Outdoor Cooling

Air Handler

STULZ CyberHandler

Air Handling Unit

55 - 460 kW
Air handling system designed with proven STULZ cooling technology for conditioning the air in a data center.
(50 and 60 Hz data)

EM Engineering Manual

STULZ®

STULZ

Our Mission

STULZ mission is to be the premier provider of energy efficient temperature and humidity control solutions for mission critical applications.

STULZ is dedicated to providing innovative solutions for critical temperature and humidity control needs. STULZ designs and manufactures specialized, energy efficient, environmental control equipment. STULZ serves a diverse marketplace; our customers represent a variety of industries including telecommunications, information technology, medical, financial, educational, industrial process and government. Our world-class "island" manufacturing processes takes place in a modern, 150,000 ft^2 facility located in Frederick, MD USA. STULZ combines a global network of sales and service companies with an extensive factory engineering staff and highly flexible manufacturing resources dedicated to providing world-class quality, innovation and customer service.

This commitment to excellence, along with a standard two year warranty, fast lead times, and outstanding customer service, make STULZ the perfect choice for all your environmental control needs.

ISO-9001 Quality Registered

STULZ is committed to satisfying customer expectations by meeting and exceeding requirements. Our Quality Policy ensures that every Employee is committed to Customer Satisfaction, Teamwork and utilizing Continuous Process Improvement methods in order to deliver an exceptional product. We will continually measure our performance to improve the effectiveness of our quality management system.

STULZ CyberHandler

The STULZ CyberHandler air handling system is designed with proven STULZ cooling technology for conditioning the air in a data center. The STULZ CyberHandler offers a centralized cooling solution designed specifically to free up white space in the data center.

Typical applications include:

- Internet/Web Hosting
- Telecommunications
- Financial/Banking
- Insurance
- Airlines/Mass Transit
- Legal Services
- Entertainment
- Government
- Colleges/Universities
- Data Centers
- Computer/LAN Rooms
- Telecommunications Rooms
- Co-location Centers
- ISP (Internet Service Providers)
- ASP (Applications Service Providers)

STULZ

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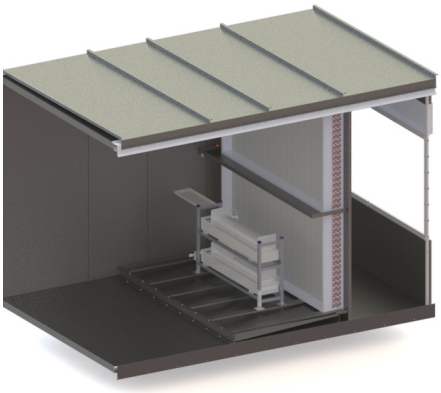
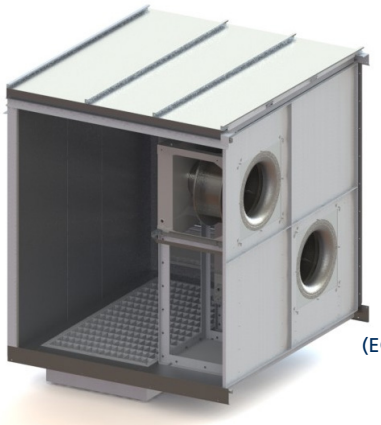
Configure Pre-Engineered Modules to make your unique STULZ CyberHandler System



Cooling Section with Optional Ultrasonic Humidification

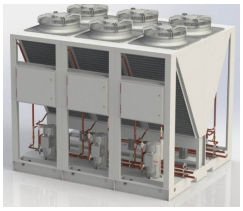
(Optional evaporative media pad for direct adiabatic cooling is available)



(EC Fan Array showing six out of nine possible fans)

EC Fan Array Section

(For Supply or Exhaust Air)



(additional modules can be added to increase capacity)

DX Condensing Section

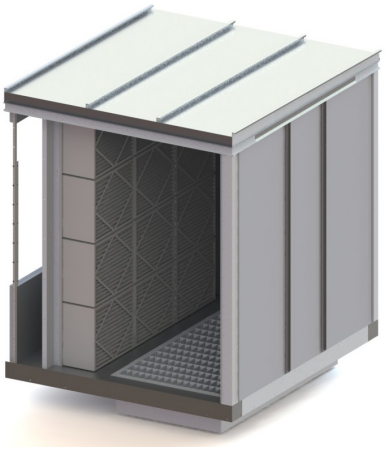
(Heat Rejection - Integral or remote options available see STULZ CyberHandler Heat Rejection Engineering Manual)

Air-Side Economizer Section

(With Modulating Dampers)

Indirect Adiabatic Section

(No Mixing of Outside Air or Water with Return or Supply Air)



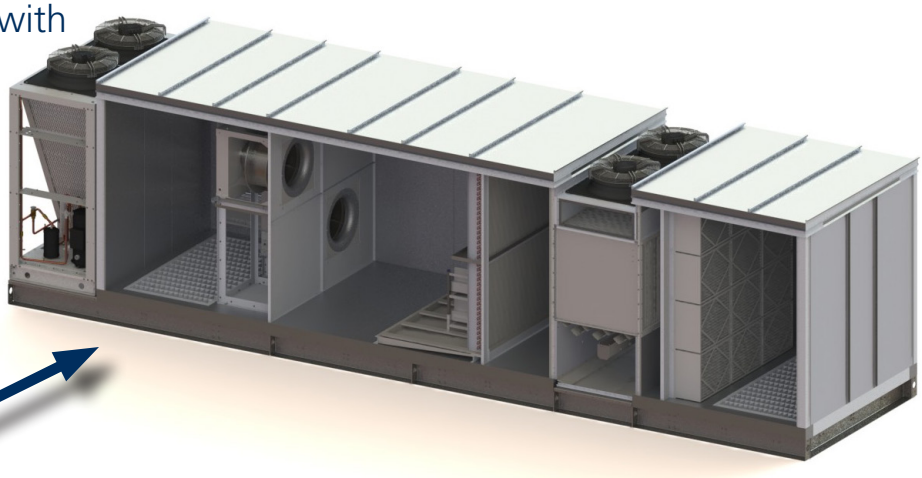
Return Air Filter Section

(Hot Air Return from the Data Center Variety of Filter Selections are Available for Custom Applications)

Data center owners choose STULZ CyberHandler; the variety of methods for cooling and heat rejection mean more choices for energy efficient cooling solutions in their high-perfomance data centers.

Example of a STULZ CyberHandler featuring

- Indirect Cooling (Air-to-Air) with
- Adiabatic Cooing Option
- Ultrasonic Humidification



...with fully integrated controls

Features

- ***Customizable to every application***
- High efficiency variable speed EC Fan array
- Thermally and acoustically insulated construction
- Corrosion resistant cabinet and base
- Indoor or outdoor use
- Sloped roof for water runoff
- Hinged doors for easy maintenance access
- Universal filter racks
- Air and water-side economizer available
- Low pressure drop direct adiabatic option
- Integrated ***E²*** series controller
- Seamless integration with BMS platforms
- DCIM ready

Most models shipped as a factory assembled package.
No piping in the field required; piped, charged, and tested at the factory.

STULZ

CyberHandler Air Handling Unit

CyberHandler air handling systems provide energy efficient cooling solutions based on any of three cooling categories (free cooling, direct expansion or chilled water), either alone or in combination.

Free cooling systems (model ASM - _ _ _ - F) utilize an air-side economizer and/or adiabatic cooler as the primary source for cooling.

