Liebert® CW

System Design Catalog

38 to181 kW (10 to 52 ton) Capacity, Upflow and Downflow, 60 Hz

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1 Nomenclature and Components

This section describes the model number for Vertiv™ Liebert® CW units and components.

1.1 Liebert® CW Model Number Nomenclature

Table 1.2 below describes each digit of the model number.

Table 1.1 Liebert® CW Model Number Example

Model Number Digits 1 to 10										Factory Configuration Number				Configuration Code
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	W	0	3	8	D	C	1	A	1	1	2	3	4	A

Table 1.2 Liebert® CW Model Number Digit Definitions

Digit	Description
Digits 1 and 2 = Unit Family	
	CW = Liebert® CW floor mounted, chilled water unit
Digit 3, 4, 5 = Nominal Cooling Capacity, kW	
	038 = 38 kW
	041 = 41 kW
	051 = 51 kW
	060 = 60 kW
	076 = 76 kW
	084 = 84 kW
	106 = 106 kW
	114 = 114 kW
	146 = 146 kW
	181 = 181 kW
Digit 6 = Air Distribution	
	D = Downflow
	U = Upflow
Digit 7 = Cooling Type	
	C = Chilled water

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Table 1.2 Liebert® CW Model Number Digit Definitions (continued)

Digit	Description
Digit 8 = Fan Type	
	S = Forward curved blower with standard motor
	V = Forward curved blower with variable speed drive
	1 = EC fan
	H = EC fan with THD
Digit 9 = Voltage	
	A = 460 V - 3 ph - 60 Hz
	B = 575 V - 3 ph - 60 Hz
	C = 208 V - 3 ph - 60 Hz
	D = 230 V - 3 ph - 60 Hz
	2 = 380 V - 3 ph - 60 Hz
Digit 10 = Valve Type	
	1 = 2-way valve, high pressure
	T = 3-way valve, high pressure
Digit 11-14 = Factory Configuration Number	
Digit 15 = Configuration Code	
	A-Z = Standard configuration
	S = SFA

Not all combinations of options are available on all units:

- Models CW146 are CW181 are only available in downflow configuration.
- Disconnect switch, locking
  - Not available on 208V units with 20 HP motor
- Flow switch that activates the warning system
  - Ships loose
- Steam/hot water reheat package
  - Not available on units with EC fans

1.2 Component Location

The unit component locations are described in the submittal documents included in the Submittal Drawings on page 47 .

The following table lists the relevant documents by number and title.

Table 1.3 Component Location Drawings

Document Number	Title
DPN002869	Component Location, Downflow Models
DPN002868	Component Location, Upflow Models

1.3 Blower Configurations

Figure 1.1 Downflow Blower Configurations, Front and Rear Supply with EC Fans

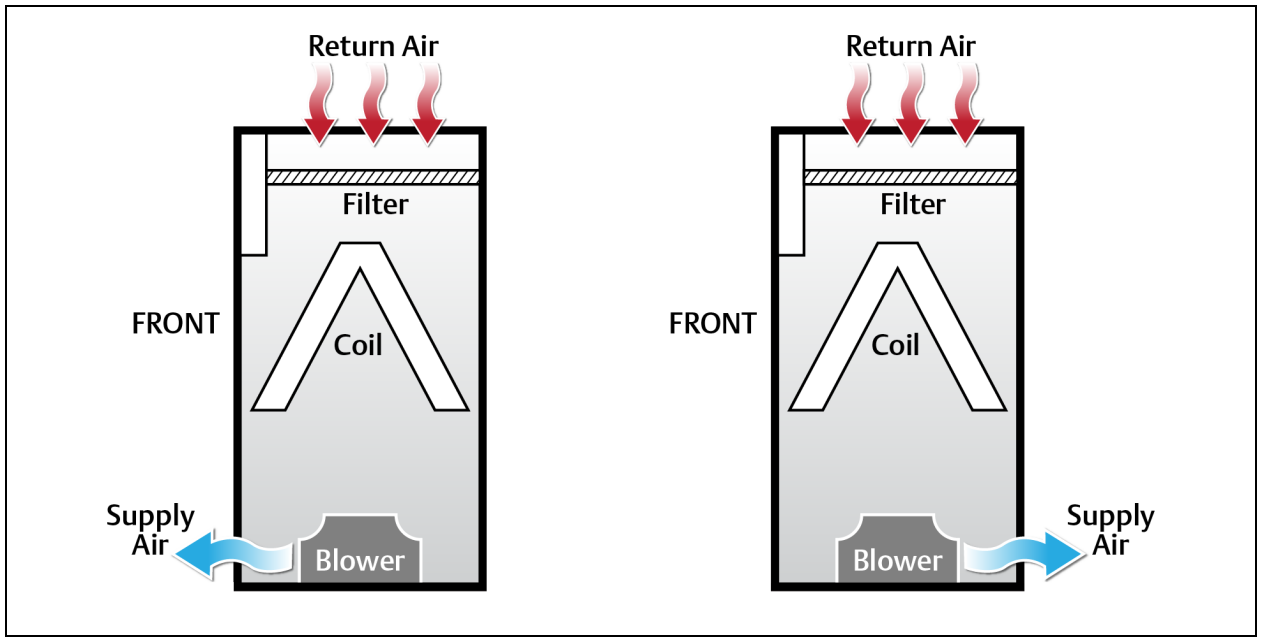
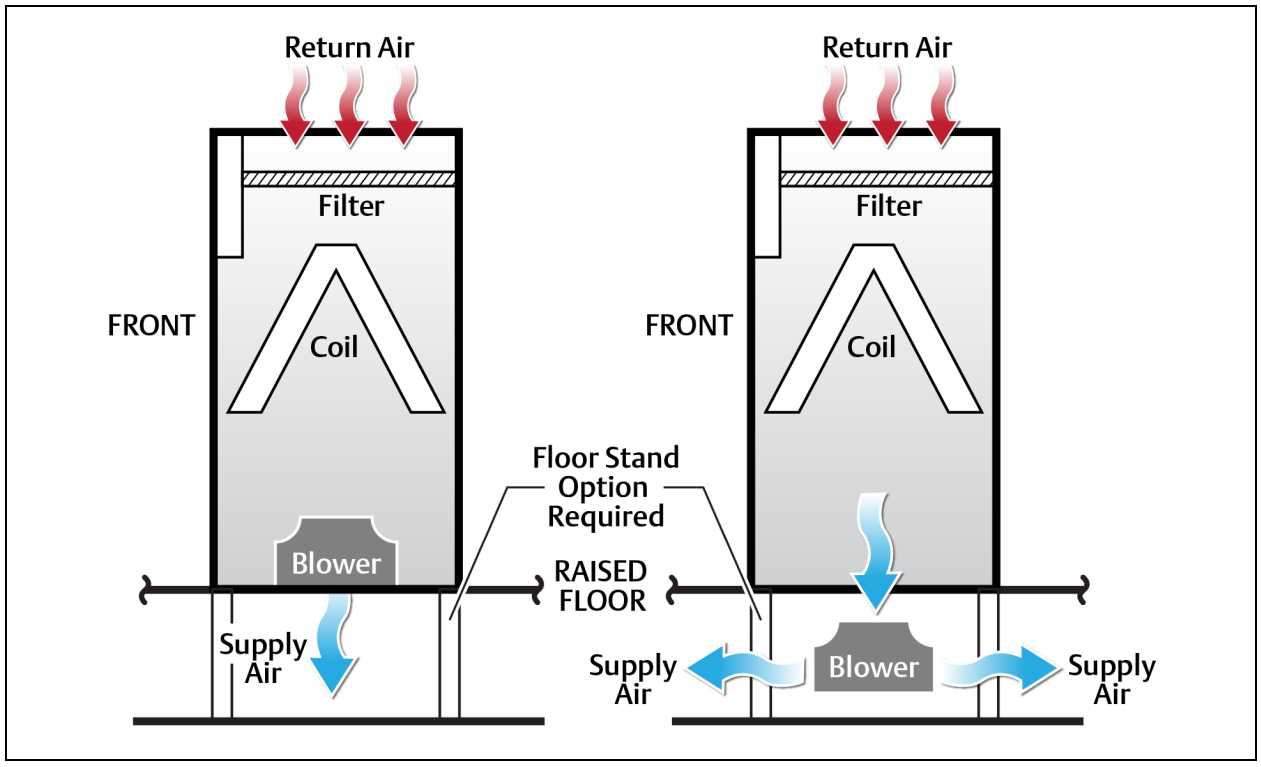


Figure 1.2 Downflow Blower Configurations, Bottom and Under Floor Supply with EC Fans



NOTE: Under floor supply air EC fans requires a minimum height of 24-in.

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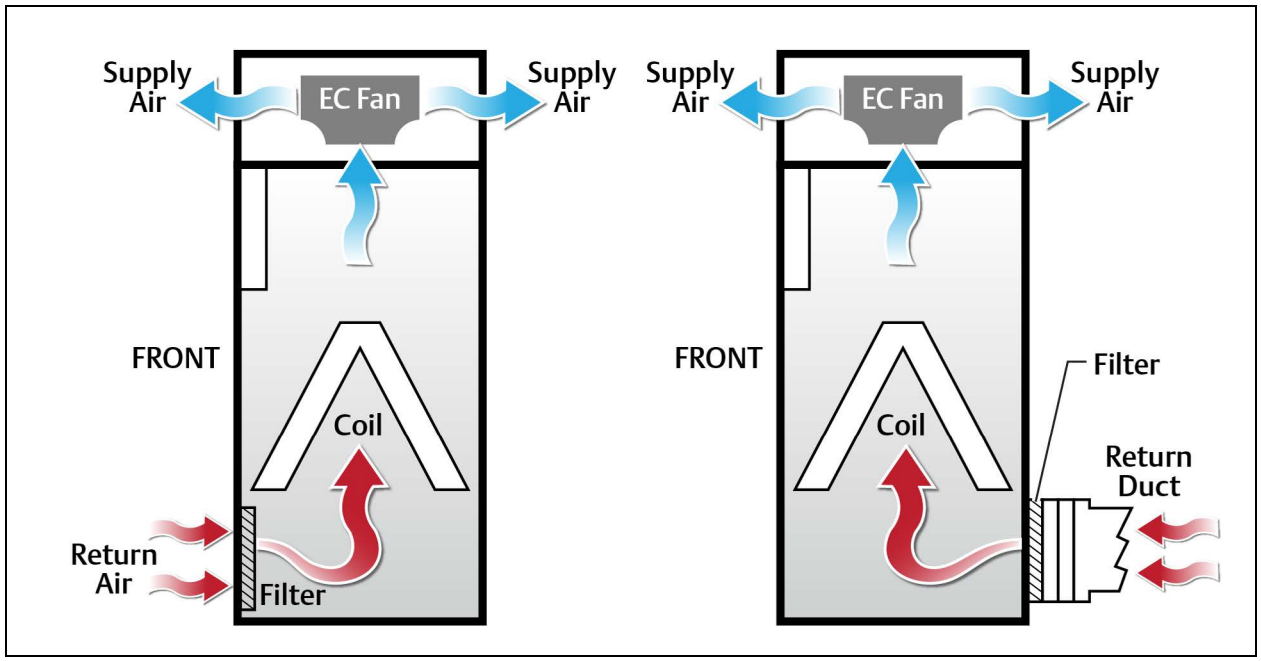
Figure 1.3 Upflow Blower Configurations with EC Fans in a Plenum



NOTE: In upflow units with EC fans in the plenum, supply air exits the front or rear only. **Figure 1.3** above represents the possible options.

Figure 1.4 Upflow Blower Configurations, Front Return with Forward Curved Blowers

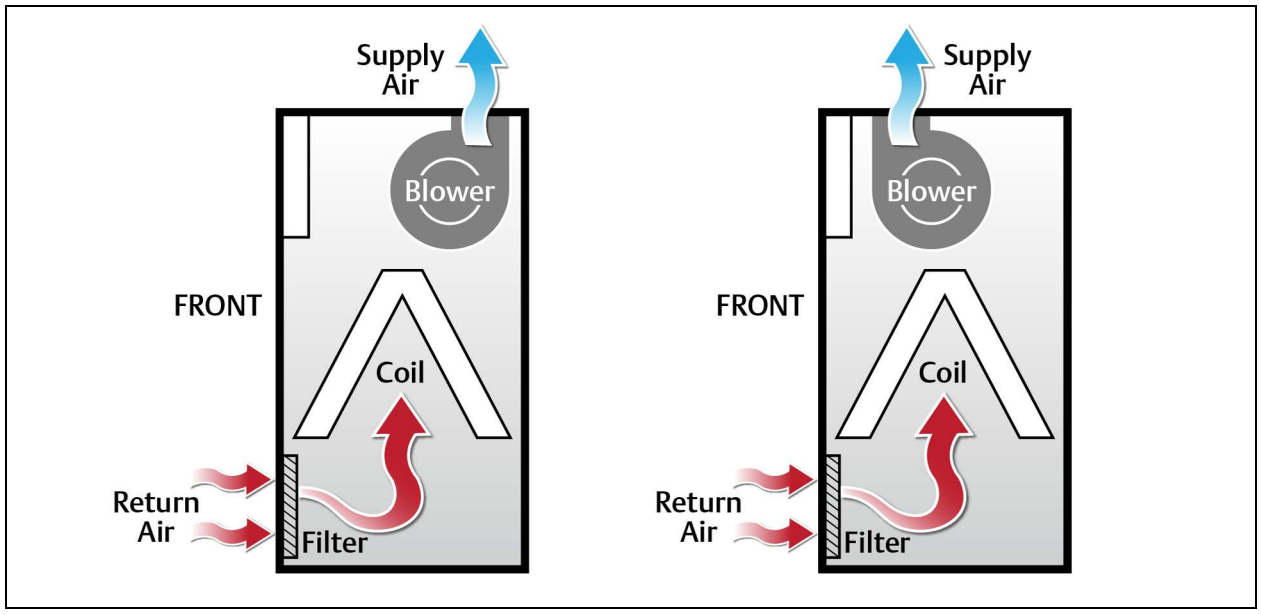
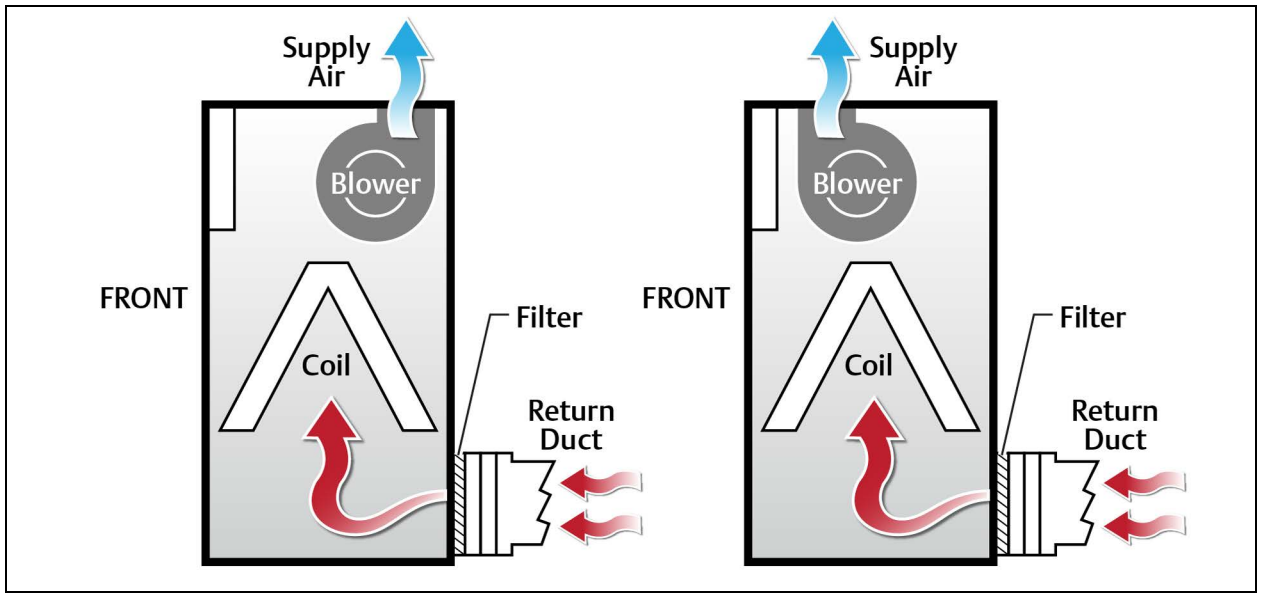


Figure 1.5 Upflow Blower Configurations, Rear Return with Forward Curved Blowers



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2 System Data

2.1 Capacity and Performance Data

Table 2.1 Performance Data, CW038-CW181, 60Hz, Upflow and Downflow Models with EC Fans

Model No.	038	041	051	060	076	084	106	114	146 *	181 *
Net Capacity Data Based on 45°F (7.2°C) Entering Water, 10°F (5.5°C) Water Rise										
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)										
Total Capacity, kW (BTUH)	33.7 (115,000)	44.5 (151,800)	51.0 (174,000)	70.0 (238,800)	71.5 (244,000)	89.1 (304,000)	106 (361,700)	133 (453,800)	154 (525,500)	211 (720,000)
Sensible Capacity, kW (BTUH)	33.1 (112,900)	40.1 (136,800)	51.0 (174,000)	63.0 (215,000)	69.7 (237,800)	80.3 (274,000)	101 (344,600)	118 (402,600)	141 (481,100)	179 (610,800)
Flow Rate GPM (lPs)	24.5 (1.5)	32.1 (2.0)	37.6 (2.4)	51 (3.2)	52.3 (3.3)	64.4 (4.1)	77.6 (4.9)	96.3 (6.1)	110 (6.9)	151 (9.5)
Unit Pressure Drop, ft of Water (kPA)	22 (65.8)	16 (47.8)	9.2 (27.5)	11 (32.9)	11 (32.9)	19 (56.8)	21 (62.8)	36 (107.6)	11 (32.9)	25 (74.8)
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)										
Total Capacity, kW (BTUH)	41.6 (141,900)	53.6 (182,900)	63.9 (218,000)	84.7 (289,000)	88.2 (301,000)	107 (365,100)	130 (443,600)	159 (542,500)	186 (634,700)	249 (849,600)
Sensible Capacity, kW (BTUH)	41.3 (140,900)	48.9 (166,900)	63.9 (218,000)	76.8 (262,100)	86.1 (293,800)	97.9 (334,000)	124 (423,100)	143 (487,900)	172 (586,900)	216 (737,000)
Flow Rate GPM (lPs)	30 (1.9)	38.3 (2.4)	46.3 (2.9)	60.9 (3.8)	63.7 (4.0)	76.8 (4.8)	93.7 (5.9)	114 (7.2)	131 (8.3)	177 (11.2)
Unit Pressure Drop, ft of Water (kPA)	32 (95.7)	22 (65.8)	14 (41.9)	15 (44.9)	16 (47.8)	26 (77.7)	29 (86.7)	50 (149.5)	15 (44.9)	34 (101.7)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)										
Total Capacity, kW (BTUH)	49.2 (167,900)	62.4 (212,900)	76.2 (260,000)	98.7 (336,800)	105 (358,300)	125 (426,500)	153 (522,100)	184 (627,800)	216 (737,000)	286 (975,900)
Sensible Capacity, kW (BTUH)	48.9 (166,900)	57.4 (195,900)	76.2 (260,000)	90.5 (308,800)	102 (348,000)	115 (392,400)	147 (501,600)	168 (573,200)	202 (689,300)	251 (856,400)
Flow Rate GPM (lPs)	35.2 (2.2)	44.3 (2.8)	54.8 (3.5)	70.5 (4.4)	74.9 (4.7)	88.7 (5.6)	109 (6.9)	131 (8.3)	152 (9.6)	202 (12.7)
Unit Pressure Drop, ft of Water (kPA)	43 (128.6)	29 (86.7)	19 (56.8)	20 (59.8)	21 (62.8)	34 (101.7)	39 (116.6)	65 (194.4)	20 (59.8)	43 (128.6)

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Table 2.1 Performance Data, CW038-CW181, 60Hz, Upflow and Downflow Models with EC Fans (continued)

Model No.	038	041	051	060	076	084	106	114	146 *	181 *
Net Capacity Data with 50°F Entering and 62°F Leaving Fresh Water										
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)										
Total Capacity, kW (BTUH)	22.1 (75,400)	29.9 (102,000)	31.6 (107,800)	46.6 (159,000)	47.2 (161,100)	60.1 (205,100)	71.2 (242,900)	90 (307,100)	105 (358,300)	142 (484,500)
Sensible Capacity, kW (BTUH)	22.1 (75,400)	29.9 (102,000)	31.6 (107,800)	46.6 (159,000)	47.2 (161,100)	60.1 (205,100)	71.2 (242,900)	90 (307,100)	105 (358,300)	142 (484,500)
Flow Rate GPM (lPs)	13.9 (0.9)	18.6 (1.2)	20.4 (1.3)	29.3 (1.8)	29.8 (1.9)	37.3 (2.3)	44.8 (2.8)	56.1 (3.5)	63.6 (4)	86.6 (5.5)
Unit Pressure Drop, ft of Water (kPA)	7.1 (21.2)	5.9 (17.6)	2.9 (8.7)	3.9 (11.7)	3.9 (11.7)	6.8 (20.3)	7.4 (22.1)	13 (38.9)	4.0 (12)	9.0 (26.9)
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)										
Total Capacity, kW (BTUH)	30.8 (105,100)	39.3 (134,100)	46.6 (159,000)	61.8 (210,900)	64.8 (221,100)	78.5 (267,900)	95.5 (325,900)	116 (395,800)	137 (467,500)	180 (614,200)
Sensible Capacity, kW (BTUH)	30.8 (105,100)	39.3 (134,100)	46.6 (159,000)	61.8 (210,900)	64.8 (221,100)	78.5 (267,900)	95.5 (325,900)	116 (395,800)	137 (467,500)	180 (614,200)
Flow Rate GPM (lPs)	18.8 (1.2)	23.9 (1.5)	28.8 (1.8)	37.8 (2.4)	39.9 (2.5)	47.8 (3)	58.6 (3.7)	71.1 (4.5)	82.2 (5.2)	108 (6.8)
Unit Pressure Drop, ft of Water (kPA)	13 (38.9)	9.3 (27.8)	5.5 (16.4)	6.1 (18.2)	6.5 (19.4)	11 (32.9)	12 (35.9)	20 (59.8)	6.3 (18.8)	13 (38.9)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)										
Total Capacity, kW (BTUH)	39.0 (133,100)	48.1 (164,100)	59.8 (204,000)	75.9 (259,000)	81.7 (278,800)	96.1 (327,900)	119 (406,000)	142 (484,500)	169 (576,700)	216 (737,000)
Sensible Capacity, kW (BTUH)	39.0 (133,100)	48.1 (164,100)	59.8 (204,000)	75.9 (259,000)	81.7 (278,800)	96.1 (327,900)	119 (406,000)	142 (484,500)	169 (576,700)	216 (737,000)
Flow Rate GPM (lPs)	23.4 (1.5)	28.9 (1.8)	36.3 (2.3)	45.9 (2.9)	49.4 (3.1)	57.8 (3.6)	71.9 (4.5)	85.6 (5.4)	99.8 (6.3)	129 (8.1)
Unit Pressure Drop, ft of Water (kPA)	19 (56.8)	13 (38.9)	8.5 (25.4)	8.7 (26)	9.7 (29)	15 (44.9)	18 (53.8)	29 (86.7)	9.1 (27.2)	19 (56.8)

* Models CW146 and CW181 available only in downflow.

The net capacity data has fan motor heat factored in for all ratings. Capacity data is factory certified to be within 5% tolerance. Data rated with standard filter.

Table 2.2 Performance Data, CW038-CW114, 60Hz, Upflow Models with Forward Curved Blowers

Model No.	038	041	051	060	076	084	106	114
Net Capacity Data with 45°F Entering and 55°F Leaving Fresh Water								
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)								
Total Capacity, kW (BTUH)	29.6 (101,000)	40.4 (137,900)	48.1 (164,100)	65.9 (224,900)	65.6 (223,800)	83.8 (285,900)	98.4 (335,800)	122 (416,300)
Sensible Capacity, kW (BTUH)	29.6 (101,000)	36.6 (124,900)	48.1 (164,100)	59.8 (204,000)	64.8 (221,100)	75.9 (259,000)	93.8 (320,100)	109 (371,900)
Flow Rate GPM (lPs)	22.9 (1.4)	30.4 (1.9)	36.1 (2.3)	48.3 (3.0)	49.2 (3.1)	61.6 (3.9)	74.3 (4.7)	90.4 (5.7)
Unit Pressure Drop, ft of Water (kPA)	19 (56.8)	15 (44.9)	8.5 (25.4)	9.8 (29.3)	9.8 (29.3)	17 (50.8)	19 (56.8)	32 (95.7)
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)								
Total Capacity, kW (BTUH)	37.2 (126,900)	49.2 (167,900)	60.7 (207,100)	80.0 (273,000)	81.7 (278,800)	101 (344,600)	122 (416,300)	147 (501,600)
Sensible Capacity, kW (BTUH)	37.2 (126,900)	45.1 (153,900)	60.7 (207,100)	73.2 (249,800)	80.6 (275,000)	92.9 (317,000)	116 (395,800)	133 (453,800)
Flow Rate GPM (lPs)	28.1 (1.8)	36.4 (2.3)	44.6 (2.8)	57.9 (3.6)	60.1 (3.8)	73.7 (4.6)	90 (5.7)	107 (6.7)
Unit Pressure Drop, ft of Water (kPA)	28 (83.7)	20 (59.8)	13 (38.9)	14 (41.9)	14 (41.9)	24 (71.8)	27 (80.7)	45 (134.6)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)								
Total Capacity, kW (BTUH)	44.8 (152,900)	57.7 (196,900)	73.0 (249,100)	93.5 (319,000)	97.3 (332,000)	118 (402,600)	144 (491,300)	171 (583,500)
Sensible Capacity, kW (BTUH)	44.8 (152,900)	53.3 (181,900)	73.0 (249,100)	86.1 (293,800)	96.4 (328,900)	110 (375,300)	139 (474,300)	157 (535,700)
Flow Rate GPM (lPs)	33.2 (2.1)	42.1 (2.7)	52.9 (3.3)	67.1 (4.2)	70.8 (4.5)	85.3 (5.4)	105 (6.6)	124 (7.8)
Unit Pressure Drop, ft of Water (kPA)	39 (116.6)	27 (80.7)	18 (53.8)	18 (53.8)	19 (56.8)	31 (92.7)	36 (107.6)	58 (173.4)

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Table 2.2 Performance Data, CW038-CW114, 60Hz, Upflow Models with Forward Curved Blowers (continued)

Model No.	038	041	051	060	076	084	106	114
Net Capacity Data with 50°F Entering and 62°F Leaving Fresh Water								
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)								
Total Capacity, kW (BTUH)	18.8 (64,100)	26.7 (91,100)	28.1 (95,900)	43.7 (149,100)	42.5 (145,000)	55.7 (190,100)	64.5 (220,100)	81.7 (278,800)
Sensible Capacity, kW (BTUH)	18.8 (64,100)	26.7 (91,100)	28.1 (95,900)	43.7 (149,100)	42.5 (145,000)	55.7 (190,100)	64.5 (220,100)	81.7 (278,800)
Flow Rate GPM (lPs)	12.9 (0.8)	17.6 (1.1)	18.7 (1.2)	27.7 (1.7)	28 (1.8)	35.6 (2.2)	42.7 (2.7)	52.6 (3.3)
Unit Pressure Drop, ft of Water (kPA)	6.2 (18.5)	5.3 (15.8)	2.5 (7.5)	3.5 (10.5)	3.4 (10.2)	6.2 (18.5)	6.8 (20.3)	12 (35.9)
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)								
Unit Pressure Drop, ft of Water (kPA)	27.1 (92,500)	35.7 (121,800)	43.7 (149,100)	58.0 (197,900)	59.8 (204,000)	73.8 (251,800)	88.2 (301,000)	107 (365,100)
Sensible Capacity, kW (BTUH)	27.1 (92,500)	35.7 (121,800)	43.7 (149,100)	58.0 (197,900)	59.8 (204,000)	73.8 (251,800)	88.2 (301,000)	107 (365,100)
Flow Rate GPM (lPs)	17.6 (1.1)	22.6 (1.4)	27.5 (1.7)	35.9 (2.3)	37.8 (2.4)	45.8 (2.9)	56.2 (3.5)	66.9 (4.2)
Unit Pressure Drop, ft of Water (kPA)	11 (32.9)	8.5 (25.4)	5.0 (15.0)	5.6 (16.7)	5.9 (17.6)	9.8 (29.3)	11 (32.9)	18 (53.8)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)								
Total Capacity, kW (BTUH)	34.9 (119,100)	44.2 (150,800)	56.5 (192,800)	71.8 (245,000)	75.9 (259,000)	91.1 (310,800)	111 (378,700)	131 (447,000)
Sensible Capacity, kW (BTUH)	34.9 (119,100)	44.2 (150,800)	56.5 (192,800)	71.8 (245,000)	75.9 (259,000)	91.1 (310,800)	111 (378,700)	131 (447,000)
Flow Rate GPM (lPs)	22.1 (1.4)	27.5 (1.7)	34.9 (2.2)	43.7 (2.8)	47.0 (3.0)	55.6 (3.5)	69.2 (4.4)	80.7 (5.1)
Unit Pressure Drop, ft of Water (kPA)	17 (50.8)	12 (35.9)	7.9 (23.6)	8.0 (23.9)	8.8 (26.3)	14 (41.9)	16 (47.8)	26 (77.7)

The net capacity data has fan motor heat factored in for all ratings. Capacity data is factory certified to be within 5% tolerance. Data rated with standard filter.

Table 2.3 Performance Data for Select Units with EC Fans, High Delta T Conditions

Model No.	106	114	148	181
Net Capacity Data with 50°F Entering and 64°F Leaving Fresh Water				
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)				
Total Capacity, kW (BTUH)	88.2 (301,000)	111 (378,700)	129 (440,200)	172 (586,900)
Sensible Capacity, kW (BTUH)	88.2 (301,000)	111 (378,700)	129 (440,200)	172 (586,900)
Flow Rate GPM (IPs)	46.7 (2.9)	58 (3.7)	66.2 (4.2)	89.4 (5.6)
Unit Pressure Drop, ft of Water (kPA)	7.9 (23.6)	14 (41.9)	4.3 (12.9)	9.5 (28.4)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)				
Total Capacity, kW (BTUH)	112 (382,200)	137 (467,500)	161 (549,400)	210 (716,500)
Sensible Capacity, kW (BTUH)	112 (382,200)	137 (467,500)	161 (549,400)	210 (716,500)
Flow Rate GPM (IPs)	58.4 (3.7)	70.8 (4.5)	81.8 (5.2)	108 (6.8)
Unit Pressure Drop, ft of Water (kPA)	12 (35.9)	20 (59.8)	6.3 (18.8)	13 (38.9)
90°F DB, 66.1°F WB, 52°F DP, 27% RH (32.2°C DB, 18.9°C WB)				
Total Capacity, kW (BTUH)	136 (464,100)	162 (552,800)	191 (651,700)	246 (839,400)
Sensible Capacity, kW (BTUH)	136 (464,100)	162 (552,800)	191 (651,700)	246 (839,400)
Flow Rate GPM (IPs)	69.7 (4.4)	83 (5.2)	96.8 (6.1)	125 (7.9)
Unit Pressure Drop, ft of Water (kPA)	17 (50.8)	27 (80.7)	8.5 (25.4)	17 (50.8)

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Table 2.3 Performance Data for Select Units with EC Fans, High Delta T Conditions (continued)

Model No.	106	114	148	181
Net Capacity Data with 50°F Entering and 66°F Leaving Fresh Water				
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)				
Total Capacity, kW (BTUH)	80.3 (274,000)	103 (351,500)	119 (406,000)	164 (559,600)
Sensible Capacity, kW (BTUH)	80.3 (274,000)	103 (351,500)	119 (406,000)	164 (559,600)
Flow Rate GPM (IPs)	37.4 (2.4)	47.9 (3.0)	53.7 (3.4)	74.6 (4.7)
Unit Pressure Drop, ft of Water (kPA)	5.3 (15.8)	9.9 (29.6)	2.9 (8.7)	6.8 (20.3)
85°F DB, 64.4°F WB, 52°F DP, 32% RH (29.4°C DB, 18°C WB)				
Total Capacity, kW (BTUH)	105 (358,300)	131 (447,000)	152 (518,600)	203 (692,700)
Sensible Capacity, kW (BTUH)	105 (358,300)	131 (447,000)	152 (518,600)	203 (692,700)
Flow Rate GPM (IPs)	48.1 (3.0)	59.4 (3.7)	67.9 (4.3)	91.2 (5.7)
Unit Pressure Drop, ft of Water (kPA)	8.3 (24.8) 1	5 (44.9)	4.5 (13.5)	9.8 (29.3)
90°F DB, 66.1°F WB, 52°F DP, 27% RH (32.2°C DB, 18.9°C WB)				
Total Capacity, kW (BTUH)	129 (440,200)	157 (535,700)	184 (627,800)	240 (818,900)
Sensible Capacity, kW (BTUH)	129 (440,200)	157 (535,700)	184 (627,800)	240 (818,900)
Flow Rate GPM (IPs)	58.2 (3.7)	70.4 (4.4)	81.4 (5.1)	107 (6.7)
Unit Pressure Drop, ft of Water (kPA)	12 (35.9)	20 (59.8)	6.2 (18.5)	13 (38.9)

The net capacity data has fan motor heat factored in for all ratings. Capacity data is factory certified to be within 5% tolerance. Data rated with standard filter.

Table 2.4 Motor Size Required to Deliver Rated Airflow, Models with Forward Curved Blowers

External Static Pressure		0.2"	0.4"	0.6"	0.8"	1.0"	1.2"	1.4"
Model	Rated Airflow CFM (l/s)	Motor Size, hp						
038	5850 (2761)	5	5	5		—	—	—
041	5750 (2714)	5	—	—	—	—	—	—
051	9150 (4318)	7.5	7.5	—	—	—	—	—
060	8900 (4200)	7.5	7.5	—	—	—	—	—
076	12100 (5711)	10	15	15	15	15	—	—
084	11650 (5498)	10	15	15	15	15	—	—
106	17100 (8070)	15	15	15	15	15	—	—
114	16500 (7787)	15	15	15	15	—	—	—

* Delivered airflow is less than rated airflow

The net capacity data has fan motor heat factored in for all ratings. Capacity data is factory-certified to be within 5% tolerance. Data rated with standard filter.

Table 2.5 Maximum Airflow with Maximum Motor Size at Listed Static Pressure, Models with Forward Curved Blowers

External Static Pressure		0.2"	0.4"	0.6"	0.8"	1.0"	1.2"	1.4"
Model	Rated Airflow CFM (l/s)	Airflow, CFM (l/s)						
038	5850 (2761)	5850 (2761)	5850 (2761)	5850 (2761)	5750 (2714)	5600 (2643)	5450 (2572)	5350 (2525)
041	5750 (2714)	5750 (2714)	5750 (2714)	5600 (2643)	5450 (2572)	5350 (2525)	—	—
051	9150 (4318)	9150 (4318)	9150 (4318)	9100 (4295)	8900 (4200)	8700 (4106)	8550 (4035)	8350 (3941)
060	8900 (4200)	8900 (4200)	8900 (4200)	8750 (4130)	8550 (4035)	8400 (3964)	8200 (3870)	8050 (3799)

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Table 2.5 Maximum Airflow with Maximum Motor Size at Listed Static Pressure, Models with Forward Curved Blowers (continued)

External Static Pressure		0.2"	0.4"	0.6"	0.8"	1.0"	1.2"	1.4"
Model	Rated Airflow CFM (l/s)	Airflow, CFM (l/s)						
076	12100 (5711)	12100 (5711)	12100 (5711)	12100 (5711)	12100 (5711)	12100 (5711)	11600 (5475)	11000 (5191)
084	11650 (5498)	11650 (5498)	11650 (5498)	11650 (5498)	11650 (5498)	11650 (5498)	11400 (5380)	NA
106	17100 (8070)	17100 (8070)	17100 (8070)	17100 (8070)	17100 (8070)	17100 (8070)	16400 (7740)	16100 (7598)
114	16500 (7787)	16500 (7787)	16500 (7787)	16500 (7787)	16500 (7787)	16100	—	—

2.2 Physical Data

Table 2.6 Physical Data, CW038 - CW084, 60Hz Models

Model Sizes	038	041	051	060	076	084
FAN SECTION Some options or combinations of options may result in reduced airflow. Consult your sales representative for recommendations.						
Fan Data - EC Fans - Available in Upflow and Downflow Orientations						
Nominal Air Volume, CFM (CMH)	6,050 (10,285)	5,950 (10,115)	9,200 (15,640)	9,200 (15,640)	12,400 (21,080)	11,900 (20,230)
Fan Motor, Maximum hp (kW), Downflow, each	4.0 (3.0)	4.0 (3.0)	3.6 (2.7) for 208/230 V 3.4 (2.5) for 380 to 460V, 60 Hz/50 Hz	3.6(2.7) for 208/230 V 3.4(2.5) for 380 to 460V, 60 Hz/50 Hz	4.0 (3.0)	4.0 (3.0)
Fan Motor, Max hp (kW), Upflow, each	4.0 (3.0)	4.0 (3.0)	4.0 (3.0)	4.0 (3.0)	4.0 (3.0)	4.0 (3.0)
Standard Ext Static Pressure, inches of water (PA)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)
Number of Fans	1	1	2	2	2	2
Fan Data - Forward-curved Blowers - Variable Pitch, Two-Belt Drive Package - Available in Upflow Configurations						
Nominal Air Volume, CFM (CMH)	5,850 (9,940)	5,750 (9,770)	9,150 (15,550)	8,900 (15,120)	12,100 (20,560)	11,650 (19,790)
Fan Motor, Maximum hp (kW), each	5.0 (3.7)		7.5 (5.6)		10.0 (7.5)	
Standard Ext Static Pressure, inches of water (PA)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)	0.2 (50)
Number of Fans	1	1	2	2	2	2
CHILLED WATER COIL						
Face Area, ft2 (m2)	11.7 (1.1)		18.5 (1.7)		25.0 (2.3)	
Number of Rows	4	6	4	6	4	6
Face Velocity, EC Fans, FPM (m/s)	519 (2.63)	510 (2.59)	503 (2.55)	503 (2.55)	496 (2.51)	476 (2.41)

Table 2.6 Physical Data, CW038 - CW084, 60Hz Models (continued)

Model Sizes	038	041	051	060	076	084
Chilled Water Valves (Standard valves, Maximum design water pressure 400 PSI [2758 kPA].						
Valve Actuator, Sensors, and Body	Modulating Valve Actuator with Proportional Sensors and either 2-Way or 3-Way Valve Body					
Valve Size, in.	1-1/4	1-1/2	1-1/2	2	2	2
MBV 2-way Valve Cv	10.0	29.0	29.0	46.0	46.0	46.0
MBV 2-Way Valve (Opt) Close-off Pressure, PSI (kPA)	200 (1379)	200 (1379)	200 (1379)	200 (1379)	200 (1379)	200 (1379)
MBV 3-way Valve Cv	11.7	29.2	29.2	46.8	46.8	46.8
MBV 3-Way Valve bypass Cv	7.4	18.7	18.7	29.2	29.2	29.2
REHEAT SECTION						
Electric Reheat - Three Stage, Fin/Tube						
Capacity, BTU/HR (kW)	51,195 (15)		68,260 (20)	83,325 (25)	102,390 (30)	
Steam Reheat: 218°F (103.3°C) Steam, 75°F (23.9°C) EAT	Modulating 2-way, 150 PSI (1034.3 kPa) max operating pressure. Not applicable to units with EC fans. Unit CFM reduced by 300 with standard motor (142 l/s)					
Capacity, BTU/HR (kW)	85,800 (25.1)	85,800 (25.1)	93,400 (27.4)	144,500 (42.4)	163,200 (47.8)	163,200 (47.8)
Hot Water Reheat @ 180°F (82.2°C) EWT & 75°F (23.8°C) EAT	Modulating 2-way, 150 PSI (1034.3 kPa) max operating pressure. Not applicable to units with EC fans. Unit CFM reduced by 300 with standard motor (142 l/s)					
Capacity, BTU/HR (kW)	49,500 (14.5)	49,500 (14.5)	89,900 (26.3)	89,900 (26.3)	125,200 (36.7)	125,200 (36.7)
Flow Rate, GPM (l/s)	5 (0.31)	5 (0.31)	8 (0.50)	8 (0.50)	8 (0.50)	8 (0.50)
Pressure Drop, PSI (kPA)	3.5 (24.1)		1.6 (11.0)			1.6 (11.0)
HUMIDIFIER SECTION						
Infrared Humidifier						
Capacity, lb/hr (kg/h)	11 (5.0)	11 (5.0)	17.4 (7.9)	17.4 (7.9)	22.1 (10)	22.1 (10)
kW	4.8	4.8	6.4	6.4	9.6	9.6
FILTER SECTION **Disposable Type - Nominal Size and Quantities, MERV8 and MERV11 (option)**						
Downflow Models						
Nominal Size, in	18 x 24					
Quantity	4	4	6	6	8	8
Upflow Models (Front Return)						
Nominal Size, in	24 x 24					
Quantity	2	2	3	3	4	4
Upflow Models (Bottom and Rear Return)						
Nominal Size, in	18 x 24					
Quantity	4	4	6	6	8	8
CONNECTION SIZES						
Chilled Water, OD Copper	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	2-1/8
Infrared Humidifier, OD Copper	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
Steam Reheat, MPT, FC Blower only	1/2	1/2	1/2	3/4	3/4	3/4
Hot Water Reheat, OD Copper, FC Blower only	5/8	5/8	7/8	7/8	7/8	7/8

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Table 2.7 Physical Data, CW106 - CW181, 60Hz Models

Model Sizes	106	114	146	181
FAN SECTION **Some options or combinations of options may result in reduced airflow. Consult your Vertiv representative for recommendations.**				
Fan Data - EC Fans - CW106 & CW114 are available in Upflow and Downflow Orientations. CW146 to CW181 are available in Downflow only.				
Nominal Air Volume, CFM (CMH)	17,300 (29,410)	17,300 (29,410)	21,000 (35,700)	24,000 (40,800)
Fan Motor, Maximum hp (kW), Downflow, each	4.0 (3.0)	4.0 (3.0)	3.7 (2.8)	4.9 (3.7)
Fan Motor, Maximum hp (kW), Upflow, each	4.0 (3.0)	4.0 (3.0)	—	—
Standard Ext Static Pressure, inches of water (PA)	0.2 (50)			
Number of Fans	3	3	3	3
Fan Data -Forward-curved Blowers - Variable Pitch, Two-Belt Drive Package - CW106 and CW114 are available in Upflow Orientations. CW146 to CW181 are available with EC Fans in downflow orientation only.				
Nominal Air Volume, CFM (CMH)	17,100 (29,050)	16,500 (28,030)	—	—
Fan Motor, Maximum hp (kW), each	3.0 (2.2)	5.0 (3.7)	—	—
Standard Ext Static Pressure, inches of water (PA)	0.2 (50)		—	—
Number of Fans	3	3	—	—
CHILLED WATER COIL				
Face Area, ft^2 (m^2)	36.3 (3.4)		56.3 (5.3)	
Number of Rows	4	6	4	6
Face Velocity, EC Fans, FPM (m/s)	476 (1.34)		373 (1.89)	427 (2.16)
Chilled Water Valves (Standard valves, Maximum design water pressure 400 PSI [2758 kPA].				
Valve Actuator, Sensors, & Body	Modulating Valve Actuator with Proportional Sensors and either 2-Way or 3-Way Valve Body			
Valve Size, in.	2	2	2 (qty. 2)	2 (qty. 2)
MBV 2-way Valve Cv	46.0	46.0	46.0	46.0
MBV 2-Way Valve (Opt) Close-off Pressure, PSI (kPA)	200 (1379)	200 (1379)	200 (1379)	200 (1379)
MBV 3-way Valve Cv	46.8	46.8	73.7	73.7
MBV 3-Way Valve bypass Cv	29.2	29.2	36.8	36.8

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Table 2.7 Physical Data, CW106 - CW181, 60Hz Models (continued)

Model Sizes	106	114	146	181
REHEAT SECTION				
Electric Reheat - Three-Stage, Fin Tube				
Capacity, BTU/HR (kW)	102,390 (30)		102,390 (30)	
Steam Reheat: 218°F (103.3°C) Steam, 75°F (23.9) EAT	Modulating 2-way, 150 PSI (1034.3 kPa) maximum operating pressure. Not applicable to units with EC fans. Unit CFM reduced by 300 with standard motor (142 l/s)			
Capacity, BTU/HR (kW)	84,100 (24.6)	85,800 (25.1)	—	—
Hot Water Reheat @ 180°F (82.2°C) EWT 75°F (23.8°C) EAT	Modulating 2-way, 150 PSI (1034.3 kPa) maximum operating pressure. Not applicable to units with EC fans. Unit CFM reduced by 300 with standard motor (142 l/s)			
Capacity, BTU/HR (kW)	133,700 (39.2)		—	—
Flow Rate, GPM (l/s)	8 (0.50)		—	—
Pressure Drop, PSI (kPA)	1.6 (11.0)		—	—
HUMIDIFIER SECTION				
Infrared Humidifier Note (50Hz Models are 22.1 lb/h (10.0 kg/h); 9.6 kW)				
Capacity, lb/hr (kg/h)	22.1 (10)		22.1 (10)	22.1 (10)
kW	9.6	9.6	9.6	9.6
FILTER SECTION **Disposable Type - Nominal Size and Quantities, MERV8 and MERV11 (option)**				
Downflow Models				
Nominal Size, in	24 x 31		21.5 x 24	
Quantity	5	5	10	10
Upflow Models (Front Return)				
Nominal Size, in	18 x 24		N/A	N/A
Quantity	10	10	N/A	N/A
Upflow Models (Bottom & Rear Return)				
Nominal Size, in	18 x 24		N/A	N/A
Quantity	10	10	N/A	N/A
CONNECTION SIZES				
Chilled Water, OD Copper	2-1/8" (Downflow models) 2-5/8" (Upflow models)	2-5/8"	3-1/8"	3-1/8"
Infrared Humidifier, OD Copper	1/4"	1/4"	1/4"	1/4"
Condensate Drain, FPT	1-1/4"	1-1/4"	1-1/4"	1-1/4"
Steam Reheat, MPT	3/4"	3/4"	N/A	N/A
Hot Water Reheat, OD Copper	7/8"	7/8"	N/A	N/A

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3 Electrical Power Requirements

The tables on the following pages list the electrical data.

Table 3.1 Electrical Data by Reheat Option with Humidifier and Without Condensate Pump, 60 Hz Systems with EC Fans

Models	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038	FLA	64.1	59.4	31.6	29.5	25.7	22.5	20.3	11.0	9.8	10.6
	WSA	80.1	74.3	39.5	36.9	32.1	28.1	25.4	13.8	12.3	13.3
	OPD	90	80	40	40	35	30	30	15	15	15
CW041	FLA	64.1	59.4	31.6	29.5	25.7	22.5	20.3	11.0	9.8	10.6
	WSA	80.1	74.3	39.5	36.9	32.1	28.1	25.4	13.8	12.3	13.3
	OPD	90	80	40	40	35	30	30	15	15	15
CW051 Downflow	FLA	98.7	91.3	48.2	45.5	—	43.2	38.8	20.8	19.3	—
	WSA	123.4	114.1	60.3	56.9	—	54.0	48.5	26.0	24.1	—
	OPD	125	125	70	60	—	60	45	30	25	—
CW051 Upflow	FLA	100.5	93.1	50.0	47.1	40.0	45.0	40.6	22.6	20.9	19.9
	WSA	125.6	116.4	62.5	58.9	50.0	56.3	50.8	28.3	26.1	24.9
	OPD	150	125	70	60	60	50	50	25	30	25
CW060 Downflow	FLA	112.6	104.3	55.1	52.0	—	43.2	38.8	20.8	19.3	—
	WSA	140.8	130.4	68.9	65.0	—	54.0	48.5	26.0	24.1	—
	OPD	150	150	70	70	—	60	45	30	25	—
CW060 Upflow	FLA	114.4	106.1	56.9	53.6	45.0	45.0	40.6	22.6	20.9	19.9
	WSA	143.0	132.6	71.1	67.0	56.3	56.3	50.8	28.3	26.1	24.9
	OPD	150	150	80	70	60	50	50	25	30	25
CW076	FLA	124.1	119.2	63.1	58.7	48.1	45.0	40.6	22.0	19.6	18.0
	WSA	155.1	149.0	78.9	73.4	60.1	56.3	50.8	27.5	24.5	22.5
	OPD	175	150	80	80	70	50	50	25	25	25
CW084	FLA	124.1	119.2	63.1	58.7	48.1	45.0	40.6	22.0	19.6	18.0
	WSA	155.1	149.0	78.9	73.4	60.1	56.3	50.8	27.5	24.5	22.5
	OPD	175	150	80	80	70	50	50	25	25	25
CW106	FLA	133.3	128.4	68.0	62.7	51.3	54.2	49.8	26.9	23.6	21.2
	WSA	166.6	160.5	85.0	78.4	64.1	67.8	62.3	33.6	29.5	26.5
	OPD	175	175	90	80	70	70	70	35	30	30

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Table 3.1 Electrical Data by Reheat Option with Humidifier and Without Condensate Pump, 60 Hz Systems with EC Fans (continued)

Models	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW114	FLA	133.3	128.4	68.0	62.7	51.3	54.2	49.8	26.9	23.6	21.2
	WSA	166.6	160.5	85.0	78.4	64.1	67.8	62.3	33.6	29.5	26.5
	OPD	175	175	90	80	70	70	70	35	30	30
CW146 Downflow	FLA	—	—	65.9	61.8	50.7	—	—	24.8	22.7	20.6
	WSA	—	—	82.4	77.3	63.4	—	—	31	28.4	25.8
	OPD	—	—	90	80	70	—	—	35	30	30
CW181 Downflow	FLA	—	—	71.9	66.3	54.3	—	—	30.8	27.2	24.2
	WSA	—	—	89.9	82.9	67.9	—	—	38.5	34.0	30.3
	OPD	—	—	90	90	70	—	—	35	35	35

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.2 Electrical Data by Reheat Option with Humidifier and with Condensate Pump, 60 Hz Systems with EC Fans

Models	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038	FLA	66.4	61.7	32.8	30.7	26.6	24.8	22.6	12.2	11.0	11.5
	WSA	83.0	77.1	41.0	38.4	33.3	31.0	28.3	15.3	13.8	14.4
	OPD	90	80	45	40	35	35	30	15	15	15
CW041	FLA	66.4	61.7	32.8	30.7	26.6	24.8	22.6	12.2	11.0	11.5
	WSA	83.0	77.1	41.0	38.4	33.3	31.0	28.3	15.3	13.8	14.4
	OPD	90	80	45	40	35	35	30	15	15	15
CW051 Downflow	FLA	101.0	93.6	49.4	46.7	—	45.5	41.1	22.0	20.5	—
	WSA	126.3	117.0	61.8	58.4	—	56.9	51.4	27.5	25.6	—
	OPD	150	125	70	60	—	60	50	30	30	—
CW051 Upflow	FLA	102.8	95.4	51.2	48.3	40.9	47.3	42.9	23.8	22.1	20.8
	WSA	128.5	119.3	64.0	60.4	51.2	59.1	53.6	29.8	27.6	26.0
	OPD	150	125	70	70	60	60	50	30	30	30

Table 3.2 Electrical Data by Reheat Option with Humidifier and with Condensate Pump, 60 Hz Systems with EC Fans (continued)

Models	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW060 Downflow	FLA	114.9	106.6	56.3	53.2	—	45.5	41.1	22.0	20.5	—
	WSA	143.6	133.3	70.4	66.5	—	56.9	51.4	27.5	25.6	—
	OPD	150	150	80	70	—	60	50	30	30	—
CW060 Upflow	FLA	116.7	108.4	58.1	54.8	45.9	47.3	42.9	23.8	22.1	20.8
	WSA	145.9	135.5	72.6	68.5	57.4	59.1	53.6	29.8	27.6	26.0
	OPD	150	150	80	70	60	60	50	30	30	30
CW076	FLA	126.4	121.5	64.3	59.9	49.0	47.3	42.9	23.2	20.8	18.9
	WSA	158.0	151.9	80.4	74.9	61.3	59.1	53.6	29.0	26.0	23.7
	OPD	175	175	90	80	70	60	50	30	30	25
CW084	FLA	126.4	121.5	64.3	59.9	49.0	47.3	42.9	23.2	20.8	18.9
	WSA	158.0	151.9	80.4	74.9	61.3	59.1	53.6	29.0	26.0	23.7
	OPD	175	175	90	80	70	60	50	30	30	25
CW106	FLA	135.6	130.7	69.2	63.9	52.2	56.5	52.1	28.1	24.8	22.1
	WSA	169.5	163.4	86.5	79.9	65.3	70.6	65.1	35.1	31.0	27.7
	OPD	175	175	90	80	70	80	70	40	35	30
CW114	FLA	135.6	130.7	69.2	63.9	52.2	56.5	52.1	28.1	24.8	22.1
	WSA	169.5	163.4	86.5	79.9	65.3	70.6	65.1	35.1	31.0	27.7
	OPD	175	175	90	80	70	80	70	40	35	30
CW146 Downflow	FLA	—	—	67.1	63.0	51.6	—	—	26	23.9	21.5
	WSA	—	—	83.9	78.8	64.5	—	—	32.5	29.9	26.9
	OPD	—	—	90	80	70	—	—	35	30	30
CW181 Downflow	FLA	—	—	73.1	67.5	55.2	—	—	32.0	28.4	25.1
	WSA	—	—	91.4	84.4	69.0	—	—	40	35.5	31.4
	OPD	—	—	100	90	70	—	—	45	40	35

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

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Table 3.3 Electrical Data by Reheat Option without Humidifier and without Condensate Pump, 60 Hz Systems with EC Fans

Models	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038	FLA	50.8	48.3	25.5	23.7	18.3	9.2	9.2	4.9	4.0	3.2
	WSA	63.5	60.4	31.9	29.6	22.9	11.5	11.5	6.1	5.0	4.0
	OPD	70	70	35	30	25	20	20	15	15	15
CW041	FLA	50.8	48.3	25.5	23.7	18.3	9.2	9.2	4.9	4.0	3.2
	WSA	63.5	60.4	31.9	29.6	22.9	11.5	11.5	6.1	5.0	4.0
	OPD	70	70	35	30	25	20	20	15	15	15
CW051 Downflow	FLA	72.1	69.1	35.4	32.6	—	16.6	16.6	8.0	6.4	—
	WSA	90.1	86.4	44.3	40.8	—	18.7	18.7	9.0	7.2	—
	OPD	100	90	45	45	—	25	25	15	15	—
CW051 Upflow	FLA	73.9	70.9	37.2	34.2	26.5	18.4	18.4	9.8	8.0	6.4
	WSA	92.4	88.6	46.5	42.8	33.1	20.7	20.7	11.0	9.0	7.2
	OPD	100	90	50	45	35	25	25	15	15	15
CW060 Downflow	FLA	86.0	82.1	42.3	39.1	—	16.6	16.6	8.0	6.4	—
	WSA	107.5	102.6	52.9	48.9	—	18.7	18.7	9.0	7.2	—
	OPD	110	110	60	50	—	25	25	15	15	—
CW060 Upflow	FLA	87.8	83.9	44.1	40.7	31.5	18.4	18.4	9.8	8.0	6.4
	WSA	109.8	104.9	55.1	50.9	39.4	20.7	20.7	11.0	9.0	7.2
	OPD	110	110	60	60	40	25	25	15	15	15
CW076	FLA	97.5	97.0	50.9	47.1	36.5	18.4	18.4	9.8	8.0	6.4
	WSA	121.9	121.3	63.6	58.9	45.6	20.7	20.7	11.0	9.0	7.2
	OPD	125	125	70	60	50	25	25	15	15	15
CW084	FLA	97.5	97.0	50.9	47.1	36.5	18.4	18.4	9.8	8.0	6.4
	WSA	121.9	121.3	63.6	58.9	45.6	20.7	20.7	11.0	9.0	7.2
	OPD	125	125	70	60	50	25	25	15	15	15
CW106	FLA	106.7	106.2	55.8	51.1	39.7	27.6	27.6	14.7	12.0	9.6
	WSA	133.4	132.8	69.8	63.9	49.6	29.9	29.9	15.9	13.0	10.4
	OPD	150	150	70	70	50	35	35	20	15	15
CW114	FLA	106.7	106.2	55.8	51.1	39.7	27.6	27.6	14.7	12.0	9.6
	WSA	133.4	132.8	69.8	63.9	49.6	29.9	29.9	15.9	13.0	10.4
	OPD	150	150	70	70	50	35	35	20	15	15
CW146 Downflow	FLA	—	—	53.7	50.2	39.1	—	—	12.6	11.1	9.0
	WSA	—	—	67.1	62.8	48.9	—	—	13.7	12.0	9.8
	OPD	—	—	70	70	50	—	—	15	15	15

Table 3.3 Electrical Data by Reheat Option without Humidifier and without Condensate Pump, 60 Hz Systems with EC Fans (continued)

Models	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW181 Downflow	FLA	—	—	59.7	54.7	42.7	—	—	18.6	15.6	12.6
	WSA	—	—	74.6	68.4	53.4	—	—	20.2	16.9	13.7
	OPD	—	—	80	70	60	—	—	25	20	15

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.4 Electrical Data by Reheat Option without Humidifier and with Condensate Pump, 60 Hz Systems with EC Fans

Models	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038	FLA	53.1	50.6	26.7	24.9	19.2	11.5	11.5	6.1	5.2	4.1
	WSA	66.4	63.3	33.4	31.1	24.0	13.8	13.8	7.3	6.2	4.9
	OPD	70	70	35	35	25	20	20	15	15	15
CW041	FLA	53.1	50.6	26.7	24.9	19.2	11.5	11.5	6.1	5.2	4.1
	WSA	66.4	63.3	33.4	31.1	24.0	13.8	13.8	7.3	6.2	4.9
	OPD	70	70	35	35	25	20	20	15	15	15
CW051 Downflow	FLA	74.4	71.4	36.6	33.8	—	18.9	18.9	9.2	7.6	—
	WSA	93.0	89.3	45.8	42.3	—	21.0	21.0	10.2	8.4	—
	OPD	100	90	50	45	—	25	25	15	15	—
CW051 Upflow	FLA	76.2	73.2	38.4	35.4	27.4	20.7	20.7	11.0	9.2	7.3
	WSA	95.3	91.5	48.0	44.3	34.3	23.0	23.0	12.2	10.2	8.1
	OPD	100	100	50	45	35	30	30	15	15	15
CW060 Downflow	FLA	88.3	84.4	43.5	40.3	—	18.9	18.9	9.2	7.6	—
	WSA	110.4	105.5	54.4	50.4	—	21.0	21.0	10.2	8.4	—
	OPD	125	110	60	60	—	25	25	15	15	—

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Table 3.4 Electrical Data by Reheat Option without Humidifier and with Condensate Pump, 60 Hz Systems with EC Fans (continued)

