		
120	2590											7917 (3.24)			6586 (3.26)	7232 (1.94)		5619 (3.24)	6173 (2.13)	6797 (1.24)		
125	2700											8119 (3.51)			6735 (3.54)	7396 (2.10)		5738 (3.51)	6303 (2.32)	6941 (1.34)		
130	2810															7558 (2.27)		5854 (3.80)	6431 (2.51)	7082 (1.45)		
135	2918															7716 (2.45)			6557 (2.70)	7220 (1.57)		
140	3022															7872 (2.64)			6680 (2.91)	7356 (1.69)		
145	3130															8025 (2.83)			6802 (3.12)	7490 (1.81)		
150	3240															8176 (3.03)			6921 (3.34)	7621 (1.94)		
155	3350															8325 (3.23)			7038 (3.56)	7750 (2.07)		
160	3460															8471 (3.44)			7154 (3.80)	7877 (2.20)		
165	3565																			8002 (2.34)		
170	3675																				8126 (2.49)	

Notes:

- Coil capacity for other than 25 °F ΔT use the following formula: $(trm - tew)/25 \times \text{rating at } 25 \text{ °F } \Delta T$.
- To aide in balancing the water systems, all units regardless of size have the same pressure drop across the water coils.
- The values in the () indicate the nozzle pressure (inches of wg).
- The ratings above are based on 25 °F ΔT , 1.50 gpm water flow rate and 8 ft water coil pressure drop (all sizes) for a single coil.
- All ratings include allowance for lint screens.
- $\Delta T = trm - tew$ (trm = room temperature and tew = entering water temperature).

Dimensions and data

Model H4C



Unit size (H4C)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	30-1/4"	38-1/4"	46-1/4"	58-1/4"
Nom. coil (E)	24-1/8"	32"	40"	52"
Z Bar (F)	27-1/8"	35"	43"	55"
Min. free areas (sq. In.) Discharge grille	81	108	135	175
Recirculation grille	234	288	343	439
Approx. shipping weight (LB)	38	57	59	73

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Description:

- The H4C is shipped from the factory with the following:
- Acoustically designed plenum and nozzles as specified
 - Two 6-tube coils with copper tubes and aluminum fins
 - Condensate pan as specified
 - Two Z brackets for mounting unit to a rigid flat horizontal surface
 - Coil connections as specified
 - Hardware kit includes:
 - (8) Mounting screws
 - (8) Tinnerman nuts
 - (1) Lint screen clip

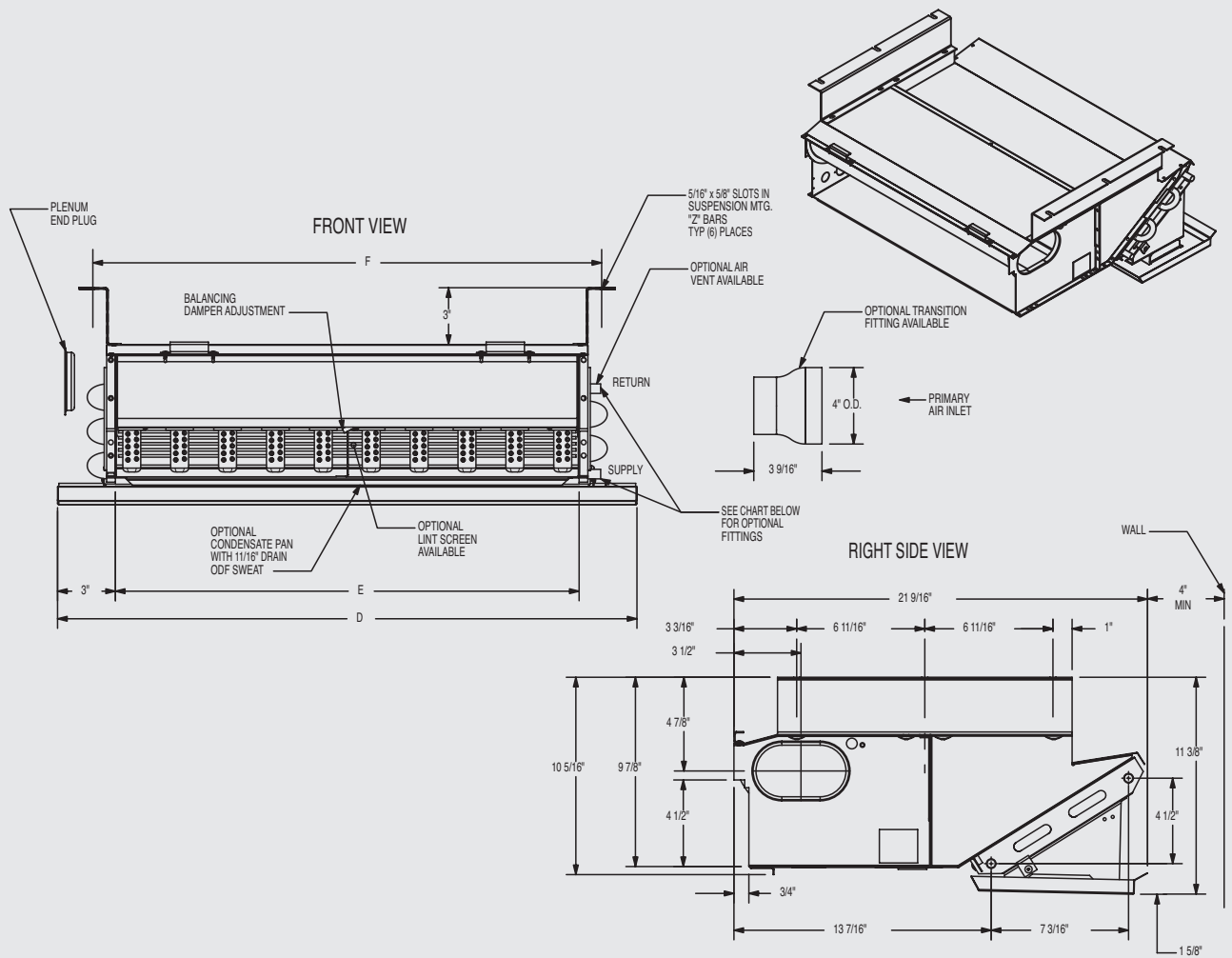
Notes:

- Condensate connection mounted same side as coil connection
- Four inch minimum distance from wall required to obtain rated capacity; 8-1/2" minimum for screen removal
- Shipping weight includes packaging

All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Hydro-Air at its base office.

Dimensions and data

Model HC



Unit Size (HC)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	30-1/4"	38-1/4"	46-1/4"	58-1/4"
Nom. coil (E)	24-1/8"	32"	40"	52"
Z Bar (F)	27-1/8"	35"	43"	55"
Min. free areas (sq. In.) Discharge grille	81	108	135	175
Recirculation grille	234	288	343	439
Approx. shipping weight (LB)	36	45	52	64

Notes:

- Condensate connection mounted same side as coil connection
- Four inch minimum distance from wall required to obtain rate capacity; 8-1/2" minimum for screen removal
- Shipping weight includes packaging

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

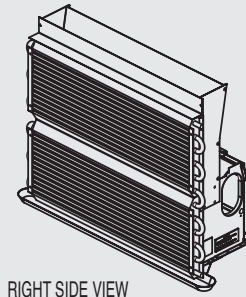
Description:

- The HC is shipped from the factory with the following:
- Acoustically designed plenum and nozzles as specified
 - One 6-tube coil with copper tubes and aluminum fins
 - Condensate pan as specified
 - Two Z brackets for mounting unit to a rigid flat horizontal surface
 - Coil connections as specified
 - Hardware kit includes:
 - (8) Mounting screws
 - (8) Tinnerman nuts
 - (1) Lint screen clip

