

STULZ

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CyberAir[®] CW

Engineering Manual

**Perimeter Mounted Precision Air Handlers
060 kW - 1080 kW / 60 Hz**

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Nomenclature								
CFX-XXX-XXX-X-XX								
CF	Air Pattern	Capacity (kW)	Cooling Method	Number of CW Circuits	Piping Connections	Secondary Cooling Options	Fan Location	Additional Special Options
CyberAir Floor Mounted System	D = Downflow U = Upflow R = Rear Return F = Front Discharge	060, 090, 120, 150, 180, 190, 230, 280, 310, 360, 510, 630, 730, 1080	C = CW	1 2*	R = Right Hand Piping L = Left Hand Piping* B = Left and Right hand piping*	0 = None F = Water Side Economizer	I = In Unit	0 = Standard S = Special* A = Aluminum
CF	D	230	C	1	R	0	I	0

* Call 301.620.2033 for additional information.

Example: 230 kW Capacity, Single Circuit, Chilled Water, Downflow, Floor Mounted System; with Right Hand Piping, Internal EC Fans, and Standard Options: CFD-230-C1R-0-I0.

CyberAir® CFD/CFU/CFF floor mounted A/Cs are designed to be the compact solution to your precision air conditioning requirements. CW systems are available in sizes from 60 to 1080 kW (60 to 280 kW for CFF) in a variety of space saving cabinet footprints.

Designed for efficient 100% front service access, STULZ CyberAir units can be easily tucked into a corner or placed side-by-side. STULZ CyberAir units are especially adaptable to raised floors and are available in both down-flow and up-flow air pattern configurations.

Upflow/Downflow/Front Discharge Models 060-C thru 280-C

CFD/CFU/CFF-C MODELS	060	090	120	150	180	190	230	280
SELECTED FEATURES								
TEMPERATURE CONTROL								
2-Way Modulating Chilled Water Control Valve	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
3-Way Modulating Chilled Water Control Valve	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Differential Temperature Flow	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
2-Stage Electric Reheating/Heating	Standard	Standard	Standard	N/A	N/A	N/A	N/A	N/A
3-Stage Electric Reheating/Heating	N/A	N/A	N/A	Standard	Standard	Standard	Standard	Standard
Hot Water Reheat	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
High Efficiency, Aluminum Fin/Copper Tube Coils	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
HUMIDITY CONTROL								
Electrode Canister Steam Humidifier	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Dehumidification Mode - Electric Reheat	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
CONTROLS								
E ² Color Touchscreen Graphic Microprocessor w/ Alarms	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Remote BMS Communications	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
CABINET								
Galvannealed Steel, Powder Coated Finish	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Stainless Steel Condensate Drain Pan	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
1/2" Thick, 2 lb/ft ² Density Thermal & Sound Insulation	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Floor Stand (Adjustable)	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
FILTERS / PLENUMS								
2 or 3-Way Plenum Box (Up-Flow Units)	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Return Air Plenum Extension Box (Down-Flow Units)	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Internal / External Filters	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal*
4", MERV8 Rated Pleated Filters	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
4", MERV11 Rated Pleated Filters	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
BLOWERS / MOTORS								
Backward Inclined, Plenum Style Fan, With an EC Motor	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
ELECTRICAL								
3-Phase Power Supply	See Electrical Table							
Multi-Voltage Control Transformer (24V Class 2)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Motor Starter Protectors and Integral Circuit Breakers	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
SAFETY FEATURES								
Audible/ Visual Local & Remote Alarms	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Main Power Circuit Breaker Unit Mounted	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Motor Overload Protection	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
CODE CONFORMANCE								
CETL US listed to UL 1995 (2011 Ed. 4)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
CSA C22.2 No. 236 (2011 Ed. 4)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard

External filter is standard on CFF-280-C.

Downflow Discharge Models 310-C thru 1080-C

CFD-C MODELS	310	360	510	630	730	1080
SELECTED FEATURES:						
TEMPERATURE CONTROL						
2-Way Modulating Chilled Water Control Valve	Standard	Standard	Standard	Standard	Standard	Standard
3-Way Modulating Chilled Water Control Valve	Optional	N/A	N/A	N/A	N/A	N/A
Entering/Leaving CW Temperature Sensors	Standard	Standard	Standard	Standard	Standard	Standard
2-Stage Electric Reheating/Heating	N/A	N/A	N/A	N/A	N/A	N/A
3-Stage Electric Reheating/Heating	Standard	Standard	N/A	N/A	N/A	N/A
Hot Water Reheat	Optional	Optional	N/A	N/A	N/A	N/A
High Efficiency, Aluminum Fin/Copper Tube Coils	Standard	Standard	Standard	Standard	Standard	Standard
HUMIDITY CONTROL						
Electrode Canister Steam Humidifier	Standard	Standard	N/A	N/A	N/A	N/A
Dehumidification Mode - Electric Reheat	Standard	Standard	N/A	N/A	N/A	N/A
CONTROLS						
E ² Color Touchscreen Graphic Microprocessor w/ Alarms	Standard	Standard	Standard	Standard	Standard	Standard
Remote BMS Communications	Optional	Optional	Optional	Optional	Optional	Optional
CABINET						
Galvannealed Steel, Powder Coated Finish	Standard	Standard	Standard	Standard	Standard	N/A
Extrude Aluminum frame with heavy gauge base	N/A	N/A	N/A	N/A	N/A	Standard
Stainless Steel Condensate Drain Pan	Standard	Standard	Standard	Standard	Standard	Standard
1/2" Thick, 2 lb/ft ² Density Thermal & Sound Insulation	Standard	Standard	Standard	Standard	Standard	N/A
1" Thick, 2 lb/ft ² Density Thermal & Sound Insulation	N/A	N/A	N/A	N/A	N/A	Standard
Floor Stand (Adjustable)	Optional	Optional	Optional	Optional	Optional	Optional
FILTERS / PLENUMS						
2- or 3-Way Plenum Box (Up-Flow Units)	N/A	N/A	N/A	N/A	N/A	N/A
Return Air Plenum Extension Box (Down-Flow Units)	Optional	Optional	Optional	Optional	Optional	Optional
Internal / External Filters	External	External	External	External	External	External
4", MERV8 Rated Pleated Filters (Down-Flow Units)	Standard	Standard	Standard	Standard	Standard	Standard
4", MERV11 Rated Pleated Filters (Down-Flow Units)	Optional	Optional	Optional	Optional	Optional	Optional
BLOWERS / MOTORS						
Backward Inclined, Plenum Style Fan, With an EC Motor	Standard	Standard	Standard	Standard	Standard	Standard
ELECTRICAL						
3-Phase Power Supply	-- See Electrical Table --					
Multi-Voltage Control Transformer (24V Class 2)	Standard	Standard	Standard	Standard	Standard	Standard
Motor Starter Protectors and Integral Circuit Breakers	Standard	Standard	Standard	Standard	Standard	Standard
SAFETY FEATURES						
Audible/ Visual Local & Remote Alarms	Standard	Standard	Standard	Standard	Standard	Standard
Main Power Circuit Breaker Unit Mounted	Standard	Standard	Standard	Standard	Standard	Standard
Motor Overload Protection	Standard	Standard	Standard	Standard	Standard	Standard
CODE CONFORMANCE						
CETL US listed to UL 1995 (2011 Ed. 4)	Standard	Standard	Standard	Standard	Standard	Standard
CSA C22.2 No. 236 (2011 Ed. 4)	Standard	Standard	Standard	Standard	Standard	Standard

Technical Specifications – CFD/CFF/CFU

Model	CFD/CFF-060-C1	CFU-060-C1	CFD/CFF-090-C1	CFU-090-C1	CFD/CFF-120-C1	CFU-120-C1	CFD/CFF- 150-C1
Chilled Water Control Valve – Sized for Medium Flow @ 75 °F DB/62.5 °F WB EAT Conditions							
2-way Modulating (standard)							
Size in. (Cv)	2 (20)	2 (20)	2 (28)	2 (28)	2 (30)	2 (30)	2 (40)
Valve Pressure Rating, psi	600	600	600	600	600	600	600
Close-off Pressure Rating, psi	200	200	200	200	200	200	200
3-way Modulating (optional)							
Size in. (Cv)	2 (20)	2 (20)	2 (28)	2 (28)	2 (30)	2 (30)	2 (40)
Valve Pressure Rating, psi	400	400	400	400	400	400	400
Close-off Pressure Rating, psi	200	200	200	200	200	200	200
Chilled Water Coil – Aluminum Fin, Copper Tube							
Rows (Face Area, ft ²)	4 (31.3)	4 (31.3)	5 (31.3)	5 (31.3)	6 (37.2)	6 (37.2)	3 (52.6)
Face Velocity, ft/min	368	352	368	352	333	269	314
Evaporator Blower / Motor – Backward Inclined Direct Driven EC							
Nominal Motor Power, hp/each	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Rated Air Flow, ft ³ /min @ 0.2 in H ₂ O esp	11,500	11,000	11,500	11,000	12,400	10,000	16,500
Quantity of Blowers	2	2	2	2	2	2	3
Reheat / Heat – Performance Capacities							
Electric Reheat / Heat – Finned Tubular Heaters, (Standard)							
Number of Stages	2	2	2	2	2	2	3
Heater Rating, kW	18.0	18.0	18.0	18.0	18.0	18.0	27.0
Total Capacity, kW (MBH)	23.8 (81.2)	23.8 (81.2)	23.8 (81.2)	23.8 (81.2)	23.8 (81.2)	23.8 (81.2)	35.7 (121.8)
Hot Water Reheat / Heat – Rated at 180 °F EWT / 160 °F LWT & 75 °F DB/61.1 °F WB EAT (Optional)							
Include Evaporator Blower Motor Heat @ Rated, ft ³ /min and esp							
Total Capacity, kW (MBH)	24.9 (84.9)	28.4 (96.9)	24.9 (84.9)	28.4 (96.9)	27.6 (94.1)	30.5 (104.2)	46.3 (157.9)
gpm (Pressure Drop, ft H ₂ O)	7 (4)	8 (5)	7 (4)	8 (5)	8 (4)	9 (6)	13 (13)
Control Valve	Modulating, 2-way, 1in., 300psi, Cv=8.0						
Humidification – Electrode Steam Canister Humidifier with Adjustable Output, (Standard)							
Capacity lb/hr	15	15	15	15	15	15	20
Power Input, kW	5.1	5.1	5.1	5.1	5.1	5.1	6.8
Std Control	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional
Filters – MERV 8 Average Dust Spot Efficiency, Throwaway (Standard), MERV 11 Average Dust Spot Efficiency (Optional)							
Actual Size, H in. x W in. x D in. (Quantity)	37 × 23 × 3 3/4 (3)	35 7/8 × 24 3/4 × 3 3/4 (1)	37 × 23 × 3 3/4 (3)	35 7/8 × 24 3/4 × 3 3/4 (1)	37 × 29 × 3 3/4 (3)	35 7/8 × 24 3/4 × 3 3/4 (3)	35 7/8 × 24 3/4 × 3 3/4 (4)
		35 7/8 × 18 7/8 × 3 3/4 (2)		35 7/8 × 18 7/8 × 3 3/4 (2)		24 3/4 × 21 × 3 3/4 (1)	24 3/4 × 21 × 3 3/4 (2)
		21 × 18 7/8 × 3 3/4 (1)		21 × 18 7/8 × 3 3/4 (1)			
Filter Face Area, ft ²	17.7	18.3	17.7	18.3	22.4	22.1	28.5

Connection Sizes – Copper, (Water In/Out connections are sized for flow rates at 75 °F DB/62.5 °F WB EAT conditions.)							
Water In/Out, in. OD (see drawing for quantity)	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8
Condensate Drain w/o Pump, in. OD	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Condensate Drain w/ Pump, in. OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Humidifier Inlet, in. OD	1/4	1/4	1/4	1/4	1/4	1/4	1/4
HW Reheat / Heat In/Out, in. OD	7/8	7/8	7/8	7/8	7/8	7/8	7/8
Physical Data							
Approximate Unit Weight, lb	1,500	1,700	1,600	1,800	1,900	2,000	2,000
Approximate Shipping Weight, lb	1,600	1,800	1,700	1,900	2,100	2,200	2,200
Unit Dimensions, H in. x W in. x D in.	76.2 × 77.4 × 40.3 [†] 88.1 × 77.4 × 40.3 [‡]	88.1 × 77.4 × 40.3	76.2 × 77.4 × 40.3 [†] 88.1 × 77.4 × 40.3 [‡]	88.1 × 77.4 × 40.3	76.2 × 89.1 × 40.3 [†] 88.1 × 89.1 × 40.3 [‡]	88.1 × 89.1 × 40.3	76.2 × 118.4 × 40.3 [†] 88.1 × 118.4 × 40.3 [‡]
(w/ Hot Water Reheat)	Internal	(91.1 × 77.4 × 40.3)	Internal	(91.1 × 77.4 × 40.3)	Internal	(91.1 × 89.1 × 40.3)	Internal
Unit Shipping Dimensions, H in. x W in. x D in.	95 × 80 × 46	95 × 80 × 46	95 × 80 × 46	95 × 80 × 46	95 × 95 × 46	95 × 95 × 46	95 × 124 × 46
(w/ Hot Water Reheat)		(98 × 80 × 46)		(98 × 80 × 46)		(98 × 95 × 46)	

Technical Specifications – CFD/CFF/CFU

Model	CFU-150-C1	CFD/CFF-180-C1	CFU-180-C1	CFD/CFF-190-C1	CFU-190-C1	CFD/CFF-230-C1	CFU-230-C1
Chilled Water Control Valve – Sized for Medium Flow @ 75 °F DB/62.5 °F WB EAT Conditions							
2-way Modulating (Standard)							
Size in. (Cv)	2 (40)	2 (60)	2 (60)	2 (60)	2 (60)	2 (60)	2 (60)
Valve Pressure Rating, psi	600	600	600	600	600	600	600
Close-off Pressure Rating, psi	200	200	200	200	200	200	200
3-way Modulating (Optional)							
Size in. (Cv)	2 (40)	2 (60)	2 (60)	2 (60)	2 (60)	2 (60)	2 (60)
Valve Pressure Rating, psi	400	400	400	400	400	400	400
Close-off Pressure Rating, psi	200	200	200	200	200	200	200
Chilled Water Coil – Aluminum Fin, Copper Tube							
Rows (Face Area, ft ²)	3 (52.6)	4 (52.6)	4 (52.6)	5 (52.6)	5 (52.6)	6 (52.6)	6 (52.6)
Face Velocity, ft/min	314	342	319	342	319	361	312
Evaporator Blower / Motor – Backward Inclined Direct Driven EC							
Nominal Motor Power, hp/each	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Rated Air Flow, ft ³ /min @ 0.2 in H ₂ O esp	16,500	18,000	16,800	18,000	16,800	19,000	16,400
Quantity of Blowers	3	3	3	3	3	3	3
Reheat / Heat – Performance Capacities							
Electric Reheat / Heat – Finned Tubular Heaters, (Standard)							
Number of Stages	3	3	3	3	3	3	3
Heater Rating, kW	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Total Capacity, kW (MBH)	35.7 (121.8)	35.7 (121.8)	35.7 (121.8)	35.7 (121.8)	35.7 (121.8)	35.7 (121.8)	35.7 (121.8)
Hot Water Reheat / Heat – Rated at 180 °F EWT / 160 °F LWT & 75° F DB/61.1 °F WB EAT (Optional)							
Include Evaporator Blower Motor Heat @ Rated ft3/min and esp							
Total Capacity, kW (MBH)	56.2 (191.9)	47.7 (162.9)	56.5 (192.9)	47.7 (162.9)	56.5 (192.9)	48.6 (165.9)	56.1 (191.4)
ft ³ /min (Pressure Drop, ftH ₂ O)	17 (20)	14 (13)	17 (20)	14 (13)	17 (20)	14 (14)	17 (19)
Control Valve	Modulating, 2-Way, 1 in., 300 psi, Cv=8.0						
Humidification – Electrode Steam Canister Humidifier with Adjustable Output, (Standard)							
Capacity lb/hr	20	20	20	20	20	20	20
Power Input, kW	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Std Control	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional

Filters – MERV 8 Average Dust Spot Efficiency, Throwaway (Standard), MERV 11 Average Dust Spot Efficiency (Optional)

Actual Size, H in. x W in. x D in. (Quantity)	$37 \times 18 \frac{1}{2} \times 3 \frac{3}{4}$ (6)	$35 \frac{7}{8} \times 24 \frac{3}{4} \times 3 \frac{3}{4}$ (4)	$37 \times 18 \frac{1}{2} \times 3 \frac{3}{4}$ (6)	$35 \frac{7}{8} \times 24 \frac{3}{4} \times 3 \frac{3}{4}$ (4)	$37 \times 18 \frac{1}{2} \times 3 \frac{3}{4}$ (6)	$35 \frac{7}{8} \times 24 \frac{3}{4} \times 3 \frac{3}{4}$ (4)	$36 \frac{1}{2} \times 25 \frac{3}{8} \times 3 \frac{3}{4}$ (3)
		$24 \frac{3}{4} \times 21 \times 3 \frac{3}{4}$ (2)		$24 \frac{3}{4} \times 21 \times 3 \frac{3}{4}$ (2)		$24 \frac{3}{4} \times 21 \times 3 \frac{3}{4}$ (2)	
Filter Face Area, ft ²	31.9	28.5	31.9	28.5	31.9	28.5	31.9

Connection Sizes – Copper, (Water In/Out connections are sized for flow rates at 75 °F DB/62.5 °F WB EAT conditions.)

Water In/Out, OD in. (see drawing for quantity)	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8
Condensate Drain w/o Pump, OD in.	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Condensate Drain w/ Pump, OD in.	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Humidifier Inlet, OD in.	1/4	1/4	1/4	1/4	1/4	1/4	1/4
HW Reheat / Heat In/Out, OD in.	7/8	7/8	7/8	7/8	7/8	7/8	7/8

Physical Data

Approximate Unit Weight, lb	2,200	2,100	2,300	2,200	2,400	2,300	2,500
Approximate Shipping Weight, lb	2,400	2,800	2,500	2,400	2,600	2,500	2,700
Unit Dimensions, H in. x W in. x d in.	$88.1 \times 118.4 \times 40.3$	$76.2 \times 118.4 \times 40.3^{\dagger}$ $88.1 \times 118.4 \times 40.3^{\ddagger}$	$88.1 \times 118.4 \times 40.3$	$76.2 \times 118.4 \times 40.3^{\dagger}$ $88.1 \times 118.4 \times 40.3^{\ddagger}$	$88.1 \times 118.4 \times 40.3$	$76.2 \times 118.4 \times 40.3^{\dagger}$ $88.1 \times 118.4 \times 40.3^{\ddagger}$	$88.1 \times 118.4 \times 40.3$
(w/ Hot Water Reheat)	$(91.1 \times 118.4 \times 40.3)$	Internal	$(91.1 \times 118.4 \times 40.3)$	Internal	$(91.1 \times 118.4 \times 40.3)$	Internal	$(91.1 \times 118.4 \times 40.3)$
Unit Shipping Dimensions, H in. x W in. x D in.	$95 \times 124 \times 46$	$95 \times 124 \times 46$	$95 \times 124 \times 46$	$95 \times 124 \times 46$	$95 \times 124 \times 46$	$95 \times 124 \times 46$	$95 \times 124 \times 46$
(w/ Hot Water Reheat)	$(98 \times 124 \times 46)$		$(98 \times 124 \times 46)$		$(98 \times 124 \times 46)$		$(98 \times 124 \times 46)$

[†] CFD cabinet; [‡] CFF cabinet

Technical Specifications — CFD/CFF/CFU

Floor Mounted Air Conditioners								
Model	CFD/CFF-280-C1	CFU-280-C1	CFD-310-C1	CFD-360-C1	CFD-510-C2	CFD-630-C2	CFD-730-C2	CFD- 1080-C2
Chilled Water Control Valve - Sized for Medium Flow @ 75 °F DB/62.5 °F WB EAT Conditions								
2-way Modulating (Standard)								
Size in. (Cv)	2 (60)	2 (60)	2 (60)	3 (124)	3 (124)	3 (124)	3 (124)	3 (145)
Quantity	1	1	1	1	2	2	2	2
Valve Pressure Rating, psi	600	600	600	600	600	600	600	600
Close-off Pressure Rating, psi	200	200	200	100	100	100	100	100
3-Way Modulating (Optional)								
Size in. (Cv)	2 (60)	2 (60)	2 (60)	N/A	N/A	N/A	N/A	N/A
Valve Pressure Rating, psi	400	400	400	N/A	N/A	N/A	N/A	N/A
Close-off Pressure Rating, psi	200	200	200	N/A	N/A	N/A	N/A	N/A
Chilled Water Coil — Aluminum Fin, Copper Tube								
Coil Rows	6	6	6	6	8	8	8	8
Face Area, ft²	70.2	70.2	70.2	82.8	123.8	123.8	123.8	177.3
Face Velocity, ft/min	342	294	413	386	291	388	485	506
Evaporator Blower/Motor — Backward Inclined Direct Driven EC								
Nominal Motor Power, hp/each	5.3	5.3	5.3	5.3	4.2	4.2	4.2	7.2
Rated Air Flow,CFM 0.2 in. H ₂ O esp	24,000	20,600	29,000	32,000	36,000	48,000	60,000	90,000
Quantity of Blowers	3	3	4	4	6	8	10	12
Reheat / Heat — Performance Capacities								
Electric Reheat / Heat — Finned Tubular Heaters (Standard)								
Number of Stages	3	3	3	3	N/A	N/A	N/A	N/A
Heater Rating, kW	27	27	27	27	N/A	N/A	N/A	N/A
Total Capacity, kW (MBH)	35.7 (121.8)	35.7 (121.8)	38.6 (131.7)	38.6 (131.7)	N/A	N/A	N/A	N/A
Hot Water Reheat / Heat— Rated at 180 °F EWT / 160 °F LWT & 75 °F DB/61.1°F WB EAT (Optional)								
Include Evaporator Blower Motor Heat @ Rated CFM and ESP								
Total Capacity, kW (MBH)	47.7 (162.6)	56.4 (192.4)	53.7 (183.2)	52.6 (179.4)	N/A	N/A	N/A	N/A
Flow Rate, GPM	14	17	15	14	N/A	N/A	N/A	N/A
Pressure Drop, ft H ₂ O	16	22	18	17	N/A	N/A	N/A	N/A
Control Valve	Modulating, 2-Way, 1 in., 300 psi, Cv=8.0				N/A			
Humidification — Electrode Steam Canister Humidifier with Adjustable Output, (Standard)								
Capacity, lb/hr	20	20	20	30	N/A	N/A	N/A	N/A
Power Input, kW	6.8	6.8	6.8	10.2	N/A	N/A	N/A	N/A
Control Type	Proportional	Proportional	Proportional	Proportional	N/A	N/A	N/A	N/A
Filters — MERV 8 Average Dust Spot Efficiency, Throwaway (Standard), MERV 11 Average Dust Spot Efficiency (Optional)								
Actual Size, H in. x W in. x D in. (Quantity)	46 1/2 x 18 1/2x 3 3/4 (6)	35 7/8 x 24 3/4x 3 3/4 (1) 24 3/4 x 21 x 3 3/4 (2) x 45 x 24 3/4 x 3 3/4 (3)	37 x 29 x 3 3/4 (8)	37 x 25 x 3 3/4 (10)	20 1/2 x 18 1/2 x 3 3/4 (48)	20 1/2 x 18 1/2x 3 3/4 (48)	20 1/2 x18 1/2 x 3 3/4 (48)	22 1/4 x 33 1/2 x 3 3/4 (36)
Filter Face Area, ft²	35.8	36.6	59.6	64.2	126.4	126.4	126.4	186.3

Connection Sizes — Copper, (Water In/Out connections are sized for flow rates at 75 °F DB/62.5 °F WB EAT conditions.)

