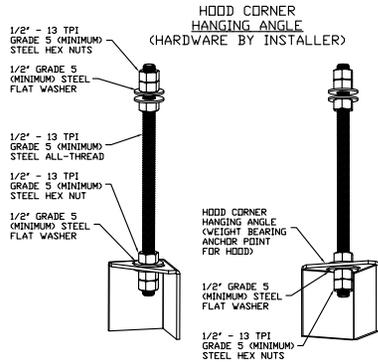


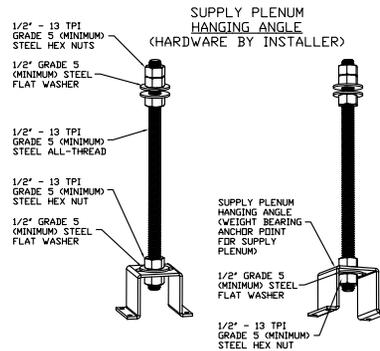


Date:



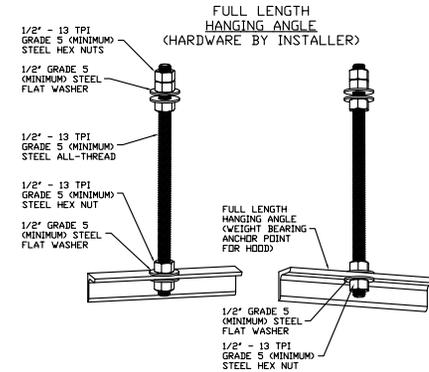
ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD, SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD, SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR PSP HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD, SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR FULL LENGTH HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

CUSTOMER APPROVAL TO MANUFACTURE:

- Approved as Noted
- Approved with NO Exception Taken
- Revise and Resubmit

SIGNATURE _____
Your Title _____ Date _____

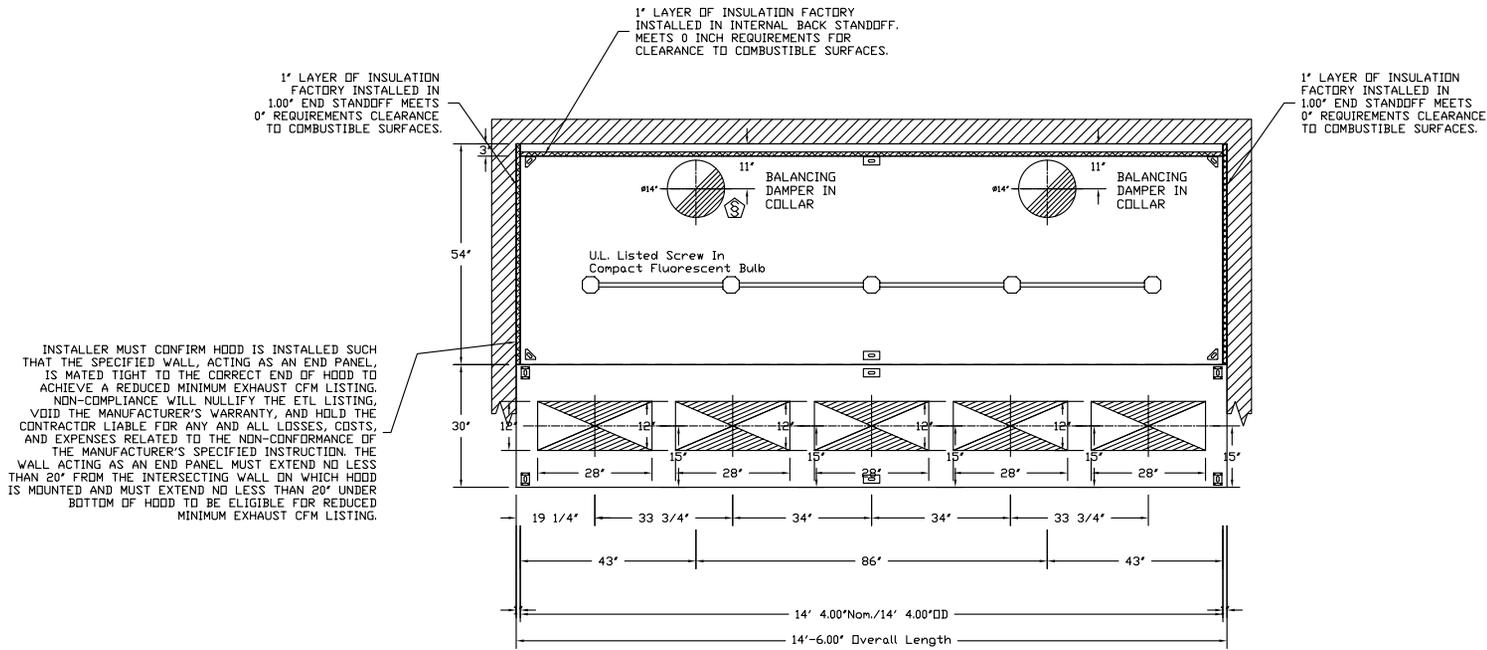


JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 2	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

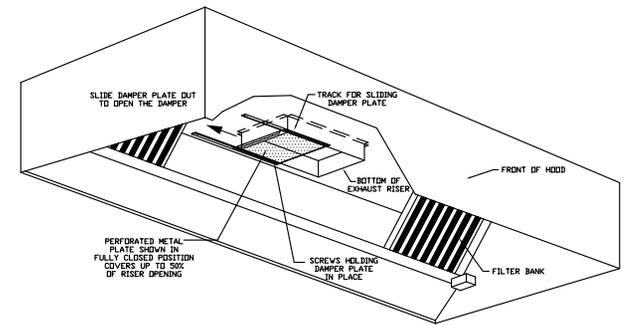
Date: 01/10/18



PLAN VIEW - Hood #1 (GREASE HOOD)
14' 4.00" LONG 5412SND-2

NOTE: Additional hanging angles provided for hoods 12' and longer.

PLAN VIEW - Hood #2 (SUPPLY PLENUM)
14' 6.00" LONG 306MISC-PSP



BALANCING DAMPER DETAIL

CUSTOMER APPROVAL TO MANUFACTURE:

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Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



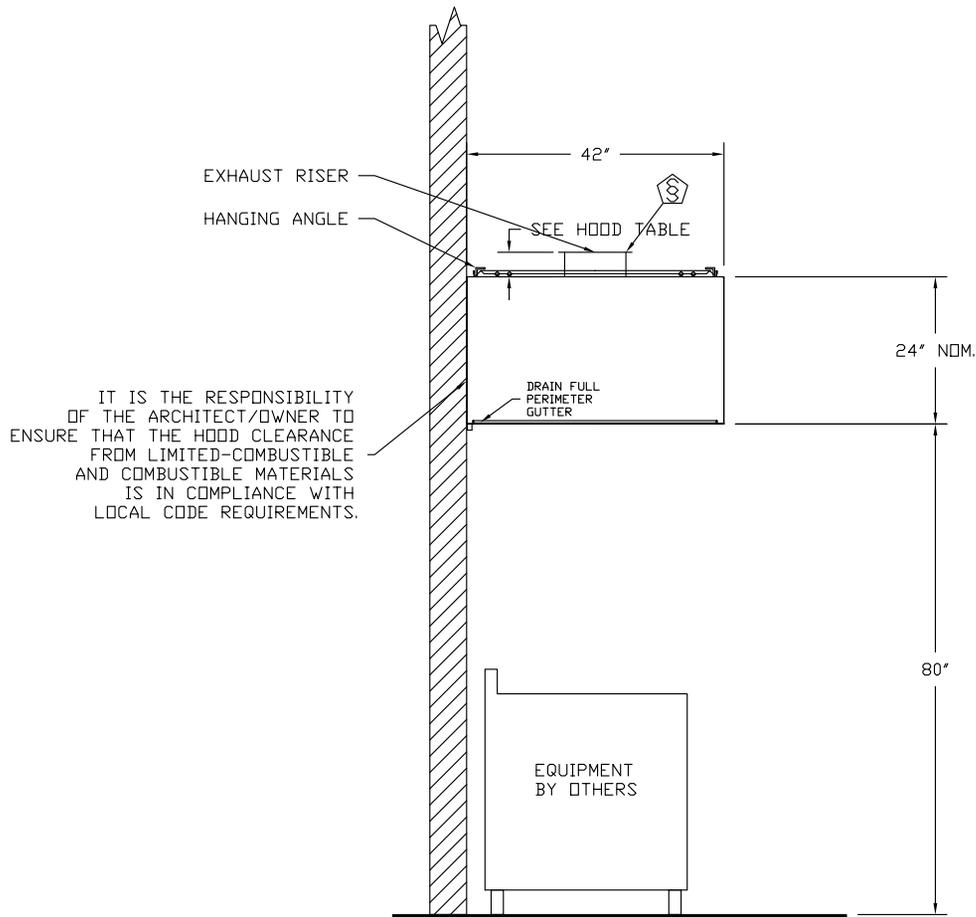
CAPTIVEAIRE

JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 3	DRAWN BY BFC-21
REV.	SCALE 1/4" = 1'-0"

