

SECTION 16402 - LOW VOLTAGE SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Panelboards
 - 2. Transformers
 - 3. Contactors
 - 4. Motor Starters
 - 5. Fuses

- B. Related Requirements:
 - 1. 16050 - Basic Electrical Materials and Methods. For installation of equipment.
 - 2. Owner's Independent Power Systems Study Consultant's arc flash risk assessment at completion of electrical work.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

- B. National Fire Protection Association (NFPA)
 - 1. NFPA 70 - National Electrical Code (NEC)

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Provide proper facilities for handling and storage of materials to prevent damage. Keep materials dry, fully protected from weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Items of electrical distribution system shall be manufactured by one of the following, unless otherwise indicated on Drawings.
 - 1. Cutler Hammer/Eaton.
 - 2. General Electric.
 - 3. Siemens (ITE).
 - 4. Square D.

- B. Equipment shall bear name and trademark of manufacturer as listed above.

2.2 NEW SERVICE ENTRANCE EQUIPMENT

- A. In general, service entrance equipment will be as indicated and/or scheduled on Drawings. Service entrance equipment will be U.L. labeled as suitable for use as service equipment.

- B. Install service entrance rated switchboard assembly as indicated on Drawings. Configure switchboard as scheduled on Drawings, including voltage, amperage, bus bracing and interrupting ratings. Install main lugs only (MLO), main circuit breaker (MCB), or main fusible switch (MFS) and branch devices as indicated on Schedule. Switchboard will be of same manufacturer as downstream distribution equipment.

- C. Install service entrance rated panelboard(s) as indicated on Drawings. Configure panelboard(s) as scheduled on Drawings including voltage, amperage, bus bracing and interrupting ratings. Install main lugs only (MLO), main circuit breaker(s) (MCB), or main fusible switch(es) (MFS) and branch devices as indicated on Schedule. Panelboard(s) will be of same manufacturer as downstream distribution equipment.
 - 1. Where service entrance Panelboard Schedule(s) call for main fusible switch(es) integral with panelboard assembly, separate fusible safety switches are acceptable if mounting space limitations indicated on Drawings and applicable code requirements are complied with. Identify switches as "Service Disconnect", "for", "Panel", "****" in accordance with Section 16050, Part 2.
- D. Service entrance switchboards or panelboards with main circuit breakers, main fusible switches or branch devices rated 1000 amperes or above will be equipped with ground fault protection.
- E. Equip main fusible switches or fusible switch type branch devices with rejection type fuse holders and current limiting fuses as indicated on Drawings. No substitutions permitted.

2.3 TRANSFORMERS

- A. Transformers: general purpose, ul-listed/labeled. Comply with NEMA st-020 standards.
- B. Insulation class: for three phase transformers less than 15 KVA and all single phase – 185 degrees C, UL-component-recognized insulation system with a maximum of 115 degree C rise above a 40 degree C ambient temperature; for three phase transformers 15 KVA and larger - 220 degrees C, UL-component-recognized insulation system with a maximum of 150 degree C rise above a 40 degree C ambient temperature. UL-component-recognized insulation system replaces the UL1446 insulation rating system that used letters.
- C. Phases, voltages, and sizes: as indicated on the drawings.
- D. Sound level: not exceeding NEMA standards for the sizes indicated.
- E. Full-capacity primary taps: below 25 KVA –one 5 percent tap above and one 5 percent tap below; 25 KVA to 500 KVA - six 2.5 percent taps (2 above, 4 below); Above 500 KVA - four 2.5 percent (2 above, 2 below).
- F. Transformer core and coil assemblies: mounted on integral vibration-absorbing pads.
- G. Transformers 75 KVA and larger shall be floor mounted unless indicated otherwise. Transformers 45 KVA and smaller may be wall mounted where wall construction is suitable for the load. Floor mounted transformers shall be securely bolted to a 4 inch house keeping pad with vibration isolation pads. Wall mounted or suspended transformers shall have a means of isolating vibration from the support.
- H. Transformers up through 1000 KVA shall be mounted on elastomeric vibration isolation pads. Pad shall be constructed of neoprene, rubber, glass fiber, or a combination thereof. Pads shall be “ribbed” or “waffled” in texture. Pads shall be selected for smallest durometer (hardness), preferably less than 50. Deflection of pad shall be .25” static minimum. Stack pads until the desired deflection is achieved.
- I. Make final conduit connections to transformers with flexible conduit, with at least 6 inches of slack in all directions.
- J. Transformer enclosures: fully enclosed (except for ventilation openings), NEMA 2, drip-proof, fabricated of heavy gauge sheet steel construction.
- K. Provide Energy-efficient Transformers Complying with NEMA TP-1, when tested in accordance with NEMA TP-2.
- L. K-rated transformers shall be provided as indicated on the drawings and be listed for 115 degree C rise.
- M. Manufacturers:

1. Square D
2. Cutler Hammer
3. General Electric
4. Siemens

2.4 CONTACTORS

- A. Manufacturers:
 1. Square-D
 2. General Electric
 3. Siemens
 4. Cutler Hammer
- B. Provide contactors as indicated on Drawings.
 1. General Electric CR463M40BJA10A0 or equal.
- C. Industrial duty type; silver alloy, double break contacts, convertible with NO and NC indicators; capable of adding poles in the field; number and rating of poles as indicated on the Drawings or required by the load controlled; typed directory affixed to the inside of the enclosure door listing all branch circuits switched and the control power branch circuit.
- D. Mechanically Held Type, control interface shall be 2-wire input module.
- E. Coil and Control Voltage as specified on drawings.
- F. Short circuit current rating:
 1. 10,000A at 240V Maximum
 2. 14,000A at 480V Maximum
- G. Enclosures:
 1. NEMA 1

2.5 FUSES

- A. Install fuses as indicated on Drawings.
- B. Subject to compliance with project requirements, provide fuses as manufactured by one of the following:
 1. Bussmann.
 2. Gould-Shawmut.
 3. Littelfuse.
- C. Acceptable Fuse Types:

<u>Size</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>UL Listed</u>
601 Amperes and Above, 480 Volt	Bussman	Hi-Cap, KRP-C	Class L
	Gould-Shawmut	A4BY	Class L
	Littelfuse	KLLU	Class L
600 Amperes and Below, 480 Volt	Bussman	LPS-R-SP	RK1
	Gould-Shawmut	A6D	RK1
	Littelfuse	KLSR	RK1
600 Amperes and Below, 250 Volt	Bussman	LPN-RK-SP	RK1
	Gould-Shawmut	A2D	RK1
	Littelfuse	KLNR	RK1

Motor Loads, Transformers
(Circuits with Heavy Inrush),
600 Amperes and Below

Bussman
Gould-Shawmut
Littelfuse

FRN-R, 250V
FRS-R, 600V
TR, 250V
TRS, 600V
FLNR, 250V
FLSR, 600V

RK5
RK5
RK5
RK5
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RK5

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations, power company requirements, and as indicated on Drawings.
- B. Branch circuits shall be connected exactly as indicated on Panel Schedule.

3.2 ELECTRICAL SERVICE

- A. Perform Work in compliance with the local utility's requirements.

3.3 TEMPORARY POWER

- A. Provide temporary power during construction in accordance with Section 01500.

END OF SECTION