

## Liebert® DS™ Thermal Management Unit

System Design Manual - 28-105kW (8-30 Tons), Downflow/Upflow, 60Hz

Floor Mounted, Air-Cooled, Water/Glycol-Cooled, GLYCOOL Economizer Coil, Dual-Cool DX with Secondary Chilled Water Coil





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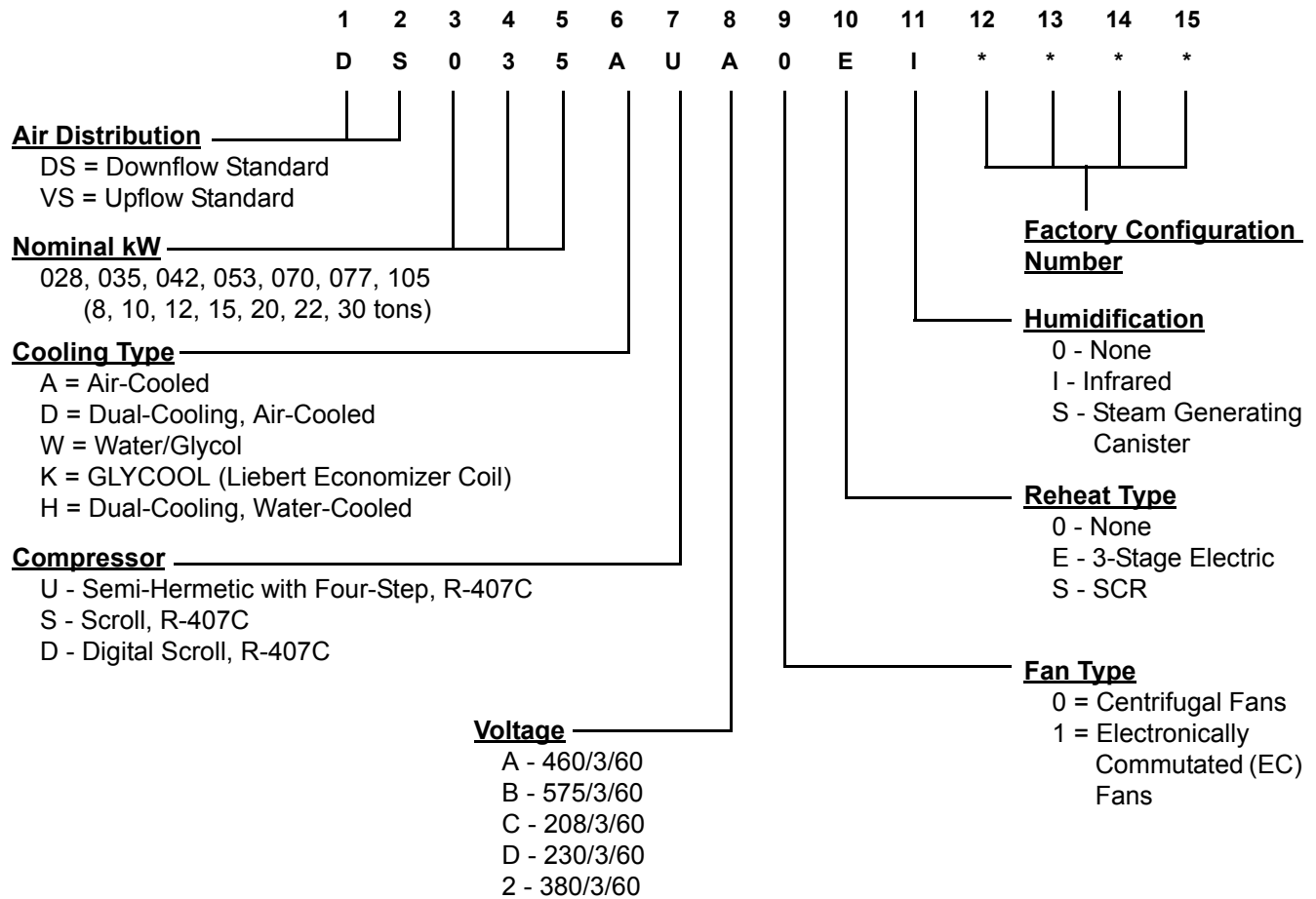
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**LIEBERT DS MODEL NUMBER**



Not all combinations of options are available on all units.

**Digital Scroll Compressors**

- Not available on 077 and 105 models
- Not compatible with SCR reheat because digital scroll provides variable capacity control

**EC Fans, Direct-Drive**

- Not available on upflow (VS) configuration
- Liebert Econ-O-Coil™ not available on 028, 035, 042 models with 208/230V

**Steam Generating Canister Humidifier**

- Not available on upflow (VS) configurations
- Not available on EC fan configurations

**575 Volt Option Limitations**

- Digital scroll compressors available only on 053, 070 models

**GLYCOOL Liebert Economizer Models**

- 105 model requires semi-hermetic compressors only, so as to prevent potential coil freezing

**Turning Vanes**

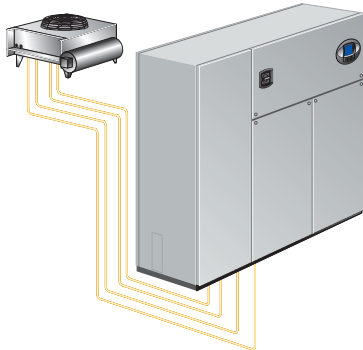
- Not available on floor stands 6" (152.4mm) tall
- Not available or required on units with EC fans

## 1.0 COOLING CONFIGURATIONS



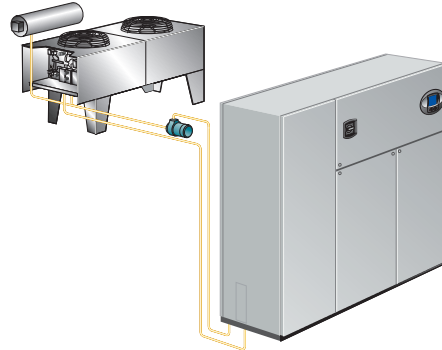
### NOTE

All field-installed piping must comply with applicable local, state and federal codes.



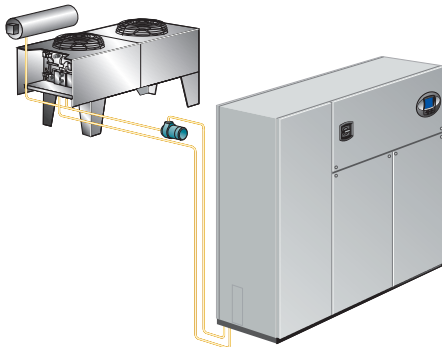
### AIR-COOLED

Air-cooled unit piping is spun closed from the factory and contains a nitrogen holding charge. Each installation requires field-supplied refrigerant and piping to a condenser.



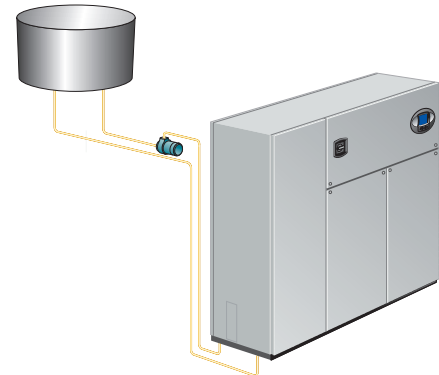
### GLYCOL-COOLED

Glycol-cooled units are factory-charged and tested. Field-supplied and field-installed piping is required from the unit to the drycooler and pump package.



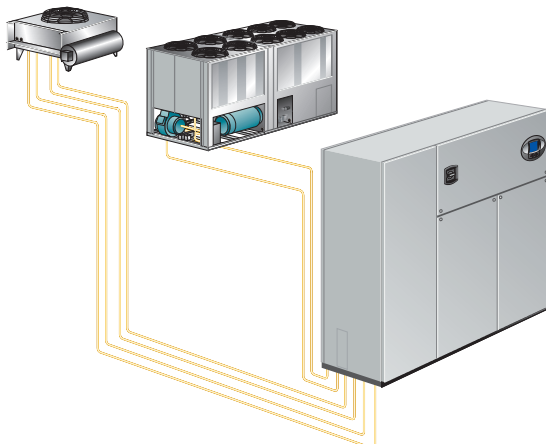
### GLYCOOL-INTEGRATED FLUID ECONOMIZER

GLYCOOL units are factory-charged and tested. Field-supplied and field-installed piping is required from the unit to the drycooler and pump package. An additional Liebert Economizer coil is included for use when fluid temperatures are sufficiently low (below room temperature). Economizer cooling is provided by circulating cold glycol through this second coil, reducing or eliminating compressor operation.



### WATER-COOLED

Water-cooled units are factory-charged and tested. Field-supplied and field-installed water piping is required from the unit to the cooling tower.



### DUAL-COOL

This system has all of the features of a compressed system, but adds a second cooling coil that is connected to a source of chilled water. Cooling is provided by circulating chilled water, when available, through this second coil and reducing compressor operation.

## 2.0 BLOWER CONFIGURATIONS

Figure 1 Blower configurations—Downflow, front and rear supply models, EC fans

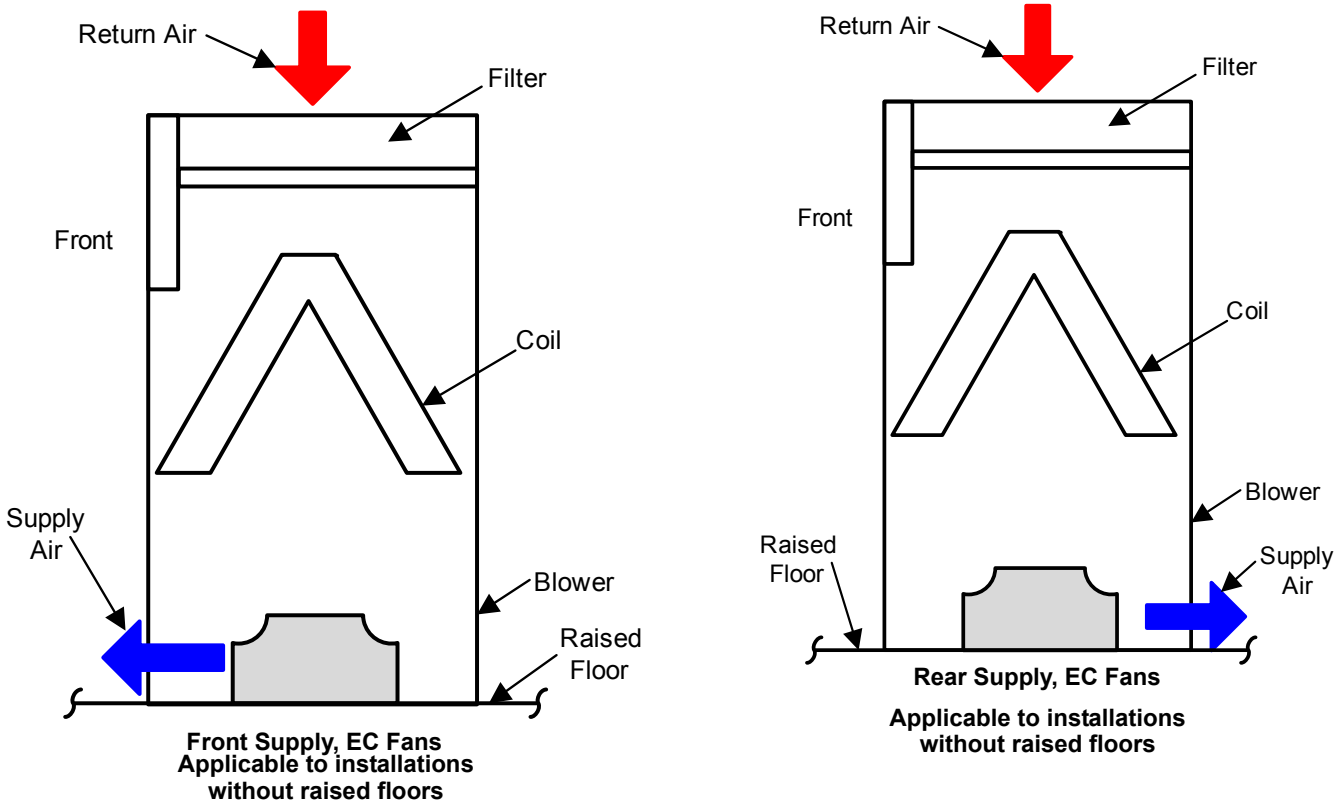


Figure 2 Blower configurations—Downflow, bottom supply and under-floor supply models, EC fans

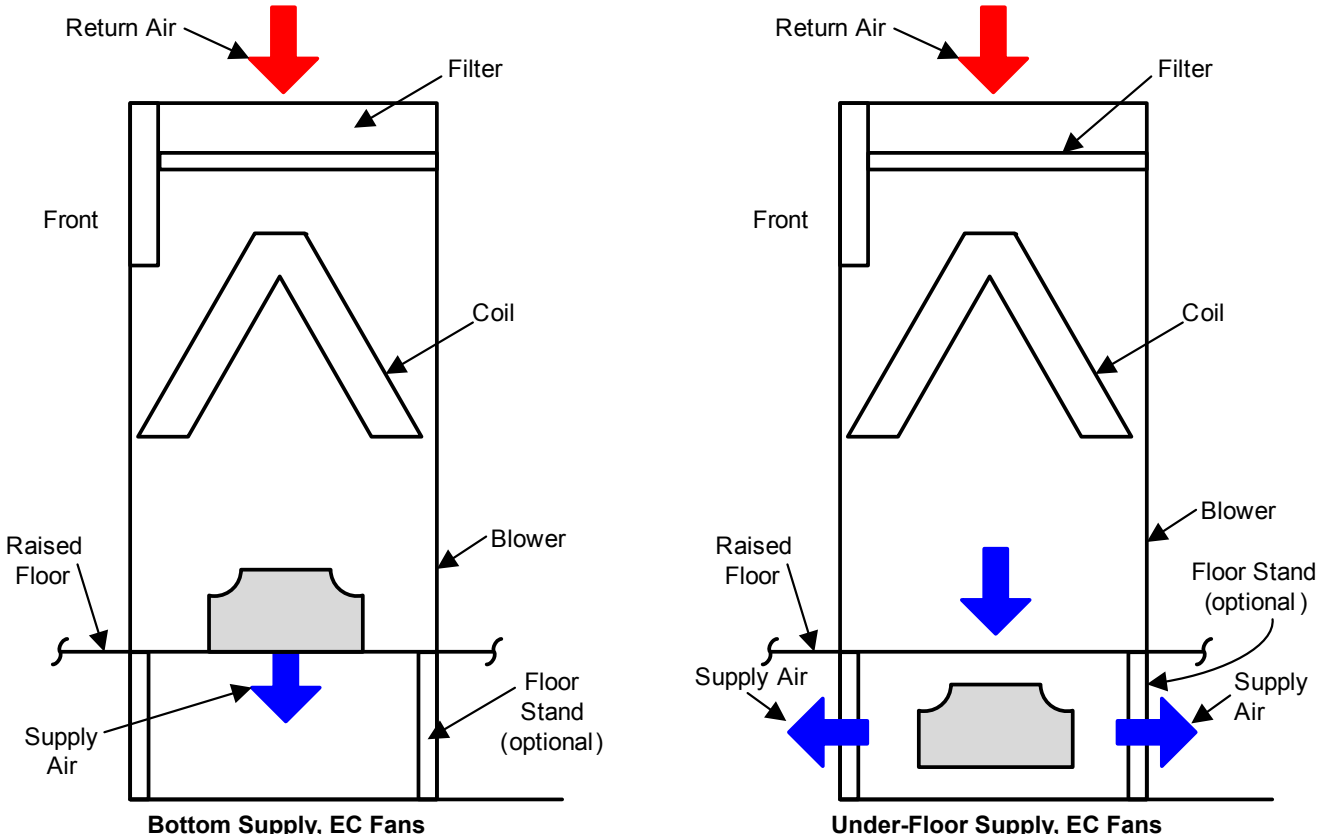


Figure 3 Blower configurations—Downflow, front and rear supply models, centrifugal fans

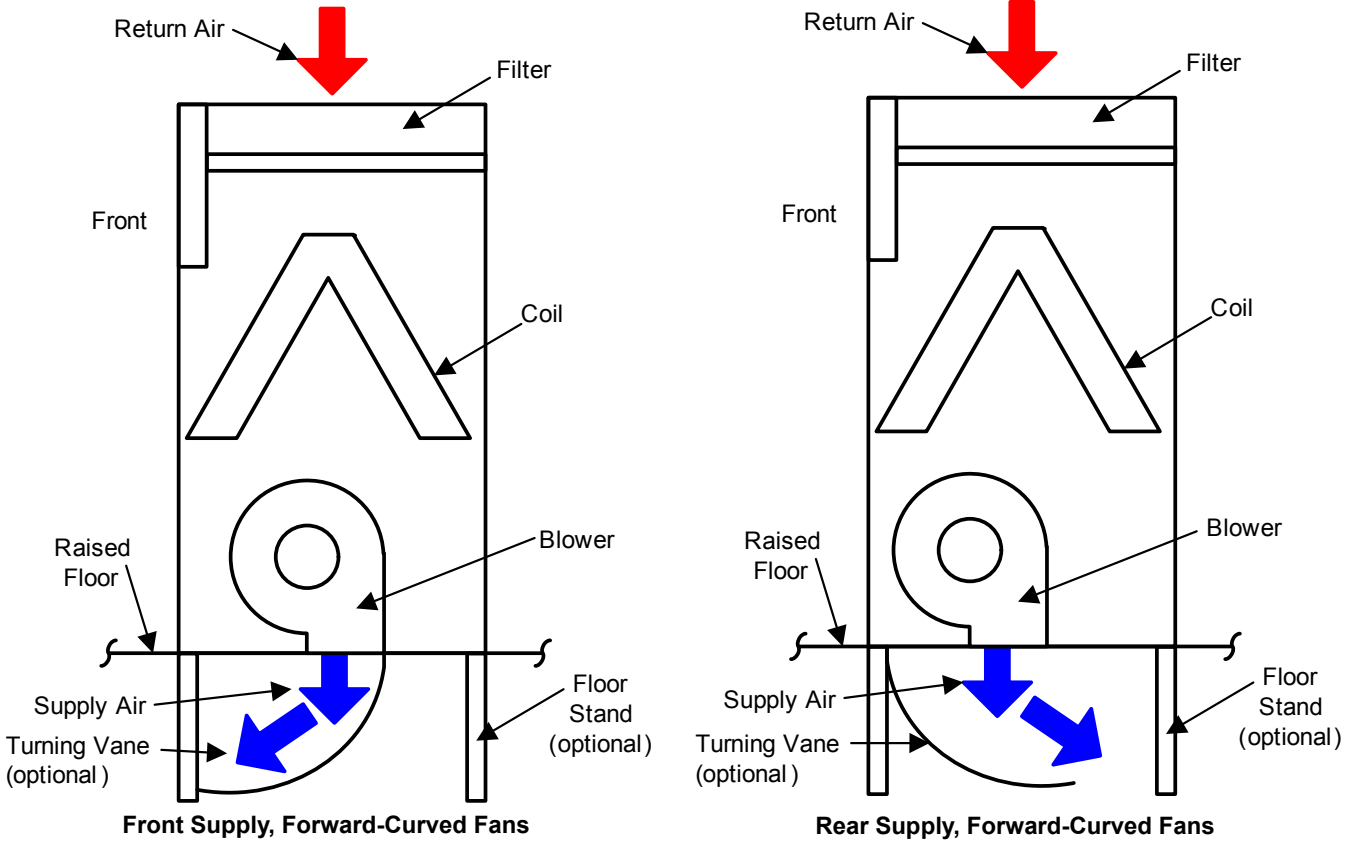
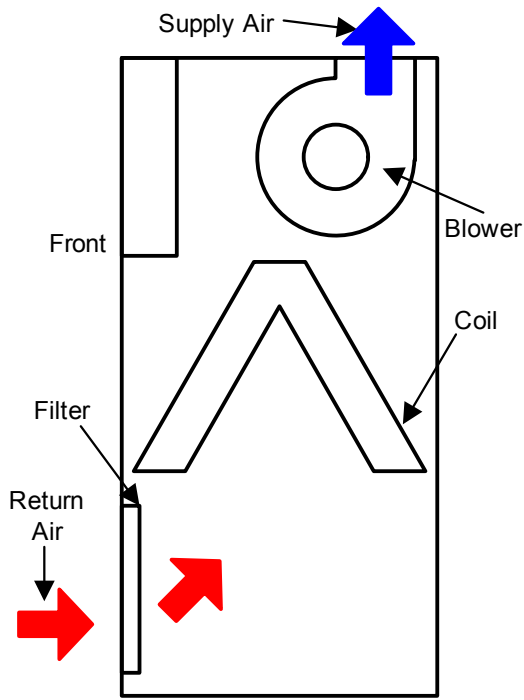
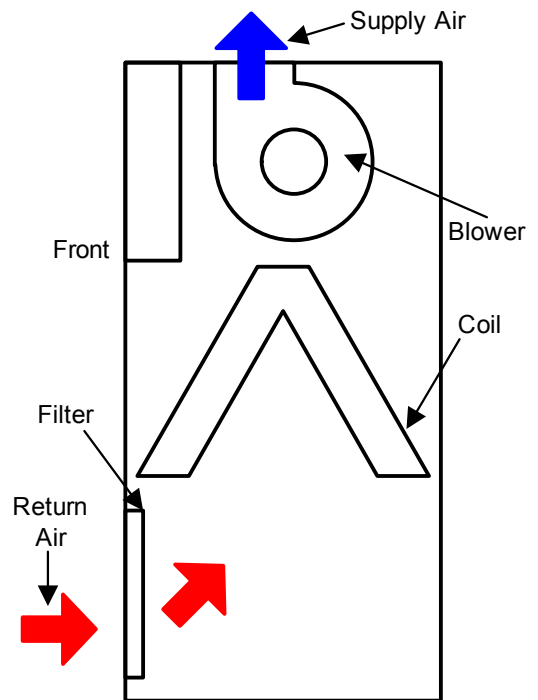




Figure 4 Blower configurations—Upflow, front return models, centrifugal fans

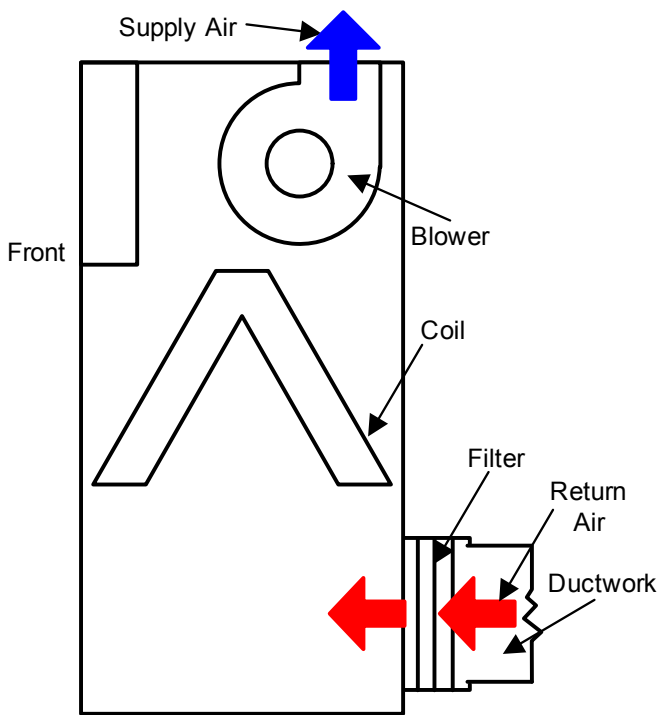


Top Supply, Front Throw Forward-Curved Fans

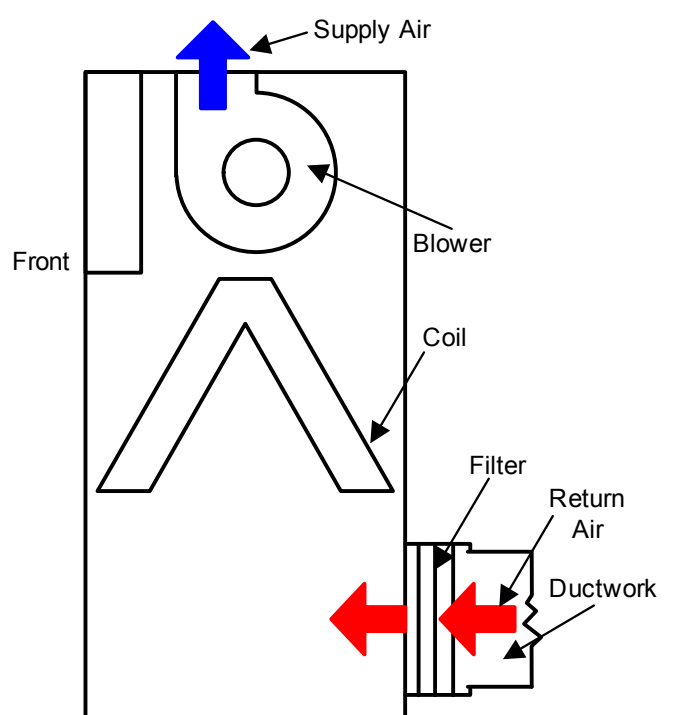


Top Supply, Rear Throw Forward-Curved Fans

Figure 5 Blower configurations—Upflow, rear return models, centrifugal fans



Top Supply, Front Throw, Forward-Curved Fans



Top Supply, Rear Throw, Forward-Curved Fans

## 3.0 AIR-COOLED SYSTEMS

### 3.1 CAPACITY AND PHYSICAL DATA

**Table 1 Performance Data—Air-cooled, EC fan, under-floor discharge**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA with EC Fans</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Semi Hermetic Compressors with EC Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	34.1 (116.4)	42.1 (143.6)	47.9 (163.6)	61.7 (210.6)	72.4 (247.1)	79.2 (270.3)	103.3 (352.5)
Sensible kW (kBTUH)	34 (116)	41.4 (141.2)	47.9 (160.9)	61.6 (210.2)	72 (245.9)	78.9 (269.2)	98.9 (337.5)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	32.4 (110.5)	40.1 (136.8)	45.7 (156.1)	58.3 (198.9)	68.8 (234.8)	75.3 (257.1)	99.1 (338.2)
Sensible kW (kBTUH)	31 (105.9)	37.5 (128.1)	45.7 (146.2)	56.8 (193.9)	66.4 (226.6)	72.9 (248.8)	90 (307.2)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	30.9 (105.3)	38.3 (130.8)	43.8 (149.5)	55.4 (189)	65.6 (223.9)	72 (245.8)	95.2 (325)
Sensible kW (kBTUH)	27.5 (93.9)	33.3 (113.8)	43.8 (129.9)	50.8 (173.3)	59 (201.3)	64.9 (221.5)	80 (273.1)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	30 (102.5)	37.3 (127.4)	42.7 (145.8)	53.8 (183.6)	63.9 (218)	70.2 (239.7)	93.1 (317.6)
Sensible kW (kBTUH)	25.3 (86.3)	30.7 (104.8)	42.7 (119.7)	46.7 (159.3)	54.2 (184.9)	59.7 (203.6)	73.8 (251.8)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with EC Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	35.4 (120.8)	40.2 (137.1)	45.5 (155.3)	63.5 (216.8)	75.8 (258.6)	81.3 (277.6)	103.6 (353.7)
Sensible kW (kBTUH)	35.2 (120)	40 (136.4)	45.3 (154.7)	63.2 (215.7)	74.9 (255.6)	80.6 (275.1)	99.1 (338.3)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	33.4 (113.9)	38.2 (130.4)	43.4 (148.1)	60.5 (206.5)	72.7 (248)	77.9 (265.8)	99.7 (340.2)
Sensible kW (kBTUH)	31.8 (108.7)	36.5 (124.6)	41.6 (141.9)	58.3 (199.1)	68.9 (235)	74.1 (253)	90.3 (308.2)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	31.6 (107.8)	36.5 (124.7)	41.6 (141.9)	57.8 (197.4)	69.9 (238.4)	74.9 (255.5)	96 (327.8)
Sensible kW (kBTUH)	28.2 (96.1)	32.5 (110.8)	37 (126.3)	52 (177.6)	61.4 (209.4)	65.9 (224.9)	80.4 (274.3)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	30.6 (104.3)	35.6 (121.5)	40.6 (138.5)	56.4 (192.6)	68.3 (233)	73.2 (249.9)	93.8 (320.3)
Sensible kW (kBTUH)	25.8 (88.2)	29.9 (102.1)	34.1 (116.3)	47.9 (163.6)	56.5 (192.9)	60.6 (206.9)	74.1 (253)
<b>FAN SECTION - Downflow Models - EC Fans Under Floor</b>							
Standard Air Volume, CFM (CMH) 0.2" External Static	4,400 (7,476)	5,200 (8,835)	6200 (10533.9)	8,000 (13,592)	9,600 (16,310)	11,000 (18,689)	13,700 (23,276)
Standard Fan Motor, Nominal kW (total for all fans)	2.8	2.8	2.8	2.5	4.0	5.9	7.8
Number of Fans	1	1	1	2	2	2	3

- Capacity data is rated and factory-certified per ASHRAE 127-2012 with a 5% tolerance.
- Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
- Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only.

**Table 2 Performance data—Air-cooled, centrifugal fan**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA with Centrifugal Fans</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Semi Hermetic Compressors with Centrifugal Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	40.3 (137.6)	41.0 (140.0)	46.2 (157.6)	60.2 (205.3)	70.5 (240.6)	76.9 (262.6)	101.3 (345.6)
Sensible kW (kBTUH)	38.0 (129.6)	40.3 (137.6)	45.5 (155.3)	59.7 (203.8)	69.7 (237.9)	76.2 (259.9)	96.6 (329.6)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	38.6 (131.8)	39.1 (133.3)	43.9 (150)	57.2 (195.1)	67.2 (229.3)	73.4 (250.6)	97.1 (331.5)
Sensible kW (kBTUH)	34.3 (117.2)	36.5 (124.6)	41.2 (140.5)	54.8 (187.1)	63.8 (217.7)	69.8 (238.2)	87.7 (299.4)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	37.1 (126.5)	37.3 (127.2)	42 (143.3)	54.4 (185.6)	64.1 (218.9)	70.2 (239.7)	93.3 (318.4)
Sensible kW (kBTUH)	30.5 (104.2)	32.3 (110.3)	36.4 (124.2)	48.7 (166.2)	56.5 (192.9)	61.8 (210.9)	77.8 (265.4)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	36.1 (123.3)	36.3 (123.8)	40.9 (139.6)	52.9 (180.6)	62.5 (213.2)	68.6 (234)	91.0 (310.6)
Sensible kW (kBTUH)	28.2 (96.3)	29.7 (101.3)	33.4 (113.9)	44.7 (152.7)	51.9 (177.2)	56.7 (193.6)	71.5 (244.1)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with Centrifugal Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	34.1 (116.4)	39.7 (135.5)	43.7 (149.2)	62.1 (212.1)	74.0 (252.6)	79.1 (270.1)	101.6 (346.9)
Sensible kW (kBTUH)	40.1 (136.9)	34.0 (116.0)	43.6 (148.9)	61.3 (209.3)	72.3 (246.6)	77.8 (265.6)	96.8 (330.4)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	32.4 (110.5)	38.3 (130.8)	41.6 (141.9)	59.3 (202.5)	71.2 (243)	75.9 (259)	97.7 (333.5)
Sensible kW (kBTUH)	31.0 (105.9)	36.1 (123.2)	39.9 (136.1)	56.1 (191.6)	65.9 (225)	71.1 (242.6)	88.0 (300.4)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	30.9 (105.3)	36.7 (125.4)	39.8 (135.7)	56.9 (194.2)	68.5 (233.9)	73 (249.3)	94.1 (321.1)
Sensible kW (kBTUH)	27.5 (93.9)	32.1 (109.4)	35.3 (120.6)	49.9 (170.4)	58.6 (200.1)	63.1 (215.2)	78.1 (266.6)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	30.0 (102.5)	35.9 (122.4)	38.8 (132.3)	55.5 (189.5)	67 (228.7)	71.4 (243.7)	91.9 (313.7)
Sensible kW (kBTUH)	25.3 (86.3)	29.5 (100.6)	32.4 (110.5)	46.0 (157)	54.0 (184.3)	58.0 (197.8)	71.9 (245.5)
<b>FAN SECTION - Downflow Models - Fixed Pitch, Two Belts</b>							
Standard Air Volume - CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6,300 (10,704)	7,500 (12,743)	9,000 (15,291)	10,400 (17,670)	13,700 (23,276)
Standard Fan Motor hp (kW)	2 (1.5)	3 (2.2)	5.0 (3.7)	3 (2.2)	5 (3.7)	7.5 (5.6)	10.0 (7.5)
Number of Fans	1	1	1	2	2	2	3

- Capacity data is rated and factory-certified per ASHRAE 127-2012 with a 5% tolerance.
- Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
- Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

Table 3 Physical data—Air-cooled systems

Model Size	028	035	042	053	070	077	105
<b>EVAPORATOR COIL- A-Frame - Copper Tube/Aluminum Fin</b>							
Face Area, sq. ft. (sq. m)	17.1 (1.6)	17.1 (1.6)	17.1 (1.6)	24.7 (2.3)	24.7 (2.3)	24.7 (2.3)	32.3 (3.0)
Rows of Coil	3	3	3	3	3	3	3
<b>REHEAT SECTION</b>							
Electric Reheat - Three-Stage, Stainless Steel Fin Tubular, capacity does not include fan motor heat							
Capacity - kW (kBTUH) - Standard Selection	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
Capacity, kW (kBTUH) - Optional Selection	10.0 (34.1)	10.0 (34.1)	10.0 (34.1)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	20.0 (68.3)
Electric Reheat - SCR Control, Stainless Steel Fin Tubular (optional selection)							
Capacity, kW (kBTUH)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
<b>HUMIDIFIER SECTION</b>							
Infrared Humidifier (Steam canister humidifiers available on downflow models with centrifugal fans)							
Capacity, lb./hr. (kg/h)	11.0 (5.0)	11.0 (5.0)	11.0 (5.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)
<b>FILTER SECTION - Disposable Type - Nominal Sizes and Quantities, Standard MERV 8 or Optional MERV 11 (filter types cannot be mixed, must be all MERV 8 or all MERV 11)</b>							
Downflow Models							
Quantity	3	3	3	4	4	4	4
Nominal Size, inches	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	4 @ 25x20	4 @ 25x20	4 @ 25x20	4 @ 25x20
Upflow Models (Front & Rear return) Filters located in separate filter box on rear return, located on lower unit panel							
Quantity	4	4	4	6	6	6	8
Nominal Size, inches	25x20	25x20	25x20	25x20	25x20	25x20	25x20
<b>PIPING CONNECTION SIZES - Air-cooled Liebert DS Indoor Unit (Not External Line Sizes)</b>							
Liquid Line, O.D. Copper (2/unit)	1/2	1/2	1/2	5/8	5/8	5/8	5/8
Hot Gas Line, O.D. Copper (2/unit)	5/8	5/8	5/8	7/8	7/8	7/8	1-1/8
Infrared Humidifier, O.D. Copper	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Condensate Drain, FPT	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Condensate Drain w/Optional Condensate Pump, OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2
<b>OUTDOOR AIR-COOLED CONDENSER, STANDARD 95°F AMBIENT SELECTION; see Tables 44 and 49 for other selections</b>							
Model (R-407C refrigerant)	MCM080_8	MCM080_8	MCM080_8	MCM080_8	MCM080_8	MCM080_8	MCL110_8
Number of Fans	2	2	2	2	2	2	2
<b>DUAL-COOL UNITS DATA, Water (0% Glycol), Net Capacity Data kW (kBTUH)</b>							
<b>CAUTION: CuNi coil option must be specified when Econ-O-Coil is applied to open water tower.</b>							
75°F DB, 61.1 WB (23.9°C DB, 16.2°C WB) 45% RH, 45°F EWT, 55°F LWT Based on Centrifugal Fans							
Total Capacity, kW (kBTUH)	26.2 (89.2)	29.8 (101.6)	32.2 (109.8)	49.9 (170.4)	55.3 (188.8)	57.7 (196.8)	75.8 (258.8)
Sensible Capacity, kW (kBTUH)	24.9 (85)	28.8 (98.2)	31.6 (107.8)	46 (157.1)	51.7 (176.4)	54.3 (185.4)	73 (249.1)
Flow Rate GPM (l/m) @ 10°F Rise	19 (71.9)	22.4 (84.8)	25.5 (96.5)	36.4 (138)	41.7 (158)	46 (174)	59.4 (225)
Pressure Drop, ft. (kPa), valve, coil	6.1 (18.23)	8.3 (24.81)	10.50 (31.39)	10.40 (31.09)	13.3 (39.8)	15.9 (47.6)	15.9 (47.5)
Airflow, CFM (CMH)	4400 (7475)	5500 (9344)	6600 (11213)	8000 (13592)	9600 (16310)	11000 (18689)	13,700 (23,256)
<b>Fluid Volumes</b>							
Econ-O-Coil fluid volume, gal (l)	5 (19.0)	5 (19.0)	5 (19.0)	8 (30.4)	8 (30.4)	8 (30.4)	10 (38.0)

Capacity data is rated per ASHRAE 127-2012 with a 5% tolerance

Table 4 Electrical data—Air-cooled systems with EC fans

Model #	Reheat Options	Electric Standard, kW				None				Electric Standard kW				None				Electric, Downsized kW				Electric, Downsized kW			
	Humidifier Options	Infrared				Infrared				None				None				Humidifier				No Humidifier			
	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575
DS028	FLA	67.3	64.8	32.1	25.5	56.3	54.1	26.9	24.2	67.3	64.8	32.1	25	43	43	21.1	16.8	56.3	54.1	26.9	24.2	53.5	51.9	25.6	19.9
	WSA	82	78.9	39.2	31.9	60.6	58.4	29.1	25.9	82	78.9	39.2	30.5	47.3	47.3	23.3	18.5	64.8	62.8	31.1	25.9	64.8	62.8	31.1	24.1
	OPD	80	80	40	30	70	70	35	30	80	80	40	30	60	60	30	25	70	70	35	30	70	70	35	25
DS035	FLA	70.7	68.2	33.4	25.5	63.1	60.9	29.5	25.2	70.7	68.2	33.4	25.5	49.8	49.8	23.7	17.8	63.1	60.9	29.5	25.2	56.9	55.3	26.9	20.4
	WSA	86.3	83.2	40.8	31.9	68.3	66.1	32	27.1	86.3	83.2	40.8	31.1	55	55	26.2	19.7	69	67	32.7	27.1	69	67	32.7	24.8
	OPD	90	90	45	30	80	80	40	30	90	90	45	30	70	70	35	25	80	80	40	30	80	80	35	25
DS042	FLA	78.2	75.9	37.7	33	78.1	75.9	37.7	33	78.2	75.7	37.5	29.4	64.8	64.8	31.9	25.6	78.1	75.9	37.7	33	64.8	64.8	31.9	25.6
	WSA	95.7	92.5	46	36	85.2	83	41.2	35.8	95.7	92.5	46	36	71.9	71.9	35.4	28.4	85.2	83	41.2	35.8	78.4	76.4	37.8	29.6
	OPD	110	110	50	45	110	110	50	45	110	110	50	40	100	100	45	35	110	110	50	45	100	100	45	35
DS053	FLA	119.9	116	57.1	43.5	109.2	104.8	52.4	42	119.9	116	57.1	43.5	82.6	82.6	40.8	30.4	109.2	104.8	52.4	42	92.1	89.6	44.1	33.5
	WSA	145.3	140.4	69.4	53.9	117.2	112.8	56.5	45	145.3	140.4	69.4	52.8	90.6	90.62	44.9	33.4	117.2	112.8	56.5	45	110.52	107.4	53.1	40.3
	OPD	150	150	70	50	125	125	70	50	150	150	70	50	110	110	60	45	125	125	70	50	125	125	60	45
DS070	FLA	129.2	125.3	59.9	46.4	127.8	123.4	58	46.4	129.2	125.3	59.9	45.7	101.2	101.2	46.4	34.8	127.8	123.4	58	46.4	101.4	101.2	46.9	35.7
	WSA	156.9	152	72.9	55.5	138.2	133.8	62.8	50	156.9	152.0	72.9	55.5	111.6	111.6	51.2	38.4	138.2	133.8	62.8	50	122.15	119.02	56.6	43
	OPD	175	175	80	60	175	175	80	60	175	175	80	60	150	150	70	50	175	175	80	60	150	150	70	50
DS077	FLA	139.2	134.8	61.4	50	139.2	134.8	61	50	134.9	131	61.4	47.5	112.6	112.6	49.4	38.4	139.2	134.8	61	50	112.6	112.6	49.4	38.4
	WSA	164	159.2	74.8	57.8	151	146.6	66.2	54	164.0	159.2	74.8	57.8	124.37	124.4	54.6	42.4	151	146.6	66.2	54	129.27	126.15	58.5	45.3
	OPD	175	175	80	70	175	175	80	70	175	175	80	60	150	150	70	50	175	175	80	70	150	150	70	50
DS105	FLA	171.5	167.1	83.7	69.1	171.5	167.1	83.7	69.1	164	163.5	79.8	62.6	144.9	144.9	72.1	57.5	171.5	167.1	83.7	69.1	144.9	144.9	72.1	57.5
	WSA	198.8	198.2	97.4	76.4	186.5	182.1	91.6	75.4	198.8	198.2	97.4	76.4	159.9	159.9	80	63.8	186.5	182.1	91.6	75.4	169.3	165.5	81.3	63.9
	OPD	225	225	110	100	225	225	110	100	225	225	110	90	200	200	110	80	225	225	110	100	200	200	110	80

1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.
6. Steam canister humidifiers not available on models with EC fans.

Table 5 Electrical data—Air-cooled systems with centrifugal fans

Reheat Options			Electric, Std. kW				None				Electric, Std. kW				None			
Humidifier Options			Infrared or Steam Generating Canister				Infrared or Steam Generating Canister				None				None			
Model	Motor hp	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575
028	2.0	FLA	66.4	63.2	31.8	25.2	55.4	52.5	26.6	23.9	66.4	63.2	31.8	24.7	42.1	41.4	20.8	16.5
		WSA	81.1	77.3	38.9	31.5	59.7	56.8	28.8	25.6	81.1	77.3	38.9	30.2	46.4	45.7	23	18.2
		OPD	80	80	40	30	70	70	35	30	80	80	40	30	60	60	30	25
028	3.0	FLA	69.5	66.0	33.2	26.4	58.5	55.3	28.0	25.1	69.5	66.0	33.2	25.9	45.2	44.2	22.2	17.7
		WSA	84.2	80.1	40.3	33	62.8	59.6	30.2	26.8	84.2	80.1	40.3	31.4	49.5	48.5	24.4	19.4
		OPD	90	80	40	30	80	70	35	30	90	80	40	30	60	60	30	25
035	3.0t	FLA	72.9	69.4	34.5	26.4	65.3	62.1	30.6	26.1	72.9	69.4	34.5	26.4	52.0	51.0	24.8	18.7
		WSA	88.5	84.4	41.9	33.0	70.5	67.3	33.1	28.0	88.5	84.4	41.9	32.0	57.2	56.2	27.3	20.6
		OPD	90	90	45	35	90	80	40	35	90	90	45	35	70	70	35	25
035	5.0	FLA	79.0	75.0	37.3	28.6	71.4	67.7	33.4	28.3	79.0	75.0	37.3	28.6	58.1	56.6	27.6	20.9
		WSA	94.6	90.0	44.7	35.8	76.6	72.9	35.9	30.2	94.6	90.0	44.7	34.2	63.3	61.8	30.1	22.8
		OPD	100	100	45	35	90	90	45	35	100	100	45	35	80	80	40	30
042	5.0	FLA	86.5	82.7	41.6	36.1	86.4	82.7	41.6	36.1	86.5	82.5	41.4	32.5	73.1	71.6	35.8	28.7
		WSA	104	99.3	49.9	39.1	93.5	89.8	45.1	38.9	104.0	99.3	49.9	39.1	80.2	78.7	39.3	31.5
		OPD	110	110	50	50	110	110	50	50	110	110	50	45	100	100	50	40
042	7.5	FLA	94.0	89.5	45.0	39.0	93.9	89.5	45.0	39.0	94.0	89.3	44.8	35.4	80.6	78.4	39.2	31.6
		WSA	111.5	106.1	53.3	42.0	101.0	96.6	48.5	41.8	111.5	106.1	53.3	42.0	87.7	85.5	42.7	34.4
		OPD	125	110	60	50	125	110	60	50	125	110	60	45	110	110	50	45
053	3.0	FLA	112.1	107.2	53.9	41	101.4	96	49.2	39.5	112.1	107.2	53.9	41	74.8	73.8	37.6	27.9
		WSA	137.5	131.6	66.2	50.8	109.4	104.0	53.3	42.5	137.5	131.6	66.2	50.3	82.8	81.8	41.7	30.9
		OPD	150	125	70	50	125	125	60	50	150	125	70	50	110	110	50	40
053	5.0	FLA	118.2	112.8	56.7	43.2	107.5	101.6	52.0	41.7	118.2	112.8	56.7	43.2	80.9	79.4	40.4	30.1
		WSA	143.6	137.2	69.0	53.5	115.5	109.6	56.1	44.7	143.6	137.2	69.0	52.5	88.9	87.4	44.5	33.1
		OPD	150	150	70	50	125	125	70	50	150	150	70	50	110	110	60	45
070	5.0	FLA	127.5	122.1	59.5	46.1	126.1	120.2	57.6	46.1	127.5	122.1	59.5	45.4	99.5	98	46	34.5
		WSA	155.2	148.8	72.5	55.2	136.5	130.6	62.4	49.7	155.2	148.8	72.5	55.2	109.9	108.4	50.8	38.1
		OPD	175	150	80	60	175	150	80	60	175	150	80	60	150	125	70	50
070	7.5	FLA	135.0	128.9	62.9	49.0	133.6	127.0	61.0	49.0	135.0	128.9	62.9	48.3	107.0	104.8	49.4	37.4
		WSA	162.7	155.6	75.9	58.1	144.0	137.4	65.8	52.6	162.7	155.6	75.9	58.1	117.4	115.2	54.2	41.0
		OPD	175	175	80	60	175	175	80	60	175	175	80	60	150	150	70	50
077	7.5	FLA	145	138.4	64.4	52.6	145.0	138.4	64.0	52.6	140.7	134.6	64.4	50.1	118.4	116.2	52.4	41.0
		WSA	169.8	162.8	77.8	60.4	156.8	150.2	69.2	56.6	169.8	162.8	77.8	60.4	130.2	128.0	57.6	45.0
		OPD	200	175	90	70	200	175	80	70	175	175	90	70	175	175	70	60
077	10.0	FLA	151.6	144.4	67.4	54.6	151.6	144.4	67.0	54.6	147.3	140.6	67.4	52.1	125.0	122.2	55.4	43.0
		WSA	176.4	168.8	80.8	62.4	163.4	156.2	72.2	58.6	176.4	168.8	80.8	62.4	136.8	134.0	60.6	47.0
		OPD	200	200	90	70	200	200	90	70	200	175	90	70	175	175	80	60
105	10.0	FLA	177.4	170.2	88.4	72.6	177.4	170.2	88.4	72.6	169.9	166.6	84.5	66.1	150.8	148	76.8	61.0
		WSA	204.7	201.3	102.1	79.9	204.7	201.3	102.1	79.9	204.7	201.3	102.1	79.9	165.8	163.0	84.7	67.3
		OPD	250	225	125	100	250	225	125	100	225	225	110	90	225	200	110	90
105	15.0	FLA	192.3	184.2	95.4	78.6	192.3	184.2	95.4	78.6	185.3	180.6	91.5	72.1	166.2	162.0	83.8	67.0
		WSA	220.1	215.3	109.1	85.9	220.1	215.3	109.1	85.9	220.1	215.3	109.1	85.9	181.2	177.0	91.7	73.3
		OPD	250	250	125	100	250	250	125	100	250	250	125	100	225	225	110	90

1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.

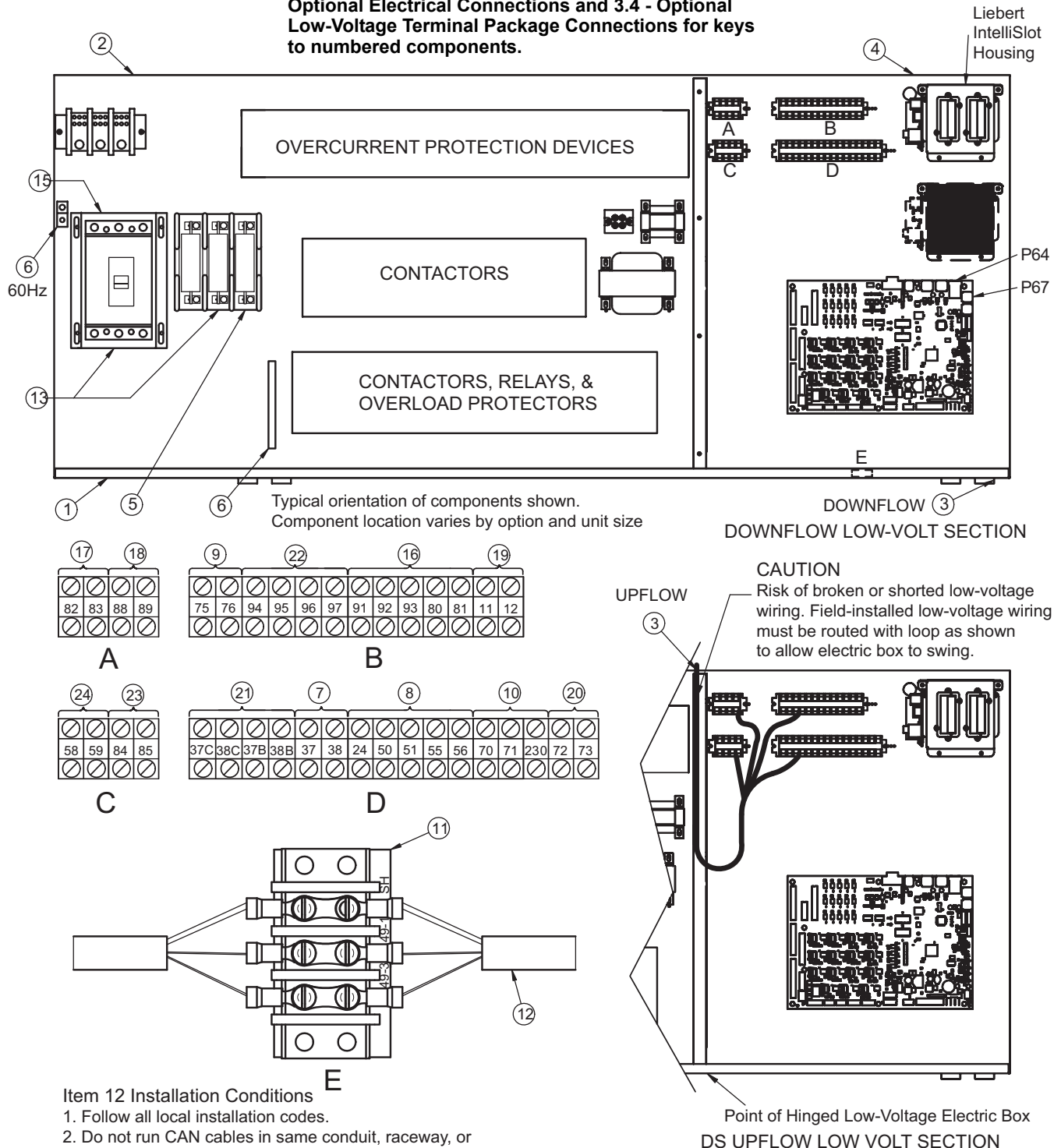
**Table 5 Electrical data—Air-cooled systems with centrifugal fans (continued)**

Reheat Options			Electric, Downsized kW							
Humidifier Options			Infrared or Steam Generating Canister				None			
Model	Motor, hp	Volts	208	230	460	575	208	230	460	575
028	2.0	FLA	55.4	52.5	26.6	23.9	52.6	50.3	25.3	19.6
		WSA	63.9	61.2	30.8	25.6	63.9	61.2	30.8	23.8
		OPD	70	70	35	30	70	70	35	25
028	3.0	FLA	58.5	55.3	28	25.1	55.7	53.1	26.7	20.8
		WSA	67.0	64.0	32.2	26.8	67.0	64.0	32.2	25.0
		OPD	80	70	35	30	70	70	35	25
035	3.0	FLA	65.3	62.1	30.6	26.1	59.1	56.5	28.0	21.3
		WSA	71.2	68.2	33.8	28.0	71.2	68.2	33.8	25.7
		OPD	90	80	40	35	80	80	40	30
035	5.0	FLA	71.4	67.7	33.4	28.3	65.2	62.1	30.8	23.5
		WSA	77.3	73.8	36.6	30.2	77.3	73.8	36.6	27.9
		OPD	90	90	45	35	90	80	40	30
042	5.0	FLA	86.4	82.7	41.6	36.1	73.1	71.6	35.8	28.7
		WSA	93.5	89.8	45.1	38.9	86.7	83.2	41.7	32.7
		OPD	110	110	50	50	100	100	50	40
042	7.5	FLA	93.9	89.5	45.0	39.0	80.6	78.4	39.2	31.6
		WSA	101.0	96.6	48.5	41.8	94.2	90.0	45.1	35.6
		OPD	125	110	60	50	110	110	50	45
053	3.0	FLA	101.4	96.0	49.2	39.5	84.3	80.8	40.9	31
		WSA	109.4	104.0	53.3	42.5	102.7	98.6	49.9	37.8
		OPD	125	125	60	50	110	110	60	45
053	5.0	FLA	107.5	101.6	52.0	41.7	90.4	86.4	43.7	33.2
		WSA	115.5	109.6	56.1	44.7	108.8	104.2	52.7	40.0
		OPD	125	125	70	50	125	125	60	45
070	5.0	FLA	126.1	120.2	57.6	46.1	99.7	98	46.5	35.4
		WSA	136.5	130.6	62.4	49.7	120.5	115.8	56.2	42.7
		OPD	175	150	80	60	150	125	70	50
070	7.5	FLA	133.6	127.0	61.0	49.0	107.2	104.8	49.9	38.3
		WSA	144.0	137.4	65.8	52.6	128.0	122.6	59.6	45.6
		OPD	175	175	80	60	150	150	70	50
077	7.5	FLA	145	138.4	64.0	52.6	118.4	116.2	52.4	41.0
		WSA	156.8	150.2	69.2	56.6	135.1	129.8	61.5	47.9
		OPD	200	175	80	70	175	175	70	60
077	10.0	FLA	151.6	144.4	67.0	54.6	125.0	122.2	55.4	43.0
		WSA	163.4	156.2	72.2	58.6	141.7	135.8	64.5	49.9
		OPD	200	200	90	70	175	175	80	60
105	10.0	FLA	177.4	170.2	88.4	72.6	150.8	148	76.8	61.0
		WSA	192.4	185.2	96.3	78.9	175.2	168.6	86.0	67.4
		OPD	250	225	125	100	225	200	110	90
105	15.0	FLA	192.8	184.2	95.4	78.6	166.2	162.0	83.8	67.0
		WSA	207.8	199.2	103.3	84.9	190.6	182.6	93.0	73.4
		OPD	250	250	125	100	225	225	110	90

1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.

**Figure 6 Electrical field connections—Upflow and downflow models, single molded case switch disconnect with main fuses**

See 3.2 - Standard Electrical Connections, 3.3 - Optional Electrical Connections and 3.4 - Optional Low-Voltage Terminal Package Connections for keys to numbered components.



**Item 12 Installation Conditions**

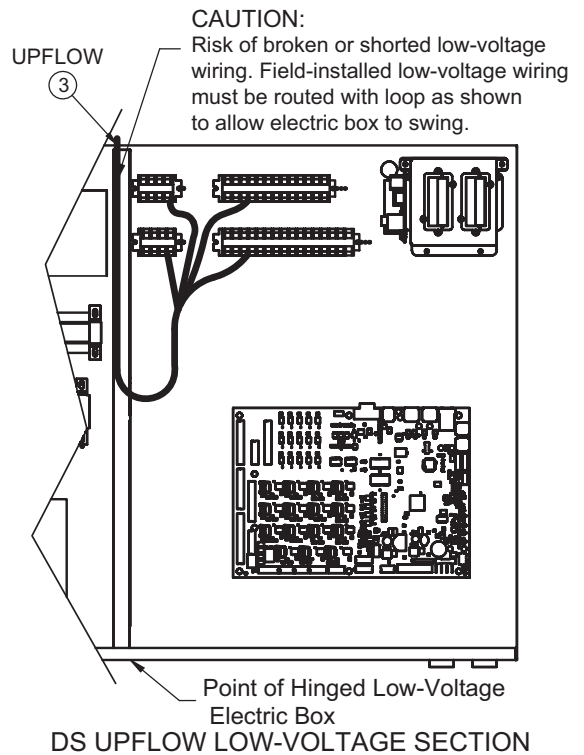
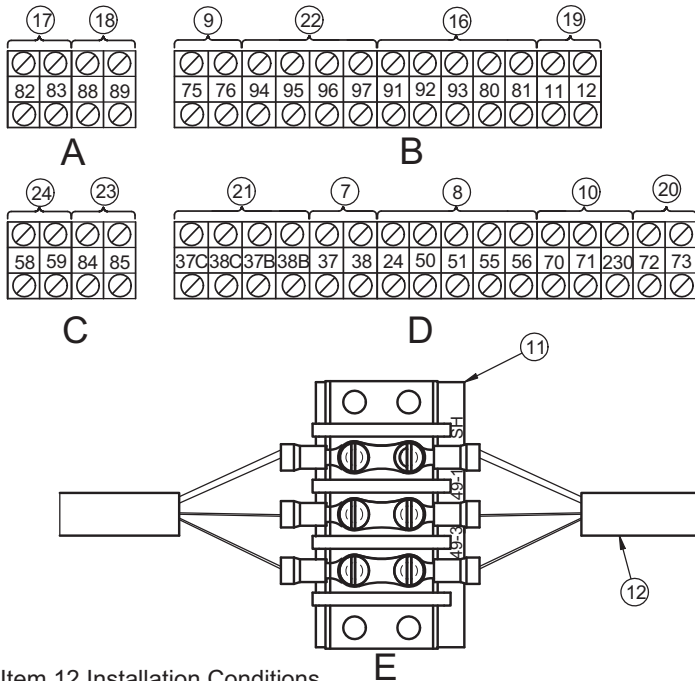
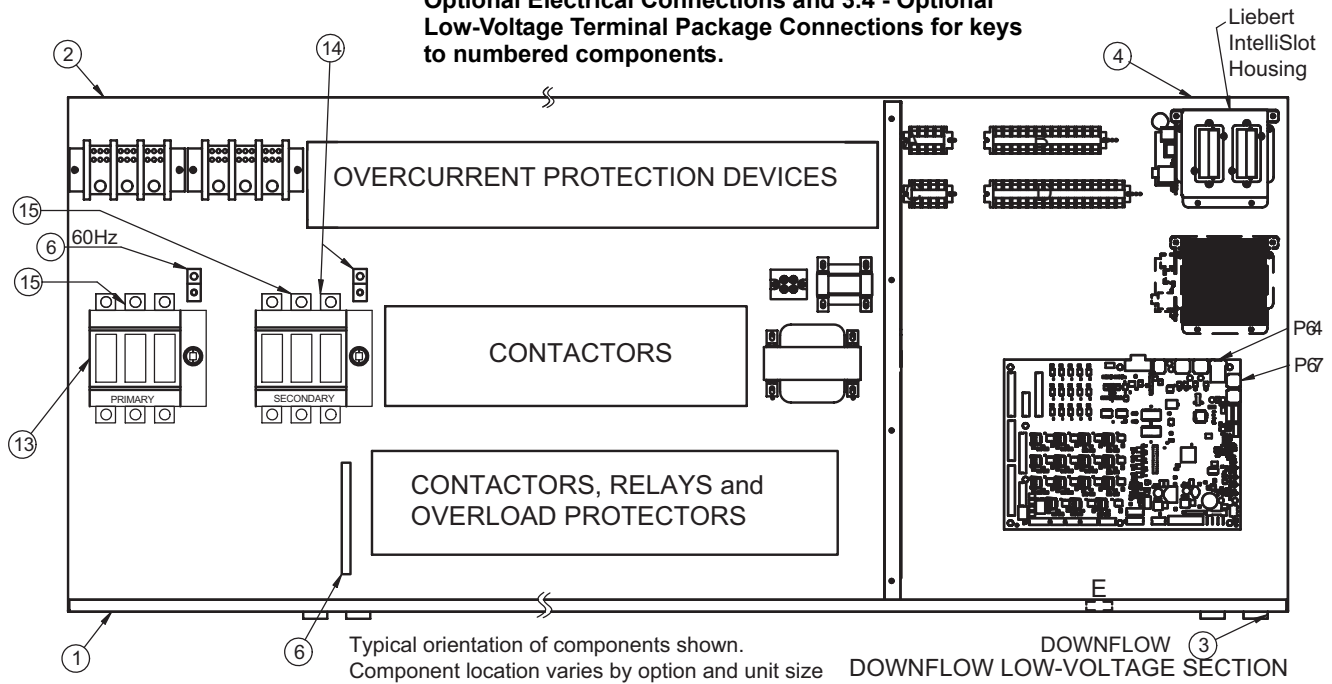
1. Follow all local installation codes.
2. Do not run CAN cables in same conduit, raceway, or chase as high voltage wires (120-600V).
3. Separate high-voltage wires from CAN wires by 12" (305mm).
4. For runs greater than 350ft (107m), contact Emerson factory.

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**Figure 7 Electrical field connections—Upflow and downflow models, dual fused disconnect switches**

See 3.2 - Standard Electrical Connections, 3.3 - Optional Electrical Connections and 3.4 - Optional Low-Voltage Terminal Package Connections for keys to numbered components.



**Item 12 Installation Conditions**

1. Follow all local installation codes.
2. Do not run CAN cables in same conduit, raceway or chase as high-voltage wires (120-600V).
3. Separate high-voltage wires from CAN wires by 12" (305mm).
4. Contact Liebert factory for runs greater than 350ft. (107m).
5. All electrical loads may not be capable of being connected to both power feeds, with automatic transfer switch. Consult local representative for dual power configurations available.

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## 3.2 STANDARD ELECTRICAL CONNECTIONS

Source: DPN000807, Rev. 8

1. **Primary high voltage entrance**—2.5" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in bottom of box.
2. **Secondary high voltage entrance**—2.5" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in top of box.
3. **Primary low voltage entrance**—Quantity (3) 1.375" (35mm) diameter knockouts located in bottom of unit.
4. **Secondary low voltage entrance**—Quantity (3) 1.375" (35mm) diameter knockouts located in top of box.
5. **Three phase electrical service**—Terminals are on main fuse block (disregard if unit has optional disconnect switch). Three-phase service not by Emerson.
6. **Earth ground**—Terminal for field-supplied earth grounding wire. Earth grounding required for Liebert units.
7. **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.
8. **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.
9. **Common alarm**—On any alarm, normally open dry contact is closed across Terminals 75 & 76 for remote indication. 1A, 24VAC maximum load. Use Class 1 field-supplied wiring.
10. **Heat rejection interlock**—On any call for compressor operation, normally open dry contact is closed across Terminals 70 & 71 (Circuit 1), 230 (Circuit 2) to heat rejection equipment. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring. When a Liebert DS unit is paired with a Liebert MC series condenser, remove jumper between Terminal 71 and Terminal 230. Three wires must connect Terminals 70, 71 and 230 of the indoor unit to Terminals 70, 71 and 230 of the Liebert MC series condenser.

### 3.3 OPTIONAL ELECTRICAL CONNECTIONS

Source: DPN000807, Rev. 8

11. **Unit factory installed disconnect switch, Fuse Block and Main Fuses**—Two types of disconnect switches are available: Non-Locking and Locking. The Non-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 with the switch in either the On or Off position. The Locking Type is identical except access to the high-voltage electric panel compartment can be obtained only with the switch in the Off position. Units with fused disconnects are provided with a defeater button that allows access to the electrical panel when power is On. The molded case switch disconnect models contain separate main fuses. Units with fused disconnect have main fuses within the disconnect. Only fused disconnects are used on dual disconnect options.
12. **Secondary disconnect switch and earth ground**
13. **Three-phase electrical service**—Terminals are on top of disconnect switch. Three-phase service not by Emerson.
14. **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. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
15. **Reheat and humidifier lockout**—Remote 24VAC required at Terminals 82 & 83 for lockout of reheat and humidifier.
16. **Condensate alarm (with condensate pump option)**—On pump high water indication, normally open dry contact is closed across Terminals 88 & 89 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
17. **Remote humidifier**—On any call for humidification, normally open dry contact is closed across Terminals 11 & 12 to signal field-supplied remote humidifier. 1A, 24VAC maximum load. Use Class 1 field-supplied wiring.
18. **Auxiliary cool contact**—On any call for Econ-O-coil operation, normally open dry contact is closed across Terminals 72 & 73 on dual cool units only. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.

### 3.4 OPTIONAL LOW-VOLTAGE TERMINAL PACKAGE CONNECTIONS

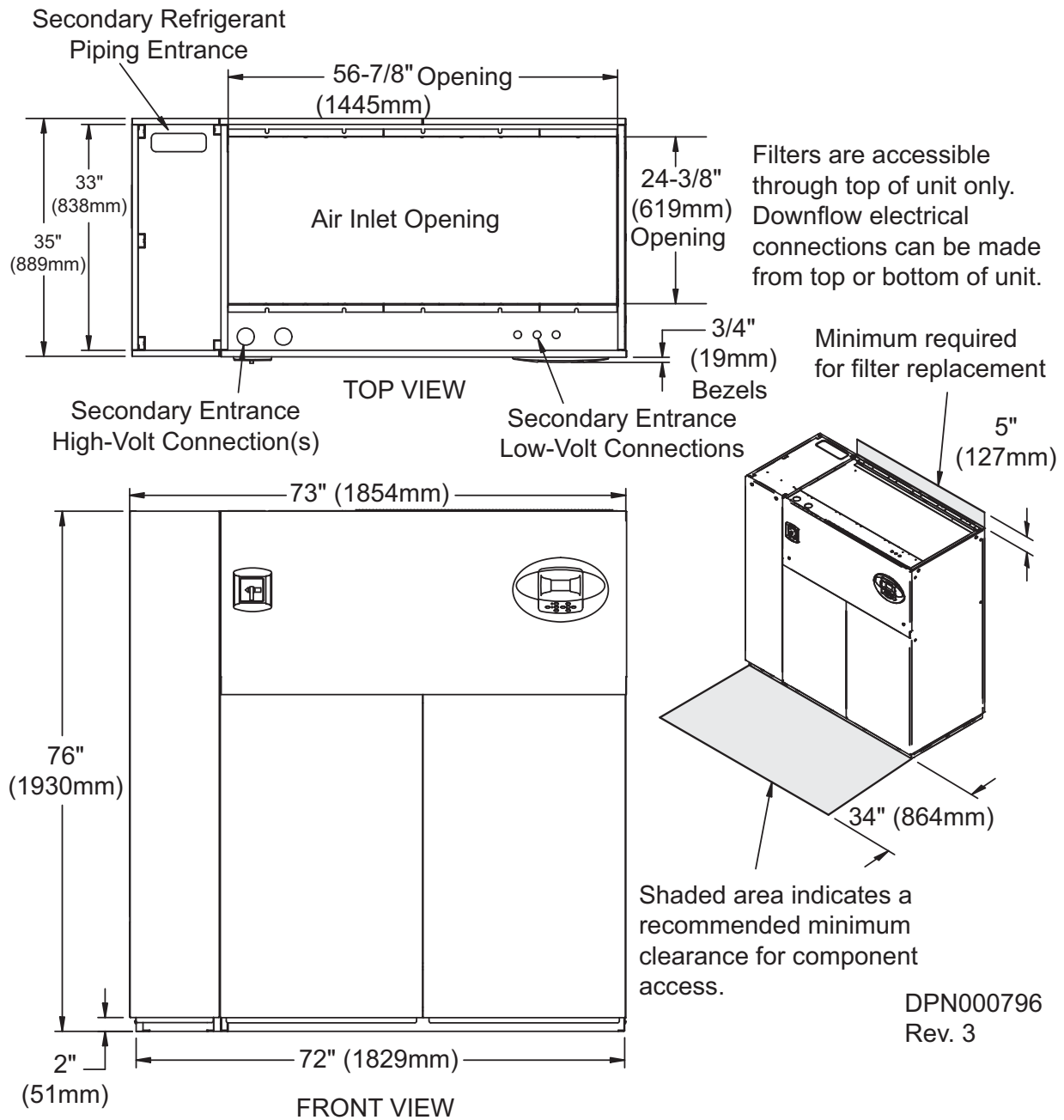
Source: DPN000807, Rev. 8

19. **Remote unit shutdown**—Two additional contact pairs available for unit shutdown (labeled as 37B & 38B, 37C and 38C). Replace jumpers with field-supplied, normally closed switch having a minimum rating of 75VA, 24VAC. Use field-supplied Class 1 wiring.
20. **Common alarm**—On any alarm, two additional normally open dry contacts are closed across Terminals 94 & 95 and 96 & 97 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
21. **Main fan auxiliary switch**—On closure of main fan contactor, normally open dry contact is closed across Terminals 84 & 85 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
22. **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). 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.

### 3.5 DIMENSIONS—LIEBERT DS 028-042, DOWNFLOW, AIR-COOLED MODELS

The following figures are general illustrations that show the dimensional layout for a Liebert DS unit.

**Figure 8** Dimensions—downflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans

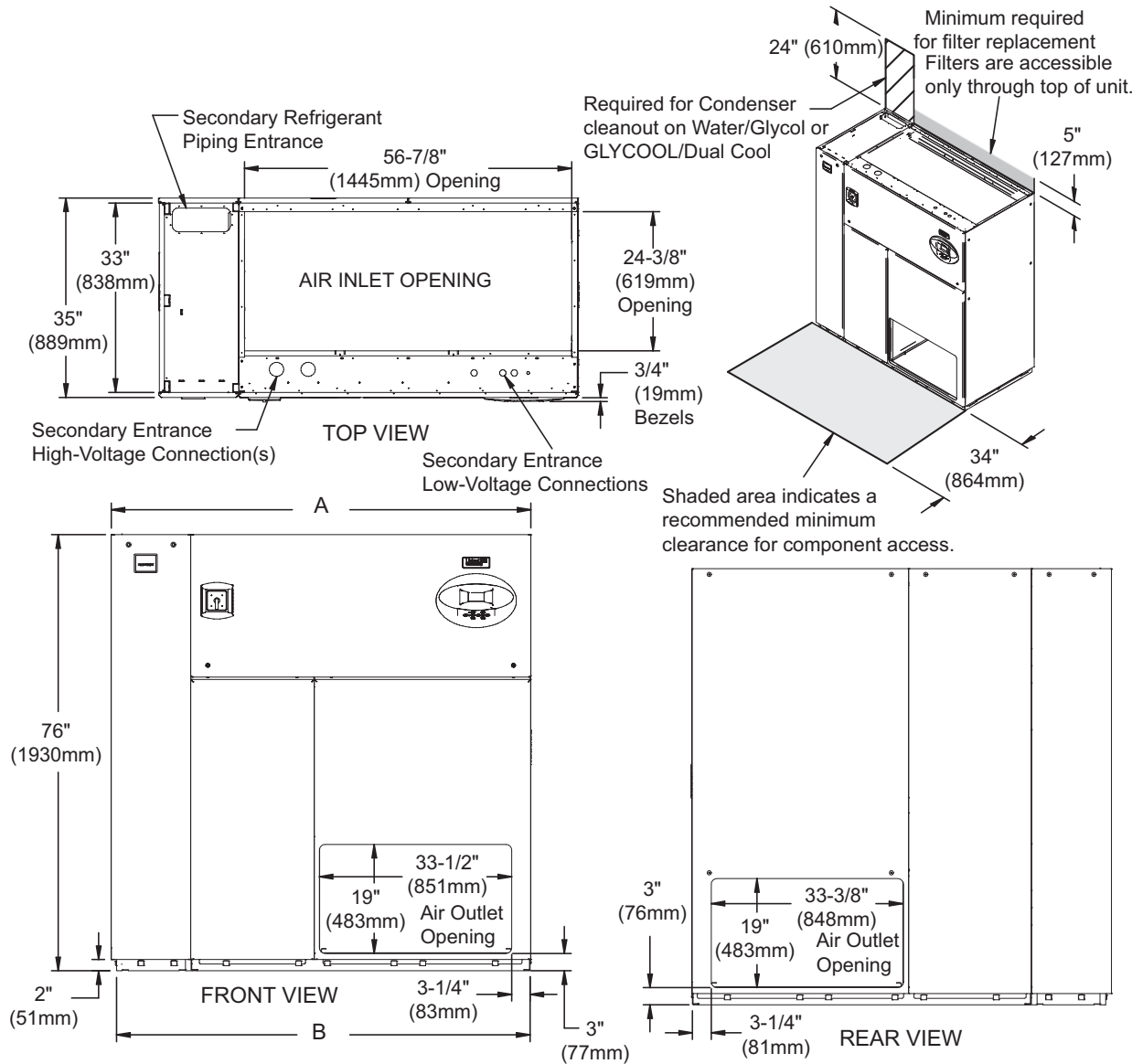


**Table 6** Weights—downflow, air-cooled, 28-42kW (8-12 ton), scroll/digital scroll compressors

Dry Weight, Approximate, lb. (kg)	
Model Type	Model Size: 028-042
Air-Cooled	1470 (668)
Dual-Cool	1620 (736)

Source: DPN000796, Rev. 3

Figure 9 Dimensions—downflow, air-cooled, 28-42kW (8-12 ton), front and/or rear discharge models



Customer Piping and Wiring Connections

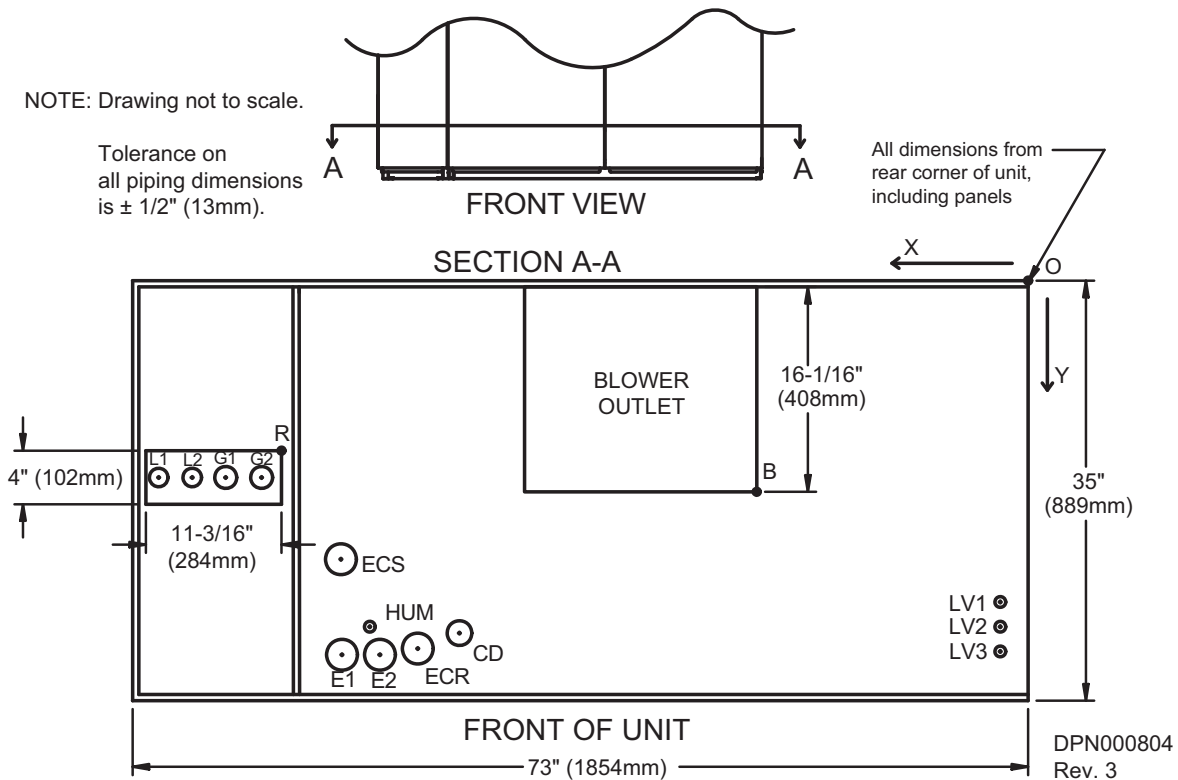
1. For primary connection locations see standard submittals DPN000803, DPN000804 or DPN000900. A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations

310697  
Pg. 1, Rev. 0

Dry Weight, lb (kg) Approximate			Dimensions, In. (mm)	
Compressor Type	Model	028-042	A	B
Semi-Hermetic	Air-Cooled	1780 (809)	86 (2184mm)	85 (2159)
	Dual Cool	1930 (877)		
Scroll / Digital	Air-Cooled	1470 (668)	73 (1854)	72" (1829)
	Dual Cool	1620 (736)		

Source: 310697, Pg. 1, Rev. 0

**Figure 10 Primary connection locations—downflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans**



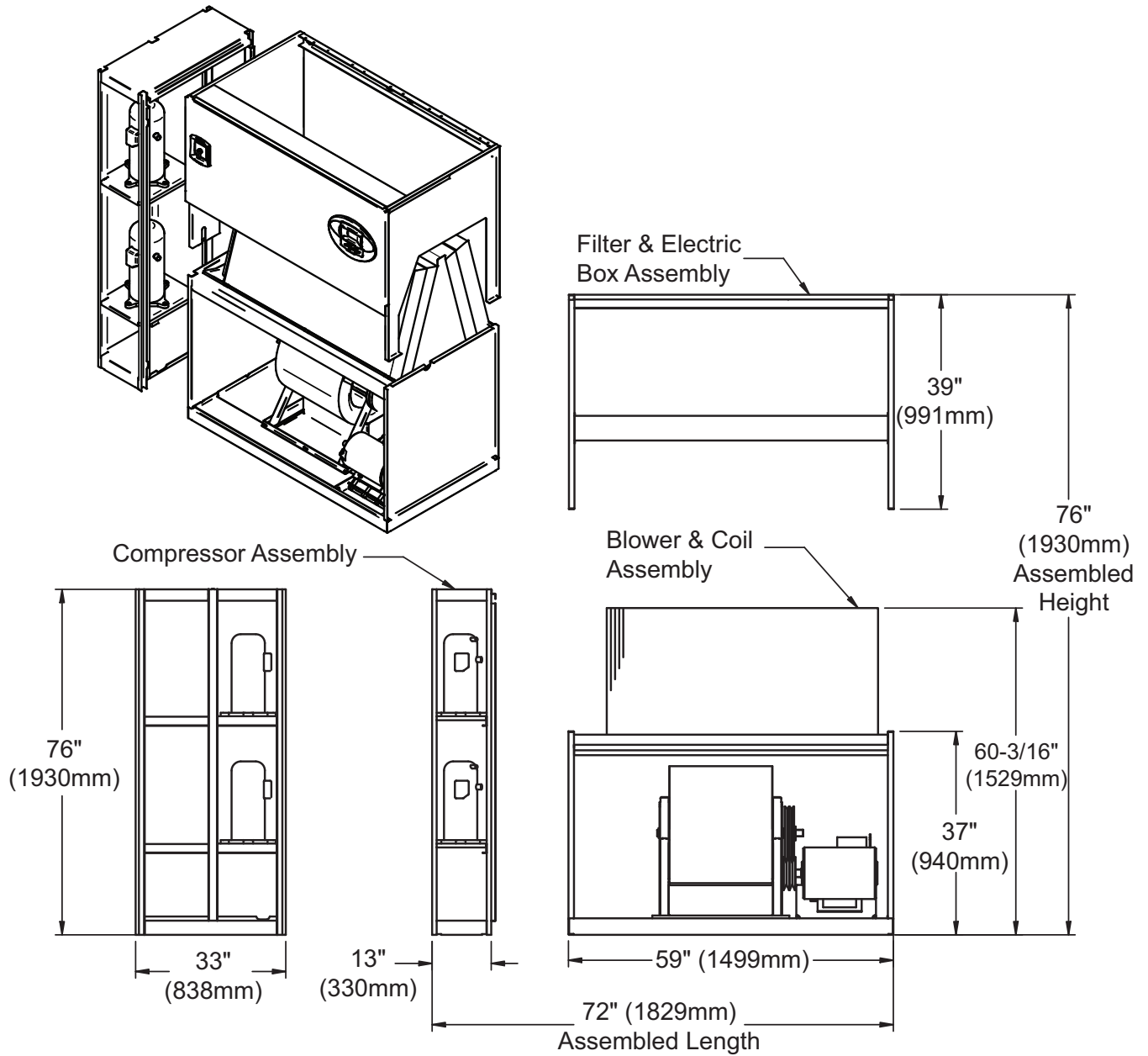
**Table 7 Piping data—downflow, air-cooled, 28-42kW (8-12 ton), scroll/digital scroll**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	59-5/16 (1507)	14-3/4 (375)	11-3/16 x 4 (284 x 102)
L1	Liquid Line System 1	69-15/16 (1776)	16-13/16 (411)	1/2" Cu Sweat
L2	Liquid Line System 2	67-5/8 (1718)	16-13/16 (411)	1/2" Cu Sweat
G1	Hot Gas Discharge 1	65-1/2 (1664)	16-13/16 (411)	5/8" Cu Sweat
G2	Hot Gas Discharge 2	62-7/16 (1586)	16-13/16 (411)	5/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier) *	46 (1168)	29-1/2 (749)	3/4" FPT
	Condensate Drain (steam generating humidifier) *	46 (1168)	29-1/2 (749)	1-1/4" FPT
	W/ Optional Pump	46 (1168)	29-1/2 (749)	1/2" Cu Sweat
HUM	Humidifier Supply Line	53-1/2 (1359)	29 (737)	1/4" Cu Sweat
ECS	Econ-O-Coil Supply	54-7/8 (1394)	22-9/16 (573)	1-5/8" Cu Sweat
ECR	Econ-O-Coil Return	49-3/8 (1254)	30-3/4 (781)	1-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	55-1/2 (1410)	31-1/4 (794)	2-1/2"
E2	Electrical Conn. (High Volt)	52-7/16 (1332)	31-1/4 (794)	2-1/2"
LV1	Electrical Conn. (Low Volt)	2-1/4 (57)	27 (686)	7/8"
LV2	Electrical Conn. (Low Volt)	2-1/4 (57)	29 (737)	7/8"
LV3	Electrical Conn. (Low Volt)	2-1/4 (57)	31 (787)	7/8"
B	Blower Outlet	21-15/16 (557)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN000804, Rev. 3

**Figure 11 Disassembly dimensions—downflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

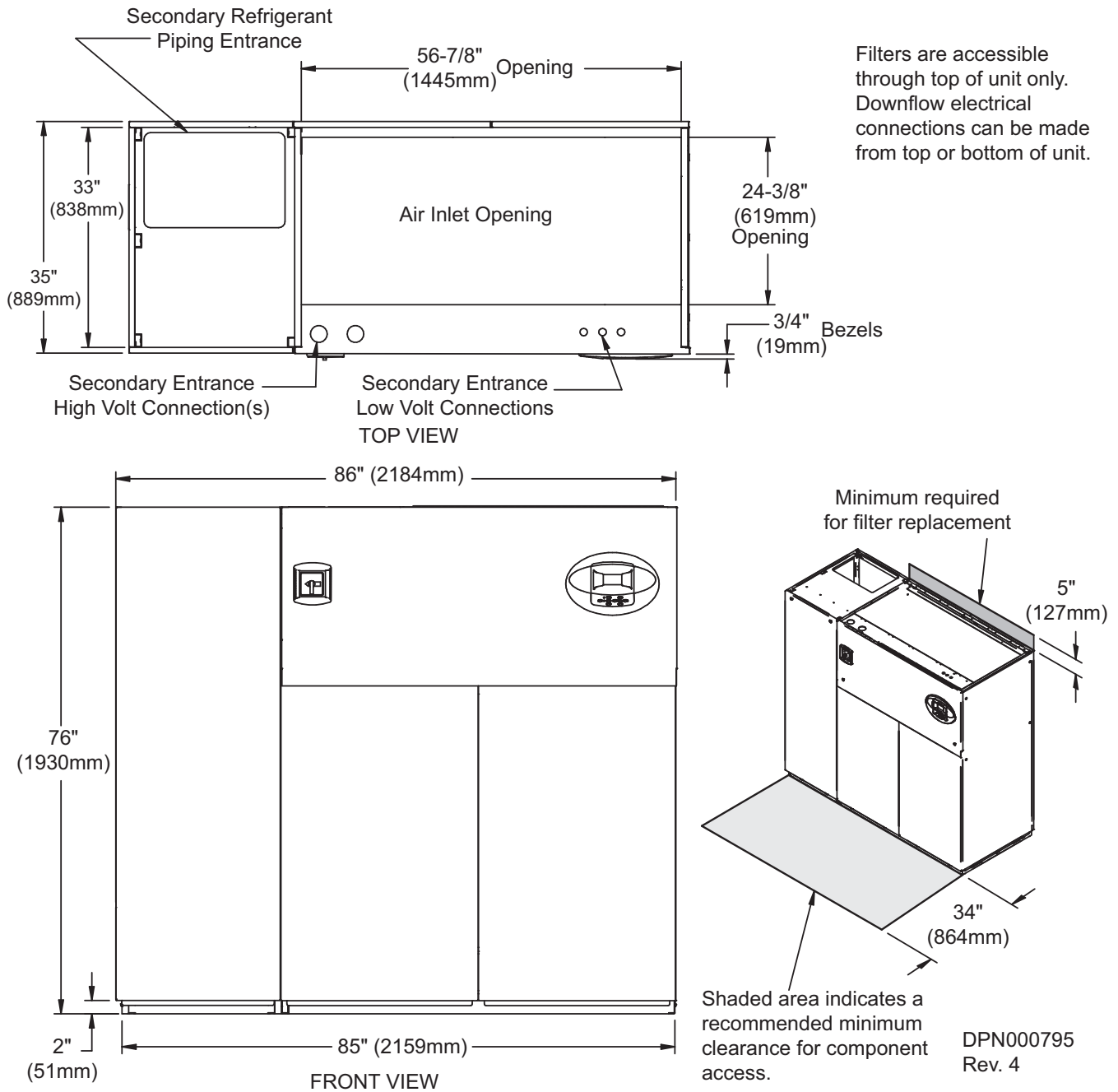
DPN000802  
Rev. 2

**Table 8 Component weights—downflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors**

Dry Weight, Approximate, lb. (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	490 (223)	490 (223)
Filter and Electric Box Assembly	210 (96)	210 (96)
Blower and Coil Assembly	770 (350)	920 (418)