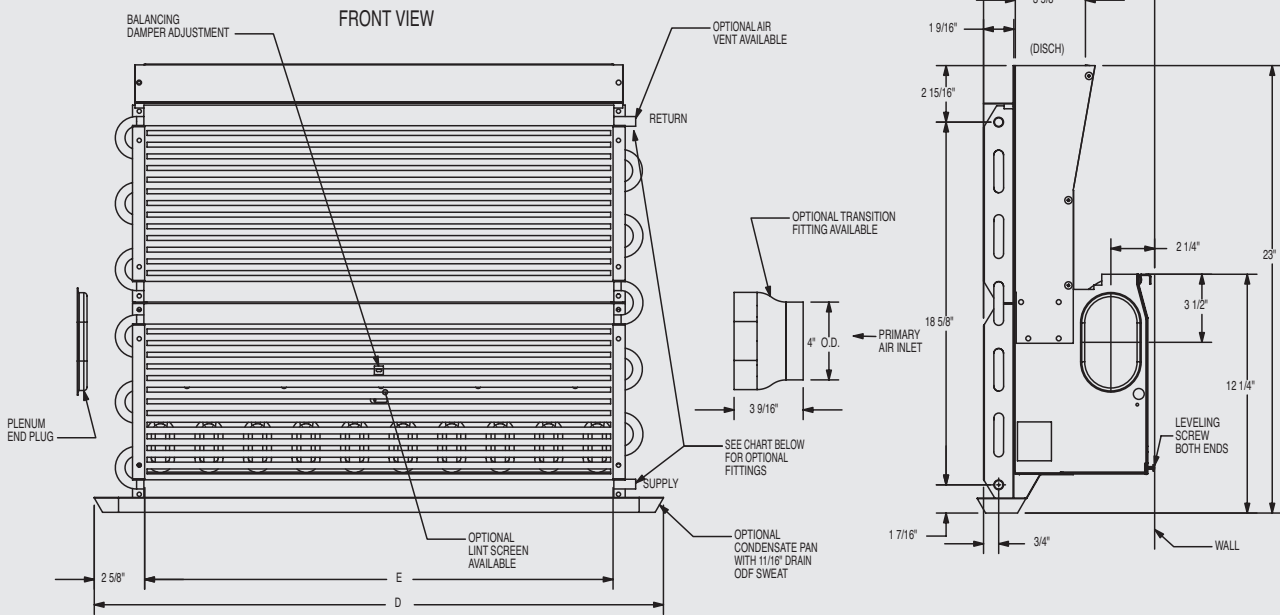
All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model V2H



RIGHT SIDE VIEW



Unit Size (V2H)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Z Bar (F)	3 inches			
Min. free areas (sq. In.) Discharge grille	81	108	135	175
Recirculation grille	473	630	788	1023
Approx. shipping weight (LB)	35	43	52	66

Notes:

- Condensate connection mounted same side as coil connection
- Shipping weight includes packaging

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

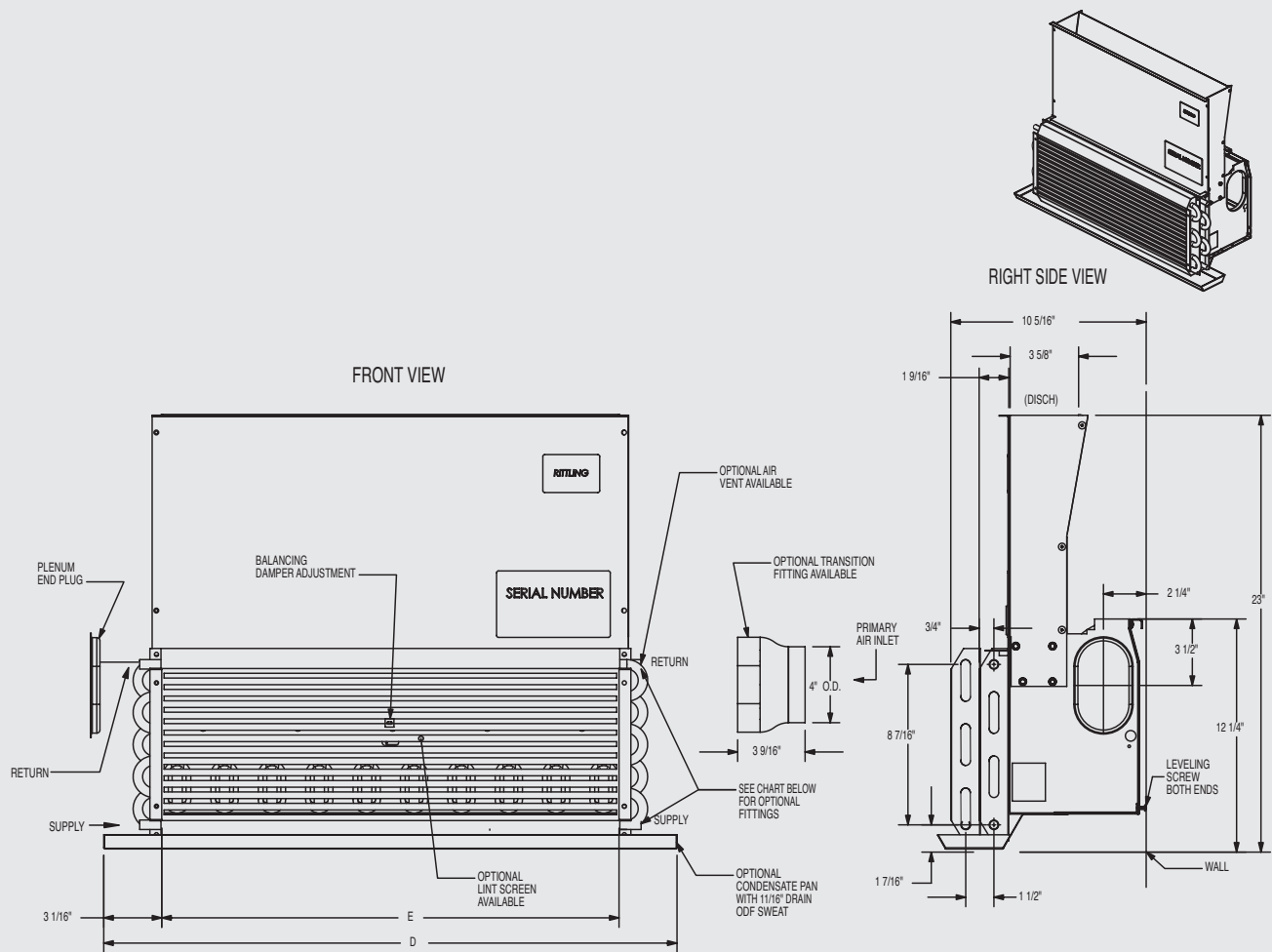
Description:

- The V2H is shipped from the factory with the following:
- Acoustically designed plenum and nozzles as specified
 - One 12-tube coil with copper tubes and aluminum fins
 - Condensate pan as specified
 - Coil connections as specified
 - Recovery stack and drain pan assembled and ready for wall mounting
 - Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model V4H



Unit Size (V4H)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	237	315	394	512
Approx. shipping weight (LB)	37	45	55	70

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

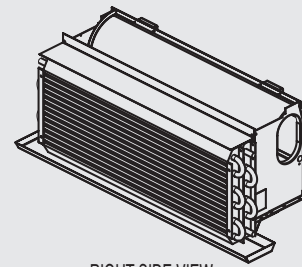
- Notes:**
- Condensate connection mounted same side as cooling coil connection
 - Shipping weight includes packaging
 - Orientation of coil connections to be determined
 - Inner coil is always for cooling and determines whether it is RH or LH connections. Heating coil connections are opposite of cooling connections

- Description:**
- The V4H shipped from the factory with the following:
- Acoustically designed plenum and nozzles as specified
 - Two 6-tube coil with copper tubes and aluminum fins
 - Condensate pan as specified
 - Coil connections as specified
 - Recovery stack and drain pan, assembled ready for wall mounting
 - Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

