

# Canada Facilities Maintenance Center

4200 Farm Hill Blvd  
Redwood City, CA 94061

Architect: Bunton Clifford Associates

Engineer: Interface Engineering

Contractor: WKW Mechanical Contractors, Inc.

IC08C1031



☐ **Charlotte, NC**  
3308-B Oak Lake Blvd.  
Charlotte, NC 28208  
704-372-4642

■ **San Francisco, CA**  
1555 Bayshore Highway  
Suite 200  
Burlingame, CA 94010  
650-616-7400

☐ **Las Vegas, NV**  
6283 South Valley View Blvd.  
Suite M  
Las Vegas, NV 89118  
702-896-8300

☐ **Morrisville, NC**  
507 Airport Blvd.,  
Suite 109  
Morrisville, NC 27560  
919-388-1800

☐ **Greensboro, NC**  
214-F East JJ Drive  
Greensboro, NC 27406  
336-273-9465

☐ **Greenville, SC**  
157-A Brozzini Ct.  
Greenville, SC 29615  
864-288-7746

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Representing:



Technologies:



**NETWORK 8000™**

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REVISIONS		
REV#	DESCRIPTION	DATE
1	RECORD DRAWINGS	7/16/2009

T.A.C. Engineer: Dmitry Yevtushenko  
Systems Integration Pac-Atlantic division  
1555 Bayshore Highway, Suite 200  
Burlingame, CA 94010  
Tel.: (650) 616-7400  
Fax: (650) 616-7408  
email: dmitriy.yevtushenko@tac.com

**BILL OF MATERIAL LISTING**

Installing Trade	Item #	Qty	Part Number	Description	Vendor	Manufacturer
<b>Electrical</b>						
Electrical	1	30	AMX24-MFT + P10003(A03)	NON-SPRING RETURN ACTUATOR 180	BELIMO	BELIMO
Electrical	2	2	BAP-10K-3(11K)-D-8	DUCT UNIT 8"	SINGLE SOURCED SOLUTIONS	BLDG AUTOMATION PRODUCTS
Electrical	3	1	BAP-10K-3(11K)-O-WP	OUTSIDE AIR SENSOR IN WEATHER	SINGLE SOURCED SOLUTIONS	BLDG AUTOMATION PRODUCTS
Electrical	4	30	DMPR-KC001	DELTA Support Bracket with bea	DELTA	DELTA
Electrical	5	148	DMPR-KC203	DELTA drive arm & u-bolt kit	DELTA	DELTA
Electrical	6	6	E112-908	SPLIT CORE CURRENT SWITCH; 1-1	SINGLE SOURCED SOLUTIONS	VERIS
Electrical	7	2	FUN-RIB2402SB	Enclosed Relay 20 Amp SPST-N/O	SINGLE SOURCED SOLUTIONS	FDI
Electrical	8	2	FUN-RIBU1-C	RIB SPDT FRM 1C 10A@277 VAC 10	SINGLE SOURCED SOLUTIONS	FDI
Electrical	9	18	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	SINGLE SOURCED SOLUTIONS	FDI
Electrical	10	2	LMB24-MFT US A03	NON-SPRING RETURN ACTUATOR 45	BELIMO	BELIMO
Electrical	11	1	MAC-A520-2A1	STATIC PRESSURE SENSOR, 8" ALU	SINGLE SOURCED SOLUTIONS	MAMAC SYSTEMS
Electrical	12	14	MN-S3	IA MICRONET S-LINK SENSOR W/OV	TAC	TAC AUTOMATION
Electrical	13	1	MS40-7043	DURADRV ACT ELEC SR 0-10 VDC	TAC	TAC COMPONENTS
Electrical	14	16	NMB24-MFT + P10003(A03)	NON-SPRING RETURN ACTUATOR 90	BELIMO	BELIMO
Electrical	15	1	TSMN-90220-850	10K THRMSTR 11K SHNT&PRGM JACK	TAC	TAC COMPONENTS
Electrical	16	4	VER-CWLSXX	WALL MTD CO2 TRAN/LCD DISP & A	SINGLE SOURCED SOLUTIONS	VERIS
Electrical	17	1	VER-GWMXS	CO2 SENSOR - WALL MTD 4-20MA	SINGLE SOURCED SOLUTIONS	VERIS
Electrical	18	1	VER-H8036-0400-3	MODBUS NETWORK POWER METER	VERIS	VERIS
<b>Network</b>						
Network	19	1	IA-ENT-N	SW FOR ADDITIONL UNC'S	TAC	TAC AUTOMATION
Network	20	2	LON-TERM2	LON TERMINATION, DOUBLE, FOR F	TAC	TAC AUTOMATION
Network	21	1	UNC-520-2	NETWORK CONTROLLER 10/100 MBIT	TAC	TAC AUTOMATION
<b>Panel</b>						
Panel	22	1	A24N20ALP	24"x20"x6" NEMA 1 ENCLOSURE	HOFFMAN	HOFFMAN
Panel	23	1	A24N20MP	24"H x 20"W BACKPLATE	HOFFMAN	HOFFMAN
Panel	24	2	A36N24ALP	36"x24"x6" NEMA 1 ENCLOSURE	HOFFMAN	HOFFMAN
Panel	25	2	A36N24MP	36"H x 24"W BACKPLATE	HOFFMAN	HOFFMAN
Panel	26	1	G-100	CONTROL SERVER	ENFLEX	ENFLEX
Panel	27	8	MNL-15RS3	MN 150 CONT. WITH LONMARK ROOF	TAC	TAC AUTOMATION
Panel	28	6	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC	TAC AUTOMATION
Panel	29	2	T-203	TRANSFORMER 170 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS	CORE
Panel	30	3	T-204	TRANSFORMER 240 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS	CORE
Panel	31	1	T-208	TRANSFORMER 96 VA 120P-24VS U	SINGLE SOURCED SOLUTIONS	CORE
Panel	32	1	VER-PXPLX01S	DIFF PRES SEN DRY MEDIA PNL MT	SINGLE SOURCED SOLUTIONS	VERIS

Revisions	
#	Date
1	07/16/09
2	
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance  
 Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**BILL OF MATERIALS**

JOB NUMBER  
IC08C1031  
 FILE NAME  
BOM.vsd  
 SHEET NO.  
1 OF 13

DAMPER SCHEDULE							
Number	Qty.	Service		Width (inches)	Height (inches)	Area (sq. ft.)	Blades
1	1	RM 121	Wall Louver	48	36	11.9	parallel
2	1	RM 121	Wall Louver	48	36	11.9	parallel
3	1	RM 121	Wall Louver	48	36	11.9	parallel
4	1	RM 121	Wall Louver	48	36	11.9	parallel
5	1	RM 121	Wall Louver	48	36	11.9	parallel
6	1	RM 121	Wall Louver	48	36	11.9	parallel
7	1	RM 121	Wall Louver	48	36	11.9	parallel
8	1	RM 121	Wall Louver	48	36	11.9	parallel
9	1	RM 121	Wall Louver	48	36	11.9	parallel
10	1	RM 121	Wall Louver	48	36	11.9	parallel
11	1	RM 121	Wall Louver	48	36	11.9	parallel
12	1	RM 121	Wall Louver	48	36	11.9	parallel
13	1	RM 121	Wall Louver	48	36	11.9	parallel
14	1	RM 121	Wall Louver	48	36	11.9	parallel
15	1	RM 121	Wall Louver	48	36	11.9	parallel
16	1	RM 121	Wall Louver	48	36	11.9	parallel
17	1	RM 121	Ceiling Louver	48	16	5.3	parallel
18	1	RM 121	Ceiling Louver	48	16	5.3	parallel
19	1	RM 121	Ceiling Louver	48	16	5.3	parallel
20	1	RM 121	Ceiling Louver	48	16	5.3	parallel
21	1	RM 121	Ceiling Louver	48	16	5.3	parallel
22	1	RM 121	Ceiling Louver	48	16	5.3	parallel
23	1	RM 121	Ceiling Louver	48	16	5.3	parallel
24	1	RM 121	Ceiling Louver	48	16	5.3	parallel
25	1	RM 121	Ceiling Louver	48	16	5.3	parallel
26	1	RM 121	Ceiling Louver	48	16	5.3	parallel
27	1	RM 121	Ceiling Louver	48	16	5.3	parallel
28	1	RM 121	Ceiling Louver	48	16	5.3	parallel
29	1	RM 121	Ceiling Louver	48	16	5.3	parallel
30	1	RM 121	Ceiling Louver	48	16	5.3	parallel
31	1	RM 121	Ceiling Louver	48	16	5.3	parallel
32	1	RM 121	Ceiling Louver	48	16	5.3	parallel
33	1	RM 121	Ceiling Louver	48	16	5.3	parallel
34	1	RM 121	Ceiling Louver	48	16	5.3	parallel
35	1	RM 121	Ceiling Louver	48	16	5.3	parallel
36	1	RM 121	Ceiling Louver	48	16	5.3	parallel
37	1	RM 121	Ceiling Louver	48	16	5.3	parallel
38	1	RM 121	Ceiling Louver	48	16	5.3	parallel
39	1	RM 121	Ceiling Louver	48	16	5.3	parallel
40	1	RM 121	Ceiling Louver	48	16	5.3	parallel
41	1	RM 121	Ceiling Louver	48	16	5.3	parallel
42	1	RM 121	Ceiling Louver	48	16	5.3	parallel
43	1	RM 121	Ceiling Louver	48	16	5.3	parallel
44	1	RM 121	Ceiling Louver	48	16	5.3	parallel
45	1	RM 121	Ceiling Louver	48	16	5.3	parallel
46	1	RM 121	Ceiling Louver	48	16	5.3	parallel
47	1	RM 121	Ceiling Louver	48	16	5.3	parallel
48	1	RM 121	Ceiling Louver	48	16	5.3	parallel
49	1	RM 121	Ceiling Louver	48	16	5.3	parallel
50	1	RM 121	Ceiling Louver	48	16	5.3	parallel
51	1	RM 121	Ceiling Louver	48	16	5.3	parallel
52	1	RM 121	Ceiling Louver	48	16	5.3	parallel
53	1	RM 121	Ceiling Louver	48	16	5.3	parallel
54	1	RM 121	Ceiling Louver	48	16	5.3	parallel
55	1	RM 121	Ceiling Louver	48	16	5.3	parallel
56	1	RM 121	Ceiling Louver	48	16	5.3	parallel
57	1	RM 121	Ceiling Louver	48	16	5.3	parallel
58	1	RM 121	Ceiling Louver	48	16	5.3	parallel
59	1	RM 121	Ceiling Louver	48	16	5.3	parallel
60	1	RM 121	Ceiling Louver	48	16	5.3	parallel
61	1	RM 121	Ceiling Louver	48	16	5.3	parallel
62	1	RM 121	Ceiling Louver	48	16	5.3	parallel
63	1	RM 121	Ceiling Louver	48	16	5.3	parallel
64	1	RM 121	Ceiling Louver	48	16	5.3	parallel
65	1	RM 121	Ceiling Louver	48	16	5.3	parallel
66	1	RM 121	Ceiling Louver	48	16	5.3	parallel
67	1	RM 121	Ceiling Louver	48	16	5.3	parallel
68	1	RM 121	Ceiling Louver	48	16	5.3	parallel
69	1	RM 121	Ceiling Louver	48	16	5.3	parallel
70	1	RM 121	Ceiling Louver	48	16	5.3	parallel
71	1	RM 121	Ceiling Louver	48	16	5.3	parallel
72	1	RM 121	Ceiling Louver	48	16	5.3	parallel
73	1	RM 121	Ceiling Louver	48	16	5.3	parallel
74	1	RM 121	Ceiling Louver	48	16	5.3	parallel
75	1	RM 121	Ceiling Louver	48	16	5.3	parallel

