

Specification Number: 26 18 39.12

Product Name: MEDIUM VOLTAGE MOTOR CONTROL CENTERS FVNR

SECTION 26 18 39.12 MEDIUM VOLTAGE MOTOR CONTROL CENTERS

Part 1 GENERAL

1.01 SECTION INCLUDES

The Contractor shall furnish and install the medium voltage controllers as specified herein and as shown on the contract drawings.

Controller applications include:

- 2.3 kV to 7.2 kV.
- 200 A, 400 A, 450 A, 720 A
- Induction
- Non-Reversing.
- Full Voltage

1.02 REFERENCES

Medium voltage controllers shall be designed, manufactured, assembled and tested in accordance with the following standards:

NEMA ICS 3 Part 1 & 2 , 1993 (R2000)

UL 347.

EEMAC E14-1. Arc Resistant (Option)

IEC 60470, 60529, 60694, 60129, 62271-102, 62271-200 (*replaces 298*)

ANSI C:37.20.7, 200X, Arc Resistant (Option)

1.03 SUBMITTALS

FOR REVIEW/APPROVAL

The following information shall be submitted to the Engineer:

- Master drawing index.
- Front view elevation.
- Floor plan.
- Top view.
- Schematic diagram.
- Nameplate schedule.
- Component list.
- Conduit entry/exit locations.
- Assembly ratings including:
 - Short circuit rating.
 - Voltage.
 - Continuous current.
 - Basic impulse level.
- Major component ratings including:
 - Voltage.
 - Continuous current.
 - Interrupting ratings.
- Cable terminal sizes.

2. Where applicable the following additional information shall be submitted to the Engineer:

- a. Bus connection.
- b. Connection details between close-coupled assemblies.
- c. Composite floor plan of close-coupled assemblies.

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- d. Key interlock scheme drawing and sequence of operations.
- 3. Submit six (6) copies of the above information. [Submit in .DWG Electronic Format]
- B. FOR INFORMATION
 - 1. When requested by the Engineer the following product information shall be submitted:
 - a. Product brochures.
 - b. Product datasheets.
- C. FOR CLOSE-OUT
 - 1. The following information shall be submitted for record purposes at time of shipment:
 - a. Final as-built drawings and information for items listed in Article 1.03A.
 - b. Wiring diagrams.
 - c. Installation information.
 - 2. Submit six (1) copy of the above information. [Submit in .DWG Electronic Format]

1.04 QUALITY ASSURANCE

In accordance with (customer to specify section)

Manufacturer: Company specializing in medium voltage metal-enclosed motor controller with at least five years documented experience. The manufacturer of the motor controller must be the same as the manufacturers of the no-load disconnecter.

Equipment shall have **cULus** certification.

The equipment shall be completely tested at an independent STL.

1.05 QUALIFICATIONS

A. For the equipment specified herein, the manufacturer shall be ISO 9000 or 9001 certified.

1.06 DELIVERY, STORAGE, AND HANDLING

Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.07 OPERATION AND MAINTENANCE MANUALS

Three (3) copies of the equipment operation and maintenance manuals shall be provided at time of shipment. Operation and maintenance manuals shall include the following information:

- Instruction books and/or leaflets.
- Recommended spare parts list.
- Drawings and information required by Article 1.03.

1.08 EXTRA PRODUCTS

Manufacturer shall provide a recommended Spare Parts List, included as part of the Operation and Maintenance Manuals.

PART 2 PRODUCT

2.01 MANUFACTURERS

Motor controller: The Medium Voltage Motor Controllers shall be Square D type MOTORPACT or approved equal.

2.02 MEDIUM VOLTAGE MOTOR CONTROLLER ASSEMBLY

Controllers to be supplied in modular one-high, one controller per structure construction. Stacked or tiered controllers are not acceptable. The equipment shall be factory-assembled (except for necessary shipping splits) and operationally checked.

The motor controller shall consist of a [single section] [multiple section line-up] [close coupled to MetalClad Switchgear], [close coupled to HVL/cc load interrupter switches], be of [indoor][outdoor] construction.

The medium voltage motor controller assembly shall be compartmentalized into the following distinct compartments:

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Main bus compartment or incoming cable compartment
 Isolating disconnecter compartment
 Mechanism compartment
 Low Voltage compartment
 Load compartment containing the fuses, contactor, instrument transformers and power cable terminations.
 Isolating disconnecter and contactor assemblies, including current limiting fuses, shall be of the component to component design. There shall be no bolted connections between the contactor and the customer load terminals.