Models	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW060 Upflow	FLA	90.1	86.2	45.3	41.9	32.4	20.7	20.7	11.0	9.2	7.3
	WSA	112.6	107.8	56.6	52.4	40.5	23.0	23.0	12.2	10.2	8.1
	OPD	125	110	60	60	45	30	30	15	15	15
CW076	FLA	99.8	99.3	52.1	48.3	37.4	20.7	20.7	11.0	9.2	7.3
	WSA	124.8	124.1	65.1	60.4	46.8	23.0	23.0	12.2	10.2	8.1
	OPD	125	125	70	70	50	30	30	15	15	15
CW084	FLA	99.8	99.3	52.1	48.3	37.4	20.7	20.7	11.0	9.2	7.3
	WSA	124.8	124.1	65.1	60.4	46.8	23.0	23.0	12.2	10.2	8.1
	OPD	125	125	70	70	50	30	30	15	15	15
CW106	FLA	109.0	108.5	57.0	52.3	40.6	29.9	29.9	15.9	13.2	10.5
	WSA	136.3	135.6	71.3	65.4	50.8	32.2	32.2	17.1	14.1	11.3
	OPD	150	150	80	70	60	40	40	20	15	15
CW114	FLA	109.0	108.5	57.0	52.3	40.6	29.9	29.9	15.9	13.2	10.5
	WSA	136.3	135.6	71.3	65.4	50.8	32.2	32.2	17.1	14.2	11.3
	OPD	150	150	80	70	60	40	40	20	15	15
CW146 Downflow	FLA	—	—	54.9	51.4	40.0	—	—	13.8	12.3	9.9
	WSA	—	—	68.6	64.3	50.0	—	—	14.9	13.2	10.7
	OPD	—	—	70	70	60	—	—	15	15	15
CW181 Downflow	FLA	—	—	60.9	55.9	43.6	—	—	19.8	16.8	13.5
	WSA	—	—	76.1	69.9	54.5	—	—	21.4	18.1	13.9
	OPD	—	—	80	70	60	—	—	25	20	15

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.5 Electrical Data by Reheat Option with Humidifier and without Condensate Pump, 60 Hz Systems with Forward Curved Blowers

Models / Motor HP	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038 3.0 HP	FLA	65.5	59.8	32.5	30.3	26.4	23.9	20.7	11.9	10.6	11.3
	WSA	81.9	74.8	40.6	37.9	33.0	29.9	25.9	14.9	13.3	14.1
	MFCB	90	80	45	40	35	35	30	15	15	15
CW038 5.0 HP	FLA	71.6	65.4	35.9	33.1	28.6	30.0	26.3	15.3	13.4	13.5
	WSA	89.5	81.8	44.9	41.4	35.8	37.5	32.9	19.1	16.8	16.9
	MFCB	90	80	45	40	35	50	45	25	20	20
CW041 3.0 HP	FLA	65.5	59.8	32.5	30.3	26.4	23.9	20.7	11.9	10.6	11.3
	WSA	81.9	74.8	40.6	37.9	33.0	29.9	25.9	14.9	13.3	14.1
	MFCB	90	80	45	40	35	35	30	15	15	15
CW041 5.0 HP	FLA	71.6	65.4	35.9	33.1	28.6	30.0	26.3	15.3	13.4	13.5
	WSA	89.5	81.8	44.9	41.4	35.8	37.5	32.9	19.1	16.8	16.9
	MFCB	90	80	45	40	35	50	45	25	20	20
CW051 5.0 HP	FLA	98.8	89.9	49.4	46.7	39.7	43.3	37.4	22	20.5	19.6
	WSA	123.5	112.4	61.8	58.4	49.6	54.1	46.8	27.5	25.6	24.5
	MFCB	125	125	70	60	50	60	50	30	30	25
CW051 7.5 HP	FLA	106.3	96.7	53.5	50.1	42.6	50.8	44.2	26.1	23.9	22.5
	WSA	132.9	120.9	66.9	62.6	53.3	63.5	55.3	32.6	29.9	28.1
	MFCB	125	110	70	60	50	80	70	40	35	30
CW060 5.0 HP	FLA	112.7	102.9	56.3	53.2	44.7	43.3	37.4	22	20.5	19.6
	WSA	140.9	128.6	70.4	66.5	55.9	54.1	46.8	27.5	25.6	24.5
	MFCB	150	125	80	70	60	60	50	30	30	25
CW060 7.5 HP	FLA	120.2	109.7	60.4	56.6	47.6	50.8	44.2	26.1	23.9	22.5
	WSA	150.3	137.1	75.5	70.8	59.5	63.5	55.3	32.6	29.9	28.1
	MFCB	150	125	70	80	60	80	70	40	35	30
CW076 7.5 HP	FLA	129.9	122.8	66.6	61.7	50.7	50.8	44.2	25.5	22.6	20.6
	WSA	162.4	153.5	83.3	77.1	63.4	63.5	55.3	31.9	28.3	25.8
	MFCB	175	150	90	80	70	80	70	40	35	30
CW076 10.0 HP	FLA	136.5	128.8	70.2	64.7	52.7	57.4	50.2	29.1	25.6	22.6
	WSA	170.6	161.0	87.8	80.9	65.9	71.8	62.8	36.4	32.0	28.3
	MFCB	175	150	90	80	60	90	80	50	40	35
CW084 7.5 HP	FLA	129.9	122.8	66.6	61.7	50.7	50.8	44.2	25.5	22.6	20.6
	WSA	162.4	153.5	83.3	77.1	63.4	63.5	55.3	31.9	28.3	25.8
	MFCB	175	150	90	80	70	80	70	40	35	30

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Table 3.5 Electrical Data by Reheat Option with Humidifier and without Condensate Pump, 60 Hz Systems with Forward Curved Blowers (continued)

Models / Motor HP	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW084 10.0 HP	FLA	136.5	128.8	70.2	64.7	52.7	57.4	50.2	29.1	25.6	22.6
	WSA	170.6	161.0	87.8	80.9	65.9	71.8	62.8	36.4	32.0	28.3
	MFCB	175	150	90	80	60	90	80	50	40	35
CW106 10.0 HP	FLA	136.5	128.8	70.2	64.7	52.7	57.4	50.2	29.1	25.6	22.6
	WSA	170.6	161.0	87.8	80.9	65.9	71.8	62.8	36.4	32.0	28.3
	MFCB	175	150	90	80	60	90	80	50	40	35
CW106 15.0 HP	FLA	151.9	142.8	78.7	71.7	58.7	72.8	64.2	37.6	32.6	28.6
	WSA	189.9	178.5	98.4	89.6	73.4	91.0	80.3	47	40.8	35.8
	MFCB	200	175	110	90	70	125	110	60	50	45
CW106 20.0 HP	FLA	165.1	154.8	86	77.7	63.7	86.0	76.2	44.9	38.6	33.6
	WSA	206.4	193.5	107.5	97.1	79.6	107.5	95.3	56.1	48.3	42.0
	MFCB	225	200	125	110	90	150	125	80	70	60
CW114 10.0 HP	FLA	136.5	128.8	70.2	64.7	52.7	57.4	50.2	29.1	25.6	22.6
	WSA	170.6	161.0	87.8	80.9	65.9	71.8	62.8	36.4	32.0	28.3
	MFCB	175	150	90	80	60	90	80	50	40	35
CW114 15.0 HP	FLA	151.9	142.8	78.7	71.7	58.7	72.8	64.2	37.6	32.6	28.6
	WSA	189.9	178.5	98.4	89.6	73.4	91.0	80.3	47	40.8	35.8
	MFCB	200	175	110	90	70	125	110	60	50	45
CW114 20.0 HP	FLA	165.1	154.8	86	77.7	63.7	86.0	76.2	44.9	38.6	33.6
	WSA	206.4	193.5	107.5	97.1	79.6	107.5	95.3	56.1	48.3	42.0
	MFCB	225	200	125	110	90	150	125	80	70	60

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.6 Electrical Data by Reheat Option with Humidifier and with Condensate Pump, 60 Hz Systems with Forward Curved Blowers

Models / Motor HP	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038 3.0 HP	FLA	67.8	62.1	33.7	31.5	27.3	26.2	23.0	13.1	11.8	12.2
	WSA	84.8	77.6	42.1	39.4	34.2	32.8	28.8	16.4	14.8	15.3
	MFCB	90	80	45	40	35	35	35	20	15	15
CW038 5.0 HP	FLA	73.9	67.7	37.1	34.3	29.5	32.3	28.6	16.5	14.6	14.4
	WSA	92.4	84.6	46.4	42.9	36.9	40.4	35.8	20.6	18.3	18.0
	MFCB	90	80	45	40	35	50	45	25	20	20
CW041 3.0 HP	FLA	67.8	62.1	33.7	31.5	27.3	26.2	23.0	13.1	11.8	12.2
	WSA	84.8	77.6	42.1	39.4	34.2	32.8	28.8	16.4	14.8	15.3
	MFCB	90	80	45	40	35	35	35	20	15	15
CW041 5.0 HP	FLA	73.9	67.7	37.1	34.3	29.5	32.3	28.6	16.5	14.6	14.4
	WSA	92.4	84.6	46.4	42.9	36.9	40.4	35.8	20.6	18.3	18.0
	MFCB	90	80	45	40	35	50	45	25	20	20
CW051 5.0 HP	FLA	101.1	92.2	50.6	47.9	40.6	45.6	39.7	23.2	21.7	20.5
	WSA	126.4	115.3	63.3	59.9	50.8	57.0	49.6	29	27.1	25.7
	MFCB	150	125	70	60	60	60	50	30	30	25
CW051 7.5 HP	FLA	108.6	99.0	54.7	51.3	43.5	53.1	46.5	27.3	25.1	23.4
	WSA	135.8	123.8	68.4	64.1	54.4	66.4	58.1	34.1	31.4	29.3
	MFCB	125	125	70	60	50	80	70	40	35	30
CW060 5.0 HP	FLA	115.0	105.2	57.5	54.4	45.6	45.6	39.7	23.2	21.7	20.5
	WSA	143.8	131.5	71.9	68.0	57.0	57.0	49.6	29	27.1	25.7
	MFCB	150	150	80	70	60	60	50	30	30	25
CW060 7.5 HP	FLA	122.5	112.0	61.6	57.8	48.5	53.1	46.5	27.3	25.1	23.4
	WSA	153.1	140.0	77	72.3	60.7	66.4	58.1	34.1	31.4	29.3
	MFCB	175	150	70	80	70	80	70	40	35	30
CW076 7.5 HP	FLA	132.2	125.1	67.8	62.9	51.6	53.1	46.5	26.7	23.8	21.5
	WSA	165.3	156.4	84.8	78.6	64.5	66.4	58.1	33.4	29.8	26.9
	MFCB	175	175	90	80	70	80	70	40	35	30
CW076 10.0 HP	FLA	138.8	131.1	71.4	65.9	53.6	59.7	52.5	30.3	26.8	23.5
	WSA	173.5	163.9	89.3	82.4	67.0	74.6	65.6	37.9	33.5	29.4
	MFCB	175	150	90	80	60	90	80	50	40	35
CW084 7.5 HP	FLA	132.2	125.1	67.8	62.9	51.6	53.1	46.5	26.7	23.8	21.5
	WSA	165.3	156.4	84.8	78.6	64.5	66.4	58.1	33.4	29.8	26.9
	MFCB	175	175	90	80	70	80	70	40	35	30

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Table 3.6 Electrical Data by Reheat Option with Humidifier and with Condensate Pump, 60 Hz Systems with Forward Curved Blowers (continued)

Models / Motor HP	Volts	Reheat/Humidifier					No Reheat/Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW084 10.0 HP	FLA	138.8	131.1	71.4	65.9	53.6	59.7	52.5	30.3	26.8	23.5
	WSA	173.5	163.9	89.3	82.4	67.0	74.6	65.6	37.9	33.5	29.4
	MFCB	175	150	90	80	60	90	80	50	40	35
CW106 10.0 HP	FLA	138.8	131.1	71.4	65.9	53.6	59.7	52.5	30.3	26.8	23.5
	WSA	173.5	163.9	89.3	82.4	67.0	74.6	65.6	37.9	33.5	29.4
	MFCB	175	150	90	80	60	90	80	50	40	35
CW106 15.0 HP	FLA	154.2	145.1	79.9	72.9	59.6	75.1	66.5	38.8	33.8	29.5
	WSA	192.8	181.4	99.9	91.1	74.5	93.9	83.1	48.5	42.3	36.9
	MFCB	200	175	110	90	80	125	110	70	60	50
CW106 20.0 HP	FLA	167.4	157.1	87.2	78.9	64.6	88.3	78.5	46.1	39.8	34.5
	WSA	209.3	196.4	109	98.6	80.8	110.4	98.1	57.6	49.8	43.2
	MFCB	225	200	125	110	90	150	125	80	70	60
CW114 10.0 HP	FLA	138.8	131.1	71.4	65.9	53.6	59.7	52.5	30.3	26.8	23.5
	WSA	173.5	163.9	89.3	82.4	67.0	74.6	65.6	37.9	33.5	29.4
	MFCB	175	150	90	80	60	90	80	50	40	35
CW114 15.0 HP	FLA	154.2	145.1	79.9	72.9	59.6	75.1	66.5	38.8	33.8	29.5
	WSA	192.8	181.4	99.9	91.1	74.5	93.9	83.1	48.5	42.3	36.9
	MFCB	200	175	110	90	80	125	110	70	60	50
CW114 20.0 HP	FLA	167.4	157.1	87.2	78.9	64.6	88.3	78.5	46.1	39.8	34.5
	WSA	209.3	196.4	109	98.6	80.8	110.4	98.1	57.6	49.8	43.2
	MFCB	225	200	125	110	90	150	125	80	70	60

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.7 Electrical data by Reheat Option without Humidifier and without Condensate Pump, 60 Hz Systems with Forward Curved Blowers

Models / Motor HP	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038 3.0 HP	FLA	52.2	48.7	26.4	24.5	19.0	10.6	9.6	5.8	4.8	3.9
	WSA	65.3	60.9	33	30.6	23.8	13.3	12.0	7.3	6.0	4.9
	MFCB	60	70	30	35	25	20	20	15	15	15
CW038 5.0 HP	FLA	58.3	54.3	29.8	27.3	21.2	16.7	15.2	9.2	7.6	6.1
	WSA	72.9	67.9	37.3	34.1	26.5	20.9	19.0	11.5	9.5	7.6
	MFCB	70	70	40	35	25	35	30	20	15	15
CW041 3.0 HP	FLA	52.2	48.7	26.4	24.5	19.0	10.6	9.6	5.8	4.8	3.9
	WSA	65.3	60.9	33	30.6	23.8	13.3	12.0	7.3	6.0	4.9
	MFCB	60	70	30	35	25	20	20	15	15	15
CW041 5.0 HP	FLA	58.3	54.3	29.8	27.3	21.2	16.7	15.2	9.2	7.6	6.1
	WSA	72.9	67.9	37.3	34.1	26.5	20.9	19.0	11.5	9.5	7.6
	MFCB	70	70	40	35	25	35	30	20	15	15
CW051 5.0 HP	FLA	72.2	67.7	36.6	33.8	26.2	16.7	15.2	9.2	7.6	6.1
	WSA	90.3	84.6	45.8	42.3	32.8	20.9	19.0	11.5	9.5	7.6
	MFCB	90	80	45	40	30	35	30	20	15	15
CW051 7.5 HP	FLA	79.7	74.5	40.7	37.2	29.1	24.2	22.0	13.3	11.0	9.0
	WSA	99.6	93.1	50.9	46.5	36.4	30.3	27.5	16.6	13.8	11.3
	MFCB	100	100	50	50	40	50	45	25	20	20
CW060 5.0 HP	FLA	86.1	80.7	43.5	40.3	31.2	16.7	15.2	9.2	7.6	6.1
	WSA	107.6	100.9	54.4	50.4	39.0	20.9	19.0	11.5	9.5	7.6
	MFCB	110	110	50	60	40	35	30	20	15	15
CW060 7.5 HP	FLA	93.6	87.5	47.6	43.7	34.1	24.2	22.0	13.3	11.0	9.0
	WSA	117.0	109.4	59.5	54.6	42.6	30.3	27.5	16.6	13.8	11.3
	MFCB	110	110	60	50	45	50	45	25	20	20
CW076 7.5 HP	FLA	103.3	100.6	54.4	50.1	39.1	24.2	22.0	13.3	11.0	9.0
	WSA	129.1	125.8	68	62.6	48.9	30.3	27.5	16.6	13.8	11.3
	MFCB	125	125	70	60	50	50	45	25	20	20
CW076 10.0 HP	FLA	109.9	106.6	58	53.1	41.1	30.8	28.0	16.9	14.0	11.0
	WSA	137.4	133.3	72.5	66.4	51.4	38.5	35.0	21.1	17.5	13.8
	MFCB	125	125	70	70	50	60	60	35	30	20
CW084 7.5 HP	FLA	103.3	100.6	54.4	50.1	39.1	24.2	22.0	13.3	11.0	9.0
	WSA	129.1	125.8	68	62.6	48.9	30.3	27.5	16.6	13.8	11.3
	MFCB	125	125	70	60	50	50	45	25	20	20

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Table 3.7 Electrical data by Reheat Option without Humidifier and without Condensate Pump, 60 Hz Systems with Forward Curved Blowers (continued)

Models / Motor HP	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW084 10.0 HP	FLA	109.9	106.6	58.0	53.1	41.1	30.8	28.0	16.9	14.0	11.0
	WSA	137.4	133.3	72.5	66.4	51.4	38.5	35.0	21.1	17.5	13.8
	MFCB	125	125	70	70	50	60	60	35	30	20
CW106 10.0 HP	FLA	109.9	106.6	58	53.1	41.1	30.8	28.0	16.9	14.0	11.0
	WSA	137.4	133.3	72.5	66.4	51.4	38.5	35.0	21.1	17.5	13.8
	MFCB	125	125	70	70	50	60	60	35	30	20
CW106 15.0 HP	FLA	125.3	120.6	66.5	60.1	47.1	46.2	42.0	25.4	21.0	17.0
	WSA	156.6	150.8	83.1	75.1	58.9	57.8	52.5	31.8	26.3	21.3
	MFCB	175	150	90	80	60	100	90	50	45	35
CW106 20.0 HP	FLA	138.5	132.6	73.8	66.1	52.1	59.4	54.0	32.7	27.0	22.0
	WSA	173.1	165.8	92.3	82.6	65.1	74.3	67.5	40.9	33.8	27.5
	MFCB	200	200	110	90	70	125	110	70	60	45
CW114 10.0 HP	FLA	109.9	106.6	58	53.1	41.1	30.8	28.0	16.9	14.0	11.0
	WSA	137.4	133.3	72.5	66.4	51.4	38.5	35.0	21.1	17.5	13.8
	MFCB	125	125	70	70	50	60	60	35	30	20
CW114 15.0 HP	FLA	125.3	120.6	66.5	60.1	47.1	46.2	42.0	25.4	21.0	17.0
	WSA	156.6	150.8	83.1	75.1	58.9	57.8	52.5	31.8	26.3	21.3
	MFCB	175	150	90	80	60	100	90	50	45	35
CW114 20.0 HP	FLA	138.5	132.6	73.8	66.1	52.1	59.4	54.0	32.7	27.0	22.0
	WSA	173.1	165.8	92.3	82.6	65.1	74.3	67.5	40.9	33.8	27.5
	MFCB	200	200	110	90	70	125	110	70	60	45

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.8 Electrical Data by Reheat Option without Humidifier with Condensate Pump, 60 Hz Systems with Forward Curved Blowers

Models / Motor HP	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW038 3.0 HP	FLA	54.5	51.0	27.6	25.7	19.9	12.9	11.9	7.0	6.0	4.8
	WSA	68.1	63.8	34.5	32.1	24.9	15.6	14.3	8.5	7.2	5.8
	MFCB	70	70	35	35	25	25	20	15	15	15
CW038 5.0 HP	FLA	60.6	56.6	31	28.5	22.1	19.0	17.5	10.4	8.8	7.0
	WSA	75.8	70.8	38.8	35.6	27.7	23.2	21.3	12.7	10.7	8.5
	MFCB	80	70	40	35	25	35	35	20	15	15
CW041 3.0 HP	FLA	54.5	51.0	27.6	25.7	19.9	12.9	11.9	7	6.0	4.8
	WSA	68.1	63.8	34.5	32.1	24.9	15.6	14.3	8.5	7.2	5.8
	MFCB	70	70	35	35	25	25	20	15	15	15
CW041 5.0 HP	FLA	60.6	56.6	31.0	28.5	22.1	19.0	17.5	10.4	8.8	7.0
	WSA	75.8	70.8	38.8	35.6	27.7	23.2	21.3	12.7	10.7	8.5
	MFCB	80	70	40	35	25	35	35	20	15	15
CW051 5.0 HP	FLA	74.5	70.0	37.8	35.0	27.1	19.0	17.5	10.4	8.8	7.0
	WSA	93.1	87.5	47.3	43.8	33.9	23.2	21.3	12.7	10.7	8.5
	MFCB	90	80	45	40	35	35	35	20	15	15
CW051 7.5 HP	FLA	82.0	76.8	41.9	38.4	30.0	26.5	24.3	14.5	12.2	9.9
	WSA	102.5	96.0	52.4	48.0	37.5	32.6	29.8	17.8	15.0	12.2
	MFCB	110	100	50	50	40	50	50	30	25	20
CW060 5.0 HP	FLA	88.4	83.0	44.7	41.5	32.1	19.0	17.5	10.4	8.8	7.0
	WSA	110.5	103.8	55.9	51.9	40.2	23.2	21.3	12.7	10.7	8.5
	MFCB	125	110	50	60	45	35	35	20	15	15
CW060 7.5 HP	FLA	95.9	89.8	48.8	44.9	35.0	26.5	24.3	14.5	12.2	9.9
	WSA	119.9	112.3	61	56.1	43.8	32.6	29.8	17.8	15.0	12.2
	MFCB	125	110	60	50	45	50	50	30	25	20
CW076 7.5 HP	FLA	105.6	102.9	55.6	51.3	40.0	26.5	24.3	14.5	12.2	9.9
	WSA	132.0	128.6	69.5	64.1	50.0	32.6	29.8	17.8	15.0	12.2
	MFCB	125	125	70	60	50	50	50	30	25	20
CW076 10.0 HP	FLA	112.2	108.9	59.2	54.3	42.0	33.1	30.3	18.1	15.2	11.9
	WSA	140.3	136.1	74	67.9	52.5	40.8	37.3	22.3	18.7	14.7
	MFCB	150	125	80	70	50	70	60	35	30	25
CW084 7.5 HP	FLA	105.6	102.9	55.6	51.3	40.0	26.5	24.3	14.5	12.2	9.9
	WSA	132.0	128.6	69.5	64.1	50.0	32.6	29.8	17.8	15.0	12.2
	MFCB	125	125	70	60	50	50	50	30	25	20

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Table 3.8 Electrical Data by Reheat Option without Humidifier with Condensate Pump, 60 Hz Systems with Forward Curved Blowers (continued)

Models / Motor HP	Volts	Reheat/No Humidifier					No Reheat/No Humidifier				
		208	230	380	460	575	208	230	380	460	575
CW084 10.0 HP	FLA	112.2	108.9	59.2	54.3	42.0	33.1	30.3	18.1	15.2	11.9
	WSA	140.3	136.1	74	67.9	52.5	40.8	37.3	22.3	18.7	14.7
	MFCB	150	125	80	70	50	70	60	35	30	25
CW106 10.0 HP	FLA	112.2	108.9	59.2	54.3	42.0	33.1	30.3	18.1	15.2	11.9
	WSA	140.3	136.1	74	67.9	52.5	40.8	37.3	22.3	18.7	14.7
	MFCB	150	125	80	70	50	70	60	35	30	25
CW106 15.0 HP	FLA	127.6	122.9	67.7	61.3	48.0	48.5	44.3	26.6	22.2	17.9
	WSA	159.5	153.6	84.6	76.6	60.0	60.1	54.8	33	27.5	22.2
	MFCB	175	175	90	80	60	100	90	50	45	35
CW106 20.0 HP	FLA	140.8	134.9	75	67.3	53.0	61.7	56.3	33.9	28.2	22.9
	WSA	176.0	168.6	93.8	84.1	66.3	76.6	69.8	42.1	35.0	28.4
	MFCB	200	200	110	100	80	125	110	70	60	50
CW114 10.0 HP	FLA	112.2	108.9	59.2	54.3	42.0	33.1	30.3	18.1	15.2	11.9
	WSA	140.3	136.1	74	67.9	52.5	40.8	37.3	22.3	18.7	14.7
	MFCB	150	125	80	70	50	70	60	35	30	25
CW114 15.0 HP	FLA	127.6	122.9	67.7	61.3	48.0	48.5	44.3	26.6	22.2	17.9
	WSA	159.5	153.6	84.6	76.6	60.0	60.1	54.8	33	27.5	22.2
	MFCB	175	175	90	80	60	100	90	50	45	35
CW114 20.0 HP	FLA	140.8	134.9	75.0	67.3	53.0	61.7	56.3	33.9	28.2	22.9
	WSA	176.0	168.6	93.8	84.1	66.3	76.6	69.8	42.1	35.0	28.4
	MFCB	200	200	110	100	80	125	110	70	60	50

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device

Notes:

1. 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.
2. The values in the chart are for power of the unit only.
3. Units are 3 phase, 60 cycle.
4. For units with other variations not listed above, consult your Vertiv representative for electrical requirements.
5. SCCR - Short Circuit Current Rating 65,000 rms (less than 480V), 25,000 rms (575V).

Source: DPN004977 Rev. 2

Table 3.9 Indoor Evaporator Forward Curved Fan Motor Electrical Requirements, 60 Hz Systems

HP	Voltage							
	208		230		460		575	
	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA
2.0	7.5	55.0	6.8	50.0	3.4	25.0	2.7	20.0
3.0	10.6	71.0	9.6	64.0	4.8	32.0	3.9	25.6
5.0	16.7	102.0	15.2	92.0	7.6	46.0	6.1	36.8
7.5	24.2	140.0	22.0	127.0	11.0	63.5	9.0	50.8
10.0	30.8	179.0	28.0	162.0	14.0	81.0	11.0	64.8
15.0	46.2	257.0	42.0	232.0	21.0	116.0	17.0	93.0
20.0	59.4	321.0	54.0	290.0	27.0	145.0	22.0	116.0

Note: Refer to General Data Section for standard fan-motor size on units.

Source: DPN004977 Rev. 2

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3.1 Electrical Field Connections

Three phase electrical service is required for all models. Electrical service must conform to national and local electrical codes.

The electrical connections are described in the submittal documents included in the Submittal Drawings on page 47 .

The following table lists the relevant documents by number and title.

Table 3.10 Electrical Field Connection Drawings

Document Number	Title
Downflow Units	
DPN004548	Electrical Field Connections, Downflow CW038 to CW084
DPN004549	Electrical Field Connections, Downflow, CW106, and CW114
DPN004550	Electrical Field Connections, Downflow, CW146 and CW181
Upflow Units	
DPN003200	High-voltage Connections, Upflow, CW038 to CW084
DPN004552	Low-voltage and Ethernet Connections, Upflow, CW038 to CW084
DPN003202	High Voltage Connections, Upflow, CW106, and CW114
DPN004551	Low Voltage and Ethernet Connection, Upflow CW106, and CW114
Unit to Unit Networking	
DPN004351	Liebert® iCOM™ Unit to Unit Network Connections

4 Planning Guidelines

4.1 Location Considerations

For a downflow unit, the unit can sit on an accessible, elevated flooring system. It may be necessary to furnish additional pedestal support below the unit to ensure maximum structural support. A separate floor stand for the unit may be used as support, independent of the elevated floor and installed prior to the flooring system.

For downflow and upflow units, provide approximately 34 in. (864 mm) service clearance on the left, right and in front of the unit whenever possible. The minimum space required for service is 18 in. (457 mm) on the left end, 18 in. (457 mm) on the right end and 24 in. (610 mm) in front of the unit. This space is necessary to permit routine maintenance, such as replacing filters and adjusting the fan speed. On downflow and upflow CW106 and CW114 models, left and right end minimum clearances are 0 in. (0 mm) except for rear return.

Avoid installing units in an alcove or at the extreme end of a room that has a high aspect ratio (long narrow room). Also avoid installing units too close together. This tends to reduce the effectiveness of the air distribution as compared to units located 30 to 40 ft (9 to 12 mm) apart.

4.2 Shipping Dimensions and Unit Weights

Table 4.1 Shipping Dimensions

Model	Domestic Packed, in. (mm)	Export Packed, in. (mm)
038, 041	64 X 45 X 85 (1625.6 X 1143 X 2159)	64.5 X 45 X 85.5 (1683.3 X 1143 X 2171.1)
051, 060	97 X 45 X 85 (2463.8 X 1143 X 2159)	97.5 X 45 X 85.5 (2476.5 X 1143 X 2171.1)
076, 084	120 X 45 X 85 (3048 X 1143 X 2159)	120.5 X 45 X85.5 (3060.7 X 2476.5 X 2171.1)
106, 114	143 X45 X 85 (3632.2 X 1143 X 2159)	143.5 X 45 X 85.5 (3632.2 X 2476.4 X 2171.1)
146, 181	136 X 54 X 85 (3454.4 X 1143 X 2159)	136.5 X 54.5 X 85.5 (3467.1 X 2576.4 X 2171.1)

Table 4.2 Shipping Weights

Model	Domestic Packaging, lb. (kg)	Export Packaging, lb. (kg)
038	840 (381)	1065 (483)
041	890 (404)	1115 (506)
051	1135 (515)	1360 (617)
060	1200 (544)	1425 (646)
076	1380 (625)	1630 (739)
084	1480 (671)	1730 (785)
106	1950 (885)	2225 (1,009)
114	2090 (949)	2365 (1,073)
146	2900 (1,314)	3200 (1,450)
181	2900 (1,314)	3200 (1,450)

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4.3 Planning Dimensions

The unit, floor stand, and plenum dimensions are described in the submittal documents included in the Submittal Drawings on page 47.

The following table lists the relevant documents by number and title.

Table 4.3 Dimension Planning Drawings

Document Number	Title
Downflow Units with EC Fans	
DPN003192	Cabinet Dimensional Data, CW038 to CW084
DPN003222	Cabinet Dimensional Data, Front Discharge, CW038 and CW041
DPN003223	Cabinet Dimensional Data, Front Discharge, CW051, CW060, CW076, and CW084
DPN003193	Cabinet Dimensional Data, CW106, and CW114
DPN003224	Cabinet Dimensional Data, Front Discharge, CW106 and CW114
DPN003208	Cabinet Dimensional Data, CW146 and CW181
DPN003225	Cabinet Dimensional Data, Front Discharge, CW146 and CW181
Upflow Units with EC Fans	
DPN003215	Cabinet Dimensional Data, CW038 to CW084
DPN003216	Cabinet Dimensional Data, CW106 and CW114
Upflow Units with Forward Curved Blowers	
DPN003194	Cabinet Dimensional Data, CW038 to CW084
DPN003195	Cabinet Dimensional Data, CW106 and CW114
Floor Stands for Units with EC Fans	
DPN003212	Floor Stand Dimensional Data, Downflow Models, CW038 to CW041
DPN003211	Floor Stand Dimensional Data, Downflow Models, CW051 and CW060
DPN003210	Floor Stand Dimensional Data, Downflow Models, CW076 and CW084
DPN003191	Floor Stand Dimensional Data, Downflow Models, CW106 and CW114
DPN003207	Floor Stand Dimensional Data, Downflow Models, CW146 and CW181
Floor Stands for Units with Forward Curved Blowers	
DPN001676	Floorstand Dimensional Data, CW038 to CW084
DPN001677	Floorstand Dimensional Data, CW106 and CW114
Plenums for Units with EC Fans	
DPN004604	Plenum Dimensional Data, Downflow Models, CW038 to CW084
DPN004605	Plenum Dimensional Data, Downflow Models, CW106 and CW114
DPN003214	Plenum Dimensional Data, Upflow Models, CW038 to CW084
DPN003213	Plenum Dimensional Data, Upflow Models, CW106 and CW114

Table 4.3 Dimension Planning Drawings (continued)

Document Number	Title
Plenums for Units with Forward Curved Blowers	
DPN003204	Plenum Dimensional Data, Upflow Models, CW038 to CW084
DPN003205	Plenum Dimensional Data, Upflow Models, CW106 and CW114

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5 Piping

Field installed piping must be installed in accordance with local code.

The following pipe connections are required:

- A drain line from the evaporator coil drain pan.
- A water supply line to the optional humidifier (if applicable).
- Connections to the building chilled water source.

The pipe connection locations, piping general arrangement and schematics are described in the submittal documents included in the Submittal Drawings on page 47 .

The following tables list the relevant documents by number and title.

Table 5.1 Piping General Arrangement Drawings

Document Number	Title
DPN004561	Piping Schematic, Downflow, CW038 to CW114
DPN004138	Piping Schematic, Downflow, CW146 and CW181
DPN004562	Piping Schematic, Upflow, CW038 to CW114

Table 5.2 Piping Connection Drawings

Document Number	Title
Downflow Units with EC Fans	
DPN002036	Connection Locations, CW038 and CW041
DPN002035	Connection Locations, CW051 and CW050
DPN002034	Connection Locations, CW075 to CW084
DPN001628	Connection Locations, CW106 and CW114
DPN001693	Connection Locations, CW146 and CW181
Upflow Units with Forward Curved Blowers	
DPN001668	Connection Locations, CW038 to CW084
DPN001669	Connection Locations, CW106 and CW114

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Appendices

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2378

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

505 N. Cleveland Ave.

Westerville, OH 43082 USA

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road

Wanchai, Hong Kong

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Appendix B: Optional Configuration for Vertiv™ Liebert® CW Seismic Application

Electrical wiring, conduit, and/or other connections to the equipment is the responsibility of others. Data and recommendations are supplied in the Submittal Drawings on page 47 , and in the unit installation supplement for seismic installation.

The following table lists the relevant documents by number and title.

Table B.1 Seismic Application Drawings

Document Number	Title
DPN003209	Seismic Application Assumptions and Requirements

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Appendix C: Optional Vertiv™ Liebert® Air Economizer for Vertiv™ Liebert® CW

The Liebert® Air Economizer is an option for Liebert® CW chilled water downflow units and Liebert® DS downflow units. The Liebert® Air Economizer uses cool outdoor air in mild climates to condition indoor spaces. It is functional only on cooling units with Vertiv™ Liebert® iCOM™ controls that are factory-wired and configured to accommodate the Liebert® Air Economizer.

The Liebert® Air Economizer is supplied with electrical wiring for connection to the cooling unit, outdoor air sensors, return air sensors and a temperature-and-humidity-sensing unit the appropriate drawings included in the Submittal Drawings on page 47 .

The following table lists the relevant documents by number and title.

Table C.1 Liebert® Air Economizer Drawings

Document Number	Title
DPN001333	Air Economizer Ducting
DPN003226	Planning Dimensions for CW106 to CW114 Downflow Models
DPN003227	Planning Dimensions for CW038 to CW084 Downflow Models
DPN001449	Air Economizer Field Connections

Special firmware is loaded into the primary cooling unit at the factory to permit the primary cooling unit to control the Liebert® Air Economizer.

NOTE: When upgrading the firmware for the primary cooling unit, either a Liebert® DS downflow unit or Liebert® CW downflow unit, ensure that the new firmware includes the Liebert® Air Economizer controls. If in doubt, contact your sales representative.

C.1 Customer Supplied Equipment and Ductwork

Installation and operation requires outside air entry duct work with louvers, screening and filtration to prevent intrusion of precipitation, particulates, vermin and unauthorized entry, DPN001333 included in the Submittal Drawings on page 47 .

Proper installation also requires a customer provided powered relief air discharge to rid the structure of the outside air drawn in for cooling. The relief-air discharge must be equivalent to the airflow of the total of all cooling systems equipped with the Air Economizer.

A flange is provided to attach the Air Economizer to the outdoor air duct. See DPN003226 and DPN003227 in the Submittal Drawings on page 47 .

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Appendix D: Submittal Drawings

Table D.1 Submittal Drawing Contents

Document Number	Title
Component Location	
DPN002869	Component Location, Downflow Models
DPN002868	Component Location, Upflow Models
Planning Dimensions--Downflow Units with EC Fans	
DPN003192	Cabinet Dimensional Data, CW038to CW084
DPN003222	Cabinet Dimensional Data, Front Discharge, CW038 and CW041
DPN003223	Cabinet Dimensional Data, Front Discharge, CW051, CW060, CW076, and CW084
DPN003193	Cabinet Dimensional Data, CW106, and CW114
DPN003224	Cabinet Dimensional Data, Front Discharge, CW106 and CW114
DPN003208	Cabinet Dimensional Data, CW146 and CW181
DPN003225	Cabinet Dimensional Data, Front Discharge, CW146 and CW181
Planning Dimensions--Upflow Units with EC Fans	
DPN003215	Cabinet Dimensional Data, CW038 to CW084
DPN003216	Cabinet Dimensional Data, CW106 and CW114
Planning Dimensions--Upflow Units with Forward Curved Blowers	
DPN003194	Cabinet Dimensional Data, CW038 to CW084
DPN003195	Cabinet Dimensional Data, CW106 and CW114
Planning Dimensions--Floor Stands for Units with EC Fans	
DPN003212	Floor Stand Dimensional Data, Downflow Models, CW038 and CW041
DPN003211	Floor Stand Dimensional Data, Downflow Models, CW051 and CW060
DPN003210	Floor Stand Dimensional Data, Downflow Models, CW076 and CW084
DPN003191	Floor Stand Dimensional Data, Downflow Models, CW106 and CW114
DPN003207	Floor Stand Dimensional Data, Downflow Models, CW146 and CW181
Planning Dimensions--Floor Stands for Units with Forward Curved Blowers	
DPN001676	Floor Stand Dimensional Data, CW038 to CW084
DPN001677	Floor Stand Dimensional Data, CW106 and CW114

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Table D.1 Submittal Drawing Contents (continued)

Document Number	Title
Planning Dimensions--Plenums for Units with EC Fans	
DPN004604	Plenum Dimensional Data, Downflow Models, CW038 to CW084
DPN004605	Plenum Dimensional Data, Downflow Models, CW106 and CW114
DPN003214	Plenum Dimensional Data, Upflow Models, CW038 to CW084
DPN003213	Plenum Dimensional Data, Upflow Models, CW106 and CW114
Planning Dimensions--Plenums for Units with Forward Curved Blowers	
DPN003204	Plenum Dimensional Data, Upflow Models, CW038 to CW084
DPN003205	Plenum Dimensional Data, Upflow Models, CW106 and CW114
Piping Schematics	
DPN004561	Piping Schematic, Downflow, CW038 to CW114
DPN004138	Piping Schematic, Downflow, CW146 and CW181
DPN004562	Piping Schematic, Upflow, CW038 to CW114
Piping Connections--Downflow Units with EC Fans	
DPN002036	Connection Locations, CW038 to CW041
DPN002035	Connection Locations, CW051 and CW060
DPN002034	Connection Locations, CW075 to CW084
DPN001628	Connection Locations, CW106 and CW114
DPN001693	Connection Locations, CW146 and CW181
Piping Connections--Upflow Units with Forward Curved Blowers	
DPN001668	Connection Locations, CW038 to CW084
DPN001669	Connection Locations, CW106 and CW114
Electrical Connections--Downflow Units	
DPN004548	Electrical Field Connections, Downflow CW038 to CW084
DPN004549	Electrical Field Connections, Downflow, CW106, and CW114
DPN004550	Electrical Field Connections, Downflow, CW146 and CW181
Electrical Connections--Upflow Units	
DPN003200	High Voltage Connections, Upflow, CW038 to CW084
DPN004552	Low Voltage and Ethernet Connections, Upflow, CW026 to CW084
DPN003202	High Voltage Connections, Upflow, CW106 and CW114
DPN004551	Low Voltage and Ethernet Connection, Upflow CW106 and CW114
Unit to Unit Networking	
DPN004351	Liebert® iCOM™ Unit to Unit Network Connections

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Table D.1 Submittal Drawing Contents (continued)

Document Number	Title
Air Economizer Option	
DPN001333	Air Economizer Ducting
DPN003226	Planning Dimensions for CW106 to CW114 Downflow Models
DPN003227	Planning Dimensions for CW038 to CW084 Downflow Models
DPN001449	Air Economizer Field Connections
Liebert® CW Seismic Application	
DPN003209	Seismic Application Assumptions and Requirements

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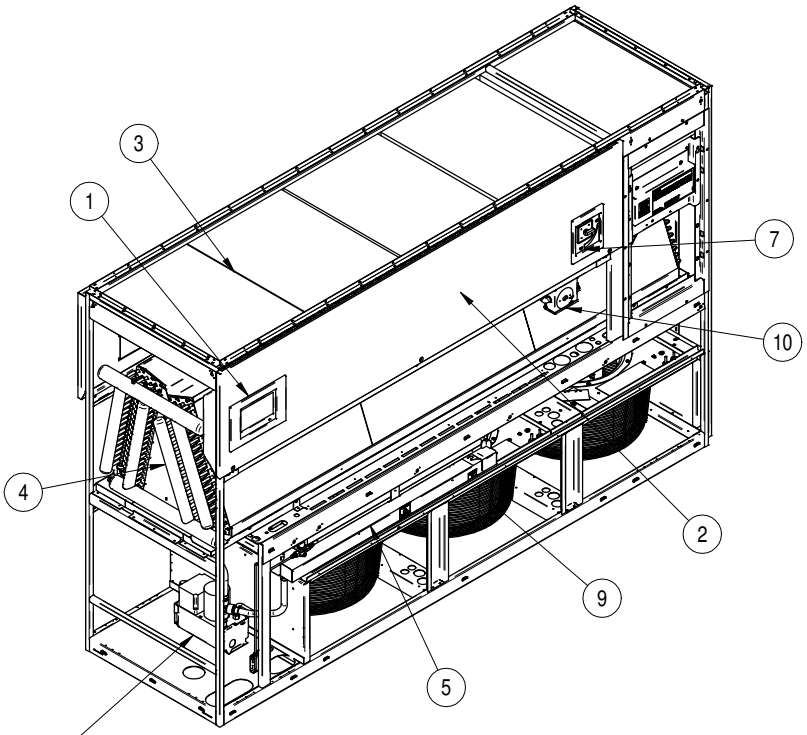
LIEBERT® CW

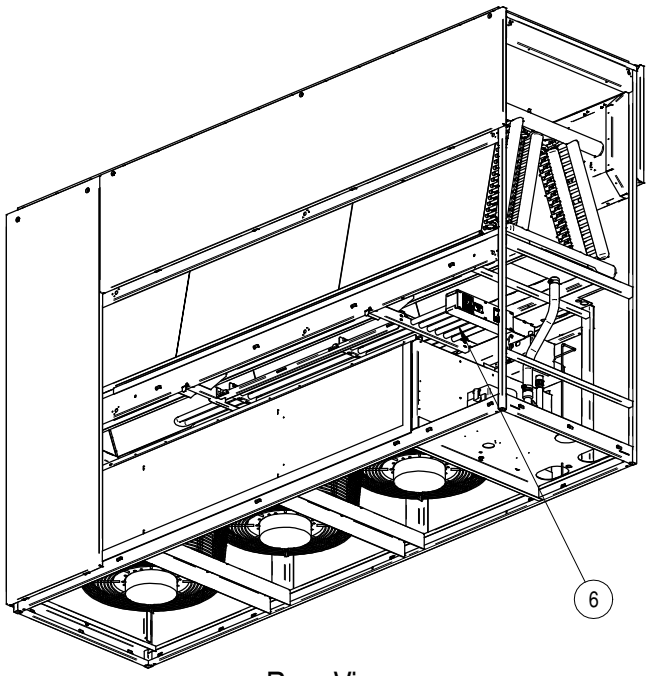
COMPONENT LOCATION
DOWNFLOW MODELS



Front View

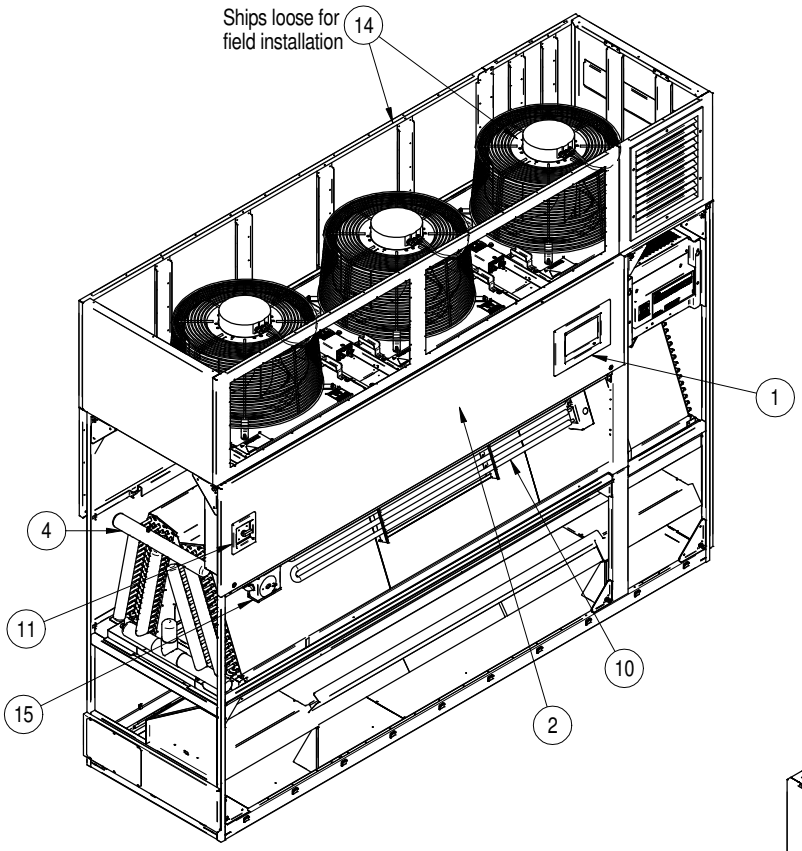
8 Ships loose for field installation on CW038-CW060 units.

1.	Liebert® iCOM™ Control Display
2.	Electric Box
3.	Filters
4.	Coil
5.	Infrared Humidifier (optional)
6.	Reheat (optional)
7.	Disconnect
8.	Condensate Pump (optional)
9.	EC Fans
10.	Smoke Detector (optional)



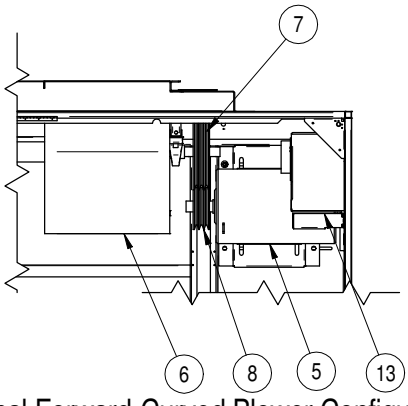
Rear View

COMPONENT LOCATION
UPFLOW MODELS

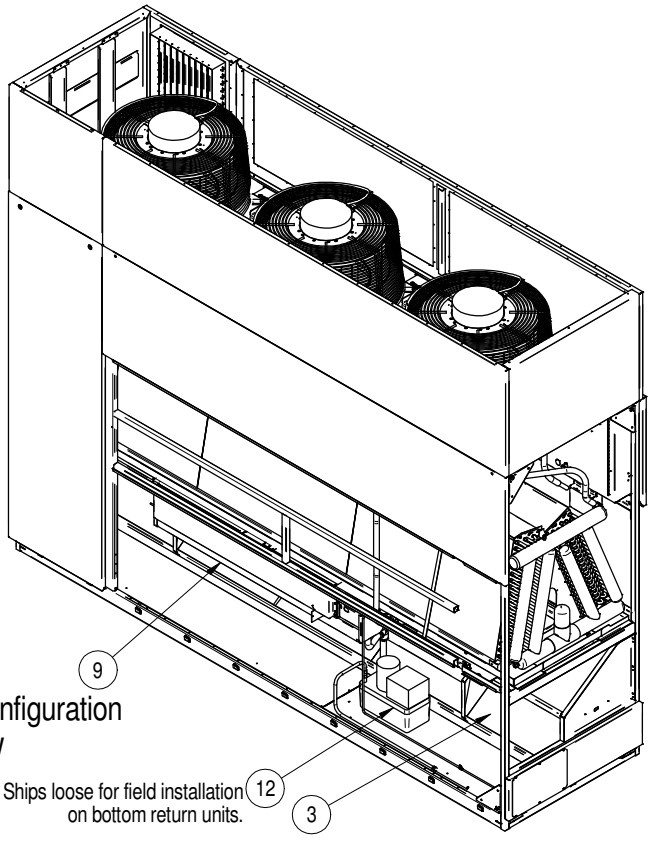


Optional EC Fan Configuration
Front View

1.	Liebert® iCOM™ Control Display
2.	Electric Box
3.	Filters
4.	Coil
5.	Motor
6.	Blower
7.	Fan Pulley
8.	Motor Sheave & Belts
9.	Infrared Humidifier (optional)
10.	Reheat (optional)
11.	Disconnect (optional)
12.	Condensate Pump (optional)
13.	Variable Frequency Drive (optional)
14.	Plenum with EC Fans (optional)
15.	Smoke Detector (optional)



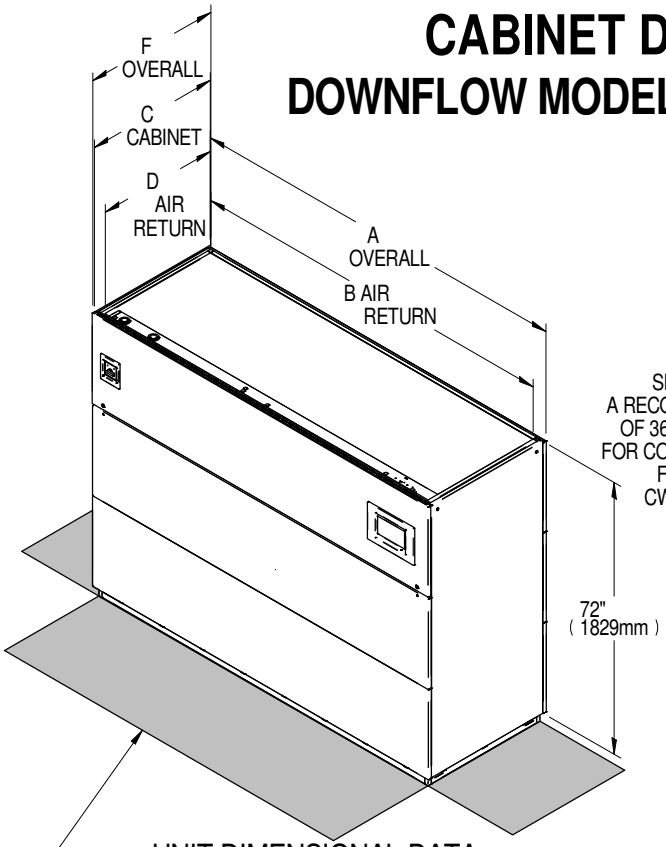
Optional Forward-Curved Blower Configuration
Front View



Optional EC Fan Configuration
Rear View

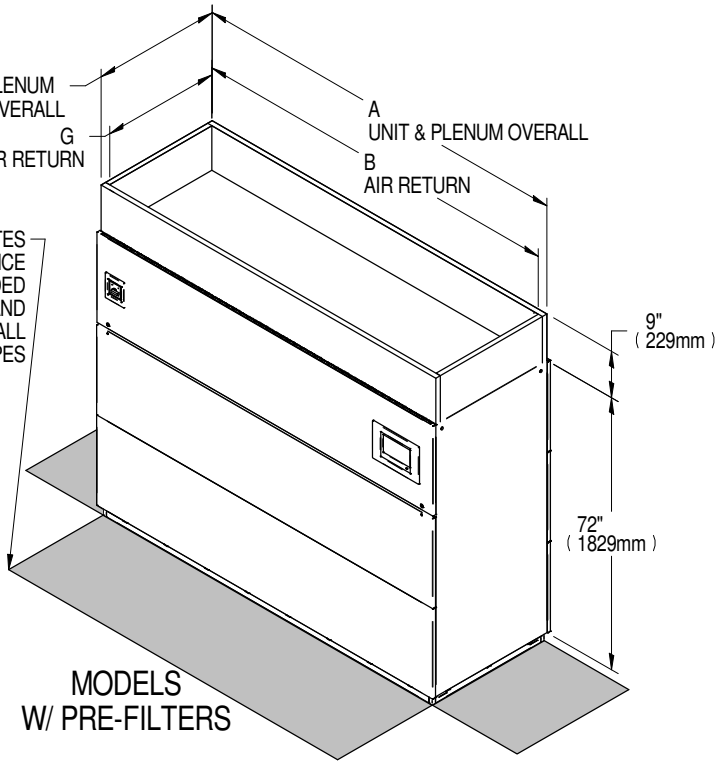
LIEBERT® CW

CABINET DIMENSIONAL DATA
DOWNFLOW MODELS CW038 - CW084 W/ EC FANS



UNIT DIMENSIONAL DATA

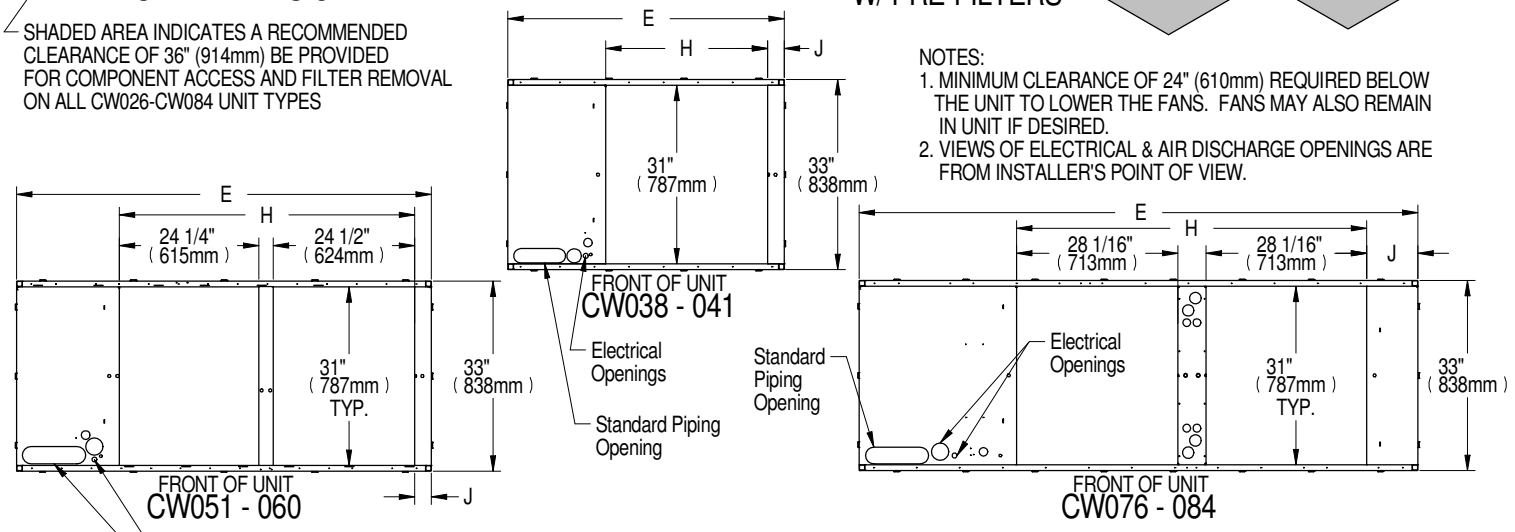
SHADED AREA INDICATES A RECOMMENDED CLEARANCE OF 36" (914mm) BE PROVIDED FOR COMPONENT ACCESS AND FILTER REMOVAL ON ALL CW026-CW084 UNIT TYPES



MODELS
W/ PRE-FILTERS

SHADED AREA INDICATES A RECOMMENDED CLEARANCE OF 36" (914mm) BE PROVIDED FOR COMPONENT ACCESS AND FILTER REMOVAL ON ALL CW026-CW084 UNIT TYPES

NOTES:
1. MINIMUM CLEARANCE OF 24" (610mm) REQUIRED BELOW THE UNIT TO LOWER THE FANS. FANS MAY ALSO REMAIN IN UNIT IF DESIRED.
2. VIEWS OF ELECTRICAL & AIR DISCHARGE OPENINGS ARE FROM INSTALLER'S POINT OF VIEW.

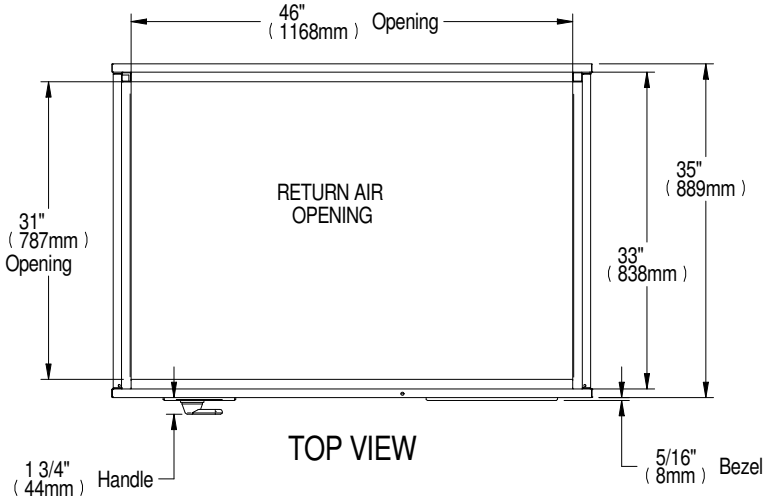


STANDARD PIPING, ELECTRICAL & AIR DISCHARGE OPENINGS

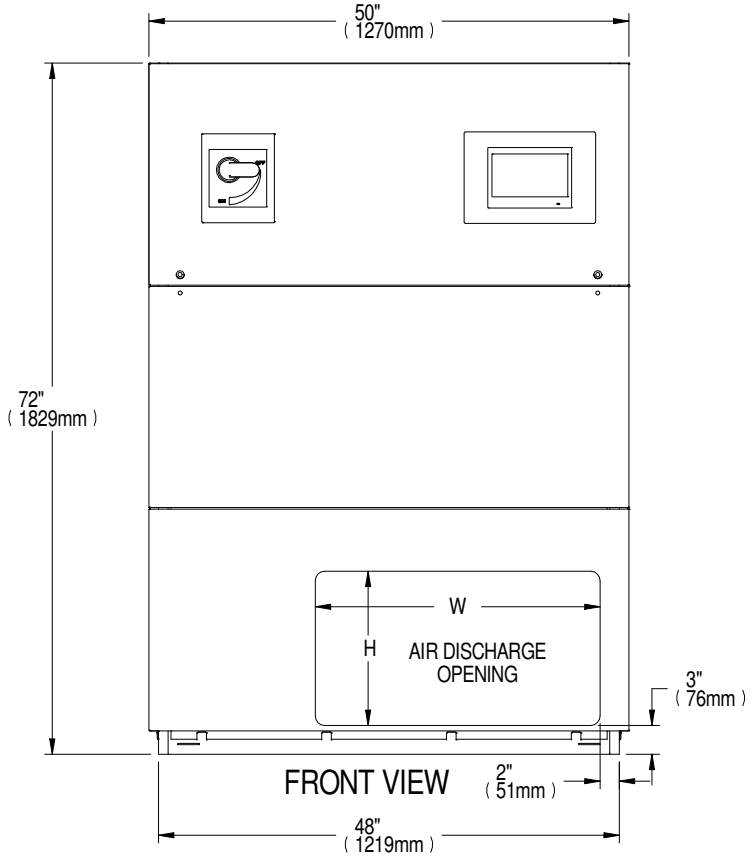
CHILLED WATER MODEL	DIMENSIONAL DATA inches (mm)									NET WT. lb. (kg)
	A	B	C	D	E	F	G	H	J	
CW038	50 (1270)	46 (1168)	35 (889)	32 (813)	48 (1219)	35 5/8 (905)	31 (787)	28 (711)	2 7/8 (73)	840 (381)
CW041										900 (408)
CW051	74 (1880)	70 (1778)			72 (1829)			51 1/4 (1302)		1220 (553)
CW060										1250 (567)
CW076	99 (2515)	95 (2413)			97 (2464)			60 3/4 (1543)	8 7/8 (225)	1440 (653)
CW084										1540 (690)

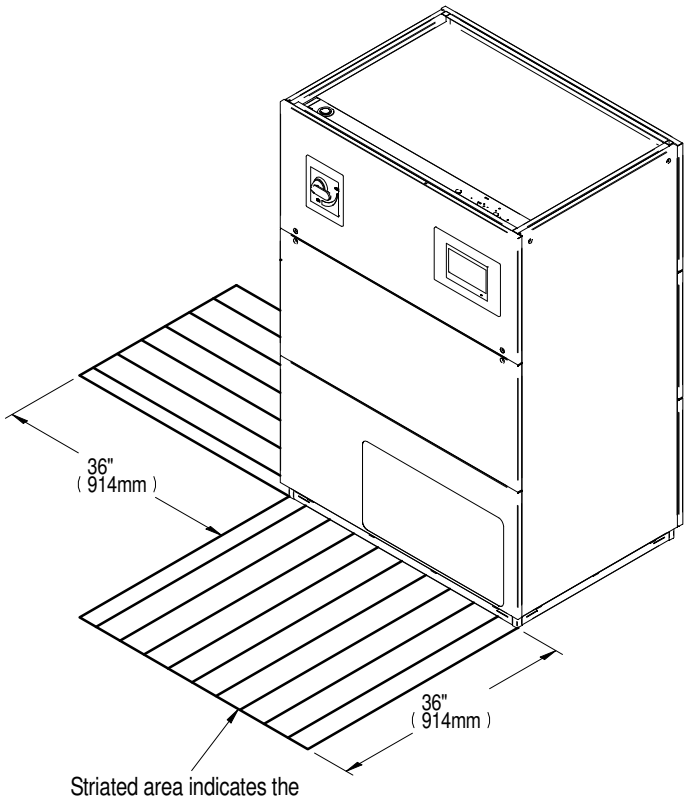
LIEBERT® CW

CABINET DIMENSIONAL DATA
DOWNFLOW CW038 - CW041 W/ EC FANS & FRONT DISCHARGE



Notes:
1. Customer piping and wiring connections
   a) Standard bottom connections require unit to be placed on a minimum of a 9" floorstand.
   b) If unit is to be placed directly on the floor, additional modifications are required to relocate customer connections. Contact your local Vertiv™ Sales Representative.





