

MECHANICAL FLOOR PLAN EXISTING FIRST FLOOR DUCTWORK LAYOUT
 SCALE: 1/8" = 1'-0"

MECHANICAL LEGEND

- NEW R6 RIGID DUCT (1st FIGURE WIDTH; 2nd DEPTH)
 - EXIST. SHEETMETAL OR R6 RIGID DUCT (1st FIGURE WIDTH; 2nd DEPTH)
 - R6 FLEXIBLE SUPPLY DUCT
 - R6 FLEXIBLE RETURN DUCT
 - DIRECTION OF FLOW
 - INCLINED DROP IN RESPECT TO AIR FLOW
 - INCLINED RISE IN RESPECT TO AIR FLOW
 - FIRE DAMPER WITH ACCESS DOOR
 - MANUAL VOLUME DAMPER
 - AUTOMATIC VOLUME DAMPER
 - SUPPLY DUCT SECTION; SIZE
 - RETURN DUCT SECTION; SIZE
 - SUPPLY OUTLET; CEILING DIFFUSER
 - SUPPLY OUTLET; SIDE WALL DIFFUSER OR REGISTER
 - E = EXISTING
 - N = NEW
 - R = RELOCATED
 - ⊕ THERMOSTAT
- LEGEND MAY CONTAIN ITEMS NOT USED IN THIS PROJECT.

SCOPE OF WORK

- ALL WORK TO BE PERFORMED ACCORDING TO FLORIDA BUILDING CODE 2010 - MECHANICAL.
- EXISTING SPACE TO REMAIN THE SAME.
 - REMOVE EXISTING RTU DIRECT EXPANSION A/C UNITS AND REPLACE ALL UNITS WITH A NEW 80 TONS CHILLED WATER AIR COOLED SYSTEM AND WITH NEW ROOF TOP FAN COIL UNITS.
 - PROVIDE NEW CURB ADAPTERS FOR TRANSITION OF EXISTING RTU TO NEW RTU FAN COIL UNITS AND INSTALL IN EXISTING DUCTWORK SYSTEM.
 - REPAIR WATER DAMAGED INSULATION OF ALL DUCTWORK SYSTEM CONNECTED TO NEW FAN COIL UNITS AS NEEDED.
 - RUN NEW INSULATED CHILLED WATER SUPPLY AND RETURN LINES AS PER FMC 2010 & FPC 2010.
 - MAINTAIN ALL FIRE DAMPERS IN ALL SLAB PENETRATIONS AND EXISTING FIRE ZONES.
 - FIRE CAULK ALL NEW AND EXISTING PENETRATIONS.
 - PROVIDE NEW ELECTRICAL SERVICE TO NEW AIR COOLED 80 TON CHILLED WATER SYSTEM, AND ALL ROOF TOP CHILLED WATER FAN COIL UNITS AS PER ELECTRICAL PLANS.
 - REINFORCE ROOF SLAB FOR NEW UNIT PLACEMENT, AND PROVIDE NEW GALVANIZE STEEL BASE FOR MOUNTING NEW WATER COOLED CHILLED WATER UNIT.

MECHANICAL NOTES:

- MECHANICAL AND GRAVITY OUTDOOR AIR INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 10 FEET HORIZONTALLY FROM ANY HAZARDOUS OR NOXIOUS CONTAMINANT SOURCE, SUCH AS VENTS, CHIMNEYS, PLUMBING VENTS, STREETS, ALLEYS, PARKING LOTS AND LOADING DOCKS, EXCEPT AS OTHERWISE SPECIFIED IN THIS CODE. FRESH AIR INTAKES SHALL NOT BE LOCATED CLOSER THAN 10 FEET (3048 MM) FROM ANY VENT OUTLET, OR SANITARY SEWER VENT OUTLET.
- PROVIDE MOTORIZED DAMPERS ON ALL FRESH AIR INTAKE DUCTS.
- ALL MECHANICAL WORK TO BE COORDINATED WITH ELECTRICAL CEILING FIXTURES.
- COMPLY WITH THE 2010 FLORIDA ENERGY CONSERVATION CODE FOR AUTOMATIC SHUTOFF DAMPER CONTROLS WHEN THE SYSTEMS OR SPACES SERVED ARE NOT IN USE, SEC.503.2.4.4 AND 503.2.5.4.
- FRESH AIR INTAKE TO BE LOCATED 10' FROM ANY EXHAUST FANS AND OR PLUMBING VENT STACK.
- UNITS LOCATED CLOSER THAN 10' FROM THE EDGE OF A ROOF, WILL HAVE SAFETY RAILINGS AS REQUIRED BY CODE.

REQUIRED OUTDOOR VENTILATION AIR					
AS PER TABLE M403.3 F.B.C. REQUIRED OUTDOOR VENTILATION AIR					
SPACE DESCRIPTION	S.F.	ESTIMATED MAX. OCCUPAND LOAD	OUTDOOR AIR (cfm/persons) UNLESS NOTED.	OUTDOOR AIR (cfm/s.f.) UNLESS NOTED.	CALCULATED CFM
OFFICE	18,730	188	7.5 CFM/PERSON	0.18 CFM/SQ.FT.	4,782
TOTAL SQUARE FOOTAGE TO VENTILATE	18,730		TOTAL		4,782 CFM

$$V_{bz} = R_p P_z + R_a A_z$$

$$V_{bz} = (7.5)(188) + (0.18)(18,730)$$

$$V_{bz} = 4,782 \text{ CFM}$$

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ALFREDO M. CARBONELL, P.E., INC.

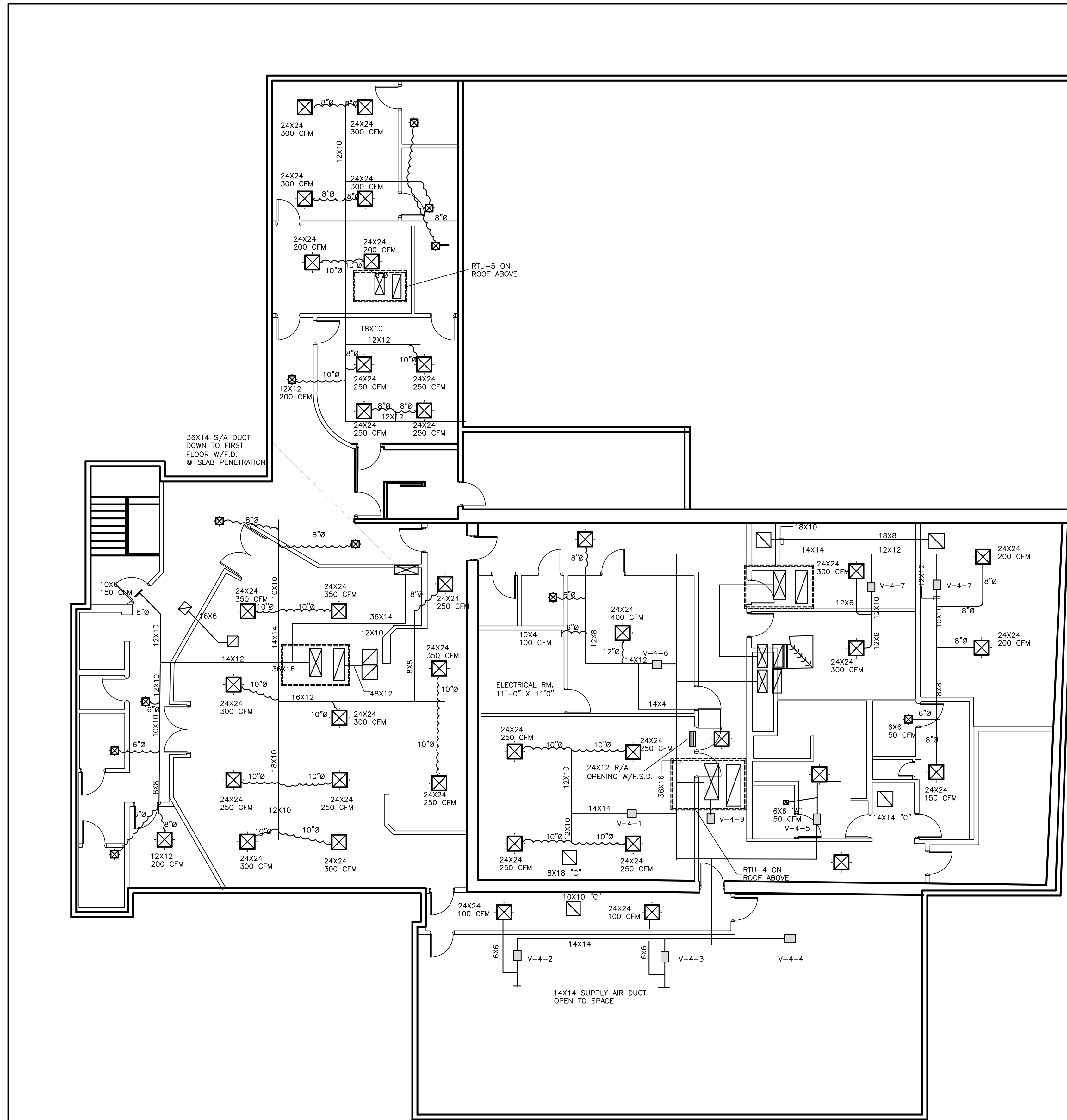
Reviews:

