



Division 262913

Enclosed Motor Controllers

DESIGN GUIDE

1 General

1.1 Introduction

- A. This section applies to the following:
 - 1. Manual motor starters
 - 2. Automatic motor starters
 - 3. Combination motor controllers and disconnects

2 Materials

2.1 Manual Motor Starters

- A. Description: Manual motor starters shall be enclosed, general-purpose, Class A, manually operated, full-voltage controllers with toggle handles. Each manual motor starter shall include properly sized overload elements and a pilot run light.
- B. Enclosures: Enclosures shall be NEMA rated to suit the installation location.

2.2 Automatic Motor Controllers

- A. Description: Automatic motor controllers shall be enclosed general-purpose, Class A motor starters, sized for the application. Provide



control station and pilot lights in cover. Automatic controllers shall include the following features:

1. Overload protection in each ungrounded conductor with a common reset button.
 2. A fused control voltage transformer with primary and secondary fuses.
 3. An adjustable 0 to 30 second time delay relay.
 4. Pilot lights
 5. HOA Selector Switch for Hand/Off/Auto operation.
 6. Auxiliary contacts
 7. Additional spare normally-open and normally-closed auxiliary contacts, not less than two (2) per starter (one of each type).
- B. Enclosures: Enclosures shall be NEMA rated to suit the installation location.

2.3 Variable Frequency Drives

- A. When VFD equipment is provided for control of equipment, the VFD shall be provided by Division 23 and installed by Division 26.

2.4 Disconnects

- A. Combination Controllers: Where possible, combine motor controllers with fusible switch disconnect or motor circuit protector in a common enclosure.
- B. Fusible Switches: Fusible switches shall be quick-make quick-break, load-interrupter knife switches with externally operable handles.
- C. Motor circuit protectors shall be molded-case circuit breakers.



3 Execution

3.1 Installation

- A. Install motor controllers plumb. Anchor to structure.
- B. Motor controllers shall generally be located adjacent to equipment to be controlled.
- C. Where possible, mount controller such that the highest part requiring manual operation is no more than 54 inches above the floor.
- D. Connect time delay relays.
- E. Select and install overload elements in motor controllers to match installed motor characteristics.
- F. Neatly arrange and support conductors in enclosure.
- G. Install fuses.
- H. Motor data: Provide a typed directory card inside the front cover of each motor controller identifying the motor served, together with its nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.
- I. Label equipment per equipment identification standards.

3.2 Adjustment and Testing

- A. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Check tightness of bolted connections and connections using calibrated torque wrench or torque screwdriver per manufacturer's instructions. Record date and torque values and include in O&M manuals.
- B. Set time delay relays to stagger start the motors. Time delays for motors connected to emergency power shall be adjusted in accordance with starting sequence indicated for the emergency power system.



4 Appendix

4.1 Reserved for future.