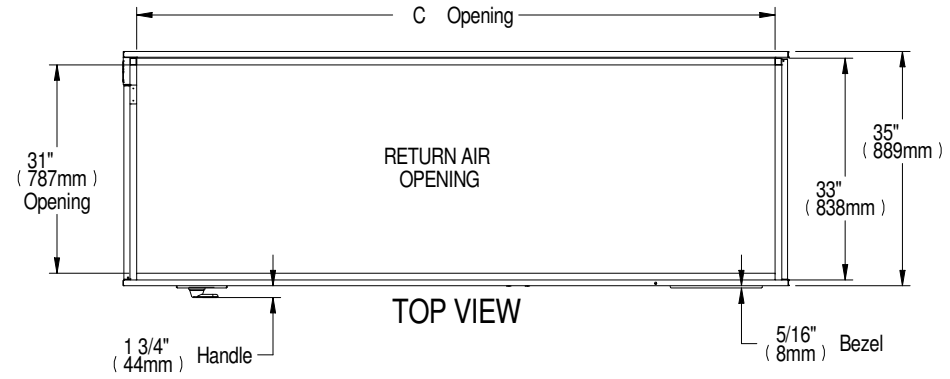
Striated area indicates the recommended minimum clearance to be provided for component access.

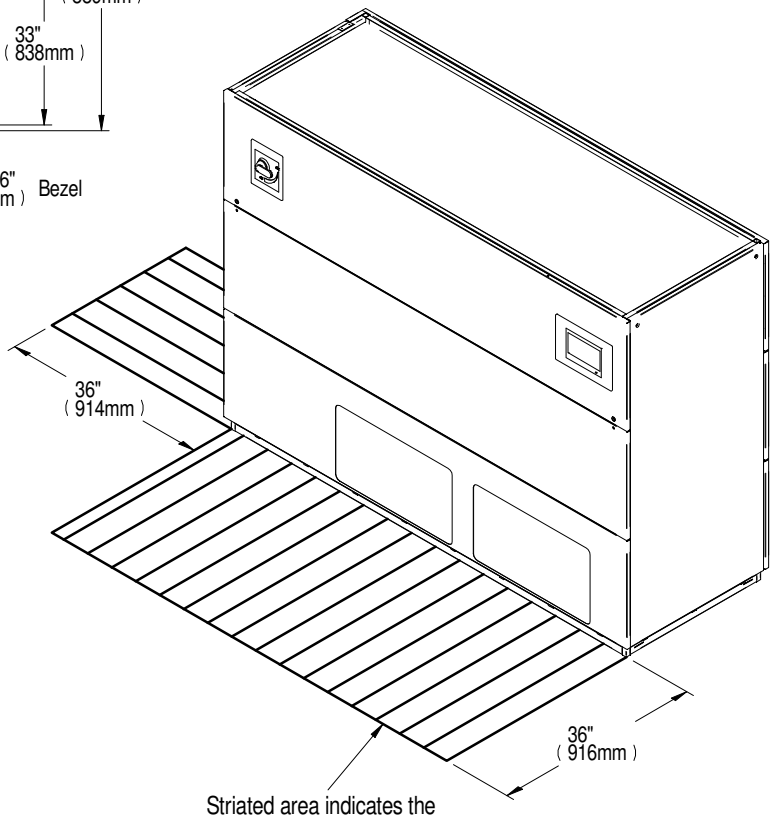
Model	H	W	Dry Weight lbs. (kg)
CW038	16-1/16" (408mm)	29-11/16" (754mm)	840 (381)
CW041			900 (408)

LIEBERT® CW

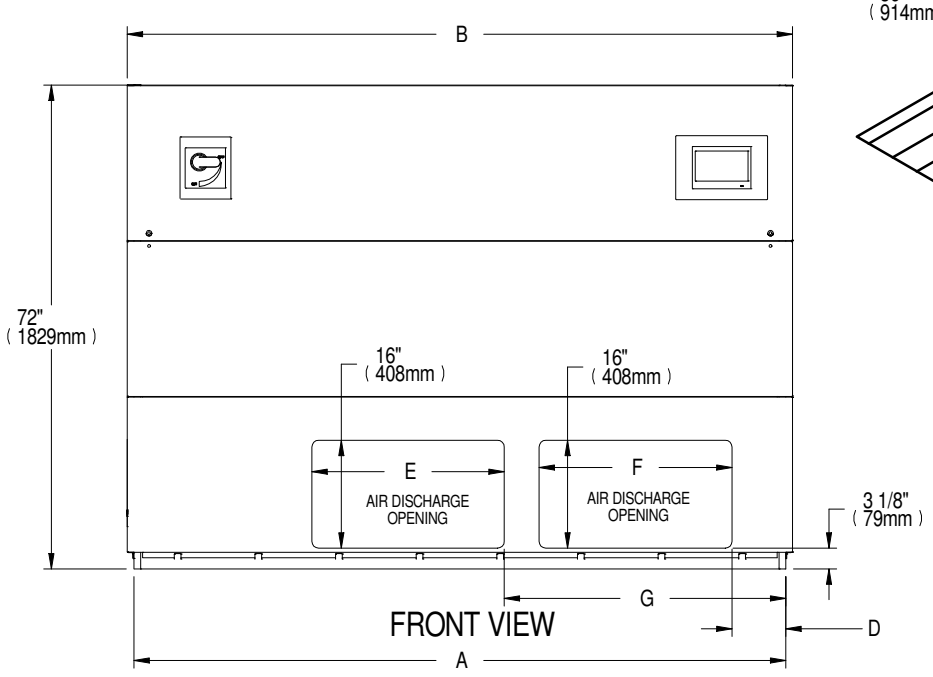
CABINET DIMENSIONAL DATA

DOWNFLOW CW051 - CW084 W/ EC FANS & FRONT DISCHARGE





Striated area indicates the recommended minimum clearance to be provided for component access.

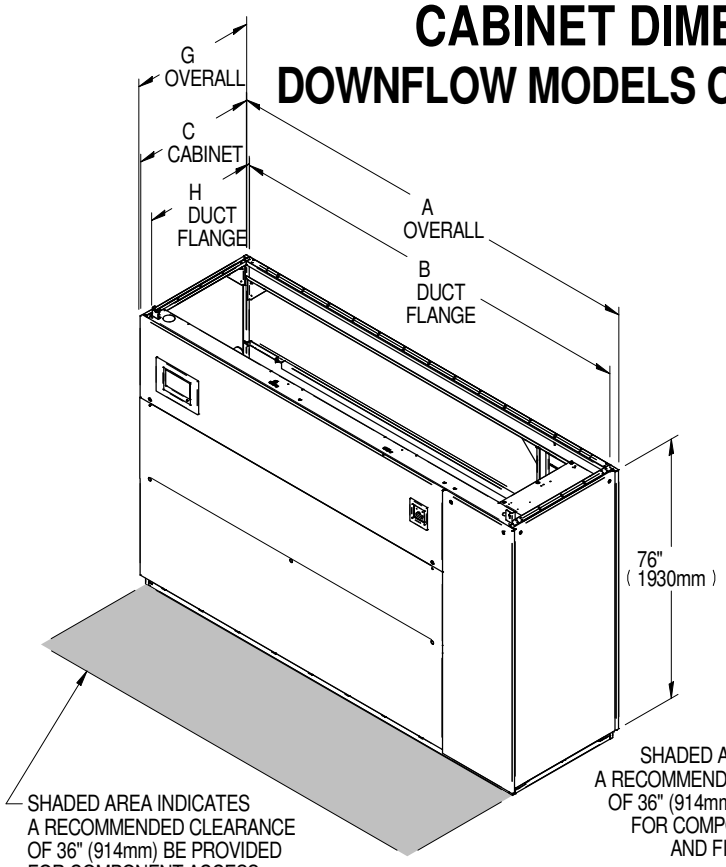


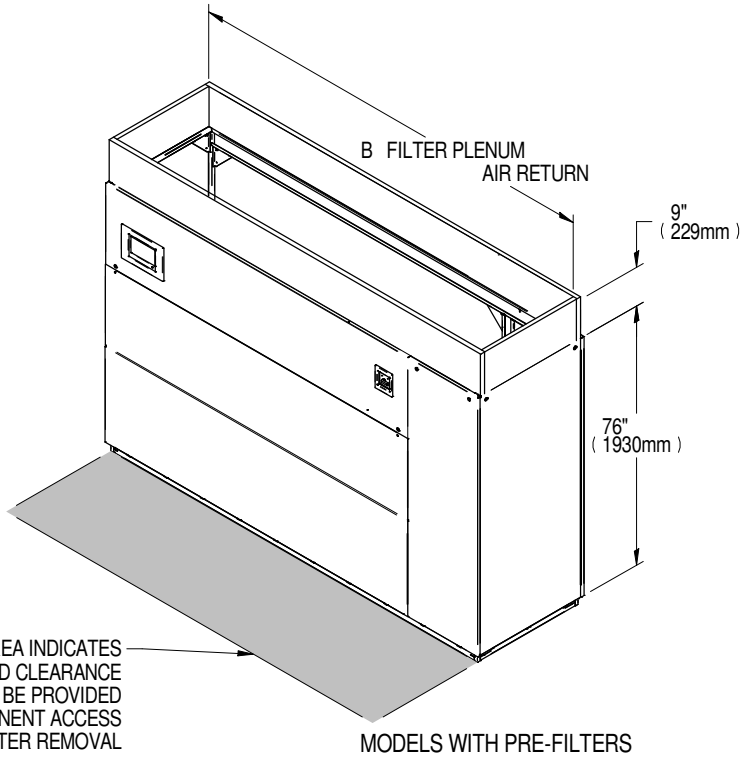
Notes:
1. Customer piping and wiring connections
   a) Standard bottom connections require unit to be placed on a minimum of a 9" floorstand.
   b) If unit is to be placed directly on the floor, additional unit modifications are required to relocate customer connections. Contact your local Vertiv™ Sales Representative.

CHILLED WATER MODEL	**DIMENSIONAL DATA** inches (mm)							**DRY WEIGHT** lbs. (kg)
	A	**B**	**C**	**D**	**E**	**F**	**G**	
CW051	72 (1829)	74 (1880)	70 (1778)	2 (51)	25 (636)	25.3 (643)	30.1 (764)	1220 (553)
CW060								1250 (567)
CW076	97 (2464)	99 (2515)	95 (2413)	8 (203)	28.6 (727)	28.8 (730)	41.9 (1064)	1440 (653)
CW084								1540 (690)

CABINET DIMENSIONAL DATA

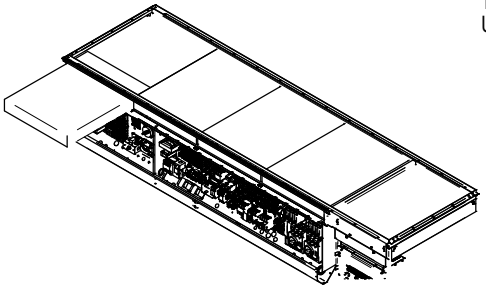
DOWNFLOW MODELS CW106 - CW114 W/ EC FANS



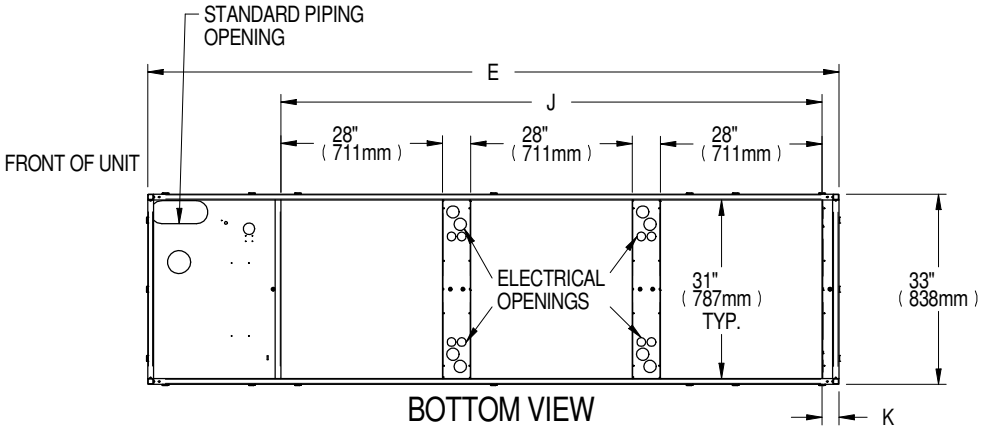


MODELS WITH PRE-FILTERS

NOTE:
MINIMUM CLEARANCE OF 24" (610mm) REQUIRED BELOW THE UNIT TO LOWER FANS. FANS MAY ALSO REMAIN IN UNIT IF DESIRED.



NOTE:
1. FILTERS ARE ACCESSIBLE THRU FRONT OF UNIT. ACCESS PANEL LOCATED ABOVE ELECTRICAL PANEL.
2. ELECTRICAL CONNECTIONS CAN BE MADE FROM TOP OR BOTTOM OF UNIT.



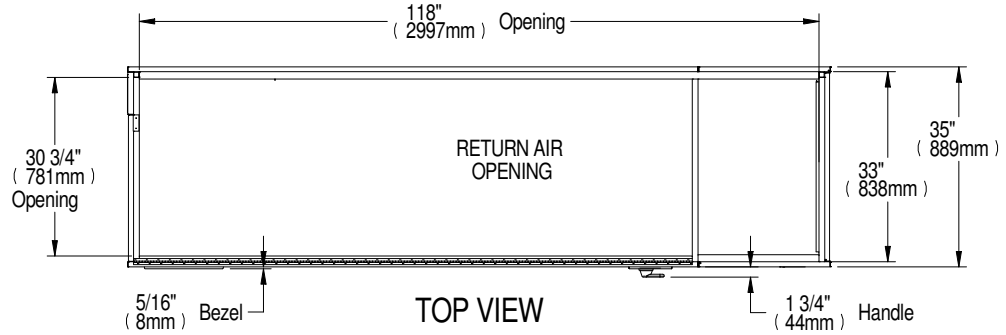
BOTTOM VIEW
FRAME ONLY

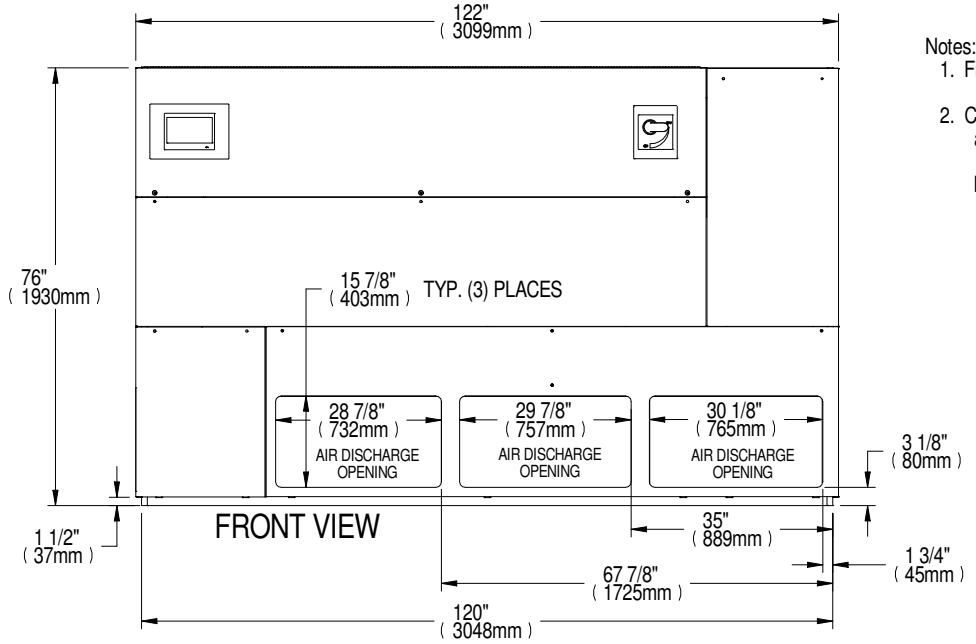
CHILLED WATER MODEL	DIMENSIONAL DATA inches (mm)										NET WEIGHT lbs. (kg)
	A	B	C	D	E	F	G	H	J	K	
CW106	122 (3099)	118 (2997)	35 (889)	31 (787)	120 (3048)	33 (838)	34-3/4 (883)	32 (813)	94 (2388)	2.88 (73)	1785 (810)
CW114											1925 (873)

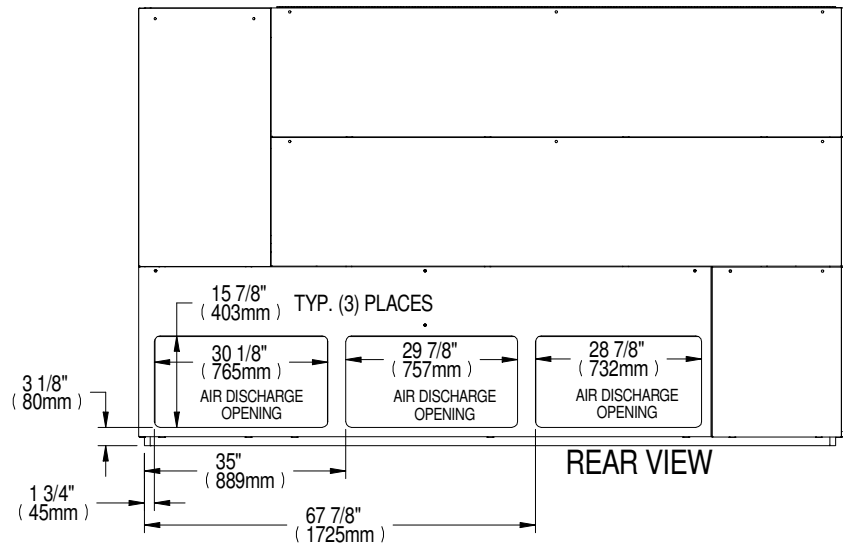
LIEBERT® CW

CABINET DIMENSIONAL DATA

DOWNFLOW CW106 - CW114 W/ EC FANS & FRONT DISCHARGE

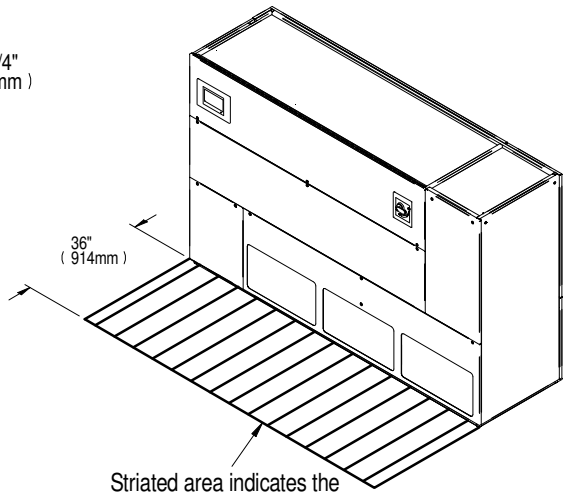






Notes:

1. Filters are accessible from front of unit only.
2. Customer piping and wiring connections
   a) Standard bottom connections require unit to be placed on a minimum of a 9" floorstand.
   b) If unit is to be placed directly on the floor, additional unit modifications are required to relocate customer connections. Contact your local Vertiv™ Sales Representative.



Striated area indicates the recommended minimum clearance to be provided for component access.

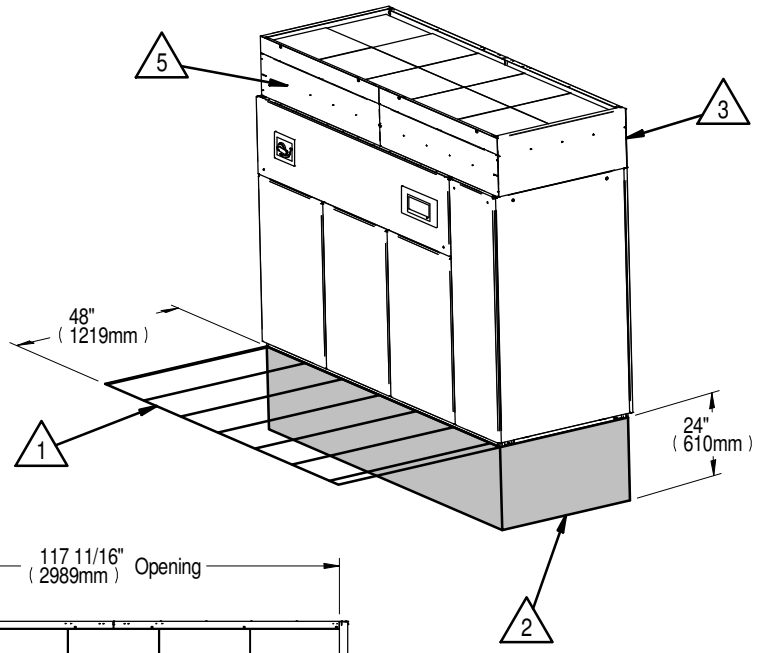
Model	Dry Weight lbs. (kg)
CW106	1785 (810)
CW114	1925 (873)

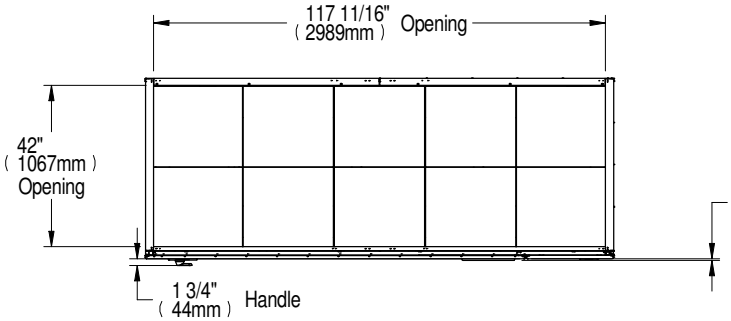
LIEBERT® CW

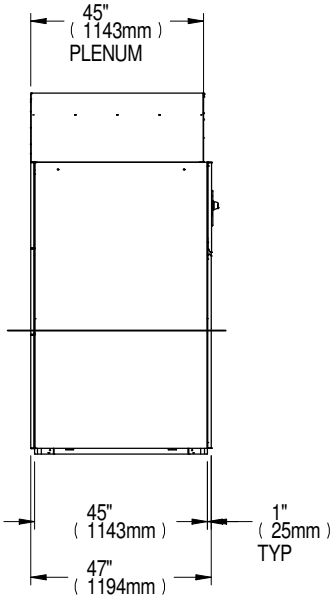
CABINET DIMENSIONAL DATA
DOWNFLOW CW146 & CW181 W/ EC FANS AND FILTER PLENUM
(plenum shipped separately)

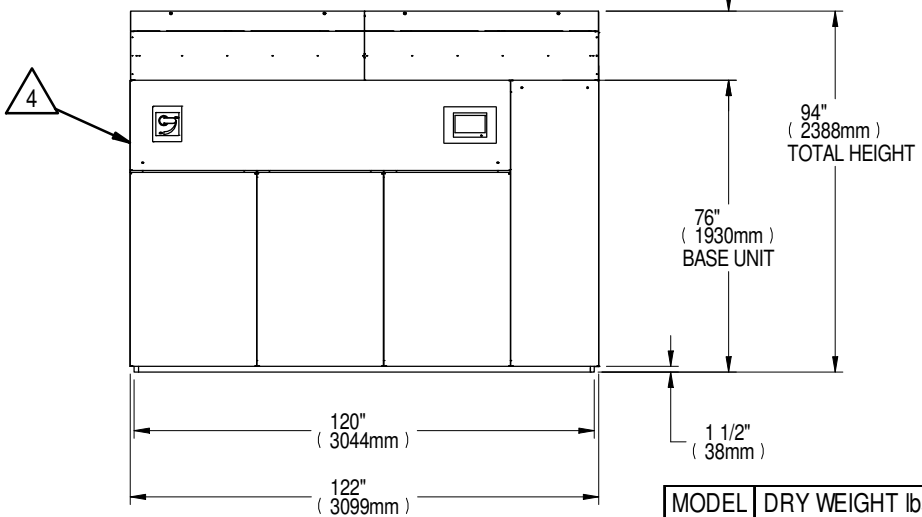
Notes:

1. Striated area indicates the recommended minimum clearance to be provided for component access.
2. Shaded area indicates the required minimum clearance below the unit to lower the fans into the floor. Fans may also remain in their shipped position if desired.
3. Filter Plenum shipped separately
4. CW146 or CW181 base unit
5. Filters are removed through the front of the plenum.
6. Reference DPN001693 for the electrical and plumbing requirements.







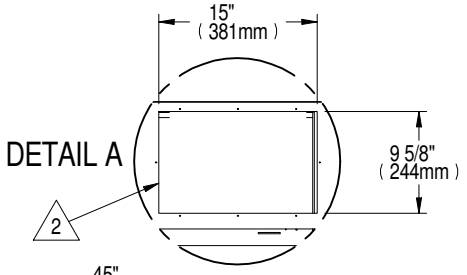


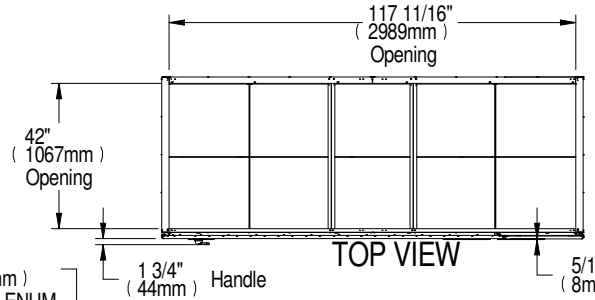
MODEL	DRY WEIGHT lbs. (kg)
CW146	2520 (1143)
CW181	

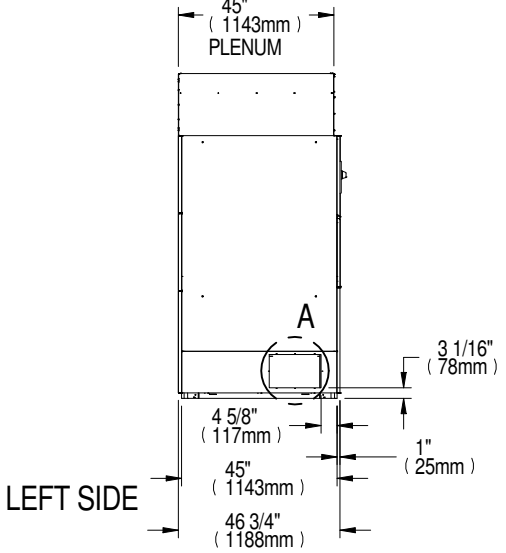
LIEBERT® CW

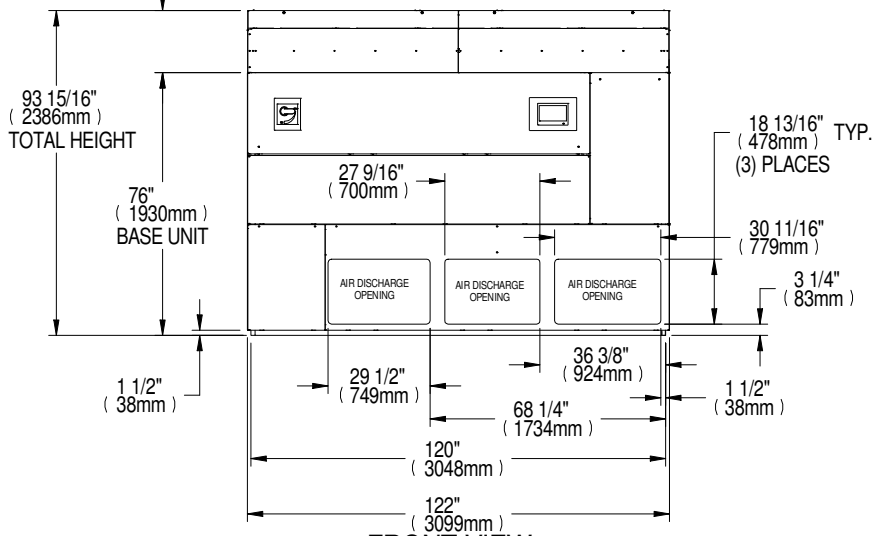
CABINET DIMENSIONAL DATA

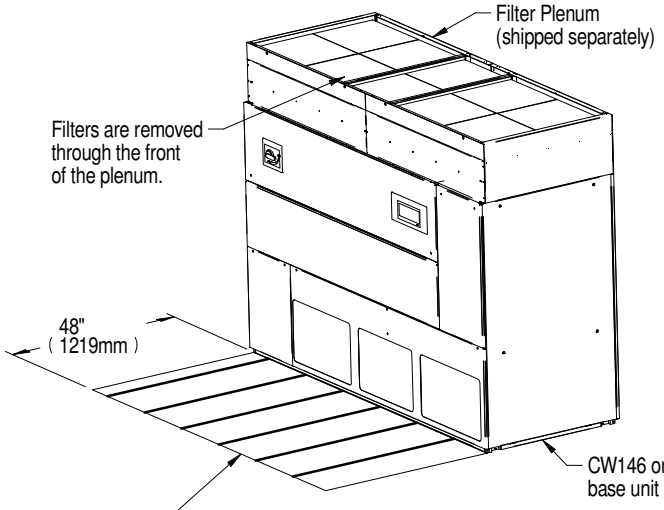
DOWNFLOW CW146 & CW181 W/ EC FANS & FRONT DISCHARGE

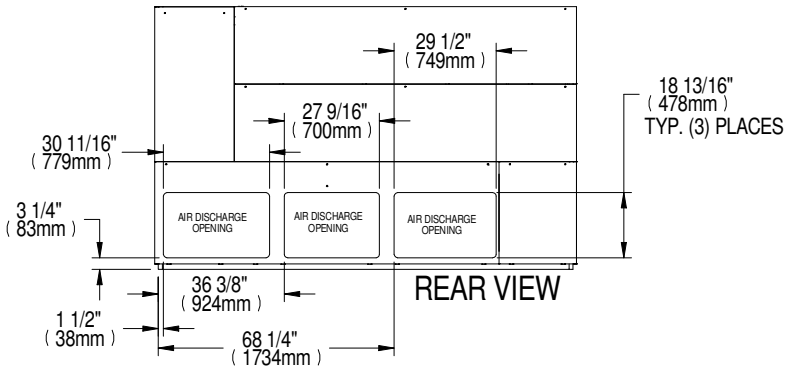












Notes:

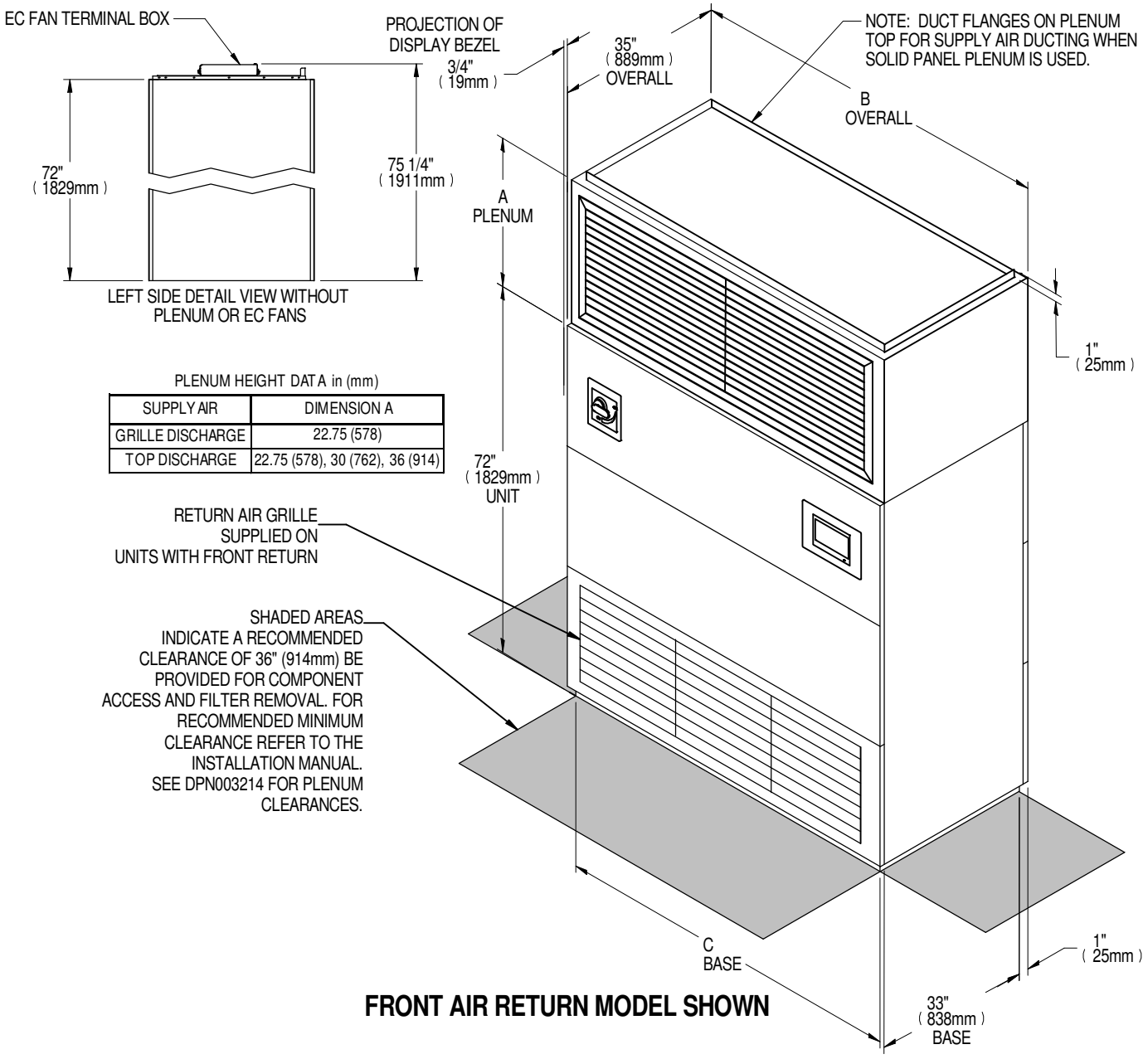
1. Standard bottom connections require unit to be placed on a minimum of 9" floorstand.

2. If unit is to be placed on the floor an opening is provided in front left end panel for piping and high voltage wire routings (See Detail A).
   - customer must drill holes in right end panel to route low volt connections to standard location (must be routed separate from any high voltage wires).

MODEL	DRY WEIGHT lbs. (kg)
CW146	2520 (1143)
CW181	

CABINET DIMENSIONAL DATA

UPFLOW MODELS CW038 - CW084 W/ EC FANS



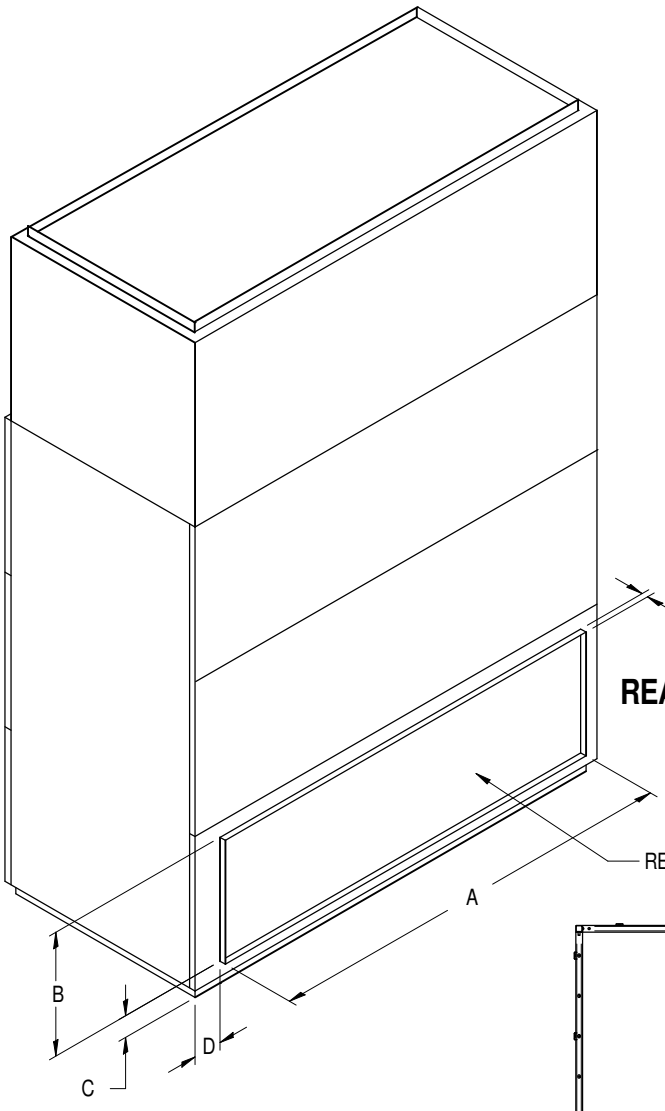
PLENUM HEIGHT DATA in (mm)

SUPPLY AIR	DIMENSION A
GRILLE DISCHARGE	22.75 (578)
TOP DISCHARGE	22.75 (578), 30 (762), 36 (914)

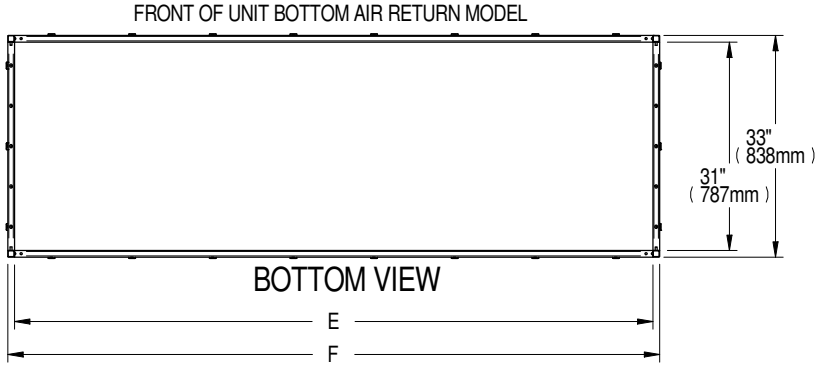
FRONT AIR RETURN MODEL SHOWN

UNIT DIMENSIONAL DATA in. (mm)			NET WEIGHT lbs. (kg)	
MODEL	B	C	UNIT ONLY	UNIT W/ PLENUM & FANS
CW038	50 (1270)	48 (1219)	542 (246)	774 (351)
CW041			589 (267)	821 (372)
CW051	74 (1880)	72 (1829)	755 (342)	1118 (507)
CW060			827 (375)	1190 (540)
CW076	99 (2515	97 (2464)	1141 (518)	1566 (710)
CW084			1239 (562)	1664 (755)

CABINET DIMENSIONAL DATA
UPFLOW MODELS CW038 - CW084 W/ EC FANS

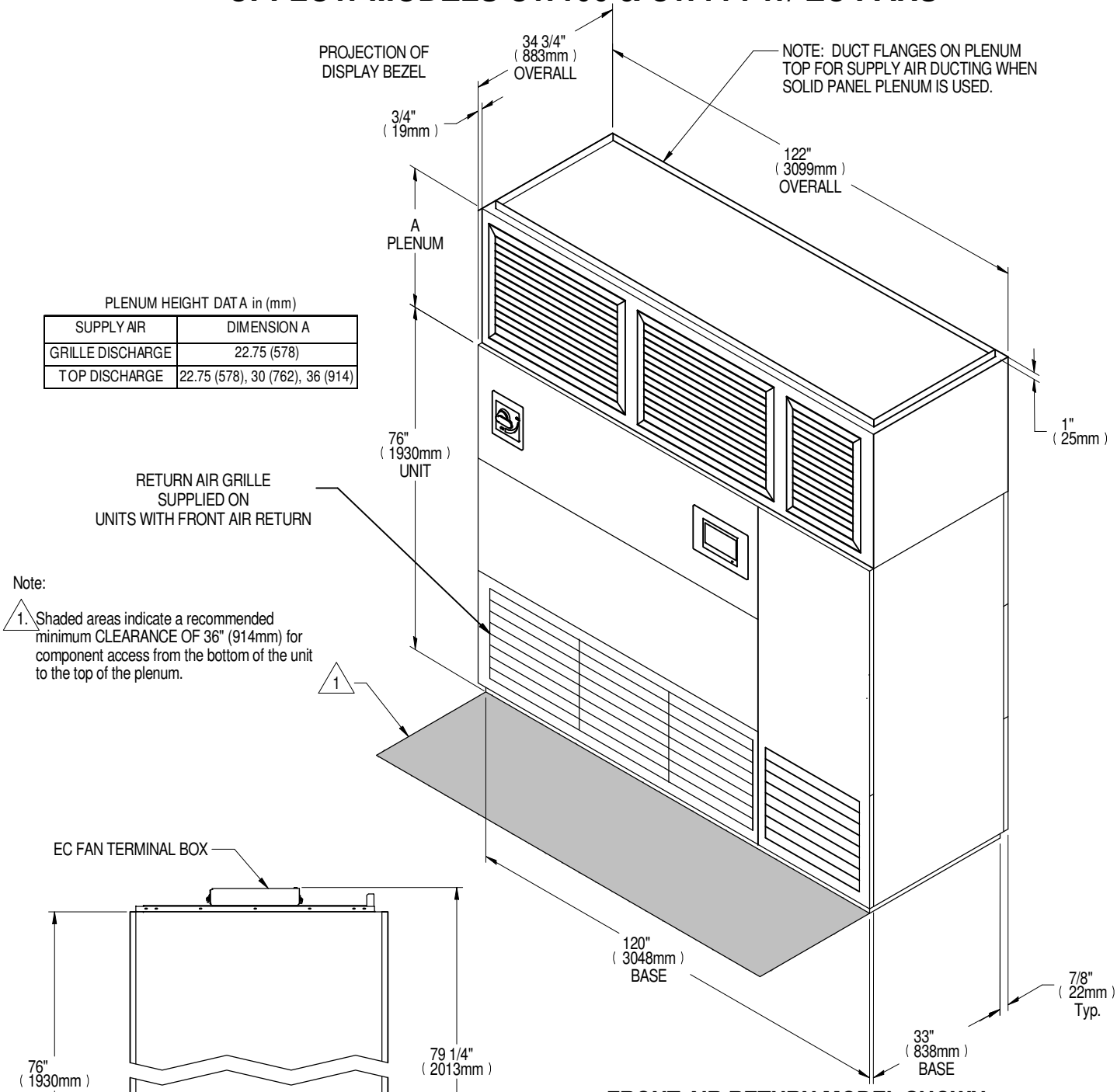


REAR AIR RETURN MODEL



CHILLED WATER MODEL	Dimensional Data in. (mm)					
	A	B	C	D	E	F
CW038	44 (1118)	18 (457)	5 (127)	3 (76)	46 (1168)	48 (1219)
CW041						
CW051	68 (1727)	20 (508)	4 (102)		70 (1778)	72 (1829)
CW060						
CW076	86 (2184)	18 (457)	5 (127)	6-1/2 (165)	95 (2413)	97 (2464)
CW084						

CABINET DIMENSIONAL DATA
UPFLOW MODELS CW106 & CW114 W/ EC FANS



PLENUM HEIGHT DATA in (mm)

SUPPLY AIR	DIMENSION A
GRILLE DISCHARGE	22.75 (578)
TOP DISCHARGE	22.75 (578), 30 (762), 36 (914)

Note:

1. Shaded areas indicate a recommended minimum CLEARANCE OF 36" (914mm) for component access from the bottom of the unit to the top of the plenum.

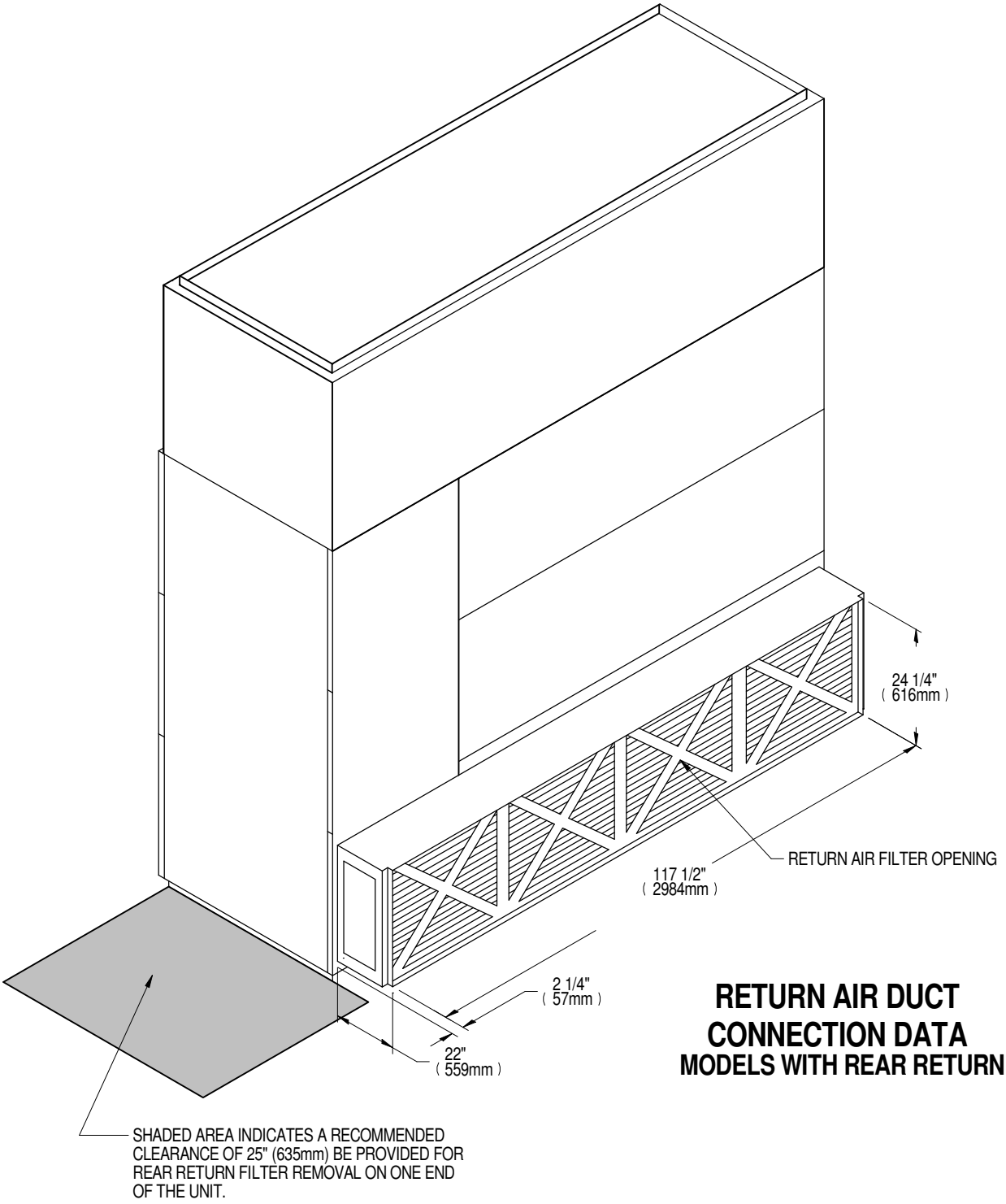
LEFT SIDE DETAIL VIEW WITHOUT PLENUM OR EC FANS

FRONT AIR RETURN MODEL SHOWN

Model	Net Wt lbs. (kg)	
	Unit Only	Unit w/ Plenum & Fans
CW106	1240 (562)	1827 (829)
CW114	1375 (624)	1962 (890)

CABINET DIMENSIONAL DATA

UPFLOW MODELS CW106 & CW114 W/ EC FANS



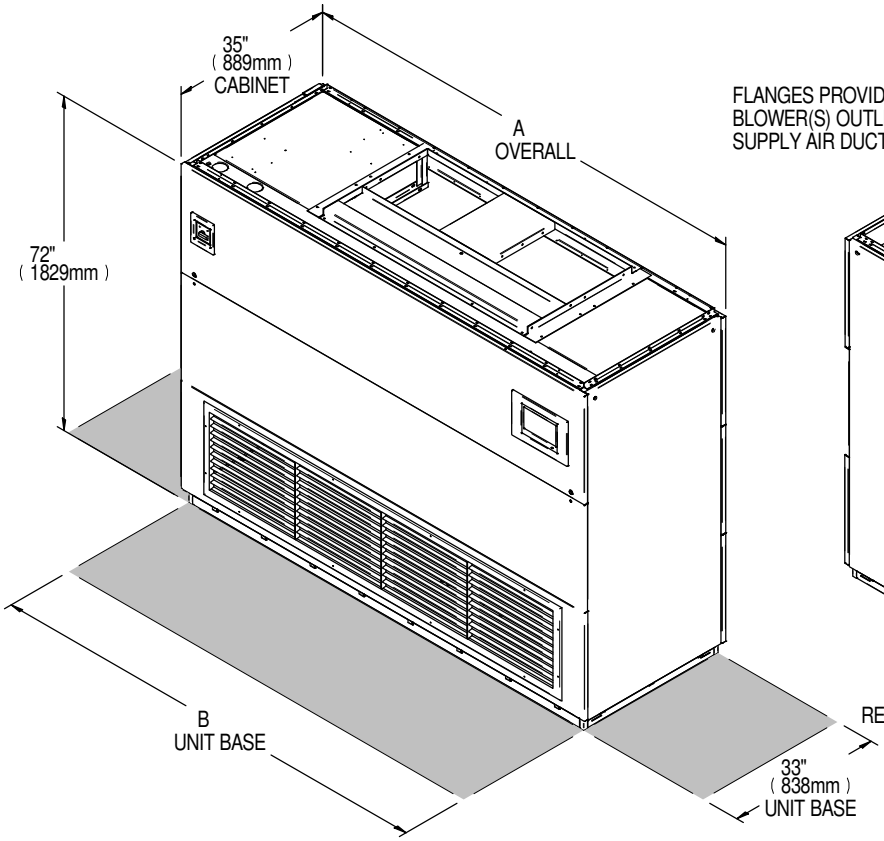
RETURN AIR DUCT CONNECTION DATA

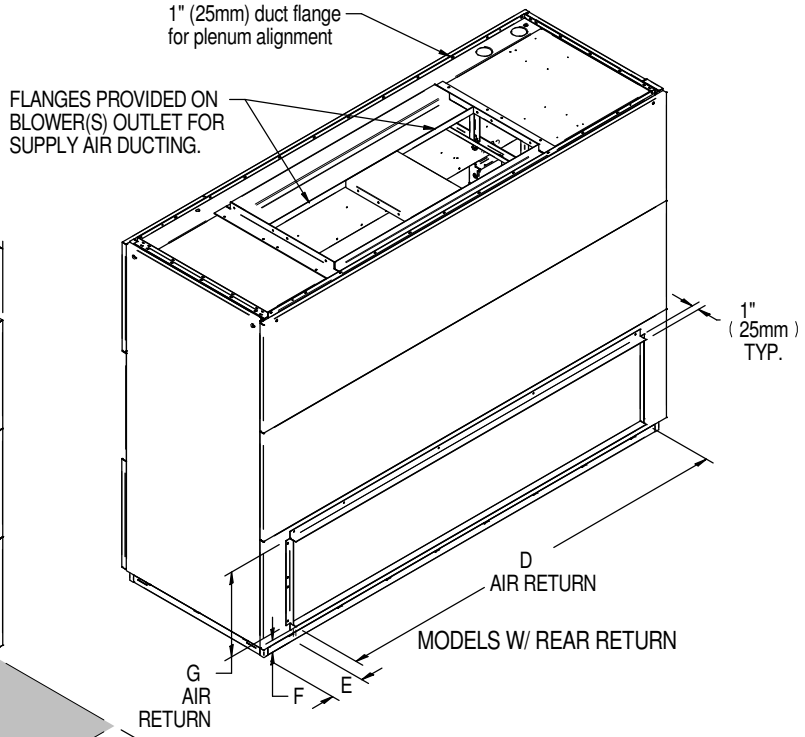
MODELS WITH REAR RETURN

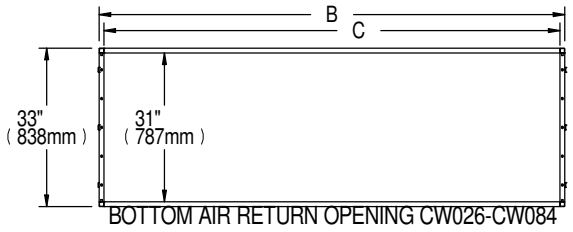
LIEBERT® CW

CABINET DIMENSIONAL DATA

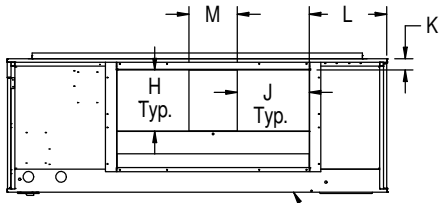
UPFLOW MODELS CW038 THRU CW084 W/ FORWARD CURVED BLOWERS



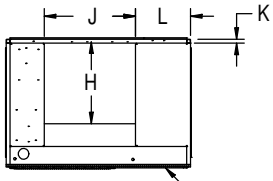




BOTTOM AIR RETURN OPENING CW026-CW084



CW051-084



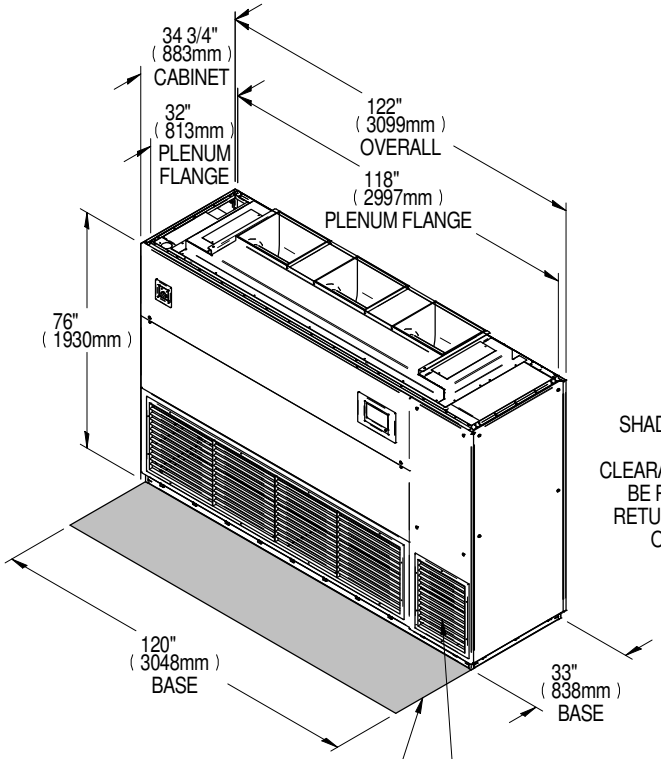
CW038-041

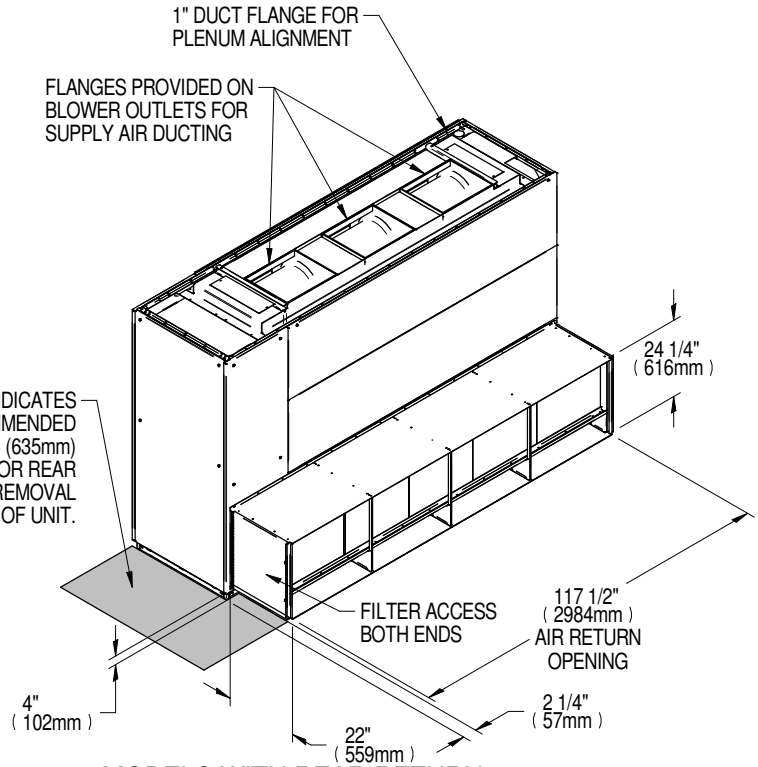
Notes:
1. Air Grille may be supplied on units with front or rear return air.
2. Shaded areas indicate a recommended clearance of 36" (914mm) be provided for component access and filter removal.
3. A Return Air Grille may be ordered in place of the duct flange on units with rear return air (see specification sheet for option supplied).