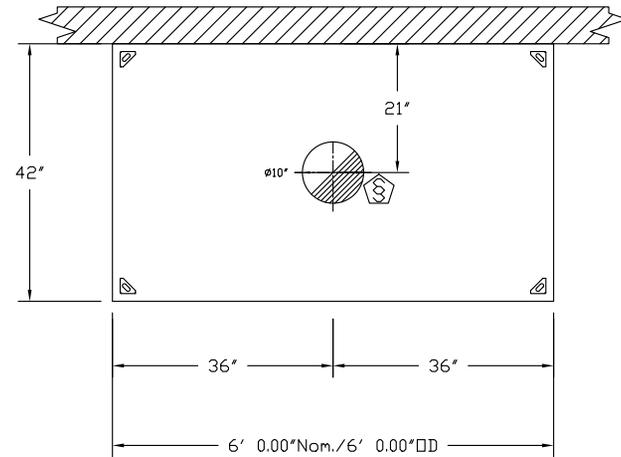


Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/10/18



SECTION VIEW - MODEL 4224VHB-G
HOOD - #3 (DISH HOOD)



PLAN VIEW - Hood #3 (DISH HOOD)
6' 0.00\"/>

CUSTOMER APPROVAL TO MANUFACTURE:

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SIGNATURE _____
Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 5	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/10/18

EXHAUST FAN INFORMATION - Job#3084171

FAN UNIT NO.	TAG	FAN UNIT MODEL #	CFM	ESP.	RPM	H.P.	B.H.P.	Ø	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS.)	SONES
1	GREASE EXHAUST	CASRE24DD	4300	2.250	1265	7.500	4.0540	3	460	9.6	1460 FPM	510	32
3	DISH HOOD EXHAUST	DU50HFA	750	1.000	1465	0.500	0.3550	1	115	5.6		118	15.2

MUA FAN INFORMATION - Job#3084171

FAN UNIT NO.	TAG	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP.	RPM	H.P.	B.H.P.	Ø	VOLT	FLA	WEIGHT (LBS.)	SONES	BURNER EFFICIENCY(%)
2	GREASE HOOD MUA	A2-D.500-20D	20MF-2-MOD	A2-D.500	2000	3440	0.750	1443	3.000	1.6660	3	460	4.3	905	13.7	92

GAS FIRED MAKE-UP AIR UNIT(S)

FAN UNIT NO.	TAG	INPUT BTUs	OUTPUT BTUs	TEMP. RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE
2	GREASE HOOD MUA	343252	315792	85 deg F	7 in. w.c. - 14 in. w.c.	Natural

FAN OPTIONS

FAN UNIT NO.	TAG	OPTION (Qty. - Descr.)
1	GREASE EXHAUST	1 - Full Crating For Exhaust Fans
		1 - Utility Set Grease Cup
		1 - 3 Year Extended Motor Warranty
		1 - Fan Base Ceramic Seal - Ship Loose - For Grease Ducts
2	GREASE HOOD MUA	1 - RE24 - Rain Cap Assembly - Includes Hardware And Gasket.
		1 - AC Interlock Relay - 24VAC Coil
		1 - Motorized Backdraft Damper for A2-D Housing
		1 - Full Crating For Commercial Heater
		1 - Low Fire Start
3	DISH HOOD EXHAUST	1 - Inlet Pressure Gauge, 0-35"
		1 - Manifold Pressure Gauge, -5 to 15" wc
		1 - Separate 120V Wiring Package (Required and used only for DCV or Prewire with VFD) - Three Phase Only
		1 - 3 Year Extended Motor Warranty
		1 - Full Crating For Exhaust Fans
		1 - ECM Wiring Package-Exhaust - Manual or 0-10VDC Reference Speed Control (NIDEC Motor)

FAN ACCESSORIES

FAN UNIT NO.	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	GREASE EXHAUST	YES						
2	GREASE HOOD MUA					YES		
3	DISH HOOD EXHAUST		YES					

FAN SOUND INFORMATION

FAN UNIT NO.	MOTOR	RPM	LWA	SONES	DBA	DISTANCE FT	OCTAVE 1	OCTAVE 2	OCTAVE 3	OCTAVE 4	OCTAVE 5	OCTAVE 6	OCTAVE 7	OCTAVE 8
1	Exhaust	1265	90.9	32	79.4	5	91	90.8	92.1	86.2	85.2	83.5	79	74
2	Supply	1443	76.8	13.7	65.3	5	72	79.6	74.5	74.7	71	68.1	65.2	61.8
3	Exhaust	1465	78.7	15.2	67.2	5	75.2	77.3	83.1	75	70.6	68.4	64.2	55.2

CUSTOMER APPROVAL TO MANUFACTURE:

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Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



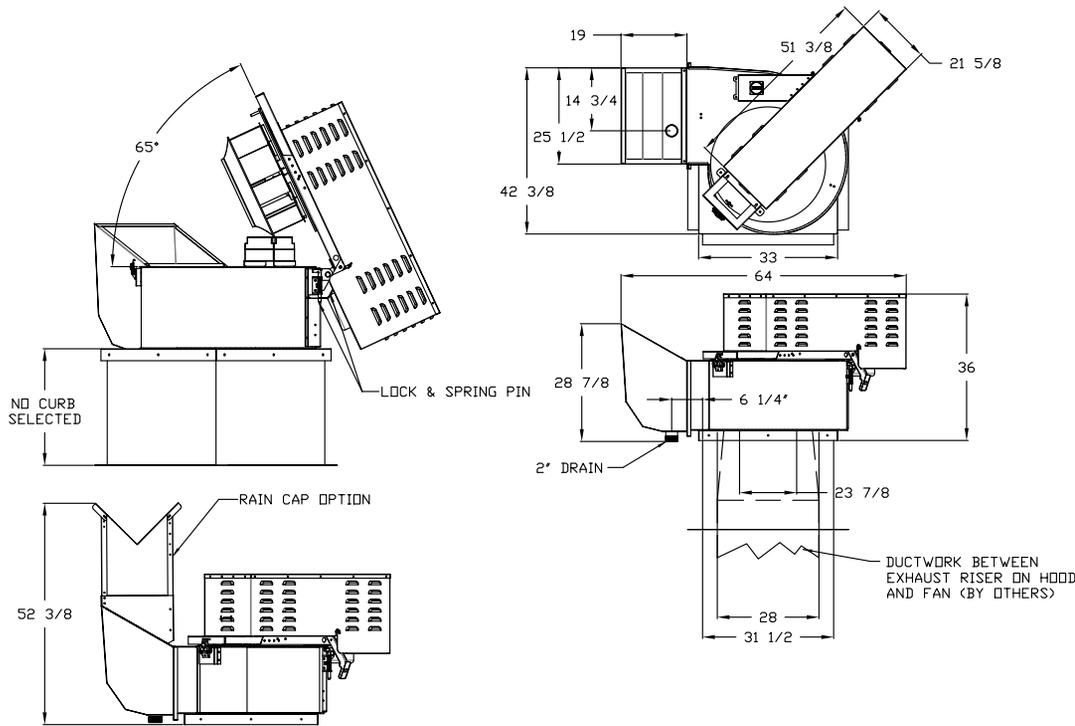
JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 6	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"

FAN #1 CASRE24DD - EXHAUST FAN (GREASE EXHAUST)



Reviewed for Code Compliance
Inspection Division
Approved with Conditions

Date: 01/10/18



FEATURES:

- ROOF MOUNTED FANS
- RESTAURANT MODEL
- UL762
- HIGH HEAT OPERATION DIRECT DRIVE 300°F (149°C)
- HIGH HEAT OPERATION BELT DRIVE 500°F (260°C)
- HEAT SLINGER
- GREASE CLASSIFICATION TESTING
- TILT OUT WHEEL
- LOCKING PIN FOR POWER PACK
- MOTOR WEATHER COVER
- INTERLOCKED DISCONNECT SWITCH

NORMAL TEMPERATURE TEST DIRECT DRIVE
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST BELT & DIRECT DRIVE
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS

- FULL CRATING FOR EXHAUST FANS
- UTILITY SET GREASE CUP
- 3 YEAR EXTENDED MOTOR WARRANTY
- FAN BASE CERAMIC SEAL - SHIP LOOSE - FOR GREASE DUCTS
- RE24 - RAIN CAP ASSEMBLY - INCLUDES HARDWARE AND GASKET.

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted

Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 7	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"

FAN#1 (GREASE EXHAUST) - EXHAUST PERFORMANCE CURVES.