Chilled water systems (model ASM - _ _ _ - C) utilize multiple chilled water coils, fed by any remote source of chilled water (cooling tower, building chiller, etc.), as the primary source for cooling.

Direct expansion refrigerant systems (model ASM- _ _ _ - D) utilize multiple independent refrigerant circuits and a multistage remote condensing unit (air, water or glycol cooled) as the primary source for cooling.

A STULZ ***E²*** Series controller stages refrigerant circuits and/or control valves, dampers and fans, as needed, to precisely control temperature and humidity. If the CyberHandler system is configured with multiple cooling modes, the STULZ ***E²*** Series controller determines what ratio of cooling modes will achieve the required cooling/dehumidification with the lowest energy usage.

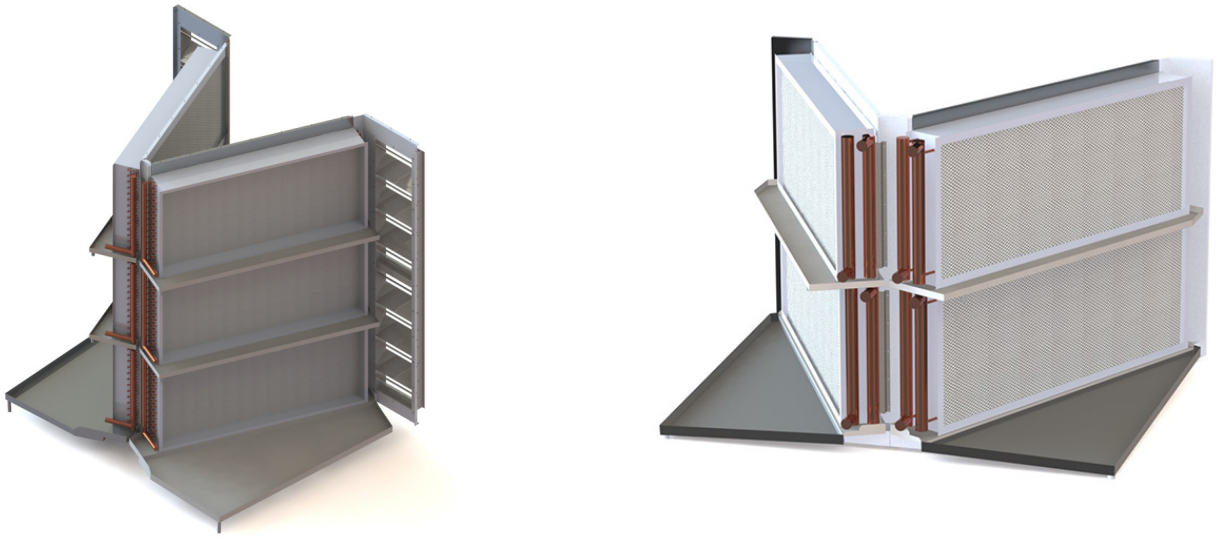
MODEL NOMENCLATURE

ASM - _ _ _ - _

Modular Air Handling System

Cabinet Size
028 = Small
041 = Medium
061 = Large
Custom Sizes Available

Primary Cooling Method
C = Chilled Water
D = Direct Expansion
F = Free Cooling

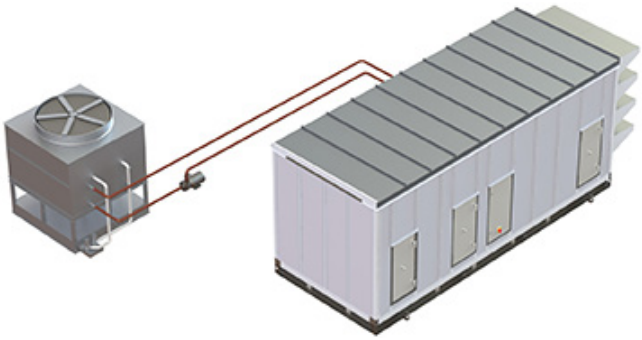


Coil arrangement showing four chilled water coils in a V orientation, with (left) and without (right) optional bypass dampers.

Free Cooling (F)
(Models ASM -_ _ _- F)

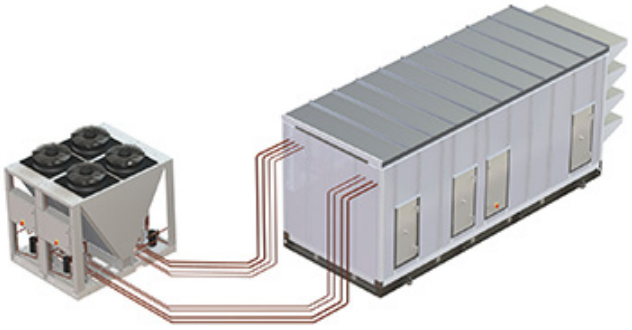
Primary cooling shall come from a green alternative, such as an air-side economizer or adiabatic cooler. The system shall be a self-contained air handling unit (model ASM). For air-side economizer, the ASM -_ _ _ - F shall house, as a minimum, the outside air damper, damper actuator, weather hood, air filters, and supply air fans. For adiabatic cooling, the ASM -_ _ _ - F shall house, as a minimum, the water atomizing system, air filters, and supply air fans. All controls and control components shall be included. Exhaust fans and damper are optional.

Chilled Water (CW) Cooling
(Models ASM -_ _ _ - C)



The primary cooling method shall be based on chilled water coils fed by an external source of chilled water. Chilled water shall be supplied by a building chiller, cooling tower, or any other remote chilled water source, and shall allow ethylene or propylene glycol mixtures. At least two independent cooling circuits shall be provided to allow for efficient dehumidification when needed. The system shall be a self-contained air handling unit (model ASM) and shall house, as a minimum, the chilled water coils, chilled water control valves, air filters and supply air fans. All controls and control components shall be included.

Direct Expansion (DX) Cooling
(Models ASM - _ _ _ - D)



The primary cooling method shall be based on multiple independent refrigerant circuits. Cooling capacity and dehumidification shall be economically controlled by staging the refrigerant circuits. The system shall include an air handling unit (model ASM) and condensing unit (model RCU). The ASM -_ _ _ - D shall house, as a minimum, the DX evaporator coils, air filters and supply air fans. The RCU shall be optionally located remotely from the ASM or mounted next to the ASM on a common skid. All controls and control components shall be included. For more information, please refer to the current RCU manual.

