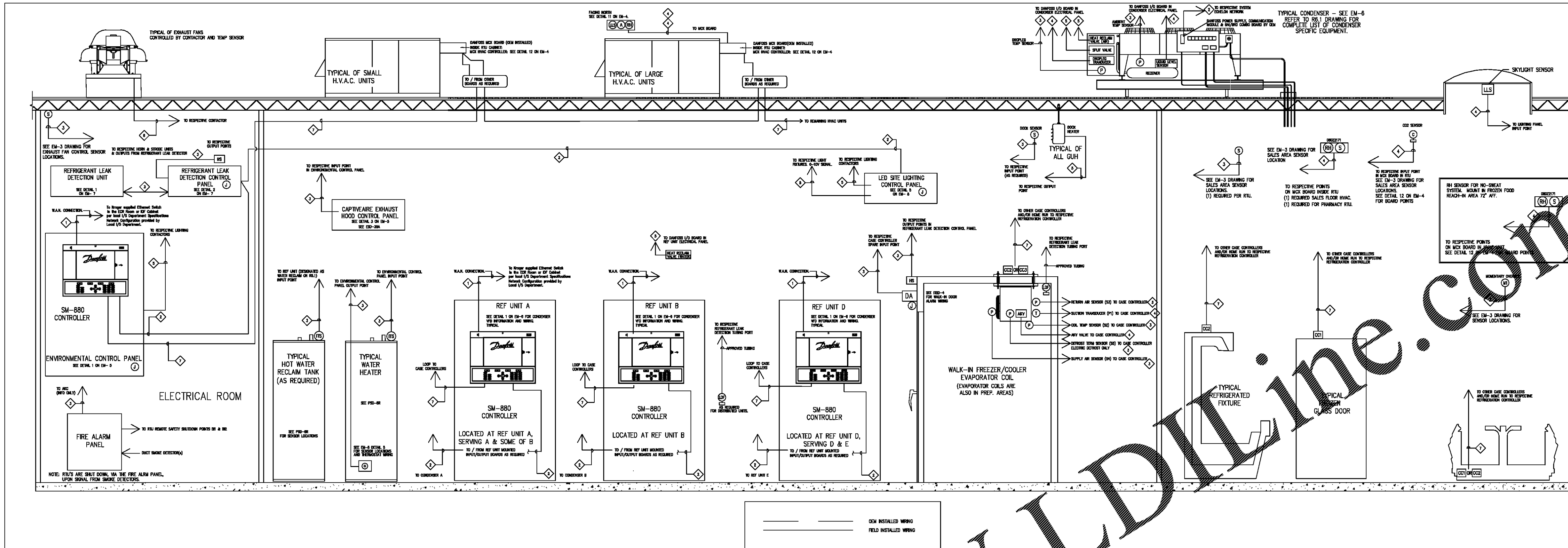


1 ENERGY MANAGEMENT SYSTEM REQUIREMENTS — SCALE: NONE

DANFOSS CONTROLS TAKEOFF

Kroger Item #	Description	Supplier Part ID	Qty
REFRIGERANT LEAK DETECTION			
K-0005955	AK2 Enclosure for 1 row of 4 full size Modules Includes Power Supply and 1AK2 Comm Module 13x30x5	AK2I08	1
K-0005947	AK2 Module Type AK2-XM 205A (8AI/8DO)	080Z0010	2
K-0005980	150 VA Wall Mount Control Transformer - 24V	55-168	1
K-0052368	Bacharach 16Ch HGM MZ, 5x 1,000' Tubing, 10 High Flow Fittings, 2 & 3 way splitter connections with line end filter assembly, Machine room binder with technical bulletins and parts guide (Includes Filter Ends)	3015-KIT	1
K-0052369	4-20v Interface Card (Danfoss compatible)	3015-5152	1
K-0052371	Washdown J-box for filter ends.	3015-5748	4
K-0052370	Tubing- 1,000' roll (Not for NH3)	TG100	EXTRA IF REQ'D
K-0052372	Line End Filter Assembly (Includes filter & tubing connection)	3015-3420	EXTRA IF REQ'D
K-0052397	TYPE BLUE HORN STROBE AC/DC 24V 868STRB-AQ	BLUE HORN STROBE	1 FOR OFFICES, 1 NEAR LDU, 1 PER MECH [illegible] 1 PER BOX [illegible] MAY REQUIRE [illegible] BOX, INSIDE AND [illegible])
LIGHTING DIMMING CONTROL			
K-0005955	AK2 Enclosure for 1 row of 4 full size Modules Includes Power Supply and 1AK2 Comm Module 13x30x5	AK2I08	1
K-0005947	AK2 Module Type AK2-XM 205A (8AI/8DO)	080Z[illegible]	1
K-0023514	Danfoss AK-XM 103A, Control, Ext. Module 4AI/4AO	[illegible]0032	1
K-0037729	AK2 Light Ballast Dimmer Driver board (Boosts [illegible] to drive multiple ballasts)	[illegible]0270	2
K-0005980	150 VA Wall Mount Control Transformer	55-168	1
BUILDING CONTROL			
