

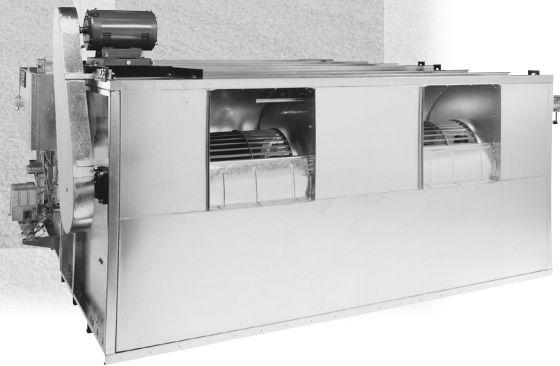
DFM Direct Fired Gas Heating System

Technical Guide for:

Indoor Mounted Units
To 64,000 CFM
And 9M BTUH

Applied Air

Keeps You



Warm

Featuring the Patented AdaptAir[®]
controlled Air Circulation System



Applied Air[®]



DFM Direct Fired Gas Heating System Technical Guide

Applied Air®

In the business of commercial and industrial operations, efficient and low-cost heating is essential. Applied Air keeps you warm for less.

Since 1975, Applied Air has been providing cost-effective, reliable gas heating solutions. Our proven Direct Fired Gas Heating System adds warm, fresh and clean air to your work environment for greater comfort and productivity.

This Technical Guide will help you choose an Applied Air Direct Fired Gas Heating System to provide efficient, cost-effective heating for your warehouse, factory or process operation. The Guide covers:

- Technical Specifications — Configure the right system components (e.g., burner, motors, drive, filter, options, etc.) to meet your needs.
- Installation Information — Plan details of on-site installation with dimensional information and cabinet arrangement diagrams.

If you have questions, please contact Applied Air's Customer Service Department at 214-638-6010. We'll be glad to help.

To add evaporative cooling, refer to the Applied Air ECS Evaporative Cooling System brochure.

Applied Air

Keeps You

Warm

In the interest of product improvement, Applied Air reserves the right to make changes without notice.

Table of Contents



Applied Air[®]

Air Delivery Tables	4-5
Burner Performance Table	6-7
Dimensions	
Horizontal Units	8-9
Vertical Units	10-11
Return Air Sections	12
Filter Banks	13
Inlet Dampers	14
Discharge Louvers	15
Fixed and Revolving Discharge Options ...	16-23
Control Systems	24-27
Amp Draw Table	28
Sequence of Operation	29
Typical Gas Piping Layout	30
Cabinet Arrangements	31
Unit Weights	32
Guide Specification – Basic Unit	33
Guide Specification – Mixing Dampers With Return Air Flow System	34
Guide Specification – Touchscreen Controller	35

Air Delivery Table

Blower HP Selection										
Unit Model	CFM Std. Air @ 70°	FPM Outlet Velocity	Total External Static Pressure (W.C.)							
			1/4" HP	3/8" HP	1/2" HP	3/4" HP	1" HP	1 1/4" HP	1 1/2" HP	2" HP
109	1600	1914	1	1	1	1	—	—	—	—
	1900	2273	1	1	1 1/2	1 1/2	1 1/2	1 1/2	2	—
	2200	2632	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	3
	2600	3110	2	2	2	2	3	3	3	3
	3000	3589	3	3	3	3	3	3	3	5
112	3250	2257	1 1/2	2	2	2	2	3	3	3
	3500	2431	2	2	2	2	3	3	3	3
	3750	2604	2	2	3	3	3	3	3	5
	4000	2778	3	3	3	3	3	3	5	5
	4250	2951	3	3	3	3	3	5	5	5
115	4500	2239	2	2	3	3	3	3	5	—
	5000	2488	3	3	3	3	3	5	5	5
	5500	2736	3	3	3	3	5	5	5	5
	6000	2985	3	5	5	5	5	5	5	7 1/2
118	6500	2265	3	5	5	5	5	5	5	7 1/2
	7000	2439	5	5	5	5	5	5	7 1/2	7 1/2
	7500	2613	5	5	5	5	5	7 1/2	7 1/2	7 1/2
	8000	2787	5	5	5	5	7 1/2	7 1/2	7 1/2	7 1/2
	8500	2962	5	5	5	7 1/2	7 1/2	7 1/2	7 1/2	10
120	9000	2143	5	5	5	5	7 1/2	7 1/2	7 1/2	—
	9500	2262	5	5	5	7 1/2	7 1/2	7 1/2	7 1/2	—
	10,000	2381	5	5	5	7 1/2	7 1/2	7 1/2	7 1/2	10
	10,500	2500	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10
	11,000	2619	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10
122	11,000	2157	5	5	7 1/2	7 1/2	7 1/2	7 1/2	10	—
	12,000	2353	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10	15
	13,000	2549	7 1/2	7 1/2	7 1/2	10	10	10	10	15
	14,000	2745	7 1/2	10	10	10	10	15	15	15
	15,000	2941	—	10	10	10	15	15	15	15
125	14,000	2086	7 1/2	7 1/2	7 1/2	7 1/2	10	—	—	—
	15,000	2235	7 1/2	7 1/2	7 1/2	10	10	10	15	—
	16,000	2385	7 1/2	7 1/2	7 1/2	10	10	15	15	—
	18,000	2683	10	10	10	10	15	15	15	15
	20,000	2981	15	15	15	15	15	15	15	20
130	22,000	2486	10	10	10	15	15	15	15	—
	24,000	2581	10	15	15	15	15	15	20	20
	26,000	2796	15	15	15	15	20	20	20	25
	28,000	3011	15	15	15	20	20	20	20	25
	30,000	3226	20	20	20	20	20	25	25	30

NOTE:

The horsepower selections are based on system external static pressure. One or more of the following must be added when applicable.

- A. Motor Operated Inlet Damper .13" W.C.
- B. V-Bank Filter Section .25" W.C.
- C. Discharge Louver .13" W.C.
- D. 5F or 5R Discharge pg 18-19
- E. 8F or 8R Discharge pg 22-23

SELECTION GUIDE

1. Determine the required amount of replacement air (CFM) by computing the total amount of air being exhausted. (Restaurants should be sized for 90% of exhaust air to minimize food odors.)
2. Determine the total external static pressure by adding the pressure drops through all accessories and ducts.
3. Select unit sizes and motor horsepower from table.

Air Delivery Table

Blower HP Selection										
Unit Model	CFM Std. Air @ 70°	FPM Outlet Velocity	Total External Static Pressure (W.C.)							
			1/4" HP	3/8" HP	1/2" HP	3/4" HP	1" HP	1 1/4" HP	1 1/2" HP	2" HP
215	9000	2239	5	5	5	5	5	—	—	—
	9500	2363	5	5	5	5	7 1/2	7 1/2	—	—
	10,000	2488	5	5	5	7 1/2	7 1/2	7 1/2	7 1/2	—
	10,500	2612	5	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	—
	11,000	2736	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10
	11,500	2861	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10
	12,000	2985	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10	15
218	12,500	2178	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	—	—	—
	13,000	2265	7 1/2	7 1/2	7 1/2	7 1/2	10	10	—	—
	14,000	2439	7 1/2	7 1/2	7 1/2	10	10	10	15	—
	15,000	2613	7 1/2	10	10	10	10	15	15	15
	16,000	2787	10	10	10	10	15	15	15	15
	17,000	2962	10	10	10	15	15	15	15	20
220	18,000	2143	7 1/2	10	10	10	15	15	15	—
	19,000	2262	10	10	10	10	15	15	15	—
	20,000	2381	10	10	10	15	15	15	15	20
	21,000	2500	10	15	15	15	15	15	20	20
	22,000	2619	15	15	15	15	15	15	20	20
	23,000	2738	15	15	15	15	15	20	20	20
	24,000	2857	15	15	15	15	20	20	20	25
	25,000	2976	15	15	15	20	20	20	20	25
26,000	3095	15	20	20	20	20	20	25	25	
222	25,000	2451	15	15	15	15	20	20	20	25
	26,000	2549	15	15	15	20	20	20	20	25
	27,000	2647	15	15	15	20	20	20	25	25
	28,000	2745	15	20	20	20	20	25	25	30
	29,000	2843	20	20	20	20	25	25	25	30
	30,000	2941	20	20	20	20	25	25	25	30
	31,000	3039	20	20	20	25	25	25	30	30
225	30,000	2235	15	15	15	15	20	20	—	—
	32,000	2385	15	15	15	20	20	25	25	—
	34,000	2534	15	20	20	20	20	25	25	30
	36,000	2683	20	20	20	20	25	25	30	30
	38,000	2832	20	20	20	25	25	30	30	40
	40,000	2981	20	25	25	25	30	30	30	40
	42,000	3130	25	25	25	30	30	30	40	40
	44,000	3279	25	30	30	30	40	40	40	40
	46,000	3428	30	30	30	40	40	40	40	50
230	44,000	2366	20	20	20	25	25	30	—	—
	48,000	2581	20	25	25	25	30	30	40	—
	52,000	2796	25	25	30	30	40	40	40	50
	56,000	3011	30	30	30	40	40	40	40	50
	60,000	3226	40	40	40	40	40	50	50	50
	64,000	3441	40	40	40	50	50	50	50	60

Burner Performance Table

Single Blower Models								
Unit Model	CFM Std. Air @ 70°	70° RISE	80° RISE	90° RISE	100° RISE	110° RISE	120° RISE	130° RISE
109	1600	142	159	175	191	206	221	235
	1900	169	189	208	227	245	262	279
	2200	195	219	241	263	284	304	323
	2600	231	258	285	311	335	359	382
	3000	266	298	329	358	387	414	440
112	3250	288	323	356	388	419	449	477
	3500	311	348	384	418	451	483	514
	3750	333	373	411	448	483	518	550
	4000	355	397	438	478	516	552	587
	4250	377	422	466	508	548	587	624
115	4500	399	447	493	537	580	621	661
	5000	444	497	548	597	644	690	734
	5500	488	546	603	657	709	759	807
	6000	532	596	658	717	773	828	881
118	6500	577	646	712	776	838	897	954
	7000	621	696	767	836	902	966	1027
	7500	665	745	822	896	967	1035	1101
	8000	710	795	877	955	1031	1104	1174
	8500	754	845	932	1015	1096	11733	1248
120	9000	798	894	986	1075	1160	1242	1321
	9500	843	944	1041	1135	1224	1311	1394
	10,000	887	994	1096	1194	1289	1380	1468
	10,500	932	1043	1151	1254	1353	1449	1541
	11,000	976	1093	1205	1314	1418	1518	1615
122	11,000	976	1093	1205	1314	1418	1518	1615
	12,000	1065	1192	1315	1433	1547	1656	1761
	13,000	1153	1292	1425	1553	1676	1794	1908
	14,000	1242	1391	1534	1672	1804	1932	2055
	15,000	1331	1490	1644	1791	1933	2070	2202
125	14,000	1242	1391	1534	1672	1804	1932	2055
	15,000	1331	1490	1644	1791	1933	2070	2202
	16,000	1419	1590	1753	1911	2062	2208	2349
	17,000	1508	1689	1863	2030	2191	2346	2495
	18,000	1597	1788	1973	2150	2320	2484	2642
	20,000	1774	1987	2192	2388	2578	2760	2936
130	22,000	1952	2186	2411	2627	2836	3036	3229
	24,000	2129	2385	2630	2866	3093	3312	3523
	26,000	2307	2583	2849	3105	3351	3588	3816
	28,000	2484	2782	3069	3344	3609	3864	4110
	30,000	2661	2981	3288	3583	3867	4140	4404

SELECTION GUIDE

1. Determine the temperature rise required through the heater by subtracting the winter design temperature from the desired indoor temperature.
2. Values shown in above MBH Input Tables are based on -40° F Inlet Temperature. MBH input shown on unit rating plate will be corrected for actual air density.
3. Natural gas units are limited to 130° F temperature rise, propane units are limited to 100° F temperature rise.

