



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

**APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: OSP-0366

HCAI Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Vertiv Corporation

Manufacturer's Technical Representative: Kiel Stephens

Mailing Address: 1050 Dearborn Drive, Columbus, OH 43085

Telephone: (614) 841-8168

Email: Kiel.Stephens@Vertiv.com

Product Information

Product Name: Air Conditioning Units

Product Type: Air Conditioning Units - Data Room

Product Model Number: DA050D, DA080D, DA125D, DA150D and DA165D

General Description: Liebert DSE air-cooled product line, 50-165kW units with aluminum fan assemblies.

Mounting Description: Rigid base mount to carbon steel floorstand (7" to 48" tall), Floor Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: Buehler Engineering, Inc

Contact Person: Gillian Montgomery

Mailing Address: 600 Q Street, Suite 200, Sacramento, CA 95811

Telephone: (916) 443-0303

Email: gmontgomery@buehlerengineering.com

Title: Senior Associate





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California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: BUEHLER ENGINEERING, INC.
Name: Scott Hooker California License Number: S3937
Mailing Address: 600 Q St., Suite 200, Sacramento, CA 95811
Telephone: (916) 443-0303 Email: shooker@buehlerengineering.com

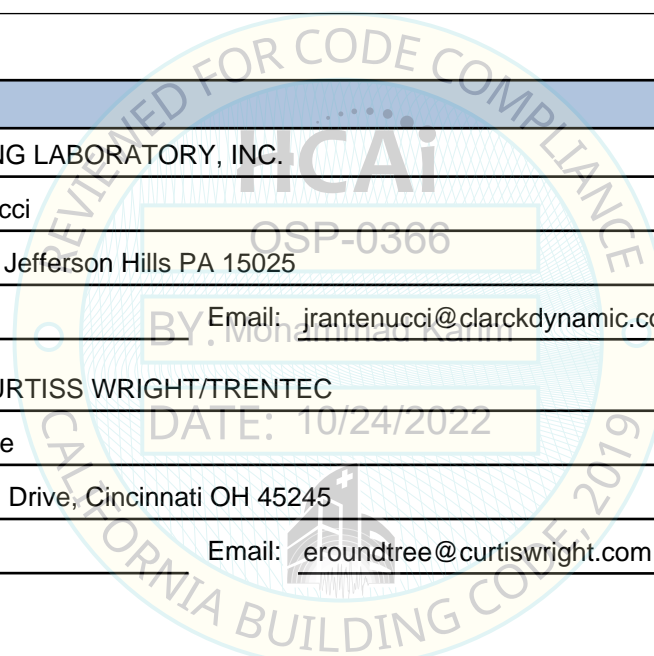
Certification Method

GR-63-Core [X] ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
Other (Please Specify):

Testing Laboratory

Company Name: CLARK TESTING LABORATORY, INC.
Contact Person: John R. Antenucci
Mailing Address: 1801 Route 51, Jefferson Hills PA 15025
Telephone: (412) 387-1010 Email: jrantenucci@clarckdynamic.com

Company Name: QUALTECH/CURTISS WRIGHT/TRENTEC
Contact Person: Ed G. Roundtree
Mailing Address: 4600 East Tech Drive, Cincinnati OH 45245
Telephone: (513) 528-7900 Email: eroundtree@curtiswright.com





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = See Attachment

SDS (Design spectral response acceleration at short period, g) = See Attachment

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 10/24/2028

Date: 10/24/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: SDS (g) = See Above z/h = See Above

