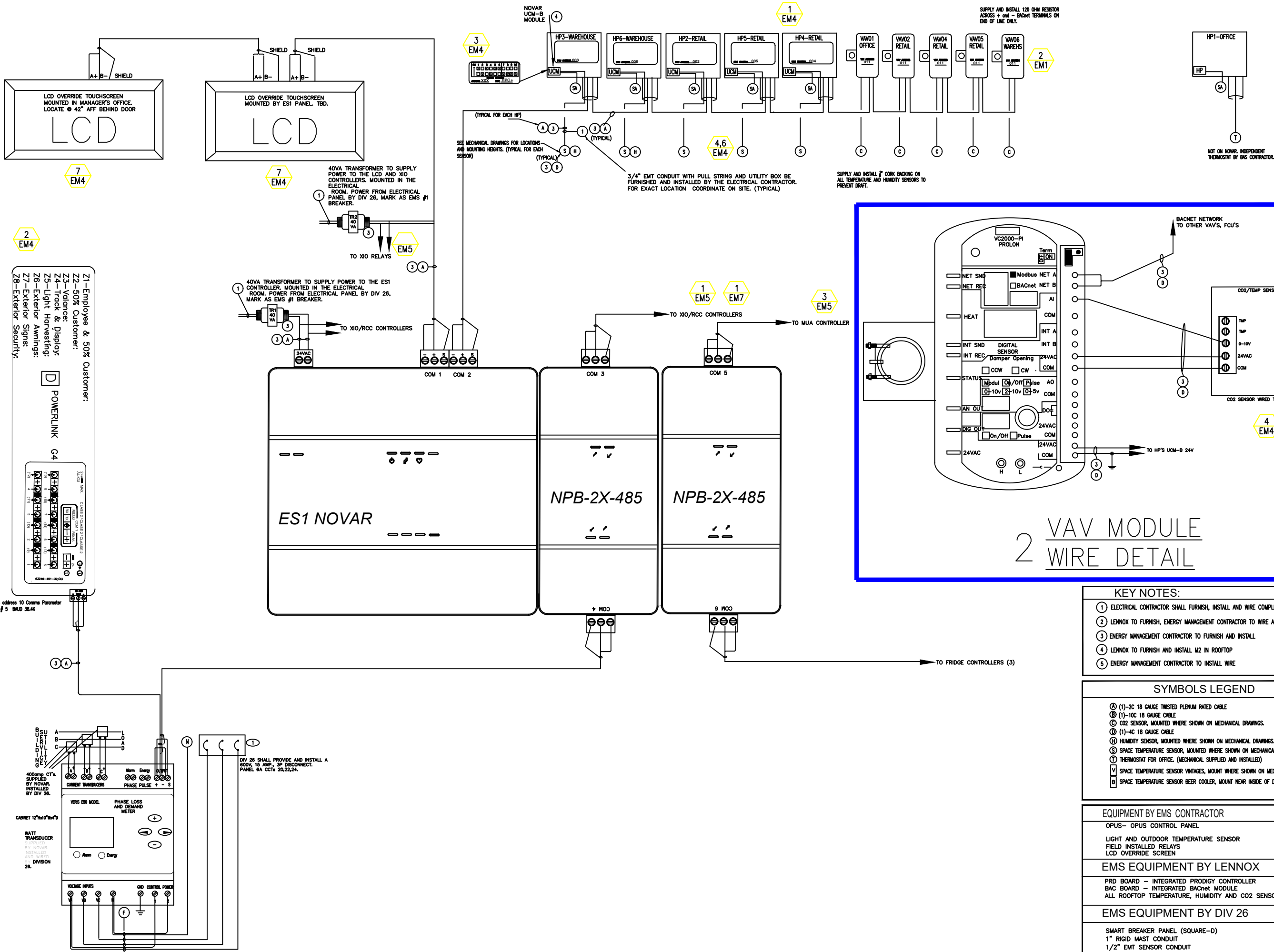




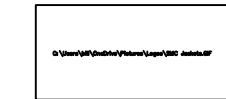
- KEY NOTES:**
- 1 ELECTRICAL CONTRACTOR SHALL FURNISH, INSTALL AND WIRE COMPLETE.
 - 2 LENNOX TO FURNISH, ENERGY MANAGEMENT CONTRACTOR TO WIRE AND INSTALL
 - 3 ENERGY MANAGEMENT CONTRACTOR TO FURNISH AND INSTALL
 - 4 LENNOX TO FURNISH AND INSTALL M2 IN ROOFTOP
 - 5 ENERGY MANAGEMENT CONTRACTOR TO INSTALL WIRE

- SYMBOLS LEGEND**
- ① (1)-2C 18 GAUGE TWISTED PLENUM RATED CABLE
 - ② (1)-10C 18 GAUGE CABLE
 - ③ CO2 SENSOR, MOUNTED WHERE SHOWN ON MECHANICAL DRAWINGS.
 - ④ (1)-4C 18 GAUGE CABLE
 - ⑤ HUMIDITY SENSOR, MOUNTED WHERE SHOWN ON MECHANICAL DRAWINGS.
 - ⑥ SPACE TEMPERATURE SENSOR, MOUNTED WHERE SHOWN ON MECHANICAL DRAWINGS.
 - ⑦ THERMOSTAT FOR OFFICE. (MECHANICAL SUPPLIED AND INSTALLED)
 - ⑧ SPACE TEMPERATURE SENSOR VINTAGES, MOUNT WHERE SHOWN ON MECHANICAL DRAWINGS.
 - ⑨ SPACE TEMPERATURE SENSOR BEER COOLER, MOUNT NEAR INSIDE OF DOOR

EQUIPMENT BY EMS CONTRACTOR			
OPUS- OPUS CONTROL PANEL			
LIGHT AND OUTDOOR TEMPERATURE SENSOR			
FIELD INSTALLED RELAYS			
LCD OVERRIDE SCREEN			
EMS EQUIPMENT BY LENNOX			
PRD BOARD - INTEGRATED PRODIGY CONTROLLER			
BAC BOARD - INTEGRATED BACnet MODULE			
ALL ROOFTOP TEMPERATURE, HUMIDITY AND CO2 SENSORS			
EMS EQUIPMENT BY DIV 26			
SMART BREAKER PANEL (SQUARE-D)			
1" RIGID MAST CONDUIT			
1/2" EMT SENSOR CONDUIT			



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Context Plan

General Notes

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2. VERIFY ALL DIMENSIONS.
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Rev.	Date	Description	Initial
3			
2			
1			

Issued for	July 30, 2020
Issue date	
Project No.	NTS
Scale	BK
Drawn by	JR
Checked by	

LCBO Store No. 686
Ottawa, ON

NOVAR BAS SYSTEM WIRING DIAGRAM

Drawing title
Revision

Sheet no. EM-01 of 7

SCOPE OF WORK

GENERAL CONTRACTOR INFORMATION:

The Purchase Order will be issued to SMC 6 weeks prior to the fixture date. The Novar equipment will arrive two weeks prior to the construction date as indicated by LCBO. SMC will be on site a total of 5 times to complete the project.