Water In/Out, in. OD (see drawing for quantity)	2 5/8	2 5/8	2 5/8	3 1/8	2 5/8	2 5/8	3 1/8	3 1/8
Condensate Drain w/o Pump, in. OD	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	7/8
Condensate Drainw/ Pump, in. OD	1/2	1/2	1/2	1/2	1/2	1/2	1/2	N/A
Humidifier Inlet, in. OD	1/4	1/4	1/4	1/4	N/A	N/A	N/A	N/A
HW Reheat / Heat In/Out, in. OD	7/8	7/8	7/8	7/8	N/A	N/A	N/A	N/A

Physical Data

Approximate Unit Weight, lb		2,900	3,000	3,200	3,400	4,100	4,300	4,500	9,372
Approximate Shipping Weight per pallet, lb.	Coil Cabinet	3,100	3,200	3,400	3,600	4,500	4,700	4,900	2,694*
	Filter Plenum	237	N/A	570	700	760	760	760	1,470*
	Fan Deck	Internal	Internal	Internal	Internal	Internal	Internal	Internal	2,914*
Unit Dimensions, H in. x W in. x D in.		88.1 x 118.4 x 50.2	96.0 x 118.4 x 49.9	88.1 x 118.4 x 50.2	88.1 x 127.9 x 50.2	96.0 x 154.0 x 65.7	96.0 x 154.0 x 65.7	96.0 x 154.0 x 65.7	120.3 x 200 x 70
w/ Hot Water Reheat		Internal	99.0 x 118.4 x 49.9	Internal	Internal	N/A	N/A	N/A	N/A
Unit Dimensions w/ Filter Plenum, H in. x W in. x D in.		104 x 118.3 x 50.2	N/A	124.1 x 118.4 x 50.2	124.1 x 127.9 x 50.2	132.0 x 154.0 x 65.7	132.0 x 154.0 x 65.7	132.0 x 154.0 x 65.7	156.3 x 200 x 70
Unit Shipping Dimensions, H in. x W in. x D in.		95 x 125 x 57	103 x 125 x 57	95 x 125 x 57	95 x 135 x 57	102 x 160 x 72	102 x 160 x 72	102 x 160 x 72	100 x 104 x 80*
w/ Hot Water Reheat		Internal	106 x 125 x 57	Internal	Internal	N/A	N/A	N/A	N/A
Filter Plenum Shipping Dimensions, H in. x W in. x D in.		15.9 x 118.3 x 50.2	N/A	43 x 125 x 57	43 x 135 x 57	43 x 160 x 72	43 x 160 x 72	43 x 160 x 72	80 x 104 x 80*
Fan Deck Shipping Dimensions, H in. x W in. x D in.		N/A	N/A	N/A	N/A	N/A	N/A	N/A	66 x 104 x 80*
Unit Dimensions, H in. x W in. x D in.		88.1 x 118.4 x 50.2	96.0 x 118.4 x 49.9	88.1 x 118.4 x 50.2	88.1 x 127.9 x 50.2	96.0 x 154.0 x 65.7	96.0 x 154.0 x 65.7	96.0 x 154.0 x 65.7	120.3 x 200 x 70

*Shipping Notice: Dimensions and weights are per pallet. Coil sections ship on individual pallets. Filter plenums and fan decks ship with two per pallet.

Performance/Capacity Data – CFD/CFF 45° EWT/0% Glycol

Model CFD/CFF-	060-C1	090-C1	120-C1	150-C1	180-C1	190-C1	230-C1
NET COOLING CAPACITY - kW (MBH) @ 45°F EWT, 0% Glycol Solution (Includes motor heat @ rated ft ³ /min and esp)							
85°FDB/65.9°FWB, 36% RH, 55°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	102.3 (349)	116.9 (399)	145.4 (496)	133.1 (454)	170.6 (582)	226.3 (772)
	Sensible, kW (MBH)	96.4 (329)	104.9 (358)	123.7 (422)	127.8 (436)	157.1 (536)	191.1 (652)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	74 (49)	84 (38)	104 (39)	97 (42)	123 (38)	161 (42)
Med. Flow (12°F □Tw)	Total, kW (MBH)	99.1 (338)	114.0 (389)	141.0 (481)	128.4 (438)	165.9 (566)	222.1 (758)
	Sensible, kW (MBH)	94.1 (321)	103.2 (352)	121.6 (415)	124.0 (423)	153.9 (525)	189.0 (645)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	60 (34)	69 (27)	84 (27)	78 (30)	100 (27)	132 (30)
Low Flow (14°F □Tw)	Total, kW (MBH)	95.5 (326)	110.5 (377)	137.2 (468)	123.7 (422)	161.2 (550)	218.9 (747)
	Sensible, kW (MBH)	91.1 (311)	100.5 (343)	119.9 (409)	119.6 (408)	150.1 (512)	187.3 (639)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	50 (25)	57 (20)	70 (21)	65 (22)	83 (20)	111 (23)
80°FDB/64.2°FWB, 42% RH, 55°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	87.9 (300)	101.7 (347)	126.6 (432)	113.7 (388)	147.7 (504)	199.3 (680)
	Sensible, kW (MBH)	81.2 (277)	89.1 (304)	105.5 (360)	107.3 (366)	133.1 (454)	163.8 (559)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	65 (38)	74 (30)	91 (31)	84 (33)	107 (30)	143 (34)
Med. Flow (12°F □Tw)	Total, kW (MBH)	84.4 (288)	97.6 (333)	121.9 (416)	108.7 (371)	142.7 (487)	195.2 (666)
	Sensible, kW (MBH)	78.5 (268)	86.5 (295)	103.2 (352)	103.2 (352)	129.5 (442)	161.8 (552)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	52 (26)	59 (21)	73 (22)	67 (23)	87 (22)	116 (25)
Low Flow (14°F □Tw)	Total, kW (MBH)	80.0 (273)	93.8 (320)	117.8 (402)	103.7 (354)	137.2 (468)	189.6 (647)
	Sensible, kW (MBH)	75.3 (257)	83.8 (286)	101.1 (345)	98.8 (337)	125.4 (428)	158.6 (541)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	42 (19)	49 (16)	61 (17)	55 (17)	72 (16)	97 (19)
75°FDB/62.5°FWB, 50% RH, 55°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	73.3 (250)	85.6 (292)	107.6 (367)	94.4 (322)	124.8 (426)	172.3 (588)
	Sensible, kW (MBH)	65.4 (223)	72.4 (247)	86.5 (295)	86.5 (295)	108.1 (369)	135.7 (463)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	54 (29)	63 (23)	78 (24)	71 (25)	92 (24)	124 (27)
Med. Flow (12°F □Tw)	Total, kW (MBH)	68.6 (234)	80.9 (276)	102.6 (350)	88.5 (302)	118.4 (404)	166.2 (567)
	Sensible, kW (MBH)	62.4 (213)	69.5 (237)	83.8 (286)	81.8 (279)	104.0 (355)	132.5 (452)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	43 (20)	50 (16)	62 (17)	56 (18)	73 (17)	100 (19)
Low Flow (14°F □Tw)	Total, kW (MBH)	63.9 (218)	76.2 (260)	97.6 (333)	81.8 (279)	111.1 (379)	159.7 (545)
	Sensible, kW (MBH)	58.6 (200)	66.5 (227)	81.5 (278)	76.5 (261)	98.8 (337)	129.2 (441)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	34 (14)	41 (12)	51 (13)	45 (13)	59 (13)	83 (15)
85°FDB/64.5°FWB, 32% RH, 52°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	95.2 (325)	114.3 (390)	139.8 (477)	126.9 (433)	158.3 (540)	217.8 (743)
	Sensible, kW (MBH)	95.2 (325)	109.0 (372)	128.4 (438)	126.9 (433)	158.3 (540)	198.4 (677)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	69 (44)	83 (36)	100 (37)	93 (39)	115 (34)	155 (39)
Med. Flow (12°F □Tw)	Total, kW (MBH)	91.1 (311)	112.0 (382)	137.5 (469)	121.6 (415)	152.4 (520)	215.7 (736)
	Sensible, kW (MBH)	91.1 (311)	107.3 (366)	127.2 (434)	121.6 (415)	152.4 (520)	196.9 (672)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	56 (30)	68 (26)	82 (26)	75 (28)	92 (24)	128 (28)
Low Flow (14°F □Tw)	Total, kW (MBH)	86.2 (294)	95.5 (326)	116.6 (398)	115.8 (395)	146.5 (500)	213.6 (729)
	Sensible, kW (MBH)	86.2 (294)	95.5 (326)	116.6 (398)	115.8 (395)	146.5 (500)	195.5 (667)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	45 (21)	50 (16)	60 (16)	61 (20)	76 (18)	109 (22)
80°FDB/62.9°FWB, 38% RH, 52°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	80.6 (275)	99.1 (338)	121.9 (416)	107.3 (366)	144.2 (492)	191.4 (653)
	Sensible, kW (MBH)	80.6 (275)	92.9 (317)	109.6 (374)	107.3 (366)	138.3 (472)	170.3 (581)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	59 (33)	72 (29)	88 (29)	80 (31)	105 (29)	137 (32)
Med. Flow (12°F □Tw)	Total, kW (MBH)	75.6 (258)	95.8 (327)	118.7 (405)	101.7 (347)	128.7 (439)	163.5 (558)
	Sensible, kW (MBH)	75.6 (258)	90.3 (308)	108.1 (369)	101.7 (347)	128.7 (439)	149.8 (511)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	47 (22)	58 (21)	71 (21)	63 (21)	79 (19)	113 (23)
Low Flow (14°F □Tw)	Total, kW (MBH)	70.0 (239)	78.2 (267)	115.8 (395)	95.2 (325)	120.7 (412)	160.3 (547)
	Sensible, kW (MBH)	70.0 (239)	78.2 (267)	106.4 (363)	95.2 (325)	120.7 (412)	147.1 (502)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	37 (16)	41 (13)	60 (16)	51 (16)	64 (14)	83 (26)
75°FDB/61.1°FWB, 45% RH, 52°FDP							
High Flow (10°F □Tw)	Total, kW (MBH)	71.5 (244)	82.6 (282)	102.9 (351)	92.6 (316)	120.7 (412)	163.5 (558)
	Sensible, kW (MBH)	68.9 (235)	76.2 (260)	91.1 (311)	90.3 (308)	113.7 (388)	142.1 (485)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	53 (28)	61 (22)	75 (23)	70 (25)	89 (22)	118 (25)
Med. Flow (12°F □Tw)	Total, kW (MBH)	59.2 (202)	79.1 (270)	99.4 (339)	80.6 (275)	115.8 (395)	159.4 (544)
	Sensible, kW (MBH)	59.2 (202)	73.6 (251)	89.1 (304)	80.6 (275)	109.6 (374)	139.8 (477)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	37 (16)	49 (16)	60 (16)	51 (16)	71 (16)	96 (18)
Low Flow (14°F □Tw)	Total, kW (MBH)	53.0 (181)	59.8 (204)	72.4 (247)	72.7 (248)	93.2 (318)	133.9 (457)
	Sensible, kW (MBH)	53.0 (181)	59.8 (204)	72.4 (247)	72.7 (248)	93.2 (318)	120.5 (411)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	29 (12)	32 (10)	39 (9)	40 (12)	50 (11)	80 (14)

Performance/Capacity Data – CFD/CFF 45° EWT/0% Glycol

Model CFD/CFF-*		280-C1	310-C1	360-C1	510-C2	630-C2	730-C2	1080-C2
NET COOLING CAPACITY - kW (MBH) @ 45°F EWT, 0% Glycol Solution (Includes motor heat @ rated ft ³ /min and esp)								
85°FDB/65.9°FWB, 36% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	289 (986)	328.8 (1122)	373.4 (1274)	509.4 (1738)	638 (2177)	753.2 (2570)	1030.6 (3517)
	Sensible, kW (MBH)	242.7 (828)	282.8 (965)	317.7 (1084)	399.2 (1362)	513.2 (1751)	621.3 (2120)	871.9 (2975)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	206 (55)	236 (71)	266 (42)	362 (57)	454 (84)	536 (113)	755 (40)
Med. Flow (12°F □Tw)	Total, kW (MBH)	284 (969)	323.6 (1104)	367.5 (1254)	502.3 (1714)	629.2 (2147)	743.5 (2537)	1012.2 (3454)
	Sensible, kW (MBH)	240.3 (820)	279.9 (955)	314.8 (1074)	396.2 (1352)	509.1 (1737)	616.3 (2103)	862.8 (2944)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	169 (39)	193 (50)	218 (31)	298 (41)	372 (60)	442 (80)	620 (29)
Low Flow (14°F □Tw)	Total, kW (MBH)	279.3 (953)	318.6 (1087)	361.9 (1235)	495.9 (1692)	621.6 (2121)	735 (2508)	990 (3378)
	Sensible, kW (MBH)	237.7 (811)	277 (945)	311.2 (1062)	392.7 (1340)	505.3 (1724)	611.6 (2087)	851.4 (2905)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	142 (30)	163 (37)	185 (24)	252 (32)	316 (46)	374 (61)	520 (21)
80°FDB/64.2°FWB, 42% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	255 (870)	289 (986)	328.8 (1122)	453.7 (1548)	566.8 (1934)	667 (2276)	905.3 (3089)
	Sensible, kW (MBH)	208.1 (710)	241.5 (824)	272.3 (929)	345.5 (1179)	442.8 (1511)	534.6 (1824)	744.9 (2542)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	182 (45)	208 (57)	235 (35)	324 (47)	404 (69)	478 (92)	669 (33)
Med. Flow (12°F □Tw)	Total, kW (MBH)	249.4 (851)	283.1 (966)	322.1 (1099)	446.1 (1522)	557.1 (1901)	656.5 (2240)	878.3 (2997)
	Sensible, kW (MBH)	205.1 (700)	238.3 (813)	268.5 (916)	342 (1167)	438.1 (1495)	528.7 (1804)	731.4 (2496)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	149 (32)	170 (40)	193 (25)	266 (34)	332 (50)	392 (66)	542 (23)
Low Flow (14°F □Tw)	Total, kW (MBH)	242.1 (826)	277.2 (946)	315.6 (1077)	438.7 (1497)	548.3 (1871)	646.8 (2207)	854.1 (2914)
	Sensible, kW (MBH)	201.3 (687)	234.7 (801)	264.6 (903)	338.2 (1154)	433.7 (1480)	523.7 (1787)	719.5 (2455)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	124 (24)	143 (30)	162 (19)	224 (26)	280 (37)	332 (49)	453 (17)
75°FDB/62.5°FWB, 50% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	220.7 (753)	248.8 (849)	284 (969)	398.6 (1360)	495.6 (1691)	581.2 (1983)	772.7 (2636)
	Sensible, kW (MBH)	172.6 (589)	199.3 (680)	225.4 (769)	290.1 (990)	370.4 (1264)	445.2 (1519)	611.0 (2085)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	159 (35)	181 (44)	205 (28)	286 (39)	356 (56)	418 (74)	577 (25)
Med. Flow (12°F □Tw)	Total, kW (MBH)	212.2 (724)	241.8 (825)	276.4 (943)	389.5 (1329)	484.2 (1652)	568.6 (1940)	742.0 (2532)
	Sensible, kW (MBH)	168.2 (574)	195.2 (666)	221 (754)	286 (976)	364.9 (1245)	438.7 (1497)	596.1 (2034)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	128 (25)	147 (31)	166 (20)	234 (28)	290 (40)	342 (52)	463.5 (18)
Low Flow (14°F □Tw)	Total, kW (MBH)	204 (696)	232.7 (794)	266.1 (908)	380.7 (1299)	474.2 (1618)	557.1 (1901)	713.3 (2434)
	Sensible, kW (MBH)	164.1 (560)	190.2 (649)	215.1 (734)	281.9 (962)	359.9 (1228)	432.6 (1476)	580.7 (1981)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	106 (19)	122 (23)	138 (15)	196 (21)	244 (30)	288 (39)	383 (13)
85°FDB/64.5°FWB, 32% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	277.5 (947)	318 (1085)	360.2 (1229)	478.6 (1633)	604.9 (2064)	720.1 (2457)	995.9 (3398)
	Sensible, kW (MBH)	251.5 (858)	294.5 (1005)	330.3 (1127)	407.1 (1389)	526.9 (1798)	641.8 (2190)	906.9 (3094)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	198 (52)	228 (67)	257 (40)	340 (52)	430 (77)	514 (105)	732 (38)
Med. Flow (12°F □Tw)	Total, kW (MBH)	274.9 (938)	315.3 (1076)	357 (1218)	474.8 (1620)	600.8 (2050)	716 (2443)	984.8 (3360)
	Sensible, kW (MBH)	249.7 (852)	292.5 (998)	328.2 (1120)	405.3 (1383)	524.9 (1791)	638.9 (2180)	900.6 (3073)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	163 (37)	189 (48)	212 (29)	282 (38)	356 (56)	426 (75)	604 (27)
Low Flow (14°F □Tw)	Total, kW (MBH)	272 (928)	312.7 (1067)	354.3 (1209)	472.1 (1611)	597.6 (2039)	712.7 (2432)	971.0 (3313)
	Sensible, kW (MBH)	247.9 (846)	290.4 (991)	326.2 (1113)	403.9 (1378)	522.8 (1784)	636.8 (2173)	892.9 (3047)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	139 (28)	161 (36)	181 (23)	240 (29)	304 (43)	364 (58)	511 (21)
80°FDB/62.9°FWB, 38% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	243.8 (832)	278.7 (951)	316.2 (1079)	425.8 (1453)	536.3 (1830)	636.3 (2171)	870.8 (2971)
	Sensible, kW (MBH)	216 (737)	251.7 (859)	283.1 (966)	352.9 (1204)	455.1 (1553)	552.4 (1885)	755.0 (2644)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	175 (42)	201 (53)	227 (33)	304 (43)	384 (63)	456 (85)	644 (31)
Med. Flow (12°F □Tw)	Total, kW (MBH)	240.3 (820)	275.2 (939)	312.4 (1066)	421.4 (1438)	531 (1812)	630.7 (2152)	853.7 (2913)
	Sensible, kW (MBH)	213.6 (729)	249.4 (851)	280.8 (958)	350.5 (1196)	452.2 (1543)	549.2 (1874)	766.3 (2615)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	144 (30)	166 (38)	187 (24)	252 (32)	318 (46)	378 (61)	527 (22)
Low Flow (14°F □Tw)	Total, kW (MBH)	235.9 (805)	271.4 (926)	308.3 (1052)	417.6 (1425)	526.9 (1798)	626.3 (2137)	837.4 (2857)
	Sensible, kW (MBH)	211 (720)	246.8 (842)	277.5 (947)	348.5 (1189)	449.9 (1535)	546.3 (1864)	757.0 (2583)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	121 (23)	140 (29)	158 (19)	214 (24)	270 (35)	322 (47)	444 (17)
75°FDB/61.1°FWB, 45% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	208.7 (712)	237.7 (811)	270.2 (922)	369.3 (1260)	463.3 (1581)	548.3 (1871)	736.7 (2514)
	Sensible, kW (MBH)	180.5 (616)	209.8 (716)	236.5 (807)	297.8 (1016)	383 (1307)	463.9 (1583)	643.2 (2195)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	151 (32)	173 (41)	196 (26)	266 (34)	334 (50)	396 (67)	552 (24)
Med. Flow (12°F □Tw)	Total, kW (MBH)	203.4 (694)	233 (795)	265.5 (906)	364 (1242)	457.5 (1561)	541.6 (1848)	716.7 (2455)
	Sensible, kW (MBH)	177.3 (605)	206.6 (705)	233 (795)	295.1 (1007)	380.1 (1297)	459.8 (1569)	631.9 (2156)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	123 (23)	142 (29)	160 (19)	218 (25)	276 (37)	326 (48)	448 (17)
Low Flow (14°F □Tw)	Total, kW (MBH)	197.8 (675)	226.8 (774)	258.5 (882)	358.7 (1224)	452.2 (1543)	535.7 (1828)	735.3 (2514)
	Sensible, kW (MBH)	173.8 (593)	202.5 (691)	228.6 (780)	292.5 (998)	376.9 (1286)	456 (1556)	635.3 (2156)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	103 (18)	119 (22)	134 (15)	184 (20)	234 (28)	278 (37)	383 (13)

