

STULZ

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WallFlow Custom AHU CW

Engineering Manual

**Floor Mounted Precision Air Handlers
100 kW - 200 kW / 60 Hz**

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Nomenclature						
CAH-XXXX-XXXX-XXX						
CAH	Capacity (kW)	Air Flow (CFM)	Primary Cooling	Secondary Cooling	Air Pattern	Special
Custom Air Handler Unit	0100 0200	013K 025K	C = Chilled Water	0 = None	H = Horizontal	If Applicable

Example: 200 kW capacity, 25,000 CFM airflow, chilled water coil, horizontal configuration: **CAH-0200-025K-C0H**

Product Features Matrix

Model CAH-()-()-C0()	CAH-0100-013K-C0H	CAH-0200-025K-C0H
Selected Standard Features		
Temperature Control		
1-Stage Cooling Mode	Standard	Standard
Controls		
Advanced Microprocessor w/ Alarms Display	Standard	Standard
Cabinet		
Aluminum Exterior	Standard	Standard
Stainless Steel Dual Sloped Condensate Drain Pan	Standard	Standard
2 lb Density Thermal and Sound Insulation	Standard	Standard
Filters/Plenums		
2 inch., MERV 8 Pleated Filters	Standard	Standard
4 inch, MERV 8, Pleated Filters	Optional	Optional
Blowers / Motors		
Backward Inclined, Plenum Style Fan, With an EC Motor	Standard	Standard
Electrical		
460-3-60 Power Supply	See Electrical Data Table on page 4.	
Multi-Voltage Control Transformer (24V Class 2)	Standard	Standard
Modular Motor Controllers with Integral Circuit Breakers	Standard	Standard
Safety Features		
Visual Local and Remote Alarms	Standard	Standard
Main Power Non-Fused Disconnect, unit mounted	Standard	Standard
Motor Overload Protection	Standard	Standard
Specific Model Standard Features – Chilled Water Systems		
2-way, 600 psig Modulating Valve	Standard	Standard
Available Options		
Main Power Meter	Optional	Optional
BMS Serial Monitoring and Control	Optional	Optional
2-Way PICV Energy Control Valve	Optional	Optional
Smoke Detector	Optional	Optional
Spot Water Detection	Optional	Optional
Cable Water Detection	Optional	Optional
High Short Circuit Current Rating	Optional	Optional

Technical Specifications

Model CAH-()-()-C0()	CAH-0100-013K-C0H	CAH-0200-025K-C0H
Chilled Water Control Valve — Sized for 85°F FB/52 °F DP EAT Conditions		
2-way (standard) — Modulating		
Size, in. (Cv)	2 (60)	2 (60)
Valve Pressure Rating, psi	600	600
Close-off Pressure Rating, psi	200	200
Chilled Water Coil — Aluminum Fin, Copper Tube		
Rows (Face Area, ft ²)	5 (25)	5 (50)
Face Velocity, ft/min	500	500
Evaporator Blower / Motor - Backward Curved EC		
Nominal Motor Power Each, hp	4.9	4.9
Rated Air Flow, ft ³ /min @0.2 in H ₂ O esp	12,500	25,000
Quantity of Blowers	2	4
Filters — 2-Inch Deep, MERV 8, Pleated, Disposable		
Actual Size, in. (Quantity)	20 x 24 (4) 12 x 24 (4)	20 x 24 (8) 12 x 24 (8)
Filter Face Area, ft ²	21.3	42.7
Connection Sizes — Copper		
Water In and Out in., O.D.	2 1/8	2 1/8
Condensate Drain, in., O.D.	7/8	7/8
Physical Data		
Approximate Unit Weight, lb	2,800	5,600
Approximate Shipping Weight, lb	2,800 lbs.	5,600 lbs.
Unit Dimensions, H in. x W in. x D in.	59.1 x 94.5 x 61.4	118.1 x 94.5 x 61.4
Approximate Shipping Dimensions, H in. x W in. x D in.	71.1 x 106.5 x 73.4	130.1 x 106.5 x 73.4

