Medium Voltage Across-the-Line Starters

Instruction Bulletin

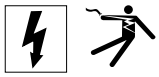
30072-454-76

Rev. 01, 07/2012

Retain for future use.

Hazard Categories and Special Symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

ANSI 

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

IEC 

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol is not used with this signal word.

NOTE: Provides additional information to clarify or simplify a procedure.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. This Class A digital apparatus complies with Canadian ICES-003.

Table of Contents

Introduction and Technical Characteristics

Overview

The Medium Voltage Across-the-Line (MVATL) starter is suitable for starting medium voltage induction motors. When a start command is issued, the vacuum starting contactor closes and applies full voltage to the motor.

Before You Begin

⚠ DANGER

ONE OR MORE LIVE CIRCUITS

Disconnect ALL power to this equipment before servicing it.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual in its entirety before installing or operating the equipment.
- Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Ensure the main disconnect switch is open before using the Test Mode or servicing this equipment. Verify through the disconnect viewing window that the main disconnect blades are fully seated against the switch grounding bar.
- Always use a properly rated voltage sensing device to confirm power is off.
- Before servicing:
  - — Disconnect all power, including external control power that may be present. Use a properly rated voltage sensing device to confirm power is off.
  - — Place a “DO NOT TURN ON” label on all power disconnects.
  - — Lock all power disconnects in the open position.
- Install and close all devices (including fuse barriers), doors, and covers before applying power or starting and stopping the equipment.

Failure to follow these instructions will result in death or serious injury.

NOTICE

DAMAGED EQUIPMENT

Do not operate or install any starter that appears damaged.

Failure to follow these instructions can result in equipment damage.

Standard Features

Isolating Disconnect Switch

A 400 A, 5 kv load make / load break disconnect switch is provided. This disconnect switch has the following standard features:

- Mechanical interlock on the medium voltage access door to prevent entry when the disconnect switch is in the ON position
- Ground in the OFF position
- View window for determining the status of the disconnect blades
- Pad lock provision in the OFF position

Medium Voltage Section

Standard components in the medium voltage starting section include:

- Class R-rated motor fuses
- Vacuum starting contactor
- Control power transformer
- Current transformers for overload sensing

Low Voltage Section

The following are included in the low voltage section, which is built into the main access door:

- Motor overload protection relay
- Start/Stop control logic

Optional Features

Incoming Power Bus and Motor Connecting Bus

Incoming power connections are made directly to the top of the isolating disconnect switch unless the optional incoming power bus is installed.

Motor power connections are made directly to the vacuum contactor unless the optional motor connecting bus is installed.

Specifications

Table 1: Technical Specifications

AC power supply	2300 V / 3300 V / 4160 V RMS (Refer to supplied schematics.)
Current capacity	Refer to supplied schematics.
Control voltage	115 V, 15% **NOTE:** 115 V control power is derived from the 3-phase power source.
Line frequency	50 or 60 Hz
Operating temperature	+32 to +122 °F (0 to +50 °C)
Storage temperature	–40 to +149 °F (–40 to +65 °C)
Starting mode	Full voltage
Standard user accessible relays	Run relay: (1) SPST Normally Open (N.O.) Contact, 10 A @ 25O V, Inductive Rating
Short circuit interruption level	50 kA [1]
Impulse withstand level (BIL)	45 kV impulse withstand level [1]
Dimension / Weight	54 in. H x in. W x in. D: 675 lbs (306.2 kg) 90 in. H x 31 in. W x 31 in. D: 800 lbs (362.9 kg)

[1] Tested per UL347 requirements

Terminology

The following terminology is used throughout this instruction bulletin. The terminology distinctions are made to minimize confusion when discussing configuration and connection practices.

Controller— a device or group of devices that governs, in some predetermined manner, the electric power delivered to the devices to which it is connected

MVATL—Medium Voltage Across-the-Line starter—suitable for starting medium voltage induction motors.

Medium Voltage Starter—see MVATL.

Receiving

Preliminary Inspection

NOTICE

DAMAGED EQUIPMENT

Do not operate or install any starter that appears damaged.

Failure to follow these instructions can result in equipment damage.