DAMPER SCHEDULE							
Number	Qty.	Service		Width (inches)	Height (inches)	Area (sq. ft.)	Blades
76	1	RM 121	Ceiling Louver	48	16	5.3	parallel
77	1	RM 121	Ceiling Louver	48	16	5.3	parallel
78	1	RM 121	Ceiling Louver	48	16	5.3	parallel
79	1	RM 121	Ceiling Louver	48	16	5.3	parallel
80	1	RM 121	Ceiling Louver	48	16	5.3	parallel
81	1	RM 121	Ceiling Louver	48	16	5.3	parallel
82	1	RM 121	Ceiling Louver	48	16	5.3	parallel
83	1	RM 121	Ceiling Louver	48	16	5.3	parallel
84	1	RM 121	Ceiling Louver	48	16	5.3	parallel
85	1	RM 121	Ceiling Louver	48	16	5.3	parallel
86	1	RM 121	Ceiling Louver	48	16	5.3	parallel
87	1	RM 121	Ceiling Louver	48	16	5.3	parallel
88	1	RM 121	Ceiling Louver	48	16	5.3	parallel
89	1	RM 121	Ceiling Louver	48	16	5.3	parallel
90	1	RM 121	Ceiling Louver	48	16	5.3	parallel
91	1	RM 121	Ceiling Louver	48	16	5.3	parallel
92	1	RM 121	Ceiling Louver	48	16	5.3	parallel
93	1	RM 121	Ceiling Louver	48	16	5.3	parallel
94	1	RM 121	Ceiling Louver	48	16	5.3	parallel
95	1	RM 121	Ceiling Louver	48	16	5.3	parallel
96	1	RM 121	Ceiling Louver	48	16	5.3	parallel
97	1	RM 123	Wall Louver	48	36	11.9	parallel
98	1	RM 123	Ceiling Louver	48	16	5.3	parallel
99	1	RM 123	Ceiling Louver	48	16	5.3	parallel
100	1	RM 123	Ceiling Louver	48	16	5.3	parallel
101	1	RM 123	Ceiling Louver	48	16	5.3	parallel
102	1	RM 123	Ceiling Louver	48	16	5.3	parallel
103	1	RM 123	Ceiling Louver	48	16	5.3	parallel
104	1	RM 123	Ceiling Louver	48	16	5.3	parallel
105	1	RM 123	Ceiling Louver	48	16	5.3	parallel
106	1	RM 125	Wall Louver	48	36	11.9	parallel
107	1	RM 125	Wall Louver	48	36	11.9	parallel
108	1	RM 125	Wall Louver	48	36	11.9	parallel
109	1	RM 125	Wall Louver	48	36	11.9	parallel
110	1	RM 125	Wall Louver	48	36	11.9	parallel
111	1	RM 125	Ceiling Louver	48	16	5.3	parallel
112	1	RM 125	Ceiling Louver	48	16	5.3	parallel
113	1	RM 125	Ceiling Louver	48	16	5.3	parallel
114	1	RM 125	Ceiling Louver	48	16	5.3	parallel
115	1	RM 125	Ceiling Louver	48	16	5.3	parallel
116	1	RM 125	Ceiling Louver	48	16	5.3	parallel
117	1	RM 125	Ceiling Louver	48	16	5.3	parallel
118	1	RM 125	Ceiling Louver	48	16	5.3	parallel
119	1	RM 125	Ceiling Louver	48	16	5.3	parallel
120	1	RM 125	Ceiling Louver	48	16	5.3	parallel
121	1	RM 125	Ceiling Louver	48	16	5.3	parallel
122	1	RM 125	Ceiling Louver	48	16	5.3	parallel
123	1	RM 125	Ceiling Louver	48	16	5.3	parallel
124	1	RM 125	Ceiling Louver	48	16	5.3	parallel
125	1	RM 125	Ceiling Louver	48	16	5.3	parallel
126	1	RM 125	Ceiling Louver	48	16	5.3	parallel
127	1	RM 126	Wall Louver	48	36	11.9	parallel
128	1	RM 126	Wall Louver	48	36	11.9	parallel
129	1	RM 126	Wall Louver	48	36	11.9	parallel
130	1	RM 126	Wall Louver	48	36	11.9	parallel
131	1	RM 126	Ceiling Louver	48	16	5.3	parallel
132	1	RM 126	Ceiling Louver	48	16	5.3	parallel
133	1	RM 126	Ceiling Louver	48	16	5.3	parallel
134	1	RM 126	Ceiling Louver	48	16	5.3	parallel
135	1	RM 126	Ceiling Louver	48	16	5.3	parallel
136	1	RM 126	Ceiling Louver	48	16	5.3	parallel
137	1	RM 126	Ceiling Louver	48	16	5.3	parallel
138	1	RM 126	Ceiling Louver	48	16	5.3	parallel
139	1	RM 128	Wall Louver	48	36	11.9	parallel
140	1	RM 128	Wall Louver	48	36	11.9	parallel
141	1	RM 128	Ceiling Louver	48	16	5.3	parallel
142	1	RM 128	Ceiling Louver	48	16	5.3	parallel
143	1	RM 128	Ceiling Louver	48	16	5.3	parallel
144	1	RM 128	Ceiling Louver	48	16	5.3	parallel
145	1	RM 128	Ceiling Louver	48	16	5.3	parallel
146	1	RM 128	Ceiling Louver	48	16	5.3	parallel
147	1	RM 128	Ceiling Louver	48	16	5.3	parallel
148	1	RM 128	Ceiling Louver	48	16	5.3	parallel
149	1	F1-MD	Bypass Dmpr	24	12	2.0	parallel
150	1	F2-MD	Bypass Dmpr	24	12	2.0	parallel



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Revisions	
#	Date
1	07/14/09
2	
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

JOB NUMBER: IC08C1031  
 FILE NAME: RADIANT HEATERS.vsd  
 SHEET NO.: DAMPER SCHEDULE  
 2 OF 13

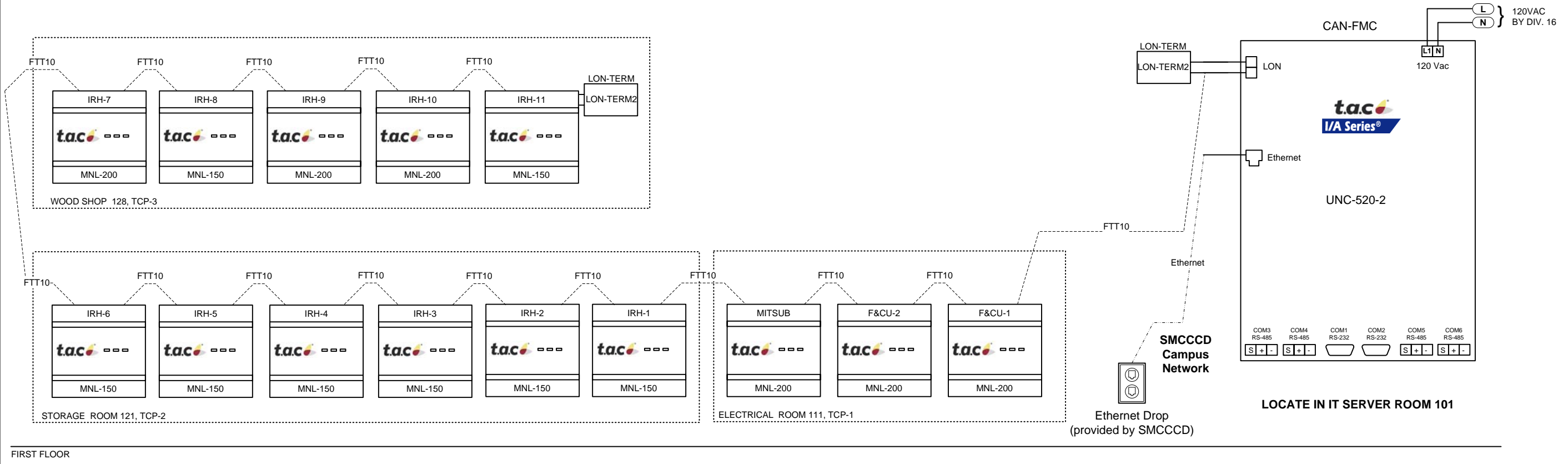
Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061

# SYSTEM RISER

NETWORK Device	Qty	Part Number	Description	Vendor
Network				
CAN-FMC	1	UNC-520-2	NETWORK CONTROLLER 10/100 MBIT	TAC
CAN-FMC_1	1	IA-ENT-N	SW FOR ADDITIONL UNC'S	TAC
LON-TERM	2	LON-TERM2	LON TERMINATION, DOUBLE, FOR F	TAC



Revisions	
#	Date
1	07/14/09
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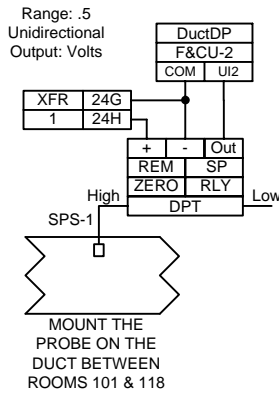
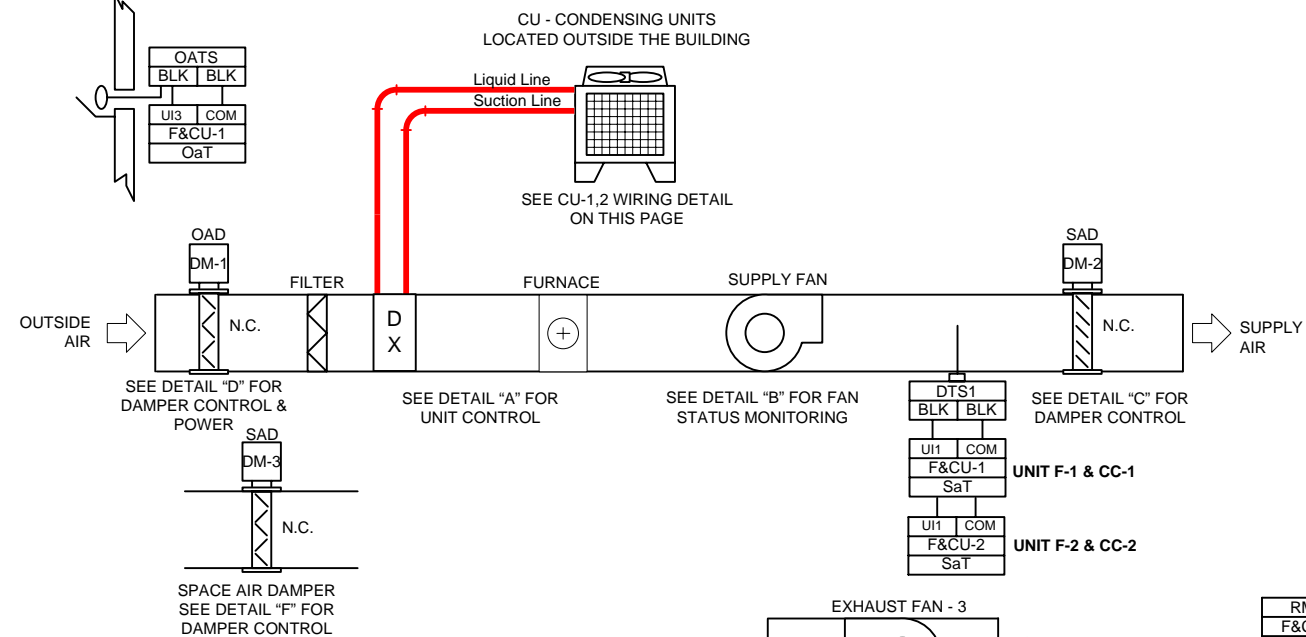
TOTAL NUMBER OF LON CONTROLLERS IS 14

**Architect:** Bunton Clifford Associates  
**Engineer:** Interface Engineering  
**Contractor:** WKW Mechanical Contractors, Inc.  
**Designed by:** DY Date: 04/04/2008  
**Software by:** Date:  
**Checked by:** Date:

**JOB NUMBER:** IC08C1031  
**FILE NAME:** RISER.vsd  
**SHEET NO.:** 3 OF 13

**Canada Facilities Maintenance Center**  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**SYSTEM RISER**

# FURNACE UNITS w/ DX COOLING COILS (F-1 & CC-1; F-2 & CC-2) LOCATED IN MECHANICAL ROOM 127 (TYPICAL OF 2)

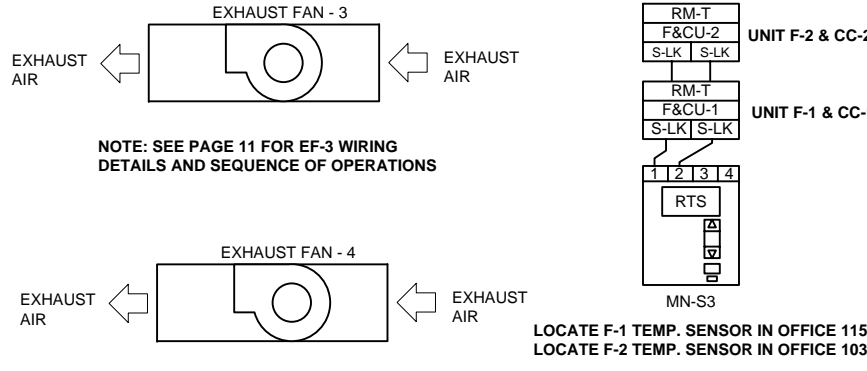
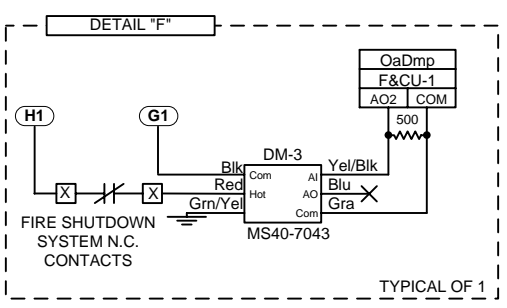


FURNACE UNIT Device	Qty	Part Number	Description	Vendor
Electrical				
CT1-2	2	E112-908	SPLIT CORE CURRENT SWITCH; 1-1	SINGLE SOURCED SOLUTIONS
DM-2	2	LMB24-MFT US A03	NON-SPRING RETURN ACTUATOR 45	BELIMO
DM-3	1	MS40-7043	DURADRV ACT ELEC SR 0-10 VDC	TAC
DTS1-2	2	BAP-10K-3(11K)-D-8	DUCT UNIT 8"	SINGLE SOURCED SOLUTIONS
OATS	1	BAP-10K-3(11K)-O-WP	OUTSIDE AIR SENSOR IN WEATHER	SINGLE SOURCED SOLUTIONS
R1	1	FUN-RIBU1-C	RIB SPDT FRM 1C 10A@277 VAC 10	SINGLE SOURCED SOLUTIONS
RTS	2	MN-S3	1A MICRONET S-LINK SENSOR W/OV	TAC
SPS-1	1	MAC-A520-2A1	STATIC PRESSURE SENSOR, 8" ALU	SINGLE SOURCED SOLUTIONS