Client: TOWN OF SURFSIDE
 Project: TOWN HALL BUILDING NEW CHILLED WATER SYSTEM
 9293 HARDING AVE. SURFSIDE, FL 33154
 PROPERTY FOLIO NUMBER:

Plan Description:
**MECHANICAL PLAN
 FIRST FLOOR
 DUCTWORK LAYOUT
 AND SCOPE OF WORK**

Seal:
 FLA. REG. P.E. # 14170

Designed by: ALFREDO M. CARBONELL
 Drawn by: ERICK FLORIDO
 Revised & Stamped: ALFREDO M. CARBONELL
 Date: MAY. 25 . 2014
 Scale:
 Job No.: 2014-05.25



MECHANICAL FLOOR PLAN EXISTING SECOND FLOOR DUCTWORK LAYOUT
 SCALE: 1/8" = 1'-0"

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 MECHANICAL PLAN
 DUCTWORK LAYOUT
 SECOND FLOOR

FLA. REG. P.E. # 14170

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GENERAL

UNITS ARE CONSTRUCTED OF A GALVANIZED STEEL FRAME WITH GALVANIZED STEEL PANELS AND ACCESS DOORS. COMPONENT SURFACES ARE FINISHED WITH A POWDER-COATED PAINT ALL PAINT MEETS THE REQUIREMENT FOR OUTDOOR EQUIPMENT OF THE US NAVY AND OTHER FEDERAL GOVERNMENT AGENCIES. THIS PAINT FINISH IS DURABLE ENOUGH TO WITHSTAND A 1,000-CONSECUTIVE-HOUR SALT SPRAY APPLICATION IN ACCORDANCE WITH STANDARD ASTM B117.

EACH UNIT SHIPS WITH FULL OPERATING CHARGES OF REFRIGERANT AND OIL.

COMPRESSOR AND MOTOR

THE UNIT IS EQUIPPED WITH FOUR HERMETIC, DIRECT-DRIVE, 3,600 RPM 60HZ SUCTION GAS-COOLED SCROLL COMPRESSORS THE SIMPLE DESIGN HAS ONLY THREE MAJOR MOVING PARTS AND A COMPLETELY ENCLOSED COMPRESSION CHAMBER WHICH LEADS TO INCREASED EFFICIENCY OVERLOAD PROTECTION IS INTERNAL TO THE COMPRESSORS THE COMPRESSOR INCLUDES CENTRIFUGAL OIL PUMP, OIL LEVEL SIGHT GLASS AND OIL CHARGING VALVE. EACH COMPRESSOR WILL HAVE COMPRESSOR HEATERS INSTALLED AND PROPERLY SIZED TO MINIMIZE THE AMOUNT OF LIQUID REFRIGERANT PRESENT IN THE OIL SUMP DURING OFF CYCLES.

UNIT-MOUNTED STARTER

THE CONTROL PANEL IS DESIGNED PER UL 1995. THE STARTER IS IN AN ACROSS-THE-LINE CONFIGURATION, FACTORY-MOUNTED AND FULLY PRE-WIRED TO THE COMPRESSOR MOTOR AND CONTROL PANEL TYPICALLY, TRANE SCROLL COMPRESSORS ARE UP TO FULL SPEED IN ONE SECOND WHEN STARTED ACROSS-THE-LINE.

A FACTORY-INSTALLED, FACTORY-WIRED 820 VA CONTROL POWER TRANSFORMER PROVIDES ALL UNIT CONTROL POWER (120 VAC SECONDARY) AND TRANE CH530 MODULE POWER (24 VAC SECONDARY).

A MOLDED CASE HIGH INTERRUPTING CAPACITY CIRCUIT BREAKER, FACTORY PRE-WIRED WITH TERMINAL BLOCK POWER CONNECTIONS AND EQUIPPED WITH A LOCKABLE EXTERNAL OPERATOR HANDLE, IS AVAILABLE TO DISCONNECT THE CHILLER FROM MAIN POWER.

POWER CONNECTION

POWER CONNECTIONS INCLUDE MAIN THREE-PHASE POWER AND ONE SEPARATE 120V, 15 AMP CUSTOMER PROVIDED SINGLE PHASE POWER CONNECTION IS REQUIRED TO POWER THE HEATERS (IF USED FOR FREEZE PROTECTION).

SHORT CIRCUIT CURRENT RATING OF 65 KAIC IS PROVIDED.

EVAPORATOR

BRAZE PLATE EVAPORATOR IS MADE OF STAINLESS STEEL WITH COPPER AS THE BRAZE MATERIAL. IT IS DESIGNED TO WITHSTAND A REFRIGERANT SIDE WORKING PRESSURE OF 430 PSIG (29.6 BARS) AND A WATERSIDE WORKING PRESSURE OF 150 PSIG (10.5 BARS) EVAPORATOR IS TESTED AT 1.1 TIMES MAXIMUM ALLOWABLE REFRIGERANT SIDE WORKING PRESSURE AND 1.5 TIMES MAXIMUM ALLOWABLE WATER SIDE WORKING PRESSURE. IT HAS ONE WATER PASS A WATER STRAINER AND A FLOW SWITCH ARE FACTORY INSTALLED.

IMMERSION HEATERS PROTECT THE EVAPORATOR TO AN AMBIENT OF -20°F (-29°C).

CONDENSER

AIR-COOLED CONDENSER COILS HAVE LANCED ALUMINUM FINS MECHANICALLY BONDED TO INTERNALLY-FINISHED COPPER TUBING.

THE CONDENSER COIL HAS AN INTEGRAL SUB COOLING CIRCUIT THE MAXIMUM ALLOWABLE WORKING PRESSURE OF THE CONDENSER IS 650 PSIG (44.8 BARS) . CONDENSERS ARE FACTORY PROOF AND LEAK TESTED AT 715 PSIG (49.3 BARS) .

DIRECT-DRIVE VERTICAL DISCHARGE CONDENSER FANS ARE BALANCED AND INDIVIDUALLY PROTECTED. THREE-PHASE CONDENSER FAN MOTORS WITH PERMANENTLY LUBRICATED BALL BEARINGS AND EXTERNAL THERMAL OVERLOAD PROTECTION ARE PROVIDED.

THE UNIT STARTS AND OPERATES FROM 32.0°F TO 125.0°F.