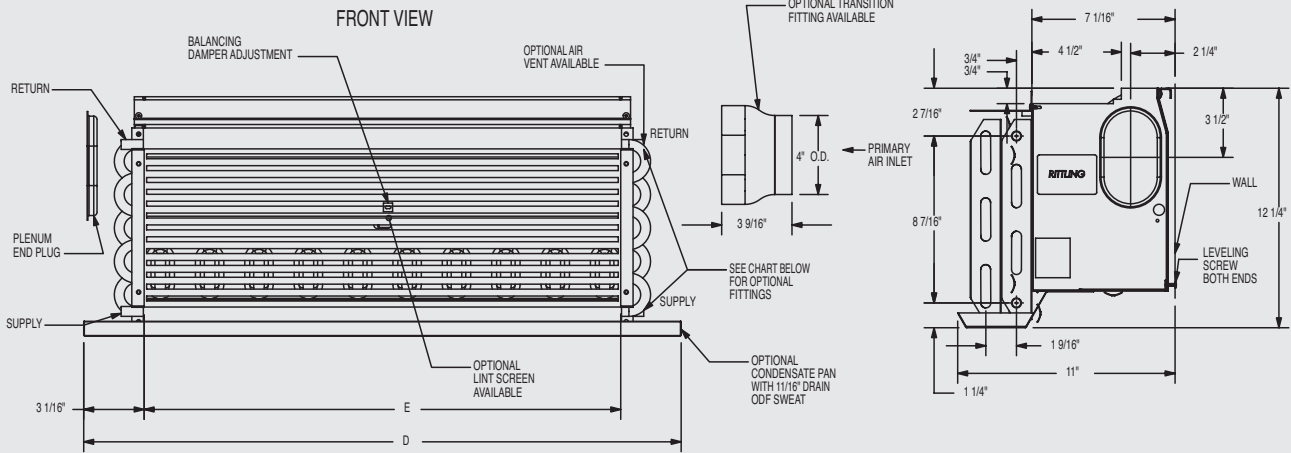
All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model V4L



RIGHT SIDE VIEW



Unit Size (V4L)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	124	165	206	269
Approx. shipping weight (LB)	26	31	36	47

Notes:

- Condensate connection mounted same side as cooling coil connection
- Shipping weight includes packaging
- Orientation of coil connections to be determined
- Inner coil is always for cooling and determines whether it is RH or LH connections. Heating coil connections are opposite of cooling connections

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Description:

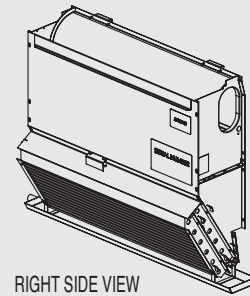
The V4L is shipped from the factory with the following:

- Acoustically designed plenum and nozzles as specified
- Two 6-tube coils with copper tubes and aluminum fins
- Condensate pan as specified
- Coil connections as specified
- Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

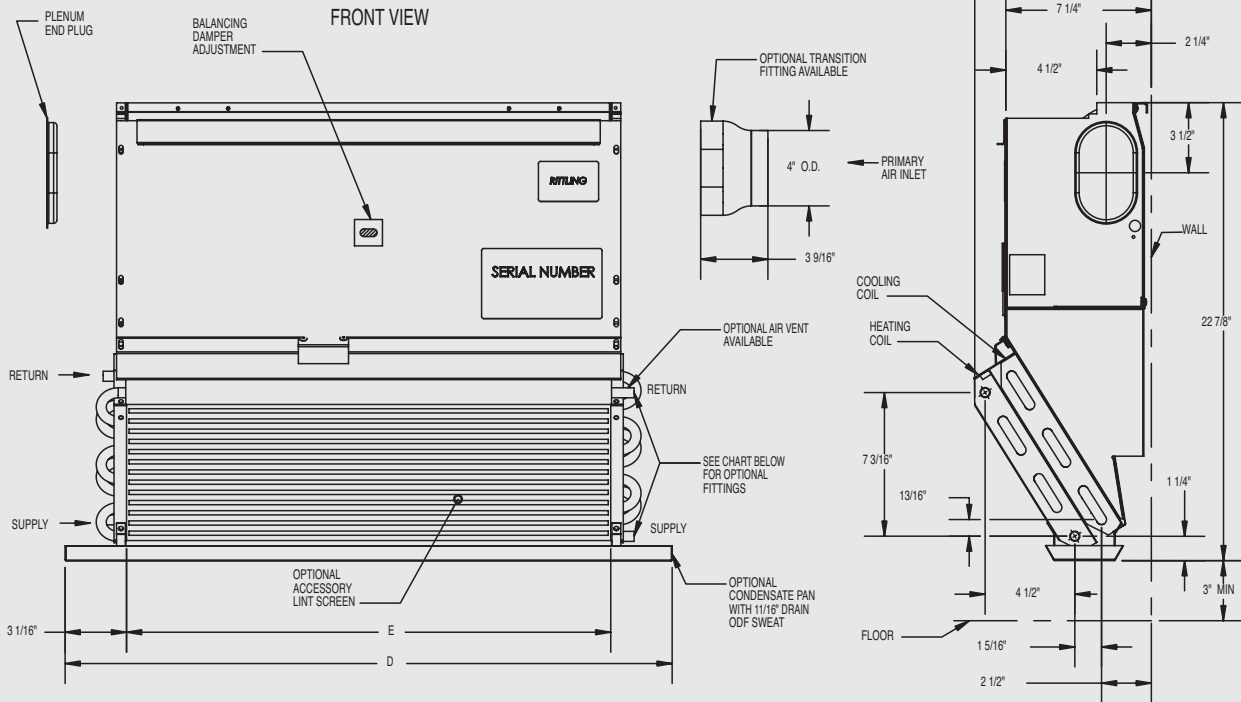
All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model V4W



RIGHT SIDE VIEW



Unit Size (V4W)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-3/8"	37-3/8"	45-3/8"	57-3/8"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. height from floor	3 inches			
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	237	315	394	512
Approx. shipping weight (LB)	37	47	55	69

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Notes:

- Condensate connection mounted same side as cooling coil connection
- Shipping weight includes packaging
- Orientation of coil connections to be determined
- Inner coil is always for cooling and determines whether it is RH or LH connections. Heating coil connections are opposite of cooling connections

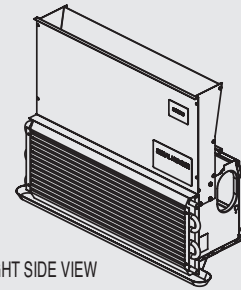
Description:

- The V4W is shipped from the factory with the following:
- Acoustically designed plenum and nozzles as specified
 - One 6-tube coil with copper tubes and aluminum fins
 - Condensate pan as specified
 - Coil connections as specified
 - Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

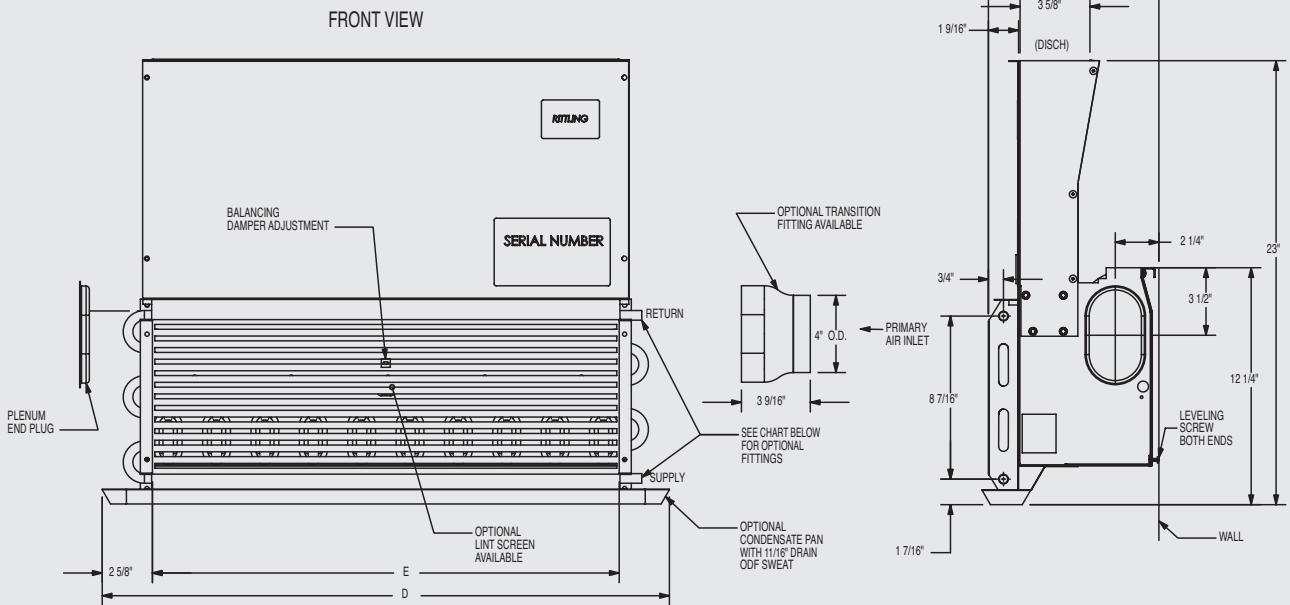
All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model VH