Performance/Capacity Data – CFU 45° EWT/0% Glycol

Model CFU-	060-C1	090-C1	120-C1	150-C1	180-C1	190-C1	230-C1	280-C1
NET COOLING CAPACITY - kW (MBH) @ 45°F EWT, 0% Glycol Solution (Includes motor heat @ rated ft ³ /min and esp)								
85°FDB/65.9°FWB, 36% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	99.4 (339)	113.4 (387)	121.9 (416)	133.1 (454)	162.9 (556)	189.3 (646)	256.7 (876)
	Sensible, kW (MBH)	92.9 (317)	101.1 (345)	101.4 (346)	127.8 (436)	148.6 (507)	162.9 (556)	211.6 (722)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	72 (47)	82 (36)	88 (29)	97 (42)	118 (35)	136 (58)	184 (45)
Med. Flow (12°F □Tw)	Total, kW (MBH)	96.1 (328)	110.2 (376)	118.1 (403)	128.4 (438)	158.3 (540)	184 (628)	252.3 (861)
	Sensible, kW (MBH)	90.9 (310)	99.1 (338)	99.6 (340)	124 (423)	145.4 (496)	160 (546)	209.5 (715)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	58 (32)	67 (25)	71 (21)	78 (30)	95 (25)	110 (41)	151 (32)
Low Flow (14°F □Tw)	Total, kW (MBH)	92.6 (316)	107 (365)	114.6 (391)	123.7 (422)	153.6 (524)	179.9 (614)	246.5 (841)
	Sensible, kW (MBH)	87.9 (300)	97 (331)	97.9 (334)	119.6 (408)	141.8 (484)	157.4 (537)	206.6 (705)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	48 (24)	55 (19)	59 (16)	65 (22)	80 (19)	93 (31)	126 (24)
80°FDB/64.2°FWB, 42% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	85.3 (291)	98.5 (336)	106.4 (363)	113.7 (388)	141 (481)	165.9 (566)	226.5 (773)
	Sensible, kW (MBH)	78.5 (268)	85.9 (293)	86.5 (295)	107.3 (366)	125.7 (429)	139.2 (475)	181.7 (620)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	63 (37)	72 (29)	77 (24)	84 (33)	103 (28)	120 (47)	163 (37)
Med. Flow (12°F □Tw)	Total, kW (MBH)	81.5 (278)	94.7 (323)	102 (348)	108.7 (371)	136 (464)	161.2 (550)	220.4 (752)
	Sensible, kW (MBH)	75.6 (258)	83.5 (285)	84.4 (288)	103.2 (352)	122.2 (417)	136.6 (466)	178.5 (609)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	50 (25)	58 (20)	62 (17)	67 (23)	83 (20)	97 (33)	132 (26)
Low Flow (14°F □Tw)	Total, kW (MBH)	77.7 (265)	90.6 (309)	98.5 (336)	103.7 (354)	130.4 (445)	155.9 (532)	213.9 (730)
	Sensible, kW (MBH)	72.7 (248)	80.9 (276)	82.6 (282)	98.8 (337)	118.4 (404)	133.3 (455)	175.3 (598)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	41 (18)	48 (15)	51 (13)	55 (17)	68 (15)	81 (25)	110 (20)
75°FDB/62.5°FWB, 50% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	71.2 (243)	82.9 (283)	90.3 (308)	94.4 (322)	119 (406)	142.1 (485)	195.5 (667)
	Sensible, kW (MBH)	63.3 (216)	69.8 (238)	70.9 (242)	86.5 (295)	102.3 (349)	114.6 (391)	150.3 (513)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	53 (28)	61 (22)	66 (19)	71 (25)	88 (22)	104 (37)	142 (29)
Med. Flow (12°F □Tw)	Total, kW (MBH)	66.5 (227)	78.2 (267)	85.9 (293)	88.5 (302)	112.8 (385)	137.2 (468)	187.6 (640)
	Sensible, kW (MBH)	60.1 (205)	67.1 (229)	68.6 (234)	81.8 (279)	98.2 (335)	111.7 (381)	146.2 (499)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	42 (19)	48 (16)	53 (14)	56 (18)	70 (16)	83 (26)	114 (21)
Low Flow (14°F □Tw)	Total, kW (MBH)	61.8 (211)	73.9 (252)	81.5 (278)	81.8 (279)	105.5 (360)	132.2 (451)	179.9 (614)
	Sensible, kW (MBH)	56.6 (193)	64.2 (219)	66.5 (227)	76.5 (261)	93.2 (318)	108.7 (371)	142.4 (486)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	33 (14)	39 (12)	43 (11)	45 (13)	56 (12)	69 (20)	94 (16)
85°FDB/64.5°FWB, 32% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	92.3 (315)	110.8 (378)	116.6 (398)	126.9 (433)	159.1 (543)	181.7 (620)	245 (836)
	Sensible, kW (MBH)	92.3 (315)	104.9 (358)	104.9 (358)	126.9 (433)	154.2 (526)	167.9 (573)	218.3 (745)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	67 (41)	80 (34)	84 (27)	93 (39)	115 (34)	131 (55)	176 (42)
Med. Flow (12°F □Tw)	Total, kW (MBH)	88.2 (301)	108.4 (370)	114 (389)	121.6 (415)	145.1 (495)	178.8 (610)	242.4 (827)
	Sensible, kW (MBH)	88.2 (301)	103.2 (352)	103.7 (354)	121.6 (415)	145.1 (495)	165.6 (565)	216.9 (740)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	54 (28)	65 (25)	69 (20)	75 (28)	88 (22)	107 (39)	145 (30)
Low Flow (14°F □Tw)	Total, kW (MBH)	83.2 (284)	92.3 (315)	112 (382)	115.8 (395)	139.2 (475)	176.1 (601)	238.9 (815)
	Sensible, kW (MBH)	83.2 (284)	92.3 (315)	102.6 (350)	115.8 (395)	139.2 (475)	163.5 (558)	215.1 (734)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	44 (20)	48 (16)	58 (15)	61 (20)	73 (17)	91 (30)	123 (23)
80°FDB/62.9°FWB, 38% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	83.8 (286)	95.8 (327)	101.4 (346)	107.3 (366)	137.2 (468)	158.6 (541)	215.7 (736)
	Sensible, kW (MBH)	81.8 (279)	89.4 (305)	89.7 (306)	107.3 (366)	130.7 (446)	143.6 (490)	187.6 (640)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	62 (36)	70 (27)	74 (22)	80 (31)	100 (27)	115 (44)	156 (34)
Med. Flow (12°F □Tw)	Total, kW (MBH)	73 (249)	92.6 (316)	98.8 (337)	101.7 (347)	133.3 (455)	155.3 (530)	211.3 (721)
	Sensible, kW (MBH)	73 (249)	87 (297)	88.2 (301)	101.7 (347)	127.2 (434)	141.3 (482)	185.2 (632)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	45 (21)	57 (20)	60 (16)	63 (21)	81 (20)	94 (32)	127 (25)
Low Flow (14°F □Tw)	Total, kW (MBH)	67.7 (231)	75.6 (258)	79.7 (272)	95.2 (325)	114.3 (390)	152.1 (519)	207.5 (708)
	Sensible, kW (MBH)	67.7 (231)	75.6 (258)	79.7 (272)	95.2 (325)	114.3 (390)	138.6 (473)	182.9 (624)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	36 (15)	40 (12)	42 (10)	51 (16)	61 (13)	79 (24)	107 (19)
75°FDB/61.1°FWB, 45% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	69.5 (237)	80 (273)	85.6 (292)	92.6 (316)	114.9 (392)	134.5 (459)	183.8 (627)
	Sensible, kW (MBH)	66.5 (227)	73.3 (250)	74.1 (253)	90.3 (308)	107.6 (367)	119.3 (407)	156.5 (534)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	52 (27)	59 (21)	63 (17)	70 (25)	85 (21)	98 (34)	134 (27)
Med. Flow (12°F □Tw)	Total, kW (MBH)	57.1 (195)	76.5 (261)	82.6 (282)	80.6 (275)	109.9 (375)	131 (447)	178.8 (610)
	Sensible, kW (MBH)	57.1 (195)	70.9 (242)	72.7 (248)	80.6 (275)	103.5 (353)	116.6 (398)	153.6 (524)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	36 (15)	47 (15)	51 (13)	51 (16)	68 (15)	80 (24)	109 (19)
Low Flow (14°F □Tw)	Total, kW (MBH)	51.3 (175)	57.7 (197)	79.4 (271)	72.7 (248)	87.9 (300)	127.2 (434)	173.8 (593)
	Sensible, kW (MBH)	51.3 (175)	57.7 (197)	70.9 (242)	72.7 (248)	87.9 (300)	113.7 (388)	150.9 (515)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	28 (11)	31 (9)	42 (10)	40 (12)	48 (10)	67 (19)	91 (15)

Performance/Capacity Data – CFD/CFF 50° EWT/0% Glycol

Model CFD/CFF-		060-C1	090-C1	120-C1	150-C1	180-C1	190-C1	230-C1
NET COOLING CAPACITY - kW (MBH) @ 50°F EWT, 0% Glycol Solution (Includes motor heat @ rated ft ³ /min and esp)								
85 °F DB/65.9 °F WB, 36% RH, 55 °F DP								
High Flow (10°F □Tw)	Total, kW (MBH)	80.6 (275)	89.1 (304)	120.7 (412)	107 (365)	134.5 (459)	164.4 (561)	187.6 (640)
	Sensible, kW (MBH)	80.6 (275)	89.1 (304)	113.1 (386)	107 (365)	134.5 (459)	155.9 (532)	174.7 (596)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	59 (33)	65 (25)	87 (29)	80 (30)	98 (26)	119 (46)	134 (31)
Med. Flow (12°F □Tw)	Total, kW (MBH)	76.2 (260)	84.7 (289)	103.7 (354)	101.4 (346)	128.4 (438)	161.5 (551)	186.1 (635)
	Sensible, kW (MBH)	76.2 (260)	84.7 (289)	103.7 (354)	101.4 (346)	128.4 (438)	153.3 (523)	173.5 (592)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	47 (23)	52 (17)	63 (17)	63 (21)	78 (19)	97 (33)	111 (23)
Low Flow (14°F □Tw)	Total, kW (MBH)	70.9 (242)	79.1 (270)	97.3 (332)	95.8 (327)	121.9 (416)	139.5 (476)	159.7 (545)
	Sensible, kW (MBH)	70.9 (242)	79.1 (270)	97.3 (332)	95.8 (327)	121.9 (416)	139.5 (476)	159.7 (545)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	51 (13)	51 (16)	64 (14)	73 (21)	83 (15)
80°FDB/64.2°FWB, 42% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	65.4 (223)	72.7 (248)	101.7 (347)	87 (297)	110.2 (376)	138.9 (474)	160 (546)
	Sensible, kW (MBH)	65.4 (223)	72.7 (248)	95 (324)	87 (297)	110.2 (376)	130.1 (444)	146.8 (501)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	49 (24)	54 (18)	74 (22)	66 (22)	82 (20)	101 (35)	116 (24)
Med. Flow (12°F □Tw)	Total, kW (MBH)	60.1 (205)	67.1 (229)	82.6 (282)	81.2 (277)	103.7 (354)	136 (464)	158.3 (540)
	Sensible, kW (MBH)	60.1 (205)	67.1 (229)	82.6 (282)	81.2 (277)	103.7 (354)	127.5 (435)	145.4 (496)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	51 (13)	52 (16)	64 (14)	83 (26)	95 (18)
Low Flow (14°F □Tw)	Total, kW (MBH)	54.2 (185)	61 (208)	74.4 (254)	73.6 (251)	95 (324)	112.5 (384)	126.6 (432)
	Sensible, kW (MBH)	54.2 (185)	61 (208)	74.4 (254)	73.6 (251)	95 (324)	112.5 (384)	126.6 (432)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	30 (12)	33 (10)	40 (10)	41 (12)	51 (11)	60 (16)	67 (11)
75°FDB/62.5°FWB, 50% RH, 55°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	49.2 (168)	55.1 (188)	82.4 (281)	66.5 (227)	85.3 (291)	113.1 (386)	131.9 (450)
	Sensible, kW (MBH)	49.2 (168)	55.1 (188)	75.6 (258)	66.5 (227)	85.3 (291)	103.7 (354)	118.1 (403)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	61 (17)	52 (16)	65 (14)	84 (26)	96 (18)
Med. Flow (12°F □Tw)	Total, kW (MBH)	43.1 (147)	48.6 (166)	59.5 (203)	58.9 (201)	75.9 (259)	109.3 (373)	128.1 (437)
	Sensible, kW (MBH)	43.1 (147)	48.6 (166)	59.5 (203)	58.9 (201)	75.9 (259)	100.5 (343)	115.5 (394)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	28 (11)	31 (9)	38 (9)	39 (11)	49 (10)	68 (19)	78 (14)
Low Flow (14°F □Tw)	Total, kW (MBH)	36.3 (124)	41.3 (141)	48.9 (167)	50.1 (171)	65.4 (223)	82.1 (280)	90 (307)
	Sensible, kW (MBH)	36.3 (124)	41.3 (141)	48.9 (167)	50.1 (171)	65.4 (223)	82.1 (280)	90 (307)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	21 (8)	23 (7)	27 (7)	29 (8)	37 (8)	45 (11)	49 (8)
85°FDB/64.5°FWB, 32% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	80.3 (274)	89.1 (304)	109.3 (373)	107 (365)	134.2 (458)	150.3 (513)	172 (587)
	Sensible, kW (MBH)	80.3 (274)	89.1 (304)	109.3 (373)	107 (365)	134.2 (458)	150.3 (513)	172 (587)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	59 (33)	65 (25)	79 (25)	79 (30)	98 (26)	109 (40)	124 (27)
Med. Flow (12°F □Tw)	Total, kW (MBH)	76.2 (260)	84.7 (289)	103.7 (354)	101.4 (346)	128.4 (438)	145.1 (495)	167.1 (570)
	Sensible, kW (MBH)	76.2 (260)	84.7 (289)	103.7 (354)	101.4 (346)	128.4 (438)	145.1 (495)	167.1 (570)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	47 (23)	52 (17)	63 (17)	63 (21)	78 (19)	88 (28)	100 (19)
Low Flow (14°F □Tw)	Total, kW (MBH)	70.9 (242)	79.1 (270)	97 (331)	95.8 (327)	121.9 (416)	139.5 (476)	159.4 (544)
	Sensible, kW (MBH)	70.9 (242)	79.1 (270)	97 (331)	95.8 (327)	121.9 (416)	139.5 (476)	159.4 (544)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	51 (13)	51 (16)	64 (14)	73 (21)	82 (15)
80°FDB/62.9°FWB, 38% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	65.4 (223)	72.7 (248)	89.4 (305)	86.7 (296)	110.2 (376)	124.8 (426)	143.6 (490)
	Sensible, kW (MBH)	65.4 (223)	72.7 (248)	89.4 (305)	86.7 (296)	110.2 (376)	124.8 (426)	143.6 (490)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	49 (24)	54 (18)	65 (18)	66 (22)	82 (20)	92 (30)	104 (21)
Med. Flow (12°F □Tw)	Total, kW (MBH)	60.1 (205)	67.1 (229)	82.6 (282)	81.2 (277)	103.7 (354)	119 (406)	136 (464)
	Sensible, kW (MBH)	60.1 (205)	67.1 (229)	82.6 (282)	81.2 (277)	103.7 (354)	119 (406)	136 (464)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	51 (13)	52 (16)	64 (14)	73 (21)	83 (15)
Low Flow (14°F □Tw)	Total, kW (MBH)	53.9 (184)	61 (208)	74.4 (254)	73.6 (251)	95 (324)	112.5 (384)	126.6 (432)
	Sensible, kW (MBH)	53.9 (184)	61 (208)	74.4 (254)	73.6 (251)	95 (324)	112.5 (384)	126.6 (432)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	30 (12)	33 (10)	40 (10)	41 (12)	51 (11)	60 (16)	66 (11)
75°FDB/61.1°FWB, 45% RH, 52°FDP								
High Flow (10°F □Tw)	Total, kW (MBH)	49.2 (168)	55.1 (188)	68 (232)	66.2 (226)	85.3 (291)	98.5 (336)	112.2 (383)
	Sensible, kW (MBH)	49.2 (168)	55.1 (188)	68 (232)	66.2 (226)	85.3 (291)	98.5 (336)	112.2 (383)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	38 (16)	42 (13)	51 (13)	52 (16)	65 (14)	74 (22)	83 (15)
Med. Flow (12°F □Tw)	Total, kW (MBH)	43.1 (147)	48.6 (166)	59.5 (203)	58.6 (200)	75.9 (259)	91.7 (313)	102.3 (349)
	Sensible, kW (MBH)	43.1 (147)	48.6 (166)	59.5 (203)	58.6 (200)	75.9 (259)	91.7 (313)	102.3 (349)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	28 (11)	31 (9)	38 (9)	39 (11)	49 (10)	58 (15)	64 (11)
Low Flow (14°F □Tw)	Total, kW (MBH)	36.3 (124)	41 (140)	48.9 (167)	49.8 (170)	65.4 (223)	81.8 (279)	90 (307)
	Sensible, kW (MBH)	36.3 (124)	41 (140)	48.9 (167)	49.8 (170)	65.4 (223)	81.8 (279)	90 (307)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	21 (8)	23 (7)	27 (7)	29 (8)	37 (8)	45 (11)	49 (8)

Performance/Capacity Data – CFD/CFF 50° EWT/0% Glycol

Model CFD/CFF-*		280-C1	310-C1	360-C1	510-C2	630-C2	730-C2	1080-C2
NET COOLING CAPACITY - kW (MBH) @ 50 °F EWT, 0% Glycol Solution (Includes motor heat @ rated ft³/min and esp)								
85°FDB/65.9°FWB, 36% RH, 55°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	238.9 (815)	274.3 (936)	310.4 (1059)	408.8 (1395)	518.4 (1769)	619.3 (2113)	857.3 (2925)
	Sensible, kW (MBH)	221 (754)	259.7 (886)	291 (993)	354.9 (1211)	461.3 (1574)	563.6 (1923)	797.4 (2721)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	171 (40)	198 (52)	223 (32)	292 (40)	372 (59)	444 (81)	636.7 (30)
Med. Flow (12°F Tw)	Total, kW (MBH)	237.1 (809)	242.4 (827)	276.1 (942)	407.1 (1389)	517 (1764)	617.8 (2108)	745.5 (2544)
	Sensible, kW (MBH)	219.8 (750)	242.4 (827)	276.1 (942)	354 (1208)	460.1 (1570)	561.8 (1917)	745.5 (2544)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	142 (29)	147 (31)	166 (20)	244 (30)	310 (44)	370 (59)	466 (18)
Low Flow (14°F Tw)	Total, kW (MBH)	203.7 (695)	233 (795)	266.1 (908)	405.9 (1385)	515.8 (1760)	616 (2102)	704.6 (2404)
	Sensible, kW (MBH)	203.7 (695)	233 (795)	266.1 (908)	353.2 (1205)	459.2 (1567)	560.1 (1911)	704.6 (2404)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	106 (18)	122 (23)	138 (15)	208 (23)	264 (34)	316 (45)	379 (13)
80°FDB/64.2°FWB, 42% RH, 55°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	204 (696)	233.6 (797)	264.9 (904)	352.9 (1204)	446.1 (1522)	531.9 (1815)	728.0 (2484)
	Sensible, kW (MBH)	186.1 (635)	217.5 (742)	244.7 (835)	301 (1027)	390.4 (1332)	475.7 (1623)	668.5 (2281)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	148 (31)	170 (40)	192 (25)	254 (32)	322 (47)	386 (63)	546.8 (23)
Med. Flow (12°F Tw)	Total, kW (MBH)	201.3 (687)	198.7 (678)	262 (894)	350.8 (1197)	444 (1515)	529.3 (1806)	597.1 (2037)
	Sensible, kW (MBH)	184.3 (629)	198.7 (678)	242.4 (827)	299.8 (1023)	388.6 (1326)	473.3 (1615)	597.1 (2037)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	122 (23)	122 (23)	158 (19)	212 (24)	268 (34)	320 (46)	379 (13)
Low Flow (14°F Tw)	Total, kW (MBH)	162.1 (553)	184.3 (629)	212.2 (724)	349 (1191)	442 (1508)	526.4 (1796)	547.4 (1868)
	Sensible, kW (MBH)	162.1 (553)	184.3 (629)	212.2 (724)	298.6 (1019)	387.1 (1321)	471 (1607)	547.4 (1868)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	85 (14)	98 (16)	111 (12)	180 (19)	228 (27)	272 (36)	301 (10)
75°FDB/62.5°FWB, 50% RH, 55°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	167.6 (572)	191.7 (654)	218.3 (745)	295.7 (1009)	372.5 (1271)	442.5 (1510)	591.3 (2018)
	Sensible, kW (MBH)	149.5 (510)	174.1 (594)	196.4 (670)	245 (836)	316.5 (1080)	384.5 (1312)	532.2 (1816)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	123 (23)	142 (29)	160 (19)	216 (25)	272 (35)	324 (47)	451 (17.0)
Med. Flow (12°F Tw)	Total, kW (MBH)	162.9 (556)	149.2 (509)	171.4 (585)	293.1 (1000)	369.3 (1260)	438.1 (1495)	437.0 (1491)
	Sensible, kW (MBH)	146.5 (500)	149.2 (509)	171.4 (585)	243.2 (830)	314.5 (1073)	381.3 (1301)	437.0 (1491)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	100 (17)	94 (16)	107 (11)	178 (19)	226 (26)	268 (34)	287 (9)
Low Flow (14°F Tw)	Total, kW (MBH)	115.5 (394)	130.4 (445)	152.4 (520)	289 (986)	365.5 (1247)	432.9 (1477)	370.3 (1264)
	Sensible, kW (MBH)	115.5 (394)	130.4 (445)	152.4 (520)	241.2 (823)	311.5 (1063)	377.2 (1287)	370.3 (1264)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	62 (10)	72 (11)	82 (9)	150 (15)	192 (21)	228 (27)	213 (7)
85°FDB/64.5°FWB, 32% RH, 52°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	219.2 (748)	250.6 (855)	284.3 (970)	395.4 (1349)	478.3 (1632)	570 (1945)	777.5 (2653)
	Sensible, kW (MBH)	219.2 (748)	250.6 (855)	284.3 (970)	369.6 (1261)	472.7 (1613)	570 (1945)	777.5 (2653)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	158 (35)	182 (45)	205 (28)	284 (38)	344 (52)	412 (70)	581 (26)
Med. Flow (12°F Tw)	Total, kW (MBH)	213.1 (727)	242.1 (826)	275.8 (941)	397.1 (1355)	470.1 (1604)	558.3 (1905)	744.3 (2540)
	Sensible, kW (MBH)	213.1 (727)	242.1 (826)	275.8 (941)	370.4 (1264)	469.2 (1601)	558.3 (1905)	744.3 (2540)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	128 (25)	147 (31)	166 (20)	238 (29)	282 (37)	336 (50)	465 (18)
Low Flow (14°F Tw)	Total, kW (MBH)	203.7 (695)	233 (795)	265.8 (907)	398.6 (1360)	460.1 (1570)	543.9 (1856)	704.0 (2402)
	Sensible, kW (MBH)	203.7 (695)	233 (795)	265.8 (907)	370.7 (1265)	460.1 (1570)	543.9 (1856)	704.0 (2402)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	105 (18)	122 (23)	138 (15)	204 (23)	238 (28)	282 (37)	379 (13)
80°FDB/62.9°FWB, 38% RH, 52°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	182.9 (624)	207.8 (709)	236.8 (808)	341.4 (1165)	436.7 (1490)	479.2 (1635)	637.7 (2176)
	Sensible, kW (MBH)	182.9 (624)	207.8 (709)	236.8 (808)	314.5 (1073)	410.9 (1402)	479.2 (1635)	637.7 (2176)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	133 (26)	153 (33)	173 (21)	246 (30)	316 (45)	350 (53)	482.5 (19)
Med. Flow (12°F Tw)	Total, kW (MBH)	173.5 (592)	198.4 (677)	226.8 (774)	342.3 (1168)	393.6 (1343)	465.1 (1587)	596.6 (2036)
	Sensible, kW (MBH)	173.5 (592)	198.4 (677)	226.8 (774)	314.8 (1074)	393.6 (1343)	465.1 (1587)	596.6 (2036)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	106 (18)	122 (23)	138 (16)	206 (23)	238 (29)	284 (38)	379 (13)
Low Flow (14°F Tw)	Total, kW (MBH)	161.5 (551)	184 (628)	211.9 (723)	303.6 (1036)	381 (1300)	447.2 (1526)	547.1 (1867)
	Sensible, kW (MBH)	161.5 (551)	184 (628)	211.9 (723)	298.9 (1020)	381 (1300)	447.2 (1526)	547.1 (1867)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	85 (14)	98 (16)	111 (12)	158 (16)	198 (22)	234 (28)	301 (10)
75°FDB/61.1°FWB, 45% RH, 52°FDP								
High Flow (10°F Tw)	Total, kW (MBH)	143.3 (489)	163.2 (557)	187 (638)	285.2 (973)	325.9 (1112)	384.5 (1312)	489.0 (1669)
	Sensible, kW (MBH)	143.3 (489)	163.2 (557)	187 (638)	260 (887)	324.4 (1107)	384.5 (1312)	489.0 (1669)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	106 (19)	123 (23)	139 (16)	208 (23)	240 (29)	284 (38)	380 (13)
Med. Flow (12°F Tw)	Total, kW (MBH)	131 (447)	148.6 (507)	171.2 (584)	285.2 (973)	313 (1068)	366.9 (1252)	436.7 (1490)
	Sensible, kW (MBH)	131 (447)	148.6 (507)	171.2 (584)	259.7 (886)	313 (1068)	366.9 (1252)	436.7 (1490)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	82 (13)	94 (16)	107 (11)	174 (18)	194 (21)	228 (27)	287 (9)
Low Flow (14°F Tw)	Total, kW (MBH)	115.2 (393)	130.4 (445)	151.2 (516)	233.9 (798)	294.5 (1005)	344.1 (1174)	370.1 (1263)
	Sensible, kW (MBH)	115.2 (393)	130.4 (445)	151.2 (516)	233.9 (798)	294.5 (1005)	344.1 (1174)	370.1 (1263)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	62 (10)	72 (11)	82 (9)	124 (12)	156 (16)	184 (19)	213 (7)