K-0005935	Environmental Control Kit includes SM-[illegible] Building Control [illegible] power supply, comm module, BRO/SAI [illegible] humidistat / photocell [illegible] outdoor [illegible]/RH Sensor, AK-103A Board [illegible]	080Z2222	1
K-0005967	Humidity sensor w/ [illegible] Temp. Sensor (Old Part Number EMHS3-1)	080Z2171	2
K-0005980	150 VA Wall Mount Control Transformer - 24V	55-168	1
K-0037731	Zone Temperature Sensor [illegible] temp sensor on cover plate - for HVAC room temperature)	ZTP-2	1 PER RTU
K-0022867	[illegible] Danfoss CO2 Detector	LDCO2	1
K-0005966	[illegible] Light Photocell [illegible]-5000 FC with Resistor (For new applications)	080Z2169	1 (IF REQUIRED)
K-0046573	[illegible] W Boiler Temp Probe (fits well with 1/2 NPT)	084N2032	1
K-0007856	DANFOSS only: Misc. Controls Equipment (per quote); Note: Quote No. must appear on PO.	PER QUOTE	USE FOR DANFOSS PART QUOTES
K-0054610	Danfoss COMMISSIONING of Energy Mgmt. Store Controls (per quote)	K-0060135	USE FOR DANFOSS COMMISSIONING (CASE CONTROL STORES ONLY)

2 TAKE-OFF SHEET — SCALE: NONE

KEY NOTE	DESCRIPTION	WIRE TYPE ALL WIRING – PLENUM RATED
1	L.A.N. CONNECTION	BELDEN #[illegible]00A #24-8 CATEGORY-5E CABLE
2	ECHELON NETWORK	WINDY CITY #105500-S #[illegible] UNSHEILDED, TWISTED CABLE OR APPOVED EQUAL
3	#18-2 LOW VOLTAGE CONTROL WIRE	BELDEN #82760 #18-2 SHIELDED CABLE OR APPROVED EQUAL
4	#18-4 LOW VOLTAGE CONTROL WIRE	BELDEN #82418 #18-4 SHIELDED CABLE OR APPROVED EQUAL
5	LIGHTING CONTROL / SOLENOID VALVE / UNIT HEATER	#14 TWISTED PAIR (ONE PER LIGHTING CONTACTOR)
6	LINE VOLTAGE IN CONDUIT	PER NEC & MANUFACTURER'S GUIDLINES
7	MODBUS / 485 COMMUNICATION	WINDY CITY #[illegible]06AL #22-2 SHIELDED CABLE OR APPROVED EQUAL

