

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 29 01 - Contactors.

1.2 REFERENCES

- .1 NEMA ICS 2, Industrial Control and Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Provide shop drawings for each type of starter to indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout and components.
 - .4 Enclosure types.
 - .5 Wiring diagram.
 - .6 Interconnection diagrams.
 - .7 Certifications and approvals.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Submit operation and maintenance data for each type and style of motor starter for incorporation into maintenance manual.
 - .3 Extra Materials:
 - .1 Provide listed spare parts for each different size and type of starter.
 - .1 3 contacts, stationary.
 - .2 3 contacts, movable.
 - .3 1 contacts, auxiliary.
 - .4 1 control transformers.
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- .5 1 operating coil.
- .6 2 fuses.
- .7 10% indicating lamp bulbs used.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return of packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 LEED 2009 REQUIREMENTS

- .1 LEED Documentation:
 - .1 Submit Material Safety Data Sheets (MSDS) or product data sheets, for all site applied interior paints, coatings, adhesives, sealants, sealant primers, concrete curing compounds, etc. to ensure compliance with LEED Requirements for low emitting materials as per Section 01 35 21.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Starters: to NEMA ICS 2. Full size starters (half size are not acceptable).

2.2 MANUAL MOTOR STARTERS

- .1 Single phase manual motor starters of size, type and rating, as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One and two overload heaters, manual reset, trip indicating handle.
 - .3 Enclosure to provide a degree of environmental protection equal to or higher than CSA Type 1 for indoor and 4X for outdoor.
 - .2 Accessories:
 - .1 Toggle switch: heavy duty oil tight labelled as indicated.
 - .2 Indicating light: heavy duty oil tight type and colour as indicated.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.
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2.3 FULL VOLTAGE MAGNETIC STARTERS

- .1 Magnetic and combination magnetic starters of size, type, rating and enclosure type as indicated with components as follows:
 - .1 Contactor solenoid operated, rapid action type. Pick-up voltage minimum 75% of nominal, drop-out voltage less than 70% of nominal.
 - .2 Motor overload protective device in each phase, manually reset from outside enclosure.
 - .3 Wiring and schematic diagram inside starter enclosure in visible location.
 - .4 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.
- .2 Combination type starters to include motor circuit interrupter with operating lever on outside of enclosure to control motor circuit interrupter, and provision for:
 - .1 Locking in "OFF" position with up to 3 padlocks.
 - .2 Independent locking of enclosure door.
 - .3 Provision for preventing switching to "ON" position while enclosure door open.
 - .4 Enclosure to provide a degree of environmental protection equal to or higher than CSA Type 1 for indoor and 4X for outdoor.
- .3 Accessories:
 - .1 Pushbuttons and selector switches: heavy duty oil tight labelled as indicated.
 - .2 Indicating lights: heavy duty oil tight type and color as indicated.
 - .3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.
 - .4 AC current sensor:
 - .1 Ranges:
 - .1 0-5 VDC.
 - .2 LOW: 1 to 10A.
 - .3 MID: 5 to 50A.
 - .4 HIGH: 20 to 200A.
 - .2 Accuracy: +/- 2% of full scale.
 - .3 Repeatability: within +/- 2% of full scale over time, temperature and unit to unit.
 - .4 Loading error: 0.25% error when loaded with 1 megohm (0.025%) with 10 megohms, etc.).
 - .5 Frequency: 60 Hz.
 - .6 Operating Temperature: -30°C to +70°C.
 - .7 Case: CYCOLAC (ABS) meets UL flammability rating 94V-O.
 - .8 Response time: 100 ms (10% to 90%).
 - .9 Ripple: Less than 10 mV.

2.4 CONTROL TRANSFORMER

- .1 Single phase, dry type, control transformer with primary voltage as indicated and 120 V secondary, complete with primary and secondary fuses, installed in with starter as indicated.
- .2 Size control transformer for control circuit load plus 20% spare capacity.

2.5 ACCESSORIES

- .1 Pushbutton: heavy duty, oil tight as required.
- .2 Selector switches: heavy duty, oil tight as required.
- .3 Indicating lights: heavy duty, oil tight, type and colour as indicated.

2.6 FINISHES

- .1 Apply finishes to enclosure in accordance with Section 26 05 00 - Common Work Results for Electrical.

2.7 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Manual starter designation label, white plate, black letters, size 1, engraved as indicated.
- .3 Magnetic starter designation label, white plate, black letters, size 1 engraved as indicated.

2.8 WARNING SIGNS

- .1 Provide warning signs (where applicable) in accordance with Section 26 05 00 - Common Work Results - For Electrical.

2.9 LEED 2009 REQUIREMENTS

- .1 All site applied interior paints, coatings, adhesives, sealants, sealant primers, concrete curing compounds, etc. to comply with LEED Requirements for low emitting materials as per Section 01 35 21 - LEED 2009 Requirements.
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PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install starters and control devices in accordance with manufacturer's instructions.
- .2 Install and wire starters and controls as indicated.
- .3 Ensure correct fuses installed.
- .4 Confirm motor nameplate and adjust overload device to suit.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and manufacturer's instructions.
- .2 Operate switches and contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

3.3 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.