

Liebert® CW™

System Design Manual - 26-181kW, 50 & 60Hz



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LIEBERT CW MODEL NUMBER NOMENCLATURE

CW	114	D	C	S	A	2	1234	A
CW = Liebert CW Floor Mount Chilled Water Unit	Nominal Capacity, kW	D = Downflow U = Upflow	C = Chilled Water		A = 460/3/60 B = 575/3/60 C = 208/3/60 D = 230/3/60 2 = 380/3/60 F = 380/3/50 G = 415/3/50		Configuration	A-Z = Standard configuration S = SFA
			S = Forward-Curved Centrifugal Fan with Standard Motor V = Forward-Curved Centrifugal fan with Variable Speed Drive 1 = EC Motorized Impeller			2 = 2-Way Valve, Standard Pressure 3 = 3-Way Valve, Standard Pressure 1 = 2-Way Valve, High Pressure T = 3-Way Valve, High Pressure		

1.0 LIEBERT CW PERFORMANCE DATA—50 & 60 Hz SYSTEMS

	CW026	CW038	CW041	CW051	CW060	CW076	CW084	CW106	CW114
Capacity Data BTU/Hr (kW) {Based on 45°F (7.2°C) Entering Water. 10°F (5.6°C) Water Rise}									
80°F DB, 66.8°F WB (26.6°C DB, 19.3°C WB) 50% RH									
Total - kBTUH (kW)	142 (41.7)	200 (58.7)	265 (77.5)	299 (87.6)	375 (110.0)	414 (121.3)	528 (154.7)	604 (176.9)	742 (217.4)
Sensible - kBTUH (kW)	110 (32.1)	144 (42.1)	175 (51.2)	218 (63.9)	254 (74.4)	295 (86.4)	351 (102.7)	421 (123.4)	486 (142.4)
Flow Rate - GPM (l/s)	29.9 (1.9)	42.4 (2.7)	55.3 (3.5)	63.5 (4.0)	78.8 (5.0)	88.4 (5.6)	111.3 (7.0)	128.0 (8.1)	155.5 (9.8)
Press. Drop - ft (kPa)	31.4 (93.7)	50.0 (149.2)	40.5 (120.9)	24.5 (73.1)	23.2 (69.2)	27.1 (80.9)	49.2 (146.8)	51.3 (153.1)	86.0 (256.6)
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH									
Total - kBTUH (kW)	96 (28.1)	137 (40.0)	186 (54.5)	199 (58.4)	255 (74.8)	281 (82.4)	366 (107.3)	414 (121.2)	524 (153.4)
Sensible - kBTUH (kW)	88 (25.7)	116 (34.0)	143 (41.9)	175 (51.2)	205 (60.2)	238 (69.6)	285 (83.6)	341 (99.9)	398 (116.6)
Flow Rate - GPM (l/s)	20.7 (1.3)	29.7 (1.9)	39.6 (2.5)	43.6 (2.8)	55.0 (3.5)	61.9 (3.9)	79.2 (5.0)	90.2 (5.7)	111.9 (7.1)
Press. Drop - ft (kPa)	15.6 (46.6)	25.3 (75.5)	22.0 (65.6)	12.1 (36.1)	12.0 (35.8)	14.0 (41.8)	26.3 (78.5)	26.8 (80.0)	46.8 (139.7)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45% RH									
Total - kBTUH (kW)	89 (26.2)	125 (36.6)	166 (48.7)	184 (54.0)	231 (67.8)	256 (75.1)	327 (95.9)	373 (109.4)	467 (136.9)
Sensible - kBTUH (kW)	89 (26.2)	118 (34.6)	144 (42.3)	179 (52.4)	209 (61.2)	242 (70.8)	289 (84.6)	347 (101.6)	402 (117.7)
Flow Rate - GPM (l/s)	19.4 (1.2)	27.4 (1.7)	35.6 (2.3)	40.6 (2.6)	50.2 (3.2)	56.9 (3.6)	71.0 (4.5)	82.2 (5.2)	100.8 (6.4)
Press. Drop - ft (kPa)	13.9 (41.5)	21.7 (64.8)	18.2 (54.3)	10.6 (31.6)	10.1 (30.1)	12.0 (35.8)	21.6 (64.5)	22.6 (67.4)	38.6 (115.2)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH									
Total - kBTUH (kW)	75 (21.9)	106 (31.2)	146 (42.7)	155 (45.3)	200 (58.6)	218 (64.0)	285 (83.6)	322 (94.2)	411 (120.5)
Sensible - kBTUH (kW)	75 (21.9)	100 (29.4)	125 (36.6)	150 (43.9)	179 (52.4)	205 (60.0)	248 (72.8)	296 (86.7)	347 (101.8)
Flow Rate - GPM (l/s)	16.5 (1.0)	23.7 (1.5)	31.6 (2.0)	34.8 (2.2)	43.9 (2.8)	49.3 (3.1)	63.0 (4.0)	71.8 (4.5)	89.6 (5.7)
Press. Drop - ft (kPa)	10.2 (30.4)	16.5 (49.2)	14.6 (43.6)	7.9 (23.6)	7.9 (23.6)	9.3 (27.8)	17.3 (51.6)	17.6 (52.5)	31.1 (92.8)
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH									
Total - kBTUH (kW)	75 (21.9)	102 (29.9)	166 (48.7)	152 (44.4)	188 (55.0)	209 (61.1)	264 (77.3)	303 (88.7)	374 (109.5)
Sensible - kBTUH (kW)	75 (21.9)	102 (29.9)	144 (42.3)	152 (44.4)	183 (53.6)	209 (61.1)	254 (74.4)	303 (88.7)	355 (103.9)
Flow Rate - GPM (l/s)	16.4 (1.0)	22.8 (1.4)	35.6 (2.3)	34.2 (2.2)	41.5 (2.6)	47.4 (3.0)	58.7 (3.7)	68.1 (4.3)	82.2 (5.2)
Press. Drop - ft (kPa)	10.2 (30.4)	15.3 (45.7)	18.2 (54.3)	7.6 (22.7)	7.2 (21.5)	8.6 (25.7)	15.3 (45.7)	16.0 (47.7)	26.5 (79.1)
Hot-aisle Return Capacity Data, 45°F Entering Water, 12°F (6.6°C) Temperature Rise									
85°F DB, 64.5°F WB (29.4°C DB, 18.1°C WB), 32.3% RH									
Total - kBTUH (kW)	128 (37.4)	169 (49.6)	217 (63.7)	257 (75.2)	310 (90.7)	347 (101.7)	435 (127.5)	506 (148.3)	608 (178.2)
Sensible - kBTUH (kW)	128 (37.4)	169 (49.6)	201 (58.9)	257 (75.2)	295 (86.4)	347 (101.7)	405 (118.8)	492 (144.1)	559 (163.9)
Flow Rate - GPM (l/s)	22.5 (1.4)	30.1 (1.9)	38.2 (2.4)	45.9 (2.9)	54.8 (3.5)	62.4 (4.0)	77.4 (4.9)	90.5 (5.7)	107.4 (6.8)
Press. Drop - ft (kPa)	18.3 (54.6)	25.9 (77.3)	20.6 (61.5)	13.2 (39.4)	11.9 (35.5)	14.3 (42.7)	25.2 (75.2)	26.9 (80.3)	43.2 (128.9)
90°F DB, 66.2°F WB (32.2°C DB, 19.0°C WB), 27.7% RH									
Total - kBTUH (kW)	151 (44.2)	198 (57.9)	249 (72.9)	302 (88.4)	357 (104.7)	405 (118.8)	500 (146.5)	587 (172.0)	695 (203.5)
Sensible - kBTUH (kW)	151 (44.2)	198 (57.9)	232 (67.9)	302 (88.4)	342 (100.2)	405 (118.8)	469 (137.3)	572 (167.7)	644 (188.7)
Flow Rate - GPM (l/s)	26.3 (1.7)	34.8 (2.2)	43.4 (2.7)	53.4 (3.4)	62.8 (4.0)	72.1 (4.6)	88.2 (5.6)	104.0 (6.6)	121.7 (7.7)
Press. Drop - ft (kPa)	24.5 (73.1)	34.2 (102.1)	26.0 (77.6)	17.6 (52.5)	15.2 (45.4)	18.6 (55.5)	32.0 (95.5)	34.8 (103.8)	54.5 (162.6)
95°F DB, 67.7°F WB (35°C DB, 19.8°C WB), 23.6% RH									
Total - kBTUH (kW)	173 (50.8)	225 (66.0)	279 (81.8)	345 (101.2)	402 (117.9)	463 (135.6)	562 (164.8)	661 (193.7)	779 (228.1)
Sensible - kBTUH (kW)	173 (50.8)	225 (66.0)	262 (76.7)	345 (101.2)	388 (113.8)	463 (135.6)	531 (155.5)	653 (191.3)	727 (213.1)
Flow Rate - GPM (l/s)	30.1 (1.9)	39.5 (2.5)	48.5 (3.1)	60.6 (3.8)	70.2 (4.4)	81.7 (5.2)	98.6 (6.2)	116.3 (7.4)	135.6 (8.6)
Press. Drop - ft (kPa)	31.6 (94.3)	43.4 (129.5)	31.8 (94.9)	22.3 (66.5)	18.7 (55.8)	23.4 (69.8)	39.3 (117.3)	42.8 (127.7)	66.6 (198.7)