RIGHT SIDE VIEW



Unit Size (VH)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. height from floor	3 inches			
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	237	315	394	512
Approx. shipping weight (LB)	32	40	48	61

Notes:

- Condensate connection mounted same side as coil connection
- Shipping weight includes packaging

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Description:

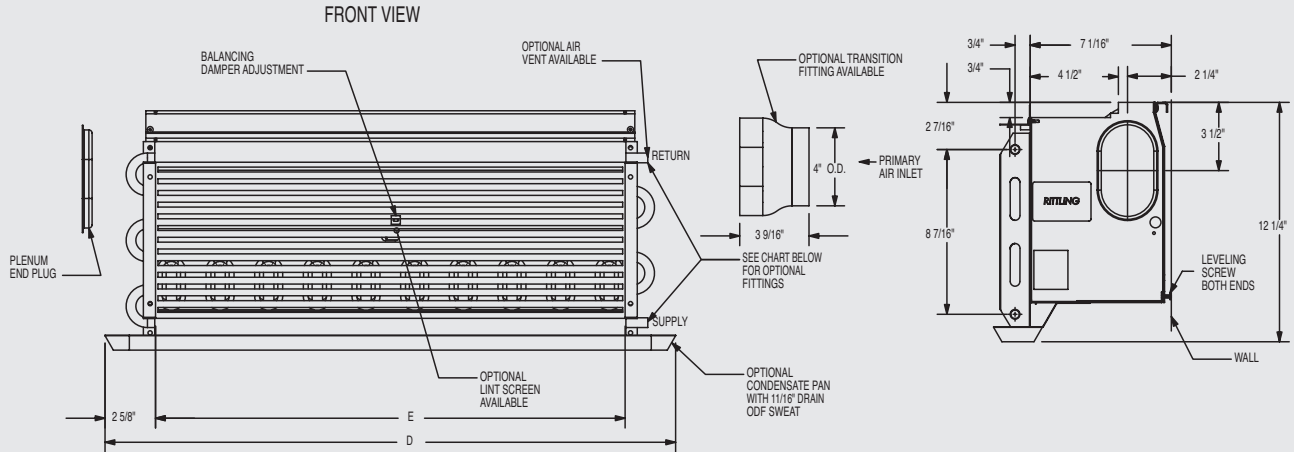
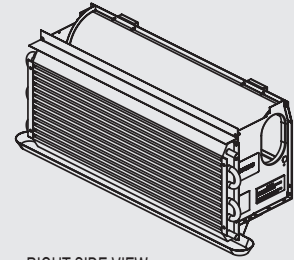
The VH is shipped from the factory with the following:

- Acoustically designed plenum and nozzles as specified
- One 6-tube coil with copper tubes and aluminum fins
- Condensate pan as specified
- Coil connections as specified
- Recovery stack and drain pan, assembled and ready for wall mounting
- Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model VL



Unit Size (VL)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	124	165	206	269
Approx. shipping weight (LB)	21	26	31	38

Notes:

- Condensate connection mounted same side as coil connection
- Shipping weight includes packaging

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Description:

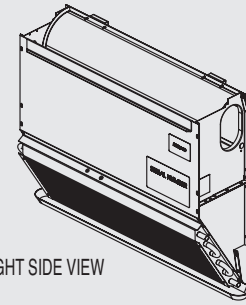
The VL is shipped from the factory with the following:

- Acoustically designed plenum and nozzles as specified
- One 6-tube coil with copper tubes and aluminum fins
- Condensate pan as specified
- Coil connections as specified
- Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

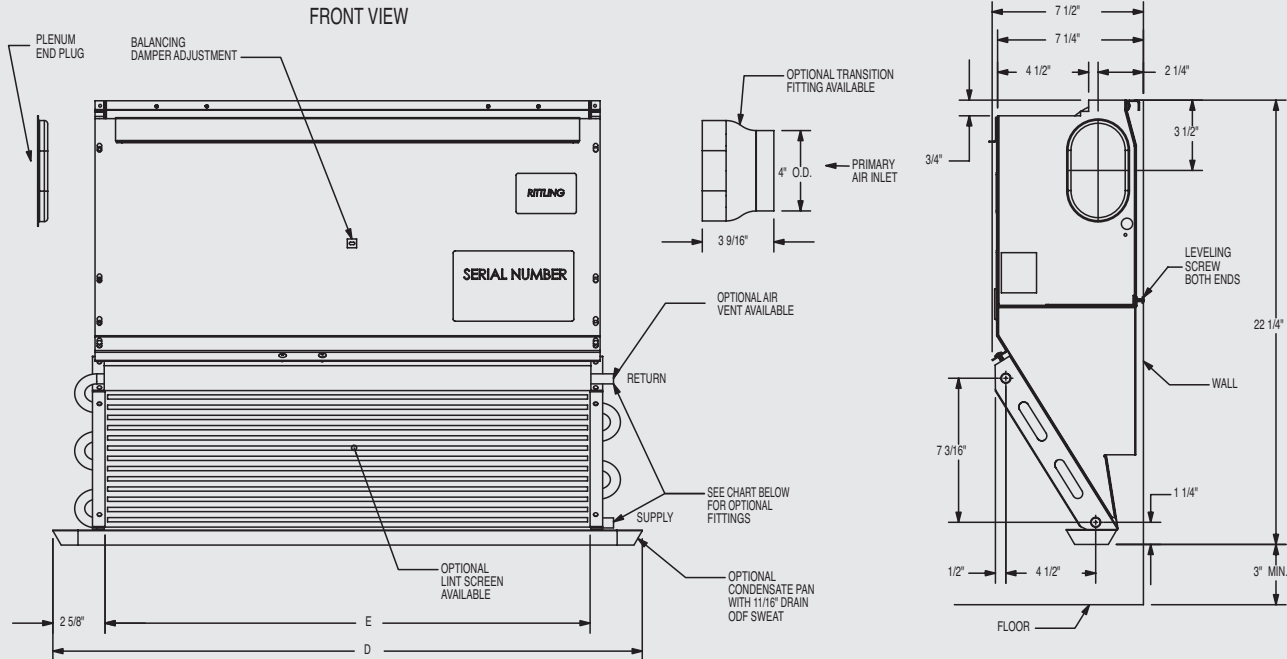
All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

Dimensions and data

Model VW



RIGHT SIDE VIEW



Unit Size (VW)	24"	32"	40"	52"
Dimensions (in.) Drain pan (D)	29-1/2"	37-1/2"	45-1/2"	57-1/2"
Nom. coil (E)	24-1/8"	32"	40"	52"
Min. height from floor	3 Inches			
Min. free areas (sq. in.) Discharge grille	81	108	135	175
Recirculation grille	234	288	343	439
Approx. shipping weight (LB)	31	40	46	57

Notes:

- Condensate connection mounted same side as coil connection
- Shipping weight includes packaging

Optional fittings	
Code digit #8	Description
0	1/2" ODF sweat fitting
1	1/2" ODF sweat fitting w/vent
2	1/2" ODM flare fitting
3	1/2" ODM flare fitting w/vent

Description:

The VW is shipped from the factory with the following:

- Acoustically designed plenum and nozzles as specified
- One 6-tube coil with copper tubes and aluminum fins
- Condensate pan as specified
- Coil connections as specified
- Drain pan, assembled and ready for wall mounting
- Hardware kit includes:
 - (2) Leveling screws
 - (2) Leveling screw clips
 - (4) Lint screen clips
 - (2) Coil condensate plates with clips

All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

General information

This installation and start-up instructions literature is for horizontal and vertical Induction Units. Induction Units are hydronic terminal units designed for year-round cooling or cooling/heating. Your equipment is initially protected under the Zehnder Rittling standard 2-year warranty provided the steps outlined in this manual for initial inspection, installation, periodic maintenance and normal every day operation of the equipment are followed. This manual should

be thoroughly reviewed prior to the installation, start-up or maintenance of the equipment. If any questions arise, please contact your local Zehnder Rittling sales representative or the factory before proceeding any further.

