Skyline CIPII 12KV SYSTEM UPGRADE

3300 College Drive,
San Bruno, CA

Engineer: CMI / DESIGN BUILD

Contractor: HENSEL PHELPS, Co.

IC08C1100

Drawing Index:

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Representing:

Technologies:

I/A Series® ECHELON®
VYKON BACnet
NETWORK 8000™

REVISIONS		
REV#	DESCRIPTION	DATE
3	RECORD DRAWINGS	5/12/2010

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Software Standard Tags

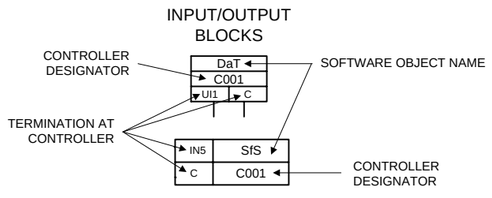
Prefix	Description	Suffix	Description
Bldg	Building	A	Alarm
Blr	Boiler	Amp	Amps
Cba	Combustion Air	Avg	Average
Cd	Cold Deck	C	Command/Control
Cg	Cooling	Ccl	Command Close
Chlr	Chiller	CO	Carbon Monoxide
Cwr	Condenser Water Return	CO2	Carbon Dioxide
Cws	Condenser Water Supply	Cop	Command Open
Chwr	Chilled Water Return	Dew	Dewpoint
Chws	Chilled Water Supply	Dis	Disable
Ct	Cooling Tower	Dmp	Damper
Da	Discharge Air	Dp	Differential Pressure
Dhw	Domestic Hot Water	Drv	Drive
Dx	Direct Expansion	Dt	Differential Temp
Ef	Exhaust Fan	Ec	Energy Consumption
Fb	Face/Bypass	Ena	Enable
Fil	Filter	Enth	Enthalpy
Hd	Hot Deck	Es	End Switch
Ht	Heating	Fire	Fire
Hum	Humidifier	Flo	Flow
Hwr	Hot Water Return	Frq	Frequency
Hws	Hot Water Supply	Hi	High
Hx	Heat Exchanger	HL	High Limit
Lt	Lighting	Hz	Hertz
Ma	Mixed Air	LL	Low Limit
Oa	Outside Air	Lo	Low
P(x)	Pump (number)	Loc	Lockout
Pht	Preheat	P	Pressure
Plw	Pool Water	Rh	Relative Humidity
Pri	Primary	Rst	Reset
Ra	Return Air	S	Status
Rf	Return Fan	Sp	Static Pressure
Rht	Reheat	Spd	Speed
Rm(xxx)	Room	Spt	Setpoint
Sa	Supply Air	SS	Start/Stop
Sec	Secondary	Stg	Stage
Sf	Supply Fan	T	Temp
Sk	Smoke	Tp	Total Pressure
Stm	Steam	Vlv	Valve