JOB SITE ELECTRICAL CONTRACTORS SCOPE (DIV 26):

The electrical contractor is to install in conduit all line voltage wiring (120v to 600v)

BAS CONTRACTORS SCOPE (DIV 25):

The BAS contractor will be responsible for installation and termination of the Novar equipment as stated in this document and indicated on drawings #EM1-5 for the LCBO equipment. The BAS contractor also provides and installs conduit, boxes, straps and fittings which pertain to the low voltage (24v). All cable shall be enclosed in conduit below the ceiling level if not concealed within the building structure.

The goal is to have the Novar system installed 100% At substantial completion.

INSTALLING THE NOVAR OPUS PANEL:

Mount the NOVAR panel in the Elect. room, on the wall as indicated on the electrical drawings. Review and coordinate with the electrical contractor the installation of conduit and 2 circuits for BAS #1 & 2. It is the 120VAC circuits which provide power to the transformers and receptacle located inside the panel.

The installation by BAS of a 1" dia. EMT sleeve which is used to bring the Novar cables into the panel. Provide a connector and bushing at the top of the conduit sleeve to protect the cables from abrasion.

NOTE: Do not terminate the low voltage cables in the panel until after the field termination have been made at the other ends of the cables. Before the terminations are made, it is important to test the cables for shorts to ground. Once you have verified the integrity of the cables, and made all field termination, you can proceed with all terminating inside the prefab panel.

VESTIBULE HEATER(S):

The vestibule heater requires 1, 18/4 w/shield conductor cable from the Opus panel to the electric heater. Electrical contractor will factory furnish a low voltage relay to control the heater. The vestibule heater sensor requires 1, 18/2 w/shield conductor cable from the heater to the sensor location.

WATTS TRANSDUCER:

The watts tranducer requires 1, 18/2 w/shield conductor cable from the transducer to the Novar panel. The transducer monitors power consumption and phase conditions through BACnet protocol.

3 rope current transducers are to be mounted in a 16x16x6 box installed by the electrician.

LIGHTING CONTROL:

Lighting will be split into 8 Zones.

1-Employee & 50% Customer, 2-50% Customer, 3-Valance, 4-Track & Displays, 5-Daylight Harvesting, 6-Exterior Awnings & Vestibule, 7-Exterior Signs, 8-Exterior Security

A complete smart breaker panel (Square D) POWERLINK G3 NF21SBRG3 - will be supplied and installed by the electrical contractor.

The Powerlink Panel requires 1, 18/2 w/shield conductor cable from the panel to the Opus panel. The Powerlink panel is operated through BACnet protocol.

BAS contractor will install an indoor light sensor for daylight harvesting located in the ceiling by the windows at the cash desks. Maximun 6' from the window wall.

ZONE CO2 SENSORS:

Each Co2 sensor requires 2, 18/2w/shield conductor cable from the VAV controller to the sensor location. Mount the CO2 on the box provided by the electrical contractor on the column or wall. Install cork to the complete back of the sensor to prevent drafts. Make all termination at the CO2 prior to terminating in the VAV. Remember to keep the polarity the same throughout the system.

NEW HEAT PUMP UNITS:

Novar UCM BACnet controllers and associated devices will be field installed as shown on drawing #EM3. Zone sensors will be supplied by EMS and installed by the Novar contractor.

The communications line requires a 1, 18/2 w/shield conductor cable from the Opus panel to the first HP and then 1, 18/2 w/shield conductor cable loop to each of the remaining HP's.

Prior to making the termination in the HP's, you must first locate the com line home run in the Opus panel, strip the wires and heat shrink them off to prevent shorting to ground during the terminations. Remember to maintain the polarity throughout the entire system. Address the UCM-B as BACnet and per the HP identification numbers.

ZONE TEMPERATURE SENSOR (ZTS):

Each ZTS requires 1, 18/2 w/shield conductor cable from the HP serving the space the ZTS is located in. Mount the ZTS on the box provided by the electrical contractor on the column or wall. Install cork to the complete back of the sensor to prevent drafts. Make all termination at the ZTS prior to terminating in the HP. Remember to keep the polarity the same throughout the system.

NEW Co2 (VAV) UNITS:

Prolon VAV BACnet controllers and associated devices will be field installed as shown on drawing #EM1. Co2 sensors will be supplied by EMS and installed by the Novar contractor.

The communications line requires a 1, 18/2 w/shield conductor cable from the HP network loop. Insert VAV's into the network loop of the HP's. Remember to maintain the polarity throughout the entire system. Address the VAV as per the HP identification numbers plus 10.

ZONE HUMIDITY SENSORS:

Each humidity sensor requires 1, 18/4w/shield conductor cable from the XIO's to the sensor location. Mount the IHS on the box provided by the electrical contractor on the column or wall. Install cork to the complete back of the sensor to prevent drafts.

OUTDOOR TEMPERATURE (OTS):

Requires 1, 18/2 w/shield cables from the OSA to the Opus panel.The OSA (10Ktype2 duct sensor) will be mounted on the incoming duct from the exterior of the MUA.

MAKE-UP AIR UNIT:

MUA BACnet controller and associated devices will be factory installed. Manufacture required sensors and VFD will be factory supplied and wired. The communications line requires a 1, 18/2 w/shield conductor cable from the Opus panel to the MUA. Remember to maintain the polarity throughout the entire system. Address the MUA on site as determined.

BOILER UNITS:

Boiler BACnet controller and associated devices will be factory installed. Manufacture required sensors will be factory supplied and wired. The communications line requires a 1, 18/2 w/shield conductor cable from the MUA controller to the boiler. Remember to maintain the polarity throughout the entire system. Address the boiler on site as determined.

PUMPS:

All circulation pumps will be use lead/lag control. BACnet control option will be factory installed with pump controller. Flow sensor for pairs of pumps will be supplied and wired by the EMS contractor. Installation of flow sensors will be by mechanical contractor. EMS contractor to hand over flow sensors at the beginning of the project and co-ordinate installation on site. The communications line requires a 1, 18/2 w/shield conductor cable from the manufacture controllers looped to each pump. Remember to maintain the polarity throughout the entire system. Address the controllers on site as determined.

FLUID COOLER:

The dry cooler requires 1, 18/4 w/shield conductor cable from the XIO's to the control panel.

EXHAUST FANS 3 and 5:

Each exhaust fan requires 1, 18/2w/shield conductor cable from the Opus panel to the exhaust fan. EMS contractor will wire to a low voltage field installed relay to control the fan.

EXHAUST FAN 1:

Exhaust fan requires 1, 18/4 and 1, 18/2 w/shield conductor cable from the Opus panel to the exhaust fan. EMS contractor will wire to factory terminals to modulate control of the fan.

REMOTE COMMUNICATION CHECKOUT:

Once you have completed this scope of work and the EMSsystem is installed and terminated, NOVAR will get on-line with the system and verify all points of control are operational

SENSOR LABELING:

All sensors must have lamacoids installed on the sensor indicating the approved LCBO identification. Hand written labels, printed or writing on the sensor is not acceptable.