Burner Performance Table

Twin Blower Models								
Unit Model	CFM Std. Air @ 70°	70° RISE	80° RISE	90° RISE	100° RISE	110° RISE	120° RISE	130° RISE
215	9000	798	894	986	1075	1160	1242	1321
	9500	843	944	1041	1135	1224	1311	1394
	10,000	887	994	1096	1194	1289	1380	1468
	10,500	932	1043	1151	1254	1353	1449	1541
	11,000	976	1093	1205	1314	1418	1518	1615
	11,500	1020	1143	1260	1373	1482	1587	1688
	12,000	1065	1192	1315	1433	1547	1656	1761
218	13,000	1153	1292	1425	1553	1676	1794	1908
	14,000	1242	1391	1534	1672	1804	1932	2055
	15,000	1331	1490	1644	1791	1933	2070	2202
	16,000	1419	1590	1753	1911	2062	2208	2349
	17,000	1508	1689	1863	2030	2191	2346	2495
220	18,000	1597	1788	1973	2105	2320	2484	2642
	19,000	1686	1888	2082	2269	2449	2622	2789
	20,000	1774	1987	2192	2388	2578	2760	2936
	21,000	1863	2087	2301	2508	2707	2898	3082
	22,000	1952	2186	2411	2627	2836	3036	3229
	23,000	2040	2285	2521	2747	2964	3174	3376
	24,000	2129	2385	2630	2866	3093	3312	3523
	25,000	2218	2484	2740	2986	3222	3450	3670
26,000	2307	2583	2849	3105	3351	3588	3816	
222	25,000	2218	2484	2740	2986	3222	3450	3670
	26,000	2307	2583	2849	3105	3351	3588	3816
	27,000	2395	2683	2959	3224	3480	3726	3963
	28,000	2484	2782	3069	3344	3609	3864	4110
	29,000	2573	2881	3178	3463	3738	4002	4257
	30,000	2661	2981	3288	3583	3867	4140	4404
	31,000	2750	3080	3397	3702	3996	4278	4550
225	30,000	2661	2981	3288	3583	3867	4140	4404
	32,000	2839	3180	3507	3822	4124	4416	4697
	34,000	3016	3378	3726	4060	4382	4692	4991
	36,000	3194	3577	3945	4299	4640	4968	5284
	38,000	3371	3776	4164	4538	4898	5244	5578
	40,000	3549	3974	4384	4777	5156	5520	5871
	42,000	3726	4173	4603	5016	5413	5796	6165
	44,000	3903	4372	4822	5255	5671	6072	6458
	46,000	4081	4571	5041	5494	5929	6348	6752
230	44,000	3903	4372	4822	5255	5671	6072	6458
	48,000	4258	4769	5260	5732	6187	6624	7046
	52,000	4613	5167	5699	6210	6702	7176	7633
	56,000	4968	5564	6137	6688	7218	7728	8220
	60,000	5323	5962	6575	7165	7733	8280	8807
	64,000	5678	6359	7014	7643	8249	8832	9394

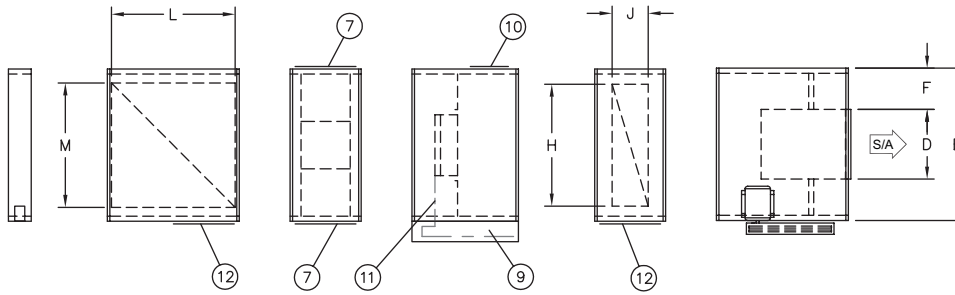
Dimensions

Single Blower Models – Horizontal Units

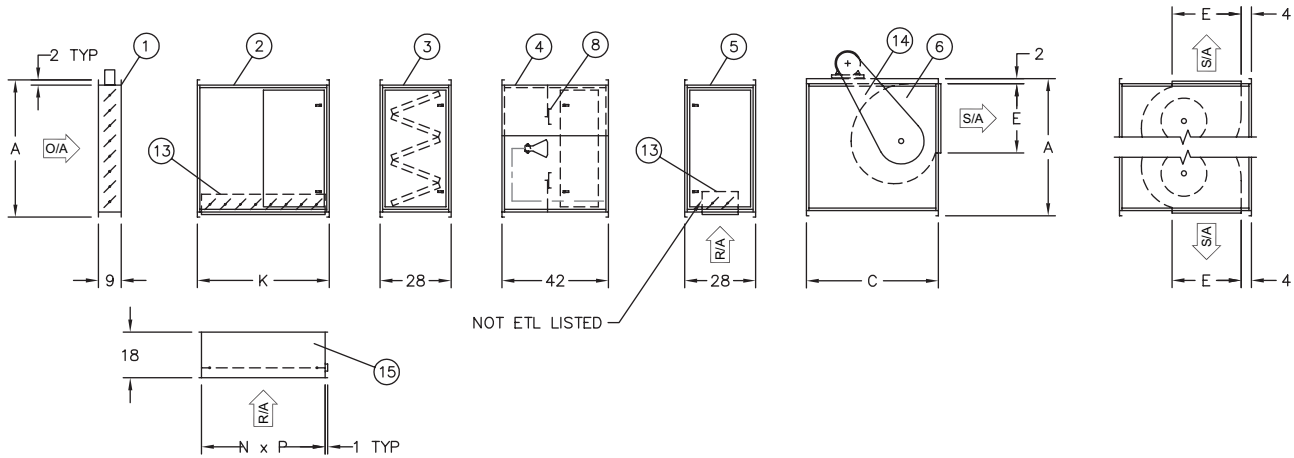
C000498A

UNIT COMPONENTS

- | | | | |
|--------------------------------|-------------------------------|--------------------------------------|---|
| 1. Inlet Damper | 5. R/A section (after burner) | 9. Control cabinet | 13. Return air damper |
| 2. R/A section (before burner) | 6. Blower section | 10. Access door (piping compartment) | 14. Belt guard |
| 3. V-bank | 7. Filter access | 11. Gas piping manifold | 15. Return air flow station
(required for ETL listed
Return Air Unit) |
| 4. Burner section | 8. Adjustable profile | 12. R/A access | |



PLAN VIEW



FRONT VIEW

Model	Dimensions												
	A	B	C	D	E	F	H	J	K	L	M	N	P
109	29	45	33	12	10 ¹ / ₂	16 ¹ / ₂	30	8 ¹ / ₄	28	24 ³ / ₄	34	25 ¹ / ₈	34 ¹ / ₂
112	29	45	33	15 ³ / ₄	13 ³ / ₈	14 ⁵ / ₈	30	8 ¹ / ₄	28	24 ³ / ₄	34	25 ¹ / ₈	34 ¹ / ₂
115	37 ¹ / ₄	51	43	18 ³ / ₄	16	16 ¹ / ₈	30	14 ¹ / ₄	43	39 ³ / ₄	40	40 ¹ / ₄	40 ¹ / ₂
118	37 ¹ / ₄	51	43	22	19	14 ¹ / ₂	30	14 ¹ / ₄	43	39 ³ / ₄	40	40 ¹ / ₄	40 ¹ / ₂
120	54	60	52	24 ⁷ / ₈	24 ⁷ / ₈	17 ⁹ / ₁₆	48	14 ¹ / ₄	52	48 ³ / ₄	49	49 ¹ / ₈	49 ¹ / ₂
122	54	60	52	27 ³ / ₈	27 ³ / ₈	16 ⁵ / ₁₆	48	14 ¹ / ₄	52	48 ³ / ₄	49	49 ¹ / ₈	49 ¹ / ₂
125	66	72	60	31 ³ / ₈	31 ³ / ₈	20 ⁵ / ₁₆	60	20 ¹ / ₄	52	48 ³ / ₄	61	49 ¹ / ₈	61 ¹ / ₂
130	66	72	60	36 ⁷ / ₈	36 ⁷ / ₈	17 ⁹ / ₁₆	60	20 ¹ / ₄	52	48 ³ / ₄	61	49 ¹ / ₈	61 ¹ / ₂

NOTE: All dimensions in inches subject to manufacturing tolerances.

Dimensions

Twin Blower Models – Horizontal Units

C000497A

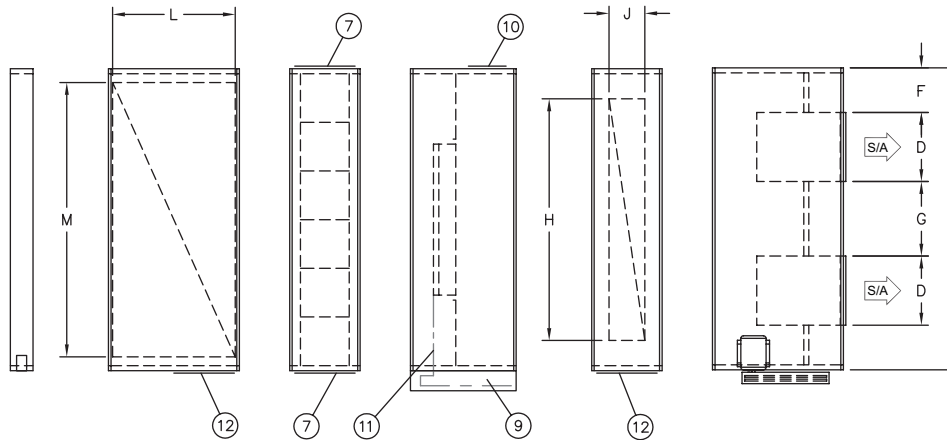
- 4. Burner section
- 5. R/A section (after burner)
- 6. Blower section
- 7. Filter access
- 8. Adjustable profile

- 14. Belt guard
- 15. Return air flow station
(Required for ETL listed
Return Air Unit)

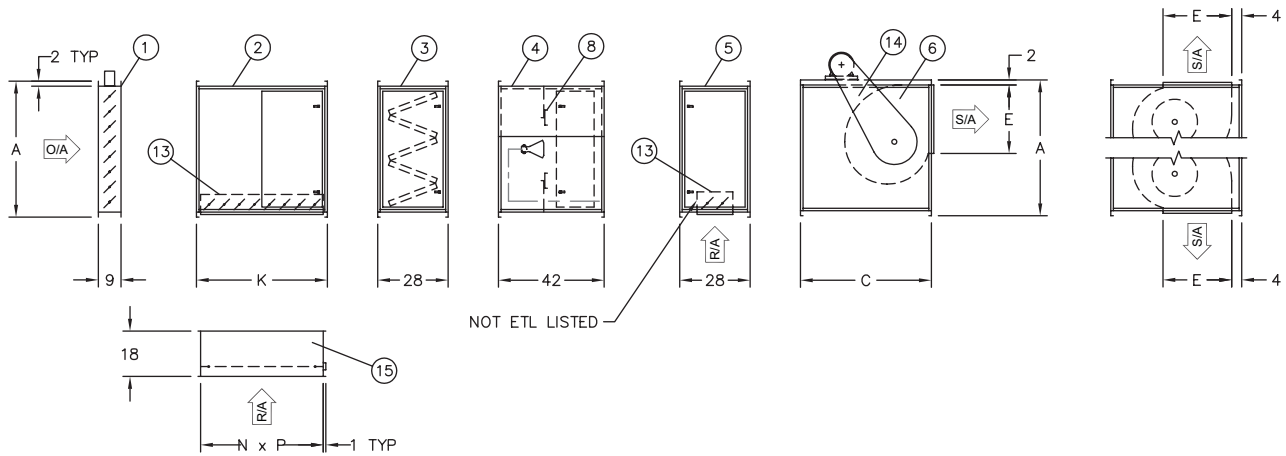
UNIT COMPONENTS

- 1. Inlet damper
- 2. R/A section (before burner)
- 3. V-bank

- 9. Control cabinet
- 10. Access door (piping compartment)
- 11. Gas piping manifold
- 12. R/A access
- 13. Return air damper



PLAN VIEW



FRONT VIEW

Model	Dimensions													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
215	37 ¹ / ₄	93	43	18 ³ / ₄	16	16 ¹ / ₂	22 ¹ / ₂	79	10	43	39 ³ / ₄	82	40 ¹ / ₄	82 ¹ / ₂
218	37 ¹ / ₄	93	43	22	19	13 ¹ / ₄	22 ¹ / ₂	79	10	43	39 ³ / ₄	82	40 ¹ / ₄	82 ¹ / ₂
220	54	120	52	24 ⁷ / ₈	24 ⁷ / ₈	20 ¹ / ₄	29 ⁵ / ₈	96	14 ¹ / ₄	52	48 ³ / ₄	109	49 ¹ / ₈	109 ¹ / ₂
222	54	120	52	27 ³ / ₈	27 ³ / ₈	17 ³ / ₄	29 ⁵ / ₈	96	14 ¹ / ₄	52	48 ³ / ₄	109	49 ¹ / ₈	109 ¹ / ₂
225	66	144	60	31 ³ / ₈	31 ³ / ₈	21 ³ / ₄	37 ⁵ / ₈	120	20 ¹ / ₄	52	48 ³ / ₄	133	49 ¹ / ₈	133 ³ / ₈
230	66	144	60	36 ⁷ / ₈	36 ⁷ / ₈	18 ⁵ / ₈	33	120	20 ¹ / ₄	52	48 ³ / ₄	133	49 ¹ / ₈	133 ³ / ₈

NOTE: All dimensions in inches subject to manufacturing tolerances.

