

SECTION 260584 - MECHANICAL EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Refer to documents of other divisions for further requirements associated with equipment and devices that are addressed in this section. This section includes supplemental information related to electrical work associated with mechanical equipment and other equipment furnished and/or installed under all other divisions or by others. Information included in this section applies not only to traditional mechanical equipment, but also to equipment of any kind that is furnished and/or installed by any supplier or installer.

PART 2 - PRODUCTS - REFER TO APPLICABLE SPECIFICATION SECTIONS

PART 3 - EXECUTION

3.1 GENERAL

- A. Common Requirements:
 - 1. Provide all necessary electrically related work as required to render all mechanical equipment (including plumbing, heating, ventilating and air conditioning equipment) fully operational and fully compliant with NEC. This includes, prior to ordering materials or commencing with rough-in, reviewing equipment submittal data and coordinating with installing contractors to ensure the correct size, rating and quantity of conductors are provided.
 - 2. Refer to Coordination Schedules on drawings. Provide disconnects, controllers, starters, accessories, wiring, connections, services, etc. where defined as "EC" in the schedule. Information in this section supplements the information in the HECS.
 - 3. Provide power wiring and connections for all equipment (including motor dampers, accessories, etc. as applicable) as required to render equipment fully operational.
 - 4. Provide engraved plates at all local disconnects and/or controllers with equipment identification and mark indicated.
 - 5. Install local disconnects and/or controllers at 48 inches to top of outlet box or enclosure as applicable above finished floor/slab/grade; provide flush mounted units in finished areas. Provide key operated controllers where accessible to general staff and/or general public.
 - 6. Drawn locations of equipment and devices are shown only for schematic indication of wiring requirements. Coordinate with locations and rough-in requirements as required to determine actual locations and termination

- requirements. Refer to all contract documents for additional electrical requirements and concerns, and for further representation of this work.
7. Provide raceway, wiring, connections, and terminations for power and interlocks for electrically operated equipment. Provide disconnect switches and/or starters for mechanical equipment unless specifically indicated otherwise herein or on the drawings.
 8. Provide disconnect switch ahead of all equipment, including controls, unless the mechanical equipment comes with integral NEC-compliant disconnect(s). Provide NEMA 3R enclosures where installed outdoors and where installed indoors in areas subject to moisture. Ground metal frames of equipment by connecting frames to the grounded metal raceway or to a full size green ground conductor or both. Provide the necessary electrical connections between the specified equipment and the junction box near equipment with flexible metallic conduit (liquid-tight outdoors) and matched connectors (see Section 26 05 33). Where mechanical equipment lugs cannot accommodate conductor sizes shown on drawings, provide ILSCO ClearTap Insulated Multi-Tap Connectors.
 9. Sizes, electrical ratings, etc. of equipment and wiring shown on drawings are based on the respective equipment design base manufacturers. If different manufacturer(s) or model(s) are actually supplied, provide necessary coordination in field (prior to ordering materials and prior to rough-in) and provide the necessary size of related electrical equipment, wiring, conduit, etc.
 10. Prior to furnishing submittals and prior to rough-in, determine exact electrically related characteristics, loads, voltages, disconnects and/or starters, and accessory requirements, locations, mounting heights, connection points, etc. of mechanical equipment.
 11. Provide lugs, lug kits and related accessory work as required to accommodate the conductor sizes and quantities needed for each application. Coordinate with single-line diagram, field conditions, equipment installers, etc.
 12. Coordinate in field with the respective trades and determine case by case, which equipment is factory listed for use with Heating and Air Conditioning Rated (HACR) breakers. In an effort to minimize requirements for stocking of fuses by the Owner, utilize HACR breakers at the source panelboards as the NEC required overcurrent protection wherever possible (in lieu of fusing local disconnect switches).
 13. Disconnect Switch and/or Starter Locations: Locations shown on drawings are indicated for schematic purposes only. Determine exact locations in field so that they are compliant with NEC Article 110.26.
- B. Maintenance Receptacles for Equipment: Provide duplex receptacle within 25 feet of all electrically operated equipment of any nature that requires periodic testing or maintenance. Provide Type WR duplex GFCI weatherproof receptacle for outdoor applications (including rooftops) and for applications subject to high humidity or moisture.
- C. Equipment and Systems:

1. Variable-Frequency Motor Controllers (VFC) / Variable Frequency Drives (VFD): Install VFD in coordinated location. Provide power, wiring, and connections. Provide local non-fused disconnect switch at each VFC/VFD, wired ahead of the VFC/VFD. Provide local non-fused disconnect at respective controlled mechanical equipment for all applications where the VFC/VFD and its disconnect are not within sight of the respective equipment, or where not within 50 feet of the equipment, or where not readily accessible. Provide these local disconnect switches with electrical interlock kits, with (2) #14 interlock wiring from interlock kit to respective VFC/VFD so that VFC's/VFD's are automatically de-energized when the respective equipment disconnect switch is opened.
2. HVAC Equipment with Multiple Integral Electrically-Operated Components: Provide separate power feeds or single power feed as directed in field by the HVAC installer (field verify prior to rough-in). Modify disconnect and/or starter requirements accordingly, if required. Provide additional dedicated 120V, 20A branch circuit for each unit from nearest panelboard (if not indicated clearly on the electrical drawings) for internal factory-installed lighting and receptacles. Provide conduit, wiring, and overcurrent protection for this work, and terminations to connections within the heat recovery units for this lighting and convenience power.
3. Split System Air Conditioning Systems: Provide (1) 3/4 inch empty conduit (with drag line) from each air handling segment to each condensing unit. Provide control conduit between pair to follow refrigerant piping routing wherever practical.
4. Commercial Kitchen Exhaust Hoods and Related Fan Equipment:
 - a. Refer to details on drawings. Refer to food service documents and manufacturer's submittals for specific information. Field-coordinate work with affected entities.
 - b. Note that multiple kitchen hoods may exist, and any single hood shown may consist of multiple sections. Provide electrical work for hoods as required to render them and ancillary systems/controls fully operational.
 - c. Provide power wiring and connections to line side of factory disconnect switches for fan units.
 - d. Provide interlock wiring and connections to and from the various equipment and controls. Include interlock wiring and components between hood exhaust fan(s) and equipment that provides make-up air for the hood exhaust to ensure both operate simultaneously when the hood is being used.
 - e. Provide control wiring from the fan units to respective remote duct stats.
 - f. Provide control wiring to and from duct heat sensors.
 - g. Provide 120V, single-phase, 2-wire, 20 ampere wiring and connections to the indoor hood bodies and fire suppression system(s) for hood lights and for control circuits.
 - h. Provide control wiring from the indoor hood bodies to respective fan units.
 - i. Provide 120V, 2-wire (#12 AWG) control wiring connections from indoor hood bodies to contacts on factory micro-switch in respective hood fire suppression system.