Performance/Capacity Data

Model CAH-()-()-C0()		CAH- 0100-013K-C0H	CAH-0200-025K-C0H
Net Cooling Capacity – kW (MBH) @ 50° F EWT, 0% Glycol Solution			
85°F DB/64.5°F WB, 32% RH, 52°F DP			
(12.2°F ΔTw)	Total	103 (352)	206 (703)
	Sensible	103 (352)	206 (703)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	60 (24.9)	120 (33)
(20°F ΔTw)	Total	87 (298)	175 (597)
	Sensible	87 (298)	175 (597)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	31 (10)	62 (12)
95°F DB/67.7 °F WB, 24% RH, 52°F DP			
(12.2°F ΔTw)	Total	137 (466)	273 (931)
	Sensible	137 (466)	273 (931)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	78 (39)	157 (53)
(20°F ΔTw)	Total	123 (420)	246 (839)
	Sensible	123 (420)	245 (839)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	43 (15)	87 (19)
105°F DB/70.7°F WB, 18% RH, 52°F DP			
(12.2°F ΔTw)	Total	169 (575)	337 (1,149)
	Sensible	169 (575)	337 (1,149)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	96 (55)	192 (76)
(20°F ΔTw)	Total	156 (533)	313 (1,066)
	Sensible	156 (533)	313 (1,066)
	Flow Rate, gpm (Pressure Drop, ft H ₂ O)	55 (22)	109 (28)