The equipment shall be designed for front accessibility only, with front and rear access to be provided as a standard.

Cable entry or exit shall be [bottom] [top] [Bottom and top].

{Option} [The enclosure shall be arc resistant Type 2 construction and capable of withstanding 25 kA for 1 second, 40 kA for .50 seconds and 50 kA for 0.25 seconds]. {Option} [A plenum shall be provided to divert the hot gasses. The plenum height shall be 17" tall]. {****Required when ceiling height is 2 meters (6 ft 6.72in) or less above the top of the equipment {top cable entry or exit is not available}}.

In establishing the requirements for the enclosure design, consideration shall be given to such relevant factors as controlled access, tamper resistance, protection from ingress of rodents and insects.

Motor controller shall not require ventilation openings to aid in cooling of the associated components.

The motor controller shall be low maintenance designed to reduce the requirement for annual/ periodic maintenance of the equipment. Equipment with scheduled maintenance intervals of one or more years is preferred.

A low voltage compartment to accommodate control circuit terminal blocks, control components [and PowerLogic metering]. The low voltage compartment shall be located at the top of each vertical section. The interior of the Low Voltage compartment shall be painted white.

Flexible power conductors shall interconnect the main contactor with the motor load terminals. Flexible power conductor terminals shall be of the swage 360° radial cold-fused compression type connections. These connections shall be maintenance free, never requiring torque.

Shipping splits shall be a maximum of 5 sections to minimize the number of overlapped main bus joints.

Medium voltage motor control equipment shall be compatible with Square D Power Distribution Equipment.

2.03 RATINGS

System Voltage: [_____] kV, three phase, [solidly grounded] [resistor grounded through a [____] ohm resistor] [ungrounded], [three phase 3 wire] [three phase 4 wire.] {Neutral bus not available.}

Operating Frequency: [50] [60] Hz.

Maximum Short Circuit Current: 50 kA RMS Symmetrical.

Maximum Design Voltage: [2.4] [3.3] [4.16] [6.6] [6.9] kV.

Basic Impulse Level (BIL): 60 kV.

Power Frequency Withstand: 20 kV.

G. Short-Time Current [(two second) 50 kA] [(3 seconds) 40kA] symmetrical.

Main Bus Ampacity: [600] [1200] [2000] [3000] amperes, continuous.

Medium Voltage Controllers shall have an integrated interrupting rating of 50kA with current limiting fuses.

MAXIMUM CONTROLLER HP/KW RATINGS SHALL BE ACCORDING TO THE FOLLOWING TABLES:

200 A		400 A		450 A		720 A	
2.3 kV	860/640	2.3 kV	1730/1290	2.3 kV	1940/1450	2.3 kV	3100/2320
3.3 kV	1240/930	3.3 kV	2480/1850	3.3 kV	2790/2080	3.3 kV	4460/3330
4.16 kV	1560/1160	4.16 kV	3120/2330	4.16 kV	3520/2630	4.16 kV	5630/4210
6.6 kV	2480/1850	6.6 kV	4960/3700	6.6 kV	5580/4160	6.6 kV	8930/6650
6.9 kV	2590/1930	6.9 kV	5190/3870	6.9 kV	5830/4350	6.9 kV	9330/6960

THE VACUUM CONTACTOR SHALL HAVE THE FOLLOWING RATINGS:

Description	Rating	Rating
Max. Interrupting Current	5000 A	7200 A
Continuous Current Rating	[200A] [400A] [450A]	[720A]
Short Time Current		
30 sec	2,400 A	4,300 A
1 sec.	6,000 A	10,800 A
10.0 ms (0.5 cycle)	85kA peak	85kA peak
Mechanical Life	2.5 million OPS	200,000 OPS
Electrical Life at rated current	250,000 OPS	200,000 OPS
Impulse Withstand (1.2 x 50 μ s)	60 kV	60 kV
Closing Time (Energization to Armature Seal)	100ms	100ms

2.04 COMPONENTS

The non-load break isolating disconnecter shall be a two position externally operated manual three-pole device, such that in the open position it grounds and isolates the line side from the load compartment. The switch-operating handle shall be removable. The operating mechanism shall be rugged, simple and shall have provisions for three padlocks in the on or off position. [A Form-C contact shall be provided for remote position indication of the disconnecter.] [Provide key interlocks to coordinate with....]