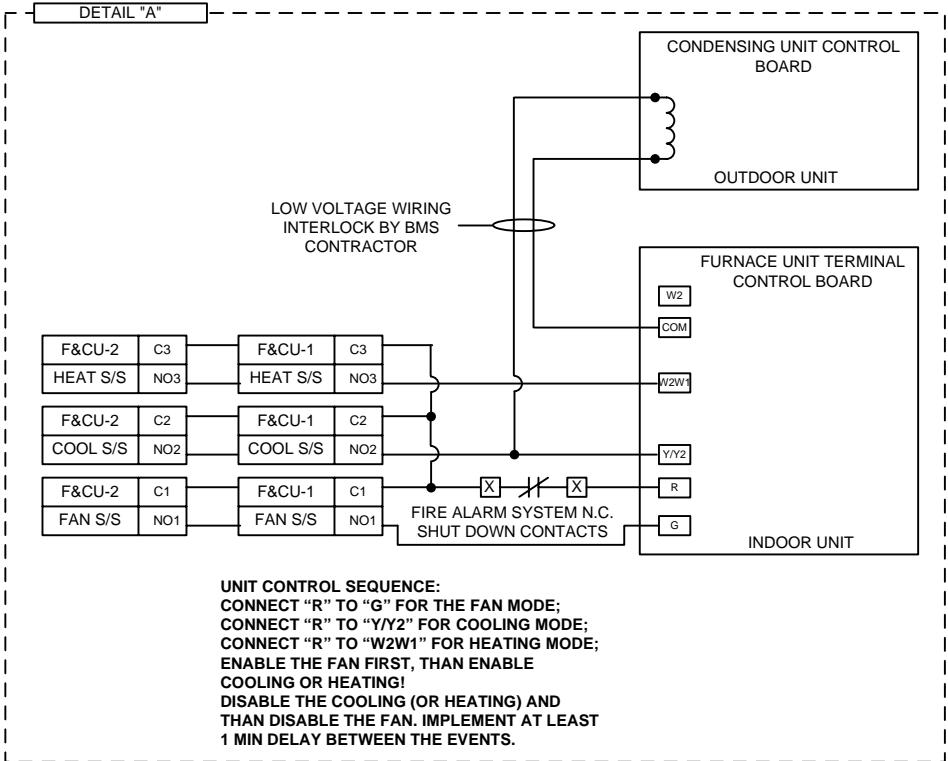
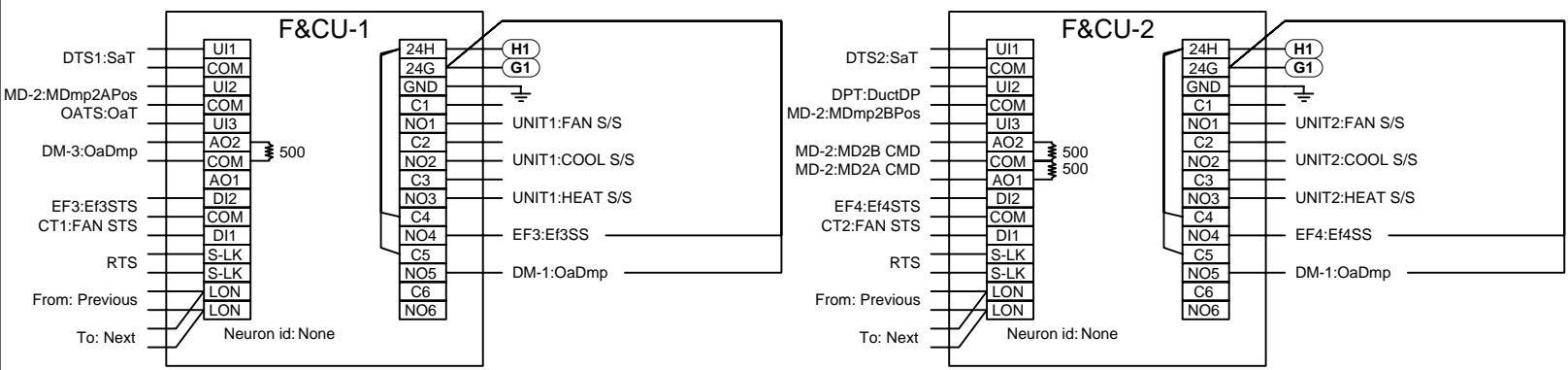
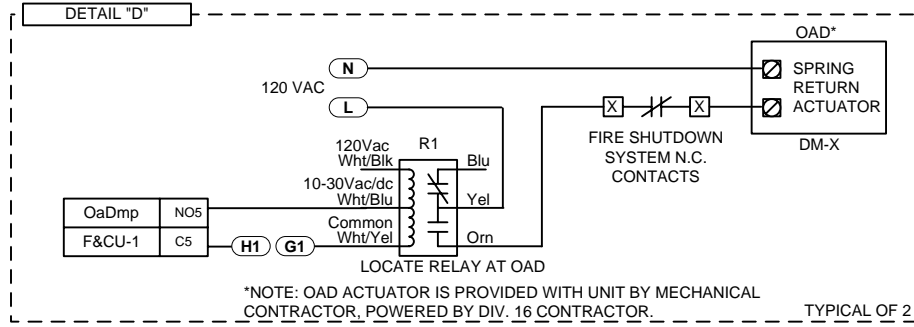
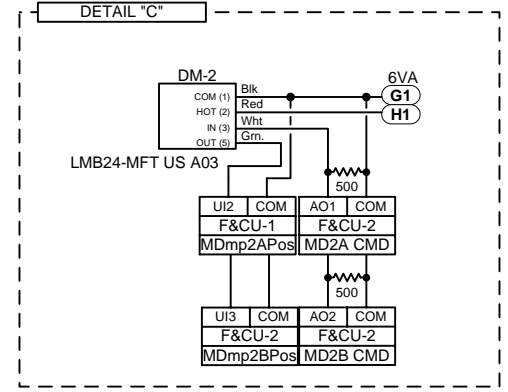
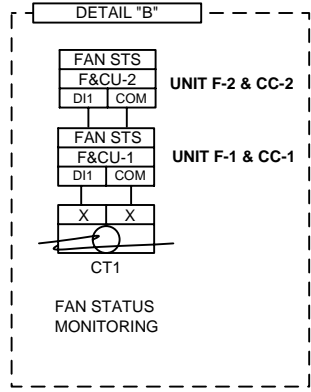
## Furnace Units (F-1 & F-2) Sequence of Operations

The system shall be commanded on from BMS schedule. The gas burner shall be commanded on when the space temperature is less than setpoint of 68 Deg. F (adjustable). The condensing unit shall be commanded on whenever the space temperature is greater than setpoint of 73 Deg.F (adjustable), with 2 Deg.F deadband. The temperature sensor shall have override button to increase the room setpoint by 4 Deg.F at 1-hour intervals. Operation of associated exhaust fan shall be interlocked with heating and ventilating unit. If either equipment status does not indicate activation after being commanded on, the BMS is to generate an alarm.

Motorized Dampers: Motorized dampers at supply air ducts shall modulate in parallel to maintain a duct pressure of 0.15 iwc (adjustable) and prevent over pressurization of the duct when diffusers are closed. Motorized damper (2-position) at outside air supply shall be opened prior to the any units fan enabling command. Motorized damper at the space (2-position) shall be opened whenever each unit is scheduled to be on.



NOTE: SEE PAGE 11 FOR EF-4 WIRING DETAILS AND SEQUENCE OF OPERATIONS



UNIT CONTROL SEQUENCE:  
CONNECT "R" TO "G" FOR THE FAN MODE;  
CONNECT "R" TO "Y/Y2" FOR COOLING MODE;  
CONNECT "R" TO "W2W1" FOR HEATING MODE;  
ENABLE THE FAN FIRST, THAN ENABLE COOLING OR HEATING!  
DISABLE THE COOLING (OR HEATING) AND THAN DISABLE THE FAN. IMPLEMENT AT LEAST 1 MIN DELAY BETWEEN THE EVENTS.

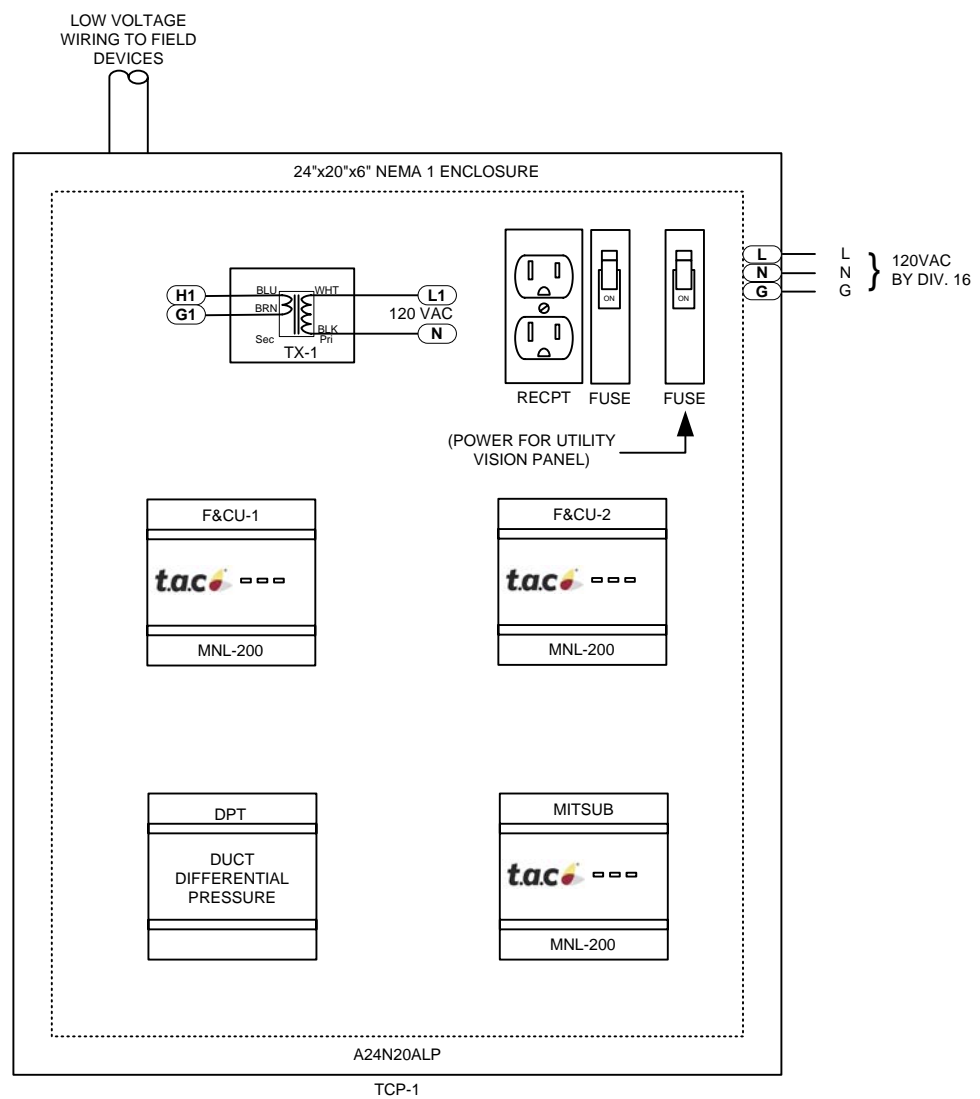


Revisions	
#	Date:
1	07/14/09
2	
3	
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Architect: Bunton Clifford Associates  
Engineer: Interface Engineering  
Contractor: WKW Mechanical Contractors, Inc.  
Designed by: DY  
Software by:  
Checked by:

JOB NUMBER: IC08C1031  
FILE NAME: FURNACE UNIT WITH COOLING COIL.vsd  
SHEET NO.: 4 OF 13  
Canada Facilities Maintenance Center  
4200 Farm Hill Blvd  
Redwood City, CA 94061  
FURNACE UNIT w/  
COOLING COIL

FURNACE UNIT TCP Device	Qty	Part Number	Description	Vendor
Panel				
DPT	1	VER-PXPLX01S	DIFF PRES SEN DRY MEDIA PNL MT	SINGLE SOURCED SOLUTIONS
F&CU-1-2	2	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC
MITSUB	1	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC
TCP-1	1	A24N20ALP	24"x20"x6" NEMA 1 ENCLOSURE	HOFFMAN
TCP-1_1	1	A24N20MP	24"H x 20"W BACKPLATE	HOFFMAN
TX-1	1	T-208	TRANSFORMER 96 VA 120P-24VS U	SINGLE SOURCED SOLUTIONS



**LOCATE THE PANEL AT ELECTRICAL ROOM 111**

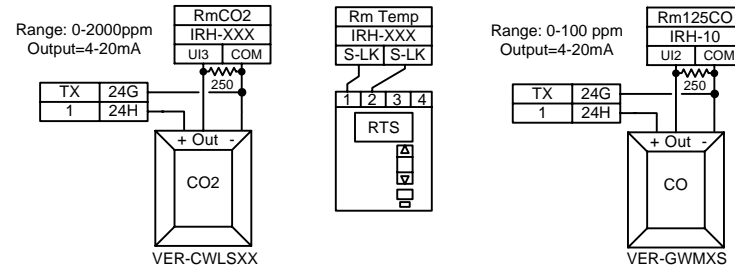
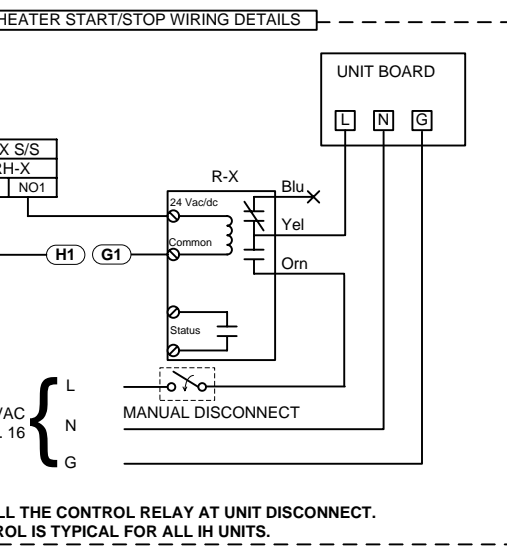
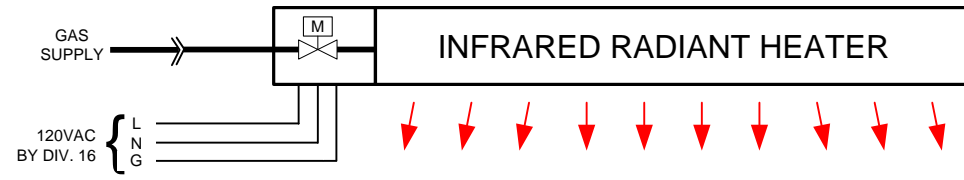


Revisions	
#	Date:
1	07/14/09
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance  
 Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
 FURNACE UNITS TCP-1