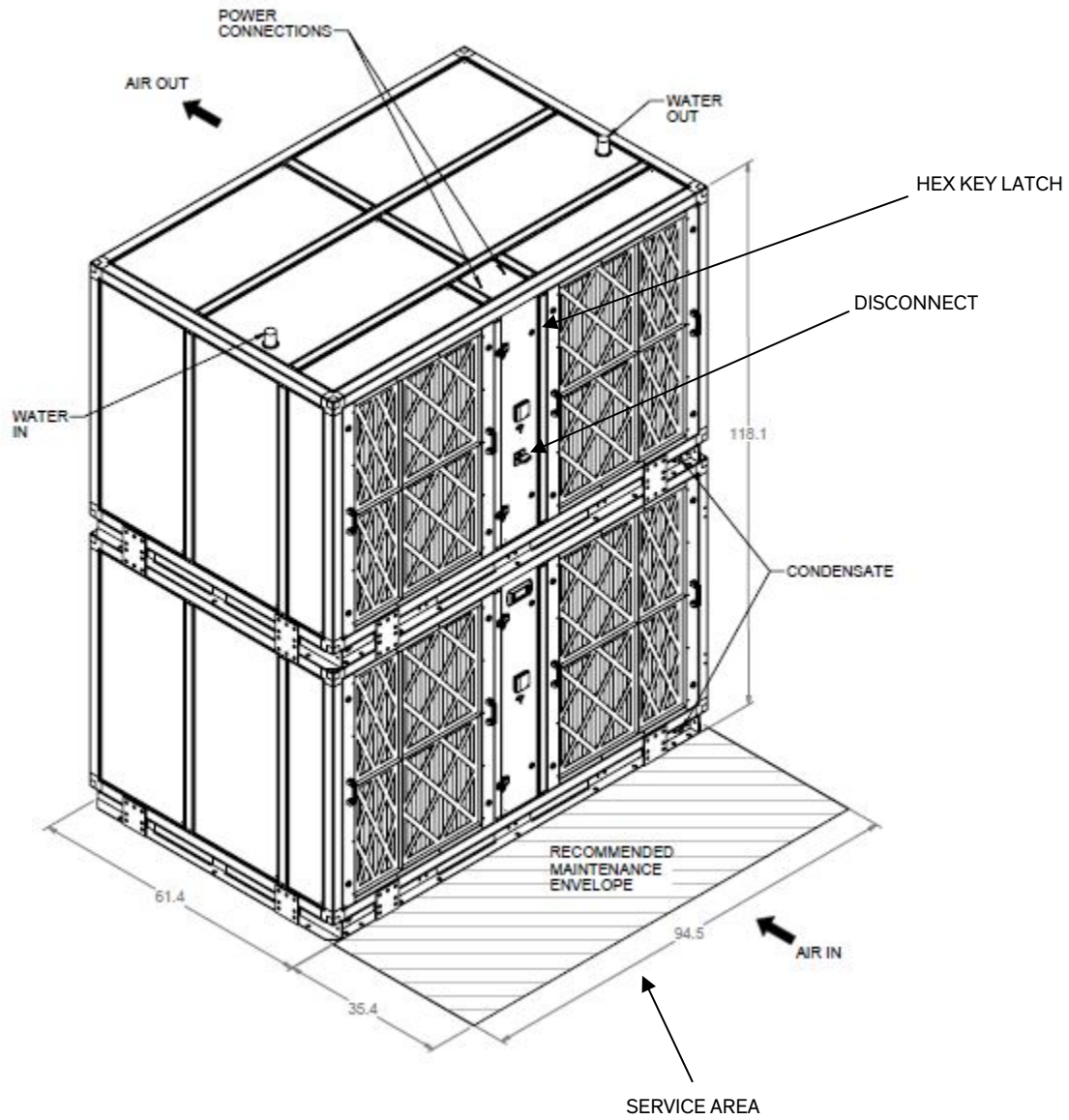
Electrical Data

Model CAH(-) -C0()						
Voltage	CAH-0100-013K-C0H			CAH-0200-025K-C0H		
	FLA	MCA	MFS	FLA	MCA	MFS
460/3/60	11.1	13.8	15	21.1	26.3	30

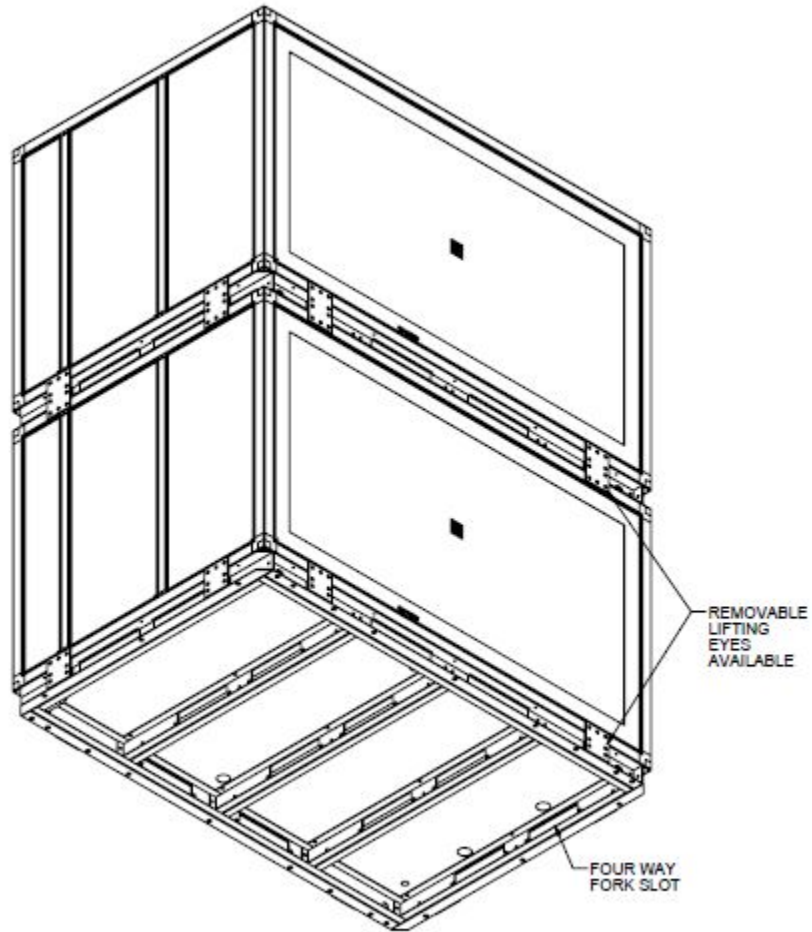
Note 1: Standard 1 KAIC (Kilo-Amperes Interrupting Capacity) rating, optional KAIC ratings available.