REFRIGERANT CIRCUITS

THE UNIT HAS DUAL REFRIGERANT CIRCUITS. EACH REFRIGERANT CIRCUIT HAS TRANE SCROLL COMPRESSORS PIPED IN PARALLEL WITH A PASSIVE OIL MANAGEMENT SYSTEM A PASSIVE OIL MANAGEMENT SYSTEM MAINTAINS PROPER OIL LEVELS WITHIN COMPRESSORS AND HAS NO MOVING PARTS EACH REFRIGERANT CIRCUIT INCLUDES FILTER DRIER, ELECTRONIC EXPANSION VALVE, LIQUID LINE AND DISCHARGE SERVICE VALVES. CAPACITY MODULATION IS ACHIEVED BY TURNING COMPRESSORS ON AND OFF. THE UNIT HAS FOUR CAPACITY STAGES

UNIT CONTROLS

THE MICROPROCESSOR-BASED CONTROL PANEL IS FACTORY-INSTALLED AND FACTORY-TESTED. THE CONTROL SYSTEM IS POWERED BY A PRE-WIRED CONTROL POWER TRANSFORMER, AND WILL TURN ON AND OFF COMPRESSORS TO MEET THE LOAD. MICROPROCESSOR-BASED CHILLED WATER RESET BASED ON RETURN WATER IS STANDARD. THE UNIT COMES WITH A FACTORY INSTALLED FLOW SWITCH.

THE TRANE CH530 MICROPROCESSOR AUTOMATICALLY ACTS TO PREVENT UNIT SHUTDOWN DUE TO ABNORMAL OPERATING CONDITIONS ASSOCIATED WITH LOW EVAPORATOR REFRIGERANT TEMPERATURE AND HIGH CONDENSING TEMPERATURE IF AN ABNORMAL OPERATING CONDITION CONTINUES AND THE PROTECTIVE LIMIT IS REACHED, THE MACHINE WILL SHUT DOWN.

THE PANEL INCLUDES MACHINE PROTECTION FOR THE FOLLOWING CONDITIONS: LOW EVAPORATOR REFRIGERANT TEMPERATURE AND PRESSURE, HIGH CONDENSER REFRIGERANT PRESSURE, CRITICAL SENSOR OR DETECTION CIRCUIT FAULTS, LOST COMMUNICATION BETWEEN MODULES, PHASE LOSS, PHASE REVERSAL, OVER TEMPERATURE PROTECTION, EXTERNAL AND LOCAL EMERGENCY STOP, AND LOSS OF EVAPORATOR WATER FLOW.

WHEN A FAULT IS DETECTED, THE CONTROL SYSTEM CONDUCTS MORE THAN 100 DIAGNOSTIC CHECKS AND DISPLAYS RESULTS. THE DISPLAY WILL IDENTIFY THE FAULT, INDICATE DATE, TIME, AND OPERATING MODE AT TIME OF OCCURRENCE, AND PROVIDE TYPE OF RESET REQUIRED AND A HELP MESSAGE.

DATA CONTAINED IN AVAILABLE REPORTS INCLUDES WATER AND AIR TEMPERATURES, REFRIGERANT PRESSURES AND TEMPERATURES, FLOW SWITCH STATUS, EXV POSITION, AND COMPRESSOR STARTS AND RUN-TIME. ALL NECESSARY SETTINGS AND SET POINTS ARE PROGRAMMED INTO THE MICROPROCESSOR-BASED CONTROLLER VIA THE OPERATOR INTERFACE. THE CONTROLLER IS CAPABLE OF RECEIVING SIGNALS SIMULTANEOUSLY FROM A VARIETY OF CONTROL SOURCES, IN ANY COMBINATION, AND PRIORITY ORDER OF CONTROL SOURCES CAN BE PROGRAMMED.

PUMP

PUMP PACKAGE INCLUDES TWO PUMPS, EXPANSION VESSEL, DRAINAGE VALVE, SHUT-OFF VALVE AT ENTERING AND LEAVING CONNECTIONS.

THE PUMP PACKAGE IS SINGLE POINT POWER INTEGRATED INTO THE CHILLER UNIT POWER WITH A SEPARATE FACTORY WIRED CONTROL PANEL AND SEPARATE POWER FOR FREEZE PROTECTION.

THE CONTROL OF THE PUMP IS INTEGRATED INTO THE CHILLER CONTROLLER. THE CH530 DISPLAYS EVAPORATOR PUMP STARTS AND RUN-TIMES FREEZE PROTECTION DOWN TO AN AMBIENT OF -29°C (-20°F) IS INCLUDED AS STANDARD THE COLD PARTS OF THE PUMP PACKAGE WILL BE INSULATED. DESIGNED WITH ONE REDUNDANT PUMP, IT IS CONTROLLED TO OPERATE BOTH PUMPS THROUGH A LEAD/LAG AND FAILURE/RECOVERY FUNCTIONALITY.

THE PUMP OFFERING CAN BE FOR APPLICATIONS THAT HAVE SHORT WATER LOOPS, DE-COUPLED SYSTEMS OR FOR APPLICATIONS WHERE THE INTEGRATED CHILLER PUMP COULD SERVE THE ENTIRE LOOP VOLUME.

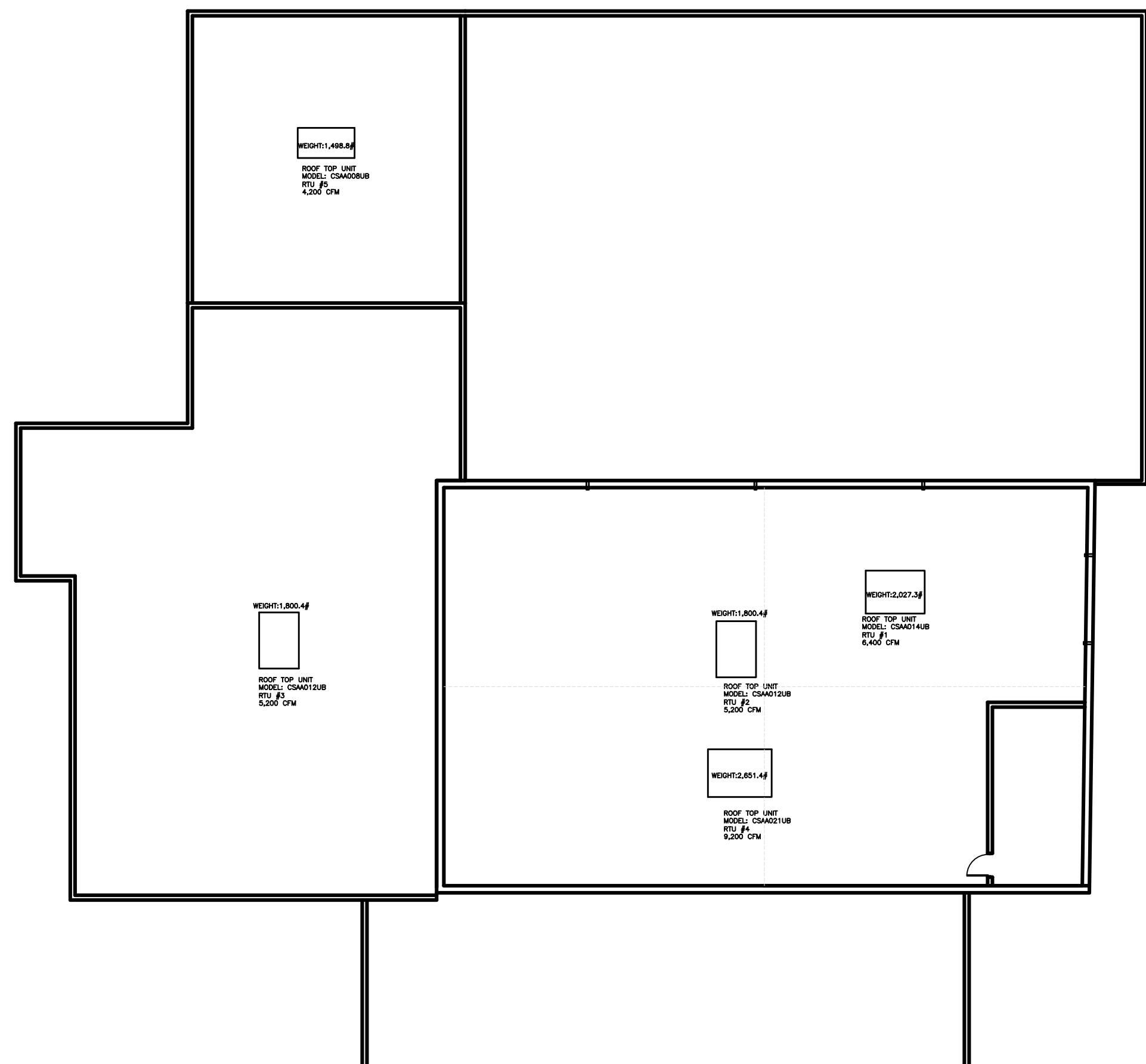
A VARIABLE SPEED DRIVE IS INSTALLED IN AN ADDITIONAL PANEL TO CONTROL THE PUMP THE INVERTER IS ADJUSTED UPON START UP TO BALANCE THE SYSTEM FLOW AND HEAD REQUIREMENTS THE PURPOSE IS TO SAVE ON WASTED PUMP ENERGY CAUSED BY A TRADITIONAL BALANCING VALVE.