Thoroughly inspect the MVATL controller before storage or installation. Upon receipt:

1. Remove the controller from its packaging and visually inspect the exterior for shipping damage. See *Unpacking the Controller* .
2. If any shipping damage has occurred, file a claim with the freight carrier within 15 days of receipt and notify your Schneider Electric sales representative.
   - — Verify that the ratings sticker on the MVATL chassis matches the motor's horsepower, current, and voltage rating for the installation.
   - — Check for loose mechanical connections and assemblies, and wires which may have broken or loosened during shipping and installation.
   - — Manually operate all electromechanical devices to make sure they work.

NOTICE

DAMAGED EQUIPMENT

Medium voltage starters must be shipped on an “Air Ride” trailer.

Failure to follow these instructions can result in equipment damage and void the warranty.

Unpacking the Controller

⚠ WARNING

HEAVY EQUIPMENT

- Lifting the controller requires the use of a lifting apparatus.
- Always use safe lifting practices.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- Handle the controller carefully to avoid damage to internal components, frame, or exterior.
- Lift the controller out of its shipping carton with a suitable lifting device and place it on a flat surface.
- If you plan to store the controller after receipt, replace it in its original packaging. See *Storing the Equipment* on page 9.

Handling and Lifting the Controller

⚠ WARNING

TOPPLE AND CRUSHING HAZARD

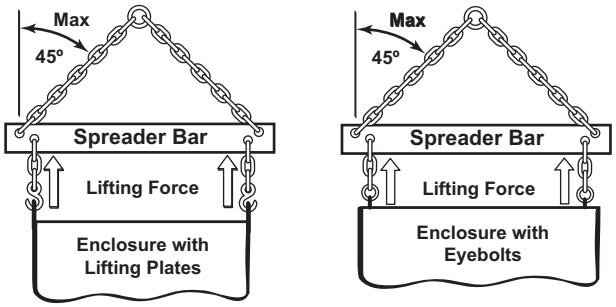
- Strap or brace the MVATL controller prior to moving it. Do not stack MVATL controllers on top of each other.
- Move packaged MVATL controllers with a forklift and tether them with safety straps.
- Use suitable lifting eyes attached to the mounting brackets, when provided, to lift the controller from the top.
- Do not remove MVATL controllers from the skid until final installation, if possible.
- Do not place any material on top of the controller.
- Store or ship the controller in the original packaging.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Keep the area below any equipment being lifted clear of all personnel and property.

When lifting the controller:

- Always work with another person.
- Use cut-resistant gloves.
- Inspect the lifting plates or eyebolts for any damage.
- Attach a spreader bar.
- Keep the lifting force vertical.
- Limit the sling angle to less than 45°.



Storing the Equipment

Storing the controller in its original packaging until it reaches its final installation site helps protect the equipment and helps prevent damage to the exterior.

If you plan to store the controller after receipt:

- Replace it in its original packaging.
- Store it in a clean, dry area where the ambient temperature is between –40 to +149 °F (–40 to +65 °C) to prevent condensation inside the controller.
- If the equipment must be shipped to another location, use the original shipping material and carton to help protect the equipment.

Mounting and Cleaning

- Make sure that the mounting method meets the latest requirement of the National Electrical Code® and any other local code requirements for working space (NEC Code Articles 110-13 and 110-16).
- Securely mount freestanding controllers to a flat, level base using the lifting eyes provided.
- Remove access plates prior to drilling or punching holes to prevent metal filings/debris from causing short circuits or reducing electrical clearances.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Turn off all voltage sources before touching any components.

Failure to follow these instructions will result in death or serious injury.

- After mounting and wiring are completed, thoroughly clean and vacuum the enclosure, and make sure that all filings, metal chips, and other materials are removed before start-up.

Environmental Specifications

The MVATL controller may be installed and operated at the nameplate rating in an area where the following conditions exist:

- Ambient temperature does not exceed 50 °C (122°F) with a 15 °C rise inside the enclosure as maximum.
- Ambient temperature is not less than 0 °C (32 °F).
- Altitude above sea level is 6000 ft (2000 m) or less.
- Ambient air is clean, dry, and free of flammable or combustible vapors, steam, or corrosive gases.

Derating Factor

When an MVATL enclosure is in an environment that does not meet the environmental specifications, it must be derated as follows:

- Derate starter size 1.5% per °C above 50 °C ambient temperature or 0.75% per °F above 122 °F ambient temperature.
- Derate starter size 1% for every 100 m above 2000 m or every 300 ft above 6000 ft altitude.