JOB NUMBER  
 IC08C1031  
 FILE NAME  
 FURNACE UNIT WITH  
 COOLING COIL.vsd  
 SHEET NO.  
 5 OF 13



NOTE: SEE TABLE 1 (THIS PAGE) FOR THERMOSTAT, CO & CO2 SENSOR LOCATIONS

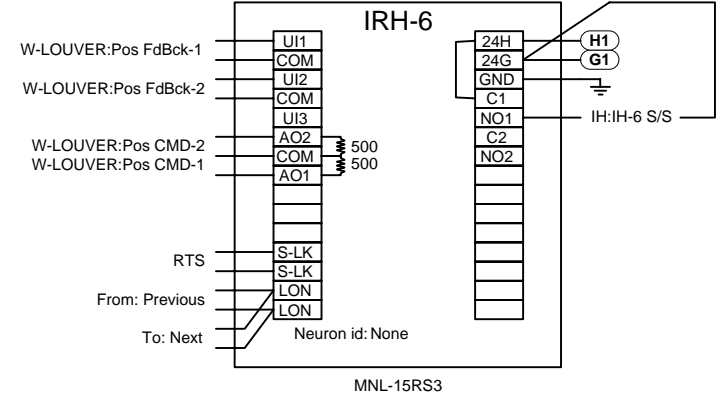
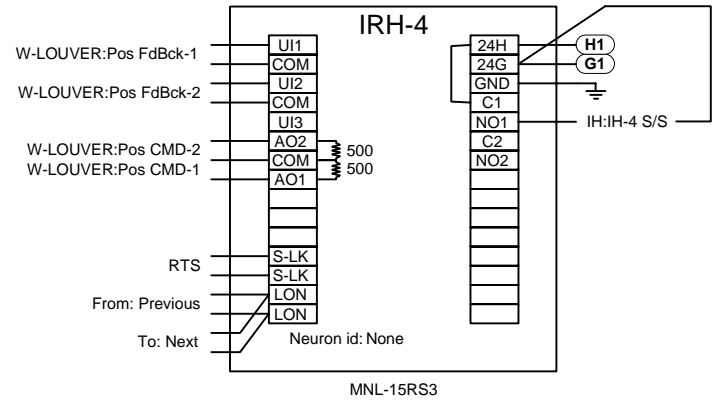
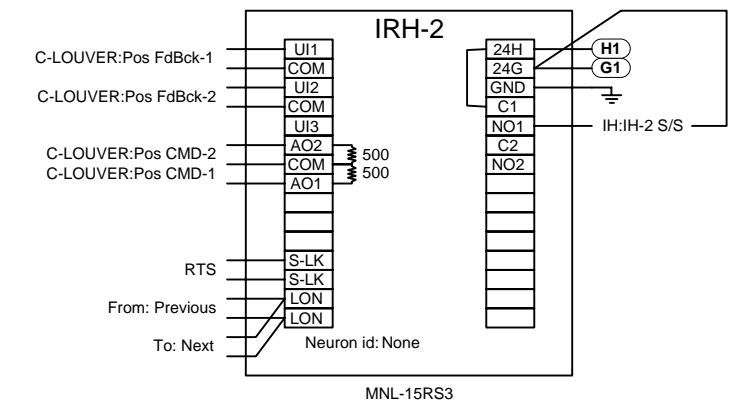
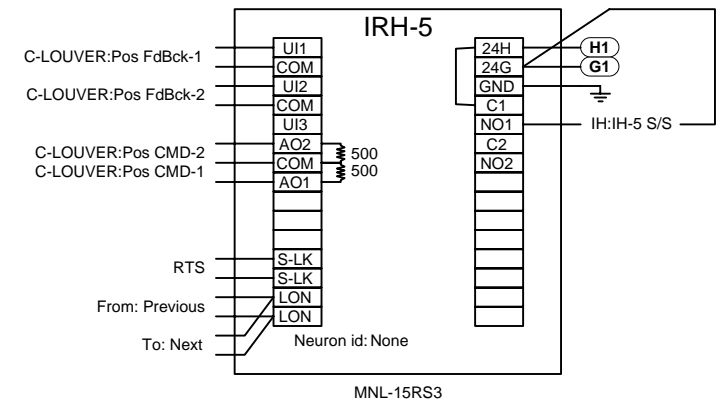
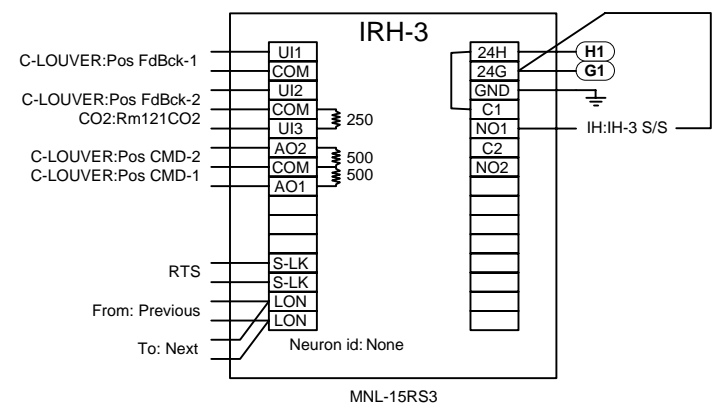
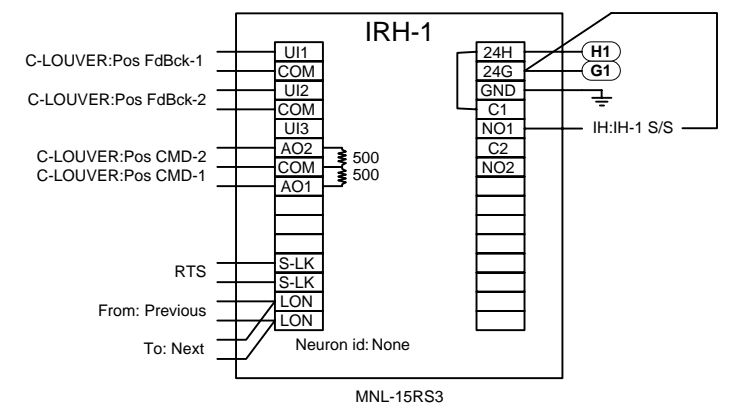
NOTE: FOR ACTUATORS GROUPING, CONTROL & WIRING SEE DETAILS "A", "C", & "D" FOR WALL LOUVERS & DETAIL "B" FOR CEILING LOUVERS ON PAGE 8

IH Device	Qty	Part Number	Description	Vendor
Electrical				
CO2	4	VER-CWLSXX	WALL MTD CO2 TRAN/LCD DISP & A	SINGLE SOURCED SOLUTIONS
CO	1	VER-GWMXS	CO2 SENSOR - WALL MTD 4-20MA	SINGLE SOURCED SOLUTIONS
RTS	11	MN-S3	IA MICRONET S-LINK SENSOR W/OV	TAC
R-X	11	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	SINGLE SOURCED SOLUTIONS

**Infrared Radiant Heater IH-1 through IH-11 Sequence of Operations**

The infrared heater shall be commanded on whenever the room setpoint is below programmed setpoint of 65 Deg. F (adjustable), with a 2 Deg. F deadband. The temperature sensor shall have an override button to place the system in occupied mode (1 hour).

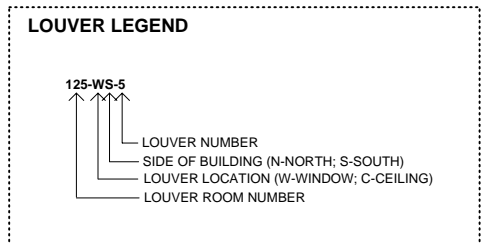
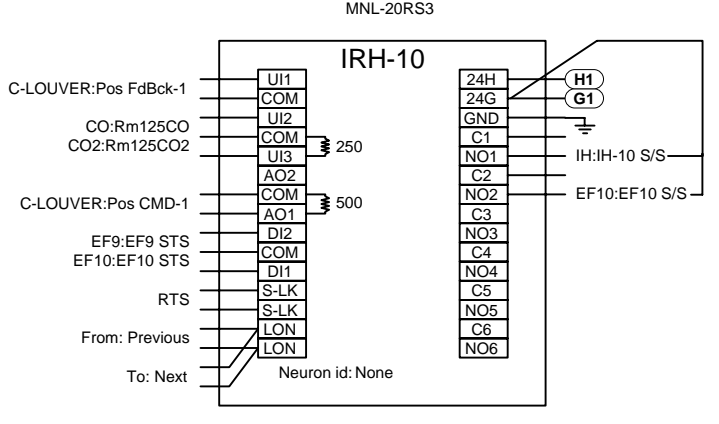
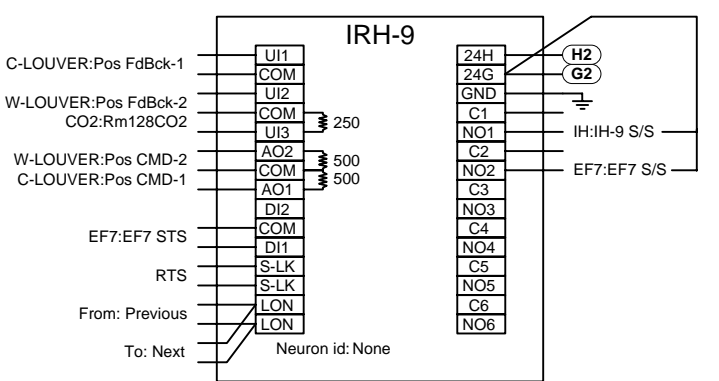
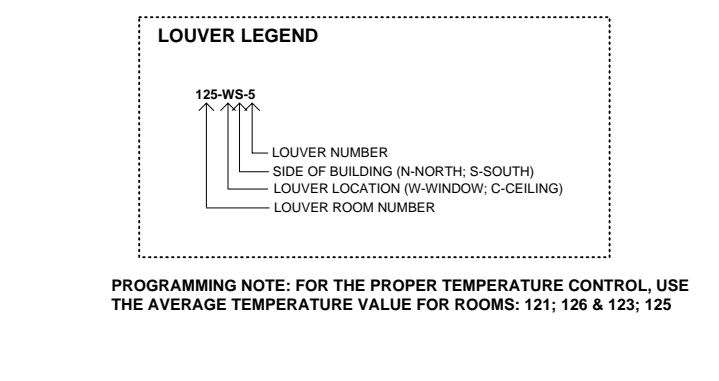
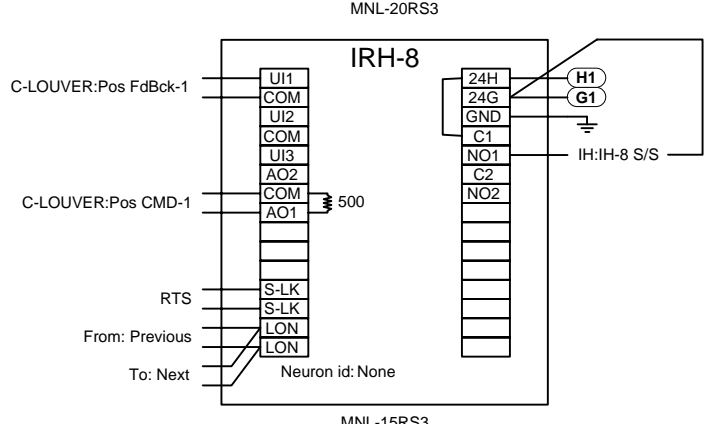
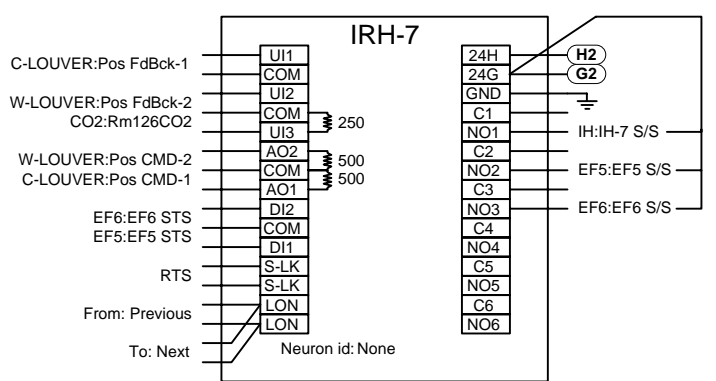
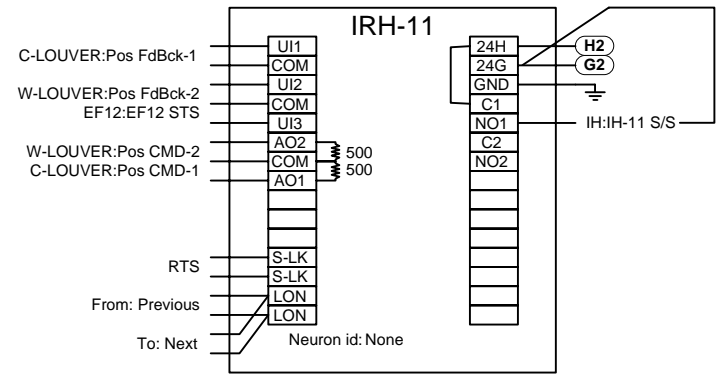
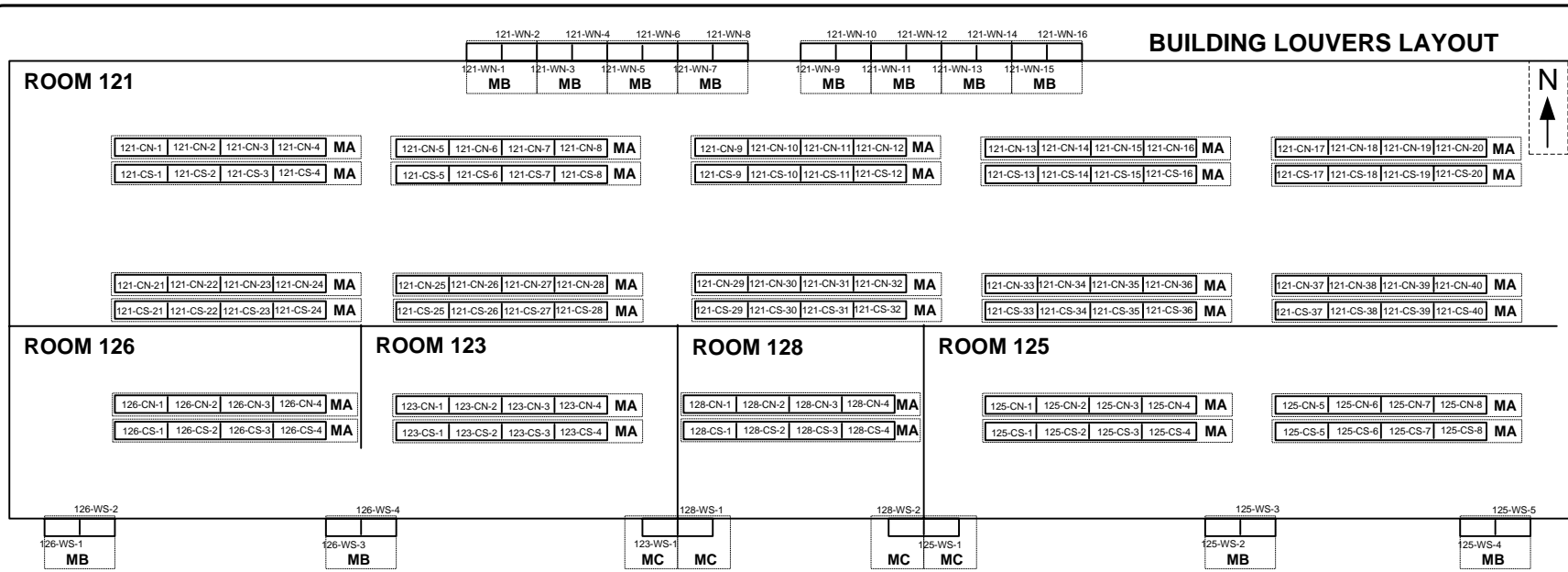
UNIT #	VOLTAGE	CURRENT	SERVICE	ROOM T-STAT LOCATION	NOTES
IH-1	120VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH-EAST)	-
IH-2	120 VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH-EAST)	-
IH-3	120 VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH MIDDLE)	CO2 SENSOR
IH-4	120 VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH MIDDLE)	-
IH-5	120 VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH-WEST)	-
IH-6	120 VAC	2.6 Amp	CUSTODIAL/EQUIPMENT 121	ROOM 121 (WALL: NORTH-WEST)	-
IH-7	120 VAC	2.6 Amp	CHEMICAL STORAGE 126	ROOM 126 (WALL: SOUTH-EAST)	CO2 SENSOR
IH-8	120 VAC	2.6 Amp	SHOP STORAGE 123	ROOM 123 (WALL: SOUTH-EAST)	-
IH-9	120 VAC	2.6 Amp	WOOD SHOP 128	ROOM 128 (WALL: SOUTH-MIDDLE)	CO2 SENSOR
IH-10	120 VAC	2.6 Amp	AUTO MAINTENANCE 125	ROOM 125 (WALL SOUTH-MIDDLE)	CO, CO2 SENSOR
IH-11	120 VAC	2.6 Amp	AUTO MAINTENANCE 125	ROOM 125 (WALL SOUTH-EAST)	-



