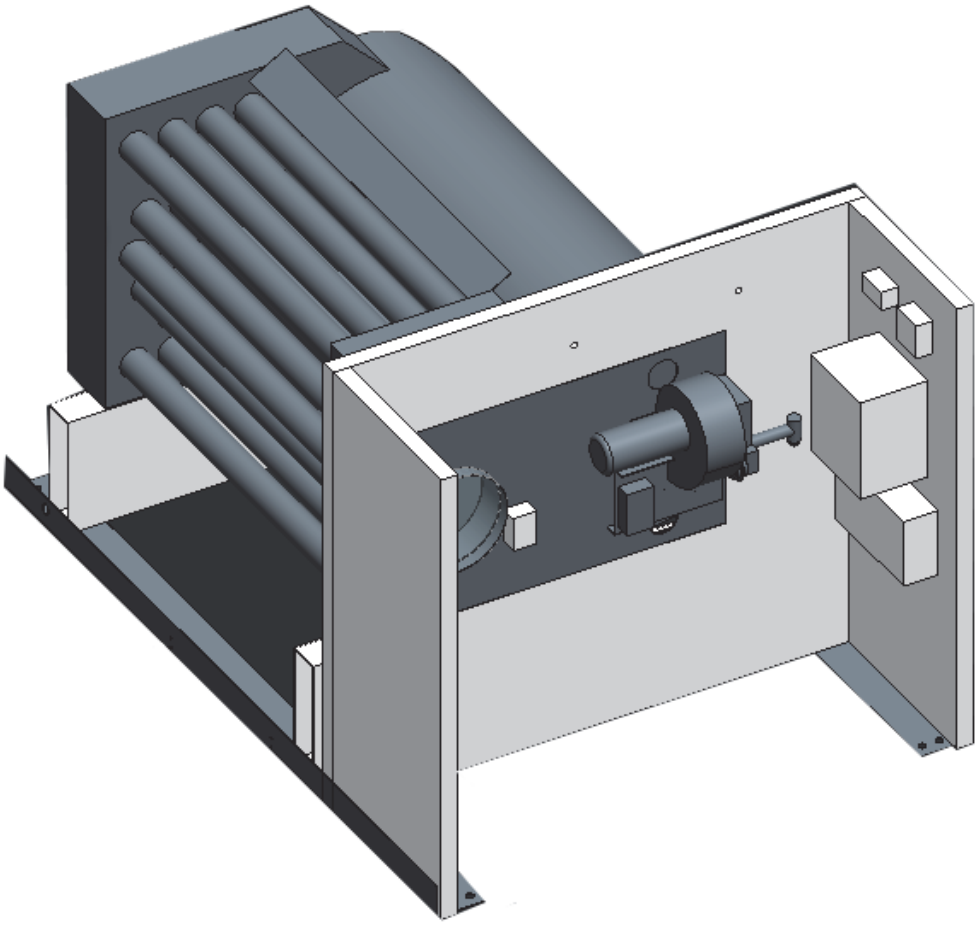
Quick Reference Guide

Gas Heat for Performance Climate Changer™ Air Handlers

Model CSAA



March 2020 **CLCH-PRC027E-EN**

Introduction

The gas heat section consists of either an inshot tube gas heat exchanger or a drum-and-tube heat exchanger, burner, gas train components, and a control panel for electrical connections. It is an integral part of the entire air-handling system.

An access door is provided for service and maintenance of the burner and gas train components.

The gas heat section must be in a blow-thru position downstream from the supply fan. Downstream sections must be separated by a blank access section and discharge temperatures must be controlled so as not to exceed the temperature limits of components in the downstream sections. For drum and tube heaters with direct drive plenum supply fans, a small diffuser section is required between the fan and the gas heat section.

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Revision History

Updated Gas Heat —Inshot MBh output table.