MODEL	NUMBER OF BLOWERS	DIMENSIONAL DATA inches (mm)												NET WEIGHT lb. (kg)
		A	B	C	D	E	F	G	H	J	K	L	M	
CW038	1	50 (1270)	48 (1219)	46 (1168)	44 (1118)	3 (76)	5 (127)	18 (457)	15-7/8 (403)	18-5/8 (473)	1 (25)	19-1/2 (495)	N/A	795 (361)
CW041														855 (388)
CW051	2	74 (1880)	72 (1289)	70 (1778)	68 (1727)		4 (102)	20 (508)		14-3/4 (375)			11 (279)	1090 (494)
CW060														1155 (524)
CW076		99 (2515)	97 (2464)	95 (2413)	86 (2184)	6.50 (165)	5 (127)	18 (457)		18-5/8 (473)	2 (51)		12-5/8 (321)	1320 (599)
CW084														1420 (644)

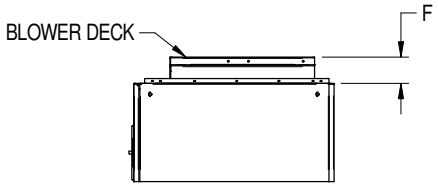
LIEBERT® CW

CABINET DIMENSIONAL DATA
UPFLOW MODELS CW106, CW114 W/ FORWARD CURVED BLOWERS

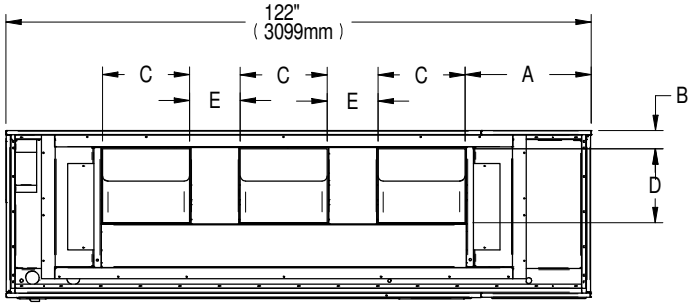




MODELS WITH REAR RETURN



RIGHT SIDE OF UNIT
FRONT OR REAR
RETURN AIR

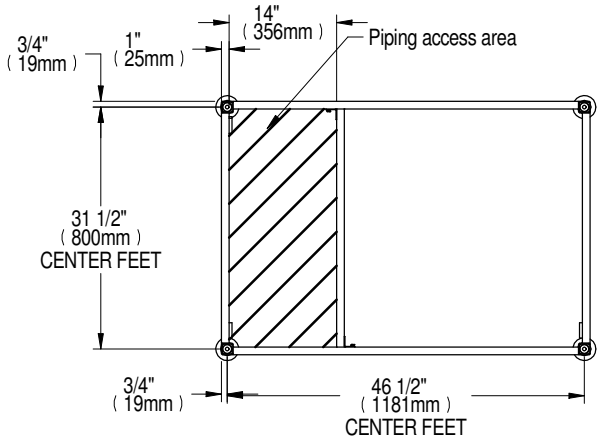


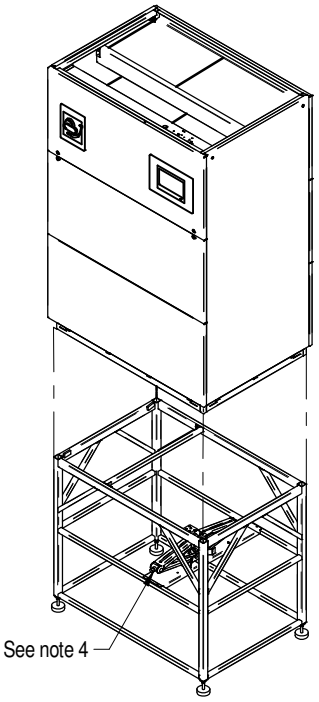
FRONT OF UNIT

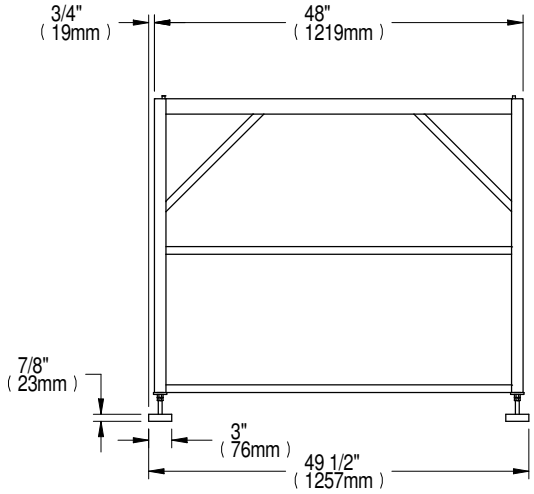
MODEL	BLOWER	SUPPLY	MOTOR HP	DIMENSIONAL DATA inches (mm)						NET WT. lbs. (kg)
				A	B	C	D	E	F	
CW106 CW114	15 x 15	TOP FRONT	10-15	26-1/4 (667)	2-3/4 (70)	18-5/8 (473)	15-7/8 (403)	10 (254)	4-1/2 (114)	1785 (810)
		TOP REAR			11-1/2 (292)					
	15 x 11	TOP FRONT	10-15	28-1/4 (718)	2-3/4 (70)	14 3/4 (375)				1925 (873)
			20							
		TOP REAR	10-20		11-1/2 (292)					

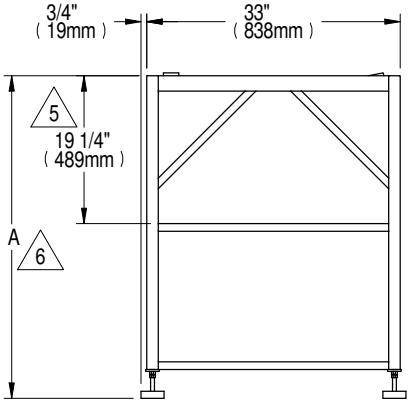
LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA
DOWNFLOW MODELS CW038 & CW041 W/ EC FANS







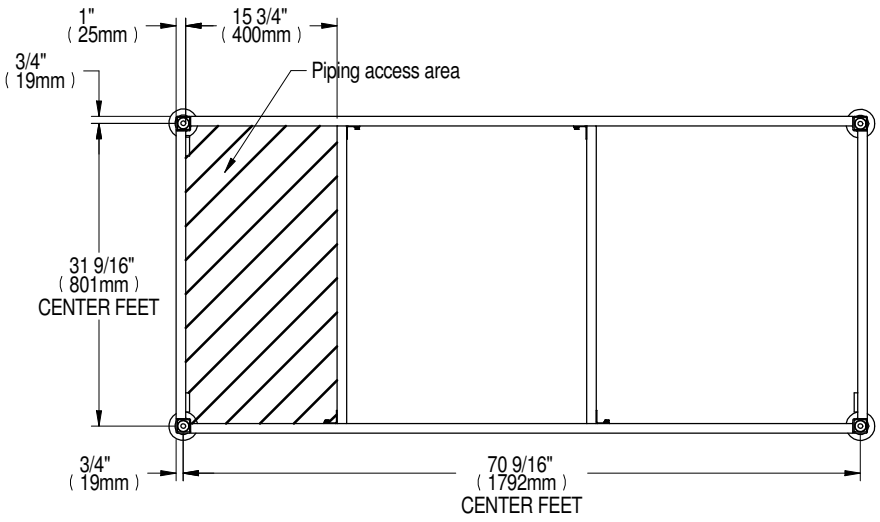


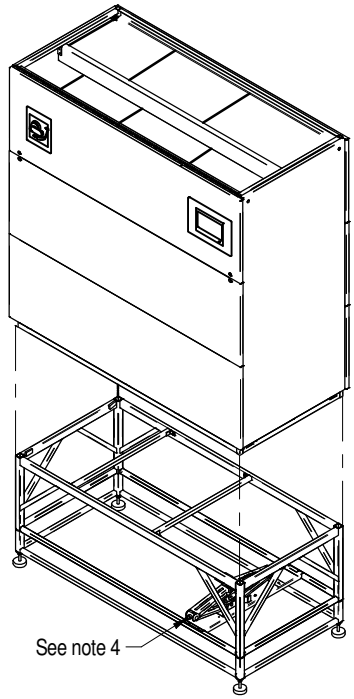
NOTE:
1. This floor stand should be used when EC fans are intended to be lowered under a raised floor. The standard Liebert® CW floor stand can be used "if" the fans are to remain in their original raised position.
2. All paneled sides of unit overhang floorstand 1" (25mm).
3. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical for lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.
4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed.
5. Not applicable to 24" high floorstand.
6. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

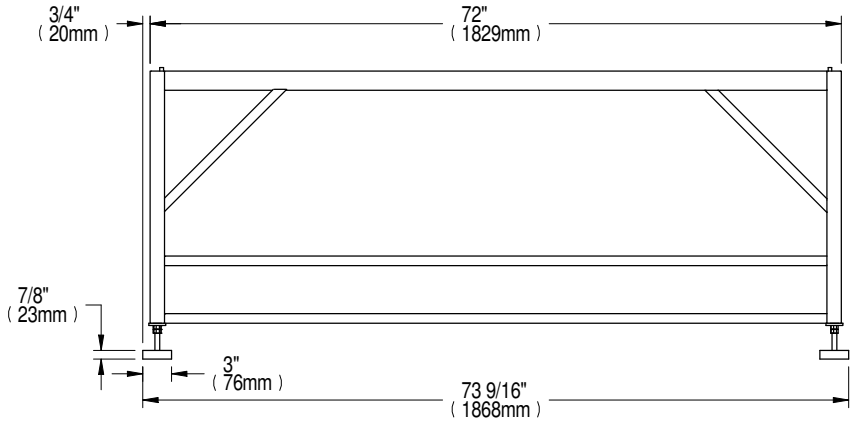
Height in (mm)
A 6
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

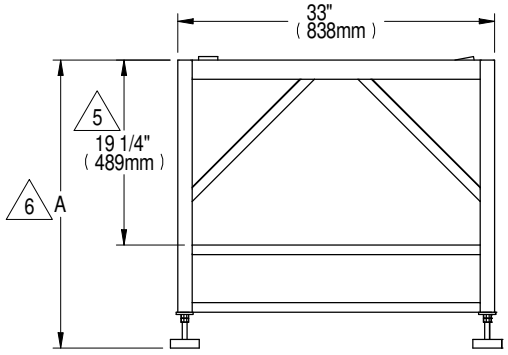
LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA
DOWNFLOW MODELS CW051 & CW060 W/ EC FANS









NOTE:
1. This floor stand should be used when EC fans are intended to be lowered under a raised floor. The standard Liebert® CW floor stand can be used if the fans are to remain in their original raised position.
2. All paneled sides of unit overhang floorstand 1" (25mm).
3. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical for lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.
4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed.

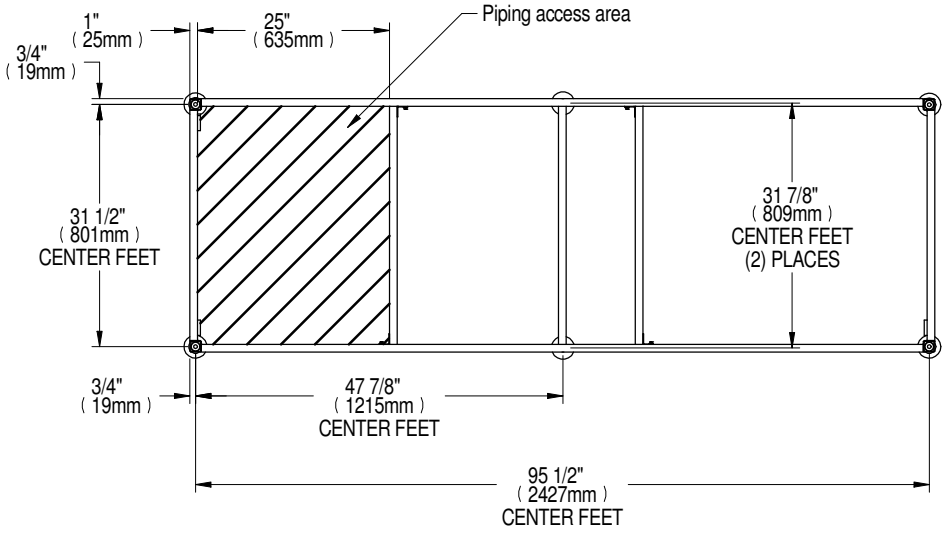
5. Does not apply to 24 " high floorstand.

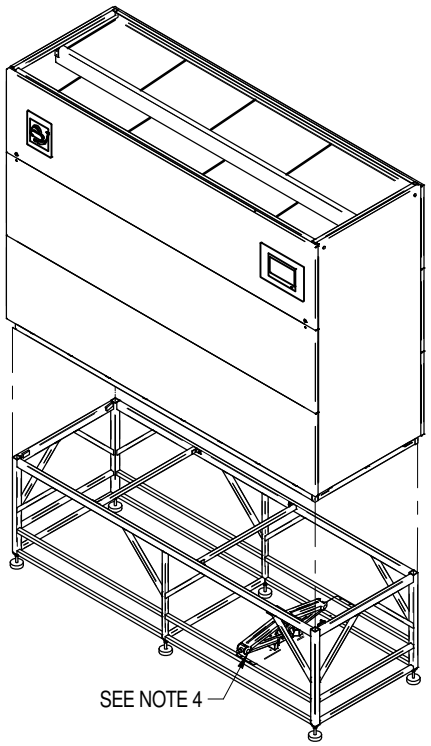
6. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

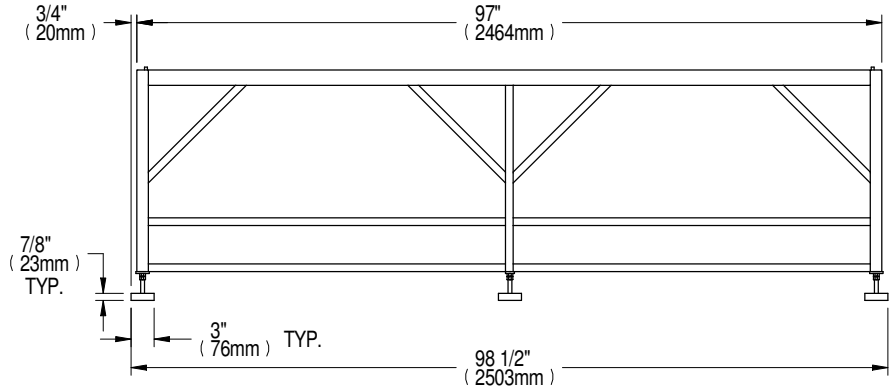
Height in (mm)
A 6
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

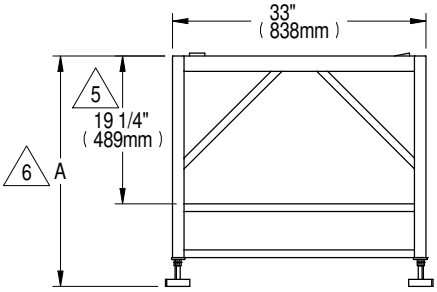
LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA
DOWNFLOW MODELS CW076 & CW084 W/ EC FANS









NOTE:

1. This floor stand should be used when EC fans are intended to be lowered under a raised floor. The standard Liebert® CW floor stand can be used "if" the fans are to remain in their original raised position.
2. All paneled sides of unit overhang floorstand 1" (25mm).
3. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical for lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.
4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed.

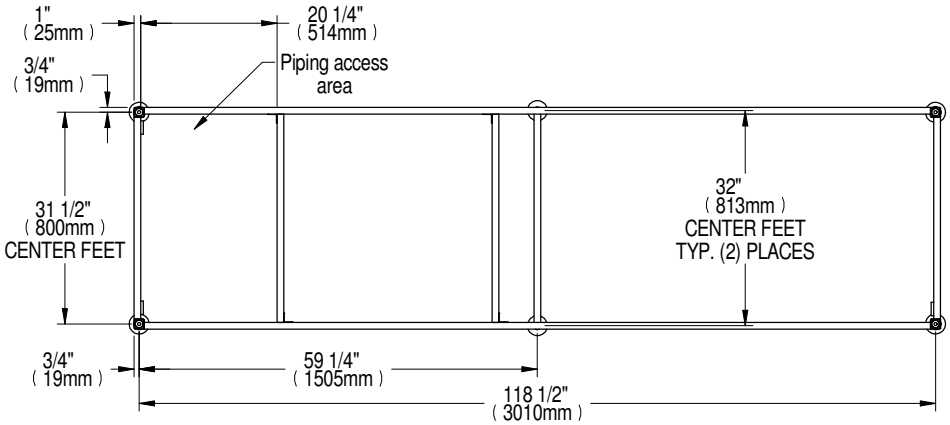
5. Does not apply to 24" high floorstand.

6. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

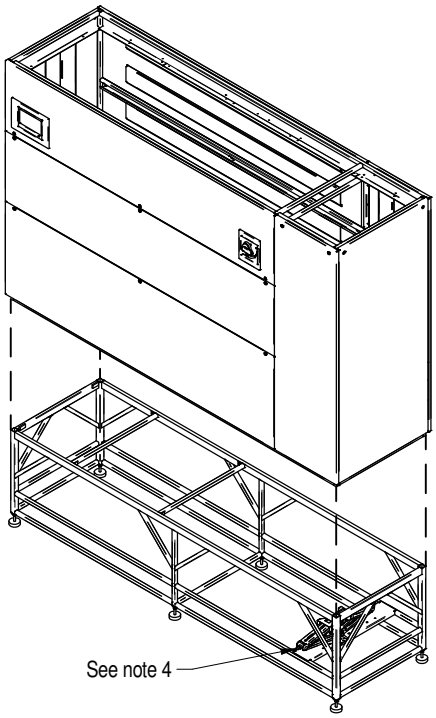
Height in (mm)
A 6
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

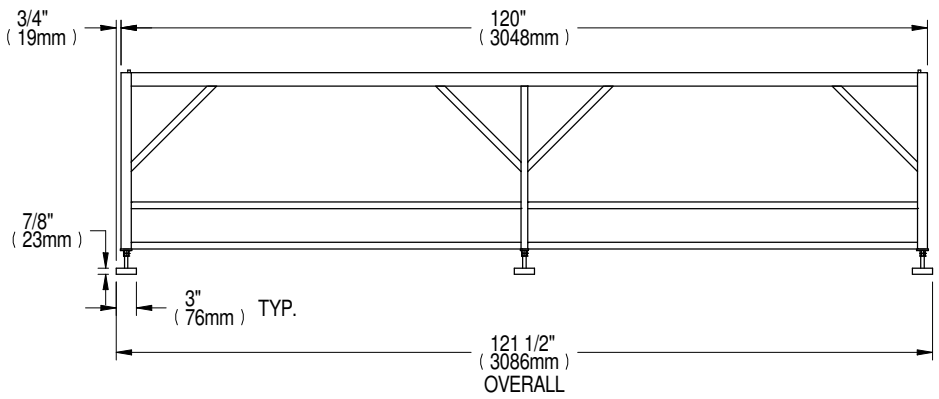
LIEBERT® CW

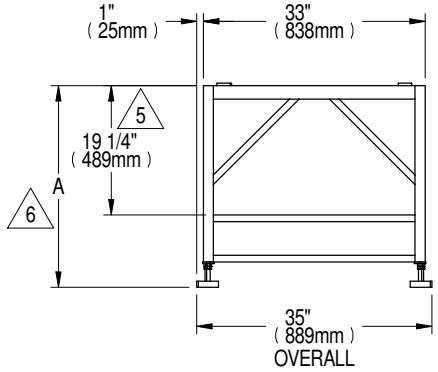
FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA
DOWNFLOW MODELS CW106 & CW114 W/ EC FANS



SUPPORT FEET CENTERS







NOTE:

1. This floor stand should be used when EC fans are intended to be lowered into the floor stand. The standard Liebert® CW floor stand can be used "if" the fans are to remain in their original raised position.
2. All paneled sides of unit overhang floorstand 1" (25mm).
3. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical for lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.
4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed.

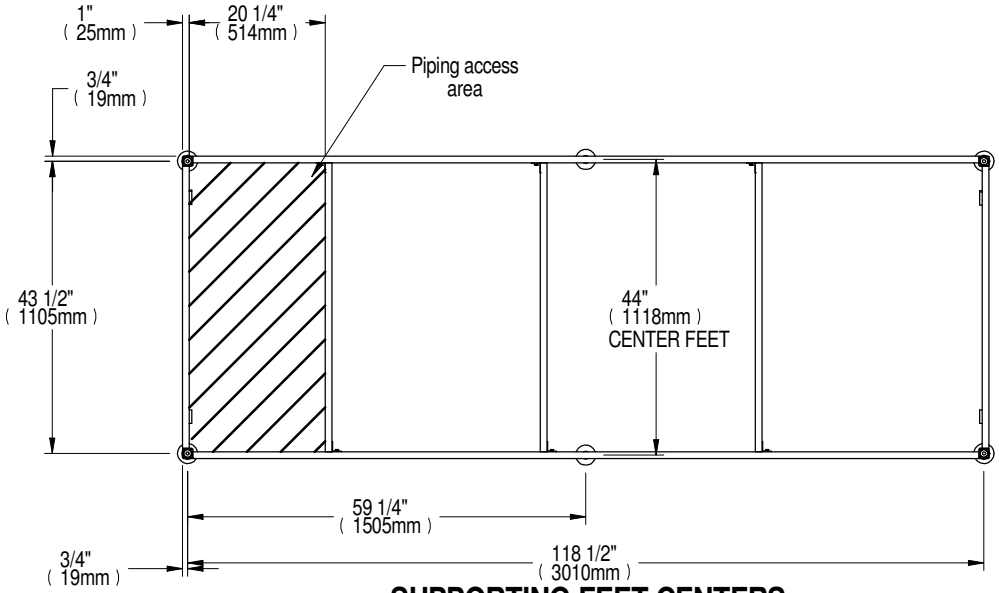
△5. Does not apply to 24" high floorstand.

6. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

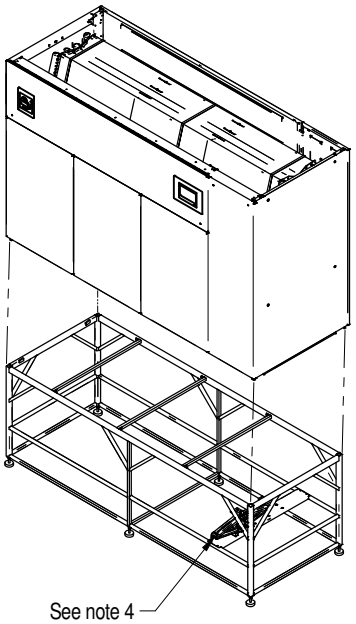
Height in (mm)
A*
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

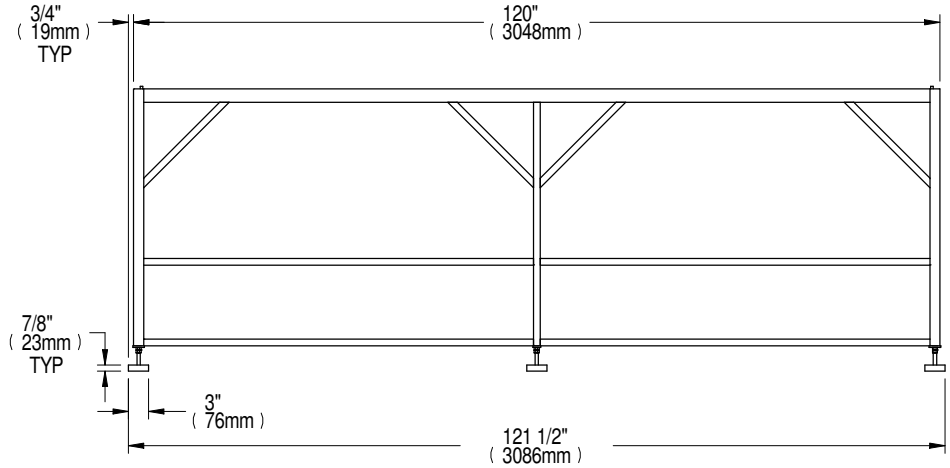
LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA
DOWNFLOW MODELS CW146 & CW181 W/ EC FANS

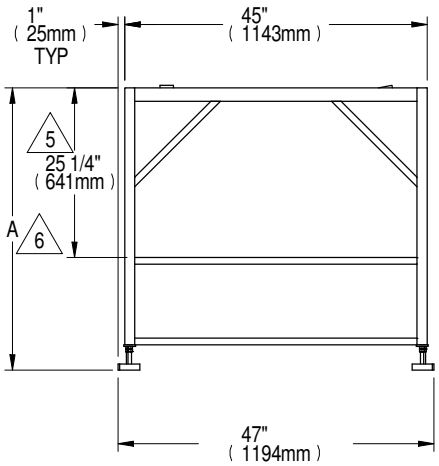


SUPPORTING FEET CENTERS





OVERALL WIDTH



OVERALL DEPTH

NOTE:

1. This floor stand should be used when EC fans are intended to be lowered into the floor stand. The standard Liebert® CW floor stand can be used "if" the fans are to remain in their original raised position.
2. All paneled sides of unit overhang floorstand 1" (25mm).
3. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical for lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.
4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed.

5. Does not apply to 24" & 30" high floorstands.

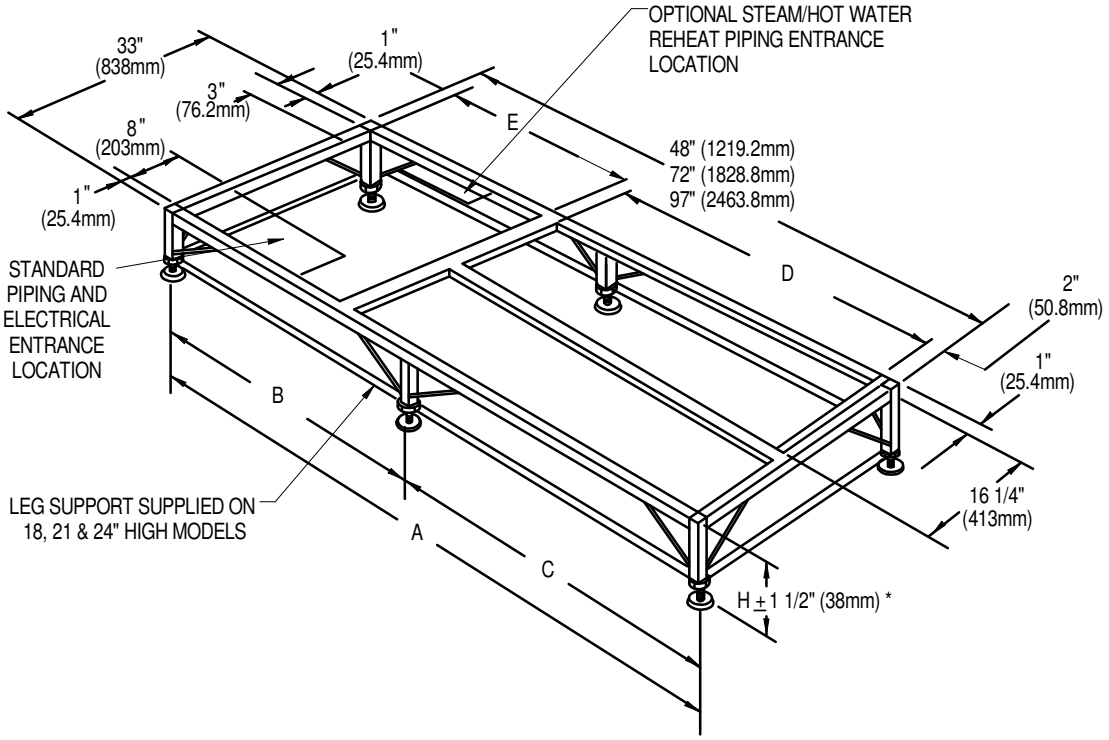
6. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

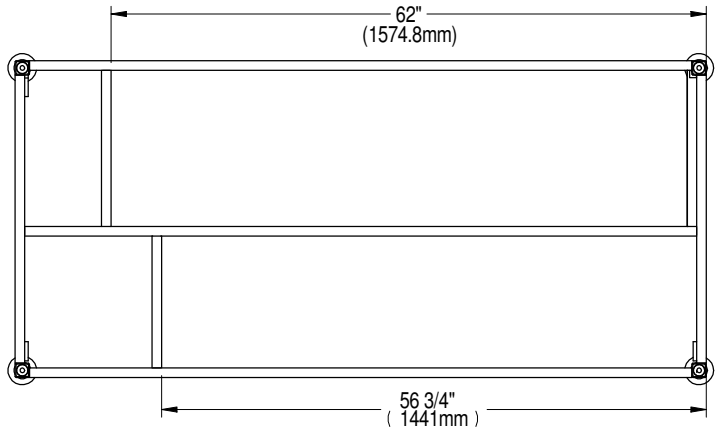
Height in (mm)
A 6
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA

CW038-084 UPFLOW MODELS





CROSS-BRACING LOCATION FOR 72" FRAMES ONLY

Dimensional Data in. (mm)						
Model	Overall Width of Unit	A	B	C	D	E
CW038, CW041	50 (1270)	48 (1219)	0		36 (914)	8 (203)
CW051, CW060	74 (1880)	72 (1829)			60 (1524)	
CW076, CW084	99 (2515)	97 (2464)	48-1/2 (1232)		77-3/4 (1975)	15-1/4 (362)

Height in. (mm)
H Nominal 1
9 (229)
12 (305)
15 (381)
18 (458)
21 (553)
24 (610)

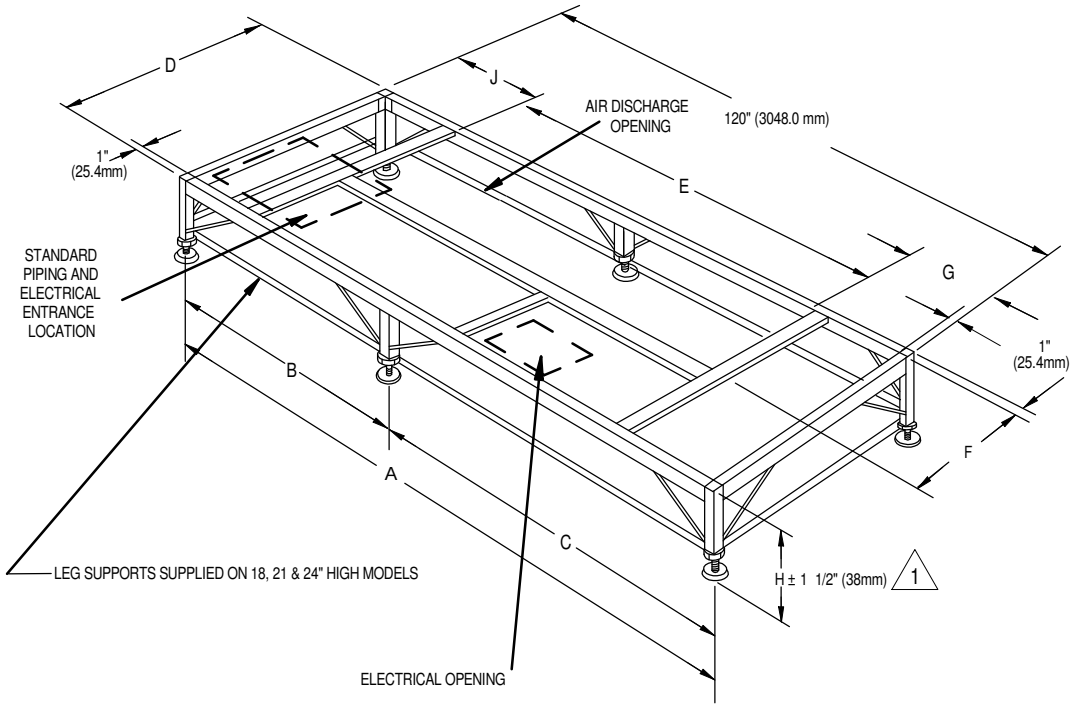
Notes:

1. Leveling feet are provided with ±1-1/2" (38mm) adjustment from nominal height H.

LIEBERT® CW

FLOORSTAND & FLOOR PLANNING DIMENSIONAL DATA

CW106, CW114 UPFLOW MODELS



Height in. (mm)
H Nominal 1
9 (229)
12 (305)
15 (381)
18 (458)
21 (553)
24 (610)

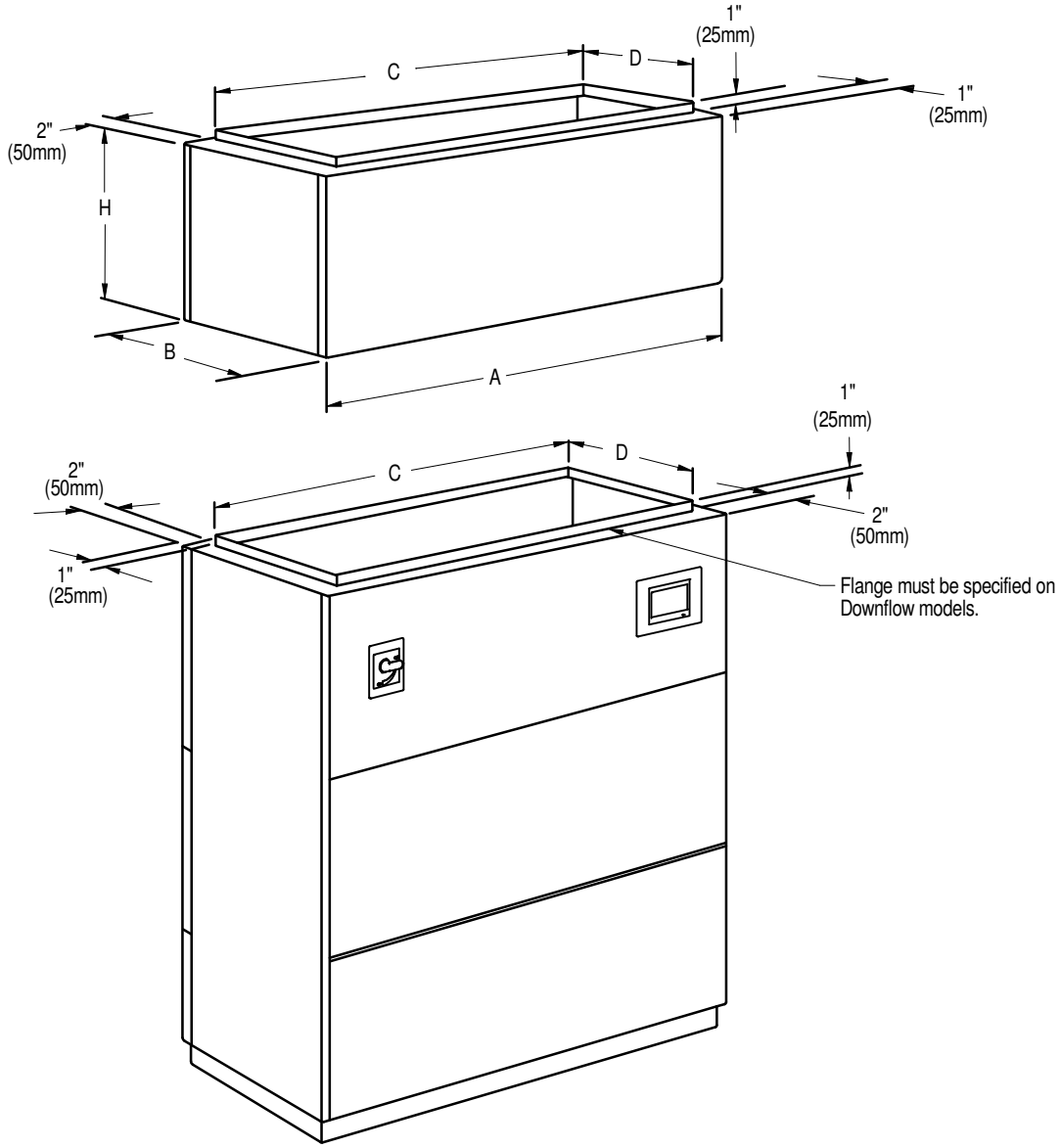
Dimensional Data in. (mm)									
Model	Overall Width of unit	A	B	C	D	E	F	G	J
CW106, CW114	122 (3099)	120 (3048)	60 (1524)		33 (838)	100-3/4 (2559)	16-1/4 (413)	8-1/4 (210)	11 (279)

Notes:

1. Leveling feet are provided with ± 1 1/2" (38mm) adjustment from nominal height H.

LIEBERT® CW

PLENUM DIMENSIONAL DATA
DOWNFLOW MODELS CW038 - CW084 W/ EC FANS



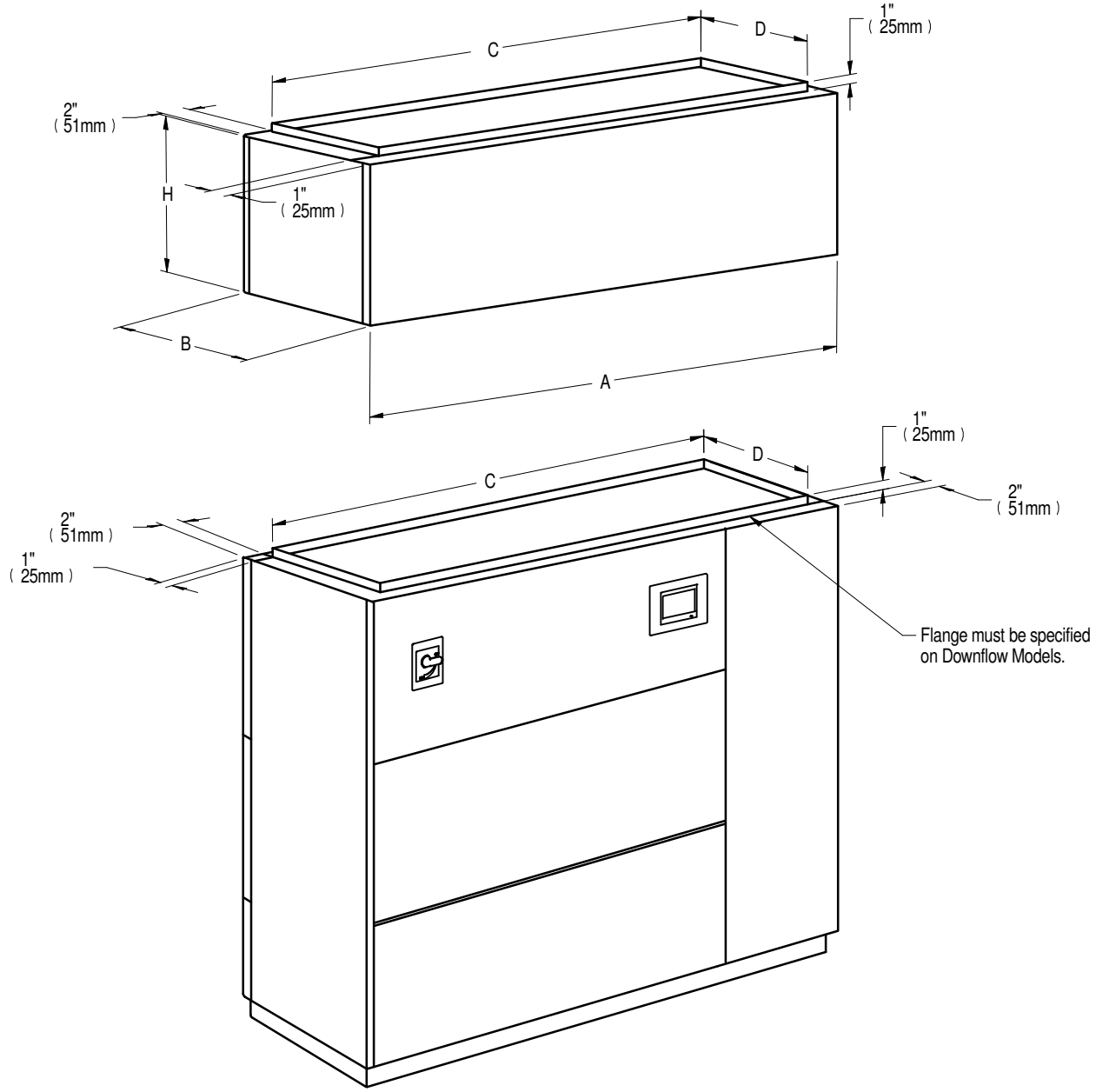
Plenum Dimensional Data in. (mm)				
Model	A	B	C	D
CW038, CW041	50 (1270)	34 (864)	46 (1168)	32 (813)
CW051, CW060	74 (1880)		70 (1778)	
CW076, CW084	99 (2515)		95 (2413)	

Plenum Height in. (mm)
H
20 (508)
22-3/4 (578)
34-3/4 (883)

LIEBERT® CW

PLENUM DIMENSIONAL DATA

DOWNFLOW MODELS CW106 - CW114 W/ EC FANS

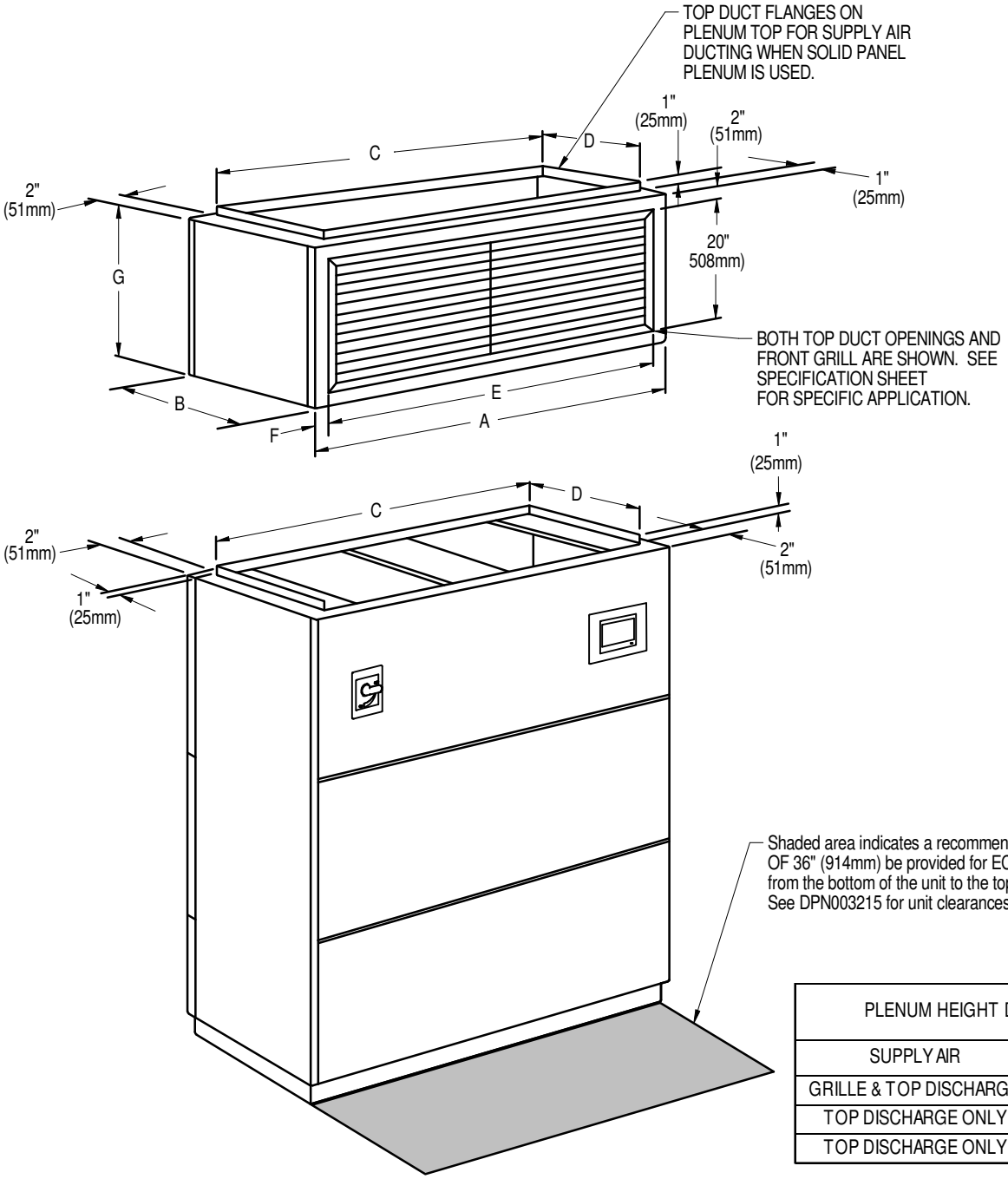


Plenum Dimensional Data in. (mm)			
A	B	C	D
122 (3099)	34 (864)	118 (2997)	32 (813)

Plenum Height in. (mm)
H
20 (508)
22-3/4 (578)
34-3/4 (883)

LIEBERT® CW

PLENUM DIMENSIONAL DATA
UPFLOW MODELS CW038 - CW084 W/ EC FANS

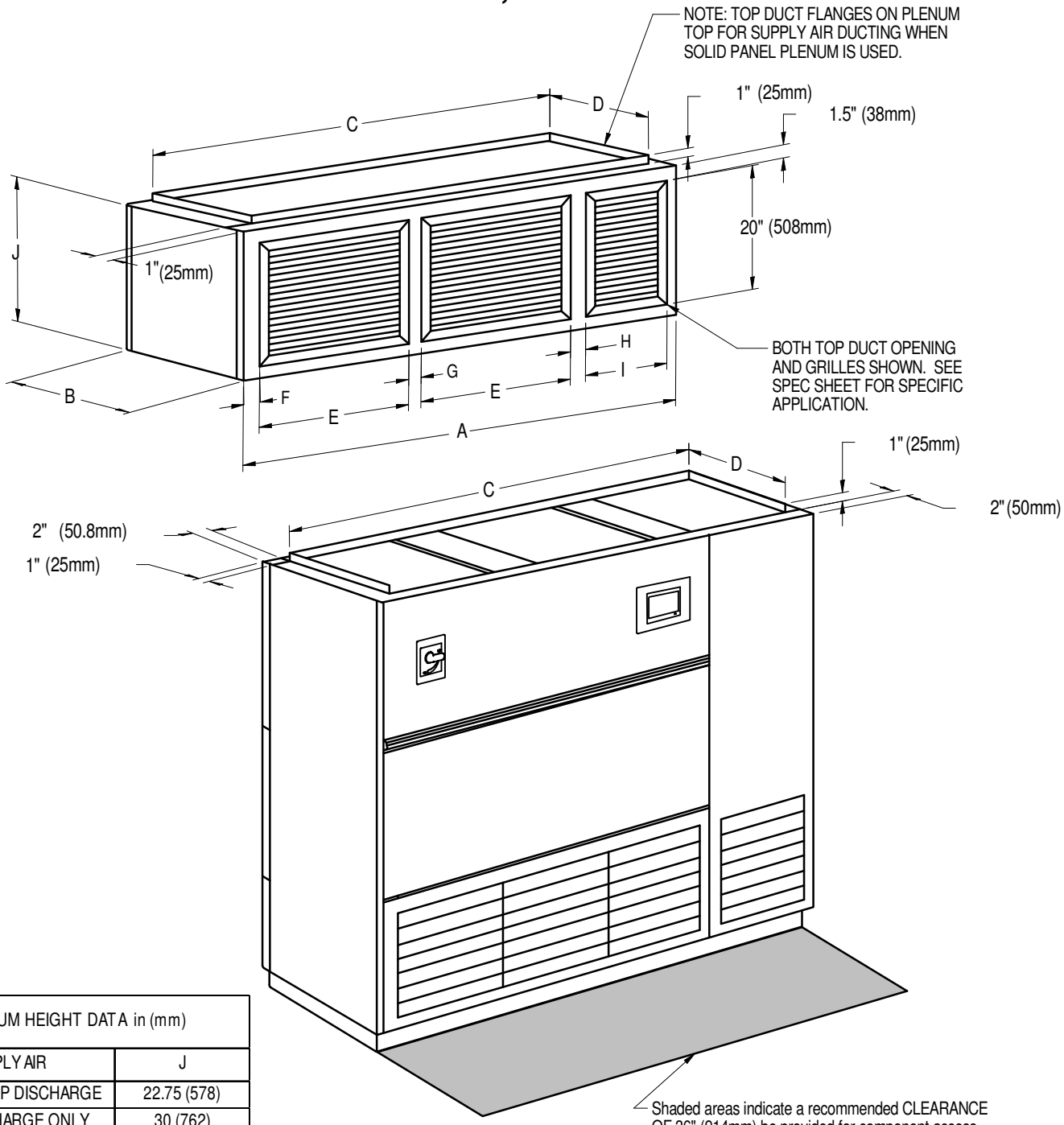


PLENUM HEIGHT DATA in (mm)	
SUPPLY AIR	G
GRILLE & TOP DISCHARGE	22.75 (578)
TOP DISCHARGE ONLY	30 (762)
TOP DISCHARGE ONLY	36 (914)

PLENUM DIMENSIONAL DATA in (mm)							GRILL FREE AREA SQ. FT. (SQ. METERS)
MODEL	A	B	C	D	E	F	
CW038, CW041	50 (1270)	34 (864)	46 (1168)	32 (813)	46 (1168)	2 (51)	4.29 (.40)
CW051, CW060	74 (1880)		70 (1778)		62 (1575)	6 (152)	5.85 (.54)
CW076, CW084	99 (2515)		95 (2413)		70 (1778)	14 1/2 (368)	6.83 (.63)

LIEBERT® CW

PLENUM DIMENSIONAL DATA
UPFLOW MODELS CW106, CW114 W/ EC FANS

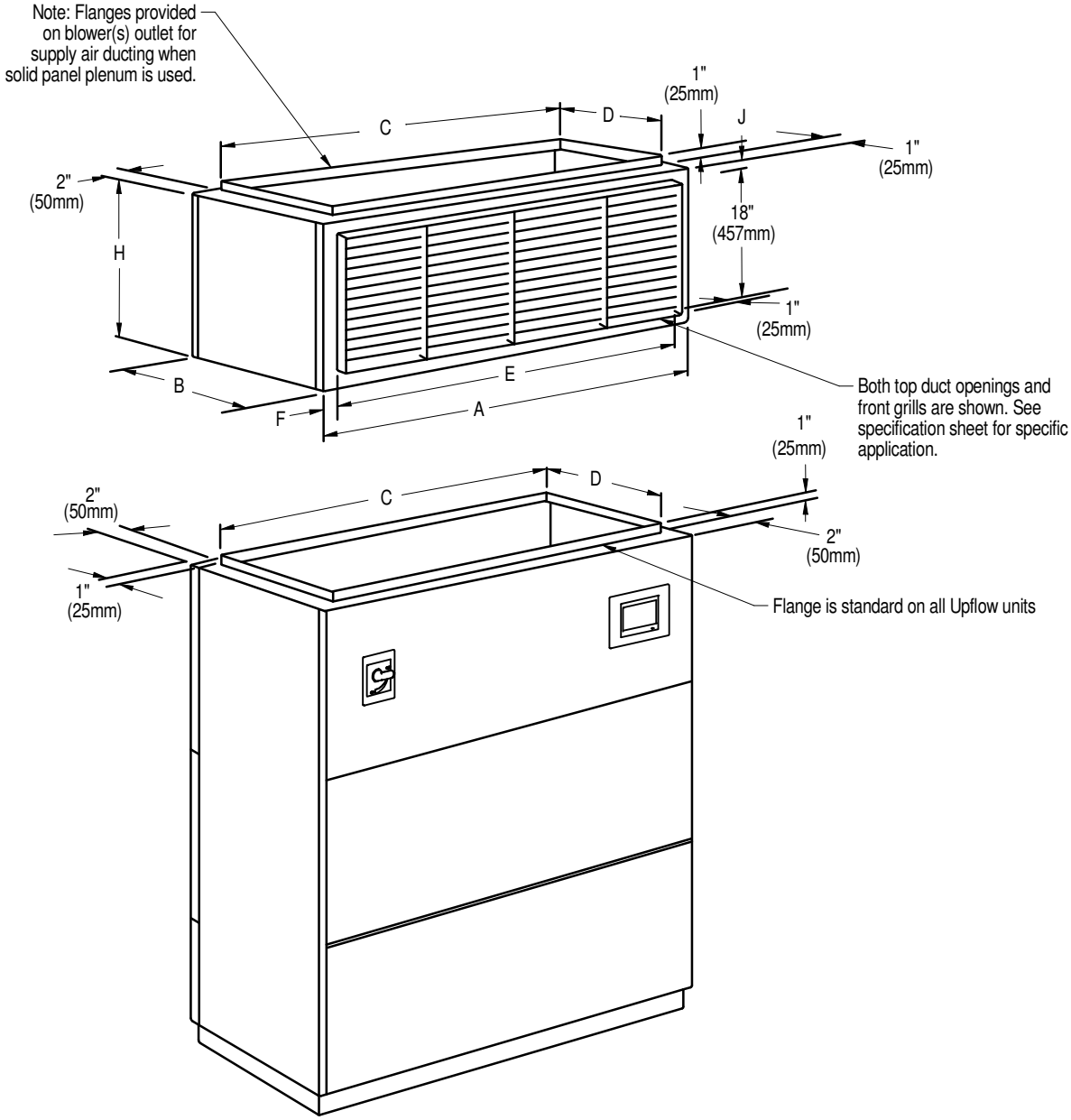


PLENUM HEIGHT DATA in (mm)	
SUPPLY AIR	J
GRILLE & TOP DISCHARGE	22.75 (578)
TOP DISCHARGE ONLY	30 (762)
TOP DISCHARGE ONLY	36 (914)

PLENUM DIMENSIONAL DATA in (mm)										GRILL FREE AREA SQ. FT. (SQ. METERS)
MODEL	A	B	C	D	E	F	G	H	I	
CW106, CW114	122 (3099)	34 (864)	118 (2997)	32 (813)	44 (1118)	3 (76)	2 (51)	5 (127)	18 (457)	10.14 (.94)

PLENUM DIMENSIONAL DATA

UPFLOW MODELS CW038 - CW084 W/ FORWARD CURVED BLOWERS



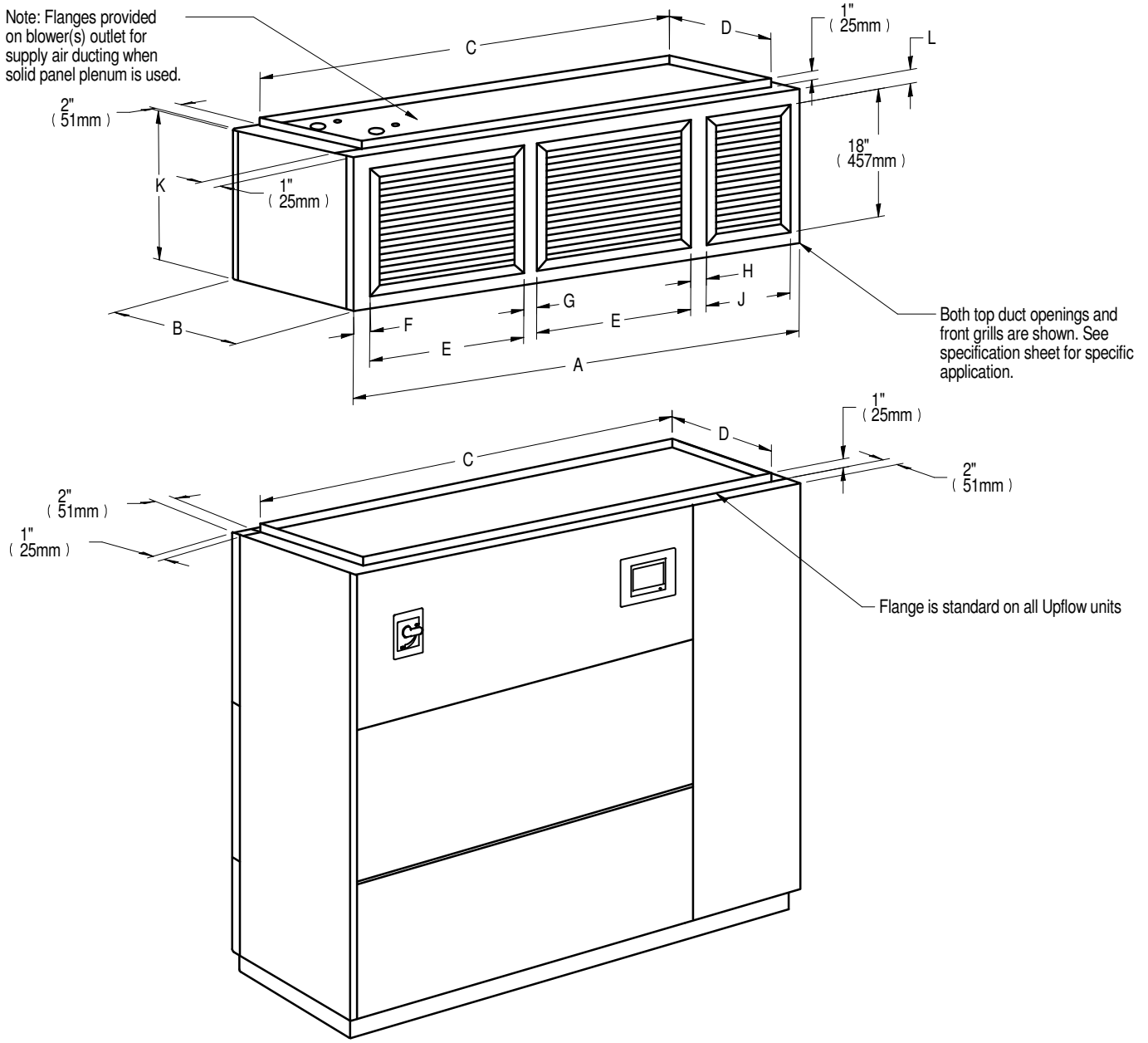
Plenum Dimensional Data in. (mm)							Grill Free Area Sq. Ft
Model	A	B	C	D	E	F	(Sq. Meters)
CW038, CW041	50 (1270)	34 (864)	46 (1168)	32 (813)	44 (1118)	3 (76)	4.29 (.40)
CW051, CW060	74 (1880)		70 (1778)		60 (1524)	7 (178)	5.85 (.54)
CW076, CW084	99 (2515)		95 (2413)		70 (1778)	14-1/2 (368)	6.83 (.63)

Plenum Height in. (mm)	
H	J
20 (508)	1 (25)
22-3/4 (578)	2-3/8 (60)
34-3/4 (883)	

LIEBERT® CW

PLENUM DIMENSIONAL DATA

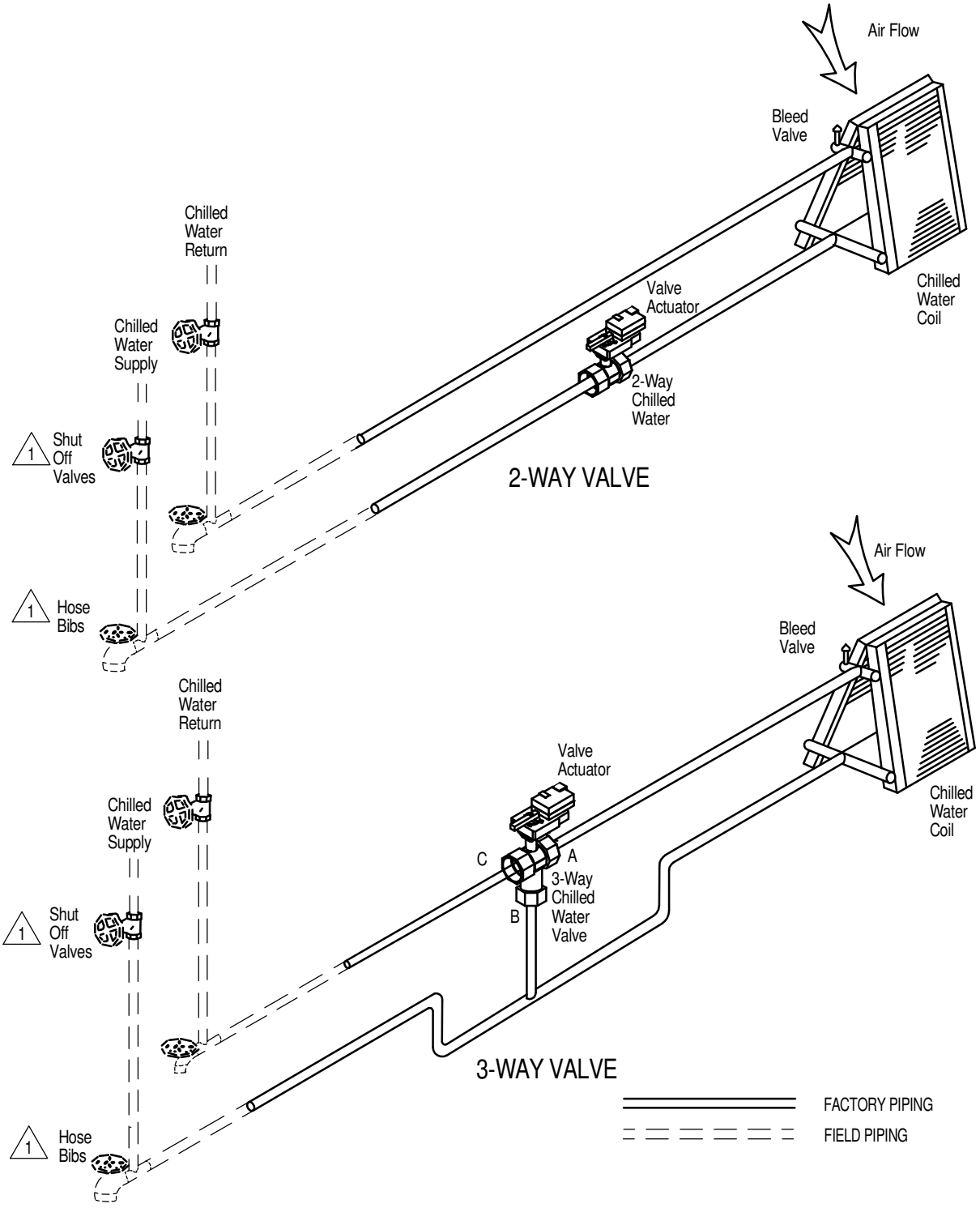
UPFLOW MODELS CW106 - CW114 W/ FORWARD CURVED BLOWERS