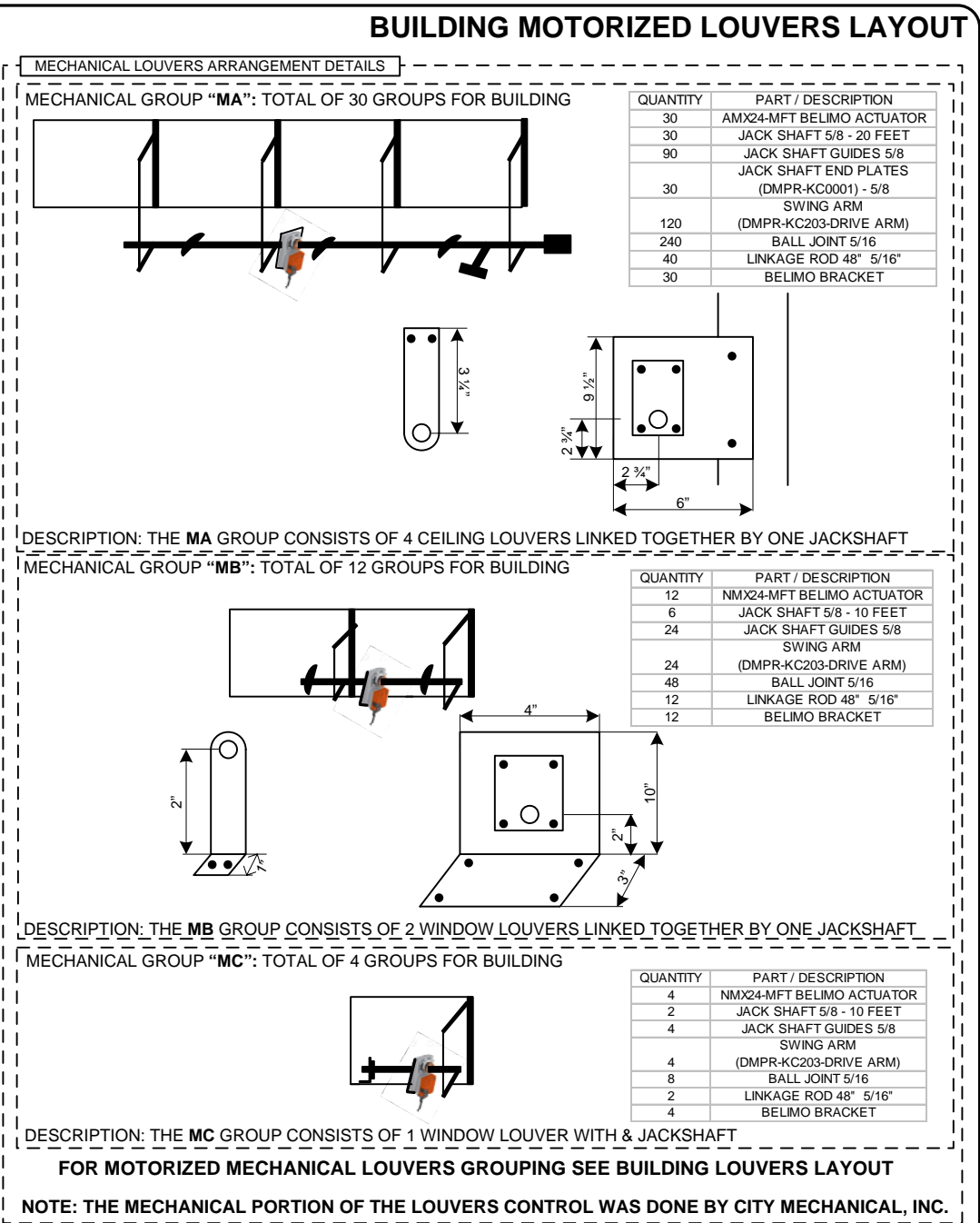
Revisions	
#	Date:
1	07/14/09
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 07/14/2008  
 Software by: Date:  
 Checked by: Date:

JOB NUMBER: IC08C1031  
 FILE NAME: RADIANT HEATERS.vsd  
 SHEET NO.: 6 OF 13  
 Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**RADIANT HEATER CONTROL**



**PROGRAMMING NOTE:** FOR THE PROPER TEMPERATURE CONTROL, USE THE AVERAGE TEMPERATURE VALUE FOR ROOMS: 121; 126 & 123; 125



#### ROOMS 123,125,126,128 MOTORIZED LOUVERS INFORMATION

CONTROLLER #	LOUVERS GROUPING	OUTPUT #	ACTUATOR GROUPING	MECHANICAL GROUPING	WIRING DETAIL	ACTUATOR POWER GROUP
IRH-7	126-CN-1...126-CN-4 126-CS-1...126-CS-4	AO1	EA	MA	A	PC
IRH-7	126-WS-1...126-WS-4 123-WS-1	AO2	EC	MB	C	PC
IRH-8	123-CN-1...123-CN-4 123-CS-1...123-CS-4	AO1	EA	MA	A	PD
IRH-9	128-CN-1...128-CN-4 128-CS-1...128-CS-4	AO1	EA	MA	A	PC
IRH-9	128-WS-1...128-WS-2	AO2	ED	MC	D	PC
IRH-10	125-CN-1...125-CN-4 125-CS-1...125-CS-4	AO1	EA	MA	A	PD
IRH-11	125-CN-5...125-CN-8 125-CS-5...125-CS-8	AO1	EA	MA	A	PC
IRH-11	125-WS-1 125-WS-2 ...125-WS-5	AO2	EC	MC	C	PC

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Revisions	
#	Date:
1	07/14/09
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Change: RECORD DRAWING

Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
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JOB NUMBER: IC08C1031  
 FILE NAME: RADIANT HEATERS.vsd  
 SHEET NO.: 7 OF 13



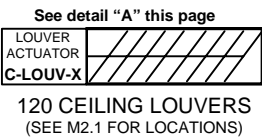
Revisions	
#	Date:
1	07/14/09
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance Center  
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 Redwood City, CA 94061

JOB NUMBER: IC08C1031  
 FILE NAME: RADIANT HEATERS.vsd  
 SHEET NO.: 8 OF 13

MOTORIZED LOUVERS



120 CEILING LOUVERS  
(SEE M2.1 FOR LOCATIONS)

MOTORIZED DAMPER				
Device	Qty	Part Number	Description	Vendor
Electrical				
CMDA-X	30	AMX24-MFT + P10003(A03)	NON-SPRING RETURN ACTUATOR 180	BELIMO
CMDA-X_1	30	DMPR-KC001	DELTA Support Bracket with bea	DELTA
WMDA-X	16	NMB24-MFT + P10003(A03)	NON-SPRING RETURN ACTUATOR 90	BELIMO
WMDA-X_1	148	DMPR-KC203	DELTA drive arm & u-bolt kit	DELTA

**Sequence of Operations**

**Room 123 (Storage), Room 126 (Electrical shop) & Room 128 (Wood shop):**

**COOLING MODE:** If in the cooling mode and the outside air temperature is cooler than cooling setpoint, then louvers shall open in parallel to 100% to meet cooling demand. When the demand is met, modulate louvers in parallel to maintain setpoint. If the cooling setpoint is not reached after 5 minutes (adjustable), the then command on EF-5, (EF-7 only for Room 128) if the setpoint is still not reached after another 5 minutes (adjustable), then command on EF-6. When demand is met, modulate fans to maintain the setpoint.

**HEATING MODE:** If in the heating mode and the outside air temperature is cooler than the heating setpoint, then louvers shall close in parallel to minimum position to maintain CO2 level less than adjustable design setpoint (1000 PPM).

**CO2 LEVEL CONTROL:** Fans shall be command on, low air intake louvers shall be command open, and high air relief louvers shall be commanded closed when CO2 reaches adjustable design setpoint (1000 PPM). If fan status does not indicate activation after being commanded on, or louvers actuators do not indicate open position, sen an alarm to the BMS.

**Room 125 (Auto Maintenance shop):**

**CO LEVEL CONTROL:** Fan shall be commanded on and all motorized louvers in room shall open 100% when CO level reaches design setpoint (9 parts per million and no greater than 2 parts per million above outdoor levels). If the fan status does not indicate activation after being commanded on, or louver actuators do not indicate open position, the BMS is to generate an alarm.

**COOLING MODE:** If in the cooling mode and the outside air temperature is cooler than the cooling setpoint, then louvers shall open in parallel to 100% to meet cooling demand. When the demand is met, modulate louvers in parallel to maintain setpoint.

**HEATING MODE:** If in the heating mode and the outside air temperature is cooler than the heating setpoint, then louvers shall close in parallel to minimum position to maintain CO2 level less then adjustable design setpoint (1000 PPM).

Fans shall be commanded on, low air intake louvers shall be commanded open, and high air relief louvers shall be commanded closed when CO2 level reaches adjustable design setpoint (1000 PPM). If the fan status does not indicate activation after being commanded on, or louver actuators do not indicate open position, send an alarm to BMS.