Table of Contents

General Information

Gas Heat — Inshot

Table 1. MBh output — gas heat — Inshot

MBh Input	MBh Output	Unit Size	4	6	8	10	12	14	17	21	25	30
		Nominal cfm	2000	3000	4000	5000	6000	7000	8500	10500	12500	15000
		Minimum cfm	1500	2250	3000	3750	4500	5250	6375	7875	9375	11250
120	95	Min MBh Output	19	19								
		Nom Temp Rise	43	29								
		Max Temp Rise	58	38								
		Min Temp Rise	12	8								
250	205	Min MBh Output	21	21	21	21						
		Nom Temp Rise	93	62	47	37						
		Max Temp Rise	101	83	62	50						
		Min Temp Rise	12	8	6	5						
400	325	Min MBh Output		33	33	33						
		Nom Temp Rise		98	74	59						
		Max Temp Rise		101	98	79						
		Min Temp Rise		13	10	8						
500	405	Min MBh Output			41	41						
		Nom Temp Rise			92	74						
		Max Temp Rise			101	98						
		Min Temp Rise			12	10						
300	240	Min MBh Output					24	24	24			
		Nom Temp Rise					36	31	26			
		Max Temp Rise					48	42	34			
		Min Temp Rise					5	4	3			
400	325	Min MBh Output					33	33	33			
		Nom Temp Rise					49	42	35			
		Max Temp Rise					66	56	46			
		Min Temp Rise					7	6	5			
600	485	Min MBh Output					49	49	49			
		Nom Temp Rise					73	63	52			
		Max Temp Rise					98	84	69			
		Min Temp Rise					10	8	7			
775	625	Min MBh Output								31	31	31
		Nom Temp Rise								54	45	38
		Max Temp Rise								72	61	51
		Min Temp Rise								4	3	3
1200	970	Min MBh Output								49	49	49
		Nom Temp Rise								84	71	59
		Max Temp Rise								101	94	78
		Min Temp Rise								6	5	4

Gas Heat Application Rules — Inshot

- The maximum allowable temperature rise is as listed in table for minimum cfm.
- Nominal airflow is based on 500 fpm through a nominal coil (i.e. 500 x unit size 8 = 4000 cfm).
- The minimum allowable airflow at full fire is 75 percent of the nominal airflow (i.e. 0.75 x 500 x unit size 8 = 3000 cfm).
- The minimum allowable airflow at reduced fire is 50 percent of the nominal airflow (i.e. 0.50 x 500 x unit size 8 = 2000 cfm).
- Calculate temperature rise at airflows other than nominal with this equation: Temp Rise = (1000 x MBh) / (1.1 x CFM)
- On high altitude applications, derate the heating capacity (MBh) by 4 percent for every 1,000 feet of altitude over 2,000 feet above sea level.
- Temperature rise is listed for nominal cfm/minimum cfm.

Motor and Electrical Specifications - Inshot

Table 2. Motor and electrical specifications

Specifications	Gas Heater Input Power	Inducer Motor[a]	Control Power[a]
Volts		115	115
Hertz	60	60	60
Phase		1	1
HP	n/a		n/a
FLA/Amps	n/a		6

(a) Powered by a “line to 115 volt” transformer for all gas heaters except 115/60/1 rated units.

Gas Heat — Drum and Tube

Table 3. MBh output — gas heat — drum and tube, sections size 6 to 30

MBh Output	Unit Size	6	8	10	12	14	17	21	25	30
	Nominal cfm	3000	4000	5000	6000	7000	8500	10500	12500	15000
	Minimum cfm	2250	3000	3750	4500	5250	6375	7875	9375	11250
200	Min MBh Output	30	30	30	30	30	30	30	30	
	Nom Temp Rise	61	45	36	30	26	21	17	15	
	Max Temp Rise	81	61	48	40	35	29	23	19	
	Min Temp Rise	12	9	7	6	5	4	3	3	
300	Min MBh Output	30	30							
	Nom Temp Rise	91	68							
	Max Temp Rise	101	91							
	Min Temp Rise	12	9							
320	Min MBh Output			30	30	30	30	30	30	30
	Nom Temp Rise			58	48	42	34	28	23	19
	Max Temp Rise			78	65	55	46	37	31	26
	Min Temp Rise			7	6	5	4	3	3	2
360	Min MBh Output			56	56	56	56	56	56	56
	Nom Temp Rise			65	55	47	39	31	26	22
	Max Temp Rise			87	73	62	51	42	35	29
	Min Temp Rise			14	11	10	8	6	5	5
560	Min MBh Output						56	56	56	56
	Nom Temp Rise						60	48	41	34
	Max Temp Rise						80	65	54	45
	Min Temp Rise						8	6	5	5
700	Min MBh Output						80	80	80	80
	Nom Temp Rise						75	61	51	42
	Max Temp Rise						100	81	68	57
	Min Temp Rise						11	9	8	6
860	Min MBh Output							80	80	80
	Nom Temp Rise							74	63	52
	Max Temp Rise							99	83	69
	Min Temp Rise							9	8	6
1000	Min MBh Output							150	150	150
	Nom Temp Rise							87	73	61
	Max Temp Rise							101	97	81
	Min Temp Rise							17	15	12