WIRE LABELING:

All wire labeling must use printed wrap around wire labels. Hand written labels or writing on the wire is not acceptable.

WELL SENSORS:

-EMS to supply 3" wells to the mechanical contractor for installation. Locations to be verified on site.

-Each well sensor requires 1, 18/2 w/shield conductor cable from the sensor to the XIO's.

-All sensor will be 10Ktype2 threaded box connection sensors.

-Apply temperature conductive material to all probes before tightening in place.

WATER FLOW SENSORS:

-EMS to supply water flow switches to the mechanical contractor for installation. Locations to be verified on site.

-Each flow sensor requires 1, 18/2 w/shield conductor cable from the sensor to the XIO's.

-All switches will be threaded box connection type.

EMS LAN CONNECTION:

Verify the RJ-45 LAN connection has been installed adjacent to the panel. Plug the CAT5 ethernet cable into the Novar controller. Obtain the IP address and submit to Novar for programming.

CURRENT TRANSDUCERS:

Each current transducer used for status requires 1, 18/2w/shield conductor cable from the XIO panel to the CT. EMS contractor will supply, install and wire CT onto load side of power circuit feeding the specific equipment.

SEQUENCE OF OPERATIONS (SEE ALSO M-6)

HEAT PUMP UNITS

-Occupied/Unoccupied shall be activated by a daily schedule. HVAC are on 1 hour before store opening and off at store closing.

-In occupied mode the fan will run continuously.

-In unoccupied mode the fan will run only on a call for heating or cooling.

-Occupied heating setpoint shall maintain a space temp of 20 "Deg C".

-Unoccupied heating setpoint shall maintain a space temperature >15 "Deg C".

-Occupied cooling setpoint shall maintain a space temperature of 21.5 "Deg C".

-Unoccupied cooling setpoint shall maintain a space temperature <23.5 "Deg C".

-The Co2 setpoint shall be 800ppm. When the Co2 > 800ppm the heat pump fan shall energize and the vav shall modulate open. At 1000ppm the vav shall be 100% open. when the Co2 < 700ppm the fan shall de-energize and the vav will revert back to monitoring parameters.

-The dehumidification setpoint shall be 50%rh. When the humidity > 53%rh the MUA shall energize the dehumidification cycle built into the MUA. When the humidity < 47% the unit will revert back to MUA control parameters.

-Alarms

-Space temperature exceeds setpoints for over 1 hour during occupied and unoccupied hours.

-Supply air temperature is less than 8 "Deg C".

-Co2 sensor exceeds setpoints for over 1 hour during occupied and unoccupied hours.

-Humidity sensor exceeds setpoints for over 1 hour during occupied and unoccupied hours.

FRIDGES:

-Occupied/Unoccupied shall be activated by a daily schedule.

-The evaporator fans run continuously durring occupied hours. during unoccupied hours they cycle for 15 minutes every hour unless there is a call for cooling by the condensor then they will stay on until the cooling call is satisfied.

-the condensor will cycle to maintain desired setpoint in the fridges. If the temperature reaches 1.5 "Deg C" > setpoint the condensor will energize. when the temperature is 1.5 "Deg C" below setpoint the condensor will de-energize.

-Beer fridge occupied setpoint 9 "Deg C", unoccupied setpoint 9 "Deg C".

-Cold room occupied setpoint 10 "Deg C", unoccupied setpoint 10 "Deg C".

-Wine fridges occupied setpoint 11 "Deg C", unoccupied setpoint 11 "Deg C".

-Alarms

-Fridge temperature exceeds setpoints for over 1 hour during occupied and unoccupied hours.

WASHROOM EF 3 & STAFF EXHAUST FAN EF 5

-Shall be commanded on/off via employee lighting schedule.

-Alarms

-Exhaust fan fails to run

EF 2

-Occupied cooling setpoint shall maintain a space temp of 22 "Deg C" (adjustable).

-Alarms

-Space temperature is above setpoint for over 1 hour

-Exhaust fan fails to run

LIGHTING

-All lighting will be operated by time of day schedules.

-Override to last a pre-determined time (adjustable).

-Exterior lights will be interlocked with an outdoor light sensor.

-Daylight harvesting lights to be interlocked with an indoor light sensor.

-Zone 1-Employee lights are on when staff arrives and off when staff leaves.

-Zone 2-Customer Lights are on 15 minutes before store opening and off 15 minutes after store closing.

-Zone 3-Valance Lights are on 5 minutes before and off 5 minutes after store closing.

-Zone 4-Track Lights are on at store opening and off at store closing.

-Zone 5-Daylight Harvesting Lights are on @ store opening and off 15 minutes after store closing when indoor light sensor is below 75 Lumens. (Adjustable).

-Zone 6-Exterior Awnings and Vestibule lights are on at store opening and off a 1/2 hour after store closing if light sensor permits.

-Zone 7-Exterior Signs are on at store opening and off a 1/2 hour after store closing if light sensor permits.

-Zone 8-Security Lighting are on at dusk and off at dawn if light sensor permits.

-There are override buttons on the LCD. During occupied hours they are inactive. During unoccupied hours if pushed once they will energize the lights and will stay on for 1 hour. If they are pushed again the lights will go off.

-Alarms

-Indoor light sensor failure.

-Outdoor light sensor failure.

-LCD touchscreen communication failure.

EXHAUST FAN 1:

-Exhaust fan shall modulate to maintain the MUA differential setpoint.

-Alarms

-Exhaust fan fails to run

VESTIBULE AND LOADING HEATERS (FFH-1, FFH-2)

-Occupied/Unoccupied shall be activated by a daily schedule.

-The relay will energize only on a call for heating.

-Occupied heating setpoint shall maintain a space temp of 17 "Deg C" (adjustable). Unoccupied heating setpoint shall maintain a space temperature >15 "Deg C".

-Alarms

-Space temperature is below setpoints for over 1 hour during occupied and unoccupied hours.

PHASE LOSS METER

-On a phase failure of the incoming power a signal will be sent to the MUA, Heatpumps and pumps to shut down immediadely.

-On a restore of phase loss condition the equipment will sequentially start up for normal operation.

-Alarms

-Pulse input failure.

KWH DEMAND METER

-Monitoring only in 15 minute increments.

-Alarms

-Pulse input failure.

VINTAGE (THC) COOLER

-Temperature monitoring only.

-Alarms

-Cooler temperature exceeds setpoint for over 1 hour during occupied and unoccupied hours.

MAKE UP AIR UNIT:

-Occupied/Unoccupied shall be activated by a daily schedule. MUA is on 1 hour before store opening and off at store closing.

-In occupied mode the fan will run continuously.

-In unoccupied mode the fan will run only on a demand for Co2.

-Winter temperature shall maintain a supply temperature of 18 "Deg C".

-Hot water coil shall be modulated to maintain setpoint.

-Summer temperature shall maintain a supply temperature of 13 "Deg C".

