

Specification Number: 26 24 16.05

Product Name: Emergency Lighting Control NF Circuit Panelboards 480Y/277 Vac Maximum

SECTION 26 24 16.05

Emergency Lighting Control NF Circuit Panelboards 480Y/277 Vac Maximum

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Emergency Lighting Control Panelboard - Furnish and install emergency lighting control panelboard(s) as specified herein and where shown on the associated [schedules] [drawings].

1.02 REFERENCES

The panelboard(s), circuit breaker(s) and relay(s) referenced herein are designed and manufactured according to the latest revision of the following specifications.

- A. NEMA PB 1 - Panelboards
- B. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- C. NEMA AB 1 - Molded Case Circuit Breakers
- D. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (480 Volts Maximum)
- E. UL 50 - Enclosures for Electrical Equipment
- F. UL 67 - Panelboards
- G. UL 924 - Emergency Lighting and Power Equipment
- H. UL 98 - Enclosed and Dead-front Switches
- I. UL 489 - Molded-Case Circuit Breakers and Circuit Breaker Enclosures
- J. CSA Standard C22.2 No. 29-M1989 - Panelboards and Enclosed Panelboards
- K. CSA Standard C22.2 No. 5-M91 - Molded Case Circuit Breakers
- L. Federal Specification W-P-115C - Type I Class 1
- M. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit And Service.
- N. NFPA 70 - National Electrical Code (NEC)
- O. ASTM - American Society of Testing Materials
- P. IBC - International Building Code - Seismic compliance requirements
- Q. NFPA 5000 - NFPA Building Code - Seismic compliance requirements
- R. ASCE 7 - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures - Seismic compliance requirements
- S. ICC ES AC156 - International Code Council Evaluation Services Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems - seismic testing protocol

1.03 SUBMITTAL AND RECORD DOCUMENTATION

- A. Approval documents shall include drawings. Drawings shall contain overall panelboard dimensions, interior mounting dimensions, and wiring gutter dimensions. The location of the main, branches, relays and solid neutral shall be clearly shown. In addition, the drawing shall illustrate one line diagrams with applicable voltage systems.

1.04 QUALIFICATIONS

- A. Company specializing in manufacturing of panelboard products with a minimum of fifty (50) years documented experience.
- B. Panelboards shall be manufactured in accordance with standards listed Article 1.02 - REFERENCES.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inspect and report concealed damage to carrier within their required time period.
- B. Handle carefully to avoid damage to panelboard internal components, enclosure, and finish.
- C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water,

construction debris, and traffic.

1.06 OPERATIONS AND MAINTENANCE MATERIALS

- A. Manufacturer shall provide installation instructions and NEMA Standards Publication PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

1.07 WARRANTY

- A. Manufacturer shall warrant specified equipment free from defects in materials and workmanship for the lesser of one (1) year from the date of installation or eighteen (18) months from the date of purchase.

1.08 RELATED WORK

- A. Specification number 26 43 13.12 – Transient Voltage Surge Suppression

PART 2 PRODUCTS

2.01 Description of work

- A. The extent of the Emergency Lighting Control Panelboard system work is indicated by the drawing and by the requirement of this section. It is defined to include, but not by way of limitation.
 - 1. Panelboards containing both standard circuit breaker and emergency lighting control relays listed as a single UL 67, UL 50 and UL 924 product.
 - 2. Provide a controllable relay contact that is circuit breaker protected under normal utility and emergency power from one panelboard.
- B. System installation includes the following:
 - 1. Wiring of main breakers conductors from UL 1008 or equivalent transfer switch.
 - 2. Wiring of emergency branch circuit conductors to Automatic Load Control Relay(s)
 - 3. Wiring of emergency lighting to Automatic Load Control Relay(s)
 - 3. Wiring of external regular power feed for voltage monitoring
 - 4. Installation of external control device(s) for load control under normal operation.

2.01 MANUFACTURERS

- A. Shall be Square D Company NF - Class 1670
- B. Substitutions must be submitted in writing three weeks prior to original bid date with supporting documentation demonstrating that the alternate manufacturer meets all aspects of the specification herein.

2.02 LIGHTING AND APPLIANCE PANELBOARD TYPE

- A. NF
 - 1. Panelboard Interior
 - a. Shall be type NF panelboard for 480Y/277 Vac maximum. Continuous main current ratings, as indicated on associated [schedules] [drawings], not to exceed 400 amperes for main breaker panelboards and not to exceed 800 amperes for main lug panelboards.
 - b. b. Minimum Short Circuit Rating:
[18,000] [35,000] [65,000] [100,000] [200,000] [_____ as indicated] rms symmetrical amperes at 480Y/277 Vac
 - c. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors limited to bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be plated [copper] [aluminum]. Bussing rated for 600 and 800 amperes shall be plated copper as standard construction. Bus bar plating shall run the entire length of the bus bar. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
 - d. All current-carrying parts shall be insulated from ground and phase-to-phase by high dielectric strength thermoplastic.
 - e. A solidly bonded [aluminum] [copper] equipment ground bar shall be provided. [An additional [aluminum] [copper] isolated/insulated ground bar shall also be provided.]
 - f. Split solid neutral shall be plated and located in the mains compartment up to 250