Table 4. MBh output — gas heat — drum and tube, sections size 35 to 120

MBh Output	Unit Size	35	40	50	57	66	80	100	120
	Nominal cfm	17500	20000	25000	28500	33000	40000	50000	60000
	Minimum cfm	13125	15000	18750	21375	24750	30000	37500	45000
320	Min MBh Output	30							
	Nom Temp Rise	17							
	Max Temp Rise	22							
	Min Temp Rise	2							
360	Min MBh Output	56							
	Nom Temp Rise	19							
	Max Temp Rise	25							
	Min Temp Rise	4							
560	Min MBh Output	56	56	56	56				
	Nom Temp Rise	29	25	20	18				
	Max Temp Rise	39	34	27	24				
	Min Temp Rise	4	3	3	2				
700	Min MBh Output	80	80	80	80	80			
	Nom Temp Rise	36	32	25	22	19			
	Max Temp Rise	48	42	34	30	26			
	Min Temp Rise	6	5	4	3	3			
860	Min MBh Output	80	80	80	80	80	80		
	Nom Temp Rise	45	39	31	27	24	20		
	Max Temp Rise	60	52	42	37	32	26		
	Min Temp Rise	6	5	4	3	3	2		
1000	Min MBh Output	150	150	150	150	150	150	150	150
	Nom Temp Rise	52	45	36	32	28	23	18	15
	Max Temp Rise	69	61	48	43	37	30	24	20
	Min Temp Rise	10	9	7	6	6	5	4	3
1250	Min MBh Output	150	150	150	150	150	150	150	150
	Nom Temp Rise	65	57	45	40	34	28	23	19
	Max Temp Rise	87	76	61	53	46	38	30	25
	Min Temp Rise	10	9	7	6	6	5	4	3
1500	Min MBh Output	150	150	150	150	150	150	150	150
	Nom Temp Rise	78	68	55	48	41	34	27	23
	Max Temp Rise	101	91	73	64	55	45	36	30
	Min Temp Rise	10	9	7	6	6	5	4	3
1750	Min MBh Output	200	200	200	200	200	200	200	200
	Nom Temp Rise	91	80	64	56	48	40	32	27
	Max Temp Rise	101	101	85	74	64	53	42	35
	Min Temp Rise	14	12	10	9	7	6	5	4

Table 4. MBh output — gas heat — drum and tube, sections size 35 to 120 (continued)

MBh Output	Unit Size	35	40	50	57	66	80	100	120
	Nominal cfm	17500	20000	25000	28500	33000	40000	50000	60000
	Minimum cfm	13125	15000	18750	21375	24750	30000	37500	45000
2000	Min MBh Output			200	200	200	200	200	200
	Nom Temp Rise			73	64	55	45	36	30
	Max Temp Rise			97	85	73	61	48	40
	Min Temp Rise			10	9	7	6	5	4
2400	Min MBh Output					150	150	150	150
	Nom Temp Rise					66	55	44	36
	Max Temp Rise					88	73	58	48
	Min Temp Rise					6	5	4	3