NOTE: *310-C1 to 1080-C2 columns apply to CFD only.

Performance/Capacity Data – CFU 50° EWT/0% Glycol

Model CFU-		060-C1	090-C1	120-C1	150-C1	180-C1	190-C1	230-C1	280-C1
NET COOLING CAPACITY - kW (MBH) @ 50°F EWT, 0% Glycol Solution (Includes motor heat @ rated ft ³ /min and esp)									
85°FDB/65.9°FWB, 36% RH, 55°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	78 (266)	86.2 (294)	99.9 (341)	107 (365)	127.8 (436)	155.6 (531)	165.9 (566)	210.1 (717)
	Sensible, kW (MBH)	78 (266)	86.2 (294)	92 (314)	107 (365)	127.8 (436)	146.5 (500)	152.1 (519)	191.4 (653)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	58 (32)	63 (23)	73 (22)	80 (30)	94 (24)	113 (42)	120 (25)	152 (33)
Med. Flow (12°F Tw)	Total, kW (MBH)	73.9 (252)	81.8 (279)	86.5 (295)	101.4 (346)	121.9 (416)	153.3 (523)	164.7 (562)	208.7 (712)
	Sensible, kW (MBH)	73.9 (252)	81.8 (279)	86.5 (295)	101.4 (346)	121.9 (416)	144.5 (493)	151.2 (516)	190.5 (650)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	46 (22)	50 (17)	53 (14)	63 (21)	75 (17)	93 (31)	99 (19)	126 (24)
Low Flow (14°F Tw)	Total, kW (MBH)	68.6 (234)	76.5 (261)	80.9 (276)	95.8 (327)	115.5 (394)	132.8 (453)	141.3 (482)	179.4 (612)
	Sensible, kW (MBH)	68.6 (234)	76.5 (261)	80.9 (276)	95.8 (327)	115.5 (394)	132.8 (453)	141.3 (482)	179.4 (612)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	37 (16)	41 (12)	43 (10)	51 (16)	61 (13)	69 (20)	74 (13)	94 (16)
80°FDB/64.2°FWB, 42% RH, 55°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	63.3 (216)	70.3 (240)	84.4 (288)	87 (297)	104.6 (357)	131.9 (450)	141.8 (484)	179.7 (613)
	Sensible, kW (MBH)	63.3 (216)	70.3 (240)	77.1 (263)	87 (297)	104.6 (357)	122.5 (418)	128.1 (437)	161.2 (550)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	48 (23)	52 (18)	62 (17)	66 (22)	78 (18)	96 (33)	103 (20)	131 (26)
Med. Flow (12°F Tw)	Total, kW (MBH)	58 (198)	65.1 (222)	68.9 (235)	81.2 (277)	98.5 (336)	129 (440)	139.5 (476)	176.4 (602)
	Sensible, kW (MBH)	58 (198)	65.1 (222)	68.9 (235)	81.2 (277)	98.5 (336)	120.2 (410)	126.6 (432)	159.4 (544)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	37 (16)	41 (12)	43 (10)	52 (16)	61 (13)	79 (24)	85 (15)	107 (19)
Low Flow (14°F Tw)	Total, kW (MBH)	52.2 (178)	58.9 (201)	61.8 (211)	73.6 (251)	89.7 (306)	107 (365)	112.2 (383)	142.1 (485)
	Sensible, kW (MBH)	52.2 (178)	58.9 (201)	61.8 (211)	73.6 (251)	89.7 (306)	107 (365)	112.2 (383)	142.1 (485)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	29 (11)	32 (9)	33 (8)	41 (12)	49 (10)	57 (15)	59 (10)	76 (12)
75°FDB/62.5°FWB, 50% RH, 55°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	47.5 (162)	63.3 (216)	68.3 (233)	66.5 (227)	80.9 (276)	107.3 (366)	116.1 (396)	147.1 (502)
	Sensible, kW (MBH)	47.5 (162)	59.8 (204)	61.3 (209)	66.5 (227)	80.9 (276)	97.6 (333)	102.6 (350)	129 (440)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	37 (16)	48 (15)	51 (13)	52 (16)	62 (13)	80 (24)	86 (16)	109 (19)
Med. Flow (12°F Tw)	Total, kW (MBH)	41.6 (142)	47.2 (161)	49.2 (168)	58.9 (201)	72.1 (246)	104 (355)	112.8 (385)	143 (488)
	Sensible, kW (MBH)	41.6 (142)	47.2 (161)	49.2 (168)	58.9 (201)	72.1 (246)	94.7 (323)	100.5 (343)	126.6 (432)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	27 (11)	31 (9)	32 (8)	39 (11)	46 (10)	65 (18)	70 (12)	88 (14)
Low Flow (14°F Tw)	Total, kW (MBH)	34.9 (119)	39.9 (136)	38.1 (130)	50.1 (171)	61.3 (209)	77.7 (265)	79.4 (271)	100.8 (344)
	Sensible, kW (MBH)	34.9 (119)	39.9 (136)	38.1 (130)	50.1 (171)	61.3 (209)	77.7 (265)	79.4 (271)	100.8 (344)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	20 (8)	23 (7)	22 (6)	29 (8)	35 (7)	43 (11)	43 (7)	55 (8)
85°FDB/64.5°FWB, 32% RH, 52°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	78 (266)	86.2 (294)	90.9 (310)	107 (365)	127.5 (435)	142.4 (486)	152.7 (521)	193.4 (660)
	Sensible, kW (MBH)	78 (266)	86.2 (294)	90.9 (310)	107 (365)	127.5 (435)	142.4 (486)	152.7 (521)	193.4 (660)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	58 (32)	63 (23)	67 (19)	79 (30)	94 (24)	104 (37)	111 (22)	140 (29)
Med. Flow (12°F Tw)	Total, kW (MBH)	73.6 (251)	81.8 (279)	86.5 (295)	101.4 (346)	121.9 (416)	137.7 (470)	147.7 (504)	187.3 (639)
	Sensible, kW (MBH)	73.6 (251)	81.8 (279)	86.5 (295)	101.4 (346)	121.9 (416)	137.7 (470)	147.7 (504)	187.3 (639)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	46 (22)	50 (17)	53 (14)	63 (21)	75 (17)	84 (26)	89 (16)	114 (21)
Low Flow (14°F Tw)	Total, kW (MBH)	68.6 (234)	76.5 (261)	80.9 (276)	95.8 (327)	115.5 (394)	132.5 (452)	141.3 (482)	179.1 (611)
	Sensible, kW (MBH)	68.6 (234)	76.5 (261)	80.9 (276)	95.8 (327)	115.5 (394)	132.5 (452)	141.3 (482)	179.1 (611)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	37 (16)	41 (12)	43 (10)	51 (16)	61 (13)	69 (20)	74 (13)	94 (16)
80°FDB/62.9°FWB, 38% RH, 52°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	63.3 (216)	70.3 (240)	74.4 (254)	86.7 (296)	104.6 (357)	118.4 (404)	126.9 (433)	160.9 (549)
	Sensible, kW (MBH)	63.3 (216)	70.3 (240)	74.4 (254)	86.7 (296)	104.6 (357)	118.4 (404)	126.9 (433)	160.9 (549)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	48 (23)	52 (18)	55 (14)	66 (22)	78 (18)	87 (28)	93 (17)	118 (22)
Med. Flow (12°F Tw)	Total, kW (MBH)	58 (198)	64.8 (221)	68.6 (234)	81.2 (277)	98.5 (336)	112.8 (385)	120.2 (410)	152.4 (520)
	Sensible, kW (MBH)	58 (198)	64.8 (221)	68.6 (234)	81.2 (277)	98.5 (336)	112.8 (385)	120.2 (410)	152.4 (520)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	37 (16)	41 (12)	43 (10)	52 (16)	61 (13)	70 (20)	74 (13)	94 (16)
Low Flow (14°F Tw)	Total, kW (MBH)	52.2 (178)	58.9 (201)	61.8 (211)	73.6 (251)	89.7 (306)	106.7 (364)	112 (382)	142.1 (485)
	Sensible, kW (MBH)	52.2 (178)	58.9 (201)	61.8 (211)	73.6 (251)	89.7 (306)	106.7 (364)	112 (382)	142.1 (485)
	Flow Rate, gpm (Pressure Drop, ftH ₂ O)	29 (11)	32 (9)	33 (8)	41 (12)	48 (10)	57 (15)	59 (10)	76 (12)
75°FDB/61.1°FWB, 45% RH, 52°FDP									
High Flow (10°F Tw)	Total, kW (MBH)	47.5 (162)	53.3 (182)	56.3 (192)	66.2 (226)	80.6 (275)	93.2 (318)	99.4 (339)	125.7 (429)
	Sensible, kW (MBH)	47.5 (162)	53.3 (182)	56.3 (192)	66.2 (226)	80.6 (275)	93.2 (318)	99.4 (339)	125.7 (429)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	37 (16)	41 (12)	43 (11)	52 (16)	62 (13)	70 (20)	74 (13)	94 (16)
Med. Flow (12°F Tw)	Total, kW (MBH)	41.6 (142)	46.9 (160)	49.2 (168)	58.6 (200)	72.1 (246)	86.5 (295)	90.3 (308)	114.9 (392)
	Sensible, kW (MBH)	41.6 (142)	46.9 (160)	49.2 (168)	58.6 (200)	72.1 (246)	86.5 (295)	90.3 (308)	114.9 (392)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	27 (11)	30 (9)	32 (8)	39 (11)	46 (10)	55 (14)	57 (9)	72 (11)
Low Flow (14°F Tw)	Total, kW (MBH)	34.9 (119)	39.9 (136)	38.1 (130)	49.8 (170)	61.3 (209)	77.7 (265)	78.8 (269)	100.5 (343)
	Sensible, kW (MBH)	34.9 (119)	39.9 (136)	38.1 (130)	49.8 (170)	61.3 (209)	77.7 (265)	78.8 (269)	100.5 (343)
	Flow Rate, GPM (Pressure Drop, ftH ₂ O)	20 (8)	23 (7)	22 (6)	29 (8)	35 (7)	43 (11)	43 (7)	55 (8)

Electrical Data

Voltage	Model															
	With Condensate Pump	CFU/D/F-060-C1			CFU/D/F-090-C1			CFU/D/F-120-C1			CFU/D/F-150-C1			CFU/D/F-180-C1		
		FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
Cooling w/Electric Reheat & Humidification																
460/3/60	No	37.2	46.5	50	37.2	46.5	50	37.2	46.5	50	54.4	68.0	70	54.4	68.0	70
460/3/60	Yes	38.0	47.5	50	38.0	47.5	50	38.0	47.5	50	55.2	69.0	70	55.2	69.0	70
575/3/60	No	29.8	37.3	40	29.8	37.3	40	29.8	37.3	40	43.6	54.5	60	43.6	54.5	60
575/3/60	Yes	30.5	38.1	40	30.5	38.1	40	30.5	38.1	40	44.3	55.3	60	44.3	55.3	60
Cooling w/Electric Reheat																
460/3/60	No	30.5	38.2	40	30.5	38.2	40	30.5	38.2	40	45.6	57.0	60	45.6	57.0	60
460/3/60	Yes	31.3	39.2	40	31.3	39.2	40	31.3	39.2	40	46.4	58.0	60	46.4	58.0	60
575/3/60	No	24.5	30.7	35	24.5	30.7	35	24.5	30.7	35	36.5	45.7	50	36.5	45.7	50
575/3/60	Yes	25.2	31.5	35	25.2	31.5	35	25.2	31.5	50	37.2	46.5	50	37.2	46.5	50
Cooling w/Humidification																
460/3/60	No	14.6	18.3	20	14.6	18.3	20	14.6	18.3	20	20.6	25.7	30	20.6	25.7	30
460/3/60	Yes	15.4	19.3	20	15.4	19.3	20	15.4	19.3	20	21.4	26.7	30	21.4	26.7	30
575/3/60	No	11.8	14.7	15	11.8	14.7	15	11.8	14.7	15	16.5	20.7	25	16.5	20.7	25
575/3/60	Yes	12.4	15.5	20	12.4	15.5	20	12.4	15.5	20	17.2	21.5	25	17.2	21.5	25
Cooling Only																
460/3/60	No	8.0	10.0	15	8.0	10.0	15	8.0	10.0	15	11.7	14.6	15	11.7	14.6	15
460/3/60	Yes	8.8	11.0	15	8.8	11.0	15	8.8	11.0	15	12.5	15.6	20	12.5	15.6	20
575/3/60	No	6.5	8.1	15	6.5	8.1	15	6.5	8.1	15	9.5	11.8	15	9.5	11.8	15
575/3/60	Yes	7.1	8.9	15	7.1	8.9	15	7.1	8.9	15	10.1	12.6	15	10.1	12.6	15

Voltage	Model															
	With Condensate Pump	CFU/D/F-190-C1			CFU/D/F-230-C1			CFU/D/F-280-C1			CFD-310-C1			CFD-360-C1		
		FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
Cooling w/Electric Reheat & Humidification																
460/3/60	No	54.4	68.0	70	54.4	68.0	70	59.4	74.3	80	64.8	81.0	90	69.3	86.6	90
460/3/60	Yes	55.2	69.0	70	55.2	69.0	70	60.2	75.3	80	65.6	82.0	80	70.1	87.6	80
575/3/60	No	43.6	54.5	60	43.6	54.5	60	47.6	59.5	60	51.9	64.9	70	55.5	69.3	70
575/3/60	Yes	44.3	55.3	60	44.3	55.3	60	48.3	60.3	70	52.6	65.7	70	56.1	70.1	80
Cooling w/Electric Reheat																
460/3/60	No	45.6	57.0	60	45.6	57.0	60	50.5	63.2	70	55.9	69.9	70	55.9	69.9	70
460/3/60	Yes	46.4	58.0	60	46.4	58.0	60	51.3	64.2	70	56.7	70.9	80	56.7	70.9	80
575/3/60	No	36.5	45.7	50	36.5	45.7	50	40.5	50.7	60	44.8	56.0	60	44.8	56.0	60
575/3/60	Yes	37.2	46.5	50	37.2	46.5	50	41.2	51.5	60	45.5	56.8	60	45.5	56.8	60
Cooling w/Humidification																
460/3/60	No	20.6	25.7	30	20.6	25.7	30	25.5	31.9	35	30.9	38.7	40	35.4	44.3	45
460/3/60	Yes	21.4	26.7	30	21.4	26.7	30	26.3	32.9	35	31.7	39.7	40	36.2	45.3	50
575/3/60	No	16.5	20.7	25	16.5	20.7	25	20.5	25.7	30	24.8	31.1	35	28.4	35.5	40
575/3/60	Yes	17.2	21.5	25	17.2	21.5	25	21.2	26.5	30	25.5	31.9	35	29.0	36.3	40
Cooling Only																
460/3/60	No	11.7	14.6	15	11.7	14.6	15	16.7	20.8	25	22.1	27.6	30	22.1	27.6	30
460/3/60	Yes	12.5	15.6	20	12.5	15.6	20	17.5	21.8	25	22.9	28.6	30	22.9	28.6	30
575/3/60	No	9.5	11.8	15	9.5	11.8	15	13.4	16.8	20	17.7	22.2	25	17.7	22.2	25
575/3/60	Yes	10.1	12.6	15	10.1	12.6	15	14.1	17.6	20	18.4	23.0	25	18.4	23.0	25

Standard 1 KAIC rating, optional KAIC ratings available. For voltages not shown, call 301.620.2033.

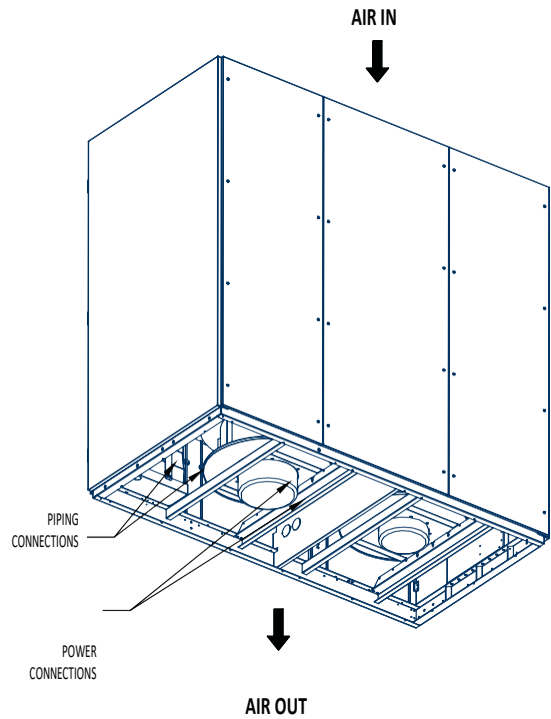
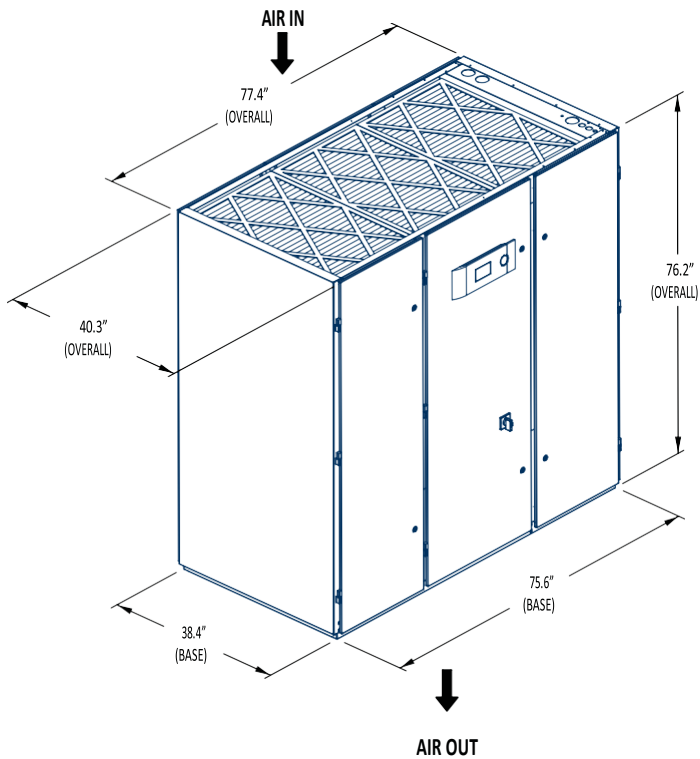
Voltage	Model												
	With Condensate Pump	CFD-510-C2			CFD-630-C2			CFD-730-C2			CFD-1080-C2		
		FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
Cooling w/Electric Reheat and Humidification													
460/3/60	No	N/A			N/A			N/A			N/A		
460/3/60	Yes	N/A			N/A			N/A			N/A		
575/3/60	No	N/A			N/A			N/A			N/A		
575/3/60	Yes	N/A			N/A			N/A			N/A		
Cooling w/Electric Reheat													
460/3/60	No	N/A			N/A			N/A			N/A		
460/3/60	Yes	N/A			N/A			N/A			N/A		
575/3/60	No	N/A			N/A			N/A			N/A		
575/3/60	Yes	N/A			N/A			N/A			N/A		
Cooling w/Humidification													
460/3/60	No	N/A			N/A			N/A			N/A		
460/3/60	Yes	N/A			N/A			N/A			N/A		
575/3/60	No	N/A			N/A			N/A			N/A		
575/3/60	Yes	N/A			N/A			N/A			N/A		
Cooling Only													
460/3/60	No	24.5	30.6	35.0	32.5	40.6	45.0	40.5	50.6	60.0	88.0	110.0	110.0
460/3/60	Yes	25.3	31.6	35.0	33.3	41.6	45.0	41.3	51.6	60.0	N/A	N/A	N/A
575/3/60	No	19.7	24.6	25.0	26.1	32.6	35.0	32.5	40.6	45.0	N/A	N/A	N/A
575/3/60	Yes	20.3	25.4	30.0	26.7	33.4	35.0	33.1	41.4	45.0	N/A	N/A	N/A

Standard 1 KAIC rating, optional KAIC ratings available. For voltages not shown, call 301.620.2033.