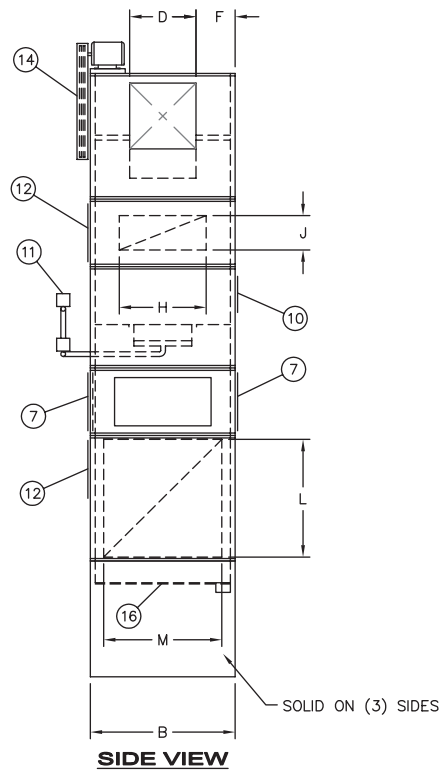
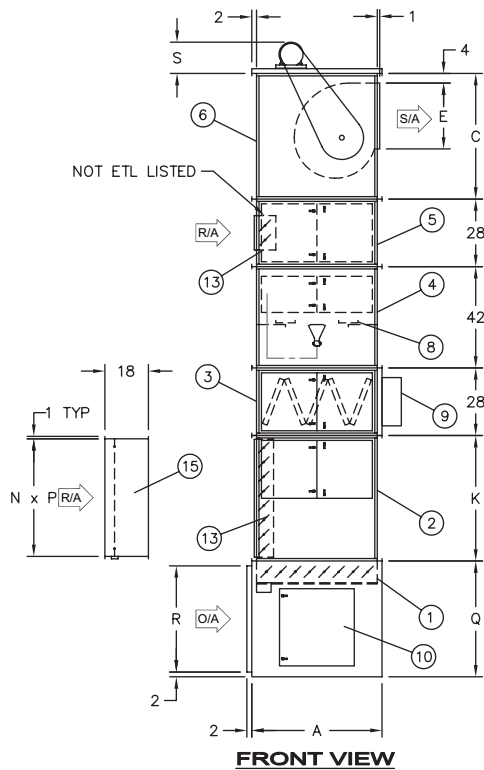
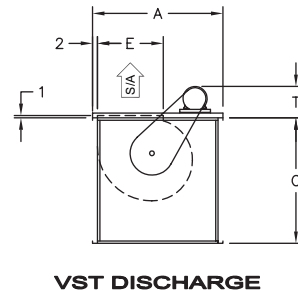
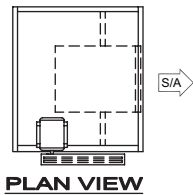
Dimensions

Single Blower Models – Vertical Units

C000500A

UNIT COMPONENTS

- | | | | |
|--------------------------------|-----------------------|-------------------------|---|
| 1. Inlet Damper | 6. Blower section | 11. Gas piping manifold | 15. Return air flow station
(Required for ETL listed
Return Air Unit) |
| 2. R/A section (before burner) | 7. Filter access | 12. R/A access | 16. Screen |
| 3. V-bank | 8. Adjustable profile | 13. Return air damper | |
| 4. Burner section | 9. Control cabinet | 14. Belt guard | |
| 5. R/A section (after burner) | 10. Access door | | |



Model	Dimensions															
	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S
109	29	45	33	12	10 ¹ / ₂	16 ¹ / ₂	30	8 ¹ / ₄	28	24 ³ / ₄	34	25 ¹ / ₈	34 ¹ / ₂	36	32	17 ¹ / ₄
112	29	45	33	15 ³ / ₄	13 ³ / ₈	14 ⁵ / ₈	30	8 ¹ / ₄	28	24 ³ / ₄	34	25 ¹ / ₈	34 ¹ / ₂	36	32	17 ¹ / ₄
115	37 ¹ / ₄	51	43	18 ³ / ₄	16	16 ¹ / ₈	30	14 ¹ / ₄	43	39 ³ / ₄	40	40 ¹ / ₄	40 ¹ / ₂	36	32	17 ¹ / ₄
118	37 ¹ / ₄	51	43	22	19	14 ¹ / ₂	30	14 ¹ / ₄	43	39 ³ / ₄	40	40 ¹ / ₄	40 ¹ / ₂	36	32	20
120	54	60	52	24 ⁷ / ₈	24 ⁷ / ₈	17 ⁹ / ₁₆	48	14 ¹ / ₄	52	48 ³ / ₄	49	49 ¹ / ₈	49 ¹ / ₂	48	44	20
122	54	60	52	27 ³ / ₈	27 ³ / ₈	16 ⁵ / ₁₆	48	14 ¹ / ₄	52	48 ³ / ₄	49	49 ¹ / ₈	49 ¹ / ₂	48	44	20
125	66	72	60	31 ³ / ₈	31 ³ / ₈	20 ⁵ / ₁₆	60	20 ¹ / ₄	52	48 ³ / ₄	61	49 ¹ / ₈	61 ¹ / ₂	48	44	21
130	66	72	60	36 ⁷ / ₈	36 ⁷ / ₈	17 ⁹ / ₁₆	60	20 ¹ / ₄	52	48 ³ / ₄	61	49 ¹ / ₈	61 ¹ / ₂	48	44	21

NOTE: All dimensions in inches subject to manufacturing tolerances.

Dimensions

Twin Blower Models – Vertical Units

C000499A

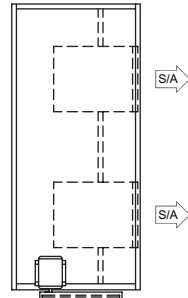
- 5. R/A section (after burner)
- 6. Blower section
- 7. Filter access
- 8. Adjustable profile
- 9. Control cabinet
- 10. Access door

UNIT COMPONENTS

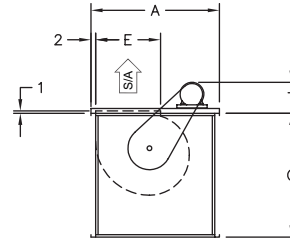
- 1. Inlet damper
- 2. R/A section (before burner)
- 3. V-bank
- 4. Burner section

- 11. Gas piping manifold
- 12. R/A access
- 13. R/A air damper
- 14. Belt guard

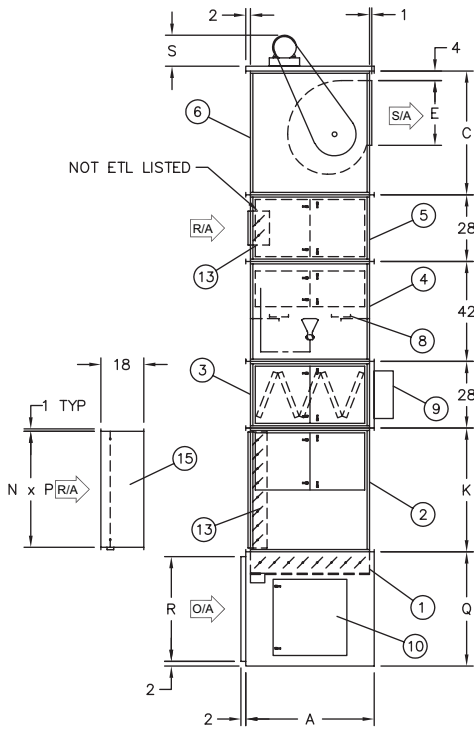
- 15. Return air flow station
(Required for ETL listed
Return Air Unit)
- 16. Screen



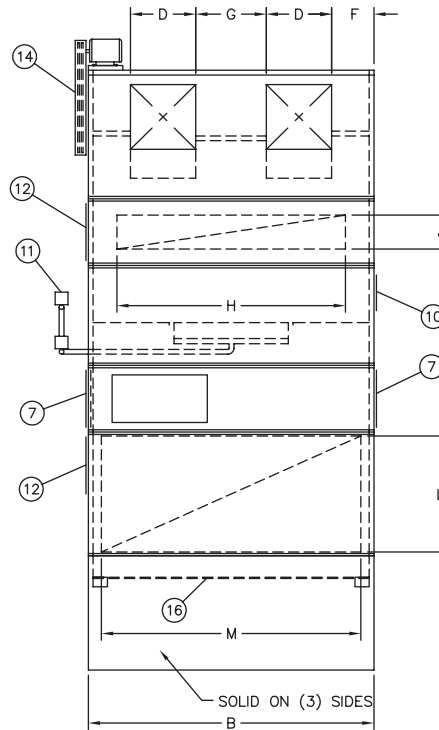
PLAN VIEW



VST DISCHARGE



FRONT VIEW



SIDE VIEW

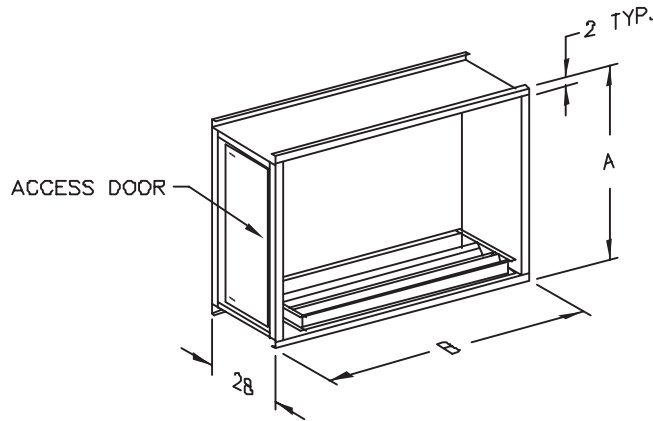
Model	Dimensions																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
215	37 ¹ / ₄	93	43	18 ³ / ₄	16	16 ¹ / ₂	22 ¹ / ₂	79	10	43	39 ³ / ₄	82	40 ¹ / ₄	82 ¹ / ₂	36	32	18 ¹ / ₂
218	37 ¹ / ₄	93	43	22	19	13 ¹ / ₄	22 ¹ / ₂	79	10	43	39 ³ / ₄	82	40 ¹ / ₄	82 ¹ / ₂	36	32	22
220	54	120	52	24 ⁷ / ₈	24 ⁷ / ₈	20 ¹ / ₄	29 ⁵ / ₈	96	14 ¹ / ₄	52	48 ³ / ₄	109	49 ¹ / ₈	109 ¹ / ₂	48	44	22
222	54	120	52	27 ³ / ₈	27 ³ / ₈	17 ³ / ₄	29 ⁵ / ₈	96	14 ¹ / ₄	52	48 ³ / ₄	109	49 ¹ / ₈	109 ¹ / ₂	48	44	23 ¹ / ₂
225	66	144	60	31 ³ / ₈	31 ³ / ₈	21 ³ / ₄	37 ⁵ / ₈	120	20 ¹ / ₄	52	48 ³ / ₄	133	49 ¹ / ₈	133 ³ / ₈	48	44	32 ³ / ₄
230	66	144	60	36 ⁷ / ₈	36 ⁷ / ₈	18 ⁵ / ₈	33	120	20 ¹ / ₄	52	48 ³ / ₄	133	49 ¹ / ₈	133 ³ / ₈	48	44	32 ³ / ₄

NOTE: All dimensions in inches subject to manufacturing tolerances.