Unit capacity data is "net," and is certified to ASHRAE 127-2007 rating standard

	CW026	CW038	CW041	CW051	CW060	CW076	CW084	CW106	CW114
Fan Section - Variable Pitch, Two-Belt Drive Package* (*Some options or combination of options may result in reduced air flow. Consult factory for recommendation.)									
Air Volume CFM (CMH)	5250 (8920)	6050 (10,280)	5900 (10,020)	9300 (15,800)	9100 (15,460)	12,500 (21,240)	12,100 (20,560)	17,100 (29,070)	16,500 (28,050)
Fan Motor HP (kW)	3.0 (2.2)	5.0 (3.7)	5.0 (3.7)	7.5 (5.6)	7.5 (5.6)	10 (7.5)	10 (7.5)	15 (11.2)	15 (11.2)
Ext. Static Press. in. of water (Pa)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)
Number of Fans	1	1	1	2	2	2	2	3	3
Chilled Water Coil									
Face Area sq. ft. (m2)	11.7 (1.08)	11.7 (1.08)	11.7 (1.08)	18.5 (1.72)	18.5 (1.72)	25.0 (2.32)	25.0 (2.32)	36.28 (3.37)	36.28 (3.37)
Number of Rows	3	4	6	4	6	4	6	4	6
Face Velocity FPM (m/s)	431 (2.2)	499 (2.5)	486 (2.4)	482 (2.4)	471 (2.4)	484 (2.5)	480 (2.4)	471 (2.3)	460 (2.3)
Chilled Water Controls (Maximum design water pressure 150 PSI [1034.3 kPa]. Higher pressure available as an option. Consult factory.)									
Valve Actuator	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating
Sensors	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional
Valve Body	3-Way	3-Way	3-Way	3-Way	3-Way	3-Way	3-Way	3-Way	3-Way
Valve Cv	11.6	11.6	28.9	28.9	46.2	46.2	46.2	46.2	46.2
Valve Size - inches	1	1-1/4	1-1/2	1-1/2	2	2	2	2	2
2-Way Valve (Optional) Close Off Pressures-PSI (kPa)	86 (593)	86 (593)	70 (483)	70 (483)	45 (310)	45 (310)	45 (310)	45 (310)	45 (310)
REHEAT SECTION									
Electric Reheat: Three-Stage, Fin Tube									
Capacity BTU/HR (kW)*	39,200 (10)	58,800 (15)	58,800 (15)	81,000 (20)	98,100 (25)	121,500 (30)	121,500 (30)	127,900 (30)	127,900 (30)
Steam Reheat: 218°F (103.3°C) Steam, 75°F (23.9°C) E.A.T., STD MTR-Modulating Control Valve 2-way****†									
Capacity BTU/HR (kW)*	84,100 (24.6)	85,800 (25.1)	85,800 (25.1)	93,400 (27.4)	144,500 (42.4)	163,200 (47.8)	163,200 (47.8)	171,700 (50.3)	171,700 (50.3)
Hot Water Reheat: Capacity @ 180°F (82.2°C) E.W.T., STD MTR 75°F (23.8°C) E.A.T. - Modulating Control Valve 2-way****†									
Capacity BTU/HR (kW)*	47,000 (13.7)	49,500 (14.5)	49,500 (14.5)	89,900 (26.3)	89,900 (26.3)	125,200 (36.7)	125,200 (36.7)	133,700 (39.2)	133,700 (39.2)
Flow Rate-GPM (l/s)	5 (.31)	5 (.31)	5 (.31)	8 (.50)	8 (.50)	8 (.50)	8 (.50)	8 (.50)	8 (.50)
Pressure Drop-PSI (kPa)	3.5 (24.1)	3.5 (24.1)	3.5 (24.1)	1.6 (11.0)	1.6 (11.0)	1.6 (11.0)	1.6 (11.0)	1.6 (11.0)	1.6 (11.0)
* Includes Fan Motor ** Optional 3-Way valve available-consult factory *** 25 PSI (172.4 kPa) Max operating pressure-consult factory for higher pressures. † Unit CFM reduced by 300 with std. motor (142 l/s) **** 150 PSI (1034.3 kPa) Max operating pressure-consult factory for higher pressures.									
HUMIDIFIER SECTION									
Infrared Humidifier (Note: 50Hz Models are 22.1 lb/hr. (10.0 kg/h); 9.6 kW)									
Capacity-lb/hr. (kg/h)	11.0 (5.0)	11 (5.0)	11.0 (5.0)	17.4 (7.9),	17.4 (7.9),	22.1 (10.0)	22.1 (10.0)	22.1 (10.0)	22.1 (10.0)
kW	4.8	4.8	4.8	6.4,	6.4,	9.6	9.6	9.6	9.6
Pan	Stainless	Stainless	Stainless	Stainless	Stainless	Stainless	Stainless	Stainless	Stainless
Steam Generating Humidifier (Water conductivity between 200-500 micromhos is required for ideal operation)									
Capacity-lb/hr. (kg/h)	11 (5.0)	11 (5.0)	11.0 (5.0)	22 (10.0)	22 (10.0)	22 (10.0)	22 (10.0)	22 (10.0)	22 (10.0)
Capacity-kW	3.6	3.6	3.6	7.2	7.2	7.2	7.2	7.2	7.2
Steam Grid Humidifier - All Models (Standard Selection, 5 PSIG. (34.5 kPa) Steam 14 lb./hr. (6.4 kg/h)									
Supply Steam Pressure, PSIG (kPa)	—	2 (13.8)	4 (27.6)	5 (34.5)	6 (41.4)	8 (55.2)	10 (68.9)	—	—
Capacity-lb/hr. (kg/h), w/ 5/32" orifice	—	8 (3.6)	12 (5.4)	14 (6.4)	16 (7.3)	19 (8.6)	21 (9.5)	—	—
Filter Section - Disposable Type - Nominal Sizes and Quantities, Downflow Models									
Nominal Size, in	18x24	18x24	18x24	18x24	18x24	18x24	18x24	24x31	24x31
Quantity	4	4	4	6	6	8	8	5	5
Upflow Models (Front Return)									
Nominal Size, in	24x24	24x24	24x24	24x24	24x24	24x24	24x24	18x24	18x24
Quantity	2	2	2	3	3	4	4	10	10
Upflow Models (Bottom & Rear Return) Bottom Return not available on CW106/CW114									
Nominal Size, in	18x24	18x24	18x24	18x24	18x24	18x24	18x24	18x24	18x24
Quantity	4	4	4	6	6	8	8	10	10
CONNECTION SIZES									
Chilled Water-OD Copper	1-1/8	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	2-1/8	2-1/8	2-5/8
Infrared Humidifier-OD Copper	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Condensate Drain-FPT	3/4	3/4	3/4	3/4	3/4	3/4	3/4	1-1/4	1-1/4
Steam Reheat-MPT	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
Hot Water Reheat-OD Copper	5/8	5/8	5/8	7/8	7/8	7/8	7/8	7/8	7/8
Steam Humidifier-MPT	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Weight-lb (kg)- Installed	810 (367)	845 (383)	895 (406)	1140 (517)	1210 (549)	1390 (630)	1490 (676)	1950 (885)	2090 (949)

2.0 LIEBERT CW PERFORMANCE DATA—MODELS WITH EC FANS, 50 & 60 Hz

	CW106D	CW114D	CW181D
Capacity Data BTU/Hr (kW) {Based on 45°F (7.2°C) Entering Water. 10°F Water Rise}			
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH *			
Total -kBTUH (kw)	435 (127.5)	552 (161.7)	813 (238.2)
Sensible - kBTUH (kw)	362 (106.1)	423 (123.9)	612 (179.3)
Flow Rate-GPM (Vs)	92.1 (5.8)	116.3 (7.4)	179.3 (11.4)
Press. Drop- ft (kPa)	27.8 (83.0)	50.2 (149.8)	40.0 (119.4)
75°F DB, 61°F WB (23.9°C DB, 16.1 °C WB) 45% RH *			
Total -kBTUH (kw)	395 (115.7)	494 (144.7)	725 (212.4)
Sensible - kBTUH (kw)	368 (107.8)	427 (125.1)	617 (180.8)
Flow Rate-GPM (Vs)	84.0 (5.8)	104.8 (6.6)	153.4 (9.7)
Press. Drop- ft (kPa)	23.5 (70.1)	41.5 (123.8)	29.3 (87.4)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH *			
Total -kBTUH (kw)	341 (99.9)	435 (127.5)	642 (188.0)
Sensible - kBTUH (kw)	316 (92.6)	371 (108.7)	537 (157.3)
Flow Rate-GPM (Vs)	73.4 (4.6)	93.2 (5.9)	136.8 (8.7)
Press. Drop- ft (kPa)	18.3 (54.6)	33.4 (99.7)	23.3 (69.5)
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH *			
Total -kBTUH (kw)	323 (94.6)	395 (115.7)	586 (171.7)
Sensible - kBTUH (kw)	323 (94.6)	378 (110.8)	546 (160.0)
Flow Rate-GPM (Vs)	69.6 (4.4)	85.2 (5.4)	125.7 (8.0)
Press. Drop- ft (kPa)	16.6 (49.5)	28.3 (84.4)	19.7 (58.7)
Fan Data			
Air Volume CFM (CMH)	17,600 (29,920)	17,360 (29,512)	24,000 (40,800)
Fan Motor hp Max, (kW), ea, qty 3	4.2 (3.4)	4.2 (3.4)	5.2 (4.3)
Ext. Static Press. in. of water (Pa)	0.2 (50)	0.2 (50)	0.2 (50)
Chilled Water Coil			
Face Area sq. ft. (m ²)	36.3 (3.4)	36.3 (3.4)	71.2 (6.6)
No. of Rows	4	6	6
Face Velocity FPM (m/s)	471 (2.3)	471 (2.3)	337 (1.6)
Valve Cv	46.2	46.2	46.2 qty2
Valve Size - inches	2	2	2
Electric Reheat - Three (3) Stage, Fin Tube			
Capacity BTU/HR (kW)	102,390 (30)	102,390 (30)	102,390 (30)
Infrared Humidifier			
Capacity-Lb. Per Hr. (kg/h)	22.1 (10.0)	22.1 (10.0)	22.1 (10.0)
kW	9.6	9.6	9.6
FILTER SECTION - DISPOSABLE TYPE - Nominal Sizes and Quantities, MERV7 or MERV11 (option)			
Nominal Size, in	24"x31"	24"x31"	21-1/2" x 24"
Quantity	5	5	10
CONNECTION SIZES			
Chilled Water-O.D. Copper	2-1/8	2-5/8	3-1/8
Infrared Humidifier-O.D. Copper	1/4	1/4	1/4
Condensate Drain-FPT	1-1/4		
Weight-lb (kg)- Installed	1950 (885)	2090 (949)	2800 (1271)

* Unit capacity data is "net," and is certified to ASHRAE 127-2007 rating standard

3.0 ELECTRICAL DATA—UNITS WITH EC FANS

3.1 CW106 and CW114 Electrical Data with EC Fans

Table 1 Electrical data—60Hz-3 phase

Reheat	Humidifier	Volts	FLA	WSA	OPD
Electric	Infrared	460	65.4	81.8	90
Electric	Infrared	575	53.4	66.8	70
Electric	Infrared	460	53.8	67.3	70
Electric	Infrared	575	41.8	52.3	60
None	Infrared	460	26.3	32.9	35
None	Infrared	575	23.3	29.1	30
None	None	460	14.7	15.9	20
None	None	575	11.7	12.7	15

Table 2 Electrical data—50Hz-3 phase

Reheat	Humidifier	Volts	FLA	WSA
Electric	Electric	400	70.8	88.5
Electric	None	400	58	72.5
None	Electric	400	27.5	34.4
None	None	400	14.7	15.9