CyberHandler ASM-028-_	Imperial			SI		
	C	D	F	C	D	F
Blower/Motor - Backward Inclined, Plenum Style Fan, with an EC Motor						
Rated Airflow @ .5" w.g. / 125 Pa ESP	15,000 CFM	12,000 CFM	12,000 CFM	25,485 m³/h	20,388 m³/h	20,388 m³/h
Fan Qty. at Rated Airflow [1]	3	2	2	3	2	2
Maximum Fan Qty. [1]	4	4	4	4	4	4
Power per Fan	4.2 Hp			3.1 kW		
Evaporator Coil - Aluminum Fin, Copper Tube						
Max. Cooling Coil Qty.	2	2	N/A	2	2	N/A
Max. DX Circuits	N/A	2	N/A	N/A	2	N/A
Coil Rows	3	4	N/A	3	4	N/A
Total Coil Face Area	28.5 ft²	23.3 ft²	N/A	2.7 m²	2.2 m²	N/A
Connection Sizes - OD Copper Sweat (unless otherwise specified)						
Water In, (Qty) [2]	1-5/8" (2)	N/A	N/A	41 mm (2)	N/A	N/A
Water Out, (Qty) [2]	1-5/8" (2)	N/A	N/A	41 mm (2)	N/A	N/A
Condensate Drains [3]	1" MPT[4]			1" MPT[4]		
Liquid line, (Qty) [2]	N/A	7/8" (2)	N/A	N/A	22 mm (2)	N/A
Suction line, (Qty) [2]	N/A	1-3/8" (2)	N/A	N/A	35 mm (2)	N/A
Filters - Standard 4" deep, 30% Dust Spot efficient, pleated, disposable						
Filter Sizes, (Qty)	20" x 20" (9) (nominal)			495 mm x 495 mm (9)		
Total Filter Face Area	25.0 ft²			2.3 m²		
Physical Data						
Approx. Weight	5,570 lbs	5,400 lbs	5,200 lbs	2,526 kg	2,449 kg	2358 kg
Approx. Dimensions, H x D x L [5]	81" x 71" x 247"			2,057 mm x 1,803 mm x 6,274 mm		

[1] **Note:** Fan quantity shown represents minimum quantity required at rated airflow and External Static Pressure (ESP). Up to the maximum allotted fan quantity can be installed for more efficient operation.
[2] **Note:** Piping connections are located inside cabinet.
[3] **Note:** Quantity of condensate drains shown represent a standard system without a secondary cooling option. With the exception of the air-side economizer, one condensate drain connection shall be provided per cooling option.
[4] **Note:** MPT = Male National Pipe Thread, metric adapters available.
[5] **Note:** Height dimension accounts for pitched/sloped roof.

DX COOLING CAPACITY[1]

ASM-028-D	60 Hz		50 Hz	
	BTU/H	kW	BTU/H	kW
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	421,400	123.5	444,000	130.1
Net Sensible	421,400	123.5	444,000	130.1
Total Heat of Rejection	551,800	161.7	579,300	169.7
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	379,300	111.1	400,700	117.4
Net Sensible	379,300	111.1	400,700	117.4
Total Heat of Rejection	508,300	148.9	535,200	156.8
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	359,500	105.3	306,600	89.8
Net Sensible	344,800	101.0	298,300	87.4
Total Heat of Rejection	487,900	143.0	415,000	121.6

[1] **Note:** Capacity data is optimized around high return air temperatures. Please contact STULZ for performance data at specific conditions.

CHILLED WATER COOLING CAPACITY[1]

ASM-028-C		Gross Capacity		Net Total/Sensible Capacity		Total Flow Rate		Total Pressure Drop	
EWT	ΔT	BTU/H	kW	BTU/H	kW	GPM	l/s	ft. H_2O	kPa
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45˚F (7.2°C)	10˚F (5.6°C)	537,100	157.4	505,400	148.1	107.3	6.3	34	101.6
	12˚F (6.7°C)	517,700	151.7	486,000	142.4	86.2	5.4	22	65.8
	14˚F (7.8°C)	498,600	146.1	466,800	136.8	71.2	4.5	24	71.7
50˚F (10°C)	10˚F (5.6°C)	486,300	142.5	454,600	133.2	97.2	6.1	28	83.7
	12˚F (6.7°C)	467,500	137.0	435,700	127.7	77.9	4.9	18	53.8
	14˚F (7.8°C)	448,400	131.4	416,600	122.1	64.0	4.0	19	56.8
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45˚F (7.2°C)	10˚F (5.6°C)	430,800	126.2	399,000	116.9	86.1	5.4	22	65.8
	12˚F (6.7°C)	411,500	120.6	379,700	111.3	68.5	4.3	22	65.8
	14˚F (7.8°C)	391,200	114.6	359,500	105.3	55.8	3.5	15	56.8
50˚F (10°C)	10˚F (5.6°C)	380,000	111.3	348,300	102.1	75.9	4.8	18	53.8
	12˚F (6.7°C)	360,900	105.7	329,200	96.5	60.1	3.8	17	50.8
	14˚F (7.8°C)	341,700	100.1	310,000	90.8	48.8	3.1	12	35.9
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45˚F (7.2°C)	10˚F (5.6°C)	324,400	95.0	292,600	85.7	64.8	4.1	20	59.8
	12˚F (6.7°C)	301,000	88.2	269,200	78.9	50.1	3.2	12	35.9
	14˚F (7.8°C)	275,000	80.6	243,300	71.3	39.3	2.5	16	47.8
50˚F (10°C)	10˚F (5.6°C)	273,500	80.1	241,800	70.8	54.7	3.5	14	41.8
	12˚F (6.7°C)	249,400	73.1	217,600	63.8	41.5	2.6	9	26.9
	14˚F (7.8°C)	223,200	65.4	191,500	56.1	31.9	2.0	11	56.8

[1] **Note:** Capacity data is based on standard units with standard options, operating at a maximum rated airflow.
[2] **Note:** Total heat of rejection at 95°F (35°C) ambient, sea level.

CyberHandler ASM-041-_	Imperial			SI		
	C	D	F	C	D	F
Blower/Motor - Backward Inclined, Plenum Style Fan, with an EC Motor						
Rated Airflow @ .5" w.g. / 125 Pa ESP	26,000 CFM	22,000 CFM	22,000 CFM	44,174 m³/h	37,378 m³/h	37,378 m³/h
Fan Qty. at Rated Airflow [1]	5	4	4	5	4	4
Maximum Fan Qty. [1]	6	6	6	6	6	6
Power per Fan	4.2			3.1 kW		
Evaporator Coil - Aluminum Fin, Copper Tube						
Max. Cooling Coil Qty.	4	4	N/A	4	4	N/A
Max. DX Circuits	N/A	4	N/A	N/A	4	N/A
Coil Rows	3	4	N/A	3	4	N/A
Total Coil Face Area	57.0 ft²	46.7 ft²	N/A	5.3 m²	4.3 m²	N/A
Connection Sizes - OD Copper Sweat (unless otherwise specified)						
Water In, (Qty) [2]	2-1/8" (2)	N/A	N/A	54 mm (2)	N/A	N/A
Water Out, (Qty) [2]	2-1/8" (2)	N/A	N/A	54 mm (2)	N/A	N/A
Condensate Drains [3]	1" MPT[4]			1" MPT[4]		
Liquid line, (Qty) [2]	N/A	7/8" (4)	N/A	N/A	22 mm (4)	N/A
Suction line, (Qty) [2]	N/A	1-3/8" (4)	N/A	N/A	35 mm (4)	N/A
Filters - Standard 4" deep, 30% Dust Spot efficient, pleated, disposable						
Filter Sizes, (Qty)	24" x 20" (9) (nominal) 20" x 20" (3) (nominal)			597 mm x 495 mm (9) 495 mm x 495 mm (3)		
Total Filter Face Area	38.3 ft²			3.6 m²		
Physical Data						
Approx. Weight	7,450 lbs	7,100 lbs	6,800 lbs	3,379 kg	3,220 kg	3,084 kg
Approx. Dimensions, H x D x L [5]	81" x 102" x 247"			2,057 mm x 2,591 mm x 6,274 mm		

[1] **Note:** Fan quantity shown represents minimum quantity required at rated airflow and External Static Pressure (ESP). Up to the maximum allotted fan quantity can be installed for more efficient operation.
[2] **Note:** Piping connections are located inside cabinet.
[3] **Note:** Quantity of condensate drains shown represent a standard system without a secondary cooling option. With the exception of the air-side economizer, one condensate drain connection shall be provided per cooling option.
[4] **Note:** MPT = Male National Pipe Thread, metric adapters available.
[5] **Note:** Height dimension accounts for pitched/sloped roof.