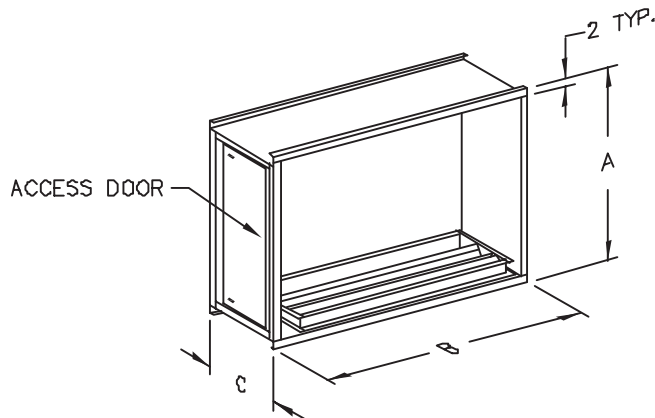
Dimensions

Return Air Section

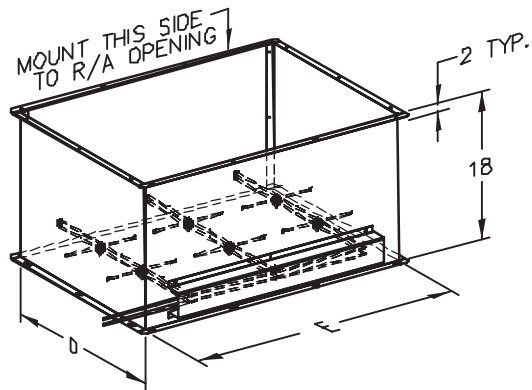
C000503



RETURN AIR
(AFTER BURNER SECTION)



RETURN AIR
(BEFORE BURNER SECTION)



RETURN AIR FLOW STATION

Dimension	MODEL							
	109-112	115-118	120-122	125-130	215-218	220-222	225-230	
A	29	37 ¹ / ₄	54	66	37 ¹ / ₄	54	66	
B	45	51	60	72	93	120	144	
C	28	43	52	52	43	52	52	
D	25 ¹ / ₈	40 ¹ / ₄	49 ¹ / ₈	49 ¹ / ₈	40 ¹ / ₄	49 ¹ / ₈	49 ¹ / ₈	
E	34 ¹ / ₂	40 ¹ / ₂	49 ¹ / ₂	61 ¹ / ₂	82 ¹ / ₂	109 ¹ / ₂	133 ³ / ₈	
Model		109-112	115-118	120-122	125-130	215-218	220-222	225-230
R/A Opening Size		Before Burner	24 ³ / ₄ x 34	39 ³ / ₄ x 40	48 ³ / ₄ x 49	48 ³ / ₄ x 61	39 ³ / ₄ x 82	48 ³ / ₄ x 109
		After Burner	8 ¹ / ₄ x 30	14 ¹ / ₄ x 30	14 ¹ / ₄ x 48	20 ¹ / ₄ x 60	10 x 79	14 ¹ / ₄ x 96

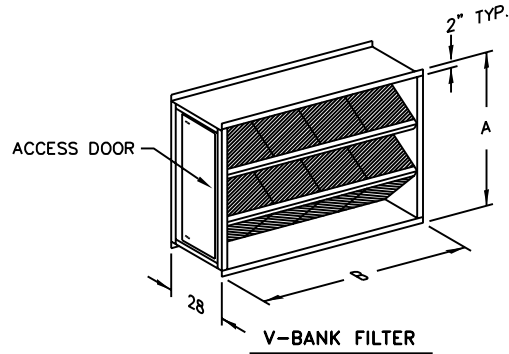
NOTE: R/A openings shall be centered on floor.

NOTE: All dimensions in inches subject to manufacturing tolerances.

Filter Dimensions

C000502

V-Bank Filter and Filter Information



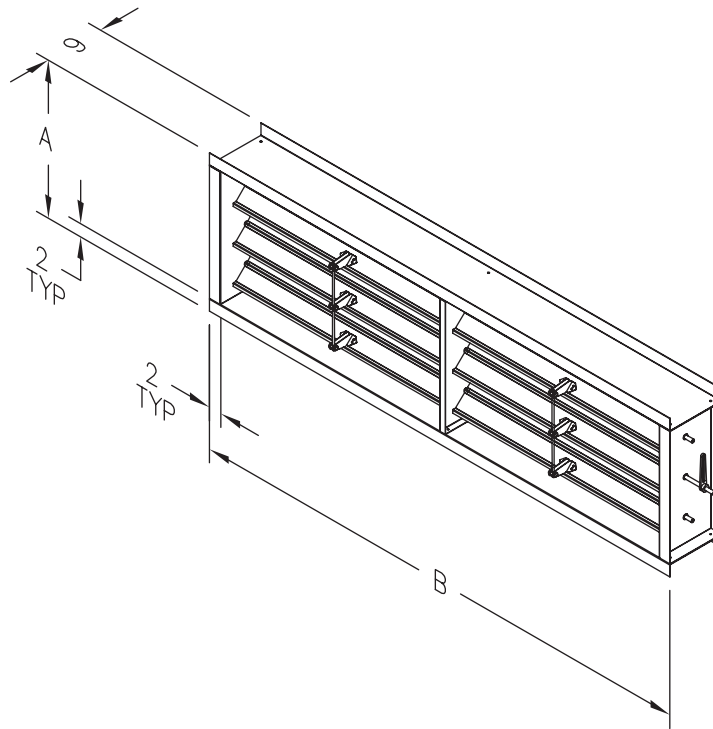
Dimension	MODEL						
	109-112	115-118	120-122	125-130	215-218	220-222	225-230
A	29	37 ¹ / ₄	54	66	37 ¹ / ₄	54	66
B	45	51	60	72	93	120	144
Model	109-112	115-118	120-122	125-130	215-218	220-222	225-230
V-Bank Filter Qty. & Size	(4) 20 x 20 x 2	(9) 16 x 20 x 2	(10) 20 x 25 x 2	(24) 16 x 20 x 2	(18) 15 x 20 x 2	(35) 16 x 20 x 2	(42) 20 x 20 x 2

NOTE: All dimensions in inches subject to manufacturing tolerances.

Dimensions

Inlet Damper

C000501A



INLET DAMPER

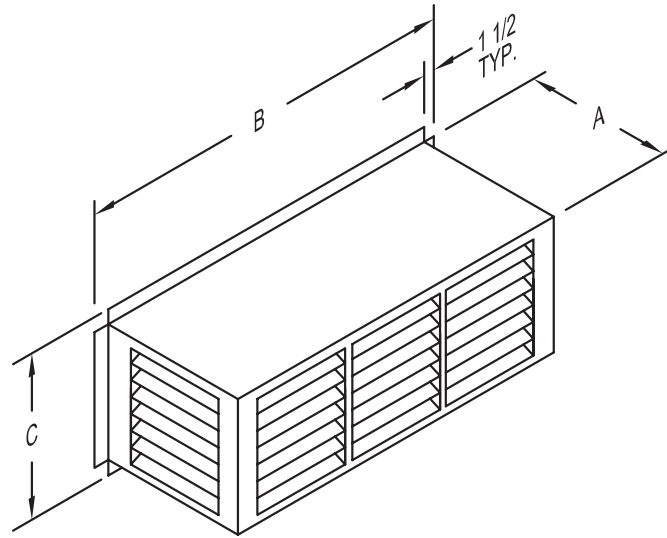
Dimension	Model						
	109-112	115-118	120-122	125-130	215-218	220-222	225-230
A	29	37 ¹ / ₄	54	66	37 ¹ / ₄	54	66
B	45	51	60	72	93	120	144

NOTE: All dimensions in inches subject to manufacturing tolerances.

Dimensions

Discharge Louvers

C000501B



SIDE INLET
DISCHARGE LOUVER

Dimension	Model						
	109-112	115-118	120-122	125-130	215-218	220-222	225-230
A	21	24	45	45	25 ⁷ / ₈	45	45
B	20 ¹³ / ₁₆	26 ¹⁵ / ₁₆	32 ¹ / ₂	41 ⁷ / ₈	70 ³ / ₄	88 ³ / ₄	111 ¹ / ₈
C	26	23	31 ¹ / ₄	40 ³ / ₄	23	31 ¹ / ₄	40 ³ / ₄

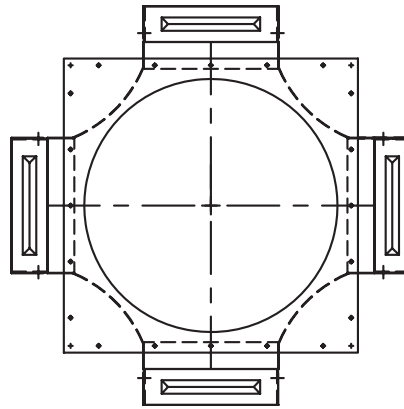
NOTE: All dimensions in inches subject to manufacturing tolerances.

Discharge Options

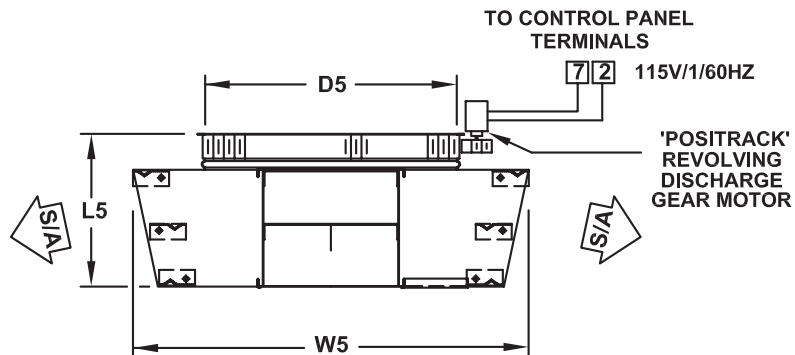
5F and 5R Discharge Dimensions and Weights

C000781

FIXED AND REVOLVING DISCHARGES TYPE 5F AND 5R FOR DIRECT FIRED VERTICAL DOWN BLAST UNITS



PLAN VIEW



SIDE ELEVATION

5F AND 5R DISCHARGES

A FOUR OUTLET DISCHARGE DESIGNED FOR FULL AIR DISTRIBUTION.

DISCHARGE VANES ARE ADJUSTABLE.

DISCHARGE DESIGNED FOR LOW CEILING HEIGHT APPLICATIONS.

Discharge Options

5F and 5R Discharge Dimensions and Weights

DISCHARGE DIMENSIONS AND WEIGHT						
Model Size	Discharge Size	5F and 5R Discharge				
		D5	L5	W5	Weight 5F	Weight 5R
109	17	17-23/32	9-1/4	25-1/2	45	100
112	22	25-23/32	11	34-1/2	60	110
115	25	31-5/32	14	40	65	120
118	28	36-17/32	16-5/8	50	90	160
120	36	42-17/32	18-1/4	57	110	185
122	40	49-17/32	20-1/8	66-1/2	120	200
125	44	49-17/32	22	66-1/2	160	245
130	44	49-17/32	22	66-1/2	160	245
215	36	42-17/32	18-1/4	57	110	185
218	40	49-17/32	20-1/8	66-1/2	120	200
220	44	49-17/32	22	66-1/2	160	245
222	44	49-17/32	22	66-1/2	160	245
225	44	49-17/32	22	66-1/2	160	245

NOTES:

1. All dimensions are in inches.
2. All weights are in pounds.

Discharge Options

5F and 5R Discharge Pressure Drop and Coverage						
Model	SCFM	Discharge Size	Air Pressure Drop	Mounting Height	Fixed Coverage	Revolving Coverage
109	1600	17	0.05	9	58 x 58	58 x 58
	1900		0.06	9	60 x 60	60 x 60
	2200		0.09	10	63 x 63	63 x 63
	2600		0.12	10	66 x 66	66 x 66
	3000		0.16	11	69 x 69	69 x 69
112	3250	22	0.06	13	75 x 75	75 x 75
	3500		0.07	13	76 x 76	76 x 76
	3750		0.09	14	77 x 77	77 x 77
	4000		0.10	14	77 x 77	77 x 77
	4250		0.11	14	78 x 78	78 x 78
115	4500	25	0.06	13	86 x 86	86 x 86
	5000		0.07	13	87 x 87	87 x 87
	5500		0.08	14	89 x 89	89 x 89
	6000		0.10	14	90 x 90	90 x 90
118	6500	28	0.07	14	92 x 92	92 x 92
	7000		0.08	15	96 x 96	96 x 96
	7500		0.09	15	101 x 101	101 x 101
	8000		0.10	16	105 x 105	105 x 105
	8500		0.11	16	109 x 109	109 x 109
120	9000	36	0.06	14	92 x 92	92 x 92
	9500		0.07	15	100 x 100	100 x 100
	10000		0.07	16	107 x 107	107 x 107
	10500		0.08	16	115 x 115	115 x 115
	11000		0.09	17	122 x 122	122 x 122
122	11000	40	0.05	17	122 x 122	122 x 122
	12000		0.06	18	125 x 125	125 x 125
	13000		0.07	18	127 x 127	127 x 127
	14000		0.08	19	130 x 130	130 x 130
	15000		0.09	19	132 x 132	132 x 132
125	14000	44	0.05	18	129 x 129	129 x 129
	15000		0.06	19	132 x 132	132 x 132
	16000		0.07	20	134 x 134	134 x 134
	18000		0.09	21	140 x 140	140 x 140
	20000		0.11	23	145 x 145	145 x 145
130	22000	44	0.14	19	132 x 132	132 x 132
	24000		0.16	21	137 x 137	137 x 137
	26000		0.19	22	141 x 141	141 x 141
	28000		0.22	24	146 x 146	146 x 146
	30000		0.25	25	150 x 150	150 x 150

