

SECTION 262419 – MOTOR STARTERS AND MOTOR CONTROL CENTERS

- 1.0 The Motor Starters and Motor Control Centers (MCC) shall be designed, manufactured and installed in accordance with the applicable sections of NFPA 70, NEMA ICS 2, UL 845, UL 508, and applicable ANSI Standards. MCCs shall utilize Class1, Type B wiring. MCCs shall have automatically actuated vertical bus safety shutters shall be provided for all plug-in unit locations. Specifications shall require the installer to provide shop drawings and as-built drawings showing all unit locations, ratings, power and control wiring and control devices.
- 2.0 The design professional is responsible for assessing the need for Motor Control Centers vs the use of separately mounted motor starters. Where four (4) or more single speed motors are grouped together, a Motor Control Center shall be utilized. In general, VFD applications shall utilize separately mounted VFDs for each motor. The use of MCC mounted VFDs shall require approval from the University Engineering Department.
- 3.0 The Motor Control Center shall have continuous current ratings suitable for the connected load plus thirty (30) percent spare capacity and thirty (30) percent space to accommodate future starter units. All vertical buses shall be rated 600 amperes, minimum.
- 4.0 The motor control centers and motor controllers shall be located adjacent to the loads served. The MCC enclosure shall be suitable for the environment. For indoor climate controlled locations, provide NEMA 2 drip-proof enclosures with top mounted drip hood. Placement of motor control centers in outdoor or indoor wet locations shall be permitted only when specifically allowed by the University Engineering Department. In situations where there is a need for a motor controller in outdoor or indoor wet locations, the preference is to use a separately enclosed controller with NEMA 4X enclosure.
- 5.0 The main bus shall be silver-plated copper; copper ground bus shall be installed to the full length of the MCC. Low voltage motor control centers shall be 480V, 3 phase, 3 wire, unless permitted otherwise by the University Engineering Department. Medium voltage motor control centers and motor starter units shall be 4160V, 3 phase, 3 wire.
- 6.0 The MCC or motor controller shall have an integrated equipment short circuit rating that exceeds the available fault current, including motor contributions. Series rated main and branch breaker combinations are not permitted. Fusible main and branch circuit devices shall not be used on low voltage MCC's.
- 7.0 All 480 volt MCC starter units shall be of the NEMA rated drawout type. All MCC mounted or separately enclosed starter units shall be combination type with motor circuit protector (MCP), minimum size shall be NEMA 1. IEC rated devices are not acceptable. Professional shall review the starter type and the affect motor starting will have on the distribution system voltage drop. Utilize solid state reduced voltage starters where the in-rush current/voltage drop is excessive. Starter units shall include all features required to perform required functions (i.e. unit mounted CPT, short circuit protection, overload protection). Starter units shall include pushbuttons, lights, and 2NO and 2NC spare auxiliary contacts. MCC Starter units shall include a safety interlock that prevents unit withdrawal unless the contactor is open.
- 8.0 Medium voltage (4160V) starters shall be across-the-line or reduced voltage auto-transformer or reactor type utilizing fused vacuum contactors. The choice of starting method shall be validated by a load flow/voltage drop analysis that takes motor starting characteristics, system operating requirements and allowable voltage disturbance limits into account. Multi-function motor protective relays shall be Schweitzer Engineering Laboratories SEL-710 series.
- 9.0 All motor control centers and motor starter units shall include 30 mm oil tight LED indicating lights for motor running (red) and motor not running (green). Provide local Hand-Off-Auto selector switch

- located on each compartment or enclosure door. Provide 2 NO and 2 NC spare auxiliary contacts for the main contractor, and for each overload or protective relay. Provide terminal points for external wiring connections to spare auxiliary contacts, external Auto, Run and Stop permissive contacts, etc.
- 10.0 Ground MCC ground bus to power supply source ground bus via a feeder equipment ground conductor. Raceway shall not be used as the ground conductor.
 - 11.0 Provide bus stabs at all unused spaces that are intended for future additions to line-up. Spaces shall include buses, safety shutters, rails, and terminal blocks.
 - 12.0 Provide nameplates for the overall MCC, all starters, spares and spaces.
 - 13.0 Mount MCCs on 4-inch high concrete housekeeping pads. Housekeeping pads shall extend in front of the MCC for the distance required to facilitate use of the lifting device for removal and installation of starter units. Provide leveling channels or rails as required by the MCC manufacturer.
 - 14.0 Fishtape barriers shall be provided in MCCs to prevent rising of bottom-entering fishtapes into wireway.
 - 15.0 Control circuits shall be 120Vac, minimum 150VA, obtained from integral control power transformer of sufficient capacity to operate connected pilot, indicating and control devices, plus 100VA spare capacity.
 - 16.0 Overload relays shall be ambient-compensated type (bi-metallic) with inverse time characteristics and Class 20 tripping characteristics.
 - 17.0 For variable frequency drives, refer to Section 262923.