

Mar 14, 2013 - 8:16am
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RACEWAYS

1.1 CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1
- B. IMC: ANSI C80.6
- C. EMT and Fittings: ANSI C80.3
 - 1. Fittings: Set–screw or compression type.
- D. FMC: Zinc–coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket, Federal Specification W–C–566C.
- F. Fittings: NEMA FB 1; compatible with conduit and tubing materials.
- G. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC, and Federal Specification W–C–1094A.
 - 1. RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.
- H. LFNC: UL 1660, Federal Specification WW–C–566C, and ANSI/NFPA 79. The conduit, including fittings shall remain flexible to 0 degrees Fahrenheit, or lower.
 - 1. Type B: Provide LFNC with a polyvinyl chloride (PVC) spiral completely surrounded by flexible PVC, suitable for a wet or dry environment. This conduit shall be listed for 600 volt use, outdoor use, and Class I, Div. 2, Class 11, Div. 1, & Class 111, Div. 1 locations. The outer covering shall be resistant to oil products, mild acids, and sunlight.

1.2 WIREWAYS:

- A. Sheet metal sized and shaped as indicated, NEMA 1; Screw–cover type. Include couplings, offsets, elbows, expansion joints, adapters, hold–down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

1.3 INSTALLATION

- A. Outdoors:
 - 1. Exposed: Rigid steel or IMC.
 - 2. Concealed: Rigid steel or IMC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor–Driven Equipment): LFNC, LFMC where greater than 2 inch trade size.
 - 4. Boxes and Enclosures: NEMA 250, Type 3R or 4.
- B. Outdoors, Underground:
 - 1. Single Run, Non–traffic Area: RNC.
 - 2. Grouped, Non–traffic Area: RNC.
 - 3. Single Run, Traffic Area, at shallow depth or within 5 feet of structures: Concrete encased RNC or RSC.
 - 4. Grouped, Traffic Area, at shallow depth or within 5 feet of structures: Concrete encased RNC or RSC.
 - 5. Provide RSC elbows, only.
- C. Indoors:
 - 1. Exposed: EMT.
 - 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor–Driven Equipment): FMC; except use LFNC, LFMC where greater than 2 inch trade size, in damp or wet locations.
 - 3. Damp or Wet Locations: Rigid steel conduit.
 - 4. Boxes and Enclosures: NEMA 250, Type 1.
- D. Minimum Raceway Size: ½–inch trade size.
- E. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
- F. Install exposed raceways, and raceways within accessible spaces, parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

- G. Join raceways with fittings designed and approved for that purpose and make joints tight.

- 1. Use insulating bushings to protect conductors.

- H. Tighten set screws of threadless fittings with suitable tools.

- I. Terminations:

- 1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
 - 2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200–lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

BOXES, ENCLOSURES, AND CABINETS


- 1.1 Cast–Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.
- 1.2 Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- 1.3 Cast–Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- 1.4 Hinged–Cover Enclosures: NEMA 250, Type 3R, with continuous hinge cover.

- A. Metal Enclosures: Steel, finished inside and out with manufacturer’s standard enamel.