3.2 CW181 Electrical Data with EC Fans

Table 3 CW181 electrical data—60Hz-3 phase

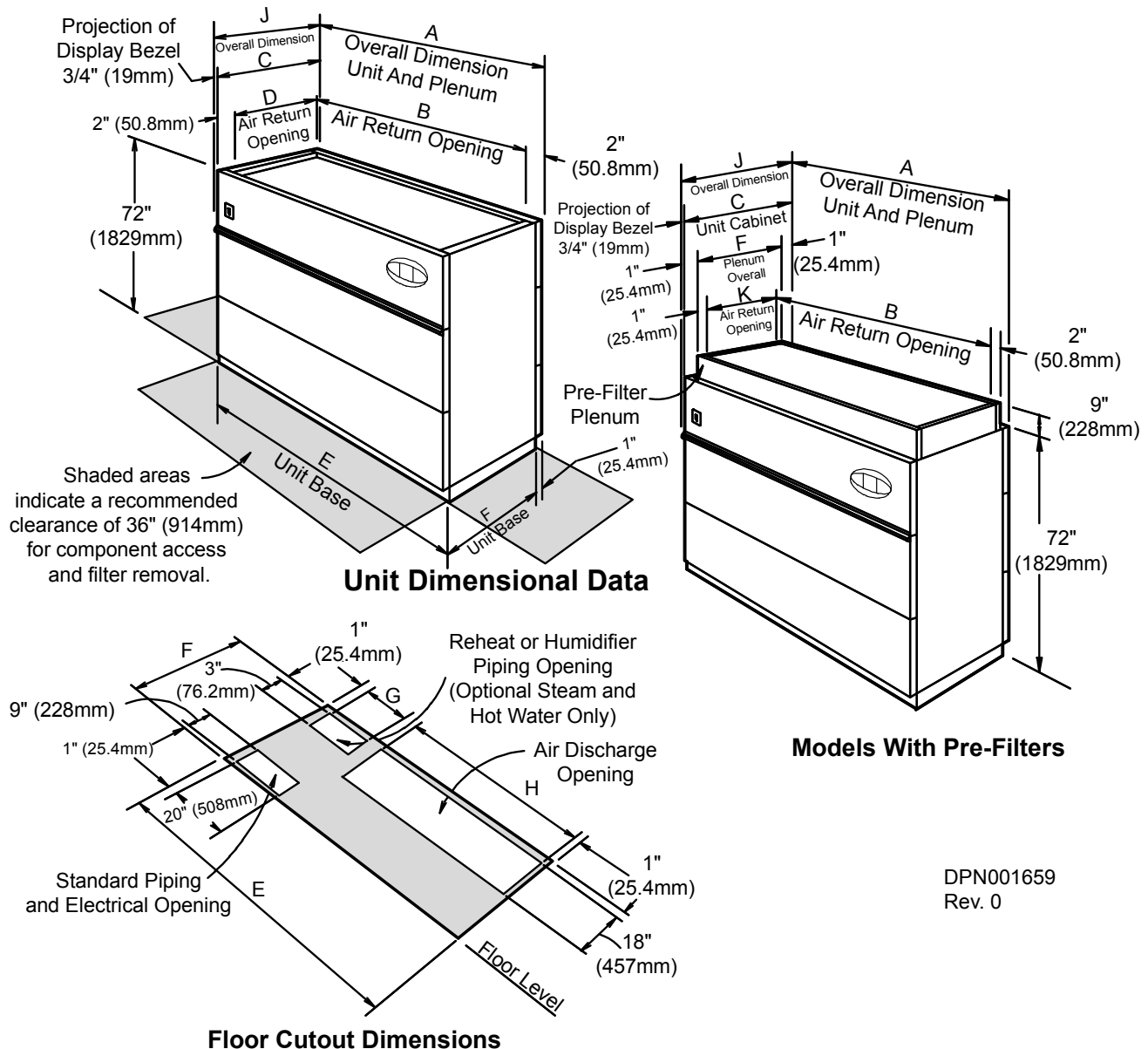
Reheat	Humidifier	Volts	FLA	WSA	OPD
Electric	Infrared	460	69	86.3	90
Electric	Infrared	575	56.4	70.5	80
Electric	None	460	57.4	71.8	80
Electric	None	575	44.8	56	60
None	Infrared	460	29.9	37.4	35
None	Infrared	575	26.3	32.9	35
None	None	460	18.3	19.8	25
None	None	575	14.7	15.9	20

Table 4 CW181 electrical data—50Hz-3 phase

Reheat	Humidifier	Volts	FLA	WSA
Electric	Electric	400	74.4	93
Electric	None	400	61.6	77
None	Electric	400	31.1	38.9
None	None	400	18.3	19.8

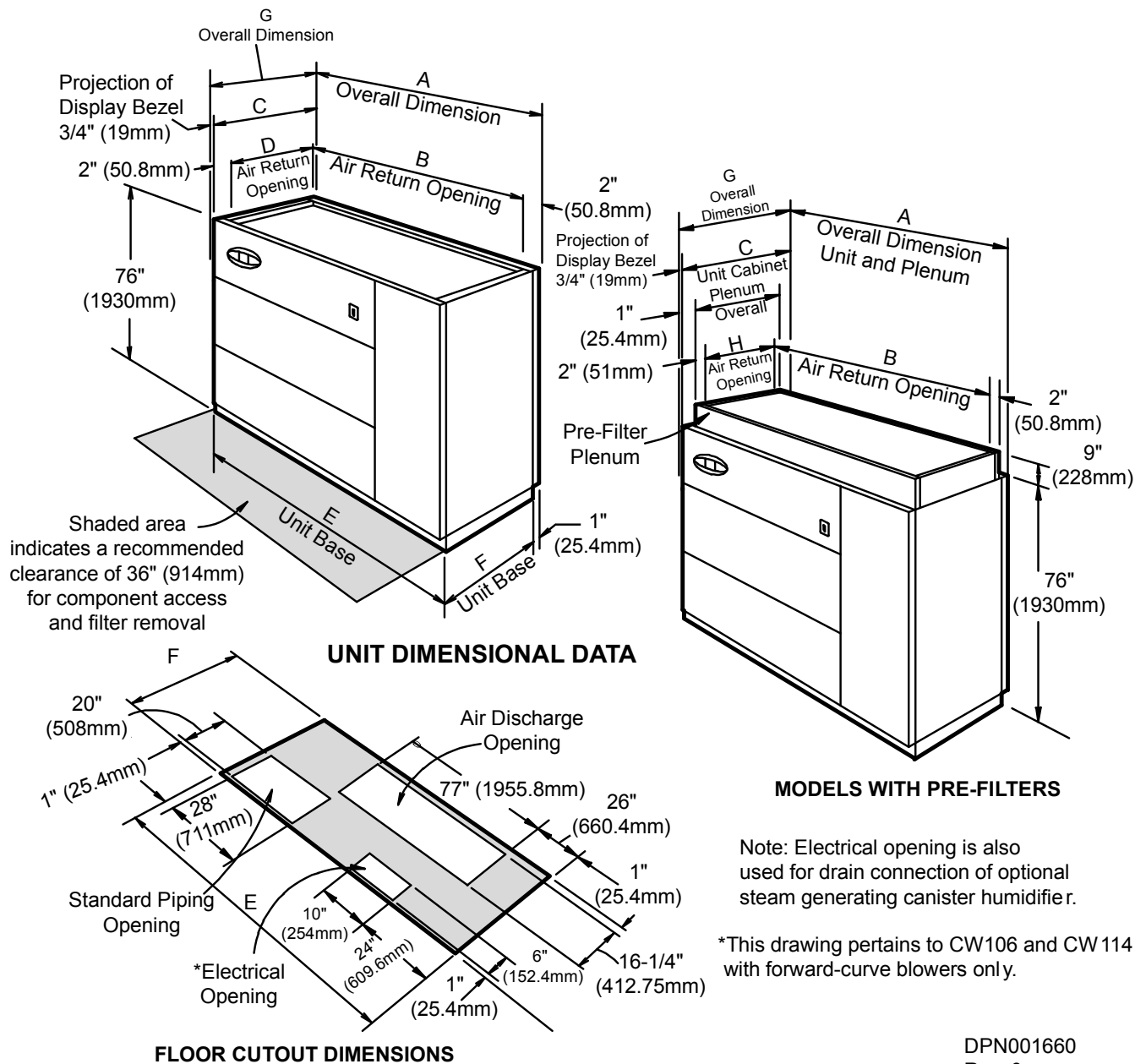
4.0 DIMENSIONAL DATA

Figure 1 Dimensions, CW026 - CW084



Model	Dimensional Data, inches (mm)										Net Weight lb (kg)
	A	B	C	D	E	F	G	H	J	K	
CW026	50 (1270)	46 (1168)	35 (889)	32 (813)	48 (1219)	33 (883)	8 (203)	37 (940)	35-5/8 (905)	31 (787)	760 (345)
CW038	50 (1270)	46 (1168)	35 (889)	32 (813)	48 (1219)	33 (883)	8 (203)	37 (940)	35 5/8 (905)	31 (787)	795 (361)
CW041	50 (1270)	46 (1168)	35 (889)	32 (813)	48 (1219)	33 (883)	8 (203)	37 (940)	35 5/8 (905)	31 (787)	855 (388)
CW051	74 (1880)	70 (1778)	35 (889)	32 (813)	72 (1829)	33 (883)	8 (203)	61 (1549)	35 5/8 (905)	31 (787)	1090 (494)
CW060	74 (1880)	70 (1778)	35 (889)	32 (813)	72 (1829)	33 (883)	8 (203)	61 (1549)	35 5/8 (905)	31 (787)	1115 (524)
CW076	99 (2515)	95 (2413)	35 (889)	32 (813)	97 (2464)	33 (883)	15 1/4 (387)	78 3/4 (2000)	35 5/8 (905)	31 (787)	1320 (599)
CW084	99(2515)	95 (2413)	35 (889)	32 (813)	97 (2464)	33 (883)	15 1/4 (387)	78 3/4 (2000)	35 5/8 (905)	31 (787)	1420 (644)

Figure 2 Dimensional Data—50 & 60 Hz Systems CW106—CW114, downflow models



DPN001660
Rev. 0

Model	Dimensional Data, inches (mm)									Net Weight lb (kg)
	A	B	C	D	E	F	G	H	I	
CW106	122 (3099)	118 (2997)	35 (889)	31 (787)	120 (3048)	33 (838)	35-5/8 (905)	30 (762)	34 (864)	1785 (810)
CW114										1925 (873)

Figure 3 Cabinet and Floor Planning Dimensional Data, Downflow Model CW181 with EC Fans