Source: DPN000802, Rev. 2

**Figure 12 Dimensions—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**



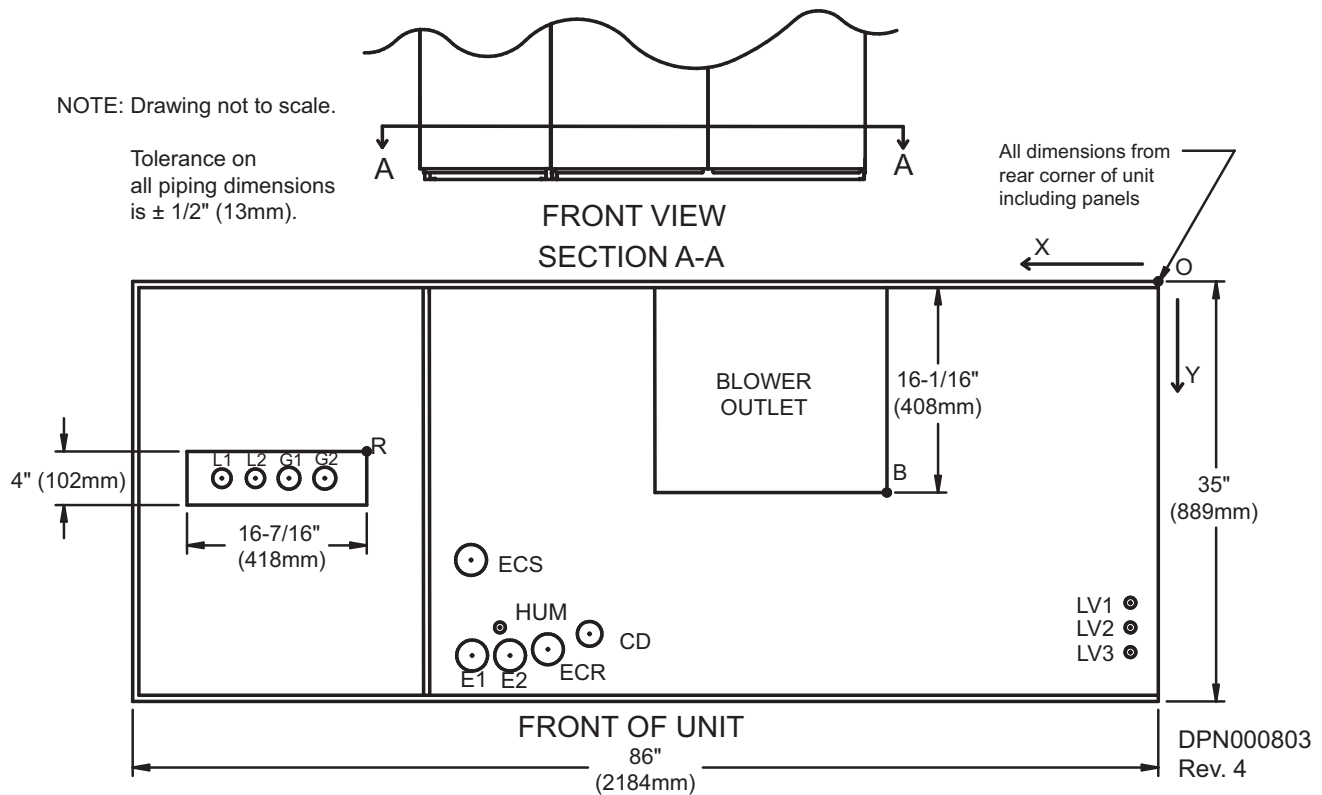
**Table 9 Weights—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

Dry Weight, Approximate, lb. (kg)	
Model Type	Model Size: 028-042
Air-Cooled	1780 (809)
Dual-Cool	1930 (877)

Source: DPN000795, Rev. 4



**Figure 13 Primary connection locations—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**



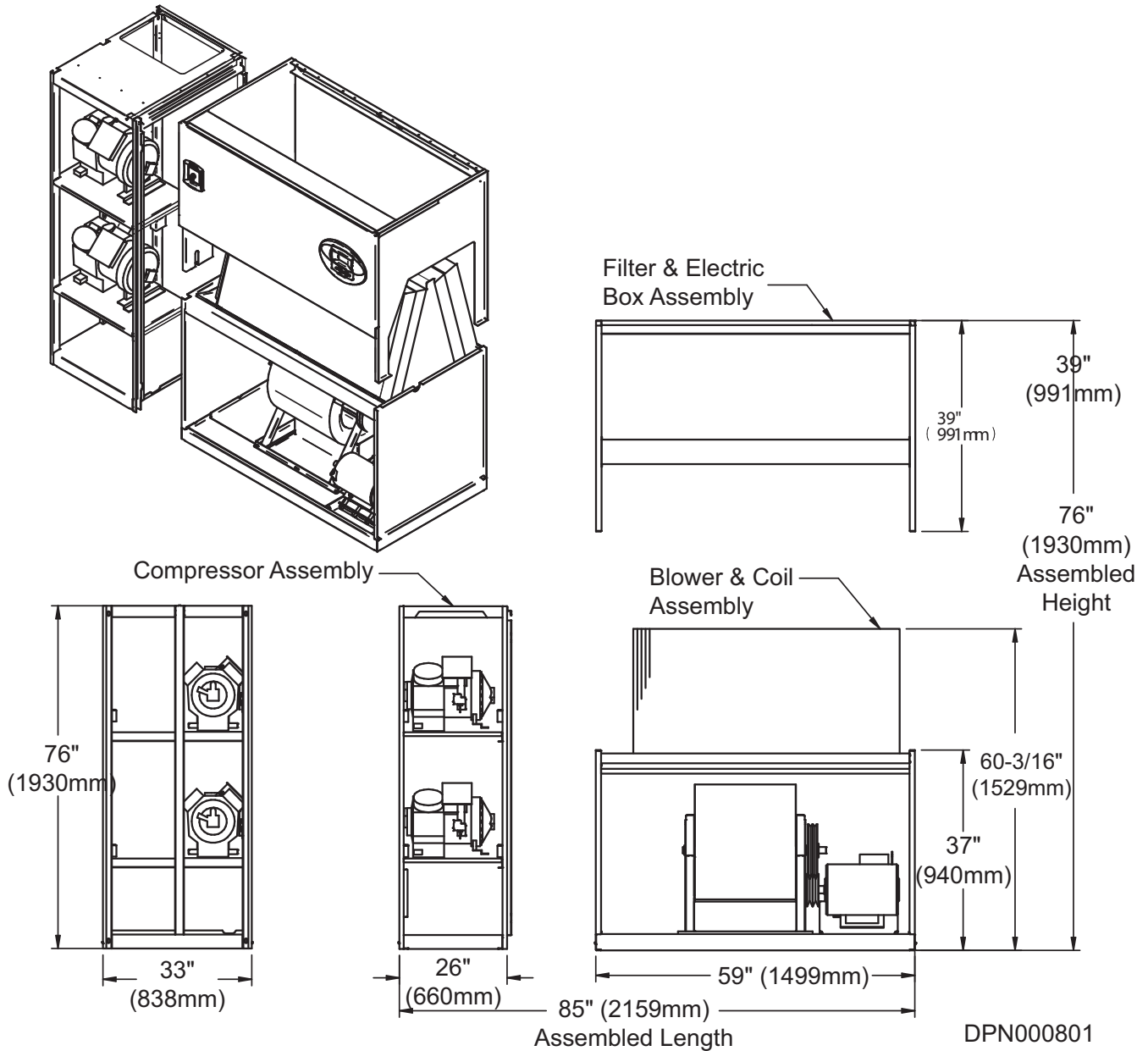
**Table 10 Piping data—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	63 (1600)	13-13/16 (351)	16-7/16 x 4 (418 x 102)
L1	Liquid Line System 1	79-3/16 (2011)	16-3/4 (425)	1/2" Cu Sweat
L2	Liquid Line System 2	76-1/2 (1943)	16-3/4 (425)	1/2" Cu Sweat
G1	Hot Gas Discharge 1	73-7/8 (1876)	16-3/4 (425)	5/8" Cu Sweat
G2	Hot Gas Discharge 2	70-1/8 (1780)	16-3/4 (425)	5/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier)*	46 (1168)	29-1/2 (749)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	46 (1168)	29-1/2 (749)	1-1/4" FPT
	W/ Optional Pump	46 (1168)	29-1/2 (749)	1/2" Cu Sweat
HUM	Humidifier Supply Line	53-1/2 (1359)	29 (737)	1/4" Cu Sweat
ECS	Econ-O-Coil Supply	54-7/8 (1394)	22-9/16 (573)	1-5/8" Cu Sweat
ECR	Econ-O-Coil Return	49-3/8 (1254)	30-3/4 (781)	1-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	55-1/2 (1410)	31-1/4 (794)	2-1/2"
E2	Electrical Conn. (High Volt)	52-7/16 (1332)	31-1/4 (794)	2-1/2"
LV1	Electrical Conn. (Low Volt)	2-1/4 (57)	27 (686)	7/8"
LV2	Electrical Conn. (Low Volt)	2-1/4 (57)	29 (737)	7/8"
LV3	Electrical Conn. (Low Volt)	2-1/4 (57)	31 (787)	7/8"
B	Blower Outlet	21-15/16 (558)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN000803, Rev. 4

**Figure 14 Disassembly dimensions—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

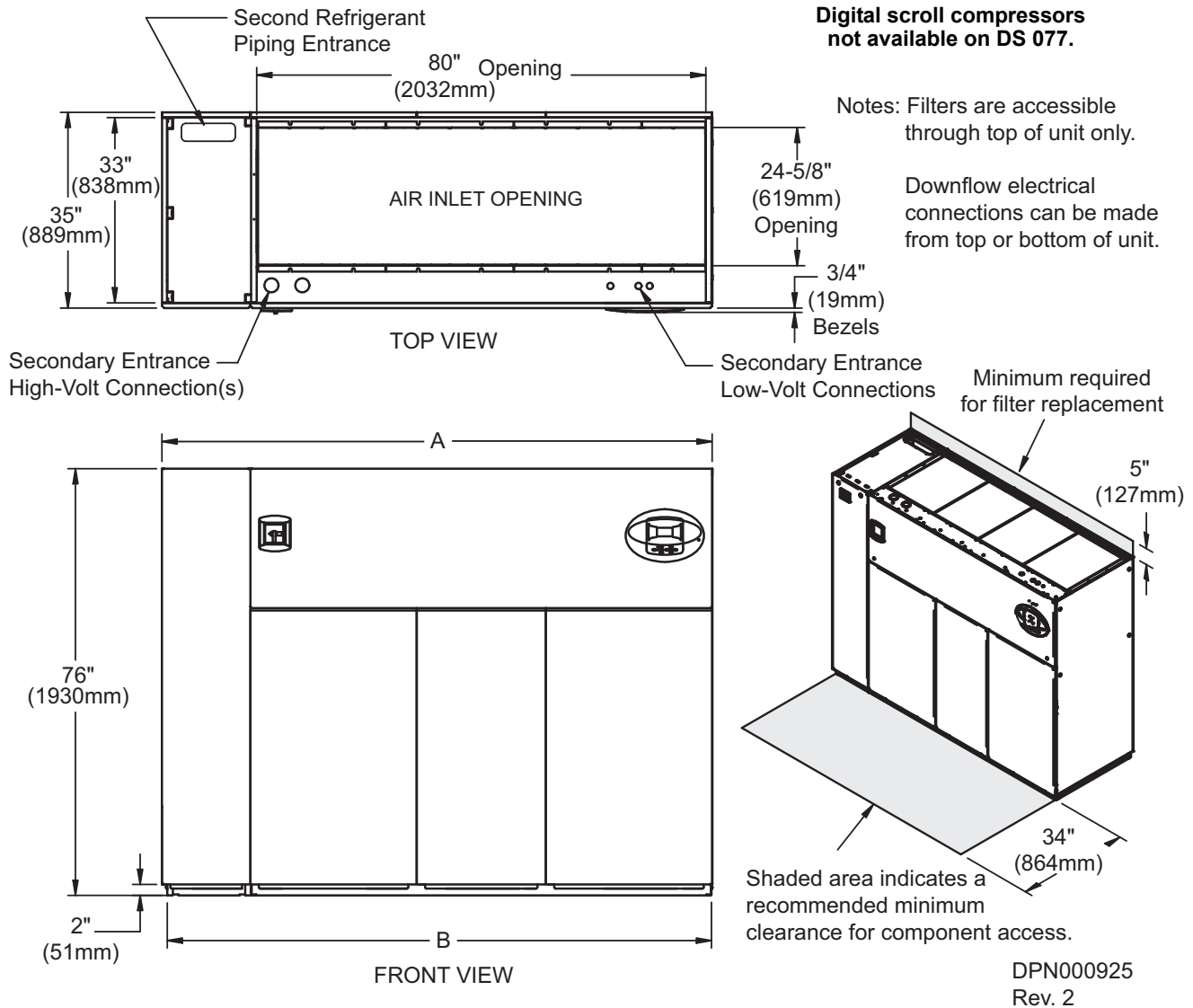
**Table 11 Component weights—downflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cooled
Compressor Assembly	800 (364)	800 (364)
Filter and Electric Box Assembly	210 (96)	210 (96)
Blower and Coil Assembly	770 (350)	920 (418)

Source: DPN000801, Rev. 2

### 3.6 DIMENSIONS—LIEBERT DS 053-077, DOWNFLOW, AIR-COOLED MODELS

**Figure 15** Dimensions—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors with centrifugal fans

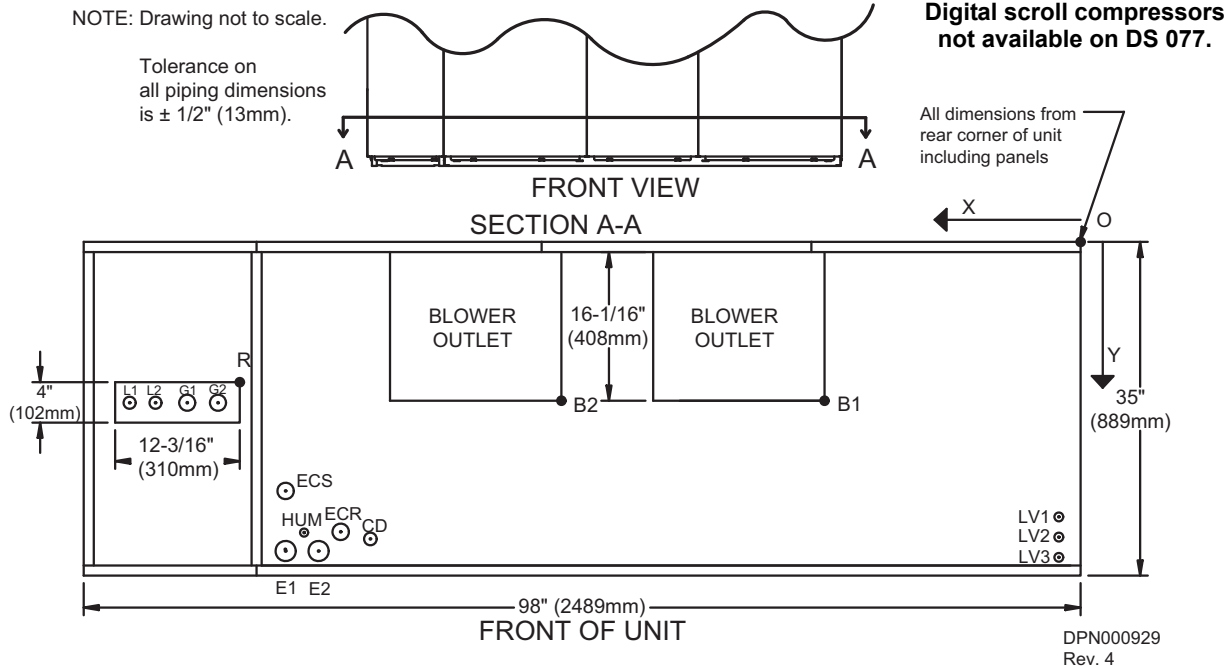


**Table 12** Weights—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors

Dry Weight, lb (kg) Approximate			
Model No.	DS 053	DS 070	DS 077 *
Air Cooled	1920 (871)	1970 (894)	2020 (916)
Dual Cool	2100 (953)	2150 (975)	2200 (998)
Dimensions, in (mm)			
Air Cooled "A"	98 (2489)	98 (2489)	98 (2489)
Air Cooled "B"	97 (2464)	97 (2464)	97 (2464)

\* Digital scroll compressors not available on DS 077  
 Source: DPN000925, Rev. 2

**Figure 16 Primary connection locations—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors with centrifugal fans**



**Table 13 Piping data—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors \*\*\***

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	81-3/4 (2076)	14-3/4 (374)	12-3/16 x 4 (310 x 102)
<b>53kW (15 ton) / 70&amp;77kW (20&amp;22 ton)</b>				
L1	Liquid Line System 1	94-11/16 (2405)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
L2	Liquid Line System 2	91-7/8 (2334)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
G1	Hot Gas Discharge 1	88-3/4 (2254)	16-3/8 (416)	7/8" / 1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	85-9/16 (2173)	16-3/8 (416)	7/8" / 1-1/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier)*	67-11/16 (1719)	30-1/2 (775)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	67-11/16 (1719)	30-1/2 (775)	1-1/4" FPT
	W/ Optional Pump	67-11/16 (1719)	30-1/2 (775)	1/2" Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	78-5/8 (1997)	22-1/4 (565)	2-1/8" Cu Sweat
ECR**	Econ-O-Coil Return	72 (1829)	29 (737)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2"
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2"
LV1	Electrical Conn. (Low Volt)	1-7/8 (48)	28-1/2 (724)	7/8"
LV2	Electrical Conn. (Low Volt)	1-7/8 (48)	30-1/4 (768)	7/8"
LV3	Electrical Conn. (Low Volt)	1-7/8 (48)	32 (813)	7/8"
B1	Blower Outlet (15 x 15)	23-1/8 (587)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	27-3/4 (705)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)
B2	Blower Outlet (15 x 15)	50-3/8 (1280)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	54-3/8 (1381)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 077.

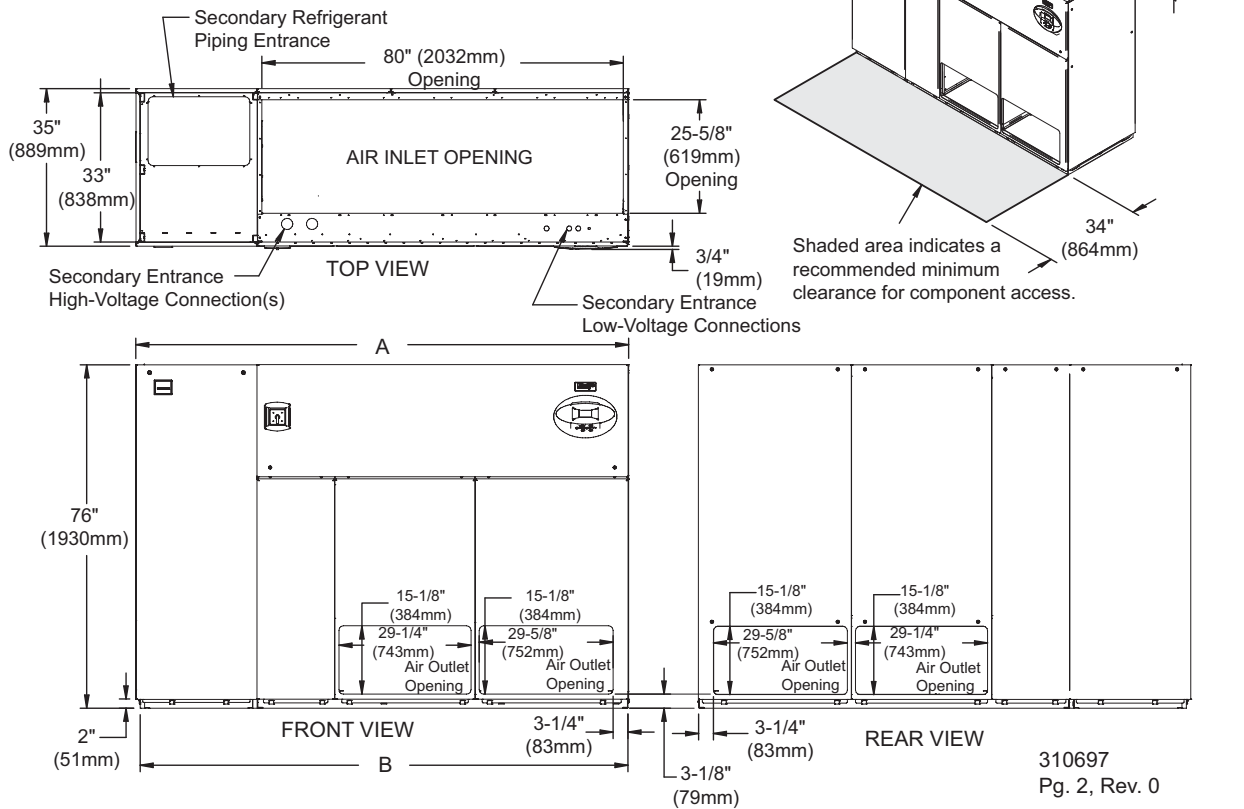
Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN000929, Rev 4

**Figure 17 Dimensions—downflow, air-cooled, 53-77kW (15-22 ton), front and/or rear discharge models with EC fans**

**Customer Piping and Wiring Connections**

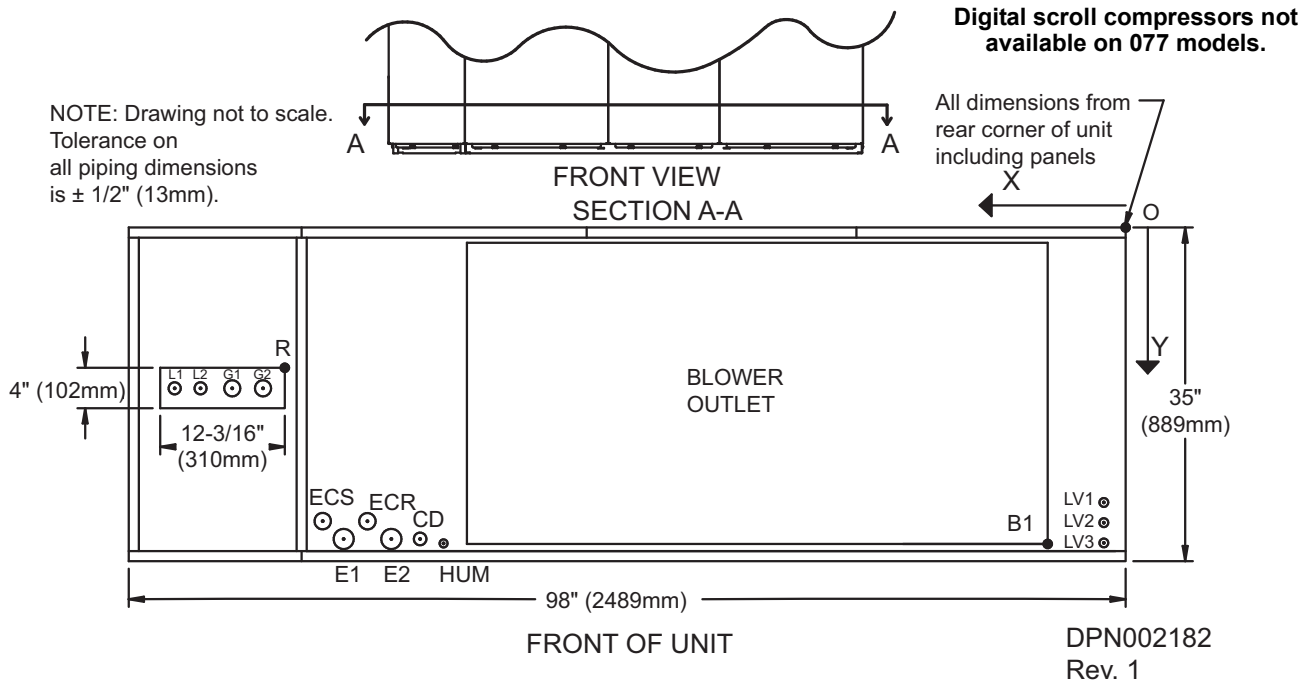
1. For primary connection locations see standard submittals DPN000928, DPN000929 or DPN000933.  
A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidifier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations



Dry Weight, lb (kg) Approximate					Dimensions, in. (mm)	
Compressor Type	Model	53	70	77 *	A	B
Semi-Hermetic	Air-Cooled	2350 (1069)	2400 (1091)	2450 (1114)	109 (2769)	108 (2743)
	Dual Cool	2530 (1150)	2580 (1173)	2630 (1196)		
Scroll / Digital	Air-Cooled	1920 (873)	1970 (896)	2020 (919)	98 (2489)	97 (2464)
	Dual Cool	2100 (955)	2150 (978)	2200 (1000)		

\* Digital scroll compressors not available on 077 models  
 Source: 310697, Pg. 2, Rev. 0

**Figure 18 Primary connection locations—downflow air-cooled 53-77kW (15-22 ton), scroll or digital scroll compressors with EC fans, front, rear or bottom discharge**



**Table 14 Piping details—downflow air-cooled 53-77kW (15-22 ton) with EC fans, scroll or digital scroll compressors \*\*\***

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	81-3/4 (2076)	14-3/4 (374)	12-3/16x4 (310x102)
<b>53kW (15 ton)/ 70 &amp; 77kW (20 &amp; 22 ton)</b>				
L1	Liquid Line System 1	94-11/16 (2405)	16-3/4 (425)	1/2 / 5/8 Cu Sweat
L2	Liquid Line System 2	91-7/8 (2334)	16-3/4 (425)	1/2 / 5/8 Cu Sweat
G1	Hot Gas Discharge 1	88-3/4 (2254)	16-3/8 (416)	7/8 / 1-1/8 Cu Sweat
G2	Hot Gas Discharge 2	85-9/16 (2173)	16-3/8 (416)	7/8 / 1-1/8 Cu Sweat
CD	Condensate Drain (Infrared Humidifier or No Humidifier)*	68-3/8 (1737)	31-3/8 (797)	3/4 FPT
	W/ Optional Pump	68-3/8 (1737)	31-3/8 (797)	1/2 Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4 Cu Sweat
ECS**	Econ-O-Coil Supply (DS Only)	78-5/8 (1997)	22-1/4 (565)	2-1/8 Cu Sweat
ECR**	Econ-O-Coil Return (DS Only)	73-15/16 (1862)	26-9/16 (675)	2-1/8 Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2
LV1	Electrical Conn. (Low Volt)	2 (51)	29 (737)	7/8
LV2	Electrical Conn. (Low Volt)	2 (51)	30-7/8 (784)	7/8
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8
B1	Blower Outlet	4-1/2 (114)	33 (838)	58-3/8x30 (1483x762)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

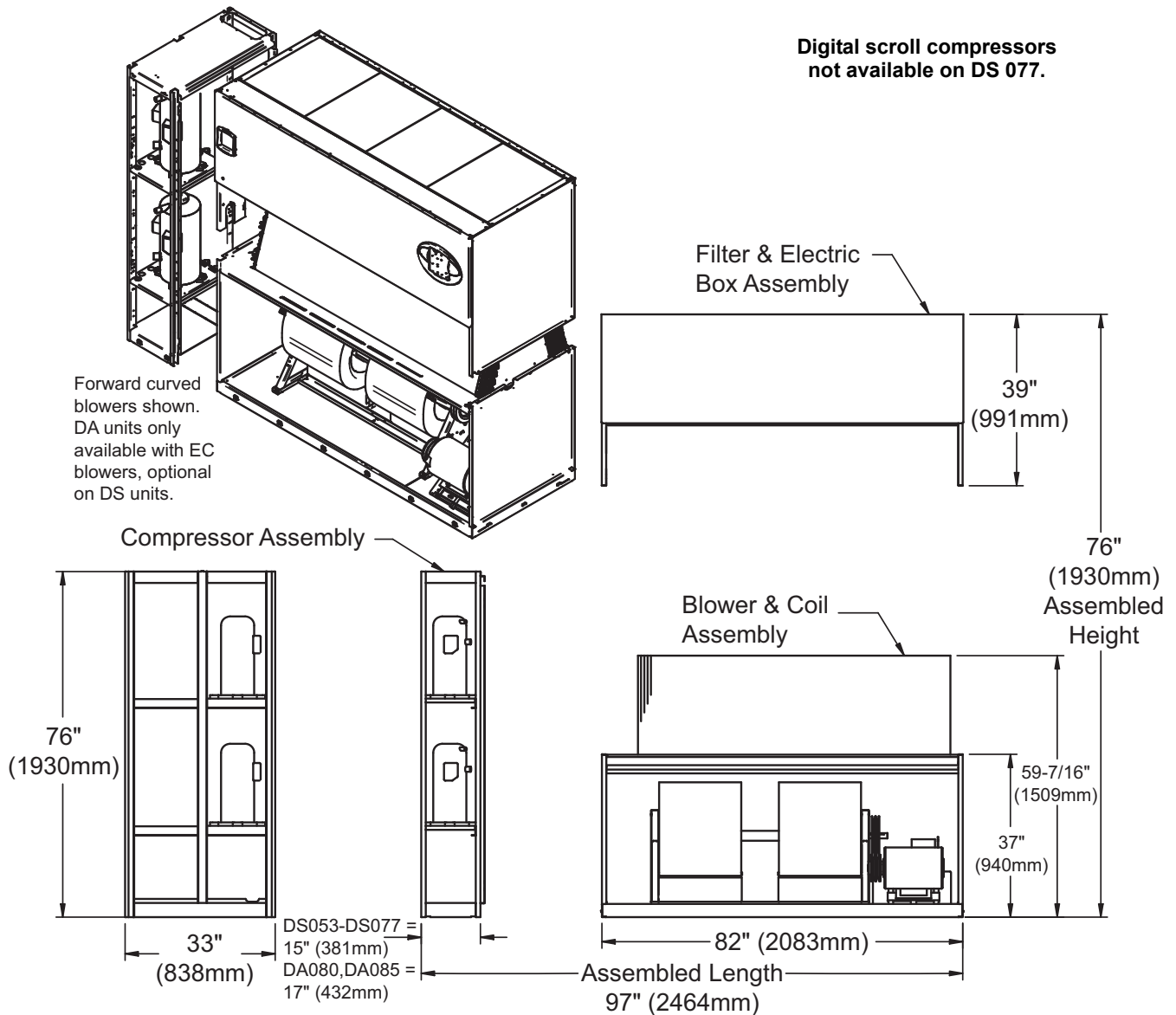
\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 077

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN002182, Rev. 1

**Figure 19 Disassembly dimensions—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors**



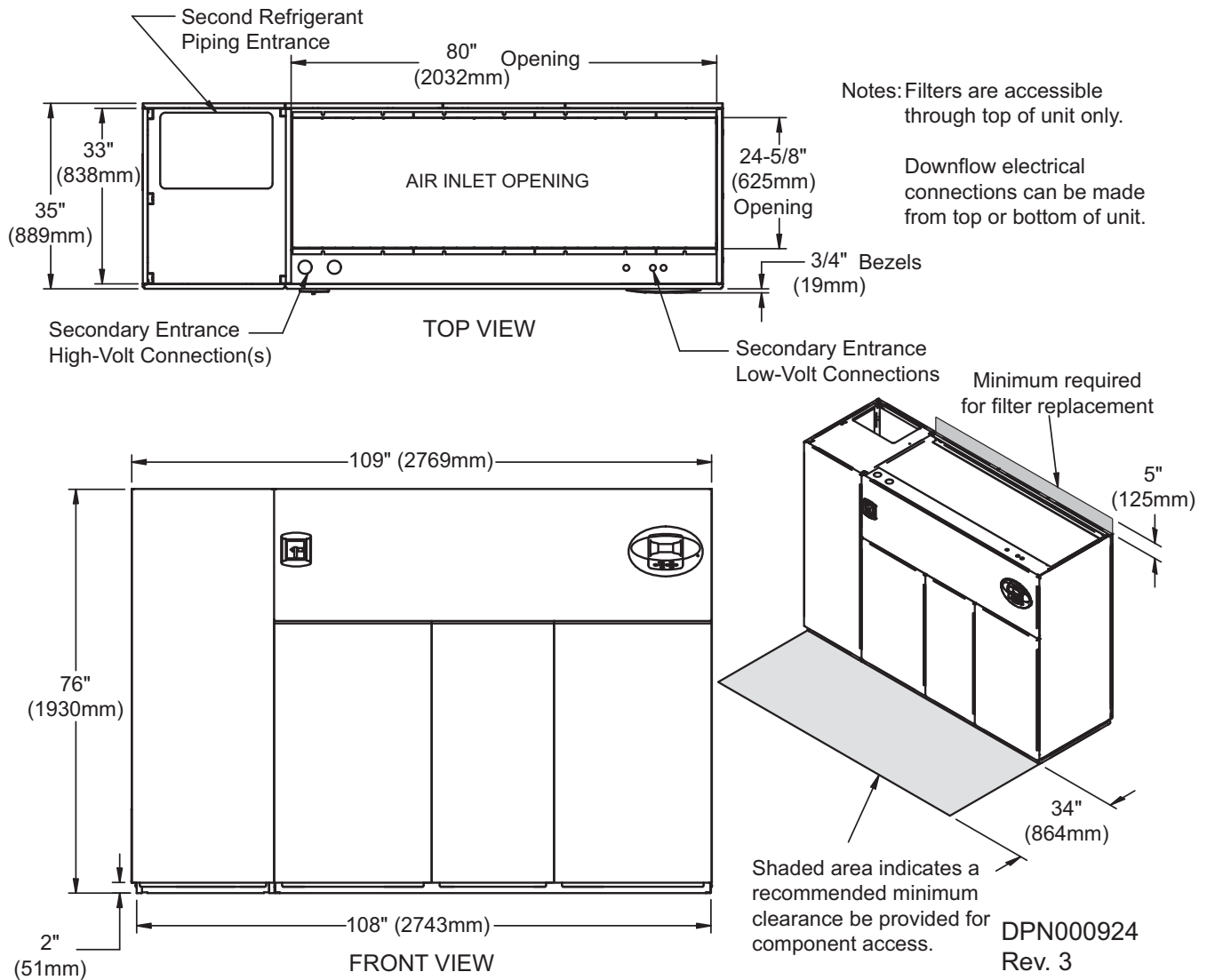
NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual. DPN000927 Rev. 4

**Table 15 Component weights—downflow, air-cooled, 53-77kW (15-22 ton), scroll or digital scroll compressors \***

Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	540 (246)	540 (246)
Filter and Electric Box Assembly	250 (114)	250 (114)
Blower and Coil Assembly	1230 (560)	1410 (641)

\* Digital scroll compressors not available on DS 077  
Source: DPN000927, Rev. 4

**Figure 20 Dimensions—downflow, air-cooled, 53-77kW (15-22 ton) with centrifugal fans, semi-hermetic compressors with centrifugal fans**



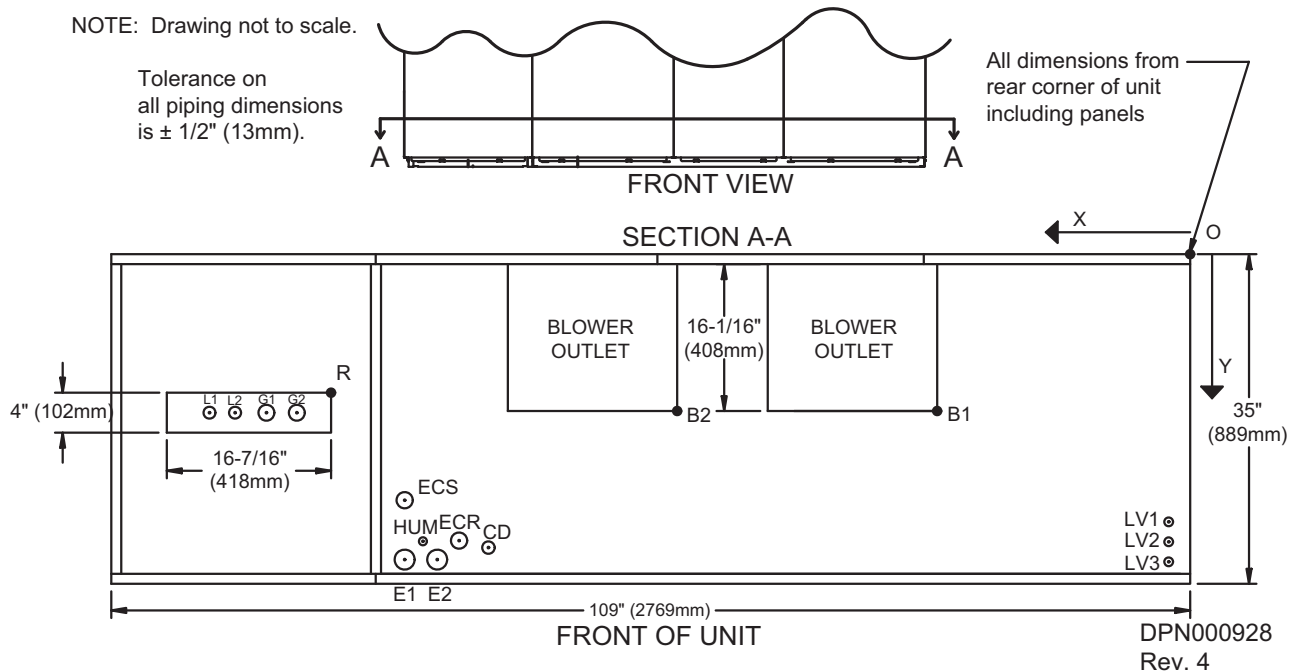
**Table 16 Weights—downflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors**

Dry Weight, Approximate, lb. (kg)			
Model Type	Model Size		
	053	070	077
Air-Cooled	2350 (1069)	2400 (1091)	2450 (1114)
Dual-Cool	2530 (1150)	2580 (1173)	2630 (1196)

Source: DPN000924, Rev. 3



**Figure 21 Primary connection locations—downflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors with centrifugal fans**



**Table 17 Piping data—downflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	82-3/4 (2102)	13-7/8 (352)	16-7/16 x 4 (418 x 102)
<b>53kW (15 tons) / 70 &amp; 77kW (20 &amp; 22 tons)</b>				
L1	Liquid Line System 1	97 (2464)	16-7/8 (428)	1/2" / 5/8" Cu Sweat
L2	Liquid Line System 2	93-5/16 (2370)	16-7/8 (428)	1/2" / 5/8" Cu Sweat
G1	Hot Gas Discharge 1	90-5/8 (2302)	16-5/8 (422)	7/8" / 1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	88 (2235)	16-5/8 (422)	7/8" / 1-1/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier) *	67-11/16 (1719)	30-1/2 (775)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	67-11/16 (1719)	30-1/2 (775)	1-1/4" FPT
	W/ Optional Pump	67-11/16 (1719)	30-1/2 (775)	1/2" Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	78-5/8 (1997)	22-1/4 (565)	2-1/8" Cu Sweat
ECR**	Econ-O-Coil Return	72 (1829)	29 (737)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2"
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2"
LV1	Electrical Conn. (Low Volt)	1-7/8 (48)	28-1/2 (724)	7/8"
LV2	Electrical Conn. (Low Volt)	1-7/8 (48)	30-1/4 (768)	7/8"
LV3	Electrical Conn. (Low Volt)	1-7/8 (48)	32 (813)	7/8"
B1	Blower Outlet (15 x 15)	23-1/8 (587)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	27-3/4 (705)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)
B2	Blower Outlet (15 x 15)	50-3/8 (1280)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	54-3/8 (1381)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)

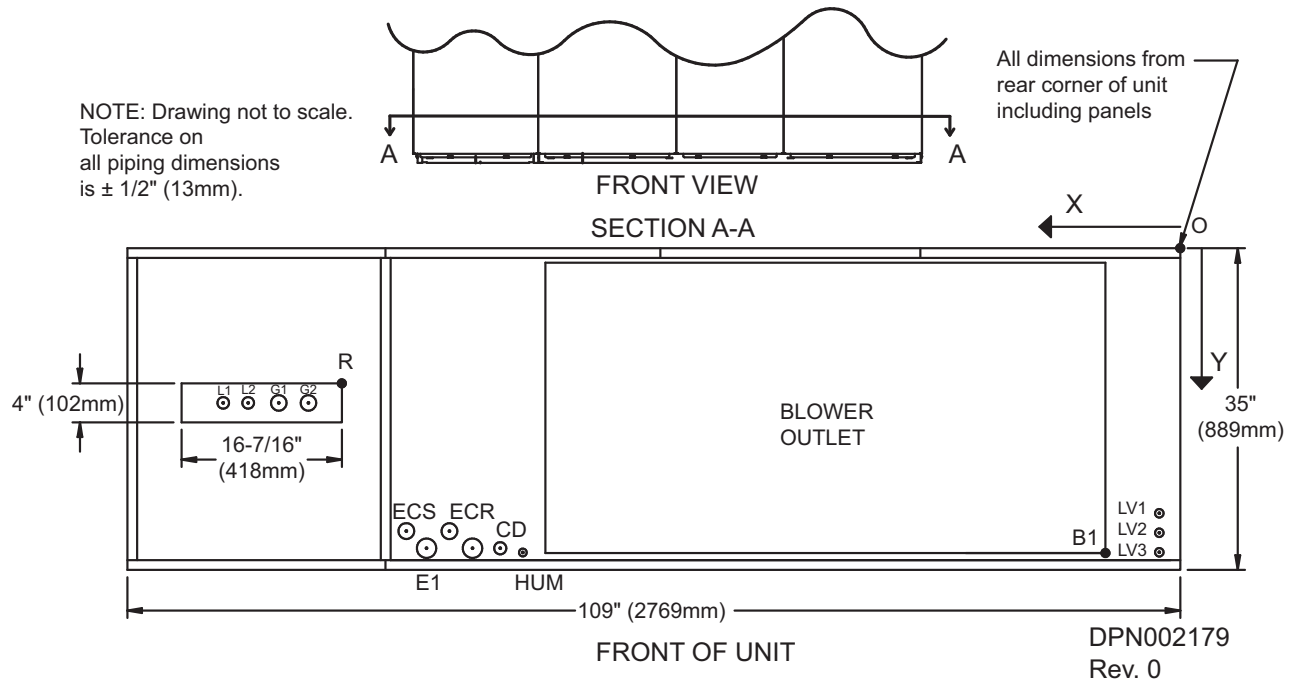
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling Systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN000928, Rev. 4

**Figure 22 Primary connection locations—downflow, air-cooled 53-77kW (15-22 ton), semi-hermetic compressors with EC fans, front, rear or bottom discharge**



**Table 18 Piping details—downflow, air-cooled 53-77kW (15-22 ton) with EC fans, semi-hermetic compressors**

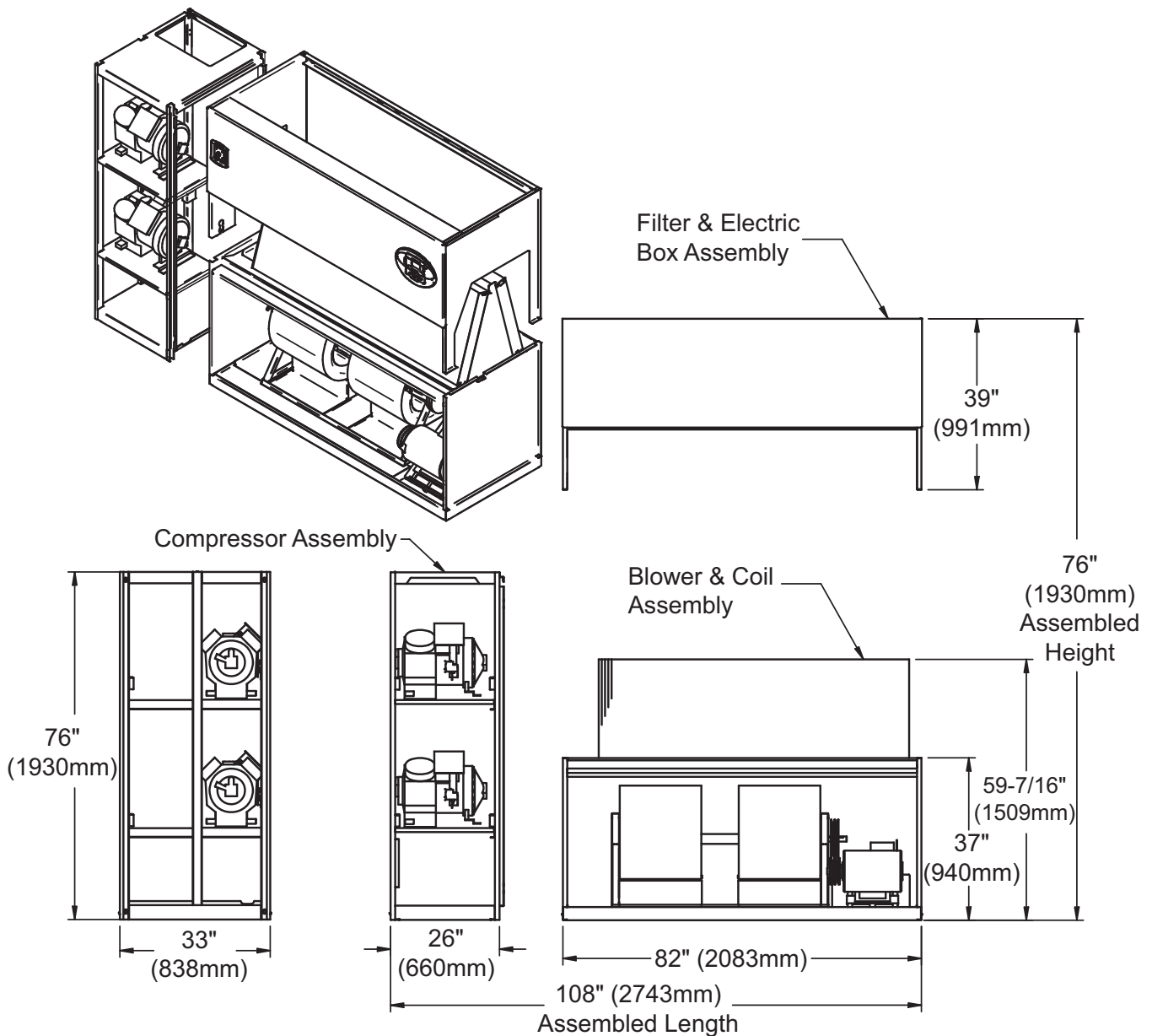
Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	82-3/4 (2102)	13-7/8 (352)	16-7/16 x 4 (4181x102)
<b>53kW (15 ton) /70 &amp; 77kw (20 &amp; 22 ton)</b>				
L1	Liquid Line System 1	97 (2464)	16-7/8 (428)	1/2 / 5/8 Cu Sweat
L2	Liquid Line System 2	93-5/16 (2370)	16-7/8 (428)	1/2 / 5/8 Cu Sweat
G1	Hot Gas Discharge 1	90-5/8 (2302)	16-5/8 (422)	7/8 / 1-1/8 Cu Sweat
G2	Hot Gas Discharge 2	88 (2235)	16-5/8 (422)	7/8 / 1-1/8 Cu Sweat
CD	Condensate Drain (Infrared Humidifier or No Humidifier)*	68-3/8 (1737)	31-3/8 (797)	3/4 FPT
	W/ Optional Pump	68-3/8 (1737)	31-3/8 (797)	1/2 Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4 Cu Sweat
ECS**	Econ-O-Coil Supply	78-5/8 (1997)	22-1/4 (565)	2-1/8 Cu Sweat
ECR**	Econ-O-Coil Return	73-15/16 (1862)	26-9/16 (675)	2-1/8 Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2
LV1	Electrical Conn. (Low Volt)	2 (51)	29 (737)	7/8
LV2	Electrical Conn. (Low Volt)	2 (51)	30-7/8 (784)	7/8
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8
B1	Blower Outlet	4-1/2 (114)	33 (838)	58-3/8 x 30 (1483x762)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN002179, Rev. 0

**Figure 23 Disassembly dimensions—downflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

DPN000926  
Rev. 4

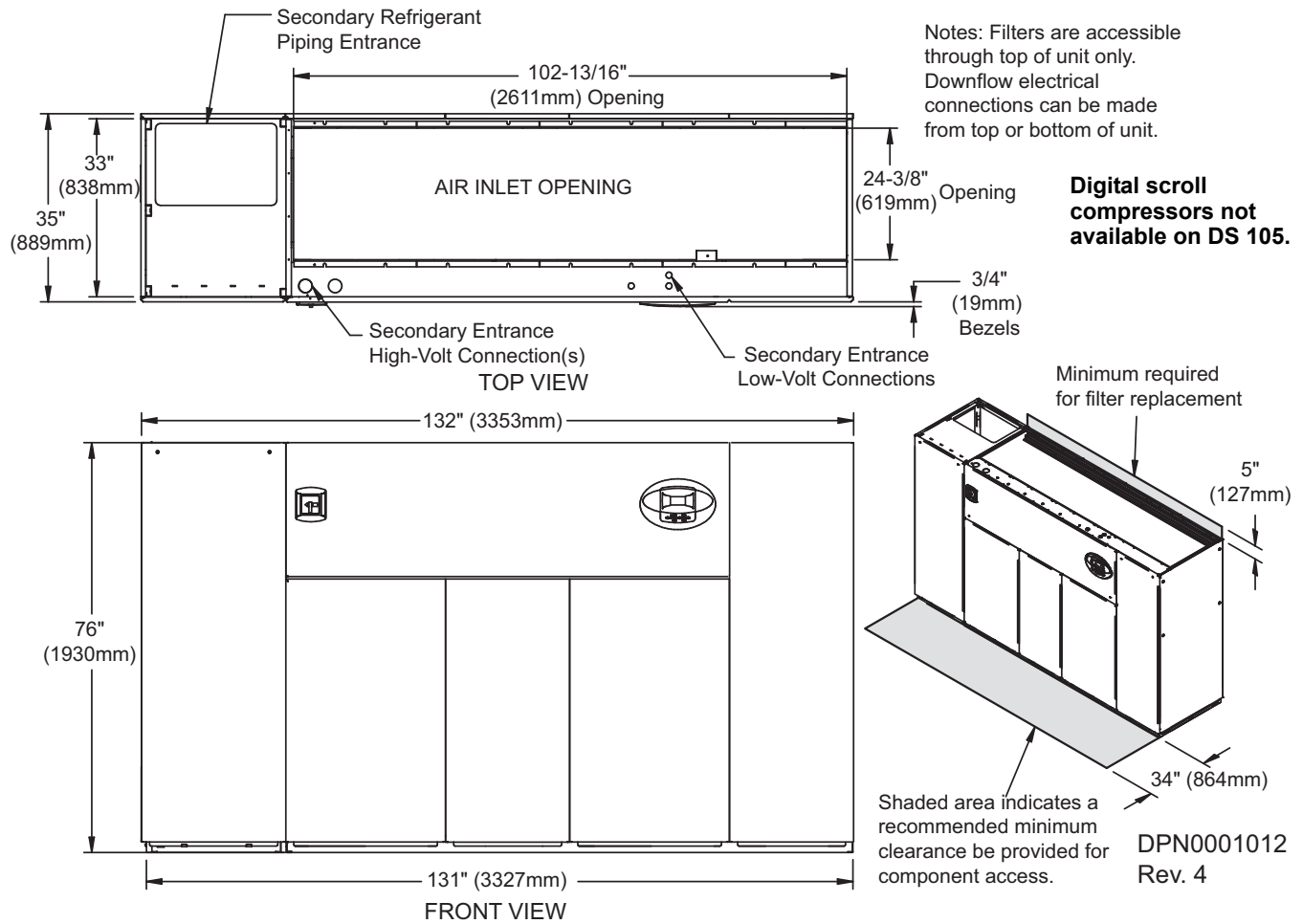
**Table 19 Component weights—downflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors**

Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	970 (441)	970 (441)
Filter and Electric Box Assembly	250 (114)	250 (114)
Blower and Coil Assembly	1230 (560)	1410 (641)

Source: DPN000926, Rev. 4

### 3.7 DIMENSIONS—LIEBERT DS 105, DOWNFLOW, AIR-COOLED MODELS

**Figure 24 Dimensions—downflow, air-cooled, 105kW (30 ton), standard scroll and semi-hermetic compressors with centrifugal fans**



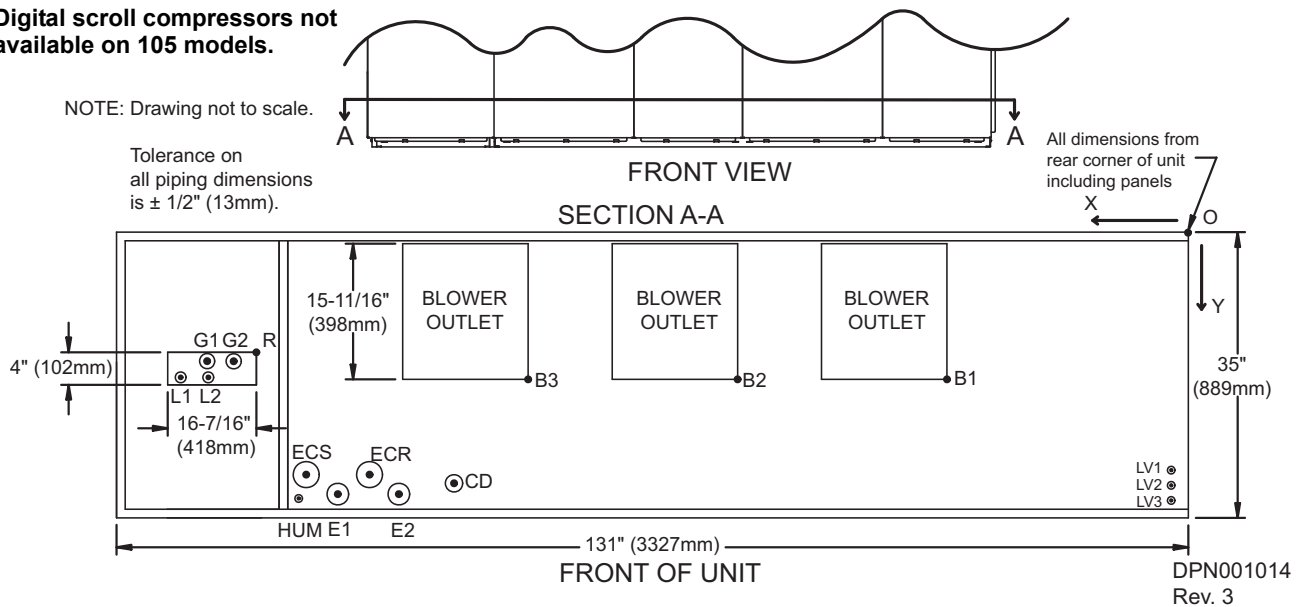
**Table 20 Weights—downflow, air-cooled, 105kW (30 ton), standard scroll and semi-hermetic compressors**

Compressor Type	Cooling Type	Forward-Curved Fans
		Weight, lb. (kg)
Semi-Hermetic Compressors	Air-Cooled	3040 (1382)
	Dual-Cool	3400 (1545)
Scroll Compressors *	Air-Cooled	2920 (1327)
	Dual-Cool	3280 (1491)

\* Digital scroll compressors not available on DS 105  
Source: DPN001012, Rev. 4

**Figure 25 Primary connection locations—downflow, air-cooled, 105kW (30 ton), standard scroll and semi-hermetic compressors with centrifugal fans**

Digital scroll compressors not available on 105 models.



**Table 21 Piping data—downflow, air-cooled, 105kW (30 ton), standard scroll\*\*\* and semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	109 (2769)	15-3/4 (400)	16-7/16 x 4 (418 x 102)
L1	Liquid Line System 1	121-3/4 (3092)	16-3/4 (425)	5/8" Cu Sweat
L2	Liquid Line System 2	118-1/8 (3000)	16-3/4 (425)	5/8" Cu Sweat
G1	Hot Gas Discharge 1	118-1/4 (3004)	14-1/4 (362)	1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	115-5/8 (2937)	14-1/4 (362)	1-1/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier)*	83-13/16 (2129)	30 (762)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	83-13/16 (2129)	30 (762)	1-1/4" FPT
	W/ Optional Pump	83-13/16 (2129)	30 (762)	1/2" Cu Sweat
HUM	Humidifier Supply Line	102-3/4 (2610)	31-3/4 (806)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	101-7/8 (2588)	29 (737)	2-5/8" Cu Sweat
ECR**	Econ-O-Coil Return	94-9/16 (2402)	29 (737)	2-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/8 (2492)	31-1/4 (794)	2-1/2"
E2	Electrical Conn. (High Volt)	91 (2311)	31-1/4 (794)	2-1/2"
LV1	Electrical Conn. (Low Volt)	2 (51)	28-1/4 (718)	7/8"
LV2	Electrical Conn. (Low Volt)	2 (51)	30-1/4 (768)	7/8"
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8"
B1	Blower Outlet	27-7/8 (708)	18 (457)	14-1/2 x 15-11/16 (368 x 398)
B2	Blower Outlet	52-1/16 (1322)	18 (457)	14-1/2 x 15-11/16 (368 x 398)
B3	Blower Outlet	76-1/4 (1937)	18 (457)	14-1/2 x 15-11/16 (368 x 398)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

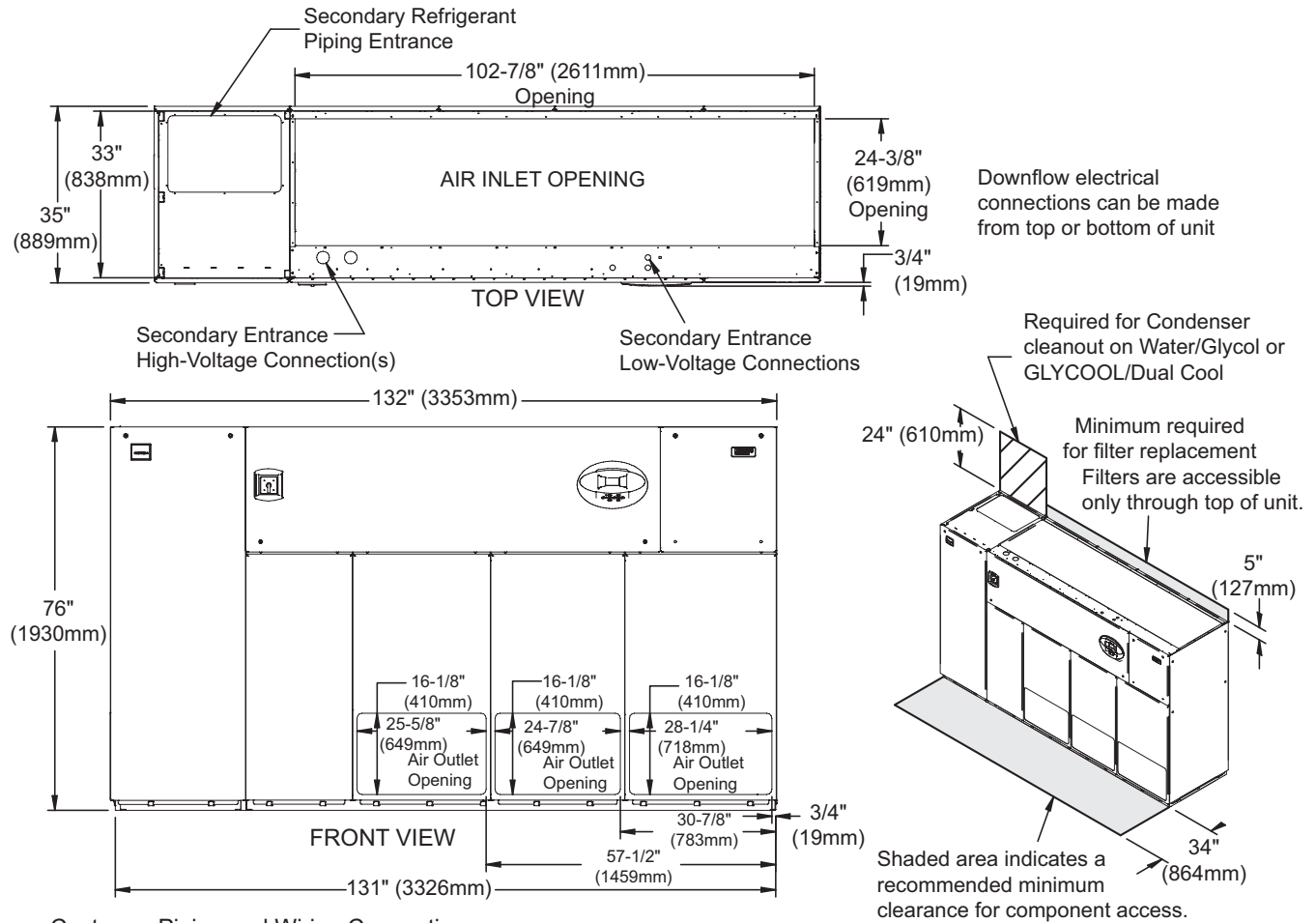
\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 105

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001014, Rev. 3

**Figure 26 Dimensions—downflow, air-cooled, 105kW (30 ton), front discharge models with EC fans**



**Customer Piping and Wiring Connections**

1. For primary connection locations see standard submittals DPN001014 or DPN001015.  
A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations

310697  
Pg. 3, Rev. 0

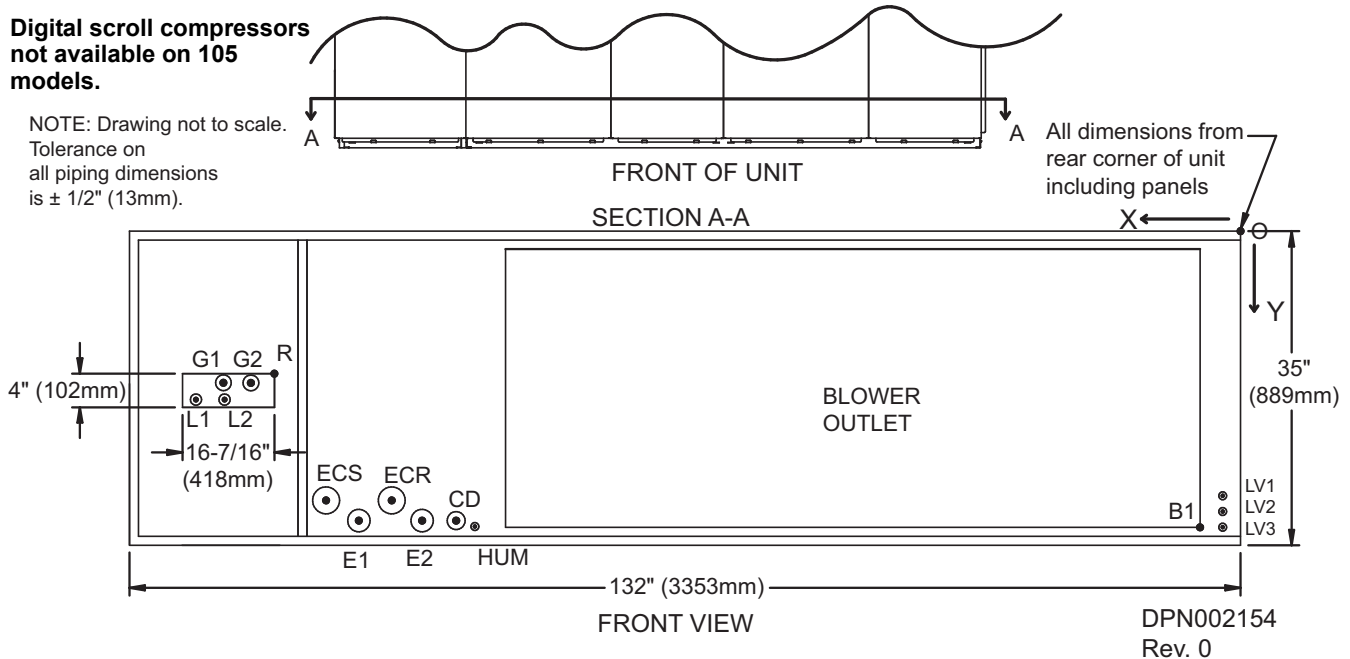
Dry Weight, lb (kg) Approximate		
Compressor Type	Model	105
Semi-Hermetic	Air-Cooled	2774 (1258)
	Dual Cool	3134 (1422)
Scroll	Air-Cooled	2654 (1204)
	Dual Cool	3014 (1367)

Digital scroll compressors not available on DS 105  
Source: 310697, Pg. 3, Rev. 0

**Figure 27 Primary connection locations—downflow, air-cooled 105kW (30 ton), standard scroll and semi-hermetic compressors with EC fans, front, rear or bottom discharge**

**Digital scroll compressors not available on 105 models.**

NOTE: Drawing not to scale. Tolerance on all piping dimensions is  $\pm 1/2"$  (13mm).



**Table 22 Piping data—downflow, air-cooled 105kW (30 ton) with EC fans, standard scroll\*\*\* and semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R	Refrigerant Access	109 (2769)	15-3/4 (400)	16-7/16 x 4 (418 x 102)
L1	Liquid Line System 1	121-3/4 (3092)	16-3/4 (425)	5/8 Cu Sweat
L2	Liquid Line System 2	118-1/8 (3000)	16-3/4 (425)	5/8 Cu Sweat
G1	Hot Gas Discharge 1	118-1/4 (3004)	14-1/4 (362)	1-1/8 Cu Sweat
G2	Hot Gas Discharge 2	115-5/8 (2937)	14-1/4 (362)	1-1/8 Cu Sweat
CD	Condensate Drain (Infrared Humidifier or No Humidifier)*	87-3/8 (2220)	31 (787)	3/4 FPT
	W/ Optional Pump	83-13/16 (2129)	30 (762)	1/2 Cu Sweat
HUM	Humidifier Supply Line	85-5/16 (2167)	32-1/2 (825)	1/4 Cu Sweat
ECS **	Econ-O-Coil Supply	101-7/8 (2588)	29 (737)	2-5/8 Cu Sweat
ECR **	Econ-O-Coil Return	94-9/16 (2402)	29 (737)	2-5/8 Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/8 (2492)	31 (788)	2-1/2
E2	Electrical Conn. (High Volt)	91 (2311)	31 (788)	2-1/2
LV1	Electrical Conn. (Low Volt)	2 (51)	29 (737)	7/8
LV2	Electrical Conn. (Low Volt)	2 (51)	30-7/8 (784)	7/8
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8
B1	Blower Outlet	4-1/2 (114)	33 (838)	77-3/8 x 30 (1965 x 762)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

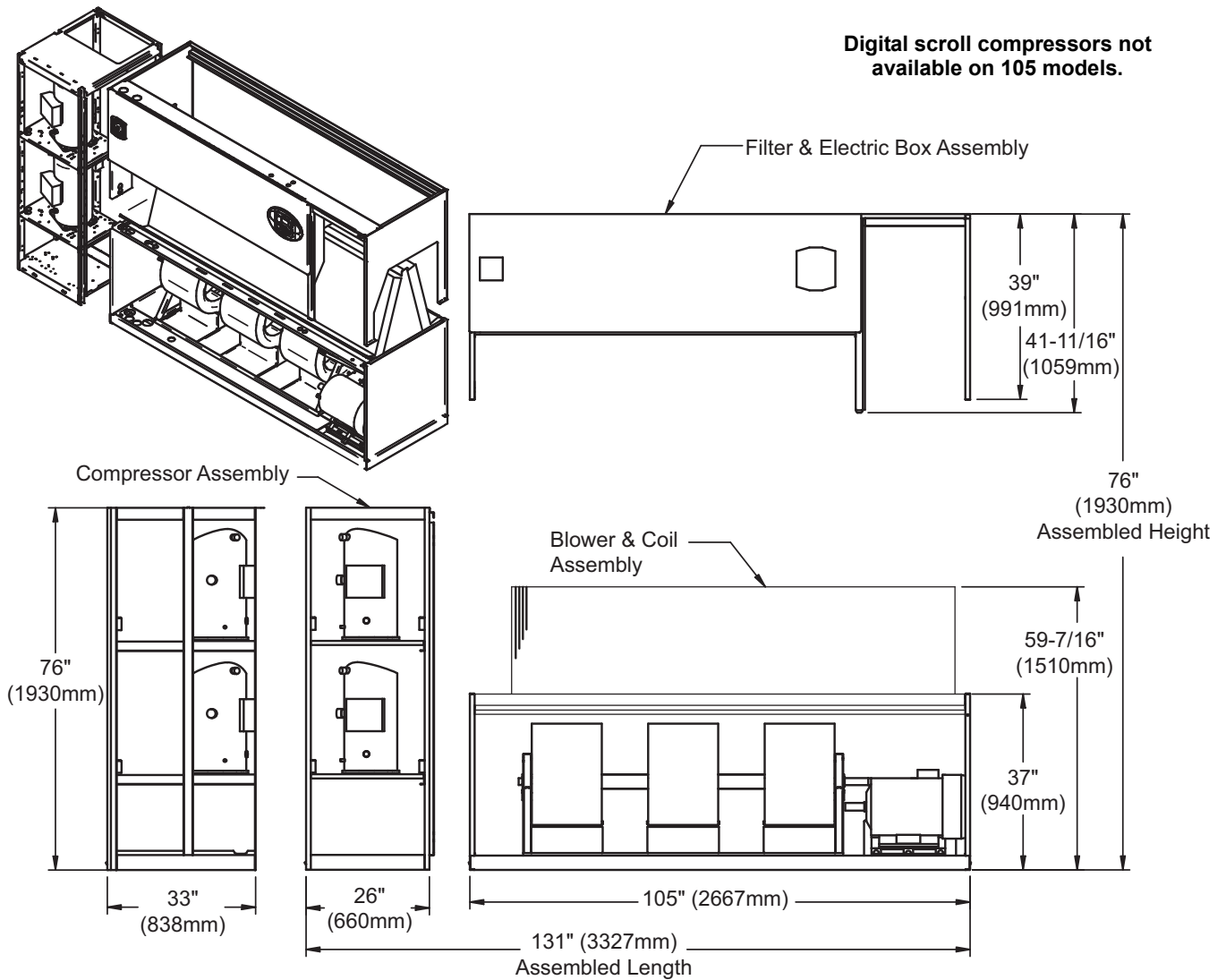
\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 105

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN002154, Rev. 0

**Figure 28 Disassembly dimensions—downflow, air-cooled, 105kW (30 ton), standard scroll compressors with centrifugal**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

DPN001058  
Rev. 2

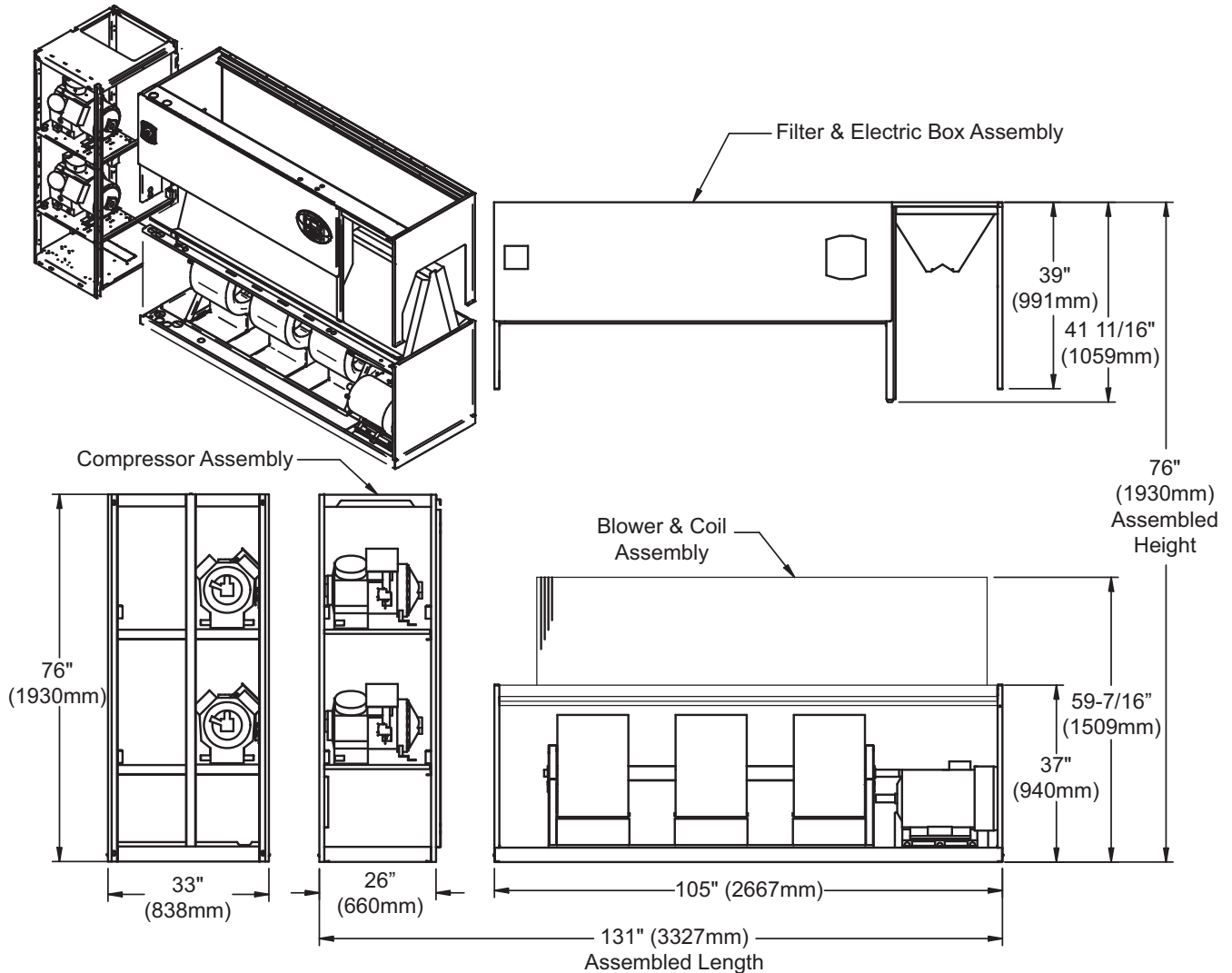
**Table 23 Component weights—downflow, air-cooled, 105kW (30 ton), standard scroll compressors \***

Component	Dry Weight, Approximate Including Panels, lb (kg)	
	Forward-Curved Fans	
	Air-Cooled	Dual-Cool
Compressor Assembly	830 (377)	830 (377)
Filter and Electric Box Assembly	270 (123)	270 (123)
Blower and Coil Assembly	1820 (827)	2180 (991)

\* Digital scroll compressors not available on DS 105  
Source: DPN001058, Rev. 2



**Figure 29 Disassembly dimensions—downflow, air-cooled, 105kW (30 ton), semi-hermetic compressors with centrifugal**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

DPN001057  
Rev. 2

**Table 24 Component weights—downflow, air-cooled, 105kW (30 ton), semi-hermetic compressors**

Component	Dry Weight, Approximate, Including Panels, lb (kg)	
	Forward-Curved Fans	
	Air-Cooled	Dual-Cool
Compressor Assembly	950 (432)	950 (432)
Filter and Electric Box Assembly	270 (123)	270 (123)
Blower and Coil Assembly	1820 (827)	2180 (991)

Source: DPN001057, Rev. 2

### 3.8 DIMENSIONS—LIEBERT DS 028-042, UPFLOW, AIR-COOLED MODELS

Figure 30 Dimensions—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans

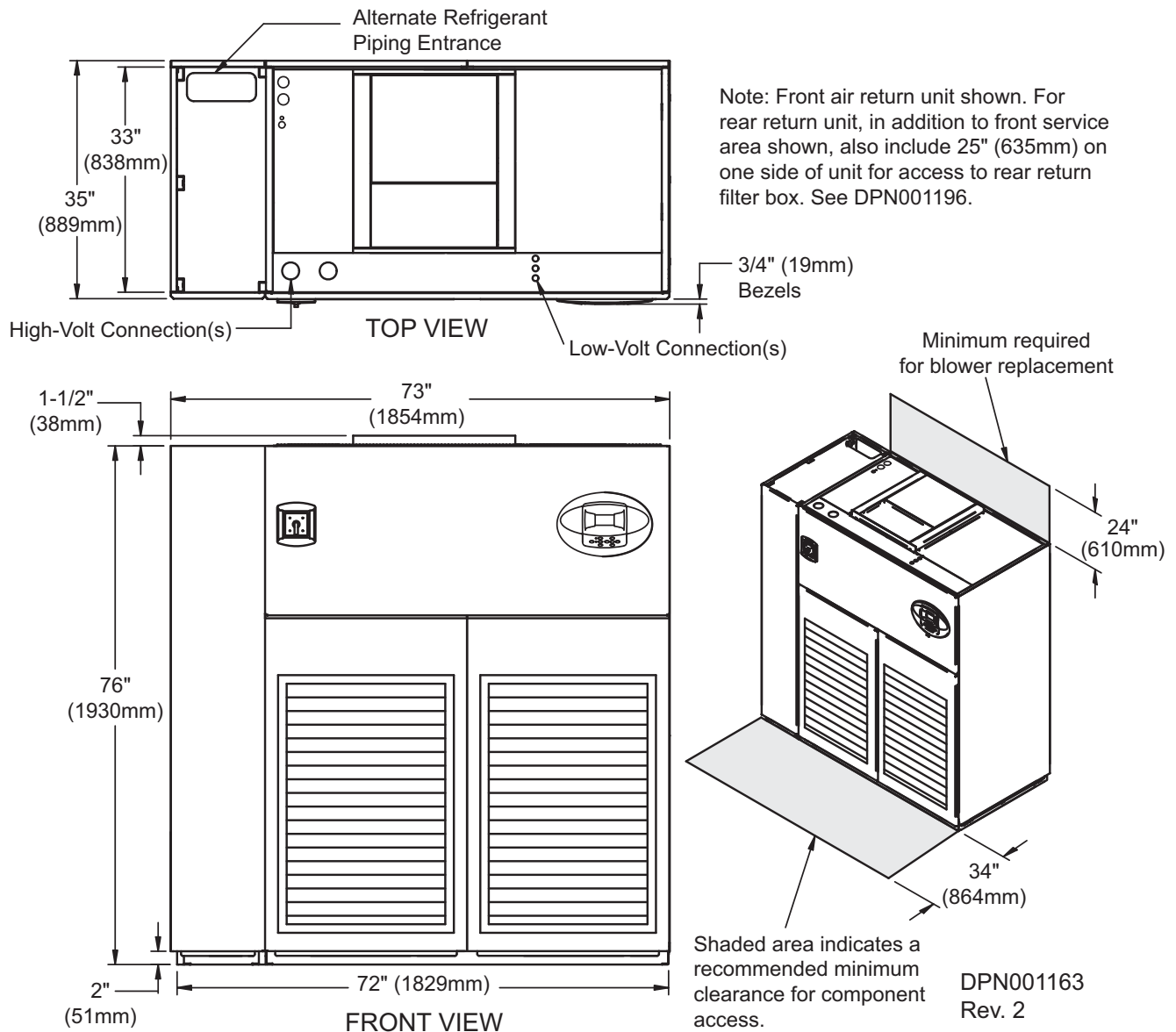


Table 25 Weights—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors

Dry Weight, Approximate, lb. (kg)	
Model Type	Forward-Curved Fans
Air-Cooled	1520 (689)
Dual-Cool	1670 (758)

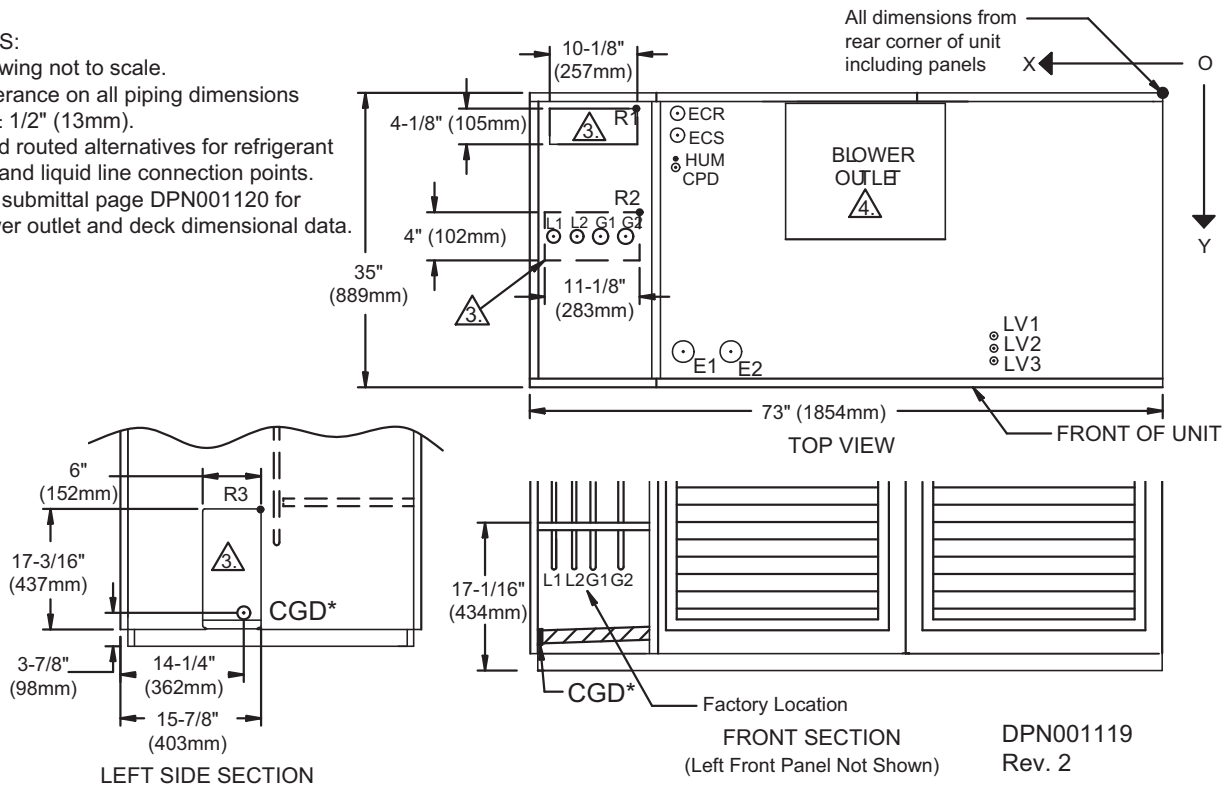
Source: DPN001163, Rev. 2

**Figure 31 Primary connection locations—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans**

**NOTES:**

1. Drawing not to scale.
2. Tolerance on all piping dimensions is  $\pm 1/2"$  (13mm).

- ③ Field routed alternatives for refrigerant gas and liquid line connection points.
- ④ See submittal page DPN001120 for blower outlet and deck dimensional data.