There are a multitude of options and accessories available with the equipment covered in this manual. For more specific details on the included options and accessories, refer to the order acknowledgment, approved submittals and catalogs.

Receiving

Upon delivery, examine the shipment against the bill of lading to make sure all of the units have been received and then check each unit carefully for shipping damage. Any damage should be reported to the freight carrier and a claim should be filed with them. Ensure the shipping company makes proper notation of any shortages or damage on all copies of the freight bill. Concealed damage not discovered during unloading must be reported to the shipping company within 15 days of receipt of the shipment.

All units are shipped F.O.B. factory. Therefore, Zehnder Rittling is not responsible for damage during transit. It is the responsibility of the installing contractor to inspect and verify that the units shipped were in fact the correct model number, have the correct nozzles, etc. Any discrepancies should be reported to the local sales representative for immediate resolution prior to unpackaging and installation. The factory should be notified of any warranty repairs required in

writing before any corrective action is taken. The factory must be fully informed of the expected costs before the work is begun. Zehnder Rittling is not responsible for any repairs or alterations made by the purchaser without Zehnder Rittling's written consent and will not accept any back charges associated with these repairs or alterations. The return of damaged equipment will not be accepted without written authorization from Zehnder Rittling.

A unit that has received a written Return Goods Authorization will be inspected by Zehnder Rittling upon receipt. Any damage, missing parts, reworking or repackaging resulting from prior installation will constitute just cause for Zehnder Rittling to issue partial credit.

Several components are shipped loose for field installation and to offer added protection during shipment and job site storage. These items may include; lint screens, wall mounting strips, air transition fittings, etc.

Safety considerations

The installation of Induction Units and all associated components, parts and accessories which make up the installation, shall be in accordance with the regulations of all authorities having jurisdiction and must conform to all applicable codes. Only trained and qualified service personnel using good judgment and safe practices should install, repair and/or service air conditioning equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils and cleaning or replacing lint screens. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in the literature, tags and labels attached to the equipment and all other safety precautions that may apply.

Improper installation, adjustment, alteration, service, maintenance, or use can cause hazardous conditions which may cause serious personal injury and/or property damage. Consult a qualified installer, service agency, or your sales representative for information or assistance.

The equipment must always be properly supported by rigging and lifting equipment. Any temporary supports used during installation or maintenance must be designed to adequately hold the equipment in place until equipment is permanently fastened and set in its final location. All supports must meet applicable local codes

and ordinances.

All fastening devices must be designed to mechanically hold the assembly in place without the ability to loosen or break away due to system operation or vibration.

Never use bulky or loose fitting clothing when working on any mechanical equipment. Gloves should always be worn for protection against heat, sharp edges and all other possible hazards. Safety glasses should always be worn, especially when drilling, cutting or working with chemicals.

Never pressurize equipment beyond specified pressures as shown on unit rating plate. Always pressure test with an inert fluid such as water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.

Always protect adjacent flammable material when welding or soldering. Use a suitable heat shield material to contain sparks or drops of solder. Have a fire extinguisher readily available. Please follow standard safe practices regarding the handling, installing or servicing of mechanical equipment.

Read these instructions thoroughly and follow all warnings or cautions attached to the equipment. Consult local building codes for special installation requirements.

Understand the signal words: danger, warning and caution.

⚠ DANGER

Identifies the most serious hazards which will result in severe personal injury or death.

⚠ WARNING

Signifies hazards that could result in personal injury or death.

⚠ CAUTION

Used to identify unsafe practices, which would result in minor personal injury or product and property damage.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service or operation of the equipment. The installation of Induction Units and all associated components, parts and accessories shall be in accordance with the regulations of all authorities having jurisdiction and must conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with all applicable codes and regulations.

Unpacking and preparation

All units are carefully inspected at the factory throughout the entire fabrication and assembly processes under Zehnder Rittling's stringent quality assurance program. All major components and subassemblies such as coils, drain pans, nozzles and sealed edges are carefully tested for proper operation, visually inspected and verified for full compliance with factory standards.

Induction Units are usually shipped on pallets of up to 10 units (24", 32") or 5 units (40", 52"). Each unit is factory tagged according to the customer's purchase order. This allows the unit, upon removal from the pallet, to be taken directly to its' assigned space for immediate installation. Units should not be installed at locations other than that designated on the tag.

Each unit is placed in a cardboard container for shipment to avoid damage during normal handling in the shipment process. It is the sole responsibility of the customer to provide the protection necessary to prevent vandalism and weather deterioration of the equipment. Under no condition should the units be left unprotected from the elements. If the equipment is not needed immediately at the job site, it should be left in its shipping carton and stored in a clean, dry area of the building or in a warehouse. Do not remove any equipment from its shipping package until it is needed for installation. The equipment is NOT suitable for outdoor installations.

After determining the condition of the cardboard container exterior, carefully remove each unit from the container and inspect for hidden damage. At this time, check that all shipped loose items such as lint screens, wall mounting strips, air transition fittings, etc. are accounted for and placed in a safe area. Any hidden damage should be recorded and immediately reported to the carrier and a claim should be filed. In the event a claim for shipping damage is filed, the unit, cardboard container, and all packing must be kept for physical inspection by the freight carrier.

Once the equipment is properly positioned on the job site, cover the units with either a shipping carton, vinyl film, or an equivalent protective covering. Cap open ends of piping that is stored on a job site. Take special care to prevent foreign materials from entering the units in areas where painting, dry walling, or spraying of fireproof material, etc. has not yet been completed as these materials may accumulate in the drain pan or on the coils. Foreign material that accumulates within the units can prevent proper start-up, necessitate costly clean-up operations, or result in immediate or premature component failure. Before installing any of the system components, be sure to examine each pipe, fitting and valve, and remove any dirt or foreign material found in or on these components. All manufacturer's warranties are void if foreign material is allowed to be deposited in the drain pan or on the coil of any unit. Some job conditions may require some form of temporary unit covering during construction.

⚠ CAUTION

DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., attics, garages, rooftops, etc.). Corrosive conditions and high temperature or humidity can significantly reduce system performance, reliability and overall service life.

Handling and installation

Installer to provide the following:

- A mounting system or frame.
This frame should elevate the unit above the floor such that the unit's air discharge meets the bottom of the supply air grille without any significant gaps, as well as allow for piping or the condensate drip tray to drain condensate from the unit (when required).
- All secondary water piping and valves including isolation valves on the supply and return, balancing valves, flow control zone valve and other valves/controls as specified.
- All mounting hardware (threaded rods, nuts, etc.) and primary air flexible ducting.
- Condensate drainage from the drip tray outlet, where required.

Installation

- Check the unit labeling to ensure that the proper unit is being installed at each location.
- Determine the orientation of the air and water connections in relation to the site plan.
- Check to ensure there is adequate space within the room enclosure for the installation of the unit and to make the piping and duct connections.
- Check the installation space for the unit to ensure adequate clearance to remove the lint screen during maintenance.
- Ensure the return air path to the unit is clear and does not restrict airflow to the unit.

- Position the unit in the enclosure and fix it to the supporting frame by the mounting brackets. Ensure that the unit's air discharge meets the bottom of the supply air grille without any significant gaps.

While all equipment is designed for durability and fabricated with heavy gauge materials and may present a robust appearance, great care must be taken to assure that no undue force is applied to the coil, piping, drain connection or other delicate components during handling. Wherever possible, all units should be maintained in an upright position and handled by the chassis, plenum sections or as close as possible to the mounting points.

Although Zehnder Rittling does not become involved with the design and selection of support methods and/or components, it should be recognized that unacceptable operating characteristics and/or performance may result from poorly implemented unit support. Additionally, proper clearance must be provided for service and removal of the equipment.

Anchoring the equipment in place is accomplished by hanging vertical units from the mounting strip, using the mounting points provided on horizontal units and positioning the unit on a level plane. The drain pan is pitched within the unit to provide proper drainage when the unit is installed level. Care must be taken to ensure that the drain pan does not slope away from the drain connection.