Dimensional Drawings

CFD-060/090-C — Downflow Vertical Air Conditioner

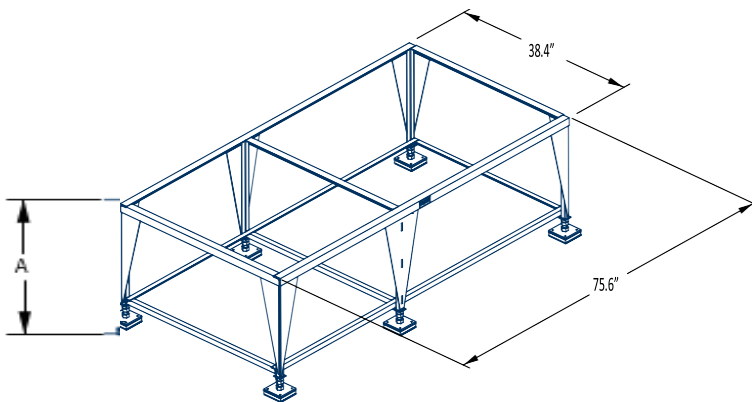
Free Return or with Optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

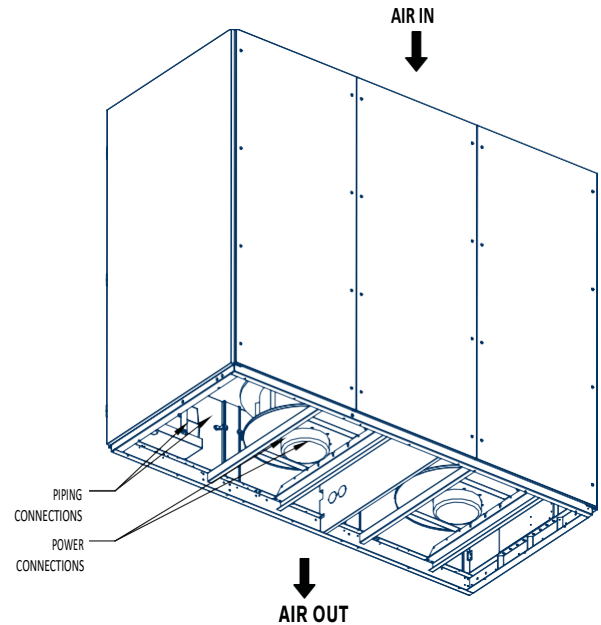
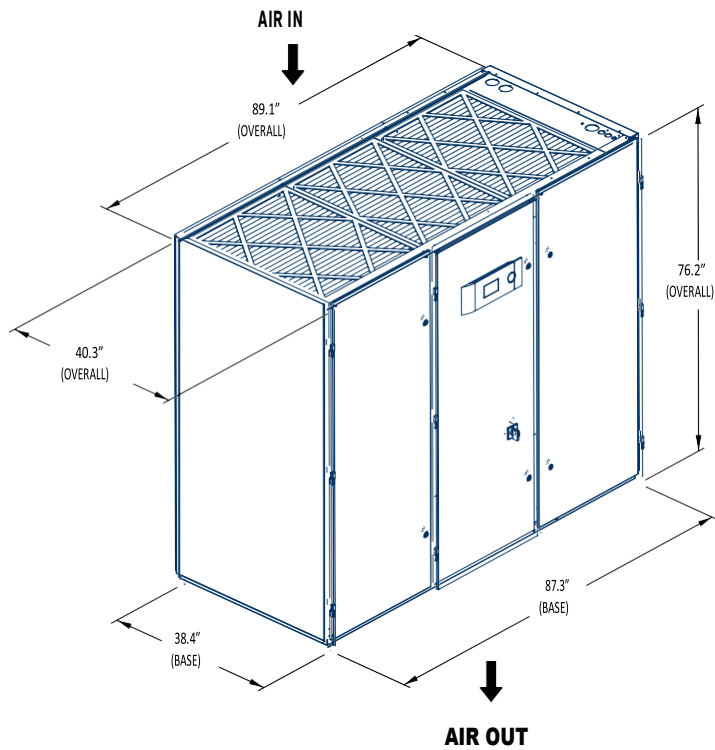


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

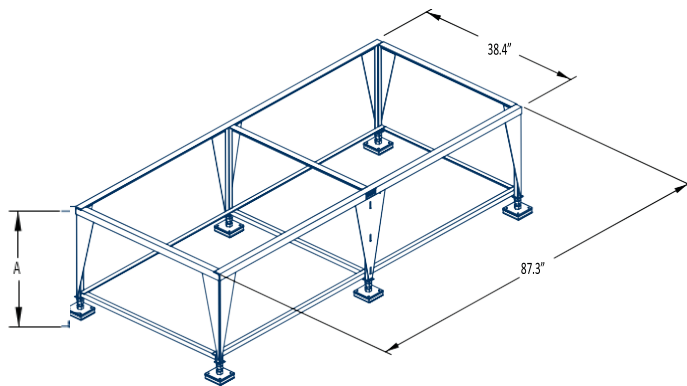
CFD-120-C — Downflow Vertical Air Conditioner

Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic Seismic Rated Floor Stand is Available

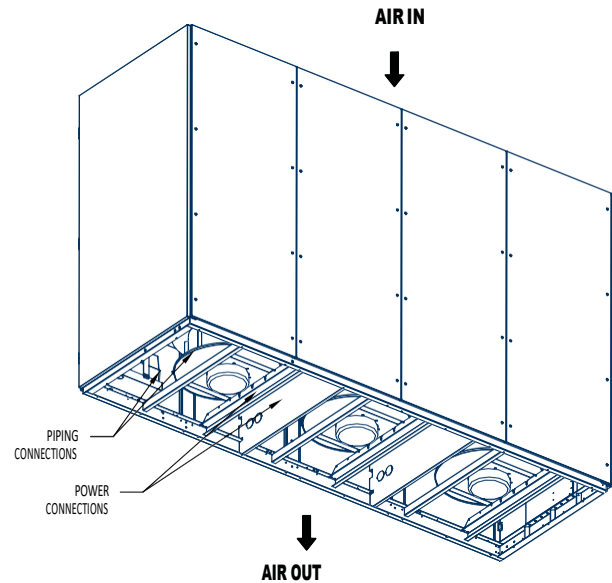
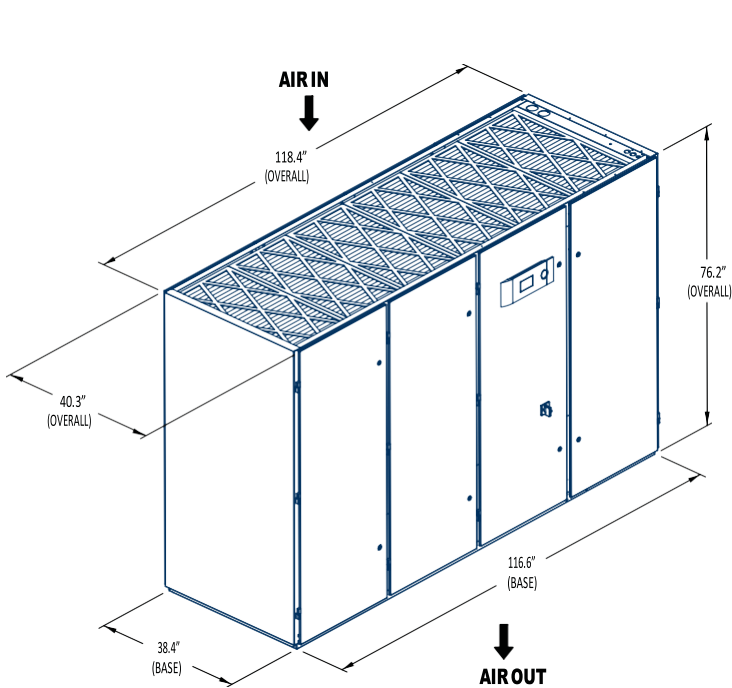


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFD-150/180/190/230-C — Downflow Vertical Air Conditioner

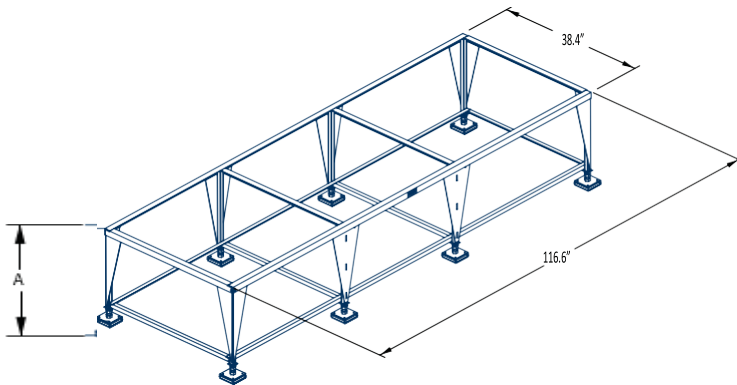
Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

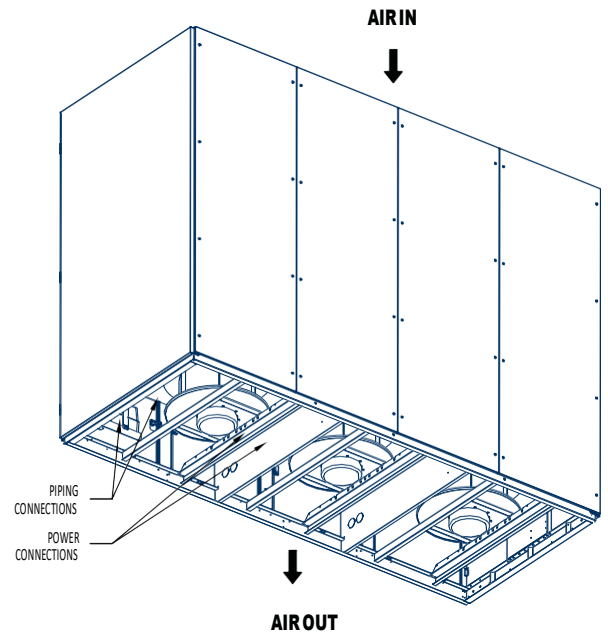
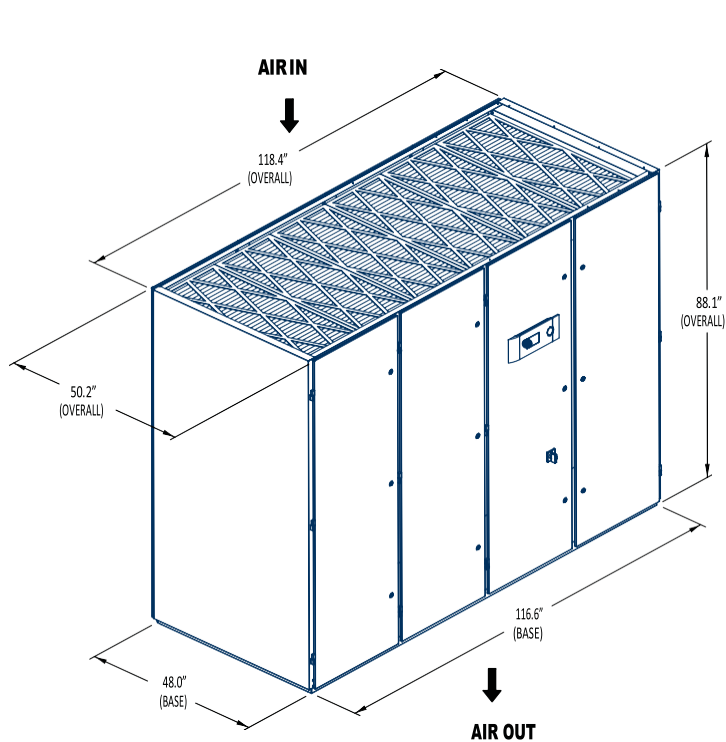


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFD-280-C — Downflow Vertical Air Conditioner

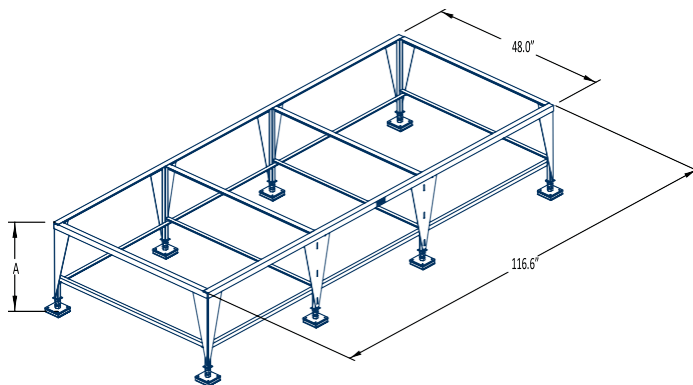
Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

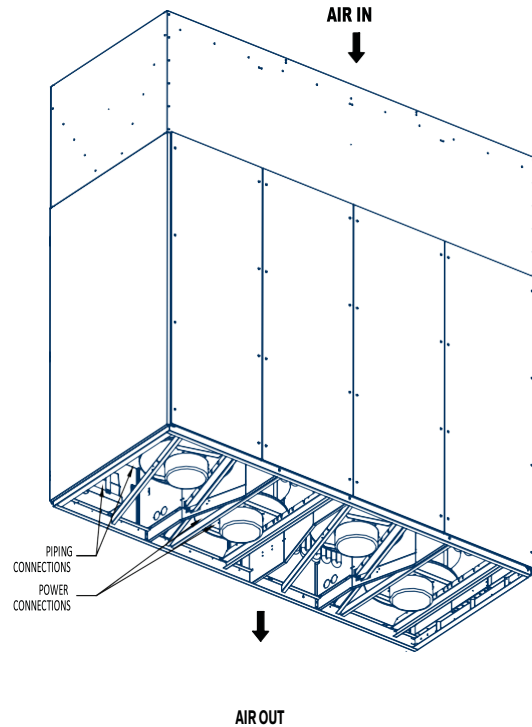
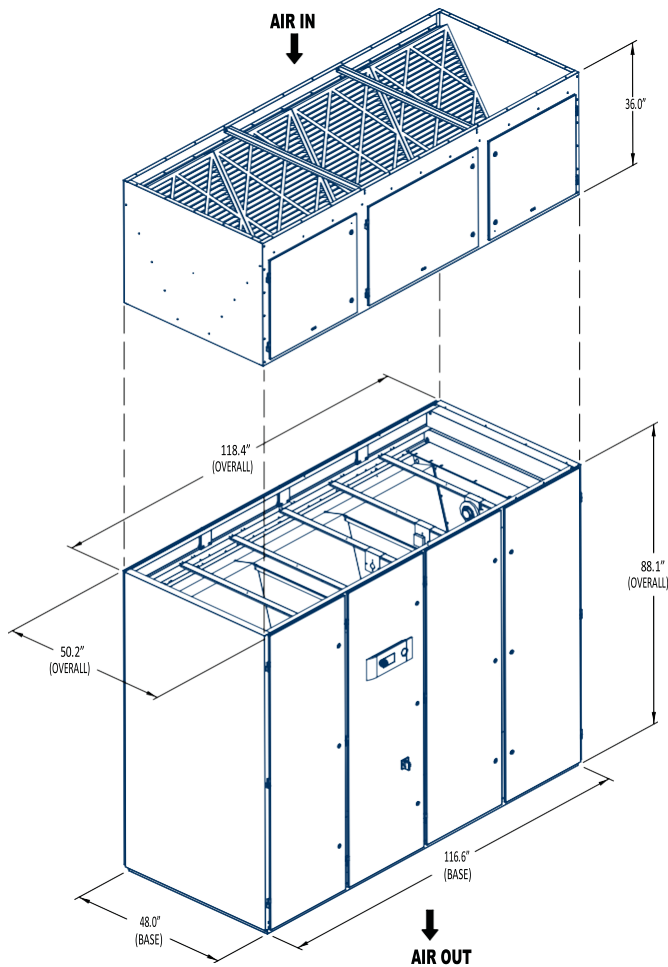


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
42.0	41.0	44.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

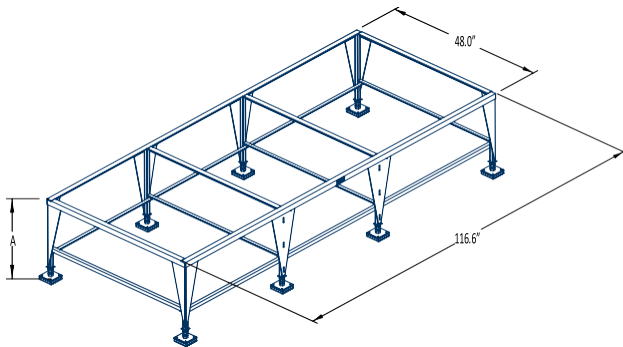
CFD-310-C — Downflow Vertical Air Conditioner

Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic Seismic Rated Floor Stand is Available

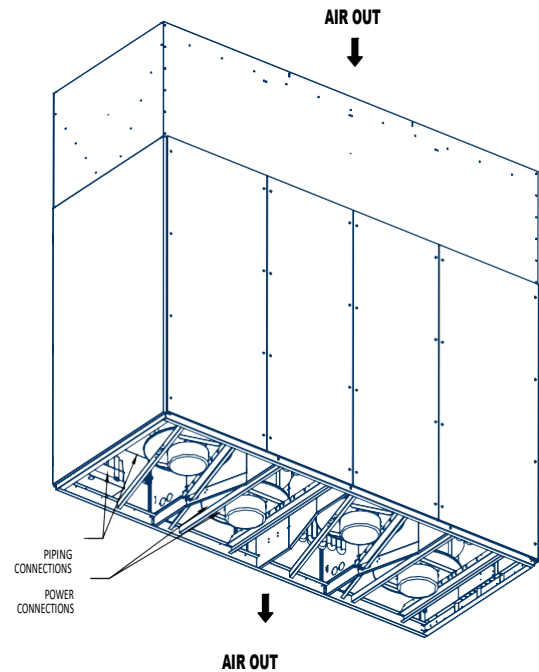
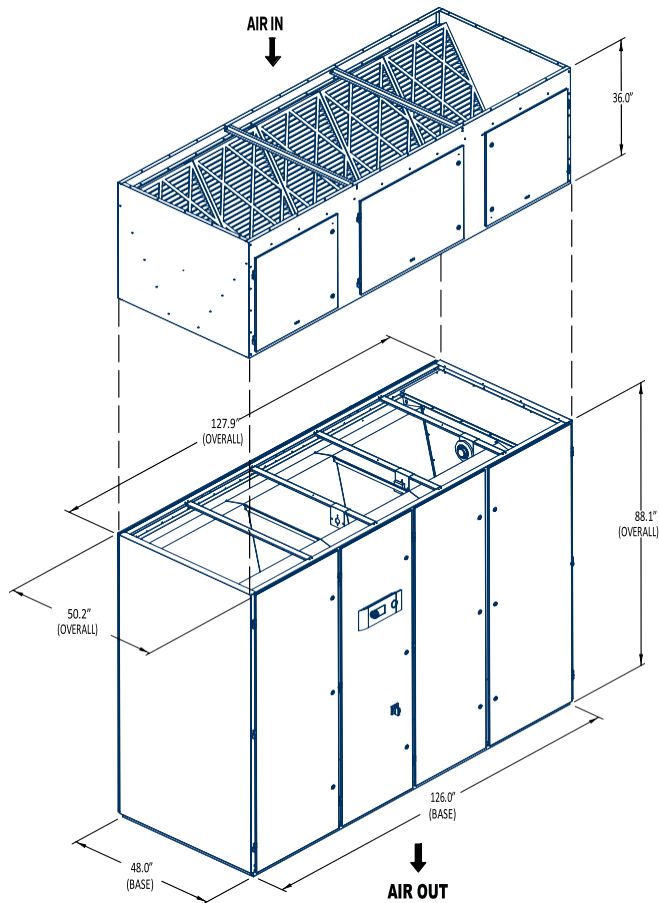


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
24.0	23.0	26.0
36.0	35.0	38.0
42.0	41.0	44.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFD-360-C — Downflow Vertical Air Conditioner

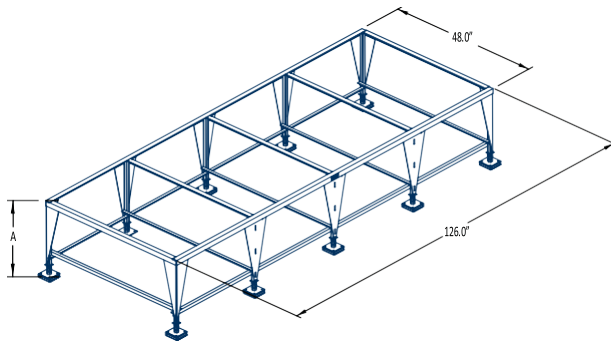
Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