**Table 26 Piping data—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R1 ③	Refrigerant Access (Top)	60-1/2 (1537)	1-7/8 (48mm)	10-1/8 x 4-1/8 (257 x 105)
R2 ③	Refrigerant Access (Bottom)	59-3/8 (1508mm)	14-3/4 (375mm)	11-1/8 x 4 (283 x 102)
L1	Liquid Line System 1	70 (1778mm)	16-3/4 (425)	1/2" Cu Sweat
L2	Liquid Line System 2	67-5/8 (1718mm)	16-3/4 (425)	1/2" Cu Sweat
G1	Hot Gas Discharge 1	65-3/8 (1661mm)	16-5/8 (422)	5/8" Cu Sweat
G2	Hot Gas Discharge 2	63 (1600mm)	16-5/8 (422)	5/8" Cu Sweat
R3 ③	Refrigerant Access (Side)	—	—	6 x 17-3/16 (152 x 437)
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	56-1/4 (1429)	11-1/8 (283)	1/2" Cu Sweat
HUM	Humidifier Supply Line	56-1/4 (1429)	9-1/8 (233)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	56 (1423)	7-5/16 (186)	1-5/8" Cu Sweat
ECR**	Econ-O-Coil Return	56 (1423)	4-1/2 (114)	1-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	52-3/8 (1330)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	46-7/8 (1191)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

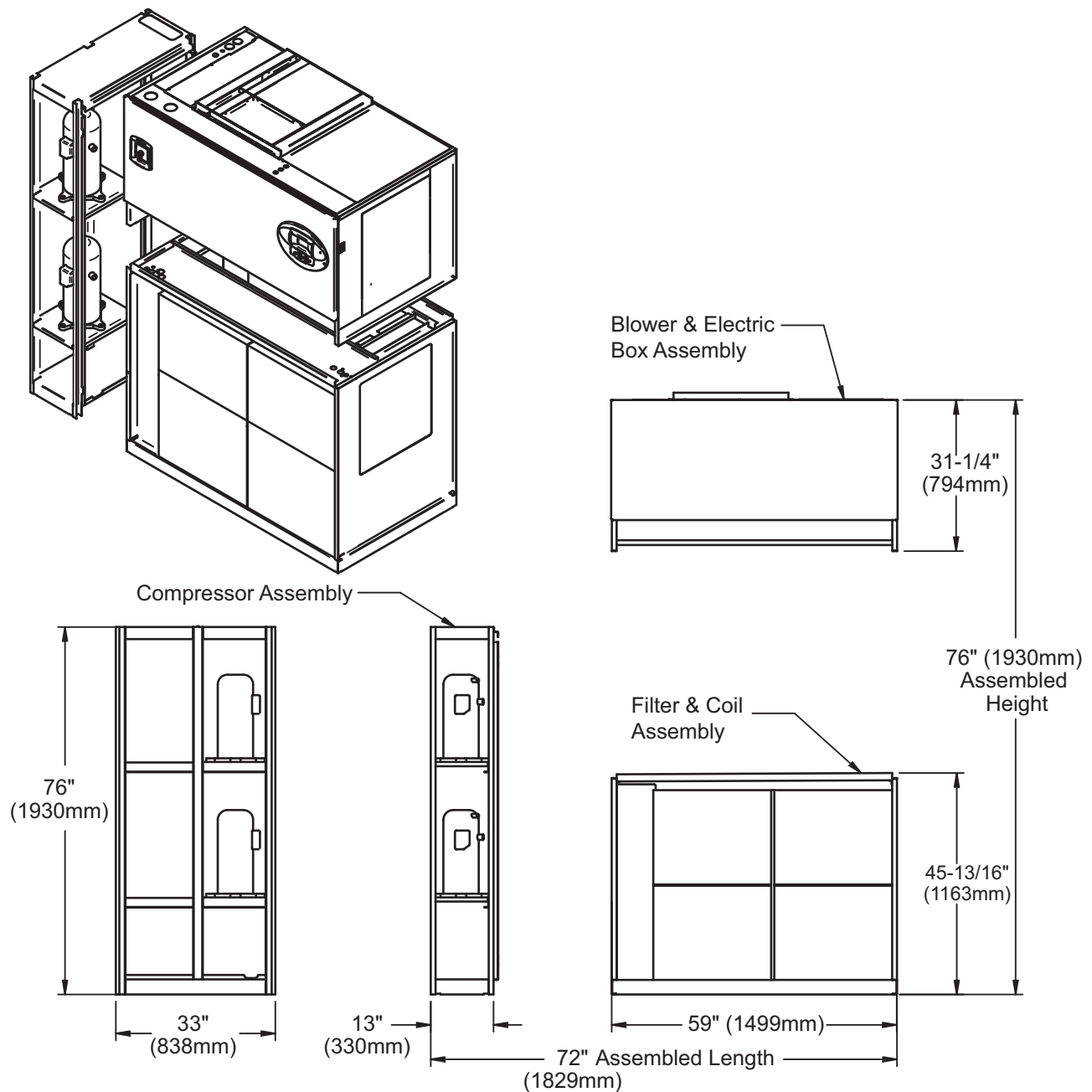
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cool systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001119, Rev. 2

**Figure 32 Disassembly dimensions—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

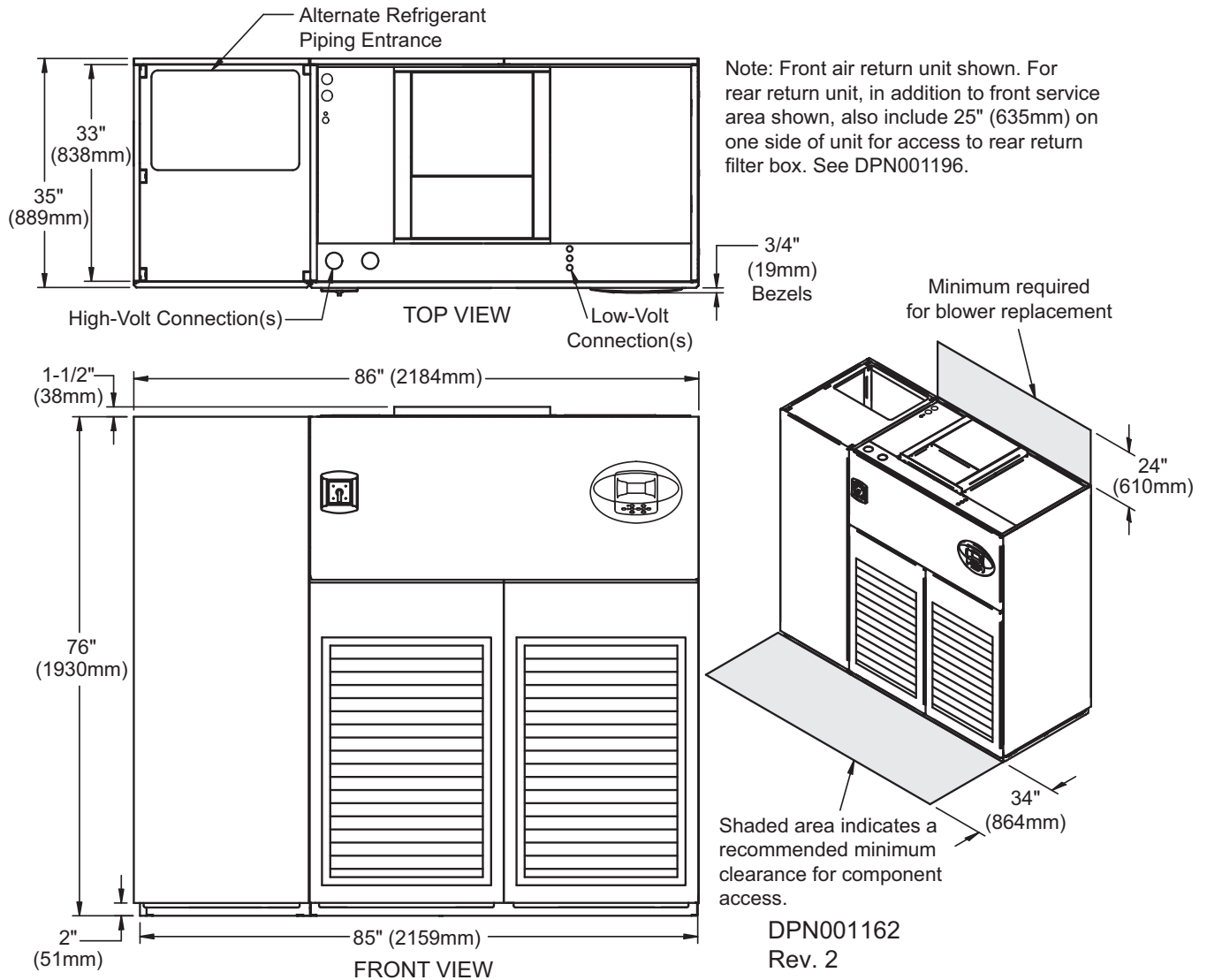
DPN001172  
Rev. 1

**Table 27 Component weights—upflow, air-cooled, 28-42kW (8-12 ton), scroll or digital scroll compressors**

Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	490 (223)	490 (223)
Blower and Electric Box Assembly (Forward-Curved Fans)	510 (231)	510 (231)
Filter and Coil Assembly	520 (236)	670 (304)

Source: DPN001172, Rev. 1

**Figure 33 Dimensions—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**

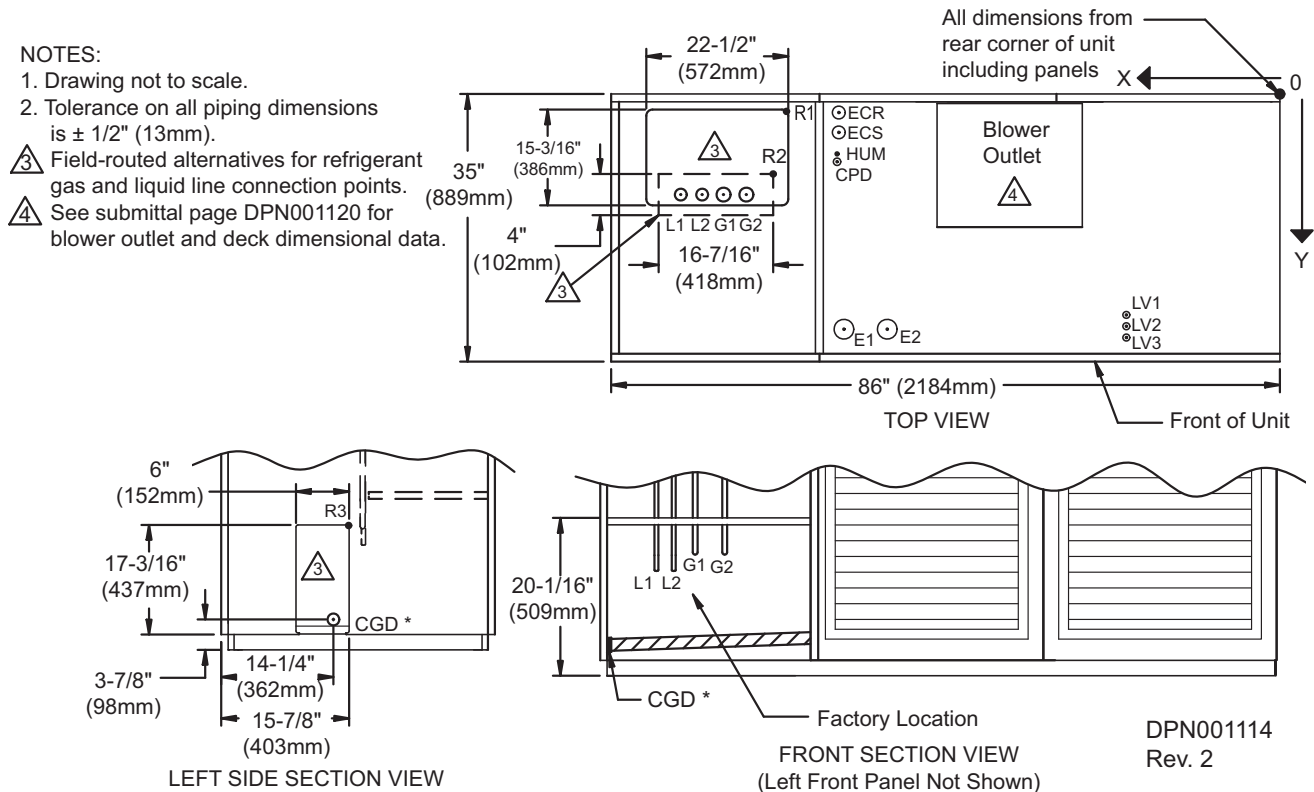


**Table 28 Weights—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

Dry Weight, Approximate, lb (kg)	
Model Type	Forward-Curved Fans
Air-Cooled	1830 (830)
Dual-Cool	1980 (898)

Source: DPN001162, Rev. 2

**Figure 34 Primary connection locations—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**



**Table 29 Piping data—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R1 ③	Refrigerant Access (Top)	60-11/16 (1542)	1-7/8 (48)	22-1/2 x 15-3/16 (572 x 386)
R2 ③	Refrigerant Access (Bottom)	63 (1600)	13-13/16 (351)	16-7/16 x 4 (418 x 102)
L1	Liquid Line System 1	79-3/16 (2011)	16-3/4 (425)	1/2" Cu Sweat
L2	Liquid Line System 2	76-1/2 (1943)	16-3/4 (425)	1/2" Cu Sweat
G1	Hot Gas Discharge 1	73-7/8 (1876)	16-3/4 (425)	5/8" Cu Sweat
G2	Hot Gas Discharge 2	70-1/8 (1780)	16-3/4 (425)	5/8" Cu Sweat
R3 ③	Refrigerant Access (Side)	—	—	6 x 17-3/16 (152 x 437)
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	56-1/4 (1429)	11-1/8 (283)	1/2" Cu Sweat
HUM	Humidifier Supply Line	56-1/4 (1429)	9-1/8 (233)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	56 (1423)	7-5/16 (186)	1-5/8" Cu Sweat
ECR**	Econ-O-Coil Return	56 (1423)	4-1/2 (114)	1-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	52-3/8 (1330)	30" (762mm)	2-1/2"
E2	Electrical Conn. (High Volt)	46-7/8 (1191)	30" (762mm)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

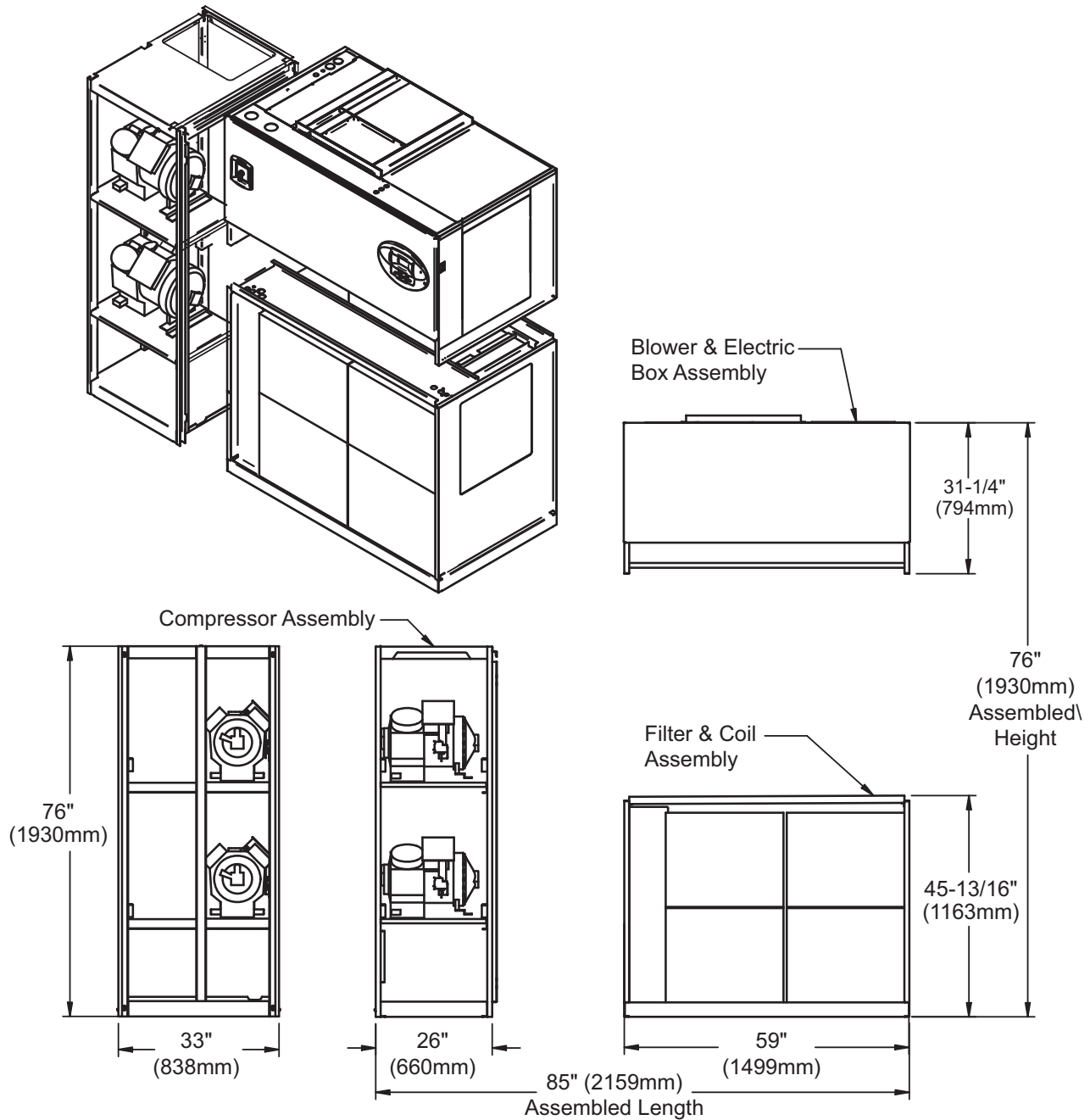
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cool systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001114, Rev. 2

**Figure 35 Disassembly dimensions—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

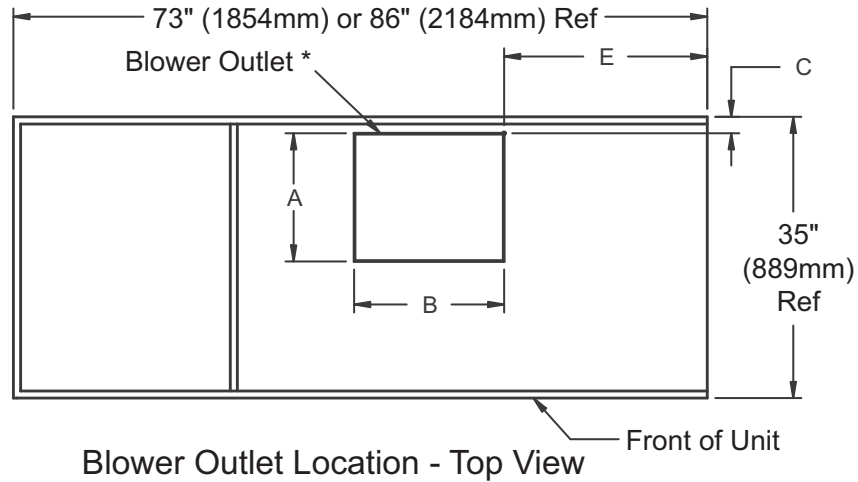
DPN001171  
Rev. 1

**Table 30 Component weights—upflow, air-cooled, 28-42kW (8-12 ton), semi-hermetic compressors**

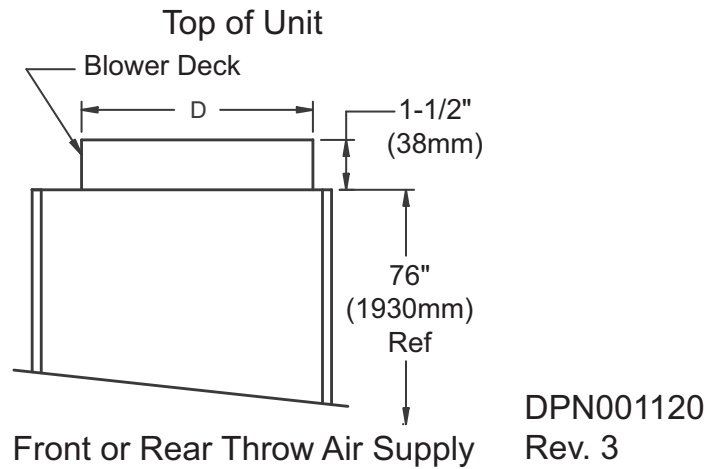
Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	800 (364)	800 (364)
Blower and Electric Box Assembly (Forward-Curved Fans)	510 (231)	510 (231)
Blower and Electric Box Assembly (EC Fans)	360 (163)	360 (163)
Filter and Coil Assembly	520 (236)	670 (304)

Source: DPN001171, Rev. 1

**Figure 36 Blower outlet and deck dimensions—upflow, air-cooled, 28-42kW (8-12 ton) with centrifugal fans**



\* Duct flange not provided



**Table 31 Blower outlet and deck dimensions—upflow, air-cooled, 28-42kW (8-12 ton)**

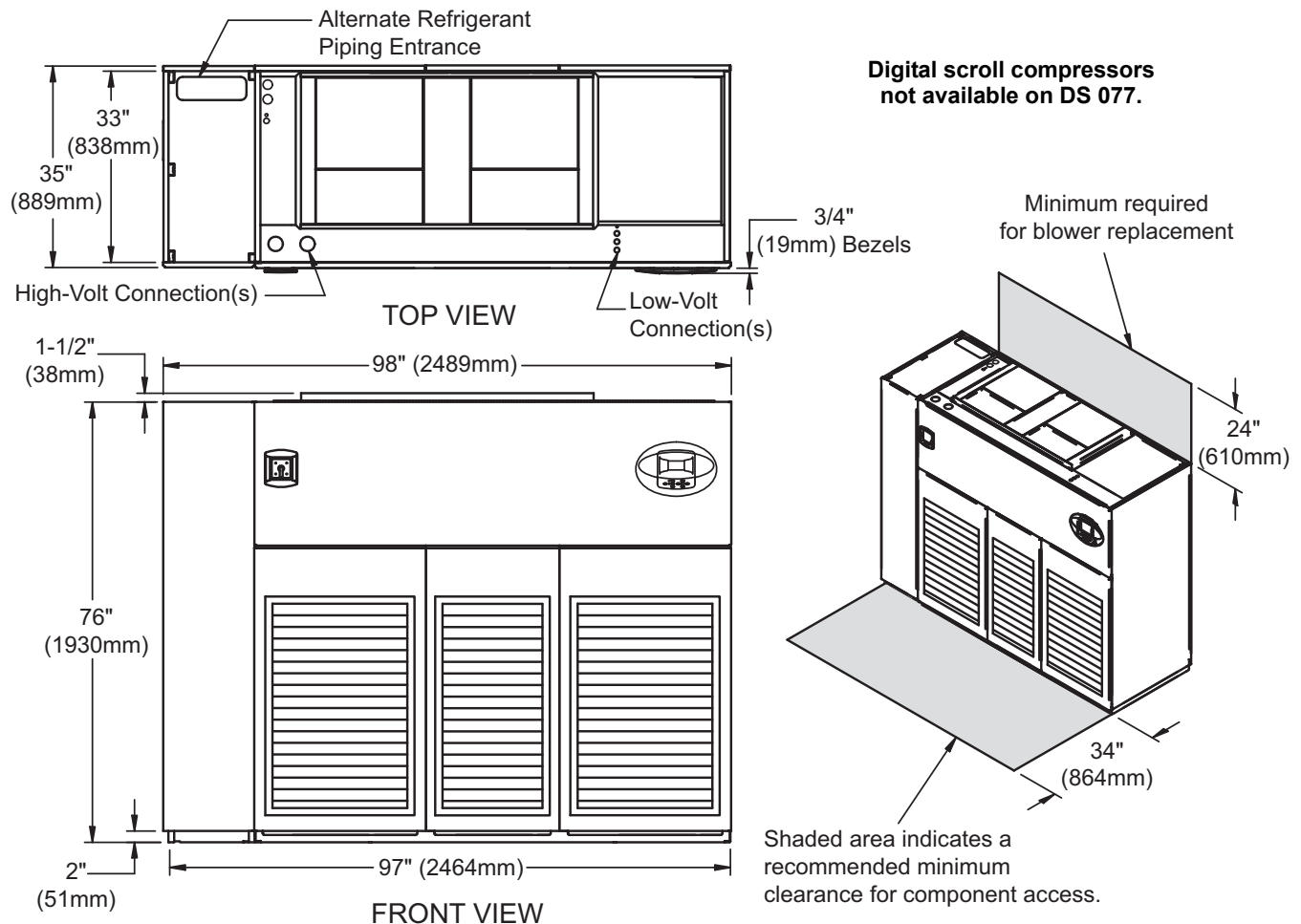
Dimensional data, in. (mm)							
Model	Blower	Supply	A	B	C	D	E
28-42kW (8-12ton)	15 x 15	Front Throw	15-7/8 (404)	18-5/8 (472)	2-1/8 (54)	25-5/8 (651)	25 (635)
		Rear Throw	15-7/8 (404)	18-5/8 (472)	11-5/8 (295)	25-5/8 (651)	25 (635)
	15 x 11	Front Throw	15-7/8 (404)	14-1/2 (368)	2-1/8 (54)	25-5/8 (651)	25 (635)
		Rear Throw	15-7/8 (404)	14-1/2 (368)	11-5/8 (295)	25-5/8 (651)	25 (635)

Source: DPN001120, Rev. 3



### 3.9 DIMENSIONS—LIEBERT DS 053-077, UPFLOW, AIR-COOLED MODELS

**Figure 37** Dimensions—upflow, air-cooled, 53-77kw (15-22 ton), scroll or digital scroll compressors with centrifugal fans



NOTE: Front air return unit shown. For rear return unit, in addition to front service area shown, also include 25" (635mm) on one side of unit for access to rear return filter box. See DPN001196.

DPN001166  
Rev. 2

**Table 32** Weights - upflow, air-cooled, 53-77kw (15-22 ton)—scroll or digital scroll compressors

Dry Weight, Approximate, lb (kg)				
Model #	053, 042		077 *	
Compressor Type	Scroll/Digital Scroll		Standard Scroll	
Fan Type	Air-Cooled	Dual-Cool	Air-Cooled	Dual-Cool
Forward-Curved Blowers	2070 (939)	2250 (1021)	2070 (939)	2250 (1021)

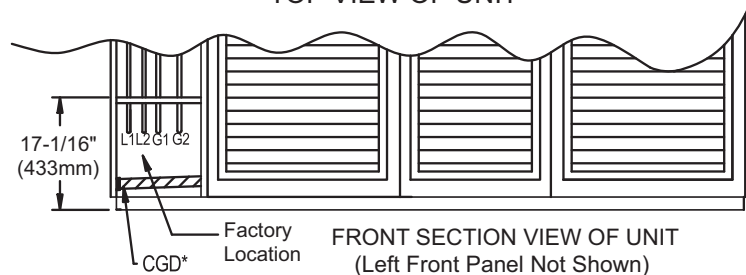
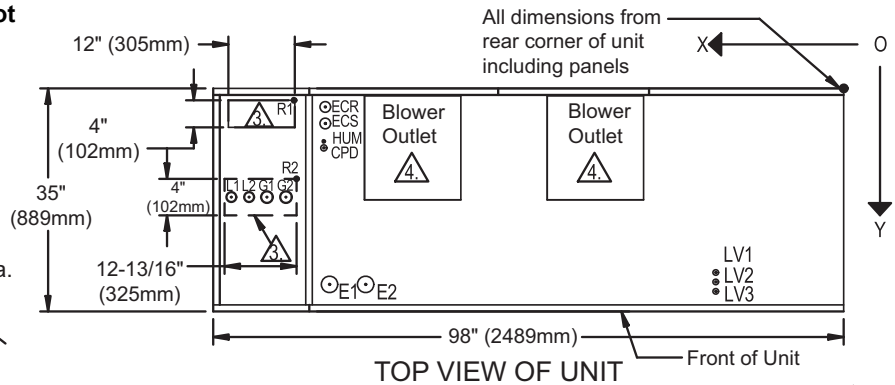
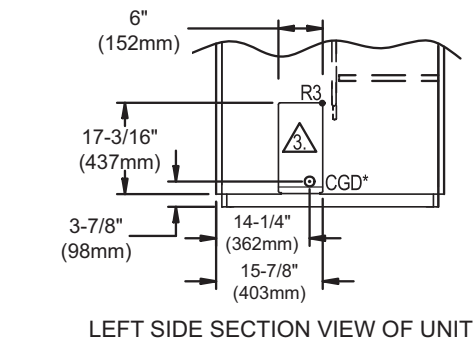
\* Digital scroll compressors not available on DS 077  
Source: DPN001166, Rev. 2

**Figure 38 Primary connection locations—upflow, air-cooled, 53-77kw (15-22 ton), scroll compressors with centrifugal fans**

**Digital scroll compressors not available on DS 077.**

**NOTES:**

1. Drawing not to scale.
2. Tolerance on all piping dimensions is  $\pm 1/2"$  (13mm).
3. Field-routed alternatives for refrigerant gas and liquid line connection points.
4. See submittal page DPN001191 for blower outlet and deck dimensional data.



DPN001213  
Rev. 1

**Table 33 Piping data - upflow, air-cooled, 53-77kw (15-22 ton)—scroll compressors \*\*\***

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening, in. (mm)
R1	Refrigerant Access (Top)	83-5/8 (2124)	2 (51)	12 x 4 (305 x 102)
R2	Refrigerant Access (Bottom)	82-3/4 (2102)	14-3/4 (374)	12-3/16 x 4 (310 x 102)
<b>53kW (15 ton) / 70 &amp; 77kW (20 &amp; 22 ton)</b>				
L1	Liquid Line System 1	94-11/16 (2405)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
L2	Liquid Line System 2	91-7/8 (2334)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
G1	Hot Gas Discharge 1	88-3/4 (2254)	16-3/8 (416)	7/8" / 1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	85-9/16 (2173)	16-3/8 (416)	7/8" / 1-1/8" Cu Sweat
R3	Refrigerant Access (Side)	—	—	6 x 17-3/16 (152 x 437)
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	79-5/16 (2015)	11-7/8 (302)	1/2" Cu Sweat
HUM	Humidifier Supply Line	79-5-16 (2015)	9-7/8 (251)	1/4" Cu Sweat
ECS	Econ-O-Coil Supply	78-5/8 (1998)	7-7/8 (200)	2-1/8" Cu Sweat
ECR	Econ-O-Coil Return	78-5/8 (1998)	4-5/8 (117)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	75-3/8 (1915)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	69-7/8 (1775)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

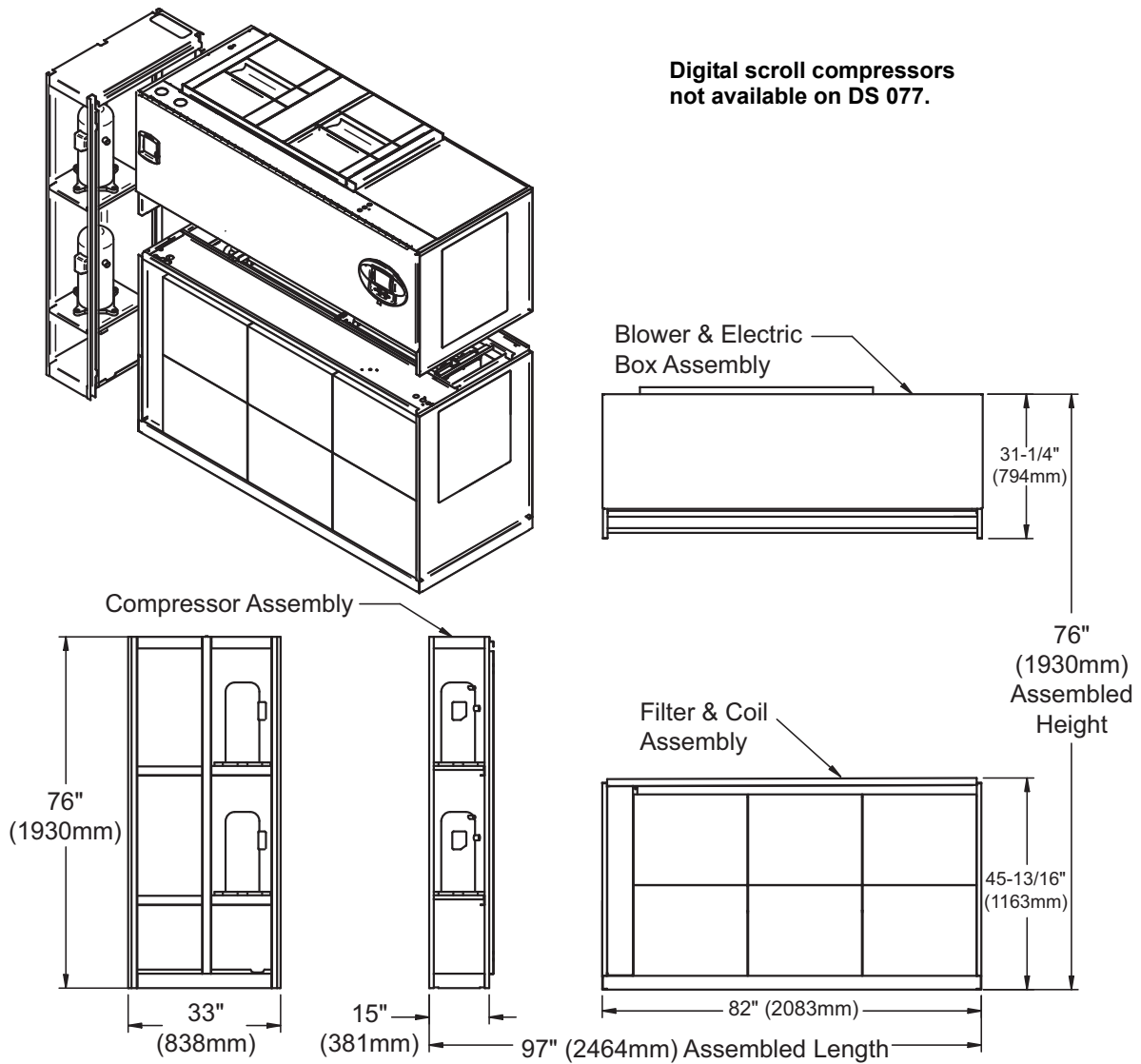
\*\* Supplied on dual-cool systems only.

\*\*\* Digital scroll compressors not available on DS 077

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001213, Rev. 1

**Figure 39 Disassembly dimensions—upflow, air-cooled, 53-77kw (15-22 ton), scroll or digital scroll compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

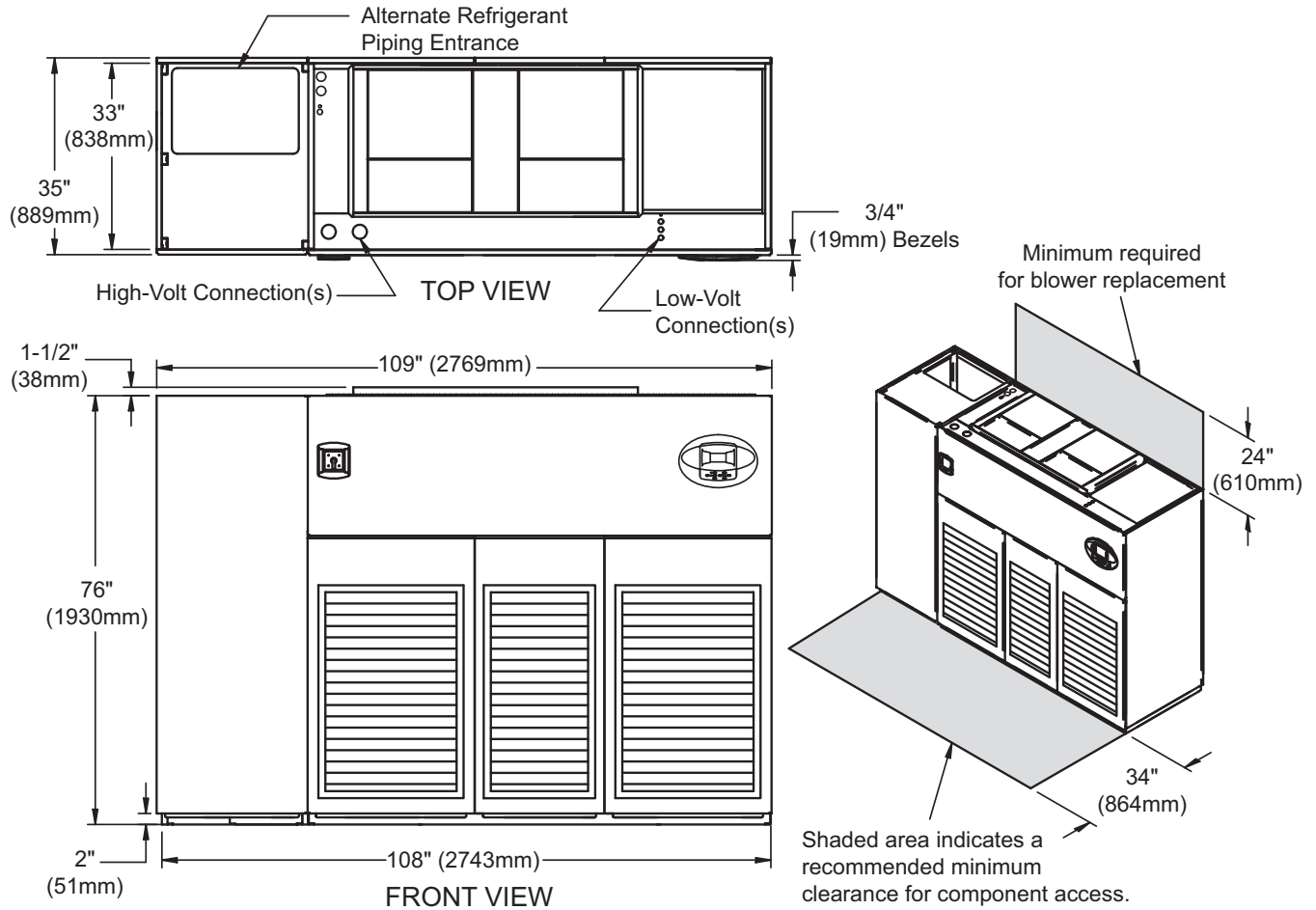
DPN001210  
Rev. 1

**Table 34 Component weights—upflow, air-cooled, 53-77kw (15-22 ton), scroll or digital scroll compressors**

Dry Weight, Approximate, Including Panels, lb (kg)				
Model #	053, 070		077	
Compressor	Scroll/Digital Scroll		Standard Scroll *	
Component	Air-Cooled	Dual-Cool	Air-Cooled	Dual-Cool
Compressor Assembly	540 (246)	540 (246)	540 (246)	540 (246)
Blower and Electric Box Assembly Forward-Curved Fans	770 (349)	770 (349)	770 (349)	770 (349)
Filter and Coil Assembly	760 (345)	940 (426)	760 (345)	940 (426)

\* Digital scroll compressors not available on DS 077  
Source: DPN001210, Rev. 1

**Figure 40 Dimensions—upflow, air-cooled 53-77kw (15-22 ton), semi-hermetic compressors with centrifugal fans**



NOTE: Front air return unit shown. For rear return unit, in addition to front service area shown, also include 25" (635mm) on one side of unit for access to rear return filter box. See DPN001196.

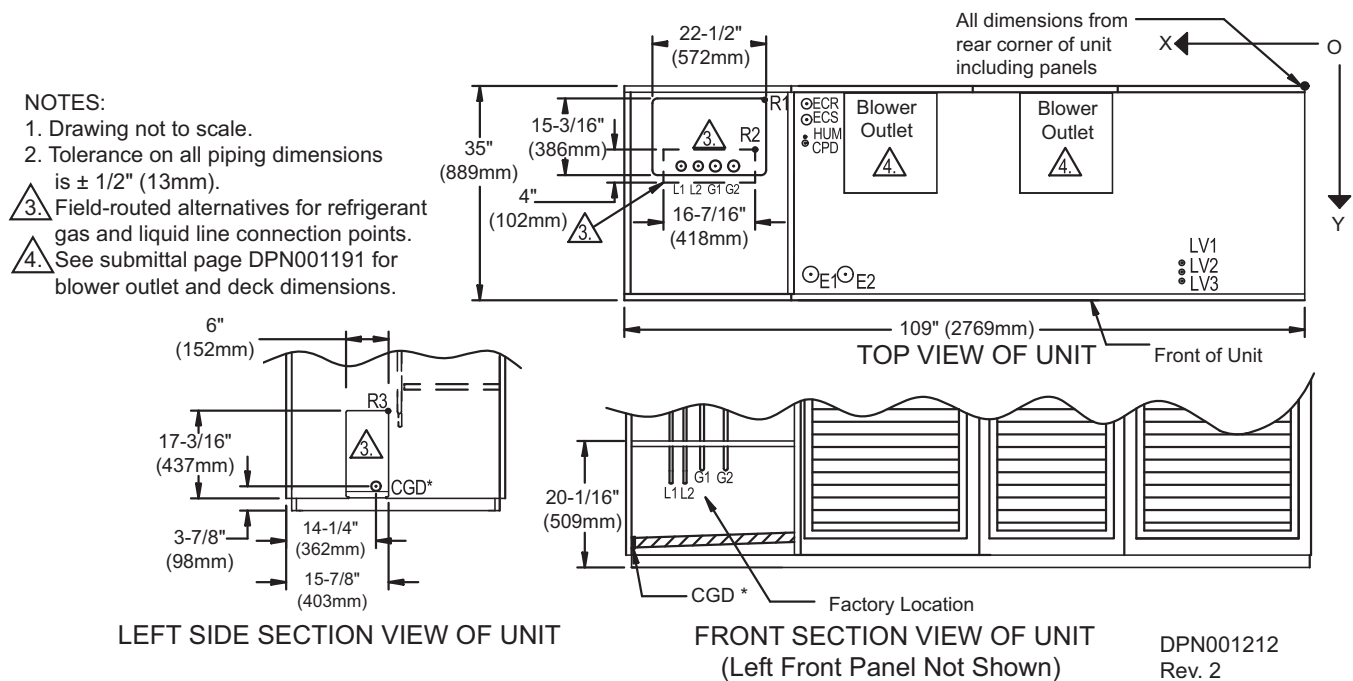
DPN001165  
Rev. 2

**Table 35 Weights—upflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors**

Dry weight, including panels, lb. (kg)				
Model Type	053		070, 077	
	Air-Cooled	Dual-Cool	Air-Cooled	Dual-Cool
Forward-Curved Fans	2350 (1069)	2530 (1150)	2500 (1134)	2680 (1216)

Source: DPN001165, Rev. 2

**Figure 41 Primary connection locations—upflow air-cooled 53-77kW (15-22 ton), semi-hermetic compressors with centrifugal fans**



**Table 36 Piping data—upflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
R1	Refrigerant Access (Top)	83-3/4 (2127)	1-7/8 (48)	22-1/2 x 15-3/16 (572 x 386)
R2	Refrigerant Access (Bottom)	86 (2184)	13-7/8 (352)	16-7/16 x4 (418 x102)
<b>53kW (15 ton) / 70 &amp; 77kW (20 &amp; 22 ton)</b>				
L1	Liquid Line System 1	97 (2464)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
L2	Liquid Line System 2	93-5/16 (2370)	16-3/4 (425)	1/2" / 5/8" Cu Sweat
G1	Hot Gas Discharge 1	90-5/8 (2302)	16-5/8 (422)	7/8" / 1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	88 (2235)	16-5/8 (422)	7/8" / 1-1/8" Cu Sweat
R3	Refrigerant Access (Side)	—	—	6 x 17-3/16 (152 x 437)
CGD*	Condensate Gravity Drain	—	—	3/4 FPT
CPD	Condensate Pump Discharge (Opt)	79-5/16 (2015)	11-7/8 (302)	1/2" Cu Sweat
HUM	Humidifier Supply Line	79-5/16 (2015)	9-7/8 (251)	1/4" Cu Sweat
ECS	Econ-O-Coil Supply	78-5/8 (1998)	7-7/8 (200)	2-1/8" Cu Sweat
ECR	Econ-O-Coil Return	78-5/8 (1998)	4-5/8 (117)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	75-3/8 (1915)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	69-7/8 (1775)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

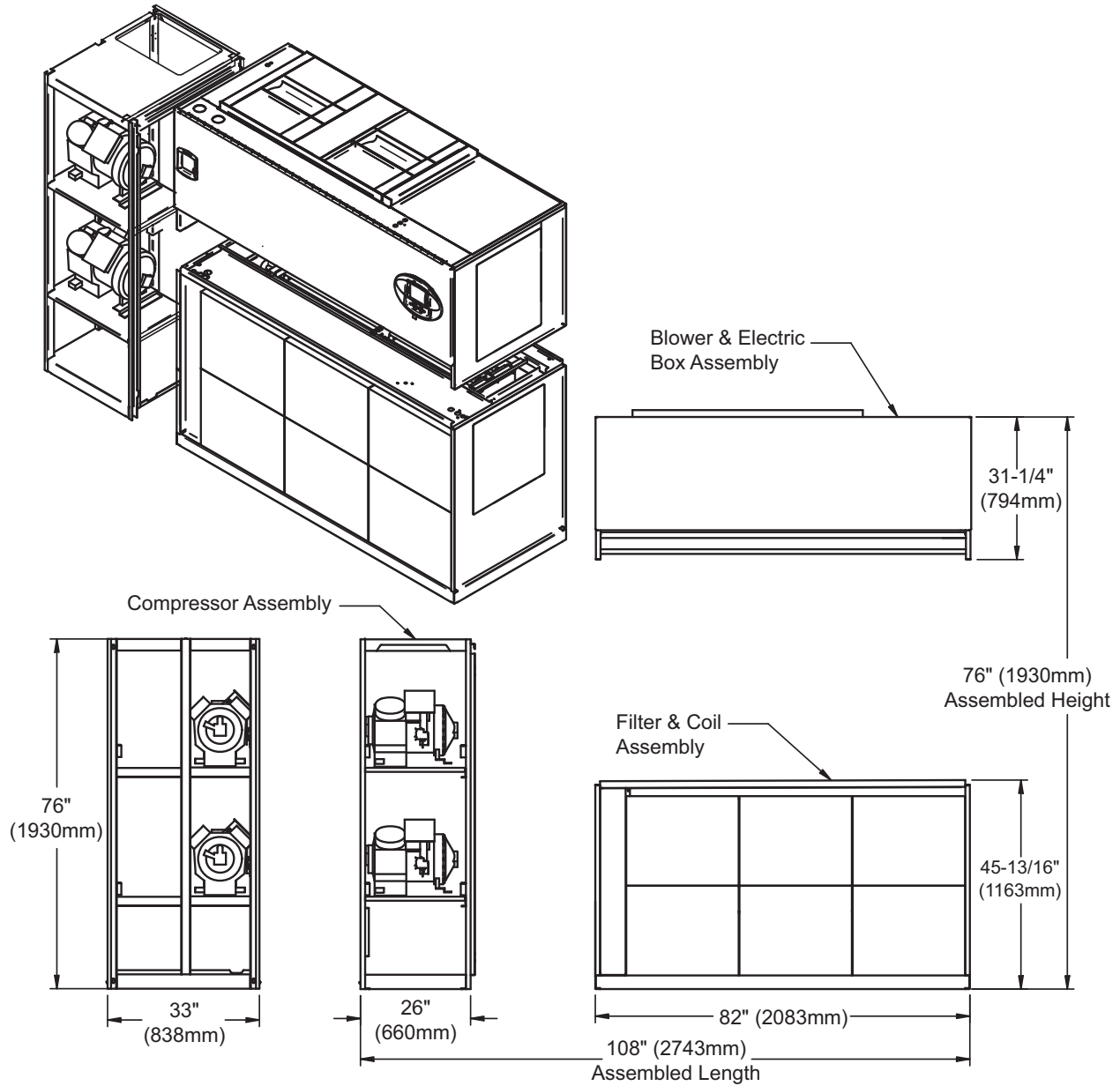
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on dual-cool systems only.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001212, Rev. 2

**Figure 42 Disassembly dimensions—upflow, air-cooled, 53-77kW (15-22 ton), semi-hermetic compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

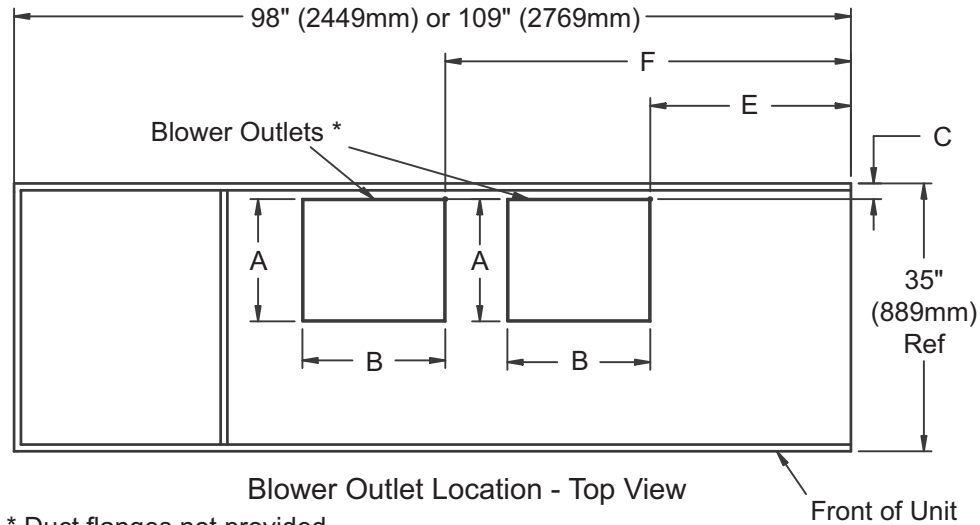
DPN001209  
Rev. 1

**Table 37 Component weights—upflow air-cooled 53-77kw (15-22 ton), semi-hermetic compressors**

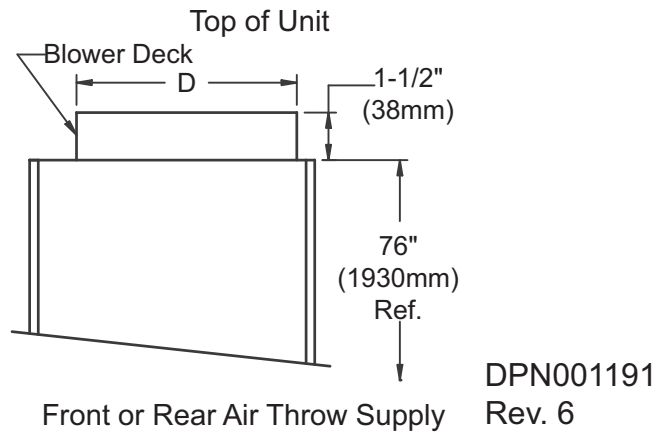
Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	970 (441)	970 (441)
Blower and Electric Box Assembly Forward-Curved Fans	770 (349)	770 (349)
Filter and Coil Assembly	760 (345)	940 (426)

Source: DPN001209, Rev. 1

**Figure 43 Blower outlet and deck dimensions—upflow 53-77kW (15-22 ton) with centrifugal fans**



\* Duct flanges not provided.



DPN001191  
Rev. 6

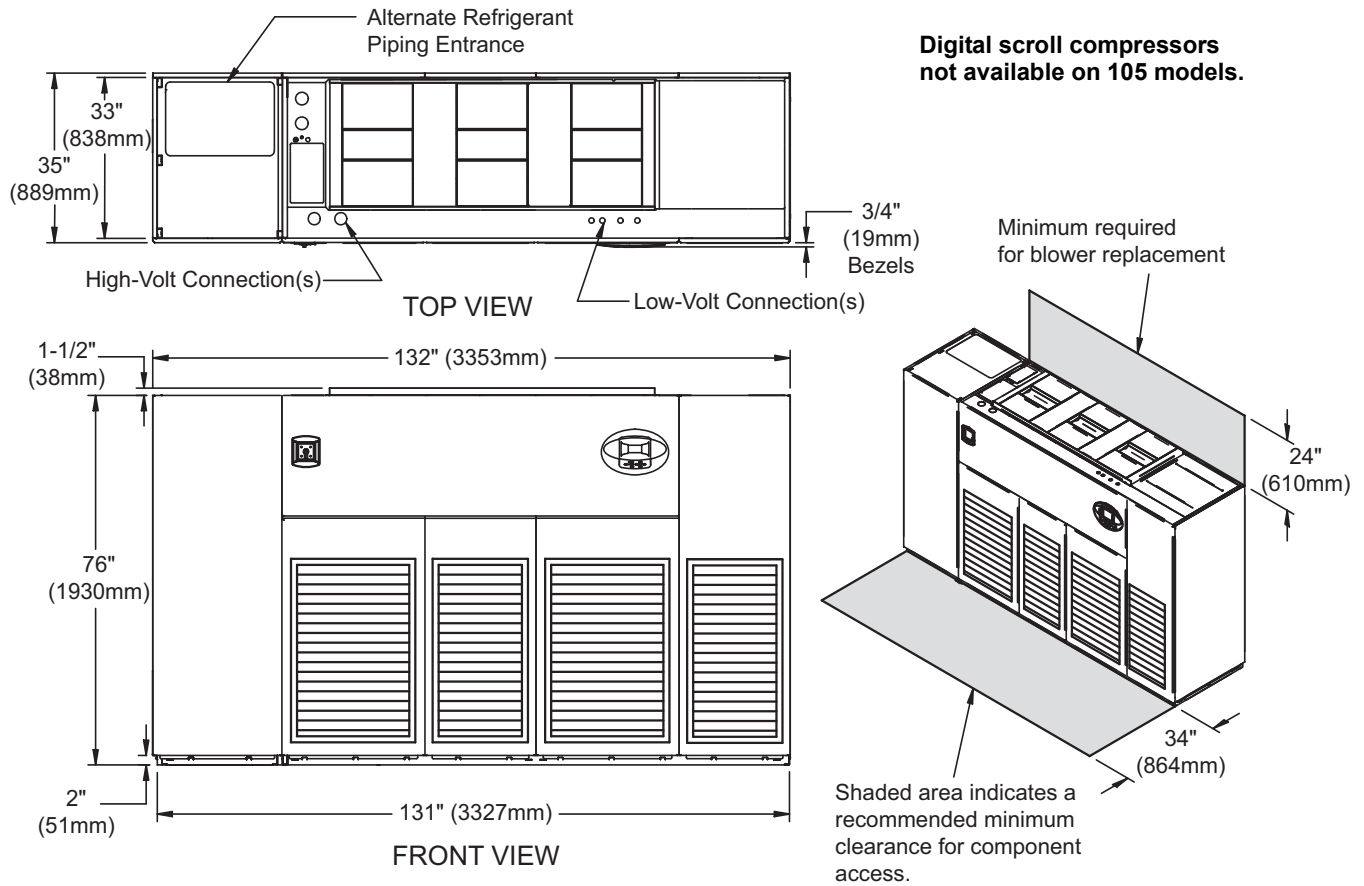
**Table 38 Blower outlet and deck dimension—upflow, 53-77kW (15-22 ton)**

Models	Blower	Supply	Dimensional Data, in. (mm)					
			A	B	C	D	E	F
53-77kW (15-22 ton)	15 x 15	Front Throw	15-7/8 (404)	18-5/8 (472)	2-1/8 (54)	25-5/8 (651)	27-3/4 (705)	55-1/2 (1410)
		Rear Throw	15-7/8 (404)	18-5/8 (472)	11-5/8 (295)	25-5/8 (651)	27-3/4 (705)	55-1/2 (1410)
	15 x 11	Front Throw	15-7/8 (404)	14-11/16 (373)	2-1/8 (54)	25-5/8 (651)	31-3/8 (797)	58-7/16 (1484)
		Rear Throw	15-7/8 (404)	14-11/16 (373)	11-5/8 (295)	25-5/8 (651)	31-3/8 (797)	58-7/16 (1484)

Source: DPN001191, Rev. 6

### 3.10 DIMENSIONS—LIEBERT DS 105, UPFLOW, AIR-COOLED MODELS

**Figure 44** Dimensions—upflow, air-cooled, 105kW (30 ton), semi-hermetic and scroll compressors with centrifugal fans



Digital scroll compressors not available on 105 models.

Note: Front air return unit shown. For rear return unit, in addition to front service area shown, also include 25" (635mm) on one side of unit for access to rear return filter box. See DPN001196.

DPN001168  
Rev. 1

**Table 39** Weights—upflow, air-cooled, 105kW (30 ton), semi-hermetic and scroll compressors \*

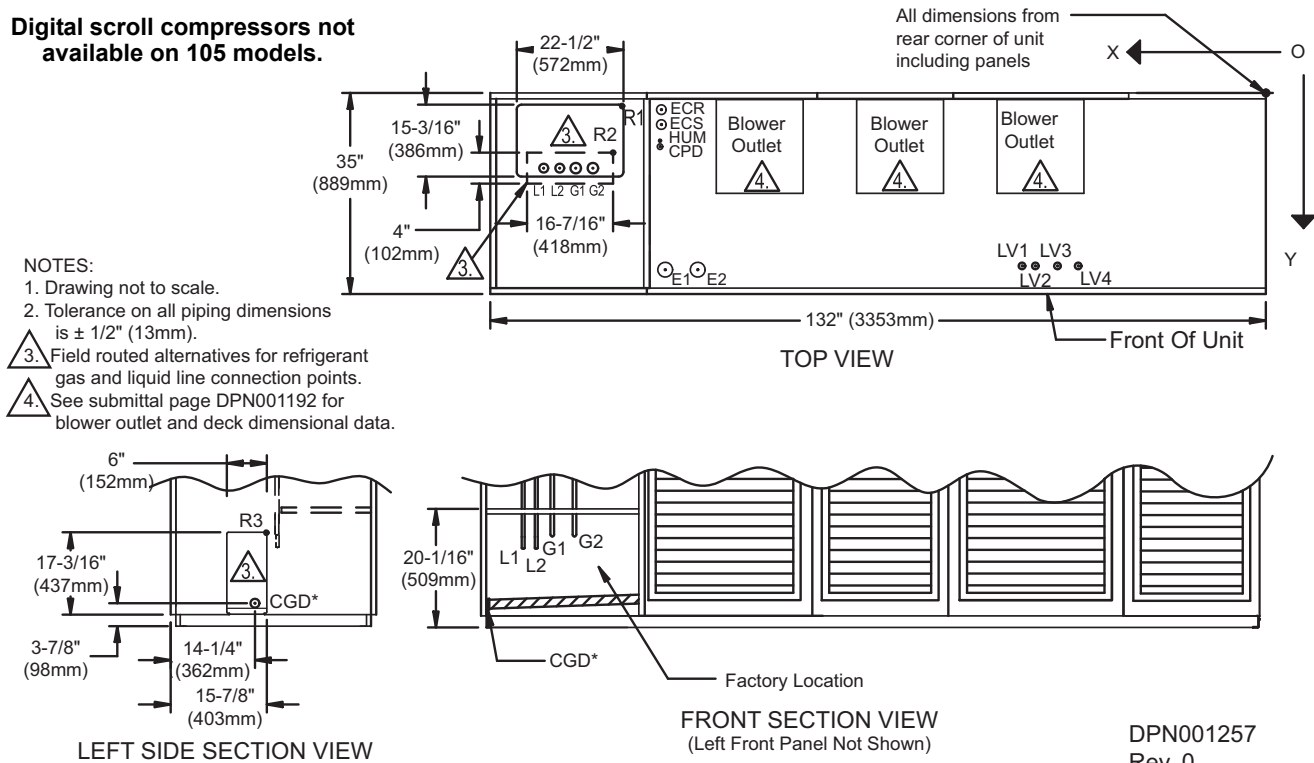
Dry Weight, Approximate, lb (kg)				
Fan Type	Semi-Hermetic		Scroll	
	Air-Cooled	Dual-Cool	Air-Cooled	Dual-Cool
Forward-Curved Fans	3000 (1361)	3330 (1510)	2880 (1306)	3210 (1456)

\* Digital scroll compressors not available on DS 105.  
Source: DPN001168, Rev. 1



**Figure 45 Primary connection locations—upflow, air-cooled, 105kW (30 ton), semi-hermetic and scroll compressors with centrifugal fans**

Digital scroll compressors not available on 105 models.



**Table 40 Piping data—upflow, air-cooled 105kW (30 ton), semi-hermetic and scroll compressors \*\*\***

Point	Description	X, in. (mm)	Y, in. (mm)	Connection Size / Opening
R1	Refrigerant Access (Top)	106-7/8 (2715)	1-7/8 (48)	22-1/2 x 15-3/16 (572 x 386)
R2	Refrigerant Access (Bottom)	109-1/8 (2772)	13-7/8 (352)	16-7/16 x 4 (418 x 102)
L1	Liquid Line System 1	121-3/4 (3092)	16-3/4 (425)	5/8" Cu Sweat
L2	Liquid Line System 2	118-1/8 (3000)	16-3/4 (425)	5/8" Cu Sweat
G1	Hot Gas Discharge 1	118-1/4 (3004)	14-1/4 (362)	1-1/8" Cu Sweat
G2	Hot Gas Discharge 2	115-5/8 (2937)	14-1/4 (362)	1-1/8" Cu Sweat
R3	Refrigerant Access (Side)	—	—	6 x 17-3/16 (152 x 437)
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	102-3/8 (2600)	13-5/8 (346)	1/2" Cu Sweat
HUM	Humidifier Supply Line	101-1/8 (2569)	13-1/8 (333)	1/4" Cu Sweat
ECS**	Econ-O-Coil Supply	101-1/8 (2569)	10-1/4 (260)	2-5/8" Cu Sweat
ECR**	Econ-O-Coil Return	101-1/8 (2569)	5-1/4 (133)	2-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/2 (2502)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	93 (2362)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	41-1/8 (1045)	30-3/8 (772)	7/8"
LV2	Electrical Conn. (Low Volt)	38-7/8 (987)	30-3/8 (772)	7/8"
LV3	Electrical Conn. (Low Volt)	35-1/8 (892)	30-3/8 (772)	7/8"
LV4	Electrical Conn. (Low Volt)	31-5/8 (803)	30-3/8 (772)	7/8"

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

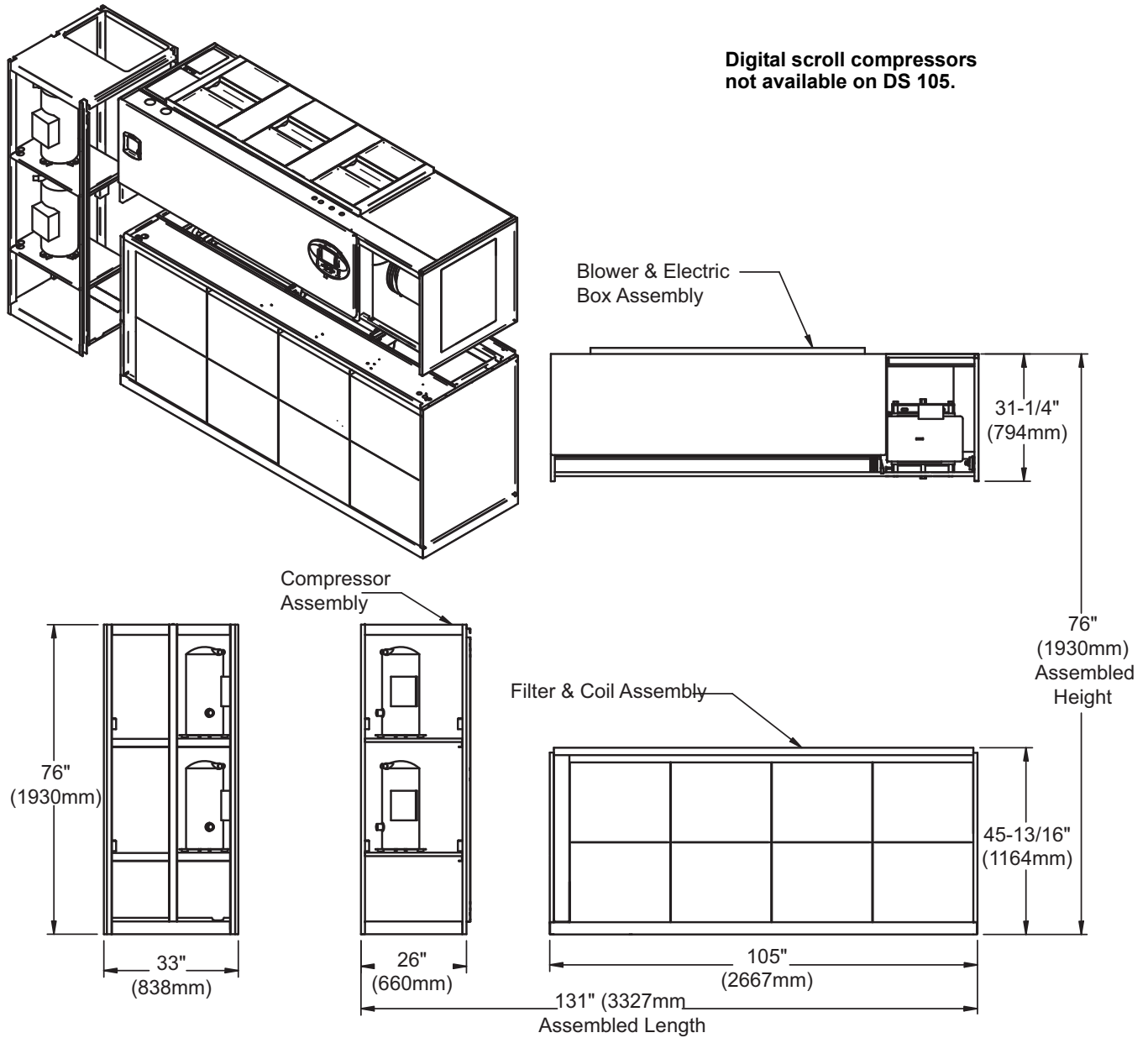
\*\* Supplied on dual-cool systems only.

\*\*\* Digital scroll compressors not available on DS 105

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001257, Rev. 0

**Figure 46 Disassembly dimensions—upflow, air-cooled, 105kW (30 ton), standard scroll compressors with centrifugal fans**



NOTE: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

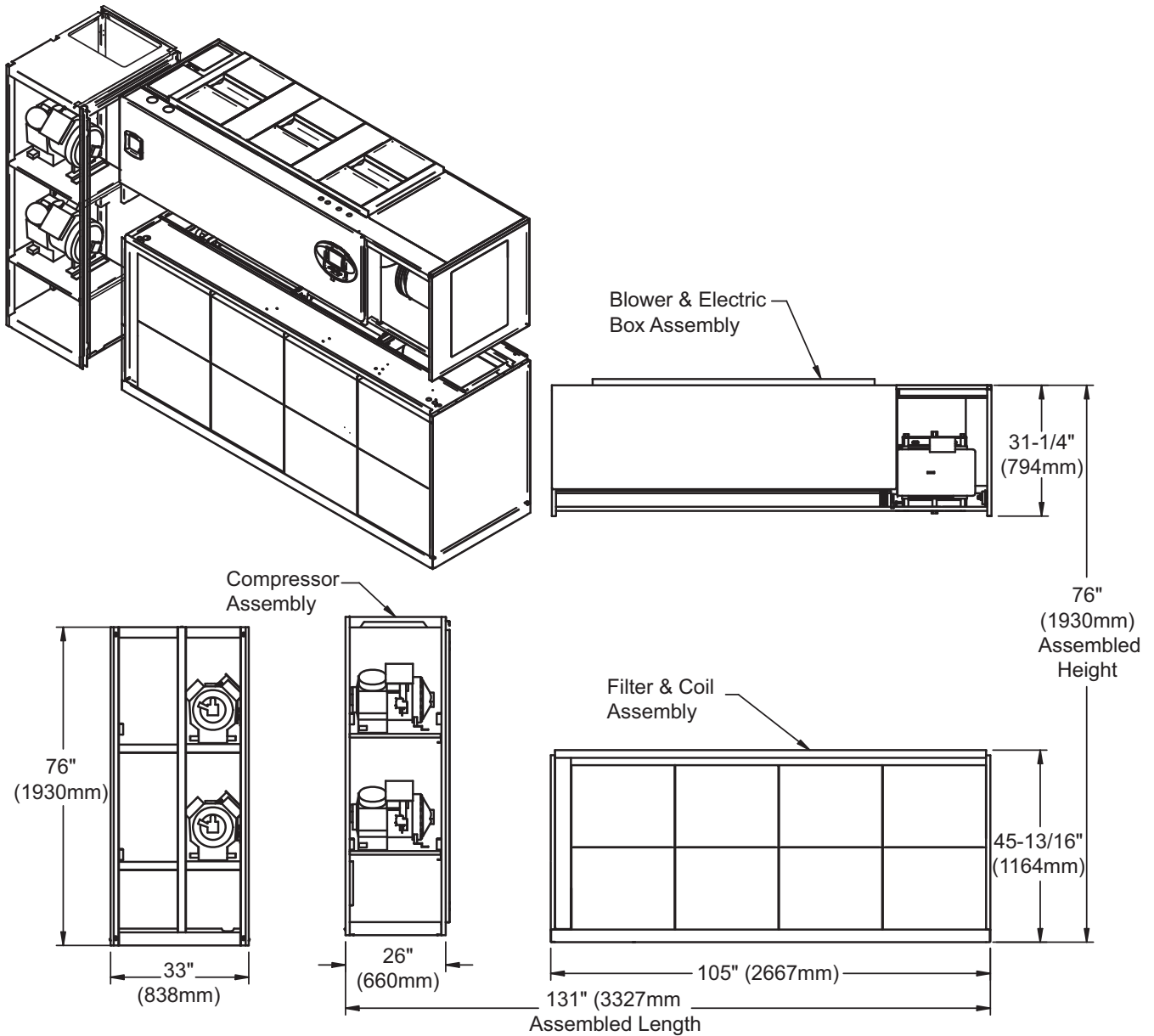
DPN001255 Rev. 1

**Table 41 Component weights—upflow, air-cooled, 105kW (30 ton), standard scroll compressors \***

Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	830 (376)	830 (376)
Blower and Electric Box Assembly Forward-Curved Fans	1080 (490)	1080 (490)
Filter and Coil Assembly	970 (440)	1300 (590)

\*Digital scroll compressors not available on DS 105  
Source: DPN001255, Rev. 1

**Figure 47 Disassembly dimensions—upflow, air-cooled, 105kW (30 ton), semi-hermetic compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

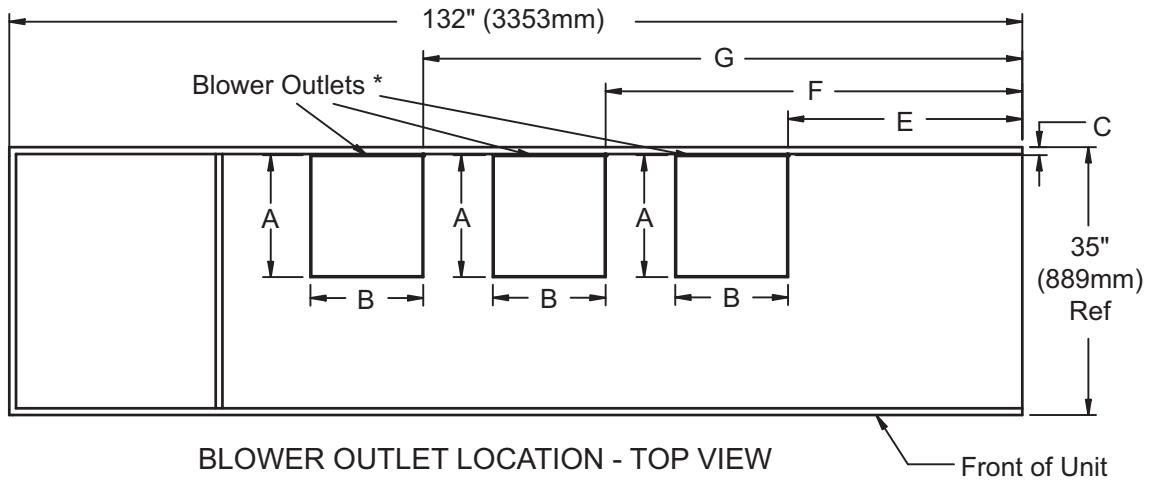
DPN001254  
Rev. 1

**Table 42 Component weights—upflow, air-cooled, 105kW (30 ton), semi-hermetic compressors**

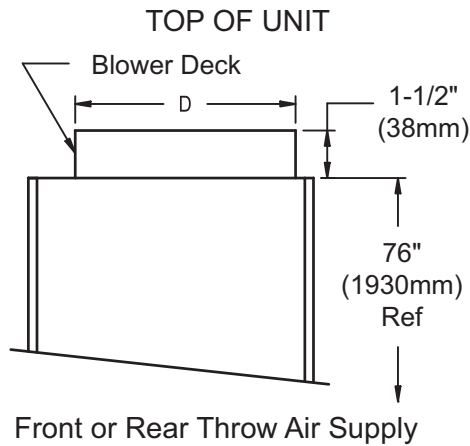
Dry Weight, Approximate, Including Panels, lb (kg)		
Component	Air-Cooled	Dual-Cool
Compressor Assembly	950 (431)	950 (431)
Blower and Electric Box Assembly Forward-Curved Fans	1080 (490)	1080 (490)
Filter and Coil Assembly	970 (440)	1300 (590)

Source: DPN001254, Rev. 0

Figure 48 Blower outlet and deck dimensions—upflow 105kW (30 ton), with centrifugal fans



\* Duct flanges not provided



DPN001192  
Rev. 1

Table 43 Blower outlet and deck dimension—upflow 105kW (30 ton), with centrifugal fans

Blower	SUPPLY	Dimensional Data, in. (mm)						
		A	B	C	D	E	F	G
15 x 11	Front Throw	15-7/8 (404)	14-11/16 (373)	2-1/8 (54)	25-5/8 (651)	30-3/4 (781)	54-1/2 (1384)	78-1/8 (1984)
	Rear Throw	15-7/8 (404)	14-11/16 (373)	11-5/8 (295)	25-5/8 (651)	30-3/4 (781)	54-1/2 (1384)	78-1/8 (1984)

Source: DPN001192, Rev. 1

### 3.11 HEAT REJECTION—LIEBERT MC, FIN/TUBE AND PIGGYBACK CONDENSERS

#### 3.11.1 Liebert MC Microchannel Condensers

##### Liebert MC Condenser Selection

**Table 44 Traditional open room (75°F/45RH return air conditions)**

Model #	Outdoor Design Ambient Temperature					
	95°F (35°C)	100°F (38°C)	105°F (41°C)	110°F (43°C)	115°F (46°C)	120°F (49°C)
DS/VS028A	MCM080_8	MCM080_8	MCM080_8	MCL110_8	MCL110_8	MCL110_8
DS/VS035A	MCM080_8	MCM080_8	MCM080_8	MCL110_8	MCL110_8	MCL110_8
DS/VS042A	MCM080_8	MCM080_8	MCL110_8	MCL110_8	MCL110_8	MCL110_8
DS/VS053A	MCM080_8	MCM080_8	MCL110_8	MCM160_8	MCM160_8	MCL220_8
DS/VS070A	MCM080_8	MCL110_8	MCL110_8	MCM160_8	MCM160_8	MCL220_8
DS/VS077A	MCM080_8	MCL110_8	MCL110_8	MCM160_8	MCM160_8	MCL220_8
DS/VS105A	MCL110_8	MCM160_8	MCM160_8	MCL220_8	MCL220_8	MCL220_8

**Table 45 High-temperature return (85°F/33RH return air conditions)**

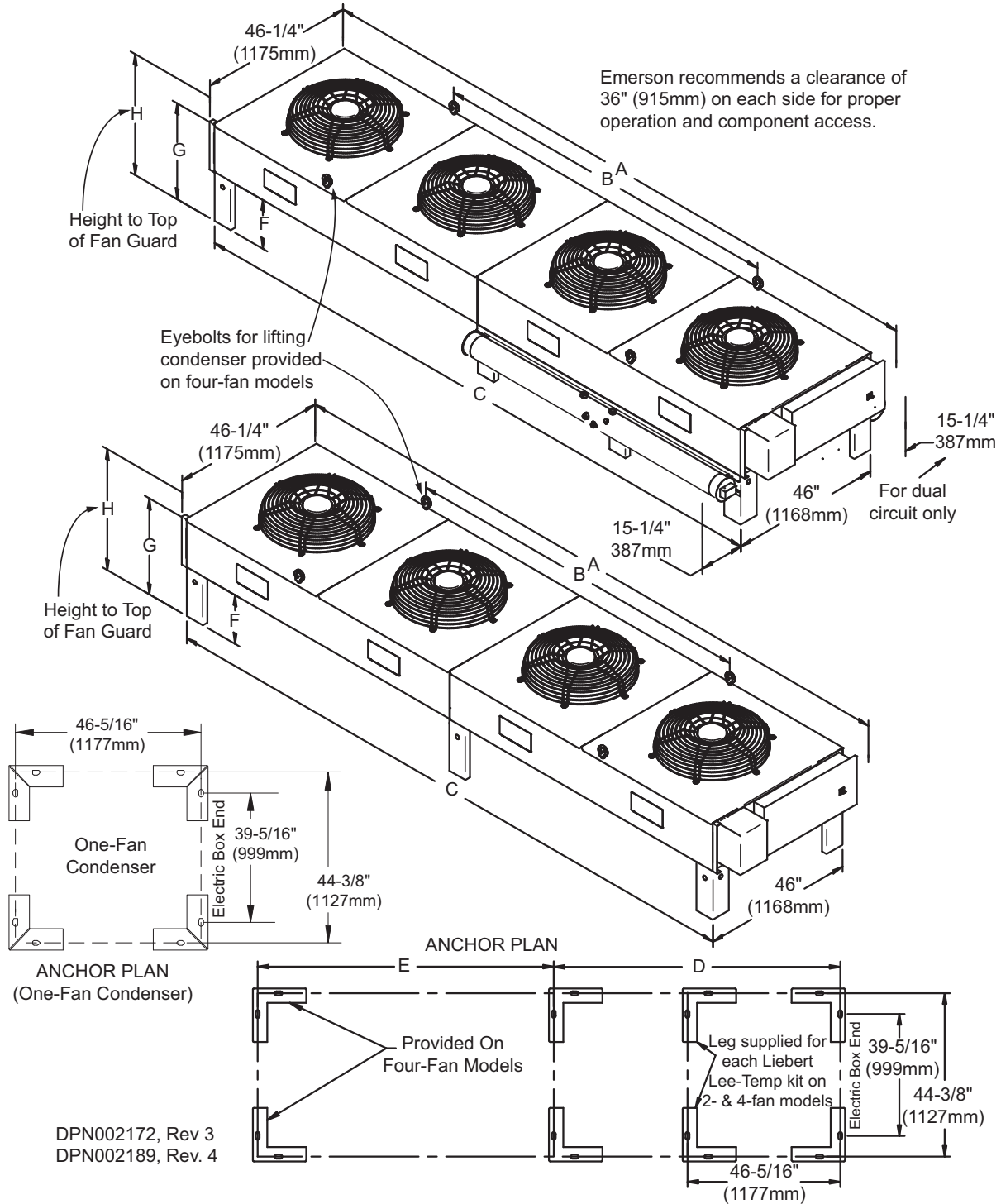
Model #	Outdoor Design Ambient Temperature					
	95°F (35°C)	100°F (38°C)	105°F (41°C)	110°F (43°C)	115°F (46°C)	120°F (49°C)
DS/VS028A	MCM080_8	MCM080_8	MCL110_8	MCL110_8	MCL110_8	MCM160_8
DS/VS035A	MCM080_8	MCM080_8	MCL110_8	MCL110_8	MCM160_8	MCM160_8
DS/VS042A	MCM080_8	MCL110_8	MCL110_8	MCM160_8	MCM160_8	MCM160_8
DS/VS053A	MCL110_8	MCL110_8	MCM160_8	MCL220_8	MCL220_8	MCL220_8
DS/VS070A	MCL110_8	MCM160_8	MCM160_8	MCL220_8	MCL220_8	MCL220_8
DS/VS077A	MCL110_8	MCM160_8	MCM160_8	MCL220_8	MCL220_8	MCL220_8
DS/VS105A	MCM160_8	MCL220_8	MCL220_8	MCL220_8	MCL220_8	—

**Table 46 Traditional open room (75°F/45RH return air conditions) Liebert QuietLine™ sound levels**

Liebert DS Model #	Outdoor Design Ambient Temperature				
	95°F (35°C)	100°F (38°C)	105°F (41°C)	110°F (43°C)	115°F (46°C)
DS/VS028A	MCM080E8	MCM080E8	MCL110E8	MCL110E8	MCL110E8
DS/VS035A	MCM080E8	MCL110E8	MCL110E8	MCM160E8	MCM160E8
DS/VS042A	MCM080E8	MCL110E8	MCL110E8	MCM160E8	MCM160E8
DS/VS053A	MCL110E8	MCL110E8	MCM160E8	MCL220E8	MCL220E8
DS/VS070A	MCL110E8	MCM160E8	MCL220E8	MCL220E8	MCL220E8
DS/VS077A	MCL110E8	MCM160E8	MCL220E8	MCL220E8	MCL220E8
DS/VS105A	MCM160E8	MCL220E8	Consult Factory		

### Dimensions—Liebert MC™ Condensers

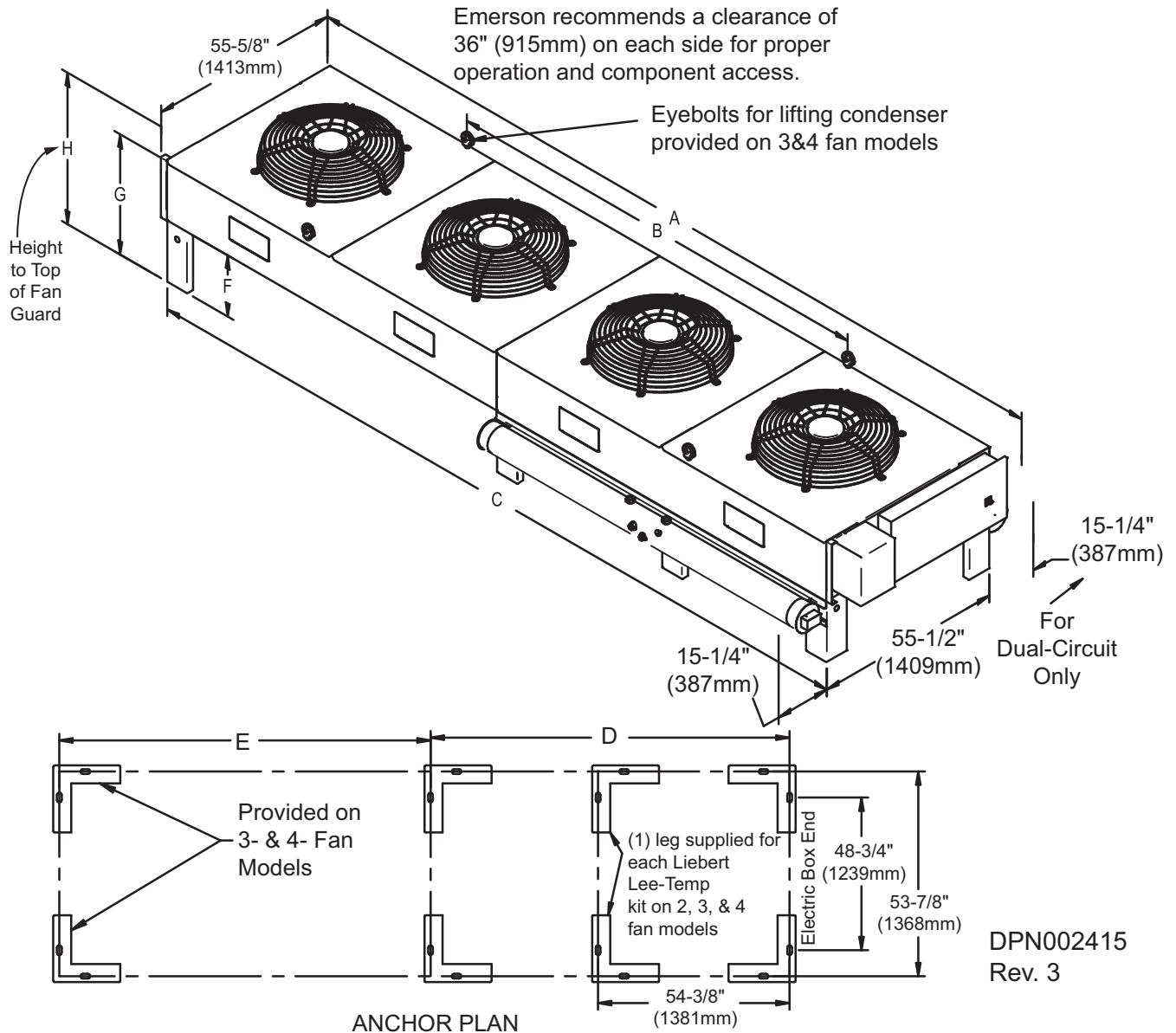
Figure 49 Condenser planning dimensions—MCM080, MCM160 with/without Liebert Lee-Temp™



Liebert Model No.	No. of Fans	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	Leg Height F* in. (m.)	G in. (mm)	H in. (mm)
MCM080	2	105-1/4 (2674)	—	96-1/16 (2440)	94-7/16 (2398)	—	18 (457)	31-5/8 (803)	39-5/8 (1006)
MCM160	4	202-7/16 (5142)	113-1/2 (2883)	192-1/4 (4883)	94-7/16 (2398)	96-3/16 (2444)	36 (914)	49-5/8 (1260)	57-5/8 (1464)
							48 (1219)	61-5/8 (1565)	69-5/8 (1768)
							60 (1524)	73-5/8 (1870)	81-5/8 (2073)

\* Cross bracing required for legs longer than 18". Number of legs varies per model and options selected.  
Source: DPN002172, Rev. 3; DPN002189, Rev. 4

**Figure 50 Cabinet and anchor dimensions—Liebert MC™ models MCL110 and MCL220 with Liebert Lee-Temp receivers**

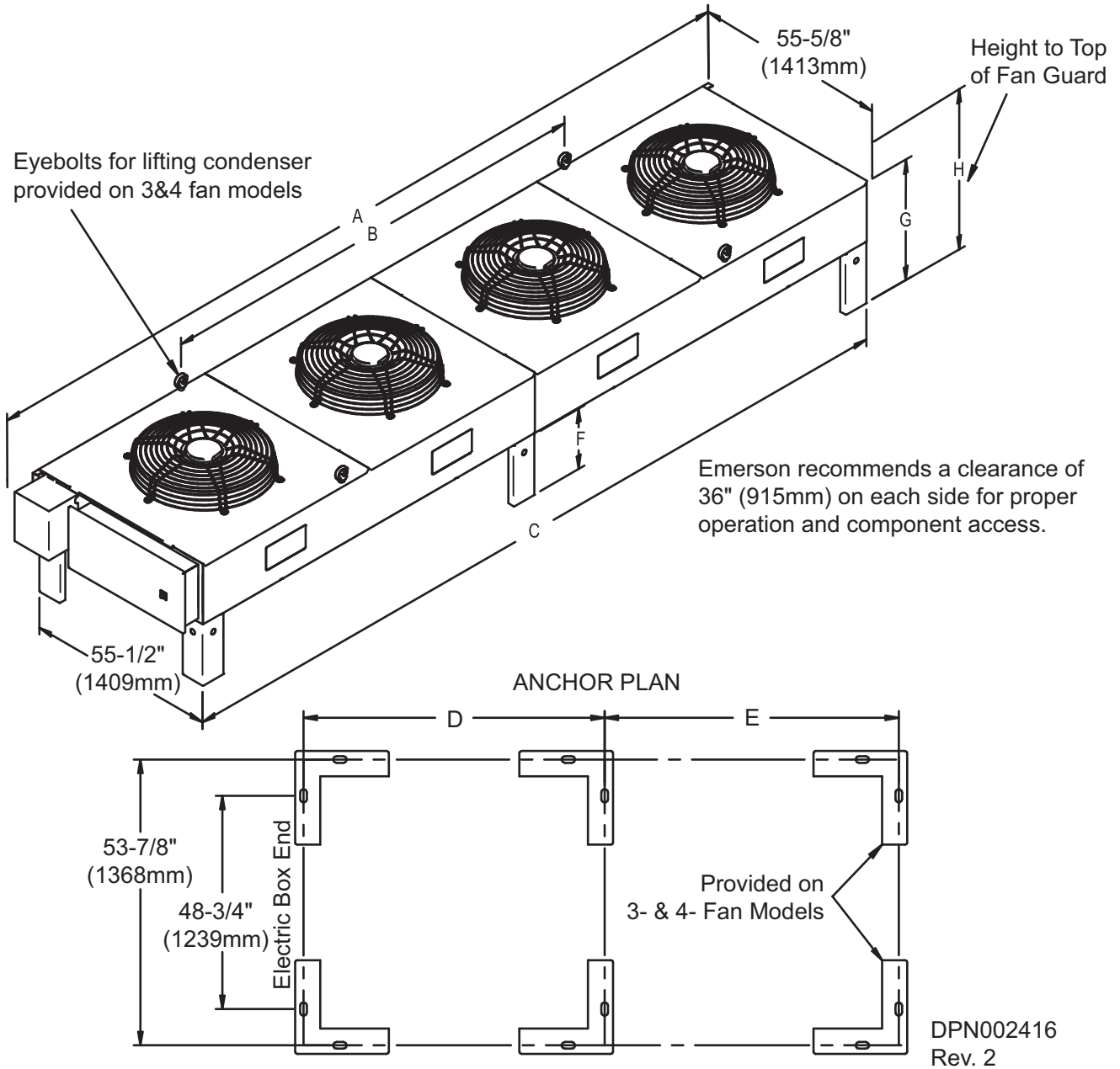


Model No	No. of Fans	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)
MCL110	2	124 1/8 (3152)	—	112-1/8 (2848)	110-1/2 (2806)	—
MCL220	4	236-5/16 (6003)	129-9/16 (3291)	224-3/8 (5699)	110-1/2 (2806)	112-1/4 (2851)

Leg Height F* in. (m.)	G in. (mm)	H in. (mm)
18 (457)	35-7/8 (911)	43-5/8 (1108)
36 (914)	53-7/8 (1368)	61-5/8 (1565)
48 (1219)	65-7/8 (1673)	73-5/8 (1870)
60 (1524)	77-7/8 (1978)	85-5/8 (2175)

\* Cross bracing required for legs longer than 18". Number of legs varies per model and options selected.  
Source: DPN002415, Rev. 3

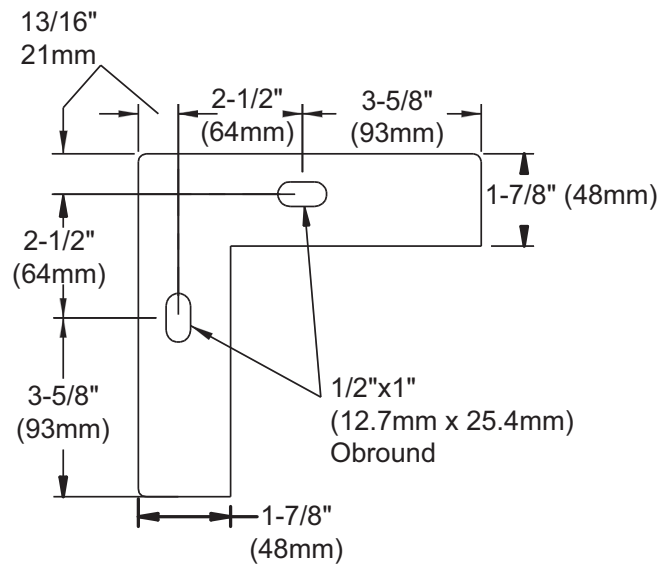
Figure 51 Condenser planning dimensions—MCL110 and MCL220



Model #	# of Fans	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	Leg Height F * In. (mm)	G In. (mm)	H In. (mm)
MCL110	2	124-1/8 (3152)	—	112-1/8 (2848)	110-1/2 (2806)	—	18 (457)	35-7/8 (911)	43-5/8 (1108)
MCL220	4	236-5/16 (6003)	129-9/16 (3291)	224-3/8 (5699)	110-1/2 (2806)	112-1/4 (2851)	36 (914)	53-7/8 (1368)	61-5/8 (1565)
						56-1/8 (1425)	48 (1219)	65-7/8 (1673)	73-5/8 (1870)

\* 18" legs standard for all models. Cross-bracing required for legs longer than 18" (457mm). Number varies according to model and options.  
Source: DPN002416, Rev. 2



**Figure 52** Typical Liebert MC™ condenser footprint—dimensions

## Electrical Data—Liebert MC™ Condensers

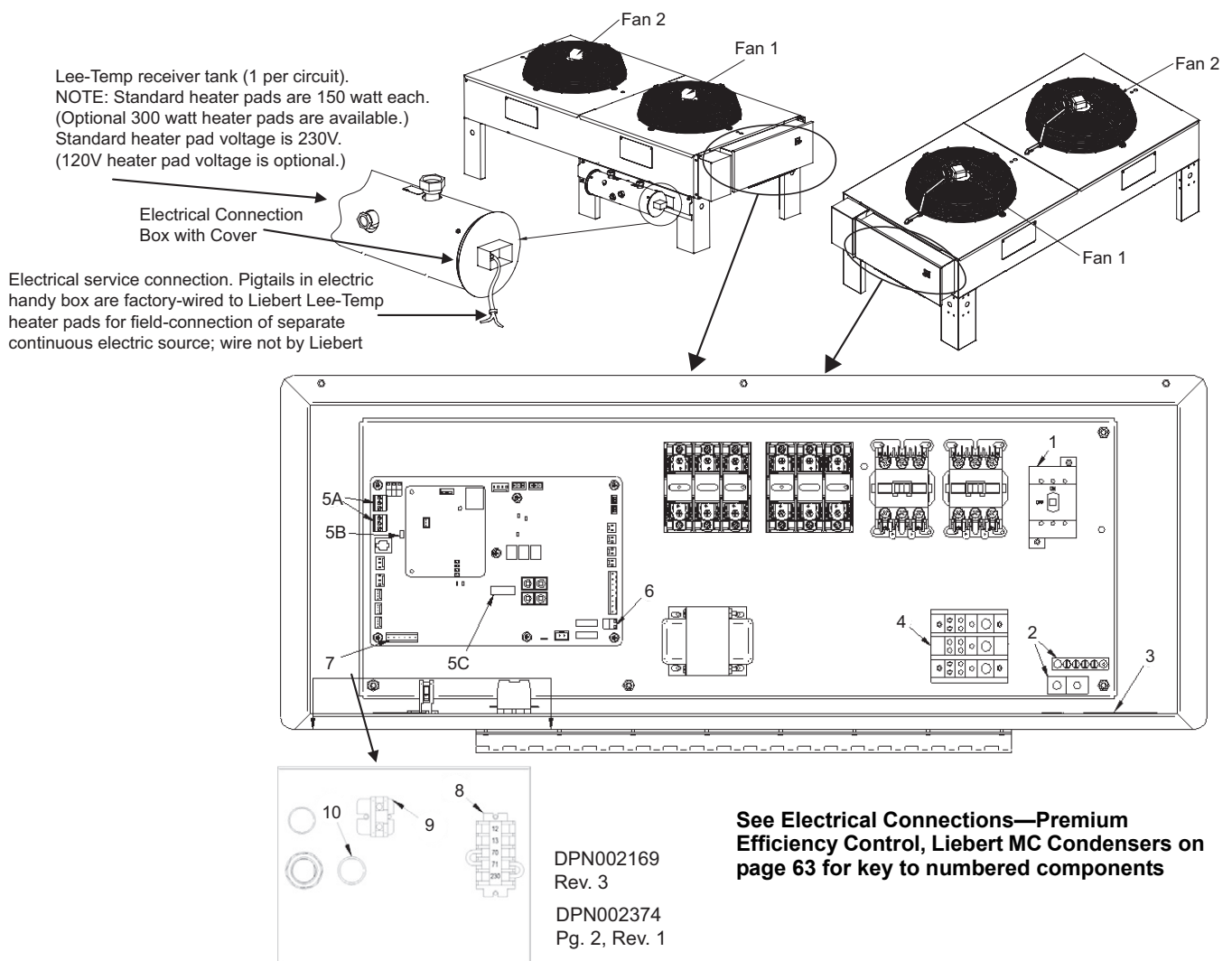
**Table 47** Liebert MC electrical data, three-phase, 60Hz condenser, Premium Version (EC control)

Model #	Number of Fans	Power Requirements								
		FLA			WSA			OPD		
		208/230V	380/415V	460V	208/230V	380/415V	460V	208/230V	380/415V	460V
MCM080	2	4.6	2.8	2.8	5.5	3.3	3.3	15	15	15
MCM160	4	9.2	5.6	5.6	9.8	6.0	6.0	15	15	15
MCL110	2	11.4	5.6	5.6	12.8	6.3	6.3	15	15	15
MCL220	4	22.8	11.2	11.2	24.2	11.9	11.9	25	15	15

1. FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.
2. 208V–460V premium models must be connected to Wye 3-phase systems.