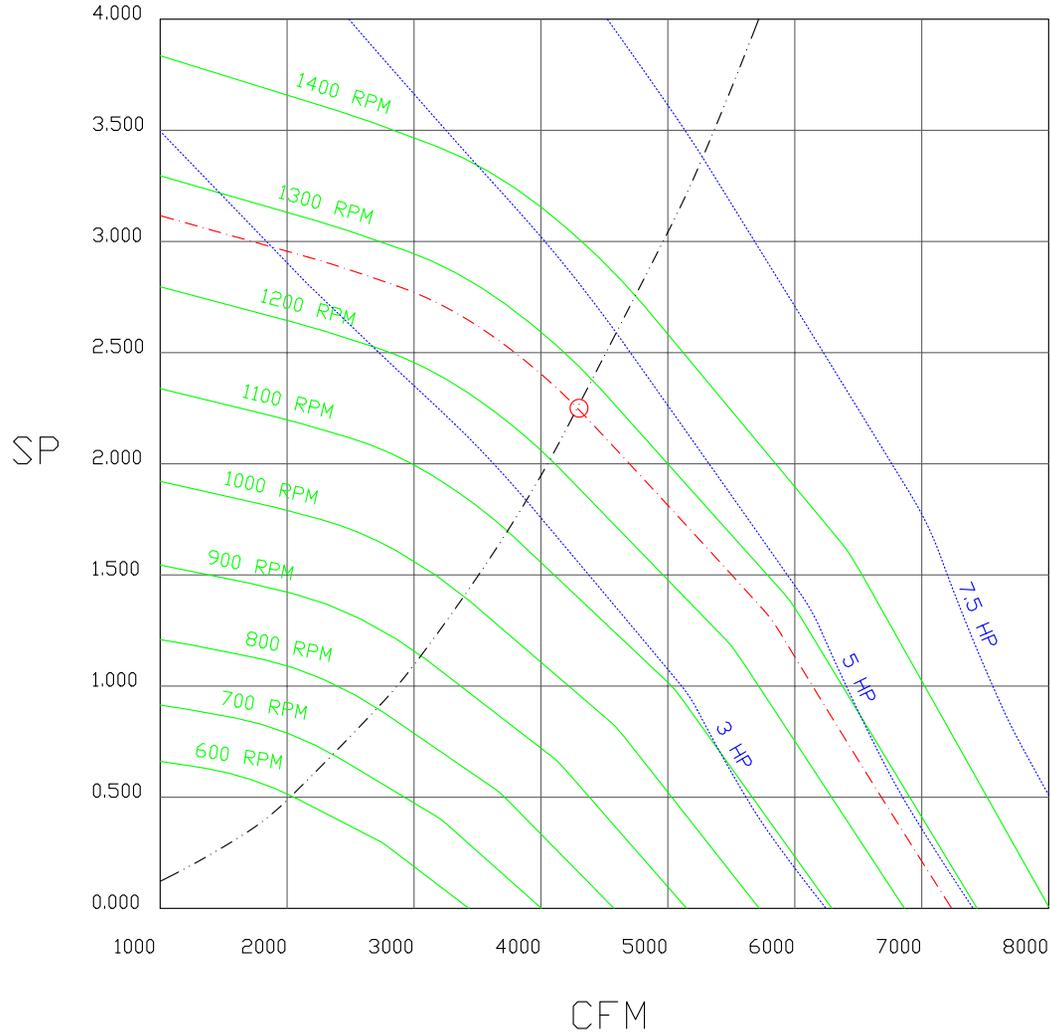
4300 CFM, 2.25 SP @ 1265 RPM and 4.054 BHP at 25 feet and 70 deg F
 * Please note that these curves were adjusted for job specific temperature and altitude.



Reviewed for Code Compliance
 Inspections Division
 Approved with Conditions

01/10/18

Date:



CUSTOMER APPROVAL TO MANUFACTURE:

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- Revise and Resubmit

SIGNATURE _____
 Your Title _____ Date _____



CAPTIVEAIRE

JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 8	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

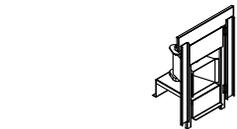
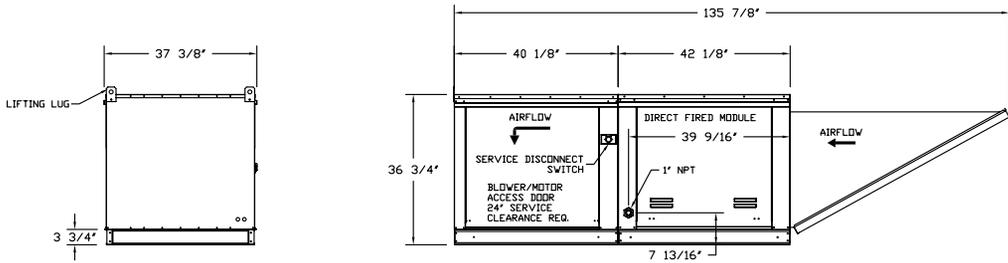
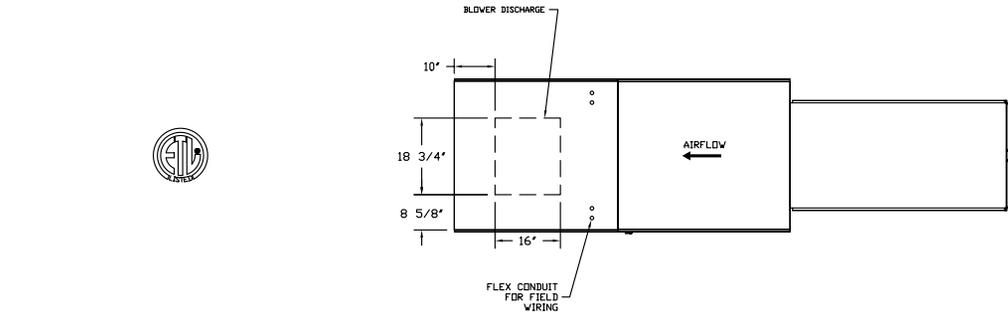
01/10/18

Date:

- FAN #2 A2-D.500-20D - HEATER (GREASE HOOD MUA)
1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 20' DIRECT DRIVE FAN
 2. INTAKE HOOD WITH EZ FILTERS
 3. DOWN DISCHARGE - AIR FLOW RIGHT -> LEFT
 4. COILING INTERLOCK RELAY, 24VAC COIL, 120V CONTACTS. LOCKS OUT BURNER CIRCUIT WHEN AC IS ENERGIZED.
 5. MODORIZED BACK DRAFT DAMPER 22.75" X 24" FOR SIZE 2 STANDARD & MODULAR HEATER AND UNTEMPERED UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LF120S ACTUATOR INCLUDED
 6. FULL CRATING FOR COMMERCIAL HEATERS FOR SHIPPING.
 7. LOW FIRE START. ALLOWS THE BURNER CIRCUIT TO ENERGIZE WHEN THE MODULATION CONTROL IS IN A LOW FIRE POSITION.
 8. GAS PRESSURE GAUGE, 0-35", 2.5" DIAMETER, 1/4" THREAD SIZE
 9. GAS PRESSURE GAUGE, -5 TO +15 INCHES WC, 2.5" DIAMETER, 1/4" THREAD SIZE
 10. SEPARATE 120VAC WIRING PACKAGE FOR MAKE-UP AIR UNITS. OPTION MUST BE SELECTED WHEN MOUNTING VFD IN PREWIRE PANEL OR WITH DCV PACKAGE. PROVIDES SEPARATE 120VAC INPUT TO SUPPLY FAN. THIS 120V SIGNAL MUST BE RUN BY ELECTRICIAN FROM DCV TO MUA SWITCH.
 11. 3 YEAR EXTENDED WARRANTY FOR FAN MOTOR. PARTS ONLY; DOES NOT INCLUDE LABOR.

SUPPLY SIDE HEATER INFORMATION:

WINTER TEMPERATURE = 0°F. TEMP. RISE = 85°F.
BTUs CALCULATED OFF STANDARD AIR DENSITY
OUTPUT BTUs AT ALTITUDE OF 0.0 ft. = 315792
INPUT BTUs AT ALTITUDE OF 0.0 ft. = 343252



Direct Fired Gas Profile Plate Assembly

Direct Fired Profile Plate Specifications

DESCRIPTION:
Direct fired burners shall have patented (US Patent No. US6600828D), self-adjusting profile plates designed to ensure proper air velocity and pressure drop across the burner. Profile plates shall have a maximum of 3000 BTU per hour per square foot of burner area. Burner shall have a maximum of 3000 BTU per hour per square foot of burner area.

OPERATION:
Spring-loaded burner profile plates are engineered to automatically react to the momentum of a flame or blowout, without the need for any motor or actuator, to reposition itself. Burners with this feature are designed for demand control ventilation (DCV) requirements.

CONSTRUCTION:
All profile plate assemblies shall be included in the BF unit's ETL listing and comply with combined safety standards ANSI Z89.1 and CAN 37 (overmanufacturing of heaters) and ANSI Z89.1 (overmanufacturing of heaters).

General Construction:
-Profile plates shall be formed from 304 galvanized steel.
-Profile plates shall vary in size per unit.
-Profile plates shall be mounted along the same plane as the discharge of the burner.
-Design shall incorporate properly located, permanently mounted service tags.
-Spring hinges shall be made from plated steel.

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted

Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 9	DRAWN BY BFC-21
REV.	SCALE 1/4" = 1'-0"

FAN#2 (GREASE HOOD MUA) - HEATER PERFORMANCE CURVES.