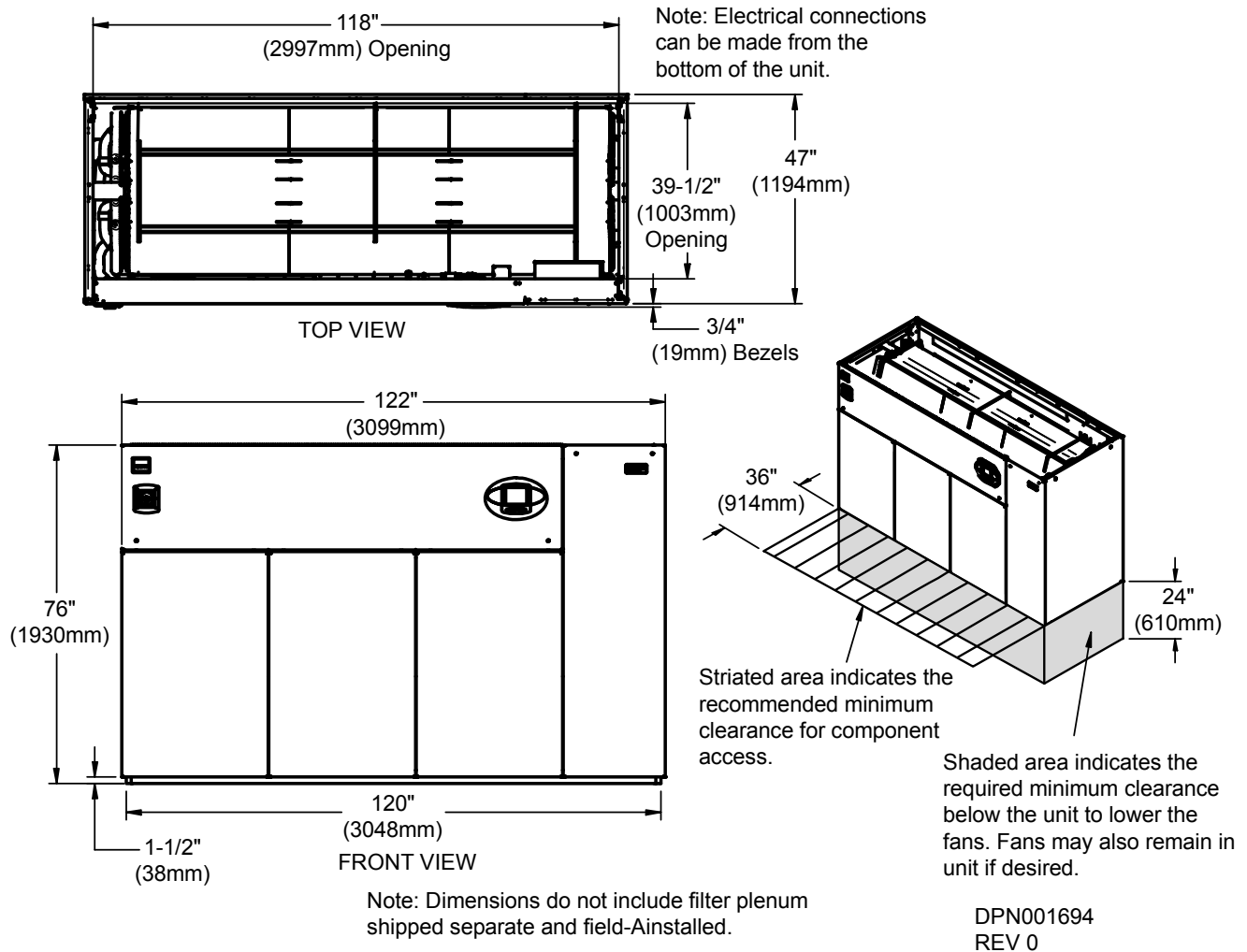
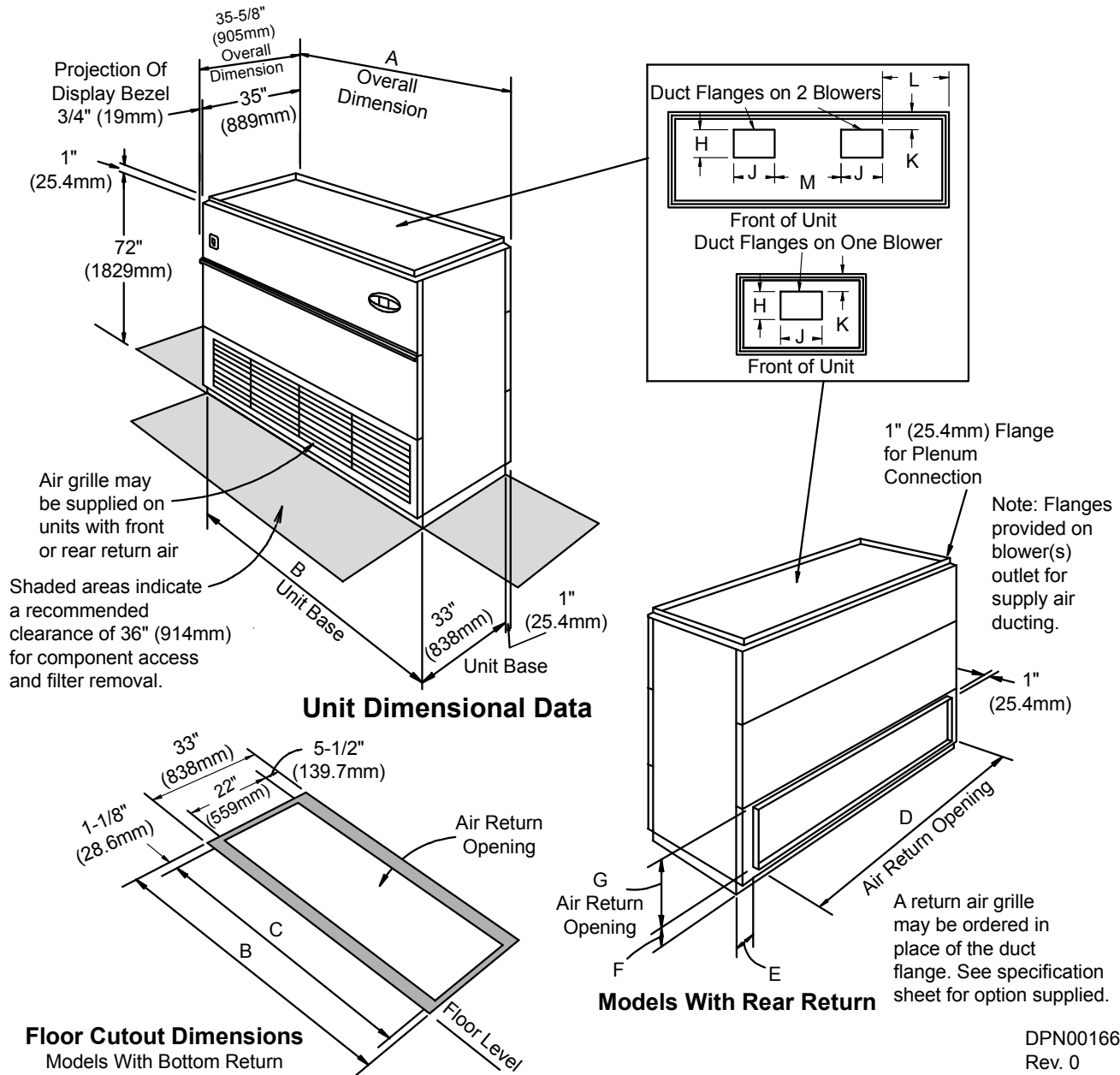


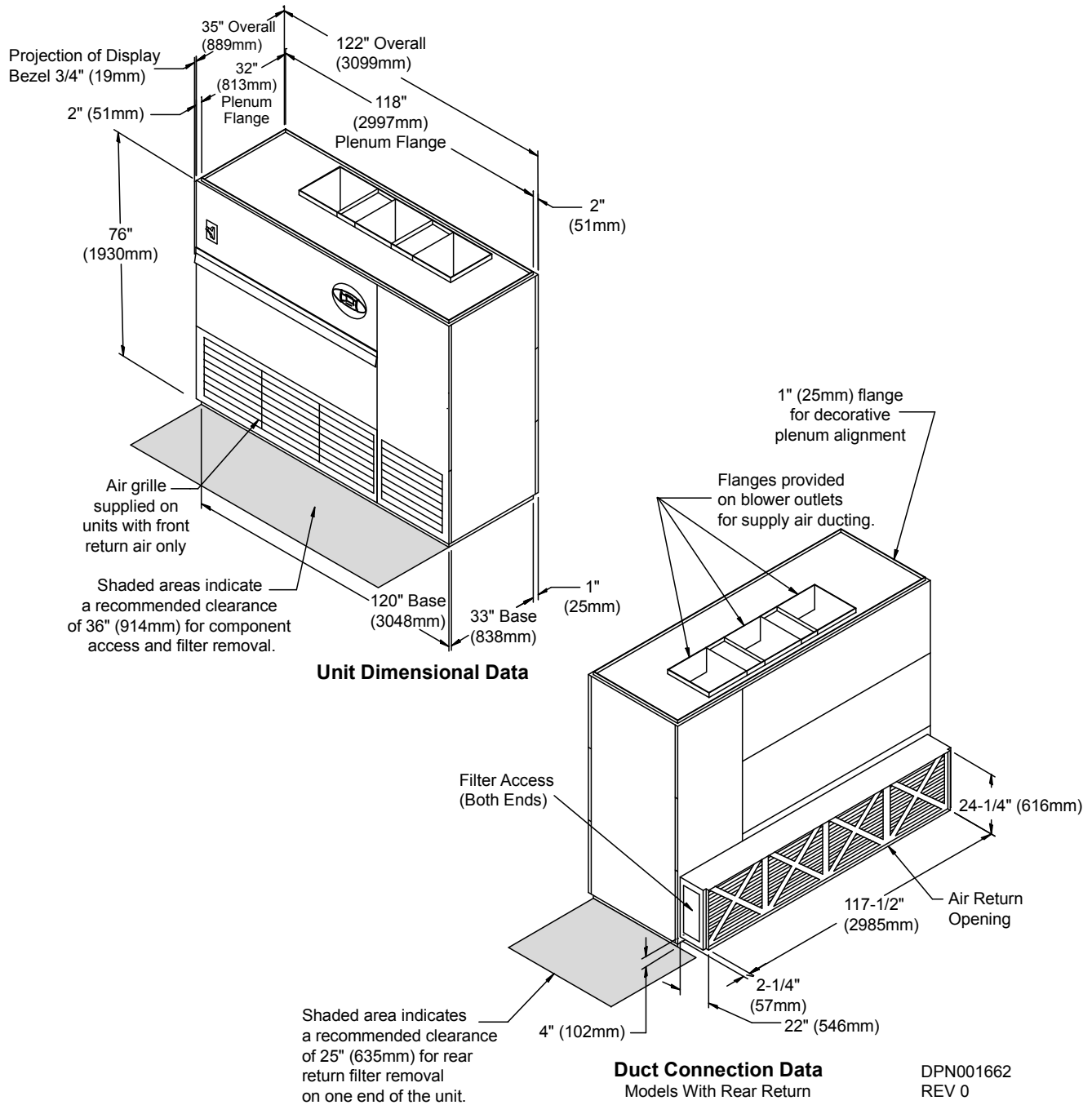
Figure 4 Cabinet and floor planning dimensions, upflow models—CW026-CW084