Condition of Approval (if applicable): DATE: 10/24/2022

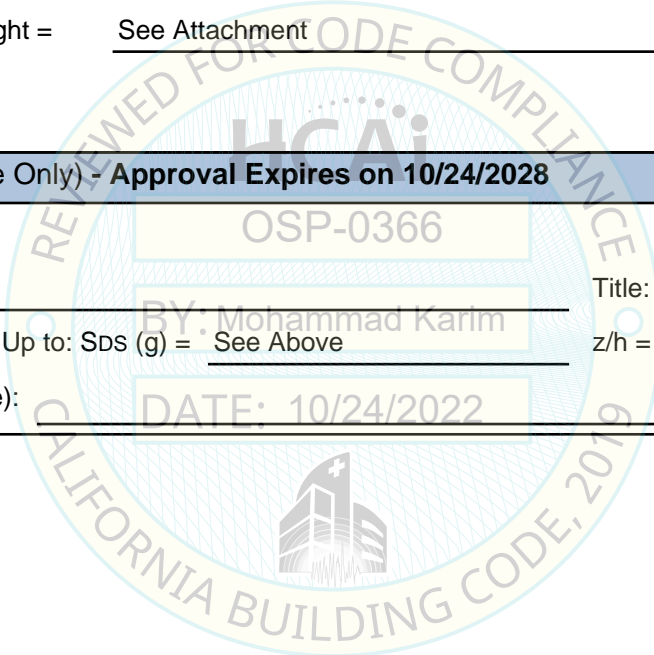


Table 1a. Certified Models and Configurations

Model Number	Nominal Capacity (kW)	Tested/ Interpolated	Length (in)	Width (in)	Height (in)	Operating Weight (lbs)
DA050D	50 kW	Tested (UUT-3b)	77	36	130	1,980
DA080D	80 kW	extrapolated	100	36	119	2,150
DA085D	85 kW	Tested (UUT-1)	100	36	119	2,150
DA125D	125 kW	interpolated	144	48	142	4,150
DA150D	150 kW	interpolated	144	48	142	4,250
DA165D	165 kW	Tested (UUT-2)	144	48	142	4,250

Seismic Parameters		
S _{DS} (g)	z/h	F _p /W _p
2.00	1.0	1.50
2.50	0.0	1.13

^ ^
 Height includes floorstand
 Height includes plenum

Table 1b. Shake Table Tested Units Summary**

Configuration	kW	UUT Mark	Mounting	Excitation Direction	Frequency* (Hz)	Length (in)	Width (in)	Height (in)	Tested Weight (lbs)
Downflow	50	UUT-3b	Hard Mount to floorstand	X	18.9	77	36	130	1,714
				Y	16.5				
				Z	>33.3				
Downflow	85	UUT-1	Hard Mount to floorstand	X	5.9	100	36	119	2,110
				Y	4.3				
				Z	17.6				
Downflow	165	UUT-2	Hard Mount to floorstand	X	4.0	144	48	142	4,248
				Y	4.1				
				Z	12.6				

* Frequencies are for units tested prior to AC156.

** All units were charged with refrigerant before AC156 testing.

Table 2. Certified Sub-Component List

Coil			
Part #	Manufacturer	Material	Interpolated / Included With Test
323171G1	Vertiv Corporation	aluminum, copper	UUT-3b
311531G1	Vertiv Corporation	aluminum, copper	UUT-1
306600G1	Vertiv Corporation	aluminum, copper	Interpolated
304455G2	Vertiv Corporation	aluminum, copper	UUT-2

Compressor			
Part #	Manufacturer	Material	Tested / Interpolated
ZPD120KCE	Emerson Climate Technologies	aluminum, copper, carbon steel	Extrapolated
ZPD137KCE	Emerson Climate Technologies	aluminum, copper, carbon steel	UUT-1
ZPD154KCE	Emerson Climate Technologies	aluminum, copper, carbon steel	UUT-3b
ZPDT18M	Emerson Climate Technologies	aluminum, copper, carbon steel	Interpolated
ZPDT24M	Emerson Climate Technologies	aluminum, copper, carbon steel	Interpolated
ZPDT27M	Emerson Climate Technologies	aluminum, copper, carbon steel	UUT-2

Fan Motor			
Part #	Manufacturer	Material	Interpolated / Included With Test
R3G560	EBM Papst	carbon steel, copper	UUT-1
R3G630	EBM Papst	carbon steel, copper	UUT-2, UUT-3b

Expansion Valve			
Part #	Manufacturer	Material	Interpolated / Included With Test
EX6	Emerson Climate Technologies	brass, copper, carbon steel	UUT-1, UUT-3b
EX7	Emerson Climate Technologies	brass, copper, carbon steel	UUT-2

Electric Control Panel			
Part #	Manufacturer	Material	Interpolated / Included With Test
181515	Vertiv Corporation	plastic, carbon steel, copper, aluminum	UUT-1
305000	Vertiv Corporation	plastic, carbon steel, copper, aluminum	UUT-2
323250	Vertiv Corporation	plastic, carbon steel, copper, aluminum	UUT-3b

Enclosure			
Part #	Manufacturer	Material	Interpolated / Included With Test
307370	Vertiv Corporation	carbon steel	UUT-2
314420	Vertiv Corporation	carbon steel	UUT-1, UUT-3b