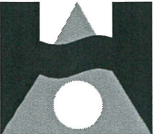
SWITCHBOARD

1.1 MANUFACTURED UNIT

- A. Switchboard shall be Front–connected, Front–Accessible with individually fixed main devices, utility metering, and ATS. Brace for 10,000 symmetrical RMS amperes, unless otherwise noted.
- B. The enclosure shall be NEMA 3R rated with a drip shield over the doors. Factory finish with the manufacturer’s standard color. Treat the underside with corrosion–resistant coating.
- C. Provide barriers between adjacent switchboard sections.
- D. Provide insulation on main and vertical buses.
- E. Provide space heaters with thermostatic control inside the enclosure. Power from an internal source with circuit protection and stepdown transformer as required.
- F. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, for indicated metering, and current transformers. Current transformer secondary wiring shall be terminated on shorting–type terminal blocks.
- G. Buses and Connections: Three phase, four wire.
 - 1. Phase– and Neutral–Bus Material: Tin–plated, high–strength, electrical–grade aluminum alloy with tin–plated aluminum circuit–breaker line connections.
 - 2. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors.
 - 3. Ground Bus: Minimum–size required by UL 891, hard–drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder–circuit ground conductors.
 - 4. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard’s main and distribution sections.
 - 5. Neutral Buses: 50 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables.
- H. Bus–Bar Insulation: Factory–applied, flame–retardant, tape wrapping of individual bus bars or flame–retardant, spray–applied insulation. Minimum insulation temperature rating of 105 deg C.



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CITY AND BOROUGH OF JUNEAU

CENTENNIAL HALL GENERATOR

JUNEAU, ALASKA

SPECIFICATION

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REVISION	DESCRIPTION	DATE

SHEET NUMBER

E904

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SWITCHBOARD (CONTINUED)

1.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded–Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents:
- Thermal–Magnetic Circuit Breakers: Inverse time–current element for low–level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit–breaker frame sizes 250 A and larger.
 - Adjustable Instantaneous–Trip Circuit Breakers: Magnetic trip element with front–mounted, field–adjustable trip setting.
 - Electronic trip circuit breakers with rms sensing; field–replaceable rating plug or field–replicable electronic trip; and the following field–adjustable settings.
 - Instantaneous trip.
 - Long– and short–time pickup levels.
 - Long– and short–time time adjustments.
 - Ground–fault pickup level, time delay, and I2t response.
 - Features and accessories:
 - Standard frame sizes, trip ratings, and number of poles.
 - Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
 - Ground–Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time–delay settings, push–to–test feature, and ground–fault indicator.

1.3 INSTALLATION

- A. Install switchboards and accessories according to NECA 400.
- B. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- C. Set field–adjustable circuit–breaker trip ranges as indicated.
- B. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner:
- Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - Record of Infrared Scanning: Prepare a report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

AUTOMATIC TRANSFER SWITCH

1.1 GENERAL REQUIREMENTS

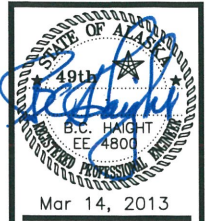
- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Tested Fault–Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
- C. Solid–State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage–surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage–impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric–motor–operated mechanism, mechanically and electrically interlocked in both directions.
- F. Switch Characteristics: Designed for continuous–duty repetitive transfer of full–rated current between active power sources.
- Switch Action: Double throw; mechanically held in both directions.
 - Contacts: Silver composition or silver alloy for load–current switching. Conventional automatic transfer–switch units, rated 225 A and higher, shall have separate arcing contacts.
- G. Neutral Terminal: Solid and fully rated, unless otherwise indicated.


1.2 MANUFACTURER’S UNIT

- A. Switching Arrangement: Double–throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
- B. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time–controlled pause at midpoint during transfer. Pause is adjustable from 0.5 to 30 seconds minimum and factory set for 0.5 second, unless otherwise indicated. Time delay occurs for both transfer directions. Pause is disabled unless both sources are live.
- C. Features:
- Undervoltage Sensing for Each Phase of Normal Source: Sense low phase–to–ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 - Adjustable Time Delay: For override of normal–source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
 - Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 - Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
 - Test Switch: Simulate normal–source failure.
 - Switch–Position Pilot Lights: Indicate source to which load is connected.
 - Source–Available Indicating Lights: Supervise sources via transfer–switch normal– and emergency–source sensing circuits.
 - Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
 - Unassigned Auxiliary Contacts: Two normally open, single–pole, double–throw contacts for each switch position, rated 10 A at 240–V ac.
 - Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 - Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32–V dc minimum.

1.3 INSTALLATION

- A. Set field–adjustable intervals and delays, relays.
- C. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner:
- Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
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