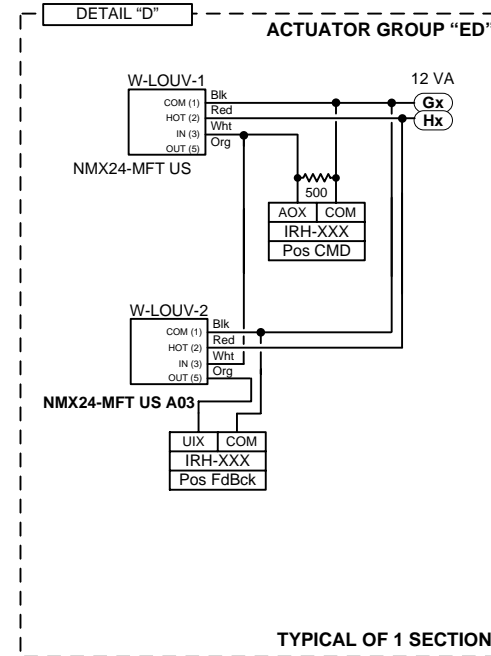
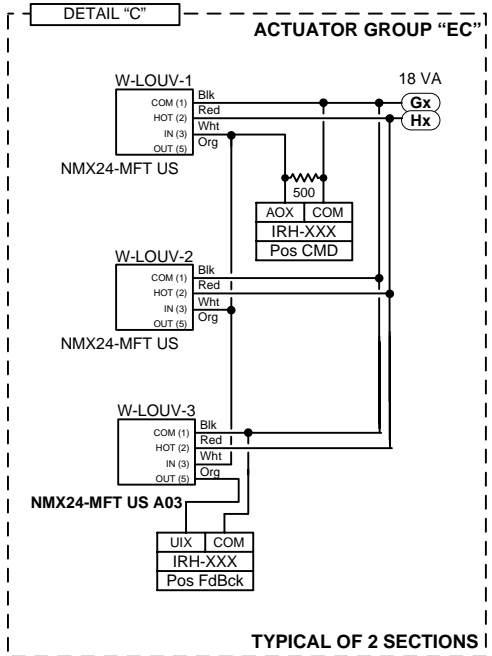
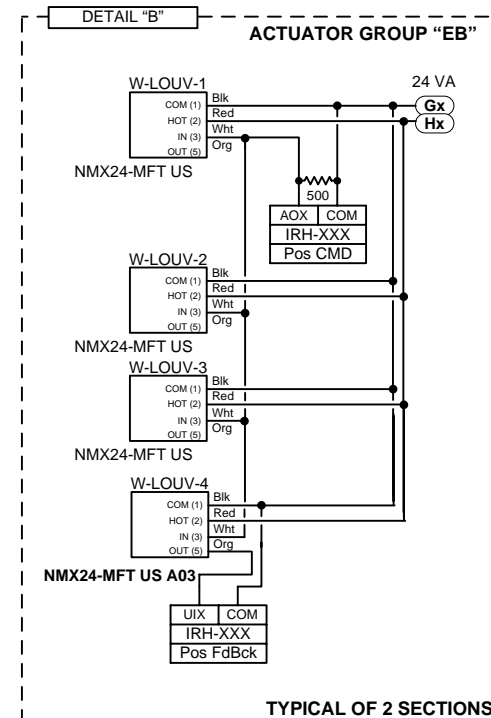
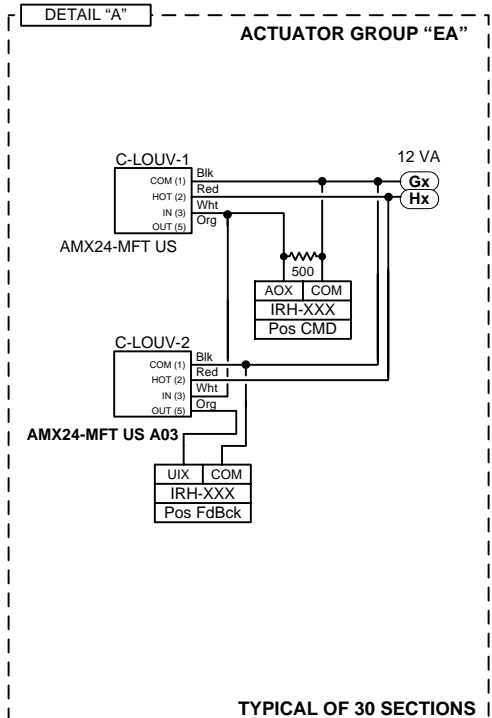
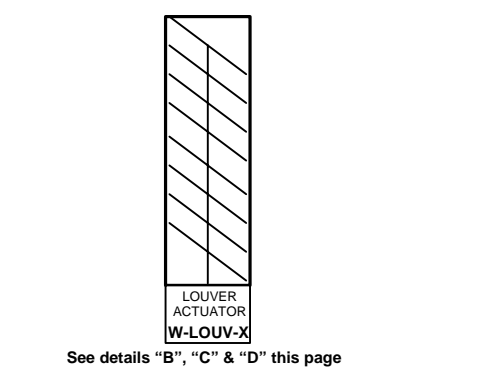
**Room 121 (Custodial Equipment / Storage):**

**COOLING MODE:** If in the cooling mode and the outside air temperature is cooler than the cooling setpoint, then louvers shall open in parallel to 100% to meet cooling demand. When the demand is met, modulate louvers in parallel to maintain setpoint.

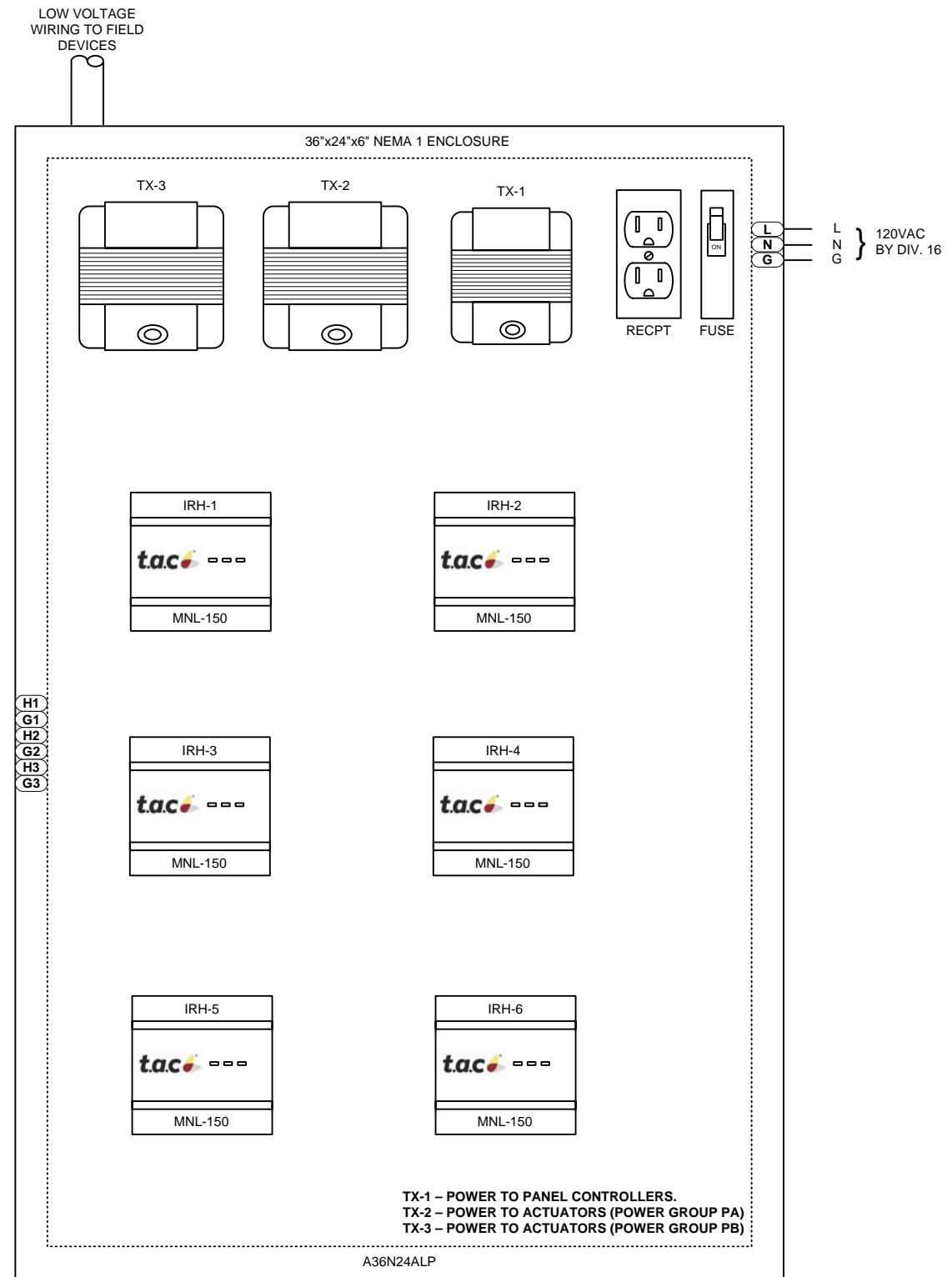
**HEATING MODE:** If in the heating mode and the outside air temperature is cooler than the heating setpoint, then louvers shall close in parallel to minimum position to maintain CO2 level less then adjustable design setpoint (1000 PPM).

Refer to the radiant heater sequence of operation for heating mode details.

ROOM 121 MOTORIZED LOUVERS INFORMATION						
CONTROLLER #	LOUVERS GROUPING	OUTPUT #	ACTUATOR GROUPING	MECHANICAL GROUPING	WIRING DETAIL	ACTUATOR POWER GROUP
IRH-1	121-CN-1...121-CN-4	AO1	EA	MA	A	PA
	121-CS-1...121-CS-4					
IRH-1	121-CN-21...121-CN-24	AO2	EA	MA	A	PA
	121-CS-21...121-CS-24					
IRH-2	121-CN-5...121-CN-8	AO1	EA	MA	A	PB
	121-CS-5...121-CS-8					
IRH-2	121-CN-25...121-CN-28	AO2	EA	MA	A	PB
	121-CS-21...121-CS-24					
IRH-3	121-CN-9...121-CN-12	AO1	EA	MA	A	PA
	121-CS-9...121-CS-12					
IRH-3	121-CN-29...121-CN-32	AO2	EA	MA	A	PA
	121-CS-29...121-CS-32					
IRH-4	121-WN-1...121-WN-8	AO1	EB	MB	B	PB
	121-WN-9...121-WN-16					
IRH-4	121-CN-13...121-CN-16	AO2	EA	MA	A	PB
	121-CS-13...121-CS-16					
IRH-5	121-CN-17...121-CN-20	AO1	EA	MA	A	PA
	121-CS-17...121-CS-20					
IRH-5	121-CN-33...121-CN-36	AO2	EA	MA	A	PB
	121-CS-33...121-CS-36					
IRH-6	121-CN-17...121-CN-20	AO1	EA	MA	A	PB
	121-CS-17...121-CS-20					
IRH-6	121-CN-37...121-CN-40	AO2	EA	MA	A	PB
	121-CS-37...121-CS-40					

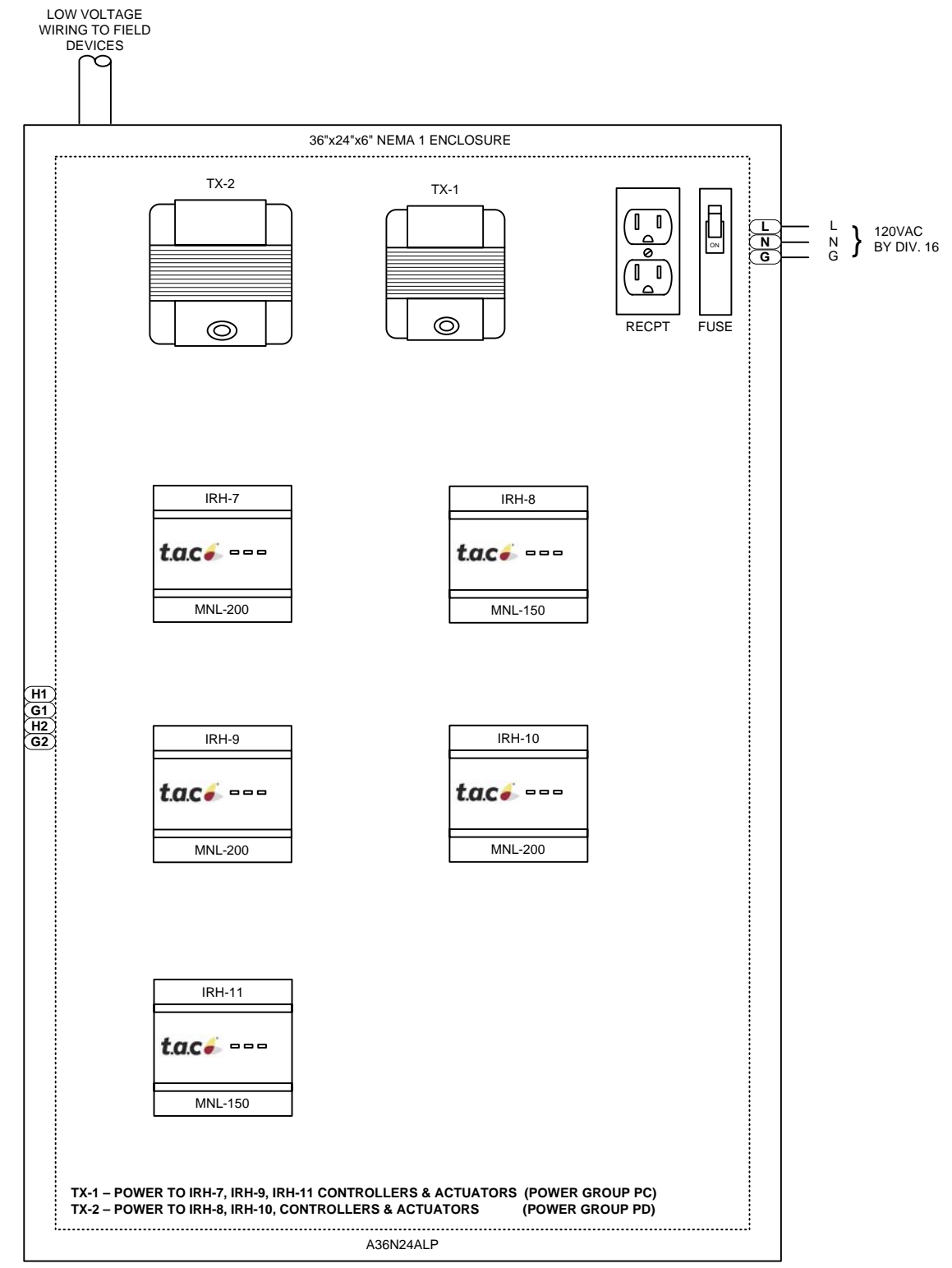


TCP-2 Device	Qty	Part Number	Description	Vendor
Panel				
IRH-1-6	6	MNL-15RS3	MN 150 CONT. WITH LONMARK ROOF	TAC
TCP-2	1	A36N24ALP	36"x24"x6" NEMA 1 ENCLOSURE	HOFFMAN
TCP-2_1	1	A36N24MP	36"H x 24"W BACKPLATE	HOFFMAN
TX-1	1	T-203	TRANSFORMER 170 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS
TX-2-3	2	T-204	TRANSFORMER 240 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS



LOCATE THE PANEL AT ROOM 121

TCP-3 Device	Qty	Part Number	Description	Vendor
Panel				
IRH-8,11	2	MNL-15RS3	MN 150 CONT. WITH LONMARK ROOF	TAC
IRH-7,9-10	3	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC
TCP-3	1	A36N24ALP	36"x24"x6" NEMA 1 ENCLOSURE	HOFFMAN
TCP-3_1	1	A36N24MP	36"H x 24"W BACKPLATE	HOFFMAN
TX-1	1	T-203	TRANSFORMER 170 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS
TX-2	1	T-204	TRANSFORMER 240 VA, 120V-P, 24	SINGLE SOURCED SOLUTIONS



