

Electric Motors General Wiring Instructions

DANGER

Electrical Equipment Installation, Service and Maintenance

Persons performing installation, service or maintenance activities on, near, or with equipment that is electrically powered are exposed to electrical hazards that could result in serious injury or death if proper precautions are not followed. Before performing such work, disconnect the electrical power source for the system at the disconnect device and lock it out, following appropriate Lockout/Tagout (LOTO) procedures, to prevent electric power from being applied while work is being performed.

All persons must use safe work practices appropriate to the electrical system, and follow all workplace procedures and policies. This requires specific knowledge, equipment and training beyond the scope of this document. Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following appropriate safety practices.

These instructions are general procedures for wiring of electric motors as typically used on TC/American Crane equipment. These may be C-face motors purchased individually and mounted on TC/American gearbox assemblies such as motorized trolleys, or on vendor supplied gearboxes. Other motors may be part of a motor and gearbox assembly purchased from various vendors. Some products may be designed to use foot-mounted motors

Motors on TC/American Crane equipment ordered with controls are shipped with the motor (and brake, if so equipped) fully wired.

However, some equipment is shipped “less controls.” The purpose of these instructions is to assist service technicians in making electrical connections to motors, and motors with brakes. The wiring diagrams shown in these instructions are “typical” and must be verified against actual motor and brake wiring instructions. Always refer to the motor data plate, the brake nameplate, and any vendor information provided.

These instructions are not to be used for electrical controls design, fabrication or assembly. Knowledgeable and experienced electrical engineers and electrical technicians must be employed for these purposes.

Notes:

- for wiring a motor without brake, disregard the brake details on the wiring diagrams
- if replacing an existing motor on TC/A equipment, verify that new motor is similar to the old
- if replacing a motor less brake with a motor with brake, add components and wiring as shown on the diagrams
- motors on dual motor cranes should generally be replaced in pairs (keep motor specifications the same on both motors)

Figure 1: typical C-face motor with brake

Figure 2: typical C-face motor less brake

Note the relation of the motor junction box to the “C-face hole pattern.” These standard motors may be mounted to a gearbox with the junction box in any position, at 90 degree increments. Consider the junction box location for clearance to equipment and efficient routing of wiring.

For mounting C-Face motors on TC/American Crane motorized trolleys, see *Motorized Trolleys Installation Instructions, Trolley Adapters for C-Face Motors.*

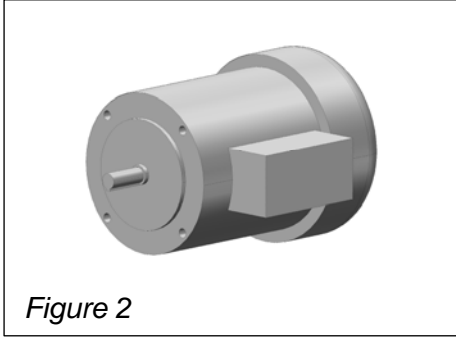
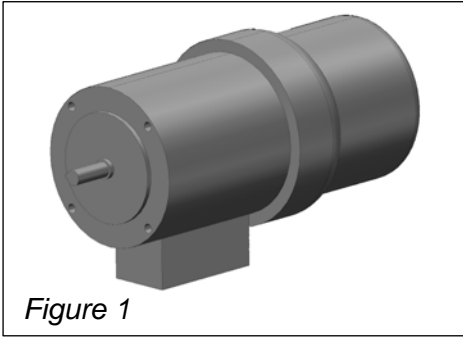


Figure 3: typical wiring diagram for a single motor with a brake, with a soft-start acceleration control unit used in the controls (as on a center motor drive crane, a drivetractor or a single motorized trolley). See the drawing legend on Page 4.