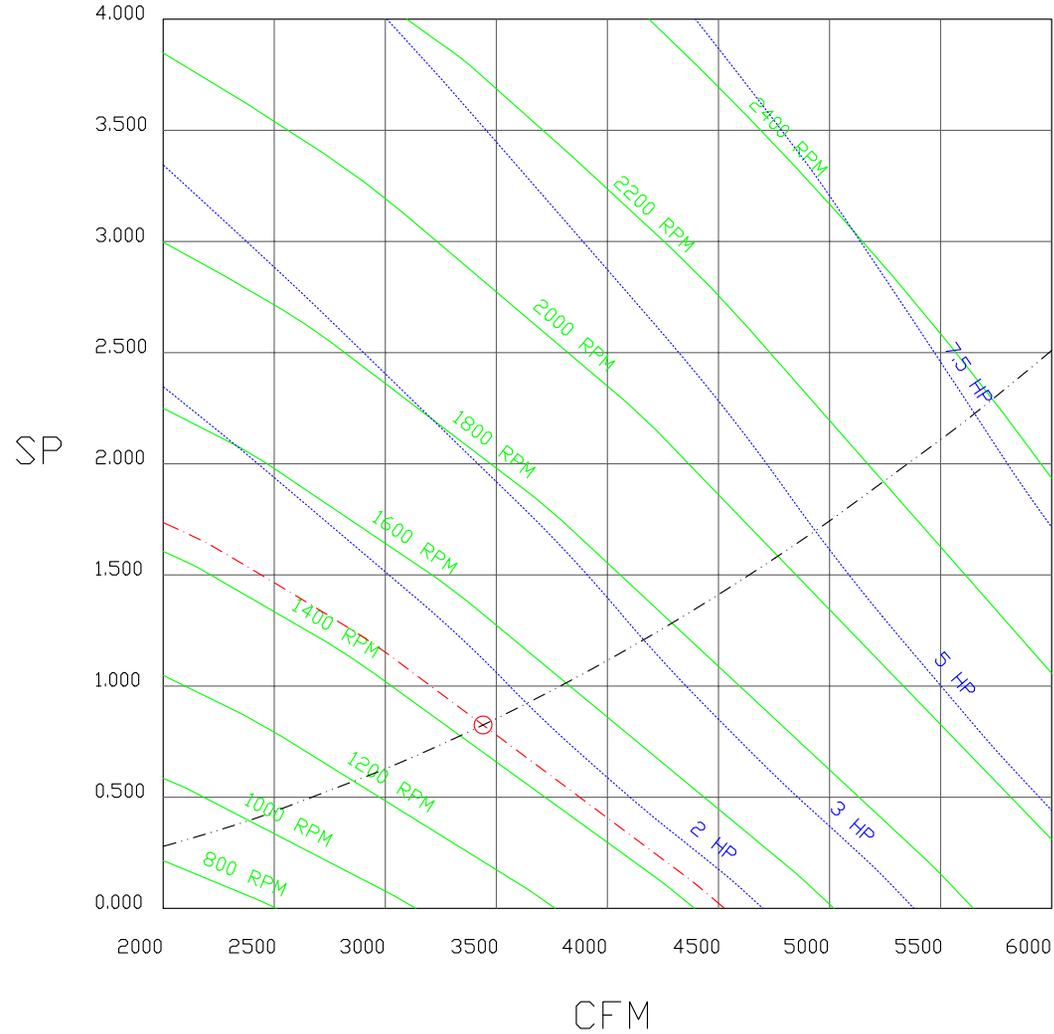


Reviewed for Code Compliance
Inspections Division
Approved with Conditions

01/10/18

Date:

3440 CFM, 0.825 SP @ 1443 RPM and 1.666 BHP at 243 feet and 85 deg F
* Please note that these curves were adjusted for job specific temperature and altitude.



CUSTOMER APPROVAL TO MANUFACTURE:

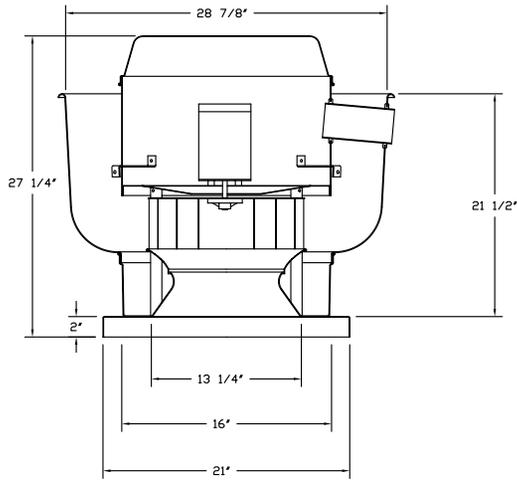
- Approved as Noted
- Approved with NO Exception Taken
- Revise and Resubmit

SIGNATURE _____
Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 10	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"

FAN #3 DU50HFA - EXHAUST FAN (DISH HOOD EXHAUST)



FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS)
- ROOF MOUNTED FANS
- UL705
- VARIABLE SPEED CONTROL
- INTERNAL WIRING
- WEATHERPROOF DISCONNECT
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE)

OPTIONS

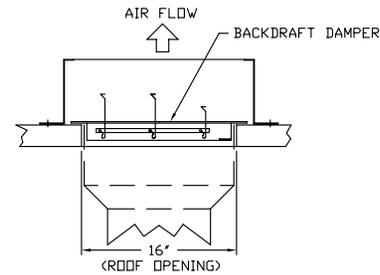
- FULL CRATING FOR EXHAUST FANS
- ECM WIRING PACKAGE-EXHAUST - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (NIDEC MOTOR)
- 3 YEAR EXTENDED MOTOR WARRANTY
- FAN BASE CERAMIC SEAL - SHIP LOOSE - FOR GREASE DUCTS
- I 15-BDD DAMPER
- HINGE KIT - SHIPS LOOSE FOR CURB SUPPLIED BY OTHERS



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/10/18

BACKDRAFT DAMPER INSTALLATION



CUSTOMER APPROVAL TO MANUFACTURE:

- Approved as Noted
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- Revise and Resubmit

SIGNATURE _____
Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 11	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"

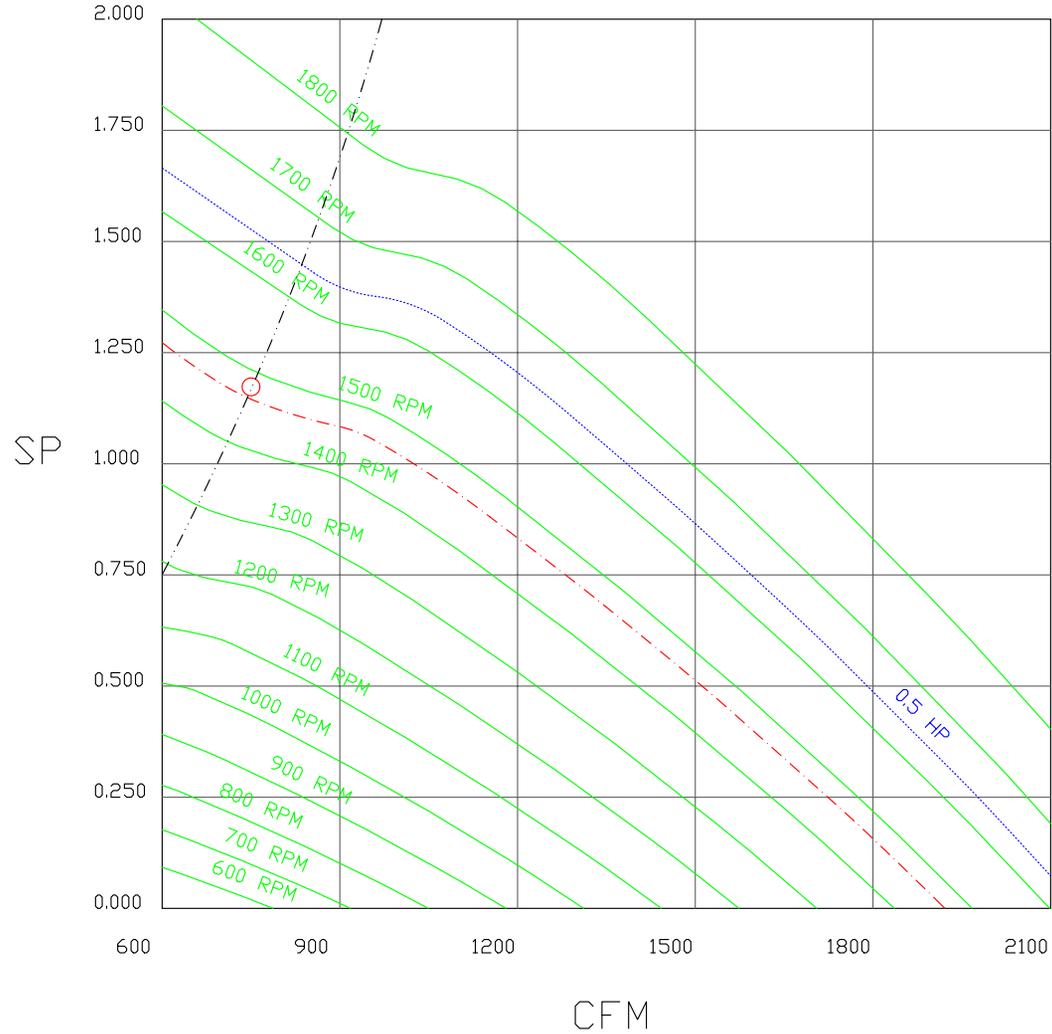
FAN#3 (DISH HOOD EXHAUST) - EXHAUST PERFORMANCE CURVES.