The type of mounting device is a matter of choice, however the mounting point should always be that provided in the chassis.

⚠ WARNING

Improper mounting could result in the unit falling from its position, causing personal injury or even death.

After mounting the unit, it is then ready for the various service connections such as water and drain (where applicable). At this time it should be verified that the proper types of services are actually provided to the unit. On those units requiring chilled water and/or hot water, the proper line size and water temperature should be available to the unit.

Chilled/hot water connections

Submittals and product literature detailing unit operation, controls and connections should be thoroughly reviewed before beginning the connection of the various cooling and/or heating mediums to the unit.

Position all isolation, control and balancing valves according to the design drawings.

- Install all valves and make all connections per industry approved plumbing practices and local codes.
- For 4-pipe coils, ensure that the chilled water connection is made to the chilled water circuit and the hot water connections be made to the hot water circuit.
- It is recommended that the unit be connected with readily removable pipe lengths and unions of flexible hoses to permit disconnection and removal of the unit should this be required.

In preparing to make the secondary water (SCHW) piping connections to the coil, ensure that the piping is aligned with the coil connections. If threaded NPT coil connections are provided, use the correct tools to grip the flare nut and union and apply only sufficient force to make the joint.

- Take care during this jointing process to ensure that the coil-piping alignment is maintained.
- Do not apply excessive force in tightening water connection fittings. The use of excessive force could result in fracturing of the water pipes or their solder connections.

Connect the condensate drain from the unit drip tray outlet to the condensate drainage system (if required).

- Should the system design not require condensate drainage, leave the sealing cap of the condensate outlet in place.

The inlet supply connection is the lowest coil stub-out with the highest coil stub-out being the outlet return connection (see dimensional drawings). In the case of field installed valve packages and piping, the chilled water valve package should be installed in such a way that any dripping condensate is captured in the drain pan/drip pan or alternatively, is eliminated through the use of insulation.

After the connections are completed, the system should be tested for leaks. Since some components are not designed to hold pressure with a gas, hydronic systems should be tested with water. Test pressure must not exceed 250 psig. Pressure testing should be completed prior to sheet rocking, finished floors, painting, caulking, etc.

▲ CAUTION

All water coils must be protected from freezing after initial filling with water. Even if the system is drained, unit coils may still hold enough water to cause damage when exposed to temperatures below freezing.

In the event that leaking or defective components are discovered, the Zehnder Rittling sales representative must be notified before any repairs are attempted. All leaks should be repaired before proceeding with the installation.

After system integrity has been established, the piping should be insulated in accordance with the project specifications. This is the responsibility of the installing or the insulation contractor. Zehnder Rittling will not accept any charges associated with re-insulating piping if the installing contractor failed to establish system integrity prior to insulating. All chilled water piping and valves must be insulated to prevent damage from sweating.

The condensate drain (where applicable) should always be connected and piped to an acceptable disposal point. For proper condensate flow, the drain piping should be sloped away from the unit at least 1/8 inch per foot. A P-trap may be required by local codes and it is strongly recommended for odor containment. Condensate drain lines should be at least the same diameter as the drain connection. Properly sized traps should be used to allow proper removal of the condensate from the drain pan. The bottom of the trap should be at least (1" + cabinet static pressure) below the drain pan connection. The top of the trap should be at least 1" below the drain connection when cabinet is under positive pressure and 1/2 the distance of the bottom of the trap from the drain connection when cabinet is under negative pressure.

Ductwork connections

All ductwork and or supply and return grilles should be installed in accordance with the project plans and specifications. If not included on the unit or furnished from the factory, supply and return grilles should be provided as recommended in the product catalog.

Primary air duct connections

Connect the flexible duct to the primary air inlet connection and seal airtight. The primary air flexible duct should be a minimum of 3 feet straight or gradual radius between the primary air duct and the primary air connections of the unit.

- Avoid sharp bends in the primary air duct connection.
- Install all ductwork and make all connections per industry approved practices and local codes.

A primary air volume control balancing damper for adjusting the primary air flow during commissioning is integral to the induction unit. All units are shipped with air inlet connections as per the schedule agreed upon in the submittal process. If the units are to be installed in series, air inlet connections will be installed on both the left and right hand side of the units.

- Check that all duct connections are properly sealed to ensure no air leakage.

Insulate the primary air duct and air inlet connection, make a vapor tight seal with approved tape at the duct and air inlet connection.

Flexible duct connections should be used on all air handling equipment to minimize vibration transmissions.

Insulation and ductwork should be installed to allow servicing of equipment including motors, blowers, filters, etc.

Zehnder Rittling assumes no responsibility for undesirable system operation due to improper design, equipment or component selection, and/or installation of base unit, ductwork, grilles and other related components.

Start-up general

Before beginning any start-up, the start-up personnel should take the time to familiarize themselves with the unit, options, accessories and control sequence to fully understand how the unit should operate properly under normal conditions. All personnel should have a good working knowledge of general start-up procedures.

The building must be completely finished before attempting to start-up the equipment, including doors, windows and insulation. All internal doors and walls

should be in place. In some cases, the internal decorations and furniture may influence overall system performance. The entire building should be as complete as possible before beginning any system balancing.

The initial step is to visually inspect all of the equipment, plenums, connecting ductwork and piping. Ensure that all systems are properly installed and supported and that all construction debris or foreign objects have been removed from the equipment.

Each unit should be checked for:

- Lint screen installed, clean and of the proper size and type (where applicable)
- Drain pan free of debris
- Proper ductwork is attached
- Supply and return grilles are in place and secure

Air system balancing

All ductwork must be complete and fully connected. All return and supply grilles, lint screens and panels must be properly installed before air balancing to ensure that the system is being balanced at the true system operating conditions.

Each individual unit and its attached ductwork is a unique system with its own operating characteristics. Because of this, air balancing is generally done by a trained balance specialist who are familiar with the procedures required to properly establish the fan system and air distribution operating conditions. This should not be attempted by unqualified personnel.

To accurately commission the primary air flow to the unit, measure the static pressure in the primary air plenum through the commissioning sample tube. To achieve this, remove the sealing plug from the commissioning sampling tube and connect the pressure-sensing instrument (digital manometer) to the commissioning sampling tube.

- Do not attempt to measure the static pressure in the flexible duct connection. Measure only at the provided commissioning sampling tube for commissioning purposes.

To obtain the designed primary air and total air flow rate, adjust the primary air volume balancing damper integral to the unit as necessary to obtain the primary air plenum pressure to achieve the specified/design primary air

flow using the plenum pressure versus primary air flow curve supplied for each unit. To adjust the damper use a 1/8" allen wrench to rotate the balancing damper. Access the damper through the outlet opening. The damper is not visible, only the operating rod is accessible. Rotate the rod clockwise to open and counter clockwise to close. Do not over tighten or force the control rod as it may cause damage.

Unit requires minimum 1.5" wg plenum pressure, maximum allowable plenum pressure is 5" wg.

After proper system operation is established, the actual unit air delivery for each unit should be measured and recorded for future reference.

Cooling/heating system

Prior to the water system start-up and balancing, the chilled/hot water system should be thoroughly flushed to clean out dirt and debris which may have accumulated in the piping during construction. During this procedure, all unit service valves must be in the closed position. This will prevent any foreign material from entering the unit's heat exchanger and clogging valves and metering devices. Strainers should be installed in

the piping mains to prevent this material from entering the units during normal operation.

During system filling, air venting from the unit is accomplished by the use of the standard, manual air vent that is installed at the top of each coil's header, if supplied by the manufacturer or alternately through another means supplied by the installing contractor. To vent the air from the coil, turn the slotted coin vent until all of the air has been vented from the coil. When water begins to escape from the vent, close the coin vent.

⚠ CAUTION

The air vents provided are not intended to replace the main system air vents and may not release air trapped in other parts of the system. Inspect the entire system for potential air traps and independently vent those areas as required. In addition, some systems may require repeated venting over time to fully eliminate air in the system.

Water system balancing

A complete knowledge of the hydronic system, including its components and controls, is essential to proper water system balancing and should only be completed by a qualified expert. The system must be complete, and all components must be in operating condition before beginning the water system balancing procedures.