Gas Heat Application Rules — Drum and Tube

- The maximum allowable temperature rise is as listed in table for minimum cfm.
- Nominal airflow is based on 500 fpm through a nominal coil (i.e. 500 x unit size 8 = 4000 cfm).
- The minimum allowable airflow at full fire is 75 percent of the nominal airflow (i.e. 0.75 x 500 x unit size 8 = 3000 cfm).
- The minimum allowable airflow at reduced fire is 50 percent of the nominal airflow (i.e. 0.50 x 500 x unit size 8 = 2000 cfm).
- Calculate temperature rise at airflows other than nominal with this equation: Temp Rise = (1000 x MBh) / (1.1 x CFM)
- On high altitude applications, derate the heating capacity (MBh) by 4 percent for every 1,000 feet of altitude over 2,000 feet above sea level.
- Temperature rise is listed for nominal cfm/minimum cfm.
- 20:1 turndown ratio option is available on unit sizes 35 through 120 with 1250 MBH burner capacity and greater.
- The 2,500 MBH burner option is only available with 20:1 turndown ratio capacity control.

Gas Heat Vestibule

All inshot tube design heat exchangers have in internal vestibule. For drum and tube exchangers, the vestibule may be internal or external. Depending on the heater size, an external vestibule that extends the width of the gas heat section may be used to house the burner and gas train components (see Figure 1). The external vestibule, if required, ships attached to the gas heat section. Some heaters have gas train components in an internal vestibule (see Figure 2). Refer to Figure 5, p. 10 for vestibule locations.

Figure 1. Gas heat section with external vestibule

Figure 2. Gas heat section with internal vestibule

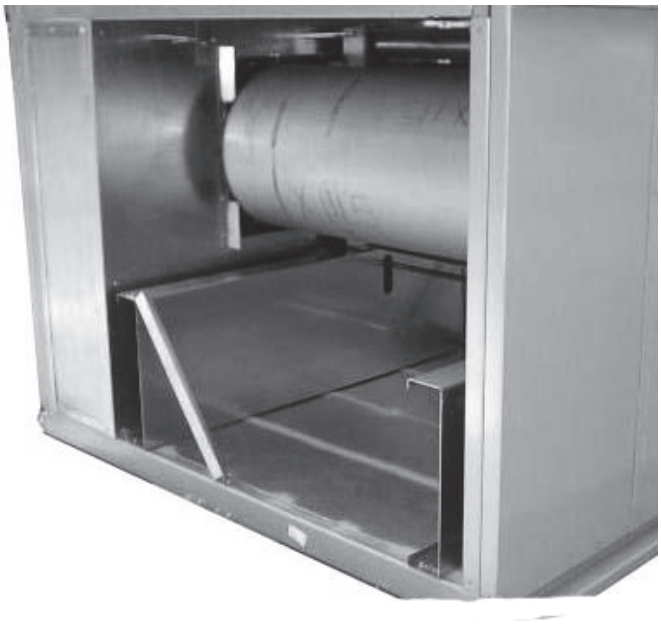

Table 5. Vestibule locations — drum-and-tube exchanger

Size	Gas Output (MBh)	Vestibule Type	Size	Gas Output (MBh)	Vestibule Type	Size	Gas Output (MBh)	Vestibule Type
6	200	Ext	35	320/360	Int	66	700	Int
	300	Ext		560	Int		860	Int
8	200	Ext		700	Int		1000	Int
	300	Ext		860	Int		1250	Int
10	200	Ext		1000	Ext		1500	Int
	320/360	Ext		1250	Ext		1750	Int
12	200	Int		1500	Ext		2000	Ext
	320/360	Ext		1750	Ext		2400	Ext
14	200	Int	40	560	Int	80	860	Int
	320/360	Ext		700	Int		1000	Int
17	200	Int		860	Int		1250	Int
	320/360	Ext		1000	Ext		1500	Int
	560	Ext		1250	Ext		1750	Int
	700	Ext		1500	Ext		2000	Ext
21	200	Int		1750	Ext		2400	Ext
	320/360	Ext	50	560	Int	100	1000	Int
	560	Ext		700	Int		1250	Int
	700	Ext		860	Int		1500	Int
	860	Ext		1000	Int		1750	Int
	1000	Ext		1250	Ext		2000	Int
25	320/360	Ext		1500	Ext		2400	Ext
	560	Ext		1750	Ext	120	1000	Int
	700	Ext		2000	Ext		1250	Int
	860	Ext	57	560	Int		1500	Int
	1000	Ext		700	Int		1750	Int
30	320/360	Int		860	Int		2000	Int
	560	Int		1000	Int		2400	Int
	700	Int		1250	Ext			
	860	Int		1500	Ext			
	1000	Ext		1750	Ext			
				2000	Ext			