DPN001661
 Rev. 0

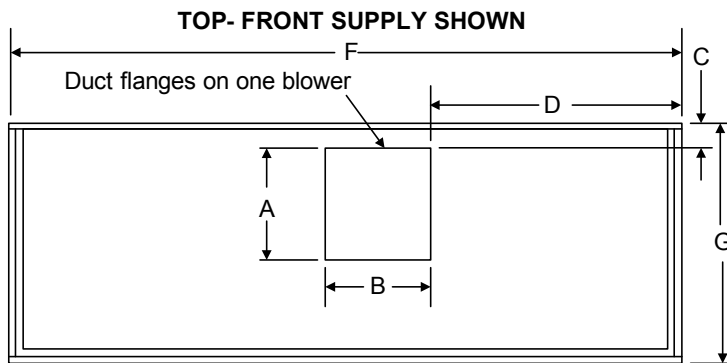
Model	No. of Blowers	Dimensional Data, inches (mm)												Net Weight, lb (kg)
		A	B	C	D	E	F	G	H	J	K	L	M	
CW026	1	50 (1270)	48 (1219)	46 (1168)	44 (1118)	3 (76)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-3/8 (454)	—	760 (345)
CW038	1	50 (1270)	48 (1219)	46 (1168)	68 (1727)	3 (76)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-3/8 (454)	—	795 (361)
CW041	1	50 (1270)	48 (1219)	46 (1168)	44 (1118)	3 (76)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-3/8 (454)	—	855 (388)
CW051	2	74 (1880)	72 (1829)	70 (1778)	44 (1118)	3 (76)	4 (102)	20 (508)	15-7/8 (403)	14-5/8 (371)	2-3/16 (55)	20-3/8 (517)	11-1/4 (286)	1090 (494)
CW060	2	74 (1880)	72 (1829)	70 (1778)	68 (1727)	3 (76)	4 (102)	20 (508)	15-7/8 (403)	14-5/8 (371)	2-3/16 (55)	20-3/8 (517)	11-1/4 (286)	1155 (524)
CW076	2	99 (2515)	97 (2464)	95 (2413)	86 (2184)	6-1/2 (165)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	3 1/4 (82)	20-5/8 (524)	12-5/8 (321)	1320 (599)
CW084	2	99 (2515)	97 (2464)	95 (2413)	86 (2184)	6-1/2 (165)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	3 1/4 (82)	20-5/8 (524)	12-5/8 (321)	1420 (644)

Figure 5 Cabinet and floor planning dimensions, CW 106 and CW114 upflow models

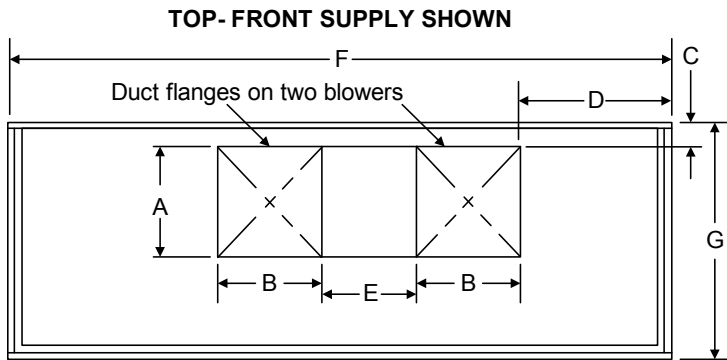


5.0 UPFLOW DUCT CONNECTION DATA CW026—CW084

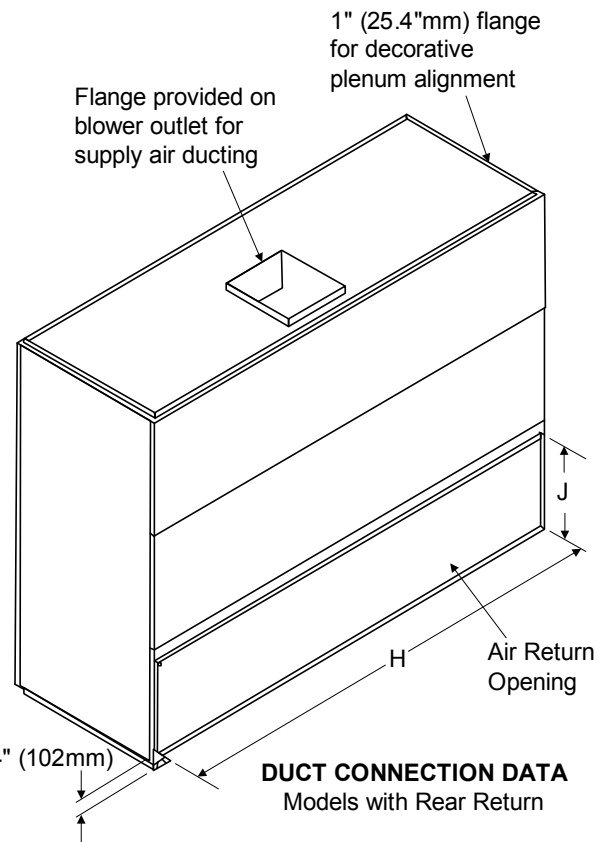
No. of Blowers	Model No. Chilled Water	Dimensional Data—in. (mm)								
		A	B	C	D	E	F	G	H	J
1	CW026	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-7/8 (454)	-	50 (1270)	35 (889)	44 (1118)	18 (457)
1	CW038	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-7/8 (454)	-	50 (1270)	35 (889)	44 (1118)	18 (457)
1	CW041	15-7/8 (403)	18-5/8 (473)	2-3/16 (55)	17-7/8 (454)	-	50 (1270)	35 (889)	44 (1118)	18 (457)
2	CW051	15-7/8 (403)	14-5/8 (371)	2-3/16 (55)	20-3/8 (517)	11-1/4 (288)	74 (1880)	35 (889)	68 (1727)	20 (508)
2	CW060	15-7/8 (403)	14-5/8 (371)	2-3/16 (55)	20-3/8 (517)	11-1/4 (288)	74 (1880)	35 (889)	68 (1727)	20 (508)
2	CW076	15-7/8 (403)	18-5/8 (473)	3-1/4 (82)	20-5/8 (524)	12-5/8 (321)	99 (2515)	35 (889)	86 (2184)	18 (457)
2	CW084	15-7/8 (403)	18-5/8 (473)	3-1/4 (82)	20-5/8 (524)	12-5/8 (321)	99 (2515)	35 (889)	86 (2184)	18 (457)



BLOWER DUCT FLANGE LOCATION - One Fan

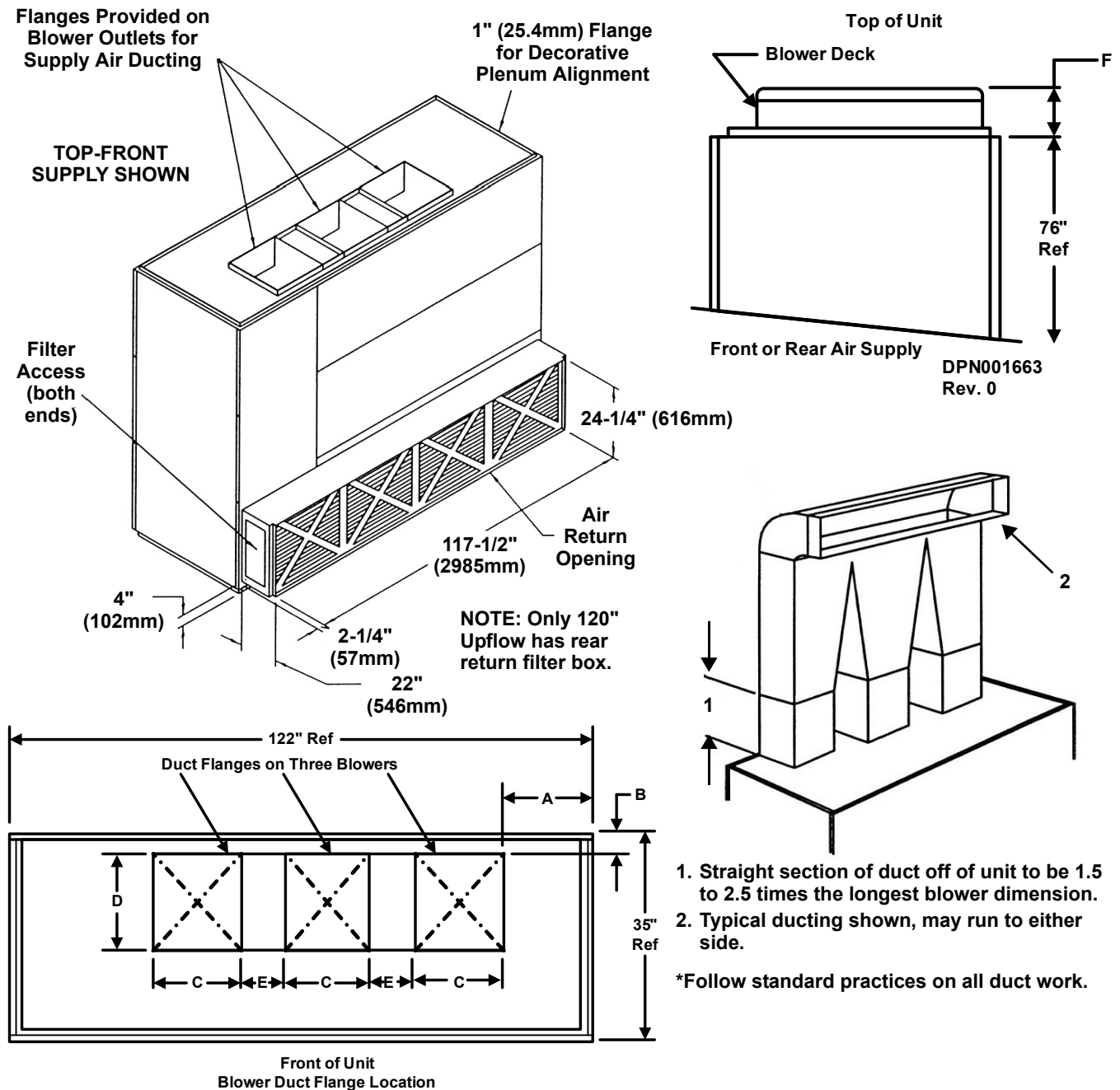


BLOWER DUCT FLANGE LOCATION - Two Fans



6.0 BLOWER DUCT & DECK DIMENSIONS, CW106 AND CW114, UPFLOW MODELS

Model	Blower	Supply	Motor, hp	Dimensional Data, inches (mm)						Net Weight lb. (Kg)
				A	B	C	D	E	F	
CW106	15 x 15	Top Front	10-15	27-1/2 (699)	3 1/2 (89)	18-11/16 (475)	16-3/16 (411)	10 (254)	4 1/2 (114)	1785 (810)
		Top Rear	10-15	27-1/2 (699)	12 5/16 (313)	18 11/16 (475)	16 3/16 (411)	10 (254)	4 1/2 (114)	
CW114	15 x 11	Top Front	10-15	30 (762)	3 1/2 (89)	14 3/4 (375)	16 3/16 (411)	10 (254)	4 1/2 (114)	1925 (873)
			20	30 (762)	3 1/2 (89)	14 3/4 (375)	16 3/16 (411)	10 (254)	4 1/2 (114)	
		Top Rear	10-20	30 (762)	12 5/16 (313)	14 3/4 (375)	16 3/16 (411)	10 (254)	4 1/2 (114)	