Each hydronic system has different operating conditions depending on the devices and controls installed for the particular application. The actual

balancing technique may vary from one system to another.

For secondary water flow commissioning, a suitable balancing valve should be installed in order to measure and adjust the secondary water flow to the designed/specified value. Adjust the balancing valve in order to achieve the specified water flow rate per unit, according to the unit schedule. For 2-pipe heating or cooling systems, balance the water flow to the chilled water flow rate as specified. Use the air vent (if provided) to bleed air from the pipe system during the commissioning state. A flat head screw-driver can be used to loosen the vent screw.

After the proper system operation is established, the appropriate operating conditions such as water temperatures, flow rates and pressure drops should be recorded for future reference.

Before and during water system balancing, conditions may exist due to incorrect system pressures which may result in noticeable water noise or undesired valve operation. After the entire system is balanced, these conditions will not exist on properly designed systems. If any of these conditions persist, recheck the system for air that may not have been properly vented during start-up.

Water treatment

Proper water treatment is a specialized industry and therefore it is recommended to consult an expert in this field to analyze the water for compliance with the water quality parameters listed below and to specify the appropriate water treatment program. The expert may recommend rust inhibitors, scaling preventative, antimicrobial growth agents or algae preventatives. Anti-freeze solutions, glycols, may also be used to lower the freezing point. All Zehnder Rittling water coils are constructed of copper tubes and headers. It is the end user's responsibility to ensure that any of the water delivery components are compatible with the treated water.

Failure to provide proper water quality will void the induction unit's warranty.

Water content	Required concentration
Sulphate	< 200 ppm
pH	7.0 – 8.5
Chlorides	< 200 ppm
Nitrate	< 100 ppm
Iron	< 4.5 mg/L
Ammonia	< 2.0 mg/L
Manganese	< 0.1 mg/L
Dissolved solids	< 1000 mg/L
Calcium carbonate hardness	300 – 500 ppm
Calcium carbonate alkalinity	300 – 500 ppm
Particulate quantity	< 10 ppm
Particulate size	800 micron max

Normal operation and periodic maintenance

General

Each unit on a project will have its own unique operating environment and conditions which dictate a maintenance schedule for that unit that may be different from other equipment on the project. A formal regular maintenance schedule and an individual unit log should be established and maintained. Following this schedule will help maximize the performance and service life of each unit on the project.

The safety considerations listed in the front of this manual should be followed during any service and maintenance operations.

Operating instructions

The water control units control room temperature by means of a field-supplied water flow control valve that modulates the flow of hot or chilled water through the unit coil. Primary air from the central station air handling apparatus flows through high pressure, high velocity ductwork to the water control induction unit. The conditioned primary air flows through the unit plenum and then passes through a balancing damper into induction nozzles. As the primary air leaves the nozzles, it induces secondary (room) air through the unit coil. Depending on the temperature of the water flowing through the coil, the secondary air is cooled or heated. Unit capacity is controlled either manually or by a field-supplied room thermostat modulating a field-supplied water control

valve. The valve, in turn, modulates water flow through the coil to maintain the desired temperature.

Maintenance instructions

Coil

Coils may be cleaned by removing the surrounding enclosure. Brush the entire finned surface with a soft bristled brush, brushing parallel to the fins, taking care not to damage the fins. Brushing should be followed by cleaning with a vacuum cleaner. If fins are damaged during the cleaning process, a 12 fins per inch fin comb can be used to straighten the fins.

For a deeper cleaning, spray the finned surface with a neutral cleaning solution and rinse thoroughly. Zehnder Rittling recommends using neutral pH cleaners. Avoid the use of strong acids and strong base cleaners. Thus, cleaners with pH range from 5 to 11 are suitable for coil cleaning. This range includes such over-the-counter cleaners as Simple Green® All Purpose Cleaner, or HVAC coil cleaners like Nu-Calgon Evap Pow'r®. Strong acidic cleaners (pH of 5 or less) that contain hydrochloric, sulfuric, nitric or acetic acid are not recommended for use on copper-tube, aluminum fin coils. Presence of these acids will result in rapid corrosion of the metals. Strong alkali (base) cleaners (pH of 11 or more) containing sodium, potassium or ammonium hydroxide are not recommended as they will aggressively corrode aluminum tubes and fins. Strong ammonium hydroxide cleaners will also cause stress corrosion cracking of copper tubes. Zehnder Rittling recommends completely rinsing all cleaners from the coil, including cleaners identified as no-rinse cleaners. Residual cleaners may decompose over time producing low molecular weight, organic acids that lead to formicary corrosion.

Failure to maintain a clean coil surface will result in reduced airflow and reduced performance. Clean the coil at every inspection. Units provided with the proper type of air filters or lint screens, replaced regularly, will require less frequent coil cleaning.

Coil removal

- Shut off water to and from unit. Disconnect lines to and from coil.
- Remove coil end cover.
- Remove the (2) sheet metal screws fastening condensate pan to unit.
- Remove the (4) sheet metal screws fastening coil to unit and remove coil.
- Install new coil in reverse.

Lint screens

These types of filters should be cleaned on a regular basis. The time interval between cleaning is dependent upon the environment in which the unit is operating and should be established based on regular inspection of the lint screen. Record the time interval in the maintenance log for future reference.

Remove unit front panel for access. Clean screen with soft brush or vacuum.

Drain

The drain pan and drain (where applicable) should be checked during initial start-up and at the beginning of each cooling season to ensure that the pan, drain, trap and line are all clear. If clogged, steps should be taken to clear the debris to allow proper flow of condensate.

Normal operation and periodic maintenance

⚠ CAUTION

Failure to do this may result in significant property damage and void the manufacturer's warranty. The manufacturer will not be responsible for any consequential damages due to water.

Periodic checks of the drain (where applicable) should be made during the cooling season to maintain a free-flowing condensate.

Should the growth of algae and/or bacteria be a concern, consult an air-conditioning and refrigeration supply company familiar with local conditions for chemicals or other solutions available to control these substances.

Foreign object in unit

Vacuum unit to remove debris dropped through discharge grille.

Controls

Refer to control manufacturer's instructions for maintenance of field-supplied room thermostat and water control valve.

Replacement parts

Factory replacement parts should be used wherever possible to maintain unit performance, it's normal operating characteristics and its safety testing agency listings.

Replacement parts may be purchased through the local Zehnder Rittling sales representative.

Contact the local sales representative or factory before attempting any unit modifications. Any modifications not authorized by the factory could result in personnel injury, damage to the unit, and will void the manufacturer's warranty.

When ordering parts, the following information should be supplied to ensure proper part identification:

- Complete unit model number
- Unit serial number
- Complete part description including any identifying numbers on the part

On warranty replacements, it is often necessary to return the faulty component to receive credit. Contact the local sales representative who will get authorization from the factory including an RGA (returned goods authorization) to be used when sending components back for inspection. Any returned components sent back to the factory without the proper RGA attached will cancel any outstanding credit.

Troubleshooting

Troubleshooting water control unit (room too hot or cold)

	Possible Cause	Remedy
System on cooling	Incorrect thermostat setting	Room too cold - move thermostat knob to warmer position until control valve closes. Room too hot - move knob to cooler position until control valve opens.
	Defective controls	Check control manufacturer's instructions
	Unit operating at other design conditions	Check primary airflow (nozzle pressure), primary air temperature and secondary water temperature. Correct to design conditions.
System on heating	Incorrect thermostat setting	Room too cold - move thermostat knob to warmer position until control valve opens. Room too hot - move knob to cooler position until control valve closes.
	Defective controls	Check control manufacturer's instructions
	Unit operating at other design conditions	Check primary airflow (nozzle pressure), primary air temperature and secondary water temperature. Correct to design conditions.