## Electrical Field Connections—Liebert MC Condensers

**Figure 53** Electrical field connections—Liebert MC Condensers premium efficiency control, with and without Liebert Lee-Temp



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**Electrical Connections—Premium Efficiency Control, Liebert MC Condensers****Key Electrical Details; Source: DPN002169, Rev. 3 and DPN002374 Rev. 2**

1. **Three-phase electrical service**—Terminals are on top of disconnect switch for one-fan and two-fan units. Terminals are on bottom of disconnect switch for three-fan and four-fan units. Three-phase service not by Emerson. See **Note 5**.
2. **Earth ground**—Field lug terminal for earth ground connection. Ground terminal strip for fan motor ground connection.
3. **Primary high voltage entrance**—Three 7/8" (22.2mm) diameter knockouts located at the bottom of the enclosure.
4. **SPD field connection terminals**—High-voltage surge protection device (SPD) terminals. SPD is an optional device.
5. **CANbus terminal connections**—Field terminals for CANbus cable connection.
  - 5A is the CANbus connectors
    - TB49-1 is the input terminal for CANbus high
    - TB49-3 is the input terminal for CANbus low
    - TB50-1 is output terminal for CANbus high
    - TB50-3 is the output terminal for CANbus low
    - Each CANbus cable shield is connected to terminal "SH", **Item 9**.
  - 5B is the "END OF LINE" jumper.
  - 5C is the CANbus "DEVICE ADDRESS DIP SWITCH". CANbus cable not by Emerson. See **Note 2**.
6. **Remote unit shutdown**—Replace exiting jumper between terminals TB38-1 and TB38-2 with field-supplied normally closed switch having a minimum 75VA 24VAC rating. Use field-supplied Class 1 wiring.
7. **Alarm terminal connections**
  - a. Common Alarm Relay indicates when any type of alarm occurs. TB74-1 is common; TB74-2 is normally open; and TB74-3 is normally closed. 1 Amp 24VAC is the maximum load. Use field-supplied Class 1 wiring.
  - b. Shutdown Alarm Relay indicates when condenser loses power or when a critical alarm has occurred that shuts down the condenser unit. TB74-4 is common, TB74-5 is normally open and TB74-6 is normally closed. 1 Amp 24VAC is the maximum load. Use field-supplied Class 1 wiring.
8. **Indoor unit interlock and SPD alarm terminals**
  - a. On any call for compressor operation, normally open contact is closed across Terminals 70 & 71 for Circuit 1, and normally open contact is closed across Terminals 70 & 230 for Circuit 2 from indoor room unit.
  - b. During SPD alarm, normally open contact is closed across Terminals 12 & 13. SPD is an optional device.
9. **CANbus shield terminal**—Terminal for field connection of the CANbus field-supplied cables. Shield of CANbus field-supplied cables must not be connected to ground at the condenser.
10. **Primary low voltage entrance**—One 7/8" (22.2mm) diameter knockout that is free for customer low-voltage wiring.

**NOTES**

1. Refer to specification sheet for unit voltage rating, full load amp and wire size amp ratings.
2. The CANbus wiring is field supplied and must be:
  - shielded
  - 22-18AWG stranded tinned copper,
  - twisted pair (minimum 8 twists per foot),
  - low capacitance (15pf/ft or less),
  - plenum rated (NEC type CMP) if required by local codes,
  - UV and moisture resistant or run within conduit once in an outdoor environment, and
  - must be temperature and voltage rated for conditions present.

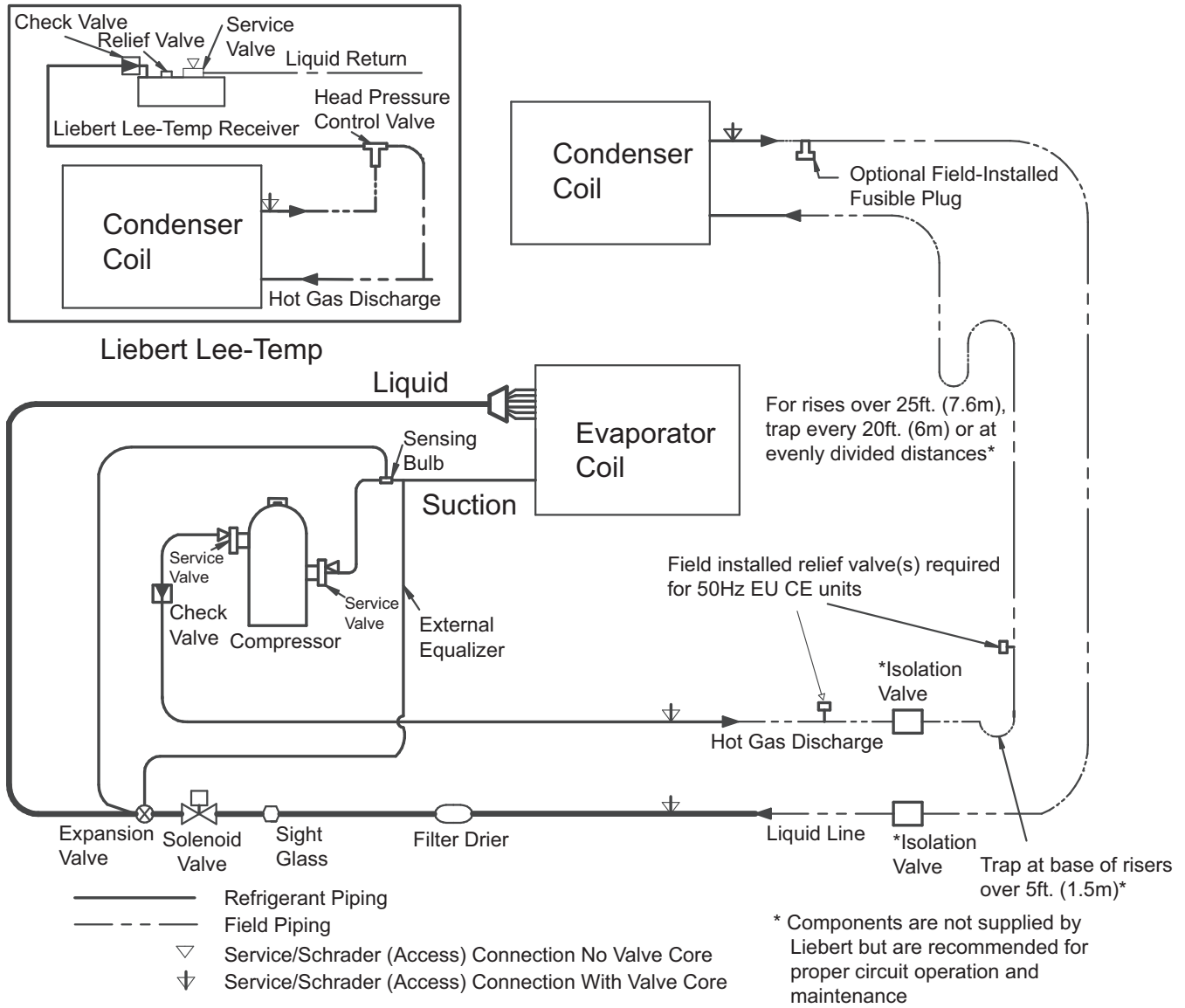
**Examples:** Belden part number 89207(plenum rated) or Alpha Wire part number 6454 (UV resistant outdoor rated) Category 5, 5e or higher.
3. Do not run the CANbus cable in the same conduit, raceway, or chase as high voltage.
4. For CANbus network lengths greater than 350ft. (107m), contact Liebert factory.
5. All wiring must be sized and selected for insulation case per NEC and other local codes.
6. The electrically commutated (EC) motors included in the Liebert MC condensers are suitable for connection to power supplies with a solidly grounded neutral. (Some platforms can accept power supplies listed under Item **b** below. Contact the factory for more information.)
  - a. Acceptable power supplies for 208 to 480V nominal units**
    - 208V wye with solidly grounded neutral and 120V line to ground;
    - 380V wye with solidly grounded neutral and 220V line to ground;
    - 480V wye with solidly grounded neutral and 277V line to ground.
  - b. Unacceptable power supplies for 208V to 480V nominal units:**
    - wye with high resistance (or impedance) ground;
    - delta without ground or with floating ground;
    - delta with corner ground; or
    - delta with grounded center tap

### 3.12 PIPING—LIEBERT MC™ CONDENSERS

#### Typical System Configurations—LIEBERT MC CONDENSERS

Figure 54 shows a single refrigeration circuit diagram, displaying the indoor air conditioning unit, the outdoor condenser (with or without Liebert Lee-Temp™) and field-supplied interconnection piping.

Figure 54 Liebert MC piping schematic with and without Liebert Lee-Temp

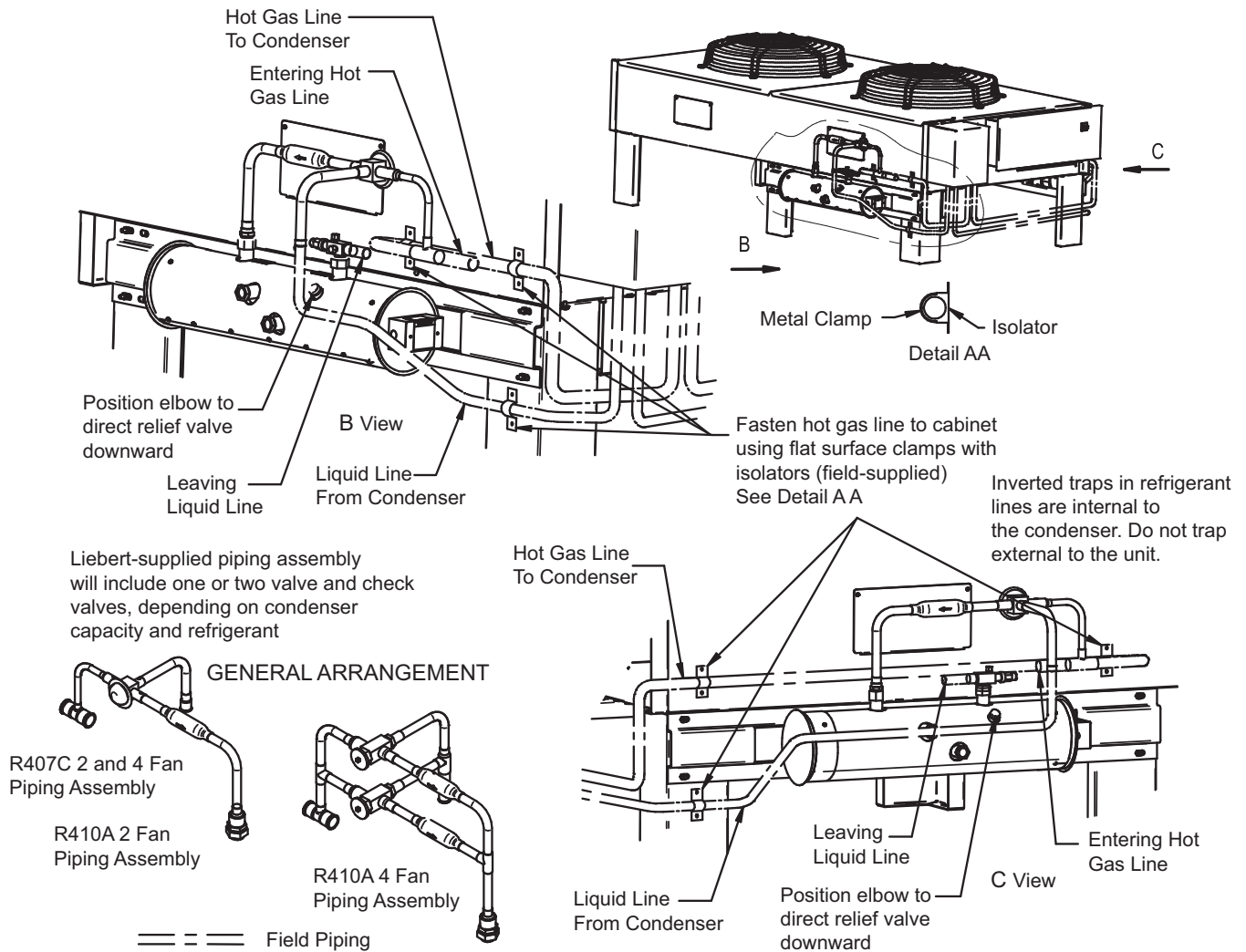


**NOTES**

Single refrigeration circuit shown for clarity.  
 Schematic representation shown. Do not use for specific connection locations.

DPN002188  
 Rev. 1

Figure 55 Piping dimensions—Liebert MC™ dual circuit condensers with Liebert Lee-Temp™



Note:

- The following materials are supplied by Emerson for each circuit (shipped loose with condenser) for field installation: insulated Liebert Lee-Temp storage tank with sight glasses, head pressure control valve, check valve, rotalock valve and pressure relief valve. All other piping to be supplied and installed by others.
- Consult factory for proper line sizing for runs longer than 150ft. (45.7m) equivalent length.

DPN002426  
Rev. 4

Table 48 Piping dimensions—Liebert MC dual circuit condensers with Liebert Lee-Temp

Model #	Condenser Connections ODS, in.			Liebert Lee-Temp Connections			
	Circuit No.	Hot Gas	Liquid	Hot Gas Tee IDS, in.	Liquid Line to Lee-Temp Valve ODS, In.	Receiver Out R407C IDS, in.	Receiver Out R410A IDS, in.
MCM080	2	7/8	5/8	7/8	5/8	5/8	5/8
MCL110	2	1-1/8	7/8	1-1/8	7/8	7/8	7/8
MCM160	2	1-1/8	7/8	1-1/8	7/8	1-1/8	1-1/8
MCL220	2	1-3/8	1-1/8	1-3/8	1-1/8	1-1/8	1-1/8

Source: DPN002426, Rev. 4

Figure 56 Piping connections—Liebert MC™ dual circuit two-fan and four-fan units

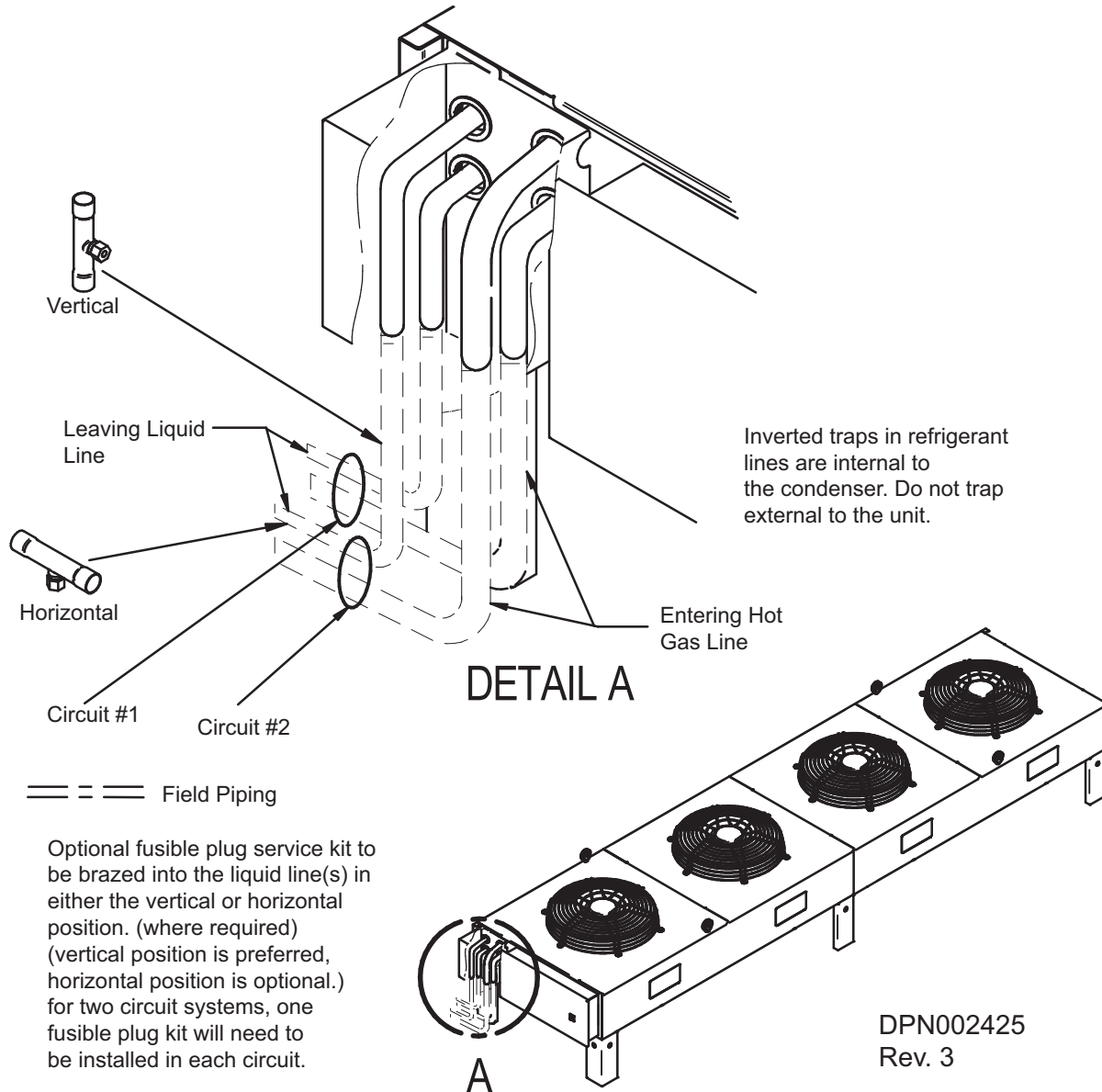


Table 48 Liebert MC piping connection sizes—Liebert MC dual-circuit, two-fan and four-fan units

Model #	# of Fans	Connection Sizes, OD, in	
		Hot Gas Line	Liquid Line
MCM080	2	7/8	5/8
MCL110	2	1-1/8	7/8
MCM160	4	1-1/8	7/8
MCL220	4	1-3/8	1-1/8

Source: DPN002425, Rev. 3

### 3.12.1 Fin/Tube Condensers

#### Fin/Tube Selections

**Table 49** Liebert DS air-cooled condenser selection, finned-tubular design, R-407C

Liebert DS Model	Ambient Temperature °F (°C)					
	Outdoor Condenser			Outdoor Quiet-Line Condenser		
	95 (35)	100 (38)	105 (41)	95 (35)	100 (38)	105 (41)
028	CD*-205	CD*-205	CD*-251	CD*-214	CD*-214	CD*-286
035	CD*-205	CD*-205	CD*-251	CD*-214	CD*-214	CD*-286
042	CD*-205	CD*-251	CD*-308	CD*-286	CD*-286	CD*-409
053	CD*-251	CD*-308	CD*-415	CD*-286	CD*-409	CD*-409
070	CD*-308	CD*-415	CD*-415	CD*-409	CD*-477	CD*-572
077	CD*-308	CD*-415	CD*-616	CD*-409	CD*-572	CD*-572
105	CD*-415	CD*-616	CD*-616	CD*-572	N/A	N/A

#### Dimensions—Fin/Tube Condensers

**Table 50** Fin/tube condenser physical data and R-407C refrigerant required per condenser circuit

Model Number	Number of Fans	Number of Circuits	Connection Size, OD, In.		Net Weight lb (kg)	Dual Circuit lb/circuit (kg/circuit)	
			Hot Gas	Liquid		FSC or VFD	Liebert Lee-Temp (includes receiver)
<b>Standard Models</b>							
CD*165	2	2	7/8	5/8	425 (193)	5 (2.3)	26 (11.8)
CD*205	2	2	1-1/8	7/8	495 (225)	7 (3.2)	54 (24.4)
CD*251	3	2	1-1/8	7/8	500 (227)	10 (4.6)	36 (16.3)
CD*308	3	2	1-3/8	1-1/8	670 (304)	11 (5.0)	55 (24.9)
CD*415	4	2	1-3/8	1-1/8	840 (381)	24 (10.9)	102 (46.2)
CD*510	4	2	1-5/8	1-1/8	1188 (539)	29 (13.2)	142 (64.4)
CD*616	6	2	1-5/8	1-1/8	1380 (626)	26 (11.8)	108 (49.0)
<b>Quiet-Line Models</b>							
DCD*143	2	2	1-1/8	7/8	515 (234)	N/A	61 (27.7)
DCD*214	3	2	1-1/8	7/8	840 (381)	N/A	77 (34.9)
DCD*286	4	2	1-1/8	7/8	1105 (501)	N/A	119 (54.0)
DCD*409	6	2	1-5/8	1-1/8	1380 (626)	N/A	125 (55.8)
DCD*572	8	2	2-1/8	1-1/8	2430 (1102)	N/A	186 (84.4)



Figure 57 Fin/tube condenser dimensions, 2-fan model

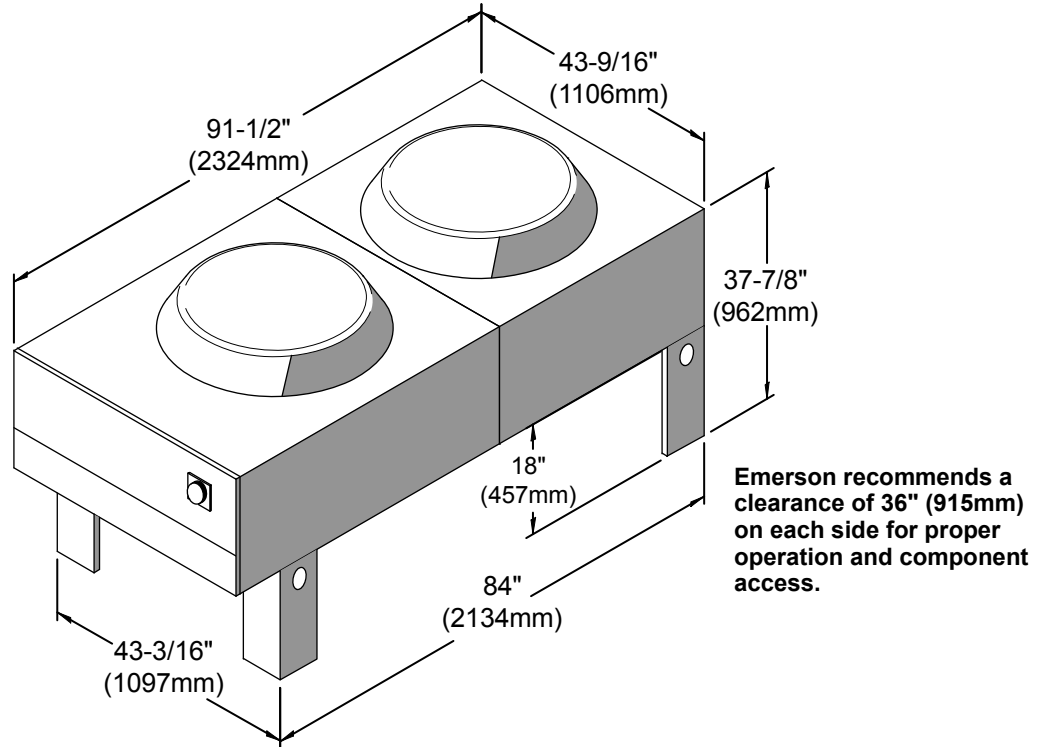


Figure 58 Fin/tube condenser dimensions, 3-fan and 4-fan models

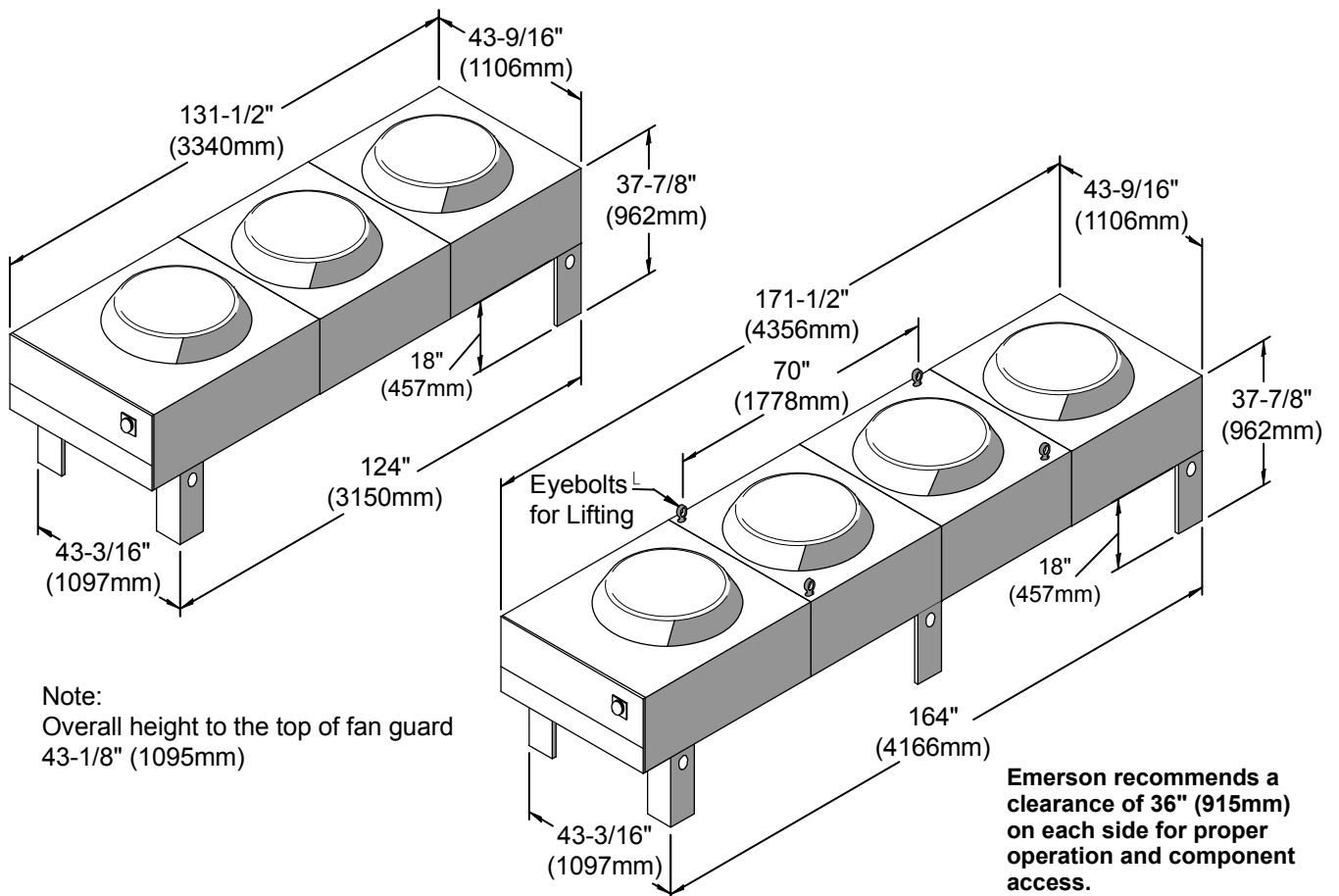
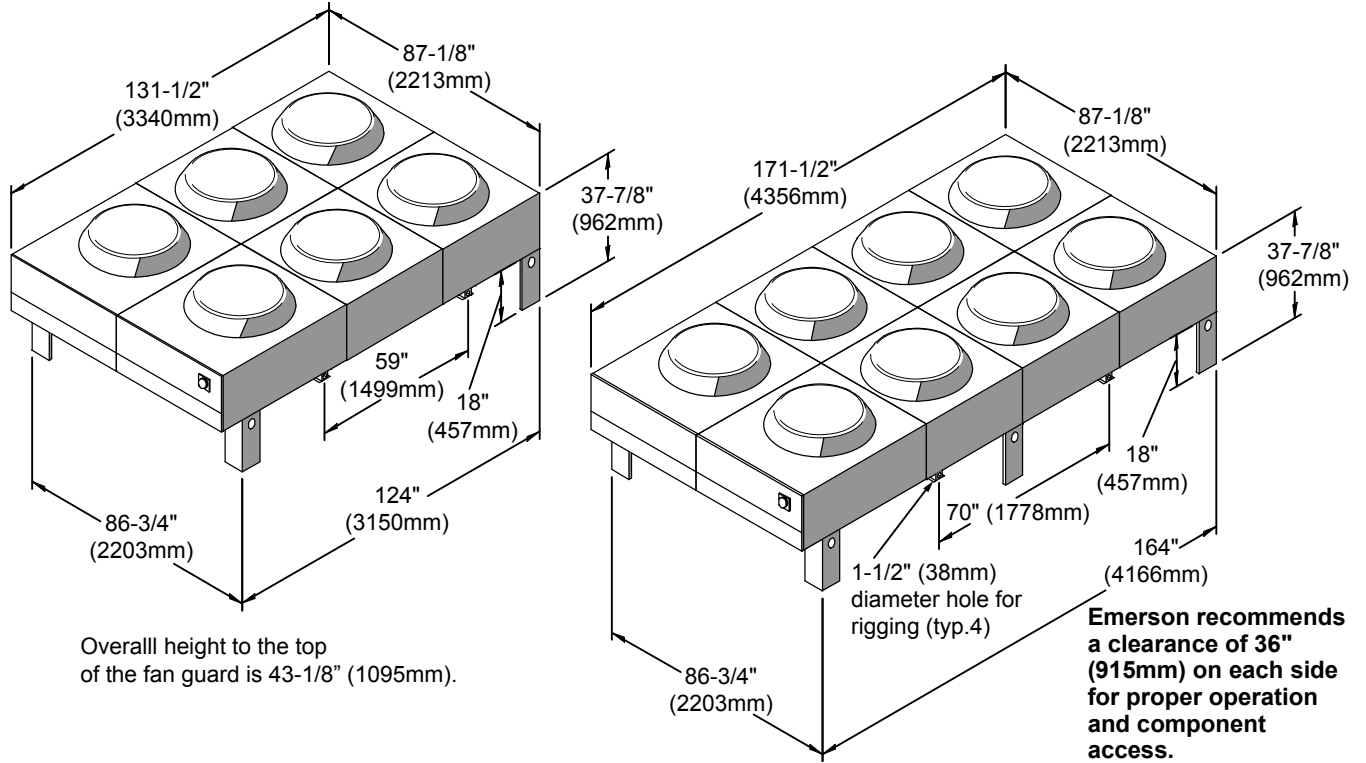


Figure 59 Fin/tube condenser dimensions, 6-fan and 8-fan models



## Electrical Data—Fin/Tube Condensers

Table 51 Fin/tube condenser data, 60Hz

Model #	83, 104			165, 205			251, 308			415, 510			616			830, 1010				
Input Voltage	ph	1 Fan			2 Fans			3 Fans			4 Fans			6 Fans			8 Fans			
		FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	
<b>Fan Speed Controlled</b>																				
208/230	1	4.8	6.0	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
460		2.5	3.1	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
575		1.9	2.4	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
208/230	3	—	—	—	8.3	9.5	15	11.8	13.0	15	15.3	16.5	20	23.6	24.8	30	30.6	31.8	40	
460		—	—	—	4.2	4.8	15	5.9	6.5	15	7.6	8.2	15	11.8	12.4	15	15.2	15.8	20	
575		—	—	—	3.3	3.8	15	4.7	5.2	15	6.1	6.6	15	9.4	9.9	15	12.2	12.7	15	
<b>VFD Controlled</b>																				
208/230	3	3.7	4.6	15	7.2	8.1	15	10.7	11.6	15	14.2	15.1	20	N/A	N/A	N/A	N/A	N/A	N/A	
460		1.8	2.3	15	3.5	4.0	15	5.2	5.7	15	6.9	7.4	15	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Lee-Temp Controlled/Fan-Cycling</b>																				
208/230	3	3.5	4.4	15	7.0	7.9	15	10.5	11.4	15	14.0	14.9	20	21.0	21.9	25	28.0	28.9	35	
460		1.7	2.1	15	3.4	3.8	15	5.1	5.5	15	6.8	7.2	15	10.2	10.6	15	13.6	14.0	20	
575		1.4	1.8	15	2.8	3.2	15	4.2	4.6	15	5.6	6.0	15	8.4	8.8	15	11.2	11.6	15	

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

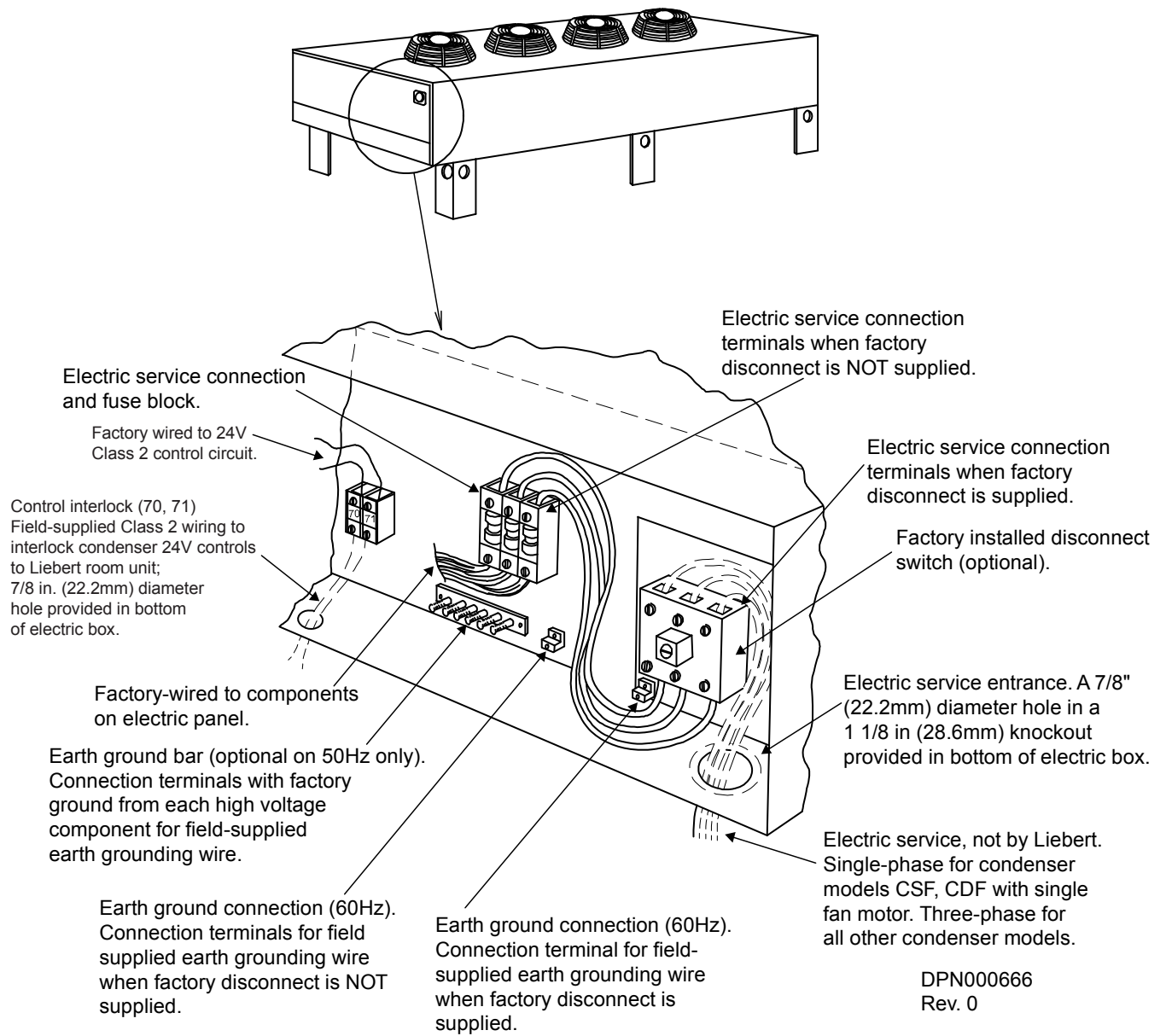
Table 52 Fin/tube condenser data, Liebert Quiet-Line™ (Liebert Lee-Temp™ controlled/fan-cycling), 60Hz

Model #	ph	63			119, 127, 143			214			286			409			572		
Input Voltage	ph	1 Fan			2 Fans			3 Fans			4 Fans			6 Fans			8 Fans		
		FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD
208/230	3	1.8	2.3	15	3.6	4.1	15	5.4	5.9	15	7.2	7.7	15	10.8	11.3	15	14.4	14.9	20
460		0.9	1.1	15	1.8	2.0	15	2.7	2.9	15	3.6	3.8	15	5.4	5.6	15	7.2	7.4	15
575		0.7	0.9	15	1.4	1.6	15	2.1	2.3	15	2.8	3.0	15	4.2	4.4	15	5.6	5.8	15

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

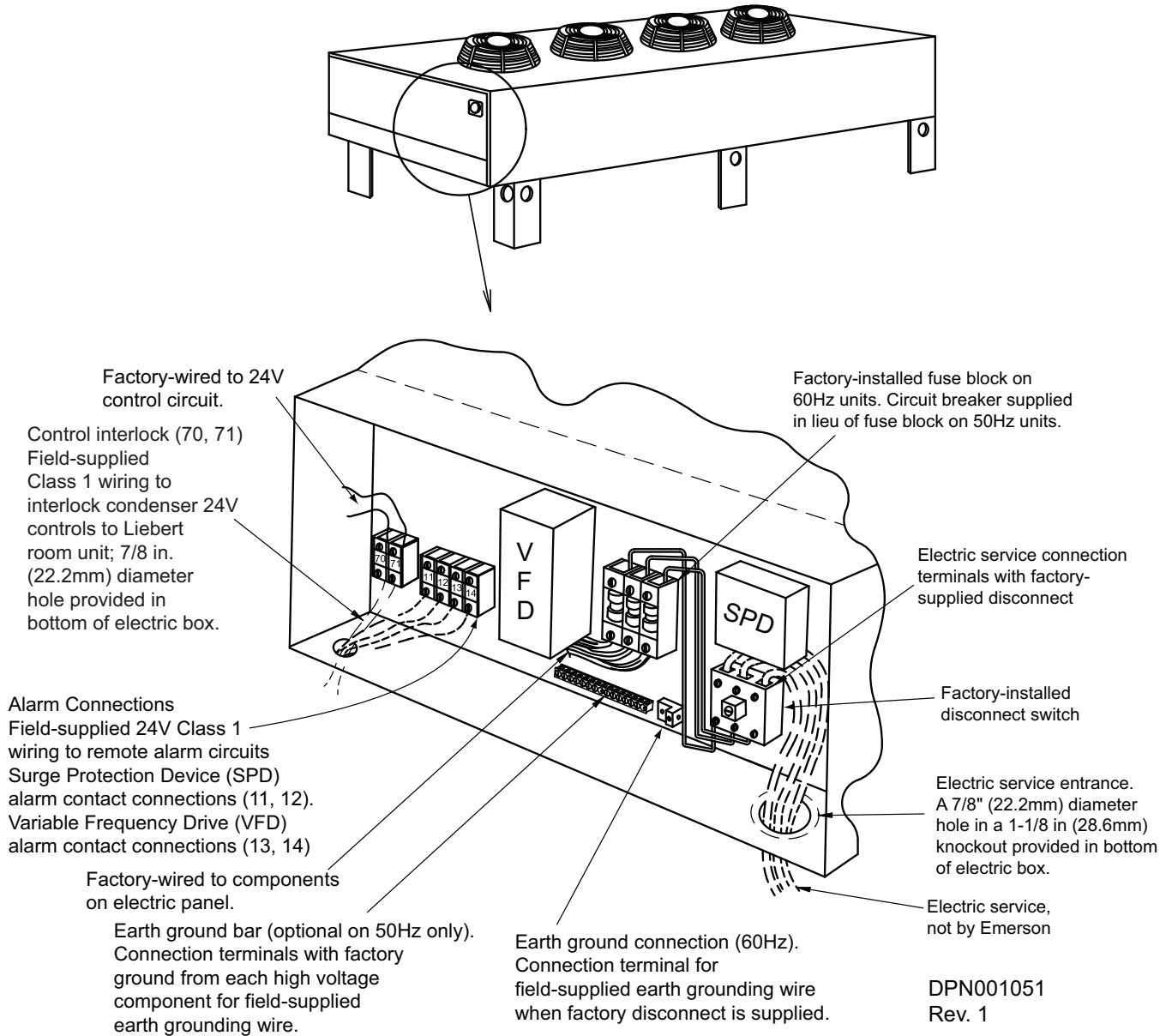
**Electrical Field Connections—Liebert Fin/Tube Condensers**

**Figure 60 Electrical field connections for Fan Speed Control fin/tube condensers**



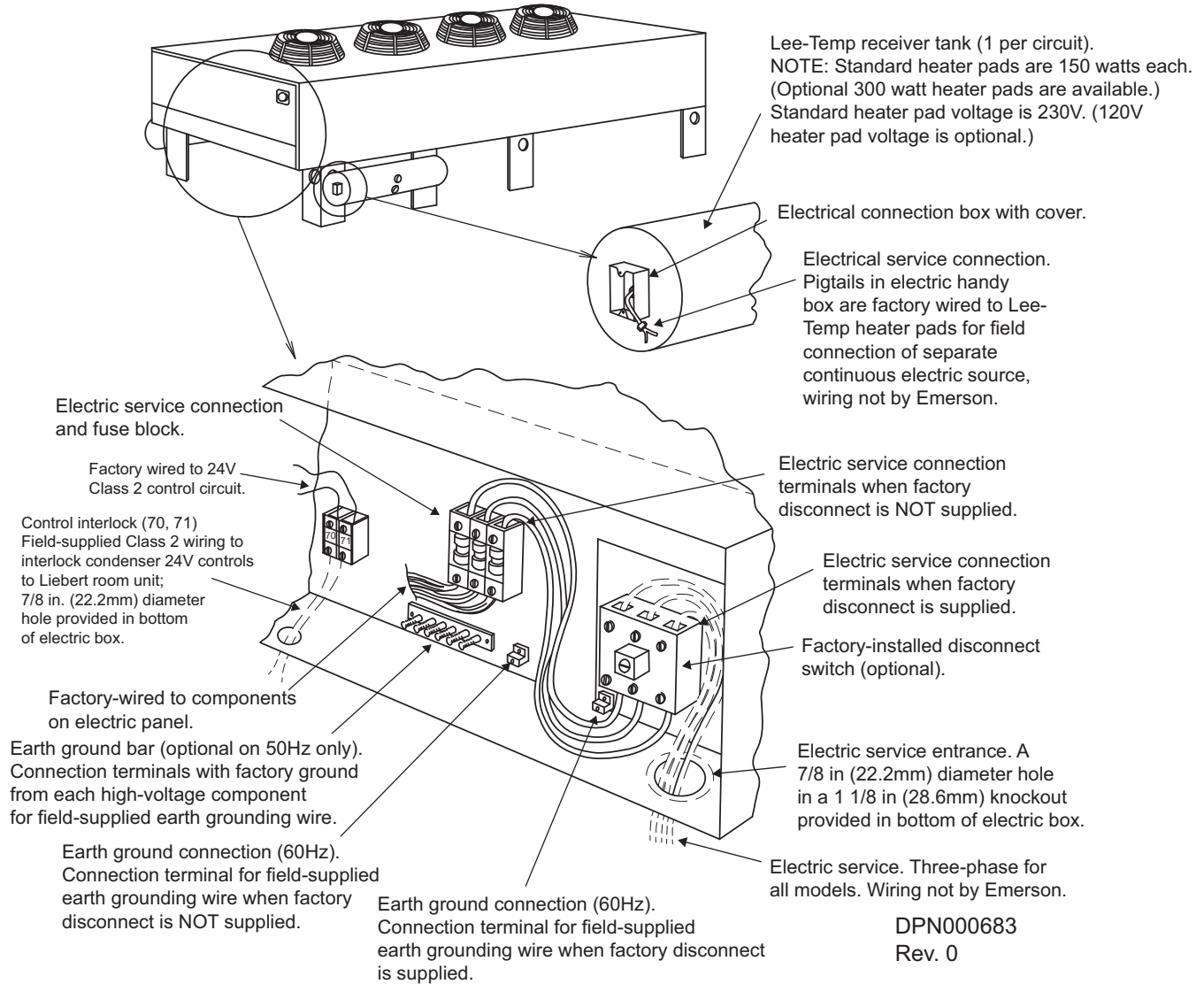
**NOTE: Refer to specification sheet for full load amp and wire size amp ratings.**

Figure 61 Electrical field connections for VFD control fin/tube condensers



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

**Figure 62 Electrical field connections for Liebert Lee-Temp control fin/tube condensers**



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

**Table 53 Liebert Lee-Temp receiver electrical data, fin/tube condensers**

Rated Voltage - Single Phase	120			200/208/230		
Watts/Receiver	150	300	450	150	300	450
Full Load Amps	1.4	2.8	4.2	0.7	1.4	2.1
Wire Size Amps	1.8	3.5	5.3	0.9	1.8	2.7
Maximum Overcurrent Protection Device, Amps	15	15	15	15	15	15

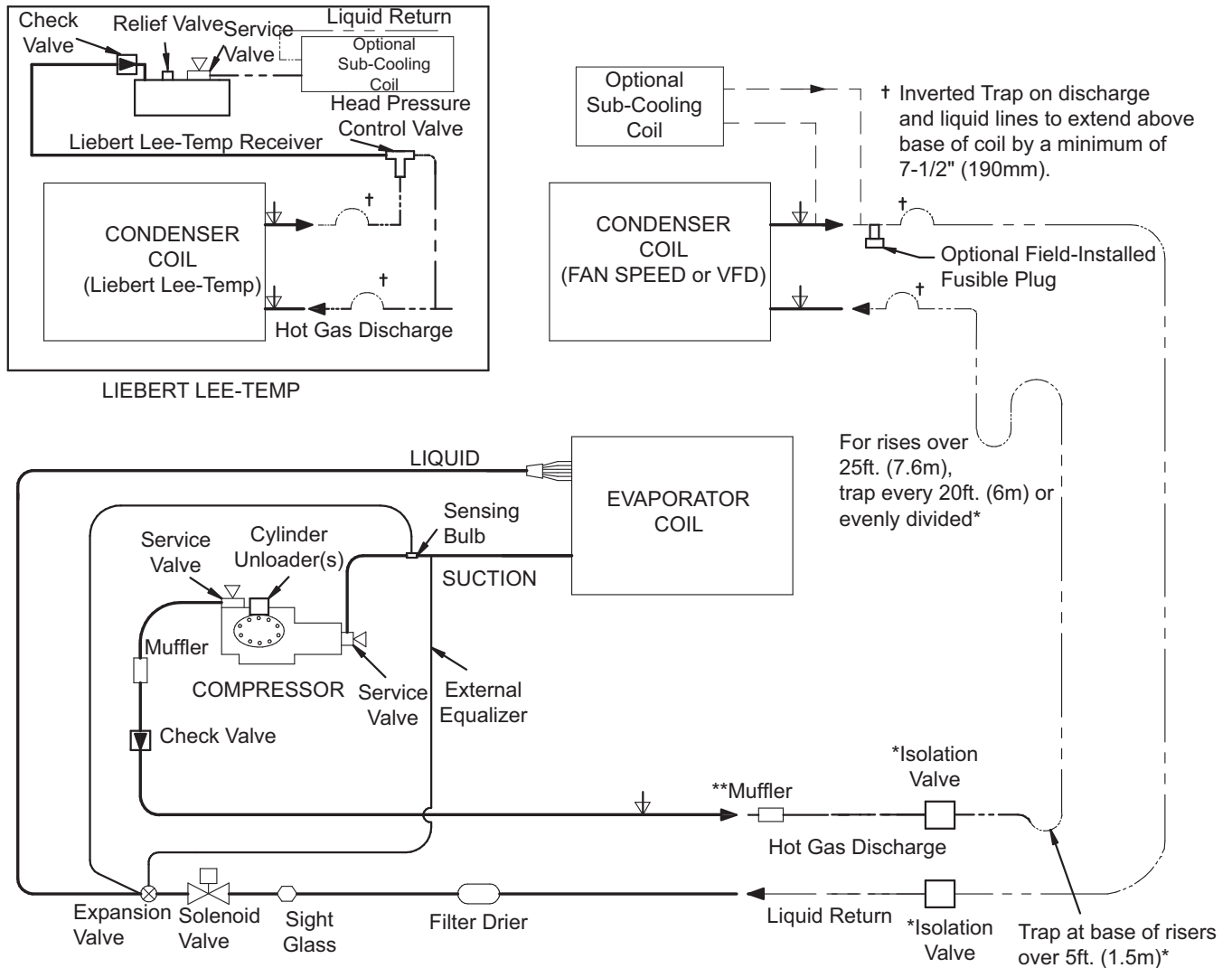
The Liebert Lee-Temp receiver requires a separate power feed for heaters. The condenser is not designed to supply power to the receiver.

## Piping—Fin/Tube Condensers

### Typical System Configurations—Fin/Tube

Figure 64 shows a single refrigeration circuit diagram, displaying the indoor air conditioning unit, the outdoor condenser (VFD, Fan Speed Control or Liebert Lee-Temp) and field-supplied interconnection piping.

Figure 63 Piping schematic, air-cooled with semi-hermetic compressor with fin/tube condenser



NOTES: Two refrigeration circuits provided. Single refrigeration circuit shown for clarity. Schematic representation shown. Do not use for specific connection locations.

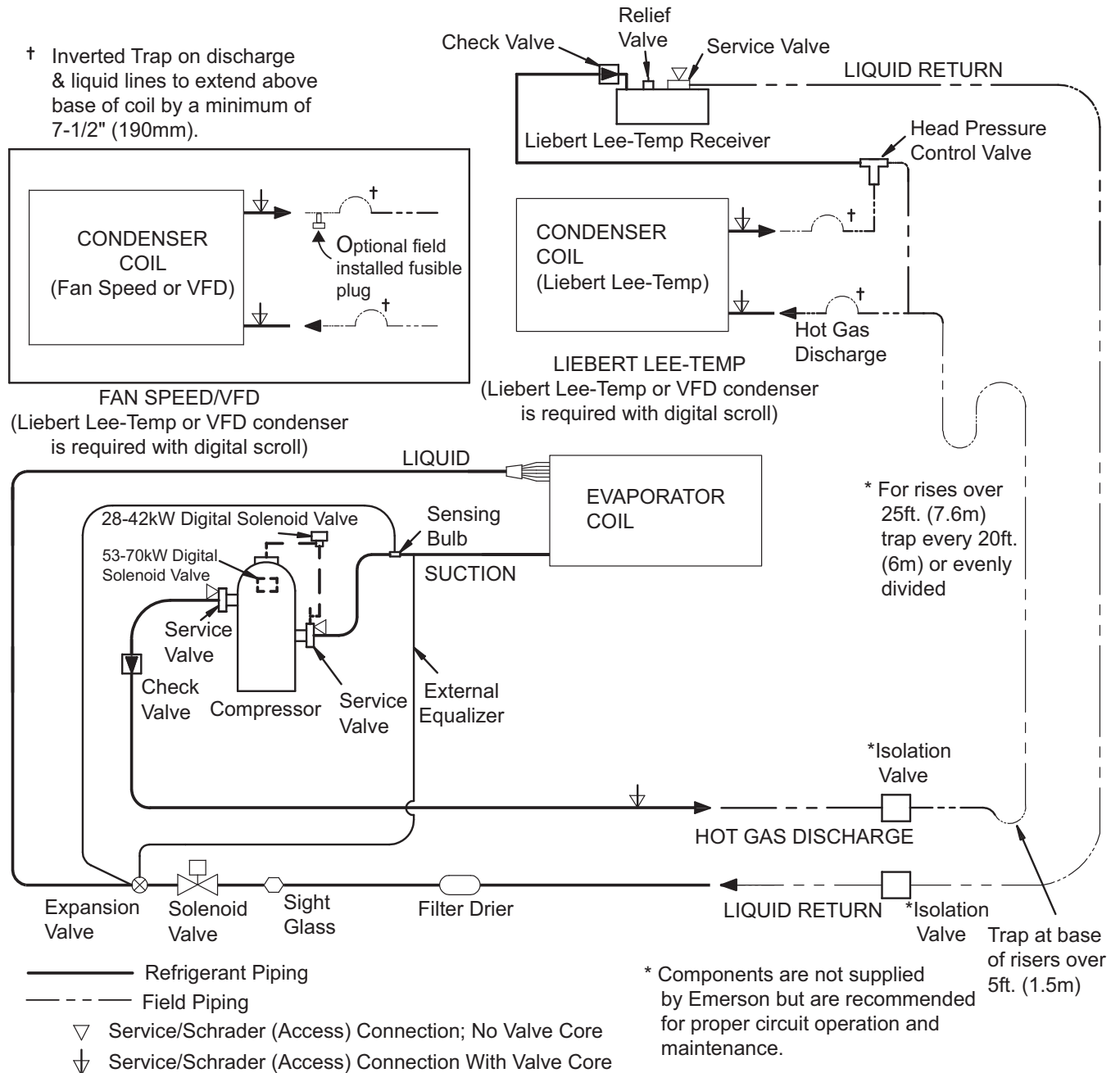
\* Components are not supplied by Emerson but are recommended for proper circuit operation and maintenance.

\*\* Components supplied by Emerson and must be field-installed (70kW, 77 kW & 105kW models only)

DPN000797  
Rev. 6

- REFRIGERANT PIPING
- - - FIELD PIPING
- ▽ Service / Schrader (Access) Connection No Valve Core
- ∇ Service / Schrader (Access) Connection With Valve Core

**Figure 64 Piping schematic, air-cooled with scroll or digital scroll compressor with fin/tube condenser**



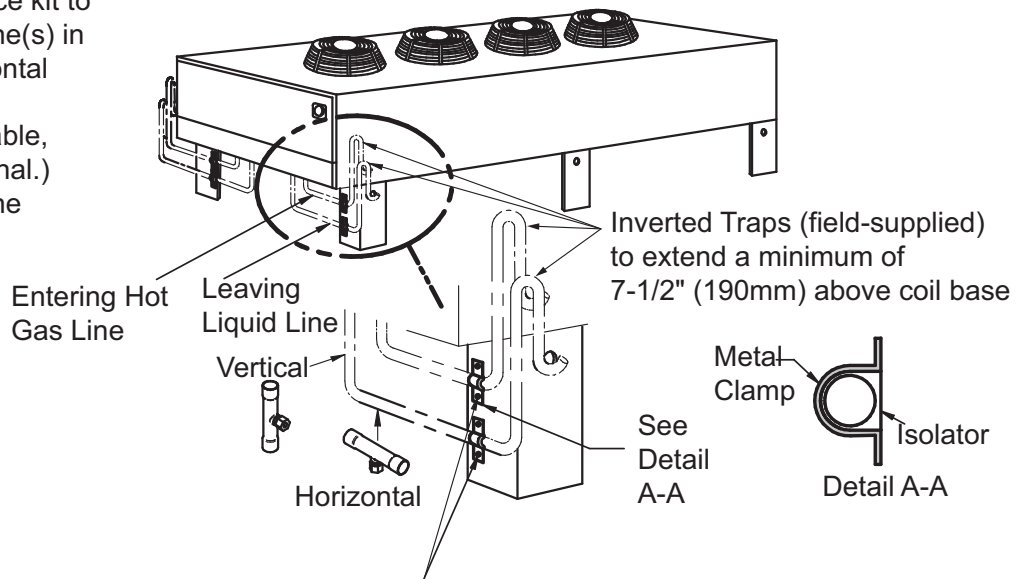
NOTES: Schematic representation shown. Do not use for specific connection locations.  
Two refrigeration circuits provided. Single refrigeration circuit shown for clarity.

DPN000798  
Rev. 5



**Figure 65 VFD and Fan Speed Control condenser piping—Fin/tube condensers**

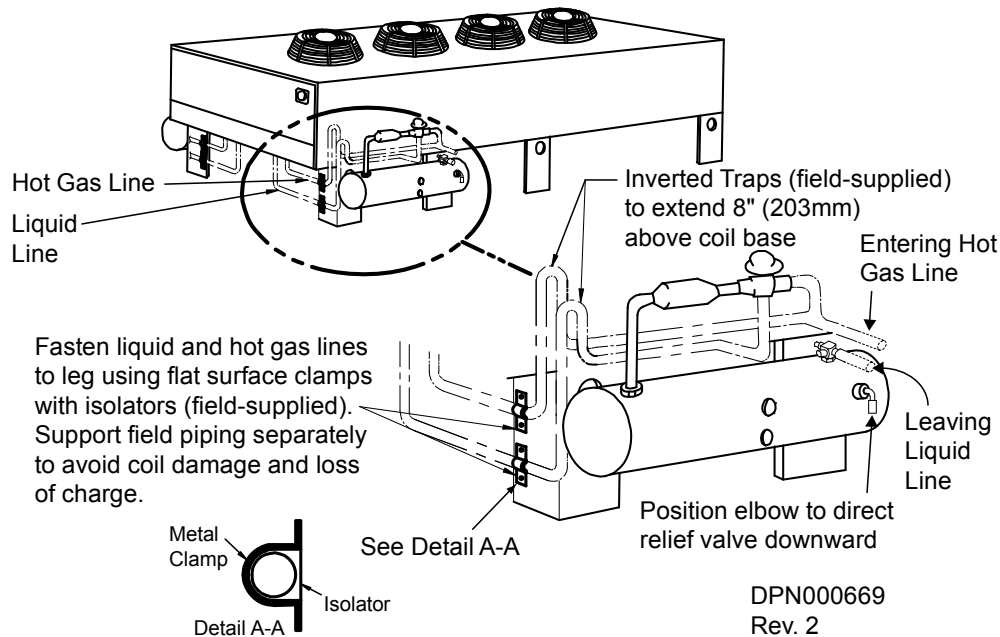
Optional fusible plug service kit to be brazed into the liquid line(s) in either the vertical or horizontal position (where required). (Vertical position is preferable, horizontal position is optional.) For two-circuit systems, one fusible plug kit must be installed in each circuit.



Fasten liquid and hot gas lines to leg using flat surface clamps with isolators (field-supplied). Support field piping separately to avoid coil damage and loss of charge.

DPN001065  
Rev. 1

**Figure 66 Liebert Lee-Temp head pressure control condenser piping—Fin/tube condensers**



Fasten liquid and hot gas lines to leg using flat surface clamps with isolators (field-supplied). Support field piping separately to avoid coil damage and loss of charge.

DPN000669  
Rev. 2

### 3.12.2 Piggyback Condensers

#### Piggyback Selections

Table 54 Liebert DS piggyback condenser selection

Air-Cooled Condenser Selection		Liebert DS Size						
Condenser Type	Ambient Temp. °F (°C)	028	035	042	053	070	077	105
Piggyback	95 (35)	PB-925	PB-925	PB-1100	PB-1350	N/A	N/A	N/A
	100 (38)	PB-1100	PB-1100	PB-1350	N/A	N/A	N/A	N/A
	105 (41)	PB-1100	PB-1350	N/A	N/A	N/A	N/A	N/A

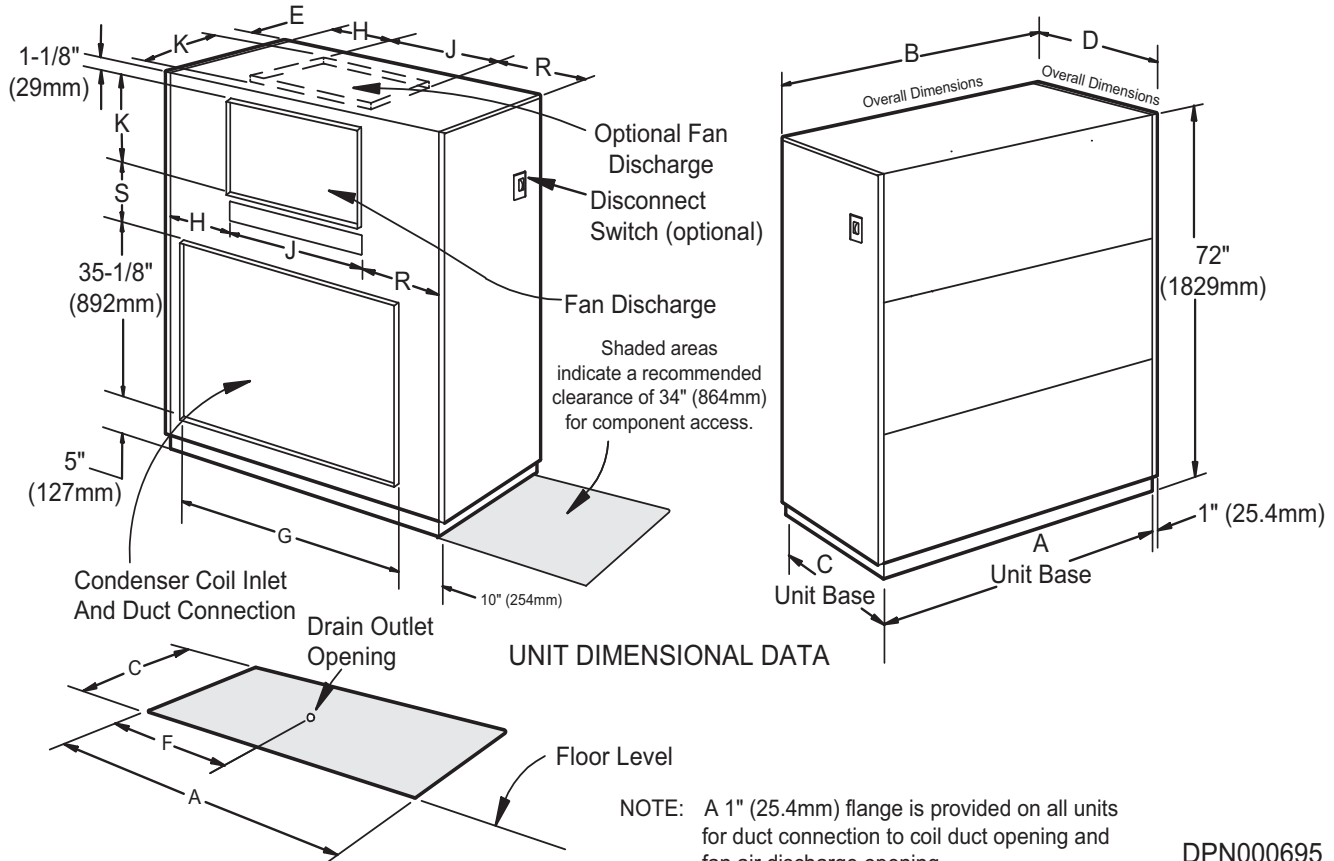
Table 55 Piggyback condenser airflow and static pressure data

Model	No. of Fans	CFM / m <sup>3</sup> / hr	HP/RPM			
			Ext. Static Pressure - in. (Pa)			
			0.25 (62.3)	0.50 (125)	0.75 (187)	1.0 (249)
PB-350A	2	7600/12,920	2/580	3/650	3/720	3/790
PB-550A	2	6600/11,200	2/575	3/650	3/725	3/800
PB-675A	2	6900/11,730	2/605	3/680	3/750	3/820
PB-925A	2	12,500/21,250	7.5/760	7.5/810	7.5/870	7.5/920
PB-1100A	2	12,300/20,910	7.5/780	7.5/830	7.5/890	7.5/940
PB-1350A	2	16,500/28,050	10/640	10/695	10/740	15/790

Values are without filter box. External Static Pressure = filter pressure drop + other static drops.  
Source: DPN000695, Rev. 0

**Dimensions—Indoor Piggyback Condensers**

**Figure 67 Piggyback condenser planning dimensions**



**FLOOR CUTOUT DIMENSIONS**

**Table 56 Piggyback condenser dimensions, in. (mm)**

Model	A	B	C	D	E	F	G	H	J	K	R	S
PB-350A	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1524)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PB-550A	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1564)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PB-675A	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1564)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PB-925A	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	45-1/2 (1156)	85 (2159)	23-5/16 (592)	50-3/16 (1275)	16-1/16 (408)	23-1/2 (597)	14-11/16 (373)
PB-1100A	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	45-1/2 (1156)	85 (2159)	23-5/16 (592)	50-3/16 (1275)	16-1/16 (408)	23-1/2 (597)	14-11/16 (373)
PB-1350A	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	45-1/2 (1156)	85 (2159)	16-5/16 (421)	63-7/8 (1622)	19-1/8 (486)	16-13/16 (427)	11-5/8 (295)

Source: DPN000695, Rev. 0

**Table 57 Piggyback condenser physical data, 60Hz**

Model	Number of Circuits	Connection Size, OD, In.		Condenser Charge Per Circuit R-407C, lb (kg)
		Hot Gas	Liquid	
PB-350	2	5/8	1/2	18 8.2)
PB-550	2	5/8	1/2	17 (7.8)
PB-675	2	7/8	1/2	25 (11.2)
PB-925	2	7/8	1/2	22 (9.9)
PB-1100	2	1-1/8	5/8	34 (15.5)
PB-1350	2	1-1/8	5/8	34 (15.5)

Electrical Data—Piggyback Condensers

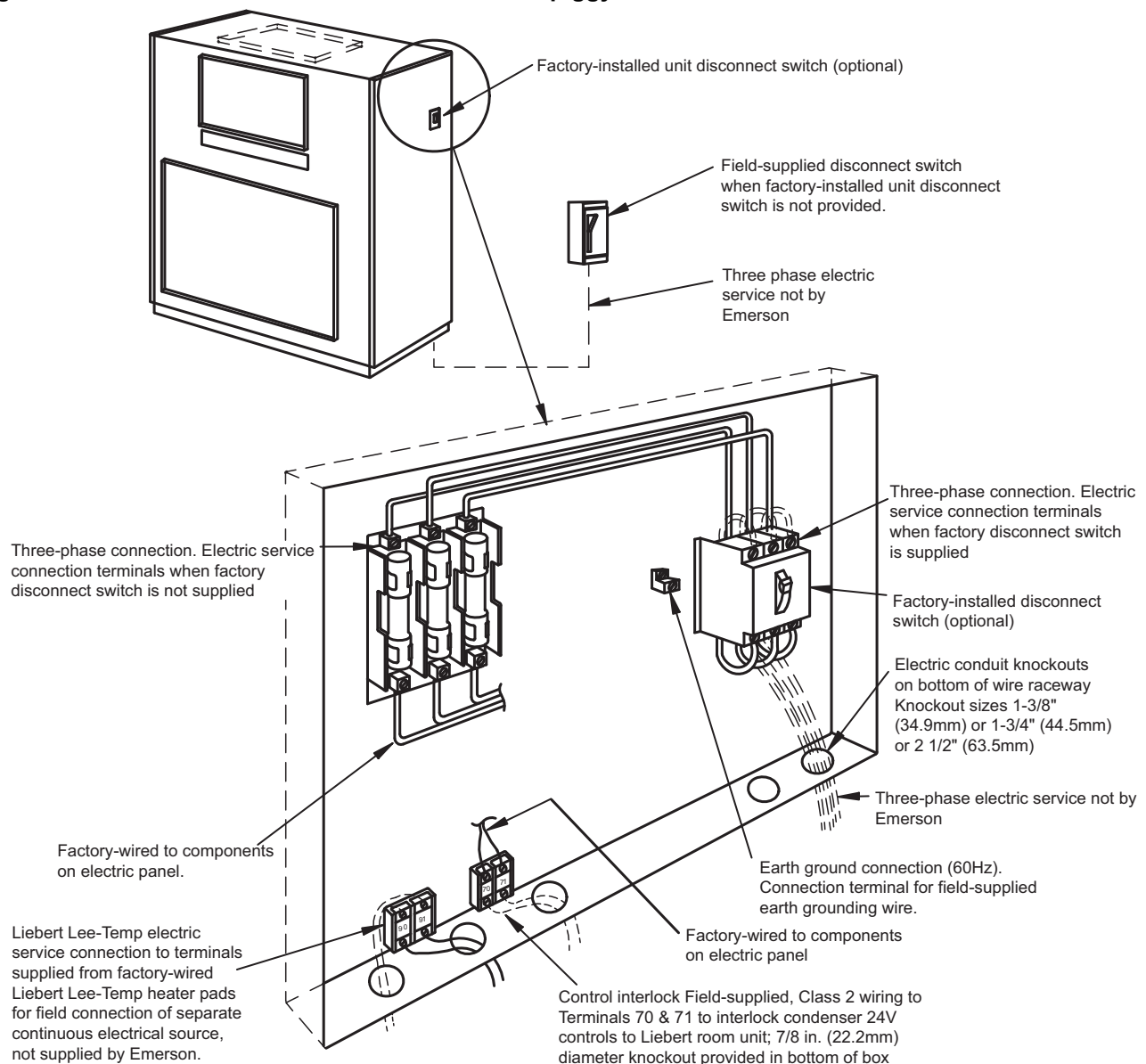
Table 58 Piggyback condenser electrical data, 60 Hz, 3 phase <sup>1</sup>

hp	208		230		460		575	
	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA
2.0	7.5	51.0	6.8	44.0	3.4	22.0	2.7	17.6
3.0	10.6	73.6	9.6	64.0	4.8	32.0	3.9	25.6
5.0	16.7	106.0	15.2	88.0	7.6	44.0	6.1	35.2
7.5	25.3	129.4	22.0	111.4	11.0	55.7	9.0	44.8
10.0	30.8	186.0	28.0	162.0	14.0	84.0	11.0	66.0
15.0	46.2	267.0	42.0	225.0	21.0	116.0	17.0	93.0

1. See Table 59 for separate power feed needed for Lee-Temp receiver heaters.
2. FLA: Full Load Amps; LRA: Lock Rotor Amps
3. Source: DPN000695, Rev. 0

Electrical Field Connections—Liebert Piggyback Condensers

Figure 68 Electrical field connections for Liebert piggyback condensers



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

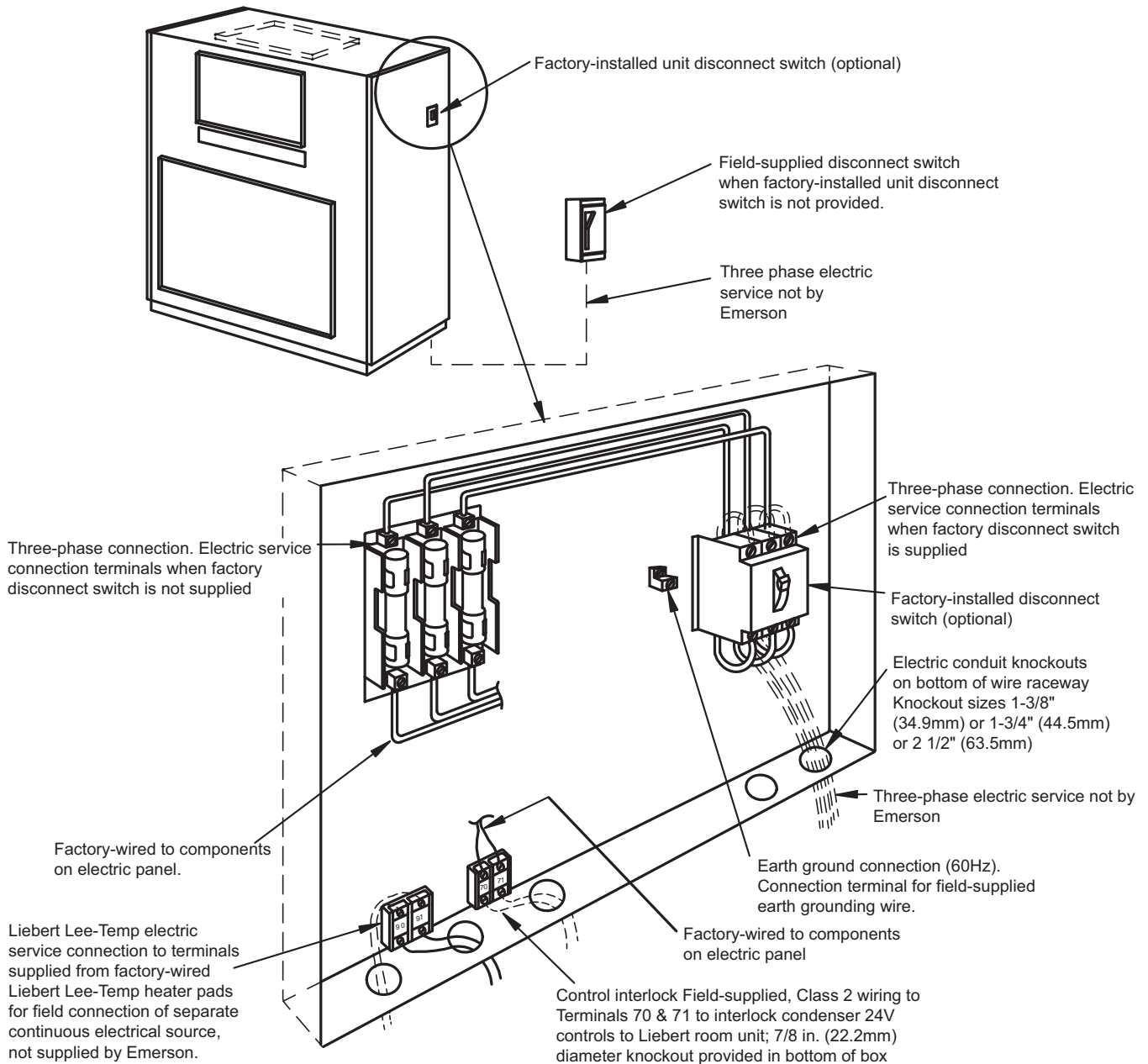
DPN000697  
Rev. 0

**Table 59** Separate electrical supply requirements for Liebert Lee-Temp™ receivers, 60Hz, 1 Ph

Voltage	120	120	208/230	208/230
Watts/Receiver	150	300	150	300
FLA	2.5	5.0	1.4	2.8
WSA	3.1	6.2	1.8	3.6
OPD	15	15	15	15

Only one independent input power supply is needed per piggyback unit; connect to Terminals 90 & 91.

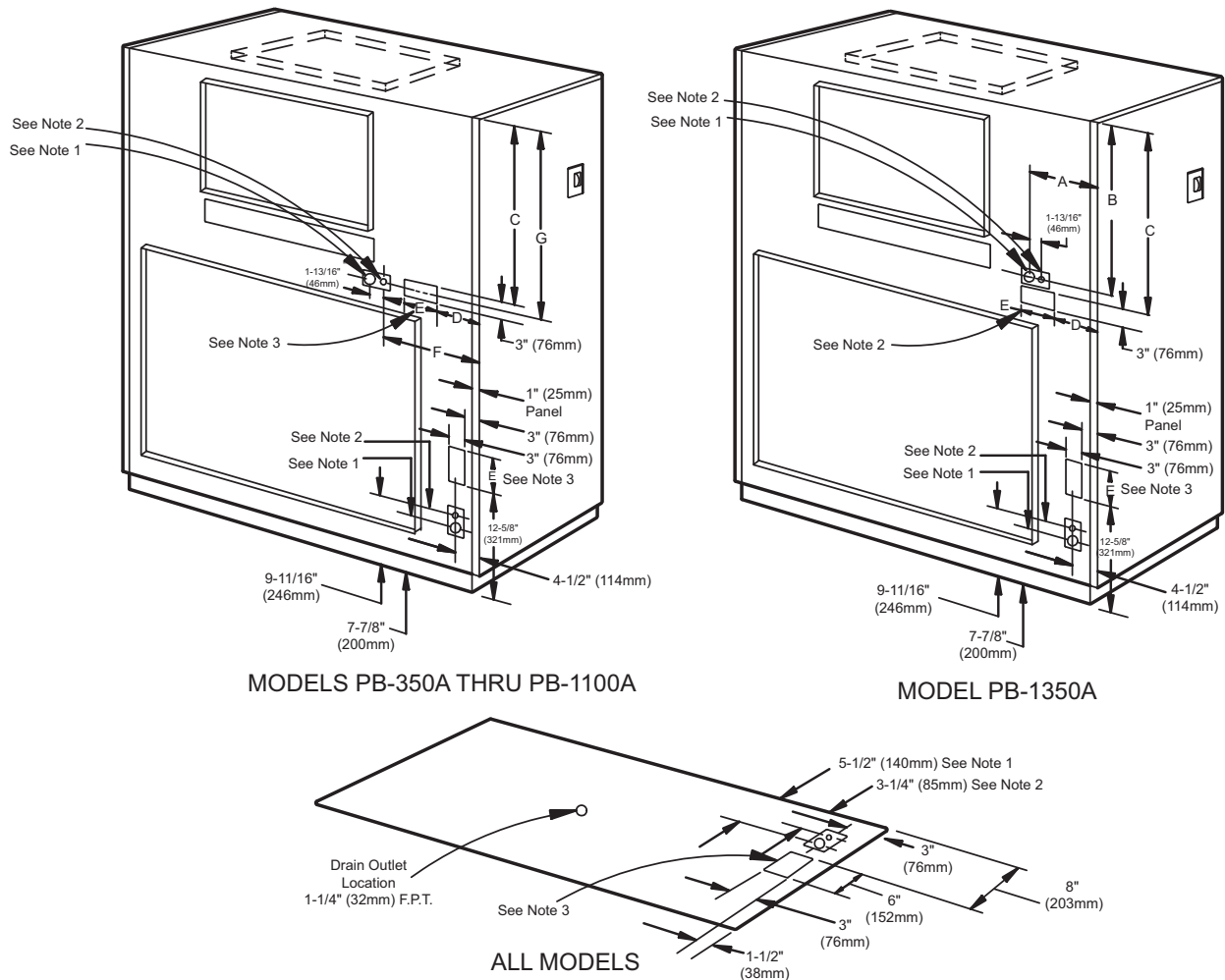
**Figure 69** Electrical field connections for Liebert piggyback condensers



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

DPN000697  
Rev. 0

Figure 70 Piggyback condenser piping and electrical connection locations



1. Multiple knockouts of 1-3/8" (35mm), 1-3/4" (45mm) and 2-1/2" (64mm) for main power supply (typical).
2. 7/8" (22.2mm) knockouts for Liebert Lee-Temp power supply (typical).
3. Cover plate for access of liquid line and hot gas line.