COMPREHENSIVE ACOUSTIC PACKAGE

ACOUSTICAL TREATMENT FOR COMPRESSORS IS FACTORY INSTALLED.

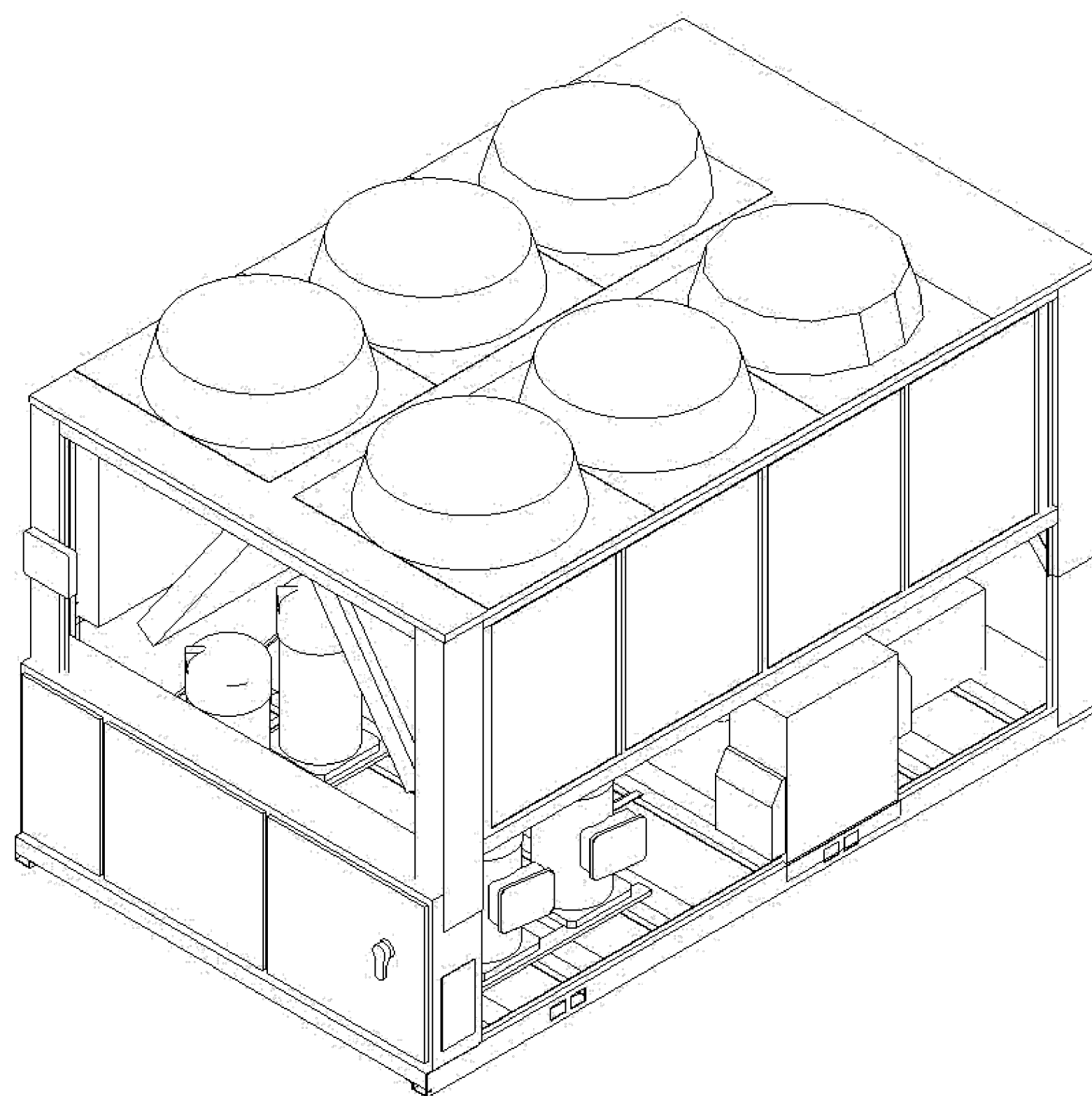
ARCHITECTURAL LOUVERED PANELS

LOUVERED PANELS COVER THE COMPLETE CONDENSING COIL AND SERVICE AREA BENEATH THE CONDENSER.



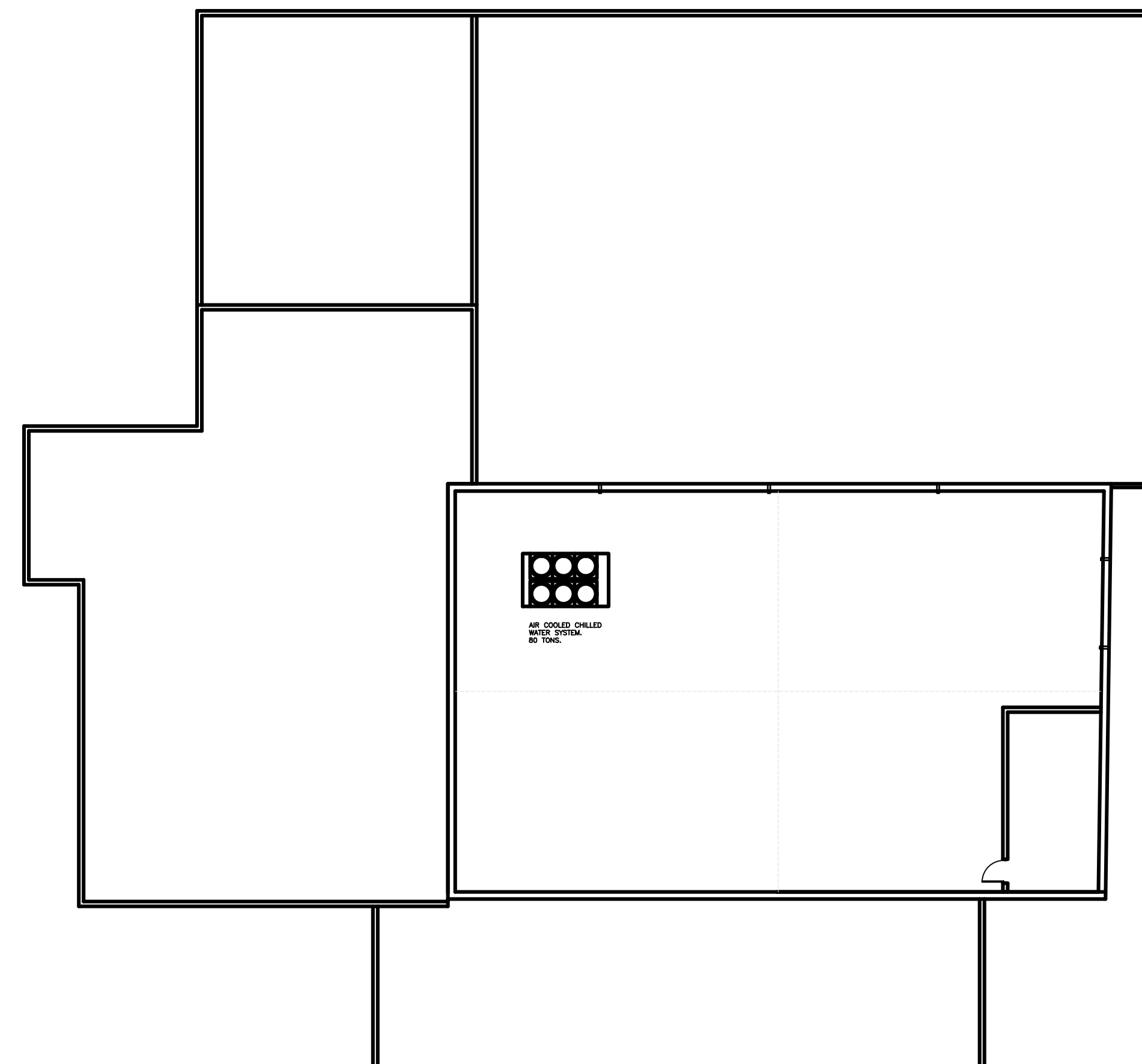
MECHANICAL FAN COIL UNITS ROOF PLAN

SCALE: 1/8" = 1'-0"



