Power Precision

**Electrical Equipment Maintenance Frequencies - Based on CSA Z463-18 Guideline on Maintenance of Electrical Systems**

**Table M.10**

**Motor Control Centres (MCCs)**

**Legend:**
x = a test or inspection should be performed
y = factory testing should be performed
- = factory testing not required
n/s = not specified; testing frequency is at the discretion of user
n/a = not applicable
a/n = as needed

| | Type of equipment — Tests to be performed | | | | Maintenance priority level, months | | |
|---|---|---|---|---|---|---|---|
| **Maintenance activities** | Low voltage motor starters | Medium voltage motor starters | Low Voltage MCCs | Medium voltage MCCs | Minimal Frequency | Good electrical practice | Optimized program for critical or severe-duty applications |
| Verify that the environment is clean, dry, and non-corrosive | | | X | X | 12 | 3 | 1 |
| Verify that ventilation passes are unobstructed | | X | | X | 12 | 3 | 1 |
| Verify that equipment labels are present and legible | X | X | X | X | 12 | 3 | 1 |
| Verify that all door latches are engaged, and that doors are closed | X | X | X | X | 12 | 3 | 1 |
| Tighten all connections | X | X | | | 36 | 24 | 12 |
| Tighten all current transformer (CT) connections | X | X | | | 36 | 24 | 12 |
| Ensure that all control and indicating devices are operational and clearly labelled | X | X | X | X | 12 | 12 | 12 |
| Exercise all breakers | X | X | X | X | 12 | 12 | 12 |
| Exercise door-mounted start/stop buttons with power off | X | X | | | 60 | 36 | 12 |
| Check for any unsealed openings (rodent entry points) | | X | | X | 24 | 24 | 24 |
| Relamp the indicating lights | X | X | | | 12 | 12 | 12 |
| Verify that the fuse type and maximum size appear on the starter or switch door | X | X | | | 12 | 12 | 12 |
| Verify that the mechanical interlocks on the contactors are functional | X | | | | 36 | 24 | 12 |
| Verify that the door cannot be opened while the primary disconnect is closed (i.e., that the door interlocks cannot be “cheated” open) | X | X | | | 12 | 12 | 12 |
| Verify that barriers are installed above the main disconnect | X | | | | 12 | 12 | 12 |
| Verify the condition of the padlock mechanism | X | | X | | 24 | 24 | 24 |
| Verify that plug-in MCC bucket lock-in devices are latching | X | | | | 36 | 36 | 36 |
| Monitor equipment loading and ensure that it is within equipment ratings | X | X | X | X | 12 | 12 | 12 |
| **Requiring specialized training, equipment, and safety precautions** | | | | | | | |
| Perform thermographic survey | X | X | X | X | 24 | 12 | 12 |
| Perform contact resistance test on bus and connections | X | X | X | X | 24 | 12 | 12 |
| Measure coil and resister resistance values | X | X | | | 12 | 12 | 12 |
| Ensure that start and holding coil interlocks are functional | X | X | | | 12 | 12 | 12 |
| Verify correct timing for reduced voltage starters | | X | | | 24 | 12 | 12 |
| Test autotransformer (megger, hi-pot, winding resistance, ratio) | | X | | | 24 | 12 | 12 |
| Verify that the correct overloads are installed or programmed | X | X | | | 12 | 12 | 12 |
| Test the breaker shunt trip circuit | X | X | | | 60 | 24 | 12 |
| Check for correct fusing [use single-line drawing (SLD)] | X | X | | | 12 | 12 | 12 |
| Remove fuses on out-of-service equipment | X | X | | | 36 | 36 | 36 |
| Hi-pot the vacuum bottles | | X | | | 36 | 36 | 12 |
| On solidly grounded systems, make sure that the motor protection relay is set to trip the contactor only if the contactor is rated for the available fault current | X | X | | | 24 | 24 | 24 |
| Make sure that the motor protection relay is programmed to trip the contactor only if the contactor is rated for the available fault current | X | X | | | 24 | 24 | 24 |
| Inspect contacts and arc chutes of air magnetic contactors | X | X | | | 24 | 24 | 24 |
| Inspect arc chutes and arc hoods for damage | X | X | | | 36 | 24 | 12 |
| Manually exercise the contactor and check for alignment | X | | | | 36 | 24 | 12 |
| Make sure that bypass contactors are working properly | X | X | | | 36 | 24 | 12 |
| On units with soft starts, replace filters and check fans | X | X | | | 12 | 12 | 12 |
| Perform short-circuit analysis, and ensure that equipment is adequately rated | X | X | X | X | 60 | 60 | 60 |
| Ensure that arc flash labelling is in place and up to date | X | X | X | X | 60 | 60 | 60 |
| Test relays, meters, instrument transformers, breakers, surge arresters, etc., in accordance with the appropriate clause of this Guideline | X | X | X | X | * | * | * |
| **Opportunities** | | | | | | | |
| Replace old overload starters with new starters | X | | | | | | |
| Consider adding an on/off toggle switch to the control circuit to prevent a start while the disconnect is being opened | X | X | | | | | |
| Retrofit old contactors to vacuum contactors | | X | | | | | |
| Replace noisy magnetic contactors and coils | X | X | | | | | |
| Replace severe jog application starters with variable-frequency drives (VFDs) | X | | | | | | |
| Infrared thermography while the equipment is in service and carrying load | X | X | X | X | 12 | 12 | 6 |

(1) Prior to starting testing, contractors should ensure that all client requirements necessary to allow work access to the equipment are met [e.g., . permits, safety hazard and risk analysis]

(2) The following safety concerns and precautions should be taken into consideration:

(a)Older starters contain asbestos shields between phases, which require special handling procedures.

(b)Because of backfeeds, starters might not be de-energized when the main switch or disconnect is open.

(c) Because of pinch points, fuse pullers should be used.

(d) Explosion can occur when a large starter is opened under loaded conditions or during a start attempt.

(e) Because starter handles cannot be installed in such a way as to be ergonomically suited to all personnel, strain injuries can occur.