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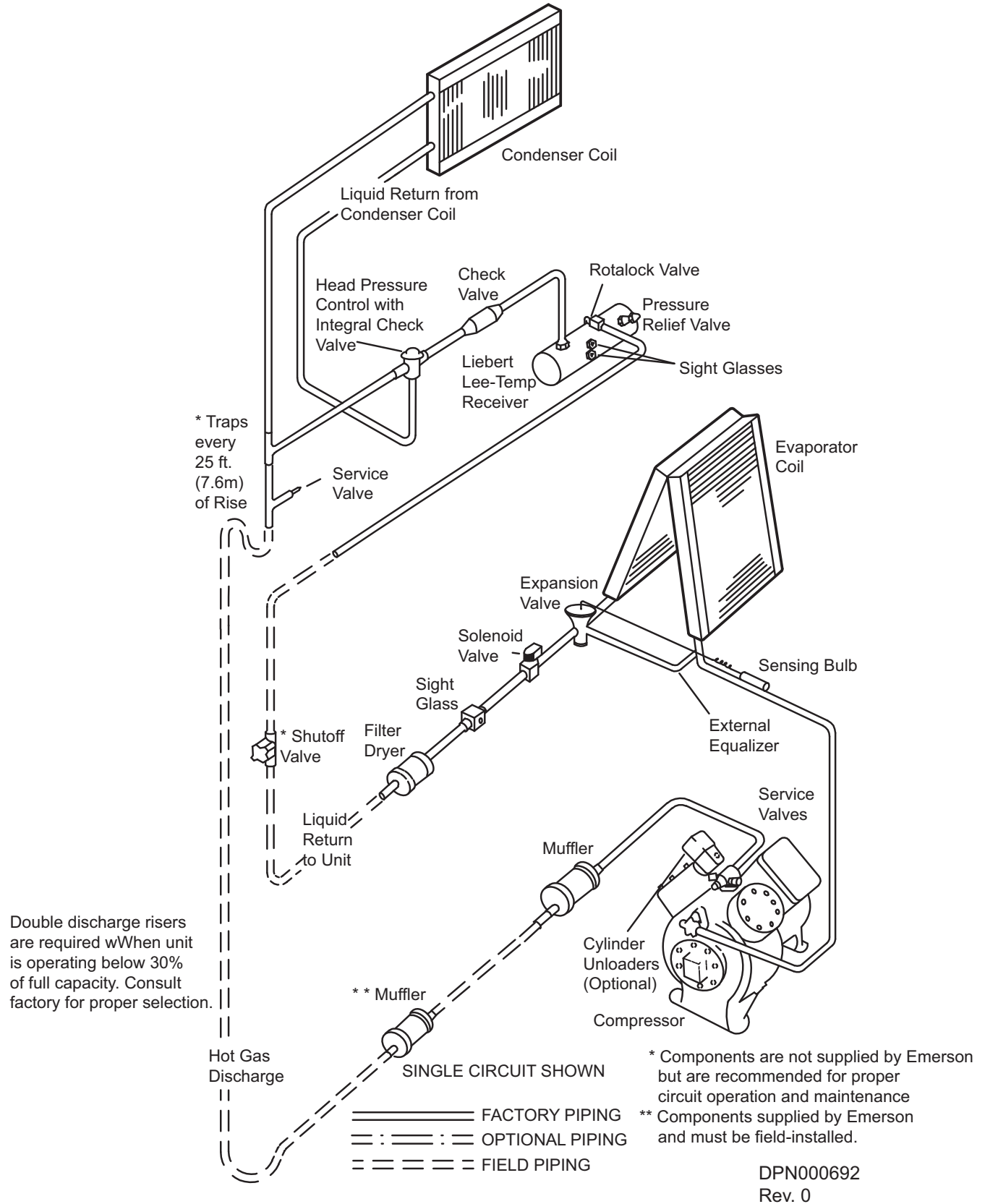
Table 60 Dimensions—Piggyback condensers, in. (mm)

Model	A	B	C	D	E	F	G
PB-350A	—	—	27-1/4 (692)	2-1/2 (64)	6 (152)	10-1/8 (267)	28-3/4 (730)
PB-550A	—	—	27-1/4 (692)	2-1/2 (64)	6 (152)	10-1/8 (267)	28-3/4 (730)
PB-675A	—	—	27-1/4 (692)	2-1/2 (64)	6 (152)	10-1/8 (267)	28-3/4 (730)
PB-925A	—	—	27-1/4 (692)	2-1/2 (64)	6 (152)	10-1/8 (267)	28-3/4 (730)
PB-1100A	—	—	27-1/4 (692)	2-1/2 (64)	6 (152)	10-1/8 (267)	28-3/4 (730)
PB-1350A	11-1/4 (286)	24 (610)	26-1/2 (673)	7 (178)	6 (152)	—	—

Table 61 Piping connection sizes, ODS, in. (mm)

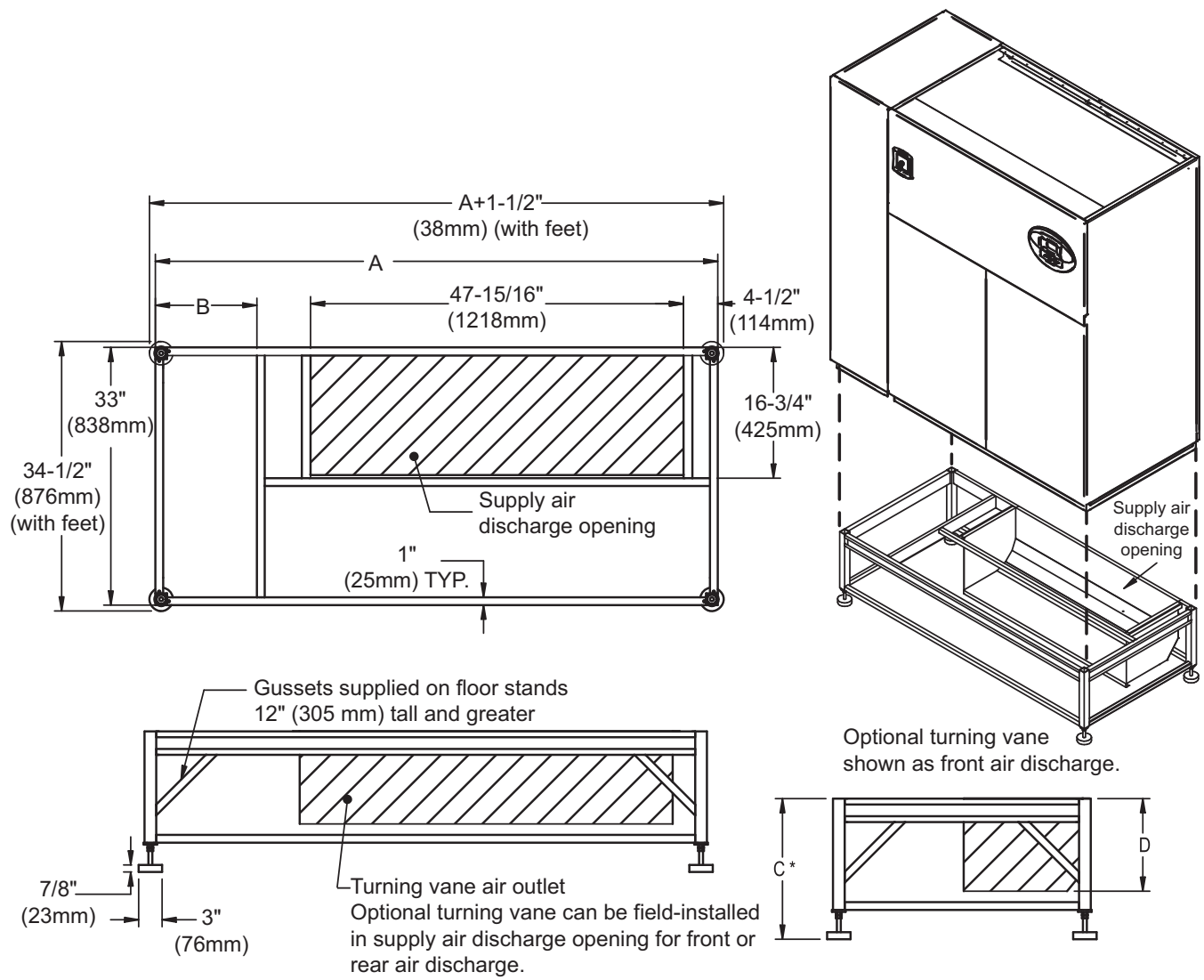
Model	Liquid Line	Hot Gas Line	Drain
PB-350A	2 @ 1/2 (13)	2 @ 5/8 (16)	1-1/4 (32)
PB-550A	2 @ 1/2 (13)	2 @ 5/8 (16)	1-1/4 (32)
PB-675A	2 @ 1/2 (13)	2 @ 7/8 (22)	1-1/4 (32)
PB-925A	2 @ 1/2 (13)	2 @ 7/8 (22)	1-1/4 (32)
PB-1100A	2 @ 5/8 (16)	2 @ 1-1/8 (29)	1-1/4 (32)
PB-1350A	2 @ 5/8 (16)	2 @ 1-1/8 (29)	1-1/4 (32)

Figure 71 Piping schematic—Liebert DS with piggyback condenser and Liebert Lee-Temp™



### 3.13 ANCILLARY ITEMS—AIR-COOLED SYSTEMS

Figure 72 Floor stand dimensions—28-42kW (8-12 ton), downflow



NOTE: Right side of paneled unit is flush with right side of floorstand. All other paneled sides overhang floor stand 1" (25mm).

\* Leveling feet are provided with  $\pm 1\frac{1}{2}''$  (38mm) adjustment from nominal height C.

DPN000820  
Rev. 3

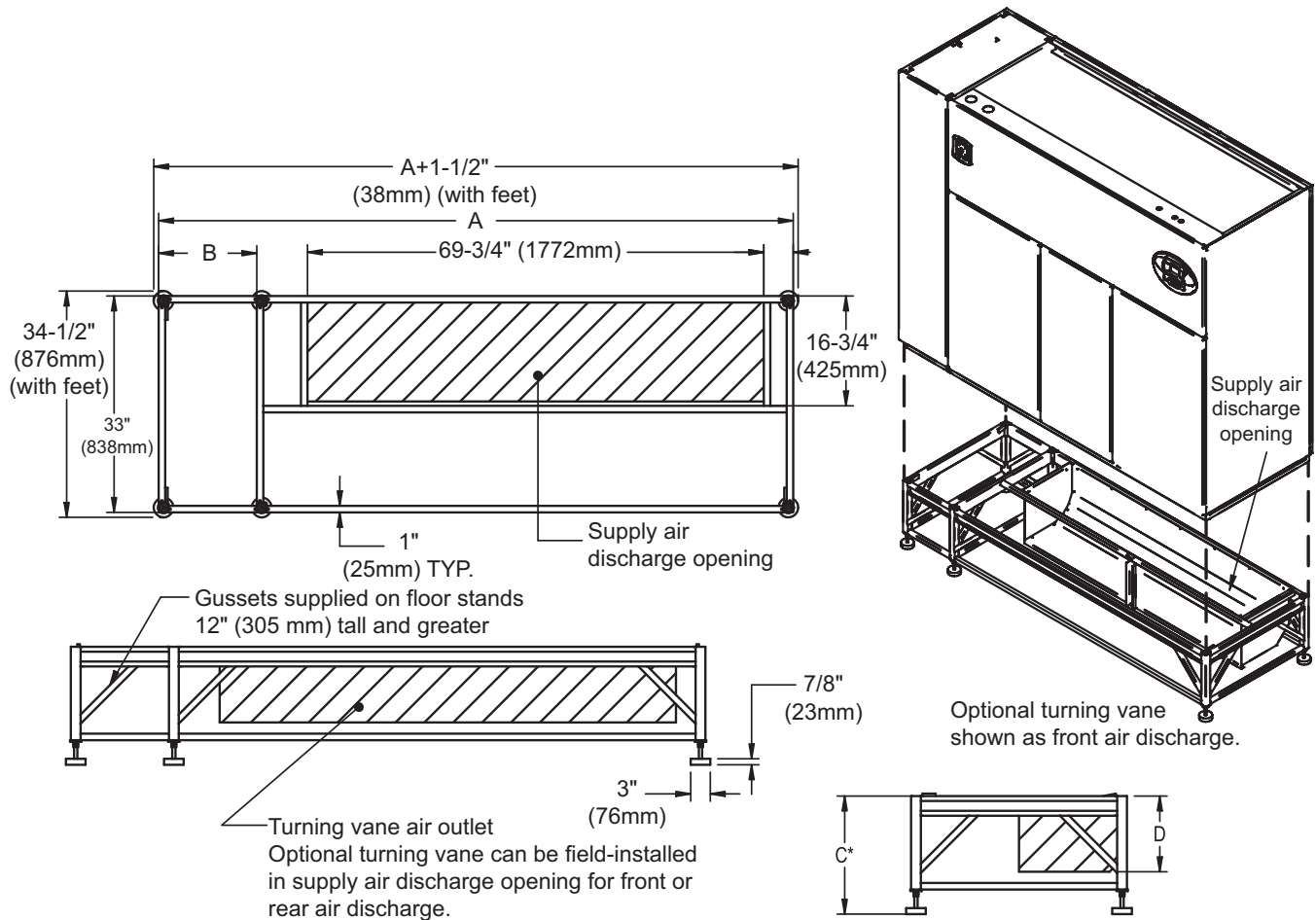
Table 62 Floor stand and floor planning dimensions—28-42kW (8-12 ton), downflow

Dimensional Data, in. (mm)			Height, in. (mm)	
Model	A	B	C*	D turning vane
Air-Cooled Semi-Hermetic Models and All Water/Glycol/GLYCOOL Models	85 (2159)	26 (660)	9 (229)	4 (111)
			12 (305)	7 (187)
			15 (381)	10 (264)
Air-Cooled Scroll Models and Air-Cooled Digital Scroll Models	72 (1829)	13 (330)	18 (457)	13 (340)
			21 (533)	16 (416)
			24 (610)	19 (492)

Source: DPN000820, Rev. 3



Figure 73 Floor stand dimensions—53-77kW (15-22 ton), downflow



NOTE: Right side of paneled unit is flush with right side of floor stand. All other paneled sides overhang floor stand 1" (25mm). \* Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height C.

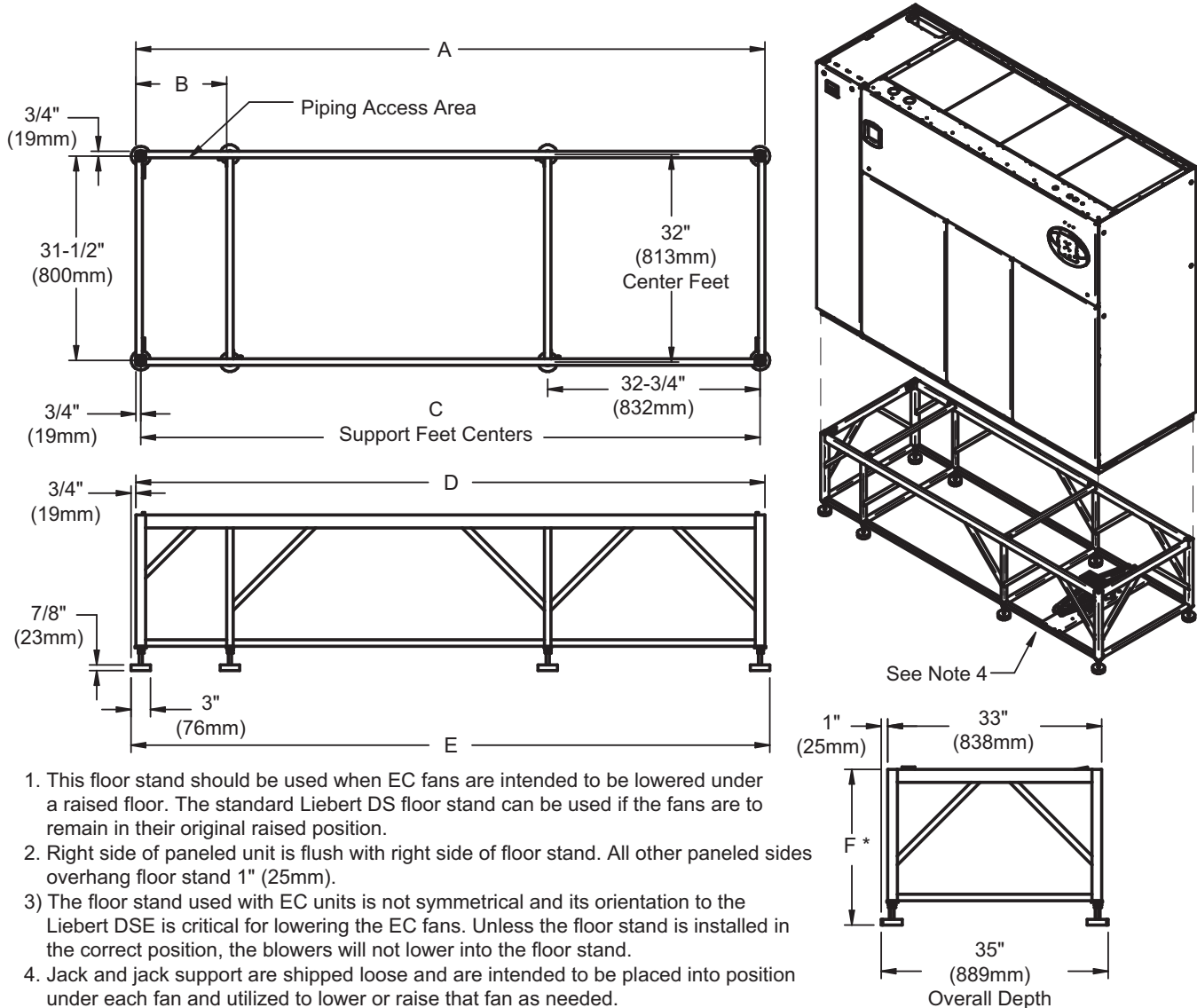
DPN000930  
Rev. 2

Table 63 Floor stand and floor planning dimensions—53-77kW (15-22 ton), downflow

Dimensional Data, in. (mm)			Height, in. (mm)	
Model	A	B	C*	D - Turning Vane
Air-Cooled Semi-Hermetic Models and All Water/Glycol/GLYCOOL Models	108 (2743)	26 (660)	9 (229)	4 (111)
Air-Cooled Scroll Models and Air-Cooled Digital Scroll Models	97 (2464)	15 (381)	12 (305)	7 (187)
			15 (381)	10 (264)
			18 (457)	13 (340)
			21 (533)	16 (416)
			24 (610)	19 (492)

Source: DPN000930, Rev. 2

**Figure 74 Floor stand and floor planning dimension, downflow 53-77kW (15-22 tons) models with EC fans**



1. This floor stand should be used when EC fans are intended to be lowered under a raised floor. The standard Liebert DS floor stand can be used if the fans are to remain in their original raised position.
2. Right side of paneled unit is flush with right side of floor stand. All other paneled sides overhang floor stand 1" (25mm).
- 3) The floor stand used with EC units is not symmetrical and its orientation to the Liebert DSE 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.

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

DPN002151  
Rev. 1

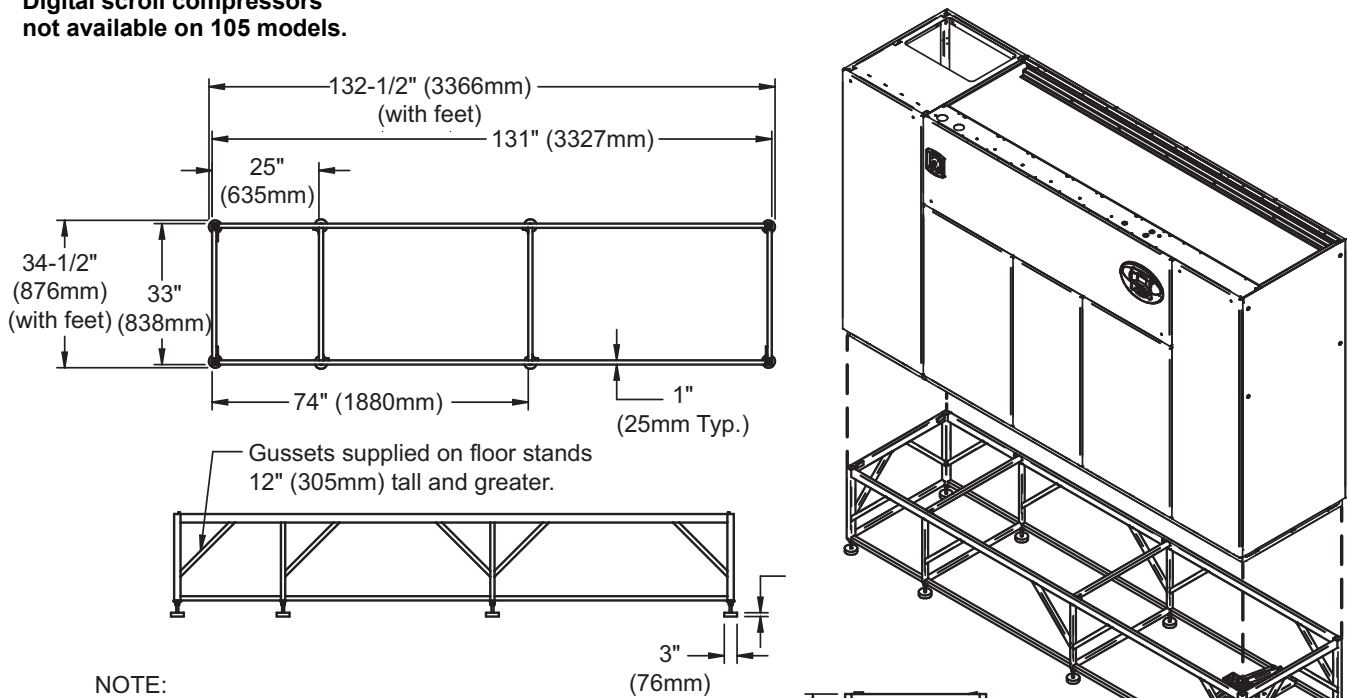
**Table 64 Floor stand and floor planning dimensions—53-77kW (15-22 ton), downflow with EC fans**

Liebert DS Model	Dimensional Data in (mm)					
	A	B	C	D	E	F
DS053-077, Air-Cooled Semi-Hermetic and all Water/Glycol/ GLYCOOL Models	108 (2743)	26 (660)	106.5 (2705)	108 (2743)	109.5 (2781)	24 (610)
DS053-077, Air-Cooled Scroll and Air-Cooled Digital Scroll Models	97 (2464)	15 (381)	5.5 (2426)	97 (2464)	98.5 (2502)	30 (762)
						36 (914)
						42 (1067)
						48 (1219)

Source: DPN002151, Rev. 1

**Figure 75 Floor stand and floor planning dimensions—downflow 105kW (30 ton) models with EC fans, standard scroll and semi-hermetic compressors without turning vane**

Digital scroll compressors not available on 105 models.



**NOTE:**

- 1) This floor stand should be used when EC fans are intended to be lowered under a raised floor. The standard Liebert DS floor stand can be used if the fans are to remain in their original raised position.
- 2) Right side of paneled unit is flush with right side of floor stand. All other paneled sides overhang floor stand 1" (25mm).
- 3) The floor stand used with EC units is not symmetrical and its orientation to the Liebert DS 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.

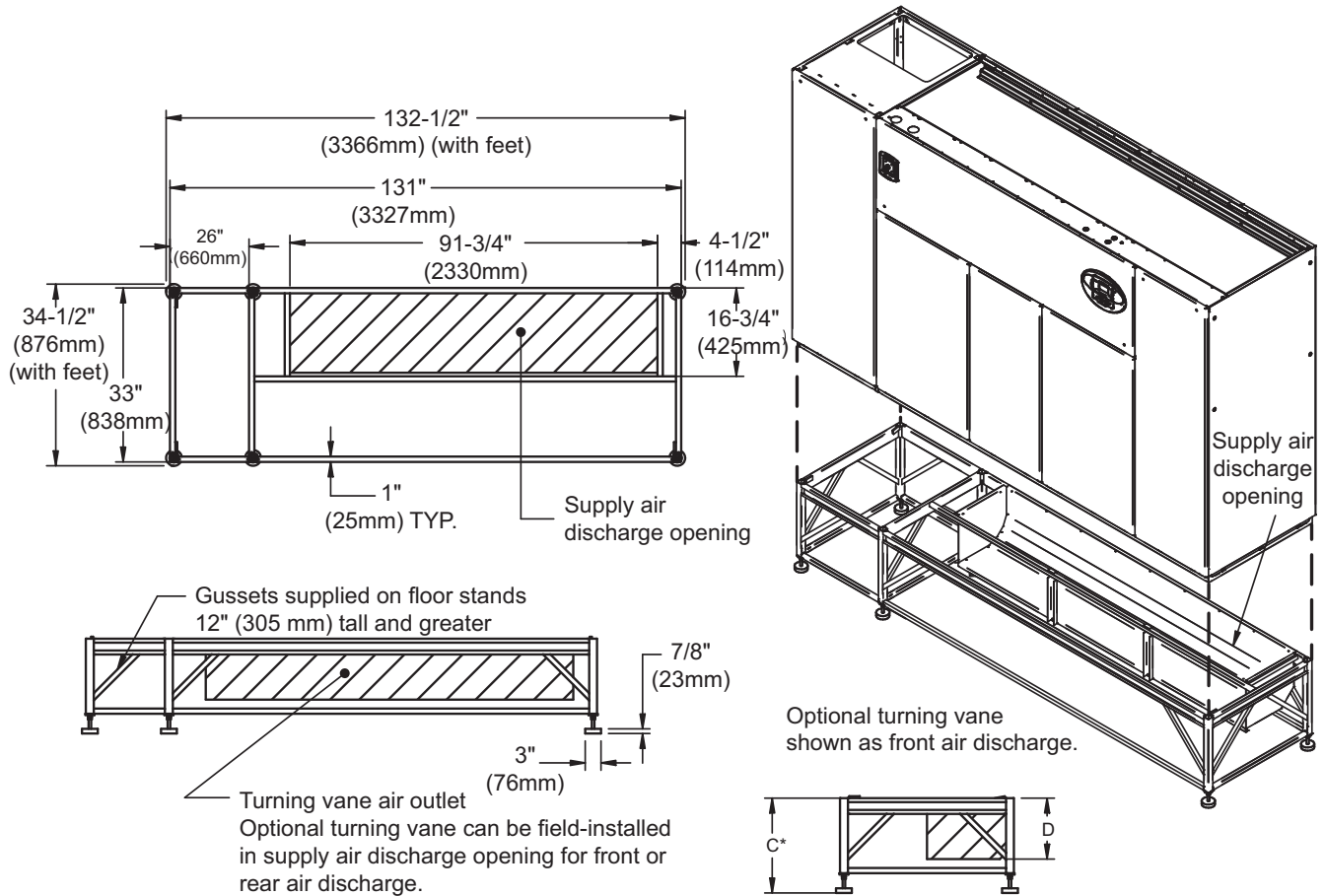
\*Leveling feet are provided with  $\pm 1\text{-}1/2"$  (38mm) adjustment from nominal height "A".

See Note 4

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

DPN002152  
Rev. 1

**Figure 76 Floor stand dimensions—105kW (30 ton), downflow with turning vane and centrifugal fans**



NOTE: Right side of paneled unit is flush with right side of floorstand. All other paneled sides overhang floor stand 1" (25mm).

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

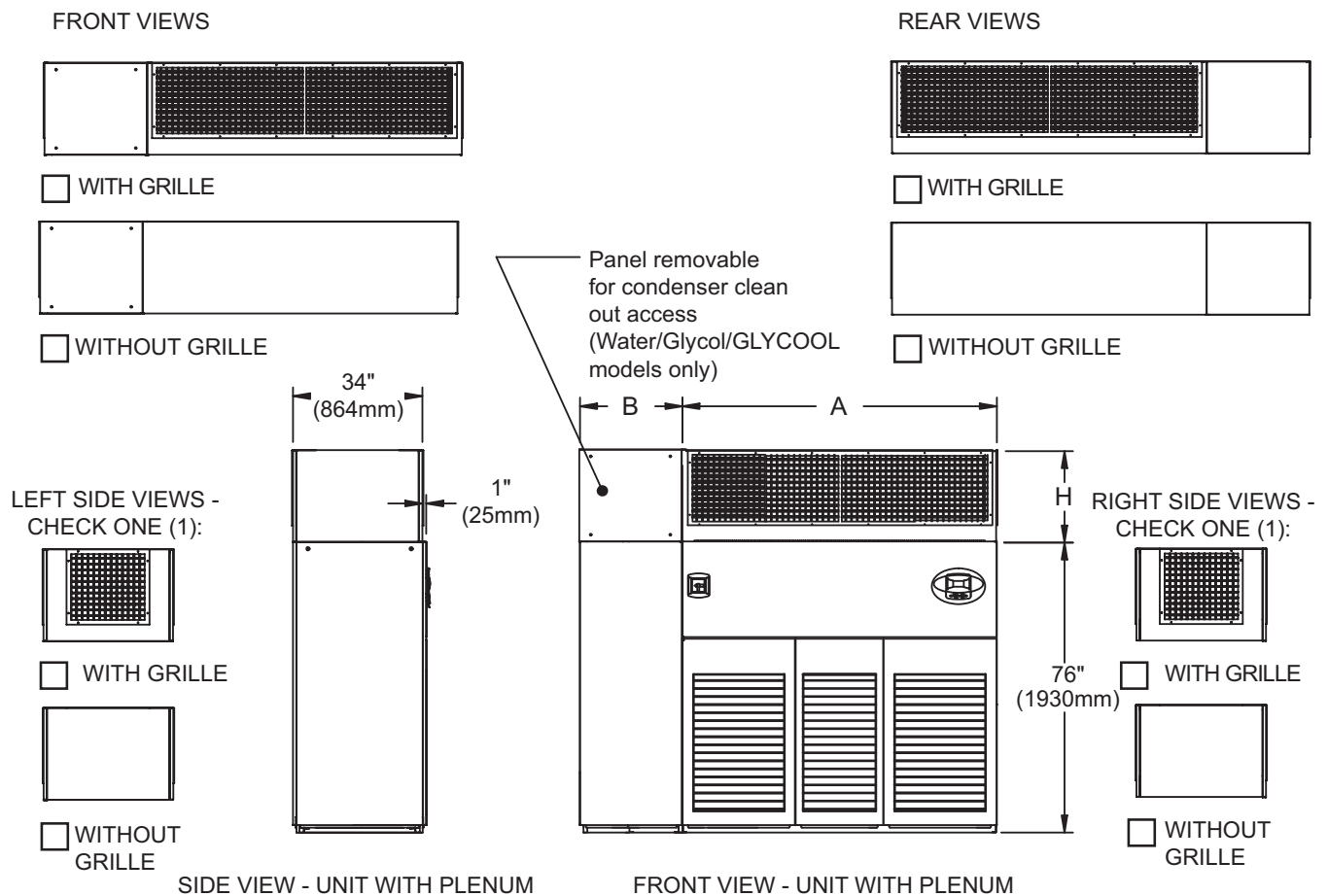
DPN001059  
Rev. 2

**Table 65 Floor stand and floor planning dimensions—105kW (30 ton), downflow**

Height, in. (mm)	
C*	D Turning Vane
9 (229)	4 (111)
12 (305)	7 (187)
15 (381)	10 (264)
18 (457)	13 (340)
21 (533)	16 (416)
24 (610)	19 (492)

Source: DPN001059, Rev. 2

**Figure 77 Plenum dimensions—28-105kW (8-30 ton), upflow**



Notes:

1. Typical 53-77kW (15-22 Tons) unit orientation shown with grille Plenum. View varies by unit size and Plenum selection.
2. All Plenums are shipped flat and must be field assembled.
3. Optional grille Plenum kits must include front or rear grille.
4. Non-grille Plenums are open on the top and not designed with duct flange.

DPN001187  
Rev. 1

**Table 66 Plenum dimensions, in. (mm)—28-105kW (8-30 ton), upflow**

Model	Dimensions, in. (mm)		Grille Size, in (mm) - Nominal		Height, in. (mm)
	A	B	Front/Rear Grilles	Side Grille	
28-42kW (8-12 ton) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	59-1/4 (1505)	13-3/4 (349)	18 x 55 (457 x 1397)	18 x 20 (457 x 508)	20 (508)
28-42kW (8-12 ton) Semi-Hermetic and all Water/Glycol/GLYCOOL Models	59-1/4 (1505)	26-3/4 (679)	18 x 55 (457 x 1397)	18 x 20 (457 x 508)	24 (610)
53-77kW (15-22 ton) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	82-1/4 (2089)	15-3/4 (400)	18 x 78 (457 x 1981)	18 x 20 (457 x 508)	30 (762)
53-77kW (15-22 ton) Semi-Hermetic and all Water/Glycol/GLYCOOL Models	82-1/4 (2089)	26-3/4 (679)	18 x 78 (457 x 1981)	18 x 20 (457 x 508)	36 (914)
105kW (30 ton)—All Models	105-1/4 (2673)	26-3/4 (679)	(1) 18 x 20 (457 x 508) (1) 18 x 78 (457 x 1981)	18 x 20 (457 x 508)	

Source: DPN001187, Rev. 1

Figure 78 Floor stand dimensions, piggyback condensers with centrifugal fans

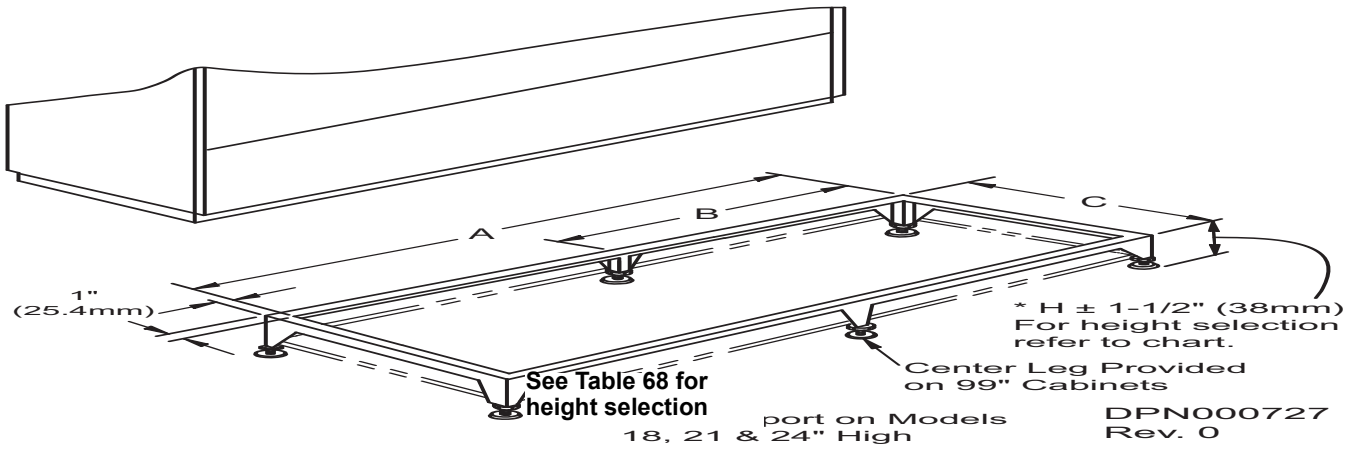


Table 67 Floor stand dimensions, in. (mm)

Model	A	B	C
PB-350A, PB-550A PB-675A	72 (1829)	36 (914)	31 (787)
PB-925A, PB-1100A PB-1350A	97 (2464)	48-1/2 (1232)	33 (838)

Source: DPN000727, Rev. 0

Table 68 Floor stand height selection, in. (mm)

Nominal	Range (Nominal $\pm 1-1/2$ *)
9 (229)	7-1/2 to 10-1/2 (191 to 267)
12 (305)	10-1/2 to 13-1/2 (267 to 343)
15 (381)	13-1/2 to 16-1/2 (343 to 419)
18 (458)	16-1/2 to 19-1/2 (419 to 495)
21 (553)	19-1/2 to 22-1/2 (495 to 572)
24 (610)	22-1/2 to 25-1/2 (572 to 648)

Leveling feet are provided with  $\pm 1-1/2$ " (38mm) Adjustment from nominal height "H".

Source: DPN000727, Rev. 0

## 4.0 WATER-COOLED, GLYCOL-COOLED AND GLYCOOL SYSTEMS

### 4.1 CAPACITY AND PHYSICAL DATA

**Table 69 Performance data—Water-cooled, EC fans**

Model Size	28	35	42	053	070	077	105
<b>CAPACITY DATA WITH EC FANS</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Semi Hermetic Compressors with EC Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	42.1 (143.8)	38.7 (132)	50.1 (171)	65.1 (220)	78.6 (268.3)	87.1 (297.1)	112.1 (382.3)
Sensible kW (kBTUH)	39.6 (135)	31.7 (108.2)	48.9 (166.9)	63.4 (212.9)	75.7 (258.2)	83.6 (285.4)	103.9 (354.6)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	40.5 (138.1)	39.7 (135.4)	47.9 (163.4)	62.2 (212.1)	75.3 (256.9)	83.4 (284.7)	107.8 (367.7)
Sensible kW (kBTUH)	35.9 (122.4)	34.4 (117.3)	44.4 (151.4)	58 (197.7)	68.9 (235)	76 (259.5)	94.3 (321.9)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	38.9 (132.7)	41.4 (141.4)	45.9 (156.7)	59.4 (202.6)	72 (245.8)	80 (273)	103.4 (352.9)
Sensible kW (kBTUH)	32 (109.3)	38.7 (131.9)	39.5 (134.7)	51.7 (176.4)	61.2 (209)	67.6 (230.8)	83.7 (285.7)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	38 (129.6)	43.5 (43.5)	44.8 (152.9)	57.8 (197.2)	70.2 (239.6)	78 (266.2)	101 (344.6)
Sensible kW (kBTUH)	29.7 (101.4)	42.6 (42.6)	36.4 (124.3)	47.7 (162.8)	56.5 (192.9)	62.4 (212.8)	77.5 (264.3)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with EC Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	35.2 (120)	42 (143.3)	47.5 (162.1)	66.3 (224.1)	80.8 (275.6)	88.5 (301.9)	111.3 (379.9)
Sensible kW (kBTUH)	35.1 (119.9)	41.6 (142.1)	47.2 (161)	64.3 (215.6)	77 (262.6)	84.5 (288.3)	103.6 (353.4)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	34 (116.1)	40.1 (136.7)	45.4 (154.8)	63.3 (216.1)	77.5 (264.6)	85 (290.2)	107.2 (365.9)
Sensible kW (kBTUH)	32.5 (111)	37.9 (129.4)	43.1 (147)	58.6 (200.1)	70 (238.9)	76.9 (262.3)	94.1 (321.1)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	32.8 (111.8)	38.4 (131)	43.5 (148.4)	60.5 (206.5)	74.3 (253.5)	81.8 (279.1)	103.2 (352.2)
Sensible kW (kBTUH)	29.1 (99.2)	33.8 (115.2)	38.4 (130.9)	52.2 (178.3)	62.3 (212.7)	68.5 (233.6)	83.8 (285.9)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	32 (109.2)	37.5 (127.9)	42.5 (145)	58.9 (201.1)	72.5 (247.5)	79.9 (272.6)	100.9 (344.2)
Sensible kW (kBTUH)	26.8 (91.6)	31.2 (106.3)	35.4 (120.7)	48.3 (164.7)	57.7 (196.7)	63.2 (215.6)	77.5 (264.4)
<b>FAN SECTION - Downflow Models - EC Fans Under Floor</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6200 (10534)	8,000 (13,592)	9,600 (16,310)	11,000 (18,689)	13700 (23276)
Standard Fan Motor, Nominal kW (total for all fans)	2.8	2.8	2.8	2.5	4.0	5.9	7.8
Number of Fans	1	1	1	2	2	2	3

1. Canister humidifier not available with EC fans.
2. Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
3. Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
4. Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

**Table 70 Performance data—Water-cooled units with centrifugal fans**

Model Size	28	35	42	053	070	077	105
<b>CAPACITY DATA WITH CENTRIFUGAL FANS</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Semi-Hermetic Compressors with Centrifugal Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	41.5 (141.6)	42.4 (144.7)	48.4 (165.2)	62.1 (211.9)	76.9 (262.5)	85.0 (289.9)	110.3 (376.4)
Sensible kW (kBTUH)	38.9 (132.8)	41.6 (141.9)	47.4 (161.7)	57 (194.6)	72.8 (248.4)	80.4 (274.4)	102.2 (348.7)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	39.8 (135.9)	40.4 (137.9)	46.1 (157.4)	59.7 (205.2)	73.7 (251.6)	81.5 (278.1)	106 (361.8)
Sensible kW (kBTUH)	35.2 (120.2)	37.6 (128.3)	42.8 (146.1)	51.9 (180.6)	66.1 (225.5)	72.9 (248.8)	92.6 (315.9)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	38.3 (130.5)	38.6 (131.9)	44.2 (150.7)	57.2 (196.9)	70.6 (240.8)	78.2 (266.7)	101.7 (346.9)
Sensible kW (kBTUH)	31.4 (107.1)	33.3 (113.8)	37.9 (129.3)	46.4 (162.1)	58.7 (200.3)	64.7 (220.8)	82 (279.8)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	37.3 (127.4)	37.7 (128.5)	43.1 (146.9)	55.8 (191.9)	68.8 (234.7)	76.2 (260.1)	99.2 (338.6)
Sensible kW (kBTUH)	29.1 (99.2)	30.7 (104.7)	34.8 (118.8)	43 (150.6)	54.2 (184.9)	59.6 (203.5)	75.7 (258.4)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with Centrifugal Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	34.5 (117.8)	40.9 (139.7)	45.8 (156.3)	64.9 (219.6)	79.0 (269.6)	86.5 (295.1)	109.6 (374)
Sensible kW (kBTUH)	34.5 (117.7)	40.6 (138.5)	45.6 (155.5)	62.0 (207.9)	74.0 (252.5)	81.3 (277.3)	101.8 (347.5)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	33.4 (113.9)	39.0 (133.2)	43.6 (148.8)	62.2 (212.1)	75.9 (259.1)	83.1 (283.6)	105.5 (360)
Sensible kW (kBTUH)	31.9 (108.8)	36.9 (125.8)	41.5 (141.6)	56.4 (192.6)	67.2 (229.3)	73.7 (251.5)	92.4 (315.2)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	32.1 (109.6)	37.4 (127.5)	41.7 (142.3)	59.5 (202.9)	72.8 (248.5)	80 (272.9)	101.5 (346.3)
Sensible kW (kBTUH)	28.4 (97)	32.7 (111.7)	36.8 (125.5)	50.3 (171.5)	59.8 (203.9)	65.5 (223.7)	82.1 (280)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	31.4 (107)	36.5 (124.4)	40.7 (138.9)	57.9 (197.5)	71.1 (242.6)	78.1 (266.5)	99.1 (338.3)
Sensible kW (kBTUH)	26.2 (89.4)	30.1 (102.8)	33.8 (115.2)	46.4 (158.4)	55.3 (188.6)	60.5 (206.4)	75.8 (258.5)
<b>FAN SECTION - Downflow Models - Fixed Pitch, Two Belts</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6200 (10534)	7,500 (12,743)	9,000 (15,291)	10,400 (17,670)	13,700 (23,276)
Standard Fan Motor, hp (kW)	2 (1.5)	3 (2.2)	5.0 (3.7)	3 (2.2)	5 (3.7)	7.5 (5.6)	10.0 (7.5)
Number of Fans	1	1	1	2	2	2	3

1. Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
2. Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
3. Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only



**Table 71 Physical data—Water-cooled units**

Model Size	028	035	042	053	070	077	105
<b>EVAPORATOR COIL- A-Frame - Copper Tube/Aluminum Fin</b>							
Face Area, sq. ft. (sq. m)	17.1 (1.6)	17.1 (1.6)	17.1 (1.6)	24.7 (2.3)	24.7 (2.3)	24.7 (2.3)	32.3 (3.0)
Rows of Coil	3	3	3	3	3	3	3
<b>REHEAT SECTION</b>							
<b>Electric Reheat - Three-stage, Stainless Steel Fin Tubular, capacity does not include fan motor heat</b>							
Capacity, kW (kBTUH), Standard Selection	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
Capacity, kW (kBTUH), Optional Selection	10.0 (34.1)	10.0 (34.1)	10.0 (34.1)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	20.0 (68.3)
<b>Electric Reheat - SCR Control, Stainless Steel Fin Tubular (optional selection)</b>							
Capacity, kW (kBTUH)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
<b>HUMIDIFIER SECTION</b>							
<b>Infrared Humidifier</b>							
Capacity, lb./hr. (kg/h)	11.0 (5.0)	11.0 (5.0)	11.0 (5.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)
<b>FILTER SECTION - Disposable Type - Nominal Sizes and Quantities, Standard MERV 8 or Optional MERV 11 (filter types cannot be mixed, must be all MERV 8 or all MERV 11)</b>							
<b>Downflow Models</b>							
Quantity	3	3	3	4	4	4	4
Nominal Size, inches	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	4 @ 25x20	4 @ 25x20	4 @ 25x20	4 @ 25x20
Nominal Size, inches	25x20	25x20	25x20	25x20	25x20	25x20	25x20
<b>Upflow Models (Front &amp; Rear return) Filters located in separate filter box on rear return, located on lower unit panel</b>							
Quantity	4	4	4	6	6	6	8
<b>WATER COOLED SYSTEM - SEMI-HERMETIC Compressors, based on 75°F/45% room conditions with EC Fans Condenser Flow Requirements - Maximum design water pressure 150psi (1034kPa), 350psi (2413kPa) available as option</b>							
THR, kBTUH (kW)	49.2 (167.7)	50.5 (172.3)	59.9 (204.3)	74.7 (255)	92.7 (316.5)	105.6 (360.4)	139.3 (475.5)
83°F (23.8°C) EWT, GPM (l/m)	28 (105.90)	29 (109.7)	34 (128.7)	43 (162.7)	53 (200.6)	60 (227.1)	79 (299.0)
Pressure Drop, ft. of water (kPa), with valve	8.9 (26.70)	9.5 (28.4)	12.8 (38.3)	11.2 (33.5)	16.6 (49.6)	20.9 (62.5)	31.3 (93.6)
<b>WATER COOLED SYSTEM - DIGITAL SCROLL Compressors, based on 75°F/45% room conditions</b>						<b>STANDARD SCROLL Compressors Only</b>	
<b>Condenser Flow Requirements - Maximum design water pressure 150psi (1034kPa), 350psi (2413kPa) available as option; with EC Fans</b>							
THR, BTUH (kW)	41.6 (141.8)	49.8 (169.8)	57 (194.5)	75.8 (258.5)	95.3 (325.3)	107.2 (365.6)	134.7 (459.6)
83°F (23.8°C) EWT, GPM (l/m)	24 (90.85)	28.5 (107.9)	32.5 (123)	44 (166)	55.5 (210.1)	62.5 (236.6)	78 (295.3)
Pressure Drop, ft. of water (kPa), valve	6.6 (19.73)	9.2 (27.50)	11.8 (35.27)	11.7 (34.97)	18.1 (54.10)	22.6 (67.55)	30.6 (91.40)
<b>PIPING CONNECTION SIZES -Water-Cooled Liebert DS Indoor Unit</b>							
Water Supply, O.D. Copper	1-5/8" (41)	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Water Return, O.D. Copper	1-5/8	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Infrared Humidifier, O.D. Copper	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Condensate Drain, FPT	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Condensate Drain w/Optional Condensate Pump, OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Hot Water Reheat, O.D. Copper	5/8	5/8	5/8	5/8	5/8	5/8	5/8
<b>DUAL-COOL UNITS CAPACITY DATA, Water (0% Glycol), Net Capacity Data kW (kBTUH)</b>							
<b>CAUTION: CuNi coil option must be specified when Econ-O-Coil is applied to open water tower.</b>							
75°F DB, 62.57 WB (23.9°C DB, 16.9°C WB) 45% RH, 45°F EWT, 55°F LWT; with EC Fans							
Total Capacity, kW (kBTUH)	26.2 (89.2)	29.8 (101.6)	32.2 (109.8)	49.9 (170.4)	58 (198.1)	57.7 (196.8)	82.1 (280.1)
Sensible Capacity, kW (kBTUH)	24.9 (85)	28.8 (98.2)	31.6 (107.8)	46 (157.1)	53.2 (181.4)	54.3 (185.4)	4 (63.7)
Flow Rate, GPM (l/m) @ 10°F Rise	19 (1.2)	22.4 (1.4)	25.5 (1.6)	36.4 (2.3)	389 (1.9)	446 (2.2)	137.76 (2.2)
Pressure Drop, ft. (kPa), valve, coil	6.1 (18.23)	8.3 (24.81)	10.50 (31.39)	10.40 (31.09)	17.2 (51.41)	15.9 (47.6)	18 (53.80)
<b>FLUID VOLUMES</b>							
Econ-O-Coil Fluid Volume, gal (l)	5 (19.0)	5 (19.0)	5 (19.0)	8 (30.4)	8 (30.4)	8 (30.4)	10 (38.0)
Unit Volume, Without Econ-O-Coil, gal, (l)	4 (15.2)	4 (15.2)	4 (15.2)	7 (26.6)	7 (26.6)	7 (26.6)	8 (30.4)

**Table 72 Performance data—Glycol-cooled units with EC fans**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA with EC Fans</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor,</b>							
<b>Semi-Hermetic Compressors with EC Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	36.7 (125.3)	38.2 (130.4)	43.9 (149.9)	57.1 (194.8)	70 (238.9)	77.9 (265.7)	101.5 (346.3)
Sensible kW (kBTUH)	36.4 (124.4)	38.2 (130.4)	43.9 (149.9)	56.7 (193.5)	69.7 (237.7)	77.3 (263.8)	97.7 (333.4)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	34.9 (119.1)	35.8 (122.3)	41.3 (141)	54.2 (185.1)	66.5 (226.8)	74.1 (252.9)	97.1 (331.4)
Sensible kW (kBTUH)	33.1 (112.9)	35.4 (120.9)	40.7 (138.8)	52.1 (177.6)	63.9 (218.1)	71.0 (242.2)	89.1 (304)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	33.3 (113.6)	33.9 (115.8)	39.2 (133.8)	51.6 (176)	63.3 (215.9)	70.8 (241.5)	92.9 (317.1)
Sensible kW (kBTUH)	29.4 (100.3)	31.5 (107.6)	36.2 (123.6)	46.4 (158.4)	57.0 (194.5)	63.2 (215.7)	79.0 (269.6)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	32.4 (110.6)	32.9 (112.3)	38.1 (130)	50.0 (170.6)	61.4 (209.7)	68.9 (235.2)	90.6 (309)
Sensible kW (kBTUH)	27.1 (92.4)	29.0 (98.9)	33.3 (113.6)	42.7 (145.5)	52.4 (178.8)	58.2 (198.5)	72.7 (248.1)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll compressors with EC Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	31.9 (108.7)	37.5 (128)	42.5 (145.2)	59.7 (203.6)	71.6 (244.5)	79.9 (272.6)	101.0 (344.6)
Sensible kW (kBTUH)	31.9 (108.7)	37.5 (128)	42.5 (145.2)	59.5 (203)	71.0 (242.2)	78.9 (269.2)	97.4 (332.3)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	30.2 (103)	35.3 (120.6)	40.1 (136.8)	56.7 (193.4)	68.3 (233.1)	76.3 (260.5)	96.9 (330.7)
Sensible kW (kBTUH)	30.1 (102.6)	35.1 (119.6)	39.8 (135.9)	54.8 (187)	65.1 (221.1)	72.3 (246.6)	89.0 (303.6)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	28.6 (97.6)	33.6 (114.7)	38.2 (130.2)	54.0 (184.1)	65.4 (223.2)	73.2 (249.8)	93.1 (317.6)
Sensible kW (kBTUH)	27.0 (92)	31.4 (107.1)	35.7 (121.8)	49.0 (167.2)	58.1 (198.4)	64.4 (219.7)	79.1 (270)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	27.7 (94.5)	32.7 (111.6)	37.1 (126.8)	52.4 (178.7)	63.8 (217.6)	71.4 (243.8)	90.9 (310.1)
Sensible kW (kBTUH)	24.8 (84.5)	28.9 (98.6)	32.8 (112.1)	45.1 (153.9)	53.6 (182.8)	59.3 (202.3)	72.9 (248.8)
<b>FAN SECTION - Downflow Models - EC Fans Under Floor</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6200 (10534)	8,000 (13,592)	9,600 (16,310)	11,000 (18,689)	13,700 (23,276)
Standard Fan Motor, nominal kW (total for all fans)	2.8	2.8	2.8	2.5	4.0	5.9	7.8
Number of fans	1	1	1	2	2	2	3

- Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
- Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
- Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

**Table 73 Performance Data—Glycol-cooled units with centrifugal fans**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA WITH CENTRIFUGAL FANS</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor, Semi-Hermetic Compressors</b>							
<b>Semi-Hermetic Compressors with Centrifugal Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	36.1 (123.1)	37.2 (126.8)	42.3 (144.4)	57.1 (194.8)	68.3 (233.2)	75.9 (258.8)	99.8 (340.4)
Sensible kW (kBTUH)	35.8 (122.2)	37.2 (126.8)	42.3 (144.4)	56.7 (193.5)	67.4 (229.9)	74.7 (254.9)	96.0 (327.4)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	34.2 (116.9)	34.8 (118.8)	39.6 (135.3)	54.2 (185.1)	65 (221.8)	72.3 (246.6)	95.4 (325.5)
Sensible kW (kBTUH)	32.4 (110.7)	34.4 (117.3)	39.1 (133.4)	52.1 (177.6)	61.5 (209.7)	68.1 (232.5)	87.3 (298)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	32.7 (111.4)	32.9 (112.3)	37.5 (128)	51.6 (176)	62 (211.5)	69.1 (235.6)	91.2 (311.2)
Sensible kW (kBTUH)	28.7 (98.1)	30.5 (104.1)	34.7 (118.3)	46.4 (158.4)	54.6 (186.4)	60.4 (206.2)	77.3 (263.7)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	31.8 (108.4)	31.9 (108.8)	36.4 (124.2)	50 (170.6)	60.3 (205.7)	67.3 (229.5)	88.8 (303)
Sensible kW (kBTUH)	26.4 (90.2)	28.0 (95.4)	31.7 (108.2)	42.7 (145.5)	50.2 (171.4)	55.5 (189.5)	71 (242.2)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with Centrifugal Fans</b>							<b>Scroll Compressors Only</b>
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	31.2 (106.5)	36.5 (124.5)	40.8 (139.4)	58.4 (199.3)	70.1 (239)	77.9 (265.7)	99.3 (338.7)
Sensible kW (kBTUH)	31.2 (106.5)	36.5 (124.5)	40.8 (139.4)	57.8 (197.1)	68.7 (234.3)	76.1 (259.8)	95.6 (326.3)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	29.6 (100.8)	34.3 (117)	38.3 (130.8)	55.6 (189.8)	66.9 (228.3)	74.5 (254.3)	95.2 (324.8)
Sensible kW (kBTUH)	29.4 (100.4)	34 (116.1)	38.1 (130.2)	52.9 (180.5)	62.6 (213.5)	69.4 (236.7)	87.2 (297.7)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	28 (95.4)	32.6 (111.2)	36.4 (124)	53.1 (181.1)	64.1 (218.8)	71.5 (244)	91.3 (311.6)
Sensible kW (kBTUH)	26.3 (89.8)	30.3 (103.5)	34.1 (116.3)	47.2 (161)	55.7 (190.1)	61.6 (210.1)	77.4 (264)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	27 (92.3)	31.7 (108.1)	35.3 (120.6)	51.5 (175.7)	62.6 (213.5)	69.8 (238.1)	89.1 (304.2)
Sensible kW (kBTUH)	24.1 (82.3)	27.9 (95)	31.2 (106.5)	43.4 (148.1)	51.3 (175.2)	56.7 (193.4)	71.2 (242.9)
<b>FAN SECTION - Downflow Models - Fixed Pitch, Two Belts</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6,300 (10,704)	7,500 (12,743)	9,000 (15,291)	10,400 (17,670)	13,700 (23,276)
Standard Fan Motor hp (kW)	2 (1.5)	3 (2.2)	5.0 (3.7)	3 (2.2)	5 (3.7)	7.5 (5.6)	10.0 (7.5)
Number of Fans	1	1	1	2	2	2	3

- Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
- Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
- Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

**Table 74 Physical data—Glycol-cooled units**

Model Size	028	035	042	053	070	077	105
<b>EVAPORATOR COIL - A-Frame - Copper Tube/Aluminum Fin</b>							
Face Area, sq. ft. (sq. m)	17.1 (1.6)	17.1 (1.6)	17.1 (1.6)	24.7 (2.3)	24.7 (2.3)	24.7 (2.3)	32.3 (3.0)
Rows of Coil	3	3	3	3	3	3	3
<b>REHEAT SECTION</b>							
<b>Electric Reheat - Three-Stage, Stainless Steel Fin Tubular, Capacity Does Not Include Fan Motor Heat</b>							
Capacity, kW (kBTUH), Standard Selection	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
Capacity, kW (kBTUH), Optional Selection	10.0 (34.1)	10.0 (34.1)	10.0 (34.1)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	20.0 (68.3)
<b>Electric Reheat - SCR Control, Stainless Steel Fin Tubular (Optional Selection)</b>							
Capacity, kW (kBTUH)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
<b>HUMIDIFIER SECTION</b>							
<b>Infrared Humidifier</b>							
Capacity, lb/hr (kg/h)	11.0 (5.0)	11.0 (5.0)	11.0 (5.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)
<b>FILTER SECTION - Disposable Type - Nominal Sizes and Quantities, Standard MERV 8 or Optional MERV 11 (filter types cannot be mixed, must be all MERV 8 or all MERV 11)</b>							
<b>Downflow Models</b>							
Quantity	3	3	3	4	4	4	4
Nominal Size, inches	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	4 @ 25x20	4 @ 25x20	4 @ 25x20	4 @ 25x20
<b>Upflow Models (Front &amp; Rear Return) Filters located in separate filter box on rear return, located on lower unit panel</b>							
Quantity	4	4	4	6	6	6	8
Nominal Size, inches	25x20	25x20	25x20	25x20	25x20	25x20	25x20
<b>OUTDOOR DRYCOOLERS - STANDARD 95°F AMBIENT SELECTION; SEE Table 103 FOR OTHER SELECTIONS</b>							
Model Number	D-174	D-174	D-197	D-260	D-310	D-350	D-466
Number of Fans	2	2	2	3	3	3	4
<b>CONDENSER FLOW REQUIREMENTS—with 40% ethylene glycol</b>							
<b>GLYCOL-COOLED SYSTEM -Semi-Hermetic Compressors, based on 75°F/45% room conditions with EC fans</b>							
THR, kBTUH (kW)	45.4 (154.9)	46.6 (159.1)	55.4 (189)	69.8 (238.3)	87.2 (297.7)	100.2 (341.8)	133.9 (456.9)
104°F (40°C) EGT, GPM (l/m)	32 (121.1)	33.5 (135)	39 (148)	49 (185)	62 (234.7)	70 (265)	96 (363)
Pressure Drop, ft. of water (kPa)	12.9 (38.5)	14 (41.9)	18.6 (55.7)	16 (47.7)	25 (74.7)	31.3 (93.6)	50.6 (151.3)
<b>GLYCOL-COOLED SYSTEM - Digital Scroll Compressors, based on 75°F/45% room conditions with EC Fans</b>						<b>Standard Scroll Compressors with EC Fans</b>	
THR, BTUH (kW)	39.4 (134.5)	47.6 (162.4)	54.7 (186.8)	72.7 (248)	91.2 (311.1)	103.7 (353.7)	129 (440.1)
104°F (40°C) EGT, GPM (l/m)	28 (106)	33.5 (127)	39 (148)	52 (163.5)	64 (242)	73.5 (278)	91.5 (264.9)
Pressure Drop, ft. of water (kPa)	10.0 (29.80)	14.0 (41.85)	18.6 (55.60)	17.9 (53.50)	26.6 (79.51)	34.4 (102.82)	46.2 (138.09)
<b>PIPING CONNECTION SIZES - Glycol-Cooled Liebert DS Indoor Unit</b>							
Glycol Supply, O.D. Copper	1-5/8" (41)	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Glycol Return, O.D. Copper	1-5/8" (41)	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Infrared Humidifier, O.D. Copper	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Condensate Drain, FPT	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Condensate Drain w/Optional Condensate Pump, OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Hot Water Reheat, O.D. Copper	5/8	5/8	5/8	5/8	5/8	5/8	5/8

**Table 75 Performance data—GLYCOOL units with EC fans**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA with EC Fans</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor,</b>							
<b>Semi-Hermetic Compressors with EC Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	36.5 (124.6)	37.9 (129.3)	43.5 (148.4)	58.0 (197.9)	69.3 (236.3)	77.3 (263.7)	100.4 (342.6)
Sensible kW (kBTUH)	36.3 (123.7)	37.9 (129.3)	43.5 (148.4)	58.0 (197.8)	68.9 (235.1)	76.1 (259.7)	96.3 (328.7)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	34.7 (118.4)	35.5 (121.2)	40.9 (139.5)	54.9 (187.4)	65.7 (224.2)	73.7 (251.5)	96.1 (327.8)
Sensible kW (kBTUH)	32.9 (112.3)	35.1 (119.8)	40.2 (137.2)	53.4 (182.3)	63.2 (215.5)	69.5 (237.2)	87.7 (299.1)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45.1% RH							
Total kW (kBTUH)	33.1 (112.9)	33.6 (114.7)	38.8 (132.3)	52.1 (177.7)	62.5 (213.3)	70.5 (240.5)	91.9 (313.7)
Sensible kW (kBTUH)	29.2 (99.6)	31.2 (106.6)	35.8 (122)	47.8 (163)	56.3 (192)	61.8 (210.9)	77.7 (265.1)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	32.2 (109.9)	32.6 (111.2)	37.7 (128.6)	50.4 (172.1)	60.7 (207.1)	68.7 (234.4)	89.6 (305.6)
Sensible kW (kBTUH)	26.9 (91.7)	28.7 (97.9)	32.8 (112)	43.9 (149.8)	51.7 (176.2)	56.9 (194.2)	71.5 (243.8)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll compressors with EC Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	31.7 (108)	37.2 (127.1)	42.1 (143.5)	59.1 (201.6)	70.9 (241.9)	77.3 (263.7)	99.9 (340.9)
Sensible kW (kBTUH)	31.7 (108)	37.2 (127.1)	42.1 (143.5)	58.9 (201.1)	70.2 (239.6)	75.6 (257.9)	96.0 (327.6)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	30 (102.4)	35.1 (119.6)	39.6 (135.1)	56.1 (191.4)	67.6 (230.6)	73.9 (252.3)	95.9 (327.1)
Sensible kW (kBTUH)	29.9 (102)	34.8 (118.6)	39.3 (134.1)	54.2 (185.1)	64.3 (219.5)	68.8 (234.8)	91.2 (298.8)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	28.4 (96.9)	33.3 (113.7)	37.6 (128.5)	53.4 (182.3)	64.7 (220.7)	70.9 (242)	92.0 (314.1)
Sensible kW (kBTUH)	26.8 (91.4)	31.1 (106.1)	35.2 (120.1)	48.5 (165.5)	57.4 (195.8)	61.0 (208.3)	77.8 (265.4)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	27.5 (93.8)	32.4 (110.7)	36.6 (125)	51.8 (176.9)	63.0 (215)	69.2 (236.1)	89.9 (306.6)
Sensible kW (kBTUH)	24.6 (83.9)	28.6 (97.6)	32.3 (110.4)	44.6 (152.2)	52.8 (180.2)	56.1 (191.5)	71.6 (244.5)
<b>FAN SECTION - Downflow Models - EC Fans Under Floor</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6200 (10,534)	8,000 (13,592)	9,600 (16,310)	10,400 (17670)	13,500 (22937)
Standard Fan Motor, nominal kW (total for all fans)	2.8	2.8	2.8	2.5	4.0	5.9	7.8
Number of fans	1	1	1	2	2	2	3

1. Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
2. Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
3. Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

**Table 76 Performance data—GLYCOOL units with centrifugal fans**

Model Size	028	035	042	053	070	077	105
<b>CAPACITY DATA WITH CENTRIFUGAL FANS</b>							
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor, Semi-Hermetic Compressors</b>							
<b>Semi-Hermetic Compressors with Centrifugal Fans</b>							
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	35.9 (122.4)	36.8 (125.7)	41.9 (142.8)	56.6 (193.2)	67.6 (230.8)	74.9 (255.7)	98.6 (336.5)
Sensible kW (kBTUH)	35.6 (121.5)	36.8 (125.7)	41.9 (142.8)	56.2 (191.9)	66.7 (227.5)	73.8 (251.7)	94.6 (322.6)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	34.1 (116.2)	34.5 (117.7)	39.2 (133.7)	53.8 (183.4)	64.3 (219.4)	71.4 (243.5)	94.3 (321.7)
Sensible kW (kBTUH)	32.3 (110)	34.1 (116.3)	38.6 (131.9)	51.6 (176)	60.8 (207.3)	67.2 (229.2)	89.5 (293)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	32.5 (110.7)	32.6 (111.1)	37.1 (126.5)	51.1 (174.4)	61.3 (209)	68.1 (232.4)	90.1 (307.6)
Sensible kW (kBTUH)	28.5 (97.4)	30.2 (103)	34.2 (116.7)	45.9 (156.8)	53.9 (184)	59.4 (202.8)	75.9 (258.9)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	31.6 (107.7)	31.6 (107.7)	35.9 (122.7)	49.5 (169)	59.6 (203.3)	66.3 (226.4)	87.8 (299.5)
Sensible kW (kBTUH)	26.2 (89.5)	27.6 (94.3)	31.2 (106.6)	42.2 (143.9)	49.5 (169)	54.6 (186.2)	69.7 (237.7)
<b>Net Capacity Data kW (BTUH), Standard Air Volume and Evaporator Fan Motor</b>							
<b>Scroll or Digital Scroll Compressors with Centrifugal Fans</b>						<b>Scroll Compressors Only</b>	
85°F DB, 64.5°F WB, 52.3°F DP (29.4°C DB, 18.1°C WB) 32.4% RH							
Total kW (kBTUH)	31 (105.8)	36.2 (123.5)	40.4 (137.8)	57.9 (197.4)	69.3 (236.6)	76.8 (262)	98.1 (334.8)
Sensible kW (kBTUH)	31 (105.8)	36.2 (123.5)	40.4 (137.8)	57.2 (195.3)	67.9 (231.8)	75.1 (256.2)	94.2 (321.5)
80°F DB, 62.9°F WB, 52.3°F DP (26.7°C DB, 17.1°C WB) 38.2% RH							
Total kW (kBTUH)	29.4 (100.2)	34 (116.1)	37.9 (129.3)	55.1 (187.9)	66.2 (225.9)	73.4 (250.6)	94.1 (321)
Sensible kW (kBTUH)	29.2 (99.8)	33.7 (115.1)	37.7 (128.6)	52.4 (178.8)	61.9 (211.1)	68.3 (233.1)	89.4 (292.7)
75°F DB, 61.1°F WB, 52.3°F DP (23.9°C DB, 16.2°C WB) 45% RH							
Total kW (kBTUH)	27.8 (94.7)	32.3 (110.2)	35.9 (122.5)	52.5 (179.1)	63.4 (216.4)	70.4 (240.3)	90.3 (307.9)
Sensible kW (kBTUH)	26.1 (89.1)	30 (102.5)	33.6 (114.7)	46.7 (159.2)	55 (187.6)	60.5 (206.6)	76 (259.3)
72°F DB, 60.0°F WB, 52.3°F DP (22.2°C DB, 15.6°C WB) 49.9% RH							
Total kW (kBTUH)	26.9 (91.6)	31.4 (107.1)	34.9 (119)	51 (174)	61.9 (211.1)	68.7 (234.4)	88.1 (300.5)
Sensible kW (kBTUH)	23.9 (81.7)	27.6 (94.1)	30.8 (105)	42.9 (146.4)	50.6 (172.7)	55.6 (189.8)	69.9 (238.3)
<b>FAN SECTION - Downflow Models - Fixed Pitch, Two Belts</b>							
Standard Air Volume, CFM (CMH) 0.2" external static	4,400 (7,476)	5,200 (8,835)	6,300 (10,704)	7,500 (12,743)	9,000 (15,291)	10,400 (17,670)	13,700 (23,276)
Standard Fan Motor hp (kW)	2 (1.5)	3 (2.2)	5.0 (3.7)	3 (2.2)	5 (3.7)	7.5 (5.6)	10.0 (7.5)
Number of Fans	1	1	1	2	2	2	3

- Capacity data is rated and factory certified per ASHRAE 127-2012 with a 5% tolerance.
- Some options or combinations of options may result in reduced air flow—consult factory for recommendations.
- Digital scroll not available on 077 and 105 models; units available with semi-hermetic and standard scroll compressors only

Table 77 Physical data—GLYCOOL units

Model Size	028	035	042	053	070	077	105
<b>EVAPORATOR COIL - A-Frame - Copper Tube/Aluminum Fin</b>							
Face Area, sq. ft. (sq. m)	17.1 (1.6)	17.1 (1.6)	17.1 (1.6)	24.7 (2.3)	24.7 (2.3)	24.7 (2.3)	32.3 (3.0)
Rows of Coil	3	3	3	3	3	3	3
<b>REHEAT SECTION</b>							
<b>Electric Reheat - Three-Stage, Stainless Steel Fin Tubular, Capacity Does Not Include Fan Motor Heat</b>							
Capacity, kW (kBTUH), Standard Selection	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
Capacity, kW (kBTUH), Optional Selection	10.0 (34.1)	10.0 (34.1)	10.0 (34.1)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	20.0 (68.3)
<b>Electric Reheat - SCR Control, Stainless Steel Fin Tubular (Optional Selection)</b>							
Capacity, kW (kBTUH)	15.0 (51.2)	15.0 (51.2)	15.0 (51.2)	25.0 (85.3)	25.0 (85.3)	25.0 (85.3)	30.0 (102.4)
<b>HUMIDIFIER SECTION</b>							
<b>Infrared Humidifier</b>							
Capacity, lb/hr (kg/h)	11.0 (5.0)	11.0 (5.0)	11.0 (5.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)	22.0 (10.0)
<b>FILTER SECTION - Disposable Type - Nominal Sizes and Quantities, Standard MERV 8 or Optional MERV 11 (filter types cannot be mixed, must be all MERV 8 or all MERV 11)</b>							
<b>Downflow Models</b>							
Quantity	3	3	3	4	4	4	4
Nominal Size, inches	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	2 @ 25x20 1 @ 25x16	4 @ 25x20	4 @ 25x20	4 @ 25x20	4 @ 25x20
<b>Upflow Models (Front &amp; Rear Return) Filters located in separate filter box on rear return, located on lower unit panel</b>							
Quantity	4	4	4	6	6	6	8
Nominal Size, inches	25x20	25x20	25x20	25x20	25x20	25x20	25x20
<b>OUTDOOR DRYCOOLERS - STANDARD 95°F AMBIENT SELECTION; SEE Table 103 FOR OTHER SELECTIONS</b>							
Model Number	D-174	D-174	D-197	D-260	D-310	D-350	D-466
Number of Fans	2	2	2	3	3	3	4
<b>CONDENSER FLOW REQUIREMENTS—40% Ethylene Glycol</b>							
<b>GLYCOOL SYSTEM - Semi-Hermetic Compressors, Based on 75°F/45% Room Conditions with EC Fans</b>							
THR, kBTUH (kW)	45.4 (154.9)	46.6 (159)	55.5 (189.2)	70.6 (240.8)	87.2 (297.7)	99.4 (339.3)	133.6 (455.9)
104°F (40°C) EGT, GPM (l/m)	32 (121)	33 (125)	40 (151)	49 (185)	62 (235)	71 (269)	95 (360)
Pressure Drop, ft. of water (kPa)	12.9 (38.50)	13.6 (40.60)	19.6 (58.59)	16.0 (47.83)	25.0 (74.73)	32.2 (96.25)	49.6 (148.30)
<b>GLYCOOL SYSTEM - Digital Scroll Compressors, Based on 75°F/45% Room Conditions with EC Fans</b>						<b>Standard Scroll with EC Fans</b>	
THR, BTUH (kW)	39.4 (134.5)	47.6 (162.4)	54.7 (186.8)	72.7 (248)	91.2 (311.1)	102.9 (351.1)	128.7 (439.1)
104°F (40°C) EGT, GPM (l/m)	28 (98.4)	33.5 (127)	39 (148)	51 (193)	64 (242)	72 (273)	89 (337)
Pressure Drop, ft. of water (kPa)	10.0 (29.89)	14.0 (41.85)	18.6 (55.60)	17.2 (51.41)	26.6 (79.51)	33.1 (98.84)	43.8 (130.92)
<b>PIPING CONNECTION SIZES - Glycol-Cooled Liebert DS Indoor Unit</b>							
Glycol Supply, O.D. Copper	1-5/8" (41)	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Glycol Return, O.D. Copper	1-5/8" (41)	1-5/8" (41)	1-5/8" (41)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)	2-1/8" (54)
Infrared Humidifier, O.D. Copper	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Condensate Drain, FPT	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Condensate Drain w/Optional Condensate Pump, OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Hot Water Reheat, O.D. Copper	5/8	5/8	5/8	5/8	5/8	5/8	5/8
<b>ECON-O-COIL CAPACITY DATA (GLYCOOL Units), 40% Ethylene Glycol, Net Capacity Data, kW (kBTUH)</b>							
75°F DB, 62.57°F WB (23.9°C, 16.9°C) 45% RH, 45°F EGT Room Conditions with EC Fans							
Total capacity kW(kBTUH)	24.3 (82.8)	27.5 (93.9)	30.4 (103.9)	45.9 (156.8)	53.4 (182.3)	57.2 (182.3)	71.3 (243.3)
Sensible Capacity	24.1 (82.4)	27.5 (93.9)	30.4 (103.9)	44.7 (152.6)	51.8 (176.9)	55.3 (176.9)	69.8 (238.2)
Flow rate, GPM (l/m)	28 (106)	33.5 (127)	39 (148)	51 (193)	64 (242)	72 (273)	89 (337)
Pressure Drop, ft. of water (kPa)	18.4 (55.0)	25.7 (76.82)	33.8 (101.03)	38.9 (116.27)	59.1 (176.65)	73.5 (219.70)	75.2 (224.78)
<b>FLUID VOLUMES</b>							
Unit Volume Without Econ-O-Coil, gal (l)	4 (15.2)	4 (15.2)	4 (15.2)	7 (26.6)	7 (26.6)	7 (26.6)	8 (30.4)
Unit Volume with Econ-O-Coil, gal (l)	9 (34.2)	9 (34.2)	9 (34.2)	14 (53.2)	14 (53.2)	14 (53.2)	17 (64.6)

**Table 78 Electrical data—Water/glycol-cooled systems with EC fans**

Model #	Reheat Options	Electric Standard, kW				None				Electric Standard kW				None				Electric, Downsized kW				Electric, Downsized kW			
	Humidifier Options	Infrared				Infrared				None				None				Humidifier				No Humidifier			
	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575
DS028	FLA	67.3	64.8	32.1	25.5	56.3	54.1	26.9	24.2	67.3	64.8	32.1	25	43	43	21.1	16.8	56.3	54.1	26.9	24.2	53.5	51.9	25.6	19.9
	WSA	82	78.9	39.2	31.9	60.6	58.4	29.1	25.9	82	78.9	39.2	30.5	47.3	47.3	23.3	18.5	64.8	62.8	31.1	25.9	64.8	62.8	31.1	24.1
	OPD	80	80	40	30	70	70	35	30	80	80	40	30	60	60	30	25	70	70	35	30	70	70	35	25
DS035	FLA	70.7	68.2	33.4	25.5	63.1	60.9	29.5	25.2	70.7	68.2	33.4	25.5	49.8	49.8	23.7	17.8	63.1	60.9	29.5	25.2	56.9	55.3	26.9	20.4
	WSA	86.3	83.2	40.8	31.9	68.3	66.1	32	27.1	86.3	83.2	40.8	31.1	55	55	26.2	19.7	69	67	32.7	27.1	69	67	32.7	24.8
	OPD	90	90	45	30	80	80	40	30	90	90	45	30	70	70	35	25	80	80	40	30	80	80	35	25
DS042	FLA	78.2	75.9	37.7	33	78.1	75.9	37.7	33	78.2	75.7	37.5	29.4	64.8	64.8	31.9	25.6	78.1	75.9	37.7	33	64.8	64.8	31.9	25.6
	WSA	95.7	92.5	46	36	85.2	83	41.2	35.8	95.7	92.5	46	36	71.9	71.9	35.4	28.4	85.2	83	41.2	35.8	78.4	76.4	37.8	29.6
	OPD	110	110	50	45	110	110	50	45	110	110	50	40	100	100	45	35	110	110	50	45	100	100	45	35
DS053	FLA	119.9	116	57.1	43.5	109.2	104.8	52.4	42	119.9	116	57.1	43.5	82.6	82.6	40.8	30.4	109.2	104.8	52.4	42	92.1	89.6	44.1	33.5
	WSA	145.3	140.4	69.4	53.9	117.2	112.8	56.5	45	145.3	140.4	69.4	52.8	90.6	90.62	44.9	33.4	117.2	112.8	56.5	45	110.52	107.4	53.1	40.3
	OPD	150	150	70	50	125	125	70	50	150	150	70	50	110	110	60	45	125	125	70	50	125	125	60	45
DS070	FLA	129.2	125.3	59.9	46.4	127.8	123.4	58	46.4	129.2	125.3	59.9	45.7	101.2	101.2	46.4	34.8	127.8	123.4	58	46.4	101.4	101.2	46.9	35.7
	WSA	156.9	152	72.9	55.5	138.2	133.8	62.8	50	156.9	152.0	72.9	55.5	111.6	111.6	51.2	38.4	138.2	133.8	62.8	50	122.15	119.02	56.6	43
	OPD	175	175	80	60	175	175	80	60	175	175	80	60	150	150	70	50	175	175	80	60	150	150	70	50
DS077	FLA	139.2	134.8	61.4	50	139.2	134.8	61	50	134.9	131	61.4	47.5	112.6	112.6	49.4	38.4	139.2	134.8	61	50	112.6	112.6	49.4	38.4
	WSA	164	159.2	74.8	57.8	151	146.6	66.2	54	164.0	159.2	74.8	57.8	124.37	124.4	54.6	42.4	151	146.6	66.2	54	129.27	126.15	58.5	45.3
	OPD	175	175	80	70	175	175	80	70	175	175	80	60	150	150	70	50	175	175	80	70	150	150	70	50
DS105	FLA	171.5	167.1	83.7	69.1	171.5	167.1	83.7	69.1	164	163.5	79.8	62.6	144.9	144.9	72.1	57.5	171.5	167.1	83.7	69.1	144.9	144.9	72.1	57.5
	WSA	198.8	198.2	97.4	76.4	186.5	182.1	91.6	75.4	198.8	198.2	97.4	76.4	159.9	159.9	80	63.8	186.5	182.1	91.6	75.4	169.3	165.5	81.3	63.9
	OPD	225	225	110	100	225	225	110	100	225	225	110	90	200	200	110	80	225	225	110	100	200	200	110	80

1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.
6. Steam canister humidifiers available on downflow models with centrifugal fans.



**Table 79 Electrical data—Water/glycol-cooled systems with centrifugal fans**

Reheat Options			Electric, Std. kW				None				Electric, Std. kW				None			
Humidifier Options			Infrared or Steam Generating Canister				Infrared or Steam Generating Canister				None				None			
Model	Motor hp	Volts	208	230	460	575	208	230	460	575	208	230	460	575	208	230	460	575
028	2.0	FLA	66.4	63.2	31.8	25.2	55.4	52.5	26.6	23.9	66.4	63.2	31.8	24.7	42.1	41.4	20.8	16.5
		WSA	81.1	77.3	38.9	31.5	59.7	56.8	28.8	25.6	81.1	77.3	38.9	30.2	46.4	45.7	23	18.2
		OPD	80	80	40	30	70	70	35	30	80	80	40	30	60	60	30	25
028	3.0	FLA	69.5	66.0	33.2	26.4	58.5	55.3	28.0	25.1	69.5	66.0	33.2	25.9	45.2	44.2	22.2	17.7
		WSA	84.2	80.1	40.3	33	62.8	59.6	30.2	26.8	84.2	80.1	40.3	31.4	49.5	48.5	24.4	19.4
		OPD	90	80	40	30	80	70	35	30	90	80	40	30	60	60	30	25
035	3.0	FLA	72.9	69.4	34.5	26.4	65.3	62.1	30.6	26.1	72.9	69.4	34.5	26.4	52.0	51.0	24.8	18.7
		WSA	88.5	84.4	41.9	33.0	70.5	67.3	33.1	28.0	88.5	84.4	41.9	32.0	57.2	56.2	27.3	20.6
		OPD	90	90	45	35	90	80	40	35	90	90	45	35	70	70	35	25
035	5.0	FLA	79.0	75.0	37.3	28.6	71.4	67.7	33.4	28.3	79.0	75.0	37.3	28.6	58.1	56.6	27.6	20.9
		WSA	94.6	90.0	44.7	35.8	76.6	72.9	35.9	30.2	94.6	90.0	44.7	34.2	63.3	61.8	30.1	22.8
		OPD	100	100	45	35	90	90	45	35	100	100	45	35	80	80	40	30
042	5.0	FLA	86.5	82.7	41.6	36.1	86.4	82.7	41.6	36.1	86.5	82.5	41.4	32.5	73.1	71.6	35.8	28.7
		WSA	104	99.3	49.9	39.1	93.5	89.8	45.1	38.9	104.0	99.3	49.9	39.1	80.2	78.7	39.3	31.5
		OPD	110	110	50	50	110	110	50	50	110	110	50	45	100	100	50	40
042	7.5	FLA	94.0	89.5	45.0	39.0	93.9	89.5	45.0	39.0	94.0	89.3	44.8	35.4	80.6	78.4	39.2	31.6
		WSA	111.5	106.1	53.3	42.0	101.0	96.6	48.5	41.8	111.5	106.1	53.3	42.0	87.7	85.5	42.7	34.4
		OPD	125	110	60	50	125	110	60	50	125	110	60	45	110	110	50	45
053	3.0	FLA	112.1	107.2	53.9	41	101.4	96	49.2	39.5	112.1	107.2	53.9	41	74.8	73.8	37.6	27.9
		WSA	137.5	131.6	66.2	50.8	109.4	104.0	53.3	42.5	137.5	131.6	66.2	50.3	82.8	81.8	41.7	30.9
		OPD	150	125	70	50	125	125	60	50	150	125	70	50	110	110	50	40
053	5.0	FLA	118.2	112.8	56.7	43.2	107.5	101.6	52.0	41.7	118.2	112.8	56.7	43.2	80.9	79.4	40.4	30.1
		WSA	143.6	137.2	69.0	53.5	115.5	109.6	56.1	44.7	143.6	137.2	69.0	52.5	88.9	87.4	44.5	33.1
		OPD	150	150	70	50	125	125	70	50	150	150	70	50	110	110	60	45
070	5.0	FLA	127.5	122.1	59.5	46.1	126.1	120.2	57.6	46.1	127.5	122.1	59.5	45.4	99.5	98	46	34.5
		WSA	155.2	148.8	72.5	55.2	136.5	130.6	62.4	49.7	155.2	148.8	72.5	55.2	109.9	108.4	50.8	38.1
		OPD	175	150	80	60	175	150	80	60	175	150	80	60	150	125	70	50
070	7.5	FLA	135.0	128.9	62.9	49.0	133.6	127.0	61.0	49.0	135.0	128.9	62.9	48.3	107.0	104.8	49.4	37.4
		WSA	162.7	155.6	75.9	58.1	144.0	137.4	65.8	52.6	162.7	155.6	75.9	58.1	117.4	115.2	54.2	41.0
		OPD	175	175	80	60	175	175	80	60	175	175	80	60	150	150	70	50
077	7.5	FLA	145	138.4	64.4	52.6	145.0	138.4	64.0	52.6	140.7	134.6	64.4	50.1	118.4	116.2	52.4	41.0
		WSA	169.8	162.8	77.8	60.4	156.8	150.2	69.2	56.6	169.8	162.8	77.8	60.4	130.2	128.0	57.6	45.0
		OPD	200	175	90	70	200	175	80	70	175	175	90	70	175	175	70	60
077	10.0	FLA	151.6	144.4	67.4	54.6	151.6	144.4	67.0	54.6	147.3	140.6	67.4	52.1	125.0	122.2	55.4	43.0
		WSA	176.4	168.8	80.8	62.4	163.4	156.2	72.2	58.6	176.4	168.8	80.8	62.4	136.8	134.0	60.6	47.0
		OPD	200	200	90	70	200	200	90	70	200	175	90	70	175	175	80	60
105	10.0	FLA	177.4	170.2	88.4	72.6	177.4	170.2	88.4	72.6	169.9	166.6	84.5	66.1	150.8	148	76.8	61.0
		WSA	204.7	201.3	102.1	79.9	204.7	201.3	102.1	79.9	204.7	201.3	102.1	79.9	165.8	163.0	84.7	67.3
		OPD	250	225	125	100	250	225	125	100	225	225	110	90	225	200	110	90
105	15.0	FLA	192.3	184.2	95.4	78.6	192.3	184.2	95.4	78.6	185.3	180.6	91.5	72.1	166.2	162.0	83.8	67.0
		WSA	220.1	215.3	109.1	85.9	220.1	215.3	109.1	85.9	220.1	215.3	109.1	85.9	181.2	177.0	91.7	73.3
		OPD	250	250	125	100	250	250	125	100	250	250	125	100	225	225	110	90

1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.