3 ENERGY MANAGEMENT WIRING SCHEDULE — SCALE: NONE

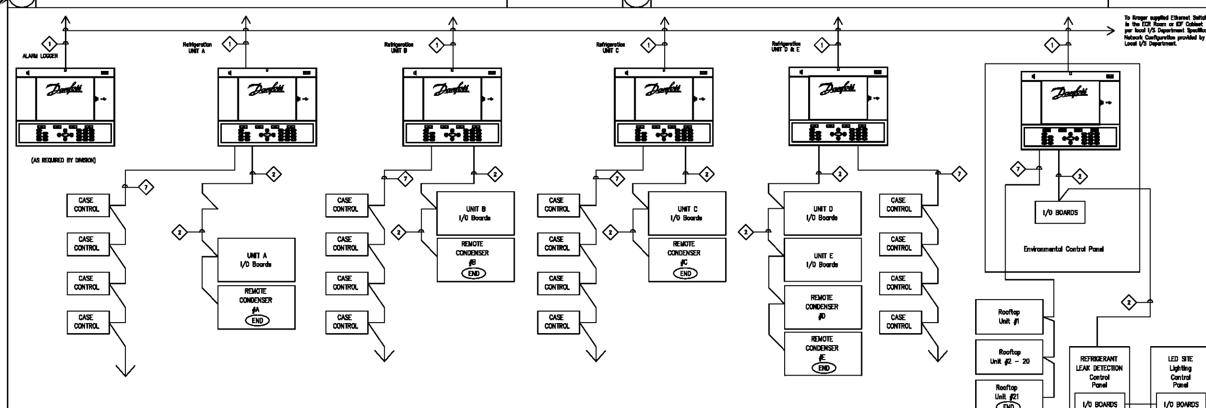
REFER TO ESD-6 FOR POWER MONITORING.

5 — SCALE: NONE

SYMBOL	DESCRIPTION
(hexagon)	REFRIGERATION CIRCUIT DESIGNATION
(triangle)	DEFROST TERMINATION THERMOSTAT
(diamond)	WIRING KEY NOTE SYMBOL
P	ANALOG TEMPERATURE SENSOR (REFRIGERATION)
S	ANALOG ZONE TEMPERATURE SENSOR (HVAC)
RH S	ANALOG TEMPERATUE / RELATIVE HUMIDITY SENSOR
LLS	INDOOR LIGHT LEVEL SENSOR
A RH LLS	AMBIENT TEMPERATURE / OUTSIDE HUMIDITY / OUTDOOR LIGHT LEVEL
LDF	REFRIGERANT LEAK DETECTION FILTER DEVICE
J	CLEAN POWER FIELD INSTALLED BY EC
C	CO2 SENSOR
T	REFRIGERANT PRESSURE TRANSDUCER

SYMBOL	DESCRIPTION
DA	DOOR ALARM
ITS	IMMERSABLE TEMPERATURE SENSOR
M1	MOMENTARY OVER RIDE BUTTON
HS	HORN / STROBE UNIT
CC1	CASE CONTROLLER W/ ELECTRIC DEFROST
CC2	CASE CONTROLLER W/O ELECTRIC DEFROST
CC3	WALK-IN CASE CONTROLLER W/ ELECTRIC DEFROST
AKV	ELECTRONIC EXPANSION VALVE

6 GENERAL SYMBOLS — SCALE: NONE



NOTE:
1. CONTRACTOR TO INSTALL AND TERMINATE NETWORKS. NETWORK SHALL BE DAISY-CHAINED AND TERMINATED AT MODULE END.
1. CONTRACTOR TO TERMINATE NETWORKS WITH APPROPRIATLEY SIZED RESISTORES PER NETWORK WIRE IMPEDANCE.