DX COOLING CAPACITY[1]

ASM-041-D	60 Hz		50 Hz	
	BTU/H	kW	BTU/H	kW
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	815,300	238.9	857,300	251.2
Net Sensible	815,300	238.9	857,300	251.2
Total Heat of Rejection	1,075,100	315.0	1,127,200	330.3
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	738,400	216.3	793,600	232.5
Net Sensible	738,400	216.3	788,500	231.0
Total Heat of Rejection	995,600	291.7	1,062,400	311.3
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	709,000	207.7	615,200	180.3
Net Sensible	605,600	177.4	609,000	178.4
Total Heat of Rejection	965,300	282.8	831,800	243.7

[1] **Note:** Capacity data is optimized around high return air temperatures. Please contact STULZ for performance data at specific conditions.

CHILLED WATER COOLING CAPACITY[1]

ASM-041-C		Gross Capacity		Net Total/Sensible Capacity		Total Flow Rate		Total Pressure Drop	
EWT	ΔT	BTU/H	kW	BTU/H	kW	GPM	l/s	ft. H_2O	kPa
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	993,300	291.0	940,400	275.5	198.5	12.5	32	95.6
	12°F (6.7°C)	958,000	280.7	905,100	265.2	159.5	10.1	21	62.8
	14°F (7.8°C)	923,400	270.6	870,500	255.1	131.8	8.3	20	59.8
50°F (10°C)	10°F (5.6°C)	899,500	263.6	846,600	248.1	179.8	11.3	26	77.7
	12°F (6.7°C)	865,200	253.5	812,300	238.0	144.1	9.1	17	50.8
	14°F (7.8°C)	831,000	243.5	778,100	228.0	118.6	7.5	16	47.8
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	797,100	233.5	744,200	218.0	159.3	10.1	21	62.8
	12°F (6.7°C)	761,800	223.2	708,900	207.7	126.9	8.0	19	56.8
	14°F (7.8°C)	721,000	211.3	668,100	195.8	102.9	6.5	18	53.8
50°F (10°C)	10°F (5.6°C)	703,600	206.2	650,700	190.7	140.6	8.9	16	47.8
	12°F (6.7°C)	669,000	196.0	616,100	180.5	111.4	7.0	14	41.8
	14°F (7.8°C)	629,100	184.3	576,200	168.8	89.8	5.7	14	41.8
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	600,200	175.9	547,300	160.4	119.9	7.6	17	50.8
	12°F (6.7°C)	554,600	162.5	501,700	147.0	92.4	5.8	15	44.8
	14°F (7.8°C)	506,400	148.4	453,500	132.9	72.3	4.6	15	44.8
50°F (10°C)	10°F (5.6°C)	505,600	148.1	452,700	132.6	101.0	6.4	12	35.9
	12°F (6.7°C)	460,100	134.8	407,200	119.3	76.6	4.8	10	29.9
	14°F (7.8°C)	411,000	120.4	358,100	104.9	58.7	3.7	10	29.9

[1] **Note:** Capacity data is based on standard units with standard options, operating at a maximum rated airflow.
[2] **Note:** Total heat of rejection at 95°F (35°C) ambient, sea level.

CyberHandler ASM-061-_	Imperial			SI		
	C	D	F	C	D	F
Blower/Motor - Backward Inclined, Plenum Style Fan, with an EC Motor						
Rated Airflow @ .5" w.g. / 125 Pa ESP	42,000 CFM	32,000 CFM	32,000 CFM	71,358 m³/h	54,368 m³/h	54,368 m³/h
Fan Qty. at Rated Airflow [1]	7	6	6	7	6	6
Maximum Fan Qty. [1]	9	9	9	9	9	9
Power per Fan	4.2 HP			3.1 kW		
Evaporator Coil - Aluminum Fin, Copper Tube						
Max. Cooling Coil Qty.	4	6	N/A	4	6	N/A
Max. DX Circuits	N/A	6	N/A	N/A	6	N/A
Coil Rows	3	4	N/A	3	4	N/A
Total Coil Face Area	87.0 ft²	70.0 ft²	N/A	8.1 m²	6.5 m²	N/A
Connection Sizes - OD Copper Sweat (unless otherwise specified)						
Water In, (Qty) [2]	2-5/8" (2)	N/A	N/A	67 mm (2)	N/A	N/A
Water Out, (Qty) [2]	2-5/8" (2)	N/A	N/A	67 mm (2)	N/A	N/A
Condensate Drains [3]	1" MPT[4]			1" MPT[4]		
Liquid line, (Qty) [2]	N/A	7/8" (6)	N/A	N/A	22 mm (6)	N/A
Suction line, (Qty) [2]	N/A	1-3/8" (6)	N/A	N/A	35 mm (6)	N/A
Filters - Standard 4" deep, 30% Dust Spot efficient, pleated, disposable						
Filter Sizes, (Qty)	24" x 24" (9) (nominal) 24" x 20" (6) (nominal) 20" x 20" (1) (nominal)			597 mm x 597 mm (9) 597 mm x 495 mm (6) 495 mm x 495 mm (1)		
Total Filter Face Area	58.8 ft²			5.5 m²		
Physical Data						
Approx. Weight	9,100 lbs	8,600 lbs	8,000 lbs	4,127 kg	4,354 kg	3,628 kg
Approx. Dimensions, H x D x L [5]	113" x 102" x 247"			2,870 mm x 2,591 mm x 6,274 mm		

[1] **Note:** Fan quantity shown represents minimum quantity required at rated airflow and External Static Pressure (ESP). Up to the maximum allotted fan quantity can be installed for more efficient operation.
[2] **Note:** Piping connections are located inside cabinet.
[3] **Note:** Quantity of condensate drains shown represent a standard system without a secondary cooling option. With the exception of the air-side economizer, one condensate drain connection shall be provided per cooling option.
[4] **Note:** MPT = Male National Pipe Thread, metric adapters available.
[5] **Note:** Height dimension accounts for pitched/sloped roof.

DX COOLING CAPACITY[1]

ASM-061-D	60 Hz		50 Hz	
	BTU/H	kW	BTU/H	kW
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	1,208,400	354.1	1,269,600	372.0
Net Sensible	1,208,400	354.1	1,269,600	372.0
Total Heat of Rejection	1,597,500	468.1	1,674,100	490.5
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	1,096,700	321.3	1,189,700	348.6
Net Sensible	1,085,100	317.9	1,181,000	346.0
Total Heat of Rejection	1,482,100	434.3	1,592,900	466.7
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition				
Total Net	1,056,200	309.5	918,300	269.1
Net Sensible	862,400	252.7	875,700	256.6
Total Heat of Rejection	1,440,400	422.0	1,243,100	364.2

[1] **Note:** Capacity data is optimized around high return air temperatures. Please contact STULZ for performance data at specific conditions.