ISOMETRIC VIEW

LOUVERED PANELS NOT SHOWN OVER CONTROL PANEL FOR CLARITY



MECHANICAL AIR COOLED CHILLED WATER SYSTEM ROOF PLAN

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CHILLER PLANT

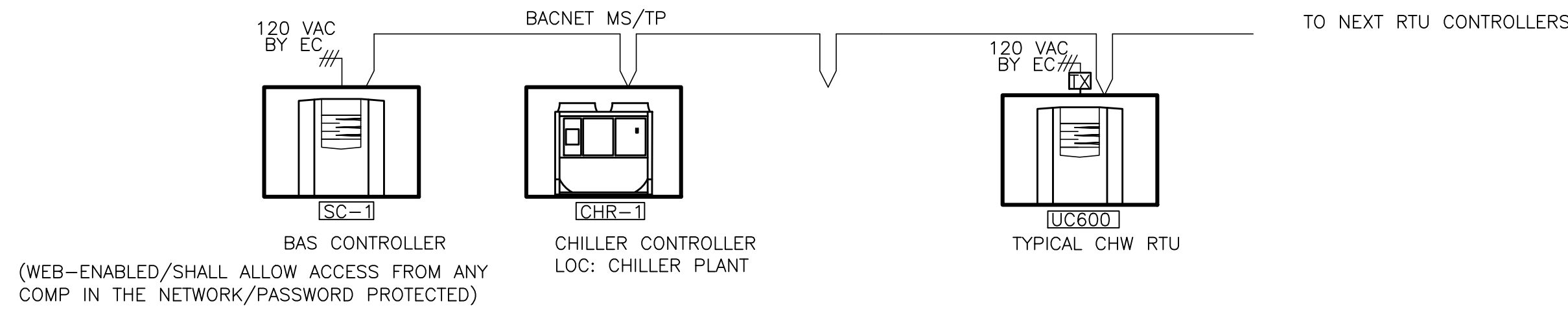
CHILLER PLANT SEQUENCE OF OPERATION:
SYSTEM GENERAL DESCRIPTION: THE CHILLED WATER SYSTEM CONSISTS OF THE FOLLOWING:
 ONE (1) AIR COOLED CHILLER
 CHILLER HAS TWO (2) INTERNAL CHW PUMPS : ONE (1) PRIMARY AND ONE (1) STANDBY
 CHILLER PLANT CONTROL SYSTEM SHALL MONITOR AND CONTROL THE CHILLED WATER SYSTEM INCLUDING THE CHILLER AND INTERNAL CHILLED WATER PUMPS.

CHILLER - RUN CONDITIONS: THE PRIMARY CHILLER SHALL BE ENABLED TO RUN WHENEVER:
 . A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING
 . AND THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 54°F (ADJ.).
 WHEN ENABLED, THE CHILLER, VIA ITS INTERNAL CONTROLS, SHALL MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT SETPOINT.

CHILLED WATER TEMPERATURE MONITORING: THE FOLLOWING TEMPERATURES SHALL BE MONITORED:
 . CHILLED WATER SUPPLY AND RETURN. (CAN BE COMMUNICATED VALUES)

ALARMS SHALL BE PROVIDED AS FOLLOWS:
 . CHILLER/PUMPS/FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 . CHILLER/PUMPS RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
 . CHILLER/PUMPS RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
 . HIGH/LOW CHWS/CHWR TEMPERATURE

NETWORK



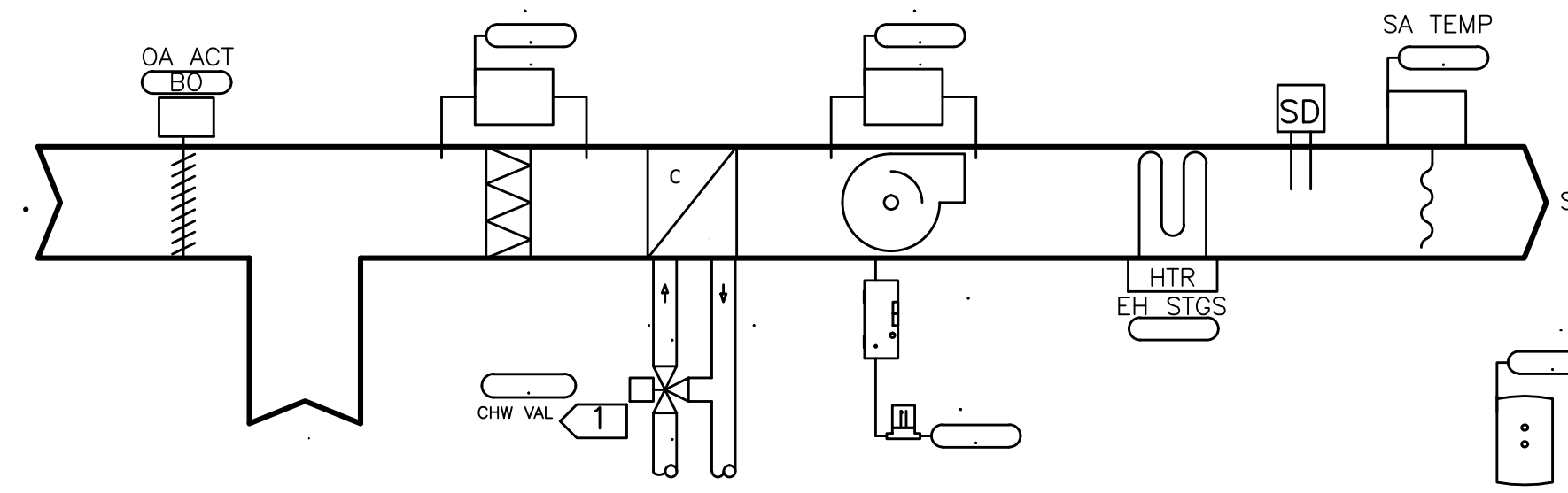
- GENERAL NOTES:**
- BUILDING CONTROLLER SHALL BE WEB-ENABLED AND ALLOW OWNER CHANGE SETPOINTS, SCHEDULES, AND RECEIVE ALARMS
 - SC IP ADDRESS BY OTHERS
 - PROVIDE 3-D GRAPHICS (EQUIPMENT AND FLOOR PLANS)
 - SPACE SENSORS LOCATED AS PER PLANS.
 - DIV.16 ELECTRICAL CONTRACTOR TO PROVIDE 120/277 VAV POWER TO ALL FIELD CONTROLLERS
 - MOTORIZED DAMPERS BY OTHERS
 - RTU CONTROLLERS SHALL BE FACTORY MOUNTED
 - HVAC EQUIPMENT SEQUENCE OF OPERATIONS DURING EMERGENCY MODE BY F/A.

BASIS OF DESIGN TRANE (954) 499-6900



⊠ VALVE SHIPPED LOOSE. FIELD INSTALL VALVE AND CONNECT CABLE. FOLLOW MANUFACTURER'S PIPING INSTRUCTIONS.