LOCATE THE PANEL AT ROOM 128



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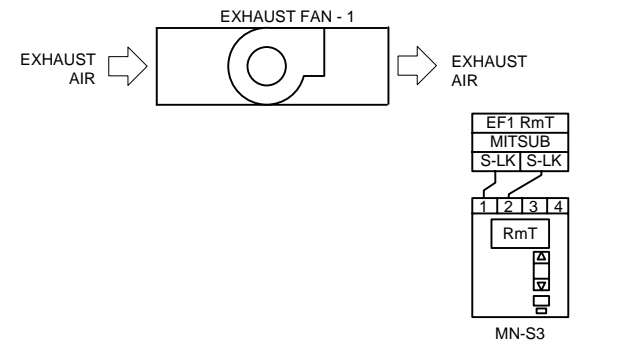
Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**RADIANT HEATERS TCP-2 & TCP-3**

JOB NUMBER: IC08C1031  
 FILE NAME: RADIANT HEATERS TCP-2 & TCP-3.dwg  
 SHEET NO.: 9 OF 13

# MITSUBISHI SPLIT SYSTEM

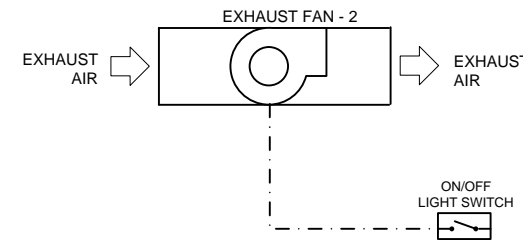
## ELECTRICAL ROOM 111 TEMPERATURE CONTROL COMPONENTS



NOTE: SEE PAGE 11 FOR EF-1 WIRING DETAILS AND SEQUENCE OF OPERATIONS

NOTE: MOUNT ROOM STAT AT ELECTRICAL ROOM 111

## JANITOR ROOM 113 EXHAUST FAN DETAILS

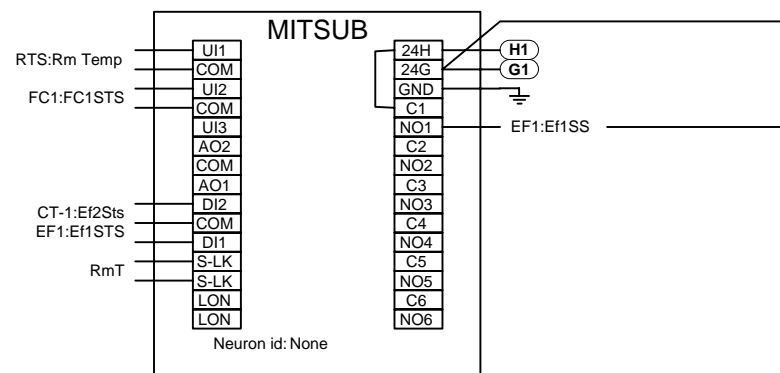


SEE PAGE 11 FOR EF-2 & LIGHTING SWITCH INTERLOCK WIRING DETAILS AND SEQUENCE OF OPERATIONS

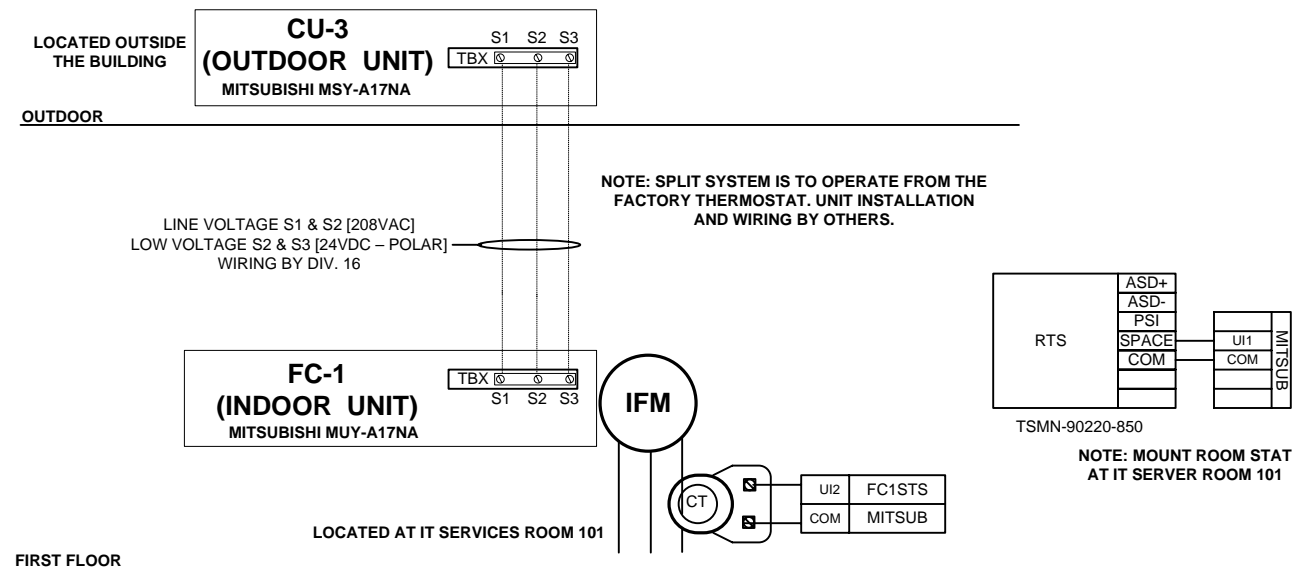
SPLIT SYSTEM Device	Qty	Part Number	Description	Vendor
Electrical				
CT	1	E112-908	SPLIT CORE CURRENT SWITCH; 1-1	SINGLE SOURCED SOLUTIONS
RmT	1	MN-S3	1A MICRONET S-LINK SENSOR W/OV	TAC
RTS	1	TSMN-90220-850	10K THRMSTR 11K SHNT&PRGM JACK	TAC

### Split System Sequence of Operations

The unit factory thermostat shall enable/disable the unit based on the time schedule command. The BMS shall monitor the indoor fan status and the room temperature. The split system shall maintain the desired room temperature (programmed from the wireless remote control, comes with the unit). The BMS shall generate an alarm on the rise of the room temperature above the desired setpoint (78 Deg. F, adjustable)



SEE PAGE 5 FOR CONTROLLER LOCATION AND POWER



FIRST FLOOR

## SPLIT SYSTEM COOLING: FC-1 & CU-3

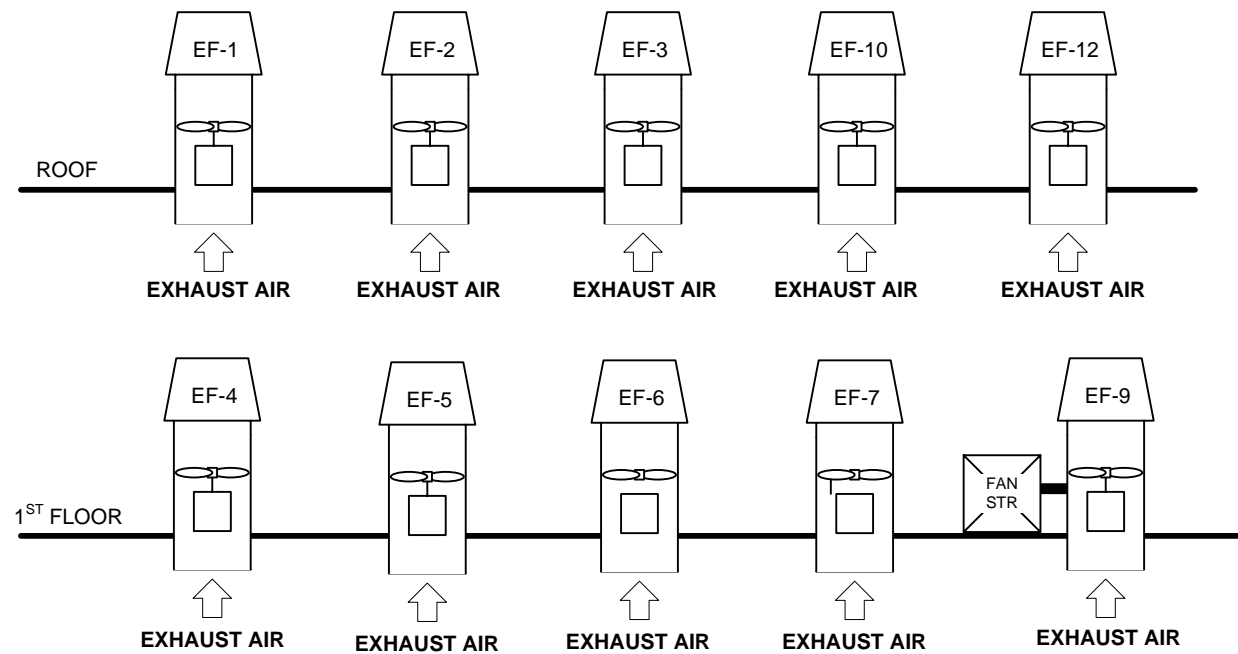


Revisions	
#	Date:
1	07/14/09
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Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY  
 Software by: DY  
 Checked by: DY  
 Date: 04/04/2008  
 Date:   
 Date:

Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
 SPLIT SYSTEM FC-1/CU-3  
 CONTROL

JOB NUMBER: IC08C1031  
 FILE NAME: SPLIT SYSTEM.vsd  
 SHEET NO.: 10 OF 13



FAN	VOLTAGE	PHASE	HP	SERVICE	REMARKS
EF-1	120 VAC	1Ø	1/20 HP	ELECTRICAL	
EF-2	120 VAC	1Ø	1/60 HP	JANITOR	LIGHT SWITCH INTERLOCK
EF-3	120 VAC	1Ø	1/4 HP	LOCKER/RESTROOM	INTERLOCK WITH F-1 & F-2
EF-4	120 VAC	1Ø	1/20 HP	CHEMICAL STORAGE	24/7 SCHEDULE
EF-5	120 VAC	1Ø	1/4 HP	PLUMBING SHOP	CO2 SENSOR
EF-6	208 VAC	1Ø	1/4 HP	SHOP STORAGE	
EF-7	120 VAC	1Ø	1/4 HP	WOOD SHOP	CO2 SENSOR
EF-8	NOT USED				
EF-9	460 VAC	3Ø	3 HP	VEHICULAR EXHAUST	
EF-10	120 VAC	1Ø	1/3 HP	AUTO MAIN. BAY	CO + CO2 SENSOR
EF-11	NOT USED				
EF-12	120 VAC	1Ø	1/60 HP	RESTROOM	LIGHT SWITCH INTERLOCK

### Exhaust Fans Sequence of Operations

- EF-1:** The exhaust fan shall be commanded on whenever the room temperature is above programmed room temperature setpoint of 78 Deg. F (adjustable), with 2 Deg. F deadband. BMS is to generate an alarm if the fan status does not match fan command (after 30 sec., adjustable).
- EF-2 & EF-12:** The corresponding exhaust fan shall be interlocked with lighting switch. The BMS is to monitor the fans status only!
- EF-3:** The exhaust fan shall be interlocked with F-1 & F-2 units. (see F-1 & F-2 units sequence of operation). BMS is to generate an alarm if the the fan status does not match fan command (after 30 sec., adjustable).
- EF-4:** The exhaust fan shall run continuously to ventilate chemical storage room. BMS is to generate an alarm if the the fan status does not match fan command (after 30 sec., adjustable).
- EF-5, EF-6 & EF-7:** See motorized louvers sequence of operation for these exhaust fans. The BMS is to command the exhaust fan on when CO2 level reaches adjustable design setpoint (1000 PPM) and monitor the fan status. BMS is to generate an alarm if the the fan status does not match fan command (after 30 sec., adjustable).
- EF-9:** The exhaust fan shall be commanded on through its own local control, when necessary. The BMS is to monitor the fan status only!
- EF-10:** The exhaust fan shall be commanded on when CO level reaches design setpoint (9 parts per million and no greater than 2 parts per million above outdoor levels) or/and when CO2 level reaches adjustable design setpoint (1000 PPM). See auto maintenance shop louvers sequence of operation for more details. BMS is to generate an alarm if the the fan status does not match fan command (after 30 sec., adjustable).

EF Device	Qty	Part Number	Description	Vendor
Electrical				
CT9	1	E112-908	SPLIT CORE CURRENT SWITCH; 1-1	SINGLE SOURCED SOLUTIONS
CT2,12	2	E112-908	SPLIT CORE CURRENT SWITCH; 1-1	SINGLE SOURCED SOLUTIONS
R1,4	2	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	SINGLE SOURCED SOLUTIONS
R2,12	2	FUN-RIB2402SB	Enclosed Relay 20 Amp SPST-N/O	SINGLE SOURCED SOLUTIONS
R-X	5	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	SINGLE SOURCED SOLUTIONS