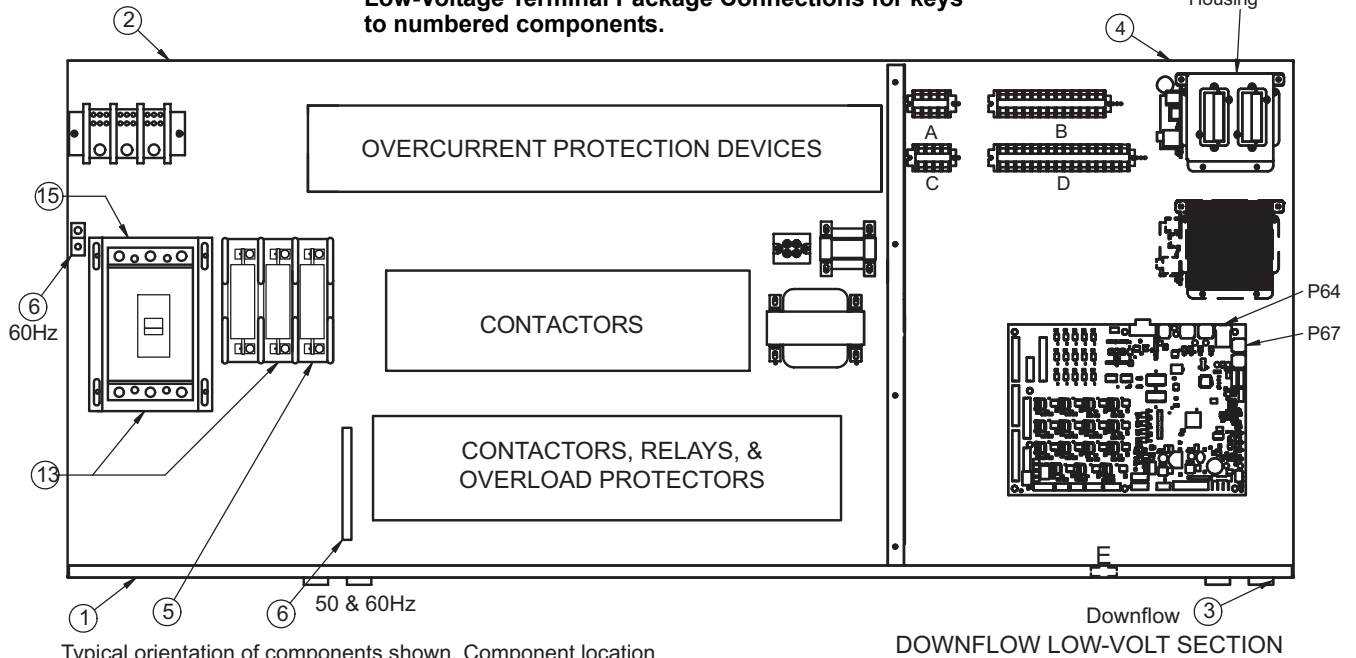
**Table 79 Electrical data—Water/glycol-cooled systems with centrifugal fans (continued)**

Reheat Options			Electric, Downsized kW							
Humidifier Options			Infrared or Steam Generating Canister				None			
Model	Motor, hp	Volts	208	230	460	575	208	230	460	575
028	2.0	FLA	55.4	52.5	26.6	23.9	52.6	50.3	25.3	19.6
		WSA	63.9	61.2	30.8	25.6	63.9	61.2	30.8	23.8
		OPD	70	70	35	30	70	70	35	25
028	3.0	FLA	58.5	55.3	28	25.1	55.7	53.1	26.7	20.8
		WSA	67.0	64.0	32.2	26.8	67.0	64.0	32.2	25.0
		OPD	80	70	35	30	70	70	35	25
035	3.0	FLA	65.3	62.1	30.6	26.1	59.1	56.5	28.0	21.3
		WSA	71.2	68.2	33.8	28.0	71.2	68.2	33.8	25.7
		OPD	90	80	40	35	80	80	40	30
035	5.0	FLA	71.4	67.7	33.4	28.3	65.2	62.1	30.8	23.5
		WSA	77.3	73.8	36.6	30.2	77.3	73.8	36.6	27.9
		OPD	90	90	45	35	90	80	40	30
042	5.0	FLA	86.4	82.7	41.6	36.1	73.1	71.6	35.8	28.7
		WSA	93.5	89.8	45.1	38.9	86.7	83.2	41.7	32.7
		OPD	110	110	50	50	100	100	50	40
042	7.5	FLA	93.9	89.5	45.0	39.0	80.6	78.4	39.2	31.6
		WSA	101.0	96.6	48.5	41.8	94.2	90.0	45.1	35.6
		OPD	125	110	60	50	110	110	50	45
053	3.0	FLA	101.4	96.0	49.2	39.5	84.3	80.8	40.9	31
		WSA	109.4	104.0	53.3	42.5	102.7	98.6	49.9	37.8
		OPD	125	125	60	50	110	110	60	45
053	5.0	FLA	107.5	101.6	52.0	41.7	90.4	86.4	43.7	33.2
		WSA	115.5	109.6	56.1	44.7	108.8	104.2	52.7	40.0
		OPD	125	125	70	50	125	125	60	45
070	5.0	FLA	126.1	120.2	57.6	46.1	99.7	98	46.5	35.4
		WSA	136.5	130.6	62.4	49.7	120.5	115.8	56.2	42.7
		OPD	175	150	80	60	150	125	70	50
070	7.5	FLA	133.6	127.0	61.0	49.0	107.2	104.8	49.9	38.3
		WSA	144.0	137.4	65.8	52.6	128.0	122.6	59.6	45.6
		OPD	175	175	80	60	150	150	70	50
077	7.5	FLA	145	138.4	64.0	52.6	118.4	116.2	52.4	41.0
		WSA	156.8	150.2	69.2	56.6	135.1	129.8	61.5	47.9
		OPD	200	175	80	70	175	175	70	60
077	10.0	FLA	151.6	144.4	67.0	54.6	125.0	122.2	55.4	43.0
		WSA	163.4	156.2	72.2	58.6	141.7	135.8	64.5	49.9
		OPD	200	200	90	70	175	175	80	60
105	10.0	FLA	177.4	170.2	88.4	72.6	150.8	148	76.8	61.0
		WSA	192.4	185.2	96.3	78.9	175.2	168.6	86.0	67.4
		OPD	250	225	125	100	225	200	110	90
105	15.0	FLA	192.8	184.2	95.4	78.6	166.2	162.0	83.8	67.0
		WSA	207.8	199.2	103.3	84.9	190.6	182.6	93.0	73.4
		OPD	250	250	125	100	225	225	110	90

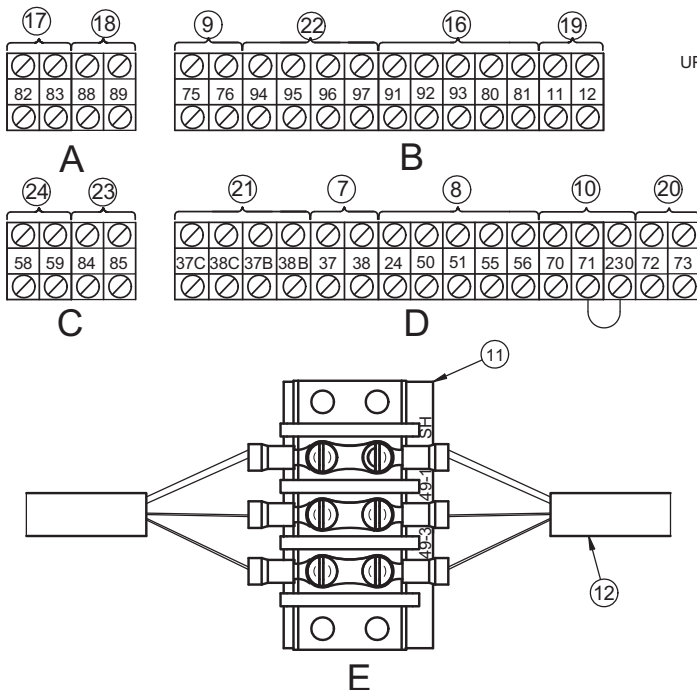
1. Reduced reheat for 028, 035, and 042 models is 10kW.
2. Reduced reheat for 053, 070, and 077 models is 15kW.
3. Consult local representative for SCR reheat values.
4. Reduced reheat for 105 kW models is 20kW.
5. SCCR - Short Circuit Current Rating 65,000 amps rms symmetrical maximum.

**Figure 79 Electrical field connections—Upflow and downflow models, single molded case switch disconnect with main fuses**

See 4.2 - Standard Electrical Connections, 4.3 - Optional Electrical Connections and 4.4 - Optional Low-Voltage Terminal Package Connections for keys to numbered components.



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



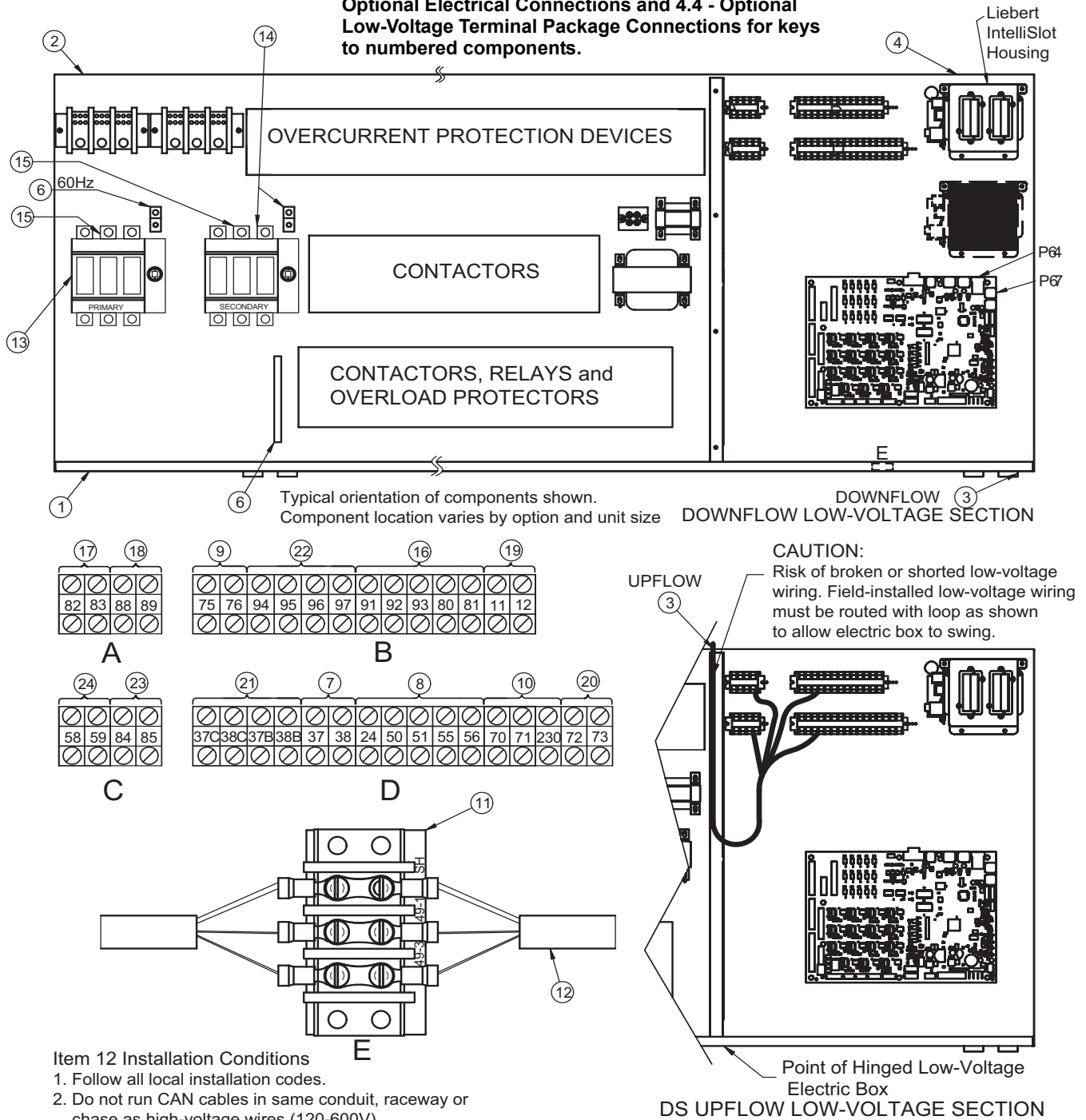
**Item 12 Installation Conditions**

1. Follow all local installation codes.
2. Do not run CAN cables in same conduit, raceway, or chase as high voltage wires (120-600V).
3. Separate high volt wires from CAN wires by 12 inches.
4. For runs greater than 350ft(107m), contact Liebert factory.

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**Figure 80 Electrical field connections—Upflow and downflow models, dual fused disconnect switches**

See 4.2 - Standard Electrical Connections, 4.3 - Optional Electrical Connections and 4.4 - Optional Low-Voltage Terminal Package Connections for keys to numbered components.



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## 4.2 STANDARD ELECTRICAL CONNECTIONS

Source: DPN000807, Rev. 8

1. **Primary high voltage entrance**—2.5" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in bottom of box.
2. **Secondary high voltage entrance**—2.5" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in top of box.
3. **Primary low voltage entrance**—Quantity (3) 1.375" (35mm) diameter knockouts located in bottom of unit.
4. **Secondary low voltage entrance**—Quantity (3) 1.375" (35mm) diameter knockouts located in top of box.
5. **Three phase electrical service**—Terminals are on main fuse block (disregard if unit has optional disconnect switch). Three-phase service not by Emerson.
6. **Earth ground**—Terminal for field-supplied earth grounding wire. Earth grounding required for Liebert units.
7. **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.
8. **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.
9. **Common alarm**—On any alarm, normally open dry contact is closed across Terminals 75 & 76 for remote indication. 1A, 24VAC maximum load. Use Class 1 field-supplied wiring.
10. **Heat rejection interlock**—On any call for compressor operation, normally open dry contact is closed across Terminals 70 & 71 (Circuit 1), 230 (Circuit 2) to heat rejection equipment. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring. When a Liebert DS unit is paired with a Liebert MC series condenser, remove jumper between Terminal 71 and Terminal 230. Three wires must connect Terminals 70, 71 and 230 of the indoor unit to Terminals 70, 71 and 230 of the Liebert MC series condenser.

### 4.3 OPTIONAL ELECTRICAL CONNECTIONS

Source: DPN000807, Rev. 7

11. **Unit factory installed disconnect switch, Fuse Block and Main Fuses**—Two types of disconnect switches are available: Non-Locking and Locking. The Non-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 with the switch in either the On or Off position. The Locking Type is identical except access to the high-voltage electric panel compartment can be obtained only with the switch in the Off position. Units with fused disconnects are provided with a defeater button that allows access to the electrical panel when power is On. The molded case switch disconnect models contain separate main fuses. Units with fused disconnect have main fuses within the disconnect. Only fused disconnects are used on dual disconnect options.
12. **Secondary disconnect switch and earth ground**
13. **Three-phase electrical service**—Terminals are on top of disconnect switch. Three-phase service not by Emerson.
14. **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. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
15. **Reheat and humidifier lockout**—Remote 24VAC required at Terminals 82 & 83 for lockout of reheat and humidifier.
16. **Condensate alarm (with condensate pump option)**—On pump high water indication, normally open dry contact is closed across Terminals 88 & 89 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
17. **Remote humidifier**—On any call for humidification, normally open dry contact is closed across Terminals 11 & 12 to signal field-supplied remote humidifier. 1A, 24VAC maximum load. Use Class 1 field-supplied wiring.
18. **Auxiliary cool contact**—On any call for Econ-O-coil operation, normally open dry contact is closed across Terminals 72 & 73 on dual cool units only. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.

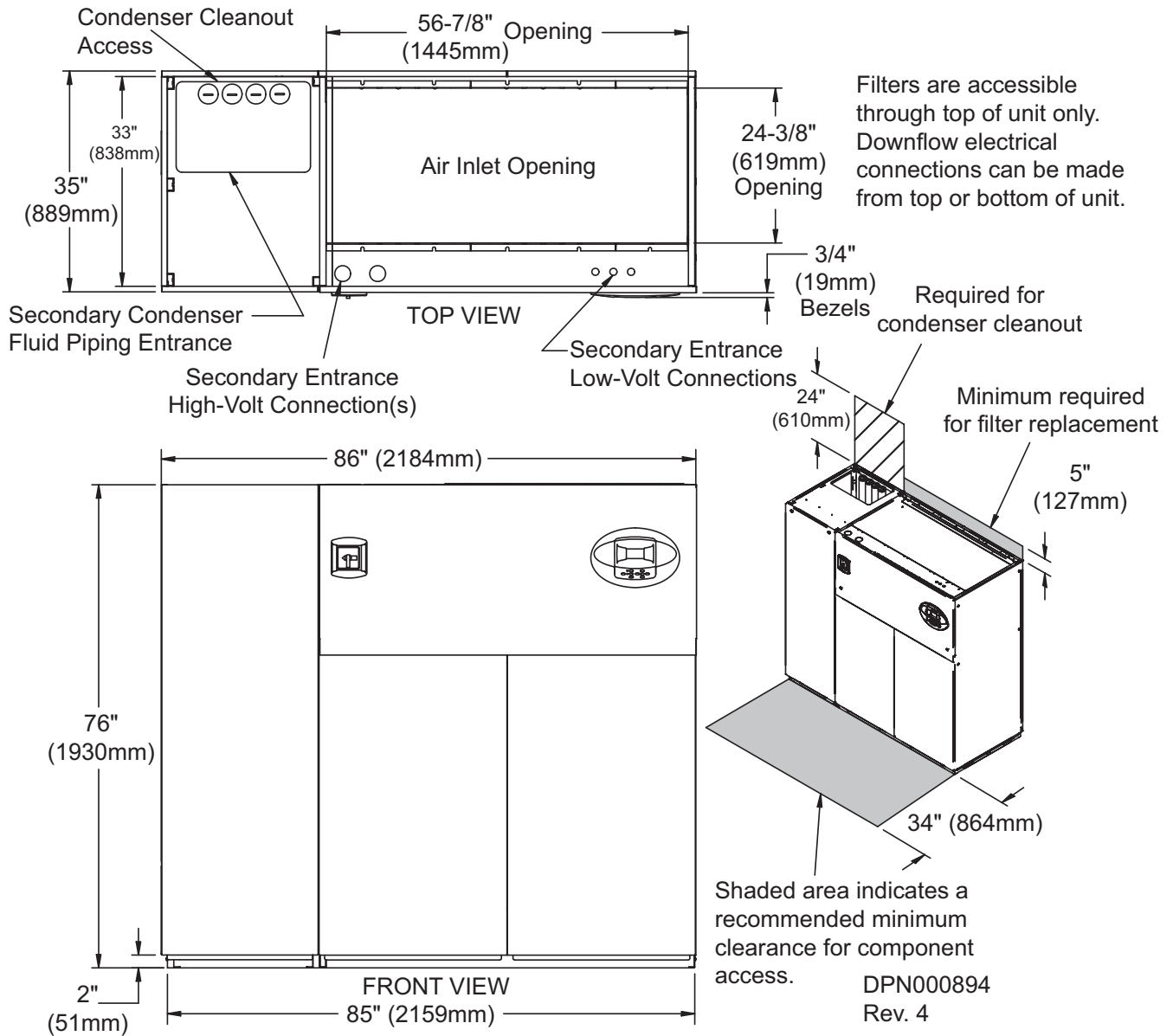
### 4.4 OPTIONAL LOW-VOLTAGE TERMINAL PACKAGE CONNECTIONS

Source: DPN000807, Rev. 7

19. **Remote unit shutdown**—Two additional contact pairs available for unit shutdown (labeled as 37B & 38B, 37C and 38C). Replace jumpers with field-supplied, normally closed switch having a minimum rating of 75VA, 24VAC. Use field-supplied Class 1 wiring.
20. **Common alarm**—On any alarm, two additional normally open dry contacts are closed across Terminals 94 & 95 and 96 & 97 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
21. **Main fan auxiliary switch**—On closure of main fan contactor, normally open dry contact is closed across Terminals 84 & 85 for remote indication. 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.
22. **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). 1A, 24VAC maximum load. Use field-supplied Class 1 wiring.

**4.5 DIMENSIONS—LIEBERT DS 028-042, DOWNFLOW, WATER/GLYCOL/GLYCOOL MODELS**

**Figure 81 Dimensions—water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors with centrifugal fans**

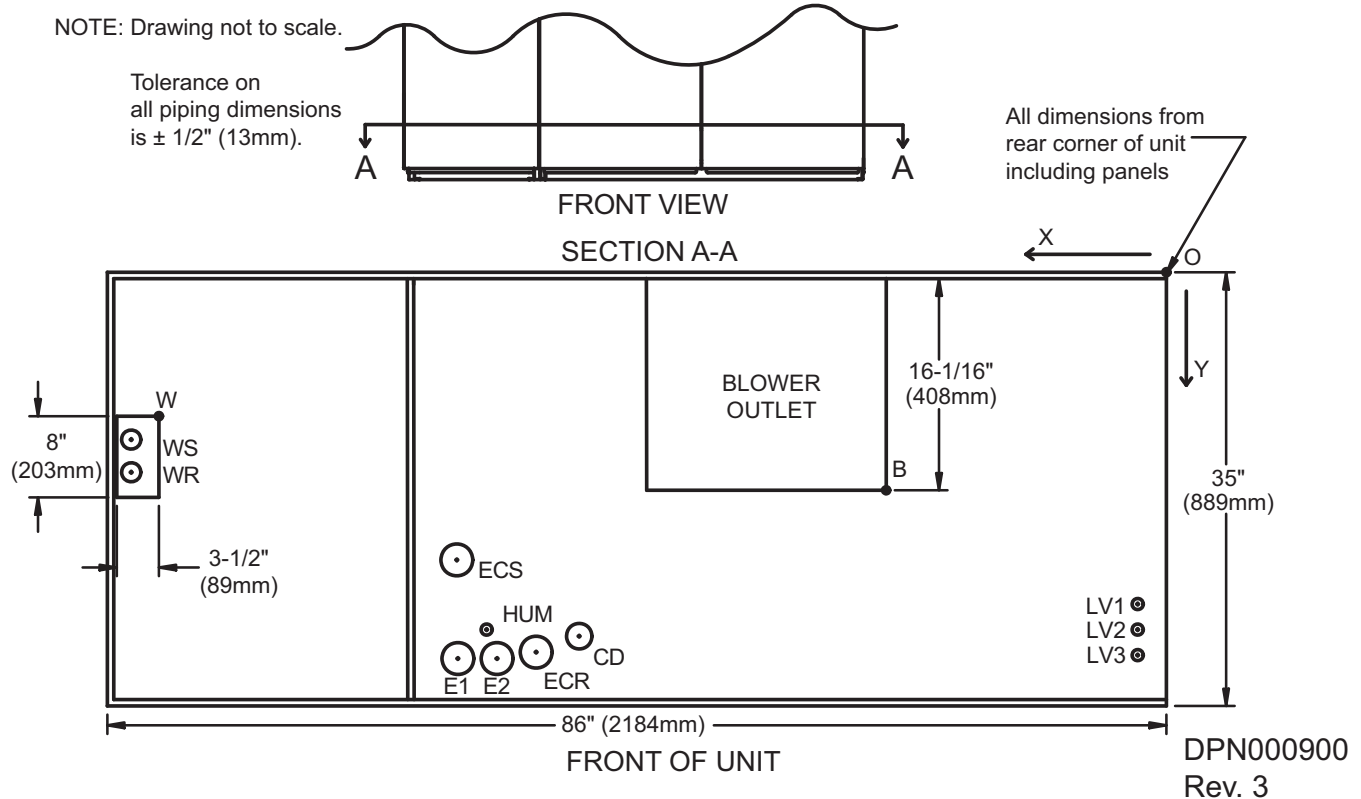


**Table 80 Weights—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors**

Dry Weight, Approximate, lb. (kg)		
Model Type	Model Size: 028-042	
Semi-Hermetic Compressor	Water/Glycol	1930 (877)
	GLYCOOL/Dual-Cool	2080 (945)
Scroll or Digital Scroll Compressor	Water/Glycol	1780 (809)
	GLYCOOL/Dual-Cool	1930 (877)

Source: DPN000894, Rev. 4

**Figure 82 Primary connection locations—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors with centrifugal fans**



**Table 81 Piping data—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors**

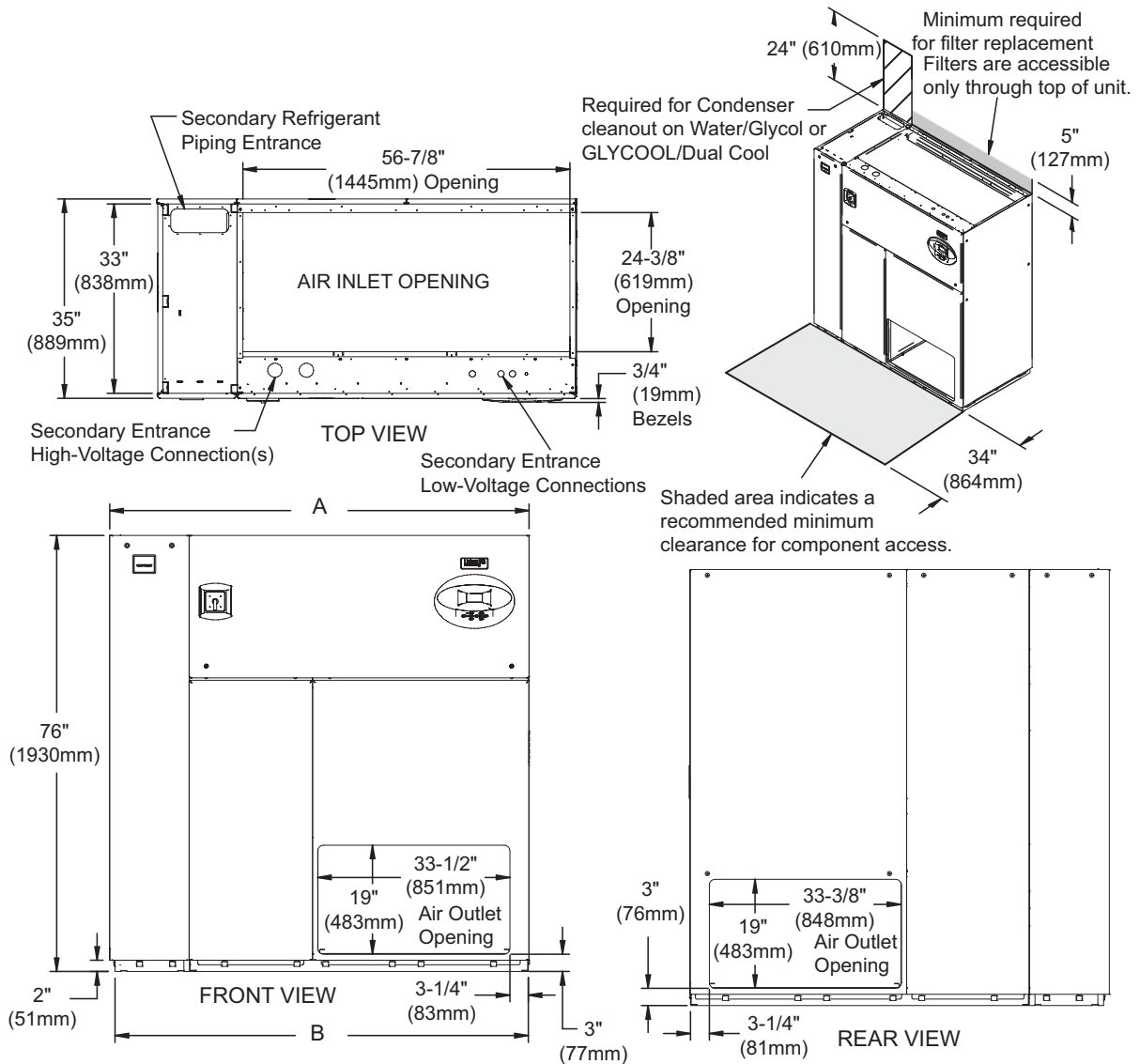
Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W	Water/Glycol/GLYCOOL Access	79-15/16 (2030)	9-1/16 (230)	3-1/2 x 8 (89 x 203)
WS	Water/Glycol/GLYCOOL Supply	82-15/16 (2107)	10-15/16 (278)	1-5/8" Cu Sweat
WR	Water/Glycol/GLYCOOL Return	82-15/16 (2107)	14-1/16 (357)	1-5/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier) *	46 (1168)	29-1/2 (749)	3/4" FPT
	Condensate Drain (steam generating humidifier) *	46 (1168)	29-1/2 (749)	1-1/4" FPT
	W/ Optional Pump	46 (1168)	29-1/2 (749)	1/2" Cu Sweat
HUM	Humidifier Supply Line	53-1/2 (1359)	29 (737)	1/4" Cu Sweat
ECS	Dual-Cool Supply	54-7/8 (1394)	22-9/16 (573)	1-5/8" Cu Sweat
ECR	Dual-Cool Return	49-13/16 (1265)	28-1/2 (724)	1-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	55-1/2 (1410)	31-1/4 (794)	2-1/2"
E2	Electrical Conn. (High Volt)	52-7/16 (1332)	31-1/4 (794)	2-1/2"
LV1	Electrical Conn. (Low Volt)	2-1/4 (57)	27 (686)	7/8"
LV2	Electrical Conn. (Low Volt)	2-1/4 (57)	29 (737)	7/8"
LV3	Electrical Conn. (Low Volt)	2-1/4 (57)	31 (787)	7/8"
B	Blower Outlet	21-15/16 (557)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN000900, Rev. 3



**Figure 83 Dimensions—downflow, water/glycol/GLYCOOL systems, 28-42kW (8-12 ton), with EC fans, front and/or rear discharge models**



**Customer Piping and Wiring Connections**

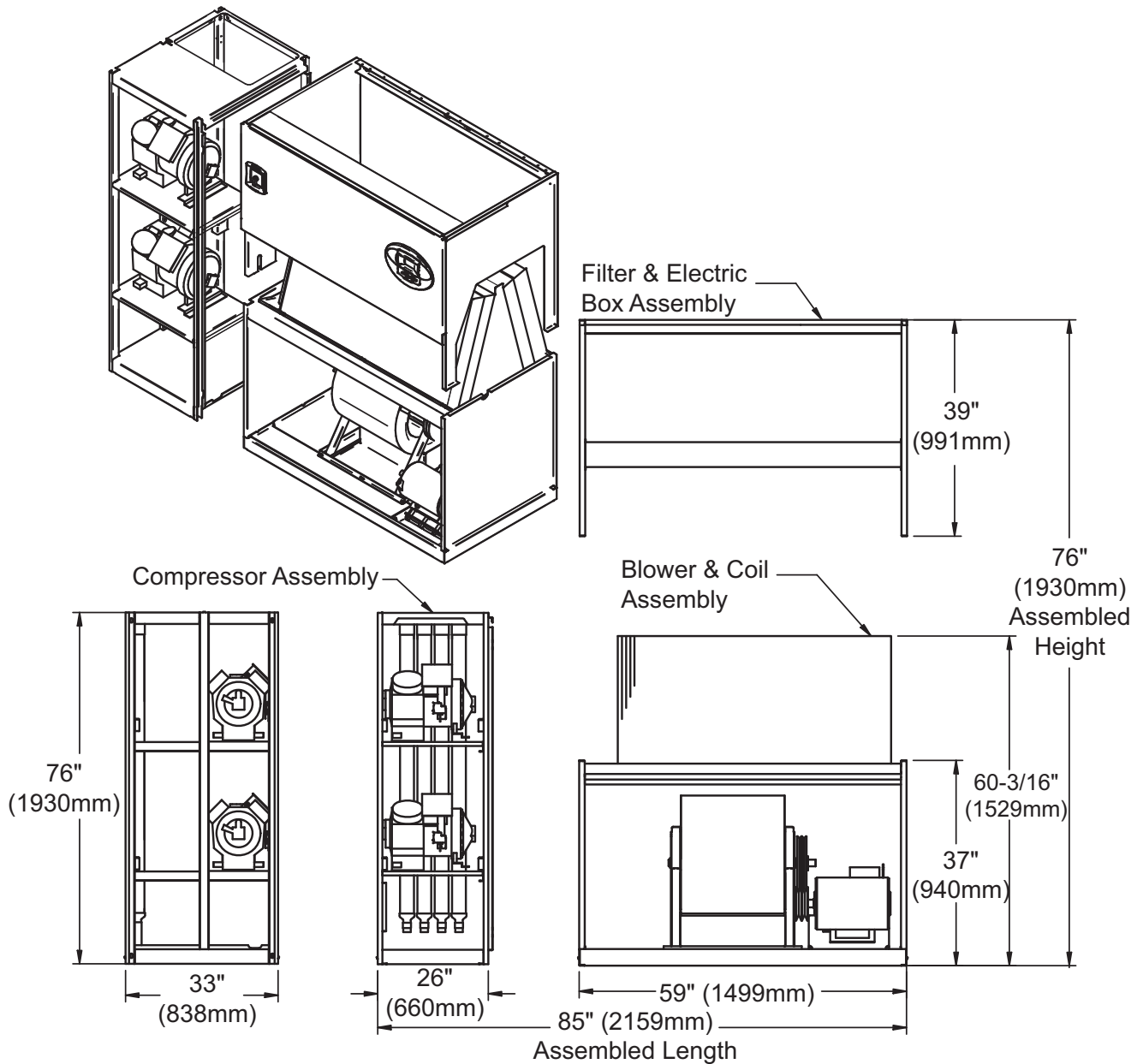
1. For primary connection locations see standard submittals DPN000803, DPN000804 or DPN000900. A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations

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Dry Weight, lb (kg) Approximate			Dimensions	
Compressor Type	Model	028-042	A	B
Semi-Hermetic	Dual Cool	1930 (877)	86" (2184mm)	85" (2159mm)
Scroll / Digital	Dual Cool	1620 (736)	73" (1854mm)	72" (1829mm)
Semi-Hermetic	Water/Glycol	1930 (877)	86" (2184mm)	85" (2159mm)
	GLYCOOL/Dual Cool	2080 (945)		
Scroll / Digital	Water/Glycol	1780 (809)	86" (2184mm)	85" (2159mm)
	GLYCOOL/Dual Cool	1930 (877)		

Source: 310697, Pg. 1, Rev. 0

**Figure 84** Disassembly dimensions—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors with centrifugal fans



NOTES: Drawing views are simplified with panels removed to show overall dimensions.

See disassembly and handling instructions in installation manual.

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Rev. 2

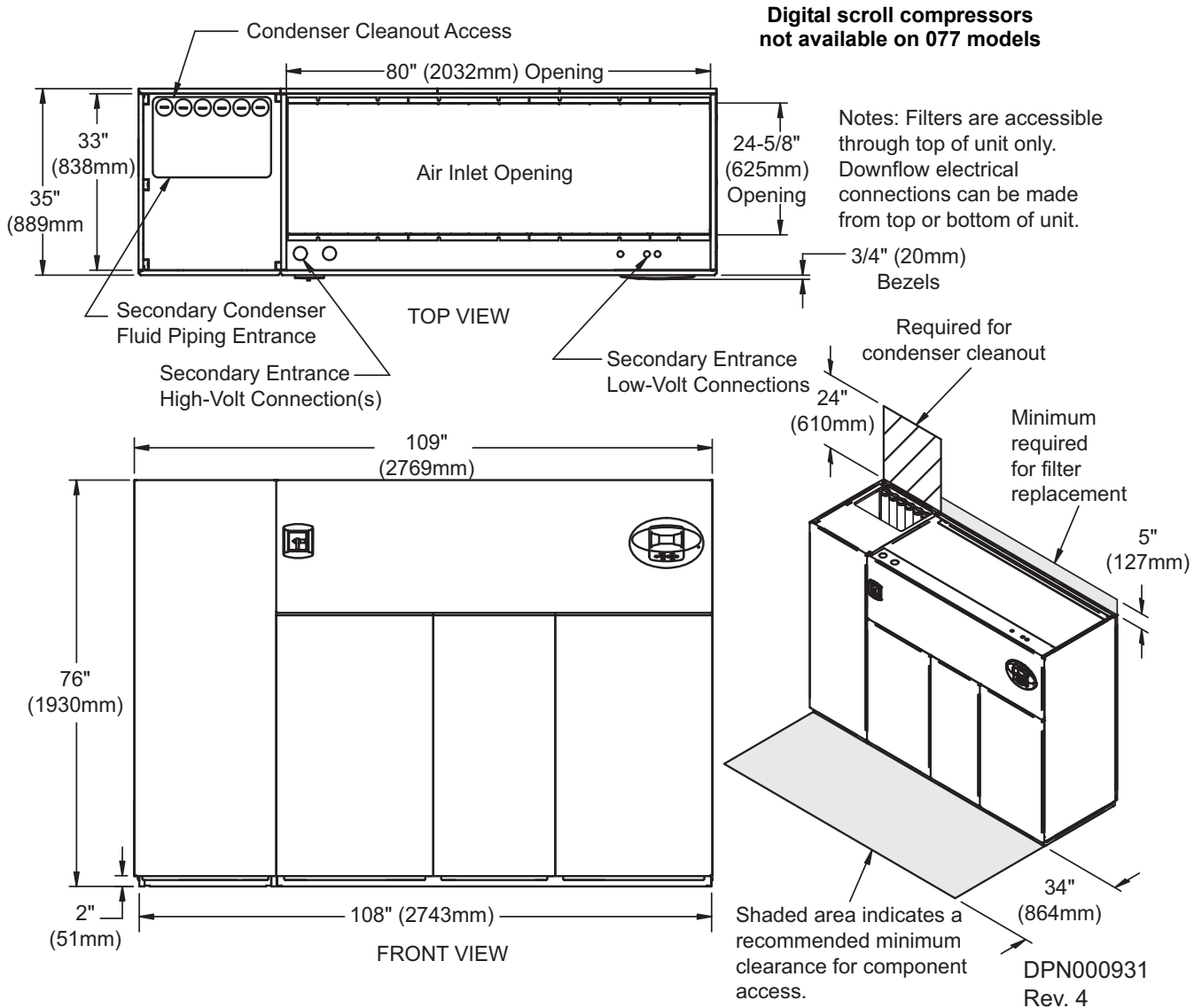
**Table 82** Component weights—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), downflow, all compressors

Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Scroll or Digital Scroll Compressor	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	950 (432)	950 (432)	800 (364)	800 (364)
Filter and Electric Box Assembly	210 (96)	210 (96)	210 (96)	210 (96)
Blower and Coil Assembly	770 (350)	920 (418)	770 (350)	920 (418)

Source: DPN000899, Rev. 2

**4.6 DIMENSIONS—LIEBERT DS 053-077, DOWNFLOW, WATER/GLYCOL/GLYCOOL MODELS**

**Figure 85 Dimensions—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow, all compressors with centrifugal fans**



**Table 83 Weights—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow, all compressors**

Compressor Type	Cooling Type	Model Size		
		053 lb (kg)	070 lb (kg)	077 * Standard Scroll Only lb (kg)
Semi-Hermetic Compressor	Water/Glycol	2650 (1205)	2700 (1228)	2750 (1250)
	GLYCOOL/Dual-Cool	2830 (1287)	2880 (1310)	2930 (1332)
Scroll or Digital Scroll Compressor	Water/Glycol	2220 (1010)	2270 (1032)	2320 (1055)
	GLYCOOL/Dual-Cool	2400 (1091)	2450 (1114)	2500 (1137)

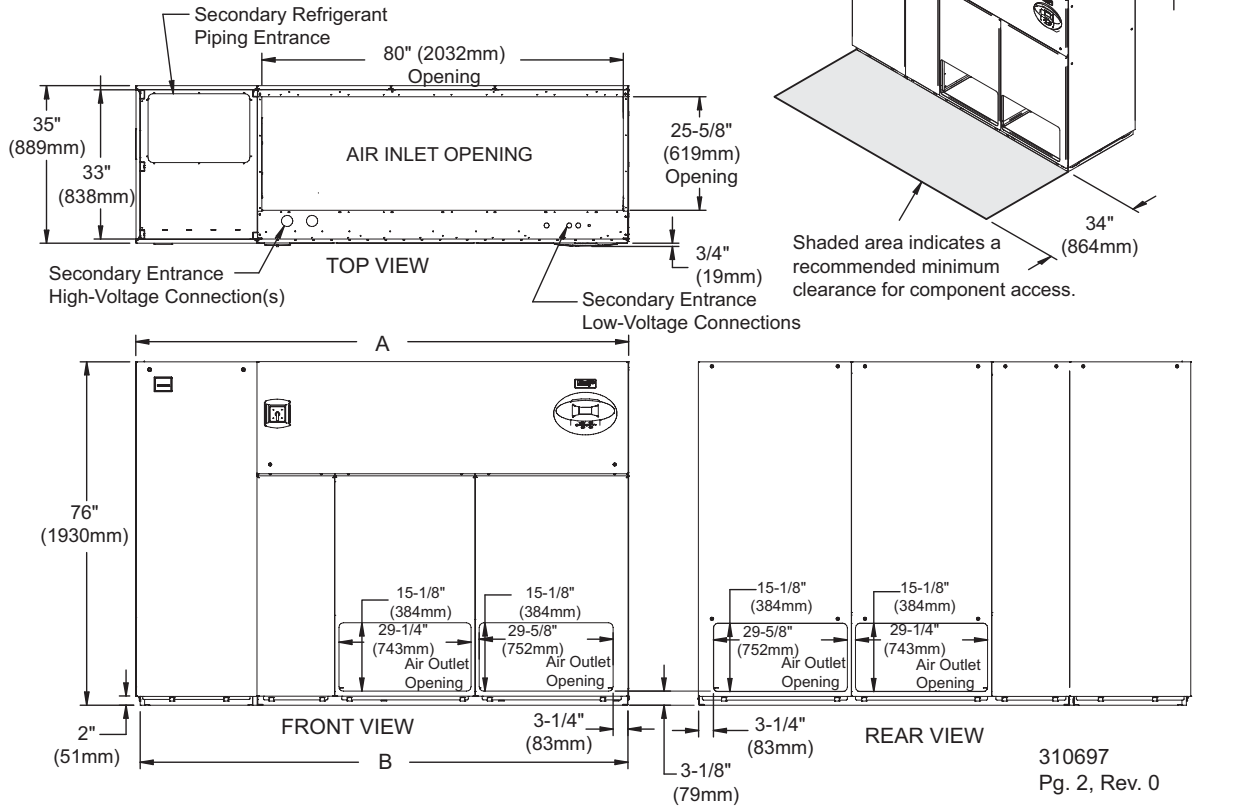
\* Digital scroll compressors not available on DS 077

Source: DPN000931, Rev. 4

**Figure 86 Dimensions—downflow, water/glycol, GLYCOOL systems, 53-77kW (15-22 ton), front and/or rear discharge models**

**Customer Piping and Wiring Connections**

1. For primary connection locations see standard submittals DPN000928, DPN000929 or DPN000933.  
A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidifier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations

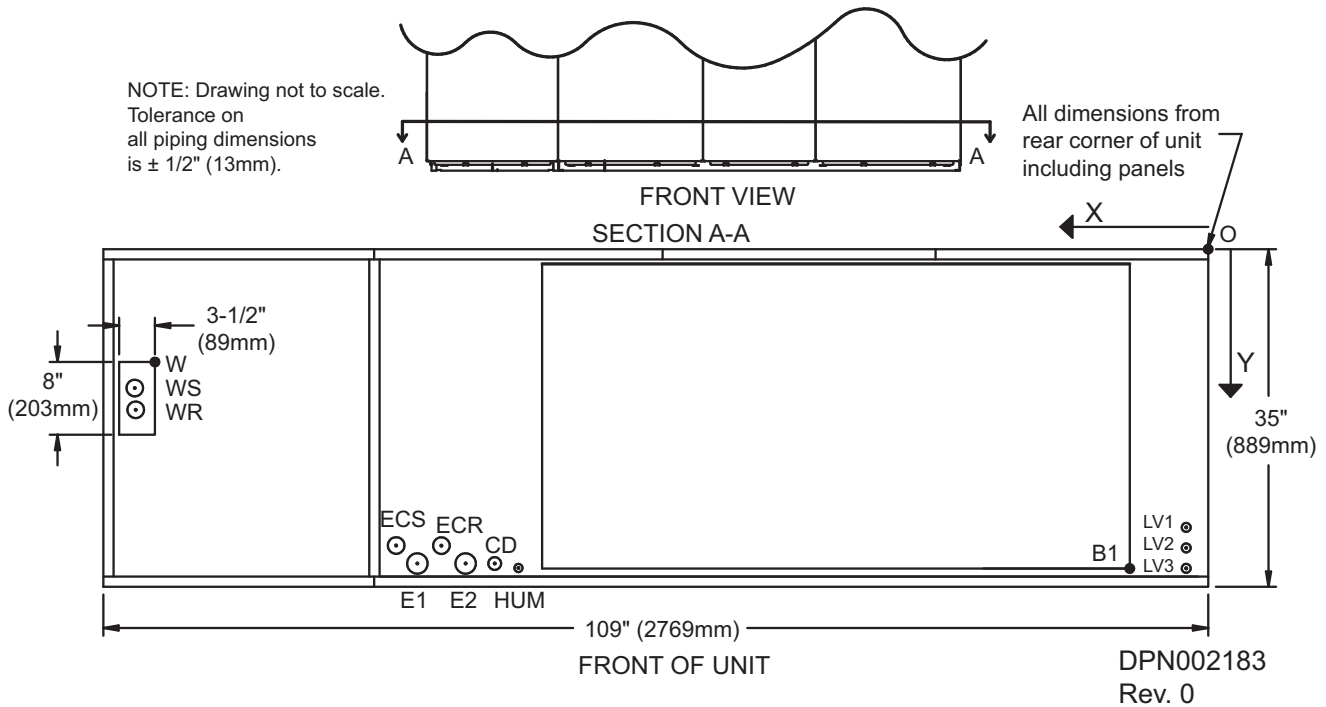


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Dry Weight, lb (kg) Approximate					Dimensions, in. (mm)	
Compressor Type	Model	53	70	77	A	B
Semi-Hermetic	Dual Cool	2530 (1150)	2580 (1173)	2630 (1196)	109 (2769)	108 (2743)
Scroll / Digital	Dual Cool	2100 (955)	2150 (978)	2200 (1000)	98 (2489)	97 (2464)
Semi-Hermetic	Water/Glycol	2650 (1205)	2700 (1228)	2750 (1250)	109 (2769)	108 (2743)
	GLYCOOL/Dual Cool	2830 (1287)	2880 (1310)	2930 (1332)		
Scroll / Digital	Water/Glycol	2220 (1010)	2270 (1032)	2320 (1055)	109 (2769)	85 (2159)
	GLYCOOL/Dual Cool	2400 (1091)	2450 (1114)	2500 (1137)		

Source: 310697, Pg. 2, Rev. 0

**Figure 87 Primary connection locations—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), all compressor models with EC fans**



**Table 84 Piping data—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow with EC fans**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W	Water/Glycol/GLYCOOL Access	103 (2616)	9 (229)	3-1/2 x 8 (89x203)
WS	Water/Glycol/GLYCOOL Supply	104-3/4 (2661)	11 (279)	2-1/8 Cu Sweat
WR	Water/Glycol/GLYCOOL Return	104-3/4 (2661)	15 (381)	2-1/8 Cu Sweat
CD	Condensate Drain (Infrared Humidifier or No Humidifier)*	68-3/8 (1737)	31-3/8 (797)	3/4 FPT
	W/ Optional Pump	68-3/8 (1737)	31-3/8 (797)	1/2 Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4 Cu Sweat
ECS**	Dual-Cool Supply	78-5/8 (1997)	22-1/4 (565)	2-1/8 Cu Sweat
ECR**	Dual-Cool Return	73-15/16 (1862)	26-9/16 (675)	2-1/8 Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2
LV1	Electrical Conn. (Low Volt)	2 (51)	29 (737)	7/8
LV2	Electrical Conn. (Low Volt)	2 (51)	30-7/8 (784)	7/8
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8
B1	Blower Outlet	4-1/2 (114)	33 (838)	58-3/8x30 (1483x762)

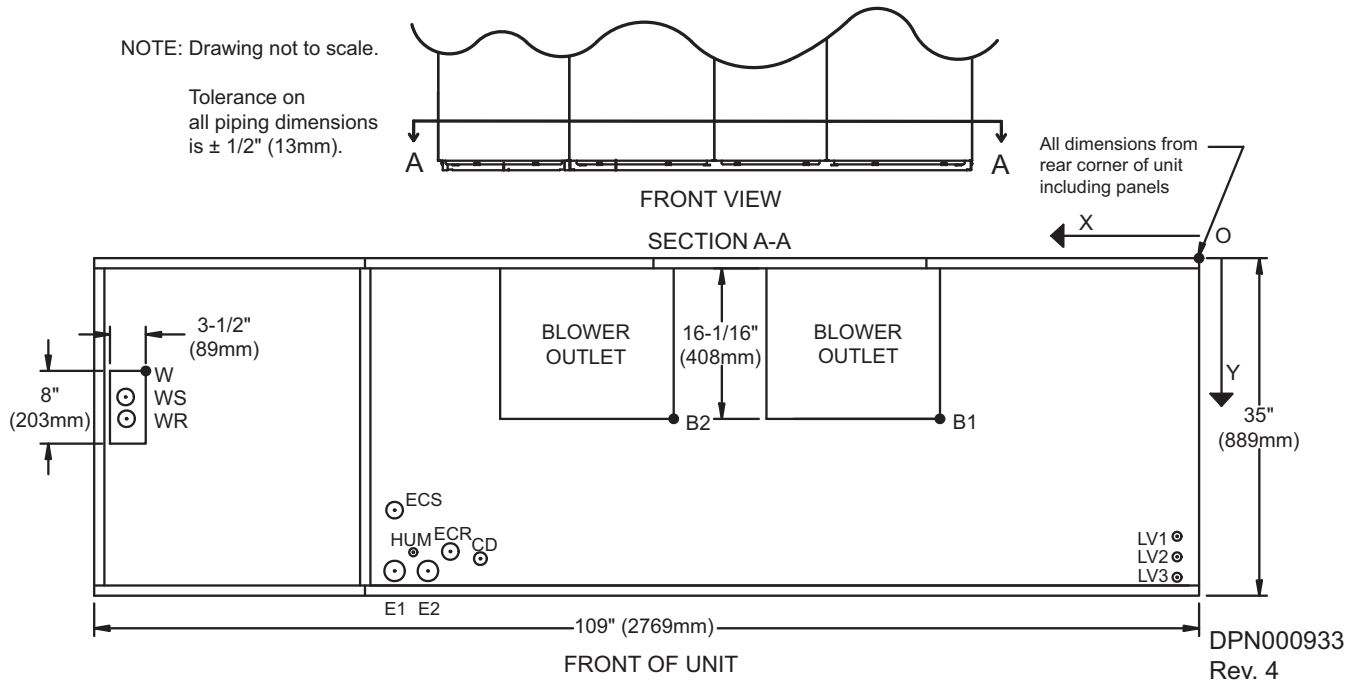
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN002183, Rev. 0

**Figure 88 Primary connection locations—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow, all compressor models with centrifugal fans**



**Table 85 Piping data—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow**

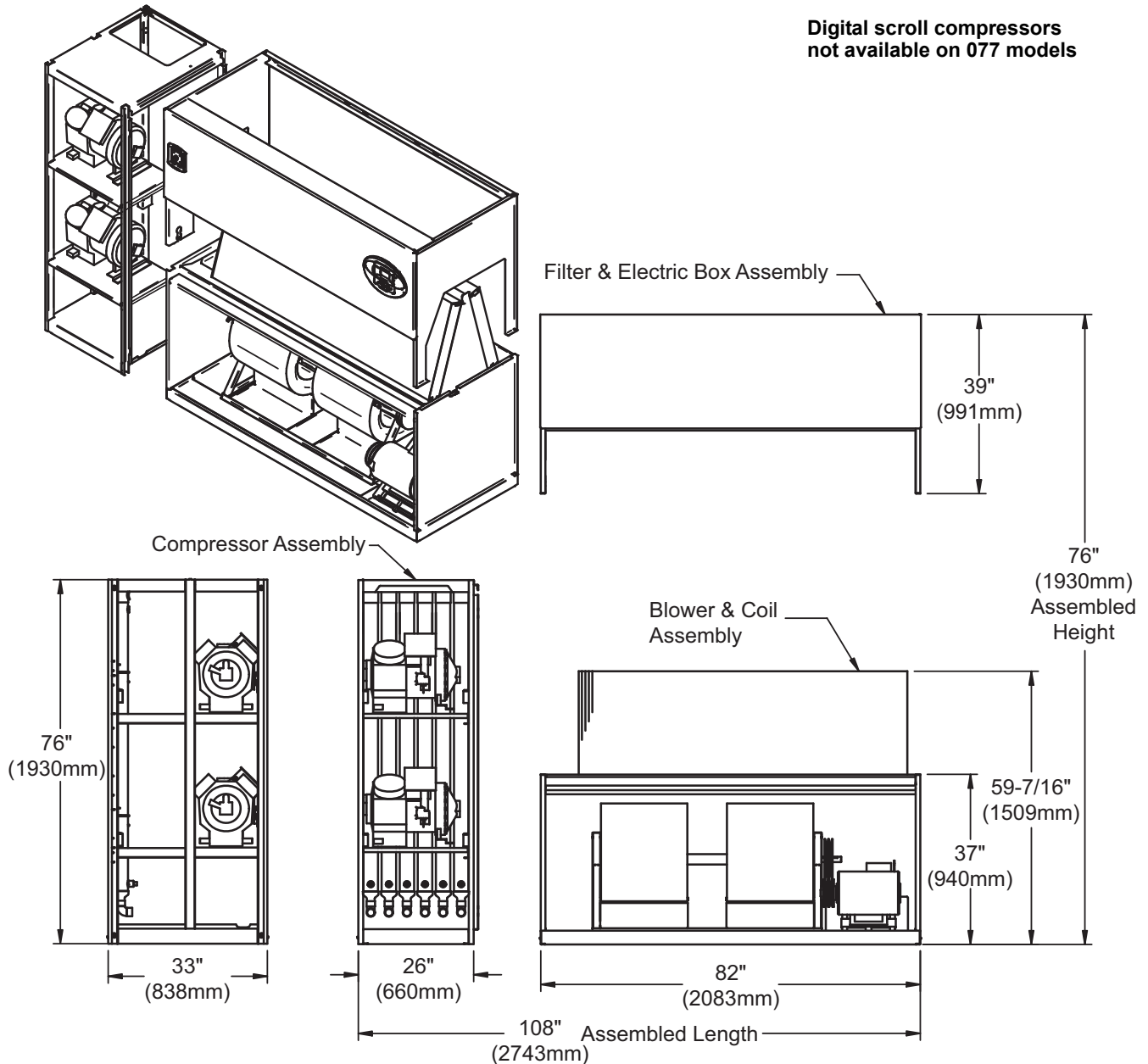
Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W	Water/Glycol/GLYCOOL Access	103 (2616)	9 (229)	3-1/2 x 8 (89 x 203)
WS	Water/Glycol/GLYCOOL Supply	104-3/4 (2661)	11 (279)	2-1/8" Cu Sweat
WR	Water/Glycol/GLYCOOL Return	104-3/4 (2661)	15 (381)	2-1/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier)*	67-11/16 (1719)	30-1/2 (775)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	67-11/16 (1719)	30-1/2 (775)	1-1/4" FPT
	W/ Optional Pump	67-11/16 (1719)	30-1/2 (775)	1/2" Cu Sweat
HUM	Humidifier Supply Line	76-1/2 (1943)	29 (736)	1/4" Cu Sweat
ECS**	Dual-Cool Supply	78-5/8 (1997)	22-1/4 (565)	2-1/8" Cu Sweat
ECR**	Dual-Cool Return	72 (1829)	29 (737)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	78-1/2 (1994)	31-1/8 (790)	2-1/2"
E2	Electrical Conn. (High Volt)	75-3/8 (1915)	31-1/8 (790)	2-1/2"
LV1	Electrical Conn. (Low Volt)	1-7/8 (48)	28-1/2 (724)	7/8"
LV2	Electrical Conn. (Low Volt)	1-7/8 (48)	30-1/4 (768)	7/8"
LV3	Electrical Conn. (Low Volt)	1-7/8 (48)	32 (813)	7/8"
B1	Blower Outlet (15 x 15)	23-1/8 (587)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	27-3/4 (705)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)
B2	Blower Outlet (15 x 15)	50-3/8 (1280)	18-1/16 (459)	18-3/4 x 16-1/16 (476 x 408)
	Blower Outlet (15 x 11)	54-3/8 (1381)	18-1/16 (459)	14-3/4 x 16-1/16 (375 x 408)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling systems only (four-pipe system)

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN000933, Rev. 4

**Figure 89 Disassembly dimensions—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow, all compressors with centrifugal or EC fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual. DPN000932 Rev. 3

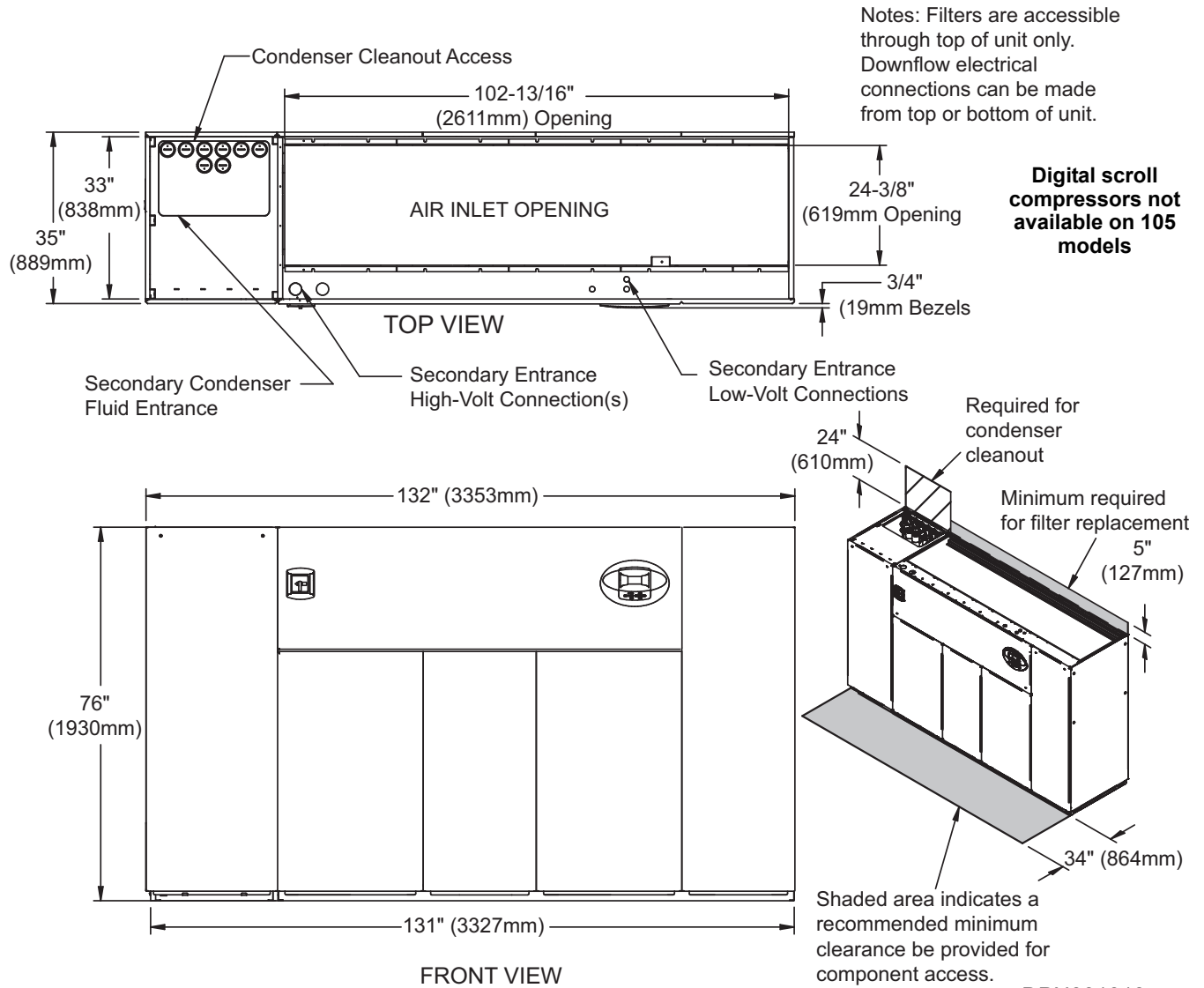
**Table 86 Component weights—Water/glycol/GLYCOOL, 53-77kW (15-22 ton), downflow, all compressors \* with centrifugal or EC fans**

Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Scroll or Digital Scroll Compressor	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	1270 (578)	1270 (578)	840 (382)	840 (382)
Filter and Electric Box Assembly	250 (114)	250 (114)	250 (114)	250 (114)
Blower and Coil Assembly	1230 (560)	1410 (641)	1230 (560)	1410 (641)

\* Digital scroll compressors not available on DS 077  
Source: DPN000932, Rev. 3

### 4.7 DIMENSIONS—LIEBERT DS 105, DOWNFLOW, WATER/GLYCOL/GLYCOOL-COOLED MODELS

**Figure 90** Dimensions—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic or scroll compressors with centrifugal or EC fans



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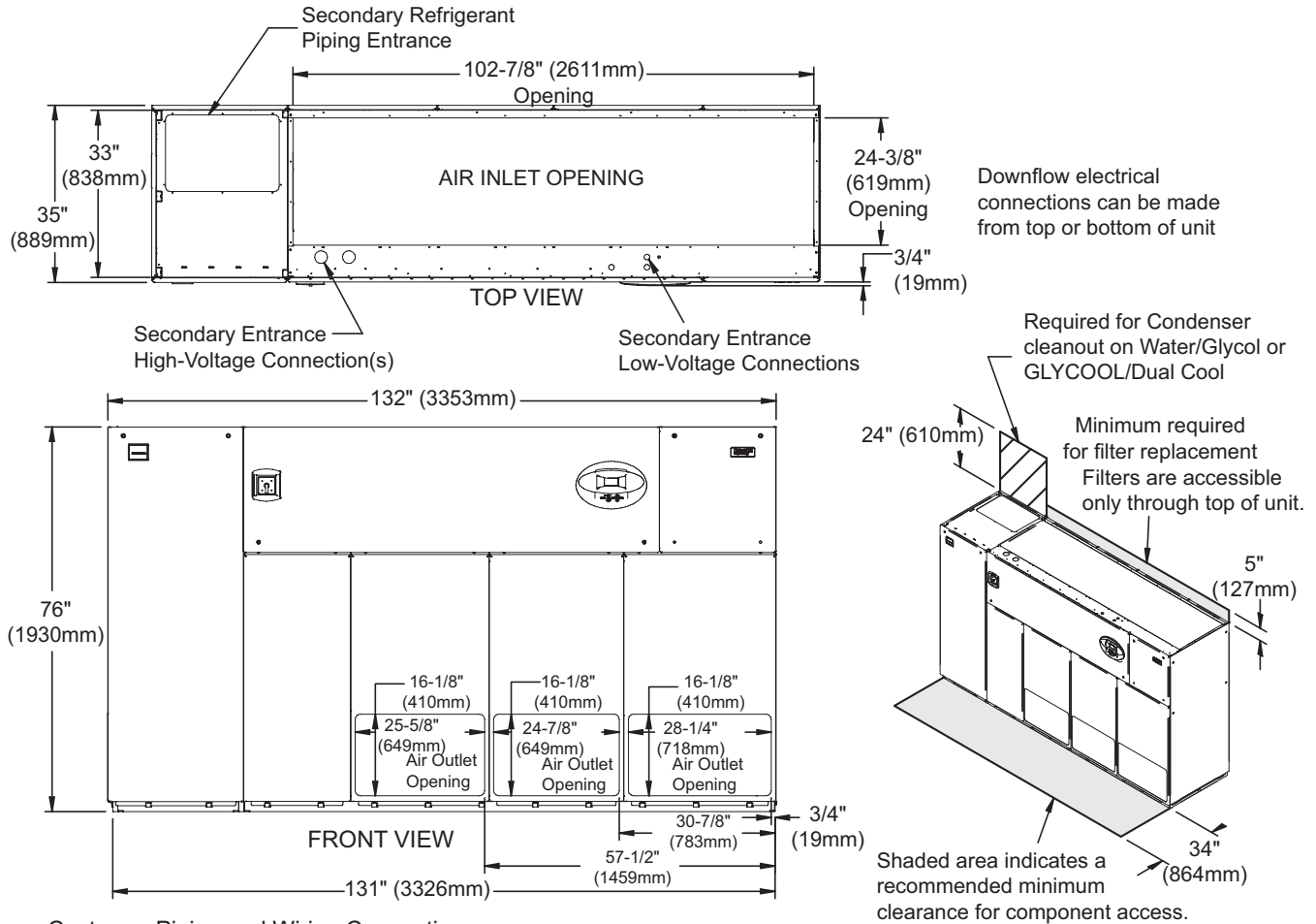
**Table 87** Weights—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic and scroll compressors \*

Compressor Type	Dry Weight, Approximate, lb (kg)			
	Forward-Curved Fans		EC Fans	
	Air-Cooled	Dual-Cool	Air-Cooled	Dual-Cool
Semi-Hermetic	3410 (1550)	3770 (1714)	3144 (1426)	3504 (1589)
Scroll	3290 (1495)	3650 (1659)	3024 (1372)	3384 (1535)

\* Digital scroll compressors not available on DS 105  
Source: DPN001013, Rev. 4



**Figure 91 Dimensions—downflow, water/glycol, GLYCOOL systems, 105kW (30 ton), front discharge models with EC fans**



**Customer Piping and Wiring Connections**

1. For primary connection locations see standard submittals DPN001014 or DPN001015.  
A floor stand at least 9" high is recommended if primary connections locations are to be used.
2. If no floor stand is used and unit is placed directly on the floor, then do the following:
  - a) Use secondary connection locations (shown on standard floor planning submittals).
  - b) Order a condensate pump.
  - c) Field pipe condensate and humidier line (if ordered) to secondary connection point in compressor section.
  - d) Or order additional SFA's to relocate connection locations

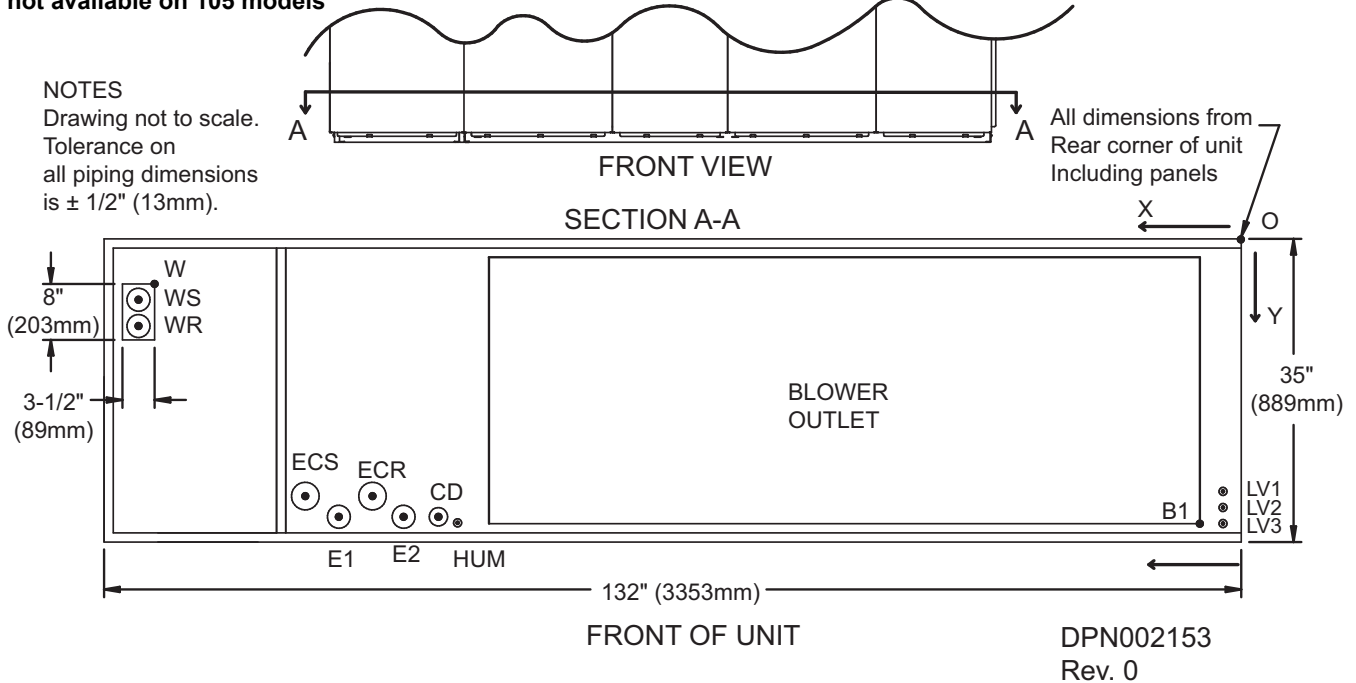
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Dry Weight, lb (kg) Approximate		
Compressor Type	Model	105
Semi-Hermetic	Dual Cool	3134 (1422)
Scroll / Digital	Dual Cool	3014 (1367)
Semi-Hermetic	Water/Glycol	3144 (1426)
	GLYCOOL/Dual Cool	3504 (1589)
Scroll / Digital	Water/Glycol	3024 (1372)
	GLYCOOL/Dual Cool	3384 (1535)

Source: 310697, Pg. 3, Rev. 0

**Figure 92 Primary connection locations—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic or standard scroll compressors with EC fans**

**Digital scroll compressors not available on 105 models**



**Table 88 Piping data—Water/glycol/GLYCOOL 105kW (30 ton), downflow with EC fans, semi-hermetic and standard scroll compressors \*\*\***

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W	Water/Glycol/GLYCOOL Access	125-15/16 (3199)	9 (229)	3-1/2 x 8 (89x203)
WS	Water/Glycol/GLYCOOL Supply	127-7/8 (3248)	10-1/16 (256)	2-1/8 Cu Sweat
WR	Water/Glycol/GLYCOOL Return	127-7/8 (3248)	13-1/4 (337)	2-1/8 Cu Sweat
CD	Condensate Drain (Infrared Humidifier or No Humidifier)*	87-3/8 (2220)	31 (787)	3/4 FPT
	W/ Optional Pump	83-13/16 (2129)	30 (762)	1/2 Cu Sweat
HUM	Humidifier Supply Line	85-5/16 (2167)	32-1/2 (825)	1/4 Cu Sweat
ECS	Dual-Cool Supply	101-7/8 (2588)	29 (737)	2-5/8 Cu Sweat
ECR	Dual-Cool Return	94-9/16 (2402)	29 (737)	2-5/8 Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/8 (2492)	31 (788)	2-1/2
E2	Electrical Conn. (High Volt)	91 (2311)	31 (788)	2-1/2
LV1	Electrical Conn. (Low Volt)	2 (51)	29 (737)	7/8
LV2	Electrical Conn. (Low Volt)	2 (51)	30-7/8 (784)	7/8
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8
B1	Blower Outlet	4-1/2 (114)	33 (838)	77-3/8 x 30 (1965x762)

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

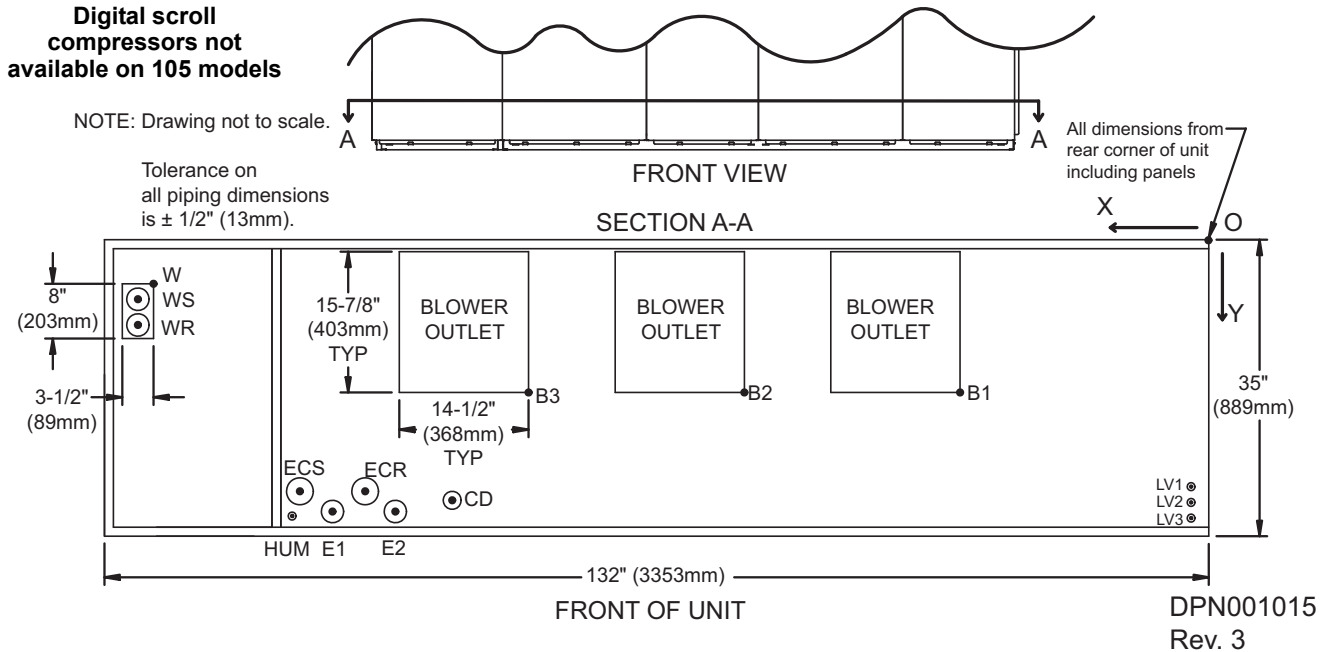
\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 105

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN002153, Rev. 0

**Figure 93 Primary connection locations—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic or standard scroll compressors with centrifugal fans**



**Table 89 Piping data—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic and standard scroll compressors \*\*\***

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W	Water/Glycol/GLYCOOL Access	125-15/16 (3199)	9 (229)	3-1/2 x 8 (89 x 203)
WS	Water/Glycol/GLYCOOL Supply	127-7/8 (3248)	10-1/16 (256)	2-1/8" Cu Sweat
WR	Water/Glycol/GLYCOOL Return	127-7/8 (3248)	13-1/4 (337)	2-1/8" Cu Sweat
CD	Condensate Drain (infrared humidifier or no humidifier)*	83-13/16 (2129)	30 (762)	3/4" FPT
	Condensate Drain (steam generating humidifier)*	83-13/16 (2129)	30 (762)	1-1/4" FPT
	W/ Optional Pump	83-13/16 (2129)	30 (762)	1/2" Cu Sweat
HUM	Humidifier Supply Line	102-3/4 (2610)	31-3/4 (806)	1/4" Cu Sweat
ECS**	Dual-Cool Supply	101-7/8 (2588)	29 (737)	2-5/8" Cu Sweat
ECR**	Dual-Cool Return	94-9/16 (2402)	29 (737)	2-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/4 (2496)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	88-7/16 (2246)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	2 (51)	27-1/2 (796)	7/8"
LV2	Electrical Conn. (Low Volt)	2 (51)	30-1/4 (768)	7/8"
LV3	Electrical Conn. (Low Volt)	2 (51)	32 (813)	7/8"
B1	Blower Outlet	28-1/4 (718)	18 (457)	14-1/2 x 15-7/8 (368 x 403)
B2	Blower Outlet	52 (1321)	18 (457)	14-1/2 x 15-7/8 (368 x 403)
B3	Blower Outlet	75-11/16 (1922)	18 (457)	14-1/2 x 15-7/8 (368 x 403)

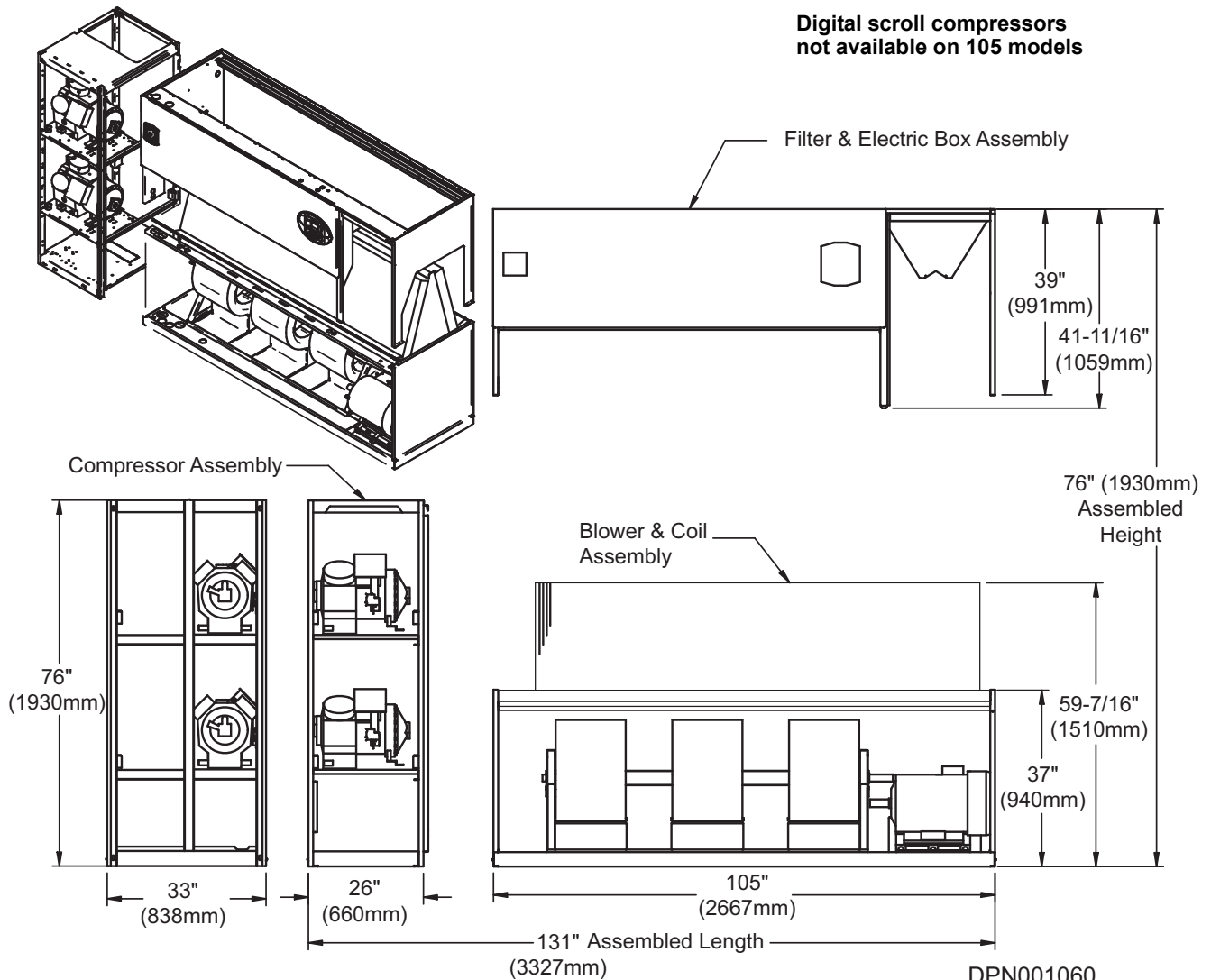
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on Dual-Cooling systems only (four-pipe system)

\*\*\* Digital scroll compressors not available on DS 105 Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001015, Rev. 3

**Figure 94 Disassembly dimensions—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic or standard scroll compressors with centrifugal and EC fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

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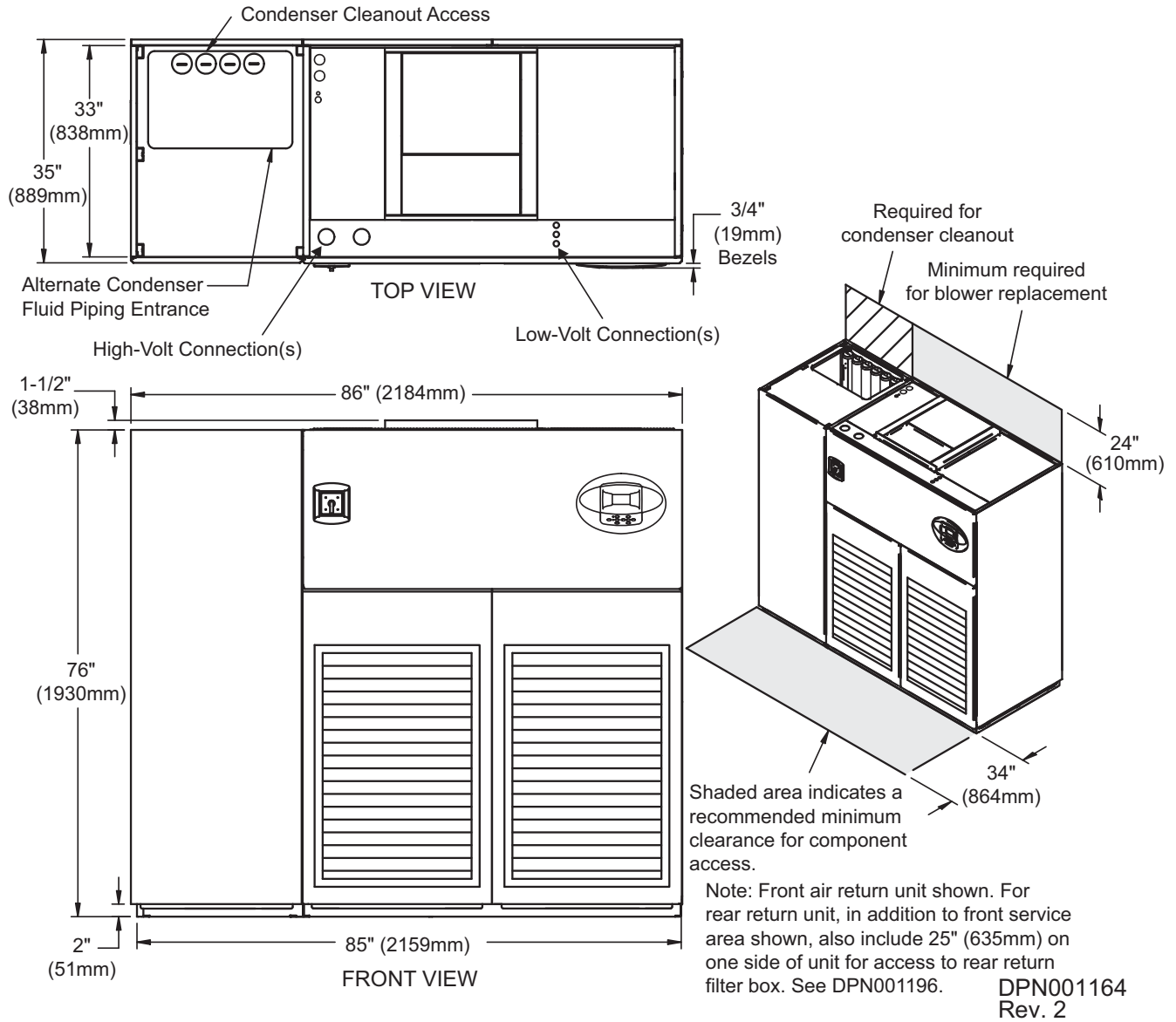
**Table 90 Component weights—Water/glycol/GLYCOOL 105kW (30 ton), downflow, semi-hermetic and standard scroll compressors**

Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Standard Scroll Compressor *	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	1320 (600)	1320 (600)	1200 (545)	1200 (545)
Filter and Electric Box Assembly	270 (123)	270 (123)	270 (123)	270 (123)
Blower and Coil Assembly Forward-Curved Fans	1820 (827)	2180 (991)	1820 (827)	2180 (991)

\* Digital scroll compressors not available on DS 105  
Source: DPN001060, Rev. 2

### 4.8 DIMENSIONS—LIEBERT DS 028-042, UPFLOW, WATER/GLYCOL/GLYCOOL-COOLED MODELS

**Figure 95** Dimensions—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors with centrifugal fans



**Table 91** Weights—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors

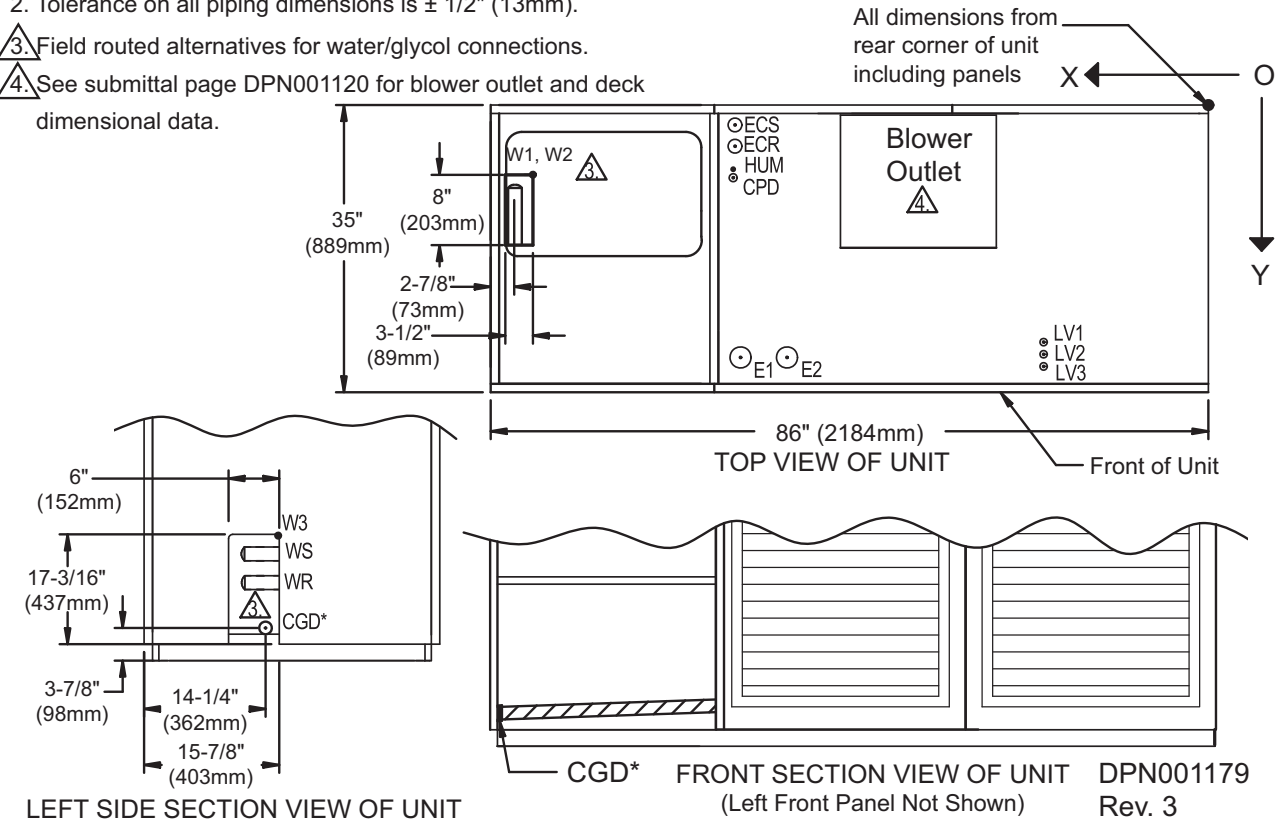
Dry weight, including panels, lb. (kg)				
	Semi-Hermetic Compressor		Scroll or Digital Scroll Compressor	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Forward-Curved Fans	1980 (898)	2130 (966)	1830 (830)	1980 (898)

Source: DPN001164, Rev. 2

**Figure 96 Primary connection locations—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors with centrifugal fans**

**NOTES:**

1. Drawing not to scale.
2. Tolerance on all piping dimensions is  $\pm 1/2"$  (13mm).
3. Field routed alternatives for water/glycol connections.
4. See submittal page DPN001120 for blower outlet and deck dimensional data.