Plenum Height in. (mm)	
K	L
20 (508)	1 (25)
22-3/4 (578)	2-3/8 (60)
34-3/4 (883)	

Plenum Dimensional Data in. (mm)									Grill Free Area Sq. Ft. (Sq. Meters)
A	B	C	D	E	F	G	H	J	
122 (3099)	34 (864)	118 (2997)	32 (813)	44 (1118)	3-1/2 (89)	4 (102)	7 (178)	16 (406)	10.14 (0.94)

GENERAL ARRANGEMENT DIAGRAM
DOWNFLOW CW038 - CW114 MODELS

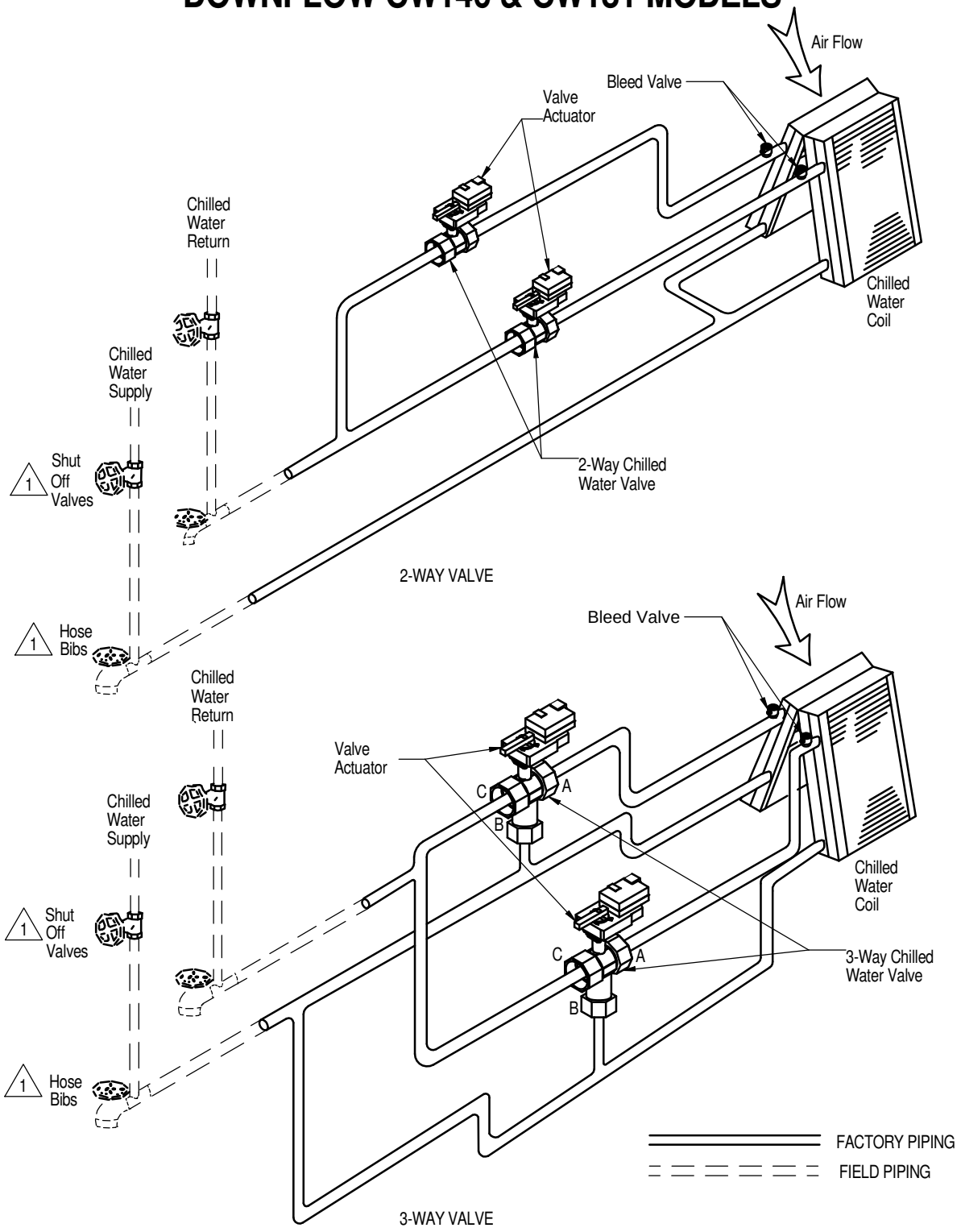


Notes:

1. Components are not supplied by Vertiv, but are required for proper circuit operation and maintenance.

GENERAL ARRANGEMENT DIAGRAM

DOWNFLOW CW146 & CW181 MODELS

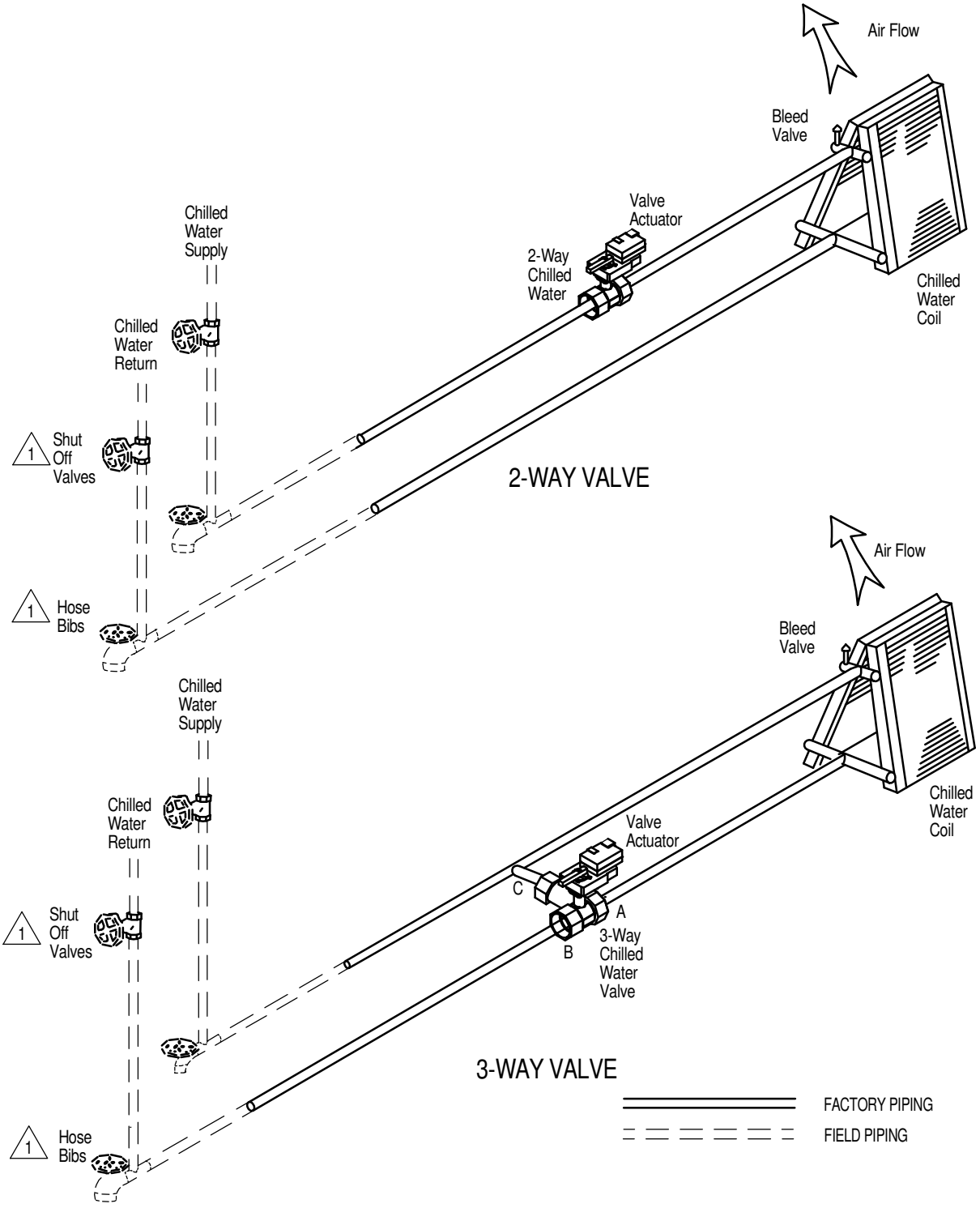


Notes:

1. Components are not supplied by Vertiv™, but are required for proper circuit operation and maintenance.

GENERAL ARRANGEMENT DIAGRAM

UPFLOW CW038 - CW084, CW106 - CW114 MODELS

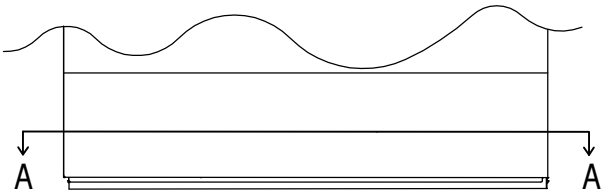


Notes:

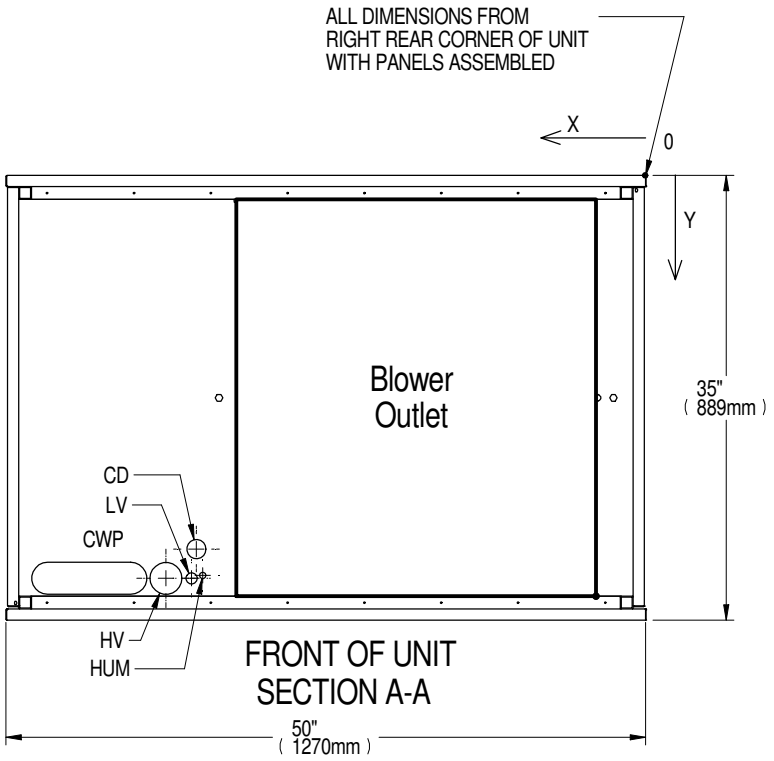
1. Components are not supplied by Vertiv, but are required for proper circuit operation and maintenance.

LIEBERT® CW

PRIMARY CONNECTION LOCATIONS
DOWNFLOW MODELS CW038 & CW041 W/ EC FANS



FRONT VIEW



POINT	DESCRIPTION	X	Y	CONNECTION SIZE / OPENING
CD	CONDENSATE DRAIN 2	35 1/16" (891mm)	29 5/16" (745mm)	3/4" (19mm) NPT Female
	W/ OPTIONAL CONDENSATE PUMP 3			1/2" (13mm) O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	34 9/16" (878mm)	31 3/8" (797mm)	1/4" (6mm) O.D. Cu
CWP	CHILLED WATER PIPING SLOT (CENTER)	43 7/16" (1104mm)	31 5/8" (803mm)	9"(229mm) X 2 1/2"(64mm)
	SUPPLY & RETURN PIPING DIAMETER	N/A		CW038: 1 3/8"(32mm)
				CW041: 1 5/8"(41mm)
HV	HIGH VOLT ELECTRICAL CONNECTION	37 7/16" (951mm)	31 5/8" (803mm)	2 1/2" (64mm)
LV	LOW VOLT ELECTRICAL CONNECTION	35 7/16" (900mm)		7/8" (22mm)

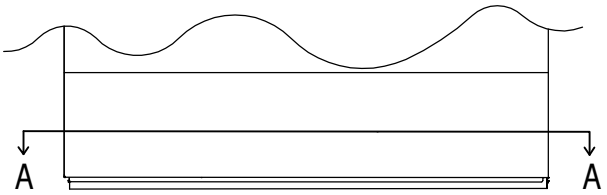
Notes:
1. Drawing not to scale. Tolerance on all piping dimensions is ± (13mm) 1/2".

2. Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.

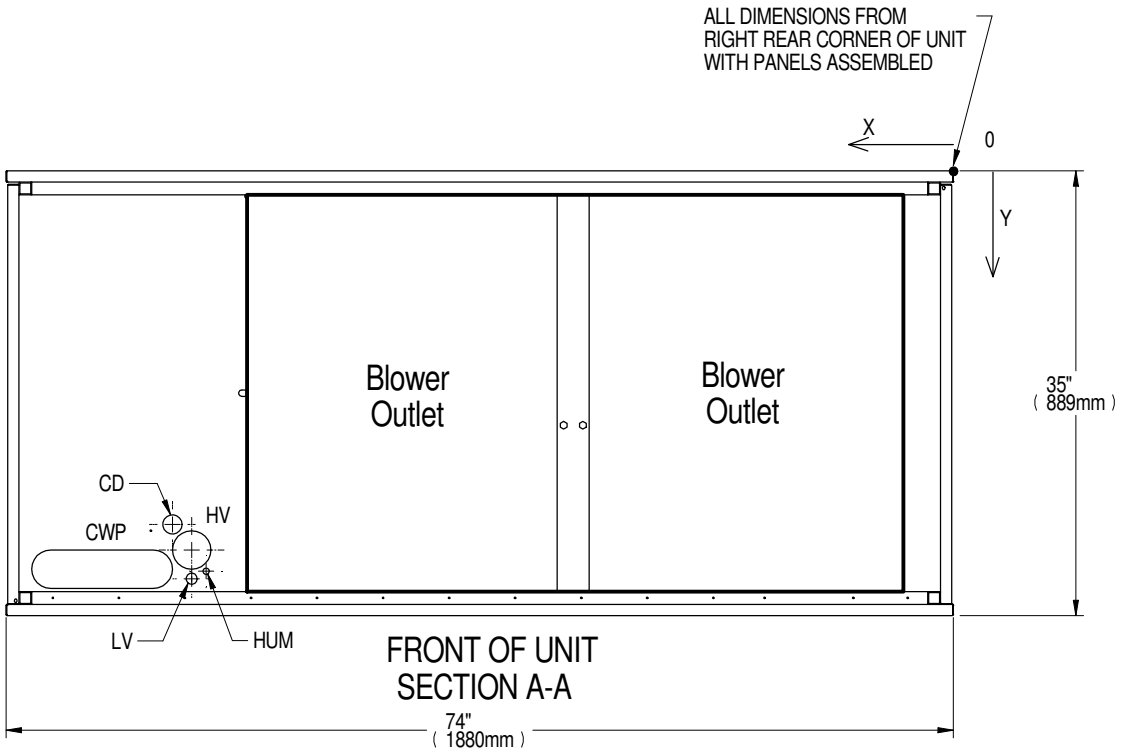
3. Optional Condensate Pump to be installed under unit.

LIEBERT® CW

PRIMARY CONNECTION LOCATIONS
DOWNFLOW MODELS CW051 & CW060 W/ EC FANS



FRONT VIEW



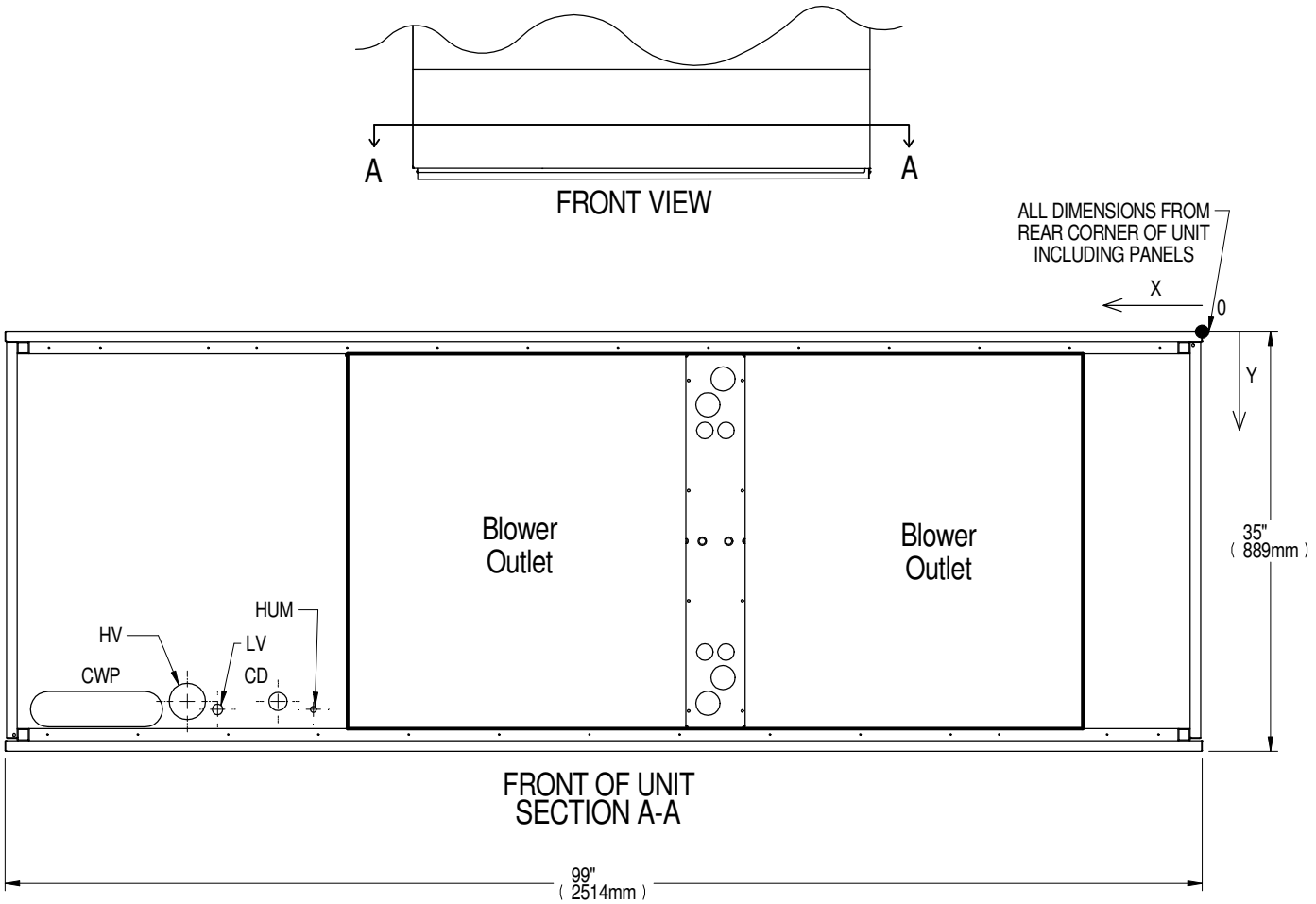
POINT	DESCRIPTION	X	Y	CONNECTION SIZE / OPENING
CD	CONDENSATE DRAIN 2	61" (1550mm)	27 3/4" (705mm)	3/4" (19mm) NPT Female
	W/OPTIONAL CONDENSATE PUMP 3			1/2" (13mm) O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	58 3/8" (1484mm)	31 7/16" (799mm)	1/4" (6mm) O.D. Cu
CWP	CHILLED WATER PIPING SLOT (CENTER)	66 1/2" (1690mm)	31 1/4" (794mm)	11"(279mm) X 3"(76mm)
	SUPPLY & RETURN PIPING DIAMETER	-	-	CW051: 1 5/8" (41mm)
				CW060: 2 1/8" (54mm)
HV	HIGH VOLT ELECTRICAL CONNECTION	59 1/2" (1512mm)	29 3/4" (756mm)	3" (76mm)
LV	LOW VOLT ELECTRICAL CONNECTION	59 1/2" (1512mm)	32" (813mm)	7/8" (22mm)

Notes:
1. Drawing not to scale. Tolerance on all piping dimensions is ± (13mm) 1/2".

2. Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.

3. Optional Condensate Pump to be installed under unit.

PRIMARY CONNECTION LOCATIONS
DOWNFLOW MODELS CW076 & CW084 W/ EC FANS

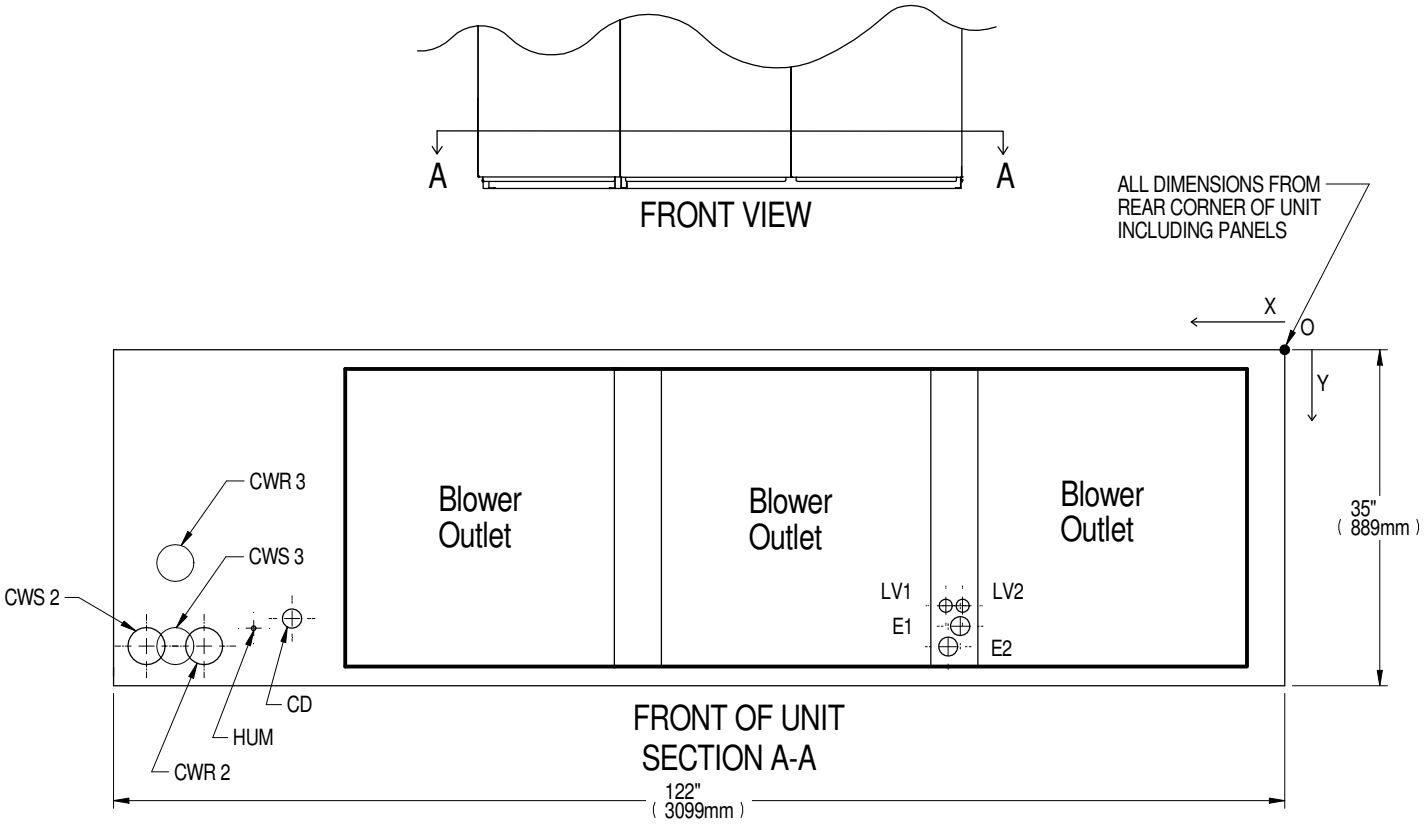


POINT	DESCRIPTION	X	Y	CONNECTION SIZE / OPENING
CD	CONDENSATE DRAIN 2	76 3/8" (1940mm)	30 7/8" (784mm)	3/4" (19mm) NPT Female
	W/OPTIONAL CONDENSATE PUMP	76 3/8" (1940mm)	30 7/8" (784mm)	1/2" (13mm) O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	73 7/16" (1865mm)	31 7/16" (799mm)	1/4" (6mm) O.D. Cu
CWP	CHILLED WATER PIPING SLOT (CENTER)	91 3/8" (2321mm)	31 3/8" (797mm)	101 5/16"(277mm) X 2 15/16"(74mm)
	SUPPY & RETURN PIPING DIAMETER	-	-	2 1/8" (54mm)
HV	HIGH VOLT ELECTRICAL CONNECTION	83 7/8" (2130mm)	30 7/8" (784mm)	3" (76mm)
LV	LOW VOLT ELECTRICAL CONNECTION	81 3/8" (2067mm)	31 7/16" (799mm)	7/8" (22mm)

Notes:
1. Drawing not to scale. Tolerance on all piping dimensions is ± (13mm) 1/2".

2. Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.

PRIMARY CONNECTION LOCATIONS
DOWNFLOW CW106 & CW114 W/EC FANS MODELS



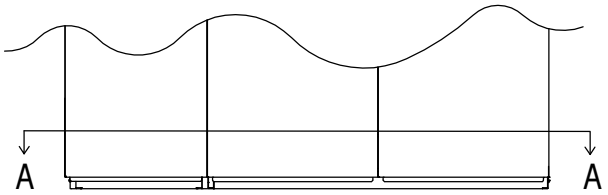
POINT	DESCRIPTION	X	Y	CONNECTION SIZE / OPENING
CD	CONDENSATE DRAIN △2	103-1/2" (2629mm)	28" (711mm)	1-1/4" NPT Female
	W/ OPTIONAL PUMP	103-1/2" (2629mm)	28" (711mm)	1/2" O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	107-1/2" (2731mm)	29" (737mm)	1/4" O.D. Cu
CWS 2	2-WAY CHILLED WATER SUPPLY	118-1/2" (3010mm)	31" (787mm)	CW106: 2-1/8"; CW114: 2-5/8"
CWS 3	3-WAY CHILLED WATER SUPPLY	115-1/2" (2934mm)	31" (787mm)	CW106: 2-1/8"; CW114: 2-5/8"
CWR 2	2-WAY CHILLED WATER RETURN	112-1/2" (2858mm)	31" (787mm)	CW106: 2-1/8"; CW114: 2-5/8"
CWR 3	3-WAY CHILLED WATER RETURN	115-1/2" (2934mm)	22" (559mm)	CW106: 2-1/8"; CW114: 2-5/8"
E1	ELECTRICAL CONN. (HIGH VOLT)	35" (889mm)	31" (787mm)	2"
E2	ELECTRICAL CONN. (HIGH VOLT)	34" (864mm)	29" (737mm)	2"
LV1	ELECTRICAL CONN. (LOW VOLT)	35.5" (902mm)	26-1/2" (673mm)	1-3/8"
LV2	ELECTRICAL CONN. (LOW VOLT)	33.5" (851mm)	26-1/2" (673mm)	1-3/8"

Notes:
1. Drawing not to scale. Tolerance on all piping dimensions is ± (13mm) 1/2".

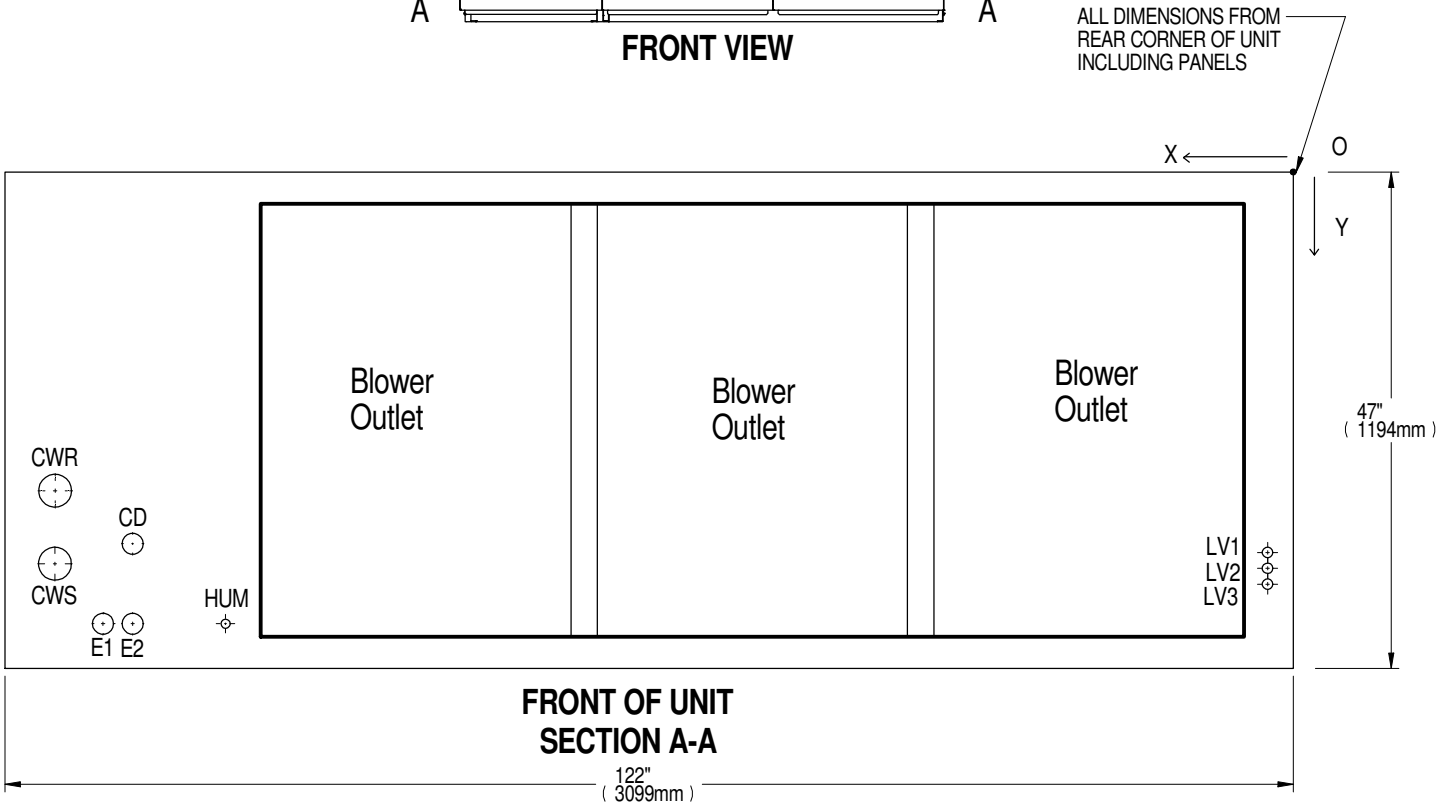
△2. Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.

LIEBERT® CW

PRIMARY CONNECTION LOCATIONS
CW146 & CW181 DOWNFLOW MODELS W/ EC FANS



FRONT VIEW



FRONT OF UNIT
SECTION A-A

POINT	DESCRIPTION	X	Y	CONNECTION SIZE / OPENING
CD	CONDENSATE DRAIN 2	110" (2794mm)	35" (889mm)	1-1/4" NPT Female
	W/ OPTIONAL PUMP	110" (2794mm)	35" (889mm)	1/2" O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	101" (2565mm)	43" (1092mm)	1/4" O.D. Cu
CWS	2-WAY CHILLED WATER SUPPLY	117" (2972mm)	37" (940mm)	3-1/8"
	3-WAY CHILLED WATER SUPPLY	117" (2972mm)	37" (940mm)	3-1/8"
CWR	2-WAY CHILLED WATER RETURN	117" (2972mm)	30" (762mm)	3-1/8"
	3-WAY CHILLED WATER RETURN	117" (2972mm)	30" (762mm)	3-1/8"
E1	ELECTRICAL CONN. (HIGH VOLT)	113" (2870mm)	43" (1092mm)	2"
E2	ELECTRICAL CONN. (HIGH VOLT)	110" (2794mm)	43" (1092mm)	2"
LV1	ELECTRICAL CONN. (LOW VOLT)	2-1/2" (64mm)	36" (914mm)	7/8"
LV2	ELECTRICAL CONN. (LOW VOLT)	2-1/2" (64mm)	37-1/2" (953mm)	7/8"
LV3	ELECTRICAL CONN. (LOW VOLT)	2-1/2" (64mm)	39" (991mm)	7/8"

Notes:
1. Drawing not to scale. Tolerance on all piping dimensions is ± (13mm) 1/2".

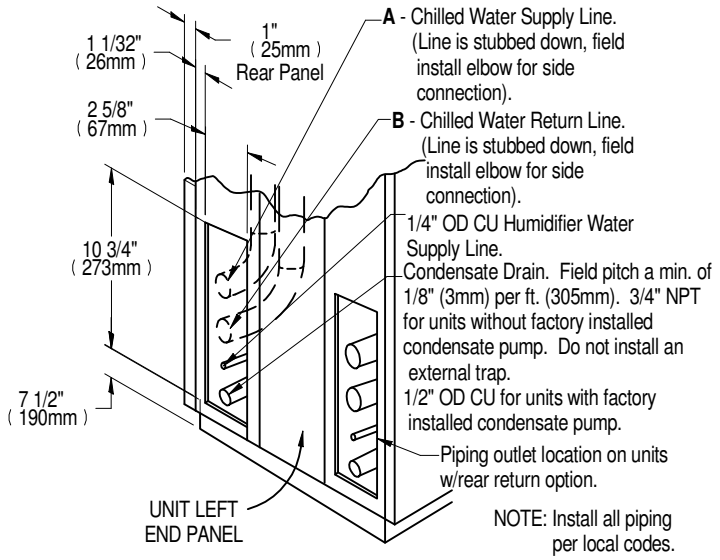
2. Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.

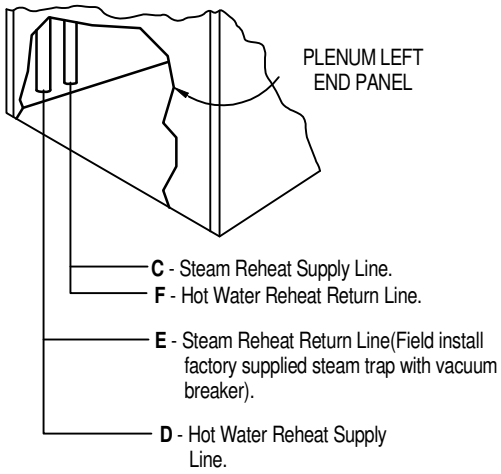
LIEBERT® CW

UNIT PIPING CONNECTION LOCATIONS
CW038 - CW084 UPFLOW MODELS W/ FORWARD CURVED BLOWERS

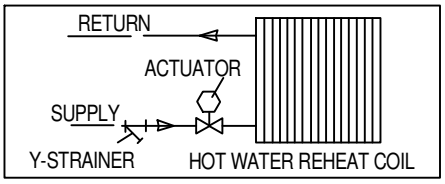
UNIT FIELD PIPING LOCATIONS
Piping stubbed out inside unit end compartment for field connection through 2 5/8" x 10 3/4" (66 x 273mm) opening as shown. Piping may also exit through bottom or top of end compartment by field cutting an opening in a suitable location (except bottom return air units).

PLENUM FIELD PIPING LOCATIONS
For separate steam or hot water plenum in UPFLOW units, piping may exit through bottom, top or sides by field cutting an opening in a suitable location. Steam or hot water plenum piping connections are located at the left side of the plenum.

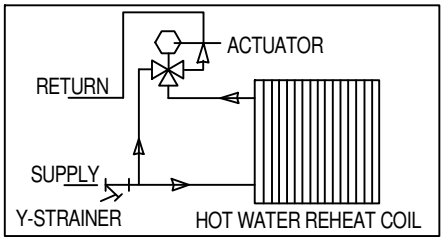




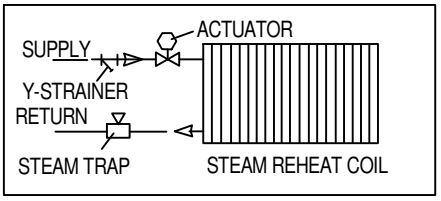
OPTIONAL PLENUM REHEAT SCHEMATICS



OPTIONAL HOT WATER REHEAT
(2-WAY VALVE)



OPTIONAL HOT WATER REHEAT
(3-WAY VALVE)



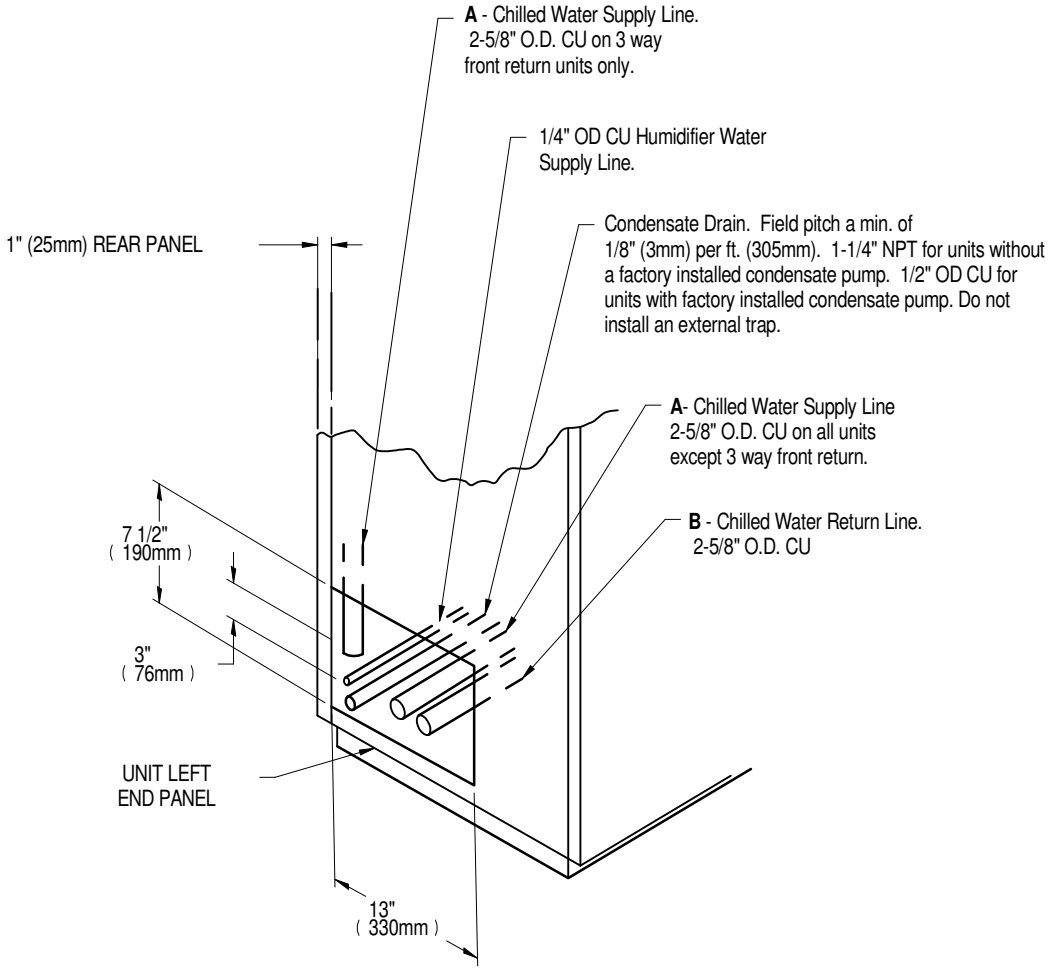
OPTIONAL STEAM REHEAT

Factory Provided Piping Connection Sizes in.						
MODELS	A OD CU	B OD CU	C NPT FEMALE	D OD CU	E NPT FEMALE	F OD CU
CW038	1 3/8	1 3/8	1/2	5/8	1/2	5/8
CW041	1 5/8	1 5/8				
CW051			3/4	7/8	3/4	7/8
CW060	2 1/8	2 1/8				
CW076						
CW084						

UNIT PIPING CONNECTION LOCATIONS
CW106 & CW114 UPFLOW MODELS

UNIT FIELD PIPING LOCATIONS

Piping stubbed out inside unit end compartment for field connection through 13" x 6-1/2" (330 x 165mm) opening as shown. Piping may also exit through bottom of end compartment by field cutting an opening in a suitable location.



Notes:
1. Install all piping per local codes.

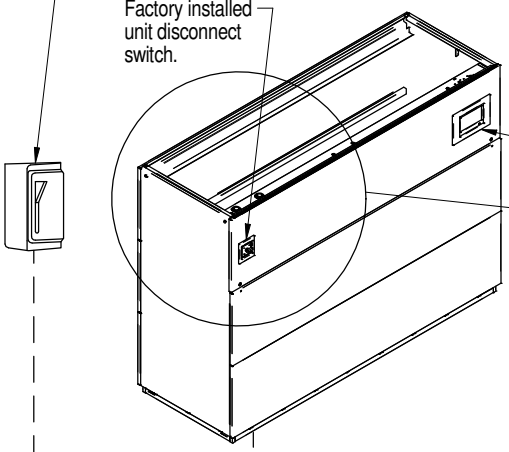
LIEBERT® CW

ELECTRICAL FIELD CONNECTIONS
DOWNFLOW MODELS CW038 - CW084

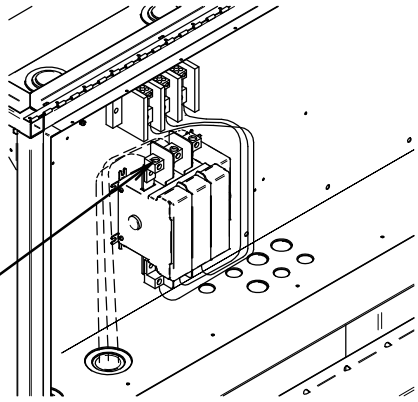
Field supplied disconnect switch when factory installed unit disconnect switch is not provided. Select per national and local codes.

Factory installed unit disconnect switch.

MONITORING PANEL

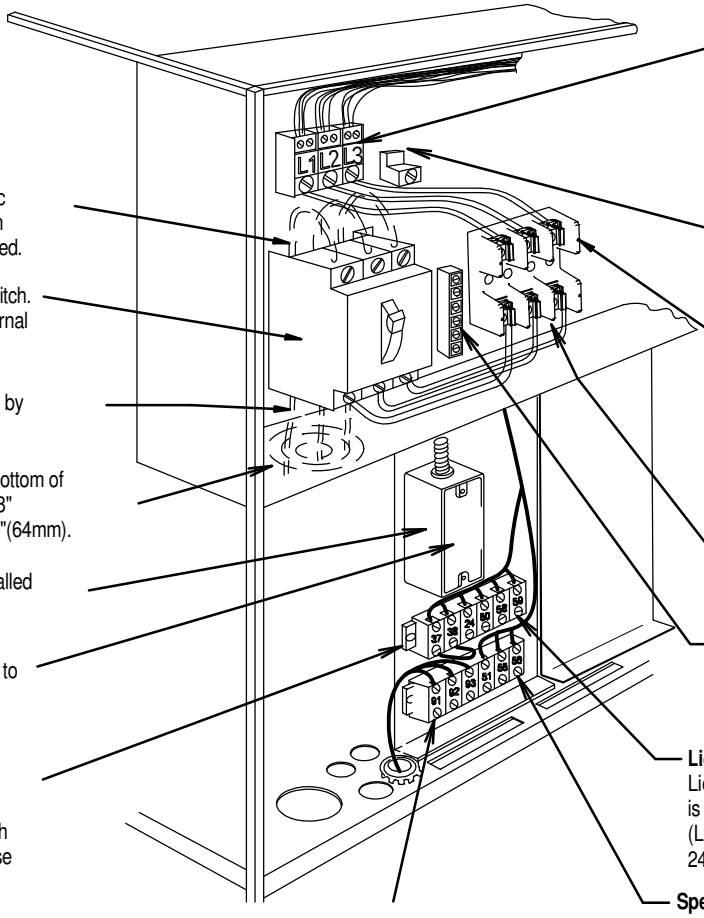


Three phase connection. Electric service connection terminals when factory fused disconnect switch is supplied.



Fused disconnect view

3 phase electric service not by Liebert.



Three phase connection (50Hz). Electrical service connection terminals when factory disconnect switch is NOT supplied.

Three phase connection. Electric service connection terminals when factory disconnect switch is supplied.

Earth ground connection (60HZ). Connection terminal for field supplied earth grounding wire.

Factory installed disconnect switch. May be fused disconnect with internal fuses.

Main fuseblock and fuses not present when fused disconnect installed or on 50Hz units.

Three phase electric service not by Vertiv.

Electric conduit knockouts on bottom of electric box. Knockouts sizes 1-3/8" (35mm) or 1-3/4" (45mm) or 2-1/2"(64mm).

Three Phase Connection (60Hz). Electric service connection point when factory disconnect is NOT supplied.

Electrical handy box factory installed with cover.

Earth ground bar (on 50HZ only). Connection terminals with factory ground from each high voltage component for field supplied earth grounding wire.

Common alarm connection. Field supplied 24V. Class 2 wiring to common alarm pigtails 75 + 76 which are factory connected to common alarm relay (R3).

Liebert® Liqui-Tect™ shutdown and dry contact. On Liebert® Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Liebert® Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 2 field supplied wiring.

Remote unit shutdown. Replace existing jumper between terminals 37 + 38 with normally closed switch having a minimum 50VA rating. Use field supplied 24V Class 2 wire.

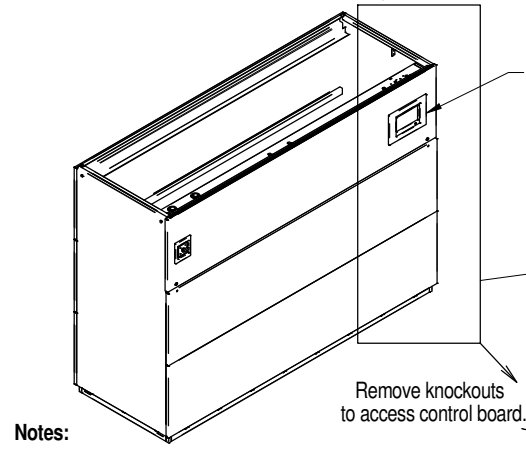
Special alarm connections. Field supplied 24V. Class 2 wire for special alarms.

Smoke detector alarm connections. Field supplied 24V. Class 2 wire to remote alarm circuits. Factory wired terminals from optional smoke detector are #91-comm., #92-NO, and #93-NC. Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes.

NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

LIEBERT® CW

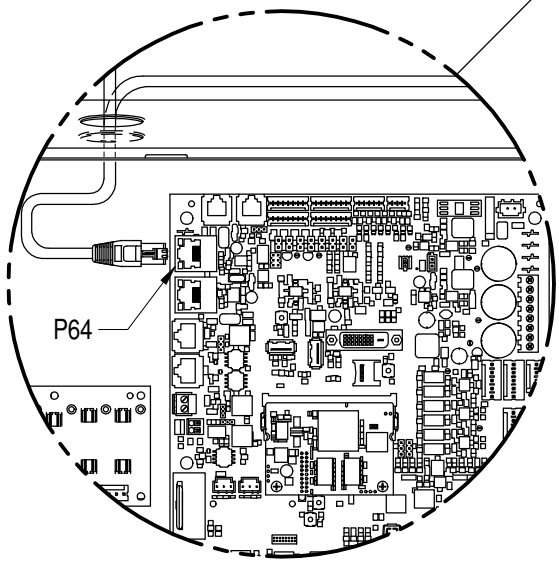
ELECTRICAL FIELD CONNECTIONS
DOWNFLOW MODELS CW038 - CW084
FOR NETWORK ETHERNET CONNECTIONS

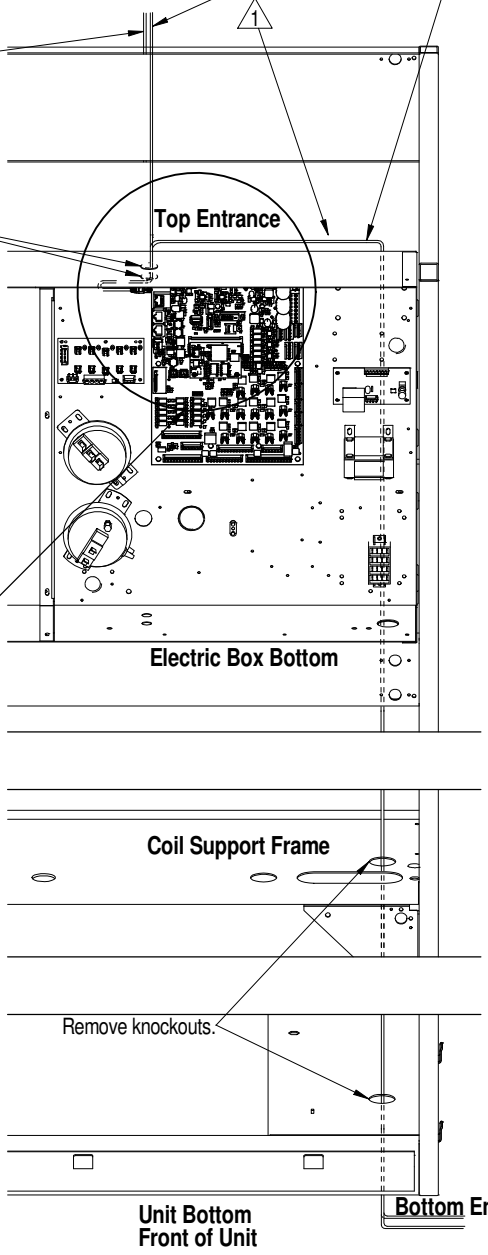


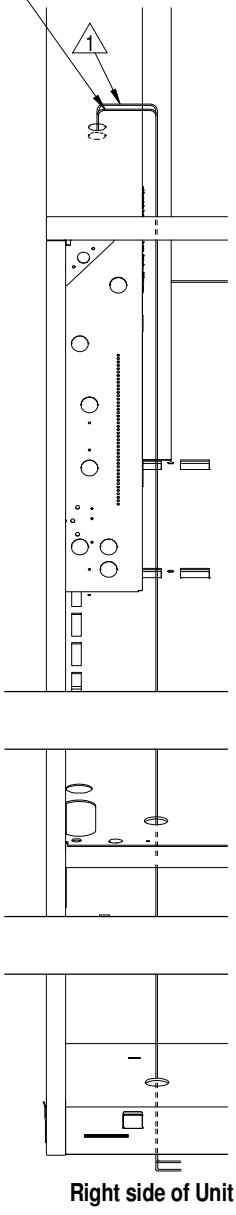
Low Voltage Communication Wiring
CAT5E Ethernet connections – field installed
Avoid routing near high voltage wiring.
Secure wiring to prevent damage and
use bushing or edge guard to avoid sharp edges.

Notes:

1. To provide unit to unit (U2U) networking, the customer must first connect an Ethernet cable from P64 on the Liebert® iCOM™ control board, to a network switch.



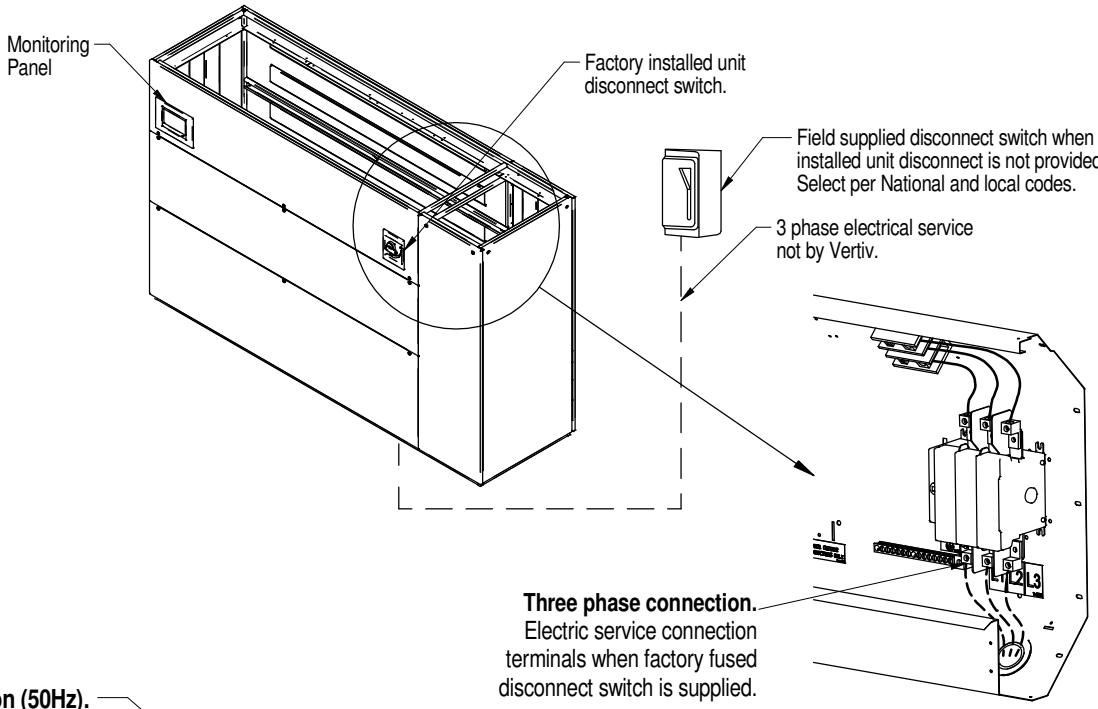




NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

LIEBERT® CW

ELECTRICAL FIELD CONNECTIONS
DOWNFLOW MODELS CW106 & CW114



Fused Disconnect View

Three phase connection (50Hz). Electric service connection terminals when factory disconnect switch is NOT supplied.

Earth ground connection (60 HZ). Connection terminal for field supplied earth grounding wire.

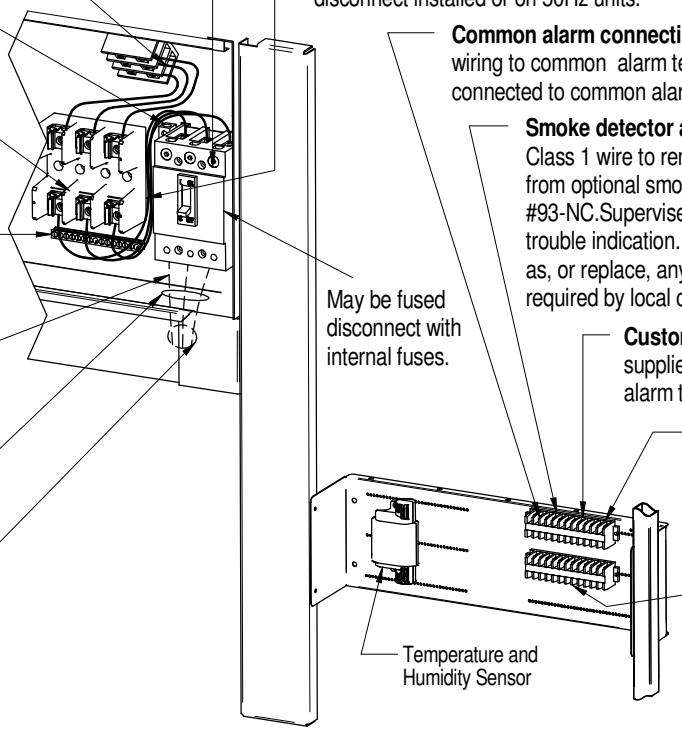
Three phase connection (60Hz). Electric service connection terminals when factory disconnect switch is NOT supplied.

Earth ground bar (optional). Connection terminals with factory ground from each high voltage component for field supplied earth grounding wire.

Three phase connection. Electric service connection terminals when factory disconnect switch is supplied.

Three phase electric service. Not provided by Vertiv.

Electric conduit knockouts. Bottom of electric box. Knockout sizes 1 3/8"(35mm) or 1 3/4" (45mm) or 2 1/2" (64mm).



Common alarm connection. Field supplied 24V, Class 1 wiring to common alarm terminals 75 + 76 which are factory connected to common alarm relay (R3).

Smoke detector alarm connections. Field supplied 24V, Class 1 wire to remote alarm circuits. Factory wired terminals from optional smoke detector are #91-comm., #92-NO, and #93-NC.Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes.

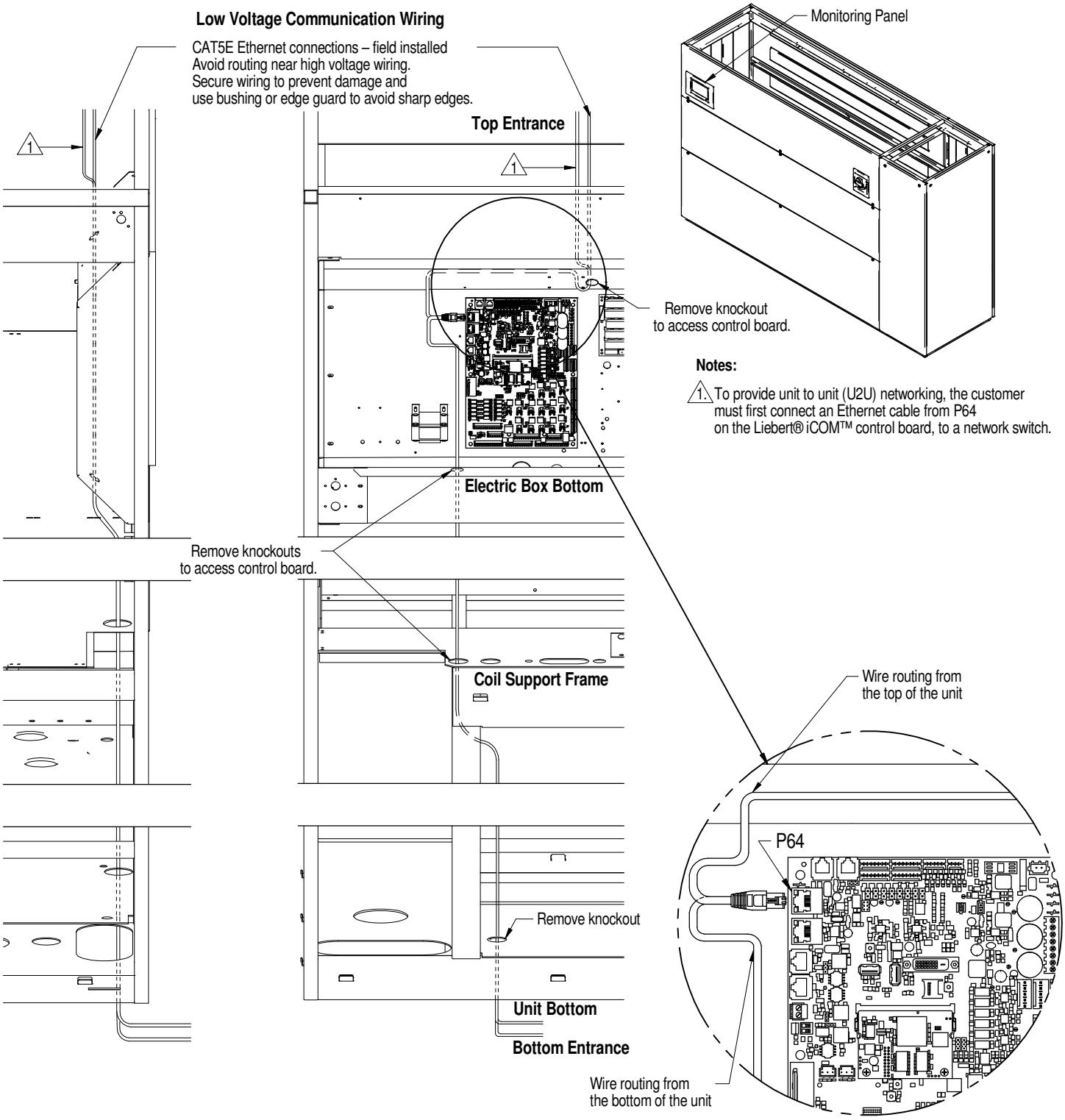
Customer alarm connections. Field supplied 24V, Class 1 wire for customer alarm terminals 24, 50, 51, 55, 56.