4 I/O NETWORK DETAIL — SCALE: NONE

1. THE CONTROLS INSTALLER SHALL BE RESPONSIBLE FOR SUPERVISING THE COMPLETE INSTALLATION OF THE ENERGY MANAGEMENT SYSTEM (EMS). THIS SHALL INCLUDE, BUT NOT BE LIMITED TO THE START-UP, PUNCHDOWN AND PROGRAMMING ADJUSTMENT OF THE ENTIRE DANFOSS CONTROL SYSTEM, INCLUDING REFRIGERATION, HVAC AND LIGHTING CONTROL.
2. THE CONTROLS INSTALLER SHALL PROVIDE ALL COORDINATION BETWEEN THE VARIOUS TRADES, INCLUDING REFRIGERATION, HVAC AND ELECTRICAL TO ENSURE THAT ALL EQUIPMENT IS PROPERLY CONTROLLED AND THAT ALL CONTROL POINTS HAVE BEEN ACCOMMODATED. THIS SHALL INCLUDE VERIFYING ALL HVAC EQUIPMENT TO BE CONTROLLED, VERIFYING ALL STAGES OF HEATING, COOLING, HEAT RECLAIM, ETC. AND ENSURING THAT ADEQUATE SENSORS HAVE BEEN SUPPLIED TO ENABLE PROPER CONTROL OF SAME.
3. UPON COMPLETION OF THE EMS INSTALLATION, THE CONTROLS INSTALLER SHALL PROVIDE ACCURATE AND COMPLETE AS-BUILT DOCUMENTATION TO THE OWNER AND THE ENGINEER. THIS DOCUMENTATION MUST INCLUDE AN 8 1/2" x 11" PLAN INDICATING THE LOCATIONS OF ALL OF THE PROBES, SENSORS, RELAYS, REMOTE I/O BOARDS, CONTROLLERS AND REFRIGERANT LEAK SENSORS FOR THE ENTIRE EMS INSTALLATION INCLUDING REFRIGERATION, HVAC AND LIGHTING. THE EMS-C SHALL ALSO FURNISH AND INSTALL AN 8 1/2" x 11" DRAWING SHOWING THE LOCATIONS OF ALL THE REFRIGERATION CIRCUITS. THIS DRAWING SHALL BE MOUNTED ADJACENT TO THE CONTROL PANEL. FURTHER, THIS DOCUMENT SHALL INCLUDE A COMPLETE PRINTOUT SHOWING TERMINATION POINTS, BOARD LAYOUTS AND INITIAL CONTROL SET POINTS FOR REFRIGERATION, HVAC AND LIGHTING CONTROL.
4. ONCE THE NEW CONTROL SYSTEM HAS BEEN INSTALLED AND THE HVAC SYSTEMS ARE READY TO BE BROUGHT ON LINE, THE HVAC-C MUST PROVIDE THE NECESSARY SUPERVISION FOR STARTUP OF THE CONTROL SYSTEM AND COORDINATE START-UP WITH CONTROLS INSTALLER ON SITE. THE HVAC-C MUST ENSURE THAT ALL THE HVAC SYSTEMS ARE OPERATING CORRECTLY AND PROVIDE ANY FINE TUNING OF THE SYSTEM THAT IS REQUIRED.
5. THIS DRAWING IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO CONVEY INSTALLATION REQUIREMENTS REGARDING THE ENERGY MANAGEMENT CONTROL SYSTEM. THIS DRAWING IS PICTORIALLY DRAWN FOR CLARIFICATION PURPOSES ONLY, DO NOT SCALE. REFER TO RESPONSIBILITY MATRIX FOR FINAL EQUIPMENT AND INSTALLATION REQUIREMENTS.
6. FOR CONTRACTOR RESPONSIBILITIES, REFER TO RESPONSIBILITY MATRIX LOCATED IN CONTROLS INSTALLATION SPEC. 11.41.46
7. REFER TO REFRIGERATION LEGENDS FOR INFORMATION REGARDING FIXTURE, WALK-IN COOLER/FREEZERS, EVAPORATORS, CONDENSERS AND RECLAIM REQUIREMENTS.
8. REFER TO DANFOSS INSTRUCTION MANUALS FOR INFORMATION REGARDING CONTROL COMPONENTS (I.E. INPUT / OUTPUT BOARDS, ELECTRICAL REQUIREMENTS, ETC.)

7 ENERGY MANAGEMENT NOTES — SCALE: NONE

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FIRE PROTECTION

ISSUE LOG

NO.	REV.	DESCRIPTION	DATE
1	-	PERMIT SET	12/06/18
2	-	BID SET	03/21/19

JOB:	SCALE:
2018041	AS SHOWN

SHEET NO.

EM1.0

ENERGY MANAGEMENT RISER AND LEGENDS

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