Mechanical Interlocks: An interlocking system shall be provided to prevent the opening of the high voltage access door with the no-load disconnecter closed. To access the medium voltage compartment, the no-load disconnecter must be opened to the ground position; the operating port must be closed to allow padlocking the disconnecter open. The interlock must be directly attached to the operating mechanism and should not rely on long cables and linkages.

A viewing port shall be installed in the disconnecter enclosure to enable visible verification of the blade position. {Optional Provide LED light with pushbutton operation for ease of viewing.}

{Option:} A cable ground switch (LDA Load Discharge Assembly) shall be provided. The LDA shall be used to ground the load cables. It shall be mechanically interlocked with the Isolation Switch (disconnecter) and be operated using the same handle. The LDA shall have a spring operated quick make device capable of making 5kA sym. current at 7.2kV up to five times. The LDA shall not be used as a system grounding switch. The LDA shall be mounted in the load box at the motor lead terminals. The LDA shall be a maintenance free device.

Current limiting fuses shall be type "R" for motor loads or type "E" for non-motor loads. A blown fuse indicator shall be provided. The blown fuse indicator shall be an "Extended Travel" type with a minimum of 1 inch of travel. Fuses shall have a 50,000 Amperes interrupting capability. The type "R" fuses shall incorporate time/current characteristics for motor service allowing proper coordination with the contactor and overload relay for maximum protection. This coordination shall be such that under a low fault

condition the interrupting rating and dropout time of the contactor shall be properly coordinated with all possible fuse sizes to eliminate contactor racing. The power fuses shall be vertically mounted permitting easy inspection and replacement without the need for removing the contactor.

1. {Option} Provide a FuseLogic shunt trip, single phase protection system using Square D din style fuses (or equal) to automatically open the vacuum contactor when a fuse blows. This is intended for backup protection only to the motor overload relay. The system shall further prevent potential single phasing conditions by blocking the closing of the contactor when a fuse is blown. (Provide optional 1NO/1NC contact for trip indication).

The vacuum contactor shall be magnetically held or [latched design], with single-break high-pressure type main contacts. The vacuum contactor contact wear shall be easily checked with the use of a “go / no-go” feeler gauge, included with each contactor. A built-in test circuit shall be included within each controller to permit checking the control and pilot circuits, with the contactor in open position. The test circuit shall be capable of being energized through a polarized plug connector from an external 120-volt supply while in the test mode. The plug connector shall be electrically interlocked with the disconnect. Option: [A viewing window shall be provided to view the contactor status.]

The contactor shall withdraw on a rail system. When the contactor is lowered it will disconnect the contactor and when raised, it will connect the contactor and lock it in position.

ACCESSORIES

The controller mounted control power transformer (CPT) shall be [300VA], [500VA], [750VA], [2kVA], [5kVA] and be 60kV BIL rated. Below 2kVA shall be urethane encapsulated.

{Option} Provide Live Line Indicators (LLI) lights connected by a capacitive circuit to motor lead terminals. LLI lights will indicate voltage when the equipment is energized.

2.05 POWER AND GROUND BUS (MOTOR CONTROL CENTER CONSTRUCTION ONLY)

When controllers are grouped together in a line-up, the horizontal main bus shall be located in its own compartment to allow for ease of maintenance or extension of line-ups, the main bus shall be front, and rear accessible.

Main power bus bars, {when required}, shall be tin-plated copper [silver-plated copper] and braced for 50 kA symmetrical for 2 seconds. The bus bar shall be continuous over the shipping split to simplify installation and reduce the number of overlaps in the equipment

Bare [tin-plated] and copper ground bus, when required, shall be continuous and extend from one end of the shipping split to the other through each vertical section. Minimum size ground bus to be 0.25”(6.35mm) by 2.0” (50.8mm).

2.06 WIRING/TERMINATIONS

All control wire shall be UL recognized.

Standard control wire shall be 14 gauge TFFN/THHN, except for internal circuits that may use 16 gauge of the same types.

Current transformer circuits shall utilize 12-gauge wire with the same characteristics as above. {optional} [10 gauge THHN wire in low voltage compartment]

Provide terminal blocks for customer connections, rated 600V 30A compression-box style that can accept up to #10 AWG. Internal terminal block connections shall be rated 600V 20A spring-cage style that can accept up to #12 AWG. Internal harness connections shall be rated 300V 10A spring-cage style.