CHILLED WATER COOLING CAPACITY[1]

ASM-061-C		Gross Capacity		Net Total/Sensible Capacity		Total Flow Rate		Total Pressure Drop	
EWT	ΔT	BTU/H	kW	BTU/H	kW	GPM	l/s	ft. H²O	kPa
105°FDB/72.8°FWB (40.6°CDB/22.7°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	1,567,400	459.2	1,493,400	437.6	313.2	19.8	30	89.7
	12°F (6.7°C)	1,512,200	443.1	1,438,200	421.4	251.8	15.9	20	59.8
	14°F (7.8°C)	1,457,400	427.0	1,383,300	405.3	208.0	13.1	23	68.7
50°F (10°C)	10°F (5.6°C)	1,419,700	416.0	1,345,600	394.3	283.7	17.9	25	74.7
	12°F (6.7°C)	1,365,300	400.0	1,291,300	378.3	227.4	14.3	16	47.8
	14°F (7.8°C)	1,311,500	384.3	1,237,500	362.6	187.2	11.8	18	53.8
95°FDB/69.9°FWB (35°CDB/21.1°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	1,258,000	368.6	1,183,900	346.9	251.4	15.9	20	59.8
	12°F (6.7°C)	1,202,800	352.4	1,128,800	330.7	200.3	12.6	21	62.8
	14°F (7.8°C)	1,143,100	334.9	1,069,000	313.2	163.2	10.3	17	50.8
50°F (10°C)	10°F (5.6°C)	1,110,100	325.3	1,036,000	303.5	221.8	14.0	16	47.8
	12°F (6.7°C)	1,055,800	309.3	981,700	287.6	175.8	11.1	16	47.8
	14°F (7.8°C)	998,000	292.4	923,900	270.7	142.5	9.0	13	38.9
85°FDB/66.8°FWB (29.4°CDB/19.3°CWB), 57°FDP (13.9°CDP) Return Air Condition									
45°F (7.2°C)	10°F (5.6°C)	948,600	277.9	874,500	256.2	189.6	12.0	19	56.8
	12°F (6.7°C)	877,700	257.2	803,700	235.5	146.2	9.2	15	44.8
	14°F (7.8°C)	805,300	236.0	731,300	214.3	115.0	7.3	13	38.9
50°F (10°C)	10°F (5.6°C)	800,500	234.5	726,500	212.9	160.0	10.1	14	41.8
	12°F (6.7°C)	729,800	213.8	655,800	192.1	121.5	7.7	10	29.9
	14°F (7.8°C)	654,300	191.7	580,300	170.0	93.4	5.9	9	26.9

[1] **Note:** Capacity data is based on standard units with standard options, operating at a maximum rated airflow.
[2] **Note:** Total heat of rejection at 95°F (35°C) ambient, sea level.

ELECTRICAL DATA 60 Hz

CyberHandler MODEL	460/3/60			575/3/60		
	FLA	MCA	MFS	FLA	MCA	MFS
CW-only cooling at max rated CFM						
ASM-028-C	13.2	16.5	20	11.2	14.0	15
ASM-041-C	21.6	27.0	30	18.3	22.9	25
ASM-061-C	30.0	37.5	40	25.5	31.8	35
DX-only cooling at max rated CFM [1]						
ASM-028-D	9.0	11.2	15	7.6	9.5	15
ASM-041-D	17.4	21.7	25	14.8	18.4	20
ASM-061-D	25.8	32.2	35	21.9	27.4	30

ELECTRICAL DATA 50 Hz

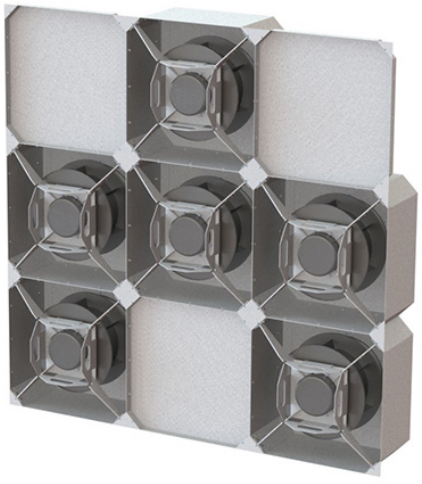
CyberHandler MODEL	400/415/3/50		
	FLA	MCA	MFS
CW-only cooling at max rated CFM			
ASM-028-C	15.4	19.2	20
ASM-041-C	25.2	31.5	35
ASM-061-C	35.0	43.7	45
DX-only cooling at max rated CFM [1]			
ASM-028-D	10.5	13.1	15
ASM-041-D	20.3	25.3	30
ASM-061-D	30.1	37.6	40

[1] **Note:** Associated Remote Condensing Unit (RCU) electrical data can be found under separate cover.

Note: Standard Short Circuit Rating is 1kA RMS Symmetrical. Optional 65 kA RMS symmetrical available.

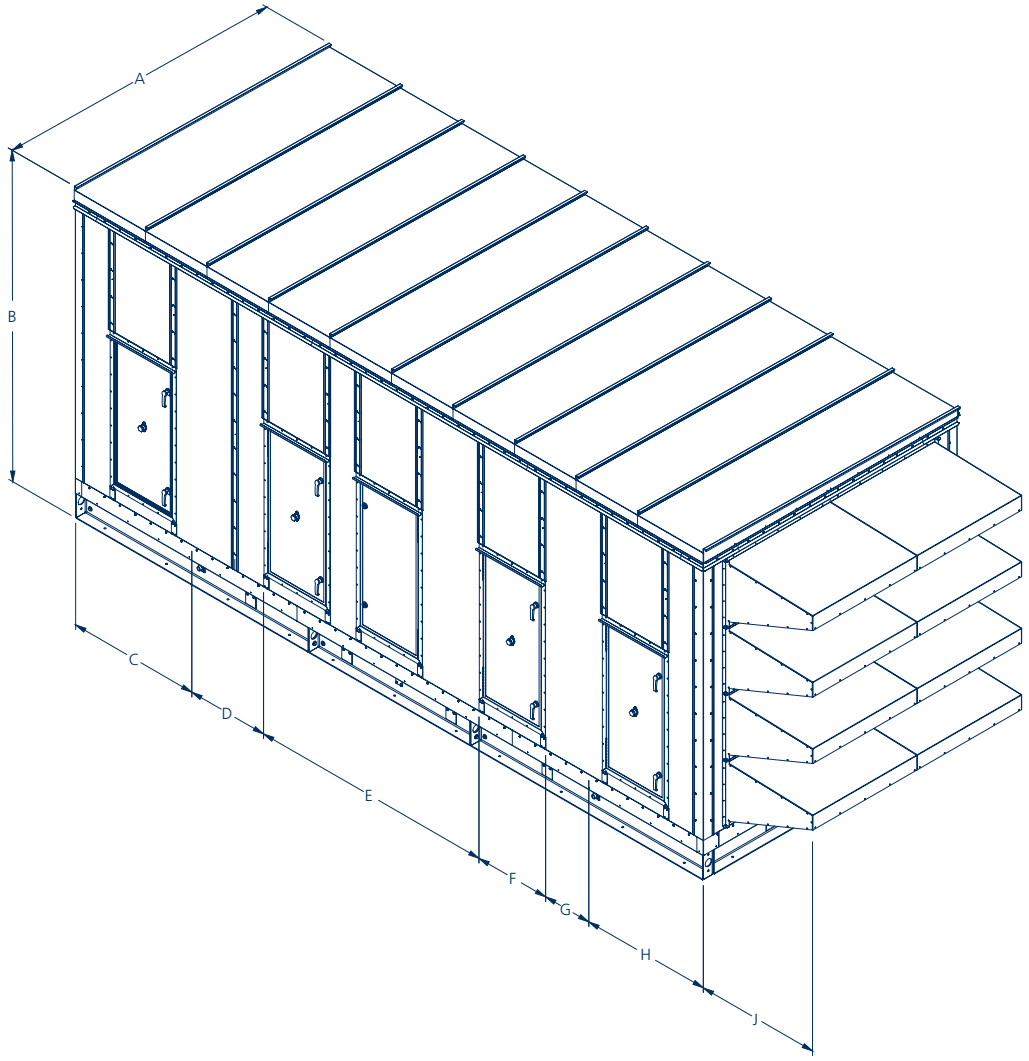
Note: Electrical data represents standard units with standard options.