Reviewed for Code Compliance
Inspection Division
Approved with Conditions

Date: 01/10/18

750 CFM, 1.173 SP @ 1465 RPM and 0.355 BHP at 25 feet and 70 deg F
* Please note that these curves were adjusted for job specific temperature and altitude.



  			JOB Benkay r3	
			LOCATION PORTLAND, ME, 04101	
			DATE 7/17/2017	JOB # 3084171
			DWG # 12	DRAWN BY BFC-21
			REV.	SCALE 3/8" = 1'-0"

Exhaust Fan Wiring

JOB 3084171 - Benkay r3

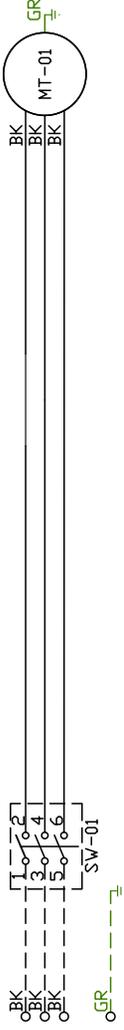
DRAWING NUMBER EXH3084171-1

SHIP DATE 7/17/2017

MODEL CASRB24DD

Installed Options

1



Component Identification Location

MT-01 Fan Motor [20]
 SW-01 Main disconnect switch [20]

Label

Description

Location

EXHAUST MOTOR_INFD 7.5HP-460V-3P-9.6FLA

ELECTRICAL INFORMATION
 MOTOR/CTRL MOP: 12.0A
 MOTOR/CTRL MOP: 20A

NOTES
 --- DENOTES FIELD WIRING
 --- DENOTES INTERNAL WIRING

WIRE COLOR
 BK - BLACK
 BL - BLUE
 BR - BROWN
 OR - ORANGE
 RD - RED
 WH - WHITE

Direct Fired Heater Wiring

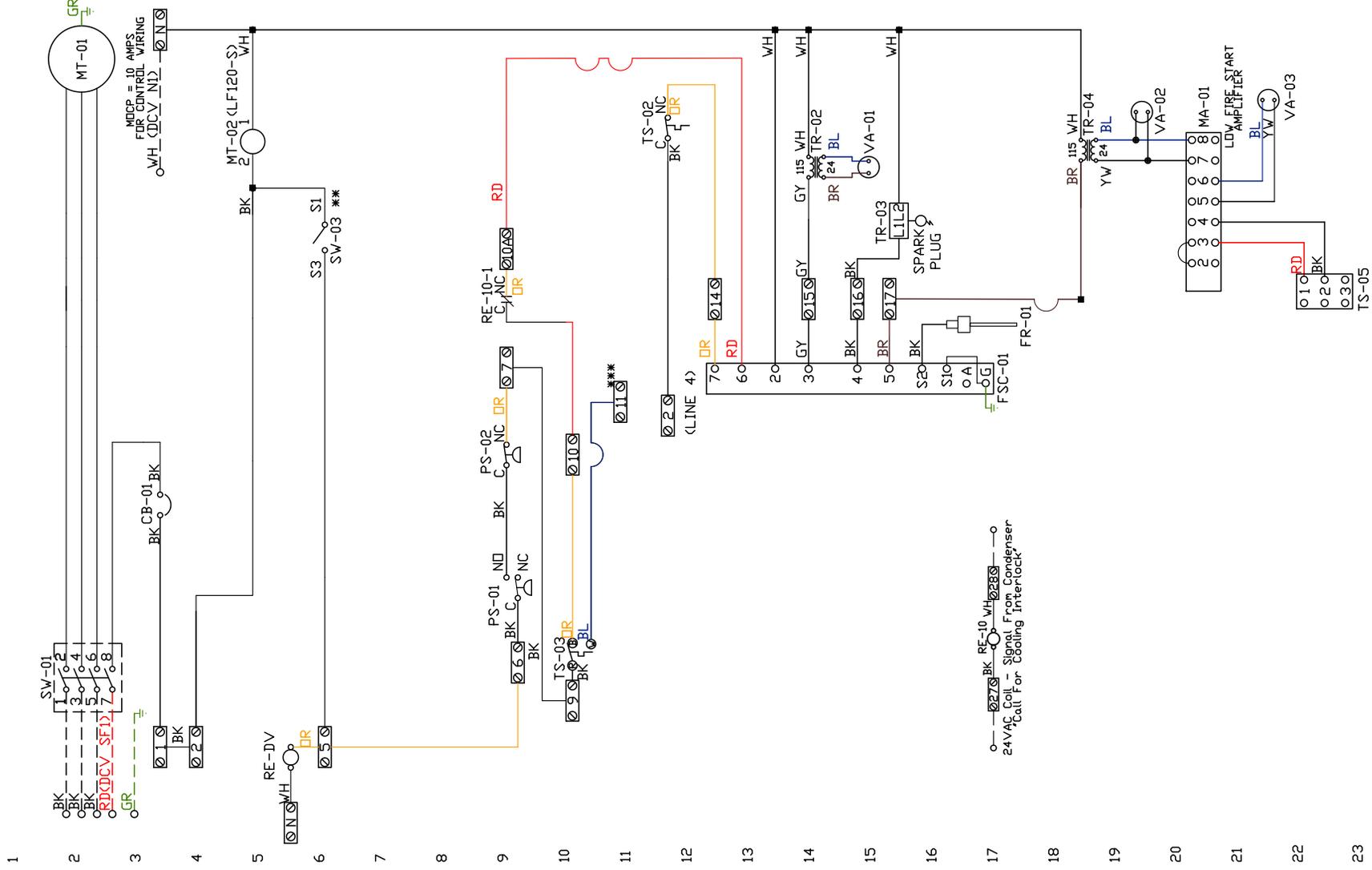
JOB 3084171 - Benkay r3

DRAWING NUMBER DF3084171-2

SHIP DATE 7/17/2017

MODEL A2-D.500-20D

ATTENTION ELECTRICIAN
 DROP FOR DISCONNECT CONNECTION WIRE TO YW C1ND
 IS FACTORY SUPPLIED IN DCV AND IL1B RE-DV-1
 CONNECT POWER TO THE DROP (D3&D7 IN EMSPLUS)



Installed Options
 Motorized Back Draft Damper
 Discharge Temp. Control

DCV Wiring
 24V AC Interlock Relay

Label	Description	Specification	Location
CB-01	Circuit breaker	(comp)	[3]
FR-01	Fine eye FSC	[16]	[11-14]
MA-01	Modulating amplifier	[19]	[19]
MT-01	Supply motor	[20]	[20]
MT-02	Damper motor	[50]	[50]
PS-01	Low Air-flow Switch	[39]	[39]
PS-02	High Air-flow Switch	[39]	[39]
RE-DV	DCV Relay	[10E50]	[10E50]
RE-10	AC Interlock Relay	[10E170]	[10E170]
SV-01	Main disconnect switch	[20]	[20]
SV-03	Damper end limit switch	[40]	[40]
TR-01	Power transformer(200v)	[30]	[30]
TR-02	Power transformer(20v)	[100]	[100]
TR-03	Ignition transformer	[140]	[140]
TR-04	Power transformer(20v)	[170]	[170]
TS-02	High temp limit switch	[100]	[100]
TS-03	Intake Air Sensor	[100]	[100]
TS-05	Discharge Air Sensor	[210]	[210]
VA-01	Pilot gas valve	[130]	[130]
VA-02	Main gas valve	[180]	[180]
VA-03	Modulating gas valve	[200]	[200]

SUPPLY MOTOR INFO
 3HP-460V-3P-4.3FLA

ELECTRICAL INFORMATION
 MOTOR ELECTRICAL DATA
 CONTROL CIRCUIT MCA 3.7A
 MOTOR CIRCUIT MCA 15.20A
 CONTROL CIRCUIT MOP 15A
 CONTROL CIRCUIT MOP 15A

NOTES
 --- DENOTES FIELD WIRING
 --- DENOTES INTERNAL WIRING

** TERMINALS S4 AND NF & AF SERIES AC
 *** TERMINAL 11 PROVIDES CONNECTION
 WIRE COLOR CONNECTION
 BK-BLACK YW - YELLOW
 BL-BLUE GR - GREEN
 BR - BRWN GR - GRAY
 DR - DRANGE PR - PURPLE