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Table 2. Certified Sub-Component List Con't

Reheat			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
309711G004	Vertiv Corporation	galvanized carbon steel	UUT-1
309711G009	Vertiv Corporation	galvanized carbon steel	Extrapolated
305011G11	Vertiv Corporation	galvanized carbon steel	UUT-2
177999	Vertiv Corporation	galvanized carbon steel	UUT-3b

Plenums			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
312792	Vertiv Corporation	carbon steel	UUT-1
196957	Vertiv Corporation	carbon steel	UUT-2
323154	Vertiv Corporation	carbon steel	UUT-3b

Floorstands			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
325473	Vertiv Corporation	carbon steel	UUT-3b
315275	Vertiv Corporation	carbon steel	UUT-1
315906	Vertiv Corporation	carbon steel	UUT-2
307181	Vertiv Corporation	carbon steel	Extrapolated

Humidifier			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
305012	Vertiv Corporation	carbon steel, aluminum	UUT-1 & UUT-2
177972	Vertiv Corporation	carbon steel	UUT-3b

Condensate Pump			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
1A19271	Hartell Pumps	plastic, aluminum, carbon steel	UUT-1

Transformer			
<i>Part #</i>	<i>Manufacturer</i>	<i>Material</i>	<i>Interpolated / Included With Test</i>
323244	Vertiv Corporation	carbon steel, copper	UUT-3b
303370	Vertiv Corporation	carbon steel, copper	UUT-2

Shake Table Test Setup

UUT Designation	UUT-1	Seismic Parameters							
		Building Code	Test Criteria	S _{Ds} (g)	z/h	Horizontal		Vertical	
A _{FLX-H}	A _{RIG-H}					A _{FLX-V}	A _{RIG-V}		
Lab Report	Clark Testing 2570A Rev1	CBC 2022	ICC-ES AC 156	2.00	1.0	3.2 g	2.4 g	-	-
Identification No.	DA085DP1AT479S			2.50	0.0	-	-	1.68 g	0.68 g
Attachment Method	Rigid mount, (24) 1/2"-13 bolts								



Notes: The UUTs were full of contents during the test.
 After the test, the UUT was functional and the structural integrity of the component attachment and force-resisting systems was maintained.

Shake Table Test Setup

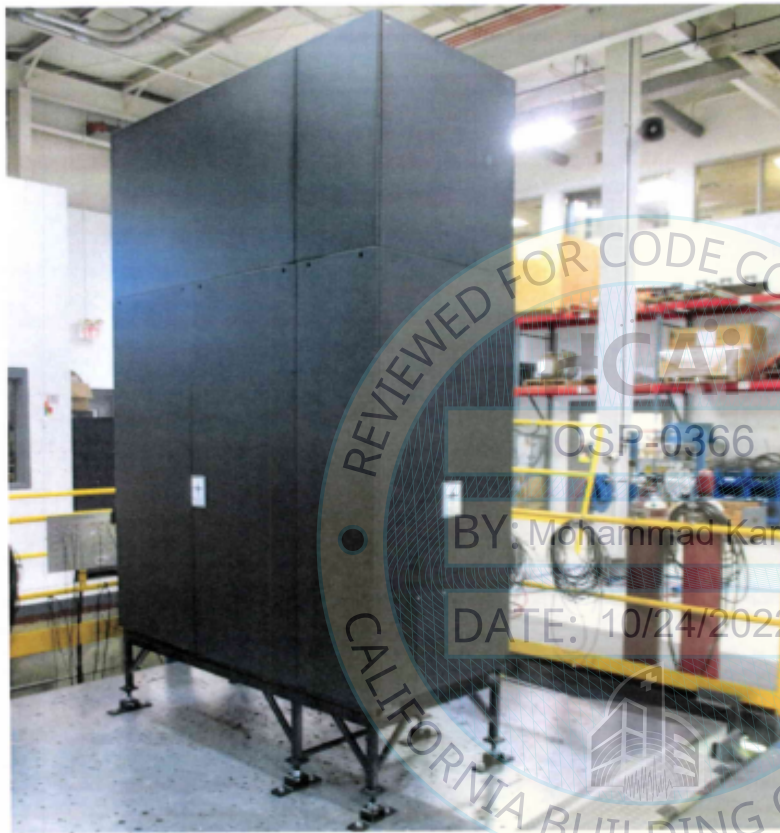
UUT Designation	UUT-2	Seismic Parameters							
		Building Code	Test Criteria	S _{Ds} (g)	z/h	Horizontal		Vertical	
A _{FLX-H}	A _{RIG-H}					A _{FLX-V}	A _{RIG-V}		
Lab Report	Clark Testing 2570A Rev1	CBC 2022	ICC-ES AC 156	2.00	1.0	3.2 g	2.4 g	-	-
Identification No.	DA165DP1ATPROT			2.50	0.0	-	-	1.68 g	0.68 g
Attachment Method	Rigid mount, (16) 1/2"-13 bolts								