Note: For information on adiabatic cooling, please contact STULZ Application Engineering.

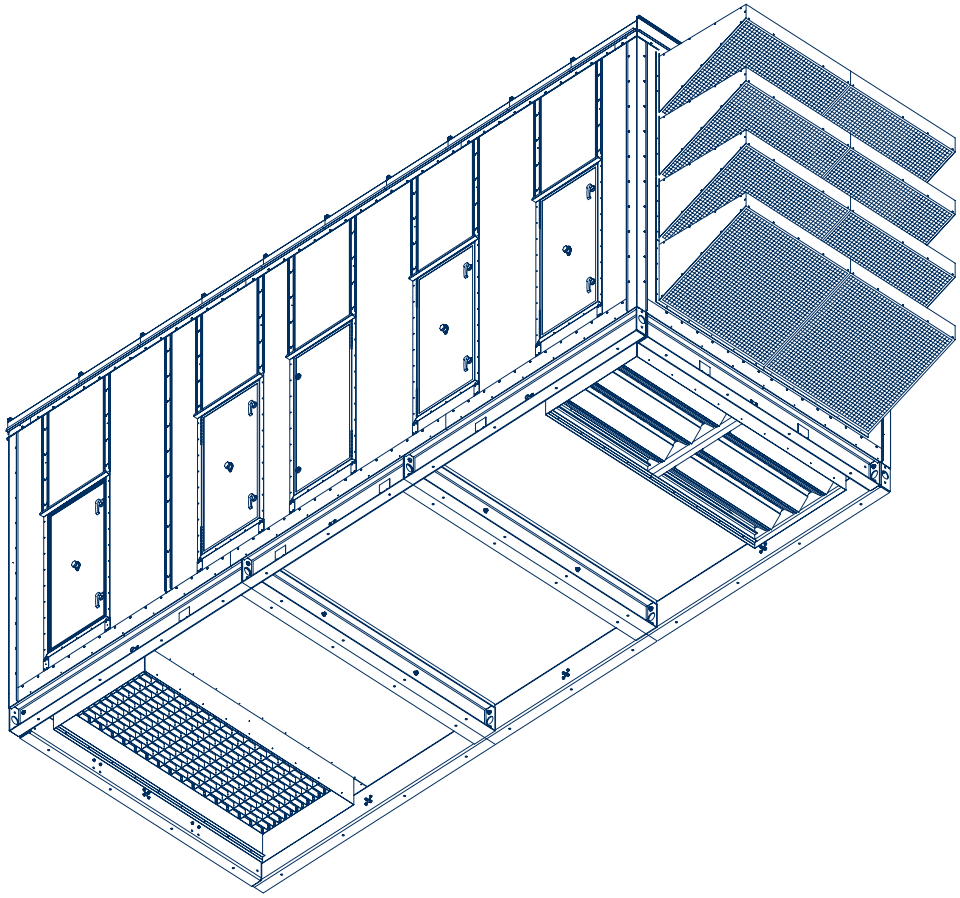


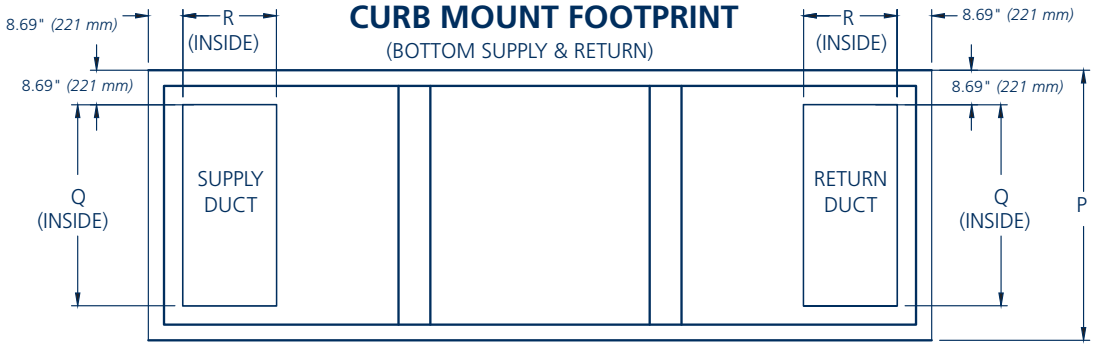
EC Fan array, showing six out of nine potential fans. Typical for ASM-061-D.

Optional three-module remote condensing unit (model RCU-345-A6). Typically used with air handling unit ASM-061-D. For more information, please refer to the current STULZ RCU manual.



DIMENSIONAL DATA							
Section/Module	Dimension Letter	ASM-028		ASM-041		ASM-061	
Overall Unit Depth	A	70.8"	1,798 mm	101.8"	2,586 mm	101.8"	2,586 mm
Overall Unit Height	B	81.1"	2,060 mm	81.1"	2,060 mm	112.1"	2,847 mm
Bottom/Rear Discharge	C	50.5"	1,283 mm	50.5"	1,283 mm	50.5"	1,283 mm
Supply Air Fans	D	24.0"	610 mm	24.0"	610 mm	24.0"	610 mm
DX Cooling	E	96.0"	2,438 mm	96.0"	2,438 mm	96.0"	2,438 mm
CW Cooling	E	96.0"	2,438 mm	96.0"	2,438 mm	96.0"	2,438 mm
Direct Adiabatic Cooling	F	48.0"	1,219 mm	48.0"	1,219 mm	48.0"	1,219 mm
Air Filters	G	24.0"	610 mm	24.0"	610 mm	24.0"	610 mm
Bottom/Rear Return	H	50.5"	1,283 mm	50.5"	1,283 mm	50.5"	1,283 mm
Airside Economizer Hood	J	36.0"	914 mm	36.0"	914 mm	36.0"	914 mm





DIMENSIONAL DATA							
Description	Dimension Letter	ASM-028		ASM-041		ASM-061	
Skid Depth	P	67.9"	1,725 mm	98.9"	2,512 mm	98.9"	2,512 mm
Duct Depth	Q	50.5"	1,283 mm	81.5"	2,070 mm	81.5"	2,070 mm
Duct Width	R	23.5"	597 mm	23.5"	597 mm	35.5"	902 mm

STULZ CyberHandler 55 - 460 kW Precision Environmental Control System

SUMMARY

This specification describes requirements for a high efficiency, precision environmental control system. The STULZ CyberHandler is designed to provide efficient, continuous and precise temperature and humidity control 24 hours a day, 365 days a year. CyberHandler systems are intended as centralized cooling solutions that are located outside the conditioned space, freeing up valuable floor space and facilitating free cooling options such as an air-side, or water-side, economizer. CyberHandler systems are fabricated using corrosion resistant materials and coatings to ensure durability and sustain all functions for the life of the system. The supplied system will be provided with ETL certification. The CyberHandler model number will be ASM- _ _ _ -_.