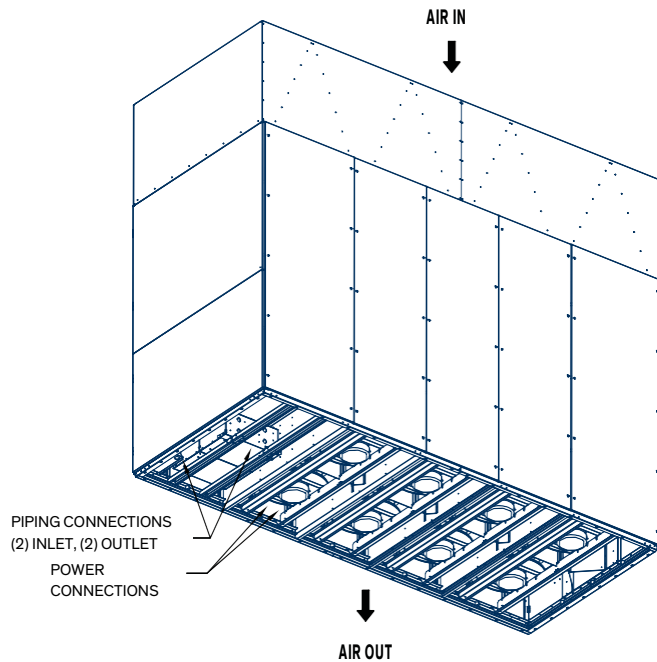
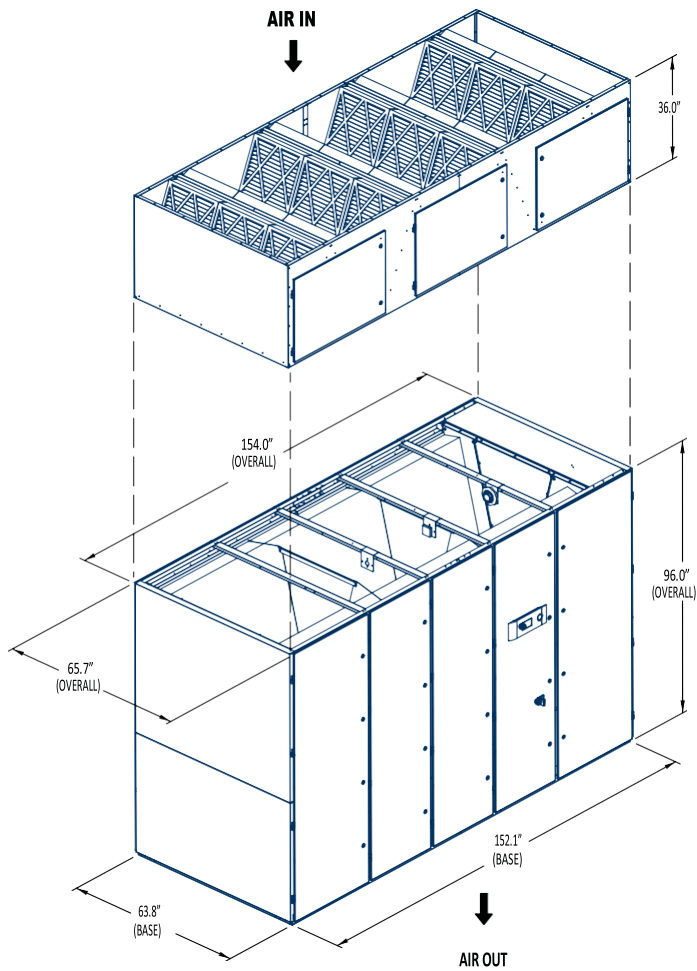


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
24.0	23.0	26.0
36.0	35.0	38.0
42.0	41.0	44.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFD-510/630/730-C — Downflow Vertical Air Conditioner

Free Return or with optional Ducted Return

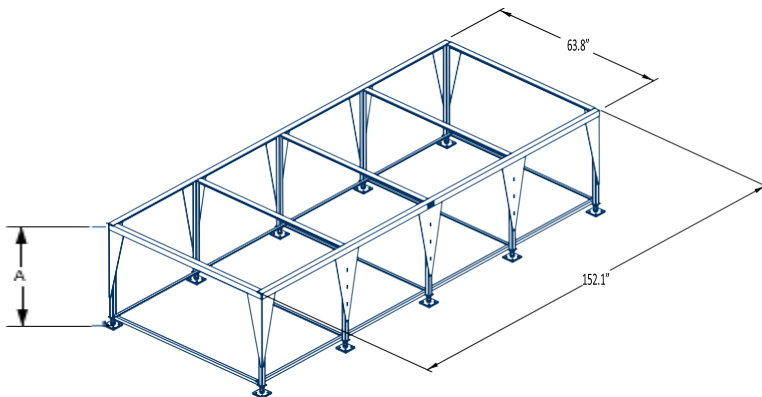


Model CFD-630-D Fans Shown for Reference

NOTE: Standard piping connections terminate inside the cabinet at the bottom, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

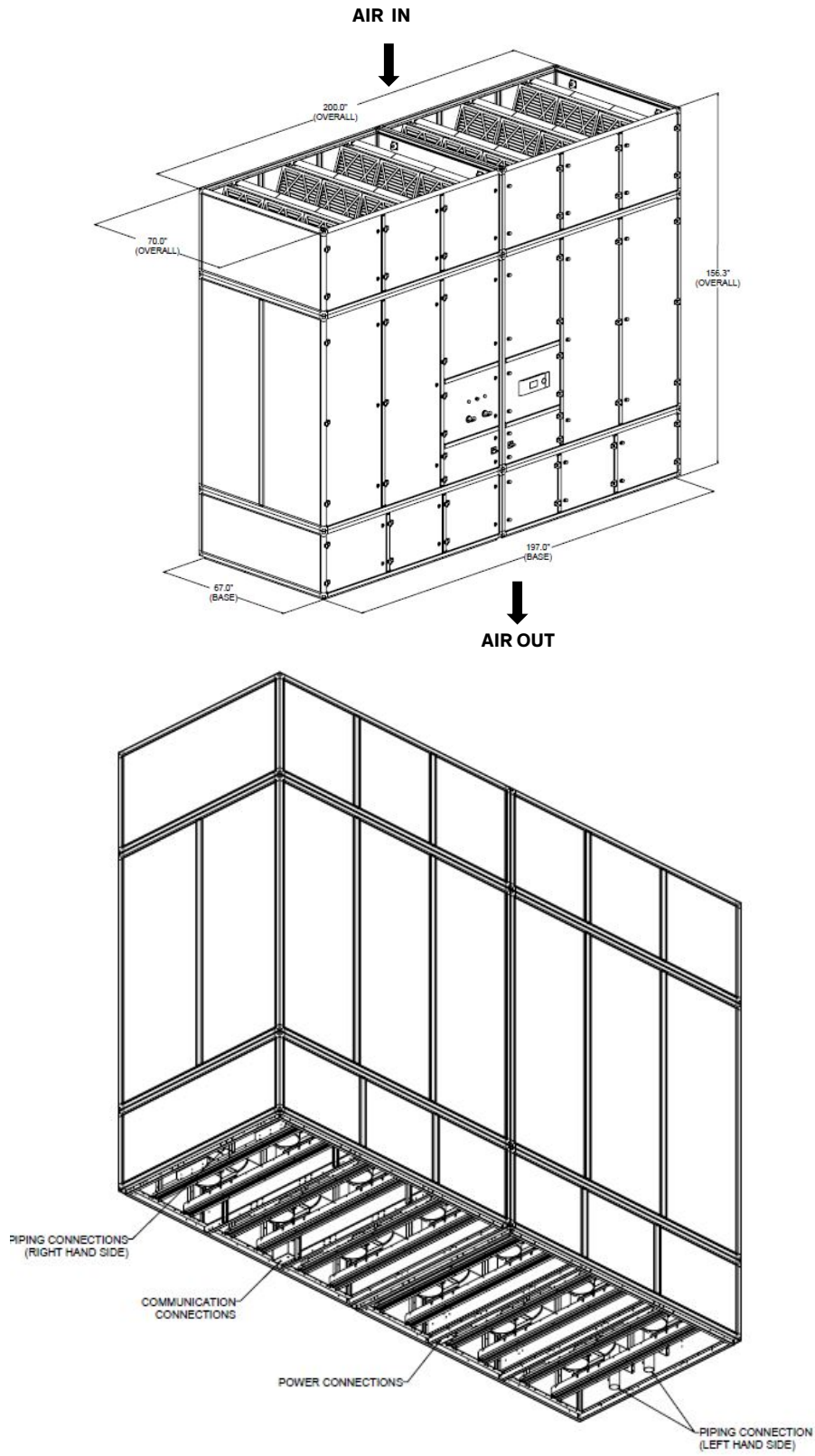


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
36.0	35.0	38.0
42.0	41.0	44.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

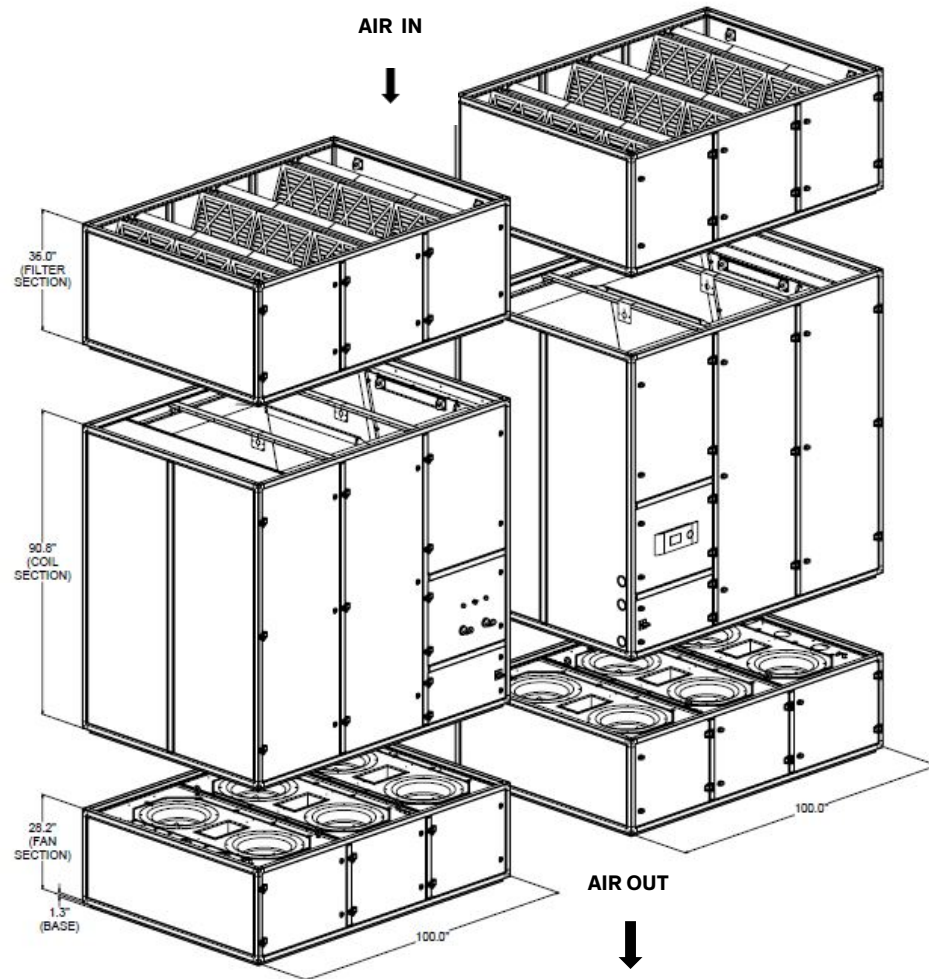
CFD-1080-C2 — Downflow Vertical Air Conditioner

Free Return or with optional Ducted Return



CFD-1080-C2 — Downflow Vertical Air Conditioner

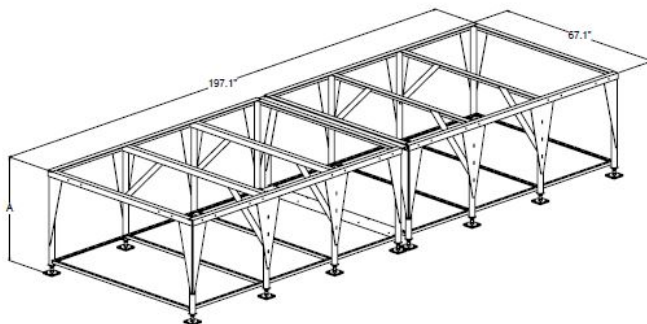
Free Return or with optional Ducted Return



NOTE: Standard piping connections terminate at the bottom of the cabinet on both sides. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

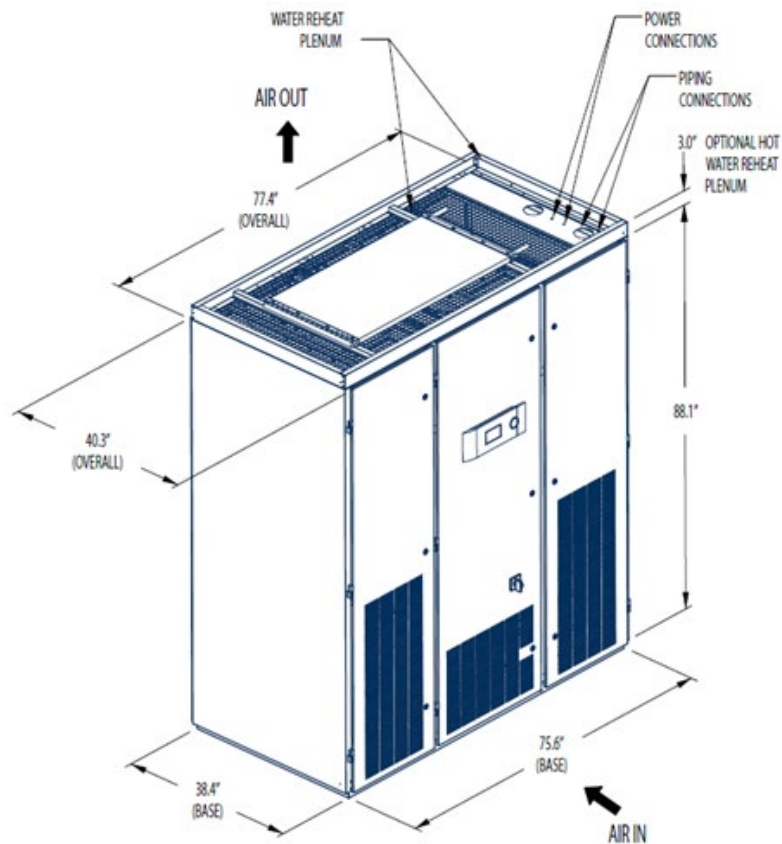


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
36.0	35.0	38.0
42.0	41.0	44.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

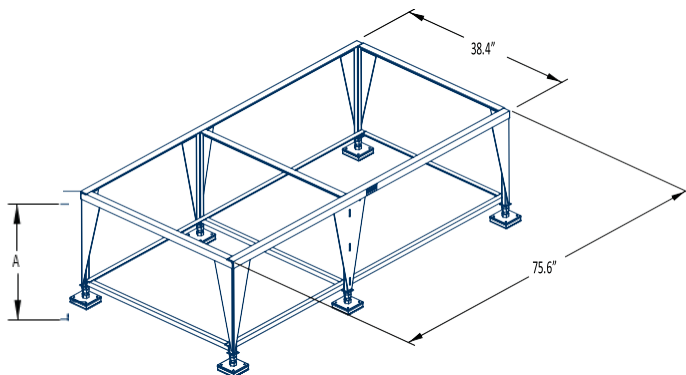
CFU-060/090-C — Upflow Vertical Air Conditioner

Ducted or provided with optional 2- or 3-way Plenum Box



NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic Seismic Rated Floor Stand is Available

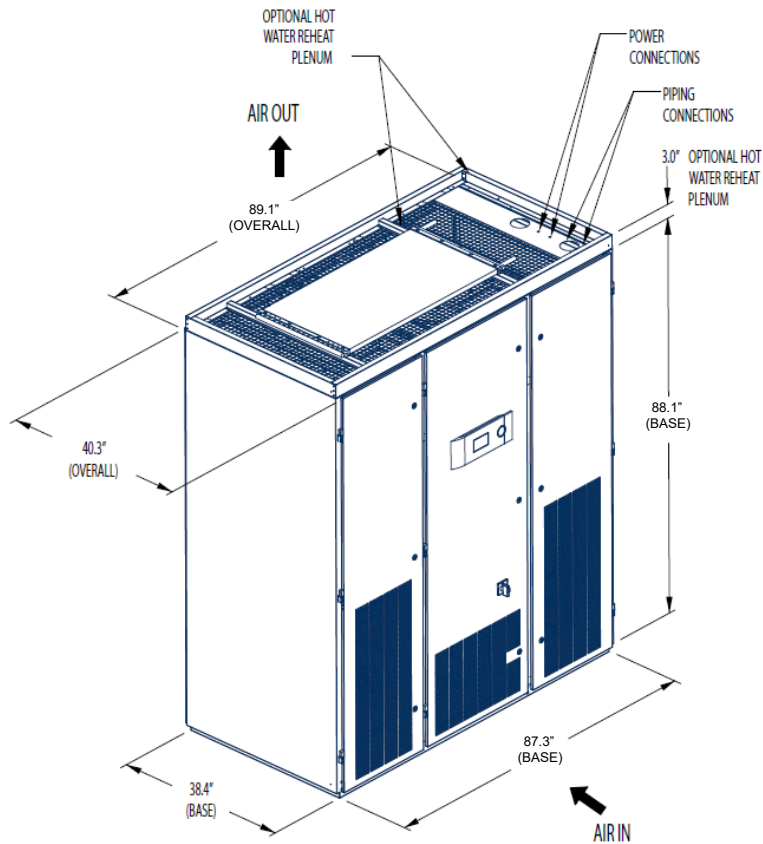


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFU-120-C — Upflow Vertical Air Conditioner

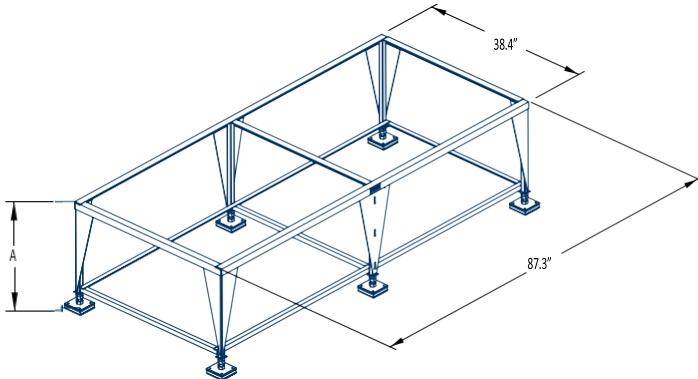
Ducted or provided with optional 2- or 3-way Plenum Box



NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

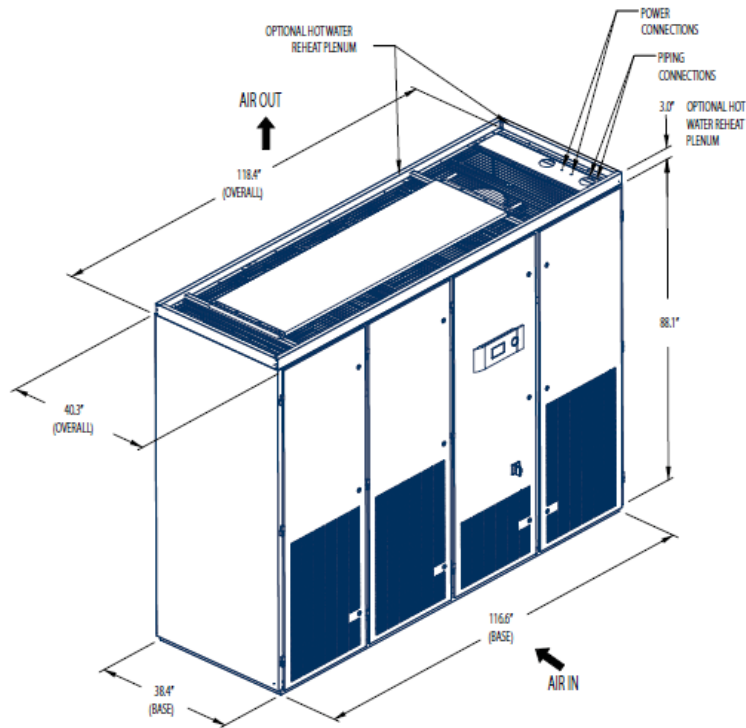


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

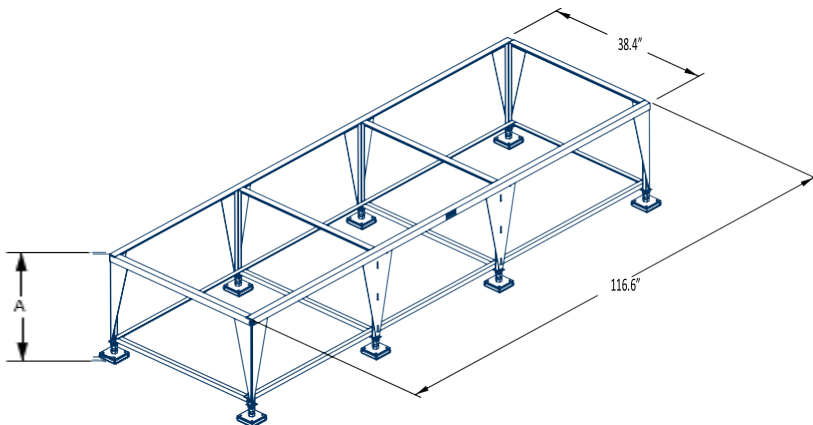
CFU-150/180/190/230-C — Upflow Vertical Air Conditioner