{Option}Current transformer circuits shall be provided with [ring type terminals], [shorting terminal blocks] where specified.

Controllers shall be complete with all internal power and control wires including provisions for terminations of external connections.

Phase sequencing shall have proper identification.

All wires shall have insulated sleeve wire markers at all terminations.

2.07 MOTOR PROTECTION

{Option} Overload protection shall be provided by means of a three-phase thermal overload relay, bimetallic, ambient-compensated type, and shall be operated through current transformers. Relays shall be mounted

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on the low voltage panel with external reset on the low voltage compartment door. Pressing the overload-reset button shall not open control circuit nor stop the motor if it is running. Overload relay shall be a Telemecanique LR2D type relay.

{Option} Where indicated on the drawings, provide a microprocessor-based multi-function, motor protective relay that monitors three-phase ac current and makes separate trip and alarm decisions based on pre-programmed motor current and temperature conditions. [Sepam 1000 Series (20), (40) (80)]

2.08 METERING

Microprocessor-Based Metering Package

Where indicated on the drawings, provide a UL Listed solid-state microprocessor-based metering package with optional waveform capture. Metering package shall be a Square D PowerLogic® circuit monitor.[Each] PowerLogic Circuit Monitor, [with digital display][with waveform capture][stand-alone section[s] containing a controller shall include the following [as shown on the drawings]:

- a. [CM 3000] [CM 4000]
- b. [Wired for communications; to other [devices.]
- c. PowerLogic digital meter. [PM820] [PM 850]
- d. Other: []

Auxiliary Devices

- 1. {Option} Provide fixed mounted potential transformer, fused type, 3 phase open delta as indicated on the contract drawings. These shall be used for the MPR [and meter].

2.09 CONTROLLERS

The controllers shall be designed to accommodate motors of the size and type as shown on the drawings.

The controllers shall be provided by a single manufacturer with a complete product offering (refer to Article 1.01B) of controllers to accommodate the following motor types and starting methods:

Induction Motor Full Voltage Start.

Provide the following equipment for type controller indicated in Article 2.07.A., and the contract drawings.

Each Induction Motor Full Voltage Non-reversing Controller shall include:

Medium Voltage Compartment:

- one - three-pole non-load break isolating disconnecter.
- three - Current limiting power fuses.
- one - Draw-out three-pole vacuum contactor assembly.
- one - Control circuit transformer [300VA] [500VA] [750VA] [2kVA] [5kVA].
- two - Control circuit primary current limiting fuses.
- set - Electrical and Mechanical interlocks.
- three - Load terminals

Current Transformer Options: (Max 3)

- Each section containing a contactor shall include the following [as shown on the drawings]:
- [one] three phase donut Type Low Power Current Transformer [use with SEPAM relay]
- [one] [two] three phase donut type current transformers []: 5A. or []: 1A
- [one] Zero Sequence CT [2000:1] [50:5]

Low-Voltage Compartment Door:

- one - Motor protection relay (MPR) Sepam Series [20][40][80]where specified.
- one - Microprocessor metering package where specified. [Square D PowerLogic® circuit monitor].

Mounting space for any additional low voltage control, protection, or metering specified.

Low-Voltage Compartment:

- Two - Control relay's.
- one - Control circuit secondary fuse.
- Set of control circuit terminal blocks.
- Customer terminal blocks with screw compression type connections.
- Mounting space for any additional low voltage control, protection, or metering specified.
- One Test circuit receptacle requiring no access to the MV components

Operator panel

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Disconnect operator mechanism
 Mechanical open-close indication
 Disconnect Viewing Window
 two – 22 mm pushbuttons
 two 22 mm indicating lights
 {Option} Elapsed time meter
 {Option} Key Interlocks: shall be provided for the disconnect operating mechanism as indicated on the drawings].

{Option} Provide [compression lugs] for terminating cables onto the motor controller terminal pads.
 {Option} Indoor anti-condensation space heaters rated 120 VAC, 125W shall be supplied in each section.
 Control power shall be supplied [by internal controller mounted CPT][supplied by owner] {and shall be supplied with} [thermostats] [humidistat.]
 {Option} Cable ground switch - LDA

2.10 MECHANICALLY-LATCHED CONTACTOR

Mechanically-latched contactor shall be provided when specified for transformer disconnect circuits, and other uses when it is required to have contactor remain closed, regardless of system and/or controller voltage condition.