Note 2: Electrical data is based on standard performance and component selection of this manual. Contact your local Sales Representative for special equipment electrical data.

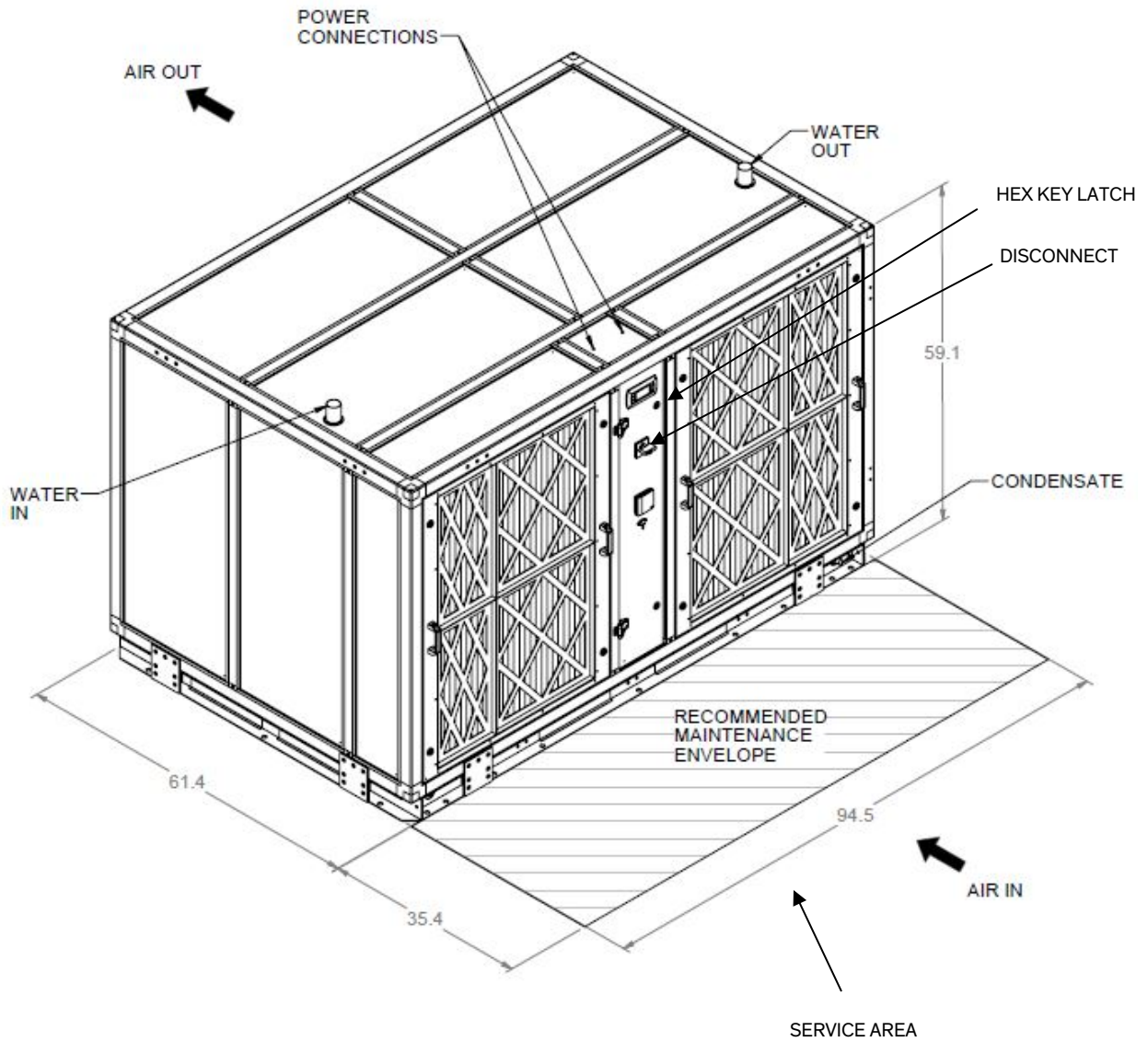
Dimensional Data – CAH-0200-025K-C0H



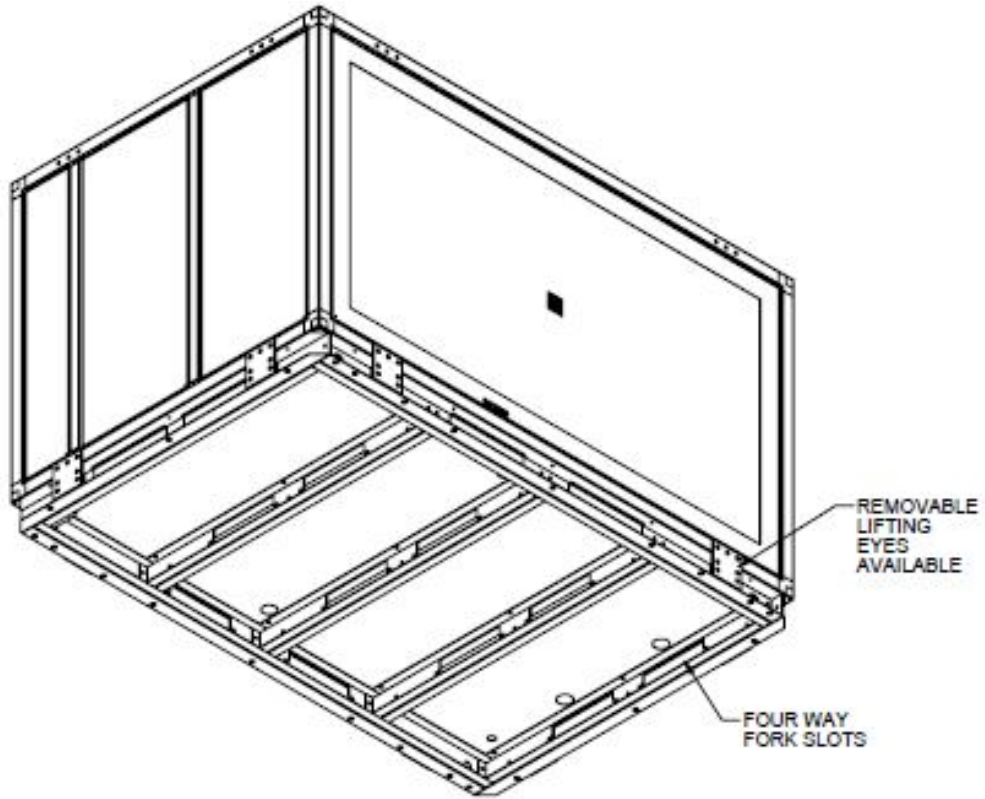
Dimensional Data — CAH-0200-025K-C0H



Dimensional Data – CAH-0100-013K-C0H



Dimensional Data — CAH-0100-013K-C0H



Product Guide Specifications

STULZ CAH Series

Chilled Water Horizontal Floor Mounted Precision Air Conditioners

Summary

This specification describes requirements for a precision environmental control system. The STULZ CAH is a cooling system that provides precision temperature control for computer rooms, or rooms containing telecommunications or other highly sensitive heat load equipment, where continuous 24 hours a day 365 days a year air conditioning is required.