Example: ChwsT — Chilled Water Supply Temperature

Suffix

Prefix

SYMBOL LEGEND



Standard Wiring Practice

Function	Device Type	Prefered Color	Conductors	PLENUM Equivalent Reference Info. Windy City Part #	PS3 (Connect Air) Part #	NON-PLENUM Equivalent Reference Info. Windy City Part #	PS3 (Connect Air) Part #	Notes
Comm	BACnet	Orange	24/2 Shielded Lo Cap	042002-B	WBAC-4-242C-PR-BX	042007-B	-	(1)
Comm	Modbus	Grn Stp	18/2 Shielded	002326-B	W4-182C-GRS-RB	014106-B	W2-182C-GY-BX (grey)	(2)
Comm	ASD-Bus	Orange	22/2 Shielded	0043240-B	W4-222C-OR-BX	016104-B	W2-222C-GY-BX (grey)	(2)
Comm	Lon-Bus	Orange	22/2 Non-shielded Echelon	105540-B	WLON-3-221P-OR-RB	107540-B	WLON-1-221P-GY-RB (grey)	(3)
Comm	Ethernet	Blue	24/4P Non-shielded	555619-B	WCAT5-3-244P-BL-BX	8665619-B	WCAT5-1-244P-BL-BX	(4)
T-stat	S-Link	Blue	22/2 Non-shielded	004369-B	W3-222C-BL-BX	025100-B (gray)	W1-222C-GY-BX (grey)	(3)
Power	24 VAC Long Distance	White	16/2 Non-shielded	001360-B	W3-162C-WH-BX	028100-B (gray)	W1-162C-GY-BX (grey)	
Power	24 VDC/24VAC	White	18/2 Non-shielded	002360-B	W3-182C-WH-BX	027100-B (gray)	W1-182C-GY-BX (grey)	
I/O	2-wire I/O Shielded	White	22/2 Shielded	004320-B	W4-222C-WH-BX	016100-B (gray)	W2-222C-GY-BX (grey)	(2)
I/O	3-wire I/O Shielded	White	22/3 Shielded	004330-B	W4-223C-WH-BX	016200-B (gray)	W2-223C-GY-BX (grey)	(2)
I/O	4-wire I/O Shielded	White	22/4 Shielded	004340-B	W4-224C-WH-BX	016300-B (gray)	W2-224C-GY-BX (grey)	(2) (5)
I/O	6-wire I/O Shielded	White	22/6 Shielded	004351-B	W4-226C-WH-BX	016400-B (gray)	W2-226C-GY-BX (grey)	(2) (5)
I/O	8-wire I/O Shielded	White	22/8 Shielded	004352-B	W4-228C-WH-BX	-	W2-228C-GY-BX (grey)	(2) (5)
I/O	2-wire I/O Unshielded	White	22/2 Non-shielded	004360-B	W3-222C-WH-BX	025100-B (gray)	W1-222C-GY-BX (grey)	
I/O	3-wire I/O Unshielded	White	22/3 Non-shielded	004370-B	W3-223C-WH-BX	-	W1-223C-GY-BX (grey)	
I/O	4-wire I/O Unshielded	White	22/4 Non-shielded	004380-B	W3-224C-WH-BX	-	W1-224C-GY-BX (grey)	(5)
I/O	6-wire I/O Unshielded	White	22/6 Non-shielded	004391-B	W3-226C-WH-BX	-	W1-226C-GY-BX (grey)	(5)
I/O	8-wire I/O Unshielded	White	22/8 Non-shielded	004392-B	W3-228C-WH-BX	-	W1-228C-GY-BX (grey)	(5)

(1) Capacitance between conductors is approximately 12pF per foot

(2) Shielded twisted pair

(3) Unshielded twisted pair. **No substitutes.**

(4) Category 5e

(5) Multi-color pair can be used to for multi-output on similar systems.

MS/TP — BACNET MS/TP WIRING: 24AWG, 2 CONDUCTOR, LOW CAPACITANCE STRANDED SHIELDED CABLE. 120 OHM 1/4WATT RESISTOR AT EACH EOL. NO TEES ALLOWED. DAISY-CHAINED ONLY. MAX LENGTH 4000'.

MODBUS — MODBUS WIRING: 18 AWG 2 CONDUCTOR STRANDED SHIELDED CABLE. TERMINATE SHIELD OR DRAIN WIRE AT CONTROLLER ONLY. MAX LENGTH 4000' FOR RS-485 OR 50' FOR RS-232.

ASD — ASD WIRING: 22AWG, 2 CONDUCTOR, STRANDED SHIELDED CABLE. 120OHM 1/4WATT RESISTOR AT EACH EOL. NO TEES ALLOWED. DAISY-CHAINED ONLY. MAX LENGTH 4000' OR 31 DEVICES WITHOUT REPEATER.

FTT-10 — LON WIRING: CAT-4, 22AWG, 2 CONDUCTOR, NON-SHIELDED, TWISTED PAIR. DAISY CHAIN CONFIGURATION, NO TEES ALLOWED, LON TERMINATOR MUST BE USED AT EACH EOL. INSTALL ALONE IN DEDICATED CONDUIT, NO OTHER CONDUCTORS ALLOWED. NO SPLICING OF LON WIRING PERMITTED. MAX LENGTH 4600' OR 63 DEVICES WITHOUT REPEATER.

ETHERNET — ETHERNET WIRING: CATEGORY 5, 24 AWG 4-PAIR UTP. INSTALLERS OF ETHERNET BUS WIRING ARE REQUIRED TO REFER TO INVENSYS TECHNICAL MANUAL F-25955 "ETHERNET NETWORKS" PRIOR TO INSTALLATION. MAXIMUM SEGMENT LENGTH 326'.