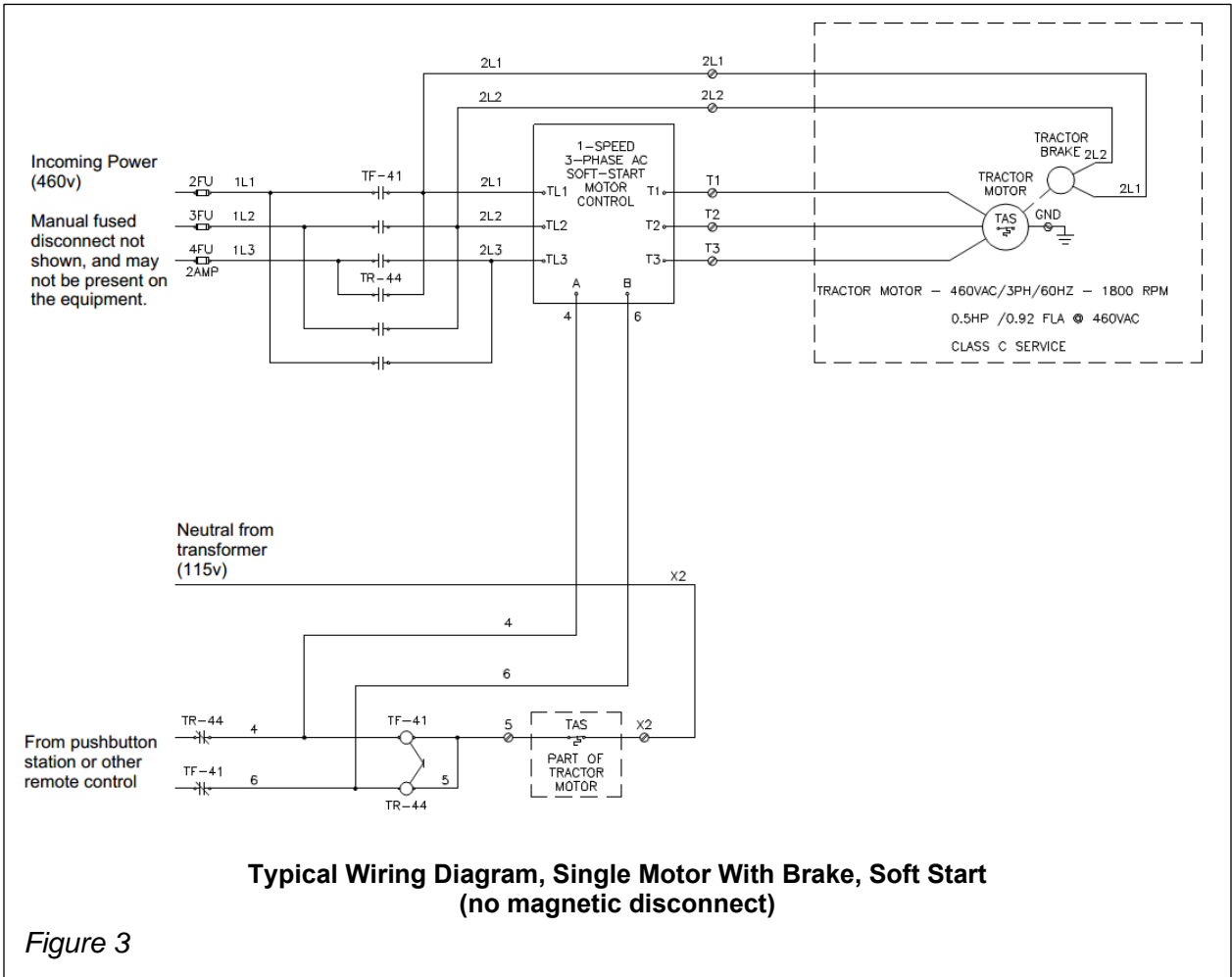


Figure 4: typical wiring diagram for a single motor with a brake, with variable frequency control drive unit (VFD) used in the controls (as on a center motor drive crane, drivetractor or a single motorized trolley). See the drawing legend on Page 4.