Main Door and Main Disconnect Switch Operation

Disconnect Switch Positions

The main disconnect switch has three positions:

1. The **ON** position is used to close the main disconnect switch and apply power to the controller.
2. The **OFF** position is used to open the main disconnect switch turning the power off to the controller.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Many parts in this controller, including the motor terminals or control equipment parts operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Failure to follow these instructions will result in death or serious injury.

3. The **OPEN/CLOSE** position is used to open or close the main door. In this position, the disconnect switch handle must be rotated fully counterclockwise.

To Open the Main Door or Main Disconnect Switch

1. Rotate all the main door latches away from the main door.
2. Rotate the handle to the OFF position.

   NOTE: The main disconnect switch blades should be in the open position. Verify this by using the disconnect switch viewing window.
3. Rotate the handle to the fully counterclockwise position (OPEN/CLOSE) until the mechanical interlock releases.
4. Open the door.

To Close the Main Door or Main Disconnect Switch

Perform these steps before securing the nine main door latches.

1. Rotate the handle to the fully counterclockwise position (OPEN/CLOSE) to engage the mechanical interlock.

   NOTE: This step is necessary to fully close the main door.
2. Ensure that the main door is fully seated against the body of the enclosure.
3. Release the handle.
4. Rotate the handle to the clockwise position (ON) to close the disconnect switch.

   The main disconnect switch should be in the closed position. Verify this using the disconnect switch viewing window.

Wiring

Wire the controller in accordance with the National Electrical Code and any local codes that may apply.

Use copper conductors (90 °C min.) for power and control wiring unless specified otherwise.

The minimum recommended wire size is #14 AWG for control circuits.

Tighten the connections to the torque values shown on the controller. Refer to the torque values in Table 2.

Incoming Power

Connect properly sized power wires to the MVATL input terminals marked L1, L2, and L3.

Refer to the National Electrical Code for wire sizing.

NOTE: The connection is a single 3/8 inch thru hole per phase. Lugs are not provided and are not recommended.

Table 2: Recommended Tightening Torque
(unless otherwise noted on the controller)

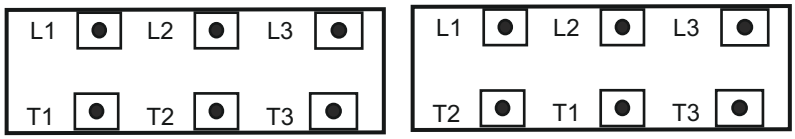
Wire size	Torque (lb-in)		
	Slotted Head No. 10 and Larger		Hex Head or Socket Head Screw
	Slot Width < 3/64 in. Slot Length < 1/4 in.	Slot Width > 3/64 in. Slot Length > 1/4 in.	
18–10	20	35	75
8	25	40	75
6–4	35	45	110
3	35	50	150
2	40	50	150
1	—	50	150
1/0–2/0	—	50	180
3/0–4/0	—	50	250
250–400	—	50	325
500–750	—	50	375

Motor Connection

Connect properly sized motor leads to terminals T1, T2, and T3 as illustrated in Figure 1. If motor rotation needs to be reversed, swap the position of any two motor leads.

NOTE: The connection is a single 3/8 inch thru hole per phase. Lugs are not provided and are not recommended.

Figure 1: Forward and Reverse Motor Connections



Forward Reverse

Control Wiring

Connect the control wiring to the controller's terminal block in accordance with the wiring diagram supplied.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

For two-wire control circuits: Two-wire connection must be opened (switched off) when a trip occurs. If this condition is not met, the motor may restart when the trip is cleared.

Failure to follow these instructions will result in death or serious injury.

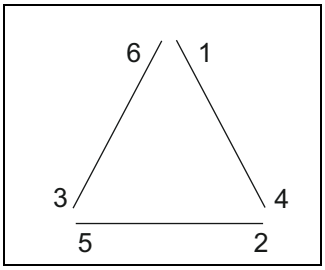
Grounding

Connect a properly sized ground cable to the starter ground terminal. Refer to the National Electrical Code for proper size. Ensure that the ground conductor is connected to a solid earth ground.