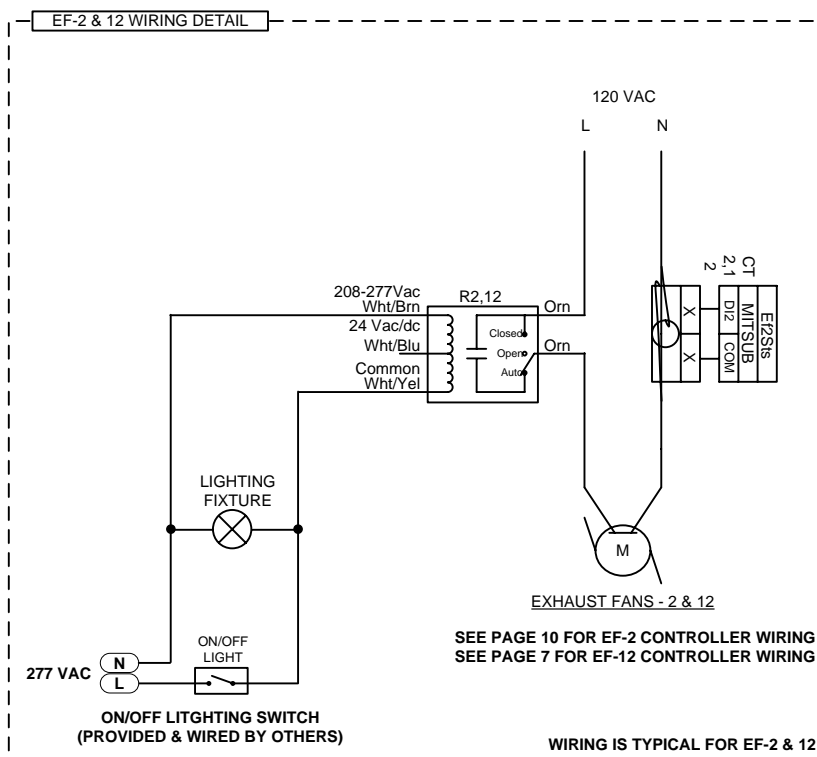


Revisions	
#	Date
1	07/14/09
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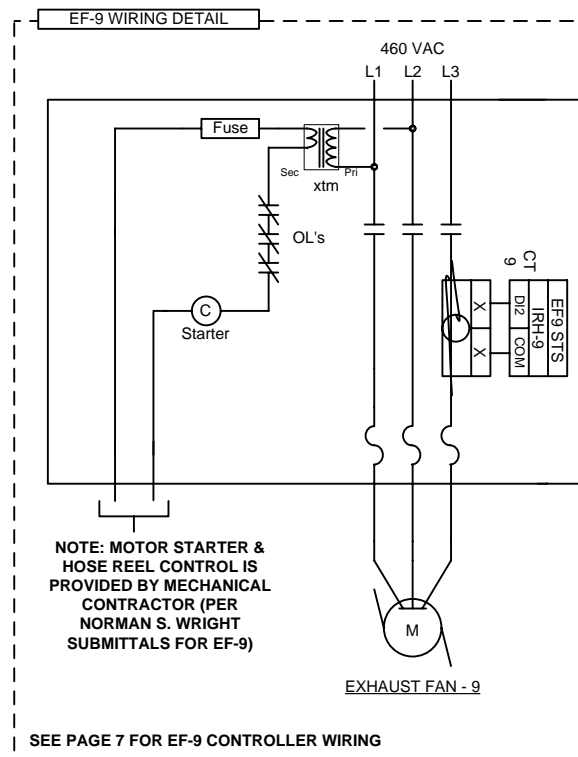
Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY  
 Software by: DY  
 Checked by: DY  
 Date: 04/04/2008  
 Date:   
 Date:

Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**EXHAUST FAN CONTROL**

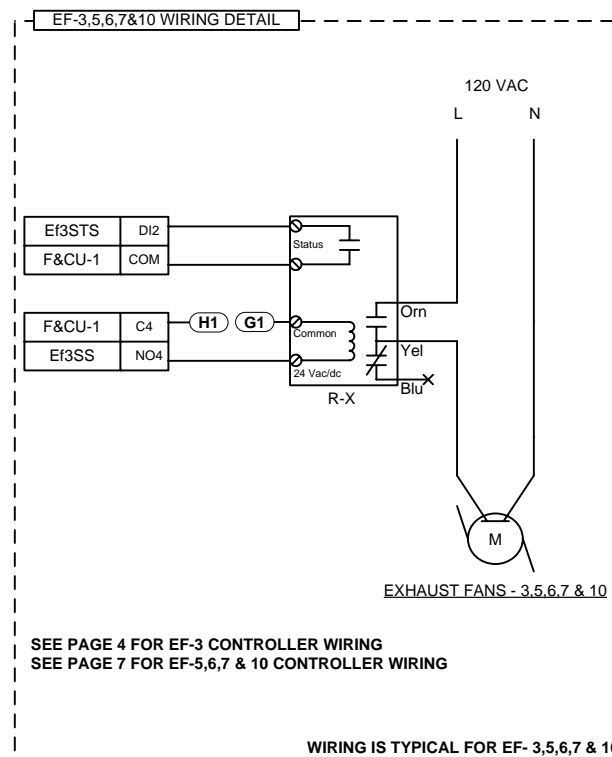
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 FILE NAME: EXHAUST\_FANS.vsd  
 SHEET NO.: 11 OF 13



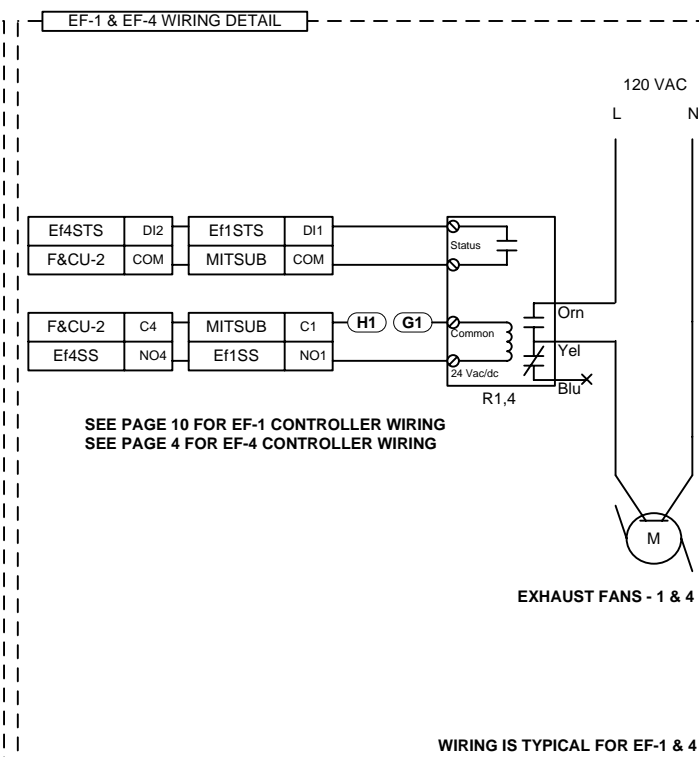
**EXHAUST FANS  
EF-2 & 12 WIRING**



**EXHAUST FAN  
EF-9 WIRING**



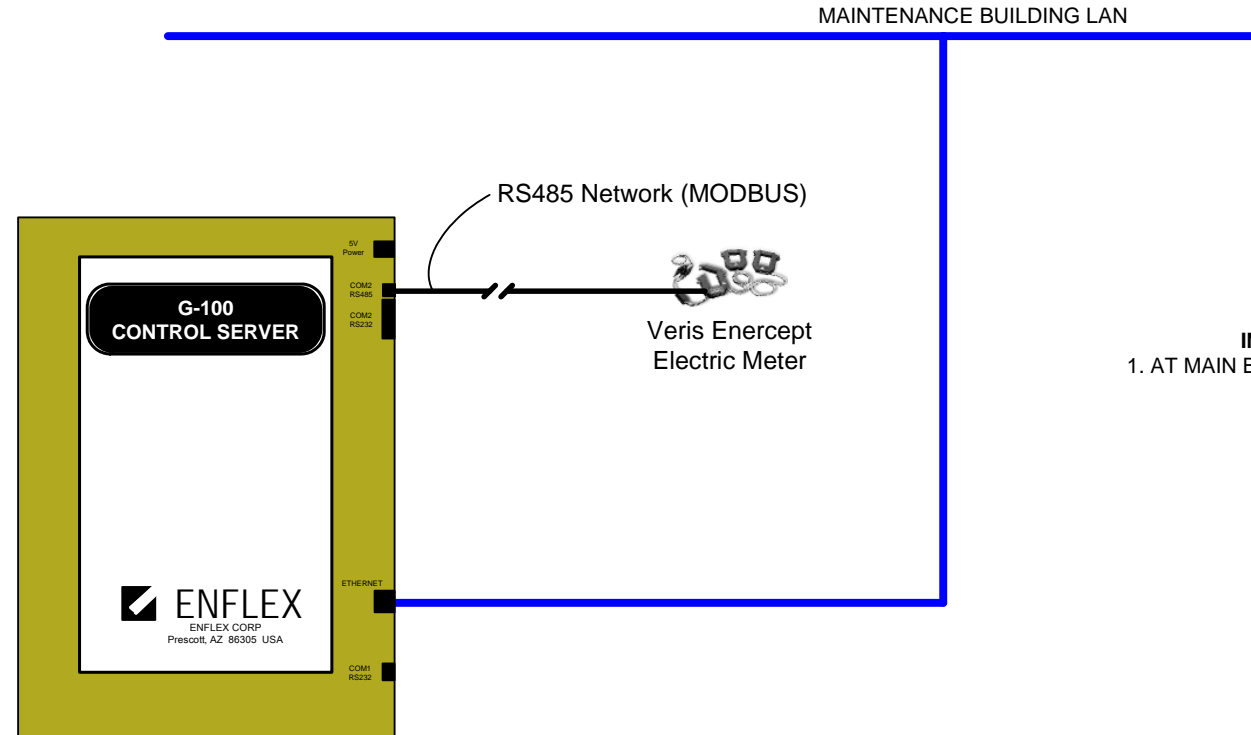
**EXHAUST FANS  
EF-3,5,6,7 & 10 WIRING**



**EXHAUST FANS  
EF-1 & 4 WIRING**

# UTILITY VISION LAYOUT FOR CAÑADA MAINTENANCE CENTER

## Cañada College Maintenance Building UV Panel



NOTE: INSTALL THE POWER MONITOR METER IN MAIN SWITCHBOARD (MSB-MFC), LOCATED IN ELECTRICAL ROOM 111, FIRST FLOOR.

**INSTALL POWER MONITORING METERS:**  
1. AT MAIN BREAKER (400 Amp, 3 PH).

Utility Vision Device	Qty	Part Number	Description	Vendor
Electrical ENRG MON	1	VER-H8036-0400-3	MODBUS NETWORK POWER METER	VERIS
Panel ENFLEX	1	G-100	CONTROL SERVER	ENFLEX

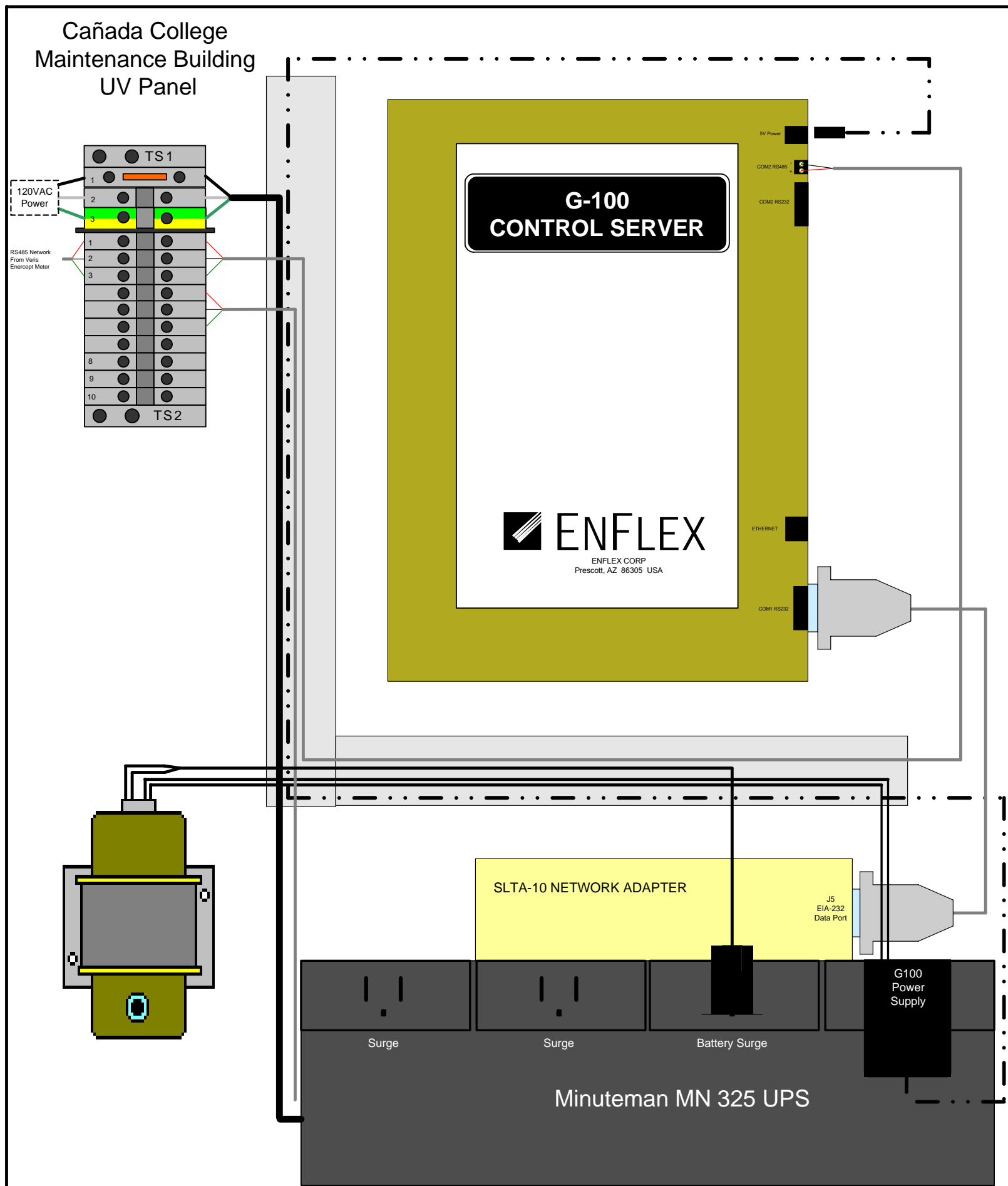


Revisions	
#	Date
1	07/14/09
2	
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5	

Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
**UTILITY VISION SYSTEM**

JOB NUMBER: IC08C1031  
 FILE NAME: UTILITY VISION.vsd  
 SHEET NO.: 12 OF 13



UTILITY VISION PANEL  
 - MOUNT PANEL IN THE  
 ELECTRICAL ROOM 111  
 PANEL SIZE: 18"H x 12"W x 6"D



Revisions	
#	Date:
1	07/14/09
2	
3	
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5	

Architect: Bunton Clifford Associates  
 Engineer: Interface Engineering  
 Contractor: WKW Mechanical Contractors, Inc.  
 Designed by: DY Date: 04/04/2008  
 Software by: Date:  
 Checked by: Date:

Canada Facilities Maintenance  
 Center  
 4200 Farm Hill Blvd  
 Redwood City, CA 94061  
 UTILITY VISION PANEL

JOB NUMBER  
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 FILE NAME  
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