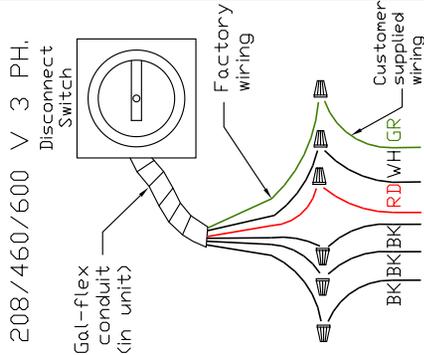
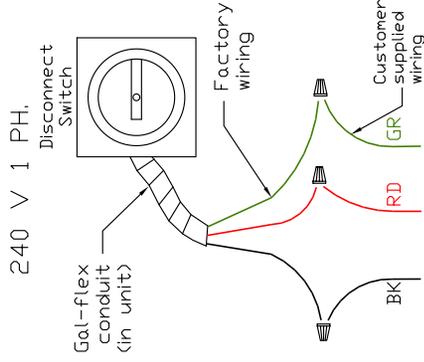
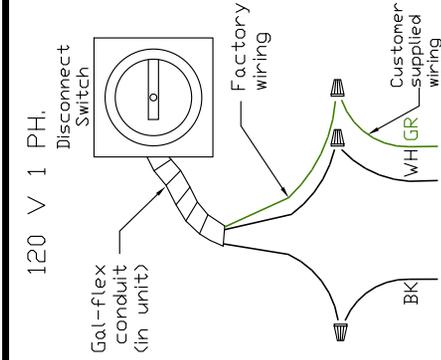
Installation Wiring

JOB 3084171 - Benkey r3

DRAWING NUMBER RP3084171-2

SHIP DATE 7/17/2017

MODEL A2-D.500-20D



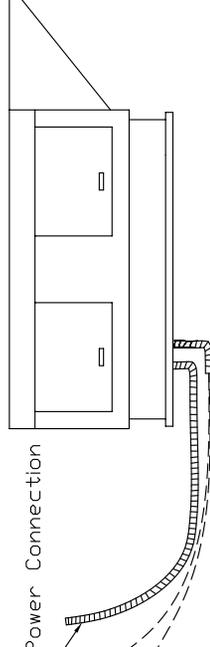
POWER FROM DEDICATED BREAKER

Installed Options

DCV Connections

See above details. Power Connection

D3 IN HEATER TO IL1A IN DCV
 D7 IN HEATER TO IL1B IN DCV
 WIRE TO DCV
 DCV



NOTES

WIRE COLOR

- BK - BLACK
- BL - BLUE
- BR - BROWN
- OR - ORANGE
- RD - RED
- WH - WHITE

Date:

01/10/18



Reviewed for Code Compliance
 Inspections Division
 Approved with Conditions

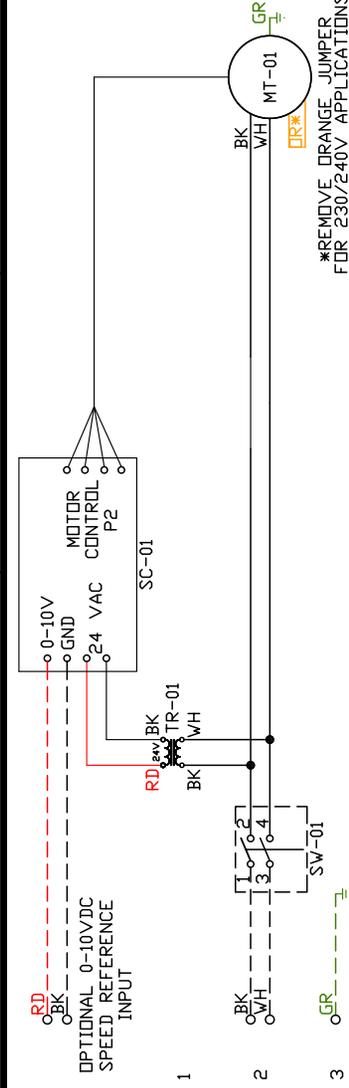
Exhaust Fan Wiring

JOB 3084171 - Benkay r3

DRAWING NUMBER EXH3084171-3

SHIP DATE 7/17/2017

MODEL DU50HFA



*REMOVE ORANGE JUMPER FOR 230/240V APPLICATIONS

Installed Options

Label	Component Description	Location
MT-01	Fan Motor	[20]
SC-01	RTC-FSC-1	[10]
SW-01	Main disconnect switch	[20]
TR-01	24VAC 20VA Transformer	[10]

EXHAUST MOTOR INFO
0.5HP-115V-1P-5.6FLA

ELECTRICAL INFORMATION
MOTOR/CTRL MOP: 70A
MOTOR/CTRL MOP: 15A

NOTES
--- DENOTES FIELD WIRING
___ DENOTES INTERNAL WIRING

WIRE COLOR

- BK - BLACK
- BL - BLUE
- BR - BROWN
- OR - ORANGE
- RD - RED
- WH - WHITE

Date:

10/10/18



Reviewed for Code Compliance
Inspections Division
Approved with Conditions



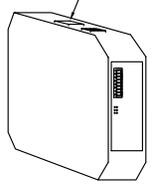
Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: **01/10/18**

ELECTRICAL PACKAGES - Job#3084171

NO.	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED							
				LOCATION	QUANTITY		FAN TAG	TYPE	?	H.P.	VOLT	FLA		
1		DCV-1111	Wall Mount In SS Box	05 - SS Wall Mount Box	1 Light 1 Fan	Smart Controls DCV	GREASE EXHAUST	Exhaust	3	7.500	460	9.6		
							GREASE HOOD MUA	Supply	3	3.000	460	4.3		

Field Connection to Router or Ethernet Switch
OR Factory Wired Connection to Cellular Kit

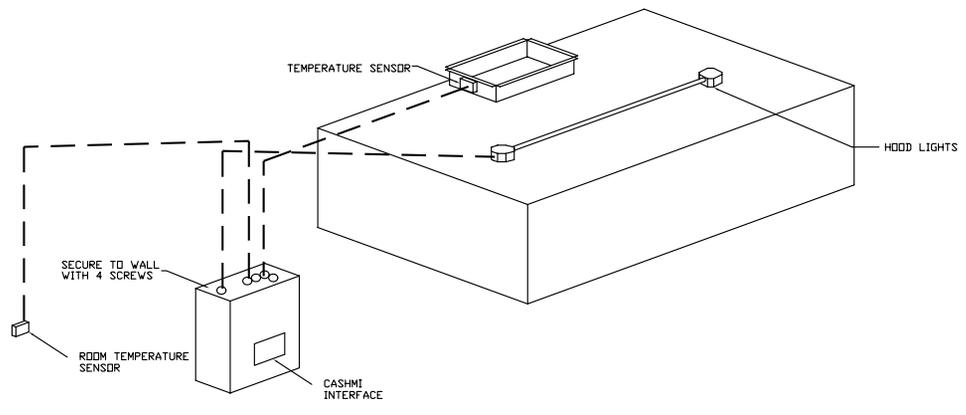


CASlink Monitor and Control

- Hood control panel to support communications to cloud-based Building Management System.
- Hood Control Panel to allow cloud-based Building Management System to monitor real time parameters outlined as MONITOR in the points list.
- Hood Control Panel to allow cloud-based Building Management System to control parameters outlined as CONTROL in the points list.
- Hood control panel to allow remote changes to system setting such as: VFD Frequencies, ECM speeds, temperature set points, fan and wash schedules, etc.

MONITORING AND CONTROL POINTS LIST

DCV Packages	Function	SC Packages	Function
Room Temperature	MONITOR	Room Temperature(s)	MONITOR
Duct Temperature(s)	MONITOR	Duct Temperature(s)	MONITOR
MUA Discharge Temperature	MONITOR	MUA Discharge Temperature	MONITOR
Kitchen RTU Discharge Temperature	MONITOR	Kitchen RTU Discharge Temperature	MONITOR
Fan Speed	MONITOR	Controller Faults	MONITOR
Fan Amperage	MONITOR	Fan Faults	MONITOR
Fan Power	MONITOR	Fan Status	MONITOR
VFD Faults	MONITOR	PCU Faults	MONITOR
Controller Faults	MONITOR	PCU Filter Clog Percentages	MONITOR
Fan Faults	MONITOR	Fire Condition	MONITOR
Fan Status	MONITOR	CDRE Fire System	MONITOR
PCU Faults	MONITOR	Building Pressures	MONITOR
PCU Filter Clog Percentages	MONITOR	Fans Button(s)	MONITOR & CONTROL
Fire Condition	MONITOR	Lights Button(s)	MONITOR & CONTROL
CDRE Fire System	MONITOR	Wash Button	MONITOR & CONTROL
Building Pressures	MONITOR		
Prep Time Button	MONITOR & CONTROL		
Fans Button	MONITOR & CONTROL		
Lights Button	MONITOR & CONTROL		
Wash Button	MONITOR & CONTROL		



WALL MOUNTED CONTROL CENTER

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted

Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 17	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/10/18

Demand Control Ventilation Hood Control Panel Specifications:

- Controls shall be listed by ETL (UL 508A) and shall comply with demand ventilation system turndown requirements outlined in IECC 403.2.8 (2015).
- The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure may be constructed of stainless steel or painted steel.
- Temperature probe(s) located in the exhaust duct riser(s) shall be constructed of stainless steel.
- A digital controller shall be provided to activate the hood exhaust fans dynamically based on a fixed differential between the ambient and duct temperatures sensors. This function shall meet the requirements of IMC 5.7.1.1.
- A digital controller shall provide adjustable hysteresis settings to prevent cycling of the fans after the cooking appliances have been turned off and/or the heat in the exhaust system is reduced.
- A digital controller shall provide an adjustable minimum fan run-time setting to prevent fan cycling.
- Variable Frequency Drives (VFDs) shall be provided for fans as required. The digital controller shall modulate the VFDs between a minimum setpoint and a maximum setpoint on demand. The duct temperature sensor input(s) to the digital controller shall be used to calculate the speed reference signal.
- The VFD speed range of operation shall be from 0% to 100% for the system, with the actual minimum speed set as required to meet minimum ventilation requirements.
- An internal algorithm to the digital controller shall modulate supply fan VFD speed proportional to all exhaust fans that are located in the same fan group as the supply fan.
- The system shall operate in PREP MODE during light cooking load or COOL DOWN MODE when sufficient heat remains underneath the hood system after cooking operations have completed. Operation during either of these periods will disable the supply fans and provide an exhaust fan speed that is equal to the minimum ventilation requirement.
- A digital controller shall disable the supply fan(s), activate the exhaust fan(s), activate the appliance shunt trip, and disable an electric gas valve automatically when fire condition is detected on a covered hood.
- A digital controller shall allow for external BMS fan control via Dry Contact (external control shall not override fan operation logic as required by code).
- An LCD interface shall be provided with the following features:
 - a. On/Off push button fan & light switch activation
 - b. Integrated gas valve reset for electronic gas valves (no reset relay required)
 - c. VFD Fault display with audible & visual alarm notification
 - d. Duct temperature sensor failure detection with audible & visual alarm notification
 - e. Mis-wired duct temperature sensor detection with audible & visual alarm notification
 - f. A single low voltage Cat-5 RJ45 wiring connection
 - g. An energy savings indicator that utilizes measured kWh from the VFDs

Sequence of Operations:

The hood control panel is capable of operating in one or more of the following states at any given time:

- Automatic: The system operates based on the differential between room temperature and the temperature at the hood cavity or exhaust duct collar. Fans activate at a configurable temperature differential threshold. Depending on the job configuration each fan zone can be configured as static or dynamic. These terms refer to whether a variable motor (such as EC Motors or VFD driven motors) modulate with temperature. If the panel is equipped with variable speed fans and the zone is defined as "dynamic", these will modulate within a user-defined range based on the temperature differential. Panels equipped with variable speed fans and a fan zone defined as "static", fans will run at a set speed calculated for the drive. Demand control ventilation systems are capable of modulating exhaust and make up air fan speeds per the requirements outlined in IECC 403.2.8.
- Manual: The system operates based on human input from an HMI.
- Schedule: A weekly schedule can be set to run fans for a specified period throughout the day. There are three occupied times per day to allow for the user to set up a time that is suitable to their needs. Any time that is within the defined occupied time, the system will run at modulation mode and follow the fan procedure algorithm based on temperature during this time. During unoccupied time, the system will have an extra offset to prevent unintended activation of the system during a time where the system is not being occupied.
- Other: The system operates based on the input from an external source (DDC, BMS or hard-wired interlock)

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted

Approved with NO Exception Taken

Revise and Resubmit

SIGNATURE _____

Your Title _____ Date _____



JOB Benkay r3	
LOCATION PORTLAND, ME, 04101	
DATE 7/17/2017	JOB # 3084171
DWG # 18	DRAWN BY BFC-21
REV.	SCALE 3/8" = 1'-0"

JOB NO
3084171

MODEL NUMBER
DCV-1111

DRAWN BY
INSTALL

DESCRIPTION OF OPERATION:
Demand Control Ventilation, w/ control for 1 Exhaust Fan, 1 Supply Fan, Exhaust on F modulate based on duct temperature. INVERTER DUTY THREE PHASE MOTOR REQUIRED! Room loose for field installation. Verify distance between VFD and Motor; additional cost could 50 feet.

JOB NAME
Benkey r3

DATE
7/17/2017

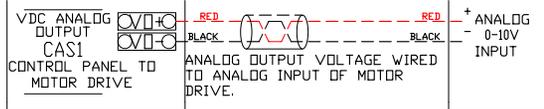
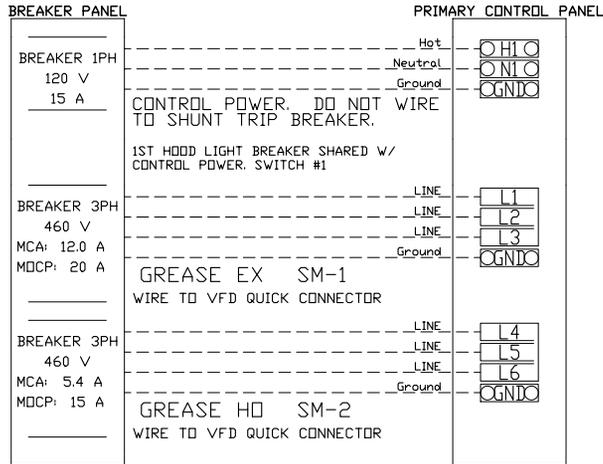
DWG NO
ECP #1-1



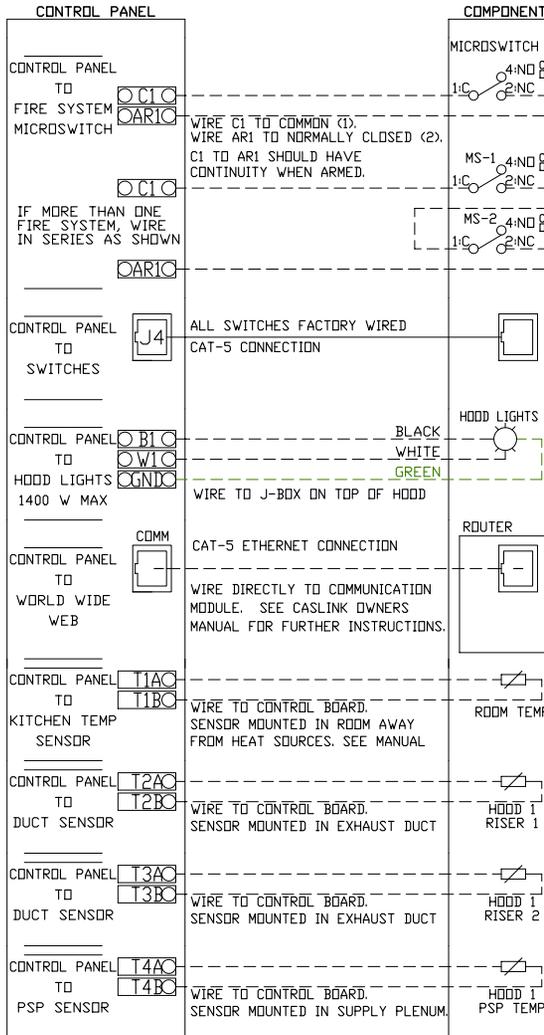
Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: **01/10/18**

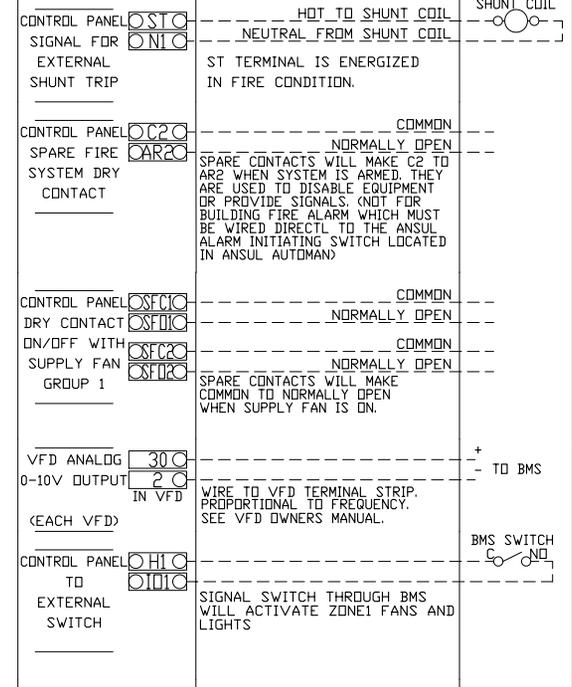
BREAKER PANEL TO PRIMARY CONTROL PANEL
Responsibility: Electrician
BREAKER SIZE SHOWN IS THE MAXIMUM ALLOWED