Design Requirements

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

Mechanical Components

Backward-Inclined Plenum Style Fan with EC Motor

The blower shall be direct driven, single inlet, backward curved centrifugal fan 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, and integrated current limitations.

Each fan shall be low noise, low vibration manufactured with an anti-corrosive composite impeller. Each fan impeller shall be balanced and aerodynamically optimized 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 stainless-steel condensate drain pan. The water circuit shall be designed to distribute water into the entire coil face area.

2-way Chilled Water Control Valve

A 2-way fully modulating control valve shall be factory installed and wired. The two-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.

Air Filtration

All units shall be supplied with disposable air filters classified as UL 900 or UL 586. Filters shall be 2" deep (nominal). Filters shall be pleated with a Minimum Efficiency Reporting Value (MERV) of 8 or higher. Filters shall be installed in a front accessible holding frame.

Optional: A variety of filter types and ratings are available upon request.

Cabinet

The unit employs a double-wall panel frame construction on a powder-coated steel base. The cabinet exterior shall be constructed of steel coated with a durable finish to protect against corrosion. It has an extruded aluminum frame with fiberglass reinforced nylon corners and joints. The system is designed to mount on slab flooring in or adjacent to the space to be conditioned.

Horizontal-Flow

The air conditioner shall be configured for horizontal air pattern with free return air and conditioned supply air discharge through the front of the system.

Electrical System

The electrical system shall conform to National Electrical Code requirements. The control circuit shall be 24 volts AC, wire 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.

Electrical components are divided between a main electric box housed behind a hinged access door in the bottom module, and a controller electric box containing the E² controller housed behind a hinged access door in the top module.

The door of each compartment has two handles that operate in tandem to latch/unlatch the door. Both doors have a lockable handle. The main electric box contains the main power service disconnect circuit breaker that turns the power on and off.

Motor Start Protectors

Individual overload protection is provided for the unit fans by motor start protectors. When tripped, these switches must be manually reset once the overload condition is cleared.

E² Series Controller**Display**

The controller user interface display panel features a backlit liquid-crystal alphanumeric display equipped with a 6-key keypad. The screens that appear on the user interface display panel present data that originates from the controller.

The controller offers an alarm log plus four different interface menu levels to the operator:

- Information
- Control
- Service
- Factory

These menus permit the user to easily view, control, and configure operating parameters for the STULZ CAH system.

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 liquid crystal display (LCD) 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 chilled water (CW) 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 required, the customer may restore the setpoints back to the Customer Default setpoint values or to the original Factory (primary) setpoint values.

Timer Feature

The timer shall enables set up 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.

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.

A/C Grouping pLAN Operation (Optional)

Multiple STULZ CAHU 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 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 STULZ CAHU systems consisting of up to eight STULZ precision air conditioners equipped with like controllers may be controlled and monitored via the E² series controller.

With multiple STULZ CAHU 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 CAHU system within the rotating group is operationally exercised on a periodic timed basis.

Temperature/Humidity Sensors

A supply-side temperature averaging sensor is standard on each module of the unit. A sensor is factory-mounted in each module's supply airstream between the coil and supply damper. They return an accurate supply temperature and minimize the chance of stratification temperature reading.

The Supply air temperature is monitored by the system controller and compared to limit values set at the factory. Control outputs are based on the set points entered into the system controller by the user.

A temperature/humidity (T/H) sensor is factory mounted in the return air stream for room air control. The T/H sensor monitors the return air conditions and provides input signal(s) to the system controller to manage the operation of the A/C unit consistent with the set points entered in the controller. As an option, sensor(s) may be shipped loose for field installation.

As an alternative to locating the T/H sensor inside the A/C unit, it may be field installed on a wall in the conditioned space for sensing actual room conditions.

Optional Features

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

Power Meter

The power meter measures and reports the unit's total power usage and associated data (Volts, Watts, Amps and Hertz), which are displayed in a screen on the graphic terminal.