**Table 92 Piping data—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors**

Point	Description	X in. (mm)	Y in. (mm)	Connection Size / Opening in. (mm)
W1	Water/Glycol/GLYCOOL Access (Bottom)	79-15/16 (2030)	9 (229) 3-1/2	3-1/2 x 8 (89 x 203)
W2	Water/Glycol/GLYCOOL Access (Top)	79-15/16 (2030)	9 (229)	3-1/2 x 8 (89 x 203)
W3	Water/Glycol/GLYCOOL Access (Side)	—	—	6 x 17-3/16 (152 x 437)
WS	Water/Glycol/GLYCOOL Supply	—	—	1-5/8" CU Sweat
WR	Water/Glycol/GLYCOOL Return	—	—	1-5/8" CU Sweat
CGD *	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	56-1/4 (1429)	11-1/8 (282)	1/2" CU Sweat
HUM	Humidifier Supply Line	56-1/4 (1429)	9-1/8 (232)	1/4" CU Sweat
ECS **	Dual-Cool Supply	56 (1423)	7-5/16 (186)	1-5/8" CU Sweat
ECR **	Dual-Cool Return	56 (1423)	4-1/2 (114)	1-5/8" CU Sweat
E1	Electrical Conn. (High Volt)	55-3/8 (1407)	30-7/8 (784)	2-1/2"
E2	Electrical Conn. (High Volt)	49-7/8 (1267)	30-7/8 (784)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

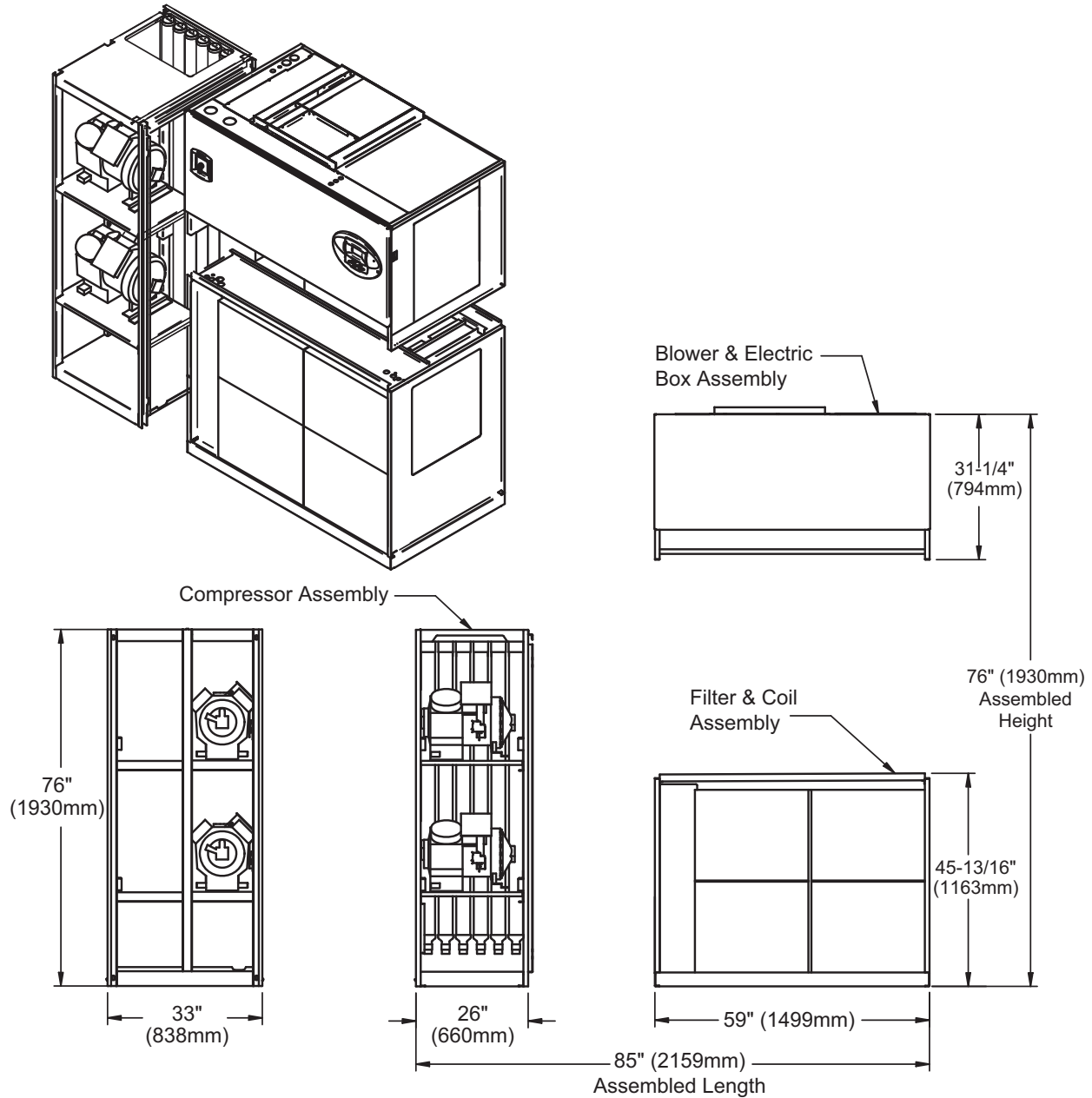
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory-installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on dual-cool systems only (four-pipe system).

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001179, Rev. 3

**Figure 97 Disassembly dimensions—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

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**Table 93 Component weights—Water/glycol/GLYCOOL, 28-42kW (8-12 ton), upflow, all compressors**

Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Scroll/Digital Scroll Compressor	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	950 (432)	950 (432)	800 (364)	800 (364)
Blower and Electric Box Assembly	510 (231)	510 (231)	510 (231)	510 (231)
Filter and Coil Assembly	520 (236)	670 (304)	520 (236)	670 (304)

Source: DPN001173, Rev. 1

Figure 98 Blower outlet location—28-42kW (8-12 ton), upflow with centrifugal fans

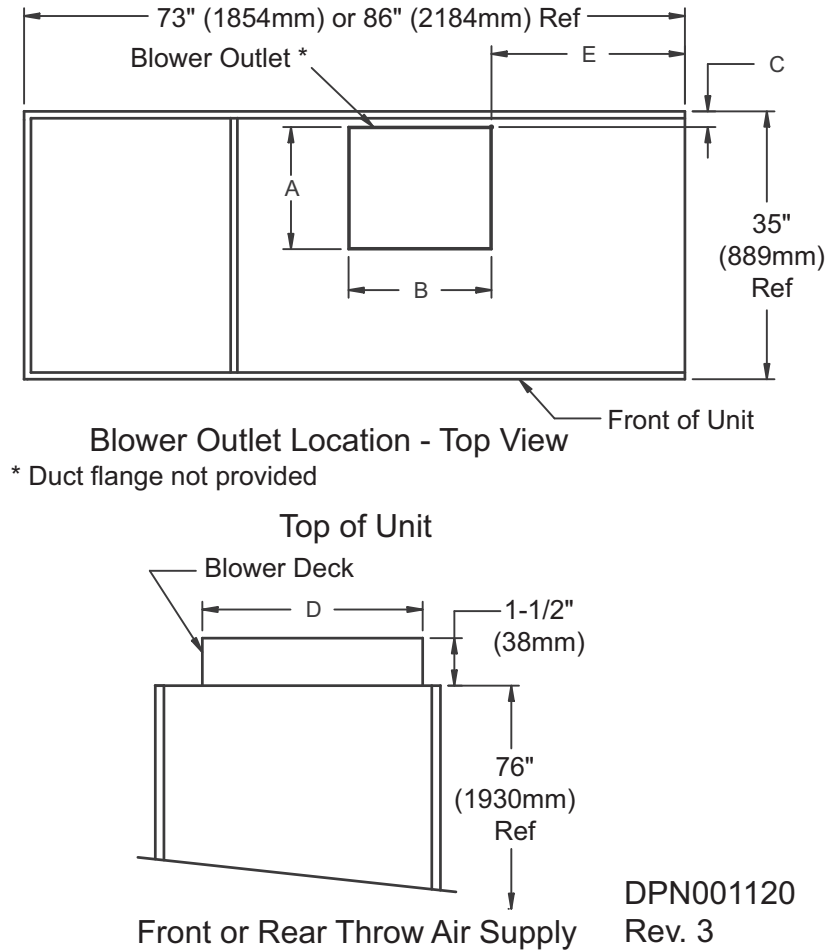


Table 94 Blower outlet and deck dimensions—28-42kW (8-12 ton), upflow

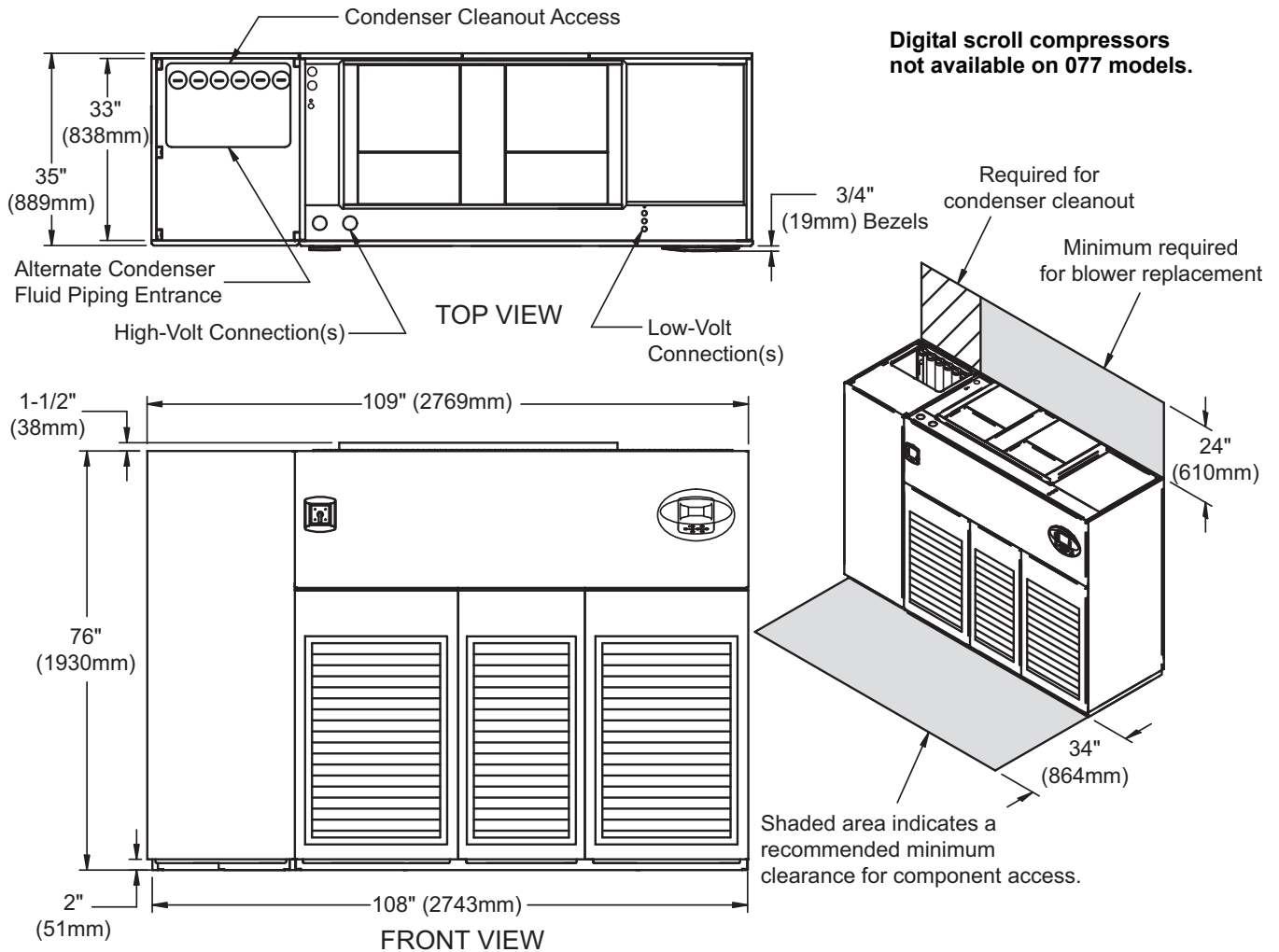
Dimensional data, in. (mm)							
Model	Blower	Supply	A	B	C	D	E
28-42kW (8-12ton)	15 x 15	Front Throw	15-7/8 (404)	18-5/8 (472)	2-1/8 (54)	25-5/8 (651)	25 (635)
		Rear Throw	15-7/8 (404)	18-5/8 (472)	11-5/8 (295)	25-5/8 (651)	25 (635)
	15 x 11	Front Throw	15-7/8 (404)	14-1/2 (368)	2-1/8 (54)	25-5/8 (651)	25 (635)
		Rear Throw	15-7/8 (404)	14-1/2 (368)	11-5/8 (295)	25-5/8 (651)	25 (635)

Source: DPN001120, Rev. 3



### 4.9 DIMENSIONS—LIEBERT DS 053-077, UPFLOW, WATER/GLYCOL/GLYCOOL-COOLED MODELS

**Figure 99** Dimensions—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow, all compressors with centrifugal fans



Digital scroll compressors not available on 077 models.

NOTE: Front air return unit shown. For rear return unit, in addition to front service area shown, also include 25" (635mm) on one side of unit for access to rear return filter box. See DPN001196.

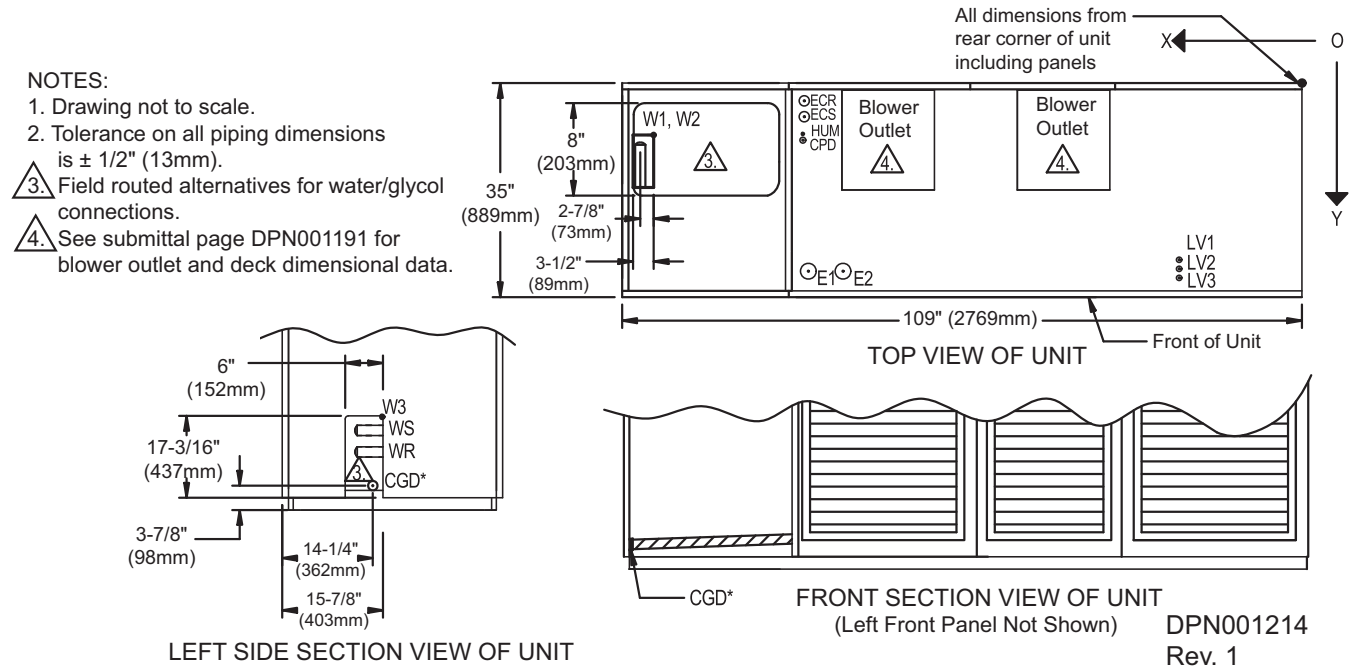
DPN001167  
Rev. 2

**Table 95** Weights—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow, all compressors

Dry Weight, Approximate, lb (kg)						
Fan Type	Semi-Hermetic Compressor				Scroll or Digital Scroll	
	053		070, 077		053, 070, 077 *	
	Water/ Glycol	GLYCOOL/ Dual-Cool	Water/Glycol	GLYCOOL/ Dual-Cool	Water/Glycol	GLYCOOL/ Dual-Cool
Forward-Curved Fans	2650 (1205)	2830 (1287)	2800 (1270)	2980 (1352)	2370 (1075)	2550 (1157)

\* Digital scroll compressors not available on DS 077  
Source: DPN001167, Rev. 2

**Figure 100 Primary connection locations—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow with centrifugal fans**



**Table 96 Piping data—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow**

Point	Description	X, in. (mm)	Y, in. (mm)	Connection Size / Opening
W1	Water/Glycol/GLYCOOL Access (Bottom)	102-15/16 (2615)	9 (229)	3-1/2 x 8 (89 x 203)
W2	Water/Glycol/GLYCOOL Access (Top)	102-15/16 (2615)	9 (229)	3-1/2 x 8 (89 x 203)
W3	Water/Glycol/GLYCOOL Access (Side)	—	—	6 x 17-3/16 (152 x 437)
WS	Water/Glycol/GLYCOOL Supply	—	—	2-1/8" Cu Sweat
WR	Water/Glycol/GLYCOOL Return	—	—	2-1/8" Cu Sweat
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	79-5/16 (2015)	11-7/8 (302)	1/2" Cu Sweat
HUM	Humidifier Supply Line	79-5/16 (2015)	9-7/8 (251)	1/4" Cu Sweat
ECS	Dual-Cool Supply	78-5/8 (1998)	7-7/8 (200)	2-1/8" Cu Sweat
ECR	Dual-Cool Return	78-5/8 (1998)	4-5/8 (117)	2-1/8" Cu Sweat
E1	Electrical Conn. (High Volt)	75-3/8 (1915)	30 (762)	2-1/2"
E2	Electrical Conn. (High Volt)	69-7/8 (1775)	30 (762)	2-1/2"
LV1	Electrical Conn. (Low Volt)	19-1/2 (495)	29-1/16 (738)	7/8"
LV2	Electrical Conn. (Low Volt)	19-1/2 (495)	30-1/2 (775)	7/8"
LV3	Electrical Conn. (Low Volt)	19-1/2 (495)	31-15/16 (811)	7/8"

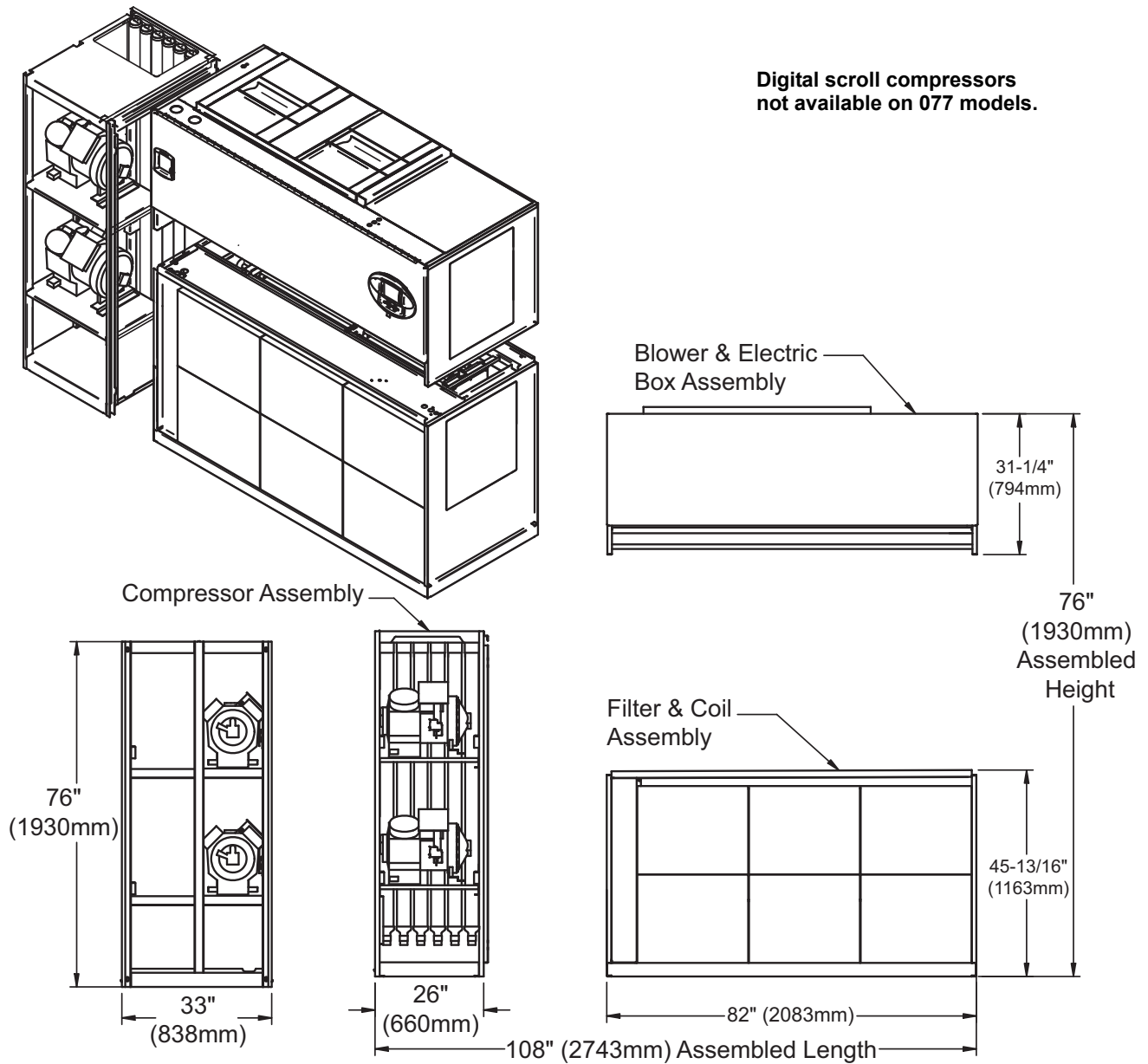
\* Field pitch condensate drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

\*\* Supplied on dual-cool systems only.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825.

Source: DPN001214, Rev. 1

**Figure 101** Disassembly dimensional data—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow, all compressors with centrifugal fans



NOTES: Drawing views are simplified with panels removed to show overall dimensions.  
See disassembly and handling instructions in installation manual.

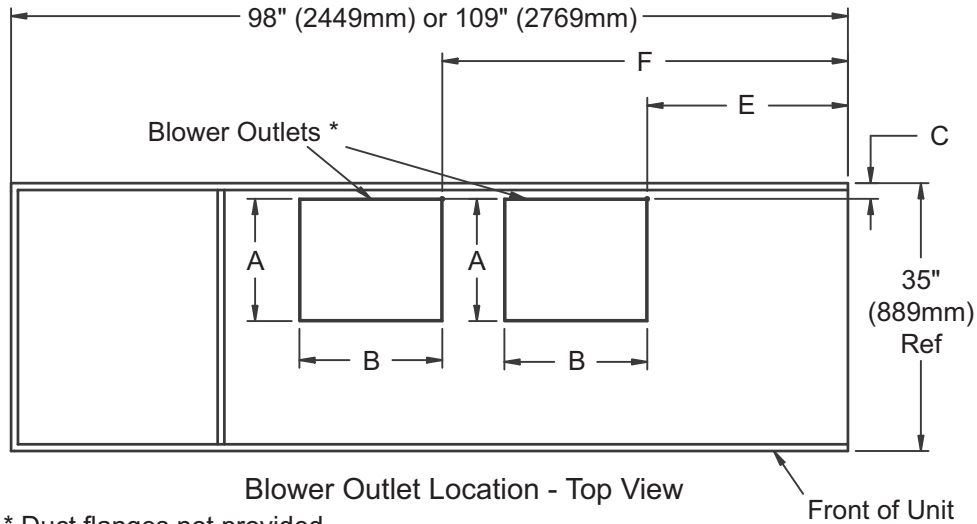
DPN001211  
Rev. 1

**Table 97** Component weights—Water/glycol/GLYCOOL, 53-77kw (15-22 ton), upflow, all compressors

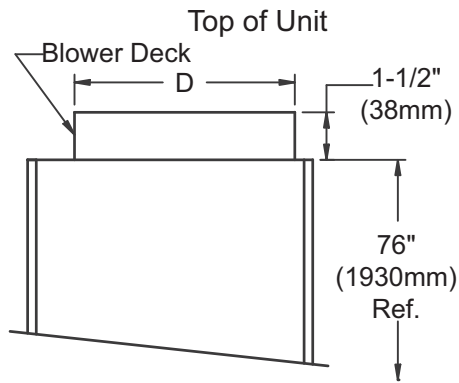
Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Scroll or Digital Scroll Compressor *	
	Water/Glycol	GLYCOOL/Dual-cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	1270 (578)	1270 (578)	840 (382)	840 (382)
Blower and Electric Box Assembly Forward-Curved Fans	770 (349)	770 (349)	770 (349)	770 (349)
Filter and Coil Assembly	760 (345)	940 (426)	760 (345)	940 (426)

\* Digital scroll compressors not available on DS 077  
Source: DPN001211, Rev. 1

Figure 102 Blower outlet and deck dimensions—53-77kW (15-22 ton), upflow, with centrifugal fans



\* Duct flanges not provided.



Front or Rear Air Throw Supply      DPN001191 Rev. 6

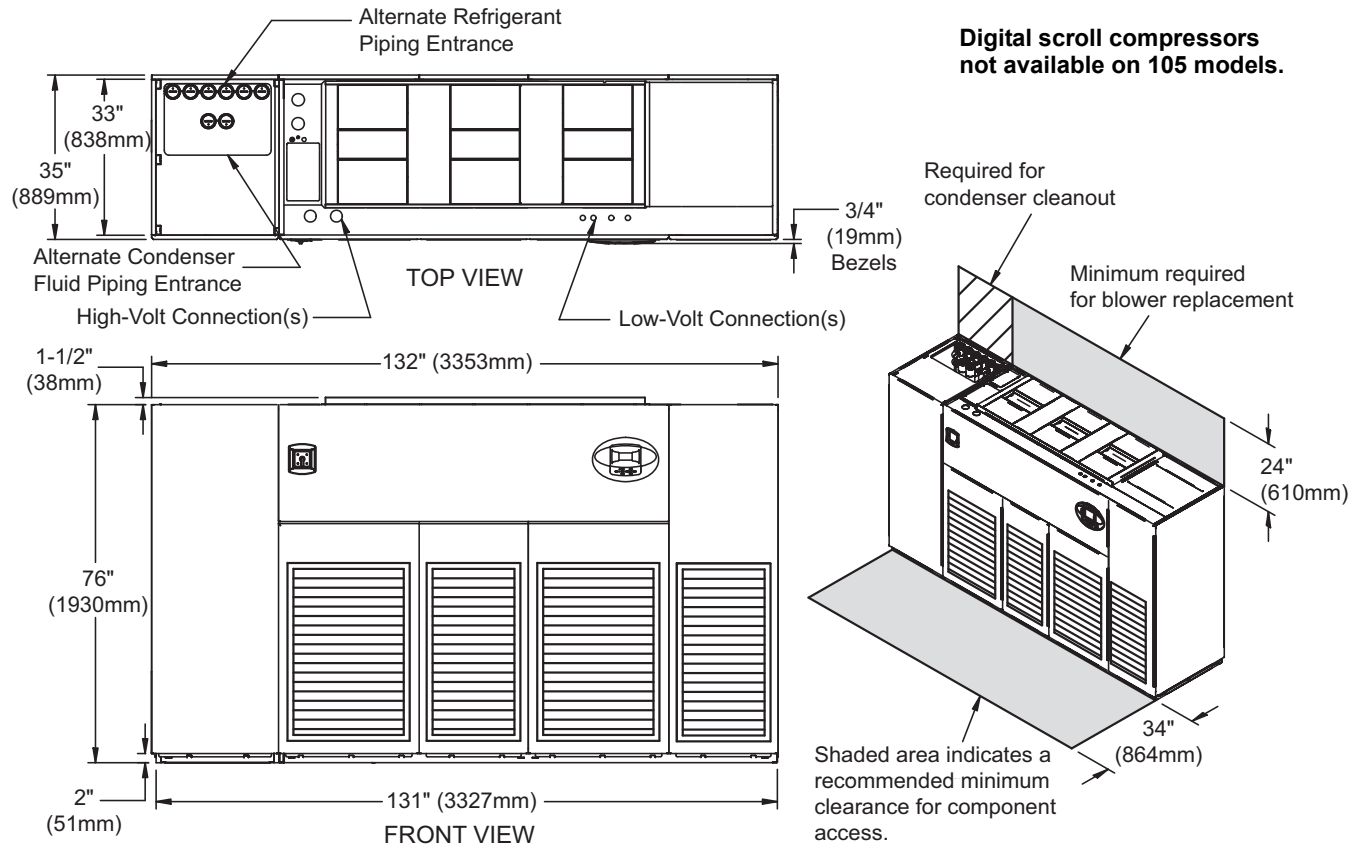
Table 98 Blower outlet and deck dimensions—53-77kW (15-22 ton), upflow, forward-curved fans

Models	Blower	Supply	Dimensional Data, in. (mm)					
			A	B	C	D	E	F
53-77kW (15-22 ton)	15 x 15	Front Throw	15-7/8 (404)	18-5/8 (472)	2-1/8 (54)	25-5/8 (651)	27-3/4 (705)	55-1/2 (1410)
		Rear Throw	15-7/8 (404)	18-5/8 (472)	11-5/8 (295)	25-5/8 (651)	27-3/4 (705)	55-1/2 (1410)
	15 x 11	Front Throw	15-7/8 (404)	14-11/16 (373)	2-1/8 (54)	25-5/8 (651)	31-3/8 (797)	58-7/16 (1484)
		Rear Throw	15-7/8 (404)	14-11/16 (373)	11-5/8 (295)	25-5/8 (651)	31-3/8 (797)	58-7/16 (1484)

Source: DPN001191, Rev. 6

### 4.10 DIMENSIONS—LIEBERT DS 105, UPFLOW, WATER/GLYCOL/GLYCOOL MODELS

**Figure 103 Dimensions—Water/glycol/GLYCOOL, 105kW (30 ton), upflow, semi-hermetic and standard scroll compressors with centrifugal fans**



**Digital scroll compressors not available on 105 models.**

Note: Front air return unit shown. For rear return unit, in addition to front service area shown, also include 25" (635mm) on one side of unit for access to rear return filter box. See DPN001196.

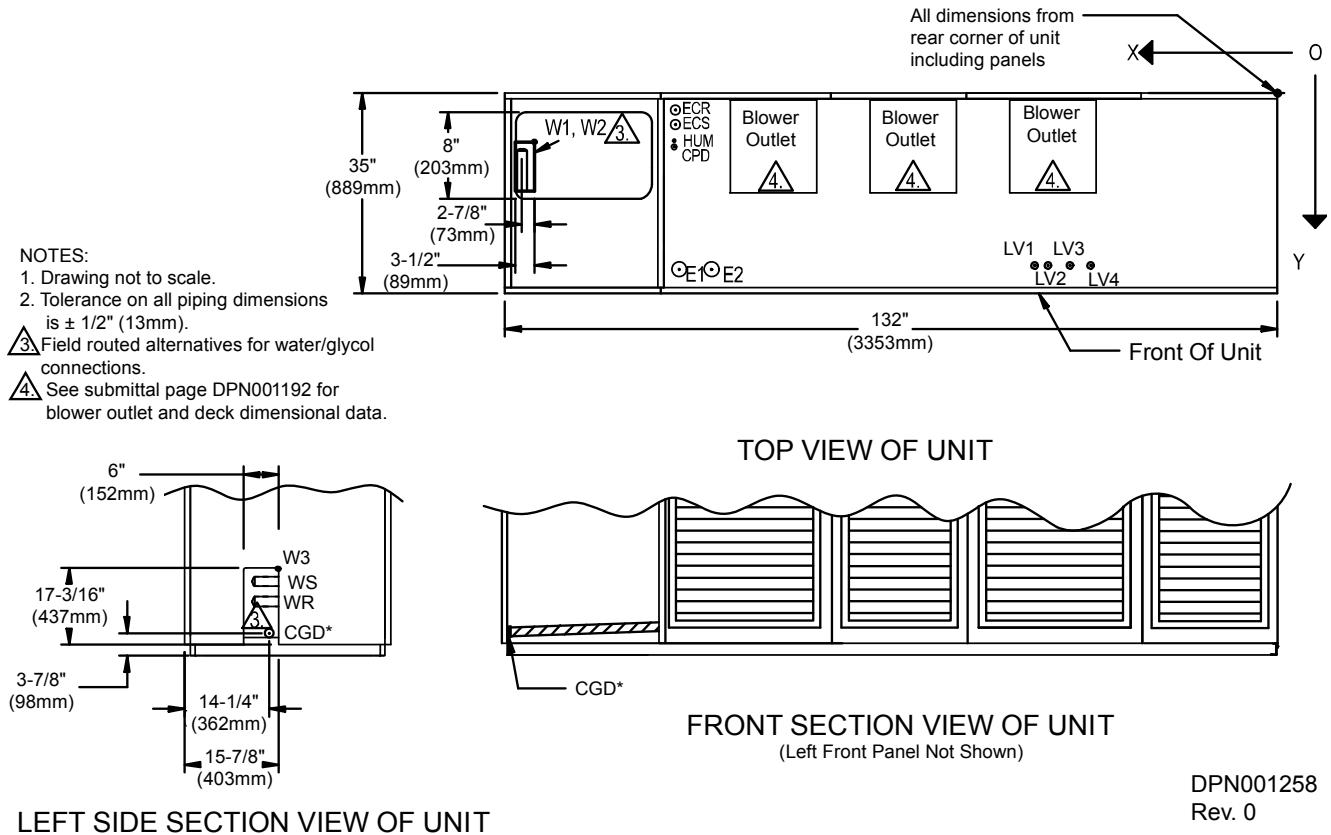
DPN001169  
Rev. 1

**Table 99 Weights—Water/glycol/GLYCOOL, 105kW (30 ton), upflow, semi-hermetic and standard scroll compressors \***

Dry Weight, Approximate, lb (kg)				
Fan Type	Semi- Hermetic Compressor		Standard Scroll Compressor	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Forward-Curved Fans	3370 (1529)	3700 (1678)	3250 (1474)	3580 (1624)

\* Digital scroll compressors not available on DS 105  
Source: DPN001169, Rev. 1

**Figure 104 Primary connection locations—Water/glycol/GLYCOOL,105kW (30 ton), upflow with centrifugal fans**



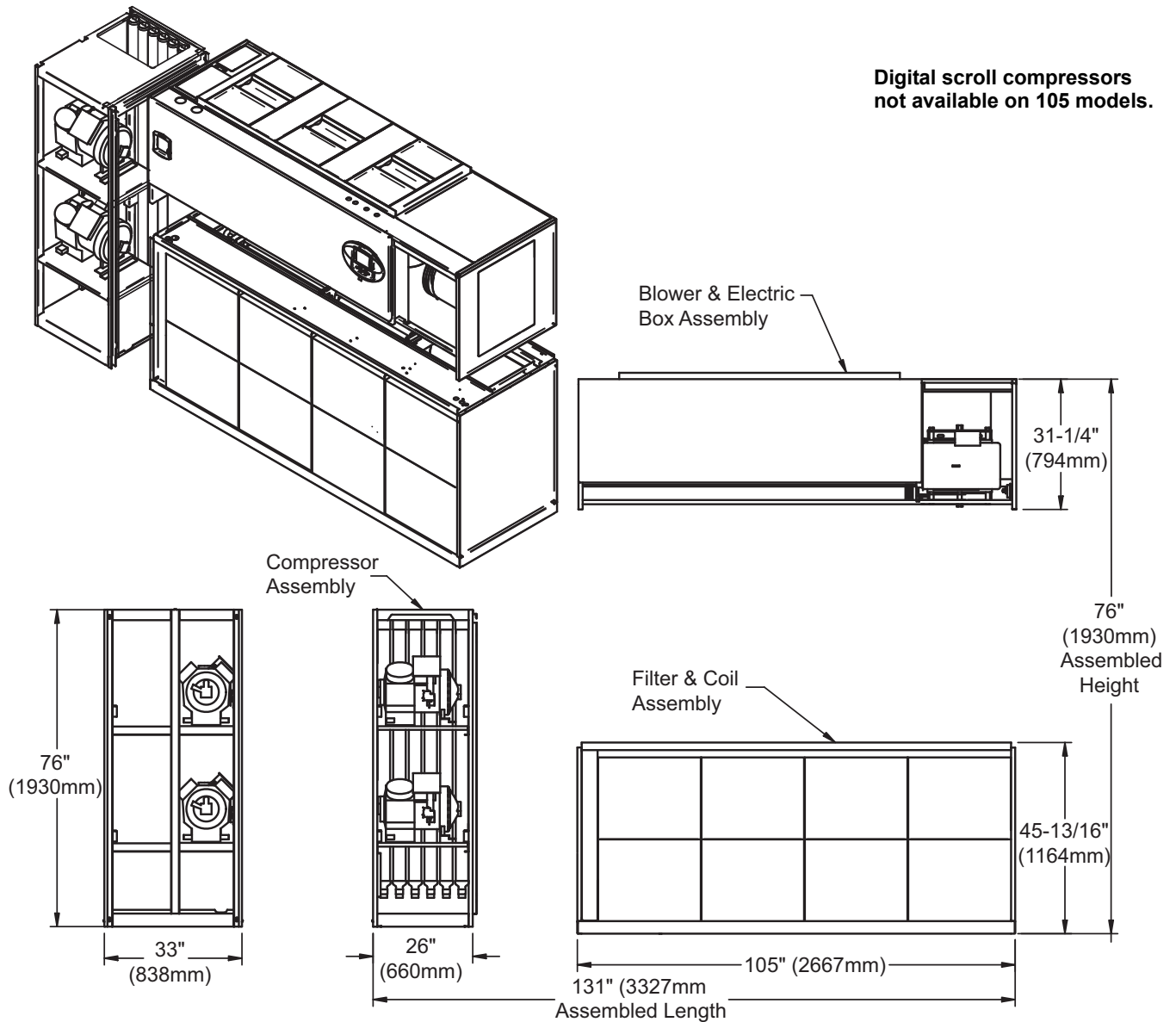
**Table 100 Piping data—Water/glycol/GLYCOOL,105kW (30 ton), upflow**

Point	Description	X	Y	Connection Size/ Opening
W1	Water/Glycol/GLYCOOL Access (Bottom)	126-1/8" (3204mm)	9" (229mm)	3-1/2" x 8" (89mm x 203mm)
W2	Water/Glycol/GLYCOOL Access (Top)	126-1/8" (3204mm)	9" (229mm)	3-1/2" x 8" (89mm x 203mm)
W3	Water/Glycol/GLYCOOL Access (Side)	—	—	6" x 17-3/16" (152mm x 437mm)
WS	Water/Glycol/GLYCOOL Supply	—	—	2-1/8" Cu Sweat
WR	Water/Glycol/GLYCOOL Return	—	—	2-1/8" Cu Sweat
CGD*	Condensate Gravity Drain	—	—	3/4" FPT
CPD	Condensate Pump Discharge (Opt)	102-3/8" (2600mm)	13-5/8" (346mm)	1/2" Cu Sweat
HUM	Humidifier Supply Line	101-1/8" (2569mm)	13-1/8" (333mm)	1/4" Cu Sweat
ECS	Dual-Cool Supply	101-1/8" (2569mm)	10-1/4" (260mm)	2-5/8" Cu Sweat
ECR	Dual-Cool Return	101-1/8" (2569mm)	5-1/4" (133mm)	2-5/8" Cu Sweat
E1	Electrical Conn. (High Volt)	98-1/2" (2502mm)	30" (762mm)	2-1/2"
E2	Electrical Conn. (High Volt)	93" (2362mm)	30" (762mm)	2-1/2"
LV1	Electrical Conn. (Low Volt)	41-1/8" (1045mm)	30-3/8" (772mm)	7/8"
LV2	Electrical Conn. (Low Volt)	38-7/8" (987mm)	30-3/8" (772mm)	7/8"
LV3	Electrical Conn. (Low Volt)	35-1/8" (892mm)	30-3/8" (772mm)	7/8"
LV4	Electrical Conn. (Low Volt)	31-5/8" (803mm)	30-3/8" (772mm)	7/8"

\* 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. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

Piping dimensions shown are connection sizes; field piping sizes may be different depending on distance. Refer to user manual, SL-18825. Source: DPN001258, Rev. 0

**Figure 105 Disassembly dimensions—Water/glycol/GLYCOOL,105kW (30 ton), upflow, all compressors with centrifugal fans**



NOTES: Drawing views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

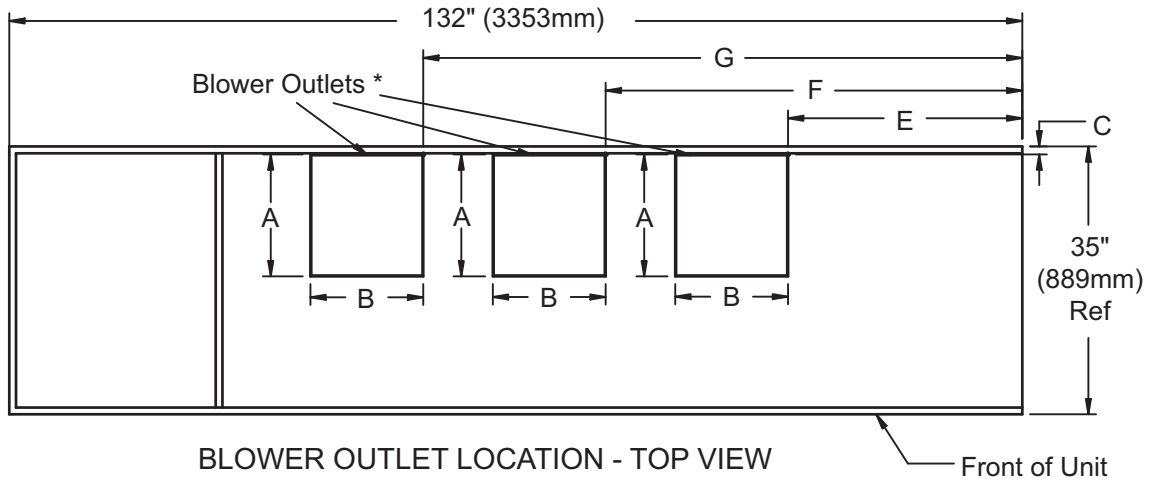
DPN001256  
Rev. 1

**Table 101 Component weights—Water/glycol/GLYCOOL,105kW (30 ton), upflow, all compressors**

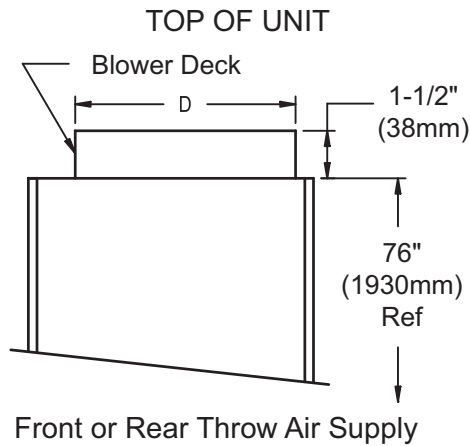
Dry Weight, Approximate, Including Panels, lb (kg)				
Component	Semi-Hermetic Compressor		Standard Scroll Compressor *	
	Water/Glycol	GLYCOOL/Dual-Cool	Water/Glycol	GLYCOOL/Dual-Cool
Compressor Assembly	1320 (599)	1320 (599)	1200 (544)	1200 (544)
Blower and Electric Box Assembly Forward-Curved Fans	1080 (490)	1080 (490)	1080 (490)	1080 (490)
Filter and Coil Assembly	970 (440)	1300 (590)	970 (440)	1300 (590)

\* Digital scroll compressors not available on DS 105  
Source: DPN001256, Rev. 1

Figure 106 Blower outlet and deck dimensions—105kW (30 ton), upflow with centrifugal fans



\* Duct flanges not provided



DPN001192  
Rev. 1

Table 102 Blower outlet and deck dimensions—105kW (30 ton), upflow, forward-curved fans

Blower	SUPPLY	Dimensional Data, in. (mm)						
		A	B	C	D	E	F	G
15 x 11	Front Throw	15-7/8 (404)	14-11/16 (373)	2-1/8 (54)	25-5/8 (651)	30-3/4 (781)	54-1/2 (1384)	78-1/8 (1984)
	Rear Throw	15-7/8 (404)	14-11/16 (373)	11-5/8 (295)	25-5/8 (651)	30-3/4 (781)	54-1/2 (1384)	78-1/8 (1984)

Source: DPN001192, Rev. 1



## 4.11 HEAT REJECTION—DRYCOOLERS AND PUMPS

### 4.11.1 Drycooler Selection—Prop Fan Drycoolers

Table 103 Liebert DS drycooler selection

Liebert DS Model	Drycooler Type					
	Outdoor Drycooler			Outdoor Quiet-Line Drycooler		
	95°F (35°C)	100°F (38°C)	105°F (41°C)	95°F (35°C)	100°F (38°C)	105°F (41°C)
028	D-174	D-225-16	D-310-16	D-173-16	D-205-16	D-356-32
035	D-174	D-225-16	D-350-16	D-178-16	D-205-16	D-356-32
042	D-225-16	D-310	D-419	D-205	D-347-32	D-453-32
053	D-260	D-350	D-491-32	DD-248	D-347-32	D-453-32
070	D-310	D-419	D-620-32	D-347-32	D-453-32	D-453-32
077	D-350	D-466	D-650-40	D-347-32	D-453-32	N/A
105	D-466	D-620-32	D-880-52	D-453	N/A	N/A

### 4.11.2 Dimensions—Prop Fan Drycoolers

Figure 107 Dimensions—2-fan fin/tube drycooler models

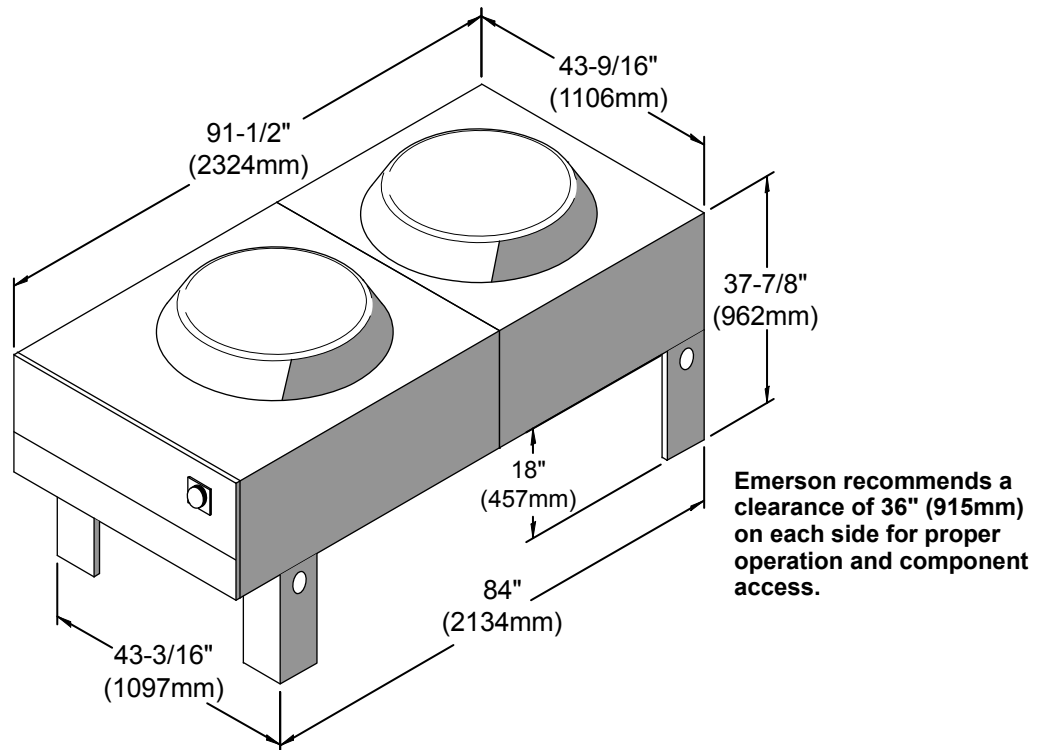


Figure 108 Dimensions—3- and 4-fan fin/tube drycooler models

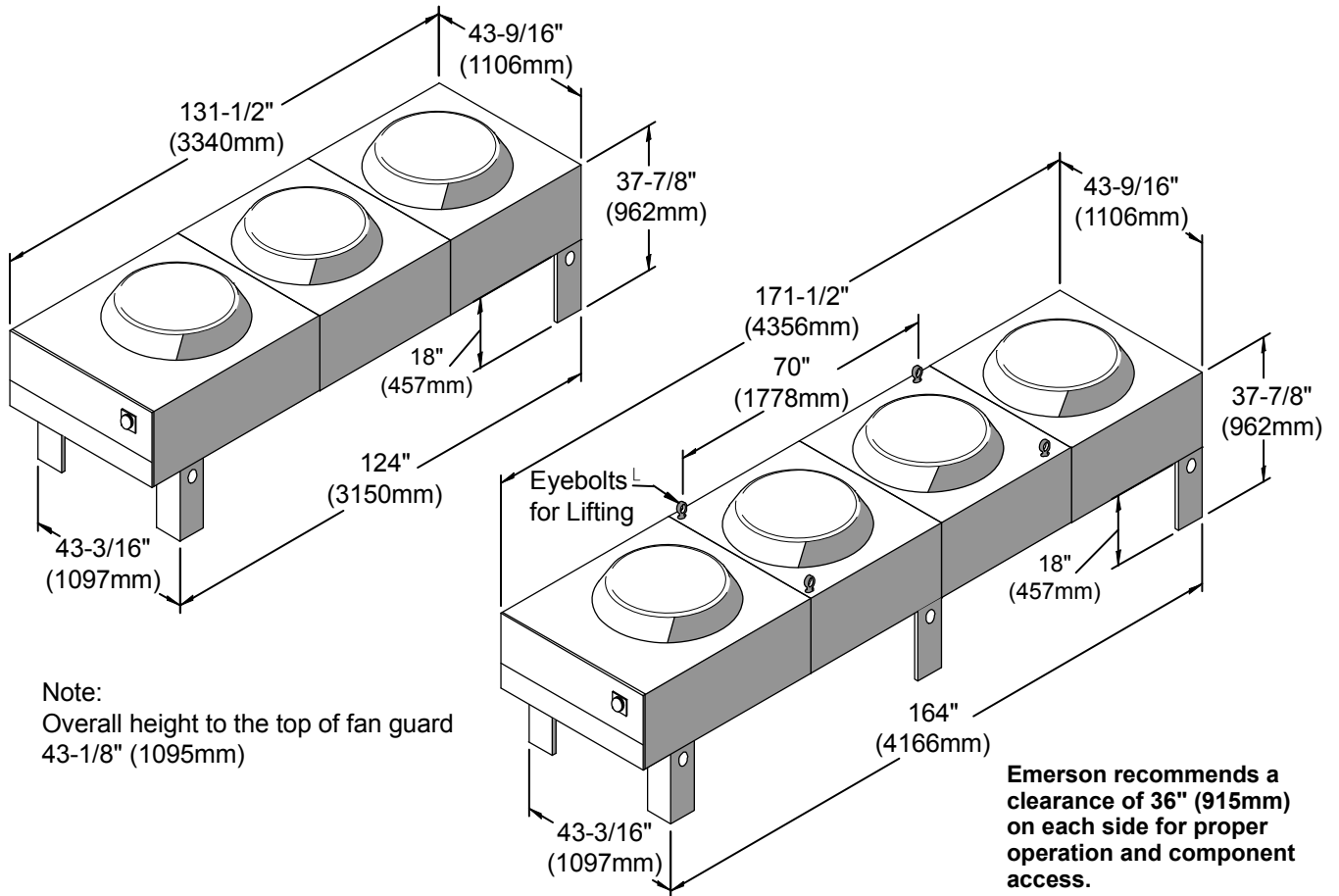
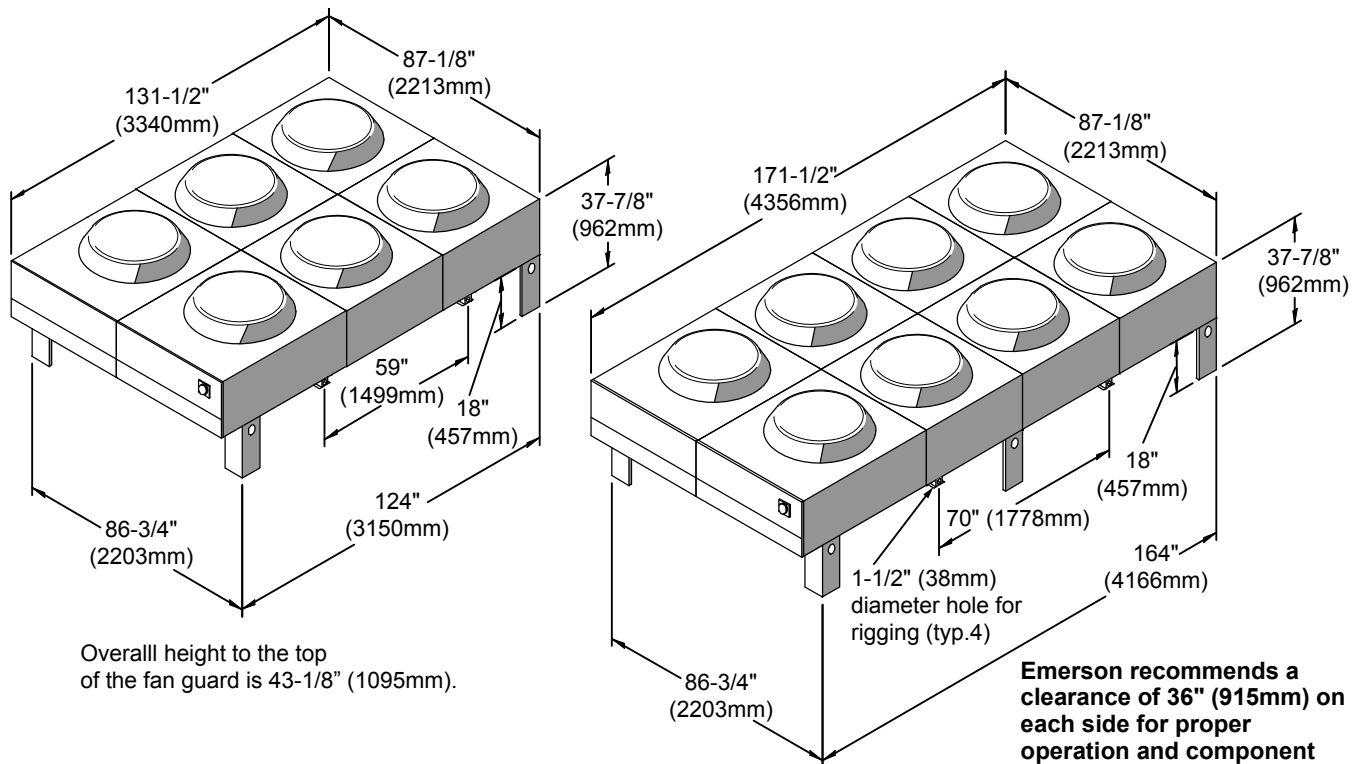


Figure 109 Dimensions—6- and 8-fan fin/tube drycooler models



**Table 104 Drycooler physical data**

Model #	Number of Fans	Internal Volume, gal. (L)	Net Weight lb. (kg)
-033	1	1.2 (4.6)	390 (177)
-069		2.4 (9.2)	410 (186)
-092		3.7 (13.9)	430 (195)
-109		4.9 (18.6)	450 (204)
-112		5.8 (22.0)	470 (213)
-139	2	4.8 (18.2)	565 (256)
-174		6.9 (26.2)	605 (274)
-197		9 (34)	645 (293)
-225		11.1 (42.1)	685 (310)
-260	3	10.0 (37.8)	826 (375)
-310		13.1 (50.0)	886 (402)
-350		19.4 (73.3)	946 (429)
-352	4	13.1 (49.6)	1040 (471)
-419		17.4 (65.9)	1120 (508)
-466		22.0 (83.3)	1150 (522)
-491		26.3 (99.6)	1200 (544)
-620	6	27.0 (102.2)	1940 (880)
-650		33.0 (124.9)	2000 (907.2)
-700		40.0 (151.4)	2060 (934.4)
-790	8	35.0 (132.5)	2550 (1157)
-880		44.0 (166.5)	2730 (1238.3)
-940		52.0 (196.8)	2910 (1320)

All drycooler fan motors are 3/4 hp.

**Table 105 Liebert Quiet-Line™ drycooler physical data**

Model #	Number of Fans	Internal Volume, gal. (L)	Net Weight lb. (kg)
-040	1	2.4 (9.2)	410 (186)
-057		3.7 (13.9)	430 (195)
-060		4.9 (18.6)	450 (204)
-080	2	4.8 (18.2)	565 (256)
-111		6.9 (26.2)	605 (274)
-121		9.0 (34.0)	645 (293)
-158	3	10.0 (37.9)	825 (374)
-173		13.1 (50.0)	885 (401)
-178		19.4 (73.3)	860 (390)
-205	4	13.1 (50.0)	1070 (485)
-248		17.4 (65.9)	1160 (526)
-347	6	27.0 (102.2)	1770 (803)
-356		39.3 (148.8)	1890 (857)
-453	8	35.0 (132.5)	2320 (1052)
-498		52.6 (199.1)	2680 (1216)

## 4.11.3 Electrical Data—Prop Fan Drycoolers

Table 106 60Hz electrical values—Prop fan drycoolers without pump controls, standard models

Voltage	Phase		Drycooler Model					
			33, 69, 92, 109, 112 1 Fan	139, 174, 197 225 2 Fans	260, 310, 350 3 Fans	352, 419, 466, 491 4 Fans	620, 650, 700 6 Fan	790, 880, 940 8 Fans
208/230	1	FLA	4.8	—	—	—	—	—
		WSA	6.0	—	—	—	—	—
		OPD	15	—	—	—	—	—
	3	FLA	3.5	7.0	10.5	14.0	21.0	28.0
		WSA	4.4	7.9	11.4	14.9	21.9	28.9
		OPD	15	15	15	20	25	35
460	3	FLA	1.7	3.4	3.4	6.8	10.2	13.6
		WSA	2.1	3.8	3.8	7.2	10.6	14.0
		OPD	15	15	15	15	15	20
575	3	FLA	1.4	2.8	4.2	5.6	8.4	11.2
		WSA	1.8	3.2	4.6	6.0	8.8	11.6
		OPD	15	15	15	15	15	15

Table 107 60Hz electrical values—Prop fan drycoolers without pump controls, Liebert Quiet-Line models

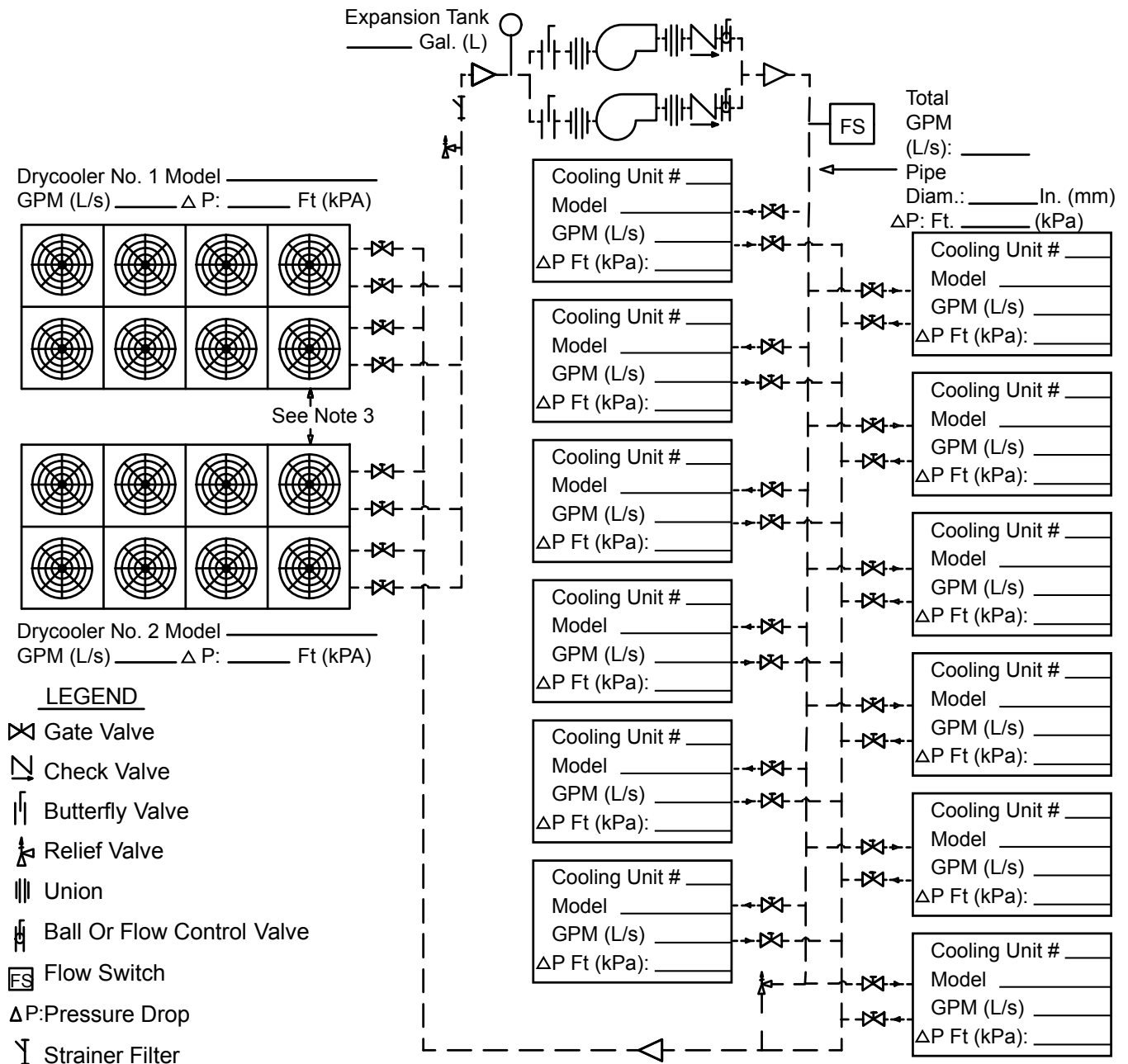
Voltage	Phase		Drycooler Model					
			40, 57, 60 1 Fan	80, 111, 121 2 Fans	158, 173, 178 3 Fans	205, 248 4 Fans	347, 356 6 Fans	453, 498 8 Fans
208/230	3	FLA	1.8	3.6	10.5	5.4	10.8	14.4
	3	WSA	2.3	4.1	11.4	5.9	11.3	14.9
	3	OPD	15	15	15	15	15	20
460	3	FLA	0.9	1.8	5.1	2.7	5.4	7.2
	3	WSA	1.1	2.0	5.5	2.9	5.6	7.4
	3	OPD	15	15	15	15	15	15
575	3	FLA	0.7	1.4	4.2	2.1	4.2	5.6
	3	WSA	0.9	1.6	4.6	2.3	4.4	5.8
	3	OPD	15	15	15	15	15	15

**Table 108 60Hz electrical values—Standard prop fan drycoolers with integral pump controls**

Model #	Number of Fans														
	2			3			4			6			8		
	139, 174, 197, 225			260, 310, 350			352, 419, 466, 491			620, 650, 700			790, 880, 940		
Pump HP	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD
<b>208/230/3/60</b>															
0.75	10.5	11.4	15	14.0	14.9	20	17.5	18.4	25	24.5	25.4	30	31.5	32.4	40
1.5	13.6	15.3	20	17.1	18.8	25	20.6	22.3	25	27.6	29.3	35	34.6	36.3	40
2.0	14.5	16.4	20	18.0	19.9	25	21.5	23.4	30	28.5	30.4	35	35.5	37.4	45
3.0	17.6	20.3	30	21.1	23.8	30	24.6	27.3	35	31.6	34.3	40	38.6	41.3	50
5.0	23.7	27.9	40	27.2	31.4	45	30.7	34.9	50	37.7	41.9	50	44.7	48.9	60
7.5	31.2	37.3	60	34.7	40.8	60	38.2	44.3	60	45.2	51.3	70	52.2	58.3	80
10.0	37.8	45.5	70	41.3	49.0	70	44.8	52.5	80	51.8	59.5	90	58.8	66.5	90
15	53.2	64.8	110	56.7	68.3	110	60.2	71.8	110	67.2	78.8	110	74.2	85.8	125
<b>460/3/60</b>															
0.75	5.0	5.4	15	6.7	7.1	15	8.4	8.8	15	11.8	12.2	15	15.2	15.6	20
1.5	6.4	7.2	15	8.1	8.9	15	9.8	10.6	15	13.2	14.0	20	16.6	17.4	20
2.0	6.8	7.7	15	8.5	9.4	15	10.2	11.1	15	13.6	14.5	20	17.0	17.9	20
3.0	8.2	9.4	15	9.9	11.1	15	11.6	12.8	15	15.0	16.2	20	18.4	19.6	25
5.0	11.0	12.9	20	12.7	14.6	20	14.4	16.3	20	17.8	19.7	25	21.2	23.1	30
7.5	14.4	17.2	25	16.1	18.9	25	17.8	20.6	30	21.2	24.0	30	24.6	27.4	35
10.0	17.4	20.9	30	19.1	22.6	35	20.8	24.3	35	24.2	27.7	40	27.6	31.1	45
15	24.4	29.7	50	26.1	31.4	50	27.8	33.1	50	31.2	36.5	50	34.6	39.9	60
<b>575/3/60</b>															
0.75	4.1	4.5	15	5.5	5.9	15	6.9	7.3	15	9.7	10.1	15	12.5	12.9	15
1.5	5.2	5.8	15	6.6	7.2	15	8.0	8.6	15	10.8	11.4	15	13.6	14.2	20
2.0	5.5	6.2	15	6.9	7.6	15	8.3	9.0	15	11.1	11.8	15	13.9	14.6	20
3.0	6.7	7.7	15	8.1	9.1	15	9.5	10.5	15	12.3	13.3	15	15.1	16.1	20
5.0	8.9	10.4	15	10.3	11.8	15	11.7	13.2	15	14.5	16.0	20	17.3	18.8	20
7.5	11.8	14.1	20	13.2	15.5	20	14.6	16.9	25	17.4	19.7	25	20.2	22.5	30
10.0	13.8	16.6	25	15.2	18.0	25	16.6	19.4	30	19.4	22.2	30	22.2	25.0	35
15	19.8	24.1	40	21.2	25.5	40	22.6	26.9	40	25.4	29.7	45	28.2	32.5	45

4.11.4 Piping—Prop Fan Drycoolers

Figure 110 Typical piping arrangement, multiple prop fan drycoolers and multiple indoor units



- Notes:
1. Pressure and temperature gauges (or ports for same) are recommended to monitor component pressure drops and performance.
  2. Flow measuring devices, drain and balancing valves to be supplied by others and located as required.
  3. See product literature for installation guidelines and clearance dimensions.
  4. Drawing shows dual pump package. Alternate pump packages with more pumps may be considered, consult supplier

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**Table 109 Standard drycooler piping connection sizes and internal volume**

Drycooler Model #	No. of Internal Coil Circuits	No. of Fans	Internal Volume, gal. (L)	No. of Inlets/Outlets	Inlet & Outlet Connection Size	
					OD Copper, in.	ID Sweat, in.
033	4*	1	1.2 (4.6)	1/1	1-3/8	—
069	4, 8*		2.4 (9.2)	1/1	1-3/8	—
092	6, 12*, 16		3.7 (13.9)	1/1	1-5/8	—
109	8		4.9 (18.6)	1/1	1-3/8	—
109	16*			1/1	2-1/8	—
112	8		5.8 (22.0)	1/1	1-3/8	—
112	16*, 26			1/1	2-1/8	—
139	8, 16*	2	4.8 (18.2)	1/1	2-1/8	—
174	8, 16*, 24		6.9 (26.2)	1/1	2-1/8	—
197	8, 16*, 32		9 (34)	1/1	2-1/8	—
225	16, 26*		11.1 (42.1)	1/1	2-1/8	—
260	16, 24*	3	10.0 (37.8)	1/1	2-1/8	—
310	16, 32*		13.1 (50.0)	1/1	2-1/8	—
350	16, 32*		19.4 (73.3)	1/1	2-1/8	—
350	48			1/1	2-5/8	—
352	16, 24*	4	13.1 (49.6)	1/1	2-1/8	—
419	16, 32*		17.4 (65.9)	1/1	2-1/8	—
466	26		22.0 (83.3)	1/1	2-1/8	—
466	40*			1/1	25/8	—
491	16		26.3 (99.6)	1/1	2-1/8	—
491	32, 48*			1/1	2-5/8	—
620	32, 64*	6	27.0 (102.2)	2/2	—	2-1/8
650	40, 52*		33.0 (124.9)	2/2	—	2-1/8
650	80			4/4	—	2-1/8
700	32, 64*		40.0 (151.4)	2/2	—	2-1/8
700	96			4/4	—	2-1/8
790	32, 64*		8	35.0 (132.5)	2/2	—
880	52	44.0 (166.5)		2/2	—	2-1/8
880	80*			4/4	—	2-1/8
940	32, 64	52.0 (196.8)		2/2	—	2-1/8
940	96*			4/4	—	2-1/8

\* = Standard Circuiting

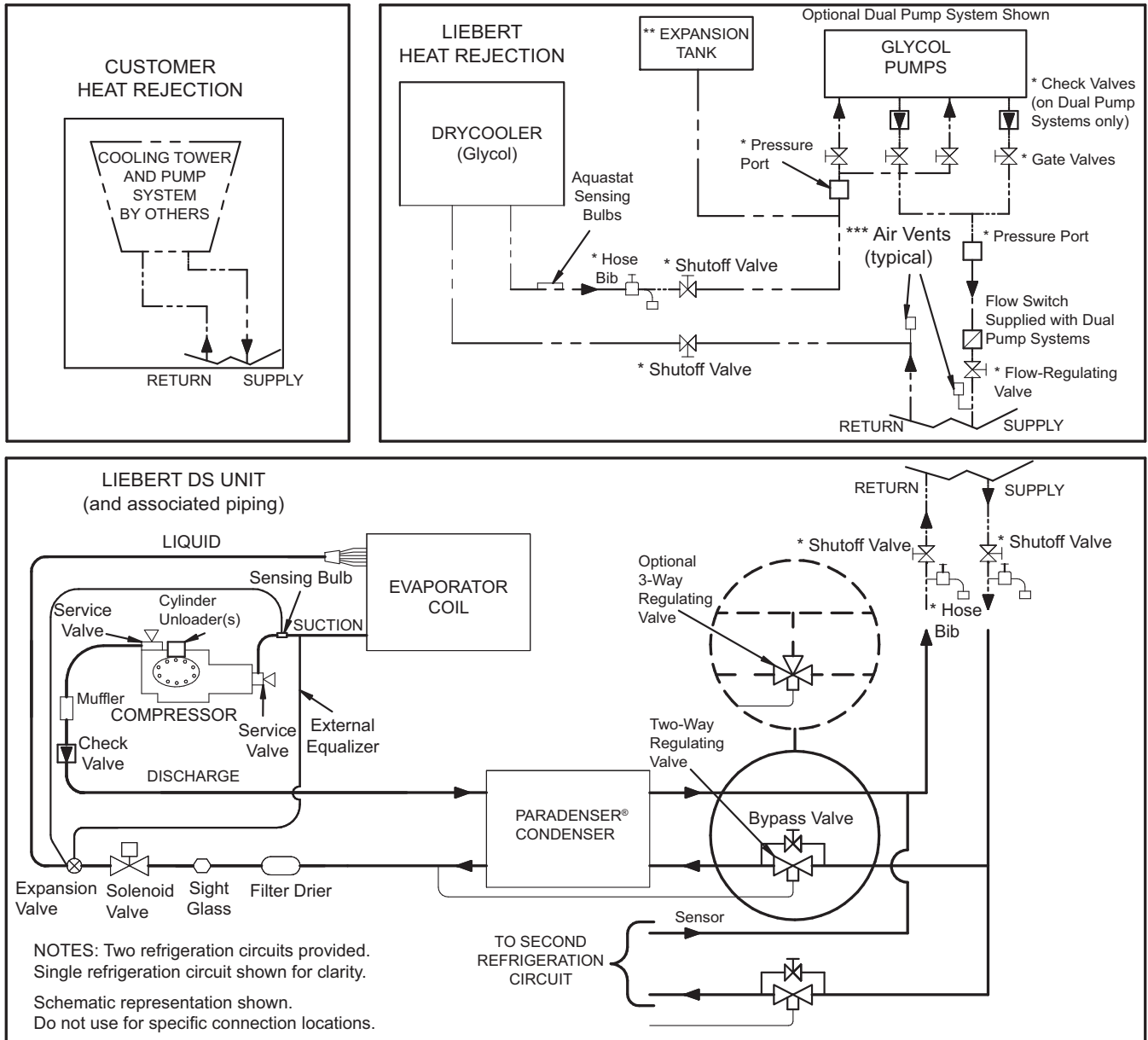
**Table 110 Liebert Quiet-Line drycooler piping connection sizes and internal volume**

Drycooler Model #	No. of Internal Coil Circuits	No. of Fans	Internal Volume gal. (L)	No. of Inlets/Outlets	Inlet & Outlet Connection Size	
					OD Copper, in.	ID Sweat, in.
040	4, 8*	1	2.4 (9.2)	1/1	1-3/8	—
057	12*		3.7 (13.9)	1/1	1-5/8	—
057	16			1/1	2-1/8	—
060	8		4.9 (18.6)	1/1	1-3/8	—
060	16*			1/1	2-1/8	—
080	8, 16*	2	4.8 (18.2)	1/1	2-1/8	—
111	16*, 24		6.9 (26.2)	1/1	2-1/8	—
121	16*, 32		9.0 (34.0)	1/1	2-1/8	—
158	16, 24*	3	10.0 (37.9)	1/1	2-1/8	—
173	16, 32*		13.1 (50.0)	1/1	2-1/8	—
178	16, 32*		19.4 (73.3)	1/1	2-1/8	—
178	48			1/1	2-5/8	—
205	16, 24*	4	13.1 (50.0)	1/1	2-1/8	—
248	16, 32*		17.4 (65.9)	1/1	2-1/8	—
347	32, 64*	6	27.0 (102.2)	2/2	—	2-1/8
356	32, 64*		39.3 (148.8)	2/2	—	2-1/8
356	96			4/4	—	2-1/8
453	32, 64*	8	35.0 (132.5)	2/2	—	2-1/8
498	32, 64		52.6 (199.1)	2/2	—	2-1/8
498	96*			4/4	—	2-1/8

\* = Standard circuiting



Figure 111 Piping schematic—Water/glycol semi-hermetic compressor models

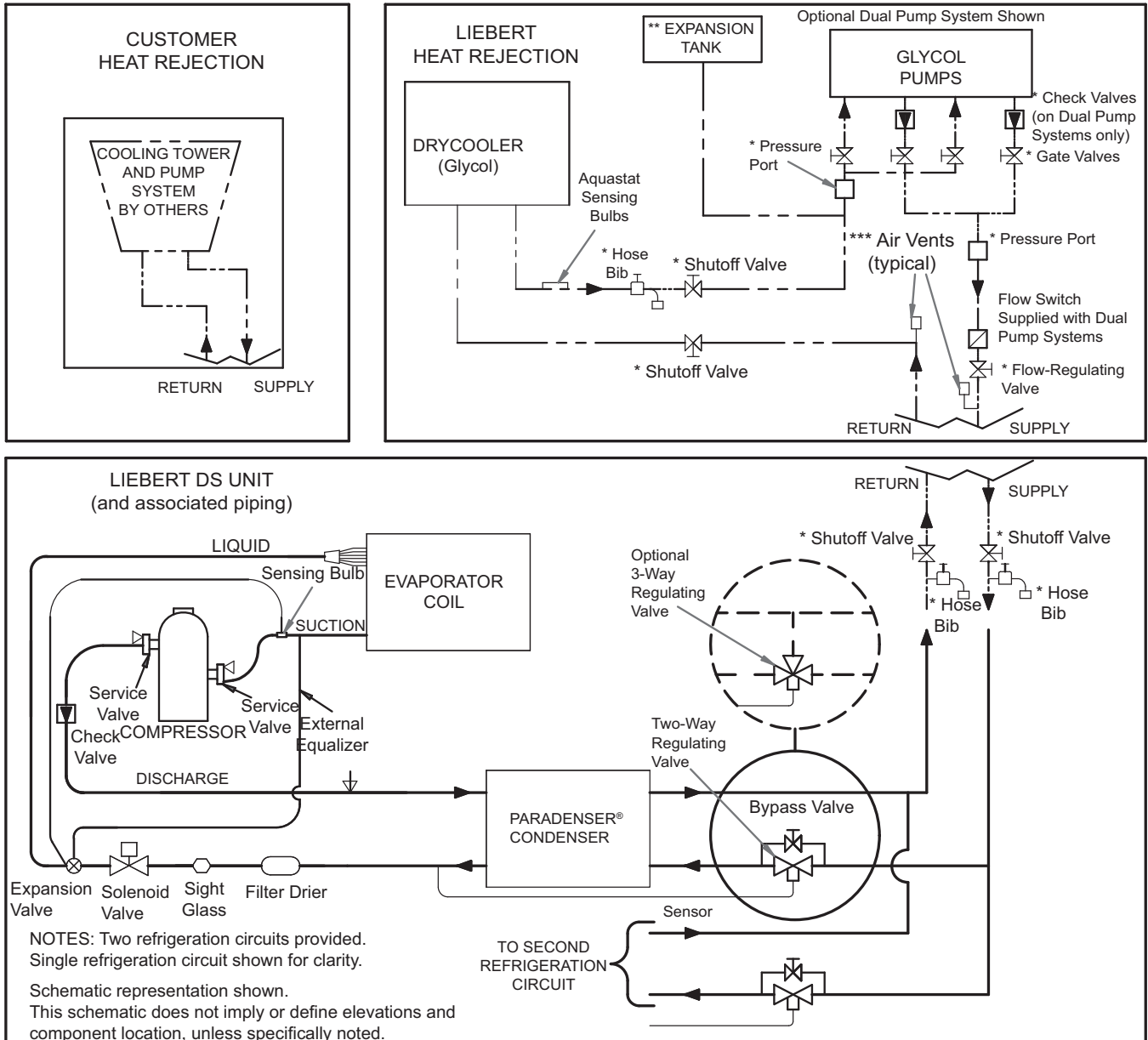


- FACTORY PIPING
- - - FIELD PIPING
- - - OPTIONAL FACTORY PIPING
- ▽ Service / Schrader (Access) Connection No Valve Core
- ▽ Service / Schrader (Access) Connection With Valve Core

- \* Components are not supplied by Emerson but are recommended for proper circuit operation and maintenance
- \*\* Field-installed at highest point in system on return line to pumps
- \*\*\* Locate at tops of all risers and any intermediate system high points

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Figure 112 Piping schematic—Water/glycol scroll compressor models



- FACTORY PIPING
- - - - FIELD PIPING
- - - - OPTIONAL FACTORY PIPING

- ▽ Service / Schrader (Access) Connection No Valve Core
- ▽ Service / Schrader (Access) Connection With Valve Core

- \* Components are not supplied by Emerson but are recommended for proper circuit operation and maintenance
- \*\* Field-installed at highest point in system on return line to pumps
- \*\*\* Locate at tops of all risers and any intermediate system high points

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### 4.11.5 Pump Packages & Expansion Tank

Figure 113 Single pump package piping connections and dimension

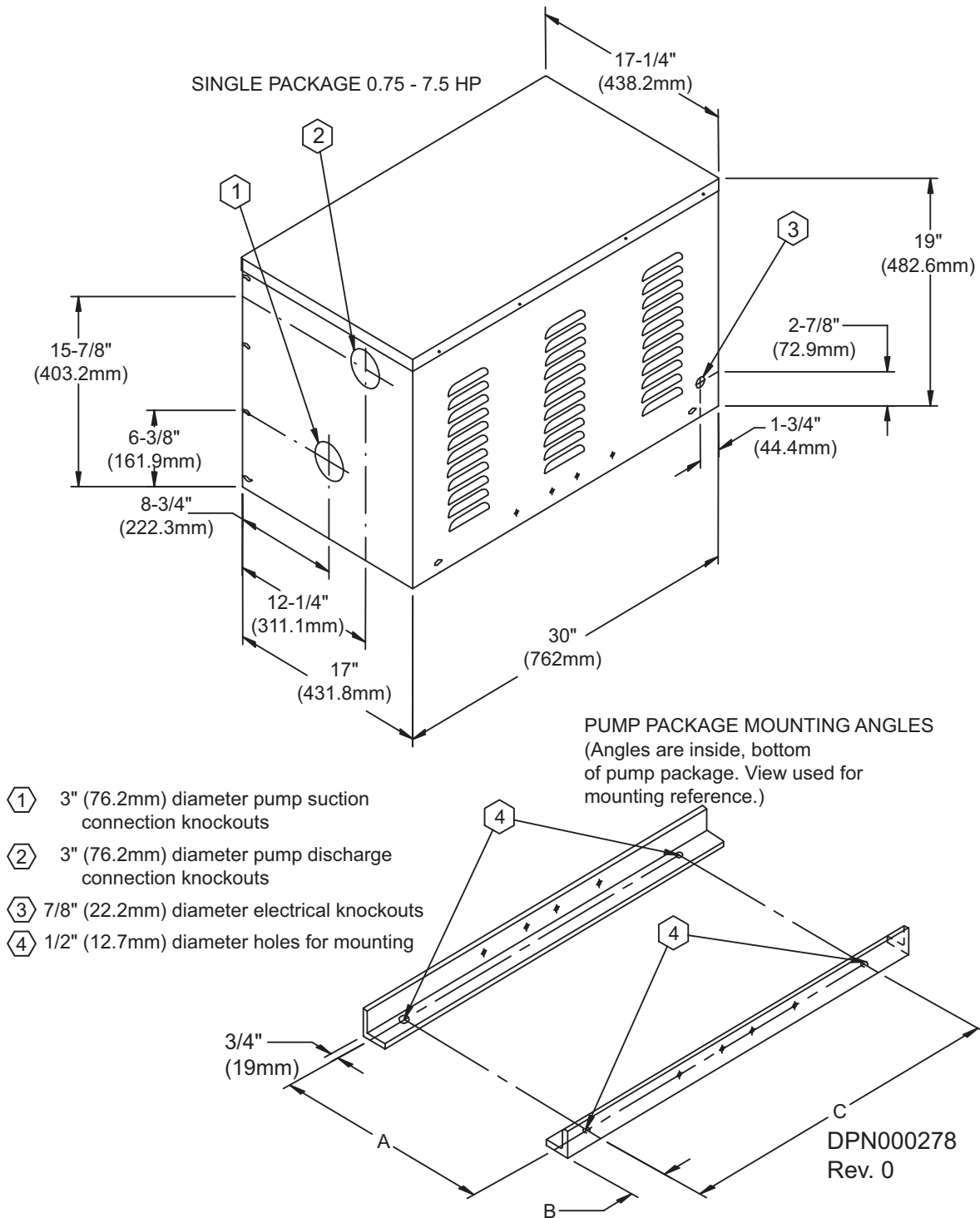


Table 111 Mounting hole dimensions, in. (mm)

Pump Package	A	B	C
Single (0.75 - 7.5hp)	15-1/4 (387.4)	2-1/2 (63.5)	22-1/2 (571.5)
Dual (0.75 - 5hp)	30-1/4 (768.4)	2-1/2 (63.5)	22-1/2 (571.5)
Dual (7.5hp)	39-5/16 (998.5)	1-3/4 (44.5)	26-7/8 (682.6)

Source: DPN000278, Rev. 0

Figure 114 Dual pump package piping connections and dimensions

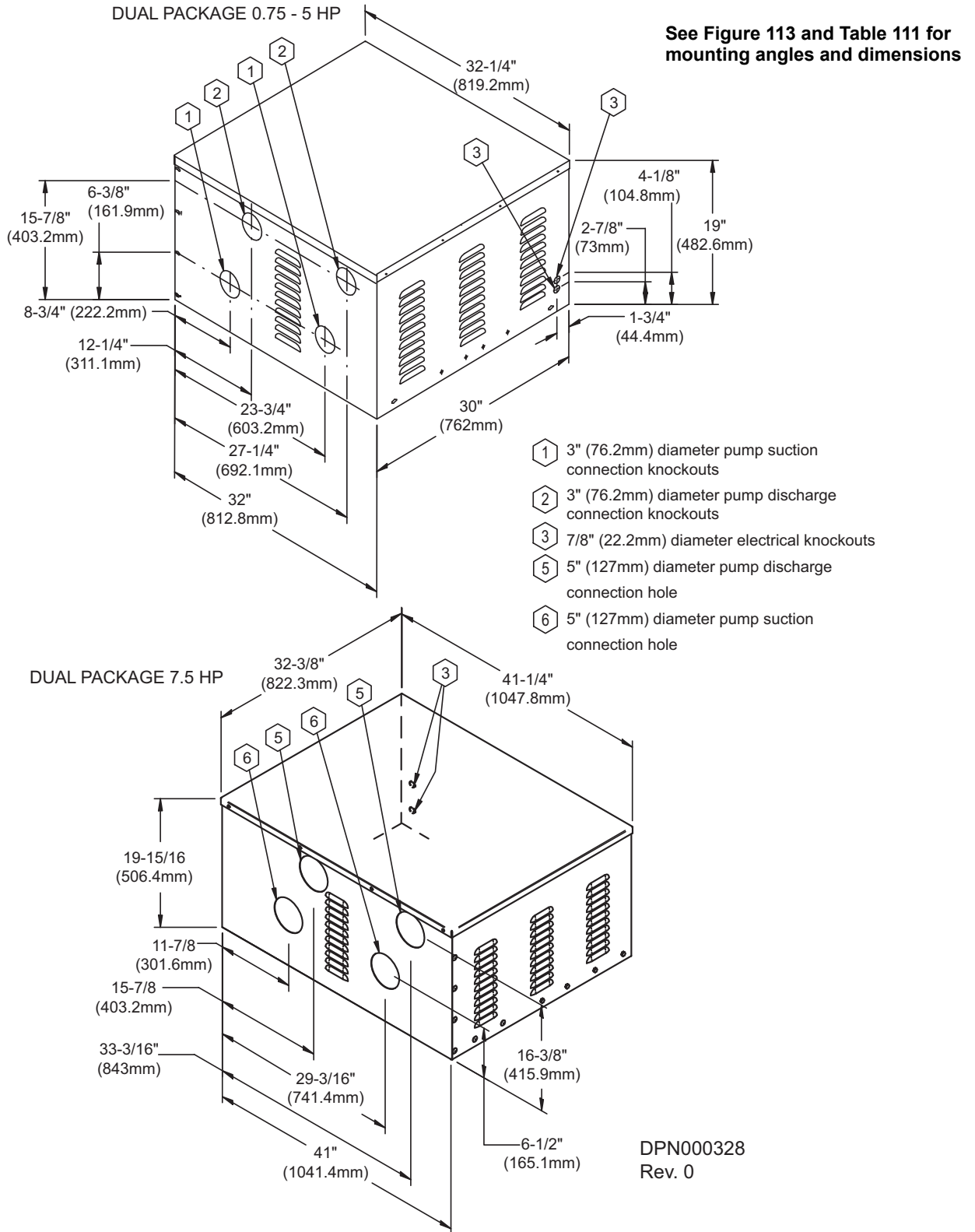
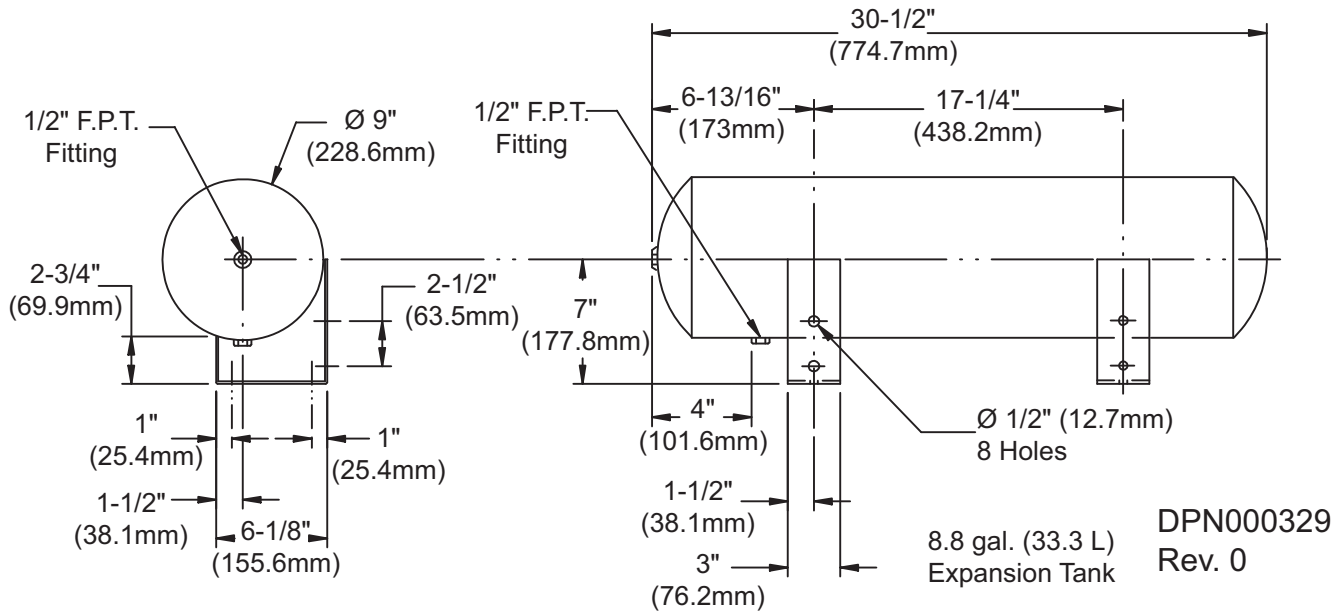


Figure 115 Pump package expansion tank



**Expansion Tank (P/N 1C16717P1)**

This tank, included in a standard pump package, has an internal volume of 8.8 gal. (33 l) and a maximum pressure of 100 psi (690 kPa).