Discharge Options

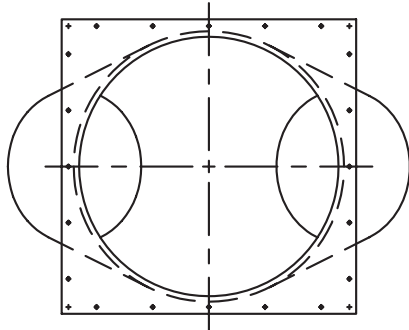
5F and 5R Discharge Pressure Drop and Coverage						
Model	SCFM	Discharge Size	Air Pressure Drop	Mounting Height	Fixed Coverage	Revolving Coverage
215	9500	36	0.07	16	111 x 111	111 x 111
	10000		0.07	17	114 x 114	114 x 114
	10500		0.08	17	116 x 116	116 x 116
	11000		0.09	17	118 x 118	118 x 118
	11500		0.10	18	121 x 121	121 x 121
	12000		0.11	18	123 x 123	123 x 123
218	12500	40	0.07	18	123 x 123	123 x 123
	13000		0.07	18	124 x 124	124 x 124
	14000		0.08	18	126 x 126	126 x 126
	15000		0.10	19	128 x 128	128 x 128
	16000		0.11	19	130 x 130	130 x 130
	17000		0.12	19	132 x 132	132 x 132
220	18000	44	0.09	22	135 x 135	135 x 135
	19000		0.10	23	139 x 139	139 x 139
	20000		0.11	23	142 x 142	142 x 142
	21000		0.12	24	146 x 146	146 x 146
	22000		0.14	25	150 x 150	150 x 150
	23000		0.15	25	153 x 153	153 x 153
	24000		0.16	26	157 x 157	157 x 157
	25000		0.18	26	160 x 160	160 x 160
	26000		0.19	27	164 x 164	164 x 164
222	25000	44	0.18	27	160 x 160	160 x 160
	26000		0.19	27	163 x 163	163 x 163
	27000		0.21	28	166 x 166	166 x 166
	28000		0.22	28	169 x 169	169 x 169
	29000		0.24	28	171 x 171	171 x 171
	30000		0.25	29	174 x 174	174 x 174
	31000		0.27	29	177 x 177	177 x 177
225	30000	44	0.25	28	170 x 170	170 x 170
	32000		0.29	29	176 x 176	176 x 176
	34000		0.33	30	184 x 184	184 x 184
	36000		0.36	30	187 x 187	187 x 187
	38000		0.41	31	192 x 192	192 x 192
	40000		0.45	32	198 x 198	198 x 198

Discharge Options

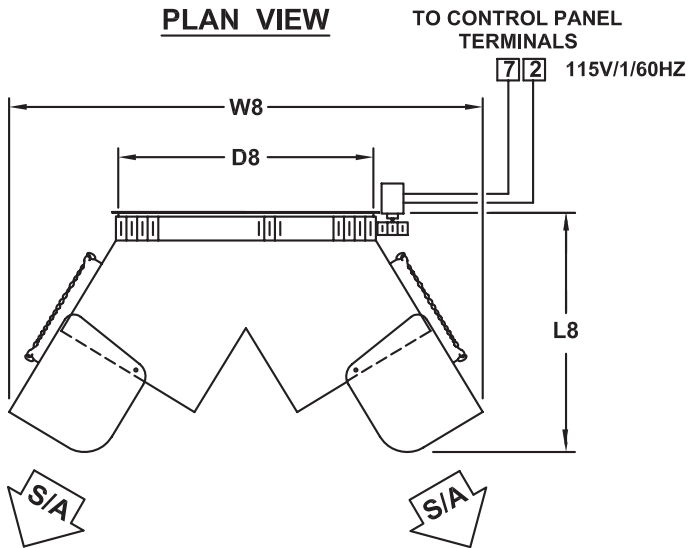
8F and 8R Discharge Dimensions and Weights

C000782

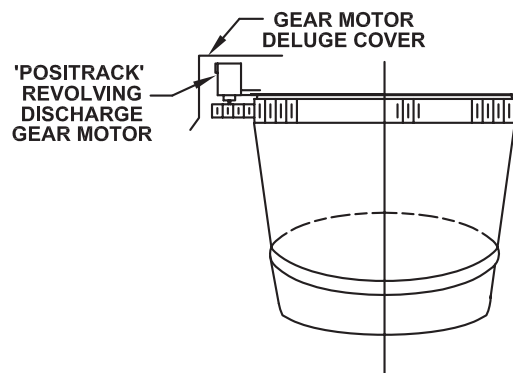
FIXED AND REVOLVING DISCHARGES TYPE 8F AND 8R FOR DIRECT FIRED VERTICAL DOWN BLAST UNITS



PLAN VIEW



SIDE ELEVATION



END ELEVATION

8F AND 8R DISCHARGE
A TWO OUTLET DISCHARGE DESIGNED
FOR FULL AIR DISTRIBUTION.
DISCHARGE DESIGNED FOR
HIGH MOUNTING APPLICATIONS.

Discharge Options

8F and 8R Discharge Dimensions and Weights

DISCHARGE DIMENSIONS AND WEIGHT						
Model Size	Discharge Size	8F and 8R Discharge				
		D8	L8	W8	Weight 8F	Weight 8R
109	22	25-23/32	29-7/8	47-1/2	80	100
112	22	25-23/32	29-7/8	47-1/2	80	100
115	25	31-5/32	31-1/2	53-1/2	92	117
118	28	36-17/32	35-1/2	64	100	125
120	36	42-17/32	47-1/16	77	120	145
122	40	49-17/32	54-9/16	89-1/2	140	165
125	44	49-17/32	53-7/16	86	160	195
130	44	49-17/32	53-7/16	86	160	195
215	36	42-17/32	47-1/16	77	120	145
218	40	49-17/32	54-9/16	89-1/2	140	165
220	44	49-17/32	53-7/16	86	160	195
222	44	49-17/32	53-7/16	86	160	195
225	44	49-17/32	53-7/16	86	160	195

NOTES:

1. All dimensions are in inches.
2. All weights are in pounds.

Discharge Options

8F and 8R Discharge Pressure Drop and Coverage						
Model	SCFM	Discharge Size	Air Pressure Drop	Mounting Height	Fixed Coverage	Revolving Coverage
109	1600	22	0.03	14	24 x 47	47 x 47
	1900		0.05	15	26 x 51	51 x 51
	2200		0.06	16	28 x 55	55 x 55
	2600		0.09	17	30 x 61	61 x 61
	3000		0.12	18	33 x 66	66 x 66
112	3250	22	0.14	18	33 x 66	66 x 66
	3500		0.17	19	34 x 68	68 x 68
	3750		0.19	19	36 x 71	71 x 71
	4000		0.22	20	37 x 73	73 x 73
	4250		0.25	20	38 x 75	75 x 75
115	4500	25	0.28	20	39 x 78	78 x 78
	5000		0.34	21	40 x 79	79 x 79
	5500		0.41	22	40 x 80	80 x 80
	6000		0.49	23	41 x 81	81 x 81
118	6500	28	0.17	26	42 x 84	84 x 84
	7000		0.20	27	44 x 87	87 x 87
	7500		0.23	28	45 x 90	90 x 90
	8000		0.26	28	47 x 92	92 x 92
	8500		0.29	29	48 x 95	95 x 95
120	9000	36	0.18	30	49 x 97	97 x 97
	9500		0.20	31	51 x 100	100 x 100
	10000		0.22	33	52 x 104	104 x 104
	10500		0.25	34	54 x 107	107 x 107
	11000		0.27	35	55 x 110	110 x 110
122	11000	40	0.14	35	55 x 110	110 x 110
	12000		0.17	37	56 x 112	112 x 112
	13000		0.20	39	57 x 113	113 x 113
	14000		0.23	41	57 x 115	115 x 115
	15000		0.26	43	58 x 116	116 x 116
125	14000	44	0.13	40	57 x 114	114 x 114
	15000		0.15	43	58 x 117	117 x 117
	16000		0.17	46	60 x 119	119 x 119
	18000		0.22	52	62 x 125	125 x 125
	20000		0.27	58	65 x 130	130 x 130
130	22000	44	0.33	42	59 x 116	116 x 116
	24000		0.40	47	61 x 120	120 x 120
	26000		0.46	51	63 x 124	124 x 124
	28000		0.54	56	64 x 128	128 x 128
	30000		0.62	60	66 x 132	132 x 132

Discharge Options

8F and 8R Discharge Pressure Drop and Coverage						
Model	SCFM	Discharge Size	Air Pressure Drop	Mounting Height	Fixed Coverage	Revolving Coverage
215	9000	36	0.18	30	49 x 97	97 x 97
	9500		0.20	31	50 x 100	100 x 100
	10000		0.22	32	51 x 103	103 x 103
	10500		0.25	34	53 x 105	105 x 105
	11000		0.27	35	54 x 107	107 x 107
	11500		0.29	36	55 x 110	110 x 110
	12000		0.32	37	56 x 112	112 x 112
218	12500	40	0.18	38	56 x 112	112 x 112
	13000		0.19	39	56 x 113	113 x 113
	14000		0.22	40	57 x 115	115 x 115
	15000		0.25	41	58 x 116	116 x 116
	16000		0.29	43	59 x 118	118 x 118
	17000		0.33	44	60 x 120	120 x 120
220	18000	44	0.22	54	64 X 126	126 x 126
	19000		0.25	57	65 x 129	129 x 129
	20000		0.28	60	66 x 131	131 x 131
	21000		0.31	62	67 x 134	134 x 134
	22000		0.34	65	69 x 136	136 x 136
	23000		0.37	68	70 x 140	140 x 140
	24000		0.40	71	71 x 141	141 x 141
	25000		0.43	73	72 X 144	144 x 144
	26000		0.47	76	73 X 146	146 X 146
222	25000	44	0.43	75	72 X 144	144 x 144
	26000		0.46	77	73 x 146	146 X 146
	27000		0.50	79	74 x 149	149 x 149
	28000		0.54	81	76 x 151	151 x 151
	29000		0.58	82	77 x 153	153 x 153
	30000		0.62	84	78 x 156	156 x 156
	31000		0.66	86	79 x 158	158 x 158
225	30000	44	0.62	81	75 x 151	151 x 151
	32000		0.71	85	78 x 157	157 x 157
	34000		0.80	92	82 x 165	165 x 165
	36000		0.89	94	85 x 170	170 x 170
	38000		0.99	99	88 x 177	177 x 177
	40000		1.10	103	91 x 183	183 x 183

MDT Touch Control System

C000775

Application:

Modulating Discharge Temperature Control with Equipment Touch Touchscreen controller allowing after hours unit enable, discharge setpoint adjustment, operating feedback, monitoring of alarm status and digital temperature readout.