DESIGN REQUIREMENTS

The environmental control system shall be a STULZ CyberHandler factory engineered and fabricated Air Handling Unit (AHU). The AHU shall be factory assembled, functionally tested, and shipped complete (unless shipping splits are required). The system shall be designed for indoor or outdoor installation and year-round service. The AHU shall meet the performance as indicated in the submittal data.

QUALITY ASSURANCE

The manufacturer shall maintain a set of international standards of quality management to insure product quality. Prior to shipment, each system shall be subject to complete operational and functional testing based on predefined procedures. The AHU manufacturer shall be ISO 9001 certified. The AHU manufacturer shall have a minimum of 20 years of experience in the design and fabrication of similar equipment.

CODE CONFORMANCE

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

CABINET

The AHU cabinet shall be constructed of 2-1/2" (60 mm) thick double-wall panels insulated with foam to provide a minimum R value of 15. Interior and exterior panel skins shall be aluminum with a minimum thickness of 0.040" (1 mm). A true thermal break shall be employed to prevent through-metal contact between interior and exterior aluminum skins. Panels shall be sealed to be airtight and watertight. The AHU roof shall be sloped to promote water run-off. The AHU cabinet exterior shall be aluminum with a weather and UV resistant coating.

The cabinet panels shall comply with UL 1995 and NFPA 90A. Foam insulation in the cabinet panels shall have a UL rating of UL 94 HF-1. Foam insulation shall be completely encapsulated; exposure of the foam insulation to the airstream shall not be permitted.

Cabinet panels shall be manufactured in an environmentally responsible manner. Blowing agents used in the foam injection process shall be non-ozone depleting and have a global warming potential less than 1.

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).

ACCESS DOORS

Hinged access doors shall be provided on the front of the AHU to allow access to major components. Doors shall be capable of opening a minimum of 90 degrees without interference.

Access doors shall be constructed of double-walled aluminum with foam insulation. A true thermal break shall be employed to prevent through-metal contact between interior and exterior aluminum skins. The access doors shall comply with UL 1995 and NFPA 90A. Foam insulation in the access doors shall have a UL rating of UL 94 HF-1. Foam insulation shall be completely encapsulated; exposure of the foam insulation to the airstream shall not be permitted. Access doors shall be finished with the same exterior coating as the cabinet.

Access doors shall be manufactured in an environmentally responsible manner. Blowing agents used in the foam injection process shall be non-ozone depleting and have a global warming potential less than 1.

Doors shall open opposite interior cabinet pressure; outswing doors shall be used for negative pressure sections. Inswing doors will be used for positive pressure sections.

Door latches shall have a minimum of two latching points and be operable from inside or outside of the cabinet. Hinges shall be made of stainless steel.

BASE

The AHU shall be constructed on a steel base adequate to support the full operating weight of the unit and allow for rigging, transportation and handling at the job site, as well as leveling at installation. The unit base shall be hot-dipped galvanized, after forming/welding, for improved corrosion resistance. Steel material that is galvanized prior to punching and/or welding shall not be accepted.

Lifting points shall be provided to assist in loading and placing the AHU at the job site.

AIRFLOW PATTERNS

The AHU shall accommodate various airflow patterns. Bottom supply and return duct connections shall be available for curb mounting applications. Optional end and/or rear duct connections shall be available for supply, return, economizer, or make up air, as needed.

AIR FILTRATION

All units shall be supplied with disposable air filters classified as UL 900 or UL 586. Filters shall be 4" (100mm) deep pleated with a dust spot efficiency of 30% or higher.. Filters shall be installed in a front access, galvanized steel holding frame, and accessible through a hinged door. Filter frames shall be sealed with a gasket to prevent air from bypassing the filters. Fasteners shall hold each filter securely in place.

Optional: Filters up to 12" (310 mm) deep, rated up to MERV 14, shall be available.

MECHANICAL COMPONENTS

SUPPLY FANS

Supply air fans shall be backward inclined, plenum style, with an EC motor. Electronically commutated (EC) motors shall be integral to the supply air fan. Fan speed shall be variable without the need for an external variable frequency drive. The EC supply air fan shall contain permanently lubricated ball

bearings. Fans requiring re-greasing shall not be acceptable.

Multiple supply air fans shall be utilized to provide improved operating efficiency. Fans shall be configured in a parallel array. In the event of a single fan failure, the remaining fans shall continue to operate and provide a level of redundancy.

Supply air fans shall be mounted in such a manner as to allow independent removal of any fan, without disturbing or removing other fans. Fans shall be removable through the access door. Fan motors shall be wired in accordance with NFPA 70 (NEC).

COILS

Cooling coils shall be fabricated of seamless drawn copper tubes, mechanically bonded to aluminum fins (that have an enhanced design for maximum heat transfer) and encased in a galvanized steel or aluminum frame.

Coils shall be provided with a stainless steel drain pan extending beyond the leaving coil face. Cooling coil drain pans shall be sloped in the direction of airflow. A condensate drain line shall be piped to the cabinet exterior for field connection of a trap (trap by others).

DAMPERS

Air control dampers shall be opposed blade design with a rated leakage less than 3 cfm/ft.^{2} (15.21 ./s/m^2). Damper blades and frame shall be extruded aluminum with extruded elastomeric seals.

Optional: Insulated dampers shall be available for dampers that mount directly on the cabinet exterior.

COOLING OPTIONS

AIR-SIDE ECONOMIZER

A means to introduce outside air and mix it with return air shall be provided for applications that can use outdoor air for cooling (air-side economizer). The air-side economizer shall include outside air and return air dampers with electronic actuators. Damper construction and rated damper leakage shall be as defined in the damper section of this specification. Damper actuators shall be factory installed and wired. The outside air damper shall include a spring-return actuator to ensure full damper closure upon loss of power. The ***E²*** Series controller shall inversely modulate the outside air and return air dampers in order to mix the two airstreams and maintain the target supply air temperature. The controller shall only introduce outside air when it is more economical than using return air.

The outside air intake shall include a weather hood, or louver, to prevent water infiltration into the AHU. A screen shall be included to prevent birds from nesting.

Optional: Relief (exhaust) air control shall be included to prevent over-pressurizing the controlled space. Relief air control shall modulate 0-100% (utilizing a modulating damper or an on/off damper with modulated exhaust fan) to maintain building pressure based on a user-defined building pressure setting. Relief air control shall be factory mounted without affecting the CyberHandler system's overall dimensional data. Damper construction and rated damper leakage shall be as defined in the Damper section of this specification. A spring-return actuator shall be used to ensure full damper closure upon loss of power.
The ***E²*** Series controller shall provide a modulating control signal (0-10VDC) for relief air control. In addition to controlling the optional factory installed relief air control, the control signal shall

be available to control externally installed relief air methods.

DIRECT EXPANSION COOLING

Multiple independent refrigerant circuits shall be used to minimize energy usage at reduced loads. Circuits shall stage On/Off in response to demand (cooling and/or dehumidification).

Each refrigerant circuit shall contain, as a minimum, an evaporator coil and an externally equalized thermal expansion valve. The remaining refrigeration control components shall be included in the remote condensing unit (RCU).

Piping between the AHU and (optional) RCU shall be refrigerant grade, type L or ACR light annealed seamless drawn copper. All piping and refrigeration components shall be rated for use with R410A refrigerant. Copper to copper joints shall be brazed with a lead-free, acid flux-free copper brazing alloy such as Sil-Fos®. Service ports shall be provided in each independent refrigerant circuit.