Notes: The UUTs were full of contents during the test.
 After the test, the UUT was functional and the structural integrity of the component attachment and force-resisting systems was maintained.

Shake Table Test Setup

UUT Designation	UUT-3b	Seismic Parameters							
		Building Code	Test Criteria	S _{DS} (g)	z/h	Horizontal		Vertical	
A _{FLX-H}	A _{RIG-H}					A _{FLX-V}	A _{RIG-V}		
Lab Report	Curtiss Wright Q1627.0 Rev1	CBC 2022	ICC-ES AC 156	2.00	1.0	3.2 g	2.4 g	-	-
Identification No.	DA050DP1ADPROT3			2.50	0.0	-	-	1.68 g	0.68 g
Attachment Method	Rigid mount, (12) 1/2"-13 bolts								



Notes: The UUTs were full of contents during the test.
 After the test, the UUT was functional and the structural integrity of the component attachment and force-resisting systems was maintained.



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Table 1c. Tested Unit Subcomponent List

UUT #1: DA085DP1AT479S			
<i>Sub-Component</i>	<i>Material</i>	<i>Manufacturer</i>	<i>Part Number</i>
Compressor	aluminum, carbon steel, copper	Emerson Climate Technologies	ZPD137KCE
Heat Exchanger	aluminum fin, copper tube	Vertiv Corporation	311531G1
Fan	aluminum, carbon steel, copper	EBM Papst	R3G560
Humidifier	aluminum, carbon steel	Vertiv Corporation	309717
Heater	aluminum, carbon steel	Vertiv Corporation	309711
Drainage, condensate	plastic, copper, carbon steel	Hartell Pumps	1A19271
Electric Control Panel	plastic, carbon steel, copper, aluminum	Vertiv Corporation	181515
Expansion Valve	carbon steel, copper	Emerson Climate Technologies	EX6
Plenum	carbon steel	Vertiv Corporation	312792
Enclosure w/ IBC/OSHPD bracing	carbon steel	Vertiv Corporation	314420
Floorstand	tubular carbon steel	Vertiv Corporation	315275
UUT #2: DA165DP1ATPROT			
<i>Sub-Component</i>	<i>Material</i>	<i>Manufacturer</i>	<i>Part Number</i>
Compressor	aluminum, carbon steel, copper	Emerson Climate Technologies	ZPDT27M
Heat Exchanger	aluminum fin, copper tube	Vertiv Corporation	304455G2
Fan	aluminum, carbon steel, copper	EBM Papst	R3G630
Humidifier	aluminum, carbon steel	Vertiv Corporation	186783
Heater	aluminum, galvanized carbon steel	Vertiv Corporation	305011
Drainage, condensate	plastic, copper, carbon steel	Hartell Pumps	1A19271
Transformer	carbon steel, copper	Vertiv Corporation	303370
Electric Control Panel	plastic, carbon steel, copper, aluminum	Vertiv Corporation	305000
Expansion Valve	carbon steel, copper	Emerson Climate Technologies	EX7
Plenum	carbon steel	Vertiv Corporation	196957
Double skin - Enclosure w/ IBC/OSHPD bracing	carbon steel	Vertiv Corporation	307370
Floorstand	tubular carbon steel	Vertiv Corporation	307181
UUT #3b: DA050DP1ADPROT3			
<i>Sub-Component</i>	<i>Material</i>	<i>Manufacturer</i>	<i>Part Number</i>
Compressor	aluminum, carbon steel, copper	Emerson Climate Technologies	ZPD154KCE
Heat Exchanger	aluminum fin, copper tube	Vertiv Corporation	323171G1
Fan	aluminum, carbon steel, copper	EBM Papst	R3G630
Exterior Panels	16ga painted carbon steel	Vertiv Corporation	304363
Humidifier	aluminum, carbon steel	Vertiv Corporation	177972
Heater	aluminum, galvanized carbon steel	Vertiv Corporation	177999
Drainage, condensate	plastic, copper, carbon steel	Hartell Pumps	1A19271
Transformer	carbon steel, copper	Vertiv Corporation	323244
Electric Control Panel	plastic, carbon steel, copper, aluminum	Vertiv Corporation	323250
Expansion Valve	carbon steel, copper	Emerson Climate Technologies	EX6
Plenum	carbon steel	Vertiv Corporation	323154
Enclosure w/ IBC/OSHPD bracing	carbon steel	Vertiv Corporation	314420
Floorstand	tubular carbon steel	Vertiv Corporation	325473