S-LK — S-LINK WIRING: 22AWG, 2 CONDUCTOR, STRANDED, NON-SHIELDED CABLE. CAPACITANCE BETWEEN CONDUCTORS CAN NOT EXCEED 32pF PER FOOT. S-LINK IS NON-POLARITY SENSITIVE. S-LINK & LON MAY BE HOUSED IN SAME CONDUIT BUT SHOULD BE IN SEPARATE CABLES (TWO PAIR CABLE IS NOT RECOMMENDED). MAX LENGTH 200'.

ABBREVIATIONS

AWG	AMERICAN WIRE GAUGE
A.F.F.	ABOVE FINISHED FLOOR
ASD	ADDRESS SPECIFIC DEVICE
AHU	AIR HANDLER UNIT
COM	COMMON
DDC	DIRECT DIGITAL CONTROL
EA	EXHAUST AIR
(E)	EXISTING
EOL	END OF LINE
EF	EXHAUST FAN
FACP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
GND	GROUND
HC	HEATING COIL
HHW	HEATING HOT WATER
HX	HEAT EXCHANGER
I/A	INTELLIGENT AUTOMATION
LAN	LOCAL AREA NETWORK
LON	LOCAL OPERATING NETWORK
M/S	MOTOR STARTER
MNB	MICRONET BACNET
MNL	MICRONET LON
MZ2	MICROZONE II
NW8000	NETWORK 8000
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
OA	OUTSIDE AIR
PEM	PACKAGE EQUIPMENT MODULE
RA	RETURN AIR
SA	SUPPLY AIR
TCP	TEMPERATURE CONTROL PANEL
UV	UNIT VENTILATOR
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE

BACnet instance addressing assignment

1. UNC INSTANCE: always starts with 16000x (Example [160001]: FOR UNC # 1)
2. MS/TP CONTROLLER INSTANCE: UNC # + 0 + Port # + MAC Aaddress # (2 digits) (Example [110312]: UNC # 11, port # 3, device # 12)
3. IP SETTINGS: Network # (always 1) + last octet of IP address of the Web Supervisor (3 digits min.) (Example [1186]: W.S IP = 72.20.240.**186**)
4. ETHERNET SETTINGS: Network # (always 2) + last octet of IP address of the Web Supervisor (3 digit min.) (Example [2024]: W.S. IP = 72.20.240.**024**)

MS/TP network assignment models

1. UNC: UNC # + Port # (Example [126]: UNC 12, Port 6)
2. PLANT CONTROLLER:
   - OVER MS/TP: UNC # + Port # (Example [24]: UNC # 2 on port # 4)
   - OVER IP: Network # (always 1) + last octet of IP address of the Web supervisor (3 digit min.) (Example [1126]: W.S. IP = 72.20.240.1**26)**
   - OVER ETHERNET: Network # (always 2) + last octet of IP address of the Web Supervisor (3 digit min.) (Example [2101]: W.S. IP = 72.20.240.**101)**

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Revisions

#	Change:	Date:
4		
5	RECORD DRAWING	05/12/10
6		

Architect:
Engineer: CMI / DESIGN BUILD
Contractor: HENSEL PHELPS, Co.
Designed by: DY Date: 03/16/2010
Software by: Date:
Checked by: Date:

Skyline CIPII 12KV SYSTEM UPGRADE
3300 College Drive, San Bruno, CA

LEGEND

JOB NUMBER IC08C1100

FILE NAME Legends SSF.vsd

SHEET NO. 1 OF 5

BILL OF MATERIAL LISTING

Installing Trade	Item #		Qty	Part Number	Description	Vendor	Manufacturer
Electrical							
Electrical	**1**		1	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	TAC (PS3)	Functional Devices
Electrical	**2**		1	MN-S1	IA MICRONET S-LINK SENSOR	TAC (Invensys)	TAC (INVEN-AUT)
Electrical	**3**		1	RH1B-ULAC24V	ENCLOSED SPDT RELAY 24VAC	KELE	IDEC
Electrical	**4**		1	SH1B-05	SPDT RELAY BASE	KELE	IDEC
Electrical	**5**		1	VER-608	CURR. SW. SPLIT CORE ADJ S.P.	TAC (PS3)	Veris Industries
Panel							
Panel	**6**		1	A16N126	16"x12"x6" NEMA 1 ENCLOSURE	HOFFMAN	HOFFMAN
Panel	**7**		1	A16N12P	16"H x 12"W BACKPLATE	HOFFMAN	HOFFMAN
Panel	**8**		1	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC (Invensys)	TAC (INVEN-AUT)
Panel	**9**		1	T-208	TRANSFORMER 96 VA 120P-24VS U	SINGLE SOURCED SOLUTIONS	CORE