Remote unit shutdown. Replace existing jumper between terminals 37 + 38 with normally closed switch having a minimum 50VA rating. Use field supplied, 24V Class 1 wire.

Liebert® Liqui-Tect™ shutdown and dry contact. On Liebert® Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Liebert® Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

ELECTRICAL FIELD CONNECTIONS
DOWNFLOW MODELS CW106 & CW114



NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

ELECTRICAL FIELD CONNECTIONS DEFINITIONS & LOCATIONS
DOWNFLOW CW146 & CW181 MODELS W/ EC FANS

STANDARD ELECTRICAL CONNECTIONS

1) **Primary high voltage entrance -** 2" (51mm); 1.375" (35mm) diameter concentric knockouts located in bottom of box.
2) **Primary low voltage entrance -** Quantity (3) 1.375" (35mm) diameter knockouts located in bottom of box.
3) **Three phase electrical service -** Terminals are on main fuse block (disregard if unit has optional disconnect switch). Three phase service not by Vertiv.
4) **Earth ground -** Terminal for field supplied earth grounding wire.
5) **Remote unit shutdown -** Replace existing jumper between terminals 37 & 38 with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
6) **Customer alarm inputs -** Terminals for field supplied, normally open contacts, having a minimum 75VA, 24VAC rating, between terminals 24 & 50, 51, 55, 56. Use field supplied Class 1 wiring. Terminal availability varies by unit options.
7) **Common alarm -** On any alarm, normally open dry contact is closed across terminals 75 & 76 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
8) **Unit factory installed disconnect switch, Fuse Block and Main Fuses –** Type of disconnect switch available – "Locking". The "Locking Type" consists of a non-automatic molded case switch operational from the outside of the unit. Access to the high voltage electric panel compartment can be obtained only with the switch in the "off" position. The molded case switch disconnect models contain separate main fuses. Units with fused disconnect have main fuses within the disconnect.

OPTIONAL ELECTRICAL CONNECTIONS

9) **Secondary disconnect switch and earth ground –** Fuses are included in the 65KAIC SCCR fused disconnect switch models.
10) **Three phase electrical service -** Terminals are on top of disconnect switch. Three phase service not by Liebert.
11) **Smoke sensor alarm -** Factory wired dry contacts from smoke sensor are 91-common, 92-NO, and 93-NC. Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
12) **Reheat and humidifier lockout -** Remote 24VAC required at terminals 82 & 83 for lockout of reheat and humidifier.
13) **Condensate alarm** (with condensate pump option) - On pump high water indication, normally open dry contact is closed across terminals 88 & 89 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
14) **Remote humidifier -** On any call for humidification, normally open dry contact is closed across terminals 11 & 12 to signal field supplied remote humidifier. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
15) **Reversing Starter Power Supply Notification –** Normally open contact terminals 106 and 107 will close when Power Supply 1 is engaged; 110 and 111 will close when Power Supply 2 is engaged.

OPTIONAL LOW VOLTAGE TERMINAL PACKAGE CONNECTIONS

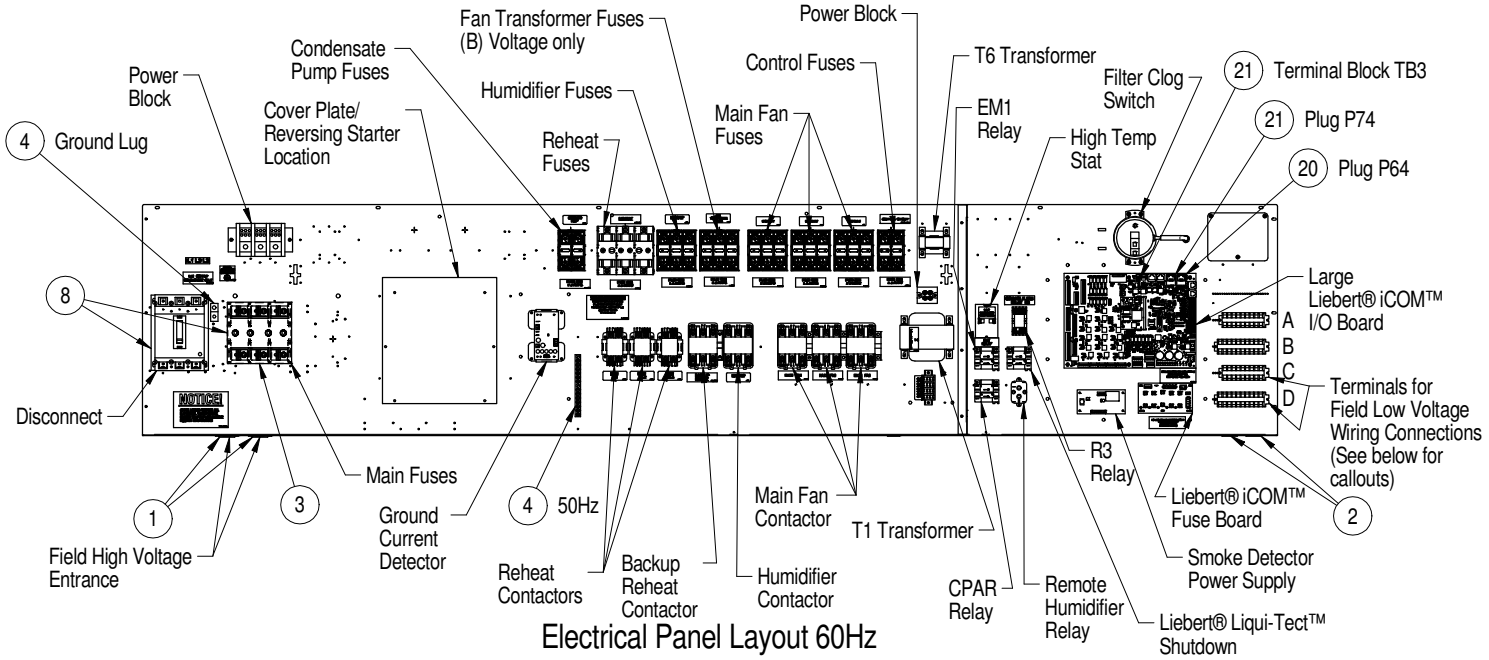
16) **Remote unit shutdown -** Two additional contact pairs available for unit shutdown (labeled as 37B & 38B, 37C & 38C). Replace jumpers with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
17) **Common alarm -** On any alarm, two additional normally open dry contacts are closed across terminals 94 & 95 and 96 & 97 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
18) **Main fan auxiliary switch -** On closure of main fan contactor, normally open dry contact is closed across terminals 84 & 85 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
19) **Liebert® Liqui-Tect™ shutdown and dry contact -** On Liebert® Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Liebert® Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

OPTIONAL COMMUNCATION CONNECTIONS

20) **Unit-To-Unit -** Plug 64 is reserved for U2U communication.
21) **Site and BMS -** Plug 74 and terminal block 3 are reserved for Site and BMS connections. Plug 74 is an eight pin RJ45 for a Cat 5 cable. Terminal block 3 is a two position screw terminal block for use with twisted pair wires.

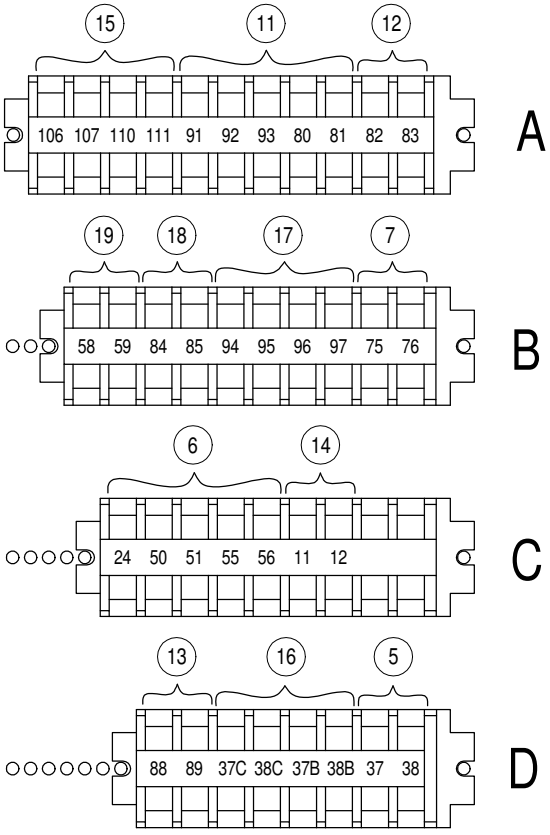
ELECTRICAL FIELD CONNECTIONS DEFINITIONS & LOCATIONS

DOWNFLOW CW146 & CW181 MODELS W/ EC FANS



Electrical Panel Layout 60Hz

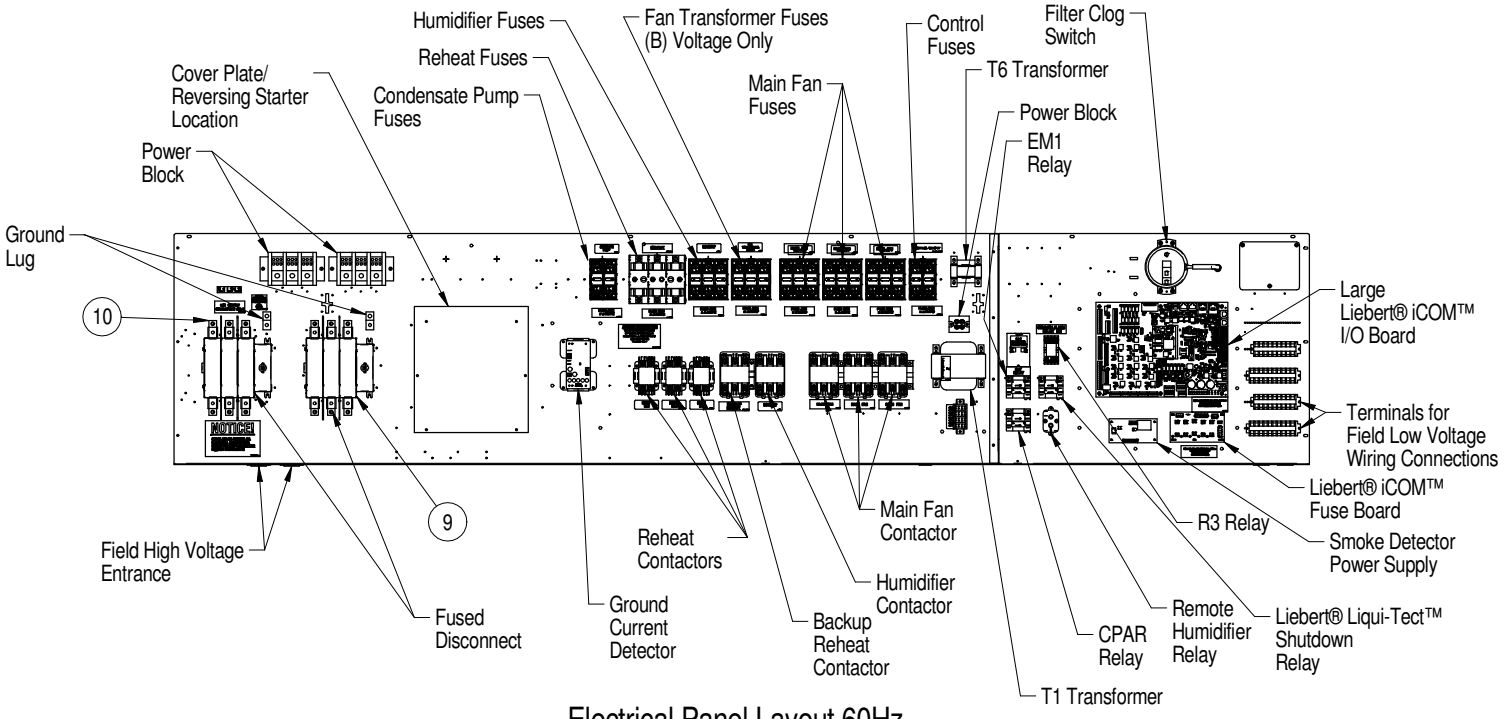
Note: Typical orientation of components shown. Component location varies by option and unit.



Note: Refer to DPN001699 SHT. 1 of 4 for descriptions of numbered callouts.

ELECTRICAL FIELD CONNECTIONS DEFINITIONS & LOCATIONS

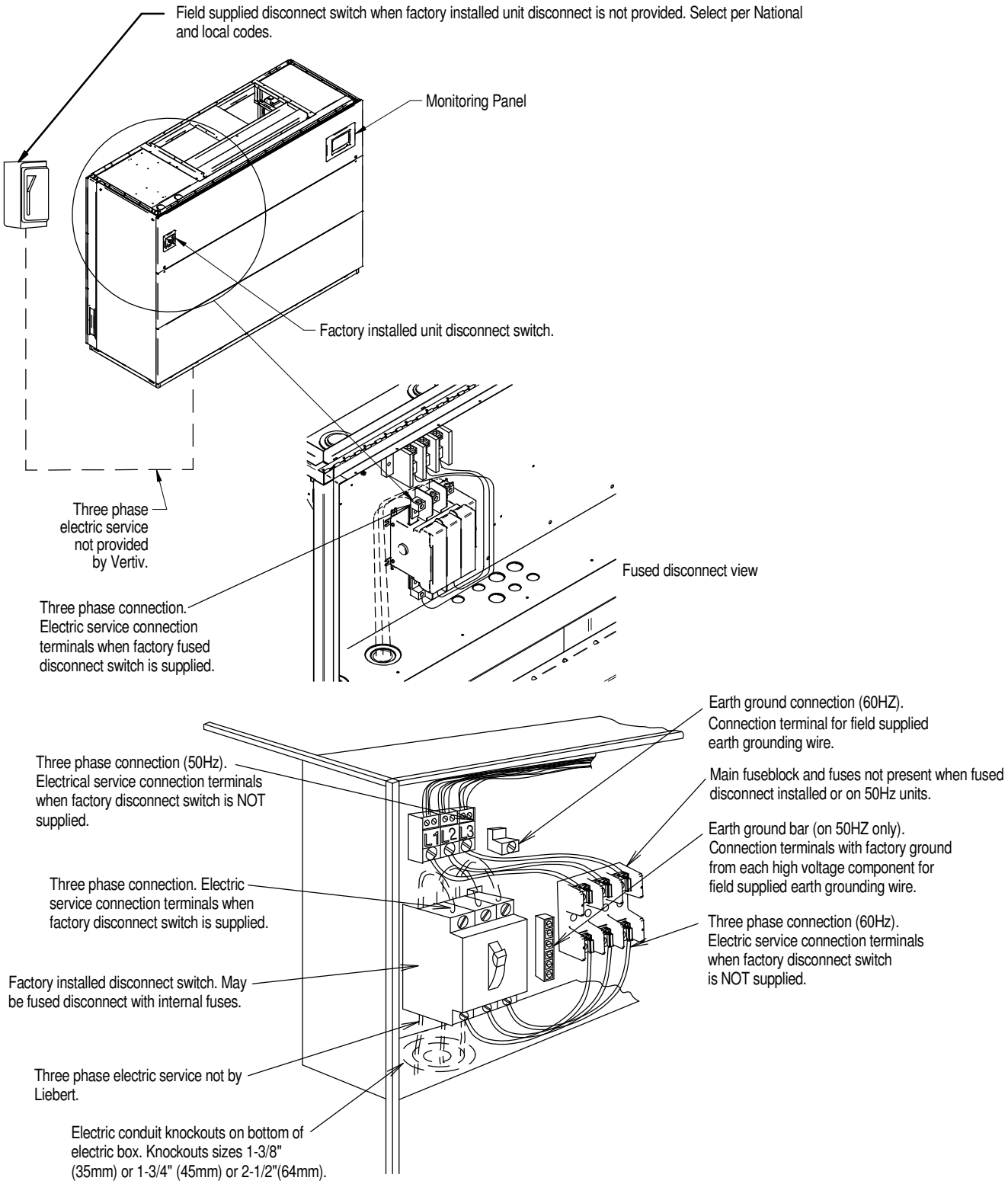
DOWNFLOW CW146 & CW181 MODELS W/ EC FANS



Electrical Panel Layout 60Hz

Typical Arrangement for Dual Fused Disconnect Switches

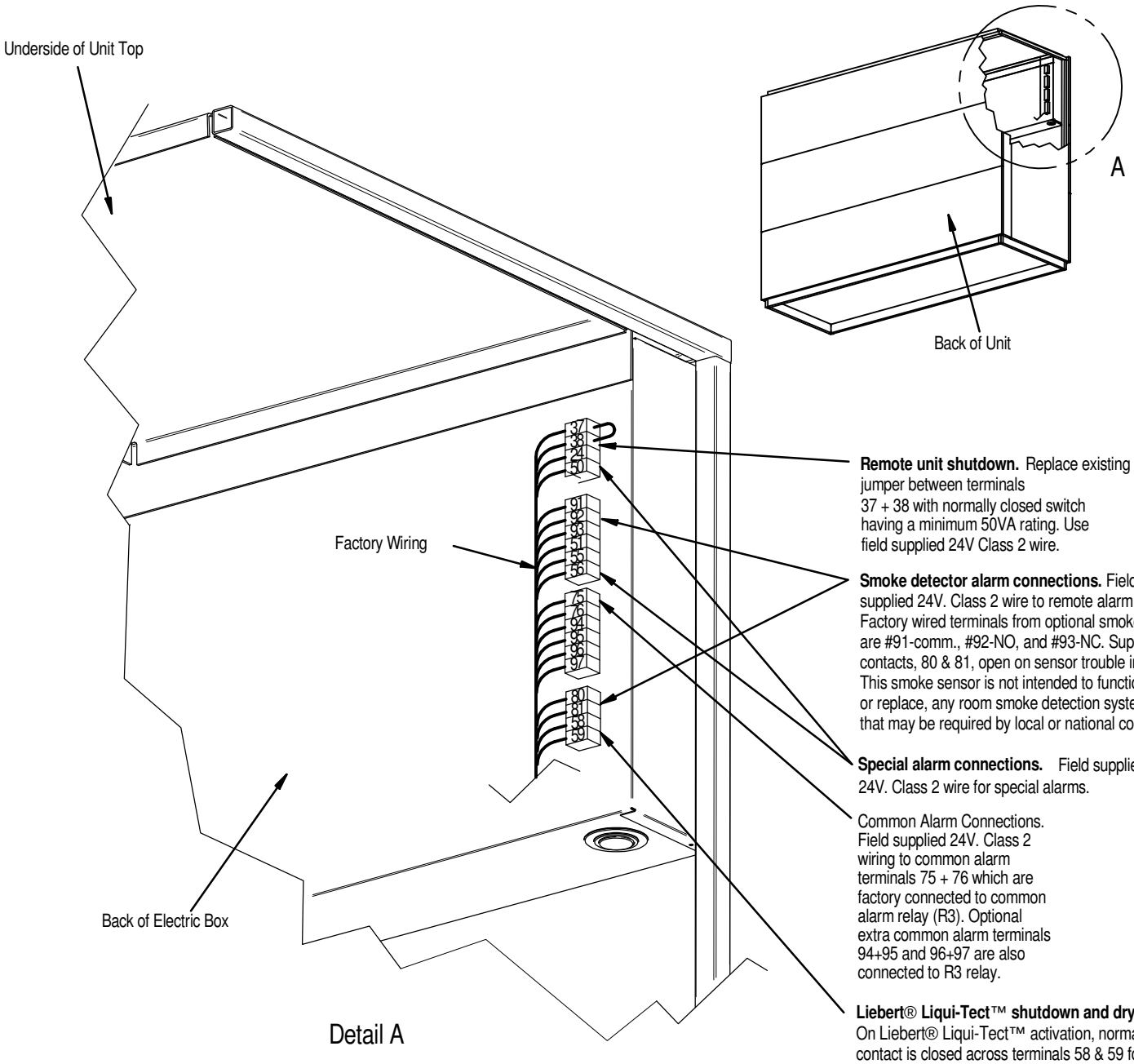
ELECTRICAL FIELD CONNECTIONS
UPFLOW MODELS CW038 - CW084 HIGH VOLTAGE



NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

LIEBERT® CW

ELECTRICAL FIELD CONNECTIONS
UPFLOW MODELS CW038 - CW084 LOW VOLTAGE



Remote unit shutdown. Replace existing jumper between terminals 37 + 38 with normally closed switch having a minimum 50VA rating. Use field supplied 24V Class 2 wire.

Smoke detector alarm connections. Field supplied 24V. Class 2 wire to remote alarm circuits. Factory wired terminals from optional smoke detector are #91-comm., #92-NO, and #93-NC. Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes.

Special alarm connections. Field supplied 24V. Class 2 wire for special alarms.

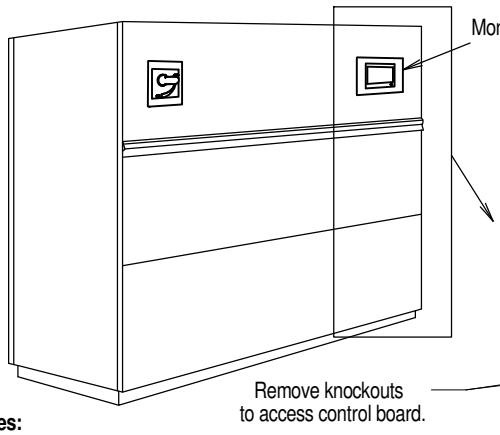
Common Alarm Connections. Field supplied 24V. Class 2 wiring to common alarm terminals 75 + 76 which are factory connected to common alarm relay (R3). Optional extra common alarm terminals 94+95 and 96+97 are also connected to R3 relay.

Liebert® Liqui-Tect™ shutdown and dry contact. On Liebert® Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Liebert® Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 2 field supplied wiring.

NOTE: REFER TO SPECIFICATION SHEET FOR FULL LOAD AMP. AND WIRE SIZE AMP. RATINGS

LIEBERT® CW

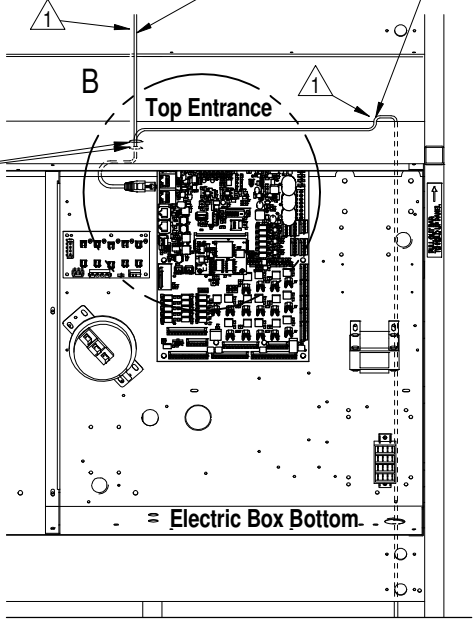
ELECTRICAL FIELD CONNECTIONS
UPFLOW MODELS CW038 - CW084 LOW VOLTAGE

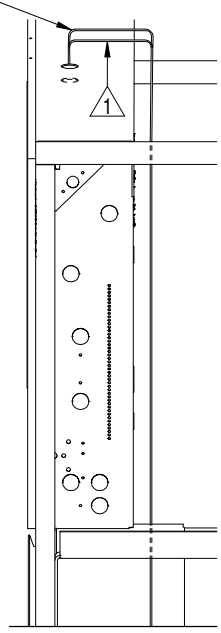


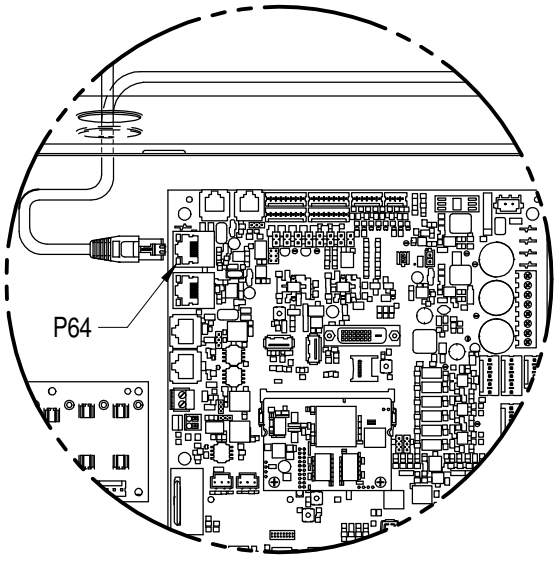
Low Voltage Communication Wiring
CAT5E Ethernet connections – field installed
Avoid routing near high voltage wiring.
Secure wiring to prevent damage and
use bushing or edge guard to avoid sharp edges.

Notes:

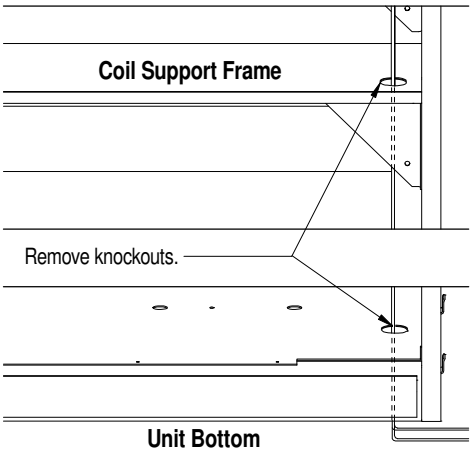
1. To provide unit to unit (U2U) networking, the customer must first connect an Ethernet cable from P64 on the Liebert® iCOM™ control board, to a network switch.

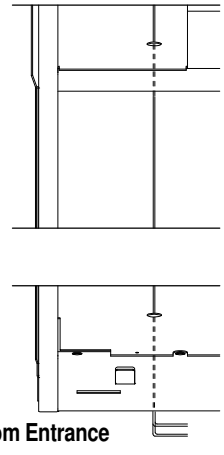






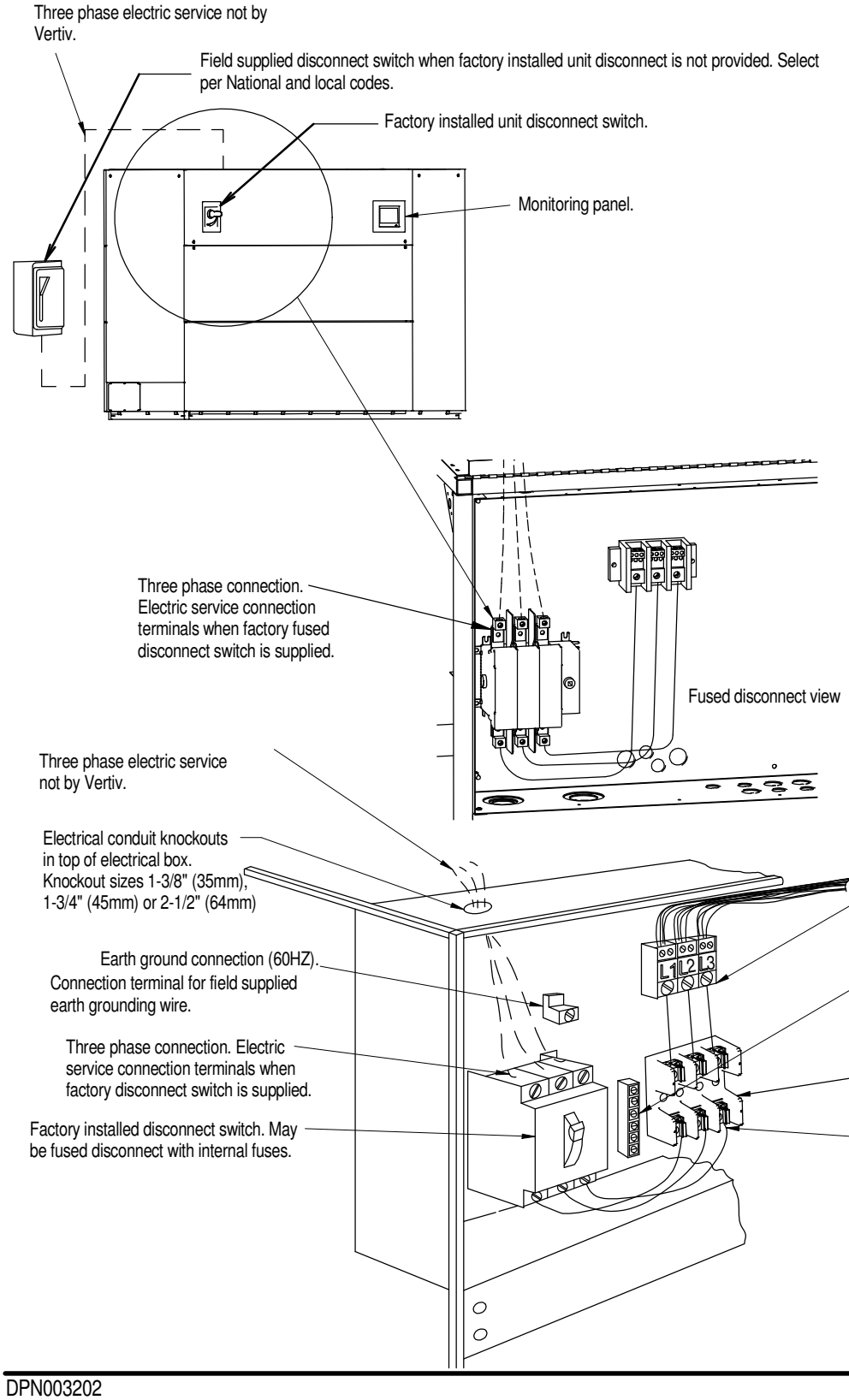
Detail B





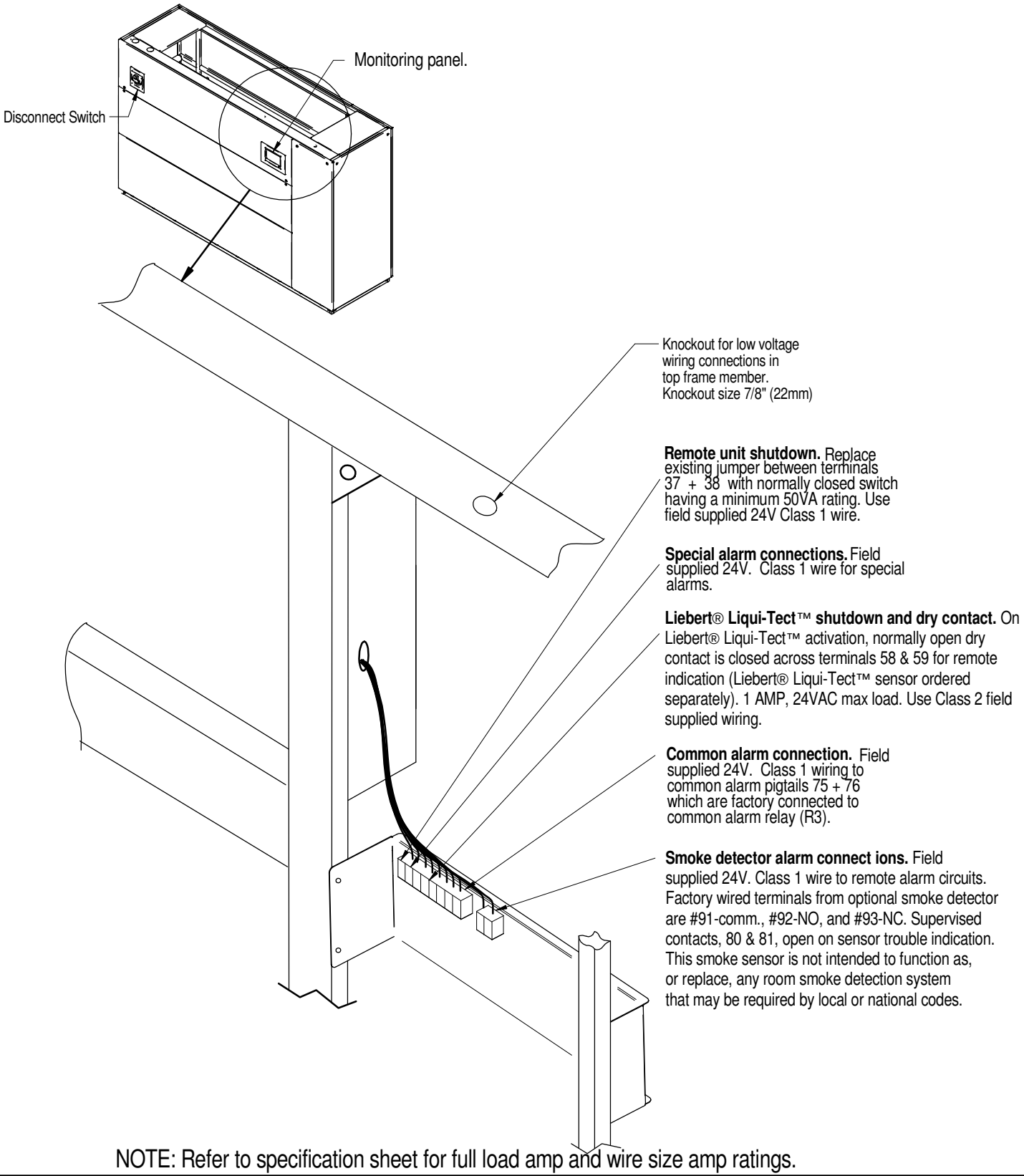
NOTE: REFER TO SPECIFICATION SHEET FOR FULL LOAD AMP. AND WIRE SIZE AMP. RATINGS

ELECTRICAL FIELD CONNECTIONS
UPFLOW MODELS CW106 - CW114 HIGH VOLTAGE



ELECTRICAL FIELD CONNECTIONS

UPFLOW MODELS CW106 & CW114 LOW VOLTAGE



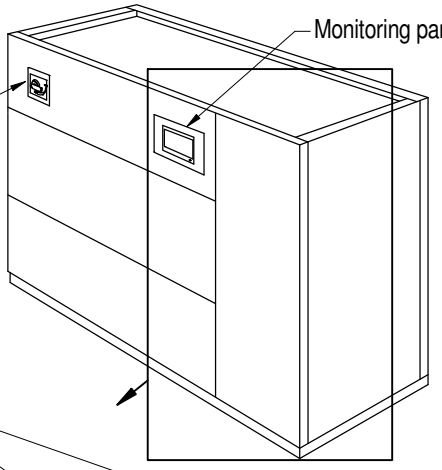
NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

LIEBERT® CW

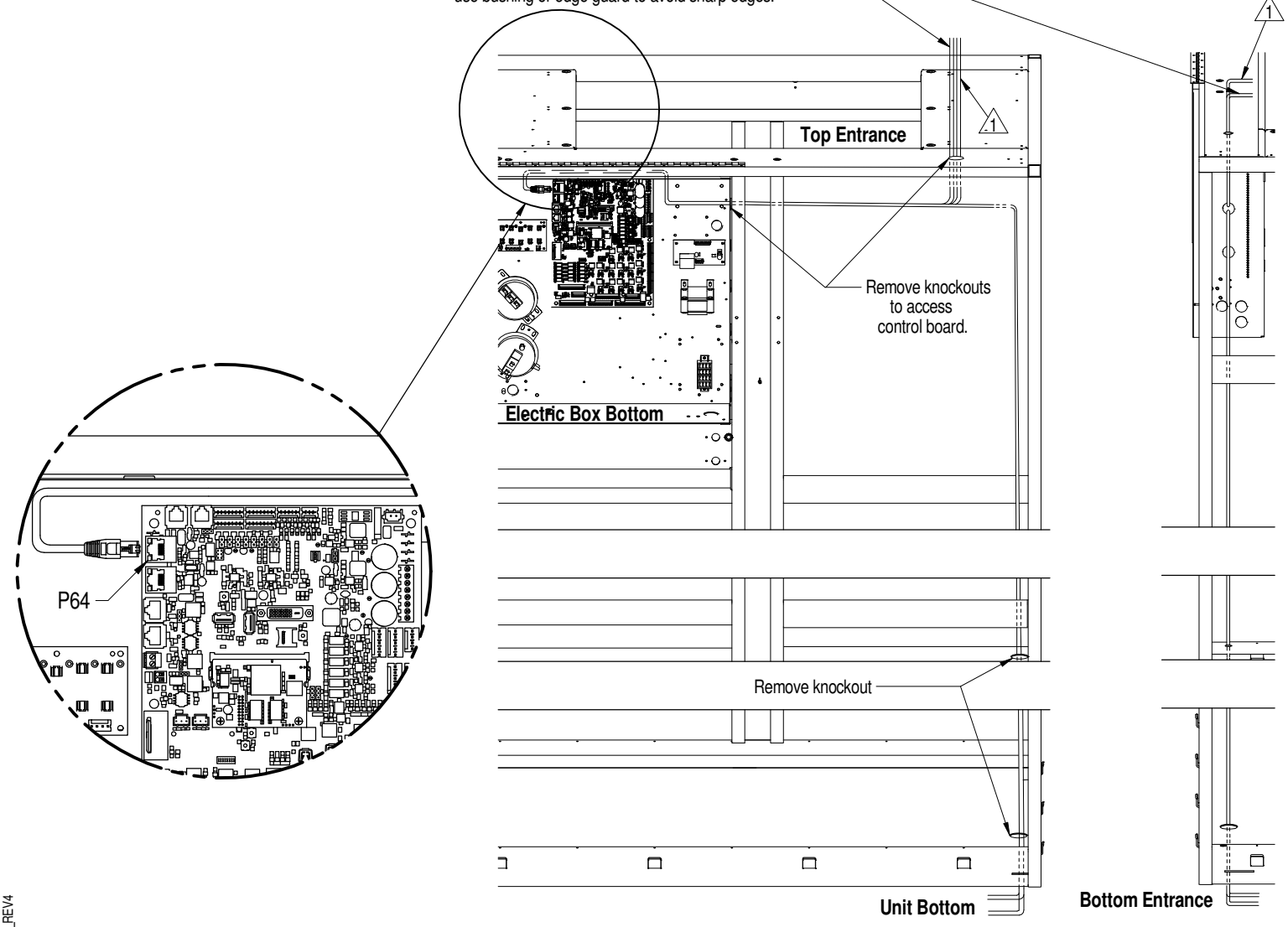
ELECTRICAL FIELD CONNECTIONS
UPFLOW MODELS CW106 & CW114 LOW VOLTAGE

Notes:

1. To provide unit to unit (U2U) networking, the customer must first connect an Ethernet cable from P64 on the Liebert® iCOM™ control board, to a network switch.



Low Voltage Communication Wiring

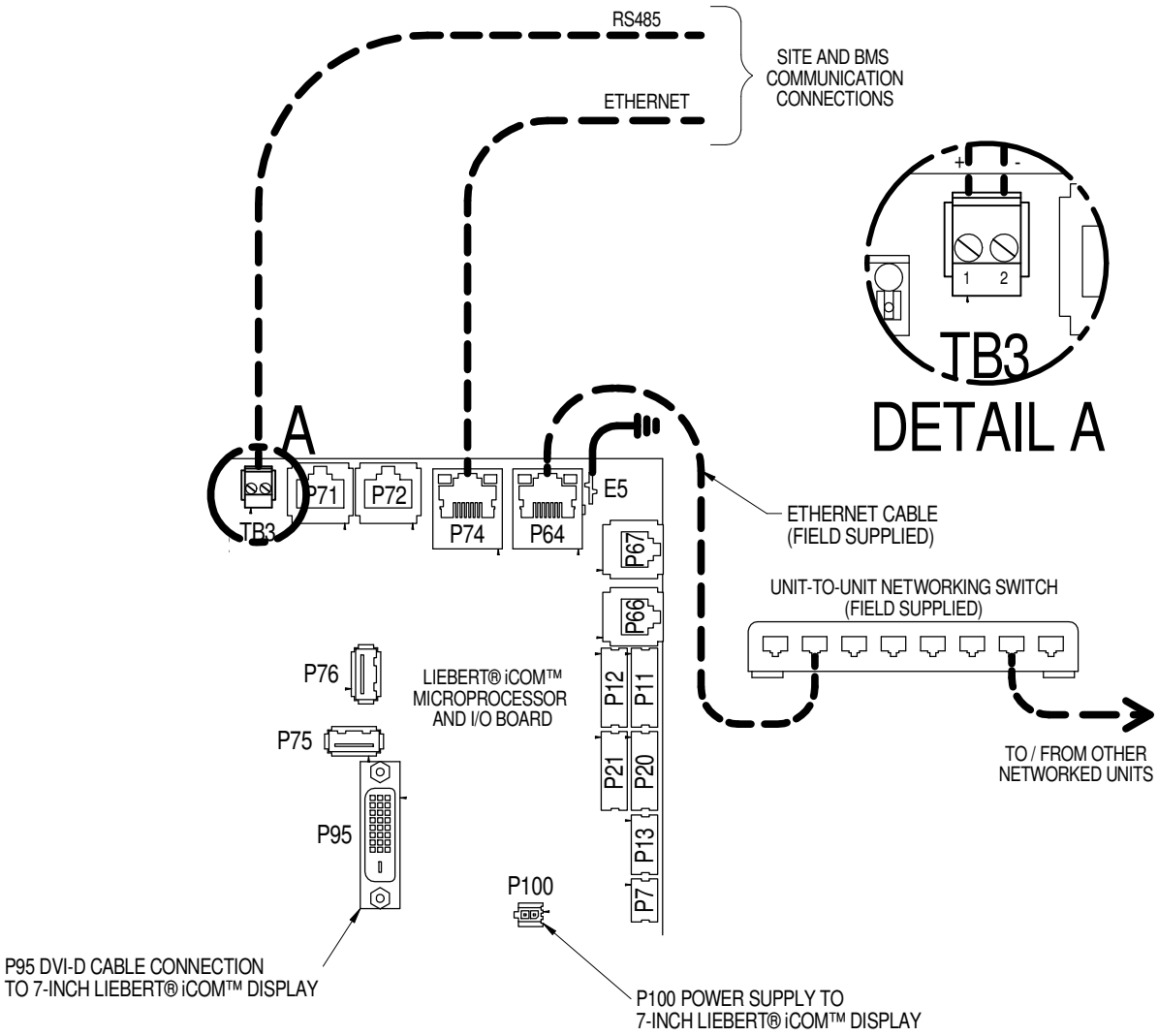


NOTE: Refer to specification sheet for full load amp and wire size amp ratings.

LIEBERT® iCOM™

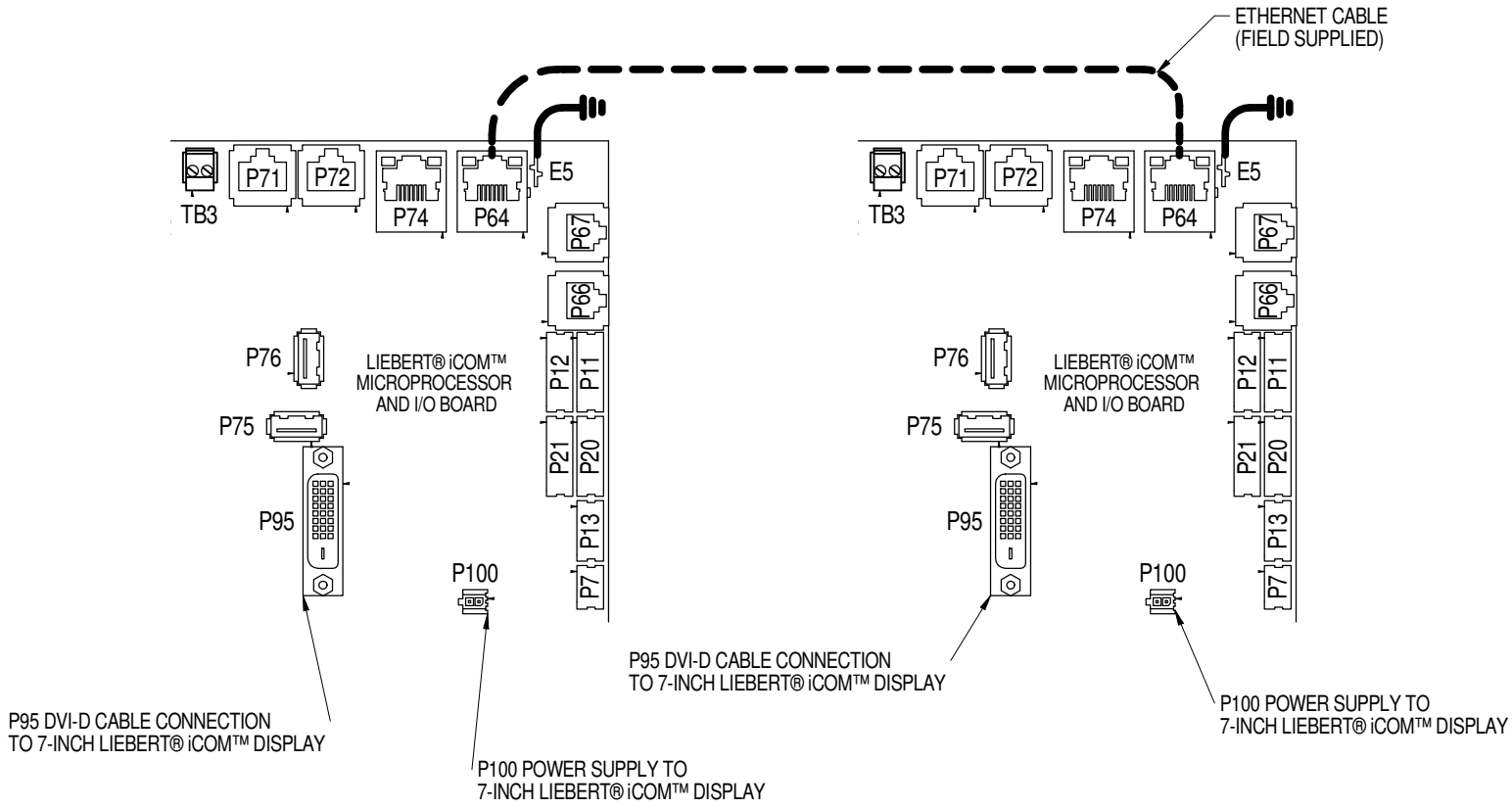
UNIT TO UNIT NETWORK CONNECTIONS

LIEBERT® CW, LIEBERT® CWA, LIEBERT® DS, LIEBERT® DSE, LIEBERT® PDX, LIEBERT® PCW



UNIT TO UNIT NETWORK CONNECTIONS

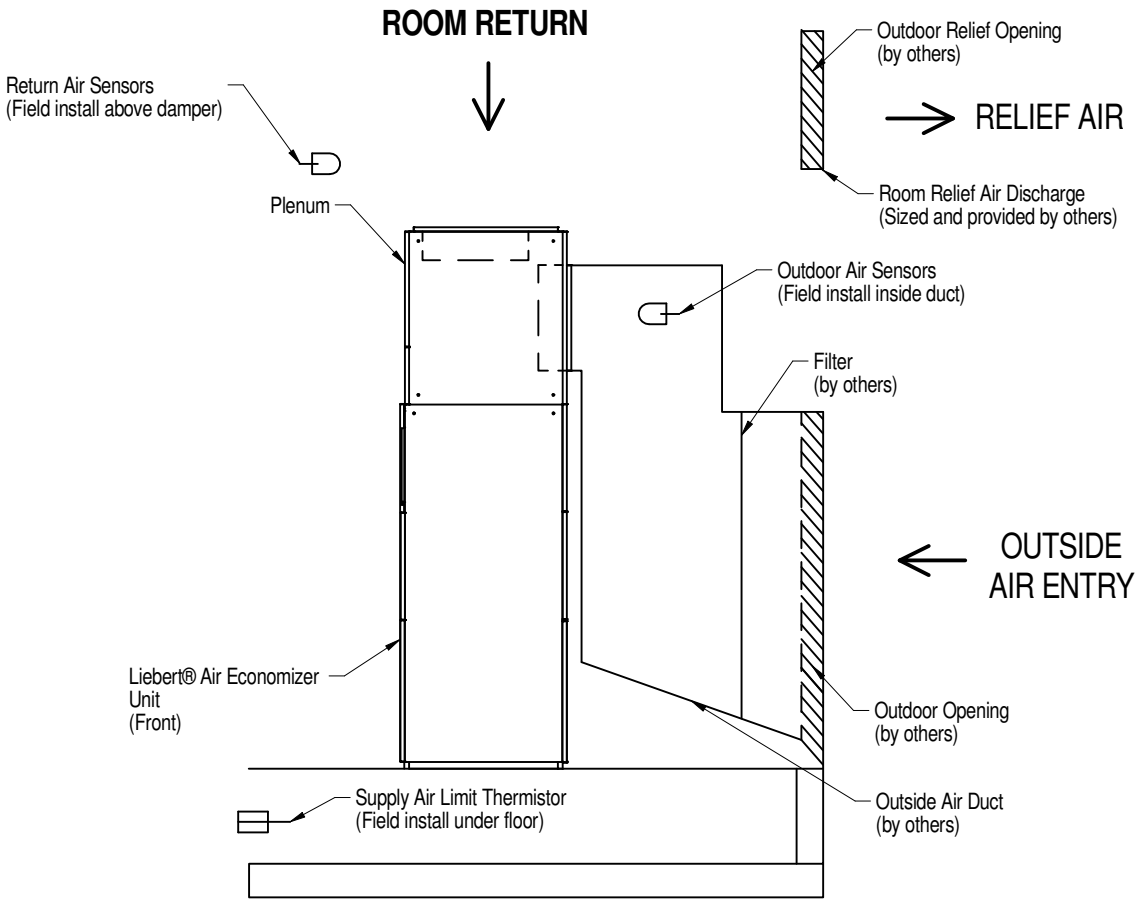
LIEBERT® CW, LIEBERT® CWA, LIEBERT® DS, LIEBERT® DSE, LIEBERT® PDX, LIEBERT® PCW



NOTE* For dual-unit network configurations only

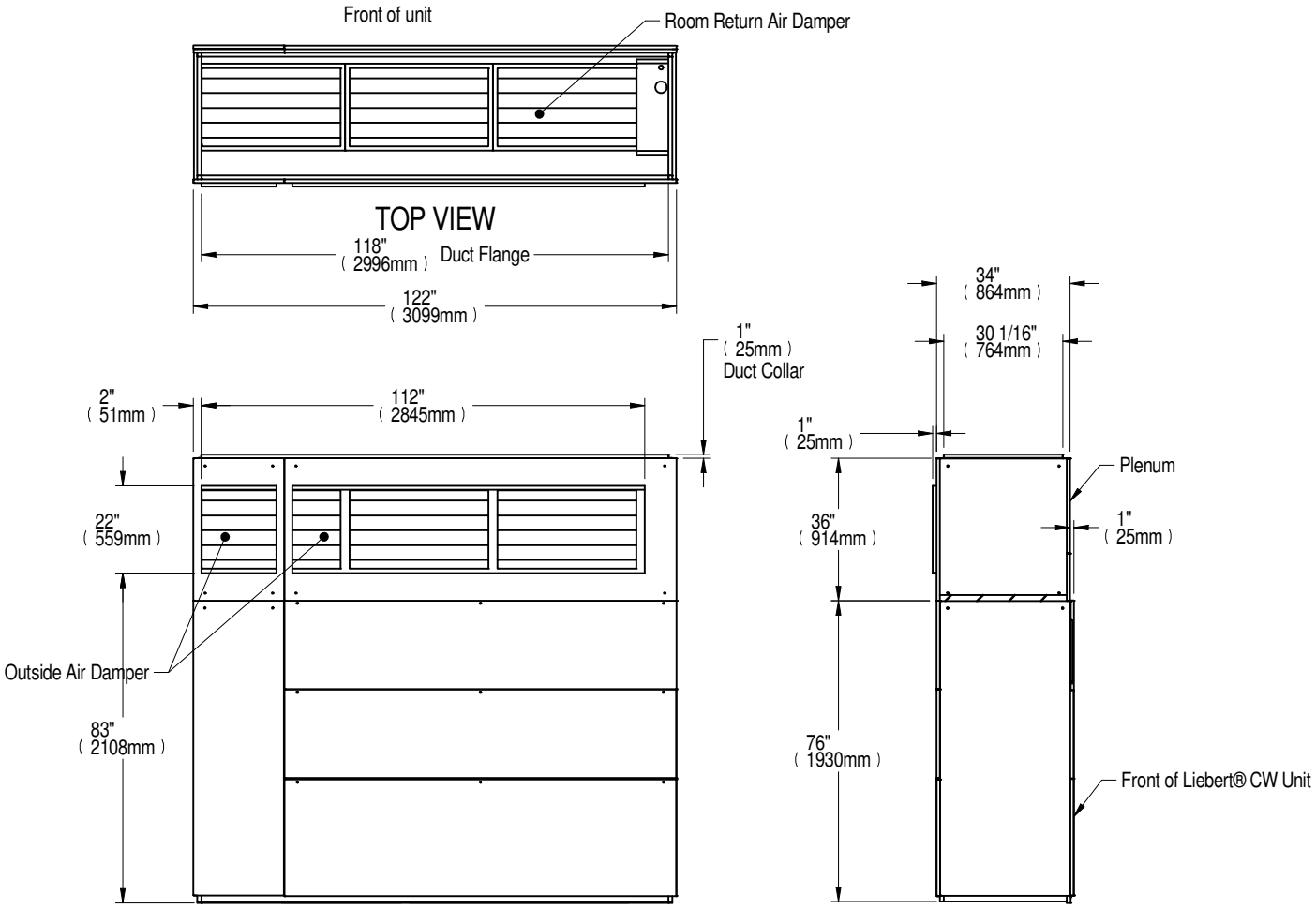
LIEBERT® AIR ECONOMIZER

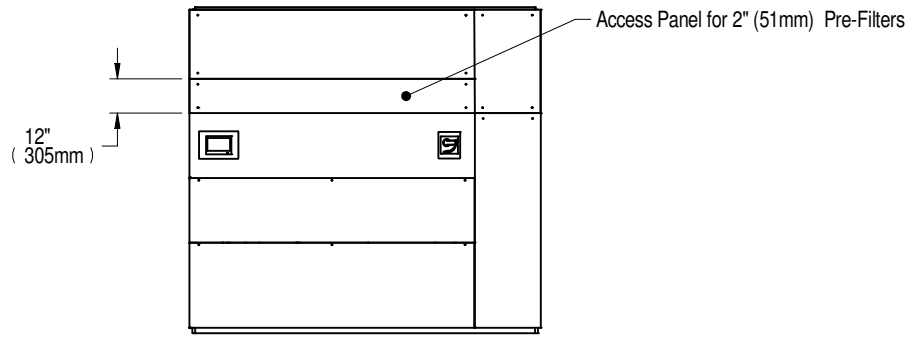
DUCTING DATA
DOWNFLOW MODELS



LIEBERT® CW

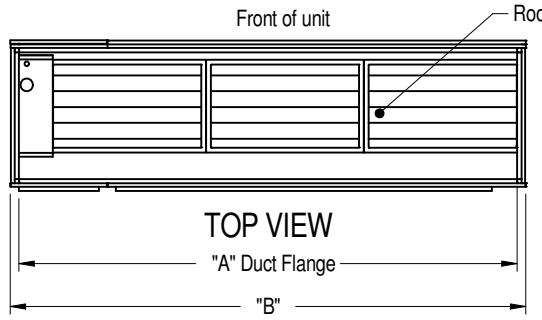
AIR ECONOMIZER DIMENSIONAL DATA
DOWNFLOW CW106 & CW114 MODELS