Equipment start-up checklist

Receiving and inspection

- Unit received undamaged
- Unit received complete as ordered
- Unit arrangement and handling is correct
- Unit structural support is complete and correct

Handling and installation

- Unit mounted level and square
- Proper access is provided for unit and accessories
- Proper chilled/hot water line sizes to unit
- All services to unit in code compliance
- Unit protected from dirt and foreign matter

Cooling/heating connections

- Connect field piping to unit
- Pressure test all piping for leaks
- Install drain lines and traps, as required
- Insulate all piping, as required

Ductwork connections

- Install ductwork, fittings and grilles, as required
- Flexible duct connections at unit
- Proper supply and return grille type and size
- Control outside air for freeze protection
- Insulate all ductwork, as required

Unit start-up

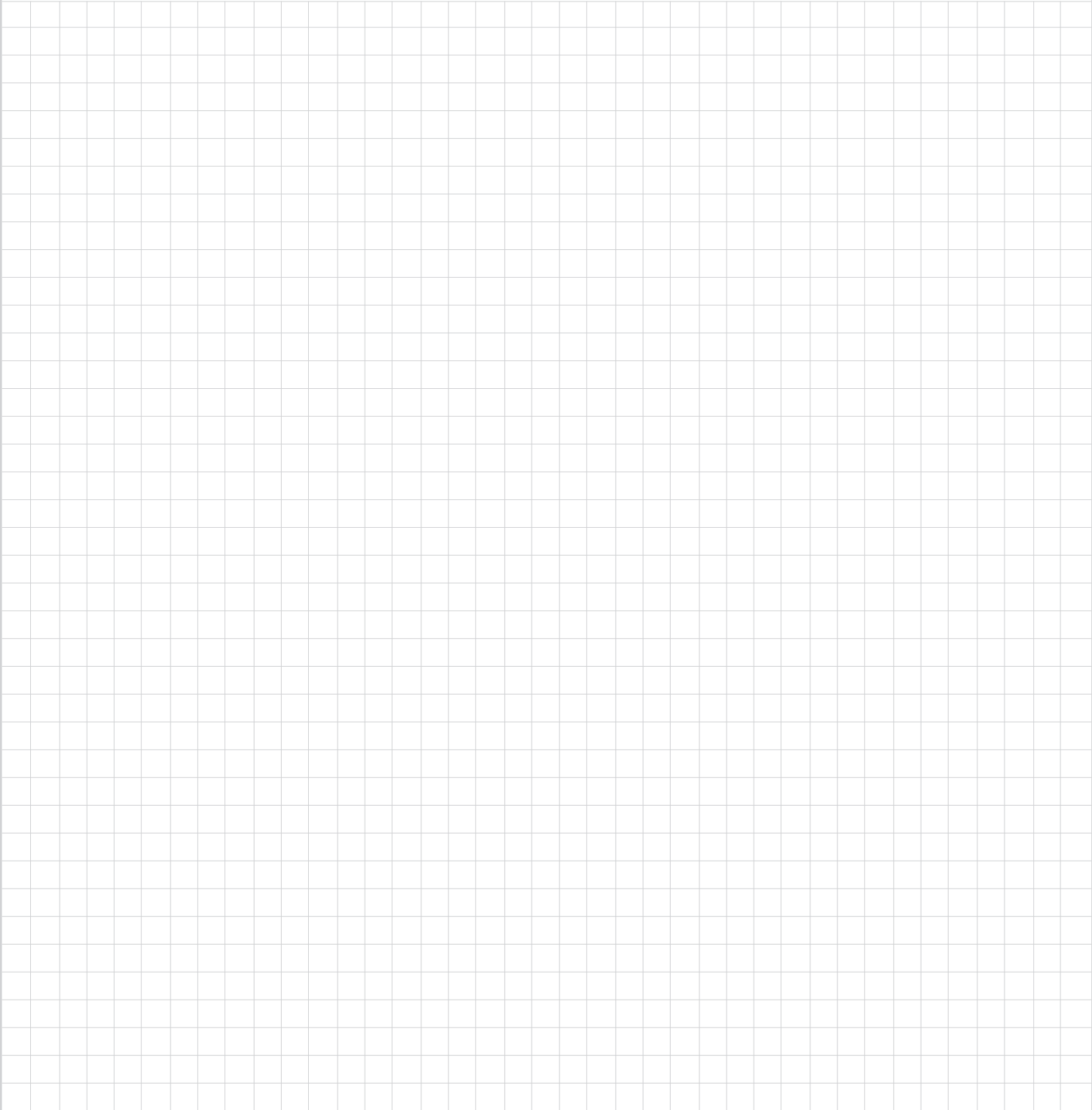
- General visual inspection and system inspection
- Close all unit isolation valves
- Flush water systems
- After system has been flushed, ensure all isolation valves are open

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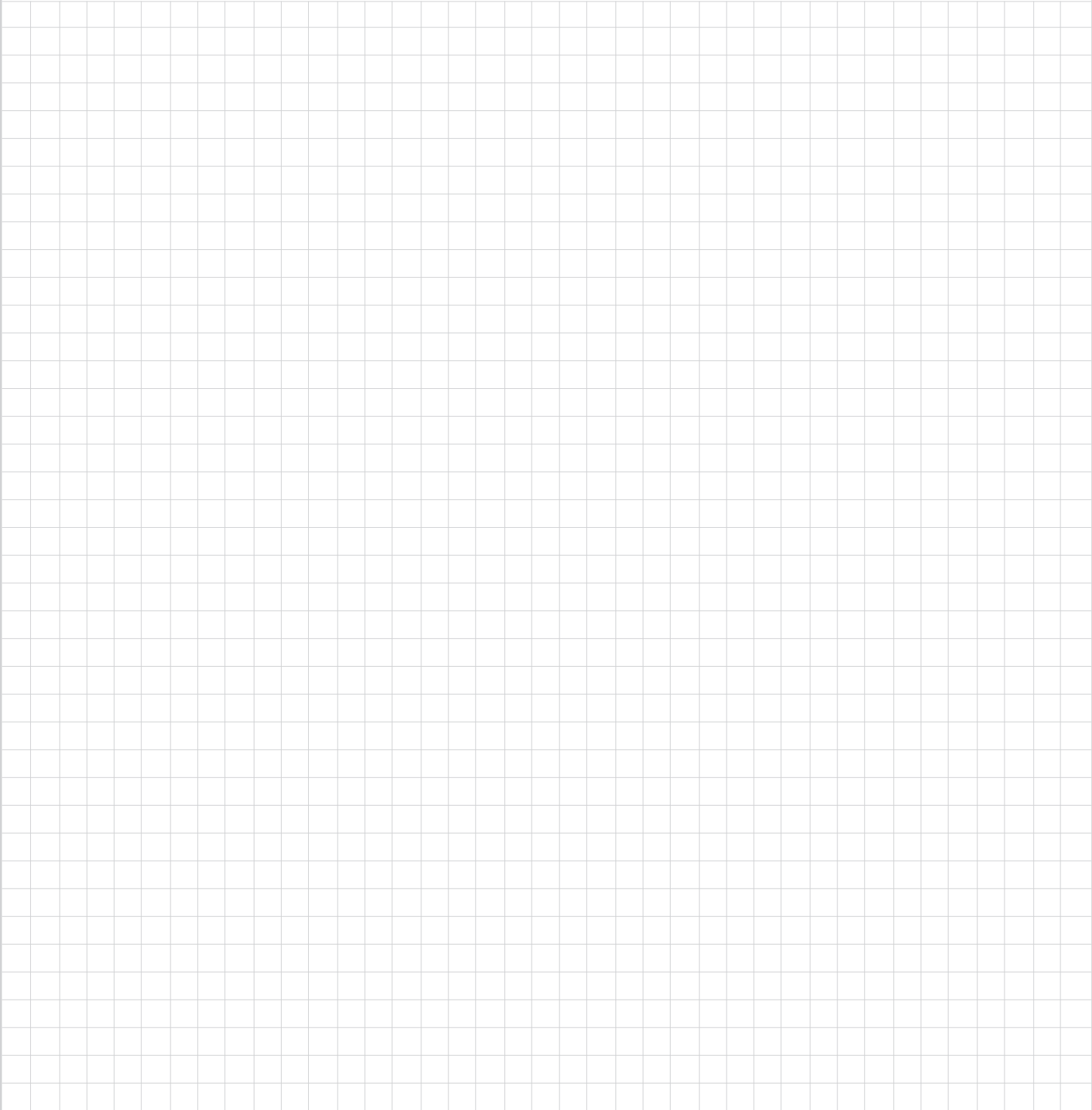


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