CHW CV RTU CONTROL



SYSTEM POINT DESCRIPTION	CONSTANT VOLUMEN RTU CONTROL POINT LIST											NOTES:		
	POINT TYPE					ALARMS								
	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	SOFTWARE POINT	HARDWARE INTERLOCK	DEFAULT VALUE	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL		COMMUNICATION FAIL	DIAGNOSTICS
SA SD LOCAL CLOSE					x									
SPACE AIR TEMP	x	AI					x	x			x		SENSOR FAILURE	NOTE 1
SA TEMP	x	AI					x	x			x		SENSOR FAILURE	
FILTER STATUS	x	BI								x			FILTER DIRTY	
SF STATUS	x	BI								x			FAN FAILURE	
OA DAMPER	x				BO									
CHW VALVE	x				AO									
HEATING STAGES	x				BO									NOTE 3
SF START/STOP	x				BO									
OCCUPIED COOLING SP					x									
OCCUPIED HEATING SP					x									
STANDBY COOLING SP					x									
STANDBY HEATING SP					x									
UNOCCUP COOLING SP					x									
UNOCCUP HEATING SP					x									
OCCUP BYPASS TIMER					x									
BAS COMM STATE	x				x							x		NOTE 2
GENERAL NOTES	1- SEE PLANS FOR LOCATION 2- DISPLAY AT BAS USER INTERFACE 3- SEE EQUIPMENT SCHEDULE FOR NUMBER OF HEATING STAGES													

SEQUENCE OF OPERATIONS CV RTU (TYPICAL OF 5):

BUILDING AUTOMATION SYSTEM INTERFACE: THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED BYPASS, MORNING WARM-UP/PRE-COOL, OCCUPIED/UNOCCUPIED AND HEAT/COOL MODES. IF A BAS IS NOT PRESENT, OR COMMUNICATION IS LOST WITH THE BAS THE CONTROLLER SHALL OPERATE USING DEFAULT MODES AND SETPOINTS.

OPTIMAL START: THE BAS SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS. MORNING WARM-UP MODE: DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT A MORNING WARM-UP MODE SHALL BE ACTIVATED. WHEN MORNING WARM-UP IS INITIATED THE UNIT SHALL ENABLE THE HEATING AND SUPPLY FAN. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED HEATING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

PRE-COOL MODE: DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT, PRE-COOL MODE SHALL BE ACTIVATED. WHEN PRE-COOL IS INITIATED THE UNIT SHALL ENABLE THE FAN AND COOLING. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. WHEN THE SPACE TEMPERATURE REACHES OCCUPIED COOLING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

OPTIMAL STOP: THE BAS SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL STOP OCCURS. WHEN THE OPTIMAL STOP MODE IS ACTIVE THE UNIT CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT. OUTSIDE AIR DAMPER SHALL REMAIN ENABLED TO PROVIDE VENTILATION.

OCCUPIED BYPASS: THE BAS SHALL MONITOR THE STATUS OF THE "ON" AND "CANCEL" BUTTONS OF THE SPACE TEMPERATURE SENSOR. WHEN AN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM ITS CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND THE UNIT SHALL MAINTAIN THE SPACE TEMPERATURE TO THE OCCUPIED SETPOINTS (ADJ.).

OCCUPIED: DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL OPEN TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS. THE CHILLED WATER VALVE SHALL MODULATE OR ELECTRIC HEAT SHALL STAGE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE DYNAMICALLY RESET BASED ON THE DEVIATION OF ACTUAL SPACE TEMPERATURE FROM THE ACTIVE SPACE TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE SENSOR FAILS THE CHILLED WATER VALVE SHALL MODULATE OR ELECTRIC HEAT SHALL STAGE TO MAINTAIN THE ACTIVE SPACE TEMPERATURE SETPOINT AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. IF THE DISCHARGE AIR TEMPERATURE SENSOR AND THE SPACE TEMPERATURE SENSOR FAIL THE CHILLED WATER VALVE SHALL CLOSE AND ELECTRIC HEAT SHALL BE DISABLED AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

UNOCCUPIED: WHEN THE SPACE TEMPERATURE IS BELOW THE UNOCCUPIED HEATING SETPOINT OF 60.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE ELECTRIC HEAT SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT OF 60.0 DEG. F (ADJ.) PLUS THE UNOCCUPIED DIFFERENTIAL OF 4.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STOP AND THE ELECTRIC HEAT SHALL BE DISABLED.

WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED COOLING SETPOINT OF 85.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE CHILLED WATER VALVE SHALL OPEN. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT OF 85.0 DEG. F (ADJ.) MINUS THE UNOCCUPIED DIFFERENTIAL OF 4.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STOP AND THE CHILLED WATER VALVE SHALL CLOSE.

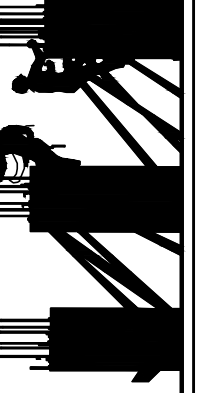
HEAT/COOL MODE: WHEN THE SPACE TEMPERATURE RISES ABOVE THE OCCUPIED COOLING SETPOINT THE MODE SHALL TRANSITION TO COOLING. WHEN THE SPACE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SETPOINT THE MODE SHALL TRANSITION TO HEATING. WHEN THE SPACE TEMPERATURE IS BELOW THE OCCUPIED COOLING SETPOINT AND ABOVE THE OCCUPIED HEATING SETPOINT THE MODE SHALL REMAIN IN ITS LAST STATE. IF THE SPACE TEMPERATURE SENSOR FAILS THE MODE SHALL REMAIN IN ITS LAST STATE AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. IF THE LOCAL AND COMMUNICATED SETPOINTS FAIL THE CONTROLLER SHALL DISABLE THE SUPPLY FAN AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

SMOKE DETECTOR SHUTDOWN (BY FIRE ALARM CONTRACTOR): THE UNIT SHALL SHUT DOWN IN RESPONSE TO A SIGNAL FROM THE SMOKE DETECTOR INDICATING THE PRESENCE OF SMOKE. THE SMOKE DETECTOR SHALL BE INTERLOCKED TO THE UNIT THROUGH THE DRY CONTACTS OF THE SMOKE DETECTOR. A MANUAL RESET OF THE SMOKE DETECTOR SHALL BE REQUIRED TO RESTART THE UNIT.

FILTER STATUS: A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSURES DURING NORMAL OPERATION A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

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Seal:
 FLA. REG. P.E. # 14170

Designed by: ALFREDO M. CARBONELL
 Drawn by: ERICK FLORIDO
 Revised & Stamped: ALFREDO M. CARBONELL
 Date: MAY. 25 . 2014
 Scale:
 Job No.: 2014-05.25

Sheet:
M4
 4 of 5 Sheets

A/C GENERAL NOTES:

1. GENERAL
 - A. SUBMIT MANUFACTURER'S DATA AND SHOP DRAWINGS ON ALL A/C EQUIPMENT AND DUCTWORK FOR REVIEW BEFORE INSTALLATION.
 - B. INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND TYPICAL DETAIL AND MINIMUM SPECIFICATIONS.
 - C. ALL DIMENSIONS AND ACTUAL CONSTRUCTION CONDITIONS MUST BE VERIFIED AT THE JOB SITE.
 - D. CONTRACTOR SHALL COORDINATE ALL HIS WORK WITH OTHER TRADES AND FIELD CONDITIONS.
 - E. CONTRACTOR, PRIOR TO SUBMITTING HIS BID PRICE, SHALL VISIT THE SITE, FAMILIARIZE HIMSELF WITH ALL FIELD CONDITIONS, AND SHALL OBTAIN ALL REQUIRED INFORMATION NECESSARY TO COMPLETE THE JOB. ANY DISCREPANCIES BETWEEN WHAT IS SHOWN ON THE DRAWINGS AND ACTUAL WORK REQUIRED TO COMPLETE THE JOB SHALL BE TAKEN INTO ACCOUNT IN THE BID PRICE.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
 - A. ALL APPLICABLE BUILDING CODES.
 - B. NFPA - 90A AIR CONDITIONING AND VENTILATION.
 - C. NFPA - 91 BLOWER AND EXHAUST SYSTEMS.
 - D. ASHRAE GUIDE - EQUIPMENT, SYSTEM AND APPLICATIONS.
 - E. SMACNA - LOW VELOCITY DUCT CONSTRUCTION.
 - F. NFPA-101 SAFETY TO LIFE FROM FIRE IN BUILDINGS.
3. MATERIALS:

DUCTWORK

 1. ALL LOCATIONS: GALVANIZED SHEET METAL CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS. INSULATE WITH 2" THICK, 1 PCF FIBERGLASS WITH EXT. FOIL FACE VAPOR BARRIER (R=6), FASTENED WITH FLARE TYPE STAPLES 1" O.C. SEAL JOINTS. STAPLES AND SEAMS WITH FIRE RESISTIVE MASTIC. INSULATION ON METAL DUCT SHALL HAVE A MAX OF 25 PERCENT COMPACTION (NAIMA STANDARD) MASTIC CAN NO BE USED OVER FOIL TAPE.
 2. PROVIDE AIR EXTRACTORS IN ALL RECTANGULAR BRANCH TAPS.
 3. ROUND BRANCH TAPS SHALL BE MADE WITH "SPIN-IN" TYPE FITTING WITH VOLUME DAMPER AND ADAPTER FOR CONNECTION TO FIBERGLASS DUCT.
 4. DUCTWORK INSTALLATION AND FABRICATION SHALL BE DONE IN ACCORDANCE WITH SMACNA STANDARDS.
 5. FLEXIBLE DUCTS: DUCT SHALL BE LIGHTWEIGHT CONSTRUCTED WITH CORROSION RESISTANCE CORE AND REINFORCED WITH BONDED HELIX DUCT TO BE INSULATED WITH 2" THICK, 1 LB. FIBERGLASS BLANKET INSULATION WITH ALUMINUM FILM VAPOR BARRIER. DUCT SHALL BE LISTED CLASS 1, U.L. STANDARD 181.
 6. INSULATE ALL EXPOSED TO OUTDOORS AIR CONDITIONING DUCTWORK AS FOLLOWS; COVER WITH 2" THICK DUCT BOARD WITH FOIL R-8.0 COVER WITH MASTIC "FOSTER 4500" EMBED GLASSFAB INTO MASTIC, COVERING THE ENTIRE DUCTBOARD, COVER GLASSFAB WITH FOSTER 4500 MASTIC.

INSULATION:

 - A. INSULATE NECK, THROATS AND COLLARDS OF SUPPLY OUTLETS ABOVE CEILING.
 - HANGERS - 4" AND SMAUER GRINNEL #115.
 - EQUIPMENT AS SPECIFIED ON SCHEDULE.
 - PROVIDE TURNING VANES IN ALL ELBOWS, AIR EXTRACTORS OR ADJUSTABLE TURNING VANES AT ALL BRANCH TAKEOFFS AND ALL REQUIRED DAMPERS TO PROPERLY BALANCE THE SYSTEM.
 - CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL DIFFUSERS, GRILLES, AND REGISTERS WITH DESIGN ENGINEER.
 - PROVIDE APPROVED FIRE DAMPERS AT ALL PENETRATIONS OF FIRE RATED PARTITIONS, WALLS AND CEILINGS AS REQUIRED BY CODE.
 - TOILET. PRESSURIZATION, SMOKE EXHAUST RISER DUCT FABRICATION SHALL BE GALVANIZED SHEET METAL 24 GAUGE MINIMUM.
 - DUCTS IN UNCONDITIONED AREAS MUST BE R-6 MINIMUM.
 - NO PVC OR ANY COMBUSTIBLE MATERIALS ALLOWED IN AC CLOSET PLENUM/RETURN AIR PLENUM.
 - PROVIDE ACCESS PANELS WHERE INDICATED OR REQUIRED FOR SERVICE AT ALL VALVES, MECHANICAL EQUIPMENT, FAN, AHU'S CONTROL DEVICES AND DAMPERS WHICH REQUIRED ADJUSTMENT. USE MILCOR STYLE M FOR EXPOSED MASONRY APPLICATION, STYLE B FOR ACUSTICAL PLASTER APPLICATION. PROVIDE U.L. LABELED FIRE RATED TYPE WHERE REQUIRED. FURNISH WITH FACTORY APPLIED, BAKED-ON PRIME COAT AND STANDARD FLUSH TYPE METAL CAM LOCK.

CHILLED WATER PIPING SYSTEM

- PART 1 GENERAL
 - 1.01 SUBMIT MANUFACTURER'S DATA AND SHOP DRAWINGS FOR REVIEW BEFORE ANY WORK IS COMMENCED.
- PART 2 PRODUCTS
 - 2.01 CHILLED WATER PIPING (ABOVE GROUND) BLACK STEEL. ASTM-A-53 GRADE B SCHEDULE 40.
 - A. PIPE FITTINGS: THREADED STEEL PIPE. MALLEABLE IRON, 300 LB. BANDED.
 - USE WELDED STEEL PIPE FOR ALL PIPING 2-1/2" IN DIAMETER AND LARGER WITH CARBON STEEL FITTINGS, ASTM-A-234-WPB, BUTT WELD TYPE, MANUFACTURED BY TAYLOR FORGE, TUBE TURNS, MID-WEST OR CRANE "WELDOLETS" MAY BE USED ONLY WHERE BRANCH PIPING IS TWO OR MORE SIZES SMALLER THAN THE MAIN AND THE MAIN IS LARGER THAN 4". OTHERWISE FITTINGS TO BE FABRICATED "TEES". MAKE ALL PIPING TURNS WITH FABRICATED LONG RADIUS ELBOWS, UNLESS SPECIFICALLY DESIGNED ON THE DRAWINGS.
 - B. USE ECCENTRIC REDUCERS ONLY FOR PIPE SIZE CHANGES IN HORIZONTAL PIPING.
 - C. IF USING, VICTAULIC FITTINGS (REFER TO SPEC BOOK) HAND FORM THE KNUCKLE WITH FOAMGLASS
 - 2.03 COMPRESSION TANKS AND AIR ELIMINATORS:
 - A. PROVIDE COMPRESSION TANKS AS INDICATED. TANKS: 200 PSI WORKING PRESSURE. ASME STAMPED CONSTRUCTION TO INCLUDE GAUGE GLASS, DRAIN, PIPED TO NEAREST FLOOR DRAIN OR AS DIRECTED, CHECK VALVE, PRESSURE REDUCING VALVE, AIR ELIMINATOR TANK FITTING AND NECESSARY TAPPING TO CONNECT TO SYSTEMS.
 - B. AIR ELIMINATORS: CONSTRUCTION OF STEEL WITH FLANGED CONNECTIONS, INTERNAL STAINLESS STEEL AIR COLLECTOR TUBE AND REMOVABLE SYSTEM STRAINER OF GALVANIZED STEEL. PROVIDE BLOW-DOWN CONNECTION UNIT TO BE CONSTRUCTED IN ACCORDANCE WITH ASME AND STAMPED 200 PSI WORKING PRESSURE. MANUFACTURER: BELL AND GOSSETT OR TACO.
 - 2.04 PROVIDE DISTRIBUTION PIPING TO TERMINAL EQUIPMENT 1" AND SMALLER, TYPE L COPPER TUBE ASTM B-88 WITH 95/5 SOLDER.
 - 2.05 PROVIDE ISOLATION DI-ELECTRIC FITTINGS BETWEEN STEEL AND COPPER.
- PART 3 EXECUTION
 - 3.01 INSTALL EQUIPMENT AND MATERIALS AS RECOMMENDED BY THE MANUFACTURER.
 - 3.02 MAINTAIN LINE AND GRADE IN ORDER TO PROPERLY VENT SYSTEMS.
 - 3.03 FILL THE NEW WATER SYSTEM WITH WATER AND THOROUGHLY FLUSH BEFORE PLACING IN OPERATION IN ORDER TO REMOVE FOREIGN MATTER FROM THE PIPING SYSTEMS.
 - 3.04 INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS OF PIPING SYSTEMS AND WATER COILS. PROVIDE AUTOMATIC VENTS AS NEEDED.
 - 3.05 TEST ALL PIPING WITH WATER TO 250 PSIG BEFORE INSULATING.
 - 3.06 PROVIDE SYSTEM IDENTIFICATION. PROVIDE OWNER WITH CHART SHOWING IDENTIFICATION KEY.