-Supply fan shall modulate to maintain a minimum diferential setpoint of xxx.

-VAV controllers shall modulate to maintain a minimum fresh air CFM of xxx.

-The Co2 setpoint shall be 800ppm. When the Co2 > 800ppm in the space the VAV shall modulate open. At 1000ppm the vav shall be 100% open. when the Co2 < 700ppm the MUA fan shall modulate to maintain the minimum differential setpoint and the vav will revert back to monitoring parameters.

-When the MUA is in heating, cooling or dehumidification mode, unit fan is modulated to maximum air flow setpoint. Otherwise, reset and modulate based on the total air capacity of the VAV (Co2 level)

-The dehumidification setpoint shall be 50%rh. When the humidity > 54%rh the MUA shall energize the dehumidification cycle built into the MUA. When the humidity < 46% the unit will revert back to MUA control parameters.

-Duct differential static pressure setpoint is 1" w.g.

-If MUA duct differential static pressure is over 2" w.g., system to be disengaged immediately by hardwire interlock. Manual reset is required by button in the mechanical room

-When the MUA is in heating, cooling or dehumidification mode, VAV dampers are modulated to maximum air flow setpoint.

Otherwise, reset and modulate based on Co2 level

-Alarms

-Supply temperature exceeds setpoints for over 1 hour during occupied hours.

-Supply air temperature is less than 8 "Deg C".

-Co2 sensor exceeds setpoints for over 1 hour during occupied and unoccupied hours.

-Humidity sensor exceeds setpoints for over 1 hour during occupied and unoccupied hours.

HEAT EXCHANGER MIXING VALVES:

-Main circulation loop shall be maintained at a constant 40.4°C.

-HX valves shall modulate open as the main loop temperature decreases.

-HX valve shall initialize when the main loop temperature is 35°C. HX valve shall continue to modulate open until the main loop temperature is 40.4°C Once the main loop is satisfied valve will close.

-Alarms

-HX valve fails to open

-Main loop temperature is below 15°C

PUMPS (1A,1B,2A,2B,3A,3B)

-Lead pump for P1A/B circulation loop shall run continuously

-Lead pump for P2A/B, P3A/B circulation loops shall run on an occupied schedule. In unoccupied mode the pumps shall run on demand based

-Lag pump will alternate on a weekly schedule Sunday 8pm.

lag pump shall be energized and an alarm sent for no flow.

-If the lead pump fails for more than 30sec or if the flow switch detects no flow after 5 sec, the lag pump shall start automatically to maintain the loop.

-Alarms

-Lead pump fails

-No flow detected

FLUID COOLER:

-Main circulation loop shall be maintained at a constant 40.4°C.

-FC circuits shall stage on as the main loop temperature increases.

-Stage 1 shall energize when the main loop temperature is 42.0°C. Stage 2 shall energize when the main loop temperature is 29.5°C. Stage 3 shall energize when the main loop temperature is 44.0°C. All stages will energize until the main loop temperature is 24.5°C Once the main loop is satisfied all stages will de-energize.

-Stages shall have a run time of 2 minutes and a minimum off time of 5 minutes

-Alarms

-FC Stage fails to energize

-Main loop temperature is above 34°C

BOILER UNITS

-Occupied/Unoccupied shall be activated by a daily schedule. Boiler is on 1 hour before store opening and off at store closing.

-In occupied mode the boiler supply loop temperature shall be maintained by an outdoor air reset calculation.

OAT 15 °C Boiler Setpoint 49 °C

OAT 0 °C Boiler Setpoint 72 °C

-In unoccupied mode the boiler supply loop temperature shall be based on demand

-Boiler shall be Bacnet monitored with the ability to write the setpoint to the system.

-Boiler manufacture shall setup boilers to run parallel sequencing.

-Alarms

-Supply temperature does not maintain setpoints for over 1 hour during occupied hours.

-Boiler has a Bacnet alarm conditon



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Rev.	Date	Description	Initial
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Issued for	July 30, 2020		
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Project No.	Scale	NTS	BK
			JR
Drawn by			
Checked by			

LCBO Store No. 686
Ottawa, ON

SCOPE OF WORK
SEQUENCE OF
OPERATIONS

Sheet No.	EM-02	of	7
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LIGHTING & OTHER EQUIPMENT									
ID#	EQUIP	POINT DESCRIPTION	TYPE	CONTROL	ADD	POINT#	INTERFACE	TREND LOG	LCD
1	METER	KWH DEMAND	DI	VERIS	01	01	MODBUS	YES	YES
2	PHASE	PHASE LOSS PROTECTION	DI	VERIS	01	01	MODBUS	YES	
3	THC	TEMPERATURE SENSOR	AI	XCM20R	—	07	SENSOR	YES	YES
4	SEC	SECURITY GENERAL ALARM	DI	XCM20R	—	08	RELAY	YES	
5	VEST	VESTIBULE SENSOR	AI	XCM20R	—	06	SENSOR	YES	YES
6	VEST	VESTIBULE FAN ON/OFF	DO	UCM B	1	FAN	RELAY	YES	YES
7	VEST	VESTIBULE HEATER ON/OFF	DO	XIO	21	04	RELAY	YES	YES
8	EF	EXHAUST FAN 01 ON/OFF	AO	XIO	21	03	0—10V	YES	YES
9	MISC	OUTDOOR TEMPERATURE SENSOR	AI	XCM20R	—	01	SENSOR	YES	YES
10	MISC	INDOOR LIGHT SENSOR	AI	XCM20R	—	05	SENSOR	YES	YES
11	LIGHT	EMPLOYEE LIGHTS ON/OFF	DO	SQUARE D	10	1	BACNET	YES	
12	LIGHT	CUSTOMER LIGHTS ON/OFF	DO	SQUARE D	10	2	BACNET	YES	
13	LIGHT	VALANCE LIGHTS ON/OFF	DO	SQUARE D	10	3	BACNET	YES	
14	LIGHT	TRACK & DISPLAY LIGHTS ON/OFF	DO	SQUARE D	10	4	BACNET	YES	
15	LIGHT	DAYLIGHT HARVESTING ON/OFF	DO	SQUARE D	10	5	BACNET	YES	
16	LIGHT	EXTERIOR AWNINGS ON/OFF	DO	SQUARE D	10	6	BACNET	YES	
17	LIGHT	EXTERIOR SIGNS ON/OFF	DO	SQUARE D	10	7	BACNET	YES	
18	LIGHT	EXTERIOR SECURITY ON/OFF	DO	SQUARE D	10	8	BACNET	YES	
19	LIGHT	EMPLOYEE LIGHTS STATUS	VI	SQUARE D	—	1	BACNET	YES	
20	LIGHT	CUSTOMER LIGHTS STATUS	VI	SQUARE D	—	2		YES	
21	LIGHT	VALANCE LIGHTS STATUS	VI	SQUARE D	—	3		YES	
22	LIGHT	TRACK & DISPLAY LIGHTS STATUS	VI	SQUARE D	—	4		YES	
23	LIGHT	DAYLIGHT HARVESTING STATUS	VI	SQUARE D	—	5		YES	
24	LIGHT	EXTERIOR AWNINGS STATUS	VI	SQUARE D	—	6		YES	
25	LIGHT	EXTERIOR SIGNS STATUS	VI	SQUARE D	—	7		YES	
26	LIGHT	EXTERIOR SECURITY STATUS	VI	SQUARE D	—	8		YES	
27	LIGHT	EMPLOYEE LIGHTS OVERRIDE	VI	LCD	1,2	1		YES	YES
28	LIGHT	CUSTOMER LIGHTS OVERRIDE	VI	LCD	1,2	2		YES	YES
29	LIGHT	VALANCE LIGHTS OVERRIDE	VI	LCD	1,2	3		YES	YES
30	LIGHT	TRACK & DISPLAY LIGHTS OVERRIDE	VI	LCD	1,2	4		YES	YES
31	LIGHT	DAYLIGHT HARVESTING OVERRIDE	VI	LCD	1,2	5		YES	YES
32	LIGHT	EXTERIOR AWNINGS OVERRIDE	VI	LCD	1,2	6		YES	YES
33	LIGHT	EXTERIOR SIGNS OVERRIDE	VI	LCD	1,2	7		YES	YES
34	LIGHT	EXTERIOR SECURITY OVERRIDE	VI	LCD	1,2	8		YES	YES
35	MECH	MAIN HP LOOP SUPPLY TEMP	AI	XIO	21	01	SENSOR	YES	YES
36	MECH	MAIN HP LOOP RETURN TEMP	AI	XIO	21	02	SENSOR	YES	YES
37	MECH	BOILER LOOP SUPPLY TEMP	AI	XIO	23	06	SENSOR	YES	YES
38	MECH	BOILER LOOP RETURN TEMP	AI	XIO	23	07	SENSOR	YES	YES
39	MECH	MUA LOOP SUPPLY TEMP	AI	XIO	23	T1	SENSOR	YES	YES
40	MECH	MUA LOOP RETURN TEMP	AI	XIO	23	T2	SENSOR	YES	YES
41	MECH	BOILER # 1 SUPPLY TEMP	AI	XIO	23	04	SENSOR	YES	YES
42	MECH	BOILER # 2 SUPPLY TEMP	AI	XIO	23	05	SENSOR	YES	YES
43	MECH	HX # 1 LOOP RETURN TEMP	AI	XIO	23	T3	SENSOR	YES	YES
44	MECH	MUA DUCT PRESSURE	AI	XIO	22	3	SENSOR	YES	YES

