

CENTERLINE[®] Motor Control Centers

1.0 General

The motor control center shall be constructed to meet or exceed the requirements within NEMA ICS-18, UL845, CSA, C22.2 No. 14 and EN 60439-1 for motor control centers. The motor control center shall be designed, manufactured, and tested in facilities registered to ISO9001 quality standards.

The motor control center enclosure shall be NEMA (*Type 1 [IP40], Type 1 w/gasket [IP40], Type 12 [IP54], Type 3R non walk in [IP44], NEMA Type 4 [IP65]*). Gasketing shall be closed cell neoprene material. Open cell gasketing shall not be acceptable.

(Interwiring, No Interwiring) shall be provided between units.

The motor control center shall be rated for a (V / 3-phase / Hz) system with an available fault current of (kA). Provisions for terminating a neutral wire at the MCC (*need to, need not*) be provided.

2.0 Vertical Sections

Each vertical section shall be approximately (*90" [2286mm], 71" [1791mm]*) high and (*15" [381mm], 20" [508mm]*) deep. Vertical sections shall have internal base mounting angles at the bottom and external lifting angles at the top running continuous within each shipping block. Lifting eyelets at the top are not acceptable.

To minimize the chance of fault propagation to adjacent sections, each vertical section shall have side sheets extending the full height and depth of the section.

3.0 Incoming Line Compartments

(Incoming line lug compartment, Main circuit breaker, Main fusible disconnect) shall be (*top, bottom*) entry. The size and quantity of incoming cables shall be shown on the drawings.

4.0 Wireways

Horizontal wireways of standard sections, both top and bottom, shall be not less than 6" (150mm) high. To prevent damage to cable insulation, the wireway opening between sections shall have rounded corners and the edges shall be rolled back.

4.0 Wireways - continued

A full height vertical wireway door being *(4.37" [111mm] or 9.37" [238mm])* wide and hinged shall be provided in each standard vertical section. A permanent vertical wireway wall shall separate the units from the vertical wireway, and remain intact even when the units are removed. If a permanent wireway wall cannot be provided tie bars shall be included in each vertical wireway.

5.0 Power Bus Bars

The power bus system shall be supported, braced, and isolated by a bus support molded of a high strength, non-tracking glass-filled polyester material. Bus bracing shall be rated to withstand the fault current listed in Section 1.0 of this specification, but shall not be rated less than *(42kA, 65 kA)* rms. symmetrical.

The horizontal bus shall be continuously braced within each section. It shall be *(copper, aluminum)* with *(tin, silver)* plating and rated *(600A, 800A, 1200A, 1600A, 2000A, 2500A, 3000A)*.

To ensure the reliability of the splice connections, both ends of the horizontal bus splices shall have at least two (2) bolts (up to 1200A) or four (4) bolts (1600A and above).

The vertical bus shall be continuously braced and sandwiched in a glass-filled polyester molding. The bus shall be isolated from the user by a red non-metallic molded cover. The vertical bus shall be copper with the same plating as the horizontal bus, and shall accommodate plug-in loads totaling up to *(600A, 1200A)*.

Back-to-back sections shall be supplied with separate vertical bus in both the front and rear sections, providing the same phase order in all units.

6.0 Ground Bus Bars

The horizontal bus shall be connected to the vertical bus with two (2) bolts, and each bolt shall be capable of handling the load.

The horizontal ground bus bar shall be *(unplated, tin-plated)* copper and located in the *(bottom, top, bottom and top)* horizontal wireway. The size of the horizontal ground bus shall be *(1/4" x 1" [6.4x25.4mm], 1/4" x 2" [6.4x50.8mm])*. A mechanical screw-type ground lug shall be mounted on the ground bus in the incoming line section.

A grounding stab shall be provided on each plug-in unit, such that the stab engages onto a *(steel, copper)* vertical ground bus prior to the power stabs engaging.

A grounding point shall be provided at each starter unit for purposes of landing the ground wire coming from the motor. This grounding point shall be directly tied to the horizontal ground bus.

7.0 Isolation and Insulation

Shutters shall automatically open when a unit is inserted and automatically close when a unit is removed, so personnel are not exposed to live vertical bus bars and so the bus is isolated from arcing faults.

8.0 Units

8.1 Unit Mounting

After insertion, each plug-in unit shall be held in place by a latch that is located at the front of the unit.

Plug-in stabs shall be mounted in a polyester molding at the rear of the unit. Wiring from the unit disconnecting means to the plug-in stabs shall be routed into this molding such that the wiring is not exposed at the rear of the unit.

Non-reversing starters (FVNR) shall be plug-in units through NEMA Size 5 and 304A for IEC.

The unit door shall be fastened to the stationary structure (not the unit itself), so that the door can be closed when the unit has been removed. The door shall be hinged on the left-hand side so it opens away from the vertical wireway.

8.2 Disconnecting Means

The operator handle of all units shall be interlocked with the MCC frame, so that a unit insert can not be withdrawn or inserted when the operator is in the ON position.

Circuit breaker type starter units shall have a short circuit rating greater than the available fault current listed in Section 1.0, and shall be motor circuit protectors (MCP) with only magnetic trip. Feeder breakers shall be molded case breakers with thermal magnetic or electronic trip and have short circuit rating greater than the available fault current listed in section 1.0.

-OR-

Fusible disconnect type starter units and feeder units shall have class *J, CC, R, H, HRCII-C* fuse clips.

8.3 Starters

Starters shall be of NEMA, not IEC design. That is, starters shall have molded coils, replaceable contacts, and a metal mounting plate. Starters shall have provisions for accepting up to seven (7) auxiliary contacts and one (1) overload alarm contact. Starter units shall be supplied with 3-pole manual reset overload relays (eutectic alloy or solid state), providing Class 20 operation. For eutectic alloy overload relays, heater elements (*shall, shall not*) be provided. Each starter shall be mounted in a unit insert at least (*13", 6-1/2"*) high by 14" wide. All starters shall be Size 1 or larger and no intermediate sizes (such as 1-3/4) will be acceptable.

-OR-

Starters shall be IEC design and shall be supplied with a Class 10 overload relay.

8.0 Units – continued

8.4 Terminal Blocks

To minimize exposure to live terminals, terminal blocks shall be mounted within the unit and located near the front for accessibility. They shall not be located at the rear of the vertical wireway. Power terminal blocks (*shall, shall not*) be provided. On non-plug-in (frame mounted) units, terminal blocks need not be pull-apart style. On plug-in units, control terminal blocks shall be pull-apart style.

8.5 Control Station

Pilot devices shall be of (*NEMA, IEC*) design.

8.6 Documentation

Wiring diagrams shall be provided (*inside each unit, at a centralized location in the MCC*). The diagram shall show the exact devices inside the unit and shall not be a generic diagram. The manufacturer's unit wiring diagrams, elevation drawings, and floor plan shall be available for review prior to placement of the order.

9.0 Finish

Surfaces shall be painted according to the manufacturer's standard color scheme. All unpainted parts shall be plated for resistance to corrosion.

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