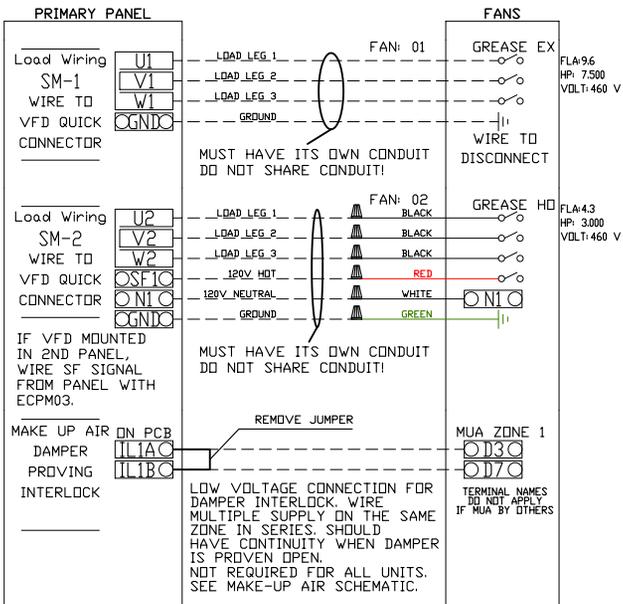
CONTROL PANEL TO ACCESSORY ITEMS
Responsibility: Electrician



THE FOLLOWING CONNECTIONS MAY OR MAY NOT BE REQUIRED BASED ON JOBSITE SPECIFICATIONS



CONTROL PANEL TO FANS
Responsibility: Electrician



FLA:96
HP: 7500
VOLT:460 V

FLA:43
HP: 3000
VOLT:460 V

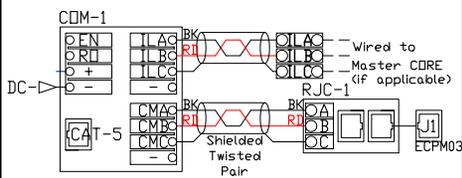
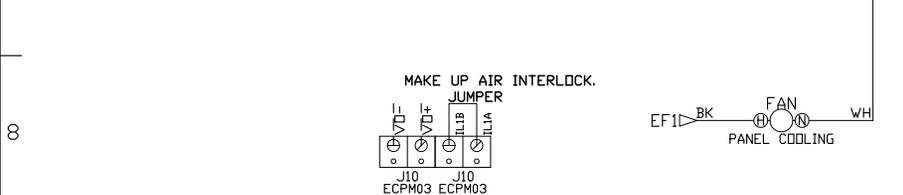
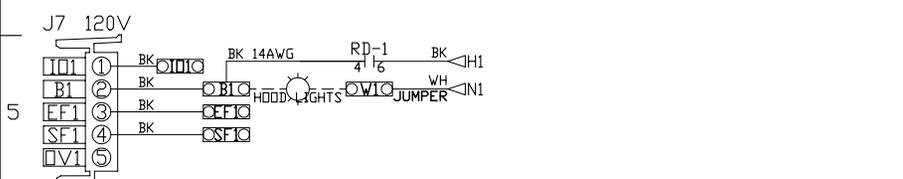
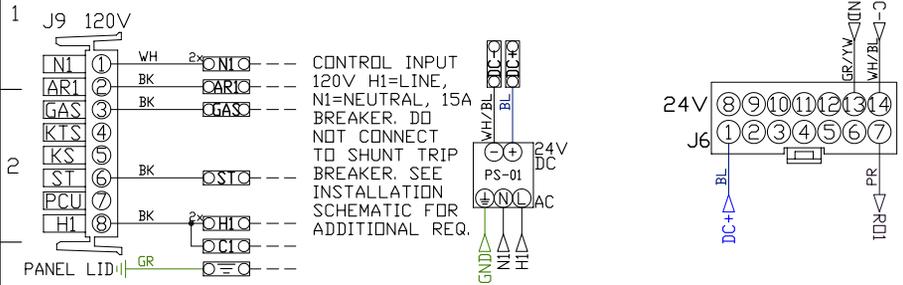
TERMINAL NAMES DO NOT APPLY IF MUA BY OTHERS



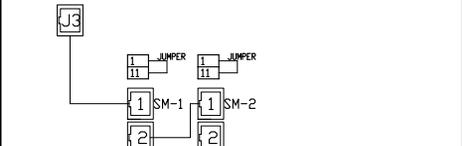
Reviewed for Code Compliance
Inspection Division
Approved with Conditions

Date: **01/10/18**

UNLESS SPECIFIED OTHERWISE, ALL FACTORY AC WIRING 16 AWG. ALL FACTORY DC WIRING 18 AWG.

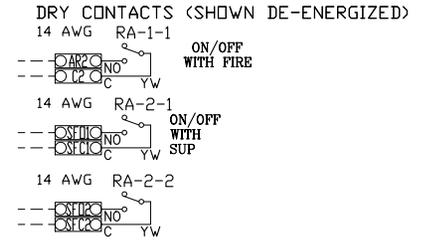
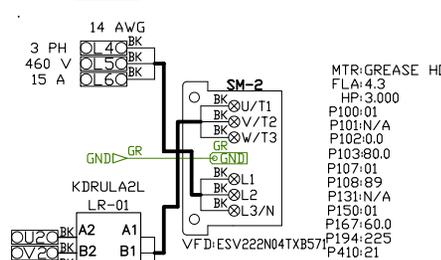
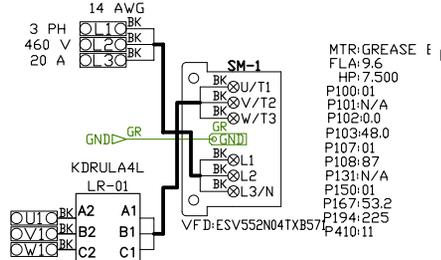


NOTE: All items on ECPM03 J3 line to be daisy chained from one component to the next, with EDL120A at end of line. Place PN: EDL120A in empty RJ45 port.



MOTOR POWER CIRCUIT

NOTE: IF VFD HAS 1PH 240V INPUT, USE L1 & L2 ONLY
IF VFD HAS 1PH 120V INPUT, USE L1 & N ONLY.



NO	4	3	NO	4	3
NC	2	1	NC	2	1
COIL	8	7	COIL	8	7
COM	6	5	COM	6	5

COMPONENT LIST

LABEL	DESCRIPTION
ST-X	Starter PN-varies
DL-X	Overload PN-varies
C-X	Contactors PN-varies
PS-1	Power Sup. 24VDC PN-MDP18-24A-1C
RA-x	120V Relay DPDT PN-34.110.0184.0
RD-x	24VDC Light Relay PN-34.110.0186.0
RJC-x	RJ45 to Twist Pair PNRJ45_MDDBUS_CONV.
CDM-1	CASLink MODULE PN:CDMM01
LR-X	Line/Load Reactor PN-varies

LEGEND

--- FIELD WIRING
--- FACTORY WIRING
BK- BLACK YW- YELLOW
BL- BLUE GY- GREY
BR- BROWN PR- PURPLE
OR- ORANGE RD- RED
WH- WHITE GR- GREEN
DR/BL- DR/BL STRIPE
BL/RD- BL/RD STRIPE
RD/GN- RD/GN STRIPE
WH/BL- WH/BL STRIPE

JOB NAME
Benkey r3

DRAWING TITLE
DCV-1111

DESCRIPTION OF OPERATION
Demand Control Ventilation, w/ control for 1 Exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire; Fans modulate based on duct temperature. INVERTER DUTY THREE PHASE MOTOR REQUIRED! Room temperature sensor shipped loose for field installation. Verify distance between VFD and Motor; additional cost could apply if distance exceeds 50 feet.

JOB NO 3084171	DRAWN BY
TYPE FACTORY	DATE 7/17/2017
DWG NO ECP #1-2	

System Design Verification (SDV)

If ordered, CAS Service will perform a System Design Verification (SDV) once all equipment has had a complete start up per the Operation and Installation Manual. Typically, the SDV will be performed after all inspections are complete.

Any field related discrepancies that are discovered during the SDV will be brought to the attention of the general contractor and corresponding trades on site. These issues will be documented and forwarded to the appropriate sales office. If CAS Service has to resolve a discrepancy that is a field issue, the general contractor will be notified and billed for the work. Should a return trip be required due to any field related discrepancy that cannot be resolved during the SDV, there will be additional trip charges.

During the SDV, CAS Service will address any discrepancy that is the fault of the manufacturer. Should a return trip be required, the general contractor and appropriate sales office will be notified. There will be no additional charges for manufacturer discrepancies.



Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: **01/10/18**

CUSTOMER APPROVAL TO MANUFACTURE:

- Approved as Noted
- Approved with NO Exception Taken
- Revise and Resubmit

SIGNATURE _____
Your Title _____ Date _____



CAPTIVEAIRE

<i>JOB</i> Benkay r3	
<i>LOCATION</i> PORTLAND, ME, 04101	
<i>DATE</i> 7/17/2017	<i>JOB #</i> 3084171
<i>DWG #</i> 21	<i>DRAWN BY</i> BFC-21
<i>REV.</i>	<i>SCALE</i> 3/8" = 1'-0"