Latched controllers shall have all the same features as a Full voltage Non-reversing Controllers except shall be closed electrically from a standard local or remote “close” push-button, and be tripped by a solenoid from a local or remote “open” push-button. An easily accessible, door mounted mechanical trip device shall be provided to allow the contactor to be opened when control power is not present.

2.11 {OPTION} VOLTAGE TRANSFORMER SECTION

A. The voltage transformer section shall contain [one (1) VT and be an open delta connection] [(2) VT’s and be an open delta connection] [(3) VT’s and be a wye connection] [(3) VT’s and be a delta connection]. VT primaries shall have disconnect fuses and be connected directly to a source.

The width of the unit shall be 20” wide.

The voltage transformer shall have a secondary of 120 VAC. Primary will be determined by the system.

(Option 1) 1 VT arrangements shall have a rating of 700 VA.

{Option 2} 2 VT arrangements shall have a combined rating of [750 VA] [1500 VA].

(Option 3) 3 VT arrangements shall have a rating of [750 VA] [1500 VA].

{Option} The Voltage transformer shall have a no-load disconnect to disconnect and ground the primary of the VT from the source.

{Option:} Key Interlocks: shall be provided for the disconnect operating mechanism as indicated on the drawings

2.12 INCOMING LINE SECTIONS TO MCC

Each incoming line section shall be [20” wide {bottom entry only}] [29.5” wide {top or bottom entry and shall be connected to an adjacent controller or VT section.

Terminations shall accommodate up to quantity and size or ratings of cables as indicated on the drawings.

Incoming Line section shall have a rating of [600A] [1200A] [2000A] [3000A].

{Option } Section shall have a set of three (3) phase CT’s to be used for main metering of lineup. Ratio :5 A

{Option} Provide Live Line Indicators (LLI) lights connected by a capacitive circuit to the main bus. LLI lights will indicate voltage when the equipment is energized.

{Option:} Surge Arresters (metal-oxide type): [Distribution] [Intermediate] [Station] class, rated [3, 6, 9] kV, one per phase. See specification Section 16412 for specifications on surge arresters.

{Option} The section shall contain a top mounted pull box [10” high {max 500 kcmil}][17” high {1000 kcmil}] to ease in cable pulling and for additional shielded cable bending space.

2.13 LOAD BREAK SWITCHES AS INCOMING DEVICES TO MCC

- A. Furnish where shown on the contract drawings, three-pole manually operated quick-make, quick – break load break switches. Provide mechanical interlocks such that the switch door cannot be opened when the switch is on, and the switch cannot be closed when the door is open.
- B. The load break switch shall have the following ratings without fuses:

Choose HVL/cc for 40 kA, 600/1200A or HVL for 61 kA 1200A applications

SQUARE D HVL/CC

Max Voltage (kV)	BIL Rating (kV)	Continuous Current (Amperes)	Momentary Current 10 Cycles Asymmetrical (Amperes)	Fault Current Closing Asymmetrical (Amperes)	Switch Width
5.5	60	600	40,000	40,000	[14.75"] [20"] [29.5"]
5.5	60	1200	40,000	40,000	29.5"
7.2	60	600	40,000	40,000	[14.75"] [20"] [29.5"]
7.2	60	1200	40,000	40,000	29.5"

SQUARE D HVL

Max Voltage (kV)	BIL Rating (kV)	Continuous Current (Amperes)	Momentary Current 10 Cycles Asymmetrical (Amperes)	Fault Current Closing Asymmetrical (Amperes)	Switch Width
5.5	60	600	40,000	40,000	38"
5.5	60	1200	61,000	61,000	38"
7.2	60	600	40,000	40,000	38"
7.2	60	1200	61,000	61,000	38"

2.15 SPECIFIED COMPONENTS

- A. Standard push buttons shall be Square D type 9001 XB5, 600 V rated.
 - B. Standard pilot lights shall be Square D type 9001 XB5, 600 V rated LED long life.
- Standard control relays shall be Telemecanique type CA2.