HP’S, VAV’S AND MECH EQUIPMENT									
ID#	EQUIP	POINT DESCRIPTION	TYPE	CONTROL	ADD	POINT#	INTERFACE	TREND LOG	LCD
45	HP’S	ZONE TEMPERATURE	AI	UCM—B	2—6	3,4	BACNET	YES	YES
46	HP’S	SUPPLY AIR TEMP	AI	UCM—B	2—6	4,5	BACNET	YES	YES
47	HP’S	SUPPLY FAN ON/OFF	DO	UCM—B	2—6	21	BACNET	YES	YES
48	HP’S	COOL STAGE 1	DO	UCM—B	2—6	26	BACNET	YES	YES
49	HP’S	COOL STAGE 2	DO	UCM—B	2—6	22	BACNET	YES	YES
50	HP’S	REVERSING VALVE	DO	UCM—B	2—6	25	BACNET	—	—
51	HP’S	SCHEDULE STATUS	DO	UCM—B	2—6	VIRT	BACNET	—	YES
52	HP’S	HEAT PUMP STATUS	AI	UCM—B	2—6	VIRT	BACNET	—	—
53	HP’S	COOLING OCC SETPOINT	AO	UCM—B	2—6	VIRT	BACNET	—	YES
54	HP’S	COOLING UNOCC SETPOINT	AO	UCM—B	2—6	VIRT	BACNET	—	—
55	HP’S	HEATING OCC SETPOINT	AO	UCM—B	2—6	VIRT	BACNET	—	YES
56	HP’S	HEATING UNOCC SETPOINT	AO	UCM—B	2—6	VIRT	BACNET	—	—
57	HP’S	ACTIVE SETPOINT(’C)	VI	UCM—B	2—6	VIRT	BACNET	YES	YES
58	PMP	PUMP 1A ENABLE/DISABLE	DO	XIO	23	01	BACNET	YES	YES
59	PMP	PUMP 1B ENABLE/DISABLE	DO	XIO	23	04	BACNET	YES	YES
60	PMP	PUMP 2A ENABLE/DISABLE	DO	XIO	23	07	BACNET	YES	YES
61	PMP	PUMP 2B ENABLE/DISABLE	DO	XIO	23	10	BACNET	YES	YES
62	PMP	PUMP 3A ENABLE/DISABLE	DO	XIO	23	13	BACNET	YES	YES
63	PMP	PUMP 3B ENABLE/DISABLE	DO	XIO	23	16	BACNET	YES	YES
64	PMP	PUMP 1A STATUS	DI	XIO	23	01	BACNET	YES	YES
65	PMP	PUMP 1B STATUS	DI	XIO	23	02	BACNET	YES	YES
66	PMP	PUMP 2A STATUS	DI	XIO	24	01	BACNET	YES	YES
67	PMP	PUMP 2B STATUS	DI	XIO	24	02	BACNET	YES	YES
68	PMP	PUMP 3A STATUS	DI	XIO	24	03	BACNET	YES	YES
69	PMP	PUMP 3B STATUS	DI	XIO	24	04	BACNET	YES	YES
70	PMP	PUMPS 1A/B FLOW SWITCH	DI	XIO	24	05	BACNET	YES	YES
71	PMP	PUMPS 2A/B FLOW SWITCH	DI	XIO	24	06	BACNET	YES	YES
72	PMP	PUMPS 3A/B FLOW SWITCH	DI	XIO	24	07	BACNET	YES	YES
73	HX	HX—1 3—WAY VALVE	AO	XIO	22	01	0—10V	YES	YES
74	HX	HX—2 3—WAY VALVE	AO	XIO	22	02	0—10V	YES	YES
75	BOIL	BOILER # 1 ON/OFF	VO	BOILER			BACNET	YES	YES
76	BOIL	BOILER # 2 ON/OFF	VO	BOILER			BACNET	YES	YES
77	BOIL	BOILER SETPOINT	VO	BOILER			BACNET	YES	YES
78	MUA	MUA ON/OFF	VO	MUA			BACNET	YES	YES
79	MUA	MUA FAN SPEED	VO	MUA			BACNET	YES	YES
80	MUA	MUA SUPPLY TEMP	VO	MUA			BACNET	YES	YES
81	MUA	MUA SETPOINT	VO	MUA			BACNET	YES	YES
82	MUA	MUA COOLING STATUS	VO	MUA			BACNET	YES	YES
83	MUA	MUA HEATING STATUS	VO	MUA			BACNET	YES	YES
84	DC	DC STAGE # 1 ON/OFF	DO	XIO	21	01	RELAY	YES	YES
85	DC	DC STAGE # 2 ON/OFF	DO	XIO	21	01	RELAY	YES	YES
86	DC	DC STAGE # 3 ON/OFF	DO	XIO	21	01	RELAY	YES	YES
87	MECH	HX # 1 LOOP SUPPLY TEMP	AI	XIO	22	07	SENSOR	YES	YES
88	MECH	DC LOOP SUPPLY TEMP	AI	XIO	22	08	SENSOR	YES	YES

LEGEND:

EQUIPMENT:
Equipment Novar is wired to.