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Revisions

#	Change:	Date:
1	BOM UPDATE	02/12/10
2	CHNG PER CPD 2.16.10 MET. NOTE	03/16/10
3	RECORD DRAWING	05/12/10
4		
5		

Architect:
Engineer: CMI / DESIGN BUILD
Contractor: HENSEL PHELPS, Co.
Designed by: DY Date: 03/16/2010
Software by: Date:
Checked by: Date:

Skyline CIPII 12KV SYSTEM UPGRADE
3300 College Drive,
San Bruno, CA

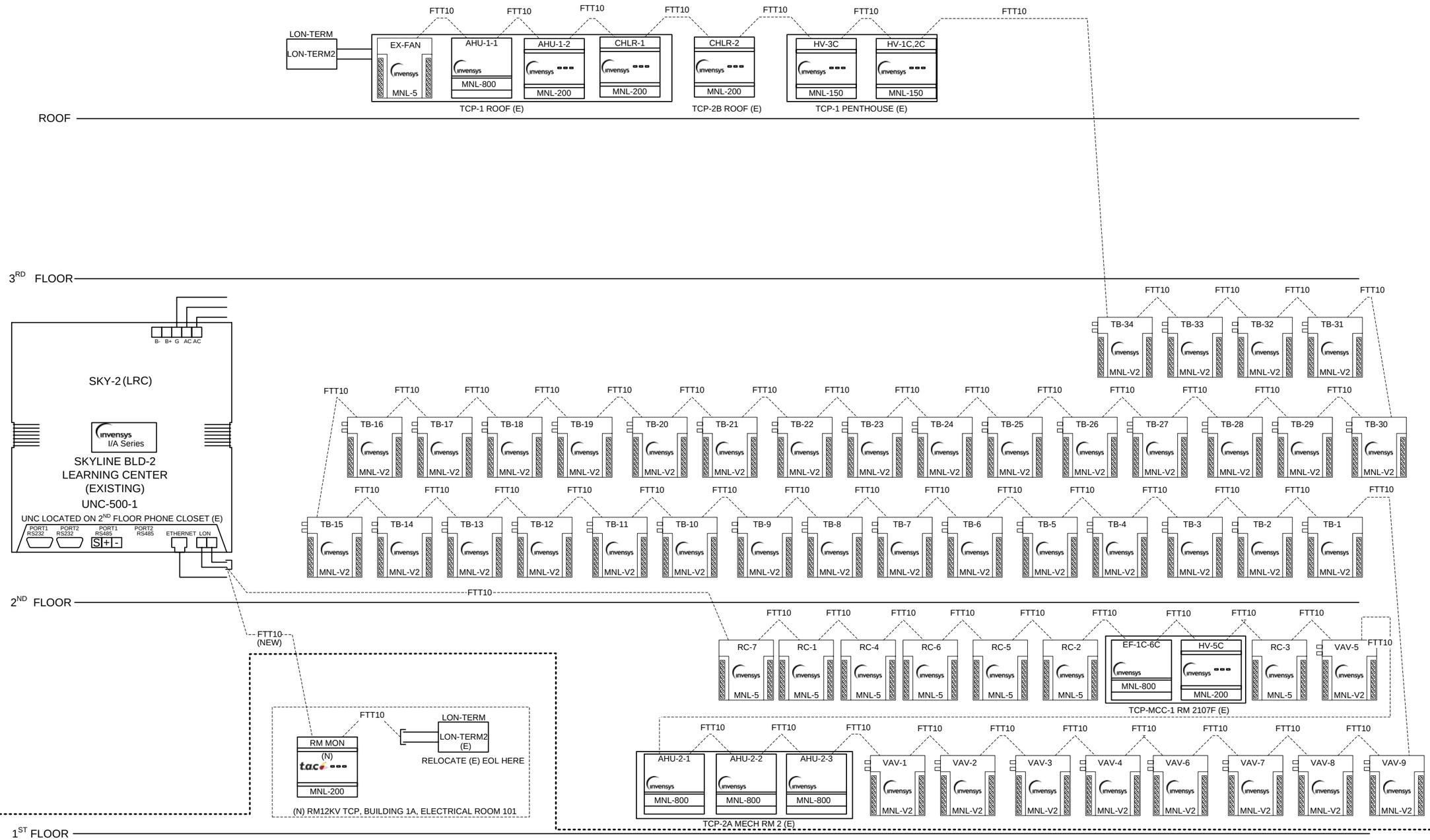
BILL OF MATERIALS

JOB NUMBER IC08C1100

FILE NAME BOM.vsd

SHEET NO. 2 OF 5

NOTE: THE ZONE WORK SHOWN HERE IS DONE UNDER DIFFERENT CONTRACT AND USED FOR REFERENCES ONLY!



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Revisions

#	Change:	Date:
1		
2		
3	RECORD DRAWING	05/12/10
4		
5		

Architect:
Engineer: CMI / DESIGN BUILD
Contractor: HENSEL PHELPS, Co.
Designed by: DY Date: 03/16/2010
Software by: Date:
Checked by: Date:

Skyline CIPII 12KV SYSTEM UPGRADE
3300 College Drive,
San Bruno, CA

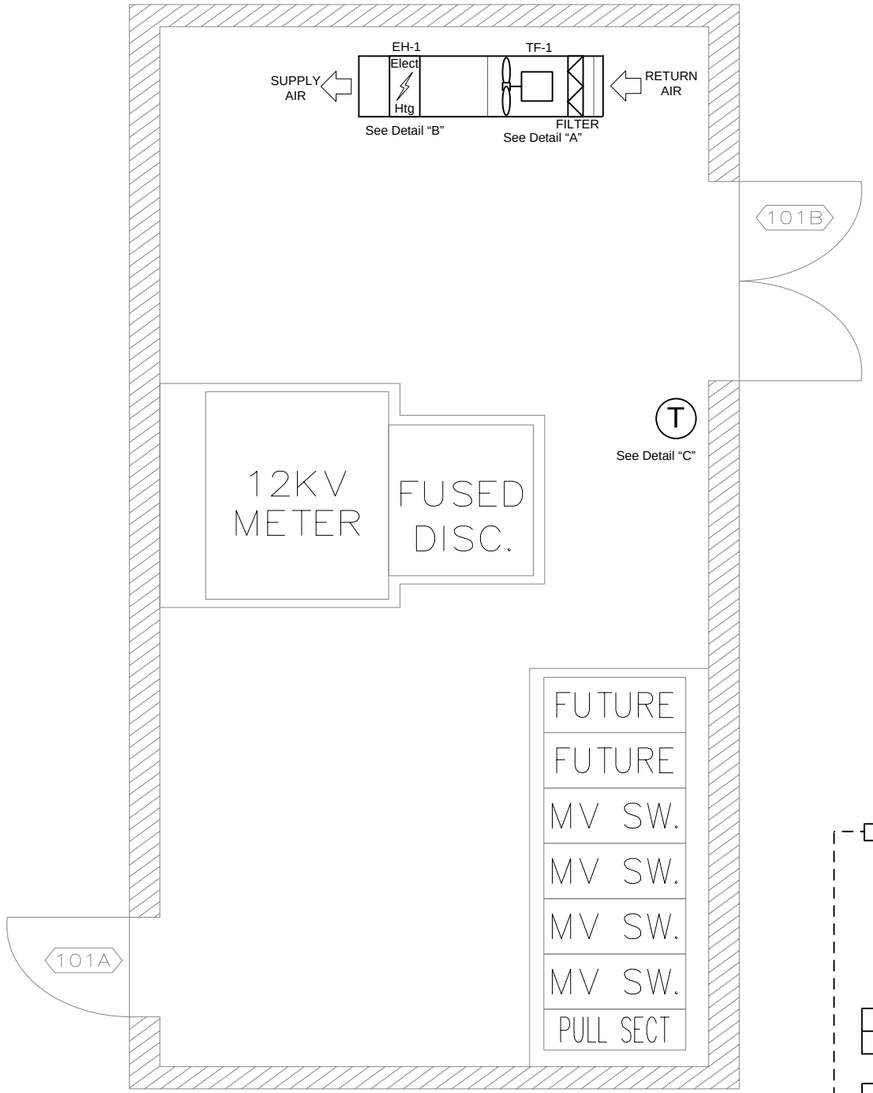
SYSTEM RISER

JOB NUMBER IC08C1100

FILE NAME RISER.vsd

SHEET NO. 3 OF 5

12 KV ROOM TEMPERATURE CONTROL SCHEMATICS

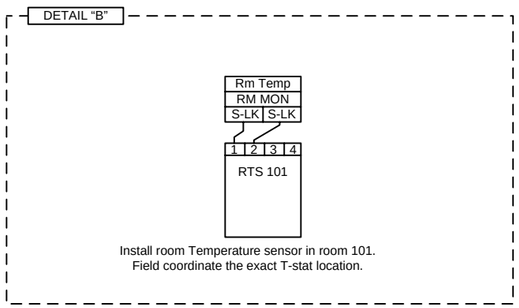


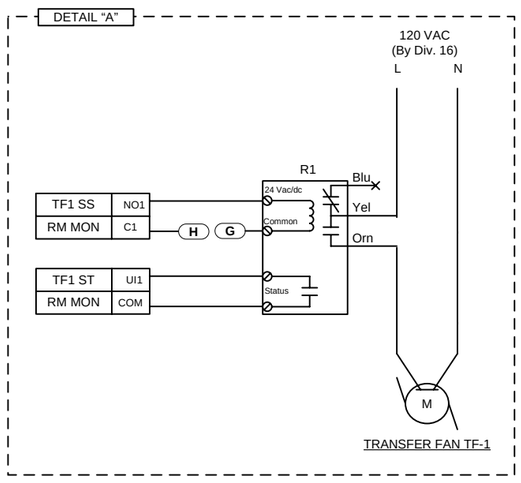
TF & EH CONTROL

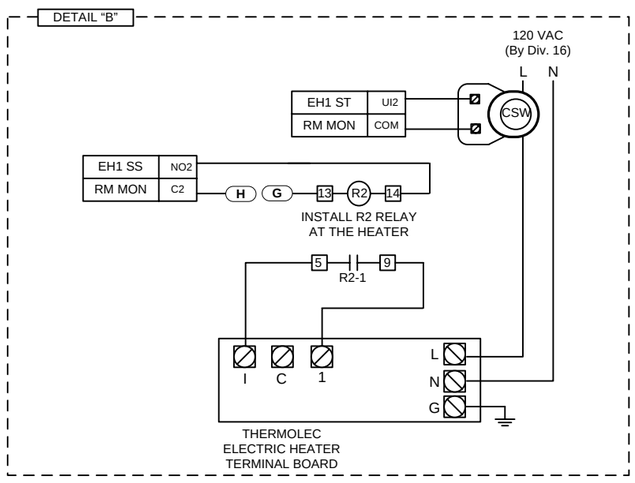
Device	Qty	Part Number	Description	Vendor
Electrical				
R1	1	FUN-RIBX24BA	ENC INTRNL ADJ CUR SENS&RELAY	TAC (PS3)
R2	1	RH1B-ULAC24V	ENCLOSED SPDT RELAY 24VAC	KELE
R2_1	1	SH1B-05	SPDT RELAY BASE	KELE
RTS 101	1	MN-S1	IA MICRONET S-LINK SENSOR	TAC (Invensys)

SEQUENCE OF OPERATIONS.

1. The BMS system shall constantly monitor room temperature and maintain the room temperature set-point of 68° F (adjustable from the front end).
2. Upon temperature drop below 68° F, the BMS shall start the transfer fan TF-1 and electric heater EH-1 and keep them on until the room temperature set-point is satisfied.
3. When the room temperature set-point is met, the electrical heater and transfer fan shall be shut down.
4. The BMS shall start the electrical heater only after the transfer fan run status has been proven "ON."
5. The BMS shall keep transfer fan running for approximately 1 minute (adjustable) after the electrical heater has been disabled.
6. The BMS shall generate an alarm (high level) to the front end operator if the transfer fan command does not match fan status for 30 seconds (adjustable).
7. The BMS shall generate an alarm (high level) to the front end operator if the electrical heater command does not match heater status for 30 seconds (adjustable).
8. The BMS system shall generate temperature alarms (high level) to the front end operator if:
   - Room temperature is 5° F below its set-point.
   - Room temperature is above 90° F.
9. The front end operator shall have an ability to remotely disable transfer fan and / or electrical heater, when necessary.