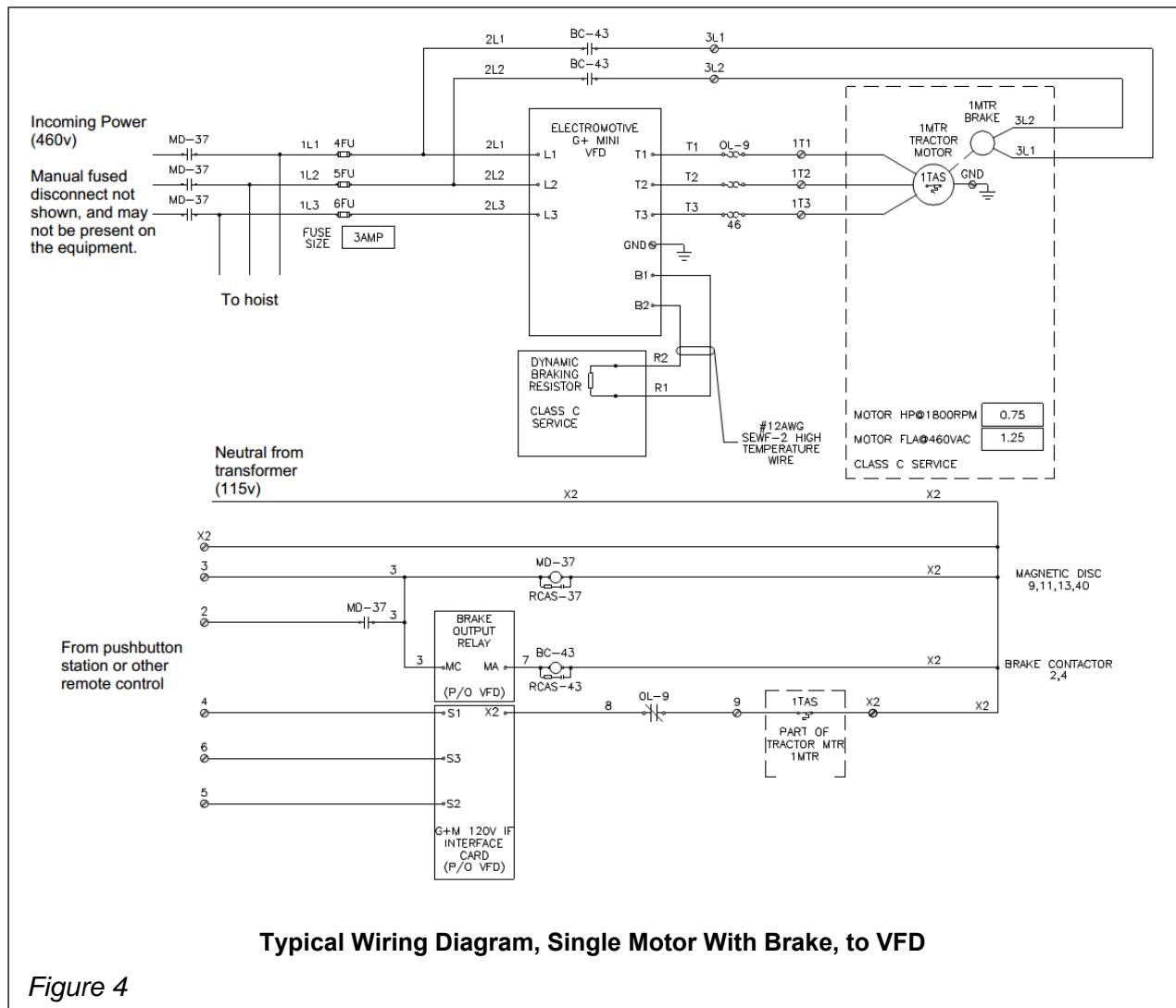


Figure 4

NOTE: There are many details beyond the mere process of connecting a motor to a power source that this instruction sheet cannot cover. Consult a qualified electrical engineer or electrical technician for the following and more:

- proper wire size (gage)
- conduit type (EMT/rigid/flexible)
- conduit size (depends upon number and size of conductors)
- proper conduit connections and grounding (customer may have requirements)
- proper circuit protection
- proper markings
- proper wire terminations
- assure that design and workmanship conform to National Electric Code (NEC) or other regulatory standards or codes.

Figure 5: typical wiring diagram for two motors with brakes, with variable frequency control drive unit (VFD) used in the controls (as on a dual motor crane). See the drawing legend below.