POINT DESCRIPTION:
Point controlled or monitored by Novar

TYPE:
Analog Input (AI), Analog Output (AO)
Digital Input (DI), Digital Output (DO)
Virtual Input (VI), Virtual Output (VO)

CONTROL:
Novar Module

ADDRESS:
Novar Module Software Address

POINT#:
Novar Point Allocation Number

INTERFACE:
Interface Peripheral

TREND LOG:

IBI

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Context Plan

General Notes

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POINT LIST

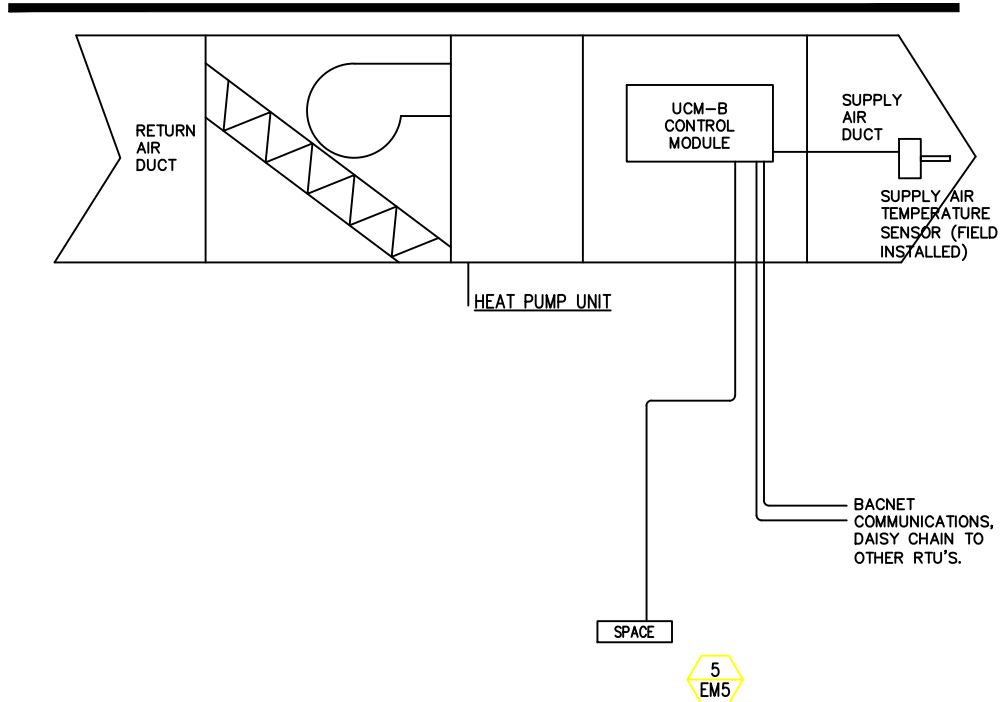
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Filename

Sheet no.

EM-03

of 7



1 HEAT PUMP LAYOUT

2 G4 DETAIL

PANEL 2L – SQUARE D POWERLINK G4 NF21SBRG3 ①						
EMS	DESCRIPTION	CCT	PHASE	CCT	DESCRIPTION	EMS
–	BATTERY UNIT BU	1	A	2	SPARE	6
2	CASH DESK LIGHT	3	B	4	EXTERIOR SCNCE & CANOPY LIGHTS	–
1	WAREHOUSE LIGHT	5	C	6	RETAIL EMPLOYEE LIGHT	1
2	WAREHOUSE LIGHT	7	A	8	RETAIL CUSTOMER LIGHT	2
–	NIGHT LIGHT	9	B	10	SPARE	–
–	SPARE	11	C	12	SPARE	–
–	SPARE	13	A	14	SPARE	–
–	SPARE	15	B	16	SPARE	–
1	EMPLOYEE TRACK LIGHT	17	C	18	LCBO CHANNEL LETTERS	7
1	EMPLOYEE TRACK LIGHT	19	A	20	LCBO CHANNEL LETTERS	7
4	RETAIL TRACK LIGHT	21	B	22	LCBO BOX SIGN	7
4	RETAIL TRACK LIGHT	23	C	24	LCBO BOX SIGN	7
3	RETAIL VALENCE LIGHTS	25	A	26	LCBO BOX SIGN	7
–	OFF+STAFF+W/R+JANITOR ROOM	27	B	28	EXTERIOR AWNING LIGHT	6
–	SPARE	29	C	30	EXTERIOR AWNING LIGHT	6
4	GIFT/SPIRIT FIXTURE LIGHT	31	A	32	SPARE	–
3	COOLER VALANCE LIGHT	33	B	34	SPARE	–
4	COOLER DAIRY DOOR LIGHT	35	C	36	SPARE	–
5	DAY LIGHT HARVESTING	37	A	38	TVSS	–
–	SPARE	39	B	40	TVSS	–
–	SPARE	41	C	42	TVSS	–

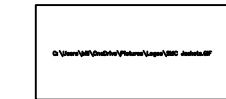


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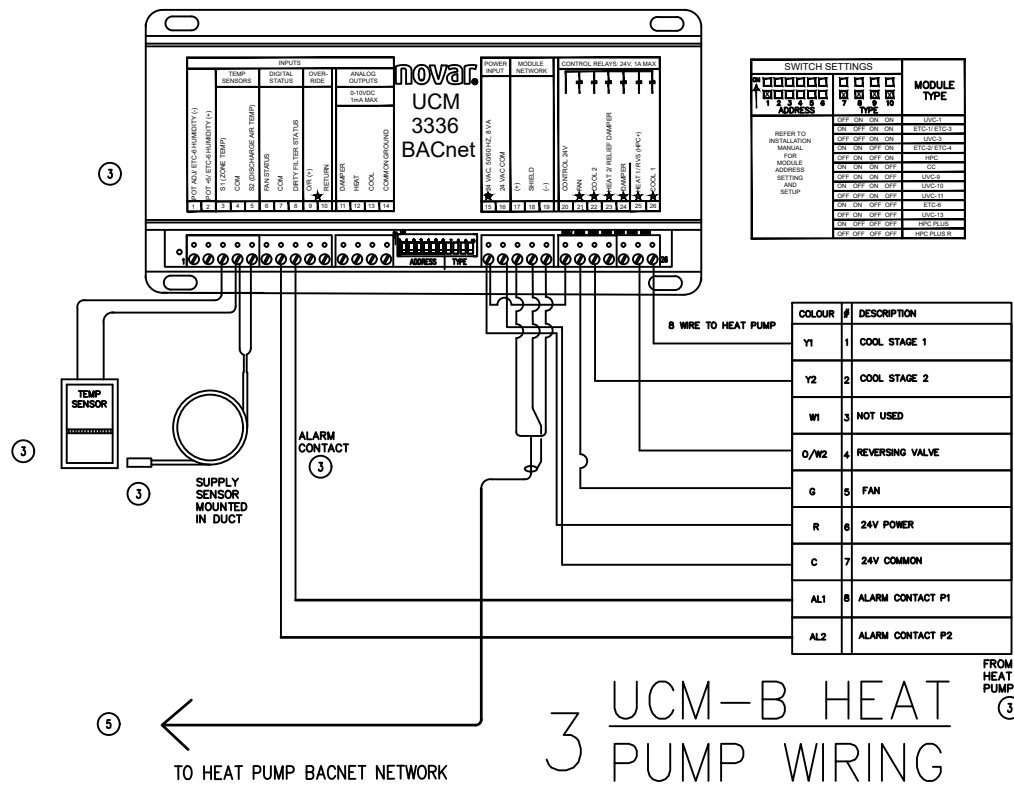