Ducted or provided with optional 2- or 3-way Plenum Box



Adjustable Floor Stand, Non-Seismic
Seismic Rated Floor Stand is Available

NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

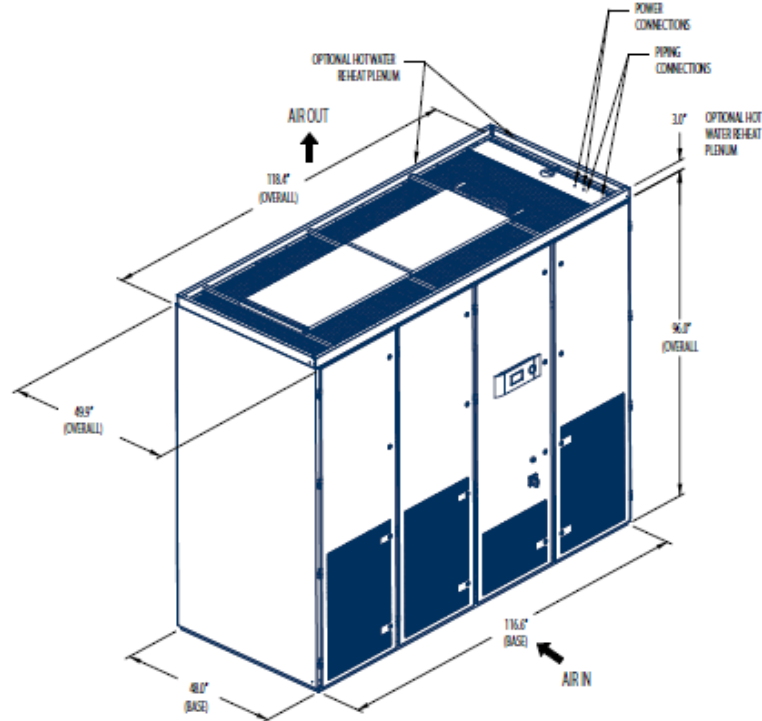


Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

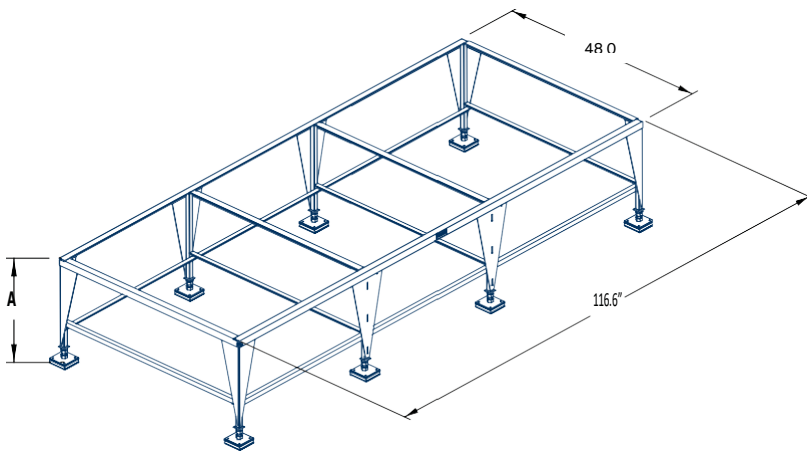
CFU-280-C — Upflow Vertical Air Conditioner

Ducted or provided with optional 2 or 3-way Plenum Box



Adjustable Floor Stand, Non-Seismic
Seismic Rated Floor Stand is Available

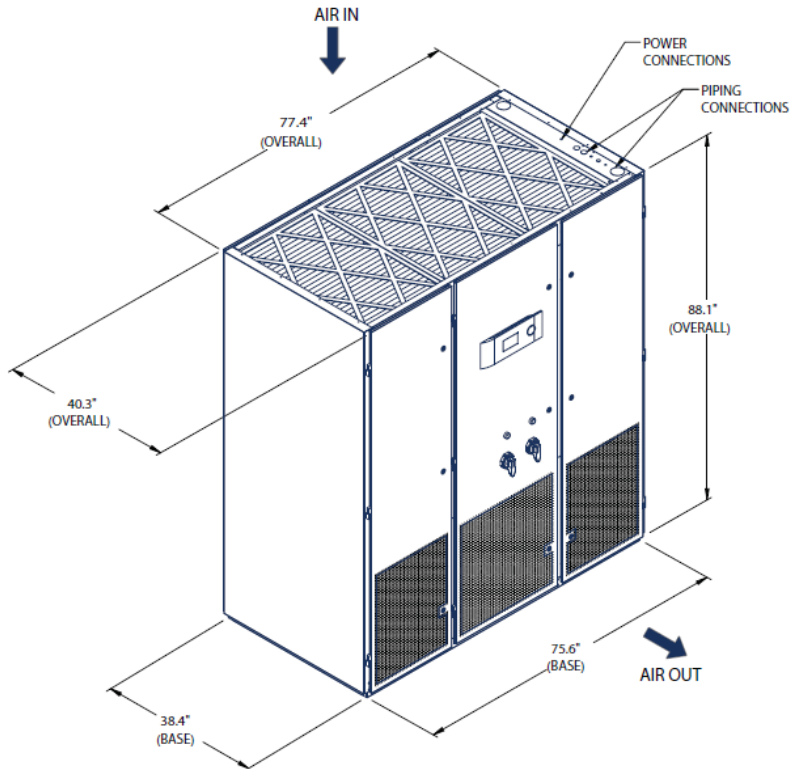
NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.



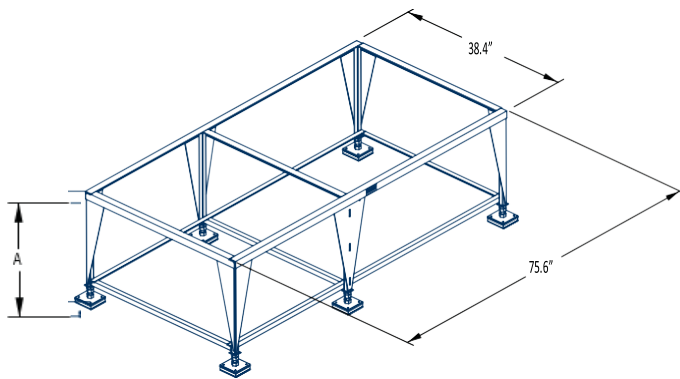
Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

CFF-060/090-C — Front Discharge Air Conditioner Free Return Or with optional Ducted Return



Adjustable Floor Stand, Non-Seismic Seismic Rated Floor Stand is Available



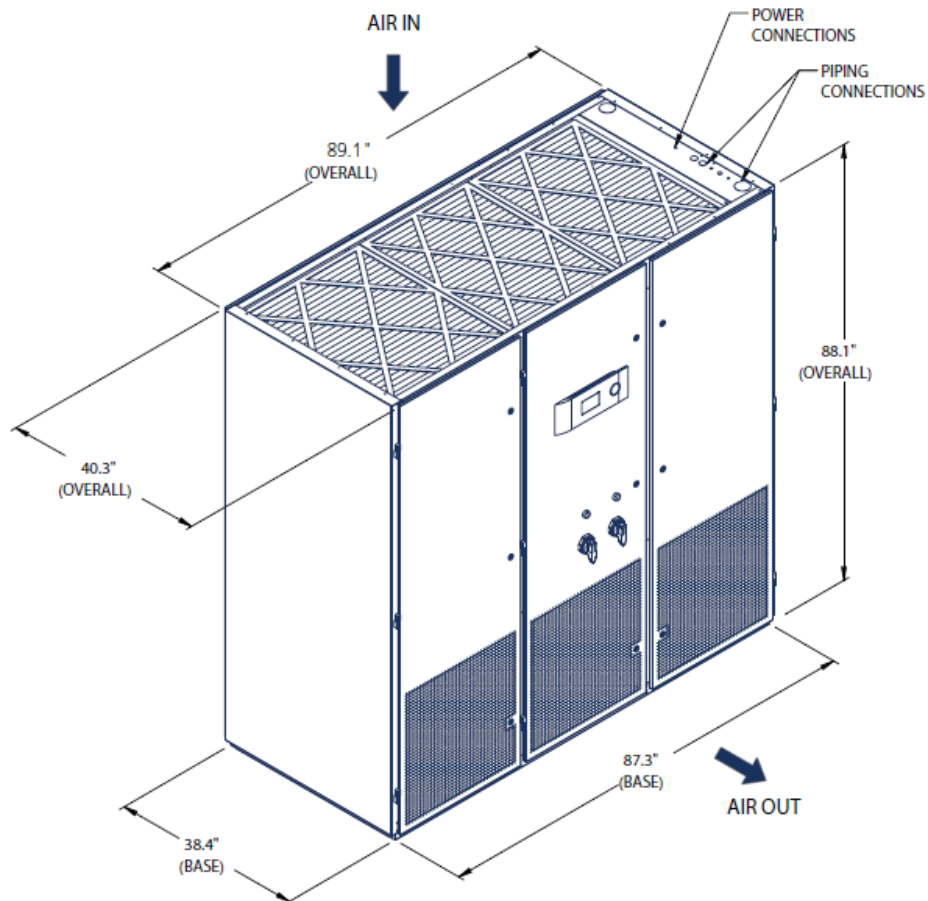
NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

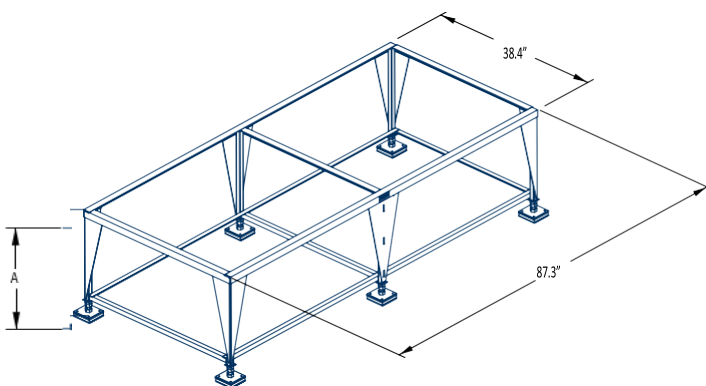
CFF-120-C — Front Discharge Air Conditioner

Free Return or with optional Ducted Return



Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available



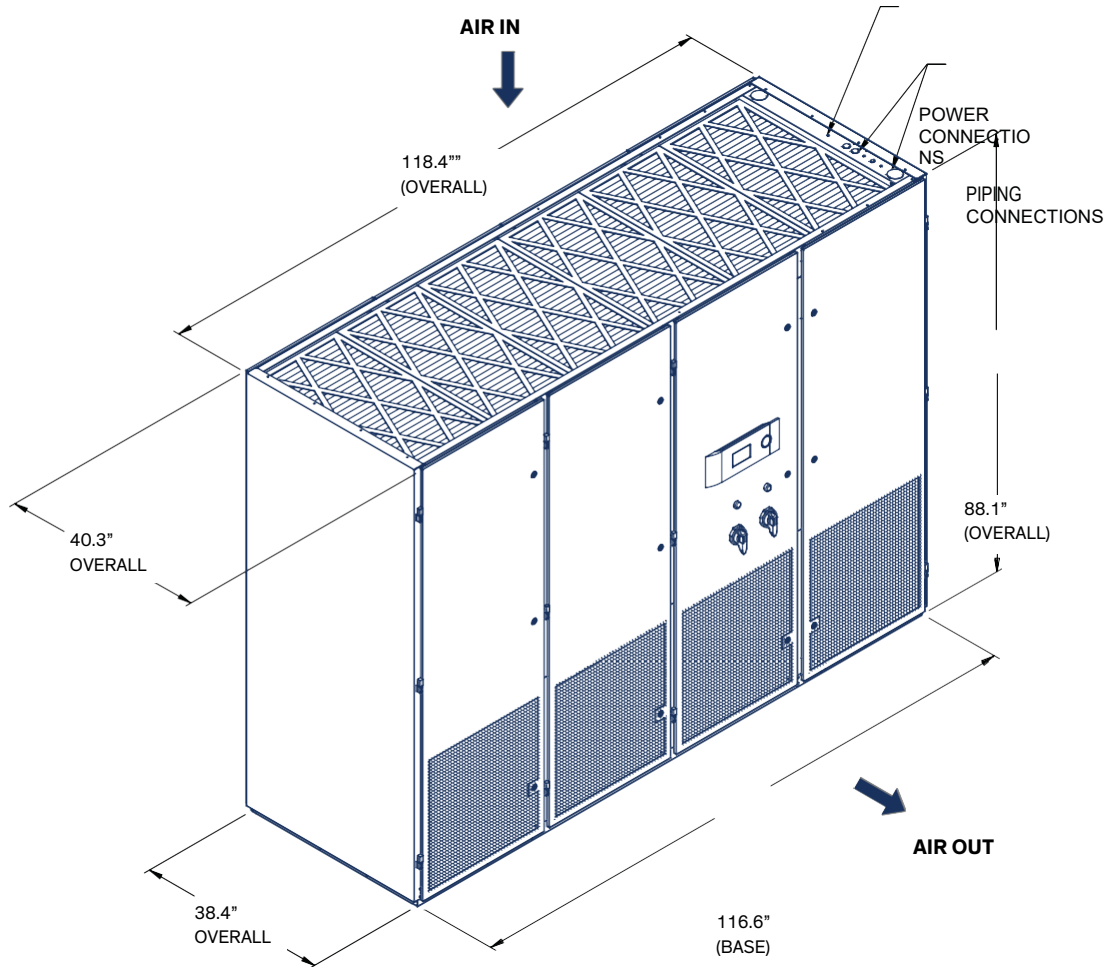
NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

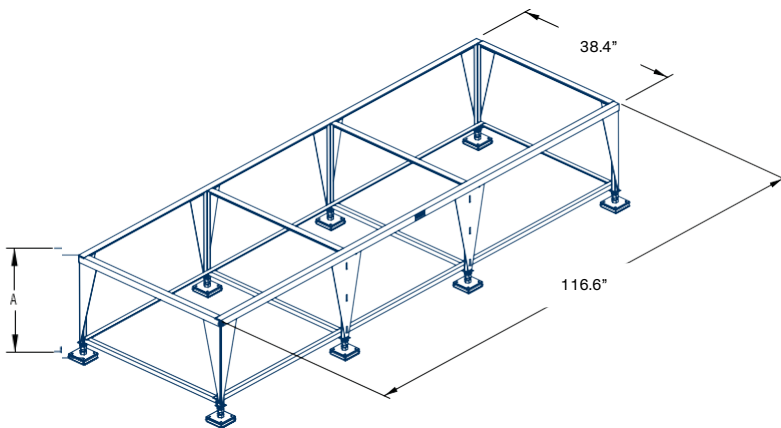
CFF-150/180/190/230-C — Front Discharge Air Conditioner Return

Or with Optional Ducted Return



Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available



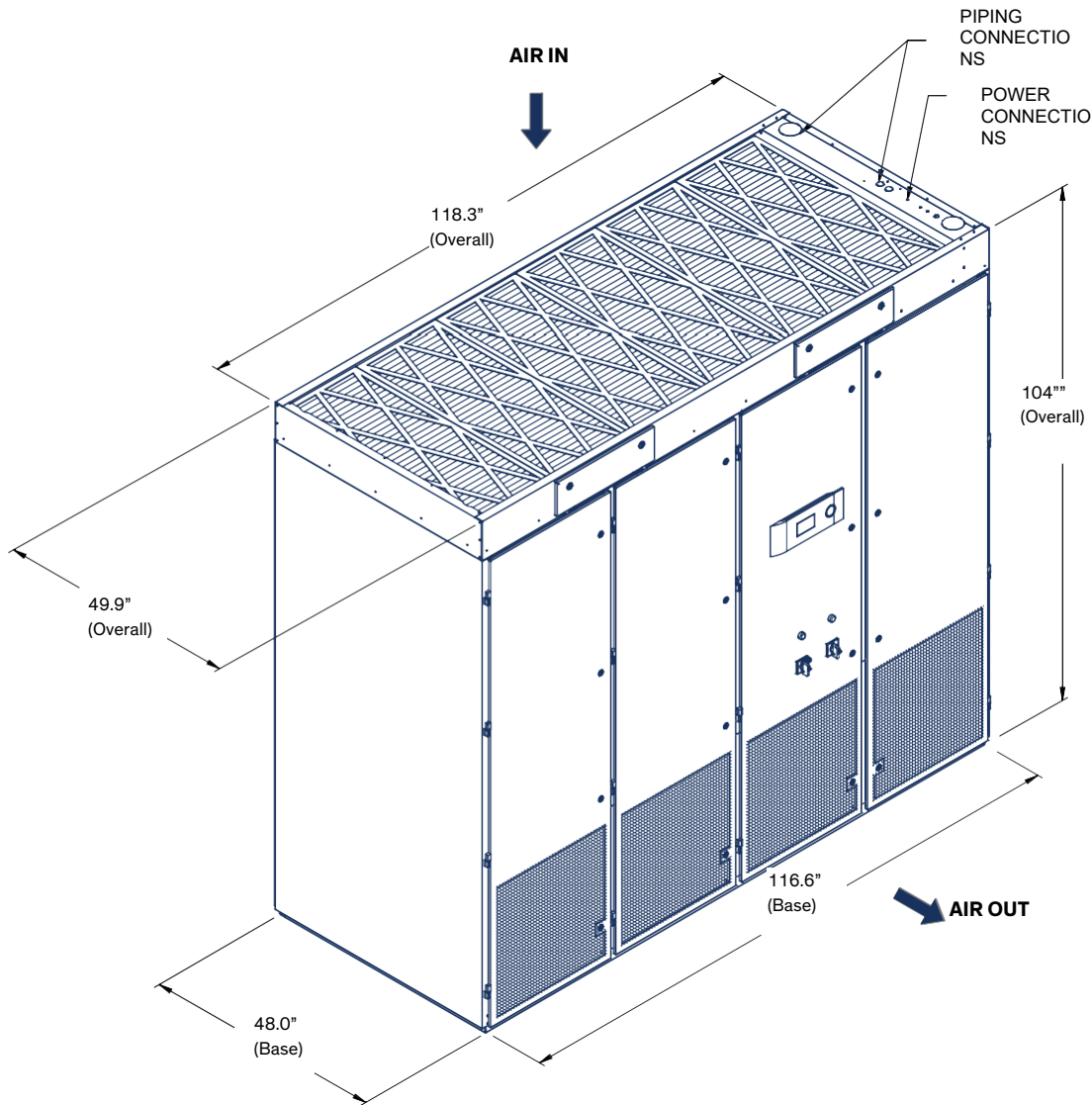
Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

Other Floor Stand Heights Optionally Available.

NOTE: Standard piping connections terminate outside the cabinet at the Top, Right hand side. For any other option, contact STULZ.

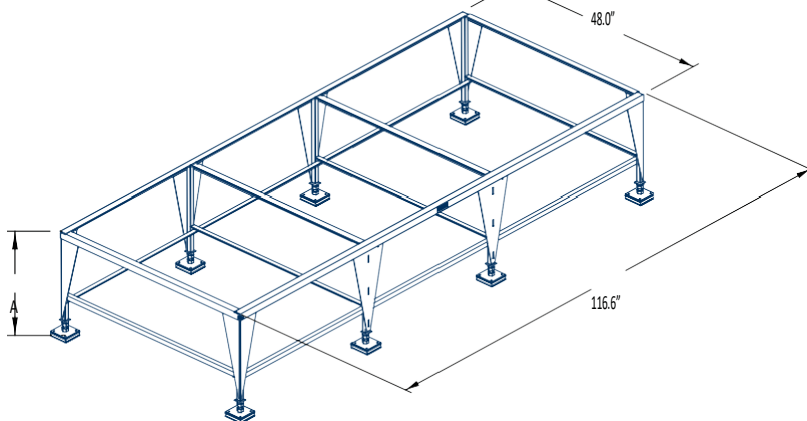
CFF-280-C — Front Discharge Air Conditioner

Free Return or with optional Ducted Return



Adjustable Floor Stand, Non-Seismic

Seismic Rated Floor Stand is Available

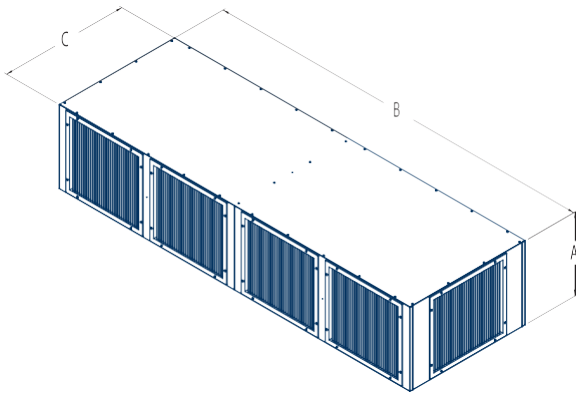


NOTE: Standard piping connections terminate outside the cabinet at the top, right hand side. For any other option, contact STULZ.

Adjustable Floor Stand Height Dimensions (inches)		
Nominal Height	Dim A Minimum	Dim A Maximum
15.0	14.0	17.0
18.0	17.0	20.0
24.0	23.0	26.0
36.0	35.0	38.0
48.0	47.0	50.0

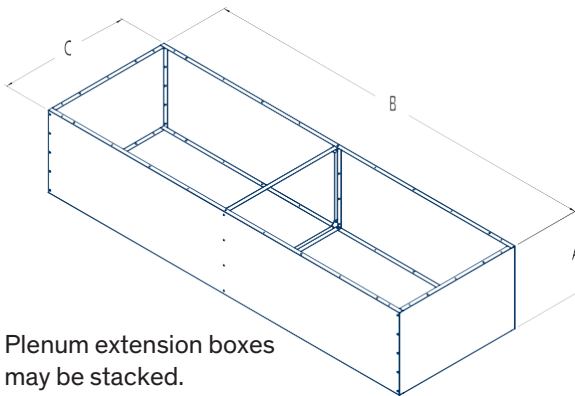
Other Floor Stand Heights Optionally Available.