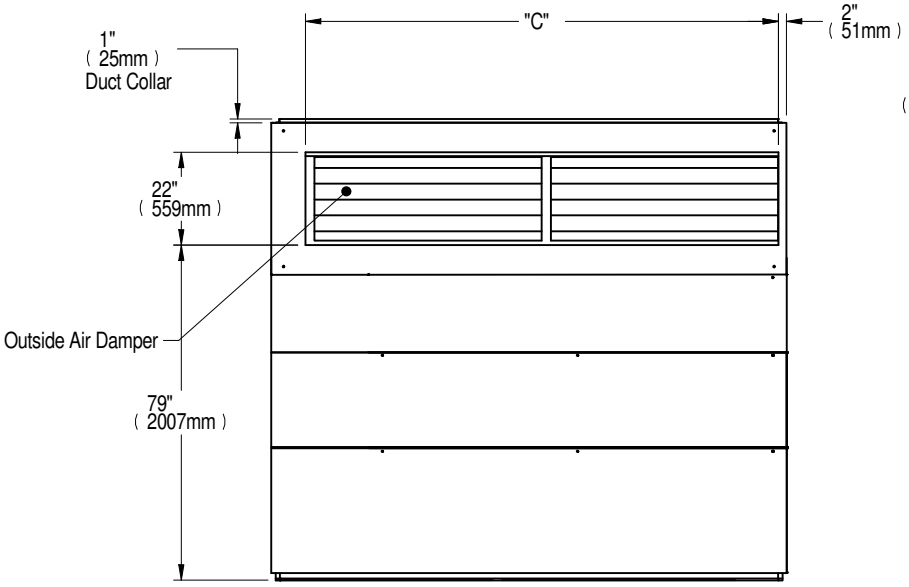




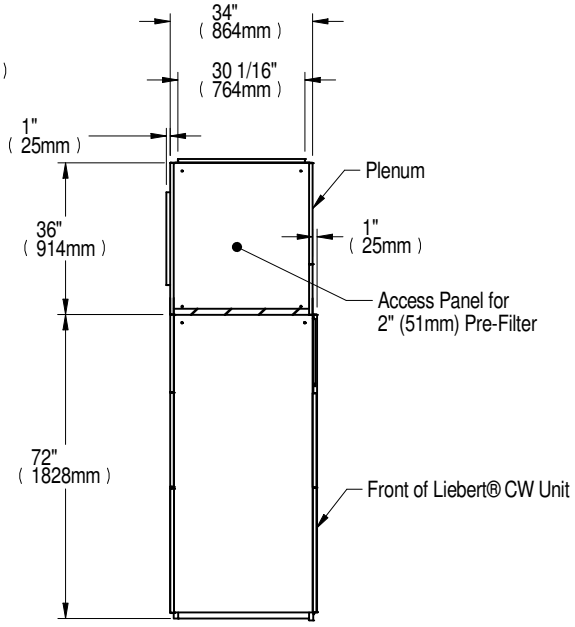
LIEBERT® CW

AIR ECONOMIZER DIMENSIONAL DATA
DOWNFLOW CW026 - CW084 MODELS

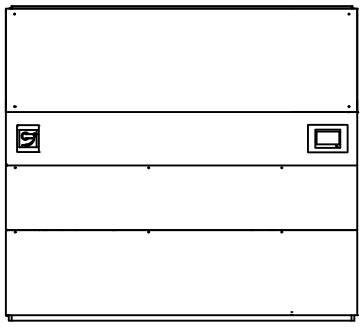




REAR VIEW



LEFT SIDE VIEW

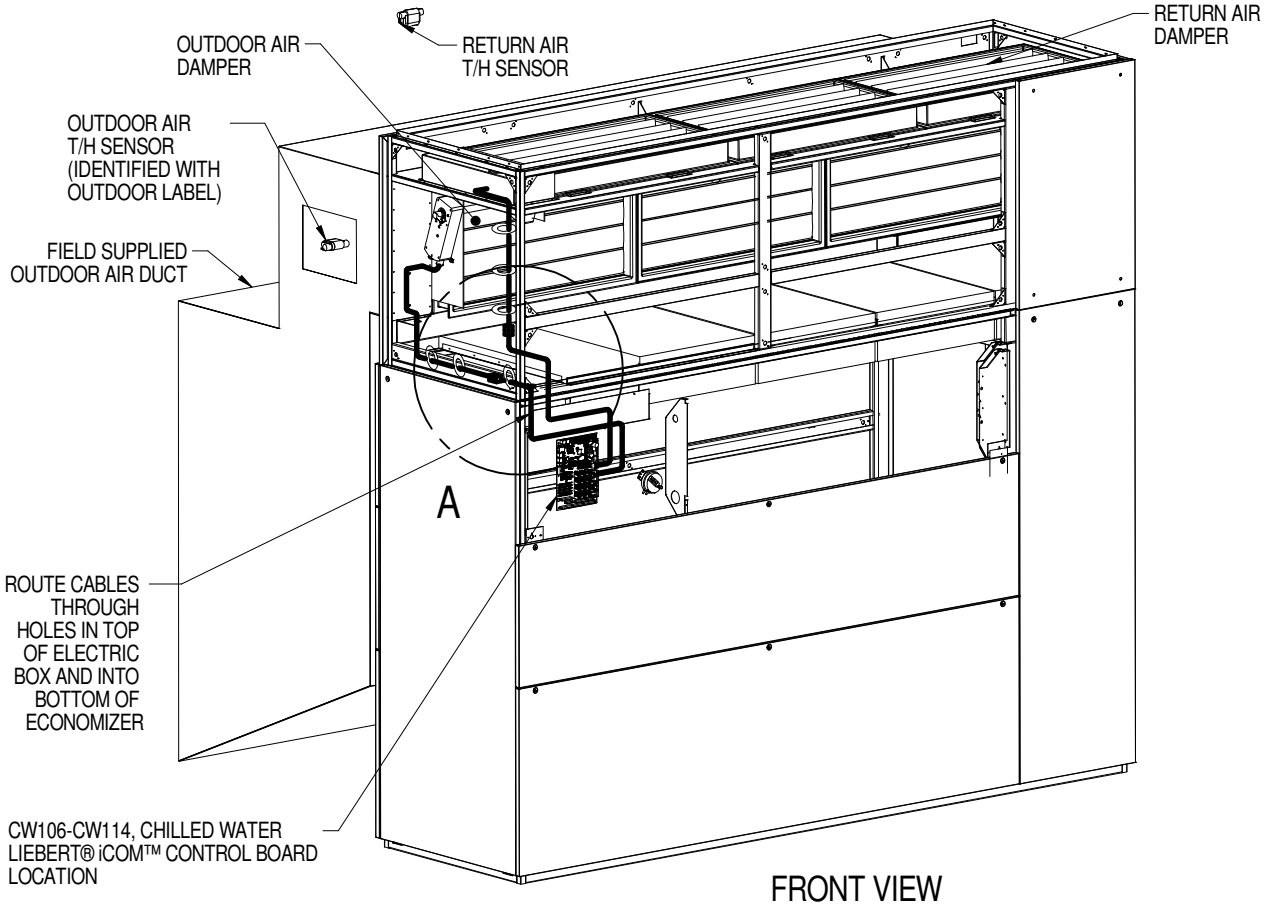


FRONT VIEW (Ref only)

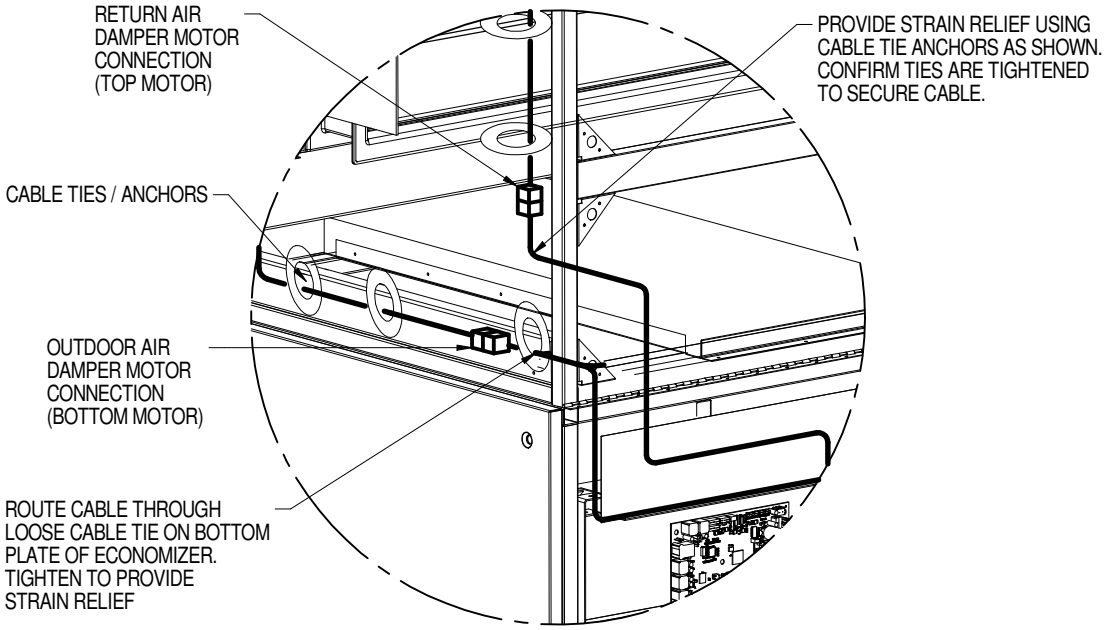
DIMENSIONAL DATA inches (mm)			
CHILLED WATER MODEL	"A"	"B"	"C"
CW038-041	46 (1168)	50 (1270)	40 (1016)
CW051-060	70 (1778)	74 (1880)	64 (1626)
CW076-084	95 (2413)	99 (2515)	89 (2261)

AIR ECONOMIZER FIELD CONNECTION DATA

DAMPER WIRING CW106 & CW114 MODELS



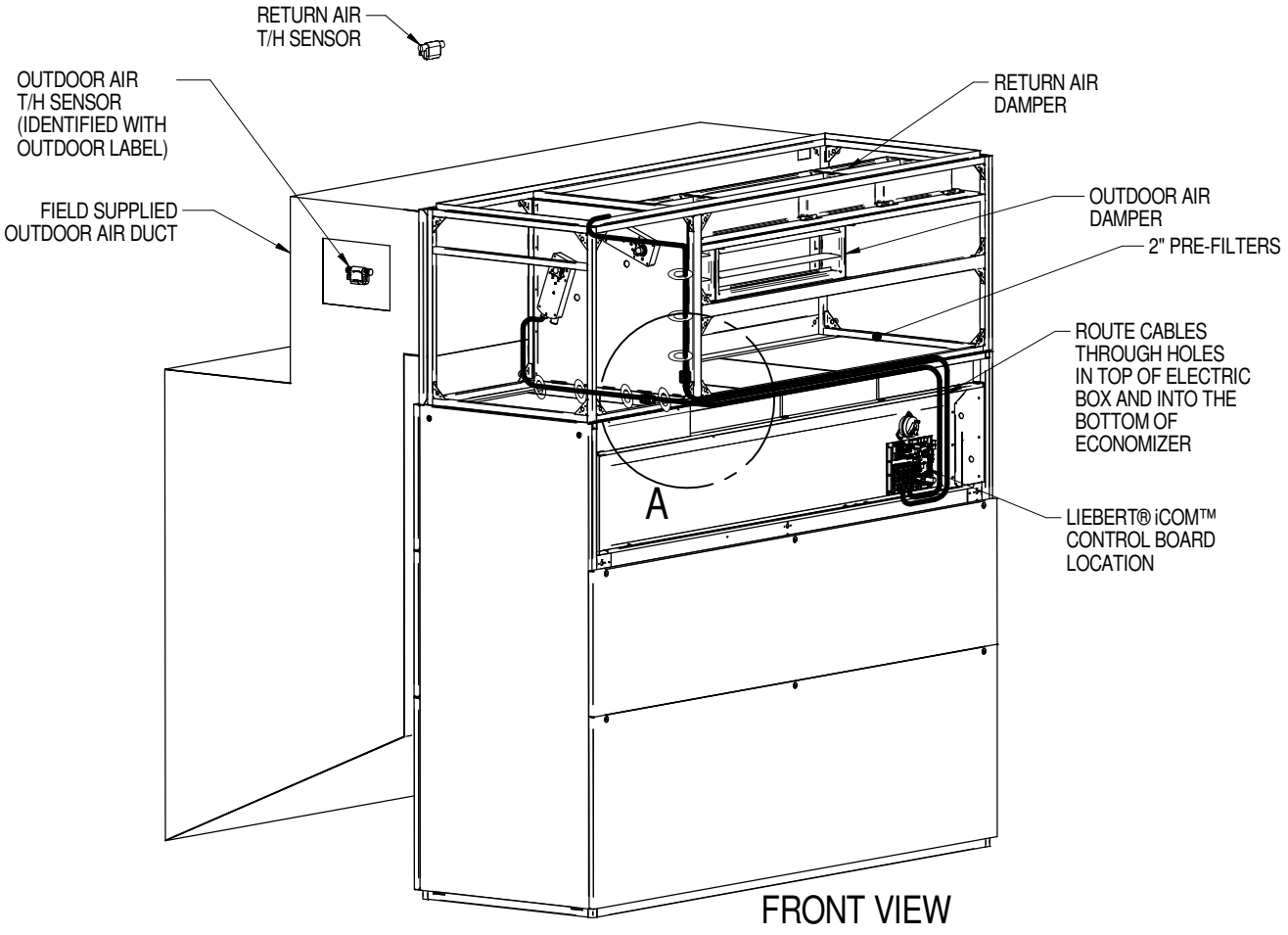
FRONT VIEW

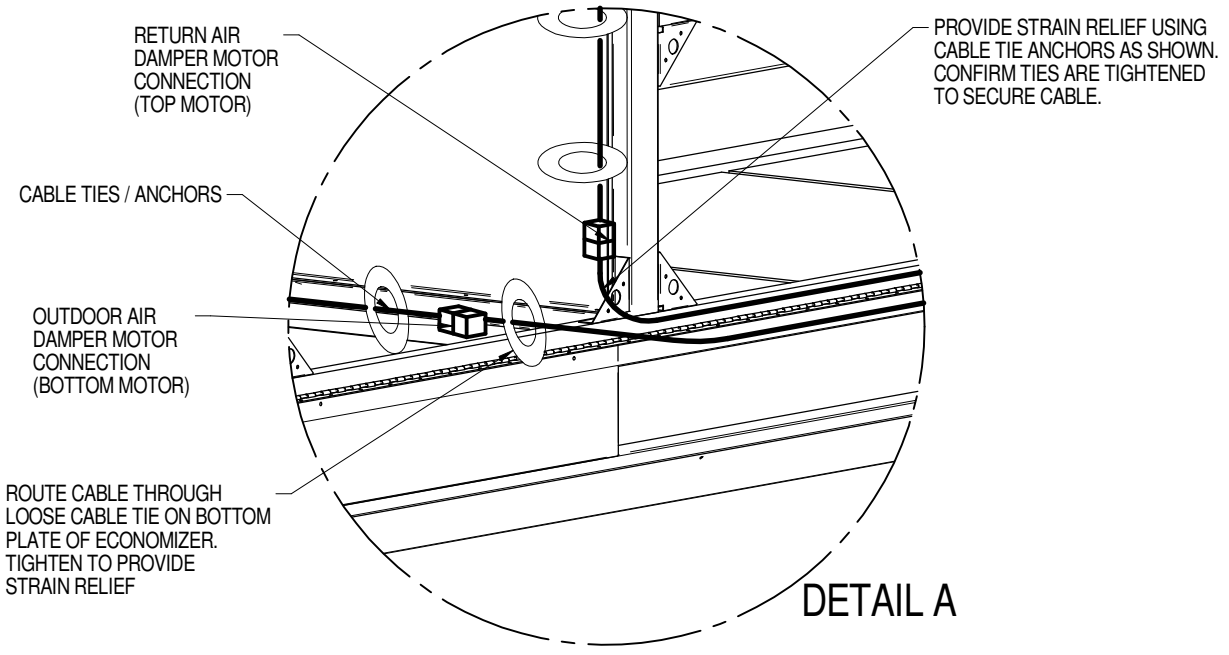


DETAIL A

AIR ECONOMIZER FIELD CONNECTION DATA

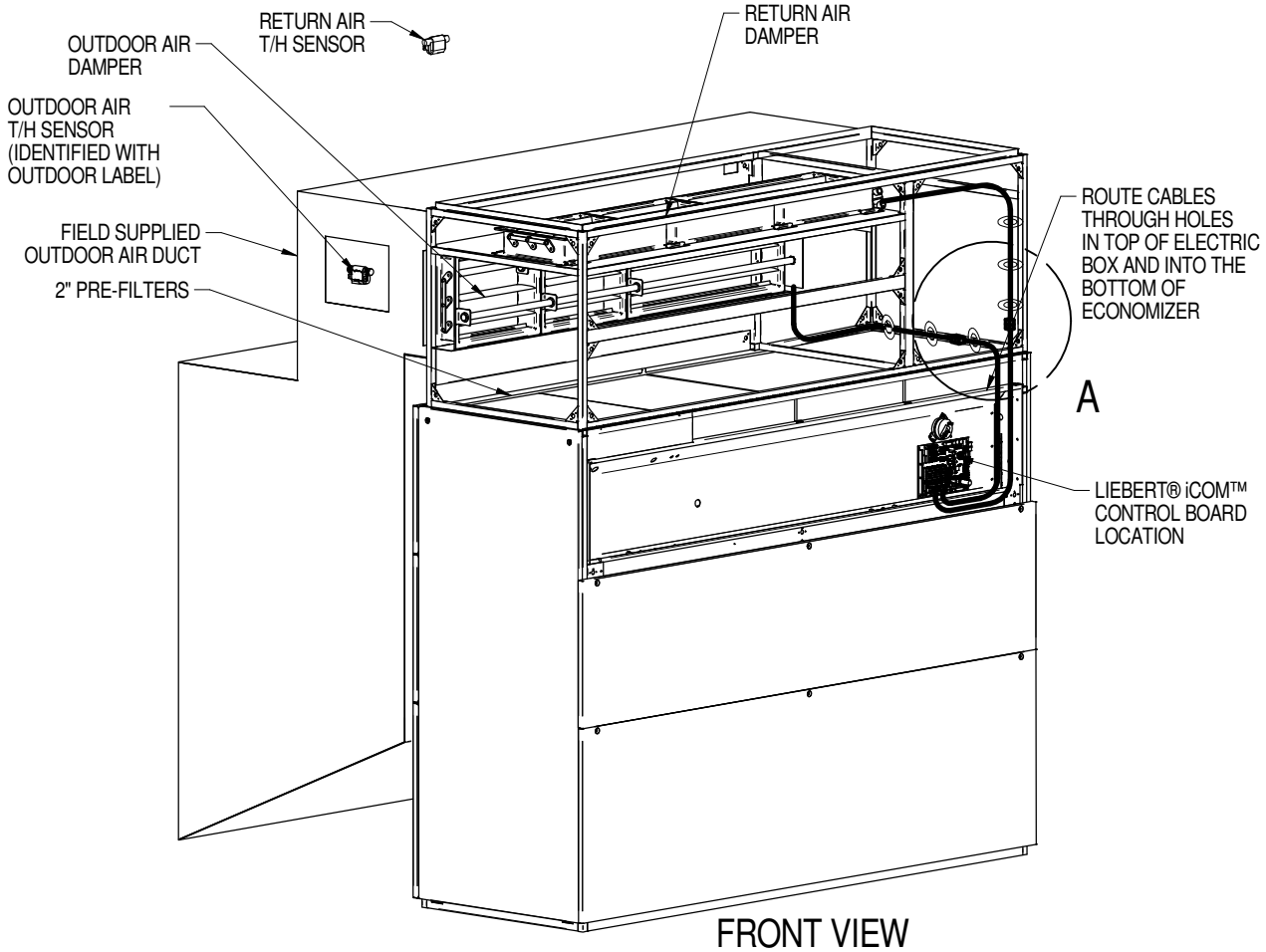
DAMPER WIRING DS MODELS



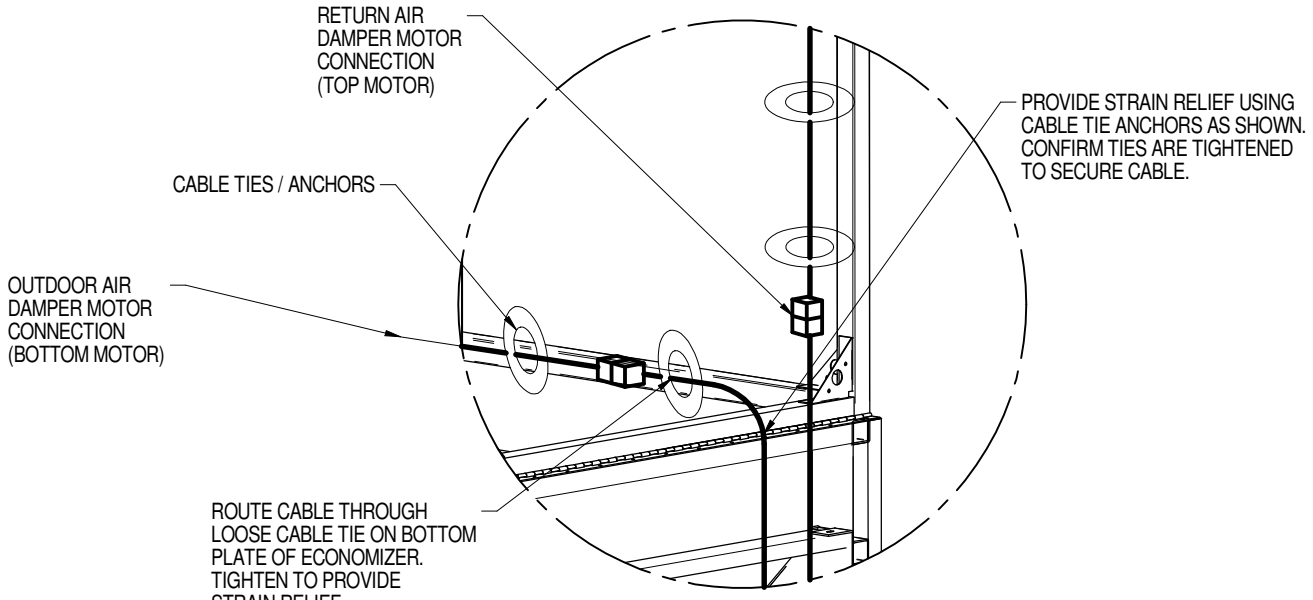


AIR ECONOMIZER FIELD CONNECTION DATA

DAMPER WIRING CW038 - CW084 MODELS



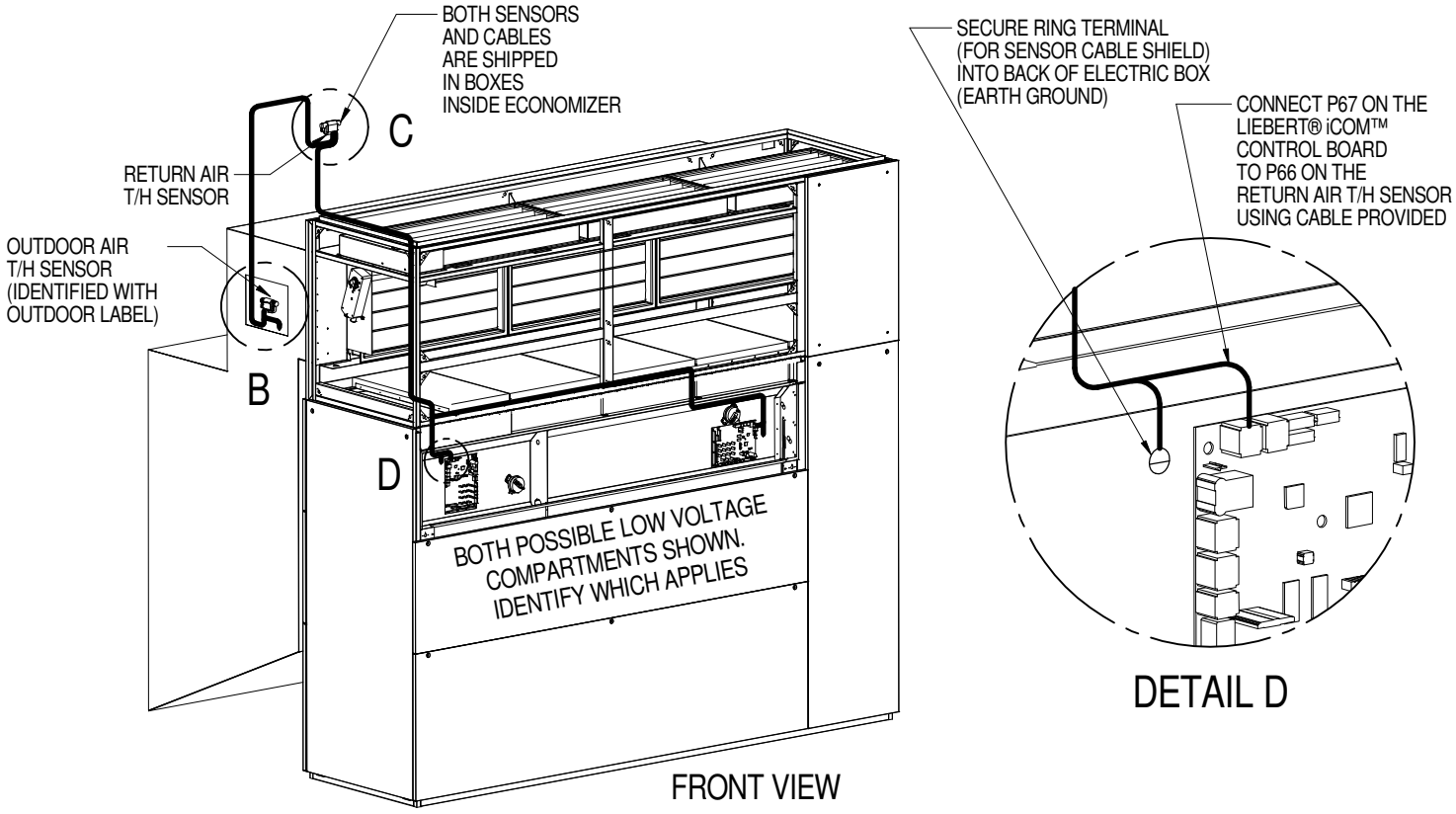
FRONT VIEW

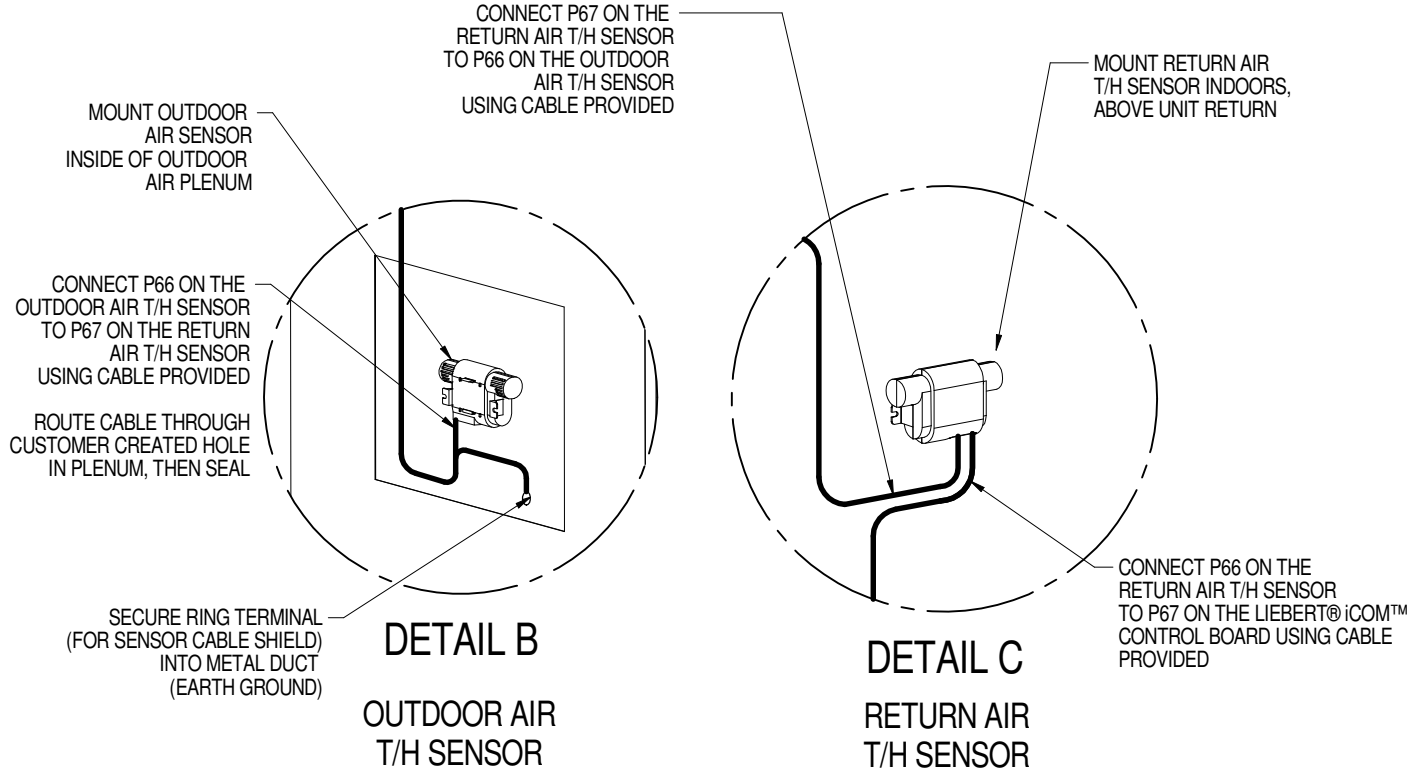


DETAIL A

AIR ECONOMIZER FIELD CONNECTION DATA

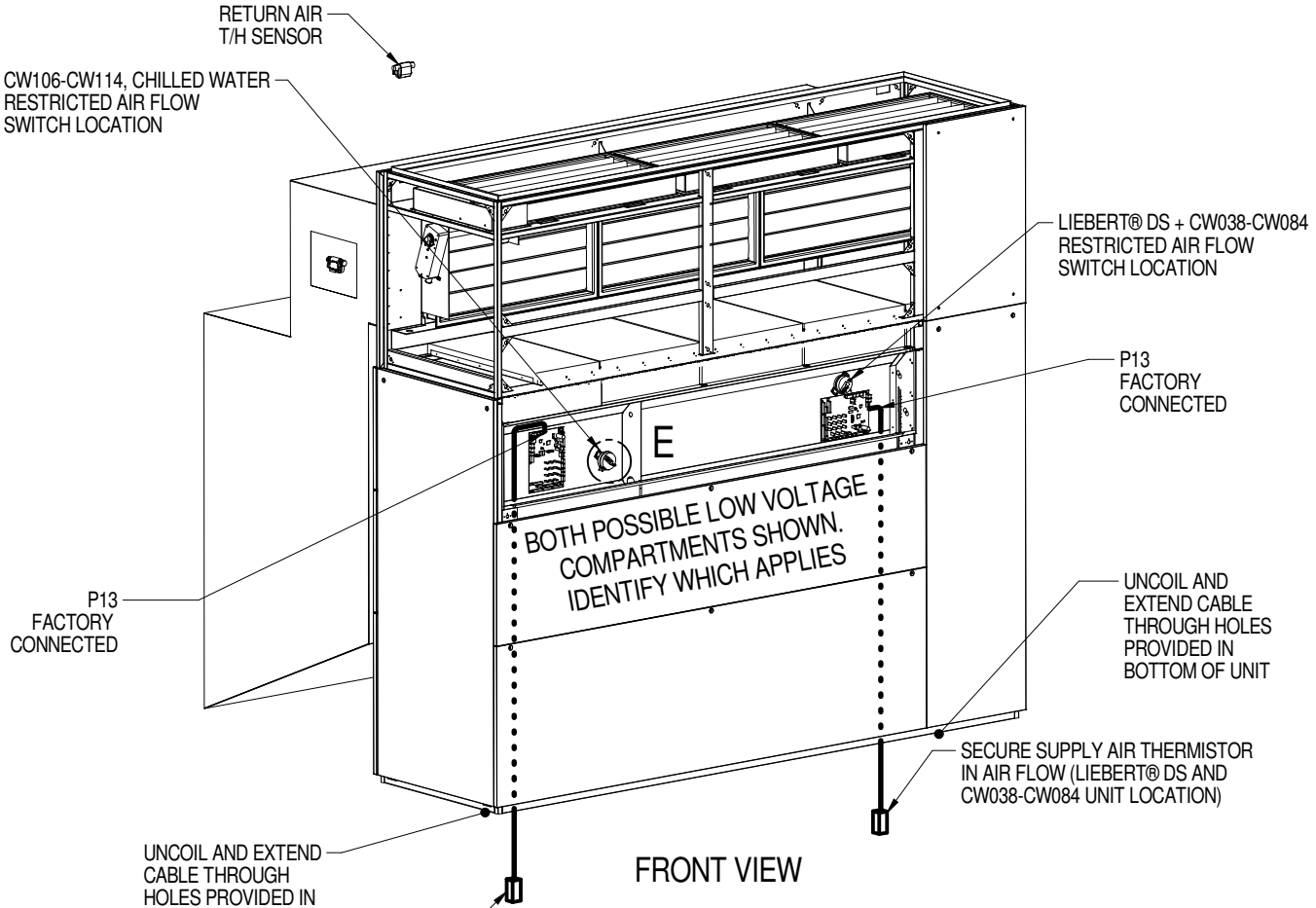
TEMPERATURE AND HUMIDITY SENSOR WIRING



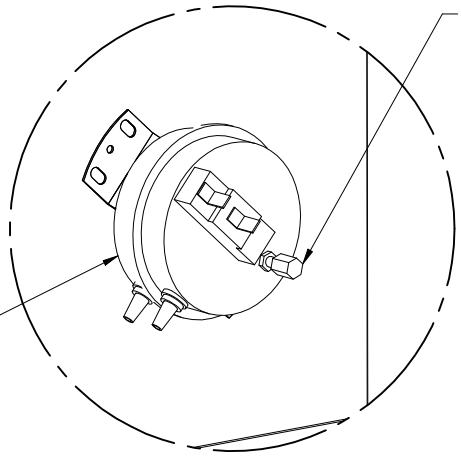


AIR ECONOMIZER FIELD CONNECTION DATA

SUPPLY LIMIT THERMISTOR WIRING AND RESTRICTED AIRFLOW SWITCH ADJUSTMENT



FRONT VIEW

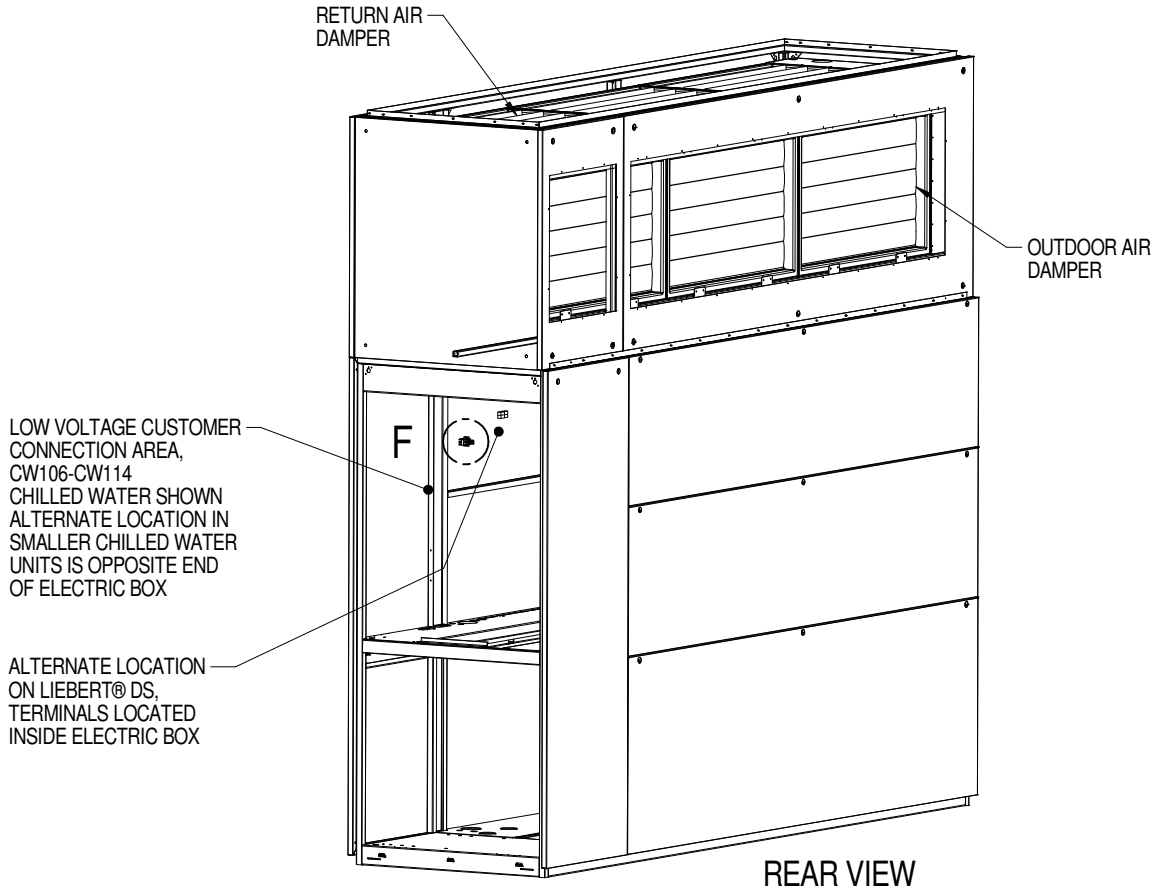


ADJUSTMENT INSTRUCTIONS:
1. UNIT MUST BE RUNNING.
2. TURN ADJUSTMENT KNOB CLOCKWISE UNTIL YOU HEAR IT TRIP (UNIT WILL ALSO ALARM)
3. TURN BACK COUNTERCLOCKWISE:
   - 1/2 TURN FOR STANDARD UNITS
   - 1 TURN FOR UNITS WITH VFD
   - OR TO DESIRED SETPOINT

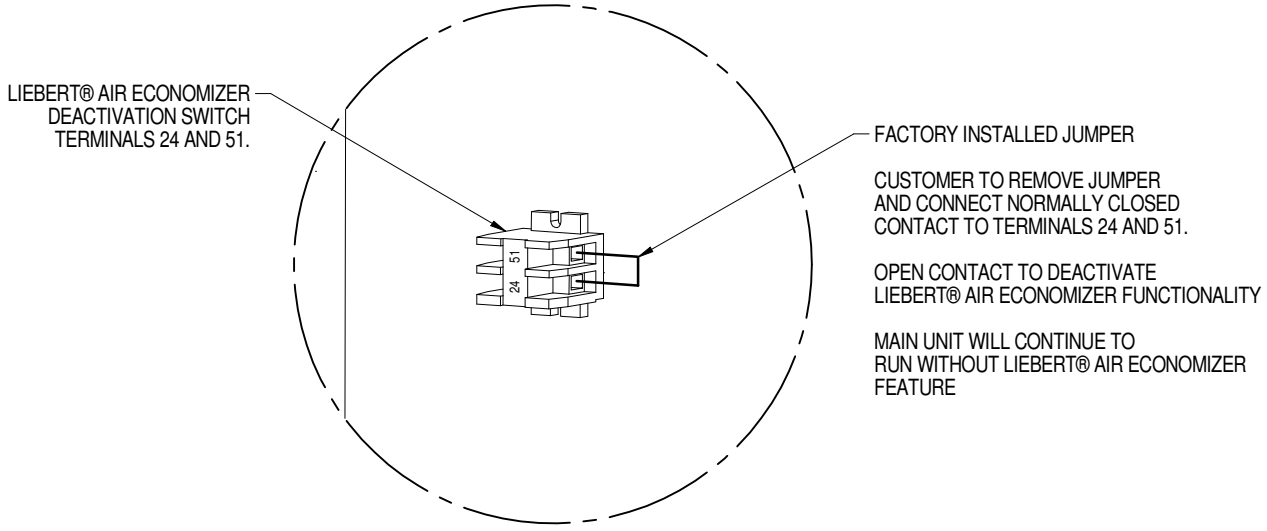
DETAIL E
RESTRICTED AIR FLOW SWITCH

AIR ECONOMIZER FIELD CONNECTION DATA

AIR ECONOMIZER DEACTIVATION SWITCH TERMINALS LOCATION



REAR VIEW



DETAIL F

SEISMIC APPLICATION ASSUMPTIONS AND REQUIREMENTS

The International Code Council's International Building Code (IBC) has become the primary code document for the design and installation of building systems. Vertiv has conducted analytical modeling and dynamic shake table testing of the Liebert® CW product to provide an option for those systems requiring seismic certification of compliance. This certification goes beyond the equipments In critical applications the equipment must be capable of performing its primary function after a seismic event within the limit of certification.

Certification Criteria

The Liebert® CW certification is based on a maximum mapped spectral response acceleration, S_s, of 3.0g adjusted by the soil site coefficient to Soil Site Class D as the default when the site soil properties or final equipment installation location is not known. The certification maximum spectral response coefficient S_{ds} value of 2.0g including Soil Class and Seismic Use group corrections. Soil Classes A, B, C, D, E, and Seismic Design Categories A, B, C, D, E, and F are all covered under this certification, limited by the Sds value stated above. A seismic importance factor, Ip, of 1.5 applies to this certification to include essential facility requirements and life safety applications for post event functionality.

Requirements for Anchorage

Anchors

1. Mounting requirement details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record.

Anchorage Surface

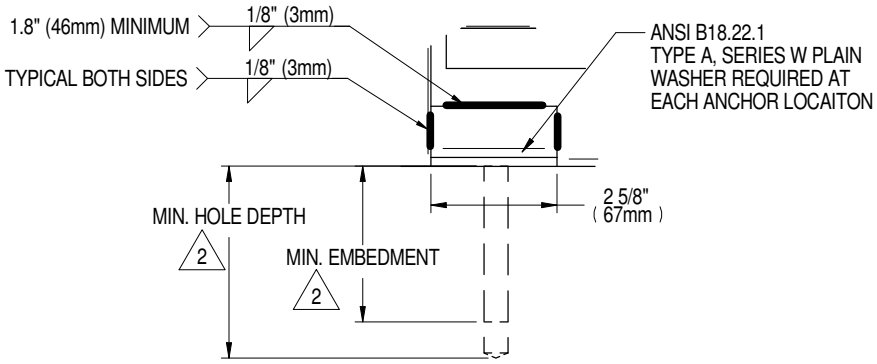
2. Structural floors, and housekeeping pads must also be seismically designed and approved by the project Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact the Manufacturer's Representative if a detailed Seismic Installation Calculation Package is required.

Connections to Unit

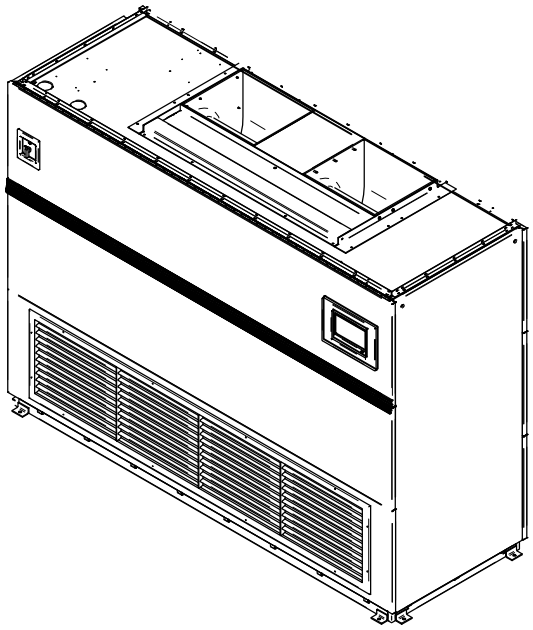
3. Electrical wiring, conduit, and/or other connections to the equipment is the responsibility of others. Data and recommendations are supplied here and in the unit installation supplement for seismic installation.

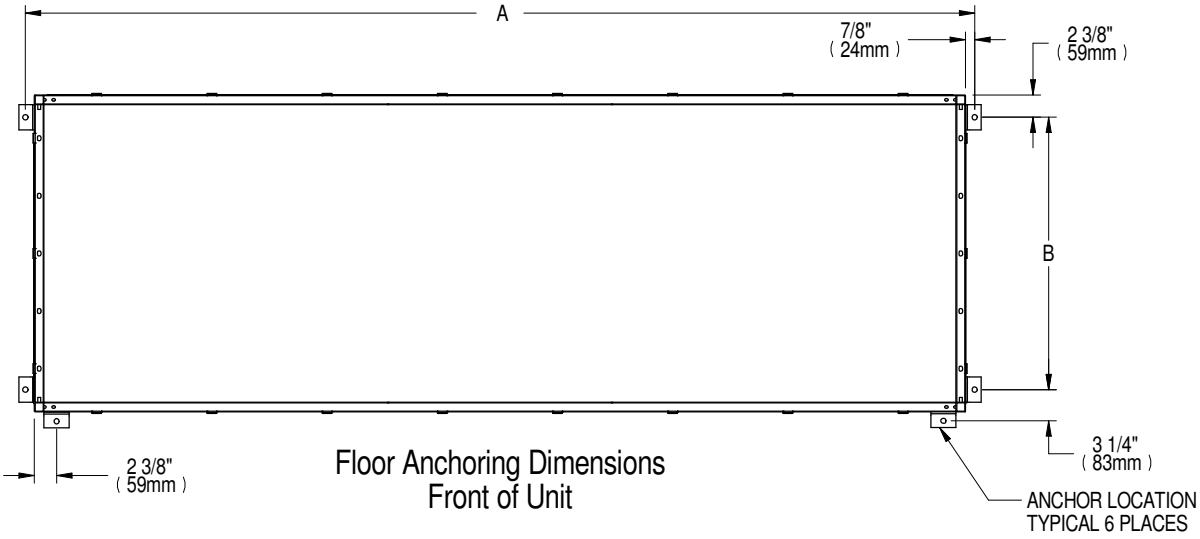
DIMENSIONAL DATA

SEISMIC ANCHORAGE UPFLOW UNITS W/ FORWARD CURVED BLOWERS



Field Welding of Anchor Bracket
Typ. (4) Plcs





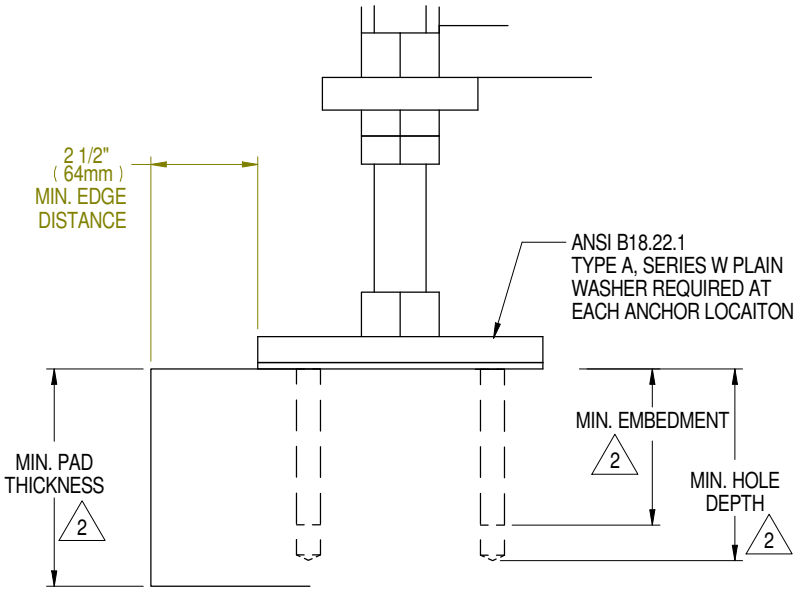
Floor Anchoring Dimensions
Front of Unit

Notes:

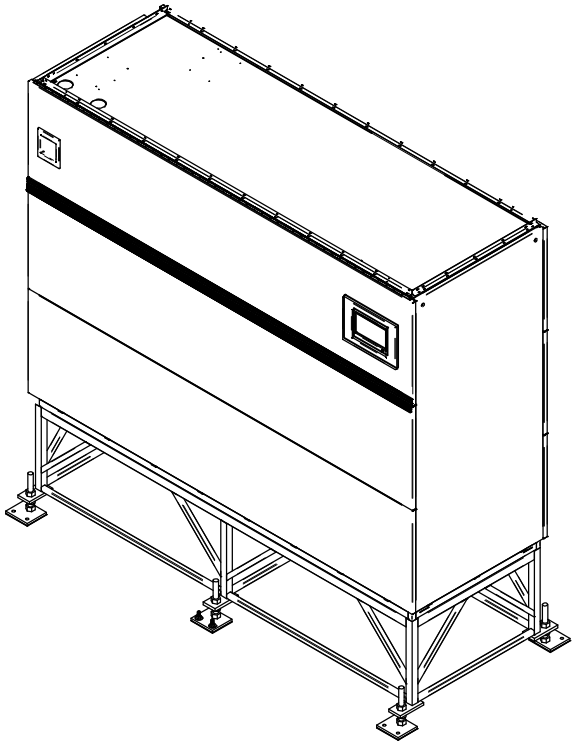
1. Anchor Bolt sized per Hilti Kwik Bolt TZ Carbon and Stainless in concrete, ICC ESR-1917. Alternates are subject to review by Vertiv or Engineer of Record.
2. Specified by Engineer of Record.

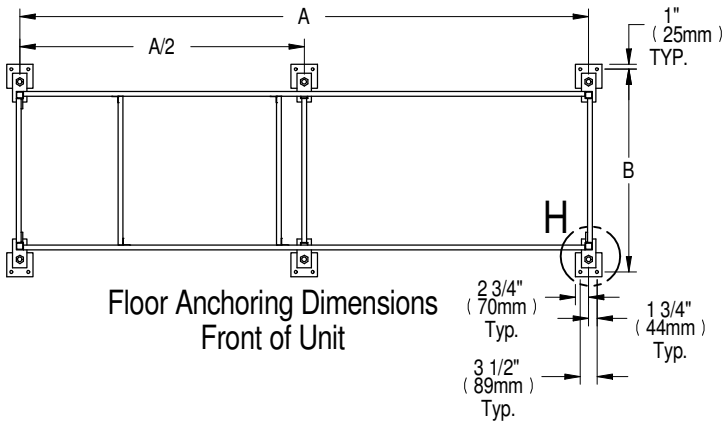
UPFLOW MODEL NUMBER	DIMENSIONAL DATA inches (mm)		ANCHOR SIZE 1
	A	B	
CW038, CW041	50 (1270)	29 (37)	1/2"
CW051, CW060	74 (1880)		
CW076, CW084	99 (2515)		
CW106, CW114	122 (3099)		

DIMENSIONAL DATA
SEISMIC ANCHORAGE RIGID FLOORSTAND W/ EC FANS

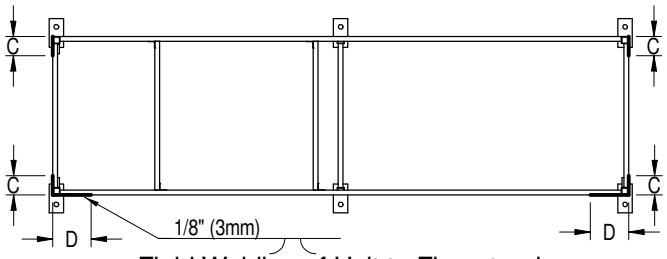


Anchor Detail
Typ (6) Plcs





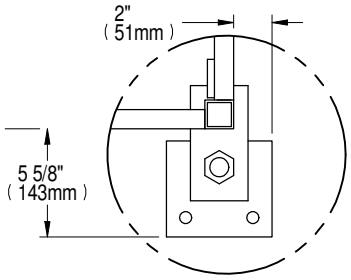
Floor Anchoring Dimensions
Front of Unit



Field Welding of Unit to Floorstand
Unit must be welded to floorstand to maintain certification

Notes:

1. Anchor Bolt sized per Hilti Kwik Bolt TZ Carbon and Stainless in concrete, ICC ESR-1917. Alternates are subject to review by Vertiv or Engineer of Record.
2. Specified by Engineer of Record.

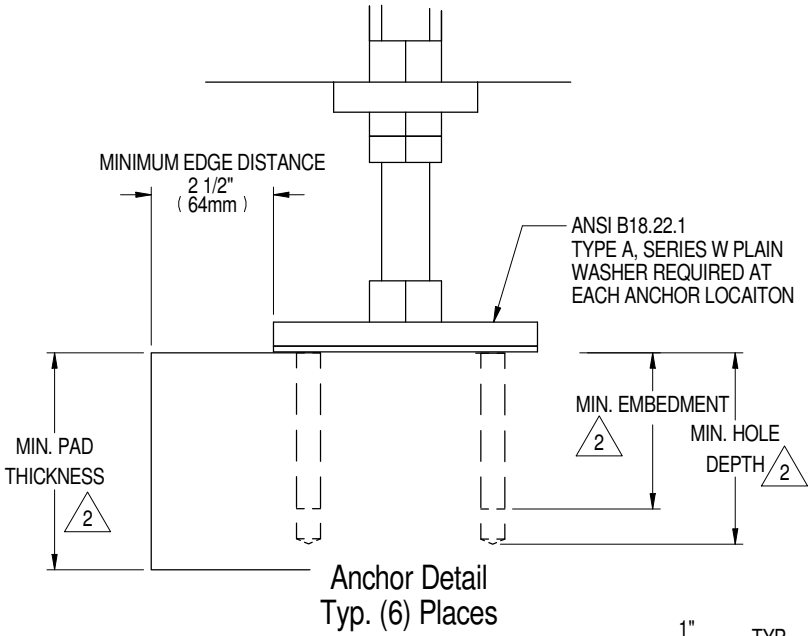


Dimensions are from
Anchor Base to Panels

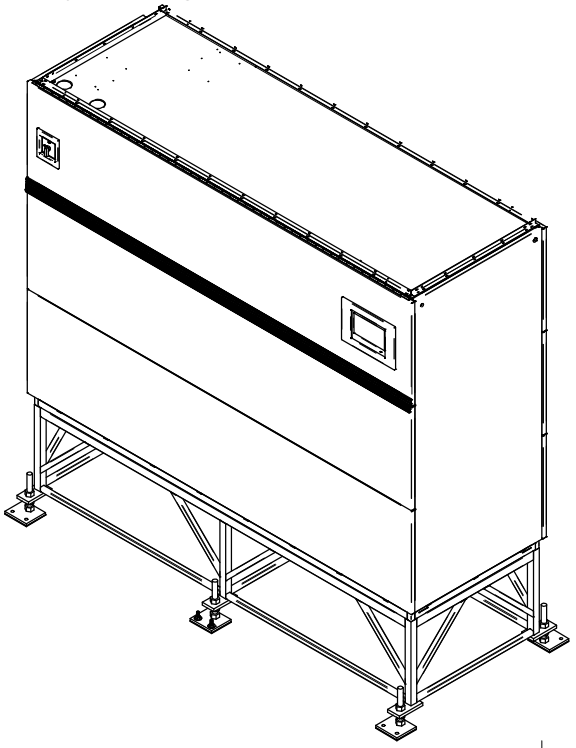
MODEL NUMBER	ANCHOR SIZE 1	DIMENSIONAL DATA inches (mm)			
		A	B	C	D
CW038, CW041	1/2"	46-1/2 (1181)	42-5/16 (1074)	3 (76)	4 (102)
CW051, CW060		70-1/2 (1791)			
CW076, CW084		95-1/2 (2426)		4 (102)	6 (152)
CW106, CW114	1/2"	118-1/2 (3010)			
CW146, CW181			54-5/16 (1379)	6 (152)	8 (203)

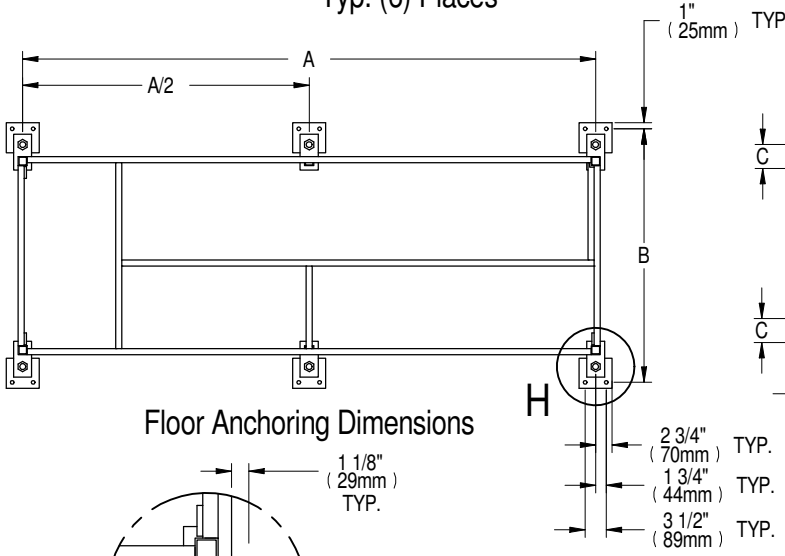
DIMENSIONAL DATA

SEISMIC ANCHORAGE RIGID FLOORSTAND W/ FORWARD CURVED BLOWERS

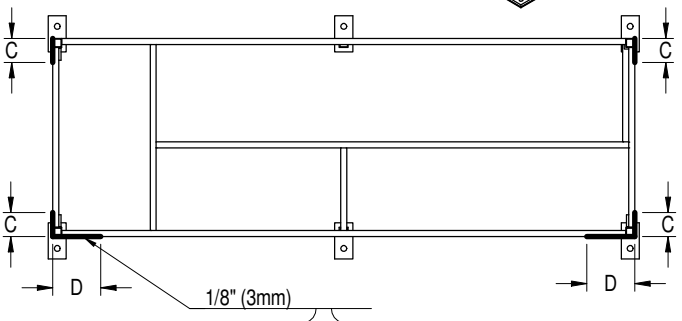


Anchor Detail
Typ. (6) Places

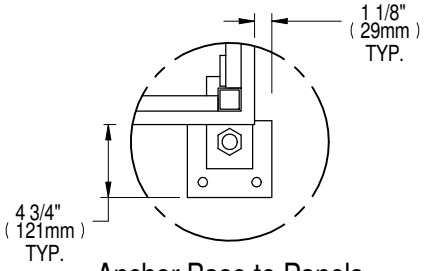




Floor Anchoring Dimensions



Field Welding of Unit to Floorstand
Unit must be welded to Floorstand
to maintain certification



Anchor Base to Panels

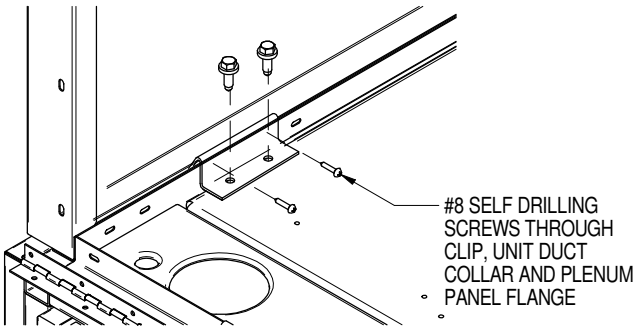
MODEL NUMBER	ANCHOR SIZE 1	DIMENSIONAL DATA inches (mm)			
		A	B	C	D
CW038, CW041	1/2"	46.5 (118	42.3 (1073)	3.0 (76)	4.0 (102)
CW051, CW060		70.5 (1791)			
CW076, CW084		95.5 (2426)		4.0 (102)	6.0 (152)
CW106, CW114		118.5 (3010)			
CW146, CW181			54.3 (1378)	6.0 (152)	8.0 (203)

Notes:

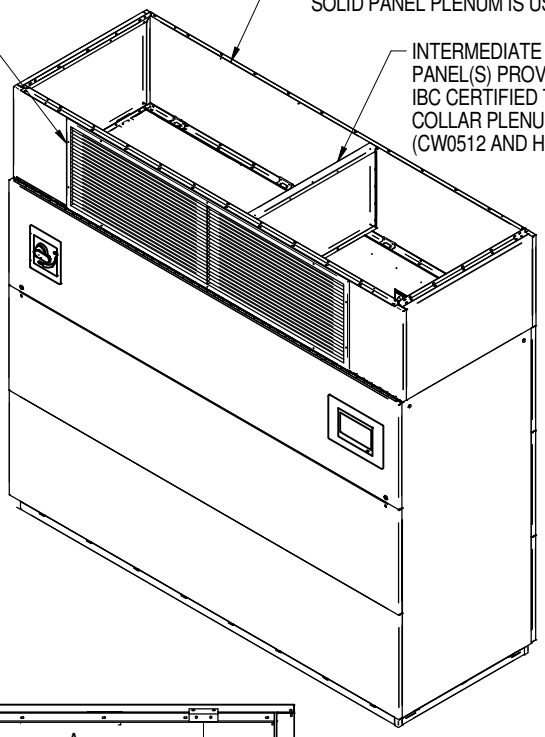
1. Anchor Bolt sized per Hilti Kwik Bolt TZ Carbon and Stainless in concrete, ICC ESR-1917. Alternates are subject to review by Vertiv or Engineer of Record.
2. Specified by Engineer of Record.