7.0 ELECTRICAL SPECIFICATIONS

Table 5 Electrical data—50 Hz systems

Reheat Options			Electric			None			Electric			None		
Humidifier Options			IR/SGH			IR/SGH			Steam or None			Steam or None		
Models	Motor HP	Volts	200	230	380-415	200	230	380-415	200	230	380-415	200	230	380-415
CW026	2.0	FLA	46.7	43.4	24.3	19.8	17.2	9.9	33.9	32.3	17.9	7.0	6.1	3.5
	3.0	FLA	49.8	46.1	25.9	22.9	19.9	11.5	37.0	35.0	19.5	10.1	8.8	5.1
CW038	3.0	FLA	62.9	59.0	33.2	22.9	19.9	11.5	50.1	47.9	26.8	10.1	8.8	5.1
	5.0	FLA	68.6	63.9	36.0	28.6	24.8	14.3	55.8	52.8	29.6	15.8	13.7	7.9
CW041	3.0	FLA	62.9	59.0	33.2	22.9	19.9	11.5	50.1	47.9	26.8	10.1	8.8	5.1
	5.0	FLA	68.6	63.9	36.0	28.6	24.8	14.3	55.8	52.8	29.6	15.8	13.7	7.9
CW051	5.0	FLA	94.6	88.4	49.6	41.2	35.9	20.7	69.2	66.2	36.8	15.8	13.7	7.9
	7.5	FLA	103.9	96.5	54.2	50.5	44.0	25.3	78.5	74.3	41.4	25.1	21.8	12.5
CW060	5.0	FLA	107.9	101.4	56.8	41.2	35.9	20.7	82.5	79.2	44.0	15.8	13.7	7.9
	7.5	FLA	117.2	109.5	61.4	50.5	44.0	25.3	91.8	87.3	48.6	25.1	21.8	12.5
CW076	7.5	FLA	126.6	122.6	68.6	50.5	44.0	25.3	101.2	100.4	55.8	25.1	21.8	12.5
	10.0	FLA	131.7	128.4	71.2	55.6	49.8	27.9	106.3	106.2	58.4	30.2	27.6	15.1
CW084	7.5	FLA	126.6	122.6	68.6	50.5	44.0	25.3	101.2	100.4	55.8	25.1	21.8	12.5
	10.0	FLA	131.7	128.4	71.2	55.6	49.8	27.9	106.3	106.2	58.4	30.2	27.6	15.1
CW106	10.0	FLA	131.7	128.4	71.2	55.6	49.8	27.9	106.3	106.2	58.4	30.2	27.6	15.1
	15.0	FLA	147.1	142.4	78.9	71.0	63.8	35.6	121.7	120.2	66.1	45.6	41.6	22.8
	20.0	FLA	161.5	152.8	86.1	85.4	74.2	42.8	136.1	130.6	73.3	60.0	52.0	30.0
CW114	10.0	FLA	131.7	128.4	71.2	55.6	49.8	27.9	106.3	106.2	58.4	30.2	27.6	15.1
	15.0	FLA	147.1	142.4	78.9	71.0	63.8	35.6	121.7	120.2	66.1	45.6	41.6	22.8
	20.0	FLA	161.5	152.8	86.1	85.4	74.2	42.8	136.1	130.6	73.3	60.0	52.0	30.0

1. FLA = FULL LOAD AMPS
2. Amperage requirements are based on the rated max FLA current of each component in the unit. The rated max FLA current of the unit is not the sum total of all components, but is the total of the components which operate during maximum electrical load conditions.
3. The values in the table are for power demand of the unit only.
4. Units are 3-phase, 50-cycle.
5. Consult factory engineering department for electrical requirements of units with variations not listed above.

Table 6 Indoor evaporator fan motor electrical requirements—50Hz systems

Hp	Volts	200	230	380-415
2.0	FLA	7.0	6.1	3.5
3.0	FLA	10.1	8.8	5.1
5.0	FLA	15.8	13.7	7.9
7.5	FLA	25.1	21.8	12.5
10.0	FLA	30.2	27.6	15.1
15.0	FLA	46.2	42.0	24.2
20.0	FLA	NA	NA	30.0

1. Refer to General Data Section for standard fan motor size on units.
2. FLA = Full Load Amps

Table 7 Electrical data—60 Hz Systems

Chilled Water Models - 60Hz																		
Reheat Options		Electric				None				Electric				Electric				
Humidifier Options		Infrared or Steam Generating				Infrared or Steam Generating				Steam or None				Steam or None				
Models / Motor HP	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575	
CW026	2.0 HP	FLA	48.6	44.1	22.4	20.1	20.8	17.9	9.2	10.1	35.3	33.0	16.6	12.7	7.5	6.8	3.4	2.7
		WSA	60.8	55.1	28.0	25.1	26.0	22.4	11.5	12.6	44.1	41.3	20.8	15.9	9.4	8.5	4.3	3.4
		MFCB	60	50	25	30	30	25	15	15	40	40	20	15	15	15	15	15
CW026	3.0 HP	FLA	51.7	46.9	23.8	21.3	23.9	20.7	10.6	11.3	38.4	35.8	18.0	13.9	10.6	9.6	4.8	3.9
		WSA	64.6	58.6	29.8	26.6	29.9	25.9	13.3	14.1	48.0	44.8	22.5	17.4	13.3	12.0	6.0	4.9
		MFCB	60	50	25	30	35	30	15	15	50	45	20	15	20	20	15	15
CW038	3.0 HP	FLA	65.5	59.8	30.3	26.4	23.9	20.7	10.6	11.3	52.2	48.7	24.5	19.0	10.6	9.6	4.8	3.9
		WSA	81.9	74.8	37.9	33.0	29.9	25.9	13.3	14.1	65.3	60.9	30.6	23.8	13.3	12.0	6.0	4.9
		MFCB	90	80	40	35	35	30	15	15	60	70	35	20	20	20	15	15
CW038	5.0 HP	FLA	71.6	65.4	33.1	28.6	30.0	26.3	13.4	13.5	58.3	54.3	27.3	21.2	16.7	15.2	7.6	6.1
		WSA	89.5	81.8	41.4	35.8	37.5	32.9	16.8	16.9	72.9	67.9	34.1	26.5	20.9	19.0	9.5	7.6
		MFCB	90	80	40	35	50	45	20	20	70	70	35	25	35	30	15	15
CW041	3.0 HP	FLA	65.5	59.8	30.3	26.4	23.9	20.7	10.6	11.3	52.2	48.7	24.5	19.0	10.6	9.6	4.8	3.9
		WSA	81.9	74.8	37.9	33.0	29.9	25.9	13.3	14.1	65.3	60.9	30.6	23.8	13.3	12.0	6.0	4.9
		MFCB	90	80	40	35	35	30	15	15	60	70	35	20	20	20	15	15
CW041	5.0 HP	FLA	71.6	65.4	33.1	28.6	30.0	26.3	13.4	13.5	58.3	54.3	27.3	21.2	16.7	15.2	7.6	6.1
		WSA	89.5	81.8	41.4	35.8	37.5	32.9	16.8	16.9	72.9	67.9	34.1	26.5	20.9	19.0	9.5	7.6
		MFCB	90	80	40	35	50	45	20	20	70	70	35	25	35	30	15	15
CW051	5.0 HP	FLA	98.8	89.9	46.7	39.7	43.3	37.4	20.5	19.6	72.2	67.7	33.8	26.2	16.7	15.2	7.6	6.1
		WSA	123.5	112.4	58.4	49.6	54.1	46.8	25.6	24.5	90.3	84.6	42.3	32.8	20.9	19.0	9.5	7.6
		MFCB	125	110	60	50	60	50	30	25	90	80	40	30	35	30	15	15
	7.5 HP	FLA	106.3	96.7	50.1	42.6	50.8	44.2	23.9	22.5	79.7	74.5	37.2	29.1	24.2	22.0	11.0	9.0
		WSA	132.9	120.9	62.6	53.3	63.5	55.3	29.9	28.1	99.6	93.1	46.5	36.4	30.3	27.5	13.8	11.3
		MFCB	125	110	60	50	80	70	35	30	100	100	50	40	50	45	20	20
CW060	5.0 HP	FLA	112.7	102.9	53.2	44.7	43.3	37.4	20.5	19.6	86.1	80.7	40.3	31.2	16.7	15.2	7.6	6.1
		WSA	140.9	128.6	66.5	55.9	54.1	46.8	25.6	24.5	107.6	100.9	50.4	39.0	20.9	19.0	9.5	7.6
		MFCB	150	125	70	60	60	50	30	25	110	110	50	40	35	30	15	15
	7.5 HP	FLA	120.2	109.7	56.6	47.6	50.8	44.2	23.9	22.5	93.6	87.5	43.7	34.1	24.2	22.0	11.0	9.0
		WSA	150.3	137.1	70.8	59.5	63.5	55.3	29.9	28.1	117.0	109.4	54.6	42.6	30.3	27.5	13.8	11.3
		MFCB	150	125	80	60	80	70	35	30	110	110	50	45	50	45	20	20
CW076	7.5 HP	FLA	129.9	122.8	61.7	50.7	50.8	44.2	22.6	20.6	103.3	100.6	50.1	39.1	24.2	22.0	11.0	9.0
		WSA	162.4	153.5	77.1	63.4	63.5	55.3	28.3	25.8	129.1	125.8	62.6	48.9	30.3	27.5	13.8	11.3
		MFCB	175	150	80	60	80	70	35	30	125	125	60	50	50	45	20	20
CW076	10.0 HP	FLA	136.5	128.8	64.7	52.7	57.4	50.2	25.6	22.6	109.9	106.6	53.1	41.1	30.8	28.0	14.0	11.0
		WSA	170.6	161.0	80.9	65.9	71.8	62.8	32.0	28.3	137.4	133.3	66.4	51.4	38.5	35.0	17.5	13.8
		MFCB	175	150	80	60	90	80	40	35	125	125	70	50	60	60	30	20
CW084	7.5 HP	FLA	129.9	122.8	61.7	50.7	50.8	44.2	22.6	20.6	103.3	100.6	50.1	39.1	24.2	22.0	11.0	9.0
		WSA	162.4	153.5	77.1	63.4	63.5	55.3	28.3	25.8	129.1	125.8	62.6	48.9	30.3	27.5	13.8	11.3
		MFCB	175	150	80	60	80	70	35	30	125	125	60	50	50	45	20	20
CW084	10.0 HP	FLA	136.5	128.8	64.7	52.7	57.4	50.2	25.6	22.6	109.9	106.6	53.1	41.1	30.8	28.0	14.0	11.0
		WSA	170.6	161.0	80.9	65.9	71.8	62.8	32.0	28.3	137.4	133.3	66.4	51.4	38.5	35.0	17.5	13.8
		MFCB	175	150	80	60	90	80	40	35	125	125	70	50	60	60	30	20
CW106	10.0 HP	FLA	136.5	128.8	64.7	52.7	57.4	50.2	25.6	22.6	109.9	106.6	53.1	41.1	30.8	28.0	14.0	11.0
		WSA	170.6	161.0	80.9	65.9	71.8	62.8	32.0	28.3	137.4	133.3	66.4	51.4	38.5	35.0	17.5	13.8
		MFCB	175	150	80	60	90	80	40	35	125	125	70	50	60	60	30	20
CW106	15.0 HP	FLA	151.9	142.8	71.7	58.7	72.8	64.2	32.6	28.6	125.3	120.6	60.1	47.1	46.2	42.0	21.0	17.0
		WSA	189.9	178.5	89.6	73.4	91.0	80.3	40.8	35.8	156.6	150.8	75.1	58.9	57.8	52.5	26.3	21.3
		MFCB	200	175	90	70	125	110	50	45	175	150	80	60	100	90	45	35