Motor and Electrical Specifications — Drum and Tube

Table 6. Motor and electrical specifications

Specifications	Gas Heater Input Power	Burner Motor[a]	Control Power[a]	Exhaust Motor
Volts		115	115	
Hertz	60	60	60	60
Phase		1	1	
HP	n/a		n/a	
FLA/Amps	n/a		6	
MCA		n/a	n/a	n/a
MOP		n/a	n/a	n/a

(a) Powered by a “line to 115 volt” transformer for all gas heaters except 115/60/1 rated units.

Dimensions and Weights

Service Clearance Recommendations

A minimum clearance of the section width plus 12 inches on the access door side of the gas heat section is recommended for routine maintenance. This clearance provides enough room to replace the heat exchanger in the event of failure. The section side panels must be removed to access the heat exchanger.

Figure 1. Service clearance for indoor units

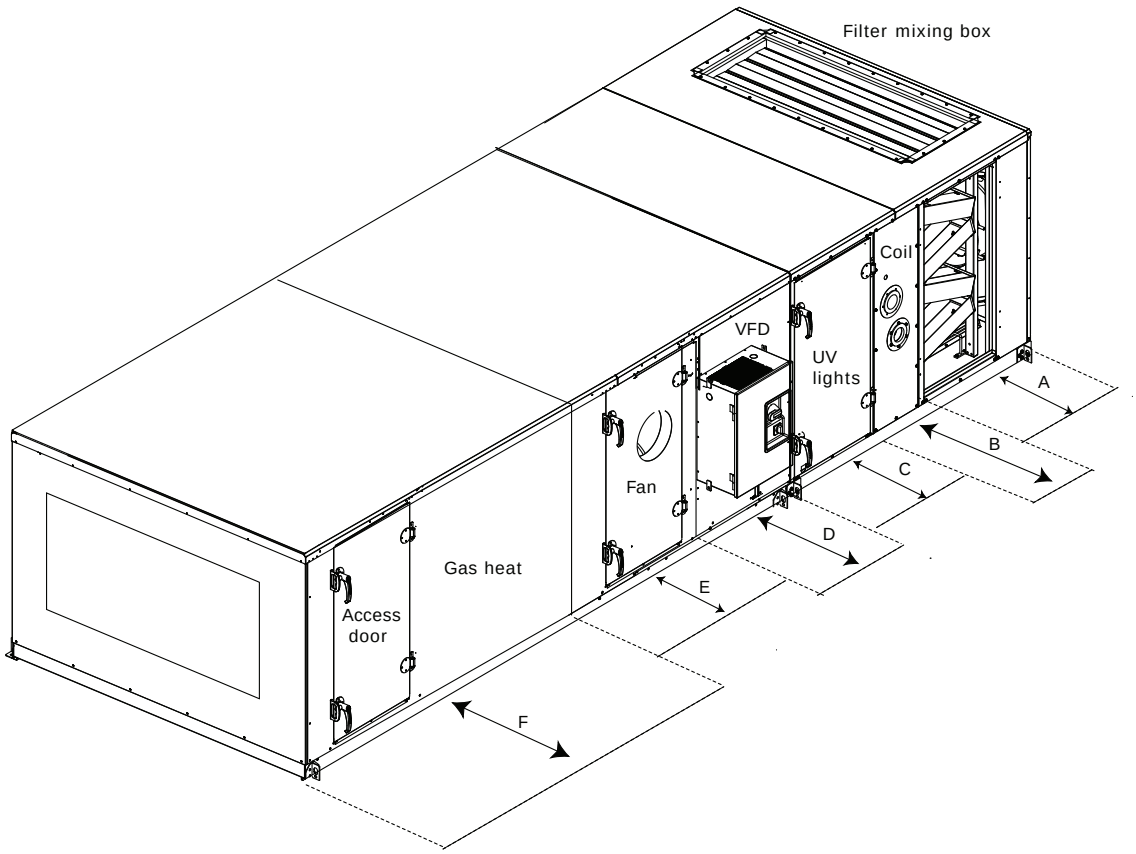

Table 1. Service clearance dimensions (inches)