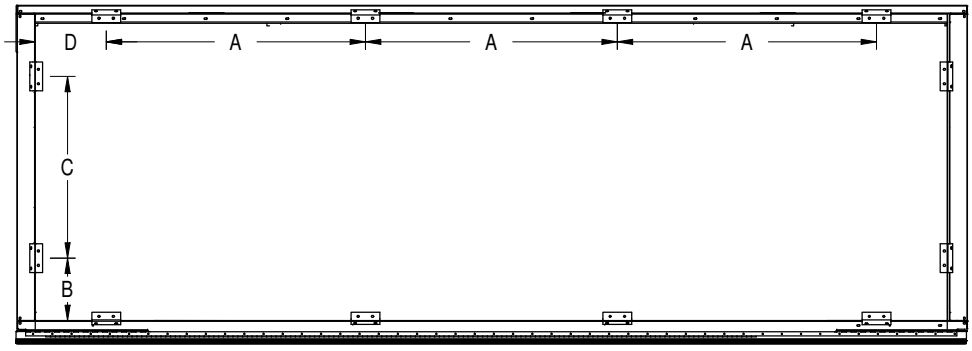
SEISMIC DATA

PLENUM MOUNTING FOR UPFLOW UNITS W/ FORWARD CURVED BLOWERS



Plenum Hold-Down Clip Detail
(Front Panel removed for clarity)
All clips & fasteners are required
to maintain IBC certification of conformity



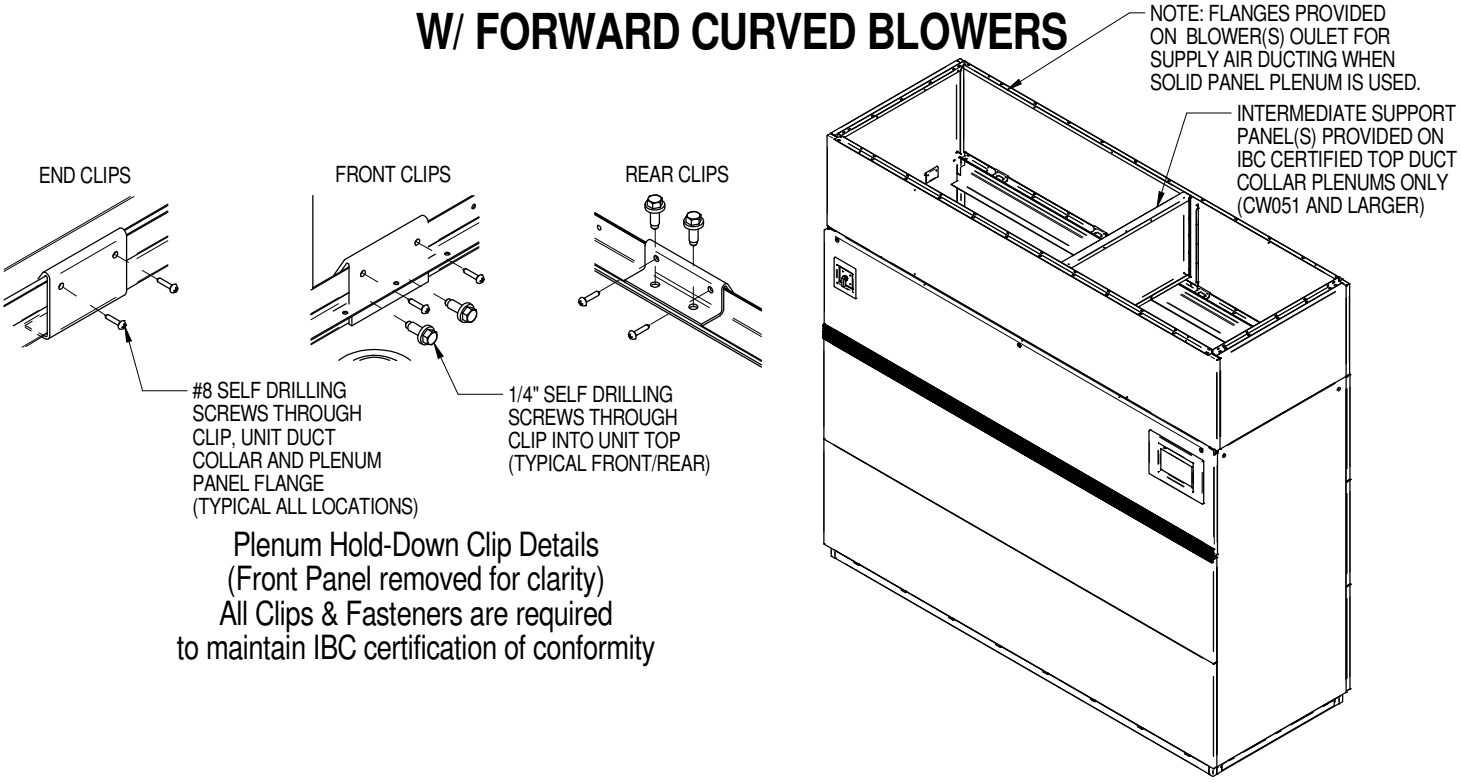


Plenum Hold-Down Clip Dimensions
Front of Unit

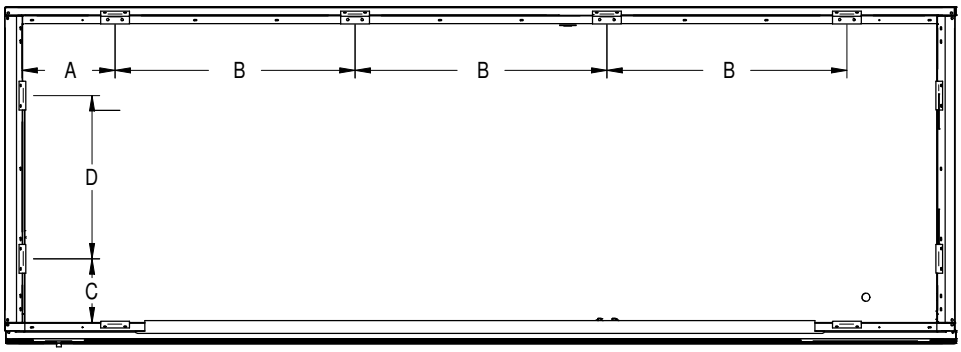
MODEL NUMBER	CLIPS REQUIRED			APPROXIMATE LOCATION in. (mm)			
	END	FRONT/REAR	TOTAL	A	B	C	D
CW038	2	2	8	31-3/16 (792)	6-1/2 (165)	19 (483)	7-3/8 (187)
CW041							
CW051		3	10	27-9/16 (701)			
CW060							
CW076		4	12	26-11/16 (679)			
CW084							
CW106				34-3/8 (874)			
CW114							

SEISMIC DATA

PLENUM MOUNTING FOR UPFLOW UNITS W/ FORWARD CURVED BLOWERS



Plenum Hold-Down Clip Details
(Front Panel removed for clarity)
All Clips & Fasteners are required
to maintain IBC certification of conformity

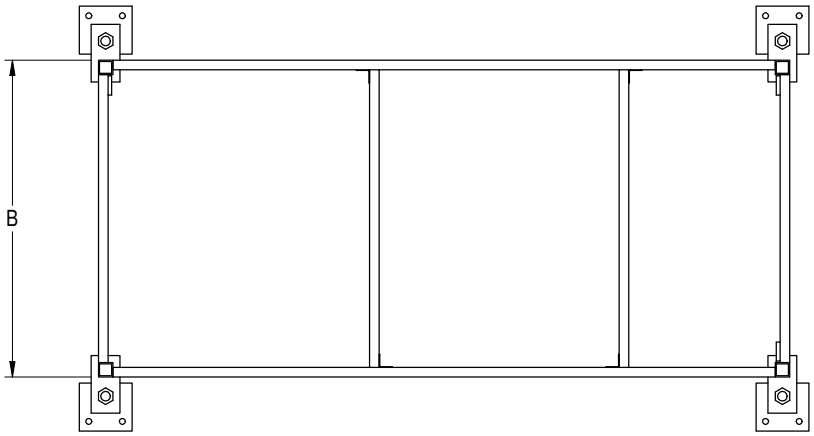


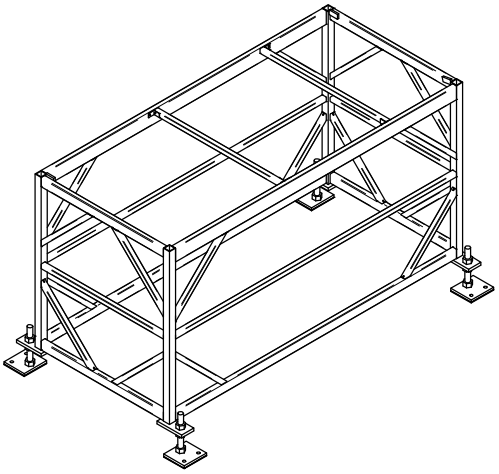
Plenum Hold-Down Clip Dimensions
Front of Unit

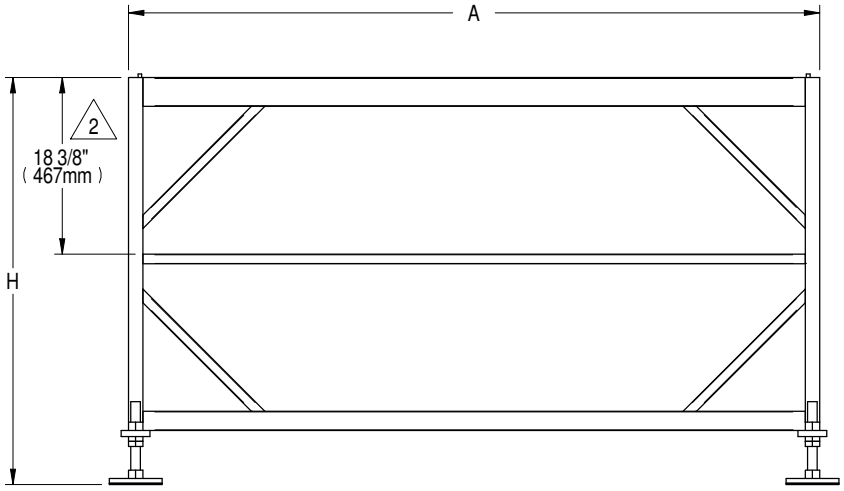
MODEL NUMBER	CLIPS REQUIRED			APPROXIMATE LOCATION inches (mm)			
	END	FRONT/REAR	TOTAL	A	B	C	D
CW038	2	2	8	7-3/8 (188)	31-3/16 (792)	6-1/2 (165)	19 (483)
CW041							
CW051		3	10		27-9/16 (701)		
CW060							
CW076		4	12		26-11/16 (679)		
CW084							
CW106					34-3/8 (874)		
CW114							

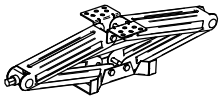
SEISMIC DATA

FLOORSTAND MOUNTING FOR DOWNFLOW CW038 - CW114 MODELS W/ EC FANS

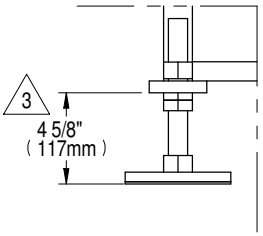








JACK



Foot Detail

NOTE:

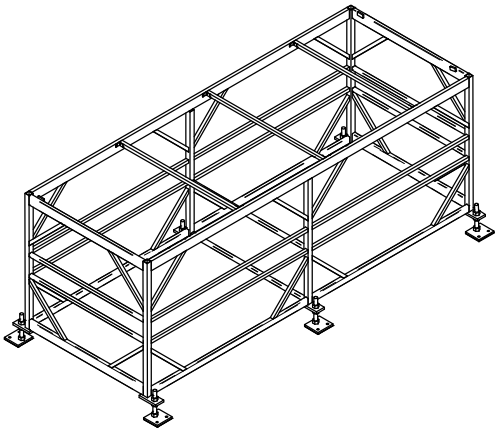
1. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical to lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.

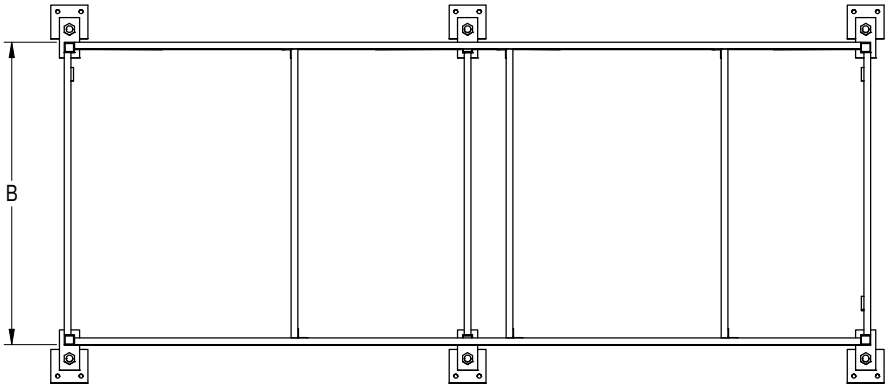
2. Not applicable to 24" & 30" tall floorstands.

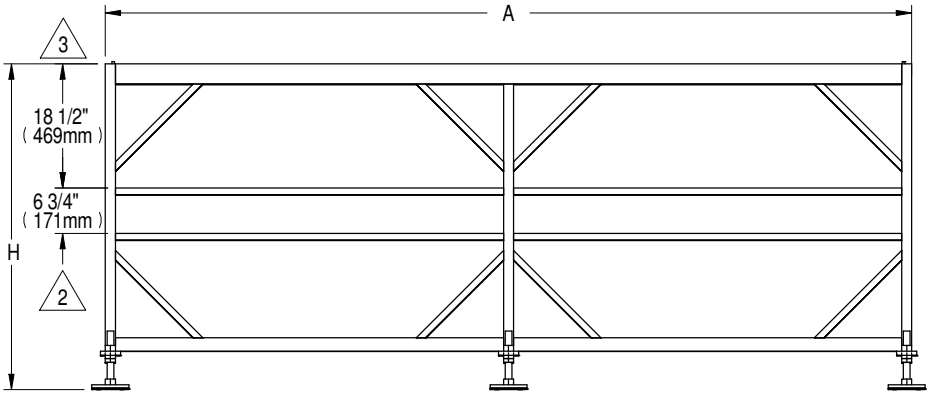
3. Foot provides ±1.5" (38mm) adjustment from nominal height H

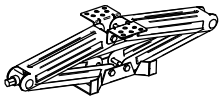
DIMENSIONAL DATA in. (mm)			
MODEL	OVERALL WIDTH	A	B
CW038, CW041	50 (1270)	48 (1219)	33 (838)
CW051, CW060	74 (1880)	72 (1829)	
CW076, CW084	99 (2515)	97 (2464)	
CW106, CW114	120 (3048)	118 (2997)	

SEISMIC DATA
FLOORSTAND MOUNTING FOR DOWNFLOW CW146 - CW181 MODELS W/ EC FANS









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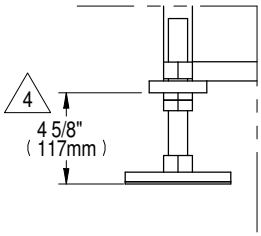


Foot Detail

NOTE:

1. The floor stand used with EC units is not symmetrical and its orientation to the Liebert® CW is critical to lowering the EC fans. Unless the floor stand is installed in the correct position, the blowers will not lower into the floor stand.

2. Applicable only to 48" tall floorstand.

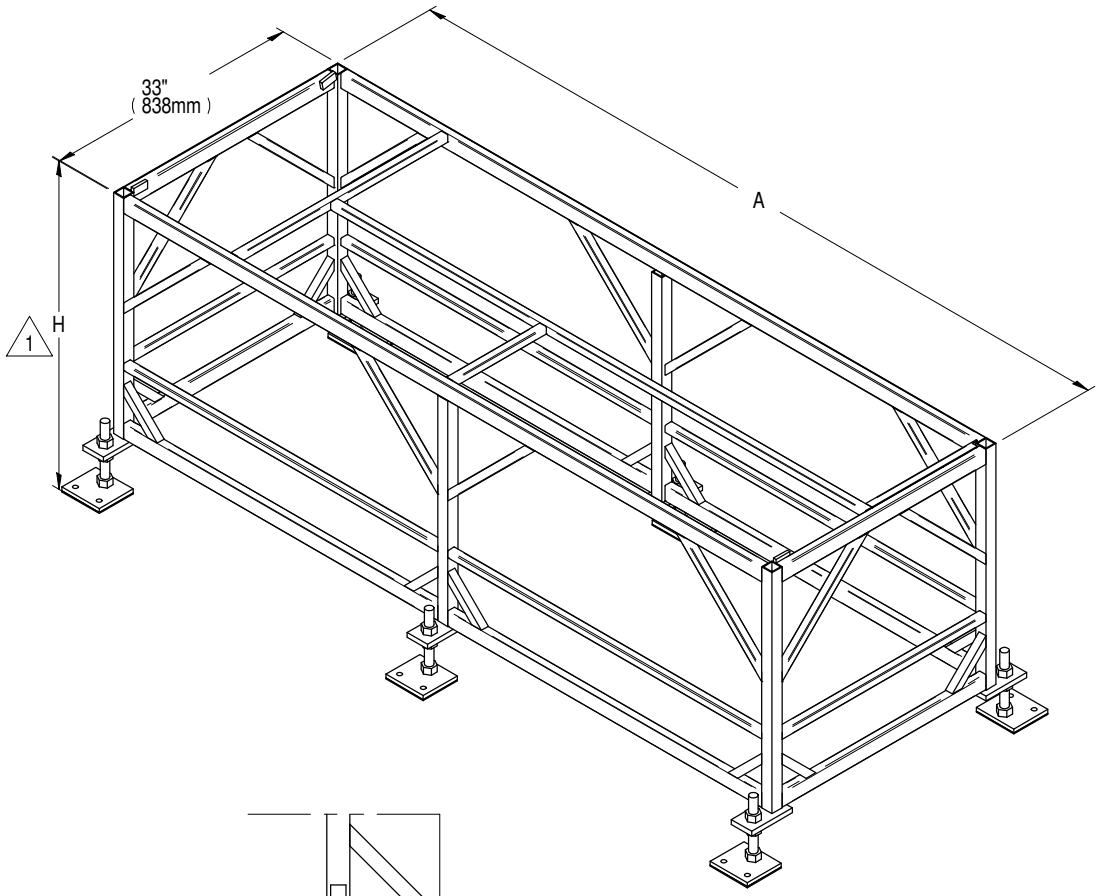
3. Not applicable to 24" & 30" tall floorstands.

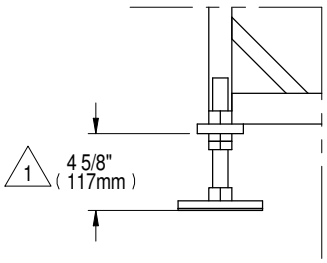
4. Foot provides ±1.5" (38mm) adjustment from nominal height H

DIMENSIONAL DATA in. (mm)			
MODEL	OVERALL WIDTH	A	B
CW146, CW181	120 (3048)	118 (2997)	45 (114)

DIMENSIONAL DATA

SEISMIC RIGID FLOORSTAND W/ FORWARD CURVED BLOWERS





Foot Detail

DIMENSIONAL DATA in. (mm)		
MODEL	OVERALL WIDTH OF UNIT	A
CW038, CW041	50 (1270)	48 (1219)
CW051, CW060	74 (1880)	72 (1829)
CW076, CW084	99 (2515)	97 (2464)
CW106, CW114	120 (3048)	118 (2997)

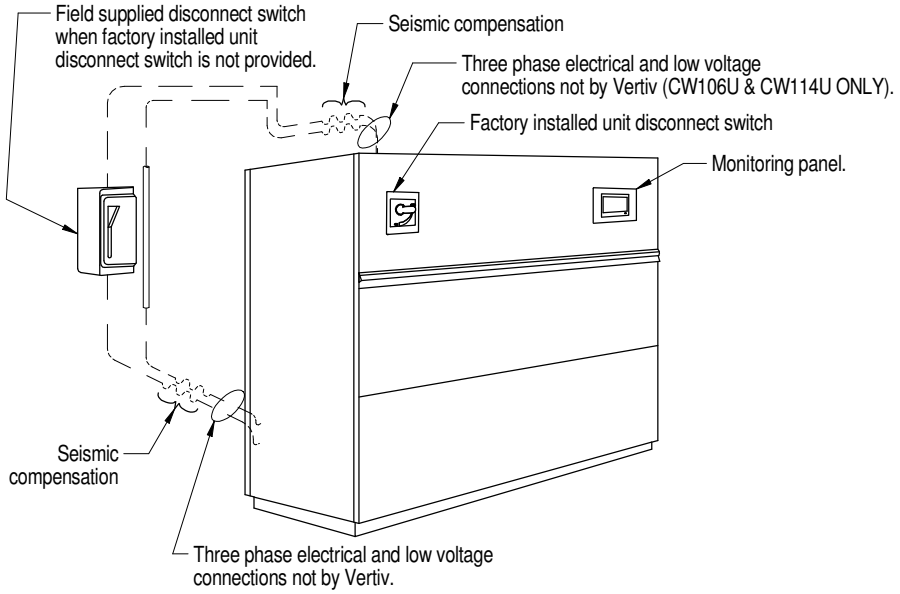
HEIGHT in. (mm)
"H" NOMINAL 1
12 (305)
15 (381)
18 (457)
21 (533)
24 (610)
30 (762)
36 (914)
48 (1219)

Notes:

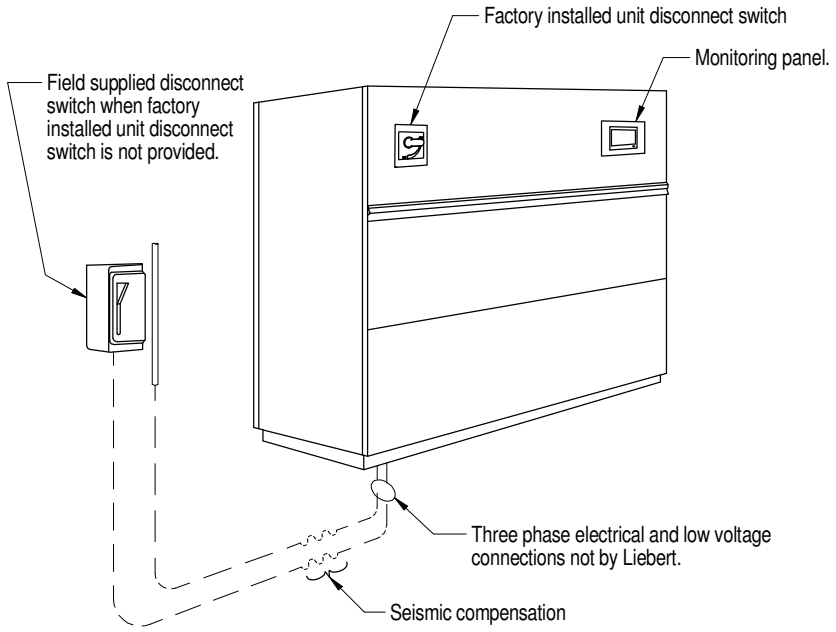
1. Foot provides ±1-1/2" (38mm) adjustment from nominal height "H".

SEISMIC DATA

ELECTRICAL FIELD CONNECTIONS W/ FORWARD CURVED BLOWERS



Upflow Models



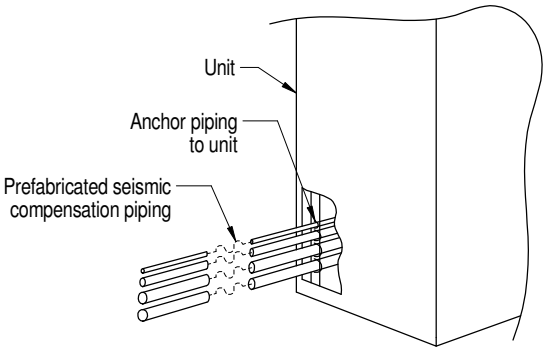
Downflow Models

Notes:

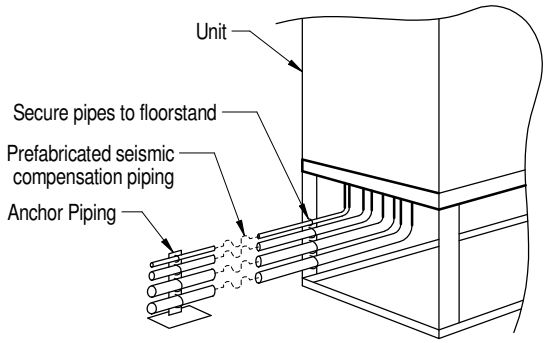
1. Flexible conduit and conductors must be provided to allow for movement of the unit in three dimensions during a seismic event.
   The flexible conduit shall have at least one bend between the rigid connection at the unit cabinet and the connection to rigid conduit or foundation.

2. Monitoring panel and disconnect are switched on CW106U, CW114U, CW106D & CW114D.

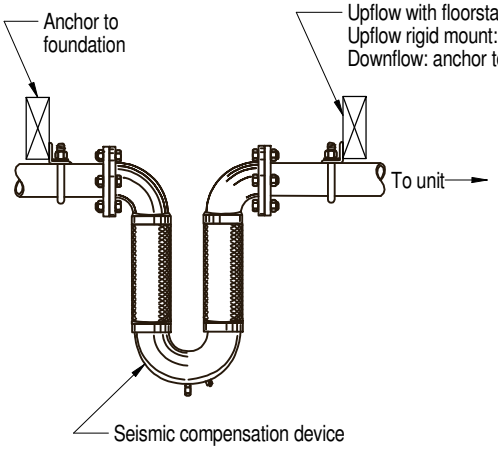
SEISMIC DATA
PIPING FIELD CONNECTIONS



Floor Mount



Floorstand Mount

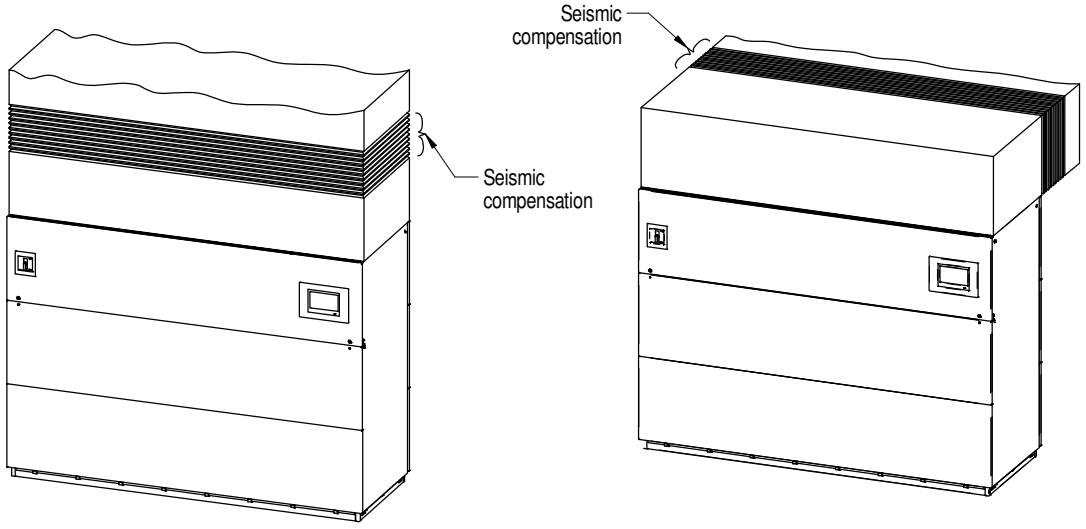


Flexible Loop Example

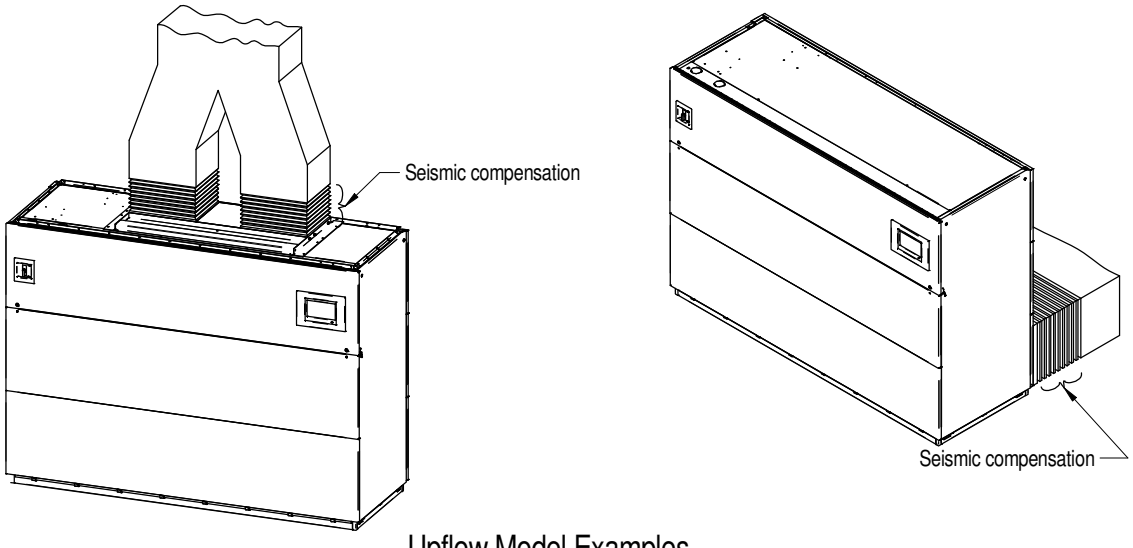
Notes:
1. Flexible Loops:
   All units, either rigidly mounted or mounted on vibration isolators, shall be attached to the piping system using flexible loops designed for seismic movement. Flexible loops shall be capable of movement in the three axes and must completely isolate the equipment from the piping.
   The loops shall be suitable for an operating pressure and temperature of the system, refer to Vertiv installation instructions. This includes 1/4" copper humidifier supply, condensate drainage, and chilled water supply and return. Follow manufacturer's installation instructions for proper seismic application of flexible loops.

SEISMIC DATA

DUCT CONNECTION CONSIDERATIONS W/ FORWARD CURVED BLOWERS



Downflow Model Examples



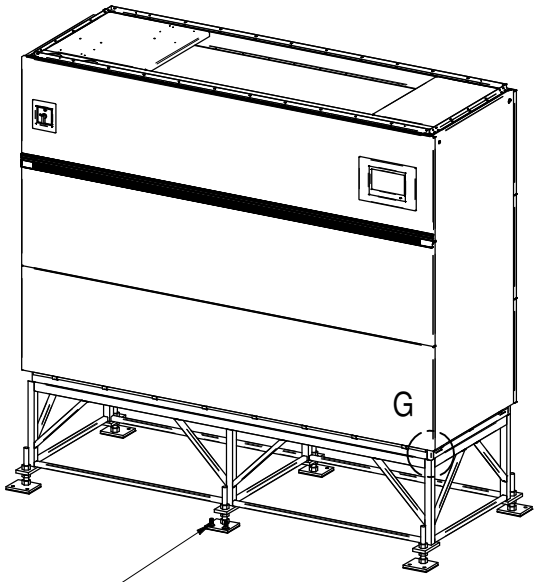
Upflow Model Examples

Notes:

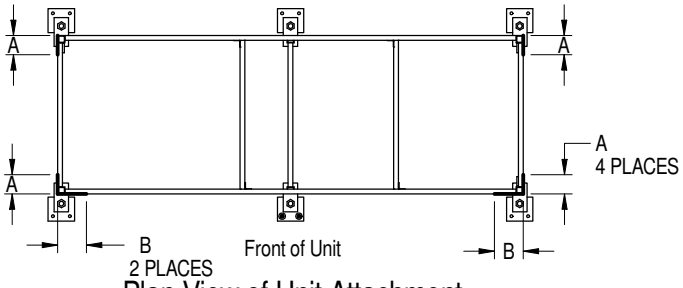
1. All ducted units, either rigidly mounted or mounted on vibration isolators, shall be attached to the ducting system using flexible duct designed for seismic movement. Flexible loops shall be capable of movement in the three axes and must completely isolate the equipment from the duct work. Refer to Vertiv installation instructions for ducting requirements. Follow manufacturer's installation instructions for proper seismic application of flexible ducts.

CONNECTION DETAIL AS TESTED FOR SEISMIC CERTIFICATION

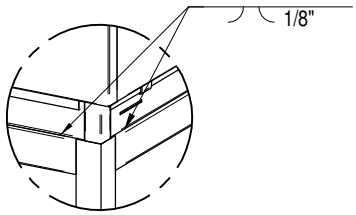
MODEL NUMBER	WELD LENGTH		QTY SUPPORTS	FLOORSTAND
	A (in)	B (in)	C	HEIGHT (in)
CW114DC1	4	6	6	36
CW181DC1	6	8		



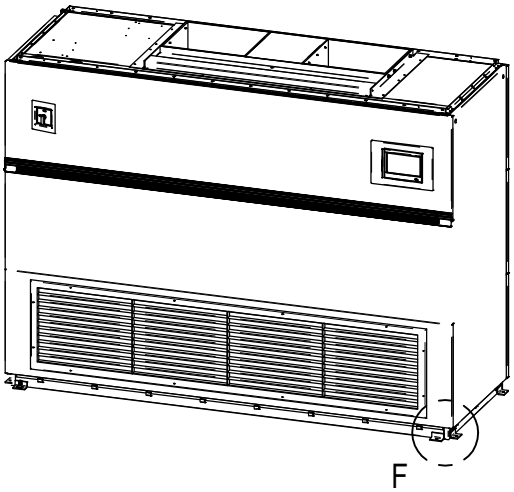
Floorstand Supported Anchorage



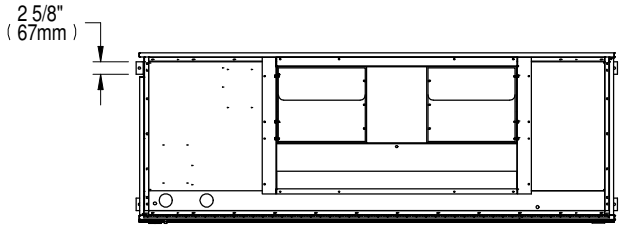
Plan View of Unit Attachment



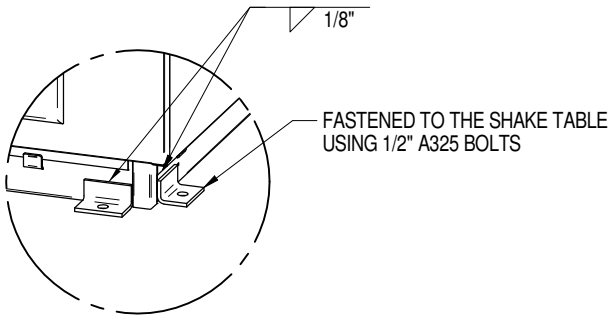
DETAIL G



Floor Mounted Anchorage (CW114UCS)



Plan View of Attachment Angles



DETAIL F

Appendix E: Guide Specifications

The following are the guide specifications for the Vertiv™ Liebert® CW.

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Vertiv™ Liebert® CW
Guide Specifications
Chilled Water Environmental Control System

1.0 GENERAL

1.1 Summary

These specifications describe requirements for a Thermal Management system. The system shall be designed to control temperature and humidity conditions in rooms containing electronic equipment, with good insulation and vapor barrier. The manufacturer shall design and furnish all equipment to be fully compatible with heat-dissipation requirements of the room.

1.2 Design Requirements

The Thermal Management system shall be a Liebert self-contained, factory-assembled unit. Standard 60 Hz units shall be CSA-certified to the harmonized U.S. and Canadian product safety standard, "CSA C22.2 No 236/UL 1995 for Heating and Cooling Equipment" and are marked with the CSA c-us logo.

The Liebert® CW system performance shall be AHRI Certified, the trusted mark of performance assurance for heating, ventilation, air conditioning and commercial refrigeration equipment, using AHRI Standard 1360.

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.

1.4 Serviceability/ Access

The cabinet shall be designed so that all components are easily accessible for service and maintenance through the unit's side and front [CW038-084], front [CW106-181].

1.5 Acceptable Alternatives

Acceptable alternatives shall be permitted with engineer's prior approval only. Contractor to submit a detailed summary form listing all variations to include size deviations, electrical load differences, functional and component changes and savings to end user.

1.6 Quality Assurance

The specified system shall be factory-tested before shipment. Testing shall include but shall not be limited to: Quality Control Checks, “Hi-Pot.” The system shall be designed and manufactured according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

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2.0 PRODUCT

2.1 Frame

The frame shall be constructed of welded tubular steel. It shall be painted using the autophoretic coating process for maximum corrosion protection.

2.1.1 Downflow Air Flow Configurations

1. **Downflow Air Supply**

   The supply air shall exit from the bottom of the unit.

2. **Downflow Air, EC Fans Lowered into Floor Stand**

   The supply air shall exit from all sides of the floor stand.

3. **Downflow Air, Front Discharge**

   The supply air shall exit from the front of the unit.

4. **Downflow Air, Rear discharge**

   The supply air shall exit from the rear of the unit.

5. **Downflow Air Return**

   The return air shall enter the unit from the top.

2.1.2 Upflow Air Flow Configurations

1. **Upflow Top Air Supply, Front Throw**

   The supply air shall exit from the top of the cabinet (or plenum) with the air throw toward the front.

2. **Upflow Top Air Supply, Rear Throw**

   The supply air shall exit from the top of the cabinet (or plenum) with the air throw toward the back.

3. **Upflow Rear Air Supply**

   The supply air shall exit from the back of the cabinet.

4. **Upflow Air Return, Front**

   The return air shall enter the unit from the front of the cabinet through factory-installed grilles. Grilles shall be painted black.

5. **Upflow Air Return, Rear**

   The return air shall enter the unit from the back of the cabinet.

6. **Upflow Air Return, Bottom**

   The return air shall enter the unit from the bottom of the cabinet.

2.1.3 Exterior Panels

The exterior panels shall be insulated with a minimum 1 in. (25 mm), 1.5 lb. (0.68 kg) density fiber insulation. The main front panel shall have captive quarter-turn fasteners. The main unit color shall be _____. The accent color shall be _____.

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2.2 Filters

- The filter chambers for CW038-084 filters are located within the cabinet and serviceable from either end of the unit.
- The filter chambers for CW106 and CW114 are located within the cabinet and serviceable from the front of the unit.
- The filter chambers for CW146 and CW181 are field mounted on the top of the cooling unit. The filters are located in an 18-in. (457-mm) plenum, which is serviceable from the front of the unit.
- For CW038-084 units with rear-return filter boxes, the filter chambers shall be field-mounted on the rear of the cooling unit and are serviceable from either end of the unit.

2.2.1 Filters, 4-in. MERV8 and MERV11

Filters shall be deep-pleated 4-in. filters with an ASHRAE 52.2-2007 MERV8 or ASHRAE 52.2-2007 MERV11.

2.2.2 Filters, 2-in. Pre-filter with 4-in. Filter MERV8 and MERV11

Filters shall be 2-in. ASHRAE 52.2-2007 MERV8 pre-filter, with 4-in. ASHRAE 52.2-2007 MERV8 or MERV11 efficiency filter.

2.2.3 Extra Filter Set

____ extra set(s) of filters shall be provided per system.

2.3 Locking Disconnect Switch

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.

2.4 Short-Circuit Current Rating (SCCR)

The electrical panel shall provide at least 65,000A SCCR (60hz).

Short-circuit current rating (SCCR) is the maximum short-circuit current a component or assembly can safely withstand when protected by a specific overcurrent protective device(s) or for a specified time.

2.5 Fan Section

2.5.1 Electronically Commutated (EC) Fans

The fans shall be plug/plenum type, single-inlet and shall be dynamically balanced. The drive package shall be direct drive, electronically commutated and variable speed. The fans shall be located to draw air over the A-frame coil to ensure even air distribution and maximum coil performance. EC fans shall be available on downflow models, and fans may be lowered into a raised floor with a minimum height of 24 in. (610 mm). EC fans may operate within the Vertiv™ Liebert® CW cabinet, instead of under the floor.

EC fans shall be available on upflow models and fans shall operate outside the unit in a factory-provided plenum.

- **Upflow CW038–114**: The fan motor(s) shall be 4.0 hp (3.0 kW) with maximum speed of 1520 rpm; quantity 1 for CW038–41; 2 for CW051–084; 3 for CW106–114.
- **Downflow CW038–CW041**: The fan motor shall be 4.0 hp (3.0 kW) with a maximum operating speed of 1520 rpm; quantity 1.
- **Downflow CW051 and CW060**: The fan motors shall be 3.4 hp (2.5 kW) with a maximum operating speed of 1700 rpm; quantity 2. (Power rating for 380–480V. For 200–240V, power is 3.6 hp [2.7 kW]).

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- **Downflow CW076–CW084**: The fan motors shall be 4.0 hp (3.0 kW) with a maximum operating speed of 1520 rpm; quantity 2.
- **Downflow CW106–CW114**: The fan motors shall be 4.0 hp (3.0 kW) with a maximum operating speed of 1520 rpm; quantity 3.
- **CW146**: The fan motors shall be 3.7 hp (2.8 kW) with a maximum operating speed of 1230 rpm; quantity 3.
- **CW181**: The fan motors shall be 4.9 hp (3.7 kW) with a maximum operating speed of 1370 rpm; quantity 3.

2.5.2 Forward Curved Blower—Optional

- The blower section shall be designed for ___ CFM (____CMH) at an external static pressure of ___ in. wg. (Pa). 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 lifespan of 100,000 hours.
- The fans shall be located to draw air over the A-frame coil to ensure even air distribution and maximum coil performance. The fan motor shall be ____ hp at 1750 rpm at 60 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.

2.6 Chilled Water Control Valve

The water circuit shall include a 2-way (3-way) modulating valve. The valve shall be designed for up to 400 PSI (2758 kPa) water pressure. The Vertiv™ Liebert® iCOM™ shall position the valve in response to room conditions.

2.7 Chilled Water Coil

- The evaporator coil shall be A-frame design for downflow and upflow units and have ____ ft^2 (m^2) face area, ____ rows deep.
- It shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of ____ ft per minute (m/s) at ____ CFM (m^3).
- 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.

2.8 Humidifier

2.8.1 Infrared Humidifier—Optional

A humidifier shall be factory-installed inside the unit. The humidifier shall be of the infrared type, consisting of high-intensity quartz lamps mounted above and out of the water supply. The humidifier pan shall be stainless steel and arranged to be serviceable without disconnecting water-supply lines, drain lines or electrical connections. The complete humidifier section shall be pre-piped ready for final connection. The infrared humidification system shall use by-pass air to prevent over-humidification of the controlled space. The auto-flush system shall automatically flush deposits from the humidifier pan. The system shall be field adjustable to change the cycle time to suit local water conditions.

A minimum 1-in. (25-mm) air gap within the humidifier piping assembly, in compliance with ASME A112.1.2 section 2.4.2 (backsiphonage testing), shall prevent back-flow of the humidifier supply water.

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2.9 Reheat

2.9.1 Electric Reheat—Optional

The Thermal Management unit shall include a factory-installed reheat to control temperature during dehumidification. The low-watt density, 304/304, stainless-steel, finned-tubular electric reheat coils. The reheat section shall include UL/CSA recognized safety switches to protect the system from overheating.

2.9.2 Hot Water Reheat—Optional

The hot water reheat coil shall have copper tubes and aluminum fins. The control system shall be factory pre-piped with a 2-way motorized control valve. A cleanable Y-strainer is factory-installed on hot-water supply line. Upflow model requires a 22 ¾-in. (58-cm) high plenum with grille.

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3.0 CONTROLS

3.1 Vertiv™ Liebert® iCOM™ Microprocessor Control With 7-in. Color Touchscreen

The Liebert® iCOM™ shall be microprocessor-based with a 7-inch, high definition, capacitive, color touchscreen display and shall be mounted in an ergonomic, aesthetically pleasing housing. The display and housing shall be viewable while the front panel is open or closed. The controls shall be menu driven. 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 percentage 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. 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. The Liebert® iCOM™ control shall provide Ethernet/RS-485 ports dedicated for BMS connectivity (i.e. Base-Comms).

- **Password Protection** - The Liebert® iCOM™ shall contain two unique passwords to protect against unauthorized changes. An auto hide/show feature shall allow the user to see applicable information based on the login used.
- **Unit Backup and Restore** - The user shall be able to create safe copies of important control parameters. The Liebert® iCOM™ shall have the capacity for the user to automatically backup unit configuration settings to internal memory or USB storage drive. Configuration settings may be transferred to another unit for a more streamlined unit startup.
- **Parameter Download**—The Liebert® iCOM™ shall enable the user to download a report that lists parameter names, factory default settings and user-programmed settings in .csv format for remote reference.
- **Parameter Search**- The Liebert® iCOM™ shall have search fields for efficient navigation and parameter lookup.
- **Parameter Directory** - The Liebert® iCOM™ shall provide a directory that lists all parameters in the control. The list shall provide Line ID numbers, parameter labels, and current parameter values.
- **Context Sensitive Help** - The Liebert® iCOM™ will have an on-board help database. The database shall provide context sensitive help to assist with setup and navigation of the menus.
- **Display Setup** - The user shall be able to configure the display information based on the specific user's preference. Language, units of measure, screen contrast, home screen layout, back-light timer and the hide/show of certain readouts will be configurable through the display.
- **Additional Readouts** - The Liebert® iCOM™ shall enable the user to configure custom widgets on the main screen. Widget options shall include items such as fan speed, call for cooling, call for free cooling, maintenance status, call for hot water reheat, call for electric reheat, call for dehumidification, call for humidification, airflow, static pressure, fluid flow rate and cooling capacity.
- **Status LED's** - The Liebert® iCOM™ shall provide the user with the unit's operating status using an integral LED. The LED shall indicate if the unit has an active alarm; if the unit has an active alarm that has been acknowledged; or if the unit is On, Off or in standby status.
- **Event Log** - The Liebert® iCOM™ shall automatically store the last 400 unit-only events (messages, warnings and alarms).
- **Service Contact Information** - The Liebert® iCOM™ shall have the capacity to store the local service or sales contact information.

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- **Upgradeable** - Vertiv™ Liebert® iCOM™ firmware upgrades shall be performed through a USB Upgradeable connection.
- **Timers/Sleep Mode** - Menu shall allow various customer settings for turning on/Off unit.
- **Menu Layout** - The menus will be broken out into two main menu screens: User screen and Service screen. The User screen contains the menus to access parameters required for basic unit control and setup. The Service screen is designed for service personnel and provides access to advanced control setup features and diagnostic information.
- **Sensor Calibration** – The menus shall allow unit sensors to be calibrated with external sensors.
- Maintenance/Wellness Settings - The menus shall allow reporting of potential component problems before they occur.
- **Options Setup** - The menus shall provide operation settings for the installed components.
- **Auxiliary Boards** - The menus shall allow setup of optional expansion boards.
- **Various Sensors** - The menus 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. 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.
- **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.
- **Base-Comms for BMS Connectivity** – The Liebert® iCOM™ controller shall provide one Ethernet Port and RS-485 Port dedicated for BMS Connectivity. Provides ground fault isolated RS-485 Modbus, BACnet IP & Modbus IP network connectivity to Building Management Systems for unit monitoring and management. Also, provides ground fault isolated 10/100 baseT Ethernet connectivity for unit monitoring and management. The supported management interfaces include SNMP for Network Management Systems, HTTP for web page viewing, SMTP for email, and SMS for mobile messaging. The Liebert® iCOM™ controller can support dual IP on a single network and one 485 protocol simultaneously.

3.2 Alarms

All unit alarms shall be annunciated through both audio and visual cues, clearly displayed on the screen, automatically recorded in the event log and communicated to the customer's Building Management System/Building Automation System. 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
- EC Fan Fault
- Change Filters
- Loss of Air Flow

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- Loss of Power
- Custom Alarms

Custom alarm inputs shall be provided to indicate facility-specific events. Custom alarms can be identified with programmable labels. Frequently used alarm inputs include:

- Leak Under Floor
- Smoke Detected
- Standby Unit On

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

3.3 Vertiv™ Liebert® iCOM™ Control Methods and Options

The Liebert® iCOM™ shall be factory-set to allow precise monitoring and control of the condition of the air entering and leaving the unit. This control shall include predictive methods to control air flow and cooling capacity-based control sensors installed. Proportional and Tunable PID shall also be user-selectable options.

3.3.1 Controlling Sensor Options

The Liebert® iCOM™ shall be flexible in the sense that it shall allow controlling the capacity and fan from multiple different sensor selections. The sensor selections shall be:

1. **Cooling Capacity**
   - Supply
   - Remote
   - Return
2. **Fan Speed**
   - Supply
   - Remote
   - Return
   - Manual (for diagnostic or to receive a signal from the BMS through the Liebert remote monitoring devices or analog input)
   - Static Pressure

3.3.2 Temperature Compensation

The Liebert® iCOM™ shall have the ability to adjust the capacity output based on supply and return temperature conditions to meet SLA guidelines while operating to highest efficiency.

3.3.3 Humidity Control

Dew point and relative humidity control methods shall be available (based on user preference) for humidity control within the space.

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3.4 MULTI-UNIT COORDINATION

Vertiv™ Liebert® iCOM™ teamwork shall save energy by preventing multiple units in an area from operating in opposing modes. Teamwork shall allow the control to optimize a group of connected cooling units equipped with Liebert® iCOM™ using the U2U (Unit to Unit) network. There shall be three modes of teamwork operation:

- **Teamwork Mode 1 (Parallel)**: Is best in small rooms with balanced heat loads. The controlling temperature and humidity sensor readings of all units in operation (fan on) are collected to be used for an average or worst-case sensor reading (user selectable). The master unit shall send the operating requirements to all operating units in the group. The control band (temperature, fan and humidity) is divided and shared among the units in the group. Each unit will receive instructions on how to operate from the Master unit based on how far the system deviates from the setpoints. Evaporator fans and cooling capacity are ramped in parallel.
- **Teamwork Mode 2 (Independent)**: Is best applied in large rooms with unbalanced heat loads. The Liebert® iCOM™ calculates the worse-case demand for heating, cooling humidification and dehumidification. Based on the greatest demand within the group, each unit operates independently, meaning that the unit may respond to the thermal load and humidity conditions based on the unit's controlling sensors. All sensor readings are shared.
- **Teamwork Mode 3 (Optimized Aisle)**: May be employed in large and small rooms with varying heat loads. Optimized Aisle is the most efficient teamwork mode that allows the unit to match cooling capacity with heat load. In the Optimized Aisle mode, the fans operate in parallel. Fans can be controlled exclusively by remote temperature or using static pressure with a secondary remote temperature sensor(s) as an override to ensure the inlet rack temperature is being met. Cooling (Chilled Water Valve or Economizer) is controlled through unit supply air conditions. The Liebert® iCOM™ calculates the average or worst-case sensor reading (user-selectable) for heating, cooling humidification and dehumidification. Based on the demand within the group, units will be allowed to operate within that mode until room conditions are satisfied. This is the best form of control for a room with an unbalanced load.

3.5 Standby Lead-Lag

The Liebert® iCOM™ shall allow planned rotation to keep equal run time on units and provide automated emergency rotation of operating and standby units.

3.6 Standby Unit Cascading

The Liebert® iCOM™ cascade option shall allow the units to turn On and Off based on heat load when utilizing Teamwork Mode 1, Independent mode or Teamwork Mode 3, Optimized Aisle mode with remote temperature sensors. In Teamwork Mode 1, Cascade mode will stage units on based on the temperature and humidity readings and their deviation from setpoint. In Teamwork 3 Mode, Cascade mode dynamically coordinates the fan speed to save energy and to meet the cooling demands. For instance, with a Liebert® iCOM™ group of six units and only 50% of the heat load, the Liebert® iCOM™ shall operate only four units at 80% fan speed and leave the other two units in standby. As the heat load increases, the Liebert® iCOM™ shall automatically respond to the new load and bring on another unit, increasing the units in operation to five. As the heat load shifts up or down, the control shall meet the need by cascading units On or putting them into standby.

3.7 Virtual Master

As part of the robust architecture of the Liebert® iCOM™ control, it shall allow for a virtual master that coordinates operation. The Virtual Master function provides smooth control operation if the group's communication is compromised. When the lead unit, which is in charge of component staging in teamwork, unit staging and standby rotation, becomes disconnected from the network, the Liebert® iCOM™ automatically assigns a virtual master. The virtual master assumes the same responsibilities as the master until communication is restored.

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3.8 Virtual Back-Draft Damper

Vertiv™ Liebert® iCOM™ shall allow the use of a virtual back-draft damper, eliminating the need for a mechanical damper. This shall allow the fans to spin slowly (15% or less) to act as a damper.

3.9 System Auto Restart

The auto restart feature shall automatically restart the system after a power failure. Time delay shall be programmable. An optional capacitive buffer may be provided for continuous control operation through a power failure.

3.10 Wired Supply Sensor

Each Liebert® iCOM™ shall have one factory-supplied and connected supply air sensor that may be used as a controlling sensor or reference. When multiple sensors are applied for control purposes, the user shall be able to control based on a maximum or average temperature reading.

3.11 Sequential Load Activation

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

3.12 CW Quick Start

Each Liebert® iCOM™ controller shall have the option to enable Chilled Water Quick-Start. After a loss of power, Liebert® iCOM™ application normally requires approximately 60 seconds to reboot prior to the unit providing airflow and cooling output. With CW Quick-Start enabled, the end-user may configure a specific airflow output percentage and cooling capacity output percentage as desired. The unit shall operate at these configured values within approximately 10 seconds after a power restoration all while the Liebert® iCOM™ application is rebooting. After Liebert® iCOM™ has fully booted, the unit will continue normal operation.

3.13 Adaptive PID CW Auto-Tuning

Liebert® iCOM™ shall support the use of Liebert's auto-tuning feature called Adaptive PID. Adaptive PID may be used for fan speed control or cooling capacity control. With Adaptive PID selected, Liebert® iCOM™ shall automatically recognize oscillations across multiple sub-systems relating to the PI tuning associated with either mode of control or correct those oscillations with zero human intervention. This feature allows for better overall system operation and responds well to increasing/decreasing system loads.

3.14 Supply Sensor Aggregation

Each Liebert® iCOM™ controller shall support the Supply Sensor Aggregation feature. Supply Sensor Aggregation allows for the use of additional remote 2T temperature sensors that are used to calculate an aggregated supply air temperature value which may be used for cooling capacity control. Each Liebert® iCOM™ controller can support up to five additional remote 2T sensors for supply sensor aggregation.

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4.0 MISCELLANEOUS OPTIONS

4.1 Flow Switch—Optional

The flow switch shall activate the alarm system should the chilled water supply be interrupted. The switch shall be designed for up to 400 PSI (2758 kPa) water pressure and shipped loose for field installation.

4.2 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 Vertiv™ Liebert® iCOM™ control. The variable-speed-drive option shall be available with an infrared humidifier.

4.3 Wired Remote Sensor(S)—Optional

Each Liebert® iCOM™ shall have up to 10 2T sensors (20 sensor readings total) for control or reference. As part of the U2U network, these sensors shall be shared and used to control the cooling units and provide greater flexibility, visibility and control, using that to respond to changes in the conditioned space. When the sensors are used for control, the user may set the control to be based on a maximum or average of a selected highest temperature reading.

4.4 Dual Chilled Water Valve Staging—Optional

- The control shall provide special staging options on dual chilled water valve applications. The chilled-water valves may be staged in parallel, cascade or alternate lead operation.
- Parallel control shall allow both chilled-water valves to operate at the same time, following the same open/close command as the room conditions deviate from the setpoint.
- Cascade control shall allow the valves to operate in stages. Only 1 circuit shall be operated to maintain the conditioned space temperature. If the room condition is not held with 1 circuit in operation, the control will automatically stage a second valve on to maintain room conditions. An automatic timer may be used to alternate the lead valve to keep equal component run time.
- Alternate operation shall allow 1 circuit to work as lead and the second circuit to act as backup. The lead valve will rotate based on valve run time, or the user can alternate the lead valve using a customer input connection.

4.5 High Temperature Sensor—Optional

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

4.6 Condensate Pump, Dual Float—Optional

The pump shall have a capacity of _____ GPM (_____ l/m) at _____ ft head (_____ kPa). The pump shall be complete with integral dual-float switch, pump, motor assembly and reservoir. The secondary float shall send a signal to the local alarm and shut-down the unit upon a high-water condition. The pump shall be shipped loose for field installation on Chilled Water units that are upflow with bottom return. They are also shipped loose for under-floor field installation on CW038-CW060 units with EC fans.

4.7 Vertiv™ Liebert® Liqui-Tect™ Sensors (Maximum of 2 Per Unit)—Optional

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

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4.8 Smoke Sensor—Optional

The smoke sensor shall immediately shut-down the Thermal Management 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. The smoke sensor is not intended to function as or replace any room smoke-detection system that may be required by local or national codes. The smoke sensor shall include a supervision contact closure.

4.9 Vertiv™ Liebert® SiteScan™ Site Monitoring System—Optional

Provide a Liebert® SiteScan™ monitoring system with the Liebert CW. The Liebert® SiteScan™ shall have the capability of monitoring and changing (at the user's 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.

4.10 Low-voltage Terminal Package Includes—Optional

- Remote Shutdown Terminals - 2 additional pairs of terminals provide the customer with additional locations to remotely shut-down the unit by field-installed devices or controls.
- Extra Common-Alarm Contacts - 2 additional pairs of terminals provide the customer with normally open contacts for remote indication of unit alarms.
- Main-Fan Auxiliary Switch - 1 set of normally open contacts wired to the EC-fan motor contactor will close when EC-fan operation is required. This set of dry contacts could also be used to initiate air economizer operation. Air economizer and associated devices by others.
- Vertiv™ Liebert® Liqui-Tect™ Shutdown - 1 pair of dry contacts for the Liebert® Liqui-Tect™ sensor signal will provide unit shut down. (Liebert® Liqui-Tect™ sensor is not included.)

4.11 Reheat & Humidifier Lockout—Optional

The reheat and humidifier lockout includes the necessary relays to disable the reheat and humidifier from an external customer supplied 24-V signal while on emergency power.

4.12 Remote Humidifier Contact—Optional

A pair of N/O contacts provided for connection to a remote humidifier that allows the unit's humidity controller to control a humidifier outside the unit. Power to operate the remote humidifier does not come from the unit.

4.13 Vertiv™ Liebert® vNSA Network Switch—Optional

The Liebert® vNSA network switch is designed for networking multiple Vertiv™ Liebert® iCOM™ unit-level controllers together. There shall be two different styles of the vNSA14 panel available:

- Liebert® vNSA14 – enclosure with network switches only
- Liebert® vNSA14- Liebert® iCOM™ - H – enclosure with network switches and 9" Liebert® iCOM™ color touchscreen display

Each offering shall be housed inside a steel enclosure secured with a key lock and contain two network switches, providing a total of 14 Ethernet ports available for Liebert® iCOM™ controller unit-to-unit networking. The Liebert® vNSA requires field supplied, hard wiring, 16AWG, 100-240VAC universal (12V, 1.5A) single-phase input power supply for 120V or 230V operation with factory supplied power connector.

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4.14 Floor Stand—Optional

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 ____ in. (mm) high.

4.14.1 EC-fan Lowering Jack—Optional

An EC-fan lowering jack shall be supplied to assist the lowering of EC fans from downflow unit into the floor stand. Only available with downflow units with EC fans and “Under-the-floor” options when floor stands are selected. Ships with floor stand.

4.14.2 Seismic-rated Floor Stand—Optional

The floor stand shall be seismic-rated and shall be bolted to the unit frame.

4.15 Return-Air Plenum For Downflow Units—Optional

The air plenum shall be constructed of 20-gauge steel, powder coated to match unit color. A door shall be included in the front of the plenum to enable front filter access. Air shall enter the plenum from the top.

4.16 Discharge Air Plenum For Upflow Units, With Discharge Grille(S)—Optional

The air plenum shall be constructed of 20-gauge steel, powder coated to match unit color. Discharge air grilles shall be painted black and shall be included on the (front), (rear), (left side) or (right side) of the plenum.

4.17 Discharge Air Plenum For Upflow Units, Without Discharge Grille(S)—Optional

The air plenum shall be constructed of 20-gauge steel, powder coated to match unit color. Air shall discharge from the top of the plenum.

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5.0 EXECUTION

5.1 Installation of Thermal Management Units

5.1.1 General

The user shall install Thermal Management units in accordance with manufacturer’s installation instructions. The units shall be installed plumb and level, firmly anchored in locations indicated and shall maintain manufacturer’s recommended clearances.

5.1.2 Electrical Wiring

The user shall install and connect electrical devices furnished by the manufacturer but not specified to be factory mounted. The manufacturer shall furnish a copy of manufacturer’s electrical connection diagram submittal to electrical contractor.

5.1.3 Piping Connections

The user shall install and connect devices furnished by the manufacturer but not specified to be factory-mounted. The manufacturer shall furnish a copy of piping connection diagram submittal(s) to the piping contractor.

5.1.4 Supply and Drain Water Piping

The user shall startup Thermal Management units in accordance with the manufacturer's startup instructions. The manufacturer shall test controls and demonstrate compliance with requirements.

5.2 Field Quality Control

Start cooling units in accordance with manufacturer's startup instructions. Test controls and demonstrate compliance with requirements. These specifications describe requirements for a computer-room environmental-control system. The system shall be designed to maintain temperature and humidity conditions in the rooms containing electronic equipment.

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

5.3 Warranty Start-Up And Control Programming

Install the indoor unit in accordance with manufacturer's installation instructions provided with seismic option. Firmly anchor maintaining manufacturer's recommended clearances. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection and attachment to non-building structures must be outlined and approved by the Engineer of Record for the projection or building. Electrical, pipe and duct connections must permit movement in three dimensions and isolate the unit from field connections. Electrical conduit shall be flexible, having at least one bend between the rigid connection at the unit cabinet and the connection to rigid conduit or foundation. The piping flexible connection or loop must be suitable for the operation pressure and temperature of the system. Furnish copy of manufacturer's piping connection diagram submittal to piping contractor.

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