DUCT SIZE (GREATEST DIMENSION)	MINIMUM THICKNESS (US GAGE)
UP TO 8"	NO. 24 (.024in.)
8" TO 18"	NO. 22 (.030in.)
18" TO 30"	NO. 20 (.036in.)
30"	NO. 18 (.047in.)

MECHANICAL SYSTEM INSULATION

- PART 1 GENERAL
 - 1.01 SUBMIT MANUFACTURER'S DATA FOR REVIEW, IF REQUIRED BY GENERAL PROVISIONS, BEFORE ANY WORK IS COMMENCED.
 - 1.02 PROTECT ALL MATERIALS FROM THE WEATHER DURING STORAGE AND INSTALLATION.
- PART 2 PRODUCTS
 - 2.01 DUCTWORK INSULATION:
 - A. INSULATE ALL AIR CONDITIONING SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK WITH MINIMUM R=6.0 BLANKET TYPE OF NOT LESS THAN 1 PCF DENSITY WITH FIRE RETARDANT FOIL FACING. MATERIAL SHALL BE UNDERWRITERS' LABORATORIES LABELED TO COMPLY WITH NFPA 90A. FASTEN WITH FLARE TYPE STAPLES ON 1" CENTERS ALONG OVERLAPS. SEAL ALL STAPLE HEADS, LAPS AND BREAKS IN INSULATION WITH FIRE RESISTANT MASTIC.
 - B. INSULATE NECK, THROATS AND COLLARS OF SUPPLY OUTLET RUNOUTS ABOVE CEILINGS.
 - 2.02 PIPING INSULATION:
 - A. CHILLED WATER AND REFRIGERANT SUCTION PIPING (ABOVEGROUND IN BUILDING AIR CONDITIONING PLENUMS): INSULATE WITH PREFORMED SPLIT SECTIONAL PIPE INSULATION. PITTSBURGH CORNING'S "FOAMGLASS". USE 2" THICK INSULATION ON PIPES 6" DIAMETER AND SMALLER AND 2 1/2" THICK INSULATION ON PIPES 8" DIAMETER AND LARGER. INSULATION TO BE SECURED WITH 16 GA COPPERWELD WIRE ON 12" CENTERS. COVER WITH FIRE RESISTING "STAY-DRY" JACKET. SECURE ALL LAPS WITH FLARE TYPE STAPLES ON 1" CENTER, COVER STAPLE HEADS WITH MASTIC. FIELD FABRICATE FITTINGS WITH CELLULAR GLASS AND COVER WITH "STAY-DRY" JACKETS EMBEDDED IN MASTIC. IN AIR HANDLING ROOMS AND WHEREVER EXPOSED TO VIEW, COVER INSULATION WITH FIELD APPLIED LAMOTIPE JACKETING ON STRAIGHT PIPE, ON FITTINGS, FLANGES AND VALVES, FABRICATE FROM PIPE INSULATION AND APPLY A SMOOTHING COAT OF INSULATION CEMENT AND WHITE GLASFAB AND WHITE MASTIC, BENJAMIN-FOSTER 30-35, OR APPROVED EQUAL.
 - B. CHILLED WATER (UNDERGROUND AND EXPOSED TO WEATHER): INSULATE WITH 2-1/2" THICK FOAMGLAS INSULATION 3" THICK FOR 6" AND SMALLER AND 3-1/2" FOR 6" THRU 12". COVER WITH PITTSBURGH CORNING SELF SEALING "PITTRAP" WHEN UNDERGROUND, .016 SMOOTH ALUMINUM JACKET WHEN EXPOSED TO WEATHER.
 - 2.07 INSULATE ALL INTERIOR ABOVE GROUND HORIZONTAL RUNS OF STORM WATER DRAINAGE ABOVE CEILING OR WITHIN CONDITIONED SPACES WITH 1-1/2" THICK FIBERGLASS BLANKET INSULATION WITH ALUMINUM FOIL VAPOR BARRIER. STAPLE ALL JOINTS ON 1" CENTER AND SEAL WITH BENJAMIN FOSTER 30-3500 MASTIC TO PROVIDE COMPLETE VAPOR BARRIER.
 - 2.08 MISCELLANEOUS: CAP VALVES, DRAIN AND VENT LINES AND MISCELLANEOUS APPURTENANCES SUBJECT TO SWEATING WITH FOAM PLASTIC CAPS WITH APPROVED FLAME SPREAD 25 OR LESS AND SMOKE DEVELOPED RATING 50 OR LESS.
- PART 3 EXECUTION
 - 3.01 INSTALL INSULATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - 3.02 NO INSULATION SHALL BE INSTALLED UNTIL THE SYSTEM HAS BEEN CHECKED AND FREE OF ALL LEAKS.
 - 3.03 INSTALL ALL MATERIALS IN A NEAT AND WORKMANLIKE MANNER.
 - 3.04 PROTECT ALL PIPE INSULATION AT HANGERS WITH GALVANIZED SHEET METAL SHIELDS.

TEST & BALANCE NOTES

1. PROCURE THE SERVICES OF AN INDEPENDENT BALANCE & TESTING AGENCY TO PERFORM TEST AND BALANCE TO ENTIRE SYSTEM.

HVAC DESIGN REQUIRES	YES	NO
DUCT SMOKE DETECTOR	●	
FIRE DAMPER(S)	●	
SMOKE DAMPER(S)	●	
FIRE RATED ENCLOSURE	●	
FIRE RATED ROOF/FLOOR CEILING ASSEMBLY	●	
FIRE STOPPING	●	
SMOKE CONTROL	●	

AIR-COOLED CHILLER

Air-Cooled Chiller, Scroll Compressors Schedule Report

Result Tags	Quantity	Model Number	Base unit module															
			TOPSS version number	Unit nominal tonnage	Unit type	Evaporator application	Unit voltage	Unit application	Fin material	Capacity tons	Unit power kW	Full load efficiency EER	Evap leaving temp F	Evap entering temp F	Evap flow rate gpm	Evap fluid type	Evap fouling factor	
CGAM-1	1	CGAM080	164	80 tons	High efficiency	Std cooling	208 volt 3 phases	High ambient	Lanced aluminum	77.6	90.4	10.3	44	56	154.7	Water	0.0001	

RTU UNIT SCHEDULE

Unit Tags	Quantity	Model Number	Module Tag	Actual airflow cfm	Unit elevation ft	Unit size ft	Integral base frame	UL listed unit	Circuit number 1	FLA (CV)	MCA	MOP	Fuse size circuit 1	Product group	Roof curb type	High voltage location	Length in	Width in	Installed weight lb
RTU-1	1	CSAA014UB	Unit level options	6400	0	14	6in. integral base frame	UL listed unit	Supply fan motor(s)	9.4	11.75	21.15	20	Outdoor unit	Standard roof curb	Right	99.005	72	2027.3
RTU-2	1	CSAA012UB	Unit level options	5200	0	12	6in. integral base frame	UL listed unit	Supply fan motor(s)	6.7	8.38	15.07	15	Outdoor unit	Standard roof curb	Right	93.88	66.5	1800.4
RTU-3	1	CSAA012UB	Unit level options	5200	0	12	6in. integral base frame	UL listed unit	Supply fan motor(s)	6.7	8.38	15.07	15	Outdoor unit	Standard roof curb	Right	93.88	66.5	1800.4
RTU-4	1	CSAA021UB	Unit level options	9200	0	21	6in. integral base frame	UL listed unit	Supply fan motor(s)	12.5	15.63	28.13	25	Outdoor unit	Standard roof curb	Right	106.755	80	2651.4
RTU-5	1	CSAA008UB	Unit level options	4000	0	8	6in. integral base frame	UL listed unit	Supply fan motor(s)	9.4	11.75	21.15	20	Outdoor unit	Standard roof curb	Right	95.38	50.5	1498.8

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ALFREDO M. CARBONELL, P.E., Inc.

Reviews:

Client: TOWN OF SURFSIDE
 Project: TOWN HALL BUILDING NEW CHILLED WATER SYSTEM
 9293 HARDING AVE. SURFSIDE, FL 33154
 PROPERTY FOLIO NUMBER:

Plan Description:
 A/C NOTES AND EQUIPMENT SPECIFICATIONS

Seal:
 FLA. REG. P.E. # 14170

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