Component	4	6	8	10	12	14	17	21	25	30	35	40	50	57	66	80	100	120
F (gas heat external vestibule)	n/a	89	90	108	100	100	105	115	115	118	136	140	156	156	170	179	180	n/a
F (gas heat internal vestibule)	56	56	63	74	79	84	84	92	92	106	112	125	138	138	153	153	167	194

Notes: At a minimum, the above clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, hoods, pipe cabinets, etc. Sufficient clearance must be provided on all sides of unit for removal of access panels, plug panels, or section-to-section attachment brackets. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements. For specific dimensional and weight information, refer to the unit submittals. The dimensions and weights in this manual are approximate. Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

Dimensions and Weight Tables

Table 2. Gas heat dimensions (inches) and weights (pounds) — Inshot

Unit Size	Output Capacity MBh	Length	Weight
004	95	41.136	432
	205	56.636	625
006	95	41.136	441
	205	56.636	636
	325	74.136	856
008	205	56.636	691
	325	74.136	919
	405	84.136	1027
010	205	56.636	733
	325	74.136	970
	405	84.136	1068
012	240	44.386	639
	325	57.386	854
	485	67.136	997
014	240	44.386	657
	325	57.386	875
	485	67.136	1021
017	240	44.386	686
	325	57.386	910
	485	67.136	1060
021	650	66.006	1348
	970	81.006	1646
025	650	66.006	1391
	970	81.006	1695
030	650	66.006	1453
	970	81.006	1767

Table 3. Gas heat dimensions (inches) and weights (pounds) — drum and tube

Unit Size	Output Capacity MBh	Length	Weight
6	200	57.00	753
	300	73.00	901
8	200	57.00	798
	300	73.00	954
10	200	59.00	953
	320/360	77.00	1093
12	200	57.00	913
	320/360	73.00	1132
14	200	57.00	937
	320/360	68.00	1128
17	200	60.00	1011
	320/360	71.00	1211
	560	71.00	1192
	700	83.00	1480
21	200	60.00	1075
	320/360	69.00	1265
	560	69.00	1247
	700	75.00	1503
	860	81.00	1606
	1000	87.00	1364
25	320/360	69.00	1348
	560	65.00	1307
	700	75.00	1599
	860	81.00	1711
	1000	90.00	1497
30	360/360	66.00	1299
	560	66.00	1442
	700	76.00	1746
	860	76.00	1805
	1000	85.00	1560
35	320/360	66.00	1402
	560	66.00	1595
	700	73.00	1895
	860	80.00	2046
	1000	80.00	1724
	1250-1750	101.00	2541
40	560	64.00	1468
	700	75.00	1804
	860	75.00	2099
	1000	81.00	1845
	1250-1750	105.00	2718

Table 3. Gas heat dimensions (inches) and weights (pounds) — drum and tube (continued)

Unit Size	Output Capacity MBh	Length	Weight
50	560	64.00	1854
	700	74.00	2191
	860	74.00	2281
	1000	77.00	2325.57
	1250-1750	106.00	3267
	2000	114.00	3759
57	560	64.00	1901
	700	74.00	2242
	860	74.00	2332
	1000	77.00	2083
	1250-1750	106.00	2943
	2000	114.00	3430
66	700	74.00	2491
	860	74.00	2581
	1000	74.00	2301
	1250-1750	109.00	3309
	2000	112.00	3688
	2400	118.00	3890
80	860	74.00	2199
	1000	74.00	1919
	1250-1750	109.00	2950
	2000	112.00	3320
	2400	112.00	3455
100	1000	84.00	3156
	1250-1750	92.00	3879
	2000	109.00	4504
	2400	121.00	4716
120	1000	92.00	3125
	1250-1750	102.00	3887
	2000	109.00	4391
	2400	119.00	4669

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