Table 7 Electrical data—60 Hz Systems (continued)

Chilled Water Models - 60Hz																	
Reheat Options		Electric				None				Electric				Electric			
Humidifier Options		Infrared or Steam Generating				Infrared or Steam Generating				Steam or None				Steam or None			
Models / Motor HP	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575
CW106 20.0 HP (Upflow only)	FLA	165.1	154.8	77.7	63.7	86.0	76.2	38.6	33.6	138.5	132.6	66.1	52.1	59.4	54.0	27.0	22.0
	WSA	206.4	193.5	97.1	79.6	107.5	95.3	48.3	42.0	173.1	165.8	82.6	65.1	74.3	67.5	33.8	27.5
	MFCB	225	200	110	90	150	125	70	60	200	200	90	70	125	110	60	45
CW114 10.0 HP	FLA	136.5	128.8	64.7	52.7	57.4	50.2	25.6	22.6	109.9	106.6	53.1	41.1	30.8	28.0	14.0	11.0
	WSA	170.6	161.0	80.9	65.9	71.8	62.8	32.0	28.3	137.4	133.3	66.4	51.4	38.5	35.0	17.5	13.8
	MFCB	175	150	80	60	90	80	40	35	125	125	70	50	60	60	30	20
CW114 15.0 HP	FLA	151.9	142.8	71.7	58.7	72.8	64.2	32.6	28.6	125.3	120.6	60.1	47.1	46.2	42.0	21.0	17.0
	WSA	189.9	178.5	89.6	73.4	91.0	80.3	40.8	35.8	156.6	150.8	75.1	58.9	57.8	52.5	26.3	21.3
	MFCB	200	175	90	70	125	110	50	45	175	150	80	60	100	90	45	35
CW114 20.0 HP (Upflow only)	FLA	165.1	154.8	77.7	63.7	86.0	76.2	38.6	33.6	138.5	132.6	66.1	52.1	59.4	54.0	27.0	22.0
	WSA	206.4	193.5	97.1	79.6	107.5	95.3	48.3	42.0	173.1	165.8	82.6	65.1	74.3	67.5	33.8	27.5
	MFCB	225	200	110	90	150	125	70	60	200	200	90	70	125	110	60	45

Table 8 Indoor evaporator fan motor electrical requirements—60Hz systems

Hp	208		230		460		575	
	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA
2.0 HP	7.5	46.9	6.8	40.8	3.4	20.4	2.7	16.2
3.0 HP	10.6	66.0	9.6	58.0	4.8	26.8	3.9	23.4
5.0 HP	16.7	105.0	15.2	91.0	7.6	45.6	6.1	36.6
7.5 HP	24.2	152.0	22.0	132.0	11.0	66.0	9.0	54.0
10.0 HP	30.8	193.0	28.0	168.0	14.0	84.0	11.0	66.0
15.0 HP	46.2	290.0	42.0	252.0	21.0	126.0	17.0	102.0
20.0 HP	59.4	321.0	54.0	290.0	72.0	145.0	22.0	116.0

1. Refer to General Data Section for standard fan motor size on units.
2. FLA = Full Load Amps
WSA = Wire Sizing Amps (Minimum supply circuit ampacity)
MFCB = Maximum Fuse or Circuit Breaker Size
3. Amperage requirements are based on the rated max FLA current of each component in the unit. The rated max FLA current of the unit is not the sum total of all components, but is the total of the components which operate during maximum electrical load conditions.
4. The values in the chart are for power of the unit only.
5. Units are 3 phase, 60 cycle.
6. For units with other variations not listed above, consult factory engineering department for electrical requirements.

GUIDE SPECIFICATIONS

1.0 GENERAL

1.1 Summary

These specifications describe requirements for a precision environmental control system. The system shall be designed to maintain temperature conditions in the rooms containing electronic equipment.

The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements of the room.

1.2 Design Requirements

The precision environmental control system shall be a Liebert self-contained factory assembled unit with (upflow) (down-flow) air delivery. The system shall have a total cooling capacity of ____ BTU/HR, (kW) with a sensible cooling capacity of ____ BTU/HR (kW) based on an entering air temperature of ____ °F (°C) dry bulb and ____ °F (°C) wet bulb. The unit is to be supplied with ____ volt ____ ph ____ Hz electrical service.

1.3 Submittals

Submittals shall be provided with the proposal and shall include: Single-Line Diagrams; Dimensional, Electrical, and Capacity Data; Piping and Electrical Connection Drawings.

2.0 PRODUCT

2.1 Cabinet and Frame Construction

The frame shall be constructed of heliarc welded tubular steel. It shall be painted using the auto-phoretic coating process for maximum corrosion protection. The exterior panels shall be insulated with a minimum 1 in. (25.4mm), 1.5 lb. (0.68 kg) density fiber insulation. The main front panel shall have captive 1/4 turn fasteners. The main unit color shall be _____. The accent color shall be _____. The exterior panels shall be powder coated.

2.2 Filter Chamber

The filter chambers shall be an integral part of the system, located within the cabinet serviceable from either end of the unit. The filters shall be rated not less than ____% efficiency (based on ASHRAE 52.1).

For models CW106 and CW114, the filters shall be serviceable from the front of the unit.

2.3 Fan Section

The fan shall be the centrifugal type, double width double inlet, and shall be factory-balanced as a completed assembly. The shaft shall be heavy duty steel with self-aligning ball bearings with a minimum life span of 100,000 hours. The fan motor shall be ____ hp at 1750 RPM at 60 Hz (1450 RPM at 50 Hz) and mounted on an adjustable slide base. The drive package shall be two-belt, variable speed, sized for 200% of the fan motor horsepower. The fans shall be located to draw air over the A-frame coil to ensure even air distribution and maximum coil performance.

2.3 Electronically Commutated (EC) Fan

The fan shall be the plug/plenum type, single inlet and shall be dynamically balanced. The fan motor shall be 4.2 hp, 1520 rpm maximum operating speed. The drive package shall be direct drive Electronically Commutated, variable speed. The fans shall be located to draw air over the A-frame coil to ensure even air distribution and maximum coil performance.

2.4 Liebert iCOM™ Microprocessor Control With Small Graphic Display

The Liebert iCOM unit control shall be factory-set for Intelligent Control which uses “fuzzy logic” and “expert systems” methods. Proportional and Tunable PID shall also be user selectable options. Internal unit component control shall include the following:

System Auto Restart - The auto restart feature will automatically restart the system after a power failure. Time delay is programmable.

Sequential Load Activation - On initial startup or restart after power failure, each operational load is sequenced with a minimum of one second delay to minimize total inrush current.

Hot Water Flush Cycles - Hot water reheat coils and Econ-O-Coils are periodically flushed to prevent a buildup of contaminants.

Predictive Humidity Control - calculates the moisture content in the room and prevents unnecessary humidification and dehumidification cycles by responding to changes in dew point temperature.

The Liebert iCOM control shall be compatible with Liebert remote monitoring and control devices. Options are available for BMS interface via MODbus, Jbus, BACNet, Profibus and SNMP.

The Liebert iCOM control processor shall be microprocessor based with a 128x64 dot matrix graphic front monitor display and control keys for user inputs mounted in an ergonomic, aesthetically pleasing housing. The display & housing shall be viewable while the unit panels are open or closed. The controls shall be menu driven. The display shall be organized into three main sections: User Menus, Service Menus and Advanced Menus. The system shall display user menus for: active alarms, event log, graphic data, unit view/status overview (including the monitoring of room conditions, operational status in % of each function, date and time), total run hours, various sensors, display setup and service contacts. A password shall be required to make system changes within the service menus. Service menus shall include: setpoints, standby settings (lead/lag), timers/sleep mode, alarm setup, sensor calibration, maintenance/wellness settings, options setup, system/network setup, auxiliary boards and diagnostics/service mode. A password shall be required to access the advanced menus which include the factory settings and password menus.

The User Menus Shall be Defined as Follows

Active Alarms: Unit memory shall hold the 200 most recent alarms with time and date stamp for each alarm.

Event Log: Unit memory shall hold the 400 most recent events with ID number, time and date stamp for each event.

Graphic Data View: Eight graphic records shall be available: return air temperature, return air humidity, supply air temperature, outdoor temperature and four custom graphs.

Unit View: Status Overview: Simple or Graphical “Unit View” summary displays shall include temperature and humidity values, active functions (and percent of operation) and any alarms of the host unit.

Total Run Hours: Menu shall display accumulative component operating hours for major components including fan motor, humidifier and reheat.

Various Sensors: Menu shall allow setup and display of optional custom sensors. The control shall include four customer accessible analog inputs for sensors provided by others. The analog inputs shall accept a 4 to 20mA signal. The user shall be able to change the input to 0 to 5VDC or 0 to 10VDC if desired. The gains for each analog input shall be programmable from the front display. The analog inputs shall be able to be monitored from the front display.

Display Setup: Customer shall pre-select the desired grouping of display languages at the time of the order from the following choices:

- Group 1: English, French, Italian, Spanish, German
- Group 2: English, Russian, Greek
- Group 3: English, Japanese, Chinese, Arabic
- Service Contacts: Menu shall allow display of local service contact name and phone number.