Plenum Box



Plenum Boxes (Upflow Units)	Dim A Nominal (inches)	Dim B Minimum (inches)	Dim C Maximum (inches)
CFU-060	18.5	77.4	38.7
CFU-090	18.5	77.4	38.7
CFU-120	18.5	89.1	38.7
CFU-150	24	118.4	38.7
CFU-180	24	118.4	38.7
CFU-190	24	118.4	38.7
CFU-230	24	118.4	38.7
CFU-280	24	118.4	48.1

Plenum Extension Box

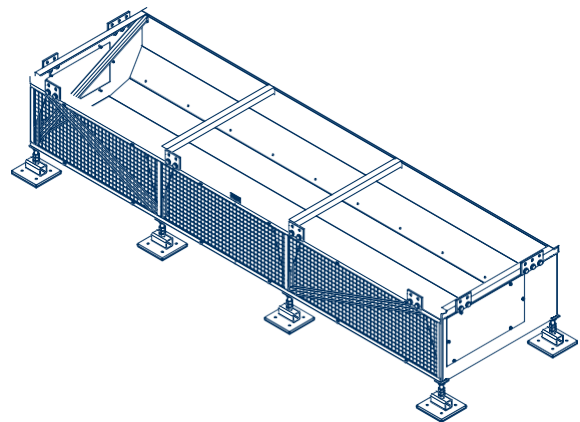
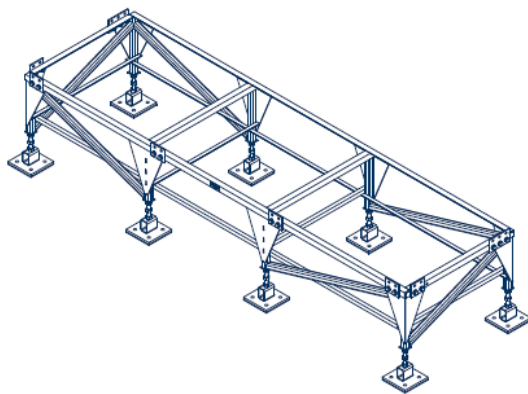


Plenum extension boxes may be stacked.

NOTE: Taller plenum boxes are optionally available.

Plenum Extension Boxes (Downflow Units)	Dim A Nominal (inches)	Dim B Minimum (inches)	Dim C Maximum (inches)
CFD-060	12 or 24	77.4	38.8
CFD-090	12 or 24	77.4	38.8
CFD-120	12 or 24	89.1	38.8
CFD-150	12 or 24	118.4	38.8
CFD-180	12 or 24	118.4	38.8
CFD-190	12 or 24	118.4	38.8
CFD-230	12 or 24	118.4	38.8
CFD-280	12 or 24	118.4	48.1
CFD-310	12 or 24	118.4	48.1
CFD-360	12 or 24	127.9	48.1

Seismic rated floor stands are available for any size cabinet.



Typical Seismic Rated Floor Stand
Enclosed, Seismic Rated Floor Stand

Enclosed, non-seismic rated Floor stands also available.

STULZ CyberAir Series

CW CFD/CFU/CFF — Floor Mounted Precision Air Conditioners

Summary

This specification describes requirements for a precision environmental control system. The STULZ CyberAir floor-mounted air conditioning system shall provide precision temperature and/or humidity control for computer rooms or rooms containing communications or other highly sensitive heat load equipment where continuous 24 hour a day, 365 days a year air conditioning is required.

Designed for front service access, CyberAir systems require minimum floor space. The units are designed with a wide range of options to handle all precision cooling applications.

Design Requirements

The environmental control system shall be a STULZ CyberAir factory-assembled unit. The unit shall be designed for corner installation requiring front access through hinged and removable front access panels. No allowance for side service access shall be required.

CyberAir units are especially adapted for both raised and non-raised floors. The air handling system shall be specifically designed to provide a high sensible heat ratio.

Quality Assurance

The manufacturer shall maintain a set of international standards of quality management to ensure product quality. Prior to shipment each system shall be subject to a complete operational and functional testing based on predefined procedures. The air conditioner manufacturer shall be ISO 9001:2015 certified.

Cabinet

Down-Flow (CFD-060-730)

Access panels shall be fabricated from 18 gauge galvanized steel. Door jambs and top cabinet frame shall be fabricated from 16 gauge galvanized steel. Bottom cabinet frame shall be fabricated from 10 gauge galvanized steel for CFD-060-360. Whereas the bottom cabinet of the CFD-510-730 shall be fabricated from 1/4" thick hot rolled steel.

The panels shall be lined with 1/2" (13 mm), 2 lb (.90 kg), high-density sound and thermal insulation and sealed with a self-extinguishing gasket conforming to NFPA 90A and 90B. The main unit color shall be black, extra fine texture.

Down-Flow (CFD-1080)

The CFD-1080 cabinet shall be constructed using extruded aluminum frame members with

nylon corners and joints. All panels shall be folded over to capture edges of insulation.

The panels shall be lined with 1" thick high-density sound and thermal insulation and sealed with a self-extinguishing gasket conforming to NFPA 90A and 90B.

Cabinet air leakage shall be less than 1% of design airflow rate measured at design static pressure. Maximum panel deflection shall be limited to 1/200 of any span at design operating pressure (positive or negative).

The CFD-1080 shall be constructed on a 10-gauge heavy formed and powder-coated steel base adequate to support the full operating weight of the unit and enable transportation and site handling.

Up-Flow/Front-Discharge (CFU/F-060-280)

Access panels shall be fabricated from 18 gauge galvanized steel. Door jambs shall be fabricated from 16 gauge galvanized steel. Bottom cabinet frame shall be fabricated from 10 gauge galvanized steel.

The panels shall be lined with 1/2" (13 mm), 2 lb (.90 kg), high-density sound and thermal insulation and sealed with a self-extinguishing gasket conforming to NFPA 90A and 90B. The main unit color shall be black, extra fine texture.

Air Flow Patterns

Down-Flow (CFD)

The air conditioner shall be configured for a down-flow air pattern with top free return air and conditioned supply air discharge through the bottom of the system into the raised floor.

Front Discharge (CFF)

The air conditioner shall be configured for a down-flow air pattern with top free return air and conditioned supply air discharge through the front of the unit.

Up-Flow (CFU)

The air conditioner shall be configured for an up-flow air pattern with free return air through front filtered grille or ducted rear return air and conditioned supply air discharge through the top of the unit.

Air Filtration

All units shall be supplied with disposable air filters classified as UL 900 or UL 586. Filters shall be 4" deep (nominal). Filters shall be pleated with a Minimum Efficiency Reporting Value (MERV) of 8. Filters shall be installed in a front accessible, steel holding frame, and accessible through the front of the unit (except for the rear return configuration).

Optional: Filters rated up to MERV 11 shall be available.

Mechanical Components

Backward Inclined Plenum Style Fan with an EC Motor

The blower(s) shall be direct driven, single inlet, backward curved centrifugal with an electronically commutated motor for maintenance free operation. The motor shall include:

- ☐ Integrated electronic control board and direct microprocessor control signaling for fan speed control
- ☐ Soft-starting capabilities
- ☐ RS-485 BUS connection
- ☐ Integrated current limitations

Each fan shall be low noise, low vibration manufactured with an anti-corrosive aluminum impeller. Each fan impeller shall be dynamically and statically balanced in two planes to minimize vibration during operation.

Chilled Water Cooling Coil

The coil shall be constructed of seamless drawn copper tubes, mechanically bonded to tempered aluminum fins with enhanced fin design for maximum heat transfer and mounted in a sloped stainless-steel condensate drain pan. The coil shall be designed for a maximum of 500 ft/min face velocity. The water circuit shall be designed to distribute water into the entire coil face area. Manual air bleed vents and drain ports shall be factory installed.

Differential Temperature Flow

Factory mounted and wired NTC temperature sensors for inlet and outlet chilled water temperatures shall be provided. The sensors shall supply input signals to the system controller to indicate the entering and leaving CW temperature in a status display screen.

The controller shall provide a loss of flow alarm in the event the inlet/outlet temperature difference is within 3 °F (adjustable) during chilled water valve operation.

Modulating CW Control Valves

2-Way Chilled Water Control Valve (CFS-060-360)

A 2-way fully modulating control valve shall be factory installed and wired. The 2-way chilled water modulating valve shall automatically meter the flow of chilled water to the cooling coil in response to a proportional signal (0-10 VDC) provided to the valve by the microprocessor controller. The pressure rating of the valve shall be maximum of 600 psig w.w.p. Manual

override capabilities shall be included on the actuator drive.

2-Way Chilled Water Control Valve (CFD-510-1080)

A quantity of two, 2-way fully modulating control valve shall be factory installed and wired. The 2-way chilled water modulating valve shall automatically meter the flow of chilled water to the cooling coil in response to a proportional signal (0-10 VDC) provided to the valve by the microprocessor controller.

The pressure rating of the valves shall be maximum of 600 psig w.w.p. The system shall include two (2) return and two (2) supply chilled water piping connections. Manual override capabilities shall be included on the actuator drive.

3-Way Chilled Water Control Valve (CFS-060-310) (Optional)

A 3-way modulating control valve shall be factory installed and wired. The 3-way modulating valve shall automatically meter the flow of chilled water to the cooling coil as needed for cooling load control, the remaining flow shall bypass the chilled water coil.

A proportional control signal (0-10 VDC) is provided to the valve by the unit's controller. The pressure rating of the valve shall be maximum of 400 psig w.w.p. Manual override capabilities shall be included on the actuator drive.

Steam Generating Humidifier (Standard)

The humidifier shall be a self-contained atmospheric steam generator. The humidifier assembly shall include an integral fill cup, fill and drain valves, disposable steam cylinder and associated piping. The humidifier shall be equipped with an auto adaptive control system to optimize water conductivity, control automatic drain/flush cycles, minimize energy waste and maximize cylinder life. The humidifier shall have a modulating output between 20% and 100% of rated capacity. The unit shall include draw in water tempering to ensure the drain water do not exceed 140 °F during operation.

Dehumidification Cycle (Standard)

The system shall be provided with a dehumidification control mode. The chilled water valve shall be opened to allow chilled water flow during a dehumidification demand. Moisture is condensed on the cooling coil and discharged through the condensate drain. Reheat (electric, hot water) shall be provided to offset sensible cooling during the dehumidification cycle.

Electric Reheat (Standard)

A factory mounted and wired low-watt density, plated fin tubular design electric resistance heater shall be included to provide automatic sensible re-heating as required during the dehumidification cycle and automatic heating mode.

Electric heaters shall be provided with miniature thermal/magnetic circuit breakers, which shall protect each ungrounded conductor. Also included will be one automatic reset and one manual reset over-temperature safety device (pilot duty).

Hot Water Reheat (Optional)

A factory-installed, copper tube, aluminum fin heat/reheat coil and 2-way control valve shall be provided to control the flow of hot water for automatic sensible reheating mode during the dehumidification cycle and automatic heating mode as required.

SCR Fired Reheat (Optional)

The electric heat/reheat shall be controlled through a “Zero Firing” Silicon Controlled Rectifier (SCR) with an extruded aluminum heat sink and solid-state logic system to provide close dry bulb temperature control.

Electrical System

The electrical system shall conform to National Electrical Code requirements. The control circuit shall be 24 volts AC, wired in accordance with NEC Class II requirements. The control circuit wire shall not be smaller than 18 AWG. All wiring shall be neatly wrapped and routed in bundles. Each wire shall end with a service loop and be securely fastened by an approved method. Each wire in the unit shall be numbered for ease of service tracing.

All electrically actuated components shall be easily accessible from the front of the unit without reaching over exposed high voltage components or rotating parts. Each high voltage circuit shall be individually protected by circuit breakers, manual motor starters on all three phases. Line voltage and 24-volt control circuit wiring shall be routed in separate bundles.

The electric box shall be positioned for service convenience and shall include all the contactors, starters, fuses, circuit breakers, terminal boards and control transformer required for operation of the STULZ unit and shall allow for full service access.

Main Power Service Switch

The unit shall be provided with a unit mounted main power service non-fused disconnect switch.

Remote Start/Stop Contacts

Included in the system's electrical control circuit shall be a 2-pin terminal connection for remote start/stop of the CyberAir CW air conditioner by a remote source.

Automatic Dual Power Transfer Switch (Optional)

Two individual main power input disconnect switches shall be provided, one for each

incoming power source. In the event the primary power fails, or a phase loss/imbalance occurs, the automatic transfer switch immediately transfers power to the secondary power source.

Once the primary power has been restored, the transfer switch automatically shifts the power load back to the primary power. The transfer time from one source to the other is adjustable to allow staging or sequence restart of load.

In addition to the automatic transfer switch, the local controller display shall indicate which power source has failed. This indication is a visual depiction that allows the user to determine the status of the input source. This status shall be conveyed through the BMS serial communications link. A through-the-door indicator light shall be included for a fast and local notification of available power sources

Airflow Control

EC Fan Speed Control

The system shall include a variable fan speed control package. The unit's controller shall permit control of the fan speed from 100% rated air volumetric flow rate to a user defined minimum fan speed setting. Minimum and maximum fan speed settings shall be user adjustable. User configured control sequences shall be available for fan speed energy savings control.

Fail Safe Mode

In the event of a fan failure, the controller shall automatically enable all remaining EC fans to increase to the maximum fan speed setting.

E2 Series Controller

General

The advanced microprocessor-based E² Series controller shall be equipped with flexible software capable of meeting the specific needs of the application. The setpoints shall be default and their ranges shall be easily viewed and adjusted from the user interface display. The program and operating parameters shall be permanently stored on a non-volatile system in the event of power failure.

The controller shall be designed to manage temperature and relative humidity (RH) levels to a user defined setpoint via control output signals to the CW system. Control parameters have variable outputs from 0 to 100% of the full rated capacity.

The controller shall receive inputs for measurable control conditions (temperature, relative humidity, and dew point) via return air or room mounted sensors. The internal logic will then determine if the conditions require cooling, humidification or dehumidification. Control

setpoints shall be established to maintain design conditions of the installation. The controller will respond accordingly to changes in these conditions and control the output/demand for the appropriate mode of operation until user defined conditions are achieved.

Field Configurable

The program for the E² Series controller shall be field configurable, allowing the operator the capability of selecting control setpoints specific to the application. Operator interface for the E² controller is provided via a door mounted user interface display panel.

The display panel shall have a backlit LCD graphical display and function keys giving the user complete control and monitoring capability of the precision cooling system. The menu driven interface shall provide users the ability to scroll through and enter various menu screens.

Password Protection

Access to the Info Menu, Alarms Log, and the ability to monitor room conditions shall be allowed without the use of a password. Modifications to the control setpoints shall require the use of a password. The controller shall be programmed to recognize predetermined security levels before allowing access to display screens containing critical variables.

Three secured menu levels (Control, Service, and Factory) will support unique passwords that must be entered to access the menu screens so only authorized personnel may perform modifications to the settings.

Restorable Parameters/Factory Defaults

Upon initial start-up, the CyberAir system shall operate using the setpoints programmed by the factory. The customer may enter new operating parameters in the Control menu and the system will then operate accordingly. The new setpoints may be stored as, "Customer Default setpoints". The primary setpoints entered by the factory remain stored in the controller's memory as, "Factory setpoints".

The setpoints for the system may be re-adjusted in the Control menu at any time. If it becomes necessary, the customer may restore the setpoints back to the Customer Default setpoint values or to the original Factory (primary) setpoint values.

A/C Grouping pLAN Operation (Optional)

Multiple STULZ CyberAir system controllers shall be able to be connected (grouped) to a pLAN local network to enable the communication of data and information from each controller to a central control terminal or Lead controller.

The Lead controller display screen can be used to monitor and adjust group control variables for the individual system controllers. Each E² controller connected to the pLAN network shall be identified with its own unique address.

Multiple STULZ CyberAir systems consisting of up to eight floor-mounted air conditioners equipped with like controllers may be controlled and monitored via the E² series controller. With multiple STULZ CyberAir systems, each unit can be selectively configured as “Active” to operate as a primary A/C, “Capacity Assist” for staged operation, or as “Standby” to come online in case of a failed air conditioning unit to ensure continuous availability.

The controller may also be configured to rotate units with timed duty cycling to promote equal run- time and assure that each STULZ CyberAir system within the rotating group is operationally exercised on a periodic timed basis.

Remote BMS Communications (Optional)

The E² series controller shall incorporate a communication interface port that can be field connected to a Building Management System via Modbus RTU, BACnet MS/TP, SNMP, HTTP, or BACnet over ETHERNET/IP as configured by the factory. A controller interfaced to a network must be configured for BMS communication.

Alarms

Alarm conditions shall activate a red LED indicator that backlights the alarm function key. As an option, an alarm condition may also be enunciated by an audible alarm signal. An alarm is acknowledged by pressing the alarm key.

This calls up alarm display screens that provides a text message detailing the alarm conditions. After an alarm condition is corrected, the alarm can be cleared by pressing the alarm key.

Large Bezel Display Panel — Touch Screen

The large bezel touch screen user interface display panel features a high-resolution backlit liquid-crystal graphical display equipped with contrast adjustment and LED illuminated function keys. The screens that appear on the user interface display panel present data that is from the controller.

The controller offers an alarm log plus four different interface menu levels to the operator: Information, Control, Service, and Factory. These menus permit the user to easily view, control, and configure operating parameters for the STULZ CyberAir system.

E² Constant Contact

The control package shall include a STULZ Constant Contact short term power supply for the E² Series Controller to allow the controller to manage the power transfer switch from one primary power source to another while maintaining communications with an active monitoring system. The E² Constant Contact shall permit a minimum of one-minute ride thru period.

Timer Feature

The timer shall enable set up of an operating schedule to automatically scale back or shut down the air conditioner during low demand or unoccupied periods. This is an energy saving feature that offers the ability to create an operating schedule tailored to the needs of the building.

An evening (night-setback) schedule may also be created to enable the CW system to operate at night with relaxed temperature/humidity setpoints and offsets.

Optional Features

STULZ CyberAir floor-mounted air conditioning system standard features can be deleted and/or substituted with optional features to allow you the flexibility to select the configuration best suited for your application.

Adjustable Floor Stand

An adjustable floor stand shall be provided to enable ease of installation of the STULZ CyberAir floor-mounted air conditioning system onto a raised floor environment. Floor stand height shall be adjustable and ship separately for field installation.

Seismic Rated Floor Stand

The unit floor stand shall be constructed and rated for use to the install site seismic performance requirements.

Enclosed Floor Stand

A factory provided enclosed floor stand shall be factory constructed full cabinet length and pre-fabricated within the support structure for one-way front air discharge.

Condensate Pump

A condensate pump shall be factory installed within the STULZ CyberAir floor-mounted air conditioning system for automatic removal of condensate and humidifier flush water (if applicable). The condensate pump shall include an internal overflow safety float which, when wired to the remote start/stop terminals, shall open the unit's control circuit, thereby shutting the unit down in the event of a condensate overflow.

The condensate pump shall be specifically designed to operate with the higher condensate temperatures caused by the flush and drain cycle of the electrode canister humidifiers.

Smoke Detection

A photo-electric smoke detector shall be factory installed and wired in the return air section of the STULZ CyberAir floor-mounted air conditioning system. The photo-electric detector shall

include built-in circuitry that performs a functional test of all detection circuits at least once every 40 seconds without the need for generating smoke. The UL-listed velocity range shall be 0-3000 fpm. The air conditioner will shut down upon sensing smoke in the return air stream.

Firestat

The STULZ CyberAir floor-mounted air conditioning system shall be provided with a factory wired and mounted firestat. The firestat will shut down the air conditioner upon sensing a high return air temperature.

Supply Air Control

The STULZ CyberAir floor-mounted air conditioning system controller shall be provided with a temperature and humidity sensor factory unit mounted in the return air stream and a field installed supply air temperature and humidity sensor for supply air control capabilities. The controller shall provide the user an adjustable supply air control setpoint.

Under Floor Pressure Control

The STULZ CyberAir floor-mounted air conditioning system shall permit variable fan speed control to a user defined external static pressure setting. A remote differential pressure transducer shall be provided to determine the static pressure, and the system controller shall modulate fan speed to maintain an external static pressure setpoint.

Remote Water Detector— Spot Type

A remote single-point water/leak detector shall be factory supplied and shall ship separately for field installation. Upon sensing a water leak, the normally closed water detector control circuit shall open, thereby shutting down the STULZ CyberAir floor-mounted air conditioning unit's water producing components.

Remote Water Detector— Dual Spot Type

A dual remote single point water/leak detector shall be factory supplied and shall ship separately for field installation. Upon sensing a water leak, the normally closed water detector control circuit shall open, thereby shutting down the STULZ CyberAir floor-mounted air conditioning unit's water producing components.

Remote Water Detector— Strip Type

A 20 ft. remote strip/cable type water/leak detector shall be provided for remote field installation. In addition to the 20 ft. sensing cable, a 24-volt water detector power module shall require field mounting and wiring to the factory provided terminal connection. Upon sensing a water leak, the normally closed water detector control circuit shall open, thereby shutting down the STULZ CyberAir floor-mounted air conditioning unit's water producing components.

Top Discharge Plenum Box

A 2- or 3-way plenum discharge box shall be provided. The plenum box shall include double-deflecting, adjustable grilles. The plenum discharge box shall be selectable for upflow units only.

High Short Circuit Current Rating

The STULZ CyberAir floor-mounted air conditioning system shall be rated for a short circuit current rating for a minimum of 65k AIC. The higher short circuit current rating shall include safe touch fusing upstream of the unit's main power disconnect switch.

Air-Side Economizer Controls

The STULZ CyberAir floor-mounted air conditioning system controller shall be equipped with a unique air-side economizer mode for applications using outdoor air-side economizing.

The STULZ Air-Side economizer control package shall include an outdoor temperature and humidity sensor, remote space return air sensor, and supply air sensor for proper control during economizer operation. Individual discrete analog output signals (0-10 VDC) are available to allow control of the external outdoor air intake damper and exhaust relief provisions.

Control settings shall be included for both temperature and humidity properties of the outdoor air. A damper signal lockout shall be included if the outdoor air conditions reaches user adjustable limits. The economizing damper signal shall allow a minimum output setting for minimum outside air control to meet ventilation requirements.

Code Conformance

The supplied system shall be provided with the following compliance approvals:

CETL US listed to UL 1995 (2011 Ed. 4)

CSA C22.2 No. 236 (2011 Ed. 4)



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