High Short Circuit Current Rating

The STULZ CAHU system shall be rated for a short circuit current rating for a minimum of 65 KAIC. The higher short circuit current rating shall include safe touch fusing upstream of the unit's main power disconnect switch.

Remote BMS Communications

The E² series controller shall incorporate a 10 Mbps communication interface port that can be field connected to a Building Management System (BMS) via Modbus, BACnet, SNMP, HTTP, or MODEM as configured by the factory. A controller interfaced to a network must be configured for BMS communication.

Fan

An aluminum fan impeller shall be available upon request.

Chilled Water Control Energy Valve

An energy valve shall be factory installed. The valve uses a built-in electronic flow meter and water supply and return temperature sensors to provide data used to calculate energy usage. Add PICV valve.

Seismic Rating

Upon customer request the unit can be seismically rated according to a seismic criteria or specification.

Backdraft Dampers

Air control dampers shall be opposed blade design with a rated leakage less than 3 cfm/ft² (55 m³/h/m²). Damper blades and frame shall be extruded aluminum with extruded elastomeric seals. Dampers shall be controlled (open/close or modulating) utilizing electronic actuators. One single actuator shall not control greater than 25 ft² (2.3 m²) of damper area.

Remote Water Detector – Strip Type

A 20 -foot long remote strip/cable type water/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 STULZ CAH unit's water producing components.

Smoke Detection

A photo-electric smoke detector shall be factory installed and wired in the return air section of the 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 Underwriter's Laboratory (UL) listed velocity range shall be 0-3000 fm. The air conditioner will shut down upon sensing smoke in the return air stream.

Firestat

The CAH CW 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.

Automatic Dual Power Transfer Switch

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 KAIC fuses as specified 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 communication link. A through-the-door indicator light shall be included for a fast and local notification of available power sources.

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 International Standards Organization (ISO) 9001:2015 certified.

Code Conformance



The standard models are certified to UL 1995 and CSA C22.2 No.236.

Glossary

Term	Definition	Term	Definition
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers	IT	Information Technology
BTUH/Hr	British Thermal Units Per Hour	IOM	Installation, Operation, and Maintenance Manual
°C	Degrees Celsius	Kw	kilowatt
CCD	Compact-CWE	KAIC	Kilo-Amperes Interrupting Capacity
CFM	Cubic Feet Per Minute	LWT	Leaving Water Temperature
CNDCT	Conductor	MAX CKT BKR	Maximum Circuit Breaker
CRAC	Computer Room Air Conditioner	MAX FUSE	Maximum Fuse
CRAH	Computer Room Air Handler	MCA	Minimum Circuit Ampacity
CW	Chilled Water	MOCP	Maximum Over Current Protection
DB	Dry Bulb	NEC	National Electric Code
DF	Downflow	NFPA	National Fire Protection Agency
E ²	Energy Efficiency	PH	Phase
EC	Electronically Commutated	PSI	Pounds Per Square Inch
DP	Dewpoint	PSIG	Pounds Per Square Inch Gauge
DX	Direct Expansion Systems	RLA	Run Load Amps
ESD	Electrostatic Discharge	RMA	Return Material Authorization
EST	Eastern Standard Time	R-Value	Thermal Resistance
°F	Degrees Fahrenheit	SATS	STULZ Air Technology Systems, Inc.
FLA	Full Load Amps	SDS	Safety Data Sheet
FOB	Freight on Board	SPDT	Single Pole, Double Throw
HGBP	Hot Gas Bypass	UF	Upflow
HACR	Heating, Air Conditioning, Refrigeration	UL	Underwriters Laboratories
HP	Horsepower	UPS	Uninterruptible Power Supply
HVAC	Heating, Ventilation and Air Conditioning	V	Volt
HX	Heat Exchanger	VA	Volt-Amperes
Hz	Hertz	VAC	Volt, Alternating Current
IAQ	Indoor Air Quality	VFD	Variable Frequency Drive
in. w.g.	Inches of Water Gauge	W	Watt(s)



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