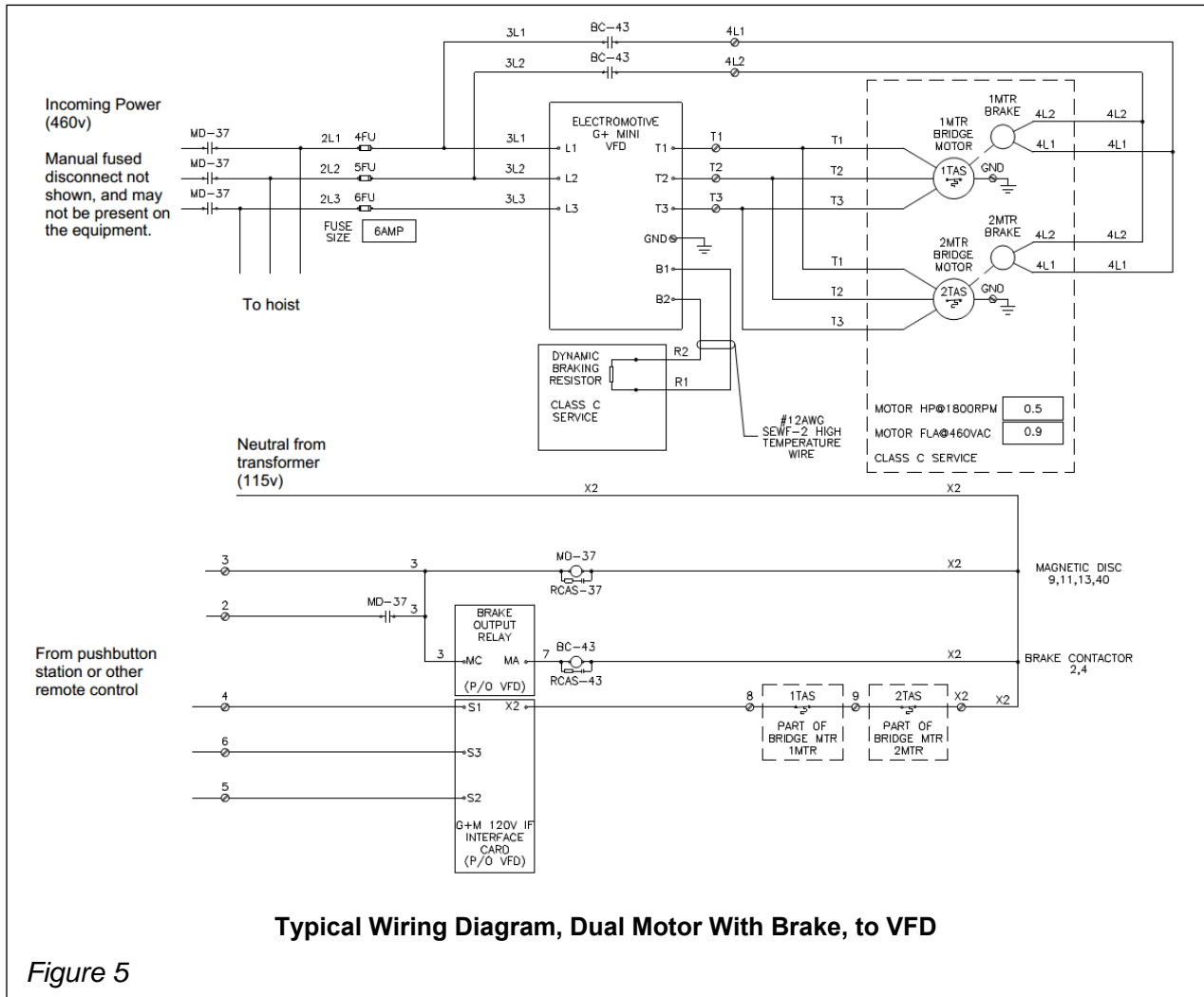


Figure 5

Drawing Legend:

- | | | | | | |
|------------|---|----------------------------|---------------|---|--|
| TF | = | Contactor, Tractor Forward | GND | = | Ground |
| TR | = | Contactor, Tractor Reverse | DBR | = | Dynamic Braking Resistor |
| TAS | = | Thermally Activated Switch | R1, R2 | = | Terminals for Connection of DBR to VFD |
| MD | = | Magnetic Disconnect | B1, B2 | = | Terminals for Connection of VFD to DBR |
| FU | = | Fuse | RCAS | = | Surge Suppressor |
| L1, L2, L3 | = | Incoming Power | | | |
| X2 | = | Neutral Wire | | | |
| VFD | = | Variable Frequency Drive | Numbering: | | |
| BC | = | Brake Contactor | 4, 5, 6, etc. | = | arbitrary wire and terminal markings |
| T1, T2, T3 | = | Motor Leads | | | |

Figure 8: typical motor wire lead connection information.