Includes:

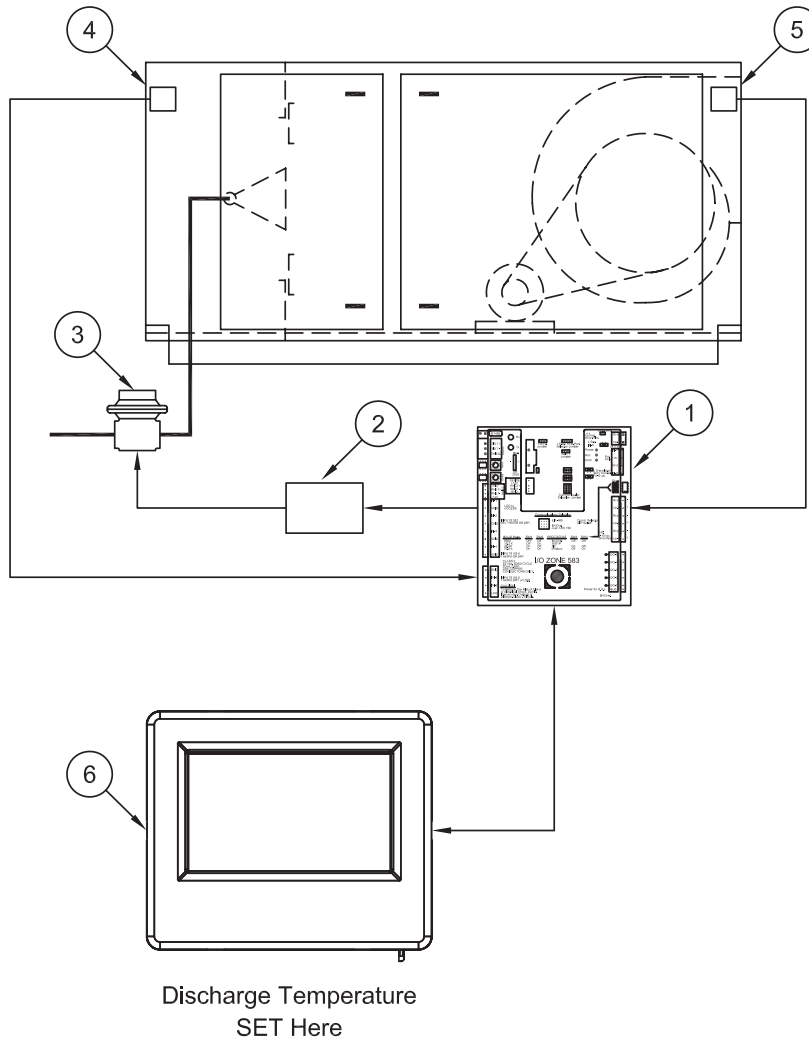
Discharge air sensor ⑤ mounted in unit discharge with remote mounted Equipment Touch Touchscreen controller ⑥ to set discharge temp, operating schedules, and optional damper control setpoints. Service information, operating feedback and alarm status can also be monitored.

COMPONENT I.D.

- 1. Unit DDC Controller
- 2. Signal Conditioner

- 3. Modulating Gas Valve
- 4. Inlet Air Sensor

- 5. Discharge Air Sensor
- 6. Equipment Touch Touchscreen Interface



MRT Touch Control System

C000774

Application:

Modulating Room Temperature Control with Equipment Touch Touchscreen controller allowing after hours unit enable, room setpoint adjustment, operating feedback, monitoring of alarm status and digital temperature readout with ZS-Standard room sensor.

Includes:

Discharge air sensor ⑤ mounted in unit discharge with remote mounted Equipment Touch Touchscreen controller ⑦ to set space temp, operating schedules, and optional damper control setpoints. Service information, operating feedback and alarm status can also be monitored. Also includes a ZS-Standard room sensor ⑥.

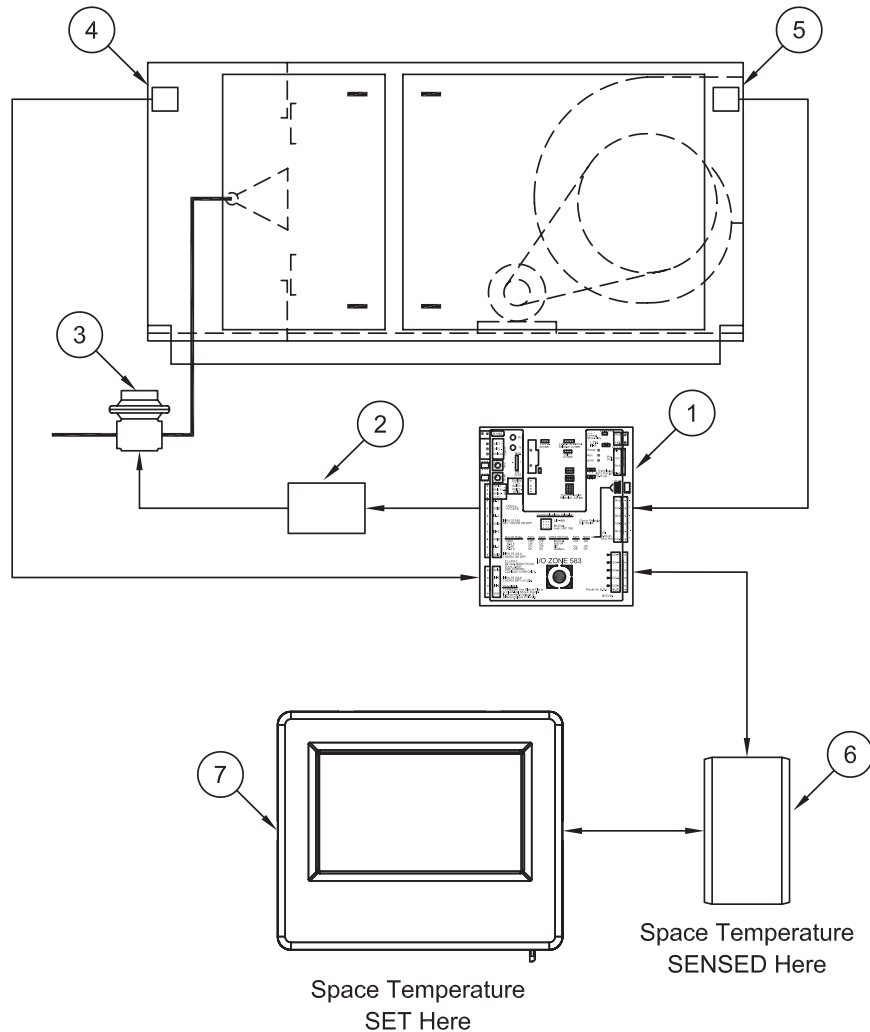
COMPONENT I.D.

1. Unit DDC Controller
2. Signal Conditioner

3. Modulating Gas Valve
4. Inlet Air Sensor

5. Discharge Air Sensor
6. Room Thermostat

7. Equipment Touch
Touchscreen Interface



System 14

C000779

Application:

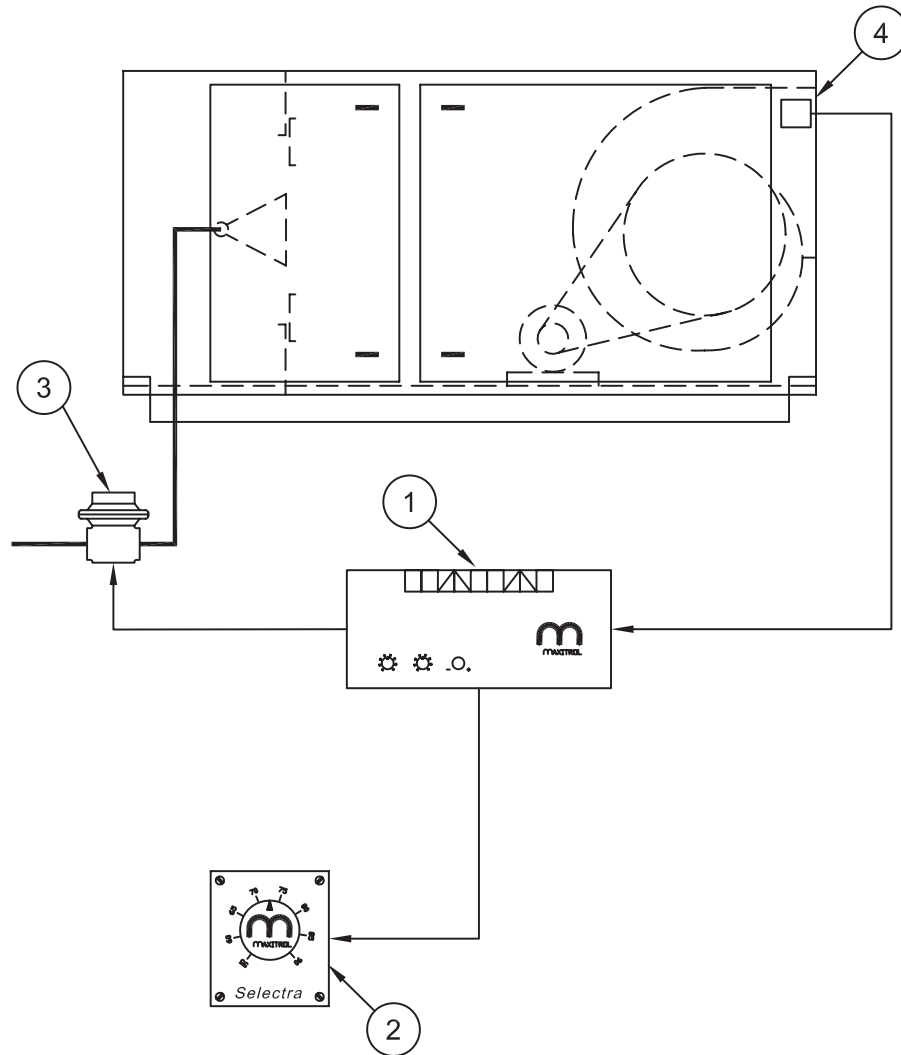
Non-DDC Modulating Discharge Temperature Control

Includes:

System 14 Amplifier ① compares signals from Discharge Air Sensor ④ mounted in unit discharge and Remote Temperature Selector ② mounted in space. Modulating Gas Valve ③ receives signal from amplifier and adjusts gas pressure to maintain constant discharge air temperature.

COMPONENT I.D.

- | | |
|--------------------------------|-------------------------|
| 1. Amplifier (System14) | 3. Modulating Gas Valve |
| 2. Remote Temperature Selector | 4. Discharge Air Sensor |



Discharge Temperature
SET Here

System 44

C000780

Application:

Non-DDC Modulating Room Temperature Control

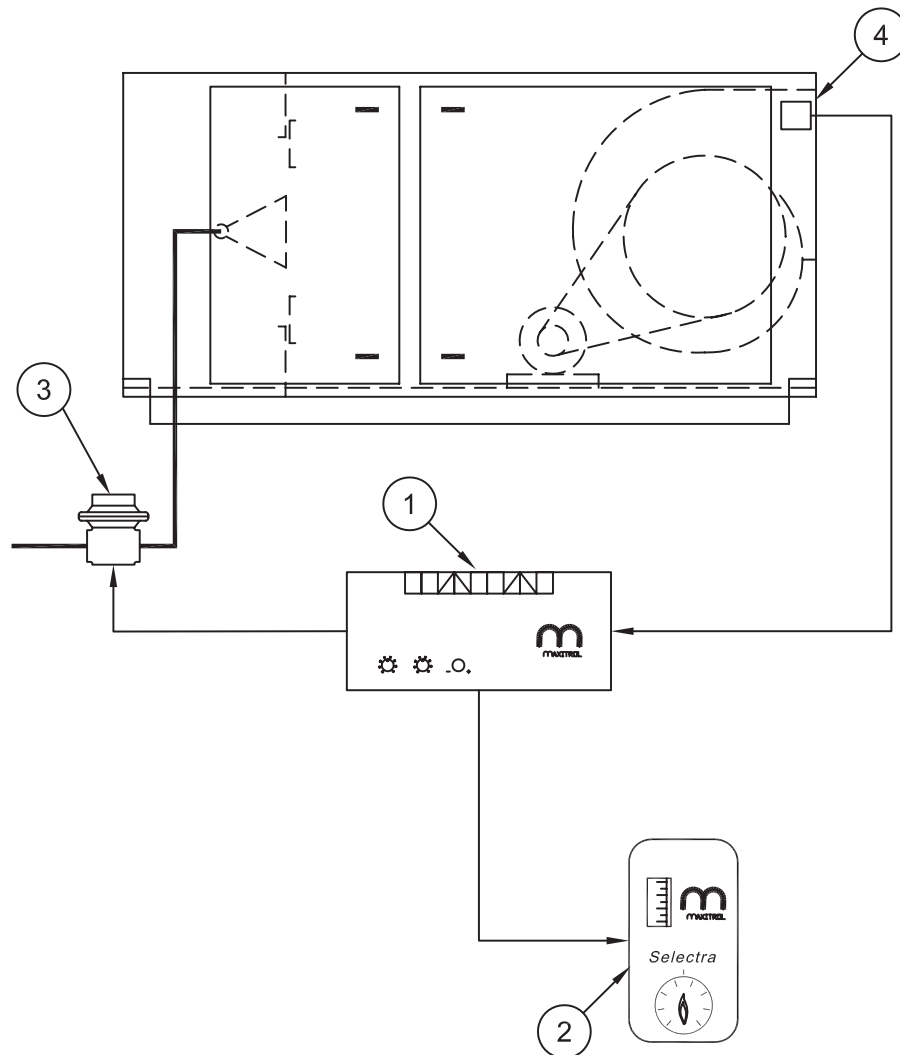
Includes:

System 44 Amplifier ① compares signals from Discharge Air Sensor ④ mounted in unit discharge and Remote Room Thermostat ② mounted in space and sends signal to Modulating Gas Valve ③ to adjust gas pressure for desired space temperature while maintaining preset minimum and maximum discharge air temperature settings.