Evaporator coils shall be leak tested using pressurized dry nitrogen at the factory. The AHU shall ship with dry nitrogen in all evaporator coils. Charging of the refrigerant system shall be performed on site by the installer.

CHILLED WATER COOLING

A minimum of two independent circuits shall be used in order to minimize energy usage when dehumidification is required. Each cooling circuit shall be controlled by a proportional valve for tighter temperature/humidity control. Evaporator coils shall be leak tested using pressurized dry nitrogen at the factory.
Control valves shall have a minimum close-off pressure rating of 200 psi (13.8 bar)and minimum working pressure rating of 400 psi (27.6 bar).

ELECTRICAL SYSTEM

The electrical system shall conform to National Electrical Code requirements.. A single point power connection shall be provided for AHU main power. In accordance with NEC Class II requirements, the control circuit shall be 24VAC and wiring shall not be smaller than 24 AWG. Line voltage and 24 volt control circuit wiring shall be routed in separate bundles. Each wire shall end with a service loop and be neatly secured and labeled in accordance with the unit electrical drawing. Components in the electrical enclosure shall be labeled in accordance with the electrical drawing.

All electrically actuated components shall be easily accessible without reaching over exposed high voltage components or rotating parts. Each high voltage circuit shall be individually protected by circuit breakers or manual motor starters on all three phases. Fan motors shall have thermal and short circuit protection. The main electric box shall contain all the contactors, starters, circuit breakers, fuses and terminal boards required for operation of the AHU.

Optional: Interior lights are available. Lights shall be operable from a single switch located on the cabinet exterior. 120V power with branch circuit protection shall be provided to the lighting circuit by the AHU installer.

Optional: A 120V, 20A, GFCI service receptacle shall be included on the casing exterior. 120V power with branch circuit protection shall be provided to the lighting circuit by the AHU installer.

CONTROLS

All functions of the AHU shall be controlled by a factory installed ***E²*** Series controller. The control program shall be specific to the AHU and includes user-adjustable setpoints and tuning.

Optional: A supervisory controller shall oversee a group of AHU's serving a common space with common setpoints.

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 CyberHandler unit. 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 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 CyberHandler 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 still remain stored in the controllers' 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.

CYBERHANDLER GROUPING pLAN OPERATION

Multiple CyberHandler system controllers shall be able to be connected (grouped) to a pLAN, allowing the communication of data and information from each controller to a central control terminal or Lead controller. The Lead controller display screens 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 CyberHandler units consisting of up to eight AHUs equipped with like controllers may be controlled and monitored via the ***E²*** series controller.

BMS INTERFACE

The ***E²*** series controller may incorporate a communication interface port that can be field connected through a serial interface to a Building Management System via Modbus, BACnet, SNMP, or HTTP 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 provide a text message detailing the alarm conditions. After an alarm condition is corrected, the alarm can be cleared by pressing the alarm key.

SMALL BEZEL DISPLAY PANEL

The small bezel user interface display panel features an easy to read, backlit liquid-crystal alphanumeric display equipped with contrast adjustment and LED illuminated function keys. The screens that appear on the user interface display panel present data that originates from the controller I/O module. The controller is operated via a 6-key menu-driven loop structure and 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 CyberHandler unit.

OPTIONAL ACCESSORIES

SMOKE DETECTION

A photo-electric smoke detector shall be factory installed and wired downstream of the return air inlet. The AHU shall shut down upon sensing smoke in the return air.

FIRESTAT

The AHU shall be provided with a factory mounted and wired firestat. The firestat shall shut down the air handler upon sensing air temperatures that indicate a fire.

REMOTE WATER DETECTOR: SPOT TYPE

A remote single-point water and 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 CyberHandler system's water producing components.

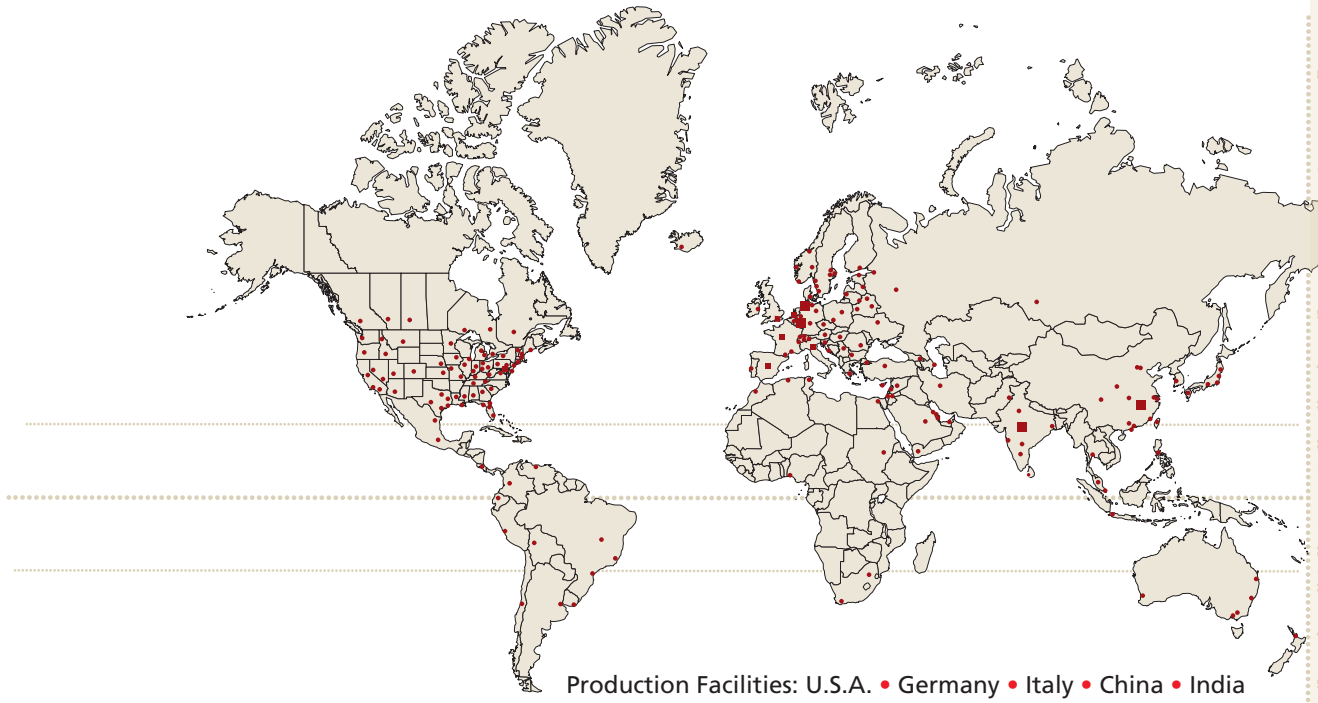
REMOTE WATER DETECTOR: STRIP TYPE

A 20 foot (6 m) long remote strip/cable-type water and leak detector shall be provided for remote field installation. Upon sensing a water leak, the normally-closed water detector control circuit shall open, thereby shutting down the CyberHandler system's water producing components.

MECHANICAL FLOW SWITCH

A factory provided, field installed flow switch shall activate a loss of flow alarm in the event of an interruption in chilled water flow.

Notes



Production Facilities: U.S.A. • Germany • Italy • China • India

STULZ mission is to be the premier provider of energy efficient temperature and humidity control solutions for mission critical applications.

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