DSE Model Number Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
D A 1 2 5 D A 1 A T H A 0 8 1 1 D 0 0 S P 1 2 3 S

Model number = first 10 digits plus last 4 digits of configuration number

Digit 1, 2	Product Family
DA	Liebert DSE

Digit 3, 4, 5	Cooling Capacity, kW
	Nominal Sensible Capacity, kW

Digit 6	Air Discharge
D	Downflow

Digit 7	System Type
A	Air Cooled
P	Air-Cooled, EconoPhase ready

Digit 8	Airflow (fan type)
1	EC plug fans

Digit 9	Power Supply
A	460V / 3ph / 60Hz
B	575V / 3ph / 60Hz
C	208V / 3ph / 60Hz
D	230V / 3ph / 60Hz
2	380-415V / 3ph / 60Hz

Digit 10	Cooling System
T	Tandem w/ Digital, R-410A

Digit 11	Humidification
0	No humidifier
H	Infrared Humidifier

Digit 12	Display
A	Small Display
D	Large Display
F	Small Display w/ Supply Air Sensor
E	Large Display w/ Supply Air Sensor

Digit 13	Reheat
0	No reheat
1	Electric reheat, 15, 20, 25, 30kW

Digit 14	Air filter
8	MERV 8, 4"
9	MERV 11, 4"
A	MERV 13, 4"
6	MERV 11, 2" + MERV8 pre-filter, 2"
C	MERV 13, 2" + MERV8 pre-filter 2"

Digit 15 Coil options	
1	Non-Coated coil, indoor unit
2	Coated coil, indoor unit

Digit 16	Enclosure options
1	Color standard
2	Color optional
6	Color standard w/double skin panels
9	Color optional w/double skin panels
3	Color standard & IBC/OSHPD bracing
4	Color optional & IBC/OSHPD bracing
8	Color standard, IBC/OSHPD, double-skin panels
A	Color optional, IBC/OSHPD, double-skin panels

Digit 17	High Voltage Options
0	No disconnect

D	Non-locking disconnect
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L	Locking disconnect
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3	No disconnect with condensate pump
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4	Non-locking disconnect with condensate pump
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5	Locking disconnect with condensate pump
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Digit 18	Option Packages
0	None

1	Option pkg #1 - low voltage terminal package
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H	Reheat & Humidifier Lockout
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R	Remote Humidity contact
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C	Option pkg #1, plus reheat/humidifier lockout
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D	Option pkg #1, plus remote humidifier contact
---	---

E	Option pkg #1, plus reheat/humidifier lockout, plus remote contact
---	--

F	Remote Humidity contact plus R&H Lockout
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Digit 19	Monitoring cards
0	None

1	IS-WEBL Card
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3	IS-485L Card
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F	IS-IPBML Card
---	---------------

C	IS-485EXI Card
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5	IS-WEBL & IS-485L Cards
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H	IS-WEBL & IS-IPBML Cards
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D	IS-WEBL & IS-485EXI Cards
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J	IS-485L & IS-IPBML Cards
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E	IS-485L & IS-485EXI Cards
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K	IS-IPBML & IS-485EXI Cards
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Digit 20	Sensors
0	None

S	Smoke Sensor
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H	High Temp Sensor
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F	Smoke and High Temp Sensor
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C	Compressor Overload Sensors
---	-----------------------------

A	Compressor, High Temp
---	-----------------------

D	Compressor, Smoke Sensor
---	--------------------------

K	Compressor, High Temp, Smoke sensor
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Digit 21	Packaging
P	Domestic

Digit 22-24	Configuration code
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Digit 25	Configuration code
A	1

S	SFA
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