- j. Provide auxiliary control circuit wiring from the factory micro-switch in the hood fire suppression system(s) to respective dedicated fire alarm system monitor modules to initiate alarm signal when respective hood fire protection system is activated.
 - k. Provide auxiliary control circuit wiring from the factory micro-switch in the hood fire suppression system to contactor control coil(s).
 - l. Provide empty octagon box for mechanical manual pull station (and install pull station) for each hood fire protection system (mounted at 48" to top of outlet box above finished floor) with (1) 1/2" empty conduit routed up and over to hood as directed by hood installer in field (with sweep 90's). install manual pull station near means of egress, between 10 and 20 feet from the cooking area. Field-verify locations.
 - m. Provide interlock control wiring between gas solenoid shut off valves and respective kitchen hood fire suppression system. Coordinate with affected installers.
5. Ductless Split System Air Conditioning Units:
- a. Provide power, control and interlock wiring and connections, to indoor and outdoor equipment.
 - b. Provide local weatherproof fused disconnect at each outdoor condensing unit.
 - c. Provide power, control and interlock wiring in conduit from each outdoor condensing unit to respective indoor air conditioning unit. Determine specific wiring requirements in field from HVAC installer since these wiring specifics vary by manufacturer. Provide related wiring as required to render systems fully operational.
 - d. Provide 2-pole local flush snap switch disconnect at each indoor air conditioning unit (with pilot light).
 - e. Route control conduit/wiring between each air conditioning unit and respective condensing unit to follow refrigerant piping routing wherever practical.
 - f. Provide power home-run from each outdoor condensing unit, or from each indoor air conditioning unit, or from both unit for each application. Determine specific wiring requirements in field from HVAC installer since these wiring specifics vary by manufacturer. Provide related power home-runs as required to render systems fully operational.
6. Control Wiring:
- a. General: Unless specifically indicated as empty conduit on drawings or herein, provide electrical control and interlock work as shown on drawings. Provide additional control work as specifically indicated herein. Coordinate HVAC thermostat and sensor locations in field (case by case) with Design Professionals, Owner's Representative and equipment installer to ensure that they are placed in locations that will not interfere with furniture, equipment, artwork, wall-hung specialties, room finishes, etc. Field-verify

- these wall locations case by case, prior to rough-in, since locations shown on drawings are schematic only.
- b. Schematic Thermostat and Sensor Locations: Refer to HVAC drawings and documents to determine locations and quantities if locations are not shown on electrical drawings, and to confirm locations and quantities even if locations are shown on electrical drawings.
 - c. Low Voltage Thermostats and Sensors: Provide 4-inch square by 2-1/8 inch deep wall outlet boxes at 46 inches above finished floor to center of outlet box (with single-gang rings) for each unit. Provide one 3/4-inch empty conduit from each location, turned out above accessible ceilings (in joist space or against overhead slab/deck). Identify conduit in ceiling cavity; provide sweep bends, bushings and drag line.
 - d. Line Voltage Thermostats and Sensors: Provide 4-inch square by 2-1/8 inch deep wall outlet boxes at 46 inches above finished floor to center of outlet box (with single-gang rings) for each unit. Provide line voltage power wiring, in 3/4-inch conduit, and connections from thermostats and sensors to respective equipment that is to be controlled by same. Install thermostats and sensors.
 - e. Motor Operated Dampers: Provide wiring associated with interlock of motors to associated motor dampers for exhaust fans. Provide local disconnect at each motor damper if fan is not furnished with one. Where HVAC equipment or exhaust fans are controlled by VFC/VFD units, wire motor operated dampers (MOD's) back to the respective VFC/VFD unit separately from the respective exhaust fan power wiring, with (2) #12 AWG in 3/4 inch conduit. Provide local disconnect for each such MOD.
7. Domestic Water Heaters (Gas): Provide electrical 120VAC power connection. Provide interlock wiring with circulating pumps, flow switches and aquastat controls as applicable. Refer to wiring diagrams on drawings for further definition where applicable.
 8. Domestic Hot Water Circulating Pumps: Provide manual starter with pilot light, and wire pump to operate through the aquastat. Refer to wiring diagrams on drawings for further definition.
 9. Electric Water Coolers (Surface): Provide 120V duplex receptacle. Provide GFCI circuit breaker to feed the circuit that serves electric water coolers, even if not indicated on panelboard schedule. Install at height and location as directed by water cooler installer. Conceal outlet within water cooler enclosure if enclosure is designed for such an installation. Assemble and connect cord if needed. Coordinate all specifics with water cooler installing contractor prior to rough-in of related work.
 10. Air Compressors: Provide power and control wiring and connections. Provide combination H.O.A. starter at the unit

END OF SECTION 260584