Figure 2: Typical Motor Connections
Dual Voltage Six-lead Delta/Wye Connected Motors

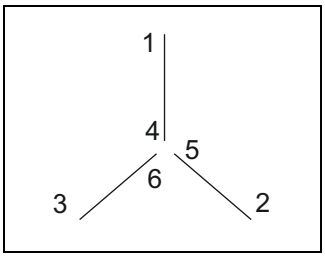
Lower Voltage Delta Connection

L1	L2	L3
1, 6	2, 4	3, 5



Higher Voltage Wye Connection

L1	L2	L3	Join
1	2	3	4, 5, 6



Installation and Start-up

Follow all the guidelines and steps in this section when installing and commissioning the MVATL controller.

Use the MVATL Start-up Procedure Checklist on page 16 while performing the start-up procedure.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Many parts in this controller, including motor terminals or control equipment parts, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Failure to follow these instructions will result in death or serious injury.

Inspection

- Ensure that the starter has been installed in accordance with the guidelines outlined in *Wiring* on page 11.
- Ensure that the controller has been wired according to the schematics and all electrical codes.
- Check that all connections are tight. Ensure that the motor shaft rotates freely.

Overload Relay Setup

Before applying power to the starter, review the following settings and adjust them as required.

The motor protection relay must be configured in accordance with the motor's nameplate full-load current. The current transformer ratio is required for configuring the relay. This ratio is marked on the current transformers, and on the wiring diagrams supplied with the equipment.

Obtain the overload relay setting by dividing the motor full load amperes (FLA) by the current transformer (CT) ratio.

Example: Motor FLA = 100 A
CT Ratio = 200:5

The required overload relay setting would be as follows:
O/L Setting = 100/(200:5) = 100/40 = 2.5 A

Therefore, the overload relay would be set (as closely as possible) to 2.5 A.

Start-up Inspection

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Many parts in this controller, including motor terminals or control equipment parts, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Failure to follow these instructions will result in death or serious injury.

1. Verify that the incoming supply voltage matches the rated supply voltage of the MVATL controller. According to NEMA MG1, voltage unbalance should not exceed 5%.
2. Verify that the full-load amperage (FLA) of the motor does not exceed the FLA rating of the MVATL.
3. Follow the *Overload Relay Setup* instructions on page 13 and verify that the overload relay is correctly adjusted.
4. Verify that properly sized power leads are connected to the MVATL incoming terminals L1, L2, and L3.
5. Verify that a properly sized ground cable is connected to the ground terminal on the MVATL.
6. Check the motor lead connections and verify that proper power leads are connected to the MVATL as shown in Figure 1 on page 11, depending on the rotation of the motor.
7. Verify that the control wire connections are made in accordance with the wiring diagram.

Start-up

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Fuse barriers and removable panels must be in place before applying power to the starter.
- Do not manually operate the contactor to jog the motor.

Failure to follow these instructions will result in death or serious injury.

1. Ensure that *Start-up Inspection* on page14 has been checked and confirmed.
2. Ensure that all personnel, tools, and equipment are clear of the controller and motor-driven moving parts.
3. If the motor is remotely located, it is essential to have another person stand by the motor to verify the direction of motor rotation.
4. Apply power and close the main disconnect switch on the starter.
5. Ensure that the motor is ready to be started in an unloaded condition.
6. Energize the Start circuit; the motor accelerates until it reaches full speed.

NOTICE

EQUIPMENT FAILURE

Do not allow the motor to remain energized if the motor stalls. If the motor fails to accelerate, immediately de-energize the motor using local, remote, or manual stop control.

Failure to follow these instructions can result in property damage.

7. If at any time during the starting cycle the motor does not accelerate or stops, disconnect power to the control circuit and open the line disconnect.
8. Check the wiring and overload relay settings.
9. Repeat this *Start-up* procedure.
10. Should the motor still fail to start, consult the *Troubleshooting and Maintenance* section on page 17.

MVATL Start-up Procedure Checklist

We recommend making a copy of this checklist to fill out while performing the start-up procedure.