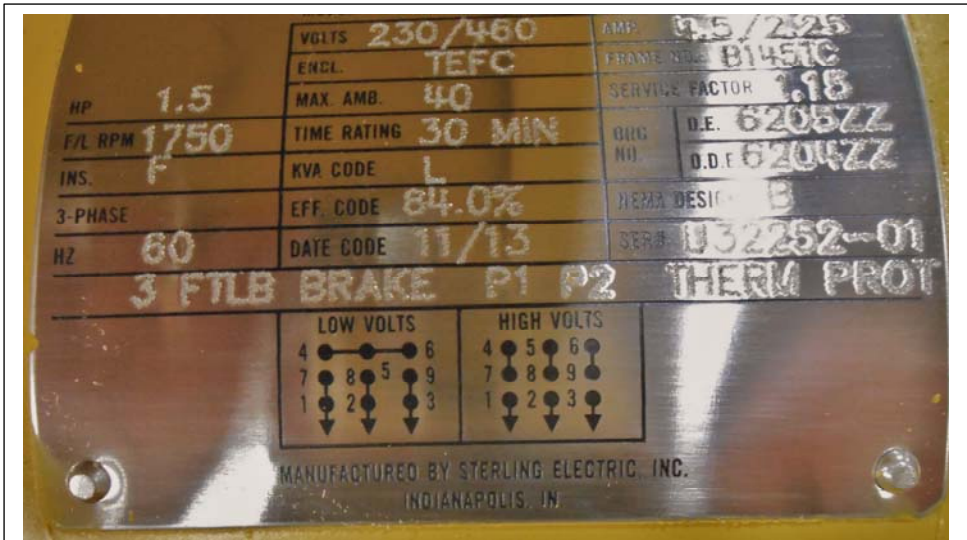
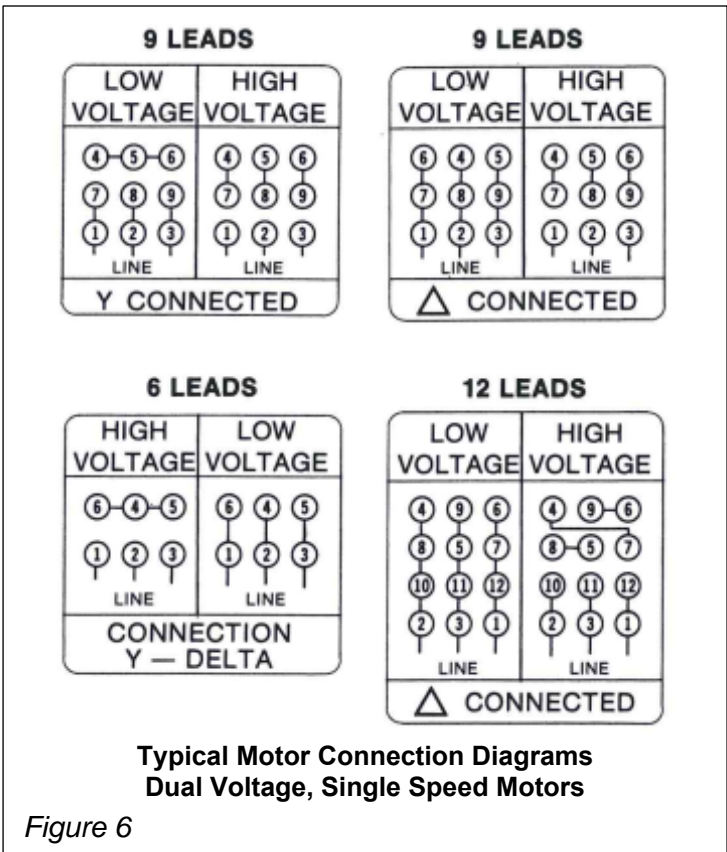
Always refer to the motor data plate of the motor being used for appropriate connections.

Verify building power for “low” or “high” voltage (i.e., as in 230/460 volts).

See Figures 7 and 8 for typical motor data plates. Note the “low” and “high” voltage connection diagrams, as well as other motor information.