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4 CO2/TEMP WIRING DETAIL

6 HUMIDITY SENSOR WIRING DETAIL

5 STATUS CT WIRING DETAIL

9 FLOW SWITCH WIRING DETAIL

7 LCD WIRING DETAIL

8 MUA DP SWITCH WIRE DETAIL

Rev.	Date	Description	Initia
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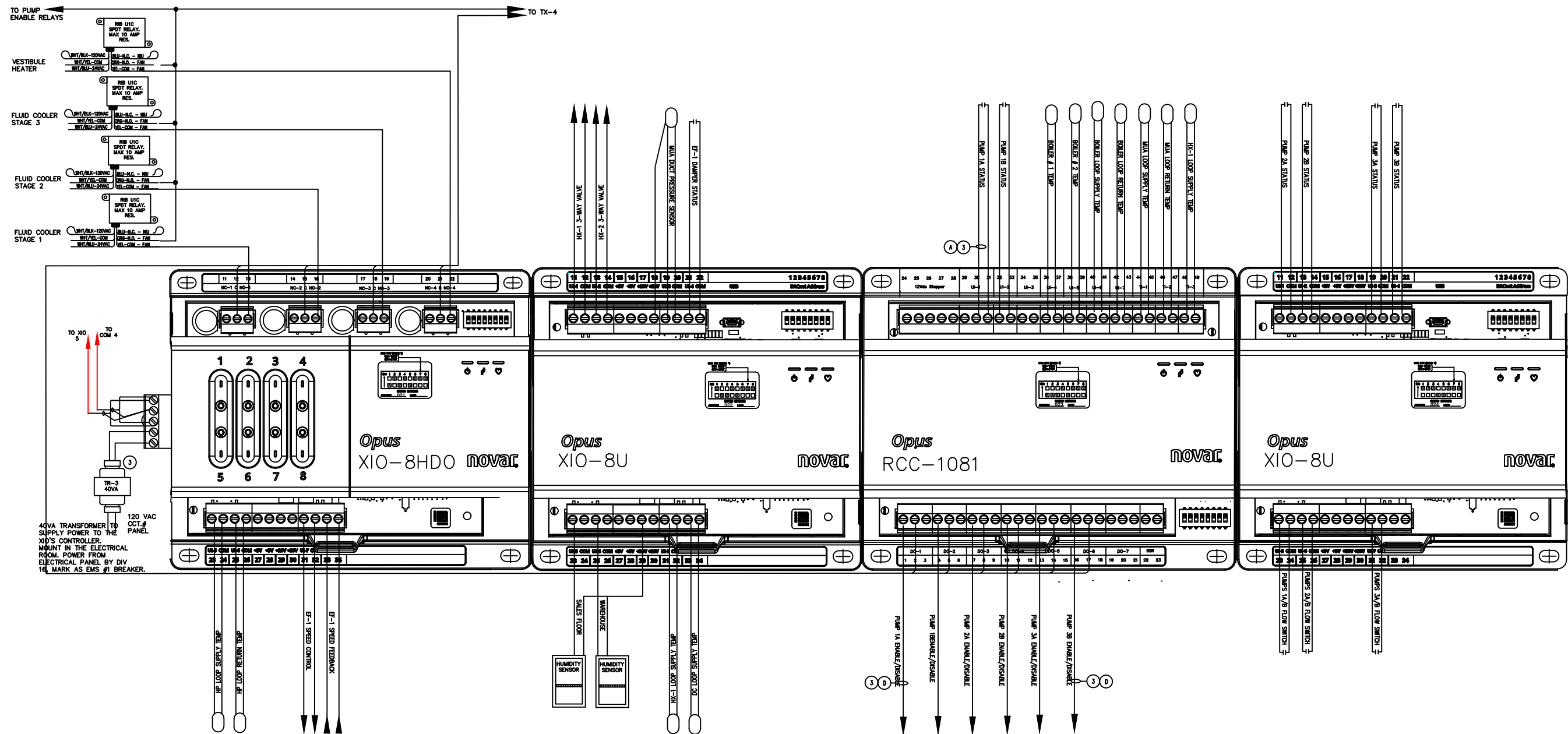
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Project
HEAT PUMP UCM
LCD DIAGRAM
POWERLINK

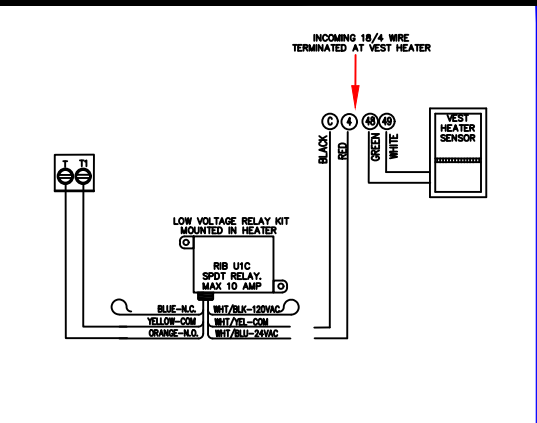
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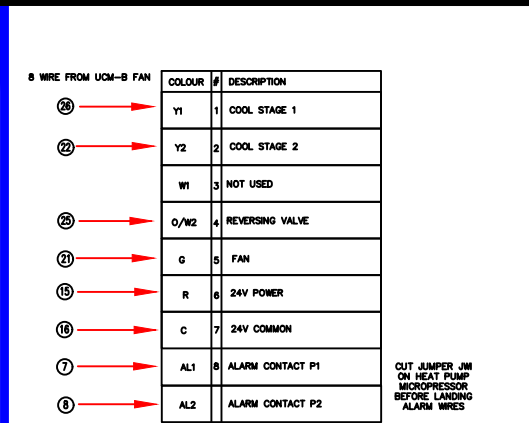
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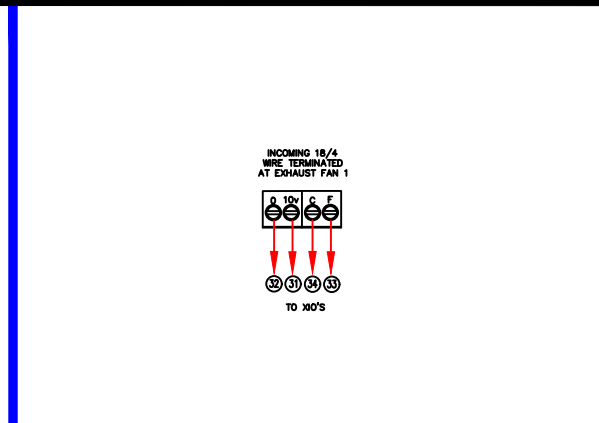
3 EM2
1 XIO WIRING DIAGRAM