Table 3: MVATL Start-up Procedure Checklist

Power System	
☐ Yes ☐ No	1. Verify with the local power company that any line voltage unbalance does not exceed 5%. See *Preliminary Inspection* on page 7 of this manual and NEMA MG1.
☐ Yes ☐ No	2. Consult your Schneider Electric representative for any applications other than chiller compressors with single induction motors.
☐ Yes ☐ No	3. For areas where frequent lightning occurs, use lightning arrestors installed upstream of the starter.
Motor	
☐ Yes ☐ No	4. Raychem HVT-Z series stress cones or equivalent are used with single conductor power cable. http://energy.tycoelectronics.com
☐ Yes ☐ No	5. Motor leads are wired using the voltage listed on the motor nameplate. Open and inspect the motor junction box.
☐ Yes ☐ No	6. The RTD monitor (if used) is programmed according to the motor manufacturer's RTD type and trip levels. See the motor data sheet.
☐ Yes ☐ No	7. The cable run from the motor to the starter meets NEC and local codes.
Starter	
☐ Yes ☐ No	8. Read and fully understand this instruction bulletin.
☐ Yes ☐ No	9. There is no obvious damage inside the control box located inside of the main door.
☐ Yes ☐ No	10. There is no obvious damage inside the medium voltage section located behind the main door.
☐ Yes ☐ No	11. The cable run from the supply transformer to the starter meets NEC and local codes.
☐ Yes ☐ No	12. The ground cable run from the supply transformer to the starter meets NEC and local codes (the ground point is located on the back wall of the starter near the main disconnect).
☐ Yes ☐ No	13. The cable is solidly grounded from the MVATL enclosure to the earth ground, meeting NEC and local codes (the ground bar along the bottom front of the enclosure is used for this purpose).
☐ Yes ☐ No	14. For environments requiring NEMA 3R, 4, or 12 enclosures, the enclosure NEMA rating is suitable for the environment. See the label inside the main door.
☐ Yes ☐ No	15. For environments requiring NEMA 3R, 4, or 12 enclosures, the field installation procedure from the factory is followed.
☐ Yes ☐ No	16. For applications that have multiple starters in a line-up (horizontal bus), the field installation procedure from the factory is followed.
☐ Yes ☐ No	17. For applications that have multiple starters in a line-up (horizontal bus) and top exit of the motor cables, the field installation procedure from the factory is followed.
☐ Yes ☐ No	18. Control and power connections match the controller schematic.
☐ Yes ☐ No	19. Red Glastic barrier sheets between R-rated motor fuses and the enclosure wall are in place (3 sheets). Located inside the main door.
☐ Yes ☐ No	20. Verify that the overload relay was properly setup. See *Overload Relay Setup* on page 13.
☐ Yes ☐ No	21. Verify that the two control wire plugs are fully connected from the door to the enclosure junction. The control wires are located inside the main door.
☐ Yes ☐ No	22. Run the test mode to verify proper operation of the starter. See *Test Mode* on page 18.
☐ Yes ☐ No	23. Write down the motor data located on the motor nameplate: FLA_____ Voltage_____
☐ Yes ☐ No	24. Write down the starter data located behind the main door on the customer data label: FLA_____ Voltage_____
☐ Yes ☐ No	25. If all the above steps have Yes checked, start the motor.

Troubleshooting and Maintenance

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual in its entirety before installing, operating, or maintaining the equipment.
- Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Ensure the main disconnect switch is open before using the Test Mode or servicing this equipment. Verify, through the disconnect viewing window, that the main disconnect blades are fully seated against the switch grounding bar
- Always use a properly rated voltage sensing device to confirm power is off.
- Before servicing:
  - — Disconnect all power, including external control power that may be present. Use a properly rated voltage sensing device to confirm power is off.
  - — Place a “DO NOT TURN ON” label on all power disconnects.
  - — Lock all power disconnects in the open position.
- Install and close all devices (including fuse barriers), doors, and covers before applying power or starting and stopping the equipment.

Failure to follow these instructions will result in death or serious injury.

Test Mode

The Test Mode can assist in verifying the proper operation of the MVATL. Enter and run the MVATL test mode as follows:

Run the Test

1. Open the main disconnect switch. The test mode cannot be enabled with the main disconnect closed.
2. Insert a 120 Vac supply into the receptacle in the low voltage control cabinet.
3. Rotate the control panel Test/Run switch to the TEST position.

   In this mode, the line contactor may be safely operated to ensure it is functional.

   NOTE: An ohmmeter can be used to verify closure of the contactor by monitoring the contactor auxiliary contacts. Refer to the schematics supplied with the controller for terminal block points to monitor. When the contactor closes, the meter reads near zero Ω (short). When the contactor opens, the meter reads infinite impedance.
4. Note any problems encountered, and refer to Table 4 below for diagnostics and troubleshooting suggestions.