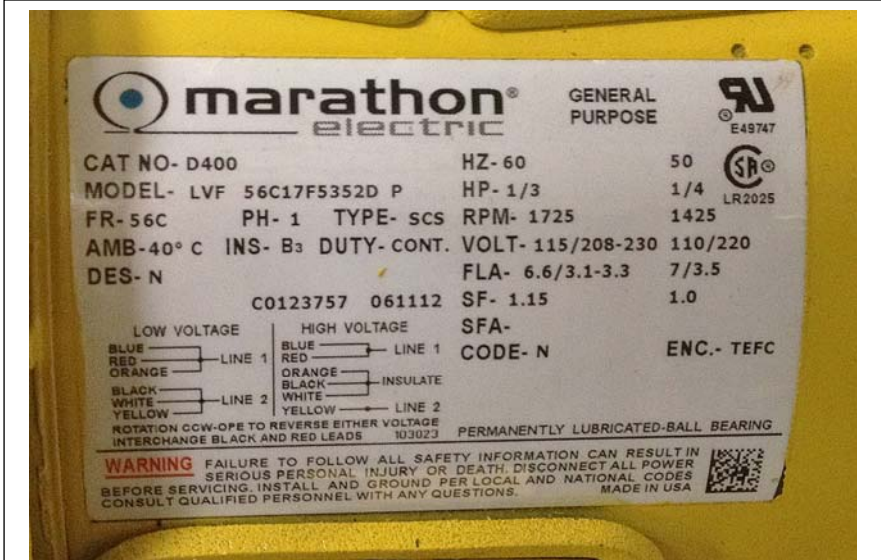
See Figure 9 for typical rigid and flexible conduit routing for a motorized crane trolley, motor with brake, and connection of motor leads. Also see Figure 10.

Motor Rotation Note: to reverse the rotation on 3-phase motors, interchange any two incoming line leads.



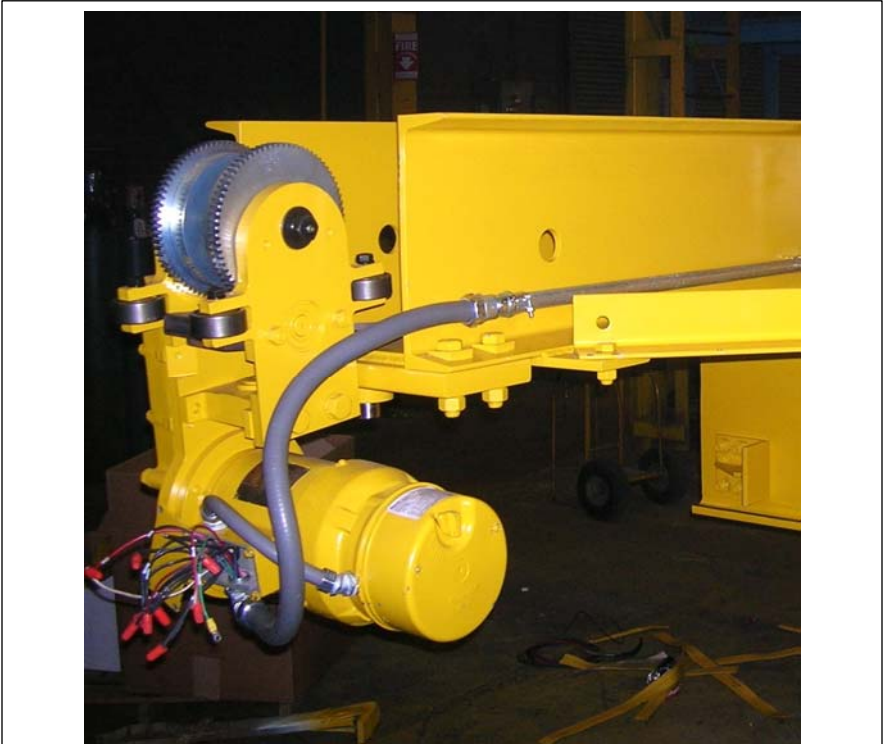
Typical Motor Data Plate with Wire Connection Diagrams (3-phase, 230/460 volts)

Figure 7



Typical Motor Data Plate with Wire Connection Diagrams (single phase, 115v)

Figure 8



Typical Conduit Routing and Motor Wiring Motor with Brake, Motorized Crane Trolley

Figure 9

Figure 10: Typical configuration and routing of flexible conduit for power to motor, and for brake leads to motor. Example shown is for a motorized interlock.



**Typical Conduit Routing
Motor with Brake, Motorized Interlock**

Figure 10

Figure 11: typical nameplate and wire connection information for a motor brake.

Confirm actual connection information on nameplate of brake being used.

Note: coils used in brakes may be “single voltage” or “dual voltage.” Verify voltage rating per the tag on the coil.



Typical Brake Nameplate

Figure 11