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Revisions

#	Change:	Date:
1	NEW PROJECT PAGE	02/12/10
2	CHNG PER CPD 2.16.10 MET. NOTE	03/16/10
3	RECORD DRAWING	05/12/10
4		
5		

Architect:
Engineer: CMI / DESIGN BUILD
Contractor: HENSEL PHELPS, Co.
Designed by: DY Date: 03/16/2010
Software by: Date:
Checked by: Date:

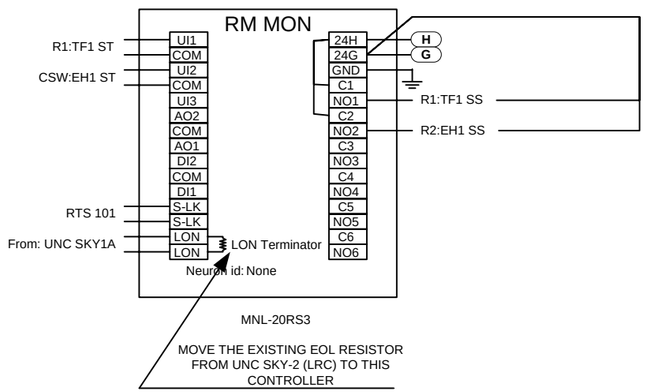
Skyline CIPII 12KV SYSTEM UPGRADE
3300 College Drive,
San Bruno, CA
TRANSFER FAN & ELECTRIC HEATER CONTROL

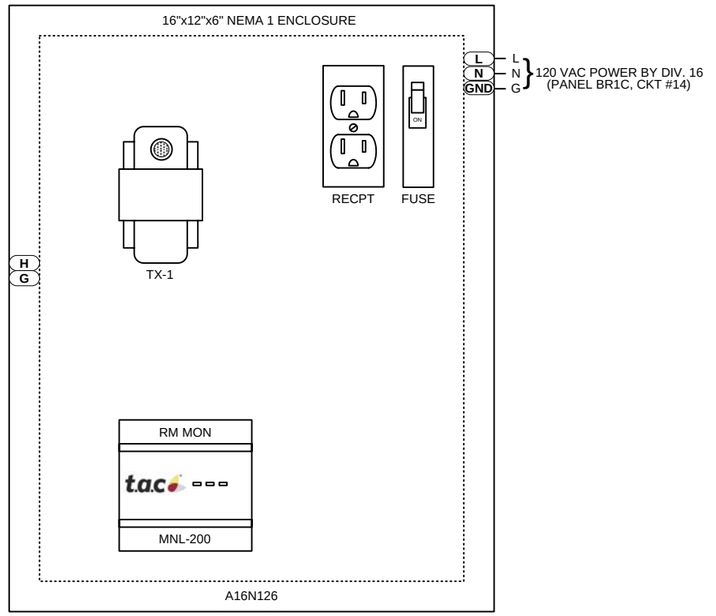
JOB NUMBER IC08C1100
FILE NAME TF & EH CONTROL.vsd
SHEET NO. 4 OF 5

12 KV ROOM MONITORING TCP

ROOM 12KV TCP

Device	Qty	Part Number	Description	Vendor
Panel				
RM MON	1	MNL-20RS3	MN 200 CONT. WITH LONMARK ROOF	TAC
RM12KV TCP	1	A16N126	16"x12"x6" NEMA 1 ENCLOSURE	HOFFMAN
RM12KV TCP_1	1	A16N12P	16"H x 12"W BACKPLATE	HOFFMAN
TX-1	1	T-208	TRANSFORMER 96 VA 120P-24VS U	SINGLE SOURCED SOLUTIONS





INSTALL RM12KV TCP IN NEW ELECTRICAL ROOM 101

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Revisions

#	Change:	Date:
1	CONTROLLER WIRING DETAILS	02/12/10
2	CHNG PER CPD 2.16.10 MET. NOTE	03/16/10
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4		
5		

Architect:
Engineer: CMI / DESIGN BUILD
Contractor: HENSEL PHELPS, Co.
Designed by: DY Date: 03/16/2010
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Skyline CIPII 12KV SYSTEM UPGRADE
3300 College Drive,
San Bruno, CA

12KV ROOM MONITORING TCP

JOB NUMBER
IC08C1100

FILE NAME
ROOM SCHEMATICS.vsd

SHEET NO.
5 OF 5