This tank is sized for a typical “open” system with a fluid volume of less than 75 gal. (280l). When used in a “closed” system, volumes of up to 140 gal. (910l) can be accommodated. The use of a safety relief valve, field-supplied, is recommended for systems “closed” to atmospheric venting. Other piping accessories for filling, venting, or adjusting the fluid in the system, are recommended, but not included.

Table 112 Glycol pump data

Pump HP	Connections		Electric @ 60Hz				
	NPT Suction Connection	Female Discharge Connection	ph	208 FLA	230 FLA	460 FLA	575 FLA
3/4	1-1/4"	3/4"	1	7.6	6.9	N/A	N/A
3/4	1-1/4"	3/4"	3	3.5	3.2	1.6	1.3
1-1/2	1-1/4"	3/4"	3	6.6	6.0	3.0	2.4
2	1-1/4"	3/4"	3	7.5	6.8	3.4	2.7
3	1-1/2"	1"	3	10.6	9.6	4.8	3.9
5	1-1/2"	1-1/4"	3	16.7	15.2	7.6	6.1
7-1/2	3"	3"	3	24.2	22.0	11.0	9.0

- To Calculate Total Pump and Drycooler Full Load Amps (FLA):  
**Total FLA = Pump FLA + Drycooler FLA**
- To Calculate Total Pump and Drycooler Wire Size Amps (WSA):  
**Total WSA = Largest Motor FLA x 1.25 + Sum of other Motor FLA values**
- To Calculate Total Pump and Drycooler Maximum Overcurrent Protective Device (OPD):  
**Total OPD = Largest Motor FLA x 2.25 + Sum of other Motor FLA values**  
Select standard fuse size (15A, 20A, 25A, 30A, etc.)

Figure 116 Pump curve, 60 Hz

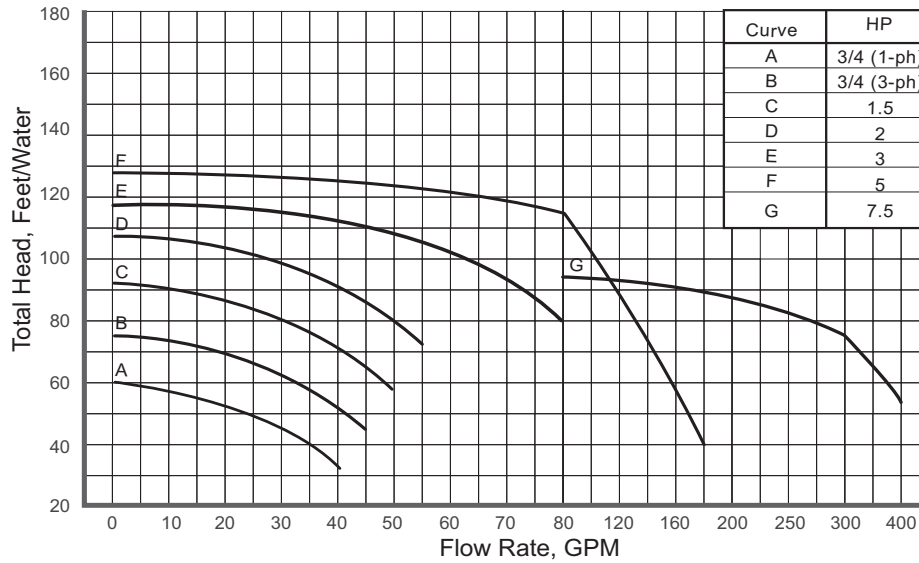


Table 113 60Hz electrical values—Quiet-Line drycoolers with integral pump controls

Model #	Number of Fans											
	3			4			6			8		
	158, 173, 178			205, 248			347, 356			453, 498		
Pump H.P.	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD	FLA	WSA	OPD
<b>208/230/3/60</b>												
0.75	8.9	9.8	15.0	10.7	11.6	15.0	14.3	15.2	20.0	17.9	18.8	25.0
1.5	12.0	13.7	20.0	13.8	15.5	20.0	17.4	19.1	25.0	21.0	22.7	25.0
2.0	12.9	14.8	20.0	14.7	16.6	20.0	18.3	20.2	25.0	21.9	23.8	30.0
3.0	16.0	18.7	25.0	17.8	20.5	30.0	21.4	24.1	30.0	25.0	27.7	35.0
5.0	22.1	26.3	40.0	23.9	28.1	40.0	27.5	31.7	45.0	31.1	35.3	50.0
7.5 *	29.6	35.7	50.0	31.4	37.5	60.0	35.0	41.1	60.0	38.6	44.7	60.0
10.0 *	36.2	43.9	70.0	38.0	45.7	70.0	41.6	49.3	80.0	45.2	52.9	80.0
15 *	51.6	63.2	100.0	53.4	65.0	110.0	57.0	68.6	110.0	60.6	72.2	110.0
<b>460/3/60</b>												
0.75	4.3	4.7	15.0	5.2	5.6	15.0	7.0	7.4	15.0	8.8	9.2	15.0
1.5	5.7	6.5	15.0	6.6	7.4	15.0	8.4	9.2	15.0	10.2	11.0	15.0
2.0	6.1	7.0	15.0	7.0	7.9	15.0	8.8	9.7	15.0	10.6	11.5	15.0
3.0	7.5	8.7	15.0	8.4	9.6	15.0	10.2	11.4	15.0	12.0	13.2	15.0
5.0	10.3	12.2	15.0	11.2	13.1	20.0	13.0	14.9	20.0	14.8	16.7	20.0
7.5 *	13.7	16.5	25.0	14.6	17.4	25.0	16.4	19.2	30.0	18.2	21.0	30.0
10.0 *	16.7	20.2	30.0	17.6	21.1	35.0	19.4	22.9	35.0	21.2	24.7	35.0
15 *	23.7	29.0	45.0	24.6	29.9	50.0	26.4	31.7	50.0	28.2	33.5	50.0
<b>575/3/60</b>												
0.75	3.4	3.7	15.0	4.1	4.4	15.0	5.5	5.8	15.0	6.9	7.2	15.0
1.5	4.5	5.1	15.0	5.2	5.8	15.0	6.6	7.2	15.0	8.0	8.6	15.0
2.0	4.8	5.5	15.0	5.5	6.2	15.0	6.9	7.6	15.0	8.3	9.0	15.0
3.0	6.0	7.0	15.0	6.7	7.7	15.0	8.1	9.1	15.0	9.5	10.5	15.0
5.0	8.2	9.7	15.0	8.9	10.4	15.0	10.3	11.8	15.0	11.7	13.2	15.0
7.5 *	11.1	13.4	20.0	11.8	14.1	20.0	13.2	15.5	20.0	14.6	16.9	25.0
10.0 *	13.1	15.9	25.0	13.8	16.6	25.0	15.2	18.0	25.0	16.6	19.4	30.0
15 *	19.1	23.4	40.0	19.8	24.1	40.0	21.2	25.5	40.0	22.6	26.9	40.0

Values are calculated per UL 1995. Pump FLA values used are based on NEC tables for motor horsepower. OPD values may be adjusted higher than calculations to compensate for maximum anticipated application temperatures.

\* May require electrical component(s) with higher capacity in the drycooler. Consult factory representatives for assistance before ordering.

4.11.6 Drycooler Selection—Indoor Piggyback Drycoolers

Table 114 Liebert indoor piggyback drycooler/DS matchup data

Drycooler Selections		Liebert DS Model					
Drycooler Type	Ambient Temp. °F (°C)	028	035	042	053	070	077
Piggyback Drycooler	95 (35)	PD-133/150	PD-150	PD-223	PD-290	PD-333	PD-333
	100 (38)	PD-223	PD-223	PD-333	N/A	N/A	N/A
	105 (41)	PD-333	PD-333	PD-333	N/A	N/A	N/A

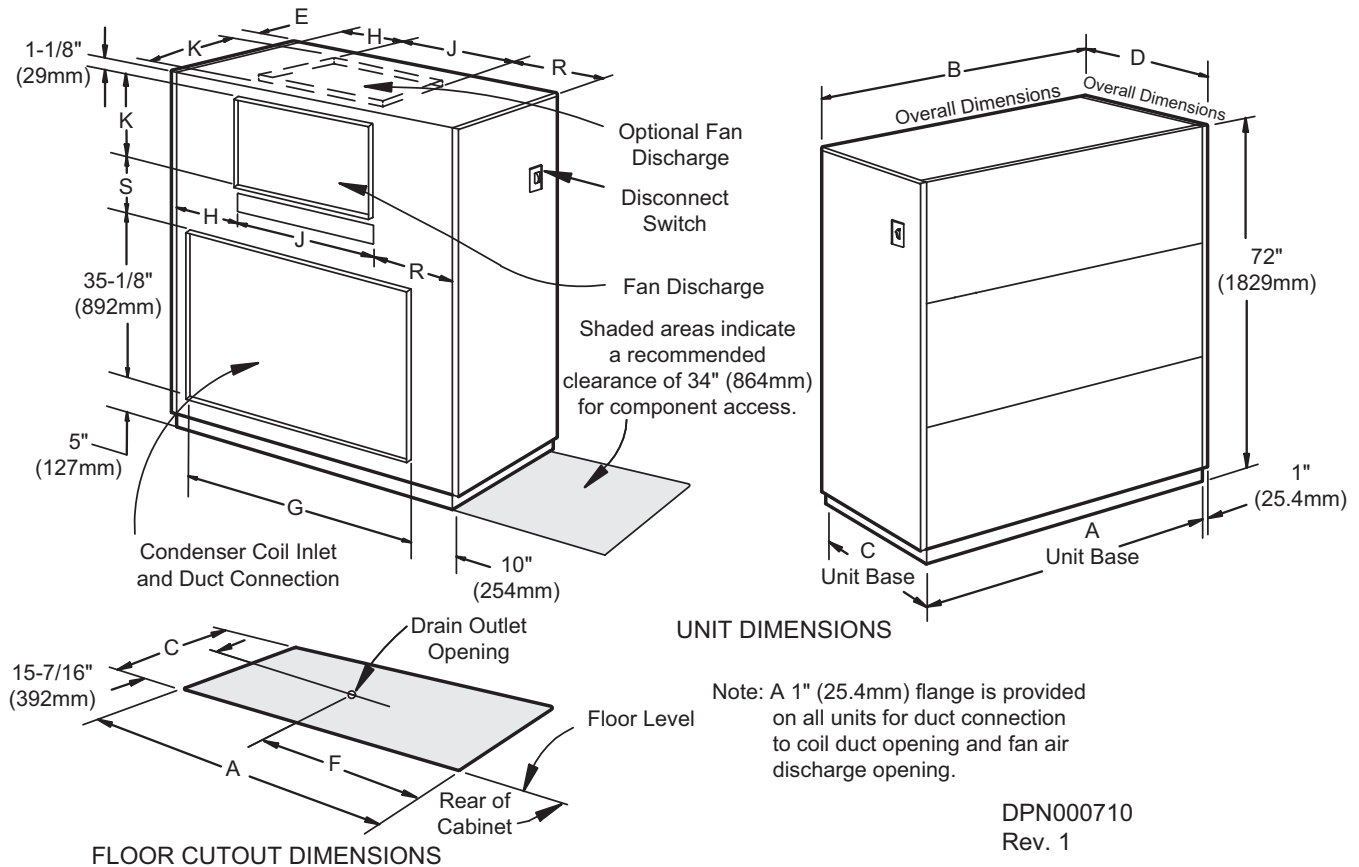
Table 115 Indoor piggyback airflow and static pressure data

Model	No. of Fans	CFM (m <sup>3</sup> /hr)	HP/RPM			
			Ext. Static Pressure - in. (Pa)			
			0.25 (62.3)	0.50 (125)	0.75 (187)	1.0 (249)
PD-102	2	6600 (11,200)	2/575	3/650	3/725	3/800
PD-133 PD-150	2	6900 (11,730)	2/605	3/680	3/750	3/820
PD-223	2	12,500 (21,250)	7.5/760	7.5/810	7.5/870	7.5/920
PD-290	2	12,300 (20,910)	7.5/780	7.5/830	7.5/890	7.5/940
PD-333	2	16,500 (28,050)	10/640	10/695	10/740	15/790

Values are without filter box. External Static Pressure = filter pressure drop + other static drops.  
Source: DPN000695, Rev. 0

4.11.7 Weights and Dimensions—Indoor Piggyback Drycoolers

Figure 117 Dimensions—Indoor piggyback drycoolers



**Table 116 Dimensions—Indoor piggyback drycoolers, in (mm)**

Model	A	B	C	D	E	F	G	H	J	K	R	S
PD-102	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1524)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PD-133	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1524)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PD-150	72 (1829)	74 (1880)	31 (787)	32 (813)	1-1/8 (29)	33 (838)	60 (1524)	8-5/8 (219)	50-3/16 (1275)	16-1/16 (408)	13-3/16 (335)	14-11/16 (373)
PD-223	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	46-1/2 (1181)	85 (2159)	23-5/16 (592)	50-3/16 (1275)	16-1/16 (408)	23-1/2 (597)	14-11/16 (373)
PD-290	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	46-1/2 (1181)	85 (2159)	23-5/16 (592)	50-3/16 (1275)	16-1/16 (408)	23-1/2 (597)	14-11/16 (373)
PD-333	97 (2464)	99 (2515)	33 (838)	34 (864)	3-1/8 (79)	46-1/2 (1181)	85 (2159)	16-5/16 (421)	63-7/8 (1622)	19-1/8 (486)	16-13/16 (427)	11-5/8 (295)

1. A 1" (25.4mm) flange is provided on all units for duct connection to coil duct opening and fan air discharge opening.
2. Source: DPN000710, Rev. 1

**4.11.8 Electrical Data—Piggyback Drycoolers**

**Table 117 Electrical data, piggyback drycoolers, 60Hz, 3 Ph**

Model	Voltage	Blower Motor HP	Drycooler No Pumps			Drycooler Standard Pump Package					Drycooler - Optional Pump Package			
			Total Unit			Pump Only		Total Unit			Pump Only	Total Unit		
			FLA	WSA	OPD	hp	FLA	FLA	WSA	OPD	hp	FLA	WSA	OPD
PD-102 PD-133	208	3	10.6	13.3	20	1.5	6.6	17.2	19.9	30	2	18.1	20.8	30
	230	3	9.6	12.0	20	1.5	6.0	15.6	18	25	2	16.4	18.8	25
	460	3	4.8	6.0	15	1.5	3.0	7.8	9	15	2	8.2	9.4	15
	575	3	3.9	4.9	15	1.5	2.4	6.3	7.3	15	2	6.6	7.6	15
PD-150	208	3	10.6	13.3	20	2	7.5	18.1	20.8	30	3	21.2	23.9	30
	230	3	9.6	12.0	20	2	6.8	16.4	18.8	25	3	19.2	21.6	30
	460	3	4.8	6.0	15	2	3.4	8.2	9.4	15	3	9.6	10.8	15
	575	3	3.9	4.9	15	2	2.7	6.6	7.6	15	3	7.8	8.8	15
PD-223	208	7.5	24.2	30.3	50	3	10.6	34.8	40.9	60	5	40.9	47	70
	230	7.5	22.0	27.5	45	3	9.6	31.6	37.1	50	5	37.2	42.7	60
	460	7.5	11.0	13.8	20	3	4.8	15.8	18.6	25	5	18.6	21.4	30
	575	7.5	9.0	11.3	20	3	3.9	12.9	15.2	20	5	15.1	17.4	25
PD-290	208	7.5	24.2	30.3	50	5	10.6	40.9	47	60	3	34.8	40.9	60
	230	7.5	22.0	27.5	45	5	9.6	37.2	42.7	30	3	31.6	37.1	50
	460	7.5	11.0	13.8	20	5	4.8	18.6	21.4	25	3	15.8	18.6	25
	575	7.5	9.0	11.3	20	5	3.9	15.1	17.4	20	3	12.9	15.2	20
PD-333	208	10	30.8	38.5	60	5	10.6	47.5	55.2	80	3	41.4	49.1	70
	230	10	28.0	35.0	60	5	9.6	43.2	50.2	70	3	37.6	44.6	70
	460	10	14.0	17.5	30	5	4.8	21.6	25.1	35	3	18.8	22.3	35
	575	10	11.0	13.8	20	5	3.9	17.1	19.9	30	3	14.9	17.7	25

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





4.11.9 System Piping—Piggyback Drycoolers

Figure 119 Piping schematic—Liebert DS glycol-cooled models with centrifugal piggyback drycoolers

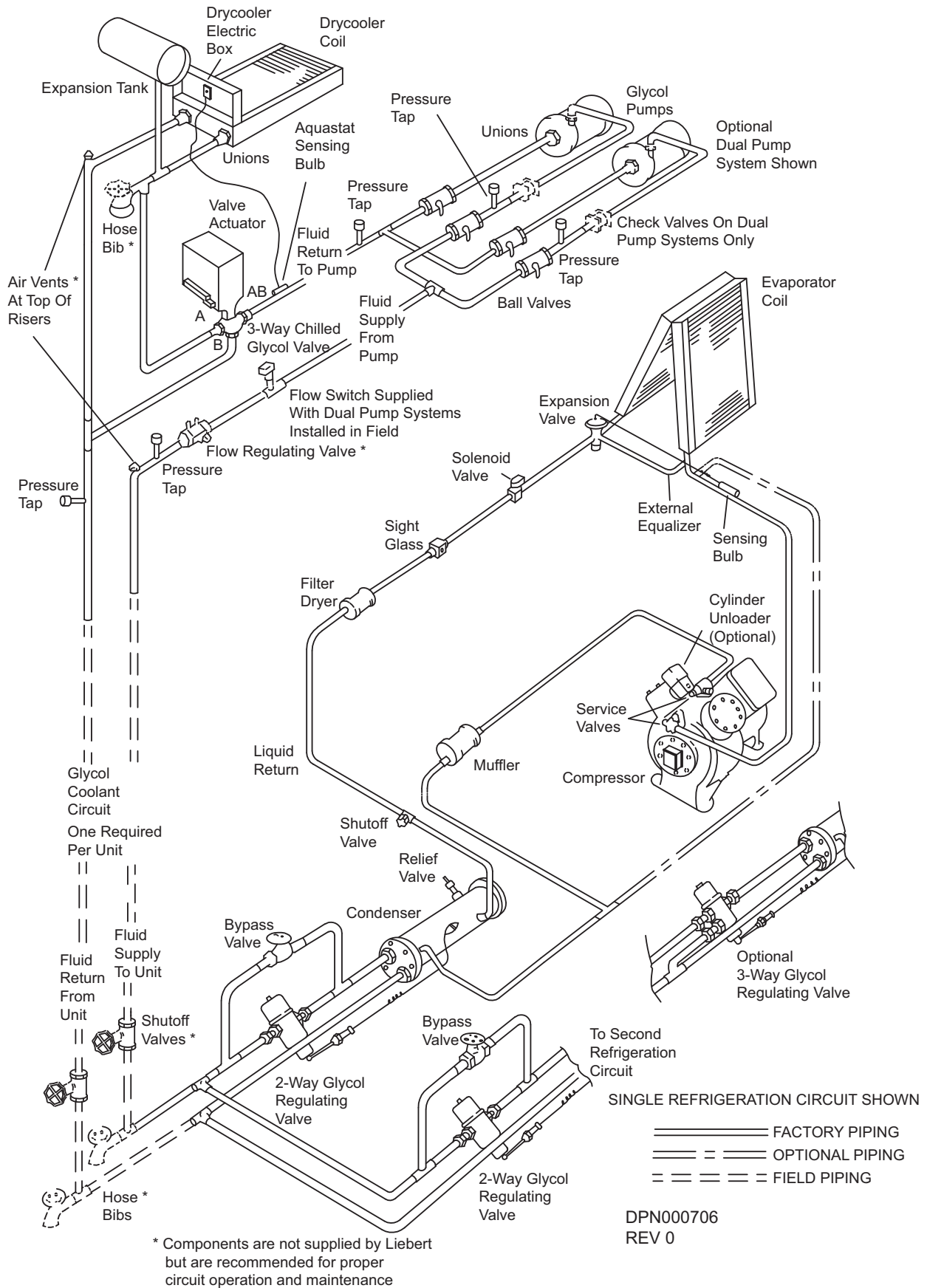
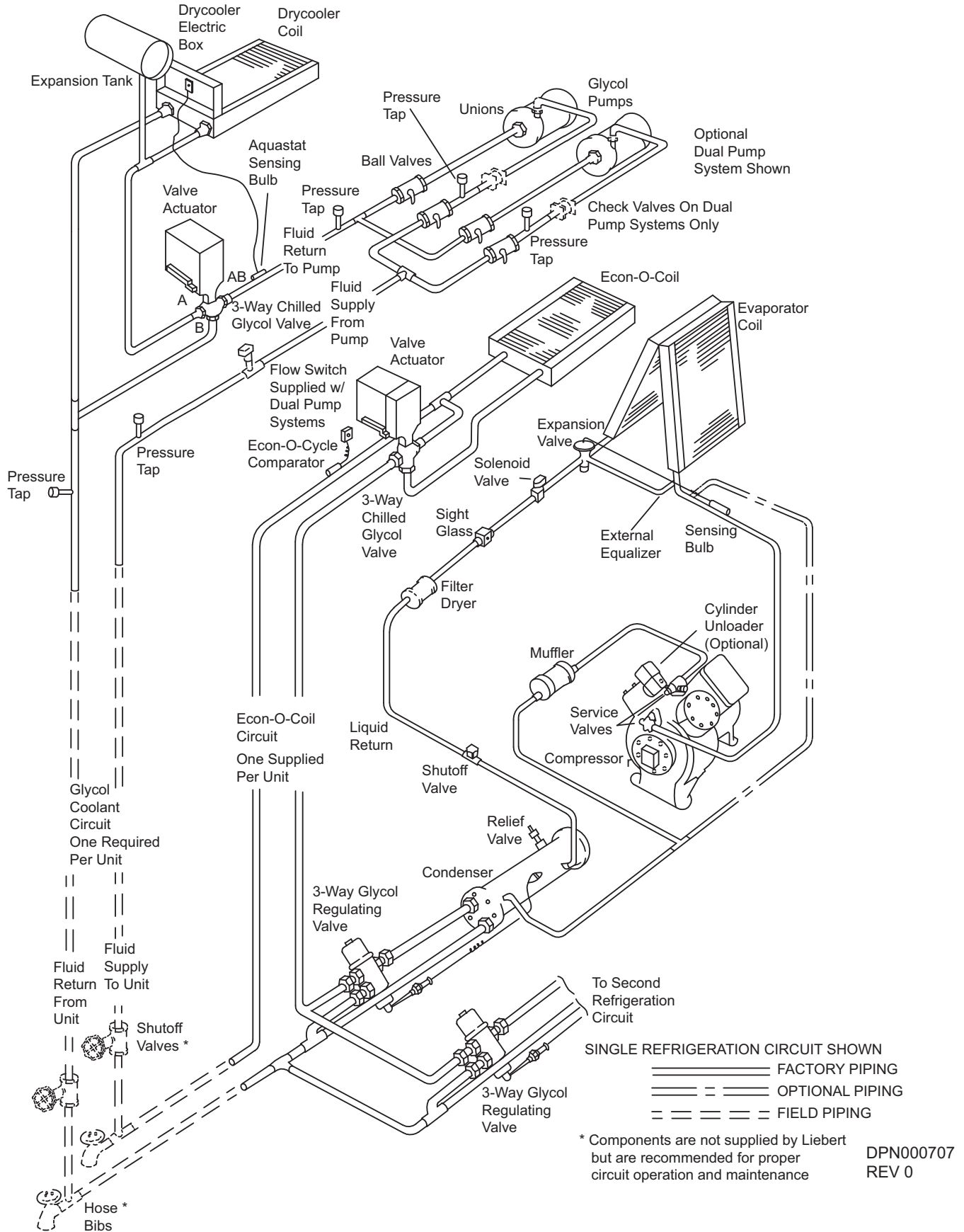
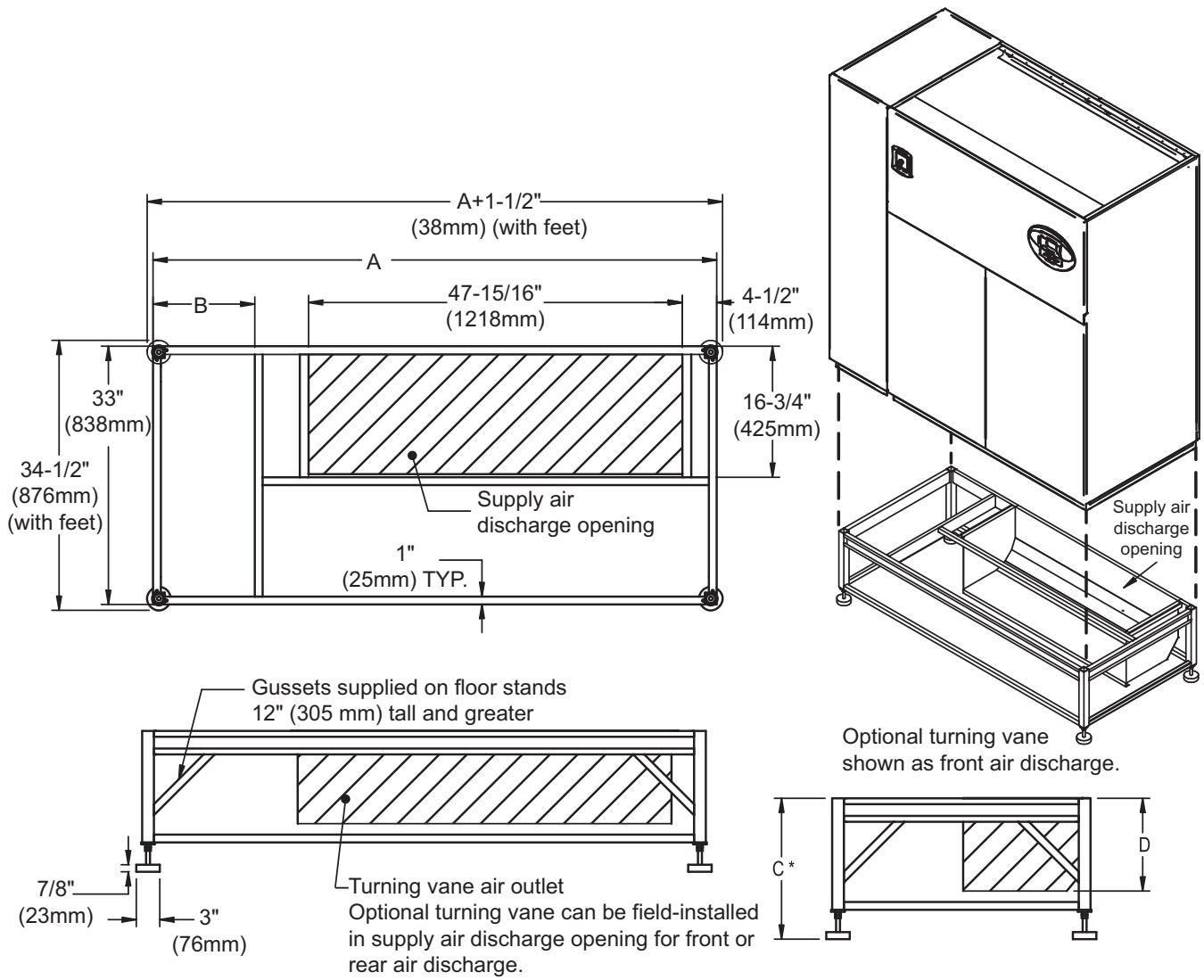


Figure 120 Piping schematic—Liebert DS GLYCOOL models with centrifugal piggyback drycoolers



4.12 ANCILLARY ITEMS—WATER-COOLED SYSTEMS

Figure 121 Floor stand dimensions—28-42kW (8-12 ton), downflow



NOTE: Right side of paneled unit is flush with right side of floorstand. All other paneled sides overhang floor stand 1" (25mm).

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

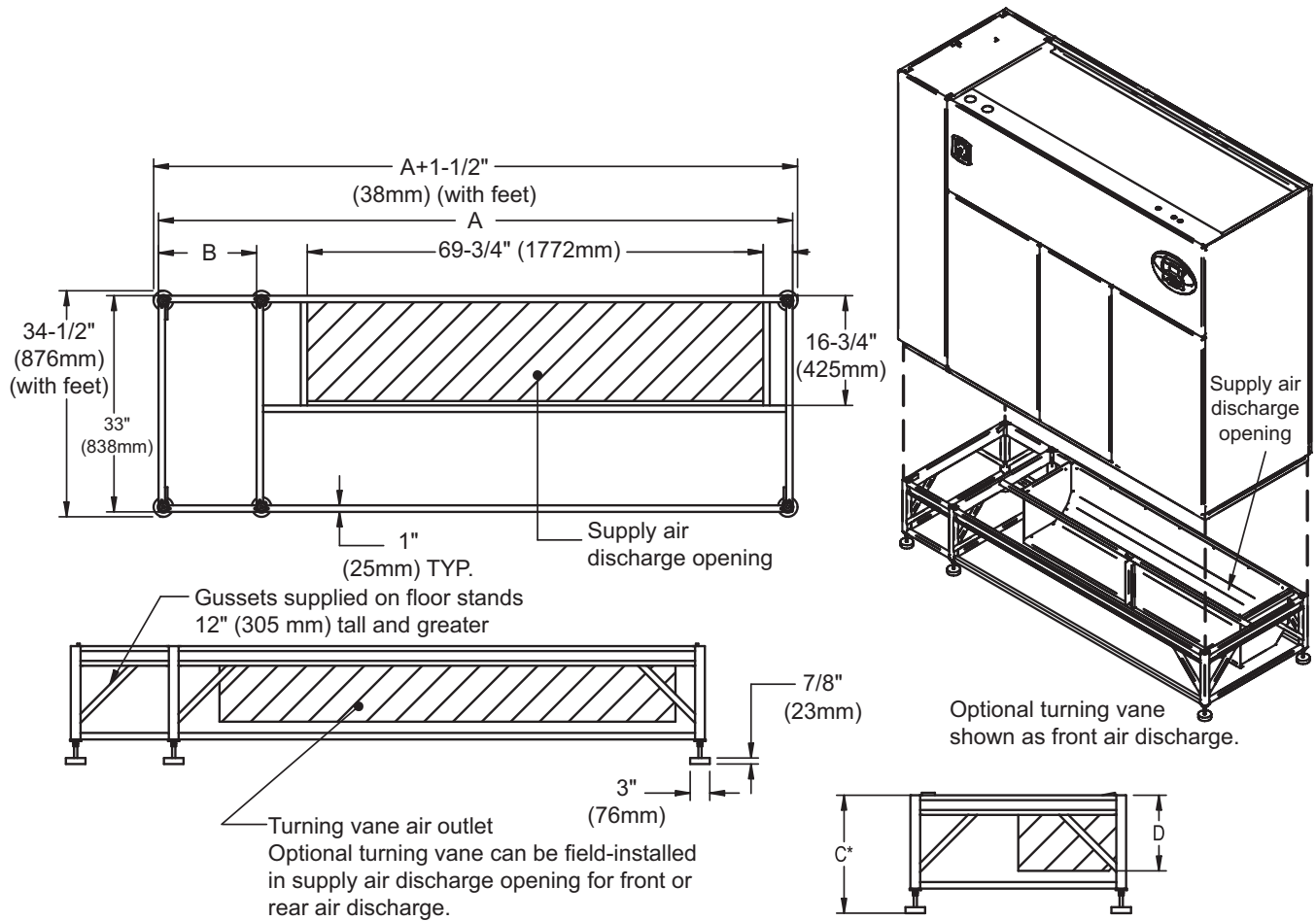
DPN000820  
Rev. 3

Table 120 Floor stand and floor planning dimensions—28-42kW (8-12 ton), downflow

Dimensional Data, in. (mm)			Height, in. (mm)	
Model	A	B	C*	D turning vane
Air-Cooled Semi-Hermetic Models and All Water/Glycol/GLYCOOL Models	85 (2159)	26 (660)	9 (229)	4 (111)
Air-Cooled Scroll Models and Air-Cooled Digital Scroll Models	72 (1829)	13 (330)	12 (305)	7 (187)
			15 (381)	10 (264)
			18 (457)	13 (340)
			21 (533)	16 (416)
			24 (610)	19 (492)

Source: DPN000820, Rev. 3

Figure 122 Floor stand dimensions—53-77kW (15-22 ton), downflow



NOTE: Right side of paneled unit is flush with right side of floor stand. All other paneled sides overhang floor stand 1" (25mm). \* Leveling feet are provided with  $\pm 1\frac{1}{2}''$  (38mm) adjustment from nominal height C.

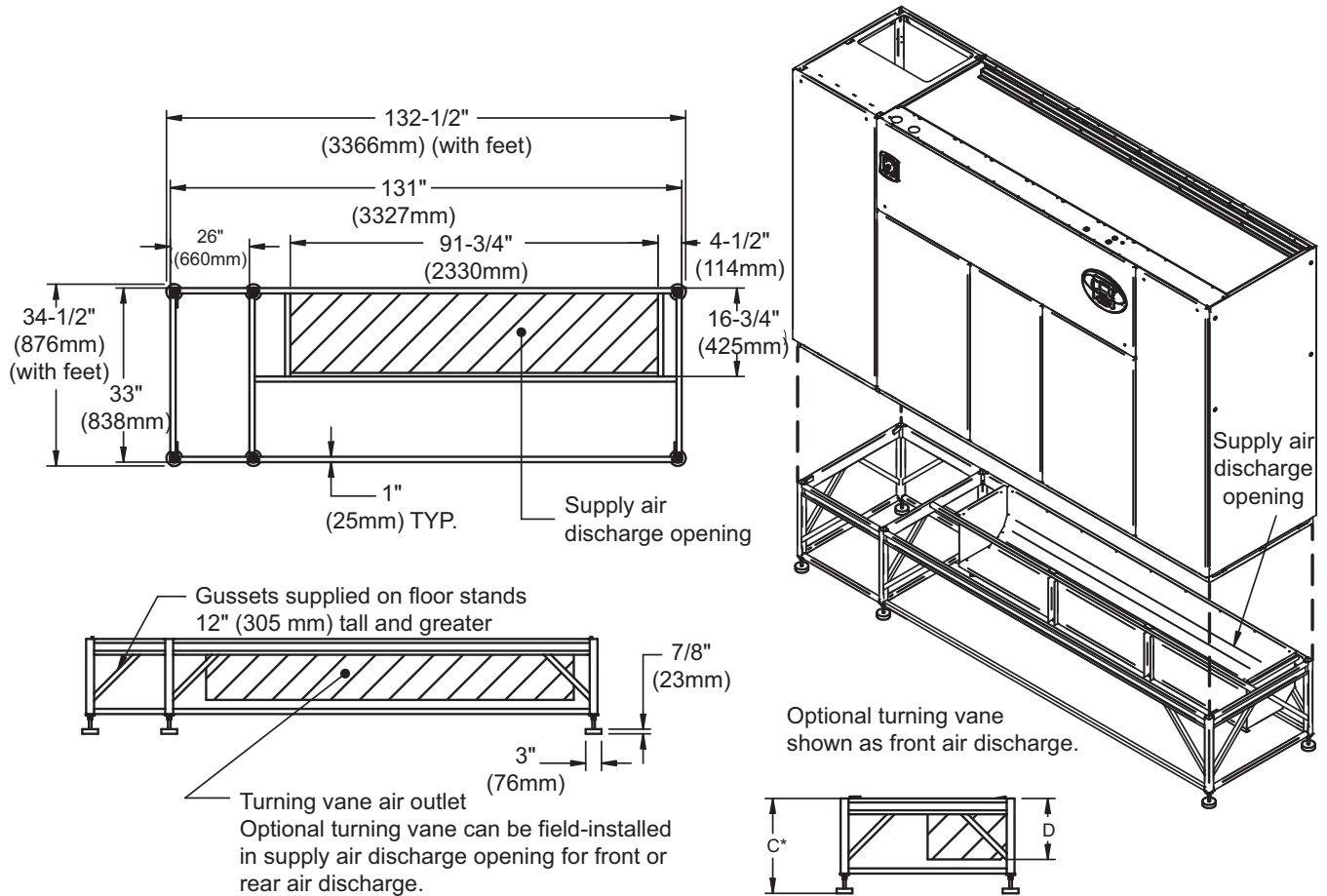
DPN000930  
Rev. 2

Table 121 Floor stand and floor planning dimensions—53-77kW (15-22 ton), downflow

Dimensions, in. (mm)			Height, in. (mm)	
Model	A	B	C*	D - Turning Vane
Air-Cooled Semi-Hermetic Models and All Water/Glycol/GLYCOOL Models	108 (2743)	26 (660)	9 (229)	4 (111)
Air-Cooled Scroll Models and Air-Cooled Digital Scroll Models	97 (2464)	15 (381)	12 (305)	7 (187)
			15 (381)	10 (264)
			18 (457)	13 (340)
			21 (533)	16 (416)
			24 (610)	19 (492)

Source: DPN000930, Rev. 2

Figure 123 Floor stand dimensions—105kW (30 ton), downflow



NOTE: Right side of paneled unit is flush with right side of floorstand. All other paneled sides overhang floor stand 1" (25mm).

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

DPN001059  
Rev. 2

Table 122 Floor stand and floor planning dimensions—105kW (30 ton), downflow

Height, in. (mm)	
C*	D turning vane
9 (229)	4 (111)
12 (305)	7 (187)
15 (381)	10 (264)
18 (457)	13 (340)
21 (533)	16 (416)
24 (610)	19 (492)

Source: DPN001059, Rev. 2

Figure 124 Floor stand dimensions, piggyback drycoolers with centrifugal fans

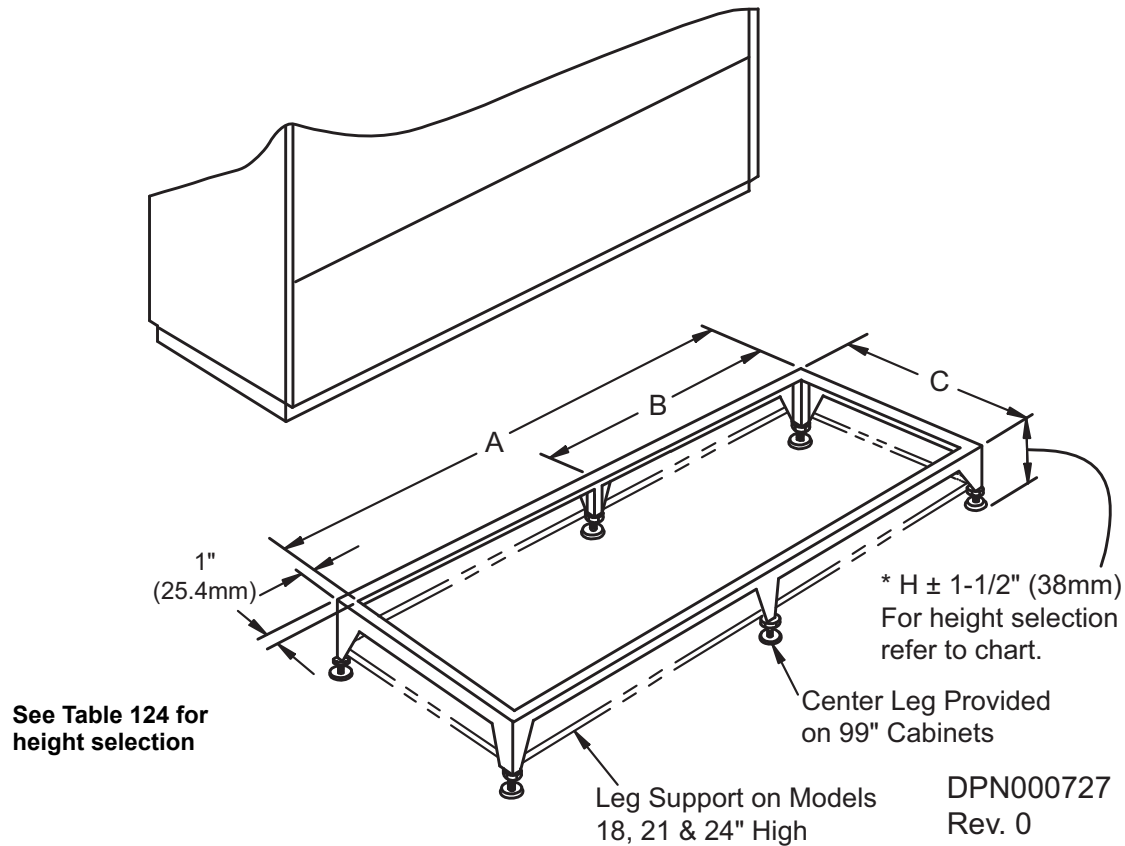


Table 123 Floor stand dimensions, in. (mm)

Model	A	B	C
PD-102, PD-133, PD-150	72 (1829)	36 (914)	31 (787)
PD-223, PD-290 PD-333	97 (2464)	48-1/2 (1232)	33 (838)

Source: DPN000727, Rev. 0

Table 124 Floor stand height selection, in. (mm)

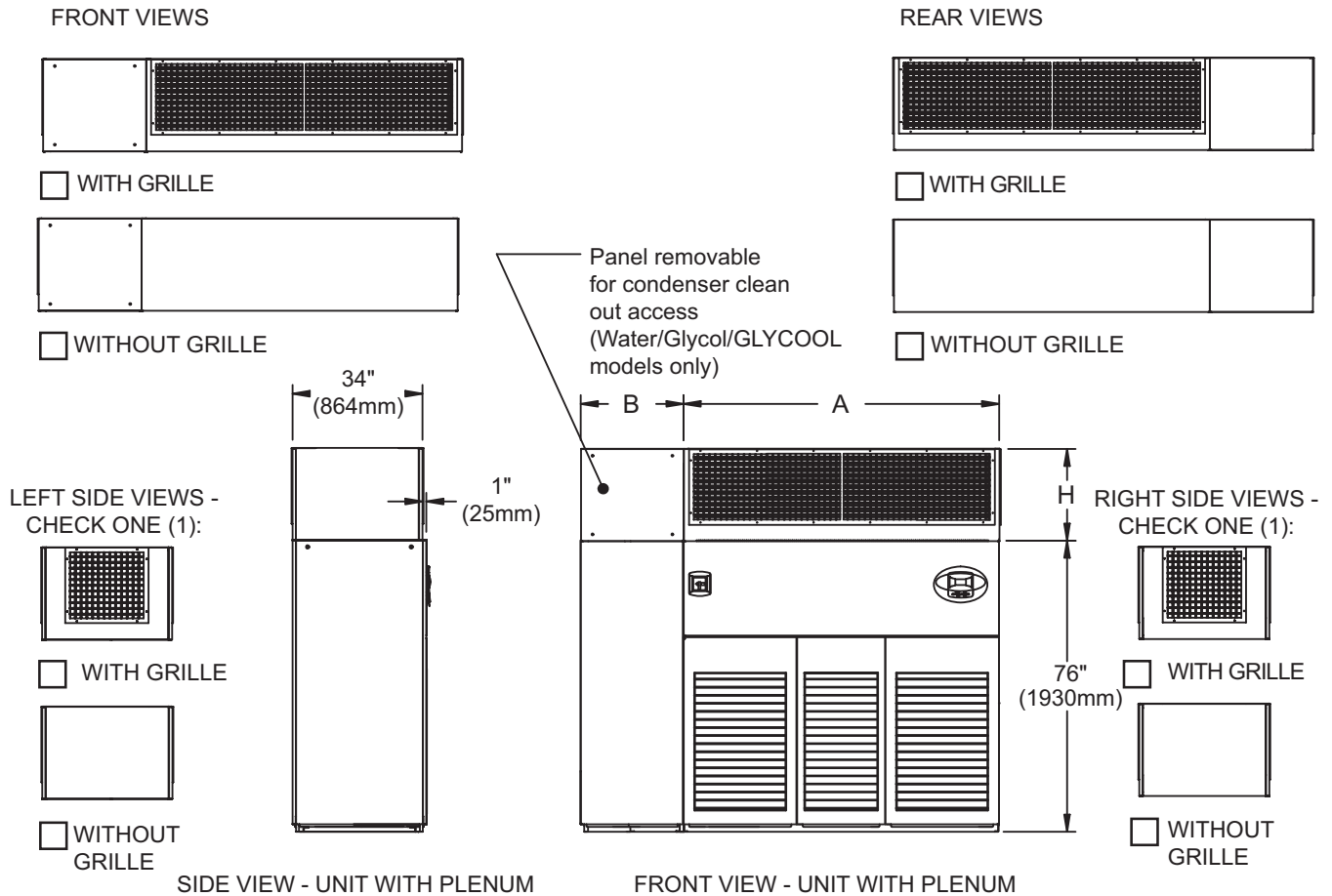
Nominal	Range (Nominal ±1-1/2 *)
9 (229)	7-1/2 to 10-1/2 (191 to 267)
12 (305)	10-1/2 to 13-1/2 (267 to 343)
15 (381)	13-1/2 to 16-1/2 (343 to 419)
18 (458)	16-1/2 to 19-1/2 (419 to 495)
21 (553)	19-1/2 to 22-1/2 (495 to 572)
24 (610)	22-1/2 to 25-1/2 (572 to 648)

Leveling feet are provided with ±1-1/2" (38mm)

Adjustment from nominal height "H".

Source: DPN000727, Rev. 0

**Figure 125 Plenum dimension—28-105kW (8-30 ton), upflow**



Notes:

1. Typical 53-77kW (15-22 Tons) unit orientation shown with grille Plenum. View varies by unit size and Plenum selection.
2. All Plenums are shipped flat and must be field assembled.
3. Optional grille Plenum kits must include front or rear grille.
4. Non-grille Plenums are open on the top and not designed with duct flange.

DPN001187  
Rev. 1

**Table 125 Plenum dimensions, in. (mm)—28-105kW (8-30 ton), upflow**

Dimensions, in. (mm)	Grille Size, in (mm) - Nominal		Height in. (mm)
	A	B	
28-42kW (8-12 ton) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	59-1/4 (1505)	13-3/4 (349)	20 (508)
28-42kW (8-12 ton) Semi-Hermetic and all Water/Glycol/GLYCOOL Models	59-1/4 (1505)	26-3/4 (679)	24 (610)
53-77kW (15-22 ton) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	82-1/4 (2089)	15-3/4 (400)	30 (762)
53-77kW (15-22 ton) Semi-Hermetic and all Water/Glycol/GLYCOOL Models	82-1/4 (2089)	26-3/4 (679)	36 (914)
105kW (30 ton)—All Models	105-1/4 (2673)	26-3/4 (679)	

Source: DPN001187, Rev. 1



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## 5.0 GUIDE SPECIFICATIONS

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### 1.0 GENERAL

#### 1.1 SUMMARY

These specifications describe requirements for a Data Center Cooling system. The system shall be designed to control temperature and humidity conditions in rooms containing computers or electronic equipment, with good insulation and vapor barrier.

#### 1.2 DESIGN REQUIREMENTS

The cooling system shall be a Liebert self-contained, factory-assembled unit with downflow or upflow air delivery. The system shall have a net total cooling capacity of \_\_\_\_ kW (BTUH) with a net sensible cooling capacity of \_\_\_\_ kW (BTUH) based on an entering air temperature of \_\_\_\_ °F (°C) dry bulb and \_\_\_\_ °F (°C) wet bulb, based on ASHRAE127 rating method and test method. Net capacities shall include losses due to fan motor heat. The unit is to be supplied with \_\_\_\_ volt \_\_\_\_ ph \_\_\_\_ Hz electrical service.

The indoor cooling unit shall have a short circuit current rating (SCCR) of 65,000A RMS symmetrical, determined in accordance with the U.S. National Electric Code Section 409, Standard 508a SB, based on test data performed at certified third-party laboratories.

#### 1.3 SUBMITTALS

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

### 2.0 PRODUCT

#### 2.1 FRAME

The modular constructed frame shall be welded, formed sheet metal. It shall be protected against corrosion using the autophoretic coating process. The frame shall be capable of being separated into three parts in the field to accommodate rigging through small spaces.

##### 2.1.1 Downflow Air Supply, Bottom Supply, Front Throw, Centrifugal fans

The supply air shall exit from the bottom of the unit with the air thrown toward the front of the unit.

##### 2.1.1 Downflow Air Supply, EC Fans

The supply air shall exit from the bottom of the unit, with the ability to operate the fans within the floor stand (requires minimum 24" raised floor height), throwing the air in a horizontal direction.

##### 2.1.1 Downflow Air Supply, Front Supply (or Rear Supply), EC Fans

The supply air shall exit from the front of the unit utilizing direct drive EC fans.

##### 2.1.1 Downflow Air Return

The return air shall enter the unit from the top.

##### 2.1.1 Upflow Top Air Supply, Front Throw

The supply air shall exit from the top of the cabinet with the air throw towards the front.

##### 2.1.1 Upflow Top Air Supply, Rear Throw

The supply air shall exit from the top of the cabinet with the air throw towards the back.

##### 2.1.1 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.

##### 2.1.1 Upflow Air Return, Rear

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

## 2.1.2 Exterior Panels

The exterior panels shall be insulated with a minimum 1 in. (25mm), 1.5 lb. (0.68 kg) density fiber insulation. The main front panel shall have captive 1/4 turn fasteners. The main unit color shall be \_\_\_\_\_.

### 2.1.2.1 Double-Skin Panels (Optional)

The exterior panels shall be internally lined with 20 gauge sheetmetal, sandwiching the insulation between the panels, for easy cleaning.

## 2.2 FILTERS—DOWNFLOW UNIT

The filter chamber shall be located within the cabinet, and filters shall be removable from the top of the unit.

### 2.2.1 Filters, 4"

Filters shall be deep pleated 4" filters with an ASHRAE 52.2 MERV8 rating (45% ASHRAE 52.1) or ASHRAE 52.2 MERV11 rating (60-65% ASHRAE 52.1).

### 2.2.1 Filters, 2" Pre-Filter With 2" Filter

Filters shall be 2" ASHRAE 52.2 MERV8 (40% ASHRAE 52.1) pre-filter, with 2" ASHRAE 52.2 MERV11 (60-65% ASHRAE 52.1) efficiency filter.

### 2.2.2 Extra Filter Set

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

## 2.3 FAN SECTION

### 2.3.1 Centrifugal Blower Section

The blower section shall be designed for \_\_\_\_ CFM (CMH) at an external static pressure of \_\_\_\_ in. wg. (Pa). The fans shall be the centrifugal type, double width double inlet and shall be dynamically balanced as a completed assembly. The shaft shall be heavy duty steel with self-aligning, permanently sealed, pillow block bearings with a minimum L3 life of 200,000 hours. The fans shall draw air through the A-frame coil to ensure even air distribution and maximum coil performance. A static regain duct shall be factory-installed to the bottom of the blower on downflow units.

#### 2.3.1.1 Motor

The fan motor shall be \_\_\_\_ hp (kW) at 1750 rpm @60hz (1450 rpm @50hz), mounted to an automatic, spring tensioning base. The motor shall be removable from the front of the cabinet.

##### 2.3.1.1.1 Premium Efficiency Motor

The fan motor shall be Open Drip-Proof, Premium efficiency and shall meet NEMA Premium standard. Motor efficiency shall be \_\_\_\_%.

##### 2.3.1.1.1 TEFC Motor (Optional)

The motor shall be Totally Enclosed Fan Cooled for protection in harsh environments.

#### 2.3.1.2 Drive Package

The motor sheave and fan pulley shall be double-width, fixed-pitch. Two belts, sized for 200% of the fan motor horsepower shall be provided with the drive package. An auto-tension system shall provide constant tension on the belts. Belts, shaft, blower bearings, sheave and pulley shall be warranted for five years (parts only).

### 2.3.1 Electronically Commutated (EC) Fan, Direct-Drive, Variable Speed

The fans shall be plug/plenum type, single inlet and shall be dynamically balanced, and 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 only, and fans may be field-lowered into a raised floor with minimum height of 24" in order to achieve more efficient fan operation. EC fans may operate within the Liebert DS cabinet, instead of underfloor.

DS053, DS070, DS077 fan motor(s) shall be nominal 4.15 hp each with a maximum operating speed of 1510 rpm; quantity, two. DS105 fan motor(s) shall be nominal 3.62 hp each, with a maximum operating speed of 2150 rpm; quantity, three.

## 2.4 HUMIDIFIER

A humidifier shall be factory-installed inside the unit. Bypass air slots shall be included to enable moisture to be absorbed into the air stream. The humidifier capacity shall be \_\_\_lb./hr (kg/hr). The humidifier shall be removable from the front of the cabinet.

### 2.4.1 Infrared Humidifier

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 removable without disconnecting high voltage electrical connections. The complete humidifier section shall be pre-piped, ready for field connection to water supply. The humidifier shall be equipped with an automatic water supply system and shall have an adjustable water-overfeed to prevent mineral precipitation. A high-water detector shall shut down the humidifier to prevent overflowing. A factory-provided air-gap shall prevent backflow of the humidifier supply water.

### 2.4.1 Steam Generating Canister Humidifier

A canister-type steam canister shall be factory-installed in the cooling unit and shall be controlled by the microprocessor control system. It shall be complete with disposable canister, all supply and drain valves, steam distributor and electronic controls. The need to change canister shall be indicated on the microprocessor control panel. The humidifier shall be designed to operate with water conductivity from 200-500 micromhos. An air-gap within the humidifier assembly shall prevent backflow of the humidifier supply water. Not available with EC fans or on upflow configurations.

## 2.5 REHEAT

The indoor cooling unit shall include a factory-installed reheat to control temperature during dehumidification.

### 2.5.1 Three-Stage Electric Reheat

The electric reheat coils shall be low watt density, 304/304 stainless steel fin tubular construction, protected by thermal safety switches, shall be \_\_\_ kW (\_\_\_ BTUH) controlled in three stages. The reheat elements shall be removable from the front of the cabinet.

### 2.5.1 SCR Electric Reheat

The electric reheat coils shall be low watt density, 304/304 stainless steel fin tubular construction, protected by thermal safety switches, \_\_\_ kW (\_\_\_ BTUH) controlled by multiple pulses to achieve tight temperature control. The reheat elements shall be removable from the front of the cabinet. Available on indoor units with standard Scroll compressors, only.

## 2.6 DUAL REFRIGERATION SYSTEM

Each unit shall include two (2) independent refrigeration circuits and shall include hot gas mufflers (semi-hermetic compressors units only), liquid line filter driers, refrigerant sight glass with moisture indicator, externally equalized expansion valves and liquid line solenoid valves. Compressors shall be located outside the airstream and shall be removable and serviceable from the front of the unit.

### 2.6.1 Semi-Hermetic Compressor With Four-Step Unloaders Control

The compressor shall be semi-hermetic with a suction gas cooled motor, vibration isolators, thermal overloads, oil sight glass, automatic reset high pressure switch with control lockout after three failures, low pressure transducer, suction line strainer, crankcase heaters, service valves, reversible oil pumps for forced feed lubrication, a maximum operating speed of 1750 rpm. The system shall include cylinder unloaders on the semi-hermetic compressors. The unloaders shall be activated by solenoid valves which are controlled from the microprocessor control. In response to the return air temperature, the microprocessor control shall activate the unloader solenoids and the liquid line solenoids such that four stages of refrigeration cooling are obtained. The stages shall be: 1) one compressor, partially loaded, 2) two compressors partially loaded, 3) one compressor partially loaded, one compressor fully loaded, 4) two compressors fully loaded. On a call for dehumidification, the microprocessor control shall insure that at least one compressor is on full for proper humidity control. Hot Gas bypass shall not be an acceptable means of capacity control due to increased energy consumption.

### 2.6.1 Scroll Compressors

The compressor shall be scroll-type with a variable capacity operation capability. Compressor solenoid valve shall unload the compressor and allow for variable capacity operation. The compressor shall be suction gas cooled motor, vibration isolators, thermal overloads, automatic reset high pressure switch with lockout after three failures, rotalock service valves, crankcase heaters, low pressure transducer, suction line strainer, and a maximum operating speed of 3500 rpm. Hot gas bypass shall not be an acceptable means of capacity control, due to increased energy consumption.

### 2.6.1 Digital Scroll Compressors

The compressor shall be variable capacity, scroll-type, capable of operating between 20% and 100% compressor capacity. The compressor shall be suction gas cooled motor, vibration isolators, thermal overloads, automatic reset high pressure switch with lockout after three failures, rotalock service valves, crankcase heaters, low pressure transducer, suction line strainer and a maximum operating speed of 3500 rpm. Hot gas bypass shall not be acceptable means of capacity control, due to increased energy consumption.

### 2.6.2 Evaporator Coil, DX Coil

The evaporator coil shall be A-frame design with offset orientation and have \_\_\_\_sq. ft. (m<sup>2</sup>) face area, three rows deep. It shall be constructed of rifled copper tubes and aluminum fins and have a maximum face velocity of \_\_\_\_ ft. per minute (m/s) at \_\_\_\_ CFM (CMH). A stainless steel condensate drain pan shall be provided.

#### 2.6.2.1 Polymeric Coating (Optional)

The coil shall be coated with a high performance polymeric coating process to provide corrosion resistance within 2 to 12 pH range.

### 2.6.3 R-407C Refrigerant, non-HCFC

The system shall be designed for use with R-407C refrigerant, which meets the EPA clean air act for phase-out of HCFC refrigerants.

## 2.7 LIEBERT iCOM™ MICROPROCESSOR CONTROL WITH SMALL GRAPHIC DISPLAY

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

**Compressor Short Cycle Control**—Prevents compressor short-cycling and needless compressor wear.

**System Auto Restart**—The auto restart feature shall automatically restart the system after a power failure. Time delay is programmable.

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

**Econ-O-Coil Flush Cycles**—Econ-O-Coils are periodically flushed to prevent a buildup of contaminants.

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

The Liebert iCOM control shall be compatible with all Liebert remote monitoring and control devices. Options are available for BMS interface via Modbus, BACnet and SNMP.

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

### The User Menus Shall be Defined as Follows:

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

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

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

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

**Total Run Hours:** Menu shall display accumulative component operating hours for major components including compressors, Econ-O-Coil (FC), fan motor, humidifier and reheat.

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

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

Group 1: English, French, Italian, Spanish, German

Group 2: English, Russian, Greek

Group 3: English, Japanese, Chinese, Arabic

**Service Contacts:** Menu shall allow display of local service contact name and phone number.

**The Service Menu Shall be Defined as Follows:**

**Setpoints:** Menu shall allow setpoints within the following ranges:

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

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

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

**Timers/Sleep Mode:** Menu shall allow various customer settings for turning On/Off unit.

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

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

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

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

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

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

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

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

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

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

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

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

**The Advanced Menus Shall be Defined as Follows:**

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

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

## 2.7 LIEBERT iCOM™ MICROPROCESSOR CONTROL WITH LARGE GRAPHIC DISPLAY (OPTIONAL)

The Liebert iCOM unit control with large graphic display shall include all of the features as the Liebert iCOM with small graphic display, except that it includes a larger graphical display and shall include the additional features of: System View, Spare Parts List, Unit Diary.

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

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

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

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

## 2.7 LIEBERT iCOM WALL MOUNT LARGE GRAPHIC DISPLAY vNSA PANEL (OPTIONAL)

The Liebert iCOM Large Graphic Display Kit shall include an ergonomic, aesthetically pleasing housing, a 320x240 dot matrix graphic display and a 120V power supply. The Wall Mount Large Graphic Display shall be used to allow remote location of a System View display and all features of the Large Graphic User, Service and Advanced menus for use with Liebert iCOM controlled products connected for Unit-to-Unit (U2U) communications. This panel is also used to network together so they can be place in 1 of the 3 team work modes and lead/lag standby rotation as well as cascade mode.

## 2.8 DUAL-COOLING CHILLED WATER COIL

The dual-cooling source system shall consist of an air- or water-cooled compressorized (DX) system with the addition of a chilled water coil, a modulating control valve and a comparative temperature sensor. The system shall be able to function either as a modulating chilled water system or as a compressorized (DX) system, or a combination of both. The primary cooling mode shall be chilled water, if available. Switchover between the two cooling modes shall be performed automatically by the microprocessor control.

Four (4) pipes shall be included on water/glycol systems: chilled water supply, chilled water water return, condenser water supply and condenser water return.

Four pipes shall be included on air-cooled systems: chilled water supply, chilled water return, hot gas refrigerant line, liquid refrigerant line.

### 2.8.1 Dual-Cooling Source Control Valve

The chilled water circuit shall include a three-way modulating valve. The microprocessor shall position the valve in response to room conditions. Cooling capacity will be controlled by bypassing chilled water around the coil. The modulating valve travel for dehumidification shall be proportional.

### 2.8.1 CuNi Coil Chilled Water Coil (Optional)

A 70/30 CuNi chilled water shall be provided for Dual-Cooling units that are applied to a cooling tower loop or other open water system. This option is required on open cooling tower applications, and constant chilled water flow must be provided in order to periodically circulate chilled water through the coil when idle.

#### 2.8.1.1 Polymeric Coating on Liebert Econ-O-Coil™ and DX Coil (Optional)

The coil shall be coated with a high performance polymeric coating process to provide corrosion resistance on the exterior of the coil, within 2 to 12 pH range.

## 2.9 MISCELLANEOUS OPTIONS

### 2.9.1 Non-Locking Disconnect Switch (Optional)

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

**2.9.1 Locking Disconnect Switch (Optional)**

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.

**2.9.2 High-Temperature Sensor (Optional)**

The high-temperature sensor shall be factory-installed in the unit and shall be factory-set to 125°F (52°C). It shall immediately shut down the environmental control system when activated. The sensor shall be mounted with the sensing element in the return air.

**2.9.3 Smoke Sensor (Optional)**

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

**2.9.4 Condensate Pump, Dual Float (Optional)**

The condensate pump shall have a minimum capacity of 145 GPH (548 l/h) at 20 ft. (58 kPa) head. It shall be complete with integral dual-float switches, pump-and-motor assembly and reservoir. The secondary float shall send a signal to the local alarm and shut down the unit upon high water condition.

**2.9.5 Low-Voltage Terminal Package (Optional)**

Factory-installed and wired terminals shall be provided for customer connection to lock out the reheat and humidifier upon contact closure. Two extra N/O common alarm contacts shall be provided. Two extra remote shutdown terminals shall be provided.

**2.9.6 Remote Humidifier Contact (Optional)**

A pair of N/O contacts shall be provided for connection to a remote humidifier.

**2.9.7 Main Fan Overload (Optional)**

A pair of N/O contacts shall be factory-installed and wired to indicate Main Fan Overload.

**2.9.8 Compressor Overload (Optional)**

A pair of N/O contacts shall be factory-installed and wired to each compressor to indicate Compressor Overload.

**2.10 AIR-COOLED SYSTEMS**

The indoor evaporator unit shall include refrigerant piping, with a factory holding charge of nitrogen. The hot-gas and liquid lines shall be spun shut and shall include a factory-installed Schrader valve. Field-relief of the Schrader valve shall indicate a leak-free system. Air-cooled systems shall be field-piped and wired to a condenser, using field-supplied refrigerant piping and wiring. The system shall be field-charged with refrigerant, supplied by others.

**2.10.1 Standard Features—Air-Cooled Microchannel Condenser Design**

Condenser shall consist of microchannel condenser coil(s), propeller fan(s) direct-driven by individual fan motor(s), electrical controls, housing and mounting legs. The Liebert air-cooled condenser shall provide positive refrigerant head pressure control to the Precision Cooling indoor unit by adjusting heat rejection capacity. Microchannel coils shall provide superior heat transfer, reduce air-side pressure drop, increase energy efficiency and significantly reduce the system refrigerant volume required. EC fans and fan operating techniques shall provide reduced maximum sound levels. Various methods shall be available to match indoor unit type, maximum outdoor design ambient and maximum sound requirements.



### 2.10.1.1 Aluminum Microchannel Coil

Liebert microchannel coils shall be constructed of aluminum microchannel tubes, fins and manifolds. Tubes shall be flat and contain multiple, parallel flow microchannels and span between aluminum headers. Full-depth louvered aluminum fins shall fill spaces between the tubes. Tubes, fins and aluminum headers shall be oven brazed to form a complete refrigerant-to-air heat exchanger coil. Copper stub pipes shall be electric resistance welded to aluminum coils and joints protected with polyolefin to seal joints from corrosive environmental elements. Coil assemblies shall be factory leak-tested at a minimum of 300 psig (2068kPag). Hot gas and liquid lines shall be copper and shall be brazed using nitrogen gas flow to the stub pipes with spun closed ends for customer piping connections. Complete coil/piping assembly shall be then filled and sealed with an inert gas holding charge for shipment.

### 2.10.1.1 Aluminum Microchannel Coil with E-Coat

Aluminum microchannel coil with E-coat shall provide a flexible epoxy coating to all coil surface areas without material bridging between fins. E-coat shall increase coil corrosion protection and shall reduce heat rejection capacity degradation to less than 10% after a severe 2000 hour 5% neutral salt spray test (ref. ASTM B117). The coating process shall ensure complete coil encapsulation, and the color shall be black.

### 2.10.1.2 Fan Motor/Blade Assembly

The fan motor/blade assembly shall have an external rotor motor, fan blades and fan/finger guard. Fan blades shall be constructed of cast aluminum or glass-reinforced polymeric material. Fan guards shall be heavy gauge, close meshed steel wire, coated with a black corrosion resistant finish. Fan terminal blocks shall be located in an IP54 enclosure located on the top of the fan motor. Fan assemblies shall be factory-balanced, tested before shipment and mounted securely to the condenser structure.

### 2.10.1.3 EC Fan Motor

The EC Fan motors shall be electronically commutated for variable speed operation and shall have ball bearings. The EC fans shall provide internal overload protection through built-in electronics. Each EC fan motor shall have a built-in controller and communication module, linked via RS485 communication wire to each fan and the Premium Control Board, allowing each fan to receive and respond to precise fan speed inputs from the Premium Control Board.

### 2.10.1.4 Electrical Controls

Electrical controls and service connection terminals shall be provided and factory wired inside the attached control panel section. A locking disconnect switch shall be factory-mounted and wired to the electrical panel and controlled via an externally mounted locking and lockable door handle. Only high-voltage supply wiring and low voltage indoor unit communication/interlock wiring are required at condenser installation.

### 2.10.1.5 EC Fan Speed & Premium Control

The EC Fan/Premium Control System shall include an electronic control board, EC fan motor(s) with internal overload protection, refrigerant and ambient temperature thermistors and refrigerant pressure transducers. The control board shall receive an indoor unit run signal via field-supplied low voltage interlock wires to the compressor side switch, via field-supplied CANbus communication wires from the indoor unit's Liebert iCOM control (future feature) or via both. The control board shall use sensor and communication inputs to maintain refrigerant pressure by controlling each EC fan on the same refrigerant circuit to the same speed.

### 2.10.1.6 Cabinet

The condenser cabinet shall be constructed of bright aluminum sheet and divided into individual fan sections by full width baffles. Internal structural support members, including coil support frame, shall be galvanized steel for strength and corrosion resistance. Panel doors shall be provided on two sides of each coil/fan section to permit coil cleaning. An electrical panel shall be contained inside a factory mounted, NEMA 3R weatherproof electrical enclosure.

## 2.10.1.7 Mounting Legs

### 2.10.1.7.1 Standard Aluminum Legs

Aluminum legs shall be provided to mount unit for vertical air discharge with rigging holes for hoisting the unit into position. Standard height is 18in. (457mm).

### 2.10.1.7.1 Optional Galvanized Steel Legs with Bracing

Condensers shall be shipped with [36in. (914mm)] [48in. (1219mm)] [60in. (1524mm)] mounting legs with stabilization bracing. Legs, bracing and hardware shall be galvanized steel.

## 2.10.1 Air-Cooled Microchannel Condenser Accessories (Options)

### 2.10.1.1 Liebert Lee-Temp™ Receiver Kit

Liebert Lee-Temp Receiver Kit shall contain an insulated, heated receiver tank with sight glasses, mounting plate, mounting hardware, pressure relief valve, rotalock valve for refrigerant charge isolation and piping assembly with head pressure operated 3-way valve and check valve. Components shall be field-assembled to the condenser. The 3-way valve shall sense refrigerant head pressure and adjust the flooding charge in the condenser coil to adjust the condenser heat rejection capacity. The Liebert Lee-Temp heater shall be [(150W) (300W)], shall include an integral thermostat to maintain refrigerant temperature at a minimum of 85°F (29°C) and shall require a separate power supply of [(208/230-1-60) (120-1-60 volt)].

The Liebert Lee-Temp Kit shall function with Liebert MC variable speed fan motors and electronic controls that lower fan speed in lower outdoor ambient temperatures for maximum energy efficiency. This system shall allow system startup and positive head pressure control with ambient temperatures as low as -30°F (-34.4°C).

### 2.10.1.2 Fusible Plug Kit

A fusible plug kit shall be field-installed on the liquid line for compliance with building codes requiring refrigerant relief during high temperature and building fire conditions.

### 2.10.1.3 IBC/OSHPD Seismic Certification and IBC Wind/Snow Load Complaint

IBC/OSHPD Seismic Certification and IBC Wind/Snow Load Compliant condensers shall be provided with any applicable bracing and field installation instructions. Condensers shall bear a label certifying compliance with IBC/OSHPD requirements.

#### 2.10.1.3.1 Seismic IBC/OSHPD (Optional)

Install condenser 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. Wiring and piping 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.

## 2.10.1 Standard Features—Air-Cooled Condenser, Fin-Tube Coil Design

The Liebert-manufactured outdoor air-cooled condenser shall be the low-profile, multiple direct drive, propeller fan type. The condenser shall balance the heat rejection of the compressor at \_\_\_\_ °F (°C) ambient. The condenser shall be constructed of aluminum and contain a copper tube, aluminum fin coil arranged for (horizontal) (vertical) air discharge.

### 2.10.1.1 Fan Speed Head Pressure Control

The winter control system for the air-cooled condenser shall be Liebert Fan Speed Control. The variable speed motor shall operate from 0 to 230 volts single phase, 10 to 1050 rpm. It shall be designed with ball bearings, permanent lubrication, internal overload protection, 40°C rise at full speed, 65°C rise at 10 rpm. The control system shall be complete with transducers, thermostats and electrical control circuit, factory prepackaged in the integral condenser control box. The transducer shall automatically sense the highest head pressure of either operating compressor and control the

variable speed fan on the air-cooled condenser to properly maintain the head pressure. The Liebert Fan Speed Control system shall provide positive startup and operation in ambient temperatures as low as -20°F (-28.9°C). The air-cooled condenser shall have a \_\_\_\_ volt, \_\_\_\_ ph \_\_\_\_ Hz power supply.

### 2.10.1.2 Liebert Lee-Temp™, Heated Receiver Head Pressure Control System

The winter control system for the air-cooled condenser shall be Liebert Lee-Temp. The Liebert Lee-Temp system shall allow startup and positive head pressure control with ambient temperatures as low as -30°F (-34.4°C). The Liebert Lee-Temp package shall include the following components for each refrigeration circuit: insulated receiver, pressure relief valve, head pressure three-way control valve and rotalock valve for isolating the refrigerant charge. The Liebert Lee-Temp receiver shall be factory-insulated and mounted ready for the field connection to the air-cooled condenser. The Liebert Lee-Temp heater shall require a separate power supply of \_\_\_\_ volt, single phase.

### 2.10.1 Standard Features—Liebert Quiet-Line Condenser Fin-Tube Coil Design (Optional)

Fan motors shall be 12-pole, 570 rpm, equipped with rain shields and permanently sealed ball bearings. Motors shall include built-in overload protection. Motors shall be rigidly mounted on die-formed galvanized steel supports. Disconnect switch shall be a standard feature.

#### 2.10.2.1 Condenser Disconnect Switch (Optional)

A disconnect switch shall be factory-mounted and wired to the condenser control panel, accessible from the exterior (standard on Quiet-Line models).

## 2.10 WATER/GLYCOL SYSTEMS

The indoor evaporator unit shall include factory installed refrigerant piping, and factory charged with R-407C refrigerant. Water/glycol systems shall be field piped to an external heat rejection source such as a cooling tower (by others) or drycooler with pump package.

### 2.10.1 Paradenser™ Cleanable Shell and Tube Condenser

The water-cooled condensers for each circuit shall be cleanable, shell-and-tube, counter flow type. The heads shall be removable to allow for cleaning of the water tubes. Condensers shall be rated for a maximum refrigerant pressure of 400 psi at 200°F (2758 kPa at 93.3°C). The condenser shall be capable of operating with R-407C refrigerant. The unit shall require \_\_\_\_ GPM (l/m) of \_\_\_\_ °F (°C) water and have a maximum pressure drop of \_\_\_\_ psi (kPa).

### 2.10.2 Water/Glycol Regulating Valve, Two-Way with Adjustable Bypass Valve

The condenser shall be pre-piped with a two-way regulating valve which is head pressure actuated. A gate valve shall bypass the regulating valve.

### 2.10.2 Water/Glycol Regulating Valve, Three-Way

The condenser shall be pre-piped with a three-way regulating valve which is head pressure actuated.

### 2.10.2 Pressure Rating, 150 psi (1034 kPa), Scroll and Semi-Hermetic Compressors

The condenser water circuit shall be designed for a pressure of 150 psi (1034 kPa)

### 2.10.3 Pressure Rating, 350 psi (2413 kPa), Scroll and Semi-Hermetic Compressors

The condenser water circuit shall be designed for a pressure of 350 psi (2413 kPa)

### 2.10.3 Pressure Rating, 350psi (2413 kPa), Digital Scroll Models

The condenser water circuit shall be designed for a pressure of 350 psi (2413 kPa), using motorized ball-valves to control refrigerant head pressure.

### 2.10.3 GLYCOOL Fluid Economizer Systems

In addition to the DX (refrigerant) evaporator coil, a factory piped fluid economizer coil shall enable the system to operate in Economizer mode when the water/glycol temperature is at least 7°F lower than the return air temperature to the indoor unit. The system shall operate in partial economization, supplemented by DX operation and in full economization when fluid temperatures are low enough to offset room load. The economizer control system shall be factory installed and wired, and shall automatically control switchover between economizer mode and DX mode.

#### 2.10.3.1 GLYCOOL™ (Economizer) Coil

The GLYCOOL Economizer coil shall be constructed of copper tubes and aluminum fins. The coil shall be A-frame or V-frame in order to minimize air pressure drop and maximize cooling capacity, and shall be nested with the DX coil. The Econ-O-Coil shall be upstream of the DX coil to enable pre-cooling of the air, during partial economizer operation. A constant flow of water shall be available to enable the system to periodically flush the economizer coil of sediments that could cause pit corrosion if not flushed out of the coil.

The Economizer coil shall have a net Sensible Cooling Capacity of \_\_\_\_ BTUH (kW) with 45°F (7.2°C) entering glycol solution temperature. The total system shall require \_\_\_\_ GPM (l/s) and the total unit pressure drop shall not exceed \_\_\_\_ feet of water (kPa), when in the economizer mode of operation.

#### 2.10.3.2 GLYCOOL Three-Way Control Valve

The GLYCOOL Economizer coil shall be equipped with a fully proportional 3-way control valve, designed for a maximum operating pressure of 150psi (1034 kPa). This motorized control valve shall control the amount of flow to the economizer coil to control room temperature and relative humidity.

#### 2.10.3.3 High-Pressure System, 350 psi (2413 kPa) (Option)

The GLYCOOL Economizer system shall be designed for a water/glycol static pressure of 350 psi (2413 kPa).

#### 2.10.4.3 CuNi Economizer Coil to Inhibit Coil Corrosion

A 70/30 CuNi Econ-O-Coil shall be provided when the Econ-O-Coil is connected to a cooling tower loop or other open water system. This option is required on open cooling tower applications in order to inhibit internal coil corrosion, due to lack of proper water system treatment and lack of fluid circulation through the coil.

### 2.11 DRYCOOLER GLYCOL FLUID COOLER

The drycooler shall be the low profile, slow speed, multiple direct drive, propeller fan type. The drycooler shall be constructed of aluminum and contain a copper tube aluminum fin coil with an integral electric control panel and disconnect switch. The drycooler shall be designed for \_\_\_\_ °F (°C) ambient.

#### 2.11.1 Pump Package, Glycol System

This system shall be provided with a centrifugal pump mounted in a weatherproof and vented enclosure. The pump shall be rated for \_\_\_\_ GPM (l/m) at \_\_\_\_ ft. of head (kPa) and operate on \_\_\_\_ volt, 3-phase, \_\_\_\_ Hz.

#### 2.11.1 Dual Pump Package, Glycol System

The dual pump package shall include pumps, enclosure, field-mounted flow switch and a separate factory-wired control box (including a lead/lag switch for the pumps). The standby pump shall automatically start upon failure of the lead pump. Each pump shall be rated for \_\_\_\_ GPM (l/s) at \_\_\_\_ feet of head (kPa).

## 2.12 LIEBERT LIQUI-TECT® SENSORS

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

## 2.13 FLOOR STAND

The floor stand shall be constructed of a welded steel frame. The floor stand shall have adjustable legs with vibration isolation pads. The floor stand shall be \_\_\_\_ in. (mm) high.

### 2.13.1 Seismic Rated Floor Stand (Optional)

The floor stand shall be seismic rated and shall be field-attached to the unit frame, and to the floor.

### 2.13.2 Floor Stand Turning Vane (Optional)

A turning vane shall be supplied with the floor stand and shall be designed for the specified floor stand height.

## 2.14 RETURN AIR PLENUM FOR DOWNFLOW UNITS

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

## 2.14 DISCHARGE AIR PLENUM FOR UPFLOW UNITS, WITH DISCHARGE GRILLE(S)

The air plenum shall be constructed of 20 gauge steel, powder coated to match unit color. The plenum shall be \_\_\_\_" high. Discharge air grilles shall be painted black and shall be included on the [front], [rear], [left side], or [right side] of the plenum.

## 2.14 DISCHARGE AIR PLENUM FOR UPFLOW UNITS, WITHOUT DISCHARGE GRILLE(S)

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

## 3.0 EXECUTION

### 3.1 INSTALLATION OF PRECISION AIR CONDITIONING UNITS

#### 3.1.1 General

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

#### 3.1.2 Electrical Wiring

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

#### 3.1.3 Piping Connections

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

#### 3.1.4 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.





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## **Emerson Network Power**

Division: Liebert

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