2.16 FABRICATION

Construction: [Indoor.] Each equipment section shall be a separately constructed cubicle assembled to form a rigid freestanding unit. Minimum sheet metal thickness shall be 11-gauge steel on all exterior surfaces, with the exception of the Low Voltage door, which shall be 14-gauge steel minimum. Adjacent sections shall be securely bolted together to form an integrated rigid structure. Each individual unit shall be braced to prevent distortion. [Arc resistant enclosure as defined by C37.20.7 or EEMAC G14-1.1987 optional]

All bus joints shall use Belleville washers. Torqued bolts that are used for bus joints or for insulators and direct support of any current carrying parts shall be marked with a bead of highly visible bright orange “torque seal”, that will readily show when a bolt has loosened.

Height: [] inches, maximum including auxiliary support members on top and bottom

<u>Indoor Single / Multiple</u>	<u>ARC Resistant</u>	<u>3000 A Main Bus</u>
90.3"	117" (17" Plenum)	100" (10" Plenum)

Main bus shall be tin-plated copper, [non-insulated] [insulated] rated [600] [1200] [2000] [3000] amps, and shall be supported directly by the switch.

[For single sections, include a ground pad with lug.] [For multiple section lineups, include continuous ground bus through the motor controller assembly, securely connected to the steel frame of each cubicle. Ground connection points shall be available at each end of the lineup.]

Main bus and ground bus connections shall be designed for easy for future extensions. Cutout areas with removable bolted on covers shall allow for future extension of the main bus and ground bus

2.17 FACTORY FINISHING

All non-painted steel parts shall be zinc plated.

All painted steel parts shall be cleaned and a iron phosphate pre-treatment applied prior to paint application.

Paint Color shall be [ANSI-61 (light gray)] [ANSI-49 (dark gray)] TGIC polyester powder, applied electrostatically through air. Following paint application, parts shall be baked to produce a hard durable finish. Paint shall be uniform in color and free from blisters, sags, flaking and peeling.

Adequacy of paint finish to inhibit the buildup of rust on ferrous metal materials shall be tested and evaluated per paragraphs 5.2.8.1-7 of ANSI C37.20.3-1987. Salt spray withstand tests in accordance with paragraph 5.2.8.4 shall be performed on a periodic basis to provide conformance to this corrosion resistance standard of *at least 600 hours minimum (indoor equipment)*.

2.18 RELATED SECTIONS

[Section 16290-3]-POWER MONITORING and CONTROL SYSTEMS

[Section 16290-6.1]-MEDIUM VOLTAGE PROTECTIVE RELAY

[Section 16290-7]-WEB ENABLED POWER DISTRIBUTION EQUIPMENT

PART 3 EXECUTION

The following paragraphs in this section represent work that is to be performed by the installing contractor. If this specification is written for the motor controller manufacturer only, eliminate these sections.

3.01 EXAMINATION

Visually inspect motor controller for evidence of damage and verify that surfaces are ready to receive work.

Visually inspect to confirm that all items and accessories are in accordance with specifications and drawings.

Verify field measurements are as [shown on Drawings] [shown on shop drawings] [instructed by manufacturer.]

Verify that required utilities (e.g., control voltage for heater circuits on outdoor motor controller) are available, in proper location, and ready for use.

Beginning of installation means installer accepts existing surface conditions.

3.02 INSTALLATION

Install in accordance with manufacturer's instructions, applicable requirements of the NEC and in accordance with recognized industry practices.

[Connect the primary surge arresters if not connected. If required, use jumper cables, as provided by the motor controller manufacturer.]

Bending of high-voltage cables should be avoided or minimized. All necessary bends should meet at least the minimum radii specified by the cable manufacturer.

3.03 FIELD QUALITY CONTROL

Field inspection and testing will be performed by [the installing contractor] [a separate contractor furnished by the owner] under provisions of Section [].

Visually inspect for physical damage.

Perform mechanical operator tests in accordance with manufacturer's instructions.

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Check torque of all bolted connections, including cable terminations, either by observing the bead of indicating compound to confirm that it is still intact, or with a torque wrench to confirm the joint is tightened to the manufacturer's specifications.

Touch-up paint all chips and scratches with manufacturer-supplied paint and leave remaining paint with Owner.

Verify key interlock operation if applicable.

Perform insulation resistance test on each phase to ground and each phase to each other phase. Record results.

Perform low frequency withstand tests according to ANSI/IEEE C37.20.3, paragraph 5.5.

Perform contact resistance test across each switchblade; report any contact resistance in excess of 50 micro-ohms.

END OF SECTION

For Specific Application Assistance Contact Your Local Square D Field Office.

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