COMPONENT I.D.

1. Amplifier (System44)
2. Room Thermostat

3. Modulating Gas Valve
4. Discharge Air Sensor



Space Temperature
SENSED & SET Here

Electrical Data

Amp Draw Table									
ITEM	SOURCE	AMPS	MOTOR HORSEPOWER						
			1	1 1/2	2	3	5	7 1/2	10
A	Blower Motor	AMPS for 208V 3 Ph.	4.6	6.6	7.5	10.6	16.7	24.2	30.8
		AMPS for 230V 3 Ph.	4.2	6.0	6.8	9.6	15.3	22.0	28.8
		AMPS for 460V 3 Ph.	2.1	3.0	3.4	4.8	7.6	11.0	14.4
		AMPS for 575V 3 Ph.	1.7	2.4	2.7	3.9	6.1	9.0	11.5
ITEM	SOURCE	AMPS	MOTOR HORSEPOWER						
			15	20	25	30	40	50	60
A	Blower Motor	AMPS for 208V 3 Ph.	46.2	59.4	74.8	88.0	114.0	143.0	169.0
		AMPS for 230V 3 Ph.	42.0	54.0	68.0	80.0	104.0	130.0	154.0
		AMPS for 460V 3 Ph.	21.0	27.0	34.0	40.0	52.0	65.0	77.0
		AMPS for 575V 3 Ph.	17.0	22.0	27.0	32.0	41.0	52.0	62.0
ITEM	SOURCE	AMPS	CONTROL CIRCUIT AMPS						
			Heating Only Unit						
B	Control Transformer	AMPS for 208V 3 Ph.	2.4						
		AMPS for 230V 3 Ph.	2.2						
		AMPS for 460V 3 Ph.	1.1						
		AMPS for 575V 3 Ph.	0.9						

Steps to size optional disconnect switch:

1. Find the blower motor HP required from tables on pages 4 and 5.
2. Find amp draw for required motor HP from chart in Item A above.
3. Find amps for control circuit from chart in Item B above.
4. Add amps from step 2 and step 3, multiply by 1.25.

NOTES:

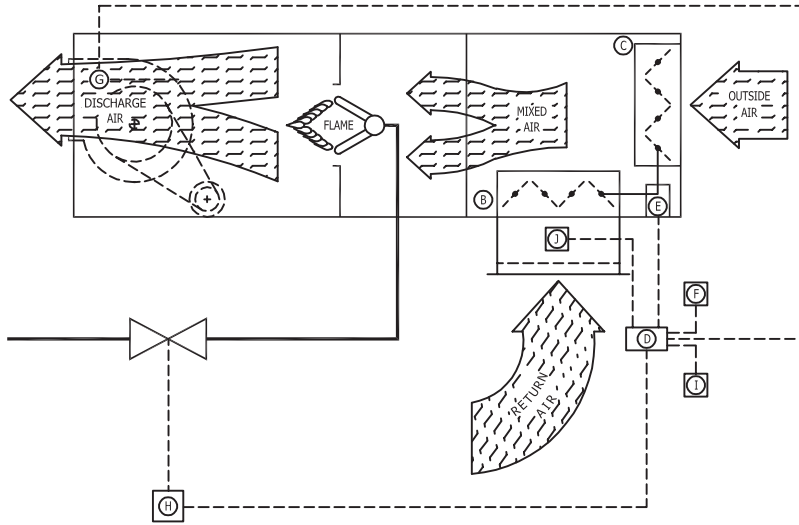
1. Above motor amps are based on 2011 edition of NEC.
2. Control circuit amps are based on standard controls.

Sequence of Operation – Return Air Units

Sequence of Operation – Return Air Units

P000621

OPERATION WITH RETURN AIR UPSTREAM OF BURNER



Signal from remote control I to AdaptAire Controller D, sets operational parameters for dampers B and C, and burner. Damper operation can be manual, building pressure or mixed air temperature.

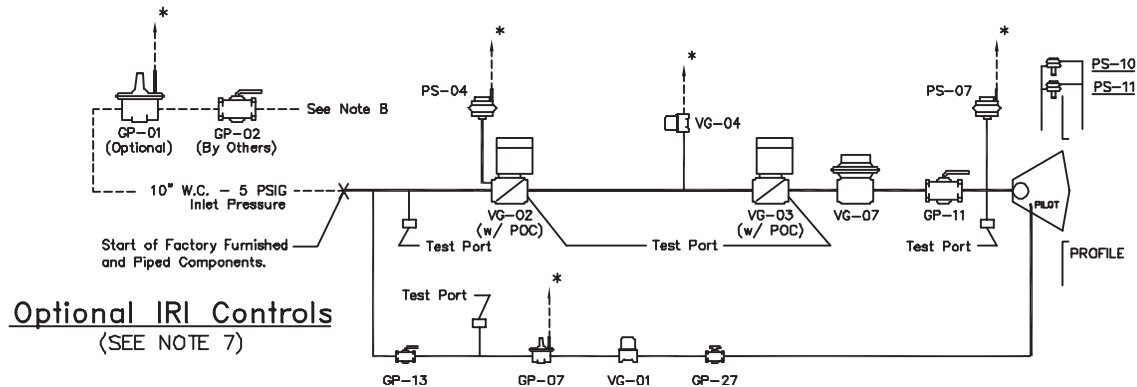
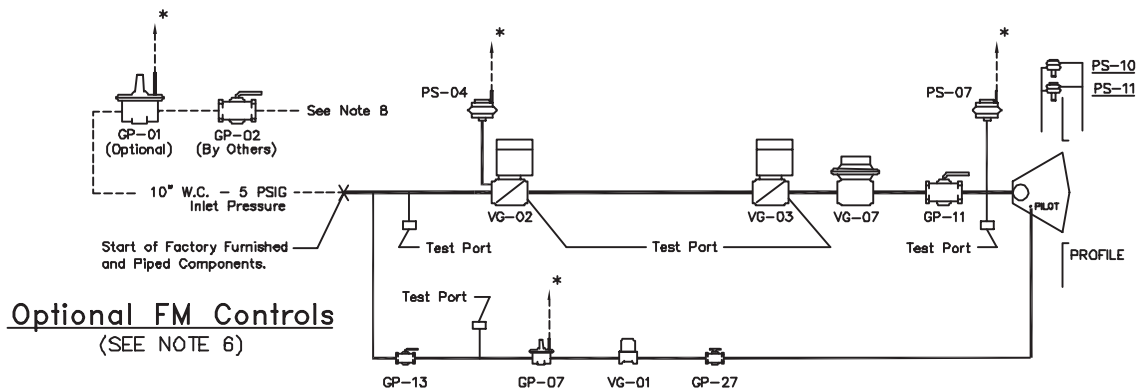
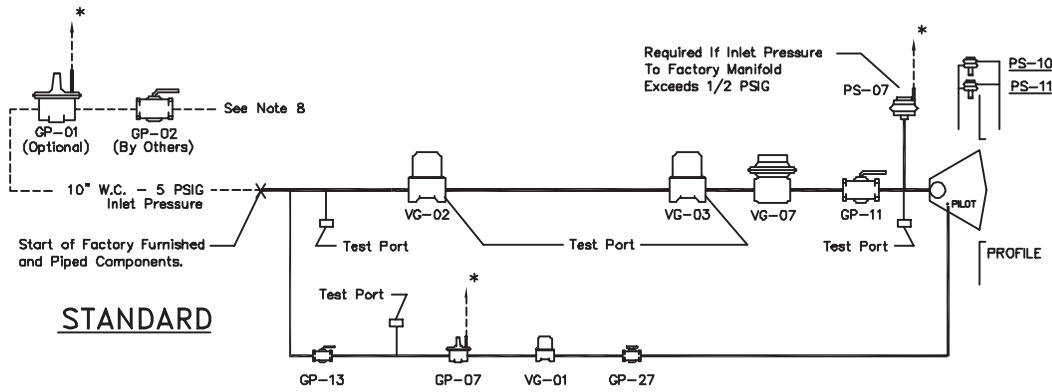
Return air dampers B, and outside air dampers C, are interlocked to move together. As one opens, the other closes. As the return air dampers open, allowing more return air to enter the unit, the outside air dampers move toward the closed position, decreasing the amount of outside air. Pressure sensor and flow station J, senses change in return airflow and signals AdaptAire Controller D.

Modulating gas valve H, regulates gas supply in response to signal from AdaptAire Controller D. AdaptAire Controller D, varies signal based on input from room temperature sensor F, discharge temperature sensor G, and airflow sensor J. Gas valve H can provide approximately 4% to 100% of rated burner capacity.

Typical Gas Piping Layout

Schematic Component Diagrams

C000148



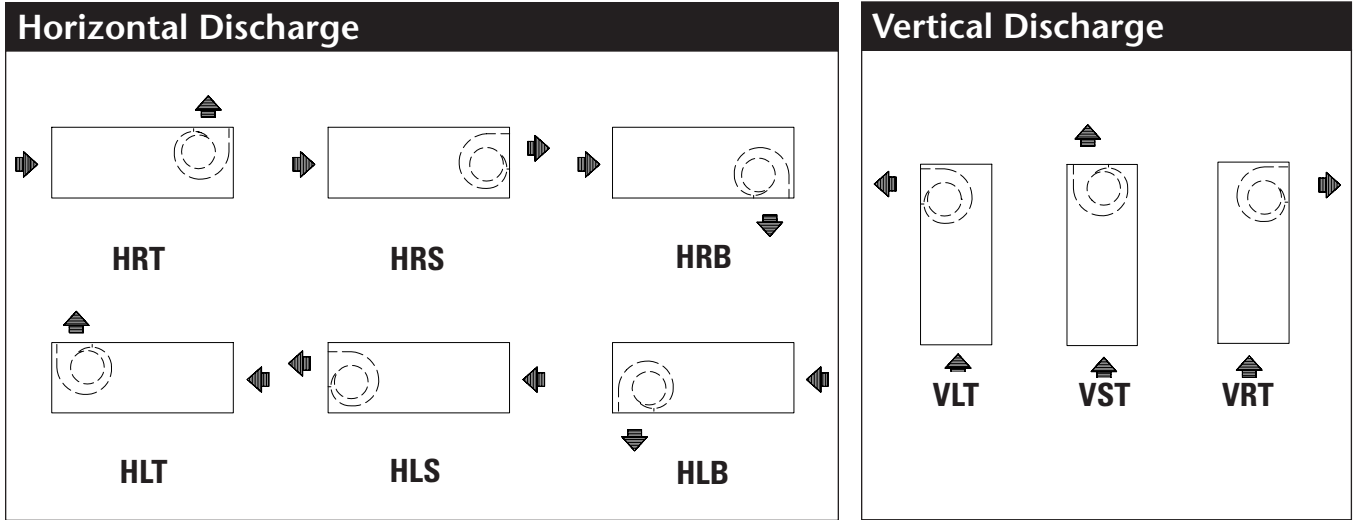
COMPONENT IDENTIFICATION

- GP-01 HIGH GAS PRESSURE REGULATOR
- GP-02 MAIN GAS SHUT-OFF VALVE
- GP-09 PILOT GAS PRESSURE REGULATOR
- GP-11 MAIN TEST FIRING SHUT-OFF VALVE
- GP-13 PILOT GAS SHUT-OFF VALVE
- GP-27 ORIFICED NEEDLE VALVE
- VG-01 PILOT GAS VALVE
- VG-02 MAIN GAS VALVE
- VG-03 AUXILIARY GAS VALVE
- VG-04 NORMALLY OPEN VENT VALVE
- VG-07 MODULATING VALVE
- PS-04 LOW GAS PRESSURE SWITCH
- PS-07 HIGH GAS PRESSURE SWITCH
- PS-10 HIGH VELOCITY PRESSURE SWITCH
- PS-11 LOW VELOCITY PRESSURE SWITCH

NOTES:

1. Vent limiting devices provided wherever possible, when venting is required* the venting to outside is by others on indoor units.
2. Units with 900 MBH and less use a pressure regulator (not shown) for high fire setting.
3. For inlet pressures under 10" W.C. - Please consult factory.
4. 3,300 MBH and above will require a minimum inlet pressure of 1 PSIG. For inlet pressures under 1 PSIG - Please consult factory.
5. Units that are listed to the Z83.4 standard (100% make-up air) carry both ETL and CETL approvals.
- 6. Standard manifold meets FM requirements for inputs under 2,500 MBH for ETL listed units.**
- 7. Standard manifold meets IRI requirements for ETL listed units.**
8. High gas pressure regulator required if inlet pressure exceeds 1/2 PSIG for inputs up to and including 900 MBH or inlet pressures over 5 PSIG for inputs greater than 900 MBH.