- amperes so all incoming neutral cable may be of the same length. [CSA and UL Listed panelboards with 200% rated solid neutral shall be plated [aluminum] [copper] for non-linear load applications. Panelboards shall be marked for non-linear load applications].
- g. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have filler plates covering unused mounting space.
 - h. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, CSA/UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.
 - i. Interiors shall be field convertible for top or bottom incoming feed. Main circuit breakers in 125A interiors shall be [horizontally] [vertically] mounted. Main circuit breakers over 125A shall be vertically mounted. Sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.
 - j. Interior phase bus shall be pre-drilled to accommodate field installable options. (i.e., Sub-Feed Lugs, Sub-Feed Breakers)
 - k. Interiors shall accept 125 ampere breakers in group mounted branch construction.
2. Automatic Load Control Relay Interior
 - a. The interior shall have four separate wire channels to ensure isolation between regular and emergency power.
 - b. Each wire channel shall have neutral and ground terminations to maintain isolation between regular and emergency power feeds.
 - b. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have filler plates covering unused mounting space.
3. Main Circuit Breaker
 - a. Shall be Square D type circuit breakers.
 - b. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.
 - c. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker that allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
 - d. Circuit breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be CSA and UL Listed for reverse connection without restrictive line or load markings.
 - e. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
 - f. Lugs shall be CSA and UL Listed to accept solid or stranded [copper and aluminum conductors] [copper conductors only]. Lugs shall be suitable for [75° C rated wire] [90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16]. Lug body shall be bolted in place; snap-in designs are not acceptable.
 - g. The circuit breakers shall be CSA and UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Ground Fault Shunt Trip, Auxiliary Switch, Alarm Switch, Mechanical Lug Kits, and Compression Lug Kits.
 4. Branch Circuit Breakers
 - a. Shall be Square D type circuit breakers. Circuit breakers shall be CSA and UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard [schedules] [drawings].
 - b. Molded case branch circuit breakers shall have bolt-on type bus connectors.

- c. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
 - d. There shall be two forms of visible trip indication. The circuit breaker handle shall reside in a position between ON and OFF. In addition, there shall be a red VISI-TRIP® indicator appearing in the clear window of the circuit breaker housing.
 - e. The exposed faceplates of all branch circuit breakers shall be flush with one another.
 - f. Lugs shall be UL Listed to accept solid or stranded [copper and aluminum conductors] [copper conductors only]. Lugs shall be suitable for [75° C rated wire] [90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16].
 - g. Breakers shall be CSA and UL Listed for use with the following factory installed accessories: Shunt Trip, Auxiliary Switch, and Alarm Switch.
 - h. Breaker shall be CSA and UL Listed with the following ratings: (15-125A) Heating, Air Conditioning, and Refrigeration (HACR), (15-30A) High Intensity Discharge (HID), (15-20A) Switch Duty (SWD), (15-50A) Equipment Protection Device (EPD) (480Y/277Vac maximum).
5. Automatic Load Control Relay
- a. Shall be Schneider Electric type Automatic Load Control Relay listed as Automatic Load Control Relay under UL 924 code.
 - b. The Automatic Load Control Relay shall be made of UL 94 V-0 rated plastic.
 - c. The Automatic Load Control Relay shall have a visible green LED to identify utility power is active. The LED shall be visible with dead front installed and panel door open
 - d. The Automatic Load Control Relay shall have a visible red LED to identify emergency power is active. The LED shall be visible with dead front installed and panel door open
 - e. The Automatic Load Control Relay shall have a centered test button for emergency power testing. The test button shall be accessible with dead front installed and panel door open
 - f. The Automatic Load Control Relay shall be have an internal timer that keeps the emergency relay contact closed for a least 2.5 seconds when the utility control power switch is opened.
 - g. The Automatic Load Control Relay shall be have screw terminals for landing 10-14 awg wire for emergency, utility, and control power.
 - h. The Automatic Load Control Relay shall have a Short Circuit Current Rating (SCCR) of 65KA @ 120VAC or 18KA @ 277VAC.
6. Enclosures
- a. Type 1 Boxes
 - 1) The circuit panel boxes shall be hot zinc dipped galvanized steel constructed in accordance with UL 50 requirements. Unpainted galvanized steel is not acceptable.
 - 2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
 - 3) Box width shall be [20" wide maximum] [82" high maximum] [8.625" depth].
 - 4) Boxes shall have an isolation barrier between the circuit breaker and Automatic Load Control Relay interior.
 - b. Type 1 Fronts
 - 1) Front shall meet strength and rigidity requirements per UL 50 standards. Shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
 - 2) Front door for breaker access shall be [1-piece with door] [hinged 1-piece with door]. Front door for relay access shall be [1-piece with door] [hinged 1-piece with door]. Mounting shall be [flush] [surface] as indicated on associated [schedules] [drawings].
 - 3) Panelboards rated 250 amperes and below shall have MONO-FLAT fronts with

concealed door hinges and trim screws. Front shall not be removable with the door locked. Panelboards rated above 250 amperes shall have vented fronts with concealed door hinges. Doors on front shall have rounded corners; edges shall be free of burrs.

- 4) Front shall have flat latch type lock with catch and spring loaded stainless steel door pull. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.
- 5) Automatic Load Control Relay and Circuit Breaker box shall have separate doors for accessing each area.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install panelboards in accordance with manufacturer's written instructions, NEMA PB 1.1 and NEC standards.

3.02 FIELD QUALITY CONTROL

- A. Inspect complete installation for physical damage, proper alignment, anchorage, and grounding.
- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 20% of each other. Maintain proper phasing for multi-wire branch circuits.
- C. Check tightness of bolted connections, circuit breaker and automatic load control relay connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

END OF SECTION