Exit the Test

1. Remove the 120 V supply from the control panel.
2. Rotate the control panel Test/Run switch to the RUN position.

Start-up Problems

Table 4: Start-up Problems

Problem	Probable Cause	Solution
Motor will not start.	1. Start circuit was wired incorrectly. 2. No start input signal. 3. Overload relay was tripped.	1. Remove power and correct the wiring. 2. Check the fuses. 3. Verify the overload relay settings.

Preventative Maintenance

Enclosures

To keep equipment operating properly and to reduce unscheduled down time, establish a periodic maintenance program.

Perform the following inspection routine annually.

- Carefully inspect all enclosure surfaces for signs of excessive heat.
- Check all cabinet doors to ensure proper operation and that all door latching and/or locking devices are in proper working order.
- Look inside the cabinets for any signs of moisture, dripping, or condensation.
  - — Seal off any conduits which may have dripped condensate or provide an alternate means for drainage.
  - — Seal off any cracks or openings which may have allowed moisture to enter the enclosure and eliminate the source of moisture on the outside of the enclosure.

- Thoroughly dry all cabinet surfaces which may be damp or wet. If accumulated deposits are apparent, conduct an electrical insulation test to ensure proper insulation integrity.
- If there is an accumulation of dust, remove it with a vacuum cleaner or a clean lint-free cloth. Do not use compressed air as it may contaminate other internal components.

Wiring

- Inspect all accessible wiring for signs of looseness or overheating. Tighten to proper torque values as required.

  If major discoloration of wire insulation or cable damage is apparent, replace the cable.
- Identify and mark all cables in accordance with equipment drawings, where required.

Disconnecting Means

Operate the main disconnect to ensure proper operation of the disconnect and mechanical interlock.

Fuses

- Examine all fuse clips and fuse blocks for signs of overheating or looseness.

  If there is any indication of reduced spring tension or overheating, replace the fuse clips or fuse block assembly.
- Ensure that all fuses are the correct type and the proper size as listed on the controller and applicable drawings.

Contactors

- If there is an accumulation of dust, remove it with a vacuum cleaner or a clean, lint-free cloth. Do not use compressed air as it may contaminate other internal components.
- Operate the starting contactor using the *Test Mode* (see page 18) to ensure proper operation.

General

- List all component part numbers which may be showing signs of wear, and order replacements for installation at next scheduled shut-down period.
- Note any equipment additions and/or wiring modifications on the appropriate drawings, for maintenance use and troubleshooting.

Maintenance After a Detected Fault

After a detected fault, all equipment must be de-energized, disconnected, and isolated to prevent accidental contact with live parts. Check the voltage on all terminals before touching or working on the equipment.

The excessive currents occurring during a detected fault may result in enclosure, component, and/or conductor damage due to mechanical distortion, thermal damage, metal deposits, or smoke. After a detected fault, determine the cause, inspect the equipment, and make any necessary repairs or replacements prior to re-commissioning this equipment. The following sub-sections outline the recommendations for this inspection.

Enclosure

Check the cabinet exterior for any sign of deformation or heat damage. Ensure that all hinges and cabinet latching and/or locking mechanisms are in working order. Replace the affected parts as required.

Disconnecting Means

Operate the main disconnect to ensure proper operation of disconnect and mechanical interlocks.

Fuses

Always replace all three fuses in a 3-phase circuit, even though only one or two are open. Possible heat damage in the remaining fuse(s) could result in a subsequent shutdown.

Terminals and Internal Conductors

Replace all damaged parts which show any sign of discoloration, melting, or arcing damage.

Contactors

Operate the starting contactor using the *Test Mode* (see page 18) to ensure proper operation.

Restoring to Service

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Install and close all devices (including fuse barriers), doors, and covers before applying power or starting and stopping the equipment.

Failure to follow these instructions will result in death or serious injury.

Before restoring the equipment to service, it is recommended that the steps outlined in *Start-up Inspections* are followed. See page 15.

Product Support

The Schneider Electric Technical Support Center is your single point of contact for information about the medium voltage starters. Qualified personnel are available to answer your customer service and technical support questions. Call toll free 800-999-8183.

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30072-454-76 Rev. 01, 08/2012