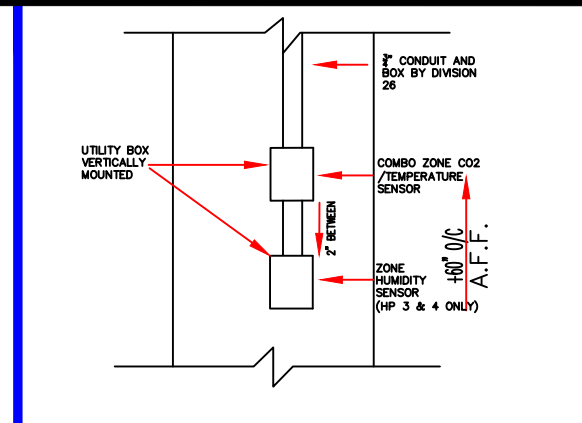
2 VEST HEATER
INSTALL DETAIL



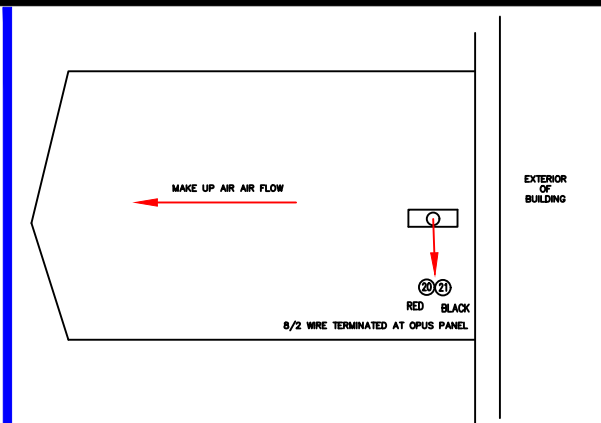
3 HEAT PUMP
INTERFACE



4 EXHAUST FAN 1
INSTALL DETAIL



5 ZONE SENSOR
INSTALL DETAIL



6 OUTDOOR SENSOR
INSTALL DETAIL

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EM-05

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7



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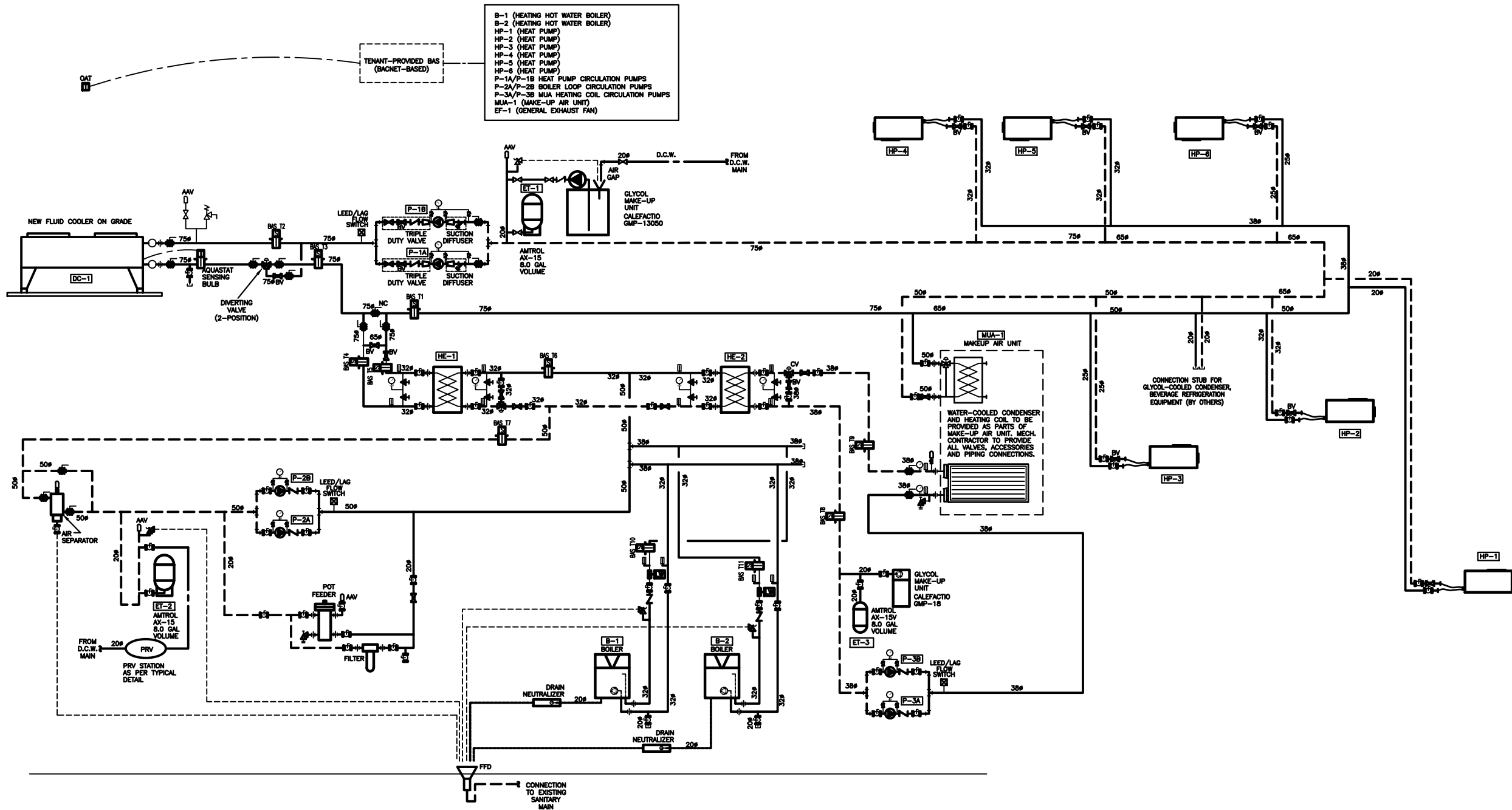
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Project
HYDRONIC
SCHEMATIC

Drawing title

Fluores

Sheet no. EM-06 of 7



1 HYDRONIC HEATING / COOLING SCHEMATIC