Cabinet Arrangements

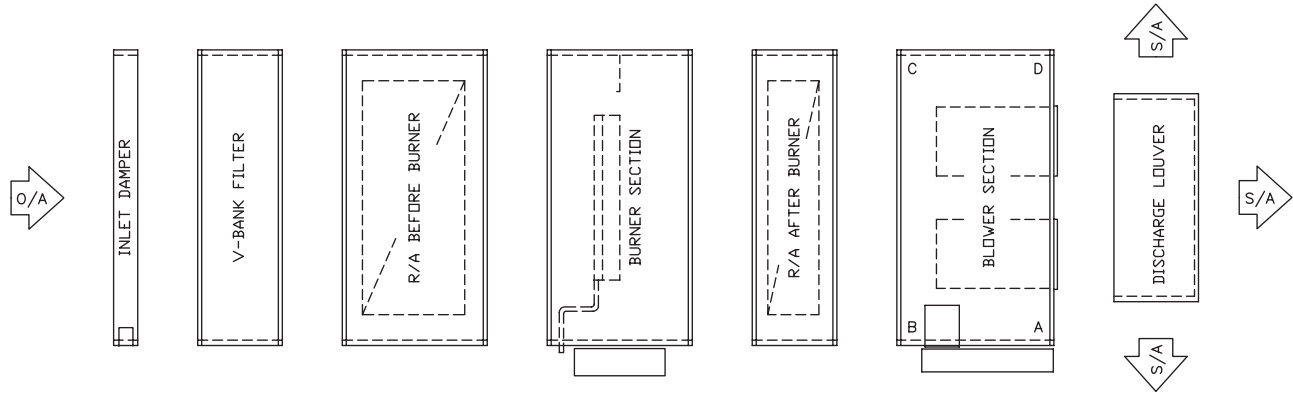


For all arrangements shown, controls are on near side.

Weights

Unit Weights (Approximate)

C000616A



PLAN VIEW

Model	Blower Section				Vertical Stand	Inlet Damper	V-Bank Filter	Burner	Return Air	Airflow Station	Discharge Louver
	A	B	C	D							
109-112	67	149	67	67	134	55	165	260	104	43	70
115-118	94	253	94	94	149	70	185	375	116	73	80
120-122	159	439	159	159	259	120	275	550	151	88	110
125-130	224	590	224	224	356	155	310	700	208	101	125
215-218	158	438	158	158	242	125	275	510	141	123	150
220-222	268	697	268	268	387	233	410	725	226	161	215
225-230	388	953	388	388	517	340	500	1010	302	191	230

APPROXIMATE WEIGHT (LBS.)

Guide Specification – Base Unit



Applied Air®

Base Bid Applied Air model DFM ____ make-up air unit(s) designed for indoor application. The unit discharge shall be designed for easy adaptation to external duct work or optional accessories. The unit(s) shall be capable of delivering ____ cfm at ____ ESP using a ____ horsepower (ODP) (TEFC) motor operating on (208/3/60) (230/3/60) (460/3/60).

Burner Section

The line burner shall be capable of delivering ____ BTUH firing on (natural gas) (propane) at an inlet pressure of ____ (inches water column) (PSIG). The standard ETL listed unit will meet ANSI, FM, and IRI requirements. Both burner and blower shall be compensated for an altitude of ____ feet above sea level. Manifold to be located outside of air stream. An observation port shall be located to provide view of pilot and main flame.

Unit(s) shall be supplied with a wide range burner with a modulating turndown ratio of 25:1. Adjustable profile plates shall be provided and sized to maintain the require velocity across the line burner. The operation of the burner shall be programmed through the flame safeguard with timed prepurge and flame-sensed by means of ultra violet scanner.

The burner assembly and gas manifold shall be completely prepiped and factory tested prior to shipment.

**The unit shall be controlled by:
(One of Three options, Choose one)**

Option 1

AdaptAire DDC control module with full BACnet compatibility. Unit shall have the AdaptAire (pick one):

1. **MDT-Touch Modulating Discharge Temperature Control System.**
2. **MRT-Touch Modulating Room Temperature Control System.**

The AdaptAire DDC control system shall include but not be limited to the following controls required for standard operation:

- Electronic time clock with normal, holiday, and override schedules.
- Timed freeze protection to prevent heater from discharging unheated air into the building.
- Inlet On-Off ductstat which will turn burner off when inlet temperature equals desired discharge air temperature as fuel savings mode.
- On-Off night setback thermostat for lower operating temperatures in unoccupied mode as fuel savings mode.

Option 2

System 14 Discharge Temperature Control. The System 14 control system shall include but not be limited to the following controls required for standard operation:

- Amplifier mounted in electrical control panel with sensitivity adjustments and one (1) calibrating potentiometer.
- Remote temperature selector mounted on optional Remote Control Panel and can be installed in any convenient location for remote adjustment of leaving air temperature between 55° to 90°F.
- Timed freeze protection to prevent heater from discharging unheated air into the building.
- Modulator/Regulator valve mounted in gas piping manifold that receives electrical signal from amplifier and adjusts gas pressure to maintain desired leaving air temperature.

Option 3

System 44 Room Temperature Control. The System 44 control system shall include but not be limited to the following controls required for standard operation:

- Amplifier mounted in electrical control panel contains adjustments for maximum and minimum discharge air temperature, three (3) calibrating potentiometers and a sensitivity adjustment.
- Remote temperature Selectrastat mounted on optional Remote Control Panel and installed in heated area for adjustment of room temperature between 55° to 90°F.
- Timed freeze protection to prevent heater from discharging unheated air into the building.
- Modulator/Regulator valve mounted in gas piping manifold that receives electrical signal from amplifier and adjusts gas pressure to maintain desired room air temperature.

UNIT CASING

Unit casing and accessories shall be fabricated from heavy-gauge bright spangled galvanized steel suitably reinforced to insure rigidity. All casings shall be air tight. Complete access shall be provided to all components. This includes the blower, burner, and electrical components.

BLOWER SECTION

Each unit shall be supplied with centrifugal forward curve, DWDI fan(s) rated in accordance with AMCA standards. The fan or fans shall be mounted on a solid shaft for single blowers and a hollow shaft for double blowers. Shaft designed for a maximum operating speed not to exceed 75% of its first critical speed. Bearings are to be external heavy-duty industrial prelubricated type. Blowers to be driven by a V-belt package sized with a capacity of 25% greater than the motor horsepower. Multiple belt applications will be matched sets. Drives are to be (fixed) (adjustable). Maximum outlet velocity ____ FPM. Motor to be externally mounted on adjustable slide base. Belt guard shall be provided for protection.

Guide Specification – Base Unit



Applied Air®

CONTROL ENCLOSURE

The unit(s) shall be supplied with a control compartment and all controls mounted within this compartment are to be wired to a numbered terminal strip. All wiring is to be color coded and in accordance with the NEC. A circuit diagram of the approved electrical drawing is to be laminated to the inside of the control cabinet door. All electrical components shall bear a recognized label.

STANDARD CONTROLS

1. Main fan starters and overloads
2. Control circuit fuses
3. High temperature limit switch
4. Flame safeguard with alarm contacts
5. UV flame detection
6. Ignition transformer
7. Automatic pilot valve
8. Main gas automatic safety shutoff valve
9. Air proving differential switch
10. Control transformer

OPTIONAL ACCESSORIES

1. V-Bank filter section with 2" filters
2. Motorized inlet air damper
3. Insulation
4. Vibration hangers or mounting feet
5. Clogged filter indication
6. Disconnect switch
7. Painted galvanized casing

8. High gas pressure regulator (required for inlet pressure over 1/2 PSIG)
9. Vertical arrangement with support stand and birdscreen
10. Mixed air section with or without return air flow station
11. Return air after the burner
12. Discharge nozzles
13. Fixed or revolving discharge
14. 115 Volt service receptacle
15. Touchscreen (for DDC Control systems only)
16. U.L. labeled control panel
17. Firestat
18. FM or IRI controls
19. Electronic time clock (Not Available with Touch DDC Control Systems)
20. On-off night setback thermostat (Not Available with Touch DDC Control Systems)
21. NEMA 1 or NEMA 12 remote control panel (System 14 or System 44 controls only)
22. Inlet on-off ductstat (System 14 or System 44 controls only)
23. VFD controller
24. Exhaust interlock
25. Interlocking relay

Guide Specification – Mixing Dampers With Return Air Flow Station

Unit(s) shall have outside air and return air dampers with modulating actuator controlled by AdaptAire DDC control system (Patent #7,059,536). The AdaptAire DDC control system shall have capability to digitally control the outside air quantity from a nominal minimum of 20% to 100% with integrated gas valve control at all room concentrations of CO₂.

The return air inlet shall include a self-calibrating flow measuring station with a grid of velocity pressure probes with spacing no greater than 12" over the entire face of the return air opening and sampled every second. Samples are averaged to provide smooth, accurate data that is delivered to the AdaptAire DDC control system every second. The DDC control system shall be capable of electronically displaying the return air/outside air ratio within 5% accuracy at all damper positions.

The AdaptAire DDC control system shall be capable of controlling mixing dampers in: (Choose One)

Manual Mode: The "Manual" mode allows manual positioning of the outside air (O.A.) damper and return air (R.A.) damper by changing the damper position setpoint.

Mixed Air Temperature Mode: The "Mixed Air Temperature" mode shall provide automatic control of the mixed air temperature by modulating the outside air (O.A.) damper and return air (R.A.) damper to maintain the mixed air temperature setpoint.

Building Pressure Mode: The "Building Pressure" mode shall provide automatic building pressure control by modulating the outside air (O.A.) damper and return air (R.A.) damper to maintain the indoor building pressure setpoint. As the building pressure decreases below the setpoint more outside air will be introduced.

Guide Specification – Touchscreen Controller



The display functions of the remote touchscreen display for the AdaptAire DDC control system shall include but not be limited to the following:

- Return air temperature
- Outside air temperature
- Discharge air temperature
- Mixed air temperature
- Maximum allowable temperature rise
- Actual temperature rise
- Current percent of outside air
- Current building pressure (optional)
- Current damper input voltage (optional)
- Current burner input voltage
- Fan operating hours since last reset
- Fan start cycle count since last reset
- Burner operating hours since last reset
- Burner start cycle count since last reset
- Cooling interlock operating hours since last reset
- Cooling interlock cycle count since last reset
- Critical alarm conditions:
 - o Airflow switch failure
 - o Unit on, fan off
 - o Unit off, fan on
 - o Low discharge temperature
 - o Safety circuit open
 - o Burner jumped

The control settings available on the remote touchscreen display for the AdaptAire DDC control system shall include but not be limited to the following:

- Heating setpoint
- Cooling setpoint
- Economizer options
- Setback setpoint
- Freeze protection setpoint
- Maximum discharge air temperature setpoint
- Minimum discharge air temperature setpoint
- Minimum ventilation option and setpoint
- Time of day schedule selection and setpoints
 - o Normal 5/7 schedule
 - o Holiday schedule
 - o Manual override



Applied Air®



Efficient Direct Fired Gas Heating System

Choose Applied Air Direct Fired Gas Heating

- Heat large or small spaces efficiently with 100% combustion efficiency
- Constantly replace contaminated indoor air with fresh, heated outside air
- Low operating and maintenance costs
- Fresh air ventilation anytime — just turn off the gas heating system
- Simple, inexpensive installation
- Applied Air, a leader in research, engineering, and customer service since 1975
- Fans tested to AMCA standards to insure rated airflow

Applied Air

www.appliedair.com

4830 Transport Drive Dallas TX 75247

Telephone 214.638.6010