The Service Menus Shall be Defined as Follows

Setpoints: Menu shall allow setpoints within the following ranges:

- Temperature Setpoint 65-85°F (18-29°C)*
- Temperature Sensitivity +1-10°F (0.6-5.6°C)
- Humidity Setpoint 20-80% RH*
- Humidity Sensitivity 1-30% RH
- High Temperature Alarm 35-90°F (2-32°C)
- Low Temperature Alarm 35-90°F (2-32°C)
- High Humidity Alarm 15-85% RH
- Low Humidity Alarm 15-85% RH

* The microprocessor may be set within these ranges, however, the unit may not be able to control to extreme combinations of temperature and humidity.

Standby Settings/Lead-Lag: Menu shall allow planned rotation or emergency rotation of operating and standby units.

Timers/Sleep Mode: Menu shall allow various customer settings for turning on/off unit.

Alarm Setup: Menu shall allow customer settings for alarm notification (audible/local/remote). The following alarms shall be available:

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- Main Fan Overload (Optional)
- Humidifier Problem
- Change Filter
- Fan Failure
- Unit Off

Audible Alarm: The audible alarm shall annunciate any alarm that is enabled by the operator.

Common Alarm: A programmable common alarm shall be provided to interface user selected alarms with a remote alarm device.

Remote Monitoring: All alarms shall be communicated to the Liebert monitoring system with the following information: Date and time of occurrence, unit number and present temperature and humidity.

Sensor Calibration: Menu shall allow unit sensors to be calibrated with external sensors.

Maintenance/Wellness Settings: Menu shall allow reporting of potential component problems before they occur.

Options Setup: Menu shall provide operation settings for the installed components.

System/Network Setup: Menu shall allow Unit-to-Unit (U2U) communication and setup for team-work modes of operation (up to 32 units).

Teamwork Modes of Operation: Saves energy by preventing operation of units in opposite modes multiple units.

Auxiliary Boards: Menu shall allow setup of optional expansion boards.

Diagnostics/Service Mode: The Liebert iCOM control shall be provided with self-diagnostics to aid in troubleshooting. The microcontroller board shall be diagnosed and reported as pass/not pass. Control inputs shall be indicated as on or off at the front display. Control outputs shall be able to be turned on or off from the front display without using jumpers or a service terminal. Each control output shall be indicated by an LED on a circuit board.

Advanced Menus

Factory Settings: Configuration settings shall be factory-set based on the pre-defined component operation.

Change Passwords: Menu shall allow new passwords to be set or changed.

2.4.1 Liebert iCOM Microprocessor Control With Large Graphic Display (Optional)

The Liebert iCOM unit control with large graphic display shall include all of the features as the Liebert iCOM with small graphic display, except that it includes a larger graphical display and shall include the additional features of:

“System View”, Spare Parts List, Unit Diary.

The Liebert iCOM control processor shall be microprocessor based with a 320x240 dot matrix graphic front monitor display panel and control keys for user inputs mounted in an ergonomic, aesthetically pleasing housing.

System View - Status Overview: “System View” shall display a summary of operation for the total number of operating units within a Unit-to-Unit (U2U) configuration.

Spare Parts List: Menu shall include a list of critical spare parts, their quantity and part numbers.

Unit Diary: Menu shall include a free field area within the unit memory where unit history may be stored for reference.

2.5 Liebert iCOM Wall-Mount Large Graphic Display (Optional)

The Liebert iCOM Large Graphic Display Kit shall include an ergonomic, aesthetically pleasing housing, a 320x240 dot matrix graphic display and a 120V power supply. The Wall-Mount Large Graphic Display shall be used to allow remote location of a “System View” display and all features of the Large Graphic User, Service and Advanced menus for use with Liebert iCOM controlled products connected for Unit-to-Unit (U2U) communications.

2.5.1 Control

The control system shall allow programming of the following room conditions:

- Temperature Setpoint: 65-85°F (18-29°C)
- Temperature Sensitivity: $\pm 1^\circ$ to 9.9°F (0.6 to 5.6°C) in 0.1°F (0.1°C) increments

All setpoints shall be adjustable from the individual unit front monitor panel. Temperature and humidity sensors shall be capable of being calibrated using the front monitor panel controls to coordinate with other temperature and humidity sensors in the room.

In addition, the system shall provide the following internal controls:

2.5.1.1 System Auto-Restart

For startup after power failure, the system shall provide automatic restart with a programmable (up to 9.9 minutes in 6-second increments) time delay. Programming can be performed either at the unit or from the central site monitoring system.

2.5.1.2 Sequential Load Activation

During startup or after a power failure, the Liebert iCOM control shall sequence operational load activation to minimize inrush current. Systems allowing multiple loads to start simultaneously are unacceptable.

2.5.1.3 Front Monitor Display Panel

The Liebert iCOM control shall provide a front monitor LCD, backlit display panel with 4 rows of 20 characters with adjustable contrast. This display (along with nine front-mounted control keys) shall be the only operator interface required to obtain all available system information such as room conditions, operational status, alarms, control and alarm setpoints and all user selections including alarm delays, sensor calibration, DIP switch selections and diagnostics. All indicators shall be in language form. No symbols or codes shall be acceptable.

2.5.1.4 Alarms

The Liebert iCOM control shall activate an audible and visual alarm in event of any of the following conditions:

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- Main Fan Overload (opt)
- Change Filters
- Loss of Air Flow
- Loss of Power
- Custom Alarm (#1 to #4)

Custom alarms are four customer accessible alarm inputs to be indicated on the front panel. Custom alarms can be identified with prepared (programmed) labels for the following frequently used inputs:

- Leak Under Floor
- Smoke Detected
- Loss of Water Flow
- Standby Unit On

User customized text can be entered for two of the four custom alarms.

Each alarm (unit and custom) can be separately enabled or disabled, selected to activate the common alarm, and programmed for a time delay of 0 to 255 seconds.

2.5.1.5 Audible Alarm

The audible alarm shall annunciate any alarm that is enabled by the operator.

2.5.1.6 Common Alarm

A programmable common alarm shall be provided to interface user selected alarms with a remote alarm device.

2.5.1.7 Remote Monitoring

All alarms shall be communicated to the Liebert site monitoring system with the following information: date and time of occurrence, unit number and current temperature and humidity.

2.5.1.8 Diagnostics

The control system and electronic circuitry shall be provided with self-diagnostics to aid in troubleshooting. The microcontroller board shall be diagnosed and reported as pass/not pass. Control inputs shall be indicated as on or off at the front monitor panel. Control outputs shall be able to be turned On or Off from the front monitor panel without using jumpers or a service terminal.

2.5.1.9 Data Collection

The control system shall maintain accumulative operating hours of compressors, fan motor and Econ-O-Coil. The 10 most recent alarms shall be retained.

2.5.1.10 Communication

The Liebert iCOM control shall be compatible with Liebert remote monitoring and control devices.

2.6 Chilled Water Control Valve

The water circuit shall include a 3-way (2-way) modulating valve. The Liebert iCOM positions the valve in response to room conditions. Cooling capacity will be controlled by bypassing chilled water around the coil.

2.7 High Pressure Chilled Water Control Valve—Optional

The chilled water circuit shall include a 3-way (2-way) high pressure modulating valve. The valve shall be designed for up to 400 PSI (2758 kPa) water pressure.

2.8 A-Frame Chilled Water Coil

The cooling coil shall be of A-frame design with a minimum of ____ sq. ft. (sq.m.) face area, ____ rows deep.

The coil shall be controlled by a 3-way modulating control valve. It shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of ____ ft. per minute (m/s) at ____ CFM (CMH).

The water circuit shall be designed to distribute water into the entire coil face area. The coil shall be supplied with ____ °F (°C) entering water temperature, with a ____ °F (°C) temperature rise. The coil shall require ____ GPM (l/s) of chilled water and the pressure drop shall not exceed ____ PSI (kPa). The entire coil assembly shall be mounted in a stainless steel condensate drain pan.

For models CW106 and CW114, the end sheets shall be aluminum, and the coil can be removed from the front or either side of the unit.

2.9 Flow Switch—Optional

The flow switch shall activate the alarm system should the chilled water supply be interrupted. The switch shall be factory mounted and wired.

2.10 Variable Speed Drive—Optional

A variable speed drive (VSD) is available for models CW106 and CW114 to reduce energy consumption. The fan motor speed shall be varied from 100% to 60% of rated speed in response to room conditions. This shall be controlled automatically by the Liebert iCOM control. The variable speed drive option shall be available with an infrared humidifier.

2.11 Optional Components

The computer room environmental control system shall be equipped with the following optional components.

2.11.1 Disconnect Switch—Non-Locking Type

The manual disconnect switch shall be mounted in the high voltage section of the electrical panel. The switch shall be accessible with the door closed.

2.11.2 Disconnect Switch—Locking Type

The manual disconnect switch shall be mounted in the high voltage section of the electrical panel. The switch shall be accessible from the outside of the unit with the door closed, and prevent access to the high voltage electrical components until switched to the “OFF” position.

2.11.3 High Temp Stat

The high temp stat shall immediately shut down the environmental control system when activated. The high temp stat shall be mounted in the electrical panel with the sensing element in the return air.

2.11.4 Condensate Pump, Dual Float

The condensate pump shall have a minimum capacity of 100 GPH at 20 ft. (378 l/hr at 6m) head. (Consult factory for 200V or 230V, 50 Hz applications.) It shall be complete with integral float switch, pump and motor assembly, and reservoir. Secondary float shall shut down unit if tripped.

2.11.5 Liebert Liqui-TECT™ Sensors (Max. of Two Per Unit)

Provide ____ (quantity) solid state water sensors under the raised floor.

2.11.6 Floor Stand

The floor stand shall be constructed of a heliarc-welded, tubular steel frame. The floor stand shall have adjustable legs with vibration isolation pads. The floor stand shall be ____ inches high.

2.11.6.1 Floor Stand Turning Vane

A factory-supplied, field-mounted turning vane shall be provided.

2.11.6.2 Smoke Sensor

The smoke sensor shall immediately shut down the environmental control system and activate the alarm system when activated. The smoke sensor shall be mounted in the electrical panel with the sensing element in the return air compartment.

2.11.6.3 Liebert SiteScan® Site Monitoring System

Provide a Liebert SiteScan monitor system with the Liebert CW. The Liebert SiteScan shall have the capability to monitor and change (at the user direction) the temperature setpoints and sensitivities of each unit. The printer shall provide the user with chronological alarm information. It shall also be capable of being programmed to print out environmental conditions or operating modes at each unit.

3.0 EXECUTION

3.1 Installation of Precision Cooling Units

3.1.1 General

Install precision cooling units in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's electrical connection diagram submittal to electrical contractor.

3.1.3 Piping Connections

Install and connect devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's piping connection diagram submittal to piping contractor.

3.2 Field Quality Control

Startup mainframe coolant units in accordance with manufacturer's startup instructions. Test controls and demonstrate compliance with requirements.

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